



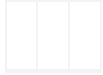
Redefined in the Age of AI: Power Automate Desktop (PPCC24)

Lab 8 – Work queue introduction and unattended automation

30 mins

September 2024





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Lab Overview

In previous labs, you have created a cloud flow that can run a desktop flow to complete the whole end-to-end steps to process an incoming invoice file from the vendor for Contoso Coffee shop company. The desktop flow was running in attended mode, which means it will run on the machine while you (the user) are logged in, so the automation is running in front of your eyes.

UNATTENDED MODE

For some situations, we would prefer the automation to run on the background by itself without anyone needing to log on to the machines (e.g., a virtual machine or a group of virtual machine pool that owned by Contoso Coffee shop company), so it can run anytime needed without interfering with human's work, or we want to scale up easily if the amount of data need to be processed is significant. This mode is called **Unattended mode**.

HOSTED MACHINES

You built this automation using your own machine and you installed the needed software (Contoso invoice app) on it. If you plan to develop different automations for different purposes, you may want to use dedicated machines to avoid installing applications that are only needed for your automations but not for your day-to-day work. Additionally, as a developer you may want to have installed development tools that you don't need on the machines ultimately running the automations. **Hosted machines** allow you to create and use VMs on demand right from the Power Automate portal. These machines are **highly customizable** (like having different VM images for instance one for finance automation and one for HR) and the **machine is ready to go**:

1. Power Automate for Desktop is automatically installed.
2. The machine is automatically joined to AAD, automatically enrolled with Microsoft Intune.
3. The machine is automatically registered to the environment.

These machines can be used for any step of your automation journey: (1) Building your automation, (2) Testing your automation or (3) Running your automation in attended or unattended mode.

HOSTED MACHINE GROUPS

Seamlessly scaling your automations based on the workload is made much easier with hosted machine groups. A hosted machine group is created with just a few clicks and can quickly process your invoices even though hundreds of them are coming daily. A new VM is automatically created when a run is waiting in the queue and no machine is available to run it.

WORK QUEUES

Use Work queues in Power Automate to store process-relevant data and provide a way to decouple complex processes and automations, allowing them to communicate asynchronously.

Work queues also provide centralized monitoring, allowing business and IT teams to collaborate in addressing processing exceptions. When combined with hosted machine, this leads to improved efficiency, scalability, and resiliency, along with reduced costs and enhanced service quality.

You will complete the following tasks in this lab:

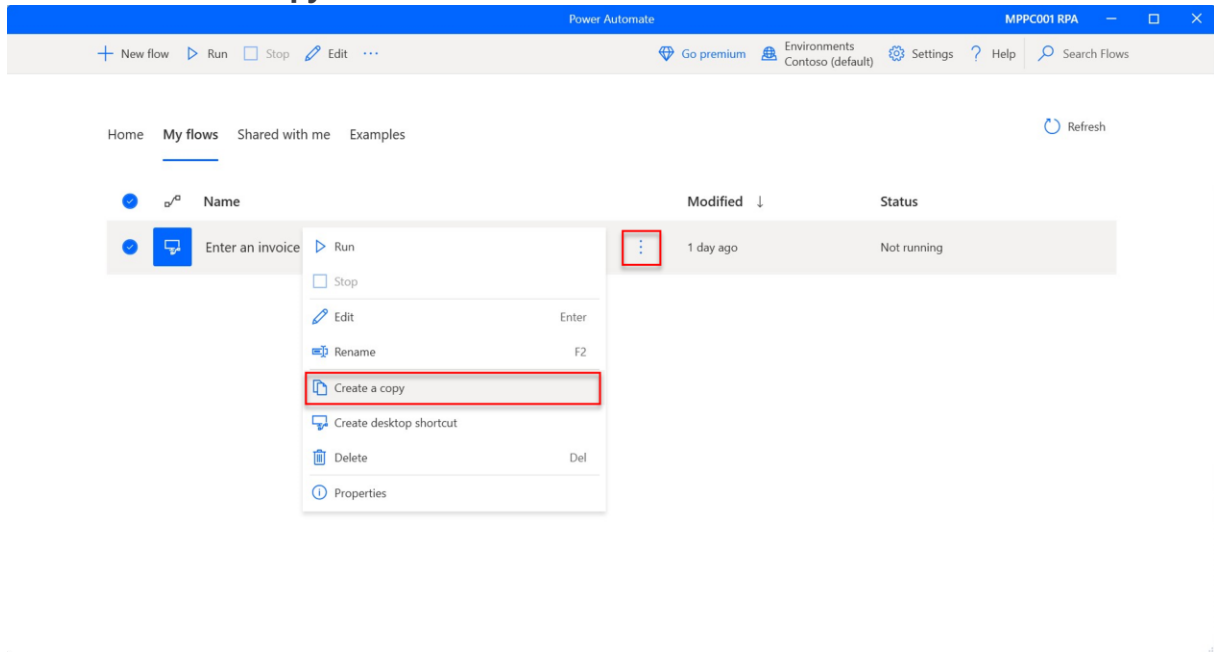
- **Exercise 1 – Use of hosted machine to run unattended automation** ○ Edit your desktop flow (and remove the Excel actions) ○ Create a new cloud flow that calls your desktop flow to run on a hosted machine in unattended mode ○ Test run unattended.
- **Exercise 2 – Unattended automations at scale** ○ Create a hosted machine group ○ Edit your desktop flow (and remove the Excel actions) ○ Create a new cloud flow that calls your desktop flow to run on a hosted machine group in unattended mode
- **Exercise 3 – Work queues** ○ Send an invoice via email to create a work queue ○ Observe that the consumer cloud flow triggers a desktop flow run and marks the work queue item as processed once completed

Prerequisites

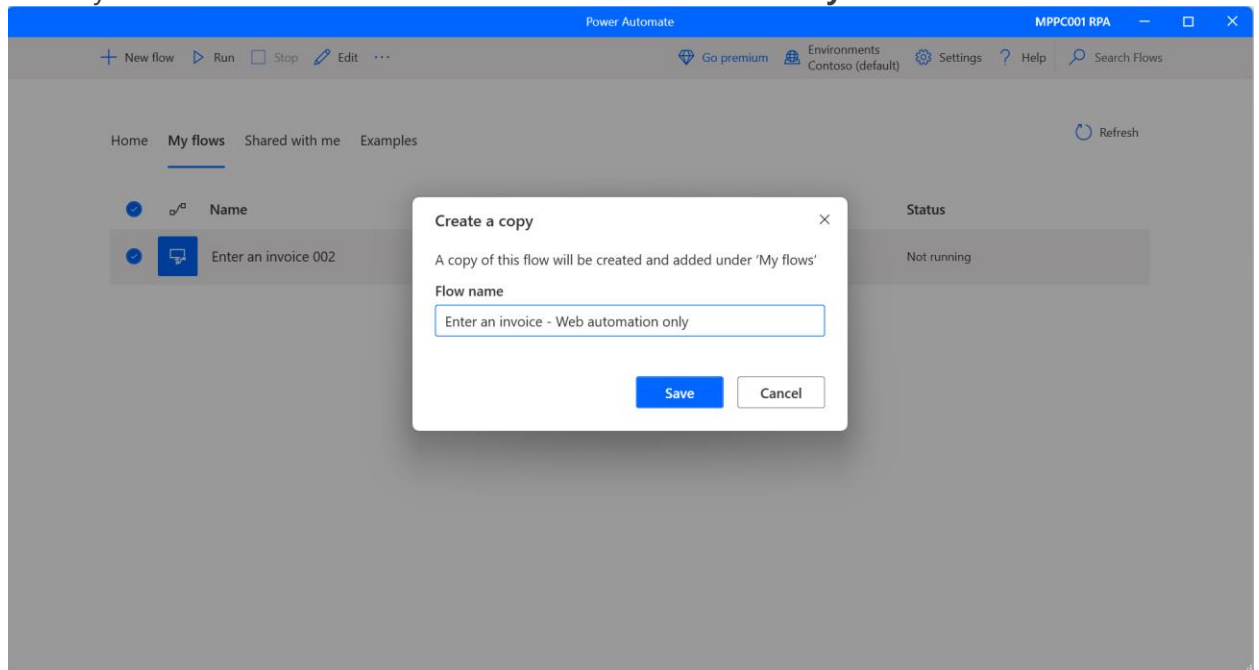
This lab builds on the initial setup lab (lab 1) and labs 2-6 – ensure these labs are complete.

Exercise 1: Use of hosted machine to run unattended automations

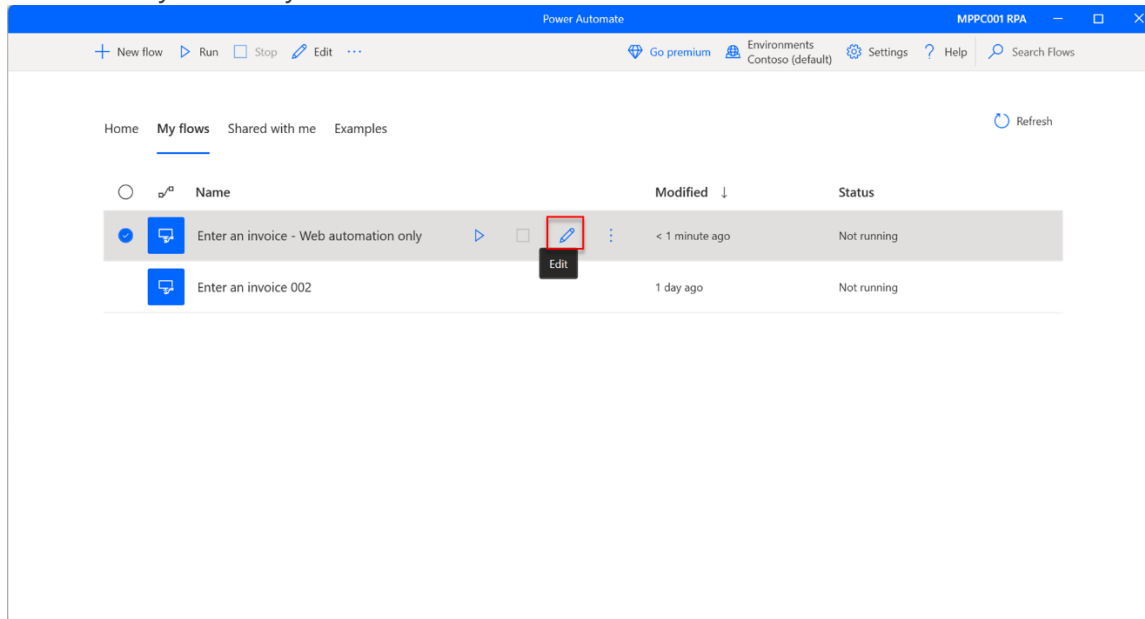
1. Go to **My flows**, open the contextual menu of your “Enter an invoice” desktop flow and select **Create a copy**:



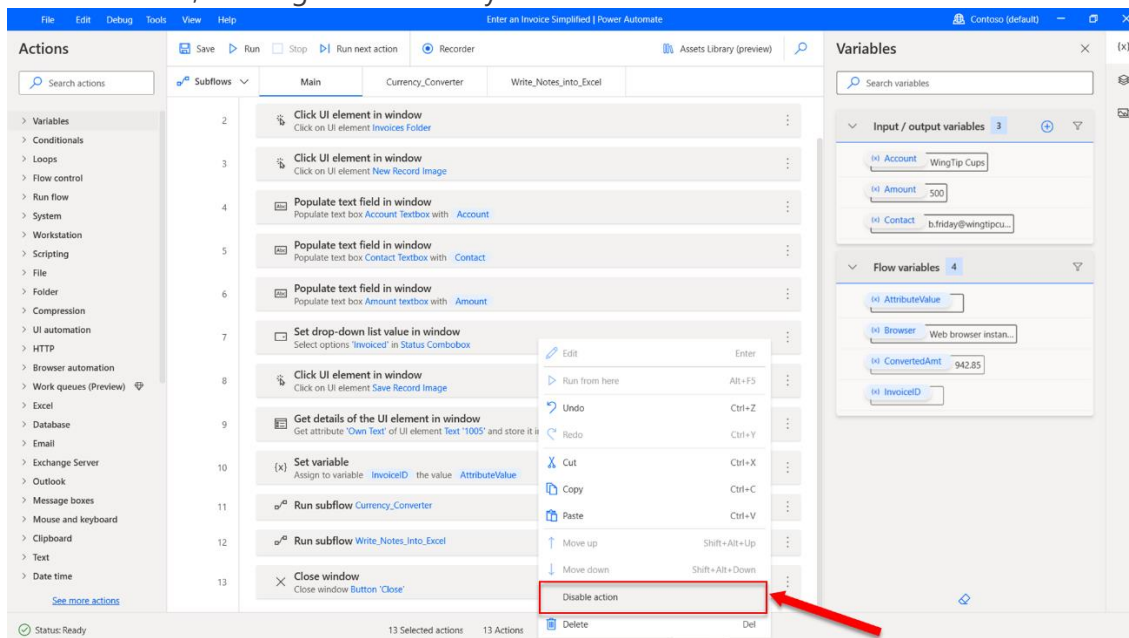
2. Name your new flow “**Enter an invoice - Web automation only**” and click **Save**:



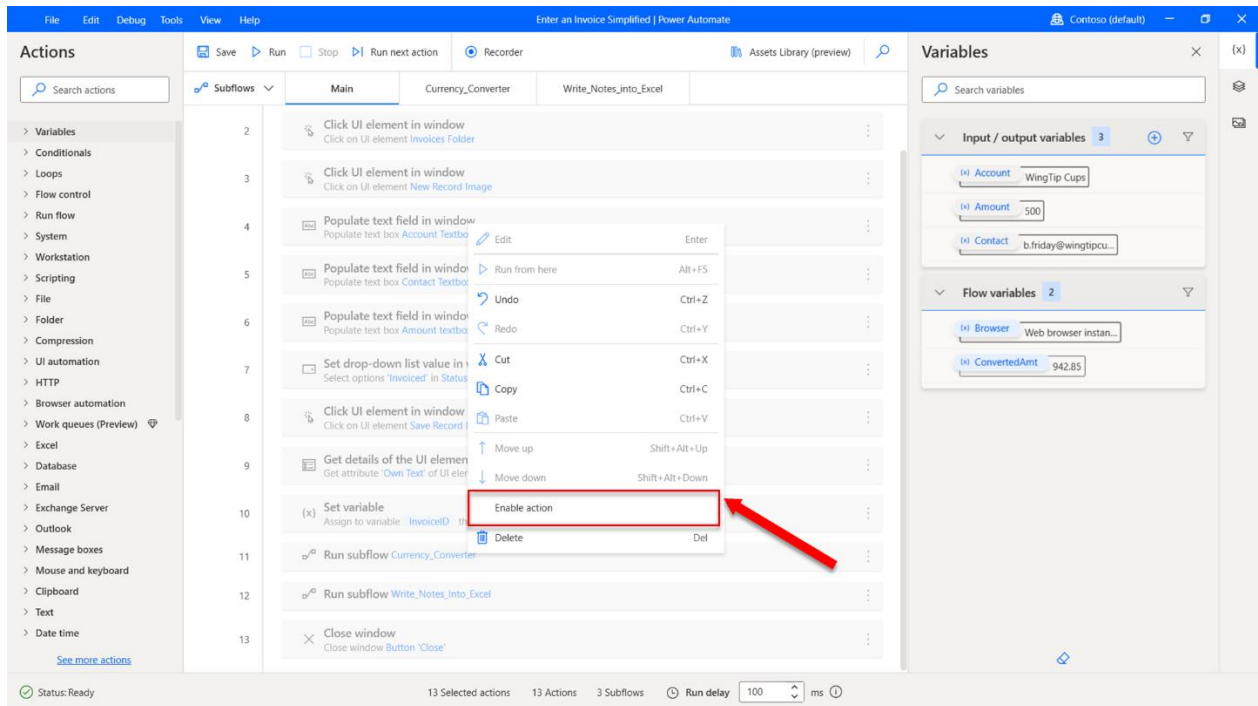
3. Edit your newly created flow:



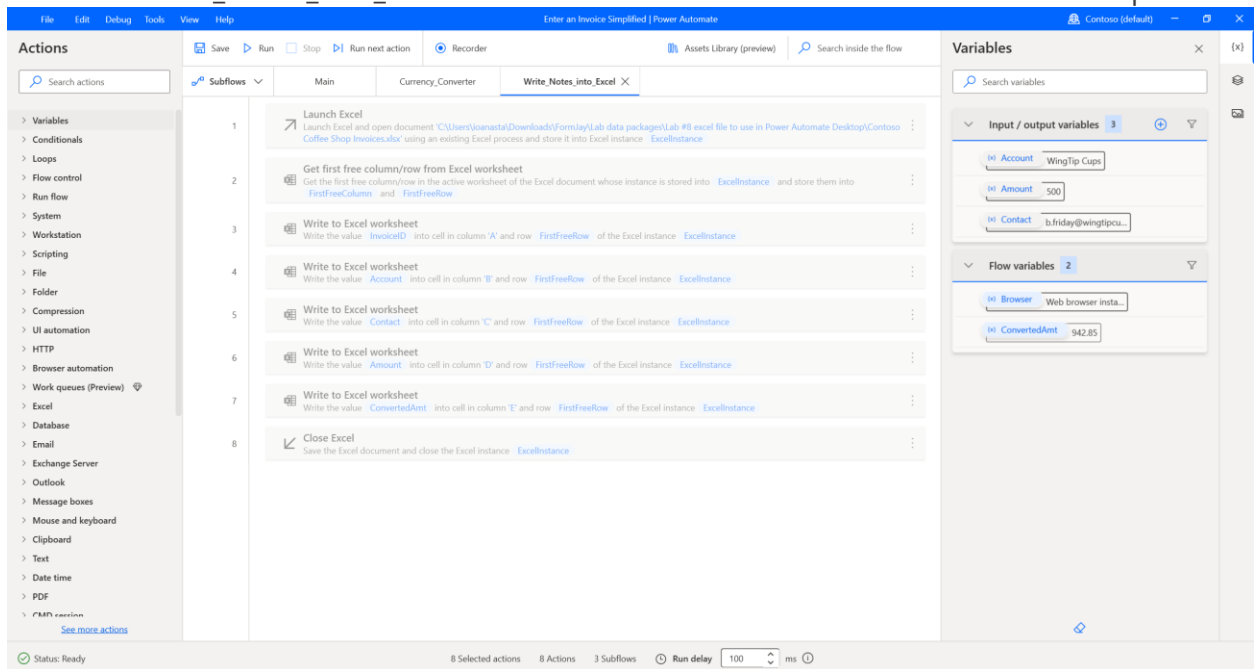
4. Your hosted machine may not be setup with Office and the Contoso app, so we will disable the related actions and will only keep the web automation part. This will ensure your flow can run successfully. From your **Main** section, press CTRL + A to select all the actions, then right-click on any action and select "Disable action"



5. Re-enable Action #11 by right-clicking on "**Run subflow Currency_Converter**" and selecting "Enable action"



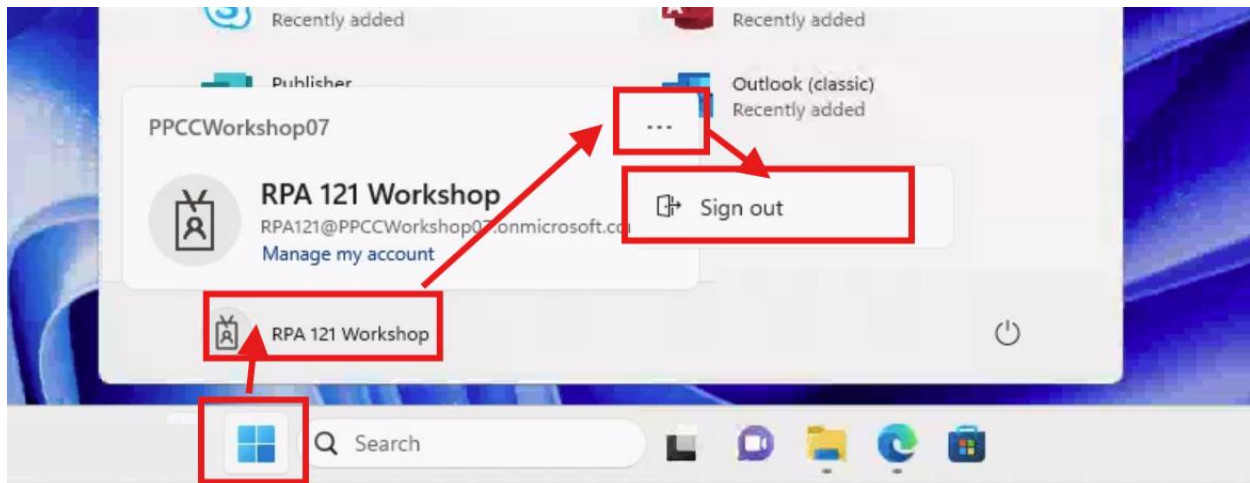
6. Go to **Write_Notes_into_Excel** subflow and **disable all the actions** like done in step 7



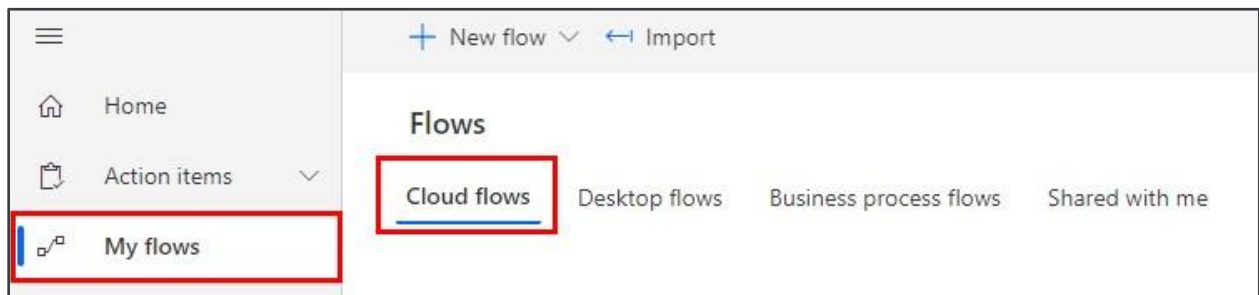
7. Don't forget to **Save** your desktop flow then **close** all Power Automate for Desktop windows (designer and console)

8. Now, let's try this flow in **unattended mode**.

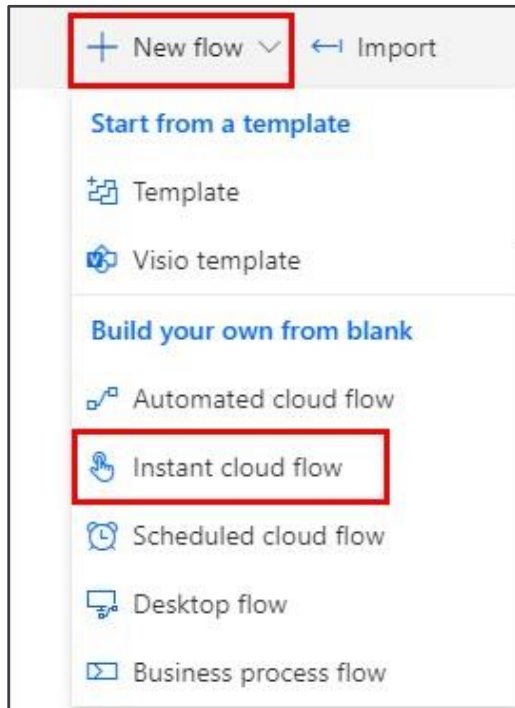
9. As the desktop flow will run in **unattended mode**, ensure that you have disconnected from the remote desktop session by selecting:
- The **Windows** button
 - Then the **User** icon
 - Then the [...]
 - And finally **Sign out**.



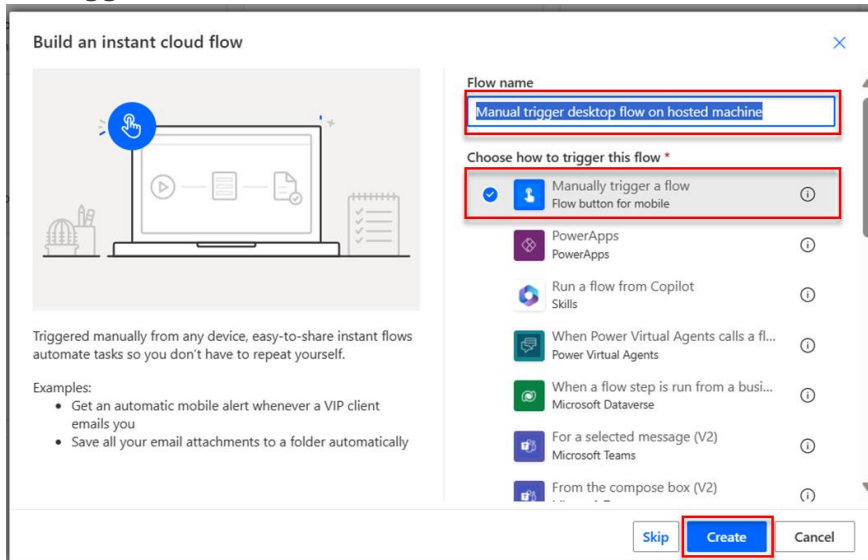
10. Navigate to <https://powerautomate.microsoft.com>. Go to **My flows > Cloud flows**



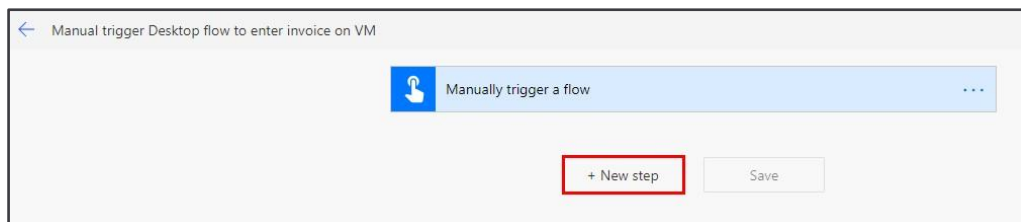
11. Click **+New flow > Instant cloud flow**



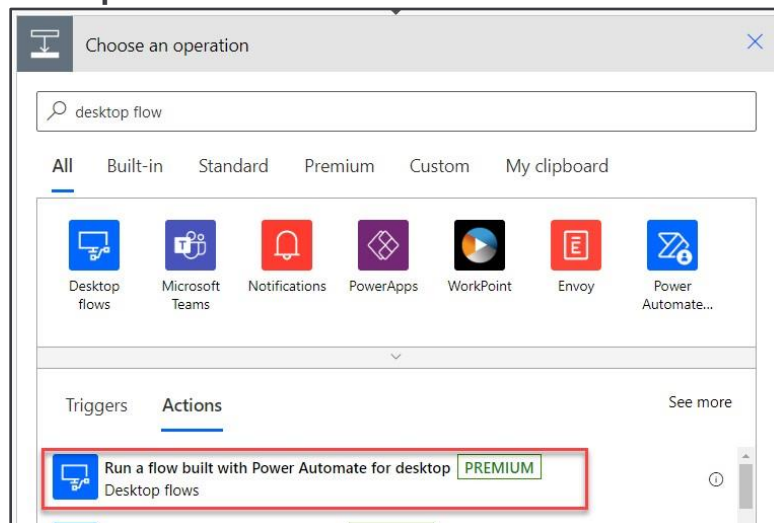
12. Name the flow as **Manual trigger desktop flow on hosted machine**, select **Manually trigger a flow**. Then click **Create**.



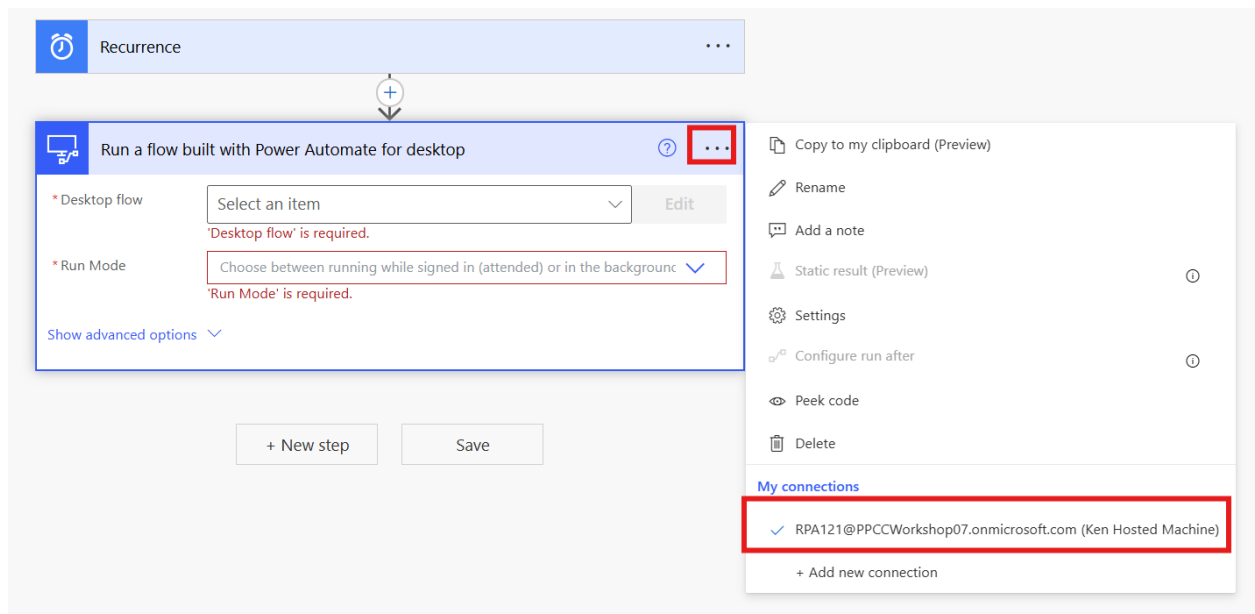
12. Click **+New step**.



13. Search for **desktop flow** and select **Run a flow built with Power Automate for desktop**.



14. In the desktop flow action card, click on the three dots and confirm the connection is to your hosted machine that you have created in the earlier lab exercise



15. Select “**Enter an invoice – Web automation only**” desktop flow and fill the box with the following values:

Run Mode: Unattended (runs on a machine that’s signed out)

Amount: \$200

Contact: b.friday@wingtiptoy.com

Account: WingTip Toys

Then click **Save**

Manually trigger a flow

Run a flow built with Power Automate for desktop

* Desktop flow: Enter an invoice - Web automation only Edit

* Run Mode: Unattended (runs on a machine that's signed out) ▼

Account: WingTip Toys

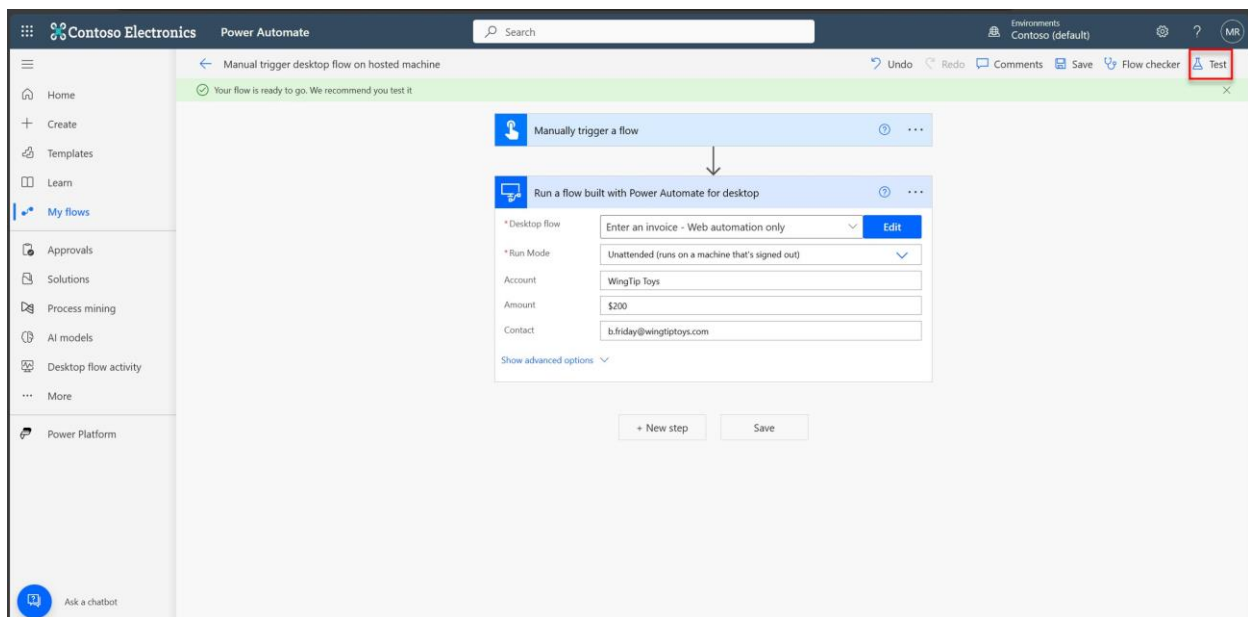
Amount: \$200

Contact: b.friday@wingtip toys.com

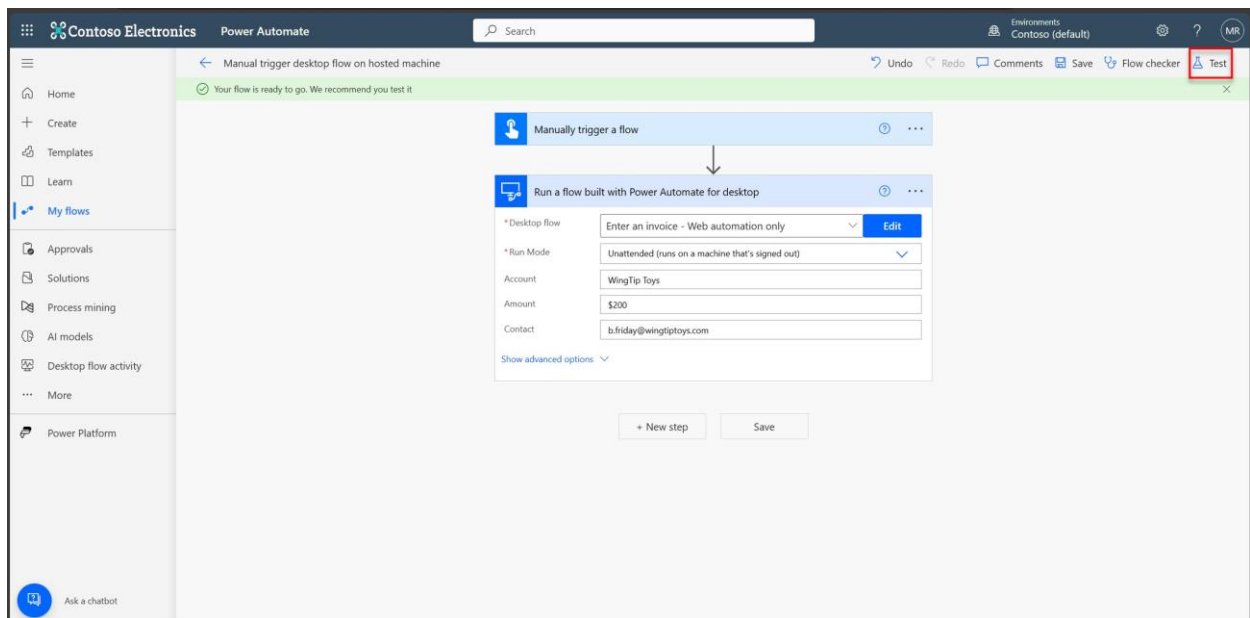
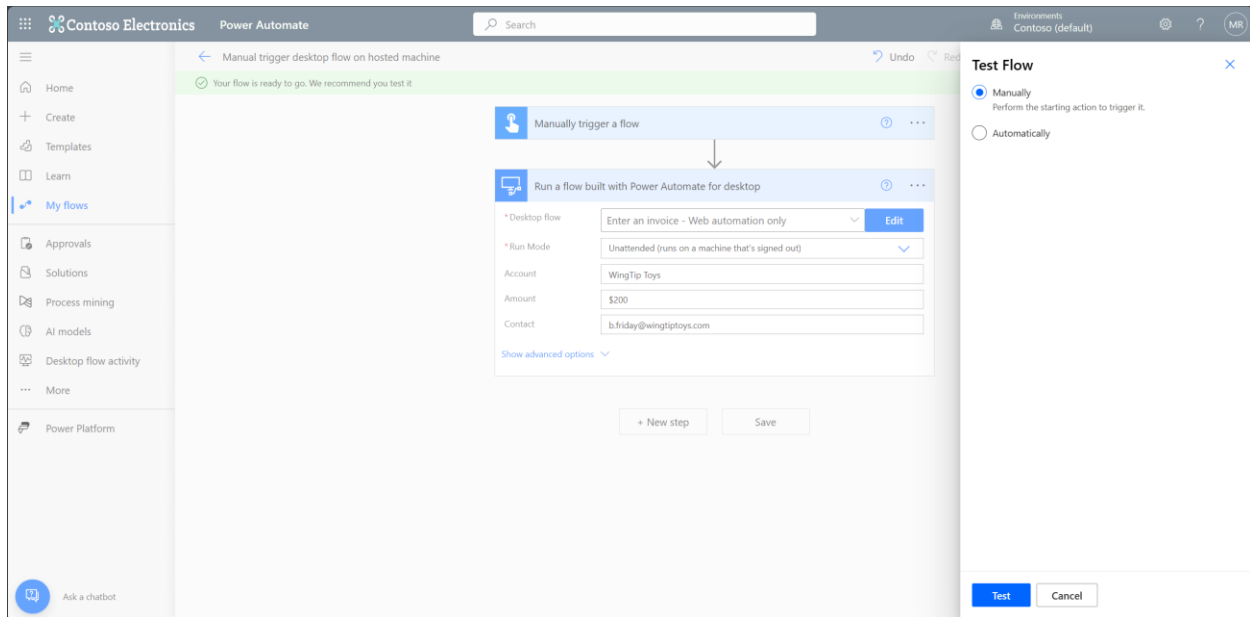
Show advanced options ▼

+ New step Save

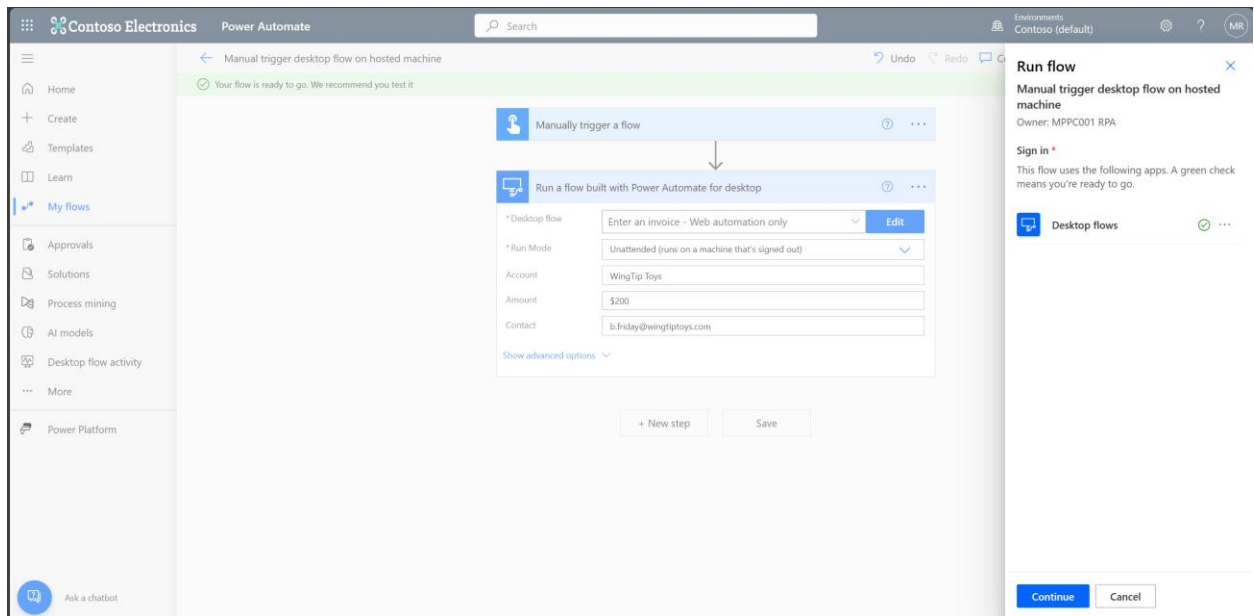
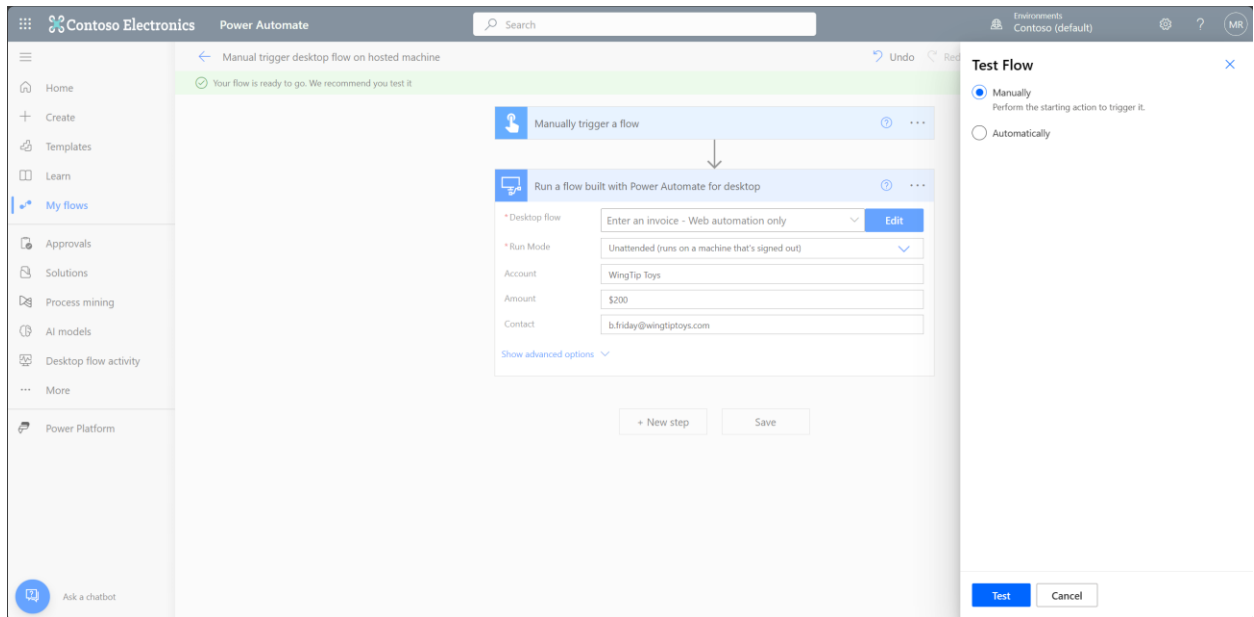
16. Test your flow attended by pressing on Test:

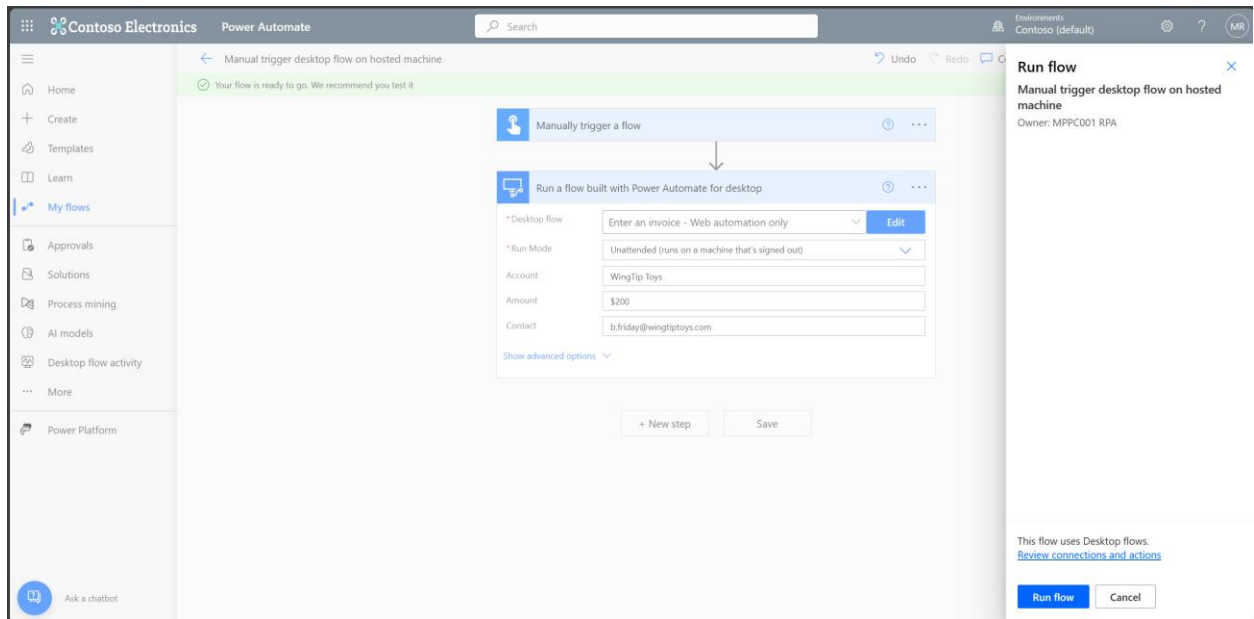


1. Select **Manually**, click on **Test** then **Continue** and then **Run Flow**.

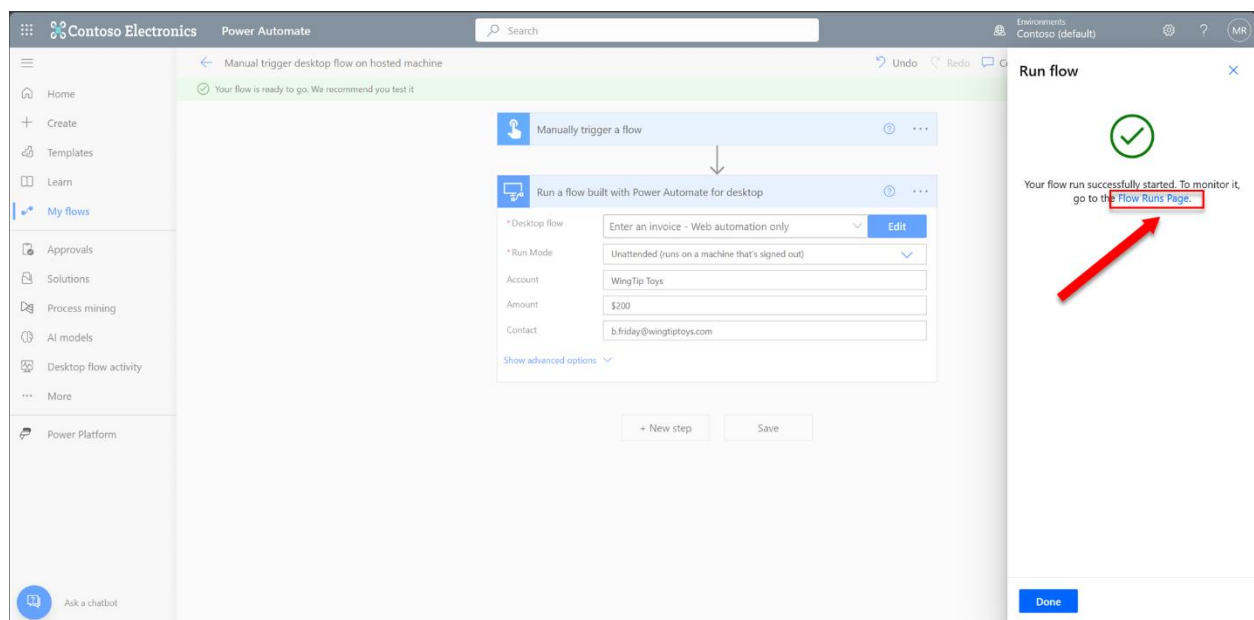


2. Select **Manually**, click on **Test** then **Continue** and then **Run Flow**.





3. Click on **Flow Runs** page

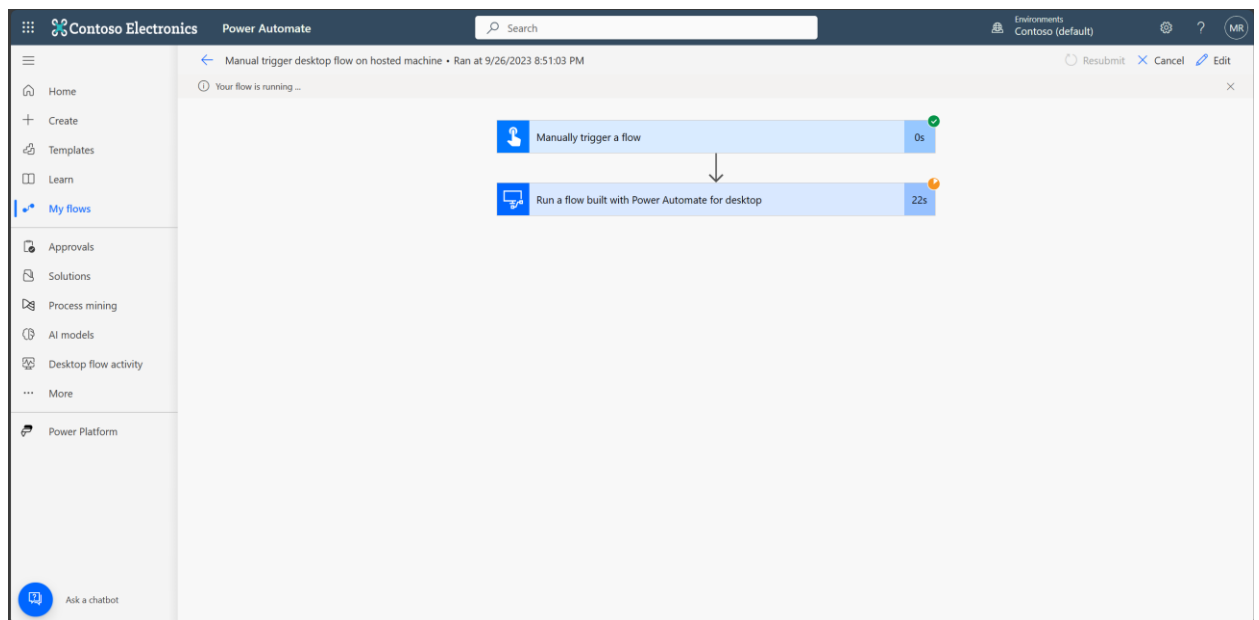


4. The run at the top is the one you just launched, click on the Start time to go to the run details page. (Don't hesitate to refresh your page)

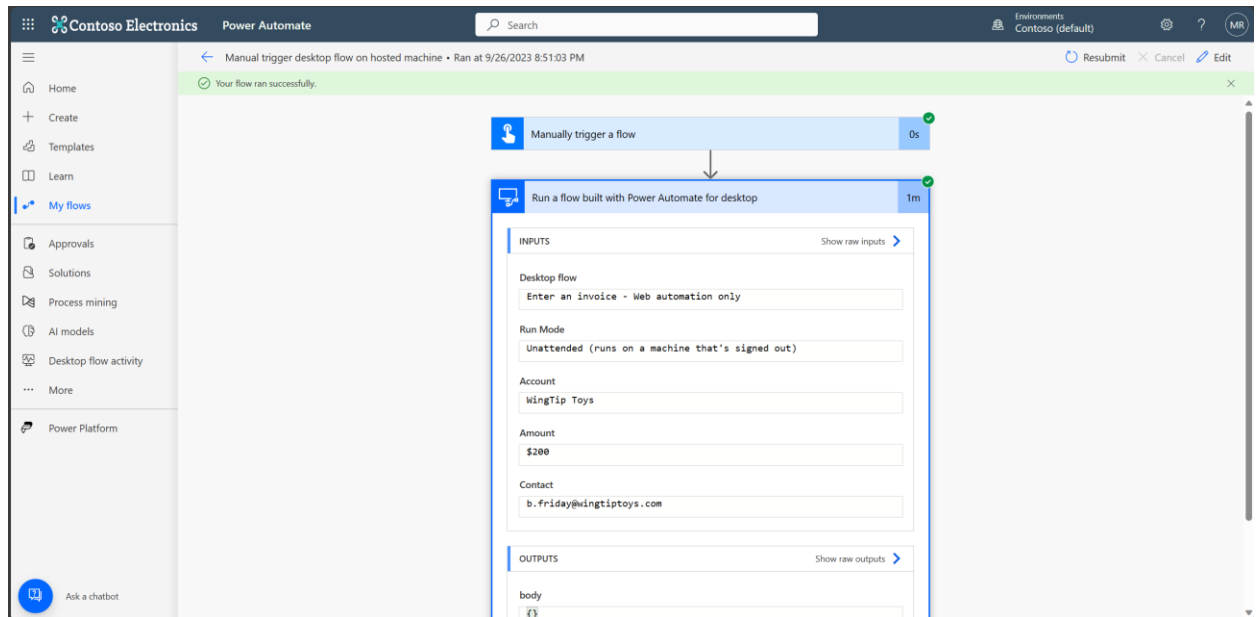
Manual trigger desktop flow on hosted machine > Run history

Start time	Duration	+ Add column	Status
Sep 26, 08:37 PM (36 sec ago)	00:00:37		Test running
Sep 26, 06:38 PM (1 h ago)	00:00:42		Succeeded
Sep 26, 06:37 PM (2 h ago)	00:00:55		Test succeeded
Sep 26, 05:58 PM (2 h ago)	00:00:35		Test failed
Sep 26, 05:55 PM (2 h ago)	00:00:44		Test failed

5. The flow is running, wait until its end. It should complete successfully

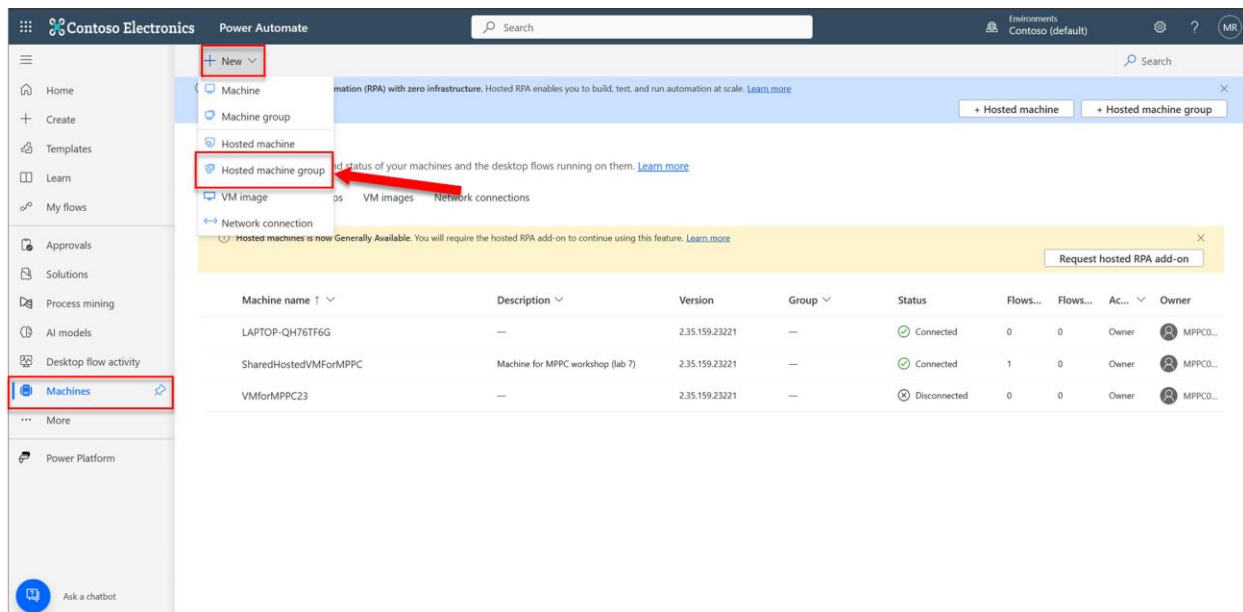


The flow should have completed successfully:



Exercise 2: Unattended automation at scale

- Now, we will move from a single machine to a hosted machine group which can scale on demand. Go to Machines, then select New > Hosted machine group:



- Give a name ("XXX Hosted group for invoice processing" where XXX is your 3 digits number) to your group and click **Next**:

3. Enable re-use session for faster processing and click **Next**:

4. Select :

- a Maximum of **20 bots** which means that based on the workload, a maximum of 20 machines will simultaneously process the flows enqueued **if there are sufficient capacity**
- b Committed capacity of **10 bots** which means that based on the workload, the hosted machine group is guaranteed to scale up at least to 10 machines

Create new hosted machine group

Step 3 of 6

Select bots usage

Bots in a group are created when needed. Whenever a desktop flow waits in the queue and no bot is available, a bot is created automatically.

A bot is created as long as the maximum number of bots for this group isn't reached and you have enough hosted process capacity assigned to your environment.

[Read more information about the licensing requirements](#)

Select the committed and maximum number of bots

Define the committed and maximum number of bots you want to assign to this group.

Note

- **Max Bots** allows your hosted machine group to scale beyond the number of Committed Bots, based on the available capacity in your environment. The Max Bots setting offers flexibility to handle increases in workload or unexpected demand surges
- **Committed Bots** (preview) guarantees the number of available bots during auto-scaling. This ensures that the necessary resources will always be available for processing your flows, providing consistent performance for your critical flows.
- Go to the [Capacity Utilization](#) page to view and manage your hosted process capacity utilization within your environment.

Maximum number of bots



20 bots

Committed number of bots



10 bots

5. Select the **Default Windows Desktop Image** (which is suitable for web only automation).

Note: We could have used a custom image that would have contained the Contoso app and Office installed. This requires additional installation from the IT department but allows advanced customization of VMs.

Contoso Electronics Power Automate

Environments Contoso (default)

Step 4 of 6

VM image selection

Each VM Image comes with a set of applications, services and configuration defined, so that every instance of the bot in a hosted machine group that is provisioned will run in the exact same manner. You can choose a default Windows image provided by Microsoft or a custom image (if available) from your organization.

Select the VM image source

Default Windows image
We provide a default Windows 11 image. If you don't see it, make sure you have access to it. [Learn more](#)

☒ **Default Windows Desktop Image**
Default Windows Desktop Image for use in Microsoft Desktop Flows. Windows 11 Enterprise 22H2 with Microsoft Edge.

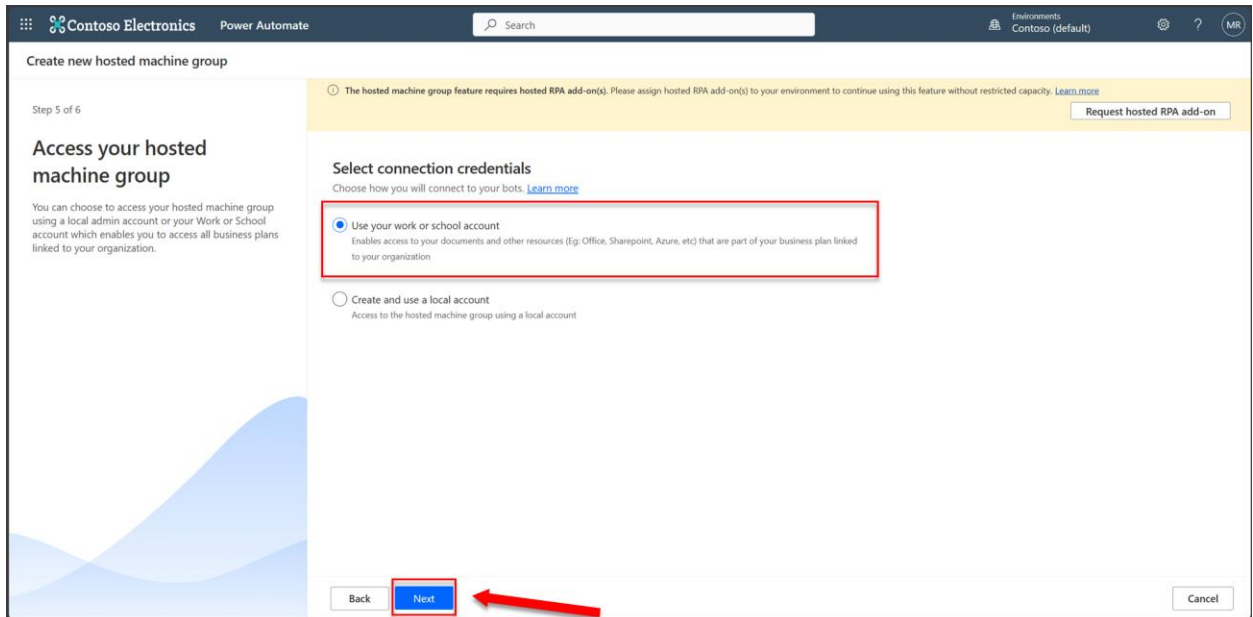
Custom image
You can personalize your hosted machine group by providing your own Windows image directly from your Azure Compute Gallery; it will allow you to have all your application installed on the hosted machine group that we provision for you.

+ New VM image Refresh

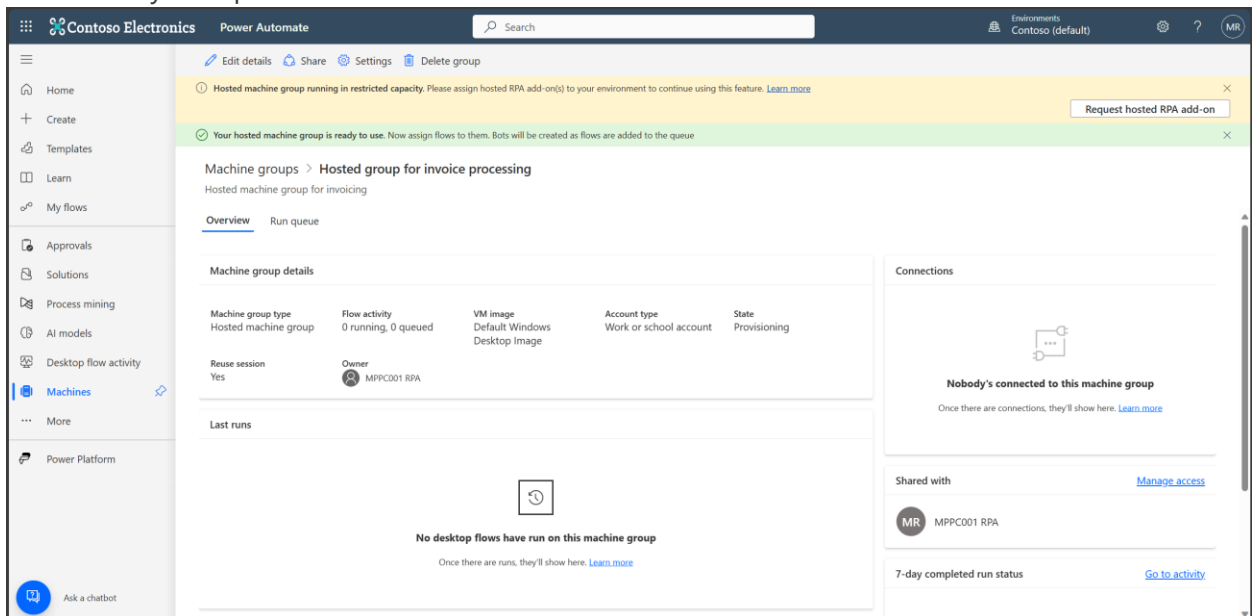
Add a VM image to get started
You need at least one VM image to create hosted machine groups. [Learn more](#)

Back **Next** Cancel

6. Select **"Use your work or school account"** to be able to use your workshop account and click **Next**.

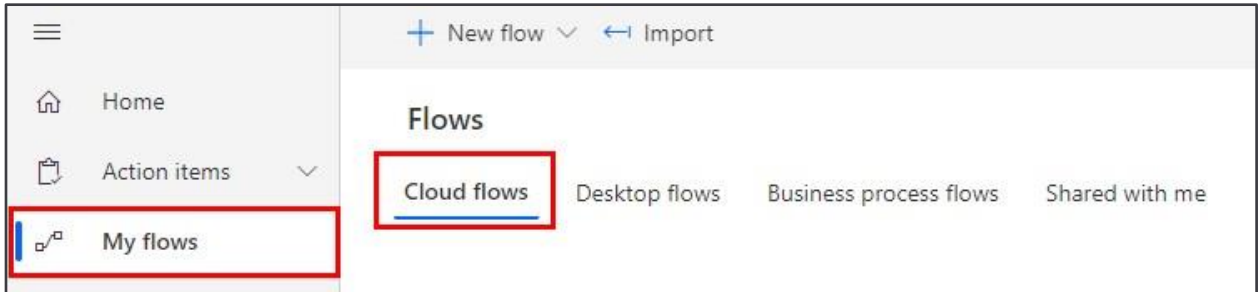


7. Review your options and click on **Create**.

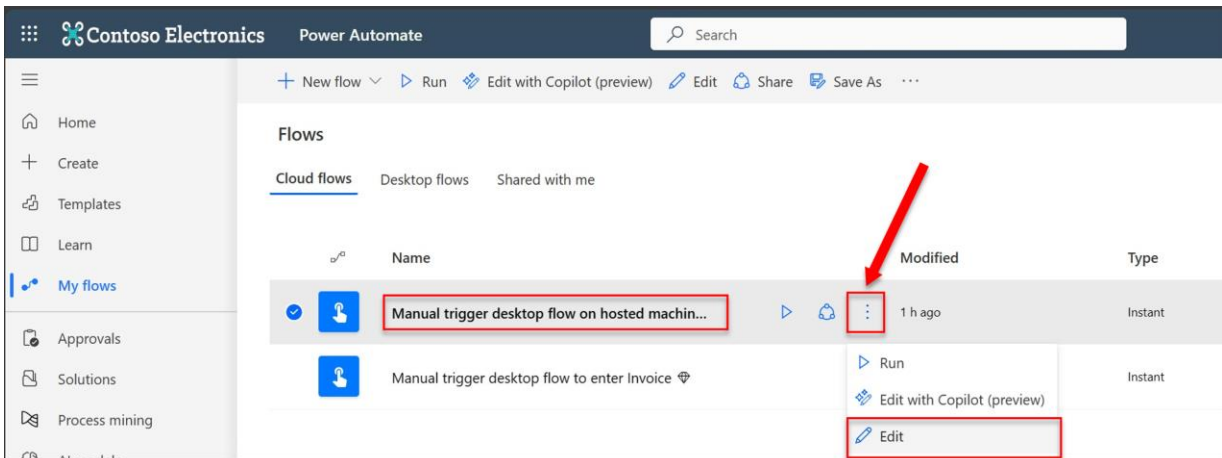


8. Now that your hosted machine group is ready to use, let update the automation to target it. Navigate to:

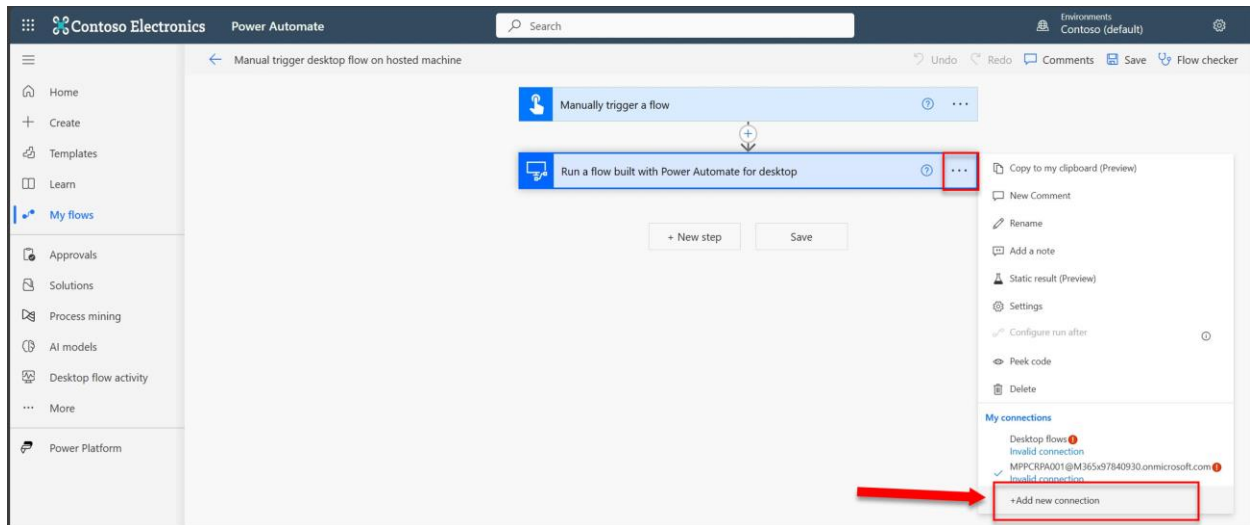
My flows > Cloud flows



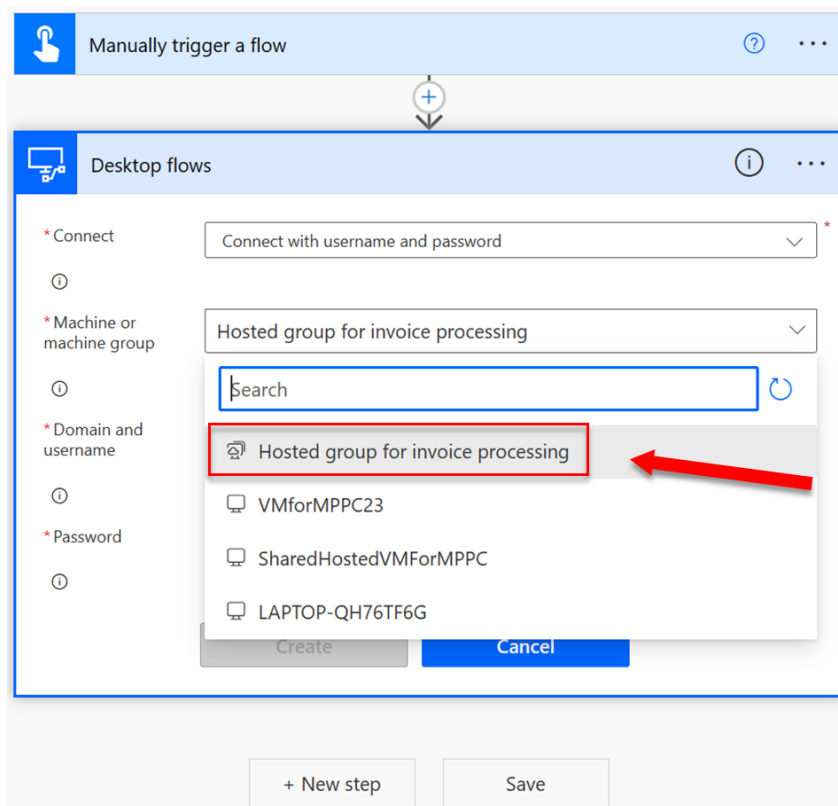
9. Open the contextual menu for the **“Manual trigger desktop flow on hosted machine”** cloud flow and select **Edit**:



10. On the Desktop flow card, open the contextual menu and select **“+Add new connection”**



11. Select your hosted machine group (**Hosted group for invoice processing**)



12. Enter the account credentials, and click on **Create**:

Desktop flows

* Connect

* Machine or machine group

* Domain and username

* Password

Create **Cancel**

+ New step Save

13. You can Save your flow and test it.

Contoso Electronics Power Automate

Manual trigger desktop flow on hosted machine

Your flow is ready to go. We recommend you test it.

Manually trigger a flow

Run a flow built with Power Automate for desktop

* Desktop flow **Edit**

* Run Mode

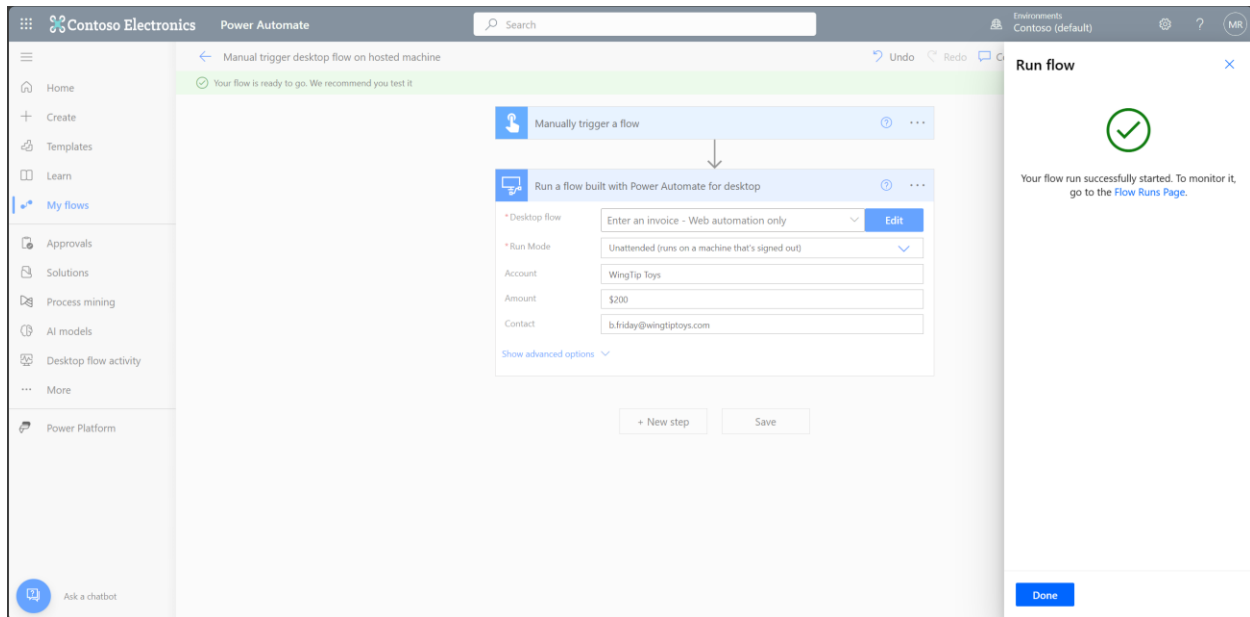
Account

Amount

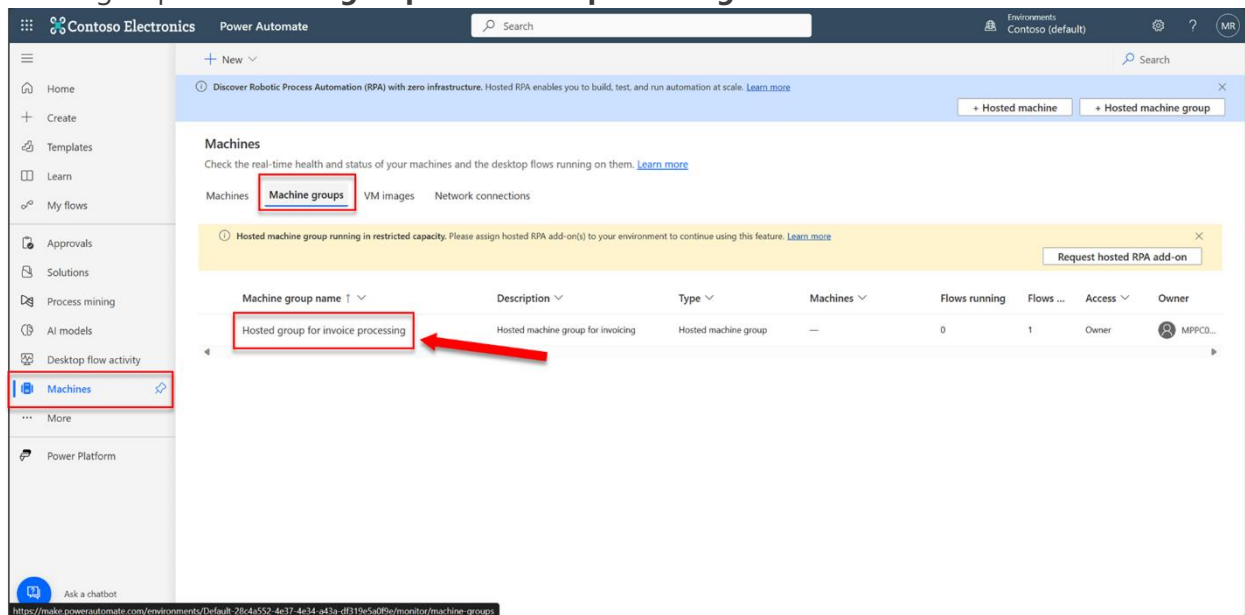
Contact

Show advanced options

+ New step Save



14. You can go to **Machines**, then select the **Machine groups** tab and click on your machine group call **Hosted group for invoice processing**:



15. You can see that your test run is queued, if you don't see it don't hesitate to refresh the page:

Contoso Electronics Power Automate

Search

Environments: Contoso (default)

Home Create Templates Learn My flows Approvals Solutions Process mining AI models Desktop flow activity **Machines** More Power Platform Ask a chatbot

Machine groups > Hosted group for invoice processing
Hosted machine group for invoicing

Overview Run queue

Machine group details

Machine group type	Flow activity	VM image	Account type	State
Hosted machine group	0 running, 1 queued	Default Windows Desktop image	Work or school account	Provisioned
Reuse session	Owner			
Yes	MPPCD001 RPA			

Last runs [See all runs](#)

Requested	Desktop flow	Status	Parent flow
Sep 26, 09:45 PM (4 min ago)	Enter an invoice - Web automation only	Queued	Manual trigger desktop flow...

Connections [See all connections](#)

MPPCRPA001@M365x97840930.on... MPPCRPA001@M... ✓

Shared with [Manage access](#)

MR MPPCD001 RPA

7-day completed run status [Go to activity](#)

No data to display yet

Note: You can change the cloud flow trigger to use a schedule based trigger running every minute in order to demonstrate the scalability of the hosted machine group solution.

Congratulations, you have successfully created a hosted machine group that auto-scales and create VMs on demand whenever a flow needs to run.

Exercise 3: Work queues

For simplification, a **Vendor Invoice Processing** work queue has been created, along with a produce & consumer cloud flow.

The screenshot shows the Power Automate interface for the 'Vendor Invoice Processing' work queue. The left sidebar contains navigation options like Home, Create, Templates, Learn, My flows, Approvals, Solutions, Process mining, AI hub, Automation center, Desktop flow activity, Work queues, More, and Power Platform. The main area displays the work queue details, including its status (Active), creation and modification dates, owner (Workshop Admin), and schema. Below this, a table lists work queue items with columns for Name, Enqueue time, Status, Expired, Priority, and Input. Two items are shown: one in 'Processing' status and one in 'Processed' status. On the right, there are sections for 'Shared with' (Workshop Admin), 'Solutions' (none found), and a 'Work queue items by status' table.

Name	Enqueue time	Status	Expired	Priority	Input
WQI_2024-09-13T1...	Sep 13, 05:12 PM	Processing		Normal	Hello test
WQI_2024-09-13T1...	Sep 13, 04:56 PM	Processed		Normal	Contoso

Status	Count
Queued	—
Processing	1
Processed	1
On hold	—
Expired	—
Processing timeout	—
Generic exception	—

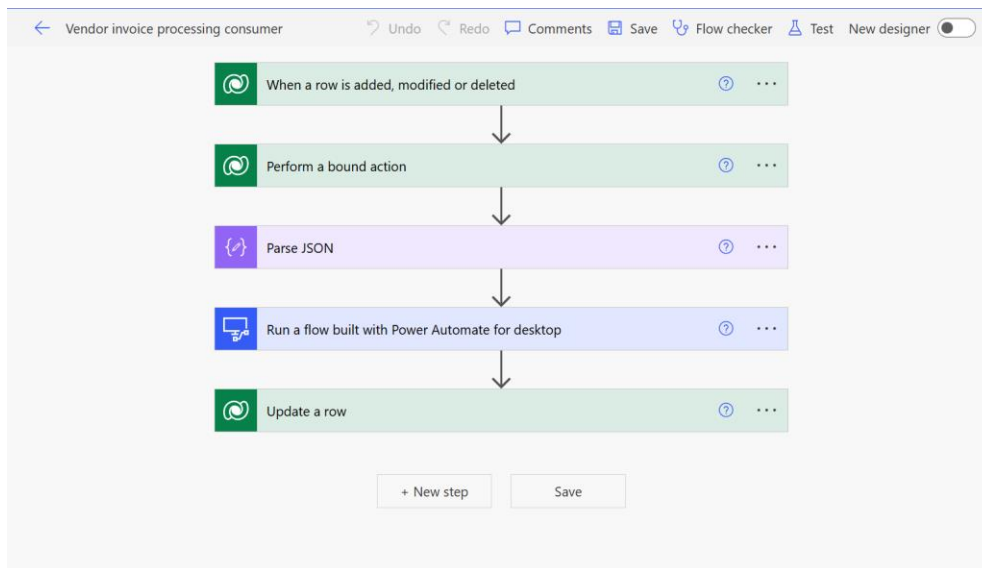
The producer cloud flow **Vendor invoice processing producer** consists of:

1. A trigger based on **a new email** arriving with the following condition:
 - a. An email is received in the Inbox
 - b. Contains 'invoice' in the subject
2. An **Add a new row** action that will add a new row in the **Work Queue Item** table, including the work queue id for the **Vendor Invoice Processing** work queue and includes the body of the email was part of the **Input**

The screenshot shows the 'Vendor invoice processing producer' cloud flow in the Power Automate designer. It starts with a trigger 'When a new email arrives (V3)' configured with the folder 'Inbox'. An arrow points to the 'Add a new row' action, which is configured with the table name 'Work Queue Items'. The 'Name' field is set to 'WQI_format utcNow() x'. The 'Is Customizable' field is set to 'For internal use only'. The 'Requeue Count' and 'Retry Count' fields are set to 'The number of times the item has been requeued.' and 'The number of times the item has been retried.' respectively. The 'Work Queue Id (Work Queues)' field is set to '/workqueues(831e6c9c-d671-ef11-a670-6045bdef6476)'. The 'Show advanced options' link is visible at the bottom of the action configuration.

The consumer cloud flow **Vendor invoice processing consumer** consists of:

1. A trigger based on **a row added** to the Work Queue Items table filtered by the new **Vendor invoice processing** work queue id.
2. **Perform a bound** action to retrieve the next work queue item to be processed
3. **Parse JSON** action to extract contents of the Work Queue Item to be processed
4. **Run a flow built with Power Automate for desktop** to execute the Vendor invoice processing job, targeting the hosted machine group **Hosted group for invoice processing**
5. **Update a row** action that updates the work queue item status to **Processed**.



1. In order to add work queue items, send an email from your account to **workshopadmin@PPCCWorkshop07.onmicrosoft.com**. Ensure that you have the subject that includes the word 'invoice' and write the name of a theoretical company in the body of the email.

Send

To

Workshop Admin x

Bcc

Cc

Invoice

Draft saved at 5:27 PM

Wingtip

- Go to the work queue details page : **Vendor Invoice Processing**.
- You should see a new work queue item added with the **Input** the same as the body of your email.

Work queue details

Process status: Active
Created on: Sep 13, 03:46 PM
Owner: Workshop Admin
Modified on: Sep 13, 05:29 PM
Modified by: Workshop Admin
Items expire after: 03:00:00
Schema: ---

Work queue items

Name	Enqueue time	Status	Expired	Priority	Input
WQI_2024-09-13T11...	Sep 13, 05:27 PM	Processing		Normal	Wingtip
WQI_2024-09-13T11...	Sep 13, 05:12 PM	Processed		Normal	Hello test
WQI_2024-09-13T11...	Sep 13, 04:56 PM	Processed		Normal	Contoso

Work queue items by status

Status	Count
Queued	—
Processing	1
Processed	2
On hold	—
Expired	—
Processing timeout	—
Generic exception	—
IT exception	—
Business exception	—

- Go to the hosted machine group's details page: **Hosted group for invoice processing**
- You should see a new run queued / running

Machine group details

Machine group type: Hosted machine group
Flow activity: 1 running, 0 queued
VM image: Default Windows Desktop image
Account type: Work or school account
State: Provisioned
Reuse session: No
Owner: Workshop Admin
CyberArk® applications (preview): Configure CyberArk®

Last runs

Requested	Desktop flow	Status	Run mode	Parent flow
Sep 13, 05:28 PM (1 min ago)	Enter an invoice - Web ...	Running	Unattended	Vendor invoice processing c...
Sep 13, 05:13 PM (17 min ago)	Enter an invoice - Web ...	Succeeded	Unattended	Vendor invoice processing c...
Sep 13, 04:57 PM (32 min ago)	Enter an invoice - Web ...	Succeeded	Unattended	Vendor invoice processing c...

7-day completed run status

2

6. Once the run is completed, the work queue item status is now marked as **Processed**

The screenshot displays the Power Automate interface for a work queue named "Vendor Invoice Processing". The left sidebar contains navigation options like Home, Create, Templates, Learn, My flows, Approvals, Solutions, Process mining, AI hub, Automation center, Desktop flow activity, Work queues, and Power Platform. The main area shows the work queue details and a list of items. The "Work queue items" table has columns for Name, Enqueue time, Status, Expired, Priority, and Input. Three items are listed, all with a status of "Processed". The first item, "WQI_2024-09-13T1...", is highlighted with a red box. The right sidebar shows "Shared with" (VWA, RW), "Solutions" (none), and "Work queue items by status" (a table with Status and Count).

Name	Enqueue time	Status	Expired	Priority	Input
WQI_2024-09-13T1...	Sep 13, 05:27 PM	Processed		Normal	Wingtip
WQI_2024-09-13T1...	Sep 13, 05:52 PM	Processed		Normal	Helps text
WQI_2024-09-13T1...	Sep 13, 04:56 PM	Processed		Normal	Combox

Status	Count
✓ Queued	—
⌚ Processing	—
⌚ Processed	3
⌚ On hold	—
⌚ Expired	—
⌚ Processing timeout	—
⌚ Generic exception	—
⌚ If exception	—
⌚ Business exception	—

Check your knowledge

5 mins

1. What can I do with a hosted machine?
 - A. Build desktop flows, test them, run them in attended and unattended mode
 - B. Only creating/editing desktop flows

2. How do I move my automation from attended to unattended?
 - A. I need to create a different desktop flow for each
 - B. I can just change the run mode of my desktop flow
 - C. I can change the run mode of my desktop flow but I may check VM configurations and the use of a password-based Desktop flow connection

3. I don't need to manage individual machines in a hosted machine group.
 - A. True
 - B. False

Answer Key

1. What can I do with a hosted machine?

- A. **Build desktop flows, test them, run them in attended and unattended mode**
- B. Only creating/editing desktop flows

Answer: **A.** Hosted machines are highly flexible machines that can be used for any RPA scenario be it, dev, test, or production.

2. How do I move my automation from attended to unattended?

- A. I need to create a different desktop flow for each
- B. I can just change the run mode of my desktop flow
- C. **I can change the run mode of my desktop flow but I may check VM configurations and the use of a password-based Desktop flow connection**

Answer: **C.** Most of the time it is as simple as changing the run mode in the desktop flow card but you need to ensure you're using a password-based connection (e.g.: the sign-in option doesn't work for unattended). Additionally, some specific configurations like NLA may prevent Desktop flows to run unattended.

3. I don't need to manage individual machines in a hosted machine group.

- A. **True**
- B. False

Answer: **A.** True. Hosted machine group automatically manages the individual machines it creates overtime. No need to handle them and no access to them is possible. Hosted machine groups are only meant for pure unattended automation.

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