2024

# 2024 Power Automate Coding Standards

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# Introduction

Welcome to the Power Automate Coding Standards for cloud flows.

In this guide you will find 60+ pages of coding rules, guidelines and best practices I use everyday to create Power Automate cloud flows. I have spent the last 3 years building Power Automate flows every day. Now I want to share the knowledge I've gained in this set of easy-to-understand, actionable examples.

Power Automate already has an official set of cloud flow coding standards released back in 2019. So why did I make my own? A few reasons:

- I wanted an updated set of standards and guidelines for 2024 that includes all of the latest features
- These coding standards can be continuously improved as new Power Automate features hit "general availability" in 2024, 2025, 2026 and beyond
- Readers can leave a comments on my website describing their own best practices which I can incorporate into future versions

I hope you enjoy my Power Automate Coding Standards For Cloud Flows.

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# Naming Conventions

## Why Use Power Automate Naming Conventions?

A consistent naming pattern makes it easier for other developers to understand what a flow does without having to review the details of every individual action. Cleanliness of the Power Automate code speeds up work and reduces bugs.

## Flow Names

A flow name should begin with a verb (action word), describe what outcome the flow will achieve and include the trigger type. Use proper case. Be as concise as possible.

| Good Examples | Bad Examples | Bad Reason |
|---|---|---|
| Send Daily Status Report (Scheduled) | Send Daily Status Report | No trigger type at end of name |
| Get Currency Rates From Web (Automated) | Currency Rates From Web | No verb at beginning of name |
| Change App Ownership (Instant) | Change app ownership (Instant) | Not proper case |

Prefix the flow with a group name at the start when it is part of a set of related flows. Do this to communicate the relationship between flows. Not every flow built requires a group name. If a flow does not belong to a set then do not add a group name.

| Examples With Group Name |
|---|
| Generate Contract: Create & Send PDF Contract (Automated) |
| Generate Contract: Calculate Line Item Prices (Instant) |
| Generate Contract: Assemble Terms & Conditions (Instant) |

## Action Names

A flow action name must always start with the action's original description. It is important to include this so developers can understand which action was selected without having to expand it. Then add more details about what the action is doing within the context of the current flow.

Use proper case. Separate the action name and its context using a colon.

| Good Examples | Bad Examples | Bad Reason |
|---|---|---|
| Get Items: Inspections Table | Download Items From The Inspections Table | Original SharePoint connector action name missing |
| Compose: Email message body | Compose | Missing description |
| Send Email (V2): Daily Report To Operations Leadership | Send Email (V2) – Daily Report To Operations Leadership | Used a dash instead of a colon |

## Trigger Names

*Automated flow* trigger names should include the table or event name in the trigger name.

| Example |
|---|
| When An Item Is Created: Safety Incidents |

*Scheduled flow* trigger names must display the recurrence schedule.

| Example |
|---|
| Recurrence: On The 1st & 15th Of The Month At 5PM |

*Instant flows* trigger names should also describe the event that triggers them.

| **Example** |
| --- |
| Manually Trigger A Flow: When An Admin Wants To Create A New SharePoint Team Site |

*Power Apps flow* trigger names should describe the event the app which triggers the flow to start.

| **Example** |
| --- |
| Power Apps (V2): When The User Submits A New File To Upload |

## Variable Names

A flow variable name should begin with a prefix of “v” and describe its subject/purpose in concise manner. Use camel case. with no spaces between each word. Be as concise as possible.

| **Good Examples** | **Bad Examples** | **Bad Reason** |
| --- | --- | --- |
| vQuantityInBox | varQuantityInBox | Do not prefix with var |
| vEmployeeFullName | strEmployeeFullName | Prefix str to denote a string data type is not necessary |
| vIsPastDue | vispastdue | Use camel case |

## Connection Reference Names

A connection reference name starts with a noun to describe the connection account. Then it is followed by the connection type, the solution name and a unique identifier. These are automatically added when building inside of a solution.

| Good Examples | Bad Examples | Bad Reason |
|---|---|---|
| SvcAcct-SharePoint CurrencyExchangeRates-ac3d5 | SharePoint CurrencyExchangeRates-ac3d5 | Missing noun at beginning |
| SvcAcct-Dataverse CurrencyExchangeRates-be005 | SvcAcct-Dataverse | No solution name or unique identifier found |
| SystemAlerts-Office 365 Outlook CurrencyExchangeRates-32a0c | DavidJohnson-Office 365 Outlook CurrencyExchangeRates-32a0c | Noun is not generic. |

# Variables

## How Should I Store Values In A Flow?

Variables, the Compose action, and Environment Variables, and Configuration Data all have a useful role to play in Power Automate flows. This section discusses where and when to use each of them.

## Variables

Variables store values that can be referenced in other flow actions. Use a variable when the value will need to be updated at multiple points during the flow run.

Avoid creating variables to store constants. A constant is a value supplied when the variable is initialized that does not change during the flow's execution.

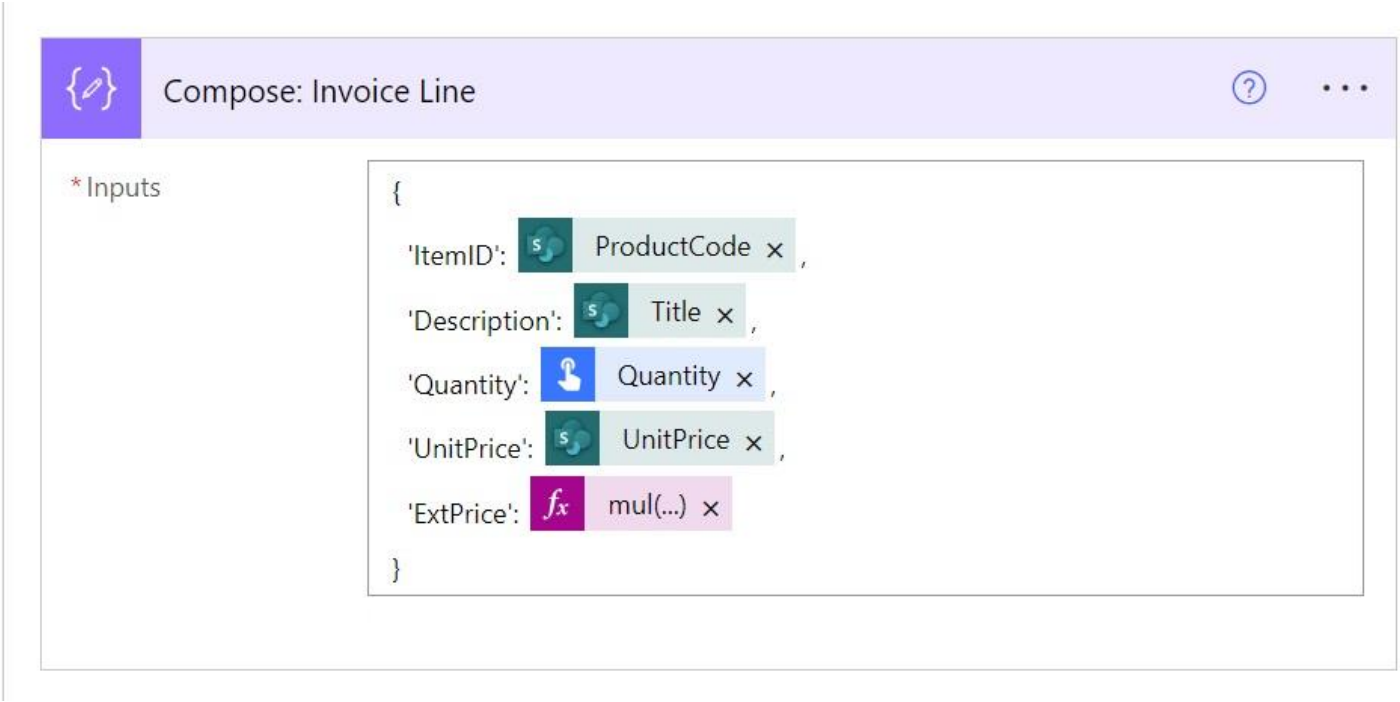
Do use a variable to store the result of a calculation. Do not use variables when a direct reference can be made in the flow action.

## Compose Action

Variables cannot be used inside of Apply To Each loops when Concurrency is enabled. Substitute the Compose action for variables within loops to maintain the performance benefit of parallelism.

When a value is stored inside of a Compose action it cannot be updated. Only use it to store values that will not change.

The Compose action is often cited as an alternative to Power Automate variables. Don't overuse this technique. Compose actions can make flows less readable at a glance because they always show the word Output when referencing a prior action.

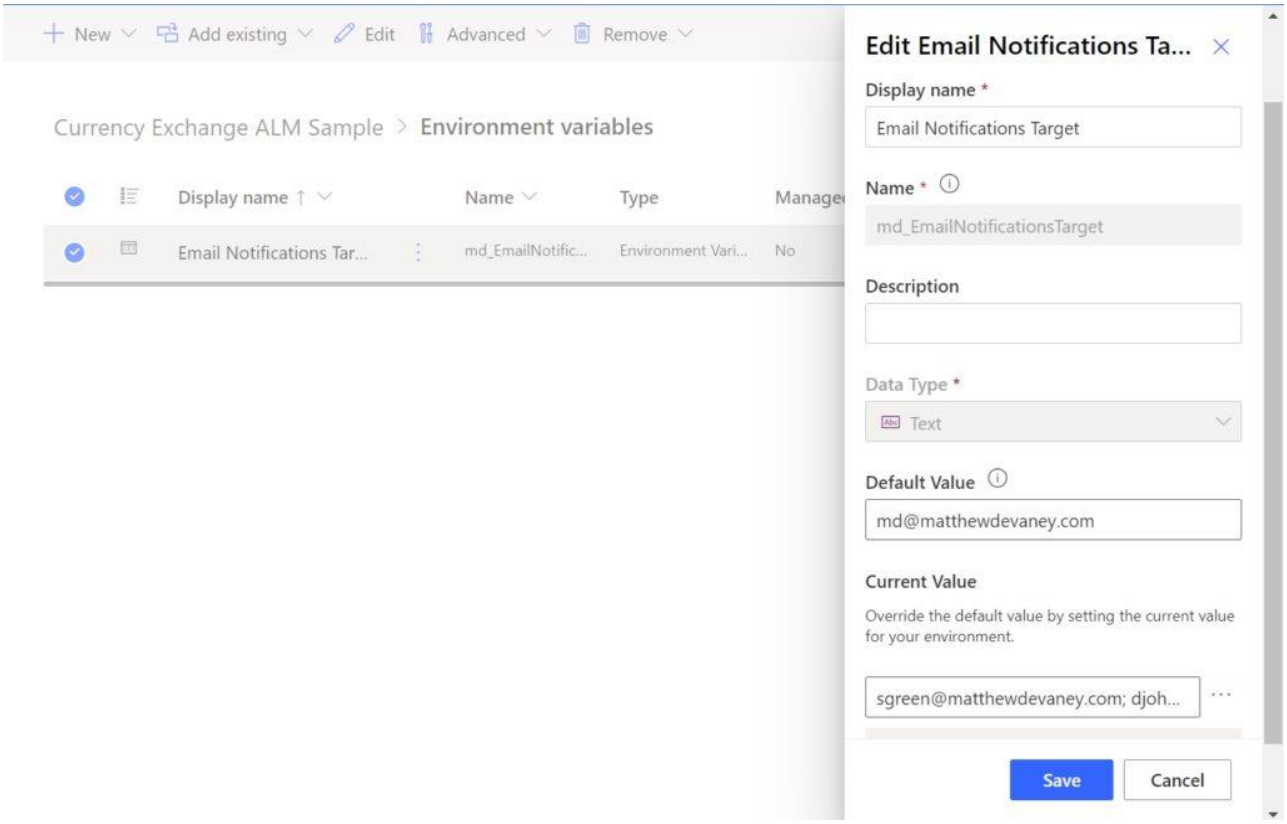


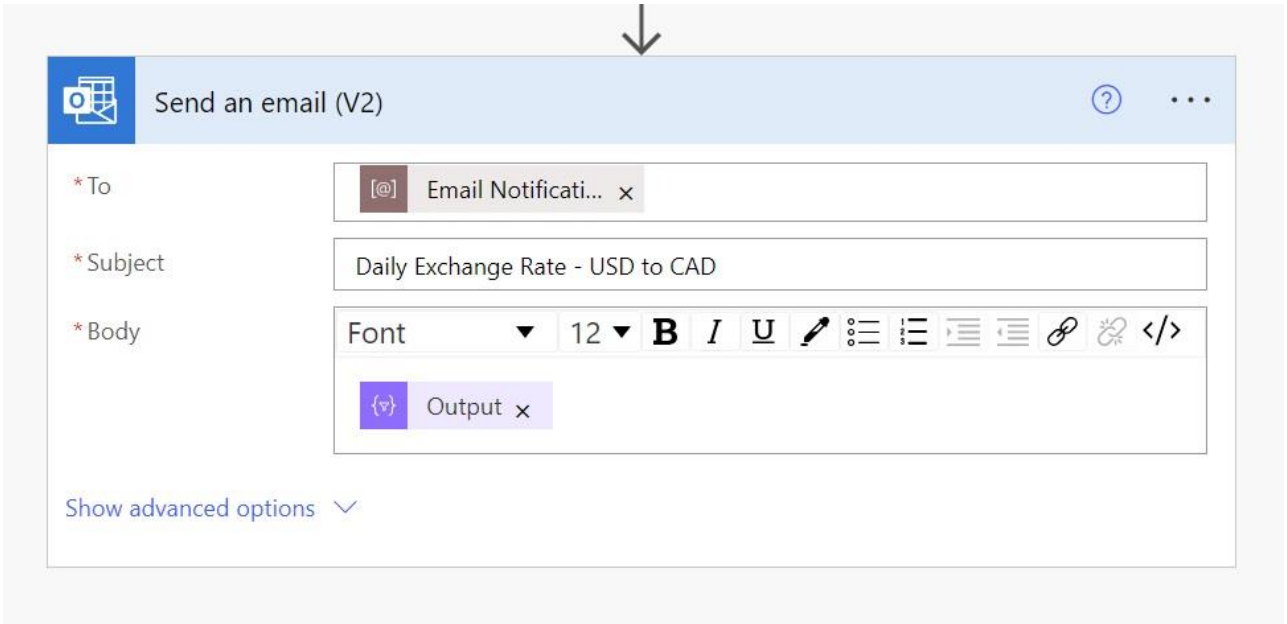

## Environment Variables

A developer following ALM best practices will create flows in a development environment, then move the flow to a testing environment for testing and into a production environment for go-live. The flow will often need to behave differently in each environment. Use environment variables to store configuration values and avoid hardcoding them into the flow. Editing a flow inside a managed solution will cause an unwanted unmanaged layer to appear.

For example, a flow sending an email targets an email distribution list while in production but only sends messages to the developer while in development and test environments.

Leverage a single environment variable to replace several of the same hardcoded values across multiple flows.



## Configuration Data Table

An environment variable should not be created when it will only be used in a single flow. Instead, create a table called *Configuration Data* and use it to hold key-value pairs containing the flow settings.

The Configuration Data table includes the following single-line text columns:

*Key* – describes the key-value pair, must be unique to the group.

*Value* – the value to be used inside the flow

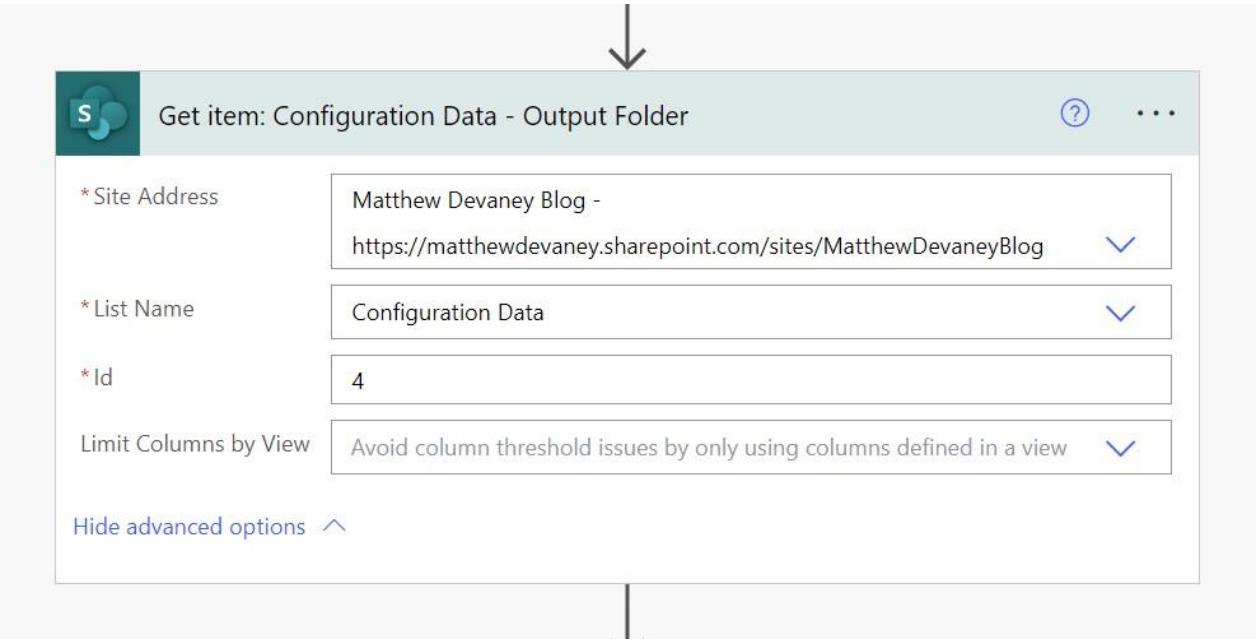
*Group* – identifies a set of key-value pairs, making it possible to get all needed key-value pairs at once

| ID | Key | Value | Group |
|---|---|---|---|
| 1 | DistributionList | alerts@matthewdevaney.com | DailyNotificationsFlow |
| 2 | EnableSendingEmail | true | DailyNotificationsFlow |
| 3 | DelaySeconds | 60 | DailyNotificationsFlow |
| 4 | OutputFolder | C:/Documents/Sales Reports | GenerateReportFlow |
| 5 | DelaySeconds | 15 | GenerateReportFlow |

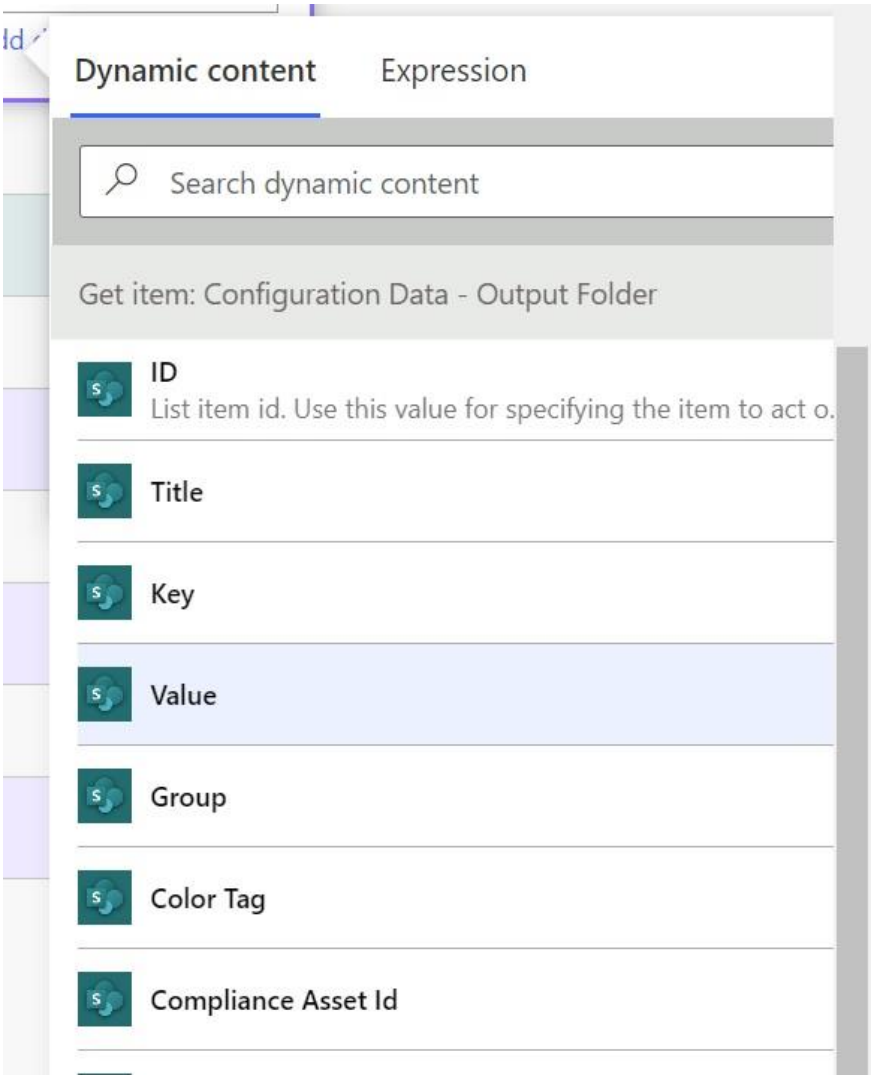
Replace as many hardcoded values in a flow as possible. This will eliminate the need to redeploy a flow to make changes to its behavior.

## Get A Single Key-Value Pair From Configuration Data

A single value key-value pair can be obtained using the Get Item (SharePoint) or Get Row (Dataverse) action.

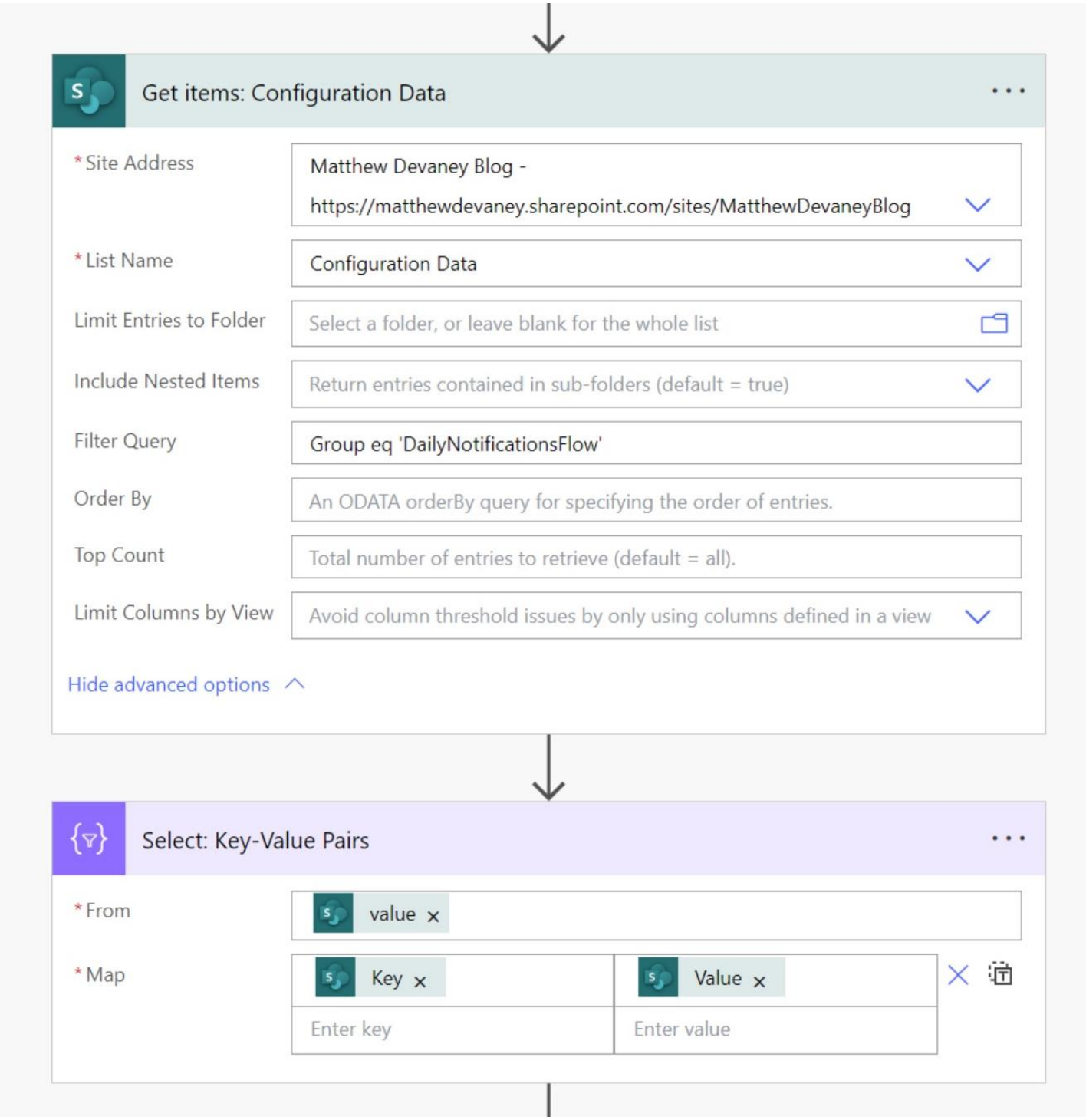


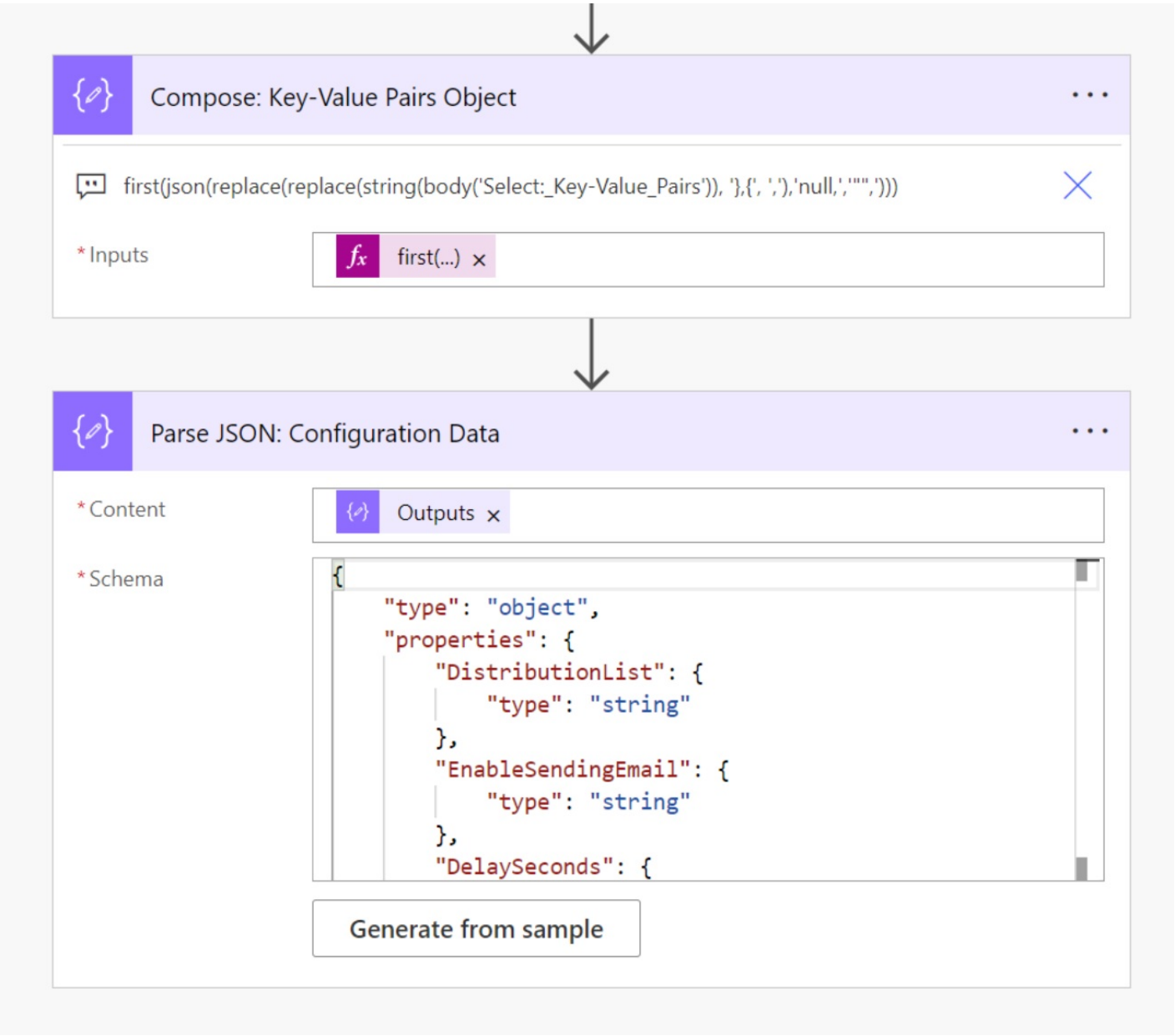
To use the configuration data value select it from the dynamic content menu.



## Retrieve All Key-Value Pairs For A Configuration Data Group

All key-value pairs for a group (e.g. DailyNotificationsFlow) can be retrieved using this flow pattern.

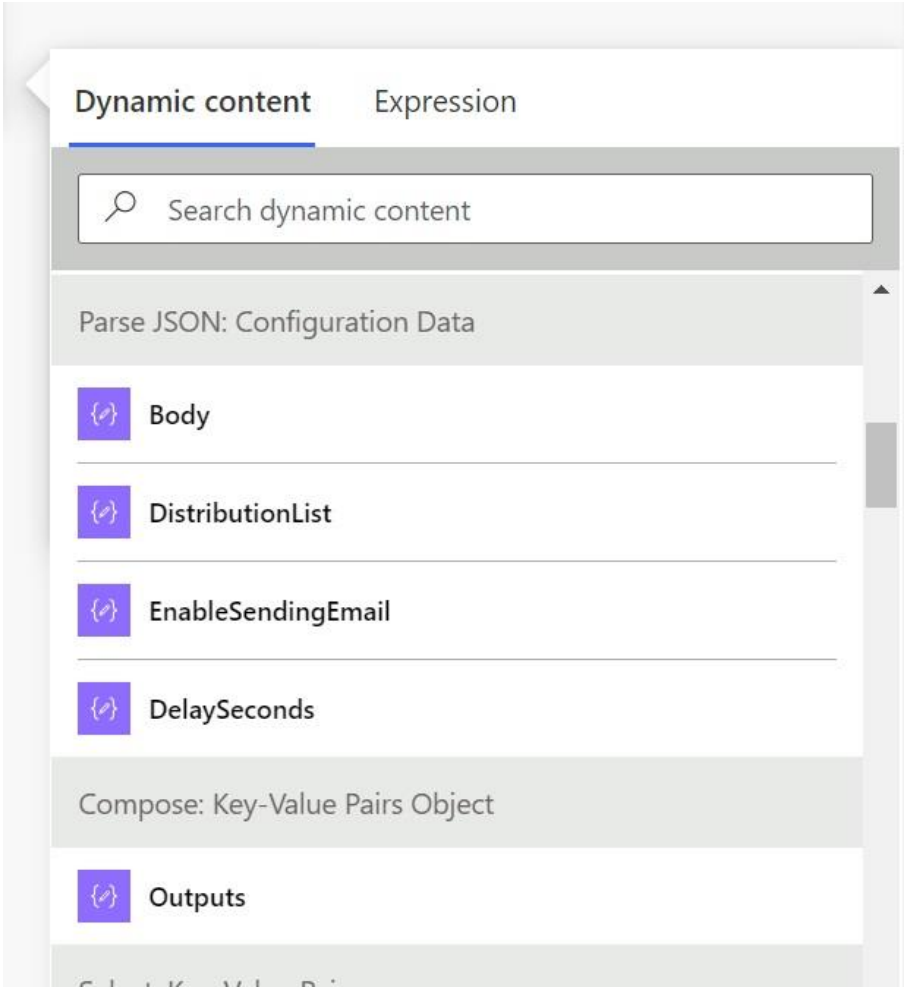





The following expression is used in the *Compose: Key-Value Pairs Object* flow action.

```
first(json(replace(replace(string(body('Select:_Key-Value_Pairs')), '},{',
','),'null,'"",')))
```

Configuration data values for the group can be accessed in the dynamic content menu.



# Commenting Code

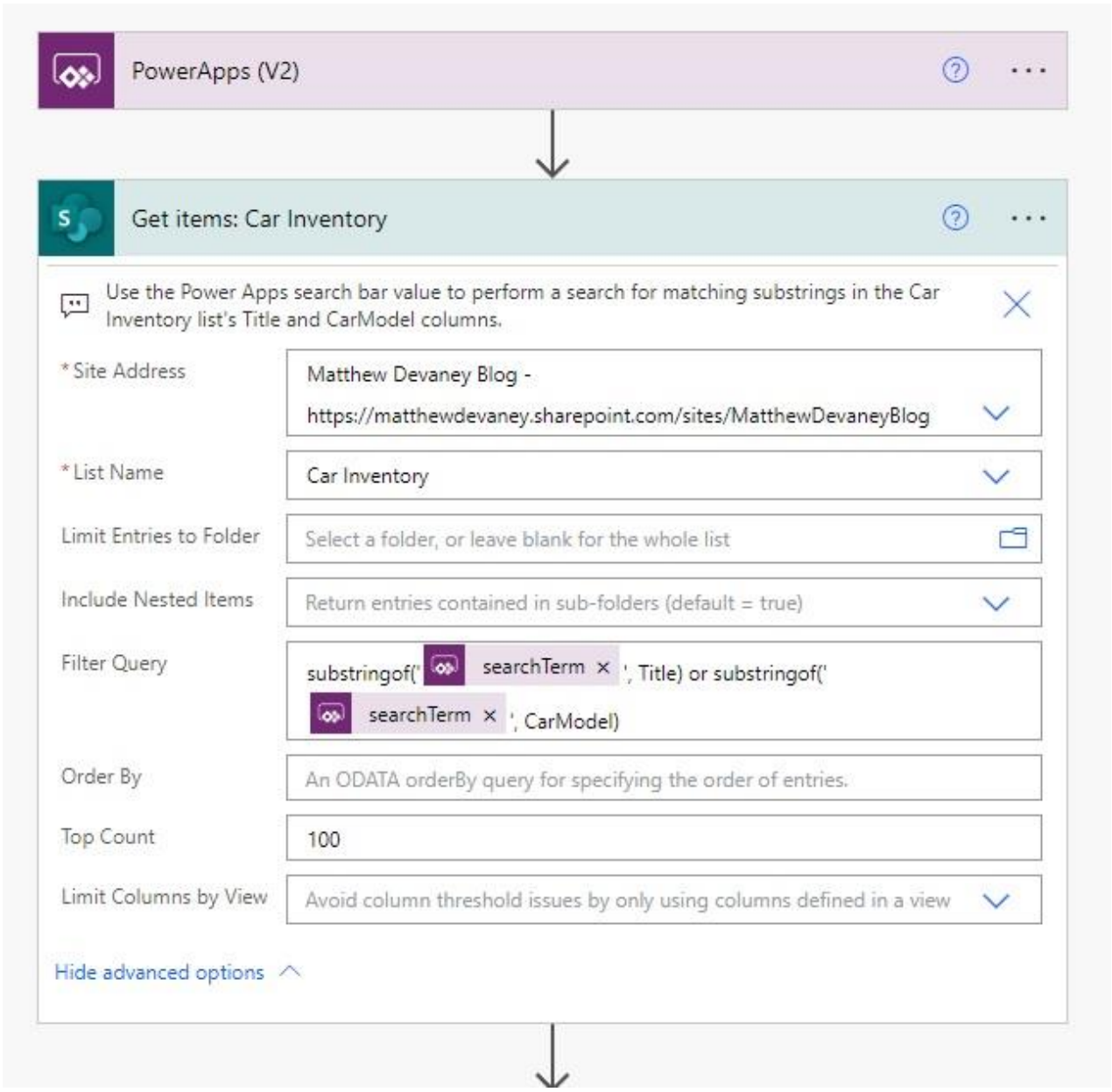
## Why Write Code Comments?

Write comments to describe the intended goal of a section of Power Automate code. Knowing the intended goal helps identify mismatches between it and the actual code outcome. Code that has comments takes significantly less time for other developers to understand.

## Tips For Writing Good Comments

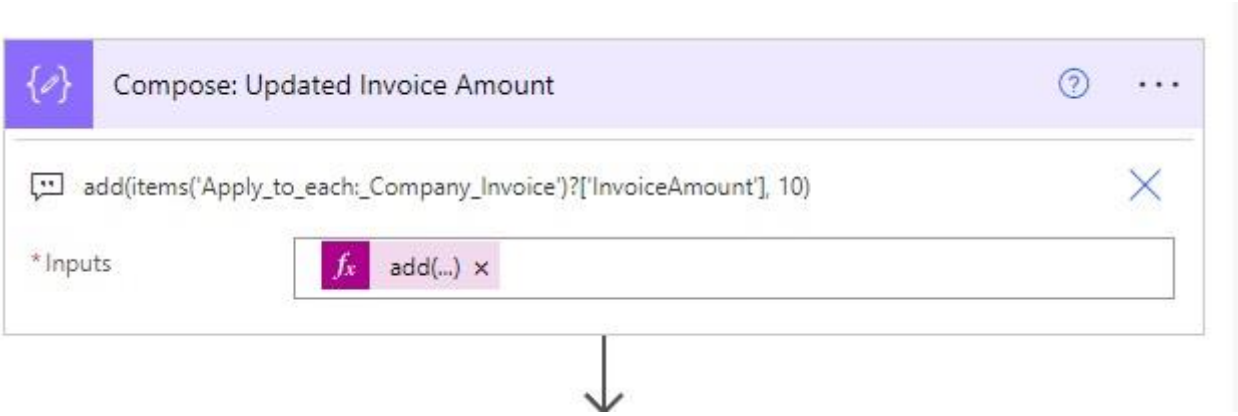
Use these suggestions to write high-quality comments:

- Do write comments that describe the intent of a code section. Intent means the goal.
- Do not write comments that simply restate what is already made clear in the flow action's name
- Do keep comments updated when the goal of a code section changes.
- Do not write so many comments they are impossible to maintain. Comments create their own technical debt.
- Do write comments in full sentences and use plain language
- Do not use abbreviations, acronyms or slang


PowerApps (V2)
Get items: Car Inventory
Use the Power Apps search bar value to perform a search for matching substrings in the Car Inventory list's Title and CarModel columns.
*Site Address
Matthew Devaney Blog -
https://matthewdevaney.sharepoint.com/sites/MatthewDevaneyBlog
*List Name
Car Inventory
Limit Entries to Folder
Select a folder, or leave blank for the whole list
Include Nested Items
Return entries contained in sub-folders (default = true)
Filter Query
substringof(' searchTerm ', Title) or substringof('
searchTerm ', CarModel)
Order By
An ODATA orderBy query for specifying the order of entries.
Top Count
100
Limit Columns by View
Avoid column threshold issues by only using columns defined in a view
Hide advanced options

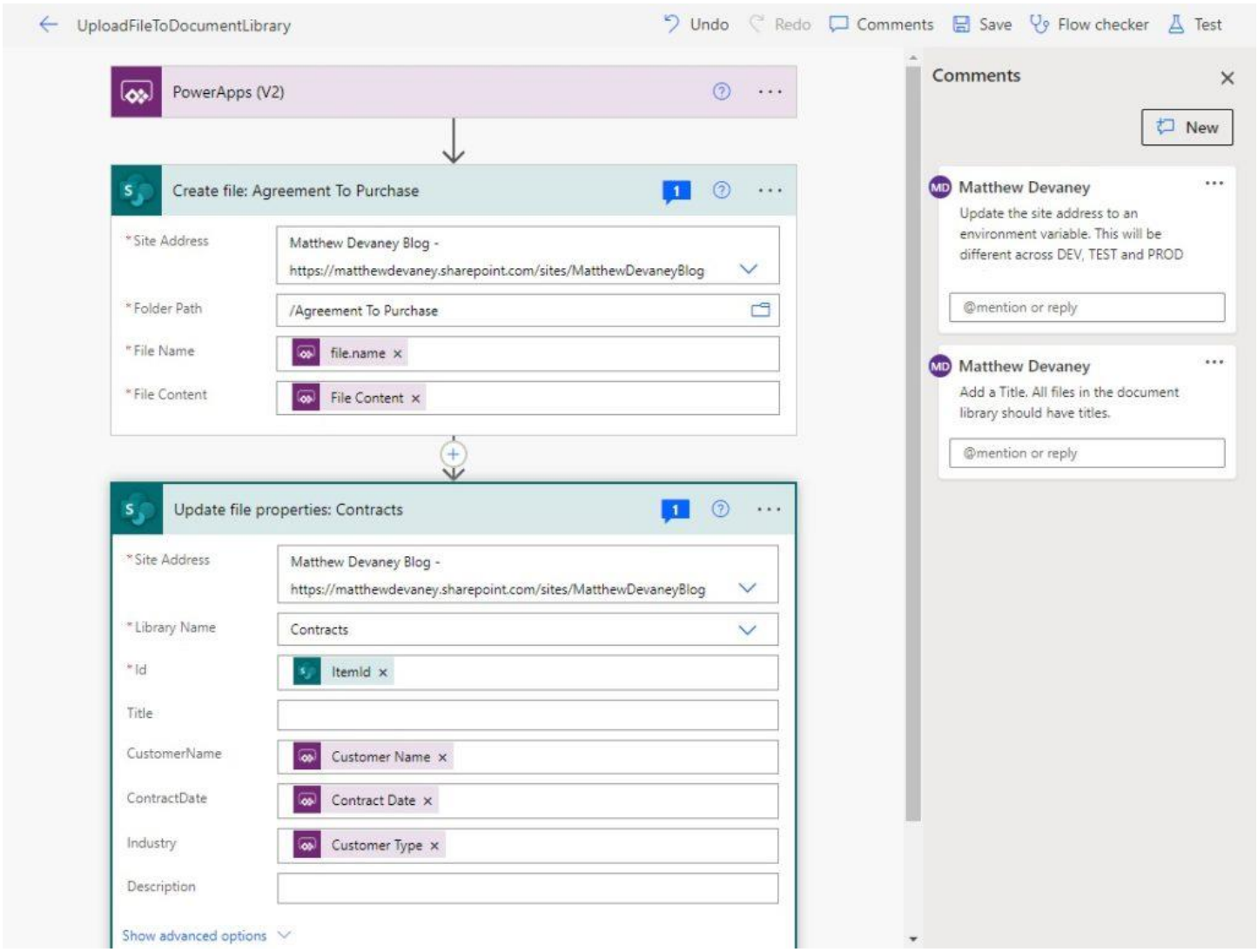
## Display Power Automate Expressions In The Flow Comments

Copy and paste Power Automate expressions into the comments section so they can be quickly browsed. The flow does not show the full expression without hovering on it or taking additional steps to open the code editor. Make sure to update the comments each time the expression is changed.



## Do Not Use The Collaborative Comments Feature For Coding Comments

Collaborative comments are stored in a Dataverse table named *Comment*. They are not stored in the flow definition. When a flow is exported to another environment, its comments do not come with it. This is why collaborative comments should be used to conduct code reviews and not to comment your flows.



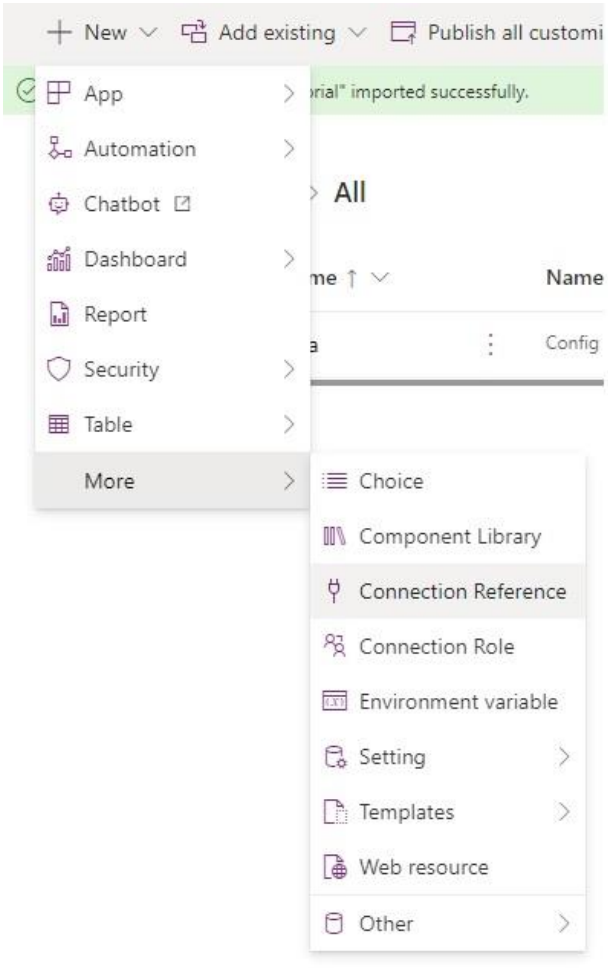
# Connection References

## Use Connection References Instead Of Connections

Flow actions requiring authentication must use either a connection or a connection reference. *Connections* allow Power Automate to interact with other online services (SharePoint, Outlook, etc). *Connections references* do the same but they hold a reference to a shared connection instead of connecting directly themselves.

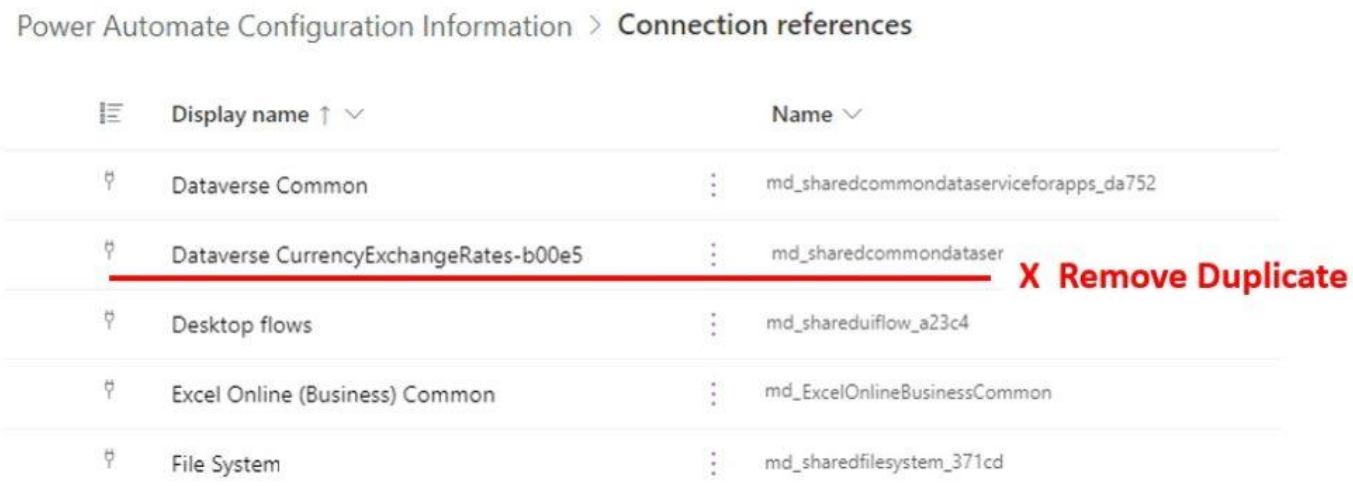
Always use Connection References to reduce maintenance efforts. Swapping out connections for a flow action must be done individually. Connection references can changed in one place and will update all connected flows. Fixing broken connections is much faster too.

Connection references in a managed solution can be updated without creating an unmanaged layer. Never directly edit flows in production and test environments to avoid introducing bugs.



## Remove Duplicate Connection References From Solutions

There should only be one connection reference within a solution for each online service being accessed. Remove any duplicate connection references from the solution. The exception should be made when an online service must be accessed with multiple sets of credentials. For example, connecting to Outlook with two different Shared Mailboxes.




## De-duplicate Connection References In Environments

In addition to removing duplicate Connection references inside of a solution, they must also be de-duplicated within an environment.

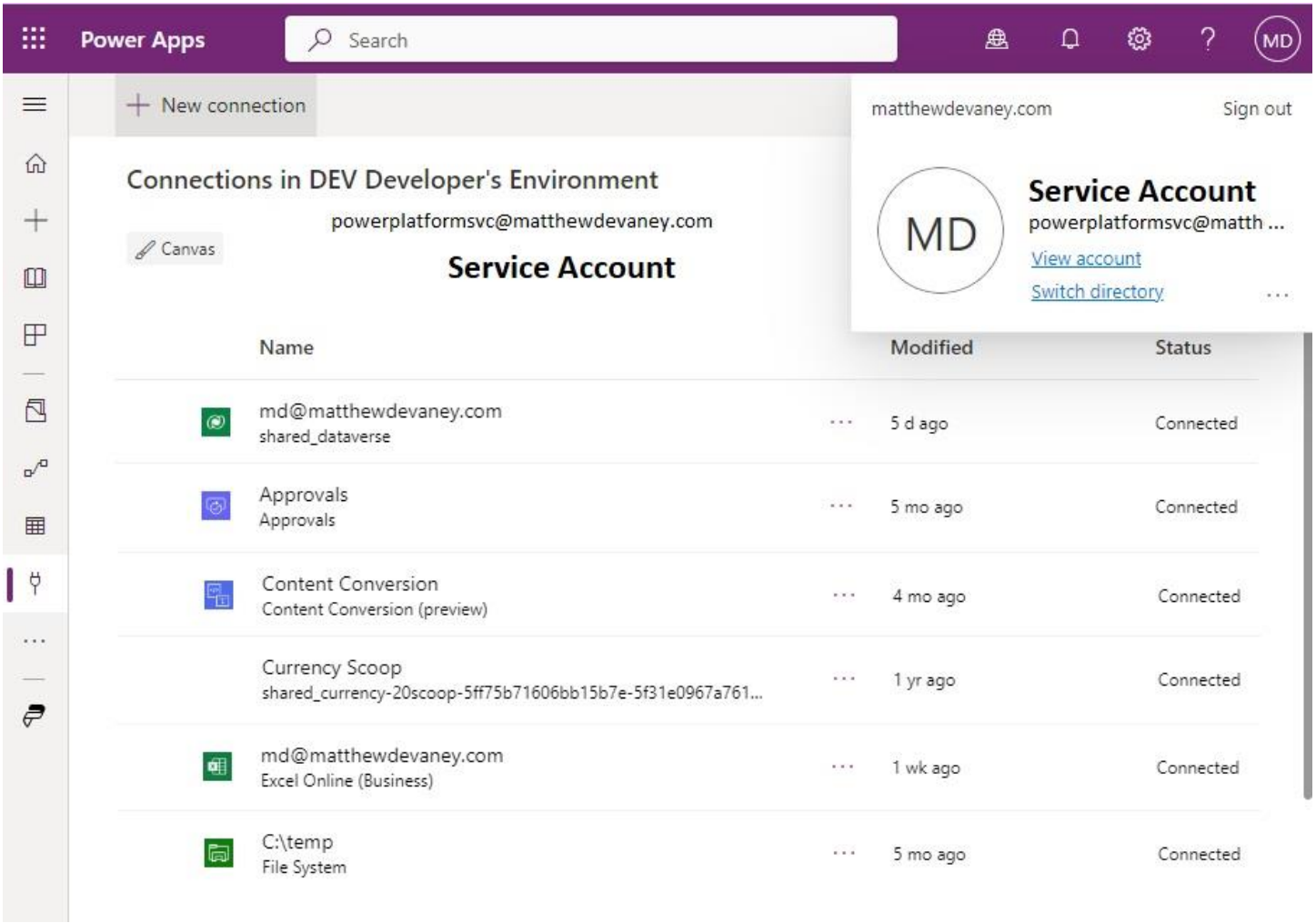
When multiple solutions are imported into an environment it is common for them to each include their own connection references.

## Assign Connection Ownership To Service Accounts

A Service Account with the System Administrator security role should own the connections being used by connection references. This enables centralized management of connections under an account with elevated permissions.

Do not use a developer's personal account as the connection owner. To change connection details another developer would have to login as the original developer.

Having a Service Principal own the connections would be ideal. However, Power Platform does not support the use of Service Principals under the Per User license. A more costly, yet higher capacity, Per Flow licensing plan is required.



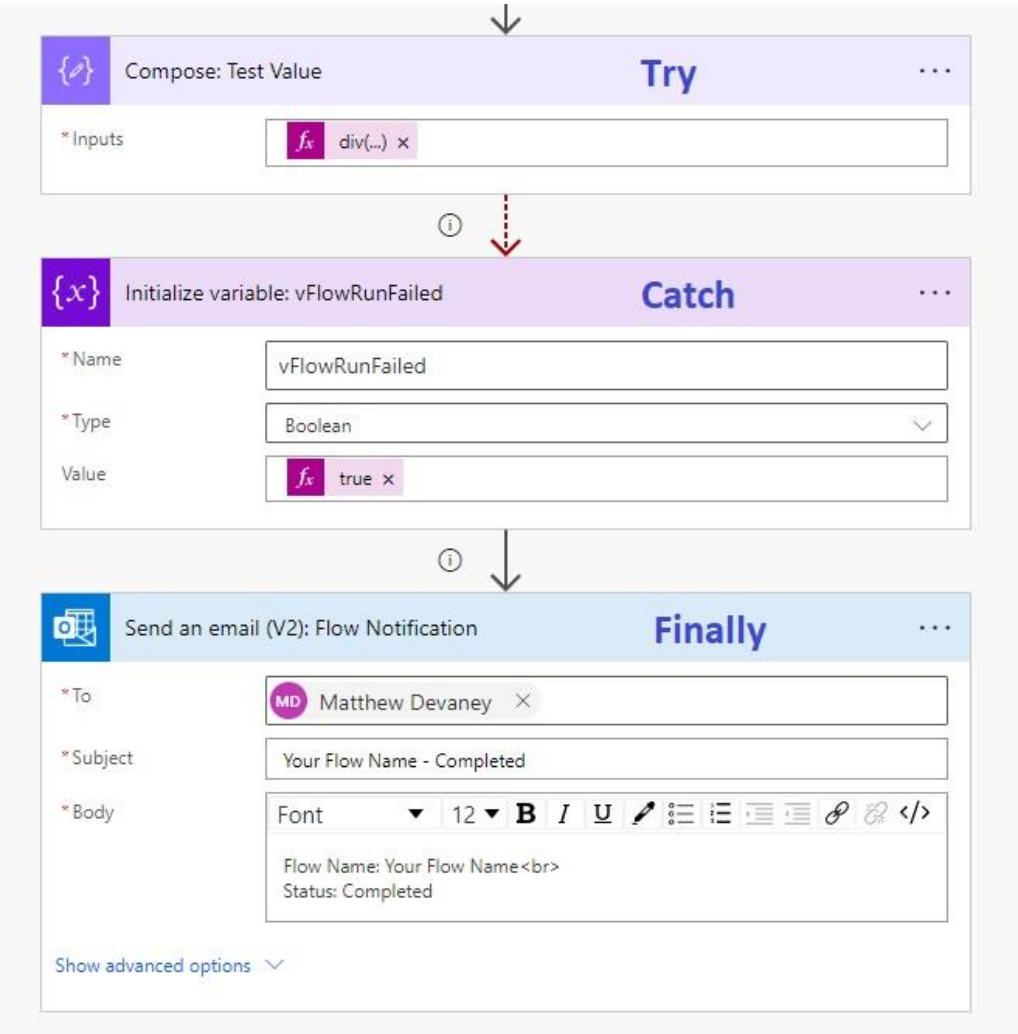
# Error-Handling

## Try, Catch, Finally Pattern

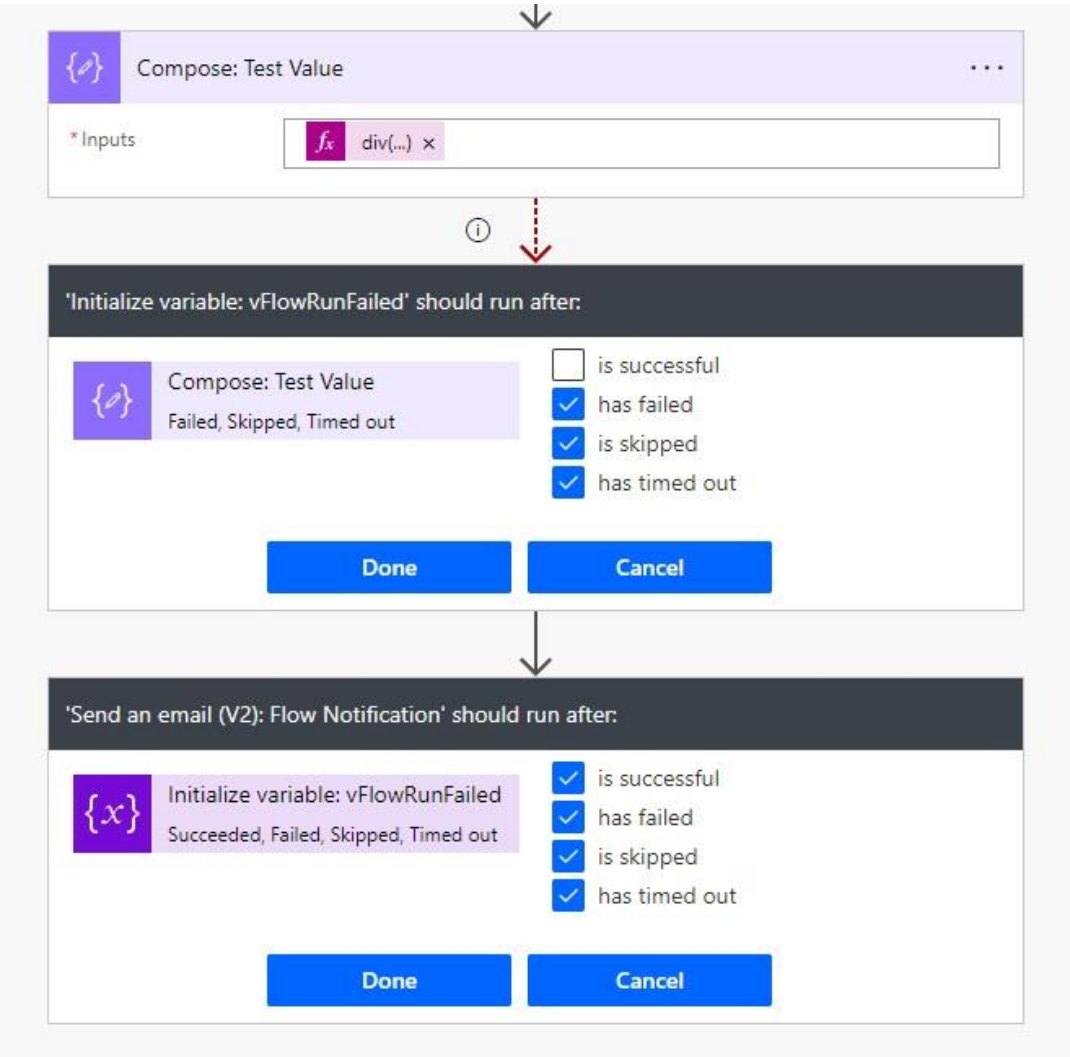
Check for errors and tell Power Automate how to handle them at possible failure points in the flow.  The Try, Catch, Finally pattern for error-handling pattern is found in most programming languages:

*Try* – Attempt to execute one or more flow actions
*Catch* – When an error occurs, do these steps next
*Finally* – always run these actions whether the previous actions succeeded or failed

Here's how to create the Try, Catch, Finally pattern with Power Automate.

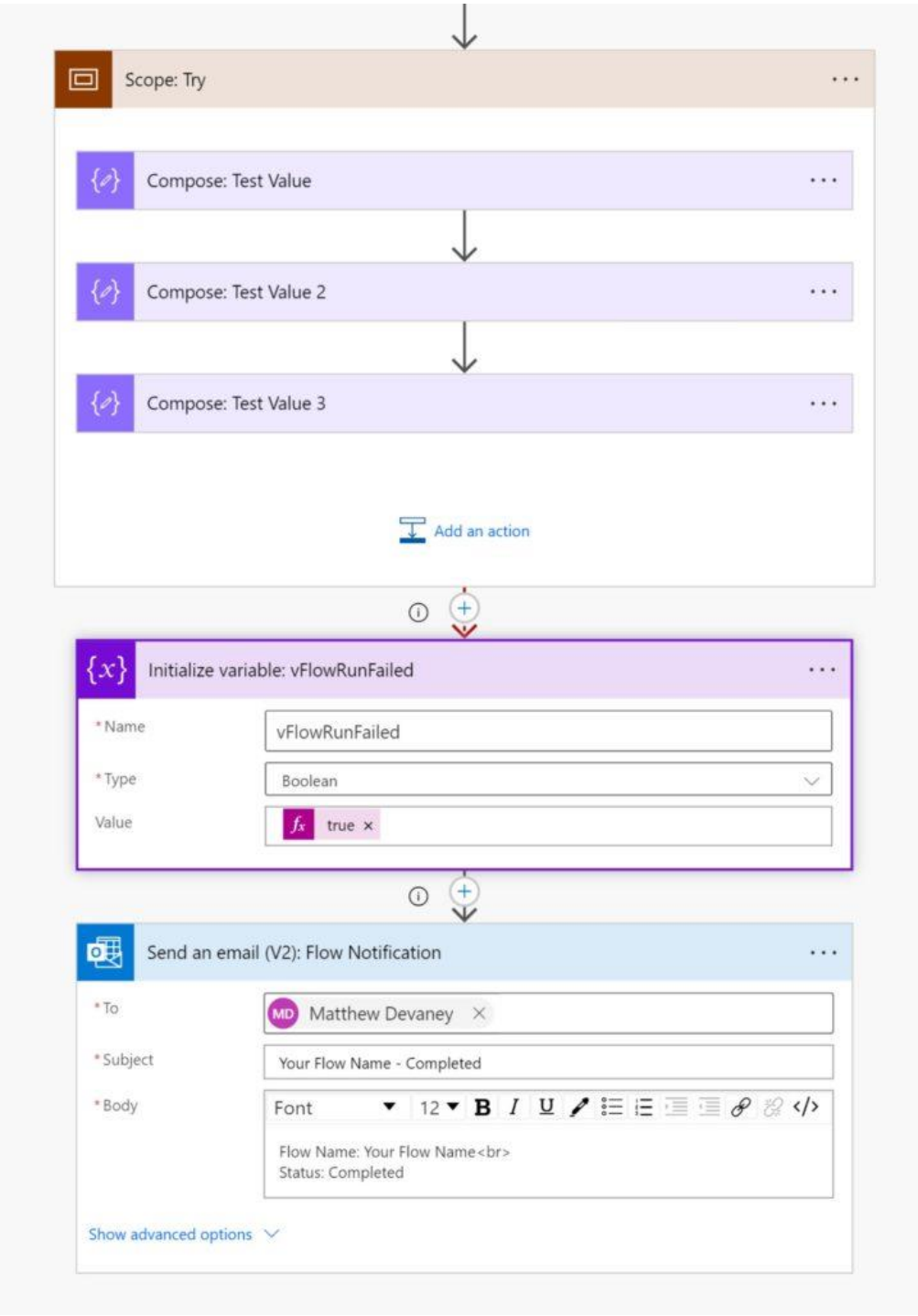


Configure the “run after settings” as shown for the flow actions below.

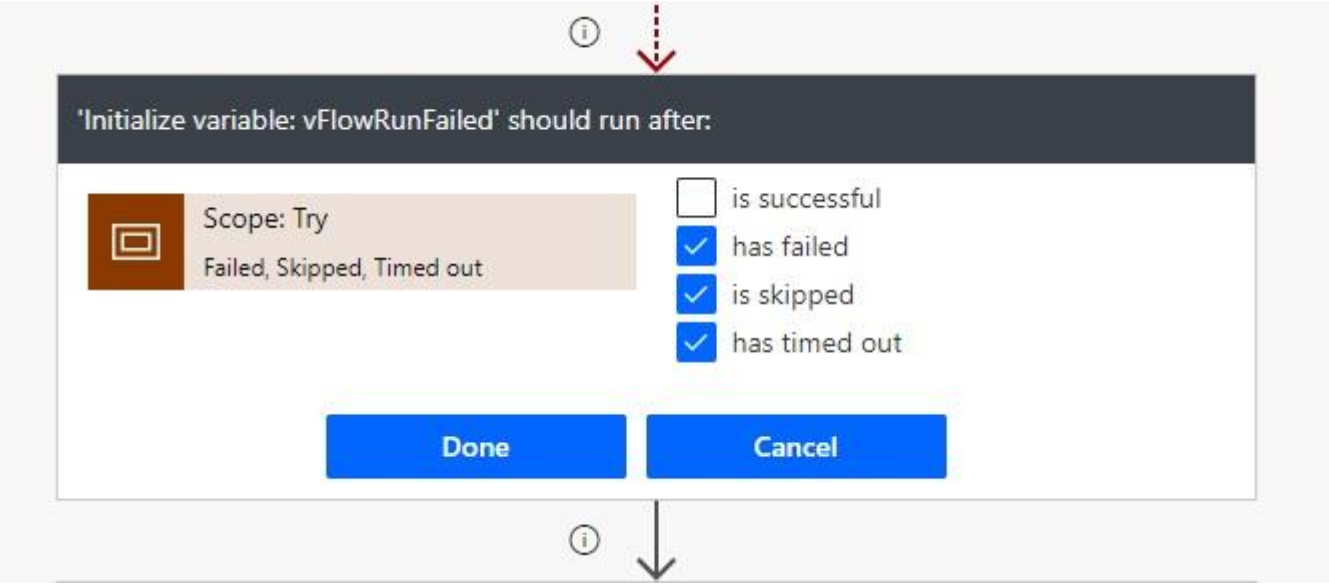


## Group Multiple Actions Inside Of A Scope Action

When multiple actions have the same error-handling requirements place them inside a scope action. A scope action holds a set of other actions.

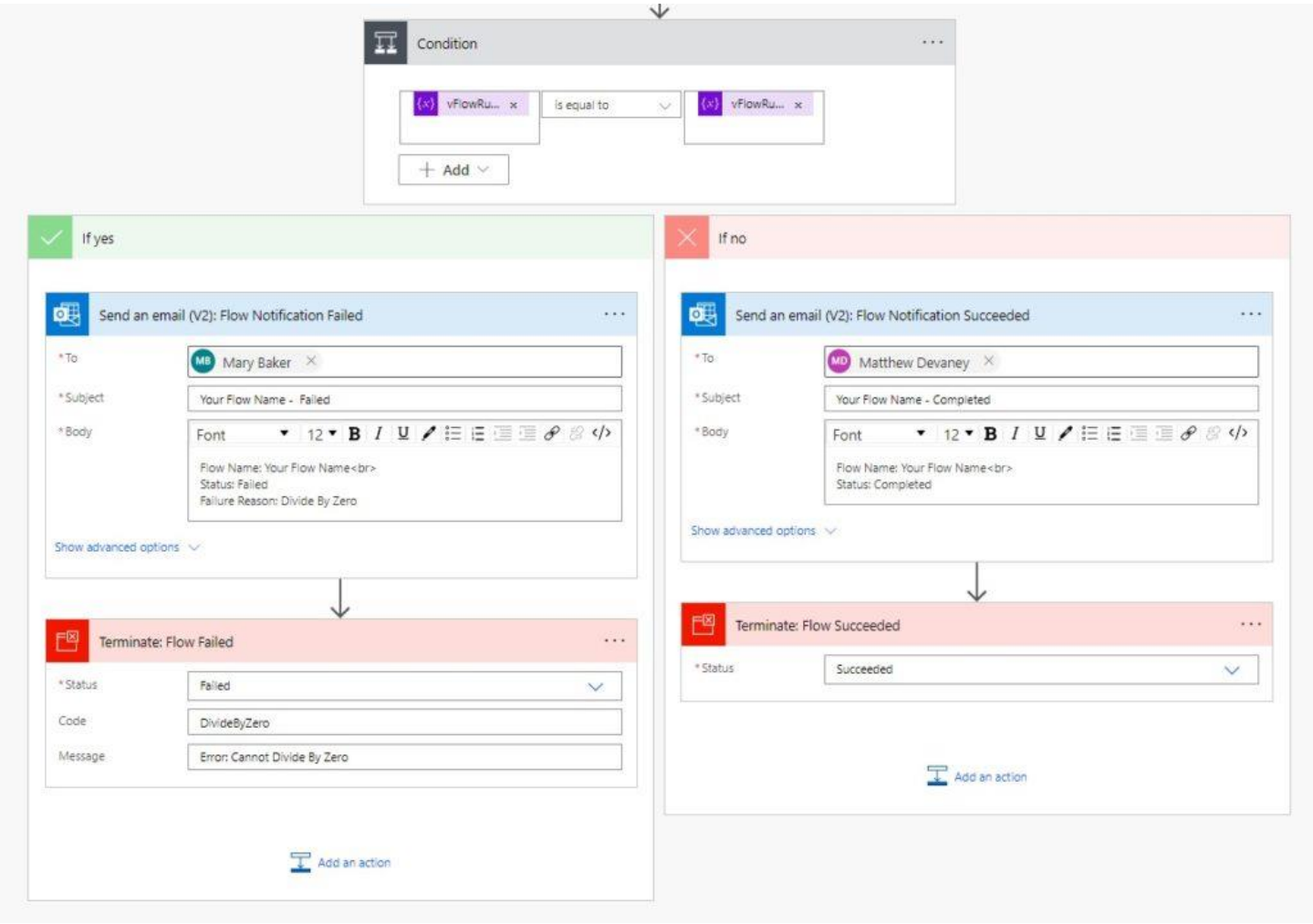


Then configure the run-after requirements for the scope. Now any action inside the scope will trigger the error-handling behavior.



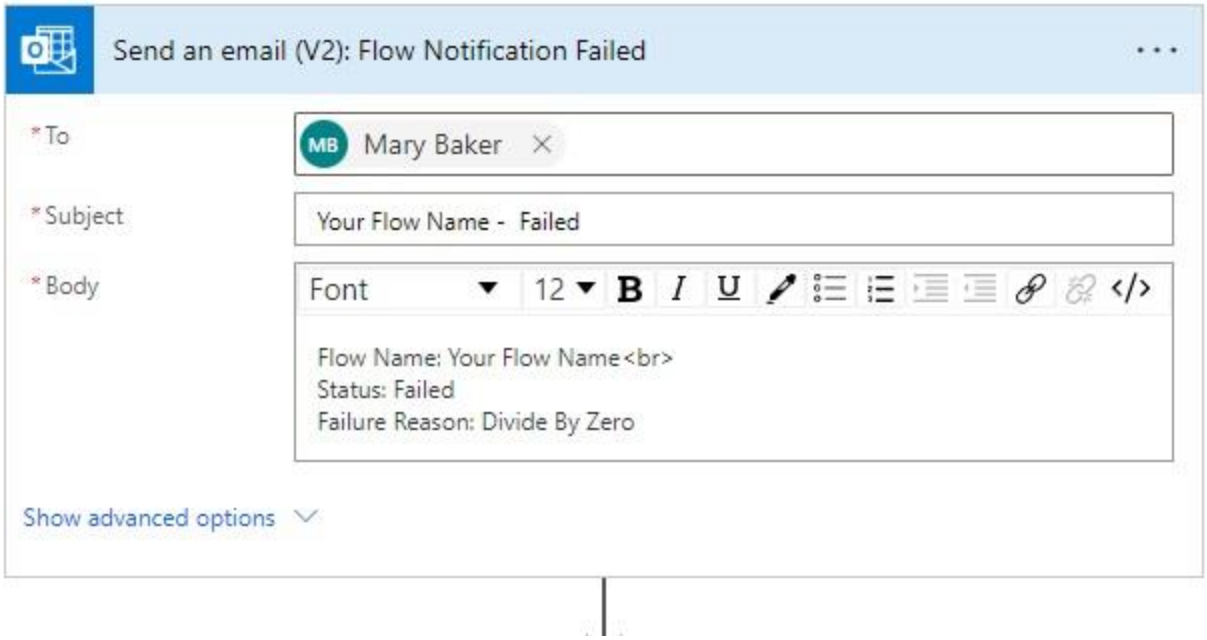
## Terminate The Flow With A Status Of Success Or Failure

A flow using error-handling will continue to run after it encounters an error. It will end with a status of succeeded even though there was a failure. To overcome this issue, include terminate actions as the final flow steps to ensure to correct status is displayed in the flow run history.



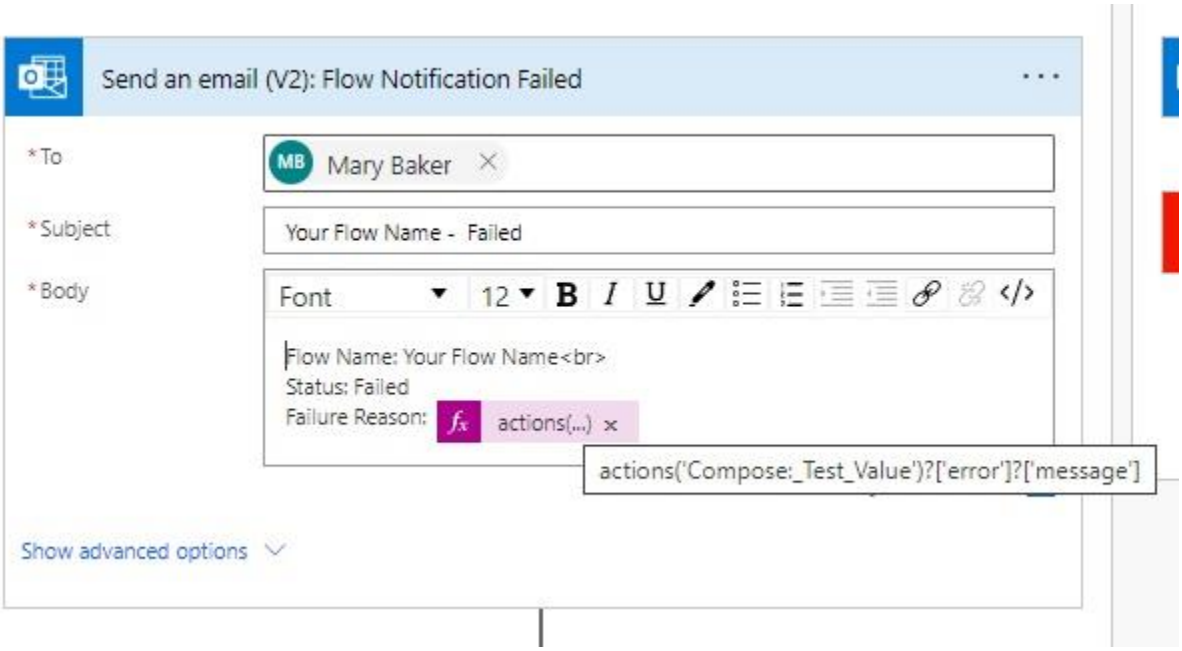

## Notify The Process Owner Of The Flow Failure

Alert the business process owner when the flow fails to let them know there was an issue. If no one is notified when the flow fails then it will not get fixed and could continue to happen.




## Get The Flow Error Message For The Failed Action

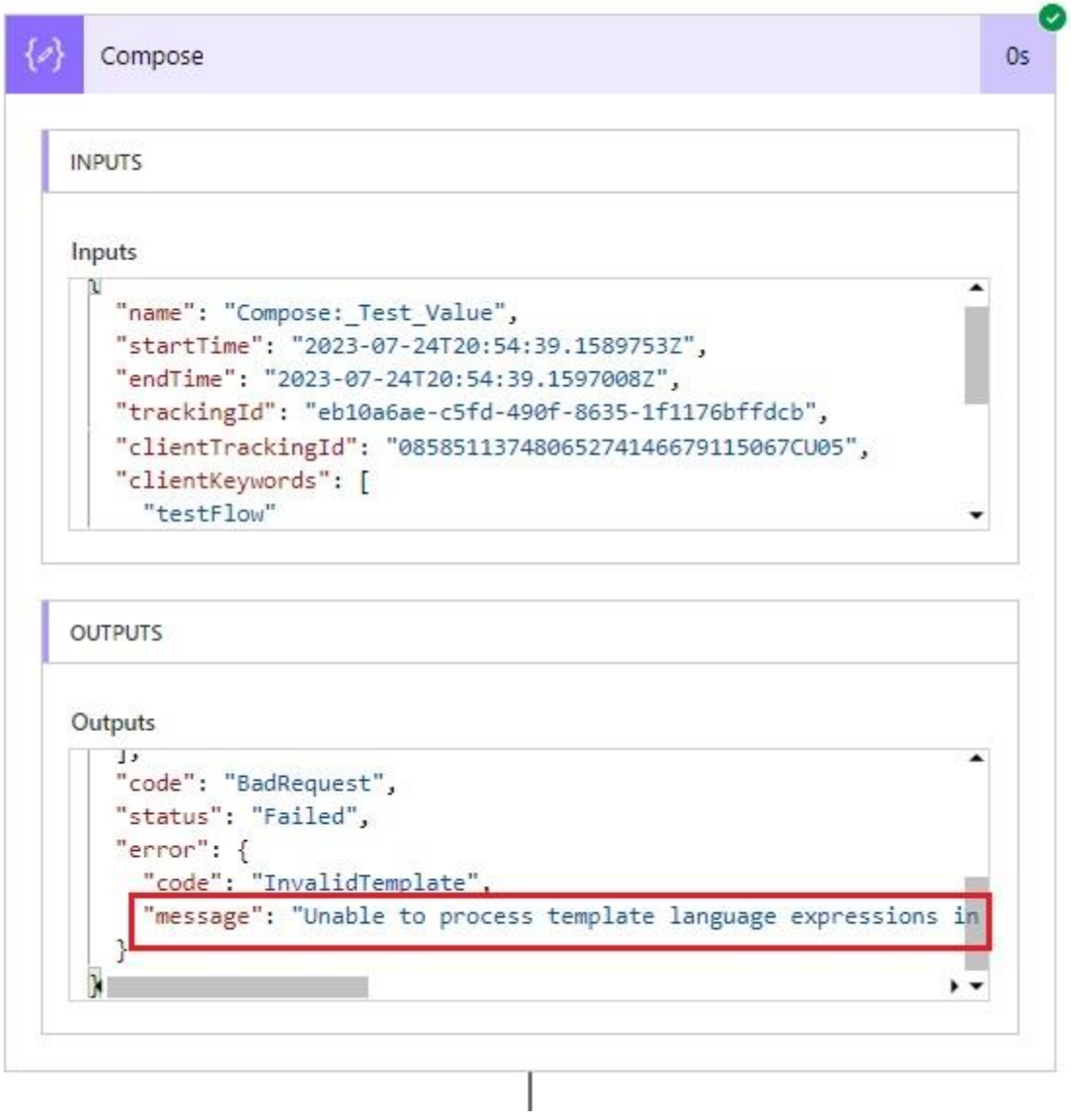
The reason for flows failures are not often not known in advance. This makes writing an error message before-hand difficult. By using the **actions** expression we can extract a useful error message from the flow action that failed.



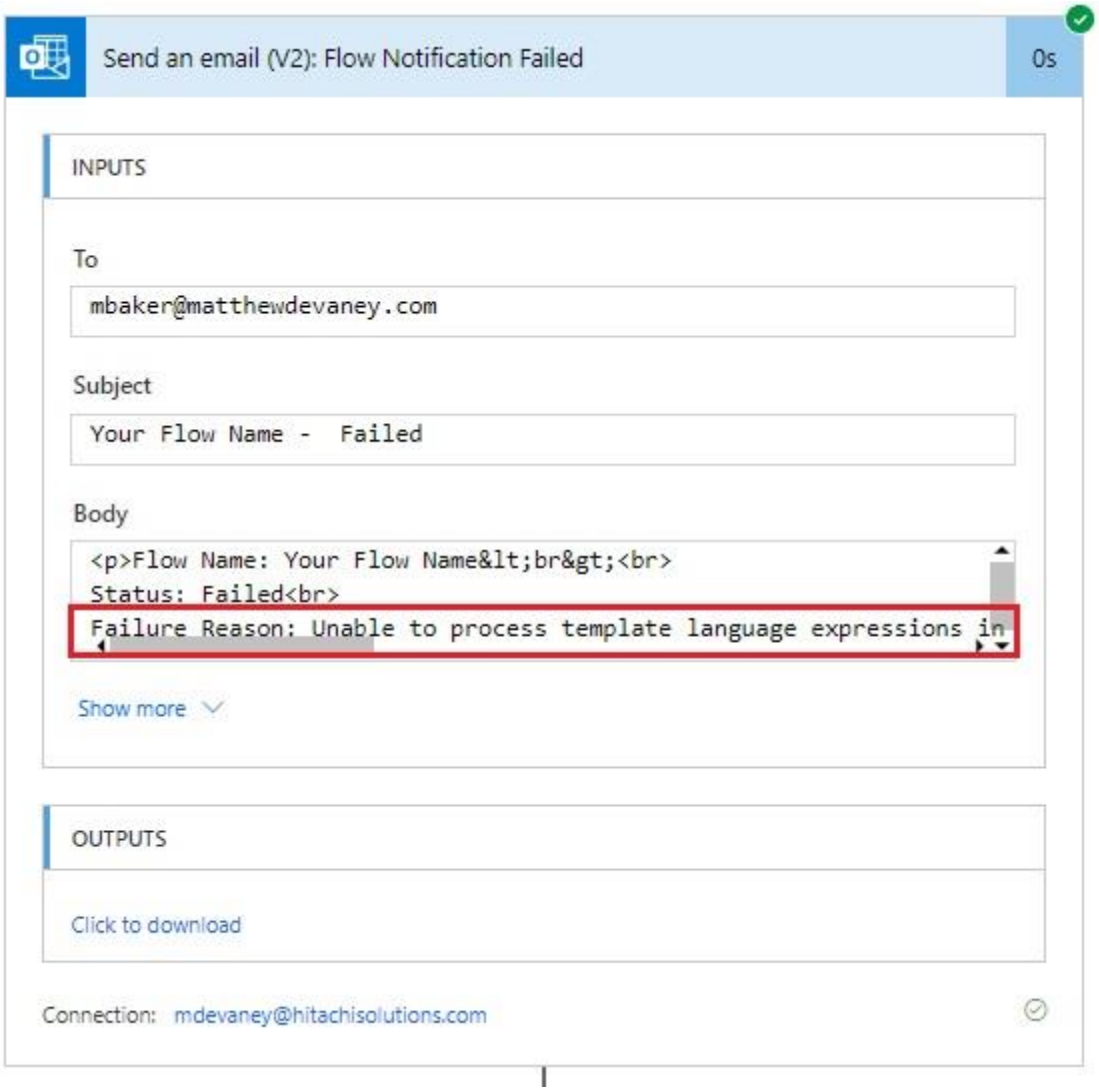
Add a failure reason section to the flow failure notification and use this expression.

```
actions('Compose:_Test_Value')?['error]'?['message']
```

When the flow fails an error message will appear in the flow run history.

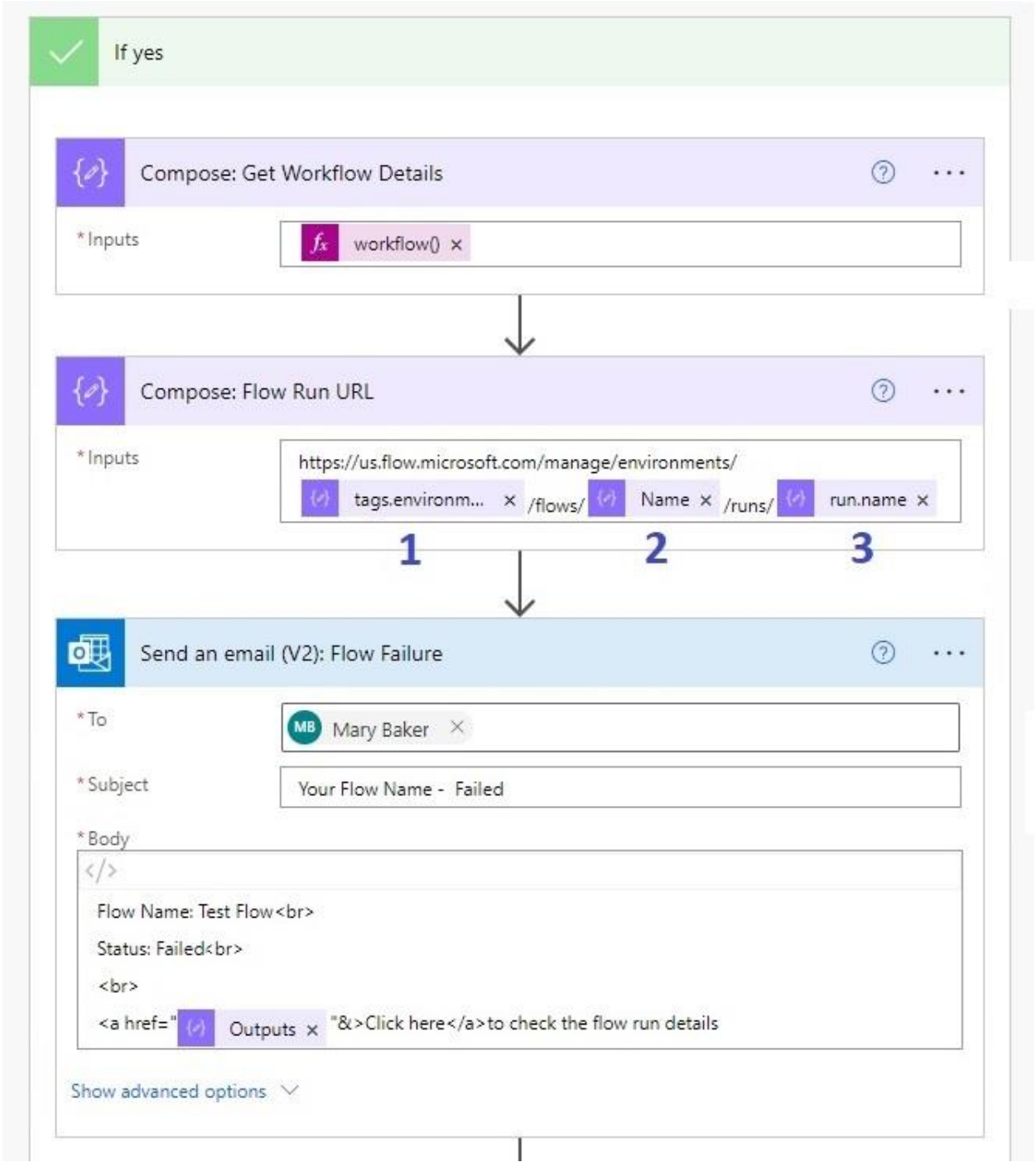


Then the message gets included in the flow failure notification to the business process owner who will take action on it.



## Include The Flow Run History URL

A clickable link to the flow run details should be added to the failure notification. The message can be forwarded to a developer who can quickly identify the failed flow run in the history. Then they can review the issue and diagnose the problem. To do this, use this following coding pattern:



Flow expression #1 gets the **environment's** unique identifier.

```
outputs('Compose:_Get_Workflow_Details')?['tags']?['environmentName']
```

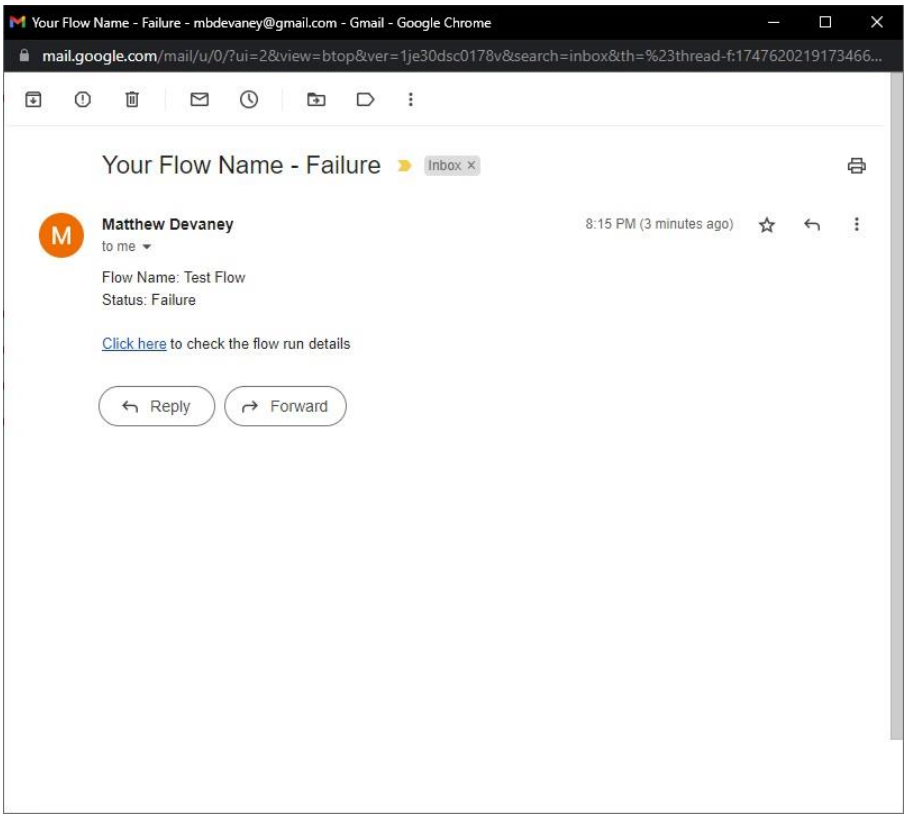
Flow expression #2 extracts the **flow's** unique identifier.

```
outputs('Compose:_Get_Workflow_Details')?['name']
```

Flow expression #3 finds the **flow run's** unique identifier.

```
outputs('Compose:_Get_Workflow_Details')?['run']?['name']
```

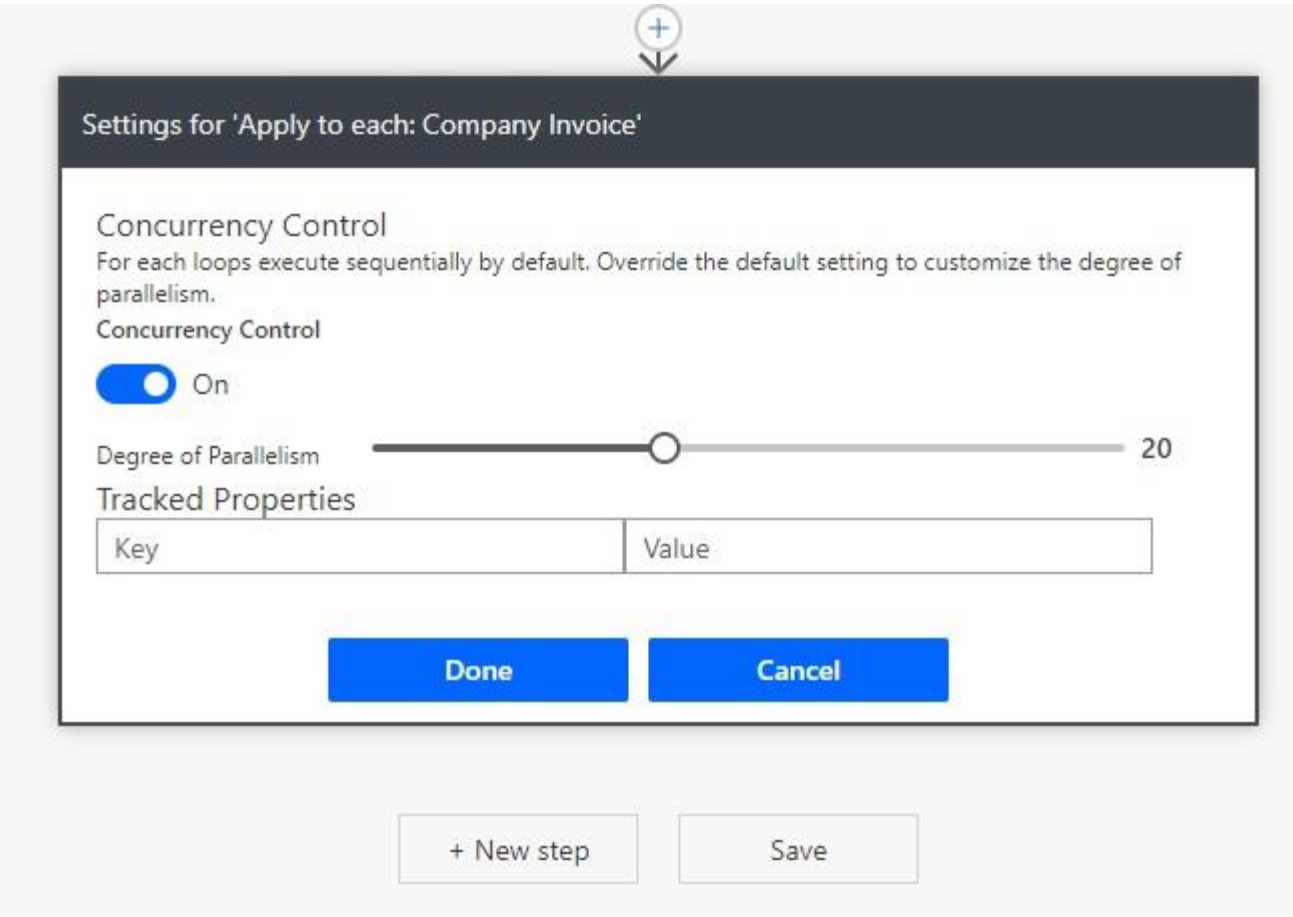
The failure notification email looks like this:



# Performance Optimization

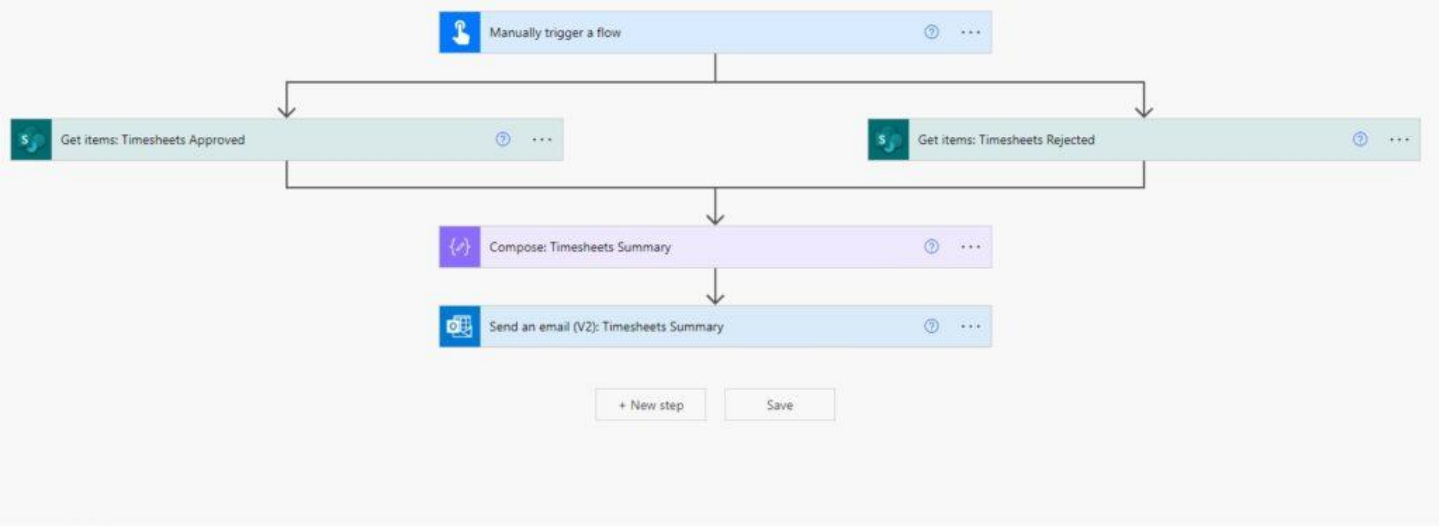
### Enable Concurrency Control In Apply To Each Loops

Apply To Each loops run sequentially by default. If there are 20 items to loop over, the flow will run them in order: 1, 2, 3… until it reaches item 20. Enable concurrency control in the Apply to Each action settings to run up to 50 actions at the same time.



## Execute Flow Actions In Parallel Branches

Power Automate executes flow actions in sequence. But actions can also be run in parallel when they are not dependent upon each another. For example, a flow that gets multiple lists of items in sequence may be reorganized to get all lists of items at the same time.

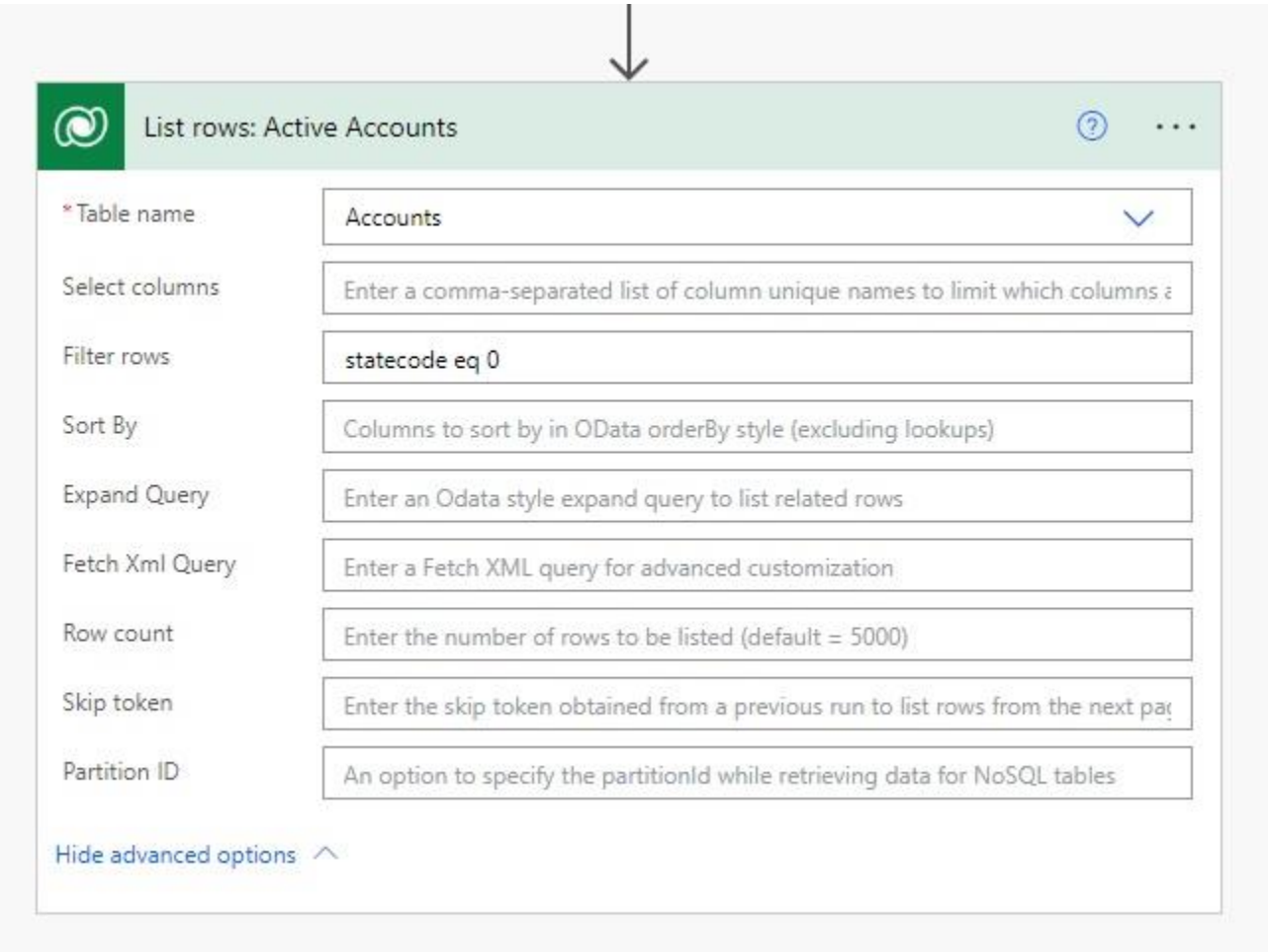


## Use Filter Queries When Retrieving Large Datasets

It takes more time to retrieve a large set of records from a datasource than a small set of records. Apply filters when fetching data to reduce the number of rows being downloaded.

If there is no option to filter the records before downloading them use the Filter Data Operation immediately afterwards. Smaller datasets require less iterations in loops.

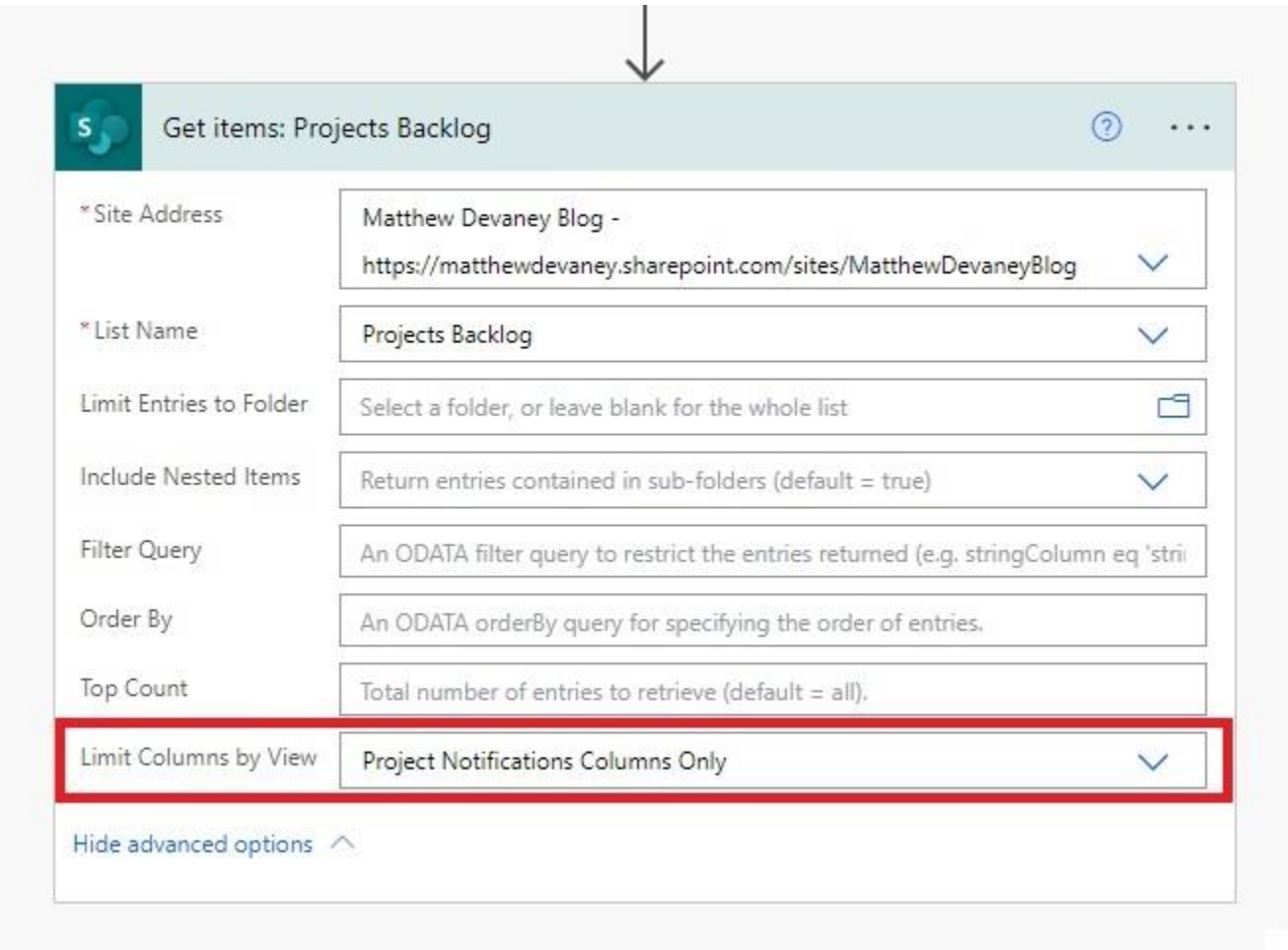
Example: Dataverse – List Rows action



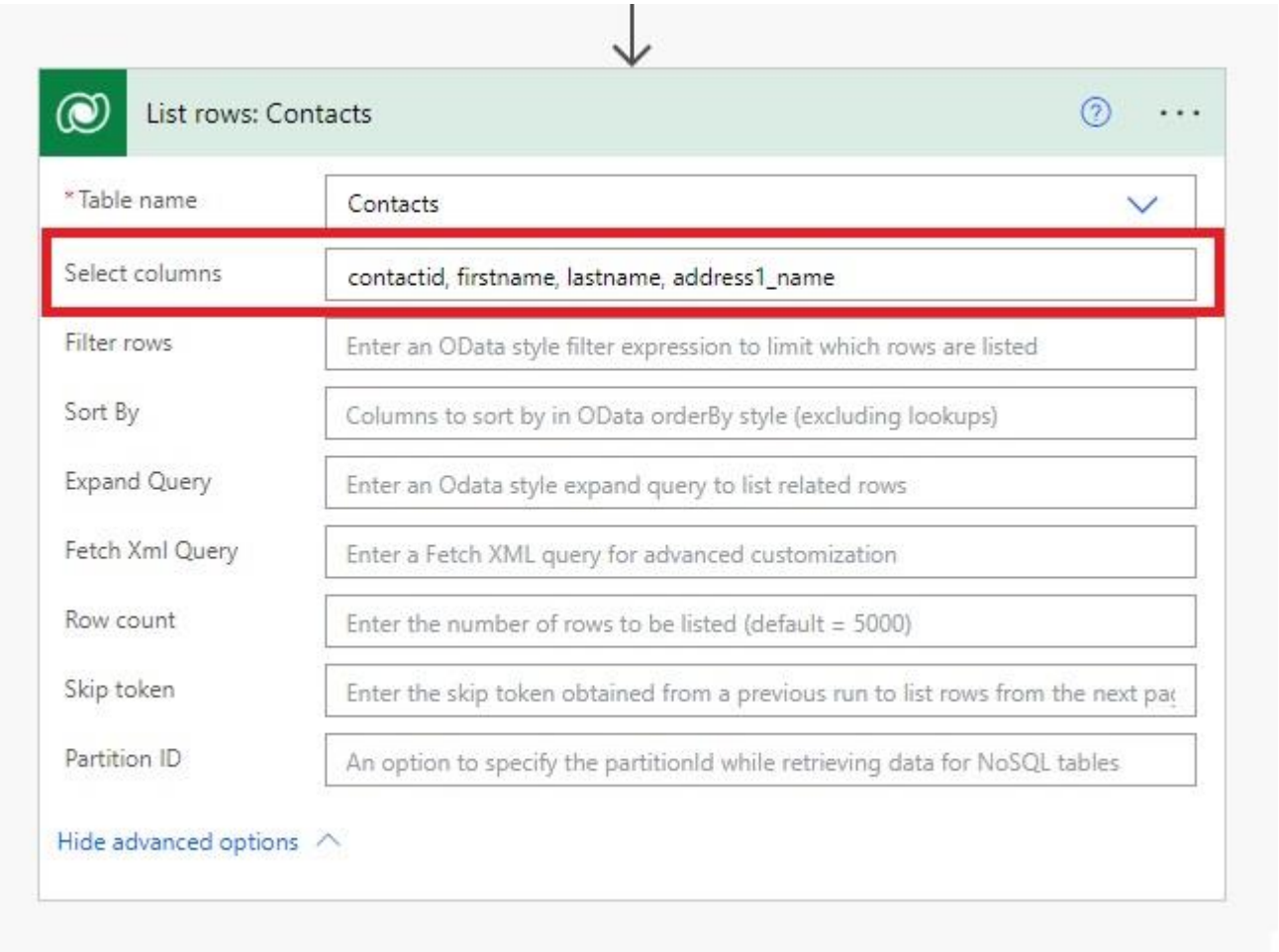
## Reduce Table Sizes By Selecting Columns

Similarly, a table with more columns is slower to download than a table with less columns. Always define which columns should be selected to minimize the size of the dataset being downloaded.

Example: SharePoint Get Items action



Example: Dataverse – List Rows action



## Stay Below The Data Connector API Limits

Every flow data connector has API limits for throughput. After a set number of API calls per minute the data connector will become throttled to protect the service. Be aware of the API limits for each connector used in a flow. API limits can be found in the Power Automate documentation for the data connector.

Example: Dataverse connector limits

| | | | |
|---|---|---|---|
| Username | securestring | Username credential | True |
| Password | securestring | Password credential | True |

# Throttling Limits

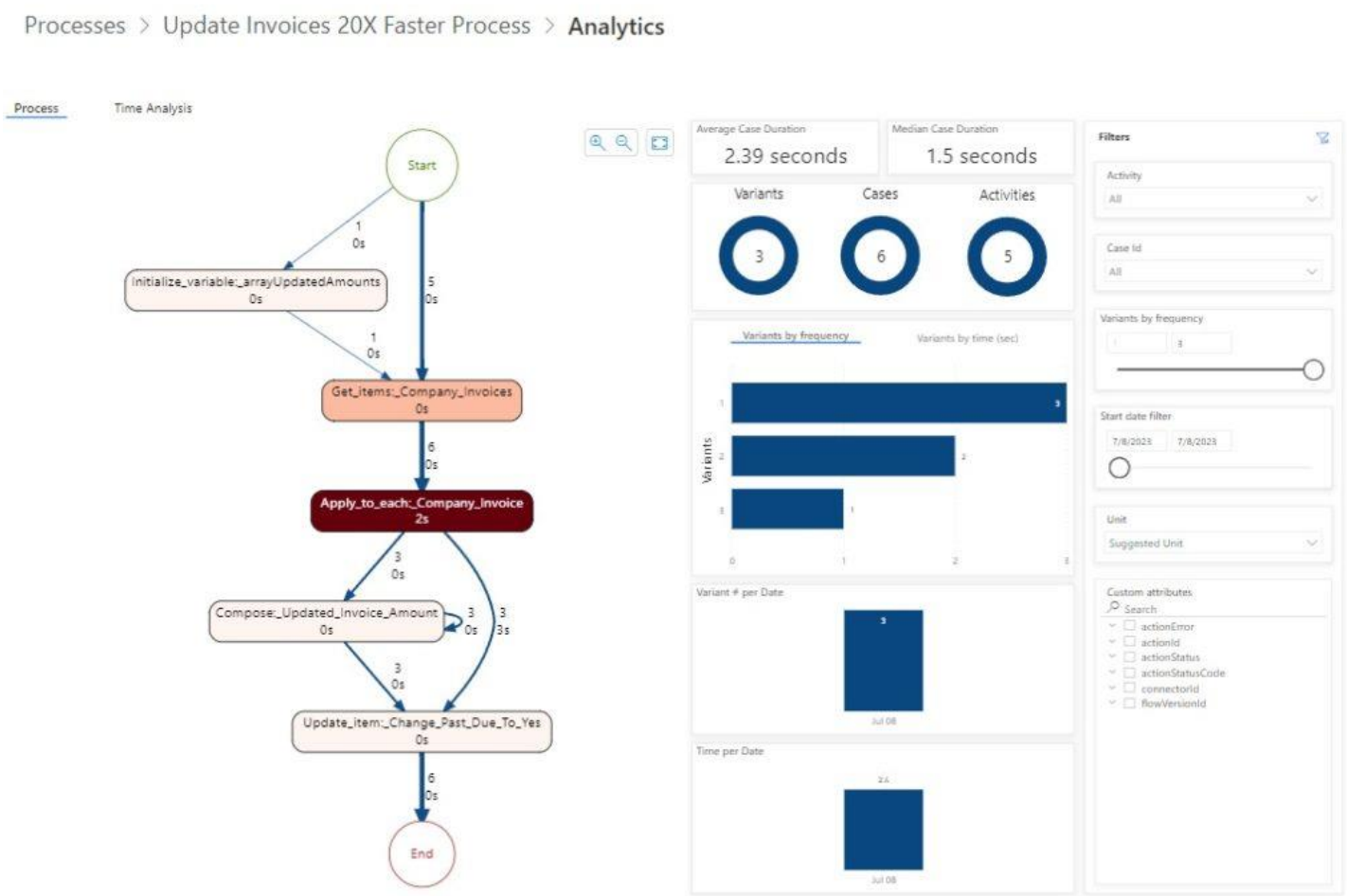
| Name | Calls | Renewal Period |
|---|---|---|
| API calls per connection | 600 | 60 seconds |

# Actions

| | |
|---|---|
| Add attachment | Adds a new attachment to the specified list item. |
| Approve hub site join request | Approve hub site join request. This will return an approval token |

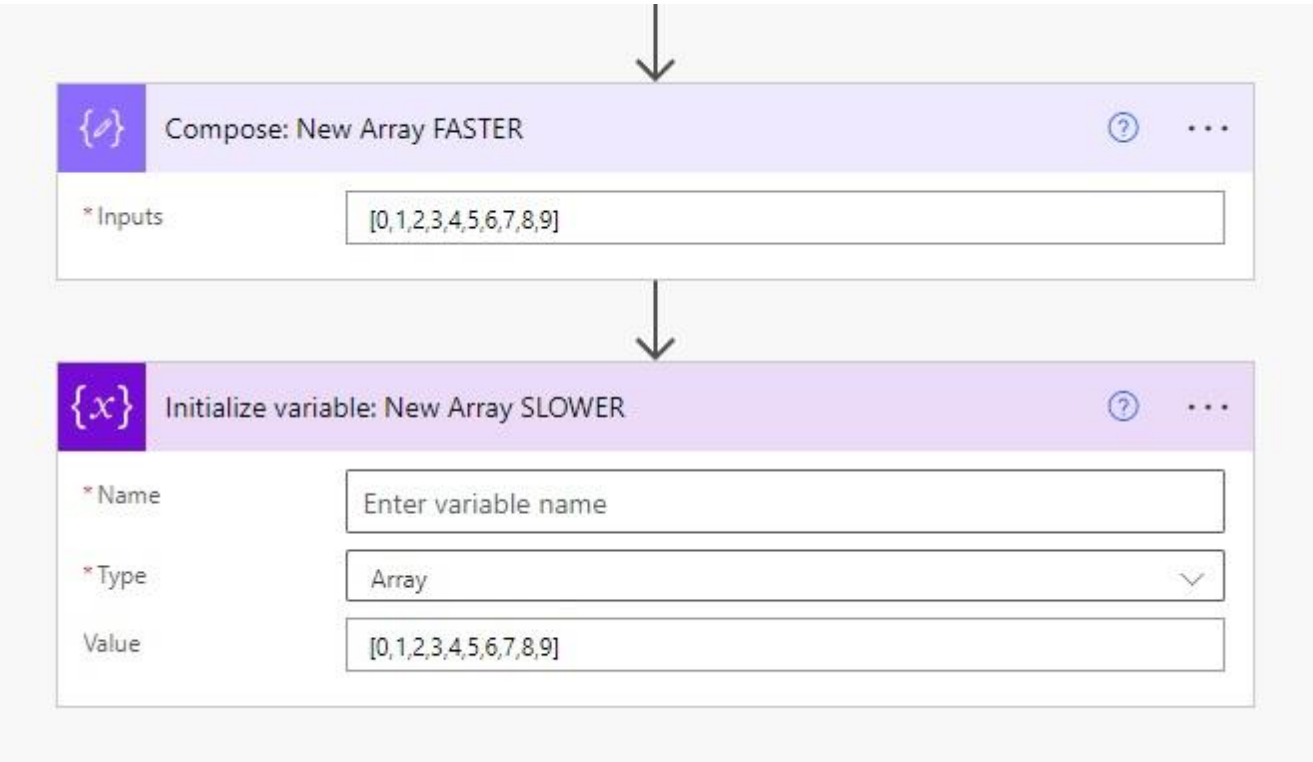
## Identify Bottlenecks With Process Advisor

Process advisor tracks the average duration of individual flow actions as well as total duration. Inspect flows using process advisor to see where bottlenecks are occurring. Focus attention on the slowest actions when improving the flow.



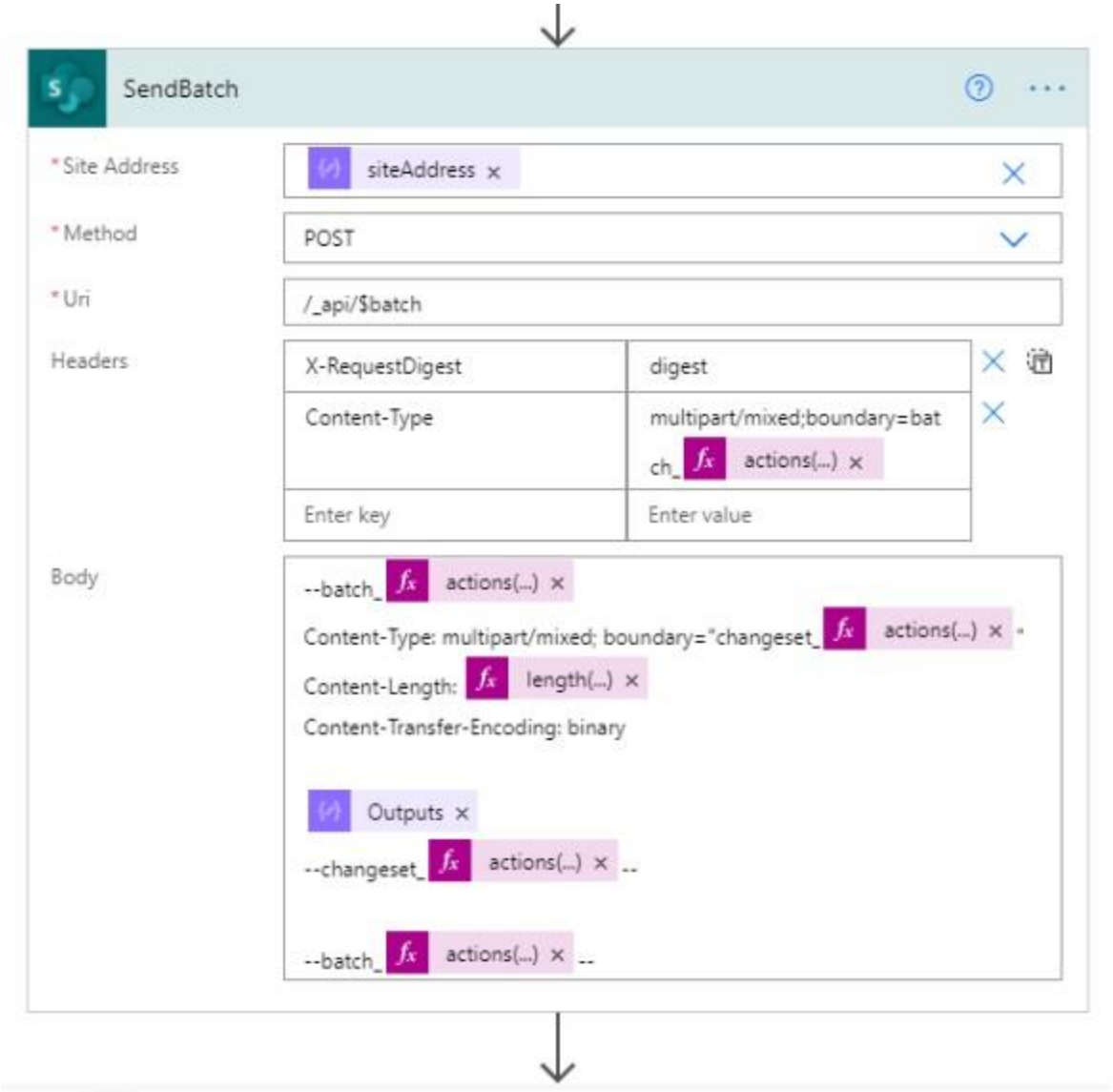
## Favor Compose Over Declaring Variables When Creating Arrays

The Compose action executes twice as fast as declaring variables. For large arrays this is a huge time saver. Use Compose instead of a variable to build arrays when the array does not have to be modified.



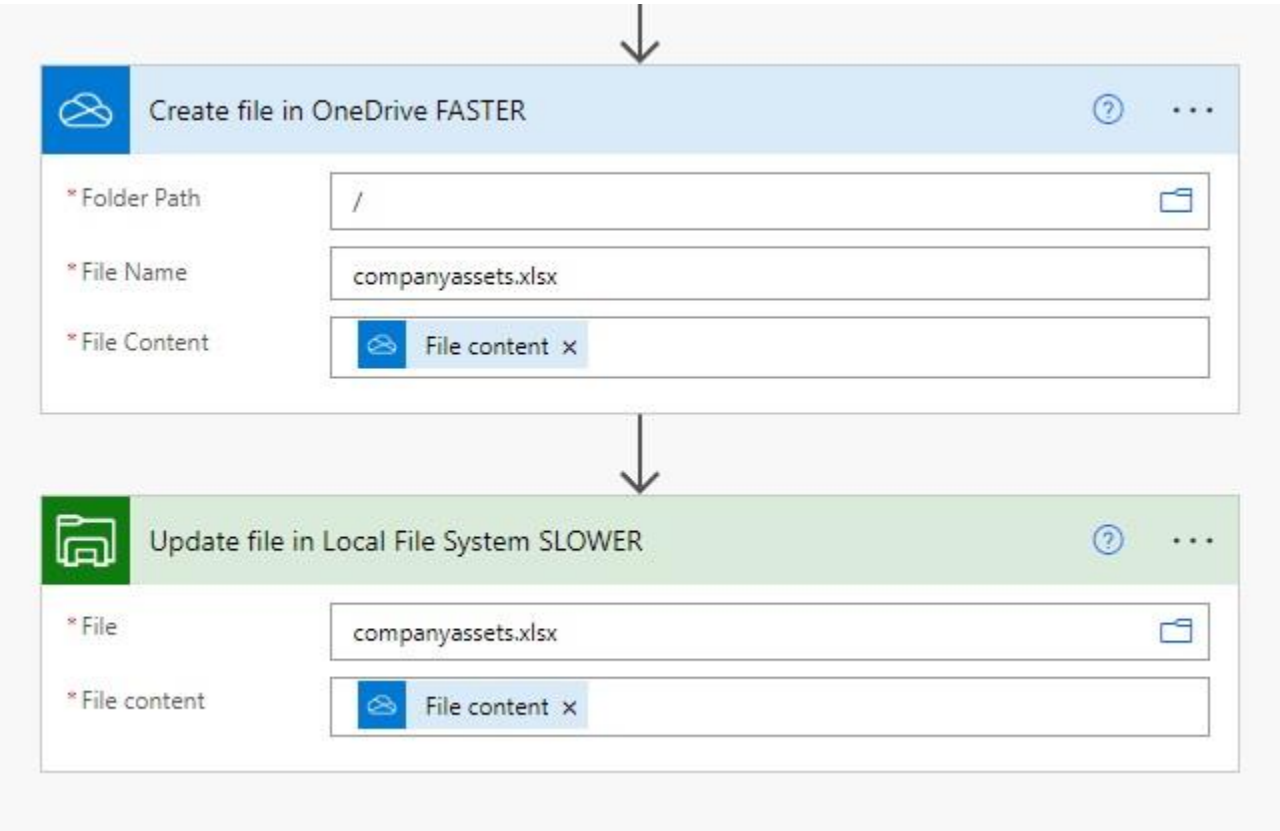
## Exploit Batch Update APIs

Look for batching capabilities in APIs. Batching allows us to do a high-volume of transactions at high-speed. For instance, SharePoint lists have batch create, update and delete abilities only accessible through the SharePoint HTTP action. Read the API documentation for the desired service to check if this is available.



## Avoid Using On-Premise Actions

Flow actions that connect to cloud resources are faster than on-premise records. For example, it would be faster to access files stored in OneDrive than files stored on the local File System via a gateway.



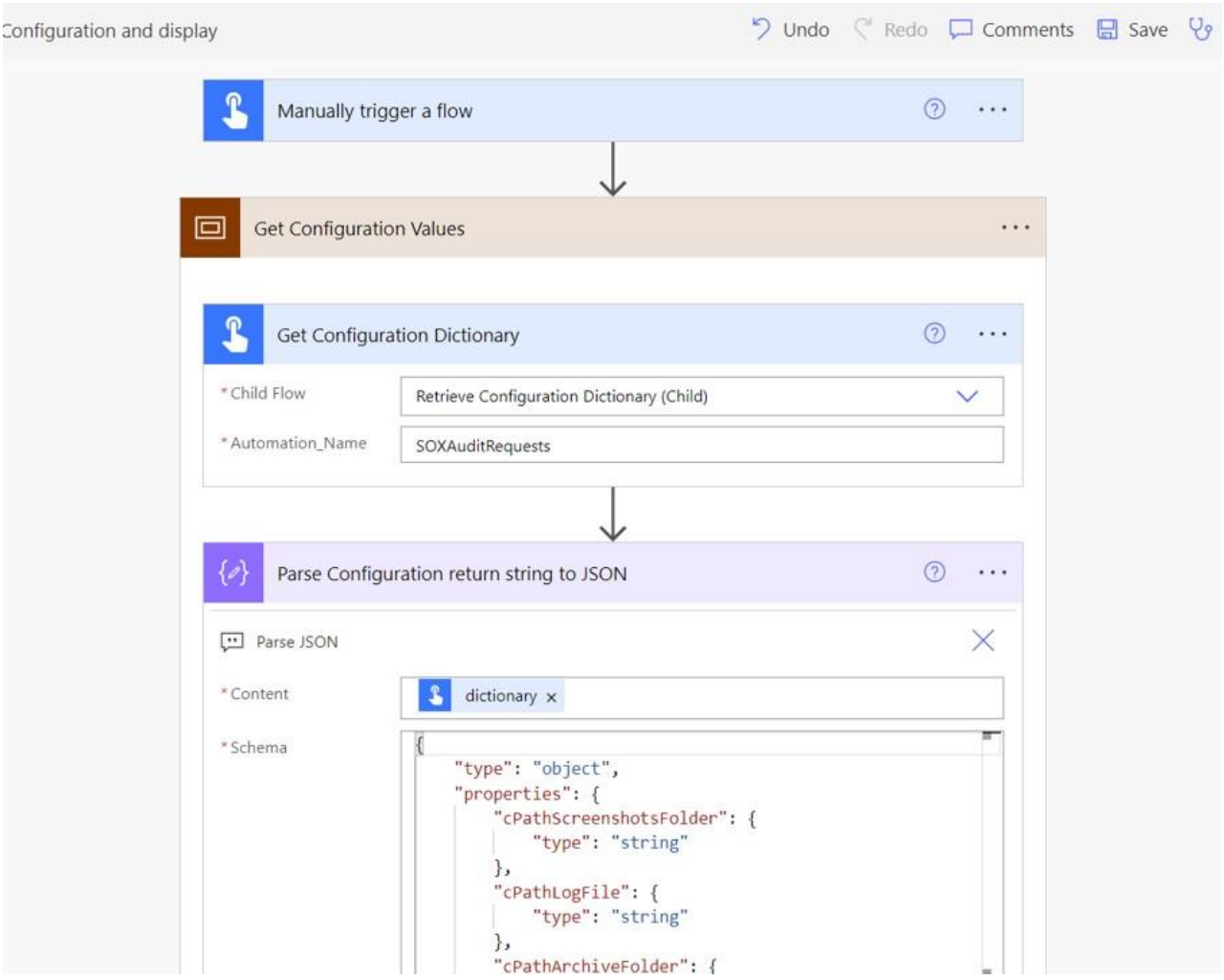
# Flow Architecture & Design Tips

## Writing Reusable Code

### *Create Child Flows To Store Repetitive Logic*

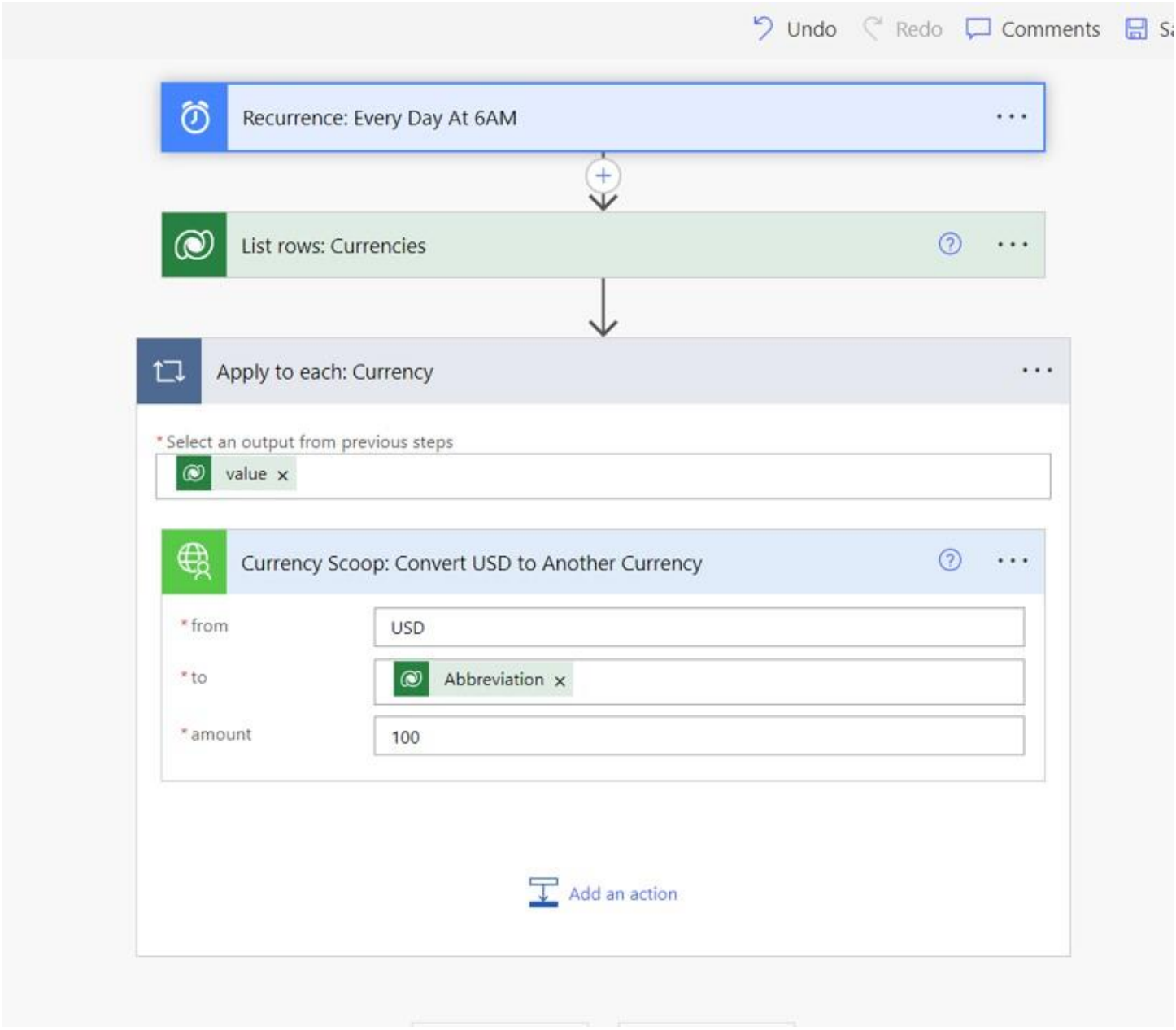
A flow that is called by another flow and passes back the result is known as child flow. Child flows should be created when there is repetitive logic used multiple times in the same flow. Or when there is repetitive logic used across multiple flows. Write the child flow once and use it in several locations.

Child flows are also recommended to abstract complex flow logic. Moving sections of code from a lengthy flow into child flows can make it more manageable/easy to understand.



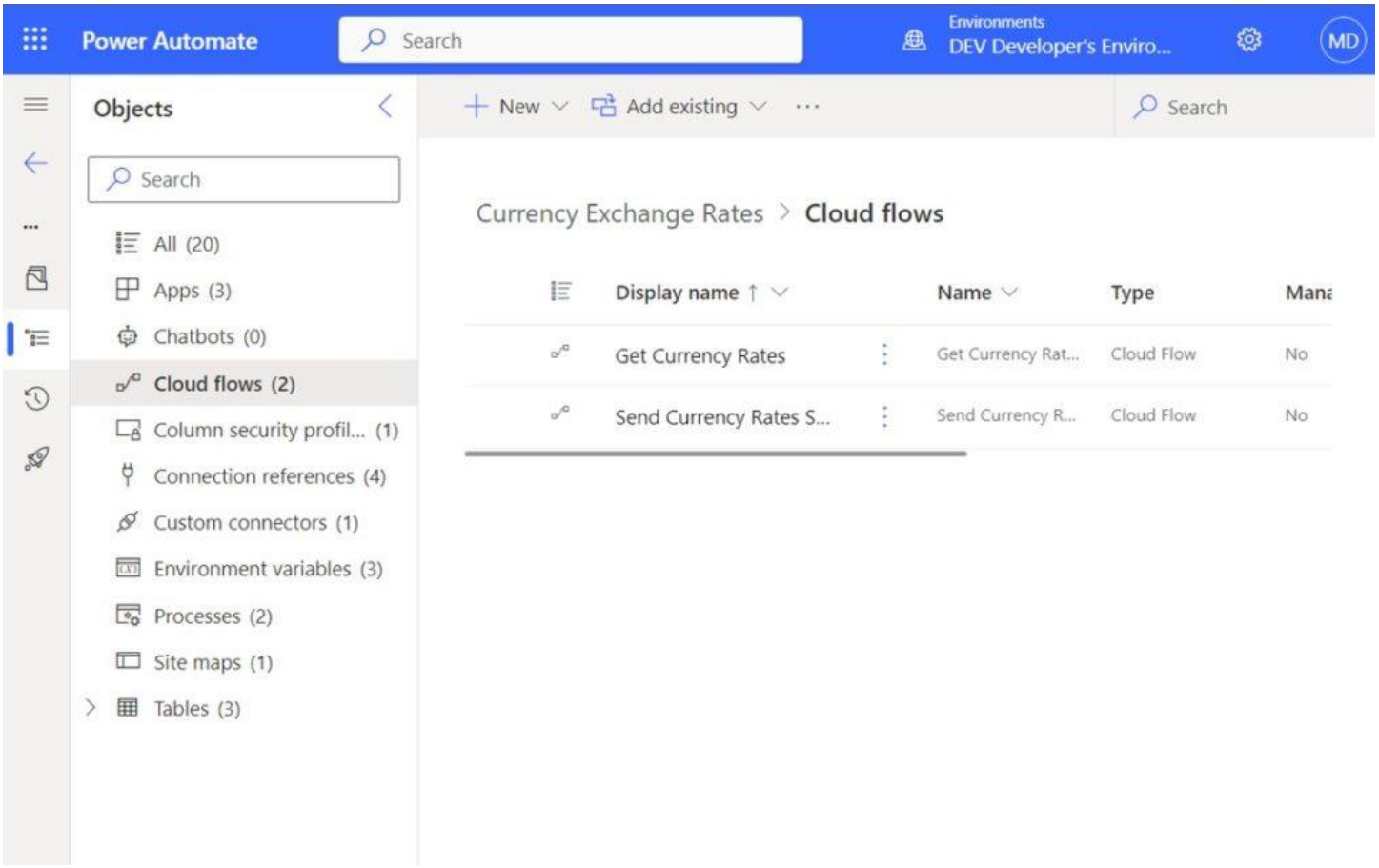
## *Favor Custom Connectors Over The HTTP Action For Reusability*

When no suitable connector exists, we have the option to use an HTTP action or a custom connector to extend Power Automate's capabilities. Custom connectors are preferable because they can be created once and deployed to the rest of the organization for everyone to use. For example, a custom connector to find the US Dollar exchange rate has many use-cases.



## *Always Build Flows Inside Of A Solution*

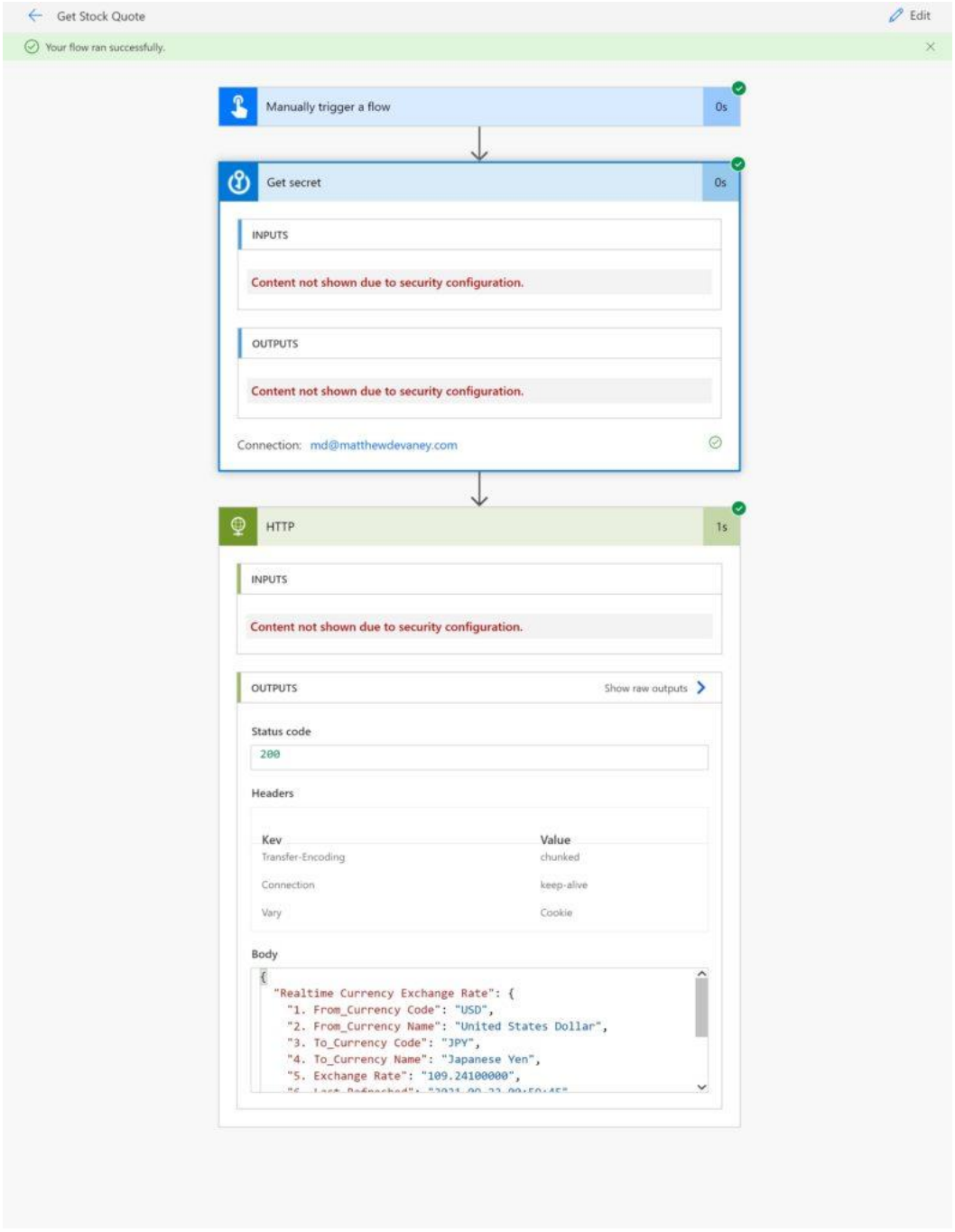
Build flows inside of a solution so they can be easily transported across environments. As new flow actions are added, and connection references are created, those connection references will automatically be placed in the solution. Environment variables used by the flow should also be added to the solution as well.



## Security Architecture

### *Secure Inputs/Outputs For Passwords, API Keys and Secrets*

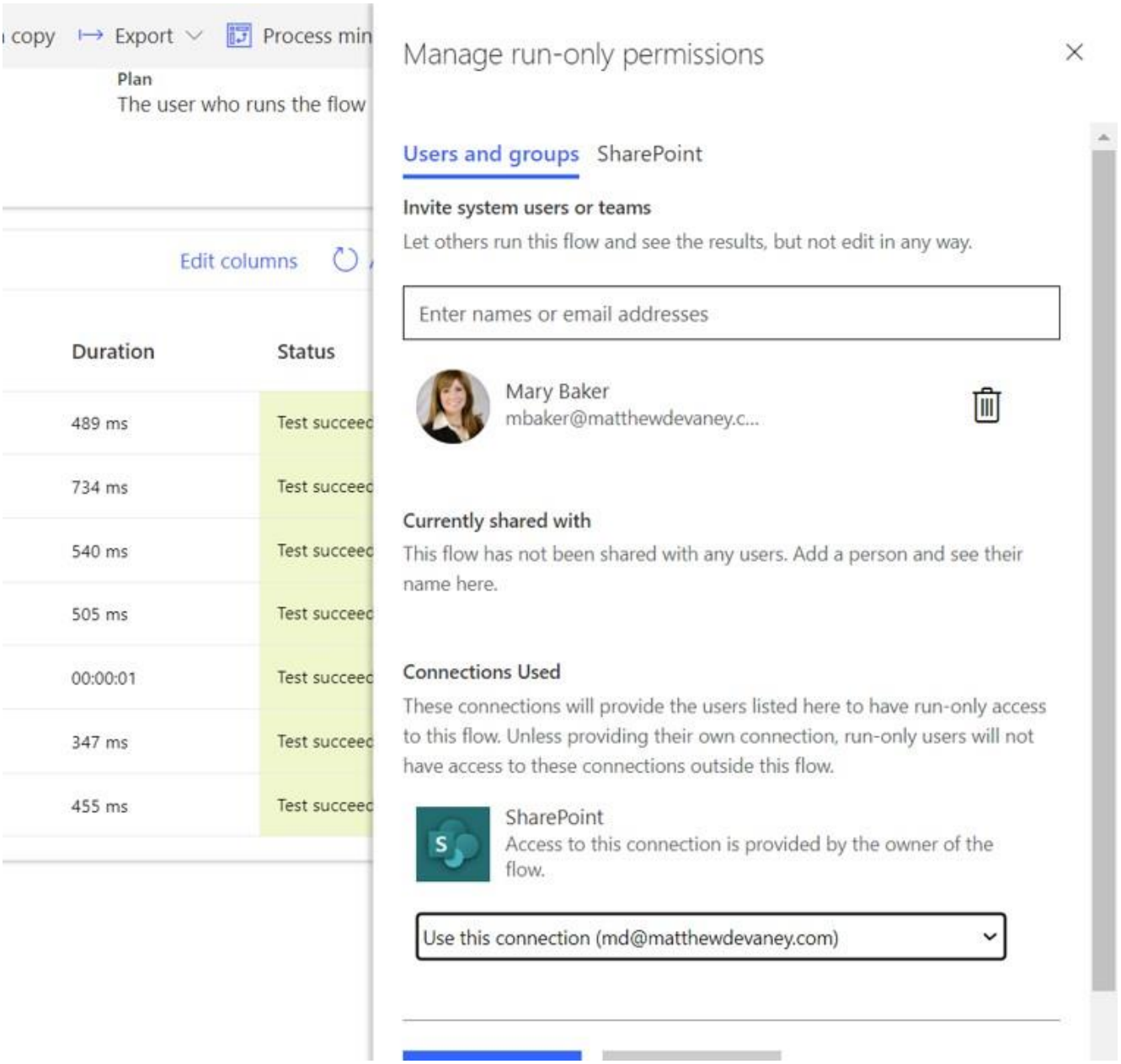
Credentials coming from Azure Key Vault, CyberArk, etc. should never be displayed in the flow run history. Change the flow action settings to secure inputs/outputs for every step where sensitive information is showing.



## *Enable Elevated Permissions By Configuring Run As User*

Power Automate flows are run in the context of a user account. The user account is what determines the permissions a flow has. Flows with instant or Power Apps triggers are run in the context of the user who performed the action to start them.

Configure the **Run As Users** setting to impersonate another user account during the flow run. Use this ability to grant elevated permissions inside the flow that the user would not normally have.

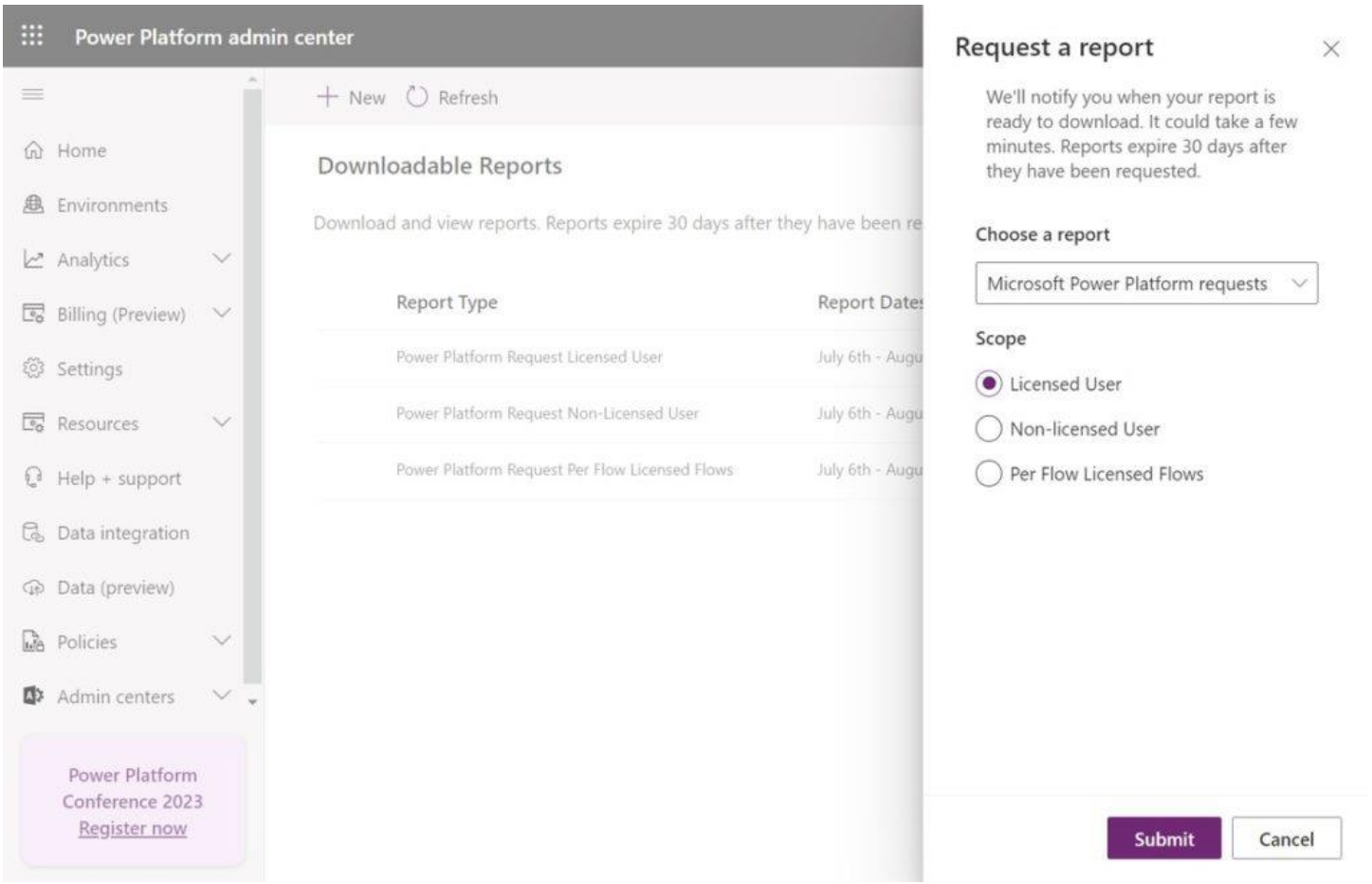


## Platform Considerations

### *Be Aware Of Power Platform Request Limits*

There is a maximum amount of Power Platform requests a user can make in a 24 hour period. Most flow triggers and actions count as 1 request. To get a rough of estimate the number of requests a flow will make multiply the anticipated number of flow runs by the total number of actions plus the trigger.

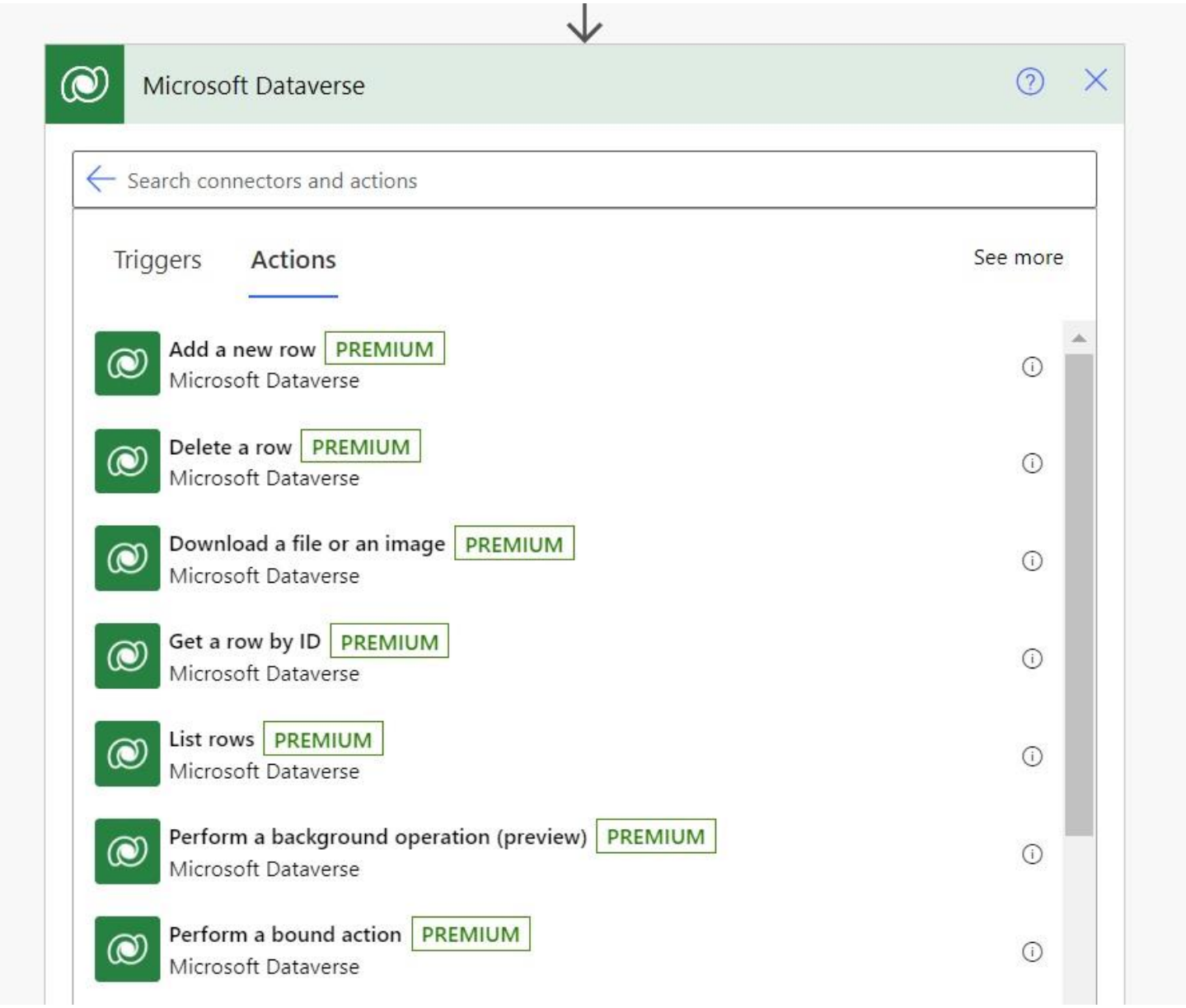
Purchase a Power Automate premium or a Power Automate Process license to increase the request limits if needed. Or reduce the number of flow runs/actions to minimize the number of requests made.



## *Decide Whether To Use Premium Flow Connectors*

Any flows containing a premium connector will require additional licensing to run. Consider moving premium functionality into flows run by the service account as opposed to an end-user to save costs. For example, a flow using premium actions to generate and collect a contract signature could be triggered indirectly by the end user and run by the service account.

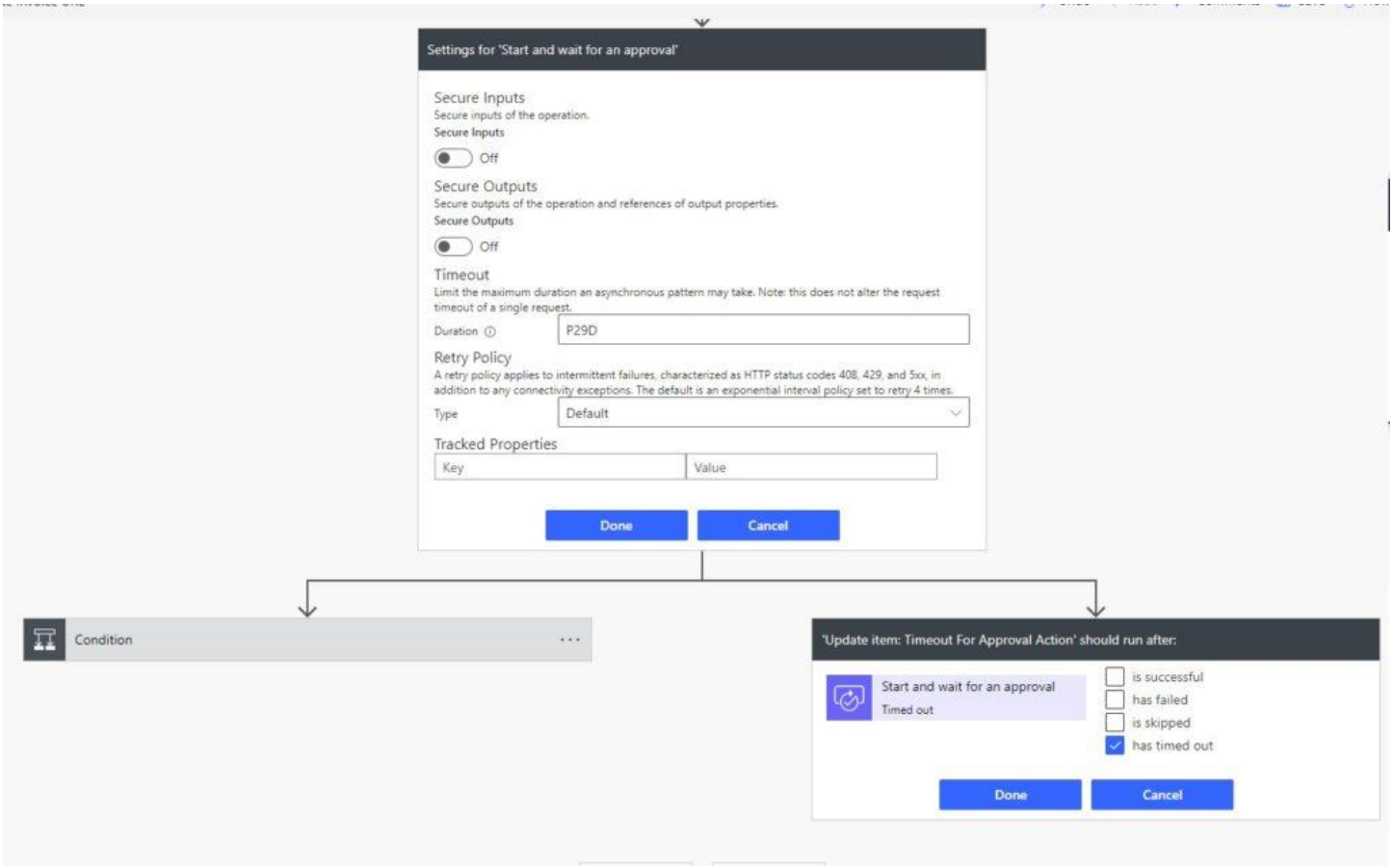
Always follow the licensing rules set forth by Microsoft. Do not engage in multiplexing activity.



## *Keep The 30 Days Flow Duration Limit In Mind*

After 30 days a flow run will terminate even if it is not done running. For example, a Wait For Approval action that receives no response from the application approver.

To restart a long running flow set a timeout value of 29d in the advanced settings. Then create a parallel branch with actions to re-trigger the flow when only when the previous step times out. Terminate the flow as the final action in this branch.

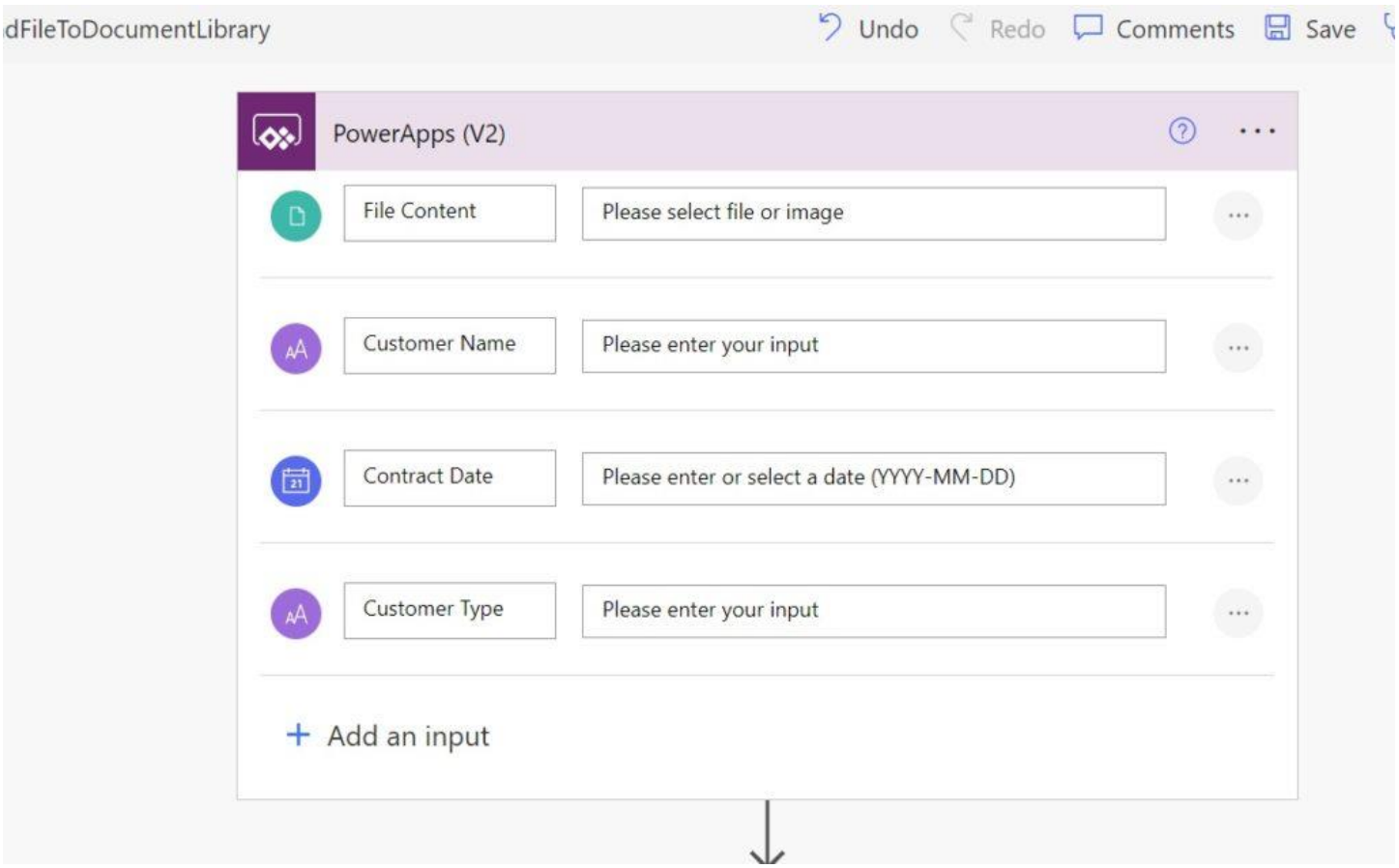


## Designing Flow Triggers

### *Replace The Power Apps V1 Trigger With V2*

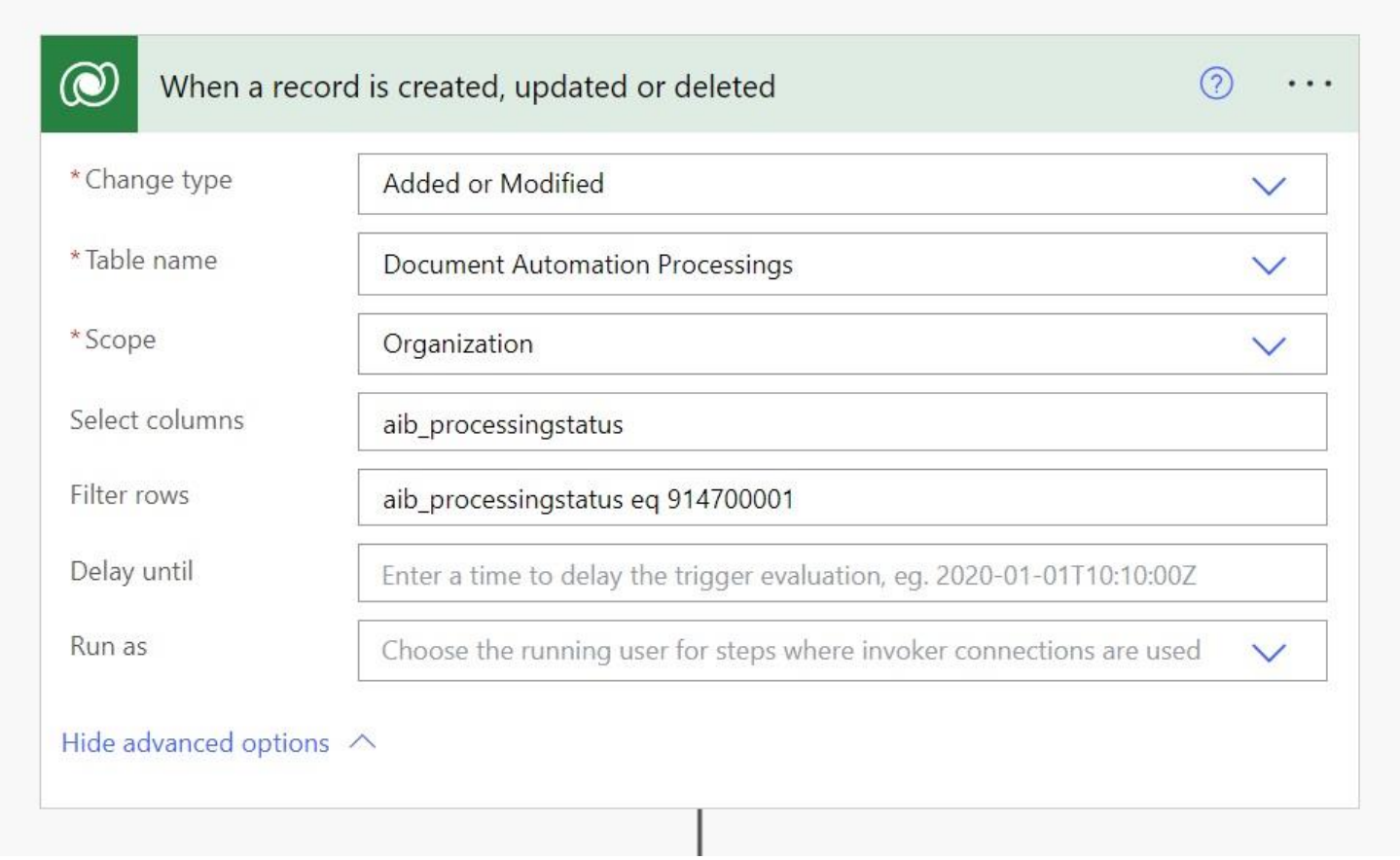
Always use the Power Apps V2 trigger instead of V1. The V2 trigger allows us to define parameters inside the trigger action and set them as required/not required. It also has a new data type called File which allows us to pass in images and attachments from Power Apps.

The V1 trigger is not recommended. Parameters are created by using an “Ask In Power Apps” option in the dynamic content window. This tends to make a mess since parameters cannot be deleted when they are no longer needed.



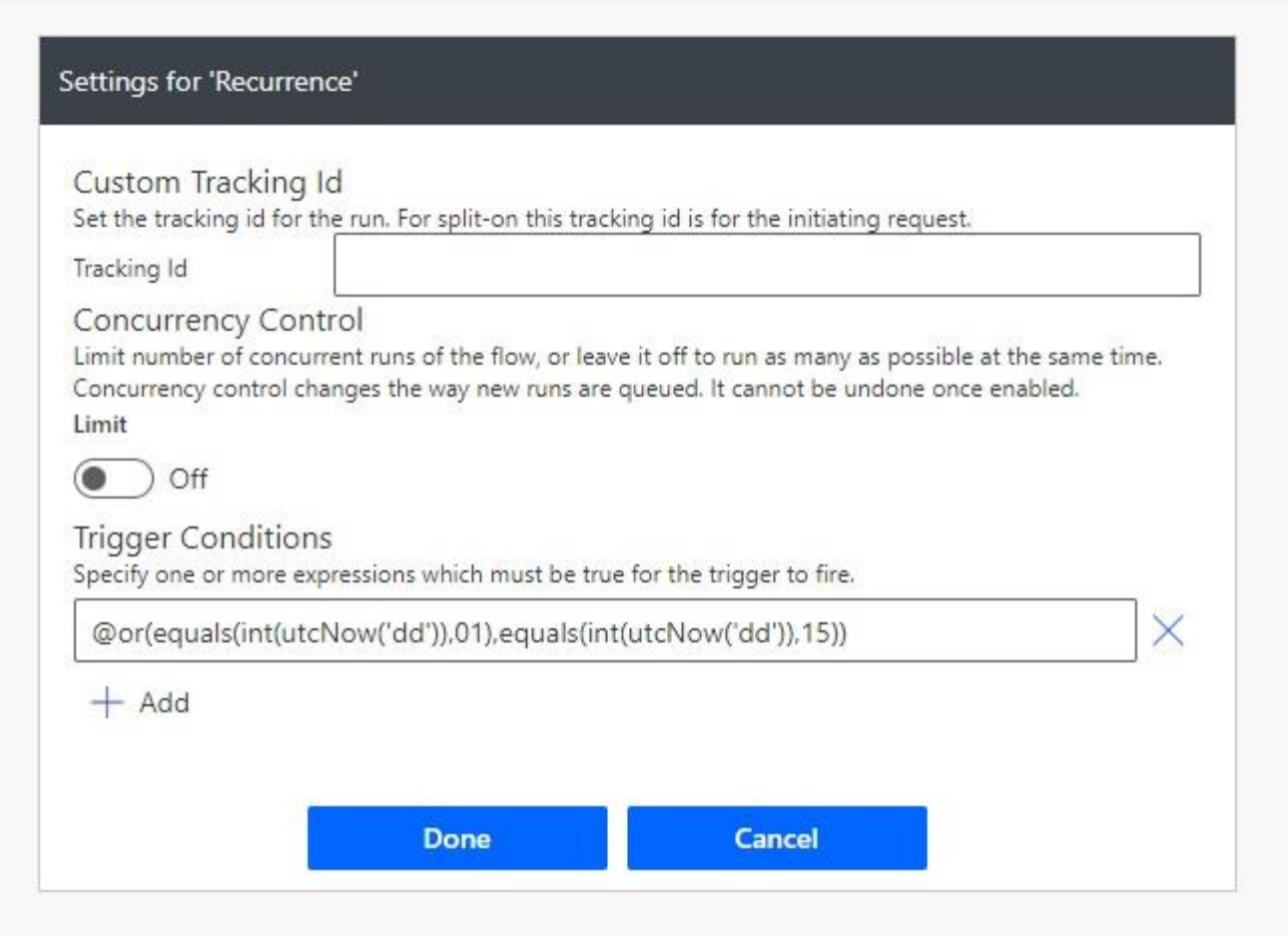
## *Apply Select And Filter Criteria To Automated Triggers*

Never use the When A Record Is Added, Modified or Deleted trigger for Dataverse without defining Select & Filter criteria. Selecting columns only triggers a flow when the targeted column is modified. Filtering ensures the flow only triggers when a specific criteria are met. A trigger without filter conditions will start after every record added, modified or deleted and its actions will count towards daily Power Platform request limits.



## *Create Advanced Trigger Conditions With Flow Expressions*

Use Power Automate expressions to create flow trigger conditions that are not available out-of-the-box. For example, the recurrence trigger does not have any option to trigger only on the last Friday of the month. But by opening the recurrence trigger settings and adding trigger conditions it can be achieved.

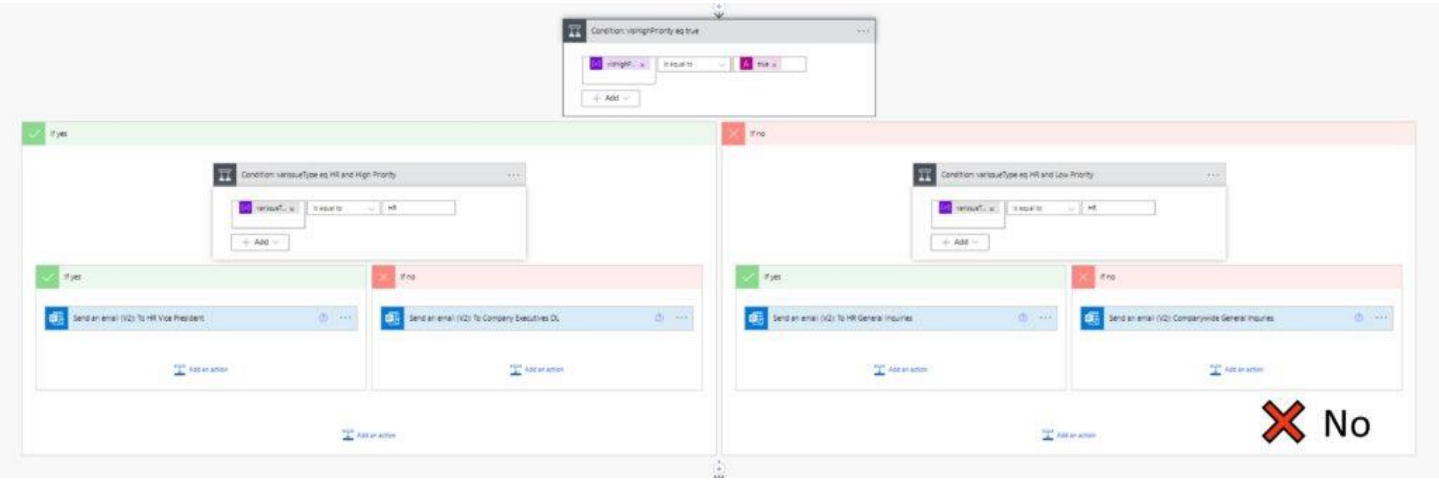


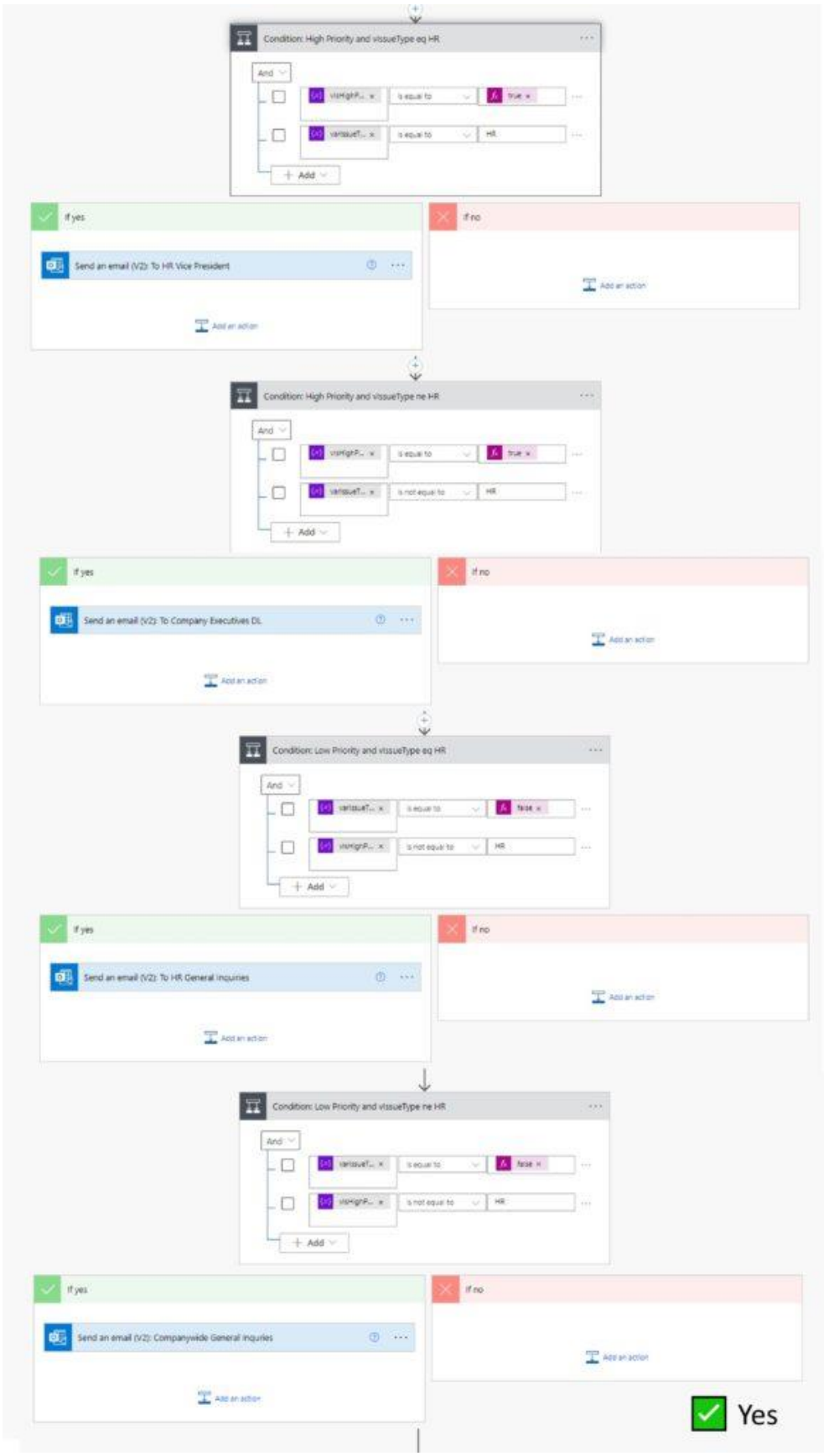
## General Coding Patterns

### *Flatten Nested IF Condition Actions*

Multiple IF condition action nested inside of one another make it difficult to understand what will happen next in the flow. To make matters worse, when we open a flow the condition actions are collapsed and we must expand them to see what's going on inside.

Make conditional logic only one layer deep wherever possible. Instead of nesting IFs try to break up logic into several sequential IF statements.

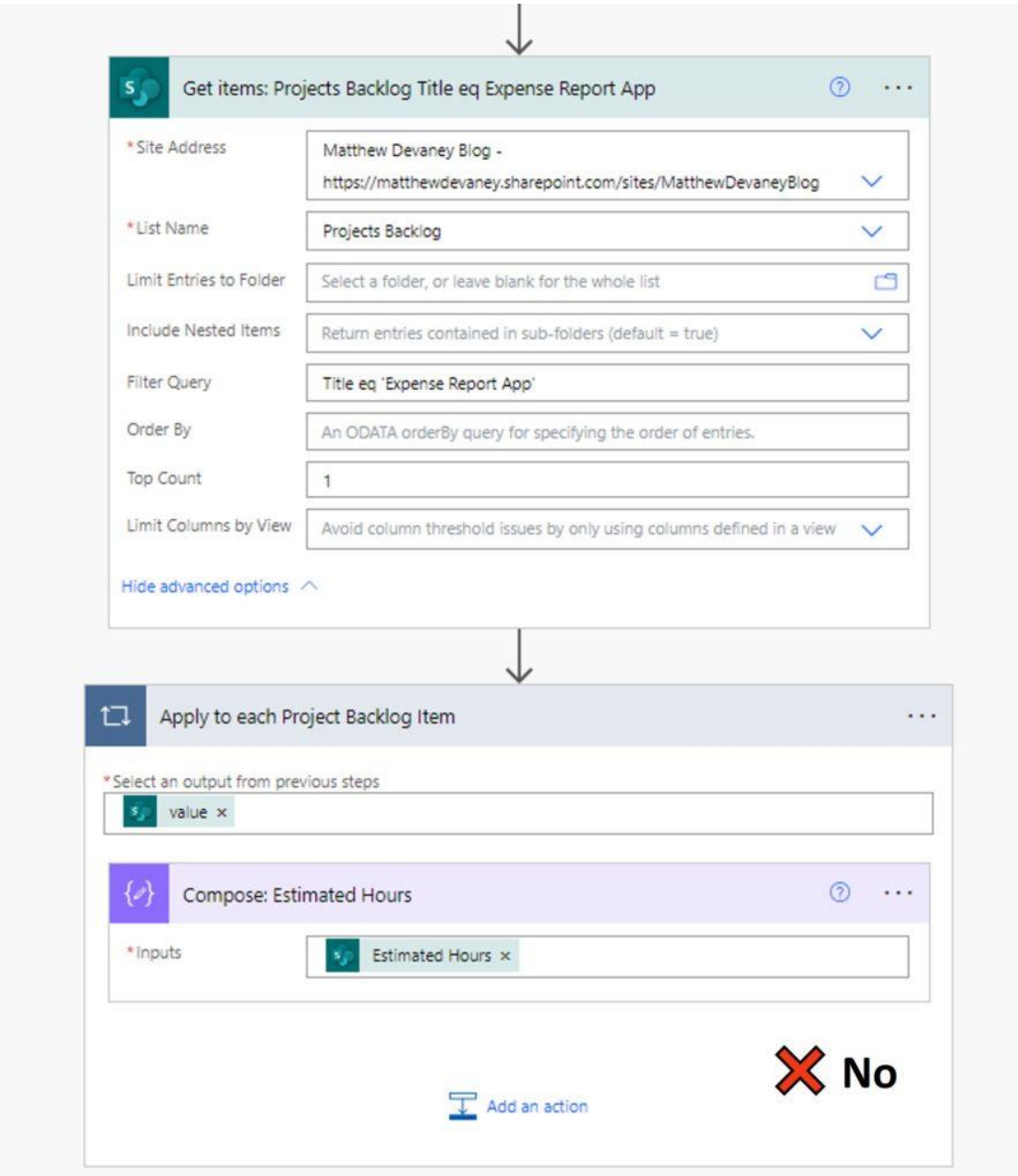


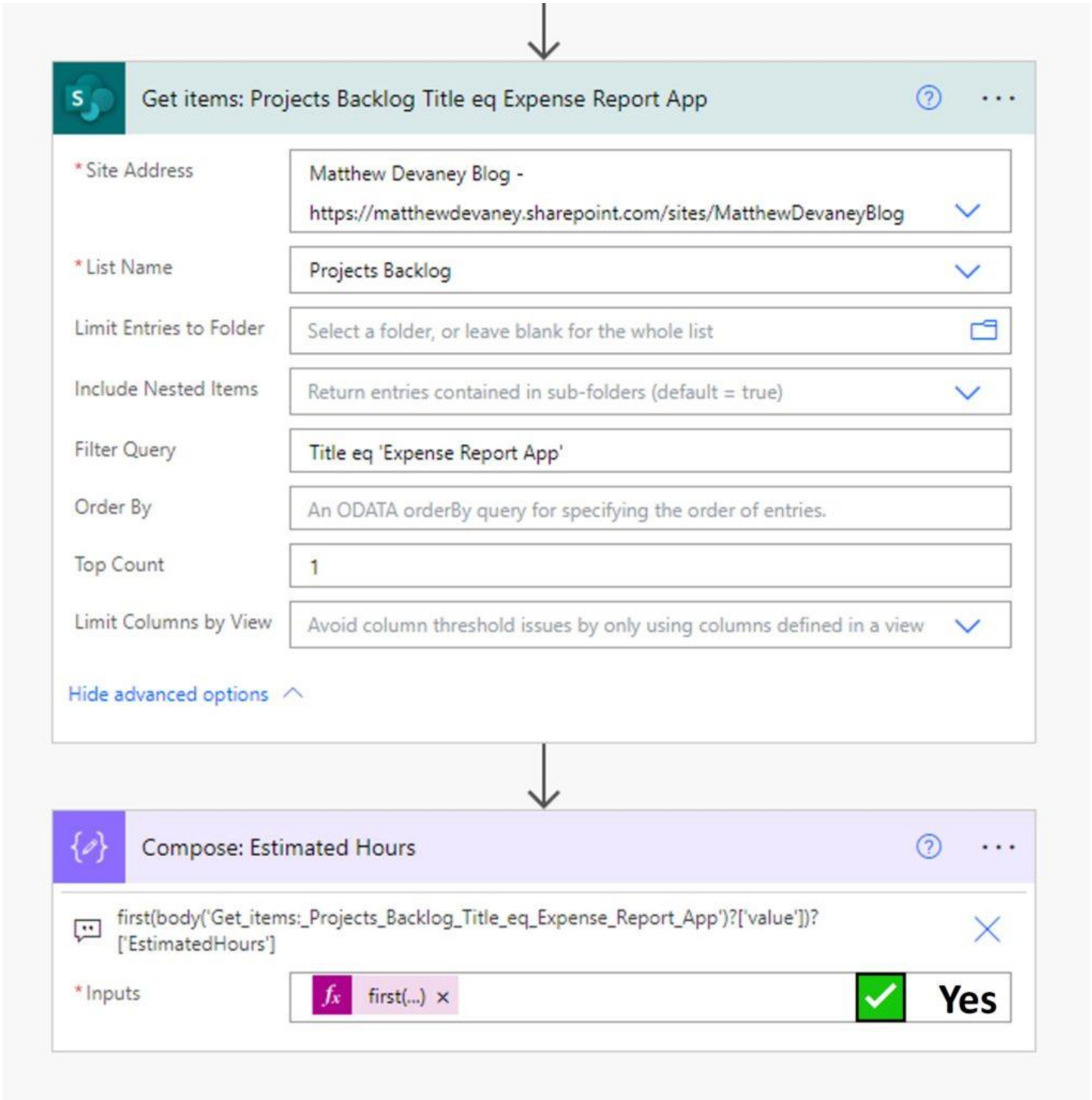

Condition: High Priority and vIssueType eq HR
And
Add
If yes
Send an email (V2): To HR Vice President
Add an action
If no
Add an action
Condition: High Priority and vIssueType ne HR
And
Add
If yes
Send an email (V2): To Company Executives DL
Add an action
If no
Add an action
Condition: Low Priority and vIssueType eq HR
And
Add
If yes
Send an email (V2): To HR General Inquiries
Add an action
If no
Add an action
Condition: Low Priority and vIssueType ne HR
And
Add
If yes
Send an email (V2): Companywide General Inquiries
Add an action
If no
Add an action
Yes

## *Eliminate Unnecessary Apply To Each Loops*

The SharePoint – Get Items action can be used to obtain a single record with a matching unique value. For example, get the list item where email address equals matthewdevaney@outlook.com from the Employees SharePoint list. Any subsequent action using the Employee data will be created inside of a loop. The Get Items action always returns a table even if only one item is returned

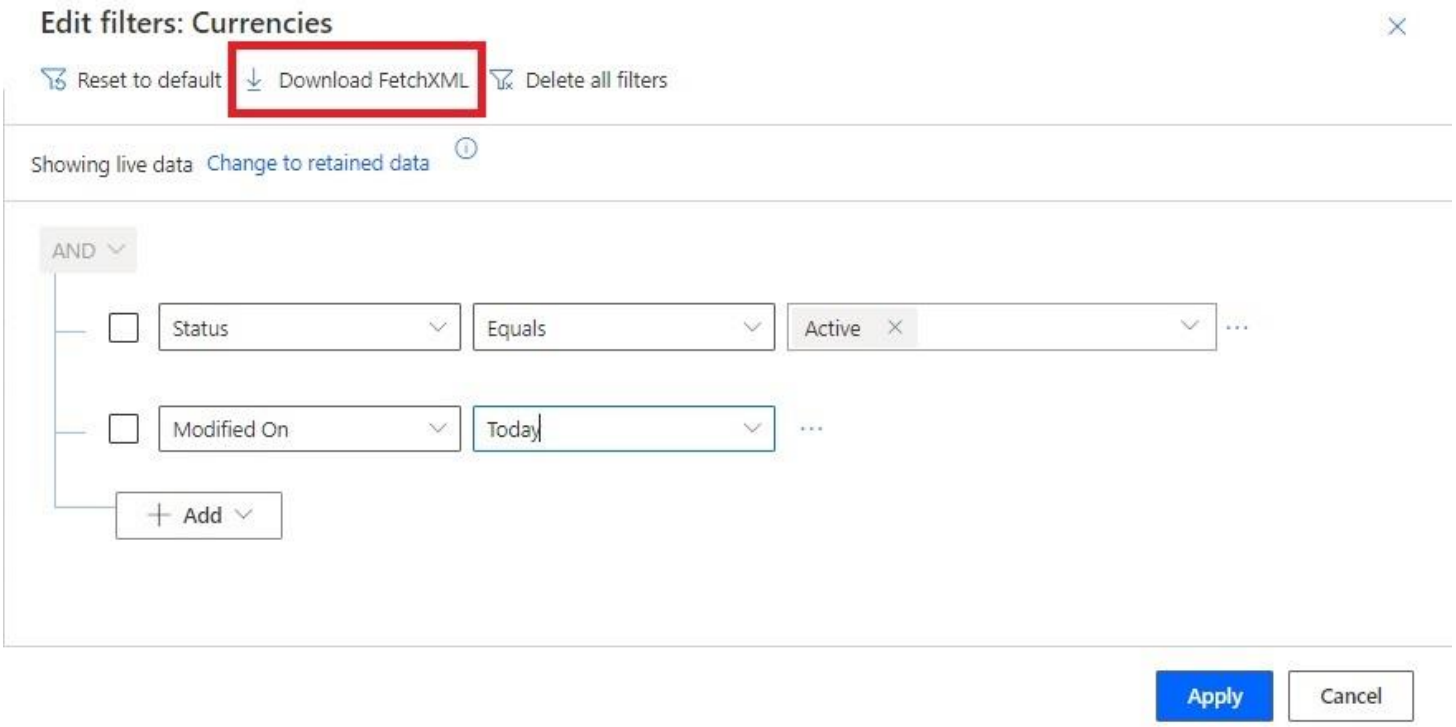
Write a flow expression that includes the first function to eliminate the Apply To Each loop. It takes the first record from an array and allows access to its values. Loops should not be added to a flow when there will only be one iteration.

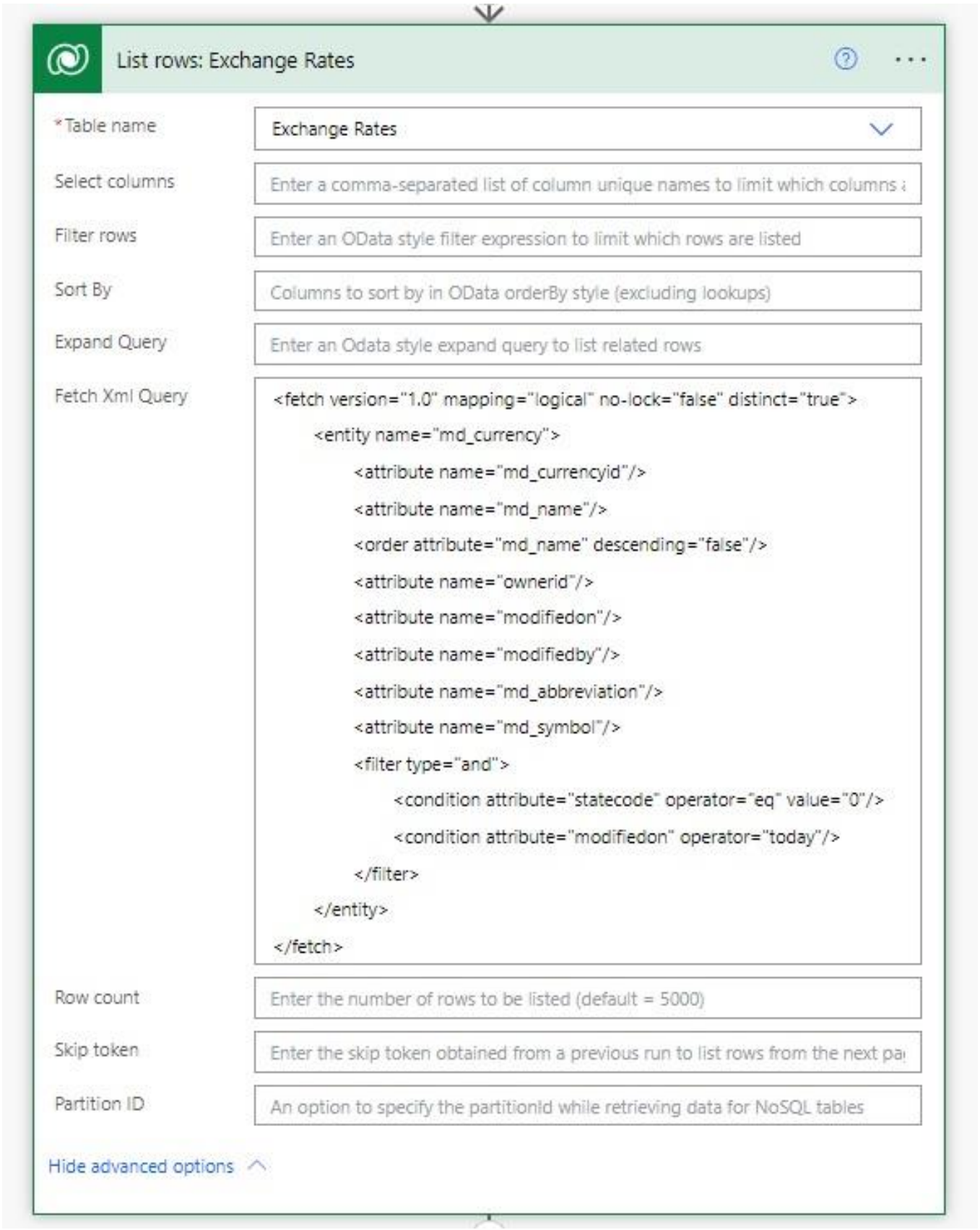



Get items: Projects Backlog Title eq Expense Report App
* Site Address
Matthew Devaney Blog -
https://matthewdevaney.sharepoint.com/sites/MatthewDevaneyBlog
* List Name
Projects Backlog
Limit Entries to Folder
Select a folder, or leave blank for the whole list
Include Nested Items
Return entries contained in sub-folders (default = true)
Filter Query
Title eq 'Expense Report App'
Order By
An ODATA orderBy query for specifying the order of entries.
Top Count
1
Limit Columns by View
Avoid column threshold issues by only using columns defined in a view
Hide advanced options
Compose: Estimated Hours
first(body('Get_items:_Projects_Backlog_Title_eq_Expense_Report_App')?['value'])?['EstimatedHours']
* Inputs
first(...)
Yes

## *Generate Fetch XML For The Dataverse List Rows Action*

When using the Dataverse List Rows action filter the rows with Fetch XML queries instead of OData queries. Fetch XML can be generated by performing an advanced filter in a model driven app and selecting the Fetch XML button. Fetch XML has more query options than OData and does not need to be manually written by the developer.




List rows: Exchange Rates
*Table name
Exchange Rates
Select columns
Enter a comma-separated list of column unique names to limit which columns
Filter rows
Enter an OData style filter expression to limit which rows are listed
Sort By
Columns to sort by in OData orderBy style (excluding lookups)
Expand Query
Enter an Odata style expand query to list related rows
Fetch Xml Query
<fetch version="1.0" mapping="logical" no-lock="false" distinct="true">
<entity name="md_currency">
<attribute name="md_currencyid"/>
<attribute name="md_name"/>
<order attribute="md_name" descending="false"/>
<attribute name="ownerid"/>
<attribute name="modifiedon"/>
<attribute name="modifiedby"/>
<attribute name="md_abbreviation"/>
<attribute name="md_symbol"/>
<filter type="and">
<condition attribute="statecode" operator="eq" value="0"/>
<condition attribute="modifiedon" operator="today"/>
</filter>
</entity>
</fetch>
Row count
Enter the number of rows to be listed (default = 5000)
Skip token
Enter the skip token obtained from a previous run to list rows from the next pa
Partition ID
An option to specify the partitionId while retrieving data for NoSQL tables
Hide advanced options

## *Use A State Machine Pattern*

Suppose there is an approvals workflow with many stages: 1st level, 2nd level, 3rd level. The flow progresses through each stage until it successfully terminates. Now let's add another requirement. When an approval is rejected the workflow must be returned to the previous level. How can we accomplish this without writing a large amount of redundant code?

We can use a State Machine pattern to detect the current state of the workflow and direct it to the next action. To do this, we create a Switch statement inside of a Do-Until loop. At the start of each loop we determine the current state (Level 1, Level 2, Level 3). Then we run the appropriate actions determined by the Switch.

Once all actions for the state are completed the approval is updated to a new state. The Do-Until loop repeats until it meets the looping exit conditions.