

Getting Started with Microsoft Flow



Agenda

- Building Flows using Triggers and Actions
- Using Control-of-Flow Actions
- Writing Advanced Flow Expressions
- Executing a Flow from a Canvas App
- Handling Flow Execution Errors



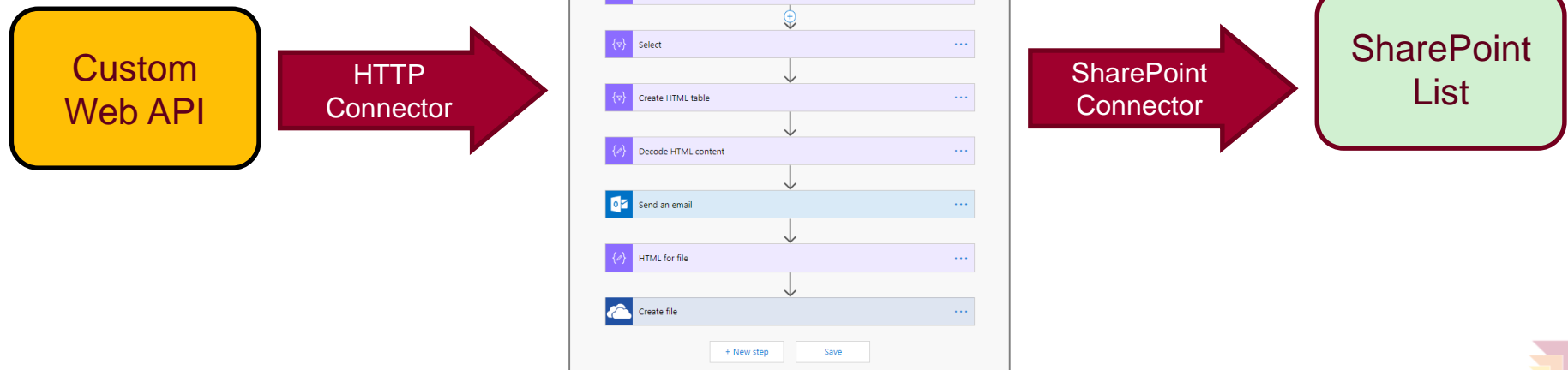
What is Flow?

- Service for automating workflows across other services
 - Designed by Microsoft for business users more than developers
- What can you do with Flow?
 - Get notifications
 - Copy files
 - Collect data
 - Automate approvals



Building Blocks of Flow

- **Triggers** - events that start a flow
- **Actions** - tasks and operation executed by flow
- **Services** - sources and destinations for data
- **Connectors** - wrappers to communicate with service APIs



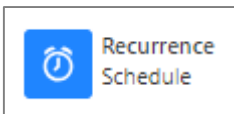
Examples Services to Use with Flow

- SharePoint Online
 - Trigger a flow when a new item is added
 - Trigger a flow when a new document is uploaded
 - Add an action to create or update a list item
- Twitter
 - Trigger a flow when a tweet contains a specific hashtag
 - Track tweet by sending email or write to SharePoint list
 - Add an action to reply to a tweet

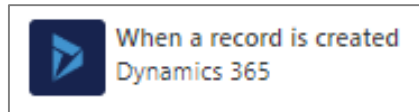
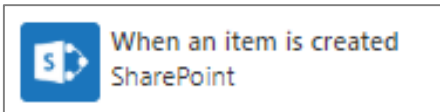


Flow Trigger Types

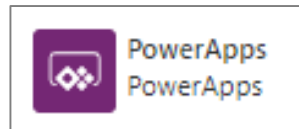
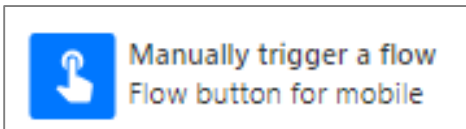
- Scheduled Flow Triggers
 - Runs periodically based on an interval



- Automated Flow Triggers
 - Runs when something happens

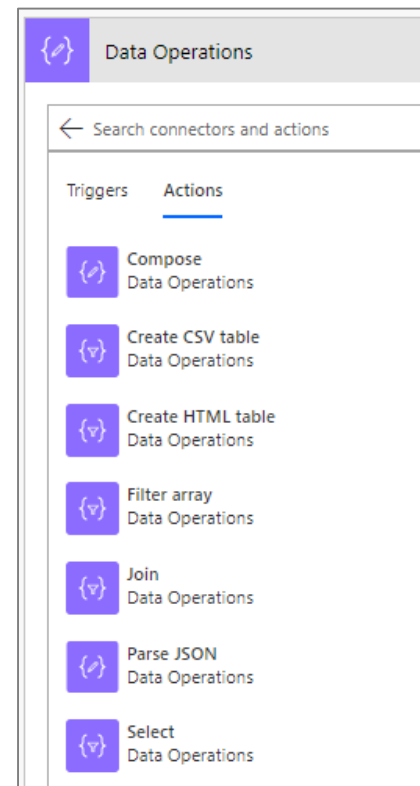
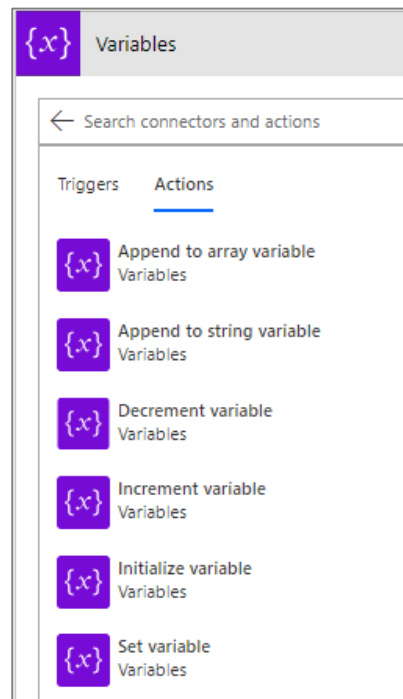
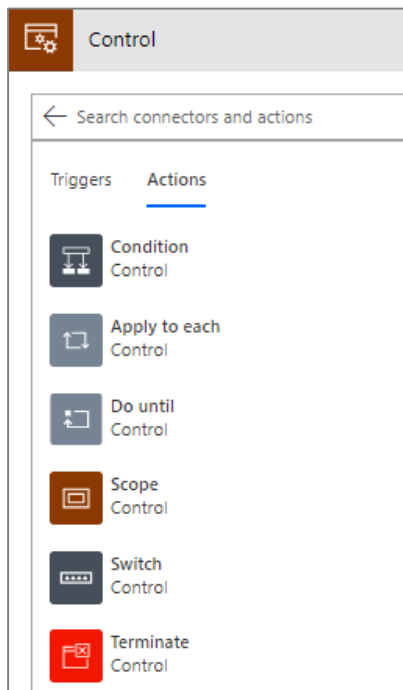


- On-demand Flow Triggers
 - Runs when a user clicks a button



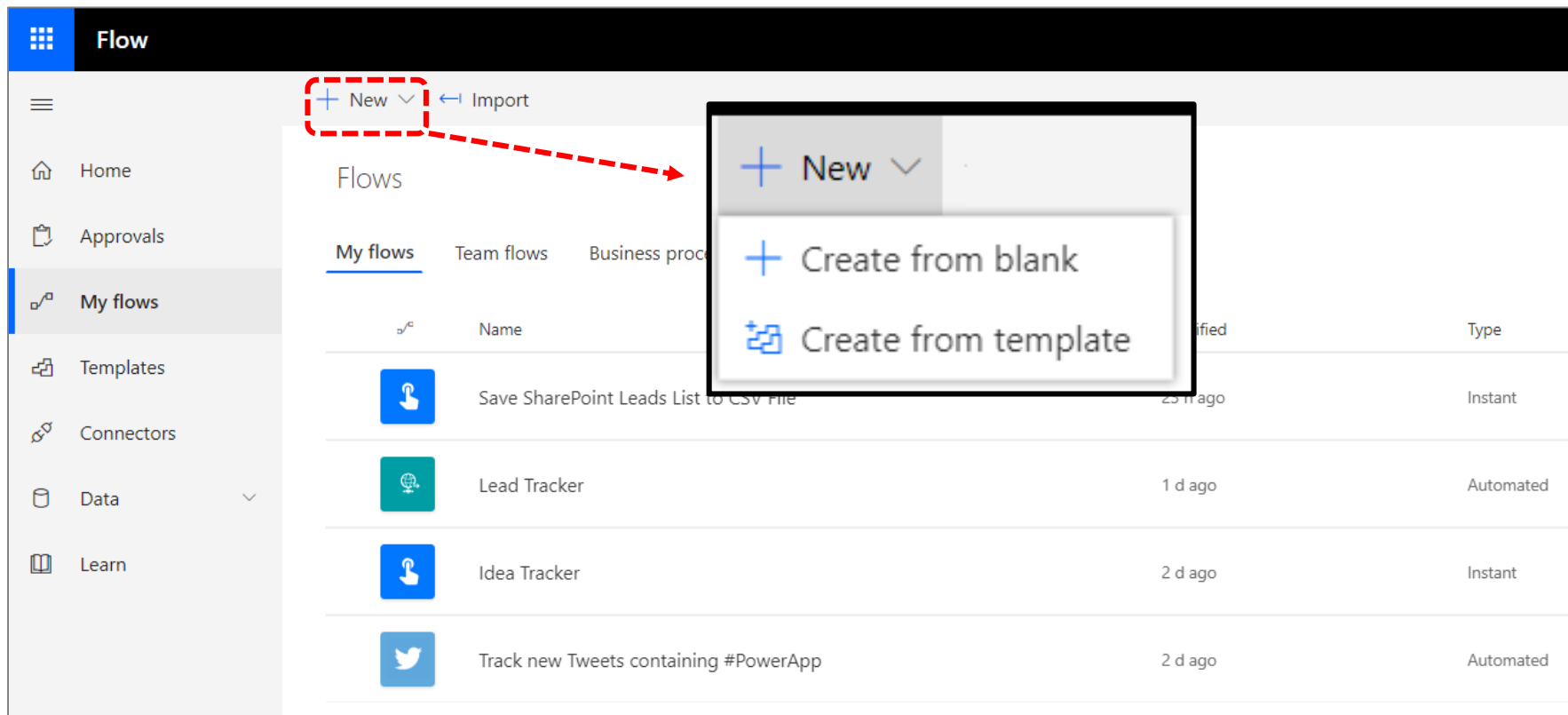
Core Action Categories

- **Control:** actions to provide control-of-flow
- **Variables:** actions to manage state within flow lifetime
- **Data operations:** action to process data & prepare content



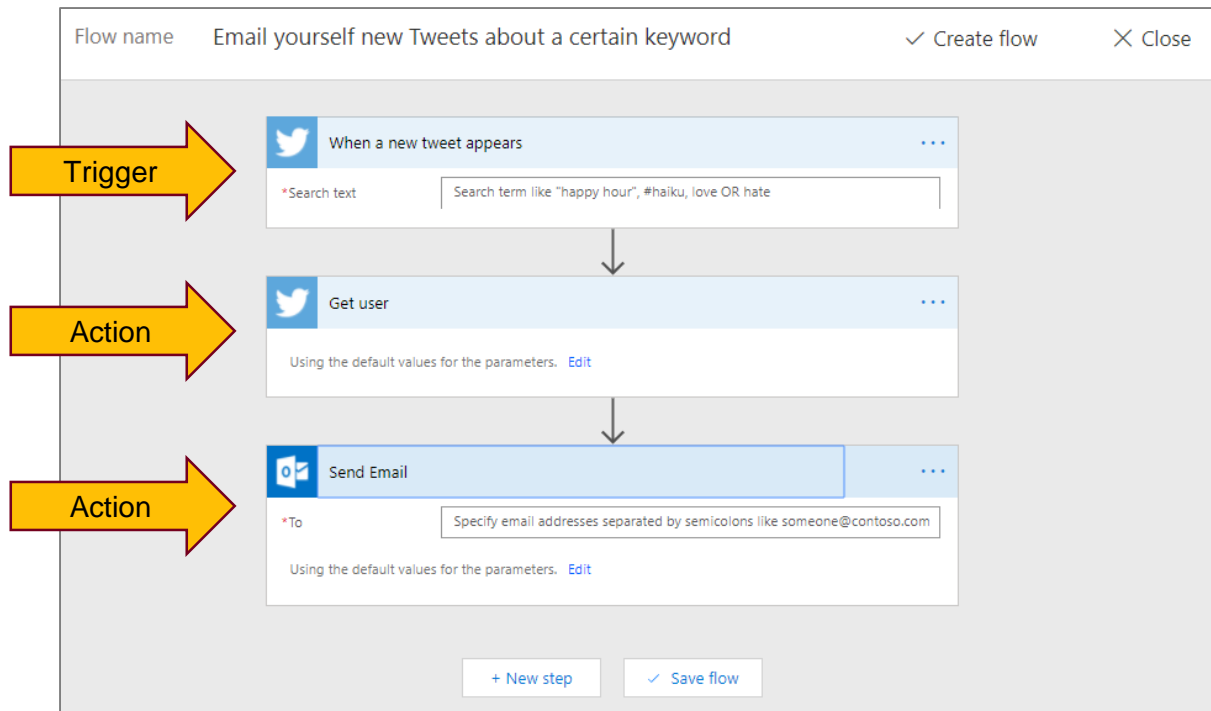
Creating and Managing Flows

- Flow user portal allows users to manage and edit flows
 - Accessible through <https://flow.microsoft.com>
 - Flow can be created from blank or from template



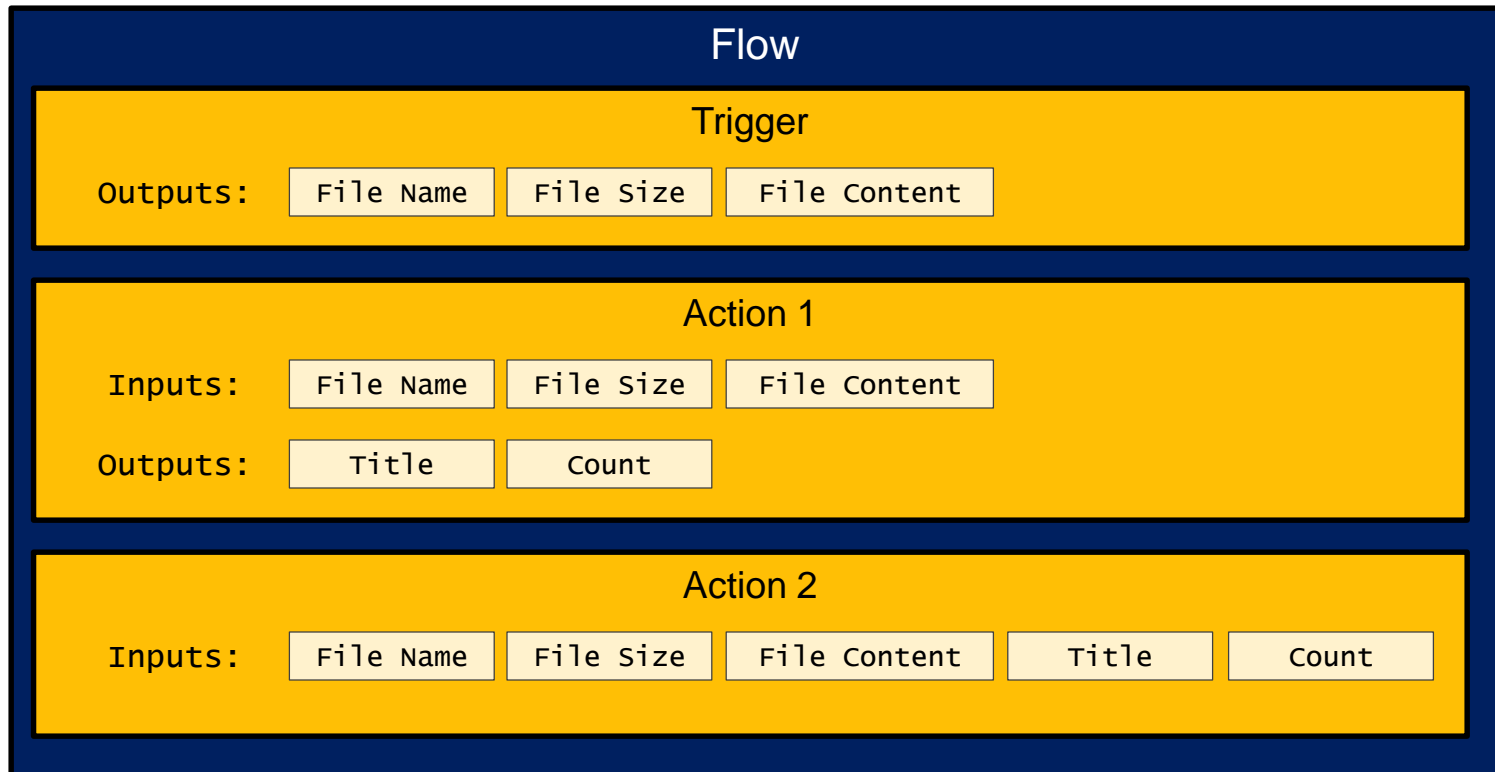
Working with the Flow Designer

- Flow Designer provides UI for building flows
 - Somewhat similar to SharePoint Designer workflow designer
 - You build flows by adding and configuring steps
 - There are 3 types of steps: triggers, actions or conditions



Data Automatically Flows from Step to Step

- Data in flows added by step outputs
 - Data added in step output is available in later steps
 - It's easy to configure step input data using output data in previous steps
 - Certain outputs displayed/hidden based on types of input and output



Flow Checker

- Automatically checks flows for errors and omissions

The screenshot displays the Microsoft Flow Builder interface. The main workspace shows a flow titled "Send an email when a new item is created in SharePoint." with two steps:

- When a new item is created** (SharePoint connector):
 - * Site Address**: Example: `https://contoso.sharepoint.com/sites/sitename`. Below the input field is the error message: "Include a Site Address."
 - * List Name**: SharePoint list name. Below the input field is the error message: "Include a List Name."
- Send an email** (Outlook connector):
 - * To**: Specify email addresses separated by semicolons like `someone@contoso.com`. Below the input field is the error message: "Using the default values for the parameters. [Edit](#)"

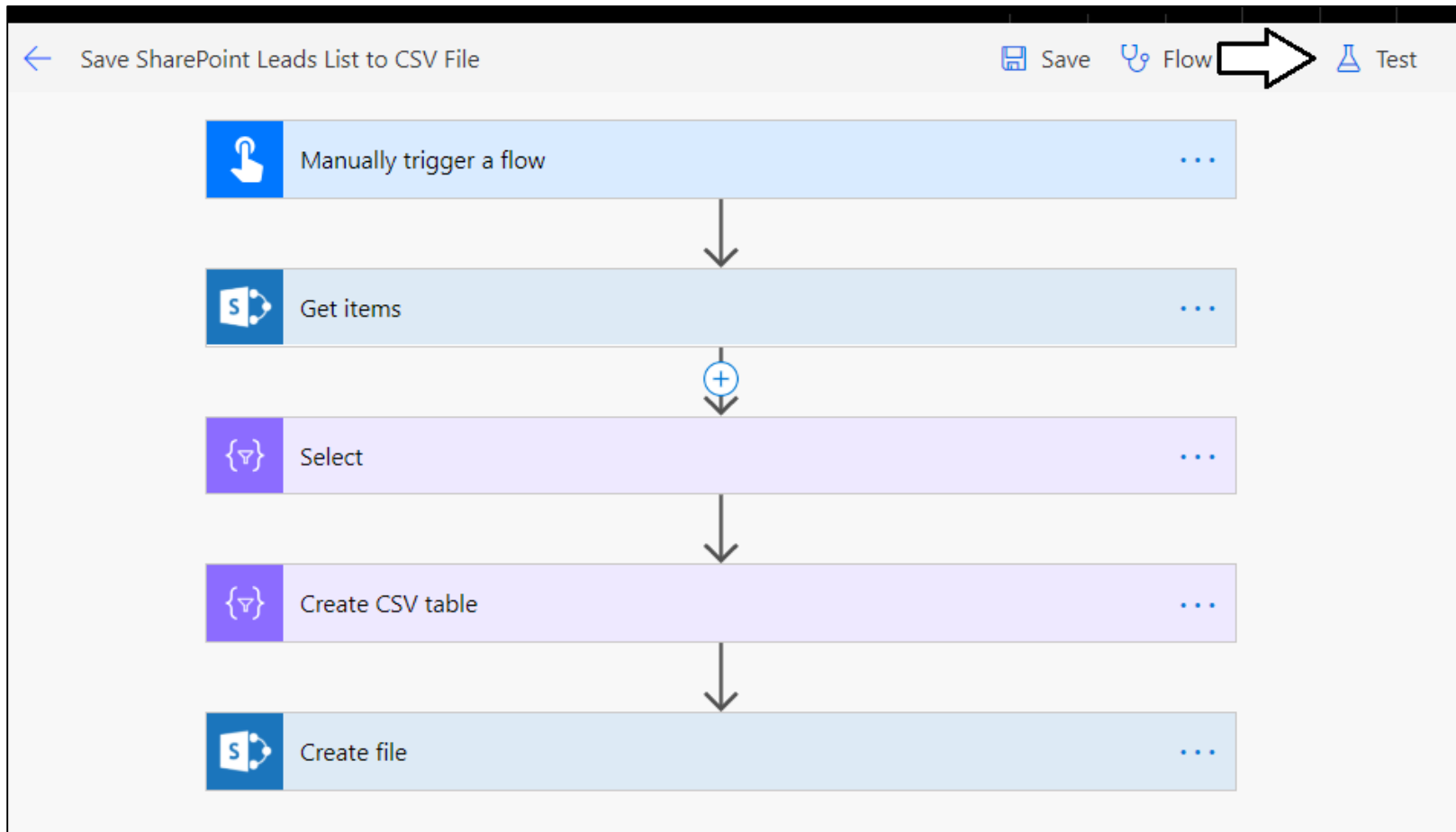
A downward arrow indicates the flow sequence from the first step to the second.

The **Flow Checker** panel on the right side of the screen shows the detected errors:

- Errors (2)**
 - When a new item is created (2)**
 - Include a Site Address.
 - Include a List Name.

Testing a Flow

- Flow can be run/tested from edit mode

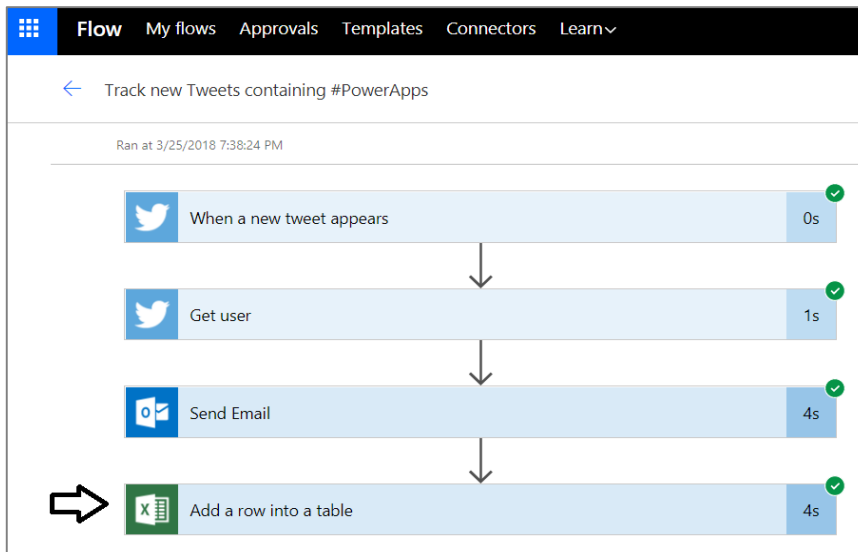


Run History

- Flow provides history flows that have run

RUN HISTORY			
➡	✓ Succeeded	9 minutes ago	8 seconds
	✓ Succeeded	2 hours ago	0 seconds
	✓ Succeeded	3 hours ago	0 seconds

- Provides read-only view of data for auditing & monitoring






DEMO

Demo 1

Creating and Testing a Simple Flow


Building a Flow

Flow name Track new Tweets containing #PowerApps ✓ Update flow ✕ Close


 When a new tweet appears ...

* Search text


↓

 Get user ...

* User name

 Tweeted by ✕


↓

 Send Email ...


* To

* Subject
 Name ✕"/>

* Body
Tweet:

 Tweet text ✕

Tweeted by:

 Tweeted by ✕

Show advanced options ▾

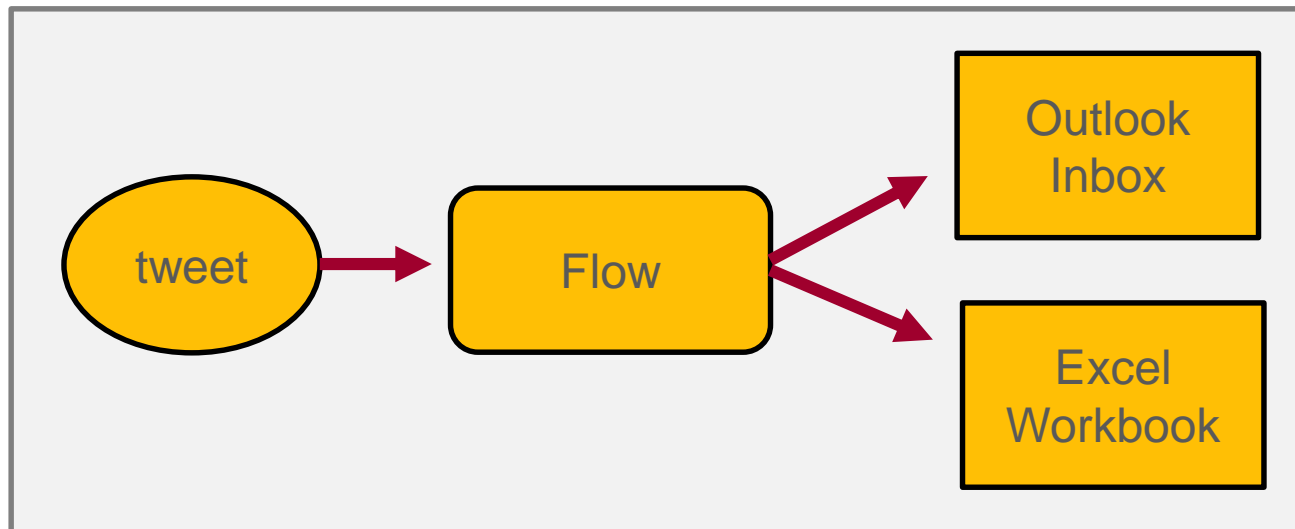


Updating a Table in an Excel Workbook



- Flow now writes tweets to Excel workbook as well as sending email

Excel Online					
Ted Pattison ▸ Documents				Tweets	
	A	B	C	D	
1	Time	Tweeter	ScreenName	RetweetCount	TweetText
2	2018-03-25T23:38:	Sea Pea Tea Student	DDPAF_Student	0	#PowerApps gets even better with Microsoft Flow
3					

- Observation: It's easy to design a flow to write data to multiple services



Run History Details

 Add a row into a table 4s 

INPUTS

Source

OneDrive for Business

Drive

OneDrive

File

/Tweets.xlsx

Table

Tweets

item

```
{
  "Time": "2018-03-25T23:38:28.5422853Z",
  "Tweeter": "Sea Pea Tea Student",
  "ScreenName": "DDPAF_Student",
  "RetweetCount": "0",
  "TweetText": "#PowerApps gets even better with Microsoft Flow"
}
```

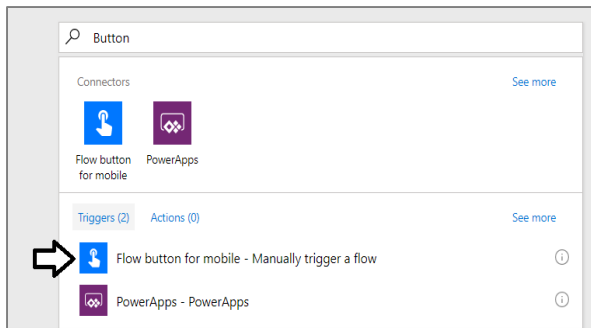
Time

2018-03-25T23:38:28.5422853Z



Creating a Flow Trigger by Manual Button

- Use Run button for Mobile as flow trigger



- Trigger can be extended with one or more input fields




Building Out The Idea Tracker Flow


Flow name

Idea Tracker

✓ Update flow

✕ Close

 Manually trigger a flow

 Quality

Please enter your input

...

List Options


Lame


Good


Great


Brilliant


Enter another option










 Idea


Please enter your input

...

+

 Add an input




 Send an email

* To


Student@DDPAF.onmicrosoft.com;

* Subject

 Quality ✕

 Idea for consideration

* Body

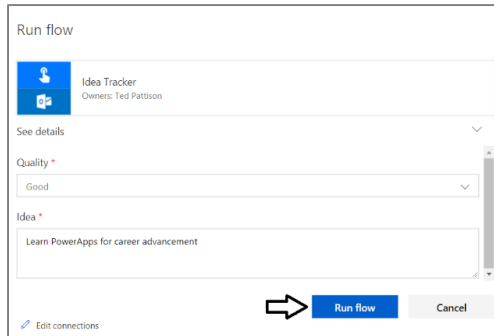
 Idea ✕

Show advanced options ▾

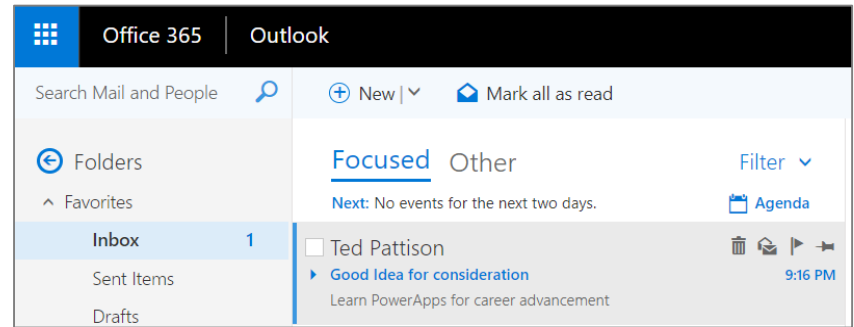
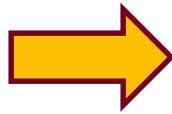


Where Should You Write the Idea?

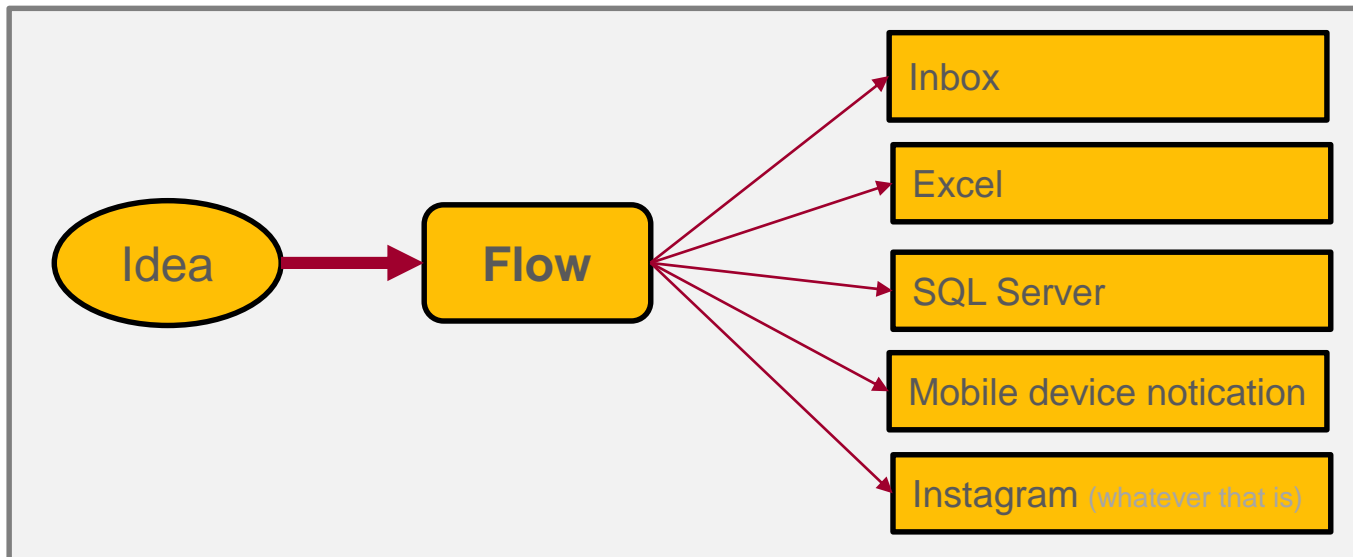
- You can track the idea by sending an email



The 'Run flow' dialog for 'Idea Tracker' (owned by Ted Pattison) is shown. It includes a 'See details' section with a 'Quality' dropdown set to 'Good' and an 'Idea' text box containing 'Learn PowerApps for career advancement'. At the bottom, there is a 'Run flow' button and a 'Cancel' button.



- Or get even more extravagant



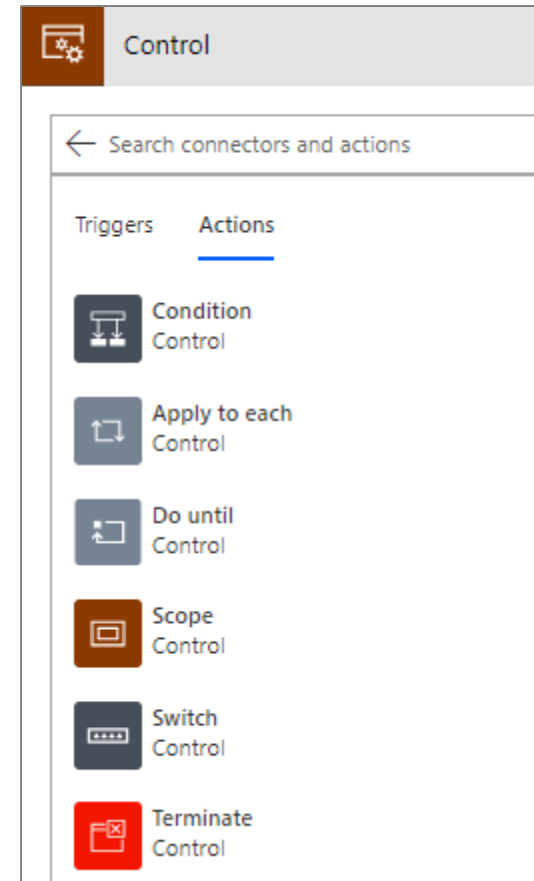
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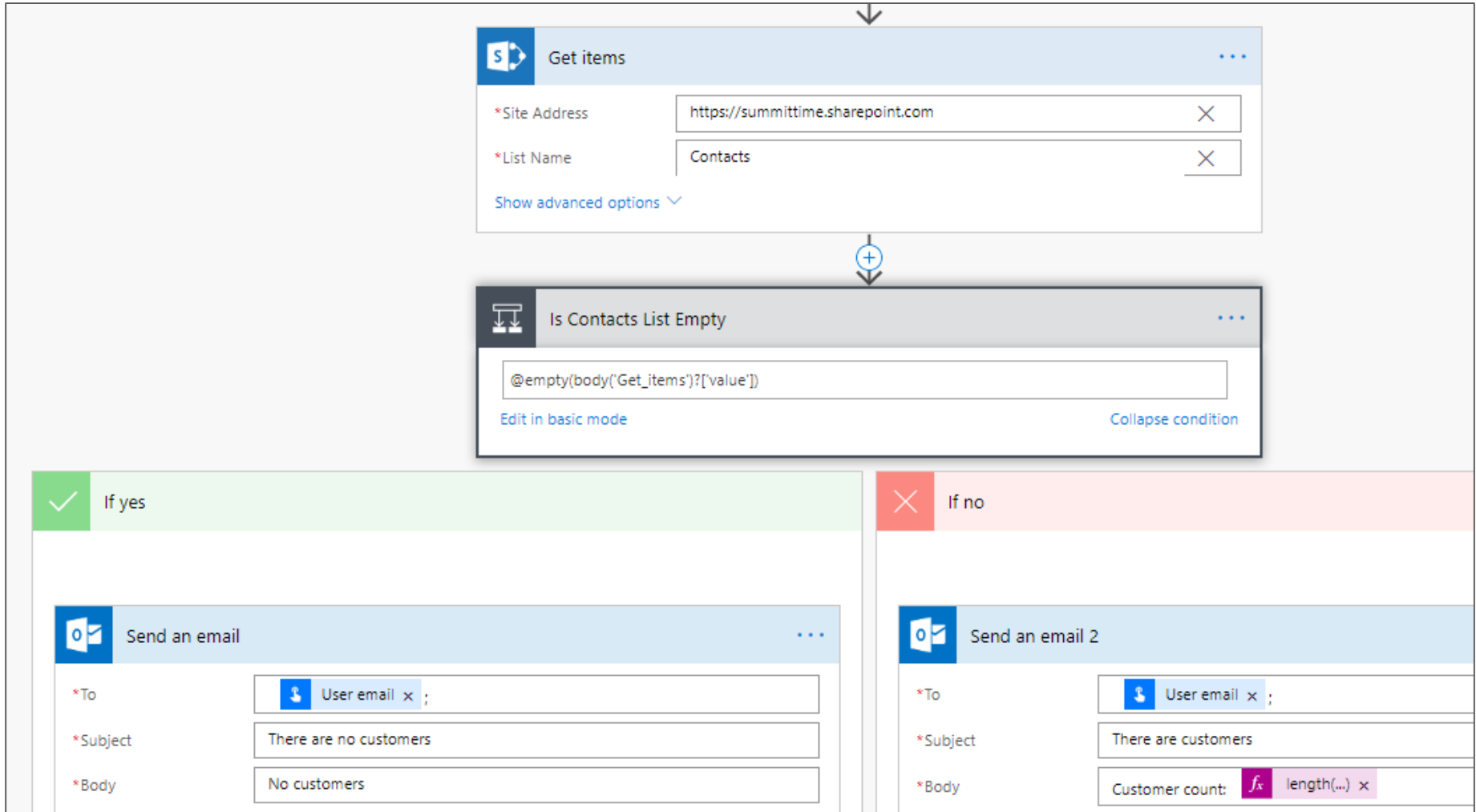


Control of Flow

- Condition
 - Provides logical structure for If Then Else
- Apply to each
 - Enumerate through collection (e.g. list items)
- Do until
 - Repeat until condition changes
- Scope
 - Create an action container with a private scope
- Switch
 - Select Case flow
- Terminate
 - Completes a flow



Condition Action



Creating a Flow for a SharePoint List

CP

Critical Path Labs Team Site

+ New

Quick edit

Export to Excel

Flow ▾

PowerApps ▾

...

Expenses

Create a flow

See your flows

Expense ▾	Category ▾	Date ▾	Amount ▾
Verizon - Telephone and Internet	Operations	1/1/2018	\$923.00
Electricity Bill	Operations	2/5/2018	\$338.00

×

Create a flow

Start with a template and create automated tasks between your SharePoint data and other apps. Choosing a template will open the Microsoft Flow site where you'll finish creating your flow.

Send a customized email when a new SharePoint list item is added

Start approval when a new item is added

When a message is posted on a group, create a SharePoint list item

Request manager approval for a selected item

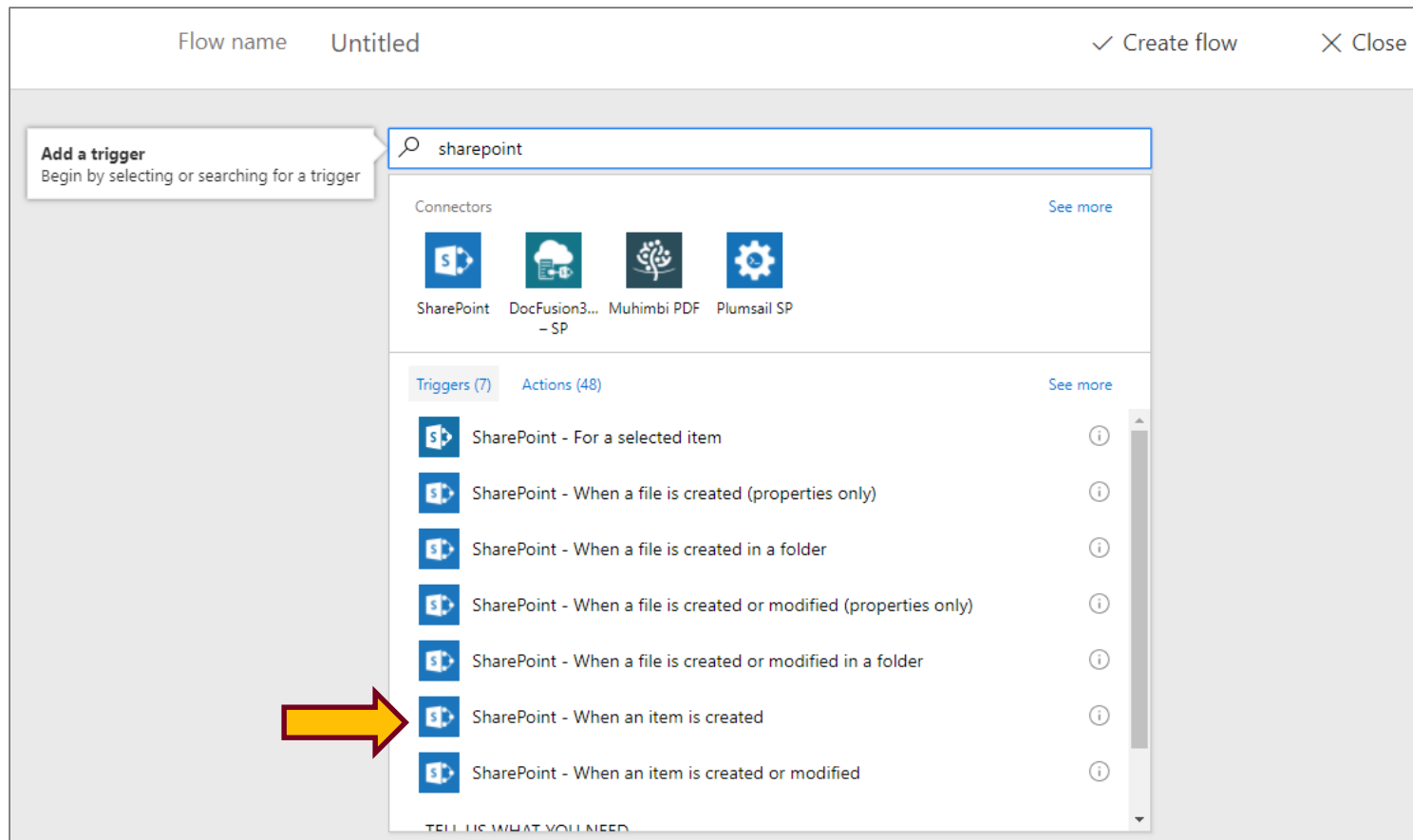
When an object is created in Dynamics 365, create a list item

Show more ▾



Another Way to Create Flows for SharePoint

- Create the flow from blank using the Flow Designer
 - Then add trigger based on SharePoint item event



Using a Condition

- Send alert email if expense amount greater than \$500
 - Condition runs test which returns true or false
 - Condition provide **If yes** branch and **If no** branch

Flow name Large Expense Alert ✓ Create flow ✕ Close

When an item is created

* Site Address

* List Name

Condition

is greater than or equal to

[Add dynamic content](#) [Edit in advanced mode](#) [Collapse condition](#)

✓ If yes ✕ If no



Build Out Branches using Actions

Flow name

Large Expense Alert

✓ Create flow

✕ Close

When an item is created

+

Condition

Amount x

is greater than or equal to ▾

500

[Add dynamic content](#) [+](#)

[Edit in advanced mode](#)

[Collapse condition](#)

✓ If yes

Send an email

*To

Ted Pattison x ;

*Subject

Large Expense Alert!

*Body

Expense: Expense x

Category: Category Value x

Amount: Amount x

Link to item x

[Add dynamic content](#) [+](#)

✕ If no

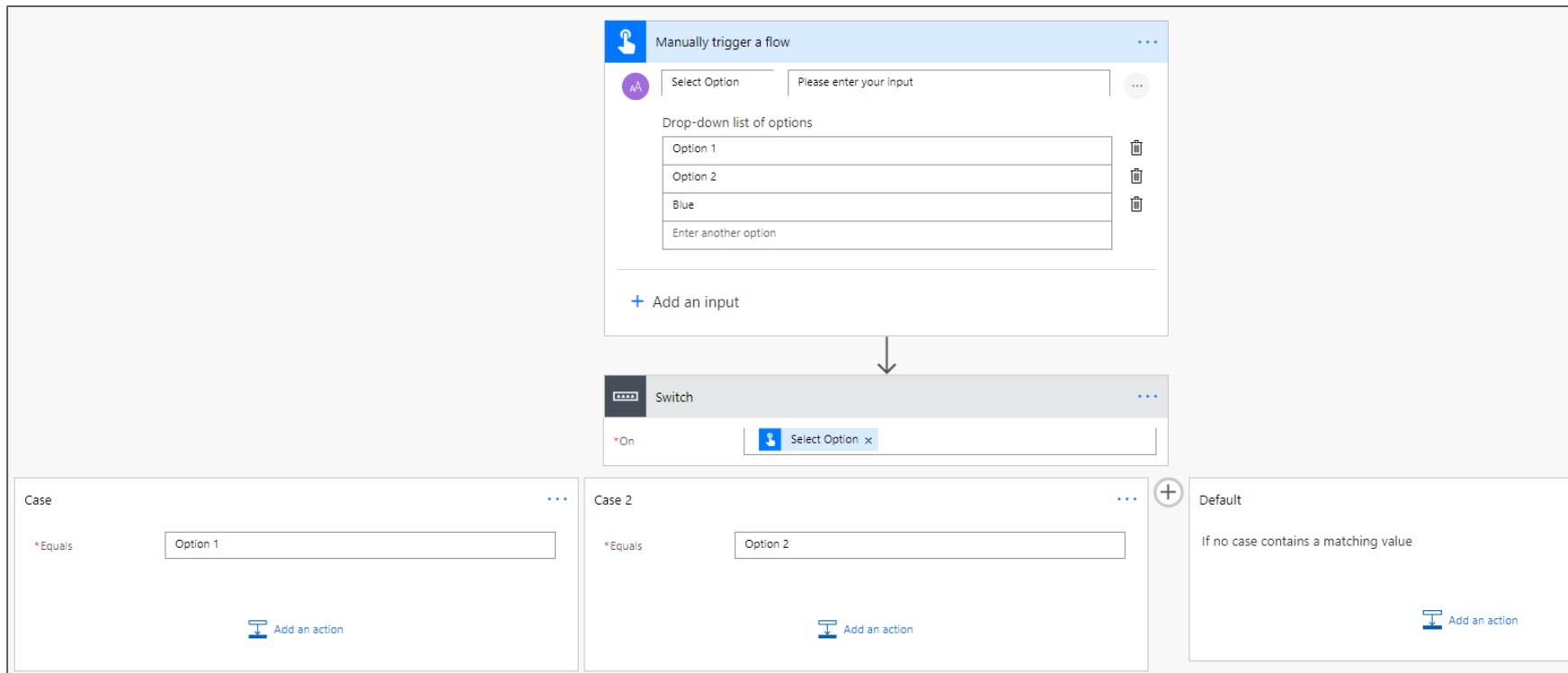
[Add an action](#)

[More](#)



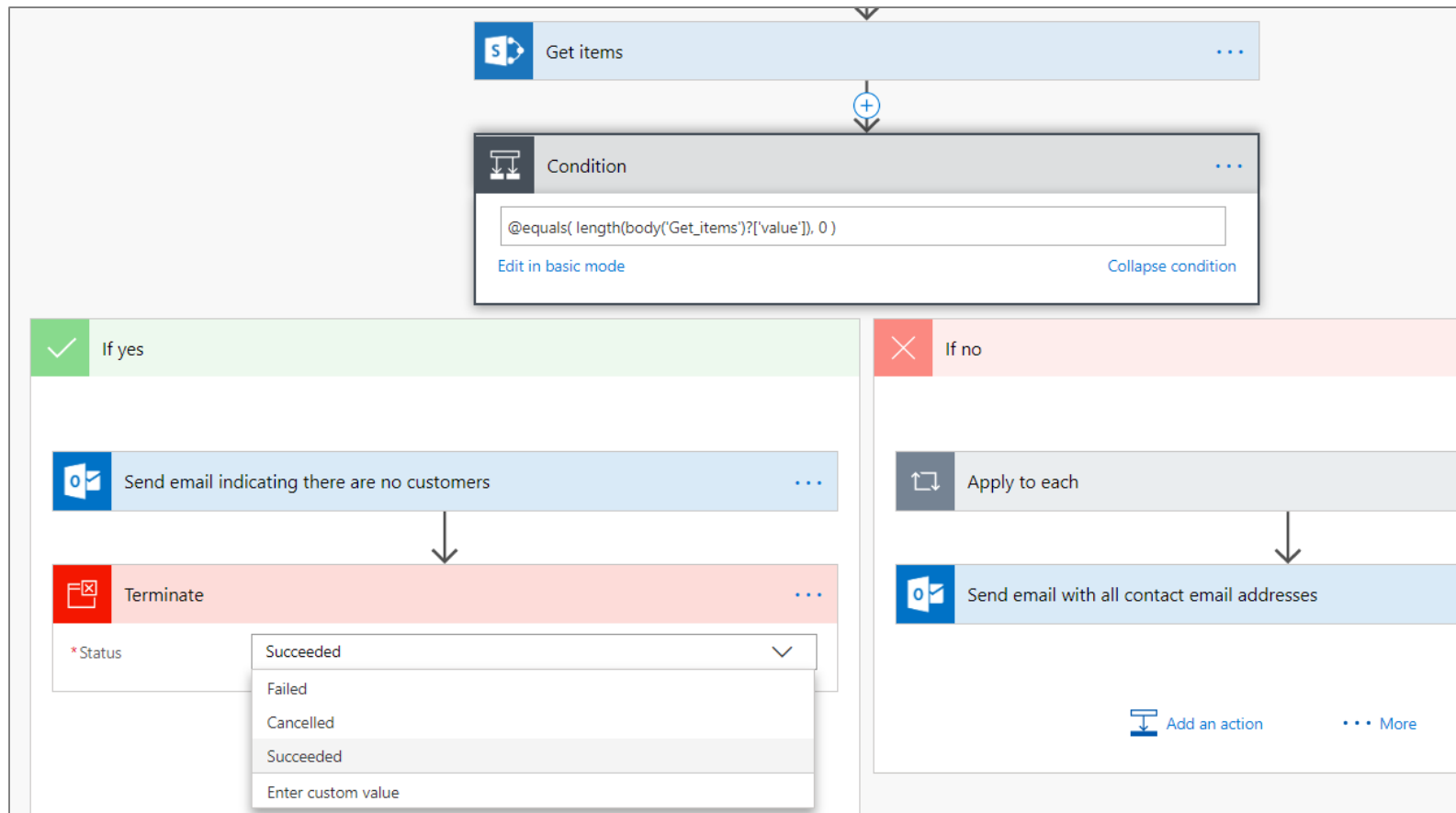
Switch Action

- Switch actions provides cases
 - Each case represents separate execution path
 - Only one execution path will execute
 - Default case executes when no other case is matched



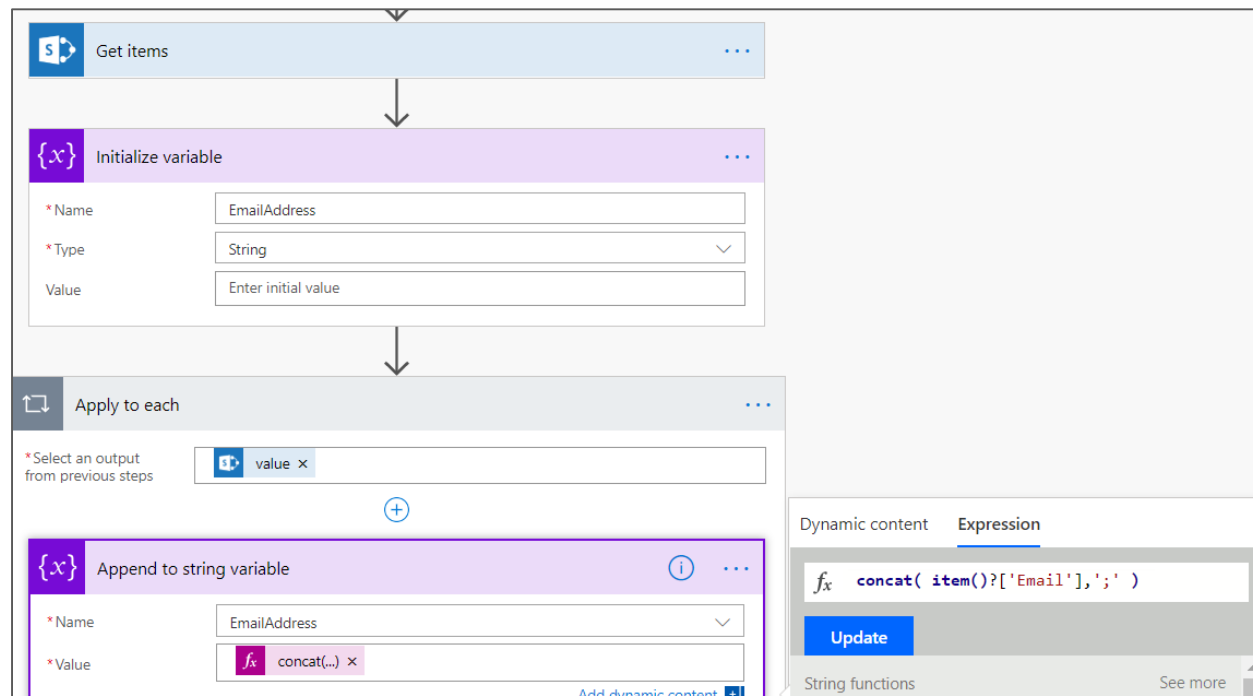
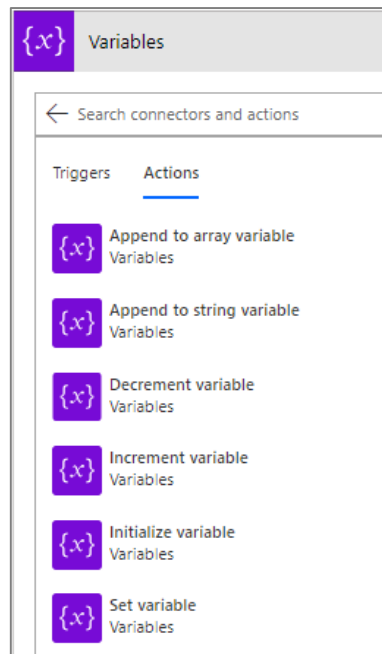
Terminate action

- Used to stop a flow at any point
 - Terminate status can be set to Succeeded, Cancelled, Failed

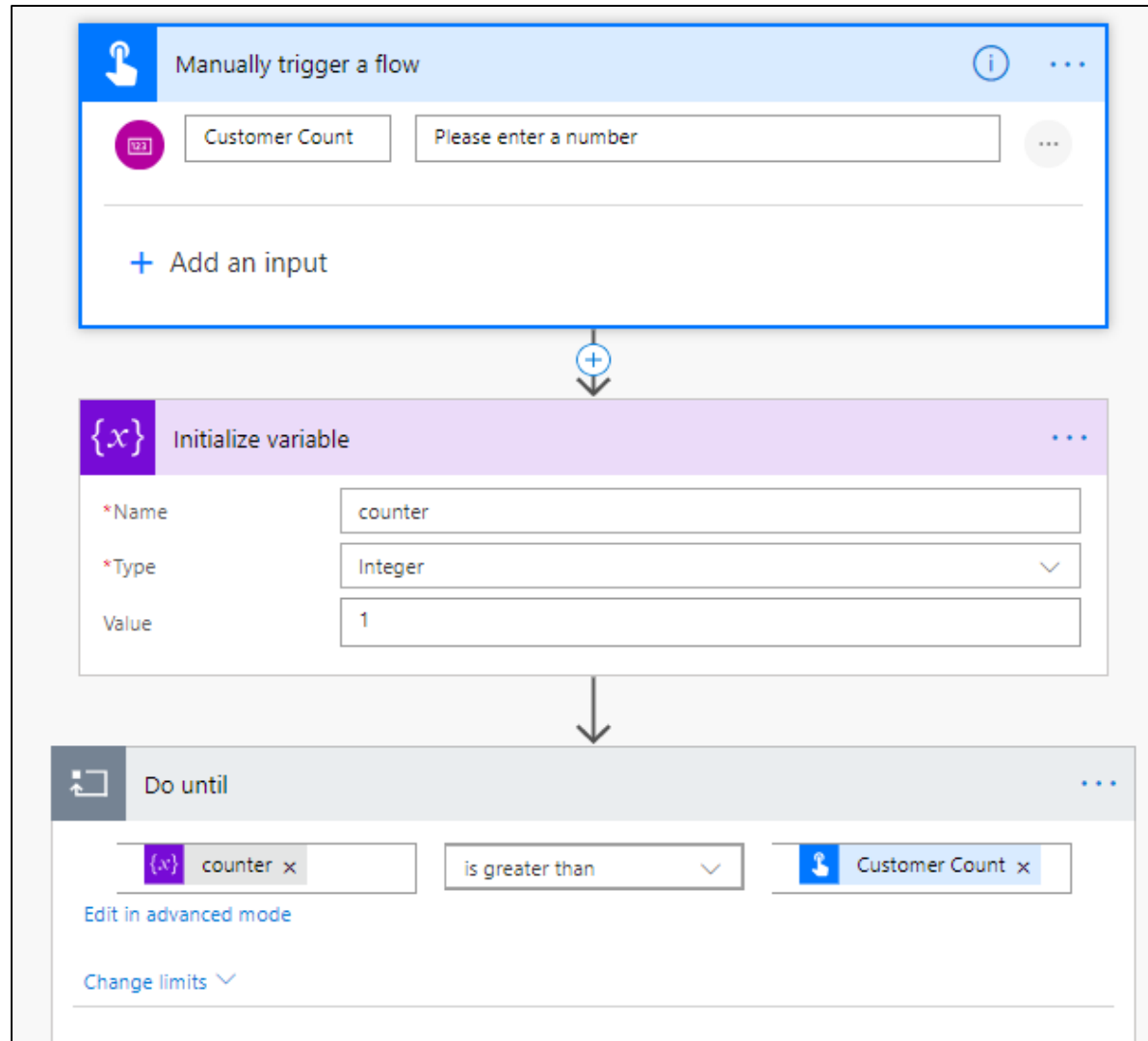


Tracking State using Variables

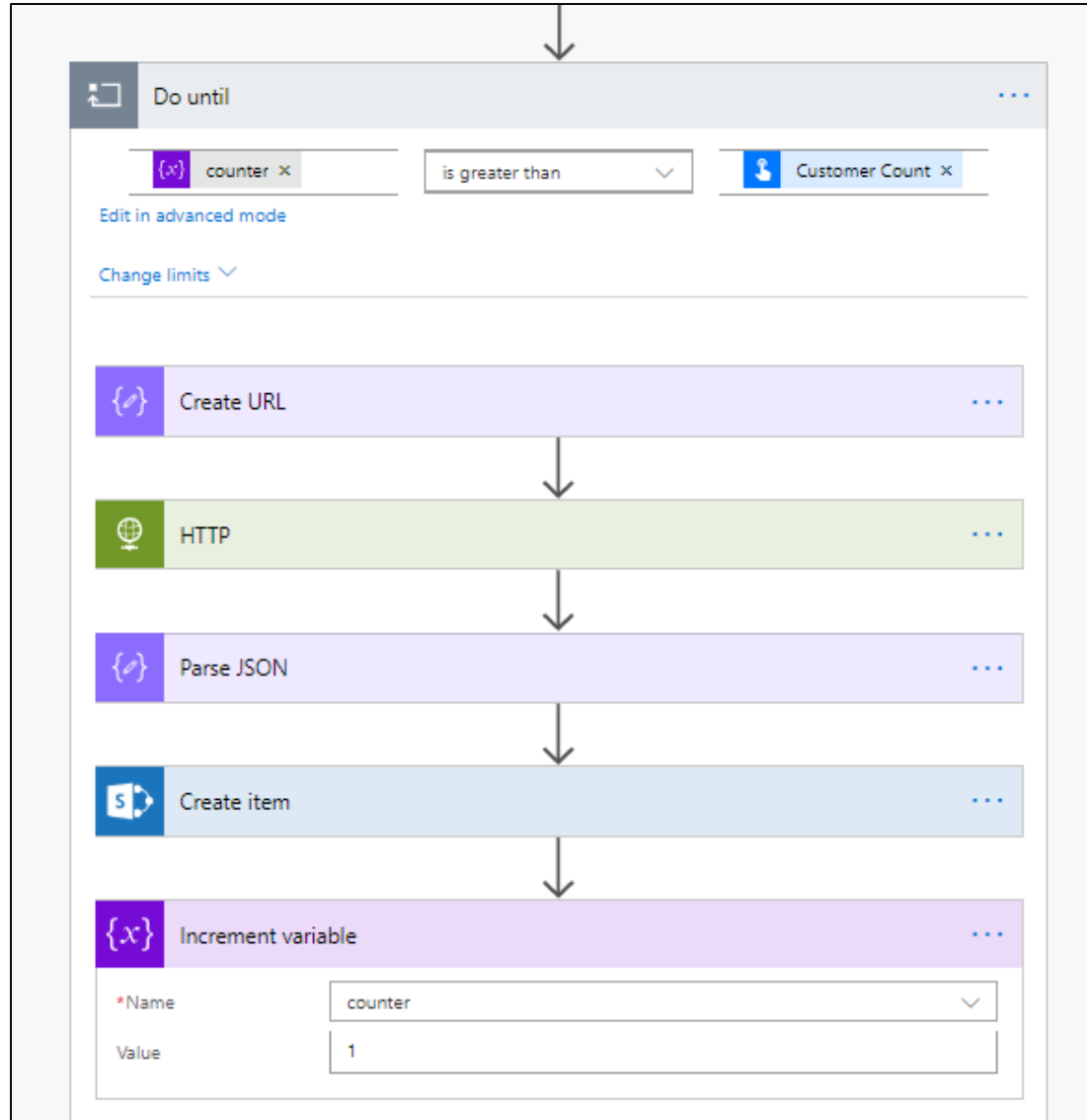
- Variables used to track state during flow lifetime
 - Initialize Variable used to create variable with Type and Value
 - Other variable actions uses to update variable values
 - By default, variable stored within flow until end of flow lifetime
 - Variables can be initialized inside Scope action to reduce lifetime



Do Until Action with Counter Variable



Executing Operations inside Do Until Loop



Using Apply to Each

- Automatically added when list is used from output
- Destination step enumerates over list items

The screenshot displays a workflow editor interface. At the top, a 'Get items' step is configured with 'Site Address' set to 'https://msd0910.sharepoint.com/' and 'List Name' set to '0769e0e8-aec5-4441-8c88-6283a6799718'. Below this, an 'Apply to each' step is shown, which is automatically added when a list is used in a previous step. The 'Apply to each' step has a dropdown menu showing 'value x'. Below the 'Apply to each' step, a 'Delete item' step is visible, configured with 'Site Address' set to 'Critical Path Training Labs Team Site - https://msd0910.sharepoint.com/', 'List Name' set to 'List1', and 'Id' set to 'ID x'. At the bottom of the editor, there are buttons for 'Add an action', 'Add a condition', and 'More'.



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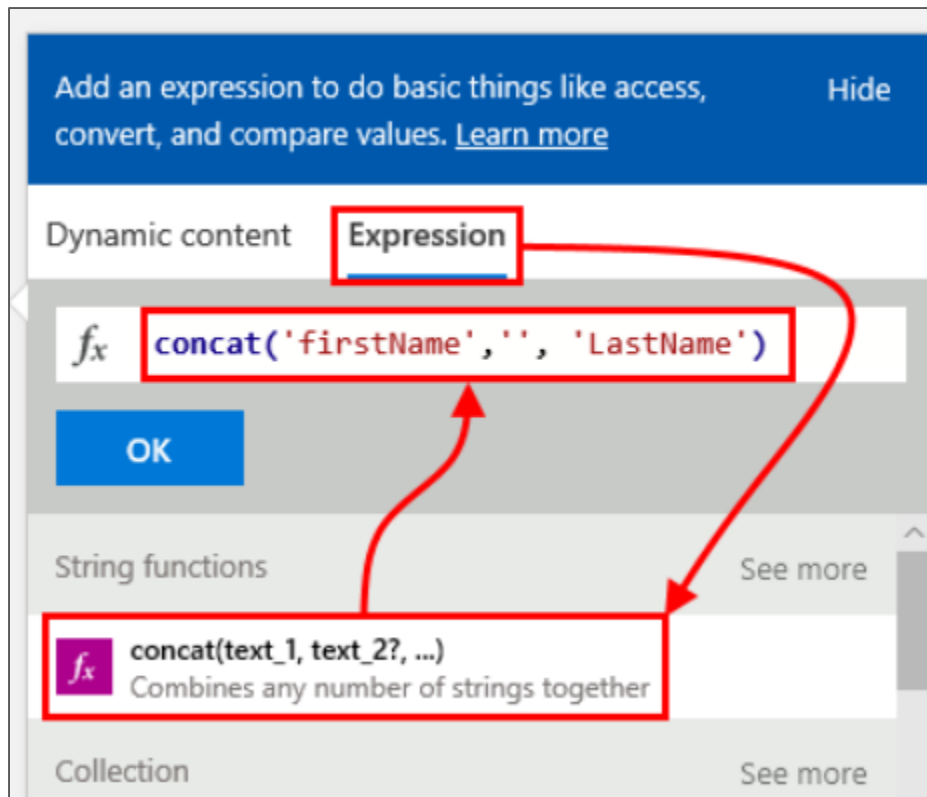
Writing Flow Expressions

- Scenarios for writing Flow expressions
 - Perform string manipulation
 - Generate a GUID or a random number
 - Convert types
 - Perform simple inline calculations
 - Handling optional values
 - Writing conditional statements using "If" statements
 - Working with arrays



Writing Expressions

- Expressions written in fx textbox
- Click OK to enter expressions



Workflow Definition Language (WDL)

- Flow expressions written in Workflow Definition Language
 - Same language used in Azure Logic Apps
 - WDL is more powerful yet more complicated than PowerApps
 - WDL does not overload operators like PowerApps does
 - WDL requires single quotes instead of double quotes

<code>fx "this is a test"</code>	Invalid: no double quotes
<code>fx 'this is a test'</code>	Valid
<code>fx 'this is a ' + 'test'</code>	Invalid : + operator not supported
<code>fx 'this is a ' & 'test'</code>	Invalid : & operator not supported
<code>fx concat('this is a ', 'test')</code>	Valid




Working with Strings

- Parse text together using **concat()**
- Parse out text using **substring()**
- Convert casing using **toLowerCase()** and **toUpperCase()**
- Search string using **indexOf** and **startsWith()**
- Create new GUID identifier using **guid()**

 **concat(text_1, text_2?, ...)**
Combines any number of strings together

 **substring(text, startIndex, length)**
Returns a subset of characters from a string

 **replace(text, oldText, newText)**
Replaces a string with a given string


 **guid()**
Generates a globally unique string (GUID)


 **toLowerCase(text)**
Converts a string to lowercase using the casing rules of the i...

 **toUpperCase(text)**
Converts a string to uppercase using the casing rules of the i...

 **indexOf(text, searchText)**
Returns the first index of a value within a string (case-insensi...

 **lastIndexOf(text, searchText)**
Returns the last index of a value within a string (case-insensit...

 **startsWith(text, searchText)**
Checks if the string starts with a value (case-insensitive, invar...

 **endsWith(text, searchText)**
Checks if the string ends with a value (case-insensitive, invari...



Performing Arithmetic Operations

- You cannot use standard arithmetic operators
 - No support for familiar operators such as **+**, **-**, *****, **/**
 - This does not work: **2 + 2**
 - This works: **add(2, 2)**

fx **min(collection or item1, item2?, ...)**
Returns the minimum value in the input array of numbers

fx **max(collection or item1, item2?, ...)**
Returns the maximum value in the input array of numbers

fx **rand(minValue, maxValue)**
Generates a random integer within the specified range (inclu...

fx **add(summand_1, summand_2)**
Returns the result from adding the two numbers

fx **sub(minuend, subtrahend)**
Returns the result from subtracting two numbers

fx **mul(multiplicand_1, multiplicand_2)**
Returns the result from multiplying the two numbers

fx **div(dividend, divisor)**
Returns the result from dividing the two numbers

fx **mod(dividend, divisor)**
Returns the remainder after dividing the two numbers (mod...



Understanding Arrays in Flow


- Flow arrays are zero-based
 - Primitive value arrays

0	Daugherty
1	Hernandez
2	Mack
3	Wiley

- Object arrays

	Last Name	First Name	Company	Business Phone	Home Phone
0	Daugherty	Cindy	Wonka Industries	1(337)111-4444	1(337)111-7777
1	Hernandez	Zane	Vandelay Industries	1(757)666-3333	1(757)777-1111
2	Mack	Chang	Wonka Industries	1(480)111-4444	1(480)777-0000
3	Wiley	Ramona	Ecumena	1(201)777-8888	1(201)777-2222

Accessing an Array using ['value']

 Get items ⓘ ⋮

*Site Address ✕

*List Name ✕

Show advanced options ▼



`body('Get_items')?['value']`

	Last Name	First Name	Company	Business Phone	Home Phone
0	Daugherty	Cindy	Wonka Industries	1(337)111-4444	1(337)111-7777
1	Hernandez	Zane	Vandelay Industries	1(757)666-3333	1(757)777-1111
2	Mack	Chang	Wonka Industries	1(480)111-4444	1(480)777-0000
3	Wiley	Ramona	Ecumena	1(201)777-8888	1(201)777-2222



Retrieving List Items

- Use **first()** and **last()** to get lead at head or tail
- Individual items retrieved using zero-based array syntax
 - SharePoint list item array - `body('Get_items')?['value']`
 - First item field value - `body('Get_items')?['value'][0]['ID']`

The screenshot shows a Power Automate flow with two actions. The first action is 'Get items' (SharePoint connector). The second action is 'Delete item' (SharePoint connector), which is connected to the first action via a connector arrow. The 'Delete item' action has three input fields: '* Site Address' with the value 'Critical Path Training Labs Team Site - https://msd0910.sharepoint.com/', '* List Name' with the value 'List1', and '* Id' with a dynamic content expression `body(...)`. An 'Add dynamic content' button is visible at the bottom right of the 'Delete item' action.

The screenshot shows the 'Dynamic content' pane in Power Automate. The 'Expression' tab is selected. The expression `body('Get_items')?['value'][0]['ID']` is entered in the text box. Below the text box is a blue 'Update' button.



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DEMO

Calling a Flow from a Canvas App

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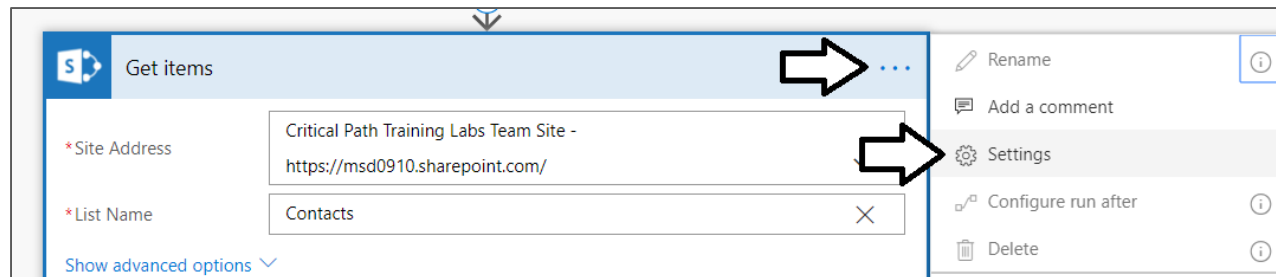
Normal action execution

- Standard behavior of a flow
 - Action steps execute in sequential order
 - Flow terminates if error occurs (failure or timeout)
- After flow runs, every action left in 1 of 4 possible states



Action Settings


- Settings let you configure
 - Async Actions
 - Timeouts
 - Retry Policy
 - Sequential Behavior
 - And more!




Error Handling

- Select the **Run after** option from action menu
 - Choose which error conditions, the arrow will turn dotted red
 - Use parallels for errors that are not at end of flow
 - Retry policy by default handles transient failures
 - Recommended to select exponential as they last a long time

'Handle duplicate file names' should run after:

 This step will only run if the flow couldn't create the file because there's already another one with the same name. It will add some numbers to the end of the file name to make it unique.

 **Create file**
Failed

☐ is successful
☒ has failed
☐ is skipped
☐ has timed out

Done **Cancel**

Retry Policy

A retry policy applies to intermittent failures, characterized as HTTP status codes 408, 429, and 5xx, in addition to any connectivity exceptions. The default retry policy is to retry 4 times with a 20 second delay between each attempt.

Retry policy type:

Interval ⓘ:

Count:

Done **Cancel**



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