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  - Delete a row
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  - Use wait conditions to delay flows
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    - Manage machine groups
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  - Variables datatype properties
  - Use variables and the % notation
  - Automate using UI elements
  - Automate using images
  - Manage errors
  - Record flows in Power Automate
  - Use loops
  - Use conditionals
  - Automate web flows
  - Use browsers and manage extensions
  - Automate desktop flows
  - Build a custom selector
- How to
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    - Check if a variable is numeric
    - Delete a row/column from a datatable
  - Handle email messages in desktop flows
    - Add images to email messages

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Automate tasks in Excel

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- Run macros on an Excel workbook
- Run SQL queries on Excel files
- Autofit Excel columns using VBScript
- Unhide worksheets in Excel using VBScript
- Convert Excel to PDF using VBScript

Use images, image recognition and OCR

- Use image recognition on machines with different screen resolutions
- Perform OCR on multilingual documents
- Print images

Automate Windows and desktop applications

- Identify a window by its handle
- Close any window through its process ID
- Extract attributes from window elements
- Ensure that application windows become focused
- Get the position and size of a window
- Automate applications using keyboard shortcuts
- Automate with mouse, keyboard, and OCR actions
- Access elements that depend on how the window appears on the screen
- Automate Java applications

Automate web applications and web pages

- Handle links that open new tabs
- Retrieve details from a web page
- Get the coordinates and size of a web element
- Send physical clicks on a web element
- Click all the elements in a list of links
- Automate browser prompts
- Scroll on a web page
- Handle iframes on a web page

- Populate text fields and click on links using JavaScript
- Convert data and files
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  - Convert Base64 text to hexadecimal format
- Run and troubleshoot SQL queries
  - Run SQL queries to Microsoft Access
  - Troubleshoot SQL queries
- Use logical operations on conditional statements
- Share/export a desktop flow
- Run SQL queries to Microsoft Access
- Run desktop flow from other desktop flows
- Set screen resolution on unattended mode
- Extract text from a Word document using VBScript
- Pass a datatable from a cloud flow to a desktop flow

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- Conditionals
- Loops
- Flow control
- Run flow
- System
- Workstation
- Scripting
- File
- Folder
- Compression
- UI automation
- HTTP
- Browser automation
- Excel
- Database
- Email

- Exchange
- Outlook
- Message boxes
- Mouse and keyboard
- Clipboard
- Text
- Date time
- PDF
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- Terminal emulation
- OCR
- Cryptography
- Windows services
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  - Create orders on Dynamics 365 Supply Chain Management
  - Use RPA with Dynamics 365 Finance
  - Use RPA with Dynamics 365 Customer Service
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  - Introduction to other types of desktop flows
  - Create and test desktop flows with Windows recorder (V1)
  - Edit desktop flows with Windows recorder (V1)

- Migrate from Windows recorder (V1) to Power Automate
- Use inputs and outputs in desktop flows with Windows recorder (V1)
  - Use Input Method Editors (IMEs) in desktop flows with Windows recorder (V1)
  - Use WinAutomation with desktop flows
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- Enhance business process flows with branching
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- Understand gateways

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  - Best practices for background workflow processes
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- Classic Dataverse dialogs
  - Use classic Dataverse dialogs
  - Replace classic Dataverse dialogs

For developers
- Enterprise developers, partners, and ISVs

Build and certify custom connectors
Integrate with websites and other technologies
Let customers test drive your flows
Work with business process flows using code
Sample: Work with business process flows
Custom Dataverse workflow activities
Administration
Flows in your organization Q&A
Pricing
Admin center
Administer environments
IP address configuration
View desktop flows analytics
Monitor desktop flows
Set a policy to help prevent data loss
Support Intune in mobile apps
Introduction to data groups
View sharing and connectors analytics reports
Respond to DSR requests
Summary
Discover requests
Export requests
Delete requests
DSR requests for Microsoft Accounts
Summary
Discover requests
Export requests
Delete requests
Close requests
Power Automate US Government
Reference
Regions overview

Limits and configuration
Power Automate Web API
Frequently asked questions
Power Automate glossary
Learn from others
Webinars
Blog
Forums
Support

Get started with Power Automate

1/15/2022 • 4 minutes to read • Edit Online

Welcome! What can you expect from Power Automate? Here are a few examples of what you can do with Power Automate.

- Automate business processes
- Send automatic reminders for past due tasks
- Move business data between systems on a schedule
- Connect to more than 500 data sources or any publicly available API
- You can even automate tasks on your local computer like computing data in Excel.

Just think about time saved once you automate repetitive manual tasks simply by recording mouse clicks, keystrokes and copy paste steps from your desktop! Power Automate is all about automation.

The following video shows you how to get started building your first flow.

Who is Power Automate for?

What skills do you need to have? Anyone from a basic business user to an IT professional can create automated processes using Power Automate's no-code/low-code platform.

What industries can benefit from Power Automate? Check out how some companies implemented Microsoft Power Platform solutions using Power Automate in:

- Banking
- Retail
- Manufacturing
- Insurance
- Healthcare

Find examples from your industry

The first step in creating an automation is to sign up, or, if you already have an account with Power Automate, sign in.

What are the different types of flows?

Visit the flow types article to learn more about the different types of flows that you can create to automate your tasks.

Check out the start page

On the start page for Power Automate, you can explore a diverse set of templates and learn about the key features for Power Automate. You can get a quick sense of what's possible and how Power Automate could help your business and your life.

Each template is designed for a specific purpose. For example, there are templates for sending you a text message when your boss emails you, adding Twitter leads to Dynamics 365, or backing up your files. These

templates are just the tip of the iceberg. They're intended to inspire you to create customized flows for the exact processes you need.

Create your first flow

1. Select a template that's useful for you. A simple template is **Notify and Email when a new file is uploaded to OneDrive**.

2. Select **Continue**.

3. Select the OneDrive folder that you want to monitor.

4. Select **Save**.

NOTE

You can explore the conditions that trigger the flow and the action that results from that event. Play around with the settings to make the flow your own. You can even add or delete actions.

TIP

Follow this tutorial to learn more about creating flows from templates.

Get creative

Now that you've created your first flow from a template, use any of the more than 380 data sources that Power Automate supports to create your own flows from scratch.

When you create a cloud flow from scratch, you control the entire workflow. Here are a few ideas to get your started:

- Flows with many steps.
- Run tasks on a schedule.
- Create an approval flow.
- Watch a cloud flow in action.
- Publish a template.
- Create flows from a Microsoft Teams template.

Peek at the code

You don't need to be a developer to create flows; however, Power Automate does provide a **Peek code** feature that allows anyone to take a closer look at the code that's generated for all actions and triggers in a cloud flow. Peeking at the code could give you a clearer understanding of the data that's being used by triggers and actions. Follow these steps to peek at the code that's generated for your flows from within the Power Automate designer:

1. Select the **...** menu item at the top right corner of any **action** or **trigger**.

2. Select **Peek code**.

3. Notice the full JSON representation of the actions and triggers. This includes all inputs, such as the text you enter directly, and expressions used. You can select expressions here and then paste them into the **Dynamic Content** expression editor. This can also give you a way to verify the data you expect is present in the flow.

Find your flows easily

When your creative juices start *flowing*, you might create many flows. Don't worry, finding your flows is easy - just use the search box on the **My flows**, **Team flows**, **Connections**, or **Solutions** screen to display only flows that match the search terms you enter.

> **NOTE**
>
> The search filter only finds flows that have been loaded into the page. If you don't find your flow, try selecting **Load more** at the bottom of the page.

Get notifications when something's wrong

Visit the cloud flow activity page to see the list of cloud flows that recently ran, sent notifications, or have failed.

1. Sign into Power Automate.
2. Select **Monitor** on the left side of the screen.
3. Select **Cloud flow activity**.

Use the mobile app

Download the Power Automate mobile app for Android, iOS, or Windows Phone. With this app, you can monitor flow activity, manage your flows and create flows from templates.

Get help planning your Power Automate projects

If you're ready to start your Power Automate project, visit the guidance and planning article to get up and running quickly.

We're here to help

We're excited to see what you do with Power Automate, and we want to ensure you have a great experience. Be sure to check out our guided learning tutorials and join our community to ask questions and share your ideas. Contact support if you run into any issues.

Overview of the different types of flows

1/15/2022 • 2 minutes to read • Edit Online

Power Automate is a service that you can use to automate repetitive tasks to bring efficiencies to any organizations.

You can create cloud flows, desktop flows, or business process flows.

Check out this video about the different types of flows.

Cloud flows

Create a cloud flow when you want your automation to be triggered either automatically, instantly, or via a schedule.

FLOW TYPE	USE CASE	AUTOMATION TARGET
Automated flows	Create an automation that is triggered by an event such as arrival of an email from a specific person, or a mention of your company in social media.	Connectors for cloud or on-premises services connect your accounts and enable them to talk to each other.
Instant flows	Start an automation with a click of a button. You can automate for repetitive tasks from your Desktop or Mobile devices. For example, instantly send a reminder to the team with a push of a button from your mobile device.	Wide range of tasks such as requesting an approval, an action in Teams or SharePoint.
Scheduled flows	Schedule an automation such as daily data upload to SharePoint or a database.	Tasks that need to be automated on a schedule.

Desktop flows

Desktop flows are used to automate tasks on the Web or the desktop. Using Power Automate for desktop you can automate tasks on the desktop as well as the Web. Alternatively, you can use the two legacy methods of creating desktop flows: Windows recorder (V1) and Selenium IDE.

Business process flows

Business process flows provide a guide for people to get work done. They provide a streamlined user experience that leads people through the processes their organization has defined for interactions that need to be advanced to a conclusion of some kind. This user experience can be tailored so that people with different security roles can have an experience that best suits the work they do.

More info

- Get started with cloud flows.

- Get started with desktop flows.
- Get started with business process flows in conditions in advanced mode.

Sign up and sign in for Power Automate

1/15/2022 • 3 minutes to read • Edit Online

Starting with Power Automate, as an individual, is easy! Before you can create a cloud flow, sign up by using any email address. If you've never used an online Microsoft product with that address, you'll need to take a few moments to register it.

Sign up free

If you haven't used other online Microsoft products, you'll need to sign up.

1. In flow.microsoft.com, select **Try free** in the upper-right corner.
2. Enter your email address.
3. Select the right arrow.

Sign in

If you've used other Microsoft online products, either for work or yourself, all you need to do is sign in.

1. In flow.microsoft.com, select **Sign in** in the upper-right corner.
2. On the sign-in page, enter your email address and password.

Using paid features

Anyone can sign up and get a free plan for Power Automate. If your organization has purchased Microsoft 365 or Dynamics 365, you may already have access to Power Automate. You can also start a 90-day free trial or purchase a Power Automate license if you want to use any of the paid features. Learn more about billing.

For administration information, see Flows in your organization Q&A.

Troubleshooting

In many cases, you can register for Power Automate by following the simple process described earlier in this topic. However, this table summarizes the most common reasons why you may not be able to sign up and describes available workarounds.

SYMPTOM / ERROR MESSAGE	CAUSE AND WORKAROUND
No Microsoft account created yet You receive a message after entering your email during signup: *That Microsoft account doesn't exist. Enter a different account or get a new one.*	You signed up with an email that doesn't yet have a Microsoft account created for it. Select the **Sign up now** link on that page and you'll be able to create a new Microsoft account for your email. You can use your existing email to create a Microsoft account.
.gov or .mil email addresses You receive a message like the following during signup: *Power Automate unavailable: Power Automate is not available for users with .gov or .mil email addresses at this time. Use another work email address or check back later.*	You cannot currently sign up for Power Automate with a .gov or .mil address. Instead, you can sign in with any Microsoft Account email address such as a *@outlook.com* address.

SYMPTOM / ERROR MESSAGE	CAUSE AND WORKAROUND
Self-service signup disabled You receive a message like the following during signup: *We can't finish signing you up. Your IT department has turned off signup for Power Automate. Contact them to complete signup.* or *We can't finish signing you up. It looks like Microsoft Power Automate isn't currently available for your work or school.*	You have selected **Sign up** instead of of **Sign in**. If you select **Sign in** in the top of the home page you will be able to access Power Automate.
Email address is not an Office 365 ID You receive a message like the following during signup: *We can't find you at contoso.com. Do you use a different ID at work or school? Try signing in with that, and if it doesn't work, contact your IT department.*	Your organization uses IDs to sign in to Office 365 and other Microsoft services, and those IDs differ from your email address. For example, your email address might be Nancy.Smith@contoso.com, but your ID might be nancys@contoso.com. To complete signup, use the ID that your organization has assigned to you for signing in to Office 365 or other Microsoft services.

Next steps

- Start with a template, which is a pre-built flow that's set up for you.
- Start from blank if you already have a process in mind and can't find a template for it.
- Get help planning your cloud flow project.

What's new in Power Automate?

1/15/2022 • 2 minutes to read • Edit Online

This article provides resources that you can use to learn about the features that have been released recently, features that will be released soon, and known issues.

Weekly releases

For information about the new features, fixes, and improvements that were released in the past few weeks, see Released versions for Microsoft Power Automate.

> **NOTE**
>
> Releases are rolled out over several days. New or updated functionality might not appear immediately.

Release plans

Get familiar with upcoming features and plan your deployments by reading 2021 release wave 1 plan or the 2021 release wave 2 plan.

Preview and Experimental features

Get early access to functionalities and updates before they are available worldwide through Preview features and Experimental features.

Learning catalog for Power Automate

1/15/2022 • 2 minutes to read • Edit Online

Find the right online training, in person workshops, and events for your role as a user of Power Apps.

Business and Technical Decision Makers

Do you decide whether to invest in new technologies?

Business and Technical Decision Makers Learning Catalog

App Makers

Are you interested in quickly creating custom business apps without writing code?

App Maker Learning Catalog

Get Started

Create Flows

Process advisor

Exam

Developers

Do you need to write code to integrate with other data sources, extend core system functionality, or build a complex application?

Developer Learning Catalog

Administrators

Do you need to keep systems and data flowing, provisioned, and secure round-the-clock?

Administrators Learning Catalog

Partner Sales and Marketing

Are you responsible for helping your customers buy the right solution?

Partner Sales and Marketing Learning Catalog

Functional Application Consultants

Are you an implementation expert for a business domain?

Functional Application Consultant Learning Catalog

Get started

Create Flows

Process advisor

Administer

App Maker Learning Catalog

1/15/2022 • 2 minutes to read • Edit Online

Are you interested in quickly creating custom business apps without writing code?

The following catalog is organized from core knowledge to specific domains, and from most basic to most advanced. If content exists in multiple formats, we'll let you know, so that you can choose the training format that best meets your needs.

Get started

CONTENT	DESCRIPTION	FORMAT	LENGTH
Get started with Power Automate	Power Automate is an online workflow service that automates actions across the most common apps and services.	Free, self-paced online learning path	58 minutes
Get Started with Power Automate	Get Started with Power Automate	Documentation	4 minutes to read
Overview of Power Automate	Discover how you can work less and do more. With Microsoft Power Automate, previously Microsoft Flow, you will be able to automate your repetitive daily tasks.	YouTube video	1 minutes 24 seconds

Create Flows

CONTENT	DESCRIPTION	FORMAT	LENGTH
Automate a business process using Power Automate	This learning path introduces you to Power Automate, teaches you how to build workflows, and how to administer flows.	Free, self-paced online learning path	3 hours 11 minutes
Get started with Power Automate buttons	Do you want to create button flows to solve business problems? Then, take this learning path, which introduces you to Power Automate buttons and demonstrates how to create button flows.	Free, self-paced online learning path	4 hours 30 minutes

CONTENT	DESCRIPTION	FORMAT	LENGTH
Introduction to business process flows in Power Automate	Do you want to create business process flows? This module will discuss what business process flows are and how to use them to solve business solutions. You will discover why automating the business process is important to organizations and how to build business process flow solutions by using Microsoft Power Platform and Microsoft Dataverse. Additionally, you will learn how business process flows differ from regular Power Automate workflows and when to use each.	Free, self-paced online learning path	31 minutes
Power Automate documentation	Power Automate is a service that helps you create automated workflows between your favorite apps and services to synchronize files, get notifications, collect data and more.	Website landing page	
Power Automate Frequently Asked Questions	Power Automate Frequently Asked Questions	5 minutes to read	

Process advisor

CONTENT	DESCRIPTION	FORMAT	LENGTH
Optimize your business process with process advisor	Power Automate's process advisor allows you to record existing business processes and analyze them in order to increase the efficacy by tracking time to complete tasks and mapping out the various actions involved. Understanding a process is the first step to automating a solution, and process advisor simplifies that exercise.	Free, self-paced online learning module	24 minutes

Exam

CONTENT	DESCRIPTION	FORMAT	LENGTH

CONTENT	DESCRIPTION	FORMAT	LENGTH
Microsoft Power Platform Fundamentals	This exam measures your ability to understand the business value of Microsoft Power Platform; understand the core components of Microsoft Power Platform; demonstrate the business value of Power BI; and demonstrate the business value of Power Automate.	Exam	cost varies by region

Administrators Learning Catalog

1/15/2022 • 2 minutes to read • Edit Online

Do you need to keep systems and data flowing, provisioned, and secure round-the-clock?

The following catalog is organized from core knowledge to specific domains, and from most basic to most advanced. If content exists in multiple formats, we'll let you know, so that you can choose the training format that best meets your needs.

Administer

CONTENT	DESCRIPTION	FORMAT	LENGTH
Use the admin center to manage environments and data policies in Power Automate	Tenant and environment admins use the Power Automate admin center to manage data policies and environments for Power Automate deployments.	Free, self-paced online learning path	36 minutes
Use best practices to secure and govern Power Automate environments	Is the Microsoft Power Platform new to your organization? Are you looking to better understand how you can improve your organization's productivity, without compromising your security posture, while enabling governance? Take this learning path, to identify best practices for securing and governing Power Automate environments. We will share tools and templates that can be used to ensure you are productive as you secure and govern the Power Platform.	Free, self-paced online learning path	4 hours 35 minutes

Developer Learning Catalog

1/15/2022 • 2 minutes to read • Edit Online

Do you need to write code to integrate with other data sources, extend core system functionality, or build a complex application?

The following catalog is organized from core knowledge to specific domains, and from most basic to most advanced. If content exists in multiple formats, we'll let you know, so that you can choose the training format that best meets your needs.

Extend

CONTENT	DESCRIPTION	FORMAT	LENGTH
Extending the Microsoft Dataverse	Create client scripting, perform common actions with client script, and automate business process flow with client script is covered in this learning path. Learn about what client script can do, rules, and maintaining scripts. Discover when to use client script as well as when not to use client script.	Free, self-paced online learning path	4 hours
Extending the Microsoft Power Platform user experience in Model Driven apps	Getting started with extending the Microsoft Dataverse can be overwhelming. This learning path looks at the tools and resources needed for extending the Microsoft Power Platform. We'll start with looking at the SDKs, the extensibility model, and event framework. This learning path also covers when to use plug-ins. Configuration of plug-ins as well as registering and deploying plug-ins.	Free, self-paced online learning path	2 hours 3 minutes

Functional Application Consultant Learning Catalog

1/15/2022 • 2 minutes to read • Edit Online

Are you an implementation expert for a business domain?

The following catalog is organized from core knowledge to specific domains, and from most basic to most advanced. If content exists in multiple formats, we'll let you know, so that you can choose the training format that best meets your needs.

For functional consultants, our job-task analysis research showed that everyone must understand the core content set as well as a domain area.

Get Started

CONTENT	DESCRIPTION	FORMAT	LENGTH
Get started with Power Automate	Power Automate is an online workflow service that automates actions across the most common apps and services.	Free, self-paced online learning path	58 minutes
Get Started with Power Automate	Get Started with Power Automate	Documentation	4 minutes to read
Overview of Power Automate	Discover how you can work less and do more. With Microsoft Power Automate, previously Microsoft Flow, you will be able to automate your repetitive daily tasks.	YouTube video	1 minute 24 seconds

Create Flows

CONTENT	DESCRIPTION	FORMAT	LENGTH
Get started with Power Automate buttons	Do you want to create button flows to solve business problems? Then, take this learning path, which introduces you to Power Automate buttons and demonstrates how to create button flows.	Free, self-paced online learning path	4 hours 30 minutes

CONTENT	DESCRIPTION	FORMAT	LENGTH
Introduction to business process flows in Power Automate	Do you want to create business process flows? This module will discuss what business process flows are and how to use them to solve business solutions. You will discover why automating the business process is important to organizations and how to build business process flow solutions by using Microsoft Power Platform and Dataverse. Additionally, you will learn how business process flows differ from regular Power Automate workflows and when to use each.	Free, self-paced online learning path	31 minutes
Power Automate documentation	Power Automate documentation. Power Automate is a service that helps you create automated workflows between your favorite apps and services to synchronize files, get notifications, collect data and more.	Website landing page	
Power Automate Frequently Asked Questions	Power Automate Frequently Asked Questions	Documentation	5 minutes to read

Process advisor

CONTENT	DESCRIPTION	FORMAT	LENGTH
Optimize your business process with process advisor	Power Automate's process advisor allows you to record existing business processes and analyze them in order to increase the efficacy by tracking time to complete tasks and mapping out the various actions involved. Understanding a process is the first step to automating a solution, and process advisor simplifies that exercise.	Free, self-paced online learning module	24 minutes

Administer

CONTENT	DESCRIPTION	FORMAT	LENGTH
Use the Admin center to manage environments and data policies in Power Automate	Tenant and environment admins use Power Automate admin center to manage data policies and environments for Power Automate deployments.	Free, self-paced online learning path	36 minutes
Use best practices to secure and govern Power Automate environments	Is Microsoft Power Platform new to your organization? Are you looking to better understand how you can improve your organization's productivity, without compromising your security posture, while enabling governance? Take this learning path, to identify best practices for securing and governing Power Automate environments. We will share tools and templates that can be used to ensure you are productive as you secure and govern Microsoft Power Platform.	Free, self-paced online learning path	4 hours 35 minutes

Partner Sales and Marketing Learning Catalog

1/15/2022 • 2 minutes to read • Edit Online

Are you responsible for helping your customers buy the right solution?

The following catalog is organized from core knowledge to specific domains, and from most basic to most advanced. If content exists in multiple formats, we'll let you know, so that you can choose the training format that best meets your needs.

Get started

CONTENT	DESCRIPTION	FORMAT	LENGTH
Microsoft Power Platform Fundamentals	Learn about the components of Power Platform, ways to connect data, and how organizations can leverage this technology	Instructor-led in person or online training, cost varies by region and partner	2 days

Overview of process advisor

1/15/2022 • 2 minutes to read • Edit Online

The process advisor feature allows you to gain a better understanding of your business processes so you can optimize them. It can also help you improve how you work by finding opportunities for automation. Process advisor offers *task mining* and *process mining* capabilities to do this.

Task mining and process mining share the same goal of improving process efficiency. The main difference is their area of focus:

- **Task mining:** Enables you to understand how your company performs its process tasks through monitoring recorded user actions and collecting data from these actions. You'll gain insights from this data that will let you know how processes are performed, find common mistakes while performing tasks, and identify tasks that can be automated.
- **Process mining:** Enables you to gain a deep understanding of your processes using event log files that you can get from your system of record (apps you use in your processes). Process mining displays maps of your processes with data and metrics to recognize performance issues.

When to use task mining or process mining

Here are some reasons to help you decide to use task mining or process mining:

Use task mining to:

- Understand what employees actually do while performing each task.
- Identify and eliminate unnecessary actions in process tasks.
- Identify the most common actions through user interactions.
- Automate tasks that would accelerate processes and reduce human errors.

Use process mining to:

- See the actual steps to perform a process.
- Improve processes.
- Detect non-compliant processes.
- Reduce process total time.
- Discover automation opportunities.

Explore the sections in Task mining and Process mining in this documentation for:

- Business scenarios
- Tutorials
- Guided procedures
- Videos

Licensing

Process advisor is licensed as part of Power Automate user licenses. If you don't have a license, you can start a Power Automate trial to try process advisor.

For more information about process advisor licensing, go to Power Automate pricing and Power Apps and Power Automate licensing FAQ.

For complete licensing details, go to the Microsoft Power Apps and Power Automate licensing guide.

Prerequisites

Before you start using process advisor, make sure you have the following prerequisites:

- A Microsoft Power Platform environment with a Microsoft Dataverse database.
  - For information about how to create an environment, go to Create and manage environments in the Power Platform admin center.
  - For information about how to add a database to an environment, go to Add a Microsoft Dataverse database.
- A Power Automate license.
- Power Automate for desktop.

Overview of task mining in process advisor

1/15/2022 • 2 minutes to read • Edit Online

With task mining in process advisor, you can quickly capture detailed steps for each process in your organization to help you better understand places to streamline workflows. You can do this on your own or invite colleagues to contribute and collaborate.

Business example

For example, in a healthcare facility, you can use task mining to record patient check-in procedures. Process advisor automatically produces a process map that visualizes the check-in process. You can see which activities take the longest, how many variations of the check-in process there are, and what variations and actions take the most time.

Application analytics and analytics dashboards show you which applications teams spend the most time in, and the best activities to optimize. You're then guided to create cloud flows with automation recommendations that reveal which connectors to use based on your workflows.

With insights and guided recommendations from process advisor, you're ready to begin automating and reclaim the time you need for what matters most.

Steps to task mining

- Prepare processes and recordings
- Analyze processes
- Visualize processes
- Identify automation recommendations
- Share processes

Tutorial: Get started with task mining in process advisor

1/15/2022 • 6 minutes to read • Edit Online

This tutorial with sample data allows you to experience task mining in the process advisor feature. In this tutorial, you will:

- Import a solution
- View sample recordings
- Analyze a process
- Gather insights with a process map
- View metrics with activity combinations and variants
- Identify automation opportunities

For the task mining tutorial, download User recording demo data. For the process mining tutorial, go to Tutorial: Get started with process mining (preview).

Get process advisor ready

1. Sign in to Power Automate.

2. Select your environment.

3. On the navigation pane to the left, select **Process advisor** > **Processes**.

   You might see a **Getting things ready** message. Allow this process to complete. It will take a few minutes.

   Once this process has completed, you should see the following screen:

Import a solution

1. On the navigation pane to the left, select **Solutions**.

2. In the toolbar at the top, select **Import**.

3. Select **Browse**.

4. Download the **RPAinaDayProcessAdvisor_1_0_0_7** solution .zip file and open it.

5. Select **Next**.

6. Select **Import** and wait for the solution to import.

View sample recordings

1. Once you've successfully imported the zip file, on the navigation pane to the left, select **Process advisor** > **Processes**.

2. Select the **Invoice submission process**.

> **NOTE**
>
> If this is the first time you're accessing process advisor, make sure you've selected **Processes** at least once and waited until the **Getting things ready** loading spinner has disappeared before importing. If you try to import the RPAinaDayProcessAdvisor_1_0_0_7.zip solution without first initializing the **Processes** section of process advisor, you'll see only a couple of recordings in the imported solution.

You can see some of the existing recordings under **Recordings**.

3. To be sure you see the entire list of existing recordings, select **See all**.

4. Go back to the Invoice submission process by selecting **Invoice submission process**.

Explore the features

You'll see the following features:

- **New recording**: Create a new recording.
- **Analytics**: See the process map and insights.
- **Share**: Share your processes with your team members.

  Process owners can pick two role options when sharing with other users: contributor and co-owner. The contributor role gives the user the ability to upload their own recording to the process. The co-owner role gives the user the ability to upload recordings and edit other recordings.

- **Analyze**: Analyze a process.
- **Create activity names**: Create activity names for your process.
- **Delete process**: Delete your process.

Analyze a process

1. Select **Analyze** to analyze a process. When you perform this action, process advisor will analyze existing recordings to identify any bottlenecks within the business process.

2. Select **Confirm**.

3. The analysis will take a few minutes to complete. During this process, a status message displays under the **New recording** button. If you run into an error during the analysis stage, select **Analyze** to trigger this action again.

4. Once it's done, you'll see the **Process analysis status** change to **Analyzed**. Select **Analytics** to see the process map and insights. This step may take a couple minutes to complete after the analysis has been performed.

Analytics page layout

This section explains what you can do on the Analytics screen.

- **Automate activities (preview)**: If during the recording process, a user ran an application that has its Power Automate actions (for example, Microsoft Outlook or Excel), then after selecting **Automate activities (preview)**, a draft Power Automate process would be opened containing the actions related to the used applications that can be automated. The user would then be able to start building the final process using the proposed draft.
- **Legend**: Displays information about the report to let users better understand what they see.
- **Process**: Provides detailed information about the analyzed process. This is where users can find the process map and general information about the process (time analytics per variant and per the recording's author).
- **Application (preview)**: Provides information about the apps used in recordings. This includes what apps were used by authors, how often were they used, and what the transitions were between them. This report explains which connectors should be used when implementing automation for the process, and where potentially to use Power Automate for desktop as there's no existing connector.

Business process step relationships

In the previous example, you'll see the various steps in the business process and their related durations. These steps include:

- **Download invoice attachment from email (48 seconds)**
- **Open Excel invoice list (11.5 seconds)**
- **Open invoice from OneDrive (21 seconds)**
- **Enter invoice details (53.6 seconds)**
- **Save and submit (9 seconds)**
- **Notify team of submission (26.67 seconds)**

Gather insights with a process map

The process map makes it possible to visualize and analyze processes. By looking at a graphical representation of how your business processes are performed, you can gather insights about where improvement opportunities exist.

Go to the process map by selecting **Analytics** > **Process map**.

View metrics with activity combinations and variants

This section explains the **Variants by frequency** bars on the right.

Different activity combinations and variants are shown separately on the process map. A process variant is a unique path from the beginning to the end of the process. A process variant is a specific activity sequence, like a "trace" through the process, from start to end. Each variant differs from the others by at least one activity. You can see additional metrics, frequency of the activities, and throughput time on the process map. Frequency shows you the total number of recordings/cases passing through it. Throughput time is the time between the first event of the case and the last.

You can see that the invoice coming through email is the most frequent process variant.

It might take a while for you to see the changes from the chart.

Identify automation opportunities

You can see that people spend a lot of their time entering the information in the application. This helps identify an opportunity to automate the process.

View analytics data

1. Deselect **Var 1** by selecting any blank space within the **Variant by frequency** area.

2. Look at the top analytics data. The average process time is 1.78 minutes out of five recordings.

3. Analyze other time-based metrics dashboards:

- **Activity by average time in sec**: Notice that **Enter invoice details** and **Download invoice** are taking the most time.

- **Recording by average time in min**: Notice that some people (**Preston Morales** and **Shakti Menon**) are taking more time than others.

4. Select the **Application (preview)** tab to see details on which applications were used.

It might take a while to load the reports.

- This report is important, as it allows you to discover insights into the different applications used in a business process, the frequency with which they're accessed, and how much time is spent on the application.
- *For example, the dashboard shows that a legacy invoicing app, Outlook, and Excel have significant contributions to time spent and actions by applications.*
- Take time to get familiar with the different reports.

5. Go back to the process map by selecting **Process**.

6. Look at the automate activities feature. From the process map, you can see that process advisor has highlighted several activities as potential candidates for automation based on applications involved inside the small blue circles.

7. Start creating a flow for automation by selecting **Automate activities (preview)** at the top.

A tab will open in the browser and show the flow designer. The recommended actions that match to the activities from the process map automatically appear on the right panel. For example, several email connectors are suggested for you to use in order to automate the **Download invoice attachment from email** activity.

Prepare processes and recordings in process advisor

1/15/2022 • 4 minutes to read • Edit Online

Before you can use process advisor task mining to visualize and analyze your processes, you need to:

- Create your process in process advisor.
- Record the activities that make up the process using the Power Automate recorder.
- Prepare the recording for analysis.
- (Optional) Manage activity names to make it easier for you and others to prepare the recording for analysis.
-

Learn more about process advisor processes in the following video.

Create a process

In general, processes you think might be inefficient or repetitive are good candidates for analysis.

1. Sign in to Power Automate.
2. Select **Process advisor** on the left-side navigation pane.
3. Select **Create** under **Process advisor**.
4. Select the **Create a new process** tile.
5. Give your process a name and description, and then select **Create**.

Record your process

Create a recording in one of three ways:

- From the **Create** screen in process advisor
- Right after process creation
- From the process details page

Here's a short video on how to record a process in process advisor:

Create a recording from the Create screen

1. From the **Process advisor** > **Create** screen, select **Add a new recording**.
2. On the **Process** screen, select the process you want to record from the dropdown.
3. Select **Open recorder**.

> **NOTE**
>
> If you aren't able to see the process in the dropdown, ensure that the process has been correctly shared with you.

Create a recording right after process creation

After you create a process, you'll see a screen with a few options as next steps.

- Select **Add a recording**.

Create a recording from the process details screen

1. From the **Process advisor** > **Processes** screen, select the process you want to record from the list view.
2. Select the name of the process to go to the process details screen.
3. Select **New recording** from the menu at the top.
4. Select **Open recorder**.

Launching the recorder in Power Automate

1. By using any of the methods described above, you should receive a message that says **Launching the recorder in Power Automate**.

   > **NOTE**
   > You should have downloaded Power Automate before you started. However, you can also select **Get the app** to install it.

2. If you've installed Power Automate, you should see an **Open Power Automate** browser pop-up window. Select it to open the app.
3. If Power Automate is installed but didn't open correctly, select **Open again**.

Power Automate recorder

1. On the Desktop recorder screen, select **Record**.
2. Perform the actions that you want to record, and then select **Finish** at the bottom of the recorder screen.

3. Once the recording has been saved successfully, select **Got it** to close the message.
4. Return to the web portal in your browser and select **View recording**.

> **NOTE**
> Depending on the length of the recording, it may take some time before the actions will be available.

Recorder features

- As you record your actions, the action descriptions will be listed in the recorder screen. You can select the trash can icon to delete any action from your recording.
- Select **Pause recording** at any time during the recording.
- Select **Start recording again** to continue recording from where you left off.
- Select **Reset recording** to erase all the recorded actions and start over.

Recording tips

- Be methodical in your actions to improve the readability of the recording. There's a slight delay, so wait for the red box to focus on the item you're trying to interact with before selecting.
- If there were any clicks made by mistake, delete the action in the recorder screen.

Prepare a recording for analysis

Once the recording has completed, you can view the recorded actions on the recording details screen. More importantly, you need to prepare the recording to be ready for analysis. What does this mean?

- The actions recorded can be granular. Group them into activities. These will be the building blocks for the process map that's created through analysis.
- Remove any sensitive information from the recording. For more information, go to Protect your data in process advisor.

Here's a short video on how to prepare a recording for analysis with process advisor:

Grouping actions into activities

1. Select **Add activity** to add an activity header. All actions under the activity header and before the next activity header are considered part of the group.

2. Move the activity header up or down the actions list to where you want the activity to start.

3. Name your activity on the right side of the screen. Use the dropdown menu to find activity names that already exist for the process or create your own.

4. If you made a mistake and want to delete an activity, use the **Delete activity** button in the command bar.

5. At any time, select **Save** on the top right to save your work.

   To analyze, you need at least two activities. Otherwise, the process map wouldn't be meaningful.

6. When you finish grouping, set **Ready to analyze** on the top right.

7. Select **Close** to return to the process details screen.

Grouping tips

- As much as possible, use an existing activity name. This creates a more consistent and accurate process map.

- Activity names will be available in the dropdown list whenever a recording is saved. To remove an activity name from the list after it was removed from all recordings that used that name, you need to analyze the recording.

Manage activity names

As a process owner or co-owner, you can create recommended activity names for a process. This will ensure more consistency in naming across recordings. To do this:

1. On the process details screen, select **Create activity names** to bring up the panel.

2. Select **New name** to add a new activity name entry to the recommended list.

3. Select **Save** when you're done.

The activity names you added will now show up under **Recommended names** in the dropdown list when grouping actions for a recording. Any activities that aren't defined in the recommended list will show up under **Custom names**.

Analyze processes in process advisor

1/15/2022 • 2 minutes to read • Edit Online

On the left navigation pane in Power Automate, select **Process advisor** > **Processes**, and then select your process to go to the **Details** screen. This is where you'll access most of your process management activities.

> **NOTE**
>
> The TDS endpoint setting for your organization needs to be enabled. This feature is enabled by default, but if it's disabled for any reason, contact your Microsoft Power Platform administrator to enable it in the Power Platform admin center.

Some key things to do here are to view the status of the recordings and analyze your process. The **Analyze** option in the menu gets you started. The analyze feature adds a selected recording into the process map and associated analytics. If a recording's status isn't *analyzed*, it won't be part of the analytics reports.

- After the process is analyzed, the process map and related analytics are available when you select **Analytics** in the menu.
- The process status on the **Details** pane shows the status of the analysis and whether the process has been analyzed before.
- Analysis happens at the process level for all recordings that are ready to be analyzed.
- Pay attention to the recording status, which you can find under the **Status** column of the **Recordings** pane. Only recordings with a specific status will be considered for analysis.

Here's a short video on how to view analytics with process advisor:

Recording status

Each recording can have one of the following statuses:

- **In progress:** Recording is in progress, but it's also possible that the recording hasn't yet started. Since recording happens in the desktop client, the web portal won't know its status until it's been saved. It's also possible to see this status after a recording has been saved since some processing is required after recording to make it ready to view.
- **Failed:** An error occurred while processing the recording. You need to create a new recording.
- **Not analyzed:** The recording has been processed and is available to view and edit, but it hasn't been marked as ready to analyze.
- **Ready to analyze:** The recording has been marked as ready to analyze and will be considered the next time you analyze the process.
- **Analyzed:** The recording has been analyzed and is part of the analyzed output that can be viewed through the **Analytics** screen.

An analyzed recording might also have one of the following icons next to it:

- Indicates that even though the recording was analyzed, it's been marked not ready to analyze and won't be included if the process is analyzed again.

- Indicates that the recording has been modified and might be out of sync with the previous analysis. Analyzing again will synchronize the recording with the analysis output and the process map.

Visualize processes in process advisor

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Process map

The process map makes it possible to visualize and analyze processes. By looking at a graphical representation of how your business processes are performed, you can glean insights into where opportunities for improvement exist. To get to the process map, select the **Analytics** > **Process** tab.

Activities describe tasks or actions that make up a business process. Activities can be performed by humans or by machines during automation. In the process map, different activities appear as nodes, and transitions between activities appear as edges. Each process sequence will have a start and an end.

Different activity combinations and variants are shown separately on the process map. A process variant is a unique path from the very beginning to the very end of the process. In other words, a process variant is a specific activity sequence, like a "trace" through the process, from start to end. Each variant differs from the others by at least one activity. You can see more metrics, frequency of the activities, and throughput time on the process map. Frequency shows you the total number of recordings/cases passing through it. Throughput time is the time between the first event of the case and the last.

There are various filters available for you to drill down into the process:

- Variant selector allows you to select one variant or a set of process variants to visualize in your process map.
- Recording selector allows you to select one recording or a set of recordings to visualize in your process map.
- Time filter allows you to see the process visualization in a particular period. Additionally, there are key performance indicators available to help you better understand your process. They're described in more detail below.

Process KPIs

- **Number (#) of recordings**: Shows you how many recordings of the same process were submitted to analyze this process. The more recordings you have available, the more insights you will get. For example, if you provide only a few recordings of a process that often has different paths to completion, you might not get insights into all the variations that the process could take.
- **Number of variants**: Shows the number of paths a process could take. For example, if a process has one other activity, that would be counted as one additional variant of a process.
- **Average time**: Shows you the average time it takes for a process to be completed across all recordings associated with the process. It's one of the most important data points for process mining because deep-diving into the duration of a process can inform you of any bottlenecks.

Process map visualizations

- **Variants by frequency**: How many times a particular process path was taken by the process.
- **Variants by time**: The average time spent to finish the process per variant.
- **Activity by average time**: The average time each activity takes. A quick glance at this visual can reveal the most time-consuming activities of a process.
- **Recordings by time**: The time it took for each recording in a process.
- **Start date**: A filter for the time when recording started. For example, if your process changed over time, you may want to see if there was any impact on your metrics after the process changed by filtering for recordings that started after a certain time.

Application analytics

Application analytics allow you to gain more insights from recordings by understanding application usage. This report informs you about:

- The top apps used
- Access patterns and what apps are used together
- App insights for each activity or recording

Application analytics KPIs

- **Apps used**: The total number of apps used in a process.
- **Number (#) of times accessed**: The number of app accesses. Times accessed is when an app comes back into focus.
- **Time spent**: The amount of time spent using apps. This does not count time spent when not focused on an app—for example, desktop.
- **Actions**: The count of actions within apps.

Application analytics visualizations

- **Application usage**: A scatter plot that shows time spent on one axis and times accessed on the other for each app used. The size of the circles represents how many recordings use that app. The goal of this plot is to understand usage patterns. Some apps are used a lot but only in terms of times accessed. This means the recorder is jumping back and forth between this application and others. For example, this may occur in cases where copy-and-paste is happening. Other apps are used for a long time and the action is limited to that application. It does not depend on other recordings for completion of the necessary activity.

  The size of the circles clarifies what applications are used in most or all recordings. It represents an application that's needed for the process and something to concentrate on from an optimization or automation perspective.
- **Application switching**: A bar chart that shows which pairs of application are most frequently used. This extends the number of times accessed in the application usage visual to help identify what two applications are most often used together. This can denote some information transfer (such as copy-and-paste) between these applications, which is something to consider when automating.
- **Time spent by application**: A pie chart that shows a distribution of the time spent per app. This helps you understand which applications are being used the most.
- **Actions by application**: A pie chart that shows a distribution of the actions per app. This helps you understand which apps have the most actions or manual inputs.

See also

Connector overview
Overview of cloud flows

Identify automation opportunities in process advisor

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The process advisor automation recommendation feature helps you identify automation opportunities and guides you through automating your processes using Microsoft Power Automate.

Here's a short video on how to use the automation recommendation feature in process advisor:

The blue recommendation icons on the process map activities show the automation opportunities.

When you select **+Automate activities** above the process map, you'll be taken to the Power Automate form designer. This is where you'll see the connector recommendations for the activities in your process map. You can select and add the connectors to your flow to automate your process.

See also

Connector overview

Visualize processes

Share processes in process advisor

1/15/2022 • 2 minutes to read • Edit Online

When you create a process in process advisor, only you can see it. But getting input from others is a key to understanding different ways to accomplish the process you've created. Share your processes with others in your organization so they can also manage or contribute to them.

Here's a short video on how to share a process in process advisor:

There are two primary ways to share a process in process advisor:

- Share a process with a co-owner
- Share a process with a contributor

If you're the co-owner or contributor of a process, you'll find it listed on the **Processes** screen.

> **IMPORTANT**
>
> You must be the co-owner to add or remove owners and contributors to a process.

Share action

The share action is available on the **Processes** screen for the following:

- Each process where you're a co-owner
- The system administrator in the environment
- Any security role that has share permissions on process advisor system entities

The share action is also available on the process details page with the same conditions. Sharing isn't needed at the recording level. Once you share a process with a co-owner, they can manage the recordings associated with a process.

Share panel

When you select the share action, a share panel is displayed. The share panel is where you select Microsoft Dataverse users and teams in your organization, and share your process with them.

When sharing a process with others, the option to automatically send an email invitation is selected. As co-owners or contributors, they're asked to help you manage the process or add new recordings, respectively. There's a link in the email invitation that leads them to the shared process.

Share a process with a contributor

Adding a contributor to a process is the most common way to share. Any contributor of a process can perform these actions:

- View the process details
- Add and label recordings
- Manage your own recordings that have been added to the process (including labeling and deleting recordings)

Share a process with a co-owner

Adding a co-owner to a process allows others to help you label and validate the contributors' recordings, manage the process, and visualize the process analytics and dashboard. Any co-owner of a process can perform these actions:

- View details

- Update properties, such as name and description
- Invite co-owners and contributors
- Add and label recordings
- Manage all recordings that have been added to the process (including labeling and deleting others' recordings)
- Analyze the process
- View the analytics of an analyzed process
- Delete the process

> **IMPORTANT**
>
> Only the owners of a process can analyze it.

Overview of process mining in process advisor (preview)

1/15/2022 • 2 minutes to read • Edit Online

[This topic is pre-release documentation and is subject to change.]

Process mining in process advisor allows you to take the event data from your system of records and visualize the processes happening in your organization. Process mining provides novel insights that can help you identify automation opportunities, and address performance and compliance opportunities.

> **IMPORTANT**
>
> - This is a preview feature.
> - Preview features aren't meant for production use and may have restricted functionality. These features are available before an official release so that customers can get early access and provide feedback.

This short video explains the concept of process mining in process advisor:

Business example

For example, as a business owner in accounts payable, you can use process advisor to find the steps and actions in your procure-to-pay process. Using event log files from your ERP systems like Dynamics 365 or SAP, process advisor produces a process map. This map enables you to visualize the activities in the procure-to-pay process to gain the following insights:

- Which activities in a process take the longest?
- How many variations of invoice approval exist in the organization?
- Are the activities of the process within compliance?

You can easily filter for custom attributes such as location, department, and other dimensions that are relevant to your process.

Steps to process mining

- Data requirements
- Transform and map data
- Troubleshoot issues (if necessary)
- Use KPIs and visualizations for analytics
- Edit and refresh processes

Tutorial: Get started with process mining in process advisor (preview)

1/15/2022 • 2 minutes to read • Edit Online

[This topic is pre-release documentation and is subject to change.]

This tutorial allows you to experience process mining with sample data. In this tutorial, you'll create a process, import data, and then analyze it.

- For the process mining tutorial, download the sample event log CSV file: English version or French version.
- For the task mining tutorial, go to Tutorial: Get started with task mining.

The sample data in this tutorial is for illustration only and is fictitious. No real association is intended or inferred.

> **IMPORTANT**
>
> - This is a preview feature.
> - Preview features aren't meant for production use and may have restricted functionality. These features are available before an official release so that customers can get early access and provide feedback.

Create a process

1. Sign in to Power Automate.
2. Select your environment.
3. On the navigation pane to the left, select **Process advisor** > **Create**.
4. Select **Create a new process**.
5. Enter a process name, and then select **Data (preview)**.

6. Select **Create**.

Import data and analyze

1. In your process, select **Setup** in the toolbar.
2. Select **Blank table**.

3. Use Notepad or any other text editor to open the sample event log CSV file that you downloaded.
4. Select all contents of the CSV file by pressing **Ctrl** + **A**.

5. Copy the selection by pressing **Ctrl** + **C**.
6. Paste the selection you copied into the blank table in process advisor by pressing **Ctrl** + **V**.
7. Select **Use first row as headers**.

8. Upload your event log, select your file from the list, and choose **Select** to continue.
9. Select **Next** twice to open the Power Query editor.
10. Validate that your fields are correct in the table view.
11. On the toolbar, select **Map to entity**.

12. On the left pane, select the **Event log** entity.
13. On the right pane, map the three required columns by selecting **Auto map**.
14. Return to the Power Query editor by selecting **OK**.

15. Return to the process details page by selecting **Save**.
16. On the toolbar, select **Analyze**, and then select **Confirm** when the dialog opens.
17. Wait for the analysis to complete. After the process is analyzed, select **Analytics** in the toolbar to view the process map.

For a description of how to analyze the process map and a short video, go to Visualize and gain insights from processes in process advisor (preview).

Prepare processes and data in process advisor (preview)

1/15/2022 • 4 minutes to read • Edit Online

[This topic is pre-release documentation and is subject to change.]

Before you can use process advisor process mining effectively, you need to understand:

- Data requirements.
- Where to get log data from your application.
- How to connect to a data source.

Here's a short video on how to upload data for process mining:

This topic explains these requirements in detail.

> **IMPORTANT**
>
> - This is a preview feature.
> - Preview features aren't meant for production use and may have restricted functionality. These features are available before an official release so that customers can get early access and provide feedback.

Data requirements

Event logs and activity logs are tables stored in your system of record that document when an event or activity occurs. For example, activities you perform in your customer relationship management (CRM) app are saved as an event log in your CRM app. For process mining to take place, the following fields are necessary:

- **Case ID (caseId when mapping)**

  Case ID should represent an instance of your process and is often the object that the process acts on. It doesn't need to be a case. It can be a "patient ID" for an inpatient check-in process, an "order ID" for an order submission process, or a "request ID" for an approval process. This ID must be present for all activities in the log.

- **Activity Name (activityName when mapping)**

  Activities are the steps of your process, and activity names describe each step. For example, in a typical approval process, the activity names may be "submit request," "request approved," "request rejected," and "revise request."

- **Start Timestamp (startTimestamp) and End Timestamp (endTimestamp)**

  Timestamps indicate the exact time that an event or activity took place. Event logs have only one timestamp. This indicates the time that an event occurred in the system. Activity logs have two timestamps: a start timestamp and an end timestamp. These indicate the start and end of each activity.

Where to get log data from your application

Regardless of your application, it's important to note that process advisor needs log data. Many of the tables that exist in your application's database will contain the current state of the data. It might not contain a historical record of the events that happened, which is what an event log is. Fortunately, in many larger applications, this historical record or log is often stored in a separate table. For example, many Dynamics applications keep this record in the Activities table. Other applications, like SAP or Salesforce, have similar concepts, but the name may be different.

While there may be tables that log historical records, the way that data is structured can be complex. You might need to join the log table with other tables in the application database to get specific IDs or names. Also, not all events that you're interested in are logged. You may need to determine what events should be kept or filtered out. If you need help, you should contact the IT team that manages this application to understand more.

Connect to a data source

The benefit of connecting to a database directly is the ability to keep process advisor up to date with the latest data from the data source.

Power Query supports a large variety of connectors. A connector provides a way for process advisor to connect and import data from the corresponding data source. Common connectors include Text/CSV, Microsoft Dataverse, and SQL Server database. If you're using an application like SAP or Salesforce, you might be able to connect to those data sources directly. For information on supported connectors and how to use them, go to Connectors in Power Query.

Try out process advisor with the Text/CSV connector

One easy way to try out process advisor regardless of where your data source is located is with the Text/CSV connector. You might need to work with your database admin to export a small sample of the event log as a CSV file. Once you have the CSV file, you can import it into process advisor using the following steps in the data source selection screen.

> **NOTE**
> You must have OneDrive for Business to use the Text/CSV connector. If you don't have OneDrive for Business, consider using *Blank table* instead of *Text/CSV*, as in step 1. You won't be able to import as many records in *Blank table*.

1. On the navigation pane on the left, select **Data** > **Tables**.
2. On the toolbar at the top, select **Data** > **Get data** > **Text/CSV** on the **Power Query - Choose data source** screen.

3. Select **Browse OneDrive**. You might need to authenticate.

4. Upload your event log by selecting the **Upload** icon in the upper right and then selecting **Files**.

5. Upload your event log, select your file from the list, and then select **Open** to use that file.

Use the Dataverse connector

The Dataverse connector isn't supported in Microsoft Power Platform. You need to connect to it using the OData connector, which will require a few more steps.

1. Make sure you have access to the Dataverse environment.
2. You need the environment URL of the Dataverse environment you are trying to connect to. Normally it looks like this:

   https://<environmentid>.crm.dynamics.com/

   To learn how to find your URL, go to Finding your Dataverse environment URL.
3. On the **Power Query - Choose data sources** screen, select **OData**.

4. In the URL textbox, type **api/data/v9.2** at the end of the URL so it looks like this:

5. Under **Connection credentials**, select **Organizational account** in the **Authentication kind** field.
6. Select **Sign in** and enter your credentials.

7. Select **Next**.
8. Expand the **OData** folder. You should see all the Dataverse tables in that environment. As an example, the **Activities** table is called *activitypointers*.
9. Select the checkbox next to the table you want to import, and then select **Next**.

Search
Display options
OData
[402]
accounts
aciviewmappers
actioncards
actioncarduserstates
activityfileattachments
activitymimeattachments
activityparties
activitypointers

Transform and map data in process advisor (preview)

1/15/2022 • 3 minutes to read • Edit Online

[This topic is pre-release documentation and is subject to change.]

After you select the data source you want to use, you're taken to the Power Query Editor. The Query Editor is a powerful tool to transform your data. To learn more, go to The Power Query user interface.

> **IMPORTANT**
>
> - This is a preview feature.
> - Preview features aren't meant for production use and may have restricted functionality. These features are available before an official release so that customers can get early access and provide feedback.

Here are some reasons why you might want to transform the data:

- You might not be interested in all the activity names that are logged, and so you want to filter for specific activity names that are important to the process you're trying to mine.
- You might want to rename some of the activity names to be more descriptive and understandable. This is often not the case with names in a database.
- You might be interested in only the most recent year's history, and not the entire history.

  > **NOTE**
  >
  > For public preview, we only support up to 150,000 rows of data. Because of this, filtering to a specific period may be necessary.

- You might want to combine multiple ID columns to form the case ID. This is often done when the ID you want to use for process mining doesn't exist or is a combination of multiple IDs in the application. For example, when a customer files support tickets, the support ticket might be assigned to multiple customer service agents. If you want to analyze how each agent handles each ticket, you would combine the agent ID and the ticket ID into the case ID.

Filter activity names

1. Select the caret next to the activity name column to bring up the sort and filter menu.
2. If there's a message that says **List may be incomplete**, select **Load more**.
3. Select only the activity names that you want to analyze. Uncheck any name you want to exclude.

4. Alternatively, you can use the **Text filter** menu for more advanced filtering. For more information on filtering by value, go to Filter by values in a column.

Rename activities

1. Ensure that the **Activity Name** column is selected.
2. Above the toolbar, select the **Transform** tab.
3. On the toolbar, select **Replace values**.

4. Under **Values to find**, type the activity name as it appears in the data source that you want to replace.
5. Under **Replace with**, type the activity name you want to show in the process map.
6. Repeat this process for all the values you want to replace.

Reduce the number of total records

One strategy for reducing the total number of records is to use only the latest records. To do this, you need to first sort the data by time.

1. Open the sort and filter menu by selecting the caret next to the **startTimestamp** column.

2. To have the most recent records show up first, select **Sort descending**.

3. Select **OK**, and then select **Keep rows** on the toolbar.

4. Enter **150000** under **Number of rows**.

5. Select **OK** to filter for the top 150,000 rows.

Combine multiple IDs

You can use **Ctrl** + **click** to select multiple columns that you want to combine.

1. On the Transform tab toolbar, select **Merge columns**.

2. (Optional) Select a separator from the dropdown list. Alternatively, you can select **none**.

3. Change the name (or make a note of the default name that's generated), so you can select it when mapping to a case ID.

Map data

Mapping tells process advisor what columns represent case ID, activity name, or timestamp.

1. In the toolbar, select **Map to entity**.

2. In the left column, if your data only has one timestamp, select the **Event log** entity. If your data has both a start and an end timestamp, select the **Activity log** entity.

3. Select each of the dropdown lists under the **Query output column** heading, and select the corresponding column in your data that maps to:

   a. Activity name (activityName)
   b. Case ID (caseId)
   c. Start timestamp (startTimestamp)
   d. End timestamp (endTimestamp) only if you select **Activity log** in step 2.

4. After everything is mapped, select **OK** to close the map to entity screen.

Select additional columns

When performing process mining, having additional information about a process is especially useful. If your data contains only five or fewer columns outside of the required columns that you've mapped in the previous procedure, nothing else needs to be done. You can select **Save** and all the columns will be analyzed. You'll also be able to filter on these columns in the Analytics page.

If you have more than five columns:

1. Select **Choose columns** in the toolbar.

2. Deselect any column you don't want to include in the analysis.

Ensure that the mapped columns (activityName, caseId, startTimestamp, endTimestamp) from the previous procedure are selected. *The five additional columns are on top of the mapped columns.*

Troubleshoot issues in process advisor (preview)

1/15/2022 • 4 minutes to read • Edit Online

[This topic is pre-release documentation and is subject to change.]

Once you're done with setup, select **Analyze**. You'll be able to view the Analytics page when the analysis is complete. Analysis typically takes a few minutes but may be faster or slower depending on how much data needs to be analyzed.

If you don't visit the Analytics page for 14 days, you'll need to re-analyze the process to access the Analytics page again.

> **IMPORTANT**
>
> - This is a preview feature.
> - Preview features aren't meant for production use and may have restricted functionality. These features are available before an official release so that customers can get early access and provide feedback.

For more information and a short video of analytics, go to Use KPIs and visualizations for analytics.

Issues with dataflow refresh

"There was an issue with a recent dataflow refresh, check your dataflow refresh history."

When you go through setup, process advisor creates a dataflow that's tied to the process. Normally you don't need to interact with the dataflow, but if there are issues with the dataflow refresh, you might need to troubleshoot them. Dataflow refresh is what reads the data source and makes it ready to be analyzed.

To troubleshoot:

1. Make a note of the environment in the environment display on the upper-right corner of the page.

2. Make a note of the value of **Name** in the Data Source card below the Details card.
3. Sign in to https://powerapps.microsoft.com/.
4. Select the same environment that you noted in step 1.
5. Select **Dataverse** > **Dataflows**.
6. Find the dataflow name that you noted in step 2.
7. View the issue by selecting the **Warning** icon in the **Last refresh** column.

8. Download the report by selecting the **Download** icon in the **Actions** column.

9. Open the report to see details of the issue.

Issues with analyze

"You must have one case with at least two activities to analyze your process. Please change your data."

Process mining will normally not be helpful when there is only one activity name in the data. This is because the process map visualizes the flow of the process from one activity to the next. In this case, you should do the following:

- Check the column that's been mapped to activity name.
- Confirm that there is only one value for that column.
- Determine if there's another column that contains something with more than one possible value that can represent activities of the process.

"Following column(s) do not have the right data types: [x]. Please check your data and try again."

The *case ID* and *activity name* columns should be of the **Text** data type. The *timestamp* columns should be of the **Date/Time** data type. One of the most frequent causes of invalid format is in the *timestamp* column. To fix this, return to setup and select the icon next to the *timestamp* column and ensure it's been mapped to **Date/Time**.

If the format is incorrect, you'll see something like this:

One possibility is that although the *timestamp* column has a valid datetime format, the format is valid for a different locale than the locale that the process is created in. A typical example is this datetime format being used in the United States locale: **dd/mm/yyyy hh:mm:ss**. In this case, we won't automatically detect that column as a datetime column. One way to fix this is by manually changing the locale. To do this:

1. Delete the **Changed column** type step that you did previously. Do this by selecting **X** next to the last applied step in the Query settings pane on the right.

2. On the toolbar, select **Options** > **Project options**.

3. On the **Locale** dropdown list, select the correct locale and then select **OK**.

4. Use the same method to set the *timestamp* column to the **Date/Time** data type again.

Where the format is **dd/mm/yyyy hh:mm:ss**, setting the locale to **English (Canada)** should result in successful conversion of the column type. For other cases, find the correct locale that supports your specific datetime format.

"More than 50% of your data has invalid format. Please check your data and try again."

To fix this, go to "Following column(s) do not have the right data types: [x]. Please check your data and try again."

"Following column(s) are missing from your dataflow: [x]. Please check your data and try again."

This issue should occur only if you didn't properly map the columns in your data source to the columns. For more information, go to Map data.

"Your entity contains no data, check your dataflow and try again."

This issue should occur only if there is no data. Either the data source that you are connecting to has no data, or the power query expression you used filtered out all the data. Check your query and ensure that you can see some data rows in the preview table.

"The number of rows in your data exceeds the limit. [x] rows have been ignored."

For preview, we support only up to 150,000 rows of data. To learn how to fix this using Power Query, go to Reduce the number of total records.

"There are too many columns in your data. Please select no more than 5 columns."

For preview, we support only up to five columns in addition to your mapped columns. To learn how to fix this using Power Query, go to Select additional columns.

"Analysis failed, please try again."

You might have run into other analyze issues. For more ways that we can support you, go to Support, or post your issue in the Community Forums.

Visualize and gain insights from processes in process advisor (preview)

1/15/2022 • 4 minutes to read • Edit Online

[This topic is pre-release documentation and is subject to change.]

This topic explains metrics and visuals, and what they could tell you about your process.

> **IMPORTANT**
>
> - This is a preview feature.
> - Preview features aren't meant for production use and may have restricted functionality. These features are available before an official release so that customers can get early access and provide feedback.

Visualize and gain insights from processes with the process map

The process map empowers you to visualize and gain insights from processes. By looking at a graphical representation of how your business processes are performed, you can glean insights about where opportunities exist.

Activities describe tasks or actions, the sequence of which makes up a business process. Activities can be performed by humans, or, in the case of automation—by machines. In the process map, different activities appear as nodes, and transitions between activities appear as edges. Each process sequence will have a start and an end.

Different activity combinations and variants are shown separately on the process map. A process variant is a unique path from the beginning to the end of the process. In other words, a process variant is a specific activity sequence, like a "trace" through the process, from start to end. Each variant differs from the others by at least one activity.

You can see additional metrics, frequency of the activities, as well as process throughput time (case duration), on the process map.

Frequency shows you the total number of workflows (also known as cases) passing through it. Case duration is the time between the very first event of the case and the last.

To drill down into the process, various filters are available:

- **Variant selector**: Allows you to select one variant, or a set of process variants to visualize in your process map.
- **Activity selector**: Allows you to select cases that contain the selected activity.
- **Start date filter**: Allows you to see the process visualization in a particular period.

Additionally, key performance indicators (KPIs) are available to help you better understand your task. The following section describes them.

Use KPIs and visualizations for analytics

Out of the box, you'll get several KPIs and visualizations to help you to understand your process.

Here's a short video on process mining analytics including custom filters:

KPIs

- **Average case duration**: Shows you the average time it takes for a process to be completed across all cases you are analyzing. It is one of the most important data points when analyzing your process. The reason is that understanding how long a process lasts, how it changes over time, and further investigating the root cause of the process duration could make a great starting point in speeding up your process.
- **Median case duration**: Median in general shows the most frequent duration for a task to complete. It's a very useful metric in cases where a small number of cases (or even a single activity) are so different from most cases that the average time for completion would look skewed toward this offending case. To prevent the user from misinterpreting the time to completing the process, this measure shows the most frequent time as opposed to a simple average.
- **Number of variants**: Shows how many different paths were taken to accomplish a process. For example, one case of a process might have 10 steps to complete a purchase order, while another only nine.
- **Number of cases**: Shows the number of cases analyzed in a particular process.
- **Number of activities**: Shows the number of steps or activities taken to complete the process.

Visualizations

- **Variants by frequency**: Shows which variants are the most common, sorted by the most common to the least common. You could select one or multiple variants in the bar chart to analyze details of the variants by filtering for them. This would update the process map, KPIs, and other visualizations.
- **Variants by time**: Shows a bar chart of the longest duration variant to the shortest one. Filtering on

specific variants updates the process map and KPIs so you could get insights into the behavior of the selected variants. To select multiple variants, press **Ctrl** and select the desired variants.

- **Variant number per Date**: Shows how the number of variants for a selected time frame changes and informs if the processes are getting more or less standardized. An increasing number of variants over time would suggest an increased complexity in process execution over time.
- **Time (case duration) per Date**: Shows how duration of the process changes over time.

Filters

- **Activity filter**: Filters for all cases where the selected activity is present
- **Unit filter**: Filters for a specific unit of time to make the process easier to analyze. For example, processes that last days would be more easily analyzed by selecting a Days unit. As a default, the process advisor selects what it thinks is the best unit, but you can change it to accommodate your analysis.
- **Start date filter**: Filters for the time range when recording has started and ended. For example, if your process changed over time, you can see if there was any impact on your metrics after the process change by filtering for recordings that started after a certain time.
- **Optional filters**: If you imported Optional Columns during your data upload process, you'll have additional filters to slice and dice the data by. In the previous image, we have examples of optional filters for Location, Role, and Resource.

Edit and refresh processes in process advisor (preview)

1/15/2022 • 2 minutes to read • Edit Online

[This topic is pre-release documentation and is subject to change.]

Some of the reasons why you might want to edit the query are:

- Your data might have multiple ID columns that can be used as case ID. There often isn't a correct answer. You might discover more insights by changing what you use as case ID.
- You have more than five additional columns with useful data. You want to try analyzing other columns to see if they're potentially useful in uncovering root causes of bottlenecks.

> **IMPORTANT**
>
> - This is a preview feature.
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Edit query

1. In the process details page, return to the Query Editor by selecting **Setup**.
2. Select (or double-click) the corresponding steps in the **Applied steps** area under **Query settings** to edit those steps.

   Don't select **Map to entity** or **Choose columns** again.

Refresh data

If you have a data source that's transactional, like Dataverse or SQL, select **Refresh** on the right side of the Data Source card in the Process details page. You need to select **Analyze** again after selecting **Refresh**. You also need to do this if you want to see the Analytics page updated with the latest data from that data source.

Disconnect data

If you want to change the data source for your process, you can easily do this. For example, you might have

been using a CSV file before but now you want to connect to a transactional data source instead. In this example, select **Disconnect data** on the right side of the Data Source card. In the Process details page, once you disconnect, select **Setup** again to connect to your new data source.

Security and privacy

1/15/2022 • 2 minutes to read • Edit Online

Security

Process advisor relies on environment security and Microsoft Dataverse security roles and privileges to grant access to its features in Power Automate. For more information, see Power Platform security overview.

Some privileges are set by default in Dataverse. This allows built-in security roles to use process advisor without further actions from system administrators. Specifically:

- Process advisor user can create, share, and contribute to processes. This role has a restricted set of privileges that are only meant to be used by process advisor. If you need to provide access to other Power Platform features, make sure to assign less restrictive security roles on top of the process advisor user role.
- Environment makers can use process advisor to create, share, and contribute to processes.
- Administrators and system customizers can access all processes created in the environment.

These security roles have privileges to the process advisor tables in Dataverse. Custom security roles can create processes in process advisor if they have the following permissions:

- Organization read permission on the Organization, User, and User Settings tables (Business management tab).
- Organization read permission on the table, field, and relationship tables (Customization tab).
- User create, read, write, delete, append, append to, assign, and share permissions on the process table (Customization tab).
- User create, read, write, delete, append, append to, assign, and share permissions on the PM inferred task, PM recording, and workflow binary tables (Custom tables tab).

> **IMPORTANT**
>
> The Process Advisor Application is an *internal security role* that process advisor uses. Don't assign this security role to users. Don't modify the set of privileges in the Process Advisor User or Process Advisor Application security roles.
>
> If you're using Conditional Access polices to limit access to Power Automate and it's features, the following apps must be included in **Cloud apps** policy application:
>
> - Microsoft PowerApps
> - Microsoft Flow
>
> Currently, **having conditional access to only Microsoft Flow is not enough**. To learn how to set up Conditional Access policies, see Plan a Conditional Access deployment and Control Access to Power Apps and Power Automate with Azure AD Conditional Access Policies.

Privacy

Sharing processes and their recordings is essential to create rich analysis and insights in process advisor. Users can add recordings to a process. They can then use Power Automate to record processes and then import the processes into process advisor. Owners and contributors can see some data from the process and its recordings.

While most of the information process recordings capture can be essential to the understanding of the process activities, some steps might contain sensitive information. You can modify and delete sensitive information such as Personal Identifiable Information (PII) from your recordings.

In Power Automate, users can:

- Delete sensitive steps or modify input data information.
- Pause and resume recording to avoid recording sensitive information and PII.

After you import the recording into process advisor, you can still remove sensitive information by doing the following:

- Rename step names or descriptions.
- Delete screenshots.

Protect your data in process advisor

1/15/2022 • 2 minutes to read • Edit Online

You can use process advisor features to remove screenshots and text entries stored during the recording session if they contain sensitive data. You can also remove any confidential information in the text or images from your recordings when preparing them.

Delete screenshots

To delete screenshots when preparing your recording, select the step that contains the screenshot you want to remove and select **Delete screenshot**.

Remove text

To remove sensitive data from a text entry, select the text entry and modify the step description.

Export and import your process in process advisor

1/15/2022 • 2 minutes to read • Edit Online

You can copy or move process advisor processes from one environment to another using Microsoft Power Platform solutions. You need to be an owner or co-owner of a process to export it.

To learn more about solutions from Microsoft Power Platform, go to Overview of solution-aware flows.

Export a process

1. Sign in to Power Automate.

   Make sure you've selected the environment where the process you want to export has been created.

2. Select **Solutions** in the navigation pane on the left.

3. In the list, select the solution you want to use to add your process, or create a solution and select it.

4. Select **Add existing** > **PM Inferred Task**.

5. Search for and select the process you want to export, and then select **Add**.

You can now export your solution and import it in another environment.

For more information about solution export, go to Export a solution.

Import a process

To import a process into another environment:

1. Make sure you've exported your process with a solution.

2. Go to the environment where you want to import your process.

3. Follow the instructions in Import a solution.

Known issues in process advisor

1/15/2022 • 2 minutes to read • Edit Online

We'll continue to add issues here. If you're experiencing an issue not mentioned, check the **Process advisor community forums**.

Unable to access process advisor

If you can't see process advisor in Power Automate, receive error messages, or if you can't access the home page, verify that:

- You have a Power Automate license.

  If you don't have a license, you can activate your trial license from **Desktop flows** in Power Automate.

- You have access to the Power Automate environment and the permissions required by process advisor described in the Security section.

- Your browser has the feature to accept third-party cookies enabled. You can enable it in your browser settings.

Glossary in process advisor

1/15/2022 • 2 minutes to read • Edit Online

Activity—Activities in process advisor describe tasks or actions, the sequence of which results in a business process. Activities can be performed by humans or (automated) by machines.

Attributes—Attributes are the dimensions of your data. Also known as columns.

Contributor—A role which can create and upload recordings to a task mining process. Contributors can label and manage their own recordings, but they can't edit the process or other people's recordings.

Co-owner—A role which has similar privileges to the process owner roles. They can edit the process and its recordings, invite people to the process, manage activate label templates, and more.

Dataflow—A self-service, cloud-based, data preparation technology that enables customers to ingest, transform, and load data into Microsoft Dataverse environments, Power BI workspaces, or the organization's Azure Data Lake Storage account.

Data Lake—Azure Data Lake includes all the capabilities required to make it easy for developers, data scientists, and analysts to store data of any size, shape, and speed, and do all types of processing and analytics across platforms and languages.

Data source—Where the source event log data is located. Dataflow accesses different data sources through its connectors.

Event logs—Tabular data of processes (or cases) and activities stored in an information system of record. The minimum column requirements for process mining are case ID, activity ID, and start timestamp. Also known as event data.

Power Query—A data transformation and data preparation engine. Power Query comes with a graphical interface for getting data from sources and a Power Query Editor for applying transformations. Learn more: What is Power Query?

Process—A series of activities taken to accomplish a goal. Planning demand and converting purchase requisition to purchase orders are examples of processes.

Process map—Visualizes the actual flow of your process based on the imported user or system data.

Process mining—Visualization and analysis of processes based on event logs. Event logs are information stored in information systems. For example, in CRM (Customer Relationship Management), you can find event logs on orders, start and completion of an activity, resources used, and more.

Recording—A recorded sequence of activities that users perform on their desktop. Usually, multiple recordings are analyzed together to get insights into different variants of the same task.

Robotic process automation (RPA)—Software that can be easily programmed to do basic, repetitive tasks across applications.

Task mining—Technology that captures users' interaction with computers and analyzes how people get jobs done, and how they can do them better.

Variant—A specific path it takes for a process to be completed.

Workflow—The sequence of industrial, administrative, or other processes through which a piece of work passes from initiation to completion.

Overview of cloud flows

1/15/2022 • 2 minutes to read • Edit Online

Create a cloud flow when you want your automation to be triggered either automatically, instantly, or via a schedule.

This video gives an overview of cloud flows.

FLOW TYPE	USE CASE	AUTOMATION TARGET
Automated flows	Create an automation that is triggered by an event such as arrival of an email from a specific person, or a mention of your company in social media.	Connectors for cloud or on-premises services connect your accounts and enable them to talk to each other.
Instant flows	Start an automation with a click of a button. You can automate for repetitive tasks from your Desktop or Mobile devices. For example, instantly send a reminder to the team with a push of a button from your mobile device.	Wide range of tasks such as requesting an approval, an action in Teams or SharePoint.
Scheduled flows	Schedule an automation such as daily data upload to SharePoint or a database.	Tasks that need to be automated on a schedule.

If you're ready to start your Power Automate project, visit the guidance and planning article to get up and running quickly. |

Get started with triggers

1/15/2022 • 2 minutes to read • Edit Online

What is a trigger?

A **trigger** is the event that starts a cloud flow. For example, if you want to get a notification in Microsoft Teams when someone sends you an email, in this case you receiving an email is the **trigger** that starts this flow.

Power Automate offers connectors (apps/services like SharePoint, Outlook, /.) and most connectors offer prebuilt triggers that you can use to start your flows. Here's a partial look at the triggers that Office 365 Outlook connector provides by default.

Choose the right trigger

Triggers can be started instantly or manually, on a schedule, or automatically when some other even occurs.

Triggers for instant/manual flows

If you'd like to run a cloud flow with a tap of a button on your mobile device, to remind your team to join the

daily team meeting, create an instant flow (button flow). You can trigger these flows manually from any device.

Learn more about instant flows.

Triggers for scheduled flows

If you'd like to run a cloud flow on a schedule, for example, to send a weekly project report, create a scheduled flow. In scheduled flows, you can choose when (date and time) and frequency (monthly/daily/hourly, etc.).

Learn more about scheduled flows.

Triggers for automated flows

If you'd like to create a cloud flow that performs tasks automatically after an event, for example, create a cloud flow that notifies you by email when someone tweets keyword you specify, create an automated flow.

Learn more about automated flows

Add a trigger to an existing flow

1. Add a new step

2. Search for the connector and select the app icon.

3. Once selected, the corresponding triggers and actions will be shown. Choose the trigger that best suits your need.

> **IMPORTANT**
>
> The trigger must be the first step of the flow.

Licensing for premium connectors

You need a standalone Power Apps license or Power Automate license to access all premium, on-premises, and custom connectors. Microsoft 365 plan licensees can use standard connectors but cannot use premium connectors.

To find your license:

1. Go to flow.microsoft.com
2. Select **My flows**.
3. Select a cloud flow.
4. Go to the **Details** section, and then select **Plan**.

   Your current license plan is displayed.

Customize a trigger by adding conditions

Sometimes, you may need to customize a trigger so that it fires only when certain conditions are met. For example, you may be using SharePoint's **When an item is created or modified** trigger in Power Automate. This trigger fires for every change to SharePoint items but you might want the flow to only trigger when an item is created or the status is marked as *Approved*. While you can filter other events by adding conditions to the flow, the flow still runs and the calls are counted as an API request, causing you to reach your API request limits faster. To avoid it, you can write expressions in trigger conditions, avoiding a *run* if the condition in trigger isn't met.

You may also need to secure the trigger inputs/outputs in the run history of a cloud flow. To do this, you can turn on the secure input and/or secure output setting in the trigger. A great community article of how to do it is here.

Get contextual help with flows from the Power Virtual Agents bot

1/15/2022 • 2 minutes to read • Edit Online

Real-time, in-product help is available from the documentation and the Power Virtual Agent bot to solve the most common workflow scenarios. While building your flows, you can access content from the documentation, community, blogs, and templates.

Use in-product help

> **NOTE**
>
> In-product help is available while you create or edit cloud and desktop flows.

Select the **?** on a connector, action, or trigger to see the in-product help experience.

The right pane opens with details about the action and provides documentation links for that action.

In the following example, the **Send an email (V2)** action is selected, showing help topics regarding the top email scenarios, an overview of the action, and more.

If you select **?** on a different action, the help pane updates to show guidance documents for the currently selected action.

> **TIP**
> In product help is contextual, always displaying content that's relevant to the currently selected action, trigger, or connector.

Now that you've displayed the in-product help, follow these steps to use the various topics.

1. Select any link from the list of help topics.

The corresponding documentation opens.

2. Expand the **Community** section.

   The community results about the action are displayed.

3. Select an item to go to specific community thread.

You can also get conversational self-help from the bot.

1. Select **Chat with a bot**.

   The chat box shows the most requested topics and provides a field that you can use to ask the bot questions.

2. Choose one of the topics.

   The bot gives an overview and provides the next level of topics.

3. Find the right topic.

   The bot provides the steps and links to the corresponding documentation with a detailed explanation, showing examples and images.

4. Select **Yes** to go back to the previous topic list to continue your chat.

5. Select **No** if the bot helped answer the question and you don't need more help.

6. Select **Yes** to check the knowledge database and enter another question.

7. Select a category to see the corresponding results

Please enter your question

A minute ago

Sharepoint

Just now

I found

- 8 Community answers
- 25 Articles
- 25 Blogs

Would you like to see:

Just now

Community answers

Articles

Blogs

None of these

Type your message

I found

- 8 Community answers
- 25 Articles
- 25 Blogs

Would you like to see:

Just now

Community answers

Just now

Community answers

- Sharepoint : I have 3 lists in Sharepoint 2 of those lists get synced into the 3rd list. I am creating the items in those 2 lists, but for some reason, the 3rd lists is not syncing everything in or it is gettin...
- Sharepoint excel to sharepoint list : Hello all, I have an excel table with 3 date columns submitted, action, completed, along with other data. I have build a flow to make a SharePoint list. However the dreaded date doesn't come...

Share a cloud flow

1/15/2022 • 6 minutes to read • Edit Online

Share a cloud flow with others in your organization so they can also benefit from automation you've created. There are three primary ways to share a cloud flow in Power Automate:

- Add an owner to a cloud flow.
- Share a cloud flow with run-only privileges.
- Share a copy of a cloud flow.

Prerequisites

- You must have either a Power Automate license (except the free license) or a seeded license (Office 365, Dynamics 365 Enterprise plans, Dynamics 365 Professional plans, Dynamics 365 Team Member, Power Apps (Canvas and Model driven Apps)- Per App plans, Power Apps per user plan, Power Apps Plan 1 (grandfathered), Power Apps Plan 2 (grandfathered), Windows licenses) to share a cloud flow.
- You must be the creator or owner to add or remove owners from a cloud flow.

About embedded and other connections

Connections used in a cloud flow fall into two categories:

- **Embedded**: These connections are used in the flow.
- **Other**: These connections have been defined for a cloud flow, but aren't used in it.

If you stop using a connection in a cloud flow, that connection appears in the **Other connections** list, where it remains until an owner includes it in the flow again. To make changes to embedded connections, follow the steps in Modify a connection, later in this article.

The list of connections appears under the list of owners in a cloud flow's properties, as shown in the following image.

Add an owner to a cloud flow

Adding an owner to a cloud flow is the most common way to share a cloud flow. Any owner of a cloud flow can

perform these actions:

- View the run history.
- Manage the properties of the flow (for example, start or stop the flow, add owners, or update credentials for a connection).
- Edit the definition of the flow (for example, add or remove an action or condition).
- Add or remove other owners (but not the flow's creator).
- Delete the flow.

If you're the creator or an owner of a cloud flow, you'll find it listed on the **Team flows** tab in Power Automate.

> **NOTE**
>
> Shared connections can be used *only* in the flow in which they were created.

Owners can use services in a cloud flow but can't modify the credentials for a connection that another owner created.

To add more owners to a cloud flow

1. Sign in to Power Automate, and then select **My flows**.
2. Select the flow that you want to share, select **More commands** ⋮, and then select **Share**.

3. Enter the name, email address, or group name for the person or group that you want to add as an owner.

The user or group you've selected becomes an owner of the flow.

Congratulations—you've created your team flow!

Add a list as a co-owner

You can add SharePoint lists as co-owners of a cloud flow so that everyone who has edit access to the list automatically gets edit access to the flow. After the flow is shared, you can simply distribute a link to it. More information: Training: Create and set up a SharePoint list

> **TIP**
>
> Use a list when the flow is connected to SharePoint, and use a group in all other cases.

> **IMPORTANT**
>
> - SharePoint users must have **Edit** permission or be a member of the **Members** or **Owners** group to run flows in SharePoint.
> - Adding a list as a co-owner is not available in GCC High and DoD tenants.

Remove an owner

> **IMPORTANT**
>
> When you remove an owner whose credentials are used to access Power Automate services, you should update the credentials for those connections so that the flow will continue to run properly. More information: Modify a connection

1. On the flow details page, in the **Owners** section, select **Edit**.

2. Select **Delete** for the owner you want to remove.

3. In the confirmation dialog box, select **Remove**.

Congratulations—the user or group that you removed is no longer listed as an owner of the flow.

Modify a connection

You might need to change the owner of a connection in a cloud flow if you remove the existing owner or if you just want to use a different account to sign in to an action or trigger.

1. Go to the flow that you want to modify.

2. Select **Edit**.

3. Select **More commands** (...) in the step where you want to edit the connection.

4. If you have a connection already, select it; if not, select **Add new connection** to create a new connection, and then select **Sign in** to create your new connection.

Share a cloud flow with run-only permissions

Instant flows (that is, flows that use a manual trigger such as a button or an item being selected) can be shared by using run-only permissions. Any user who's added as a run-only user won't have access to edit or modify the flow in any way; they'll only have permissions to trigger the flow.

To add a run-only user

1. On the flow details page, in the **Run only users** section, select **Edit**.

2. In the **Manage run-only permissions** panel, specify the users and groups you want to provide run-only access to.

3. As an owner, you can specify whether run-only users will need to provide their own connections or you can choose use a connection that's already defined in the flow.

Congratulations—the user or group now has access to run the flow.

To remove a run-only user

1. On the flow details page, in the **Run only users** section, select **Edit**.
2. In the **Manage run-only permissions** panel, select **Delete** 🗑 next to the user whose access you want to remove, and then select **Save**.

Congratulations—the user or group no longer has access to run this flow.

Share a copy of a cloud flow

You can share a copy of a cloud flow with another user, who can then use the definition of the flow as a template. It provides a good way for you to share the general structure of a cloud flow without sharing any connections, while also allowing the recipient to modify their flow independently of yours, so they can make it fit their needs.

> **NOTE**
>
> Sharing a copy creates an independent instance of the flow for the recipient. You can't revoke access to the flow after you share it.

To send a copy of a cloud flow

1. On the flow details page command bar, select **Send a copy**.

2. In the **Send a copy** panel, you can edit the name and description of the flow you want to share, and

specify the users with whom you want to share it.

3. The recipient will receive an email stating that you have shared a cloud flow template with them, and they can then create their own instance of that flow.

NOTE

As a recipient, you can also access the flow by selecting **Templates** on the left pane and then selecting the **Shared with me** tab.

FAQ

What happens if the user who created a shared flow leaves the organization?

If the shared flow still has an active owner, the flow continues to run.

> **NOTE**
>
> If the flow uses any active or embedded connections that belong to the user who has left the organization, those specific actions might fail. To fix this, follow the steps in Modify a connection, earlier in this article to update the credentials.

If there's no active owner for a flow, you should change the owner. To change the owner of a flow, make a copy of the flow, and then let the intended owner create the flow from the copy.

How can I change the owner of a solution flow?

It is currently not possible to change the owner of a solution flow in the modern solution explorer. That capability will be added in the future. In the meantime, there is a workaround:

1. Obtain the environment organization URL by selecting "Switch to classic" in the Solutions Explorer and copying the host name from the URL. This is an example: https://org123456.crm10.dynamics.com/.
2. Open environment using organization URL
3. Select **Settings** > **Advanced Settings**.
4. Select **Advanced Find**.
5. In the **Look for lookup**, select **Processes**.
6. Select **Clear** to clear the existing filter.
7. In the filter area, add a filter for Category Equals "Modern Flow"
8. Select **Results** to see the list of flows that you own.
9. Select the check box next to the desired flow and then select **Assign Processes**.
10. Change **Assign to** to **User or team**.
11. Use the **User or team** lookup to provide the new owner.
12. Select **Assign**.

Create a cloud flow from a template in Power Automate

1/15/2022 • 2 minutes to read • Edit Online

A good way to get started is to use a template that is suited to your organization's scenario. You can choose from a collection of templates to find the one that best matches your scenario. Search all templates or browse by category to find your scenario, and then follow the steps in the template to create a cloud flow from the template.

The following video gives insights into using templates to create your flows.

You can tweak templates by adding, editing, or removing triggers and actions to create your own flows. You can copy paste actions in the same flow or across flows to speed up the your tweaks.

Create a cloud flow from one of many built-in templates that can, for example, send you a Slack message when your manager sends you an email in Microsoft 365.

> **TIP**
>
> Create a cloud flow from scratch if you already have a process in mind and can't find a template for it.

Here, we'll follow an example that uses a template to create a flow that sends you a Slack message when your manager sends you an email in Microsoft 365.

Prerequisites

To complete this example, you'll need accounts with access to the following:

- Power Automate.
- Slack.
- Microsoft 365.

Choose a template

1. Sign into Power Automate, and then select **Templates** in the left-side navigation pane.
2. Use the search bar to search for **slack manager** to find the **Send a message on Slack when my manager emails me** template, and then select it.
3. If you aren't signed into Office or Slack, select **Sign in** and then follow the prompts.
4. After you confirm your connections, select **Continue**.

   Your flow appears, showing each action with an orange title bar.

Customize your flow

1. Select the title bar for an event to expand it, and then customize it (for example, by specifying a filter on the email that interests you).

2. Actions that require input from you will automatically be expanded.

   For example, the **Post message** action is expanded because you need to enter a channel, such as your *@username*. You can also customize the message content. By default, the message will contain just the subject, but you can include other information.

3. Near the top of the screen, specify a name for your flow, and then select **Create flow**.

4. Finally, if you're happy with your flow, select **Save**.

Now, when your manager sends you an email, you'll receive a Slack message that contains the information that you specified.

More information

- Watch your flow in action
- Publish your own template
- Use a template with Microsoft Dataverse
- Get started with team flows and invite others to collaborate with you to design flows.

Create a cloud flow in Power Automate

1/15/2022 • 3 minutes to read • Edit Online

Create a cloud flow that performs one or more tasks automatically after it's triggered by an event. For example, create a cloud flow that notifies you by email when someone sends a tweet that contains a keyword you specify. In this example, sending a tweet is the event, and sending mail is the action.

Prerequisites

- An account on flow.microsoft.com
- A Twitter account
- Office 365 credentials

Specify an event to start the flow

First, you will need to select what event, or *trigger*, starts your flow.

1. In Power Automate, select **My flows** from the navigation bar on the left.
2. Select **New**, and then select **Automated-from blank**.
3. Give your flow a name in the **Add a name or we'll generate one** field.
4. Enter **Twitter** into the **Search all triggers** field.
5. Select **Twitter - When a new tweet is posted**.

1. Select the **Create** button at the bottom of the screen.

> **TIP**
> Connectors support multiple types of authentication. For example, SQL Server supports Azure AD, SQL Server authentication, Windows authentication, and SQL connection string. Users choose which type of authentication they want to use when configuring a connector.

2. If you haven't already connected your Twitter account to Power Automate, select **Sign in to Twitter**, and

then provide your credentials.

3. In the **Search text** box, type the keyword that you want to find.

Specify an action

1. Select **New step**.

2. In the box that shows **Search connectors and actions**, enter **send email**, and then select **Send an email (V2)**.

3. If prompted, select the sign-in button, and then provide your credentials.

4. In the form that appears, enter your email address in the **To** box, and then select your name from the list of contacts that appears.

5. In the **Subject** box, enter **New tweet from:**, and then type a space.

6. In the list of tokens, select the **Tweeted by** token to add a placeholder for it.

7. Select the **Body** box, and then select the **Tweet text** token to add a placeholder for it.

   Optionally, you can add more tokens, other text, or both to the body of the email.

8. Near the top of the screen, select **Save**.

Test your flow

Send a tweet with the keyword that you indicated, or wait for someone else to post such a tweet.

Within a minute after the tweet is posted, an email message notifies you of the new tweet.

> **TIP**
>
> Use the **Send email (V2)** action to format email in which you customize the font, use bold, italic or underline, customize the color and highlight, and create lists or links, and more.

Manage a cloud flow

1. In Power Automate, select **My flows** in the navigation bar on the left side.
2. In the list of flows, do any of the following:
   - To pause a cloud flow, set its toggle to **Off**.

   - To resume a cloud flow, set its toggle to **On**.

- To edit a cloud flow, select the pencil icon that corresponds to the flow you want to edit.

- To delete a cloud flow, select the **...** icon, select **Delete**, and then select **Delete** on the message box that appears.

- To view the run history of a cloud flow, select the flow from the **My flows** page, and then view the history under the **28 day run history** section of the page that opens.

Select a cloud flow run from the list of runs to see the inputs and outputs of each step.

> **NOTE**
>
> You can have up to 600 flows in your account. If you already have 600 flows, delete one before you create another flow.

Next steps

- Add steps, such as different ways to be notified, to your flow.
- Run tasks on a schedule, when you want an action to occur daily, on a certain date, or after a certain number of minutes.
- Add a cloud flow to an app to allow your app to kick off logic in the cloud.
- Get started with team flows and invite others to collaborate with you to design flows.

Create a cloud flow by using Dynamics 365 (online)

1/15/2022 • 7 minutes to read • Edit Online

> **IMPORTANT**
>
> Dynamics 365 apps such as Dynamics 365 Sales, Dynamics 365 Customer Service, Dynamics 365 column Service, Dynamics 365 Marketing, and Dynamics 365 Project Service Automation, use Microsoft Dataverse as the data source.
>
> The Dynamics 365 connector is deprecated, but continues to work until removed. More information: Dynamics 365 Connector is deprecated.
>
> Do not use the Dynamics 365 connector for new flows. Use the Microsoft Dataverse connector whenever you can. If the Microsoft Dataverse connector does not fit your needs, use the Microsoft Dataverse (legacy) connector.
>
> The Microsoft Dataverse connector should be your first choice because it provides the most capability and best performance. However, it does not currently provide certain capabilities that the Dynamics 365 and Microsoft Dataverse connectors do, such as the ability to connect to multiple environments. The Microsoft Dataverse (legacy) provides the same capabilities as the Dynamics 365 connector, but also provides substantially improved reliability.

By using a Dynamics 365 connector, you can create flows that initiate when an event occurs in Dynamics 365, or some other service, which then performs an action in Dynamics 365, or some other service.

In Power Automate, you can set up automated workflows between your favorite apps and services to synchronize files, get notifications, collect data, and more. For more information, see Get started with Power Automate.

> **IMPORTANT**
>
> To invoke a Power Automate trigger, the table used with the flow must have **Change Tracking** enabled. More information: Enable change tracking to control data synchronization

Create a cloud flow from a template

You can create a cloud flow using one of the many templates available, such as these examples:

- When an object is created in Dynamics 365, create a list item in SharePoint.
- Create Dynamics 365 leads from an Excel table.
- Copy Dynamics 365 accounts to customers in Dynamics 365 for Operations.

To create a cloud flow from a template, follow these steps.

1. Sign in to the Power Automate website.
2. Click or tap **Services**, and then click or tap **Dynamics 365**.
3. Several templates are available. To get started, select the template that you want.

Create a task from a lead

If a template isn't available for what you need, create a cloud flow from scratch. This walkthrough shows you how to create a task in Dynamics 365 whenever a lead is created in Dynamics 365.

1. Sign in to the Power Automate website.

2. Click or tap **My flows**, and then click or tap **Create from blank**.
3. In the list of flow triggers, click or tap **Dynamics 365 - When a record is created (deprecated)**.
4. If prompted, sign in to Dynamics 365.
5. Under **Organization Name**, select the Dynamics 365 instance where you want the flow to listen.
6. Under **Table Name**, select the table that you want to listen to, which will act as a trigger initiating the flow.

   For this walkthrough, select **Leads**.

> [IMPORTANT] In order for the flow to trigger on the Dynamics 365 table, the table definition must have **Change Tracking** enabled. See Enable change tracking to control data synchronization

7. Click or tap **New step**, and then click or tap **Add an action**.
8. Click or tap **Dynamics 365 – Create a new row**.
9. Under **Organization Name**, select the Dynamics 365 instance where you want the flow to create the row. Notice that it doesn't have to be the same instance where the event is triggered from.
10. Under **Table Name**, select the table that will create a row when the event occurs.

    For this walkthrough, select **Tasks**.
11. A **Subject** box appears. When you click or tap it, a dynamic content pane appears where you can select either of these columns.

    - **Last Name**. If you select this column, the last name of the lead will be inserted in the **Subject** column of the task when it's created.
    - **Topic**. If you select this column, the **Topic** column for the lead will be inserted in the **Subject** column of the task when it's created.

    For this walkthrough, select **Topic**.

> **Tip:** On the dynamic content pane, click or tap **See more** to display more columns that are associated with the table. For example, you can also populate the **Subject** column of the task with the **Company Name**, **Customer**, **Description**, or **Email** column of the lead.

12. Click or tap **Create flow**.

Trigger based logic

Triggers like **When a row is added, modified or deleted**, **When an action is performed**, and **When a flow step is run from a business process flow** initiate your flow within a few minutes of the event occurring. In rare cases, your flow can take up to 2 hours to trigger.

When the trigger occurs, the flow receives a notification, but the flow runs on data that exists at the time the action runs. For example, if your flow triggers when a new row is created, and you update the row twice before the flow runs, your flow runs only once with the latest data.

Specify advanced options

When you add a step to a cloud flow, you can click or tap **Show advanced options** to add a filter or order by query that controls how the data is filtered in the flow.

For example, you can use a filter query to retrieve only active contacts, and you can order them by last name. To do this, enter the OData filter query **statuscode eq 1** and select **Last Name** from the dynamic content pane. For more information about filter and order by queries, see Query data > Filter results and Query data > Order results.

Best practices when using advanced options

When you add a value to a column, you must match the column type whether you type a value or select one from the dynamic content pane.

COLUMN TYPE	HOW TO USE	WHERE TO FIND	NAME	DATA TYPE
Text columns	Text columns require a single line of text or dynamic content that is a text type column. Examples include the **Category** and **Sub-Category** columns.	**Settings** > **Customizations** > **Customize the System** > **Tables** > **Task** > **Fields**	**category**	**Single Line of Text**
Integer columns	Some columns require integer or dynamic content that is an integer type column. Examples include **Percent Complete** and **Duration**.	**Settings** > **Customizations** > **Customize the System** > **Tables** > **Task** > **Fields**	**percentcomplete**	**Whole Number**
Date columns	Some columns require a date entered in mm/dd/yyyy format or dynamic content that is a date type column. Examples include **Created On**, **Start Date**, **Actual Start**, **Last on Hold Time**, **Actual End**, and **Due Date**.	**Settings** > **Customizations** > **Customize the System** > **Tables** > **Task** > **Fields**	**createdon**	**Date and Time**

COLUMN TYPE	HOW TO USE	WHERE TO FIND	NAME	DATA TYPE
Fields that require both a row ID and lookup type	Some columns that reference another table row require both the row ID and the lookup type.	**Settings** > **Customizations** > **Customize the System** > **Tables** > **Account** > **Fields**	**accountid**	**Primary Key**
Choice	Choice columns require a known integer value to be passed into this type of column. In the Dynamics 365 customization area, you can view the choices backing integer column along with its respective label.	Settings > Customization > Customize the System > Tables> Account > Fields	Preferred Method of Contact	Whole Number

More examples of columns that require both a row ID and lookup type

Expanding on the previous table, here are more examples of columns that don't work with values selected from the dynamic content list. Instead, these columns require both a row ID and lookup type entered into the columns in Power Apps.

- **Owner** and **Owner Type**.
  - The **Owner** column must be a valid user or team row ID.
  - The **Owner Type** must be either **systemusers** or **teams**.
- **Customer** and **Customer Type**.
  - The **Customer** column must be a valid account or contact row ID.
  - The **Customer Type** must be either **accounts** or **contacts**.
- **Regarding** and **Regarding Type**.
  - The **Regarding** column must be a valid row ID, such as an account or contact row ID.
  - The **Regarding Type** must be the lookup type for the row, such as **accounts** or **contacts**.

This example adds an account row that corresponds to the row ID, adding it to the **Regarding** column of the task.

This example also assigns the task to a specific user based on the user's row ID.

To find a row's ID, see Find the row ID later in this topic.

> **Important:** Fields shouldn't contain a value if they have a description of "For internal use only." These columns include **Traversed path**, **Additional Parameters**, and **Time Zone Rule Version Number**.

Find the row's ID

1. In the Dynamics 365 web application, open a row, such as an account row.

2. On the actions toolbar, click or tap **Pop Out** (or click or tap **EMAIL A LINK** to copy the full URL to your default email program).

   In the address bar of the web browser, the URL contains the row ID between the %7b and %7d encoding characters.

Related topics

Troubleshooting a cloud flow

Flow in your organization Q&A

Frequently asked questions

Create flows from the OneDrive for Business launch panel

1/15/2022 • 2 minutes to read • Edit Online

Similar to the Power Automate Launch Panel in SharePoint, you can run flows on specific files in OneDrive for Business.

This feature enables the person running the flow to use their own credentials, which is especially applicable for flows that have been created by an IT department.

Users can also get prompts for runtime inputs like **Approver** or **Message**, which can be of type text, file, email, Boolean, or number.

In this walkthrough, we'll create a simple flow that uses one of the many OneDrive for Business templates to request approval of a file by the requestor's manager.

Create a cloud flow that requests manager approval for a file in OneDrive for Business

1. Sign into OneDrive for Business.
2. Find, and then select the file for which you want to create the flow.
3. Select the **Show actions** link (three dots).
4. Select **Automate** > **Power Automate** > **Create a flow**.

5. Select one of the templates.

   In this example, select the **Request my manager's approval for the selected file** template.

   > **TIP**
   > Sign into all connectors that request that you sign in.

6. Select **Continue**.

7. Make any changes you want to the template and then save your flow with a name that you'll remember easily.

Run the flow

1. Sign into OneDrive for Business.

2. Find, and then select the file for which you want to request manager approval.

3. Select the **Show actions** link (three dots).

4. Select **Flow**. You'll see the flow that you created earlier.

5. Select the flow you created earlier.

> **TIP**
>
> While this walkthrough shows how to create a cloud flow from a template, you can also create a cloud flow from blank to use any of the hundreds of connectors available in Power Automate.

Learn more

- Get started with Power Automate
- Build multi-step flows

Filter and copy data with Power Automate

1/15/2022 • 5 minutes to read • Edit Online

This walkthrough shows you how to create a cloud flow that monitors a source for new or changed items and then copies those changes to a destination. You may create a cloud flow like this one if your users enter data in one location, but your team needs it in a different location or format.

While this walkthrough copies data from a Microsoft SharePoint list (the source) to an Azure SQL Database table (the destination), you can copy data among any of the more than 380 connectors that Power Automate supports.

> **TIP**
> For detailed information about using SharePoint with Power Automate, see the SharePoint documentation.

> **IMPORTANT**
> Changes you make in the destination aren't copied to the source because two-way syncs aren't supported. If you attempt to set up a two-way sync, you'll create an infinite loop where changes are sent endlessly between the source and destination.

Prerequisites

- Access to a data source and a destination. This walkthrough doesn't include steps to create the source and destination.
- Access to Power Automate.
- A basic understanding of how your data is stored.
- Familiarity with the basics of creating flows. You can review how to add actions, triggers, and conditions. The following steps assume that you know how to perform these actions.

> **TIP**
> Every column name in the source and destination doesn't need to match, but you must provide data for all *required* columns when you insert or update an item. Power Automate identifies the required fields for you.

Quick overview of the steps

If you're comfortable with Power Automate, use these quick steps to copy data from one data source to another:

1. Identify the source you'll monitor and the destination to which you'll copy changed data. Confirm you've access to both.
2. Identify at least one column that uniquely identifies items in the source and destination. In the example that follows, we use the **Title** column, but you could use any column(s) you want.
3. Set up a trigger that monitors the source for changes.
4. Search the destination to determine if the changed item exists.
5. Use a **Condition** like this:
   - If the new or changed item doesn't exist in the destination, create it.

- If the new or changed item exists in the destination, update it.

6. Trigger your flow, and then confirm that new or changed items are being copied from the source to the destination.

> **NOTE**
>
> If you haven't created a connection to SharePoint or Azure SQL Database previously, follow the instructions when you're prompted to sign in.

Here are the detailed steps to create the flow.

Monitor the source for changes

1. Sign into Power Automate, select **My flows** > **Create from blank**.

2. Search for **SharePoint** > select the **SharePoint - When an item is created or modified** trigger from the list of triggers.

3. Enter the **Site Address** and then select the **List Name** on the **When an item is created or modified** card.

   Provide the **Site Address** and **List Name** for the SharePoint list your flow monitors for new or updated items.

Search the destination for the new or changed item

We use the **SQL Server - Get rows** action to search the destination for the new or changed item.

1. Select **New step** > **Add an action**.

2. Search for **Get rows**, select **SQL Server - Get rows**, and then select the table you want to monitor from the **Table name** list.

3. Select **Show advanced options**.

4. In the **Filter Query** box, enter **Title eq '**, select the **Title** token from the dynamic content list, and then enter **'**.

   The previous step assumes you're matching the Titles of the rows in the source and the destination.

   The **Get rows** card should now look like this image:

Check if the new or changed item was found

Select **New step** > **Add a condition** to open the **Condition** card.

On the condition card:

1. Select the box on the left.

   The **Add dynamic content from the apps and connectors used in this flow** list opens.

2. Select **value** from the **Get rows** category.

   > **TIP**
   > Confirm you've selected **value** from the **Get rows** category. Don't select **value** from the **When an item is created or modified** category.

3. Select **is equal to** from the list in the center box.

4. Enter **0** (zero) in the box on the right side.

   The **Condition** card now resembles this image:

5. Select **Edit in advanced mode**.

   When advanced mode opens, you see **@equals(body('Get_rows')?['value'], 0)** expression in the box. Edit this expression by adding **length()** around the **body('Get_items')?['value']** function. The entire expression now appears like this: **@equals(length(body('Get_rows')?['value']), 0)**

   The **Condition** card now resembles this image:

> **TIP**
> Adding the **length()** function allows the flow to check the **value** list and determine if it contains any items.

When your flow "gets" items from the destination, there're two possible outcomes.

OUTCOME	NEXT STEP
The item exists	Update the item
The item doesn't exist	Create a new item

> **NOTE**
> The images of the **Insert row** and **Update row** cards shown next may differ from yours because these cards show the names of the columns in the Azure SQL Database table that's being used in the flow.

Create the item in the destination

If the item doesn't exist in the destination, create it using the **SQL Server - Insert row** action.

On the **If yes** branch of the **Condition**:

1. Select **Add an action**, search for **insert row**, and then select **SQL Server - Insert row**.

   The **Insert row** card opens.

2. From the **Table name** list, select the table into which the new item will be inserted.

   The **Insert row** card expands and displays all columns in the selected table. Fields with an asterisk (*) are required and must be populated for the row to be valid.

3. Select each column that you want to populate and enter the data.

   You may enter the data manually, select one or more tokens from the **Dynamic content**, or enter any combination of text and tokens into the columns.

   The **Insert row** card now resembles this image:

Update the item in the destination

If the item exists in the destination, update it with the changes.

1. Add the **SQL Server - Update row** action to the **If no** branch of the **Condition**.
2. Follow the steps in the create the item section of this document to populate the columns of the table.

3. At the top of the page, enter a name for your flow in the **Flow name** box, and then select **Create flow** to save it.

Now, whenever an item in your SharePoint list (source) changes, your flow triggers and either inserts a new item or updates an existing item in your Azure SQL Database (destination).

> **NOTE**
> Your flow isn't triggered when an item is deleted from the source. If this is an important scenario, consider adding a separate column that indicates when an item is no longer needed.

Learn more

Use data operations in your flows.

Run your flows with Flics smart buttons (Preview)

1/15/2022 • 4 minutes to read • Edit Online

Trigger your flows by pressing a physical button, known as a Flic, from Shortcut Labs. For example, press a Flic to track your working hours, block your calendar, count visitors at an event, or save geographical locations.

> **IMPORTANT**
>
> Configure all Flic properties by using Flic's mobile app for Android or iOS before you create your flow.

Prerequisites

To use Flics with Power Automate, you must have:

- Access to Power Automate.
- Downloaded Flic's Android or iOS mobile app, and used it to pair one or more Flics.

Configure Flic properties

Use Flic's mobile app to program the Flic's events. The events are:

- click (one quick press)
- double-click (two quick presses)
- hold (one long press)

This screenshot shows a sample of what your Flic configuration process might be like:

After you've linked a Flic event to Power Automate, you can then select that Flic as a trigger for your flows. You select triggers later in this walkthrough.

Create a cloud flow that's triggered by a Flic

In this walkthrough, we use a Flic to run a cloud flow that records the time a consultant spends at each client. The consultant presses the Flic once upon arrival, and then presses it again, just before departure from the client. Each press of the Flic starts a run of the flow to which it's connected. The flow saves the current time in Google Sheets, and then sends an email notification. The email contains details about the flow run.

Note: Be sure you've used the Flic mobile app to pair, and configure at least one **click** action to trigger Power Automate. In this screenshot, I've configured the **click** action to trigger Power Automate. Later in this walkthrough we configure our flow to trigger when the Flic is pressed once (clicked).

Let's get started creating our flow.

Start with a template

1. Sign into Power Automate.

2. Enter **flic** into the search box, and then select the search icon.

3. Select the **Track your working hours with Flic smart button** template.

Create a spreadsheet in Google Sheets

1. Review the template's details and note that this template requires a spreadsheet in Google Sheets.

2. In Google Sheets, create a spreadsheet that contains a sheet with columns named **ClickType** and **TimeStamp**.

   Tip: You name columns in Google Sheets by entering the column name at the top of the column. So, your sheet should appear like this screenshot:

   Note: You use this sheet later in this walkthrough.

Add the Flic trigger to your flow

1. Sign in to the template's services, and then select **Continue**.

   Continue is enabled after you sign into all required services for the template.

2. Enter **flic** into the search box, and then select the **Flic - When a Flic is pressed** trigger.

3. Select the Flic you want to use from the **Flic button** list on the **Flic - When a Flic is pressed** card.

4. Select **click** from the **Events** list to indicate that you want to trigger the flow when the Flic is pressed once.

Optionally, you can select **any** to indicate that each Flic event (click, double-click, or hold) triggers the flow.

Double-click indicates that the flow triggers when the Flic is quickly pressed two times. **Hold** indicates that a long press on the Flic triggers the flow.

You're free to create other flows and trigger them using the other events in the **Events** list. For example, you can use the **double-click** event to note the time you leave a client.

Configure the sheet

On the **Insert row** card:

1. Select the spreadsheet you created earlier from the **File** list.

2. Select the sheet from the **Worksheet** list.

   Note: Two additional boxes appear on the **Insert row** card after you select the sheet. These boxes represent the two columns in the sheet you created earlier.

3. Select the **ClickType** box, and then select the **Click type** token.

4. Select the **Timestamp** box, and then select the **Click time** token.

Confirm the email settings are correct

1. Confirm the **Send me an email notification** card looks like this screenshot.

Save your flow and test it

1. Give your flow a name, and then save it.

If you've followed along, pressing the Flic once triggers the flow. The flow then records the click type and the current time in the sheet and then sends an email to you.

1. Press your Flic once.

2. Open your worksheet in Google Sheets. You should see the **ClickType** and the **Timestamp** columns populated with the "click" and the time, respectively.

3. You can also see the results of the run from the Power Automate website or from the Power Automate mobile app. Here's a screenshot of my test run.

4. Here's what the body of the notification email that I received from the run of the flow looks like.

For extra credit, consider extending the flow to automatically store your location (latitude and longitude) when the Flic is pressed.

More information

- Share button flows.
- Learn to use button trigger tokens to send current data when your button flows are executed.
- Install the Power Automate mobile app for Android, iOS, or Windows Phone.

Run your flows with bttns from The Button Corporation (Preview)

1/15/2022 • 3 minutes to read • Edit Online

Trigger your flows by pressing a bttn (a physical button made by The Button Corporation). For example, you can press a bttn that triggers a cloud flow to perform these tasks:

- contacts your helpdesk with location information
- sends an email to your team
- blocks your calendar
- reorders supplies

> **IMPORTANT**
>
> You must register your bttn before you can use it in a cloud flow.

> **TIP**
>
> Configure all bttn properties such as name, location, and email address on the bttn website before you create your flow.

You can also trigger a cloud flow by using a Flic physical button.

Prerequisites

- Access to Power Automate.
- At least one registered bttn.

Create a cloud flow that's triggered from a bttn

In this walkthrough, we use a helpdesk template to create a cloud flow that you can trigger with a single press of a bttn. When the flow runs, it generates a support request and then sends it to the helpdesk. The support request provides the helpdesk with the location of the room where help is needed. This walkthrough demonstrates how to create this flow from a template, but you can use the blank template, which gives you full control over all aspects of your flow.

You can use any of these templates to quickly create flows for your bttn and connect to Zendesk, Google, and SharePoint, among others:

Tip: For the purposes of this walkthrough, give your bttn a name that represents a conference room in a typical office building.

The settings for your bttn should resemble this example (from the bttn website):

Now that you've registered and configured your bttn, let's get started creating our flow.

Sign in and select a template

1. Sign into Power Automate.

   Note: As an alternative, you can create flows in the Power Automate mobile app for Android, iOS, or Windows Phone.

2. Enter **bttn** into the search box, and then select the search icon.

   After you select the search icon, all templates that you can use with bttns appear.

3. Select the **Use Bttn to call technical support for meeting room** template.

Authorize Power Automate to connect to your bttn

1. If prompted, sign into the bttn and the Office 365 Outlook services, which will enable the **Continue** button.

2. When you sign into the bttn service, authorize Power Automate to use your bttns.

   Important: If you don't authorize Power Automate to use your bttns, you can't see or connect to them from Power Automate.

3. After you sign into both services, select **Continue**.

Select the bttn that triggers the flow

1. In the **When a bttn is pressed** card, open the list of bttn IDs, and then select the bttn that you want to use.

Your flow should now resemble this example.

2. Give your flow a name, and then select **Create flow** to save it.

Test your flow and confirm results

1. Press the button on your bttn.

2. View your flow's run history to confirm that it ran successfully.

   You can check run history on the Power Automate website or on your mobile device.

   Note: The run status is set to **running** until someone selects **Acknowledge** in the support-request email.

3. You can also confirm that the email was sent to the support team.

   If you've followed along, the support email looks similar to this example:

Troubleshooting

- If your flow wasn't triggered, sign into The Button Corporation's site and confirm whether the button activity (presses) are being recorded.
- You can also drill into the run activity on the Power Automate site and check for error messages.

More information

- Share button flows.
- Learn to use button trigger tokens to send current data when your button flows run.
- Install the Power Automate app for Android.
- Install the Power Automate app for iOS.

Run flows on a schedule

1/15/2022 • 2 minutes to read • Edit Online

Create a cloud flow that performs one or more tasks (such as sending a report in email):

- Once a day, an hour, or a minute
- On a date that you specify
- After a number of days, hours, or minutes that you specify

Create a recurring flow

1. Sign in to Power Automate, and then select **My flows** on the left navigation pane.
2. Select **New** and then **Scheduled-from blank**.

3. Specify when your flow should start by editing **Starting** boxes, and specify the flow's recurrence by editing **Repeat every** boxes then select **Create**.

Configure advanced options

1. Follow the steps in the previous section. and then select **Recurrence** > **Show advanced options**.

> **NOTE**
>
> These options change based on the values to which **Interval** and **Frequency** are set. If your screen doesn't match the graphic below, make sure that **Interval** and **Frequency** are set to the same values that the graphic shows.

2. Select a **Time zone** to specify whether the **Start time** reflects a local time zone, Universal Coordinated Time (UTC), etc.

3. Specify a **Start time** in this format:
   YYYY-MM-DDTHH:MM:SSZ

4. If you specified **Day** under **Frequency**, specify the time of day when the flow should run.

5. If you specified **Week** under **Frequency**, specify the day or days of the week on which the flow should run and the time or times of day when the flow should run.

   For example, configure the options as shown to start a cloud flow no sooner than noon (Pacific time) on Monday, January 1, 2018, and run it every two weeks on Tuesdays at 5:30p (Pacific time).

6. Add the action or actions that you want the flow to take, as Create a cloud flow from scratch describes.

Learn more

Learn more about the advanced options and how to configure them.

Use the apply to each action in Power Automate to process a list of items periodically

1/15/2022 • 5 minutes to read • Edit Online

Many triggers can immediately start a cloud flow based on an event such as when a new email arrives in your inbox. These triggers are great, but sometimes you want to run a cloud flow that queries a data source on a predefined schedule, taking certain actions based on the properties of the items in the data source. To do this, your flow can be started on a schedule (such as once per day) and use a loop action such as **Apply to each** to process a list of items. For example, you could use **Apply to each** to update records from a database or list of items from Microsoft SharePoint.

Watch this video for a demo of the **Apply to each** action.

In this walk-through, we'll create a cloud flow that runs every 15 minutes and does the following:

1. Gets the last 10 unread messages in your Office 365 Outlook Inbox.
2. Checks each of the 10 messages to confirm if any has **meet now** in the subject.
3. Checks if the email is from your boss or was sent with high importance.
4. Sends a push notification and marks as read, any email that has **meet now** in the subject and is either from your boss or was sent with high importance.

This diagram shows the details of the flow we'll create:

Prerequisites

Here are the requirements for successfully performing the steps in this walk-through:

- An account that's registered to use Power Automate.
- An Office 365 Outlook account.
- The Power Automate mobile app for Android, iOS, or Windows Phone.
- Connections to Office 365 Outlook and the push notification service.

> **TIP**
>
> For detailed information about using SharePoint with Power Automate, see the SharePoint documentation.

Create a cloud flow

1. Sign into Power Automate.
2. Select **My flows** > **New** > **Scheduled-from blank**
3. Provide a name for your flow in **Flow name** on the **Build a scheduled flow** screen.
4. Set the schedule to run every 15 minutes.
5. Select the **Create**

6. Select **+ New step**, and then type **outlook** into the search box to find all connectors and actions related to Microsoft Outlook.
7. Select the **Get emails (V3)** action:
8. The **Get emails (V3)** card opens. Configure the **Get emails (V3)** card to select the top 10 unread emails from the Inbox folder. Don't include attachments because they won't be used in the flow:

> **NOTE**
>
> So far, you've created a simple flow that gets some emails from your inbox. These emails will be returned in an array; the **Apply to each** action requires an array, so this is exactly what's needed.

Add actions and conditions

1. Select **New step** > **Built-in** > **Apply to each** action.
2. Insert the **value** token into the **Select an output from previous steps** field on the **Apply to each** card. This pulls in the body of the emails to be used in the **Apply to each** action:

3. Select **New step** > **Control** > **Condition**.
4. Configure the **Condition** card to search the subject of each email for the words "meet now":
   - Insert the **Subject** token into the first field of the **Condition** card.
   - Select **contains** in the list of operators.
   - Enter **meet now** into the third field.

5. Select **Add an action** > **Condition** from the **If yes** branch. This opens the **Condition 2** card; configure that card like this:

   - Insert the **Importance** token into the first field.
   - Select **is equal to** in the list of operators.
   - Enter **high** into the field on the right side.

6. Select **Add an action** under the **If yes** section.
   This opens the **Choose an action** card, where you'll define what happens if the search condition (the **meet now** email was sent with high importance) is true.

7. Search for **notification**, and then select the **Send me a mobile notification** action:

8. On the **Send me a mobile notification** card, provide the details for the push notification that will be sent if the subject of an email contains "meet now" and the **Importance** is **high**.

9. Going back to the **Condition 2** card, on the **If no** branch:

   - Select **Add an action**, and then type **get manager** into the search box.
   - Select the **Get manager (V2)** action from the search results list.
   - Enter the **To** token into the **User (UPN)** box of the **Get Manager (V2)** card.

10. Select **Add an action** from the **If no** branch.

11. Select **Condition** from the **Choose an action** card. This opens the **Condition 3** card; configure the card to check if the email sender's email address (the From token) is the same as your boss' email address (the Email token):

    - Insert the **From** token into the first box.
    - Select **contains** in the list of operators.
    - Enter **mail** token into the rightmost box.

12. Select **Add an action** under the **If yes** section of the **Condition 3** card.

Next, you'll define what should happen if the search condition (the email was sent from your boss) is true:

1. Search for **notification**, and then select the **Send me a mobile notification** action:

2. On the **Send me a mobile notification 2** card, provide the details for the push notification that will be sent if the email is from your boss, and then select **Add an action**:

3. Add the **Mark as read or unread (V2)** action.

4. Add the **Message Id** token to the **Mark as read or unread (V2)** card. You may need to select **See more** to find the **Message Id** token. The **Message Id** is the Id of the message that will be marked as read.

5. Select **Read** from the **Mark as** list on the **Mark as read or unread (V2)** card.

6. Select **Save** to save your flow.

Run the flow

1. Send yourself a high-importance email that includes **meet now** in the subject (or have someone in your organization send you such an email).
2. Confirm the email is in your inbox and it's unread.
3. Sign into Power Automate, select **My flows**.

   A list of your flows displays.
4. Select the flow you just created, and then select **Run**.

5. Select **Flow Runs Page**, and then select the flow run in which you are interested to view the results.

View results of the run

Now that you've run the flow successfully, you should receive the push notification on your mobile device.

> **NOTE**
>
> If you don't receive the push notification, confirm that your mobile device has a working data connection.

Introducing instant flows

1/15/2022 • 5 minutes to read • Edit Online

There are many repetitive tasks that we all wish we could run with just a tap of a button. For example, you may need to quickly email your team to remind them to join the daily team sync, or you may want to start a new Visual Studio Codespaces build of your code base after you've been notified that there are no more checkins planned for the day. Instant flows allow you to accomplish these and many other tasks simply by tapping a button on your mobile device.

> **NOTE**
>
> You can create instant flows either from your mobile device or from Power Automate.

Why create buttons?

Create buttons so that you can easily run repetitive tasks from any place, at anytime via your mobile device. Running buttons saves you time and, since the tasks they perform are automated, there will be less errors than if you manually did them.

Create a button

Prerequisites

- Access to Power Automate.
- An account with permissions to use the connectors to create your button. For example, you will need a Dropbox account in order to create a button that accesses Dropbox.

From the portal

In this walk-through, let's create a button that starts a Visual Studio Codespaces build and sends notifications to let you know when the build starts:

1. Sign in to Power Automate.

2. Select **Create** from the left side of the screen.

3. Select **Instant flow**.

4. Give your flow a name in the **Flow name** > **Manually trigger a flow** > **Create**.

5. Select the **Trigger a new build in VSO** template from the list of templates.

6. Select the **Use this template** button on the **Trigger a new build in VSO** page.

7. If you aren't signed in, you'll be prompted to do so at this point:

8. After you've signed into Flow, you'll be prompted to sign into the connectors used in the template you've selected. In this example, in step 2 above we selected the **Trigger a new build in VSO** template, so we have to sign into VSO (and any other connectors you are working with), if you're not already signed in:

9. Select the **Accept** button if you agree to authorize Power Automate to access your VSO account.

Note You'll need to authorize each connector similarly. The designer should appear like this when you are ready to move on to the next step. Select the **Continue** button to move on:

10. You are now ready to configure the properties for the build you wish to start:

11. Select or enter the **Account name**, **Project name**, **Build definition Id**, **Source branch** and optionally, **Parameters**, in the **Queue a new build** card:

12. Next, configure the properties of the push notification on the **Send a push notification** card. By default, this push notification is configured to send an HTML link to a Web page that displays the status of the build:

13. Select the **Create flow** button to save your instant flow:

14. You should see this success message within a few moments:

Congratulations, you've created a instant flow! You can now run this instant flow anytime, any place, from the **Buttons** tab in the Flow app. Simply press the "button" and it will run! The Power Automate mobile app is available for Android, iOS, or Windows Phone.

From your mobile device

> **NOTE**
>
> While this walk-through displays screens from an Android device, the screens and experience on an iOS device are similar.

In the app:

1. Select the **Browse** tab and scroll to the **Button** category.

2. Select the **See all** link. This displays all ready-to-go button templates.

3. Select the **Send an email to remind your team to join a meeting** template

4. Select the **USE THIS TEMPLATE** link, at the bottom of the page.

5. You'll need to sign into all services that this template uses:

6. Select the **Next** link after you've signed in to all services.

7. Select the **Create** link. Here you can also review the flow and make any changes you require to personalize the email, for example.

8. After a few moments, the instant flow is created. Select **SEE MY FLOW**:

9. View all your flows on the **My flows** tab

Congratulations, you've created a instant flow! You can now run this instant flow anytime, any place, from the **Buttons** tab in the Flow app. Simply press the "button" and it will run! The Flow app is currently available on Android and iOS mobile devices.

Trigger an instant flow

Now that you've created a instant flow, it's time to run it. Since you can only run instant flows from the Flow app, be sure you've installed Flow on your Android or iOS mobile device.

1. Now, launch the flow app, tap the **Buttons** tab that's located at the bottom of the page, and tap the *button* that represents the instant flow you wish to trigger:

2. See the progress while the flow runs:

3. Finally, the page updates, indicating that the instant flow has completed:

That's all there is to running a cloud flow.

You should now receive the push notification, indicating that the email has been sent.

Monitor your instant flow runs

You can monitor instant flows from the **Activity** tab of the flow app:

> **TIP**
>
> Tap any activity to drill into the results of the run to learn about the run.

Manage instant flows

You have full control of your instant flows so you can enable/disable, edit or delete a button anytime, any place. From the mobile app or from the flow portal, select **My flows** to get started managing your flows.

On the **My flows** tab of the Flow app:

1. Select the flow you wish to manage:

2. You can tap any of these options, based on what you'd like to accomplish:

Tap **Delete flow** to delete a cloud flow.

> **WARNING**
>
> All run history is deleted when you delete a cloud flow.

Tap **Update** after you are done editing a instant flow, to save your changes:

Tap **Run history** to see the results of all runs of a particular instant flow:

If you disable a cloud flow, it will no longer be available on the **Buttons** tab:

Next steps

- Share instant flows.
- Learn to use button trigger tokens to send real-time data when your instant flows are run.
- Install the Power Automate mobile app for Android, iOS, or Windows Phone.

Create a flow from your phone

1/15/2022 • 2 minutes to read • Edit Online

Create a cloud flow from your phone by using a Power Automate template. On the **Templates** screen in Power Automate, you can select the **Mobile** category to find templates designed to work on your mobile phone.

In this topic, we'll follow an example to create a flow that sends a push notification to your phone when you get mail from your boss.

If you're unfamiliar with Power Automate, get an overview.

Prerequisites

To complete the example in this topic, you'll need the following:

- Access to Power Automate.
- The Power Automate mobile app for Android, iOS, or Windows Phone on a supported device. The graphics in this topic reflect the iPhone version of the app, but the interface on an Android device or Windows Phone is similar.
- To use the template demonstrated in this topic, you'll also need:
  - Office 365 credentials.
  - Push notifications enabled on your phone.

Find a template

1. Open the mobile app, and then tap **Browse** at the bottom of the screen.

You can find a template in any of these ways:

- Specify a keyword in the search box at the top of the screen.
- Tap an option in the list of services.
- Scroll down to show a variety of categories, and then tap a template in any category.

For this tutorial, you'll open the template that sends a push notification when you get mail from your boss.

2. In the list of services, tap **See all**.

3. Tap the **Notifications** service icon.

4. In the search bar, type **boss**, and then tap the template to send a push notification when you receive a message from your boss.

5. In the screen that gives details about the template that you've selected, tap **Use this template**.

Finish the flow

1. If prompted, tap **Sign in**, and provide your credentials for Office 365 Outlook, Office 365 Users, or both.

> **TIP**
>
> You can use the same connections when you create other flows.

2. In the upper-right corner, tap **Create**.

Your flow is created and it checks for email from your boss until you pause or delete the flow.

Next steps

- Monitor your flow activity.
- Manage your flows.

Get started with button trigger tokens

1/15/2022 • 3 minutes to read • Edit Online

What are button trigger tokens?

Button trigger tokens are data points that are known and available to the device on which a button flow is running. These tokens change based on factors such as the current time or the geographic location of the device at a given moment.

For example, if you are running a button flow on a smart phone, it is likely that the **phone knows the time** at your current location as well as the date and your current address. In this context, the time, date and address where the phone is located are all determined at the time the button flow runs. They are automatically available for use in any button flows that are executed on the device. You can use these trigger tokens to build useful flows that will minimize repetitive tasks such as providing your location to someone or tracking how much time you spent on a particular job/service call.

List of button trigger tokens

Here's the list of the button trigger tokens that are available for you to use when creating your button flows.

PARAMETER	DESCRIPTION
City	The city in which the device that's running the flow is located.
Country/Region	The country/region in which the device that's running the flow is located.
Full address	The full address where the device that's running the flow is located.
Latitude	The latitude in which the device that's running the flow is located.
Longitude	The longitude in which the device that's running the flow is located.
PostalCode	The postal code in which the device that's running the flow is located.
State	The state in which the device that's running the flow is located.
Street	The street on which the device that's running the flow is located.
Timestamp	The time in the area where the device that's running the flow is located.
Date	The date in the area where the device that's running the flow is located.

PARAMETER	DESCRIPTION
User name	The user name of the person signed into the device that's running the flow.
User email	The email address of the person signed into the device that's running the flow.

Create a button flow that uses trigger tokens

When you create a button, you can use trigger tokens to add rich functionality to your button.

In this walk-through, we will create a button flow on an Android device. The button flow will use trigger tokens to send the date and your full address in a "**Working from home**" email to your boss.

In this walk-through, you will see screen-shots from an Android device, however, the experience is similar on iOS and Windows Phone devices as well.

Prerequisites

- A work or school email address or a Microsoft Account with access to Power Automate.
- The Power Automate mobile app for Android, iOS, or Windows Phone.

Let's get started:

1. Launch Flow and select **Browse**

2. Select the **Send a 'Working from home today' email to your manager** service under the **Button** category

3. Select **USE THIS TEMPLATE**

4. Select **Edit** on the **Send an email** card

5. Tap the **Subject** text box and enter: " **today** - " into the text box after the "WFH" text. Notice that when you tapped on the text box, a list of parameters/tokens also opened up. We'll use one of these tokens in the next step to add the date to the subject of the email.

6. With the cursor still in the subject text box, scroll to the **manual** list of parameters and tap **Date**. Notice the date parameter is now in the **Subject** text box:

7. Scroll to the **Body** text box and tap after the default message so that additional tokens can be included there.

8. Tap the **Full address** parameter, then tap **Create**

9. Tap **Done**. Your button flow is now created.

Run the button flow

NOTE: This button flow will send your current location via email.

1. Tap the **Buttons** category at the bottom of the screen. You will see a list of the buttons that you have permissions to use. Tap the button that represents the button flow you just created:

2. Tap **ALLOW** to indicate that it's OK for the button flow to access your device's location information:

3. Within a few moments, notice that the email was sent to your boss:

Congratulations, you've just created a button flow that uses both the date and full address trigger tokens.

Next steps

- Share button flows
- Learn about button flows

Introducing button flows with user input

1/15/2022 • 3 minutes to read • Edit Online

Create a button flow to run routine tasks by simply tapping a button. Customize your flow by allowing the user to provide specific details that will be used when the flow runs. This topic walks you through creating a button flow that takes input from the user and then running the button flow, highlighting how to provide the user input.

You can create a button flow in the Power Automate website or the mobile app for Power Automate. For this topic, you'll use the website.

Prerequisites

- An account on the Power Automate website.

Open the template

1. Sign in to the Power Automate website, enter **Visual Studio** in the search box, and then click or tap the search icon to find all templates that relate to Visual Studio:

2. Select the **Open a Priority 2 Bug in Visual Studio** template:

3. Select **Use this template** button:

This template uses the Visual Studio Team Services (VSTS) and the Push notification services. You'll need to sign into these services if you don't have a connection to either of them. The **Sign in** button will appear only if you need to sign into a service.

4. After you sign into all required services, select the **Continue** button:

5. (optional) Change the name of the flow by typing a name of your choice into the box at the top of the portal:

Customize the user input

1. In the trigger card, select **Edit**:

2. Select the **+** icon to expand the page so that you can add custom input fields:

3. Enter the **Input title** and **Input description** for each custom field that you want to make available when someone runs your flow.

   In this example, you'll create two custom input fields (**Bug repro steps** and **Bug severity**) so that anyone who uses this flow can enter the steps to reproduce the bug and rate the bug's severity:

Customize the bug

1. Tap the **Create a new work item** card's title bar:

2. Make the selections that are appropriate for your VSTS environment, and then select **Edit**:

   For example, connect to myinstance.visualstudio.com by typing **myinstance**.

3. Select **Show advanced options** to reveal the other fields for this card:

4. Place the cursor before the **Bug title** token, and then enter "Severity: " into the **Title** text field.
5. With the cursor still in the title text field, select the **Bug severity** token, and then enter " -- ".
6. In the **Description** text field, place your cursor just after the **Bug description** token, and then press Enter to start a new line.
7. Place your cursor on the new line, and then select the **Bug Repro steps** token:

Customize the push notification

1. Tap the title bar on the **Send a push notification** card to expand it.
2. In the list of dynamic content tokens, select **See more**, and then add the **URL** token in the **Link** text field.
3. In the **Link label** text field, add the **Id** token:

4. Tap **Create flow** on the menu to create your flow:

Run your flow

In this walk-through, you'll use the mobile app for Power Automate to run the button flow you just created. You'll provide all the user input that's needed to create a bug with a title, a description, repro steps, and a severity level.

1. In the mobile app for Power Automate, tap the **Buttons** tab, and then tap the **Create bug report with steps** button.

2. Enter the title for the bug you are reporting, and then tap **Next**. For example:

3. Enter the description of the bug you are reporting, and then tap **Next**. For example:

4. Enter the steps to reproduce the bug you are reporting, and then tap **Next**. For example:

5. Enter the severity of the bug you are reporting, and then tap **Done**:

The flow runs.

6. (optional) Tap the **Activity** tab to show the results.

7. (optional) Show the detailed results of the flow's run by tapping the **Create a new work item** step.

Use different input types

Your button flows can also accept rich data types. Here's the list of data input types that button flows accept:

- Text
- Drop-downs (like radio buttons)
- Email address
- File (for example, a photo on your phone)
- Yes or No check box
- Number
- Date (with a calendar picker)

To use these input types, add the **Manually trigger a cloud flow** trigger, and then add any of these types to your flow:

Additionally, you might want to designate some inputs as required and others as optional. Use the action menu (... at the right side) on each input field. There's a limit of five inputs per button.

Next steps

- Share button flows
- Learn about button flows
- Learn about button flows with trigger tokens

Share button flows in Power Automate

1/15/2022 • 3 minutes to read • Edit Online

In the Power Automate mobile app, you can share button flows (buttons) with other users or groups within your organization. When you share a button, the person or group with whom you share can run your button, the same way they run their own buttons. You can also share a link to buttons that another person shared with you. You can stop sharing your buttons at any time.

> The screenshots used in this document were taken from an Android device. If you're using an iPhone, the images may appear differently, but the functionality is the same.

Follow these steps to use a button that someone shared with you.

Prerequisites

To share buttons, you need:

- An account with access to Power Automate.
- A flow to share.
- A mobile device with the Power Automate mobile app for Android, iOS, or Windows Phone.
- A group or user within your organization with whom to share your button.

Share a button

You can share a button from the **Buttons** tab of the Power Automate mobile app.

1. Tap the small icon next to the button you want to share.

2. Tap **Invite others** from the **Button users** page.

3. Search for, and then select the group or person with whom you'd like to share the button.

4. Tap **SEND** on the **Invite others** page.

5. Tap **DONE** on the page that indicates the button sharing operation completed successfully.

Require users to use their own connections

> **NOTE**
>
> When you share a button, you can allow persons with whom you've shared the button to use all connections that your button uses. You can also require them to use their own connections. If you allow others to use your connections, they can't access the credentials in your connection, or reuse them in any other flow.

Follow these steps to require persons with whom you've shared your buttons to use their own connections.

1. Select **MANAGE CONNECTIONS** on the screen that's displayed immediately after you share a button.
2. Select **EDIT** on the button you want to manage.
3. Select **Provided by user** or your email address.

   Your choice indicates whose connections must be used in the shared button.

You can view or change your choice any time. To do so, select the **Flows** tab > the flow you shared > **Users and connections** > the **CONNECTIONS** tab > **EDIT** on the button you want to manage.

View the list of button users

You can view all groups or users with whom a button is shared by following these steps from the **Buttons** tab:

1. Tap the small icon next to the button in which you're interested.
2. On the **Button users** page, view all groups or users with whom the button is shared.

Stop sharing a button

You can stop sharing a button by following these steps from the **Buttons** tab:

1. Tap the small icon next to the button you no longer want to share.
2. On the **Button users** page, tap the user or group with whom you want to stop sharing the button.

3. Tap **Remove user** when the user's page is displayed.

4. Wait for the remove operation to complete. Notice the **Button users** list refreshes, and the user or group you removed is no longer listed.

Monitor the run history

All run history, including the runs initiated by a person with whom a button is shared, appear only on the **Activity** tab of the button creator's Power Automate mobile app.

Use shared buttons

Before you can run a button that someone has shared with you, you must add it to your **Buttons** tab from the **Add buttons** page.

1. Tap **GET MORE** (or the **New buttons are available** banner if it appears) on the **Buttons** tab.

2. Tap the button you want to use.

   The tapped button is immediately added to the **Buttons** tab of the Power Automate app. You can then use the button from the **Buttons** tab, just like any other button that's listed there.

Re-share a button

You can share a link to a button that's been shared with you.

1. Select ... next to the button you want to share.
2. Select **Share button link**.

3. Select the app that you'd like to use to share the button, and then follow the steps to send the button to the person with whom you want to share.

Stop using a shared button

If you no longer want to use a button that was shared with you, remove it from the **Buttons** tab by taking these steps:

1. On the **Buttons** tab, tap **...** next to the button you no longer want to use.

2. Tap **Remove** from the menu that appears.

That's it. The button no longer appears on the **Buttons** tab of the Power Automate app.

> **NOTE**
>
> After you remove a shared button, you can add it back by selecting **GET MORE** from the **Buttons** tab.

Add multiple actions and advanced options to a cloud flow

1/15/2022 • 5 minutes to read • Edit Online

Customize a cloud flow by adding one or more advanced options and multiple actions for the same trigger. For example, add an advanced option that sends an email message as high priority. In addition to sending mail when an item is added to a SharePoint list, create a file in Dropbox that contains the same information.

> **TIP**
>
> For detailed information about using SharePoint with Power Automate, see the SharePoint documentation.

Prerequisites

- Create a cloud flow

Add another action

In this procedure, you'll add an action in the middle of the flow. This action will save a file in your Dropbox, archiving the item in the list.

1. In flow.microsoft.com, select **My flows** in the top navigation bar.
2. In the list of flows, select the flow that you want to edit.
3. Select **New step**, and then select **Add an action**.

4. In the list of possible actions, search for **Create file**, and then select **Dropbox - Create file**.

5. If prompted, provide your Dropbox credentials.
6. Select the folder icon on the right side of the **Folder path** box.
7. Find and then select the folder in which you want to place the new file.

8. Enter the name of the new file into the **File name** box. Be sure to append an extension, such as ".txt", to the file name. Here, let's use the **TweetId** in the file's name to ensure uniqueness of the files. You may have to select **See more** to find the **TweetId** token.
9. Add the text that you want the file to contain by typing into the **File content** box. You can also add tokens into the **File content** box.

> **IMPORTANT**
>
> If you give the file a name that matches an existing file's name (in the selected folder), the existing file will be overwritten.

10. Select **Update flow**, which is located on the menu at the top of the screen.
11. Send a tweet that contains the keyword you specified.

    Within a minute, a file is created in your Dropbox account.

Reorder or delete an action

- To receive email after the file is created in Dropbox, move the Dropbox action by dragging its title bar above the email action. Release the Dropbox action over the arrow between the trigger (**When a new tweet is posted**) and the email action. (The cursor indicates whether the action is positioned correctly.)

> **NOTE**
>
> You can't move a step before another if you're using any outputs from that step.

- To delete an action, select the ellipsis (...) near the right edge of the title bar for the action you want to delete, select **Delete**, and then select **OK**.

Note: You can't delete an action if you're using any outputs from it anywhere in the flow. First, remove those outputs from the fields, and then you can delete the action.

Copy and paste actions

If you want to duplicate actions while designing a cloud flow, you can copy and paste them. For example, if you are building a condition and want similar actions in the **If yes** side and the **If no** side, instead of creating both actions from scratch you can build the first action in one side and then copy it to the other side.

To copy an action

1. Select the action menu (the ... at the top-right of the action).
2. Select **Copy to my clipboard**.
3. Select **New step** where you want your action to go.

   Notice the **My clipboard** tab that lets you choose from all of the actions that you've copied.
4. Select the item you want to paste.

Add advanced options

Start with a cloud flow that has a **Send an email** action.

1. Select **Show advanced options**, which is located at the bottom of the **Send an email** card.

   You'll then see the advanced options for sending an email.

2. Select **High** from the **Importance** list, and then select **Hide advanced options** to hide the advanced options.

3. Select **Update flow**, which is located on the menu at the top of the screen.

   This step saves your changes.

Use co-presence to see all editors

Power Automate displays the list of other makers who are editing a flow simultaneously. The list of editors is updated periodically.

Add comments to actions and triggers

Makers can have threaded comments with colleagues as they build their flows. They can add or edit comments, reply to comment threads, and resolve and delete comment threads. It's possible to have multiple comment threads for both actions and triggers.

> **IMPORTANT**
>
> Comments are supported for environments that have a Dataverse database.

Follow these steps to add a comment to any action or trigger in your flow.

1. Select the ellipsis on the trigger or action.
2. Select **New Comment**.

   The comments pane opens.

3. Enter a comment to your action with an @mention to others. If you do this, an email notification will be sent to them when you select the **Send** icon.

   If the person you want to @mention is not a co-owner of the flow, they'll see the **Share and notify** option. This would automatically share the flow with the other user, and send an email notification.

   @mention or comment dialog." title="@mention or comment dialog" />

4. Enter your comments in the **Start a conversation** box on the **Comments** pane, and then post it.

The Power Automate designer provides visual cues on the action cards to display the number of comment

threads contained within each.

Limitations

- Makers must save the flow at least once before a comment could be added.
- The comment thread count icons don't appear for control actions such as condition, switch, and scope.
- Comments aren't allowed for managed solution flows.
- The **Share and notify** option is available only for non-solution aware flows. For solution aware flows, @mentioning is limited to users who are already co-owners of the flow.

Address conflicts from multiple edits

If multiple users make changes to the flow simultaneously, Power Automate presents appropriate options to the maker to minimize conflicts during a save operation. A maker can choose to refresh the flow definition or save a copy of the flow to keep their changes.

New expression editor for actions (experimental feature)

Do you struggle with writing expressions in your flow actions? Now, you can make use of the improved expression editor in experimental mode. To use the improved expression editor, enable the Experimental Features setting and select **fx** on an action.

- The expression editor view is larger to help you manage richer and complex expressions.

- Ability to choose dynamic content in the expressions without having to switch tabs.

- Ability to preserve expressions with errors and unblock the view to work in parallel on other parts of flow.

> **NOTE**
>
> Some actions may not support the new expression editor.

Add a condition to a cloud flow

1/15/2022 • 2 minutes to read • Edit Online

Use a **Condition** to specify that a cloud flow performs one or more tasks only if a condition is true or false. For example, you can use a **Condition** that indicates that you'll get an email only if a tweet that contains a keyword is retweeted at least 10 times.

Check out the following video tutorial to learn more about conditions.

Prerequisites

- Create a cloud flow from a template - this tutorial uses this template as the example

Add a condition

1. In Power Automate, select **My flows**.

   You might need to sign in if you're not already signed in.

2. Select one of the flows from **My flows**, and then select **More commands** (the three dots).

   This tutorial uses an example with a Twitter trigger and a SharePoint action.

3. Select **Edit**.
4. Under the last action, select **New step** > **Condition**.
5. On the **Condition** card, select an empty area in box on the left.

   The **Dynamic content** list opens.

6. Select the **Retweet count** parameter to add it to the box.
7. In the box in the middle of the **Condition** card, select **is greater than or equal to**.
8. In the box on the right, enter **10**.

Now that you've configured the condition, continue with the following steps to send an email if the **Retweet count** is more than 10.

9. Select **Add an action** on the **If yes** send of the condition.
10. Enter **Send an email** into the search box, and then select **Send an email (V2)**.

11. Configure the **Send an email (V2)** card to your liking, indicating the contents of the email that the flow sends if the **Retweet count** is greater than 10.

    You can also configure the **If no** side of the condition if you'd like to take an when the **Retweet count** is less than 10.

12. Save the flow.

> **TIP**
>
> You can create complex conditions by using the **Add** button on the condition card.

Learn about all the available expressions.

Next steps

Learn how to use expressions in conditions in advanced mode.

Use data operations with Power Automate

1/15/2022 • 5 minutes to read • Edit Online

In this walkthrough, you'll learn about some common data operations in Power Automate—such as compose, join, select, filter arrays, create tables, and parse JSON—that are available to manipulate data when you create flows.

Here's a quick video about data operations.

Prerequisites

- Access to Power Automate.
- A tool such as PostMan to send HTTP POST requests with a JSON array to your flow.

Use the compose action

Use the **Data Operation - Compose** action to save yourself from having to enter the same data multiple times as you're designing a cloud flow. In this example, you need to enter an array of digits—`[0,1,2,3,4,5,6,7,8,9]`—several times while you design your flow. You can use the compose action to save the array, as described in the following procedure.

1. Search for **Compose**, and then select the **Data Operation - Compose** action.

2. In the **Inputs** box, enter the array that you want to reference later.

> **TIP**
> To make the **Compose** card easier to find later, rename it by selecting the text **Compose** on the title bar of the card and entering a name that's easy to remember.

When you need to access the contents of the compose action, do so by following these steps:

1. Add an action, such as **Data Operation – Join**.
2. Select the control to which you'd like to add the contents you saved in the compose action.

   The **Add dynamic content from the apps and connectors used in this flow** screen opens.
3. On the **Dynamic content** tab, in the **Compose** section, select **Outputs**.

Use the join action

Use the **Data Operation - Join** action to delimit an array with the separator of your choice. For example, your flow receives a web request that includes the following array of email addresses: `["d@example.com", "k@example.com", "dal@example.com"]`. However, your email program requires addresses to be formatted in a single string, separated with semicolons. You'll use the **Data Operation - Join** action to change the comma delimiter (,) to a semicolon (;) by following these steps:

1. Add a new action, search for **Join**, and then select **Data Operation - Join**.

2. In the **From** box, enter the array, and in the **Join with** box, enter a semicolon (;).

3. Save your flow, and then run it

4. After your flow runs, the output of the **Data Operation – Join** action will be a string with the addresses joined by semicolons, as shown in the following image.

Use the select action

Use the **Data Operation – Select** action to transform the shape of objects in an array. For example, you can add, remove, or rename elements in each object in an array.

> **NOTE**
> Although you can add or remove elements by using the select action, you can't change the number of objects in the array.

In this example, data enters your flow via a web request in this format:

```
[ { "first": "Eugenia", "last": "Lopez" }, { "first": "Elizabeth", "last": "Moore" } ]
```

You want to reshape the incoming data by renaming `first` to `FirstName` and `last` to `FamilyName`, and adding a new member named `FullName` that combines `first` and `last` (separated with a space).

```
[ { "FirstName": "Eugenia", "FamilyName": "Lopez", "FullName": "Eugenia Lopez" }, { "FirstName":
"Elizabeth", "FamilyName": "Moore", "FullName": "Elizabeth Moore" } ]
```

To do this:

1. Add the **When an HTTP request is received** trigger to your flow.
2. Select **Use sample payload to generate schema**.

3. In the box that appears, paste a sample of your source data array, and then select **Done**.
4. Add the **Data Operation – Select** action, and then configure it as shown in the following image.

Screenshot showing the select action. From is set to Body. In the Map section, FirstName is set to first, FamilyName is set to last, and FullName is set to first and last, separated by a space.:::image-end:::

> **TIP**
> The output from the select action is an array that contains the newly shaped objects. You can then use this array in any other action, such as the compose action discussed earlier.

Use the filter array action

Use the **Data Operation - Filter array** action to reduce the number of objects in an array to a subset that matches the criteria you provide.

> **NOTE**
> - You can't use the filter array action to change the shape of objects in the array.
> - The text on which you filter is case-sensitive.

In this example, you use the filter array action on this array:

```
[ { "first": "Eugenia", "last": "Lopez" }, { "first": "Elizabeth", "last": "Moore" } ]
```

to create a new array that contains only objects in which `first` is set to `Eugenia`.

Let's do this.

1. Find, and then add, the **Filter array** action to your flow.
2. Configure the filter array action as shown in the following image.

3. Save, and then run your flow.

   You can use PostMan to generate a web request that sends a JSON array to your flow.

4. When your flow runs, the output looks like the following array. Notice that only objects in which `first` is set to `Eugenia` are included in the output of the action.

```
[ { "first": "Eugenia", "last": "Lopez" }]
```

Use the create CSV table action

Use the **Data Operation - Create CSV table** action to change a JSON array input into a comma-separated value (CSV) table. You can keep the headers visible in the CSV output. In this example, you convert the following array into a CSV table:

```
[ { "first": "Eugenia", "last": "Lopez" }, { "first": "Elizabeth", "last": "Moore" } ]
```

1. Find, add, and then configure the **Data Operation - Create CSV table** action to resemble the following image.

The **Body** token in this image comes from a **When a HTTP request is received** action; however, you can get the input for the **Create CSV table** action from the output of any previous action in your flow, or you can enter it directly in the **From** box.

2. Save, and then run, your flow.

When your flow runs, the **Create CSV table** action displays the output shown in the following image.

Use the create HTML table action

Use the **Data Operation - Create HTML table** action to change a JSON array input into an HTML table. You can keep the headers visible in the HTML output.

To do this, follow the steps in previous section for creating a CSV table, but use the **Data Operation - Create HTML table** action instead of **Create CSV table**.

> **TIP**
> If you plan to send the HTML table via email, remember to select **IsHtml** in the email action.

Use expressions in conditions to check multiple values

1/15/2022 • 7 minutes to read • Edit Online

In this walkthrough, you'll learn to use expressions and **Conditions** to compare multiple values in **Advanced mode**.

When you create a cloud flow, you can use the **Condition** card in basic mode to quickly compare a single value with another value. However, there're times when you need to compare multiple values. For example, you may want to check the value of a few columns in a spreadsheet or database table.

You can use any combination of the following logical expressions in your conditions.

EXPRESSION	DESCRIPTION	EXAMPLE
and	Takes two arguments and returns true if both values are true. **Note**: Both arguments must be Booleans.	This expression returns false: and(greater(1,10),equals(0,0))
or	Takes two arguments and returns true if either argument is true. **Note**: Both arguments must be Booleans.	This expression returns true: or(greater(1,10),equals(0,0))
equals	Returns true if two values are equal.	For example, if parameter1 is someValue, this expression returns true: equals(parameters('parameter1'), 'someValue')
less	Takes two arguments and returns true if the first argument is less than the second argument. **Note**: The supported types are integer, float, and string.	This expression returns true: less(10,100)
lessOrEquals	Takes two arguments and returns true if the first argument is less than or equal to the second argument. **Note**: The supported types are integer, float, and string.	This expression returns true: lessOrEquals(10,10)
greater	Takes two arguments and returns true if the first argument is greater than the second argument. **Note**: The supported types are integer, float, and string.	This expression returns false: greater(10,10)
greaterOrEquals	Takes two arguments and returns true if the first argument is greater than or equal to the second argument. **Note**: The supported types are integer, float, and string.	This expression returns false: greaterOrEquals(10,100)

EXPRESSION	DESCRIPTION	EXAMPLE
empty	Returns true if the object, array, or string is empty.	This expression returns true: empty('')
not	Returns the opposite of a boolean value.	This expression returns true: not(contains('200 Success','Fail'))
if	Returns a specific value if the expression results in true or false.	This expression returns "yes": if(equals(1, 1), 'yes', 'no')

Prerequisites

Here's what you'll need to complete this walkthrough.

- Access to Power Automate.
- Your own spreadsheet with the tables described later in this walkthrough. Be sure to save your spreadsheet in a location such as Dropbox or Microsoft OneDrive so that Power Automate can access it.
- Microsoft 365 Outlook (While we use Outlook here, you can use any supported email service in your flows.)

Use the or expression

Sometimes your workflow needs to take an action if the value of an item is valueA **or** valueB. For example, you may be tracking the status of tasks in a spreadsheet table. Assume that the table has a column named *Status* and the possible values in the *Status* column are:

- **completed**
- **blocked**
- **unnecessary**
- **not started**

Here's an example of what the spreadsheet might look like:

Issue to do	Assigned to	Status
Check dropbox account for new files	David James	completed
Update payroll app	John Wonder	blocked
Alert security about new employee	James John	not started
Prepare invoices for printers	Annie Caines	unnecessary
Change password	D. Herb	completed

Given the preceding spreadsheet, you want to use Power Automate to remove all rows with a *Status* column that's set to *completed* or *unnecessary*.

Let's create the flow.

Start with a blank flow

1. Sign into Power Automate.

2. Select **My flows**.

3. Select **New flow** > **Scheduled cloud flow**.

Add a trigger to your flow

1. Give your flow a name.
2. Set the schedule to run the flow once daily.
3. Select the **Create** button to move on to the next step.

Select the spreadsheet and get all rows

1. Select **New step**.

2. Search for **rows**, and then select **Excel Online (Business)**.

   Note: Select the "get a row" action that corresponds to the spreadsheet that you're using. For example, if you're using Google Sheets, select **Google Sheets - Get rows**.

3. Select the **List rows present in a table** action.

4. Select the **Location**, **Document Library**, **File**, and **Table** that contains your data.

Check the status column of each row

1. Select **New step**.

2. Search for **apply to each**, and then select the **Apply to each** control.

3. Add the **Value** token to the **Select an output from previous steps** box.

   This **value** token represents the spreadsheet table and all of its data.

4. Select **Add an action** on the **Apply to each** card.

5. Search for **condition**, and then select the **Condition** control.

6. Add the following **or** expression. This **or** expression checks the value of each row in the table. If the value of the **status** column is *completed* **or** *unnecessary*, the **or** expression evaluates to "true".

   Your **Condition** card resembles this image:

Delete matching rows from the spreadsheet

1. Select **Add an action** on the **If yes** branch of the condition.

   The **If yes** branch runs if the **or** condition evaluates to **true**.

2. Search for **Delete a row**, select **Excel Online (Business)**, and then select **Delete a row**.

3. On the **Delete a row** card, set the **Location**, **Document Library**, **File**, and **Table** boxes exactly as you set these boxes on the **List rows present in a table** card earlier in this walkthrough.

4. Select ***PowerAppsId*** in the **Key Column** list, and then insert the ***PowerAppsId*** dynamic value into the **Key Value** box.

5. Be sure to save your flow!

Run the flow with the or expression

The flow runs after you save it. If you created the spreadsheet shown earlier in this walkthrough, here's what the it looks like after the run completes:

Issue to do	Assigned to	Status	__PowerAppsId__
Update payroll app	John Wonder	blocked	XQu2dQeTgCY
Alert security about new employee	James John	not started	HI5hPkF_e5g
			hcOmRBkYA9M
			zWFK53IEUX4
			7aoJcRUxK28
			IxhG_7e_jHU

Notice all data from rows that had "completed" or "unnecessary" in the **Status** column were deleted.

Use the and expression

Assume you have a spreadsheet table with two columns. The column names are Status and Assigned. Assume also that you want to delete all rows if the Status column's value is "blocked" and the Assigned column's value is "John Wonder". To accomplish this task, follow all steps earlier in this walkthrough, however, when you edit the **Condition** card in advanced mode, use the **and** expression shown here:

```
@and(equals(item()?['Status'], 'blocked'), equals(item()?['Assigned'], 'John Wonder'))
```

Your **Condition** card resembles this image:

Run the flow with the and expression

If you followed along, your spreadsheet resembles this image:

Issue to do	Assigned	Status	__PowerAppsId__
Update payroll app	John Wonder	blocked	XQu2dQeTgCY
Alert security about new employee	James John	not started	HI5hPkF_e5g
			hcOmRBkYA9M
			zWFK53IEUX4
			7aoJcRUxK28
			IxhG_7e_jHU

After your flow runs, your spreadsheet resembles this image:

Issue to do	Assigned	Status	__PowerAppsId__
Alert security about new employee	James John	not started	HI5hPkF_e5g
			hcOmRBkYA9M
			zWFK53IEUX4
			7aoJcRUxK28
			IxhG_7e_jHU

Use the empty expression

Notice that there are several empty rows in the spreadsheet now. To remove them, use the **empty** expression to identify all rows that don't have any text in the Assigned and Status columns.

To accomplish this task, follow all steps listed in **Use the and expression** section earlier in this walkthrough, however, when you edit the **Condition** card in advanced mode, use the empty expression this way:

```
@and(empty(item()?['Status']), empty(item()?['Assigned']))
```

Your **Condition** card resembles this image:

After your flow runs, the spreadsheet resembles this image:

Issue to do	Assigned	Status	__PowerAppsId__
Alert security about new employee	James John	not started	HI5hPkF_e5g

Notice extra lines are removed from the table.

Use the greater expression

Imagine you've bought baseball tickets for your coworkers and you're using a spreadsheet to ensure you're reimbursed by each person. You can quickly create a cloud flow that sends a daily email to each person who hasn't paid the full amount.

Use the **greater** expression to identify the employees who haven't paid the full amount. You can then automatically send a friendly reminder email to those who haven't paid in full.

Here's a view of the spreadsheet:

Employee	Email	Due	Paid
Jenny	jenny@example.com	10.00	5.00
Evo	evo@example.com	10.00	10.00
Shea	shea@example.com	10.00	0.00
Kohl	kohl@example.com	10.00	20.00

Here's the implementation of the **greater** expression that identifies all persons who have paid less than the amount due from them:

```
@greater(item()?['Due'], item()?['Paid'])
```

Use the less expression

Imagine you've bought baseball tickets for your coworkers, and you're using a spreadsheet to ensure you're reimbursed by each person by the date to which everyone agreed. You can create a cloud flow that sends a reminder email to each person who hasn't paid the full amount if the current date is less than one day before the due date.

Use the **and** expression along with the **less** expression since there are two conditions being validated:

CONDITION TO VALIDATE	EXPRESSION TO USE	EXAMPLE
Has the full amount due been paid?	greater	@greater(item()?['Due'], item()?['Paid'])
Is the due date less than one day away?	less	@less(item()?['DueDate'], addDays(utcNow(),1))

Combine the greater and less expressions in an and expression

Use the **greater** expression to identify the employees who have paid less than the full amount due and use the **less** expression to determine if the payment due date is less than one day away from the current date. You can then the **Send an email** action to send friendly reminder email to those who haven't paid in full and the due date is less than one day away.

Here's a view of the spreadsheet table:

Employee	Paid	Due	DueDate
Jenny	5.00	10.00	12/25/2017
Evo	10.00	10.00	12/1/2017
Shea	0.00	10.00	11/25/2017
Kohl	10.00	10.00	6/27/2017

Here's the implementation of the **and** expression that identifies all persons who have paid less than the amount due from them and the due date is less than one day away from the current date:

```
@and(greater(item()?['Due'], item()?['Paid']), less(item()?['dueDate'], addDays(utcNow(),1)))
```

Use functions in expressions

Some expressions get their values from runtime actions that might not yet exist when a cloud flow starts to run. To reference or work with these values in expressions, you can use functions that the Workflow Definition Language provides. More information: Functions reference for Workflow Definition Language in Power Automate

Store and manage values in variables

1/15/2022 • 7 minutes to read • Edit Online

This article shows how to create and work with variables to store values in your cloud flows. For example, variables can help you track the number of times that a loop runs. To iterate over an array or check an array for a specific item, you can use a variable to reference the index number apply to each array item.

You can create variables for data types such as integer, float, boolean, string, array, and object. After you create a variable, you can perform other tasks, for example:

- Get or reference the variable's value.
- Increase or decrease the variable by a constant value, also known as *increment* and *decrement*.
- Assign a different value to the variable.
- Insert or *append* the variable's value as the last item in a string or array.

Variables exist and are global only within the cloud flow that creates them. Also, they persist across any loop iterations inside the flow.

When you reference a variable, use the variable's name as the token, not the action's name, which is the usual way to reference an action's outputs.

> **WARNING**
> By default, each iteration in "apply to each" loops run sequentially. You can run the loop iterations in parallel to improve performance. If you use variables in "apply to each" loops, you **must** run the loop iterations *sequentially* if it's important for your loop variables to return predictable results.

Prerequisites

- Access to Power Automate.
- A cloud flow in which you want to create the variable.

  If you're new to Power Automate, review Getting started with Power Automate and Overview of cloud flows.

> **NOTE**
> Before you can add actions for creating and working with variables, your flow must start with a trigger.

Initialize variable

You can create a variable and declare its data type and initial value - all within one action in your flow. You can only declare variables at the global level, not within scopes, conditions, and loops.

1. Sign into Power Automate.
2. Create a cloud flow and under the step where you want to add a variable, follow one of these steps:
   - To add an action under the last step, select **New step**.

- To add an action between steps, move your mouse over the connecting arrow so that the plus sign (**+**) appears. Select the plus sign, and then select **Add an action**.

3. Under **Choose an action**, in the search box, enter `variable` as your filter. From the actions list, select **Initialize variable**.

4. Provide this information about your variable:

PROPERTY	REQUIRED	VALUE	DESCRIPTION
Name	Yes	*<variable-name>*	The name for the variable to initialize
Type	Yes	*<variable-type>*	The data type for the variable

PROPERTY	REQUIRED	VALUE	DESCRIPTION
Value	No	*<start-value>*	The initial value for your variable **Tip**: Although optional, set this value as a best practice so you always know the start value for your variable.

For example:

5. Now continue adding the actions you want. When you're done, select **Save**.

> **NOTE**
> Although the **Initialize variable** action has a `variable` section that's structured as an array, the action can create only one variable at a time. Each new variable requires an individual **Initialize variable** action.

Here are examples for some other variable types:

String variable

```
"name": "myStringVariable",
"type": "String",
"value": "lorem ipsum"
```

Boolean variable

```
    "name": "myBooleanVariable",
    "type": "Boolean",
    "value": false
```

Array with integers

```
    "name": "myArrayVariable",
    "type": "Array",
    "value": [1, 2, 3]
```

Array with strings

```
    "name": "myArrayVariable",
    "type": "Array",
    "value": ["red", "orange", "yellow"]
```

Get the variable's value

To retrieve or reference a variable's contents, you can use the variables() function in the Power Automate designer.

For example, this expression gets the items from the array variable by using the `variables()` function. The `string()` function returns the variable's contents in string format: `"1, 2, 3, red"`

```
@{string(variables('myArrayVariable'))}
```

Increment variable

To increase or *increment* a variable by a constant value, add the **Increment variable** action to your flow.

> **IMPORTANT**
> This action works only with integer and float variables.

1. In the Power Automate designer, under the step where you want to increase an existing variable, select **New step**.

   For example, this cloud flow already has a trigger and an action that created a variable. So, add a new action under these steps:

To add an action between existing steps, move your mouse over the connecting arrow so that the plus sign (+) appears. Select the plus sign, and then select **Add an action**.

2. In the search box, enter "increment variable" as your filter. In the actions list, select **Increment variable**.

3. Provide this information for incrementing your variable:

PROPERTY	REQUIRED	VALUE	DESCRIPTION
Name	Yes	*<variable-name>*	The name for the variable to increment
Value	No	*<increment-value>*	The value used for incrementing the variable. The default value is one. **Tip**: Although optional, set this value as a best practice so you always know the specific value for incrementing your variable.

For example:

4. When you're done, on the designer toolbar, select **Save**.

Example: Create loop counter

Variables are commonly used for counting the number of times that a loop runs. This example shows how to create and use variables for this task by creating a loop that counts the attachments in an email.

1. In the Power Automate, create a cloud flow. Add a trigger that checks for new email and any attachments.

   This example uses the Office 365 Outlook trigger for **When a new email arrives**. You can set up this trigger to fire only when the email has attachments. However, you can use any connector that checks for new emails with attachments, such as the Outlook.com connector.

2. In the trigger, to check for attachments and pass those attachments into your flow, select **Yes** for these properties:

   - **Include Attachments**
   - **Only with Attachments**

3. Add the **Initialize variable** action. Create an integer variable named `Count` that has a zero start value.

4. Add an *apply to each* loop to cycle through the attachments.

   a. Under the **Initialize variable** action, select **New step**.

   b. Under **Choose an action**, select **Built-in**. In the search box, enter `apply to each` as your search filter, and select **Apply to each**.

5. In the loop, select inside the **Select an output from previous steps** box. When the dynamic content list appears, select **Attachments**.

The **Attachments** property passes an array, which has all email attachments from the email, into your loop.

6. In the **Apply to each** loop, select **Add an action**.

7. In the search box, enter "increment variable" as your filter. From the actions list, select **Increment variable**.

> **NOTE**
>
> The **Increment variable** action must appear inside the loop.

8. In the **Increment variable** action, from the **Name** list, select the **Count** variable.

9. Under the loop, add any action that sends you the number of attachments. In your action, include the value from the **Count** variable, for example:

10. On the designer toolbar, select **Save**.

Decrement variable

To decrease or *decrement* a variable by a constant value, follow the steps for increasing a variable except that you find and select the **Decrement variable** action instead. This action works only with integer and float variables.

Here are the properties for the **Decrement variable** action:

PROPERTY	REQUIRED	VALUE	DESCRIPTION
Name	Yes	< *variable-name*>	The name for the variable to decrement
Value	No	< *increment-value*>	The value for decrementing the variable. The default value is one. **Tip**: Although optional, set this value as a best practice so you always know the specific value for decrementing your variable.

Set variable

To assign a different value to an existing variable, follow the steps for increasing a variable except that you:

1. Find and select the **Set variable** action instead.
2. Provide the variable name and value you want to assign. Both the new value and the variable must have the same data type. The value is required because this action doesn't have a default value.

Here are the properties for the **Set variable** action:

PROPERTY	REQUIRED	VALUE	DESCRIPTION
Name	Yes	< *variable-name*>	The name for the variable to change
Value	Yes	< *new-value*>	The value you want to assign the variable. Both must have the same data type.

> **NOTE**
> Unless you're incrementing or decrementing variables, changing variables inside loops *might* create unexpected results if you run loops in parallel. For these cases, try setting your loop to run sequentially, which is the default setting.

Append to variable

For variables that store strings or arrays, you can insert or *append* a variable's value as the last item in those strings or arrays. You can follow the steps for increasing a variable except that you follow these steps instead:

1. Find and select one of these actions based on whether your variable is a string or an array.
   - **Append to string variable**
   - **Append to array variable**
2. Provide the value to append as the last item in the string or array. This value is required.

Here are the properties for the **Append to...** actions:

PROPERTY	REQUIRED	VALUE	DESCRIPTION
Name	Yes	*<variable-name>*	The name for the variable to change
Value	Yes	*<append-value>*	The value you want to append, which can have any type

Next steps

- Learn about Power Automate connectors

Design flows in Microsoft Visio

1/15/2022 • 2 minutes to read • Edit Online

The Power Automate designer is a rich tool in which you can configure every detail of your logic. However, sometimes you may want to just sketch your flow logic before you start building your flow. To do this, use Microsoft Visio directly from within Power Automate.

> **TIP**
>
> Many processes share a common model but have minor variations throughout an organization. You can save time within your organization by using Visio to create a master workflow model that others will then adjust with specialized parameters.

Prerequisites

- A Power Automate account.
- The Microsoft Visio desktop app (English version).
- Expertise in using Microsoft Visio.

Design a workflow in Visio

1. Sign into Power Automate.
2. Select **Templates** from the left side panel.

3. Select **Visio** from the list.

4. Select the **Basic Flow BPMN Diagram** template from the list of **Visio** templates that displays.

> **IMPORTANT**
>
> Visio warns you that files from the Internet could harm your device. If you are comfortable, select **YES** on the warning message.

5. The Visio designer launches.

6. Use the BPMN basic shapes to design your workflow.

Prepare to export your workflow to Power Automate

Follow these steps to prepare your workflow so that you can export it to Power Automate.

1. Select the **Process** tab.

2. Select **Prepare to Export** from the **Power Automate** group of icons.

The **Prepare to Export** group opens.

3. On the **Flow Mapping** tab of the **Prepare to Export** group, map your BPMN diagram to Power Automate controls.

4. On the **Triggers and Actions** tab of the **Prepare to Export** group, map your BPMN diagram to Power Automate triggers and actions by selecting each shape and then selecting either a trigger or action to represent that shape in Power Automate.

Your workflow is ready to be exported when there are no issues remaining on the **Prepare to Export** control.

Export your workflow

1. Select the **Export to Flow** button to export your workflow diagram to Power Automate.

2. Name your flow and then select the **Create flow** button.

3. You should see a success report similar to this one.

You can now run or make edits to your flow from the Power Automate designer, just like any other flow.

> **TIP**
> Use Visio's sharing and commenting capabilities to collaborate with multiple stakeholders and create a complete workflow quickly.

Learn more

- Get started with Power Automate
- Build multi-step flows
- Design a cloud flow with Microsoft Visio

Manage flows in Power Automate from your phone

1/15/2022 • 2 minutes to read • Edit Online

View a list of all flows that you created and, for each flow, view its events and actions, enable or disable it, and explore its run history.

Prerequisites

- Install the Power Automate mobile app for Android, iOS, or Windows Phone on a supported device. The graphics in this topic reflect the iPhone version of the app, but the graphics on Android and Windows Phone look similar.
- If you don't already have a cloud flow, create one on the website for Power Automate. For easier testing, use one that you can trigger yourself instead of waiting for an external event.

The flow in this tutorial runs when you receive mail from a specific address:

You could configure such a cloud flow with your personal email address for testing and a different address (for example, your manager's) when the flow is ready for real use.

When the flow runs, it sends a custom push notification, with this syntax, to your phone:

Note: You can also monitor flow activity from the mobile app.

Manage a cloud flow

1. Open the mobile app, and then tap **My flows** at the bottom of the screen to list all your flows.

   Each entry shows the name of the flow, icons for its events and actions, the time when it ran most recently, and an icon that indicates whether the most recent run succeeded.

2. Tap a cloud flow to show options for managing it.

3. Tap the **Enable flow** toggle to enable or disable the flow.

4. Tap **See flow** to show the events and actions for that flow, tap each event or an action to expand it, and then tap **Back**.

5. Tap **Run history** to show the flow's successes, failures, or both.

6. Tap a run to show whether each event and action succeeded and, if so, how much time (in seconds) it took.

Submit a template to the Power Automate gallery

1/15/2022 • 2 minutes to read • Edit Online

Submit a cloud flow template to the gallery of templates for Power Automate. Templates help people not only to create flows more easily but also to imagine additional scenarios that would benefit from a cloud flow.

1. On the **My Flows** page, select the ellipsis (...) for a cloud flow.

2. Select **Details** in the menu that appears.

3. Select **More**, and then select **Submit as template** in the menu that appears.

You can only submit flows that have run successfully at least once since the last save:

4. Specify a meaningful title, a clear description of the scenario that your template will help automate, the biggest benefit, the number of users, number of runs, and the categories that apply for the template.

5. Select **Submit**.

   The Power Automate team verifies and *possibly modifies* your template. If the team approves your template, it appears in the gallery of templates for Power Automate.

> **NOTE**
>
> Templates are for use in the public gallery only. They are not supported for private use.

Turn flows on or off

1/15/2022 • 2 minutes to read • Edit Online

At times, you might want to turn off a cloud flow to prevent it from running. Follow these steps to turn flows off or on.

Turn flows off

After you create a cloud flow, it is turned on by default. Follow these steps to turn off a cloud flow.

1. On the **My flows page**, select the ellipsis (...) for the flow you want to turn off.

2. Select **Turn off** in the menu that appears.
3. A message appears with the new flow status.

> **NOTE**
>
> If you turn off a flow, its runs are queued and they'll run when you turn the flow on.

Turn flows on

If you've turned a cloud flow off, but want to turn it back on so that it will run again, follow these steps:

1. On the **My flows page**, select the flow that you want to modify.
2. On the menu at the top of the screen, select **Turn on** to enable or disable the flow.

3. Message appears with the new flow status.

> **NOTE**
>
> If you disable a flow while it's running, the run will continue. If you delete a flow that's running, the current run terminates.

Get started with approvals

1/15/2022 • 4 minutes to read • Edit Online

Whether you need written acknowledgment from your manager or a formal authorization from a diverse group of stakeholders, getting things approved is part of almost every organization.

With the approvals capability in Power Automate, you can automate sign-off requests and combine human decision-making for workflows. Some popular cases where approvals can be used include:

- Approving vacation time requests.
- Approving documents that need sign-off.
- Approving expense reports.

When you submit an approval in a flow, approvers are notified and can review and act on the request.

Approvals actions

Actions are the events you want your flow to perform after the trigger starts the flow. For example, when a new item is added to a SharePoint list, trigger an approval to have somebody review the new item.

The following image shows the full list of approval actions that you can use in your flows.

If you want to quickly get started with approvals, use the **Start and wait for an approval** action. This action lets you provide the information that should be in the approval request and the approvers who will receive the request.

When you use the **Start and wait for an approval** action, the flow starts and then waits for the approvers' response before it completes the run.

There are four approval types you can use:

APPROVAL TYPE	BEHAVIOR
Approve/Reject - Everyone must approve	All approvers are given two options: **Approve** or **Reject**. A response is needed from *each* approver before the flow run is completed. The actions that follow the **Start and wait for an approval** action run after *all* the approvers respond, or when a single rejection occurs.
Approve/Reject - First to respond	Assigned approvers are given two options: **Approve** or **Reject**. Approval or rejection by any approver completes the request. The actions that follow the **Start and wait for an approval** action run after any one of the approvers gives approval.
Custom Responses - Wait for all responses	You define the options the assigned approvers can choose from. All approvers must respond to complete the process.
Custom Responses - Wait for one response	You define the options the assigned approvers can choose from. A response from any approver completes the process.

Prerequisites

If it's the first time you're using approvals in your organization, ensure that you've met the following prerequisites:

- A Microsoft Dataverse database.
- A valid license to create flows.

Permissions to create a Dataverse database

When you create approval flows, they're saved in Dataverse. Initially, when you use the approvals connector in a cloud flow that's located in a non-default environment, the system automatically provisions a database. To be successful, the user who runs the first approval flow must have an administrator role in the environment.

It can take a few minutes for the database provisioning to be completed, and you'll notice this delay the first time that you run the flow. Other users who create approval flows don't need any elevated permissions in the environment.

> **NOTE**
> If you're using the default environment, you don't need to provision the Dataverse database. If you create approval flows, the Dataverse database is created for you automatically in the default environment.

License to create flows

Because the approvals connector is a standard connector, any license that grants access to Power Automate and the ability to use standard connectors is sufficient to create approval flows.

Here are the licenses that grant rights to use standard connectors.

- Power Automate.
- Office 365.
- Dynamics 365 license with built-in Power Automate capabilities.

You can find a list of the Office 365 and Dynamics 365 licenses in the Microsoft Power Apps and Power Automate licensing guide.

Get started

Use one of the following options to get started creating approval flows.

- Use an existing template—You can search the list of approvals templates for your scenario, and then follow steps to create a flow that suits your needs.

- Tweak an existing template—If one of the existing templates is similar, but doesn't fit your needs precisely, create a flow from that template and then tweak the flow to your liking.

  After you create a flow from a template, it's yours to modify or extend. Do this by adding, editing, or removing triggers and actions.

  > **TIP**
  > You can copy and paste actions in the same flow or across flows to speed up the editing process.

- Create an approval flow from scratch—If you can't find a suitable template, you can create a flow from scratch and then connect it to the services and the approvals you need by using the approvals actions. Learn how to create a flow from scratch.

- Consult the community for inspiration and help—Power Automate has a thriving community that can help if you're stuck or looking for some inspiration. Just head over to the Power Automate forums to ask specific questions and get answers.

Assign approvals to any user in your tenant

You can assign approvals to users—including guest users and Microsoft 365 groups—in your current Dataverse environment or your Azure Active Directory (Azure AD) tenant.

When you assign an approval to users who aren't in your environment, they're automatically given the *Approvals User* Dataverse security role. Users need this role for their responses to be processed and persisted in their approvals history.

The following tenant configurations don't allow this:

- When the AllowAdHocSubscriptions setting in Azure AD is disabled. In this case, you can request your tenant administrator to enable it. You can find more information about this in the self-service signup.
- If a security group has been used to control which users have access to the Dataverse environment.
- Power Automate US Government plans.

After you assign an approval request to a user, they can respond directly from an Outlook email, a Microsoft Teams adaptive card, or the Power Automate action center if they have a Power Automate license or an Office 365 or a Dynamics 365 license with built-in Power Automate capabilities. You can find a list of these Office 365 and Dynamics 365 licenses in the Microsoft Power Apps and Power Automate licensing guide.

Next steps

- Create approval flows.

Trigger approvals from SharePoint lists

1/15/2022 • 2 minutes to read • Edit Online

Imagine that you have a SharePoint list in which employees store requests for devices like monitors or headsets. You want to create an approval process so that every time an employee adds a request to a SharePoint list, somebody receives a request to approve it.

To follow this guided walkthrough, create a list in a SharePoint site to which you have access. You can use the following example of a list:

Once you have a SharePoint list for which you want to create an approval process:

1. Go to the Start approval when a new item is added template, which provides a flow that's configured to create an approval process on a SharePoint list. Make sure all connections listed have a green check, and then continue.

2. Once the flow is created, configure these three items:

- **Site address**: Select the SharePoint site where you have your list from the dropdown list. If the SharePoint site doesn't appear on the dropdown list, just write your SharePoint site URL.

- **List name**: once you have defined the Site Address, select the list you want every new item added to trigger an approval

- **Assigned to**: the person in your company who should receive the approval request. You can start by putting yourself as the approver!

That's it! The approval flow is now all configured. If you look at the whole flow the steps are:

- The flow is triggered every time a new item is added to the SharePoint list you have defined on the first step.
- An approval request is sent to the person you've chosen.
- If the approval is answered as **Approve**, the person that created the item on the SharePoint list gets an email with the approval confirmation. If the request was answered as **Reject**, that person gets an email saying that the request was rejected.

- If for some reason the approval fails, you as the maker of this flow will get an email informing you that the approval failed. In this case, you will need to look at the run history of the flow to see why the approval failed.

3. Now let's test this flow. first, select **Save** on the top right.

4. Once the flow has been successfully saved, select **Test**.

5. Select, **I'll select the trigger action**.

6. Select **Save and test**.

7. Power Automate alerts you once the flow is in test mode. When it is, create a new item on your SharePoint list and then look at your flow to see it.

   You will see that once your flow starts, it runs to the approval action where it shows an orange circle on the top right of the approval action step. This means that the assigned approvers need to respond to the approval request for the flow to continue.

Next steps

- Create approval flows

Trigger approvals from a SharePoint document library

1/15/2022 • 3 minutes to read • Edit Online

This article shows you how to create an approval flow for new documents (invoices) when they are added to a SharePoint document library and how to attach the document to the approval request.

In the approval process, every time a new invoice is added to a SharePoint library, a request is sent for somebody to reviews its contents. If the request is approved, the invoice files are then moved to a folder.

Follow these steps to complete this tutorial.

1. Create two folders, for example: **Incoming Invoices** and **Reviewed Invoices**.

2. Go to the Start an approval for new file to move it to a different folder template. This template provides us a flow that's configured to setup an approval process for a SharePoint document library. Confirm that all the connections listed have a green check, and then select continue.

3. Once the flow is created, configure these items.

   - **Site address** - On the trigger card, select the SharePoint site that contains your list. If the SharePoint site doesn't appear on the list, just write in your SharePoint site URL.

- **Folder id:** - Select the folder where you will put the incoming files to be reviewed with an approval.
- On the **Create file** card enter the same **Site address** as before, and then select the folder where you would like the files to be moved once they have been approved.
- On the **Delete file** card, enter the same **Site address** as before. This action will delete the file from the first folder once it has been approved and copied to the new folder.

4. Replace the **Start an approval** action with another approval action that will let you attach files to it.
   - Delete the **Start an approval** action from the flow.

   - Where the approval action used to be, select the vertical line to add a new action.

- Search for, and then select **Start and wait for an approval**.

- Select **Approve/Reject – First to respond** as the approval type.

- Give the approval request a title, and then assign it to the approver. The approver can even be you!

- Select **Show advanced options**, and then select **Attachment Name – 1**.

  A floating panel opens on the right where you will see all the data you can get from the SharePoint trigger.

- Select **File name**.

- Select **Attachments Content – 1**, and then select **File Content**.

5. Expand the **Condition** card, and on the left text box, select **Outcome**.

   This way if the approver approves the request, the action to copy the file to the second folder runs.

We're done configuring the flow. Now let's test it.

1. Select the **Save** button on the top right.

You might get a warning message from the Flow checker. It is safe to dismiss it.

2. Once the flow is saved, select the **Test** button.

3. Select, **I'll select the trigger action**, and then select **Save and test**.

4. Power Automate indicates to you when the flow is in test mode. When it is, add a new file to the incoming files folder in the SharePoint document library that you specified earlier.

5. Now, you can see the flow is running.

The person to whom you have assigned the approval now receives the approval request in various places where they can approve or reject it. The file to review is attached to the approval request for easy reference.

By email

If you are not seeing the email displayed correctly, make sure you have the latest updates in your Outlook app or use the web version of Outlook.

In Power Automate, on the Action items Approvals section

Once the the request is approved or rejected, the flow execution continues. If the request was approved, the file you put in the incoming folder will be moved to the other folder.

Congratulations! You have successfully run your flow with approval capabilities. Now that you know the basics, you can build on top of this flow to tailor it to your specific business needs.

Next steps

- Create approval flows

How to - Top scenarios with approval flows

1/15/2022 • 4 minutes to read • Edit Online

Here are the top *how to* questions and answers about approvals in Power Automate.

Customize approval requests

There are two ways to customize approval requests.

Using custom options

Power Automate approvals provides two default options to *approve* or *reject* requests.

Your business might need other options beyond approve/reject. For example, you might be reviewing a discount request and you may want the approver to be able to respond from a list of possible discount limits, including:

- Up to 5%
- Up to 10%
- Up to 15%
- Denied.

You can customize the list of responses to approval requests by using **Custom Responses**.

Here's an example.

Salespeople in an organization can request an approver to give customers a discount for their purchases. These Salespeople enter the discount request into a SharePoint list, which is the trigger of the flow. The flow then uses custom responses with the **Start and wait for an approval** action.

Select as approval type **Custom Responses – Wait for all responses** or **Custom Responses – Wait for one response**, depending on if you need multiple approvers or just one.

Add as many **response options** as needed. In this case we are giving four mentioned earlier.

Give a **Title** to the approval request, and then list the approvers in **Assigned to**.

After the approval request is answered, the flow sends an email to the salesperson who requested the discount, informing them about the outcome of the request.

To get the response to the approval request, just use the **Outcome** output.

The approver sees the approval request like this.

Using markdown

Markdown is a language that's used to format text into Webpages like headers, tables, or bold text. In an approval request, you can use markdown in the **Details** field to format the information presented to approvers.

You can learn more about how to use markdown and the supported apps in the Use Markdown in Power Automate approval requests article.

Here is an example of its usage.

And here's how the approvers see it in a nicely formatted email in Outlook.

Display approval date in my timezone

By default, approval emails display the **Date Created** field in GMT. There no way to change this field.

You can work around this by displaying the date the flow was run, in your desired timezone, in the **Details** field of the approval request. For example, to display the approval request date in Paris time, add two time actions like this.

And the resulting approval email will look like this:

Reassign an approval to another person

If received an approval request, but you want somebody else to make the approval decision, you can reassign the approval to somebody else:

1. Login to the Power Automate.
2. On the left navigation bar, go to **Action items** > **Approvals**
3. Hover your mouse over the approval you want to reassign, select the three dots > **Reassign**.

On the other hand, if you are the requester, you cannot reassign the approval request. However, you can **Cancel** the approval request, and then edit the flow to change the **Assigned to** approver.

To cancel an approval:

1. Login to the Power Automate.
2. On the left navigation bar, go to **Action items** > **Approvals**
3. Select the **Sent** tab.
4. Select **Cancel**.

Get a confirmation email once an approval has been answered

If you would like to be notified when an approver responds to an approval request, just send yourself an email after the approval step in the flow. Send the email on the **If yes** and on the **If no** branches of the approval outcome condition like this.

Cancel an approval

If you are the maker of a flow that requests approvals, and the approval requests haven't been answered, you can cancel it by:

1. Login to the Power Automate.
2. On the left navigation bar, go to **Action items** > **Approvals**
3. Select the **Sent** tab.
4. Select **Cancel**.

Do sequential approvals

Some processes require pre-approval before the final approver is required to sign off. For example, an organization may have a sequential approval policy that requires pre-approval for invoices over $1,000.00 before they're approved by the Finance department. This walkthrough guides you on how to manage sequential approvals with Power Automate.

Post an approval request in Microsoft Teams

If you would like to notify the assigned approvers through a message in Microsoft Teams instead of by email, start with the Request approval in Teams for a selected item in SharePoint template to do it.

Send an approval to multiple people

You can assign an approval request to multiple persons. Here are the two options.

1. When adding an approval action, there are two actions options for sending the approval request to multiple persons. Select the appropriate option based on your needs.

   - If only a response of one person from the group of people is enough to sign off the approval and continue with the flow run, use the **Approve/Reject – First to respond** or **Custom Responses – Wait for one response** action.

   - If *Everybody* must respond to the approval request to continue with the flow run, select **Approve/Reject – Everybody must approve** or **Custom Responses – Wait for all responses**.

2. In the **Assigned to** field, define the list of persons to whom the approval request should be sent. Separate each person with a semicolon (;).

Next steps

- Create approval flows

Create and test an approval workflow with Power Automate

1/15/2022 • 6 minutes to read • Edit Online

With Power Automate, you can manage the approval of documents or processes across several services, including SharePoint, Dynamics 365, Salesforce, OneDrive for Business, Zendesk, or WordPress.

To create an approval workflow, add the **Approvals - Start and wait for an approval** action to any flow. After you add this action, your flow can manage the approval of documents or processes. For example, you can create document approval flows that approve invoices, work orders, or sales quotations. You can also create process approval flows that approve vacation requests, overtime work, or travel plans.

Approvers can respond to requests from their email inbox, the approvals center in Power Automate, or the Power Automate app.

Create an approval flow

Here's an overview of the flow we'll create and test:

The flow performs the following steps:

1. Starts when someone creates a vacation request in a SharePoint Online list.
2. Adds the vacation request to the approval center, and then emails it to the approver.
3. Sends an email with the approver's decision to the person who requested vacation.
4. Updates the SharePoint Online list with the approver's decision comments.

> **TIP**
>
> For detailed information about using SharePoint with Power Automate, see the SharePoint documentation.

> **IMPORTANT**
> Always follow the best practices for SharePoint security and your organization's best practices to ensure your environment is secure. Security is outside the scope of this article.

Prerequisites

To complete this walk-through, you must have access to:

- Power Automate.
- A SharePoint Online list.
- Office 365 Outlook and Office 365 Users account.

> **NOTE**
> While we use SharePoint Online and Office 365 Outlook in this walk-through, you can use other services such as Zendesk, Salesforce, or Gmail. If you are using SharePoint 2010, see SharePoint 2010 workflow retirement

Before you create the flow, create a SharePoint Online list. Later, we'll use this list to request approval for vacations.

Create these columns in your SharePoint Online list:

COLUMN	TYPE
Title	Single line of text
Start Date	Date and Time
End Date	Date and Time
Comments	Single line of text
Approved	Yes/No
Manager Comments	Single line of text

Make note of the name and URL of the SharePoint Online list. You'll need these items later when you configure the **SharePoint - When an item is created** trigger.

Create an automated cloud flow

1. Sign in to Power Automate.
2. Select **My flows** in the left-side navigation pane.
3. On the top-left menu, select **New flow** > **Automated cloud flow**.

Add a trigger

1. Give your flow a name.
2. Under **Choose your flow's trigger**, select **When an item is created - SharePoint**, and then select **Create**.
3. On the **When an item is created** card, select the **Site Address** and the **List Name** for the SharePoint list

that you created earlier.

The **Site Address** and the **List Name** are the items you noted earlier in this walkthrough.

Add a profile action

1. Select **New step**, and then type **profile** into the **Choose an action** search box.
2. Select **Office 365 Users**.
3. Find, and then select the **Get my profile (V2)** action.

4. Select the fields from your profile that you want to include in your flow, and then select **Create** to save the work you've done so far.

Add an approval action

1. Select **New step**.
2. Type **approval** into the **Choose an action** search box.
3. Select the **Start and wait for an approval** action.

4. Configure the **Start and wait for an approval** card to suit your needs.

> **NOTE**
>
> The **Approval type**, **Title** and **Assigned To** fields are required. You can use Markdown to format the **Details** field.

> **NOTE**
>
> This action sends the approval request to the email address in the **Assigned To** box.
>
> If your scenario requires it, you can attach files to your approval requests that use Microsoft Dataverse.

Add a condition

1. Select **New step**, and then select **Condition** in the list of actions.
2. On the **Condition** card, select **Choose a value** on the left.

   A list of dynamic values display.
3. Select **Responses Approver response** from the list of dynamic values.

4. Select the **Choose a value** box on the right, and then enter **Approve** into the box.

> **NOTE**
>
> The valid responses to the **Approvals - Start an approval** action are "Approve" and "Reject". These responses are case-sensitive.

5. Your **Condition** card should now show:

Add an email action for approvals

Follow these steps to send an email if the vacation request is approved:

1. Select **Add an action** on the **If yes** branch of the condition.

2. Enter **send email** into the search box on the **Choose an action** card.

3. Select the **Send an email (V2)** action.

4. Configure the email card to suit your needs.

> **NOTE**
>
> **To**, **Subject**, and **Body** are required.

This card is a template for the email that is sent when the status of the vacation request changes.

In the **Body** box on the **Send an email (V2)** card, use the **Comments** token from the **Approvals - Start an approval** action.

Add an update action for approved requests

1. Select **Add an action** in the **If yes** branch.
2. Enter **SharePoint** in the search box on the **Choose an action** card, select the **SharePoint** filter, and then select the **Update item** action.

3. Configure the **Update item** card to suit your needs.

> **NOTE**
>
> **Site Address**, **List Name**, **Id**, and **Title** are required.

Add an email action for rejections

1. Select **Add an action** on the **If no** branch.
2. Enter **Send** into the search box of the **Choose an action** card, select **Office 365 Outlook** to filter the actions, and then select the **Send an email (V2) - Office 365 Outlook** action.

3. Configure the email card to suit your needs.

   This card represents the template for the email that's sent when the status of a vacation request changes.

Add update action for rejected requests

1. Select **Add an action**.

2. Enter **update** into the search box on the **Choose an action** card, and then select the **Update item - SharePoint** action.

3. Configure the card to suit your needs.

> **NOTE**
>
> **Site Address**, **List Name**, **Id**, and **Title** are required.

4. Select **Save** to save the work we've done.

If you've followed along, your flow should resemble this screenshot:

Now that we've created the flow, it's time to test it!

Request an approval to test your flow

Create a vacation request in the SharePoint Online list you created earlier.

After you save this request, the flow triggers, and then:

1. Creates a request in the approvals center.
2. Sends an approval request email to the approvers.

Create long-running approvals

If it's likely that your flow will run for more than 30 days, consider storing your approvals in Microsoft Dataverse. This makes it possible for you to create flows that act on responses to approval requests, even after the original flow run times out.

To do this, use two flows, one to send an approval request, and the other to run business logic on the responses to the approval request, based on the **Create an approval (v2)** action. Learn more about long running approvals.

> **TIP**
> If you use modern email clients, you don't have to wonder if a request is still required because Power Automate automatically updates the email to indicate that the approval request is completed.

Cancel an approval request

Sometimes you might want to cancel an approval request that you've sent. Possibly you made a mistake in the request, or it's no longer relevant. In either case, the person who sent the request can cancel it by following these steps:

1. Select the approval
2. Select **Cancel approval** in the side pane.

> **TIP**
> You can always select the **History** tab to view the approval requests that you've canceled.

> **NOTE**
> The cancel feature is supported on the **Create an approval (v2)** action.

Request approvals from guest users

You can send approvals requests to persons outside your organization. To do this, use Azure Active Directory (Azure AD) guest users by inviting users from other tenants as guests.

When you assign a role to a guest, this gives the guest the permission required to participate in the approval process.

Now that you've created and tested your flow, be sure to let others know how to use it.

Learn more

- View and manage pending approval requests
- Create sequential approval flows.
- Create parallel approval flows.
- Install the Power Automate mobile app for Android, iOS, or Windows Phone.

Create approval flows with attachments

1/15/2022 • 2 minutes to read • Edit Online

Sometimes, you need to get a file approved for business purposes. Fortunately, you can use Power Automate approvals to do this task. For example, let's say you are an accountant and you want to get approval for an invoice, you could create an instant flow that lets you send the file for approval by simply tapping a button and selecting the file to send.

In this article, you'll learn how to create an approval flow that sends an attachment that the approver needs to review before deciding if the request should be approved.

Create the flow

1. Sign into Power Automate.
2. Select **My flows** > **New** > **Instant-from blank**.

3. Give your cloud flow a name > search for, and then select **Manually trigger a cloud flow**, and then select **Create**.

4. Select the **Manually trigger a cloud flow** trigger > **Add an input** > **File**.

The previous steps configure your flow so that when it runs, it requests a file from the user to trigger your flow.

5. Select **New step**

6. Search for **Approvals** and then select **Start and wait for an approval**.

7. Select **Approve/reject - First to respond** in the **Approval type** list of the **Start and wait for an approval** card.

8. Provide the following information on the **Start and wait for an approval** card:

   - **Title** - This is a short description that tells the approver what the request is about.
   - **Assigned to** - The person to whom the request is sent.
   - **Details** - This text shows up in the approval request.

9. Select **Show advanced options** to reveal the fields in which you'll provide information about the file attached to the request.

10. Provide a file name in **Attachments Name - 1**

> **TIP**
> You must include the file extension that matches the file type that's uploaded.

11. Provide the contents for the file that will be sent to the approver in the **Attachments Content - 1** box.

    An easy way to do this is to use the **File Content** item from the list of dynamic content that's displayed when you select the **Attachments Content - 1** box.

12. Select **Save** to save your flow.

Test your flow

You can test your flow by selecting **Test** and then uploading an .xlsx file.

1. Select **Test**.
2. Select **I'll perform the trigger action**.

3. Select **Test** > **Continue** to start the test.
4. Select **Import**.

5. Find the file, select it, and then select **Open** to upload the file or image you're sending for approval.
6. Select **Run flow**.

   You'll see that the test run starts.

7. Select **Flow Runs Page** to monitor the status of the test.

Approve the request

The person to whom you send the approval request receives an email, similar to this image, where they can view the attachment and then **Approve** or **Reject** the request:

TIP

Approvers can review requests in the approvals center as well.

Learn more

In most approval flows, you'd want to notify the person who requests the approval of the decision. Follow the modern approvals article to learn how to add a **condition** to an approval flow to take specific actions based on the **outcome** of the request.

Manage sequential approvals with Power Automate

1/15/2022 • 8 minutes to read • Edit Online

Some workflows require pre-approval before the final approver is required to sign off. For example, a company may have a sequential approval policy that requires pre-approval for invoices over $1000.00 before they're approved by the Finance department.

In this walkthrough, we create a sequential approval flow that manages employee vacation requests.

> **NOTE**
>
> SharePoint is used here only as an example; it is not required to create approval flows. You can use any of the more than 200 services with which Power Automate integrates to drive your flows. If you are using SharePoint 2010, see SharePoint 2010 workflow retirement

> **TIP**
>
> For detailed information about using SharePoint with Power Automate, see the SharePoint documentation.

Detailed steps in the flow

The flow:

1. Starts when an employee creates vacation request in a SharePoint Online list.
2. Adds the vacation request to the approval center and then emails the request to the pre-approver.
3. Emails the pre-approval decision to the employee.
4. Updates the SharePoint Online list with the pre-approver's decision and comments. Note: If the request is pre-approved, the flow continues with these steps:
5. Sends the request to the final approver.
6. Emails the final decision to the employee.
7. Updates the SharePoint list with the final decision.

This image summarizes the preceding steps:

Prerequisites

- Power Automate.
- A SharePoint Online list.
- Office 365 Outlook and Office 365 Users account.

> **NOTE**
> While we use SharePoint Online and Office 365 Outlook in this walk-through, you can use other services such as Zendesk, Salesforce, or Gmail. If you are using SharePoint 2010, see SharePoint 2010 workflow retirement

Before you create the flow, create a SharePoint Online list. Later, we'll use this list to request approval for vacations.

For the purposes of this walkthrough, the SharePoint Online list that you create must include the following columns:

The SharePoint Online list you create must include the following columns:

TITLE	SINGLE LINE OF TEXT
Vacation start date	Date and time
Vacation end date	Date and time
Comments	Single line Of text
Approved	Yes/No
Manager comments	Multiple lines Of text
Modified	Date and time
Created	Date and time
Pre-approved	Yes/No

TITLE	SINGLE LINE OF TEXT
Created By	Person or group
Modified By	Person or group

Make note of the name and URL of the SharePoint Online list. We use these items later when you configure the **SharePoint - When a new item is created** trigger.

Create your flow

1. Sign in to Power Automate.
2. Select **My flows** in the left-side navigation pane.
3. On the top-left menu, select **New flow** > **Automated cloud flow**.

Add a trigger

1. Give your flow a name.
2. Under **Choose your flow's trigger**, select **When an item is created - SharePoint**, and then select **Create**.
3. On the **When an item is created** card, select the **Site Address** and the **List Name** for the SharePoint list that you created earlier.

Get the manager for the person who created the vacation request

1. Select **+New step**, and then type **get manager** into the **Choose an action** search box.
2. Find, and then select the **Get manager (V2) - Office 365 Users** action.

3. Insert the **Created By Email** token into the **User (UPN)** box on the **Get manager** card.

   This action gets the manager for the person who created the vacation request in SharePoint.

> **NOTE**
>
> It's a good idea to periodically save changes to your flow as you go.

Add an approval action for pre-approvals

1. Select **New step**.
2. Type **approval** into the **Choose an action** search box.
3. Select the **Start and wait for an approval** action.

4. Configure the **Start and wait for an approval** card to suit your needs.

> **NOTE**
>
> The **Approval type**, **Title** and **Assigned To** fields are required. You can use Markdown to format the **Details** field.

Note: This action sends the pre-approval request to the email address in the **Assigned To** box.

Add a condition

1. Select **New step**, and then select **Condition** in the list of actions.
2. On the **Condition** card, select **Choose a value** on the left.

   A list of dynamic values display.
3. Select **Responses Approver response** from the list of dynamic values.

4. Select the **Choose a value** box on the right, and then enter **Approve** into the box.

> **NOTE**
>
> The valid responses to the **Approvals - Start an approval** action are "Approve" and "Reject". These responses are case-sensitive.

5. Your **Condition** card should now show:

> **NOTE**
>
> This condition checks the response from the **Start and wait for an approval** action.

Add an email action for pre-approvals

1. Select **Add an action** on the **If yes** branch of the condition.

2. Enter **send email** into the search box on the **Choose an action** card.

3. Select the **Send an email (V2)** action.

4. Configure the email card to suit your needs.

> **NOTE**
>
> **To**, **Subject**, and **Body** are required.

This card is a template for the email that is sent when the status of the vacation request changes.

In the **Body** box on the **Send an email (V2)** card, use the **Comments** token from the **Approvals - Start an approval** action.

Add an update action for pre-approved requests

1. Select **Add an action** in the **If yes** branch.
2. Enter **SharePoint** in the search box on the **Choose an action** card, select the **SharePoint** filter, and then select the **Update item** action.

3. Configure the **Update item** card to suit your needs.

Get the pre-approver's manager

1. Use the Get the manager for the person who created the vacation request steps we did earlier to add, and then configure another **Get manager** action. This time we get the pre-approver's manager.

2. The **Get manager 2** card should resemble this image when you're finished. Be sure to use the **Email** token from the **Get manager** category on the **Add dynamic content from the apps and services used in this flow** card.

Add the final approval action

1. Use the add an approval action for pre-approvals steps we did earlier to add, and then configure another **Start and wait for an approval** action. This action sends an email request for final approval.

2. When you're done, the card should resemble this image:

Add the final approval condition

1. Repeat the steps from add a condition to add, and then configure a **Condition** that checks the final approver's decision.

Send email with final approval

1. Use the steps from Add an email action for pre-approvals to add, and then configure an action that sends an email when vacation requests are approved.

2. When you're finished, your card should resemble this image:

Update SharePoint with approval

1. Use the steps from Add an update action for pre-approved requests to add, and then configure an action

that updates SharePoint when the vacation request is approved.

2. When you're finished, the card should resemble this image:

Send email with pre-approval rejection

1. Select **Add an action** on the **If no** branch.

2. Enter **Send** into the search box of the **Choose an action** card, select **Office 365 Outlook** to filter the actions, and then select the **Send an email (V2) - Office 365 Outlook** action.

3. Configure the email card to suit your needs.

   This card represents the template for the email that's sent when the status of a vacation request changes.

Note: This action must be added to the **IF NO, DO NOTHING** branch below the **Condition** card.

Update SharePoint with pre-approval rejection

1. Select **Add an action**.
2. Enter **update** into the search box on the **Choose an action** card, and then select the **Update item - SharePoint** action.

3. Configure the card to suit your needs.

Send email with final rejection

1. Use the steps from Send email with pre-approval rejection to add, and then configure an action that sends an email when the vacation request is rejected by the final approver.

   Note: This action must be added to the **IF NO, DO NOTHING** branch below the **Condition 2** card.

2. When you're finished, the card should resemble this image:

Update SharePoint with final rejection

1. Use the steps from Update SharePoint with pre-approval rejection to add, and then configure an action that updates SharePoint if the final approver rejects the vacation request.

2. When you're finished, the card should resemble this image:

3. Select **Update flow** to save the work we've done.

If you've followed along, your flow should resemble this image:

Now that we've created the flow, let's see it in action.

Request an approval

Create a vacation request in the SharePoint Online list you created earlier.

After you save this request, the flow triggers, and then:

1. Creates a request in the approvals center.
2. Sends an approval request email to the approvers.

Your request should resemble this image:

View pending approval requests

View all pending approval requests by following these steps:

1. Sign in to Power Automate.
2. In the left-side navigation pane, select **Action items** > **Approvals**.
3. Your pending approval requests appear on the **Received** tab.

Pre-approve a request

If you're an approver in an approval flow, you receive an email whenever someone creates a request. The approval request is also sent to the approvals center. You can then approve or reject requests from the email, the approvals center, or the Power Automate app.

To approve a request:

From email

1. Select **Approve** from the email you receive when an item is added to the SharePoint Online list.

   Note: If you're using a mobile device with the Power Automate app installed, the Power Automate app launches, otherwise, the approvals center opens in your browser.

2. Enter a comment, and then select the **Confirm** button.

From the approvals center

1. Sign in to Power Automate.
2. Select the **Action items** > **Approvals** in the left-side navigation pane.
3. Select **Approve** on the request you want to approve.
4. Add any comments, and then select **Confirm** at the bottom of the screen.

From the Power Automate app

1. On your mobile phone with the Power Automate app installed, select **Approve** from the request approval email.

2. Select **Confirm** in the upper right corner of the screen.

3. The success page shows, indicating that your approval has been recorded.

> **NOTE**
> The screens on Android, iOS and Windows Phone may differ slightly, however, the functionality is the same on all devices.

Approve the request

The steps to approve a request are identical to the steps to pre-approve a request

Note: The final approver gets the vacation request only after the request has been pre-approved.

Reject a request

You can reject a request via email, the approvals center, or the Power Automate app. To reject a request, follow the steps for approving a request, but select **Reject**, instead of **Approve**.

After you confirm your decision (rejection of the request), the flow runs the following steps:

1. Sends an email to the person who requested vacation.
2. Updates the SharePoint Online list with the decision, and the comments from the approver.

More information

Single approver modern approvals walkthrough

Create parallel approval workflows with Power Automate

1/15/2022 • 7 minutes to read • Edit Online

In a parallel approval workflow, multiple persons are required to approve items such as invoices, purchase orders, vacation requests, etc. Each person's approval is independent of all other approvers.

In this walkthrough, we use Power Automate to create a cloud flow that automates a parallel approval workflow. This flow automates an employee vacation request process that requires approval from all persons (or teams) that the employee supports regularly. Employees use a SharePoint list to request vacation. Vacation approvals are required from the employee's direct manager, the Sales team, and the Human Resources team. Each vacation request is routed to each approver for a decision. The flow sends email with status changes and then updates SharePoint with the decisions.

> **TIP**
> For detailed information about using SharePoint with Power Automate, see the SharePoint documentation.

Prerequisites

- Power Automate.
- A SharePoint Online list.
- Office 365 Outlook and Office 365 Users account.

> **NOTE**
> While we use SharePoint Online and Office 365 Outlook in this walk-through, you can use other services such as Zendesk, Salesforce, or Gmail. If you are using SharePoint 2010, see SharePoint 2010 workflow retirement

Before you create the flow, create a SharePoint Online list. Later, we'll use this list to request approval for vacations.

The SharePoint Online list you create must include the following columns:

TITLE	SINGLE LINE OF TEXT
Employee comments	Single line Of text
Direct manager comments	Multiple lines Of text
Sales team comments	Multiple lines of text
HR team comments	Multiple lines of text
Direct manager approved	Yes/No
Sales team approved	Yes/No

TITLE	SINGLE LINE OF TEXT
HR team approved	Yes/No
Vacation start date	Date and time
Vacation end date	Date and time

Make note of the name and URL of the SharePoint Online list. We use these items later to configure the **SharePoint - When an item is created** trigger.

Create your flow from the blank template

1. Sign in to Power Automate.
2. Select **My flows** in the left-side navigation pane.
3. On the top-left menu, select **New flow** > **Automated cloud flow**.

Add a trigger

1. Give your flow a name.
2. Under **Choose your flow's trigger**, select **When an item is created - SharePoint**, and then select **Create**.
3. On the **When an item is created** card, select the **Site Address** and the **List Name** for the SharePoint list that you created earlier.

Get the manager for the person who created the vacation request

1. Select **+New step**, and then type **get manager** into the **Choose an action** search box.
2. Find, and then select the **Get manager (V2) - Office 365 Users** action.

3. Insert the **Created By Email** token into the **User (UPN)** box on the **Get manager** card.

   This action gets the manager for the person who created the vacation request in SharePoint.

Name and save your flow

Provide a name for your flow, and then select **Save** to save the work we've done so far.

> **NOTE**
>
> Select the **Save** icon periodically to save the changes to your flow.

Add an approval action for immediate manager

1. Select **New step**.
2. Type **approval** into the **Choose an action** search box.
3. Select the **Start and wait for an approval** action.

4. Configure the **Start and wait for an approval** card to suit your needs.

> **NOTE**
>
> The **Approval type**, **Title** and **Assigned To** fields are required. You can use Markdown to format the **Details** field.

> **IMPORTANT**
> This action sends the vacation request to the email address in the **Assigned To** box, so insert the **Email** token from the **Get manager (v2)** list.

Insert a parallel branch approval action for the sales team

1. Select the down arrow that's located between the **Get manager (v2)** and the **Start and wait for an approval** cards.
2. Select the plus sign that shows up on the down arrow after you select it.
3. Select **Add a parallel branch**.

4. Search for, select, and then configure a **Start and wait for an approval** action that sends the vacation request to the sales team. See the steps used to Add an approval action for immediate manager if you're not sure how to add the **Start and wait for an approval** action.

> **IMPORTANT**
> Use the sales team's email address in the **Assigned To** box of the **Start an approval 2** action.

Insert a parallel branch approval action for the human resources team

Repeat the steps to insert a parallel branch for the sales team to add, and then configure a **Start an approval** action to send vacation requests to human resources.

> **IMPORTANT**
> Use the human resources team's email address in the **Assigned To** box of the **Start an approval 3** action.

If you've followed along, your flow should resemble this example:

Options after adding parallel branches

After you've added actions to parallel branches, there are two ways to add steps to your flow:

- **Insert a step within a branch:** Use the *Insert a new step* (+) button above or below the card. This button that appears when you select a branch or hover over the connector arrow). This button adds a step to that **specific branch**. This button is shown here:

- **Add a step to the flow:** Use the larger **+New step** button at the bottom of the entire workflow. Steps you add with this button run after all previous branches complete. This button is shown here:

In the following sections, we add steps within each branch:

- Add a condition that checks if the vacation request was approved or rejected.
- Send an email that informs the employee of the decision.
- Update the vacation request in SharePoint with the approval decision.

Then, we use the *+New step* button to send an email that summarizes all decisions made on the vacation request.

Let's continue:

Add a condition to each branch

1. Select the first **Start and wait for an approval** branch.
2. Select the small *Insert a new step* (**+**) button below the card (the circular plus button that appears when you hover over the connector arrow).
3. Select **Add an action** from the menu that appears, and then select **Condition** in the list of actions.
4. Select the first box on the **Condition** card, and then select the **Response** token from the **Start and wait for an approval** category in the dynamic content list.

5. Confirm the list (in the middle of the **Condition card**) is set to **is equal to**.
6. Enter **Approve** (this text is case-sensitive) into the last box.
7. Your condition card should now resemble this example:

> **NOTE**
>
> This condition checks the response from the **Start an approval** action that goes to the employee's manager.

8. Repeat the preceding steps on the **Start an approval 2** (the approval request to sales) and **Start an approval 3** (the approval request to human resources) branches.

Add email actions to each branch

Perform the following steps on the **IF YES** side of the **Condition** branch.

Note: Your flow uses these steps to send an email when the request is approved:

1. Select **Add an action** on the **If yes** branch of the condition.

2. Enter **send email** into the search box on the **Choose an action** card.

3. Select the **Send an email (V2)** action.

4. Configure the email card to suit your needs.

> **NOTE**
>
> **To**, **Subject**, and **Body** are required.

This card is a template for the email that is sent when the status of the vacation request changes.

In the **Body** box on the **Send an email (V2)** card, use the **Comments** token from the **Approvals - Start an approval** action.

To send an email when a request is rejected, use the **IF NO** side of the **Condition** branch, and then repeat the preceding steps to add a template for the rejection email.

Repeat the preceding steps on the **Start and wait for an approval 2** (the approval request to sales) and **Start and wait for an approval 3** (the approval request to human resources) branches.

Update the vacation request with the decision

Perform the following steps to update SharePoint when decisions are made.

Note: Be sure perform these steps on both the **IF YES** and the **IF NO** sides of the branch.

1. Select **Add an action** in the **If yes** branch.
2. Enter **SharePoint** in the search box on the **Choose an action** card, select the **SharePoint** filter, and then select the **Update item** action.

3. Configure the **Update item** card to suit your needs.

Repeat the preceding steps on the **Start an approval 2** and **Start an approval 3** branches.

Complete the flow

1. Select **+New step**
2. Use the steps provided previously to send an email that summarizes the results of each approval. Send this email to the employee who requested vacation. Your card may resemble this example:

Learn more about modern approvals

Introduction to modern approvals

Create an approval flow that requires everyone to approve

1/15/2022 • 5 minutes to read • Edit Online

This walkthrough shows you how to create an approval workflow that requires everyone (all assigned approvers) to agree for a vacation request to be approved, but any approver can reject the entire request.

This type of approval workflow is useful in an organization that requires a person's manager and the manager's manager, to both agree to a vacation request for it to be approved. However, either manager can decline the request without the other person's input.

> **NOTE**
> While this walkthrough highlights a vacation approval scenario, you can use this type of approval flow in any situation where multiple approvers are required to approve a request.

Here's a quick video tutorial about approvals.

Prerequisites

- Access to Power Automate, Microsoft Office 365 Outlook, and Microsoft Office 365 Users.
- A SharePoint list.

  This walkthrough assumes you've created a SharePoint list that's used to request vacations. See the parallel approvals walkthrough for an in-depth example that details what your SharePoint list might look like.

  > **TIP**
  > For detailed information about using SharePoint with Power Automate, see the SharePoint documentation.

- Familiarity with the basics of creating flows.

  You can review how to add actions, triggers, and conditions. The following steps assume that you know how to perform these actions.

> **NOTE**
> While we use SharePoint and Office 365 Outlook in this walkthrough, you can use other services such as Zendesk, Salesforce, Gmail, or any of the more than 200 services that Power Automate supports.

Create the flow

> **NOTE**
> If you haven't created a connection to SharePoint or Office 365 previously, follow the instructions when you're prompted to sign in.

This walkthrough uses tokens. To display the list of tokens, tap or click any input control, and then search for the token in the **Dynamic content** list that opens.

Sign into Power Automate, and then perform the following steps to create your flow.

1. Select **My flows** > **New** > **Automated-from blank**, in the top left of the screen.
2. Give your flow a name and then add the **SharePoint - When an item is created or modified** trigger.
3. Enter the **Site Address** for the SharePoint site that hosts your vacation request list, and then select a list from **List Name**.
4. Select **New step**, add the Office 365 **Get manager (V2)** action, select the **User (UPN)** box, and then add the **Created By Email** token to it.

   The **Created By Email** token is located under the **When an item is created or modified** category of the **Dynamic content** list. This token dynamically provides access to data about the manager for the person who created the item in SharePoint.
5. Select **New step**, add another Office 365 **Get manager (V2)** action, and then add the **Mail** token to the **User (UPN)** box.

   The **Mail** token is located under the **Get manager (V2)** category of the **Dynamic content** list. This token dynamically provides access to the email address for the manager's manager.

   You can also rename the **Get manager (V2) 2** card to something meaningful like "Skip level manager".
6. Select **New step**, add the **Start and wait for an approval** action, and then select **Approve/Reject - Everyone must approve** from the **Approval type** list.

   > **IMPORTANT**
   > If any approver rejects, the approval request is considered rejected for all approvers.
7. Use the following table as a guide to complete the **Start and wait for an approval** card.

FIELD	DESCRIPTION
Approval type	See the approval types.
Title	The title of the approval request.
Assigned to	The email addresses of the approvers.
Details	Any additional information that you want sent to the approvers listed in the **Assigned to** field.
Item link	A URL to the approval item. In this example, this is a link to the item in SharePoint.
Item link description	A text description for the **Item link**.

> **TIP**
> The **Start and wait for an approval** action provides several tokens, including **Responses** and **Outcome**. Use these tokens in your flow to provide rich reporting of the results from a run of an approval request flow.

The **Start and wait for an approval** card is a template for the approval request that's sent to approvers. Configure it in a way that's useful for your organization. Here's an example.

When a cloud flow with the **Start and wait for an approval** action is configured with **Approve/Reject - Everyone must approve**, it waits until all **Assigned to** approve or at least one **Assigned to** rejects the approval request.

> **TIP**
> Add a **Condition** step if you want your flow to check the response of the approval request and perform different actions based on the **Outcome**. The **Outcome** can be **Approve** or **Reject**.

Let's continue with the flow and send an email when a decision is made on the approval request.

8. Select **New Step**, search for "send an email", add the Office 365 Outlook **Send an email (V2)** action, and then configure the action to send an email with the results of the request to the person who wants to go on vacation.

   Here's an example of what the **Send an email (V2)** card might look like.

> **NOTE**
>
> Any action that follows the **Start and wait for an approval** action runs based on your selection in the **Approval type** list on the **Start and wait for an approval** card. The following table lists the behavior based on your selection.

Approval types and their behaviors

APPROVAL TYPE	BEHAVIOR
Approve/Reject - Everyone must approve	Approval or rejection is needed by **all** approvers to complete the request. The actions that follow the **Start and wait for an approval** action run after **all** of the approvers approve, or when a single rejection is done.
Approve/Reject - First to respond	Approval or rejection by any approver completes the request. The actions that follow the **Start and wait for an approval** action run after any one of the approvers decides.
Custom responses - Wait for all responses	All approvers must respond to complete the process.
Custom responses - Wait for one response	A response from any approver completes the process.

At the top of the screen, select **Save** to save your flow.

Congratulations, your flow is complete! If you followed along, your flow resembles this image.

Now, whenever an item is added to your SharePoint list, or if an item changes, your flow triggers and sends approval requests to all approvers whom are listed in the **Assigned to** box of the **Start and wait for an approval** card. Your flow sends approval requests via the Power Automate mobile app and via email. The person who creates the item in SharePoint gets an email that summarizes the results, clearly indicating if the request was approved or rejected.

Here's an example of the approval request that's sent to each approver.

Here's an example of what a response and a response summary may look like after your flow runs.

Learn more about approvals

- Single approver modern approvals
- Sequential modern approvals
- Parallel modern approvals
- Approvals and Dataverse
- Approve requests on the go

Request approvals from Microsoft 365 groups

1/15/2022 • 3 minutes to read • Edit Online

> **NOTE**
>
> Effective February 2022, support for Microsoft 365 Groups (previously known as Office Groups) and Yammer in Dynamics 365 will be deprecated. This will impact customers who use Microsoft 365 Groups and/or Yammer for collaboration in Dynamics 365. We recommend that customers transition to Microsoft Teams for more advanced collaboration functionalities. For information about integrating Dynamics 365 with Teams, see Integrate customer engagement apps in Dynamics 365 with Microsoft Teams.
>
> If you've questions about the deprecation, contact your Microsoft Customer Service representative or Microsoft Partner.

You can send approvals to Microsoft 365 groups and to individuals. It's useful to send approvals to groups in scenarios where you need an approval from **any one** person in the group. For instance:

- You need the approval of a representative of the leadership team for a project.
- You want the copy of the new marketing material to be approved by someone on the social media team.

> **TIP**
>
> Only a single user from the group needs to respond to the approval. That user's response is used to represent the entire group.

Send an approval to a Microsoft 365 group

Approvals to groups behave exactly like approvals to users, it's just the entity that the approval is being sent to that's different. Let's look at a simple example.

> **NOTE**
>
> This example uses the **First to respond** action, but you can combine this action with other types of approvals as well.

Create the flow

1. Sign in to Power Automate.
2. Select **My flows** > **New** > **Instant — from blank**.

3. Give your flow a name, search for and then select **Manually trigger a flow**, and then select **Create**.

4. Select the **Manually trigger a flow** trigger > **Add an input** > **File**.

   This step configures your flow so that when it runs, it requests a file from the user to trigger your flow.

5. Select **New step**.

6. Search for **Approvals**, and then select **Start and wait for an approval**.

7. On the **Start and wait for an approval** card, for **Approval type**, select **Approve/reject - First to respond**.

8. Enter the following:

   - **Title**: This is a short description that gives the approver some details about the approval request.
   - **Details**: This text shows up in the approval request.

9. In the **Assigned to** field, start entering the name of the group to which you want to send the approval. The **Assigned to** field accepts both user and Microsoft 365 group inputs. If you know the email ID associated with the group, you can include that as well.

> **TIP**
> You can include multiple groups and users in the **Assigned to** field.

10. Select **Save** to save your flow.

Test your flow

1. Select **Test**.
2. Select **I'll perform the trigger action**.

3. Select **Test** > **Continue**.
4. Select **Run flow**.

   You'll see that the test run starts.

5. Select **Flow Runs Page** to monitor the status of the test.

Approve the request

For mail-enabled groups, the group to which the approval is sent receives a notification to respond to the approval. Members of the group can also view the approval in the Approvals action center on the Power Automate portal and in the Approvals app in Microsoft Teams.

What to expect when you send approval requests to groups and users

You can choose to send an approval to multiple groups, or even a combination of groups and users. Here are a few examples of such scenarios and their expected outcome:

- The **First to respond** approval sent to group 1 and group 2: At least one user from *either* group 1 or group 2 needs to approve.
- The **Everyone must respond** approval sent to group 1 and group 2: At least one user from *both* group 1 and group 2 needs to approve.
- The **First to respond** approval sent to group 1 and user 1: At least user 1 or one member from group 1 needs to approve.
- The **Everyone must respond** approval sent to user 1 and group 1: Both user 1 and at least one member from group 1 needs to approve.

Learn more

In most approval flows, you'd want to notify the person who requests the approval of the decision. Follow the modern approvals article to learn how to add a **condition** to an approval flow to take specific actions based on the **outcome** of the request.

Build an approval loop by using Power Automate and Dataverse

1/15/2022 • 9 minutes to read • Edit Online

Dataverse can give you a way to build flows that have information stored in a database independent of a cloud flow. The best example of this is with approvals. If you store the status of the approval in an table, your flow can work on top of it.

In this example, you'll create an approval process that starts when a user adds a file to Dropbox. When the file is added, information about it appears in an app, where a reviewer can approve or reject the change. When the reviewer approves or rejects the change, notification mail is sent, and rejected files are deleted from Dropbox.

By following the steps in this section, you'll build:

- a **custom table** that will contain information about each file added to Dropbox and whether the file's status is approved, rejected, or pending.
- a **flow** that adds information to the custom table when a file is added to Dropbox, sends mail when the file is approved or rejected, and deletes rejected files. These steps demonstrate how to build such a cloud flow from scratch, but you can create a similar flow from a template.
- an **app** in which a reviewer can approve or reject files added to Dropbox. You'll use Power Apps to generate this app automatically based on the columns in the custom table.

Prerequisites

- Sign up for Power Automate and Power Apps.
- Create connections to Dropbox and Office 365 Outlook, as Manage your connections describes.

Build the table

1. Sign in to powerapps.com.
2. If the left navigation bar doesn't appear by default, click or tap the icon with three horizontal lines in the upper-left corner.

3. In the left navigation bar, click or tap **Manage**, and then click or tap **Tables**.

4. If prompted, click or tap **Create my database**.

5. Near the upper-right corner, click or tap **New table**.

If your browser window isn't maximized, this button might appear in a different place.

6. Under **Table name**, specify a name that doesn't contain spaces and that no other table in your database has.

To follow this example exactly, specify **ReviewDropboxFiles**.

7. Under **Display name**, specify a friendly name.

8. Click or tap **Next**.

Add columns to the table

1. Near the upper-right corner, click or tap **Add column**.

2. In the blank row that appears at the bottom of the list of columns, set the properties of an **Approver** column. (As you set these properties, you can switch to the next column by pressing Tab.)

   - In the **Display Name** column, type **Approver**.
   - In the **Name** column, type **ApproverEmail**.
   - In the **Type** column, click or tap the **Email** option.
   - In the **Required** column, select the checkbox.

3. In the next row, set the properties of a **Status** column:

   - In the **Display Name** column, type **Status**.
   - In the **Name** column, type **Status**.
   - In the **Type** column, click or tap the **Text** option.

- In the **Properties** column, leave the default value.
- In the **Required** column, select the checkbox.

4. In the next row, set the properties of a **FileID** column:
   - In the **Display Name** column, type **File identifier**.
   - In the **Name** column, type **FileID**.
   - In the **Type** column, click or tap the **Text** option.
   - In the **Properties** column, leave the default value.
   - In the **Unique** column, select the checkbox.
   - In the **Required** column, select the checkbox.

5. Near the right edge, click or tap the ellipsis (...) for the **FileID** column, and then click or tap **Set as Title column**.

6. Near the lower-left corner, click or tap **Create**.

7. (optional) When the list of tables reappears, maximize your browser window if it isn't already maximized, and then click or tap the **Type** column header. The list is sorted with the custom tables, such as the one you just created, appearing at the top.

Sign in and create a cloud flow

1. Open the Power Automate portal.
2. Maximize your browser window if it isn't already maximized, and then click or tap **Sign in** near the upper-right corner.

3. In the top right menu you select the environment that you created the database in powerapps.com.

   Note: if you do not select the same environment then you will not see your table.

4. Near the upper-left corner, click or tap **My flows**.

5. Near the upper-right corner, click or tap **Create new flow**.

Start when a file is added

1. In the box that contains **Search for more triggers**, type or paste **Dropbox**, and then click or tap **Dropbox - when a file is created**.

2. Under **Folder**, click or tap the folder icon, and then browse to the folder where files will be added.

Add data to the table

1. Click or tap **New step**, and then click or tap **Add an action**.

2. In the box that contains **Search for more actions**, type or paste **Dataverse**, and then click or tap **Dataverse - Create object**.

3. Under **The table**, type or paste **Review**, and then click or tap **Review Dropbox files**.

4. Under **Title**, click or tap in the box, and then click or tap **File name** in the list of parameter tokens to add that token to the column.

5. Under **Approver**, type or paste the email address of the person who will review the files.

   Note: To make testing the flow easier, specify your own address. You can change it later, when the flow is ready for actual use.

6. Under **Status**, type or paste **Pending**.

7. Under **File Identifier**, click or tap in the box, and then click or tap **File identifier** in the list of parameter tokens to add that token to the column.

Check whether the file has been reviewed

1. Under the **Create object** action, click or tap **New step**, click or tap **More**, and then click or tap **Add a do until**.

2. In the upper-left corner of the **Do until** action, click or tap in the box that contains **Choose a value**.

   Note: If your browser window isn't maximized, click or tap in the upper box that contains **Choose a value**.

3. Under **Outputs from Create object**, click or tap **Status** to add that parameter token to the column.

4. Open the list near the center of the **Do until** action, and then click or tap **is not equal to**.

5. In the upper-right corner of the **Do until** action, type or paste **Pending** in the box that contains **Choose a value**.

Note: If your browser window isn't maximized, click or tap in the lower box that contains **Choose a value**.

6. Near the bottom of the **Do until** action, click or tap **Add an action**.

7. In the box that contains **Search for more actions**, type **Dataverse**, and then click or tap **Microsoft Dataverse - Get object**.

8. Under **The namespace**, click or tap your database.

9. Under **The table**, type or paste **Review**, and then click or tap **Review Dropbox files**.

10. Under **Object id**, click or tap in the box, and then click or tap the **File identifier** parameter token to add it to the column.

Check whether the item has been approved

1. Under the **Do-Until** action, click or tap **New step**, and then click or tap **Add a condition**.

2. In the upper-left corner of the condition, click or tap in the box that contains **Choose a value**.

Note: If your browser window isn't maximized, click or tap in the upper box that contains **Choose a**

value.

3. Under **Outputs from Get object**, click or tap the **Status** parameter token to add it to the column.

4. In the upper-right corner of the condition, type or paste **Approved** in the box that contains **Choose a value**.

Note: If your browser window isn't maximized, type or paste **Approved** in the lower box that contains **Choose a value**.

Send notification mail

1. Under **If yes, do nothing**, click or tap **Add an action**.

2. In the box that contains **Search for more actions**, type or paste **send mail**, and then click or tap **Office 365 Outlook - Send an email**.

3. Under **To**, type or paste the address of the person whom you want to notify when an item is accepted.

   Note: To make testing the flow easier, specify your own address. You can change it when the flow is ready for actual use.

4. Under **Subject**, click or tap in the box, and then click or tap the **File name** parameter token to add it to the column.

5. Under **Body**, type or paste **The item has been approved.**

6. Under **If no, do nothing**, repeat steps 1-5 in this procedure except specify the body of the email message as **The item has been rejected.**

Delete rejected files

1. Under the fields for the rejection mail, click or tap **Add an action**.

2. In the box that contains **Search for more actions**, type or paste **Dropbox**, and then click or tap **Dropbox - Delete file**.

3. Under **File**, click or tap in the box, and then click or tap the **File identifier** token parameter to add it to the column.

Save the flow

1. At the top of the screen, type or paste a name for the flow that you're creating, and then click or tap **Create Flow**.

2. Click or tap **Close** and then click or tap **Done**.

3. In Dropbox, add at least two files to the folder that you specified: one to test approval and one to test rejection.

Build the app

1. Sign in to powerapps.com, and then click or tap **New app** near the bottom of the left navigation bar.

2. In the dialog box that appears, click or tap the option to open either Power Apps Studio for Windows or Power Apps Studio for the web.

3. If you opened Power Apps Studio for Windows, click or tap **New** in the left navigation bar.

4. Under **Create an app from your data**, click or tap **Phone layout** in the **Microsoft Dataverse** tile.

5. In the **Search** box, type or paste **Review**.

6. Under **Choose an table**, click or tap **Review Dropbox Files**.

7. Near the lower-right corner, click or tap **Connect**.

8. If the opening screen of intro tour appears, take the tour to get familiar with Power Apps (or click or tap **Skip**).

You can always take the tour later by clicking or tapping the question-mark icon near the upper-left corner and then clicking or tapping **Take the intro tour**.

9. (optional) Near the bottom of the screen, drag the slider to increase the zoom so the app is easier to see.

Customize the app

1. In the right navigation bar, click or tap the layout that includes a header and a description.

2. On the **BrowseScreen**, click or tap just under the search bar to select the larger text-box control.

3. In the right-hand pane, open the lower list by clicking or tapping its down arrow.

4. In the lower list, click or tap **Title** so show the file name of the added files.

5. In the right-hand pane, open the upper list, and then click or tap **Status** to show the status of each file.

Test the overall solution

1. In Power Apps, open Preview mode by clicking or tapping the play button near the upper-left corner.

2. For the first file in the list, click or tap the arrow to show details about that file.

3. In the upper-right corner, click or tap the pencil icon to change details about the file.

4. In the **Status** box, type or paste **Approved**.

5. In the upper-right corner, click or tap the checkmark icon to save your changes and return to the details screen.

In a few minutes, you'll receive email stating that the file was approved.

6. In the upper-right corner, click or tap the back button to return to the browse screen.

7. For the other file in the list, click or tap the arrow to show details about that file.

8. In the upper-right corner, click or tap the pencil icon to change details about the file.

9. In the **Status** box, type or paste **Rejected** (or anything except **Approved**, including **Aproved** or **Approoved**).

10. In the upper-right corner, click or tap the checkmark icon to save your changes and return to the details screen.

In a few minutes, you'll receive email stating that the file was rejected, and the file will be deleted from Dropbox.

Use Markdown in Power Automate approval requests

1/15/2022 • 4 minutes to read • Edit Online

This article teaches you how to use Markdown syntax to add rich formatting to your approval requests.

IMPORTANT

- Approval request emails are *actionable messages*. If your Microsoft Outlook client doesn't support actionable messages, it displays approval requests in HTML format.
- All Markdown renderers have implementation differences. Review the Client Support section for details.
- Markdown is not currently supported for the Approvals app on Microsoft Teams.
- Markdown is not currently supported for GCC and GCC High customers.

Client Support

Markdown support among clients is inconsistent. The Power Automate team works to address these inconsistencies, however, inconsistencies remain. The following table lays out the known limitations among the supported clients.

FEATURE	POWER AUTOMATE	POWER AUTOMATE MOBILE APP	OUTLOOK	OUTLOOK WEB	TEAMS	TEAMS MOBILE APP	APPROVALS TEAMS APP
Headers	Yes	Yes	Yes	Yes	***No***	***No***	***No***
Numbered Lists	Yes	Yes	***No***	Yes	Yes	Yes	***No***
Nested Numbered Lists	Yes	Yes	***No***	Yes	Yes	Yes	***No***
Tables	Yes	Yes	Yes	Yes	***No***	***No***	***No***
Images	***No***	***No***	***No***	***No***	***No***	***No***	***No***
Forced Line Breaks	Yes*	Yes*	***No*** (use a blank line instead)	Yes*	Yes*	Yes*	***No***
Blank Lines	***No***	***No***	Yes	Yes	***No***	Yes	***No***
Emphasis	Yes	Yes	Yes	Yes	***No***	***No***	***No***

*Forced line breaks *within table cells* are not supported for Power Automate, the Power Automate mobile app, Outlook Web, Teams, and the Teams mobile app.

> **NOTE**
> For Outlook Mobile, the previous parameters can vary depending on the Outlook client app and version that you are using.

Headers

Structure your comments using headers. Headers segment longer comments, making them easier to read.

Start a line with a hash character `#` to set a heading. Organize your remarks with subheadings by starting a line with additional hash characters, for example `####`. Up to six levels of headings are supported.

Example:

```
# This is a H1 header
## This is a H2 header
### This is a H3 header
#### This is a H4 header
##### This is a H5 header
```

Result:

Paragraphs and line breaks

Make your text easier to read by breaking it up with paragraphs or line breaks. Enter two spaces prior to the line break to force most clients to start a new line.

Example:

```
This is line 1.(space)
Now text will appear on the next line.
```

Result: This is line 1.
Now text will appear on the next line.

Example 2

```
This is line 1.(space, space)

Line 2 has extra space before it.
```

Result:
This is line 1.

Line 2 has extra space before it.

Lists

Organize related items with lists. You can add ordered lists with numbers, or unordered lists with just bullets.

Ordered lists start with a number followed by a period for each list item. Unordered lists start with a `*`. Begin each list item on a new line. In a Markdown file or widget, enter two spaces prior to the line break to begin a new paragraph, or enter two line breaks consecutively to begin a new paragraph.

Ordered or numbered lists

Example:

```
0. First item.
0. Second item.
0. Third item.
```

Result:

1. First item.
2. Second item.
3. Third item.

Bullet lists

Example:

```
- Item 1
- Item 2
- Item 3
```

Result:

- Item 1
- Item 2
- Item 3

Nested lists

Example:

```
1. First item.
   - Item 1
   - Item 2
   - Item 3
1. Second item.
   - Nested item 1
   - Nested item 2
   - Nested item 3
```

Result:

1. First item.
   - Item 1
   - Item 2
   - Item 3
2. Second item.
   - Nested item 1

- Nested item 2
- Nested item 3

Links

HTTP and HTTPS URLs are automatically formatted as links.

You can set text hyperlinks for your URL using the standard markdown link syntax:

```
[Link Text](Link URL)
```

Example:

```
[Power Automate](https://flow.microsoft.com)
```

Result:
Power Automate

Tables

Organize structured data with tables.

- Place each table row on its own line
- Separate table cells using the pipe character `|`
- The first two lines of a table set the column headers and the alignment of elements in the table
- Use colons (`:`) when dividing the header and body of tables to specify column alignment (left, center, right)
- Make sure to end each row with a CR or LF.

Example:

```
| Heading 1 | Heading 2 | Heading 3 |
|-----------|:-----------:|-----------:|
| Cell A1 | Cell A2 | Cell A3 |
| Cell B1 | Cell B2 | Cell B3 |
```

Result:

HEADING 1	HEADING 2	HEADING 3
Cell A1	Cell A2	Cell A3
Cell B1	Cell B2	Cell B3 second line of text

Emphasis (bold, italics, strikethrough)

You can emphasize text by applying bold, italics, or strikethrough to characters:

- To apply italics: surround the text with an asterisk `*` or underscore `_`
- To apply bold: surround the text with double asterisks `**`.
- To apply strikethrough: surround the text with double tilde characters `~~`.

Combine these elements to apply multiple emphases to text.

Example:

```
Use _emphasis_ in comments to express **strong** opinions and point out ~~corrections~~
**_Bold, italicized text_**
**~~Bold, strike-through text~~**
```

Result:

Use *emphasis* in comments to express **strong** opinions and point out ~~corrections~~

Bold, italicized text

~~**Bold, strike-through text**~~

Special characters

SYNTAX	EXAMPLE/NOTES

To insert one of the following characters, prefix with a backslash:
```\ backslash ```
`\` `backtick`
```_ underscore ```
```{} curly braces ```
```[] square brackets ```
```() parentheses ```
```# hash mark ```
```+ plus sign ```
```- minus sign (hyphen) ```
```. dot ```
```! exclamation mark ```
	Some examples on inserting special characters
	Enter ```\\``` to get \\
	Enter ```_``` to get _
	Enter ```\#``` to get \#
	Enter ```\(``` to get \(
	Enter ```\.``` to get \.
	Enter ```\!``` to get \!

Create custom response options for approval flows

1/15/2022 • 2 minutes to read • Edit Online

Let's say you want to send an approval request each time an employee uploads an expense report to SharePoint and then allow the approver to respond with one of three options: Accept, Need more info, or Reject.

Prerequisites

- A Power Automate account.
- A SharePoint list for employees to enter their expense reports.

> **TIP**
> For detailed information about using SharePoint with Power Automate, see the SharePoint documentation.

Create approval flow

1. Sign in to Power Automate.
2. Select **My flows** from the left navigation bar.
3. Select **New** > **Automated-from blank**.

4. On the screen that opens, provide a name for your flow in **Flow name**.
5. Search for **SharePoint** in **Choose your flow's trigger**, select **When an item is created** from the list of triggers, and then select **Create**.

6. Provide the SharePoint **Site Address** and **List Name**.

> **TIP**
>
> Select **Enter custom value** from the **Site Address** field before you enter text into **Site Address**.

7. Select **New step**, search for **Approval**, and then select **Start and wait for an approval**.
8. On the **Start and wait for an approval** card, select the **Approval type** list.
9. Select **Custom Responses - Wait for one response**.

Next, you will create the custom responses that your approvers will use when they respond to an approval request for an employee expense.

10. In the **Response options Item** box, enter **Accept** and then select **Add new item**.

11. In the **Response options Item** box, enter **Reject** and then select **Add new item**.
12. In the **Response options Item** box, enter **Need more info**.

13. Enter a **Title**, **Assigned to** (email for the approver), and **Details** (the details to be contained in the approval request).

    Here's an example of what you might include for your organization.

Now that you've created your custom responses, you might want to do different things in your flow, depending on the response from the approver.

Use approval responses

If the response to the request is **Accept**, you might want to send an email to the accounting department, asking them to reimburse the employee for the expense.

If the response is **Reject**, you might want to send an email to the employee, letting them know that the request was rejected.

And finally, if the response from the approver is **Need more info**, you might want to send an email to the employee, requesting the employee to provide more information.

To do any of these in the flow, add a **Condition** or a **Switch** action to your flow, and then select the **Outcome** field of the approval request from the dynamic content picker. Be sure to confirm whether the value is Accept, Need more info, or Reject.

Respond to approval requests with a custom response

Approvers receive approval requests in email. The requests are also displayed in the approval center on Power Automate.

Limitations

Outlook and Outlook Web Access(OWA) actionable messages have a limit of five custom responses. This means that only the first five responses that are defined within the flow will be visible in the actionable section of Power Automate approval emails. You can submit the remaining options via a non-actionable HTML email, the Power Automate approval center, the Power Automate mobile application, or Teams.

> **NOTE**
>
> For approvals using a single custom response, Outlook and OWA expand the response field so users do not need to select a button before they can respond like they do when there are multiple approval options.

Learn more

- Create single approver flows
- Create sequential approver flows

Known issues

1/15/2022 • 2 minutes to read • Edit Online

Working with guest users

If you assign a guest user to an approval, that user won't be able to view or act on the approval by default. The guest user must be assigned a valid Power Automate license (Per user license or Microsoft 365-based user license) to view or respond to the approval.

Adaptive Cards mismatch in Microsoft Teams

There are multiple ways in which you can notify an approver when a flow runs. By default, all flows that handle approvals send an email notification. You can also send an Adaptive Card with the approval to users in Microsoft Teams. If the approver responds through the email notification or through the approval action center, the card in Microsoft Teams will not auto update. This can lead to situations where there's a mismatch between the status shown on the Adaptive Card and that of the flow.

To avoid this, you can choose to disable the default notification email that is sent to the user as part of approval creation.

Abandoned approvals in the approval action center

As part of the flow you can send an approval request to a user and wait for a response. Today, an approval flow can wait for 28 days. If the wait time exceeds 28 days, that flow will fail. This only impacts the flow itself, meaning that the approval continues to exist in the action center. This can lead to cases where there are abandoned approvals in the approval action center, which have no flow waiting on them. The requestor or environment admin will need to manually delete these approvals from the action center.

Anchors

Anchor links are not supported. Unexpected results will occur if you use anchors.

Data Templating

Data templating isn't fully supported for adaptive cards in Power Automate. As a workaround, use actions like compose, filter, select, and apply to each to manually construct the card within your flows.

Overview of Office 365 Outlook email use with Power Automate

1/15/2022 • 2 minutes to read • Edit Online

Connectors represent the service to which you want to connect. For example, you can use the OneDrive, SharePoint, or Twitter connectors to use those services. One of the most popular connectors used in flows to send or receive email are the Outlook.com connector and the Office 365 Outlook connector. Both connectors offer similar operations that you can use to manage your mail, calendars, and contacts. You can perform actions such as send mail, schedule meetings, add contacts, and so on with both of these connectors.

Outlook.com or Office 365 Outlook: which connector should I use?

If you're using a work or school email account, use Office 365 Outlook connector. If you're using a personal account (Microsoft account), use the Outlook.com connector. In this article, we refer only to the Office 365 Outlook triggers and actions, but you can use the same techniques for the Outlook.com connector as well.

Triggers

A **trigger** is an event that starts a cloud flow. For example, **When a new email arrives (V2)** is a trigger that starts a cloud flow when an email arrives into an inbox. Here is the full list of the Office 365 Outlook triggers you can use to start flows. Use the Trigger a cloud flow based on email properties article to learn more on how to trigger flows based on email properties.

The following image shows a partial list of Office 365 Outlook triggers. For the full list of triggers you can use to start a flow, go to Office 365 Outlook triggers.

Actions

Actions are the events you want the flow to do *after* the trigger event takes place, for example "when someone sends me an email, save it to OneDrive."

The following image shows a partial list of Office 365 Outlook actions. For the full list of actions you can use in your flows, go to Office 365 Outlook actions.

More information

- Create flows to manage email
- Customize email in flows
- View the top email scenarios

Create flows to manage email

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There are four ways to create flows to manage your email:

1. Use a template—Most likely, there's already a template accomplishes your scenario. Search for your scenario among the templates and then follow the steps to create a cloud flow from the template.
2. Tweak a template—If you find a template that is similar to your scenario, but it doesn't do exactly what you are want, you can create a cloud flow from that template and then tweak the flow to your liking. You can extend a cloud flow that's created from template by adding, editing, or removing, triggers and actions.

   > **TIP**
   >
   > You can copy and paste actions in the same flow or across flows to speed up the process.

3. Create a cloud flow from scratch—If you can't find a template that's similar to your scenario, you can create a cloud flow from scratch and then connect the services you want.
4. Create a cloud flow from a connector—In Power Automate, select **Connectors** from the left side of the screen, search for the connector you want, and then select it to create your flow. For example, search for "outlook" to find connectors for Office 365 Outlook.

More information

- Overview of email with flows
- Customize email in flows
- Create the top email scenarios

Create flows for popular email scenarios

1/15/2022 • 2 minutes to read • Edit Online

Here are some of the top scenarios in which you can use Power Automate to manage your email:

- Send an email from your account.
- Send an email from a distribution list (DL) or shared mailbox.
- Send an email with voting options.
- Build an approval process and notify colleagues via email.
- Send reminder email to approvers.
- Send a daily digest email with a summary table.

Send email from your account

To send email from your account, use the Send an email (V2) action.

You can send the email to one or more recipients. You can use the rich text editor to make text bold, add color, and format the email similar to the way you do in Outlook. You can add static text or values from previous actions by using dynamic content. You can use the **send as** option to send email as someone else, or on behalf of someone else. (To use this option, you'll need the permissions in Outlook to send on another person's behalf). You can find all email you send in your **Sent items** folder in Outlook.

For example, if you have a cloud flow that sends you an email as soon as your item is approved, you can add the link of the approved item as an attachment.

Send email with voting options

Use the **Send email with options** action to send an email with voting options using actionable email. Provide voting options in the **User Options** field.

The recipients receive an email similar to the following image.

In your flow, you must capture that response and save it somewhere. You might email it to yourself, save it to Excel, or post it to Teams. Don't forget to save it, otherwise you won't know how people voted.

Send an email from a distribution list or shared mailbox

Use the Send an email from a shared mailbox (V2) action and specify the shared mailbox address to send email from a shared mailbox.

The distribution list admin must first give you permissions to the shared mailbox. When you use this action, email appears in the Sent folder of your shared mailbox because you're sending it from that account directly.

Build an approval process and send notifications via email

You can use Power Automate to build an approval process that notifies users via email.

Send reminder email to approvers

You can also send reminder emails for approval requests.

Send a daily digest email with a table

Here are three ways you can send a daily digest email with a table:

- Use the Data Operation – Select action to create a table with the column names and data you'd like to see in the email. You can further format the data by using expressions. In following example, the flow gets calendar events within a certain timeframe, converts the time zones, and then creates a table with the events.

- Add the Create HTML Table action, and then add the output from the select action to the HTML action.
- Add the Send an email (V2) action, add the output from an HTML table into the body of the email.

More information

- Overview of email with flows
- Create flows to manage email
- Customize email in flows

Trigger a cloud flow based on email properties

1/15/2022 • 6 minutes to read • Edit Online

Use the **When a new email arrives (V3)** trigger to create a cloud flow that runs when one or more of the following email properties match criteria that you provide:

PROPERTY	WHEN TO USE
Folder	Trigger a cloud flow whenever emails arrive in a specific folder. This property can be useful if you have rules that route emails to different folders.
To	Trigger a cloud flow based on the address to which an email was sent. This property can be useful if you receive email that was sent to different email addresses in the same inbox.
CC	Trigger a cloud flow based on the CC address to which an email was sent. This property can be useful if you receive email that was sent to different email addresses in the same inbox.
From	Trigger a cloud flow based on the sender's email address.
Importance	Trigger a cloud flow based on the importance with which emails were sent. Email can be sent with high, normal, or low importance.
Has Attachment	Trigger a cloud flow based on the presence of attachments in incoming emails.
Subject Filter	Search for the presence of specific words in the subject of an email. Your flow then runs *actions* that are based on the results of your search.

IMPORTANT

Each Power Automate plan includes a run quota. Always check properties in the flow's trigger when possible. Doing so avoids using your run quota unnecessarily. If you check a property in a condition, each run counts against your plan's run quota, even if the filter condition that you defined isn't met.

For example, if you check an email's From address in a condition, each run counts against your plan's run quota, even if it's not from the address that interests you.

In the following walkthroughs, we check all properties in the **when a new email arrives (V3)** trigger. Learn more by visiting the frequently asked billing questions and the pricing page.

Prerequisites

- An account with access to Power Automate
- A Microsoft 365 Outlook account
- The Power Automate mobile app for Android, iOS, or Windows Phone

- Connections to Office, Outlook, and the push notification service

Trigger a cloud flow based on an email's subject

In this walkthrough, we create a cloud flow that sends a push notification to your mobile phone if the subject of any new email has the word "lottery" in it. Your flow then marks any such email as *read*.

> **NOTE**
>
> Although this walkthrough sends a push notification, you're free to use any other action that suits your workflow needs. For example, you might store the email contents in another repository such as Google Sheets or a Microsoft Excel workbook stored on Dropbox.

Ok, let's get started.

1. Sign in to Power Automate, and then select the **My flows** tab.
2. Select **New** > **Automated-from blank**.

3. Give your flow a name.
4. Search for "new email", and then select **When a new email arrives (V3)** from the list of triggers. This trigger runs each time an email arrives.
5. Select **Create**.

6. Select the folder that you'd like the flow to monitor for incoming emails, and then select **Show advanced options**.

> **NOTE**
>
> To display all your email folders, select the **Show Picker** icon, which is located on the right side of the **Folder** box on the **When a new email arrives (V3)** card.

1. In the **Subject Filter** box, enter the text that your flow uses to filter incoming emails.

   In this example, we're interested in any email that has the word "lottery" in the subject.

a. Select **New step**.

b. Search for "notification," and then select **Send me a mobile notification** from the list of actions.

2. Enter the details for the mobile notification you want to receive when you receive an email that matches the **Subject Filter** you specified earlier.

a. Select **New step**.

b. Search for "read", and then select **Mark as read or unread (V2)** from the list of actions.

c. In the **Mark as read** card, add the **MessageId** token in the **Message Id** box.

If the **Message Id** token isn't visible, search for it by entering **Message Id** in the search box.

3. Select **Save** at the top of the page.

Congratulations! You now receive a push notification each time you receive an email that contains the word "lottery" in the subject.

Trigger a cloud flow based on an email's sender

In this walkthrough, we create a cloud flow that sends a push notification to your mobile phone if any new email arrives from a specific sender (email address). The flow also marks any such email as *read*.

1. Sign in to Power Automate, and then select the **My flows** tab.

2. Select **New** > **Automated-from blank**.

3. Give your flow a name.
4. Search for "new email", and then select **When a new email arrives (V3)** from the list of triggers. This trigger runs each time an email arrives.
5. Select **Create**.

6. Select the folder that you'd like the flow to monitor for incoming emails, and then select **Show advanced options**.

> **NOTE**
>
> To display all your email folders, select the **Show Picker** icon, which is located on the right side of the **Folder** box on the **When a new email arrives (V3)** card.

1. In the **From** box, enter the email address of the sender.

   Your flow takes action on any emails that are sent from this address.

   a. Select **New step**.

   b. Search for "notification," and then select **Send me a mobile notification** from the list of actions.

2. Enter the details for the mobile notification you'd like to receive whenever a message arrives from the email address that you entered earlier.

a. Select **New step**.

b. Search for "read", and then select **Mark as read or unread (V2)** from the list of actions.

c. In the **Mark as read** card, add the **MessageId** token in the **Message Id** box.

If the **Message Id** token isn't visible, search for it by entering **Message Id** in the search box.

3. Give your flow a name, and then save it by selecting **Create flow** at the top of the page.

Trigger a cloud flow when emails arrive in a specific folder

If you have rules that route emails to different folders based on certain properties, such as the address, you might want this type of flow.

Let's get started.

> **NOTE**
> If you don't already have a rule that routes email to a folder other than your inbox, create such a rule and confirm it works by sending a test email.

1. Sign in to Power Automate, and then select the **My flows** tab.

2. Select **Create from blank**.

3. Search for "email", and then select **Office 365 Outlook - When a new email arrives (V3)** from the list of triggers. This trigger runs each time an email arrives.

1. Select the folder to which you're routing specific emails. To display all email folders, first select the **Show Picker** icon, which is located on the right side of the **Folder** box on the **when a new email arrives (V3)** card.

a. Select **New step**.

b. Search for "notification," and then select **Send me a mobile notification** from the list of actions.

2. Enter the details for the mobile notification you'd like to receive when an email arrives in the folder you selected earlier. If you haven't already, enter the credentials for the notifications service.

a. Select **New step**.

b. Search for "read", and then select **Mark as read or unread (V2)** from the list of actions.

c. In the **Mark as read** card, add the **MessageId** token in the **Message Id** box.

If the **Message Id** token isn't visible, search for it by entering **Message Id** in the search box.

3. Give your flow a name, and then save it by selecting **Create flow** at the top of the page.

Test the flow by sending an email that gets routed to the folder you selected earlier in this walkthrough.

Customize email in flows

1/15/2022 • 3 minutes to read • Edit Online

Here are the top how-to scenarios about email in Power Automate, with examples of how to achieve them:

1. Send a beautifully formatted email.
2. Add an image to your email.
3. Send email to a distribution list.
4. Send automatic replies from a shared mailbox.
5. Change the date and time format of an email.

Send a beautifully formatted email

You can use HTML to beautify your email. Following are two options that you can use to beautify your messages with HTML:

Option 1: Write HTML directly into the flow

1. Select the `</>` button inside the rich text editor in the Power Automate designer.

2. Enter any HTML content into the body of the email.

Option 2: Copy HTML from an Outlook email

Alternatively, if you don't know HTML or don't feel like playing with HTML, follow these steps:

1. Create an email in Outlook, styling it with colors, content placeholders, images, and tables.
2. Send the email to yourself.
3. Open the email you sent to yourself in Outlook. Be sure to use a new window; don't use the preview window in Outlook.
4. Go to the **Message** tab > **More Actions** > **Other Actions** > **View Source**.

The HTML representation of the email opens in your text editor.

5. Find **<html>** in the file.
6. Copy the content between **<html>** and **</html>**.
7. Back in Power Automate, select the **</>** button in the rich text editor of the **Send an email** action, and then paste the contents that you copied from Outlook.

Add an image to your email

Outlook takes the image you included in your email and converts it to plain text. Instead of copying/pasting the plain text into Power Automate, follow these steps:

1. Upload the image to cloud-based storage, such as Google Drive or OneDrive for Business.
2. Get the anonymous visitor URL to the image.
3. In the Power Automate **Send an email** action, go to the HTML section of the rich text editor, look for **<image src=** in the HTML, and then change the value of the **src** property to the URL of the image from the cloud-based storage provider where you uploaded the image.

   Your **src** should be similar to: **<image src="https://url/to/your/images.png"/>**.

   > **IMPORTANT**
   >
   > Inline images are limited to a size of 100 KB. This might affect the quality of the image.

Send email to a distribution list

The **Send an email** action can send messages to an email-enabled security group or distribution list. Each member of the email-enabled security group or distribution list receives the email in their group mailbox rather than their own mailbox.

Alternatively, follow these steps if you want users to receive the email in their mailbox:

1. Add the Get group members action from the Azure AD connector, and then select the distribution list.
2. Add an **Apply to each** action under the action **Azure AD-Get group members**.
3. Inside the **Apply to each**, add the **Send an email** action, and then add the group members from the **Get group members** action as dynamic content in the **To** field.

Send automatic replies from a shared mailbox

You can do this in the Outlook Web App.

1. Sign in to the Outlook Web App at https://outlook.office365.com with your Office 365 credentials.
2. Select your profile image (or placeholder image) in the upper-right corner.
3. Select **Open another mailbox**.
4. Enter the name or email address of the shared mailbox, and then select it.
5. Select the **settings icon** in the upper-right corner, and then select **Automatic replies**.
6. Configure your automatic reply.

Change the date and time format of an email

By default, the email you receive shows Coordinated Universal Time (UTC) time zone. However, your users might want to change it to their local time zone. Follow the steps in this article to convert the time zone.

More information

- Overview of email with flows
- Create flows to manage email
- Top email scenarios

Troubleshoot common issues with email in flows

1/15/2022 • 2 minutes to read • Edit Online

Known limitations

For known limitations of the **Send an email** action, go to Office 365 Outlook: Known issues and limitations.

Frequently asked questions

I didn't get an email. Why?

1. Confirm that your IT department has approved all Power Automate endpoints to allow it to send email to your email servers. These endpoints include IP addresses and domains.
2. Double-check whether you have any Outlook rules that are moving the email to a different folder.
3. Check whether you're using the **Focused** inbox feature. Check whether the email landed in another folder.

I didn't get an email and the send an email action looks stuck in my flow.

If you're using the **Mail** connector, note that it has a limit of 100 API calls per 24 hours. Try the Office 365 Outlook connector, which has a limit of 300 API calls per 60 seconds instead, so you're less likely to hit the limit.

I have a cloud flow that triggers when an email arrives in a folder. Will my flow trigger if I move email from one folder to another folder?

No. Your flow will be triggered only when a new email arrives.

I'm trying to send an email to all the approvers. I see an apply to each action around the send an email action, causing separate emails. I want to send an email to all of them.

Apply to each is added because there are multiple approvers. You can create a string variable (as opposed to an array) and store email addresses in it, separated by semicolons.

I don't get an attachment for some of my approvals.

The Approval action attaches files to a notification email until the size of the email reaches 5 MB. If the attachments exceed 5 MB, the approval email directs the approver to check the attachments in the Power Automate approval center.

How to increase email attachment size limit for Power Automate?

A Microsoft Dataverse administrator can change the limit by going into **Microsoft Dataverse** > **Email Configuration** settings, and then setting the file size limit for attachments.

Power Automate stopped working - "Item ID doesn't belong to current mailbox" error Power Automate when using actions with shared mailbox.

As of May 6, 2020, shared mailbox support was added for certain operations with an optional **Mailbox address** parameter, allowing you to specify a shared mailbox address for your operations to access. If you were using this operation prior to May 6, 2020, you'll need to explicitly update your operations to specify the shared mailbox address.

I see this error: "REST API is not yet supported for this mailbox"

This error can occur for accounts that are on a dedicated (on-premises) mail server when:

1. The mailbox is on a dedicated Microsoft Exchange Server, or it isn't a valid Microsoft 365 mailbox.
2. The mailbox is an Outlook.com account that isn't enabled.
3. The mailbox isn't part of a Microsoft 365 plan that includes Power Automate.

To resolve the issue, go to "REST API is not yet supported for this mailbox" error for request to a mailbox.

Unable to send email with attachment error: "Parameter 'Attachment Content' cannot be null or empty."

Use expressions to encode the attachment with base64. The attachment will be recognized after you're done.

More information

- Overview of email with flows
- Create flows to manage email
- Customize email in flows
- Top email scenarios

Use SharePoint and Power Automate to build workflows

1/15/2022 • 2 minutes to read • Edit Online

Power Automate is deeply integrated with SharePoint. You can start with any of the more than 100 SharePoint templates, or create your own flow that integrates with SharePoint from scratch.

Learn more about how to use Power Automate with SharePoint in the following video.

Top SharePoint workflow scenarios

Here are some of the top scenarios in which you can use Power Automate with SharePoint:

- Manage approval flows
- Work with files and lists
- Migrate from workflows to Power Automate

Manage approval flows

- Customize SharePoint page approvals to meet your needs.
- Require approval of documents in SharePoint by using Power Automate.
- Route finished documents to a team for approval.

Work with files and lists

- Manage list item and file permissions.
- Move files to different folders after they're approved in SharePoint.
- Create an item in SharePoint when a new order is added in Salesforce.
- Get items from lists, or get files from libraries.
- Create a flow for a list or library in SharePoint or OneDrive.
- Edit a cloud flow.

Other top scenarios

- Use HTTP requests to manage lists and libraries.
- Create SharePoint reminder flows.

SharePoint triggers and actions

You can use SharePoint triggers to start flows that monitor changes made to a SharePoint list or library. For a full list, go to SharePoint triggers.

As soon as your flow starts, you can use any of the more than 40 *actions* to manipulate your SharePoint lists.

Migrate from workflows to Power Automate

- Migrate from classic workflows to Power Automate flows in SharePoint.

Next steps

- Get started with Power Automate and SharePoint.
- Get started with approvals.
- Create modern approval flows in conditions in advanced mode.

SharePoint remind me

1/15/2022 • 2 minutes to read • Edit Online

SharePoint lists and libraries allowed you to define custom metadata columns to track dates. With Power Automate's integration with SharePoint, you can easily create reminder flows, based on DateTime columns in SharePoint. With reminder flows, you receive a personal email alert a predetermined number of days in advance of a date on any document or item in SharePoint.

Prerequisites

- Access to Microsoft SharePoint Online.
- A SharePoint list, or library with a DateTime column.
- Access to Power Automate.

> **TIP**
>
> For detailed information about using SharePoint with Power Automate, see the SharePoint documentation.

Create a reminder flow

1. Create a SharePoint list with at least one DateTime column in the current view.
2. Select **Automate** > **Set a reminder** > **Date deactivated** (this is the column with the DateTime for the reminder).

3. Optionally, you might need to sign into the the services that this Power Automate template uses.
4. Select **Continue**.
5. Provide a **Flow name** and the number of days prior to the DateTime column entry when you want to receive the reminder alert on the **Set a reminder** card.

6. On the **Set a reminder** card, select **Create** .

7. You'll receive the following message, indicating that the flow was created:

Confirm reminders received

You'll receive a reminder via email, based on the **Remind me this many day(s) in advance** entry you made on the **Set a reminder** flow you created earlier.

Edit your flow

The reminder flow is like any other flow, so you can access and edit it through Power Automate.

Learn more

- Getting started with Power Automate.
- Set a reminder flow in SharePoint.

Manage SharePoint page approvals with Power Automate

1/15/2022 • 2 minutes to read • Edit Online

SharePoint site admins can use Power Automate to require new or updated site pages to be approved before being published.

In this article, you'll learn how to configure your SharePoint site to use a cloud flow to require changes to the site to be approved before they go live.

> **NOTE**
>
> SharePoint approvals isn't available in all goverment cloud environments.

Configure SharePoint for page approvals

Prerequisites

You must be a SharePoint site admin to perform the activities in this article.

> **TIP**
>
> For detailed information about using SharePoint with Power Automate, see the SharePoint documentation.

1. Sign in to SharePoint as a site admin.
2. Select **Pages** from the navigation bar.

3. Select **Automate** > **Power Automate** > **Configure page approval flow**.

4. Select **Create flow**.
5. Optionally, you might need to sign into the the services that this Power Automate template uses.

6. Select **Continue**.

7. Provide a **Flow name**, at least one name in the **Approvers** box, and then select **Create**.

That's it! Now, each time a page is added or modified, an approval request goes to the **Approvers** you listed in the flow.

The page approval flow is just like any other flow, so it's listed in the **My flows** tab.

Submit a page for approval

Now that you've created a page approval flow, anyone who adds or changes a page will need to do the following:

- Make a change to the site (add a new page, for example) and then save the change.

- Wait for someone to approve the change.

Approve a page

Approvers receive an email whenever there's a page approval request. They can either approve the requests directly in the email (if their email client supports actionable messages) or open the page from the email to review, and then approve the page in SharePoint.

Customize page approval flows

Because page approvals use Power Automate behind the scenes, the page approval flow is available for site owners to modify and add any custom business logic in the flow. To modify the flow, the site owner can select **Flows** and then select **See your flows** in the pages library to find the page approval flow.

Learn more

- Page approval flow
- Configure page approval

Use flows in Microsoft Teams

1/15/2022 • 2 minutes to read • Edit Online

Power Automate flows can be used in three scenarios with Teams.

SCENARIO	DESCRIPTION
Trigger flows from Teams messages.	In this scenario, you can create flows that are triggered when someone selects a Teams message. The flow can then run as any other flow you create.
Use flows with adaptive cards.	Here, adaptive cards can be used as the trigger for flows. The full set of rich adaptive cards is available to you.
Create flows from within the Power Apps app in Teams.	Use the Power Apps app in Teams to create flows that use Project Oakdale. Project Oakdale is a built-in, low-code data platform for Teams that empowers users to build custom apps and workflows within Teams by using Power Apps and Power Automate.

Learn more about how to use Power Autoamte with Teams in the following video.

Licensing

There are no additional licensing requirements when you use Power Automate with Microsoft Teams.

For detailed licensing information about Project Oakdale, see licensing and restrictions in the Microsoft Power Platform admin guide.

Related topics

Power Apps and Teams
Power Virtual Agents and Teams

Install the Power Automate app in Microsoft Teams

1/15/2022 • 2 minutes to read • Edit Online

The Power Automate app lets you automate your Microsoft Teams activities or and connect Microsoft Teams to other apps and services.

1. Sign into Microsoft Teams.
2. Select **More added apps (...)**, search for **Power Automate**, and then select the **Power Automate** app.

3. Select **Add for me**.

4. Select your **Country/region**, and then select **Get started**.

After a few moments, the Power Automate app installs. You can access the app in Microsoft Teams from the left pane.

> **TIP**
>
> You can also install the Power Automate app from the Microsoft Teams app store.

Pin the Power Automate app

> **TIP**
>
> You can pin the Power Automate app in Microsoft Teams, allowing you to access it more easily at a later time.

Follow these steps to pin the Power Automate app in Microsoft Teams:

1. Right-click on **Power Automate** in the pane on the left side.
2. Select **Pin**.

Get started with the Power Automate app

From the **Home** tab, you can create and manage your flows.

Known issues

The Power Automate app in Microsoft Teams only shows flows from your organization's default environment. Any flow that you create from the Power Automate app is located in the default environment.

Next Steps

- Create flows in Microsoft Teams.
- Manage your flows in Microsoft Teams.

Create flows in Microsoft Teams

1/15/2022 • 2 minutes to read • Edit Online

You can use the Power Automate app to create and manage flows from within Microsoft Teams. To get started quickly, use one of the existing templates to create your flows, or you can create customized flows from scratch.

Prerequisites

To use the Power Automate app, you need an account with access to Microsoft Teams.

Create a cloud flow from a template

> **NOTE**
>
> By default, the Power Automate app shows you templates that have been created for Microsoft Teams. You can switch filters on the top right to view all Power Automate templates, if desired.

Follow these steps to create a cloud flow from a Microsoft Teams template:

1. Sign into Microsoft Teams.

   > **TIP**
   >
   > You may also use the Microsoft Teams app.

2. Select **Apps** on the right side on the screen.

3. Search for, and then select the **Power Automate** app.

4. Select the **Create** tab, and then select the template on which you'd like to base your flow.

5. If the template that you selected is optimized for Microsoft Teams, a dialog that lets you rename the flow and authenticate with the apps necessary for the flow displays.

> **NOTE**
>
> You must login to all connectors so that your flow can run successfully. A green check indicates that you've authenticated.

6. Set up the connections as needed.

7. Select **Continue** to get a list of parameters that are necessary for the flow to run successfully. Provide the parameters that are needed.

If you wish to see the full flow, select **Edit in advanced mode**.

8. You're all set! You will get a confirmation screen showing that your flow was successfully created. After you create your flow, you can find it on the **Home** tab.

IMPORTANT

When you create flows from within the Power Automate app in Microsoft Teams, they are always created in your organization's default environment. You can also access these flows from Power Automate.

Create a cloud flow from scratch

If you want full control over the flow that you create, select **Create from blank** from the top right side of the screen, instead of using a template.

This brings up the full Power Automate designer experience within Microsoft Teams where you can create a fully customized flow.

Known issues

Any flow that you create from within the Power Automate app is located in your organization's default environment.

Related articles

- Manage your flows in Microsoft Teams.
- Visit the Microsoft Teams connector documentation.

Use flows in teams created from templates

1/15/2022 • 2 minutes to read • Edit Online

Microsoft Teams templates are pre-built definitions of a team's structure that are designed around a specific business need or project.

Power Automate templates and team templates are meant to address similar business scenarios. When you create a team with a Microsoft-provided team template, you get a curated selection of flow templates that are specific to your team scenario.

Here are the five team templates that support scenario-specific flow templates.

- Manage a Project
- Manage an Event
- Organize a Help Desk
- Incident Response
- Onboard Employees

For example, if you create a team from the **Manage a Project** template, the recommended flow templates on the Power Automate tab in the General channel is filtered to your Manage a Project scenario.

For example, follow these steps to use the **Manage a Project** template from within Microsoft Teams.

1. Open Microsoft Teams.
2. Select **Teams** from the top of the panel on the left.
3. Select **Join or create a team** from the bottom of the **Teams** panel on the left.
4. Select **Create team** from the **Join or create a team** screen.

5. Select the **Manage a Project** template.

6. Select **Next** on the **Manage a Project** screen after you've reviewed the summary and details of the template.

7. Select the **Sensitivity** and **Privacy** levels for your team.

8. Give your team a **Name**, a **Description**, and then select **Create**.

9. Wait while the team is created.

10. After you create the team, select the **Power Automate** tab in the **General** channel, and then select **Set up tab**.

11. Select **Post to the channel about this tab**, and then select **Save** on the **Power Automate** screen.

12. Scroll on the **Power Automate** tab to view the list of suggested Power Automate flow templates that are relevant to your team's scenario.

You can now select any of the flow templates listed to customize your team.

> **TIP**
> You can use any of the five team templates listed earlier in the article to create a team that's right for your organization.

Related links

Use team templates in the admin center

Create a team with a Teams templates

Manage flows in Microsoft Teams

1/15/2022 • 2 minutes to read • Edit Online

The **Home** tab provides an overview of your flows from your organization's default environment.

By default, the **Home** tab is filtered to display flows that use Microsoft Teams triggers and actions. You can select **Microsoft Teams flows** to change the filter to display all your flows.

On the **Home** tab, you can view the information that's displayed in each of the following six columns to get an overview of your flows.

COLUMN	DESCRIPTION
Flow name	Represents the name that you provided for the flow.
Status	Displays the status of the flow. For example, is the flow enabled or disabled? You can change the status of your flows directly from this list.
Modified	Displays the amount of time that's passed since the flow was last changed.
Owners	Provides a list of the users who own the flow.
Type	Shows the type of flow. Flows can be **Automated**, **Instant**, or **Scheduled**.
Team and channel	If your flow reads from or writes to any team or channel, that information is provided here so you can get a quick glance of the teams your flow touches.

TIP

You can select any flow to view more details about it.

Known issues

The Power Automate app in Microsoft Teams only shows your flows that are located in your organization's default environment.

Related articles

Create flows in Microsoft Teams.

View the Microsoft Teams connector documentation.

Send a message in Teams using Power Automate

1/15/2022 • 6 minutes to read • Edit Online

You can use Power Automate to set up a flow that sends messages to a Teams Channel or group chat using the Microsoft Teams connector. Messages can be posted either as the user who's signed into the connector in the flow or by using the Flow bot.

This article covers all the different ways in which you can send a message in Teams.

Flow setup

For the purposes of this document, we're using a scenario where a flow is used to notify a Channel or a Group chat, but the same principles can be used to apply to any flow where the **Post a message in a chat or channel** is used.

1. Sign in to Power Automate.
2. Select **My flows** > **New** > **Automated cloud flow**.
3. Enter a name for your flow.
4. Select the **When a file is created (properties only)** trigger.

5. Select **Create**.
6. Set up your trigger by choosing a SharePoint site and Folder ID that you want to monitor
7. Select the + New Step to add an action to this flow, and search for the **Post a message in a chat or channel** action and select it

Message sender options

The **Post a message in a chat or channel** action can send a message in the following two ways:

1. As the Flow bot: In this method, the message gets sent as the Flow bot instead of any individual users. Use this sender option if you didn't want to tie the message to any specific user and just want to use a generic sender instead.
2. As a User: In this method, the message gets sent as the user who's signed in to the Teams connector in the Flow (generally the Flow owner). This method can be used when the message needs to get sent as a regular user.

The **Post as** and **Post in** options within the action control all the different combinations of how messages can be posted in Teams.

Posting a message as the Flow bot in a Teams channel

To send a message as the Flow bot in a Teams Channel select the **Post as** option as **Flow bot** and the **Post in** option as Channel. Once you do two more dynamic inputs show up, which allows you to specify the Team and Channel in which to send the message and add your message in the message field.

Posting a message as the Flow bot in an existing named group chat

To send a message as the Flow bot in a group chat select the **Post as** option as **Flow bot** and the **Post in** option as **Group chat**. Once you do an additional option will show up that lets you select the Group chat to post in. Choose a group chat to post the message in and add your message in the message field.

> **IMPORTANT**
>
> By default Teams only lists the 50 most recent **named** group chats in the drop down. If you want to send a message to a new group chat use the option below.

Create a new group chat and post a message to it as the Flow bot

The **Post message in a chat or channel** action can be combined with the **Create a chat** action to create a new group chat and post a message to it. This is useful in scenarios where a chat might not already exist for this topic and one needs to be created.

In order to create a new group chat add the **Create a chat** action *before* the **Post message in a chat or channel** action. Add the members who need to be in the chat using their emails. Separate multiple emails with a semi-colon and enter the title for the chat if needed.

To send a message as the Flow bot in the new created group chat select the **Post as** option as **Flow bot** and the **Post in** option as **Group chat**. Once you do an additional option will show up that lets you select the Group chat to post in. In the Group chat field, choose **Enter custom value** and select the **Conversation id** from the **Create a chat** action in the dynamic token picker.

Posting a message as the Flow bot directly to a user

When sending a message as the Flow bot you have the additional option of posting directly to a user. This is useful in notification scenarios where you want to reach out to an individual user using the Flow bot. For this select the **Chat with Flow bot** option and specify the user you want to message and the specific message you want to send.

Posting a message as the user in a Teams Channel

To send a message as the user in a Teams Channel select the **Post as** option as **User** and the **Post in** option as **Channel**. Once you do two additional dynamic inputs show up, which allows you to specify the Team and Channel in which to send the message and add your message in the message field.

Posting a message as the user in an existing named group chat

To send a message as the user in a group chat select the **Post as** option as **User** and the **Post in** option as **Group chat**. Once you do an additional option will show up that lets you select the Group chat to post in. Choose a group chat to post the message in and add your message in the message field.

> **IMPORTANT**
> By default Teams only lists the 50 most recent **named** group chats in the drop down. If you want to send a message to a new group chat use the option below.

Create a new group chat and post a message

The **Post message in a chat or channel** action can be combined with the **Create a chat** action to create a new group chat and post a message to it. This is useful in scenarios where a chat might not already exist for this topic and one needs to be created.

To create a new group chat add the **Create a chat** action *before* the **Post message in a chat or channel** action. Add the members who need to be in the chat using their emails. Separate multiple emails with a semi-colon and enter the title for the chat if needed.

To send a message as the Flow bot in the new created group chat select the **Post as** option as **User** and the **Post in** option as **Group chat**. Once you do an additional option will show up that lets you select the Group chat to post in. In the Group chat field, choose **Enter custom value** and select the **Conversation id** from the **Create a chat** action in the dynamic token picker.

Mention a user in any message

Mentions are a great way to get the attention of a user in Teams. You can combine any of the above actions and add a mention in the message of to a user or channel.

To mention a user, use the **Get @mention token for a user** action and specify the email of the user you want to mention in the **User** field. The **User** field only accepts a single user input, if you want to mention multiple users you will need to add multiple instances of this action within the flow.

Then add the mention token generated from that action in any of the **Post a message in chat or channel**

action scenarios above.

> **IMPORTANT**
>
> The **Get @mention token for a user** action only supports mentioning users and not channels or Teams at the moment.

Known issues and limitations

- By default Teams only lists the 50 most recent **named** group chats in the drop-down list. If you want to send a message to a new group chat use the option below.
- The **Get @mention token for a user** can only be used for mentioning users, mentioning channels/teams is currently not supported.

Trigger a cloud flow from any message in Microsoft Teams

1/15/2022 • 2 minutes to read • Edit Online

You can use messages to trigger processes in Teams. For example, you might use a Teams message as a starting point to create a work item in Azure DevOps or create a sales opportunity in Dynamics 365.

Use the **For a selected message** trigger in the Teams connector to trigger a cloud flow directly from within Teams.

Create the flow

1. Sign in to Power Automate, and then select **My flows** > **New** > **Instant-from blank**.
2. Enter a name for your flow.
3. Select the **For a selected message** trigger.

4. Select **Create**.

> **NOTE**
>
> You must sign in to Teams if you aren't already signed in.

The **For a selected message** trigger has an optional input in the form of an adaptive card. Use an adaptive card to construct a form to collect information from the user who triggers the flow. For instance, if the flow creates a task, you can use an adaptive card to collect information like the title of the task and the description.

Collect information from the user

To collect information from the user by using a form, users can select **Create Adaptive Card** in the trigger.

This displays an inline adaptive card editor, where you can drag card elements to construct your own form.

Each input within the adaptive card form has an ID. You can use the ID later in the flow through dynamic tokens to reference inputs that a user might have entered as part of running the flow.

Use the message details within the flow

Several message elements are available as a trigger output for use within the flow. Here's an overview of some of the properties:

- **Message content**: The full HTML content of the Teams message.
- **Plain text message output**: The plain text variation of the Teams message.
- **Link to message**: A direct URL to reference the message.
- **Sender display name, Sender ID**: The details about the user who sent the message.
- **Originating user display name, originating user ID**: The details about the user who invoked the flow.

For more information, go to the full list of trigger outputs.

Trigger the flow

> **IMPORTANT**
>
> You must create these flows within the *default* environment for them to appear in Teams.

> **IMPORTANT**
>
> If you don't see the flows you create with the **For selected message in Teams** trigger, ask your admin to confirm whether the Power Automate Actions app is enabled in the Teams admin center https://admin.teams.microsoft.com/policies/manage-apps.

Any flow that uses the **For a selected message** trigger shows up as a message action in the Teams message in the **More actions** menu for the flow.

> **IMPORTANT**
>
> The name of the flow is used to reference the flow within Teams, so be sure to provide a descriptive name for it.

Best practices

Be sure to include a form of a confirmation to the user after the flow is completed. We recommend using **Post a message as the flow bot to a user** or **Post a message as the flow bot to a channel** to notify the user in Teams when a triggered flow has been completed.

Here's an example of a cloud flow that creates a work item in Azure DevOps and then posts a confirmation to the originating user.

Known issues and limitations

You must create these flows within the default environment to ensure they get listed in Teams.

Create flows using the Power Apps app in Microsoft Teams

1/15/2022 • 2 minutes to read • Edit Online

You can build flows to customize and add further value to Teams from within the new Power Apps app in Teams. You can create instant, scheduled, and automated flows, with access to over 350 connectors. This includes a connector to work with Microsoft Dataverse for Teams tables within Teams as well.

> **NOTE**
>
> You need a Power Automate license to access all Power Automate connectors, including the premium connectors. Users with a Microsoft 365 license can use all standard connectors.

Prerequisites

- The Power Apps app must be installed before you can create flows in Teams. More information: Install the Power Apps personal app in Microsoft Teams
- Before you can use the Power Apps app in Teams to create a cloud flow, a Dataverse for Teams environment must already exist for that team. A Dataverse for Teams environment is automatically provisioned when you create your first app in Teams.

Create a cloud flow in Teams

1. Go to the **Build** tab in your Power Apps app, and then select **See all**.
2. Select **New**, select **Flow**, and then select the type of flow you want to create. You can create only the following types of flows: instant, scheduled, and automated.

3. If this is your first time creating a cloud flow, you'll have to select your country/region, and then select **Get started**.

4. The **Build an automated flow** screen appears, where you can select a trigger, and create and save your flow.

> **NOTE**
>
> The screen that appears here will be different depending on whether you selected **Instant** or **Scheduled** in step 2 earlier.

Work with your flows

To find your saved flows:

1. Sign in to Teams.

2. On the left pane, select **Power Apps**.

3. On the **Build** tab, select the team in which you created your flow, and then select **See all** in the tree view.

Customize a cloud flow

In Teams, you might have acquired flows from an installed app or you might have created them yourself. You can update or customize either of these types of flows.

1. To update a cloud flow, select the **Build** tab, and then select **See all** to see all the apps and flows in this team.

2. Select the flow that you want to edit, and then select **Edit**.

View details and run history

1. To view the details and run history for a cloud flow, select the **Build** tab, and then select **See all**.

2. Select the flow for which you want to view the details, and then select **Details**.

Related articles

Use the new Power Apps app in Microsoft Teams
What is Dataverse for Teams?
About the Dataverse for Teams environment

Create your first adaptive card

1/15/2022 • 4 minutes to read • Edit Online

Adaptive cards within Power Automate may either share blocks of information or collect data via a form for a given data source.

In either case you will need to sketch out which datasets you will share, and/or what data the form will need to collect.

> **TIP**
> Use simple blocks of data rather than complex table arrays.

Prerequisites

- Microsoft Teams with the Power Automate app installed.

Add an action

In this procedure, you'll add an action which will use the data from previous actions in the flow to post information to a Microsoft Teams channel.

1. Sign into Power Automate.
2. Select **My flows** in the top navigation bar.
3. Select **New flow** > **Instant cloud flow**.
4. Give your flow a name.
5. Select **Manually trigger a flow** as the trigger.
6. Select **Create**.
7. Select **New Step**.
8. Search for **Microsoft Teams**, and then select **Post an adaptive card to a Teams channel and wait for a response** as the action.
9. Select the **Team** and the **Channel** to which you'd like to post the card.
10. Paste this JSON into the **Message** box.

```
{
    "$schema": "http://adaptivecards.io/schemas/adaptive-card.json",
    "type": "AdaptiveCard",
    "version": "1.0",
    "body": [
        {
            "type": "TextBlock",
            "text": "Poll Request",
            "id": "Title",
            "spacing": "Medium",
            "horizontalAlignment": "Center",
            "size": "ExtraLarge",
            "weight": "Bolder",
            "color": "Accent"
```

```
            "color": "Accent"
        },
        {
            "type": "TextBlock",
            "text": "Header Tagline Text",
            "id": "acHeaderTagLine",
            "separator": true
        },
        {
            "type": "TextBlock",
            "text": "Poll Header",
            "weight": "Bolder",
            "size": "ExtraLarge",
            "spacing": "None",
            "id": "acHeader"
        },
        {
            "type": "TextBlock",
            "text": "Lorem ipsum dolor sit amet, consectetur adipiscing elit. Integer vestibulum lore
m eget neque sollicitudin, quis malesuada felis ultrices. ",
            "id": "acInstructions",
            "wrap": true
        },
        {
            "type": "TextBlock",
            "text": "Poll Question",
            "id": "acPollQuestion"
        },
        {
            "type": "Input.ChoiceSet",
            "placeholder": "Select from these choices",
            "choices": [
                {
                    "title": "Choice 1",
                    "value": "Choice 1"
                },
                {
                    "title": "Choice 2",
                    "value": "Choice 2"
                },
                {
                    "title": "Choice 3",
                    "value": "Choice 3"
                }
            ],
            "id": "acPollChoices",
            "style": "expanded"
        }
    ],
    "actions": [
        {
            "type": "Action.Submit",
            "title": "Submit",
            "id": "btnSubmit"
        }
    ]
}
```

11. Make the following replacements in the JSON.

> **IMPORTANT**
>
> Do not remove any quotation marks when you do the replacements. You can revise the car choices to suit your needs:

TEXT TO CHANGE	NEW TEXT
Header Tagline Text	Power Automate Poll
Poll Header	Preferred Car Model
Poll Question	Please vote on your preferred car model from the choices listed here.
Replace the latin text with a reason, or business context, related to why you are conducting the poll.	We are polling our employees in order to determine if we should provide personalized parking places that are sized for the most popular cars.
Choice 1 (replace in both places)	Tesla
Choice 2 (replace in both places)	Lexus
Choice 3 (replace in both places)	Honda

12. Select **New Step**, and then search for and select one of the **Send an email** actions to which you have access.
13. Provide the email recipient as the person who selected the instant button (use the **Email** tag from the dynamic content from the **trigger**).
14. Configure the **Body** of the email as follows. Replace the words in curly parentheses "{}" with dynamic tokens:
    Your poll response was {acPollChoices} (acPollChoices is dynamic content from the wait for a response action). **It was submitted by {User Name}** (User Name is dynamic content from the trigger)

Test your adaptive card

To test your work, run the flow you created earlier and confirm the following:

- The flow run has no errors, and waits for the response, showing the wait indicator for the Adaptive Card action on the run screen.
- The Teams channel has the new adaptive card posted.
- When you respond to the card by selecting a car model, and then selecting the **Submit** button on the bottom section of the adaptive card:
  - No errors should occur on the adaptive card.
  - The flow run completes successfully.
- Card replacement is relevant after submission if you have configured the **Update message** area at the bottom of the **wait for a response** actions (shown next with the corresponding replacement card). Otherwise, all submissions will simply reset the form.

- The email notification contains the body that shows who submitted the response and which car was selected.

Congratulations! you've just made your first interactive adaptive card!

Troubleshooting tips for adaptive cards

The most common problems that you will encounter when creating adaptive cards are:

- Flow run errors are often caused by one of the following factors:
  - The Flow App is not installed in Microsoft Teams – Please install the Flow App into Teams.

  In this case the error may resemble this screenshot:

  - Improperly formatted JSON – This is not usually as complex as one might expect. These are most often just situations where:
    - There are curly quotes, or missing quotes, around values within the JSON. Always check the JSON to ensure all text values are enclosed within double quotes, and that numbers are enclosed in quotation marks. All quotation marks should be straight and not curly.
    - You can validate the format of your JSON by pasting the JSON into the Card Payload Editor.
  - Missing Image URLs – All image values within Adaptive Cards must refer to a valid URL. Full image content is not be directly supported in an Adaptive Card. Test your image links by pasting the URL into the browser to see if an image is displayed.

- Adaptive Cards may not look like what's expected during to styling and schema constraints:
  - Check that placeholder values, text styles, and any markup language align with Adaptive Card schema requirements (review **Adaptive Card schema best practices** here)
  - Leverage the **Visual Studio Code** Adaptive Card validator. To install it from the Visual Studio Code application, open the Extensions Marketplace, and search for **Adaptive Card Viewer**.

Truncated screenshot of the Adaptive Card Viewer extension installed in Visual Studio Code (shortcut: Ctrl+V+A once enabled).

- Errors following Adaptive Card submission are often due to:
  - Using an action, which does not include 'wait for response' in the name

  - Attempting to submit the card more than once. Each Adaptive Card can be submitted only once, after which all further submissions will be ignored.

Overview of Adaptive Cards for Microsoft Teams

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Adaptive Cards are a platform-agnostic method of sharing and displaying blocks of information without the complexity of customizing CSS or HTML to render them. You author Adaptive Cards in JSON format, with integrations that cloud apps and services can openly exchange. When delivered to a specific host, such as Microsoft Teams, the JSON is transformed into native UI that automatically adapts to its host. Therefore, process designers can now offer consistent UI patterns whenever they need to display information as part of a business process/automation.

Since Adaptive Cards adapt to their host, they are perfect vehicles for sharing information between Microsoft Teams and other services.

Currently available actions for flows

The following actions enable makers to create Adaptive Cards for Microsoft Teams. As integration scenarios evolve, other hosts will also be supported by Power Automate, which will extend your opportunities to leverage Adaptive Cards throughout Microsoft cloud subscriptions.

> **NOTE**
>
> Adaptive Cards aren't available within the DoD environment.

Directing content to **Teams members or AAD users**

- **Post your own adaptive card as the Flow bot to a user**
  This action posts an adaptive card as a Flow bot to a specific user. In this case, you will need to provide a recipient email address, and the card will show up in the recipient's chat and/or activity feeds during the

flow run. There is no requirement for the user to be part of a Teams instance to receive these types of Adaptive Cards. In this case, only the URL buttons function by redirecting to the URL that's configured within the flow.

- **Post an adaptive card as the Flow bot to a Teams user, and wait for a response**
  This action posts an adaptive card as a Flow bot to a specific user, like the case presented earlier in this article. However, in this case the flow run will not continue after the post until the recipient responds to inputs that are required within the card. The flow continues after the recipient responds. The flow returns dynamic content for one (1) response per recipient and per card.

Directing content to **Teams channels**

- **Post your own adaptive card as the Flow bot to a channel**
  This action posts an adaptive card as a Flow bot to a specific Teams channel. In this case, you will be prompted for Teams instance, and a channel where the card will be posted. The flow-maker will have to have access to the Teams instance in order to post an adaptive card there. In this case, only URL buttons function by redirecting to the URL configured within the flow.

- **Post an adaptive card as the Flow bot to a Teams channel, and wait for a response**
  This action posts an adaptive card as a Flow bot to a specific Teams channel as in the case above. However, in this case the flow will not continue until someone on the channel has responded to any inputs required within the card. The flow will continue once the anyone in the Teams channel responds but will only return dynamic content for one (1) response per responder and per card.

> **TIP**
> When you use this card, the flow waits for a response from any Teams member.

Known issues

- It is not possible to collect data from Adaptive Cards unless they are created using one of the "wait for a response" actions. Adaptive Cards that don't wait return an error for all button actions except OpenURL. Learn more on OpenURL buttons.
- Selecting Action.Submit buttons on a card which doesn't include the "wait for a response" suffix, will throw an error.
- Adaptive Cards created using the "wait for response" actions can only be submitted once per card. The flow run will continue after the first response, and any further submissions are ignored.
- Only the information within the 'Update message' input box (see image 3) will be shown on the replacement card after consumers submit the card.

  Additional details, such as the user id of the person submitting the card, will be available within the dynamic content in actions following the 'wait for a response' action. However, it may be necessary to include the Office 365 Users connector in order to complete desired profile information for the user who submitted the card.
- Once the "wait for a response" Adaptive Cards are submitted, the card resets and then appears exactly the same, unless the replacement/update message area is configured. Update messages are a best practice, and are recommended in order to update others, but also to prevent consumers from attempting to submit the card more than once.

> **TIP**
> The **Update Message** and the **Should update card** inputs must be configured if a replacement card is desired.

- Power Automate uses Microsoft Adaptive Cards' unique features and services to handle the cards within any host. This article is intended to clarify any specifics related to flow actions. You can also use the full documentation for building Adaptive Cards.

Learn more

- Create your first adaptive card
- Full documentation for the Microsoft Teams connector
- Full documentation on Adaptive Cards IO

Create your first adaptive card

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Adaptive cards within Power Automate may either share blocks of information or collect data via a form for a given data source.

In either case you will need to sketch out which datasets you will share, and/or what data the form will need to collect.

> **TIP**
> Use simple blocks of data rather than complex table arrays.

Prerequisites

- Microsoft Teams with the Power Automate app installed.

Add an action

In this procedure, you'll add an action which will use the data from previous actions in the flow to post information to a Microsoft Teams channel.

1. Sign into Power Automate.
2. Select **My flows** in the top navigation bar.
3. Select **New flow** > **Instant cloud flow**.
4. Give your flow a name.
5. Select **Manually trigger a flow** as the trigger.
6. Select **Create**.
7. Select **New Step**.
8. Search for **Microsoft Teams**, and then select **Post an adaptive card to a Teams channel and wait for a response** as the action.
9. Select the **Team** and the **Channel** to which you'd like to post the card.
10. Paste this JSON into the **Message** box.

```
{
    "$schema": "http://adaptivecards.io/schemas/adaptive-card.json",
    "type": "AdaptiveCard",
    "version": "1.0",
    "body": [
        {
            "type": "TextBlock",
            "text": "Poll Request",
            "id": "Title",
            "spacing": "Medium",
            "horizontalAlignment": "Center",
            "size": "ExtraLarge",
            "weight": "Bolder",
            "color": "Accent"
```

```
            "color": "Accent"
        },
        {
            "type": "TextBlock",
            "text": "Header Tagline Text",
            "id": "acHeaderTagLine",
            "separator": true
        },
        {
            "type": "TextBlock",
            "text": "Poll Header",
            "weight": "Bolder",
            "size": "ExtraLarge",
            "spacing": "None",
            "id": "acHeader"
        },
        {
            "type": "TextBlock",
            "text": "Lorem ipsum dolor sit amet, consectetur adipiscing elit. Integer vestibulum lore
m eget neque sollicitudin, quis malesuada felis ultrices. ",
            "id": "acInstructions",
            "wrap": true
        },
        {
            "type": "TextBlock",
            "text": "Poll Question",
            "id": "acPollQuestion"
        },
        {
            "type": "Input.ChoiceSet",
            "placeholder": "Select from these choices",
            "choices": [
                {
                    "title": "Choice 1",
                    "value": "Choice 1"
                },
                {
                    "title": "Choice 2",
                    "value": "Choice 2"
                },
                {
                    "title": "Choice 3",
                    "value": "Choice 3"
                }
            ],
            "id": "acPollChoices",
            "style": "expanded"
        }
    ],
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        {
            "type": "Action.Submit",
            "title": "Submit",
            "id": "btnSubmit"
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```

11. Make the following replacements in the JSON.

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Truncated screenshot of the Adaptive Card Viewer extension installed in Visual Studio Code (shortcut: Ctrl+V+A once enabled).

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  - Using an action, which does not include 'wait for response' in the name

  - Attempting to submit the card more than once. Each Adaptive Card can be submitted only once, after which all further submissions will be ignored.

Candidate feedback sample

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The **candidate feedback form** sample is an Adaptive Card input form that's designed for collecting feedback during an interview loop. We recommend using this with a shared instant flow button to enable anyone on the team to provide feedback on candidates during an interview loop. Extend this by recording responses in a database or other desired data sources to support these additional opportunities:

- Facilitate the review of follow-up suggestions before the next session with the candidate.
- Facilitate aggregated data review after all responses are recorded.
- Notify the human resources representative with the hire/no hire vote count at the end of the process

Inputs/Outputs and notes

DYNAMIC TOKEN NAME	PLACEHOLDER TEXT	NOTES:
{acFullName}	{acFullName}	Display text
{acComments}	{acComments}	Display text

DYNAMIC TOKEN NAME	PLACEHOLDER TEXT	NOTES:
{acDecision}		Response **output**
{acFollowUp}		Response **output**

```
{
  "$schema": "http://adaptivecards.io/schemas/adaptive-card.json",
  "type": "AdaptiveCard",
  "version": "1.0",
  "body": [
    {
      "type": "TextBlock",
      "size": "Medium",
      "weight": "Bolder",
      "id": "Title",
      "text": "CANDIDATE FEEDBACK FORM",
      "horizontalAlignment": "Left"
    },
    {
      "type": "Input.Text",
      "placeholder": "{acFullName}",
      "style": "text",
      "isMultiline": false,
      "maxLength": 75,
      "id": "acFullName"
    },
    {
      "type": "Input.Text",
      "placeholder": "{acComments}",
      "style": "text",
      "isMultiline": true,
      "maxLength": 200,
      "id": "acComments"
    },
    {
      "type": "TextBlock",
      "size": "Medium",
      "weight": "Bolder",
      "text": "Decision",
      "horizontalAlignment": "Left",
      "separator": true
    },
    {
      "type": "Input.ChoiceSet",
      "id": "acDecision",
      "value": "1",
      "choices": [
        {
          "title": "Hire",
          "value": "Hire"
        },
        {
          "title": "No Hire",
          "value": "No Hire"
        }
      ],
      "style": "expanded"
    },
    {
      "type": "TextBlock",
      "text": "Suggest follow-up discussion regarding:",
      "weight": "Bolder"
    },
    {
      "type": "Input.ChoiceSet",
```

```
      "type": "Input.ChoiceSet",
      "id": "acFollowUp",
      "isMultiSelect": true,
      "value": "",
      "choices": [
        {
          "title": "Past experience in the topic area",
          "value": "Experience"
        },
        {
          "title": "Inclusive behaviors and work ethics",
          "value": "Inclusivity"
        },
        {
          "title": "Ability to work without supervision",
          "value": "Independent"
        }
      ]
    }
  ],
  "actions": [
    {
      "type": "Action.Submit",
      "title": "Submit"
    }
  ]
}
```

Image share sample

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The **Image Share Form** sample is an Adaptive Card designed for sharing photos that have been posted to SharePoint and which may be a dependency for a process to complete (such as processes related to inspection, compliance, and audits). This is a display only adaptive card.

Inputs/Outputs and notes

DYNAMIC TOKEN NAME (INPUTS)	PLACEHOLDER TEXT	NOTES
acphotoTitle	{acphotoTitle}	Display text
acTimestamp	{acTimestamp}	Display date/time
acImageThumbnail	{acImageThumbnail}	Display image This must be replaced with a valid URL
acAltText	{acAltText}	Accessibility alternative text

```
{
    "$schema": "http://adaptivecards.io/schemas/adaptive-card.json",
    "type": "AdaptiveCard",
    "version": "1.0",
    "body": [
        {
            "type": "TextBlock",
            "text": "{acphotoTitle}",
            "id": "Title",
            "size": "Large"
        },
        {
            "type": "TextBlock",
            "text": "{acTimestamp}",
            "size": "Medium",
            "weight": "Lighter"
        },
        {
            "type": "Image",
            "altText": "{acAltText}",
            "url": "{acImageThumbnail}"
        }
    ],
    "spacing": "None"
}
```

Lead collection sample

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The **lead collection** sample is an Adaptive Card input form designed for collecting leads from anyone that may come into contact with individuals interested in a set of products. Feel free to change the choices for the products, remembering that each choice can have display text, as well as an internal value which will be output after someone submits the card (they can also be the same as we show in the sample code block).

Inputs/Outputs and notes:

DYNAMIC TOKEN NAME	PLACEHOLDER TEXT	NOTES
Title		Display text
acInstructions		Display text
acLeadFName	{firstName}	Response **output**

DYNAMIC TOKEN NAME	PLACEHOLDER TEXT	NOTES
acLeadLName	{lastName}	Response **output**
acLeadEmail	{emailAddress}	Response **output**
acLeadPrimaryPhone	{primaryPhone10digits}	Response **output**
acLeadProductInterest	{productInterests}	Response **output** As multi-select values, where each selection will be separated by a comma.

```
{
    "$schema": "http://adaptivecards.io/schemas/adaptive-card.json",
    "type": "AdaptiveCard",
    "version": "1.0",
    "body": [
        {
            "type": "ColumnSet",
            "columns": [
                {
                    "type": "Column",
                    "width": 2,
                    "items": [
                        {
                            "type": "TextBlock",
                            "text": "Lead Notification",
                            "weight": "Bolder",
                            "id": "Title",
                            "size": "ExtraLarge"
                        },
                        {
                            "type": "TextBlock",
                            "text": "Please fill out a single form for each individual expressing interest
in our products. ",
                            "isSubtle": true,
                            "wrap": true,
                            "id": "acInstructions",
                            "size": "Large"
                        }
                    ]
                }
            ]
        },
        {
            "type": "Container",
            "items": [
                {
                    "type": "TextBlock",
                    "text": "Potential Customer FIRST NAME",
                    "wrap": true,
                    "size": "Medium"
                }
            ]
        },
        {
            "type": "Input.Text",
            "id": "acLeadFName",
            "placeholder": "{firstName}"
        },
        {
            "type": "TextBlock",
            "text": "Potential Customer LAST NAME",
```

```
            "wrap": true
        },
        {
            "type": "Input.Text",
            "id": "acLeadLName",
            "placeholder": "{lastName}"
        },
        {
            "type": "TextBlock",
            "text": "Corporate email",
            "wrap": true
        },
        {
            "type": "Input.Text",
            "id": "acLeadEmail",
            "placeholder": "{emailAddress}",
            "style": "Email"
        },
        {
            "type": "TextBlock",
            "text": "Business Phone Number"
        },
        {
            "type": "Input.Text",
            "id": "acLeadPrimaryPhone",
            "placeholder": "{primaryPhone10digits}",
            "style": "Tel"
        },
        {
            "type": "RichTextBlock",
            "inlines": [
                {
                    "type": "TextRun",
                    "text": "{productInterests}"
                }
            ]
        },
        {
            "type": "Input.ChoiceSet",
            "placeholder": "Placeholder text",
            "choices": [
                {
                    "title": "Office 365",
                    "value": "Office 365"
                },
                {
                    "title": "Dynamics 365",
                    "value": "Dynamics 365"
                },
                {
                    "title": "Azure Services",
                    "value": "Azure Services"
                },
                {
                    "title": "Power Platform",
                    "value": "Power Platform"
                }
            ],
            "style": "expanded",
            "id": "acLeadProductInterest",
            "isMultiSelect": true
        }
    ],
    "actions": [
        {
            "type": "Action.Submit",
            "title": "Submit"
        }
    ]
```

```
}
```

Create a poll sample

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The **create a poll** sample is an Adaptive Card input form that's designed for submitting polls to Microsoft Teams. Replace the display text in this card to customize for the poll. This adaptive card enables you to take different decision paths based on the responses given in the poll values, or voting counts, of card consumers.

Inputs/Outputs and notes

DYNAMIC TOKEN NAME	PLACEHOLDER TEXT	NOTES:
Title		Display text
acHeaderTagLine		Display text
acHeader		Display text
acPollQuestion		Display text

DYNAMIC TOKEN NAME	PLACEHOLDER TEXT	NOTES:
acPollChoices		Response **output** Single select as radio buttons

```
{
    "$schema": "http://adaptivecards.io/schemas/adaptive-card.json",
    "type": "AdaptiveCard",
    "version": "1.0",
    "body": [
        {
            "type": "TextBlock",
            "text": "Poll Request",
            "id": "Title",
            "spacing": "Medium",
            "horizontalAlignment": "Center",
            "size": "ExtraLarge",
            "weight": "Bolder",
            "color": "Accent"
        },
        {
            "type": "TextBlock",
            "text": "Header Tagline Text",
            "id": "acHeaderTagLine",
            "separator": true
        },
        {
            "type": "TextBlock",
            "text": "Poll Header",
            "weight": "Bolder",
            "size": "ExtraLarge",
            "spacing": "None",
            "id": "acHeader"
        },
        {
            "type": "TextBlock",
            "text": "Lorem ipsum dolor sit amet, consectetur adipiscing elit. Integer vestibulum lorem eget
neque sollicitudin, quis malesuada felis ultrices. ",
            "id": "acInstructions",
            "wrap": true
        },
        {
            "type": "TextBlock",
            "text": "Poll Question",
            "id": "acPollQuestion"
        },
        {
            "type": "Input.ChoiceSet",
            "placeholder": "Select from these choices",
            "choices": [
                {
                    "title": "Choice 1",
                    "value": "Choice 1"
                },
                {
                    "title": "Choice 2",
                    "value": "Choice 2"
                },
                {
                    "title": "Choice 3",
                    "value": "Choice 3"
                }
            ],
            "id": "acPollChoices",
            "style": "expanded"
        }
```

```
    ],
    "actions": [
        {
            "type": "Action.Submit",
            "title": "Submit",
            "id": "btnSubmit"
        }
    ]
}
```

Metadata update card sample

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The **Metadata Update** sample is an adaptive card designed to enable flow makers to notify or update Teams members or channels with metadata related to a record, file, or topic. This card is a display only adaptive card. However, input fields may be added if one of the *wait for response* actions are used to create it.

This card is comprised of three sections:

1. The topic header area with header, sub-header, and description.
2. The fact list area for relevant row metadata.
3. A column set which supports a table array of data

Inputs/Outputs and notes

DYNAMIC TOKEN NAME (INPUTS)	PLACEHOLDER TEXT	NOTES
acHeader	{Header}	Display text
acSubHeader	{SubHeader}	Display text
acDescription	Latin Text	Display text
acFact1	{acFact1}	Display text
acFact2	{acFact2}	Display text
acFact3	{acFact3}	Display text

DYNAMIC TOKEN NAME (INPUTS)	PLACEHOLDER TEXT	NOTES
acColumnSetHeader	Headers 1 through 3	Display text Column set header display tex
acColumnSet	Columns 1 through 3	Replace with array or column values.

```
{
    "$schema": "http://adaptivecards.io/schemas/adaptive-card.json",
    "type": "AdaptiveCard",
    "version": "1.0",
    "body": [
        {
            "type": "TextBlock",
            "text": "Metadata Update Card",
            "weight": "bolder",
            "size": "large",
            "id": "acTitle"
        },
        {
            "type": "ColumnSet",
            "columns": [
                {
                    "type": "Column",
                    "width": "auto",
                    "items": [
                        {
                            "type": "TextBlock",
                            "text": "Sub Header Tag Line",
                            "weight": "Bolder",
                            "wrap": true,
                            "id": "acSubHeader"
                        }
                    ]
                }
            ]
        },
        {
            "type": "TextBlock",
            "text": "Lorem ipsum dolor sit amet, consectetur adipiscing elit. In condimentum leo lorem, at
facilisis augue hendrerit eget. Praesent ut malesuada ipsum. Vivamus semper faucibus felis quis sagittis.
Nunc pellentesque metus at nunc gravida, vitae volutpat sapien vehicula. Nulla lorem nibh, porttitor vel
semper ut, ornare nec erat.",
            "wrap": true,
            "id": "acDescriptionArea"
        },
        {
            "type": "FactSet",
            "facts": [
                {
                    "title": "Fact 1:",
                    "value": "{acFact1}"
                },
                {
                    "title": "Fact 2:",
                    "value": "{acFact2}"
                },
                {
                    "title": "Fact 3:",
                    "value": "{acFact3}"
                }
            ],
            "id": "acFactSet"
        },
        {
            "type": "Container",
```

```
            "type": "Container",
            "spacing": "Large",
            "items": [
                {
                    "type": "ColumnSet",
                    "columns": [
                        {
                            "type": "Column",
                            "items": [
                                {
                                    "type": "TextBlock",
                                    "weight": "Bolder",
                                    "text": "HEADER 1"
                                }
                            ],
                            "width": "stretch"
                        },
                        {
                            "type": "Column",
                            "items": [
                                {
                                    "type": "TextBlock",
                                    "weight": "Bolder",
                                    "text": "HEADER 2"
                                }
                            ],
                            "width": "stretch"
                        },
                        {
                            "type": "Column",
                            "items": [
                                {
                                    "type": "TextBlock",
                                    "weight": "Bolder",
                                    "text": "HEADER 3"
                                }
                            ],
                            "width": "stretch"
                        }
                    ]
                }
            ],
            "bleed": true
        },
        {
            "type": "ColumnSet",
            "columns": [
                {
                    "type": "Column",
                    "items": [
                        {
                            "type": "TextBlock",
                            "text": "Column 1",
                            "wrap": true,
                            "id": "acCol1"
                        }
                    ],
                    "width": "stretch"
                },
                {
                    "type": "Column",
                    "items": [
                        {
                            "type": "TextBlock",
                            "text": "Column 2",
                            "wrap": true,
                            "id": "acCol2"
                        }
                    ],
                    "width": "stretch"
```

```
                    "width": "stretch"
                },
                {
                    "type": "Column",
                    "items": [
                        {
                            "type": "TextBlock",
                            "text": "Column 3",
                            "wrap": true,
                            "id": "acCol4"
                        }
                    ],
                    "width": "stretch"
                }
            ],
            "$data": "acDataContext"
        }
    ],
    "bleed": true

}
```

Daily weather report sample

1/15/2022 • 2 minutes to read • Edit Online

The **daily weather report** sample is an Adaptive Card designed to be used with MSN weather to post a daily weather update to a Teams channel.

Inputs/Outputs and notes

DYNAMIC TOKEN NAME	PLACEHOLDER TEXT	NOTES
{acCityState}	See template	Display text A variable can be used to hold the City, State, or Zip Code values
{acDailySummary}	See template	Display text
{acCurrentDateTime}	See template	Display text
{acUrlConditionsImage}	See template	Display text See template comments This must be replaced with a valid URL
{acCurrentTemperature}	See template	Display text
{actempHi}	See template	Display text
{actempLow}	See template	Display text

```
{
    "$schema": "http://adaptivecards.io/schemas/adaptive-card.json",
    "type": "AdaptiveCard",
    "version": "1.0",
    "body": [
        {
```

```
            "type": "TextBlock",
            "text": "{acCity}, {acState}",
            "size": "Large",
            "isSubtle": true
        },
        {
            "type": "TextBlock",
            "text": "{acCurrentDateTime}",
            "spacing": "None"
        },
        {
            "type": "TextBlock",
            "text": "{acDailySummary}",
            "spacing": "None"
        },
        {
            "type": "ColumnSet",
            "columns": [
                {
                    "type": "Column",
                    "width": "auto",
                    "items": [
                        {
                            "type": "Image",
                            "url": "{acUrlConditionsImage}",
                            "size": "Large"
                        }
                    ]
                },
                {
                    "type": "Column",
                    "width": "auto",
                    "items": [
                        {
                            "type": "TextBlock",
                            "text": "{acCurrentTemperature}",
                            "size": "ExtraLarge",
                            "spacing": "None"
                        }
                    ]
                },
                {
                    "type": "Column",
                    "width": "stretch",
                    "items": [
                        {
                            "type": "TextBlock",
                            "text": "°F",
                            "weight": "Bolder",
                            "spacing": "Small"
                        }
                    ]
                },
                {
                    "type": "Column",
                    "width": "stretch",
                    "items": [
                        {
                            "type": "TextBlock",
                            "text": "Hi {actempHi}",
                            "horizontalAlignment": "Left"
                        },
                        {
                            "type": "TextBlock",
                            "text": "Lo {actempLow}",
                            "horizontalAlignment": "Left",
                            "spacing": "None"
                        }
                    ]
```

```
                ]
                }
            ]
        }
    ]
}
```

Acronyms form sample

1/15/2022 • 2 minutes to read • Edit Online

The **acronym form** sample is an Adaptive Card input form that's designed to collect acronyms and storing them in Dataverse. These acronyms could be queried from anywhere due to this ongoing data collection.

Inputs/Outputs and notes

DYNAMIC TOKEN NAME	PLACEHOLDER TEXT	NOTES:
{acAcronym}	Enter the abbreviation for the acronym	Response **output**
{acDefinition}	Enter a definition of the acronym above	Response **output**

```
{
    "$schema": "http://adaptivecards.io/schemas/adaptive-card.json",
    "type": "AdaptiveCard",
    "version": "1.0",
    "body": [
        {
            "type": "TextBlock",
            "text": "Acronym Logger",
            "id": "Title",
            "spacing": "Medium",
            "horizontalAlignment": "Center",
            "size": "ExtraLarge",
            "weight": "Bolder",
            "color": "Accent"
        },
        {
            "type": "Container",
            "items": [
                {
                    "type": "TextBlock",
                    "text": "Acronym",
                    "wrap": true,
                    "spacing": "Medium"
                },
                {
                    "type": "Input.Text",
                    "id": "acAcronym",
                    "placeholder": "Enter the abbreviation for the acronym"
                },
                {
                    "type": "TextBlock",
                    "text": "Definition",
                    "wrap": true
                },
                {
                    "type": "Input.Text",
                    "placeholder": "Enter a definition of the acronym above",
                    "id": "acDefinition",
                    "isMultiline": true
                }
            ]
        }
    ],
    "actions": [
        {
            "type": "Action.Submit",
            "title": "Submit",            "id": "btnSubmit"
        }
    ]
}
```

Lead collection sample

1/15/2022 • 2 minutes to read • Edit Online

The **lead collection** sample is an Adaptive Card input form designed for collecting leads from anyone that may come into contact with individuals interested in a set of products. Feel free to change the choices for the products, remembering that each choice can have display text, as well as an internal value which will be output after someone submits the card (they can also be the same as we show in the sample code block).

Inputs/Outputs and notes:

DYNAMIC TOKEN NAME	PLACEHOLDER TEXT	NOTES
Title		Display text
acInstructions		Display text
acLeadFName	{firstName}	Response **output**

DYNAMIC TOKEN NAME	PLACEHOLDER TEXT	NOTES
acLeadLName	{lastName}	Response **output**
acLeadEmail	{emailAddress}	Response **output**
acLeadPrimaryPhone	{primaryPhone10digits}	Response **output**
acLeadProductInterest	{productInterests}	Response **output** As multi-select values, where each selection will be separated by a comma.

```
{
    "$schema": "http://adaptivecards.io/schemas/adaptive-card.json",
    "type": "AdaptiveCard",
    "version": "1.0",
    "body": [
        {
            "type": "ColumnSet",
            "columns": [
                {
                    "type": "Column",
                    "width": 2,
                    "items": [
                        {
                            "type": "TextBlock",
                            "text": "Lead Notification",
                            "weight": "Bolder",
                            "id": "Title",
                            "size": "ExtraLarge"
                        },
                        {
                            "type": "TextBlock",
                            "text": "Please fill out a single form for each individual expressing interest
in our products. ",
                            "isSubtle": true,
                            "wrap": true,
                            "id": "acInstructions",
                            "size": "Large"
                        }
                    ]
                }
            ]
        },
        {
            "type": "Container",
            "items": [
                {
                    "type": "TextBlock",
                    "text": "Potential Customer FIRST NAME",
                    "wrap": true,
                    "size": "Medium"
                }
            ]
        },
        {
            "type": "Input.Text",
            "id": "acLeadFName",
            "placeholder": "{firstName}"
        },
        {
            "type": "TextBlock",
            "text": "Potential Customer LAST NAME",
```

```
            "wrap": true
        },
        {
            "type": "Input.Text",
            "id": "acLeadLName",
            "placeholder": "{lastName}"
        },
        {
            "type": "TextBlock",
            "text": "Corporate email",
            "wrap": true
        },
        {
            "type": "Input.Text",
            "id": "acLeadEmail",
            "placeholder": "{emailAddress}",
            "style": "Email"
        },
        {
            "type": "TextBlock",
            "text": "Business Phone Number"
        },
        {
            "type": "Input.Text",
            "id": "acLeadPrimaryPhone",
            "placeholder": "{primaryPhone10digits}",
            "style": "Tel"
        },
        {
            "type": "RichTextBlock",
            "inlines": [
                {
                    "type": "TextRun",
                    "text": "{productInterests}"
                }
            ]
        },
        {
            "type": "Input.ChoiceSet",
            "placeholder": "Placeholder text",
            "choices": [
                {
                    "title": "Office 365",
                    "value": "Office 365"
                },
                {
                    "title": "Dynamics 365",
                    "value": "Dynamics 365"
                },
                {
                    "title": "Azure Services",
                    "value": "Azure Services"
                },
                {
                    "title": "Power Platform",
                    "value": "Power Platform"
                }
            ],
            "style": "expanded",
            "id": "acLeadProductInterest",
            "isMultiSelect": true
        }
    ],
    "actions": [
        {
            "type": "Action.Submit",
            "title": "Submit"
        }
    ]
```

```
}
```

Approvals in Microsoft Teams

1/15/2022 • 2 minutes to read • Edit Online

Approvals in Microsoft Teams is a native Teams application that lets you easily create, manage, and share approvals from your hub for teamwork.

You can quickly start an approval flow from the same place you send a chat, a channel conversation, or from the approvals app itself. Just select an approval type, add details, attach files, and choose approvers. Once submitted, approvers are notified and can review and act on the request.

These approvals are triggered directly with the Power Automate infrastructure and don't require a flow with an approvals action. Though, if you wish to modify your approvals, by creating custom pre-approval or post-approvals actions, you can create a flow for your approval.

Use the approvals app in Teams

1. Sign into Microsoft Teams
2. Select **More added apps (...)**, search for **Approvals**, and then select the **approvals** app

> **TIP**
> If you do not see the approvals app in the more apps menu, it is likely that your Teams Administrator has disabled the app in your tenant. Contact your Teams administrator to enable the approvals app from the Teams admin center.

Known issues

Currently, all the approvals are created in your organization's default environment.

Create an approval from a chat or channel

1/15/2022 • 2 minutes to read • Edit Online

With the new approvals experience in Teams, you can create an approval from any chat or channel from the compose box.

Start an approval in a chat or channel

Follow these steps to create an approval in a chat or channel in Teams.

1. Sign into Microsoft Teams.
2. Navigate to the chat or channel in which you want to send the approval.
3. Select the approvals icon under the compose box.

4. When you select the icon, a modal dialog appears for you to enter the details of the approval.

5. Enter the details of the approval you want to send, along with who you need the approval from.

> **TIP**
> By default, the approvers' input is restricted to the roster of the team or chat in which you are sending the approval.

6. **Optional**: You can also include a file with your approval. To do so, select *Add attachment* in the Approval form. Any files you upload are automatically stored in your OneDrive/SharePoint folder, just like other files shared on Teams.

7. Select **Send**.

   A card is created and sent in the chat or channel.

Custom responses for approvals

If you want to customize the actions for an approval, use the **Custom responses** option to change the action to

anything you want. To do so, follow the same steps mentioned earlier and then toggle the custom responses option in the approvals form.

> **TIP**
> If you want to add more than two custom responses, you will need to use a cloud flow to send the approval. Learn more about custom responses in approvals.

Known issues

Currently, all the approvals created using this native Teams experience are created in your organization's default environment.

Create an approval from the approvals app

1/15/2022 • 2 minutes to read • Edit Online

You can trigger an approval at any time from the approvals app in Teams.

Start an approval from the approvals app

Follow these steps to create an approval from the approvals app in Teams.

1. Sign into Microsoft Teams.
2. Select **More added apps (...)**, search for **approvals**, and then select the **approvals** app.

3. Select **New Approval request** on the top right of the app.

4. Enter the details of the approval.

TIP

If you are sending an approval to multiple users and you need everyone to respond, ensure that select the **Require a response from all approvers** option. If you only need one of the approvers to approve turn the option off.

5. Select **Send**.

   The approval shows up in the **Sent** tab in the app.

Known issues

Currently, all the approvals created using this native Teams experience are created in your organization's default environment.

Respond to an approval from a chat or channel

1/15/2022 • 2 minutes to read • Edit Online

If a user sends you an approval in a chat or channel message or from the approvals app, you can respond to it directly from within the Teams chat or channel or from the approvals app.

The approvals app also shows you any approvals that were sent using a flow in the same environment. So, you can use the approvals app in Teams to manage all your approvals.

Approve or reject an request in Teams

Follow these steps to respond to an approval in a chat or channel in Microsoft Teams.

1. Sign into Microsoft Teams.

2. Go to the chat or channel in which you were sent the approval.

   You should see a card with the approval.

   Alternately, you can open the approvals app in Teams and go to the **Received** tab.

3. Select **View details** on the card or select the approval to open the approval form.

4. From here, you can approve or reject the approval. You can also include comments with your decision. Once approved, the state is updated in the card or the app.

TIP

If the approver has chosen to send an approval with custom responses, the actions at the bottom can differ. For example:

Known issues

Currently, only approvals sent in your organization's default environment are listed within the approvals app in Teams.

Manage your approvals from the approvals app in Teams

1/15/2022 • 2 minutes to read • Edit Online

The approvals app in Teams gives you an overview of all the approvals that you have sent or received in your organization's default tenant. This includes approvals you might have received through chat or channel messages, direct approvals, and even approvals that come in through a flow.

From here you can either approve or reject an approval you have received, or cancel an approval you have sent out.

View approvals

From the main approvals app in Teams, you can get a view of all the approvals you have sent or received.

Cancel an approval request

From the **Sent** tab, you can choose to cancel an approval that is still in progress. To do so, select the approval you want to cancel and then select the **Cancel** approval option.

NOTE

You can only cancel approvals that are in progress.

Customizing approvals in Teams

1/15/2022 • 2 minutes to read • Edit Online

By default, the approvals app only lets you modify custom responses in the app.

If you want to create a custom process with pre and post approval actions that are automatically triggered using an event, you will need to create an approval flow in the Power Automate.

Visit the approvals documentation section to get started with approval flows

Microsoft Teams approvals with custom connectors

1/15/2022 • 3 minutes to read • Edit Online

You can use the approvals hub in Microsoft Teams to quickly integrate approvals workflows into existing line of business apps that do not have their own approvals system. You achieve this by using a custom connector to 'connect' to the existing line of business apps.

> **TIP**
>
> When you use the approvals hub, you get to manage all your approvals in a central location.

This article shows you how to:

- Create a custom connector.
- Add a trigger and actions to a custom connector.
- Create an approval flow.
- Use the approvals hub in Teams to manage approvals that you created with the flow.

Prerequisites

- One of the following subscriptions:
  - Power Automate
  - Power Apps
- Basic experience building flows and custom connectors.

Create a custom connector

1. Sign into Power Automate.
2. Expand **Data**, and then select **Custom connectors**.

3. Select **New custom connector**.

4. Select **Create from blank** from the dropdown list.

5. In the **Connector name** field, enter a name for the custom connector.

6. In **General Information**, enter a **Description** and a **Host**.

7. Select the **Security** tab, and then select the authentication type that your API uses.

Add a trigger

You need a trigger to serve as the first step in the approval flow that you'll create.

Some common approval triggers are:

- When a new row is created.
- Wen a row is updated.

> **TIP**
> Both Webhook and polling triggers work with approval flows.

1. Continuing from the earlier steps, select the **Definition** tab.

2. Select **New Trigger** in the Triggers list.

3. Enter a **Summary**, **Description**, **Operation ID**, and select a **Trigger type**.

> **NOTE**
>
> Select either **important** or **advanced** for the **visibility** the trigger to make the trigger available when you create the approval flow.

4. Select **Import from sample.**

5. Define the **Verb**, **URL**, **Headers**, and **Body** for your trigger.

6. Add a Response.

   The response configuration depends on your trigger type (Webhook or polling). Webhook triggers require a callback URL parameter and a location header that contains a value that's used to delete the Webhook registration.

7. Configure the **Webhook Response** and Trigger configuration

8. Configure the **polling response** to meet your needs.

9. Configure the trigger to meet your needs.

Create an approval flow

Now that you've created your custom connector, it's time to create your approval flow that uses the custom connector.

1. Sign into Power Automate.
2. Select **My flows**.
3. Select **New flow**, and then select **Automated cloud flow**.
4. Select **Skip** on the **Build an automated cloud flow** screen.
5. Select the **Custom** tab, and then select your new custom connector.

6. Select a trigger from your custom connector.
7. Select **New step**.
8. Search for "approvals", and then select **Start and wait for an approval**.

9. Select the **Approval type**, and then populate the required fields on the **Start and wait for an approval** card.

10. Select **New step** > **Control** > **Condition**.

11. Select the **Choose a value** text box, and then search the dynamic content for "Responses Approver response".

12. Update the condition with the desired result.

> **IMPORTANT**
>
> The "Approve" or "Reject" approval responses are case sensitive.

13. Add an action in both condition result sections.

Manage approvals generated by the approval flow

1. Sign into Microsoft Teams.

2. Search for the **approvals** app, and then select it.

3. View your received and sent approvals.

4. Take an action that activates your custom connector's trigger.

5. View the new approval request in flow run history.

6. View the new approval request in the approvals app.

7. Select the approval request, review the details, and then select **Reject** or **Approve**.

8. View the completed approval request in flow run history.

9. View the completed approval request in approvals app.

10. Confirm in the target system the approval completion update steps were executed successfully.

More info

- Create a custom connector from scratch
- Webhook triggers: Use a Webhook as a trigger for Azure Logic Apps and Power Automate
- Polling triggers: Use a polling trigger for Microsoft Power Automate

Trigger a cloud flow from any Power BI report

1/15/2022 • 3 minutes to read • Edit Online

Empower your end-users to go from insight to action. With the Power Automate visual, end-users can run an automated flow all within a Power BI report. Furthermore, the executed flow can be data contextual, meaning that the inputs to the flow can be dynamic, based on the filters that the user sets. This article describes how to add visual into a Power BI report that lets you manually trigger a flow directly from the Power BI report

Add Power Automate visual to a Power BI report

To get started, launch either Power BI Desktop or Power BI Service and select the Power Automate icon from the **Visualizations** pane.

If you're using Power BI Desktop, you can also access the visual from the ribbon by navigating to the Insert tab and selecting Power Automate (preview) within the Power Platform section

You can follow these steps to create button that triggers automated tasks.

The initial state of the widget shows you the getting started instructions for using flows in Power BI. Once you've reviewed the instructions, you can resize the button and place it where you'd like it on the report.

Using the Power Automate visual in Power BI

Follow these steps to trigger a flow from within a Power BI report.

Add the data fields that need to be passed to the flow

1. In the **Visualization** pane, add any fields from the report that you want to pass into the flow when it runs.

   These fields can be used at flow design time as well to specify how you want to use the Power BI data.

Add an existing cloud flow to the Power BI report

1. Select **Edit** from the **More options** menu of the visual.

2. Select an existing flow to apply to the button.

   Your existing cloud flow is now added to the Power BI report.

Create a new flow

To create a flow, use **Instant from blank** or start with one of the built-in templates. The following steps detail how to create a flow from scratch for use within a Power BI report.

When you select the **Instant from blank** option, Power Automate automatically adds the Power BI button clicked trigger.

Apply the flow to the Power BI report

1. Add the relevant actions into your flow.

2. **Save**, and then select the back arrow to take you back to the details page.

3. Select the **Apply** button to attach the flow to your Power BI report button.

Once you have applied a flow to the button, you should test the flow before you share it.

> **IMPORTANT**
>
> You can only run these Power BI flows in the context of a Power BI report. You cannot run these flows in Power Automate or elsewhere.

If your flow is data contextual, test how the filters selections in the report impact the outcome of the flow. To test the flow in edit mode of the report, select Back to report, and then press Ctrl + click on the button to run the Flow in the context of the report.

You can navigate to the edit mode or to Power Automate to view the run history of the flow to ensure its running successfully.

Share the flow in run only mode

In order for other viewers of your Power BI report to run the flow, you must explicitly share the flow with those users/Azure Active Directory groups. You can do so from the details page of your flow.

To share, select edit next to the **Run only users** tile and then specify the users or groups that you want to have access.

Format the button on the Power BI report

Optionally, if you want to change the button text, font color, font size, or fill color of the button, you can find these options along with other settings in the **Format** pane.

Known limitations

- The user running the flow within the Power BI report needs to have permissions to run the flow. Grant these permissions through direct sharing by the user or by sharing to an Azure Active Directory group.
- The Power BI visual only functions with flows in a tenant's default environment. Any flow created with the visual is created in the users default environment.
- Additional manual inputs to the button are not supported at this time.
- Create flows that you will use with the Power BI button trigger directly within the Power BI report. Do not go directly to Power Automate to create these flows as the trigger will not have access to the data fields necessary for creating the flow.
- Power BI data is sent to, and processed in, a geography where the flow is deployed.
- The Power Automate visual isn't supported for PaaS-embedded scenarios, nor in sovereign cloud scenarios.

Overview of flows with Microsoft Forms

1/15/2022 • 2 minutes to read • Edit Online

Connectors serve as a way to connect to a service from Microsoft Power Platform. There are numerous types of form connectors available, including the Microsoft Forms connector. Microsoft Forms is a new part of Office 365 Education that allows teachers and students to quickly and easily create custom quizzes, surveys, questionnaires, registrations, and more. You can follow these instructions to create a Microsoft Form.

Check out this video about Microsoft Forms.

Microsoft Forms trigger

A trigger is the event that starts the flow. For example, Here is the full list of the Microsoft Forms triggers.

Microsoft Forms action

Actions are the events you want the workflow to do once the trigger takes place. Here is the full list of the Forms actions. The trigger doesn't contain dynamic content that includes all of the responses, so you always need to use When a new response is identified with Get response details.

Related topics

- Power Apps and Microsoft Teams
- Power Virtual Agents and Microsoft Teams

Get started

1/15/2022 • 2 minutes to read • Edit Online

A good way to get started is to use a template that is suited to your business scenario. You can choose from our collection of templates to find the right one to accomplish your scenario. Search our templates or browse by category to find your scenario, and then follow steps in the template to create a flow from the template.

Perhaps you found a template that is similar to what you are looking for, but isn't quite right for your scenario. No problem - just create your own flow from that template and tweak the it to your liking. You can extend a flow created from template by adding, editing, removing trigger and actions. You can copy paste actions in the same flow or across flows to speed up the process.

Did you not find a template you like? You can create a flow from scratch and connect the services you want to use. More information: How to create a flow from scratch.

Next step

Top scenarios

See also

Create a cloud flow from a template in Power Automate

Submit a template to the Power Automate gallery

Top scenarios

1/15/2022 • 3 minutes to read • Edit Online

Here are some of the top scenarios in which you can use Power Automate with forms:

- Send an email when there is a new form response.
- Send an email to the form responder after they submit a response.
- Send an approval with contents of the form.
- Upload Microsoft Forms responses to Excel.
- Get an attachment from a form and send an email with the attachment.

Send an email when there is a new form response

Although you can enable a notification to "Get email notification of each response" within the Microsoft Form settings, you can create a customized email notification with Power Automate.

First, add the When a response is submitted trigger.

If your form is only for people in your organization, that means that the form is automatically recording the responder's email and you need to use the 'Apply to Each' control. This demo will demonstrate this scenario and require you to choose "List of response notifications Response Id." However, if your form is public and anyone with the link can respond, you will need to ask for their email as a response in the form and you will not need to add the 'Apply to Each' control.

Then, add the Get response details action. Select **Response Id** to view the dynamic content. Select the Response Id option, which means that you'll get the response details for the responses that caused the trigger. After that, choose the Send an email (V2) action. Within the action card, click on Add dynamic content so that you can use the forms responses in your email.

Send an email to the form responder after they submit a response

Although you can enable a notification to Send email receipt to respondents within the Microsoft Form settings, you can create a customized email notification with Power Automate. This is similar to top scenario #1, except the Send an email (V2) action is now being sent to the responder.

Send an approval with contents of the form

Create an approval with dynamic content from the form. In this example, the content will be the feedback, which is denoted by the question "What can we improve about our product?"

After adding the Microsoft Forms trigger and action, the third step is to add the Start and wait for an approval action.

You can view more examples with approvals in the documentation.

Upload Microsoft Forms responses to Excel

Create a new Excel Online sheet and add a table to the sheet. Learn more about tables in the Excel documentation.

You can also add an approval to approve a response before it enters the Excel sheet. The Approve a Microsoft Forms response to add a row to an Excel spreadsheet template can help you do this!

Get an attachment from a form and send it in an email message

Ensure that you've added a section in your form for the responder to upload their file.

After adding the Forms trigger and action, add the Parse JSON action. We recommend running the flow before adding this action to generate the JSON schema from a sample.

Once you've pasted the full sample, you can Get file content using path from OneDrive and find your Microsoft Form. Then, add a '/' followed by the following expression: **first(body('Parse_JSON'))?['id']**. This would extract the one file that the responder will be uploading.

Finally, you can send that upload to via email using the Send an email (V2) action card from Office 365 Outlook. Include the expression **first(body('Parse_JSON'))?['id']**

You can combine the scenario of getting an attachment from a form and creating an approval flow by exploring a blog post here.

How to

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Here are the top how to questions about forms in Power Automate with examples on how to achieve them:

- Change the date and time format of the forms response.
- Configure a flow with a group form.
- Send an email based on a conditional form response.
- Convert an attachment in Microsoft Forms to PDF.
- Upload forms responses to a Power BI dataset to visualize responses.
- Create a lead from a Microsoft Forms response.

Change the date and time format of the forms response

By default, the form submission time will show the UTC time zone but users might want to change it to their local time zone.

- For information about how to convert the time zone, see: Converting time zone in Microsoft Power Automate
- For information about how to customize date formats in the flow, see: How to customize/format Date and Time values in a flow

Configure a flow with a group form

Go to your form. Copy the Form Id from the URL of the form and add it as a custom value.

Send an email based on a conditional form response

Once you choose the Microsoft Forms trigger and action, you can add a condition based on a particular response in the form. The condition can be equal to a text value or numerical value. After you create the condition, you will see an "If yes" and an "If no" statement for which you can add actions. For example, if someone responds that they would attend an event, you can send them the event details. Use the step by step instructions to Create an automated workflow for Microsoft Forms to learn more.

Convert an attachment in Microsoft Forms to PDF

After creating the Forms trigger and action, add a Select data operation, Create HTML table, Create file in OneDrive for Business, and then Convert file in OneDrive for Business to a PDF or other type of file.

Upload forms responses to a Power BI data set to visualize responses

In Power BI, you can create a dashboard that aligns with questions in your form. See step-by-step instructions: Turning Forms surveys into insights with Flow and Power BI

Create a lead from a Microsoft Forms Response

You can push a responder's data as a lead to Dynamics 365. More information: Converting Web Forms to Dynamics 365 Leads with Microsoft Flow & Forms

See also

- Troubleshoot common issues

- Microsoft Forms - known issues and limitations

Troubleshoot known issues with Forms in flows

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Limitations

For information about limitations of forms see: Microsoft Forms - known issues and limitations

Known issues

My flow doesn't work or has stopped working.

Make sure that the form being referenced hasn't been deleted or the name of the form hasn't changed.

You may have reached a limit for the connector or for the product. For the Microsoft Forms connector, the limits on API calls per connection are 300 API calls per connection within 60 seconds and a frequency of 1 trigger poll every 86400 seconds. Furthermore, view the response limits for Microsoft Forms.

I am experiencing an invalid connection error.

Check throttling limits for all connectors in your flow.

Disable any plug-ins, such as the Chrome plug-in Privacy Badger, as it may be blocking the cookies that Power Automate uses.

When the email sends form responses, the files are corrupt.

Make sure you are not using a base64() function as this may corrupt the files.

Flow with form only works sometimes.

One reason that this may be happening is that some users may inputting more than 255 characters in the single line of text field in the form. Enable long answer in the text field .

Form created by another team doesn't isn't listed as an option in Form Id.

Double check that the form is listed in the Microsoft Forms "Shared with me" tab. You may also want to transfer ownership of the form, especially if members of the team will be leaving the company.

The Forms Id field lists duplicate form names.

The list will propagate all forms until the form is deleted from the recycling bin. Therefore, go back into Microsoft Forms and ensure that the forms you no longer need are deleted.

Unable to find the correct Form Id.

Go to your form. Copy the Form Id from the URL of the form and add it as a custom value.

I don't get an attachment for some of my approvals.

Approval action will attach file in notification email till the size is 5 MB. Beyond that, approval action in Power Automate won't be able to attach the file in notification email. It will redirect user/approver to check the attachment in Microsoft Flow portal.

Send email action looks stuck in my flow.

If you are using Mail connector as part of your flow, it has a limit of 100 API calls per 24 hours. Try the Office 365 Outlook connector, which has a limit of 300 API calls per 60s, so that you are less likely to hit the limit.

Overview of how to integrate Power Automate flows with Dataverse

1/15/2022 • 2 minutes to read • Edit Online

With Microsoft Dataverse, you can store and manage data for business applications and integrate natively with other Microsoft Power Platform services like Power BI, Power Apps, Power Virtual Agents, and AI Builder from your cloud flows.

The Microsoft Dataverse connector provides several triggers to start your flows and many actions that you can use to create or update data in Dataverse while your flows run. You can use Dataverse actions even if your flows don't use a trigger from the Dataverse connector.

Use the Microsoft Dataverse connector to create cloud flows that start when data changes in Dataverse tables and custom messages. For example, you can send an email whenever a row gets updated in Dataverse.

Overview of triggers

The Microsoft Dataverse connector provides the following triggers to help you define when your flows start:

- When a row is created, updated, or deleted
- When an action is performed
- When a flow step is run from a business process flow

Overview of actions

The Microsoft Dataverse connector provides the following actions to help you manage data in your flows:

- Create a new row
- Update a row
- Search rows with relevance search
- Get a row
- List rows
- Delete a row
- Relate rows
- Unrelate rows
- Execute a changeset request
- Get file or image content
- Upload file or image content
- Perform a bound action
- Perform an unbound action

Triggers Actions Help See more

Add a new row PREMIUM
Microsoft Dataverse

Delete a row PREMIUM
Microsoft Dataverse

Download a file or an image PREMIUM
Microsoft Dataverse

Get a row by ID PREMIUM
Microsoft Dataverse

List rows PREMIUM
Microsoft Dataverse

Perform a bound action PREMIUM
Microsoft Dataverse

Perform an unbound action PREMIUM
Microsoft Dataverse

Predict using AI Builder models PREMIUM
Microsoft Dataverse

Relate rows PREMIUM
Microsoft Dataverse

Search rows (preview) PREMIUM
Microsoft Dataverse

Trigger flows when a row is added, modified, or deleted

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The **When a row is added, modified or deleted** trigger runs a flow whenever a row of a selected table and scope changes or is created.

Prerequisites

- To create a flow that triggers when you create, modify, or delete a row, you must have user-level permissions for create, read, write, and delete on the **Callback Registration** table.
- Additionally, depending on the scopes defined in the flow, you might need at least that level of read on the same table. You can get more information about Environment security.

The following information is required to use the **When a row is added, modified or deleted** trigger.

- Trigger condition
- Table name
- Scope

Trigger condition

The trigger condition, **Change type**, precisely defines which combination of changes to a row would run the flow.

When the flow is triggered by the creation, update, or deletion of a row, the value of `triggerOutputs()['body/SdkMessage']` will be `Create`, `Update`, or `Delete`, respectively.

Table name

The **Table name** list filters the rows to indicate precisely which kind of rows should change before the flow triggers. See Tables in Dataverse.

Scope

The **Scope** list indicates those rows should be monitored to determine if the flow should be run.

Here's what each scope means:

SCOPE	ROW OWNERSHIP LEVEL
Business Unit	Actions are taken on rows owned by anyone in your business unit.
Organization	Actions are taken by anyone within the environment.
Parent: Child business unit	Actions are taken on rows that are owned by anyone in your business unit or a child business unit.
User	Actions are taken on rows owned by you.

Advanced options

You can set additional properties to define more granularly when the flow runs and the user profile under which it runs.

Filter conditions

Use filter conditions to set conditions for when to trigger flows.

Filtering columns

Use the **Column filter** box to define the specific columns of the row that should cause the flow to run when changed, as a comma-separated list of unique column names.

> **NOTE**
>
> This property applies to the **Update** condition only. **Create** and **Delete** apply to all columns of a row.

Filter expression

The filter expression provides a way for you to define an OData style filter expression to help you to define the trigger conditions even more precisely. The flow runs only when the expression evaluates to *true* after the change is saved in Dataverse. In the following example, the flow triggers when `firstname` is updated to "John".

See the following examples, standard filter operators, and query functions to learn how to construct these filter expressions.

> **NOTE**
>
> Unlike the examples in the reference links, your expression must not contain the string **$filter=**. This string applies only when you use the APIs directly.

When a row is added, modified or deleted

* Change type

Create

* Table name

Accounts

* Scope

Organization

Column filter

firstname,lastname

Row filter

firstname eq 'John'

Delay until

Enter a time to delay the trigger evaluation, eg. 2020-01-01T10:10:00Z

Run as

Choose the running user for steps where invoker connections are used

Hide advanced options

Wait condition using delay until

Use an OData-style time stamp in the **Delay until** property to delay the flow trigger until a specific UTC time.

The key benefit of using the Dataverse **Delay until** property instead of the standard **Delay until** *action* is the Dataverse **Delay until** property never expires, allowing the flow run to wait for long periods of time.

User impersonation using Run As

> **IMPORTANT**
>
> The flow owner must have the Microsoft Dataverse privilege **Act on Behalf of Another User** (prvActOnBehalfOfAnotherUser). The **Delegate** security role includes this privilege by default. You can enable it on any security role. For more details, go to Impersonate another user.

When you create flows with the **When a row is added, modified or deleted** trigger, you can set each Microsoft Dataverse action in the flow to be performed using the context of a user, other than the flow owner.

Follow these steps to impersonate a user:

1. In the Power Automate flow definition, select **Show advanced options** in the **When a row is added, modified or deleted** trigger.
2. Select a value for **Run as** to tell Microsoft Dataverse which user's context you intend to use for subsequent Dataverse actions.
3. For each Dataverse action that you want to run as a different user, select the menu in the upper-right corner (...), as shown in the following image, and select the **Use invoker's connection** setting. For the steps in which it is not selected, the default user is assumed. This would call the underlying APIs as per the selected user, and not as the flow owner.

If nothing is specified, it defaults to the flow owner who created the flow—essentially, the author. Here are the other options:

- **Flow owner**: The user who created the flow.
- **Row owner**: The user who owns the Microsoft Dataverse row that underwent a change, causing the flow to be triggered. If a row is owned by a team, then this option falls back to run as the flow owner.
- **Modifying user**: The user that took the action on the Microsoft Dataverse row, causing the flow to get triggered or modified.

Additionally, instant flows allow running the steps of any other connector (such as Microsoft Teams, Microsoft 365 Outlook, or SharePoint in the same flow using the invoker's connection. To do so, follow these steps:

1. Go to the flow overview page.
2. Select **Edit** on the **Run only users** settings.
3. In the **Manage run-only permissions** pane, go to the **User and groups** tab, and then select **Provided by run-only user** under the **Connections Used** list.

Trigger flows with actions

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You can create flows that trigger based on a Dataverse action that's included in both a Catalog and a Category.

Additionally, your role needs permissions to read it, which may require read access to the *sdkmessage*, *customapi*, or *workflows* tables in Dataverse.

As the name suggests, this trigger runs the flow whenever a specific Dataverse action is performed. A Dataverse action is distinct from a Power Automate action. In Dataverse, custom process actions, or simply actions, are a way of extending out of the box operations on data. You can use them to define reusable custom business logic. To learn more, see Work with actions and Use Custom Process Actions with code. To learn how to run Dataverse actions from Power Automate, see Perform bound or unbound actions.

Here are the input fields for the trigger.

- **Catalog** – used to organize and manage Dataverse actions, similar to the way you use folders to organize files.
- **Category** – used as a sub-classification within a catalog.
- **Table name** – used to filter the available actions by their associated table (bound actions), or to filter global actions (unbound actions). For unbound actions, select *(none)*.
- **Action name** – used to identify the action that triggers the flow each time it runs successfully. The list of available actions is filtered by the catalog, category, and table name.

Using dynamic content and action inputs / outputs

A Dataverse custom action is meant for custom business logic, it accepts input parameters and returns output parameters. When this trigger runs, these parameters are available as dynamic content in the flow and can be used in subsequent steps.

Here's the naming scheme for the parameters.

- The prefixes *ActionInputs* and *ActionOutputs* specify whether it is an input or output parameter.
- The next literal is the name of the parameter.
- For complex data types such as an entity object, the last literal is the column name, for example, *donotfax*.

Use a flow to add a row in Dataverse

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Use the **Add a new row** action to add a new row in Microsoft Dataverse.

Follow these steps to add a new account in Dataverse when you receive an email to your sign-up address, as shown in the following image:

1. Create a flow with the **When a new email arrives (V3)** trigger to your flow.
2. Select **New step** to add an action to your flow.
3. Enter **new row** into the **Search connectors and actions** search box on the **Choose an operation** card.
4. Select **Microsoft Dataverse**.
5. Select **Add a new row** action.

6. Select the **Accounts** table in the **Add a new row** card.

After you select a table, the card expands, displaying both optional and required items. All mandatory items display an asterisk (*).

7. Optional: If you don't see a column that you need, select **Show advanced options** at the bottom of the card to view all columns.

TIP

You can use outputs from previous triggers and actions in the **Dynamic content** selector, as shown in the following image, or modify them by building an expression as outlined in Use expressions in flow actions.

When a new email arrives (V3)
Add a new row
*Table name
Accounts
*Account Name
Type the company or business name.
Add dynamic content
Address 1: City
Type the city for the primary address.
Address 1: Street 1
Type the first line of the primary address.
Address 1: Street 2
Type the second line of the primary address.
Address 1: ZIP/Postal Code
Type the ZIP Code or postal code for the primary address.
Annual Revenue
Type the annual revenue for the account, used as an indicator in financial perfo
Description
Type additional information to describe the account, such as an excerpt from t
Add dynamic content from the apps and connectors used in this flow
Hide
Dynamic content
Expression
Search dynamic content
When a new email arrives (V3)
From
The mailbox owner and sender of the message

Use a flow to update a row

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Use the **Update a row** action to make changes to a row in Microsoft Dataverse.

For example, you can create a flow that updates an **Account** in Dataverse when you receive an email, as shown in the following image.

After you select a table, new columns appear. All mandatory columns display an asterisk (*). It's not necessary to enter a value for optional columns. Columns that are left blank are skipped in the update unless you provide a null value explicitly.

The **Row ID** column is the unique ID of the row that you are updating. If you do not see a column, you can select **Show advanced options** at the bottom of the card.

Get a row by ID from Dataverse

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Use the **Get a row by ID** action to retrieve data from Microsoft Dataverse. This action helps you retrieve the columns of a specific row when its unique ID is known.

> **TIP**
> After you get a row by ID, you can use the columns from that row in all steps that come later in your flow.

Follow these steps to use **Row ID** to get a row from the Accounts table.

1. Select **New step** to add an action to your flow.
2. Enter **get row** into the **Search connectors and actions** search box on the **Choose an operation** card.
3. Select **Microsoft Dataverse**.

4. Select the **Get a row by ID** action.

5. Select the **Accounts** table from the **Table name** list, and then enter the row ID in the **Row ID** box for the row that you want to get from the Accounts table.

> **NOTE**
>
> The **Item ID** column is the unique ID of the row that you are retrieving, as shown in the following image.

Advanced options

Select **Show advanced options** to set more properties that further define the information that should be returned.

The advanced options are:

- Select columns
- Expand Query
- Partition Id

Select columns

Sometimes it's necessary to optimize the amount of data retrieved in a flow, especially if you're performing this

step inside a loop. Instead of retrieving all columns, you can specify which ones you want to retrieve by entering unique names of those columns. Separate columns with a comma.

Expand Query

Use **Expand Query** to specify an OData-style expression that defines which data from related tables is returned. There are two types of navigation properties:

- *Single-valued* navigation properties correspond to **Lookup** columns that support many-to-one relationships and allow you to set a reference to another table.
- *Collection-valued* navigation properties correspond to one-to-many or many-to-many relationships.

If you include only the name of the navigation property, you'll receive all the properties for the related rows. To learn more, see Retrieve related table rows with a query.

To use the **Expand Query** box in a flow step, enter an Odata expression as shown in the following image. This example shows how to get the *contactid* and *fullname* columns for the *primarycontactid* of the *account*.

Use a flow to delete a row from Dataverse

1/15/2022 • 2 minutes to read • Edit Online

Follow these steps to delete a row from Dataverse.

1. Create a flow with the **When a new email arrives (V3)** trigger to your flow.
2. Select **New step** to add an action to your flow.
3. Enter **delete row** into the **Search connectors and actions** search box on the **Choose an operation** card.
4. Select **Microsoft Dataverse**.

5. Select **Delete a new row** action.

6. Select the table name, and then enter an ID in **Row ID**.

The **Row ID** column is the unique ID of the row that you are deleting.

> **TIP**
>
> You can retrieve the **Row ID** by using the dynamic content that's generated from earlier steps in your flow.

Use lists of rows in flows

1/15/2022 • 4 minutes to read • Edit Online

Use the **List rows** action to retrieve multiple rows at once from Microsoft Dataverse with a structured query.

Get a list of rows

Follow these steps to add the **List rows** action to your flow to return up to 5000 accounts from the **Accounts** table in Dataverse.

1. Select **New step** to add an action to your flow.
2. Enter **list row** into the **Search connectors and actions** search box on the **Choose an operation** card.
3. Select **Microsoft Dataverse** to filter the search results to display only actions and triggers for Microsoft Dataverse.
4. Select **List rows**.

5. Select the **Accounts** table from the **Table name** list.

6. Save and run your flow to confirm that no more than 5,000 rows are returned.

Turn on pagination to request more than 5,000 rows

To get more than 5,000 rows from a query automatically, turn on the **Pagination** feature from **Settings** as the following steps indicate:

1. In the upper-right corner of the **List rows** card, select the menu (...).
2. Select **Settings**.

3. Move the **Pagination** slider to the **On** position if it's not already turned on.
4. In **Threshold**, enter the maximum number of rows requested. Internally, this number is rounded off in increments of the default page size. For example, if that page size is 5,000, and you enter 7,000, the number of rows returned is 10,000.

> **NOTE**
>
> Content throughput limits and message size limits apply to ensure general service guarantees. When pagination is not set, the response includes an *@odata.nextLink* parameter that can be used to request the next set of rows. See the **Skip token** section later in this article to learn how to use it.

Advanced options

The advanced options for the **List Rows** action allow you to sort, filter, arrange, and extend the results of a query. Here's an example of how they can be put together:

Select columns

Enter a comma-separated list of columns to return, such as "name,createdon,preferredcontactmethodcode,emailaddress1,telephone1" for the Account table.

Filter rows

Use to define an OData-style filter expression to narrow down the set of rows that Dataverse returns, such as "createdon ge 2021-01-01T00:00:00-00:00" for rows with **createdon** greater than or equal to the year 2021.

> **TIP**
> Learn how to use standard filter operators and query functions to construct **Filter Query** expressions.

> **IMPORTANT**
> Filter expressions cannot contain this string, **$filter=**, because it only applies when you use the APIs directly.

Sort By

Use to define an OData-style expression that defines the order in which items are returned, such as "name desc". Use the **asc** or **desc** suffix to indicate ascending or descending order, respectively. The default order is ascending.

Expand Query

Use to specify an OData-style expression that defines the data that Dataverse returns from the related tables, such as "primarycontactid($select=contactid,fullname)" to use the account's **primarycontactid** to retrieve the **fullname** column from the related contact with ID **contactid** in the response.

There are two types of navigation properties that you can use in **Expand Query**:

1. *Single-valued* navigation properties correspond to lookup columns that support many-to-one relationships and allow you to set a reference to another table.
2. *Collection-valued* navigation properties correspond to one-to-many or many-to-many relationships.

If you include only the name of the navigation property, you'll receive all the properties for the related rows. To learn more, see Retrieve related table rows with a query.

To use it in a flow step, enter an Odata expression as shown in the following image. This example shows how to get the *contactid* and *fullname* columns for the *primarycontactid* of each *account*.

Row count

Use to indicate the specific number of rows for Dataverse to return. Here's an example that shows how to request 10 rows.

Fetch Xml Query

Use to specify a Dataverse-style FetchXML snippet which allows additional flexibility in building custom queries. These can be useful when you work with a table that has multiple related tables, or handling pagination. The following screenshot shows how to use FetchXML for the same filters and sort conditions as the previous example:

Example FetchXML query for the Account table:

```
<fetch count="10">
 <entity name="account">
  <attribute name="name" />
  <attribute name="preferredcontactmethodcode" />
  <attribute name="emailaddress1" />
  <attribute name="telephone1" />
     <link-entity name="contact" to="primarycontactid" from="contactid">
         <attribute name="fullname" />
  </link-entity>
  <filter>
   <condition attribute="createdon" operator="ge" value="2021-01-01T00:00:00-00:00" />
  </filter>
  <order attribute="name" descending="true" />
 </entity>
</fetch>
```

Skip token

Because Power Automate applies content throughput limits and message size limits to ensure general service guarantees, it is often useful to use *pagination* to return a smaller number of rows in a batch, rather than the default limits on number of table rows returned.

The default page limit of 5,000 rows applies if you do not use pagination.

To use it, implement a loop to parse the *@odata.nextLink* value in the JSON response, extract the **skip token**, and then send another request until you have listed the number of rows that you need.

```
HTTP/1.1 200 OK
Content-Type: application/json; odata.metadata=minimal
OData-Version: 4.0
Content-Length: 402
Preference-Applied: odata.maxpagesize=3

{
   "@odata.context":"[Organization URI]/api/data/v9.1/$metadata#accounts(name)",
   "value":[
      {
         "@odata.etag":"W/\"437194\"",
         "name":"Fourth Coffee (sample)",
         "accountid":"7d51925c-cde2-e411-80db-00155d2a68cb"
      },
      {
         "@odata.etag":"W/\"437195\"",
         "name":"Litware, Inc. (sample)",
         "accountid":"7f51925c-cde2-e411-80db-00155d2a68cb"
      },
      {
         "@odata.etag":"W/\"468026\"",
         "name":"Adventure Works (sample)",
         "accountid":"8151925c-cde2-e411-80db-00155d2a68cb"
      }
   ],
   "@odata.nextLink":"[Organization URI]/api/data/v9.1/accounts?
$select=name&$skiptoken=%3Ccookie%20pagenumber=%222%22%20pagingcookie=%22%253ccookie%2520page%253d%25221%252
2%253e%253caccountid%2520last%253d%2522%257b8151925C-CDE2-E411-80DB-
00155D2A68CB%257d%2522%2520first%253d%2522%257b7D51925C-CDE2-E411-80DB-
00155D2A68CB%257d%2522%2520%252f%253e%253c%252fcookie%253e%22%20/%3E"
}
```

Partition ID

An option to specify the partitionId while retrieving data for NoSQL tables. To learn more, see Improve performance using storage partitions when accessing table data.

Use wait conditions to delay flows

1/15/2022 • 2 minutes to read • Edit Online

The Microsoft Dataverse connector provides four ways to add wait conditions. Use these wait conditions when you need to delay processing in your flows until a particular condition is met.

- Postpone triggering the flow and the first action until a specific time. To learn more, go to Wait condition using Postpone Until.
- Add a fixed delay before the next step.
- Delay an action until a specific timestamp.

- Delay an action until a specific event occurs. You can use a trigger from the Microsoft Dataverse connector or any other connector as a step in the middle of the flow to delay subsequent steps until a specific event occurs. For example, you can define a flow that's similar to the one in the following image to check for updates to **Account** rows in Dataverse, and then waits for an email confirmation from the **Account** manager before updating the change.

When a row is added, modified or deleted

* Change type	Update
* Table name	Accounts
* Scope	Business unit

Show advanced options

Send email with options

* To	XYZ
Subject	Confirm account updates for Account Name
User Options	Accept, Reject

Show advanced options

When a new email arrives (V3)

Update a row 2

Perform bound actions or unbound actions

1/15/2022 • 2 minutes to read • Edit Online

> **IMPORTANT**
>
> In this article, the term "action" means a Dataverse action. Dataverse actions are not the same as Power Automate actions. In Dataverse, you use actions to extend out of the box operations on data. You can use these actions to define reusable custom business logic.

Flows can call Dataverse actions that are available in the Microsoft Dataverse connector. These actions include everything from fulfilling a sales order to exporting a solution.

Actions represent operations that might have side effects in the database, such as creating or updating rows.

There are two types of Dataverse actions that you can use in flows.

- Bound actions
- Unbound actions

Bound actions

Bound actions target a single table or a set of rows from a single table.

To perform a bound action, add **Perform a bound action** to your flow.

Follow these steps to edit one of your flows to perform a bound action.

1. After any step in your flow, select **Add new step**.
2. Enter **bound** in the search box, select **Microsoft Dataverse** from the list of connectors, and then select **Perform a bound action**.

3. In **Table name**, select the name of a table you want to use.
4. In **Action name**, select the action you'll perform.
5. In **Row ID**, enter the row in the table on which you want to perform the bound action.

6. Save, and then run your flow.
7. Confirm that the bound action completes successfully on the table that you selected.

Unbound actions

Unbound actions aren't bound to a table and are called as static operations. Unbound actions are performed on the entire environment, not on specific tables or rows.

To perform an unbound action in your flow, add **Perform an unbound action** to your flow.

Follow these steps to edit one of your flows to perform an unbound action.

1. After any step in your flow, select **Add new step**.
2. Enter **unbound** in the search box, select **Microsoft Dataverse** from the list of connectors, and then select **Perform an unbound action**.

3. In **Action name**, select an action.

4. Enter or select any of the optional details on the **Perform an unbound action** card.

5. Save, and then run your flow.

6. Confirm that the unbound action completes successfully.

Use relationships to modify rows

1/15/2022 • 2 minutes to read • Edit Online

Relationships are an important concept in the Microsoft Dataverse. Power Automate allows you to work with these relationships in a few ways.

Modify or add rows directly with relationships

When you create or modify rows, there are columns that hold relationships. For example, when you create an account, there is a **Primary Contact** column.

When you want to create or modify a relationship, use standard OData notation. For example, while creating an account row, you should set the **Primary contact** column to the OData ID of a contact row like this: `contacts(c96be312-4ac1-4358-99b6-1e14e2957b15)`.

> **IMPORTANT**
>
> If you try to pass only the GUID from previous step, you'll get an error like this: *Resource not found for the segment <segmentname>*. The Microsoft Dataverse connector expects the full OData ID of the target row, including the type of the row.

If the lookup column is *polymorphic* (meaning it can have more than one possible target type), then the target

row OData ID must be provided in the correct column. For example, the **Company name** column for **Contacts** is polymorphic and can take either an account or contact, but not both.

Activity party relationships

Activity parties are a special type of relationship in Dataverse. For example, when you create an appointment, the values for **Required Attendees** and **Optional Attendees** are related to the System users table.

Select **Add new item**, and then enter the required data to add multiple values for an activity party. As shown earlier in the article, you must use the OData ID syntax for `systemusers(<ID of the user>)`.

You can also pass in a list of different activity parties by toggling from item mode to array mode by using the "T" button in the upper-right corner. When you do that, you can use expressions to pass in data from a previous action, as shown in the following array:

Activity Parties


```
[
  {
    "participationtypemask": 5,
    "partyid@odata.bind": "systemusers(c75bc527-91ef-e911-a812-000d3a35f9bf)"
  },
  {
    "participationtypemask": 6,
    "partyid@odata.bind": "systemusers(dae8b701-e855-4180-bca3-f7b2e61bd275)"
  }
]
```

Use Dataverse search to retrieve rows

1/15/2022 • 4 minutes to read • Edit Online

Use the **Search rows** action in flows to retrieve data from Microsoft Dataverse by using keywords and Dataverse search, which delivers fast, intelligent, and comprehensive results across tables in Dataverse.

Prerequisites

Your admin must configure Dataverse search on your environment before you can use the search action on Microsoft Dataverse.

You can add the **Search rows** action to your flows, and then provide a keyword in **Search term** to search for that keyword across all the indexed rows in Dataverse.

You can use dynamic content from a previous step in the flow to parameterize the **Search term** box. For example, you can use a keyword that's entered in a Power Virtual Agent bot and set the following options to initiate an automated search:

> **NOTE**
>
> It can take a few hours for newly added rows to be included in the search results.

Search type

Use the **Search type** option to provide the syntax for the search query. Use **simple** to indicate that you want to

use the simple query syntax. Or, use **full** if you prefer to use the Lucene query syntax. The default query syntax is **simple**.

Take a look at the following examples or review the full list of features at Search across table data using Dataverse search.

The simple query syntax supports the following functionality:

OPERATOR	DESCRIPTION
Boolean operators	AND operator; denoted by + OR operator; denoted by | NOT operator; denoted by -
Precedence operators	A search term "hotel+(wifi | luxury)" will search for results containing the term "hotel" and either "wifi" or "luxury" (or both).
Wildcards	Trailing wildcards are supported; for example, "Alp*" searches for "alpine".
Exact matches	A query enclosed in quotation marks " ".

The Lucene query syntax supports the following functionality:

OPERATOR	DESCRIPTION	
Boolean operators	Provides an expanded set compared to simple query syntax. AND operator; denoted by AND, &&, + OR operator; denoted by OR, || NOT operator; denoted by NOT, !, –	
Precedence operators	The same functionality as simple query syntax.	
Wildcards	In addition to a trailing wildcard, also supports a leading wildcard. Trailing wildcard – "alp*" Leading wildcard - "/.*pine/"	
Fuzzy search	Supports queries misspelled by up to two characters. "Uniersty~" will return "University" "Blue~1" will return "glue", "blues"	
Term boosting	Weighs specific terms in a query differently. "Rock^2 electronic" will return results where the matches to "rock" are more important than matches to "electronic".	

OPERATOR	DESCRIPTION	
Proximity search	Returns results where terms are within *x* words of each other, for more contextual results. For example, "airport hotel"~5 returns results where "airport" and "hotel" are within five words of each other, thus boosting the chances of finding a hotel located close to an airport.	
Regular expression (regex) search	For example, /[mh]otel/ matches "motel" or "hotel".	

To use any of the search operators as part of the search text, escape the character by prefixing it with a single backslash (\). Special characters that be escaped include the following characters: + - & | ! ( ) { } [ ] ^ " ~ * ? : \ /

Search mode

You can specify whether any or all the search terms must be matched to count the document as a match. The default is **any**. It controls whether a term with the NOT operator is AND'ed or OR'ed with other terms in the query (assuming there is no + or | operator on the other terms).

- Using **any** for **Search mode** increases the recall of queries by including more results. By default, it is interpreted as "OR NOT". For example, "wifi -luxury" will match documents that either contain the term "wifi" or those that don't contain the term "luxury".
- Using **all** for **Search mode** increases the precision of queries by including fewer results. By default, it is interpreted as "AND NOT". For example, "wifi -luxury" will match documents that contain the term "wifi" and don't contain the term "luxury".

Go to Search across table data using Dataverse search for more details.

Advanced Options

You can optimize your search by using other advanced options as described is this section. See Search across table data using Dataverse search for more examples.

- **Row filter**: You can narrow your search by specifying filters as shown in the following image.
- **Table filter**: You can restrict your search to specified tables as shown in the following image.
- **Sort by**: Use this option to sort by specifying a column name and adding *asc* or *desc* as the suffix, as shown in the following image.

Using dynamic content and Dataverse rows

You can use the outputs of the action directly from **Dynamic content**. Here's the meaning of each of the parameters.

PARAMETER NAME	DESCRIPTION
Body	The object that represents the entire response. It contains the list of rows, total row count, and facet results.
List of rows	An object that represents all the rows returned.
List of rows item	An individual row in the list of rows, when used inside a loop.
Row search score	The Dataverse score of a row. This score indicates how closely it matched the search keywords and conditions.
Row search highlights	Highlights the specific keywords that matched the search keywords in the row.

PARAMETER NAME	DESCRIPTION
Row table name	The name of the table for a single row. This action aggregates rows from all searchable tables in the environment.
Row object id	This is an identifier for each row. Use this identifier in conjunction with the table name in the **Get rows** action to read all the columns in a row.
Row object type code	The table name identifier for the row.

When you are building your flow, the dynamic content might appear like this image:

The **Search rows** action returns many other columns for the matched rows in a variable schema, depending on your Dataverse search configuration. To use these columns, parse the JSON response, and then use the dynamic outputs generated from it as shown in the following image.

Apply to each
Select an output from previous steps
List of rows
Parse JSON
Content
Current item
Schema
"type": "object",
"properties": {
"@@search.score": {
"type": "number"
},
"@@search.highlights": {
"type": "object",
"properties": {
"name": {
Generate from sample
Append to array variable
Name
SearchResults
Value
emailaddress1
Add dynamic content
Add an action
Create HTML table
Send an email (V2)
+ New step
Save
Add dynamic content from the apps and connectors used in this flow.
Hide
Dynamic content
Expression
Search dynamic content
Parse JSON
Body
@search.highlights
@search.score
name
sharedtoprincipalid
statecode@StringCollection
statuscode@StringCollection

Use a flow to perform a change set request in Dataverse

1/15/2022 • 2 minutes to read • Edit Online

Change sets provide a way to bundle several operations that either succeed or fail as a group. When multiple operations are contained in a change set, all the operations are considered *atomic*, which means that if any one of the operations fails, any completed operations are rolled back.

Follow these steps to get started with change sets.

1. In your flow, select **New step**.
2. Enter **changeset** into the search box of the **Choose an operation** card.

   Notice that the operations list now only displays operations with the word "changeset" in its name.
3. Select the **Perform a changeset request** to add its scope to your flow.

4. Select **Add an action**.

You'll notice that this approach is different from any other action you've added in the following ways:

- Instead of inputs and outputs, this is a container to which you can add actions.
- When you select **Add an action**, you'll see just the following three actions:
  - Add a new row
  - Delete a row
  - Update a row

You cannot have additional built-in actions inside of a change set scope because all actions are evaluated together in Dataverse. You will see that there are no arrows between each of the actions, indicating that there are no dependencies between these actions (they'll all run at once).

5. Add all of the actions that you want to perform.

Perform a changeset request
Choose an operation
Search connectors and actions
All
Microsoft Dataverse
Triggers
Actions
Add a new row
PREMIUM
Microsoft Dataverse
Delete a row
PREMIUM
Microsoft Dataverse
Update a row
PREMIUM
Microsoft Dataverse
Don't see what you need?
Help us decide which connectors and triggers to add next with UserVoice

Upload or download image and file content

1/15/2022 • 2 minutes to read • Edit Online

You can use flows to upload or download images and files in Microsoft Dataverse. There are two column data types for handling images and file content in Dataverse.

- **File**: You can have a column that stores arbitrary file data for your table.
- **Image**: In addition to a column that stores the full size of an image as a file, the **Image** datatype can also include thumbnail information.

You can use the Microsoft Dataverse connector to work with these data types in Power Automate.

Download file or image content

Follow these steps to add the **Download a file or an image** action to your flow. You can use the downloaded file contents in suitable actions later in the flow.

1. Select **New step** to add an action to your flow.
2. Enter **download a file** into the **Search connectors and actions** search box on the **Choose an operation** card.
3. Select **Microsoft Dataverse**.
4. Select the **Download a file or an image** *action*.

5. Select the table from which you want to download the file or image content or enter your own custom value for the table name.

6. In **Row ID**, enter the row ID of the row in the table that you just selected.

> **TIP**
>
> You can normally copy the row identifier from a previous request by using dynamic content.

The list of supported file and image columns for the table you selected earlier will be populated in the **Column name** list.

7. From **Column name**, select the column that holds the file or image content that you want to download.

You now can access the file or image content by using the **File or image content** variable in the **Dynamic content** list.

With the content output of the action, you can pass it to any action later in the flow. In the following example, the file contents are being passed to the **Create file** action.

Upload file or image content

Follow these steps to add the **Upload a file or an image** action to your flow. This way, you can upload content to a corresponding file or image column in Microsoft Dataverse.

1. In **Table name**, select the table to which you want to upload the file or image content or enter a custom value.
2. Enter the identifier in **Row ID** for the row to which you want to upload the file or image content.

> **TIP**
>
> You can normally copy the row identifier from a previous request by using dynamic content.

The list of available file and image columns in the table that you selected is populated.

3. From **Column name**, select the column to which you want to upload the image or enter a custom value.

   Your **Upload a file or an image** action card might look like this now.

4. Enter the content you want to upload.

   In this example, the files to upload are the attachments content from an email captured earlier in the flow. You can select **Attachments Content** in the list of dynamic content that's displayed when you select **Add dynamic content** on the **Upload a file or an image** card.

Troubleshoot known issues with Dataverse

1/15/2022 • 2 minutes to read • Edit Online

Here's a list of known issues with Microsoft Dataverse and Microsoft Power Automate.

- **Localization of metadata** – When you change the Power Automate language and regional locale settings, there's no change to metadata like table and column names. There is no change in the metadata because they display in the language and regional locale settings of your Microsoft Dataverse environment. See Languages to view your Dataverse settings.

- **Working with lookup fields** – When working with the Add a new row and Update a row actions, you must enter lookup fields in the following syntax – **entity_unique_name(Item_ID)**.

- **Working with multi-select fields** – When working with the [Add a new row and Update a row actions, the user interface allows you to select only one option. To select multiple options, you must switch the input method to **custom**, and then enter a unique name for each option, separating each name with a comma.

- **Adding a row with attachments to the Notes table**– When you use an attachment from the dynamic output of a non-Dataverse step, you must use an expression to convert it to a string. For example, when you add a row inside an **Apply to each** loop over the output from the **When a new email arrives** trigger, use *string(triggerOutputs()?['body/attachments'])* instead of *items('Apply_to_each')?['contentBytes']*, as shown in the following image.

- **SharePoint and OneDrive document tables don't display inputs when you create a flow** - When you create a flow that triggers on the Dataverse SharePoint documents table or the OneDrive documents table, no data from these tables is passed to the editor and the flow inputs array is empty. This behavior occurs because these tables are virtual and their data isn't stored in Dataverse.

Use Dataverse-based flows in Power Apps

1/15/2022 • 2 minutes to read • Edit Online

Power Apps is a suite of apps, services, connectors, and data platform that provides a rapid application development environment to build custom apps for your business needs. Use Power Apps, to quickly build custom business apps that connect to your business data that's stored *either* in the underlying data platform Microsoft Dataverse *or* in various cloud and on-premises data sources, such as SharePoint, Microsoft 365, Dynamics 365, SQL Server, and so on.

Apps built using Power Apps provide rich business logic and workflow capabilities to transform your manual business processes to digital, automated processes. Further, apps built using Power Apps have a responsive design, and can run seamlessly in Web browsers or on mobile devices (phone or tablet).

With Power Apps, you can create Canvas apps and Model-driven apps, and both types of apps support using data stored in Microsoft Dataverse. You can use the Microsoft Dataverse connector in Power Automate to integrate your apps with an automated flow, setting them off whenever users tap the associated button.

Get started with Power Apps:

- Watch Power Apps demos
- Watch videos on the Power Apps channel on YouTube.

Canvas apps

You can associate any button in a canvas app with a cloud flow that uses the Microsoft Dataverse. Each time the canvas app user hits the button, the associated flow runs in the background.

1. Edit an existing canvas app, or create one by following the steps in Create a canvas app from Microsoft Dataverse in Power Apps. Then go to the **Insert** menu and then add a **Button** as shown here.

2. Select the button you just added.
3. Select the **Action** menu.
4. Add a **Power Automate** flow by choosing an existing flow or creating a new one from the panel that appears on the right. If the flow requires any parameters, this step prompts you to provide them in the formula bar.

5. Be sure to use the Power Apps trigger as shown here.

6. Create the flow as shown here.

Create an automated flow with Microsoft Dataverse

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> **IMPORTANT**
>
> There are three connectors available to connect to Dataverse. Use the recommended Microsoft Dataverse connector. The **Microsoft Dataverse (legacy)** connector, covered in this article, and the Dynamics 365 connector are available if you are unable to use the recommended connector.

With the Microsoft Dataverse (legacy) connector, you can create flows that are initiated by create and update events within Dataverse. Additionally, you can perform create, update, retrieve, and delete actions on rows within Dataverse.

Initiate a cloud flow from Dataverse

You can use any of the following triggers to initiate your flow.

- When a flow step is run from a business process flow
- When a row is added
- When a row is modified
- When a row is deleted
- When a action is performed (preview)

If the selected trigger requires an environment to be selected, then you can choose `(Current)`, which will always use the database within the environment in which Power Automate runs. If you want your flow to always trigger based on an event in a specific environment, select that environment.

You can use scopes to determine if your flow runs if you add row, if a new row is added by a user within your business unit, or if a new row is added by any user in your organization.

SCOPE	TRIGGER TIMING
Business Unit	Action is taken on a row owned by your business unit
Organization	Action is taken by anyone within the organization or database
Parent: Child business unit	Action is taken on a row owned by your business unit or a child business unit
User	Action is taken on a row owned by you

Triggers that run when a row is modified can also use filtering columns. This ensures that the flow only runs when any of the defined columns are modified.

> **IMPORTANT**
>
> Use filter columns to prevent your flow from unnecessarily running.

This flow triggers any time the first or last name of a contact that the flow user owns is modified.

Trigger privileges

To create a cloud flow that triggers based on create, update, or delete on a row, the user needs to have user level permissions for create, read, write, and delete on the Callback Registration table. Additionally, depending on the scopes defined, the user might need at least that level of read on the same table. Learn more about environment security.

Write data into Dataverse

Use any of the following actions to write data into Dataverse:

- Create a new row
- Update a row

Here's an example of creating a follow-up task when the given user creates a new account row.

Advanced concepts

Write data into customer, owner, and regarding columns

To write data into customer, owner, and regarding columns, two columns must be populated.

COLUMN CATEGORY	EXAMPLE SETTINGS
Regarding	Regarding = ID of the row (for example, account ID) and Regarding Type as selected from the list.
Customer	Represents the ID of the row and the customer type as selected from the list.
Owner	Represents the ID of the system user or team, and owner type as selected from the list.

Enable upsert behavior

You can leverage the **update a row** command to provide upsert actions, which updates the row if it already exists, or creates a new row. To invoke upsert, provide the table and a GUID key. If the row with the specified type and key exists, an update occurs. Otherwise, a row with the specified key is created.

Trigger behavior

If you have a trigger registered on the update of a row, the flow runs for every *committed* update to the given row. The service invokes your flow asynchronously, and with the payload that it captures at the time the invocation occurs.

Flow runs may be delayed if there is a backlog of system jobs in your environment. If this delay occurs, your flow is triggered when the system job to invoke the flow runs.

Overview of solution-aware flows

1/15/2022 • 2 minutes to read • Edit Online

When you host your flows in a solution, they become portable, making it effortless to move them and all their components from one environment to another. A typical use case is for an independent software vendor (ISV) to develop flows in a sandbox environment, and then move those flows to a test environment. After testing, the ISV would then move the flows to a production environment for clients who purchase these flows. This process is much easier when you create your flows in solutions, and then move the solutions and their contents.

Flows created in a solution are known as *solution-aware* flows. You can add multiple flows to a single solution.

> **NOTE**
> For detailed information about solution concepts and implementing a healthy application lifecycle management (ALM) practice in your organization, see Application lifecycle management (ALM) with Microsoft Power Platform.

Prerequisites

You must have the following components to create solutions, and solution-aware flows:

- Dataverse
- An environment with version 9.1.0.267 or later.

  To check your version, go to Power Platform admin center, select **Environments**, and then select the environment in which you are interested. The **Details** tab displays all configuration information for the environment that you selected.

Create a solution

Follow these steps to create a solution:

1. Sign in to Power Automate.
2. Select **Solutions** from the navigation bar on the left side of the screen.
3. Select **New solution**.

4. Provide all required information for your new solution, including the **Display Name**, **Name**, **Publisher**, and **Version**. It's also a good idea to provide a description of your solution.

5. Select the **Create** button.

   Your new solution might appear like this image:

Known limitations

There are certain limitations when using flows with solutions. For information about these limitations, see Known limitations in the Power Apps docs.

Learn more

- Create a cloud flow in a solution
- Export a solution
- Import a solution
- Edit a solution-aware flow
- Remove a solution-aware flow

Create a cloud flow in a solution

1/15/2022 • 2 minutes to read • Edit Online

Flows you create in a solution are known as *solution-aware* flows. Follow these steps to create a solution-aware flow.

Prerequisites

You need to have at least one solution before you can create a solution-aware flow.

Create the flow

1. Sign in to Power Automate.
2. Select **Solutions** from the navigation bar.

3. Select the solution in which you'll create your flow.

4. Select **New**, and then select **Flow**.

Power Automate opens.

5. Use the available connectors and triggers to build your flow.

   In this example, we'll build a simple flow that sends a notification when an email arrives in your inbox.

6. Search for and then select **Office 365 Outlook**.
7. Select the **When a new email arrives (V3)** trigger.
8. Select **New step**.
9. Search for the word "Notification", and then select the **Send me a mobile notification** action.
10. Add the **Subject** dynamic token to the **Text** field of the **Send me a mobile notification** box.
11. Give your flow a name and then save the flow.

    Your flow should appear like this:

12. Select **Solutions** to see your flow in the solution:

Learn more

- Create a solution
- Export a solution
- Import a solution
- Edit a solution-aware flow
- Remove a solution-aware flow

Create child flows

1/15/2022 • 4 minutes to read • Edit Online

Today, people are building flows that need dozens or hundreds of steps; however, if you try to put all of these actions into a *single* flow, it can be difficult to navigate and maintain that flow.

You can use child flows to easily manage flows, avoiding flows with hundreds of steps. This approach is especially beneficial if you want to reuse tasks in multiple places in a cloud flow, or even across multiple flows.

Let's look at an example where you have a child flow that you want to create or update a contact in Dataverse based on that contact's name.

You will need a solution with two flows:

- A *child* flow. This is the flow that is nested inside the *parent* flow and contains the smaller tasks you want to run.
- A *parent* flow. This flow can have any type of trigger and will call into the child flow.

Create the child flow in a solution

1. Sign into Power Automate, select **Solutions**, and then pick an existing solution.

   Alternatively, you can create a solution.

2. Select **New** > **Flow** > **Button flow** > **Manually trigger a flow**.

   > **TIP**
   > You can also use the **Power Apps** or the **When an HTTP request is received** triggers for child flows.

3. Select **Add an input**. The input you define here will be passed in to the child flow from the parent flow.

4. For this walkthrough, the child flow creates a contact, so it needs the **Contact name** and **Contact email**.

5. Build the logic that you want the child flow to run. This logic can contain as many steps as you need.

After your steps, you need to return data to the parent flow. In this case you can use one of two actions:

i. **Respond to a Power App or flow** (under the Power Apps connector).

ii. **Response** (on the premium HTTP request/response connector).

6. As with the trigger, you can define as many outputs as you want to be returned from the child flow. In the following image, we can respond with the ID of the contact.

7. Give your flow a descriptive name and then save it.

   You need to then test your child flow. Because you can manually trigger this flow, it's very easy to test right inside of the designer. Try it out with a couple different inputs, and verify that the outputs are what you expect.

8. Lastly, if your flow uses anything other than built-in actions or the Microsoft Dataverse connector, you will need to update the flow to use the connections **embedded** in the flow. To do this, select the back button to get to the child flow's properties page, and then select **Edit** in the **Run only users** tile.

9. In the pane that appears, for each connection used in the flow, you will need to select **Use this connection (<*connection name*>)** instead of **Provided by run-only user**.

10. Select **Save**. At this time, you cannot pass connections from the parent flow to the child flow. If you do not do this, you will receive an error stating that the name cannot be used as a child workflow because child workflows only support embedded connections.

Create the parent flow in a solution

1. Build the parent flow in the same solution in which you created the child flow.

   Alternatively, you can bring an existing flow into that solution. The parent flow can have any type of trigger.

2. Find the place in your *parent flow* from which you want to call the child flow and then add the **Run a Child Flow** action that's located under the **Flows** connector on the **Built-in** tab.

3. Pick the child flow that you created earlier.

> **NOTE**
>
> You will only see the flows to which you have access and are located in a solution. Child flows must also have one of the three triggers mentioned earlier.

4. After you select your child flow, you will see the *inputs* that you defined. After the child flow action, you will be able to use any of the *outputs* from that child flow.

When the parent flow runs, it waits for the child flow to complete for the lifetime of the flow (one year for flows that use built-in connections and Dataverse or 30 days for all other flows).

5. Save and test this flow.

> **TIP**
> When you export the solution that contains these two flows and import it into another environment, the new parent and child flows will be automatically linked, so there's no need to update URLs.

Known issues

We are working to address the following known issues and limitations.

1. If you block the HTTP Request connector via data loss prevention (DLP), child flows are also blocked because child flows are implemented using the HTTP connector. Work is underway to separate DLP enforcement for child flows so that they are treated like other cloud flows.

2. You must create the parent flow and all child flows **directly** in the same solution. If you import a flow into a solution, you will get unexpected results.

Export a solution

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Follow these steps to move your solution and its dependencies to a new environment:

1. Select **Solutions** from the navigation bar.
2. Select the unmanaged solution that you want to export, and then select **Export**. You can't export managed solutions. More information: Managed and unmanaged solutions
3. The **Before you export** right pane appears. Choose from the following options, and then select **Next**:
   - **Publish all changes**. Notice that, when you export an unmanaged solution, only published components are exported. We recommend that you select **Publish all changes** to make sure all components are included in the exported solution.
   - **Check for issues**. Run the solution checker against the solution to detect performance and stability issues.
4. The **Export this solution** right pane appears. Enter or select from the following options, and then select **Export**:
   - **Version number**: Power Automate automatically increments your solution version while displaying the current version. You can accept the default version or enter your own.
   - **Export as**: Select the package type, either **Managed** or **Unmanaged**. More information: Managed and unmanaged solutions

The export can take several minutes to complete. Once finished, the export .zip file is available in the download folder specified by your web browser.

> **NOTE**
>
> To implement healthy application lifecycle management (ALM) in your organization, consider using a source control system to store and collaborate on your solutions, and automate the solution export process. More information: ALM basics in the Power Platform ALM guide.

> **NOTE**
>
> Once a flow is solution-aware and in Dataverse, then it must be exported in a solution as described earlier in this article. You cannot export a solution-aware flow from the flow details page.

Learn more

- Create a solution
- Create a cloud flow in a solution
- Import a solution
- Edit a solution-aware flow

Import a solution

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> **TIP**
> If you want to have your flows start automatically after you import a solution, use the Microsoft Dataverse connector in your flow when you create it.

After you've exported your solution, you can import it into any environment that meets the prerequisites. Follow these steps to import a solution:

1. Sign into Power Automate, and then select **Solutions** from the navigation bar on the left side of the screen.

2. Select **Import**.

3. Select **Browse** from the **Import a solution** page that opens.

4. Find, and then select the solution that you want to import.

5. Select **Open**.

   You should now see the **Select Solution Package** page similar to this image:

6. Select **Next**.

   If there are no errors, the importation completes within a few moments.

> **NOTE**
>
> You cannot import a solution into an environment in which the solution already exists.

Learn more

- Create a solution
- Create a cloud flow in a solution
- Export a solution
- Edit a solution-aware flow
- Remove a solution-aware flow

Edit a solution-aware flow

1/15/2022 • 2 minutes to read • Edit Online

Follow these steps to edit a solution-aware flow.

> **IMPORTANT**
>
> Stop your flow before you begin editing it, or you might lose your changes.

1. Sign in to Power Automate, and then select **Solutions** from the navigation bar.
2. Select the solution that contains the flow you want to edit.

3. Select ... (More Commands) for your flow, and then select **Turn off**.
4. Select ... (More Commands) for your flow, and then select **Edit**.

5. Make your edits in the Power Automate designer, test your changes, and then save your flow.
6. Turn on your flow if you'd like it to run.

Learn more

- Create a solution
- Create a cloud flow in a solution
- Export a solution
- Import a solution
- Remove a solution-aware flow

Remove a solution-aware flow

1/15/2022 • 2 minutes to read • Edit Online

You can either remove a cloud flow from a solution, or delete the flow from an environment entirely.

ACTION	RESULT
Remove from this solution	The flow is removed from the selected solution, but it remains in the environment. You can use the flow in other solutions in the environment at a later date.
Delete from this environment	The flow is deleted; it is not available in the environment.

Remove a cloud flow from a solution

1. Sign in to Power Automate, and then select **Solutions** from the navigation bar.
2. Select the solution that contains the flow you want to remove from the solution.

3. Select **...** (More Commands) for your flow, select **Remove**, and then select either **Remove from this solution**.

> **IMPORTANT**
>
> When you remove a cloud flow, it gets moved to the **Default Solution**, where you can edit or delete the flow, or add it to another solution.

Delete a cloud flow from an environment

1. Sign in to Power Automate, and then select **Solutions** from the navigation bar.
2. Select the solution that contains the flow you want to delete from the environment.

3. Select ... (More Commands) for your flow, select **Remove**, and then select **Delete from this environment**.

Learn more

- Create a solution
- Create a cloud flow in a solution
- Export a solution
- Import a solution
- Edit a solution-aware flow

Use AI Builder in Power Automate

1/15/2022 • 2 minutes to read • Edit Online

AI Builder is a new Microsoft Power Platform capability that enables you to add intelligence to your automated processes, predict outcomes, and help improve business performance. AI Builder is a turnkey solution that brings the power of Microsoft AI through a point-and-click experience and is directly integrated into Power Apps and Power Automate. More information: What is AI Builder?

You can build AI models by using the **AI Builder** option from the left navigation pane of Power Automate. More information: AI model types

Use your AI Builder models in your flows to add intelligence to your organization. More information: Use AI Builder in Power Automate

Troubleshoot common issues with triggers

1/15/2022 • 10 minutes to read • Edit Online

Here are a few tips and tricks for troubleshooting issues with triggers.

My trigger doesn't fire

1. A data loss prevention policy could be to blame.

   Admins can create data loss prevention (DLP) policies that can act as guardrails to help prevent users from unintentionally exposing organizational data. DLP policies enforce rules for which connectors can be used together by classifying connectors as either **Business** or **Non-Business**. If you put a connector in the **Business** group, it can only be used with other connectors from that group in any given app or flow.

   If your flow violates a DLP policy, it will be suspended, causing the trigger to not fire. To know if your flow is suspended, try to edit the flow and save it. The Flow checker will report it if the flow is violating a DLP policy. Your admin can change the DLP policy.

2. The trigger may be failing.

   To confirm:

   a. Go to **My flows** and then select your flow.

   b. Do you see the following error in the **Details**?

   This error means that Power Automate tried multiple times to establish a connection to register the trigger and failed. Your flow won't trigger until this problem is resolved.

   One of the common reasons for the failure is that the Power Automate service end points are not part of the allow list. To fix it, confirm that your IT department has added these endpoint to the allow list.

   Here is the list of IP addresses and domains that need to be added to your allow list.

   Refer to this support article to know more about how to fix issues with triggers.

Once the problem is resolved, modify the flow, save it, and then change it back and save again. The flow becomes aware that it's configuration changed, and tries to register its trigger again.

Verify connections

With the default settings, users only need to login to a connection once. They can then use that connection until it's revoked by an admin. A possible scenario is that the password for the connection can expire or there might be a policy in your organization which sets the connector's login token expiration after a specific amount of time. Token lifetime policies have been configured on Azure Active Directory. For more information, check this Azure article or this support article.

To verify if your connections are broken:

1. Sign into Power Automate.

2. Go to **Data** > **Connections**.

3. Find the connection that's used in your flow.

4. Select **Fix connections**, and then update the credentials for your connection if there is a **Fix connection** message next to the **Status** column.

Verify if the flow uses a premium connector trigger

1. Edit your flow to find the connector name for the trigger.

2. Go to the list of connectors and search for that connector. If the connector is a premium connector, it shows below the name of the connector.

A standalone Power Apps or Power Automate license is required to access all premium, on-premises, and custom connectors. You can purchase new licenses at any time.

Check your license type

To view the type of license that you have:

- Go to **My flows** in navigation tab.
- Select any flow.
- In the **Details** section, find **Plan**. Your current license plan is listed.

Verify if trigger check is skipped

You just completed an event (for example, added a new list item or sent an email, etc.) that should have triggered the flow, but the flow didn't run.

Go to **My flows** in the navigation pane, and then select the flow. In the **28-day run history**, select **All runs**.

If you are expecting the flow to run but it didn't run, see if it shows the trigger check was skipped at that time. If the trigger check was skipped, the trigger condition wasn't met for the flow to trigger. Verify the inputs and trigger conditions of the flow to see you are using the latest configuration to trigger the flow.

Verify inputs and trigger conditions

Sometimes, the inputs and trigger conditions may cause failures. Follow these steps to verfiy your inputs and conditions.

1. Edit the flow.
2. Expand the first card to see what folders, sites, mailboxes, etc. are used in the trigger.
3. Select the ellipses (...) on the card

4. Select **Settings**.

5. Find **Trigger conditions**.

   If the field is empty, it means that there are no additional customizations and that the title of the card (in this case, **when an item is created or modified**) indicates when the trigger fires.

   If there are additional customizations in **Trigger conditions**, confirm that you are using the expected/correct inputs to trigger the flow.

Check permissions

Verify that you have access to the folders, sites, or mailboxes that are used in the trigger. For example, to be able to send email from a shared inbox via Power Automate, you need permissions to send an email via the shared inbox. Test sending an email from that shared mailbox in Outlook.

Verify if admin mode is turned on

If an environment's admin mode is turned on, all background processes, including flows will be turned off, causing the flow to not trigger.

Follow these steps to disable the admin mode.

1. Go to the Power Platform admin center and sign in using Environment Admin or System Administrator role credentials.
2. From the left-side menu, select **Environments**, and then select a sandbox or production environment.
3. On the **Details** page, select **Edit**.
4. Under **Administration** mode, toggle **Disabled** to **Enabled**.
5. Optionally, you can set Background operations and Custom message, and then select Save.

If everything looks good but your flow is still not triggering, verify if your flow triggers after every step.

Try these steps

1. Test the flow manually.
2. Remove, and then re-add the trigger.
3. Switch connection.

4. Turn off, and then turn on the flow.
5. Export, and then import the flow.
6. Create a copy of the flow.
7. If the trigger uses special conditions, like when an email arrives in specific folder, remove the folder, and then add it again.

My trigger is firing for old events

There are two types of triggers—polling triggers or Webhook triggers.

If you turned off your flow and then turned it back on, depending on your trigger type, your old triggers may be processed.

A polling trigger periodically makes a call to your service to look for new data, whereas a Webhook trigger responds to a push of new data from the service.

See the following table to understand how your flow responds when it's turned back on.

Trigger type	Description
Polling, such as the **recurrence** trigger	When the flow is turned on again, all unprocessed/pending events are processed. Delete, and then recreate your flow if you don't want to process pending items when you turn your flow back on.
Webhook	When the flow is turned on again, it processes new events that are generated after the flow is turned on.

To determine the type of trigger that's used in your flow:

1. Select the ...(ellipses) for your flow, and then select **Peek code**.

2. Find the recurrence section with an interval frequency element. If this section is available, the trigger is a polling trigger.

'When an item is created' (code view)

```
1  {
2      "inputs": {
3          "host": {
4              "connectionName": "shared_sharepointonline",
5              "operationId": "GetOnNewItems",
6              "apiId": "/providers/Microsoft.PowerApps/apis/
shared_sharepointonline"
7          },
8          "parameters": {
9              "dataset": "",
10             "table": ""
11         },
12         "authentication": "@parameters('$authentication')"
13     },
14     "recurrence": {
15         "interval": 1,
16         "frequency": "Minute"
17     },
18     "splitOn": "@triggerOutputs()?['body/value']"
19 }
```

Done

My recurrence trigger runs ahead of schedule

Confirm you've set the start time to make sure it runs only at that time.

There's a delay before my trigger fires

If the trigger is a polling trigger, it wakes up periodically to check if any new events have occurred. The wake-up time depends on the license plan on which the flow runs.

For example, your flows may run every 15 minutes if you're on the **Free** license plan. On the **Free** plan, if a cloud flow is triggered less than 15 minutes after its last run, it's queued until 15 minutes have elapsed.

And, if your license is the **Flow for Office 365** plan (from your Enterprise license E3, E5, etc.) or the **Flow for Dynamics 365** plan, your flow won't run again until five minutes have elapsed. So, it may be a few minutes between the time the triggering event occurs and the time the flow begins.

To check the trigger wake up frequency:

1. Go to your flow trigger, and then select the ...(ellipses).
2. Select **Peek code**.

3. Find the interval frequency.

'When an item is created' (code view)

```
1  {
2      "inputs": {
3          "host": {
4              "connectionName": "shared_sharepointonline",
5              "operationId": "GetOnNewItems",
6              "apiId": "/providers/Microsoft.PowerApps/apis/
   shared_sharepointonline"
7          },
8          "parameters": {
9              "dataset": "",
10             "table": ""
11         },
12         "authentication": "@parameters('$authentication')"
13     },
14     "recurrence": {
15         "interval": 1,
16         "frequency": "Minute"
17     },
18     "splitOn": "@triggerOutputs()?['body/value']"
19 }
```

Done

If it is taking much longer than expected for your flow to trigger, the two likeliest reasons are:

1. There has been too many calls to the connector or flow, causing it to be throttled. To verify if your flow is being throttled, manually test the flow to see if it triggers immediately. If it triggers immediately, it is not throttled.

   Further, you can check the Power Automate action analytics. Check out this blog to know more about action analytics.

   If your flow is frequently throttled, redesign your flow to use fewer actions. Learn more about plan limits and tips to optimize flows to use fewer actions.

   Additional tips:

   a. Acquire a Per User or Per Flow license. After this is acquired, open and resave the flow, in order to refresh the entitlement associated with it, and to change the throttling Mode.

   b. Split the flow into several instances. If the flow processes data, you can divide this data into subsets (per country, per business area, etc.).

   c. After this, you can use **Save As** on the flow to create several instances that will process each one their own data. Since the quota is per flow, this can be used as a workaround.

2. There was a communication issue preventing Power Automate from reacting to trigger events. Potentially because of a service outage, policy change, password expiry, and so on, that caused the delay. You can check to find out if there are any active outages. You can also clear the cache of the browser and then retry.

Dynamics 365 connector trigger issues

There's a delay - Dynamics 365 connector triggers can take up to 2 hours to run. This connector is deprecated and our recommendation is to migrate your flows to use Microsoft Dataverse.

My flow is not listed - The Power Automate menu only lists flows that begin with the **When a row is added, modified or deleted** trigger and contain at least one trigger or action that references that table. Flows that contain other types of triggers (automatic, scheduled, etc.) will not be listed in Dynamics 365.

You can also access these flows in the Power Platform admin center:

1. Sign into Power Platform admin center.
2. Select **Environments**.
3. Select that environment that contains the flow.
4. Select **Flows** under the **Resources** section.

> **IMPORTANT**
>
> You must enable Power Automate before you can find these flows.

Power Apps apps trigger issues

Unable to rename actions in a cloud flow – This is a known issue for flows that use Power Apps triggers. As a work around to rename actions, remove the trigger. Rename the actions and add your Power Apps trigger and configure variables wherever needed.

Once a Power Apps app is published, make copies of the flows used by the Power Apps app to make any updates. Any update to a cloud flow that's referenced by a published Power Apps app can break existing users. Do not delete or turn off existing flows until all users have been upgraded to the new published version of the Power Apps app.

SharePoint trigger issues

SharePoint triggers, for example **When a file is created or modified** will not fire if a file is added/updated in a subfolder. If you need the flow to trigger on subfolders, create multiple flows.

My flow triggers multiple times

Verify that you don't have copies of the flow active in different environments that are triggering based on same condition. Use trigger conditions to customize triggers to reduce the number of times it triggers.

Users are unable to run flows that are shared to them, but the owner can run the flow

You can try one of the following:

1. Fix/update connections.

   If your flow uses a **Manual** trigger, it needs the connection of the user who is triggering the flow. If it uses the **Recurrence** trigger, it can run on the flow maker's connections.

2. Confirm the user has the appropriate license for the connections in the flow.

   A Power Automate license is required for the user to perform any actions like save, turn off, etc. A Power Apps, Dynamics 365, or Office 365 license is not sufficient. Users with whom flows that use premium connectors are shared will each need a Power Automate **Per User** or **Per Flow** license to edit or manually trigger the flow. If the user was previously able to save/modify the flow, it's possible that their license has expired.

   Alternatively, you can start a trial for the **Per User** plan for 90 days, after which you will need a paid plan to run/edit flows that use premium connectors. See the licensing page or this support article for more details.

Watch your flows in action

1/15/2022 • 2 minutes to read • Edit Online

To ensure that your flows run as you expect, perform the trigger, and then review the inputs and outputs that each step in your flow generates.

1. Create or update a cloud flow, and then leave the designer open after you select **Create flow** or **Update flow**.

   For example, create a cloud flow that sends email whenever someone tweets using the **#azure** hashtag.

2. Perform the starting action for your flow.

   For example, send a tweet that contains the **#azure** hashtag.

   The starting action and each subsequent step indicates whether it succeeded and how long it took.

3. Select the trigger or action to see its inputs and outputs.

4. Select **Edit flow** to make more changes or select **Done** if the flow works as you expect.

Monitor activity in Power Automate from your phone

1/15/2022 • 2 minutes to read • Edit Online

View a summary of how many times each flow succeeded or failed today, yesterday, and previous days. Explore details about each run, such as when it ran, how long each step took and, if it failed, why.

Prerequisites

- Install the Power Automate mobile app for Android, iOS, or Windows Phone on a supported device. The graphics in this topic reflect the iPhone version of the app, but the graphics on Android and Windows Phone are similar.
- If you don't already have a cloud flow, create one on the website for Power Automate. For easier testing, use one that you can trigger yourself instead of waiting for an external event.

The flow in this tutorial runs when you receive mail from a specific address:

You could configure such a cloud flow with your personal email address for testing and a different address (for example, your manager's) when the flow is ready for real use.

When the flow runs, it sends a custom push notification, with this syntax, to your phone:

Note: You can also manage your flows from the mobile app.

Display a summary of activity

1. If your flow hasn't run before, trigger a run to generate data.

   It might take some time for the data to appear in the app.

2. Open the mobile app, which shows the **Activity** tab by default.

   This tab organizes data by day, with today's data at the top.

Each entry shows the name of a cloud flow with icons that correspond to its trigger events and actions.

If at least one run of a cloud flow has succeeded in a day, an entry shows the number of successes and the time when it succeeded most recently. A different entry shows similar information if a cloud flow has failed.

If a cloud flow sends a push notification, the text of the most recent notification appears at the bottom of the entry for successful runs.

3. If multiple push notifications were sent in a day, swipe left on the notification to view notifications from up to three previous runs. If more than four notifications were sent in a day, swipe left until **See more** appears, and then tap it to view a list of all notifications.

4. Tap **Back** to return to the activity summary.

5. To filter the activity summary, tap the icon in the upper-right corner.

   You can show all entries, only the failure entries, or only the entries that include push notifications.

Show details of a run

1. In the activity summary, tap an entry to show details for the most recent run.

   Each event and action appears with an icon that indicates whether the event or action succeeded or failed. If it succeeded, the amount of time it took (in seconds) also appears.

2. At the bottom of the screen, tap **See previous runs** to list all runs of the flow, and then tap a run to show its details.

Back
Run history
Flow failed
Flow failed
Flow failed
Flow successful
Flow successful
Flow successful
Flow failed
Flow failed

Troubleshooting a cloud flow

1/15/2022 • 3 minutes to read • Edit Online

Repair tips in email

Repair tips are sent to flow owners via email whenever a cloud flow fails. These repair tips emails contain specific, actionable feedback about certain errors. For example, one common error is setting up a cloud flow that attempts to get a person's manager in Office 365—but there is no manager configured in Azure Active Directory (Azure AD). If this or several other conditions cause your flow to fail, you get a repair tips email like this:

The repair tips email contains the following sections:

NAME	DESCRIPTION
Time	Displays the time the flow first failed.
What happened	Provides a description of the problem that caused the failure in the flow.
How do I fix	Provides tips for resolving the issue that cause the failure in the flow.
Troubleshooting Tips	Provides details including the number of times the flow failed, and a link to retry the flow with the same input data.

To fix the reported errors, select **Fix my flow** and follow the steps in the repair tips email.

Repair tips emails are optional. If you don't want to receive them, just turn them off from the properties menu for the specific flow.

If your flow fails, you can also troubleshoot it directly in Power Automate. Here are a few common failure scenarios and tips on how to fix them.

Identify the error

1. Select **My flows**.
2. Select the flow that failed.
3. In the **28-day run history** section, select the **date** of the failed run.

   Details about the flow appear, and at least one step shows a red exclamation icon.
4. Open that failed step, and then review the error message.

   On the right pane, you can see the **details** of the error and **How to fix** the error

Authentication failures

In many cases, flows fail because of an authentication error. If you have this type of error, the error message contains **Unauthorized** or an error code of **401** or **403** appears. You can usually fix an authentication error by updating the connection:

1. In the right pane, click on **View Connections** below **How to fix**.
2. Scroll to the connection for which you saw the **Unauthorized** error message.
3. Next to the connection, click or tap the **Fix connection** link in the message about the connection not being authenticated.
4. Verify your credentials by following the instructions that appear, return to your flow-run failure, and then click or tap **Resubmit**.

The flow should now run as expected.

Action configuration

Flows also fail if a setting in an action of the flow doesn't function as expected. In this case, the error message contains **Bad request** or **Not found**, or an error code of **400** or **404** appears.

The error details should specify how to correct the failure. You'll need to click or tap the **Edit** button and then correct the problem inside the flow definition. Save the updated flow, and then click or tap **Resubmit** to try the run again with the updated configuration.

Other failures

If the error code **500** or **502** appears, the failure is temporary or transient. Click or tap **Resubmit** to try the flow again.

Getting help from support or the community

When you need help, you can use our **Self Help** options, or you can **Ask for help** from others.

Self help

1. Go to the support site.
2. Go to the **Self Help** category and select one of the self-help options.

Ask for help from others

1. Go to the support site.
2. Select **Contact Support** in the **Ask for help** section.

3. Complete the **Problem type**, **Category**, and the **Tell us what you need help with** fields, and then select **See solutions**.

4. Notice that the **Solutions** section displays after you select **See solutions**. It contains a list of results that you can use to help address the issue you're facing.

If you need help with an issue, help is available from our community and Microsoft.

Find and fix errors with Flow Checker

1/15/2022 • 2 minutes to read • Edit Online

Flow Checker in Power Automate promotes higher quality flows by ensuring you follow best practices when you design flows. When you run the checker, you get insights into questions like "which areas of my flow's implementation pose a performance or reliability risk?"

For each issue the checker identifies, the checker points to specific occurrences within the flow where you should consider making improvements. And, you learn how to implement these improvements by following detailed guidance.

The checker is always active, appearing in the command bar in the designer. The checker shows a red dot when it finds one or more errors, potential errors, or warnings in your flow.

View errors or warnings in the checker

While designing your flow, you can select the **Flow Checker** button to open the checker to view errors and warnings.

The checker also opens automatically when you save the flow if there are errors or warnings. Once the checker opens, it shows all errors and warnings in your flow. In each section, the checker calls out the actions where the error or warning occurs.

Learn to fix errors and warnings

Expand each section to learn more about how to fix the errors or warnings.

Learn more

Introduction to Power Automate for desktop

1/15/2022 • 2 minutes to read • Edit Online

Power Automate for desktop broadens the existing robotic process automation (RPA) capabilities in Power Automate and enables you to automate all repetitive desktop processes. It's quicker and easier than ever to automate with the new intuitive Power Automate desktop flow designer using the prebuilt drag-and-drop actions or recording your own desktop flows to run later.

Leverage automation capabilities in Power Automate. Create flows,interact with everyday tools such as email and excel or work with modern and legacy applications. Examples of simple and complex tasks you can automate are:

- Quickly organize your documents using dedicated files and folders actions
- Accurately extract data from websites and store them in excel files using Web and Excel automation
- Apply desktop automation capabilities to put your work on autopilot

Power Automate for desktop is addressed to home users, small businesses, enterprises or larger companies. It's addressed essentially to everyone who is performing simple or complex rule-based tasks on their workstations.

In case you are a home user who is accessing a weather website to see tomorrow's forecast, or a self-employed businessperson who extracts information from vendors' invoices or even an employee of a large enterprise who automates data entry on an ERP system, Power Automate is designed for you.

It allows you to automate both legacy applications, such as terminal emulators, modern web and desktop applications, Excel files, and folders. Interact with the machine using application UI elements, images, or coordinates.

Sign in to Power Automate for desktop Windows application using one of the following accounts and automate your tedious tasks:

Getting started with a Microsoft account

Getting started with a work or school account

Getting started with an Organization premium account

A full comparison of the features included in each account can be found here.

Here's a list of known issues for Power Automate.

You can also create desktop flows using the alternative solutions legacy Windows recorder (V1) and Selenium IDE.

Getting started with Power Automate in Windows 11

1/15/2022 • 2 minutes to read • Edit Online

Windows 11 allow users to create automations through the preinstalled Power Automate for desktop app. Power Automate is a low-code platform that enables home and business users to optimize their workflows and automate repetitive and time-consuming tasks.

Any Windows user can build flows with little-to-no coding experience. A collection of more than 400 pre-made actions and a recorder that captures mouse and keyboard functions make RPA intuitive for both regular and power users.

Using the available actions, you can automate virtually any Microsoft and third-party application on Windows and exchange data between different applications and web pages.

For example, you can extract prices from shopping websites, compare them, and store them to Excel spreadsheets by deploying some easy-to-configure actions.

Using Power Automate, you can populate any form and reduce the time needed to enter data on regularly used applications. Performing repetitive online orders, tracking price changes, populating fields on web pages and desktop applications, creating backups, and converting files are all tasks that can be fully automated with Power Automate for desktop.

Apart from the pre-made actions, Power Automate for desktop enables you to record your activity and automatically convert these steps into actions. The recording feature makes RPA friendly to all non-technical users and allows you to develop simple flows effortlessly.

To start your journey with Power Automate for desktop, follow our getting started guide. More technical starting guides are available for users with a work or school account and organization premium account. Check the Sign-in account comparison to view what each version offers.

Power Automate for desktop prerequisites & limitations

1/15/2022 • 4 minutes to read • Edit Online

Prerequisites

- A Microsoft work or school account to sign into Power Automate
- An account with administrator privileges to sign in to your Windows device
- System requirements:
  - A device that runs Windows 10 Home, Windows 10 Pro, Windows 10 Enterprise, Windows Server 2016, or Windows Server 2019. ARM devices are not supported.
    - Minimum hardware
      - Storage: 1GB
      - RAM: 2GB
    - Recommended hardware
      - Storage: 2GB
      - RAM: 4GB
    - .NET Framework 4.7.2 or later

> **NOTE**
> The minimum requirements do not include the resources required for the applications involved in the flows.

> **TIP**
> If your device runs Windows 10 Home, you can use Power Automate to create your desktop flows and monitor them on Power Automate. You can't trigger desktop flows to run from the cloud on Windows 10 Home devices. Other types of desktop flows (Windows recorder V1 and Selenium IDE) are not supported.

ACTIVITY	DESCRIPTION	WINDOWS HOME	WINDOWS ENTERPRISE / PRO / SERVER
Authoring	Create with Power Automate for desktop	Yes	Yes
Authoring	Create with Selenium IDE	No	Yes
Runtime	Local runtime (Attended)	Yes	Yes
Runtime	Cloud runtime (Attended / Unattended)	No	Yes
Monitoring	Manage desktop flows	Yes	Yes

ACTIVITY	DESCRIPTION	WINDOWS HOME	WINDOWS ENTERPRISE / PRO / SERVER
Monitoring	View run logs	Yes	Yes

- Access as described in the IP Address configuration
- TLS 1.2 is required for accessing the required services
- The Microsoft Edge (version 80 or later) or Google Chrome browser.
- An environment with a Microsoft Dataverse database. (Applicable only for work or school accounts)
- A supported keyboard attached.
- An active connection to the Internet.

Set the display language for Power Automate for desktop

The language used in Power Automate for desktop is the display language selected on your Windows OS. Get more details on how to manage display language settings in Windows 10.

Supported languages

Here are the languages that Power Automate for desktop supports, in addition to English:

Basque	French	Latvian	Slovak
Bulgarian	Galician	Lithuanian	Slovenian
Catalan	German	Malay	Spanish
Chinese (Simplified)	Greek	Norwegian	Swedish
Chinese (Traditional)	Hindi	Polish	Thai
Croatian	Hungarian	Portuguese (Brazil)	Turkish
Czech	Indonesian	Portuguese (Portugal)	Ukrainian
Danish	Italian	Romanian	Vietnamese
Dutch	Japanese	Russian	
Estonian	Kazakh	Serbian (Cyrillic, Serbia)	
Finnish	Korean	Serbian (Latin, Serbia)	

Sign-in account comparison

Below you can find detailed comparison on what each user will have access to. You can find more information on the versions in the Power Platform license guide.

	MICROSOFT ACCOUNT	WORK OR SCHOOL ACCOUNT	ORGANIZATION PREMIUM ACCOUNT
Storage	OneDrive Personal account	Dataverse of Default Environment	Dataverse across environments
Accessible recorder: Add different actions and record desktop apps and web apps in a single desktop flow.	Yes	Yes	Yes
Easy to use designer: Use the drag-and-drop visual designer to organize your flow logically, while utilizing desktop and web recorders to capture core logic of your automation within a single desktop flow.	Yes	Yes	Yes
Robust browser support: Use intelligent data extraction across all major web browsers (Edge, Firefox, Internet Explorer, Chrome)	Yes	Yes	Yes
Pre-built actions: Leverage a diverse set of 400+ pre-built actions that connect to many different systems.	Yes	Yes	Yes
Access to new actions: Automate more non-API systems with new support for SAP, legacy terminals such as mainframes and AS/400, Java apps, Citrix, etc.	Yes	Yes	Yes
Exception handling: take advantage of exception handling to enable automation of complex cases that require validation (via action and scripts) and proactively manage flow settings to ensure a flow is completed without the need for human interaction.	Yes	Yes	Yes
Connectivity with cloud flows (triggering/scheduling flows)	No	No	Yes

	MICROSOFT ACCOUNT	WORK OR SCHOOL ACCOUNT	ORGANIZATION PREMIUM ACCOUNT
Dataverse storage: Save new desktop flows built with Power Automate centrally in Dataverse, benefiting from Environment isolation and role-based access.	No	No	Yes
Sharing and Collaboration: Share flows between team members and select access level such as co-development or run-only.	No	No	Yes
Centralized management and reporting: New flows and any execution logs are automatically saved to Power Automate service to provide centralized management and reporting.	No	No	Yes
Additional capabilities such as AI Builder, integration with cloud flows, use of over 400+ premium and custom connectors, unattended RPA (with unattended addon) and much more.	No	No	Yes

Known issues and limitations

1. Only work or school account users with Dataverse database provisioned in their default environment can create Power Automate desktop flows. Power Automate desktop flows will be stored in the default environment with the Dataverse database.

   If the Dataverse database doesn't exist in the default environment, the user will not be able to create desktop flows and be prompted to create a database. There will be no connectivity of Power Automate desktop flows with cloud flows.

   - After creating the Dataverse in the Power platform admin center, intermittently user might get prompted to create the database again. In this scenario, restart Power Automate for desktop (exit from the system tray icon).
2. If users have signed in with trial or paid accounts and want to connect their free Microsoft accounts, they have to use Power Automate for desktop version 2.6.48.21069 or above. Otherwise, they'll encounter the following error.

3. Microsoft Account and Work account without a paid license are not supported in Sovereign clouds. GCC, GCCH, China sovereign clouds need paid license to sign-in to Power Automate and paid attended RPA license to use Power Automate for desktop.

4. Power Automate applies the proxy configuration specified in Windows proxy settings. If the proxy server requires authentication, the administrator has to exclude Power Automate from using it or use another server that doesn't require authentication. You can find more information regarding bypassing proxy servers in Configure Power Automate to bypass a corporate proxy server.

Learn more

- Learn to create Power Automate desktop flows.
- Learn how to run desktop flows.
- Learn to manage desktop flows.

Install Power Automate on your device

1/15/2022 • 7 minutes to read • Edit Online

The installer contains all the components you need to record, edit, and test your automations, as well as connect to the cloud.

Install Power Automate

Follow these steps to install the Power Automate for desktop:

1. Download the Power Automate installer.
2. Open the **Setup.Microsoft.PowerAutomateDesktop.exe** file.

   This file is likely in your **Downloads** folder after you downloaded it in the previous step.
3. Follow the instructions in the **Power Automate for desktop setup** installer to complete the installation.
4. Make your selections for each feature for the installation to complete.

The installer allows you to install two different apps on your device:

- Power Automate for desktop is the app to build your desktop flows. With it you can create, edit and run your automations. Learn more about the desktop flows designer.
- Power Automate machine runtime app allows you to connect your machine to the Power Automate cloud. It allows you to harness the full power of your robotic process automation (RPA). Learn more about machine management.

By default, both are installed on your device.

> **IMPORTANT**
>
> The installer installs the Webdriver component. You need it to run desktop flows created with Selenium IDE. It will also install the Power Automate app and third-party components.

> **IMPORTANT**
>
> In order to register your machine, you need to have an Organization premium account.

> **NOTE**
>
> Power Automate for desktop by default honors the proxy settings specified in Windows. To override this configuration, refer to Power Automate for desktop using a proxy server.

Set data collection options

During installation, you can change the default settings if you don't want to send usage data to Microsoft. To do so, uncheck **Allow Microsoft to collect usage data to improve Power Automate**.

> **IMPORTANT**
>
> Sharing usage data to Microsoft, will help the support department to solve a Power Automate issue.

Install the Power Automate browser extension

After the installation completes, you will need to install and enable the extension for Power Automate for desktop. This extension will allow you to record and run web actions in your desktop flows.

Select one of the links displayed in the installer. For example, if you want to record your browser automations on Microsoft Edge, select the **Microsoft Edge** link.

The store for your browser opens directly to the public page for the extension.

> **IMPORTANT**
>
> If you have already installed the Power Automate extension in the past, you don't need to reinstall it

Microsoft Edge:

- Install Edge extension: select **Get**, and then select **Add extension** when prompted.
- If you see the message: *This extension has been turned off in Microsoft Edge*, at the top of the page, select **Turn on extension**.

Google Chrome:

- Install Chrome extension: select **Add to Chrome**, and then select **Enable extension** when prompted.
- If you see the message: *This item has been disabled in Chrome* on top of the page, select **Enable this item**.

Mozilla Firefox:

- Install Firefox extension: select **Add to Firefox**, and then select **Add** when prompted.

> **TIP**
>
> If you are not able to activate the extension(s) in your browser, you must use Microsoft Edge (version 80 or later) or Google Chrome or Firefox. Other browsers are not supported.

Install Power Automate for desktop silently

Follow these steps if you want to silently install Power Automate.

> **NOTE**
>
> The same installer is used for both manual and silent installation of Power Automate for desktop.

Install Power Automate for desktop using the command line

1. Download Power Automate for desktop.

2. Open **Start**.

3. Search for **command prompt**, and then run it as the administrator.

4. Change the directory to **Downloads** (or to the directory into which you downloaded Power Automate):

   For example, enter:

```
cd C:\Users\Nvarga\Downloads\
```

5. Enter:

```
Setup.Microsoft.PowerAutomateDesktop.exe -Silent -Install -ACCEPTEULA
```

   The installer runs and completes the setup of Power Automate.

   > **IMPORTANT**
   > You must provide the `-ACCEPTEULA` argument to indicate that you accept the terms and conditions for Power Automate.

6. You can now launch Power Automate from the Start menu.

Command line argument details

You can also retrieve the details of all the command line arguments from the help menu in the command prompt:

```
Setup.Microsoft.PowerAutomateDesktop.exe -HELP
```

COMMAND	DESCRIPTION
-INSTALLPATH:Value	The full path of the installation folder that will be created. The default is `%PROGRAMFILES(X86)%\Power Automate`.

COMMAND	DESCRIPTION
-DISABLEPADSHORTCUT	By default, a shortcut of Power Automate app is created on the desktop. Use this argument to indicate that you don't want it to be created.
-DISABLETURNONRD	Use the argument if you don't want the installer to turn on Remote Desktop on the device. You must turn on Remote Desktop if you want support for unattended runs.
-ACCEPTEULA	Use this argument to indicate that you accept the terms of use for Power Automate.
-HELP	This argument displays all details about the arguments for the installer prompt.

Here's an example of a command line argument that installs Power Automate:

```
Setup.Microsoft.PowerAutomateDesktop.exe -SILENT -Install -ACCEPTEULA -INSTALLPATH: D:\My Programs\foo
```

Uninstall Power Automate for desktop using the command line

Use the following command to silently uninstall Power Automate:

```
Setup.Microsoft.PowerAutomateDesktop.exe -Silent -Uninstall
```

Update your version of Power Automate

To update Power Automate for desktop, use the same command line arguments that you use to install it.

> **NOTE**
> All your data and configuration, including telemetry, shortcuts, etc. are retained when you update Power Automate. If you want to enable parameters previously disabled, you will need to first uninstall Power Automate for desktop, and then reinstall it.

Install the gateway with PowerShell Cmdlets

> **NOTE**
> Power Automate for desktop now offers direct connectivity to the cloud without the use of on-premises data gateways. You can find more information in Manage machines.

You will need the on-premises data gateway to trigger your desktop flows from a cloud flow.

You can use PowerShell Cmdlets to install, configure, and manage your gateway.

> **IMPORTANT**
> To use PowerShell cmdlets, you will need to run them from PowerShell 7.0.0 or higher in an elevated access.

Setup desktop flows connections and machine credentials

1. Sign into Power Automate.
2. Expand **Data** on the left side of the screen.
3. Select **Connections**.

4. Select New connection.

5. Search for *Desktop flow*, and then select **Desktop flows**.
6. Provide the machine or gateway information and device credentials:
   - To connect to a machine or a machine group, select **Directly to machine** in the **Connect** field, and choose the respective machine or machine group in the **Machine or machine group** field.

- To connect to a gateway, select **Using an on-premises data gateway** in the **Connect** field, and choose the respective gateway in the **Choose a gateway** field.

- **Domain and Username**: Provide your device account. You can use a local account by using the name of the user (for example, "MACHINENAME\User" or "local\User"), or an Active Directory account such as "DOMAIN\User".

- **Password**: Your account's password.

7. Select **Create**.

Install Windows recorder (v1) extension (optional)

The Windows recorder (v1) is another option to record and playback your desktop automations. We recommend you to use Power Automate for desktop since this is the latest RPA solution.

Follow these steps to install Windows recorder (v1) extension:

1. Install the extension on Microsoft Edge and/or Google Chrome from the store (Firefox is not supported for Windows recorder (v1))

Microsoft Edge:

- Install Edge extension: select **Get**, and then select **Add extension** when prompted.

Google Chrome:

- Install Chrome extension: select **Add to Chrome**, and then select **Enable extension** when prompted.

Install Selenium IDE to automate Web applications with desktop flows (optional)

The Selenium IDE is an open source tool that lets you record and playback human interactions on websites.

With desktop flows, you can run Selenium IDE scripts from Power Automate and keep them stored securely (with appropriate IT governance) in Dataverse.

Follow these steps to install Selenium IDE:

1. Make sure you already installed and enabled Windows recorder (v1) extension (see previous section)

2. Download and install the Selenium IDE for Microsoft Edge (version 80 or later) or Google Chrome.

3. On Microsoft Edge (version 80 or later), select **Allow extensions from other stores**, and then select **Add to Chrome**.

Install the on-premises data gateway to run your desktop flows from the cloud

> **NOTE**
> Power Automate for desktop now offers direct connectivity to the cloud without the use of on-premises data gateways. You can find more information in Manage machines.

You will need the gateway to trigger your desktop from an event, schedule, or button flow. on a remote device.

> **TIP**
> The gateway isn't required if you only want to create, edit, and test your flows on your device.

Install the on-premises data gateway, if you need it.

> **IMPORTANT**
> You must install the on-premises gateway on each device from which you automate desktop flows.

> When you install the gateway, it defaults to the region that Power Automate uses.

Troubleshoot missing gateway

> **NOTE**
> Power Automate for desktop now offers direct connectivity to the cloud without the use of on-premises data gateways. You can find more information in Manage machines.

You might not find the gateway in the list while creating the connection for the following reasons:

- The gateway may be installed in a different region than your Power Automate region. To resolve this issue, uninstall the gateway from the device, and then reinstall it, selecting the correct Power Automate region.
- The gateway was deleted by its owner.

Uninstall Power Automate

1. Open the **start** menu > **Settings** > **Apps**.
2. Search for **Power Automate**, and then select it.
3. Select **Uninstall**.

Learn more

- Learn to create Power Automate desktop flows.
- Learn how to run desktop flows.
- Learn to manage desktop flows.

Governance in Power Automate

1/15/2022 • 2 minutes to read • Edit Online

Prevent users manually updating Power Automate for desktop

Using the following registry entry you can prevent users to manually update Power Automate for desktop on their machines and receive update notifications.

Hive	HKEY_LOCAL_MACHINE
Key	SOFTWARE\Microsoft\Power Automate Desktop
Name	DisableOptionalUpdates
Type	DWORD

Value

- **1**: Users will not be able to manually update Power Automate for Desktop.

Prevent users accessing Power Automate for desktop using their Microsoft accounts

Using the following registry entry you can prevent users to login on Power Automate for desktop on their machines using a Microsoft account.

Hive	HKEY_LOCAL_MACHINE
Key	SOFTWARE\Microsoft\Power Automate Desktop
Name	RestrictMSAAccountsSignIns
Type	DWORD

Value

- **1**: Users will not be able to sign-in using their Microsoft account

Prevent users accessing Power Automate for desktop using their work or school accounts

You can use the following registry entry to prevent users from logging into Power Automate for desktop with their work or school account without a per user plan with attended RPA license.

Hive	HKEY_LOCAL_MACHINE

Key	SOFTWARE\Microsoft\Power Automate Desktop
Name	RestrictNoLicenseOrgIDAccountsSignIns
Type	DWORD

Value

- **1**: Users will not be able to sign-in using their work or school account without a per user plan with attended RPA license

Prevent users accessing Power Automate for desktop using their work or school accounts or organization premium accounts

You can use the following registry entry to prevent users from logging into Power Automate for desktop with their work or school accounts or organization premium accounts.

Hive	HKEY_LOCAL_MACHINE
Key	SOFTWARE\Microsoft\Power Automate Desktop
Name	RestrictOrgIDAccountsSignIns
Type	DWORD

Value

- **1**: Users will not be able to sign-in using their work or school account or organization premium account

> **NOTE**
> - Setting any value other than 1, or not setting a value at all will allow users to access for desktop. When all registry keys are set to 1, users will not be able to login to Power Automate for desktop with any type of account.

Restricting access to Power Automate for desktop

In order to restrict access to Power Automate for desktop on a workstation with Windows 10, use Applocker.

Configure Power Automate for desktop to interact with a corporate proxy server

IT administrators, may set the following registry keys, to configure the Power Automate's interaction with a corporate proxy server.

Hive	HKEY_LOCAL_MACHINE
Key	SOFTWARE\Microsoft\Power Automate Desktop

Name	ProxyServer
Type	String

Value

- **ProxyAddress:Port (e.g.: myproxy.com:3128)**: The proxy server and port configured, will override the proxy server and port configured in Windows.

Configure Power Automate for desktop to bypass a corporate proxy server

Hive	HKEY_LOCAL_MACHINE
Key	SOFTWARE\Microsoft\Power Automate Desktop
Name	DisableWindowsProxy
Type	DWORD

Value

- **1**: Power Automate for desktop will not honor the Windows Proxy settings and the proxy server will be bypassed for Power Automate's traffic.

Configure Power Automate for desktop to authenticate to a corporate proxy server using the current user's credentials

Hive	HKEY_LOCAL_MACHINE
Key	SOFTWARE\Microsoft\Power Automate Desktop
Name	UseDefaultProxyCredentials
Type	DWORD

Value

- **1**: Power Automate for desktop will authenticate to the corporate proxy server using the current user's credentials.

Learn more

- Learn to create Power Automate desktop flows.
- Learn how to run desktop flows.
- Learn to manage desktop flows.

Troubleshooting Power Automate

1/15/2022 • 2 minutes to read • Edit Online

To open the troubleshoot tool:

1. Open **Power Automate machine runtime**
2. Select **Troubleshoot**
3. Select **Launch Troubleshoot tool**

> **NOTE**
>
> You need to have admin privileges to open the troubleshoot tool from Power Automate machine runtime.

Resolve sign in and sign out issues

Power Automate uses a file named **msalcache.bin3** to acquire tokens and authenticate users.

If you encounter errors while signing in or signing out, try to delete this file to erase all the stored tokens. To delete the file, navigate to **C:\Users\Username\AppData\Local\Microsoft\Power Automate**.

> **NOTE**
>
> If the **AppData** folder isn't visible in your user folder, try to display hidden files.

If you have installed Power Automate in another drive, replace **C** with the letter of the respective drive. Also, replace **Username** with the name of your user folder.

After deleting the **msalcache.bin3** file, restart the Power Automate service and sing in to your account.

Resolve failed connection between Power Automate components

In some cases, Power Automate may display an error indicating that the connection between its components couldn't be established.

The cause of this error can be another process running a named pipes server in the same machine. This process probably runs with elevated rights using the localhost endpoint. As a result, it blocks other applications from using the endpoint.

To identify whether another process is indeed the issue:

- Close Power Automate and use the Windows Task Manager to ensure that its process isn't still running.
- Download the Sysinternals Suite.
- Extract the zip file to a folder on your desktop.
- Run a command prompt session as administrator.
- Navigate to the folder in which you've extracted Sysinternals.
- Run the following command:

  ```
  handle net.pipe
  ```

  Running this command should display a list of processes that use named pipes and the address they listen to.

- Identify whether a process displaying the string **EbmV0LnBpcGU6Ly8rLw==** exists.
- If such a process exists, stop the process identified in the previous step and try again to launch Power Automate.

As a permanent fix, you can stop the process causing the issue from running. Alternatively, if it's an internal process, you can change it to use a more specific endpoint, such as **net.pipe://localhost/something**.

If none of the above is possible, specify Power Automate executables to run as administrator. However, this solution may not solve the issue in all cases, and it will cause a UAC prompt to appear each time.

Change the on-premises Service account

The UIFlowService uses the virtual account “NT SERVICE\UIFlowService”. This account needs the ability to “Logon as a service” in order to successfully startup.

Most environments wouldn't require to change the default configuration. If your company has some restrictions in place, you can either ask your domain administrator to grant “NT SERVICE\UIFlowService” the right to “Logon as a service” or change the account here with an allowed one.

1. Select **Change account**
2. Select **This account**

3. Provide the new account. Ex: DOMAIN\AlexJohnson
4. Provide the password of this account and select Configure

Collect Machine logs

There are several logs you can collect for the machine's configuration and service logs, and you should always start with the logs. In the Troubleshoot tool, select Exports logs link, as shown in the following image.

This file is saved to the desktop as a zip file.

Data Collection in Power Automate

1/15/2022 • 3 minutes to read • Edit Online

Overview of Diagnostic Data in Power Automate

Microsoft is dedicated to being transparent with our customers about the data we collect from our client software and giving them more control over their data. As part of this work, we're moving our major products to a model where diagnostic data we collect from our client software as customers use their devices will be classified as either *Required* or *Optional*. This will make it easier for our customers to find information about the data we collect and how we use it, and to make informed choices about their privacy.

Diagnostic data is used to keep Power Automate client software secure and up-to-date, detect, diagnose and fix problems, and also make product improvements. This data does not include a user's name or email address, the content of the user's files, or information about apps unrelated to the product.

While Microsoft classifies some diagnostic data as *Required* and some as *Optional*, Power Automate client software doesn't collect Optional diagnostic data from its users by default unless specified otherwise during the initial installation process or later within the Settings area. This article provides an overview of the types of diagnostic data that are Required and Optional, and the specific categories of diagnostic data that are collected by Power Automate client products.

Required data

As noted above, data in the *Required* category is necessary to keep our products up to date, secure, and working as expected. Required diagnostic data includes things like the type and version of a customer's device or software configuration so we can provide connectivity to our cloud services, security patches to help keep our customers' experiences safe, secure and functioning with a high degree of performance, detect significant feature failures, and then diagnose and fix those failures more quickly to reduce impact to customers.

Required diagnostic data is the minimum data necessary to help keep Power Automate client software performing as expected on the device it's installed on. Examples include summary details about the health and security of the running service like versioning information about your infrastructure, configuration details, success or errors you've received, and aggregated information about failures and security concerns, flow runs, service interactions, and more.

Required diagnostic data is managed with your organization's and your employees' security and privacy in mind. You can learn more about our commitments to protect data in the Microsoft Trust Center / Privacy.

Required diagnostic data in Power Automate client software is organized into various data categories:

Required diagnostic data summary

DATA CATEGORY	DESCRIPTION	EXAMPLES
Device connectivity and configuration	This type of **Required diagnostic data** includes details about the device, its configuration, and connectivity capabilities	• Details on the user's device, screen resolution, screen orientation, and other configuration details

DATA CATEGORY	DESCRIPTION	EXAMPLES
Product and service performance	This type of **Required diagnostic data** includes details about device or service health and performance	• Information about memory, processor, disk usage • Information about form load times • Information about process completion times
Product and service usage	This type of **Required diagnostic data** includes details about the usage of the device, operating system, applications, and services	• Details on navigation patterns • Details on form usage • Details on frequency use of activities and actions
Software setup and inventory	This type of **Required diagnostic data** includes software installation and update information on the device	• An event used to ensure new users can successfully launch and run Power Automate client applications for the first time • An event that ensures critical regression detection for installed client applications

Optional data

Data in the Optional category isn't essential to the product or service experience, however opting into this feature allows us to identify additional usage trends which further enhances our ability to make product improvements. Power Automate client products don't collect Optional data unless the user consents during the product installation process, or has enabled the feature through the application settings thereafter. If you choose to send Optional diagnostic data, it is collected in addition to Required diagnostic data.

DATA CATEGORY	DESCRIPTION	EXAMPLES
Enhanced anonymized product usage	This type of **Optional diagnostic data** includes details about the usage of advanced flow objects, such as selectors	• Process names that the user is trying to automate such as EXCEL.exe

Power Automate for desktop architecture

1/15/2022 • 5 minutes to read • Edit Online

There are two different methods that Power Automate can use to connect to the cloud services in order to receive flow execution jobs. The first option is direct connectivity, while the second option requires the on-premises data gateway to be installed.

The data flow between the desktop and the cloud is the same in both options, only the application and user account that initiates the web requests are different.

Attended/Unattended desktop direct connectivity to the cloud service

The **UIFlowService** is a Windows service that is installed with Power Automate on the desktop machine. By default, it's set to start automatically and runs as the new user **NT SERVICE\UIFlowService**. This user is created during installation.

Azure Relay is a service that facilitates communication channels that are established entirely by making outgoing requests to the service. It achieves this functionality either by establishing a WebSocket connection or using HTTP long-polling, if necessary.

> **NOTE**
>
> The Azure Relay and Power Automate cloud services are both cloud resources in Azure. You can find more information about Azure Relays in What is Azure Relay.

The outgoing web requests from the **UIFlowService** on the desktop machine to the Azure Relay in the cloud use HTTPS to make requests to FQDN ***.servicebus.windows.net** over port 443.

Destination IP addresses for the Azure Relay can be found here for the Public Cloud under the name **ServiceBus**. Similar documents are available for the other Azure national clouds. No inbound ports are required to be open on the desktop machine.

Attended/Unattended desktop connectivity to the cloud service using the on-premises data gateway

> **NOTE**
>
> Power Automate now offers direct connectivity to the cloud without the use of on-premises data gateways. You can find more information in Attended/Unattended desktop direct connectivity to the cloud service.

The **UIFlowService** is a Windows service that is installed with Power Automate on the desktop machine. The

on-premises data gateway Windows service is a separately installed component that acts as a communications gateway between the **UIFlowService** and the Azure Relay.

By default, the data gateway service is set to start automatically and runs as the new user **NT SERVICE\PBIEgwService**. This user is created during installation.

Azure Relay is a service that facilitates communication channels that are established entirely by making outgoing requests to the service. It achieves this functionality either by establishing a WebSocket connection or using HTTP long-polling, if necessary.

> **NOTE**
> The Azure Relay and Power Automate cloud services are both cloud resources in Azure. You can find more information about Azure Relays in What is Azure Relay.

The details about this data flow are documented in Adjust communication settings. The firewall requirements for execution are exactly the same as the direct connectivity option, but a different service and user account will be making the outgoing requests.

Other Power Automate outgoing web requests

Power Automate makes some additional outgoing web requests at runtime, which are documented in Desktop flows services required for runtime.

The CRL endpoints are only required if you use the on-premises data gateway. They use HTTP over port 80 and are initiated by the **UIFlowService**.

The WebDriver endpoints are only required if you use Selenium IDE desktop flows and have an automatically updating browser. These endpoints use HTTPS over port 443 and are initiated by the **Microsoft.Flow.RPA.Agent.exe** process using the user account that is running the desktop flow.

Session credential lifecycle

1. A desktop machine is registered by signing in to the on-premises data gateway or registering inside Power Automate using the direct connectivity feature. This process generates a public and private key to be used for secure communication with this machine.

2. The machine registration request is sent by the desktop application to the Power Automate cloud services. The request contains the newly generated machine's public key. This key is stored along with the machine registration in the cloud.

3. When the request completes, the machine is successfully registered and appears in the Power Automate web portal as a resource that can be managed. However, the machine cannot be used by a flow until a connection to it is established.

4. To establish a Power Automate connection in the web portal, users must select an available machine and provide the username and password credentials of the account to use to run the desktop flow.

   Users can select any previously registered machine, including machines that have been shared with them.

When a connection is saved, the credentials are encrypted using the public key associated with the machine and stored in this encrypted form.

The cloud service is storing the encrypted user credentials for the machine. However, it can't decrypt the credentials because the private key only exists on the desktop machine. The user can delete this connection at any point, and the stored encrypted credentials will also be deleted.

5. When a desktop flow is run from the cloud, it uses a previously established connection selected in the **Run a flow built with Power Automate for desktop** action.

6. When the desktop flow job is sent from the cloud to the desktop, it includes the encrypted credentials stored in the connection. These credentials are then decrypted on the desktop using the secret private key, and they're used to sign in as the given user account.

Session credential lifecycle

Although the logical data flow is from the cloud to the desktop, the connection is established from the desktop to the cloud. It uses an Azure Relay to connect to the cloud using an outgoing web request.

If a gateway cluster is created using the on-premises data gateway, the private key used to decrypt credentials is generated on all machines in the cluster. The private key is generated using the recovery key that is requested during machine registration. The recovery key is never sent to the cloud.

If a machine group is created using direct connectivity, the group's private key is encrypted using a user-defined group password. Then, it's sent to the cloud for storage as part of the register machine request.

The encrypted private key is shared with other machines that join the group. However, as the user must first provide the password to decrypt this private key, the service can't read any stored credentials in the connection.

Create a Microsoft Dataverse database

1/15/2022 • 2 minutes to read • Edit Online

A Microsoft Dataverse database stores flows created in Power Automate.

> **NOTE**
> For the preview release, you may need to create a Dataverse database before using Power Automate for desktop with your work or school account. This must be done only once in a tenant.

If you are an administrator or if you would like to provide information to the administrator to create a Dataverse database, see Add a Microsoft Dataverse database.

Create a Microsoft Dataverse database in Power Automate for desktop

Administrators can create a Microsoft Dataverse database in Power Automate.

If you're using a free work or school account, the provisioning will start automatically after logging in with your account. If the connected account is a premium account, select **Create database** to create a Microsoft Dataverse database.

Add a Microsoft Dataverse database as a Microsoft Teams user

You can use the approvals experience in Teams to automatically add a Dataverse database that Power Automate can use to store flows. This only needs to be done once per tenant and non-admins can perform this task.

Follow these steps to create an approval from the Approvals app in Teams.

1. Sign into Microsoft Teams.

2. Select **More added apps (...)**.

3. Search for **approvals**, and then select the **Approvals** app.

4. Select **New approval request** on the top right of the app.

5. Provide a name for your request. For example, *My first request*.

6. Specify yourself in the **Approvers** list.

7. Select **Send**.

   This starts the process for adding a Dataverse database and may take a few minutes to complete. Once created, you will receive a notification in Teams with a request for approval.

8. Approve this request.

   Your Dataverse database is now added to the default environment.

9. Restart Power Automate for desktop (exit from the system tray icon).

You can now create desktop flows with Power Automate.

Next Steps

- Learn how to set up Power Automate for desktop.
- Begin your journey in Power Automate by creating a Power Automate desktop flow.
- Get familiar with the console and the flow designer, which are part of Power Automate.
- You'll find the list of actions available in the Actions reference.

Getting started with a Microsoft account

1/15/2022 • 2 minutes to read • Edit Online

Power Automate enables regular and power users alike to create flows, which save time and eliminate human error.

Focus on other activities by automating routine and repetitive tasks like organizing or backing up your files and folders. Create flows to extract product prices from a website and save them in an Excel spreadsheet then email it as an attachment. Fill in web forms by supplying information dynamically from your files.

Create automated workflows with step-by-step guidance and an intuitive, no-code interface anyone can use, regardless of their technical expertise. Build flows from a wide variety of pre-made actions, or record your interactions as steps to be played back anytime.

Using Power Automate with a Microsoft account is available at no additional cost.

> **NOTE**
>
> Flows built with Power Automate using a Microsoft account are stored automatically on the users' OneDrive.

Build your first flow

The following example demonstrates the creation of a short flow. The completed flow will prompt the user to select a folder. The flow will then copy the folder to another folder named **backup** on the user's desktop.

To create the flow:

1. Launch Power Automate and select the New flow button in the console.

2. Enter a name for the flow and then select **Create**. In this example, the flow is named **Copy Folder to Desktop**.

3. When the Flow Designer opens, go to the Actions pane, open the **Folders** group, and drag and drop the **Get special folder** action to the workspace to add it to the flow.

4. In the resulting action properties dialog, the desktop folder is selected by default. Select OK to add the action to the flow.

5. Similarly to step 3, go to the **Message boxes** group, and add the **Display select folder dialog** action to the flow. Set **Dialog description** to **Select a folder to back up:**.

6. In the **Folders** group, add **Create folder** to the flow. Set the **Create new folder into** field to **%SpecialFolderPath%** and **New folder name** to **backup**.

7. In the same group, select the **Copy folder** action. Set **Folder to copy** to **%SelectedFolder%**, **Destination folder** to **%SpecialFolderPath%\backup** and add the action to the flow.

8. Select run to run the flow.

9. Close flow designer and save the flow. Now you can run the flow from the console.

When prompted for a folder, select any folder you wish to copy. The flow will create a new folder on your desktop called **backup** with the selected folder inside.

Following this example, it is possible to imagine a wide range of scenarios where these actions could be combined with other actions. Among the many possibilities, users could:

- Select an additional folder on a flash drive to back up to
- Back up files based on specific criteria
- Create a file structure for the backup
- Iterate through a list of folders and only back up selected folders

Next Steps

- Learn how to set up Power Automate.
- Begin your journey in Power Automate by creating a Power Automate desktop flow.
- Get familiar with the console and the flow designer, which are part of Power Automate for desktop.
- You'll find the list of actions available in the Actions reference.

Getting started with a work or school account

1/15/2022 • 3 minutes to read • Edit Online

Power Automate enables users to automate repetitive desktop tasks through a collection of prebuilt drag-and-drop actions.

Using the available actions and built-in recorder, you can automate any business procedure, such as filling forms, retrieving data from web or desktop applications, and sending standardized emails.

Combining these features allows the creation of powerful flows that disengage humans from repetitive, unproductive procedures. Tasks like copying data across different systems are common in business environments, and Power Automate can entirely handle them.

Apart from third-party applications, Power Automate allows the automation of integrated Windows applications and features. Creating backups of critical files and running diagnostics or custom scripts can be performed effectively through desktop flows.

Using Power Automate with a work or school account is available at no additional cost. To use Power Automate for desktop, your default environment must contain a Dataverse database. To unlock additional RPA features, such as running flows automatically, premium cloud connectors and flow sharing and monitoring, start a trial or upgrade to an Organization premium account.

To start a trial, select **Go Premium** on the Power Automate for desktop console.

Flow example

To become familiar with the available features of Power Automate, follow the steps below to create a flow.

The presented flow copies all the files located in the Documents folder and creates a backup to a secondary drive. The original location of each file is appended to an existing log file.

> **NOTE**
> To implement this example, a secondary drive has to be connected to your computer. If a secondary drive isn't available, select a different destination folder for the files.

To create the flow:

1. Launch Power Automate for desktop and select the **New flow** button in the **Console**.

2. Populate a name for the flow and then select the **Create** button. In this example, the flow is named **Backup flow**.

3. When the **Flow designer** is launched, add a **Get special folder** action in the workspace and retrieve the Documents folder's path.

4. Add a **Get files in folder** action to retrieve all the files located in the previously retrieved Documents folder. Optionally, set the action to retrieve the files located in subfolders of the selected folder.

5. Deploy a **For each** action to access and handle each file of the retrieved list independently.

6. Inside the **For each** loop, add a **Get file path part** action to retrieve the path of the currently selected file.

7. Add a **Copy file** action to copy the currently selected file to the desired location. In this example, the destination folder is called **Backup** and it's located in the **D** drive.

> **NOTE**
>
> If a secondary drive isn't available, select a different destination folder for the copied file.

8. Use a **Write text to file** action to append a new registry in the log file. In this example, the file is called **Logs.txt**, and each registry contains the original path of the copied file.

9. To test if the flow runs as expected, select the **Run** button on the upper part of the **Flow designer**.

10. To check how every single action is implemented, run the flow step-by-step using the **Run next action** button.

11. If the flow runs as expected, select **Save** and close the **Flow designer** window.

12. Now, you can run your flow directly through the **Run** button in the **Console**. To stop the flow before its completion, select the **Stop** button.

Next Steps

- Learn how to set up Power Automate for desktop.
- Begin your journey in Power Automate by creating a Power Automate desktop flow.
- Get familiar with the console and the flow designer, which are part of Power Automate.
- You'll find the list of actions available in the Actions reference.

Getting started with an Organization premium account

1/15/2022 • 2 minutes to read • Edit Online

Power Automate enables regular and power users alike to create flows that automate routine repetitive tasks. Build flows from pre-made actions, or record windows and web browser activity in real time.

Unlock the full spectrum of RPA features such as premium cloud connectors, the ability to run your flows automatically, detailed monitoring and many more.

Power Automate gives you the option to share your flows among your colleagues so that you can improve automations and build on top of them.

Access your flows from anywhere, harnessing the power of the cloud to establish a robust and flexible RPA system. Take full advantage of multiple environments to organize and manage users' flows.

If you currently use Power Automate with a work or school account or your license does not include attended RPA, you can still use Power Automate for your desktop automation needs. Start a trial to preview all the features by selecting **Go Premium** on the Power Automate for desktop console.

Creating a flow

1. Begin by visiting https://flow.microsoft.com/ and entering your credentials; then, navigate to **My flows**, and create a new **Desktop flow**:

2. After you assign a name to the flow, you will be prompted to launch Power Automate for desktop; select **Open** to do so.

3. In the flow designer, start building the flow by double-clicking on actions, or dragging them from the actions pane on the left, to the central workspace pane.

4. Expand the **Datetime** category, and select the **Get current date and time** action. Configure it to only retrieve the date:

5. Next, expand the **Text** category, and configure the **Convert datetime to text** actions as follows:

This will ensure that the current date is displayed in a filename-friendly format.

6. Use the **Get special folder** action to retrieve the path of the **Documents** folder:

7. Add the **If file exists** action from the **Conditionals** category, and configure it to check whether the file "report.xlsx" is present in the Documents folder:

8. Finally, add the current date to the file's name by using the **Rename file(s)** action from the **File** category:

9. The resulting flow should look like this:

Following this example, it is possible to imagine a wide range of scenarios where Power Automate can be used to automate tasks. The abundance of actions, combined with cloud management capabilities, affords endless possibilities to individual users and organizations.

Next Steps

- Learn how to set up Power Automate.
- Begin your journey in Power Automate by creating a Power Automate desktop flow.
- Get familiar with the console and the flow designer, which are part of Power Automate.
- You'll find the list of actions in the Actions reference.

- Learn how to apply unattended RPA licenses to your flows.

Create a Power Automate desktop flow

1/15/2022 • 4 minutes to read • Edit Online

Desktop flows are used to automate tasks on the Web or the desktop. Using Power Automate you can automate tasks on the desktop as well as the Web. Alternatively, you can use the two legacy methods of creating desktop flows: Windows recorder (V1) and Selenium ID.

Prerequisites

- To trigger desktop flows through Power Automate, you have to use machines or machine groups. Machines are physical or virtual devices that are used to automate desktop processes. Machine groups allow you to organize multiple machines together to help distribute your automation workload.

  As an alternative to the machines, you can use the on-premises data gateway. The gateway is an enterprise-grade secure connection between Power Automate and your device.

- To create a desktop flow in Power Automate, you need a Microsoft work, school or organization premium account. To create and trigger a desktop flow through Power Automate, you need an organization premium or trial premium account.

  > **IMPORTANT**
  >
  > You must use the same work or school account to set up the gateway, to sign into Power Automate, and to log into your Windows device.

Create a new desktop flow in Power Automate

1. To create a desktop flow in Power Automate, open the app and select **New Flow**.

2. Enter a name for the desktop flow, and click **OK**.

3. Create the flow in the **flow designer** and press **Ctrl+S** to save the flow. Close the flow designer and the flow will appear in the console.

Design a flow in Power Automate

1. Create a new folder on the desktop, and name it **Countries**.

2. Go to **flow.microsoft.com**, select **My flows**, then **+New flow**, and **Instant cloud flow**.

3. In the dialog box, enter a cloud flow name, select **Manually trigger a flow**, and then select **Create**.

4. Select **+ New step**.

5. Search for **power automate**, and select the **Run a flow built with Power Automate for desktop** action.

6. In the action, under Run mode select **Attended - Runs when you're signed in** and under Desktop flow select **Create a new desktop flow**.

7. Enter a desktop flow name or one will be generated and select **Launch app**.

8. A message from the browser may appear, asking whether to allow flow.microsoft.com to open an application. Allow this action to continue to Power Automate for desktop.

9. In Power Automate for desktop, open the Variables pane, select + and select **Input** to add a new input variable.

10. Configure the variable as follows:

- Variable type: **Input**
- Variable name: **CountryName**
- Data type: **Text**
- Default value: **France**
- External name: **CountryName**
- Description: **This is the country name input variable.**

11. Add the **Get current date and time** action and set **Retrieve** to **Current date only**. Select **Save** to add the action to the workspace. This action retrieves only the current date, and stores it in a variable.

12. Add the **Convert datetime to text** action. In **Datetime to convert**, select the **variables** icon and double-click on **%CurrentDateTime%** in the pop-out to add the variable to the field.

For Format to use set **Custom**, and enter **MM-dd-yyyy** in **Custom Format**. This action converts the

datetime variable to a text variable, while also converting the date to the specified format.

13. Add the **Get special folder** action. The **Special folder name** will default to **Desktop**. This action stores the location of the current user's Desktop in a variable.

14. Add the **Create Folder** action and set **Create new folder into** to **%SpecialFolderPath%\Countries** and **New folder name** to **%CountryName%**. This action creates a new folder with the specified name, in the specified location.

15. Add the **Write text to file** action and use the variables pop-out to set **File path** to **%SpecialFolderPath%\Countries\%CountryName%\%FormattedDateTime%.txt**.

> **NOTE**
> To use both hardcoded text and variables in the field, populate the hardcoded text manually, and use the variables pop-out to insert each variable in the currently selected part of the text.

16. Set **Text to write** to **This text was written by Power Automate**. This action writes the specified text to a text file on the current user's desktop, and sets the filename to the current date.

    This action writes the specified text into a text file.

17. Add the **Get files in folder** action and set **Folder** to **%SpecialFolderPath%\Countries\%CountryName%**. This action retrieves a list of the files in a specified folder.

18. In the **Variables** pane, create two Output variables as follows:

- Variable type: **Output**
- Variable name: **FileCount**

- External name: **FileCount**
- Description: **This is the file count output variable.**

and

- Variable type: **Output**
- Variable name: **FilePath**
- External name: **FilePath**
- Description: **This is the file path output variable.**

19. Add two **Set variable** actions and configure them as follows:

- Set variable: **FilePath**
- To: **%SpecialFolderPath%\Countries\%CountryName%\%FormattedDateTime%.txt**

and

- Set variable: **FileCount**
- To: **%Files.count%**

20. Select **Save** to save the flow and close the flow designer.

21. Back in Power Automate, in the dialog box select **Keep Working**.

22. Select the new desktop flow in the action, and enter **Greece** into **CountryName**.

23. Select **Save** to save the flow and then select **Test**.

24. Select **I'll perform the trigger action.** and **Test**.

25. When Power Automate connects to the desktop app, select **Continue**, then **Run Flow** and then **Done**.

26. When the flow finishes running, all actions will have a green checkmark icon and a notification will confirm that the flow ran successfully.

27. Select the **Run a flow built with Power Automate for desktop** action to open its inputs and outputs. The values of the two variables, **FileCount** and **FilePath**, were returned from Power Automate. Similarly, any output variables may be used elsewhere in the flow.

28. Check the **Countries** folder on the desktop. A folder with the name **Greece** has been added, and contains a text file with today's date.

Run attended and unattended desktop flows

1/15/2022 • 8 minutes to read • Edit Online

After you've created and tested a desktop flow, you can run it from an event, schedule, or button. To make this possible, add your desktop flow to an automated flow, a instant flow, a scheduled flow, or a business process flow.

Prerequisites

- To trigger desktop flows through Power Automate, you have to use machines or machine groups. Machines are physical or virtual devices that are used to automate desktop processes. Machine groups allow you to organize multiple machines together to help distribute your automation workload.

  As an alternative to the machines, you can use the on-premises data gateway. The gateway is an enterprise-grade secure connection between Power Automate and your device.

- If you use the on-premises data gateway to trigger desktop flows, you also need to setup a desktop flow connection.

- A work or school account.

> **IMPORTANT**
>
> You must use the same work or school account to set up the gateway, to sign into Power Automate, and to log into your Windows device.

Run desktop flows unattended or attended

When you create desktop flows, you run them either in **attended** or **unattended** mode. Unattended is best for applications that do not need human supervision.

When running unattended, Power Automate automatically signs into the target devices that run Windows 10, Windows Server 2016, or Windows Server 2019. Once the automation completes, Power Automate signs out from the device and reports its activity.

When running attended, Power Automate uses an existing Windows user session.

When you add a desktop flow to a cloud flow, you can choose whether you want your desktop flow to run attended or unattended. Here are some key differences between attended and unattended runs:

Unattended mode

To run unattended desktop flows, the target machine needs to be available with all users signed out.

> **IMPORTANT**
>
> - Locked Windows user sessions will prevent desktop flows from running.
> - Flows run in unattended mode can't be launched with elevated privileges

Power Automate performs the following:

1. Power Automate creates, manages, and then releases the Windows user session on the target devices.

2. Unattended desktop flows run on devices with the screen locked so that no one can see the flow while it runs.

3. Windows 10 devices cannot run unattended if there are any active Windows user sessions present (even a locked one). You will receive this error: *Cannot execute desktop flow. There is a locked or an inactive Windows user session on the target device*.

4. On Windows Server, if you have a locked Windows user session open with the same user as the desktop flow is supposed to run as, you will receive the same error: *Cannot execute desktop flow. There is a locked or inactive Windows user session on the target device*.

Attended mode

To run an attended desktop flow, you need to have an active Windows user session that matches the name of the user configured for your connection. The session must not be locked.

When an attended desktop flow starts on the target machine, we recommend that you avoid interacting with your device until the run completes.

Run multiple desktop flows on the same device sequentially

You can schedule multiple desktop flows to run on one or more devices. If more than one desktop flow is triggered to run on the same device, Power Automate follows these rules:

1. The first desktop flow runs on the target device based on priority and time requested.

2. Queues other desktop flows and then displays them as **Queued**.

3. Picks the next desktop flow when each run completes based on priority and time requested, shown as **Next to run**.

You can view the real-time execution order of a device by its run queue. You can also manually change the order of the desktop flows in the run queue at run-time, either by changing the priority or moving them to the top of the queue.

> **NOTE**
> These orchestration rules apply to desktop flows runs that are scheduled by any user on the same device.

> **IMPORTANT**
> A timeout will occur if desktop flows don't run within three hours after being requested.

Run desktop flows concurrently on Windows Server devices

Multiple users can be signed in simultaneously on Windows Server 2016 and Windows Server 2019. Power Automate leverages this OS capability to simultaneously run multiple desktop flows on such devices. With this feature, your organization can save on its infrastructure costs.

Perform the following steps to benefit from multiple desktop flows on a single device:

1. Setup a Windows Server 2016 or 2019 device with the on-premises gateway and the latest version of desktop flows installed.
2. Use two or more user accounts to create desktop flows connections targeting the gateway on this device.

Power Automate automatically scales the number of concurrent desktop flows runs to the maximum supported by the device. If the capacity of the device is exceeded, the additional runs *wait* as described here.

> **IMPORTANT**
>
> If you want to use more than two parallel user sessions on Windows Server, you must turn on Remote Desktop Services. Learn more about RDS.

> **NOTE**
>
> Running multiple concurrent desktop flows by the **same user** is not supported. You will need to have different users running desktop flows at the same time to benefit from this feature.

Load balance requests across gateways in a cluster

You can choose to distribute desktop flows runs evenly across gateways in a cluster. By default, the selection of a gateway during load balancing is random.

Follow these steps to add a gateway to create a cluster

> **NOTE**
>
> Offline gateway members within a cluster will negatively impact performance. Disable or remove these members.

To provide load balancing from the Power Automate gateway details page, navigate to **Data** -> **Gateways**, and then select your gateway cluster.

In the gateway details page, toggle Run on all gateways in cluster. This will distribute the desktop flows runs on all the gateways within that cluster.

> **NOTE**
>
> In rare cases, it can take up to 10 minutes for this setting to be effective and for load balancing runs to begin accross cluster members.

> **IMPORTANT**
> If you are using local Windows accounts, all machines in the cluster must have the same local account with the same password. Use these credentials when you create the desktop flows connection. If you are using Active Directory or Azure AD joined machines, confirm that the user account you will be using in the desktop flows connection can access all machines in the cluster.

Best practices to avoid timeouts and distribute load across machines

If you plan to run multiple desktop flows, there are a set of strategies you can adopt to distribute load and ensure that all your desktop flows run successfully without overloading the target machine(s) or running into timeouts because multiple desktop flows are running at the same time. You can either:

1. Plan your desktop flows to run at different times of the day, spreading your load over time. This works best if you have a single or a limited set of machines that can run workloads, and you can control the triggers (for example, scheduled flows) that start your desktop flows.
2. Create clusters of machines that can run desktop flows with identical configurations in parallel.
3. Create multiple flows that each use a separate connection to target different machines.

By following these strategies, you can avoid having desktop flows competing to run on the same device and in some cases failing due to timeouts.

> **NOTE**
> If you are running desktop flows in unattended mode, you will need to anticipate the number of desktop flows your organization plans to run in parallel, and then purchase an adequate amount of Unattended Add-ons.

> **NOTE**
> If a target device or gateway becomes offline due to either a restart or connectivity issues, desktop flows will wait for up to three hours before it fails. This wait time allows for transient machine states and allows you to successfully run automation even even if the devices go through restart or update cycles.

Rerun failed desktop flows

If a desktop flow run fails, correct the issue, and then try the following steps to rerun it:

1. Go to the details page and identify the failed run.

2. Select the **Resubmit** button from the action menu.

Support long running desktop flows

Some of your desktop flows might run for long durations (e.g. more than 24 hours). To ensure that those flows run successfully and don't fail due to the default timeout values:

1. Select the ellipsis (...) on the top right corner of the desktop flows action. And select Settings.

2. Select the **Timeout** property and update the duration to correctly handle your dekstop flow run.

3. Select **Done**.

Troubleshoot failures

1. If your unattended desktop flow fails with the **cannot create new session** message, follow these steps to resolve the issue:

   - On Windows 10, confirm that you don't have an active user session locked or unlocked on your target device.
   - On Windows Server 2016 or Windows Server 2019, confirm you haven't reached the maximum number of active user sessions that's configured for your device. Desktop flows won't be able to run if it cannot create new sessions.

2. If the **gateway status** is **offline**, confirm that the device is turned on and connected to the Internet. You may also troubleshoot the gateway.

3. If the **gateway status** is **online**, try the following actions:

   - Confirm the desktop flows app and services are running on your device.

   - Restart the service on your device.

Learn more

- Install the on-premises data gateway.
- Use the on-premises data gateway app documentation.
- Troubleshoot the on-premises data gateway.

Runtime notifications

A notification popup appears by default when a desktop flow is downloading or running, when it is cancelled, when it finishes running successfully, or when it encounters an error.

> **NOTE**
>
> Runtime notifications are displayed when a flow is run directly from the console. When a flow is run from the portal, Power Automate doesn't display notifications.

Trigger a Power Automate desktop flow from another flow

1/15/2022 • 2 minutes to read • Edit Online

Prerequisites

- To trigger desktop flows through Power Automate, you have to use machines or machine groups. Machines are physical or virtual devices that are used to automate desktop processes. Machine groups allow you to organize multiple machines together to help distribute your automation workload.

  As an alternative to the machines, you can use the on-premises data gateway. The gateway is an enterprise-grade secure connection between Power Automate and your device.

- A work or school account.

  > **IMPORTANT**
  > You must use the same work or school account to set up the gateway, to sign into Power Automate, and to log into your Windows device.

1. Go to **flow.microsoft.com** and sign in with your credentials. In Power Automate, select **My flows**. Select **+ New flow**, and from the drop-down select **Instant cloud flow**.

   Alternatively, you can select **Automated cloud flow** to create a flow that is triggered by a specific event, like the creation of a new file in an OneDrive for Business account.

2. Enter a name for the cloud flow, otherwise one will be automatically generated. Select **Manually trigger a flow** and then select **Create**.

3. Select **+ New Step**.

4. In the **Choose an action** prompt search field, enter **power automate desktop**. Under **Actions**, select **Run a flow built with Power Automate desktop**.

5. In the action parameters, set Run mode to **Attended - Runs when you're signed in**, and in the desktop flow drop-down select **Create a new desktop flow**.

6. Enter a name for the desktop flow and select **Launch app**.

7. A message from the browser may appear, asking whether to allow flow.microsoft.com to open an

application. Allow this action to continue to Power Automate for desktop.

8. The Power Automate Console creates a desktop flow with the selected name and opens the flow designer to edit the new flow.

9. Optionally, create Input/output variables to pass data back and forth from the Power Automate web portal to Power Automate for desktop. In the Variables pane, select + to add an input or output variable.

10. To create an input or output variable, the Edit variable dialog box will require filling in the fields as follows:

    - Variable type—input or output
    - Variable name—the name of the variable in flow designer
    - Default value—the value which the variable holds if none is assigned
    - Data type—the type of the variable (integer, string, datetime, and so on.)
    - External name—the name used outside flow designer. This name appears in Power Automate.
    - Description—a description of the variable. This mandatory field appears in Power Automate
    - Mark as sensitive-enable this option to set the variable as sensitive and hide its content in the flow designer and the Power Automate logs.

11. Create an Input variable to pass data from Power Automate web portal to Power Automate for desktop. The variable can be used anywhere in the desktop flow.

12. To pass data from Power Automate for desktop to Power Automate web portal, create an Output variable.

13. Back in Power Automate, any input variables appear as fields in the UI action.

14. Output variables from Power Automate for desktop can be used in other Power Automate actions.

Manage machines

1/15/2022 • 6 minutes to read • Edit Online

Machines are the physical or virtual devices that are used to automate your desktop processes. When you connect your machine to Power Automate, you can instantly start your desktop automation using any of the wide array of available triggers, such as when you receive an e-mail or on a pre-defined scheduled.

Connecting your machine directly to Power Automate and the cloud allows you to harness the full power of your robotic process automation (RPA). The easiest way to connect your machine to the cloud is with our direct connectivity. All you need to do is ensure that you are signed into the latest version of Power Automate for desktop, and your machine will be registered with Power Automate automatically. Once registered, you can create a connection right away in your cloud flows.

> **IMPORTANT**
> Direct connectivity is only available for versions of Power Automate 2.8.73.21119 or newer. If you are using an older version, update to the latest.

> **IMPORTANT**
> In order to register your machine and use the machine management features, your Power Platform environment must have a version of the MicrosoftFlowExtensionsCore solution that is greater than or equal to 1.2.4.1.

Register a new machine

Your machine will be automatically registered on the currently selected environment in the application. If you do not have permission to register your machine in that environment or want to use another environment, you will need to update the environment.

1. Install the latest version of Power Automate on your device. If you already have the latest version, skip to step 3.
2. Make sure you have checked **Install the machine-runtime app to connect to the Power Automate cloud portal**

3. When the installation completes, launch the **Power Automate machine-runtime app**

4. Sign into Power Automate machine runtime. Your machine should be automatically registered in the currently selected environment

5. If the machine hasn't been registered yet, a message will prompt you to select a Machine running environment. Power Automate will use this environment to run all the triggered desktop flows.

When the connection is established successfully, the machine settings section will display the following fields regarding the machine:

- **Machine name:** A unique name to identify the machine.
- **Machine description:** An optional description of the machine.
- **Machine running environment:** The running environment of the machine.

NOTE

- Users will need either an Environment Maker or Desktop Flow Machine Owner role to register machines. Before registering a machine, make sure that you have the required permissions, and there is an available environment to register the new machine.
- In case of a virtual machine, make sure not to clone the virtual machine after installing the Power Automate machine runtime.
- Machines are not affected by a change in the Power Automate for desktop organization.

IMPORTANT

To successfully register a machine, make sure that the services specified in IP address configuration are accessible.

Update running environment for your machine

Your machine can only run desktop flows from the cloud in one environment at a time.

You can update the running environment which your machine can run desktop flows at any time from within Power Automate.

1. In the machine-runtime app, select**Machine settings**.
2. Under**Machine running environment**, select an environment in the dropdown list.
3. Click**Save**.

NOTE

Keep in mind that changing the running environment of a machine removes all its current connections.

Trigger a desktop flow to run on your machine

1. Edit your cloud flow or create a new cloud flow.
2. Select **+ New step**.
3. Select the **Run a flow built with Power Automate for desktop** action.
4. If you've already created a connection with desktop flows, click the three dots in the top right and under

My connections select **+Add new connection**.

5. Next to Connect, select **Direct to machine**.
6. Select the name of your machine.
7. Enter the username and password you would use to sign into your machine.
8. Click **Create**.

9. Select the desktop flow you want to run and the desired run mode.
10. Save your cloud flow.
11. You can now trigger your desktop flow to run on your machine from the cloud.

Power Automate enables you to trigger desktop flows from cloud flows using events, schedules, and buttons.

> **NOTE**
> To apply this functionality, you have to own a premium per-user plan with attended RPA.

View list of machines

Once a machine is registered to an environment, you can view its details at any time in Power Automate. You can also view all other machines that you have access to.

1. Sign into Power Automate.
2. Select **Monitor** > **Machines**.

Within the list, for each machine you can view:

- The name of the machine.
- The description of the machine.
- The group that the machine is a part of, if applicable.
- The status of the machine.

- The number of flows running on the machine.
- The number of flows queued on the machine, if applicable.
- The type of access you have to the machine.
- The owner of the machine.

Share a machine

You can share a machine with other users in your organization, giving those users specific permissions to access your machine.

1. Sign into Power Automate.
2. Select **Monitor**, then select **Machines**.
3. Select your machine from the list.
4. Select **Manage access**.
5. Select the **Add people** field, then enter the name of the person in your organization with whom you'd like to share the machine.
6. Select the name of the person to choose with which permissions they can access the machine.
7. Click **Save**.

There are two levels of permissions that you can use when managing access to your machine:

1. **Co-owner**. This access level gives full permissions to that machine. Co-owners can run desktop flows on the machine, share it with others, edit its details, and delete it.
2. **User**. This access level only gives permission to run desktop flows on the machine. No edit, share, or delete permissions are possible with this access.

ACTIONS	CO-OWNER	USER
Run a desktop flow on the machine	X	X
Share the machine	X	
Add machine to group	X	
Edit details	X	
Delete machine	X	

Switch from gateways to direct connectivity

You can easily switch to using direct connectivity by changing the desktop flow connection and use one with the direct to machine option.

You can edit the flow and choose the new desktop flow connection for each of the desktop flow actions in your flow or create a new connection:

1. If you haven't done it yet, update Power Automate to version 2.8.73.21119 or newer.
2. If you've already created a connection with desktop flows, click the three dots in the top right and under **My connections** select **+Add new connection**.
3. Next to Connect, select **Direct to machine**.
4. Select the name of your machine.
5. Enter the username and password you would use to sign into your machines.
6. Click **Create**.

You can also change the connections that are used by cloud flow in its details page when you click on run.

Update permissions based on security role

By default, all users with an Environment Maker role can register their machines in an environment. You can restrict actions on machines and machine groups by modifying the **Flow Machine** and **Flow Machine Group** permissions for a particular security role.

Environment admins can also restrict machine registration to a specific set of users by using the three security roles that come with machine management.

ACTIONS	DESKTOP FLOWS MACHINE OWNER	DESKTOP FLOWS MACHINE USER	DESKTOP FLOWS MACHINE USER CAN SHARE
Register a machine	X		
Run a desktop flow	X	X	X
Share a machine	X		X
Share a machine group	X		X
Add machine to group	X		
Edit machine details	X		
Edit machine group details	X		
Delete machine	X		
Delete machine group	X		

Machine and machine group limitations

NAME	LIMIT
Maximum number of machines in a group	50
Maximum amount of time a desktop flow can run	24 hours

NAME	LIMIT
Maximum amount of time a desktop flow can be queued	3 hours

Other known limitations

- Machines and machine groups are not available in the Government Community Cloud (GCC), Government Community Cloud - High (GCC High), Department of Defense (DoD), or China regions. You can still run desktop flows from the cloud using an on-premises data gateway.

Manage machine groups

1/15/2022 • 6 minutes to read • Edit Online

Create a machine group

Machine groups allow you to organize multiple machines together to help distribute your automation workload and optimize productivity.

1. Sign into **Power Automate machine runtime**
2. Select **Machine group**
3. Select **Create a new group**
4. Enter a name for your machine group, then optionally enter a description.
5. Click **Create**

You can also create a machine group directly from Power Automate:

1. Sign into Power Automate.
2. Select **Monitor**, then select **Machines**.
3. Select **New machine**, then select **Group**.
4. Enter a name for your machine group, then optionally enter a description.
5. Click **Create**.

Add your machine to a group

You will need at least one machine in your group to run desktop flows.

1. In the Power Automate machine runtime, select **Machine group**
2. In the displayed list, you can find all the available machine groups. To add the machine to a machine group, select the desired group and fill in the required credentials.

3. If this is the first time adding a machine to your group, you will need to create a password for your group. This password is used to limit access for those who can add machines to the group. Make sure you do not lose the password, as you will be unable to recover it. If you have already added a machine before, enter the password for the group.

4. Select **Add machine**.

When you add your machine to a group, any connections currently targeting your machine will break. You will need to update those connections to target the machine group.

> **NOTE**
>
> - In case of a virtual machine, make sure not to clone the virtual machine after installing the Power Automate machine runtime.
> - Machines are not affected by a change in the Power Automate for desktop organization.

> **IMPORTANT**
>
> In order to register your machine, you need to have an Organization premium account.

Trigger a desktop flow to run on your machine group

1. Edit your cloud flow or create a new cloud flow.

2. Select **+New step**.

3. Select the **Run a flow built with Power Automate for desktop** action.

4. If you've already created a connection with desktop flows, click the three dots in the top right and under **My connections** select **+Add new connection**.

5. Next to Connect, select **Direct to machine**.

6. Select the name of your machine group.

7. Enter the username and password you would use to sign into your machines.

8. Click **Create**.

9. Select the desktop flow you want to run and the desired run mode.
10. Save your cloud flow.
11. You can now trigger your desktop flow to run on your machine group from the cloud.

> **IMPORTANT**
> If you are using local Windows accounts, all machines in the group must have the same local account with the same password. Use these credentials when you create the desktop flows connection. If you are using Active Directory or Azure AD joined machines, confirm that the user account you will be using in the desktop flows connection can access all machines in the cluster.

View list of machine groups

Once a machine group is created in an environment, you can view its details at any time in Power Automate. You can also view all other machine groups that you have access to.

1. Sign into Power Automate.
2. Select **Monitor** > **Machines**.
3. Select **Machine groups**.

Within the list, for each machine you can view:

- The name of the machine group.
- The description of the machine group.
- The number of the machines in the group.
- The number of flows running in the machine group.
- The number of flows queued in the machine group.

- The type of access you have to the machine group.
- The owner of the machine group.

Share a machine group

You can share a machine group with other users in your organization, giving those users specific permissions to access your machine group.

1. Sign into Power Automate.
2. Select **Monitor**, then select **Machines**.
3. Select **Machine groups**.
4. Select your machine group from the list.
5. Select **Manage access**.
6. Select the **Add people** field, then enter the name of the person in your organization with whom you'd like to share the machine group.
7. Select the name of the person to choose with which permissions they can access the machine group.
8. Click **Save**.

There are two levels of permissions that you can use when managing access to your machine group:

1. **Co-owner**. This access level gives full permissions to that machine. Co-owners can run desktop flows on the machine group, share it with others, edit its details, and add or delete machines.
2. **User**. This access level only gives permission to run desktop flows on the machine group. No edit, share, or delete permissions are possible with this access.

ACTIONS	CO-OWNER	USER
Run a desktop flow on the group	X	X

ACTIONS	CO-OWNER	USER
Share the machine group	X	
Add machines to group	X	
Remove machines from group	X	
Edit details	X	
Delete machine group	X	

You can only delete a machine group if you have sufficient permissions and there are no machines in the machine group. Remove any machines from the group before deleting the machine group.

Access for machine groups is managed at the group level. All machines in the group will use the same permissions and connections.

If the permissions of a machine and its group fall out of sync, for example if you modify the permissions of the group directly in Microsoft Dataverse, certain actions for that machine may no longer be available and your machine and machine group may not behave as expected. Ensure the permissions between the machine and machine group are consistent to avoid any such issues.

Power Automate allows you to create groups of machines that can be accessed all together by a name reference. This feature is essential for organizations that want to trigger desktop flows to multiple machines simultaneously.

Change the machine group of a machine

If you want to change the machine group that contains your machine, select another group in the list of available machine groups and fill in the required credentials

If you want to remove the machine from a group without adding it to a new one, select **Leave group**.

Change machine group's password

To change the password of the currently used machine group, click on the ellipses next to the machine group and select **Edit group password**.

Next, populate the **New password** and **Confirm password** fields, and select the **Change** button to confirm the changes.

Update permissions based on security role

By default, all users with an Environment Maker role can register their machines in an environment. You can restrict actions on machines and machine groups by modifying the **Flow Machine** and **Flow Machine Group** permissions for a particular security role.

Environment admins can also restrict machine registration to a specific set of users by using the three security roles that come with machine management.

ACTIONS	DESKTOP FLOWS MACHINE OWNER	DESKTOP FLOWS MACHINE USER	DESKTOP FLOWS MACHINE USER CAN SHARE
Register a machine	X		
Run a desktop flow	X	X	X
Share a machine	X		X
Share a machine group	X		X
Add machine to group	X		
Edit machine details	X		
Edit machine group details	X		
Delete machine	X		
Delete machine group	X		

Machine and machine group limitations

NAME	LIMIT
Maximum number of machines in a group	50
Maximum amount of time a desktop flow can run	24 hours
Maximum amount of time a desktop flow can be queued	3 hours

Other known limitations

- Machines and machine groups are not available in the Government Community Cloud (GCC), Government Community Cloud - High (GCC High), Department of Defense (DoD), or China regions. You can still run desktop flows from the cloud using an on-premises data gateway.
- When triggering multiple desktop flows in parallel on a machine group, there are cases where machine selection will take up to 50 seconds before assigning the desktop flow to machine that is available. In these rare cases, desktop flow runs might seem to be running sequentially if they have very short run durations.

Silent registration for machines

1/15/2022 • 3 minutes to read • Edit Online

This article describes how to use our mass deployment tool that allows you to easily install Power Automate on multiple machines. You can both register your machines to Power Automate and add them to machine groups.

Pre-requisites

To silently register your machine(s), Power Automate for desktop needs to be downloaded and installed on the targeted devices. Visit this page to understand how to install Power Automate silently

To silently register your machine and join a group, we recommend you to use a service principal account. You can also use your Azure Active Directory account.

Using a service principal account

> **NOTE**
>
> To create the application user, you need to have admin rights on the Dataverse environment of your tenant.

1. Create an Azure app:

   a. Go to Azure portal: https://portal.azure.com/

   b. Search **app registrations**

   c. Select **new registration**

d. Define a name and select **Single tenant** (or multi-tenant) then select **register**

2. Give your app the following permissions

   a. Select **Add a permission**

   b. Select **Flow Service**

   c. Select **Flow.Read.All**

3. Create an application user..

> **NOTE**
> Regarding their security roles, the user need to grant at least Environment Maker (or Desktop Flows Machine Owner) to be able to register a machine and join a group.

1. Get the following information that will be used in the Machine Registration app: a. Applicationid b. Directory (tenant) Id c. Client credentials (certificate or thumbprint)

How to use the Machine registration App?

1. Open **Start** menu

2. Search for command prompt (or PowerShell) and then run it as the administrator

3. Change the directory to the Power Automate install folder (by default: C:\Program Files (x86)\Power Automate)

```
cd C:\Program Files (x86)\Power Automate
```

4. You can use the help menu to have an overview of what you can do with the silent app.

```
.\PAD.MachineRegistration.Silent.exe -help
```

Silently register a new machine

To register silently your machine in Power Automate with the service principal account, use the register operation **-register** with the following arguments: Connection arguments (for service principal account):

1. Applicationid: The application to use.
2. Clientsecret: The secret of the applicationid (you can also use the certificateThumbprint). This input isn't expected to be specified as an input to the command line. See "Secure input" section to see options you can choose to provide it.
3. Tenantid: The tenant identifier to use.

Machine registration arguments:

1. Environmentid (optional): The environment where the machine will be registered. If not provided, the machine is registered in the default environment. You can retrieve it in the URL of Power Automate.
2. Machine name (optional): The name of the registered machine.
3. Machine description (optional): The description of the registered machine

```
.\PAD.MachineRegistration.Silent.exe -register -applicationid appid -clientsecret (or -
certificatethumbprint thumbprint) -tenantid tenantid -environmentid envid
```

> **NOTE**
> If you decide to use AAD account, you can specify the username: -username [UPN] instead of service principal account arguments

Join silently a machine group

> **NOTE**
> You cannot create machine group silently. You will need to create them from the portal before adding machines silently.

To join a group silently with the service principal account, use the join group operation -joinmachinegroup with the following arguments:

1. Environmentid: The environment where the machine group is registered. You can retrieve it in the URL of Power Automate.
2. Groupid: the id of the machine group you want to join. You can retrieve it in the URL of Power Automate

when you are in the machine group details page.

3. Grouppassword: the password of your machine. If this is the first machine of the group, you need to define it. If not, you need to provide the defined password of the group. This input isn't expected to be specified as an input of the command line. See "Secure input" section to see options you can choose to provide it

```
.\PAD.MachineRegistration.Silent.exe -joinmachinegroup -groupid groupid -grouppassword
```

Secure input

In the machine registration tool, you will have to provide secure inputs for registration and joining group. You have two options to provide a secure input:

1. type when asked: you will be prompted to enter this data when needed. This is an interactive action that is not adapted if you need to do mass deployment

2. redirect string/file to the silent registration application

   a. redirect string (if you need to input multiple strings, you can do it easily in PowerShell):

   ```
   echo mypassword | .\PAD.MachineRegistration.Silent.exe -joinmachinegroup -groupid groupid -
   grouppassword
   ```

   b. redirect file:

   i. create a txt file that contains your password and save it in Power Automate folder (you will need to have admin privileges

   ii. use the following:

   a. For cmd prompt:

   ```
   grouppassword < pwd.txt
   ```

   b. For Powershell:

   ```
   Get-Content password.txt | .\PAD.MachineRegistration.Silent.exe -joinmachinegroup -groupid
   groupid -grouppassword
   ```

Introduction to the Power Automate Azure Virtual Desktop integration starter kit

1/15/2022 • 2 minutes to read • Edit Online

The Microsoft Power Automate Azure Virtual Desktop (AVD) Integration Starter Kit is a set of templates that are designed to help orchestrate and scale virtual machines used to run desktop flows. The kit includes a Power App and multiple flows to automate the scaling up and down of machines. The assets part of the starter kit should be seen as a template from which you inherit your individual solution or can serve as inspiration for implementing your own apps and flows.

You can download the latest version of the Power Automate AVD Starter Kit for the GitHub repository.

> **IMPORTANT**
>
> Despite the fact that underlying features and components used to build the kit (such as Dataverse, admin APIs, and connectors) are fully supported, the kit itself represents sample implementations of these features. Our customers and community can use and customize these features to implement admin and governance capabilities in their organizations.
>
> If you face issues with:
>
> - Using the kit: Report your issue at the GitHub repo issues section. Microsoft support won't help you with issues related to this kit, but they will help with related, underlying platform and feature issues.
> - The core features in Microsoft Power Platform: Use your standard channel to contact Support.

Getting started

After following the instructions to install and configure the starter kit, start by launching the **AVD integration configuration app** and creating a new scaling configuration.

Starter kit modules

1/15/2022 • 5 minutes to read • Edit Online

The Power Automate AVD integration starter kit is shipped as a solution which can be imported into your environment, plus an Azure Automation runbook that will allow you to automate the installation of Power Automate for desktop and machine registrations.

The starter kit solution includes:

- An application, that will help with configuring your scale strategy and collecting the necessary information to interact with both your Azure Virtual Desktop deployment and the Power Platform.
- A sample orchestration flow that will be used as a template to generate new flows with your own configurations.
- Other helpful flows that either enable the configuration application or help generating the customized orchestration flows.

Prerequisites

The following are prerequisites for installing the Power Automate AVD integration starter kit as it's included in the solution:

- Download the content package which includes the starter kit solution and runbook script to your device.

Azure Virtual Desktop hostpool

- An Azure Virtual Desktop deployment with at least one host pool. If you don't have one, you can follow this documentation to set it up.
- You have provisioned VMs in the host pool, that the starter kit will turn on/off when applying your scaling strategy.

Microsoft Dataverse

- Admin account:
  - Microsoft Power Platform service admin, global tenant admin, or Dynamics 365 service admin for access to all tenant resources through the Power Apps APIs.
  - This solution will work for environment admins, but the view will be restricted to only the environments an environment admin has access to.
- Environment with a Dataverse instance, where the user installing the solution has the System Administrator security role.
- If you are using this starter kit in Production environment with a Dataverse, premium licenses are required for all users interacting with the Power Automate AVD integration starter kit. Depending on what components you will use, your organization size and the existing licenses available in your organization, you will require either a Power Apps per user or per app or Power Automate per user or per flow license or a combination of these licenses.

Azure Automation and Key vaults

- An Azure Automation Account
- An Azure Automation Credential which is needed to run the runbook automation and is used to

authenticate to Azure.

- A service principal account to register your VMs
- An app registration with Azure Service Management permission
- An Azure Key Vault where you can store the secrets for your app registrations and machine group passwords.

Setup the Power Automate AVD integration starter kit

Import the solution into a Production environment

1. Download the Power Automate AVD integration starter kit from the Github repository
2. Navigate to your environment:
   a. Go to https://flow.microsoft.com
   b. Select the environment in which the starter kit will be hosted.
3. On the left pane, select **Solutions**.
4. Select **Import**, and then **Browse**.
5. Select the Power Automate AVD integration starter kit solution from File Explorer (AzureVirtualDesktopStarterKit_x_x_x_xx_managed.zip or AzureVirtualDesktopStarterKit_x_x_x_xx.zip)
6. When the compressed (.zip) file has been loaded, select **Next**.
7. Review the information, and then select **Next**.
8. Establish connections to activate your solution. If you create a new connection, you must select **Refresh**. You won't lose your import progress.
9. Make sure you create connections that target the AVD tenant you want to use.
10. Select **Import**.

> **NOTE**
> The import can take up to 10 minutes to be completed.

Update the Flow Sample Environment Variable

> **NOTE**
> You can't update the values for environment variables from within the solution.

Once the solution import is competed, click on the VM Orchestration Sample Flow, navigate to its details page and copy the Flow Id.

> **NOTE**
> You can find the flow Id by navigating to the details page of your flow and then copying the value in the address bar of your browser:
> `https://flow.microsoft.com/manage/environments/<environmentId>/solutions/<solutionId>/flows/<flow-Id>`

To update Environment Variables:

1. Go to Power Automate.
2. On the left pane, select **Solutions**.
3. Select the **Default Solution** and change the filter to show **Environment Variables**.
4. Select the **Sample Orchestration Flow Id** variable and then configure its **Current Value**.
5. Enter the Flow Id you copied earlier as the current value.

Update the runbook name Variable

If you rename the runbook file when you import it in your Azure Automation account, you need to update the **Runbook Name** environment variable with the same value.

To update Environment Variables:

1. Go to Power Automate.
2. On the left pane, select **Solutions**.
3. Select the **Default Solution** and change the filter to show **Environment Variables**.
4. Select the **Runbook Name** variable and then configure its **Current Value**.
5. Enter the new runbook name you specified in the "import the runbook script" step.

> **IMPORTANT**
>
> When environment variable values are changed directly within an environment instead of through an ALM operation like solution import, flows will continue using the previous value until the flow is either saved or turned off and turned on again.

Import the Runbook script

1. Sign in to the Azure portal.
2. Search for and select Automation Accounts.
3. On the Automation Accounts page, select your Automation account from the list.
4. From the Automation account, select Runbooks under Process Automation to open the list of runbooks.
5. Click **Import a runbook** and then **Select a file.**
6. Select the runbook from the File Explorer (runbookWorkflow.ps1)
7. Rename the runbook if needed and select **PowerShell** in the **Runbook type** dropdown.
8. Click **Create**. The new runbook appears in the list of runbooks for the Automation account.
9. You have to publish the runbook before you can run it.

Create an Azure AD app registration to connect to Azure Service Management APIs and to the Power Platform

- Create an app registration to register your VMs and add them to machine groups

> **NOTE**
>
> The application user should at least have maker role in the environment.

> **IMPORTANT**
> Make sure you follow these steps to create an application user in the Power Platform Admin Center: Manage application users in the Power Platform admin center

- Create an app registration with Azure Service Management permission

> **NOTE**
> The AAD application needs to have read permission on the subscription.

> **IMPORTANT**
> You need to save the App registration secrets in the Key Vault in order to use them within the starter kit.

Limitations

Coauth and connections

If you have multiple identities managing the CoE Toolkit you may see this error when trying to use the flows:

The caller with object id '...GUID...' does not have permission for connection.

This is because the product does not yet support multiple people using connection references.

If you see this you should either log in with the identity that installed the solution to run the flows, or update the flows to use your identity.

To do the later, browse to the default solution, filter to connection references, and edit each connection to use your connection instead.

Supported languages

The Power Automate Azure Virtual Desktop integration starter kit is currently available only in English. Add the English language pack to your environment to make sure all apps and flows work. Read more in the regional and language options for your environment.

Multi-tenant App registrations

If your Dataverse tenant is different from the AVD one, there are additional steps and validation you need to go

through to let your application interact with your Dataverse tenant.Read more on [how to use multi-tenant server-to-server authentication](/powerapps/developer/data-platform/use-multi-tenant-server-server-authentication>

Use the Azure Virtual Desktop Integration starter kit

1/15/2022 • 2 minutes to read • Edit Online

The main entry point to the AVD integration starter kit is the AVD Integration Configuration App. You can use this application to:

1. List the Orchestration flows that have already been generated by the Starter Kit
2. Create a new scale configuration.

To create a new scale configuration:

1. Go to Power Automate.
2. On the left pane, select **Solutions**.
3. Select the starter kit solution, navigate to Apps then launch the **AVD Integration Configuration App**
4. Select **New scaling configuration** in the home page.

5. Enter the tenant domain name and tenant Id. Read the respective documentation to find more information
6. Select the Environment you want to create the orchestration Flow in.
7. Provide the secret names for both App registrations (Power Platform and Azure Service Management).
8. Select the machine group you want to automatically scale using AVD VMs.
9. Select the host pool you want to use to scale your machine group.
10. Provide the Azure Automation specific information (Account Name and Automation Credential).
11. Enter the secret name for the selected machine group.
12. Configure your scaling strategy:

13. Select **Create Orchestration Flow**

A new cloud flow will be created with the configured the information and scaling strategy. You can now navigate to the target environment and review, test or edit the cloud flow if needed. Once you are happy with your configuration, you can enable the cloud flow to automatically apply your scaling configuration to the machine group.

Manage desktop flows

1/15/2022 • 2 minutes to read • Edit Online

After you've created desktop flows, you might need to view, edit, or just check on their status. To do this, go to the **Desktop flows** tab.

List of desktop flows

1. Sign into Power Automate.
2. Select **My flows** > **Desktop flows**.

From this section, you can create a new desktop flow and then edit or delete your existing desktop flows.

> **NOTE**
> If you choose to delete or rename a desktop flow, press the refresh button in Power Automate to reflect the changes in the flows list.

Details page

For each of your desktop flows, you can see its details by selecting its name from the list of desktop flows. You then see details including:

- The run history with details of each run.
- The applications or Websites used in the desktop flow.

Follow these steps to see the details for a desktop flow:

1. Sign into Power Automate.
2. Select **My flows** > **Desktop flows**.
3. Select any of your desktop flows.

Share desktop flows

You can share a desktop flow with other users in your organization, giving those users specific permissions to access your flows.

Follow these steps to share a desktop flow.

1. Sign into Power Automate.
2. Select **My flows** from the left side of the screen.
3. Select **Desktop flows**.
4. Select any flow that you own.

5. Select **Share**.
6. Select the **Add people** field, and then enter the name of the person in your organization with whom you'd like to share the flow.
7. Select **Give access**, and then select either **User** or **Co-owner** as the permission for the person with whom you share the flow.
8. Select the **Share** button.

These are the two permission levels you can use when you share desktop flows:

1. **Co-owner**: This access level gives the co-owner full permissions to that desktop flow. They can edit, share, and delete the flow.

2. **User**: Has permission to only use that desktop flow in a cloud flow. No edit, rename, delete or share permissions are possible with this access. Alternatively, those users can create a copy of that desktop flow by using 'Save as', and work independently.

Once a desktop flow has been shared, owners and co-owners can change the access of each user by selecting the **Manage access** link on the desktop flow details page.

> **NOTE**
>
> If someone shares a desktop flow with you, press the refresh button in Power Automate to see it in the **Shared with me** flows list.

Copy desktop flows

To duplicate an existing flow:

1. Sign into Power Automate.

2. Select **My flows** from the left side of the screen.

3. Select **Desktop flows**.

4. Select the flow that you want to copy.

5. Select **Save As**.

6. Populate a name for the new flow.

7. Select **Save**.

Manage desktop flows access

For each of your desktop flows, you can manage its access by selecting manage access in the desktop flows details page.

In this panel, you can:

- Share the desktop flow with another user
- Edit users' permissions
- Remove users' permissions for this flow

> **NOTE**
> Administrators of an environment are co-owners of all dekstop flows created in this environment and can't be removed.

More information

- Create desktop flows.
- Run desktop flows.
- Create Windows recorder (V1) flows.
- Create Selenium IDE flows.

Monitor desktop flow runs

1/15/2022 • 2 minutes to read • Edit Online

As you scale the automations in your business, you may need an easy way to ensure all your desktop flows are running as expected. Monitor all your desktop flow runs in just one location to keep your automations running smoothly.

View list of all desktop flow runs

1. Sign into Power Automate
2. Select **Monitor** > **Desktop flow runs**

From this page you can view all your desktop flow runs for the current environment to which you have access.

Prerequisites

In order to see runs in this list, one of the following must be true:

- You have run an attended or unattended desktop flow in the current environment
- Another user has shared their desktop flow with you, which has run in the current environment
- You have permission to view all data in the environment

> **TIP**
> To enable a user to view all the desktop flow runs in the current environment, ensure they have been assigned at least a System Administrator or Environment Admin security role for that environment. Learn more about configuring user security to resources.

Desktop flow run information

The following information is available on your runs:

PROPERTY	DESCRIPTION
Requested	The time in which the desktop flow was requested by the parent flow. This may not be the same as the time when the desktop flow started running on the machine.
Desktop flow	The name of the desktop flow which was run.
Status	The status of the desktop flow run.
Run mode	The mode in which the desktop flow was run.
Duration	How long the desktop flow took to run on the machine, excluding any time spent in the run queue.
Parent flow	The cloud flow that triggered the desktop flow to run.

Customize your view

You can make changes to your view to narrow the list of runs to only those you are interested in seeing. Click the column name to change the order of items or filter them to specific values.

View all runs from the parent flow run

You may have several desktop flow runs that were triggered by one flow run. Click the three dots next to the desktop flow name, then select See all desktop flow runs in the parent flow.

View the run queue for a queued run

Machines and gateways can be used to run multiple desktop flows. To see the placement of a desktop flow in the run queue, click the three dots next to the name of the desktop flow and select **See desktop flow in run queue**.

Live updates

To keep your desktop flow run information always up to date, you can activate the **Live updates** toggle switch at the top of the page.

Live updates are only supported for up to fifty desktop flow runs. Loading more runs will deactivate live updates and activating live updates with more than fifty runs will trim the list to the supported amount.

Monitor desktop flow queues

1/15/2022 • 4 minutes to read • Edit Online

As you scale the automations in your business, you may need an easy way to ensure that competing desktop flows are running according to their business priority. Monitor, manage and visualize all your queued desktop flow runs in just one location. Desktop flow queues can be used whether your target device is a machine, machine group, or a gateway.

> **NOTE**
>
> Everyone accessing the run queues for their gateways from the **Desktop flow queues** page should now navigate to the **Gateways** pivot in the **Machines** page to access them.

Setting a priority

The desktop flows connector actions contains a new priority parameter under the Advanced options section.

Available priorities are High and Normal (the default value). This value can also be passed dynamically using the custom value parameter. Every time the desktop flow is triggered, it will be executed with the priority that has been set.

When multiple runs are queued, the execution ordering is based on the run priority and enqueued time. Runs with a high priority that have been enqueued first will be executed first.

View run queue for a machine or machine group

Visit the details page for your machine or machine group, then click on the **Run queue** tab to see the list of

queued desktop flow runs.

Prerequisites

In order to see runs in this list, one of the following must be true:

- You are running an attended or unattended desktop flow in the current environment
- Another user has shared their desktop flow with you, which has run in the current environment
- You have permission to see view all data in the environment

> **TIP**
> To enable a user to view all the desktop flow runs in the current environment, ensure they have been assigned at least a System Administrator or Environment Admin security role for that environment. Learn more about configuring user security to resources in Configure user security to resources in an environment.

Queue Status

A run in a queue can have the following status:

- Running
- Queued
- Next to run

Actions on a run

Four actions are available when clicking on the three dots next to the desktop flow name:

- Change priority
- Move to top
- See parent flow run
- Cancel parent flow run

Change priority

You can change the priority of a specific run by clicking on the three dots then **Change priority**. You can only

change the priority of a run of which you are an owner, or if you are a co-owner on the machine/machine group or admin on the gateway.

Changing the priority only impacts the current run and not any subsequent ones. If you wish to change the priority of all the upcoming runs, you need to change the priority in the connector action.

Move to top

The owner of the device or a user with administrator privileges for the machine, machine group, or gateway can override the queue priority by moving an item to the top of the queue. That item will be put at the top of the queue regardless of its original priority and queued time. If multiple runs are moved to top, the last one added will be executed first.

You can cancel moving a run to top. It will revert the run back to its original priority and queued time.

See parent flow run

If you have permission to access the parent flow, you can use this action to view its run details.

Cancel parent flow run

If you are the owner of the flow, or have the role System Administrator or Environment Admin, you can cancel the parent flow run instance. This will cancel the current desktop flow as well as all the other action that were used in the parent flow.

View list of run queues for gateways

Users can view the desktop flow queues for their gateways under the **Machines page > Gateways pivot**. The gateways pivot is only available if you own or have access to a gateway.

From this page you can view all the gateways to which you have access. Each gateway will have its own run queue when used to run desktop flows.

Using gateways with multiple environments

It is recommended to use a gateway for desktop flows only by one environment. However, gateways can still be used across multiple environments if needed.

With multiple environments, in some cases no flows may appear to be running even with a full list of queued runs, as the gateway may be running flows in another environment. Run queues are per environment and cannot be prioritized one over the other. A message will be shown to indicate if the gateway is being used in another environment.

Known issues

- Machines and machine groups are not available in the Government Community Cloud (GCC), Government Community Cloud - High (GCC High), Department of Defense (DoD), or China regions. You can still view the desktop flow queue for your gateways by visiting the Desktop flow queues page under the Monitor section in the left navigation.

Data loss prevention (DLP) policies (preview)

1/15/2022 • 3 minutes to read • Edit Online

[This topic is pre-release documentation and is subject to change.]

Power Automate offers to administrators the option to create and enforce policies that classify desktop flows action groups as business or non-business and mark actions or action groups as blocked. That way a non-business action can't be combined with an action that has been marked as business so that to avoid data exposure outside the organization. For more details on how to form a data loss prevention (DLP) policy policy, visit the respective topic under the Administer Power Platform documentation.

This feature will be rolling out to all cloud regions based on the following schedule.See when will the feature be fully enabled in your region in the table below.

DATE	AVAILABLE IN REGIONS
11/1	Canada
11/30	Switzerland , Brazil, Canada
12/6	Asia, UK, Australia, Japan
12/20	Europe
12/20	US(NAM)
1/4	Government Community Cloud (GCC), Government Community Cloud - High (GCC High), Department of Defense (DoD), or China regions

Troubleshoot data loss prevention (DLP) policies violations

While saving a desktop flow you will be notified about the data loss prevention violations the flow includes. The same will occur while attempting to run the flow from the designer and the console. A desktop flow that violates a data loss prevention (DLP) policy will be marked as suspended and the run option will be disabled.

To resolve a violation navigate to the designer and delete or disable the actions causing this error.

Business vs non-business data loss prevention policy

The business vs non-business data loss prevention policy, prevents users to use actions from the two categories on the same flow.

For example, the flow that appears below contains the **Open SQL connection**, **Execute SQL statement** and **Close SQL connection** actions which belong to the Database actions group and the **Launch Excel**, **Write to Excel** and **Close Excel** actions that belongs to the Excel actions group. Thus it receives an error as the Database group of actions are marked as business while the Excel group is marked as non-business.

To resolve this data loss prevention policy (DLP) violation, delete or disable actions from one of the two groups.

Blocked actions and action groups data loss prevention policy

Apart from marking action groups as business and non-business, the administrator can mark action groups or particular actions as blocked. In this case these actions can't be used at all in the flow.

In the example shown below the Email group of actions and the Send email through Outlook actions are marked as blocked.

To resolve this data loss prevention policy (DLP) violation, delete or disable all actions that are marked as blocked.

NOTE

- In case a flow calls other flows using the **Run desktop flow** action, the dependent flows are not being evaluated for data loss prevention (DLP) violations.
- If the suspended desktop flow was used in a cloud flow, this cloud flow will be also marked as suspended. Once you have fixed the violations on your desktop flow, make sure that all your cloud flows appear on again.

IMPORTANT

For cases that a desktop flow is suspended, it won't be able to run it. Similarly, a cloud flow using a suspend desktop flow won't be able to run either.

Making use of suspended desktop flows in cloud flows

A suspended desktop flows due to data loss prevention (DLP) prevention policies violations won't be available to be selected.

To be able to launch the desktop flow from a cloud flow, edit the desktop flow in the desktop designer and resolve the DLP violations.You will then be able to select again the desktop flow to run.

> **IMPORTANT**
>
> In case a data loss prevention (DLP) policy rule is set to a desktop flow after it has been used in a cloud flow, there won't be any notification and the cloud flow will error out at that step. In case a desktop flow violates any rules and you correct it you will need to go back to the cloud flow and reselect it from the list.

Power Automate for desktop console

1/15/2022 • 2 minutes to read • Edit Online

The flow console is the central interface of Power Automate.

After signing in, your username will be displayed in the top-right corner, while a list of flows occupies the central pane. At the top right-hand side, a dropdown list allows you to switch environments in order to access different flows; alongside the environments are also the Settings and Help buttons, and a search bar for easily locating flows.

Starting a desktop flow

Users may run any Power Automate desktop flows available to them through the console, by hovering the cursor over a desktop flow and pressing the "Start" button. The status of the flow is also displayed:

If the flow contains input variables, a dialog box prompts the user to provide values for each input variable.

Editing a desktop flow

Through the console, users may also create a new flow by pressing the "New flow" button, or edit an already existing one by double-clicking on it, or hovering the cursor over it and pressing the edit button:

In both scenarios, the flow designer will be launched; this is where flow creation and editing takes place.

> **NOTE**
> When more than one people make changes to a shared desktop flow, the last one that saves the flow overrides all previous actions.

Console Settings

Press the **Settings** button to configure Power Automate for desktop to your liking:

Under the **Application** category, select whether Power Automate should launch automatically, whether closing

the console will close the application as well, and whether Power Automate should be able to display Windows notifications. You may also set a hotkey combination to instantly stop a running flow.

Decide whether Microsoft may collect diagnostic data to improve user experience under **Data collection**.

> **NOTE**
>
> Only an admin may change Data collection settings.

Update Power Automate for desktop

Power Automate will frequently check for updates and display a notification dialog. In order not to disrupt your work, the update dialog offers you the option to delay the update and proceed with it at a later time. If you don't wish to receive any update notifications, you may uncheck the **Show update notifications** option in the general settings. To manually update, you may click on the **Check for updates** button in the general settings.

Switch organization

For cases that a user is member of more than one tenants, they can switch between them by selecting their alias at the top right of the console window and clicking on **Switch organization**.

Power Automate flow designer

1/15/2022 • 2 minutes to read • Edit Online

The flow designer contains all the tools required to design and debug a Power Automate flow. Additionally, any images, UI elements, or variables of a desktop flow can be accessed and managed here.

The flow designer consists of multiple elements. The actions pane, the variables pane, and the workspace display information about the status of the flow, and all the data it contains. Subflows are separated into tabs to help design large, complex flows. Tools for debugging flows, such as breakpoints and the option to run a desktop flow step by step, are also available in flow designer. Any error information is displayed, and the erroneous actions are immediately highlighted.

Configure actions and the actions pane

1/15/2022 • 3 minutes to read • Edit Online

Upon opening the flow designer, the actions pane on the left side of the window shows all the action groups.

To quickly find a specific action, enter the name of the action in the search bar. Searching also returns partial matches.

Adding an action to the workspace

To begin developing a desktop flow, select an action and double-click on it, or drag it into the workspace.

A dialog box opens with the parameters of the action. Actions have certain parameters such as variable names and default values. Other actions will require user input to be initialized. After selecting **Save**, the action appears in the workspace.

Configuring an action

Power Automate actions consist of two main segments:

- The input parameters - They have the form of text fields, drop-down menus, and check boxes
- The produced variables - Automatically created variables

The input parameters determine the way an action functions and the data it gets as input. The data can be hardcoded values or variables.

To use a variable as a parameter, select the icon on the field's right side and pick the respective variable.

Each field can accept specific data types, such as numbers, text, or lists. If a value or variable of a wrong data type is used as an input, the action will throw an error.

The produced variables hold the outcomes of the action for later use. All the produced variables are displayed on the bottom part of the action's properties.

Each produced variable has a data type defined by its data. You can see the data type of a variable in the **Variables** pane. Find more information about data types in the respective article.

In case a produced variable isn't needed for later use, unselect the checkbox under **Variables produced**.

> **NOTE**
> Produced variable names, may not contain special characters, white spaces and non-latin characters and can't start with arithmetic characters.

Configuring action errors

When an action throws an error, the flow stops its execution by default. To configure a custom error handling behavior for an action, select the **On error** option in its properties.

The first option in the dialog box is the **Retry action if an error occurs** checkbox. This checkbox makes the flow execute the action a set number of times after a set number of seconds. The default value is one retrying with an interval of two seconds.

To continue the flow's execution, even if the retry option fails, select the **Continue flow run** option. Through the drop-down list, you can:

- **Go to next action**: Executes the following action in order.
- **Repeat action**: Repeats the action until it runs successfully.
- **Go to label**: Continues the execution from a point defined by a **Label** action.

Power Automate offers two additional error handling options. Select the **New rule** button to:

- **Set variable**: Sets the desired value to a specified variable.
- **Run subflow**: Executes a specified subflow.

If different errors require different error handling behaviors, select the **Advanced** option and configure each possible error separately.

Enabling and disabling actions

To disable or enable an action, right-click on it and select **Disable action** or **Enable action**, respectively.

Disabling an action allows you to remove it from the flow without erasing it. This feature is commonly applied to

test different versions of a desktop flow and decide which one is the most efficient.

When an action is disabled, all variables defined in it are hidden from the **Variables** pane. If the hidden variables are used in other actions, the flow may throw an error.

In the example below, two actions threw an error because they contain variables defined in a disabled action.

Manage the flow designer workspace

1/15/2022 • 3 minutes to read • Edit Online

The central pane of the flow designer is called the workspace. Here is where the series of actions that make up the flow is assembled:

During development, users may add, edit, and delete actions in the workspace.

Drag actions to rearrange them and change the order in which they run. Right-click an action and select **Enable action** or **Disable action** to enable or disable an action respectively; while running, the flow skips any disabled actions.

Copy and paste any selected actions in the workspace. This can be done within the same subflow, among different subflows, or other open instances of flow designer.

Setting up subflows

Subflows are groups of actions, which may be referenced as a group within a desktop flow.

Every flow contains the **Main** subflow - this is the subflow that is run when a desktop flow starts. Any other subflows may be invoked through the **Run subflow** action:

Subflows are shown in tabs, directly over the main workspace. To add a new subflow, select the subflows tab, select **+**, and enter the subflow name.

Select a subflow tab to edit the respective subflow.

Saving flows

To save a flow, select **File** in the flow designer's menu bar and then pick **Save**. Alternatively, you can press the keyboard shortcut **Ctrl +S**.

To save the flow's current state as a new flow, select **Save as** in the **File** menu and populate a name for the new flow in the displayed dialog.

Managing the workspace toolbar

Drag actions to rearrange them and change the order in which they run. Right-click an action and select **Enable action** or **Disable action** to enable or disable an action respectively. While running, the flow skips any disabled actions.

Hold down **Ctrl** to select multiple actions. Hold down **Shift** and select the first and last actions to select a range of actions. Copy and paste any selected actions in the workspace.

When copying actions, all their parameters, images, and UI elements are copied as well. You can copy and paste actions within the same subflow, among different subflows, or other flow designer instances. Apart from flows, you can paste actions in other applications, such as chats and text files.

Searching in the flow

To search for a text string, an action or variable within the flow, use the search field at the top right of the flow designer window. The results pane will show all occurrences of text string by action and subflow. Double-click on a result to highlight the action that contains it.

Using the Go to line option

The Go to line function navigates to a specific line within the current subflow. This function is helpful in subflows that contain a large number of actions.

Select **Edit**, then **Go to line** and enter a line. The corresponding action will be highlighted.

Using the Run from here option

To run the flow starting from a specific action, right-click the action and select **Run from here**. This ignores all previous actions and runs the flow from the selected action onwards.

> **NOTE**
>
> The **Run from here** option isn't available for actions located in loops, conditionals, or the **On block error** action.

Record desktop flows

Power Automate for desktop enables you to record actions in real time through the built-in recorder. The recorder keeps track of mouse and keyboard activity in relation to UI elements, and records each action separately. The recorder can be used to automate desktop and web applications.

To record a flow, select **Recorder** in the toolbar of the flow designer. When the recorder dialog is launched, select **Record** to start recording. To suspend the recording, select **Pause**. To add a comment to the recorded actions, select **+ Comment**.

Select the bin icon to remove individual actions, or select **Reset** to delete all the actions recorded so far. When the recording is completed, select **Finish** to convert the recorded steps to Power Automate for desktop actions.

> **NOTE**
>
> You can find more information regarding the built-in recorder in Record flows in Power Automate Desktop.

Debug a desktop flow

1/15/2022 • 2 minutes to read • Edit Online

It is common to have to debug flows in case there are any changes in the system or if a desktop flow cannot run because it contains errors.

Debug a desktop flow using the following tools:

- Errors Pane
- Breakpoints
- Run flow action by action
- Set the Run delay

Run, stop, and pause in flow designer

Select **Run** or press **F5** to run the flow. When the flow runs, **Run** becomes **Pause**. Select **Pause** or press **Ctrl + Pause** while the flow is running to pause and inspect any changes up to that point. Select **Run** while the flow is paused to resume it. The **Run next action** button and the **F10** shortcut run the flow action by action and pause it after each action completes. The **Stop** button and the **Shift + F5** shortcut stop the flow completely.

Adding breakpoints

Click to the left of the running order number in the workspace to place a breakpoint in the flow, which appears as a red dot. Add a breakpoint to specify at which action to pause the flow. Resume running the flow by selecting **Run** or **Run next action**. Select the breakpoint to remove it.

Run a desktop flow by action

The **Run next action** button runs the flow action by action. After each action is completed, the flow is paused. Open the variables pane to check the value of any variable at the point where it's paused. This feature is useful for debugging.

The status bar

The status bar on the bottom of the window shows the status of the flow and the number of the selected actions. Additionally, it shows the total number of actions and subflows in the current flow.

The **Run delay** field defines the time that the flow waits after running each action in the flow designer. You can modify the default value to increase or decrease the milliseconds that the flow waits.

The status bar also displays the number of errors, if any are present. Select the **Errors** option to pop up the **Errors pane**.

If you search inside the flow, the status bar shows an additional field containing the number of the results. Select this field to pop up the **Find in code** pane.

Run from here

To run the flow starting from a specific action, right-click the action and select **Run from here**. This ignores all previous actions and runs the flow from the selected action onwards.

Power Automate reserved keywords

A certain amount of words are being used in the core of Power Automate and can't be used during development in the variable, subflow, label or error block names. The list of these words is displayed below.

action	false	loop	step
and	for	main	switch
block	foreach	mod	then
call	from	next	throw
case	function	no	times
default	global	not	to
disable	goto	on	true
else	if	or	wait
end	in	output	while
error	input	repeat	xor
exit	label	set	yes

Manage variables and the variables pane

1/15/2022 • 6 minutes to read • Edit Online

The variables pane shows the input and output variables passed to and from Power Automate. It also displays all the variables used in the current flow under **Flow variables**.

Through the **Variables** pane, you can search for variables, rename them, find their usages and filter them by type.

The variable value viewer

When the flow runs, the current value of each variable is shown next to its name. Variables of disabled actions are omitted. To clear the values of all variables, select the eraser icon at the bottom of the pane.

To view the value of a variable in more detail, double-click on the variable. The **variable value viewer** shows the data type of the variable, and expands any datarows or datatables to show their contents.

#	First name	Last name	Full name	Language	Gender	First name (native)
0	Alexandre	Azevedo	Alexandre Azevedo	Portuguese (Portugal)	Male	Alexandre
1	Marat	Ismagulov	Ismagulov Marat Niyaz uly	Tatar	Male	Марат
2	Kousar	Zaheen	Kousar Zaheen	Urdu	Female	کوثر
3	Naresh	Gouda	Naresh Gouda	Telugu	Male	నరేష్ గౌడ
4	Guilherme	Sarmento	Guilherme Sarmento	Portuguese (Portugal)	Male	Guilherme
5	Rita	Santos	Rita Santos	Portuguese (Portugal)	Female	Rita
6	Ameen	Choudhary	Amir Choudhary	Urdu	Male	عامر
7	Joao	Cunha	Joao Cunha	Portuguese (Portugal)	Male	João
8	Abdullah	Sequib	Abdullah Sequib	Urdu	Male	عبداللہ

Certain data types may contain nested elements. For example, a custom object type variable may contain another custom object in its properties. The figure below shows the variable **CustomerObject** which contains **Company**, another custom object. To view the properties of the nested element, select **More**.

The variable value viewer displays the properties of the child custom object. To go back to the parent custom object, select the arrow.

Renaming a desktop variable

To rename a desktop flow variable, make a right-click on its name in the **Variables** pane and select **Rename**. The name of the variable will be updated in all its occurrences.

Although you can update variables' names manually through actions, the name will be changed only in these specific actions, not globally.

Input and output variables

Power Automate enables data exchange with the Power Automate platform through the input and output variables. These variables are passed to and from Power Automate for desktop, allowing you to create sophisticated flows.

Additionally, you can use input variables to set values manually when the flows are triggered through the console.

> **NOTE**
> You can find more information about passing data between Power Automate cloud flows and desktop flows in Trigger a Power Automate flow from another flow.

Create an input variable

To create an input variable:

1. Select the (+) button in the variables pane and then **Input**.

2. When the **Add a new input variable** dialog is appeared, populate the following fields:

- **Variable type**: Defines if the variable is input or output.
- **Variable name**: The name of the variable in the flow.
- **Data type**: The type of the variable, like number, text, or datetime.
- **Default value**: The default value when the flow runs from the Power Automate flow designer or the Power Automate console.
- **External name**: The name used outside the flow. The external name is the name that will appear in Power Automate.
- **Description**: A description of the variable that will appear in Power Automate and the Flow inputs dialog.

> **NOTE**
>
> The **Variable type**, **Variable name**, **Data type**, and **External name** fields are required to create an input variable.

If you run a flow containing input variables through the console, the **Flow inputs** dialog will prompt you to set their values manually. You can find more information about running flows in Run attended and unattended desktop flows.

Create an output variable

To create an output variable:

1. Select the (+) button in the variables pane and then **Output**.

2. When the **Add a new output variable** dialog is appeared, populate the following fields:

- **Variable type**: Defines if the variable is input or output.
- **Variable name**: The name of the variable in the flow.
- **External name**: The name used outside the flow. The external name is the name that will appear in Power Automate.
- **Description**: A description of the variable that will appear in Power Automate.

> **NOTE**
>
> The **Variable type**, **Variable name**, and **External name** fields are required to create an output variable.

Manage input and output variables

All the created input and output variables are displayed in the appropriate section of the variables pane.

Through this pane, you can rename, update, delete, and find the usages of each input/output variable.

To update an input/output variable:

1. Right-click on its name in the variables pane and select **Edit**.

2. In the **Edit variable** dialog, update the desired fields and select **Update** to apply the changes.

Sensitive variables

> **IMPORTANT**
>
> Flows developed in older versions of Power Automate for desktop (v.2.13 or older) remain unaffected from the sensitive variables functionality, as long as they aren't edited. If users run existing flows from the console and the portal without editing them, they will still have the old behavior and work in the same way as before. To migrate flows to the new functionality, edit and save them at least once with Power Automate for desktop v.2.14 or above. This will convert past encrypted type input variables, as well as encrypted type variables produced by the 'Get password from CyberArk' action, to text type variables marked as sensitive.

There are scenarios where flows handle sensitive information that needs to be hidden while debugging and running the flow. Power Automate for desktop allows users to create sensitive variables that aren't visible when a flow runs from within the flow designer.

If you have logged in with an organization premium account, the values of sensitive variables aren't logged in the desktop flow logs of the Power Automate portal when the flow runs from the console or a cloud flow.

Users can set any variable as sensitive, independently of its type, via the variables pane. Sensitivity is marked at the variable level, so variable types that are structures of data, like lists, datarows, datatables or custom objects, will be sensitive as a whole. There is no way to mark only a list item or a datatable column or a variable property as sensitive in an otherwise non-sensitive variable.

Sensitive variables can be manipulated, referenced, processed, and used in every action without any limitation, like every other variable. Additionally, they can be combined with other variables and included in expressions. In this case, for the logs' purposes, such expressions would be considered sensitive as a whole.

In the flow designer, the sensitivity works as a mask that can be set on and off. Thus, users can unmask sensitive variables to see their values or mask them again to hide their values.

> **NOTE**
>
> - The value of a sensitive variable is visible when the variable is sent to an application outside Power Automate for desktop or displayed through the **Display message** action.
> - Sensitivity isn't inheritable in variables. This means that if a sensitive variable or expression is added or assigned to another variable, the latter won't be sensitive by default, unless explicitly marked otherwise by the user.
> - Marking a variable as sensitive hides its values from the summary of the **Set variable** action.
> - The input details of the **Set variable** action aren't visible in the desktop flow logs when the contained variables have been marked as sensitive.

To set a variable as sensitive, right-click on it in the variables pane and select **Mark as sensitive**. To stop a variable from being sensitive, right-click on it and select **Mark as not sensitive**.

Apart from the context menus, you can use the dedicated icon next to each variable to mark it as sensitive or not sensitive.

Sensitive input and output variables

When creating or editing an input or output variable, select **Mark as sensitive** in the respective dialog to make it sensitive.

The default value of an input variable is visible in the creating or editing dialog when sensitivity is enabled. This functionality is implemented because this value exists only for testing and debugging purposes. Each input has to be initialized in production runs from the portal or the console.

On the other hand, the default value isn't visible in the variables pane. Additionally, the default value of a sensitive input variable is hidden in the **Flow input** dialog, which appears when a flow containing input variables is run through the console.

The eye icon to reveal the value isn't available unless the user deletes the default value and provides a new one.

Known issues and limitations

- **Issue:** Flows built or edited with Power Automate for desktop version 2.14 or above are incompatible with older versions of Power Automate for desktop. You can't use older versions of Power Automate for desktop to open or run these flows.
- **Workarounds:** None.

Variable datatypes

1/15/2022 • 7 minutes to read • Edit Online

When you create variables in your flows, Power Automate converts them to a specific type based on their content.

Some of these data types are widely used throughout the application, such as **numbers**, while others, such as **browser instances**, require explicit actions or groups of actions.

Simple data types

- **Text value** - Any kind of text, from email addresses to the text contents of a .txt file.

  Text data type properties

  To create a **Text value** variable, use the **Set variable** action and populate the input parameter with the desired text without any notation.

- **Numeric value** - This is the type applied to numbers. Only this data type can be used in mathematical operations.

  To create a **Numeric value** variable, use the **Set variable** action and populate the input parameter with a number without any notation.

  Except for hardcoded numeric values, you can use mathematical expressions with variables within percentage signs. You can find more information about the mathematical expressions in the Use variables and the % notation article.

- **Boolean value** - The value can be either **True** or **False**.

  To create a **Boolean value** variable, use the **Set variable** action and populate the input parameter with the expressions **%True%** or **%False%**.

  Additionally, you can create complex expressions using logical operators, variables and the percentage notation. You can find more information about the logical expressions in the Use variables and the % notation article.

Advanced data types

- **List** - Lists are collections of items. Depending on the types of the individual list items, there can be lists of text values, lists of numerical values, and so on. The list data type is the equivalent of a single-dimension array in programming terms.

  You can create a list through the **Create new list** action and add an item to that list through the **Add item to list** action.

You can also create a list through actions that generate lists as output. For example, the **Read text from file** action can return a list of text values and the **Get files in folder** action returns a list of files.

To retrieve a specific item of a list, use the following notation: **%VariableName[ItemNumber]%**

In the example below, the flow stores the first number of the previously displayed list to a new variable. Keep in mind that the index should be 0 for the first item of the list.

A common practice is to use a **For each** action to iterate through the items of a list.

List data type properties

- **Datatable** - A datatable contains data in a tabular form. Datatables are the equivalent of two-dimensional arrays in programming terms.

  A datatable contains rows and columns that describe the position of each item uniquely. Datatables can be considered as lists that contain datarows as items.

#	Product Name	Product Code	Price	Availability	Description
0	Product1	2384	$40	True	This is Product 1
1	Product2	4635	$20	True	This is Product 2
2	Product3	9584	$60	False	This is Product 3
3	Product4	8635	$25	True	This is Product 4
4	Product5	7464	$70	False	This is Product 5
5	Product6	1836	$10	True	This is Product 6

Power Automate provides three actions to generate datatables: the **Read from Excel worksheet** action, the **Execute SQL statement** action and the **Extract data from web page** action.

Alternatively, while Power Automate doesn't provide an action to form your own datatables, you can create a datatable using the **Set variable** action and the programming array notation.

This notation consists of multiple single-dimension arrays separated by commas and enclosed in curly brackets. The final expression must have the following form: **%{['Product1', '10 USD'], ['Product2', '20 USD']}%**.

If you want to add column headers while creating a new datatable, use the **^['ColumnName1', 'ColumnName2']** expression for the first row.

To add a new row to an existing table, create an expression containing the variable name of the datatable, a plus character (+), and the values you want to add in brackets.

To retrieve a specific item of a datatable, use the following notation: **%VariableName[RowNumber][ColumnNumber]%**. Keep in mind that the **RowNumber** and the **ColumnNumber** should be 0 for the first item (row or column).

For example, suppose that a flow retrieves the content of an Excel worksheet and stores it in the **ExcelData** variable. To access the first cell on the second row of the retrieved table, use the expression displayed below.

> **NOTE**
>
> The **ExcelData** variable contains a table of values extracted from an Excel worksheet using the **Read from Excel worksheet** action. It contains some values of a specific worksheet and not the whole Excel file.

If you want to access a specific column in a datable that contains column headers, use the **%ExcelData[rowNumber]['ColumnName']** notation.

If you loop through a datatable with a **For Each** action, the variable that will contain the current iteration's data is considered to be a datarow.

Datatable data type properties

- **Datarow** - A datarow contains the values of a single row of a datatable. When you loop through a datatable with a **For Each** action, the variable that contains the current iteration's data is a datarow.

  To retrieve a specific item of a datarow, use the following notation: **%VariableName[ItemNumber]%**

  Alternatively, you can use the **%VariableName['ColumnName']%** notation. The name of each column is defined by the datatable from which you retrieved the datarow.

  Datarow data type properties

- **Custom object** – Contains pairs of properties and values, which can be easily converted to JSON format.

  To create a new empty **Custom object**, use the **Set variable** action and populate the following expression **%{{ }}%**. To create a new **Custom object** and initialize it with properties and values, use an epxression of the following structure: **%{ 'Property1': 'Value1', 'Property2': 'Value2', 'Property3':**

'Value2' }%.

To update the value of an existing property or add a new one, deploy a **Set variable** action, populate the property's name in the **Set** field, and enter its value in the **To** field.

Apart from literal values, you can use variables to dynamically set the properties and values of custom objects. For example, the following flow uses two variables to add a new property to a new empty custom object.

Known issues and limitations

- **Issue**: The values for datarow and datatable variables are not displayed properly in the variables pane.
- **Workarounds**: None.

Instances

- **Web browser instance** – Contains a browser instance created through the **Launch new Internet Explorer** or other browser launching actions.

  Web browser instance data type properties

- **Window instance** – Contains a window instance created through the **Get window** action.

  Window instance data type properties

- **Excel instance** – Contains an Excel instance created through the **Launch Excel** action.

  Excel instance data type properties

- **Outlook instance** - Contains an Outlook instance created through the **Launch Outlook** action.

Connections

- **SQL connection** - Contains a connection to an SQL database established through the **Open SQL connection** action.

  SQL connection data type properties

- **Exchange connection** - Contains a connection to an Exchange server established through the **Connect to Exchange server** action.

  Exchange connection data type properties

- **FTP connection** - Contains an FTP connection created through the **Open FTP connection** and **Open secure FTP connection** actions.

  FTP connection data type properties

Others

Active Directory

- **Active Directory entry** - Contains a connection to an Active Directory server established through the **Connect to server** action.
- **Group info** - Contains information about a specified Active Directory group.
- **Group member** - Represents a member of a specified Active Directory group.
- **User info** - Contains information about a specified Active Directory user.

Active Directory data type properties

AWS

- **EC2 client** - Contains an EC2 session created through the **Create EC2 session** action.
- **EC2 instance** - Represents a retrieved EC2 instance.
- **EC2 instances info** - Contains information about an EC2 instance.
- **Instance state change** - Contains information about an EC2 instance that was started or stopped.
- **EBS snapshot** - Represents an EBS snapshot.
- **EBS volume** - Represents an EBS volume.

AWS data type properties

Azure

- **Azure client** - Contains an Azure session created through the **Create session** action.
- **Azure resource group** - Represents a retrieved Azure resource group.
- **Azure managed disk** - Represents a retrieved Azure disk.
- **Azure snapshot** - Represents an Azure snapshot.
- **Azure virtual machine** - Represents a retrieved Azure virtual machine.
- **Azure virtual machine info** - Contains information about an Azure virtual machine.
- **Azure subscription** - Represents a retrieved Azure subscription.

Azure data type properties

CMD

- **CMD session** - Contains a CMD session created through the **Open CMD session** action.

CMD data type properties

Dates and time

- **Datetime** - Contains date and time information. To create a datetime variable through the **Set Variable action**, populate the input parameter with the expressions **%d"yyyy-MM-dd HH:mm:ss.ff+zzz"%**, where:

NOTATION	DESCRIPTION
yyyy	Year
MM	Month
dd	Day
HH	Hour
mm	Minutes
ss	Seconds

NOTATION	DESCRIPTION
ff	Milliseconds
zzz	UTC Offset

Dates and time data type properties

Email

- **Mail message** - Represents an email message. The **Retrieve emails** action populates these variables.

Email data type properties

Exchange

- **Exchange mail message** - Represents an email message retrieved from an Exchange server. The **Retrieve Exchange email messages** action populates these variables.

Exchange data type properties

Files and folders

- **File** - Represents a file.
- **Folder** - Represents a folder.

Files and folders data type properties

FTP

- **FTP file** - Represents an FTP file.
- **FTP directory** - Represents an FTP directory

FTP data type properties

OCR

- **OCR Engine** – Contains an OCR engine created through the **Create OCR engine** action.

Outlook

- **Outlook mail message** - Represents an email Outlook message. The **Retrieve email messages from Outlook** action populates these variables.

Outlook data type properties

Terminal

- **Terminal session** - Contains a terminal session created through the **Open terminal session** action.

Terminal data type properties

XML

- **XML node** - Contains the content of an XML document. The **Read XML from file** action populates these variables.

XML data type properties.

Variables datatype properties

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Some of the built-in data types have properties that are associated with the value stored in the variable.

A property may contain a part of the information stored in the variable, like the day of a date, or an extra attribute describing the variable, like the size of a list.

The value of these properties can be accessed directly through the following notation: **%VariableName.PropertyName%**.

For example, if you have a list of files called **Files**, you can get the number of the stored files using the expression: **%Files.Count%**

The data types that have properties are displayed in the following lists.

Texts

PROPERTY	DESCRIPTION
Length	The length of the stored text in characters.
isEmpty	This property is true if the variable is empty or false if it contains some characters.
ToUpper	The text of the variable written in upper case characters.
ToLower	The text of the variable written in lower case characters.
Trimmed	The text of the variable written without white characters in the begging and the end.

Dates

PROPERTY	DESCRIPTION
Year	The year part of the datetime value.
Month	The month part of the datetime value.
Day	The day part of the datetime value.
DayOfWeek	The name of the day (Sunday, Monday etch).
DayOfYear	The day of the year part of the datetime value (1-365/6).
Hour	The hour part of the datetime value.
Minute	The minute part of the datetime value.
Second	The seconds part of the datetime value.

Lists

PROPERTY	DESCRIPTION
Count	The number of items stored into the list.

Files

PROPERTY	DESCRIPTION
FullName	The full path to the file.
RootPath	The root path of the file, for example **C:**.
Directory	The directory where the file is stored.
Name	The name of the file, including the extension.
NameWithoutExtension	The name of the file without its extension.
Extension	The extension of the file.
Size	The size of the file in bytes.
CreationTime	The date when the file was created.
LastAccessed	The date when the file was last accessed.
LastModified	The date when the file was last modified.
IsHidden	This property is true if the file is hidden or false if the file is visible.

PROPERTY	DESCRIPTION
IsSystem	This property is true if the file is a system file or false if it isn't.
IsReadOnly	This property is true if the file is read only or false if it isn't.
IsArchive	This property is true if the file is an archive or false if it isn't.
Exists	This property is true if the file exists or false if the file doesn't exist.
isEmpty	This property is true if the file is empty or false if the file isn't empty.

Folders

PROPERTY	DESCRIPTION
FullName	The full path to the folder.
RootPath	The root path of the folder, for example, `C:\`.
Parent	The parent directory of the folder.
Name	The name of the folder.
CreationTime	The date when the folder was created.
LastModified	The date when the folder was last modified.
IsHidden	This property is true if the folder is hidden or false if the folder is visible.
Exists	This property is true if the folder exists or false if the folder doesn't exist.
isEmpty	This property is true if the folder is empty or false if the folder isn't empty.
FilesCount	The number of files in the folder.
FoldersCount	The number of folders in the folder.

Mail messages

PROPERTY	DESCRIPTION
MailFolder	The name folder the email message is retrieved from.
Uid	The unique identifier of the message.

PROPERTY	DESCRIPTION
From	The sender of the email message.
To	A list of values containing the recipients of the message.
Cc	A list of values containing additional recipients for the message (carbon copy).
Date	The date and time in which the message was sent.
Subject	The subject of the message.
Body	The body of the message. The body can be in plain text or in HTML form.
BodyText	If the previous property contains HTML, this property contains the body of the message in plain text form.
Attachments	A list of files that represent the saved attachments of the email message (if any).

Exchange connection

PROPERTY	DESCRIPTION
ServerAddress	The address of the Exchange server.

Exchange mail messages

PROPERTY	DESCRIPTION
MailFolder	The name folder the email message is retrieved from.
ItemId	The unique identifier of the message.
From	The sender of the email message.
To	A list of values containing the recipients of the message.
Cc	A list of values containing additional recipients for the message (carbon copy).
Date	The date and time in which the message was sent.
Subject	The subject of the message.
Body	The body of the message. The body can be in plain text or in HTML form.
BodyText	If the previous property contains HTML, this property contains the body of the message in plain text form.

PROPERTY	DESCRIPTION
Attachments	A list of files that represent the saved attachments of the email message (if any).

Outlook mail messages

PROPERTY	DESCRIPTION
MailFolder	The name folder the email message is retrieved from.
EntryId	The unique identifier of the message.
From	The sender of the email message.
To	A list of values containing the recipients of the message.
Cc	A list of values containing additional recipients for the message (carbon copy).
Bcc	A list of values containing additional recipients for the message (blind carbon copy).
Date	The date and time in which the message was sent.
Subject	The subject of the message.
Body	The body of the message. The body can be in plain text or in HTML form.
BodyText	If the previous property contains HTML, this property contains the body of the message in plain text form.
Attachments	A list of files that represent the saved attachments of the email message (if any).

FTP files

PROPERTY	DESCRIPTION
FullName	The full path to the file.
Directory	The directory where the file is stored on the FTP Server.
Name	The name of the file, including the extension.
NameWithoutExtension	The name of the file without its extension.message.
Extension	The extension of the file.
Size	The size of the file in bytes.

PROPERTY	DESCRIPTION
LastModified	The date when the file was last modified.

FTP folders

PROPERTY	DESCRIPTION
FullName	The full path to the folder.
Parent	The parent directory of the folder.
Name	The name of the folder.
LastModified	The date when the folder was last modified.

FTP connection

PROPERTY	DESCRIPTION
Host	The host of the FTP connection.
SecurityProtocol	The security protocol used in the connection.

Datatables

PROPERTY	DESCRIPTION
RowsCount	The number of rows of the data table.
Columns	A list that contains the names of the columns of the data table.
IsEmpty	This property is true if the datatable is empty or false if it is contains elements.

Datarows

PROPERTY	DESCRIPTION
ColumnsCount	The number of columns that the data row holds.
ColumnsNames	A list that contains the headers of the datarow.

Web browser instance

PROPERTY	DESCRIPTION

PROPERTY	DESCRIPTION
DisplayRectangleX	The position of the top-left corner of the window in the x axel.
DisplayRectangleY	The position of the top-left corner of the window in the y axel.
Handle	The handle of the browser instance.
HtmlDialogs	Contains the dialogs of the current page, if they exist.
IsAlive	This property is true if the browser window is alive or false if it isn't.

Window instance

PROPERTY	DESCRIPTION
Handle	The handle of the window instance.

Excel instance

PROPERTY	DESCRIPTION
Handle	The handle of the Excel instance.

SQL connection

PROPERTY	DESCRIPTION
ConnectionString	The connection string used for the database connection.
IsClosed	This property is true if the browser window is closed or false if it is open.

CMD session

PROPERTY	DESCRIPTION
IsAlive	This property is true if the CMD session is alive or false if it isn't.
ProcessId	The unique identifier of the process.

Terminal session

PROPERTY	DESCRIPTION

PROPERTY	DESCRIPTION
IsTerminated	This property is true if the terminal session is terminated or false if it isn't.

XML node

PROPERTY	DESCRIPTION
Children	The children of the XML node.
InnerText	The inner text of the XML node.
InnerXML	The inner XML of the XML node .
Name	The name of the XML document.
OuterXML	The outer XML of the XML node.
Parent	The parent of the XML node.
Value	The value of the XML node.

Active Directory entry

PROPERTY	DESCRIPTION
LdapPath	The LDAP path of the Active Directory connection.

Group info

PROPERTY	DESCRIPTION
Description	The description of the group.
DisplayName	The display name of the group.
Members	A list containing the members of the group.
Name	The name of the group.

User info

PROPERTY	DESCRIPTION
City	The city uf the user.
Company	The company of the user.
Country	The country of the user.

PROPERTY	DESCRIPTION
Department	The department of the user.
Email	The email of the user.
Extension	The extension of the user.
FirstName	The first name of the user.
Initials	The initials of the user.
LastName	The last name of the user.
PostalCode	The postal code of the user.
State	The state of the user.
StreetAddress	The address of the user.
TelephoneNumber	The phone number of the user.
Title	The title of the user.

EBS snapshot

PROPERTY	DESCRIPTION
DataEncryptionKeyId	The id of the data encryption key.
Description	The description of the snapshot.
Encrypted	This property is true if the snapshot is encrypted.
KmsKeyId	The The identifier of the AWS Key Management Service customer master key to use for encryption.
OwnerAlias	The alias of the owner.
OwnerId	The id of the owner.
Progress	The progress of the snapshot.
SnapshotId	The id of the snapshot.
StartTime	The start time of the snapshot.
State	The state of the snapshot.
StateMessage	The state message of the snapshot.
Tags	The tags of the snapshot.

PROPERTY	DESCRIPTION
VolumeId	The volume id.
VolumeSize	The size of the volume.

EBS volume

PROPERTY	DESCRIPTION
Attachments	The attachments of the volume.
AvailabilityZone	The availability zone of the volume.
CreateTime	This creation time of the volume.
Encrypted	This property is true if the volume is encrypted.
FastRestored	This property is true if the fast restore is enabled.
Iops	The max IOPS of the volume.
KmsKeyId	The The identifier of the AWS Key Management Service customer master key to use for encryption.
MultiAttachEnabled	This property is true if the multi-attach is enabled.
OutpostArn	The Amazon Resource Name (ARN) of the outpost.
Size	The size of the volume.
SnapshotId	The id of the snapshot.
State	The state of the volume.
Tags	The tags of the volume.
VolumeId	The id of the volume.
VolumeType	The type of the volume.

Azure managed disk

PROPERTY	DESCRIPTION
AvailabilityZones	The availability zones of the disk.
Configuration	The configuration of the disk.
Encrypted	This property is true if the disk is encrypted.

PROPERTY	DESCRIPTION
IopsSLimit	The max IOPS of the disk.
IsAttachedToVirtualMachine	This property is true if the disk is attached to a virtual machine.
OperationSystem	The operation system installed on the disk.
SizeInGB	The size of the disk in GB.
State	This state of the disk.
ThroughputLimit	The throughput limit of the disk.
TimeCreated	The creation time of the disk.
Type	The type of the disk.
VirtualMachine	The virtual machine that the disk is attached to.
ResourceGroup	The resource group of the disk.
Id	The id of the disk.
Location	The location of the disk.
Name	The name s of the disk.
SubscriptionId	The subscription id of the disk.
Tags	The tags of the disk.

Azure resource group

PROPERTY	DESCRIPTION
ProvisioningState	The provisioning state of the resource group.
Id	The id of the resource group.
Location	This location of the resource group.
Name	The name of the resource group.
SubscriptionId	The subscription id of the resource group.
Tags	The tags of the resource group.

Azure snapshot

PROPERTY	DESCRIPTION
CreationSourceId	The creation source id of the snapshot.
CreationSourceType	The creation source type of the snapshot.
OperationSystem	This operation system on the the snapshot.
SizeInGB	The size of the snapshot in GB.
StorageAccountType	This storage account type of the snapshot.
TimeCreated	The creation time of the snapshot.
ResourceGroup	The resource group of the snapshot.
id	This id of the snapshot.
Location	The location of the snapshot.
Name	The name of the snapshot.
SubscriptionId	The subscription id of the snapshot.
Tags	The tags of the snapshot.

Use variables and the % notation

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Variables are used within flows to store data for further processing. Every variable name must be enclosed by percentage signs (%). The percentage sign is used as a special character to denote variables. Any expression between percentage signs should be evaluated.

Occasionally, the percentage sign should be used as a simple character, instead of denoting a calculation. In those cases, it should be escaped using another percentage character (%%).

Power Automate enables you to create complex expressions containing hardcoded values, variable names, arithmetic and logical operations, comparisons and parentheses.

Hardcoded values

To include a hardcoded text value inside a variable, use quotes. Every value between the quote characters will be treated as a text value and not as a variable name.

Variable names

Variables can be used by adding their name to the expression without any further notation.

Basic arithmetic

To make mathematical operations, use all the essential, arithmetic operators, such as addition (**+**), subtraction (-), multiplication (*****), and division (**/**).

Arithmetic operations are predominantly used with numerical values and variables. However, you can also use the addition operator to concatenate strings. Adding numbers and text strings in the same expression will convert the numbers into text, and concatenate them with the other text strings.

EXPRESSION	RESULT
%5 * 3%	15 (number)
%4 / Var%	4 divided by the value of the Variable named “Var”
%'this is ' + 'text'%	this is text (text)
%'This is the number ' + 5%	This is the number 5 (text)

Comparisons

Besides arithmetic operators, make comparisons using the following operators

OPERATOR	DESCRIPTION
=, !=	Equal/not equal
<, <=	Less than/less than or equal
>, >=	Greater than/greater than or equal

Keep in mind that comparisons, when evaluated, produce either **True** or **False** as a value. Naturally, comparisons can only be done between values of the same type.

Logical operators

Logical operators can also be used to check multiple conditions simultaneously, allowing you to implement more complex logic in a single expression. The supported operators are: AND and OR.

EXPRESSION	RESULT
%Index = 1 OR Index = 2%	True if the value of the **Index** variable is 1 OR 2, otherwise False
%Index = 4 AND Text = "Four"%	True if the value of the **Index** variable is 4 AND the value of the **Text** variable is Four, otherwise False

Parentheses

To change the operators' priority, use parentheses. Parentheses are handled the same way as in algebra and programming languages.

Set variable
{x} Set the value of a new or existing variable, create a new variable or overwrite a previously created variable More info
Set:
NewVar {x}
To:
%(Salary + Bonus) * 12%
{x}
Save
Cancel

Automate using UI elements

1/15/2022 • 2 minutes to read • Edit Online

Power Automate for desktop utilizes UI elements to interact with applications and web pages without resorting to image recognition and absolute coordinates. UI elements are used as input in most UI automation and browser automation actions and identify specific elements on windows and web pages.

UI elements

When deploying a UI automation or browser automation action, you may be required to provide a UI element as input. To add a new UI element, you can do it directly from the action properties or through the UI elements pane of the flow designer.

Each one of these action groups accepts a different category of UI elements. UI automation actions accept UI elements captured from desktop applications, while browser automation actions accept UI elements captured from web pages.

> **NOTE**
>
> UI automation actions can use only UI elements for desktop applications, while the browser automation actions can use only UI elements for webpages. Therefore, incompatible UI elements aren't available for selection.

To add a new UI element to your flow, select to add a new UI element through an action or the UI elements pane, highlight the respective element, and press **Ctrl + Left click**. When the selection is finished, select **Done**.

Any captured UI elements will be added to the UI elements pane. To access the UI elements pane, select the UI elements tab on the right-hand side of the flow designer.

Elements can be sorted alphabetically through the **Sort** option of the UI elements tab. To remove all the UI elements that aren't used in any action, select the dots icon next to the **Sort** option and then **Remove unused UI elements**.

To rename or delete a UI element, right-click on the respective item and select the appropriate function.

To find where a specific UI element is being used in the flow, right-click on it and select **Find usages**. The results will display all the actions that use this UI element. Double-click on a result to highlight the action on the workspace.

UI elements types

UI automation and browser automation actions accept two different kinds of UI elements. UI automation actions accept only UI elements captured from desktop applications, while browser automation actions accept only UI elements captured from web pages.

To distinguish a UI element for a desktop application from a UI element for a web page, check its parent selector element. UI elements for desktop applications usually have the desktop as their parent element, while the UI elements for web pages have a webpage as their parent element.

UI elements for web pages

To capture a UI element from a webpage, you need to install the appropriate browser extension. You can find more information about the supported browsers and the required extension in Use browsers and manage extensions.

When the browser extension isn't able to communicate with Power Automate, the browser window is identified as a desktop application. As a result, Power Automate tries to grab UI elements for a desktop application and not a web page.

UI elements properties

To manage a UI element's selectors, right-click on the element and select **Edit selector**. This option brings up the Selector builder, where the selector can be edited with a visual editor.

To manually enter the selector's value, toggle off Visual editor, and the text value of the selector will become editable. You can find more information about selectors in Build a custom selector.

Automate using images

1/15/2022 • 2 minutes to read • Edit Online

To capture a new image in Power Automate, navigate to the **Images** tab on the right pane of the flow designer.

Select **Capture image**, and click and drag the cursor on the area you want to capture. A magnifying glass will help you to capture the image with high precision.

Alternatively, select the arrow on the **Capture image** button to capture images on a timer. Then, choose one of the suggested time options or **Capture image with custom delay** to set a custom delay time.

After capturing the image, populate a name for it in the dialog box and select **OK** to add it to the flow.

Manage captured images

To remove all the images that aren't used in any action, select the dots icon next to the **Capture image** option, and then select **Remove unused images**. If you navigate inside a specific folder, the **Remove unused images** option will remove only the unused images located in this folder.

To create a new folder, select **Add a new folder** and specify a name for the created folder. You can store images into a specific folder by capturing them while the folder is open.

To rename or delete images and folders, right-click on the respective item and select the appropriate function. Select the image thumbnail to open and view it.

To find where an image is being used in the flow, right-click on it and select **Find usages**. The results will present the actions that use the specific image. Double-clicking on a result will highlight the action in the workspace.

Use images in actions

After capturing images, you can use them as input in actions that require them, such as the **Move mouse to image** action.

In the advanced settings of these actions, you can select which image matching algorithm you want to use. The **Basic** algorithm achieves better results with images less than 200x200 pixels, while the **Advanced** algorithm is more effective with bigger images and more robust to color changes.

The **Tolerance field** defines the acceptable ammount of differences between the provided image and the image

is compared with. High tolerance values may affect the precision of image recognition.

Manage errors

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While developing and executing flows, users may encounter two different kinds of errors, **design time** and **run time** errors.

The **design time** errors are associated with the configuration of the deployed actions. This kind of error appears while developing the flow and prevent it from running. An empty mandatory field or the use of an undefined variable may cause this kind of error.

The **run time** errors or exceptions come up when the flow is running. These errors cause the flow to fail unless an exception handling behavior has been set. An invalid file path can cause this kind of error.

When an action throws an error, the platform displays an error icon next to it and a pop-up pane with relevant error information.

The **Errors** pane is split into three columns:

- **Subflow**: The name of the subflow containing the action that threw the error.
- **Action**: The line number of the action that threw the error.
- **Error**: The error message.

If the occurred error is a **design time** error, the platform also displays a short description of the error inside the action.

To implement an error handling behavior in your flow, you can use the **Get last error** action to retrieve the latest occurred error and use it in later actions.

The **Get last error** action returns an error type variable that provides six different properties: the name, the location and the index of the action that failed, the subflow that contains this action, and the details and the message of the action.

To avoid retrieving the same error value later in your flow, enable the **Clear error** option that clears the last error after storing it in the variable.

The error detail view

To find more information about a thrown exception, navigate to the **Errors** pane and double-click on the respective error. Once you do so, the **Error details** dialog box will appear. This dialog box displays information about:

1. **Location**: The subflow and the action that threw the error.
2. **Error message**: The error message.
3. **Error details**: A long description of the error. These details give a clear message about why the error happened and what the cause is.

Record flows in Power Automate Desktop

1/15/2022 • 4 minutes to read • Edit Online

Power Automate for desktop enables you to design flows automatically by replicating the task you wish to automate.

Record desktop and web flows

To record a flow that automates desktop or/and web applications:

1. Create a new desktop flow and select **Recorder** in the toolbar of the flow designer.

2. Select **Record** in the recorder window and start performing the desired actions in the appropriate application or web page.

The recorder keeps track of mouse and keyboard activity in relation to UI elements, and records each action separately. During each recording session, the recorder can generate both UI and browser automation actions.

> **NOTE**
> When the browser extension isn't able to communicate with Power Automate, the browser window is identified as a desktop application. As a result, the recorder tries to grab UI elements for a desktop application and not a web page.

3. When the recording process is completed, select **Finish** to convert the recorded steps to Power Automate for desktop actions. All the UI elements used in the generated UI and web automation actions are added automatically to the UI elements pane.

> **NOTE**
>
> The UI elements captured from web applications using the recorder are custom and can't be edited through the Visual editor. You can find more information regarding editing UI elements and creating custom selectors in Build a custom selector.

To pause the recording process temporarily, select **Pause**. To add a comment to the recorded actions, select **+ Comment**.

Launch a web browser

To launch a web browser instance while recording web flows, you can use three different approaches based on the automation scenario.

The first method is to select the dots icon on the right side of the recorder dialog and then **Launch new web browser**. You can choose between Microsoft Edge, Google Chrome, Mozilla Firefox, and Microsoft Internet Explorer.

After selecting the proper browser, the recorder will detect the loaded webpage automatically and configure the launching browsing step accordingly.

An alternative way to launch a browser is to start recording in an already open web browser. The recorder will automatically detect the loaded page and will create a launching browser action.

The last method to launch a browser is to manually launch it through its shortcut on the desktop, the start menu, the taskbar, or a folder. If you implement this approach, the recorder will generate UI automation actions that click the browser shortcut and launch it.

Add text using Input Method Editors (IMEs)

Input Method Editors (IMEs) are software components that enable users to input text in languages that can't be represented easily on a standard QWERTY keyboard. Users can type combinations of keys, and IMEs will generate a character or a list of candidate characters that match the set of keystrokes.

Power Automate for desktop supports the use of IMEs during the flow recording procedure. To populate a text field using an IME:

1. Right-click on the text field and select **Add text with IME** on the displayed menu.

2. Populate the popup dialog with the desired text using an IME.

3. Select **Add text** to generate the respective step in the **Recorder** window.

Image-based recording

In some cases, the recorder may not record actions in specific applications that don't meet the appropriate technical requirements. These applications may not expose their accessibility API, run on virtual desktop environments, or have other technical limitations that block the recording process.

As an alternative way to record flows, Power Automate for desktop provides image-based recording. The image-based recording uses image recognition and OCR to locate specific elements on the screen and extract text.

> **NOTE**
> The recorder switches automatically to image recording mode when a Citrix or Remote Desktop Protocol (RDP) window is detected.

To record flows using images:

1. Create a new desktop flow and select **Recorder** in the toolbar of the flow designer.

2. Select the dots icon on the right side of the recorder dialog, and then enable **Image recording**. After enabling this option, select **Record** to start recording actions using image recognition.

Upon clicking on an element, an image is captured automatically and saved with a default editable name. To preview the captured image, hover or select the **preview icon**.

Extract text with image-based recording

To extract a text value while using image recording:

1. Perform a **right-click** on the screen and select **Extract text from image**.

2. Wait for a popup message that will prompt you to select a text area.

3. Select the **text area** from which text will be extracted using the Tesseract OCR engine.

4. Wait for a popup message that will prompt you to select an anchor area.

5. Select an **anchor area** that isn't expected to change, such as the label next to a field.

Recording vs building a desktop flow

You can edit manually any actions created through the recorder once the recording is finished. Use the recorder in a desktop flow that is already under development to add the recorded steps to it.

> **NOTE**
> Use the recorder to create the backbone of your flow. Certain simple tasks may require no further editing, however most recorded tasks should be modified to achieve optimal results. Certain types of actions, like conditionals and loops, cannot be recorded. Also, there may be redundant actions in a recording that should be removed.

Known issues and limitations

- **Issue**: The recorder may not record all steps from the Windows Start menu or system tray.
- **Workarounds**: None.
- **Issue**: While running a flow created through image-based recording, the click may be sent to the wrong place.
- **Workarounds**: Edit the auto-generated action "Move mouse to image" through the flow designer and decrease the Tolerance parameter in the Advanced settings.
- **Issue**: The "Extract text from image" popup that appears after sending a right-click using the recorder, may hide behind the popup of the application.
- **Workarounds**: Send the right-click to another place on the screen.
- **Issue**: Any keystrokes sent to a maximized RDP window through an image-based recording are not being recorded.
- **Workarounds**: Resize the RDP window so that it doesn't cover the full screen.

Use loops

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Loops are a fundamental concept in desktop flow development and prove to be invaluable elements in complex flows. The main idea behind a loop is to make a desktop flow repeat one or more actions multiple times.

Power Automate provides three different kinds of loops that iterate based on various factors:

- **Simple loops** - Iterate for a set number of times
- **Loops condition** - Iterate as long as a condition is valid
- **For each loops** - Iterate through a list

Simple loops

The idea behind a loop is to make a desktop flow repeat one or more actions multiple times. Power Automate implements the simplest type of loops with the **Loop** action.

This loop repeats the actions between the **Loop** and **End** actions for a set number of times. A loop index variable is created automatically to track the current iteration's number.

A simple loop is ideal to use in two cases:

1. The exact number of times that a block of actions should be repeated is known.
2. The loop index variable must be used somewhere inside the loop.

In case you need to exit the loop before the specified iterations are completed, use the **Exit loop** action. To skip the current iteration, use the **Next loop** action.

Loop condition

Unlike simple loops, the **Loop condition** makes a desktop flow repeat one or more actions as long as a condition is true.

If the condition is always true, the loop will never end. This situation is called an endless loop.

The condition consists of two operands and an operator. The platform supports the most significant logical operations, such as **equal**, **not equal**, and **greater than**.

In case you need to exit the loop before the specified iterations are completed, use the **Exit loop** action. To skip the current iteration, use the **Next loop** action.

For each loop

The **For each** loop iterates through a list (or data table) and stores the current item in a variable. Its primary purpose is to get each item of a list (or row of a data table) and use it in other actions.

You can use this kind of loop to search for specific names, contents, or attributes in all kinds of lists. For example, you can iterate through a list of retrieved files to find a file with a specific name.

In case you need to exit the loop before the specified iterations are completed, use the **Exit** loop action. To skip the current iteration, use the **Next loop** action.

You'll find the list of loop actions available in the Actions reference.

Use conditionals

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Conditionals allow you to execute blocks of actions only if a given condition is met. If the condition is false, the block of actions will be skipped.

Using conditionals, you can ensure certain elements have a wished value or state before performing other actions. For example, you can check if a file exists before trying to rename it.

If/else

The **If** statement is one of the most commonly used conditionals in flow development and programming.

Power Automate provides the **If** action to check whether a given condition is valid. If the condition is true, the logic between the **If** and **End** is executed.

An **If** action consists of two operands and an operator. The platform supports the most significant logical operations, such as **equal**, **not equal**, and **greater than**.

An **If** may optionally contain an **Else** action. The **Else** action defines the logic to be executed when the **If** condition is invalid. It should be placed between the **If** and the **End** actions.

To set multiple conditions for which different logic is executed, deploy the **Else if** action. This action is executed when the previous **If** and **Else if** conditions are invalid. It should be placed within the **If/End** block and always before the **Else** action.

In all cases, the variables and values used as operands must be of the same data type. Comparing variables of different data types makes the condition always false.

If variations

Apart from the standard **If** action, Power Automate provides some additional conditional actions:

- **If file exists**: Checks if a file exists or not before executing a block of actions. This action can be used to ensure that a file exists before performing other operations on it.
- **If folder exists**: Checks if a folder exists or not before executing a block of actions.

- **If service**: Executes a block of actions if a specific service is running, is paused or is stopped.
- **If process**: Executes a block of actions if a specific Windows process is running, or not.
- **If window**: Executes a block of actions if a specific window is open, or not.
- **If window contains**: Executes a block of actions if a specific text or UI element exists in a window, or not.
- **If image**: Executes a block of actions if a specific image is found on the screen, or not.
- **If web page contains**: Executes a block of actions if a web page contains a specific element or some text, or not.
- **If text on screen (OCR)**: Checks if a given text is found on the screen or not, using an OCR Engine of your choice.

Switch-case model

Unlike if-else conditionals, a switch block can address several possible execution paths. A switch statement is a control mechanism that allows a variable or expression to change the flow's behavior.

A switch block consists of three main parts:

1. The **Switch** action that marks the beginning of a switch block. Every **Switch** is accompanied by an **End** action that marks the switch block's end.
2. Inside the switch block, each **Case** marks a block of actions to execute if the respective condition is true.
3. In case all conditions are invalid, the flow will execute the actions in the **Default case** block, if exists.

You'll find the list of conditional actions available in the Actions reference.

Automate web flows

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Power Automate offers several actions under the **Browser automation** group to enable users to interact with web browsers.

Four web browsers are currently supported:

- Microsoft Edge
- Microsoft Internet Explorer
- Google Chrome
- Mozilla Firefox

Browser automation is achieved by launching or attaching to one of the supported browsers and then deploying browser automation actions. Development may be performed manually or through the use of the recorder.

Building a browser automation flow

To begin a browser automation flow, use one of the browser-launching actions: **Launch new Microsoft Edge**, **Launch new Internet Explorer**, **Launch new Chrome**, or **Launch new Firefox**). You can start a new browser session or attach to an existing one.

> **NOTE**
> To interact with browsers, you need to install the appropriate browser extension and configure the browser accordingly. You can find more information regarding the supported browsers and the required extension in Use browsers and manage extensions.

After the browser instance is stored in a variable, you can deploy other browser automation actions to interact with the browser's content. The **Web form filling** actions focus on providing input to web pages, while **Web data extraction** actions draw data from web pages.

Most browser automation actions require you to specify a browser instance and a UI element to interact with.

> **NOTE**
> You can find a list with all the available browser automation actions in the Browser automation actions reference.

Existing UI elements are displayed in the UI element pane, while new ones can be added directly through the action's properties or the pane. To find more information about UI elements nad their different types, refer to Automate using UI elements.

NOTE

Browser automation actions accept exclusively UI elements captured from web pages. Therefore, existing UI elements captured from desktop applications aren't displayed in the browser automation actions.

To add a new UI element, highlight the appropriate web element and press **Ctrl & left-click**. After adding all the required elements, select **Done** to save them to the UI elements pane.

NOTE

When the browser extension isn't able to communicate with Power Automate, the browser window is identified as a desktop application. As a result, Power Automate tries to grab UI elements for a desktop application and not a web page.

Data population on the web

To provide input to a web page, select the appropriate **Web form filling** action depending on the nature of the element, and specify the browser instance.

Web data extraction

To extract a piece of data from a web page, use the **Get details of web page** or the **Get details of element on web page** action, depending on whether the data in question concerns the entire web page or an element inside it.

> **NOTE**
>
> You can find more information regarding details extraction from web pages in Retrieve details from a web page.

To extract large amounts of structured data, use the **Extract data from web page** action. After deploying the action, right-click on the required data on the web page to view the available options.

Any lists or tables of data will be automatically identified after two of their elements are designated for extraction.

Interacting with the web and web services

Power Automate provides various HTTP actions to allow users to communicate directly with web resources, such as web pages, files, and APIs, without the need of a web browser.

> **NOTE**
>
> You can find a list with all the available HTTP actions in the HTTTP actions reference.

Downloading web resources

Use the **Download from web** action to directly download web page content or files stored on the web.

Both the **GET** and **POST** methods can be used with this action. The files can be downloaded directly to the disk, while web page contents are saved into a variable.

Accessing web APIs

Use the **Invoke web service** action to access web APIs. Various methods are compatible with this action, which is fully customizable in order to accommodate virtually any API.

> **NOTE**
>
> Before using the **Invoke web service** action, refer to the documentation page of the web service you want to use. The example presented in the following screenshot can't be applied to all scenarios, as each web service requires a different configuration and syntax.

Apart from the **Invoke web service** action, Power Automate provides the **Invoke SOAP web service** action to interact with SOAP web services.

Use browsers and manage extensions

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To automate web-related tasks, Microsoft Power Automate provides the **Automation browser** that is preconfigured and works out of the box.

Besides the **Automation browser**, the platform supports the four most popular browsers: **Microsoft Edge**, **Internet Explorer**, **Google Chrome**, and **Mozilla Firefox**. These browsers need additional configuration or/and browser extensions to work.

> **IMPORTANT**
>
> To work with Microsoft edge, make sure you have a Chromium-based version installed. Older versions are not supported.

Configuring Internet Explorer

By default, **Internet Explorer** works in protected mode to prevent any external application from controlling it.

While Power Automate can still work with this setting enabled, it will not be able to clear the browser's cache or cookies.

To disable protected mode and allow Power Automate to clear the browser's cache and cookies:

1. Launch **Internet Explorer**, select the **gear icon**, and choose **Internet options** in the menu.

2. In the **Internet options** dialog box, navigate to the **Security** tab, select **Internet** zone, and disable the **Enable Protected Mode** option. Repeat the same step for the **Local intranet** and **Trusted sites** zones.

Internet Options
General
Security
Privacy
Content
Connections
Programs
Advanced
Select a zone to view or change security settings.
Internet
Local intranet
Trusted sites
Restricted sites
Internet
This zone is for Internet websites, except those listed in trusted and restricted zones.
Sites
Security level for this zone
Allowed levels for this zone: Medium to High
Medium-high
- Appropriate for most websites
- Prompts before downloading potentially unsafe content
- Unsigned ActiveX controls will not be downloaded
Enable Protected Mode (requires restarting Internet Explorer)
Custom level...
Default level
Reset all zones to default level
OK
Cancel
Apply

3. Select **Apply** and **OK** to save the change and close the dialog box.

Configuring Internet Explorer for servers

To use Internet Explorer in Windows Servers, you have to disable the **Internet Explorer Enhanced Security Configuration** feature.

This feature prohibits all flows from properly launching an **Internet Explorer** or **Automation browser** instance via the **Launch new Internet Explorer** action. Additionally, it prevents web helpers from working as expected.

To disable the **IEESC** feature:

1. Launch the **Server Manager** and navigate to the **Local Server** tab.
2. Select the **Internet Explorer Enhanced Security Configuration** option to open the respective configuration dialog box.
3. Disable the **IEESC** feature for both administrators and users.

4. Select **OK** to apply the changes.

Configuring Microsoft Edge

To use **Microsoft Edge** to automate web-related tasks, you have to install the respective browser extension.

To install the extension:

1. Launch **Flow Designer**, navigate to **Tools** -> **Browser extensions**, and select **Microsoft Edge**.

2. In the extension's webpage, select **Get** to install the extension.

3. In the pop-up dialog box, select **Add extension** to confirm the installation.

To ensure that **Microsoft Edge** works as expected with Power Automate, disable running background apps when Edge is closed.

To disable this option, navigate to **Settings** -> **System** and select the **slider** next to **Continue running background apps when Microsoft Edge is closed**.

Configuring Google Chrome

To use **Google Chrome** in Power Automate flows, you have to install the respective browser extension.

To install the extension:

1. Launch **Flow Designer**, navigate to **Tools** -> **Browser extensions**, and select **Google Chrome**.

2. In the appeared webpage, select **Add to Chrome** to install the extension.

3. In the pop-up dialog box, select **Add extension** to confirm the installation.

To ensure that **Google Chrome** works as expected with Power Automate, disable running background apps when Chrome is closed.

To disable this option, navigate to **Settings** -> **Advanced** -> **System** and select the **slider** next to **Continue running background apps when Google Chrome is closed**.

Configuring Mozilla Firefox

To use **Mozilla Firefox** in Power Automate flows, you have to install the respective browser extension.

To install the extension:

1. Launch **Flow Designer**, navigate to **Tools** -> **Browser extensions**, and select **Firefox**.

2. In the launched browser dialog box, select **Add** to install the extension.

3. In the appeared dialog box, select **Okay, Got it** to confirm the installation.

Firefox alerts that freeze the browser and prevent users from switching to other tabs or windows may impact flows' functionality.

To disable this feature:

1. Populate the **URL bar** with the phrase **about:config**.
2. Search for the **prompts.tab_modal.enabled** preference in the resulting list and change it to **false**.

Using the actual Internet Explorer vs the Automation browser

Although **Automation browser** is based on **Internet Explorer**, it provides some features and limitations that increase automation effectiveness.

1. **Automation browser** works out of the box, while **Internet Explorer** requires additional configuration. Security configurations may be unwanted in organizations with strict security policies that prohibit manual changes.
2. The **Click download link on web page** action works with the **Automation browser** whatever the **Internet Explorer** version. For the actual **Internet Explorer**, the action requires version 8 or below.
3. **Automation browser** suppresses all message dialog boxes that may pop up unhindered in the actual **Internet Explorer**. If this feature is undesirable, apply the **(ShowDialogs)** suffix at the end of the URL in the **Launch new Internet Explorer** action.
4. **Automation browser** doesn't support tabs or opening links in windows. When the user clicks on a link, the browser opens it in the same window/instance.

5. **Automation browser** has a small performance advantage because it doesn't load unnecessary elements and add-ons like the actual **Internet Explorer** does.

Automate desktop flows

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Power Automate offers the **UI automation** actions to allow users to interact with Windows applications and their components by either providing input or extracting data.

The actions of the **Windows** subcategory directly manipulate entire application windows, while **Form filling** actions interact with more specific components, such as text fields and buttons.

Desktop automation can be performed by manually adding the required actions or using the recorder. You can find a list with all the available UI automation actions in the UI automation actions reference.

Interacting with desktop applications

To identify windows and components in them, Power Automate utilizes UI elements. UI elements uniquely describe each component and can be managed through the flow designer's UI elements pane.

To configure a UI automation action, determine the specific element it will interact with.

Existing UI elements are displayed in the UI element pane, while new ones can be added directly through the action's properties or the pane. You can find more information regarding UI elements and their different types in Automate using UI elements.

> **NOTE**
> UI automation actions accept exclusively UI elements captured from Windows and desktop applications. Therefore, UI elements captured from web applications aren't displayed in the UI automation actions.

To add a new UI element, highlight the appropriate element and press **Ctrl & left-click**. After adding all the elements, select **Done** to save them.

To extract a piece of data from an application window, such as its title, location, or size, use the **Get details of window** action.

On the other hand, to extract data from specific components within a window, use the **Get details of a UI element in window** action.

Build a custom selector

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Power Automate enables users to interact with web and desktop applications through UI elements. Consider UI elements as application components, such as buttons and text fields.

To specify a UI element, you have to create selectors that pinpoint the specific component you want to interact with.

> **NOTE**
>
> Power Automate supports the creation of multiple selectors for a UI element. If a selector fails to access the element, the following selector is used.

Although Power Automate enables users to create selectors automatically, some particular scenarios need manually created selectors. A common scenario is the automation of applications that display dynamic content.

When a custom selector is needed, you can modify an existing selector or build one from scratch.

To edit an existing selector, select the appropriate UI element and choose the selector you want to edit.

To add more selectors for a UI element, select the appropriate UI element and then the **New** button.

In selectors, use the > notation to indicate the hierarchical structure of the selected elements. Each element in the selector is contained within the element on its left and displayed in the following form:

element[Attribute1="Attribute1Name"][Attribute2="Attribute2Name"]... [Attributen="AttributenName"]

The attributes of an element describe it uniquely and distinguish it from other elements in the same application. Enabling or disabling attributes can change the target application component of the selector.

> **NOTE**
> Web and desktop selectors have the same structure and functionality. The main differences between them are the available attributes. Web selectors use HTML attributes, while desktop selectors use different kinds of attributes based on the application design.

To specify an application component precisely, Power Automate utilizes multiple levels of selectors.

Selectors use a tree structure that describes the exact location of a component in the application or webpage. Each level is the child of the upper-level and the parent of the lower-level selector. The selector in the lower level describes the component you want to handle.

This functionality enables Power Automate to distinguish a component from components with similar attributes in the same application. Disabling or enabling levels of selectors allows you to change the location in which Power Automate will search for the component.

For example, the following selector pinpoints the **File** menu option in an untitled Notepad window. The first level of the selector describes the menu bar of the window, while the second level describes the **File** option.

> **NOTE**
> The Notepad window and the menu option are different UI elements, but they have a parent-child relationship.

Assume that you want to edit the selector to work with a Notepad window named **Notes**. To achieve this functionality, change the **Name** attribute of the selector to **Notes - Notepad**. The new selector should be: **:desktop > window[Name="Notes - Notepad"][Process="notepad"]**.

Use operators in a custom selector

In the previous example, the selector located a Notepad window with a specific title. To make the selector more dynamic, replace the **Equal to** operator with other operators or regular expressions.

The **Equal to** operator makes the selector search for a specific hard-coded value. Although this functionality is effective in static applications, hard-coded values can be a barrier in dynamic applications.

Use the **Contains** operator to locate elements that don't have fixed values but always contain a specific keyword. For example, apply the **Contains** operator in the Notepad selector to make it work with all Notepad windows.

Apart from the **Equal to** and **Contains** operators, Power Automate provides four more operators:

- **Not equal to**: Checks if an attribute contains any value except a specific one.
- **Starts with**: Checks if an attribute contains a value that starts with a particular character, keyword, or phrase.
- **Ends with**: Checks if an attribute contains a value that ends with a particular character, keyword, or phrase
- **Regular expression match**: Checks if an attribute contains a value that matches a custom regular expression. Power Automate's regular expression engine is .NET. You can find more information regarding regular expressions in Regular Expression Language - Quick Reference.

Use variables in a custom selector

Apart from various operators, Power Automate enables you to create dynamic selectors using variables.

If the value of a selector's attribute depends on calculations and results of previous actions, replace the hard-coded value with a variable.

To use a variable in a selector, launch the **Custom selector builder** and populate the variable's name enclosed by percentage signs (**%**). You can find more information about the percentage notation in Use variables and the % notation.

If you use a variable in the **Name** attribute of the Notepad example, the selector should be **:desktop > window[Name="%WindowName%"][Process="notepad"]**.

Check if a variable is numeric

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Power Automate enables users to insert data into flows using message boxes. In some scenarios, you may want to ensure that the entered data are numbers to make your flow robust to unexpected failures.

To check whether a variable contains a number or not:

1. Use the **Set variable** action to create a new variable that indicates whether the variable you want to check contains a number or not. Initialize this variable to **true**. In the following example, the created variable is named **IsNumber**.

2. Deploy the **Convert text to number** action and configure it to convert the variable you want to check to number.

3. Select the **On error** option in the action, and create a new rule that sets the **IsNumber** variable to false every time the action fails. Additionally, configure the flow to continue running when an error occurs.

4. Now, you can use conditionals to implement different behavior depending on the value of the **IsNumber** variable.

Delete a row/column from a datatable

1/15/2022 • 2 minutes to read • Edit Online

Although Power Automate doesn't provide a direct way to delete rows and columns from datatables, this functionality is feasible with the following workaround:

1. Use the **Launch Excel** action to launch a new blank Excel worksheet.

2. Deploy the **Write to Excel worksheet** action and configure it to write the datatable to the previously launched worksheet.

3. Use the **Delete row from Excel worksheet** or the **Delete column from Excel worksheet** action to delete the wanted row or column of the datatable, respectively.

4. Deploy the **Read from Excel worksheet** action and read all the available values from the Excel worksheet. The updated datatable is now stored in a variable named **ExcelData**.

5. Close the Excel worksheet without saving using the **Close Excel** action.

Add images to email messages

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Sending emails that contain images is common in many business procedures. Power Automate enables users to include images in their emails by attaching them or embedding them to the email body.

Send images as email attachments

To attach images to an email, use the **Attachment(s)** field in the **Send email**, **Send email message through Outlook**, **Respond to Outlook message**, and **Send Exchange email message** actions.

You can populate the **Attachment(s)** field with file paths or a variable containing files. To populate multiple file paths, enclose them in double quotes (**""**) and separate them by a space character.

Embed images to email body

Apart from attaching images to emails, Power Automate allows you to embed images to email bodies using HTML.

To embed an image, check the **Body is HTML** option in the appropriate email action and populate the **Body** field with the following code:

> **NOTE**
>
> After copying the following code, replace the **image-url** placeholder with the URL of the image you want to embed or a variable containing it.

```
<html>
    <body>
        <h1>Title</h1>
        <p>This is a paragraph.</p>
        <img src="image-url">
    </body>
</html>
```

Use a shared Outlook mailbox in email automations

1/15/2022 • 2 minutes to read • Edit Online

Shared mailboxes allow groups of people to monitor and send emails from public email aliases. When a group user replies to messages sent to a shared mailbox, the email appears to be from the shared address, not from the individual user.

To retrieve emails from a shared mailbox, use the **Retrieve email messages from Outlook** action and populate the name of the mailbox in the **Account** field.

To send emails through a shared mailbox, use the **Send email message through Outlook** action.

In the action's properties, select **Other mailbox** in the **Send email message from** drop-down menu, and populate the name of the shared mailbox in the **Send from** field. Additionally, populate the **Account** field with the address of your main account.

Automate email accounts with two-step verification

1/15/2022 • 2 minutes to read • Edit Online

To automate an email account protected with two-step verification, you need to create an app password.

App passwords are randomly generated passwords that can be used only once when you sign in to an application or device that doesn't support two-step verification.

To create app passwords for Microsoft personal or organizational accounts, follow the instructions in Create new app passwords. To create app passwords for other webmail services, search for information on their help page or community site.

After creating an app password, populate it in the **Password** field of the **IMAP server** or **SMTP server** section of the email actions.

Convert a CSV file into an Excel spreadsheet

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A comma-separated values file (CSV) is a delimited text file that uses a specific character to separate a series of values.

Power Automate allows you to open comma-delimited and tab-delimited CSV files directly through the **Launch Excel** action.

To convert a CSV file of this type to XLSX, open the file and then save it as a new Excel workbook using the **Save document as** option in the **Close Excel** action.

Although the **Launch Excel** action can handle the previously mentioned cases, semicolon-delimited CSV files may require a different approach.

> **NOTE**
> Excel uses the list separators defined in the Windows regional settings. In some regions, you have to manually set the semicolon character as a separator or apply the following workaround.

To overcome this limitation, deploy the **Read from CSV file** action and set the semicolon character (;) as a custom separator in the advanced options. If the first row of the CSV file contains headers, enable the **First line contains column names** option to use the respective headers at the retrieved datatable.

Next, launch a blank Excel document using the **Launch Excel** action and paste the CSV table into cell A1 using the **Write to Excel worksheet** action.

Now, you can deploy the **Close Excel** action to save the Excel worksheet as a new XLSX file.

Run macros on an Excel workbook

1/15/2022 • 2 minutes to read • Edit Online

The **Run Excel macro** action enables you to run macros in open Excel instances.

To create an Excel instance, deploy the **Launch Excel** action and select to open the Excel file containing the needed macro.

> **IMPORTANT**
>
> To run macros stored in your personal macro workbook (PERSONAL.XLSB), enable the **Load add-ins and macros** option located in the advanced options of the **Launch Excel** action.

To run the macro, deploy the **Run Excel macro** action and populate its name in the **Macro** field.

To find the name of a macro, open the respective workbook and navigate to **Developer** > **Macros**. The pop-up dialog displays all the available macros in the workbook.

To find the name of a macro assigned to a button, open the workbook, right-click on the button, and select **Assign Macro**. The pop-up dialog is the same as in the previous case.

File
Home
Insert
Page Layout
Formulas
Data
Review
View
Developer
Help
Shape Format
Share
Comments
Record Macro
Use Relative References
Macro Security
Visual Basic
Macros
Add-ins
Excel Add-ins
COM Add-ins
Insert
Design Mode
Properties
View Code
Run Dialog
Source
Expansion Packs
Import
Export
Button 1
Cut
Copy
Paste
Edit Text
Grouping
Order
Assign Macro...
Format Control...
Sheet1

Run SQL queries on Excel files

1/15/2022 • 4 minutes to read • Edit Online

Although Excel actions can handle most Excel automation scenarios, SQL queries can retrieve and manipulate significant amounts of Excel data more efficiently.

Suppose a flow has to modify only the Excel registries that contain a particular value. To achieve this functionality without SQL queries, you need loops, conditionals, and multiple Excel actions.

Oppositely, you can implement this functionality with SQL queries using only two actions, the **Open SQL connection** action and the **Execute SQL statements** action.

Open an SQL connection to an Excel file

Before running an SQL query, you have to open a connection with the Excel file you want to access.

To establish the connection, create a new variable named **%Excel_File_Path%** and initialize it with the Excel file path. Optionally, you can skip this step and use the hardcoded path of the file later in the flow.

Now, deploy the **Open SQL connection** action and populate the following connection string in its properties.

Provider=Microsoft.ACE.OLEDB.12.0;Data Source=%Excel_File_Path%;Extended Properties="Excel 12.0 Xml;HDR=YES";

> **NOTE**
>
> To use the presented connection string successfully, you have to download and install Microsoft Access Database Engine 2010 Redistributable.

Open an SQL connection to a password-protected Excel file

A different approach is required in scenarios where you run SQL queries on password-protected Excel files. The **Open SQL connection** action can't connect to password-protected Excel files, so you have to remove the protection.

To achieve that, launch the Excel file using the **Launch Excel** action. The file is password-protected, so populate the appropriate password in the **Password** field.

Next, deploy the appropriate UI automation actions and navigate to **File** > **Info** > **Protect Workbook** > **Encrypt with Password**. You can find more information about UI automation and how to use the respective actions in Automate desktop flows.

After selecting **Encrypt with Password**, populate an empty string in the popup dialog using the **Populate text**

field in windows action. To populate an empty string, use the following expression: **%""%**.

To press the **OK** button in the dialog and apply the changes, deploy the **Press button in window** action.

Lastly, deploy the **Close Excel** action to save the non-protected workbook as a new Excel file.

After saving the file, follow the instructions in Open an SQL connection to Excel files to open a connection to it.

When the manipulation of the Excel file is completed, use the **Delete file(s)** action to delete the non-protected copy of the Excel file.

Read contents of an Excel spreadsheet

Although the **Read from Excel worksheet** action can read the contents of an Excel worksheet, loops can take a significant time to iterate through the retrieved data.

A more efficient way to retrieve specific values from spreadsheets is to treat Excel files as databases and execute SQL queries on them. This approach is faster and increases the performance of the flow.

To retrieve all the contents of a spreadsheet, you can use the following SQL query in the **Execute SQL statements** action.

```
SELECT * FROM [SHEET$]
```

> **NOTE**
> To apply this SQL query in your flows, replace the **SHEET** placeholder with the name of the spreadsheet you want to access.

To retrieve the rows that contain a particular value in a specific column, use the following SQL query:

```
SELECT * FROM [SHEET$] WHERE [COLUMN NAME] = 'VALUE'
```

> **NOTE**
>
> To apply this SQL query in your flows, replace:
>
> - **SHEET** with the name of the spreadsheet you want to access
> - **COLUMN NAME** with the column that contains the value you want to find. The columns in the first row of the Excel worksheet are identified as the table's column names.
> - **VALUE** with the value you want to find

Delete data from an Excel row

Although Excel doesn't support the **DELETE** SQL query, you can use the **UPDATE** query to set all the cells of a specific row to null.

More precisely, you can use the following SQL query:

```
UPDATE [SHEET$] SET [COLUMN1]=NULL, [COLUMN2]=NULL WHERE [COLUMN1]='VALUE'
```

While developing your flow, you have to replace the **SHEET** placeholder with the name of the spreadsheet you want to access.

The **COLUMN1** and **COLUMN2** placeholders represent the names of all the existed columns. In this example, the columns are two, but in a real scenario, the number of the columns may be different. The columns in the first row of the Excel worksheet are identified as the table's column names.

The **[COLUMN1]='VALUE'** part of the query defines the row you want to update. In your flow, use the column name and the value based on which combination describes the rows uniquely.

Retrieve Excel data except for a specific row

In some scenarios, you may need to retrieve all the contents of an Excel spreadsheet except for a specific row.

A convenient way to achieve this result is to set the values of the unwanted row to null and then retrieve all the values except for the null ones.

To change the values of a specific row in the spreadsheet, you can use an **UPDATE** SQL query, as presented in Delete data from an Excel row:

```
UPDATE [SHEET$] SET [COLUMN1]=NULL, [COLUMN2]=NULL WHERE [COLUMN1]='VALUE'
```

Next, run the following SQL query to retrieve all the rows of the spreadsheet that don't contain null values:

```
SELECT * FROM [SHEET$] WHERE [COLUMN1] IS NOT NULL OR [COLUMN2] IS NOT NULL
```

> **NOTE**
>
> The COLUMN1 and COLUMN2 placeholders represent the names of all the existed columns. In this example, the columns are two, but in a real table, the number of the columns may be different. All the columns in the first row of the Excel worksheet are identified as the table's column names.

Autofit Excel columns using VBScript

1/15/2022 • 2 minutes to read • Edit Online

The autofit feature in Excel enables users to resize cells in worksheets to accommodate different-sized data without manually changing the column width and row height.

To autofit Excel columns using Power Automate:

1. Use the **Set variable** action to create a new variable containing the path of the Excel file you want to manipulate. In this example, the variable is named **ExcelFile**.

2. Deploy the **Run VBScript** action and populate the following code. Before running the flow, replace the **SheetName** placeholder with the name of the sheet you want to autofit or a variable containing it.

```
'Opens the Excel file'
Set objExcel = CreateObject("Excel.Application")
Set objWorkbook = objExcel.Workbooks.Open("%ExcelFile%")
objExcel.Application.Visible = True

'Selects the specified sheet'
Set objSheet = objWorkbook.Sheets("SheetName")

'Autofits the columns of the sheet'S
for col=1 to 19
objSheet.columns(col).AutoFit()
next

'Saves and closes the Excel file'
objWorkbook.Save
objWorkbook.Close SaveChanges = True
```

Run VBScript
Executes some custom VBScript code and retrieves its output into a variable More info
Select parameters
VBScript to run:
1 'Opens the Excel file'
2 Set objExcel = CreateObject("Excel.Application")
3 Set objWorkbook = objExcel.Workbooks.Open("%ExcelFile%")
4 objExcel.Application.Visible = True
Variables produced
VBScriptOutput
ScriptError
Save
Cancel

Unhide worksheets in Excel using VBScript

1/15/2022 • 2 minutes to read • Edit Online

If an Excel file contains hidden worksheets, replicate the following steps to make them visible:

1. Use the **Set variable** action to create a new variable containing the file path of the respective Excel file. In this example, the variable is named **ExcelFile**.

2. Deploy the **Run VBScript** action and populate the following code.

```
'Opens the Excel file'
Set objExcel = CreateObject("Excel.Application")
Set objWorkbook = objExcel.Workbooks.Open("%ExcelFile%")
objExcel.Application.Visible = True

'Unhides all the worksheets of the Excel file'
For i=1 To objWorkbook.Sheets.Count
objWorkbook.Sheets(i).Visible = True
Next

'Saves and closes the Excel file'
objWorkbook.Save
objWorkbook.Close SaveChanges = True
```

Run VBScript
Executes some custom VBScript code and retrieves its output into a variable More info
Select parameters
VBScript to run:
'Opens the Excel file'
Set objExcel = CreateObject("Excel.Application")
Set objWorkbook = objExcel.Workbooks.Open("%ExcelFile%")
objExcel.Application.Visible = True
Variables produced
VBScriptOutput
ScriptError
Save
Cancel

Convert Excel to PDF using VBScript

1/15/2022 • 2 minutes to read • Edit Online

To convert an Excel file to PDF:

1. Use the **Set variable** action to create a new variable containing the path of the Excel file you want to convert. In this example, the variable is named **ExcelFile**.

2. Use a second **Set variable** action to create a variable containing the path of the PDF file you want to create. In this example, the variable is named **PdfFile**.

3. Deploy the **Run VBScript** action and populate the following code.

```
Dim Excel
Dim ExcelDoc

'Opens the Excel file'
Set Excel = CreateObject("Excel.Application")
Set ExcelDoc = Excel.Workbooks.open("%ExcelFilePath%")

'Creates the pdf file'
Excel.ActiveSheet.ExportAsFixedFormat 0, "%PdfFilePath%" ,0, 1, 0,,,0

'Closes the Excel file'
Excel.ActiveWorkbook.Close
Excel.Application.Quit
```

Use image recognition on machines with different screen resolutions

1/15/2022 • 2 minutes to read • Edit Online

When you capture images in Power Automate, the stored images are affected by the source machine's screen resolution and DPI scaling.

In cases where flows perform image recognition on different screens or machines, you must ensure that all the screens have the exact screen resolution.

To achieve this functionality, you can use the **Set screen resolution** action to change the screen resolution of the target machines.

The new resolution has to be the same as the source machine from which the image was captured. To find the resolution of the source machine, use a temporary **Get screen resolution** action or check the Windows display settings.

> **IMPORTANT**
>
> To use the **Set screen resolution** action in flows triggered through the Power Automate portal, you have to be connected to the console session of your machine, where you can manually change the screen resolution. For example, you can use your machine's physical screen to connect to the machine. In remote sessions, such as unattended scenarios that use remote desktop clients, the action has no effect, as users can't manually change the resolution.

> **NOTE**
>
> Before using image recognition, ensure that DPI scaling stays the same among the screens. The use of varying DPI scalings may cause the flow to fail.

If you want to roll back to the original resolution later in the flow, add a **Get screen resolution** before the **Set screen resolution** action.

When all the image recognition procedures are completed, use the retrieved values and a second **Set screen resolution** action to set the screen back to the original resolution.

Set screen resolution

Sets the width, height, bit count and frequency of a selected monitor More info

Select parameters

Available screen resolutions

Monitor number:	1
Monitor width:	%MonitorWidth%
Monitor height:	%MonitorHeight%
Monitor bit count:	%MonitorBitCount%
Monitor frequency:	%MonitorFrequency%

On error

Save Cancel

Perform OCR on multilingual documents

1/15/2022 • 2 minutes to read • Edit Online

Optical character recognition (OCR) enables you to locate and extract text from images or the screen.

Although most scenarios require you to handle text in a specific language, there are cases where the sources are multilingual.

To perform OCR on these sources, use a Tesseract engine in the respective OCR action and enable the **Use other languages** option in the engine settings.

When the **Use other languages** option is enabled, the action displays two additional settings: the **Language abbreviation** and **Language data path** fields.

The **Language abbreviation** field indicates to the engine which language to look for during OCR. The **Language data path** field contains the language data files (**.traineddata**) used to train the OCR engine.

After downloading the data files for the needed languages, move them to a common folder to make them available under the same path.

Next, select the created folder in the **Language data path** field, and populate the corresponding language codes in the **Language abbreviation** field. To separate the language codes, use the plus character (**+**).

> **NOTE**
>
> You can find all the available language codes in the source of the language data files. In the following example, the used codes represent Telugu, Hindi, and English.

Extract text with OCR

The 'OCR engine variable' as an engine type is going to be deprecated. Make sure you update your flows using alternative OCR engine types.

Extract text from a given source using the specified OCR engine More info

Select parameters

OCR engine type: Tesseract engine

OCR source: Screen

Search mode: Whole of specified source

OCR engine settings

Use other language:

Language abbreviation: tel+hin+eng

Language data path: C:\Users\admin\Desktop\Data-files

Image width multiplier: 1

Image height multiplier: 1

Variables produced OcrText

On error

Save Cancel

Print images

1/15/2022 • 2 minutes to read • Edit Online

Although Power Automate enables you to print documents using the **Print document** action, printing image files requires a different approach.

To print an image file, create a batch script that launches Microsoft Paint and prints the selected image file through it. To develop the script, create a new .txt file, copy the following code, and save it as **Image-printing.bat**.

> **NOTE**
>
> Before saving the script, replace the **Image_Path** placeholder with the file path of the image you want to print.

```
@echo off+

title Print Images


rem The following command launches Microsoft Paint and prints the selected file using the default printer.

mspaint /p "Image_Path"


rem The following command ends the Microsoft Paint process.

taskkill /IM "mspaint.exe"
```

To run the script, use the **Run application** action and populate the path of the batch file in the **Application path** field.

Alternatively, you can print image files using the **Run DOS command** action with the following command as an input:

> **NOTE**
> Before running the flow, replace the **Image_Path** and **Printer_Name** placeholders with the file path and the printer's name, respectively.

```
rundll32 C:\WINDOWS\system32\shimgvw.dll,ImageView_PrintTo "Image_Path" "Printer_Name"
```

Identify a window by its handle

1/15/2022 • 2 minutes to read • Edit Online

It's common in flow development to create flows that use several windows with the same title and class.

Power Automate enables users to distinguish identical windows using handles. Handles are numbers that uniquely identify each window.

To retrieve the handle of a window, launch the application with the **Run application** action and set the **After application launch** drop-down menu to **Wait for application to load**. The handle is stored by default in a variable named **WindowHandle**.

Alternatively, you can use the **Get details of a UI element in window** action to retrieve the handle from an

already open window.

Select to retrieve the attribute **parentwindowhandle** from a random element within the window. The retrieved attribute is stored by default in a variable named **AttributeValue**.

> **NOTE**
> The **Get details of a UI element in window** action requires a UI element that specifies the selected element in the window. You can find more information regarding UI elements in Automate using UI elements.

You can use handles to manipulate windows through the following Windows actions of the UI automation group:

- Focus window
- Set window state
- Set window visibility
- Move window
- Resize window
- Close window

Close any window through its process ID

1/15/2022 • 2 minutes to read • Edit Online

When you handle desktop application, you may meet scenarios in which applications don't have static titles or have the same title as other windows. Power Automate allows users to close these applications using their process ID.

To get the process ID of a window, use the **Get details of a UI element in window** action and retrieve the attribute **processid** from a random element within the window. The retrieved attribute is stored by default in a variable named **AttributeValue**.

> **NOTE**
>
> The **Get details of a UI element in window** action requires a UI element that specifies the selected element in the window. You can find more information regarding UI elements in Automate using UI elements.

To close the window, use the **Terminate process** action and set it to stop the process with the previously retrieved ID.

Terminate process
Immediately stops a running process More info
Select parameters
Specify process by:
Process ID
Process ID:
%AttributeValue%
{x}
On error
Save
Cancel

Extract attributes from window elements

1/15/2022 • 2 minutes to read • Edit Online

The **Get details of a UI element in window** action enables users to retrieve the values of various attributes that window elements may have.

These values can be used in various operations, such as managing windows by their handles and closing windows through their process IDs.

Apart from the four predefined attributes that the action provides, you also retrieve the following attributes:

ATTRIBUTE	DESCRIPTION
Acceleratorkey	The accelerator key combinations for the automation element.
Accesskey	The access key that allows you to quickly navigate to the web server control.

ATTRIBUTE	DESCRIPTION
bulktext	The text of the element regardless of whether the element or its subelements are hidden or not.
class	The class of the element.
controltype	The control tyoe of the element.
haskeyboardfocus	Indicates whether the element has keyboard focus
helptext	The help text of the element.
id	The id of the element.
iscontentelement	Indicates whether the element is a content element.
iscontrolelement	Indicates whether the element is a control element.
Iskeyboardfocusable	Indicates whether the element is keyboard focusable.
isoffscreen	Indicates whether the element is visible on the screen.
ispassword	Indicates whether the element is a password.
localizedcontroltype	A localized description of the control type.
name	The name of the element.
parentwindowhandle	The handle of the parent window.
processid	The process ID of the parent window.
processname	The process name of the parent window.
windowtitle	The title of the parent window.

Ensure that application windows become focused

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Although Power Automate provides the **Focus window** action, depending on the nature of the selected application, the action may not bring the window to focus.

To verify that the **Focus window** action can't bring a specific window to focus, send some keystrokes using the **Send keys** action. If the window isn't focused, the keystrokes won't work as expected.

To ensure that the window will become focused, send a click on it after deploying the **Focus window** action. Depending on the scenario, you can use either of the following actions to send a click on the window:

- Click UI element in window
- Move mouse to image - Enable the **Send a click after moving mouse** option
- Send mouse click
- Move mouse to text on screen (OCR) - Enable the **Send a click after moving mouse** option

NOTE

You can find more information regarding sending keystrokes in Automate applications using keyboard shortcuts.

Get the position and size of a window

1/15/2022 • 2 minutes to read • Edit Online

When you automate windows and desktop applications, you may need to know the exact position and size of a window.

To retrieve this information, use the **Get details of window** action and set the **Window property** option to **Get window location and size**. The action stores the retrieved values in a text variable named **WindowProperty**.

> **NOTE**
>
> The **Get details of window** action requires a UI element that specifies the window from which it will retrieve the selected attrubite. You can find more information regarding UI elements in Automate using UI elements.

After retrieving the **WindowProperty** text value, you have to split it into separate values and convert them to numbers.

To split the text value, deploy the **Split text** action and separate the values using the comma character (,) as a delimiter. The separated values are stored in a list variable named **TextList**.

Before converting the texts to numbers, use the **Create new list** action to create a list that will store the converted numbers in the following steps.

To access each item of the **TextList** independently, deploy a **For each** loop.

Inside the loop, use a **Convert text to number** action to convert the current text item of the loop to number.

Next, use the **Add item to list** action to store the produced number to the previously created list.

To access the final position and size values later in your flow, use the following notations:

- **List[0]** - The left point of the window
- **List[1]** - The top point of the window
- **List[2]** - The width of the window
- **List[3]** - the height of the window

To calculate the right and bottom points of the window, you can use the following expressions:

- **%List[0] + List[2]%** - The right point of the window
- **%List[1] + List[3]%** - The bottom point of the window

> **NOTE**
> You can find more information about lists and the **VariableName[ItemNumber]** notation in Variable datatypes.

Automate applications using keyboard shortcuts

1/15/2022 • 2 minutes to read • Edit Online

Many desktop applications provide keyboard shortcuts that make multi-step tasks easy and fast to perform. Power Automate allows you to apply these shortcuts to create shorter and less complicated flows.

> **IMPORTANT**
>
> Before sending keystrokes to an open application, use the **Focus window** action to activate the respective window. To select a specific element in the window, use the appropriate UI automation action, such as the **Click UI element in windows** action.

When the window is activated or the required element is selected, use the **Send keys** action to send the intended keystrokes.

To send a key, enclose its name inside curly brackets (**{}**). The curly brackets notation makes the action simulate the key's physical press. To populate hardcoded text values in a field, enter the respective text without any notations.

> **NOTE**
>
> To send a specific key multiple times, you can use the following expression instead of entering the key numerous times: **{Key:numberOfTimes}**.

Apart from sending keys individually, you can use the **Send keys** action to send combinations of keys. To achieve this functionality, enclose the modifier inside curly brackets and the rest of the keys inside a pair of parentheses. The parentheses indicate that the keys inside them will be pressed simultaneously with the

modifier key.

For example, you can use the **Ctrl + B** shortcut to apply bold formatting in the currently selected Excel cell. To use this shortcut, populate the **Text to send** field of the **Send keys** action with the following expression: **{Control}({B})**

NOTE

You can find all the available Excel keyboard shortcuts in this article.

Automate with mouse, keyboard, and OCR actions

1/15/2022 • 2 minutes to read • Edit Online

In some cases, certain web pages and applications don't allow external software to interact with them. As a result, you can't automate them using the browser and UI automation actions or the recorder.

Although you can use image-based recording to automate some of these applications, it may not be the best option in some scenarios. For example, some applications change their interface dynamically, while the texts remain the same.

To bypass this issue, you can use a combination of keys, images, mouse clicks, and OCR extraction.

Before building your automation, ensure that the appropriate window is focused and maximized using the **Focus window** and **Set window state** actions.

If you need to wait for specific components to load before running an action, use the wait group of actions.

Use the **Wait** action to wait for a set amount of time, the **Wait for image** action to wait for an image to appear/disappear, or the **Wait for text on screen (OCR)** action to wait for a text to appear/disappear.

To navigate through the web page or application and interact with its components, use the mouse and keyboard actions.

For example, deploy the **Send keys** action to use the available keyboard shortcuts, or the **Move mouse to image** and **Move mouse to text on screen (OCR)** actions to move the cursor to a specific image or text, respectively.

To retrieve text from the screen and store it into a variable, deploy either the clipboard actions or the **Extract text with OCR** action. To store a text in the clipboard, highlight the text using either the **Send keys** or the **Send mouse click** action.

You can configure the **Send keys** action to send the **CTRL + A** keyboard shortcut that selects all the text on the web page or application.

> **NOTE**
> You can find more information regarding automation using keyboard shortcuts in Automate applications using keyboard shortcuts.

Alternatively, you can use the **Send mouse click** action to send a **Left button down** at the beginning of the text you want to select and then a **Left button up** at the end.

After highlighting, deploy the **Send keys** action to send the **CTRL + C** keyboard shortcut that stores the selected text in the clipboard. After storing the text in the clipboard, use the **Get clipboard text** action to store the clipboard content into a variable.

Access elements that depend on how the window appears on the screen

1/15/2022 • 2 minutes to read • Edit Online

There are cases where Power Automate can't detect UI elements if they aren't visible on the computer screen.

These elements may be located in areas not directly visible on the screen or may not appear on the window at all. An element may be missing because the window's zoom level isn't suitable or the screen resolution is low.

To resolve this issue, you can:

- Increase the resolution of the screen manually or using the **Set screen resolution** action.

> **IMPORTANT**
>
> To use the **Set screen resolution** action in flows triggered through the Power Automate portal, you have to be connected to the console session of your machine, where you can manually change the screen resolution. For example, you can use your machine's physical screen to connect to the machine. In remote sessions, such as unattended scenarios that use remote desktop clients, the action has no effect, as users can't manually change the resolution.

- Maximize the window of the application using the **Set window state** action.

- Zoom in or out of the window.

In some cases, you can create dynamic selectors that adapt to the state of the window or application. You can find more information about dynamic selectors in Build a custom selector.

Automate Java applications

1/15/2022 • 2 minutes to read • Edit Online

Installing Java configuration

In order to automate Java applications, particular settings must be in place.

To install the Java configuration manually, after Power Automate for desktop has been installed, navigate to the installation folder (**C:\Program Files (x86)\Power Automate Desktop**) and run the **PAD.Java.Installer.exe** as an administrator.

Logs for Java automation with Power Automate for desktop can be found in the **%temp%/java_automation_log** folder (e.g. **C:\Users\username\AppData\Local\Temp\java_automation_log**).

Uninstalling Java configuration

To uninstall the Java configuration (revert all changes applied to the machine by the Java installer):

1. Launch the Command Line tool (cmd)
2. Run the following command:

```
PAD.Java.Installer.exe -u
```

Troubleshooting

If you come across any issues while automating Java applications:

1. Make sure that you have Java installed on your machine:
   - Open the Command Line tool (cmd) and run the following command:

     ```
     java –version
     ```

   - If Java isn't installed on your machine, you'll receive an error message similar to: **'java' is not recognized as an internal or external command, operable program or batch file.**
2. The Java Access Bridge option from the Control Panel should be disabled:

   Navigate to **Control Panel -> Ease of Access -> Optimize visual display -> Java Access Bridge from Oracle, Inc. Providing Assistive Technology access to Java applications** and disable (uncheck) the **Enable Java Access Bridge** option.

3. Specific files have to exist in the Java folder(s) of the machine after the Power Automate for desktop installation.

   To check the installed Java version and installation path on your machine:

   a. Type **Configure Java** in the Search bar of Windows

   b. Launch the Java Control Panel

   c. Navigate to the **Java** tab and select **View**

   d. Check the values in the **Path** column. The row with **Architecture** equal to **x86** refers to a 32-bit Java installation, while the row with value **x86x64** refers to a 64-bit Java installation.

Additionally, you can check the following files:

For 64-bit Java installation:

- File **Microsoft.Flow.RPA.Desktop.UIAutomation.Java.Bridge.Native.dll** should have been replaced in the folder **C:\Program Files\Java\jre1.8.0_271\bin**. (**jre1.8.0_271** could be replaced with your machine's Java installation)
- File **accessibility.properties** should have been replaced in the folder **C:\Program Files\Java\jre1.8.0_271\lib**. (**jre1.8.0_271** could be replaced with your machine's Java installation)

  If you edit the file with a notepad, it should have the following value: **assistive_technologies=com.sun.java.accessibility.AccessBridge, microsoft.flows.rpa.desktop.uiautomation.JavaBridge**
- File **PAD.JavaBridge.jar** should have been inserted in the folder **C:\Program Files\Java\jre1.8.0_271\lib\ext**. (**jre1.8.0_271** could be replaced with your machine's Java installation)

For 32-bit Java installation:

- Same actions for the same files as above but in the folder path **C:\Program Files (x86) \Java\...**.

4. Make sure that there isn't an **.accessibility.properties** file present in your user folder. Check if a file named **.accessibility.properties** is present in the **C:\Users\user** folder. If yes, then rename it.
5. Ensure that **VC_redist.x64.exe** and/or **VC_redist.x86.exe** have been run.

Handle links that open new tabs

1/15/2022 • 2 minutes to read • Edit Online

Power Automate for desktop uses browser instances to pinpoint specific web pages located in specific tabs on browser windows.

If a flow clicks a link that opens a new tab, you have to apply additional configuration to continue automating inside this new tab.

The most straightforward approach is the use of the embedded automation browser that doesn't support tabs. It opens all the links in the same instance.

> **NOTE**
> You can find more information about the features and limitations of the automation browser in Use browsers and manage extensions.

To navigate back to the previous page, you can use the **Go to web page** action.

If your flow uses Edge, Internet Explorer, Chrome, or Firefox, there are also methods to handle links that open new tabs.

You can retrieve the URL behind the link using the **HRef** option in the **Attribute name** field of the **Get details of element on web page** action. Then, you can navigate to the retrieved link in the same tab using the **Go to**

web page action.

If the link is in JavaScript, you can retrieve the JavaScript function and run it as a URL in the **Go to web page** action. In this case, you should enter **JavaScript:** and the function to run.

Another approach is to click the link and then use the **Attach to running instance** option of the previously mentioned browsers to attach your flow to the newly created tab.

Launch new Microsoft Edge
Launch a new instance or attach to a running instance of Edge for automating web sites and web applications More info
Select parameters
Launch mode:
Attach to running instance
Attach to Microsoft Edge tab:
By title
Tab title:
{x}
Variables produced
Browser2
On error
Save
Cancel

Retrieve details from a web page

1/15/2022 • 2 minutes to read • Edit Online

Extracting information regarding web pages is an essential function in most web flows. Power Automate for desktop enables you to retrieve various details from web pages through the **Get details of web page** action.

To use the action, you need an already created browser instance that specifies the web page you want to extract details from. A browser instance can be created with any browser-launching action.

After selecting the appropriate browser instance, choose the information you want to extract from the web page. The **Get details of web page** action offers six different options:

- The description of the web page
- The meta keywords of the web page
- The title of the web page
- The text of the web page
- The source code of the web page
- The URL address of the web page

The retrieved information is stored for later use in a text variable named **WebPageProperty**.

Prevent errors while retrieving details

Although most properties exist virtually on every web page, there are scenarios in which the **Get details of web page** action fails to retrieve the selected detail. For example, web pages without meta keywords are a common occurrence.

If you're unsure if an attribute exists on a web page, configure the **On error** options of the **Get details of web**

page action to continue running the flow after failure. To find more information about action error handling, refer to Configuring action errors.

To determine whether the data extraction is successful, use an **If** conditional to check if the **WebPageProperty** variable is empty or not.

The conditional allows you to implement different functionality for the cases of successful and unsuccessful data extraction. You can find more information regarding conditionals in Use conditionals.

The following example subflow retrieves the available meta keywords from a web page and displays them in a message box. If the extraction is unsuccessful, the flow stops and returns an error message.

Get the coordinates and size of a web element

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When you automate web applications and web pages, you may need to know the exact location and size of a specific element.

To retrieve this information, create a browser instance and deploy the **Get details of element on web page** action. In the action's properties, set the **Attribute name** option to **waelementrectangle**. The action stores the retrieved values in a text variable named **AttributeValue**.

> **NOTE**
>
> The **Get details of element on web page** action requires a UI element that specifies the web element from which it will retrieve the selected attrubite. You can find more information regarding UI elements in Automate using UI elements.

After retrieving the **AttributeValue** text value, you have to split it into separate values and convert them to numbers.

To split the text value, deploy the **Split text** action and separate the values using the comma character (,) as a delimiter. The separated values are stored in a list variable named **TextList**.

Before converting the texts to numbers, use the **Create new list** action to create a list that will store the converted numbers in the following steps.

To access each item of the **TextList** independently, deploy a **For each** loop.

Inside the loop, use a **Convert text to number** action to convert the current text item of the loop to number.

Next, use the **Add item to list** action to store the produced number to the previously created list.

To access the final coordinates and size values later in your flow, use the following notations:

- **List[0]** - The left point of the web element, relative to the top left corner of the HTML page
- **List[1]** - The top point of the web element, relative to the top left corner of the HTML page
- **List[2]** - The width of the web element
- **List[3]** - the height of the web element

To calculate the right and bottom points of the window, you can use the following expressions:

- **%List[0] + List[2]%** - The right point of the web element
- **%List[1] + List[3]%** - The bottom point of the web element

> **NOTE**
> You can find more information about lists and the **VariableName[ItemNumber]** notation in Variable datatypes.

To find the coordinates of the top left corner of an HTML page, you can use the web browser's instance properties **DisplayRectangleX** and **DisplayRectangleY**.

After storing a browser's instance into a variable named **%Browser%**, use the **%Browser.DisplayRectangleX%** and **%Browser.DisplayRectangleY%** expressions to retrieve the X and Y dimensions.

Additionally, you can retrieve the coordinates specifying the center of a web element using the **waelementcentercoords** attribute in the **Get details of element on web page** action.

Send physical clicks on a web element

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You may meet automation cases that require right-clicks, double-clicks, or other kinds of physical clicks on web elements.

To send physical clicks on a web element, you need to know its exact coordinates on the screen. The first step to calculate the screen coordinates of the element is to retrieve its coordinates relative to the web page.

To get this information, follow the instructions in Get the coordinates and size of a web element. The instructions present the **waelementrectangle** property, but you can replace it with the **waelementcentercoords** property that specifies the center of a web element.

After completing this step, the flow must be similar to the following one:

> **NOTE**
>
> The **Windows state** of the browser must be set to **Maximized**. The flow requires additional steps to work with any browser window size.

Now, you can use the **Send mouse click** action to send the wanted type of physical click on the web element.

In the action's properties, enable the **Move mouse** option, and set the **X** and **Y** values to **%List[0] + Browser.DisplayRectangleX%** and **%List[1] + Browser.DisplayRectangleY%**, respectively.

The **List[0]** and **List[1]** variables contain the previously retrieved coordinates in a number format. The **DisplayRectangleX** and **DisplayRectangleY** properties specify the top-left coordinates of the loaded HTML page.

The addition of these two values calculates the exact screen position of the element in a maximized browser window.

To make the flow work with any browser window size, you have to retrieve the top-left coordinates of the browser window and add them to the **X** and **Y** coordinates. You can find more information about retrieving the position of a window in Get the position and size of a window.

Alternatively, you can use the **Focus windows** action to focus on the browser window, and then select **Active window** in the **Relative to** option of the **Send mouse click** action.

Send mouse click

Sends a mouse click event More info

Select parameters

Mouse event to send: Left click

Wait: 0

Move mouse:

X: %List[0] + Browser.DisplayRectangleX%

Y: %List[1] + Browser.DisplayRectangleY%

Relative to: Active window

Current cursor position: Relative to: **Active window** X = 56 Y = 97

Press **Control+Shift** to grab current cursor position

Mouse movement style: Instant

On error

Save Cancel

Click all the elements in a list of links

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In browser automation, it's common to meet scenarios that require you to click all the elements in a list of links.

To automate these scenarios, use the **Extract data from web page** action and extract a random value from two consecutive links. Power Automate will automatically extract the respective value from all the links in the list.

> **NOTE**
>
> You can find more information regarding web data extraction in Automate web flows .

After the extraction, you can use the **DataFromWebPage.RowsCount** property to get the number of the elements in the list.

To make the flow iterate through all the links on the page, use a **Loop** action. The loop should start from 0 and end at **%DataFromWebPage.Count-1%**.

Inside the loop, use the **Click link on web page** action and select a UI element of the first link as an input.

To make the action click all the links, modify the selector to click a different link in each loop iteration.

To achieve this functionality, edit the selector with the **Custom selector builder**. In this step, the right part of the selector should look something like the following example: **ul[properties] > li[properties]:eq(0) > a[properties]**

To make it select a different link in each iteration, change the **tr:eq(0)** part to **tr:eq(%LoopIndex%)**.

> **NOTE**
>
> You can find more information regarding custom selectors in Build a custom selector.

Lastly, use the **Go to web page** action to go back to the original page after each click. You can perform additional operations on each loaded page between the **Click link on web page** and **Go to web page** actions.

Go to web page
Navigate the web browser to a new page More info
Select parameters
Web browser instance:
%Browser%
Navigate:
Back
Advanced
On error
Save
Cancel

Automate browser prompts

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Many web pages display **Save as**, **Open**, and **Upload** dialogs to prompt users to select destination folders and files, respectively.

These dialogs aren't part of the web page, but they're handled by the web browser application or Windows File Explorer. As a result, you can't use the browser automation actions to automate them.

To automate these dialogs, use either the recorder or the UI automation group of actions.

Scroll on a web page

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In some browser automation flows, you may need to scroll on web pages to make specific elements visible on the screen.

Power Automate allows scrolling on web pages through two different approaches. The first one requires the **Focus text field on web page** action, while the second requires JavaScript scripting.

Scroll on a web page using the Focus text field on web page action

To scroll to a specific element on a web page, you can deploy the **Focus text field on web page** action.

In the action's properties, you have to create a UI element that selects the target element of the scrolling. Although the action's primary purpose is to focus on text fields, you can use it for scrolling to any element.

> **NOTE**
>
> You can find more information about UI elements in Automate using UI elements.

Usually, web applications contain **loading more** elements at the bottom of pages that display many elements. In these cases, you can target the **loading more** element to scroll at the bottom of the page.

Scroll on a web page using JavaScript

Apart from the **Focus text field on web page** action, you can scroll on web pages using JavaScript. To run JavaScript on web pages, use the **Execute Javascript function on web page** action.

JavaScript provides the **window.scrollTo(xpos, ypos)** function that scrolls to a specific part of a web page. The **xpos** placeholder indicates the horizontal scroll, while the **ypos** placeholder indicates the vertical scroll.

```
function ExecuteScript()
{
window.scrollTo(xpos, ypos);
}
```

You can replace both placeholders with hardcoded values, properties, or variables. In the following example, the function contains hardcoded values.

If you want to scroll to the bottom of a web page, you can replace the **ypos** placeholder with the **document.body.scrollHeight** property.

```
function ExecuteScript()
{
window.scrollTo(0, document.body.scrollHeight);
}
```

If you want to scroll inside an element of a web page, not the page itself, you can use the HTML DOM property **scrollTop**. In the following example, the function locates the **divElem** and scrolls vertically 10 pixels down.

```
function ExecuteScript()
{
document.getElementById('divElem').scrollTop -= 10;
}
```

Handle iframes on a web page

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Iframes are HTML documents embedded inside other HTML documents. These elements are often used to insert content from external sources into web pages.

When an iframe belongs to the same domain as the original page, you can use the browser automation actions to automate it. You can find more information about browser automation in Automate web flows.

If the browser automation actions don't work correctly with a particular iframe, you can use the UI automation actions to handle it. You can find more information about UI automation in Automate desktop flows.

If an iframe is cross-domain, deploy the **Get details of element on web page** to retrieve the **Source Link** attribute of the element.

Next, use the **Go to web page** action or the **Create new tab** action to navigate to the retrieved source. Now, you can use the browser automation actions to interact with the iframe.

Go to web page
Navigate the web browser to a new page More info
Select parameters
Web browser instance:
%Browser%
Navigate:
To URL
URL:
%AttributeValue%
{x}
Advanced
On error
Save
Cancel

Populate text fields and click on links using JavaScript

1/15/2022 • 2 minutes to read • Edit Online

Some web applications may have design constraints that don't allow browser automation actions to populate text fields or click on links and buttons.

An alternative approach to automate these web applications is the use of the **Run JavaScript function on web page** action, which allows you to run JavaScript code on web pages.

Before deploying the **Run JavaScript function on web page** action, you need the CSS selector of the element you want to populate or click. To get the selector, navigate to the **UI elements** tab and select **Add UI element**.

After creating the UI element, navigate again to the **UI elements** tab, select the created UI element, and open the selector with the **Selector builder**.

Now, copy the last element of the selector located on the right side of the last occurred > character.

> **NOTE**
>
> You can find more information about selectors in Build a custom selector.

To populate a text field, deploy the **Run JavaScript function on web page** action and populate the following code in the **JavaScript function** field. After pasting the code, replace the **CSS-selector** and **value-to-populate** placeholders with the previously copied selector and the value to populate, respectively.

```
function ExecuteScript()
{
document.querySelectorAll('CSS-selector')[0].value="value-to-populate";
}

OR

function ExecuteScript()
{
document.querySelectorAll('CSS-selector')[0].innerText="value-to-populate";
}
```

To click a link or press a button, use the following code:

```
function ExecuteScript()
{
document.querySelectorAll('CSS-Selector')[0].click();
}
```

Convert a file to Base64 string format

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In some web services, you can upload files via the POST method only if the files are in Base64 string format.

To convert a file to this format, use the **Run PowerShell script** action and populate the following command. Before deploying the **Run PowerShell script** action, use a **Set variable** action to store the path of the file you want to convert into a variable. In this example, the script converts a file specified by the **FilePath** variable.

```
[convert]::ToBase64String((Get-Content -path "%FilePath%" -Encoding byte))
```

> **NOTE**
>
> You can find more information regarding PowerShell utility cmdlets in this article.

The action produces the **PowershellOutput** variable that stores a text value representing the contents of the specified file in Base64 format.

Convert Base64 text to hexadecimal format

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Although cryptography actions produce variables encoded in Base64 format, some cryptography engines use the hexadecimal representation of the encrypted value.

To convert the Base64 text to hexadecimal format, use the **Run PowerShell script** action and populate the following command. Before deploying the **Run PowerShell script** action, use a **Set variable** action to store the text you want to convert into a variable. In this example, the script converts the text stored into the **Base64Text** variable.

```
[System.Convert]::FromBase64String("%Base64Text%") | Format-Hex
```

> **NOTE**
>
> You can find more information regarding PowerShell utility cmdlets in this article.

The action produces the PowershellOutput variable that stores the encrypted or hashed value in hexadecimal format.

Run SQL queries to Microsoft Access

1/15/2022 • 2 minutes to read • Edit Online

Apart from database servers, Power Automate supports the automation of Microsoft Access databases.

To establish a connection with a Microsoft Access database, use the **Open SQL connection** action, and open the connection string builder.

In the **Provider** tab of the appeared dialog, select **Microsoft Office 12.0 Access Database Engine OLE DB Provider**.

> **NOTE**
>
> If the presented provider is missing from the available options, you have to download and install Microsoft Access Database Engine 2010 Redistributable.

Next, populate the path of the Microsoft Access database in the **Data Source** field of the **Connection** tab.

The generated connection string must be similar to the following one:

Provider=Microsoft.ACE.OLEDB.12.0;Data Source=DatabasePath;Persist Security Info=False

NOTE

All the connection strings that establish connections with Microsoft Access databases consist of three main parts: the provider, the data source, and the security credentials (if applicable).

To run queries on the connected database, use the **Execute SQL statement** action. Power Automate supports all the essential queries, such as **SELECT**, **INSERT INTO**, and **UPDATE**.

When all the queries have been executed, deploy the **Close SQL connection** to close the connection with the database.

Troubleshoot SQL queries

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While developing desktop flows, you may encounter errors caused by deployed database actions that run queries on databases. If you can't identify the source of the issue through the displayed error messages, perform the following troubleshooting steps:

1. Replace any single quote (') characters with double quotes (") or the other way around.

   For example, the following query produces an error because of the single quote at the end of the variable's value.

   ```
   SELECT * FROM SALES WHERE VALUE = '%value%';
   ```

   To resolve this issue, replace the single quotes in the SQL statement with double-quotes.

   ```
   SELECT * FROM SALES WHERE VALUE = "%value%";
   ```

2. Escape percentage signs (**%**) that don't indicate variables.

   Power Automate identifies percentage signs as characters that indicate variables. To use them as normal characters, escape them using an extra percentage sign.

   > **NOTE**
   > You can find more information about the percentage signs in Use variables and the % notation.

3. Ensure that the same versions (32 bit or 64 bit) of database, database server, and Power Automate for desktop are installed on your desktop.

4. Verify that the firewall or any other network security system isn't blocking the connection between Power Automate and the database.

5. If you're using database actions to run queries on Excel files, ensure that you've applied the following practices:

   - The name of the Excel worksheet is used as a database name. Enclose the worksheet name in brackets (**[]**) and add a dollar sign (**$**) at the end, for example **[Sheet1$]**.
   - The database columns are the headers of the Excel data table.

   ```
   SELECT * FROM [Sheet1$] WHERE Value = "%value%";
   ```

   > **NOTE**
   > You can find more information regarding running SQL queries on Excel in Run SQL queries on Excel files.

Use logical operations on conditional statements

1/15/2022 • 2 minutes to read • Edit Online

Data validation is a typical requirement in most business tasks and allows the implementation of different behavior based on the available data.

Power Automate provides various conditionals that run blocks of actions only if a given condition is met. If the condition is false, the actions are skipped.

> **NOTE**
>
> You can find more information regarding conditionals in Use conditionals.

While validating data, you may encounter cases where you need to check multiple variables in the same part of the flow. For example, you may want to run a set of actions only if two variables have specific values.

To implement this functionality, you can use either multiple nested **If** actions or a single **If** action containing a complex logical expression.

To create a nested if statement, deploy an **If** action within the block of another **If** action. All the actions inside the nested block will run only when both if statements are valid.

Although the implementation of nested if statements is convenient in some cases, it can lead to complicated flows when many checks are needed.

A more efficient way to achieve the same results is the use of logical expressions. In the following example, a single **If** action offers the same result as the previously nested **If** actions.

The expression in the **First operand** field uses the **AND** operator to check whether the variables **A** and **B** contain the values **10** and **5**, respectively.

In general, logical operators can check multiple conditions simultaneously, allowing you to implement more complex logic in a single expression. The **AND** operator returns **TRUE** when both parts of the expression are valid. To check if either of the two parts (or both) are valid, use the **OR** operator.

The **Second operand** field is populated with the value **TRUE**, while the selected **Operator** is **Equals to**. This configuration makes the action check if the expression in the **First operand** field is valid. If it's valid, the actions inside the if block will run. To check if an expression is invalid, populate the value **FALSE** in the **Second operand** field.

> **NOTE**
> The logical expression must be enclosed by percentage signs (**%**). The percentage sign is used as a special character to denote variables and expressions. You can find more information regarding percentage notation in Use variables and the % notation.

To handle more demanding validation scenarios, use multiple logical operators and parentheses. Parentheses allow you to change the order of operations and work the same way as in algebra and programming languages.

In the following example, the flow displays a dialog that prompts users to select one or more files from their desktop. The **If** action checks whether the user has pressed **Cancel** in the dialog or selected more than 100 files.

The first part of the expression on the left of the **OR** operator returns **True** when the user presses **Cancel** in the dialog. In this case, there are no selected files to process, so the flow has to stop.

The second part of the expression returns **True** when the user selects **Open**, but the selected files are more than 100. This condition ensures that the user can't select too many files and prevents the flow from running too long.

If one of these conditions (or both) is valid, the flow will stop and display a dialog informing the user about the implemented limitations.

Share/export a desktop flow

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To replicate a desktop flow regardless of your account, edit it through the flow designer, and copy the actions within a subflow.

The copied text can be sent directly to others users or saved to a text file for easier sharing. The receiver can paste the text to a flow designer and run it.

> **NOTE**
> When copying actions, all their parameters, images, and UI elements are copied as well. Only one subflow can be copied at a time. If there are more than one subflows, repeat the procedure for each one individually or save the actions into separate text files.

If you've signed in with an organization premium account, you can also choose one of the following methods:

1. Share the desktop flow directly through the Power Automate portal.

   To share a desktop flow with other users in your organization, give them specific permissions to access the flow. You can find more information regarding sharing flows through Power Automate portal in Share desktop flows.

2. Export a solution that contains the desktop flow.

   To move a desktop flow from one environment to another, host it in a solution. For more information about importing flows into solutions and building solution-aware flows, see Overview of solution-aware flows.

Run SQL queries to Microsoft Access

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In the **Provider** tab of the appeared dialog, select **Microsoft Office 12.0 Access Database Engine OLE DB Provider**.

> **NOTE**
>
> If the presented provider is missing from the available options, you have to download and install Microsoft Access Database Engine 2010 Redistributable.

Next, populate the path of the Microsoft Access database in the **Data Source** field of the **Connection** tab.

The generated connection string must be similar to the following one:

Provider=Microsoft.ACE.OLEDB.12.0;Data Source=DatabasePath;Persist Security Info=False

NOTE

All the connection strings that establish connections with Microsoft Access databases consist of three main parts: the provider, the data source, and the security credentials (if applicable).

To run queries on the connected database, use the **Execute SQL statement** action. Power Automate supports all the essential queries, such as **SELECT**, **INSERT INTO**, and **UPDATE**.

When all the queries have been executed, deploy the **Close SQL connection** to close the connection with the database.

Run desktop flow from other desktop flows

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Power Automate provides the **Run desktop flow** action to enable users to call desktop flows while running other desktop flows.

Using this feature, you can split complicated flows into smaller ones and call them when needed. For example, you can create separate flows to handle specific error scenarios in the main flow.

To use the action, add it to the workspace and select the desktop flow you want to call.

Every time the action runs, the parent flow is paused until the called desktop flow completes. If the called flow contains input variables, you'll be prompt to populate them. Likewise, if the called flow has output variables, the action will return their values in the parent flow.

> **NOTE**
>
> You can find more information regarding input and output variables in Input and output variables.

Power Automate doesn't allow two flows to directly or indirectly call each other to prevent recursions. Additionally, a flow can't have more than 30 dependent flows. If a dependent flow is missing or the parent flow has more than 30 dependencies, the flow won't run.

Set screen resolution on unattended mode

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In some scenarios, Power Automate may run unattended flows in a lower resolution than the one used to develop the flows. As a result, some UI elements could be hidden from the screen and cause flows to fail.

To change the resolution in which unattended flows are run:

1. Navigate to **C:\Program Files (x86)\Power Automate Desktop** and open the **UIFlowService.exe.config** file.
2. Set the value of the **Microsoft.Flow.RPA.UIFlowService.ScreenDefaultResolutionEnabled** key to **true**.

```
<add key="Microsoft.Flow.RPA.UIFlowService.ScreenDefaultResolutionEnabled" value="true" />
```

3. Change the values of the following keys to the proper screen resolution width, height, and scale, respectively. The following code sets the default resolution to 1920 x 1080 pixels.

```
<add key="Microsoft.Flow.RPA.UIFlowService.ScreenDefaultResolutionWidth" value="1920" />
<add key="Microsoft.Flow.RPA.UIFlowService.ScreenDefaultResolutionHeight" value="1080" />
<add key="Microsoft.Flow.RPA.UIFlowService.ScreenDefaultResolutionScale" value="100" />
```

4. Restart your machine.

   Alternatively to restarting your machine, you can restart the **UIFlowService** service. To restart the service, launch Windows Task Manager, navigate to the **Services** tab, right-click on the **UIFlowService** service, and select **Restart**.

Task Manager
File Options View
Processes Performance App history Startup Users Details Services
Name PID Description Status Group
UIFlowService 9844 Power Automate service Running
UmRdpSer emote Desktop Services UserMode ... Running LocalSystemNe...
UnistoreSvc ser Data Storage Stopped UnistackSvcGro...
UnistoreSvc ser Data Storage_2e542Sab Running UnistackSvcGro...
upnphost PnP Device Host Stopped LocalServiceAn...
UserDataSv ser Data Access Stopped UnistackSvcGro...
UserDataSv ser Data Access_2e542Sab Running UnistackSvcGro...
UserManag ser Manager Running netsvcs
UsoSvc 12696 Update Orchestrator Service Running netsvcs
VacSvc Volumetric Audio Compositor Service Stopped LocalServiceNe...
VaultSvc 1108 Credential Manager Running
vds Virtual Disk Stopped
vmcompute 7704 Hyper-V Host Compute Service Running
vmicguestinterface Hyper-V Guest Service Interface Stopped LocalSystemNe...
vmicheartbeat Hyper-V Heartbeat Service Stopped ICService
vmicvpexchange Hyper-V Data Exchange Service Stopped LocalSystemNe...
vmicrdv Hyper-V Remote Desktop Virtualizati... Stopped ICService
vmicshutdown Hyper-V Guest Shutdown Service Stopped LocalSystemNe...
vmictimesync Hyper-V Time Synchronization Service Stopped LocalServiceNe...
vmicvmsession Hyper-V PowerShell Direct Service Stopped LocalSystemNe...
vmicvss Hyper-V Volume Shadow Copy Requ... Stopped LocalSystemNe...
vmms 3352 Hyper-V Virtual Machine Management Running
Start
Stop
Restart
Open Services
Search online
Go to details
Fewer details
Open Services

Extract text from a Word document using VBScript

1/15/2022 • 2 minutes to read • Edit Online

Although you can use optical character recognition (OCR) to extract text from Word documents, this approach can become complicated for multi-page documents that require scrolling.

A more efficient way to extract text from Word documents is the use of VBScript. Power Automate provides the **Run VBScript** action that enables you to run scripts on your desktop.

To extract text from a Word document, deploy the **Run VBScript** action and paste the following code in the **VBScript to run** field.

```
Dim Word
Dim WordDoc
Dim var
Set Word = CreateObject("Word.Application")

'Open the document
Set WordDoc = Word.Documents.open("%FilePath%")

'Read the document
NumberOfWords = WordDoc.Sentences.count
For i = 1 to NumberOfWords
WScript.Echo WordDoc.Sentences(i)
Next

'Close the document
WordDoc.Save
Word.Quit

'Release the object variables
Set WordDoc = Nothing
Set Word = Nothing
```

The script contains a variable named **FilePath** that specifies the file path of the Word document. You can initialize this variable using a **Set variable** action before the **Run VBScript** action or replace it with a hardcoded value.

The **Run VBScript** action stores the extracted text by default in a variable named **VBScriptOutput**. You can use this variable as an input in the available Text actions to manipulate the retrieved text.

Pass a datatable from a cloud flow to a desktop flow

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Some automation scenarios require users to pass data in tabular form from a cloud flow to a desktop flow. To implement this functionality, replicate the following flow:

1. Before deploying any actions, create a new input variable. In this example, the input variable is named **DataInput**.

This variable will be used in your cloud flow to pass data to Power Automate for desktop. The data must be in JSON format for this flow to run successfully. In the following example, you can see the structure of a JSON block.

```
[
 {
 "Name": "Tania",
 "Last Name": "Agius",
 "Email": "taniaagius@contoso.com",
 },
 {
 "Name": "Ditiro",
 "Last Name": "Kgosi",
 "Email": "ditirokgosi@contoso.com",
 },
 {
 "Name": "Zoltan",
 "Last Name": "Gal",
 "Email": "zoltangal@contoso.com",
 }
]
```

To find more information regarding passing data from cloud flows to desktop flows, refer to Trigger a Power Automate desktop flow from another flow.

2. Convert the imported JSON data to a custom object using the respective action. You can find more information regarding custom objects in Advanced data types.

3. Deploy a **Set variable** action and create a new variable named **TableContent**. In this step, the variable must contain the headers of the table you want to pass separated by semicolons.

4. Use a **For each** loop to iterate through each item of the previously created custom object.

5. Use a **Set variable** action and append the appropriate values of the current item to the **TableContent** variable. The values must be separated by semicolons.

6. Outside the loop, deploy the **Get special folder** action to retrieve the path for your desktop folder.

7. Write the content of the **TableContent** variable to a file named **table.txt** located in your desktop folder. If the file doesn't exist, the action will create it automatically.

8. Use the **Rename file(s)** action to change the file extension of the previously mentioned file to **.csv**.

9. Lastly, read the content of the converted CSV file using the **Read from CSV file** action. The read data will have the form of a datatable.

10. Optionally, use the **Delete file(s)** action to delete the **table.csv** file from your desktop.

Actions reference

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In this section, you can find a reference to all actions of the Power Automate.

Click on any of the action groups and the list of actions will appear along with their parameters to assist you configure them.

Variables	Conditionals	Loops	Flow control	Run flow
System	Workstation	Scripting	File	Folder
Compression	UI automation	HTTP	Browser automation	Excel
Database	Email	Exchange	Outlook	Message boxes
Mouse and keyboard	Clipboard	Text	Date time	PDF
CMD session	Terminal emulation	OCR	Cryptography	Windows services
XML	FTP	CyberArk	Active Directory	AWS
Azure	Google Cognitive	IBM Cognitive	Microsoft Cognitive	

Variables

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All variable-related actions for different datatypes

Truncate number
Generate random number
Clear list
Remove item from list
Sort list
Shuffle list
Merge lists
Reverse list
Remove duplicate items from list
Find common list items
Subtract lists
Retrieve data table column into list
Convert JSON to custom object
Convert custom object to JSON
Add item to list
Create new list
Increase variable
Decrease variable
Set variable

Getting started with variable actions

Create variables manually with the **Set variable** action. Provide a name and a value for the variable to use it in other actions.

To increase or decrease the numeric value of a variable, use the **Increase variable** or **Decrease variable** actions respectively.

Most actions output their result into a variable. For example, create a blank list-type variable with the **Create new list** action. The **Generate random number** action outputs the random number to a variable. Select **Generate multiple numbers** to create a list-type variable with multiple random numbers.

Add items to the list with **Add item to list**. Enter the value to add, or use a variable to add its value to the list. Similarly, remove items items from the list with **Remove item from list**. Enter the index of the item to remove.

> **NOTE**
> The index of the list starts from 0, meaning that the first item in the list will have an index of 0. Use the notation %ListName[0]% to refer to the first item in the list, %ListName[1]% to the second, and so on.

Variable actions

Truncate number

Get the integral or fractional digits of a numeric value, or round up the value to a specified number of decimal places

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Number to truncate	No	Numeric value		The number or variable that holds the numeric value to truncate/round up
Operation	N/A	Get integer part, Get decimal part, Round number	Get integer part	Specifies the operation to perform on the given number
Decimal places	Yes	Numeric value	3	The number of decimal places to round the given number up to. Enter 0 to return an integer as a result

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
TruncatedValue	Numeric value	The truncated or rounded number

Exceptions

- This action doesn't include any exceptions

Generate random number

Generate a random number or a list of random numbers that fall between a minimum and maximum value

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Minimum value	Yes	Numeric value	0	The lower boundary for the random number(s) to generate
Maximum value	Yes	Numeric value	100	The upper boundary for the random number(s) to generate
Generate multiple numbers	N/A	Boolean value	False	Specifies whether to generate a single random number or a list of random numbers
How many numbers	Yes	Numeric value	10	Specifies how many random numbers to generate
Allow duplicates	N/A	Boolean value	False	Specifies whether to permit or prevent the same number from appearing more than once in the random numbers list

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
RandomNumber	Numeric value	The newly generated random number
RandomNumbers	List of Numeric values	The newly generated list of random numbers

Exceptions

EXCEPTION	DESCRIPTION
Failed to generate random number	Indicates that there is an error generating a random number

Clear list

Remove all items from a list

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
List to clear	No	List of General values		A list variable to remove its elements

Variables Produced

This action doesn't produce any variables

Exceptions

- This action doesn't include any exceptions

Remove item from list

Remove one or multiple items from a list

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Remove item by	N/A	Index, Value	Index	Specifies whether to remove the item at a specified index or the item(s) with a specific value
At index	No	Numeric value		The index number of the item to remove
With value	No	General value		The item to remove
Remove all item occurrences	N/A	Boolean value	False	Removes all the occurrences that match the item specified
From list	No	List of General values		The list with items to remove

Variables Produced

This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Item index is out of range	Indicates that item index is out of range
Item not found	Indicates that item doesn't exist in the list

Sort list

Sort the items of a list. Use items of the same type

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
List to sort	No	List of General values		The variable that holds the list to sort
Sort by list item's properties	N/A	Boolean value	False	If the list items are objects (such are files, folders, etc), enable this option to sort the item by a specific property. Leave this option disabled to sort the elements by their default property (e.g., file objects will be sorted by their full path)

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
First property to sort by	Yes	Text value		The name of an item's property to sort the list by. Refer to the help file for the property names of each object
Sort	N/A	Ascending, Descending	Ascending	Specifies whether to sort by the first property ascending or descending
Second property to sort by	Yes	Text value		The name of a second property to sort the list by
Sort	N/A	Ascending, Descending	Ascending	Specifies whether to sort by the second property ascending or descending
Third property to sort by	Yes	Text value		The name of a third property to sort the list by
Sort	N/A	Ascending, Descending	Ascending	Specifies whether to sort by the third property ascending or descending

Variables Produced

This action doesn't produce any variables

Exceptions

- This action doesn't include any exceptions

Shuffle list

Create a random permutation of a list

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
List to shuffle	No	List of General values		The variable that contains the list to shuffle

Variables Produced

This action doesn't produce any variables

Exceptions

- This action doesn't include any exceptions

Merge lists

Merge two lists into one

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
First list	No	List of General values		The first list of items to merge
Second list	No	List of General values		The second list of items to merge

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
OutputList	List of General values	The merged list. The initial lists aren't affected

Exceptions

EXCEPTION	DESCRIPTION
The lists supplied are of incompatible types	Indicates that the lists supplied are of incompatible types

Reverse list

Reverse the order of the items of a list

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
List to reverse	No	List of General values		The list whose items order to reverse

Variables Produced

This action doesn't produce any variables

Exceptions

- This action doesn't include any exceptions

Remove duplicate items from list

Remove the multiple occurrences of items in a list, so that in the resulting list each item will be unique

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
List to remove duplicate items from	No	List of General values		The list variable to remove duplicate items from
Ignore text case while searching for duplicate items	N/A	Boolean value	False	Specifies whether to perform case insensitive comparison of text while searching for duplicate items (only applies to lists made of text items)

Variables Produced

This action doesn't produce any variables

Exceptions

- This action doesn't include any exceptions

Find common list items

Compare two lists and create a new list with the items that are common to both

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
First list	No	List of General values		The variable that contains the first list to compare
Second list	No	List of General values		The variable that contains the second list to compare

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
IntersectionList	List of General values	The new list of common items

Exceptions

- This action doesn't include any exceptions

Subtract lists

Compare two lists and create a new list with the items that are in the first list but not in the second

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
First list	No	List of General values		The variable that holds the first list to compare
Second list	No	List of General values		The variable that holds the second list to compare

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
ListDifference	List of General values	The new resulting list

Exceptions

- This action doesn't include any exceptions

Retrieve data table column into list

Convert the contents of a data table column into a list

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Data table	No	Datatable		The data table with the column to convert into a list

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Column name or index	No	Text value		The column name, if column names are defined, or the index number of the column to retrieve

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
ColumnAsList	List of General values	The new list that holds the contents of the specified data table

Exceptions

EXCEPTION	DESCRIPTION
Column name doesn't exist	Indicates that the column name isn't in the data table
Column index is out of range	Indicates that the column index is out of range

Convert JSON to custom object

Convert a JSON string to a custom object

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
JSON	No	Text value		A JSON text, or a previously created variable containing one, to convert it to a custom object

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
JsonAsCustomObject	General value	The converted custom object from the provided JSON

Exceptions

EXCEPTION	DESCRIPTION
Error parsing the JSON	Indicates that there is an error parsing the specified JSON

Convert custom object to JSON

Convert a custom object to a JSON string

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Custom object	No	Custom object		The custom object to convert to JSON

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
CustomObjectAsJson	Text value	The converted JSON from the provided custom object

Exceptions

EXCEPTION	DESCRIPTION
Error parsing the custom object	Indicates that there is an error parsing the custom object

Add item to list

Append a new item to a list

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Add item	No	General value		A value or a variable to add to the list. Provide a list of values to append multiple elements. If the list has a specific type of elements, the new element is converted over to that type
Into list	No	List of General values		A list variable to append the new elements to

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
NewList	List of General values	The new list

Exceptions

- This action doesn't include any exceptions

Create new list

Create a new empty list

Input Parameters

- This action doesn't require any input

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
List	List of General values	The new list

Exceptions

- This action doesn't include any exceptions

Increase variable

Increase the value of a variable by a specific amount

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Variable name	No	Numeric value		The numeric value to increase
Increase by	No	Numeric value		A numeric value, or a previously created variable containing one, to increase the variable by

Variables Produced

This action doesn't produce any variables

Exceptions

- This action doesn't include any exceptions

Decrease variable

Decrease the value of a variable by a specific amount

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Variable name	No	Numeric value		A numeric value, or a previously created variable containing one, to decrease the variable by
Decrease by	No	Numeric value		A numeric value, or a previously created variable containing one, to decrease the variable by

Variables Produced

This action doesn't produce any variables

Exceptions

- This action doesn't include any exceptions

Set variable

Set the value of a new or existing variable, create a new variable or overwrite a previously created variable

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
To	No	*		The value to assign to the variable

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
NewVar	*	The name of the variable to set

> **NOTE**
>
> Produced variable names, may not contain special characters, white spaces and non-latin characters and can't start with arithmetic characters.

Exceptions

- This action doesn't include any exceptions

Conditionals

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Case
Default case
Else
Else if
If
Switch

Getting started with conditionals

Conditional actions allow you to modify which actions to run, based on the outcomes of conditional statements.

Useful applications and features:

- Use the If group of conditionals to evaluate any type of condition.
- Use the Switch group of conditionals to compare a single variable with multiple possible values.
- Cover multiple scenarios by employing nested conditionals.
- Provide default and alternative behaviors to flows based on the available data.

You can find more information on how to use the conditional actions here

Conditionals actions

Case

An expression that, if met, a block of actions associated with that particular case runs

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Operator	N/A	Equal to (=), Not equal to (<>), Greater than (>), Greater than or equal to (>=), Less than (<), Less than or equal to (<=), Contains, Does not contain, Is empty, Isn't empty, Starts with, Doesn't start with, Ends with, Doesn't end with	Equal to (=)	The comparison operator of this case

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Value to compare	No	*		Enter a value to compare with the switch-block value

Variables Produced

- This action doesn't produce any variables

Exceptions

- This action doesn't include any exceptions

Default case

A block of actions that is run, if no case expression has been met in the switch body

Input Parameters

- This action doesn't require any input

Variables Produced

- This action doesn't produce any variables

Exceptions

- This action doesn't include any exceptions

Else

Marks the beginning of a block of actions that ran if the condition specified in the preceding 'If' statements aren't met

Input Parameters

- This action doesn't require any input

Variables Produced

- This action doesn't produce any variables

Exceptions

- This action doesn't include any exceptions

Else if

Marks the beginning of a block of actions that ran if the conditions specified in the preceding 'If' statements aren't met, but the condition specified in this statement is met

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Operator	N/A	Equal to (=), Not equal to (<>), Greater than (>), Greater than or equal to (>=), Less than (<), Less than or equal to (<=), Contains, Does not contain, Is empty, Isn't empty, Starts with, Doesn't start with, Ends with, Doesn't end with	Equal to (=)	Choose the relationship of first operand to the second operand.

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
First operand	No	*		Enter a value name defined by a previous action, text, number or expression to compare with the second operand.
Second operand	No	*		Enter a value name produced by a previous action, text, number or expression to compare with the first operand.

Variables Produced

- This action doesn't produce any variables

Exceptions

- This action doesn't include any exceptions

If

Marks the beginning of a block of actions that is run if the condition specified in this statement is met

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Operator	N/A	Equal to (=), Not equal to (<>), Greater than (>), Greater than or equal to (>=), Less than (<), Less than or equal to (<=), Contains, Does not contain, Is empty, Isn't empty, Starts with, Doesn't start with, Ends with, Doesn't end with	Equal to (=)	Choose the relationship of first operand to the second operand.
First operand	No	*		Enter a value name defined by a previous action, text, number or expression to compare with the second operand.
Second operand	No	*		Enter a value name produced by a previous action, text, number or expression to compare with the first operand.

Variables Produced

- This action doesn't produce any variables

Exceptions

- This action doesn't include any exceptions

Switch

Dispatches execution to different parts of the switch body based on the value of the expression

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Value to check	No	*		Enter a value name, text, or number to compare with the following cases.

Variables Produced

- This action doesn't produce any variables

Exceptions

- This action doesn't include any exceptions

Loops

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Exit loop
For each
Loop
Loop condition
Next loop

Getting started with loops

Loops are used to automate repetitive sections of a flow by executing a block of actions multiple times.

Useful applications and features:

- Use simple loops to perform a given number of repetitions and iterate through data.
- Deploy loop conditions in order to repeat actions until a condition is met.
- Iterate through the items of a list using for each loops.
- Explicitly end loops when required.

You can find more information on how to use the loop actions here

Loops actions

Exit loop

Terminates the loop and the flow resumes at the next action or statement following the loop

Input Parameters

- This action doesn't require any input

Variables Produced

- This action doesn't produce any variables

Exceptions

- This action doesn't include any exceptions

For each

Iterates over items in a list, data table or data row, allowing a block of actions to be executed repeatedly

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Value to iterate	No	*		Enter a list, data row, or data table value to iterate through it.

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
	*	The value name that will store the current item value in each iteration.

Exceptions

- This action doesn't include any exceptions

Loop

Iterates a block of actions for a specified number of times

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Start from	No	Numeric value		Set the starting point of the loop counter.
Increment by	No	Numeric value		Set the increment that the loop counter variable is increased by.
End to	No	Numeric value		Set the ending point of the loop counter.

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
	*	The value name that will store the current index, starting at the start from value. The value will change by the increment with each iteration.

Exceptions

- This action doesn't include any exceptions

Loop condition

Iterates a block of actions as long as a specified condition proves to be true

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Operator	N/A	Equal to (=), Not equal to (<>), Greater than (>), Greater than or equal to (>=), Less than (<), Less than or equal to (<=)	Equal to (=)	Choose the relationship of first operand to second operand.
First operand	No	*		Enter a value name defined by a previous action, text, number or expression to compare with the second operand.

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Second operand	No	*		Enter a value name produced by a previous action, text, number or expression to compare with the first operand.

Variables Produced

- This action doesn't produce any variables

Exceptions

- This action doesn't include any exceptions

Next loop

Forces the next iteration of the block to take place, skipping any actions in between

Input Parameters

- This action doesn't require any input

Variables Produced

- This action doesn't produce any variables

Exceptions

- This action doesn't include any exceptions

Flow control

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Control the automation flow

Comment
End
Exit subflow
Get last error
Go to
Label
On block error
Run subflow
Stop flow
Wait

Getting started with flow control

Flow control refers to controlling the order in which actions and subflows run. Power Automate enables flow control through the flow control actions.

Labels are used to create points of reference for the **Go to** action to direct the flow to. In the figure below, the flow is directed to a label earlier in the flow to repeat a series of actions.

The **Run subflow** action interrupts the subflow in which it is placed and runs another subflow. When the second subflow completes, the flow reverts to the original subflow to continue running. In the figure below, the subflow **Calculate Discount** has been created to run multiple times throughout the runtime of the flow, to avoid repeating the same code.

Flow control actions

Comment

User comment

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Comment	Yes	Text value		User comment

Variables Produced

- This action doesn't produce any variables

Exceptions

- This action doesn't include any exceptions

End

Input Parameters

- This action doesn't require any input

Variables Produced

- This action doesn't produce any variables

Exceptions

- This action doesn't include any exceptions

Exit subflow

Exits current subflow and returns to the point it was called from

Input Parameters

- This action doesn't require any input

Variables Produced

- This action doesn't produce any variables

Exceptions

- This action doesn't include any exceptions

Get last error

Retrieves the last error that occured in the flow

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Clear error	N/A	Boolean value	False	After the error is stored in the variable, it's cleared so that next time the error is retrieved, it won't retrieve the same error value

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
LastError	Error	The details of the error that last occured in the flow

Exceptions

- This action doesn't include any exceptions

Go to

Transfers the flow of execution to another point, indicated by a label

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Go to label	No	Text value		Label in the flow

Variables Produced

- This action doesn't produce any variables

Exceptions

- This action doesn't include any exceptions

Label

Acts as the destination of a 'go to' statement

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Label name	No	Text value		Label in the program

Variables Produced

- This action doesn't produce any variables

Exceptions

- This action doesn't include any exceptions

On block error

Marks the beginning of a block to handle actions errors

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Name	No	Text value		The name of the Exception Block for Visual purposes only.
Capture unexpected logic errors	N/A	Boolean value	False	Expand the scope of error handling, also capturing logical errors in the flow, for example, diving a number by zero or trying to access an item from an out of bounds position.

Variables Produced

- This action doesn't produce any variables

Exceptions

- This action doesn't include any exceptions

Run subflow

Run a subflow specifying any required arguments

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Subflow name	No	Subflow		The name of the subflow to call

Variables Produced

- This action doesn't produce any variables

Exceptions

- This action doesn't include any exceptions

Stop flow

Terminates the flow

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
End flow	No	Successfully, With error message	Successfully	Terminate the execution of the flow, either successfully or with an error
Error message	No	Text value		The error message to return to the flow caller upon exit

Variables Produced

- This action doesn't produce any variables

Exceptions

- This action doesn't include any exceptions

Wait

Suspends the execution of the flow for a specified amount of seconds

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Duration	No	Numeric value		Time duration in seconds

Variables Produced

- This action doesn't produce any variables

Exceptions

- This action doesn't include any exceptions

Run desktop flow

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Set your automation to trigger other flows

Run desktop flow

Getting started with the Run desktop flow action

The **Run desktop flow** action enables you to call other desktop flows while running a specific desktop flow. To use the action, add it to the workspace and select the desktop flow you want to call. If the called flow contains input variables, the action will prompt you to enter their values.

> **NOTE**
>
> You can find more information regarding the **Run desktop flow** action in Run desktop flow from other desktop flows.

Run desktop flow action

Run desktop flow

Runs a desktop flow which can receive input variables and may produce output variables. The parent flow run will be paused until the called desktop flow completes.

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Destop flow	No	Desktop flow		Select the desktop flow to run from within this flow

Variables Produced

- This action produces the output variables of the selected flow

Exceptions

EXCEPTION	DESCRIPTION
Run desktop flow failed	Indicates a problem while running the desktop flow

> **NOTE**
>
> - A flow's dependencies can't be more than 30 other flows.
> - Two flows can't directly or indirectly call one-another as this causes a recursion.
> - In org tenants, the flows must be under the same environment.

System

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> **NOTE**
> The System group of actions has been segregated into some new categories. You can find details on the Workstation actions and Scripting actions in their respective pages.

Perform a variety of tasks in a Windows environment and retrieve information from the system

If process
Wait for process
Run application
Terminate process
Ping
Set Windows environment variable
Get Windows environment variable
Delete Windows environment variable

Getting started with system actions

Use system actions to automate tasks which are fundamental to the Windows operating system.

Launch any of your installed applications with the **Run application** action. Command line arguments require placement in quotes and a space among them. In the figure below, the **Run application** actions opens a specific document in Word in quiet mode:

Apart from running applications, Power Automate for desktop enables you to terminate processes by name or ID through the **Terminate process** action and wait for processes to start or stop through the **Wait for process** action.

If you want to handle Windows environment variables, use the **Set Windows environment variable**, **Get Windows environment variable**, and **Delete Windows environment variable** actions for the respective tasks.

System actions

If process

Marks the beginning of a conditional block of actions depending on whether a process is running or not

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
If process	N/A	Is running, Isn't running	Is running	State of the process to check
Process name	No	Text value		The name of the process to check

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Can't retrieve list of processes	Indicates a problem retrieving the list of processes

Wait for process

Suspends the execution until a process starts or stops

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Process name	No	Text value		The name of the process to check
Wait for process to	N/A	Start, Stop	Start	Whether to wait until a certain process starts or stops

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Can't retrieve list of processes	Indicates a problem retrieving the list of processes

Run application

Executes an application or opens a document by executing the associated application

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Application path	No	File		The executable file as a complete file path
Command line arguments	Yes	Text value		Add extra arguments that would go after the executable file name. For example, enter notepad.exe in the application path and a specific text file in the command line arguments
Working folder	Yes	Folder		The full path of the folder to work out of, if applicable.
Window style	N/A	Normal, Hidden, Minimized, Maximized	Normal	Choose the appearance and size of the application window when it opens
After application launch	N/A	Continue immediately, Wait for application to load, Wait for application to complete	Continue immediately	Whether the next action execute immediately, or wait until the program loads or completes

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Timeout	Yes	Numeric value	0	The maximum wait time, and how long before forcing a continue

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
AppProcessId	Numeric value	The process ID output
AppExitCode	Numeric value	The application exit code
WindowHandle	Numeric value	The window handle. When opening a new window, this will catch the value of the window handle, and store it in this variable. A window handle is useful to specifically identify a window in a later action

Exceptions

EXCEPTION	DESCRIPTION
File or application not found	Indicates that the specified file or application was not found
Access denied for application or File	Indicates that access was denied for the specified application or file
Can't retrieve application's main window handle	Indicates a problem retrieving the application's main window handle
Can't execute application or open file	Indicates a problem executing the specified application or opening the specified file

IMPORTANT

The Application path field has to point to the executable of the application. Certain default windows applications can be opened by entering **notepad** or **calc** for calculator.

Any command line arguments have to be entered in double quotes and separated by a space. For example, to open Microsoft Word in quiet mode with the file InvoiceTemplate.docx from the user's desktop, format the field like so: **"/q" "C:\Users\username\Desktop\InvoiceTemplate.docx"**

Example

Terminate process

Immediately stops a running process

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Specify process by	N/A	Process ID, Process name	Process name	Specify whether the process to terminate will be specified by its name, or by its ID
Process ID	No	Numeric value		The ID of the process to terminate
Process name	No	Text value		The name of the process to terminate. If more than one processes with the same name are running, all of them will be terminated

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Process with specified ID not running	Indicates that a process with the specified ID isn't running
Failed to terminate process	Indicates a problem terminating the process

Ping

Sends a message to determine whether a remote computer is accessible over the network

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Host name	No	Text value		The name of the remote computer or an IP address
Timeout	Yes	Numeric value	5000	The maximum number of milliseconds to wait for the Ping reply message

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
PingResult	Text value	The status of the ping message (success or failure)
RoundTripTime	Numeric value	The number of milliseconds taken for the Ping to complete

Exceptions

EXCEPTION	DESCRIPTION
Can't complete ping action	Indicates a problem completing the ping action

Set Windows environment variable

Sets an environment variable to a given value

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Environment variable name	No	Text value		The name of the environment variable
New environment variable value	No	Text value		The value that is set to the environment variable
Type	N/A	User, System	User	The type of the environment variable

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Indicates a problem setting the environment variable's value	Indicates a problem setting the environment variable's value
Insufficient permissions	Indicates that the user has insufficient permissions to perform this action

Get Windows environment variable

Retrieves the value of an environment variable

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Environment variable name	No	Text value		The name of the environment variable whose value will be retrieved
Search for variable only in scope	N/A	Boolean value	False	Specify whether to search for the variable only in a specific scope
Scope	N/A	User, System	User	The scope from which the environment variable should be retrieved

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
EnvironmentVariableValue	Text value	The environment variable's value

Exceptions

EXCEPTION	DESCRIPTION
Environment variable doesn't exist	Indicates that the specified environment variable doesn't exist
Insufficient permissions	Indicates that the user has insufficient permissions to perform this action

Delete Windows environment variable

Deletes an environment variable from a given scope

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Environment variable name	No	Text value		The name of the environment variable to delete
Type	N/A	User, System	User	The type of the environment variable to delete

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Failed to delete environment variable	Indicates a problem deleting an environment variable
Insufficient permissions	Indicates that the user has insufficient permissions to perform this action

Workstation

1/15/2022 • 7 minutes to read • Edit Online

Perform a variety of tasks on the workstation

Print document
Get default printer
Set default printer
Log off user
Shutdown computer
Show desktop
Lock workstation
Play sound
Empty recycle bin
Take screenshot
Control screen saver
Get screen resolution
Set screen resolution

Getting started with workstation actions

The workstation group of actions provides a collection of actions that automate some essential functionalities of your workstation.

To print a document, deploy the **Print document** action and populate the path of the file you want to print.

To change the default printer of the workstation, use the **Set default printer** action. To check which is the current default printer, use the **Get default printer** action.

If you want to sign out of your Windows account, use the **Log off user** action. Additionally, you can use the **Shutdown computer** and **Lock workstation** actions to shut down or lock your workstation, respectively.

To change the resolution of any of your screens, use the **Set screen resolution**. The action requires you to populate the ID number of the screen, the width and height, the bit count, and the frequency. You can click the **Available screen resolutions** button to see all the available resolutions for each screen. Also, you can retrieve the current values of the mentioned attributes with the **Get screen resolution** action.

Workstation actions

Print document

Prints a document on the default printer

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Document to print	No	File		The path of the document to print

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Document not found	Indicates that the specified document was not found
Access denied for document	Indicates that access was denied for the provided document
Can't print document	Indicates a problem printing the specified document

Get default printer

Gets the name of the default printer

Input Parameters

- This action doesn't require any input

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
PrinterName	Text value	The name of the default printer

Exceptions

EXCEPTION	DESCRIPTION
Can't get default printer	Indicates a problem getting the default printer

Set default printer

Sets a printer as the default printer

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Printer name	No	Text value		The name of the printer to set as default

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Can't set default printer	Indicates a problem setting the default printer

Log off user

Logs off the current user

> **NOTE**
> When you run the **Log off user** action through the flow designer, the action prompts you to verify that you want to log off the current user. However, the action doesn't require confirmation when the flow is run through the console or the portal. In all cases, the action will terminate the flow.

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Force log off	N/A	Boolean value	False	Specify whether to force the user account to log off, regardless of unsaved files or programs that won't close

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Can't log off user in non interactive mode	Indicates a problem logging off the user in non-interactive mode
Can't log off the current user	Indicates a problem logging off the current user

Shutdown computer

Instructs the computer to shut down

> **IMPORTANT**
> Although a flow containing the **Shutdown computer** action is set to shut down the machine, some unrelated factors, such as other running Windows processes, may prevent it from achieving it.

> **NOTE**
> When you run the **Shutdown computer** action through the flow designer, the action prompts you to verify that you want to shut down the computer. However, the action doesn't require confirmation when the flow is run through the console or the portal. In all cases, the action will terminate the flow.

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Action to perform	N/A	Shutdown, Restart, Suspend, Hibernate	Shutdown	Specify which shutdown option the computer will perform
Force	N/A	Boolean value	False	Specify whether to force the computer to shut down, regardless of unsaved files or programs that won't close

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Can't shut down the computer	Indicates a problem shutting down the computer

Show desktop

Shows the desktop

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Operation	N/A	Minimize all windows (show desktop), Restore all windows (undo show desktop)	Minimize all windows (show desktop)	Specify whether to minimize all windows to reveal the desktop or restore all windows to their original respective states

Variables Produced

- This action doesn't produce any variables

Exceptions

- This action doesn't include any exceptions

Lock workstation

Locks the workstation's display to protect it from unauthorized use

Input Parameters

- This action doesn't require any input

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Can't lock the computer in non interactive mode	Indicates a problem locking the computer in non interactive mode

EXCEPTION	DESCRIPTION
Can't lock the computer	Indicates a problem locking the computer in non-interactive mode

Play sound

Plays a system sound or a wav file

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Play sound from	N/A	System, WAV file	System	The type of sound to play
Sound to play	N/A	Asterisk, Beep, Exclamation, Hand, Question	Asterisk	The specific sound to play
File to play	No	File		The full path of the specific WAV file to play

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Can't find sound file	Indicates that the sound file could not be found
Invalid sound file	Indicates an invalid sound file

Empty recycle bin

Deletes all files from the windows recycle bin

Input Parameters

- This action doesn't require any input

Variables Produced

- This action doesn't produce any variables

Exceptions

- This action doesn't include any exceptions

Take screenshot

Takes a screenshot of the foreground window or the specified screen and saves the image in a file or to the clipboard

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Capture	N/A	All screens, Primary screen, Select screen, Foreground window	All screens	The area to capture

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Screen to capture	No	Numeric value		Specify which screen to capture
Save screenshot to	N/A	Clipboard, File	Clipboard	The location to save the screenshot to
Image file	No	File		The full path of the file name where the captured image will be saved
Image format	N/A	BMP, EMF, EXIF, GIF, JPG, PNG, TIFF, WMF	BMP	The format for the image file to save

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Failed to take screenshot	Indicates a problem taking the screenshot
Failed to save screenshot to file	Indicates a problem saving the screenshot to a file
Failed to set screenshot to clipboard	Indicates a problem setting the screenshot to the clipboard
Failed to get specified screen	Indicates a problem getting the specified screen

Control screen saver

Enables, disables, starts or stops the screensaver

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Screen saver action	N/A	Enable, Disable, Start, Stop	Enable	The function of the screensaver

Variables Produced

- This action doesn't produce any variables

Exceptions

- This action doesn't include any exceptions
-
-

Get screen resolution

Gets the width, height, bit count and frequency of a selected monitor

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Monitor number	No	Numeric value		The number of the monitor to get the resolution of

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
MonitorWidth	Numeric value	The width of the monitor
MonitorHeight	Numeric value	The height of the monitor
MonitorBitCount	Numeric value	The monitor bit count
MonitorFrequency	Numeric value	The monitor frequency

Exceptions

EXCEPTION	DESCRIPTION
Failed to get the screen's resolution	Indicates a problem getting the screen's resolution

Set screen resolution

Sets the width, height, bit count and frequency of a selected monitor during an attended desktop flow run.

> **IMPORTANT**
> To use the **Set screen resolution** action in flows triggered through the Power Automate portal, you have to be connected to the console session of your machine, where you can manually change the screen resolution. For example, you can use your machine's physical screen to connect to the machine. In remote sessions, such as unattended scenarios that use remote desktop clients, the action has no effect, as users can't manually change the resolution.

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Monitor number	No	Numeric value		The number of monitor to set the resolution of
Monitor width	No	Numeric value		The value to set the monitor width to
Monitor height	No	Numeric value		The value to set the monitor height to
Monitor bit count	No	Numeric value		The value to set the monitor bit count to
Monitor frequency	No	Numeric value		The value to set the monitor frequency to

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Failed to set the screen's resolution	Indicates a problem setting the screen's resolution

Scripting

1/15/2022 • 6 minutes to read • Edit Online

Incorporate scripting languages code in you automation

Run DOS command
Run VBScript
Run JavaScript
Run PowerShell script
Run Python script

Getting started with scripting actions

Scripting actions are a major part of the system actions group. These actions enable users to run blocks of code and implement custom behavior in Power Automate.

All scripting actions follow the basic structure of the respective programming or scripting language: PowerShell, Python, VBScript, and JavaScript.

To declare variables in scripting actions and return results in Power Automate, use the following commands:

- To declare new variables in PowerShell scripts, use the **$** notation. To return values from Run PowerShell script actions to Power Automate, use the **Write-Output** command.

  ```
  $variableName = "variableValue"
  Write-Output $variableName
  ```

- Python scripts don't require any special notation to declare new variables. To return values from Run Python script actions, use the **print** function.

  ```
  variableName = "variableValue"
  print variableName
  ```

- VBScript doesn't require any special notation to declare new variables. Use the **WScript.Echo** function to return values from Run VBScript actions to Power Automate.

  ```
  variableName = "variableValue"
  WScript.Echo variableName
  ```

- In JavaScript scripts, use the **var** notation to declare new variables and the **WScript.Echo** function to return values from Run JavaScript actions.

```
var variableName = "variableValue";
WScript.Echo(variableName);
```

To use Power Automate variables in scripting actions, use the percentage notation (%) and handle the variables the same way as hardcoded values.

Scripting actions

Run DOS command

Executes a DOS command or console application in invisible mode and retrieves its output upon completion

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
DOS command or application	No	File		The name of DOS command or a console application, with arguments if applicable
Working folder	Yes	Folder		The full path of the folder to work out of, if applicable
Change code page	N/A	Boolean value	False	Specifies whether to change the session's current code page
Encoding	No	ASMO-708 : Arabic (ASMO 708), big5 : Chinese Traditional (Big5), cp1025 : IBM EBCDIC (Cyrillic	utf-8 : Unicode (UTF-8)	The encoding to use when reading the output

ARGUMENT	OPTIONAL	CONTENTS	DEFAULT VALUE	DESCRIPTION
		EBCDIC (Cyrillic Serbian-Bulgarian), cp866 : Cyrillic (DOS), cp875 : IBM EBCDIC (Greek Modern), csISO2022JP : Japanese (JIS-Allow 1 byte Kana), DOS-720 : Arabic (DOS), DOS-862 : Hebrew (DOS), EUC-CN : Chinese Simplified (EUC), EUC-JP : Japanese (JIS 0208-1990 and 0212-1990), euc-jp : Japanese (EUC), euc-kr : Korean (EUC), GB18030 : Chinese Simplified (GB18030), gb2312 : Chinese Simplified (GB2312), hz-gb-2312 : Chinese Simplified (HZ), IBM-Thai : IBM EBCDIC (Thai), IBM00858 : OEM Multilingual Latin I, IBM00924 : IBM Latin-1, IBM01047 : IBM Latin-1, IBM01140 : IBM EBCDIC (US-Canada-Euro), IBM01141 : IBM EBCDIC (Germany-Euro), IBM01142 : IBM EBCDIC (Denmark-Norway-Euro), IBM01143 : IBM EBCDIC (Finland-Sweden-Euro), IBM01144 : IBM EBCDIC (Italy-Euro), IBM01145 : IBM EBCDIC (Spain-Euro), IBM01146 : IBM EBCDIC (UK-Euro), IBM01147 : IBM EBCDIC (France-Euro), IBM01148 : IBM EBCDIC (International-Euro), IBM01149 : IBM EBCDIC (Icelandic-Euro), IBM037 : IBM EBCDIC (US-Canada), IBM1026 : IBM EBCDIC (Turkish Latin-5), IBM273 : IBM EBCDIC (Germany), IBM277 : IBM EBCDIC (Denmark-Norway), IBM278 : IBM EBCDIC (Finland-Sweden), IBM280 :		

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
		IBM EBCDIC (Italy), IBM284 : IBM EBCDIC (Spain), IBM285 : IBM EBCDIC (UK), IBM290 : IBM EBCDIC (Japanese katakana), IBM297 : IBM EBCDIC (France), IBM420 : IBM EBCDIC (Arabic), IBM423 : IBM EBCDIC (Greek), IBM424 : IBM EBCDIC (Hebrew), IBM437 : OEM United States, IBM500 : IBM EBCDIC (International), ibm737 : Greek (DOS), ibm775 : Baltic (DOS), ibm850 : Western European (DOS), ibm852 : Central European (DOS), IBM855 : OEM Cyrillic, ibm857 : Turkish (DOS), IBM860 : Portuguese (DOS), ibm861 : Icelandic (DOS), IBM863 : French Canadian (DOS), IBM864 : Arabic (864), IBM865 : Nordic (DOS), ibm869 : Greek, Modern (DOS), IBM870 : IBM EBCDIC (Multilingual Latin-2), IBM871 : IBM EBCDIC (Icelandic), IBM880 : IBM EBCDIC (Cyrillic Russian), IBM905 : IBM EBCDIC (Turkish), iso-2022-jp : Japanese (JIS), iso-2022-jp : Japanese (JIS-Allow 1 byte Kana - SO/SI), iso-2022-kr : Korean (ISO), iso-8859-1 : Western European (ISO), iso-8859-13 : Estonian (ISO), iso-8859-15 : Latin 9 (ISO), iso-8859-2 : Central European (ISO), iso-8859-3 : Latin 3 (ISO), iso-8859-4 : Baltic (ISO), iso-8859-5 : Cyrillic (ISO), iso-8859-6 :		

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
		Arabic (ISO), iso-8859-7 : Greek (ISO), iso-8859-8 : Hebrew (ISO-Visual), iso-8859-8-i : Hebrew (ISO-Logical), iso-8859-9 : Turkish (ISO), Johab : Korean (Johab), koi8-r : Cyrillic (KOI8-R), koi8-u : Cyrillic (KOI8-U), ks_c_5601-1987 : Korean, macintosh : Western European (Mac), shift_jis : Japanese (Shift-JIS), us-ascii : US-ASCII, utf-16 : Unicode, utf-16BE : Unicode (Big-Endian), utf-32 : Unicode (UTF-32), utf-32BE : Unicode (UTF-32 Big-Endian), utf-7 : Unicode (UTF-7), utf-8 : Unicode (UTF-8), windows-1250 : Central European (Windows), windows-1251 : Cyrillic (Windows), Windows-1252 : Western European (Windows), windows-1253 : Greek (Windows), windows-1254 : Turkish (Windows), windows-1255 : Hebrew (Windows), windows-1256 : Arabic (Windows), windows-1257 : Baltic (Windows), windows-1258 : Vietnamese (Windows), windows-874 : Thai (Windows), x-Chinese-CNS : Chinese Traditional (CNS), x-Chinese-Eten : Chinese Traditional (Eten), x-cp20001 : TCA Taiwan, x-cp20003 : IBM5550 Taiwan, x-cp20004 : TeleText Taiwan, x-cp20005 : Wang Taiwan, x-cp20261 : T.61, x-cp20269 : ISO-6937, x-cp20936 : Chinese Simplified (GB2312-80), x-cp20949 : Korean Wansung, x-cp50227 : Chinese Simplified (ISO-		

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
		Simplified (ISO 2022) x-EBCDIC-KoreanExtended : IBM EBCDIC (Korean Extended), x-Europa : Europa, x-IA5 : Western European (IA5), x-IA5-German : German (IA5), x-IA5-Norwegian : Norwegian (IA5), x-IA5-Swedish : Swedish (IA5), x-iscii-as : ISCII Assamese, x-iscii-be : ISCII Bengali, x-iscii-de : ISCII Devanagari, x-iscii-gu : ISCII Gujarati, x-iscii-ka : ISCII Kannada, x-iscii-ma : ISCII Malayalam, x-iscii-or : ISCII Oriya, x-iscii-pa : ISCII Punjabi, x-iscii-ta : ISCII Tamil, x-iscii-te : ISCII Telugu, x-mac-arabic : Arabic (Mac), x-mac-ce : Central European (Mac), x-mac-chinesesimp : Chinese Simplified (Mac), x-mac-chinesetrad : Chinese Traditional (Mac), x-mac-croatian : Croatian (Mac), x-mac-cyrillic : Cyrillic (Mac), x-mac-greek : Greek (Mac), x-mac-hebrew : Hebrew (Mac), x-mac-icelandic : Icelandic (Mac), x-mac-japanese : Japanese (Mac), x-mac-korean : Korean (Mac), x-mac-romanian : Romanian (Mac), x-mac-thai : Thai (Mac), x-mac-turkish : Turkish (Mac), x-mac-ukrainian : Ukrainian (Mac)`		

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
CommandOutput	Text value	The text output from the DOS command or application
CommandErrorOutput	Text value	The text describing the errors occurred (if any) during the execution of the DOS command or application

ARGUMENT	TYPE	DESCRIPTION
CommandExitCode	Numeric value	The command or application exit code. This will be a numeric value

Exceptions

EXCEPTION	DESCRIPTION
Can't execute command or console application	Indicates a problem executing the specified command or console application

Run VBScript

Executes some custom VBScript code and retrieves its output into a variable

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
VBScript to run	Yes	Text value		The VBScript code to execute. Variables may be included within the script since they will be evaluated prior to the execution of the VBScript

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
VBScriptOutput	Text value	The script's output
ScriptError	Text value	The errors that may occur during the execution of the VBScript code

Exceptions

- This action doesn't include any exceptions

Run JavaScript

Executes some custom JavaScript code and retrieves its output into a variable

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
JavaScript to run	Yes	Text value		The JavaScript code to execute. Variables may be included within the script since they will be evaluated prior to the JavaScript code's execution

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
JavascriptOutput	Text value	The script's output

ARGUMENT	TYPE	DESCRIPTION
ScriptError	Text value	The errors that may occur during the execution of the JavaScript code

Exceptions

- This action doesn't include any exceptions

Run PowerShell script

Executes some custom PowerShell script and retrieves its output into a variable

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
PowerShell code to run	Yes	Text value		The PowerShell code to execute. Variables may be included within the script since they will be evaluated prior to the execution of the PowerShell code

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
PowershellOutput	Text value	The script's output
ScriptError	Text value	The errors that may occur during the execution of the PowerShell code

Exceptions

EXCEPTION	DESCRIPTION
Failed to run PowerShell script	Indicates a problem running the provided PowerShell script

Run Python script

Executes Python 2 script code and retrieves its output

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Python script to run	No	Text value		The Python script code to execute
Module folder paths	Yes	List of Folders		The path(s) of folder(s) where external Python modules lie

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
PythonScriptOutput	Text value	The script's output

ARGUMENT	TYPE	DESCRIPTION
ScriptError	Text value	The errors that may occur during the execution of the Python script code

Exceptions

EXCEPTION	DESCRIPTION
Failed to run Python script	Indicates a problem running the provided Python script
Directory not found	Indicates that the directory was not found

File

1/15/2022 • 12 minutes to read • Edit Online

Manage and manipulate files

If file exists
Wait for file
Copy file(s)
Move file(s)
Delete file(s)
Rename file(s)
Read text from file
Write text to file
Read from CSV file
Write to CSV file
Get file path part
Get temporary file

Getting started with file actions

Power Automate provides the files actions to automate managing files and manipulate their properties.

To get a list of all files in a specified folder, you can use the **Get files in folder** action. You can filter files by using the File filter action. Add keywords, along with the asterisk (*) wildcard character, and separate multiple terms with a semicolon (;). In the figure below, the file filter is set to **.png**, and **Include subfolders** has been enabled. This means that the resulting variable will only contain PNG format files stored in the specified folder and its subfolders.

To copy or move files, use the Copy file(s) and Move file(s) actions, respectively.

Rename a file or multiple files with the **Rename file(s)** action. Select to either set a new name or add, replace or remove a string of text to the existing filename. In the figure below, a list of files has been selected and the string **backup_** will be appended to the beginning of each file.

The same action can be used to remove this string of text should the backed up files be restored.

The **Read text from file** action stores text from a .txt file in a variable. Specify a .txt file, and the file contents are stored as a single text value or as a list.

The **Write text to file** action adds text to an existing .txt file or creates a new file with the specified text.

File actions

If file exists

Marks the beginning of a conditional block of actions depending on whether a file exists or not

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
If file	N/A	Exists, Doesn't exist	Exists	The state of the file to check
File path	No	File		The full path to look for the file

Variables Produced

- This action doesn't produce any variables

Exceptions

- This action doesn't include any exceptions

Wait for file

Suspend the execution of the automation until a file is created or deleted

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Wait for file to be	N/A	Created, Deleted	Created	Specifies whether to pause the flow on the creation or deletion of a certain file
File path	No	File		The full path to look for the file

Variables Produced

- This action doesn't produce any variables

Exceptions

- This action doesn't include any exceptions

Copy file(s)

Copy one or more files into a destination folder

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
File(s) to copy	No	List of Files		The file(s) to copy. This can be a file path, or a variable containing a file, a list of files, a text path, or a list of text paths. Use the 'Get files in folder' action to populate a variable with a list of files
Destination folder	No	Folder		The destination folder for the copied files
If file exists	N/A	Do nothing, Overwrite	Do nothing	Specifies what to do if a file with the same name already exists in the destination folder

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
CopiedFiles	List of Files	The copied file(s) as a list of files

Exceptions

EXCEPTION	DESCRIPTION
Source folder doesn't exist	Indicates that the source folder doesn't exist
Destination folder doesn't exist	Indicates that the destination folder doesn't exist
File not found	Indicates that the file doesn't exist
Can't copy file	Indicates a problem copying the file

Move file(s)

Move one or more files into a destination folder

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
File(s) to move	No	List of Files		The file(s) to move. This can be a file path, or a variable containing a file, a list of files, a textual path, or a list of text paths. Use the 'Get files in folder' action to populate a variable with a list of files

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Destination folder	No	Folder		The destination folder for the moved files
If file exists	N/A	Do nothing, Overwrite	Do nothing	Specifies what to do if a file with the same name already exists in the destination folder

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
MovedFiles	List of Files	The moved file(s) as a list of files

Exceptions

EXCEPTION	DESCRIPTION
Source folder doesn't exist	Indicates that the source folder doesn't exist
Destination folder doesn't exist	Indicates that the destination folder doesn't exist
File not found	Indicates that the file doesn't exist
Can't move file	Indicates a problem moving the file

Delete file(s)

Delete one or more files

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
File(s) to delete	No	List of Files		The file(s) to delete. This can be a file path, or a variable containing a file, a list of files, a text path, or a list of text paths. Use the 'Get files in folder' to populate a variable with a list of files

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
File path doesn't exist	Indicates that the file path doesn't exist
File not found	Indicates that the file doesn't exist

EXCEPTION	DESCRIPTION
Can't delete file	Indicates a problem deleting the file

Rename file(s)

Change the name of one or more files

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
File to rename	No	List of Files		The file(s) to rename. This can be a file path, or a variable containing a file, a list of files, a text path, or a list of text paths. Use the 'Get files in folder' action to populate a variable with a list of files
Add number to	N/A	Boolean value	True	Specifies whether to add the number to the existing file name(s) or a new name
Rename scheme	N/A	Set new name, Add text, Remove text, Replace text, Change extension, Add datetime, Make sequential	Set new name	Specifies how to rename the file(s)
New file name	No	Text value		The new name of the file(s)
New extension	Yes	Text value		The text to add as the new extension for the file(s)
New file name	No	Text value		The new name of the file(s)
Add number to	N/A	After name, Before name	After name	Specifies whether to add the number before or after the original name(s) or a new base name
Text to add	Yes	Text value		The text to add to the original file name(s)

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Text to remove	Yes	Text value		The text to remove from the original file name(s). This rename scheme searches each file name, and removes the entered text anywhere in the name, each time it occurs
Text to replace	No	Text value		The text to replace in the original file name(s). This rename scheme searches each file name, and replaces the entered text anywhere in the name, each time it occurs
Use custom datetime	N/A	Boolean value	False	Specifies whether to use a custom datetime
Datetime to add	N/A	Current datetime, Creation time, Last accessed, Last modified	Current datetime	Specifies what datetime value to add to the file name(s)
Keep extension	N/A	Boolean value	True	Specifies whether to include the previous extension with the file name(s). Disable this option to add the extension to the file(s) manually
Replace with	Yes	Text value		The text to replace the original text with
Start numbering at	No	Numeric value		The starting number value
Add text	N/A	After name, Before name	After name	Specifies whether to add the text before or after the original name(s)
Custom datetime	No	Datetime		The datetime to add to the file name(s)
Increment by	No	Numeric value		The number to increment the starting value by

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Add datetime	N/A	After name, Before name	After name	Specifies whether to add the datetime before or after the original name(s)
Separator	N/A	Nothing, Space, Dash, Period, Underscore	Space	Specifies what to use to separate the original file name and the number added, including the option to not use a separator
Separator	N/A	Nothing, Space, Dash, Period, Underscore	Space	Specifies what to use to separate the original file name and the datetime value added, including the option to not use a separator
Use padding	N/A	Boolean value	False	Specifies whether to use padding
Datetime format	Yes	Text value	yyyyMMdd	The format of the datetime value to add to the file name, such as MM/dd/yyyy for date, and hh:mm:sstt for time
Make each number at least	Yes	Numeric value	3	The minimum length for each number added
If file exists	N/A	Do nothing, Overwrite	Do nothing	Specifies what to do if a file with the same name already exists in the folder

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
RenamedFiles	List of Files	The renamed file(s) as a list of files

Exceptions

EXCEPTION	DESCRIPTION
Directory not found	Indicates that the directory wasn't found
File not found	Indicates that the file doesn't exist
Can't rename file	Indicates a problem renaming the file

Read text from file

Read the contents of a text file

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
File path	No	File		The file to read
Store content as	N/A	Single text value, List (each is a list item)	Single text value	Specifies how to store the text. Choose 'Single text value' to store the entire text as a single text value. Choose 'List' to store each line of the original text as a text item in a list
Encoding	N/A	Default, ANSI, Unicode, Unicode (big-endian), UTF-8	UTF-8	The encoding to read the specified text from the text file with.

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
FileContents	Text value	The contents as a text
FileContents	List of Text values	The contents as a list of texts

Exceptions

EXCEPTION	DESCRIPTION
Directory not found	Indicates that the directory wasn't found
File not found	Indicates that the file doesn't exist
Failed to read from file	Indicates a problem reading from the file

Write text to file

Write or appends text to a file

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
File path	No	File		The file to write the text. This can be a file path, or a variable containing a file or a textual path
Text to write	Yes	General value		The text to write in the specified file

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Append new line	N/A	Boolean value	True	Specifies whether to append a new line at the end of the overall text to write to the file
If file exists	N/A	Overwrite existing content, Append content	Overwrite existing content	Specifies whether to overwrite the existing content, or to append to the end of the existing content. If the file doesn't exist, this action automatically creates it
Encoding	N/A	Default, ANSI, Unicode, Unicode (big-endian), UTF-8, Unicode (without byte order mask), UTF-8 (without byte order mask)	Unicode	The encoding to use for the specified text to write into the text file

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Failed to write text to file	Indicates a problem writing to the file
Invalid directory for file	Indicates that the directory is invalid

Read from CSV file

Read a CSV file into a data table

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
File path	No	File		The CSV file to read. This can be a file path, or a variable containing a file or a textual path
Encoding	N/A	UTF-8, Unicode, Unicode (big-endian), UTF-8 (No byte order mark), Unicode (no byte order mark), System default, ANSI	UTF-8	The encoding be use for reading the specified CSV file

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Trim fields	N/A	Boolean value	True	Specifies whether to automatically trim off the leading and trailing whitespaces of the extracted cells
First line contains column names	N/A	Boolean value	False	Specifies whether to use the first row of the CSV resource to set the column names of the resulting data table variant. Enable this option to avoid reading the names as data into the table. Subsequent actions may access the data held by the data table using column names (instead of column numbers)
Columns separator	N/A	Predefined, Custom, Fixed column widths	Predefined	Specifies whether to use a predefined columns separator, a custom one or fixed column widths
Separator	N/A	System default, Comma, Semicolon, Tab	System default	The column-separator to parse the the CSV file
Custom separator	No	Text value		The custom column-separator to use for parsing the CSV resource specified
Fixed column widths	No	Text value		The fixed column-widths to use for parsing the CSV resource specified. Separate the widths using commas, spaces, tabs or newlines

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
CSVTable	Datatable	The contents of the CSV file as a data table

Exceptions

EXCEPTION	DESCRIPTION
Read from CSV failed	Indicates a problem reading from the CSV file

Write to CSV file

Write a data table, data row or list to a CSV file

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Variable to write	No	General value		The data table, data row variable or list variable to write into the target CSV file
File path	No	File		The CSV file to export the variable to. This can be a file path, or a variable containing a file or a textual path
Encoding	N/A	UTF-8, Unicode, Unicode (big-endian), UTF-8 (No byte order mark), Unicode (no byte order mark), System default, ANSI	UTF-8	The encoding to use for writing to the specified CSV file
Include column names	N/A	Boolean value	False	Specifies whether the column names of the variant specified should become the very first row of the CSV file. This option takes effect if and only if the target CSV file either doesn't intially exist or exists but is otherwise empty of text
If file exists	N/A	Overwrite existing content, Append content	Overwrite existing content	Specifies the desired behaviour when the targeted CSV file already exists in the filesystem
Separator	N/A	System default, Comma, Semicolon, Tab	System default	The column separator to use in the specified CSV file
Custom columns separator	No	Text value		The custom column separator to use in the CSV file

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Use custom columns separator	N/A	Boolean value	False	Specifies whether to use a custom columns separator or a predefined one

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Write failed	Indicates a problem writing to the CSV file

Get file path part

Retrieve one or more parts (directory, filename, extension etc) from a text that represents a file path

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
File path	No	File		The file path to use as the source

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
RootPath	File	The root path of the source file
Directory	Folder	The directory of the source file
FileName	Text value	The name of the source file
FileNameNoExtension	Text value	The file name (without the extension) of the source file
FileExtension	Text value	The extension (for example, .doc) of the source file

Exceptions

EXCEPTION	DESCRIPTION
File path contains invalid characters	Indicates that the file path doesn't exist

Get temporary file

Create a uniquely named, empty temporary file on disk, and get the file object (which is a representation, and can access the file and all its information)

Input Parameters

- This action doesn't require any input

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
TempFile	File	The temporary file object

Exceptions

EXCEPTION	DESCRIPTION
Failed to create temporary file	Indicates a problem creating a temporary file

Folder

1/15/2022 • 9 minutes to read • Edit Online

Manage and manipulate folders

If folder exists
Get files in folder
Get subfolders in folder
Create folder
Delete folder
Empty folder
Copy folder
Move folder
Rename folder
Get special folder

Getting started with folder actions

Manipulate and organize folders with the Power Automate folders actions.

The **Get special folder** action retrieves the paths for commonly used directories which vary among different users and computers. In the figure below, the desktop directory is retrieved and stored into a variable. The variable **%SpecialFolderPath%** can now be used any time it is necessary to use the desktop path, regardless of the user who runs the flow or the computer which it runs on.

Create new folders with the **Create folder** action.

To get a list of a folder's contents, use the **Get subfolders in folder** action. This action provides a list of folders located within the specified folder. In the figure below, the variable for the path of a special folder is used as input and include subfolders has been enabled. In the expanded Advanced section, folders are to be sorted by creation time in ascending order and name in descending order.

Copying, moving, renaming and deleting or emptying folders each has its respective action.

Folder actions

If folder exists

Mark the beginning of a conditional block of actions depending on whether a folder exists or not

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
If folder	N/A	Exists, Doesn't exist	Exists	Choose the state of the folder to check
Folder path	No	Folder		Enter or choose the full path of the folder, or a variable containing the folder, to check its state

Variables Produced

- This action doesn't produce any variables

Exceptions

- This action doesn't include any exceptions

Get files in folder

Retrieve the list of files in a folder

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Folder	No	Folder		Enter or choose the full path of the folder, or a variable containing the folder, to retrieve the list of files from
File filter	Yes	Text value	*	Choose a filter to limit the files retrieved. This allows wild cards, for example, *.txt or document?.doc. To allow for multiple file filters, separate the choices with a semi-colon, for example, *.txt;*.exe.
Include subfolders	N/A	Boolean value	False	Specify whether to look into subfolders as well
Fail upon denied access to any subfolder	N/A	Boolean value	True	Specify whether to throw an error when trying to get files of a folder with no access rights or ignore those folders

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Sort by	N/A	No sort, Full name, Root path, Directory, Name, Name without extension, Extension, Size, Creation time, Last accessed, Last modified, Is hidden, Is system, Is read-only, Is archive, Exists	No sort	Specify whether to sort the results and by which criterion
Descending	N/A	Boolean value	False	Specify whether to sort the items in descending or ascending order
Then by	N/A	No sort, Full name, Root path, Directory, Name, Name without extension, Extension, Size, Creation time, Last accessed, Last modified, Is hidden, Is system, Is read-only, Is archive, Exists	No sort	Specify whether to sort the results by a second criterion
Descending	N/A	Boolean value	False	Specify whether to sort the items in descending or ascending order
Then by	N/A	No sort, Full name, Root path, Directory, Name, Name without extension, Extension, Size, Creation time, Last accessed, Last modified, Is hidden, Is system, Is read-only, Is archive, Exists	No sort	Specify whether to sort the results by a third criterion
Descending	N/A	Boolean value	False	Specify whether to sort the items in descending or ascending order

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
Files	List of Files	The retrieved files as a list of file objects

Exceptions

EXCEPTION	DESCRIPTION
Folder doesn't exist	Indicates that the folder was not found

EXCEPTION	DESCRIPTION
Can't retrieve list of files	Indicates a problem retrieving the list of files

Get subfolders in folder

Retrieve the list of subfolders in a folder

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Folder	No	Folder		Enter or choose the full path of the folder, or a variable containing the folder, to retrieve the list of subfolders from
Folder filter	Yes	Text value	*	Choose a filter to limit the subfolders retrieved. This allows wild cards, for example, Doc* or Document?. To allow for multiple folder filters, separate the choices with a semi-colon, for example, Doc*;*.
Include subfolders	N/A	Boolean value	False	Specify whether to look into the subfolders and retrieve their subfolders (and so on) as well
Fail upon denied access to any subfolder	N/A	Boolean value	True	Specify whether to throw an error when trying to get subfolders of a folder with no access rights or ignore those folders
Sort by	N/A	No sort, Full name, Root path, Directory, Name, Name without extension, Extension, Size, Creation time, Last accessed, Last modified, Is hidden, Is system, Is read-only, Is archive, Exists	No sort	Specify whether to sort the results and by which criterion
Descending	N/A	Boolean value	False	Specify whether to sort the items in descending or ascending order

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Then by	N/A	No sort, Full name, Root path, Directory, Name, Name without extension, Extension, Size, Creation time, Last accessed, Last modified, Is hidden, Is system, Is read-only, Is archive, Exists	No sort	Specify whether to sort the results by a second criterion
Descending	N/A	Boolean value	False	Specify whether to sort the items in descending or ascending order
Then by	N/A	No sort, Full name, Root path, Directory, Name, Name without extension, Extension, Size, Creation time, Last accessed, Last modified, Is hidden, Is system, Is read-only, Is archive, Exists	No sort	Specify whether to sort the results by a third criterion
Descending	N/A	Boolean value	False	Specify whether to sort the items in descending or ascending order

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
Folders	List of Folders	The retrieved subfolders as a list of folder objects

Exceptions

EXCEPTION	DESCRIPTION
Folder doesn't exist	Indicates that the folder was not found
Can't retrieve list of subfolders	Indicates a problem retrieving the list of subfolders

Create folder

Create a new folder

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Create new folder into	No	Folder		Enter or choose the full path of the folder, or a variable containing the folder, to create a new folder in

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
New folder name	No	Text value		Enter the text, or a text variable, to be the name of the new folder

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
NewFolder	Folder	The created folder object (which is a representation and can access the folder and all its information)

Exceptions

EXCEPTION	DESCRIPTION
Folder doesn't exist	Indicates that the folder was not found
Can't create folder	Indicates a problem creating the folder
New folder path and name are empty	Indicates that both the new folder path and folder name do not have value

Delete folder

Delete an existing folder and its contents (files and subfolders)

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Folder to delete	No	Folder		Enter or choose the full path of the folder, or a variable containing the folder, to delete. Remember that all contents of that folder and its subfolders are deleted too.

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Folder doesn't exist	Indicates that the folder was not found
Can't delete folder	Indicates a problem deleting the folder

Empty folder

Delete all the contents of a folder (files and subfolders) without deleting the folder itself

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Folder to empty	No	Folder		Enter or choose the full path of the folder, or a variable containing the folder, to delete its contents

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Folder doesn't exist	Indicates that the folder was not found
Can't delete folder's contents	Indicates a problem clearing the folder's contents

Copy folder

Copy a folder into a destination folder

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Folder to copy	No	Folder		Enter or choose the full path of the folder, or a variable containing the folder, to copy. If the folder path ends with a \ only the contents of the folder (files + subfolders) are copied. Otherwise, the folder itself (along with its contents) is copied as a subfolder into the destination folder.
Destination folder	No	Folder		Enter or choose the full path of the folder, or a variable containing the folder, to be the destination folder
If folder exists	N/A	Do nothing, Overwrite	Do nothing	Specify whether to overwrite files or not copy them at all, if the destination folder already exists. If the folder exists, but the files have different names, the old files still remain in the folder.

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
CopiedFolder	Folder	The copied folder object (which is a representation and can access the folder and all its information)

Exceptions

EXCEPTION	DESCRIPTION
Folder doesn't exist	Indicates that the folder was not found
Destination folder doesn't exist	Indicates that the destination folder was not found
Can't copy folder	Indicates a problem copying the folder

Move folder

Move an existing folder into a destination folder

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Folder to move	No	Folder		Enter or choose the full path of the folder, or a variable containing the folder, to move
Destination folder	No	Folder		Enter or choose the full path of the folder, or a variable containing the folder, to be the destination folder

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
MovedFolder	Folder	The moved folder object (which is a representation and can access the folder and all its information)

Exceptions

EXCEPTION	DESCRIPTION
Folder doesn't exist	Indicates that the folder was not found
Destination folder doesn't exist	Indicates that the destination folder was not found
Can't move folder	Indicates a problem moving the folder

Rename folder

Change the name of a folder

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Folder to rename	No	Folder		Enter or choose the full path of the folder, or a variable containing the folder, to change its name
New folder name	No	Text value		Enter the text, or a text variable, to be the new folder name

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
RenamedFolder	Folder	The renamed folder object (which is a representation and can access the folder and all its information)

Exceptions

EXCEPTION	DESCRIPTION
Folder doesn't exist	Indicates that the folder was not found
Can't rename folder	Indicates a problem renaming the folder

Get special folder

Retrieve the path of a Windows' special folder (such as Desktop, My Pictures, Internet Cache etc)

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Special folder name	N/A	Programs, Personal, Favorites, Startup, Recent, Send To, Start Menu, Music, Desktop, Templates, Application Data, Local Application Data, Internet Cache, Cookies, History, Common Application Data, System, Program Files, Pictures, Common Program Files	Desktop	Choose the name of the special folder (like My Documents or Desktop). This will be independent of path, to find the special folder on any computer regardless of path specifics.

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
SpecialFolderPath	Folder	The special folder object (which is a representation and can access the folder and all its information)

Exceptions

- This action doesn't include any exceptions

Compression

1/15/2022 • 3 minutes to read • Edit Online

Zip or unzip files from archives

ZIP files
Unzip files

Getting started with compression actions

To compress (or zip) a file, use the **ZIP files** action. Specify a path to the archive, or where it should be created. If the archive already exists, the specified files will be added to it. In the figure below, the path to the file is entered as a variable. **Best compression** ensures maximum file size reduction, and a password adds a layer of security to the archive. A comment is also added as a variable.

Unzip files works similarly, and requires the path to the archive as well as the destination folder. In the figure below, **Include mask** has been set to **.xlsx;*.txt**, to only unzip files with the extensions .txt and .xlsx.

Compression actions

ZIP files

Compress one or more files or folders into a ZIP archive

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Archive path	No	File		The full path of ZIP file to create. If the file already exists, this action adds the new zipped files and/or to the existing ZIP file. If the ZIP file already contains a file or folder with the same name, it overwrites it.
File(s) to zip	No	List of FileSystemObject		The full path of the file(s) or folder(s) to include in the ZIP file

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Compression level	N/A	None, Best speed, Best balance of speed and compression, Best compression	Best balance of speed and compression	The level of compression to use. The higher the compression the smaller the file, though it takes longer to create or access
Password	Yes	Encrypted value		The password to use for protecting the ZIP. Leave this attribute blank to create a non password-protected ZIP
Archive comment	Yes	Text value		The comment to include in the ZIP file as a file property

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
ZipFile	File	The ZIP file created by this action

Exceptions

EXCEPTION	DESCRIPTION
File or folder doesn't exist	Indicates that the specified file or folder doesn't exist
File or folder name is invalid	Indicates that the file or folder name is invalid
Archive already exists but it isn't a valid ZIP archive	Indicates that the archive already exists but it isn't a valid ZIP archive
Failed to zip files	Indicates a problem zipping the files

Unzip files

Uncompress one or more files or folders contained in a ZIP archive

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Archive path	No	File		The full path of a ZIP file to extract
Destination folder	No	Folder		The full path of the folder to extract the archive to. This overwrites files in the folder with the same name as a file in the archive

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Password	Yes	Encrypted value		The password, if any, that is used for this archive. If the ZIP file isn't password-protected, leave this blank
Include mask	Yes	Text value		The filter to limit the files extracted to those entered here. This allows wild cards, for example '*.txt' or 'document?.doc' (without the quotes). To allow multiple file filters, separate the choices with a semi-colon, for instance,* '.txt;*.exe'
Exclude mask	Yes	Text value		The filter to limit the files extracted by excluding those entered here. This allows wild cards, for example, '*.txt' or 'document?.doc' (without the quotes). To allow multiple file filters, separate the choices with a semi-colon, for instance,* '.txt;*.exe'

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Can't create destination folder	Indicates that the destination folder couldn't be created
Archive not found	Indicates that the archive doesn't exist
Archive isn't a valid ZIP file	Indicates that the archive isn't a valid ZIP file
Failed to unzip files	Indicates a problem unzipping the files

UI automation

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Interact with desktop/windows applications

You can find more information on how to use the UI automation actions here

Get details of window
Get details of a UI element in window
Get selected checkboxes in window
Get selected radio button in window
Extract data from window
Take screenshot of UI element
Focus text field in window
Populate text field in window
Press button in window
Select radio button in window
Set checkbox state in window
Set drop-down list value in window
Get window
Focus window
Set window state
Set window visibility
Move window
Resize window
Close window
If window contains
Wait for window content

If image
Use desktop
Select tab in window
Wait for image
Click UI element in window
Select menu option in window
Drag and drop UI element in window
Expand/collapse tree node in window
If window
Wait for window

Getting started with UI automation

Power Automate provides various UI automation actions to enable users to interact with Windows and desktop applications. Some UI automation actions require you to set UI elements in their properties to indicate the element you want to handle.

To add a new UI element, select **Add UI element** through the deployed UI automation action or the **UI elements** tab of the flow designer.

All UI elements consist of selectors that pinpoint the hierarchical structure of the components. Selectors use the `>` notation to indicate that each element is contained within the element on its left.

When you create a UI element of an application window, its selector always has a root element named **:desktop**.

If you create a UI element that pinpoints a component inside an application window, two UI elements will be created automatically. The parent UI element pinpoints the application window, while the child shows the hierarchical structure of the specific component inside the window.

Although selectors are created automatically when adding UI elements, some particular scenarios need manually created selectors. When a custom selector is needed, you have the option to edit an existing selector or build one from scratch.

To develop more dynamic web flows, replace the **Equals to** operators with other operators or regular expressions. Additionally, if the value of a selector's attribute depends on the results of previous actions, use variables instead of hard-coded values.

> **NOTE**
> You can find more information about developing UI automation flows and creating custom selectors in Automate desktop flows and Build a custom selector, respectively.

UI automation actions

Data extraction

Extract data from desktop applications, from a single value up to tables or custom multiple pieces of data

Get details of window

Gets a property of a window such as its title or its source text

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Window	No	UIControl		The window to get details from
Window property	N/A	Get window title, Get window text, Get window location and size, Get process name	Get window title	Choose which property of the window to extract

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
WindowProperty	General value	The retrieved information of the window

Exceptions

EXCEPTION	DESCRIPTION
Failed to retrieve property of window	Indicates a problem retrieving the window property

Get details of a UI element in window

Gets the value of a UI element's attribute in a window

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
UI element	No	UIControl		The UI element to get details from
Attribute name	Yes	Text value	Own Text	The attribute whose value will be retrieved

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
AttributeValue	Text value	The value of the UI element's text

Exceptions

EXCEPTION	DESCRIPTION
Failed to retrieve attribute of UI element	Indicates a problem retrieving the UI element's attribute

Get selected checkboxes in window

Retrieves the names of the selected checkboxes in a checkbox group or the state of a specific checkbox

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
UI element	No	UIControl		The checkbox or checkbox group
Operation	N/A	Get names of selected checkboxes in group, Get state of checkbox	Get names of selected checkboxes in group	Specify whether to retrieve the state of multiple selected checkboxes or just one

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
IsChecked	Boolean value	The state of the selected checkbox
SelectedCheckboxes	List of Text values	The names of selected checkboxes inside the specified checkbox group

Exceptions

EXCEPTION	DESCRIPTION
Failed to retrieve checkbox state(s)	Indicates a problem retrieving the specified checkbox state(s)

Get selected radio button in window

Retrieves the names of the selected radio button in a radio button group or the state of a specific radio button

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
UI element	No	UIControl		The radio button or radio button group
Operation	N/A	Get selected radio button name in group, Get state of radio button	Get selected radio button name in group	Specify whether to retrieve the name of the radio button that's selected inside a group of radio buttons or just the state of a single radio button

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
IsSelected	Boolean value	The state of the selected radio button
SelectedRadiobutton	Text value	The selected radio button inside the specified radio group

Exceptions

EXCEPTION	DESCRIPTION
Failed to retrieve radio button state	Indicates a problem retrieving the specified radio button state

Extract data from window

Extracts data from specific parts of a window in the form of single values, lists, or tables

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Window	No	UIControl		The window to extract data from
Store extracted data in	N/A	an Excel spreadsheet, A variable	an Excel spreadsheet	Specify where to store the extracted data

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
ExcelInstance	Excel instance	The Excel instance with the extracted data. Use this instance to manipulate the spreadsheet (or save and close it) by using the dedicated Excel actions.
DataFromWindow	General value	The extracted data in the form of a datatable

Exceptions

EXCEPTION	DESCRIPTION
Extraction failed	Indicates a problem extracting data from the specified window

Take screenshot of UI element

Takes a screenshot of a UI element in window

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
UI element	No	UIControl		The UI element in the window to capture as screenshot

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Save mode	N/A	Clipboard, File	Clipboard	Specify whether to save the image into a file or store it into the clipboard
Image file path	No	File		Set the full path for the file to be saved
File format	N/A	BMP, EMF, EXIF, GIF, JPG, PNG, TIFF, WMF	BMP	The file format of the image file

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
ImageFile	File	The file path of the generated screenshot image file

Exceptions

EXCEPTION	DESCRIPTION
Failed to retrieve UI element	Indicates a problem retrieving the UI element
Failed to save image	Indicates a problem saving the taken screenshot
Failed to take screenshot of UI element	Indicates a problem taking a screenshot of the UI element

Form filling

Fill-in forms on desktop applications

Focus text field in window

Sets the focus on a text box of a window and scrolls it into view

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Text field	No	UIControl		The text box to focus

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Failed to set input focus in window text box	Indicates a problem setting the focus on the specified web page text field

Populate text field in window

Fills a text box in a window with the specified text

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Text box	No	UIControl		The text box to populate
Text to fill-in	No	Encrypted value		The text to fill in the text field
If field isn't empty	Yes	Replace text, Append text	Replace text	Specify whether to replace existing content, or to append.
Click before populating	Yes	Left click, Double click, No	Left click	Specify whether a left mouse click is performed before populating the text field or not.

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Failed to write in textbox	Indicates a problem populating the specified text field

Press button in window

Presses a window button

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
UI element	No	UIControl		The button to press

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Failed to press button	Indicates a problem pressing the specified button

Select radio button in window

Selects a radio button on a window

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Radio button	No	UIControl		The radio button to select

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Failed to select radio button UI element	Indicates a problem selecting the specified radio button UI element

Set checkbox state in window

Checks or unchecks a checkbox in a window form

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Checkbox	No	UIControl		The checkbox to set the state of
Set checkbox state to	N/A	Checked, Unchecked	Checked	Specify whether the checkbox will become checked or unckeched

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Failed to set checkbox state	Indicates a problem setting the specified checkbox state

Set drop-down list value in window

Sets or clears the selected option(s) for a drop-down list in a window form

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Drop-down list	No	UIControl		The drop-down list whose value to set
Operation	N/A	Clear selected options, Select option(s) by name, Select option(s) by index	Clear selected options	Specify whether you want to select a value by name or by ordinal position (1 2 3 ...) or clear the selected value of the drop-down list
Options indices	No	Text value		A space-separated list of 1-based indices (e.g. 1 3 4)

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Options names	No	Text value		One or more options (one per line if more than one) to select in the drop down list. Multiple options make sense only when working with multi-select lists. If the list is single-selection, then only the first option specified will be used.

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Failed to select the specified options in the drop down list	Indicates a problem selecting the specified options in the drop down list

Windows

Windows manipulation regarding size, state visibility, focus

Get window

Gets a running window, for automating desktop applications

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Get window	N/A	Specific window, Foreground window	Specific window	Specify whether to look using a selector or the foreground window
UI element	No	UIControl		The selector of the window to get
Bring window to front	N/A	Boolean value	False	Specify whether to bring the window to the foreground automatically upon acquiring it
Fail if window isn't found	N/A	Boolean value	True	Specify whether to wait indefinitely for the window to appear or to fail if the window doesn't show up within a set time period

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Timeout	No	Numeric value		The timeout to wait in seconds

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
WindowTitle	Text value	The title of the foreground window
AutomationWindow	Window instance	The specific window instance for use with later UI Automation actions

Exceptions

EXCEPTION	DESCRIPTION
Failed to get window	Indicates a problem getting the window

Focus window

Activates and brings to the foreground a specific window

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Find window mode	N/A	By window UI element, By window instance/handle, By title and/or class	By window UI element	Specify whether to look for the window using a UI element or a combination of window title/class
Window	No	UIControl		The window UI element
Window title	Yes	Text value		The window title. Wildcards can be used, like '?' or '*'.
Window instance	No	Numeric value		The instance or handle of the window to focus
Window class	Yes	Text value		If there are two windows with the same title, window class may help differentiate between them. In this case, enter the class of the window to use.

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Window wasn't found	Indicates that the specified window wasn't found
Can't focus window	Indicates a problem focusing the specified window
Can't perform window-related action in non interactive mode	Indicates a problem performing window-related action in non-interactive mode

Set window state

Restores, maximizes or minimizes a specific window

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Find window mode	N/A	By window UI element, By window instance/handle, By title and/or class	By window UI element	Specify whether to look for the window using a UI element or a combination of window title/class
Window	No	UIControl		The window UI element
Window title	Yes	Text value		The window title. Wildcards can be used, like '?' or '*'.
Window instance	No	Numeric value		The instance or handle of the window to set the state of
Window class	Yes	Text value		If there are two windows with the same title, window class may help differentiate between them. In this case, enter the class of the window to use.
Window state	N/A	Restored, Maximized, Minimized	Restored	Choose in which state to display the window

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Window wasn't found	Indicates that the specified window wasn't found
Can't set window state	Indicates a problem setting the window state of the specified window

EXCEPTION	DESCRIPTION
Can't perform window-related action in non interactive mode	Indicates a problem performing window-related action in non-interactive mode

Set window visibility

Shows a hidden window or hides a visible window

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Find window mode	N/A	By window UI element, By window instance/handle, By title and/or class	By window UI element	Specify whether to look for the window using a UI element or a combination of window title/class
Window	No	UIControl		The window UI element
Window title	Yes	Text value		The window title. Wildcards can be used, like '?' or '*'.
Window instance	No	Numeric value		The instance or handle of the window to set the visibility of
Window class	Yes	Text value		If there are two windows with the same title, window class may help differentiate between them. In this case, enter the class of the window to use.
Visibility	N/A	Visible, Hidden	Hidden	Choose in which state to set the window visibility to

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Window wasn't found	Indicates that the specified window wasn't found
Can't set window visibility	Indicates a problem setting the visibility of the specified window
Can't perform window-related action in non interactive mode	Indicates a problem performing window-related action in non-interactive mode

Move window

Sets the position of a specific window

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Find window mode	N/A	By window UI element, By window instance/handle, By title and/or class	By window UI element	Specify whether to look for the Window using a UI element or a combination of window title/class
Window	No	UIControl		The window UI element
Window title	Yes	Text value		The window title. Wildcards can be used, like '?' or '*'.
Window instance	No	Numeric value		The instance or handle of the window to move
Window class	Yes	Text value		If you have two windows with the same title, Window Class may help differentiate between them. In this case, enter the class of the window to use.
Position X	No	Numeric value		The X position of the window
Position Y	No	Numeric value		The Y position of the window

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Window wasn't found	Indicates that the specified window wasn't found
Can't move window	Indicates a problem moving the specified window
Can't perform window-related action in non interactive mode	Indicates a problem performing window-related action in non-interactive mode

Resize window

Sets the size of a specific window

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Find window mode	N/A	By window UI element, By window instance/handle, By title and/or class	By window UI element	Specify whether to look for the window using a UI element or a combination of window title/class
Window	No	UIControl		The window UI element
Window title	Yes	Text value		The window title. Wildcards can be used, like '?' or '*'.
Window instance	No	Numeric value		The instance or handle of the window to resize
Window class	Yes	Text value		If there are two windows with the same title, window class may help differentiate between them. In this case, enter the class of the window to use
Width	No	Numeric value		The new width, in pixels
Height	No	Numeric value		The new height, in pixels

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Window wasn't found	Indicates that the specified window wasn't found
Can't resize window	Indicates a problem resizing the specified window
Can't perform window-related action in non interactive mode	Indicates a problem performing window-related action in non-interactive mode

Close window

Closes a specific window

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Find window mode	N/A	By window UI element, By window instance/handle, By title and/or class	By window UI element	Specify whether to look for the window using a UI element or a combination of window title/class
Window	No	UIControl		The window UI element
Window title	Yes	Text value		The window title. Wildcards can be used, like '?' or '*'.
Window instance	No	Numeric value		The instance or handle of the window to close
Window class	Yes	Text value		If there are two windows with the same title, window class may help differentiate between them. In this case, enter the class of the window to use.

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Window wasn't found	Indicates that the specified window wasn't found
Can't close window	Indicates a problem closing the specified window
Can't perform window-related action in non interactive mode	Indicates a problem performing window-related action in non-interactive mode

If window contains

Marks the beginning of a conditional block of actions depending on whether a specific piece of text or UI element exists in a window

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Check if window	N/A	Contains UI element, Doesn't contain UI element, Contains text, Doesn't contain text	Contains UI element	Check whether a specific text or UI element exists in a window
Check UI element state	N/A	Boolean value	False	Check whether a specific UI element is enabled or disabled

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Text	No	Text value		The text to check for
UI element	No	UIControl		The UI element to check for
Window	No	UIControl		The window to check if the text exists on
State	N/A	Enabled, Disabled	Enabled	The UI element state to check for

Variables Produced

- This action doesn't produce any variables

Exceptions

- This action doesn't include any exceptions
-

Wait for window content

Suspends the execution of the automation until a specific piece of text or UI element appears or disappears from a Window

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Wait until window	N/A	Contains UI element, Doesn't contain UI element, Contains text, Doesn't contain text	Contains UI element	Whether to wait for a specific text or UI element to appear in a window
Check UI element state	N/A	Boolean value	False	Check whether a specific UI element is enabled or disabled
Text	No	Text value		The text to check for
UI element	No	UIControl		The UI element to check for
Window	No	UIControl		The window to check if the text exists on
State	N/A	Enabled, Disabled	Enabled	The UI element state to check for

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Wait for window content failed	Indicates that the wait operation failed

If image

This action marks the beginning of a conditional block of actions depending on whether a selected image is found on the screen or not

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
If image	N/A	exists, doesn't exist	exists	Whether to check for the existence or absence of the selected image
Image to check	No	List of Image		The image/s that the action will check if it/they exist
Search for image on	N/A	Entire screen, Foreground window only	Entire screen	Whether to look for the specified image in the foremost window only or the entire visible screen. Neither choice will find the image if it isn't clearly visible on the screen
Search Mode	N/A	Search whole screen or foreground window, Search on specified subregion of screen or foreground window	Search whole screen or foreground window	Whether to scan the entire screen (or window) to find the supplied text or only a narrowed down subregion of it
Find all images in the list	N/A	Boolean value	False	Check whether all images on the list exist or don't exist
X1	Yes	Numeric value		The start X coordinate of the subregion to scan for the supplied text
X2	Yes	Numeric value		The end X coordinate of the subregion to scan for the supplied text
Y1	Yes	Numeric value		The start Y coordinate of the subregion to scan for the supplied text
Y2	Yes	Numeric value		The end Y coordinate of the subregion to scan for the supplied text

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Tolerance	Yes	Numeric value	10	Specify how much the image(s) searched for can differ from the originally chosen image

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Can't check image in non interactive mode	Indicates that an image can't be identified in non-interactive mode
Invalid subregion coordinates	Indicates that the coordinates of the given subregion were invalid

Use desktop

Performs desktop and taskbar related operations

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
UI element	No	UIControl		The UI element to perform a click on
Click type	N/A	Left click, Right click, Double click	Left click	The kind of click to perform
Launch new application when left-clicking on the taskbar	N/A	Boolean value	True	When this parameter is set to 'true', it ensures that a new window of an application will be created when left-clicking on its icon in the 'quick launch' bar, aka the taskbar of Windows 7 or above. Uncheck this option to bring an already running instance of the application to the foreground.

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Taskbar operation failed	Indicates that the taskbar operation failed

Select tab in window

Selects a tab from a group of tabs

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Tab	No	UIControl		The tab to select

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Selecting tab failed	Indicates a problem selecting the specified tab

Wait for image

This action waits until a specific image appears on the screen or on the foreground window

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Wait for image to	N/A	Appear, Disappear	Appear	Check whether to wait for the image(s) to appear or disappear
Image to wait for	No	List of Image		The image/s that the action will check if it/they exist
Search for image on	N/A	Entire screen, Foreground window only	Entire screen	Whether to look for the specified image in the foremost window only or the entire visible screen. Neither choice will find the image if it isn't clearly visible on the screen
Search Mode	N/A	Search whole screen or foreground window, Search on specified subregion of screen or foreground window	Search whole screen or foreground window	Whether to scan the entire screen (or window) to find the supplied text or only a narrowed down subregion of it
Wait for all images	N/A	Boolean value	False	Whether to wait for all the images on the list to appear(disappear), or just one of them
X1	Yes	Numeric value		The start X coordinate of the subregion to scan for the supplied text

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
X2	Yes	Numeric value		The end X coordinate of the subregion to scan for the supplied text
Y1	Yes	Numeric value		The start Y coordinate of the subregion to scan for the supplied text
Y2	Yes	Numeric value		The end Y coordinate of the subregion to scan for the supplied text
Tolerance	Yes	Numeric value	10	Specify how much the image(s) searched for can differ from the originally chosen image

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
X	Numeric value	The X coordinate of the point where the text was found on the screen. If the text has been search in the foreground window this is relative to the top left corner of the window.
Y	Numeric value	The Y coordinate of the point where the text was found on the screen. If the text has been search in the foreground window this is relative to the top left corner of the window.

Exceptions

EXCEPTION	DESCRIPTION
Wait for image failed	Indicates that the wait operation failed
Can't check image in non interactive mode	Indicates that an image can't be identified in non-interactive mode
Invalid subregion coordinates	Indicates that the coordinates of the given subregion were invalid

Click UI element in window

Clicks on any UI element of a window

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
UI element	No	UIControl		The UI element to click on
Click type	N/A	Left click, Right click, Double click, Middle click, Left button down, Left button up, Right button down, Right button up	Left click	The kind of click to perform
Mouse position relative to UI element	N/A	Top left, Top center, Top right, Middle left, Middle center, Middle right, Bottom left, Bottom center, Bottom right	Middle center	Specify which section of the UI element the mouse will be moved to prior to clicking
Offset X	Yes	Text value	0	Offset the mouse from the position by this many pixels to the right
Offset Y	Yes	Text value	0	Offset the mouse from the position by this many pixels down

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Click failed	Indicates that the click failed

Select menu option in window

Selects an option in a menu of a window

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
UI element	No	UIControl		The menu option to select

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Failed to select option	Indicates a problem selecting the specified menu option

Drag and drop UI element in window

Drags and drops a UI element of a window

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
UI element to drag	No	UIControl		The UI element to drag
UI element to drop over	No	UIControl		The UI element to drop over
Click type	N/A	Left click, Right click	Left click	Specify which mouse button to use for clicking and holding down, while dragging the UI element over to its destination
Mouse down offset X	Yes	Text value	0	Offset the mouse-down click, that will be used to grab the UI element drag, by this many pixels to the right
Mouse down offset Y	Yes	Text value	0	Offset the mouse-down click, that will be used to grab the UI element to drag, by this many pixels downwards
Mouse down position relative to drag-target UI element	N/A	Top left, Top center, Top right, Middle left, Middle center, Middle right, Bottom left, Bottom center, Bottom right	Middle center	Specify which section of the UI element to drop the mouse onto prior to clicking
Mouse up offset X	Yes	Text value	0	Offset the mouse-up click, that will be used to grab the UI element to drag, by this many pixels to the right
Mouse up offset Y	Yes	Text value	0	Offset the mouse-up click, that will be used to grab the UI element to drag, by this many pixels downwards
Mouse up position relative to drop-target UI element	N/A	Top left, Top center, Top right, Middle left, Middle center, Middle right, Bottom left, Bottom center, Bottom right	Middle center	Specify which section of the UI element to drag the mouse onto after clicking

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
UI element to drag wasn't found	Indicates that the UI element to drag wasn't found
Drop target UI element wasn't found	Indicates that the drop target UI element wasn't found
Drag and drop failed	Indicates a problem during drag and drop of the speficied UI element

Expand/collapse tree node in window

Expands or collapses a node of a tree view residing in a window

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
UI element	No	UIControl		The tree node to expand/collapse
Folders path	Yes	Text value		A forward slash separated path made out of folder names leading to the tree node to expand or collapse
Use regular expressions	N/A	Boolean value	False	Specify whether each folder name in the path to interpret as a regular expression
Operation	N/A	Expand, Collapse	Expand	Specify whether to expand or collapse the tree node

> **NOTE**
> Power Automate's regular expression engine is .NET. You can find more information in Regular Expression Language - Quick Reference.

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Failed to set tree node to the specified state	Indicates a problem setting the tree node to the specified state

If window

This action marks the beginning of a conditional block of actions depending on whether a window is open or not or whether a window is the focused (foreground) window

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Get window	N/A	By window UI element, By window instance/handle, By title and/or class	By window UI element	Specify whether to look for the Window using a UI element or a combination of window title/class
Window title	Yes	Text value		The window title. Wildcards can be used, like '?' or '*'.
Window	No	UIControl		The window UI element
Window instance	No	Numeric value		The instance or handle of the window to check
Window class	Yes	Text value		If there are two windows with the same title, window class may help differentiate between them. In this case, enter the class of the window to be used.
Check if window	N/A	Is open, Isn't open, Is focused, Isn't focused	Is open	The state of the window to be checked

Variables Produced

- This action doesn't produce any variables

Exceptions

- This action doesn't include any exceptions

Wait for window

Suspends the execution or the process until a specific window opens, closes, get or loses the focus

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Find window	N/A	By window UI element, By window instance/handle, By title and/or class	By window UI element	Specify whether to look for the window using a UI element or a combination of window title/class
Window title	Yes	Text value		The window title. Wildcards can be used, like '?' or '*'.
Window	No	UIControl		The window UI element

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Window instance	No	Numeric value		The instance or handle of the window to check
Window class	Yes	Text value		If there are two windows with the same title, window class may help differentiate between them. In this case, enter the class of the window to be used
Wait for window to	N/A	Open, Close, Become focused, Lose focus	Open	Whether to wait for a specific window to open, close, become focused (i.e become the foreground window), or lose focus (i.e stop being the foreground window).
Focus window after it opens	N/A	Boolean value	False	Bring the window to the front after it opens, so later actions are directed at this window

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Can't focus window	Indicates a problem focusing the specified window
Wait for window failed	Indicates that the wait operation failed
Can't perform window-related action in non interactive mode	Indicates a problem performing window-related action in non-interactive mode

HTTP

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Communicate with web applications and services directly

You can find more information on how to use the web actions here

Download from web
Invoke SOAP web service
Invoke web service

Getting started with web actions

HTTP actions enable users to interact with APIs and send web requests that perform various operations, such as uploading and downloading data and files.

To send an API request, like POST, GET, PUT, or DELETE, you can use the **Invoke web service** action.

In the action's properties, you have to populate the service's URL and the appropriate HTTP method. Additionally, you have to choose the request and response content type, such as XML and JSON.

The **Custom headers** and **Request body** fields depend on the API, and you have to configure them as described in its documentation.

If the webserver requires authentication, you can populate your credentials in the appropriate fields of the action's **Advanced** settings.

The results of the web service request are stored in a variable named **WebServiceResponse**. If the results are files, you can select to save them locally on your desktop.

To download text or files from the web, you can use the **Download from web action**. This action requires you to populate the URL of the web page or the file and select the appropriate HTTP method.

If the webserver requires authentication, you can populate your credentials in the appropriate fields of the action's **Advanced** settings.

The downloaded text is stored in a variable named **WebPageText**. If you use the action to download files, you can select to save them locally on your desktop.

> **NOTE**
> Apart from the HTTP actions, Power Automate enables users to interact with web application through the browser automation actions. You can find more information about browser automation actions in Browser automation.

HTTP actions

Download from web

Downloads text or a file from the web and stores it

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
URL	No	Text value		The web page or file's URL
Method	N/A	GET, POST	GET	Specify how to retrieve a website's information. GET should be used when all information needed is in the URL, and POST to enter more information (passwords, etc)
Post parameters	No	Datatable		The POST parameters in the form of a datatable with two columns
Save response	N/A	Get text into variable (for web pages), Save to disk (for files)	Get text into variable (for web pages)	Specify how the returned data will be saved
File name	N/A	Keep original file name (specify only destination folder), Specify full path (destination folder + custom file name)	Keep original file name (specify only destination folder)	Specify whether to keep the original file name of the downloaded file or specify a new name
Destination folder	No	Folder		The folder where the file returned from the web server will be saved
Destination file path	No	File		The full path (folder plus filename) where the file returned by the web server will be stored

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Connection timeout	Yes	Numeric value	30	The time (in seconds) that the agent should wait for a connection to be established with the server, before giving up
Follow redirection	N/A	Boolean value	True	Specify whether to allow the web server to redirect you to another web page or website
Clear cookies	N/A	Boolean value	False	Specify whether to clear all cookies created by similar actions during this automation
User agent	Yes	Text value	Mozilla/5.0 (Windows; U; Windows NT 5.1; en-US; rv:1.8.1.21) Gecko/20100312 Firefox/3.6	Specify which browser identity to be seen as. Some web servers will not allow access unless a browser identity is chosen
Encoding	N/A	Auto - detect, IBM037 : IBM EBCDIC (US-Canada), IBM437 : OEM United States, IBM500 : IBM EBCDIC (International), ASMO-708 : Arabic (ASMO 708), DOS-720 : Arabic (DOS), ibm737 : Greek (DOS), ibm775 : Baltic (DOS), ibm850 : Western European (DOS), ibm852 : Central European (DOS), IBM855 : OEM Cyrillic, ibm857 : Turkish (DOS), IBM00858 : OEM Multilingual Latin I, IBM860 : Portuguese (DOS), ibm861 : Icelandic (DOS), DOS-862 : Hebrew (DOS), IBM863 : French Canadian (DOS), IBM864 : Arabic (864), IBM865 : Nordic (DOS), cp866 : Cyrillic (DOS),	Auto - detect	The encoding used for the web page. If the Auto-detect option is chosen, the encoding to be used will be specified by the web server

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
		ibm869 : Greek, Modern (DOS), IBM870 : IBM EBCDIC (Multilingual Latin-2), windows-874 : Thai (Windows), cp875 : IBM EBCDIC (Greek Modern), shift_jis : Japanese (Shift-JIS), gb2312 : Chinese Simplified (GB2312), ks_c_5601-1987 : Korean, big5 : Chinese Traditional (Big5), IBM1026 : IBM EBCDIC (Turkish Latin-5), IBM01047 : IBM Latin-1, IBM01140 : IBM EBCDIC (US-Canada-Euro), IBM01141 : IBM EBCDIC (Germany-Euro), IBM01142 : IBM EBCDIC (Denmark-Norway-Euro), IBM01143 : IBM EBCDIC (Finland-Sweden-Euro), IBM01144 : IBM EBCDIC (Italy-Euro), IBM01145 : IBM EBCDIC (Spain-Euro), IBM01146 : IBM EBCDIC (UK-Euro), IBM01147 : IBM EBCDIC (France-Euro), IBM01148 : IBM EBCDIC (International-Euro), IBM01149 : IBM EBCDIC (Icelandic-Euro), utf-16 : Unicode, utf-16BE : Unicode (Big-Endian), windows-1250 : Central European (Windows), windows-1251 : Cyrillic (Windows), Windows-1252 : Western European (Windows), windows-1253 : Greek (Windows), windows-1254 : Turkish (Windows), windows-1255 : Hebrew (Windows), windows-1256 : Arabic (Windows), windows-1257 : Baltic (Windows), windows-1258 : Vietnamese		

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
		(Windows), Johab : Korean (Johab), macintosh : Western European (Mac), x-mac-japanese : Japanese (Mac), x-mac-chinesetrad : Chinese Traditional (Mac), x-mac-korean : Korean (Mac), x-mac-arabic : Arabic (Mac), x-mac-hebrew : Hebrew (Mac), x-mac-greek : Greek (Mac), x-mac-cyrillic : Cyrillic (Mac), x-mac-chinesesimp : Chinese Simplified (Mac), x-mac-romanian : Romanian (Mac), x-mac-ukrainian : Ukrainian (Mac), x-mac-thai : Thai (Mac), x-mac-ce : Central European (Mac), x-mac-icelandic : Icelandic (Mac), x-mac-turkish : Turkish (Mac), x-mac-croatian : Croatian (Mac), utf-32 : Unicode (UTF-32), utf-32BE : Unicode (UTF-32 Big-Endian), x-Chinese-CNS : Chinese Traditional (CNS), x-cp20001 : TCA Taiwan, x-Chinese-Eten : Chinese Traditional (Eten), x-cp20003 : IBM5550 Taiwan, x-cp20004 : TeleText Taiwan, x-cp20005 : Wang Taiwan, x-IA5 : Western European (IA5), x-IA5-German : German (IA5), x-IA5-Swedish : Swedish (IA5), x-IA5-Norwegian : Norwegian (IA5), us-ascii : US-ASCII, x-cp20261 : T.61, x-cp20269 : ISO-6937, IBM273 : IBM EBCDIC (Germany), IBM277 : IBM EBCDIC (Denmark-Norway), IBM278 : IBM EBCDIC (Finland-Sweden), IBM280 : IBM EBCDIC (Italy),		

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
		IBM284 : IBM EBCDIC (Spain), IBM285 : IBM EBCDIC (UK), IBM290 : IBM EBCDIC (Japanese katakana), IBM297 : IBM EBCDIC (France), IBM420 : IBM EBCDIC (Arabic), IBM423 : IBM EBCDIC (Greek), IBM424 : IBM EBCDIC (Hebrew), x-EBCDIC-KoreanExtended : IBM EBCDIC (Korean Extended), IBM-Thai : IBM EBCDIC (Thai), koi8-r : Cyrillic (KOI8-R), IBM871 : IBM EBCDIC (Icelandic), IBM880 : IBM EBCDIC (Cyrillic Russian), IBM905 : IBM EBCDIC (Turkish), IBM00924 : IBM Latin-1, EUC-JP : Japanese (JIS 0208-1990 and 0212-1990), x-cp20936 : Chinese Simplified (GB2312-80), x-cp20949 : Korean Wansung, cp1025 : IBM EBCDIC (Cyrillic Serbian-Bulgarian), koi8-u : Cyrillic (KOI8-U), iso-8859-1 : Western European (ISO), iso-8859-2 : Central European (ISO), iso-8859-3 : Latin 3 (ISO), iso-8859-4 : Baltic (ISO), iso-8859-5 : Cyrillic (ISO), iso-8859-6 : Arabic (ISO), iso-8859-7 : Greek (ISO), iso-8859-8 : Hebrew (ISO-Visual), iso-8859-9 : Turkish (ISO), iso-8859-13 : Estonian (ISO), iso-8859-15 : Latin 9 (ISO), x-Europa : Europa, iso-8859-8-i : Hebrew (ISO-Logical), iso-2022-jp : Japanese (JIS), csISO2022JP : Japanese (JIS-Allow 1 byte Kana), iso-2022-jp : Japanese (JIS-Allow 1 byte		

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
		Kana - SO/SI), iso-2022-kr : Korean (ISO), x-cp50227 : Chinese Simplified (ISO-2022), euc-jp : Japanese (EUC), EUC-CN : Chinese Simplified (EUC), euc-kr : Korean (EUC), hz-gb-2312 : Chinese Simplified (HZ), GB18030 : Chinese Simplified (GB18030), x-iscii-de : ISCII Devanagari, x-iscii-be : ISCII Bengali, x-iscii-ta : ISCII Tamil, x-iscii-te : ISCII Telugu, x-iscii-as : ISCII Assamese, x-iscii-or : ISCII Oriya, x-iscii-ka : ISCII Kannada, x-iscii-ma : ISCII Malayalam, x-iscii-gu : ISCII Gujarati, x-iscii-pa : ISCII Punjabi, utf-7 : Unicode (UTF-7), utf-8 : Unicode (UTF-8)		
Accept untrusted certificates	N/A	Boolean value	False	Specify whether untrusted certificates will be accepted
Use credentials	N/A	Boolean value	False	Specify whether the web server requires authentication. This property refers to HTTP authentication (that is, when the browser displays a popup window asking for user name and password)
User name	No	Text value		The user name for the web server
Password	No	Encrypted value		The password for the web server

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
DownloadedFile	File	The downloaded file
WebPageText	Text value	The web page text

Exceptions

EXCEPTION	DESCRIPTION
Directory doesn't exist	Indicates that a required directory doesn't exist

EXCEPTION	DESCRIPTION
Download from web error	Indicates a problem downloading from web

Invoke SOAP web service

Invokes a method from a SOAP web service

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Endpoint	No	Text value		The endpoint of the web service
Custom headers	Yes	Text value		The custom headers to be included in the request that will be sent to the web service
Request body	No	Text value		The body of the request that will be sent to the web service
Connection timeout	No	Numeric value	30	The time (in seconds) that the agent should wait for a connection to be established with the server
Follow redirection	N/A	Boolean value	True	Specify whether to allow the web server to redirect you to another web service
Clear cookies	N/A	Boolean value	False	Specify whether to clear all cookies previously created by similar actions during this flow
Fail on error status	N/A	Boolean value	False	Specify whether the responses of the invoked web service that denote errors will be processed as if they were normal responses (suppressing all exceptions) or will result in the related exceptions

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
User agent	No	Text value	Mozilla/5.0 (Windows; U; Windows NT 5.1; en-US; rv:1.8.1.21) Gecko/20100312 Firefox/3.6	Specify which browser identity to be seen as. Some web servers will not allow access unless a browser identity is chosen
User agent	Yes	Text value	Mozilla/5.0 (Windows; U; Windows NT 5.1; en-US; rv:1.8.1.21) Gecko/20100312 Firefox/3.6	Specify which browser identity to be seen as. Some web servers will not allow access unless a browser identity is chosen
Encoding	N/A	Auto - detect, IBM037 : IBM EBCDIC (US-Canada), IBM437 : OEM United States, IBM500 : IBM EBCDIC (International), ASMO-708 : Arabic (ASMO 708), DOS-720 : Arabic (DOS), ibm737 : Greek (DOS), ibm775 : Baltic (DOS), ibm850 : Western European (DOS), ibm852 : Central European (DOS), IBM855 : OEM Cyrillic, ibm857 : Turkish (DOS), IBM00858 : OEM Multilingual Latin I, IBM860 : Portuguese (DOS), ibm861 : Icelandic (DOS), DOS-862 : Hebrew (DOS), IBM863 : French Canadian (DOS), IBM864 : Arabic (864), IBM865 : Nordic (DOS), cp866 : Cyrillic (DOS), ibm869 : Greek, Modern (DOS), IBM870 : IBM EBCDIC (Multilingual Latin-2), windows-874 : Thai (Windows), cp875 : IBM EBCDIC (Greek Modern), shift_jis : Japanese (Shift-JIS), gb2312 : Chinese Simplified (GB2312), ks_c_5601-1987 :	Auto - detect	The encoding used for the web service response. If the auto-detect option is chosen, the encoding to be used will be specified by the web service

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
		Korean, big5 : Chinese Traditional (Big5), IBM1026 : IBM EBCDIC (Turkish Latin-5), IBM01047 : IBM Latin-1, IBM01140 : IBM EBCDIC (US-Canada-Euro), IBM01141 : IBM EBCDIC (Germany-Euro), IBM01142 : IBM EBCDIC (Denmark-Norway-Euro), IBM01143 : IBM EBCDIC (Finland-Sweden-Euro), IBM01144 : IBM EBCDIC (Italy-Euro), IBM01145 : IBM EBCDIC (Spain-Euro), IBM01146 : IBM EBCDIC (UK-Euro), IBM01147 : IBM EBCDIC (France-Euro), IBM01148 : IBM EBCDIC (International-Euro), IBM01149 : IBM EBCDIC (Icelandic-Euro), utf-16 : Unicode, utf-16BE : Unicode (Big-Endian), windows-1250 : Central European (Windows), windows-1251 : Cyrillic (Windows), Windows-1252 : Western European (Windows), windows-1253 : Greek (Windows), windows-1254 : Turkish (Windows), windows-1255 : Hebrew (Windows), windows-1256 : Arabic (Windows), windows-1257 : Baltic (Windows), windows-1258 : Vietnamese (Windows), Johab : Korean (Johab), macintosh : Western European (Mac), x-mac-japanese : Japanese (Mac), x-mac-chinesetrad : Chinese Traditional (Mac), x-mac-korean : Korean (Mac), x-mac-arabic : Arabic (Mac), x-mac-hebrew : Hebrew (Mac), x-		

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
		mac-greek : Greek (Mac), x-mac-cyrillic : Cyrillic (Mac), x-mac-chinesesimp : Chinese Simplified (Mac), x-mac-romanian : Romanian (Mac), x-mac-ukrainian : Ukrainian (Mac), x-mac-thai : Thai (Mac), x-mac-ce : Central European (Mac), x-mac-icelandic : Icelandic (Mac), x-mac-turkish : Turkish (Mac), x-mac-croatian : Croatian (Mac), utf-32 : Unicode (UTF-32), utf-32BE : Unicode (UTF-32 Big-Endian), x-Chinese-CNS : Chinese Traditional (CNS), x-cp20001 : TCA Taiwan, x-Chinese-Eten : Chinese Traditional (Eten), x-cp20003 : IBM5550 Taiwan, x-cp20004 : TeleText Taiwan, x-cp20005 : Wang Taiwan, x-IA5 : Western European (IA5), x-IA5-German : German (IA5), x-IA5-Swedish : Swedish (IA5), x-IA5-Norwegian : Norwegian (IA5), us-ascii : US-ASCII, x-cp20261 : T.61, x-cp20269 : ISO-6937, IBM273 : IBM EBCDIC (Germany), IBM277 : IBM EBCDIC (Denmark-Norway), IBM278 : IBM EBCDIC (Finland-Sweden), IBM280 : IBM EBCDIC (Italy), IBM284 : IBM EBCDIC (Spain), IBM285 : IBM EBCDIC (UK), IBM290 : IBM EBCDIC (Japanese katakana), IBM297 : IBM EBCDIC (France), IBM420 : IBM EBCDIC (Arabic), IBM423 : IBM EBCDIC (Greek), IBM424 : IBM		

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
		EBCDIC (Hebrew), x-EBCDIC-KoreanExtended : IBM EBCDIC (Korean Extended), IBM-Thai : IBM EBCDIC (Thai), koi8-r : Cyrillic (KOI8-R), IBM871 : IBM EBCDIC (Icelandic), IBM880 : IBM EBCDIC (Cyrillic Russian), IBM905 : IBM EBCDIC (Turkish), IBM00924 : IBM Latin-1, EUC-JP : Japanese (JIS 0208-1990 and 0212-1990), x-cp20936 : Chinese Simplified (GB2312-80), x-cp20949 : Korean Wansung, cp1025 : IBM EBCDIC (Cyrillic Serbian-Bulgarian), koi8-u : Cyrillic (KOI8-U), iso-8859-1 : Western European (ISO), iso-8859-2 : Central European (ISO), iso-8859-3 : Latin 3 (ISO), iso-8859-4 : Baltic (ISO), iso-8859-5 : Cyrillic (ISO), iso-8859-6 : Arabic (ISO), iso-8859-7 : Greek (ISO), iso-8859-8 : Hebrew (ISO-Visual), iso-8859-9 : Turkish (ISO), iso-8859-13 : Estonian (ISO), iso-8859-15 : Latin 9 (ISO), x-Europa : Europa, iso-8859-8-i : Hebrew (ISO-Logical), iso-2022-jp : Japanese (JIS), csISO2022JP : Japanese (JIS-Allow 1 byte Kana), iso-2022-jp : Japanese (JIS-Allow 1 byte Kana - SO/SI), iso-2022-kr : Korean (ISO), x-cp50227 : Chinese Simplified (ISO-2022), euc-jp : Japanese (EUC), EUC-CN : Chinese Simplified (EUC), euc-kr : Korean (EUC), hz-gb-2312 : Chinese Simplified (HZ), GB18030 : Chinese Simplified (GB18030),		

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
		x-iscii-de : ISCII Devanagari, x-iscii-be : ISCII Bengali, x-iscii-ta : ISCII Tamil, x-iscii-te : ISCII Telugu, x-iscii-as : ISCII Assamese, x-iscii-or : ISCII Oriya, x-iscii-ka : ISCII Kannada, x-iscii-ma : ISCII Malayalam, x-iscii-gu : ISCII Gujarati, x-iscii-pa : ISCII Punjabi, utf-7 : Unicode (UTF-7), utf-8 : Unicode (UTF-8)		
Accept untrusted certificates	N/A	Boolean value	False	Specify whether untrusted certificates will be accepted
HTTP Authentication	N/A	Boolean value	False	Specify whether the web server requires HTTP authentication (that is, the browser displays a popup window asking for a username and password)
User name	No	Text value		The user name for the web server
Password	No	Encrypted value		The password for the web server

Request Builder Parameters

ARGUMENT	ACCEPTS	DESCRIPTION
WSDL	File	The Web Services Decription Language (WSDL) document to build the request with
Service	Text value	The service to invoke
Port	Text value	The port to invoke the service
SOAP version	Text value	The version of the SOAP service
Operation	Text value	The operation to invoke the service
Request envelope	Text value	The envelope to send in the request to invoke the service

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
SoapServiceResponseHeaders	List of Text values	The HTTP headers of the response
SoapServiceResponse	Text value	The web service response text

ARGUMENT	TYPE	DESCRIPTION
StatusCode	Numeric value	The status code returned

Exceptions

EXCEPTION	DESCRIPTION
Invoke SOAP service error	Indicates a problem invoking the SOAP service
Invalid header in custom headers	Indicates that some custom headers were invalid

Invoke web service

Invokes a web service by sending data and retrieves the response from the web service

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
URL	No	Text value		The web service's URL
Method	N/A	GET, POST, CONNECT, HEAD, PUT, DELETE, OPTIONS, TRACE, PATCH	GET	The HTTP method to be used to invoke the web service
Accept	Yes	Text value	application/xml	The acceptable content type for the response of the web service
Content type	Yes	Text value	application/xml	The content type of the request that will be sent to the web service
Custom headers	Yes	Text value		The custom headers to be included in the request that will be sent to the web service
Request body	Yes	Text value		The body of the request that will be sent to the web service
Save response	N/A	Get text into variable (for web pages), Save to disk (for files)	Get text into variable (for web pages)	Specify how the returned data will be saved

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
File name	N/A	Keep original file name (specify only destination folder), Specify full path (destination folder + custom file name)	Keep original file name (specify only destination folder)	Specify whether to keep the original file name of the downloaded file or specify a new name
Destination folder	No	Folder		The folder where the file returned by the web service will be saved
Destination file path	No	File		The full path (folder plus filename) where the file returned by the web service will be stored
Connection timeout	Yes	Numeric value	30	The time (in seconds) that the agent should wait for a connection to be established with the server, before giving up
Follow redirection	N/A	Boolean value	True	Specify whether to allow the web server to redirect you to another web service
Clear cookies	N/A	Boolean value	False	Specify whether to clear all cookies created by similar actions during this automation before this action
Fail on error status	N/A	Boolean value	False	Specify whether the responses of the invoked web service that denote errors will be processed as if they were normal responses (suppressing all exceptions) or will result in the related exceptions
Encode request body	N/A	Boolean value	True	Specify whether the body of request should be URL-encoded before invoking

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
User agent	Yes	Text value	Mozilla/5.0 (Windows; U; Windows NT 5.1; en-US; rv:1.8.1.21) Gecko/20100312 Firefox/3.6	Specify which browser identity to be seen as. Some web servers will not allow access unless a browser identity is chosen
Encoding	N/A	Auto - detect, IBM037 : IBM EBCDIC (US-Canada), IBM437 : OEM United States, IBM500 : IBM EBCDIC (International), ASMO-708 : Arabic (ASMO 708), DOS-720 : Arabic (DOS), ibm737 : Greek (DOS), ibm775 : Baltic (DOS), ibm850 : Western European (DOS), ibm852 : Central European (DOS), IBM855 : OEM Cyrillic, ibm857 : Turkish (DOS), IBM00858 : OEM Multilingual Latin I, IBM860 : Portuguese (DOS), ibm861 : Icelandic (DOS), DOS-862 : Hebrew (DOS), IBM863 : French Canadian (DOS), IBM864 : Arabic (864), IBM865 : Nordic (DOS), cp866 : Cyrillic (DOS), ibm869 : Greek, Modern (DOS), IBM870 : IBM EBCDIC (Multilingual Latin-2), windows-874 : Thai (Windows), cp875 : IBM EBCDIC (Greek Modern), shift_jis : Japanese (Shift-JIS), gb2312 : Chinese Simplified (GB2312), ks_c_5601-1987 : Korean, big5 : Chinese Traditional (Big5), IBM1026 : IBM EBCDIC (Turkish Latin-5), IBM01047 : IBM Latin-1, IBM01140 : IBM EBCDIC (US-Canada-Euro), IBM01141 :	Auto - detect	The encoding used for the web service response. If the auto-detect option is chosen, the encoding to be used will be specified by the web service

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
		IBM EBCDIC (Germany-Euro), IBM01142 : IBM EBCDIC (Denmark-Norway-Euro), IBM01143 : IBM EBCDIC (Finland-Sweden-Euro), IBM01144 : IBM EBCDIC (Italy-Euro), IBM01145 : IBM EBCDIC (Spain-Euro), IBM01146 : IBM EBCDIC (UK-Euro), IBM01147 : IBM EBCDIC (France-Euro), IBM01148 : IBM EBCDIC (International-Euro), IBM01149 : IBM EBCDIC (Icelandic-Euro), utf-16 : Unicode, utf-16BE : Unicode (Big-Endian), windows-1250 : Central European (Windows), windows-1251 : Cyrillic (Windows), Windows-1252 : Western European (Windows), windows-1253 : Greek (Windows), windows-1254 : Turkish (Windows), windows-1255 : Hebrew (Windows), windows-1256 : Arabic (Windows), windows-1257 : Baltic (Windows), windows-1258 : Vietnamese (Windows), Johab : Korean (Johab), macintosh : Western European (Mac), x-mac-japanese : Japanese (Mac), x-mac-chinesetrad : Chinese Traditional (Mac), x-mac-korean : Korean (Mac), x-mac-arabic : Arabic (Mac), x-mac-hebrew : Hebrew (Mac), x-mac-greek : Greek (Mac), x-mac-cyrillic : Cyrillic (Mac), x-mac-chinesesimp : Chinese Simplified (Mac), x-mac-romanian : Romanian (Mac), x-mac-ukrainian : Ukrainian		

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
		(Mac), x-mac-thai : Thai (Mac), x-mac-ce : Central European (Mac), x-mac-icelandic : Icelandic (Mac), x-mac-turkish : Turkish (Mac), x-mac-croatian : Croatian (Mac), utf-32 : Unicode (UTF-32), utf-32BE : Unicode (UTF-32 Big-Endian), x-Chinese-CNS : Chinese Traditional (CNS), x-cp20001 : TCA Taiwan, x-Chinese-Eten : Chinese Traditional (Eten), x-cp20003 : IBM5550 Taiwan, x-cp20004 : TeleText Taiwan, x-cp20005 : Wang Taiwan, x-IA5 : Western European (IA5), x-IA5-German : German (IA5), x-IA5-Swedish : Swedish (IA5), x-IA5-Norwegian : Norwegian (IA5), us-ascii : US-ASCII, x-cp20261 : T.61, x-cp20269 : ISO-6937, IBM273 : IBM EBCDIC (Germany), IBM277 : IBM EBCDIC (Denmark-Norway), IBM278 : IBM EBCDIC (Finland-Sweden), IBM280 : IBM EBCDIC (Italy), IBM284 : IBM EBCDIC (Spain), IBM285 : IBM EBCDIC (UK), IBM290 : IBM EBCDIC (Japanese katakana), IBM297 : IBM EBCDIC (France), IBM420 : IBM EBCDIC (Arabic), IBM423 : IBM EBCDIC (Greek), IBM424 : IBM EBCDIC (Hebrew), x-EBCDIC-KoreanExtended : IBM EBCDIC (Korean Extended), IBM-Thai : IBM EBCDIC (Thai), koi8-r : Cyrillic (KOI8-R), IBM871 : IBM EBCDIC (Icelandic),		

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
		IBM880 : IBM EBCDIC (Cyrillic Russian), IBM905 : IBM EBCDIC (Turkish), IBM00924 : IBM Latin-1, EUC-JP : Japanese (JIS 0208-1990 and 0212-1990), x-cp20936 : Chinese Simplified (GB2312-80), x-cp20949 : Korean Wansung, cp1025 : IBM EBCDIC (Cyrillic Serbian-Bulgarian), koi8-u : Cyrillic (KOI8-U), iso-8859-1 : Western European (ISO), iso-8859-2 : Central European (ISO), iso-8859-3 : Latin 3 (ISO), iso-8859-4 : Baltic (ISO), iso-8859-5 : Cyrillic (ISO), iso-8859-6 : Arabic (ISO), iso-8859-7 : Greek (ISO), iso-8859-8 : Hebrew (ISO-Visual), iso-8859-9 : Turkish (ISO), iso-8859-13 : Estonian (ISO), iso-8859-15 : Latin 9 (ISO), x-Europa : Europa, iso-8859-8-i : Hebrew (ISO-Logical), iso-2022-jp : Japanese (JIS), csISO2022JP : Japanese (JIS-Allow 1 byte Kana), iso-2022-jp : Japanese (JIS-Allow 1 byte Kana - SO/SI), iso-2022-kr : Korean (ISO), x-cp50227 : Chinese Simplified (ISO-2022), euc-jp : Japanese (EUC), EUC-CN : Chinese Simplified (EUC), euc-kr : Korean (EUC), hz-gb-2312 : Chinese Simplified (HZ), GB18030 : Chinese Simplified (GB18030), x-iscii-de : ISCII Devanagari, x-iscii-be : ISCII Bengali, x-iscii-ta : ISCII Tamil, x-iscii-te : ISCII Telugu, x-iscii-as : ISCII Assamese, x-iscii-or : ISCII Oriya, x-iscii-ka : ISCII Kannada, x-iscii-		

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
		ma : ISCII Malayalam, x-iscii-gu : ISCII Gujarati, x-iscii-pa : ISCII Punjabi, utf-7 : Unicode (UTF-7), utf-8 : Unicode (UTF-8)		
Accept untrusted certificates	N/A	Boolean value	False	Specify whether untrusted certificates will be accepted
HTTP Authentication	N/A	Boolean value	False	Specify whether the web server requires authentication. This property refers to HTTP authentication (that is, when the browser displays a popup window asking for user name and password)
User name	No	Text value		The user name for the web server
Password	No	Encrypted value		The password for the web server

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
WebServiceResponseHeaders	List of Text values	The HTTP headers of the response
DownloadedFile	File	The downloaded file
WebServiceResponse	Text value	The web service response text
StatusCode	Numeric value	The status code returned

Exceptions

EXCEPTION	DESCRIPTION
Invoke web service error	Indicates a problem invoking the web service
Directory doesn't exist	Indicates that a required directory doesn't exist
Invalid header in custom headers	Indicates that some custom headers were invalid

Browser automation

1/15/2022 • 25 minutes to read • Edit Online

Start and manage web applications on browsers

You can find more information on how to use the browser automation actions here

Extract data from web page
Get details of web page
Get details of element on web page
Take screenshot of web page
Focus text field on web page
Populate text Field on web page
Set check box state on web page
Select radio button on web page
Set drop-down list value on web page
Press button on web page
If web page contains
Wait for web page content
Launch new Internet Explorer
Launch new Firefox
Launch new Chrome
Launch new Microsoft Edge
Create new tab
Go to web page
Click link on web page
Click download link on web page
Run JavaScript function on web page

Hover mouse over element on web page
Close web browser

Getting started with browser automation

Browser automation actions enable users to interact with web applications and components through UI elements. UI elements describe uniquely the web components that the action is going to handle.

To add a new UI element, select **Add UI element** through the deployed browser automation action or the **UI elements** tab of the flow designer.

All web-related UI elements are specified by one or more CSS selectors that pinpoint the hierarchical structure of the component on the page. Selectors use the > notation to indicate that each element is contained within the element on its left.

Although selectors are created automatically when adding UI elements, some particular scenarios need manually created selectors. When a custom selector is needed, you have the option to edit an existing selector or build one from scratch.

To develop more dynamic web flows, replace the **Equals to** operators with other operators or regular expressions. Additionally, if the value of a selector's attribute depends on the results of previous actions, use variables instead of hard-coded values.

> **NOTE**
> You can find more information about developing web flows and creating custom selectors in Automate web flows and Build a custom selector, respectively.

Browser automation actions

Web data extraction

Extract data from web applications, from a single value up to tables or custom multiple pieces of data

Extract data from web page

Extract data from specific parts of a web page in the form of single values, lists, rows or tables

You can find more information on how to use this action here

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Web browser instance	No	Web browser instance		Enter or choose the variable that contains the web browser instance to work with

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
UI element	No	WebControl		Select the UI element on web page to extract data from
Extraction parameters	No	Datatable		The parameters to use when extracting data. Depending on the extraction mode, this accepts different data.
Max web pages to process	No	Numeric value		The maximum number of web pages to process
Pager CSS selector	No	Text value		The pager CSS selector
Extraction mode	N/A	Undefined, Single value, Handpicked values, List, Table, Entire HTML table	Single value	Specify what to extract from the web page
Use paging	N/A	Boolean value	False	Specify whether to use paging
Get all web pages	N/A	Boolean value	False	Specify whether to get all web pages
Store data mode	N/A	Variable, Excel spreadsheet	Variable	Specify whether to store the extracted data in a variable or an Excel spreadsheet

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
ExcelInstance	Excel instance	The Excel instance with the extracted data. Use this instance to manipulate the spreadsheet (or save and close it) by using the dedicated Excel actions.
DataFromWebPage	Datatable	The extracted data in the form of a single value, list, datarow or datatable

Exceptions

EXCEPTION	DESCRIPTION
Failed to extract data	Indicates a problem extracting data
Failed to launch Excel instance	Indicates a problem launching an Excel instance
Failed to write values to Excel	Indicates a problem writing the values to an Excel

Get details of web page

Get a property of a web page, such as its title or its source text

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Web browser instance	No	Web browser instance		Enter or choose the variable that contains the web browser instance to work with
Get	N/A	Web page description, Web page meta keywords, Web page title, Web page text, Web page source, Web browser's current URL address	Web page description	Select the information to retrieve from the web page

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
WebPageProperty	Text value	The details retrieved from the web page

Exceptions

EXCEPTION	DESCRIPTION
Failed to get details of web page	Indicates a problem getting the details of the specified web page

Get details of element on web page

Get the value of an element's attribute on a web page

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Web browser instance	No	Web browser instance		Enter or choose the variable that contains the web browser instance to work with
UI element	No	WebControl		Select the UI element on web page to get details from
Attribute name	Yes	Text value	Own Text	Enter or select the attribute whose value to retrieve

Variables Produced

ARGUMENT	TYPE	DESCRIPTION

ARGUMENT	TYPE	DESCRIPTION
AttributeValue	Text value	The value of the web element's attribute

Exceptions

EXCEPTION	DESCRIPTION
Failed to retrieve attribute of UI element on web page	Indicates a problem retrieving attribute of web page element

Take screenshot of web page

Take a screenshot of the web page (or an element of the web page) currently displayed in the browser and save the image into a file or to the clipboard

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Web browser instance	No	Web browser instance		Enter or choose the variable that contains the web browser instance to work with
Capture	N/A	Entire web page, Specific element	Entire web page	Specify whether to capture the entire web page or only a specific element of it
UI element	No	WebControl		Select the UI element on web page to capture
Save mode	N/A	Clipboard, File	Clipboard	Specify whether to save the image into a file or store it into the clipboard
Image file	No	File		Set the full path for the file to save the image capture
File format	N/A	BMP, EMF, EXIF, GIF, JPG, PNG, TIFF, WMF	BMP	Select the format of the image file

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Element with specified CSS selector not found	Indicates that a web page element with the specified CSS selector was not found
Failed to save file	Indicates a problem saving the specified file
Failed to save in the clipboard	Indicates a problem while saving to the clipboard

EXCEPTION	DESCRIPTION
Failed to take screenshot	Indicates a problem taking a screenshot

Web form filling

Fill in forms on web applications

Focus text field on web page

Set the focus on an input element of a web page and scroll it into view

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Web browser instance	No	Web browser instance		Enter or choose the variable that contains the web browser instance to work with
UI element	No	WebControl		Select the UI element on web page to focus
Wait for page to load	N/A	Boolean value	True	Specify whether to wait for the new web page to load completely before proceeding
If a pop-up dialog appears	N/A	Close it, Press a button, Do nothing	Do nothing	Specify what to do if a pop-up dialog appears
Dialog button to press	Yes	Text value	OK	Enter the dialog button to press if a pop-up dialog appears

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Element with specified CSS selector not found	Indicates that a web page element with the specified CSS selector was not found
Failed to set input focus on web page text field	Indicates a problem setting input focus on the specified web page text field

Populate text Field on web page

Fill a text field in a web page with the specified text

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Web browser instance	No	Web browser instance		Enter or choose the variable that contains the web browser instance to work with
UI element	No	WebControl		Select the text field to populate
Text	No	Encrypted value		Enter the text to fill in the text field
Emulate typing	N/A	Boolean value	True	Specify whether to fill the text field at once by simply setting the value of the text box, or emulate a user typing by sending characters one by one. The latter method is slower, but required in some complex web pages.
Unfocus text box after filling it	N/A	Boolean value	False	Choose whether to unfocus the text box right after this action fills it with the specified text. In case of scraping autocompletion lists, this parameter should be set to "False".
Wait for page to load	N/A	Boolean value	True	Specify whether to wait for the new web page to load completely after populating the text field
If a pop-up dialog appears	N/A	Close it, Press a button, Do nothing	Do nothing	Specify what to do if a pop-up dialog appears after populating the text field
Dialog button to press	Yes	Text value	OK	Enter the dialog button to press if a pop-up dialog appears
If field isn't empty	Yes	Replace text, Append text	Replace text	Specify whether to replace existing content, or to append.

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Element with specified CSS selector not found	Indicates that a web page element with the specified CSS selector was not found
Failed to write on text field	Indicates a problem writing to the specified text field

Set check box state on web page

Check or uncheck a check box in a web form

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Web browser instance	No	Web browser instance		Enter or choose the variable that contains the web browser instance to work with
UI element	No	WebControl		Select the check box to set the state of
Check box state	N/A	Checked, Unchecked	Checked	Select the check box state
Wait for page to load	N/A	Boolean value	True	Specify whether to wait for the new web page to load completely after setting the check box state
If a pop-up dialog appears	N/A	Close it, Press a button, Do nothing	Do nothing	Specify what to do if a pop-up dialog appears after setting the check box state
Dialog button to press	Yes	Text value	OK	Enter the dialog button to press if a pop-up dialog appears

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Element with specified CSS selector not found	Indicates that a web page element with the specified CSS selector was not found
Failed to set the state of the checkbox	Indicates a problem in setting the state of the specified check box

Select radio button on web page

Select a radio button on the web page

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Web browser instance	No	Web browser instance		Enter or choose the variable that contains the web browser instance to work with
UI element	No	WebControl		The radio button to select
Wait for page to load	N/A	Boolean value	True	Specify whether to wait for the new web page to load completely after selecting the radio button
If a pop-up dialog appears	N/A	Close it, Press a button, Do nothing	Do nothing	Specify what to do if a pop-up dialog appears after selecting the radio button
Dialog button to press	Yes	Text value	OK	The dialog button to press if a pop-up dialog appears

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Element with specified CSS selector not found	Indicates that a web page element with the specified CSS selector was not found
Failed to select radio button	Indicates a problem in selecting the specified radio button

Set drop-down list value on web page

Set or clear the selected option for a drop-down list in a web form

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Web browser instance	No	Web browser instance		Enter or choose the variable that contains the web browser instance to work with
UI element	No	WebControl		Select the drop-down list to set its value

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Operation	N/A	Clear all options, Select options by name, Select options by index	Clear all options	Select whether to select a value or clear the selected value of the drop-down list
Option name(s)	No	List of Text values		Enter one or more options (one per line if more than one) to be selected in the drop-down list. Multiple options make sense only when working with multi-select lists. If the list is single-selection, then only the first option specified will be used.
Option indices	No	List of Numeric values		Type a space-separated list of 1-based indices (e.g. 1 3 4)
Wait for page to load	N/A	Boolean value	True	Specify whether to wait for the new web page to load completely after setting the drop-down list value
If a pop-up dialog appears	N/A	Close it, Press a button, Do nothing	Do nothing	Specify what to do if a pop-up dialog appears after setting the drop-down list value
Dialog button to press	Yes	Text value	OK	Enter the dialog button to press if a pop-up dialog appears

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Element with specified CSS selector not found	Indicates that a web page element with the specified CSS selector was not found
Failed to set the selected option	Indicates a problem setting the selected drop-down list option

Press button on web page

Press a web page button

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Web browser instance	No	Web browser instance		Enter or choose the variable that contains the web browser instance to work with
UI element	No	WebControl		Select the button to press
Wait for page to load	N/A	Boolean value	True	Specify whether to wait for the new web page to load completely after pressing the button
If a pop-up dialog appears	N/A	Close it, Press a button, Do nothing	Do nothing	Specify what to do if a pop-up dialog appears after pressing the button
Dialog button to press	Yes	Text value	OK	Enter the dialog button to press if a pop-up dialog appears

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Element with specified CSS selector not found	Indicates that a web page element with the specified CSS selector was not found
Failed to click on web page button	Indicates a problem clicking the specified web page button

If web page contains

Mark the beginning of a conditional block of actions, depending on whether a specific piece of text or element exists in a web page

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Web browser instance	No	Web browser instance		Enter or choose the variable that contains the web browser instance to work with
Check if web page	N/A	Contains element, Doesn't contain element, Contains text, Doesn't contain text	Contains element	Check whether a specific text or web page element exists in a web page

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
UI element	No	WebControl		Select the UI element on web page to check for
Text	No	Text value		Enter the text on web page to check for

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Failed to communicate with the browser	Indicates that an error with the browser occured

Wait for web page content

Suspend the flow until a specific piece of text or web page element appears or disappears from a web page

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Web browser instance	No	Web browser instance		Enter or choose the variable that contains the web browser instance to work with
Wait for web page to	N/A	Contain element, Not contain element, Contain text, Not contain text	Contain element	Specify whether to wait for a specific text or web page element to (dis)appear in a web page
UI element	No	WebControl		Select the UI element on web page to check for
Text	No	Text value		Enter the text on web page to check for

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Wait for web page content failed	Indicates that the wait operation failed

Launch new Internet Explorer

Launch a new instance or attach to a running instance of Internet Explorer for automating web sites and web applications

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Launch mode	N/A	Launch automation browser, Launch new Internet Explorer, Attach to running Internet Explorer	Launch automation browser	Specify whether to launch the automation browser or a new instance of Internet Explorer or attach to an existing one
Attach to Internet Explorer tab	N/A	By title, By URL, Use foreground window	By title	Specify whether to attach to an Internet Explorer tab by its title, URL, or attach to the active tab of Internet Explorer running as the foreground window
Initial URL	No	Text value		Enter the URL of the web site to visit when the web browser is launched
Tab title	No	Text value		Enter the title (or part of it) of the Internet Explorer tab to attach to
Tab URL	No	Text value		Enter the URL (or part of it) of the Internet Explorer tab to attach to
Window state	N/A	Normal, Maximized, Minimized	Normal	Specify whether to launch the browser window in normal, minimized of maximized state
Clear cache	N/A	Boolean value	False	Specify whether to clear the entire cache of the web browser right after launching it
Clear cookies	N/A	Boolean value	False	Specify whether to clear all stored cookies in the web browser right after launching it
Wait for page to load	N/A	Boolean value	True	Specify whether to wait for the new web page to load completely before proceeding

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
If a pop-up dialog appears	N/A	Close it, Press a button, Do nothing	Do nothing	Specify what to do if a pop-up dialog appears while loading the initial web page
Dialog button to press	Yes	Text value	OK	Enter the dialog button to press if a pop-up dialog appears
Custom user agent string	Yes	Text value		Specify the custom user agent string for the runtime web helper. If this field remains empty, the runtime web helper uses by default the user agent string of Internet Explorer installed on the machine.

> **NOTE**
> The **Clear cache** and **Clear cookies** options only work as intended if running in Protected Mode is disabled in the Internet options menu.

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
InternetExplorer	Web browser instance	The Internet Explorer instance to use with browser automation actions

Exceptions

EXCEPTION	DESCRIPTION
Failed to launch Internet Explorer	Indicates a problem launching Internet Explorer
Invalid URL	Indicates that the provided URL was invalid

Launch new Firefox

Launch a new instance or attach to a running instance of Firefox for automating web sites and web applications

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Launch mode	N/A	Launch new Instance, Attach to running instance	Launch new Instance	Specify whether to launch a new instance of Firefox or attach to an existing one

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Attach to Firefox tab	N/A	By title, By URL, Use foreground window	By title	Specify whether to attach to a Firefox tab by its title, URL, or attach to the active tab of Firefox running as the foreground window
Initial URL	No	Text value		Enter the URL of the web site to visit when the web browser is launched
Tab title	No	Text value		Enter the title (or part of it) of the Firefox tab to attach to
Tab URL	No	Text value		Enter the URL (or part of it) of the Firefox tab to attach to
Window state	N/A	Normal, Maximized, Minimized	Normal	Specify whether to launch the browser window in normal, minimized of maximized state
Clear cache	N/A	Boolean value	False	Specify whether to clear the entire cache of the web browser right after launching it
Clear cookies	N/A	Boolean value	False	Specify whether to clear all stored cookies in the web browser right after launching it
Wait for page to load	N/A	Boolean value	True	Specify whether to wait for the new web page to load completely before proceeding
If a pop-up dialog appears	N/A	Close it, Press a button, Do nothing	Do nothing	Specify what to do if a pop-up dialog appears while loading the initial web page
Dialog button to press	Yes	Text value	OK	Enter the dialog button to press if a pop-up dialog appears

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Timeout	No	Numeric value	60	Set the time in seconds that you want to wait for the browser to be launched before the action fails

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
Browser	Web browser instance	The Firefox instance to use with browser automation actions

Exceptions

EXCEPTION	DESCRIPTION
Failed to launch Firefox	Indicates a problem launching Firefox
Invalid URL	Indicates that the provided URL was invalid

Launch new Chrome

Launch a new instance or attach to a running instance of Chrome for automating web sites and web applications

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Launch mode	N/A	Launch new Instance, Attach to running instance	Launch new Instance	Specify whether to launch a new instance of Chrome or attach to an existing one
Attach to Chrome tab	N/A	By title, By URL, Use foreground window	By title	Specify whether to attach to a Chrome tab by its title, URL, or attach to the active tab of Chrome running as the foreground window
Initial URL	No	Text value		Enter the URL of the web site to visit when the web browser is launched
Tab title	No	Text value		Enter the title (or part of it) of the Chrome tab to attach to
Tab URL	No	Text value		Enter the URL (or part of it) of the Chrome tab to attach to

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Window state	N/A	Normal, Maximized, Minimized	Normal	Specify whether to launch the browser window in normal, minimized of maximized state
Clear cache	N/A	Boolean value	False	Specify whether to clear the entire cache of the web browser right after launching it
Clear cookies	N/A	Boolean value	False	Specify whether to clear all stored cookies in the web browser right after launching it
Wait for page to load	N/A	Boolean value	True	Specify whether to wait for the new web page to load completely before proceeding
If a pop-up dialog appears	N/A	Close it, Press a button, Do nothing	Do nothing	Specify what to do if a pop-up dialog appears while loading the initial web page
Dialog button to press	Yes	Text value	OK	Enter the dialog button to press if a pop-up dialog appears
Timeout	No	Numeric value	60	Set the time in seconds that you want to wait for the browser to be launched before the action fails

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
Browser	Web browser instance	The Chrome instance to use with browser automation actions

Exceptions

EXCEPTION	DESCRIPTION
Failed to launch Chrome	Indicates a problem launching Chrome
Invalid URL	Indicates that the provided URL was invalid

Launch new Edge

Launch a new instance or attach to a running instance of Edge for automating web sites and web applications

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Launch mode	N/A	Launch new Instance, Attach to running instance	Launch new Instance	Specify whether to launch a new instance of Edge or attach to an existing one
Attach to Edge tab	N/A	By title, By URL, Use foreground window	By title	Specify whether to attach to an Edge tab by its title, URL, or attach to the active tab of Edge running as the foreground window
Initial URL	No	Text value		Enter the URL of the web site to visit when the web browser is launched
Tab title	No	Text value		Enter the title (or part of it) of the Edge tab to attach to
Tab URL	No	Text value		Enter the URL (or part of it) of the Edge tab to attach to
Window state	N/A	Normal, Maximized, Minimized	Normal	Specify whether to launch the browser window in normal, minimized of maximized state
Clear cache	N/A	Boolean value	False	Specify whether to clear the entire cache of the web browser right after launching it
Clear cookies	N/A	Boolean value	False	Specify whether to clear all stored cookies in the web browser right after launching it
Wait for page to load	N/A	Boolean value	True	Specify whether to wait for the new web page to load completely before proceeding

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
If a pop-up dialog appears	N/A	Close it, Press a button, Do nothing	Do nothing	Specify what to do if a pop-up dialog appears while loading the initial web page
Dialog button to press	Yes	Text value	OK	Enter the dialog button to press if a pop-up dialog appears
Timeout	No	Numeric value	60	Set the time in seconds that you want to wait for the browser to be launched before the action fails

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
Browser	Web browser instance	The Edge instance to use with browser automation actions

Exceptions

EXCEPTION	DESCRIPTION
Failed to launch Edge	Indicates a problem launching Edge
Invalid URL	Indicates that the provided URL was invalid

Create new tab

Create a new tab and navigate to the given URL (supported in Edge, Chrome and Firefox)

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Web browser instance	No	Web browser instance		Enter or choose the variable that contains the web browser instance to work with
URL to navigate to	No	Text value		Enter the URL, or a variable containing the URL, to navigate to
Wait for page to load	N/A	Boolean value	True	Specify whether to wait for the new web page to load completely before proceeding

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
If a pop-up dialog appears	N/A	Close it, Press a button, Do nothing	Do nothing	Specify what to do if a pop-up dialog appears while loading the web page
Dialog button to press	Yes	Text value	OK	Enter the dialog button to press if a pop-up dialog appears

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
NewBrowser	Web browser instance	The new web browser instance to use with browser automation actions

Exceptions

EXCEPTION	DESCRIPTION
Invalid URL	Indicates that the provided URL was invalid
Failed to create a new tab	Indicates a problem creating a new tab

Go to web page

Navigate the web browser to a new page

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Web browser instance	No	Web browser instance		Enter or choose the variable that contains the web browser instance to work with
Navigate	N/A	To URL, Back, Forward, Reload web page	To URL	Specify where to navigate to
URL	No	Text value		Enter the URL to navigate to
Wait for page to load	N/A	Boolean value	True	Specify whether to wait for the web page to load completely before proceeding
If a pop-up dialog appears	N/A	Close it, Press a button, Do nothing	Do nothing	Specify what to do if a pop-up dialog appears while loading the web page

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Dialog button to press	Yes	Text value	OK	Enter the dialog button to press if a pop-up dialog appears

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Failed to navigate to web page	Indicates a problem navigating to the specified web page
Invalid URL	Indicates that the provided URL was invalid

Click link on web page

Click on a link or any other element of a web page

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Web browser instance	No	Web browser instance		Enter or choose the variable that contains the web browser instance to work with
UI element	No	WebControl		Select the UI element on web page to click
Wait for page to load	N/A	Boolean value	True	Specify whether to wait for the new web page to load completely after clicking on the link
If a pop-up dialog appears	N/A	Close it, Press a button, Do nothing	Do nothing	Specify what to do if a pop-up dialog appears after clicking on the link
Dialog button to press	Yes	Text value	OK	Enter the dialog button to press if a pop-up dialog appears

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Element with specified CSS selector not found	Indicates that a web page element with the specified CSS selector was not found

EXCEPTION	DESCRIPTION
Failed to click UI element	Indicates a problem clicking the specified element

Click download link on web page

Click on a link in a web page that results in downloading a file

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Web browser instance	No	Web browser instance		Enter or choose the variable that contains the web browser instance to work with
UI element	No	WebControl		Select the UI element on web page to click
Destination folder	No	Folder		Enter or choose the full path of the folder, or a variable containing the folder, to save the downloaded file to

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
DownloadedFile	File	The file on the disk where the download is saved. This is a filepath that consists of the download folder as specified above plus the name of the file as provided by the web server.

Exceptions

EXCEPTION	DESCRIPTION
Failed to download file	Indicates a problem downloading the specified file
Element with specified CSS selector not found	Indicates that a web page element with the specified CSS selector was not found
Failed to click UI element	Indicates a problem clicking the specified element
Failed to save file	Indicates a problem saving the specified file

Run JavaScript function on web page

Run a JavaScript function on the web page and get the returned result

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Web browser instance	No	Web browser instance		Enter or choose the variable that contains the web browser instance to work with
JavaScript function	Yes	Text value	function ExecuteScript() { /*your code here, return something (optionally); */ }	Enter the JavaScript function to run on the web page

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
Result	Text value	The result of the JavaScript function that run

Exceptions

EXCEPTION	DESCRIPTION
Failed to run JavaScript	Indicates a problem running JavaScript

Hover mouse over element on web page

Hover the mouse over an element of a web page

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Web browser instance	No	Web browser instance		Enter or choose the variable that contains the web browser instance to work with
UI element	No	WebControl		Select the UI element on web page to hover

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Failed to hover over element	Indicates a problem hovering over the specified element

Close web browser

Close a web browser window

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Web browser instance	No	Web browser instance		Enter or choose the variable that contains the web browser instance to close

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Failed to close the web browser	Indicates a problem closing the web browser

Excel

1/15/2022 • 21 minutes to read • Edit Online

Automate any Excel related activity

Run Excel Macro
Get active Excel worksheet
Get all Excel worksheets
Delete Excel worksheet
Rename Excel worksheet
Activate Cell in Excel Worksheet
Select cells in Excel worksheet
Get selected cell range from Excel worksheet
Copy cells from Excel worksheet
Paste cells to Excel worksheet
Delete from Excel worksheet
Insert row to Excel worksheet
Delete row from Excel worksheet
Insert column to Excel worksheet
Delete column from Excel worksheet
Find and replace cells in Excel worksheet
Get first free row on column from Excel worksheet
Launch Excel
Attach to running Excel
Read from Excel worksheet
Get active cell on Excel worksheet
Save Excel

Write to Excel worksheet
Close Excel
Set active Excel worksheet
Add new worksheet
Get first free column/row from Excel worksheet
Get column name on Excel worksheet

Getting started with Excel actions

After setting an Excel instance, either with the **Launch Excel** or the **Attach to running Excel** action, you may read from or write to an Excel file.

To read and extract data from an Excel document, use the **Read from Excel worksheet** action. Retrieve the value of a single cell, or a table of data.

In the following example, to read the cells A1 through E5 as seen in the selection below:

The action has to have the following configuration:

When the flow runs, the action stores the data in a datatable type variable:

Write data from the flow to Excel by using the **Write to Excel worksheet** action. This action can write any static data or variable to a specified cell, or multiple cells in an Excel worksheet.

In the following example, the action writes the above mentioned datatable variable to cell A51.

Each cell in the workbook is populated with its corresponding cell in the datatable. The result is that the A51 to E55 cell range is filled with the contents of the datatable.

Excel actions

Advanced

Advanced Excel automation actions

Run Excel Macro

Runs a specified macro on the document of an Excel instance

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Excel instance	No	Excel instance		The Excel instance to work with. This variable must have been previously specified in a Launch Excel action
Macro	No	Text value		The macro to run. The text should consist of the name of the macro, followed by any arguments (optional), all separated by semicolons

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Failed to run macro	Indicates a problem running the specified macro

Get active Excel worksheet

Retrieves an Excel document's active worksheet

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Excel instance	No	Excel instance		The Excel instance to work with. This variable must have been previously specified in a Launch Excel action

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
SheetName	Text value	The name of the active worksheet
SheetIndex	Numeric value	The index of the active worksheet

Exceptions

EXCEPTION	DESCRIPTION
Failed to retrieve active worksheet	Indicates a problem retrieving the active worksheet

Get all Excel worksheets

Retrieves all worksheet names of an Excel document

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Excel instance	No	Excel instance		Specify the Excel instance. This variable must have been previously specified in a Launch Excel action

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
SheetNames	List of Text values	The names of all worksheets

Exceptions

EXCEPTION	DESCRIPTION
Failed to retrieve all worksheet names	Indicates a problem retrieving the names of the Excel worksheet

Delete Excel worksheet

Deletes a specific worksheet from an Excel instance

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Excel instance	No	Excel instance		The Excel instance to work with. This variable must have been previously specified in a Launch Excel action
Delete worksheet with	N/A	Index, Name	Name	Whether to find the worksheet by name or index
Worksheet index	No	Numeric value		The Index number of the worksheet to delete. The numbering starts from 1, meaning that the index of the fist worksheet is 1, the second one is 2 etc.
Worksheet name	No	Text value		The name of the worksheet to delete

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION

EXCEPTION	DESCRIPTION
Can't find worksheet	Indicates that a worksheet with the specified name could not be found
Failed to delete worksheet	Indicates a problem deleting the specified worksheet

Rename Excel worksheet

Renames a specific worksheet of an Excel instance

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Excel instance	No	Excel instance		Specify the Excel instance. This variable must have been previously specified in a Launch Excel action
Rename worksheet with	N/A	Index, Name	Name	Specify whether to find the worksheet by name or index
Worksheet index	No	Numeric value		The index of the worksheet to rename. The numbering starts from 1, meaning that the index of the fist worksheet is 1, of the second is 2 etc.
Worksheet name	No	Text value		The name of the worksheet to rename
Worksheet new name	No	Text value		The new name of the worksheet

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Can't find worksheet	Indicates that a worksheet with the specified name could not be found
Failed to rename worksheet	Indicates a problem renaming the specified worksheet

Activate Cell in Excel Worksheet

Activate a cell in the active worksheet of an Excel instance, by providing column, row and offset

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Excel instance	No	Excel instance		Specify the Excel instance to work with. This variable must have been previously specified in a Launch Excel action
Activate	N/A	Absolutely specified cell, Relatively specified cell	Absolutely specified cell	Select whether to specify the cell to activate absolutely, or relatively, by using an offset distance being the number of cells between the currently activated reference cell and the actual cell activate
Column	No	Text value		The numeric value or letter of the cell column
Direction	N/A	Left, Right, Above, Below	Left	Select offset direction. Select where to look for the cell to activate based on the position of the currently active cell
Offset from active cell	No	Numeric value		The distance in cells between the currently active cell and the desired cell. The numbering starts from 0
Row	No	Numeric value		The numeric value of the cell row. The numbering starts from 1

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Failed to activate cell	Indicates a problem activating an Excel cell

Select cells in Excel worksheet

Selects a range of cells in the active worksheet of an Excel instance

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Excel instance	No	Excel instance		The Excel instance to work with. This variable must have been previously specified in a Launch Excel action
Select	N/A	Absolutely specified cell, Relatively specified cell	Absolutely specified cell	Specify whether to select an explicitly specified range of cells or a range of cells relatively to the currently active cell
X Axis Direction	N/A	Left, Right	Left	The X-axis offset direction. Where to look along the horizontal axis, based on currently activated cell's position
Start column	No	Text value		The index or letter of the first column
X Offset	No	Numeric value		The X-axis offset
Start row	No	Numeric value		The first row number. The numbering starts from 1
End column	No	Text value		The index or letter of the last column
Y Axis Direction	N/A	Above, Below	Above	The Y-axis offset direction. Where to look along the vertical axis, based on the position of the currently active cell
End row	No	Numeric value		The last row number. The numbering starts from 1
Y Offset	No	Numeric value		The Y-axis offset

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Failed to select cells	Indicates a problem selecting the specified cells

Get selected cell range from Excel worksheet

Retrieve the selected range of cells in a structure consisting of first column, first row, last column and last row

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Excel instance	No	Excel instance		The Excel instance to work with. This variable must have been previously specified in a Launch Excel action

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
FirstColumnIndex	Numeric value	The numeric value of the range's first column
FirstRowIndex	Numeric value	The numeric value of the range's first row
LastColumnIndex	Numeric value	The numeric value of the range's last column
LastRowIndex	Numeric value	The numeric value of the range's last row

Exceptions

EXCEPTION	DESCRIPTION
Failed to retrieve the selected range of cells	Indicates a problem retrieving the selected range of cells

Copy cells from Excel worksheet

Copies a range of cells from the active worksheet of an Excel instance

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Excel instance	No	Excel instance		The Excel instance to work with. This variable must have been previously specified in a Launch Excel action
Copy mode	N/A	Single Cell's Values, Values from a Range of Cells, Values from Selection	Single Cell's Values	Specify whether to copy a single cell, a range of cells or the current selection of cells
Start column	No	Text value		The index or letter of the first column

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Start row	No	Numeric value		The index of the first row
End column	No	Text value		The index or letter of the last column
End row	No	Numeric value		The index of the last row

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Failed to copy cells	Indicates a problem copying the cells from the Excel document

Paste cells to Excel worksheet

Pastes a range of cells to the active worksheet of an Excel instance

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Excel instance	No	Excel instance		Specify the Excel instance. This variable must have been previously specified in a Launch Excel action
Paste mode	N/A	On specified cell, On currently active cell	On specified cell	Specify whether to paste on a specified cell or the currently active cell
Column	No	Text value		The index or letter of the cell column
Row	No	Numeric value		The row number

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Failed to paste cells	Indicates a problem pasting the specified cells

Delete from Excel worksheet

Deletes a cell or a range of cells from the active worksheet of an Excel instance

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Excel instance	No	Excel instance		The Excel instance to work with. This variable must have been previously specified in a Launch Excel action
Retrieve	N/A	The value of a single cell, Values from a range of cells	The value of a single cell	Whether to delete a single cell or a table from a range of cells
Start column	No	Text value		The cell column (single cell's value) or first column as a numeric value or a letter
Start row	No	Numeric value		The cell row (single cell's value) or first row number
End column	No	Text value		The last column as a numeric value or a letter
End row	No	Numeric value		The last row number
Shift direction	N/A	Left, Up	Left	The shift direction

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Failed to delete cell(s)	Indicates a problem deleting the specified cell(s)

Insert row to Excel worksheet

Inserts a row above a selected row of an Excel instance

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Excel instance	No	Excel instance		The Excel instance to work with. This variable must have been previously specified in a Launch Excel action
Row index	No	Numeric value		The index of the row to add a new row above. The numbering starts from 1

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Can't find row	Indicates that a row with the specified index could not be found
Failed to insert row	Indicates a problem inserting a row at the specified Excel instance

Delete row from Excel worksheet

Deletes a selected row from an Excel instance

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Excel instance	No	Excel instance		The Excel instance. This variable must have been previously specified in a Launch Excel action
Delete row	No	Numeric value		The Index number of the row to delete. The numbering starts from 1

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Can't find row	Indicates that a row with the specified index could not be found
Failed to delete row	Indicates a problem deleting the specified row

Insert column to Excel worksheet

Inserts a column to the left of a selected column of an Excel instance

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Excel instance	No	Excel instance		The Excel instance to work with. This variable must have been previously specified in a Launch Excel action

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Column	No	Text value		The column's index number or letter. A new column will appear on the left side of the column indicated

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Can't find column	Indicates that a column with the specified name could not be found
Failed to insert column	Indicates a problem inserting a column at the specified Excel instance

Delete column from Excel worksheet

Deletes a selected column from an Excel instance

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Excel instance	No	Excel instance		The Excel instance to work with. This variable must have been previously specified in a Launch Excel action
Delete column	No	Text value		The index number or letter of the column to delete

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Can't find column	Indicates that a column with the specified name could not be found
Failed to delete column	Indicates a problem deleting the specified column

Find and replace cells in Excel worksheet

Finds text and replaces it with another in the active worksheet of an Excel instance

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Excel instance	No	Excel instance		The Excel instance to work with. This variable must have been previously specified in a Launch Excel action
Search mode	N/A	Find, Find and replace	Find	The mode to search with
All matches	N/A	Boolean value	False	Whether to find/replace text in all the matching cells found or in the first matching cell only
Text to find	No	Text value		The text to find in the worksheet
Text to replace with	No	Text value		The text used to replace the matching cells
Match case	N/A	Boolean value	False	Whether to search for case-sensitive data
Match entire cell contents	N/A	Boolean value	False	Whether to search for cells that contain just the specified text
Search by	N/A	Rows, Columns	Rows	The order in which to search for the text

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
FoundColumnIndex	Numeric value	The index of the column found
FoundRowIndex	Numeric value	The index of the row found
Cells	Datatable	The list of cells matching the criteria

Exceptions

EXCEPTION	DESCRIPTION
Failed to find and/or replace text	Indicates a problem finding and/or replacing the specified text

Get first free row on column from Excel worksheet

Retrieve the first free row, given the column of the active worksheet

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Excel instance	No	Excel instance		Specify the Excel instance. This variable must have been previously specified in a Launch Excel action
Column	No	Text value		The index or letter that identifies the column. Column numbering starts from index 1

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
FirstFreeRowOnColumn	Numeric value	The numeric value of the given column's first fully empty row

Exceptions

EXCEPTION	DESCRIPTION
Failed to retrieve first free row	Indicates a problem retrieving the first free row of an Excel instance

Launch Excel

Launches a new Excel instance or opens an Excel document

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Launch Excel	N/A	with a blank document, and open the following document	with a blank document	Specify whether to open a New Excel document, or an existing one
Document path	No	File		The full path of the existing Excel document to open
Make instance visible	N/A	Boolean value	True	Specify whether to make the Excel window visible or hide it
Password	Yes	Encrypted value		The password on the Excel document, if it is password protected
Open as ReadOnly	N/A	Boolean value	False	Specify whether to open the stored document in read-only mode or not

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Load add-ins and macros	N/A	Boolean value	False	Specify whether to load add-ins and macros into the new Excel instance

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
ExcelInstance	Excel instance	The specific Excel instance for use with later Excel actions. This allows the user to specify which of possibly several Excel spreadsheets to access

Exceptions

EXCEPTION	DESCRIPTION
Failed to launch Excel	Indicates a problem launching an Excel instance
Failed to open Excel document	Indicates a problem opening the specified Excel document

Attach to running Excel

Attaches to an Excel document that's already open

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Document name	No	File		The name or the path of the Excel document to attach to

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
ExcelInstance	Excel instance	The Excel instance this action has attached to for use with later Excel actions

Exceptions

EXCEPTION	DESCRIPTION
Specified Excel document not found	Indicates that the specified Excel document could not be found
Failed to attach to Excel document	Indicates a problem attaching to the Excel document

Read from Excel worksheet

Reads the value of a cell or a range of cells from the active worksheet of an Excel instance

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Excel instance	No	Excel instance		The Excel instance to work with. This variable must have been previously specified in a Launch Excel action
Retrieve	N/A	The value of a single cell, Values from a range of cells, Values from selection, All available values from worksheet	The value of a single cell	Whether to retrieve the value of a single cell, a table from a range of cells or the entire worksheet
Start column	No	Text value		The cell column (single cell's value) or first column as a numeric value or a letter
Start row	No	Numeric value		The cell row (single cell's Value) or first row number
End column	No	Text value		The last column as a numeric value or a letter
End row	No	Numeric value		The last row number
Get cell contents as text	N/A	Boolean value	False	Specify whether to retrieve the content of the cell(s) purely as text or as the closest matching type such as Date Time for dates, Numeric for numbers and so on
First line of range contains column names	N/A	Boolean value	False	Specify whether to consider the first row as column names. In this case, the names won't be read as data into the table and later actions can search the data by column names

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
ExcelData	General value	The value of the single cell
ExcelData	Datatable	The value of the range of cells as a DataTable

Exceptions

EXCEPTION	DESCRIPTION
Failed to read cell value(s)	Indicates a problem reading the value(s) of the specified Excel cell(s)

Get active cell on Excel worksheet

Get the active cell in the active worksheet of the Excel document

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Excel instance	No	Excel instance		The Excel instance to work with. This variable must have been previously specified in a Launch Excel action

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
ActiveCellColumnIndex	Numeric value	The numeric value of the active cell's column
ActiveCellRowIndex	Numeric value	The numeric value of the active cell's row

Exceptions

EXCEPTION	DESCRIPTION
Failed to get active cell	Indicates a problem getting the active cell

Save Excel

Saves a previously launched Excel instance

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Excel instance	No	Excel instance		The Excel instance to save. This variable must have been previously specified in a Launch Excel action
Save mode	N/A	Save document, Save document as	Save document	How to save the document of this instance

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Document format	N/A	Default (From Extension), Excel Workbook (.xlsx), Excel Workbook Macro Enabled (.xlsm), Excel 97-2003 Workbook (.xls), Web Page (.htm, .html), Excel Template (.xltx), Excel Template Macro Enabled (.xltm), Excel 97-2003 Template (.xlt), Text (.txt), Unicode Text (.txt), Text Macintosh (.txt), Text DOS (.txt), XML Spreadsheet (.xml), Excel 95 (.xls), CSV (.csv), DIF (.dif), SYLK (.slk), Excel Add-In (.xlam), Excel 97-2003 Add-In (.xla), Strict Open XML Workbook (.xlsx), OpenDocument Spreadsheet (.ods), XML Data (.xml), Excel Binary Workbook (.xlsb)	Default (From Extension)	The format to save the document as
Document path	No	File		The full path to save the document as

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Failed to save Excel document	Indicates a problem saving the Excel document

Write to Excel worksheet

Writes a value into a cell or a range of cells of an Excel instance

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Excel instance	No	Excel instance		The Excel instance to work with. This variable must have been previously specified in a Launch Excel action

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Value to write	No	General value		Enter the text, number or variable to insert. If the variable contains a table, it will fill in cells to the right and below writing over other cell data if need be and a list will fill in cells below
Write mode	N/A	On specified cell, On currently active cell	On specified cell	Whether to write into a specified cell or the currently active cell
Column	No	Text value		The column number or letter for the cell to write to
Row	No	Numeric value		The row of the cell to write to. The numbering starts from 1, meaning that the index of the fist worksheet is 1, of the second is 2 etc.

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Failed to write value to Excel	Indicates a problem writing the specified value to the Excel instance

Close Excel

Closes an Excel instance

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Excel instance	No	Excel instance		The Excel instance to close. This variable must have been previously specified in a Launch Excel action
Before closing Excel	N/A	Do not save document, Save document, Save document as	Do not save document	Whether and how to save the document of this instance before closing that instance

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Document format	N/A	Default (From Extension), Excel Workbook (.xlsx), Excel Workbook Macro Enabled (.xlsm), Excel 97-2003 Workbook (.xls), Web Page (.htm, .html), Excel Template (.xltx), Excel Template Macro Enabled (.xltm), Excel 97-2003 Template (.xlt), Text (.txt), Unicode Text (.txt), Text Macintosh (.txt), Text DOS (.txt), XML Spreadsheet (.xml), Excel 95 (.xls), CSV (.csv), DIF (.dif), SYLK (.slk), Excel Add-In (.xlam), Excel 97-2003 Add-In (.xla), Strict Open XML Workbook (.xlsx), OpenDocument Spreadsheet (.ods), XML Data (.xml), Excel Binary Workbook (.xlsb)	Default (From Extension)	The format of the document
Document path	No	File		The full path of the document

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Failed to save Excel document	Indicates a problem saving the Excel document
Failed to close Excel instance	Indicates a problem closing the Excel instance

Set active Excel worksheet

Activates a specific worksheet of an Excel instance

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Excel instance	No	Excel instance		Specify the Excel instance. This variable must have been previously specified in a Launch Excel action

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Activate worksheet with	N/A	Index, Name	Name	Specify whether to find the worksheet by name or index
Worksheet index	No	Numeric value		The index number of the worksheet to activate. The numbering starts from 1, meaning that the index of the fist worksheet is 1, of the second is 2, etc.
Worksheet name	No	Text value		The name of the worksheet to activate

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Can't find worksheet	Indicates that a worksheet with the specified name could not be found
Failed to activate worksheet	Indicates a problem activating the specified worksheet

Add new worksheet

Adds a new worksheet to the document of an Excel instance

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Excel instance	No	Excel instance		Specify the Excel instance. This variable must have been previously specified in a Launch Excel action
New worksheet name	No	Text value		Specify the name of the new worksheet
Add worksheet as	N/A	First worksheet, Last worksheet	First worksheet	Specify whether the new Excel worksheet will be added before or after the existing worksheets

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
A worksheet with the same name already exists	Indicates that the worksheet could not be added because a worksheet with the same name already exists
Failed to add worksheet	Indicates a problem adding the worksheet

Get first free column/row from Excel worksheet

Retrieves the first free column and/or row of the active worksheet. This is useful for adding new data into a worksheet that already has data in it

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Excel instance	No	Excel instance		Specify The Excel instance. This variable must have been previously specified in a Launch Excel action

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
FirstFreeColumn	Numeric value	The numeric value of the first fully empty column. For example, if column F is the first empty column, it will be stored as '6'
FirstFreeRow	Numeric value	The numeric value of the first fully empty row. For example, if row 7 is the first empty row, it will be stored as '7'

Exceptions

EXCEPTION	DESCRIPTION
Failed to retrieve first free column/row	Indicates a problem retrieving the first free column/row of an Excel instance

Get column name on Excel worksheet

Gets the name of the column

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Column number	No	Numeric value		The column number

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
ColumnName	Text value	The name of the column

Exceptions

- This action doesn't include any exceptions

Database

1/15/2022 • 2 minutes to read • Edit Online

Connect to databases and execute SQL statements

Open SQL connection
Execute SQL statement
Close SQL connection

Getting started with database actions

To connect to a database, use the **Open SQL connection** action. The **Connection string** field specifies all information that is necessary to connect to a database, such as the driver, the database, server names, and the username and password.

Connect to an Excel Database:

Example of a connection string used to connect to an Excel database connection string that one can use is:

```
Provider=Microsoft.ACE.OLEDB.12.0;Data Source=C:\myFolder\myExcelFile.xlsx;Extended Properties="Excel 12.0
Xml;HDR=YES";
```

Example of a connection string used to connect to an Access database:

```
Provider=Microsoft.ACE.OLEDB.12.0;Data Source=C:\myFolder\myAccessFile.accdb; Persist Security Info=False;
```

To manually build a connection string, select **Build connections string** to open the **Data Link Properties** window. The data link tool helps the user compose the required connection string step by step.

> **NOTE**
>
> Power Automate for desktop is a 64-bit application, only 64-bit installed drivers will be available for selection in the **Open SQL connection** action.

Database actions

Open SQL connection

Open a new connection to a database

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Connection string	No	Text value		The connection string to use to connect to the database

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
SQLConnection	SQL connection	A handle for the new SQL connection

Exceptions

EXCEPTION	DESCRIPTION
Can't connect to data source	Indicates a problem connecting to the data source
Invalid connection string	Indicates that the specified connection string is invalid

Execute SQL statement

Connect to a database and execute a SQL statement

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Get connection by	N/A	Connection string, SQL connection variable	SQL connection variable	Specifies whether to create a new connection from a given connection string or select an already open connection
SQL connection	No	SQL connection		The handle for the new SQL connection
Connection string	No	Text value		The connection string to use to connect to the database
SQL statement	No	Text value		The SQL statement to execute to the database
Timeout	Yes	Numeric value	30	The maximum amount of time to wait for a result from the database

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
QueryResult	Datatable	The result from the database in the form of a data table, with rows and columns

Exceptions

EXCEPTION	DESCRIPTION
Can't connect to data source	Indicates a problem connecting to the data source
Invalid connection string	Indicates that the specified connection string is invalid
Error in SQL statement	Indicates there is an error in the given SQL statement

Close SQL connection

Close an open connection to a database

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
SQL connection	No	SQL connection		The handle for the new SQL connection

Variables Produced

- This action doesn't produce any variables

Exceptions

- This action doesn't include any exceptions

Configuring the connection string

SQL actions require a database connection. To connect to a database, enter the string manually or as a variable. When the action connects to a database, it stores the connection into a SQL connection variable.

1. Select **Build connections string** to open the **Data Link Properties** window. The data link tool helps the user compose the required connection string step by step.

2. Once you access the wizard, select the correct driver for the database under the **Provider** tab.

3. Next, under the **Connection** tab, enter the remaining details such as the server name, the username, password, and database name. Select the **Test Connection** button to test that the connection string connects to a database successfully. Alternatively, copy a ready-made connection string.

4. Specify a connection timeout and additional network settings in the **Advanced** tab.

Email

1/15/2022 • 6 minutes to read • Edit Online

Automate sending, receiving and managing emails through imap/smtp

Retrieve email messages

Process email messages

Send email

Getting started with email actions

Before deploying any email action, you have to configure the server that will handle the respective request. The **Retrieve email messages** and **Process email messages** actions require an IMAP server, while the **Send email** action requires an SMTP server.

To retrieve emails that meet specific criteria from your mailbox, use the **Retrieve email messages** action. In the example below, the filter has been configured to retrieve only unread messages from the inbox. The filter further specifies that the email should be from b.friday, the subject contains the word "Report" and the body contains "Tuesday". Attachments from any retrieved emails which match these criteria will be saved locally.

Manage your email messages with the **Process email messages** action. Using the variable created by the Retrieve e-mail messages action, select whether you would like to move, delete, or mark email messages as read/unread.

The **Send email** action in the figure below has been configured to send an e-mail from N. Varga to B. Friday, with invoicing in the BCC field. The subject and body contain the **%ReportID%** variable, and the attachment is a file which has been processed by the flow.

Email actions

Retrieve email messages

Retrieves email messages from an IMAP server

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
IMAP server	No	Text value		The IMAP server address (e.g. imap.gmail.com)
Port	Yes	Numeric value	993	The port to use for the IMAP server. Usually this is port 993

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Enable SSL	N/A	Boolean value	True	Specify whether to use a secure connection to communicate with the IMAP Server
User name	No	Text value		The username of the email account to access
Password	No	Encrypted value		The password of the email account to access
Accept untrusted certificates	N/A	Boolean value	False	Specify whether untrusted certificates will be accepted
Mail folder	No	Text value		The name of the IMAP mail-folder (also known as 'mailBox') to retrieve messages from
Retrieve	N/A	All email messages, Unread email messages only, Read email messages only	All email messages	Specify whether to retrieve all messages in the folder or only the unread ones
Mark As read	N/A	Boolean value	True	Specify whether to mark as read the retrieved messages or leave them as is
"From" field contains	Yes	Text value		The full email address of the sender whose messages will be retrieved. Leave this attribute blank to retrieve all messages regardless of the sender
"To" field contains	Yes	Text value		The full email address(es) of the recipient(s) (separated by space if more than one) for the messages that will be retrieved. Leave this attribute blank to retrieve all messages regardless of the recipient(s)

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
"Subject" contains	Yes	Text value		The key phrase to find within the email subject. Leave this attribute blank to retrieve all emails regardless of their subject
'Body' contains	Yes	Text value		The key phrase to find within the email body. Leave this attribute blank to retrieve all emails regardless of their content
Save attachments	N/A	Save attachments, Do not save attachments	Do not save attachments	Specify whether to save the attachments of the emails retrieved or not
Save attachments into	No	Folder		The folder to save the attachments

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
RetrievedEmails	List of Mail Messages	The retrieved emails for later processing as a list of mail message objects

Exceptions

EXCEPTION	DESCRIPTION
Failed to connect to IMAP server	Indicates that there was a problem connecting to the IMAP server
Failed to authenticate to the IMAP server	Indicates a problem authenticating to the specified IMAP server
Specified mail-folder doesn't exist	Indicates that the specified mail folder wasn't found
Failed to save attachments	Indicates a problem saving the attachments
Failed to retrieve emails	Indicates a problem retrieving the emails

Process email messages

Moves, deletes or marks as unread an email (or a list of emails) retrieved by a Retrieve emails action

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
IMAP server	No	Text value		The IMAP server address (e.g. imap.gmail.com)
Port	Yes	Numeric value	993	The port to use for the IMAP server. Usually this is port 993
Enable SSL	N/A	Boolean value	True	Specify whether to use a secure connection to communicate with the IMAP server
Username	No	Text value		The username of the email account to access
Password	No	Encrypted value		The password of the email account to access
Accept Untrusted Certificates	N/A	Boolean value	False	Specify whether untrusted certificates will be accepted
Email(s) to process	No	List of Mail Messages		The email or list of emails to process. This should be a variable populated by a Retrieve emails action
Operation	N/A	Delete emails from server, Mark emails as unread, Move emails to mail folder, Mark emails as unread and move to mail folder	Move emails to mail folder	The operation you want to perform on the specified email messages
Mail folder	No	Text value		The name of the mail folder to which the emails will be moved

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Failed to connect to IMAP server	Indicates that there was a problem connecting to the IMAP server
Specified mail-folder doesn't exist	Indicates that the specified mail folder wasn't found

EXCEPTION	DESCRIPTION
Failed to process emails	Indicates a problem with processing the specified emails

Send email

Creates and sends a new email message

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
SMTP server	No	Text value		The SMTP server address
Server port	Yes	Numeric value	25	The port to use for the server. Usually this is port 25
Enable SSL	N/A	Boolean value	False	Specify whether or not to communicate with the server through a secure connection
SMTP Server needs authentication	N/A	Boolean value	False	Specify whether the server requires authentication
User name	No	Text value		The username of the email account to access
Password	No	Encrypted value		The password of the email account to access
Accept untrusted certificates	N/A	Boolean value	False	Specify whether untrusted certificates will be accepted
From	No	Text value		The sender's email address
Sender display name	Yes	Text value		The sender's display name
To	No	Text value		The email(s) of the recipient(s). If more than one email is entered, the list of addresses should be separated by semi-colons

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
CC	Yes	Text value		The email(s) of the Cc recipient(s). If more than one email is entered, the list of addresses should be separated by semi-colons
BCC	Yes	Text value		The email(s) of the BCC (hidden) recipient(s). If more than one email is entered, the list of addresses should be separated by semi-colons
Subject	Yes	Text value		The subject of the email
Body	Yes	Text value		The body of the email
Body Is HTML	N/A	Boolean value	False	Specify whether the body of the email will be interpreted as HTML coding
Attachment(s)	Yes	List of Files		The full path of any attachment(s), or a file or a list of files. Multiple files should be enclosed in double quotes (") and separated by a space character

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Invalid email address	Indicates that the specified email address is invalid
Failed to send email	Indicates a problem sending the email
Attachment not found	Indicates that the specified attachment(s) were not found

Further details

Common IMAP ports:

- 143 (non-encrypted and TLS)
- 993 (secure IMAP)

Common IMAP servers:

- imap-mail.outlook.com (Outlook.com)
- outlook.office365.com (Office365.com)
- imap.mail.yahoo.com (Yahoo mail)
- imap.gmail.com (Google mail)

Common SMTP ports:

- 25 (non-encrypted)
- 587 (non-encrypted and TLS)
- 465 (SSL)

Common SMTP servers:

- smtp-mail.outlook.com (Outlook.com)
- smtp.office365.com (Office365.com)
- smtp.mail.yahoo.com (Yahoo mail)
- smtp.gmail.com (Google mail)

Exchange

1/15/2022 • 6 minutes to read • Edit Online

Automate sending, receiving, and managing emails through Exchange

Connect to Exchange server
Retrieve Exchange email messages
Send Exchange email message
Process Exchange email messages

Getting started with Exchange actions

The Exchange group of actions allows users to connect to an exchange server of their choice, and manage their correspondence.

Exchange actions require a connection to an Exchange server. Establish the connection by using the **Connect to Exchange server** action. In the following figure, the exchange server address has been entered manually, rather than using auto discovery. The credetials are set to user defined, so the domain, username and password are entered manually as well. In the **Advanced** section, a timeout has been set. This allows the action to return an error if a connection hasn't been established within the specified time frame.

To retrieve emails from the exchange server, use the **Retrieve Exchange email messages** action. In the figure below, the action has been set to retrieve email messages from a custom folder, Receipts. In the filters, the from, subject and body fields have been set to contain values of variables which have been previously defined in the flow. Attachments from resulting email messages will also be saved to the specified folder.

The **Process Exchange email messages** action processes email messages retrieved by the **Retrieve Exchange email messages** action. The required input is the Exchange connection and the retrieved emails variable. Use this action to move, delete or mark email messages as read.

Exchange actions

Connect to Exchange server

Open a new connection to an Exchange server

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Exchange server version	N/A	Exchange 2010, Exchange 2010 SP1, Exchange 2010 SP2, Exchange 2013, Exchange 2013 SP1	Exchange 2013 SP1	The version of the Exchange server

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Connection type	N/A	Auto discovery, Exchange server address	Auto discovery	Specifies how to connect to the Exchange server
Server address	No	Text value		The Exchange server address
Email address	No	Text value		The Exchange account email address
Credentials	N/A	Exchange default, User defined	Exchange default	Specifies the way to provide the user's Exchange credentials
Domain	Yes	Text value		The Exchange account domain. To extract the account domain from the username, left this field empty
Username	No	Text value		The Exchange account username
Password	No	Encrypted value		The Exchange account password
Timeout	Yes	Numeric value	30	The time in seconds to wait for the connection to be established before the action fails

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
ExchangeConnection	Exchange connection	The specific Exchange connection for use with later Exchange actions

Exceptions

EXCEPTION	DESCRIPTION
Failed to connect to the Exchange server	Indicates a problem connecting to the Exchange server

Retrieve Exchange email messages

Retrieve email messages from the specified Exchange server

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Exchange connection	No	Exchange connection		The Exchange connection. Create an Exchange connection with the 'Connect to Exchange server' action
Mailbox type	N/A	Personal, Shared	Personal	The type of the mailbox to retrieve email messages from
Shared mailbox address	No	Text value		The address of the shared mailbox to retrieve email messages from
Retrieve email messages from custom folder	N/A	Boolean value	False	Specifies whether to retrieve email messages from a custom folder or a predefined Exchange folder
Exchange folder	N/A	Inbox, Deleted items, Drafts, Outbox, Sent items, Junk email	Inbox	A predefined Exchange folder to retrieve email messages from
Mail folder	Yes	Text value	Inbox	The name or path (e.g. folder1\folder2) of the mail-folder to retrieve email messages from
Retrieve	N/A	All email messages, Unread email messages only, Read email messages only	Unread email messages only	Specifies whether to retrieve all email messages in the folder or only the unread ones
Mark as read	N/A	Boolean value	True	Specifies whether to mark as read the retrieved email messages or leave them as is
From contains	Yes	Text value		The full email address of the sender to retrieve messages from. Leave this attribute blank to retrieve all messages regardless of the sender

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
To contains	Yes	Text value		The full email address(es) of the recipient(s) (separated by space if more than one) for the email messages to retrieve. Leave this attribute blank to retrieve all email messages regardless of the recipient(s)
Subject contains	Yes	Text value		The key phrase to find within the email subject. Leave this attribute blank to retrieve all email messages regardless of their subject
Body contains	Yes	Text value		The key phrase to find within the email body. Leave this attribute blank to retrieve all email messages regardless of their content
Attachments	N/A	Save attachments, Do not save attachments	Do not save attachments	Specifies whether to save the attachments of the email messages retrieved or not
Save attachments into	No	Folder		The folder to save the attachments into

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
RetrievedEmails	List of Exchange mail messages	The retrieved email messages for later processing as a list of Exchange mail messages objects

Exceptions

EXCEPTION	DESCRIPTION
Failed to save attachments	Indicates a problem saving the attachments
Specified mail-folder doesn't exist	Indicates that the specified mail folder doesn't exist
Failed to retrieve email messages	Indicates a problem retrieving the email messages

Send Exchange email message

Create and send a new email message

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Exchange connection	No	Exchange connection		The Exchange connection. Create an Exchange connection with the 'Connect to Exchange server' action
From	No	Text value		The sender's email address
Sender display name	Yes	Text value		The sender's display name
To	No	Text value		The email(s) of the recipient(s). To enter more than one email, separate the list of addresses by semi-colons
CC	Yes	Text value		The email(s) of the CC recipient(s). To enter more than one email, separate the list of addresses by semi-colons
BCC	Yes	Text value		The email(s) of the BCC (hidden) recipient(s). To enter more than one email, separate the list of addresses by semi-colons
Subject	Yes	Text value		The subject of the email
Body	Yes	Text value		The text of the body
Body is HTML	N/A	Boolean value	False	Specifies whether to interpret the body of the email as HTML coding
Attachment(s)	Yes	List of Files		The full path of any attachment(s). Enclose multiple files in double quotes (") and separate them by a space character

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Attachment not found	Indicates that the specified attachment(s) don't exist
Failed to send email	Indicates a problem sending the email

Process Exchange email messages

Move, delete or mark as unread an email message (or a list of email messages)

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Exchange connection	No	Exchange connection		The Exchange connection. Create an Exchange connection with the 'Connect to Exchange server' action
Email message(s) to process	No	List of Exchange mail messages		The email message(s) to process. Use a variable populated by a 'Retrieve Exchange email messages' action
Operation	N/A	Delete email messages from server, Mark email messages as unread, Move email messages to mail folder	Move email messages to mail folder	Specifies which operation to perform on the specified email messages
Mailbox type	N/A	Personal, Shared	Personal	The type of the mailbox to retrieve email messages from
Shared mailbox address	No	Text value		The address of the shared mailbox to retrieve email messages from
Move to custom folder	N/A	Boolean value	False	Specifies whether to move email messages to a custom folder or a predefined Exchange folder
Exchange folder	N/A	Inbox, Deleted items, Drafts, Outbox, Sent items, Junk email	Inbox	A predefined Exchange folder to move email messages from

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Mail folder	Yes	Text value	Inbox	The name or path (e.g. folder1\folder2) of the mail-folder to move email messages to

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Specified mail-folder doesn't exist	Indicates that the specified mail folder doesn't exist
Failed to process email messages	Indicates a problem processing the specified email messages

Outlook

1/15/2022 • 8 minutes to read • Edit Online

Automate sending, receiving, and managing emails of an Outlook account

Launch Outlook
Retrieve email messages from Outlook
Send email through Outlook
Process email messages in Outlook
Save Outlook email messages
Respond to Outlook mail message
Close Outlook

Getting started with Outlook actions

For PCs with an installation of Outlook, users can manage the mailboxes of their accounts with the Outlook group of actions.

After creating an Outlook instance with the **Launch Outlook** action, use the **Retrieve email messages from Outlook** action to get the messages from a specified account and mail folder. In the figure below, the action retrieves all the email messages from the folder **Tickets** which is in a subfolder of the Inbox. The filters have been configured to search for email messages from a specific address, further specifying the contents of the subject with a previously defined variable. Any attachments are also saved.

The **Process email messages in Outlook** action processes email messages retrieved by the **Retrieve email messages from Outlook** action. The Outlook instance, account, and retrieved emails variable are required to use this action. Select whether to Move, delete or mark as read as the operation to perform.

Store Outlook email messages locally by using the **Save Outlook email messages** action. Specify the Outlook instance, account, and messages to save via variables, as well as the format and location to save in.

To close the instance of Outlook opened with Power Automate, use the **Close Outlook** action.

Outlook actions

Launch Outlook

Launch Outlook and create a new Outlook instance

Input Parameters

- This action doesn't require any input

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
OutlookInstance	Outlook instance	The specific Outlook instance for use with later Outlook actions

Exceptions

EXCEPTION	DESCRIPTION
Failed to launch Outlook	Indicates a problem launching Outlook

Retrieve email messages from Outlook

Retrieve email messages from an Outlook account

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Outlook instance	No	Outlook instance		The Outlook instance to work with. Specify this variable in a 'Launch Outlook' action
Account	No	Text value		The name of the Outlook account (data file name) to work with
Mail folder	No	Text value		The name of the folder to retrieve messages from. Enter the full folder path for subfolders (ex: Inbox\Work)
Retrieve	N/A	All email messages, Unread email messages only, Read email messages only	All email messages	Specifies whether to retrieve all messages in the folder or only the unread ones
Mark as read	N/A	Boolean value	True	Specifies whether to mark as read all the unread messages retrieved
From contains	Yes	Text value		The full email address of the sender whose messages to retrieve. Leave this attribute blank to retrieve all messages regardless of the sender

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
To contains	Yes	Text value		The full email address(es) of the recipient(s) (separated by space or semicolon if more than one) for the messages to retrieve. Leave this attribute blank to retrieve all messages regardless of the recipient(s)
Subject contains	Yes	Text value		The key phrase to find within the email subject. Leave this attribute blank to retrieve all email messages regardless of their subject
Body contains	Yes	Text value		The key phrase to find within the email body. Leave this attribute blank to retrieve all email messages regardless of their content
Attachments	N/A	Save attachments, Do not save attachments	Do not save attachments	Specifies whether to save the attachments of the email messages retrieved or not
Save attachments into	No	Folder		The path to save the attachments of the retrieved emails into

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
RetrievedEmails	List of Outlook mail messages	The retrieved email messages for later processing. The variable contain a list of Outlook message objects

Exceptions

EXCEPTION	DESCRIPTION
Failed to find Outlook account	Indicates that the specified Outlook account doesn't exist
Mail-folder specified not valid in Outlook	Indicates that the specified mail folder isn't valid
Directory for saving attachments not found	Indicates that the directory to save the attachments into doesn't exist

EXCEPTION	DESCRIPTION
Failed to retrieve email messages from Outlook	Indicates a problem retrieving the email messages from Outlook

Send email through Outlook

Create and send a new email message through Outlook

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Outlook instance	No	Outlook instance		The Outlook instance to work with. Specify this variable in a 'Launch Outlook' action
Account	No	Text value		The name of the Outlook account (data file name) to work with
Send email from	N/A	Account, Other mailbox	Account	Specifies whether to send the email using the specified account or a different one, for example from a shared mailbox
Send from	No	Text value		The name of the Outlook account to send the email from; for example, a shared mailbox.
To	No	Text value		The email address(es) of the recipient(s). To enter more than one email address, separate the list of addresses by spaces or semicolons
CC	Yes	Text value		The email address(es) of the CC recipient(s). To enter more than one email address, separate the list of addresses by spaces or semicolons
BCC	Yes	Text value		The email address(es) of the BCC (hidden) recipient(s). To enter more than one email address, separate the list of addresses by spaces or semicolons

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Subject	Yes	Text value		The subject of the email
Body	Yes	Text value		The text of the body
Body is HTML	N/A	Boolean value	False	Specifies whether to interpret the body of the email as HTML coding
Attachment(s)	Yes	List of Files		The full path of any attachment(s). Enclose multiple files in double quotes (") and separate them by a space character

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Failed to find Outlook account	Indicates that the specified Outlook account doesn't exist
Failed to send email	Indicates a problem sending the email
Attachment not found	Indicates that the specified attachment(s) don't exist

Process email messages in Outlook

Move or deletes an email (or a list of email messages) retrieved by a 'Retrieve emails from Outlook' action.

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Outlook instance	No	Outlook instance		The Outlook instance to work with. Specify this variable in a 'Launch Outlook' action
Account	No	Text value		The name of the Outlook account (data file name) to work with
Email messages to process	No	List of Outlook mail messages		The email message(s) to process. Use a variable populated by a 'Retrieve email messages from Outlook' action

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Operation	N/A	Delete email messages, Move email messages to mail fodler, Mark as unread	Move email messages to mail fodler	Specifies which operation to perform on the specified email messages
Mail folder	No	Text value		The name of the folder to retrieve messages from. Enter the full folder path for subfolders (e.g., Inbox\Work)

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Failed to find Outlook account	Indicates that the specified Outlook account doesn't exist
Specified mail-folder doesn't exist	Indicates that the specified mail folder doesn't exist
Failed to process email messages in Outlook	Indicates a problem processing the specified email messages in Outlook

Save Outlook email messages

Save Outlook email messages given an account

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Outlook instance	No	Outlook instance		The Outlook instance to work with. Specify this variable in a 'Launch Outlook' action
Account	No	Text value		The name of the Outlook account (data file name) to work with
Email message(s) to save	No	List of Outlook mail messages		The email message(s) to save. Use a variable populated by a 'Retrieve email messages from Outlook' action

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Save format	N/A	Text only (*.txt), Outlook template (*.oft), Outlook message format (*.msg), Outlook message format - Unicode (*.msg), HTML (*.html), MHT files (*.mht)	Outlook message format (*.msg)	Specifies the format to save the messages
File name	N/A	Default, Custom	Default	Specifies whether to save the messages using the default name (subject) or provide another
Save as	No	Text value		Specifies the custom name for messages' name which differs from message to message by an automatically added suffix
Save email message(s) to	No	Folder		The folder to save the messages to

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
StoredMessagesFiles	List of Text values	The file paths of the saved email messages for later processing

Exceptions

EXCEPTION	DESCRIPTION
Failed to find Outlook account	Indicates that the specified Outlook account doesn't exist
Directory not found	Indicates that the specified email message(s) couldn't be saved because the directory doesn't exist
Email message is deleted or moved to another folder	Indicates that the specified email message(s) couldn't be saved because they are moved or deleted
Failed to save email message(s)	Indicates a problem saving the specified email message(s)

Respond to Outlook mail message

Respond to an Outlook message, by replying, replying to all or forwarding it

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Outlook instance	No	Outlook instance		The Outlook instance to work with. Specify this variable in a 'Launch Outlook' action
Account	No	Text value		The name of the Outlook account (data file name) to work with
Mail message	No	Outlook mail message		The mail message to act upon. Use a variable populated by a 'Retrieve email messages from Outlook' action
Response action	N/A	Reply, Reply all, Forward	Reply	Specifies whether to reply (to sender or all) with a message or forward the received message
To	No	Text value		The email address(es) of the recipient(s). To enter more than one email address, separate the list of addresses by spaces or semicolons
CC	Yes	Text value		The email address(es) of the CC recipient(s). To enter more than one email address, separate the list of addresses by spaces or semicolons
BCC	Yes	Text value		The email address(es) of the BCC (hidden) recipient(s). To enter more than one email address, separate the list of addresses by spaces or semicolons
Body	Yes	Text value		The text of the body
Attachment(s)	Yes	List of Files		The full path of any attachment(s). Enclose multiple files in double quotes (") and separate them by a space character

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Failed to find Outlook account	Indicates that the specified Outlook account doesn't exist
Failed to send email	Indicates a problem sending the email
Attachment not found	Indicates that the specified attachment(s) don't exist

Close Outlook

Close a previously launched Outlook instance

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Outlook instance	No	Outlook instance		The Outlook instance to work with. This variable is specified in a 'Launch Outlook' action

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Failed to close Outlook instance	Indicates a problem closing the Outlook instance

Message boxes

1/15/2022 • 8 minutes to read • Edit Online

Interact with users and request input through message boxes

Display message
Display input dialog
Display select date dialog
Display select from list dialog
Display select file dialog
Display select folder dialog

Getting started with message boxes

Message boxes can be used in flows to interact with a user to either request input, or to provide output of flow data.

To display a message to the user while the process runs, use the **Display message** action. In the figure below, this action will show a message box which informs the user that parsing is complete, and provide two options(**Yes/No**) whether to parse an additional file. The message box has been set to display the question icon, and to always be on top of other windows. The user's selection is stored in a variable.

The resulting message looks like the following figure:

To display a dialog for the user to input data, use the **Display input dialog** action. The action requires a title for the input dialog window and a message as a prompt for the user. Optionally set a default value, and an input type (single line, multiline or password).

Use the **Display select file dialog** to prompt a user to browse for a file. In the following figure, the action is set to prompt the user to select an image file. The initial folder has been set to a variable, and the file filter has been set to only allow specific file extensions.

The select file dialog looks like the following figure. Note the file filter in the bottom right of the figure which can switch between the formats specified in the action properties:

Message boxes actions

Display message

Displays a message box

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Message box title	Yes	Text value		The text to use as the message box title
Message to display	Yes	Text value		The text to display as the actual message
Message box icon	N/A	None, Information, Question, Warning, Error	None	The icon to display with the message box
Message box buttons	N/A	OK, OK - Cancel, Yes - No, Yes - No - Cancel, Abort - Retry - Ignore, Retry - Cancel	OK	The buttons to display on the message box
Default button	N/A	First button, Second button, Third button	First button	The button to highlight by default. If the user presses **Enter**, this button will be pressed
Keep message box always on top	N/A	Boolean value	False	Specify whether the message box should always remain on top of all other windows
Close message box automatically	N/A	Boolean value	False	Specify whether the message box closes automatically after a preset time, as if the default button was pressed. Otherwise, the flow will wait until a button is pressed by the user
Timeout	Yes	Numeric value	3	The seconds to pause the automation while waiting for input, until continuing automatically

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
ButtonPressed	Text value	The text of the button pressed

Exceptions

EXCEPTION	DESCRIPTION
Failed to display message box	Indicates a problem displaying the message dialog

EXCEPTION	DESCRIPTION
Can't display message box in non interactive mode	Indicates a problem displaying the message dialog in non-interactive mode

Display input dialog

Displays a dialog box that prompts the user to enter text

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Input dialog title	Yes	Text value		The dialog title
Input dialog message	Yes	Text value		The dialog message
Default value	Yes	Text value		Specify the text to display by default. If the user wishes to change this, they can type over it. Otherwise, the default text will be used
Input type	N/A	Single line, Password, Multiline	Single line	The format for the input text. Choose Single line - password to hide the text or multiline so that a larger display box makes visible more than one line of text
Keep input dialog always on top	N/A	Boolean value	False	Specify whether the input dialog should always remain on top of all other windows

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
UserInput	Text value	The text entered by the user, or the default text
ButtonPressed	Text value	The text of the button pressed. The user will automatically be given the choice of OK or Cancel

Exceptions

EXCEPTION	DESCRIPTION
Failed to display input dialog	Indicates a problem displaying the input dialog
Can't display input dialog in non interactive mode	Indicates a problem displaying the input dialog in non-interactive mode

Display select date dialog

Displays a dialog box that prompts the user to enter a date or date range

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Dialog title	Yes	Text value		The dialog title
Dialog message	Yes	Text value		The dialog message
Dialog type	N/A	Single date, Date range (2 Dates)	Single date	Whether the user will enter a single date or two dates as the endpoints of a range of dates
Prompt for	N/A	Date only, Date and time	Date only	Specify whether the user will enter the date only or the date and time
Default value	Yes	Datetime		The default value for the date
Default value for second date	Yes	Datetime		The default value for the end date in a range
Keep date selection dialog always on top	N/A	Boolean value	False	Specify whether the date selection dialog should always remain on top of all other windows

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
SelectedDate	Datetime	The date entered by the user or the default date
SecondSelectedDate	Datetime	The second date entered by the user or that default date
ButtonPressed	Text value	The text of the button pressed by the user. The user will automatically be given the choice of OK or Cancel

Exceptions

EXCEPTION	DESCRIPTION
Failed to display select date dialog	Indicates a problem displaying the select date dialog
Can't display select date dialog in non interactive mode	Indicates a problem displaying the input dialog in non-interactive mode

Display select from list dialog

Displays a dialog box with options that lets the user select from a list

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Dialog title	Yes	Text value		The dialog title
Dialog message	Yes	Text value		The dialog message
List to choose from	No	General value		The list to display as a drop-down menu for the user to choose from
Keep select dialog always on top	N/A	Boolean value	False	Specify whether the select dialog should always remain on top of all other windows
Limit to list	N/A	Boolean value	True	Whether to allow the user to enter their own answer outside of the list being displayed
Allow empty selection	N/A	Boolean value	False	Allow the user to not select anything, creating an empty selected item output
Allow multiple selection	N/A	Boolean value	False	Allow the user to select more than one choice. This means that the selected item and selected index variables will hold a list of items
Preselect items starting with a + sign	N/A	Boolean value	False	Specify whether the items with a prepended '+' sign will appear automatically preselected

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
SelectedItem	Text value	The item selected from the list as text
SelectedItems	List of Text values	The items selected from the list as a list of text
SelectedIndex	Numeric value	The index number of the item selected from the list. This allows the user to use the item number instead of the full text of the user's choice

ARGUMENT	TYPE	DESCRIPTION
SelectedIndexes	List of Numeric values	The index number of the items selected from the list. This allows the user to use the item number instead of the full text of the user's choice
ButtonPressed	Text value	The name of the button pressed by the user (OK or Cancel)

Exceptions

EXCEPTION	DESCRIPTION
Failed to display select dialog	Indicates a problem displaying the select dialog
Can't display select dialog in non interactive mode	Indicates a problem displaying the input dialog in non-interactive mode

Display select file dialog

Displays the select file dialog and prompts the user to select one or more files

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Dialog title	Yes	Text value		The dialog title
Initial folder	Yes	Folder		The initial folder to open when browsing for a file. This is where the select file dialog action will start the user looking for the file(s)
File filter	Yes	Text value		A filter to limit the files retrieved. This allows wild cards, for example *".txt" or "document?.doc" (without the quotes). To allow the user to choose from multiple file filters, separate the choices with a semi-colon, for example* ".txt;*.exe"
Keep file selection dialog always on top	N/A	Boolean value	False	Whether the file selection dialog should always remain on top of all other windows
Allow multiple selection	N/A	Boolean value	False	Whether the user will be able to select more than one file or not

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Check if file exists	N/A	Boolean value	False	Whether only files that already exist will be accepted

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
SelectedFile	File	The file that will be selected through the dialog
SelectedFiles	List of Files	The file(s) selected
ButtonPressed	Text value	The text of the button pressed. The user will automatically be given the choice of Open or Cancel

Exceptions

EXCEPTION	DESCRIPTION
Failed to display select file dialog	Indicates a problem displaying the select file dialog
Can't display select file dialog in non interactive mode	Indicates a problem displaying the input dialog in non-interactive mode

Display select folder dialog

Displays the select folder dialog and prompts the user to select a folder

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Dialog description	Yes	Text value		The description of the select folder dialog For example, "Please select the folder into which you wish to copy the files"
Initial folder	Yes	Folder		The initial folder to open. This will be the default folder unless the user picks a new one
Keep folder selection dialog always on top	N/A	Boolean value	False	Whether the folder selection dialog should always remain on top of all other windows

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
SelectedFolder	Folder	The selected folder
ButtonPressed	Text value	The text of the button pressed. The user will automatically be given the choice of OK or Cancel

Exceptions

EXCEPTION	DESCRIPTION
Failed to display select folder dialog	Indicates a problem displaying the select folder dialog
Can't display select folder dialog in non interactive mode	Indicates a problem displaying the input dialog in non-interactive mode

Mouse and keyboard

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Take control of the mouse and keyboard

Block Input
Get mouse position
Move mouse
Move mouse to image
Move mouse to text on screen (OCR)
Send mouse click
Send keys
Press/release key
Set key state
Wait for mouse
Get keyboard identifier
Wait for shortcut key

Getting started with mouse and keyboard actions

Simulate using the keyboard to enter text or other key commands with the **Send Keys** action. Use the **Insert special key** button to insert keys such as the arrow keys, Caps Lock or keys from the numeric keypad, and Insert modifier to send keys such as Shift and Control. In the example below, a signature is added to an email message, starting with two line breaks. At the end of the text, the action sends the Ctrl+A and Ctrl+C commands, to select all and copy, to use the contents of the entire email text from the clipboard in a subsequent action.

NOTE

To use a key as a modifier, use the curly brackets notation for both keys: e.g. for Ctrl + A, use {Control}({A})

To simulate moving the mouse, use the **Move mouse** action. In the following example, the mouse has been set to move to specific coordinates by moving the pointer there manually, and pressing Control+Shift to set its current coordinates for Position X & Y. The movement speed has been set to normal.

Move the mouse to a specific image on the screen with the **Move mouse to image** action. In the figure below, the mouse is set to move to the first occurence of the search icon from the captured images, and to left click.

In the **Advanced** section, the action has been set to wait 30 seconds for the image to appear in the foreground window, and the mouse position has to be in the center of the image.

Mouse and keyboard actions

Block Input

Blocks user mouse and keyboard input, so that the flow can perform mouse and keyboard actions without interference from the user

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Block it	N/A	Boolean value	True	Specify whether to block or unblock mouse and keyboard input

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Can't block/unblock user input in non interactive mode	Indicates a problem blocking/unblocking input in non-interactive mode
Failed to block/unblock input	Indicates a problem blocking/unblocking input

Get mouse position

Retrieves the current position of the mouse cursor on the screen in pixel coordinates

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Relative to	N/A	Screen, Foreground window	Screen	Specify whether to retrieve the mouse position in screen coordinates or relative to the top left corner of the active window

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
MousePosX	Numeric value	The horizontal (X) value of the mouse position
MousePosY	Numeric value	The vertical (Y) value of the mouse position

Exceptions

EXCEPTION	DESCRIPTION
Can't retrieve the mouse position in non interactive mode	Indicates a problem retrieving the mouse cursor position in non-interactive mode

Move mouse

Moves the mouse to a specific position

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Position X	No	Numeric value		The horizontal (X) value of the position to send the mouse to
Position Y	No	Numeric value		The vertical (Y) value of the position to send the mouse to

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Relative to	N/A	Screen, Active window, Current mouse position	Screen	Specify whether the new mouse position will be relative to the top left corner of the screen, the foremost window, or the current mouse position
Move mouse from previous position	N/A	Instant, With animation (low speed), With animation (normal speed), With animation (high speed)	Instant	Specify how to move the mouse

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Can't move mouse in non interactive mode	Indicates a problem moving the mouse in non-interactive mode
Failed to move mouse	Indicates a problem moving the mouse

Move mouse to image

Moves the mouse over an image found on screen or on the foreground window

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Image to move mouse to	No	List of Image		The list of Images to move the mouse to
Search for image on	N/A	Entire screen, Foreground window only	Entire screen	Specify whether to search for the specified Image in the foremost window only, or the entire visible screen. Neither choice will find the image if it isn't clearly visible on the screen
Search mode	N/A	Search whole screen or foreground window, Search on specified subregion of screen or foreground window	Search whole screen or foreground window	Specify whether to scan the entire screen (or window) to find the supplied image or only a subregion of it

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
X1	Yes	Numeric value		The starting X of the subregion to search in
Y1	Yes	Numeric value		The starting Y of the subregion to search in
X2	Yes	Numeric value		The ending X of the subregion to search in
Y2	Yes	Numeric value		The ending Y of the subregion to search in
Mouse position relative to image	N/A	top left corner, top center, top right corner, middle left part, center, middle right part, bottom left corner, bottom center, bottom right corner	center	The section of the image the mouse will be moved to
Offset X	Yes	Text value	0	The pixels to offset the mouse from the position to the right
Offset Y	Yes	Text value	0	The pixels to offset the mouse from the position down
Tolerance	Yes	Numeric value	10	Specify how much the specified image can differ from the originally chosen image
Mouse movement style	N/A	Instant, With animation (low speed), With animation (normal speed), With animation (high speed)	Instant	Specify the style of movement in which the mouse will move from its previous position to the beginning of the recorded route (or to its final position)
Occurence	Yes	Numeric value	1	The occurence of the image found to move the mouse to
Fail timeout	Yes	Numeric value	0	The fail timeout in seconds

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Send a click after moving mouse	N/A	Boolean value	False	Specify whether to send a click after the mouse is positioned over the image
Click type	N/A	Left click, Right click, Double click, Middle click, Left button down, Left button up, Right button down, Right button up	Left click	The mouse click to send to the image
Seconds before click	Yes	Numeric value	0	The number of seconds to wait before sending the click

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
X	Numeric value	The X coordinate of the point where the image is found on the screen. If the image is being searched for on the foreground window, the coordinate returned is relative to the top left corner of the window
Y	Numeric value	The Y coordinate of the point where the image is found on the screen. If the image is being searched for on the foreground window, the coordinate returned is relative to the top left corner of the window

Exceptions

EXCEPTION	DESCRIPTION
Image not found on screen	Indicates that the speicifed image wasn't found on the screen
Can't move mouse in non interactive mode	Indicates a problem moving the mouse in non-interactive mode
Failed to move mouse	Indicates a problem moving the mouse
Invalid subregion coordinates	Indicates that the coordinates of the given subregion were invalid
Not enough Image occurences found on screen	Indicates that not enough occurences of the specified Image were found on the screen

Move mouse to text on screen (OCR)

Moves the mouse over a text found on the screen or on the foreground window using OCR

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
OCR engine type	No	OCR engine variable, Tesseract engine	OCR engine variable	The OCR engine type to use. Select a peconfigured OCR engine or set up a new one.
OCR engine variable	No	OCREngineObject		The OCR engine to search for the text with
Text to find	No	Text value		The text to move the mouse over
Is regular expression	N/A	Boolean value	False	Whether to use a regular expression to look for the text on screen
Occurence	Yes	Numeric value	1	A positive number that will be used as the occurence of the input text on screen
Search for text on	N/A	Entire screen, Foreground window only	Entire screen	Whether to look for the specified text in the foremost window only or the entire visible screen. Neither choice will find the text if it isn't clearly visible on the screen
Search mode	N/A	Whole of specified source, Specific subregion only, Subregion relative to image	Whole of specified source	Whether to scan the entire screen (or window) to find the supplied text or only a narrows down subregion of it
Image(s)	No	List of Image		The image(s) specifying the subregion (relative to the top left corner of the image) to scan for the supplied text
X1	Yes	Numeric value		The start X coordinate of the subregion to scan for the supplied text

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Tolerance	Yes	Numeric value	10	Specify how much the image(s) searched for can differ from the originally chosen image
Y1	Yes	Numeric value		The start Y coordinate of the subregion to scan for the supplied text
X1	Yes	Numeric value		The start X coordinate of the subregion relative to the specified image to scan for the supplied text
X2	Yes	Numeric value		The end X coordinate of the subregion to scan for the supplied text
Y1	Yes	Numeric value		The start Y coordinate of the subregion relative to the specified image to scan for the supplied text
Y2	Yes	Numeric value		The end Y coordinate of the subregion to scan for the supplied text
X2	Yes	Numeric value		The end X coordinate of the subregion relative to the specified image to scan for the supplied text
Y2	Yes	Numeric value		The end Y coordinate of the subregion relative to the specified image to scan for the supplied text
Move mouse from previous position	N/A	Instant, With animation (low speed), With animation (normal speed), With animation (high speed)	Instant	The style of movement in which the mouse will move from its previous position to its final position

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Windows OCR language	N/A	Chinese (Simplified), Chinese (Traditional), Czech, Danish, Dutch, English, Finnish, French, German, Greek, Hungarian, Italian, Japanese, Korean, Norwegian, Polish, Portuguese, Romanian, Russian, Serbian (Cyrillic), Serbian (Latin), Slovak, Spanish, Swedish, Turkish	English	The language of the text that the Windows OCR engine detects
Use other language	N/A	Boolean value	False	Specifies whether to use a language not given in the 'Tesseract language' field
Tesseract language	N/A	English, German, Spanish, French, Italian	English	The language of the text that the Tesseract engine detects
Language abbreviation	No	Text value		The Tesseract abbreviation of the language to use. For example, if the data is 'eng.traineddata', set this to 'eng'
Language data path	No	Text value		The path of the folder that holds the specified language's Tesseract data
Image width multiplier	No	Numeric value	1	The width multiplier of the image
Image height multiplier	No	Numeric value	1	The height multiplier of the image
Wait for text to appear	N/A	Boolean value	False	Specify whether to wait if the text isn't found on the screen or foreground window
Fail if text doesn't appear within	Yes	Numeric value	10	The number of seconds to wait for the supplied text to appear

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Send a click after moving mouse	N/A	Boolean value	False	Specify whether to send a click after the mouse is positioned over the text
Click type	N/A	Left click, Right click, Double click, Middle click, Left button down, Left button up, Right button down, Right button up	Left click	The mouse click type to send to the text
Wait before clicking for	Yes	Numeric value	1	The number of seconds to wait before clicking
Mouse position relative to text	N/A	Top left, Top center, Top right, Middle left, Middle center, Middle right, Bottom left, Bottom center, Bottom right	Middle center	Specify which section of the text the mouse will be moved to
Offset X	Yes	Text value	0	Offset the mouse from the position by this many pixels to the right
Offset Y	Yes	Text value	0	Offset the mouse from the position by this many pixels down

NOTE

Power Automate's regular expression engine is .NET. You can find more information in Regular Expression Language - Quick Reference.

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
LocationOfTextFoundX	Numeric value	The X coordinate of the point where the text is found on the screen. If the text is searched for in the foreground window, this is relative to the top left corner of the window
LocationOfTextFoundY	Numeric value	The Y coordinate of the point where the text is found on the screen. If the text is searched for in the foreground window this is relative to the top left corner of the window

ARGUMENT	TYPE	DESCRIPTION
WidthOfTextFound	Numeric value	The width of the area the text was found on
HeightOfTextFound	Numeric value	The width of the area the text was found on

Exceptions

EXCEPTION	DESCRIPTION
Text not found on screen	Indicates that the specified text couldn't be found on the screen
Can't move mouse in non interactive mode	Indicates a problem moving the mouse in non-interactive mode
Failed to move mouse	Indicates a problem moving the mouse
Invalid subregion coordinates	Indicates that the coordinates of the given subregion were invalid
Failed to create the OCR engine	Indicates an error occurred while trying to create the OCR engine
Data path folder doesn't exist	Indicates that the folder specified for the language data doesn't exist
The selected Windows language pack isn't installed on the machine	Indicates that the selected Windows language pack hasn't been installed on the machine
OCR engine isn't alive	Indicates that the OCR engine isn't alive

Send mouse click

Sends a mouse click event

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Mouse event to send	N/A	Left click, Right click, Double click, Middle click, Left button down, Left button up, Right button down, Right button up	Left click	Specify what form of mouse event to send
Wait	Yes	Numeric value	0	The time to delay before sending the mouse event in 1/1000 of a second
Move mouse	N/A	Boolean value	False	Move mouse

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
X	No	Numeric value		The horizontal (X) position of the mouse in pixel coordinates
Y	No	Numeric value		The vertical (Y) position of the mouse in pixel coordinates
Relative to	N/A	Screen, Active window, Current mouse position	Screen	Specify whether the new mouse position will be relative to the top left corner of the screen, the foremost window, or the current mouse position
Mouse movement style	N/A	Instant, With animation (low speed), With animation (normal speed), With animation (high speed)	Instant	The style of movement in which the mouse will move from its previous position to the beginning of the recorded route (or to its final position)

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Can't send mouse click in non interactive mode	Indicates a problem sending a mouse click in non-interactive mode
Mouse click out of screen bounds	Indicates that the mouse click was out of the screen bounds
Failed to send mouse click	Indicates a problem sending a mouse click

Send keys

Sends keys to the application that is currently active

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Send keys to	N/A	Foreground window, By UI element, By window instance/handle, By title and/or class	Foreground window	Specify whether to send the keys to the foreground window or to a UI element or to a window instance or a combination of window title/class

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Text to send	No	Encrypted value		The text to send to the application
Delay between keystrokes	Yes	Numeric value	10	Specify the delay in milliseconds between sending keystrokes to avoid input errors
Send Text as hardware keys	N/A	Boolean value	False	Emulate the actual keystrokes on keyboard when sending whole Text

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Can't send keystrokes in non interactive mode	Indicates a problem sending keystrokes in non-interactive mode
Text to send doesn't represent valid keystrokes	Indicates that the text given doesn't represent valid keystrokes
There isn't an active application to send keystrokes to	Indicates that there isn't an active application to send keystrokes to
Failed to send keystrokes	Indicates a problem sending keystrokes

NOTE

To simulate a physical key being pressed inside a Send Keys action, use the curly brackets **{}** notation. (e.g. To press Enter use **{Enter}**). To use a key as a modifier, use the curly brackets **{}** notation two both keys. (e.g. To press Ctrl + A use **{Control}({A})**). The Send Keys action accepts the Virtual-Key Codes

Valid keys

CATEGORY	KEYS
Buttons	LButton, RButton, Cancel, MButton, XButton1, XButton2
Keyboard Control	Back, Tab, LineFeed, Clear, Enter, Return, ShiftKey, ControlKey,Menu, Pause, CapsLock, Capital, Escape, Space, Prior, PageUp, PageDown, Next, End, Home, Left, Up, Right, Down, Select, Print, Execute, Snapshot, PrintScreen, Insert, Delete, Help
Buttons	HangulMode, HanguelMode, KanaMode, JunjaMode, FinalMode, KanjiMode, HanjaMode
IME keys	IMEConvert, IMENonconvert, IMEAccept, IMEAceept, IMEModeChange

CATEGORY	KEYS
Browser keys	BrowserSearch, BrowserFavorites, BrowserHome
Volume keys	VolumeMute, VolumeDown, VolumeUp
Media keys	MediaNextTrack, MediaPreviousTrack, MediaStop, MediaPlayPause
Buttons	LaunchMail, SelectMedia, LaunchApplication1, LaunchApplication2
OEM keys	OemSemicolon, Oem1, Oemplus, Oemcomma, OemMinus, OemPeriod, Oem2, OemQuestion, Oem3, Oemtilde, Oem4, OemOpenBrackets, OemPipe, Oem5, OemCloseBrackets, Oem6, OemQuotes, Oem7, Oem8, Oem102, OemBackslash, OemClear
Buttons	ProcessKey, Packet, Attn, Crsel, Exsel, EraseEof, Play, Zoom, NoName, Pa1
Buttons	KeyCodem, Shift, Control, Alt, Modifiers
D keys	D0, D1, D2, D3, D4, D5, D6, D7, D8, D9
Letters	A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y, Z
Windows keys	LWin, RWin, Apps, Sleep
NumPad keys	NumPad0, NumPad1, NumPad2, NumPad3, NumPad4, NumPad5, NumPad6, NumPad7, NumPad8, NumPad9
Calculation keys	Multiply, Add, Separator, Subtract, Decimal, Divide
Function keys	F1, F2, F3, F4, F5, F6, F7, F8, F9, F10, F11, F12, F13, F14, F15, F16, F17, F18, F19, F20, F21, F22, F23, F24
Buttons	NumLock, Scroll, LShiftKey, RShiftKey, LControlKey, RControlKey, LMenu, RMenu, BrowserBack, BrowserForward, BrowserRefresh, BrowserStop

Press/release key

Presses (and holds) or releases one or more modifier keys (Alt, Control, or Shift)

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Action to perform	N/A	Press, Release	Press	Specify whether to press or release keys with this action

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Control	N/A	Boolean value	False	Specify whether the Ctrl key will be pressed/released or not
Alt	N/A	Boolean value	False	Specify whether the Alt key will be pressed/released or not
Shift	N/A	Boolean value	False	Specify whether the Shift key will be pressed/released or not
Win	N/A	Boolean value	False	Specify whether the Windows key will be pressed/released or not

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Can't press or release key in non interactive mode	Indicates a problem pressing or releasing the key in non-interactive mode

Set key state

Sets the state (on or off) for the keys Caps Lock, Num Lock or Scroll Lock

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Key	N/A	Caps Lock, Num Lock, Scroll Lock	Caps Lock	Specify the key to set
State	N/A	Off, On	On	Whether to set the key state to on or off

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Can't set key state in non interactive mode	Indicates a problem setting the key state in non interactive mode

Wait for mouse

Suspends the execution of the flow until the mouse pointer changes, usually to or from the 'wait cursor' or hourglass

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Wait for mouse pointer to	N/A	Become, Become not	Become	Choose what action of the mouse cursor to wait for.
Mouse pointer	N/A	Arrow, App starting, Cross, Hand, Help, IBeam, Wait cursor	Arrow	Specify the mouse pointer state.

Variables Produced

- This action doesn't produce any variables

Exceptions

- This action doesn't include any exceptions

Get keyboard identifier

Retrieves the active keyboard identifier from the machine's registry

Input Parameters

- This action doesn't require any input

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
KeyboardLayoutId	Numeric value	The registry key of the active keyboard identifier

Exceptions

EXCEPTION	DESCRIPTION
Keyboard identifier wasn’t found	Indicates an error while retrieving the keyboard identifier

Wait for shortcut key

Pause the flow run until a specific shortcut key is pressed. Shortcut keys must contain at least one key or a key and one of (ctrl, alt, shift). Multiple shortcut keys can be defined

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Shortcut keys	N/A	Keys combination	Ctrl + A	Specify the shortcut keys to wait for. Shortcut keys must contain exactly one key or a key and a combination of (ctrl, alt, shift). To add more than one shortcut key, select 'New shortcut key'
Continue flow run on timeout	N/A	Boolean value	False	Specify whether the flow run will continue anyway when the set period of time waiting for the shortcut key expires

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Continue after	Yes	Numeric value	10	The time in seconds before continuing the flow run

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
IndexOfShortcutKeyPressed	Numeric value	The index of the shortcut key if the shortcut keys are in a list format.

Exceptions

EXCEPTION	DESCRIPTION
Shortcut key failed to register	Indicates that a shortcut key failed to register.

Clipboard

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Set or get data from the clipboard

Get clipboard text
Set clipboard Text
Clear clipboard contents

Getting started with clipboard actions

To manipulate or extract the contents of the clipboard, use the Clipboard action group.

To obtain the contents of the clipboard and store them in a variable, use the **Get clipboard text** action.

To change the text of the clipboard, use the **Set clipboard text** action. In the example below, a variable with the current date and time has been set to the clipboard. The next paste command will paste the value of the variable.

To clear the clipboard, use the **Clear clipboard contents** action.

Clipboard actions

Get clipboard text

Gets clipboard text

Input Parameters

- This action doesn't require any input

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
ClipboardText	Text value	The text stored in the clipboard

Exceptions

EXCEPTION	DESCRIPTION
Can't retrieve clipboard contents	Indicates a problem retrieving clipboard contents

Set clipboard Text

Sets clipboard text

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Clipboard text	No	Text value		The text to set to the clipboard

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Can't set clipboard contents	Indicates a problem setting clipboard contents

Clear clipboard contents

Clears clipboard contents

Input Parameters

- This action doesn't require any input

Variables Produced

- This action doesn't produce any variables

Exceptions

- This action doesn't include any exceptions

Text

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Control and manipulate text

Append line to text
Get subtext
Pad text
Trim text
Change text case
Convert text to number
Convert number to text
Convert text to datetime
Convert datetime to text
Create random text
Join text
Split text
Parse text
Replace text
Escape text for regular expression
Recognize entities in text

Getting started with text actions

To combine a list of text values into a single text value, use the **Join text** action. Specify a list variable, and separate the list items by using a delimiter. To separate a single text value into a list of items, use the **Split text** action. Specify a text value that has recognizable delimiters by which to separate the list items.

To find a string in a text and replace it with another string or character, use the **Replace text** action. The following figure demonstrates a replacement of the string "Product Characteristics" with "Characteristics".

Search a text value for a string of text with the **Parse text** action. Certain text actions contain the option to use

regular expressions. Enable the option **Is regular expression** to search for text specifying a regular expression in **Text to find**. Additionally, disable **First occurence only** for the action to return a list of positions of the matched text. You can find more information in Regular Expression Language - Quick Reference.

In the figure below, the action searches for all occurences of words starting with a capital letter in "Items detected in Stock", and will return "Items" and "Stock" in the **Matches** list, and the position they are found at (1 and 18) in the **Positions** list.

To ensure that numbers are stored as numerical values, use the **Convert text to number** action. To perform the reverse conversion, use **Convert number to text**.

Similarly, the actions **Convert text to datetime** and **Convert datetime to text** are used to ensure that dates are correctly formatted.

Use the Recognize entities in text action

Power Automate for desktop enables users to extract various entities from texts in natural language, such as numbers, dates, and measurement units, through the **Recognize entities in text** action.

The **Recognize entities in text** action gets a text or a variable containing text as input and returns a datable containing the results. Each entity returns different results based on its structure, but all the datatables contain an **Original text** field that stores the entity part of the input text.

The following table displays various examples of entities that the **Recognize entities in text** action can recognize.

ENTITY	INPUT TEXT	RETURNED VALUES
Date time	I'll go back 04th Jan 2019	**Value:** 1/4/2019 12:00:00 AM **Original text:** 04th Jan 2019
Date time	Schedule a meeting tonight at 7pm	**Value:** 9/30/2021 7:00:00 PM **Original text:** tonight at 7pm
Dimension	You weight 200lbs	**Value:** 200 **Unit:** Pound **Original text:** 200lbs
Dimension	A twister roared through an area about ten miles long there	**Value:** 10 **Unit:** Mile **Original text:** ten miles
Temperature	The temperature outside is 40 deg celsius	**Value:** 40 **Unit:** C **Original text:** 40 deg celsius
Currency	Net interest income sank 27 percent in the quarter to /$ 254 million	**Value:** 254000000 **Unit:** Dollar **Original text:** $ 254 million
Number range	This number is larger than twenty and less or equal than thirty five	**From:** 20 **To:** 35 **Original text:** larger than twenty and less or equal than thirty five

ENTITY	INPUT TEXT	RETURNED VALUES
Number range	From 5 to 10	**From:** 5 **To:** 10 **Original text:** From 5 to 10
Number range	Less than 4.565	**From:** 0 **To:** 4.565 **Original text:** Less than 4.565
Number	A dozen	**Value:** 12 **Original text:** A dozen
Number	Two thirds	**Value:** 0.666666666666667 **Original text:** Two thirds
Ordinal	I like the first two books	**Value:** 1 **Original text:** first
Ordinal	Eleventh	**Value:** 11 **Original text:** Eleventh
Percentage	100 percent	**Value:** 100 **Original text:** 100 percent
Phone number	Tel: +1 209-555-0100	**Value:** +1 209-555-0100 **Original text:** +1 209-555-0100
Email	felix@contoso.com	**Value:** felix@contoso.com **Original text:** felix@contoso.com
IP address	My PC IP address is 1.1.1.1	**Value:** 1.1.1.1 **Original text:** 1.1.1.1
Mention	@Alice	**Value:** @Alice **Original text:** @Alice
Hashtag	#News	**Value:** #News **Original text:** #News
URL	www.microsoft.com	**Value:** www.microsoft.com **Original text:** www.microsoft.com
GUID	123e4567-e89b-12d3-a456-426655440000	**Value:** 123e4567-e89b-12d3-a456-426655440000 **Original text:** 123e4567-e89b-12d3-a456-426655440000
Quoted text	Enter the value in the "value" field	**Value:** "value" **Original text:** "value"

> **NOTE**
> The **Recognize entities in text** action supports 14 different languages. However, some entities may not be available for specific languages. You can find more information about language restrictions in Microsoft Recognizers Text - Supported entities across cultures.

Text actions

Append line to text

Appends a new line of text to a text value

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Original text	No	Text value		The original text
Line to append	Yes	Text value		The text to add on as a new line

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
Result	Text value	The new text

Exceptions

- This action doesn't include any exceptions

Get subtext

Retrieve a subtext from a text value

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Original text	No	Text value		The text to retrieve a section of text from
Start index	N/A	Start of text, Character position	Character position	Specify how to find the starting point for text retrieval
Character position	No	Numeric value		The position of the first character to retrieve. This is a zero-based index, counting from zero for the first character
Length	N/A	End of text, Number of chars	Number of chars	Specify whether the subtext continues to the end of the text, or includes only a certain number of characters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Number of chars	No	Numeric value		The number of characters to retrieve

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
Subtext	Text value	The retrieved subtext

Exceptions

EXCEPTION	DESCRIPTION
Start index or length are out of range	Indicates that the start index or length are out of range

Pad text

Creates a fixed length text by adding characters to the left or to the right of an existing text

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Text to pad	Yes	Text value		The text to lengthen
Pad	N/A	Left, Right	Left	Specify whether to add characters to the left or right of the existing text
Text for padding	Yes	Text value		The character or text that will be added to lengthen the original text
Total length	Yes	Numeric value	10	The total character length of the final padded text. This means that the text for padding will be repeatedly added until the final text is of the specified length

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
PaddedText	Text value	The new, padded text

Exceptions

- This action doesn't include any exceptions

Trim text

Removes all occurrences of white space characters (such as space, tab, or new line) from the beginning and/or end of an existing text

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Text to trim	Yes	Text value		Text to trim
What to trim	N/A	whitespace characters from the beginning, whitespace characters from the end, whitespace characters from the beginning and end	whitespace characters from the beginning and end	Specify where white space characters will be removed from

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
TrimmedText	Text value	The new trimmed text

Exceptions

- This action doesn't include any exceptions

Reverse text

Reverses the order of letters in a text string

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Text to reverse	Yes	Text value		The text to reverse

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
ReversedText	Text value	The new reversed text

Exceptions

- This action doesn't include any exceptions

Change text case

Changes the casing of a text to uppercase, lowercase, title case or sentence case

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Text to convert	Yes	Text value		The text to convert
Convert to	N/A	Upper case, Lower case, Title case, Sentence case	Upper case	Specify the text case style to use

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
TextWithNewCase	Text value	The new converted text

Exceptions

- This action doesn't include any exceptions

Convert text to number

Converts a text representation of a number to a variable that contains a numeric value

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Text to convert	No	Text value		A text variable containing only a number, to convert to a numeric value variable. Spaces are ignored, but non-number text throws an exception

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
TextAsNumber	Numeric value	The new numeric value

Exceptions

EXCEPTION	DESCRIPTION
Provided text value can't be converted into a valid number	Indicates that the provided text value can't be converted into a valid number

Convert number to text

Converts a number to text using a specified format

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Number to convert	No	Numeric value		A numeric value to convert to text
Decimal places	Yes	Numeric value	2	The number of decimal places that will be included before truncation. Zeros can also be added to the end to pad the text in this way
Use thousands separator	N/A	Boolean value	True	Specify whether or not to use punctuation as a 1000 separator

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
FormattedNumber	Text value	The formatted number as text

Exceptions

- This action doesn't include any exceptions

Convert text to datetime

Converts a text representation of a date and/or time value to a datetime value

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Text to convert	No	Text value		The text to convert to a datetime value. This text must be in a recognizably datetime value format
Date is represented in custom format	N/A	Boolean value	False	Specify whether the text to convert contains a representation of the date and time in a non-standard, non-recognizable format
Custom format	No	Text value		The format in which the date is stored in the text. A custom format can be expressed as, for example, yyyyMMdd for date and hhmmss for time

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
TextAsDateTime	Datetime	The datetime value

Exceptions

EXCEPTION	DESCRIPTION
Provided text value can't be converted into a valid datetime	Indicates that the provided text value can't be converted into a valid datetime

Convert datetime to text

Converts a datetime value to text using a specified custom format

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Datetime to convert	No	Datetime		The datetime value to convert to text
Format to use	N/A	Standard, Custom	Standard	Specify whether to use a standard datetime format, or create a custom one

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Custom Format	No	Text value		The custom format to display the datetime value in. A datetime can be expressed as, for example, MM/dd/yyyy for date and hh:mm:sstt for time
Standard format	N/A	Short date, Long date, Short time, Long time, Full datetime (short time), Full datetime (long time), General datetime (short time), General datetime (long time), Sortable datetime	Short date	The standard datetime format the action uses to display the datetime value

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
FormattedDateTime	Text value	The formatted datetime as a text value

Exceptions

- This action doesn't include any exceptions

Create random text

Generates a text of specified length consisting of random characters. This can be useful for generating passwords

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Use uppercase letters (A-Z)	N/A	Boolean value	True	Specify whether uppercase characters will be included in the generated text
Use lowercase letters (a-z)	N/A	Boolean value	True	Specify whether lowercase characters will be included in the generated text
Use digits (0-9)	N/A	Boolean value	True	Specify whether digits will be included in the generated text
Use symbols (, . < > ? ! + - _ # $ ^)	N/A	Boolean value	True	Specify whether symbols will be included in the generated text

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Minimum length	Yes	Numeric value	6	The minimum length of the random text. For a certain length of text, set the minimum and maximum values to that number
Maximum length	Yes	Numeric value	10	The maximum length of the random text. For a certain length of text, set the minimum and maximum values to that number

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
RandomText	Text value	The generated random text

Exceptions

- This action doesn't include any exceptions

Join text

Converts a list into a text value by separating its items with a specified delimiter

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Specify the list to join	No	List of Text values		The list to convert to text
Delimiter to separate list items	N/A	None, Standard, Custom	None	Specify whether to use no delimiter, a standard delimiter or a custom one
Custom delimiter	No	Text value		The character(s) to use as delimiter
Standard delimiter	N/A	Space, Tab, New line	Space	Specify the delimiter to use
Times	Yes	Numeric value	1	Specify how many times to use the specified delimiter

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
JoinedText	Text value	The new delimited text

Exceptions

- This action doesn't include any exceptions

Split text

Creates a list containing the substrings of a text that are separated by a specified delimiter or a regular expression

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
The text to split	No	Text value		The text to split
Delimiter type	N/A	Standard, Custom	Standard	Whether the used delimiter is of a standard or custom format
Custom delimiter	No	Text value		The character(s) that were used as a delimiter
Standard delimiter	N/A	Space, Tab, New line	Space	The delimiter used
Times	Yes	Numeric value	1	Specify how many times is the delimiter used
Is regular expression	N/A	Boolean value	False	Specify whether the delimiter will be a regular expression. A regular expression creates a range of possibilities for the delimiter. For example, '\d' means that the delimiter could be any digit

NOTE

Power Automate's regular expression engine is .NET. You can find more information in Regular Expression Language - Quick Reference.

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
TextList	List of Text values	The new list

Exceptions

EXCEPTION	DESCRIPTION
Provided regular expression is invalid	Indicates that the provided regular expression is invalid

Parse text

Parses a text to find the first or all occurrences of a specified subtext or a regular expression pattern

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Text to Parse	No	Text value		The text to parse
Text to Find	No	Text value		The subtext or a regular expression to search for
Is regular expression	N/A	Boolean value	False	Specify whether the subtext is a regular expression. For example \d means that the subtext could be any digit
Start Parsing at Position	No	Numeric value		The position to start looking for the 'Text to Find'. The first position is zero, so use 0 to start from the beginning
First occurrence only	N/A	Boolean value	True	Specify whether to find the first occurrence only, or each occurrence of the 'Text to find'
Ignore case	N/A	Boolean value	False	Specify whether to find the specified text using case-sensitive or case-insensitive matching

NOTE

Power Automate's regular expression engine is .NET. You can find more information in Regular Expression Language - Quick Reference.

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
Position	Numeric value	The position of the 'Text to find' into the 'Text to parse'. If the text isn't found within the original text, this variable will hold the value -1
Positions	List of Numeric values	The positions of the 'Text to find' into the 'Text to parse'. If the text isn't found within the original text, this variable will hold the value -1
Match	Text value	The result that matches the given regular expression

ARGUMENT	TYPE	DESCRIPTION
Matches	List of Text values	The results that match the given regular expression

Exceptions

EXCEPTION	DESCRIPTION
Provided regular expression is invalid	Indicates that the provided regular expression is invalid

Replace text

Replaces all occurrences of a specified subtext with another text. It can also be used with regular expressions

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Text to parse	No	Text value		The text to parse
Text to find	No	Text value		The subtext or a regular expression to search for
Use regular expressions for find and replace	N/A	Boolean value	False	Specify whether the subtexts are regular expressions. A regular expression creates a range of possibilities for the subtext. For example, '\d' means that the subtext could be any digit
Ignore case	N/A	Boolean value	False	Specify whether to find the subtext to replace using case-sensitive or case-insensitive matching
Replace with	No	Text value		The text or a regular expression to replace found text
Activate escape sequences	N/A	Boolean value	False	Specify whether to use special sequences. For example, '\t' in the replacement text will be interpreted as a tab

NOTE

Power Automate's regular expression engine is .NET. You can find more information in Regular Expression Language - Quick Reference.

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
Replaced	Text value	The new updated text

Exceptions

- This action doesn't include any exceptions

Escape text for regular expression

Escapes a minimal set of characters (, *, +, ?, |, {, [, (,), ^, $,., #, and white space) by replacing them with their escape codes

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Text to escape	No	Text value		The text to escape

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
EscapedText	Text value	The escaped text

Exceptions

- This action doesn't include any exceptions

Recognize entities in text

Recognizes entities in text, such as numbers, units, data/time and others expressed in natural language accross multiple languages

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Text to recognize from	No	Text value		The text to recognize entities from
Entity type	N/A	Date time, Dimension, Temperature, Currency, Number range, Number, Ordinal, Percentage, Phone number, Email, IP address, Mention, Hashtag, URL, GUID, Quoted text	Date time	The type of entity to recognize (e.g., Date time, Email, URL etc.)
Language	N/A	English, Chinese (Simplified), Spanish, Spanish (Mexico), Portuguese, French, German, Italian, Japanese, Dutch, Korean, Swedish, Turkish, Hindi	English	Specify the language of the text

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
RecognizedEntities	Datatable	The recognized entities

Exceptions

- This action doesn't include any exceptions

Datetime

1/15/2022 • 2 minutes to read • Edit Online

Get the date and time and perform time related functions

Add to datetime
Subtract dates
Get current date and time

Getting started with datetime actions

The **Get current date and time** action will store the current date and time (or date only, if selected) in a datetime type variable. The date will be formatted with the format currently selected in Windows.

Add any amount of a specified unit of time to a date with the **Add to datetime** action.

To find the difference between two dates, use the **Subtract dates** action. The difference can be returned in seconds, minutes, hours or days.

Datetime actions

Add to datetime

Adds (or subtracts) a specific number of seconds, minutes, hours or days to a datetime value

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Datetime	No	Datetime		The datetime value to alter
Add	No	Numeric value		The numeric value to add. To subtract a time, this value would be negative. For example, add -7 days here to go back one week
Time unit	N/A	Seconds, Minutes, Hours, Days, Months, Years	Seconds	The time unit the time to add represents

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
ResultedDate	Datetime	The new, altered datetime value

Exceptions

- This action doesn't include any exceptions

Subtract dates

Finds the time difference between two given dates in days, hours, minutes, or seconds

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
From date	No	Datetime		The datetime to subtract the first datetime from. This will be the base datetime, so generally put the later date/time in this attribute
Subtract date	No	Datetime		The datetime to subtract
Get difference in	N/A	Seconds, Minutes, Hours, Days	Days	The unit of time to express the difference in

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
TimeDifference	Numeric value	The difference in time as a numeric value

Exceptions

- This action doesn't include any exceptions

Get current date and time

Retrieves the current date or the current date and time

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Retrieve	N/A	Current date and time, Current date only	Current date and time	Specify whether to get the date and time, or just the date. If the latter is chosen, the time value will be stored as midnight (0:00:00)
Time zone	N/A	System time zone, Specific time zone	System time zone	Whether to use the system's time zone or a custom one
Country/region	Yes	Text value	Europe/Bucharest	The country/region to get the time of or add a numeric value as the hours that will be added in the UTC time zone

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
CurrentDateTime	Datetime	The current datetime value

Exceptions

EXCEPTION	DESCRIPTION
Failed to get current date and time	Indicates that there was a problem retrieving the current date and time
Specified country/region not found	Indicates that the specified country or region wasn't found

PDF

1/15/2022 • 4 minutes to read • Edit Online

Automate PDF files and their content (text and images)

Extract images from PDF
Extract text from PDF
Extract PDF pages to new PDF
Merge PDF files

Getting started with PDF actions

Use the PDF action group to extract images and text from PDF files and arrange pages to create new documents.

To extract text from a PDF file, use the **Extract text from PDF** action. In the example below, a file has been specified, and the action is configured to extract text from a range of pages. In the **Advanced** section, a password has been entered to access the secure file.

Similarly, extract images with the **Extract images from PDF** action. This action contains an additional option to specify a prefix for the image names.

To create a new PDF document from an existing file, use the **Extract PDF file pages to new PDF file**. In the

example below, the source document has been selected, and a file name for a new document has been specified. The pages have been entered as a combination of specific pages and a range.

PDF actions

Extract images from PDF

Extract images from a PDF file

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
PDF file	No	File		The PDF file to extract images from. Enter a file path, a variable containing a file or a text path
Password	Yes	Encrypted value		The password of the PDF file. Leave this blank if the PDF isn't password protected
Page(s) to extract	N/A	All, Single, Range	All	Specifies how many pages to extract: All pages, a single page or a range of pages
Single page number	No	Numeric value		The number of the single page to extract images from

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
From page number	No	Numeric value		The first page number from the range of pages to extract images from
To page number	No	Numeric value		The last page number from the range of pages to extract images from
Image(s) name	No	Text value		How the name of the image(s) starts. Extracted image(s) name example: GivenName_1, GivenName_2
Save image(s) to	No	Folder		The folder to save the extracted images as png files

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Invalid password	The given password is invalid
Failed to extract images	Indicates that an error occured while extracting images from the given pages of the PDF
Folder doesn't exist	Indicates that the folder doesn't exist
PDF file doesn't exist	File doesn't exist on the given path

Extract text from PDF

Extract text from a PDF file

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
PDF file	No	File		The PDF file to extract text from. Enter a file path, a variable containing a file or a text path
Password	Yes	Encrypted value		The password of the PDF file. Leave this blank if the PDF isn't password protected

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Page(s) to extract	N/A	All, Single, Range	All	Specifies how many pages to extract: All pages, a single page or a range of pages
Single page number	No	Numeric value		The number of the single page to extract text from
From page number	No	Numeric value		The first page number from the range of pages to extract text from
To page number	No	Numeric value		The last page number from the range of pages to extract text from

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
ExtractedPDFText	Text value	The extracted text

Exceptions

EXCEPTION	DESCRIPTION
PDF file doesn't exist	File doesn't exist on the given path
Invalid password	The given password is invalid
Failed to extract text	Error while trying to extract text

Extract PDF pages to new PDF

Extract pages from a PDF file to a new PDF file

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
PDF file	No	File		The PDF file to extract pages from. Enter a file path, a variable containing a file or a text path
Password	Yes	Encrypted value		The password of the PDF file. Leave this blank if the PDF isn't password protected
Page selection	No	Text value		The index numbers of the pages to keep (eg 1,3,17-24)

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Extracted PDF path	No	File		The path to store the extracted PDF file
If file exists	N/A	Overwrite, Don't overwrite, Add sequential suffix	Add sequential suffix	Specifies what to do in case the output PDF file already exists

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
ExtractedPDF	File	The new PDF file

Exceptions

EXCEPTION	DESCRIPTION
Invalid password	The given password is invalid
PDF file doesn't exist	File doesn't exist on the given path
Page out of bounds	Indicates that one or more pages are out of bounds of the PDF file
Invalid page selection	Indicates that the given pages aren't valid for the PDF file
Failed to extract new PDF	Indicates that an error occured while trying to extract new PDF

Merge PDF files

Merges multiple PDF files into a new one

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
PDF files	No	List of Files		The files to merge. Enclose multiple files in double quotes (") and separate them by a delimiter, or use a list of files
Merged PDF path	No	File		The path to store the merged PDF
If file exists	N/A	Overwrite, Don't overwrite, Add sequential suffix	Add sequential suffix	Specifies what to do in case the destination file already exists

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Passwords	Yes	Encrypted value		The delimited passwords. The order should be the same as the order of the input PDFs. Leave this blank if the PDFs aren't password protected
Delimiter	Yes	Text value	,	A custom password delimiter. This delimiter shouldn't be part of any of the passwords

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
MergedPDF	File	The merged PDF file

Exceptions

EXCEPTION	DESCRIPTION
PDF file doesn't exist	File doesn't exist on the given path
Invalid password	The given password is invalid
Failed to merge PDF files	Indicates that an error occured while merging the files

CMD session

1/15/2022 • 6 minutes to read • Edit Online

Automate a CMD session

Open CMD session
Read from CMD session
Write to CMD session
Wait for text on CMD session
Close CMD session

Getting started with CMD actions

Use the CMD group of actions featured in Power Automate to automate Windows Command Prompt tasks.

Use **Open CMD session** to commence a command prompt session. Specify the working folder, and optionally change the code page in the **Advanced** section.

The **Write to CMD session** action uses the CMD session variable. Specify a command, and select whether to send **Enter** immediately afterwards to run it. In the figure below, the command creates a new folder in the current working directory.

To ensure that specific output appears on the command prompt before proceeding with subsequent actions, use a **Wait for text on CMD session** action. Specify the text to expect, or enter a regular expression and check the corresponding option to enable regular expressions.

To conclude the CMD session, use the **Close CMD session** action.

CMD actions

Open CMD session

Open a new CMD session

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Working folder	Yes	Folder		The full path of the folder to start the CMD session, if applicable
Change code page	N/A	Boolean value	False	Specifies whether to change the session's current code page
Encoding	No	ASMO-708 : Arabic (ASMO 708), big5 : Chinese Traditional (Big5), cp1025 : IBM EBCDIC (Cyrillic Serbian-Bulgarian), cp866 : Cyrillic (DOS), cp875 : IBM EBCDIC (Greek Modern), csISO2022JP : Japanese (JIS-Allow 1 byte Kana), DOS-720 : Arabic (DOS), DOS-862 : Hebrew (DOS), EUC-CN : Chinese Simplified (EUC), EUC-JP : Japanese (JIS 0208-1990 and 0212-1990), euc-jp :	utf-8 : Unicode (UTF-8)	The encoding to use when reading the output

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
		Japanese (EUC), euc-kr : Korean (EUC), GB18030 : Chinese Simplified (GB18030), gb2312 : Chinese Simplified (GB2312), hz-gb-2312 : Chinese Simplified (HZ), IBM-Thai : IBM EBCDIC (Thai), IBM00858 : OEM Multilingual Latin I, IBM00924 : IBM Latin-1, IBM01047 : IBM Latin-1, IBM01140 : IBM EBCDIC (US-Canada-Euro), IBM01141 : IBM EBCDIC (Germany-Euro), IBM01142 : IBM EBCDIC (Denmark-Norway-Euro), IBM01143 : IBM EBCDIC (Finland-Sweden-Euro), IBM01144 : IBM EBCDIC (Italy-Euro), IBM01145 : IBM EBCDIC (Spain-Euro), IBM01146 : IBM EBCDIC (UK-Euro), IBM01147 : IBM EBCDIC (France-Euro), IBM01148 : IBM EBCDIC (International-Euro), IBM01149 : IBM EBCDIC (Icelandic-Euro), IBM037 : IBM EBCDIC (US-Canada), IBM1026 : IBM EBCDIC (Turkish Latin-5), IBM273 : IBM EBCDIC (Germany), IBM277 : IBM EBCDIC (Denmark-Norway), IBM278 : IBM EBCDIC (Finland-Sweden), IBM280 : IBM EBCDIC (Italy), IBM284 : IBM EBCDIC (Spain), IBM285 : IBM EBCDIC (UK), IBM290 : IBM EBCDIC (Japanese katakana), IBM297 : IBM EBCDIC (France), IBM420 : IBM EBCDIC (Arabic), IBM423 : IBM EBCDIC (Greek), IBM424 : IBM EBCDIC (Hebrew)		

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
		EBCDIC (Hebrew), IBM437 : OEM United States, IBM500 : IBM EBCDIC (International), ibm737 : Greek (DOS), ibm775 : Baltic (DOS), ibm850 : Western European (DOS), ibm852 : Central European (DOS), IBM855 : OEM Cyrillic, ibm857 : Turkish (DOS), IBM860 : Portuguese (DOS), ibm861 : Icelandic (DOS), IBM863 : French Canadian (DOS), IBM864 : Arabic (864), IBM865 : Nordic (DOS), ibm869 : Greek, Modern (DOS), IBM870 : IBM EBCDIC (Multilingual Latin-2), IBM871 : IBM EBCDIC (Icelandic), IBM880 : IBM EBCDIC (Cyrillic Russian), IBM905 : IBM EBCDIC (Turkish), iso-2022-jp : Japanese (JIS), iso-2022-jp : Japanese (JIS-Allow 1 byte Kana - SO/SI), iso-2022-kr : Korean (ISO), iso-8859-1 : Western European (ISO), iso-8859-13 : Estonian (ISO), iso-8859-15 : Latin 9 (ISO), iso-8859-2 : Central European (ISO), iso-8859-3 : Latin 3 (ISO), iso-8859-4 : Baltic (ISO), iso-8859-5 : Cyrillic (ISO), iso-8859-6 : Arabic (ISO), iso-8859-7 : Greek (ISO), iso-8859-8 : Hebrew (ISO-Visual), iso-8859-8-i : Hebrew (ISO-Logical), iso-8859-9 : Turkish (ISO), Johab : Korean (Johab), koi8-r : Cyrillic (KOI8-R), koi8-u : Cyrillic (KOI8-U), ks_c_5601-1987 : Korean, macintosh : Western European (Mac),		

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
		shift_jis : Japanese (Shift-JIS), us-ascii : US-ASCII, utf-16 : Unicode, utf-16BE : Unicode (Big-Endian), utf-32 : Unicode (UTF-32), utf-32BE : Unicode (UTF-32 Big-Endian), utf-7 : Unicode (UTF-7), utf-8 : Unicode (UTF-8), windows-1250 : Central European (Windows), windows-1251 : Cyrillic (Windows), Windows-1252 : Western European (Windows), windows-1253 : Greek (Windows), windows-1254 : Turkish (Windows), windows-1255 : Hebrew (Windows), windows-1256 : Arabic (Windows), windows-1257 : Baltic (Windows), windows-1258 : Vietnamese (Windows), windows-874 : Thai (Windows), x-Chinese-CNS : Chinese Traditional (CNS), x-Chinese-Eten : Chinese Traditional (Eten), x-cp20001 : TCA Taiwan, x-cp20003 : IBM5550 Taiwan, x-cp20004 : TeleText Taiwan, x-cp20005 : Wang Taiwan, x-cp20261 : T.61, x-cp20269 : ISO-6937, x-cp20936 : Chinese Simplified (GB2312-80), x-cp20949 : Korean Wansung, x-cp50227 : Chinese Simplified (ISO-2022), x-EBCDIC-KoreanExtended : IBM EBCDIC (Korean Extended), x-Europa : Europa, x-IA5 : Western European (IA5), x-IA5-German : German (IA5), x-IA5-Norwegian : Norwegian (IA5), x-IA5-Swedish : Swedish (IA5), x-iscii-as : ISCII Assamese, x-iscii-be : ISCII Bengali, x-iscii-de :		

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
		Bengali, x-iscii-de : ISCII Devanagari, x-iscii-gu : ISCII Gujarati, x-iscii-ka : ISCII Kannada, x-iscii-ma : ISCII Malayalam, x-iscii-or : ISCII Oriya, x-iscii-pa : ISCII Punjabi, x-iscii-ta : ISCII Tamil, x-iscii-te : ISCII Telugu, x-mac-arabic : Arabic (Mac), x-mac-ce : Central European (Mac), x-mac-chinesesimp : Chinese Simplified (Mac), x-mac-chinesetrad : Chinese Traditional (Mac), x-mac-croatian : Croatian (Mac), x-mac-cyrillic : Cyrillic (Mac), x-mac-greek : Greek (Mac), x-mac-hebrew : Hebrew (Mac), x-mac-icelandic : Icelandic (Mac), x-mac-japanese : Japanese (Mac), x-mac-korean : Korean (Mac), x-mac-romanian : Romanian (Mac), x-mac-thai : Thai (Mac), x-mac-turkish : Turkish (Mac), x-mac-ukrainian : Ukrainian (Mac)`		

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
CmdSession	CMD session	The CMD session for use with later CMD actions

Exceptions

EXCEPTION	DESCRIPTION
Can't start command session	Indicates a problem initiating a CMD session
Working directory doesn't exist	Indicates that an error occured trying to locate the working directory

Read from CMD session

Read the output of a CMD session

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
CMD session	No	CMD session		A previously opened CMD session
Separate output from error	N/A	Boolean value	False	Specifies whether to store the standard output and the standard error into different variables or combined into one

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
CmdOutput	Text value	The CMD session's standard output
CmdError	Text value	The CMD session's standard error

Exceptions

EXCEPTION	DESCRIPTION
CMD session is closed	Indicates that the CMD session specified is closed

Write to CMD session

Execute a command on an open CMD session

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
CMD session	No	CMD session		A previously opened CMD session variable
Command	No	Text value		The name of the command to execute
Send **Enter** after command	N/A	Boolean value	True	Specifies whether to send an **Enter** the command

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Can't write to CMD session	Indicates an error writing to a CMD session
CMD session is closed	Indicates that the CMD session specified is closed

Wait for text on CMD session

Wait for a specific text on a previously opened CMD session

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
CMD session	No	CMD session		An open CMD session variable
Text to wait	No	Text value		The text or regular expression to wait to appear on standard output or on standard error
Is regular expression	N/A	Boolean value	False	Specifies whether to wait for a regular expression instead of plain text
Ignore case	N/A	Boolean value	True	Specifies whether the text to wait should match with standard output or standard error without taking into account the case of the text
Timeout	Yes	Numeric value	0	Specifies whether to wait indefinitely for the text to appear or to fail if the text doesn't show up within a set time period

> **NOTE**
> Power Automate's regular expression engine is .NET. You can find more information in Regular Expression Language - Quick Reference.

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
CMD session is closed	Indicates that the CMD session specified is closed
Timeout occurred while waiting for text	Indicates that the specified timeout period has elapsed before the text appeared in the command session

Close CMD session

Close a previously opened CMD session

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
CMD session	No	CMD session		The CMD session to close. Specify this variable in an open CMD session action

Variables Produced

- This action doesn't produce any variables

Exceptions

- This action doesn't include any exceptions

Terminal emulation

1/15/2022 • 10 minutes to read • Edit Online

Take control of terminal emulators for automating mainframes and legacy systems

Open terminal session
Close terminal session
Move cursor on terminal session
Get text from terminal session
Set text on terminal session
Send key to terminal session
Wait for text on terminal session

Getting started with terminal emulation actions

Power Automate provides integration with terminal emulators through the **Terminal emulation** actions. These actions enable you to handle terminals and mainframes and perform various operations on them, such as moving the cursor, setting and getting text, and sending keys.

Before deploying any terminal actions, use the **Open terminal session** action to open a new connection with the installed provider.

> **IMPORTANT**
> Before trying to connect to a terminal session, make sure that the actual terminal session is already open on your machine.

If you've installed Micro Focus Reflection on your desktop, choose the respective option in the **Provider** property of the action and populate the required configuration.

If you've installed another provider, select **HLLAPI** that works with most terminal emulation providers.

Depending on the provider you're using, select the appropriate HLLAPI DLL file located in its installation folder. In the following list, you can see the HLLAPI DLL file names of some popular terminal emulation providers:

- RocketSoftware BlueZone: **ehlapi64.dll**
- IBM Personal Communications: **EHLAPI32.dll**
- MicroFocus Rumba: **System/ehlapi32.Dll**
- Cybelesoft zScope: **zHllap32.dll**

After opening a terminal session and completing all the wanted operations, terminate the connection using the **Close terminal session** action. If you don't close the connection, some providers won't let you connect again to the already open session without restarting the software or the connection.

Terminal emulation actions

Open terminal session

Open a new terminal session

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Provider	N/A	Micro focus reflection, HLLAPI	Micro focus reflection	The terminal emulation to use
HLLAPI DLL path	No	File		The HLLAPI DLL of the provider. RocketSoftware BlueZone default name: 'ehlapi64.dll'. IBM Personal Communications default name: 'EHLAPI32.dll'. MicroFocus Rumba default path: 'System/ehlapi32.Dll'. Cybelesoft zScope default name: 'zHllap32.dll'. Any other provider that offers an HLLAPI DLL in its installation folder.
Installation path	No	Folder		The installation path of the provider's application on the user's file system

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Configuration	N/A	Existing profile, Specify connection	Existing profile	Choose 'Existing profile' to select a file containing a preconfigured terminal emulation connection. Choose 'Specify connection' to specify the type of the connection, the host address and the port.
Session name	No	Text value		The session name to connect to. The HLLAPI short name, and it is a unique identifier for the host session. It can be found in the Terminal emulator's configuration settings.
Host type	N/A	IBM 3270, IBM 5250	IBM 3270	The host type of the connection
Profile	No	File		The file that contains the preconfigured connection
Host address	No	Text value		The host's address to connect to
Port	No	Numeric value		The port to be used for this connection
Attach to running session	N/A	Boolean value	False	Specifies whether to attach to a currently open/running terminal session

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
TerminalSession	Terminal session	The specific terminal session for use with later terminal emulation commands

Exceptions

EXCEPTION	DESCRIPTION
Error communicating with the emulator	Indicates a problem connecting to the emulator
Profile error	Profile error

Close terminal session

Close an open terminal session

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Terminal session to close	No	Terminal session		The previously opened terminal session

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Error communicating with the emulator	Indicates a problem connecting to the emulator

Move cursor on terminal session

Move the terminal's cursor on the specified position

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Terminal session	No	Terminal session		The terminal session to work with
Row	No	Numeric value		The vertical position of the cursor on the screen
Column	No	Numeric value		The horizontal position of the cursor on the screen

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Screen position out of bounds	Indicates that the screen position is out of bounds
Position commands aren't supported by the emulator	Indicates that position commands used aren't supported by the emulator
Operation is unavailable for this session type	Indicates that the operation is unavailable for this session type
Error communicating with the emulator	Indicates a problem connecting to the emulator

Get text from terminal session

Get text from a terminal session

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Terminal session	No	Terminal session		The terminal session to work with
Get text from	N/A	Field, Entire screen, Cursor position, Specific position	Field	The location to get the text from
Get field by	N/A	Label, Index, Position	Label	Specifies how to look for the field
Label	No	Text value		The label of the field to look for
Index	No	Numeric value		The index of the field to look for
Text length	No	Numeric value		The length of the text to receive
Row	No	Numeric value		The vertical position of the field on the screen
Column	No	Numeric value		The horizontal position of the field on the screen

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
TerminalText	Text value	The text retrieved from the terminal session

Exceptions

EXCEPTION	DESCRIPTION
Error communicating with the emulator	Indicates a problem connecting to the emulator
Field index out of bounds	Indicates that the field index is out of bounds
Field label not found	Indicates that the field label doesn't exist
Screen position out of bounds	Indicates that the screen position is out of bounds
No field found at the given position	Indicates that no field exists at the given position
Terminal screen is unformatted	Indicates that the terminal screen is unformatted
Position commands aren't supported by the emulator	Indicates that position commands used aren't supported by the emulator

EXCEPTION	DESCRIPTION
Operation is unavailable for this session type	Indicates that the operation is unavailable for this session type

Set text on terminal session

Set text on a terminal session

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Terminal session	No	Terminal session		The terminal session to work with
Text	No	Encrypted value		The text to set on the specified location
Set text	N/A	Cursor position, Field	Field	The location to set the text to
Get field by	N/A	Label, Index, Position	Label	Specifies the way by which to look for the field
Label	No	Text value		The label of the field to look for
Index	No	Numeric value		The index of the field on the screen
Row	No	Numeric value		The vertical position of the field on the screen
Column	No	Numeric value		The horizontal position of the field on the screen
Treat @ character as literal	N/A	Boolean value	False	Check this box to sent the '@' character literally. Leave this option disabled to sent it as a special character

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Error communicating with the emulator	Indicates a problem connecting to the emulator
Field index out of bounds	Indicates that the field index is out of bounds

EXCEPTION	DESCRIPTION
Field label not found	Indicates that the field label doesn't exist
Screen position out of bounds	Indicates that the screen position is out of bounds
No field found at the given position	Indicates that no field exists at the given position
Terminal screen is unformatted	Indicates that the terminal screen is unformatted
Position commands aren't supported by the emulator	Indicates that position commands used aren't supported by the emulator
Operation is unavailable for this session type	Indicates that the operation is unavailable for this session type
Input text was rejected	Indicates that the input text was rejected

Send key to terminal session

Send a control key to a terminal session

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Terminal session	No	Terminal session		The terminal session to work with
Control key	N/A	Transmit, Alt cursor, Attention, Backspace, Back tab, Block toggle, Break, Cancel, Center, Clear, Clear comm, Clear display, Clear line, Clear page, Clear partition, Comma, Command line, Command window, Compose, Ctrl+F1, Ctrl+F2, Ctrl+F3, Ctrl+F4, Ctrl+F5, Ctrl+F6, Ctrl+F7, Ctrl+F8, Ctrl+F9, Ctrl+F10, Ctrl+F11, Ctrl+F12, Ctrl+Shift+F1, Ctrl+Shift+F2, Ctrl+Shift+F3, Ctrl+Shift+F4, Ctrl+Shift+F5, Ctrl+Shift+F6, Ctrl+Shift+F7, Ctrl+Shift+F8, Ctrl+Shift+F9, Ctrl+Shift+F10, Ctrl+Shift+F11, Ctrl+Shift+F12, Cursor blink, Cursor select, Decimal, Delete, Delete char,	Transmit	The key to submit to the session

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
		Delete line, Delete word, Destructive back space, Disconnect, Do, Down, Down double, Dup, Duplicate, Edit script, Key end, End of field, Erase EOF, Erase EOL, Erase EOP, Erase input, Escape, ExtGr, F1, F2, F3, F4, F5, F6, F7, F8, F9, F10, F11, F12, F13, F14, F15, F16, F17, F18, F19, F20, F21, F22, F23, F24, F25, F26, F27, F28, F29, F30, F31, F32, F33, F34, F35, F36, F37, F38, F39, F40, F41, F42, F43, F44, F45, F46, F47, F48, Field delimiter, Field exit, Field mark, Field minus, Field plus, Find, Hard reset, Help, Hex, Hex 00, Hex 01, Hex 02, Hex 03, Hex 04, Hex 05, Hex 06, Hex 07, Hex 08, Hex 09, Hex 0A, Hex 0B, Hex 0C, Hex 0D, Hex 0E, Hex 0F, Hex 10, Hex 11, Hex 12, Hex 13, Hex 14, Hex 15, Hex 16, Hex 17, Hex 18, Hex 19, Hex 1A, Hex 1B, Hex 1C, Hex 1D, Hex 1E, Hex 1F, Hex 7F, Hold, Hold clear, Hold set, Home, Home down, Home up, Insert, Insert char, Insert here, Insert line, Insert mode, Invalid key, KeyPad0, KeyPad1, KeyPad2, KeyPad3, KeyPad4, KeyPad5, KeyPad6, KeyPad7, KeyPad8, KeyPad9, Left, Left double, Line feed, Minus, Monitor toggle, New line, Next page, Next screen, Next word, Nul, NumLock, PA1, PA2, PA3, Page, Page down, Page up, Pan left, Pan right, Partition jump, PF1, PF2, PF3, PF4, Plus Cr, Previous word, PrevPage, PrevScreen, Print,		

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
		Protected, Print, Print line, Print Msg, Prent screen, Remove, Replace, Reset, Return, Reserve field, Right, Right double, Roll down, Roll up, Rile line, Run script, Scroll down, Scroll left, Scroll right, Scroll up, Select, Send, Send answer back, Send delete, Send line, Send Msg, Shift+Backspace, Shift+Delete, Shift+Down, Shift+F1, Shift+F2, Shift+F3, Shift+F4, Shift+F5, Shift+F6, Shift+F7, Shift+F8, Shift+F9, Shift+F10, Shift+F11, Shift+F12, Shift+F13, Shift+F14, Shift+F15, Shift F16, Shift+F17, Shift+F18, Shift+F19, Shift+F20, Shift+Home, Shift+Insert, Shift+Left, Shift+Print screen, Shift+Right, Shift+Up, Soft reset, System request, Tab, Tek zoom, Term next page, Term prev page, Test, Text assist begin bold, Text assist begin of line, Text assist begin underline, Text assist bottom of page, Text assist carrier return, Text assist center, Text assist end bold, Text assist end of line, Text assist half index down, Text assist half index up, Text assist insert symbols, Text assist next stop, Text assist next text column, Text assist page end, Text assist required space, Text assist required tab, Text assist stop, Text assist text tab advance, Text assist top of page, Text assist word underline, Trace Toggle, Udk 10, Udk 6, Udk 7, Udk 8, Udk 9, Udk 11, Udk 12, Udk 13, Udk 14,		

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
		Udk 15, Udk 16, Udk 17, Udk 18, Udk 19, Udk 20, Up, Up double		

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Error communicating with the emulator	Indicates a problem connecting to the emulator
Key not supported	Indicates that the key isn't supported

Wait for text on terminal session

Wait for a specific text to appear on a terminal session

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Terminal session	No	Terminal session		The previously opened terminal session
Text to wait for	No	Text value		The text or regular expression to wait to appear on the terminal screen or on a specified field
Regular expression	N/A	Boolean value	False	Specifies whether to wait for a regular expression instead of plain text
Wait for text location	N/A	Screen, Field	Screen	The location to wait for the text to appear on
Get field by	N/A	Label, Index, Position	Label	Specifies the way by which to look for the field
Label	No	Text value		The label of the field to look for
Index	No	Numeric value		The index of the field to look for
Row	No	Numeric value		The vertical position of the field on the screen
Column	No	Numeric value		The horizontal position of the field on the screen

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Timeout	Yes	Numeric value	0	The maximum amount of time to wait

NOTE

Power Automate's regular expression engine is .NET. You can find more information in Regular Expression Language - Quick Reference.

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Error communicating with the emulator	Indicates a problem connecting to the emulator
Field index out of bounds	Indicates that the field index is out of bounds
Field label not found	Indicates that the field label doesn't exist
Screen position out of bounds	Indicates that the screen position is out of bounds
No field found at the given position	Indicates that no field exists at the given position
Terminal screen is unformatted	Indicates that the terminal screen is unformatted
Position commands aren't supported by the emulator	Indicates that position commands used aren't supported by the emulator
Operation is unavailable for this session type	Indicates that the operation is unavailable for this session type
Timeout expired	Indicates that the timeout has been expired

OCR

1/15/2022 • 13 minutes to read • Edit Online

Initiate OCR engines to perform OCR related activities

If text on screen (OCR)
Wait for text on screen (OCR)
Extract text with OCR

Getting started with OCR actions

Power Automate enables users to read, extract, and manage data within an assortment of files through optical character recognition (OCR).

To create an OCR engine and extract text from images and documents with OCR, use the **Extract text with OCR** action. In the figure below, the engine is created for the purpose of this action alone, and the OCR source is a locally stored image. The action is set to extract text from the entire image. Power Automate supports both Windows OCR engine and Tesseract engine.

The action wherein the OCR engine is created contains the engine settings. These include the language and the image width and height multipliers. The OCR engine variable can be used in any action containing OCR capabilities.

> **WARNING**
> Image multipliers increase the size of the image to make searching and text extraction more effective. Please note that setting values greater than 3 may lead to erroneous results.

Using the Windows OCR engine

The default engine of all OCR actions in Power Automate is the Windows OCR engine. To extract any text using the Windows OCR engine, you need to install the appropriate languages pack for the language you want to extract.

If the appropriate language pack hasn't been installed, Power Automate will throw an error prompting you to install it. You can find more information regarding downloading and installing language packs in Language packs for Windows.

After installing the appropriate language pack, extend the **OCR engine settings** of the OCR action and select the desired language. The Windows OCR engine supports 25 languages: Chinese (Simplified and Traditional), Czech, Danish, Dutch, English, Finnish, French, German, Greek, Hungarian, Italian, Japanese, Korean, Norwegian, Polish, Portuguese, Romanian, Russian, Serbian (Cyrillic and Latin), Slovak, Spanish, Swedish, and Turkish.

Using the Tesseract OCR engine

Apart from the Windows OCR engine, Power Automate supports the Tesseract engine. This engine can extract text in five languages without further configuration: English, German, Spanish, French, and Italian.

To extract text in a language outside the mentioned list, enable the **Use other languages** option in the **OCR engine settings** of the OCR action. When this option is enabled, the action displays two additional settings: the **Language abbreviation** and **Language data path** fields.

The **Language abbreviation** field indicates to the engine which language to look for during OCR. The **Language data path** field contains the language data files (.traineddata) used to train the OCR engine. You can find the language data files for all the available languages in this GitHub repository.

The Tesseract engine can be also used to extract text from multilingual documents. You can find more information regarding extracting text from multilingual documents in Perform OCR on multilingual documents.

OCR actions

If text on screen (OCR)

Marks the beginning of a conditional block of actions depending on whether a given text appears on the screen or not, using OCR

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
If text	N/A	Exists, Doesn't exist	Exists	Specifies whether to check if the text exists or not on the given source to analyze
OCR engine type	No	Windows OCR engine, Tesseract engine, OCR engine variable	OCR engine variable	The OCR engine type to use. Select a peconfigured OCR engine or set up a new one.
OCR engine variable	No	OCREngineObject		The engine to use for the OCR operation
Text to find	No	Text value		The text to search for in the specified source
Is regular expression	N/A	Boolean value	False	Specifies whether to use a regular expression to find the specified text
Search for text on	N/A	Entire screen, Foreground window	Entire screen	Specifies whether to search for the specified text on the entine visible screen or just the foreground window
Search mode	N/A	Whole of specified source, Specific subregion only, Subregion relative to image	Whole of specified source	Specifies whether to scan the entire screen (or window) or a narrowed down subregion of it

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Image(s)	No	List of Image		The image(s) specifying the subregion (relative to the top left corner of the image) to scan for the supplied text
X1	Yes	Numeric value		The start X coordinate of the subregion to scan for the supplied text
Tolerance	Yes	Numeric value	10	Specifies how much the image(s) searched for can differ from the originally chosen image
Y1	Yes	Numeric value		The start Y coordinate of the subregion to scan for the supplied text
X1	Yes	Numeric value		The start X coordinate of the subregion relative to the specified image to scan for the supplied text
X2	Yes	Numeric value		The end X coordinate of the subregion to scan for the supplied text
Y1	Yes	Numeric value		The start Y coordinate of the subregion relative to the specified image to scan for the supplied text
Y2	Yes	Numeric value		The end Y coordinate of the subregion to scan for the supplied text
X2	Yes	Numeric value		The end X coordinate of the subregion relative to the specified image to scan for the supplied text

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Y2	Yes	Numeric value		The end Y coordinate of the subregion relative to the specified image to scan for the supplied text
Windows OCR language	N/A	Chinese (Simplified), Chinese (Traditional), Czech, Danish, Dutch, English, Finnish, French, German, Greek, Hungarian, Italian, Japanese, Korean, Norwegian, Polish, Portuguese, Romanian, Russian, Serbian (Cyrillic), Serbian (Latin), Slovak, Spanish, Swedish, Turkish	English	The language of the text that the Windows OCR engine detects
Use other language	N/A	Boolean value	False	Specifies whether to use a language not given in the 'Tesseract language' field
Tesseract language	N/A	English, German, Spanish, French, Italian	English	The language of the text that the Tesseract engine detects
Language abbreviation	No	Text value		The Tesseract abbreviation of the language to use. For example, if the data is 'eng.traineddata', set this to 'eng'
Language data path	No	Text value		The path of the folder that holds the specified language's Tesseract data
Image width multiplier	No	Numeric value	1	The width multiplier of the image
Image height multiplier	No	Numeric value	1	The height multiplier of the image

NOTE

- Power Automate's regular expression engine is .NET. You can find more information in Regular Expression Language - Quick Reference.
- The **OCR engine variable** option is planned for deprecation.

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
LocationOfTextFoundX	Numeric value	The X coordinate of the point where the text appears on the screen. If the search is performed in the foreground window, the coordinate returned is relative to the top left corner of the window
LocationOfTextFoundY	Numeric value	The X coordinate of the point where the text appears on the screen. If the search is performed in the foreground window, the coordinate returned is relative to the top left corner of the window

Exceptions

EXCEPTION	DESCRIPTION
Can't check if text exists in non interactive mode	Indicates that it isn't possible to check for the text on the screen when in non-interactive mode
Invalid subregion coordinates	Indicates that the specified subregion coordinates are invalid
Failed to analyze text with OCR	Indicates an error occured while trying to analyze the text using OCR
Failed to create the OCR engine	Indicates an error occurred while trying to create the OCR engine
Data path folder doesn't exist	Indicates that the folder specified for the language data doesn't exist
The selected Windows language pack isn't installed on the machine	Indicates that the selected Windows language pack hasn't been installed on the machine
OCR engine not alive	Indicates that the OCR engine isn't alive

Wait for text on screen (OCR)

Wait until a specific text appears/disappears on the screen, on the foreground window, or relative to an image on the screen or foreground window using OCR

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Wait for text to	N/A	Appear, Disappear	Appear	Specifies whether to wait for the text to appear or disappear
OCR engine type	No	Windows OCR engine, Tesseract engine, OCR engine variable	OCR engine variable	The OCR engine type to use. Select a peconfigured OCR engine or set up a new one.

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
OCR engine variable	No	OCREngineObject		The engine to use for the OCR operation
Text to find	No	Text value		The text to search for in the specified source
Is regular expression	N/A	Boolean value	False	Specifies whether to use a regular expression to find the specified text
Search for text on	N/A	Entire screen, Foreground window	Entire screen	Specifies whether to search for the specified text on the entine visible screen or just the foreground window
Search mode	N/A	Whole of specified source, Specific subregion only, Subregion relative to image	Whole of specified source	Specifies whether to scan the entire screen (or window) or a narrowed down subregion of it
Image(s)	No	List of Image		The image(s) specifying the subregion (relative to the top left corner of the image) to scan for the supplied text
X1	Yes	Numeric value		The start X coordinate of the subregion to scan for the supplied text
Tolerance	Yes	Numeric value	10	Specifies how much the image(s) searched for can differ from the originally chosen image
Y1	Yes	Numeric value		The start Y coordinate of the subregion to scan for the supplied text
X1	Yes	Numeric value		The start X coordinate of the subregion relative to the specified image to scan for the supplied text

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
X2	Yes	Numeric value		The end X coordinate of the subregion to scan for the supplied text
Y1	Yes	Numeric value		The start Y coordinate of the subregion relative to the specified image to scan for the supplied text
Y2	Yes	Numeric value		The end Y coordinate of the subregion to scan for the supplied text
X2	Yes	Numeric value		The end X coordinate of the subregion relative to the specified image to scan for the supplied text
Y2	Yes	Numeric value		The end Y coordinate of the subregion relative to the specified image to scan for the supplied text
Windows OCR language	N/A	Chinese (Simplified), Chinese (Traditional), Czech, Danish, Dutch, English, Finnish, French, German, Greek, Hungarian, Italian, Japanese, Korean, Norwegian, Polish, Portuguese, Romanian, Russian, Serbian (Cyrillic), Serbian (Latin), Slovak, Spanish, Swedish, Turkish	English	The language of the text that the Windows OCR engine detects
Use other language	N/A	Boolean value	False	Specifies whether to use a language not given in the 'Tesseract language' field
Tesseract language	N/A	English, German, Spanish, French, Italian	English	The language of the text that the Tesseract engine detects

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Language abbreviation	No	Text value		The Tesseract abbreviation of the language to use. For example, if the data is 'eng.traineddata', set this to 'eng'
Language data path	No	Text value		The path of the folder that holds the specified language's Tesseract data
Image width multiplier	No	Numeric value	1	The width multiplier of the image
Image height multiplier	No	Numeric value	1	The height multiplier of the image
Fail with timeout error	N/A	Boolean value	False	Specify whether you want the action to wait indefinitely or fail after a set time period

NOTE

- Power Automate's regular expression engine is .NET. You can find more information in Regular Expression Language - Quick Reference.
- The **OCR engine variable** option is planned for deprecation.

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
LocationOfTextFoundX	Numeric value	The X coordinate of the point where the text appears on the screen. If the search is performed in the foreground window, the coordinate returned is relative to the top left corner of the window
LocationOfTextFoundY	Numeric value	The X coordinate of the point where the text appears on the screen. If the search is performed in the foreground window, the coordinate returned is relative to the top left corner of the window

Exceptions

EXCEPTION	DESCRIPTION
Can't check if text exists in non interactive mode	Indicates that it isn't possible to check for the text on the screen when in non-interactive mode

EXCEPTION	DESCRIPTION
Invalid subregion coordinates	Indicates that the specified subregion coordinates are invalid
Failed to analyze text with OCR	Indicates an error occured while trying to analyze the text using OCR
Failed to create the OCR engine	Indicates an error occurred while trying to create the OCR engine
Data path folder doesn't exist	Indicates that the folder specified for the language data doesn't exist
The selected Windows language pack isn't installed on the machine	Indicates that the selected Windows language pack hasn't been installed on the machine
OCR engine not alive	Indicates that the OCR engine isn't alive
Timeout error	Indicates that the action failed after a set time period

Extract text with OCR

Extract text from a given source using the given OCR engine

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
OCR engine	No	Windows OCR engine, Tesseract engine, OCR engine variable	OCR engine variable	The OCR engine type to use. Select a preconfigured OCR engine or set up a new one.
OCR engine variable	No	OCREngineObject		The engine to use for the OCR operation
OCR source	N/A	Screen, Foreground window, Image on disk	Screen	The source of the image to perform the OCR operation on
Image file path	No	File		The path of the image to perform the OCR operation on
Search mode	N/A	Whole of specified source, Specific subregion only, Subregion relative to image	Whole of specified source	The selected mode for the OCR operation
Image	No	List of Image		The image to use for narrowing down the scan to a subregion that is relative to the specified image

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Tolerance	Yes	Numeric value	10	Specifies how much the image can differ from the originally chosen image
X1	Yes	Numeric value		The start X coordinate of the subregion to narrow down the scan
X2	Yes	Numeric value		The end X coordinate of the subregion to narrow down the scan
Y1	Yes	Numeric value		The start Y coordinate of the subregion to narrow down the scan
Y2	Yes	Numeric value		The end Y coordinate of the subregion to narrow down the scan
Windows OCR language	N/A	Chinese (Simplified), Chinese (Traditional), Czech, Danish, Dutch, English, Finnish, French, German, Greek, Hungarian, Italian, Japanese, Korean, Norwegian, Polish, Portuguese, Romanian, Russian, Serbian (Cyrillic), Serbian (Latin), Slovak, Spanish, Swedish, Turkish	English	The language of the text that the Windows OCR engine detects
Use other language	N/A	Boolean value	False	Specifies whether to use a language not given in the 'Tesseract language' field
Tesseract language	N/A	English, German, Spanish, French, Italian	English	The language of the text that the Tesseract engine detects
Language abbreviation	No	Text value		The Tesseract abbreviation of the language to use. For example, if the data is 'eng.traineddata', set this to 'eng'

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Language data path	No	Text value		The path of the folder that holds the specified language's Tesseract data
Image width multiplier	No	Numeric value	1	The width multiplier of the image
Image height multiplier	No	Numeric value	1	The height multiplier of the image

> **NOTE**
> The **OCR engine variable** option is planned for deprecation.

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
OcrText	Text value	The result after the text extraction

Exceptions

EXCEPTION	DESCRIPTION
Failed to extract text with OCR	Indicates an error occurred while trying to extract text with OCR from the given source
Image file not found	Indicates that the file doesn't exist on the given path
Landmark image not found	Indicates that the landmark image doesn't exist
Can't get text from screen in non-interactive mode	Indicates that it isn't possible to get text from screen when in non-interactive mode
Failed to create the OCR engine	Indicates an error occurred while trying to create the OCR engine
Data path folder doesn't exist	Indicates that the folder specified for the language data doesn't exist
The selected Windows language pack isn't installed on the machine	Indicates that the selected Windows language pack hasn't been installed on the machine
OCR engine not alive	Indicates that the OCR engine isn't alive

Cryptography

1/15/2022 • 7 minutes to read • Edit Online

Encrypt and decrypt text and files

Encrypt text with AES
Decrypt text with AES
Encrypt from file with AES
Decrypt to file with AES
Hash text
Hash from file
Hash text with key
Hash from file with key

Getting started with cryptography actions

The **Cryptography** actions enable users to encrypt and decrypt plain text and text from files providing a key and an encoding format.

The **Encrypt text with AES** action encrypts a text using the AES algorithm and a user-specified encryption key. The encryption key can be provided directly or through a variable.

To encrypt the text of a file directly, use the **Encrypt from file with AES** action. This action works similarly to the **Encrypt text with AES** action, but it requires a source file instead of a text value.

To decrypt a text, use the **Decrypt text with AES** and populate the encrypted text and the encryption key previously used to encrypt it. To decrypt a text and store it in a file, use the **Decrypt to file with AES** and specify a destination path for the file.

Apart from encryption and decryption, the **Cryptography** group of actions provides actions to hash values with and without a key. Like the encryption actions, you can hash values from files using the **Hash from file** and **Hash from file with key** actions.

Cryptography actions

Encrypt text with AES

Encrypt a string with AES, using a key and a specified encoding format

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Encoding	N/A	Default, ANSI, Unicode, Big-endian Unicode, UTF-8	Unicode	The encoding of the text to encrypt
Text to encrypt	No	Text value		The text to encrypt
Encryption key	No	Encrypted value		The encryption key to use
Padding	N/A	None, PKCS7, Zeros, ANSIX923, ISO10126	PKCS7	The padding to use for the selected encryption algorithm
Key size	N/A	128 bits, 192 bits, 256 bits	256 bits	The size of the key in bits to use for the encryption
Use salt	N/A	Boolean value	False	Specifies whether to use salt for encryption. When this option is enabled, the randomly generated salt becomes an output in the form of a base64 string.

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Use initialization vector	N/A	Boolean value	False	Specifies whether to use an initialization vector. When this option is enabled, the randomly generated initialization vector becomes an output in the form of a base64 string

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
EncryptedText	Text value	The encrypted text for later processing
Salt	Text value	The randomly generated salt value for later processing
InitializationVector	Text value	The randomly generated initialization vector value for later processing

Exceptions

EXCEPTION	DESCRIPTION
Failed to encrypt text	Indicates that an error occurred during encryption

Decrypt text with AES

Decrypt a string with AES based on a specified key and an encoding format

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Encoding	N/A	Default, ANSI, Unicode, Big-endian Unicode, UTF-8	Unicode	The encoding for the decrypted text
Text to decrypt	No	Text value		The text to decrypt in the form of a base64 string
Decryption key	No	Encrypted value		The decryption key to use
Padding	N/A	None, PKCS7, Zeros, ANSIX923, ISO10126	PKCS7	The padding to use for the selected decryption algorithm
Key size	N/A	128 bits, 192 bits, 256 bits	256 bits	The size of the key in bits to use for the decryption

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Use salt	N/A	Boolean value	False	Specifies whether to use salt for the decryption
Salt	No	Text value		The salt to use for decryption in the form of a base64 string
Use initialization vector	N/A	Boolean value	False	Specifies whether to use an initialization vector
Initialization vector	No	Text value		The initialization vector to use for decryption in the form of a base64 string

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
DecryptedText	Text value	The decrypted text for later processing

Exceptions

EXCEPTION	DESCRIPTION
Failed to decrypt text	Indicates that an error occurred during decryption

Encrypt from file with AES

Encrypt the contents of a file with AES, using a key and a specified encoding format

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Encoding	N/A	Default, ANSI, Unicode, Big-endian Unicode, UTF-8	Unicode	The encoding of the file to encrypt
File to encrypt	No	File		The text file that stores the contents to encrypt
Encryption key	No	Encrypted value		The encryption key to use
Padding	N/A	None, PKCS7, Zeros, ANSIX923, ISO10126	PKCS7	The padding to use for the selected encryption algorithm
Key size	N/A	128 bits, 192 bits, 256 bits	256 bits	The size of the key in bits to use for the encryption

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Use salt	N/A	Boolean value	False	Specifies whether to use salt for encryption. When this option is enabled, the randomly generated salt becomes an output in the form of a base64 string.
Use initialization vector	N/A	Boolean value	False	Specifies whether to use an initialization vector. When this option is enabled, the randomly generated initialization vector becomes an output in the form of a base64 string

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
EncryptedText	Text value	The text of the encrypted file for later processing
Salt	Text value	The randomly generated salt value for later processing
InitializationVector	Text value	The randomly generated initialization vector value for later processing

Exceptions

EXCEPTION	DESCRIPTION
File not found	Indicates that the file doesn't exist
Failed to encrypt the contents of the file	Indicates that an error occurred while encrypting the contents of the file

Decrypt to file with AES

Decrypt a string to a file with AES based on a specified key and an encoding format

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Encoding	N/A	Default, ANSI, Unicode, Big-endian Unicode, UTF-8	Unicode	The encoding of the text to decrypt
Text to decrypt	No	Text value		The text to decrypt in the form of a base64 string

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Decryption key	No	Encrypted value		The decryption key to use
Decrypt to file	No	File		The file to save the decrypted text into
If file exists	N/A	Overwrite, Don't decrypt to file, Add sequential suffix	Add sequential suffix	Specifies what to do in case the destination file already exists
Padding	N/A	None, PKCS7, Zeros, ANSIX923, ISO10126	PKCS7	The padding to use for the selected decryption algorithm
Key size	N/A	128 bits, 192 bits, 256 bits	256 bits	The size of the key in bits to use for decryption
Use salt	N/A	Boolean value	False	Specifies whether to use salt for decryption
Salt	No	Text value		The salt to use for decryption in the form of a base64 string
Use initialization vector	N/A	Boolean value	False	Specifies whether to use an initialization vector. Enter the initialization vector in the form of a base64 string
Initialization vector	No	Text value		The initialization vector to use for decryption

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
DecryptedFile	File	The decrypted file for later processing

Exceptions

EXCEPTION	DESCRIPTION
Failed to decrypt and store the contents to a file	Indicates that an error occurred while decrypting or storing the contents to the specified file

Hash text

Hash a string, using a specified algorithm and an encoding format

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Hash algorithm	N/A	SHA256, SHA384, SHA512	SHA256	The algorithm to use for hashing
Encoding	N/A	Default, ANSI, Unicode, Big-endian Unicode, UTF-8	Unicode	The encoding of the text to hash
Text to hash	No	Text value		The text to hash

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
HashedText	Text value	The hashed text for later processing

Exceptions

EXCEPTION	DESCRIPTION
Failed to hash text	Indicates that an error occurred during hashing

Hash from file

Hash the contents of a file, using a specified algorithm and an encoding format

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Hash algorithm	N/A	SHA256, SHA384, SHA512	SHA256	The algorithm to use for hashing
Encoding	N/A	Default, ANSI, Unicode, Big-endian Unicode, UTF-8	Unicode	The encoding of the file to hash
File to hash	No	File		The file to hash the contents of

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
HashedText	Text value	The hashed text for later processing

Exceptions

EXCEPTION	DESCRIPTION
File not found	Indicates that the file doesn't exist
Failed to hash the file	Indicates that an error occurred while hashing the contents of the file

Hash text with key

Hash a string with a key, using a specified algorithm and an encoding format

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Hash algorithm	N/A	HMAC SHA256, HMAC SHA384, HMAC SHA512	HMAC SHA256	The algorithm to use for hashing
Encoding	N/A	Default, ANSI, Unicode, Big-endian Unicode, UTF-8	Unicode	The encoding of the text to hash
Text to hash	No	Text value		The text to hash
Hash key	No	Encrypted value		The key to hash the text with

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
HashedText	Text value	The hashed text for later processing

Exceptions

EXCEPTION	DESCRIPTION
Failed to hash text with key	Indicates that an error occurred during hashing with key

Hash from file with key

Hash the contents of a file with a key, using a specified algorithm and an encoding format

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Hash algorithm	N/A	HMAC SHA256, HMAC SHA384, HMAC SHA512	HMAC SHA256	The algorithm to use for hashing
Encoding	N/A	Default, ANSI, Unicode, Big-endian Unicode, UTF-8	Unicode	The encoding of the file to hash
File to hash	No	File		The file to hash the contents of
Hash key	No	Encrypted value		The hash key to hash the text with

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
HashedText	Text value	The hashed text for later processing

Exceptions

EXCEPTION	DESCRIPTION
File not found	Indicates that the file doesn't exist
Failed to hash the file with key	Indicates that an error occurred while hashing the contents of the file with the specified key

Windows services

1/15/2022 • 3 minutes to read • Edit Online

Control the workstation's installed services

If service
Wait for service
Start service
Stop service
Pause service
Resume service

Getting started with services

Power Automate allows users to handle Windows services through the Windows services group of actions. With these actions, users can maintain full control of the operating system and limit the running services.

To control services, use the Windows services group of actions. These actions allow flows to start, stop, pause and resume Windows services. In the figure below, the **Start service** action starts **UIFlowService**. For this group of actions, only the service name is required, and no output is returned.

> **NOTE**
>
> Please note that Windows services are essential to the smooth operation of the operating system. Managing Windows services incorrectly could adversely affect your PC.

Windows services actions

If service

Marks the beginning of a conditional block of actions depending on whether a service is running, paused, stopped or installed on the computer

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
If service	N/A	Is stopped, Is installed, Isn't installed, Is running, Is paused	Is running	The state of the service to check

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Service name	No	Text value		The name of the service to check

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Service not found	Indicates that the service can't be found
Can't retrieve status for service	Indicates that there is a problem retrieving the status of the service

Wait for service

Suspend the execution of the automation until a service is running, paused or stopped on the computer

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Wait for service to	N/A	Stop, Start, Pause	Start	Specifies whether the flow pauses until a certain service starts, stops or pauses
Service name	No	Text value		The name of the service to check

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Service not found	Indicates that the service can't be found
Can't retrieve status for service	Indicates that there is a problem retrieving the status of the service

Start service

Start a stopped Windows service

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Service to start	No	Text value		The name of the service to start

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Service not found	Indicates that the service can't be found
Service is already running	Indicates that the service is already running
Can't start service	Indicates that there is a problem starting the service

Stop service

Stop a running Windows service

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Service to stop	No	Text value		The name of the service to stop

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Service not found	Indicates that the service can't be found
Service isn't running	Indicates that the service isn't running
Can't stop service	Indicates that there is a problem stopping the service

Pause service

Pause a running Windows service

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Service to pause	No	Text value		The name of the service to pause

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Service not found	Indicates that the service can't be found
Service isn't running	Indicates that the service isn't running
Can't pause service	Indicates that there is a problem pausing the service

Resume service

Resume a paused Windows service

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Service to resume	No	Text value		The name of the service to resume

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Service not found	Indicates that the service can't be found
Service isn't running	Indicates that the service isn't running
Can't resume service	Indicates that there is a problem resuming the service

XML

1/15/2022 • 7 minutes to read • Edit Online

Manage and manipulate XML files

Read XML from file
Write XML to file
Execute XPath expression
Get XML element attribute
Set XML element attribute
Remove XML element attribute
Get XML element value
Set XML element value
Insert XML element
Remove XML element

Getting started with XML actions

Power Automate provides the capability to use flows to automate the management of XML attributes and elements through XML actions.

To read an XML file, use the **Read XML from file** action. Specify the path or browse for the file, and select one of the encoding options.

After selecting a file, to run an Xpath query, select the **Execute XPath expression** action. In the example that follows, the document is specified as a variable from the **Read XML from file** action, and an XPath query is entered.

To retrieve an attribute from an XML file, use the **Get XML attribute** action. Note the example that follows and the format of the XPath query. In the XML file, **status** is an attribute of **client**, which is an element of **clientlist**. The value will be obtained as a text value.

Similarly, to retrieve element values, use the **Get XML element value** action. Elements and attributes can be managed by using the respective action to get, set or remove XML attributes or elements.

XML actions

Read XML from file

Read the contents of an XML file into a variable

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
File path:	No	File		The file that contains the XML document to read
Encoding:	N/A	Default, ANSI, Unicode, Unicode big endian, UTF-8	Default	The encoding used for the specified file

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
XmlDocument	XML node	The variable that holds the read XML document

Exceptions

EXCEPTION	DESCRIPTION
Directory not found	Indicates that the directory doesn't exist
File not found	Indicates that the file doesn't exist
Failed to read from file	Indicates a problem reading from file
File doesn't contain a valid XML document	Indicates that the file doesn't contain a valid XML document

Write XML to file

Write the contents of an XML node variable into a file

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
File path:	No	File		The file to write the XML document into
XML to write:	No	Text value		The XML node or document to write into the file
Encoding:	N/A	Default, ANSI, Unicode, Unicode big endian, UTF-8	Default	The encoding used for the specified file
Format XML:	N/A	Boolean value	True	Specifies whether to format the XML

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Indentation per level:	Yes	Numeric value	2	Specifies by how many spaces to indent each level of the XML

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Invalid directory specified	Indicates that the specified directory is invalid
Failed to write XML to file	Indicates a problem writing XML to file

Execute XPath expression

Extract values from an XML document based on the provided XPath query

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
XML document to parse:	No	Text value		The XML as text or a previously defined variable that contains the XML document to parse
XPath query:	No	Text value		The XPath expression to execute against the XML document
Get first value only:	N/A	Boolean value	False	Specifies whether to retrieve a single value (the first value only) or all the values that match the provided XPath expression

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
XPathResult	XML node	The extracted node(s) as an XML node
XPathResults	List of XML nodes	The extracted node(s) as a list of XML nodes

Exceptions

EXCEPTION	DESCRIPTION
Invalid XML document provided	Indicates that the XML document provided is invalid
Invalid XPath expression provided	Indicates that the XPath expression provided is invalid

Get XML element attribute

Get the value of an attribute of an XML element

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
XML document:	No	XML node		The XML document or XML element to retrieve its attribute
XPath query	Yes	Text value		The XPath expression to locate the sub-element and retrieve its attribute
Attribute name:	No	Text value		The name of the attribute to retrieve its value
Get value as:	N/A	Text value, Numeric value, Datetime value, Boolean value	Text value	Specifies the data type for the attribute value

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
XmlAttributeValue	Boolean value	The retrieved value of the XML attribute
XmlAttributeValue	Datetime	The retrieved value of the XML attribute
XmlAttributeValue	Numeric value	The retrieved value of the XML attribute
XmlAttributeValue	Text value	The retrieved value of the XML attribute

Exceptions

EXCEPTION	DESCRIPTION
Invalid XPath expression provided	Indicates that the XPath expression provided is invalid
XPath expression returns no element	Indicates that the XPath expression returns no element
Attribute not found in element	Indicates that the attribute doesn't exist in the element
Failed to convert attribute value to the requested data type	Indicates a problem converting the attribute value to the requested data type

Set XML element attribute

Set the value of an attribute of an XML element

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
XML document:	No	XML node		The XML document or XML element to set its attribute
XPath query:	Yes	Text value		The XPath expression to locate the sub-element and set its attribute
Attribute name:	No	Text value		The name of the attribute to set its value
Attribute value:	No	Text value		The new value for the attribute

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Invalid XPath expression provided	Indicates that the XPath expression provided is invalid
XPath expression returns no element	Indicates that the XPath expression returns no element
Failed to set XML attibute	Indicates a problem setting the XML attibute

Remove XML element attribute

Remove an attribute from an XML element

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
XML document:	No	XML node		The XML document or XML element to remove its attribute
XPath query:	Yes	Text value		The XPath expression to locate the sub-element and remove its attribute
Attribute name:	No	Text value		The name of the attribute to remove

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Invalid XPath expression provided	Indicates that the XPath expression provided is invalid

EXCEPTION	DESCRIPTION
XPath expression returns no element	Indicates that the XPath expression returns no element
Attribute not found in element	Indicates that the attribute doesn't exist in the element
Failed to remove XML attibute	Indicates a problem removing the XML attibute

Get XML element value

Get the value of an XML element

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
XML document:	No	XML node		The XML document or XML element to retrieve its value
XPath query:	Yes	Text value		The XPath expression to locate the sub-element and retrieve its value
Get value as:	N/A	Text value, Numeric value, Datetime value, Boolean value	Text value	Specifies the data type for the XML element value

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
XmlElementValue	Boolean value	The XML element value
XmlElementValue	Datetime	The XML element value
XmlElementValue	Numeric value	The XML element value
XmlElementValue	Text value	The XML element value

Exceptions

EXCEPTION	DESCRIPTION
Invalid XPath expression provided	Indicates that the XPath expression provided is invalid
XPath expression returns no element	Indicates that the XPath expression returns no element
Failed to convert element value to the requested data type	Indicates a problem converting the element value to the requested data type

Set XML element value

Set the value of an XML element

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
XML document:	No	XML node		The XML document or XML element to retrieve it value
XPath query:	Yes	Text value		The XPath expression to locate the sub-element and retrieve its value
XML element value:	No	Text value		The new value for the XML element

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Invalid XPath expression provided	Indicates that the XPath expression provided is invalid
XPath expression returns no element	Indicates that the XPath expression returns no element
Failed to set element value	Indicates a problem setting the element value

Insert XML element

Insert a new XML element into an XML document

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
XML document:	No	XML node		The XML document to insert the new XML element
XPath query:	No	Text value		The XPath expression to locate the parent XML element and insert the new element into it
XML element to insert:	No	XML node		The new XML element to insert into the XML document

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Invalid XPath expression provided	Indicates that the XPath expression provided is invalid
XPath expression returns no element	Indicates that the XPath expression returns no element

EXCEPTION	DESCRIPTION
Failed to insert XML element	Indicates a problem inserting the XML element

Remove XML element

Remove one or more XML elements from an XML document

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
XML document:	No	XML node		The XML document that contains the XML element(s) to remove
XPath query:	No	Text value		The XPath expression to locate the element(s) to remove

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Invalid XPath expression provided	Indicates that the XPath expression provided is invalid
Failed to remove XML element	Indicates a problem removing the XML element

FTP

1/15/2022 • 14 minutes to read • Edit Online

Manage files and folders on an FTP server

Open FTP connection
List FTP directory
Open secure FTP connection
Close connection
Change working directory
Download file(s) from FTP
Download folder(s) from FTP
Upload File(s) to FTP
Upload folder(s) to FTP
Delete FTP file
Rename FTP File
Create FTP directory
Delete FTP directory
Invoke FTP command
Synchronize directories

Getting started with FTP actions

Use the FTP action group to upload and download files and manipulate directories on FTP servers.

To establish an FTP connection, use the **Open FTP connection** action. In the figure below, the host and port are specified, the user's credentials are entered and a timeout is set for the action to return an error if the connection fails.

Download files using the **Download file(s) from FTP** action. The figure below shows the connection variable in use and the local folder which is the destination. The remote file has also been specified and set to overwrite existing any existing file in the same location.

Upload files by using the **Upload file(s) to FTP** action by specifying the file and the remote location.

FTP actions

Open FTP connection

This action establishes a specific connection to a remote FTP server, and stores that connection as a variable for later use.

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Host	No	Text value		Enter the FTP server address here.
Port	Yes	Numeric value	21	Enter the FTP server port here.
Active mode	N/A	Boolean value	False	Specify the mode of the connection
Username	No	Text value		Specify the username of the FTP account to use
Password	Yes	Encrypted value		Specify the password of the FTP account to use
Timeout	Yes	Numeric value	10	Set the time in seconds that you want to wait for the connection to be established before the action fails

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
FTPConnection	FTP connection	The FTP connection

Exceptions

EXCEPTION	DESCRIPTION
Login failure error	Indicated that the login failed
Connection error	Indicates that there is a problem with the connection

List FTP directory

This action returns the subdirectories and files contained in the current directory of an FTP connection

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Connection	No	FTP connection		The FTP connection
Path	Yes	Text value		The path that you want to list.

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
Directories	List of FTP directories	The listed directories
Files	List of FTP Files	The listed files

Exceptions

EXCEPTION	DESCRIPTION
Listing error	Indicates that the listing of the folder couldn't be performed
Not connected error	Indicates that there is no open connection with the FTP server
Directory doesn't exist error	Indicates that the directory couldn't be found

Open secure FTP connection

This action establishes a specific secure connection to a remote FTP server, and stores that connection as a variable for later use

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Host	No	Text value		Enter the FTP server address here.
Port	Yes	Numeric value	22	Enter the FTP server port here.
Active mode	N/A	Boolean value	True	Specify the mode of the connection
Secure FTP Protocol	N/A	SFTP, FTPS explicit, FTPS implicit	SFTP	Choose the FTP protocol you wish to use to encrypt your connection
Authentication method	N/A	Username and password, Private key, Private key and passphrase	Username and password	Choose the method you wish to use to authenticate yourself on the FTP server
User name	No	Text value		Specify the username of the FTP account to use
Password	Yes	Encrypted value		Specify the password of the FTP account you wish to use
Path to private key	No	Text value		Enter the file path to the private-key to be used for authentication

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Private key pass phrase	Yes	Encrypted value		Enter a variable containing the private-key pass phrase here
Timeout	Yes	Numeric value	10	Set the time in seconds that you want to wait for the connection to be established before the action fails

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
SftpConnection	FTP connection	SFTP connection

Exceptions

EXCEPTION	DESCRIPTION
Login failure error	Indicated that the login failed
Connection error	Indicates that there is a problem with the connection

Close connection

This action closes an open FTP connection

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Connection	No	FTP connection		The FTP connection

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Not connected error	Indicates that there is no open connection with the FTP server

Change working directory

This action sets the current working directory for an FTP connection

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Connection	No	FTP connection		The FTP connection
Set working directory to	No	Text value		Set the path to be set as the working directory

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Not connected error	Indicates that there is no open connection with the FTP server
Directory doesn't exist error	Indicates that the directory couldn't be found
Can't change working directory error	Indicates that it isn't possible to change the working directory

Download file(s) from FTP

Downloads one or more files from an FTP server

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
FTP connection	No	FTP connection		The FTP connection to work with. This variable must have been previously specified in an Open FTP connection action
Download into folder	No	Folder		The folder to be the destination of the file(s) that will be downloaded
File(s) to download	No	List of FTP Files		The file(s) to download
Transfer type	N/A	Auto, Binary, ASCII	Auto	Enter ASCII or binary to specify the method for downloading a single file. If the file type is uncertain, or more than one is dowloaded, choose Auto to follow the transfer rules specified in options
If file exists	N/A	Overwrite, Do not download, Download with unique name	Overwrite	Specify what to do if the file already exists. Overwrite writes over the original file so you can't access it any more, and download with unique name adds an underscore and a sequential number to the end

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Not connected error	Indicates that there is no open connection with the FTP server
Remote file doesn't exist error	Indicates that the file doesn't exist on the FTP server
Directory doesn't exist error	Indicates that the directory couldn't be found
FTP connection aborted error	Indicates that the FTP connection was aborted
Can't download file error	Indicates that it wasn't possible to download the file

Download folder(s) from FTP

Downloads one or more folders from an FTP server

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
FTP connection	No	FTP connection		The FTP connection to work with. This variable must have been previously specified in an Open FTP connection action
Folder(s) to download	No	List of FTP directories		The name of the folder path(s), or FTP folder(s) to download
Download into local folder	No	Folder		The full path of the destination of the FTP folder(s) you are downloading

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Not connected error	Indicates that there is no open connection with the FTP server
Remote directory doesn't exist error	Indicates that the directory doesn't exist on the FTP server
Directory doesn't exist error	Indicates that the directory couldn't be found
FTP connection aborted error	Indicates that the FTP connection was aborted
Can't download directory error	Indicates that it wasn't possible to download the directory

Upload File(s) to FTP

Uploads one or more files to an FTP server

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
FTP connection	No	FTP connection		The FTP connection to work with. This variable must have been previously specified in an Open FTP connection action
File(s) to upload	No	List of Files		The file(s) to upload
Remote location	Yes	Text value		The location where the filesshould be uploaded
Transfer type	N/A	Auto, Binary, ASCII	Auto	Enter ASCII or binary to specify the method for downloading a single file. If you're not sure what type the file will be, or if you are downloading more than one, choose Auto to follow the transfer rules specified in Options
If file exists	N/A	Overwrite, Do not download, Download with unique name	Overwrite	Specify what to do if the file already exists. Overwrite writes over the original file so you can't access it any more, and Download with Unique Name adds an underscore and a sequential number to the end

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Not connected error	Indicates that there is no open connection with the FTP server
File not found error	Indicates that the file wasn't found
FTP connection aborted error	Indicates that the FTP connection was aborted
Upload file error	Indicates that the file couldn't be uploaded

Upload folder(s) to FTP

Uploads one or more folders to an FTP server

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
FTP connection	No	FTP connection		The FTP connection to work with. This variable must have been previously specified in an Open FTP connection action
Folder(s) to upload	No	List of Folders		The folder(s) to upload. The folders being uploaded should not already exist within the active directory of the FTP server
Remote location	No	Text value		The location where the folders should be uploaded

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Not connected error	Indicates that there is no open connection with the FTP server
Remote directory doesn't exist error	Indicates that the directory doesn't exist on the FTP server
FTP connection aborted error	Indicates that the FTP connection was aborted
Upload directory error	Indicates that the directory couldn't be uploaded

Delete FTP file

Deletes one or more files from an FTP server

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
FTP connection	No	FTP connection		The FTP connection to work with. This variable must have been previously specified in an Open FTP connection action
Files to delete	No	List of FTP Files		The files to delete

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Not connected error	Indicates that there is no open connection with the FTP server
File not found error	Indicates that the file wasn't found
Can't delete file error	Indicates that the deletion of the file wasn't possible

Rename FTP File

Renames a file that resides on an FTP server

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
FTP connection	No	FTP connection		The FTP connection to work with. This variable must have been previously specified in an Open FTP connection action
File to rename	No	FTP File		The file to rename
New file name	No	Text value		The new name for the file. If you enter a name with a path, the file will also be moved to that location. If the location doesn't exist, it will throw an exception

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Not connected error	Indicates that there is no open connection with the FTP server
Can't rename file error	Indicates that it wasn't possible to rename the file
File not found error	Indicates that the file wasn't found

Create FTP directory

Creates a directory on an FTP server

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
FTP connection	No	FTP connection		The FTP connection to work with. This variable must have been previously specified in an Open FTP connection action
New directory	No	FTP directory		The new directory. If a path is specified, all of the new folders leading to the new directory will be created

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Access denied error	Indicates that this account doesn't have access for an operation
File exists error	Indicates that the file already exists
Create directory error	Indicates that it wasn't possible creating the directory
Directory doesn't exist error	Indicates that the directory couldn't be found
Not connected error	Indicates that there is no open connection with the FTP server

Delete FTP directory

Deletes a directory from an FTP server

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
FTP connection	No	FTP connection		The FTP connection to work with. This variable must have been previously specified in an Open FTP connection action
Directory to delete	No	FTP directory		The folder to be deleted. Everything in the folder will be deleted as well

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Delete directory error	Indicates that it wasn't possible to delete the directory
Remote directory doesn't exist error	Indicates that the directory doesn't exist on the FTP server
Working directory change error	Indicates that the working directory couldn't be changed
Not connected error	Indicates that there is no open connection with the FTP server

Invoke FTP command

Invokes the given literal FTP command on the server

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
FTP connection	No	FTP connection		The FTP connection to work with. This variable must have been previously specified in an open FTP connection action
FTP command	No	Text value		The command to run along with any arguments. For example, you could run FEAT, or CHMOD here

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Valid reply code(s)	Yes	Text value		The code(s) that could be returned by the command, separated by semi-colon. If the FTP command returns a code that wasn't entered here, this action will throw an exception. Only applies over simple FTP or FTPS connections

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
ReplyCode	Text value	The actual code that was returned. Only applies over simple FTP or FTPS connections
ReplyText	Text value	The text returned by the FTP server

Exceptions

EXCEPTION	DESCRIPTION
Invoke commad error	Indicates that an error occured while invoking an FTP command
Not connected error	Indicates that there is no open connection with the FTP server

Synchronize directories

Synchronize the files and subdirectories of a given Folder with a given remote FTP directory

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
FTP connection	No	FTP connection		The FTP connection to work with. This variable must have been previously specified in an Open FTP connection action

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Synchronization direction	N/A	Remote -> local (Download), Local -> remote (Upload)	Remote -> local (Download)	Direction of the Synchronization method. Whether the local folder will be synchronized to the remote directory (DOWNLOAD) or the remote directory will be synchronized to the local folder (UPLOAD)
Files to sync	N/A	All files, Only files matching the file filter, Only files not matching the file filter	All files	Choose whether you want to synchronize all files, or you want to use a file filter to include or exclude a specific set of files
File filter	Yes	Text value	*	File-name pattern that controls which files will be included or excluded. This option allows wildcards such as "*.txt", "document?.doc". The option also allows for multiple filters by using coma as a separator,* ".txt,*.pdf,document?"
Local folder	No	Folder		Name of the local folder to be syncronized
FTP directory	Yes	FTP directory	/	Name of the FTP directory to be synchronized
Delete if source is absent	N/A	Boolean value	False	This option will delete a file or folder which exists in the target directory and not the source.
Include subdirectories	N/A	Boolean value	True	This option will include subdirectories in the synchronization process.
Time difference in hours	Yes	Numeric value	0	Time difference in hours of the remote server in case it operates on a different Time Zone.

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Time difference in minutes	Yes	Numeric value	0	Time difference in Minutes of the remote server in case it operates on a different Time Zone.
Time difference ahead	N/A	Boolean value	True	Specify whether the server's time zone is ahead or not.

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
FtpFilesAdded	List of FTP Files	List of FTP files that initially existed in the source and after the syncronzation process were added to the target.
FtpFilesModified	List of FTP Files	List of FTP files that initially existed in both the source and the target and after the syncronzation process were added to the target.
FtpFilesDeleted	List of FTP Files	List of FTP files that initially existed in the target directory and after the synchronzation process were deleted.
FilesAdded	List of Files	List of files that initially existed in the source and after the syncronzation process were added to the target.
FilesModified	List of Files	List of files that initially existed in both the source and the target and after the syncronzation process were added to the target.
FilesDeleted	List of Files	List of files that initially existed in the target directory and after the synchronzation process were deleted.

Exceptions

EXCEPTION	DESCRIPTION
Listing error	Indicates that the listing of the folder couldn't be performed
Not connected error	Indicates that there is no open connection with the FTP server
File not found error	Indicates that the file wasn't found
FTP connection aborted error	Indicates that the FTP connection was aborted
Upload file error	Indicates that the file couldn't be uploaded

EXCEPTION	DESCRIPTION
Remote file doesn't exist error	Indicates that the file doesn't exist on the FTP server
Can't download file error	Indicates that it wasn't possible to download the file
Delete directory error	Indicates that it wasn't possible to delete the directory
Synchronization failed error	Indicates that the synchronization process failed due to an unexpected error.

CyberArk

1/15/2022 • 2 minutes to read • Edit Online

Connect to CyberArk and retrieve passwords

Get password from CyberArk

Getting started with CyberArk actions

CyberArk offers an identity security platform that secures human and machine identities from end-to-end. Power Automate enables you to retrieve credentials from CyberArk through the **Get password from CyberArk** action.

> **NOTE**
> To retrieve credentials from CyberArk, Power Automate issues web requests to CyberArk's Central Credential Provider web service (AIMWebService).

To find the required information to populate the action, see the following instructions:

- **Application ID**: To find the application ID, open CyberArk Password Vault on a web browser and navigate to the **Applications** tab.
- **Safe**: Populate the name of the safe displayed in PrivateArk Client.
- **Folder** and **Object**: Select a safe in PrivateArk Client and populate the folder name displayed on the left pane and the object name displayed in the main list.

CyberArk actions

Get password from CyberArk

Retrieves a password for a specific application from CyberArk

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Server address	No	Text value		The base URI for the web request
Application ID	No	Text value		The application ID to use for the web request
Safe	No	Text value		The safe on CyberArk in which the application belongs
Folder	No	Text value		The folder necessary for the web request query

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Object	No	Text value		The object necessary for the web request query
Extra data	Yes	Text value		The extra data (if any) for the web request's query
Accept untrusted certificates	N/A	Boolean value	False	Specifies whether to accept untrusted certificates
Certificate location	N/A	Don't use certificate, Load certificate from Windows Store, Load certificate from file	Don't use certificate	Specifies how to load (if needed) the certificate for the request
Use only valid certificates	N/A	Boolean value	False	Specifies whether to load only valid certificates from the store
Store certificate path	No	Text value		The path of the certificate in the certificate store
Certificates path	No	File		The path of the certificate selected from the store
Certificate password	No	Encrypted value		The password for the certificate file
Timeout	Yes	Numeric value	30	The waiting time (in seconds) to get results from CyberArk

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
JSONResponse	Custom object	The API response result
CyberArkPassword	Encrypted value	The password retrieved from CyberArk

Exceptions

EXCEPTION	DESCRIPTION
Failed to send web request	Indicates a problem sending the web request
Timeout expired	Indicates that the request timed out
Error response from web request	Indicates that the web request returned an error response

Active Directory

1/15/2022 • 15 minutes to read • Edit Online

Connect to an Active Directory server and perform operations

Create group
Get group info
Get group members
Modify group
Create object
Delete object
Move object
Rename object
Create user
Get user info
Modify user
Unlock user
Update user info
Connect to server
Close connection

Getting started with Active Directory actions

Active Directory actions require a connection to an Active Directory server. Establish the connection by using the Connect to server action, which requires the LDAP path to specify the domain controllers. The LDAP Path field should specify the domain controllers and have the following format:

```
LDAP://DC=contoso,DC=demo
```

When working with groups, objects or users, their location will be required. The Location field should specify the container as well as the domain controllers and have the following format:

```
CN=Users,DC=contoso,DC=demo
```

After getting all the distinguished names using the **dsquery user** command, enter the distinguished name in the following format (nvarga being the username):

```
CN=nvarga,CN=Users,DC=contoso,DC=demo
```

Note that if the container name contains a comma, the name should be contained within double quotes. e.g.: **CN=Varga, Norbert** should be formatted like so:

```
CN="Varga, Norbert",DC=contoso,DC=com
```

Active Directory actions

Group

Create, modify and get information about a group in an Active Directory server

Create group

Creates a group in the Active Directory

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Parent directory entry	No	Active Directory entry		The parent entry of the Active Directory server
Group name	No	Text value		The name of the newly created group
Location	Yes	Text value		The location that the group will be created in
Description	Yes	Text value		The description for the group
Group scope	N/A	Local, Global, Universal	Global	The scope of the group in the Active Directory
Group type	N/A	Security, Distribution	Security	The type of the group

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Authentication error	Indicates an error with the user's authentication

EXCEPTION	DESCRIPTION
Invalid operation	Indicates an invalid operation error
The server isn't operational	Indicates that the Active Directory server isn't operational
Unauthorized access	Indicates that an authorization error occurred
Active Directory entry not found	Indicates that the Active Directory entry given isn't found on the Active Directory server
Object already exists	Indicates that an object with the specified name already exists in the Active Directory
Active Directory error	General Active Directory error

Get group info

Gets information about a group from the Active Directory server

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Parent directory entry	No	Active Directory entry		The parent entry of the Active Directory server
Distinguished name	No	Text value		The distinguished name of the Active Directory entry

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
GroupInfo	Group info	The group's info

Exceptions

EXCEPTION	DESCRIPTION
Authentication error	Indicates an error with the user's authentication
Invalid operation	Indicates an invalid operation error
The server isn't operational	Indicates that the Active Directory server isn't operational
Unauthorized access	Indicates that an authorization error occurred
Active Directory entry not found	Indicates that the Active Directory entry given isn't found on the Active Directory server
Object doesn't exist on server	Indicates that the object doesn't exist in the Active Directory server
Active Directory error	General Active Directory error

Get group members

Gets the members of a group in the Active Directory

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Parent directory entry	No	Active Directory entry		The parent entry of the Active Directory server
Distinguished name	No	Text value		The distinguished name of the Active Directory entry

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
GroupMembers	List of Group members	The variable that holds the members of the group

Exceptions

EXCEPTION	DESCRIPTION
Authentication error	Indicates an error with the user's authentication
Invalid operation	Indicates an invalid operation error
The server isn't operational	Indicates that the Active Directory server isn't operational
Unauthorized access	Indicates that an authorization error occurred
Active Directory entry not found	Indicates that the Active Directory entry given isn't found on the Active Directory server
Object doesn't exist on server	Indicates that the object doesn't exist in the Active Directory server
Active Directory error	General Active Directory error

Modify group

Modifies a group in the Active Directory

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Parent directory entry	No	Active Directory entry		The parent entry of the Active Directory server
Distinguished name	No	Text value		The distinguished name of the Active Directory entry

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Operation	N/A	Rename group, Delete group, Add user, Remove user	Rename group	Select the operation to perform
New name	No	Text value		The new name for the group
User distinguished name	No	Text value		Specify the user's distinguished name

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Authentication error	Indicates an error with the user's authentication
Invalid operation	Indicates an invalid operation error
The server isn't operational	Indicates that the Active Directory server isn't operational
Unauthorized access	Indicates that an authorization error occurred
Active Directory entry not found	Indicates that the Active Directory entry given isn't found on the Active Directory server
Object doesn't exist on server	Indicates that the object doesn't exist in the Active Directory server
Object already exists	Indicates that an object with the specified name already exists in the Active Directory
Active Directory error	General Active Directory error

Example

In the following example, the Modify group action is used to add the user nvarga to the RPATest group.

Object

Create or manipulate an object in an Active Directory server

Create object

Creates an object in the Active Directory

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Parent directory entry	No	Active Directory entry		The parent entry of the Active Directory server
Location	Yes	Text value		The location that the group will be created in
Object type	N/A	Computer, Organizational unit	Computer	The type of the object
Object name	No	Text value		The name of the newly created object

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Authentication error	Indicates an error with the user's authentication
Invalid operation	Indicates an invalid operation error
The server isn't operational	Indicates that the Active Directory server isn't operational
Unauthorized access	Indicates that an authorization error occurred

EXCEPTION	DESCRIPTION
Active Directory entry not found	Indicates that the Active Directory entry given isn't found on the Active Directory server
Object already exists	Indicates that an object with the specified name already exists in the Active Directory
Invalid attribute syntax	Indicates that a given attribute is invalid
Active Directory error	General Active Directory error

Delete object

Deletes an object in the Active Directory

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Parent directory entry	No	Active Directory entry		The parent entry of the Active Directory server
Distinguished name	No	Text value		The distinguished name of the Active Directory entry

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Authentication error	Indicates an error with the user's authentication
Invalid operation	Indicates an invalid operation error
The server isn't operational	Indicates that the Active Directory server isn't operational
Unauthorized access	Indicates that an authorization error occurred
Active Directory entry not found	Indicates that the Active Directory entry given isn't found on the Active Directory server
Object doesn't exist on server	Indicates that the object doesn't exist in the Active Directory server
Active Directory error	General Active Directory error

Move object

Moves an object in the Active Directory

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Parent directory entry	No	Active Directory entry		The parent entry of the Active Directory server
Distinguished name	No	Text value		The distinguished name of the Active Directory entry
Move to location	No	Text value		The location for the object to be moved to

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Authentication error	Indicates an error with the user's authentication
Invalid operation	Indicates an invalid operation error
The server isn't operational	Indicates that the Active Directory server isn't operational
Unauthorized access	Indicates that an authorization error occurred
Active Directory entry not found	Indicates that the Active Directory entry given isn't found on the Active Directory server
Object doesn't exist on server	Indicates that the object doesn't exist in the Active Directory server
Active Directory error	General Active Directory error
Location can't be empty	Indicates that an Active Directory object location is empty

Rename object

Renames an object in the Active Directory

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Parent directory entry	No	Active Directory entry		The parent entry of the Active Directory server
Distinguished name	No	Text value		The distinguished name of the Active Directory entry
New name	No	Text value		Type the new name for the group

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Authentication error	Indicates an error with the user's authentication
Invalid operation	Indicates an invalid operation error
The server isn't operational	Indicates that the Active Directory server isn't operational
Unauthorized access	Indicates that an authorization error occurred
Active Directory entry not found	Indicates that the Active Directory entry given isn't found on the Active Directory server
Object doesn't exist on server	Indicates that the object doesn't exist in the Active Directory server
Object already exists	Indicates that an object with the specified name already exists in the Active Directory
Active Directory error	General Active Directory error

User

Create, modify and get information about a user in an Active Directory server

Create user

Creates a user in the Active Directory

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Parent directory entry	No	Active Directory entry		The parent entry of the Active Directory server
Location	Yes	Text value		The location that the group will be created in
First name	No	Text value		The first name of the user
Initials	Yes	Text value		The initials of the user
Last name	Yes	Text value		The last name of the user
Username	No	Text value		The username of the user

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Password	No	Encrypted value		The password of the user
Password never expires	N/A	Boolean value	False	Specify whether the password of the user will expire
Disabled account	N/A	Boolean value	False	Specify whether the account will be disabled

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Authentication error	Indicates an error with the user's authentication
Invalid operation	Indicates an invalid operation error
The server isn't operational	Indicates that the Active Directory server isn't operational
Unauthorized access	Indicates that an authorization error occurred
Active Directory entry not found	Indicates that the Active Directory entry given isn't found on the Active Directory server
Object already exists	Indicates that an object with the specified name already exists in the Active Directory
Couldn't set or update password	Indicates a problem setting or updating the user's password
Active Directory error	General Active Directory error

Example

The following figure is an example of creating a user. The user's name is Norbert Varga and their username is nvarga. The user is created in the Users container, an the domain controllers contoso and demo are specified in the location as well.

Get user info

Gets a user's information in the Active Directory

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Parent directory entry	No	Active Directory entry		The parent entry of the Active Directory server
Distinguished name	No	Text value		The distinguished name of the Active Directory entry

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
UserInfo	User info	The user's info

Exceptions

EXCEPTION	DESCRIPTION
Authentication error	Indicates an error with the user's authentication
Invalid operation	Indicates an invalid operation error

EXCEPTION	DESCRIPTION
The server isn't operational	Indicates that the Active Directory server isn't operational
Unauthorized access	Indicates that an authorization error occurred
Active Directory entry not found	Indicates that the Active Directory entry given isn't found on the Active Directory server
Object doesn't exist on server	Indicates that the object doesn't exist in the Active Directory server
Active Directory error	General Active Directory error

Modify user

Modify a user in the Active Directory

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Parent directory entry	No	Active Directory entry		The parent entry of the Active Directory server
Distinguished name	No	Text value		The distinguished name of the Active Directory entry
Operation	N/A	Enable/disable user, Rename user, Delete user, Reset password	Enable/disable user	Select the operation to be performed
Enable user	N/A	Boolean value	False	Enable or disable the user
New name	No	Text value		Type the new name for the group
New password	No	Encrypted value		Type the new password for the group

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Authentication error	Indicates an error with the user's authentication
Invalid operation	Indicates an invalid operation error
The server isn't operational	Indicates that the Active Directory server isn't operational
Unauthorized access	Indicates that an authorization error occurred

EXCEPTION	DESCRIPTION
Active Directory entry not found	Indicates that the Active Directory entry given isn't found on the Active Directory server
Object doesn't exist on server	Indicates that the object doesn't exist in the Active Directory server
Object already exists	Indicates that an object with the specified name already exists in the Active Directory
Invalid attribute syntax	Indicates that a given attribute is invalid
Active Directory error	General Active Directory error
Couldn't set or update password	Indicates a problem setting or updating the user's password

Unlock user

Unlocks an Active Directory user

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Parent directory entry	No	Active Directory entry		The parent entry of the Active Directory server
Distinguished name	No	Text value		The distinguished name of the Active Directory entry

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Authentication error	Indicates an error with the user's authentication
Invalid operation	Indicates an invalid operation error
The server isn't operational	Indicates that the Active Directory server isn't operational
Unauthorized access	Indicates that an authorization error occurred
Active Directory entry not found	Indicates that the Active Directory entry given isn't found on the Active Directory server
Object doesn't exist on server	Indicates that the object doesn't exist in the Active Directory server
Active Directory error	General Active Directory error

Update user info

Updates a user's information in the Active Directory

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Parent directory entry	No	Active Directory entry		The parent entry of the Active Directory server
Distinguished name	No	Text value		The distinguished name of the Active Directory entry
Display name	Yes	Text value		The display name of the user
First name	Yes	Text value		The first name of the user
Initials	Yes	Text value		The initials of the user
Last name	Yes	Text value		The last name of the user
Title	Yes	Text value		The title of the user
The email of the user	Yes	Text value		The email of the user
The company of the user	Yes	Text value		The company of the user
Telephone number	Yes	Text value		The telephone number of the user
Extension	Yes	Text value		The extension of the user
City	Yes	Text value		The city of the user
Postal code	Yes	Text value		The postal code of the user
State	Yes	Text value		The state of the user
Country	N/A	Afghanistan, Åland Islands, Albania, Algeria, American Samoa, Andorra, Angola, Anguilla, Antarctica, Antigua and Barbuda, Argentina, Armenia, Aruba, Australia, Austria, Azerbaijan, Bahamas, Bahrain, Bangladesh, Barbados, Belarus,	None	The country of the user as a two-letter code (ISO 3166-1 alpha-2)

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
		Belgium, Belize, Benin, Bermuda, Bhutan, State of Bolivia Plurinational, Bonaire, Bosnia and Herzegovina, Botswana, Bouvet Island, Brazil, British Indian Ocean Territory, Brunei Darussalam, Bulgaria, Burkina Faso, Burundi, Cabo Verde, Cambodia, Cameroon, Canada, Cayman Islands, Central African Republic, Chad, Chile, China, Christmas Island, Cocos (Keeling) Islands, Colombia, Comoros, Congo, Democratic Republic of the Congo, Cook Islands, Costa Rica, Côte d'Ivoire, Croatia, Cuba, Curaçao, Cyprus, Czech Republic, Denmark, Djibouti, Dominica, Dominican Republic, Ecuador, Egypt, El Salvador, Equatorial Guinea, Eritrea, Estonia, Ethiopia, Falkland Islands (Malvinas), Faroe Islands, Fiji, Finland, France, French Guiana, French Polynesia, French Southern Territories, Gabon, Gambia, Georgia, Germany, Ghana, Gibraltar, Greece, Greenland, Grenada, Guadeloupe, Guam, Guatemala, Guernsey, Guinea, Guinea-Bissau, Guyana, Haiti, Heard Island and McDonald Islands, Holy See, Honduras, Hong Kong, Hungary, Iceland, India, Indonesia, Islamic Republic of Iran, Iraq, Ireland, Isle of Man, Israel, Italy, Jamaica, Japan, Jersey, Jordan, Kazakhstan, Kenya, Kiribati, Democratic People's Republic of		

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
		Peoples Republic of Korea, Republic of Korea, Kuwait, Kyrgyzstan, Lao People's Democratic Republic, Latvia, Lebanon, Lesotho, Liberia, Libya, Liechtenstein, Lithuania, Luxembourg, Macao, North Macedonia, Madagascar, Malawi, Malaysia, Maldives, Mali, Malta, Marshall Islands, Martinique, Mauritania, Mauritius, Mayotte, Mexico, Micronesia, Moldova, Monaco, Mongolia, Montenegro, Montserrat, Morocco, Mozambique, Myanmar, Namibia, Nauru, Nepal, Netherlands, New Caledonia, New Zealand, Nicaragua, Niger, Nigeria, Niue, Norfolk Island, Northern Mariana Islands, Norway, Oman, Pakistan, Palau, Palestine, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Pitcairn, Poland, Portugal, Puerto Rico, Qatar, Réunion, Romania, Russia, Rwanda, Saint Barthélemy, Saint Helena, Saint Kitts and Nevis, Saint Lucia, Saint Martin (French part), Saint Pierre and Miquelon, Saint Vincent and the Grenadines, Samoa, San Marino, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia, Seychelles, Sierra Leone, Singapore, Sint Maarten (Dutch part), Slovakia, Slovenia, Solomon Islands, Somalia, South Africa, South Georgia and the South Sandwich Islands, South Sudan,		

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
		Spain, Sri Lanka, Sudan, Suriname, Svalbard and Jan Mayen, Swaziland, Sweden, Switzerland, Syrian Arab Republic, Taiwan, Tajikistan, Tanzania, Thailand, Timor-Leste, Togo, Tokelau, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Turks and Caicos Islands, Tuvalu, Uganda, Ukraine, United Arab Emirates, United Kingdom of Great Britain and Northern Ireland, United States of America, United States Minor Outlying Islands, Uruguay, Uzbekistan, Vanuatu, Bolivarian Republic of Venezuela, Vietnam, Virgin Islands (British), Virgin Islands (U.S.), Wallis and Futuna, Yemen, Zambia, Zimbabwe, None		

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Authentication error	Indicates an error with the user's authentication
Invalid operation	Indicates an invalid operation error
The server isn't operational	Indicates that the Active Directory server isn't operational
Unauthorized access	Indicates that an authorization error occurred
Active Directory entry not found	Indicates that the Active Directory entry given isn't found on the Active Directory server
Object doesn't exist on server	Indicates that the object doesn't exist in the Active Directory server
Couldn't set or update password	Indicates a problem setting or updating the user's password
Active Directory error	General Active Directory error

Connect to server

Connects to an Active Directory server

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
LDAP path	No	Text value		The LDAP path of the Active Directory server
Use authentication	N/A	Boolean value	False	Specify whether authentication is needed to connect to the server
Username	No	Text value		The user's username
Password	No	Encrypted value		The user's password
Authentication type	N/A	None, Secure, Encryption, Secure sockets layer, Read-only server, Anonymous, Fast bind, Signing, Sealing, Delegation, Server bind	Secure	Specify the type of authentication to be used

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
ParentDirectoryEntry	Active Directory entry	The parent of the Active Directory entry for use with later Active Directory actions

Exceptions

EXCEPTION	DESCRIPTION
Authentication error	Indicates an error with the user's authentication
Unauthorized access	Indicates that an authorization error occurred
The server isn't operational	Indicates that the Active Directory server isn't operational
Invalid operation	Indicates an invalid operation error
Active Directory error	General Active Directory error

Close connection

Closes the connection with the Active Directory server

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Parent directory entry	No	Active Directory entry		The parent entry of the Active Directory server

Variables Produced

- This action doesn't produce any variables

Exceptions

- This action doesn't include any exceptions

AWS

1/15/2022 • 13 minutes to read • Edit Online

Connect to Amazon web services and automate a variety of tasks

Start EC2 instance
Stop EC2 instance
Reboot EC2 instance
Get available EC2 instances
Describe instances
Create snapshot
Describe snapshots
Delete snapshot
Create volume
Attach volume
Detach volume
Describe volumes
Delete volume
Create EC2 session
End EC2 session

Getting started with AWS actions

> **IMPORTANT**
>
> To deploy AWS actions in your desktop flows, you need an active AWS subscription.

Power Automate enables users to handle EC2 instances, volumes, and snapshots through the AWS group of actions.

Before deploying any AWS action, create a new EC2 session using the **Create EC2 session** action.

To use a credentials file for authentication, disable **Access keys** and populate **Profile name** and **Profile location**. If you don't want to reference a profile name explicitly, choose **default** in the **Profile name** field to

use the default profile.

Alternatively, enable **Access keys** and populate the access key ID, the secret access key, and the region constraint specifying the endpoint.

After creating the session and deploying all the needed AWS actions, use the **End EC2 session** action to terminate the EC2 session.

AWS actions

EC2

Connect to Amazon EC2 and manage instances, EBS volumes and EBS snapshots

Instances

Start, stop, reboot and get information for an EC2 instance

Start EC2 instance

Start EC2 instance(s)

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
EC2 client	No	EC2 client		The EC2 client
Instance IDs	No	List of Text values		The instance IDs to start

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
StartingEc2Instances	List of Instance state changes	The returned information for the started instances

Exceptions

EXCEPTION	DESCRIPTION
Authentication failed	Indicates that the provided credentials couldn't be validated
Unauthorized operation	Indicates that an unauthorized operation was requested
Invalid instance ID	Indicates that either the specified instance ID is malformed, or that the specified instance doesn't exist
Insufficient capacity	Indicates that there isn't enough capacity to fulfill the request

EXCEPTION	DESCRIPTION
Amazon service request failed	Indicates that the request to AWS failed

Stop EC2 instance

Stop EC2 instance(s)

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
EC2 client	No	EC2 client		The EC2 client
Instance IDs	No	List of Text values		The instance IDs to stop
Force stop	N/A	Boolean value	False	Specifies whether to force the instances to stop. The instances don't have an opportunity to flush file system caches or file system metadata
Hibernatation:	N/A	Boolean value	False	Specifies whether to hibernate the instance, if it was enabled for hibernation at launch. If the instance can't hibernate successfully, a normal shutdown occurs

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
StoppingEc2Instances	List of Instance state changes	The returned information for the stopped instances

Exceptions

EXCEPTION	DESCRIPTION
Authentication failed	Indicates that the provided credentials couldn't be validated
Unauthorized operation	Indicates that an unauthorized operation was requested
Unsupported operation	Indicates that an unsupported operation was requested. For example, an instance that is instance store-backed can't be stopped
Invalid instance ID	Indicates that either the specified instance ID is malformed, or that the specified instance doesn't exist
Amazon service request failed	Indicates that the request to AWS failed

Reboot EC2 instance

Reboot EC2 instance(s)

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
EC2 client	No	EC2 client		The EC2 client
Instance IDs	No	List of Text values		The instance IDs to reboot

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Authentication failed	Indicates that the provided credentials couldn't be validated
Unauthorized operation	Indicates that an unauthorized operation was requested
Unsupported operation	Indicates that an unsupported operation was requested. For example, an instance that is instance store-backed can't be stopped
Invalid instance ID	Indicates that either the specified instance ID is malformed, or that the specified instance doesn't exist
Incorrect state for the request	Indicates that the resource is in an incorrect state for the request. This can occur if there is an attempt to attach a volume that is still being created (ensure that the volume is 'available') or detach a volume that isn't attached
Amazon service request failed	Indicates that the request to AWS failed

Get available EC2 instances

Get information for the relevant EC2 instances

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
EC2 client	No	EC2 client		The EC2 client
Availability zone	Yes	Text value		Specifies the availability zone, a region code followed by a letter identifier
Instance state	N/A	Pending, All, Unknown, Running, Shutting down, Terminated, Stopping, Stopped	All	The state of the instance (pending, running, shutting down, terminated, stopping, stopped)

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
Ec2InstancesInfo	List of EC2 instances info	The list of the EC2 instances

Exceptions

EXCEPTION	DESCRIPTION
Authentication failed	Indicates that the provided credentials couldn't be validated
Unauthorized operation	Indicates that an unauthorized operation was requested
Amazon service request failed	Indicates that the request to AWS failed

Describe instances

Returns all the information for the specified EC2 instance(s)

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
EC2 client	No	EC2 client		The EC2 client
Instance IDs	Yes	List of Text values		The instance IDs be describe
Availability zone	Yes	Text value		Specifies the availability zone, a region code followed by a letter identifier
Instance state	N/A	Pending, All, Unknown, Running, Shutting down, Terminated, Stopping, Stopped	All	The current state of the instance

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
Ec2Instances	List of EC2 instances	The retrieved instance(s) with all the relevant information

Exceptions

EXCEPTION	DESCRIPTION
Authentication failed	Indicates that the provided credentials couldn't be validated
Unauthorized operation	Indicates that an unauthorized operation was requested
Invalid instance ID	Indicates that either the specified instance ID is malformed, or that the specified instance doesn't exist
Amazon service request failed	Indicates that the request to AWS failed

Snapshots

Create or delete an EBS snapshot and get related information

Create snapshot

Create a snapshot of an EBS volume and stores it in Amazon S3

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
EC2 client	No	EC2 client		The EC2 client
Volume ID	No	Text value		The ID of the EBS volume
Name	Yes	Text value		The name of the snapshot
Description	Yes	Text value		A description for the snapshot
Purpose	Yes	Text value		The purpose of the snapshot

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
Snapshot	EBS snapshot	The created snapshot

Exceptions

EXCEPTION	DESCRIPTION
Authentication failed	Indicates that the provided credentials couldn't be validated
Unauthorized operation	Indicates that an unauthorized operation was requested
Invalid volume	Indicates that either the volume ID isn't valid, or the specified volume doesn't exist
or the volume isn't in the same qvailability zone as the specified instance	
Resource's limit is exceeded	Indicates that the limit for the specified resource is reached
Amazon service request failed	Indicates that the request to AWS failed

Describe snapshots

Describes the specified EBS snapshots available

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
EC2 client	No	EC2 client		The EC2 client

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Describe snapshots mode	N/A	All snapshots, Snapshots by ID, Snapshots by owner ID, Snapshots by restorable user ID, Snapshots by custom filter	All snapshots	Specifies whether to get all snapshots of the defined region or filter snapshots by their ID, owner or user by which they are restorable
Snapshot IDs	Yes	List of Text values		The snapshot IDs to describe
Owner IDs	Yes	List of Text values		The owner IDs who own the snapshots
Restorable by user IDs	Yes	List of Text values		The IDs of the AWS accounts that can create volumes from the snapshot

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
EBSSnapshots	List of EBS snapshots	The retrieved snapshot(s) with all the relevant information

Exceptions

EXCEPTION	DESCRIPTION
Authentication failed	Indicates that the provided credentials couldn't be validated
Unauthorized operation	Indicates that an unauthorized operation was requested
Invalid snapshot ID	Indicates that either the specified snapshot ID is invalid, or that the specified snapshot doesn't exist
Invalid user ID	Indicates that the specified user or owner isn't valid
Amazon service request failed	Indicates that the request to AWS failed

Delete snapshot

Delete the specified snapshot

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
EC2 client	No	EC2 client		The EC2 client
Snapshot ID	No	Text value		The ID of the EBS snapshot to delete

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Authentication failed	Indicates that the provided credentials couldn't be validated
Unauthorized operation	Indicates that an unauthorized operation was requested
Invalid snapshot ID	Indicates that either the specified snapshot ID is invalid, or that the specified snapshot doesn't exist
The resource is in use	Indicates that the operation can't be completed because the resource is in use
Amazon service request failed	Indicates that the request to AWS failed

Volumes

Create, attach, detach or delete an EBS volume and get related information

Create volume

Create an EBS volume

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
EC2 client	No	EC2 client		The EC2 client
Name	Yes	Text value		The desired name for the volume
Purpose	Yes	Text value		The purpose of the volume, if any
Availability zone	No	Text value		Specifies the availability zone, a region code followed by a letter identifier
From snapshot	N/A	Boolean value	False	Specifies whether to create the volume from a specified snapshot
Snapshot ID	No	Text value		The snapshot from to create the volume from
Volume size	No	Text value		The size of the volume in GBs
Size	Yes	Text value		The size must be equal to or larger than the snapshot size

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Encrypted	N/A	Boolean value	False	Specifies whether to encrypt the volume
Volume type	N/A	Gp2, Standard, Io1, Sc1, St1	Gp2	The type of the volume

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
Volume	EBS volume	The created volume

Exceptions

EXCEPTION	DESCRIPTION
Authentication failed	Indicates that the provided credentials couldn't be validated
Unauthorized operation	Indicates that an unauthorized operation was requested
Invalid parameter	Indicates that a parameter specified in the request isn't valid, unsupported, or can't be used
Invalid zone	Indicates that the specified availability zone doesn't exist, or isn't available to use
Resource's limit is exceeded	Indicates that the limit for the specified resource is reached
Volume type isn't supported in sthe pecified zone	Indicates that the specified availability zone doesn't support provisioned IOPS SSD volumes
Amazon service request failed	Indicates that the request to AWS failed

Attach volume

Attach an EBS volume to an EC2 instance

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
EC2 client	No	EC2 client		The EC2 client
Volume ID	No	Text value		The ID of the EBS volume
Instance ID	No	Text value		The ID of the instance
Device name	No	Text value		The name of the device

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Authentication failed	Indicates that the provided credentials couldn't be validated
Unauthorized operation	Indicates that an unauthorized operation was requested
Unsupported operation	Indicates that an unsupported operation was requested. For example, an instance that is instance store-backed can't be stopped
Invalid parameter	Indicates that a parameter specified in the request isn't valid, unsupported, or can't be used
Invalid volume	Indicates that either the volume ID isn't valid, or the specified volume doesn't exist
or the volume isn't in the same qvailability zone as the specified instance	
The resource is in use	Indicates that the operation can't be completed because the resource is in use
Amazon service request failed	Indicates that the request to AWS failed

Detach volume

Detach an EBS volume from an EC2 instance

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
EC2 client	No	EC2 client		The EC2 client
Volume ID	No	Text value		The ID of the EBS volume
Instance ID	Yes	Text value		The ID of the instance
Device name	Yes	Text value		The name of the device
Force detachment	N/A	Boolean value	False	Specifies whether to force detachment, if the previous detachment attempt didn't occur cleanly

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Authentication failed	Indicates that the provided credentials couldn't be validated

EXCEPTION	DESCRIPTION
Unauthorized operation	Indicates that an unauthorized operation was requested
Unsupported operation	Indicates that an unsupported operation was requested. For example, an instance that is instance store-backed can't be stopped
Invalid parameter	Indicates that a parameter specified in the request isn't valid, unsupported, or can't be used
Invalid attempt to detach	Indicates an attempt to detach a volume from an instance to which it isn't attached
Incorrect state for the request	Indicates that the resource is in an incorrect state for the request. This can occur if there is an attempt to attach a volume that is still being created (ensure that the volume is 'available') or detach a volume that isn't attached
Amazon service request failed	Indicates that the request to AWS failed

Describe volumes

Describe the specified EBS volumes

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
EC2 client	No	EC2 client		The EC2 client
Describe volumes mode	N/A	All volumes, Volumes of the specified instance, Volumes with the specified IDs	All volumes	Specifies whether to describe all volumes, volumes specified by ID or volumes of an instance
Volume IDs	No	List of Text values		The volume IDs to describe
Instance ID	No	Text value		The ID of the instance that the volume is attached to

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
EBSVolumes	List of EBS volumes	The retrieved EBS volumes with all the relevant information

Exceptions

EXCEPTION	DESCRIPTION
Authentication failed	Indicates that the provided credentials couldn't be validated
Unauthorized operation	Indicates that an unauthorized operation was requested

EXCEPTION	DESCRIPTION
Invalid parameter	Indicates that a parameter specified in the request isn't valid, unsupported, or can't be used
Amazon service request failed	Indicates that the request to AWS failed

Delete volume

Delete the specified EBS volume

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
EC2 client	No	EC2 client		The EC2 client
Volume ID	No	Text value		The ID of the EBS volume to delete

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Authentication failed	Indicates that the provided credentials couldn't be validated
Unauthorized operation	Indicates that an unauthorized operation was requested
Invalid parameter	Indicates that a parameter specified in the request isn't valid, unsupported, or can't be used
Invalid volume	Indicates that either the volume ID isn't valid, or the specified volume doesn't exist
or the volume isn't in the same qvailability zone as the specified instance	
Incorrect state for the request	Indicates that the resource is in an incorrect state for the request. This can occur if there is an attempt to attach a volume that is still being created (ensure that the volume is 'available') or detach a volume that isn't attached
The resource is in use	Indicates that the operation can't be completed because the resource is in use
Amazon service request failed	Indicates that the request to AWS failed

Create EC2 session

Create an EC2 client to automate EC2 web services

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Access keys	N/A	Boolean value	False	Specifies whether to use access key ID and secret access key in order to create the EC2 session
Access key ID	No	Text value		The AWS access key ID
Secret	No	Encrypted value		The AWS secret access key
Region endpoint	No	Text value		The region constant to use that determines the endpoint to use
Profile name	Yes	Text value	default	The name of the profile to use
Profile location	Yes	Text value		The location of the credentials file that contains the profile to use

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
Ec2Client	EC2 client	The EC2 client

Exceptions

EXCEPTION	DESCRIPTION
Profile doesn't exist	Indicates that the specified profile doesn't exist
Invalid profile	Indicates that the specified profile isn't correctly configured
Create session failed	Indicates that the creation of EC2 client failed

End EC2 session

Dispose an open EC2 client

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
EC2 client	No	EC2 client		The EC2 client

Variables Produced

- This action doesn't produce any variables

Exceptions

- This action doesn't include any exceptions

Azure

1/15/2022 • 14 minutes to read • Edit Online

Connect to Azure Cloud and automate the management of resources like virtual machines, disks, snapshots and resource groups

Get resource groups
Create resource group
Delete resource group
Get disks
Attach disk
Detach disk
Create managed disk
Delete disk
Get snapshots
Create snapshot
Delete snapshot
Get virtual machines
Describe virtual machine
Start virtual machine
Stop virtual machine
Shut down virtual machine
Restart virtual machine
Create session
Get subscriptions
End session

Getting started with Azure actions

> **IMPORTANT**
>
> To deploy Azure actions in your desktop flows, you need an active Azure subscription.

Power Automate allows you to manage Azure virtual machines through the Azure group of actions.

To implement Azure functionality in your desktop flows, create a new Azure session using the **Create session** action.

This action requires you to populate the **Client ID** that works as an authentication key for the specific application and the respective password. Additionally, populate the **Tenant ID** that is the Azure Active Directory in which you've created the application.

Lastly, choose the environment you want to use for authentication and populate the **Subscription ID**. The subscription ID is a GUID that uniquely identifies your subscription to Azure services.

Apart from manual configuration, you can select **With file** in **Authentication type** and use a file containing all the required information.

After creating the session and deploying all the needed Azure actions, use the **End session** action to terminate the Azure session.

Azure actions

Resource groups

Connect to Azure Cloud and manage resource groups

Get resource groups

Gets the resource groups based on the specified criteria

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Azure client	No	Azure clients		The client used to connect to Azure
Resource group name	Yes	Text value		The name of the resource group

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
ResourceGroups	List of Azure resource groups	The retrieved resource groups

Exceptions

EXCEPTION	DESCRIPTION
Failed to get the resource groups with the specified criteria	Indicates that getting the resource groups with the specified criteria failed

Create resource group

Creates a new resource group

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Azure client	No	Azure clients		The client used to connect to Azure

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Resource group name	No	Text value		The name of the resource group
Location	No	Text value		The location where the new disk will be created

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
ResourceGroup	Azure resource group	The created resource group

Exceptions

EXCEPTION	DESCRIPTION
Resource group already exists	Indicates that the resource group already exists and can't be created
Failed to create resource group	Indicates that creating the resource group failed

Delete resource group

Deletes the specified resource group and all the contained resources

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Azure client	No	Azure clients		The client used to connect to Azure
Resource group name	No	Text value		The name of the resource group

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Failed to delete the resource group	Indicates that deleting the resource group failed

Virtual machines

Connect to Azure Cloud and manage virtual machines, disks and snapshots

Disks

Connect to Azure Cloud and manage disks

Get disks

Gets the disks based on the specified criteria

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Azure client	No	Azure clients		The client used to connect to Azure
Retrieve disks	N/A	All, With the specified resource group, With the specified name in all resource groups, With specific name in the specified resource group	All	Specify which disks to retrieve
Resource group	No	Text value		The resource group where the disks reside
Disk name	No	Text value		The name of the disk

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
Disks	List of Azure managed disks	The retrieved disks with all the related information

Exceptions

EXCEPTION	DESCRIPTION
Disk wasn't found	Indicates that the disk with the specified criteria doesn't exist
Resource group wasn't found	Indicates that the specified resource group wasn't found
Failed to get the disks with the specified criteria	Indicates that getting the disks with the specified criteria failed

Attach disk

Attaches an existing disk to the virtual machine with the specified name and resource group

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Azure client	No	Azure clients		The client used to connect to Azure
Virtual machine name	No	Text value		The VM where the disk will be attached
VM resource group	No	Text value		The resource group of the VM
Disk is managed	N/A	Boolean value	True	Specify whether the disk to attach is managed

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Disk name	No	Text value		The name of the disk to attach
Disk's resource group	No	Text value		The resource group of the disk
Storage account	No	Text value		The storage account where VHD file is located
Container	No	Text value		The container that holds the VHD file
VHD file	No	Text value		The name of the VHD file

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
VM wasn't found	Indicates that the specified VM wasn't found
Disk wasn't found	Indicates that the disk with the specified criteria doesn't exist
Both unmanaged and managed disk can't exist together in a VM	Indicates that the attachment failed because both unmanaged and managed disk can't exist together in a VM
Failed to attach the disk	Indicates that the disk attachment failed

Detach disk

Detaches the disk from the virtual machine with the specified name and resource group

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Azure client	No	Azure clients		The client used to connect to Azure
Virtual machine name	No	Text value		The VM from where the disk will be detached
Virtual machine's resource group	No	Text value		The resource group of the VM
Disk name	No	Text value		The name of the disk to detach
Disk is managed	N/A	Boolean value	True	Specify whether the disk to detach is managed

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
VM wasn't found	Indicates that the specified VM wasn't found
Failed to detach because the disk isn't attached to the specified VM	Indicates that the detachment failed because the disk isn't attached to the specified VM
Failed to detach disk	Indicates that detaching the disk failed

Create managed disk

Creates a managed disk with the specified settings

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Azure client	No	Azure clients		The client used to connect to Azure
Disk name	No	Text value		The name of the managed disk to create
Resource group option	N/A	Use existing , Create new	Use existing	Specify whether a new resource group will be created or an existing one will be used
Resource group name	No	Text value		The resource group of the disk
Location	No	Text value		The location where the new disk is created
Source type	N/A	None, Snapshot, Storage blob	None	Specifies whether to create an empty disk or use the snapshot of another disk or use a blob in a storage account
Snapshot name	No	Text value		The managed snapshot to use as a source
Snapshot's resource group	No	Text value		The resource group of the snapshot
Blob URL	No	Text value		The URL of the blob
Disk size in GB	No	Numeric value		Size of the disk in GB

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Storage account type	N/A	Standard HDD, Premium SSD, Standard SSD, Ultra disk SSD	Standard HDD	The disk type
Storage account name	No	Text value		The name of the storage account where VHD file is stored
Availability zone	Yes	Text value		The availability zone for the managed disk

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
ManagedDisk	Azure managed disk	The created managed disk

Exceptions

EXCEPTION	DESCRIPTION
Resource group already exists	Indicates that the resource group already exists and can't be created
Resource group wasn't found	Indicates that the specified resource group wasn't found
The resource with the specified name already exists	Indicates that the resource with the specified name already exists
Snapshot wasn't found	Indicates that the specified snapshot wasn't found
Failed to create disk	Indicates that creating the disk failed

Delete disk

Deletes the managed disk with the specified name and resource group

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Azure client	No	Azure clients		The client used to connect to Azure
Disk name	No	Text value		The name of the managed disk to delete
Resource group	No	Text value		The resource group of the disk

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Disk wasn't found	Indicates that the disk with the specified criteria doesn't exist
Failed to delete the disk because it is attached to a VM	Indicates a problem deleting the disk because it is attached to a VM
Failed to delete disk	Indicates that deleting the disk failed

Snapshots

Connect to Azure Cloud and manage snapshots

Get snapshots

Gets the snapshots based on the specified criteria

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Azure client	No	Azure clients		The client used to connect to Azure
Retrieve snapshots	N/A	All, With the specified resource group, With the specified name in all resource groups, With specific name in the specified resource group	All	Specify which snapshots to retrieve
Resource group	No	Text value		The resource group where the snapshots reside
Snapshot name	No	Text value		The name of the snapshot

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
Snapshots	List of Azure snapshots	The retrieved snapshots with all the related information

Exceptions

EXCEPTION	DESCRIPTION
Snapshot wasn't found	Indicates that the specified snapshot wasn't found
Resource group wasn't found	Indicates that the specified resource group wasn't found
Failed to get the snapshots with the specified criteria	Indicates that getting the snapshots with the specified criteria failed

Create snapshot

Creates a snapshot from the specified disk

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Azure client	No	Azure clients		The client used to connect to Azure
Snapshot name	No	Text value		The name of the snapshot to create
Resource group option	N/A	Use existing , Create new	Use existing	Specifies whether a new resource group will be created or an existing one will be used
Resource group	No	Text value		The resource group where the snapshot will be created
Location	No	Text value		The location where the new disk will be created
Source disk	No	Text value		The name of the managed disk that will be used as source data
Source disk's resource group	No	Text value		The resource group of the managed disk that will be used as source data

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
Snapshot	Azure snapshot	The created snapshot

Exceptions

EXCEPTION	DESCRIPTION
Resource group already exists	Indicates that the resource group already exists and can't be created
Resource group wasn't found	Indicates that the specified resource group wasn't found
The resource with the specified name already exists	Indicates that the resource with the specified name already exists
Disk wasn't found	Indicates that the disk with the specified criteria doesn't exist
Failed to create snapshot	Indicates that creating the snapshot failed

Delete snapshot

Deletes the snapshot with the specified name and resource group

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Azure client	No	Azure clients		The client used to connect to Azure
Snapshot name	No	Text value		The name of the snapshot to delete
Resource group	No	Text value		The resource group of the snapshot

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
Snapshot wasn't found	Indicates that the specified snapshot wasn't found
Failed to delete snapshot	Indicates that deleting the snapshot failed

Get virtual machines

Gets the basic information for the virtual machines

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Azure client	No	Azure clients		The client used to connect to Azure
Resource group	Yes	Text value		The resource group of the virtual machine
Status	N/A	Running, Deallocating, Deallocated, Starting, Stopped, Stopping, Unknown, Any	Any	The status of the virtual machine

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
VirtualMachinesInfo	List of Azure virtual machine info	The retrieved virtual machines with basic information

Exceptions

EXCEPTION	DESCRIPTION
Resource group wasn't found	Indicates that the specified resource group wasn't found

EXCEPTION	DESCRIPTION
Failed to get the VMs with basic information	Indicates that getting the VMs with basic information failed

Describe virtual machine

Gets all the information for the virtual machine(s) based on the specified criteria

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Azure client	No	Azure clients		The client used to connect to Azure
Describe virtual machines	N/A	All, With the specified resource group, With the specified name in all resource groups, With specific name in the specified resource group	All	Specify which virtual machines to describe
Resource group	No	Text value		The resource group of the virtual machine
Virtual machine name	No	Text value		The name of the virtual machine
Status	N/A	Running, Deallocating, Deallocated, Starting, Stopped, Stopping, Unknown, Any	Any	The status of the virtual machine

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
VirtualMachines	List of Azure virtual machines	The retrieved virtual machines with all the related information

Exceptions

EXCEPTION	DESCRIPTION
VM wasn't found	Indicates that the specified VM wasn't found
Resource group wasn't found	Indicates that the specified resource group wasn't found
Failed to get basic information of the VM(s)	Indicates that getting basic information of the VM(s) failed

Start virtual machine

Starts the virtual machine

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Azure client	No	Azure clients		The client used to connect to Azure
Virtual machine name	No	Text value		The name of the virtual machine
Resource group	No	Text value		The resource group of the virtual machine

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
VM wasn't found	Indicates that the specified VM wasn't found
Failed to start the VM	Indicates that an error occurred while trying to start the VM

Stop virtual machine

Stops the virtual machine and deallocates the related hardware (CPU and memory) and network resources

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Azure client	No	Azure clients		The client used to connect to Azure
Virtual machine name	No	Text value		The name of the virtual machine
Resource group	No	Text value		The resource group of the virtual machine

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
VM wasn't found	Indicates that the specified VM wasn't found
Failed to stop the VM	Indicates that an error occurred while trying to stop the VM

Shut down virtual machine

Shuts down the operating system of a virtual machine

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Azure client	No	Azure clients		The client used to connect to Azure
Virtual machine name	No	Text value		The name of the virtual machine
Resource group	No	Text value		The resource group of the virtual machine

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
VM wasn't found	Indicates that the specified VM wasn't found
Failed to shut down the VM	Indicates an error occured while trying to shut down the VM

Restart virtual machine

Restarts a virtual machine

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Azure client	No	Azure clients		The client used to connect to Azure
Virtual machine name	No	Text value		The name of the virtual machine
Resource group	No	Text value		The resource group of the virtual machine

Variables Produced

- This action doesn't produce any variables

Exceptions

EXCEPTION	DESCRIPTION
VM wasn't found	Indicates that the specified VM wasn't found
Failed to restart the VM	Indicates that an error occurred while trying to restart the VM

Create session

Creates an Azure session

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Authentication type	N/A	With service principal, With file	With service principal	Specify the way to authenticate
Client ID	No	Text value		The client Id of the application, also known as application Id, which identifies the application that is using the token
Client secret	No	Encrypted value		The secret for the client ID
Tenant ID	No	Text value		The directory ID of the Azure Active Directory
Environment	N/A	Global cloud, China cloud, US Government, German cloud	Global cloud	The environment to authenticate to
Authentication file	No	Text value		The path of the file with all the required information to authenticate
Subscription ID	Yes	Text value		The Azure subscription ID. If not provided, the default subscription will be used

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
AzureClient	Azure clients	The created Azure client

Exceptions

EXCEPTION	DESCRIPTION
Failed to create Azure client	Indicates that creating the Azure client failed

Get subscriptions

Gets subscriptions that the current account can access

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Azure client	No	Azure clients		The client used to connect to Azure

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
Subscriptions	List of Azure subscriptions	The retrieved subscriptions with all the related information

Exceptions

EXCEPTION	DESCRIPTION
Failed to get the subscriptions with the specified criteria	Indicates that getting the subscriptions with the specified criteria failed

End session

Ends an Azure session

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Azure client	No	Azure clients		The client used to connect to Azure

Variables Produced

- This action doesn't produce any variables

Exceptions

- This action doesn't include any exceptions

Google cognitive

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Google's cognitive actions

Analyze sentiment
Analyze entities
Analyze syntax
Label detection
Landmark detection
Text Detection
Logo detection
Image properties detection
Safe search detection

Getting started with Google cognitive actions

Google cognitive services allow users to process unstructured data through machine learning and simplify complicated tasks like text analyzing and computer vision.

This functionality can be implemented in your desktop flows through the Google cognitive group of action.

All Google cognitive actions require an API key that authorizes you to use the respective services. You can manage your API keys in the **APIs & services** section of the Cloud Console.

Cognitive actions

Natural language

Reveal the structure and meaning of text

Analyze sentiment

Invokes the Google Cloud Natural Language service named 'Analyze Sentiment'

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
API key	No	Text value		The Google Cloud API key to be used for this API call
Document type	N/A	Plain text, HTML	Plain text	The type of document to transmit
Provide document	N/A	From file, From GCS	From file	Specify whether the document will be provided by a full path or a Google Cloud Storage URI
File path	No	File		The full path (folder plus filename) of the document to transmit

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
GCS Content URI	No	Text value		The URI of the image residing on Google Cloud Storage
Language	Yes	Text value		The language of the text
Timeout	Yes	Numeric value	30	The time (in seconds) that the agent should wait for a connection to be established with the server, before it fails

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
JSONResponse	Custom object	The API response results
StatusCode	Numeric value	The status code returned

Exceptions

EXCEPTION	DESCRIPTION
Failed to Invoke cognitive services	Indicates a problem while trying to invoke Cognitive Services
Request timeout expired	Indicates that the timeout expired while performing the request

Analyze entities

Invokes the Google Cloud Natural Language service named 'Analyze Entities'

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
API key	No	Text value		The Google Cloud API key to be used for this API call
Document type	N/A	Plain text, HTML	Plain text	The type of the document to transmit
Provide file	N/A	From file, From GCS	From file	Specify whether the document will be provided by a full path or a Google Cloud Storage URI
File path	No	File		The full path (folder plus filename) of the document to transmit

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
GCS URL	No	Text value		The URI of the document residing on Google Cloud Storage
Language	Yes	Text value		The language of the text
Timeout	Yes	Numeric value	30	The time (in seconds) that the agent should wait for a connection to be established with the server, before it fails

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
JSONResponse	Custom object	The API response results
StatusCode	Numeric value	The status code returned

Exceptions

EXCEPTION	DESCRIPTION
Failed to Invoke cognitive services	Indicates a problem while trying to invoke Cognitive Services
Request timeout expired	Indicates that the timeout expired while performing the request

Analyze syntax

Invokes the Google Cloud Natural Language service named 'Analyze Syntax'

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
API key	No	Text value		The Google Cloud API key to be used for this API call
Document type	N/A	Plain text, HTML	Plain text	The type of document to transmit
Provide document	N/A	From file, From GCS	From file	Specify whether the document will be provided by a full path or a Google Cloud Storage URI

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
File path	No	File		The full path (folder plus filename) of the document to transmit
GCS Content URI	No	Text value		The URI of the image residing on Google Cloud Storage
Language	Yes	Text value		The language of the text
Timeout	Yes	Numeric value	30	The time (in seconds) that the agent should wait for a connection to be established with the server, before it fails

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
JSONResponse	Custom object	The API response results
StatusCode	Numeric value	The status code returned

Exceptions

EXCEPTION	DESCRIPTION
Failed to Invoke cognitive services	Indicates a problem while trying to invoke Cognitive Services
Request timeout expired	Indicates that the timeout expired while performing the request

Vision

Assign labels to images and classify them into predefined categories. Detect objects, faces, and read printed and handwritten text

Label detection

Invokes the Google Cloud Vision service named 'Label Detection'

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
API key	No	Text value		The Google Cloud API key to be used for this API call

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Provide image	N/A	From file, From GCS	From file	Specify whether the image will be provided by a full path or a Google Cloud Storage URI
Image file	No	File		The full path (folder plus filename) of the image file to transmit
GCS Image URI	No	Text value		The URI of the image residing on Google Cloud Storage
Timeout	Yes	Numeric value	30	The time (in seconds) that the agent should wait for a connection to be established with the server, before it fails

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
JSONResponse	Custom object	The API response results
StatusCode	Numeric value	The status code returned

Exceptions

EXCEPTION	DESCRIPTION
Failed to Invoke cognitive services	Indicates a problem while trying to invoke Cognitive Services
Request timeout expired	Indicates that the timeout expired while performing the request

Landmark detection

Invokes the Google Cloud Vision service named 'Landmark Detection'

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
API key	No	Text value		The Google Cloud API key to be used for this API call
Provide image	N/A	From file, From GCS	From file	Specify whether the image will be provided by a full path or a Google Cloud Storage URI

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Image file path	No	File		The full path (folder plus filename) of the image file to transmit
GCS Image URI	No	Text value		The URI of the image residing on Google Cloud Storage
Timeout	Yes	Numeric value	30	The time (in seconds) that the agent should wait for a connection to be established with the server, before it fails

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
JSONResponse	Custom object	The API response results
StatusCode	Numeric value	The status code returned

Exceptions

EXCEPTION	DESCRIPTION
Failed to Invoke cognitive services	Indicates a problem while trying to invoke Cognitive Services
Request timeout expired	Indicates that the timeout expired while performing the request

Text Detection

Invokes the Google Cloud Vision service named 'Text Detection'

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
API key	No	Text value		The Google Cloud API key to be used for this API call
Provide image	N/A	From file, From GCS	From file	Specify whether the image will be provided by a full path or a Google Cloud Storage URI
Image file	No	File		The full path (folder plus filename) of the image file to transmit
GCS Image URI	No	Text value		The URI of the image residing on Google Cloud Storage

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Timeout	Yes	Numeric value	30	The time (in seconds) that the agent should wait for a connection to be established with the server, before it fails

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
JSONResponse	Custom object	The API response results
StatusCode	Numeric value	The status code returned

Exceptions

EXCEPTION	DESCRIPTION
Failed to Invoke cognitive services	Indicates a problem while trying to invoke Cognitive Services
Request timeout expired	Indicates that the timeout expired while performing the request

Logo detection

Invokes the Google Cloud Vision service named 'Logo Detection'

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
API key	No	Text value		The Google Cloud API key to be used for this API call
Provide image	N/A	From file, From GCS	From file	Specify whether the image will be provided by a full path or a Google Cloud Storage URI
Image file	No	File		The full path (folder plus filename) of the image file to transmit
GCS Image URI	No	Text value		The URI of the image residing on Google Cloud Storage
Timeout	Yes	Numeric value	30	The time (in seconds) that the agent should wait for a connection to be established with the server, before it fails

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
JSONResponse	Custom object	The API response results
StatusCode	Numeric value	The status code returned

Exceptions

EXCEPTION	DESCRIPTION
Failed to Invoke cognitive services	Indicates a problem while trying to invoke Cognitive Services
Request timeout expired	Indicates that the timeout expired while performing the request

Image properties detection

Invokes the Google Cloud Vision service named 'Image Properties Detection'

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
API key	No	Text value		The Google Cloud API key to be used for this API call
Provide image	N/A	From file, From GCS	From file	Specify whether the image will be provided by a full path or a Google Cloud Storage URI
Image file	No	File		The full path (folder plus filename) of the image file to transmit
GCS Image URI	No	Text value		The URI of the image residing on Google Cloud Storage
Timeout	Yes	Numeric value	30	The time (in seconds) that the agent should wait for a connection to be established with the server, before it fails

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
JSONResponse	Custom object	The API response results
StatusCode	Numeric value	The status code returned

Exceptions

EXCEPTION	DESCRIPTION
Failed to Invoke cognitive services	Indicates a problem while trying to invoke Cognitive Services
Request timeout expired	Indicates that the timeout expired while performing the request

Safe search detection

Invokes the Google Cloud Vision service named 'Safe Search Detection'

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
API key	No	Text value		The Google Cloud API key to be used for this API call
Provide image	N/A	From file, From GCS	From file	Specify whether the image will be provided by a full path or a Google Cloud Storage URI
Image file	No	File		The full path (folder plus filename) of the image file to transmit
GCS Image URI	No	Text value		The URI of the image residing on Google Cloud Storage
Timeout	Yes	Numeric value	30	The time (in seconds) that the agent should wait for a connection to be established with the server, before it fails

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
JSONResponse	Custom object	The API response results
StatusCode	Numeric value	The status code returned

Exceptions

EXCEPTION	DESCRIPTION
Failed to Invoke cognitive services	Indicates a problem while trying to invoke Cognitive Services
Request timeout expired	Indicates that the timeout expired while performing the request

IBM cognitive

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IBM's cognitive actions

Convert document
Translate
Identify language
Analyze tone
Classify Image

Getting started with IBM cognitive actions

IBM cognitive services are machine learning algorithms that use artificial intelligence to perform complex operations, such as language tone analyzing and visual recognition.

Power Automate for desktop enables you to use these services in your flows through the IBM cognitive actions.

All IBM cognitive actions require an API key that can be created and managed through the IBM Cloud console. Additionally, they require the release date of the used API and the service endpoint location.

IBM cognitive actions

Document conversion

Translate non-structured documents like fax, email, pdf, etc. into an EDI or other structured formats

Convert document

Invokes the IBM service named 'Convert Document'

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Username	No	Text value		The username to be used for this call
Password	No	Encrypted value		The password to use for this call
Version date	No	Text value		The release date of the API to use
File path	No	File		The path to the file to analyze

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Mime type	N/A	text/html, text/xhtml+xml, application/pdf, application/msword, application/vnd.openxmlformats-officedocument.wordprocessingml.document	text/html	The MIME type of the file
Conversion target	N/A	Answer units, Normalized HTML, Normalized text	Answer units	The output format of the conversion
Answer units	Yes	Text value		The heading levels as a comma-separated string
Timeout	Yes	Numeric value	30	The time (in seconds) that the agent should wait for a connection to be established with the server, before it fails

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
JSONResponse	Custom object	The results of the API call
StatusCode	Numeric value	The status code of the API call

Exceptions

EXCEPTION	DESCRIPTION
Request timeout expired	Indicates that the timeout expired while performing the request
Failed to Invoke cognitive services	Indicates a problem while trying to invoke Cognitive Services

Language translator

Translate documents, apps, and webpages

Translate

Invokes the IBM service named 'Translate'

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
API key	No	Text value		The API key to use for this call

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Version date	No	Text value		The release date of the API to use
Service endpoint location	N/A	US South, US East, Europe, Australia, Japan, UK, Korea	US East	The account's service location. Can be seen through IBM "Manage" in the resources section
Instance ID	No	Text value		The Instance ID of the service.
Translate mode	N/A	Model ID, Source and target	Model ID	Specify the mode to be used for this call
Model ID	No	Text value		The unique model_id of the translation model that will be used to translate the text
Source	No	Text value		The source language of the text
Target	No	Text value		The translation target language in 2 or 5 letter language code
Text	No	List of Text values		The text to send or list of words to be separately translated
Timeout	Yes	Numeric value	30	The time (in seconds) that the agent should wait for a connection to be established with the server, before it fails

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
JSONResponse	Custom object	The results of the API call
StatusCode	Numeric value	The status code returned

Exceptions

EXCEPTION	DESCRIPTION
Request timeout expired	Indicates that the timeout expired while performing the request
Failed to Invoke cognitive services	Indicates a problem while trying to invoke Cognitive Services

Identify language

Invokes the IBM service named 'Identify Language'

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
API key	No	Text value		The API key to use for this call
Version date	No	Text value		The release date of the API to use
Service endpoint location	N/A	US South, US East, Europe, Australia, Japan, UK, Korea	US East	The account's service location. Can be seen through IBM "Manage" in the resources section
Instance ID	No	Text value		The Instance ID of the service.
Text	No	Text value		The text to analyze
Content type	Yes	Text value	text/plain	The format of the requested values
Timeout	Yes	Numeric value	30	The time (in seconds) that the agent should wait for a connection to be established with the server, before it fails

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
JSONResponse	Custom object	The results of the API call
StatusCode	Numeric value	The status code of the API call

Exceptions

EXCEPTION	DESCRIPTION
Request timeout expired	Indicates that the timeout expired while performing the request
Failed to Invoke cognitive services	Indicates a problem while trying to invoke Cognitive Services

Tone analyzer

Detect emotional and language tones in written text

Analyze tone

Invokes the IBM service named 'Analyze Tone'

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
API key	No	Text value		The API key to use for this call
Version date	No	Text value		The release date of the API to use
Service endpoint location	N/A	US South, US East, Europe, Australia, Japan, UK, Korea	US East	The account's service location. Can be seen through IBM "Manage" in the resources section
Instance ID	No	Text value		The Instance ID of the service.
Provide text	N/A	From text, From file	From text	Specify how the text to be analyzed will be provided
Text	No	Text value		The text to analyze
File path	No	File		The path to the file to analyze
Content type	N/A	text/plain, text/html, application/json	text/plain	The content type of the text that will be sent
Tones	Yes	Text value		The tone with which the results will be filtered (optional)
Sentences	Yes	Text value		Specify whether to remove the sentence analysis
Timeout	Yes	Numeric value	30	The time (in seconds) that the agent should wait for a connection to be established with the server, before it fails

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
JSONResponse	Custom object	The results of the API call
StatusCode	Numeric value	The status code of the API call

Exceptions

EXCEPTION	DESCRIPTION
Request timeout expired	Indicates that the timeout expired while performing the request
Failed to Invoke cognitive services	Indicates a problem while trying to invoke Cognitive Services

Visual recognition

Find meaning in visual content. Analyze images for scenes, objects, and other content

Classify Image

Invokes the IBM service named 'Classify Image'

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
API key	No	Text value		The API key to use for this call
Version date	No	Text value		The release date of the API to use
Service endpoint location	N/A	US South, Europe, Korea	US South	The account's service location. Can be seen through IBM "Manage" in the resources section
Instance ID	No	Text value		The Instance ID of the service.
Provide image	N/A	From file, From GCS	From file	Specify how the image will be provided
Image file path	No	File		The path to the image to be analyzed
Image URL	No	Text value		The URL of the image to be analyzed
Owners	Yes	Text value	me	The classifiers to be used as a comma separated list
Classifier IDs	Yes	Text value	default	The classifier Ids to be used as a comma separated list
Threshold	Yes	Text value		The minimum score a class must have to be displayed in the response as a floating value

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Language	Yes	Text value		The language of the output
Timeout	Yes	Numeric value	30	The time (in seconds) that the agent should wait for a connection to be established with the server, before it fails

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
JSONResponse	Custom object	The results of the API call
StatusCode	Numeric value	The status code of the API call

Exceptions

EXCEPTION	DESCRIPTION
Request timeout expired	Indicates that the timeout expired while performing the request
Failed to Invoke cognitive services	Indicates a problem while trying to invoke Cognitive Services

Microsoft cognitive

1/15/2022 • 8 minutes to read • Edit Online

Microsoft's cognitive actions

Spell check
Analyze image
Describe image
OCR
Tag image
Detect language
Key phrases
Sentiment

Getting started with Microsoft cognitive actions

Microsoft cognitive services enable users to accelerate decision-making using artificial intelligence without requiring machine learning expertise.

Power Automate for desktop provides a wide variety of Microsoft cognitive actions that allow you to integrate this functionality into your flows. Text analysis, computer vision, and spell checking are all tasks that Microsoft cognitive actions can perform.

All Microsoft cognitive actions require a subscription key that validates your subscription for a service or group of services. The keys are available in the Azure portal for each resource that you've created.

Microsoft cognitive actions

Bing spell check

Correct spelling errors, recognize the difference among names, brand names, and slang, as well as understand homophones

Spell check

Invokes the Microsoft Cognitive service named 'Bing Spell Check'

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Subscription key	No	Text value		The subscription key to use for this API call
Text	No	List of Text values		The text or the list of texts to send
Mode	Yes	Text value		Specify the spell-check mode
Mkt	Yes	Text value		For proof mode, the only supported language codes are: en-us, es-es, pt-br. For spell mode, all language codes are supported

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Timeout	Yes	Numeric value	30	The time (in seconds) that the agent should wait for a connection to be established with the server, before it fails

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
JSONResponse	Custom object	The API response results
StatusCode	Numeric value	The status code returned

Exceptions

EXCEPTION	DESCRIPTION
Request timeout expired	Indicates that the timeout expired while performing the request
Failed to Invoke cognitive services	Indicates a problem while trying to invoke Cognitive Services

Computer vision

Analyze images and extract data

Analyze image

Invokes the Microsoft Cognitive service named 'Analyze Image'

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Server location	N/A	West US, West US 2, East US, East US 2, West Central US, South Central US, West Europe, North Europe, Southeast Asia, East Asia, Australia East, Brazil South, Canada Central, Central India, UK South, Japan East	West US	The server location to be use for this API call
Subscription key	No	Text value		The subscription key to use for this API call
Provide image	N/A	From file, From GCS	From file	Specify whether the image will be provided by a full path or a URL address

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Image file	No	File		The full path (folder plus filename) of the image file to transmit
Image URL	No	Text value		The URL address of an image
Visual features	Yes	Text value		A text value indicating what visual feature types to return. Multiple values should be comma-separated. For example: categories, tags, description
Details	Yes	Text value		A text value indicating which domain-specific details to return. Multiple values should be comma-separated
Language	Yes	Text value		A text value indicating which language to return. The service will return recognition results in the specified language
Timeout	Yes	Numeric value	30	The time (in seconds) that the agent should wait for a connection to be established with the server, before it fails

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
JSONResponse	Custom object	The API response results
StatusCode	Numeric value	The status code returned

Exceptions

EXCEPTION	DESCRIPTION
Request timeout expired	Indicates that the timeout expired while performing the request
Failed to Invoke cognitive services	Indicates a problem while trying to invoke Cognitive Services

Describe image

Invokes the Microsoft Cognitive service named 'Describe Image'

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Server location	N/A	West US, West US 2, East US, East US 2, West Central US, South Central US, West Europe, North Europe, Southeast Asia, East Asia, Australia East, Brazil South, Canada Central, Central India, UK South, Japan East	West US	The server location to be use for this API call
Subscription key	No	Text value		The subscription key to use for this API call
Provide image	N/A	From file, From GCS	From file	Specify whether the image will be provided by a full path or a URL address
Image file	No	File		The full path (folder plus filename) of the image file to transmit
Image URL	No	Text value		The URL address of an image
Max candidates	Yes	Text value		The maximum number of candidate descriptions to be returned. The default is 1
Timeout	Yes	Numeric value	30	The time (in seconds) that the agent should wait for a connection to be established with the server, before it fails

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
JSONResponse	Custom object	The API response results
StatusCode	Numeric value	The status code returned

Exceptions

EXCEPTION	DESCRIPTION
Request timeout expired	Indicates that the timeout expired while performing the request
Failed to Invoke cognitive services	Indicates a problem while trying to invoke Cognitive Services

OCR

Invokes the Microsoft Cognitive service named 'OCR'

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Server location	N/A	West US, West US 2, East US, East US 2, West Central US, South Central US, West Europe, North Europe, Southeast Asia, East Asia, Australia East, Brazil South, Canada Central, Central India, UK South, Japan East	West US	The server location to be use for this API call
Subscription key	No	Text value		The subscription key to use for this API call
Provide image	N/A	From file, From GCS	From file	Specify whether the image will be provided by a full path or a URL address
Image file	No	File		The full path (folder plus filename) of the image file to transmit
Image URL	No	Text value		The URL address of an image
Language	Yes	Text value		The BCP-47 language code of the text to detect in the image
Detect orientation	Yes	Text value		Specify whether to detect the text orientation in the image
Timeout	Yes	Numeric value	30	The time (in seconds) that the agent should wait for a connection to be established with the server, before it fails

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
JSONResponse	Custom object	The API response results
StatusCode	Numeric value	The status code returned

Exceptions

EXCEPTION	DESCRIPTION
Request timeout expired	Indicates that the timeout expired while performing the request
Failed to Invoke cognitive services	Indicates a problem while trying to invoke Cognitive Services

Tag image

Invokes the Microsoft Cognitive service named 'Tag Image'

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Server location	N/A	West US, West US 2, East US, East US 2, West Central US, South Central US, West Europe, North Europe, Southeast Asia, East Asia, Australia East, Brazil South, Canada Central, Central India, UK South, Japan East	West US	The server location to be use for this API call
Subscription key	No	Text value		The subscription key to use for this API call
Provide image	N/A	From file, From GCS	From file	Specify whether the image will be provided by a full path or a URL address
Image file	No	File		The full path (folder plus filename) of the image file to transmit
Image URL	No	Text value		The URL address of an image
Timeout	Yes	Numeric value	30	The time (in seconds) that the agent should wait for a connection to be established with the server, before it fails

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
JSONResponse	Custom object	The API response results
StatusCode	Numeric value	The status code returned

Exceptions

EXCEPTION	DESCRIPTION
Request timeout expired	Indicates that the timeout expired while performing the request
Failed to Invoke cognitive services	Indicates a problem while trying to invoke Cognitive Services

Text Analytics

Detect sentiment, key phrases, named entities and language from text

Detect language

Invokes the Microsoft Cognitive service named 'Text Analytics - Detect Language'

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Server location	N/A	West US, West US 2, East US, East US 2, West Central US, South Central US, West Europe, North Europe, Southeast Asia, East Asia, Australia East, Brazil South, Canada Central, Central India, UK South, Japan East	West US	The server location to be use for this API call
Subscription key	No	Text value		The subscription key to use for this API call
Text	No	Text value		The text to analyze
Timeout	Yes	Numeric value	30	The time (in seconds) that the agent should wait for a connection to be established with the server, before it fails

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
JSONResponse	Custom object	The API response results

ARGUMENT	TYPE	DESCRIPTION
StatusCode	Numeric value	The status code returned

Exceptions

EXCEPTION	DESCRIPTION
Request timeout expired	Indicates that the timeout expired while performing the request
Failed to Invoke cognitive services	Indicates a problem while trying to invoke Cognitive Services

Key phrases

Invokes the Microsoft Cognitive service named 'Text Analytics - Key Phrases'

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Server location	N/A	West US, West US 2, East US, East US 2, West Central US, South Central US, West Europe, North Europe, Southeast Asia, East Asia, Australia East, Brazil South, Canada Central, Central India, UK South, Japan East	West US	The server location to be use for this API call
Subscription key	No	Text value		The subscription key to use for this API call
Text	No	List of Text values		The text or the list of texts to analyze
Language	Yes	Text value		The language of the text(s)
Timeout	Yes	Numeric value	30	The time (in seconds) that the agent should wait for a connection to be established with the server, before it fails

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
JSONResponse	Custom object	The API response results
StatusCode	Numeric value	The status code returned

Exceptions

EXCEPTION	DESCRIPTION
Request timeout expired	Indicates that the timeout expired while performing the request
Failed to Invoke cognitive services	Indicates a problem while trying to invoke Cognitive Services

Sentiment

Invokes the Microsoft Cognitive service named 'Text Analytics - Sentiment'

Input Parameters

ARGUMENT	OPTIONAL	ACCEPTS	DEFAULT VALUE	DESCRIPTION
Server location	N/A	West US, West US 2, East US, East US 2, West Central US, South Central US, West Europe, North Europe, Southeast Asia, East Asia, Australia East, Brazil South, Canada Central, Central India, UK South, Japan East	West US	The server location to be use for this API call
Subscription key	No	Text value		The subscription key to use for this API call
Text	No	List of Text values		Text
Language	Yes	Text value		The 2 letter ISO 639-1 representation of the language of the text(s)
Timeout	Yes	Numeric value	30	The time (in seconds) that the agent should wait for a connection to be established with the server, before it fails

Variables Produced

ARGUMENT	TYPE	DESCRIPTION
JSONResponse	Custom object	The API response results
StatusCode	Numeric value	The status code returned

Exceptions

EXCEPTION	DESCRIPTION
Request timeout expired	Indicates that the timeout expired while performing the request

EXCEPTION	DESCRIPTION
Failed to Invoke cognitive services	Indicates a problem while trying to invoke Cognitive Services

Process migrator for Softomotive products (preview)

1/15/2022 • 10 minutes to read • Edit Online

[This topic is pre-release documentation and is subject to change.]

> **IMPORTANT**
> From January 1st 2022, WinAutomation and ProcessRobot will no longer be supported. Learn more about the Softomotive products deprecation here. You may migrate your flows to Power Automate.

Process migrator for Softomotive products (preview) enables users to convert automations into desktop flows for use in Power Automate.

This migration utility redefines automations to their equivalent Power Automate desktop flow action definitions where such parity exists.

Some actions have been deprecated because they don't fit into the Power Platform ecosystem. However, workarounds should be applicable to overcome what appears to be missing functionality.

> **NOTE**
> You can find the full list of migration coverage regarding action groups in the release notes here.

Prerequisites

For Process migrator for Softomotive products (preview) to be able to install and function as expected, the following Prerequisites are needed:

WinAutomation users:

- The latest publicly available version of Power Automate for desktop installed
- WinAutomation installed (v6 and later)
- Access to a Power Automate environment

ProcessRobot users:

- The latest publicly available version of Power Automate for desktop installed
- Access to a Power Automate environment. Follow the get started documentation if you haven't already provisioned an environment
- Exported ProcessRobot process files (.prp) into a folder on the same machine as the migration utility and Power Automate for desktop

Installing Process migrator for Softomotive products (preview)

After successfully downloading the setup file of the Process migrator for Softomotive products (preview), run it to install it on your machine.

NOTE

- Make sure you are performing a clean installation of Process migrator for Softomotive products (preview).
- Uninstall any previous installations of the application.
- Remove any previous installation residue (empty installation folders etc.)
- Install the latest version of the application.

In the displayed dialog, select an installation path and accept Microsoft's terms of use.

Now, you can run the Process migrator for Softomotive products (preview).

Running Process migrator for Softomotive products (preview)

1. After launching Process migrator for Softomotive products (preview), you'll be prompted to populate your Power Automate account.

The application might prompt you to connect to the account you use to access your environments in order to save the migrated processes as desktop flows.

2. Select the Softomotive product from which you want to migrate processes.

Migrating WinAutomation processes to Power Automate

1. If you use a WinAutomation version later than 9, you'll be prompted to enter your WinAutomation master key. This key is required for the migration of passwords inside encrypted processes.

   If you omit to enter your WinAutomation master key, the migration of the processes will proceed, but the password values won't be migrated.

2. After entering your master key, the application will retrieve all the processes located on your machine.

> **NOTE**
>
> Some delay might be expected after this step, but the application is successfully operating in the background.

When the process retrieving is completed, choose the processes to migrate and the Power Automate environment that will store them. The default environment is pre-selected.

3. If you choose to migrate a password-protected process, you'll be prompted to enter the password you used to encrypt it. If you choose to skip entering the requisite password, the migration of the respective process will be omitted.

Migrating PorcessRobot processes to Power Automate

1. If you choose to migrate ProcessRobot processes, you'll be prompted to select the folder containing the exported .prp (ProcessRobot Process) files.

2. After selecting the folder, you'll be able to select the processes you want to convert.

3. If you've exported the .prp files from the **History** tab in Process Designer and have chosen **Selected versions only**, the migrator will convert one version of the process.

   Exporting the .prp files without limiting to a single version will result in all previous versions being migrated.

Completing migration and accessing the migrated processes

1. During the migration, a dialog will display information about the current state of the migration and a progress bar.

2. When the migration is completed, an autogenerated log file will be displayed showing the migrated processes.

3. You can access the exported logs at **C:\Users{username}\AppData\Local\Microsoft\Process migrator for Softomotive products\Logs**

NOTE

For the migrated desktop flows to be visible, some time is required. To instantly view the migrated desktop flows in Power Automate:

- Sign out and sign in again in Power Automate, or
- Restart the Power Automate service by exiting the service and re-running Power Automate.

4. Now, you can modify the migrated processes (now desktop flows) through Power Automate.

TIP

Running the Process migrator for Softomotive products (preview) will be paused once an encrypted process has been encountered, waiting for the password to be inserted by the user. It's advised to group processes based on whether they are encrypted or not. This way, unencrypted processes will be migrated without supervision and the encrypted ones will have the required user attendance.

NOTE

- Migrated WinAutomation or ProcessRobot processes will have the following format when uploaded as desktop flows (ProcessRobot users can substitute use of WA and WinAutomation to PR and ProcessRobot respectively):WA_{Name of WinAutomation}, , process (folder path inside WinAutomation). For example, if you migrate the05 - Copy FileWinAutomation process that resides under the path"MyProcesses/Examples/01 - Beginner", the resulting desktop flow will be namedWA_05 Copy File (Examples/01 - Beginner).
- If you try to migrate a process and the resulting desktop flow name duplicates the name of an already existing desktop flow in the environment you chose, the later desktop flow will be saved with a name following the format WA_{Name of WinAutomation} (X) process (folder path inside WinAutomation), where X is an increasing number. For example, if you migrate the05 - Copy FileWinAutomation process that resides under the path"MyProcesses/Examples/01 - Beginner"and there happens to be a desktop flow in your environment of choice, having the same name, the resulting desktop flow will be namedWA_05 Copy File (1) (Examples/01 - Beginner).

Reconfiguring ProcessRobot console features in Power Automate

ProcessRobot Control Desk – Redeploying in Power Automate

Power Automate and ProcessRobot behave differently at their core, so there will be a requirement to reconfigure administrative and orchestration features. Some of your converted desktop flows may also require modification depending on the actions used within the processes. The Power Automate Learning Resources Blog is a repository of useful links for a good overview as well as detailed explanations on how to use the Power Platform for your needs.

The Power Platform Admin Center (PPAC) by default contains information related to your RPA environment that admins are accustomed to seeing in Control Desk, including cloud flow activity, desktop flow run activity, desktop flow queue monitoring and more. PPAC also enables users to create cloud flows that can incorporate schedules, triggers, run desktop flows and reach all other Power Automate components you have access to.

If you are new to the Power Platform, it is recommended that administrators complete the Admin In A Day workshop to better understand PPAC in addition to the ALM hands on lab since this is the current recommended approach to manage desktop flow versions and application lifecycle management. Citizen Devs are encouraged to participate in the RPA In a Day tutorials that help build a solid foundation across the entire stack.

Apart from the extensive set of features preconfigured into PPAC – the CoE Power BI Dashboard far exceeds the capability of ProcessRobot Dashboards and the core components of the CoE are available for all Power Automate users. The CoE starter kit provides a solid foundation to build insightful dashboards that can be modified to your organizations needs throughout their RPA journey.

Workarounds for unsupported ProcessRobot Process Studio features

User Libraries:

User Libraries are not supported in Power Automate desktop flows. If your process contains a call to a user library, it is recommended the associated user library actions are copied into your desktop flow otherwise they will not be migrated using the Process Migrator for Softomotive Products. The 'Start Process' action from ProcessRobot is on the roadmap to be reintroduced as 'Run Flow' in a future release. This will simplify management of former User Libraries since the parent flow can call the child, wait for the child to complete its task, and send back supported variable types to the parent flow.

Process Robot Actions:

Start Process

Not supported but is currently on the roadmap to be modified and reintroduced. In some instances, for the meanwhile you may be able to work around this limitation by setting up a Cloud Flow to execute process B once process A has stopped running and pass input variables to process B from process A.

Get Process Path

Not supported, not on the roadmap.

Log Message

Not supported by the migration tool but is currently on the roadmap to be modified and reintroduced.

Update KPI

Not supported by the migration tool. Administrators can apply a workaround in the CoE to calculate KPIs

Get Global Variable / Set Global Variable

Not supported by the migration tool. Possible workarounds include the ability to create and manage tables in Dataverse create a cloud flow that calls for a global variable (Get Global Variable), passes it to a desktop flow for consumption, then have an output variable from the desktop flow passed back to the Dataverse table if needed (Set Global Variable).

Enter Locked Region

Not supported by the migration tool.

Exit Locked Region

Not supported by the migration tool.

Add Queue Item in Queue

Not supported by migration tool. Review Monitor desktop flow queues for information on queue functionality in Power Automate. Other possible workarounds include the ability to create and manage tables in Dataverse where cloud flow monitors, schedules, or triggers can be used to load data.

Get Queue Item in Queue

Not supported in migration. Possible workarounds include creating a Cloud Flow to trigger an event when a row is added, modified, or deleted in a Dataverse table.

Get Credential

Not supported in migration. Workarounds include using sensitive text in power automate desktop with Azure Key Vault.

Update Credential

Not supported in migration. Workarounds include updating a secret using an API.

Display Notification

Not supported. Not on roadmap.

Non-migratable actions

The following WinAutomation and ProcessRobot actions won't be migrated from the processes to the respective UI Flows.

- All Ancora actions
- All CaptureFast actions
- Cognitive > Google > Vision > Face Detection
- Cognitive > IBM > Visual Recognition > Detect Faces
- Cognitive > Microsoft > Face > Detect Face
- Cognitive > Microsoft > Face > Find Similar Face
- Message Boxes > Display Notification
- Message Boxes > Display Custom Dialog
- PDF Actions > Extract Text From PDF With OCR
- All Synchronization Actions (group of actions)
- All WinAutomation Actions (group of actions)

Partially migratable actions

The following actions will be migrated from the processes to the respective desktop flows. However, one or more of their parameters won't be transferred at all or with the same value. Some cases might be handled by applying manual rework in the designer.

- Azure: Create Azure Session
  - Non-migratable Properties: Username, Password (for option Authentication Type: With Service Principal)
  - Missing properties: Client Secret (for option Authentication Type: With User)

- Azure: Create Azure Managed Disk
  - Missing properties: Storage Account Name
- Compression: Unzip Files
  - Non-migratable Properties: Include Mask, Exclude Mask, Include Subfolders
- Cognitive: Classify Image IBM
  - Missing properties: Location, Instance ID
- Cognitive: Analyze Tone IBM
  - Non-migratable Properties: Username, Password
  - Missing properties: API key, Location, Instance ID
- Cognitive: Translate IBM
  - Non-migratable Properties: Username, Password
  - Missing properties: API key, Location, Instance ID, Version Date
- Cognitive: Identify Language IBM
  - Non-migratable Properties: Username, Password
  - Missing properties: API key, Location, Instance ID, Version Date
- Cognitive: Detect Language Microsoft
  - Non-migratable Properties: Number Of Languages To Detect
- Cryptography: Encrypt Text
  - Non-migratable if Encryption Algorithm is NOT EQUAL to AES & Cipher Mode is NOT EQUAL to CBC
- Cryptography: Decrypt Text
  - Non-migratable if Encryption Algorithm is NOT EQUAL to AES & Cipher Mode is NOT EQUAL to CBC
- Cryptography: Encrypt From File
  - Non-migratable if Encryption Algorithm is NOT EQUAL to AES & Cipher Mode is NOT EQUAL to CBC
- Cryptography: Decrypt To File
  - Non-migratable if Encryption Algorithm is NOT EQUAL to AES & Cipher Mode is NOT EQUAL to CBC
- Cryptography: Hash Text
  - Non-migratable if Encryption Algorithm is NOT EQUAL to AES & Cipher Mode is NOT EQUAL to CBC
- Cryptography: Hash From File
  - Non-migratable if Encryption Algorithm is NOT EQUAL to AES & Cipher Mode is NOT EQUAL to CBC
- Cryptography: Hash Text With Key
  - Non-migratable if Encryption Algorithm is NOT EQUAL to AES & Cipher Mode is NOT EQUAL to CBC
- Cryptography: Hash From File With Key
  - Non-migratable if Encryption Algorithm is NOT EQUAL to AES & Cipher Mode is NOT EQUAL to CBC
- Mouse and Keyboard: Move Mouse
  - Non-migratable for option 'Move mouse to recorded positions' --->

Overview of RPA templates and Dynamics 365

1/15/2022 • 2 minutes to read • Edit Online

For many businesses, success increasingly depends on having the agility to innovate and adapt to rapid change, responding to customer needs, competitive pressure, and industry trends. But this is a difficult challenge when employees are buried in time-consuming busywork like repetitive tasks or complex processes.

That's why we are dedicated to helping organizations like yours automate manual business processes, across both legacy and modern applications, so you can focus on what's most important for your business and customers. In March, we released robotic process automation (RPA) capabilities in Microsoft Power Automate for Windows 10 users.

We are introducing enhanced workplace automation capabilities for Microsoft Dynamics 365—a set of prebuilt RPA solution templates, that seamlessly integrate with select Dynamics 365 applications.

Initially available for Dynamics 365 Customer Service, Dynamics 365 Supply Chain Management, and Dynamics 365 Finance, the prebuilt automation templates enable teams to rapidly automate common business scenarios—freeing time from day-to-day manual, repetitive, and error-prone tasks.

Developers can further extend any of those solutions by using custom actions, custom connectors, Microsoft Azure services, and APIs to take full advantage of Microsoft's one cloud and data ecosystem.

Save time across customer service, finance, and supply chain roles

Explore some of the ways that RPA can help streamline processes and save valuable time across the workforce.

Dynamics 365 Customer Service: Helping call center agents rapidly validate customer credentials

Most contact centers require agents to validate or authenticate customer identities before proceeding with the service engagement. By enhancing Dynamics 365 Customer Service with RPA, agents can automate steps of the validation process, streamlining call times and helping agents to troubleshoot and solve customer issues faster.

Dynamics 365 Supply Chain Management: Streamline ordering of replacement parts for manufacturing line equipment

We've heard from manufacturing customers about the need to improve the process of ordering replacement parts for equipment on the factory floor. Often, technicians who identify defective parts on the manufacturing line need to write down part numbers, and then place the orders into the tracking system one by one. This is an inefficient and error-prone process. By integrating RPA processes into Dynamics 365 Supply Chain Management, technicians can simply scan or enter part details and submit orders on the spot, saving time and effort. Since Power Automate natively integrates with Azure IOT connectors, this solution can be easily extended to use the Azure IoT management system.

Watch a video to learn more about the new capabilities included in the latest update to Dynamics 365 Supply Chain Management.

Dynamics 365 Finance: Streamline the creation of end-of-billing cycle

reports

At the end of billing cycles, finance workers often have to generate many different end-of-cycle reports for every account. Traditionally, this is a manual, time-consuming, and error-prone process. Dynamics 365 Finance helps streamline many of these processes and now, by integrating RPA capabilities in Power Automate, finance teams can more easily automate many processes, allowing finance professionals to focus on more critical strategic tasks. These capabilities also improve the accuracy that is demanded by increasingly restrictive financial audit regulations.

Next steps

Take the first step to enable your customer service, supply chain, and finance teams to automate processes in Dynamics 365. Get a free Power Automate RPA trial license and install Power Automate for desktop, and then import the three solutions mentioned above into your environment to set it up. Check out the documentation for steps to get started.

Create orders on Dynamics 365 Supply Chain Management

1/15/2022 • 6 minutes to read • Edit Online

Dynamics 365 empowers your organization to deliver operational excellence and delight every customer. In order to make your use of Dynamics 365 even more productive and save users time and errors, we are releasing the preview for free automation solutions that will let customers of Dynamics 365 customers automate common tasks.

In this documentation, we outline the steps needed for administrators to allow users to automate quality order creation for Dynamics 365 Supply Chain Management and focus on higher-priority activities that require their unique creativity.

Prerequisites

Before starting, we need to prepare your environment with the adequate licenses and software set-up. This section provides a step-by-step for how to get the grounds ready.

Software

You will need to:

- install the Power Automate for desktop application. Power Automate will carry out the steps in Dynamics 365 as if a human were doing it in front of their computer.
- Log out of the Dynamics 365 app you wish to automate
- Get the appropriate security role for the automation to run

Log out of the Dynamics 365 app you wish to automate

In order to do the full automation, please sign out of the application before you run the automation for the first time. You will need to do this if you switch between automation and your account.

Get the appropriate security role set up for the account running the automation

You will need to decide which work account will be running the automation. It can be a dedicated account created by your admin in Azure Active Directory or the account of an existing employee. For the account you end up choosing, you need to check that it has the appropriate security roles so that it can access the surfaces you are automating.

We recommend the following security roles:

APPLICATION	SECURITY ROLE	LINK TO DOCUMENTATION
Power Platform	Environment admin or environment maker (if the environment already has Dataverse and unattended license needed)	
Dynamic 365 Supply Chain Management		

Licenses

If you already use Power Automate, PowerApps and Dynamics 365 applications on a day-to-day basis, you can

skip this section and jump to Installing the Dynamics 365 RPA solutions.

Otherwise, you will need at least a trial license for these 3 products. This section shows you how to acquire these trial licenses.

Get a trial license for Power Automate

Power Automate can automate processes by doing what a human would do on a keyboard and screen.

There are two ways to automate processes:

1. Attended mode: someone is sitting in front of their computer and watching the process run as if they were doing it themselves manually
2. Unattended mode: the process is running in the background on distant machines that users don't see.

To run attended, users need to acquire **the Power Automate per-user license with RPA**.
To run unattended, users need to have acquire two licenses: **Power Automate per-user license with RPA and the Power Automate unattended add-on**.

Get a trial license for Power Automate per-user license with RPA to run processes in attended mode

1. From the Power Automate portal, navigate to My Flows then on Desktop Flows
2. Click the fine print **Start free trial now**

An alternative consists in logging in to Power Automate for desktop and clicking on the **Start free trial** button

Add a trial license for Power Automate unattended add-on to run processes in unattended mode

As an admin, you can get an RPA unattended add-on and assign it to your environment Power Automate sign-up Q&A in your organization - Power Automate | Microsoft Docs

Get a trial license for Power Apps

Please follow the instructions in this PowerApps guide before moving on to the last step! /en-us/powerapps/maker/signup-for-powerapps#get-a-license-from-scratch

Get a trial license for the Dynamics 365 applications you wish to automate

To get started with Dynamics 365 Supply Chain Management and automate the quality order creation process, navigate here.

Setup steps

Now that prerequisites are set, we are on our way to get these free solutions that automate the processes.

Install Power Automate for desktop

1. Click on this link to install the Power Automate for desktop on the machine that will run the automation then follow the installation wizard. Here is the detailed guide with step-by-step to install Power Automate : Set up Power Automate for desktop on your device - Power Automate | Microsoft Docs

2. Make sure you switch the machine setting from PAD to the correct environment that you will install the solution to

3. Log in https://powerautomate.microsoft.com/manage/flows to create a test cloud flow with manual trigger

4. Add a desktop flow connector.

Select the Directly to machine connection from that dropdown. then select the machine name where you have installed Power Automate, enter the machine login credential (the username and password that you used to log into this machine. (View here to learn more about direct machine connectivity). Note this step will not be needed at a later date.

Install the Dynamics 365 RPA solution

Now that prerequisites are set, we are on our way to get these free solutions that automate the processes.

1. Download the Dynamics 365 automation solution and save it on your machine https://aka.ms/D365SCMQualityOrderRPASolution

2. Import the Dynamics 365 automation solution in the environment of your choice

   a. Go to https://powerautomate.microsoft.com and log in using your work account b. Select the environment in which you wish to work using the environment picker c. In the vertical menu on the left of your screen, click on **Solutions** d. In the horizontal menu, above the Solutions title, click on **Import** then click on **Browse** e. Navigate to the solution file you previously downloaded and double click on it in your file system f. Click **Next**.

3. Configure the connections needed to be used by the solution in the environment

   a. For each connector that the solution uses, either select an existing connection or create a new one using the Microsoft account or credentials of your choice.

b. Come back to the tab from which you initiate the above step and click **Refresh**

c. Click on Import. The solution explorer shows you a message letting you know the solution is being imported. It takes a few minutes.

4. Enter the parameters that the solution should use to run the process

a. From the Solutions explorer, click on the solution to open it b. You will find there are rows with the Type column that reads Environment Variable. We need to add values for each of these.

c. Click on each of the environment variable below and under **Current Value**, click on **Add New Value** to put in your parameter.

ENVIRONMENT VARIABLE NAME	DESCRIPTION
QOrder Parameter - SCM Portal URL	URL for the SCM environment including parameters for company and form for the InventQualityOrderTable *Example: https://hxoshmyfoodus9o1mf.sandbox.operations.int.dynamics.com/?cmp=USMF&mi=InventQualityOrderTable*|

ENVIRONMENT VARIABLE NAME	DESCRIPTION
SCM SignIn User	user account to sign into Dynamics 365 SCM *example: helloworld@contoso.com*
QOrder Parameter – Site	Name of the site to use for filling in the quality order creation form.
QOrder Parameter – Test Group	Configure the Testgroup for the quality order creation
QOrder Parameter - Warehouse	Configure the Warehouse for the quality order creation

5. Turn on the cloud flow in the solution

   a. In the solution, click the ... menu for the **QOrder - CloudFlow** cloud flow b. Click on **Turn On**

6. Put in the encrypted credentials to be used by the solution to log in to Dynamics 365

   a. From the solution explorer, click on the line item called **QOrder – Desktop Flow** b. Click on **Edit** then **Launch App** c. This will open the Power Automate for desktop
   d. Under the **Subflows** dropdown, double click on **LoginSCM** e. In the **LoginSCM** subflow, double click on action 8 f. Fill in the **Text** textbox with the password of the account to use during automation

7. Share each component of the solution (app, connection, flow, desktop flow) to other users in your company as run only user.

8. Have the user launch the “QOrder-Application" Power App from their phone and start using it. Watch this video for the scenario demo

Troubleshooting or Known issues

KNOWN ISSUE	WORKAROUND
if you acquire the adequate licenses for Power Automate and Power Apps after you install the solution, the flow or app will be turned off.	After you acquire the licenses, go back to the Solution explorer, click on the … menu for the app or flow then click on “Turn On”.

Use RPA with Dynamics 365 Finance

1/15/2022 • 7 minutes to read • Edit Online

Dynamics 365 empowers your organization to deliver operational excellence and delight every customer. In order to make your use of Dynamics 365 even more productive and save users time and errors, we are releasing the preview for free automation solutions that will let customers of Dynamics 365 customers automate common tasks.

In this documentation, we outline the steps needed for you to automate end of cycle reporting in Dynamics 365 Finance and focus on higher-priority activities that require your unique creativity.

Prerequisites

Before starting, we need to prepare your environment with the adequate licenses and software set-up. This section provides a step-by-step for how to get the grounds ready.

Software

You will need to:

- install the Power Automate for desktop application. Power Automate will carry out the steps in Dynamics 365 as if a human were doing it in front of their computer.
- Set the appropriate file download configuration in the Microsoft Edge browser (available for free on Windows) to have complete automation.
- Log out of the Dynamics 365 app you wish to automate
- Get the appropriate security role for the automation to run

Set the appropriate file download configuration on Microsoft Edge

Edge has two ways of downloading files from the internet onto your computer

1. Download directly on your machine, and save the file in the destination folder specified in the Edge settings
2. Ask for the user's permissions before downloading a file, wait for the user to accept the download, then only download the file and save it in the destination folder specified in the Edge setting.

In order to make this process fully automated and not requiring a human in front of the computer for it to work, we need Edge to download files using the first mechanism.

1. Open Microsoft Edge browser on your machine (using the Windows Search bar)
2. In the top right corner of your screen, click on "..." menu
3. Click on **Settings**
4. In the vertical menu in the left of your screen, click on Downloads

Turn off the toggle "Ask me what to do with each download"

Close your browser

Log out of the Dynamics 365 app

In order to do the full automation, please sign out of the application before you run the automation for the first time. You will need to do this if you switch between automation and your account.

Get the appropriate security role set up for the account running the automation

You will need to decide which work account will be running the automation. It can be a dedicated account created by your admin in Azure Active Directory or the account of an existing employee. For the account you end up choosing, you need to check that it has the appropriate security roles so that it can access the surfaces you are automating. Go to Managing security roles in Dynamics 365.

We recommend the following security roles:

APPLICATION	SECURITY ROLE	LINK TO DOCUMENTATION
Power Platform	Environment admin or environment maker (if the envionrment already has Dataverse and unattended license needed)	
Dynamic 365 Supply Chain Management		

Licenses

If you already use Power Automate, Power Apps and Dynamics 365 applications on a day-to-day basis, you can skip this section and jump to Installing the Dynamics 365 RPA solutions.

Otherwise, you will need at least a trial license for these 3 products. This section shows you how to acquire these trial licenses.

Get a trial license for Power Automate

Power Automate can automate processes by doing what a human would do on a keyboard and screen.

There are two ways to automate processes:

1. Attended mode: someone is sitting in front of their computer and watching the process run as if they were doing it themselves manually
2. Unattended mode: the process is running in the background on distant machines that users don't see.

To run attended, users need to acquire **the Power Automate per-user license with RPA**.
To run unattended, users need to have acquire two licenses: **Power Automate per-user license with RPA and the Power Automate unattended add-on**.

Get a trial license for Power Automate per-user license with RPA to run processes in attended mode

1. From the Power Automate portal, navigate to My Flows then on Desktop Flows
2. Click the fine print **Start free trial now**

An alternative consists in logging in to Power Automate and clicking on the **Start free trial** button

Add a trial license for Power Automate unattended add-on to run processes in unattended mode

As an admin, you can get an RPA unattended add-on and assign it to your environment Power Automate sign-up Q&A in your organization

Get a trial license for the Dynamics 365 applications you wish to automate

To get started with Dynamics 365 Finance and automate the end-of-cycle reporting process, navigate here.

Setup steps

Install Power Automate

1. Click on this link to install the Power Automate for desktop on the machine that will run the automation then follow the installation wizard. Here is the detailed guide with step-by-step to install Power Automate: Set up Power Automate for desktop on your device - Power Automate | Microsoft Docs

2. Make sure you switch the machine setting from Power Automate to the correct environment that you will install the solution to

3. Log in https://powerautomate.microsoft.com/manage/flows to create a test cloud flow with manual trigger

4. Add a desktop flow connector.

Select the Directly to machine connection from that dropdown. then select the machine name where you have installed Power Automate, enter the machine login credential (the username and password that you used to log into this machine. (View here to learn more about direct machine connectivity). Note this step will not be needed at a later date.

Installing the Dynamics 365 RPA solution

Now that prerequisites are set, we are on our way to get these free solutions that automate the processes.

1. Download the Dynamics 365 automation solution and save it on your machine a. To automate the quality

order process on Dynamics 365 Supply Chain Management, download the solution here: https://aka.ms/D365SCMQualityOrderRPASolution

b. To automate the end-of-cycle reporting process on Dynamics 365 Finance, download the solution here https://aka.ms/D365FinanceEndCycleReportingRPASolution

c. To automate the customer validation process on Dynamics 365 Omnichannel, download the solution here: https://aka.ms/D365CustomerValidationRPASolution

2. Import the Dynamics 365 automation solution in the environment of your choice

   a. Go to https://powerautomate.microsoft.com and log in using your work account b. Select the environment in which you wish to work using the environment picker c. In the vertical menu on the left of your screen, click on **Solutions** d. In the horizontal menu, above the Solutions title, click on **Import** then click on **Browse** e. Navigate to the solution file you previously downloaded and double click on it in your file system f. Click **Next**.

3. Configure the connections needed to be used by the solution in the environment

   a. For each connector that the solution uses, either select an existing connection or create a new one using the Microsoft account or credentials of your choice.

   b. Come back to the tab from which you initiate the above step and click **Refresh**

c. Click on **Import**. The solution explorer shows you a message letting you know the solution is being imported. It takes a few minutes.

4. Enter the parameters that the solution should use to run the process

   a. From the Solutions explorer, click on the solution to open it b. You will find there are rows with the **Type** column that reads **Environment Variable**. We need to add values for each of these.

   c. Click on each of the environment variable listed in the table below and under **Current Value**, click on **Add New Value** to put in your desired parameter.

ENVIRONMENT VARIABLE NAME	DESCRIPTION
D365CompanyName	Name of the company to use in your D365 organization. It is located at the top right corner of your screen.
D365FinanceSite	URL to your Dynamics 365 Finance website. It goes until dynamics.com
D365SiteUserName	Email address of the user account the automation should run under.

5. Turn on the cloud flow in the solution

   a. In the solution, click the ... menu for the **Report Reconciliation** cloud flow b. Click on **Turn On**

6. Put in the encrypted credentials to be used by the solution to log in to Dynamics 365

   a. From the solution explorer, click on the line item called **Report Validation** b. Click on **Edit** then **Launch App** c. This will open the Power Automate for desktop
   d. Under the **Subflows** dropdown, double click on **login_to_FnO**

e. In the **login_to_FnO** subflow, double click on action 11

f. Fill in the **Text** textbox with the password of the account to use during automation

7. Now you can test the desktop flow from Power Automate.
8. And then you can test the cloud flow from portal. The demo below shows how the end-to-end scenario works. You will get a Teams message at the end

9. Last if you choose to run the you can
10. You can customize either the desktop flow or cloud flow to create custom reports for your own scenarios
11. Lastly if you choose to run the automation unattended, you can switch the run mode from cloud flow. See here for more details.

Known issues

KNOWN ISSUE	WORKAROUND
I created a gateway connection for my solution but now it's taking very long to import.	Nothing to worry about. It takes a while to import solutions. Give it at least 10 minutes.
My cloud flow doesn't run after I press "Play" in the flow designer	Go back to the Solution explorer, click on the ... menu for the app or flow then click on "Turn On".

Use RPA with Dynamics 365 Customer Service

1/15/2022 • 7 minutes to read • Edit Online

Automate common activities on Dynamics 365 Customer Service with Robotic Process Automation using Power Automate.

Dynamics 365 empowers your organization to deliver operational excellence, bringing delight to every customer. To make your use of Dynamics 365 even more productive, we are releasing the preview of free automation solutions that Dynamics 365 customers can use to automate common tasks.

This article outlines the steps needed for you to automate customer validation in Dynamics 365 Customer Service and focus on higher-priority activities that require your unique creativity.

Prerequisites

Here's what you need to prepare your environment.

Software

Install the following:

- Dynamics 365 for Customer Service.
- Power Automate for desktop. Power Automate for desktop will carry out the steps in Dynamics 365 as if a human were doing it in front of their computer.
- The Contoso CRM app from Microsoft. This app showcases how RPA works. You can use it as an example to build your own RPA action.

> **IMPORTANT**
>
> Be sure to get the appropriate security roles for the account that runs your automation. This account can be a dedicated one that your admin in Azure Active Directory creates or an employee's account.

Use these recommended security roles.

APPLICATION	SECURITY ROLE	LINK TO DOCUMENTATION
Power Platform	Option 1: Environment admin Option 2: Environment maker (if the environment already has Dataverse and unattended license needed)	
Dynamics 365 for Customer Service	D365 Customer Service administrator	Enable users for Customer Service and assign roles

Licenses

1. Get a trial license for Power Automate if you don't have a paid license.The Power Automate license you need depends on the mode in which your automations run.

   Here are the two modes to automate processes.

   - **Attended mode**: someone is sits at computer and watches the process run as if they were doing it themselves manually. For attended mode, users must have **the Power Automate per-user**

license with RPA.

- **Unattended mode**: the process is runs in the background without any human interaction and it's not visible on the device. For attended mode, users must have two licenses.
  - **The Power Automate per-user license with RPA**
  - **The Power Automate unattended add-on**.

Follow these steps to get a *Power Automate per-user license with RPA* to run processes in attended mode.

a. From Power Automate, select **My Flows** > **Desktop flows**.

b. Select **Start free trial now**.

To add a trial license for *Power Automate unattended add-on** to run processes in unattended mode, you must ask a tenant admin to get an *RPA unattended add-on* and assign it to your environment Power Automate sign-up Q&A in your organization.

2. Get a trial license for the Dynamics 365 Customer Service app.

3. To get started with Dynamics 365 for Customer Service and automate the customer validation process.

Set up your device

Now that prerequisites are set, we are on our way to get these free solutions that automate the processes.

Get the latest updates for your environment

1. Go to Power Platform admin center, select the environment in which you are interested, and then select **Dynamics 365 apps** at the right side.

2. Confirm that the **Agent Productivity Tools** and **App profile manager** are updated.

3. If you see **Update available** for **Agent Productivity Tools** and **App profile manager**, select **Update available**.

Install and configure Power Automate

1. Download Power Automate for desktop onto the machine that will run the automation then follow the installation wizard.

2. Follow the steps in the detailed guide to install Power Automate for desktop onto your device.

3. Change the machine settings from Power Automate to the environment to which you will install the solution.

4. Log in and confirm you can create a test cloud flow with a manual trigger.

5. Add a desktop flow connector.

6. Select **Directly to machine** from the list.

7. Select the machine onto which you installed Power Automate, and then enter the machine login credentials (the username and password that you used to log into this machine).

Install and configure Contoso CRM app

1. Download and install contoso_crm.exe to the machine where the automation runs.

   This Contoso app is used to show you how the end-to-end automation scenario works so that you can follow the example to create your own automation.

   > **NOTE**
   >
   > Select **More info** > **Run anyway** on the **Windows protected you PC** screen that appears during the installation.

After the installation completes, you can run the Contoso CRM app from the Start menu.

Install the Dynamics 365 RPA solution

1. Download the automation solution and save it on your machine.
2. Import the Dynamics 365 automation solution into the environment of your choice.
   a. Sign into Power Automate, and then log in using your work account.
   b. Select the environment that you will use from the environment picker.
   c. In the vertical menu on the left of your screen, select **Solutions**.

d. In the horizontal menu, above the **Solutions** title, select **Import** > **Browse**.

e. Run the solution file you downloaded.

f. Select **Next.**

3. Configure the connections needed to be used by the solution in the environment

   a. For each connector that the solution uses, either select an existing connection or create a new one using the Microsoft account or credentials of your choice. You will be taken to a different tab, make sure to not close the one you came from.

   b. For the **Desktop connection** domain/username and password, be sure to use the machine's Windows login credentials.

4. On the tab from which you initiated the previous step, select **Refresh**.

5. Select **Import.** The solution explorer shows you a message that lets you know the solution is being imported. It takes a few minutes.

6. Open **Case entity session – default template** (or your current case entity session template), open **Agent scripts** tab, and then add **Case agent script with automation**.

Learn more about session templates.

7. From the Dynamics 365 Customer Service app, login to Power Automate.

   a. From the case you are working on, select the **...** menu > **Flow**.

8. Select **Login to Flow**.

9. Authenticate using your Dynamics 365 account.

10. Now open one of your cases using **Shift + Left Click** to launch the productivity tools panel.

11. From the **Agent Script** session in the productivity panel, you will see several agent script steps. The first step is **Run Automation to validate Customer**. Select the **Run** button and confirm it runs.

12. The automation starts on the machine where you have installed Power Automate. You can watch how the automation uses the case data, opens the Contoso CRM app, and then finishes the look up automatically. After the automation runs, refresh the timeline to view the logs regarding the run result. Here's a demo on how it runs.

Customize the automation solution

1. Now you can start customizing the automation to meet your unique requirements. To do this, open Power Automate and then select **Edit** on the **Legacy Contoso App Contact Lookup** desktop flow.

2. You can save a copy to work on your customizations or work on the template directly.

3. Notice that there are multiple child flows. Each child flow uses the keyboard or the mouse to interact with the Contoso CRM app. You need to update the steps to interact with your legacy app.

4. After you test the desktop flow, you can save it. Now open the cloud flow in https://powerautomate.microsoft.com/manage/solutions from within the solution tab -> Customer Service RPA solution

5. Open the cloud flow named "Automation to validate customer info". Expand each action to review. In the Desktop flow action, you can switch to use any desktop flow you want and use any the input/output parameter that you want to use. To learn more, read here on how to use desktop flow in cloud flow.

6. Now you can save the cloud flow. Go back to D365 portal and trigger the agent script action to test. You will see your customization automation start to run.

7. Once you finished testing, you can share the cloud flow with everyone in the organization with run-only mode (click here to learn more) and switch it to run unattended way (click here to learn more). So that every agent will be able to reuse the same automation. License wise, the cloud flow should be put under a per flow plan (click here to learn more)

Troubleshooting and known issues

KNOWN ISSUE	WORKAROUND
Did not see the productivity tools panel from D365 customer service	Productivity tools don't show on home session. You need create a new session (Shift-click on case link) to see it. Producitivity tools runtime initialization is async. Please wait 1 – 2 seconds on home session before create new sessions.
Agent can't see the flow	Every agent needs to login flow from D365 widget for the first time
During install, you will be prompted multiple times for the same confirmation to install.	Confirm with "yes I am sure to install" every time prompted
The agent script isn't added to current session template automatically after import the demo solution.	Manually add the agent script to case session template.

Introduction to other types of desktop flows

1/15/2022 • 2 minutes to read • Edit Online

> **IMPORTANT**
>
> This section covers topics to develop automations using legacy systems:
>
> - Selenium IDE: If you are just starting your RPA automation project, we recommend that you use Power Automate for desktop instead.
> - Windows recorder (V1): From November 30th, desktop flows will no longer be supported. Migrate your flows to Power Automate for desktop or delete them.

Read on if you already have automation built using Windows recorder (V1) and Selenium IDE.

You can jump right in:

- Create and test Windows recorder (V1) flows for desktop applications
- Create and test Selenium IDE flows for Web applications

Desktop flows or connectors?

With Power Automate, you can automate both modern applications with APIs, or legacy applications with incomplete or missing APIs. You can even combine legacy apps, modern apps, and manual processes in a single automation.

APPLICATION TYPE	FEATURE	BENEFITS
Modern apps with APIs	Connectors	High reliability with software UI updates
Legacy apps (no APIs)	desktop flows	Easy to create. Works if no API is available.

You will find your desktop flows alongside automated, button, scheduled, and business process flows in **My flows**.

Next steps

- Learn how to set up desktop flows.
- Learn more about the different types of flows you can use to automate your workflows.

Create and test Windows recorder (V1) flows

1/15/2022 • 4 minutes to read • Edit Online

> **IMPORTANT**
>
> This section covers topics to develop automations using legacy systems:
>
> - Selenium IDE: If you are just starting your RPA automation project, we recommend that you use Power Automate for desktop instead.
> - Windows recorder (V1): From November 30th, desktop flows will no longer be supported. Migrate your flows to Power Automate for desktop or delete them.

In the following steps, we'll demonstrate how to automate the calculator app to sum two numbers and then store the result for later use.

Create a desktop Windows recorder (V1) flow

> **TIP**
>
> You can automate other Windows desktop apps by following a similar pattern.

1. Ensure your device is ready to create desktop flows.
2. Use Microsoft Edge (Version 80 or later) or Google Chrome to open Power Automate, and then sign in with the same work or school account as on your device.
3. Select **My flows** > **Desktop flows** > **New**.

4. Click **Additional desktop flow options**.

5. Select Windows recorder (V1), and then click **Next**.

6. Enter a name for your Windows recoder (V1) flow into the **Flow name** field, and then select **Next**.

7. Select **Next** at the bottom to skip the optional **Set up inputs** screen since we aren't using inputs in this walkthrough.
8. Select **Download package**.
9. Open the **Setup.Microsoft.PowerAutomate.UIflow.exe** file. This file is likely in your **Downloads** folder after you downloaded it in the previous step.
10. Follow the instructions in the Power Automate setup installer to complete the installation.
11. Once the Power Automate installer completes, go to Microsoft Edge store or Google Chrome store depending on the browser you are using and install **Microsoft Windows recorder (V1)** and **Selenium IDE** browser extensions and **Enable extensions**.

    Continue after you've installed the extension.
12. Select the **Record app** card to expand it.

13. Select **Launch recorder**.

The recorder control displays at the top of your screen.

14. Start the calculator app.

> **TIP**
>
> As your mouse hovers over controls in the app, you'll notice that a blue outline highlights each control. Always wait for the blue highlight before you select a control.
>
> If the blue highlight doesn't display around the element, it might not be recorded properly.

15. Select **Record** from the recorder control.

16. Select the first number, select **+**, select the second number, and then select **=**.

> **TIP**
>
> You will improve automation reliability by:
>
> - Opening and maximizing the apps you want to record before *before* you start recording
> - Starting your recording with a click the app title bar to bring it in focus.

17. Select **Done** on the recorder control after you complete the actions you want to record.
18. Close the app that you recorded.
19. Select the card that starts with "Run [app name] script" to view screenshots of the recorded steps.

> **TIP**
>
> Select ... > **Delete** to remove any duplicate steps.

20. Select **Next**.
21. Select **Next** to skip the optional **Set up outputs** step since we aren't using outputs in this walkthrough.
22. Test your desktop flow by selecting the **Test now** button, and then watch your desktop flow run.

> **IMPORTANT**
>
> For best results, do not interact with your device for the duration of playback.

1. Select **Save and exit** to save your desktop flow.

Known issues and solutions

- You may want to add a **Close** action at the end of your desktop flow because desktop flows launches a new instance of the applications with each test or run.
- Select ... > **Delete** on the recorded actions card to remove any unnecessary/duplicate actions.
- Right clicks may not play back correctly. In such case, while recording, click left to focus desktop flows on

the target user interface element, and then right click.

- If desktop flows no longer records or plays back Windows applications after installing a new version, confirm you have the latest version.

Unsupported application types

- Interactions on Windows (File explorer, startup menu, task bar, etc.).
- Web browsers (Chrome, IE, Microsoft Edge, Firefox, Mozilla, etc.). Please instead refer to Create a Selenium IDE flow to automate websites.
- Java applications.
- Click once applications.
- Applications with a Web view such as Electron applications.
- Microsoft Office 2016 and earlier.
- Microsoft Office online.

Unsupported configurations

- Multi-screen.
- Recording through a virtual machine client (Remote Desktop, Citrix, etc.).
- Multiple instances of an application where the main window titles are identical.
- Application windows with identical titles, for example, Microsoft Outlook with multiple **Untitled – Message (HTML)** new mail windows active at the same time.
- Concurrent recording sessions on a given device.
- Concurrent playback sessions on a given device. In case of simultaneous desktop flow runs, the first one takes precedence and the subsequent ones fail until the first one completes.
- Playback on a device with a different keyboard layout than the device on which it was recorded.
- Recording on a device or Windows session while the browser with Power Automate is on a different device or Windows session.

Unsupported action types and behaviors

The following actions will not be recorded:

- Double click.
- Mouse move.
- Mouse hover.
- Click and drag.
- Touch or pen input.
- Open app before recording.

Unreliable behaviors and workarounds for Microsoft Office (desktop)

- Pin the ribbon before you begin playback to avoid issues that may occur if the ribbon is set to auto-hide during playback.
- Do not select items by clicking and dragging. For example, don't use shift-click to select cells in Microsoft Excel and don't select text in Microsoft Word or Microsoft PowerPoint by dragging the mouse.

- Some elements may not work correctly in desktop flows for Microsoft Word and Microsoft PowerPoint Desktop applications. For instance, options on the **File** menu such as starting from blank, or right clicking controls like adding a paragraph in Microsoft Word or changing the layout of slides in Microsoft PowerPoint may not work.

Next steps

- Learn how to trigger the desktop flow you just created.
- If you want to do more with desktop flows, you can also create desktop flows with input and output parameters.

Edit Windows recorder (V1) flows

1/15/2022 • 19 minutes to read • Edit Online

> **IMPORTANT**
>
> This section covers topics to develop automations using legacy systems:
>
> - Selenium IDE: If you are just starting your RPA automation project, we recommend that you use Power Automate for desktop instead.
> - Windows recorder (V1): From November 30th, desktop flows will no longer be supported. Migrate your flows to Power Automate for desktop or delete them.

Windows recorder (V1) flows automate Windows desktop applications. Please refer to the Known issues to learn more about issues you might run into, workarounds for those issues, and scenarios that are not supported in this release.

Prerequisites

A desktop Windows recorder (V1) flow. Create a Windows recorder (V1) flow now if you don't have one to edit.

Edit actions

You can edit your recording to:

- Modify the value for actions that support it.
- Delete a step.
- Delete the recording.
- Change the order of actions with drag and drop. Do exercise caution with this as it may break the consistency of your recording.

Advanced parameters let you change:

- The delay after the action is performed. For example, you can add a one second delay by changing PT0S to PT1S. This can be useful when the target application has a slow response time that doesn't complete before the next step of your Windows recorder (V1) flow. You can also add delay actions explicitly so that they can be used in loops, for example.

- The selector for the target user interface element.

Add a recording

You may want to record your Windows recorder (V1) flowin multiple sessions. After you've completed your first recording you can proceed as follows:

1. Sign into Power Automate.
2. Select **My flows** > **Desktop flows**.
3. Select the Windows recorder (V1) flowthat you want to edit.

4. Select **Edit**.
5. Select **New step**.

6. Select **Record app** from the list of actions.

7. Select **Launch recorder**.

The recorder control displays at the top of your screen.

8. Start the app that you want to record.

> **TIP**
>
> As your mouse hovers over controls in the app, you'll notice that a blue outline highlights each control. Always wait for the blue highlight before you select a control.
>
> If the blue highlight doesn't display around the element, it might not be recorded properly.

9. Select **Record** from the recorder control.
10. Perform the steps in the user interface of the app you are recording, and then select **Done** on the recorder control.
11. Select **Save**, and then test your Windows recorder (V1) flow.

Provide command line arguments at launch

After you record your Windows recorder (V1) flows actions, you can provide command line arguments for the apps that your desktop flows launch.

Follow these steps to add command line arguments to the apps that your Windows recorder (V1) flow launches:

1. Record a Windows recorder (V1) flow with the desktop recorder.
2. Select **Done** on the recorder, select the application launch action to expand it.

   The screenshot uses Notepad++ as an example.

3. Select **Show advanced options**.

4. Provide the command line arguments here:

5. You can provide any valid command line argument for your application.

> **IMPORTANT**
>
> Do not pass sensitive text like passwords through command line arguments.

Add a variable

You can use variables to perform multiple actions within your desktop flows. For example, you can use a variable to count how many times an operation was performed in a loop. Or, you can use a variable to create an string array with the screen readings done in a loop.

> **TIP**
>
> You can use integer, float, Boolean, string, array, and object variable data types.

After you create a variable, you can perform other tasks, for example:

- Increase or decrease the variable by a constant value, also known as increment and decrement.
- Insert or append the variable's value as the last item in a string or array.
- Assign a different value to a variable.

Follow these steps to create and use variables in a UI flow:

1. Go to the beginning of the Windows recorder (V1) flow and select **Add an action**.

2. Search for the word *variable*, and then select the **Initialize variable** action under the built-in category.

3. Initialize the variable to type that meets your needs.

TIP

If your UI automation scenario involves reading values from a screen in a loop, you could achieve this by initializing the variable as an array type.

Then, within the UI flow, select the **Append to Array** variable action, and then use the output of **Get Text** action from dynamic content list.

Copy and paste steps

You can copy actions and scopes, use **Add an action** to select the copied actions and scopes from **My clipboard**, and then paste them into another location within the same Windows recorder (V1) flow.

Power Automate designer automatically renames the copied actions and scopes with a unique name. If the copied scope contains another scope, the nested structure is retained when you paste it from **My clipboard**.

> **IMPORTANT**
>
> This feature supports copying and adding actions within the same scope. You cannot paste actions into other scopes or Windows recorder (V1) flows.

Follow these steps to copy and then paste actions and scopes:

1. Select **...**, and then select **Copy to my clipboard** for the action or scope that you want to copy.

2. Hover over the target location, and then select **Add an action**.

> **TIP**
>
> You can select **Add an action** directly if it is at the end of the scope or Windows recorder (V1) flow.

3. Select **My clipboard**, and then select the action or scope you copied.

4. Notice that Power Automate pastes the action card with a unique name.

5. Also notice that any actions with screenshots will also retain them for easy reference.

Paste a scope immediately after itself

> **NOTE**
>
> If a scope does not have a **Close Application** action, and the user copies the scope and then pastes the scope immediately after the existing scope, the pasted actions will only be performed within the first application instance.

In this example, the highlighted actions **Left click 11** and **Replay keystrokes** will be performed in the first Notepad application, and another notepad instance will be launched.

To address this instance issue, users have two options:

1. If you only want to perform the action(s) in the first application instance, you can copy and paste only the relevant actions in the first scope. If you want to copy and paste the entire scope at once, you should remove the Launch action in the pasted scope to prevent launching an extraneous application instance.

2. If you want to perform the action(s) in a separate application instance, you can add a **Close application** action in the first scope, so that the second scope will have its own instance.

Add a loop

Windows recorder (V1) supports arrays. Use an array, to add a loop to perform repetitive steps in a Windows recorder (V1) flow. You can pass in different types of arrays from a cloud flow to your UI flow, including complex arrays from a SharePoint list, for example.

> **NOTE**
>
> You must edit an existing Windows recorder (V1) flow to add a loop.

Here are the steps to create a loop in a UI flow:

1. Edit the Windows recorder (V1) flow to which you want to add the loop.

2. Navigate to input section of the wizard, and then select **Set up inputs**.

3. Select **Array** to indicate that you want to create an array input type.

4. Enter the details for the array including a name, the array in JSON format, and a description for the array.

> **TIP**
>
> If you are using a complex array from a SharePoint list, you don't have to create the array manually. You can copy the array from a cloud flow and paste it into the middle box.

5. Select **Next**.

6. Select **Add an action** .

7. Search for "to each" > **Built-in** > and then select **Apply to each**.

8. Select **Select an output from previous steps**, select the array you defined earlier from the Dynamic content.

9. Drag the actions you want to repeat and drop them onto the **Apply to each** card.

   For example, I've dropped the **LeftClick 4** onto the **Apply to each** card in the following image.

10. Replace the input tokens created during the recording with the array input values as needed.

> **TIP**
> If the array is a simple string or integer array, you can use the **Current item** directly from the Dynamic content, like the following image. You can also use expressions.

Known Limitations:

1. Loops require static selectors. This means that the user interface (UX) element on which the repetitive action happens must not change.
2. Output operations are not currently supported.
3. For complex array objects that need to be passed from a cloud flow, like a SharePoint list, provide an example payload of that object. To get the payload, you can run the flow without the Windows recorder (V1) flow step, and then copy the output of the action into the middle (Add sample data) text box when you define the array.
4. You must use expressions for complex array object types. For example, use the expression **items('Apply to each')['[value]']**, where **value** is name of the specific object within the input array.

Add a delay

You can add delays in Windows recorder (V1) flows to help control the flow run.

Follow these steps to add a delay to a Windows recorder (V1) flow that you've recorded.

1. In the desired spot, hover over the arrow and select **Insert a new step**. Alternatively, for adding it to the end of the scope or UI flow, select **Add an action** directly.

2. Select **Add an action**.

3. Select **Built-in**, and search for "delay". Alternatively, select **Schedule** > **Delay**.

4. Enter the **count**, for example "2" to represent the number of the **Unit**.

5. Select the **Unit**, for example **minutes**, to represent the length of time for the delay.

   The following image shows a delay of two minutes.

   The delay action is added to the Windows recorder (V1) flow. Now, when the flow runs, there will be a delay as you've defined before the next action runs.

Add a retry policy

By default, Windows recorder (V1) retries failed UI automation steps using the default retry settings and timeout value.

Follow these steps to set your own retry policy on specific steps after you've recorded your Windows recorder (V1) flow.

1. Select **...** on the step that you want to change the retry policy.

2. Select **Settings**.

   The settings card for the step opens.

3. Add a timeout value in the **Duration** box.

   The timeout duration can be between one minute and 24 hours. For example, you must enter the timeout duration in this format: **PT1M** to represent a timeout duration of one minute or **PT24H** to represent a timeout of 24 hours.

   The timeout is a value you can specify to set the length of time the Windows recorder (V1) flow should try to perform an action that it's unable to complete before canceling it. Once the action is canceled, the retry policy begins. The default timeout value is five minutes.

   There are three types of retries in Windows recorder (V1) flows.

   - Default
   - None
   - Custom

The **Default** option is selected by default. This default value is set to retry 9 times. Including the initial attempt, this means a total of 10 attempts. There is a 1 second interval between retries.

If you select the **None** option, then no retry attempts are done for this step.

If you want to specify a custom retry policy, then select the **Custom** option, and enter value for **Number of retries** and **Length of intervals**.

> **NOTE**
> The retry policy isn't available for all steps. If you don't see the retry options, it means that the policy isn't available for the specific step.

Add a manual action

Once you've recorded an application with at least one action, you can manually add any of the following actions for that application.

ACTION	COMMENT
Close application	
Right click	
Send keys	Send keys and key combinations, such as CTRL + C.
Left click	
Get text	Read the text from a user interface element and then use it as an output.
Enter text	
Get element enabled	Check if a user interface element is enabled or disabled.
Clear element	Clear the value in an editable user interface element.
Wait for seconds	Wait before continuing to the next step.

Follow these steps to add a manual action:

1. Sign into Power Automate.
2. Select **My flows** > **Desktop flows**.
3. Select the Windows recorder (V1) flow that you want to edit.

4. Select **Edit**.
5. Select the recording card that contains the steps to which you want to add a new step. The card expands and displays the recorded steps.

6. Select **Add an action** on the recording card, just below the last recorded step. You'll see the list of

manual actions listed earlier in the walkthrough.

7. Select the action you want to add. Here, I've selected **Get element enabled**, but you can select any action that makes sense for your scenario.

Once the action is added, you will need to set the **Selector** in the action's advanced options.

Set the selector

The selector identifies the user interface element onto which the action is performed during playback. We recommend that you copy/paste this information from a separate step targeting the same user interface element, if possible.

The format of the selector is:

```
{
   "type":"WinUIA",
   "parameters":{
      "elementStack":[

      ],
      "elementXPath":""
   }
}
```

You need to provide the data for the the **elementStack** and **elementXPath** fields of the selector element.

Here is an example of what the **elementStack** might look like.

Selector


```
{
  "type": "WinUIA",
  "parameters": {
    "elementStack": [
      {
        "automationId": "num0Button",
        "boundingRectangle": "1817,1383,346,240",
        "className": "Button",
        "controlType": "50000",
        "frameworkId": "XAML",
        "name": "Six",
        "localizedControlType": "Button",
        "xOffset": 145,
        "yOffset": 124
      },
      {
        "automationId": "NumberPad",
        "boundingRectangle": "1118,1139,1044,972",
        "className": "NamedContainerAutomationPeer",
        "controlType": "50026",
        "frameworkId": "XAML",
        "name": "Number pad",
        "localizedControlType": "Group"
      },
```


You can capture the **elementXPath** using the WinAppDriver UI Recorder.

Remove the first element (everything before /Window) before using the result in **elementXPath** of the selector.

Test your Windows recorder (V1) flow to confirm that your selector works correctly.

Use advanced controls

You can incorporate advanced controls such as **conditions**, **switch cases**, and **terminate** actions within your desktop flows.

You can perform these advanced operations with the following steps on an existing Windows recorder (V1) flow.

1. Select the Windows recorder (V1) flow you have created > **More commands** (...) > **Edit**.
2. Select **+** > **Add an action** on the down arrow of Windows recorder (V1) flow step to which you want to add logic.

3. Select **Built-in**, and then select one of the control actions available.

4. Complete the expression that needs to be evaluated. You may use dynamic content and expressions to evaluate your condition and switch controls. Additionally, you can use any output that's generated from the previous Windows recorder (V1) flow steps.

Add a recording of a remote computer using image recognition

We expect changes to this feature, so you shouldn't use it in production. Use it only in test and development environments.

Image recognition in Windows recorder (V1) is a preview feature and currently available when recording a remote computer through the Remote Desktop Connection (RDC) app.

What is image recognition?

Currently, Windows recorder (V1) flows are primarily recorded using accessibility APIs (UI Automation and WinAppDriver) to detect the controls in the Microsoft Windows UI tree. Sometimes, the UI tree isn't available, such as with Web-based or Java apps. The UI tree may may be unreliable, such as when the IDs of a control change frequently or between sessions.

With image recognition, click locations and other details are visually matched during playback, greatly expanding the range of applications that can be automated.

Use image recognition to record a remote computer

1. In a new or existing Windows recorder (V1) flow, go to the Inputs tab and create two new **sensitive text** inputs, one for the username and one for the password that will be used to log in to the remote device. Sensitive text inputs allow you to pass in the values dynamically when testing or calling the Windows recorder (V1) flow from another flow, without them being stored or logged by the Windows recorder (V1) flow itself.

2. Follow the steps in **Add a recording** to launch the recorder control for a new or existing Windows recorder (V1) flow.

3. Use the Remote Desktop app to connect to the remote computer.

4. Expand the Remote Desktop window to full screen.

5. Select **Record** from the recorder control and select **Got it** in the alert that appears.

6. Perform the steps on the remote computer, and then select **Done** on the recorder control.

7. Locate the **Launch Remote Desktop** action within your recording, and then enter the sensitive text inputs for the username and password.

1. Select **Save**, and then test your Windows recorder (V1) flow.

> **IMPORTANT**
>
> When you call this Windows recorder (V1) flow from an automated flow, it is recommended to use a key management solution such as Azure Key Vault to retrieve the username and password and then pass them to the **sensitive text** inputs in the Windows recorder (V1) flow dynamically, rather than storing them in the flow itself.

> **TIP**
>
> Enable **Secure Inputs** in the **Settings** menu for the **Run a flow built with Windows recorder (V1)** action in the flow that is calling the Windows recorder (V1) flow. This ensures that the inputs are not stored in the run history.

Use image recognition to record on Citrix

There are two options to record on Citrix with Windows recorder (V1).

Option 1: record a Citrix application or desktop already open on your machine

1. Follow the steps in Add a recording to launch the recorder control for a new or existing Windows recorder (V1) flow.

2. Use the Citrix app or remote desktop to connect to the remote computer.

1. If you are using Citrix remote desktop, expand the window to full screen.
2. Select **Record** from the recorder control, and then select **Got it** in the alert that appears.
3. Perform the steps on Citrix, and then select **Done** on the recorder control.

> **TIP**
> With Windows recorder (V1), you can record several Citrix apps during the same session. Open all applications before you start recording if you have not recorded the launch of your Citrix workspace.

Option 2: record the launch of your Citrix application / desktop from your Citrix workspace

1. Follow the steps in Add a recording to launch the recorder control for a new or existing Windows recorder (V1) flow.
2. Open the Citrix workspace from the taskbar.
3. Enter your password, and then and select **Log on**.

> **TIP**
> If you don't want to select **Remember my password**, use a **Sensitive text** input.

4. Select the App or the Desktop you want to record.

5. Perform the steps on Citrix, and then select **Done** on the recorder control.

> **IMPORTANT**
>
> If you recorded the log-on step, the designer displays three Citrix scope applications. This is expected because the log-on window is a different application from the Citrix workspace.

> **TIP**
>
> In test and attended mode, confirm that your Citrix workspace is closed before you playback your Windows recorder (V1) flow. From the notification bar, right-click on the Citrix icon and the select **Exit** to close the workspace.

Troubleshooting

If you have problems using sensitive text in the login window:

1. Open the input menu from the recorder.
2. Select the password field.
3. Select your sensitive text (in this example “password”) in the input menu.

Use OCR to extract text from images

1. While recording your steps, navigate to the location of the text that you wish to capture.
2. Select **Outputs** > **Extract Text from Image** from the recorder control.
3. Follow the prompts to select an **anchor area** (a section of the screen that is not expected to change, such as the label next to a field).

4. Select the **target area** (the area from which text will be extracted using OCR).

5. Enter a name for the output.
6. Select **Done** on the recorder control.
7. Select **Save**, and then test your Windows recorder (V1) flow.

Known issues for Remote Desktop recordings

1. Ensure that all required inputs (computer name, username, and password) are filled in and saved before recording further steps in the same Windows recorder (V1) flow.
2. To attach to an existing remote desktop session, the session must have been launched earlier in the same Windows recorder (V1) flow.
3. The recommended way to launch the Remote Desktop Connection (RDC) when recording is from the Remote Desktop Connection app (mstc.exe) from the Start menu. If Windows Security actions are recorded in addition to the **Launch Remote Desktop** action, they should be removed from the designer so that playback is not interrupted (this can happen when the Remote Desktop session is launched from a shortcut).
4. Playback can fail if the Windows recorder (V1) flow was recorded on a screen with screen scaling (Windows Settings > Display > Screen Scaling) set to a value other than 100%. As a workaround, ensure that screen scaling is set to 100% prior to recording.

Handle error conditions

Unexpected conditions can arise during playback. These conditions can cause your desktop flows to fail. You can use advanced error handling capabilities to create alternate steps when unexpected conditions arise.

Here are the steps to do so.

1. Sign into Power Automate with your school or work account.
2. Select **My flows** > **Desktop flows**.
3. Select **More commands** (the three vertical dots for the Windows recorder (V1) flow you want to edit).

4. Select **Edit**.

5. Select the down arrow that's located immediately before the Windows recorder (V1) flow step to which you want to add error handling, and then select **+** (Insert new step).

   In the following image, we're inserting the new step before the **PostElementText 1** step. This means that if **PostElementText 1** fails, the alternate steps that you define next, run.

6. Select **Add a parallel branch**.

7. Select the action that you want to perform in the parallel branch if there's a failure when the Windows recorder (V1) flow runs.

   You can select **Record app** to do a new recording for the parallel branch or select **Terminate** from the **Built-in** actions to exit the Windows recorder (V1) flow exit gracefully if there's a failure.

> **NOTE**
>
> By default, the action that you add in the parallel branch runs only if the previous step fails. You can select ... on the parallel branch > **Configure run after** to change the default behavior.

8. From this screen, you can select the condition on which you want the parallel branch to execute. You can select from one of the four options available.

Note: You will not be able to save a Windows recorder (V1) flow that has both the main branch and parallel branch set to execute on the same condition.

Enable coordinate-based playback

Coordinate-based playback uses relative screen coordinate offset as a fallback that helps Windows recorder (V1) find target objects that the default Windows UI automation framework is unable to find during playback.

Here are some of the reasons why the default Windows UI automation framework might not find target objects during playback:

- The legacy application that you're automating might not use programming technologies that support the Windows UI automation framework.
- The application or its controls may not have a unique UI automation XPath, name, or IDs.
- The application has dynamic controls whose names or IDs could change.
- The application has controls that do not have names, IDs, unique identifiers, etc.

> **TIP**
> Use the same scale and resolution and also maximize the target application during recording to improve the accuracy of coordinate-based playback.

Follow these steps after you've recorded a Windows recorder (V1) flow script:

1. Expand the step that launches or attaches the application.

   This is usually the first step of the recording script.

2. Select **Show advanced options**.

3. Find **Use coordinate playback** properties.

4. Select **Yes** from the list to enable coordinate-based playback.

> **TIP**
> You can enable or disable **Use coordinate playback** for each application to apply the setting to all steps performed on that application.

> **WARNING**
> With coordinate-based playback, the automation may select controls that are not part of the target application due to a variety of reasons, for example, when the UI of the target applications changes dramatically.

Next steps

- Learn how to run the UI flow you just edited.

- If you want to do more with desktop flows, you can also try out input and output parameters.

Migrate from Windows recorder (V1) to Power Automate desktop flows

1/15/2022 • 2 minutes to read • Edit Online

> **IMPORTANT**
>
> This section covers topics to develop automations using legacy systems:
>
> - Selenium IDE: If you are just starting your RPA automation project, we recommend that you use Power Automate for desktop instead.
> - Windows recorder (V1): From November 30th, desktop flows will no longer be supported. Migrate your flows to Power Automate for desktop or delete them.

You can migrate desktop flows you've created with the legacy Windows recorder (V1) into Power Automate desktop flows in just a few steps.

Follow these steps to migrate a legacy desktop flow.

1. Sign into Power Automate.
2. Select **My flows** > **Desktop flows**.
3. Select the flow you'd like to migrate.
4. Select **Migrate (preview)** on the desktop flow details page.

   The migration wizard launches.

5. Select **Migrate**.

When the process completes, a copy of the desktop flow is saved in the current environment. The resulting desktop flow can then be edited using the Power Automate designer. The original Windows recorder desktop flow remains unchanged.

> **NOTE**
> Migration is available only for desktop flows that were built with Windows recorder (V1). It's not supported for desktop flows built with Selenium IDE.

Once you test your new desktop flow, you may go to your existing cloud flows and replace the UI automation action. You need to use the **Run a desktop flow built with Power Automate** action and use the newly created desktop flow.

Known issues and limitations

- Windows recorder (V1) flows that contain the **Run a WinAutomation** or **Remote Desktop Protocol (RDP)** actions are not supported for migration.
- Flows with array inputs are not supported.
- Windows recorder (V1) desktop flows with native SAP recordings are not supported. For example, desktop flows that contain **Set Property** or **Call Method** actions aren't supported.

TIP

If your Windows recorder (V1) desktop flow contains a step to close an application, add an error handling step for the **close application** step on the converted desktop flow. You can configure the **On Error** condition of that action to **Continue flow run** > **Go to next action**.

TIP

Update the duration of different **Wait** actions to change the playback speed of your converted desktop flow. Ensure you provide adequate wait time for the UI automation run to be successful.

Use inputs and outputs in Windows recorder (V1) flows

1/15/2022 • 4 minutes to read • Edit Online

IMPORTANT

This section covers topics to develop automations using legacy systems:

- Selenium IDE: If you are just starting your RPA automation project, we recommend that you use Power Automate for desktop instead.
- Windows recorder (V1): From November 30th, desktop flows will no longer be supported. Migrate your flows to Power Automate for desktop or delete them.

Use inputs to pass information from an external source such as a database or any supported connector to the legacy software that Windows recorder (V1) automates.

For example, you can use customer information from a SharePoint list as a source for input into your legacy accounting software. You can also pass sensitive input like a username or a password that are required to login to a legacy application using **Sensitive text inputs**.

Define inputs in the Windows recorder (V1) flows

1. Select **Text** to define an input or select **Sensitive text** to define a sensitive text input.

2. Add a name, a sample data, and a description to your input.

   - Sample data is used during the recording or test.
   - The description will be helpful to differentiate the inputs that you have created.
   - For sensitive text inputs, the sample value will be obscured and will not be persisted after saving

3. Once your inputs are created, you can click on next to use them in a recording.

> **TIP**
> You can use the **CTRL+ALT+L** key combination to insert text that you can pass to or from the application being used in the Windows recorder (V1) flow. This key combination works for sensitive, static, output, and input text.

Use inputs to pass information to the application

1. While recording, you can use an input in an app by selecting **Use Inputs**.

2. In the list, you can choose between three options:

   - Select one of the inputs that you defined in the **Set up inputs** step.

     > **TIP**
     > You can identify sensitive text inputs easily because they have a different icon from text inputs.

   - Use a previously defined output (see Outputs section). This is useful to pass information between different applications within the same Windows recorder (V1) flow.

   - Create a new text or sensitive text input as you are recording using the **New input** option. You will find it back in the **Set up input** step.

3. Select the location where you want to use the input. The sample value you defined is automatically used. In the below example "WingTip Toys" is the sample value for the input name "Invoice Account" and is

added to the application.

4. In Power Automate **Record and edit steps**, expand actions that use inputs to view which one is selected.

   In example that follows, you will see that "Invoice Account" is used as the value.

> **NOTE**
>
> If you also used a sensitive text input, you would see an action with a lock icon on the top right to indicate that you used sensitive text input.

5. When triggering your UI flow, you can change the input value at will.

Use outputs to extract information from the app

Outputs let you pass information from the legacy software that Windows recorder (V1) automates to an external destination such as a database or any supported connector.

For example, you can extract customer information your legacy accounting software and add it to a SharePoint list.

Outputs can only be created as you record your Windows recorder (V1) flow.

1. During a recording, select **Output**.

2. Select **Select text**.

3. Select a user interface element to get its text for the output. The text value will be automatically captured. You can then provide a name and description for the output.

4. Provide a name and a description for the output.

5. Select **Save**.

Your output is now available in the dedicated area of the wizard.

Each output has:

- An output name as defined during the recording.
- A description: This field can be very useful when you define many outputs during a recording and want to easily identify them later.
- An action name: the action in which the output is defined in your Windows recorder (V1) flow.

Use clipboard content to define outputs

During a recording, it is possible to copy a text in the clipboard of your computer and to define it as output of your Windows recorder (V1) flow.

1. During your recording, copy a string value

2. Select **Get text from Clipboard**. The content of your clipboard is displayed in the **Sample value** field

3. Define a name and a description for your output (as described above) and select **Save.**

Delete an output from a UI flow

If you do not need an output anymore, delete it by going to the associated action and removing the Output

name in the dynamic value.

Test your Windows recorder (V1) flow

Testing Windows recorder (V1) flow lets you validate your changes and the appropriate playback behavior.

1. (Optional) Enter a value in the input field.

> **NOTE**
>
> For any sensitive text inputs that are created in the recorder, the sample value will need to be specified again before testing.

2. Select **Test now** to see the legacy software being automated. You will see UI flow automation playing back the steps you recorded. **Please do not interact with your device for the duration of playback.**

3. Once playback completes, you see the run status of your UI flow:

   - For each action, a status indicator that shows that the test worked well, along with the associated inputs.

   - For each action that uses a **Sensitive text** input, the input value will not be displayed.

- You will also see the value of the outputs obtained for this test at the bottom of the designer.

- If an error occurs, you'll see which step caused the problem along with a screenshot at the moment the error occurred.

Learn more

- Learn how to trigger desktop flows.

Use Input Method Editors (IMEs) in UI flows

1/15/2022 • 2 minutes to read • Edit Online

IMPORTANT

This section covers topics to develop automations using legacy systems:

- Selenium IDE: If you are just starting your RPA automation project, we recommend that you use Power Automate for desktop instead.
- Windows recorder (V1): From November 30th, desktop flows will no longer be supported. Migrate your flows to Power Automate for desktop or delete them.

You can use the **Add static text** feature to record text input, in any language, using IMEs or regular keyboards in your UI flows. Use **Add static text** if you want the automation to insert the same text each time your UI flow runs.

TIP

Use **Text input** if you intend to use dynamic text that changes each time your UI flow runs.

Invoke IME

Follow these steps after you've started recording and you're ready to insert static text input:

1. Select the control into which you want to enter the static text.

2. Select **Use Input** on the recorder, and then select **Add static text**.

You'll see an input box into which you'll enter the static text. You can use IME, English, or any international keyboard.

3. Enter the text.
4. Select **Add to app** and then select the control into which you want to insert the text. You'll see the text inserted into the control.

   This text is entered automatically at playback time, even if the playback machines do not have the same keyboard layouts or IME that was used in the recording.

TIP

In the Web designer, expand the **Insert text input** action to review or edit the text.

Use the replay keystroke action

If you recorded any text input without using the **Add static text** option, each keystroke is recorded and played back chronologically. This includes any special keys like CTRL, ALT, Windows, etc. in any English or international keyboard layouts.

In the designer, you can review and edit the recording information in the virtual-key format under the **Replay keystroke** action.

> **NOTE**
>
> An older version of the UI flows recorder used the **SendKeys** and **PostElement** actions. These actions will be deprecated. We recommend that you upgrade to the latest version of the UI flows recorder and then re-record your scripts to take advantage of the new features.

Troubleshooting tips

1. If you record keyboard actions with the **Replay keystroke** mode, you have to make sure the playback machine is using the same keyboard as the recording time, because under different keyboards, the same keystrokes replay sequences may input different values.

2. You can only apply **Use input** to controls that are text type. Currently **Use input** cannot enter text into other types of controls such as combo Box, dropdown, ListView, etc.

Next steps

- Learn how to set up UI flows.
- Learn more about the different types of flows you can use to automate your workflows.

Use Softomotive's WinAutomation with desktop flows

1/15/2022 • 7 minutes to read • Edit Online

> **IMPORTANT**
>
> From January 1st 2022, WinAutomation and ProcessRobot will no longer be supported. Learn more about the Softomotive products deprecation here. You may migrateyour flows to Power Automate. See the Power Automate Desktop documentation to learn about the evolution of WinAutomation.

You may migrate your flows to Power Automate. See the Power Automate Desktop documentation to learn about the evolution of WinAutomation.

Here are some tips before you start using WinAutomation with desktop flows.

1. Your Power Automate Attended RPA license (paid or trial) gives you full access to WinAutomation. This document will guide you through getting WinAutomation Processes running with Power Automate.
2. Automation scripts in WinAutomation are called **Processes**. In Power Automate, automation scripts are called *cloud* or *desktop* flows*.
3. Before you create a WinAutomation Process, check the list of connectors to see if the application you want to automate already has a connector. If it does, consider creating a cloud flow instead of a desktop flow. You might also build your own connector. In general, API-based connectors provide a better experience than UI automation in terms of scalability, reliability, and lower cost.

Prerequisites

To run WinAutomation as part of Power Automate, you will need to:

1. Ensure your machine meets the requirements for desktop flows.
2. Install the desktop flows app, and then install and configure the on-premises data gateway.

> **IMPORTANT**
>
> You must have the latest version of WinAutomation and Power Automate to record, test, or run UI automation.

Licensing

You need to have a Power Automate *Per user plan with attended RPA* to use Power Automate and WinAutomation. If you don't have a paid plan, you can start a trial by going to Power Automate.

Install WinAutomation

1. Download the WinAutomation installer.
2. Run the **WinAutomationSetup.exe** file. This file is likely in your **Downloads** folder.

3. Follow the instructions in the WinAutomation installer to complete the installation. During installation, ensure the **License Type** is set to **Microsoft Power Automate**.

Sign in to WinAutomation

1. After the installation completes, start the WinAutomation Console from the Windows start menu.

2. The application will start and prompt you to login. Enter the user credentials you use for Power Automate. If you don't have a valid license, you will see this error message. You can also visit the pricing page to learn more about this license or to get a trial license.

> **IMPORTANT**
>
> You will need your tenant administrator to grant consent to use your Power Automate Work or School account with WinAutomation. For that, your admin needs to install WinAutomation, sign in with their tenant administrator account, and then grant consent.

3. When you are asked to create a Master key during sign in, create one.

4. Once signed in, you will see the WinAutomation console with a few example Processes. To get started, go to **Options** > **Help** > **Getting Started**, and then go through a few examples of creating simple Processes or check out information from WinAutomation docs: Building a Simple Process. You can learn more from WinAutomation getting started tutorials.

You can now create your own WinAutomation Processes and test them locally.

Run WinAutomation Processes from Power Automate

1. Once you have created your automation Process in WinAutomation, you can run it from a cloud flow in Power Automate in attended or unattended mode.

> **TIP**
>
> Learn more about creating and running desktop flows.

2. Create a new desktop flow. Delete the default first step of "Record app".

3. Select **New step**, select **WinAutomation**, and then select the **Run WinAutomation** action.

4. In the **Run WinAutomation** card, fill in the Process Path and any optional command line arguments for the WinAutomation Process that you want to run.

> **NOTE**
>
> You must create and store WinAutomation Processes locally. *Process Path* is a case-sensitive path in the WinAutomation Console for the Process, from a base directory of My Processes in the Folders Pane on the left side. If you have put the Process in a subfolder, you will need to include that information in the ProcessPath. Don't put quotes around the Process Path.

> **TIP**
>
> You can use desktop flows inputs and Dynamic content in the target WinAutomation Process path and arguments from Power Automate flow.

1. You can now save and test your Windows recorder (V1) flow to see how it launches the WinAutomation Process.
2. You can then add the Windows recorder (V1) flow into a cloud flow. You can even connect to other Power Automate connectors and triggers.
3. You can then select *attended* or *unattended* as the run type.

   > **TIP**
   >
   > In your WinAutomation Process, you can use the *Get Command Line Arguments* action to retrieve the command line arguments. The arguments are in an array. Use their index to reference each argument.

   > **IMPORTANT**
   >
   > Do not pass sensitive text such as passwords through the command line arguments.

   > **IMPORTANT**
   >
   > If you're running desktop flows on an unattended cluster, ensure that WinAutomation is installed on all machines on which the target Process is copied. For more information on attended and unattended desktop flows, click here.

4. You can save and then run the flow and see it launch the WinAutomation Process. The Windows recorder (V1) flow will return after the WinAutomation Process run completes. You can view the run results from Power Automate. If the Process fails, you can see the error messages as well.

> **TIP**
>
> If you get exceptions, you may not have the latest Power Automate installed. Install the latest Power Automate.

5. If you want WinAutomation to capture a screenshot when a Process fails, do the following:

6. From the WinAutomation Console, right click on a Process, select "Edit Process's Properties". Go to the "Error Handling" tab and choose "Override Default Options". Click "Add screenshot to logs" and save. Now if a Process fails, you can view the screenshot captured at runtime from the Windows recorder (V1) flow run details. For more information on Process properties, see WinAutomation docs: Process Properties.

Currently you have to use certain WinAutomation steps to write results and outputs from the process into a file in the cloud share or email the results out. Then you can use connectors from Power Automate to access and use those results.

How to obtain an RPA trial license

Log in to Power Automate then select the **Desktop flows** tab under **My flows**. You'll see the trial dialog from which you can start the trial.

If you already have a paid plan or you used a trial previously, you cannot start a new trial. In this case, you will need to ask your administrator to buy or start a trial of the Power Automate *Per user plan with attended RPA*. They can make the purchase by going to **Billing** > **Purchase services** in the Microsoft 365 admin center, and then searching for the right plan.

Finally, once they have purchased a plan or gotten the free trial, they need to assign that plan to a user.

> **IMPORTANT**
>
> When you assign a plan to a user, it may take few minutes before the assignment becomes effective.

Troubleshooting

Troubleshooting WinAutomation licensing issues

If you are receiving licensing errors during the launch of WinAutomation, ensure the user you're logging in as has a valid Power Automate RPA license. To confirm this:

1. Go to Power Automate and sign in.
2. Select **My flows** on the left navigation bar.
3. Select desktop flows on the page on the right. You should see you can create new desktop flows there if you have the correct license.
4. You may need to start a trial or ask your administrator to do it.

> **NOTE**
>
> The license is cached when users launch WinAutomation while connected to the Internet.

To reset the license information stored by WinAutomation, you can delete the following file: %localappdata%\Softomotive\WinAutomation\msalcache.bin3.

Troubleshooting other issues

Follow the links in this section to troubleshooting issues you may experience.

WinAutomation

- Installation errors
- Console
- Process errors
- Web automation
- UI automation
- Excel automation
- Image Processing
- Email automation
- Databases

ProcessRobot

- Control Desk
- Process Studio
- ProcessRobot database
- Robot errors
- Process errors
- Web automation
- UI automation
- Excel automation
- Image Processing
- Email automation
- Databases

Best practices for creating processes

Here are some tips for you to consider when you create processes.

WinAutomation

- Triggers
- Web Automation
- UI Automation
- Excel Automation
- Text Manipulation
- Image Processing
- Email Automation
- Databases
- Mathematical Operations
- Variables

ProcessRobot

- Control Desk

- Dashboards
- Triggers
- Web Automation
- UI Automation
- Excel Automation
- Text Manipulation
- Image Processing
- Email Automation
- Databases
- Mathematical Operations
- Variables

Learn more

- Read about the WinAutomation acquisition.
- Read more at WinAutomation docs.
- Learn more at WinAutomation Academy.
- Get a head start with WinAutomation tutorials.
- Learn to create Windows recorder (V1) flows.
- Learn how to run desktop flows.
- Learn to manage desktop flows.
- Learn more about the on-premises gateway.

Create and test Selenium IDE flows

1/15/2022 • 3 minutes to read • Edit Online

IMPORTANT

This section covers topics to develop automations using legacy systems:

- Selenium IDE: If you are just starting your RPA automation project, we recommend that you use Power Automate for desktop instead.
- Windows recorder (V1): From November 30th, desktop flows will no longer be supported. Migrate your flows to Power Automate for desktop or delete them.

Follow these steps to create a simple Selenium flow.

Create a Selenium IDE flow

1. Open the Microsoft Edge (version 80 or later) or Google Chrome, and then navigate to Power Automate.
2. Sign in with your work or school account if needed.
3. Select **My flows** > **Desktop flows** > **New**.

4. Click **Additional desktop flow options**.

5. Select Selenium IDE, and then select **Next**.

6. Enter a name for your Selenium IDE flow into the **Flow name** field.

7. Enter the URL for the Website you want to automate into the **Base URL** field, and then select **Launch recorder**.

The Selenium IDE launches.

> **TIP**
>
> Tip: You can record actions across multiple HTTP or HTTPS websites within the same tab.

8. In Selenium IDE, select the red **REC** button in the top right side of the screen to launch the recorder.

The URL you chose in the previous step opens.

9. Perform the actions that you want to record on the website.

> **TIP**
>
> At the bottom right, you can see the recording status.

10. When you are finished recording, select on the red **Stop** button in the top right corner of the Selenium IDE.

11. Select the **Run current test** button from the top left side of the screen to see the Selenium IDE flow you

just created run.

> **TIP**
> You can set the wait time between steps to slow the local playback for testing. This setting is for testing purposes only and has no impact when your Selenium IDE flow is deployed.

12. Select the **Save project** button in the top right of the Selenium IDE. This closes, and then uploads the project.

Now that you've created a Selenium IDE flow, use it in your other flows.

Limitations and known issues for Selenium IDE flows

> **WARNING**
> Passwords in Selenium IDE are stored in plain text.

Temporary user profile for playback

Selenium IDE recordings are done with the current user's profile, but playback is done using a temporary user profile. This means that websites that need authentication may not ask for credentials during a recording session, but the authentication steps will be needed during playback.

To address this, the user needs to manually edit the script to insert the commands needed for the login process.

Other limitations

- Recording desktop applications during a Web recording session. If you need to automate both Web and Desktop applications, you can create a separate desktop flows for each type and then combine them in a cloud flow.
- Multi-Factor Authentication (MFA) is not supported, use a tenant that doesn't require MFA.
- These Selenium IDE commands are not supported: Run, AnswerOnNextPrompt, ChooseCancelOnNextConfirmation, ChooseCancelOnNextPrompt, ChooseOkOnNextConfirmation, Debugger, ClickAt, DoubleClickAt, Echo, MouseOut, MouseUpAt, and MouseDownAt.
- Selenium IDE actions or steps cannot exceed one minute to run. Use Power Automate instead.
- Right click is not supported.
- Additional Selenium IDE flow input is generated when you use Foreach commands. To work around this issue, input any value into the extra fields. It doesn't impact the playback.
- If the .side file contains multiple test projects, only the first one that was created runs.

  > **TIP**
  > Note that the Selenium IDE orders the tests by name, not by creation date, so the first test created may not be the first one in the list.

- Playback directly in the Selenium IDE might not behave as intended. However, playback at runtime

behaves correctly.

Next steps

- Learn how to run desktop flows.
- Learn how to use input and output parameters with Selenium IDE.

Edit Selenium IDE flows

1/15/2022 • 2 minutes to read • Edit Online

> **IMPORTANT**
>
> This section covers topics to develop automations using legacy systems:
>
> - Selenium IDE: If you are just starting your RPA automation project, we recommend that you use Power Automate for desktop instead.
> - Windows recorder (V1): From November 30th, desktop flows will no longer be supported. Migrate your flows to Power Automate for desktop or delete them.

Selenium IDE flows automate websites running in the Microsoft Edge (version 80 or later) or Google Chrome. After you've created a Web UI flow, you might need to edit it. Follow the steps in this document to learn how to edit your Selenium IDE flows.

Edit in Selenium IDE

Use the Selenium IDE to edit your Selenium IDE flows.

> **NOTE**
>
> Editing in the Selenium IDE is aimed at advanced users and developers.

You can refer to the Selenium Commands to learn how to edit the script.

The Selenium IDE suggests different selectors and a default one when targeting a user interface element. You can also define a new selector if none of the proposed selectors are appropriate. This usually happens when the website's HTML structure is highly dynamic.

Here is an example of possible selectors that the Selenium IDE identified:

Accessing a property of an object variable or item of an array variable**

This advanced capability lets you use syntax like ${foo.bar} to access the bar property of the foo object. You can also write to the bar property of foo by using foo.bar as the value property in a store command. You can also use syntax such as ${foo[0]} to access the item at index 0 in the foo array.

Next steps

- Create Selenium IDE flows
- Run Windows recorder (v1) flows

Use inputs and outputs in Selenium IDE flows

1/15/2022 • 2 minutes to read • Edit Online

IMPORTANT

This section covers topics to develop automations using legacy systems:

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You can define inputs to pass to your automated applications during playback. You can also pass *output* from your automated applications to your flow.

Define inputs for a Web UI flow

Inputs of a UI flow let you pass information from an external source such as a database or another UI flow to the target legacy software that you will automate.

Any variable that is used (read) before initialization (usually done via **store** commands) will be automatically treated as an input variable and it will be displayed on the **Run a UI flow for web** action card.

You can use variables via string interpolation, for example, change the click command's target field to "id=${elementId}". Or change the type command's value field to "${inputText}".

The command, **set window size** and the command, **type** in the following screenshots use uninitialized variables ${Width}, ${Height}, and ${search}. These variables will become input values.

http://google.com

	Command	Target	Value
1	store json	[2]	indicies
2	for each	indicies	index
3	open	https://www.google.com/	
4	set window size	${Width}x${Height}	
5	click	name=q	
6	type	name=q	${search}
7	send keys	name=q	${KEY_ENTER}
8	click	css=.bkWMgd:nth-child(${index}) .g:nth-child(1) .ellip	
9	end		
10	close		

You can use variables directly in some commands, for example, forEach command's target/value fields are both variables, you don't need to surround it with "${}".

Consult Selenium commands reference to determine which commands take variable names directly.

Define outputs for a Web UI flow

Any variable defined in the selenium script automatically becomes an output value. Use the following commands to declare variables:

Store

Store attribute

Store json

Store title

store value

Store window handle

Store xpath count

Execute script(add 'return' syntax to return the object you want to store at the end of the script)

Next steps

- Learn how to create Selenium IDE flows.
- Learn how to trigger Windows recorder (V1) flows.

Business process flows overview

1/15/2022 • 11 minutes to read • Edit Online

You can help ensure that people enter data consistently and follow the same steps every time they work with a customer by creating a business process flow. For example, you might want to create a business process flow to have everyone handle customer service requests the same way, or to require that people get approval for an invoice before submitting an order. Business process flows use the same underlying technology as other processes, but the capabilities that they provide are very different from other features that use processes. To learn how to create or edit a business process flow, see Create a business process flow.

Watch a short video (4:49) about business process flows.

Why use business process flows?

Business process flows provide a guide for people to get work done. They provide a streamlined user experience that leads people through the processes their organization has defined for interactions that need to be advanced to a conclusion of some kind. This user experience can be tailored so that people with different security roles can have an experience that best suits the work they do.

Use business process flows to define a set of steps for people to follow to take them to a desired outcome. These steps provide a visual indicator that tells people where they are in the business process. Business process flows reduce the need for training because new users don't have to focus on which table they should be using. They can let the process guide them. You can configure business process flows to support common sales methodologies that can help your sales groups achieve better results. For service groups, business process flows can help new staff get up-to-speed more quickly and avoid mistakes that could result in unsatisfied customers.

What can business process flows do?

With business process flows, you define a set of *stages* and *steps* that are then displayed in a control at the top of the form.

Each stage contains a group of steps. Each step represents a column where data can be entered. You can advance to the next stage by using the **Next Stage** button. In the unified interface, you can work with a business process flow stage inside the stage flyout or you can pin it to the side pane. Business process flows doesn't support expanding the stage flyout to the side pane on mobile devices.

You can make a step *required* so that people must enter data for a corresponding column before they can proceed to the next stage. This is commonly called "stage-gating". If you are adding a business-required or system-required column to a business process flow stage, we recommend that you add this column to your form as well.

Business process flows appear relatively simple compared to other types of processes because they do not provide any conditional business logic or automation beyond providing the streamlined experience for data entry and controlling entry into stages. However, when you combine them with other processes and customizations, they can play an important role in saving people time, reducing training costs, and increasing user adoption.

> **NOTE**
>
> If any stage, including the current stage, has required columns (except hidden columns), you must fill in the columns on those stages *before* you save the form or move to a new stage. Disabled columns will still block stage navigation if they are empty and required.

Business process flows integrated with other customizations

When you or your user enters data using business process flows, the data changes are also applied to form columns so that any automation provided by business rules or form scripts can be applied immediately. Steps can be added that set values for columns that are not present in the form and these columns will be added to the `Xrm.Page` object model used for form scripts. Any workflows that are initiated by changes to columns included in a business process flow will be applied when the data in the form is saved. If the automation is applied by a real-time workflow, the changes will be immediately visible to the user when the data in the form is refreshed after the row is saved.

Although the business process flow control in the form does not provide any direct client-side programmability, changes applied by business rules or form scripts are automatically applied to business process flow controls. If you hide a column in a form, that column will also be hidden in the business process flow control. If you set a value by using business rules or form scripts, that value will be set within the business process flow.

Concurrent process flows

Concurrent business process flows let customizers configure multiple business processes and associate them with the same starting row. Users can switch between multiple business processes running concurrently, and resume their work at the stage in the process that they were on.

System business process flows

The following business process flows are included. To understand how business process flows work, review these system business process flows:

- Lead to Opportunity Sales Process
- Opportunity Sales Process
- Phone to Case Process

Multiple tables in business process flows

You can use a business process flow for a single table or span multiple tables. For example, you may have a process that begins with an opportunity, then continues to a quote, an order, and then an invoice, before finally returning to close the opportunity.

You can design business process flows that tie together the rows for up to five different tables into a single process so that people using the app can focus on the flow of their process rather than on which table they are working in. They can more easily navigate between related table rows.

Multiple business process flows are available per table

Not every user in an organization may follow the same process and different conditions may require that a different process be applied. You can have up to 10 active business process flows per table to provide appropriate processes for different situations.

Control which business process flow will be applied

You can associate business process flows with security roles so that only people with those security roles can see or use them. You can also set the order of the business process flows so that you can control which business process flow will be set by default. This works in the same way that multiple forms for a table are defined.

When someone creates a new table row, the list of available active business process definition is filtered by the user's security role. The first activated business process definition available for the user's security role according to the process order list is the one applied by default. If more than one active business process definitions is available, users can load another from the Switch Process dialog. Whenever processes are switched, the one currently rendered goes to the background and is replaced by the selected one, but it maintains its state and can be switched back. Each row can have multiple process instances associated (each for a different business process flow definition, up to a total of 10). On form load, only one business process flow is rendered. When any user applies a different process, that process may only load by default for that particular user.

To make sure a business process is loaded by default for all user (behavior equivalent to "pinning" the process), a custom Client API script (web resource) can be added on form load that specifically loads an existing business process instance based on the business process definition ID.

Business process flow considerations

You can define business process flows only for those tables that support them. You also need to be aware of the limits for the number of processes, stages, and steps that can be added.

Business process flows that call a workflow

You can call on-demand workflows from inside a business process flow. You can configure this from the new business process flow designer by dragging a workflow component to a process stage or to the Global Workflows section. For more information about using workflows in business process flows, see Blog: Business process flow automation in Dynamics 365.

When you include a workflow that you want to trigger on Stage Exit of a stage in your business process flow, and that stage is the last stage in the flow, the designer gives the impression that the workflow will be triggered when that stage is completed. However, the workflow will not be triggered because a stage transition does not take place. You will not receive a warning or error preventing you from including the workflow on the stage. When a user interacts with the business process flow, finishing or abandoning the process does not result in a stage transition, and therefore the workflow is not triggered. Consider the following examples:

- You create a business process flow with two stages, S1 connects to S2, with a workflow on stage S2 and set the trigger to **Stage Exit**.
- You create a business process flow with three stages, S1 connect to S2, then S2 branches to S3. You

include a workflow on S2 and set the trigger to **Stage Exit**.

The workflow will not trigger in either case. To work around this issue, you can add a Global Workflow and add the workflow you want to trigger to it so that the workflow is triggered for the business process rather than a stage of the process. You can set the trigger for a Global workflow to Process Abandoned or Process Completed to cause the workflow to trigger when a user abandons or completes the business process.

Tables that can use business process flows

All custom tables can use business process flows. The following standard tables can also use business process flows:

- Account
- Appointment
- Campaign
- Campaign Activity
- Campaign Response
- Competitor
- Contact
- Email
- Entitlement
- Fax
- Case
- Invoice
- Lead
- Letter
- Marketing List
- Opportunity
- Phone Call
- Product
- Price List Item
- Quote
- Recurring Appointment
- Sales Literature
- Social Activity
- Order
- User
- Task
- Team

To enable a custom table for business process flows, select the **Business process flows (columns will be created)** check box in the table definition. Note that you can't undo this action.

> **NOTE**
>
> If you navigate to the business process flow stage that contains the `Social Activity` table and choose the **Next Stage** button, you'll see the **Create** option. When you choose **Create**, the **Social Activity** form loads. However, because `Social Activity` isn't valid for `Create` from the app user interface, you won't be able to save the form and you'll see the error message: "Unexpected error."

Maximum number of processes, stages, and steps

To ensure acceptable performance and the usability of the user interface, there are some limitations you need to be aware of when you plan to use business process flows:

- There can be no more than 10 activated business process flow processes per table.
- Each process can contain no more than 30 stages.
- Multi-table processes can contain no more than five tables.

Business process flow table customization support

Introduced in the Dynamics 365 (online), version 9.0 update, business process flow tables can appear in the system so that table row data can be made available in grids, views, charts, and dashboards.

Use business process flow table rows with grids, views, charts, and dashboards

With business processes flows available as an table, you can now use advanced finds, views, charts, and dashboards sourced from business process flow data for a given table, such as a lead or opportunity. System administrators and customizers can create custom business process flow grids, views, charts, and dashboards similar to those created with any other table.

Business process flows, such as **Lead To Opportunity Sales Process**, appear as a customizable table in solution explorer.

To access a default business process flow view, open solution explorer, expand **Tables** > expand the process that you want, such as **Lead To Opportunity Sales Process**, select **Views**, and then select the view that you want.

Several default views are available that you can view as a chart, such as the **Active Opportunity Sales Process** view.

Interact with the business process flow table from a workflow

You can also interact with business process flow tables from a workflow. For example, you can create a workflow for the Business Process Flow table row to change the Active Stage when a column on the Opportunity table row is updated. For more information about how to do this, see Automate business process flow stages using workflows.

Run business process flows offline

You can use business process flows offline if the following conditions are met:

- The business process flow is used from a Power Apps app.
- The Power Apps app is enabled for offline use.
- The business process flow has a single table.

Specifically, the three commands that are available for a business process flow when the Power Apps app is offline are:

- Next stage
- Previous stage
- Set Active stage

Lookup column in a business process flow stage

Recent rows are visible in a lookup column in the unified interface. To prevent the most recently used items from showing up in the lookup, follow these steps:

1. Open the Power Apps maker portal, and then select the correct environment from the top right of the screen.

2. Go to **Tables** under **Data**. Search for your business process flow table.

3. Select **Forms**, and select the **Information** editor.

4. Select your lookup data step from the **Tree view**, and then check **Disable most recently used items**.

5. Save, and then publish.

Limitations of using business process flow tables

- Currently, you can't create custom forms for tables based on a business process flow.
- If a solution includes a business process flow table, the business process flow table must be manually added to the solution before you export it. Otherwise, the business process flow table will not be included in the solution package. More information: create and edit tables.
- Adding the process table to a model-driven app may result in limited functionality. Learn more about creating and editing business process flows.

Next steps

Watch a short video (4:49) about business process flows
Create a business process flow
Enhance business process flows with branching
Whitepaper: Process Enablement with Dynamics 365

Tutorial: Create a business process flow

1/15/2022 • 11 minutes to read • Edit Online

This tutorial shows you how to create a business process flow with Power Apps. To learn more about why you use business process flows, see Business process flows overview. For information on creating a mobile task flow, see Create a mobile task flow.

When a user starts a business process flow, the stages and steps of the process are displayed in the process bar at the top of a form:

> **TIP**
> After you create a business process flow definition, you can provide control over who can create, read, update, or delete the business process flow instance. For example, for service-related processes, you could provide full access for customer service reps to change the business process flow instance, but provide read-only access to the instance for sales reps so they can monitor post-sales activities for their customers. To set security for a business process flow definition you create, select **Enable Security Roles** on the action bar.

Prerequisites

You need a per user plan in order to create business process flows. Some Dynamics 365 license plans include the per user plan. Business process flows are currently not supported in Dataverse for Teams.

Create a business process flow

1. Open solution explorer.
2. On the left navigation pane, select **Processes**.
3. On the **Actions** toolbar, select **New**.
4. In the **Create Process** dialog box, complete the required columns:

- Enter a process name. The name of the process doesn't need to be unique, but it should be meaningful for people who need to choose a process. You can change this later.
- In the **Category** list, select **Business Process Flow**.

  You cannot change the category after you create the process.
- In the **Table** list, select the table on which you want to base the process.

  The table you select affects the columns available for steps that can be added to the first stage of the process flow. If you don't find the table you want, make sure the table has the business process flows (columns will be created) choice in the table definition. You cannot change this after you save the process.

5. Select **OK**.

   The new process is created, and the business process flow designer opens with a single stage created for you.

6. **Add stages.** If your users will progress from one business stage to another in the process:

   a. Drag a **Stage** component from the **Components** tab and drop it on a + sign in the designer.

   b. To set the properties for a stage, select the stage, and then set the properties in the **Properties** tab on the right side of the screen:

      - Enter a display name.
      - If desired, select a category for the stage. The category (such as **Qualify** or **Develop**), appears as a chevron in the process bar.

      - When you're done changing properties, select the **Apply** button.

7. **Add steps to a stage.** To see the steps in a stage, select **Details** in the lower-right corner of the stage. To add more steps:

   a. Drag the **Step** component to the stage from the **Components** tab.

b. Select the step, and then set properties in the **Properties** tab:

   a. Enter a display name for the step.
   b. If you want users to enter data to complete a step, select the appropriate column from the drop-down list.
   c. Select **Required** if people must fill in the column to complete the step before moving to the next stage of the process.
   d. Select **Apply** when you're done.

> **NOTE**
> - If you set a two-option boolean column as **Required**, users can't continue unless the column value is **Yes**. The user is required to mark the column as completed before moving to the next stage.
> - If either **Yes** or **No** are acceptable column values, then you should make the column a choice instead of a two-option boolean column.

8. **Add a branch (condition) to the process.** To add a branching condition:

   a. Drag the **Condition** component from the **Components** tab to a + sign between two stages.

   b. Select the condition, and then set properties in the **Properties** tab. For more information on branching properties, see Enhance business process flows with branching. When you're finished setting properties for the condition, select **Apply**.

9. **Add a workflow.** To invoke a workflow:

   a. Drag a **Workflow** component from the **Components** tab to a stage or to the **Global Workflow** item in the designer. Which one you add it to depends on the following:

      - **Drag it to a stage** when you want to trigger the workflow on entry or exit of the stage. The workflow component must be based on the same primary table as the stage.
      - **Drag it to the Global Workflow item** when you want to trigger the workflow when the process is activated or when the process is archived (when the status changes to **Completed** or **Abandoned**). The workflow component must be based on the same primary table as the process.

   b. Select the workflow, and then set properties in the **Properties** tab:

      a. Enter a display name.
      b. Select when the workflow should be triggered.
      c. Search for an existing on-demand active workflow that matches the stage table or create a new workflow by selecting **New**.
      d. Select **Apply** when you're done.

   For more information on workflows, see Workflow processes.

10. To validate the business process flow, select **Validate** on the action bar.

11. To save the process as a draft while you continue to work on it, select **Save** in the action bar.

> **IMPORTANT**
>
> As long as a process is a draft, people won't be able to use it.

12. To activate the process and make it available to your team, select **Activate** on the action bar.

13. To provide control over who can create, read, update, or delete the business process flow instance, select **Edit Security Roles** on the command bar of the designer. For example, for service-related processes, you could provide full access for customer service reps to change the business process flow instance, but provide read-only access to the instance for sales reps so they can monitor post-sales activities for their customers.

In the **Security Roles** screen, select the name of a role to open the security role information page. Select the Business Process Flows tab, and then assign appropriate privileges on the business process flow for a security role.

> **NOTE**
>
> The System Administrator and System Customizer security roles have access to new business process flows by default.

Specify privileges by selecting the appropriate radio buttons, and click Save. For more information about privileges, see Business process flow privileges.

Next, don't forget to assign the security role to appropriate users in your organization.

> **TIP**
>
> Here are a few tips to keep in mind as you work on your task flow in the designer window:
>
> - To take a snapshot of everything in the business process flow window, select **Snapshot** on the action bar. This is useful, for example, if you want to share and get comments on the process from a team member.
> - Use the mini-map to navigate quickly to different parts of the process. This is useful when you have a complicated process that scrolls off the screen.
> - To add a description for the business process, select **Details** under the process name in the left corner of the business process flow window. You can use up to 2000 characters.

Edit a business process flow

To edit business process flows, open solution explorer, select **Processes**, and then select the **Business Process Flow** from the list of processes that you want to edit.

When you select the name of the business process flow you want to edit from the list of processes, it opens in the designer, where you can make any updates you want. Expand **Details** under the name of the process to rename it or add a description, and view additional information.

Other things to know about business process flows

Edit Stages

Business process flows can have up to 30 stages.

You can add or change the following properties of a stage:

- **Stage Name**
- **Table**. You can change the table for any stage except the first one.
- **Stage Category**. A category lets you group stages by a type of action. It is useful for reports that will group rows by the stage they are in. The options for the stage category come from the Stage Category global choice. You can add additional options to this global choice and change the labels of existing options if you want. You can also delete these options if you wish, but we recommend that you keep the existing options. You won't be able to add the exact same option back if you delete it. If you don't want them to be used, change the label to "Do not use".
- **Relationship**. Enter a relationship when the preceding stage in the process is based on a different table. For the stage currently being defined, choose **Select relationships** to identify a relationship to use when moving between the two stages. It is recommended you select a relationship for the following benefits:
  - Relationships often have column maps defined that automatically carry over data between rows, minimizing data entry.
  - When you select **Next Stage** on the process bar for a row, any rows that use the relationship will be listed in the process flow, thereby promoting reuse of rows in the process. In addition, you can use workflows to automate creation of rows so that the user simply selects it instead of creating one to further streamline the process.

Edit Steps

Each stage can have up to 30 steps.

Add branch

To learn about adding a branch to a stage, see Enhance business process flows with branching.

To make a business process flow available for people to use, you must order the process flow, enable security roles, and activate it.

Set Process Flow Order

When you have more than one business process flow for a table (row type), you'll need to set which process is

automatically assigned to new rows. In the command bar, select **Order Process Flow**. For new rows or rows that do not already have a process flow associated with them, the first business process flow that a user has access to is the one that will be used.

Enable Security Roles

Users have access to a business process flow depending on the privilege defined on the business process flow in the security role assigned to the user.

By default, only the **System Administrator** and **System Customizer** security roles can view a new business process flow.

To specify privileges on a business process flow, open the business process flow for edit, and then select **Edit Security Roles** on the command bar of the business process flow designer. See step 13 under Create a business process flow listed earlier in this topic.

Activate

Before anyone can use the business process flow, you must activate it. In the command bar, select **Activate**. After you confirm the activation, the business process flow is ready to use. If a business process flow has errors, you will not be able to activate it until the errors are corrected.

Add an on-demand action to a business process flow

The Dynamics 365 (online), version 9.0 update introduces a business process flow feature: business process flow automation with Action Steps. You can add a button to a business process flow that will trigger an action or workflow.

Add on-demand workflows or actions using an Action Step

Suppose that, as part of the opportunity qualification process, the Contoso organization requires all opportunities to be reviewed by a designated reviewer. Subsequently, the Contoso organization created an action that:

- Creates a task row that is assigned to the opportunity reviewer.
- Appends "Ready for review" to the opportunity topic. Additionally, Contoso needs to be able to run these actions on demand. To integrate these tasks into the opportunity qualification process, the actions must appear on the opportunity business process flow. To enable this functionality, select **As a Business Process Flow action step**.

Next, the Action Step is added to Contoso's opportunity business process flow. Then the process flow is validated and updated.

Now, members of Contoso's salesforce can kick-off the action from the **Opportunity Qualify** business process step, on demand, by selecting **Execute**.

> **IMPORTANT**
>
> - To be able to execute an action or workflow on demand, the business process flow must include an Action Step. If the Action Step runs a workflow, the workflow must be configured to run on demand.
> - The table associated with the action or workflow must be the same as the table associated with the business process flow.

Limitation of using Action Steps in a business process flow

- Actions are not available as Action Steps if the input or output parameters are Table, EntityCollection, or OptionSet (Choice) types. Actions with more than one EntityReference output parameter or any number of EntityReference input parameters are not available as Action Steps. Actions not associated with a primary table (global action) are not available as Action Steps.

The action center

When you need to see the list of business process flows in which you're involved, check out the unified action center.

In the unified action center, you will see all business processes in which you're assigned at least one Microsoft Dataverse table row that the process uses. For example, if a business process uses the **Lead** and **Opportunity** tables in Dataverse, you will see all instances of this process where either the Lead or the Opportunity row is assigned to you.

View all instances that are currently being worked under the **Active** tab. From this tab, you can view the

following details:

- The name of the process.
- The current stage for each process.
- The owner of the Dataverse row associated with the active stage.
- The time since the instance was created.

Select an instance to open it in a new tab, or select it to copy a link, share a link via email, abandon, or delete the instance.

Next steps

- Business process flows overview
- Enhance business process flows with branching
- Overview of approvals
- Detailed steps for adding an instant flow to a business process flow

Create instant flows in business process flows

1/15/2022 • 3 minutes to read • Edit Online

You can run an **instant flow** to automate repetitive tasks, generate documents, track approvals, and more, from inside a stage in a business process.

Add an instant flow as a step in a business process

Let's assume you sell printers and you use the **Lead to Opportunity Sales Process** to close deals. As part of this process, you'd like to have the team lead review and approve proposals that the sales team puts together in an earlier stage of the business process flow before sharing it with the customer.

To do this, you'll need to do two things:

1. Build an instant flow that requests review and approval of the proposal from the team.
2. Add the instant flow as a step in the **Lead to Opportunity Sales Process**.

> **TIP**
>
> Only solution-aware flows can be added as a step in a business process.

Build an instant flow

1. In Power Automate, select **Solutions** in the navigation menu.
2. Select **Default Solution** from the list of solutions that appears.
3. Select the **+ New** menu, and then select **Flow** from the list that appears.
4. Search for, and then select the **Microsoft Dataverse** connector.
5. Search for, and then select the **When a row is selected** trigger from the list of **Microsoft Dataverse** triggers.
6. Set **Environment** to **Default**, and then set **Table Name** to **Lead to Opportunity Sales Process**.
7. Add a text input column for the user to enter the link to the proposal.

We'll need information from the business process flow instance to help provide context for the approval request so follow these steps to do this.

8. Add the **Parse JSON** action.
9. Set **Content** to **table** by selecting it from the list of dynamic values for the **When a row is selected** trigger.
10. Paste the following content into the **Schema** column.

```
{
    "type": "object",
    "properties": {
    "entity": {
        "type": "object",
        "properties": {
            "FlowsWorkflowLogId": {
                "type": "string"
            },
            "BPFInstanceId": {
                "type": "string"
            },
            "BPFInstanceEntityName": {
                "type": "string"
            },
            "BPFDefinitionId": {
                "type": "string"
            },
            "BPFDefinitionEntityName": {
                "type": "string"
            },
            "StepId": {
                "type": "string"
            },
            "BPFDefinitionName": {
                "type": "string"
            },
            "BPFInstanceName": {
                "type": "string"
            },
            "BPFFlowStageLocalizedName": {
                "type": "string"
            },
            "BPFFlowStageEntityName": {
                "type": "string"
            },
            "BPFFlowStageEntityCollectionName": {
                "type": "string"
            },
            "BPFFlowStageTableRowID": {
                "type": "string"
            },
            "BPFActiveStageId": {
                "type": "string"
            },
            "BPFActiveStageEntityName": {
                "type": "string"
            },
            "BPFActiveStageLocalizedName": {
                "type": "string"
            }
        }
      }
    }
}
```

Things should look like this now:

11. Add the **Get row by ID** action from the **Microsoft Dataverse** connector.

12. Set **Table Name** to **Lead to Opportunity Sales Process**, and **Row ID** to **BPFFlowStageTableRowID**.

Now that we have the data, define the approval process by adding the **Start and wait for an approval (V2)** action, and then filling in the relevant information. Learn more about approvals if you are not familiar.

> **TIP**
>
> - Use the dynamic content picker to add columns from the **Get row by ID** action to add relevant information to the approval request so that approvers can easily know what the request is about.
> - To provide further context regarding the active stage that the business process is in, add the **BPFActiveStageLocalizedName** column from the list of dynamic values.

Your **Start and wait for an approval (V2)** card might look similar to this one:

13. Finally, save the flow and then turn it on.

Add this flow as a step in the Lead to Opportunity Sales Process.

Now that you've created the instant flow, all that's needed is for you to add it to your business process flow.

1. Open the **Lead to Opportunity Sales Process** in the business process flow designer.
2. Drag and drop the **Flow Step (Preview)** from the list of **Components** onto the **Propose** stage.
3. Next, select the search icon in the **Select a Flow** column to list all flows that you can added to a business process flow.
4. Select a cloud flow from the list, and then save your changes by selecting the **Apply** button at the bottom of the properties pane.
5. Finally, select the **Update** button to make this business process flow with its new instant flow step available to your users.

Flow step considerations

The status of your flow step might be **Processing** even after your flow successfully ran to completion, if you are not writing to the process log. In order to mark a cloud flow step as completed, add the **Update a row** action of the Microsoft Dataverse connector under the **If yes** path. Set the **Table** to **Process Logs**. Then set **Row ID** to **FlowsWorkflowLogId** by picking it from the list of dynamic values. Finally, set **Status Value** to **Succeeded** by selecting it from the dropdown.

Tutorial: Enhance business process flows with branching

1/15/2022 • 6 minutes to read • Edit Online

Business process flows guide you through various stages of sales, marketing, or service processes toward completion. In simple cases, a linear business process flow is a good option. However, in more complex scenarios, you can enhance a business process flow with branching. If you have the create permissions on business process flows, you'll be able create business process flow with multiple branches by using the `If-Else` logic. The branching condition can be formed of multiple logical expressions that use a combination of `AND` or `OR` operators. The branch selection is done automatically, in real time, based on rules defined during the process definition. For example, in selling cars, you can configure a single business process flow, which after a common qualification stage splits into two separate branches on the basis of a rule (Does the customer prefer a new car or pre-owned car, is their budget above or below $20,000, and so on.), one branch, for selling new cars and another branch, for selling pre-owned cars. For more information about Business process flows, see Business process flows overview.

The following diagram shows a business process flow with branches.

What you need to know when designing business process flows with branches

Take notice of the following information when you design the business process flow with the branches:

- A process can span across a maximum of 5 unique tables.
- You can use a maximum of 30 stages per process and a maximum of 30 steps per stage.
- Each branch can be no more that 5 levels deep.
- Branching rule must be based on the steps in the stage that immediately precedes it.
- You can combine multiple conditions in a rule by using the `AND` operator or the `OR` operator, but not

both operators.

- When you define a process flow, you can optionally select a table relationship. This relationship must a 1:N (One-to-Many) table relationship.
- More than one active process can run concurrently on the same data row.
- You can rearrange tiles (Stages, Steps, Conditions etc.) on the process flow using drag and drop.
- When merging branches, all peer branches must merge to a single stage. The peer branches must all either merge to a single stage, or each peer branch must end the process. A peer branch can't merge with other branches and at the same time end the process.
- Client API changes cannot trigger evaluation of branching condition, as branching relies on Business rules.

> **NOTE**
>
> - A table used in the process can be revisited multiple times (multiple closed table loops).
> - A process can go back to the previous stage regardless of a table type. For example, if the active stage is **Deliver Quote** on a quote row, process users can move the active stage back to the **Propose** stage on an opportunity row.
>
> In another example, suppose a process is currently in the **Present Proposal** stage in your process flow: **Qualify Lead** > **Identify Needs** > **Create Proposal** > **Present Proposal** > **Close**. If the proposal presented to the customer requires more research to identify customer needs, users can simply select the **Identify Needs** stage of your process and choose **Set Active**.

Example: Car selling process flow with two branches

Let's look at the example of the business process flow with two branches, for selling new and pre-owned cars.

First, we'll create a new process named **Car Sales Process**.

1. Open solution explorer and then in the left navigation pane select **Processes**.
2. Select **New** to create a new process.
3. Specify the **Category** as **Business Process Flow** and for the primary **Entity** choose **Lead**.
4. Add the first stage to the process called **Qualify** and add steps **Purchase Time frame** and **Car Preference**.
5. After the common **Qualify** stage, we split the process into to two separate branches, by using the **Condition** tile.
   a. Configure the condition tile with rules that meet your business requirements
   b. To add the first branch for a stage, add a Stage tile on the "Yes" path of the condition tile
   c. To add the second branch that is executed when condition is not satisfied, add another Stage tile on the "No" path of the condition tile

> **TIP**
>
> You can add another condition on the "no" path of an existing condition tile to create more complex branching.

If the **Car preference** = **New**, the process branches out to the **New Car Sales** stage, otherwise, it jumps to the **Pre-Owned Car Sales** stage, in the second branch, as shown below.

After completing all the steps in the **New Car Sales** stage or **Pre-Owned Car Sales** stage, the process returns back to the main flow, with the **Deliver Quote** stage.

Prevent information disclosure

Consider a business process flow with branches for processing a loan request at a bank, as shown below. The custom tables used in the stages are shown in parenthesis.

In this scenario, the bank loan officer needs access to the Request row, but the loan officer shouldn't have any

visibility into the investigation of the request. At first glance, it looks that we can easily do this by assigning the loan officer a security role that specifies no access to the Investigation table. But, let's look at the example in more detail and see if this is really true.

Let's say that a customer puts in the loan request for over $60,000 to the bank. The loan officer reviews the request in the first stage. If the branching rule that checks if the amount owed to the bank will exceed $50,000 is satisfied, the next stage in the process is to investigate if the request is fraudulent. If it's determined that this is indeed a case of fraud, the process moves on to taking a legal action against the requestor. The loan officer shouldn't have visibility into the two investigative stages as the officer doesn't have access to the Investigation table.

However, if the loan officer opens the Request row, all would be able to see the entire end-to-end process. Not only will the loan officer be able to see the fraud investigation stage, but she'll also be able to identify the outcome of the investigation by having been able to see the Legal Action stage in the process. Also, the officer will be able to preview the steps in the investigative stages by choosing the stage. While the loan officer won't be able to see the data or the step completion status, she'll be able to identify the potential actions that were taken against the submitter of the request during the investigation and legal action stages.

In this process flow, the loan officer will be able to see the Fraud Investigation and Legal Action stages, which constitutes an improper information disclosure. We recommend paying special attention to the information that may become disclosed due to branching. In our example, split the process into two separate processes, one for the request processing and another one for the fraud investigation, to prevent the information disclosure. The process for the loan officer will look like this:

The process for the investigation will be self-contained and include the following stages:

You will need to provide a workflow to synchronize the Approve/Deny decision from the Investigation row to the Request row.

Next steps

Create a business process flow
Create custom business logic with processes

Use custom controls in business process flows

1/15/2022 • 2 minutes to read • Edit Online

Business process flows provide a guided way to get work done in the form of stages and steps. Stages tell you where you are in the process, while steps are action items that lead to a desired outcome. Steps in a business process are bound to columns in Microsoft Dataverse. In addition to the default visualizations of the control type (text boxes, dropdowns, and so on), you can use custom controls to add rich visualizations (such as sliders, radial knobs, the LinkedIn control, and more) to business process flows steps and deliver engaging experiences to those who use your business process.

Adding custom controls to a business process

Let's say that you'd like to add a radial knob for the **Estimated Budget** step and a flip switch for the **Identify Decision Maker** step of the Lead to Opportunity Sales process.

Here are the steps you must follow to add custom controls to a business process flow:

1. Configure custom controls on a related table form.
2. Generate and exporting the business process flow form.
3. Copy custom control configurations to the business process flow form from the related table form.
4. Import the customizations back into Microsoft Dataverse.

Follow these steps for a detailed walkthrough adding custom controls to business process flows steps.

Best practices in using business process flow columns

1/15/2022 • 3 minutes to read • Edit Online

Legacy process-related columns in tables is deprecated. Here are some best practices for using the *Active Stage* (activestageid) column on the business process flow table.

Reporting on the active stage of a business process flow

Let's say that you'd like to get a view of your sales pipeline by reporting on the active stage that the **Lead to Opportunity Sales Process** is on.

Previously, to report on business processes by stage, one might define a view on each related table of the business process flow and then report on the *Active Stage* (activestageid) column.

With the deprecation of the *Active Stage* (activestageid) column on related tables, there are two ways to report on business process flows.

Option 1: Views and charts on business process flow table(Recommended)****

In versions 9.0 and higher, each business process flow creates its own Dataverse table, usually with the same name as the business process flow. To report on the business process flow, select the table for the business process flow you want to report on, and then create views and charts, just as you did before.

In our example, follow these steps to go to the **Lead to Opportunity Sales Process** table:

1. Go to https://make.powerapps.com.
2. Select the **Data**.
3. Select the **Tables**.
4. Set the filter to **All**.
5. Search for, and then select the **Lead to Opportunity Sales Process** table.

Here, you can define views and charts just as you do on any other table.

An advantage of this approach is that you can use a single view or chart to report on business process flows that span multiple tables.

Further, as the business process flow table is no different from any other custom table in Dataverse, you can add custom columns to the table to track any additional information you need.

Option 2: copy active stage to a related table

Alternatively, to continue reporting off the related table, create a cloud flow to copy the *Active Stage* (activestageid) column from the business process flow table into a custom column on the related Dataverse tables.

Here are a few things to keep in mind when you use this approach:

1. It's possible to have more than one business process flow running on a single table. With this approach, it's best to have one custom column that stores the active stage for each business process flow that runs on the table. This approach ensures the integrity of the reporting.
2. As reporting is driven from the related table, it's not possible to create a single view that reports on business process flows that span multiple tables.

Using the active stage to run logic

Here are some cases in which you might want to run logic that's based on the active stage:

Using the active stage to run client-side logic

As you use the business process, there are many things that you might want to do automatically. For instance:

- Change the active business process flow based on newly available information on the form or business process flow.
- Move the active stage to the next or previous stage, based on values the users entered for steps or form columns.
- Hide or show form tabs and columns based on the selected stage.
- Show informative messages and run calculations based on the active business process flows, the active or selected stage, or events such as moving the active stage.

> **TIP**
>
> For scenarios like these, use the supported set of client APIs for business process flows.

Using the active stage to run server-side logic

There might be cases where automation based on the business process flow needs to be done server side. For instance:

- Send an email to a user if the **Qualify** the stage of the **Opportunity Sales Process** is active for longer than 15 days.
- Automatically create a set of activities relevant to the active stage of the **Opportunity Sales Process** each time it changes.
- Automatically finish the **Opportunity Sales Process** when the phone call activity for closing completes.

> **TIP**
>
> Use classic Dataverse workflows or flows you define on the table for the business process flow.

To build a classic Dataverse workflow that creates activities for internal solution reviews and to follow up with the customer in the **Propose** stage of the **Opportunity Sales Process**:

1. Create it on the **Opportunity Sales Process** table and set it to run each time the **Active Stage** column of the table changes.
2. Define a condition to check if the **Active Stage** column equals **Propose**.
3. Create an appointment and phone call row for the internal review of the solution and the customer call to review the solution respectively.

Manage connections in Power Automate

1/15/2022 • 2 minutes to read • Edit Online

Power Automate uses *connections* to make it easy for you to access your data while building flows. Power Automate includes commonly used connections, including SharePoint, SQL Server, Microsoft 365, OneDrive for Business, Salesforce, Excel, Dropbox, Twitter, and more. Connections are shared with Power Apps, so when you create a connection in one service, the connection shows up in the other service.

Here's a quick video on managing connections.

You can use connections to perform these tasks:

- Update a SharePoint list.
- Get data from an Excel workbook in your OneDrive for Business or Dropbox account.
- Send email in Microsoft 365.
- Send a tweet.

You can create a connection in multiple scenarios, including:

- Creating a flow from a template.
- Creating a flow from a blank, or updating an existing flow.
- Creating a connection in Power Automate.

> **TIP**
> For detailed information about using SharePoint with Power Automate, see the SharePoint documentation.

Add a connection

1. In Power Automate, sign in with your work or organization account.
2. On the left pane, select **Data** > **Connections**.

3. At the top of the page, select **New connection**.
4. In the list of available connections, choose the connection that you want to set up (such as SharePoint) by selecting the plus sign (**+**).

5. Follow the steps to enter your credentials to configure the connection.

> **TIP**
>
> You can find all the connections that you've created under **Data** > **Connections**.

Connect to your data through an on-premises data gateway

Some connectors, such as the SharePoint connector, support the on-premises data gateway. To create a connection that uses a gateway:

1. Follow the steps earlier in this topic to add a connection.
2. In the list of available connections, select **SharePoint**.
3. Select the **Connect using on-premises data gateway** option.

4. Provide the connection's credentials, and then select the gateway that you want to use. More information: Manage gateways and Understand gateways

> **NOTE**
>
> After the connection is configured, it's listed in **Connections**.

Delete a connection

1. Go to **Data** > **Connections**, and select the connection that you want to delete.

2. Select **...** to view more commands, and then select **Delete**.

3. Select **Delete** to confirm that you would like to delete the connection.

When you delete a connection, it's removed from both Power Apps and Power Automate.

Update a connection

You can update a connection that isn't working because your account details or your password changed.

1. Go to **Data** > **Connections**, and then select the **Fix connection** link for the connection that you want to update.

2. When prompted, update your connection with new credentials.

When you update a connection, it's updated for both Power Apps and Power Automate.

Troubleshoot a connection

Depending on your organization's policies, you might need to use the same account for signing in to Power Automate and creating a connection to SharePoint, Microsoft 365, or OneDrive for Business.

For example, you might sign in to Power Automate with *yourname@outlook.com* but be blocked when you try to connect to SharePoint with *yourname@contoso.com*. You can instead sign in to Power Automate with *yourname@contoso.com* and you'll be able to connect to SharePoint.

Manage an on-premises data gateway in Power Automate

1/15/2022 • 2 minutes to read • Edit Online

Install and manage an on-premises data gateway to securely integrate a variety of cloud-based apps with your on-premises data and apps through Power Automate.

With a gateway, you can connect to on-premises data over the following connections.

- Apache Impala
- Custom connectors that you create
- DB2
- File System
- Http with Azure AD
- Informix
- MySQL
- Oracle Database
- PostgreSQL
- SharePoint
- SQL Server
- Teradata

> **IMPORTANT**
>
> Microsoft SharePoint data gateways now support both HTTP and HTTPS traffic.

Prerequisites

- The user name and password that you used to sign up for Power Automate.
- Administrative permissions on a gateway.

  You have these permissions by default for each gateway that you install. Also, an administrator of another gateway can grant you these permissions for that gateway.
- A license that supports gateways. For more information, see the "Connectivity" section of the pricing page.

> **TIP**
>
> You can create a gateway and an on-premises connection for any environment.

Install a gateway

To install a gateway, follow the steps in Install an on-premises data gateway. Install the gateway in standard mode because the *on-premises data gateway (personal mode)* is available only for Power BI.

View your gateways

Sign in to Power Automate, and then select **Data** > **Gateways** in the navigation pane on the left side.

> **NOTE**
>
> If you created or were given access to a gateway in Power Apps, that gateway appears in the **My gateways** list in Power Automate.

Cluster your gateways

You can create high availability clusters of on-premises data gateway installations to avoid single points of failure in accessing on-premises data resources.

By default, Power Automate uses the primary gateway in the cluster. If the primary gateway isn't available, the service switches to the next gateway in the cluster, and so on.

Once you've set up a gateway cluster, you can allow traffic to be distributed across all gateways in the cluster.

Follow these steps to distribute your traffic across your gateways:

1. Select **Data** on the navigation bar on the left side.
2. Select **Gateways**.
3. Select any of your gateways.
4. Select **Distribute requests across all active gateways in this cluster**.
5. Select **Apply** to save your changes.

For more information, see Understand gateways.

What is an on-premises data gateway?

1/15/2022 • 2 minutes to read • Edit Online

The on-premises data gateway acts as a bridge to provide quick and secure data transfer between on-premises data (data that isn't in the cloud) and several Microsoft cloud services. These cloud services include Power BI, Power Apps, Power Automate, Azure Analysis Services, and Azure Logic Apps. By using a gateway, organizations can keep databases and other data sources on their on-premises networks, yet securely use that on-premises data in cloud services.

How the gateway works

For more information on how the gateway works, see On-premises data gateway architecture.

Types of gateways

There are two different types of gateways, each for a different scenario:

- **On-premises data gateway** allows multiple users to connect to multiple on-premises data sources. You can use an on-premises data gateway with all supported services, with a single gateway installation. This gateway is well-suited to complex scenarios with multiple people accessing multiple data sources.
- **On-premises data gateway (personal mode)** allows one user to connect to sources, and can't be shared with others. An on-premises data gateway (personal mode) can be used only with Power BI. This gateway is well-suited to scenarios where you're the only person who creates reports, and you don't need to share any data sources with others.

Use a gateway

There are four main steps for using a gateway.

1. Download and install the gateway on a local computer.
2. Configure the gateway based on your firewall and other network requirements.
3. Add gateway admins who can also manage and administer other network requirements.
4. Troubleshoot the gateway in case of errors.

Next steps

- Install the on-premises data gateway

Classic Dataverse background workflows

1/15/2022 • 2 minutes to read • Edit Online

Workflows automate business processes without a user interface. People usually use workflow processes to initiate automation that doesn't require any user interaction.

There are two types of workflows:

1. Real-time workflows. See the Power Apps documentation for more details about real-time workflows.
2. Background workflows.

To create background workflows, you must select the **Run this workflow in the background (recommended)** check box, as displayed in the following image.

See other topics here in the Power Automate documentation to learn more about background workflows.

Learn more

- Configure background workflow stages and steps.
- Monitor and manage background workflow processes
- Best practices for background workflow processes.
- Replace background workflows with flows

Configure background workflow stages and steps

1/15/2022 • 6 minutes to read • Edit Online

When you design workflows you have the option to contain the logic you want to perform in **stages** and **steps**.

Stages make the workflow logic easier to read, and explain the workflow logic. However, stages do not affect the logic or behavior of workflows. If a process has stages, all the steps within the process must be contained with a stage.

Steps are a unit of business logic within a workflow. Steps can include conditions, actions, other steps, or a combination of these elements.

Actions that background workflow processes can perform

Background workflow processes can perform the actions listed in the following table.

ACTION	DESCRIPTION
Create row	Creates a new row for a table and assigns values you choose to columns.
Update row	You can update the row that the background workflow is running on, any of the rows linked to that row in an N:1 relationships, or any rows created by earlier steps.
Assign row	You can assign the row that the background workflow is running on, any of the rows linked to that row with an N:1 relationship, or any rows created by earlier steps.
Send Email	Sends an email. You can choose to create a new email message or use an email template configured for the table of the row that the background workflow is running on or any tables that have an N:1 relationship with the table, or the table for any rows created by earlier steps.
Start Child Workflow	Starts a background workflow process that has been configured as a child workflow.
Change Status	Changes the status of the row that the process is running on, any of the rows linked to that row with an N:1 relationship, or any rows created by earlier steps.
Stop Workflow	Stops the current workflow. You can set a status of either **Succeeded** or **Canceled** and specify a status message.
Custom Step	Developers can create custom background workflow steps that define actions. There are no custom steps available by default.

Setting row values

When you create a row you can set values for the row. When you update a row you can set, append, increment, decrement, multiply, or clear values.

When you select **Set Properties**, a dialog box opens showing you the default form for the table.

At the bottom of the dialog box you can see a list of additional columns not present in the form.

For any column, you can set a static value and that will be set by the workflow.

On the right side of the dialog box, the **Form Assistant** gives you the ability to set or append dynamic values from the context of the current row. This includes values from related rows that can be accessed from the N:1 (many-to-one) relationships for the table.

The options available in the **Form Assistant** depend on the column you have selected in the form. When you set a dynamic value, you will see a yellow placeholder known as a 'slug' that shows where the dynamic data will be included. If you want to remove the value, just select the slug and delete it. For text columns, you can use a combination of static and dynamic data.

With dynamic values, you don't know for certain that a column or related table has the value you want to set. You can actually set a number of columns to try to set the value and sort them in order using the green arrows. If the first column doesn't have data, the second column will be tried and so on. If none of the columns has data, you can specify a default value to be used.

Setting conditions for background workflow actions

The actions that you will apply often depend on conditions. Background workflow processes provide several ways to set conditions and create branching logic to get the results you want. You can check values of the row that the background workflow process is running against, any of the rows linked to that row with an N:1 relationship, or values within the process itself.

CONDITION TYPE	DESCRIPTION
Check Condition	A logical "if <condition> then" statement. You can check the current values for the row that the background workflow is running on, any of the rows linked to that row in an N:1 relationships, or any rows created by earlier steps. Based on these values you can define additional steps when the condition is true. In the "if <condition> then" statement, you can use the following operators: **Equals**, **Does Not Equal**, **Contains Data**, **Does Not Contain Data**, **Under** and **Not Under**. **Note:** The **Under** and **Not Under** are hierarchical operators. They can only be used on the tables that have a hierarchical relationship defined. If you're trying to use these operators on the tables that don't have the hierarchical relationship defined, you'll see the error message: "You're using a hierarchical operator on a table that doesn't have a hierarchical relationship defined. Either make the table hierarchical (by marking a relationship as hierarchical) or use a different operator." For more information about hierarchical relationships, see Define and query hierarchically related data. A screenshot that follows the table is an example of the definition of the background workflow process that uses the **Under** and **Not Under** hierarchical operators.

CONDITION TYPE	DESCRIPTION
Conditional Branch	A logical "else-if-then" statement. The editor uses the text “Otherwise, if <condition> then:” Select a check condition you have previously defined and you can add a conditional branch to define additional steps when the check condition returns false.
Default Action	A logical "else" statement. The editor uses the text “Otherwise:” Select a check condition, conditional branch, wait condition, or parallel wait branch that you have previously defined and you can use a default action to define steps for all cases that do not match the criteria defined in condition or branch elements.
Wait Condition	Enables a background workflow to pause itself until the criteria defined by the condition have been met. The background workflow starts again automatically when the criteria in the wait condition have been met.
Parallel Wait Branch	Defines an alternative wait condition for a background workflow with a corresponding set of additional steps that are performed only when the initial criterion is met. You can use parallel wait branches to create time limits in your background workflow logic. They help prevent the background workflow from waiting indefinitely until the criteria defined in a wait condition have been met.
Custom Step	Developers can create custom background workflow steps that define conditions. There are no custom steps available by default.

The following screenshot contains an example of the background workflow process definition with the **Under** and **Not Under** hierarchical operators. In our example, we apply two different discounts to two groups of accounts. In **Add Step**, we selected the **Check Condition** to specify the **if-then** condition containing the **Under** or **Not Under** operators. The first **if-then** condition applies to all accounts that are **Under** the Alpine Ski House account. These accounts receive a 10 percent discount on purchased goods and services. The second **if-then** condition applies to all accounts that are **Not Under** the Alpine Ski House account and they receive a 5 percent discount. Then, we selected **Update row** to define the action to be performed based on the condition.

Next steps

Create custom business logic through processes
Workflow processes overview
Monitor and manage background workflow processes
Best practices for background workflow processes

Monitor and manage background workflow processes

1/15/2022 • 3 minutes to read • Edit Online

To monitor and manage processes, you must locate the process, evaluate the status, and perform any actions necessary to address problems.

Monitoring background workflows

Background workflows generate System Job rows to track their status. You can access information about these system jobs in several places within the application:

- Settings > **System Jobs**

  This will include all types of system jobs. You will need to filter rows to those where **System Job Type** is **Workflow**.

- **From the background workflow process**

  Open the background workflow definition and go to the **Process Session** tab. This will show only the system jobs for this background workflow.

- **From the row**

  You can edit the table form so that the navigation will include the **Background Processes** relationship. This will show all the system jobs that have been started in the context of the row.

> **NOTE**
> If an asynchronous system job (workflow) fails several times consecutively, the system starts to postpone execution of that job for longer and longer time intervals so that the administrator or app maker can investigate and resolve the issue. Once the job starts succeeding again, it will resume executing normally.

Actions on running background workflows

While a background workflow is running, you have options to **Cancel**, **Pause**, or **Postpone** the workflow. If you have previously paused a workflow, you can **Resume** it.

Status of background workflow processes

When you view a list of background workflow processes, any individual process can have one of the following **State** and **Status Reason** values:

STATE	STATUS REASON
Ready	Waiting for Resources
Suspended	Waiting

STATE	STATUS REASON
Locked	In Progress Pausing Canceling
Completed	Succeeded Failed Canceled

Deleting process log rows

If your organization uses background workflows or business process flows that run frequently, the amount of process log rows can become large enough to cause performance issues as well as consume significant amounts of storage. To delete process log rows not removed sufficiently by one of the standard bulk row deletion jobs, you can use the bulk delete system jobs feature to create a custom bulk row deletion job.

1. Go to **Settings** > **Data Management** > **Bulk Row Deletion**.
2. From the **Bulk Row Deletion** area, select **New**.
3. On the **Bulk Deletion Wizard** start page, select **Next**.
4. In the **Look for** list, select **System Jobs**.
5. The following conditions are used to create a bulk row deletion job to delete process log rows:
   - **System Job Type Equals Workflow.** This targets background workflow rows.
   - **Status Equals Completed.** Only completed workflows are valid to run the job against.
   - **Status Reason Equals Succeeded.** Delete successful, canceled, and failed jobs.
   - **Completed On Older than X Days 30.** Use the Completed On column to only delete background workflow process log rows that are older than 30 days.

6. Select **Next**.

7. Set the frequency that your bulk delete job will run. You can schedule your job to run at set intervals or create a one-time bulk deletion job Using the Immediately option. In this example, a recurring job is set to run on May 21, 2018, and every 30 days thereafter.

Using the Immediately option

Notice that you have the option of performing an immediate synchronous bulk delete of the rows by selecting the **Immediately** option. This delete is performed with direct SQL Server execution rather than passing each

row through the delete event pipeline, which can reduce the impact to system performance. This is a good option if you want to quickly clean up the extra background workflow rows instead of the bulk delete job waiting in the asynchronous queue for processing.

The **Immediately** option is enabled when the following conditions are true:

- Bulk delete job is for the System Jobs table.
- The search criteria has the condition System Job Type Equals Workflow.
- The user creating the bulk delete job has global depth for the delete privilege on the AsyncOperation table. The System Administrator security role has this privilege.

The synchronous bulk delete will only delete AsyncOperation rows in the completed state. A maximum of 1 million rows are processed for each invocation. You will need to execute the job multiple times if your environment has more than 1 million rows to remove.

Next step

Best practices for background workflow processes

Best practices for background workflow processes

1/15/2022 • 2 minutes to read • Edit Online

This topic contains best practices for creating and managing background workflow processes.

Avoid infinite loops

It's possible to create logic in a background workflow that initiates an infinite loop, which consumes server resources and affects performance. The typical situation where an infinite loop might occur is if you have a background workflow configured to start when an column is updated and then updates that column in the logic of the workflow. The update action triggers the same background workflow that updates the row and triggers the background workflow again and again.

The workflows you create include logic to detect and stop infinite loops. If a background workflow process is run more than a certain number of times on a specific row in a short period of time, the process fails with the following error: **This workflow job was canceled because the workflow that started it included an infinite loop. Correct the workflow logic and try again.** The limit of times is 16.

Use background workflow templates

If you have workflows that are similar and you anticipate creating more workflows that follow the same pattern, save your background workflow as a workflow template. This way, the next time you need to create a similar workflow, use the template to create the background workflow and avoid entering all the conditions and actions from scratch.

In the **Create Process** dialog box, choose **New process from an existing template (select from list)**.

Use child workflows

If you apply the same logic in different workflows or in conditional branches, define that logic as a child workflow so you don't have to replicate that logic manually in each background workflow or conditional branch. This helps make your workflows easier to maintain. Instead of examining many workflows that might apply the same logic, you can just update one workflow.

Automatically delete completed background workflow jobs

For background (asynchronous) workflows, we recommend selecting the **Automatically delete completed workflow jobs (to save disk space)** option in the background workflow definition. Selecting this check box allows the system to delete background workflow logs for successful executions to save space. Notice that logs from failed background workflow executions will always be saved for troubleshooting.

Limit the number of workflows that update the same table

Running more than one background workflow that updates the same table can cause resource lock issues. Imagine several workflows running where every opportunity update triggers an update to the associated account. Multiple instances of these workflows running and attempting to update the same account row at the same time can result in resource locking issues. Background workflow failures occur and an error message, such as **SQL Timeout: Cannot obtain lock on resource *resource name***, is recorded.

Use Notes to keep track of changes

When you edit workflows you should use the Notes tab and type what you did and why. This allows others to understand the changes you made.

Next steps

Configure background workflow processes
Monitor and manage background workflow processes

Replace classic Microsoft Dataverse workflows with flows

1/15/2022 • 7 minutes to read • Edit Online

This topic compares Power Automate capabilities with classic workflow.

Power Automate has significant advantages over the classic background workflow model; you should consider using Power Automate to automate your processes instead of classic workflow.

Create flows instead of classic Microsoft Dataverse workflows to build new automation processes. Additionally, you should review your existing classic background workflow processes and consider replacing them with flows.

Feature capability comparison

This table summarizes a comparison between Power Automate and classic workflows capabilities.

We are continuously adding new capabilities to Power Automate. We'll update information in this table as Power Automate gains capabilities; check back often! For information about upcoming capabilities that will help you replace classic background workflows with flows, see What's new and planned for Power Automate.

CAPABILITY		POWER AUTOMATE	CLASSIC WORKFLOW
Modeling	Conditional branching	Yes	Yes
	Looping	Yes	No
	Wait conditions on columns	No	Yes
	Parallel branch	Yes	No
	Out-of-the-box connectors to external systems (trigger and perform actions in external services)	Yes	No
Composition	Dynamic content	Yes	Yes
	Access to pre-image of event data	No	Yes
	Run child workflows	Yes	Yes
	Run Microsoft Dataverse actions (including custom)	Yes	Yes
	Run custom background workflow activities	No	Yes
	Group steps to run in a transaction	Yes (changesets)	No

	Approval workflows	Yes	No
Execution	Trigger on column changes	Yes	Yes
	Trigger conditionally on column values (For example, on a certain date in a date column)	No	No
	Trigger on multiple Dataverse table events	Yes	Yes
	Run on-demand	Yes	Yes
	Run-as scopes (for example, organization, business unit, user)	Yes	Yes
	Run on a schedule	Yes	No
	Run synchronously (real-time)	No	Yes
History	Auditing	Yes	Yes
	Run analytics	Yes	No
Authoring and portability	Solution support	Yes	Yes
	Modern designer	Yes	No
	AI-assisted authoring	Yes	No

Example scenario: Replace a background workflow with a cloud flow

Imagine a sales scenario where you have put together a quotation for a customer and now you need to request approval from your management team before you send the quotation to the customer. With classic workflows, this isn't easy and most solutions to this require a developer to write custom background workflow activities to retrieve quote line items.

With flows, this scenario is easier to build, as demonstrated in the walkthrough later that covers some of the Power Automate capabilities. These capabilities include:

- Creating a cloud flow that runs on demand.
- Getting a list of rows that are related to a Dataverse table.
- Looping over a list of rows.
- Sending approval requests.

To allow the sales person to trigger the approval request on demand:

1. Sign in to Power Automate and create a cloud flow in a solution.
2. From the list of triggers, select **Microsoft Dataverse – When a row is selected**, and then select **Quotes** as the table.

This trigger allows a cloud flow to run on-demand on a row or set of rows.

3. With the trigger configured, add actions to run in the flow. This provides the approver with the summary detail that they need to identify the quoted items and values. Begin by adding the **Microsoft Dataverse – List rows** action. The goal is to get the individual items from a Quote, so set the **Table name** to **Quote lines**. To ensure the list contains only those quote line items that belong to the Quote for which the flow was triggered, we'll specify an OData style filter criterion. In the **Filter Query** box, type *_quoteid_value eq* and then select **Quote** from the list of dynamic values that appear.

4. Because we want to summarize quote line items for the approval, add the **Initialize variable** action. Set **Name** to **Quote line summary**, and **Type** to **String** (from the drop-down list), and leave **Value** empty.

5. Add the **Append to string variable** action and then select the **Quote line summary** variable we created earlier. In the **Value** box, select **Quantity**, **Name**, **Price Per Unit**, **Extended amount**, and **Manual discount** from the list of dynamic values. The Power Automate designer identifies that these values are from a list of quote line items, and adds this action in an **Apply to each** loop to ensure information from each line item is added to this summary.

6. To request approval on the quote summary we've created, add the **Approval – Start and wait for an approval** action. Select an **Approval type** (for example, **Approve/Reject – First to respond**), give the approval request a **Title** (for example, the name of the quote for which approval is being requested, picked from the list of dynamic values), and enter the email address for the person who needs to review and approve the quote in the **Assigned to** box. In the **Details** box, add the **Quote line summary** variable, along with any other information that might be relevant using the dynamic value picker (for example, **Total Amount**).

7. To determine what happens once an approval is accepted or rejected, add the **Condition** action. Select **Outcome** from the list of dynamic values from the first field in the condition, **contains** from the drop-down list in the second field, and enter **Approve** in the third field of the condition. Finally, add actions

based on the outcome of the approval (for example, send a notification email).

We now have the approval structure created so the approver has all of the information needed to make a decision on next steps. Here's the full example:

When you run this flow against your quote, it summarizes quote line items for that quote and sends an approval request that the approver can respond to from Power Automate, or the actionable email they receive. Here's an example of the display:

Recommended patterns

- **Workflows with complex else-if conditional logic**

  Instead of using conditions, we recommend using the switch action.

- **Workflows that run from plug-in/code**

  We recommend redesigning the flow to start with triggers:

  - Use Microsoft Dataverse triggers to run flows based on events in it.
  - To run flows based on events in an external service, leverage more than 260 out-of-the-box connectors.
  - For scenarios where a connector you need isn't available out-of-the-box, easily create your own custom connector. More information: Create a custom connector from scratch
  - Finally, if there are scenarios where you cannot trigger your flow using Microsoft Dataverse (legacy) connector, one of the out-of-the-box connectors, or by creating a custom connector, leverage the When an HTTP request is received trigger to invoke the flow.

- **Workflows that run recursively**

  Use the do-until or apply to each loop in flows instead.

- **Workflows that need a list of rows**

Use the **list rows** action. When using this action, define the row filtering criteria using OData syntax to optimize the action by minimizing the number of rows you want to retrieve.

- **Workflows that sleep to run on a schedule**

  Use the **recurrence** trigger to run business logic at periodic intervals.

- **Workflows for which runs were managed to ensure activities were executed in a single transaction**

  Use the changeset action to ensure that all actions within it are performed as a single, atomic unit in which either all succeed, or fail as a group. If any one of the actions in a change set fails, changes made by completed operations are rolled back.

- **Monitor background workflow runs for failures**

  In Power Automate, use the **run-after setting** on an action to configure it to run when the previous action fails. For example, send a Power Automate mobile notification when the **update a row** action fails, or times out.

FAQs

- **I have a Dynamics 365 license. Can I use Power Automate?**

  Every Dynamics 365 user is entitled to use Power Automate. Review our licensing information.

- **How often can my flows be triggered?**

  Dynamics 365 (or Microsoft Dataverse) flows run near real-time after the trigger because they use webhooks (no polling required).

  - As with direct API access, there are throttles/limits in the system. More information: Limits and configuration in Power Automate
  - Specifically, there is a limit of 100,000 actions per 5 minutes, per flow. A single loop in a cloud flow cannot process more than 100,000 items at once.
  - Maximum of 6 GB of throughput per 5 minutes.

- **How long can a single flow run?**

  A single flow run times out after 30 days.

- **How do I move my flows between environments?**

  Just like classic workflows, you can create flows in solutions to support the full application lifecycle for processes.

- **Are Power Automate dependencies tracked in Microsoft Dataverse?**

  Similar to other components in a solution, all dependencies for flows in solutions are tracked in Microsoft Dataverse.

- **What about synchronous workflows?**

  We've seen feedback that synchronous workflows are a significant contributor to end-user performance issues. We recommend that you evaluate whether your objective, or parts of the background workflow, can be built using a cloud flow. If you can split actions out as asynchronous, the user can continue their activity while Power Automate completes the action.

- **Using Power Automate, will my data stay within region (that is, the same region as my Dynamics 365 or Microsoft Dataverse environment)?**

Yes, Power Automate always uses the same region as Microsoft Dataverse.

- **Do I need to make proxy/firewall changes?**

  Refer to the IP address configuration reference to determine whether you need to make any proxy/firewall changes.

Create a mobile task flow

1/15/2022 • 2 minutes to read • Edit Online

Design a cloud flow in Dynamics 365 for phones or Dynamics 365 for tablets based on common tasks your users perform. For example, if they need to regularly perform a series of follow-up steps after client meetings, create a task flow. When users tap the new task in their mobile app, it will lead them through from start to finish so they don't forget an important step.

Task flows can use multi-table forms and logic, and can have form logic that runs across the task flow pages.

Create a task flow

1. Make sure that you have the System Administrator, or System Customizer security role or equivalent permissions. The Manager, Vice President, or CEO-Business Manager, security roles can also create mobile task flows.
2. Open solution explorer and select **Processes**.
3. On the **Actions** toolbar, select **New**.
4. In the **Create Process** dialog box, complete the required fields:
   - Enter a process name.
   - In the **Category** list, select **Business Process Flow**.
   - In the **Table** list, select the table you want.
5. Select the **Run process as a task flow (Mobile online)** option.
6. Select **OK**.

   The task flow designer opens in a new window.

7. If your users will progress from one page to another in order, drag the **Page** component from the **Components** tab on the right side of the screen and drop it on the + sign in the appropriate spot. To add a name for a page, select the page, select the **Properties** tab, type a new name, and then select **Apply**.
8. To add a branch to the task flow, drag the **Condition** component from the **Components** tab and drop it on the + sign in the appropriate spot. To set properties for the condition, select the condition, set the properties in the **Properties** tab, and then select **Apply**.

> **NOTE**
> As you add pages and conditions to the task flow, you'll see a minimap in the lower-left corner of the window that shows all the pages and conditions in the task flow.

9. To add a field, label, or section label to a page, drag **Field**, **Label**, or **Section Label** from the **Components** tab to the appropriate page. To change the properties for one of these items, select the item, set the properties in the **Properties** tab, and then select **Apply**.
10. To validate the task flow, select **Validate** on the action bar.
11. To save the process as a draft, select **Save** at the top of the screen. (As long as a process is a draft, people won't be able to use it.)
12. To activate the task flow so that people can use it, select **Activate**.

> **TIP**
> Here are a few tips to keep in mind as you work on your task flow in the designer window:
>
> - To take a snapshot of everything in the task flow window, select **Snapshot** on the action bar.
> - To connect a valid component to another valid component in the designer, select **Connector** on the action bar.
> - You can make the images on the screen larger or smaller by selecting the **Increase the zoom level** or **Decrease the zoom level** buttons in the upper-right corner of the screen. Select the **Fit to canvas** button to blow the images up to the largest size that fits on the screen.

Next steps

Create a business process flow

Use Dataverse dialogs for guided processes (Deprecated)

1/15/2022 • 2 minutes to read • Edit Online

Dialogs are deprecated. You should replace dialogs with business process flows or canvas apps. More information: Replace dialogs with business process flows or canvas apps

Dialogs are the synchronous or interactive processes in Dataverse that collect and process information by using step-by-step scripts to direct users through a process. For example, you can create dialogs to act as a guide for your service representatives for case resolution and case escalation. Similarly, you can create dialogs for standardizing sales processes such as opportunity qualification and lead scoring.

Differences between workflows and dialogs

The following table provides information about the differences between Dataverse workflows and dialogs.

WORKFLOWS	DIALOGS
Can be either started by a user or can be automated.	Must be started by a user.
Are asynchronous or real-time processes, and do not require user input to run to completion. Asynchronous processes run in the background while real-time processes run immediately.	Are real-time processes that require user input to run to completion. When you run these processes, a wizard-like interface is presented to you so you can make appropriate selections to run the processes.
The table that stores the details about a running asynchronous workflow is `AsyncOperation` while a `Process` is used for a real-time workflow.	The table that stores information generated by a running dialog is the `ProcessSession` table.
Triggers are supported for workflows. For a list of supported triggers, see Supported Types, Triggers, and Tables for Processes.	Triggers are not supported for dialogs.

See also

Replace dialogs with business process flows or canvas apps

Replace dialogs with business process flows or canvas apps

1/15/2022 • 7 minutes to read • Edit Online

Dialogs are deprecated, and should be replaced by business process flows or canvas apps. This topic describes different capabilities of these options as well as situations where a business process flow or canvas app embedded in a model-driven form can be used to replace an existing dialog.

Feature capability comparison

This table lists the set of dialog capabilities and the equivalent capabilities in business process flows and canvas apps.

DIALOG CAPABILITY	CAPABILITY IN BUSINESS PROCESS FLOWS?	CAPABILITY IN CANVAS APPS?
Page	Yes (business process stage)	Yes (app screen)
Prompt only	No	Yes (labels)
Prompt and response	Yes (table columns only)	Yes (labels and input fields)
Input arguments	Limited (steps in business process stage)	Yes (query string parameters)
Variables	No	Yes
Query variables	No	Yes
Conditional branching logic	Yes	Yes (navigate to any screen within app)
Reuse (launch as a child dialog)	No	Yes (navigate to any screen within app, launch a different app in a new window)
Run workflows on start/end	Yes	No (use a cloud flow instead)
Run workflows on input	Yes	No (use a cloud flow instead)
Run workflows on page transition	Yes	No (use a cloud flow instead)
Start using a URL	No	Yes

DIALOG CAPABILITY	CAPABILITY IN BUSINESS PROCESS FLOWS?	CAPABILITY IN CANVAS APPS?
Session logging	Yes	No
SDK support	Yes	Yes

Additional capabilities with business process flows

- Process analytics (views, charts, and time spent in a stage)
- Custom controls

Additional capabilities with canvas apps

- App analytics (app usage & performance)
- Multi-table page composition
- Run flows
- Data connectors (standard and custom)
- Launch as a stand-alone app
- Configurable layout

Choosing between a business process flow or canvas app

When you choose your dialog replacement, it is important to account for the user experience you want to deliver. Also keep in mind, almost any dialog can be modeled using a canvas app.

Business process flows are best suited to replace dialogs that model processes providing guidance across an overarching workstream that requires collaboration across groups of individuals and Dynamics 365 app context. For example, quote review and routing.

Alternatively, canvas apps can be used to replace dialogs that model prescriptive tasks such as a call script for lead prospecting or to simplify the user experience for other tasks, such as updating an opportunity. Notice that these scenarios may even benefit from having a stand-alone canvas app.

Dialog replacement using business process flow scenario

Imagine you have a dialog that, over a series of pages, requests key pieces of information from the user, generates a quote, sends an email to reviewers to accept or reject the quote, before emailing it to the customer. This type of process is modeled more effectively using a business process flow.

To replace the dialog, you begin by identifying the key stages in the process. These might include a *Prepare Content* stage to ensure all the products are listed and discounts are applied, a *Generate Quote* stage to create the quote and review it for accuracy of format, a *Primary Review* stage to send the quote for review and approval, a *Secondary Review* stage to review the quote under certain circumstances and finally, a *Deliver Quote* stage to send the quote to the customer.

Next, identify the key steps that users must follow in the process. For instance, the *Prepare Content* stage might contain a simple true or false step for the user to double check the products to be quoted, a mandatory lookup step to select a price list, and a numeric step to enter a discount before moving on to the next stage. The *Generate Quote* stage might have an action step to create a quote based on all the information previously captured in the *Prepare Content* stage and its related Dynamics 365 row. The *Primary Review* and *Secondary Review* stages might have several true or false steps to guide quote review, along with a required step to capture the approval status, and ensure the process can only be moved to the next stage once approval is received. Configure column level security on this step to make sure that only authorized reviewers can provide approval on the quote. Additionally, one can add a workflow to the *Primary Review* and *Secondary Review* stages, such that on enter, an email notification is sent to all reviewers.

Finally, configure your business process flow stages and steps, along with the conditional logic to guide the process flow. For this example, you might add a conditional branch following the *Primary Review* stage, such that, if a step indicates the need for a second level of review, the next stage in the process is the *Secondary Review* stage, else, it's the *Deliver Quote* stage.

To make this business process flow available to users, ensure the right users have privileges to the business process flow and then activate it.

For more information about how to create a business process flow, see Tutorial: Create a business process flow to standardize processes.

Dialog replacement using canvas app scenario

Suppose you have a dialog, which follows a call script that guides sales reps through cold calling leads. This process can easily be captured using a canvas app.

Begin with connecting to the data sources you'll need to read and write data. In this example, a connection to Dynamics 365 is used for lead, account, and contact information.

Begin by identifying the number of screens needed. For this example, you may decide to have five screens.

- Screen 1. To select a lead from a list to call.
- Screen 2. For introductions, checking availability for a conversation, and scheduling a call-back at a later date.
- Screen 3. For determining BANT (budget, authority, need, and timeline).
- Screen 4. To capture next steps and schedule follow-up calls.
- Screen 5. Thank the lead for their time at the end of the call.

Next, build each screen. In the first screen, build a gallery of leads that need to be called. In the second, use labels to title the screen and provide the call script, while using controls like radio buttons to capture whether it is a good time for the person to talk. If it is, use conditional logic to enable a button to navigate to the next screen and if not, reveal a script on the same screen to attempt to schedule a call back with the customer. Similarly, define your call script across subsequent screens.

Finally, define navigation across screens. In this example, in addition to navigating through the screens sequentially, you might want to navigate the user from the second screen to the last screen (the end of the script thanking the lead for their time) if the lead is not interested in having a conversation.

To make this app available to users, publish the app. Consider how such a scenario might be transformed through the availability of a standalone app that provides call scripts and supports quick data entry.

Imagine you want to embed this experience in Dynamics 365 Sales. To do this, begin with creating an iframe on a Dynamics 365 Sales form. Next, navigate to the **Apps** section from the Power Apps menu, select the app you just published, copy the web link under the **Details** tab and paste it as the URL for the iframe.

Taking this a step further, suppose you'd like for this app to be available right within the lead main form, and be in the context of the lead so that the app doesn't require the user to select a lead in the first screen. To pass relevant information to the app, you simply modify the iframe URL to append a query string containing this information, such as lead or account Ids, using JavaScript that runs on a certain event, such as on form load. Next, update the app to remove the first screen (for lead selection) and instead access the values passed to the app via the query string using the Param function.

Dialog replacement FAQ

Are dependencies on canvas apps be tracked?

- Dependencies on canvas apps are tracked in the same way as dependencies in Dynamics 365 apps.

Can I launch a canvas app as a popup from a button in the command bar?

- Yes. To do this, simply set the target URL to that of your canvas app, obtained from the app's **Details** section as described earlier.

Can workflows be called from a canvas app?

- This is not supported. We recommend using a cloud flow instead. More information: Introducing button flows with user input

Can I automatically convert dialogs to business process flows or canvas apps?

- There is no automated way to convert dialogs to business process flows or canvas apps.

See also

Tutorial: Create a business process flow to standardize processes
What are canvas apps in Power Apps?

Power Automate for enterprise developers, ISVs, and partners

1/15/2022 • 4 minutes to read • Edit Online

> **NOTE**
>
> Microsoft Flow is now Power Automate. For more information, see this blog.
>
> This content will be updated to reflect the branding change in the coming days.

As a developer, you can extend Power Automate, enabling even more powerful solutions for organizations and customers.

Power Automate for enterprise developers

As an enterprise developer, empower your organization to build robust tailored solutions on Power Automate:

- **Build custom connectors**: Develop custom connectors to connect to your organization's data and web services through Power Automate. Learn more
- **Build Azure Functions**: Craft Azure Functions to extend apps with custom server-side logic. Learn more
- **Embed Power Automate**: Embed Power Automate directly into your website experiences to create integrated solutions, surfacing workflows or processes where people in your organization already do their work. Learn more

Power Automate for ISVs and Microsoft partners

As a Microsoft partner or Independent Software Vendor (ISV), accelerate customer adoption by extending your products to integrate with your customers' data and business processes, and add and customize workflows to automate business processes as part of your application. After you have completed the below seven steps, your application will have the ability to leverage a robust cloud-scale workflow engine that can connect to 200+ different services.

PHASE	STEP	WHEN NEEDED?
Development	1. Build a custom connector to your data	If you want to expose your own ISV data to Power Apps or Power Automate
Development	2. Add support for your application to authenticate users with Azure Active Directory (Azure AD)	If you want to embed the Power Automate UI or list in Microsoft AppSource
Development	3. Embed the Power Automate UI into your application using our web-based iframe	If you want to include flow creation or management in your application
Development	4. Create and publish flow templates	If you want to pre-build flows for your customers

PHASE	STEP	WHEN NEEDED?
Development	5. Add application logic to programmatically deploy flows	If you want to automatically deploy your pre-built flows for your customers
Distribution	6. Grant your customers licenses to Microsoft Flow through the Microsoft Cloud Solution Provider program	If your customers don't have Office 365 or Dynamics 365 licenses
Distribution	7. List your solution on Microsoft AppSource	Recommended to increase the visibility of your ISV solution

1. Connecting to your APIs OR Enabling customers to connect to your APIs

As an ISV, you often have proprietary data that you would like customers to access through your flows. You can expose access to any of your data through a custom connector. Learn more

Once created, there are two ways to make the connector available to your customers:

- The connector can be deployed into the customer's tenant via REST APIs or PowerShell.
- To make the custom connector publicly available for all users, you can submit your connector for certification. Learn more

2. Authentication

To call REST APIs and embed authenticated UI, your application needs to use Azure AD federated single sign-on to authenticate end users and customers. Go here for information on how to enable AAD federated SSO. We do not have support for unauthenticated access, or access with identity providers other than Azure AD.

3. Embedding UI components

Embed Power Automate within your app to enable deep, in-context integration between your app and all the other services that Power Automate supports. Learn more

4. Create and publish flow templates

Once you have a connector, you should publish templates that demonstrate how to use your service. These templates will serve as examples that users can use to learn and then extend to their own unique workflows. Learn more

5. Deployment

To give end users access to flows that they can use automatically, deploy the flows into the Azure AD tenant of the user. Use a deployment package that you deploy using our REST APIs or PowerShell. Learn more

6. Licensing

If your customers already have either Office 365 or Dynamics 365, and these licenses are associated with the identities that users log in with Azure AD, there are no additional licensing requirements for them to use standard connectors. Your users will need one of the Power Automate licenses to use premium and custom connectors. If your customers do not use Office 365 or Dynamics 365, then you must acquire use rights on their behalf for Power Automate, so that they are licensed to leverage those embedded components in your application.

We offer the Microsoft Cloud Solution Provider program to acquire licenses on behalf of your customers. There are two different pricing plans available for Power Automate, which you should check for plan and feature details.

7. List on AppSource

Once you have integrated Power Automate into your application, you can list it on AppSource. With AppSource

you can generate new leads for your business by building an app and publishing it to AppSource for new customers to test-drive. Learn more

Custom connectors in Power Automate

1/15/2022 • 2 minutes to read • Edit Online

> **NOTE**
>
> Microsoft Flow is now Power Automate. For more information, see this blog.
>
> This content will be updated to reflect the branding change in the coming days.

Without writing any code, you can build workflows and apps with Azure Logic Apps, Power Automate, and Power Apps. To help you integrate your data and business processes, these services offer 180+ connectors - for Microsoft services and products, as well as other services, like GitHub, Salesforce, Twitter, and more.

Sometimes though, you might want to call APIs, services, and systems that aren't available as prebuilt connectors. To support more tailored scenarios, you can build *custom connectors* with their own triggers and actions. We have a complete set of basic and advanced tutorials for custom connectors on the Connectors documentation site. We recommend that you start with the custom connector overview, but you can also go straight to the following topics for details on a specific area:

- Create a custom connector from an OpenAPI definition
- Create a custom connector from a Postman collection
- Create a custom connector from scratch
- Use a custom connector from a cloud flow
- Share custom connectors in your organization
- Submit your connectors for Microsoft certification
- Custom connector FAQ

Integrate Power Automate with websites and apps

1/15/2022 • 14 minutes to read • Edit Online

> **NOTE**
>
> Microsoft Flow is now Power Automate. For more information, see this blog.
>
> This content will be updated to reflect the branding change in the coming days.

Embed Power Automate into your app or website using *flow widgets* to give your users a simple way to automate their personal or professional tasks.

Flow widgets are iframes located in a host document. This document points to a page in the Power Automate designer. These widgets integrate specific Power Automate functionality into the third-party application.

Widgets can be simple. For example, a widget that renders a list of templates with no communication between the host and iframe. Widgets can also be complex. For example, a widget that provisions a cloud flow from a template and then triggers the flow via two-way communication between the host and the widget.

Prerequisites

- A **Microsoft Account** or
- A work or school account

Use the unauthenticated widget

To use the unauthenticated templates widget, embed it directly into the host application using an iframe. You don't need the JS SDK or an access token.

Show templates for your scenarios

To start, add this code to show the Power Automate templates on your website:

```
<iframe src="https://flow.microsoft.com/{locale}/widgets/templates/?q={search term}
&pagesize={number of templates}&destination={destination}&category={category}"></iframe>
```

PARAMETER	DESCRIPTION
locale	The four-letter language and region code for the template view. For example, `en-us` represents US English, and `de-de` represents German.
search term	The search term for the templates that you want to show in the view. For example, search `SharePoint` to show templates for SharePoint.
number of templates	The number of templates that you want to show in the view.
destination	The page that opens when users select the template. Enter `details` to show the details about the template, or enter `new` to open the Power Automate designer.
category	Filters to the given template category.
parameters.{name}	Additional context to pass into the flow.

If the destination parameter is `new`, the Power Automate designer opens when users select a template. Users can then create a cloud flow in the designer. See the next section if you want to have the full experience from the widget.

Passing additional parameters to the flow template

If the user is in a specific context in your website or app, you might want to pass that context to the flow. For example, a user might open a template for *When an item is created* while looking at a certain list in SharePoint. Follow these steps to pass in the list ID as a *parameter* to the flow:

1. Define the parameter in the flow template before you publish it. A parameter looks like `@{parameters('parameter_name')}`.
2. Pass the parameter in the query string of the iframe src. For example, add

`&parameters.listName={the name of the list}` if you have a parameter called **listName**.

Full sample

To show the top four SharePoint templates in German and to start the user with **myCoolList**, use this code:

```
<iframe src="https://flow.microsoft.com/de-de/widgets/templates/?
q=sharepoint%20&pagesize=4&destination=details&parameters.listName=myCoolList"></iframe>
```

Use the authenticated flow widgets

The following table shows the list of Power Automate widgets that support the full experience within the widget using user authentication access token. You will need to use Power Automate's JavaScript Software Developer Kit (JS SDK) to embed the widgets and provide the required user access token.

WIDGET TYPE	SUPPORTED FEATURE
flows	Shows a list of flows in a tab for personal and shared flows. Edit an existing flow or create a new flow from a template or blank.
flowCreation	Creates a cloud flow from a template Id that the host application provides.
runtime	Triggers a manual or hybrid-trigger flow that the host application provides.
approvalCenter	Embeds approval requests and sent approvals.
templates	Shows a list of templates. The user chooses one to create a new flow.

Use the authenticated Flow SDK to allow users to create and manage flows directly from your website or app (instead of navigating to Power Automate). You'll need to sign the user in with their Microsoft Account or Azure Active Directory to use the authenticated SDK.

> **NOTE**
> There is no way to hide the Power Automate branding when you use widgets.

Widget architecture

Power Automate widgets work by embedding an iframe that references Power Automate into a host application. The host provides the access token that's required by the Power Automate widget. Power Automate's JS SDK enables the host application to initialize and manage the widget life cycle.

JS SDK details

The Power Automate team provides the JS SDK to facilitate integrating Flow widgets in third-party applications. The Flow JS SDK is available as a public link in the Flow service and lets the host application handle events from the widget and interact with the Flow application by sending actions to the widget. Widget events and actions are specific to the widget type.

Widget initialization

The Flow JS SDK reference needs to be added to the host application before initializing the widget.

```
<script src="https://flow.microsoft.com/Content/msflowsdk-1.1.js"></script>
```

Create a JS SDK instance by passing optional hostName and locale values in a JSON object.

```
var sdk = new MsFlowSdk({
    hostName:'https://flow.microsoft.com',
    locale:'en-US'
});
```

NAME	REQUIRED/OPTIONAL	DESCRIPTION
`hostName`	Optional	Power Automate host name, for example, https://flow.microsoft.com
`locale`	Optional	Client locale for the widget (defaults to `en-Us` if not specified)

Once the JS SDK instance is created you can initialize and embed a Power Automate widget in a parent element in the host application. To do so, add an HTML div:

```
<div id="flowDiv" class="flowContainer"></div>
```

Then, initialize the Power Automate widget with the JS SDK `renderWidget()` method. Be sure to provide the widget type and corresponding settings.

```
var widget = sdk.renderWidget('<widgettype>', {
        container: 'flowDiv',
        flowsSettings: {},
        templatesSettings: {},
        approvalCenterSettings: {},
        widgetStyleSettings: {}
});
```

Here's a sample style for the container that you can modify to match with the host application's dimensions.

```
<head>
    <style>
        .flowContainer iframe {
            width: 400px;
            height: 1000px;
            border: none;
            overflow: hidden;
    }
    </style>
</head>
```

These are the parameters for `renderWidget()`:

PARAMETER	REQUIRED/OPTIONAL	DESCRIPTION
`container`	Required	Id of a DIV element on the host page where the widget will be embedded.
`environmentId`	Optional	Widgets need an environment Id. If you don't provide an Id, a default environment is used.
`flowsSettings`	Optional	Power Automate settings object
`templateSettings`	Optional	Template settings object
`approvalCenterSettings`	Optional	Approval settings object

Access tokens

After the JS SDK `renderWidget()` runs, the JS SDK initializes an iframe which points to the Power Automate widget URL. This URL contains all the settings in the query string parameters. The host application needs to get a Power Automate access token for the user (Azure Active Directory JWT token with audience https://service.flow.microsoft.com) before it initializes the widget. The widget raises a `GET_ACCESS_TOKEN` event to request an access token from the host. The host needs to handle the event and pass the token to the widget:

```
widget.listen("GET_ACCESS_TOKEN", function(requestParam, widgetDoneCallback) {
    widgetDoneCallback(null, {
        token:  '<accesstokenFromHost>'
    });
});
```

The host application is responsible for maintaining the token and passing it with a valid expiry date to the widget when requested. If the widget is open for longer periods, the host should check if the token is expired and refresh the token if it's needed before passing it to the widget.

Detecting if the widget is ready

After successful initialization, the widget raises an event to notify that the widget is ready. The host can listen to the `WIDGET_READY` event and execute any additional host code.

```
widget.listen("WIDGET_READY", function() {
    console.log("The flow widget is now ready.");
    // other host code on widget ready
});
```

Widget settings

FlowsSettings

FlowsSettings can be used to customize the functionality of the Power Automate widget.

```
flowsSettings?: {
    createFromBlankTemplateId?: string;
    flowsFilter?: string;sc
    tab?: string;
};
```

PARAMETER	REQUIRED/OPTIONAL	DESCRIPTION
`createFromBlankTemplateId`	Required	Use the template's GUID when the user selects the **Create from blank** button on the Flow widget
`flowsFilter`	Optional	The Power Automate widget applies the provided filter when listing flows. For example, show flows that reference a specific SharePoint site. `flowsFilter: "operations/any(operation: operation/sharepoint.site eq 'https://microsoft.sharepoint.com/teams/ProcessSimple' )"`
`tab`	Optional	Defaults the active tab to show in the Power Automate widget. For example, `tab:'sharedFlows'` displays the Team tab and `tab:'myFlows'` Displays the My flows tab.

TemplatesSettings

This applies to all widgets that enable you to create flows from a template, including Flows, FlowCreation, and Templates widgets.

```
templatesSettings?: {
    defaultParams?: any;
    destination?: string;
    pageSize?: number;
    searchTerm?: string;
    templateCategory?: string;
    useServerSideProvisioning?: boolean;
    enableDietDesigner?: boolean;
};
```

PARAMETER	REQUIRED/OPTIONAL	DESCRIPTION

PARAMETER	REQUIRED/OPTIONAL	DESCRIPTION
`defaultParams`	Optional	Design time parameters to use when creating a cloud flow from a template, for example: `defaultParams: {'parameters.sharepoint.site': 'https://microsoft.sharepoint.com/teams/ProcessSimple', 'parameters.sharepoint.list': 'b3a5baa8-fe94-44ca-a6f0-270d9f821668' }`
`destination`	Optional	Valid values are 'new' or 'details'. When set to 'details', a detail page is shown when creating a cloud flow from a template.
`pageSize`	Optional	Number of templates to display. Default size = 6
`searchTerm`	Optional	Display templates that match the provided search term
`templateCategory`	Optional	Display templates in a specific category

ApprovalCenterSettings

Applies to ApprovalCenter widgets.

```
approvalCenterSettings?: {
   approvalsFilter?: string;
   tab?: string;but
   autoNavigateToDetails?: boolean;
   showSimpleEmptyPage? boolean;
   hideLink?: boolean
};
```

PARAMETER	REQUIRED/OPTIONAL	DESCRIPTION
`hideLink`	Optional	When set to `true`, the widget hides the received and the sent approval links
`autoNavigateToDetails`	Optional	When set to `true`, the widget automatically opens the approval details when only one approval exists
`approvalsFilter`	Optional	The approval widget will apply the specified approval filter when listing the approvals, for example: The approval widget will apply the specified approval filter when listing the approvals, for example: `approvalsFilter: 'properties/itemlink eq \'https://microsoft.sharepoint.com/teams/ProcessSimple/_layout PageType=4&ListId=737e30a6-5bc4-4e9c-bcdc-d34c5c57d938&ID=3&ContentTypeID=0x010010B708969A9C16408696FD23` `approvalsFilter: 'properties/itemlinkencoded eq \'{Your base64 encoded item link url} \''`
`tab`	Optional	Default active tab to show in the Flow widget. Valid values : 'receivedApprovals', 'sentApprovals'
`showSimpleEmptyPage`	Optional	Shows an empty page when there are no approvals
`hideInfoPaneCloseButton`	Optional	Hides the info-pane Close button (or the host already has a Close button)

Widget events

The Power Automate widget supports events that let the host listen to widget life-cycle events. The Power Automate widget supports two types of events: one-way notification events (for example, Widget_Ready) and events raised from the widget to fetch data from the host (Get_Access_Token). The host needs to use the widget.listen() method to listen to specific events raised from the widget.

Usage

```
widget.listen("<WIDGET_EVENT>", function() {
    console.log("The flow widget raised event");
});
```

Supported events by widget type

WIDGET EVENT	DETAILS
`WIDGET_READY`	Widget loaded successfully
`WIDGET_RENDERED`	Widget loaded and UI rendering is complete
`GET_ACCESS_TOKEN`	Widget request for embed user-access token
`GET_STRINGS`	Allows host to override a set of UI strings shown in the widget

Runtime widget

WIDGET EVENT	DETAILS	DATA
`RUN_FLOW_STARTED`	Triggered and the flow run was started	
`RUN_FLOW_COMPLETED`	Flow run triggered successfully	
`RUN_FLOW_DONE_BUTTON_CLICKED`	User selected Done button on flow run	
`RUN_FLOW_CANCEL_BUTTON_CLICKED`	User selected Cancel button on flow run	
`FLOW_CREATION_SUCCEEDED`	The flow was created successfully	`{ flowUrl: string, flowId: string, fromTemplate: string }`
`WIDGET_CLOSE`	Fired when the host should close the widget	

Flow Creation widget

WIDGET EVENT	DETAILS	DATA
`FLOW_CREATION_FAILED`	Flow creation failed	
`WIDGET_CLOSE`	Fired when host should close the widget	
`TEMPLATE_LOAD_FAILED`	The template failed to load	
`FLOW_CREATION_SUCCEEDED`	The flow was created successfully	`{ flowUrl: string, flowId: string,fromTemplate?: string }`

Approval widget

WIDGET EVENT	DETAILS
`RECEIVED_APPROVAL_STATUS_CHANGED`	Received approval status changed
`SENT_APPROVAL_STATUS_CHANGED`	Sent approval status changed

`GET_STRINGS` event lets you customize text for some of the UI elements shown in the widget. The following strings can be customized:

STRING KEY	USE IN THE WIDGET
`FLOW_CREATION_CREATE_BUTTON`	Text displayed on the create flow button in both flow creation and runtime widget
`FLOW_CREATION_CUSTOM_FLOW_NAME`	The initial value to use for the flow name in the flow creation widget. Only used when the allowCustomFlowName setting is enabled.

STRING KEY	USE IN THE WIDGET
`FLOW_CREATION_HEADER`	Header to use when creating a cloud flow in both the flow creation and runtime widget
`INVOKE_FLOW_HEADER`	Header to use when invoking a cloud flow in the runtime widget
`INVOKE_FLOW_RUN_FLOW_BUTTON`	Text displayed on the button used to invoke/run a cloud flow in the runtime widget

Example

Call `widgetDoneCallback` passing a JSON object with key-value pairs of string key and text to override the default value.

```
widget.listen("GET_STRINGS", function(requestParam, widgetDoneCallback) {
    widgetDoneCallback(null, {
         "FLOW_CREATION_HEADER": "<string override would go here>",
        "INVOKE_FLOW_RUN_FLOW_BUTTON":  "<string override would go here>"
    });
});
```

Widget actions

The host uses widget actions to send a specific action or message to the widget. Widget JS SDK provides the `notify()` method to send a message or a JSON payload to the widget. Each widget action supports a specific payload signature.

Usage

```
widget.notify('<WIDGET_ACTION>', parameterMatchingParameterInterface)
    .then(result => console.log(result))
    .catch(error => console.log(error))
```

Example

Invoke a cloud flow by sending the following command to a runtime widget

```
widget.notify('triggerFlow', { flowName: flowName, implicitData:implicitData });
```

Runtime widget

WIDGET ACTION	DETAILS	PARAMETER INTERFACE
`triggerFlow`	Triggers a cloud flow run	`{ flowName: string, implicitData?: string }`
`triggerFlowByTemplate`	Triggers a cloud flow run by template	`{ templateId: string, implicitData?: string, designTimeParameters?: Record<string, any> }`
`getTriggerSchema`	Gets trigger schema for a cloud flow	`{ flowName: string, }`
`closeWidget`	Cancels any pending activity and raises a WIDGET_CLOSE event	

Flow Creation widget

WIDGET ACTION	DETAILS	PARAMETER INTERFACE
`createFlowFromTemplate`	Creates a cloud flow for the selected template	`{ templateName: string, designTimeParameters?: Record<string, any> }`
`createFlowFromTemplateDefinition`	Creates a cloud flow for the selected template definition	`{ templateDefinition: string }`
`closeWidget`	Cancels any pending activity and raises a WIDGET_CLOSE event	

Approval widget

WIDGET ACTION	DETAILS	PARAMETER INTERFACE
`closeInfoPane`	Closes the info-pane displaying approval details	N/A

Configuring your client application

You will need to configure your client application with Flow Service Scopes (Delegated Permissions). If the Azure Active Directory (AAD) app used for the widget integration uses a 'code grant' authorization flow, the AAD app needs to be preconfigured with delegated permissions that are supported by Power Automate. This provides delegated permissions that let the application:

- Manage approvals
- Read approvals
- Read activities
- Manage flows
- Read flows

Follow these steps to select one or more delegated permissions:

1. Go to https://portal.azure.com
2. Select **Azure Active Directory**.
3. Select **App registrations** under **Manage**.
4. Enter the third-party application to be configured for Flow service scopes.

5. Select **Settings**.
6. Select **Required permissions** under **API access/**
7. Select **Add**.
8. Choose **Select an API**.

9. Search for **Power Automate service** and select it. Note: Before you can see Power Automate service, your tenant needs to have at least one AAD user signed into the Flow portal (https://flow.microsoft.com)
10. Choose the required Flow scopes for your application then select **Save**.

Your application will now get a Flow Service token that contains delegated permissions in the 'scp' claim in the JWT token.

Sample application embedding flow widgets

A sample JavaScript Single Page Application (SPA) is provided in the resources section so you can experiment with embedding flow widgets in a host page. Using the sample application requires registering an AAD application with implicit grant flow enabled.

Registering an AAD app

1. Sign in to the Azure portal.
2. In the left navigation pane, select **Azure Active Directory**, then select **App registrations** (Preview) > New registration.
3. When the **Register an application** page appears, enter a name for your application.
4. Under **Supported account types**, select **Accounts** in any organizational directory.
5. Under the **Redirect URL** section, select the web platform and set the value to the application's URL based on your web server. Configure this value to http://localhost:30662/ to run the sample app.
6. Select **Register**.
7. On the app **Overview** page, note the application (client) ID value.
8. The sample requires implicit grant flow to be enabled. In the left navigation pane of the registered application, select **Authentication**.
9. In **Advanced settings**, under **Implicit grant**, enable both **ID tokens** and **Access tokens** checkboxes. ID tokens and access tokens are required since this app needs to sign in users and call Flow API.
10. Select **Save**.

Running the sample

1. Download the sample and copy it to a local folder on your device.
2. Open the index.html file under the FlowSDKSample folder and modify the `applicationConfig` to update the `clientID` to the application ID you registered earlier.

3. The sample app is configured to use Flow scopes **Flows.Read.All** and **Flow.Manage.All.** You can configure additional scopes by updating the **flowScopes** property in **applicationConfig** object.
4. Run these commands to install the dependency and run the sample app:

```
> npm install > node server.js
```

5. Open the browser and then enter http://localhost:30662
6. Select the **Sign in** button to authenticate to AAD and acquire a cloud flow access token.
7. The **Access Token** text box contains the access token.

8. Select **Load Flows widget** or **Load Templates widget** to embed the corresponding widgets.

Sample application download link.

Resources

Widget test pages

Find out more about widget integration and settings:

- Templates widget: <https://flow.microsoft.com/test/templateswidget/>
- FlowCreation widget: <https://flow.microsoft.com/test/flowcreationwidget/>
- Runtime widget: <https://flow.microsoft.com/test/runtimewidget/>
- Approvals center widget: <https://flow.microsoft.com/test/approvalcenterwidget/>
- Flows widget: <https://flow.microsoft.com/test/managewidget/>

Supported widget locales

If the initialized locale isn't listed, Flow will default to the closest supported locale.

LOCALE	LANGUAGE
bg-bg	Bulgarian (Bulgaria)
ca-es	Catalan (Catalan)
cs-cz	Czech (Czech Republic)
da-dk	Danish (Denmark)
de-de	German (Germany)
el-gr	Greek (Greece)
en-Us	English (United States)
es-es	Spanish (Castilian)
et-ee	Estonian (Estonia)
eu-es	Basque (Basque)
fi-fi	Finnish (Finland)
fr-fr	French (France)
gl-es	Galician (Galician)
hi-HU	Hungarian (Hungary)

LOCALE	LANGUAGE
hi-in	Hindi (India)
hr-hr	Croatian (Croatia)
id-Id	Indonesian (Indonesia)
it-It	Italian (Italy)
jp-Jp	Japanese (Japan)
kk-kz	Kazakh (Kazakhstan)
ko-kr	Korean (Korea)
lt-LT	Lithuanian (Lithuania)
lv-lv	Latvian (Latvia)
ms-my	Malay (Malaysia)
nb-no	Norwegian (Bokmål)
nl-nl	Dutch (Netherlands)
pl-pl	Polish (Poland)
pt-br	Portuguese (Brazil)
pt-pt	Portuguese (Portugal)
ro-ro	Romanian (Romania)
ru-ru	Russian (Russia)
sk-sk	Slovak (Slovakia)
sl-si	Slovenian (Slovenia)
sr-cyrl-rs	Serbian (Cyrillic, Serbia)
sr-latn-rs	Serbian (Latin, Serbia)
sv-se	Swedish (Sweden)
th-th	Thai (Thailand)
tr-tr	Turkish (Turkey)
uk-ua	Ukrainian (Ukraine)
vi-vn	Vietnamese (Viet Nam)

Let customers test drive your flows on AppSource

1/15/2022 • 2 minutes to read • Edit Online

> **NOTE**
>
> Microsoft Flow is now Power Automate. For more information, see this blog.
>
> This content will be updated to reflect the branding change in the coming days.

Do you want to show off how your app integrates with Power Automate? We now Test Drive solutions on AppSource.com as a way for you to share Power Automate integration with customers, and generate leads for your business.

What is a Test Drive solution?

A Test Drive solution enables your customers to try out a real app without installing any applications. Customers just sign into AppSource.com using their Azure Active Directory (AAD) account and run the app in a web browser. Without Test Drive, customers can only read about your app or watch a video that describes it. With Test Drive, customers get a better idea of what your solution is and what functionality your app has. And they have the experience of actually using the app. Customers won't be able to look under the hood to see how your app is built, so your intellectual property is protected. We collect and share lead information with you to help you grow your business.

How do I build a Test Drive solution?

Building an app for a Test Drive solution is just like building any app, but you need to use a data source that the user can be granted access to as a read-only user. Using a data source that's already set up will mean there is zero friction for them to try it out. The full solution that you ultimately distribute to customers will include writable data, but read-only data works well for a Test Drive solution.

Embed flow into your product

Once you have a data source that you can grant the user read-only access to, you can embed Power Automate into your application. Read more about embedding here. You will likely want to use the search functionality to highlight templates that are unique to your application. For example, if your application creates data in Dynamics 365, you can highlight a Dynamics 365 template that pulls data and then sends an email to the user.

How do I list my Test Drive solution on AppSource.com?

Now that your app is ready, it's time to publish it to AppSource.com. In order to start this process, please complete the application form on flow.microsoft.com. Once you apply you will receive an email with instructions on how to submit your app to be published on AppSource.com.

Work with business process flows using code

1/15/2022 • 15 minutes to read • Edit Online

A *business process flow* lets you create more efficient and streamlined sales, service, and other business processes. It creates a visualization of your business process by placing special controls at the top of the table forms. Users are guided through various stages of sales, marketing, or service processes towards completion. Each process supports multiple stages and steps. You can add or remove steps, change the order of stages, or add new tables to the business process flow.

Different business process flow instances can run concurrently against the same table row. Users can switch between concurrent business process instances, and resume their work at a current stage in the process.

This topic provides information about how you can programmatically work with business process flows.

> **NOTE**
> You don't have to write code to work with business process flows. For information about using the UI to create and manage business process flows, see Business Process Flows overview

Prerequisites for business process flow

Custom tables and tables that have updated UI forms can participate in the business process flow. The updated UI tables have the IsAIRUpdated property set to `true`.

To enable a table for the business process flow, set the IsBusinessProcessEnabled property to `true`.

> **IMPORTANT**
> Enabling a table for business process flow is a one way process. You can't reverse it.

Define business process flow

Use the visual business process flow designer to define a business process flow. More information: Create a business process flow

By default, a business process flow row is created in the `Draft` state.

A business process flow definition is stored in the workflow table, and the stage information for the business process flow is stored in the processstage table.

Activate business process flow

Before you can use the process flow, you have to activate it. To activate it, you must have the `prvActivateBusinessProcessFlow` privilege for the `Workflow` table. Use the UpdateRequest message to set the state of the `Workflow` table row to `Activated`. More information: Perform specialized operations using Update

> **NOTE**
> You can also use the business process flow designer to activate a business process flow.

Business process flow table

Once you activate a business process flow definition by changing the state of the corresponding `Workflow` table row or by using the business process flow designer, a custom table with the following name is automatically created to store the activated business process flow instances: "*<activesolutionprefix>_<uniquename>*", where the uniquename is derived from the name you specify.

For example, if you specified "My Custom BPF" as the name of the business process flow definition and are using the default publisher (new) for your active solution, the name of the custom table created for storing process instances will be "new_mycustombpf".

If the `uniquename` value isn't available for a business process flow definition, for example if the business process flow was imported as part of solution from an earlier version, the default name of the custom table will be "`\<activesolutionprefix>_bpf_<GUID_BPF_Definition>`":

> **IMPORTANT**
> The sample business process flow rows use system tables to store the corresponding business process flow instance rows.
>
> However, any new business process flow definitions you create will use custom tables to store its instance rows as explained earlier.

You can retrieve the name of your business process flow table using any of the following ways:

- **Using the UI**: Use the customization UI to browse to your business process flow table:

- **Using the Web API**: Use the following request:

  Request

  ```
  GET [Organization URI]/api/data/v9.0/workflows?$filter=name eq 'My Custom BPF'&$select=uniquename
  HTTP/1.1
  ```

  Response

```
{
"@odata.context":"[Organization URI]/api/data/v9.0/$metadata#workflows(uniquename)",
"value":[
     {
         "@odata.etag":"W/\"1084677\"",
         "uniquename":"new_mycustombpf",
         "workflowid":"2669927e-8ad6-4f95-8a9a-f1008af6956f"
     }
  ]
}
```

- **Using the Organization service**: Use the following code sample:

```
QueryExpression query = new QueryExpression
{
    EntityName = "workflow",
    ColumnSet = new ColumnSet("uniquename"),
    Criteria = new FilterExpression
    {
        Conditions =
        {
            new ConditionExpression
            {
                ColumnName = "name",
                Operator = ConditionOperator.Equal,
                Values = { "My Custom BPF" }
            }
        }
    }
};
Workflow Bpf = (Workflow)_serviceProxy.RetrieveMultiple(query).Entities[0];
```

NOTE

The IsBPFEntity property is `true` for business process flow tables. You can retrieve all the business process flow tables in your instance by running the following Web API request:

```
GET [Organization URI]/api/data/v9.0/EntityDefinitions?
$select=SchemaName,LogicalName,DisplayName&$filter=IsBPFEntity eq true HTTP/1.1
```

Manage security for business process flows

The custom table that is automatically created on activating a business process flow to store business process flow instances adheres to the standard security model as for any other custom table in Microsoft Dataverse. This implies that privileges granted on these tables define the runtime permissions for users for business process flows.

The custom business process flow table has organization scope. The regular create, retrieve, update and delete privileges on this table define the permission users would have based on their assigned roles. By default, when the business process flow custom table is created, only **System Administrator** and **System Customizer** security roles are granted access to it, and you must explicitly grant permissions to the new business process flow table (for example, **My Custom BPF**) for other security roles as required.

Create, retrieve, update, and delete business process flow table rows (process instances)

The custom table that is automatically created on activating a business process flow definition stores all the process instances for the business process flow definition. The custom table supports the standard programmatic creation and management of rows (process instances) using Web API and CRM 2011 endpoint.

> **IMPORTANT**
>
> Switching to another process instance for a table row is only supported through UI (client) or programmatically using information available in this section. You can no longer use the `SetProcess` message (SetProcess Action or SetProcessRequest) to programmatically switch processes (set another business process flow as the active process instance) for the target table row.

Lets consider the following example where we have a cross-table business process flow, "My Custom BPF," with 3 stages: S1:Account, S2:Account, and S3:Contact.

Retrieve all the rows (instances) for a business process flow table

If the name of your business process flow table is "new_mycustombpf", use the following query to retrieve all the rows (process instances) for your business process flow table:

```
GET [Organization URI]/api/data/v9.0/new_mycustombpfs HTTP/1.1
```

At this point, you might not get any instances in your response as there are none. Run this request after creating an instance of your business process flow definition later in this topic.

> **NOTE**
>
> To know how to retrieve the name of your business process flow table, see the earlier section, Business process flow table.

Create a business process flow table row (process instance)

Create a business process flow table row (process instance) programmatically if you want to switch to another business process flow for a table row without using the UI.

To create a business process flow table row, you need to specify the following values:

- Associate the business process flow table row to a primary table row by setting the single-valued navigation property using the `@odata.bind` annotation. To find out the navigation-property name that points to the primary table row for your business process flow definition, use the CSDL $metadata document.
- Associate the business process flow table row to a valid stage specified in the business process flow definition by setting the single-valued navigation property using the `@odata.bind` annotation. To find out the navigation-property name (typically `activestageid`) that points to the stage row for your business process flow definition, use the CSDL $metadata document.

  Also, you can retrieve information about all the stages for a business process flow definition by using the following Web API request assuming that the ID of your business process flow definition is 2669927e-8ad6-4f95-8a9a-f1008af6956f:

  #### Request

  ```
  GET [Organization URI]/api/data/v9.0/processstages?$select=stagename&$filter=processid/workflowid eq
  2669927e-8ad6-4f95-8a9a-f1008af6956f HTTP/1.1
  ```

  #### Response

  ```
  {
      "@odata.context": "[Organization URI]/api/data/v9.0/$metadata#processstages(stagename)",
      "value": [
          {
              "@odata.etag": "W/\"858240\"",
              "stagename": "S1",
              "processstageid": "9a9185f5-b75b-4bbb-9c2b-a6626683b99b"
          },
          {
              "@odata.etag": "W/\"858239\"",
              "stagename": "S3",
              "processstageid": "a107e2fd-7543-4c1a-b6b4-b8060ecb1a1a"
          },
          {
              "@odata.etag": "W/\"858238\"",
              "stagename": "S2",
              "processstageid": "19a11fc0-3398-4214-8522-cb2a97f66e4b"
          }
      ]
  }
  ```

Next, use the following request to create an instance of your business process flow definition for an account row (ID=a176be9e-9a68-e711-80e7-00155d41e206) and the active stage set as the first stage of the process instance, S1 (ID=9a9185f5-b75b-4bbb-9c2b-a6626683b99b):

Request

```
POST [Organization URI]/api/data/v9.0/new_mycustombpfs HTTP/1.1
Content-Type: application/json; charset=utf-8
OData-MaxVersion: 4.0
OData-Version: 4.0
Accept: application/json

{
    "bpf_accountid@odata.bind": "/accounts(a176be9e-9a68-e711-80e7-00155d41e206)",
    "activestageid@odata.bind": "/processstages(9a9185f5-b75b-4bbb-9c2b-a6626683b99b)"
}
```

Response

```
HTTP/1.1 204 No Content
OData-Version: 4.0
OData-EntityId: [Organization URI]/api/data/v9.0/new_mycustombpfs(cc3f721b-026e-e811-80ff-00155d513100)
```

Note that if you want to create an instance of your business process flow definition with the active stage set as a stage ***other*** than the first stage, you must also provide `traversedpath` in your request. Traversed path is the comma-delimited string of process stage ids that represent visited stages of the business process flow instance. The following request creates an instance for an account row (ID=679b2464-71b5-e711-80f5-00155d513100) and active stage set as the second stage, S2 (ID=19a11fc0-3398-4214-8522-cb2a97f66e4b).

```
POST [Organization URI]/api/data/v9.0/new_mycustombpfs HTTP/1.1
Content-Type: application/json; charset=utf-8
OData-MaxVersion: 4.0
OData-Version: 4.0
Accept: application/json

{
    "bpf_accountid@odata.bind": "/accounts(679b2464-71b5-e711-80f5-00155d513100)",
    "activestageid@odata.bind": "/processstages(19a11fc0-3398-4214-8522-cb2a97f66e4b)",
    "traversedpath":"9a9185f5-b75b-4bbb-9c2b-a6626683b99b,19a11fc0-3398-4214-8522-cb2a97f66e4b"
}
```

Update a business process flow table row (process instance)

You can update a process instance to move to next or previous stage, abandon a process instance, reactivate a process instance, or finish a process instance.

Stage navigation

To navigate to a different stage, you need to update a process instance row to change its active stage ID and accordingly update the traversed path. Note that you must only move to the next or previous stage while updating a business process flow instance.

To perform stage navigation, you will need the ID of the business process flow instance that you want to update. To retrieve all the instances of your business process flow, see Retrieve all the rows (instances) for a business process flow table earlier.

Assuming the ID of the process instance you want to update is dc2ab599-306d-e811-80ff-00155d513100, use the following request to update the active stage from S1 to S2:

```
PATCH [Organization URI]/api/data/v9.0/new_mycustombpfs(dc2ab599-306d-e811-80ff-00155d513100) HTTP/1.1
Content-Type: application/json
OData-MaxVersion: 4.0
OData-Version: 4.0

{
    "activestageid@odata.bind": "/processstages(19a11fc0-3398-4214-8522-cb2a97f66e4b)",
    "traversedpath": "9a9185f5-b75b-4bbb-9c2b-a6626683b99b,19a11fc0-3398-4214-8522-cb2a97f66e4b"
}
```

Change the state of a process instance: Abort, Reactivate, or Finish

A process instance can have one of the following states: **Active**, **Finished**, or **Aborted**. The state is determined by the following columns on the process instance row:

- **statecode**: Displays the status of the process instance.

VALUE	LABEL
0	Active
1	Inactive

- **statuscode**: Displays information about status of the process instance.

VALUE	LABEL
1	Active
2	Finished
3	Aborted

So, to **Abort** a process instance, use the following request set the `statecode` and `statuscode` values appropriately:

```
PATCH [Organization URI]/api/data/v9.0/new_mycustombpfs(dc2ab599-306d-e811-80ff-00155d513100) HTTP/1.1
Content-Type: application/json
OData-MaxVersion: 4.0
OData-Version: 4.0

{
    "statecode" : "1",
    "statuscode": "3"
}
```

> **NOTE**
>
> You can abort a process instance at any stage.

Similarly, to reactivate a process instance, replace the `statecode` and `statuscode` values in the above code with **0** and **1** respectively.

Finally, to set a process instance status as **Finished**, which is only possible at the last stage of a process instance, replace the `statecode` and `statuscode` values in the above code with **0** and **2** respectively.

Cross-table navigation

For cross-table navigation in this example, you must set the active stage of the process instance to the last stage, S3 (ID=a107e2fd-7543-4c1a-b6b4-b8060ecb1a1a), update the traversed path accordingly, and set a contact row as the primary table row as per the business process flow definition.

```
PATCH [Organization URI]/api/data/v9.0/new_mycustombpfs(dc2ab599-306d-e811-80ff-00155d513100) HTTP/1.1
Content-Type: application/json
OData-MaxVersion: 4.0
OData-Version: 4.0

{
    "activestageid@odata.bind": "/processstages(a107e2fd-7543-4c1a-b6b4-b8060ecb1a1a)",
    "traversedpath":"9a9185f5-b75b-4bbb-9c2b-a6626683b99b,19a11fc0-3398-4214-8522-cb2a97f66e4b,a107e2fd-
7543-4c1a-b6b4-b8060ecb1a1a",
    "bpf_contactid@odata.bind": "/contacts(0e3f10b0-da33-e811-80fc-00155d513100)"
}
```

Delete a business process flow table row (process instance)

Use the following Web API request:

Request

```
DELETE [Organization URI]/api/data/v9.0/new_mycustombpfs(dc2ab599-306d-e811-80ff-00155d513100) HTTP/1.1
```

Response

If the row exists, you'll get a normal response with status 204 to indicate the delete was successful. If the table isn't found, you'll get a response with status 404.

Use RetrieveProcessInstances and RetrieveActivePath messages

Use the `RetrieveProcessInstances` message (RetrieveActivePath Function or RetrieveProcessInstancesRequest) to retrieve all the business process flow instances for a table row across all business process definitions. The business process flow instances returned for a table are ordered based on the `modifiedon` column for the instance. For example, the most recently modified business process flow instance will be the *first* row in the returned collection. The most recently modified business process flow instance is the one that is active on the UI for a table row.

Each business process flow instance row returned for a table row as a result of using the `RetrieveProcessInstances` message stores the ID of the active stage in the `processstageid` column that can be used to find the active stage, and then move to the previous or next stage. To do so, you first need to find the active path of a business process flow instance and the stages available in the process flow instance using the `RetrieveActivePath` message (RetrieveActivePath Function or RetrieveActivePathRequest).

Once you have the active stage and the active path information for a business process flow instance, you can use the information to move to a previous or next stage in the active path. Forward navigation of stages must be done in sequence, that is, you should only move forward to the next stage in the active path.

For the complete sample that code demonstrates the usage of these two methods and stage navigation using the Organization service, see Sample: Work with business process flows.

Apply business process flow while creating a table row

This section provides information about the default behavior for applying business process flows automatically to new table rows created in Dataverse, and how you can override it to apply a business process flow of your choice for new table rows.

By default, for a table that has multiple business process flows defined for it, the system applies a business process flow to the new table row using the following multi-step logic:

1. Identify all business process flows applicable to the new table row based on the **Workflow.PrimaryEntity** column of the business process flow definition rows.
2. Identify the business process flow definitions that the current user has access to. For information about how access to a business process flow is determined and managed, see Manage security for business process flows earlier in this topic.
3. All business process flow definitions in the system are subject to a global order per table. The order of the business process flow is stored in the **Workflow.ProcessOrder** column. The business process flow definitions for a table are sorted based on this order, and the one with the least order value is picked.
4. Finally, if the table row is created from a business app (app module), one more level of filtering is applied to pick the business process flow to be applied automatically to the new table row. When working in an app, users can access only relevant tables, business process flows, views and forms that they have access to by virtue of the security roles assigned to the business app.
   - If the business app does not contain any business process flow then business process flow is applied as explained until step 3.
   - If the business app has one or more business process flows then only the business process flows present in the app would be applicable. In this case, when the user is working within a business app context, the list of business process flows from step 3 are filtered further to the ones that are part of the business app that are present inside the app module, and are sorted based on the process order.
   - If no business process flow is available in a business app for the table or one that the user has access to then no business process flow is applied for the new table row.

You can override the default logic of business process flows getting applied automatically to new table rows. To do so, set the **ProcessId** column of the table to one of the following values while creating a new table row:

- Set to **Guid.Empty** to skip setting a business process flow for new table rows. You might want to do that if you are bulk creating table rows, but don't want business process flow to to be applied to them.
- Set it to a specific business process flow table (as a table reference). In this case, the system will apply the specified business process flow instead of the default logic.

If you do not set a value for the **ProcessId** column while creating a new table row, the system will apply the default logic as explained earlier.

> **NOTE**
> Overriding the default logic of business process flows getting applied automatically to new table rows is only supported programmatically. You cannot do this using the UI.

Legacy process-related columns in tables

The legacy process-related columns (such as **ProcessId**, **StageId**, and **TraversedPath**) on tables enabled for business process flows are already deprecated. Manipulating these legacy process related columns for target table rows does not guarantee consistency of the business process flow state, and is ***not*** a supported scenario. The recommended way is to use the columns of the business process flow table as explained earlier in the section Create, retrieve, update, and delete business process flow table rows (process instances)

The only exception to this is programmatically modifying the **ProcessId** column while creating a table row to override the default application of the business process flow to the new row as explained in the previous section: Apply business process flow while creating a table row.

Client-side programmability support for business process flows

There is a client-side object you can use to interact with business process flows in your form scripts. Business process flows trigger client-side events every time a process is either applied to a row, the stage is changed, or its status is changed to `Active`, `Finished`, or `Aborted`. More information: formContext.data.process (Client API reference)

Maximum number of processes, stages, and steps

Per table, the default value for the maximum number of activated business process flows is 10. You can specify a different value by using the `Organization.MaximumActiveBusinessProcessFlowsAllowedPerEntity` column. However, if the value is greater than 10, you may see a decrease in your system's performance when you switch processes or open a row that has an assigned business process flow. This may be especially noticeable if processes span multiple tables.

The following settings aren't customizable:

- The maximum number of stages per table in the process is 30.
- The maximum number of steps in each stage is 30.
- The maximum number of tables that can participate in the process flow is 5.

Sample: Work with business process flows

1/15/2022 • 3 minutes to read • Edit Online

> **NOTE**
>
> Microsoft Flow is now Power Automate. For more information, see this blog.
>
> This content will be updated to reflect the branding change in the coming days.

This sample demonstrates how to programmatically work with business process flows such as retrieving the business process flow instances for a table row, retrieving active path for a business process flow instance and its process stages, and changing the active stage. For information about these concepts, see Work with business process flows using code

This sample is available to download from Sample: Work with business process flows.

Prerequisites

Before you can run the sample:

1. Have access to a Dataverse environment.
2. Have appropriate privileges on the Lead, Opportunity, and Workflow tables and business process flow definition table rows used in this sample.
3. Have Visual Studio 2015 or later to run the sample.
4. Have Internet connection to download the sample project and to restore the NuGet packages used in the sample project.

What this sample does

1. Creates a sample Lead row. This automatically creates an instance of the "Lead To Opportunity Sales Process" business process flow for the Lead row.
2. Converts the Lead row to an Opportunity row.
3. Retrieves the business process flow instances associated with the "Opportunity" row using the `RetrieveProcessInstances` message. The first row in the returned collection is the active business process flow instance for the opportunity row, which is "Lead To Opportunity Sales Process" in this case.
4. Retrieves the active path and the process stages for the "Lead To Opportunity Sales Process" instance using the `RetrieveActivePath` message.
5. Retrieves the currently active stage for the "Lead To Opportunity Sales Process" instance, and prompts the user whether to move to the next stage. On confirmation to move, sets the next stage in the active path as the active stage for the "Lead To Opportunity Sales Process" instance.
6. Finally, prompts the user whether to delete the rows created during the sample run.

   Here is the output of the sample:

```
Created a Lead: "SDK Sample Record".
Process instance automatically created for the new lead record: 'Lead to Opportunity Sales Process'

Qualified Lead to create an Opportunity record.
Current active process instance for the Opportunity record: 'Lead to Opportunity Sales Process'

Retrieved stages in the active path of the process instance:
        Stage 1: qualify (StageId: f90b4d48-7aad-456e-864a-8e7d543f7495)
        Stage 2: develop (StageId: bfc9108c-8389-406b-9166-2c3298a2e41f)
        Stage 3: propose (StageId: 3a275c22-fc45-4e89-97fc-41e5ec578743)
        Stage 4: close (StageId: 7f5247fe-cfc3-42bc-aa77-b1d836d9b7c0)

Active stage for the process instance: 'develop' (StageID: bfc9108c-8389-406b-9166-2c3298a2e41f)

Do you want to move to the next stage (y/n):
y

Changed active stage for the process instance to: 'propose' (StageID: 3a275c22-fc45-4e89-97fc-41e5ec578743)

Do you want these entity records deleted? (y/n)
y
Entity records have been deleted.
Press <Enter> to exit.
```

Run the sample

1. Download the WorkWithBPF Visual Studio sample project, and extract it to a folder on your computer.
2. Locate the `WorkWithBPF.sln` file in your extracted folder, and open it in Visual Studio.
3. The sample project uses NuGet packages that must be restored before running the sample. Ensure that automatic restore of NuGet packages is enabled in Visual Studio. More information: Enabling and disabling NuGet package restore

   Alternatively, select **Project** > **Manage NuGet Packages**, and select **Restore** to manually restore the packages used in the sample.
4. Press F5 or select **Debug** > **Start Debugging**.
5. If you have not previously run one of the samples before, you'll need to enter information to run the code, otherwise enter the number for one of the instances you have previously set up.

PROMPT	DESCRIPTION
Enter a Dynamics 365 server name and port [crm.dynamics.com]	Type the name of your Dynamics 365 server. The default is Dynamics 365 (online) (crm.dynamics.com) in North America. Example: crm5.dynamics.com
Is this organization provisioned in Microsoft online services (y/n) [n]	Type **y** if this is a Microsoft online services provisioned organization. Otherwise, type **n**.
Enter domain\username	Type your Microsoft account.
Enter password	Type your password. The characters will show as "*" in the window. Your password is securely saved in the Microsoft Credential Manager for later reuse.
Specify an organization number (1-n) [1]	From the list of organizations shown that you belong to, type the corresponding number. The default is 1, indicating the first organization in the list.

6. The sample will perform the operations described in What this sample does and may prompt you with additional options.

7. When the sample is complete, press ENTER to close the console window.

Custom Dataverse workflow activities (workflow assemblies)

1/15/2022 • 2 minutes to read • Edit Online

> **NOTE**
>
> Microsoft Flow is now Power Automate. For more information, see this blog.
>
> This content will be updated to reflect the branding change in the coming days.

Dataverse supports the registration and execution of custom workflow activities in addition to the out-of-box activities provided by Windows Workflow Foundation.

Windows Workflow Foundation includes an activity library that provides activities for control flow, sending and receiving messages, doing work in parallel, and more. However, to build applications that satisfy your business needs, you may need activities that perform tasks specific to that application. To make this possible, Windows Workflow Foundation supports the creation of custom workflow activities.

More information: Create a workflow extension

Related topics

Dataverse Developer Overview

Create a plug-in

Power Automate sign-up Q&A in your organization

1/15/2022 • 10 minutes to read • Edit Online

This topic describes how users in your organization can use Power Automate, and how you can control the Power Automate service.

Signing up for Power Automate

What is Power Automate?

Power Automate is a public cloud service to help individuals and teams to set up automated workflows between their favorite apps and services to synchronize, get notifications, collect data, and more.

How can I sign up for Power Automate?

Just go to flow.microsoft.com, select **Try free** on the top right-side of the screen, and then provide your information to complete the sign-up process.

Sign up for Power Automate includes more details.

What is the Power Automate free license?

The Power Automate Free license is used only for tracking purposes. Enabling or disabling it has no effect on a user's ability to create flows. If you disable the Power Automate Free license, it becomes enabled again when a user logs in. This is the expected behavior.

Can I block another person from signing up for Power Automate?

Power Automate is a fully public cloud service, and everyone in the world can sign up and use it to automate their day-to-day tasks. To use Power Automate there is no requirements that users have or use an Office 365 account. Because of this, there's no mechanism at this time for you to block another person from using Power Automate (as everyone in the world can, irrespective of their email address).

However, if a person signs up for Power Automate, and you choose to not support them inside of your organization, they can in no way incur costs to your company. When an individual signs up for Power Automate, the relationship is between that individual and Microsoft, which is like many other cloud services from Microsoft such as Bing, OneDrive, or Outlook.com. An individual's use of Power Automate does not in any way imply that the service is provided by your organization.

Finally, if your company wishes to restrict the use of organization-only data inside of Power Automate, that is possible through Data loss prevention (DLP) policies.

How can people gain access to the paid features of Power Automate?

Individuals can gain access to the paid features of Power Automate in three different ways:

1. They can individually sign up for a Power Automate Trial license for 90 days at no cost.
2. You can assign a Power Automate license to them within the Microsoft 365 admin center.
3. The user has been assigned a Microsoft 365 and Dynamics 365 plans that includes access to Power Automate. See the Power Automate pricing page for the list of Office 365 and Dynamics 365 plans that include Power Automate capabilities.

Can I block another person from using the paid features of Power Automate?

Any individual can try out the paid features of Power Automate for 90 days, and incur no costs. However, you can fully manage the assignment of the perpetual paid licenses inside of your organization through the Office 365 admin portal.

As with the free offerings, if an individual chooses to sign up for the trial that is a direct relationship between the individual and Microsoft, not necessarily endorsed by your company.

Administration of Power Automate

Why has the Power Automate icon appeared in the Office 365 app launcher?

As announced in August, Power Automate is now a fundamental part of the Office 365 suite. Three months after this announcement Power Automate was enabled as a service as a part of all existing Office 365 SKU's. As users everywhere in the world can now use Power Automate, it has appeared in the app launcher for them.

See the following section if you'd like to remove the Power Automate tile from the app launcher by default.

How do I remove Power Automate from the app launcher for my organization?

If a user was assigned a Power Automate license, you can take the following steps to remove the license for that user, which will remove the Power Automate icon from the app launcher:

1. Go to the Office 365 Admin Portal.
2. In the left navigation bar, select **Users** > **Active Users**.
3. Find the user for whom you want to remove the license, and then select their name.
4. On the user details pane, select the **Licenses and Apps** tab, and then uncheck the license for Power Automate.
5. At the bottom of the pane, select **Save changes**.

Bulk removal of licenses is also possible through PowerShell. See Remove licenses from user accounts with Office 365 PowerShell for a detailed example. Finally, further guidance about bulk removal of services within a license can be found at Disable access to services with Office 365 PowerShell.

Removing of the Power Automate license or service for a user in your organization will result in the removal of the Power Automate icon from the following locations for that user:

> **NOTE**
>
> This action removes the Power Automate tile by default. A user may still choose to use Power Automate as an individual.

Why did 10,000 licenses for Power Automate show up in my Office 365 tenant?

Any person can try out Power Automate Free for 90 days, and these trial licenses represent the available capacity for new Power Automate users in your tenant. There is no charge for these licenses.

If at least one user in your tenant has signed-up for a **Microsoft Power Automate Free** license, you will see 10,000 licenses (minus any assigned) under **Billing** > **Licenses** for your organization.

You can choose to assign additional licenses to users yourself through the Office 365 admin portal, but note that these are trial licenses for Power Automate, and they will expire after 90 days of being assigned to a user.

Is this free? Will I be charged for these licenses?

No user can incur any cost to your organization without your express consent, so neither free nor trial licenses can cause any charges to your organization. Moreover, they also do not use any quotas, such as run quotas.

I removed the Power Automate Free license and users can still access it.

The Power Automate Free license is included only for tracking purposes. As covered in the first section, it is not possible to prevent another person from using Power Automate for individual purposes. Thus, the presence of a Power Automate Free license does not actually grant or remove any capabilities.

Why can't I see all Power Automate licenses in the Office 365 Admin portal?

Users can use Power Automate either as individuals or as a part of their organization. Licenses at the

organization level will always be visible in the Office 365 portal. However, if a user signs up for a trial as an individual then that is not managed by their Office 365 admin and will not show up in the portal.

How does an individual find out what plan they are on?

1. Sign into Power Automate.
2. Select your profile picture in the top right corner of the screen.
3. Select **View account**.
4. Select the **Subscriptions** tile.
5. Search for **Power Automate** under the **Licenses** section.

   You will see the license that you have for Power Automate.

Will Power Automate sign up impact the identities in my organization?

If your organization already has an existing Office 365 environment and all users in your organization have Office 365 accounts, then identity management is not impacted.

If your organization already has an existing Office 365 environment but not all users in your organization have Office 365 accounts, then we create a user in the tenant and assign licenses based on the user's work or school email address. This means that the number of users you are managing at any particular time will grow as users in your organization sign up for the service.

If your organization does not have an Office 365 environment connected to your email domain, there is no change in how you manage identity. Users will be added to a new, cloud-only user directory, and you will have the option to take over as the tenant admin and manage them.

A new tenant was created by Power Automate, how do I manage this?

If a new tenant was created by Power Automate, then you can claim and manage that tenant using the following steps:

1. Join the tenant by signing up for Power Automate using an email address domain that matches the tenant domain you want to manage. For example, if Microsoft created the contoso.com tenant, then join the tenant with an email address ending with @contoso.com.
2. Claim admin control by verifying domain ownership: once you are in the tenant, you can promote yourself to the admin role by verifying domain ownership. To do so, follow these steps:
   a. Go to https://admin.microsoft.com.
   b. Select the app launcher icon in the upper-left and choose Admin.
   c. Read the instructions on the **Become the admin** page, and then choose **Yes, I want to be the admin**.

   > **TIP**
   > If this option doesn't appear, an Office 365 administrator is already in place.

If I have multiple domains, can I control the Office 365 tenant that users are added to?

If you do nothing, a tenant is created for each user email domain and subdomain.

If you want all users to be in the same tenant regardless of their email address extensions, you can create a target tenant ahead of time or use an existing tenant. Add all the existing domains and subdomains that you want consolidated within that tenant. Then all the users with email addresses ending in those domains and subdomains automatically join the target tenant when they sign up.

> **IMPORTANT**
>
> There is no supported automated way to move users across tenants. To learn about adding domains to a single Office 365 tenant, see Add your users and domain to Office 365.

How can I restrict my users' ability to access my organization's business data?

Power Automate allows you to create data zones for business and non-business data, as shown below. Once these data loss prevention policies are implemented, users are prevented from designing or running Power Automate that combine business and non-business data. For more details, See Data loss prevention (DLP) policies.

Power Automate RPA license

How can I apply unattended RPA licenses to my flow

Follow these steps to apply unattended RPA licenses to your flows.

1. The tenant admin must purchase or get trial a version of the unattended RPA add-on capacity for the tenant. The tenant admin can do this from the Microsoft 365 admin portal. Just search the purchase services page for the add-on.

2. The environment admin must assign the available (paid or trial) unattended add-on capacities to a specific environment.

3. Makers can now run unattended desktop flows within the environment that has the unattended capacity.

> **NOTE**
>
> The unattended add-on is environment-specific. So, if you have multiple environments that need to run unattended RPA, you need to assign add-on capacity to each of them. Also if you need to run multiple unattended desktop flows in parallel in a single environment, you need to assign the right number of unattended add-ons to the environment to support the flow runs.

What are the prerequisites for using RPA?

- An environment that has Dataverse enabled.
- You must have a work or school account. You cannot start a trial with a personal account.

- The admin needs a paid or trial attended plan or a per flow plan before they can turn on to start an unattended trial.

How can I check which license I am currently using?

A user can press CTRL+ALT+A from Power Automate to check their license status.

> **NOTE**
>
> There's no user interface available to check license status.

Can trials be disabled for a tenant?

Yes. Tenant admins can use PowerShell to disable all trials activations for a tenant.

How to start an unattended trial

1. Select **Purchase services** in the Microsoft 365 admin center, and then select **Add-ons**.

2. Select **Power Automate unattended RPA add-on Trial**.

3. Select **Get free trial**.

You'll now see that the unattended trial is now active in your list of add-ons.

Assign unattended RPA add-on capacity to an environment

Before you can assign add-ons, such as trial licenses, you must get the add-ons.

1. Select **Action items** > **Admin center** in the Power Platform admin center.

2. Select **Resources** > **Capacity** > **Manage**.

3. Select the environment to which you want to assign the unattended RPA licenses, assign the capacity, and then select **Save**.

TIP

You will need to assign add-on capacity to each environment that needs to run RPA unattended.

IMPORTANT

You will need to ensure you assign enough capacity if you will run desktop flows in parallel.

NOTE

Only admins can assign unattended trial capacity.

Billing and metering questions

1/15/2022 • 2 minutes to read • Edit Online

This article answers frequently asked questions regarding billing and metering in Power Automate.

> **NOTE**
>
> Power Apps and Power Automate started to use a new licensing model on October 1, 2019.

Where can I find out what pricing plans are available?

See the pricing page.

Where can I find out what my plan is?

See this subscription page.

How do I switch plans?

1. Sign into Power Automate.
2. In the top right of the screen select **?** > **Pricing**, and then select the plan to which you want to switch.

How do I know how much I've used?

1. If you're on a free plan or a trial plan, sign into Power Automate.
2. Select the gear icon in the top right of the screen.

If you're on a paid plan, runs are pooled across all users in your organization. We're working on features to expose available quota and usage across an organization.

What happens if my usage exceeds the limits?

Power Automate throttles your flow runs.

Where can I find more information regarding the usage limits?

- On the pricing page, see the **FAQ** section.
- The limits and config page.

What happens if I try to execute runs too frequently?

Your plan determines how often your flows run. For example, your flows may run every 15 minutes if you're on

the free plan. If a cloud flow is triggered less than 15 minutes after its last run, it's queued until 15 minutes have elapsed.

What counts as a run?

Whenever a cloud flow is triggered, whether by an automatic trigger or by manually starting it, this is considered a run. Checks for new data don't count as runs.

Are there differences between Microsoft Accounts and work or school accounts for billing?

Yes. If you sign in with a Microsoft Account (such as an account that ends with @outlook.com or @gmail.com), you can use only the free plan. To take advantage of the features in the paid plan, sign in with a work or school email address.

I'm trying to upgrade, but I'm told my account isn't eligible.

To upgrade, use a work or school account, or create an Office 365 trial account.

Why did I run out of runs when my flow only ran a few times?

Certain flows may run more frequently than you expect. For example, you might create a cloud flow that sends you a push notification whenever your manager sends you an email. That flow must run every time you get an email (from anyone) because the flow must check whether the email came from your manager. This action counts as a run.

You can work around this issue by putting all the filtering you need into the trigger. In the push notification example, expand the **Advanced Options** menu, and then provide your manager's email address in the **From** field.

Other limits and caveats

- Each account may have as many as:
  - 15 custom connectors.
  - 20 connections per API and 100 connections total.
- Certain external connectors, such as Twitter, implement connection throttling to control quality of service. Your flows fail when throttling is in effect. If your flows are failing, review the details of the run that failed in the flow's run history.

Licenses that can submit support tickets in Power Automate

If you have one of the following licenses, you can submit a support ticket in Power Automate

- Power Automate per flow plan
- Power Automate per user plan
- Power Automate per user with Attended RPA plan
- PowerApps per user plan
- Dynamics Enterprise plan
- Dynamics Professional plan

The admin center

1/15/2022 • 2 minutes to read • Edit Online

The admin center is the central location where tenant admins and environment admins manage an organization's data policies and environments. Any changes you make in the admin center are immediately available to users within the organization.

Here's a quick video about the admin center.

> **NOTE**
>
> The Power Automate admin center is retired and Power Automate admins will be automaticaly redirected to the Microsoft Power Platform admin center to manage data policies and environments for Power Automate deployments.

Access the admin center

Browse to https://admin.powerplatform.microsoft.com/.

Environments

Learn more about using environments in the Microsoft Power Platform admin guide to manage users, permissions and roles.

Data policies

Learn more about using data policies in the Power Platform admin guide to create rules that manage how business data is shared between services in flows.

Activity logging

Learn more about the logging activities that Power Automate does to keep you informed about your users' activities.

Using environments within Power Automate

1/15/2022 • 2 minutes to read • Edit Online

An *environment* is a space to store, manage, and share your organization's business data, apps, and flows. It also serves as a container to separate apps that might have different roles, security requirements, or target audiences. How you choose to use environments depends on your organization and the apps you build. For example:

- You can choose to only build your apps in a single environment. You might create separate environments that group the test and production versions of your apps.
- You might create separate environments that correspond to specific teams or departments in your company, each containing the relevant data and apps for each audience.
- You might also create separate environments for different global branches of your company.

You can create and manage environments using the Power Platform admin center.

Learn all about environments in the Microsoft Power Platform admin guide.

IP address configuration

1/15/2022 • 2 minutes to read • Edit Online

The IP addresses from which Power Automate requests are sent depends on the region where the environment that contains the flow is located. We don't currently publish FQDNs available for flow scenarios.

> **IMPORTANT**
> Some calls a cloud flow makes may come from IP addresses that are listed in the Logic apps documentation. Some examples of these calls include HTTP or HTTP + OpenAPI.

You should also consult the Limits and Configuration article for a supplemental listing for known IP addresses that Power Automate uses.

Logic Apps

Calls made from a cloud flow go directly through the Azure Logic App service. Some examples of these calls include HTTP or HTTP + Open API. Please reference the Logic apps documentation for which IP addresses are used by that service.

Connectors

Calls made from a connector in a cloud flow (for example, the SQL API or the SharePoint API) come from these IP addresses.

If you must authorize IP addresses for your Azure SQL database, you should use these addresses.

Required services

The following table lists the services to which Power Automate connects. Ensure none of these services are blocked on your network.

DOMAINS	PROTOCOLS	USES
management.azure.com	https	Access to the Azure Resource Manager.
login.microsoft.com login.windows.net login.microsoftonline.com secure.aadcdn.microsoftonline-p.com	https	Access to authentication and authorization endpoints.
graph.microsoft.com graph.windows.net	https	Access to Microsoft graph - for getting user information such as a profile photo.
*.azure-apim.net	https	Access to the Runtime for Connectors.
*.flow.microsoft.com	https	Access to the Power Automate site.
*.powerapps.com	https	Access to the Power Apps site.

DOMAINS	PROTOCOLS	USES
*.azureedge.net	https	Access to the Power Automate CDN.
nps.onyx.azure.net	https	Access to NPS (Net Promoter Score).
webshell.suite.office.com	https	Access to Office for header and search. Please see the Office 365 urls and ranges for more details.
*.dynamics.com	https	Access to Dataverse tables

Approval email delivery

Please see the approvals email delivery article for details about approvals email routing.

Desktop flows services required for runtime

The following table lists endpoint data requirements for connectivity from a user's machine for desktop flows runs.

ENDPOINT TYPE	DOMAINS	PROTOCOLS	USES
Worldwide endpoints	ocsp.digicert.com ocsp.msocsp.com mscrl.microsoft.com crl3.digicert.com crl4.digicert.com	http	Access to the CRL server for the public cloud. Needed when connecting through the on-premises data gateway.
U.S. Government GCC and GCC High endpoints	ocsp.digicert.com crl3.digicert.com crl4.digicert.com	http	Access to the CRL server for US government cloud. Needed when connecting through the on-premises data gateway.
21Vianet operated endpoints	crl.digicert.cn ocsp.digicert.cn	http	Access to the CRL servers for 21Vianet operated cloud. Needed when connecting through the on-premises data gateway.
All endpoints	msedgedriver.azureedge.net chromedriver.storage.googleapis.com	https	Access to UI Flows WebDriver downloaders.
Worldwide endpoints	*.servicebus.windows.net	https	Listens on Service Bus Relay over TCP. Needed for new machine connectivity.
U.S. Goverment endpoints	*.servicebus.usgovcloudapi.net	https	Listens on Service Bus Relay for US government cloud. Needed for new machine connectivity.

View desktop flows analytics in the Power Platform admin center

1/15/2022 • 2 minutes to read • Edit Online

As an admin, you will need to view the overall status of automation that runs in your organization. There are two options to monitor the analytics for automation that's built with desktop flows:

1. The Power Platform admin center.
2. The Center of Excellence (CoE) Starter Kit.

Learn more

- Analyze the desktop flows risk assessment in your environment.
- Create Windows recorder (V1) flows.
- Create Selenium IDE flows.
- Run desktop flows.

Monitor desktop flows in the Center of Excellence

1/15/2022 • 2 minutes to read • Edit Online

For an overview of the desktop flows in your environment, visit the Microsoft Power Platform Center of Excellence.

Learn more

- Analyze the desktop flows risk assessment in your environment.
- Create Windows recorder (V1) flows.
- Create Selenium IDE flows.
- Run desktop flows.

Data loss prevention (DLP) policies

1/15/2022 • 4 minutes to read • Edit Online

This document introduces you to data loss prevention policies, which help protect your organizational data from being shared with a list of connectors that you define.

What's a data loss prevention policy?

An organization's data is critical to its success. Its data needs to be readily available for decision-making, but it needs to be protected so that it isn't shared with audiences that shouldn't have access to it. To protect this data, Power Automate provides you with the ability to create and enforce policies that define which connectors can access and share business data. The policies that define how data can be shared are referred to as data loss prevention (DLP) policies.

To learn more about protecting your data, see Data loss prevention policies in the Microsoft Power Platform admin guide.

> **IMPORTANT**
>
> Administrators control data loss prevention policies. Contact your administrator if a data loss prevention policy is blocking your flows from running.

Data loss prevention for desktop flows (preview)

> **IMPORTANT**
>
> Data loss prevention for desktop flows is a preview feature and it's subject to change.

Power Automate provides the ability to create and enforce policies that classify desktop flows modules (or individual module actions) as business, non-business, or blocked categories. This categorization prevents makers from combining modules and actions from different categories into a desktop flow, or between a cloud flow and the desktop flows it uses.

> **NOTE**
>
> This feature becomes available in specific regions based on following schedule.

REGION	DATE AVAILABLE
Canada	2021/11/1
Switzerland, Brazil	2021/11/30
Asia, UK, Australia, Japan	2021/12/6
Europe	2022/02/17

REGION	DATE AVAILABLE
US(NAM)	2022/02/17
Government Community Cloud (GCC), Government Community Cloud - High (GCC High), Department of Defense (DoD), China regions	2022/2/17

> **IMPORTANT**
> This capability is available in preview at no cost. When this feature becomes generally available in 2022, it will be available for environments with premium accounts only.

> **NOTE**
> Data loss prevention for desktop flows is available for versions of Power Automate Desktop 2.14.173.21294 or newer. If you are using an older version, uninstall and update to the latest version.

> **NOTE**
> If your users don't have the latest Power Automate Desktop, they will experience limited data loss prevention policy enforcements. The users will not see the design time error messages when they are trying to run, debug from Power Automate Desktop, or save desktop flows that violate data loss prevention policies. We will have background jobs that will periodically scan desktop flows in the environment, and automatically suspend those desktop flows that violate data loss prevention policies. Users won't be able to run desktop flows from a cloud flow if the desktop flow violates any data loss prevention policy.

Create a data loss prevention policy with desktop flows restrictions

> **IMPORTANT**
> When admins edit or create a policy, new Desktop flow connectors will be added to the default group and the policy will be applied once it is saved. If the default group is set to "Blocked" and have Desktop flows running in the target environment(s), these will get suspended.

Admins can create data loss prevention policies from https://admin.powerplatform.microsoft.com. They can manage data loss prevention policy for desktop flows in the same way they manage cloud flow connectors and actions. Desktop flows modules are groups of similar actions as displayed in the Power Automate Desktop user interface. A module is similar to connectors that are used in cloud flows. You can define a data loss prevention policy that manages both desktop flows modules and cloud flows connectors. There are also basic modules such as “Variables” which aren't manageable in the scope of data loss prevention policy because almost all desktop flows need to use those modules.

After the policy is enabled

- Makers with the latest Power Automate Desktop will not be able to debug, run, or save desktop flows that have data loss prevention policy violations.
- Makers will not be able to select a desktop flow that is in violation of a data loss prevention policy from a cloud flow step.

Background jobs

- Every time a data loss prevention policy changes in your environment, a background job scans all existing flows in the environment, and then suspends the flows that violate the updated policy.

- After a data loss prevention policy changes, the background job automatically turns on all the desktop flows that no longer violate any policies. However, the background job will not automatically turn on cloud flows. Makers have to turn them on manually.

Known limitations

1. There's no support for cross checking the categories between a cloud flow and the desktop flows it calls. That function is planned to be available during the first quarter of 2022.
2. There's no support for cross checking the modules that are used between a desktop flow and all its child desktop flows. This feature is planned for general availability.
3. There's no support for "Set default group" from admin center for future added new destkop flow modules that allows admin to specify a different default group for any future added new connectors. This support is planned for general availability.

Next steps

- Learn more about environments
- Learn more about Power Automate
- Learn more about the admin center

Power Automate mobile app supports Microsoft Intune

1/15/2022 • 2 minutes to read • Edit Online

The Power Automate mobile app for iOS and Android supports Intune's Mobile Application Management (MAM) without device enrollment. Using MAM allows IT administrators to create and enforce mobile data policies to safeguard organizational data.

Why Intune support is important

Organizations are looking for more control over the data that resides on employee mobile devices. Organizations might want to restrict how that data moves to the device and ensure the data is removed, should the employee leave the organization.

What is Microsoft Application Management (MAM)

MAM allows organizations to create policies that govern how apps are used within a tenant. This includes enforcing app data encryption, limiting the ability to copy or extract data to only approved applications, or enforcing a PIN on a device.

Prerequisites

- An Intune app protection policy.
- An Azure Active Directory (Azure AD) group.
- Company Portal. One key benefit of using MAM is that devices don't need to be enrolled in Intune MAM. All that's required is the Company Portal, which is available from the App Store and the Google Play store.
- Version 2.31.0 of the Power Automate mobile app for iOS, Android, or Windows Phone.

Create an app protection policy, assign apps to the policy, define settings, and add users to an Azure AD group

For the Power Automate mobile app to be managed, you must:

1. Create an app protection policy.
2. Assign the Power Automate mobile app to the app protection policy.
3. Assign the policy settings. For example, you might assign the policy to require a PIN to access the mobile device that runs the Power Automate mobile app.
4. Apply the app protection policy to a specific Azure AD group.
5. Add all users to which the app protection policy applies to the Azure AD group.

Follow these steps to create an app protection policy that requires Power Automate mobile app users to enter a PIN before they can access the app.

Test the app protection policy

After you've created the app protection policy and assigned users to the Azure AD group, it's time to use the Power Automate mobile app and confirm the policy works.

To confirm the policy works, follow these steps:

1. Install the Power Automate mobile app on a device whose platform matches one of the platforms you defined in the app protection policy.
2. Sign in to the mobile app with an account that's in the Azure AD group that restricts use of the mobile app to users who have a PIN.

You'll then be prompted to:

1. Install the Company Portal.
2. Set your PIN if you don't already have a PIN that meets the app protection policy's criteria.

Learn more

Learn to create an app protection policy.

Learn all about data groups

1/15/2022 • 2 minutes to read • Edit Online

What is a data group?

Data groups are a simple way to categorize services within a data loss prevention (DLP) policy. The two data groups available are the **Business data only** group and the **No business data allowed** group. Organizations are free to determine which services are placed into a particular data group. A good way to categorize services is to place them in groups, based on the impact to the organization. By default, all services are placed into the **No business data allowed** data group. You manage the services in a data group when you create or modify the properties of a DLP policy from the admin center.

Visit the Microsoft Power Platform documentation to learn more about data groups and data loss prevention policies.

Next steps

- Learn more about data loss prevention (DLP) policies
- Learn more about environments

Sharing and connectors admin analytics reports

1/15/2022 • 2 minutes to read • Edit Online

Organizations need insights into how apps are used and who's using them. The Admin analytics sharing and connectors reports provide insights into how Power Automate is being used within your tenant.

Use the shared flows report to learn who your app champions are and then empower them to provide even more automated solutions for your organization. The connectors report identifies Microsoft, third-party, and custom connectors that are in use within your organization.

Visit the Microsoft Power Platform documentation to get the details how to:

- View the shared flows reports.
- View the connectors reports.
- Filter views.

Responding to GDPR Data Subject Requests for Power Automate

1/15/2022 • 4 minutes to read • Edit Online

This article prepares you and your organization for the European Union's General Data Protection Regulation (GDPR). This article not only describes what Microsoft is doing to prepare for the GDPR but also shares examples of steps you can take today to support GDPR compliance when using Power Apps, Power Automate, and Microsoft Dataverse.

Prerequisites

Users and administrators can perform the actions outlined in this article.

Users

A user needs to have an active Azure Active Directory account with a Power Automate license. Users who do not meet this requirement need to ask an administrator to perform these actions.

Administrators

You can perform the operations that require admin privileges, outlined in this article if you sign into the Power Platform admin center or Power Apps Admin PowerShell with an account that has both of these permissions:

- A paid or trial license for Power Apps Plan 2.

  A trial license expires in 30 days.

- Office 365 Global Administrator or Azure Active Directory Global Administrator.

Unmanaged Tenants

If you are a member of an unmanaged tenant, meaning that your Azure AD tenant does not have global administrator, then you will still be able to follow the steps outlined in this article to export and remove your own personal data.

Responding to DSRs for Power Automate customer data

The GDPR gives rights to people (known in the GDPR as data subjects) to manage the personal data that has been collected by an employer or other type of agency or organization (known as the data controller or just controller). Personal data is defined very broadly under the GDPR as any data that relates to an identified or identifiable natural person. The GDPR gives data subjects specific rights to their personal data; these rights include obtaining copies of personal data, requesting corrections to it, restricting the processing of it, deleting it, or receiving it in an electronic format so it can be moved to another controller. A formal request by a data subject to a controller to take an action on their personal data is called a Data Subject Rights (DSR) Request.

This article discusses how to use Microsoft's products, services and administrative tools to help controllers find and act on personal data when responding to DSRs. Specifically, this article includes how to find, access, and act on personal data that reside in Microsoft's cloud. Here’s a quick overview of the processes outlined in this guide:

1. Discover: Use search and discovery tools to more easily find customer data that may be the subject of a DSR. Once potentially responsive documents are collected, you can perform one or more of the DSR actions described in the following steps to respond to the request. Alternatively, you may determine that the request doesn't meet your organization’s guidelines for responding to DSRs. Power Automate DSR Discovery documentation

2. Access: Retrieve personal data that resides in the Microsoft cloud and, if requested, make a copy of it that can be available to the data subject.

3. Rectify: Make changes or implement other requested actions on the personal data, where applicable.

   If a data subject asks you to rectify their personal data that resides in your organization, you and your organization must determine if it's appropriate to honor the request. Rectifying the data may include taking actions such as editing, redacting, or removing personal data.

   You can use Azure Active Directory to manage Power Automate users' identities. Enterprise customers can manage DSR rectify requests, including limited editing features, per the nature of a given Microsoft service. As a data processor, Microsoft doesn't offer the ability to correct system-generated logs because these logs reflect factual activities and constitute a the history of all events within Microsoft services. Learn more about DSR.

4. Restrict: Restrict the processing of personal data, either by removing licenses for various online services or turning off the desired services where possible. You can also remove data from the Microsoft cloud and retain it on-premises or at another location.

   Data subjects may request that you restrict processing of their personal data. Microsoft provides application programming interfaces (APIs) and user interfaces (UIs) for this purpose. These interfaces allow the enterprise customer's tenant administrator to manage such DSRs through a combination of data export and data deletion. A customer may (1) export an electronic copy of the personal data of the user, including account(s), system-generated logs, and associated logs, followed with (2) deletion of the account and associated data residing within Microsoft systems.

5. Delete: Permanently remove personal data that resides in Microsoft's cloud. Learn more about deleting personal data.

6. Export: Provide an electronic copy (in a machine-readable format) of personal data to the data subject. Each section in this article outlines the technical procedures that a data controller organization can take to respond to a DSR for personal data in Microsoft's cloud. Learn more about exporting personal data.

System-generated logs

Refer to this guide for more information on system-generated logs for Power Automate.

See also

To learn more about Microsoft's commitment to trust, security and compliance, visit the Service Trust Portal.

Responding to GDPR Data Subject Discovery Requests for Power Automate

1/15/2022 • 2 minutes to read • Edit Online

The first step in responding to a DSR is finding personal data that is the subject of the request. This first step helps you to determine whether a DSR meets your organization's requirements for honoring or declining a DSR request. For example, after finding and reviewing the personal data at issue, you may determine the request doesn't meet your organization's requirements because doing so may adversely affect the rights and freedoms of others.

Below is a summary of the types of Power Automate resources that contain personal data for a specific user.

RESOURCES CONTAINING PERSONAL DATA	PURPOSE
System-generated logs	Telemetry that captures system events and history.
Run history	The history of each flow execution for the past 28 days. This data includes the start time, end time, status, and all input/output information for the flow. Learn more
Activity feed	Provides a recap of flow activities, including run status, failures, and notifications.
User jobs	Not seen to the user, system jobs that run on behalf of a user in order for flows to execute.
Flows	The workflow logic that exists for a cloud flow. Learn more
Flow permissions	Flows can be shared and re-assigned to other users. Permissions lists exist for all flows. Learn more
User details	Details, which are not seen by user, that support flow execution.
Connections	Used by connectors and allow for connectivity to APIs, systems, databases, etc. Learn more
Connection permissions	Permissions for a specific connection. Learn more
Custom connectors	Custom connectors that a user has created and published that allows for connectivity to custom or third-party systems. Learn more
Custom connector permissions	Permission lists for Custom connectors. Learn more
Gateway	Gateways are on-premises data services that can be installed by a user to transfer data quickly and securely between Power Automate and a data source that isn't in the cloud. Learn more

RESOURCES CONTAINING PERSONAL DATA	PURPOSE
Gateway permissions	Gateways can be shared with users within an organization. Learn more

Responding to GDPR Data Subject Export Requests for Power Automate

1/15/2022 • 4 minutes to read • Edit Online

As part of our commitment to partner with you on your journey to the General Data Protection Regulation (GDPR), we've developed documentation to help you prepare. The documentation not only describes what we're doing to prepare for the GDPR but also shares examples of steps you can take today with Microsoft to support GDPR compliance when using Power Automate.

Manage Export requests

The *right of data portability* allows a data subject to request a copy of their personal data in an electronic format (that's a "structured, commonly used, machine readable, and interoperable format") that may be transmitted to another data controller.

Power Automate offers the following experiences to find or export personal data for a specific user:

- **Website access:** sign into the Power Apps admin center, or the Power Platform admin center.
- **PowerShell access:** Power Apps Admin PowerShell cmdlets.

CUSTOMER DATA	WEBSITE ACCESS	POWERSHELL ACCESS
System-generated logs	Office 365 Service Trust Portal	
Run history	Power Automate Maker Portal	
Flows	Power Automate Maker Portal	
Flow permissions	Power Automate Maker Portal and Power Automate admin center	
User details		Power Apps cmdlets
Connections	Power Automate Maker Portal	Power Apps cmdlets
Connection permissions	Power Automate Maker Portal	Power Apps cmdlets
Custom connectors	Power Automate Maker Portal	Power Apps cmdlets
Custom connector permissions	Power Automate Maker Portal	Power Apps cmdlets
Gateway	Power Automate Maker Portal	On-premises Data Gateway PowerShell cmdlets
Gateway permissions	Power Automate Maker Portal	On-premises Data Gateway PowerShell cmdlets

Export a cloud flow

Either an end user or an administrator, who has granted themselves access to the flow, can export the flow by following these steps:

1. Sign into Power Automate.
2. Select the **My flows** link, and then select the flow to export.
3. Select **... More**, and then select **Export**.

4. Select **Package (.zip)**.

Your flow will now be available as a zipped package. For more information, see the blog post about how to export and import a cloud flow.

Export run history

Run history includes a list of all executions that have occurred for a cloud flow. This data includes the flow's status, start time, duration, and input/output data for triggers and actions.

Either an end user or an administrator, who has been granted access to the flow through the Power Automate admin center, can follow these steps to export this data:

1. Sign into Power Automate.
2. Select the **My flows** link, and then select the flow for which you want to export the run history.
3. In the **RUN HISTORY** pane, select **See all**.

4. Select **Download CSV**.

The run history is downloaded as a .csv file so that you can open it in Microsoft Excel or a text editor and further analyze the results.

Export a user's activity feed

In Power Automate, the activity feed shows a user's history of activities, failures and notifications. Any user can view their activity feed by following these steps:

1. Sign into Power Automate, select the bell icon near the upper-right corner, and then select **Show all activity**.

2. In the **Activity** screen, copy the results, and then paste them into a document editor such as Microsoft Word.

Export a user's connections

Connections allow flows to connect to APIs, SaaS applications, and other third-party systems. Follow these steps to view your connections:

1. Sign into Power Automate, select the gear icon near the upper-right corner, and then select **Connections**.

2. Copy the results, and then paste them into a document editor such as Microsoft Word.

Power Apps Admin PowerShell cmdlets

```
Add-PowerAppsAccount

#Retrieves all connections for the user
Add-PowerAppsAccount
$userId = "7822bb68-7c24-49ce-90ce-1ec8deab99a7"
Get-AdminConnection -CreateBy $userId | ConvertTo-Json |Out-File -FilePath "UserConnections.txt"
```

Export a list of a user's connection permissions

A user can export the connection role assignments for all connection that they have access to via the Get-ConnectionRoleAssignment function in the Power Apps PowerShell cmdlets.

```
Add-PowerAppsAccount
Get-ConnectionRoleAssignment | ConvertTo-Json | Out-File -FilePath "ConnectionPermissions.txt"
```

Power Apps Admin PowerShell cmdlets

```
Add-PowerAppsAccount

#Retrieves all connection permissions for the specified user
Add-PowerAppsAccount
$userId = "7822bb68-7c24-49ce-90ce-1ec8deab99a7"
Get-AdminConnectionRoleAssignment -PrincipalObjectId $userId | ConvertTo-Json | Out-File -FilePath
"ConnectionPermissions.txt"
```

Export a user's custom connectors

Custom connectors supplement the out of box connectors and allow for connectivity to other APIs, SaaS, and custom-developed systems. You can transfer ownership of a custom connector or delete it.

Follow these steps to export a list of customer connectors:

1. Navigate to Power Automate.
2. Select the settings **gear** icon.
3. Select **Custom Connectors**.
4. Copy and paste the list of custom connectors into a text editor such as Microsoft Word.

In addition to the experience provided in Power Automate, you can use the Get-Connector function from the Power Apps PowerShell cmdlets to export all custom connectors.

```
Add-PowerAppsAccount
Get-Connector -FilterNonCustomConnectors | ConvertTo-Json | Out-File -FilePath "CustomConnectors.txt"
```

Power Apps Admin PowerShell cmdlets

```
Add-PowerAppsAccount

#Retrieves all custom connectors for user
Add-PowerAppsAccount
$userId = "7822bb68-7c24-49ce-90ce-1ec8deab99a7"
Get-AdminConnector -CreatedBy $userId | ConvertTo-Json | Out-File -FilePath "UserCustomConnectors.txt"
```

Export a user's custom connector permissions

A user can export all custom connector permissions they have created via the Get-ConnectorRoleAssignment function in the Power Apps PowerShell cmdlets.

```
Add-PowerAppsAccount
Get-ConnectorRoleAssignment | ConvertTo-Json | Out-File -FilePath "CustomConnectorPermissions.txt"
```

Power Apps Admin PowerShell cmdlets

```
Add-PowerAppsAccount

#Retrieves all connection permissions for the specified user
Add-PowerAppsAccount
$userId = "7822bb68-7c24-49ce-90ce-1ec8deab99a7"
Get-AdminConnectorRoleAssignment -PrincipalObjectId $userId | ConvertTo-Json | Out-File -FilePath
"CustomConnectorPermissions.txt"
```

Export approval history

Power Automate Approvals History captures the history of approvals that have been received or sent for a user. Any user can view their approval history by:

1. Signing into Power Automate, selecting **Approvals**, and then selecting **History**.

2. A list shows approvals that the user received. The users can show approvals that they sent by selecting the down arrow next to **Received** and then selecting **Sent**.

Export User Details

User details provide a linkage between a user and a specific tenant. An administrator can export this information by calling the **Get-AdminFlowUserDetails** cmdlet and passing in the Object ID for the user.

Power Apps Admin PowerShell cmdlets

```
Add-PowerAppsAccount

Get-AdminFlowUserDetails -UserId 1b6759b9-bbea-43b6-9f3e-1af6206e0e80
```

Export Gateway Settings

Responding to Data Subject Export Requests for On-Premise Data Gateways can be found here.

Responding to GDPR Data Subject Delete Requests for Power Automate

1/15/2022 • 9 minutes to read • Edit Online

The "right to erasure" by the removal of personal data from an organization's Customer Data is a key protection in the GDPR. Removing personal data includes removing all personal data and system-generated logs, except audit log information.

Power Automate allows users to build automation workflows that are a critical part of your organization's day-to-day operations. When a user leaves your organization, an administrator needs to manually review and determine whether or not to delete certain data and resources that the user created. There is other personal data that's automatically deleted whenever the user's account is deleted from Azure Active Directory.

The following table shows which personal data is automatically deleted and which data requires an administrator to manually review and delete:

REQUIRES MANUAL REVIEW AND DELETION	AUTOMATICALLY DELETED WHEN THE USER IS DELETED FROM AZURE ACTIVE DIRECTORY
Environment*	System-generated logs
Environment permissions**	Run history
Flows	Activity Feed
Flow permissions	Gateway
User details	Gateway permissions
Connections*	
Connection permissions	
Custom connector*	
Custom connector permissions	

*Each of these resources contains "Created By" and "Modified By" records that include personal data. For security reasons, these records are retained until the resource is deleted.

**For environments that include a Microsoft Dataverse database, environment permissions (e.g. which users are assigned to the Environment Maker and Admin roles) are stored as records in Dataverse. Please see Executing DSRs against Dataverse Customer Data, for guidance on how to respond to DSRs for users who use Dataverse.

For the data and resources that require manual review, Power Automate offers the following experiences to find or change personal data for a specific user:

- **Website access:** sign in to the Power Apps admin center or the Power Platform admin center
- **PowerShell access:** Power Apps Admin PowerShell cmdlets

Here is the breakdown of experiences that are available for an administrator to delete each type of personal data

within each type of resource:

RESOURCES CONTAINING PERSONAL DATA	WEBSITE ACCESS	POWERSHELL ACCESS	AUTOMATED DELETION
System-generated logs	Office 365 Service Trust Portal		
Environment	Power Automate admin center	Power Apps cmdlets	
Environment permissions*	Power Automate admin center	Power Apps cmdlets	
Run history			Deleted through 28 day retention policy
Activity feed			Deleted through 28 day retention policy
User jobs			
Flows	Power Automate Maker Portal**		
Flow permissions	Power Automate Maker Portal		
User details		Power Apps cmdlets	
Connections	Power Automate Maker Portal		
Connection permissions	Power Automate Maker Portal		
Custom connector	Power Automate Maker Portal		
Custom connector permissions	Power Automate Maker Portal		
Approval History	Microsoft Power Apps Maker Portal*		

*With the introduction of Dataverse, if a database is created within the environment, environment permissions and model-driven app permissions are stored as records within Dataverse. Please see Responding to Data Subject Rights (DSR) requests for Microsoft Dataverse customer data, for guidance on how to respond to DSRs for users who use Dataverse.

** An admin will only be able to access these resources from the Power Automate Maker Portal if the administrator has been assigned access from the Power Automate admin center.

Manage Delete requests

The steps below describe how administrative functions exist to serve delete requests for GDPR. These steps

should be performed in the order outlined below.

> **IMPORTANT**
>
> To avoid data corruption, follow these steps in order.

List and re-assign flows

These steps copy existing flows for a departing user. If you assign new ownership to the copies, these flows can continue to support existing business processes. Copying these flows is important to delete personal identifier linkages to the departing user and new connections must be established for the flow to connect with other APIs and SaaS applications.

1. Sign into the Power Platform admin center, and then select the environment that contains flows that the deleted user owns.

2. Select **Resources**, > **Flows**, and then select the title for the flow that you want to reassign.

3. Select **Manage sharing**.

4. In the **Share** panel that appears near the right edge, add yourself as an owner, and then select **Save**.

5. Sign into Power Automate, select **My flows**, and then select **Team flows**.

6. Select the ellipsis (**...**) for the flow you want to copy, and then select **Save As**.

7. Configure connections as required, and then select **Continue**.

8. Provide a new name, and then select **Save**.

9. This new version of the flow appears in **My flows**, where you can share it with additional users if you want.

10. Delete the original flow by selecting the ellipsis **(...)** for it, selecting **Delete**, and then select **Delete** again when prompted. This step will also remove underlying personal identifiers that are included in system dependencies between the user and Power Automate.

11. Enable the copy of the flow, by opening **My flows** and then turning the toggle control to **On**.

12. The copy now performs the same workflow logic as the original version.

Delete approval history from Power Automate

Approval data for Power Automate is stored within the current or previous version of Microsoft Dataverse. Within an approval, personal information exists in the form of approval assignments and comments included in an approval response. Administrators can access that data by following these steps:

1. Sign into PowerApps.
2. Select **Data**, and then select **Tables**.
3. Select the ellipsis **(...)** for the **Flow Approval** table, and then open the data in Microsoft Excel.
4. In Microsoft Excel, search, filter, and then delete approval data as required.

Please see Executing DSRs against Microsoft Dataverse Customer Data, for additional guidance on how to respond to DSRs for users who use Microsoft Dataverse.

Delete connections created by a user

Connections are used in conjunction with connectors to establish connectivity with other APIs and SaaS systems. Connections include references to the user who created them and as a result, can be deleted to remove any references to the user.

Power Apps Maker PowerShell cmdlets

A user can delete all of their connections by using the Remove-Connection function from the Power Apps Maker PowerShell cmdlets:

```
Add-PowerAppsAccount

#Retrieves all connections for the calling user and deletes them
Get-AdminPowerAppConnection | Remove-Connection
```

Power Apps Admin PowerShell cmdlets

```
Add-PowerAppsAccount

$deleteDsrUserId = "7822bb68-7c24-49ce-90ce-1ec8deab99a7"
#Retrieves all connections for the DSR user and deletes them
Get-AdminPowerAppConnection -CreatedBy $deleteDsrUserId | Remove-AdminConnection
```

Delete the user's permissions to shared connections

Power Apps Maker PowerShell cmdlets

A user can delete all of their connection role assignments for shared connections Remove-ConnectionRoleAssignment function in the Power Apps Maker PowerShell cmdlets:

```
Add-PowerAppsAccount

#Retrieves all connection role assignments for the calling users and deletes them
Get-ConnectionRoleAssignment | Remove-ConnectionRoleAssignment
```

Power Apps Admin PowerShell cmdlets

```
Add-PowerAppsAccount

$deleteDsrUserId = "7822bb68-7c24-49ce-90ce-1ec8deab99a7"
#Retrieves all shared connections for the DSR user and deletes their permissions
Get-AdminConnectionRoleAssignment -PrincipalObjectId $deleteDsrUserId | Remove-AdminConnectionRoleAssignment
```

> **NOTE**
>
> Owner role assignments cannot be deleted without deleting the connection resource.

Delete custom connectors created by the user

Custom Connectors supplement the existing out of box connectors and allow for connectivity to other APIs, SaaS and custom-developed systems. Custom Connectors do include references to the user who created them and as a result, can be deleted to remove any references to the user.

Power Apps Maker PowerShell cmdlets

A user can delete all of their custom connectors the Remove-Connector function in the Power Apps Maker PowerShell cmdlets:

```
Add-PowerAppsAccount

#Retrieves all custom connectors for the calling user and deletes them
Get-Connector -FilterNonCustomConnectors | Remove-Connector
```

Power Apps Admin PowerShell cmdlets

```
Add-PowerAppsAccount

$deleteDsrUserId = "7822bb68-7c24-49ce-90ce-1ec8deab99a7"
#Retrieves all custom connectors created by the DSR user and deletes them
Get-AdminConnector -CreatedBy $deleteDsrUserId | Remove-AdminConnector
```

Delete the user's permissions to shared custom connectors

Power Apps Maker PowerShell cmdlets

A user can delete all of their connector role assignments for shared custom connector with the Remove-ConnectorRoleAssignment function in the Power Apps Maker PowerShell cmdlets:

```
Add-PowerAppsAccount

#Retrieves all connector role assignments for the calling users and deletes them
Get-ConnectorRoleAssignment | Remove-ConnectorRoleAssignment
```

Power Apps Admin PowerShell cmdlets

```
Add-PowerAppsAccount

$deleteDsrUserId = "7822bb68-7c24-49ce-90ce-1ec8deab99a7"
#Retrieves all custom connector role assignments for the DSR user and deletes them
Get-AdminConnectorRoleAssignment -PrincipalObjectId $deleteDsrUserId | Remove-AdminConnectorRoleAssignment
```

> **NOTE**
> Owner role assignments cannot be deleted without deleting the connection resource.

Delete or reassign all environments created by the user

As an admin you have two decisions to make when processing a DSR delete request for a user for each of the environments that has been created by the user:

1. If you determine that the environment is not being used by anyone else in your organization then you can choose to delete the environment
2. If you determine that the environment is still required, then you can choose to not delete the environment and add yourself (or another user in your organization) as an Environment Admin.

> **IMPORTANT**
> Deleting an environment will permanently delete all resources within the environment, including all apps, flows, connections, etc., so please review the contents of an environment before deletion.

Give access to a user's environments from the Power Automate admin center

An admin can grant Admin access to an environment created by a specific user from the Power Platform admin center. For more information on administrating environments, please navigate to Using environments within Power Automate.>!-- Edit note: Kind of confusing that Power Automate is in the heading but Power Platform is in the first sentence. -->

Delete the user's permissions to all other environments

Users can be assigned permissions (such as Environment Admin, Environment Maker, etc.) in an environment, which is stored in the Power Automate service as a "role assignment."

With the introduction of Microsoft Dataverse, if a database is created within the environment, these "role assignments" are stored as records within Microsoft Dataverse.

For more information on removing a user's permission in an environment, navigate to Using environments within Power Automate.

Delete Gateway Settings

Responding to Data Subject Delete Requests for On-Premise Data Gateways can be found here.

Delete User Details

User details provide a linkage between a user and a specific tenant. Before running this command, ensure that all flows for this user have been re-assigned and/or deleted. Once that has been completed, an administrator can delete user details by calling the **Remove-AdminFlowUserDetails** cmdlet and passing in the Object ID for the user.

Power Apps Admin PowerShell cmdlets

```
Add-PowerAppsAccount
Remove-AdminFlowUserDetails -UserId 1b6759b9-bbea-43b6-9f3e-1af6206e0e80
```

> **IMPORTANT**
> If a user still owns individual or team flows, this command will return an error. To resolve, delete all remaining flows or team flows for this user and run command again.

Delete the user from Azure Active Directory

Once the above steps have been completed, the final step is to delete the user's account for Azure Active Directory by following the steps outlined in the Azure Data Subject Request GDPR documentation that can be found on the Office 365 Service Trust Portal.

Delete the user from Unmanaged Tenant

In the event you are a member of an unmanaged tenant, you need perform an **Account close** action from the Work and School Privacy portal.

To determine whether or not you are a user of a managed or unmanaged tenant, perform the following actions:

1. Open the following URL in a browser, making sure to replace your email address in the

URL:https://login.microsoftonline.com/common/userrealm/foobar@contoso.com?api-version=2.1.

2. If you are a member of an **unmanaged tenant** then you will see an `"IsViral": true` in the response.

   {

   "Login": "foobar@unmanagedcontoso.com",

   "DomainName": "unmanagedcontoso.com",

   "IsViral": **true**,

   }

3. Otherwise, you belong to a managed tenant.

Respond to GDPR Data Subject Rights (DSRs) requests

1/15/2022 • 2 minutes to read • Edit Online

This article describes the European Union's General Data Protection Regulation (GDPR) and provides steps you can take to support GDPR compliance for Power Automate users who authenticate with Microsoft Accounts (MSA).

Prerequisites

You need an MSA with a free Power Automate license to perform the steps in this article.

> **TIP**
>
> GDPR compliance information is also available for users who authenticate with Azure Active Directory accounts.

Respond to DSRs for Power Automate customer data

A data subject's formal request to a controller to take an action on their personal data is called a Data Subject Rights (DSR) request. GDPR defines personal data as **any data that relates to an identified or identifiable natural person**. The GDPR gives people (known as data subjects) rights to manage the personal data that's collected by an employer, agency, or organization (known as the data controller or the controller). These rights include:

- Obtaining copies of personal data.
- Requesting corrections to personal data.
- Restricting processing of personal data.
- Deleting personal data.
- Receiving personal data in an electronic format so that it can be moved to another controller.

Microsoft provides products, services, and tools to help controllers find and act on personal data when responding to DSRs requests for data that lives in the cloud.

Here’s an overview of the processes outlined in this guide:

1. **Discover**: Use search and discovery tools to easily find customer data that may be the subject of a DSR request. If you determine that the documents you collect meet your controller guidelines for taking action, you can perform one or more of the DSR actions described in the following steps. Learn more in the Power Automate DSR Discovery documentation for Microsoft Accounts. Alternatively, you may determine that the request doesn’t meet your controller guidelines for responding to DSR requests.

2. **Access**: Retrieve personal data that resides in the Microsoft cloud and, if requested, make a copy of it so that can be available to the data subject.

3. **Rectify**: Make changes or implement other requested actions on the personal data, where applicable.

4. **Restrict**: Restrict the processing of personal data, either by removing licenses for various online services or turning off the desired services where possible. You can also remove data from the Microsoft cloud and retain it on-premises or at another location.

5. **Delete**: Permanently remove personal data that resides in Microsoft's cloud. Learn more about deleting personal data for Microsoft Accounts. Learn more about closing a Microsoft Account.

6. **Export**: Provide an electronic copy (in a machine-readable format) of personal data. Learn more about exporting personal data for Microsoft Accounts.

Respond to GDPR Data Subject Discovery Requests

1/15/2022 • 2 minutes to read • Edit Online

The first step in responding to a DSR request is to find the personal data that's the subject of the request. Here's a summary of the Power Automate resources that contain personal data for a user who authenticates with their Microsoft Account (MSA).

RESOURCE	PURPOSE
Run history	Provides the history of each flow's execution for the past 28 days. This data includes start time, end time, status, and all input/output information for each flow run. Learn more about flow run history.
Activity feed	Provides a recap of each flow's activities, including run status, failures, and notifications.
Flows	The workflow logic for a flow.
Connections	Used by connectors and allow connectivity to APIs, systems, databases, and more. Learn more about connections.

Respond to GDPR Data Subject Export Requests for Power Automate

1/15/2022 • 2 minutes to read • Edit Online

As part of our commitment to partner with you on your journey to the General Data Protection Regulation (GDPR), we've developed documentation to help you prepare. The documentation not only describes what we're doing to prepare for the GDPR but also shares examples of steps you can take today with Microsoft to support GDPR compliance when using Power Automate.

Manage export requests

The *right of data portability* allows data subjects to request a copy of their personal data in an electronic format (that's a "structured, commonly used, machine readable, and interoperable format") that may be transmitted to another data controller.

Use the Microsoft privacy dashboard, or Power Automate to find or export personal data for a specific user.

PERSONAL DATA	LOCATION
Product and service activity	Microsoft privacy dashboard
Flows	Power Automate maker portal
Run history	Power Automate maker portal
Activity Feed	Power Automate maker portal
Connections	Power Automate maker portal

Export product and service activity

1. Sign into the Microsoft privacy dashboard using your Microsoft Account (MSA).
2. Select **Activity history**.

You can browse your activity history for the different Microsoft applications and services that you use.

3. To export **Product and Service Activity** data select **Download your data**, and then select **CREATE NEW ARCHIVE**.

4. Select **App & service usage**, and then select **Create archive**.

5. A new archive is created. Select **Download** to obtain your exported product and service activity data.

Export a cloud flow

An end user who has access to a cloud flow, can export the flow by following these steps:

1. Sign into Power Automate.

2. Select the **My flows**, and then select the flow to export.

3. Select **... More**, and then select **Export**.

4. Select **Package (.zip)**.

Your flow will now be available as a zipped package. For more information, see the blog post about how to

export and import a cloud flow.

Export run history

Run history includes a list of all runs for a cloud flow. This data includes the flow's status, start time, duration, and input/output data for triggers and actions.

An end user who has access to the flow can follow these steps to export this data:

1. Sign into Power Automate.
2. Select the **My flows** link, and then select the flow for which you want to export the run history.
3. In the **RUN HISTORY** pane, select **See all**.

4. Select **Download CSV**.

The run history is downloaded as a .csv file so that you can open it in Microsoft Excel or a text editor to analyze the results.

Export a user's activity feed

In Power Automate, the activity feed shows a user's history of activities, failures and notifications. Users can view their activity feed by following these steps:

1. Sign into Power Automate, select the bell icon near the upper-right corner, and then select **Show all activity**.

2. In the **Activity** screen, copy the results, and then paste them into a text editor such as Microsoft Word.

Export a user's connections

Connections allow flows to connect to APIs, SaaS applications, and other third-party systems. Follow these steps to view your connections:

1. Sign into Power Automate, select the gear icon near the upper-right corner, and then select **Connections**.

2. Copy the results, and then paste them into a text editor such as Microsoft Word.

Respond to GDPR Data Subject Delete Requests

1/15/2022 • 2 minutes to read • Edit Online

The **right to erasure** by the removal of personal data is a key protection in the GDPR. Removing personal data includes removing all personal data except audit log information.

Power Automate allows users to build automated workflows. When a user decides to delete their personal data from Power Automate, the user can review their personal data, and determine whether to delete some or all of it.

The following table shows which personal data is automatically deleted and which data requires a Microsoft Account (MSA) user to review and delete it.

REQUIRES THE MSA USER TO REVIEW AND DELETE	AUTOMATICALLY DELETED
Product and service activity	Run history
Flows	Activity Feed
Connections	

Power Automate offers the following experiences to help users find, review, or change personal data and resources that aren't automatically deleted:

Manage Delete requests

The steps below describe how to self-serve delete requests for GDPR.

Delete Product and service activity

1. Sign into the Microsoft Privacy Dashboard with your MSA.
2. Select the **Activity history** link.

3. You can search or browse your activity history for the different Microsoft applications and services that you use, including Power Automate. Select **Delete** to remove specific product or service activity events.

4. Within a few moments, the item is deleted and removed from privacy dashboard.

List and delete flows

A user can list and delete their flows from Power Automate by following these steps:

1. Sign into the Power Automate, and then select on **My flows**.

2. Select ... beside the flow that you're deleting, and then select **Delete**.

Delete Connections

Connectors use connections to communicate with APIs and SaaS systems. Connections include references to the user who creates them. The user can delete these references at any time by following these steps:

1. Sign into Power Automate, select the gear icon, and then select **Connections**.

2. Select the connection that you'd like to delete, select ..., and then select **Delete**.

3. Select the **Delete** icon on the confirmation prompt.

> **NOTE**
>
> If other flows use the connection you're deleting, you're notified that a new connection is required. Otherwise, select **Delete** to continue.

Learn more

- Get started with Power Automate
- Learn what's new with Power Automate

Responding to GDPR Data Subject Account Close Requests for Power Automate

1/15/2022 • 2 minutes to read • Edit Online

The **right to erasure** of personal data is a key protection in the GDPR. This right includes removing all personal data except audit log information. When users decide to close their Microsoft Account (MSA), the user's underlying data is also deleted.

These resources contain personal data that are automatically deleted when a user closes an MSA:

RESOURCES CONTAINING PERSONAL DATA
Product and service activity
Run history
Flows
Activity Feed
User details
Connections

Account Close requests

These steps describe how to self-serve Account Close requests for GDPR.

1. Sign into the Microsoft Account Close Portal using your Microsoft Account, and then select **Next**.

> **NOTE**
> You're reminded to cancel existing subscriptions or to export data from existing services to which you may have subscribed.

2. Acknowledge that you understand the impact of closing your MSA, and then select **Mark account for closure**.

   A notification appears, indicating that your account will be closed in 30 days. You may reopen this account at any time during this 30-day period.

   At the end of this 30-day window, the process to delete all Power Automate resources for this MSA begins.

Learn more

- Get started with Power Automate
- Learn what's new with Power Automate

Power Automate US Government

1/15/2022 • 15 minutes to read • Edit Online

In response to the unique and evolving requirements of the United States public sector, Microsoft has created Power Automate US Government plans. This section provides an overview of features that are specific to Power Automate US Government. We recommend that you read this supplementary section as well as the Power Automate service getting started topic. For brevity, this service is commonly referred to as Power Automate Government Community Cloud (GCC), Power Automate Government Community Cloud – High (GCC High), or Power Automate Department of Defense (DoD).

The Power Automate US Government Service Description serves as an overlay to the general Power Automate Service Description. It defines the unique commitments and differences compared to the general Power Automate offerings that have been available to our customers since October 2016.

About Power Automate US Government environments and plans

Power Automate US Government plans are monthly subscriptions and it can be licensed to an unlimited number of users.

The Power Automate GCC environment is compliant with the Federal requirements for cloud services, including FedRAMP High, and DoD DISA IL2. It is also compliant with the criminal justice systems (CJI data types) requirements.

In addition to the features and capabilities of Power Automate, organizations that use Power Automate US Government benefit from the following unique features:

- Your organization's customer content is physically separated from customer content in commercial offering of Power Automate.
- Your organization's customer content is stored within the United States.
- Access to your organization's customer content is restricted to screened Microsoft personnel.
- Power Automate US Government complies with all certifications and accreditations that US Public Sector customers require.

Beginning September 2019, eligible customers can choose to deploy Power Automate US Government to the **GCC High** environment, which enables single sign-on and seamless integration with Microsoft Office 365 GCC High deployments.

Microsoft has designed the platform and our operational procedures to meet the requirements aligning with the DISA SRG IL4 compliance framework. We anticipate the US Department of Defense contractor customer base and other Federal agencies currently leveraging Office 365 GCC High to use the Power Automate US Government GCC High deployment option. This option enables and requires the customer to leverage Azure AD Government for customer identities, in contrast to GCC, which leverages the public Azure AD. For the US Department of Defense contractor customer base, Microsoft operates the service in a manner that enables these customers to meet ITAR commitment and DFARS acquisition regulations, as documented and required by their contracts with the US Department of Defense. A Provisional Authority to Operate has been granted by DISA.

Beginning April, 2021, eligible customers may now choose to deploy Power Automate US Government to the "DoD" environment, which enables single sign-on and seamless integration with Microsoft 365 DoD deployments. Microsoft has designed the platform and operational procedures in accordance with the DISA SRG IL5 compliance framework. DISA has granted a Provisional Authority to Operate.

Customer eligibility

Power Automate US Government is available to (1) US federal, state, local, tribal, and territorial government entities, and (2) other entities, which handle data that is subject to government regulations and requirements and where use of Power Automate US Government is appropriate to meet these requirements, subject to validation of eligibility. Microsoft's validation of eligibility includes confirmation of handling data subject to International Traffic in Arms Regulations (ITAR), law enforcement data subject to the FBI's Criminal Justice Information Services (CJIS) Policy, or other government-regulated or controlled data. Validation may require sponsorship by a government entity with specific requirements for the handling of data.

Entities with questions about eligibility for Power Automate US Government should consult their account team. Microsoft re-validates eligibility when it renews customer contracts for Power Automate US Government.

> **NOTE**
>
> Power Automate US Government DoD is only available to DoD entities.

Power Automate US Government plans

Access to Power Automate US Government plans is restricted to the offerings described in the following section; each plan is offered as a monthly subscription and can be licensed to an unlimited number of users:

- Power Automate per flow plan for Government
- Power Automate per user plan for Government
- In addition to the standalone plans, Microsoft 365 US Government and Dynamics 365 US Government plans also include the Power Apps and Power Automate capabilities, allowing customers to extend and customize Microsoft 365 and customer engagement apps (Dynamics 365 Sales, Dynamics 365 Customer Service, Dynamics 365 Field Service, and Dynamics 365 Project Service Automation).

Additional information and details regarding the differences in functionality between these groups of licenses are described in more detail here: Power Automate licensing information.

Power Automate US Government is available through the Volume Licensing and Cloud Solution Provider purchasing channels. The Cloud Solution Provider program is not currently available for GCC High customers.

Differences between customer data and customer content

Customer data, as defined in the Online Service Terms, means all data, including all text, sound, video, or image files, and software that are provided to Microsoft by, or on behalf of, customers through the use of an Online Service.

Customer content refers to a specific subset of customer data that has been directly created by users, such as content stored in databases through entries in the Dataverse entities (for example, contact information). Content is generally considered confidential information, and in normal service operations, is not sent through the Internet without encryption.

For more information on how Power Automate protects customer data, see the Microsoft Online Services Trust Center.

Data segregation for Government Community Cloud

When provisioned as part of Power Automate US Government, the Power Automate service is offered in accordance with the National Institute of Standards and Technology (NIST) Special Publication 800-145.

In addition to the logical separation of customer content at the application layer, the Power Automate Government service provides your organization with a secondary layer of physical segregation for customer content by using infrastructure that is separate from the infrastructure used for commercial Power Automate customers. This includes using Azure services in Azure's Government Cloud. To learn more, see Azure Government.

Customer content located within the United States

Power Automate US Government runs in datacenters physically located in the United States and stores customer content at rest in datacenters physically located only in the United States.

Restricted data access by administrators

Access to Power Automate US Government customer content by Microsoft administrators is restricted to personnel who are US citizens. These personnel undergo background investigations in accordance with relevant government standards.

Power Automate support and service engineering staff do not have standing access to customer content hosted in Power Automate US Government. Any staff who requests temporary permission elevation, which would grant access to customer content must first have passed the following background checks.

MICROSOFT PERSONNEL SCREENING AND BACKGROUND CHECKS [1]	DESCRIPTION
U.S. citizenship	Verification of U.S. citizenship
Employment history check	Verification of seven (7) year employment history
Education verification	Verification of highest degree attained
Social Security number (SSN) search	Verification that the SSN the employees provides is valid
Criminal history check	A seven (7) year criminal record check for felony and misdemeanor offenses at the state, county, and local level and at the federal level
Office of Foreign Assets Control list (OFAC)	Validation against the Department of Treasury list of groups with whom U.S. persons are not allowed to engage in trade or financial transactions
Bureau of Industry and Security list (BIS)	Validation against the Department of Commerce list of individuals and entities barred from engaging in export activities
Office of Defense Trade Controls Debarred Persons list (DDTC)	Validation against the Department of State list of individuals and entities barred from engaging in export activities related to the defense industry
Fingerprinting check	Fingerprint background check against FBI databases
CJIS background screening	State-adjudicated review of federal and state criminal history by state CSA appointed authority within each state that has signed up for the Microsoft CJIS IA program

MICROSOFT PERSONNEL SCREENING AND BACKGROUND CHECKS	DESCRIPTION
Department of Defense IT-2	Staff who request elevated permissions to customer data or privileged administrative access to DoD SRG L5 service capacities must pass DoD IT-2 adjudication, based on a successful OPM Tier 3 investigation.

[1] Applies only to personnel with temporary or standing access to customer content hosted in Power Automate US Governments (GCC, GCC High, and DoD).

Certifications and accreditations

Power Automate US Government is designed to support the Federal Risk and Authorization Management Program (FedRAMP) accreditation at a High Impact level. This program infers alignment to DoD DISA IL2. FedRAMP artifacts are available for review by federal customers who are required to comply with FedRAMP. Federal agencies can peruse these artifacts in support of their review to grant an Authority to Operate (ATO).

> **NOTE**
>
> Power Automate is authorized as a service within the Azure Government FedRAMP ATO. For more information, including how to access the FedRAMP documents, review the FedRAMP Marketplace.

Power Automate US Government has features designed to support customers' CJIS Policy requirements for law enforcement agencies. Visit the Power Automate US Government products page in the Trust Center for more detailed information related to certifications and accreditations.

Microsoft designed this platform and its operational procedures to meet the requirements for the DISA SRG IL4 and IL5 compliance frameworks and has received the requisite DISA Provisional Authorities to Operate. Microsoft anticipates that the US Department of Defense contractor customer base and other Federal agencies currently leveraging Microsoft Office 365 GCC High to use the Power Automate US Government GCC High deployment option, which enables and requires customers to leverage Azure AD Government for customer identities, in contrast to GCC, which leverages the public Azure AD. For the US Department of Defense contractor customer base, Microsoft operates the service in a manner that enables these customers to meet ITAR commitment and DFARS acquisition regulations. Further, Microsoft expects its US Department of Defense customers who currently use Microsoft 365 DoD to use the Power Automate US Government DoD deployment option.

Power Automate US Government and other Microsoft services

Power Automate US Government includes several features that allow users to connect to, and integrate with, other Microsoft enterprise service offerings such as Office 365 US Government, Dynamics 365 US Government, and Power Apps US Government.

Power Automate US Government runs within Microsoft datacenters in a manner consistent with a multi-tenant, public cloud deployment model; however, client applications including, but not limited to the web-user client, Power Automate mobile application (when available), and any third-party client application that connects to Power Automate US Government, are not part of Power Automate US Government's accreditation boundary. Government customers are responsible for managing them.

Power Automate US Government leverages the Office 365 customer administrator UI for customer administration and billing.

Power Automate US Government maintains the actual resources, information flow, and data management, while relying on Office 365 to provide the visual styles that are presented to the customer administrator through their

management console. For purposes of FedRAMP ATO inheritance, Power Automate US Government leverages Azure (including Azure for Government and Azure DoD) ATOs for infrastructure and platform services, respectively.

If you adopt the use of Active Directory Federation Services (AD FS) 2.0 and set up policies to help ensure your users connect to the services through single sign-on, any customer content that is temporarily cached will be located in the United States.

Power Automate US Government and third-party services

Power Automate US Government provides the ability to integrate third-party applications into the service through Connectors. These third-party applications and services might involve storing, transmitting, and processing your organization's customer data on third-party systems that are outside of the Power Automate US Government infrastructure and therefore are not covered by the Power Automate US Government compliance and data protection commitments.

> **TIP**
> Review the privacy and compliance statements provided by the third parties when assessing the appropriate use of these services for your organization.

Power Apps and Power Automate Governance Considerations can help your organization bring awareness about the capabilities available across several related themes, such as architecture, security, alert and action, and monitoring.

Configure mobile clients

Here are the steps that you must take to sign in with the Power Automate mobile client. Currently, only the iOS version of the mobile client supports connecting to GCC environments.

1. On the sign-in page, select the gear icon in the lower-right corner.
2. Select **Region settings**.
3. Select GCC: US Government GCC
4. Select OK.
5. On the sign-in page, select **Sign in**.

The mobile application will now use the US Government Cloud.

Power Automate US Government and Azure Services

The Power Automate US Government services are deployed to Microsoft Azure Government. Azure Active Directory (Azure AD) is not part of the Power Automate US Government accreditation boundary, but takes a reliance on a customer's Azure AD tenant for customer tenant and identity functions, including authentication, federated authentication, and licensing.

When a user of an organization employing ADFS attempts to access Power Automate US Government, the user is redirected to a login page hosted on the organization's ADFS server.

The user provides credentials to their organization's ADFS server. The organization's ADFS server attempts to authenticate the credentials using the organization's Active Directory infrastructure.

If authentication is successful, the organization's ADFS server issues a SAML (Security Assertion Markup Language) ticket that contains information about the user's identity and group membership.

The customer's ADFS server signs this ticket using one half of an asymmetric key pair and then it sends the

ticket to Azure AD via encrypted TLS. Azure AD validates the signature using the other half of the asymmetric key pair and then grants access based on the ticket.

The user's identity and group membership information remain encrypted in Azure AD. In other words, only limited user-identifiable information is stored in Azure AD.

You can find full details of the Azure AD security architecture and control implementation in the Azure SSP.

The Azure AD account management services are hosted on physical servers managed by the Microsoft Global Foundation Services (GFS). Network access to these servers is controlled by GFS-managed network devices using rules set by Azure. Users do not interact directly with Azure AD.

Power Automate US Government service URLs

You use a different set of URLs to access Power Automate US Government environments, as shown in the following table. The table includes the commercial URLs too for contextual reference, in case they are more readily familiar to you.

COMMERCIAL VERSION	US GOVERNMENT VERSION
https://flow.microsoft.com	https://gov.flow.microsoft.us (GCC), https://high.flow.microsoft.us (GCC High), and https://flow.appsplatform.us (DoD)
https://admin.powerplatform.microsoft.com/	https://gcc.admin.powerplatform.microsoft.us/ (GCC), https://high.admin.powerplatform.microsoft.us/ (GCC High), and https://admin.appsplatform.us (DoD)
https://flow.microsoft.com/connectors	https://gov.flow.microsoft.us/connectors (GCC), https://high.flow.microsoft.us/connectors (GCC High), https://flow.appsplatform.us/connectors/ (DoD)

For those customers that implement network restrictions, please ensure access to the following domains are made available to your end-users' access points:

GCC Customers:

- .microsoft.us
- .azure-apihub.us
- .azure.us
- .usgovcloudapi.net
- .microsoftonline.com
- .microsoft.com
- .windows.net
- .azureedge.net
- .azure.net
- .crm9.dynamics.com

Refer to the IP ranges for AzureCloud.usgovtexas and AzureCloud.usgovvirginia to enable access to Dataverse instances that users and administrators may create within your Tenant.

GCC High Customers:

- .microsoft.us
- .azure-apihub.us
- .azure.us

- .usgovcloudapi.net
- .microsoftonline.us
- .azureedge.net
- .azure.net
- .crm.microsoftdynamics.us(GCC High)
- *.high.dynamics365portals.us (GCC High)
- *.crm.appsplatform.us (DoD)
- *.appsplatformportals.us (DoD)

Also, refer to the IP ranges to enable you to access other Dataverse environments that users and administrators may create within your tenant and other Azure services that the platform leverages, including:

- GCC and GCC High: Focus on AzureCloud.usgovtexas and AzureCloud.usgovvirginia.
- DoD: Focus on USDoD East and USDoD Central.

Connectivity between Power Automate US Government and Public Azure Cloud services

Azure is distributed among multiple clouds. By default, tenants are allowed to open firewall rules to a cloud-specific instance, but cross-cloud networking is different and requires opening specific firewall rules to communicate between services. If you are a Power Automate customer and you have existing SQL instances in azure public cloud, which you need to access, you must open specific firewall ports in SQL to the Azure Government Cloud IP space for the following datacenters:

- USGov Virginia
- USGov Texas
- US DoD East
- US DoD Central

Refer to the Azure IP Ranges and Service Tags – US Government Cloud document, focusing attention on AzureCloud.usgovtexas, and AzureCloud.usgovvirginia, and/or US DoD East, and US DoD Central as noted previously in this article. Also note that these are the IP ranges required for your end-users to have access to the service URLs.

On-premises Data Gateway configuration

Install an on-premises data gateway to transfer data quickly and securely between a canvas app that's built in Power Automate and a data source that isn't in the cloud. Examples include on-premises SQL Server databases or on-premises SharePoint sites.

If your organization (tenant) has configured and successfully connected the nn-premises data gateway for PowerBI US Government, then the process your organization followed to enable that also enables on-premises connectivity for Power Automate.

Formerly, US Government customers needed to contact support before configuring their first on-premises data gateway, because support would need to give permission to the tenant to allow gateway use. This is no longer necessary. If you encounter any issues configuring or using the on-premises data gateway, you may contact support for assistance.

Power Automate US Government feature limitations

Some of the features available in the commercial version of Flow are not available in Flow US Government customers. The Power Automate team is actively working on making these features available to US Government

customers and will update this article when these features become available.

- AI Builder is not yet available in DoD tenants.
- Approvals are available, subject to the following:
  - There is no actionable approval support. Approval emails will contain links to the Power Automate approvals center for users to respond.
  - There is no markdown support for approval email.
  - Approvals are not available in DoD tenants.
- Submitting Templates
- Connectors – The most popular connectors in use in our commercial service (based on usage telemetry) have been published; if there is a connector available in the commercial offering that you do not see deployed, contact support and we will review your request.

> **NOTE**
>
> Third-party connectors will not be added to GCC High nor DoD.

Microsoft is investigating the data loss prevention (DLP) feature, considering the possibility for connectors to be *blocked by default*. Until this is possible, third-party connectors pose a measurable threat to organizations relying on the GCC High environment to maintain requisite data exfiltration controls.

- Power BI – Power Automate US Government doesn't support Power BI.
- Power Platform admin center – You can use the admin center to open support tickets, but other functionality is currently not available in US Government tenants.
- Desktop flows - To install the on-premises data gateway in DoD, go to **Data** > **Gateways** in the left navigation, and then select **New gateay**.

See also

- Desktop flows.
- Dynamics 365 US Government.
- Power Apps US Government.

Power Automate regions overview

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In Power Automate, your flows are created within your Microsoft Power Platform environment. These environments are specific to a region, which corresponds to the location of the datacenters where your Microsoft Power Platform environment is stored.

In other words, your flows are deployed in the datacenter region that hosts your Microsoft Power Platform environment.

More information about Microsoft Power Platform regions

Overview of Power Platform regions

Azure geographies

Region mappings for Power Automate and gateways

The region where the gateway is installed must map to your Power Automate region. Cross geographic boundaries aren't supported.

Here's the mapping information:

POWER PLATFORM REGION	GATEWAY REGION
Asia	East Asia, Southeast Asia
Australia	Australia East, Australia Southeast
Canada	Canada Central, Canada East
Europe	North Europe, West Europe
France	France Central, France South
India	Central India, South India, West India
Japan	Japan East, Japan West
South America	Brazil South
Switzerland	Switzerland North
United Kingdom	UK South, UK West
United States including Preview	Central US, East US 2, East US, North Central US, South Central US, West US 2, West Central US, West US

Frequently asked questions

What region should I use?

It's a good idea to create your flow in an environment that's in the region closest to your customers. When the datacenters that host your environment are closer to the people accessing the information, you're likely to see better performance.

How can I find out the region where my flow is deployed?

Administrators can identify the region by signing in to the Power Platform admin center. The **Environments** tab lists all existing environments and their regions.

Is Power Automate available in national clouds?

Yes. Learn more.

What outbound IP addresses are used in each region?

See Limits and configuration.

Limits for automated, scheduled, and instant flows

1/15/2022 • 12 minutes to read • Edit Online

This topic contains information about the current limits and configuration details for automated, scheduled, and instant flows.

> **TIP**
> Check out the pricing for details on the different plans that are available.

Performance profiles

Flows have different limits depending on their *performance profile*. There are five possible values, depending on the flow owner's plan.

PERFORMANCE PROFILE	PLANS
Low	- Free - Microsoft 365 plans - Power Apps Plan 1, Per App plans - Power Automate Plan 1 - All license trials Dynamics 365 Team Member
Medium	- Power Apps triggered flows, child flows, Power Apps Plan 2, Power Apps per user plan - Power Automate Plan 2, Power Automate per user, Power Automate per user with Attended RPA plans Dynamics 365 Enterprise plans, Dynamics 365 Professional plans - Dynamics 365 non-licensed users, application users, users with special free licenses
High	- Power Automate per flow plan

If a user has multiple plans, such as a Microsoft 365 plan and a Dynamics 365 plan, the flow will have the performance profile of the higher of the two plans. For the exact set of plans that include Power Automate, see the Microsoft Power Platform Licensing Guide.

If needed, users can see their current plan by opening the session debugging information by pressing Ctrl+Alt+A in the maker portal. The current plan being used will have isCurrent=true.

The flow uses the plan of the owner of a cloud flow. If a cloud flow has been shared with multiple people then generally the owner is the original creator. If unsure, you can see and change the owner a cloud flow using the Web API. At this time, if the original owner leaves an organization, the flow will continue to use the same performance profile until next updated, although in the future, it may be reverted to the Low performance profile.

Flow definition limits

Here are the limits for a single flow definition:

NAME	LIMIT	NOTES
Actions per workflow	500	To extend this limit, you can add child flows as needed.
Allowed nesting depth for actions	8	To extend this limit, you can add child flows as needed.
Switch scope cases limit	25	
Variables per workflow	250	
Name for `action` or `trigger`	80 characters	
Characters per expression	8,192	
Length of `description`	256 characters	
Maximum size for `trackedProperties`	16,000 characters	

My flows limit

Here is the limit for the My flow and Team flows tab:

NAME	LIMIT	NOTES
Number of flows owned by a single user	600	To extend this limit, use flows under solutions.

Duration and retention limits

Duration limits

Duration limits for a single flow run:

NAME	LIMIT	NOTES
Run duration	30 days	Run duration is calculated by using a run's start time. Includes flows with pending steps like approvals. After 30 days, any pending steps time-out.
Run retention in storage	30 days	Run retention is calculated by using a run's start time.
Minimum recurrence interval	60 seconds	
Maximum recurrence interval	500 days	
Minimum postpone interval	5 seconds for Low, 1 second for all others	

Expiration limits

Limits on how long flows will remain turned on before they expire and get turned off

NAME	LIMIT	NOTES
Flows with errors	14 days	A cloud flow that has a trigger or actions which fail continuously will be turned off. Fix your trigger or actions and turn on the flow.
Not triggered (dormant) flows	90 days for Free, Trial, Community and Microsoft 365 Plans.No expiration limit for all others	A cloud flow that has no successful triggers will expire and be turned off. After 90 days of inactivity, the flow creator will receive an email. If no action is taken in next 30 days, the flow will be systematically turned off and the creator will be notified in an email. For enterprise scenarios, we recommend you buy a standalone Power Automate license listed in Pricing article to ensure your flow isn't turned off due to inactivity. You can turn your cloud flows back on anytime.
Consistently throttled flows	14 days	A cloud flow that is consistently throttled for 14 days will be turned off. The flow creator will get an email when the flow starts throttling and when the flow is turned off. For enterprise scenarios, we recommend you buy a standalone Power Automate license listed in Pricing article to get higher action limits. You can turn your cloud flows back on anytime.

Concurrency, looping, and debatching limits

Here are the limits for a single flow run:

NAME	LIMIT	NOTES
Trigger concurrency	- Unlimited when the concurrency control is turned off - 25 is the default limit when the concurrency control is turned on, which you can't undo after you enable concurrency. You can change the default to a value between 1 and 50 inclusively.	This limit describes the highest number of flow runs that can run at the same time, or in parallel. **Note**: When concurrency is turned on, the SplitOn limit is reduced to 100 items for debatching arrays.
Maximum waiting runs	- Without concurrency, the minimum number of waiting runs is 1, while the maximum number is 50. - With concurrency, the minimum number of waiting runs is 10 plus the number of concurrent runs (trigger concurrency). You can change the maximum number in the settings for the trigger under **Concurrency Control**.	This limit describes the highest number of flow runs that can wait to run when your flow is already running the maximum concurrent instances.

NAME	LIMIT	NOTES
Apply to each array items	5,000 for Low, 100,000 for all others	This limit describes the highest number of array items that a "apply to each" loop can process. To filter larger arrays, you can use the query action.
Apply to each concurrency	1 is the default limit. You can change the default to a value between 1 and 50 inclusively.	This limit is highest number of "apply to each" loop iterations that can run at the same time, or in parallel.
Split on items	- 5,000 for Low without trigger concurrency - 100,000 for all others without trigger concurrency - 100 with trigger concurrency	For triggers that return an array, you can specify an expression that uses a 'SplitOn' property that splits or debatches array items into multiple workflow instances for processing, rather than use a "Foreach" loop. This expression references the array to use for creating and running a workflow instance for each array item. **Note**: When concurrency is turned on, the Split on limit is reduced to 100 items.
Until iterations	- Default: 60 - Maximum: 5,000	
Paginated items	5,000 for Low, 100,000 for all others	To process more items, trigger multiple flow runs over your data.

Throughput limits

Here are the time-bound limits for a single version of a cloud flow definition. These limits apply across all runs of the flow version, and are calculated on sliding windows.

If a cloud flow exceeds one of the limits, activity for the flow will be slowed and will automatically resume when the sliding window has activity below the limit. However, if a cloud flow consistently remains above the limits for 14 days, it will be turned off (see above duration limits). Be sure to monitor email for notifications about such flows. If a cloud flow consistently exceeds the limits, you will need to update the flow to remain below the limits to prevent it from being turned off.

> **TIP**
> Because these limits are for a single version, if you update your flow it will reset these limits.

Action request limits

There are limits to the number of *actions* a cloud flow can run. These runs are counted for all types of actions, including connector actions, HTTP actions, and built-in actions from initializing variables to a simple compose action. Both succeeded and failed actions count towards these limits. Additionally, retries and additional requests from pagination count as action runs. You can see the number of actions your flow has run by selecting **Analytics** from the flow details page and looking at the **Actions** tab.

NAME	TRANSITION PERIOD LIMIT	NOTES
Actions per 5 minutes	100,000	Distribute the workload across more than one flow as necessary.
Actions per 24 hours	10,000 for Low, 100,000 for Medium and 500,000 for High	Because of the current transition period (in the year of 2020) these limits are less strict than the values called out in the requests limits and allocations document. These limits represent approximations of how many requests will be allowed daily. They are not guarantees. Actual amounts may be smaller, but will be greater than the documented requests limits and allocations during the transition period. The documented limits were substantially increased in late 2021. Generally available reporting for Power Platform requests is expected in the first quarter of calendar year 2022. Any potential high usage enforcement wouldn't start until six months after reports have been made available. Distribute the workload across more than one flow as necessary.
Concurrent outbound calls	500 for Low, 2,500 for all others	You can reduce the number of concurrent requests or reduce the duration as necessary.

As of October 2019, there are limits on the number of Microsoft Power Platform requests an account can make across **all** of their flows, Power Apps, or any applications calling into the Microsoft Dataverse. No performance is guaranteed above these limits, although enforcement of these limits is not as strict during the transition period (as mentioned earlier). For more information about these, refer to requests limits and allocations.

> **TIP**
> Individual connectors have their own limits as well, which often will be reached before the limits mentioned earlier. Be sure to check the documentation for your connector.

Runtime endpoint request limits

The runtime endpoint is the direct access URL for a given flow. It starts with something like: `https://prod-00.westus.logic.azure.com:443/`.

NAME	LIMIT	NOTES
Concurrent inbound calls	~1,000	You can reduce the number of concurrent requests or reduce the duration as necessary.
Read calls per 5 minutes	6,000 for Low, 60,000 for all others	This limit applies to calls that get the raw inputs and outputs from a cloud flow's run history. You can distribute the workload across more than one flow as necessary.

NAME	LIMIT	NOTES
Invoke calls per 5 minutes	4,500 for Low, 45,000 for all others	You can distribute workload across more than one flow as necessary.

Content throughput limits

The content throughput limits refer to the amount of data that is read from or written to the run history of the cloud flow.

NAME	LIMIT	NOTES
Content throughput per 5 minutes	600 MB for Low, 6 GB for all others	You can distribute workload across more than one flow as necessary.
Content throughput per 24 hours	1 GB for Low, 10 GB for Medium, 50 GB for High	You can distribute workload across more than one flow as necessary.

Gateway limits

Power Automate supports write operations, including inserts and updates, through the gateway. However, these operations have limits on their payload size.

HTTP limits

Here are the limits for a single outgoing or incoming HTTP call:

Timeout

Some connector operations make asynchronous calls or listen for webhook requests, so the timeout for these operations might be longer than these limits. For more information, see the technical details for the specific connector.

NAME	LIMIT	NOTES
Outbound synchronous request	120 seconds (2 minutes)	Examples of outbound requests include calls made by HTTP triggers. **Tip**: For longer running operations, use an asynchronous polling pattern or an until loop. To work around timeout limits when you call another flow that has a callable endpoint, you can use the built-in action instead, which you can find in the connector picker under **Built-in**.
Outbound asynchronous request	Configurable up to 30 days	
Inbound request	120 seconds (2 minutes)	Examples of inbound requests include calls received by request triggers and webhook triggers. **Note**: For the original caller to get the response, all steps in the response must finish within the limit unless you call another flow as a child flow.

> **NOTE**
> If you test a cloud flow that runs for longer than 10 minutes, you may get a timeout message in Power Automate, even though the flow continues to run in the background. If this happens, reopen the view to receive the current status.

Message size

NAME	LIMIT	NOTES
Message size	100 MB	To work around this limit, consider allowing chunking under the action content transfer settings. However, some connectors and APIs might not support chunking or even the default limit.
Message size with chunking	1 GB	This limit applies to actions that either natively support chunking or let you enable chunking in their runtime configuration.

Character limits

NAME	NOTES	
Expression evaluation limit	131,072 characters	The `@concat()`, `@base64()`, `@string()` expressions can't be longer than this limit.
Request URL character limit	16,384 characters	

Retry policy

Default retry policy

PERFORMANCE PROFILE	DESCRIPTION
Low	This policy sends up to two retries at *exponentially increasing* intervals, which scale by 5 minutes up to an interval of approximately 10 minutes for the last retry.
Medium, High	This policy sends up to eight retries at *exponentially increasing* intervals, which scale by 7 seconds up to an interval of approximately 15 minutes for the last retry.

Retry setting limits

To change the default settings, use the retry policy parameter. Here are the limits for the retry settings.

NAME	LIMIT
Retry attempts	90
Retry maximum delay	1 day
Retry minimum delay	5 seconds

For more information on other retry policies, see Azure Logic Apps Retry Policies.

Turning off or deleting flows

When you turn off a cloud flow, no new runs are instantiated. All in-progress and pending runs continue until they finish, which might take time to complete.

When you delete a cloud flow, no new runs are instantiated. All in-progress and pending runs are canceled. If you have thousands of runs, cancellation might take significant time to complete.

Custom connector limits

Here are the limits for custom connectors that you can create from web APIs.

NAME	LIMIT	NOTES
Number of custom connectors	50 per user	Microsoft 365 users can run one flow with a custom connector.
Number of requests per minute for a custom connector	500 requests per minute per connection	

> **NOTE**
> To run any flow that has a custom connector, a premium license (or trial) is required.

SharePoint limits

There are limitations on how you can use Microsoft SharePoint with Power Automate and Power Apps.

> **TIP**
> For detailed information about using SharePoint with Power Automate, see the SharePoint documentation.

Other configuration

See IP address configuration for additional details on how to permit access to automated, scheduled and instant flows, including required endpoints.

IP addresses

Requests from Power Automate use IP addresses that are associated with the region of the environment in which your flow exists.

Calls made from connectors in cloud flows come from these IP addresses. Add them to your network's allow list to facilitate communications from Power Automate.

Power Automate Web API

1/15/2022 • 8 minutes to read • Edit Online

Going forward, all flows will be stored in Dataverse and leverage the rich Web API.

This content covers the management of flows included on the **Solutions** tab in Power Automate. Currently, flows under **My Flows** are not supported by these APIs.

Compose HTTP requests

To get started creating requests, you'll need to first construct the URL. The format for the base URL of the Power Automate Web API is: `https://{Organization ID}.{Regional Subdomain}.dynamics.com/api/data/v9.1/`. The two parameters are:

- The **Organization ID** is a unique name for the environment that stores your flows.
- The **Regional Subdomain** depends on the location of your environment.

To get these two parameters.

1. Go to the Power Platform admin center.
2. Select the environment you use to build your flows.

1. Copy the organization id and region subdomain from the environment URL.

You can also programmatically get the list of instances that are available to you via the Get Instances method in the online management API.

Each request to the Web API must have the `Accept` and `Content-type` headers set to `application/json`.

Finally, populate the `Authorization` header with an Azure AD Bearer token. You can learn how to acquire an Azure AD Bearer token for Dataverse. For example, this request:

```
GET https://org00000000.crm0.dynamics.com/api/data/v9.1/workflows
Accept: application/json
Authorization: Bearer ey...
```

The response contains the list of flows from within that environment:


```
{
 "@odata.context": "https://org00000000.crm0.dynamics.com/api/data/v9.1/$metadata#workflows",
 "value": [{
  "@odata.etag": "W/\"12116760\"",
  "category": 5,
  "statecode": 0,
  "workflowidunique": "00000000-0000-0000-0000-000000000001",
  "workflowid" : "00000000-0000-0000-0000-000000000002",
  "createdon": "2018-11-15T19:45:51Z",
  "_ownerid_value": "00000000-0000-0000-0000-000000000003",
  "modifiedon": "2018-11-15T19:45:51Z",
  "ismanaged": false,
  "name": "Sample flow",
  "_modifiedby_value": "00000000-0000-0000-0000-000000000003",
  "_createdby_value": "00000000-0000-0000-0000-000000000003",
  "type": 1,
  "description": "This flow updates some data in Dataverse.",
  "clientdata": "{\"properties\":{\"connectionReferences\":{\"shared_commondataservice\":
{\"source\":\"NotSpecified\",\"id\":\"/providers/Microsoft.PowerApps/apis/shared_commondataservice\",\"tier\
":\"NotSpecified\"}},\"definition\":{...}},\"schemaVersion\":\"1.0.0.0\"}"
 }]
}
```


List flows

As shown earlier, you can get the list of workflows by calling `GET` on `workflows`. Each workflow has many properties, but the most relevant are:

PROPERTY NAME	DESCRIPTION
category	The category of the flow. Here are the different categories. 0 - Classic Dataverse workflows. 1 - Classic Dataverse dialogs. 2 - Business rules. 3 - Classic Dataverse actions. 4 - Business process flows. 5 - Automated, instant or scheduled flows. 6 - Desktop flows.
statecode	The status of the flow. The status can be **0** - off or **1** - on.
workflowidunique	The unique identifier for this installation of the flow.
workflowid	The unique identifier for a cloud flow across all imports.
createdon	The date when the flow was created.
_ownerid_value	The unique identifier of the user or team who owns the flow. This is an id from the systemusers table in Dataverse.

PROPERTY NAME	DESCRIPTION
modifiedon	The last time the flow was updated.
ismanaged	Indicates if the flow was installed via a managed solution.
name	The display name that you have given the flow.
_modifiedby_value	The last user who updated the flow. This is an id from the systemusers table in Dataverse.
_createdby_value	The user who created the flow. This is an id from the systemusers table in Dataverse.
type	Indicates if the flow is a running flow, or a template that can be used to create additional flows. 1 - flow, 2 - activation or 3 - template.
description	The user-provided description of the flow.
clientdata	A string-encoded JSON of an object that contains the connectionReferences and the definition of the flow.

The documentation for the Dataverse workflow has additional information about properties/fields and their usage.

You can also request specific properties, filter the list of flows, and much more, as described in the Dataverse API documentation for querying data. For example, this query returns only the automated, instant, or scheduled flows that are currently on:

```
GET https://org00000000.crm0.dynamics.com/api/data/v9.1/workflows?$filter=category eq 5 and statecode eq 1
Accept: application/json
Authorization: Bearer ey...
```

Create a cloud flow

Call `POST` on the `workflows` collection to create a cloud flow. The required properties for automated, instant, and scheduled flows are: category, name, type, primaryentity, and clientdata. Use `none` for the primaryentity for these types of flows.

You can also provide a description and statecode.

```
POST https://org00000000.crm0.dynamics.com/api/data/v9.1/workflows
Accept: application/json
Authorization: Bearer ey...
Content-type: application/json
{
  "category": 5,
  "statecode": 0,
  "name": "Sample flow name",
  "type": 1,
  "description": "This flow reads some data from Dataverse.",
  "primaryentity":"none",
  "clientdata": "{\"properties\":{\"connectionReferences\":{\"shared_commondataservice\":
{\"connectionName\":\"shared-commondataser-00000000-0000-0000-0000-
000000000004\",\"source\":\"Invoker\",\"id\":\"/providers/Microsoft.Power
Apps/apis/shared_commondataservice\"}},\"definition\":{\"$schema\":
\"https:\/\/schema.management.azure.com\/providers\/Microsoft.Logic\/schemas\/2016-06-
01\/workflowdefinition.json#\",\"contentVersion\": \"1.0.0.0\",\"parameters\": {\"$connections\":
{\"defaultValue\": {},\"type\": \"Object\"},\"$authentication\": {\"defaultValue\": {},\"type\":
\"SecureObject\"}},\"triggers\": {\"Recurrence\": {\"recurrence\": {\"frequency\": \"Minute\",\"interval\":
1},\"type\": \"Recurrence\"}},\"actions\": {\"List_records\": {\"runAfter\": {},\"metadata\":
{\"flowSystemMetadata\": {\"swaggerOperationId\": \"GetItems_V2\"}},\"type\": \"ApiConnection\",\"inputs\":
{\"host\": {\"api\": {\"runtimeUrl\": \"https:\/\/firstrelease-001.azure-
apim.net\/apim\/commondataservice\"},\"connection\": {\"name\": \"@parameters('$connections')
['shared_commondataservice']['connectionId']\"}},\"method\": \"get\",\"path\":
\"\/v2\/datasets\/@{encodeURIComponent(encodeURIComponent('default.cds'))}\/tables\/@{encodeURIComponent(enc
odeURIComponent('accounts'))}\/items\",\"queries\": {\"$top\": 1},\"authentication\":
\"@parameters('$authentication')\"}}},\"outputs\": {}}},\"schemaVersion\":\"1.0.0.0\"}"
}
```

The most important section is the `clientdata`, which contains the connectionReferences that the flow uses, and the definition of the flow. The connectionReferences are the mappings to each connection that the flow uses.

There are three properties:

PROPERTY NAME	DESCRIPTION
connectionName	Identifies the connection. You can see the connectionName by going to the **Connections** page and then copying it from the URL of the connection.
source	Either `Embedded` or `Invoker`. `Invoker` is only valid for instant flows (those where a user selects a button to run the flow), and indicates that the end user will provide the connection. In this case the connectionName is only used at design time. If the connection is `Embedded`, that means the connectionName you specify is always used.
id	The identifier of the connector. The id always starts with `/providers/Microsoft.PowerApps/apis/` and then has the connector name, which you can copy from the URL of the connection or by selecting the connector from the **Connectors** page.

Once you execute the `POST` request, you'll receive the `OData-EntityId` header, which will contain the `workflowid` for your new flow.

Update a cloud flow

You can call `PATCH` on the workflow to update, turn on, or turn off a cloud flow. Use the `workflowid` property to make these calls. For example, you can update the description and the owner of the flow with the following call:

```
PATCH https://org00000000.crm0.dynamics.com/api/data/v9.1/workflows(00000000-0000-0000-0000-000000000002)
Accept: application/json
Authorization: Bearer ey...
Content-type: application/json
{
 "description" : "This flow will ensure consistency across systems.",
 "ownerid@odata.bind": "systemusers(00000000-0000-0000-0000-000000000005)"
}
```

> **NOTE**
>
> The syntax for changing the owner uses the `odata.bind` format. This means instead of patching the _ownerid_value field directly, you append `@odata.bind` to the property name and then wrap the ID with `systemusers()`.

In another example, you can turn a cloud flow on with this call:

```
PATCH https://org00000000.crm0.dynamics.com/api/data/v9.1/workflows(00000000-0000-0000-0000-000000000002)
Accept: application/json
Authorization: Bearer ey...
Content-type: application/json
{
 "statecode" : 1
}
```

Delete a cloud flow

Delete a cloud flow with a simple `DELETE` call:

```
DELETE https://org00000000.crm0.dynamics.com/api/data/v9.1/workflows(00000000-0000-0000-0000-000000000002)
Accept: application/json
Authorization: Bearer ey...
```

> **NOTE**
>
> You cannot delete a cloud flow that's turned on. You must first turn off the flow (see **Updating a cloud flow** previously) or else you will see the error: `Cannot delete an active workflow definition.`

Get all users with whom a cloud flow is shared

Listing the users with access uses a *function* in Dataverse. This function takes a single parameter of `Target`:

```
GET https://org00000000.crm0.dynamics.com/api/data/v9.1/RetrieveSharedPrincipalsAndAccess(Target=@tid)?@tid=
{'@odata.id':'workflows(00000000-0000-0000-0000-000000000002)'}
Accept: application/json
Authorization: Bearer ey...
```

The `Target` parameter is a JSON-like string with a single property called `@odata.id`. Replace the workflow ID in the previous example. It returns:

```
{
    "@odata.context":
"https://org00000000.crm0.dynamics.com/api/data/v9.1/$metadata#Microsoft.Dynamics.CRM.RetrieveSharedPrincipa
lsAndAccessResponse",
    "PrincipalAccesses": [
        {
            "AccessMask": "ReadAccess",
            "Principal": {
                "@odata.type": "#Microsoft.Dynamics.CRM.systemuser",
                "ownerid": "00000000-0000-0000-0000-000000000005"
            }
        }
    ]
}
```

Share or unshare a cloud flow

You can share a cloud flow using the `GrantAccess` action.

```
POST https://org00000000.crm0.dynamics.com/api/data/v9.1/GrantAccess
Accept: application/json
Authorization: Bearer ey...
Content-type: application/json
{
 "Target" : {
  "@odata.type": "Microsoft.Dynamics.CRM.workflow",
  "workflowid" : "00000000-0000-0000-0000-000000000002"
 },
 "PrincipalAccess": {
  "Principal": {
   "@odata.type" : "Microsoft.Dynamics.CRM.systemuser",
   "ownerid" : "00000000-0000-0000-0000-000000000005"
  },
  "AccessMask": "ReadAccess"
 }
}
```

The `AccessMask` parameter is a field with the following values for different permission levels:

NAME	DESCRIPTION
None	No access.
ReadAccess	The right to read the flow.
WriteAccess	The right to update the flow.
DeleteAccess	The right to delete the flow.
ShareAccess	The right to share the flow.
AssignAccess	The right to change the owner of the flow.

You can combine permissions with a comma; for example, provide the ability to both read and update a cloud flow by passing `ReadAccess,WriteAccess`.

You can *unshare* a cloud flow with the `RevokeAccess` action. Here's an example:

```
POST https://org00000000.crm0.dynamics.com/api/data/v9.1/RevokeAccess
Accept: application/json
Authorization: Bearer ey...
Content-type: application/json
{
 "Target" : {
  "@odata.type": "Microsoft.Dynamics.CRM.workflow",
  "workflowid" : "00000000-0000-0000-0000-000000000002"
 },
 "Revokee": {
  "@odata.type" : "Microsoft.Dynamics.CRM.systemuser",
  "ownerid" : "00000000-0000-0000-0000-000000000005"
 }
}
```

`RevokeAccess` removes all permissions granted in the `AccessMask`.

Export flows

Use the `ExportSolution` action to export flows to a .zip file. First, add the flows that you want to a solution.

Once your flow is in a solution, call the following action:

```
POST https://org00000000.crm0.dynamics.com/api/data/v9.1/ExportSolution
Accept: application/json
Authorization: Bearer ey...
Content-type: application/json
{
 "SolutionName" : "Awesome solution 1",
 "Managed": false
}
```

`ExportSolution` returns a base 64-encoded string in the `ExportSoutionFile` property.

```
{
    "@odata.context":
"https://org00000000.crm0.dynamics.com/api/data/v9.1/$metadata#Microsoft.Dynamics.CRM.ExportSolutionResponse
",
    "ExportSolutionFile": "UEsDBBQAAgAI..."
}
```

You can then save this file into source control and/or use whatever version management or distribution system you want.

Import flows

Call the `ImportSolution` action to import a solution.

PROPERTY NAME	DESCRIPTION
OverwriteUnmanagedCustomizations	If there are existing instances of these flows in Dataverse, this flag needs to be set to `true` to import them. Otherwise they will not be overwritten.
PublishWorkflows	Indicates if classic Dataverse workflows will be activated on import. This setting doesn't apply to other types of flows.

PROPERTY NAME	DESCRIPTION
ImportJobId	Provides a new, unique GUID to track the import job.
CustomizationFile	A base 64-encoded zip file that contains the solution.

```
POST https://org00000000.crm0.dynamics.com/api/data/v9.1/ImportSolution
Accept: application/json
Authorization: Bearer ey...
Content-type: application/json
{
 "OverwriteUnmanagedCustomizations": false,
 "PublishWorkflows" : true,
 "ImportJobId" : "00000000-0000-0000-0000-000000000006",
    "CustomizationFile" : "UEsDBBQAAgAI..."
}
```

Since import is a long-running operation, the response to the ImportSolution action will be a `204 No content`. To track the progress, call a `GET` on the `importjobs` object, providing the `ImportJobId` that you included in the original `ImportSolution` action.

```
GET https://org00000000.crm0.dynamics.com/api/data/v9.1/importjobs(00000000-0000-0000-0000-000000000006)
Accept: application/json
Authorization: Bearer ey...
```

This call returns the status of the import operation, including `progress` (the percentage of completion), `startedon`, and `completedon` (if import finished).

Once import has completed successfully, you will need to set up the connections for the flow, since the `connectionNames` will likely be different in the destination environment (if the connections exist at all). If you are setting up new connections in the destination environment, then the owner of the flows must create them in the Power Automate designer. If the connections are already set up in the new environment, then you can `PATCH` the `clientData` of the flow with the names of the connections.

Power Automate Glossary

1/15/2022 • 5 minutes to read • Edit Online

The following terms are commonly used in Power Automate.

A

Action: An action is the task that's started when a trigger is invoked. Flows can have one or many actions, depending on what's needed to complete a particular flow. With actions, you can perform operations such as **Create**, **Update**, **Delete**, or **Assign**.

Add an action

Action items: The **Action items** screen shows the status of approvals and business process flows. Action items is located on the left navigation pane in Power Automate.

Approvals (approval requests): Approvals refer to the actions in approving a cloud flow. It might be a basic approve or reject action. It could be a custom approval flow where the sender can request any sign off, including multiple choice. To create an approval workflow, add an approval action. After you add this action, your flow can manage the approval of documents or processes

Introducing the Unified Action Center

Automated flow: Automated flows are triggered by a predetermined event. Automated flows run when an event triggers the flow to run. For example: when a row is created, deleted, or updated in Dataverse, the flow will run if that is the trigger you chose.

Create a cloud flow in Power Automate

B

Business process flow: A business process flow ensures that everyone in your company follows the same process. You'll define a set of steps for people to follow. For example, you might want to create a business process flow so everyone handles customer service requests the same way. You might require people get approval for an invoice before submitting an order.

Business process flows overview

C

Conditions: Conditions tell flow to perform actions based on predetermined logic set in the flow. If certain conditions are true, then one or more tasks will be completed. For example, users can create conditions that specify that you'll get an email when a tweet that contains a keyword is retweeted at least 10 times.

Add a condition to a cloud flow

Connectors: Connectors allow users to connect popular services (such as Twitter, Outlook, Gmail, and more) to Microsoft Power Automate, Microsoft Power Apps, and Azure Logic Apps. They contain a set of pre-built triggers ("when a new email arrives"...) and actions ("upload email attachment to SharePoint and My App") to be used in apps and workflows.

Connectors documentation

Custom connectors: Custom connecters allow users to connect a web service to Power Automate. Users teach

Power Automate about the characteristics of the web service which include authentication, the triggers and actions that it supports, and the parameters and outputs for each of those actions. Custom connectors must be registered before they can be shared with your organization.

Start to build with Power Automate

D

Data loss prevention: Data loss prevention provides you with the ability to create and enforce policies that define which connectors can access and share business data. This is a key feature to help ensure that your business data is protected.

Data loss prevention policies

F

Flow checker: Flow checker is a diagnostic tool that points to specific occurrences within the flow where improvements may be required to run a cloud flow. For each identified issue, the flow checker appears in the designer's command bar. It will show a red dot when one or more errors are identified in your flow.

Find and fix errors with Flow Checker

Flow types: Automated, instant, scheduled, UI flows and business process flow.

Get started with Power Automate

Flow designer: The flow designer is the studio where makers create flows from blank or start from a template (that they can customize or add steps to).

I

Instant flow: Instant flow allows users to trigger repetitive tasks from the mobile or desktop app manually. For example, by clicking a button on a mobile app, it will send a reminder email to your team before a meeting.

Introducing instant flows

Item: As a Power Automate trigger, an item represents a row in a Microsoft SharePoint list. What it actually is depends on the user's list. For example, it can be a row in Microsoft Excel, or a table in a Microsoft Word document.

M

Microsoft Dataverse: A cloud-scale database used to store data for business applications such as Power Automate and Power Apps. It's an abstraction on top of underlying Azure cloud data management services to make it easier to build business applications.

What is Microsoft Dataverse?

Microsoft Dataverse for Teams: A common cloud data platform for Microsoft Teams. Microsoft Dataverse for Teams enables everyone to quickly build and deploy apps and intelligent chatbots in Teams with Microsoft Power Apps and Microsoft Power Virtual Agents.

Multistep flows: A multistep flow uses more than one action to accomplish a task.

R

Robotic Process Automation (RPA): Automation using a software application that replicates the actions of a human being interacting with the user interface of a computer system.

Use Softomotive's WinAutomation with UI flows

S

Scheduled flows: Scheduled flows run on a schedule defined by the maker. Scheduled flows can repeat on the following cadences: every second, minute, hour, day, week, and/or month. For example, users can schedule an automation such as daily data upload to SharePoint or a database.

Run flows on a schedule

Steps: There's a button at the bottom of each step (action) labeled **+New step** in the flow designer that lets the user add another action.

T

Templates: Templates are prebuilt set of triggers and actions that are designed to help users easily create flows that meet their specific business needs. Templates can be customized. There are hundreds of flow templates that cater to many types of common automation scenarios.

Power Automate Templates

Trigger: A trigger is an event that starts a cloud flow. For example, if you create a cloud flow: "when an email with an attachment arrives, automatically upload the file to OneDrive" - the arrival of the email with an attachment is the trigger of such flow.

Flows can have one or more triggers.

U

UI Flows (RPA): UI flows enable users to automate repetitive tasks in Windows and web applications. UI flows record and playback user interface actions (clicks, keyboard input, etc.) for applications that don't have easy-to-use or complete APIs available.

Introduction to UI flows

W

Workflow: A sequence of actions that takes a task from initiation to completion.

Learn more

- Take a guided learning tour of Power Automate
- Learn the basics of Power Automate in the getting started guide

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