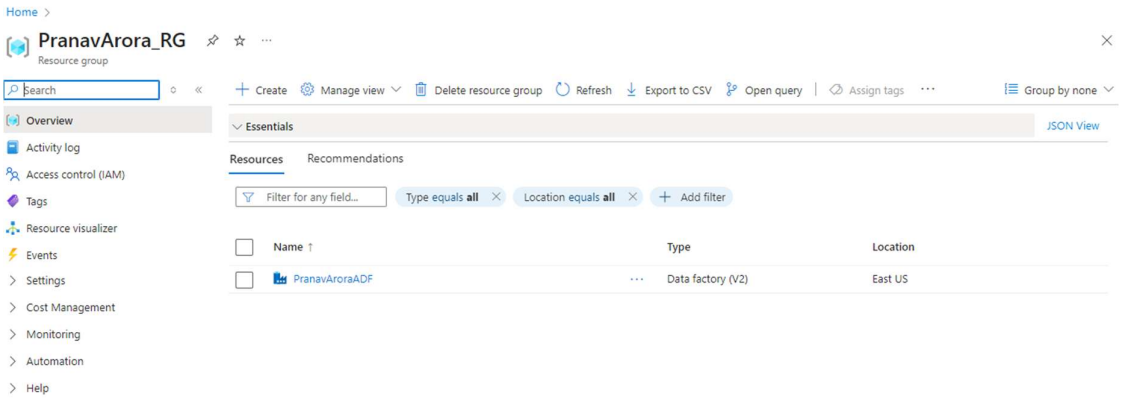
Project Documentation – Pipeline Creation

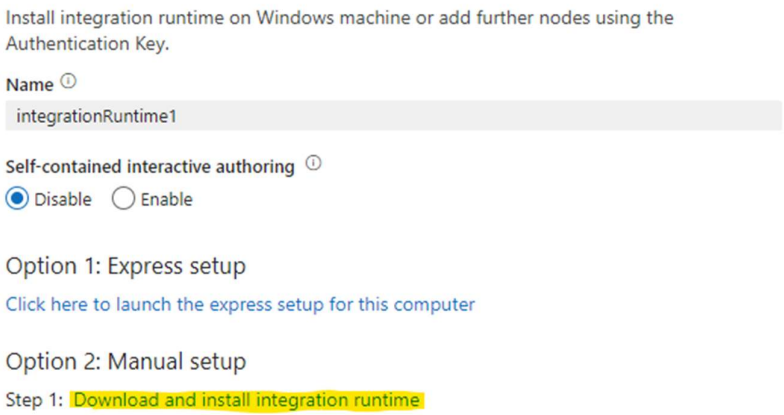
Steps Followed for Pipeline Creation:

1. Create a Resource Group and create an ADF resource.



2. Now we will create a SHIR, so that we can access the on-prem files. Below are the steps followed for the same:

   Go to Manage tab in your ADF resource → Click on Integration Runtimes tab → Click on '+New' → Select 'Azure Self Hosted' and continue → Then select 'Self Hosted' and continue → Give Name to your Runtime → Now copy the Key 1 or Key 2 and keep it in a notepad or secure place, and click on the 'Download and install integration runtime' if we don't have the IR application on our local laptop/pc → setup the application, and paste one of the Keys, and now if we come back to the Integration runtime tab and refresh, our SHIR will be up and running

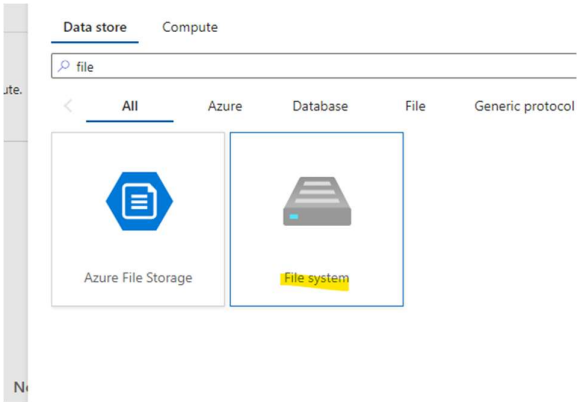


Filter by name

Showing 1 - 2 of 2 items

Name	Type	Sub-type	Status	Related	Region	Version
AutoResolveIntegrationRuntime	Azure	Public	Running	0	Auto Resolve	---
PranavSHIR	Self-Hosted	---	Running	0	---	5.54.9271.2

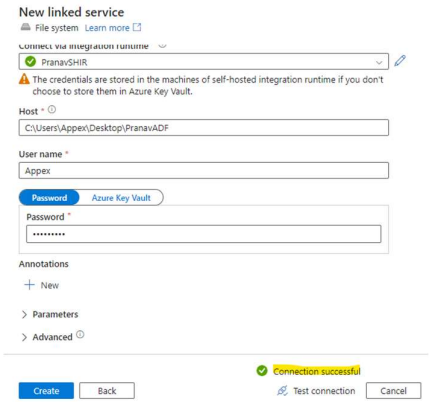
3. Now we will create a Linked service to access our local data folder, and we will use our SHIR in it. To create Linked Service, follow the steps below:
   Go to manage tab in ADF → Go to Linked Service → Click on '+New' → Select 'File system' and continue → Give name to our Linked Service, Select our SHIR for the runtime, now in our Host (we will put the folder location of the files we want to access: Ex- "C:\Users\Appex\Desktop\PranavADF"), we will then add the Username and Password (this with be the Laptop/device user name and password, and if we have setup laptop with Microsoft ID then Microsoft mail id and it's password (preferred method)), and then we Test Connection.



On Testing connection, we will get error, so we need to run two commands in our Power Shell, as it will disable the Local Folder Path Validation, which is by default on when we setup our SHIR. (We run these commands as Admin).

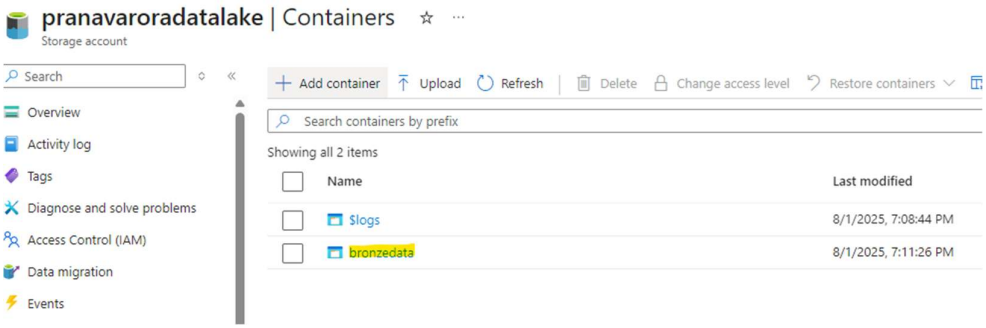
Refer to this link for the commands and issue resolution:
https://stackoverflow.com/questions/76402958/azure-data-factory-linked-service-to-c-drive

And then again Test Connection, it works –

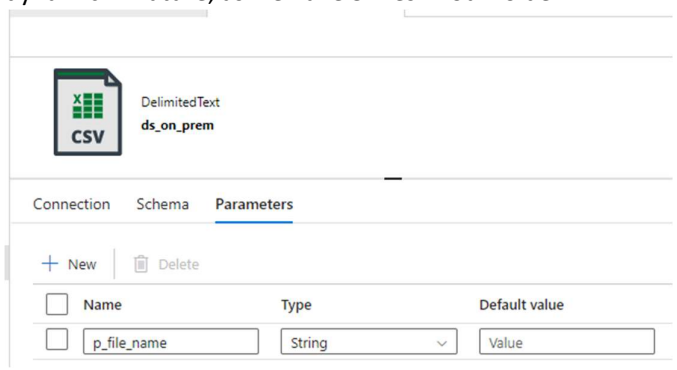


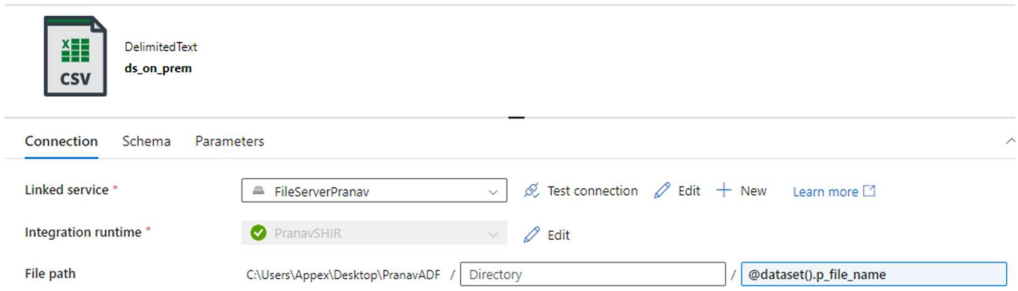
And then we create our Linked service successfully.

4. Now go to our Resource Group, and container a Storage Account Resource, in which we can create a container.

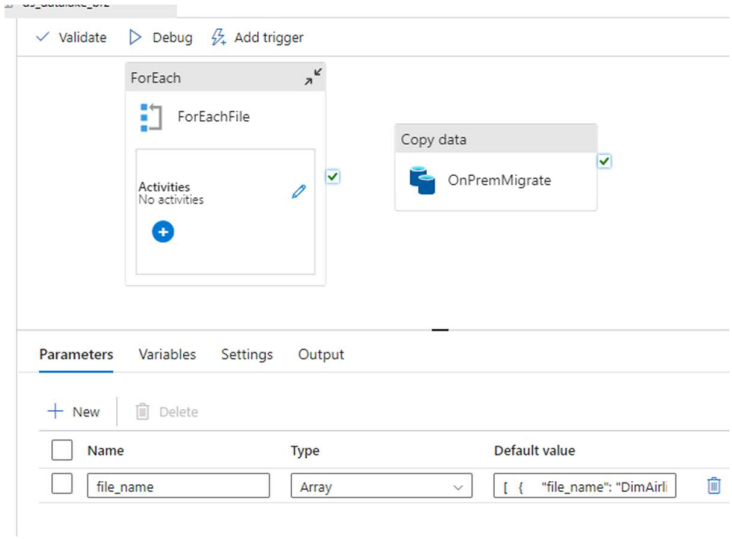


5. Now we will create a Linked Service for this storage, and we will not use SHIR, we will use the default Integration Runtime provided by Azure.
6. Now we will start creating our ADF pipeline:
   a. We will create a Copy Activity → In source we will create a dataset for File System, and we select the file format as CSV (since the files in our laptop folder are CSV), and select the linked service (the one we created for our local data). Similarly, we will create a dataset for the sink, using Linked service of our data lake.
   b. We will also parameterize our Source and Sink Datasets, so that we can make it dynamic in nature, as we have 3 files in our folder.



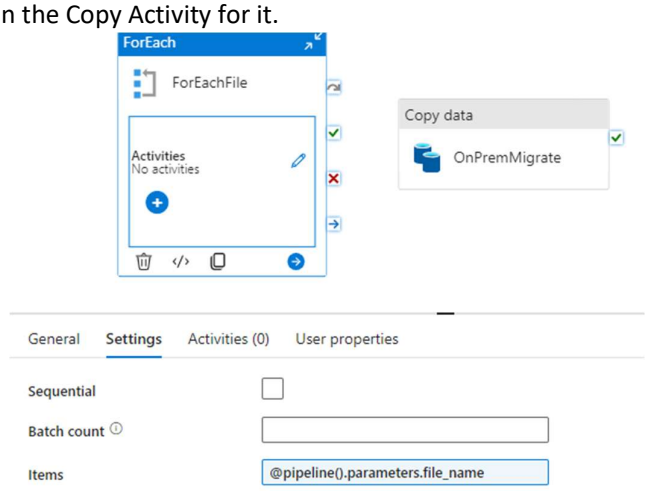


   c. Now we create a pipeline level variable to store our file names, and pass the default value through it in form of a list:

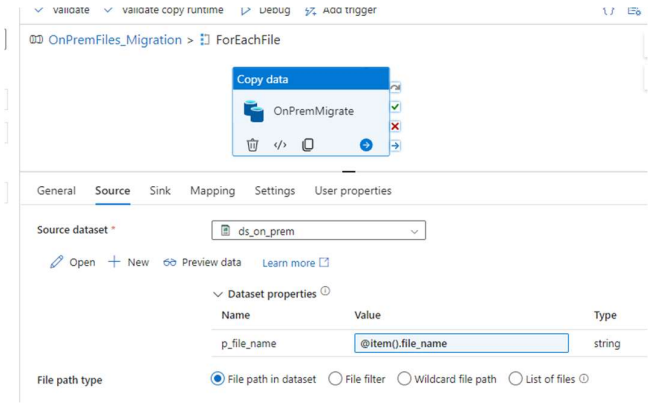



```
[
  {
    "file_name": "DimAirline.csv"
  },
  {
    "file_name": "DimFlight.csv"
  },
  {
    "file_name": "DimPassenger.csv"
  }
]
```

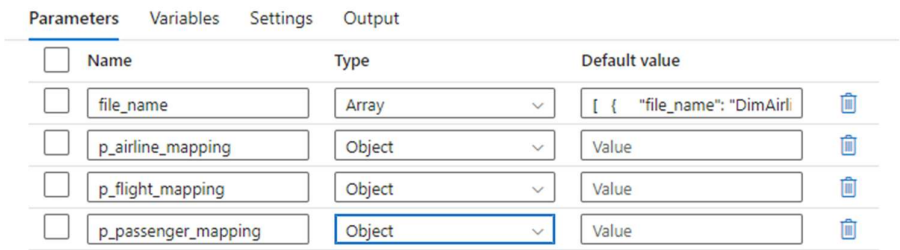
d. Now we create a For Each Activity and pass the Pipeline parameter as an input to it, and move our Copy Activity inside the For Each Activity so that we can pass each file name, and run the Copy Activity for it.



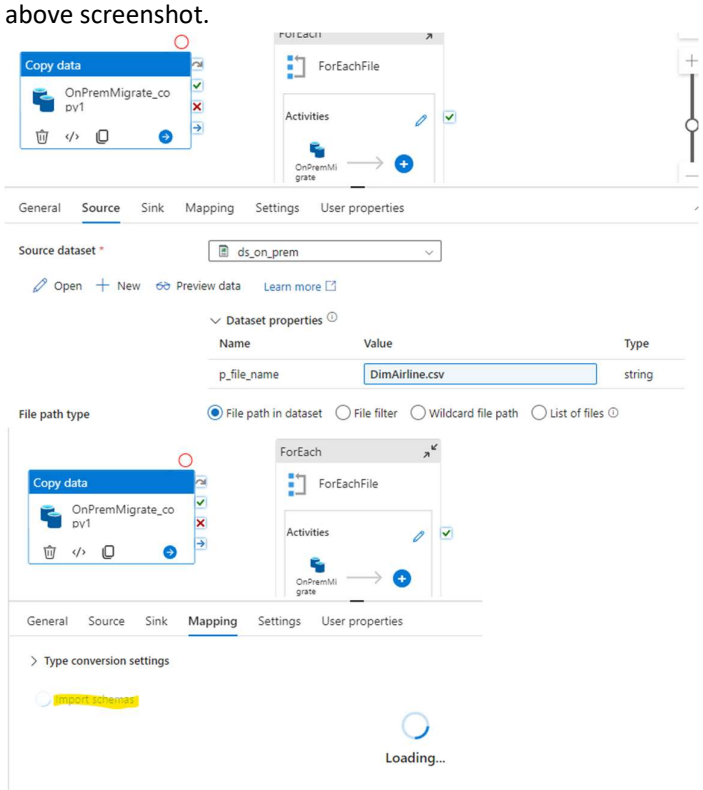
e. Also now in the Copy Activity, we will put the default value of our activity as the Parameter value output of For Each Activity. (for both Source And Sink)

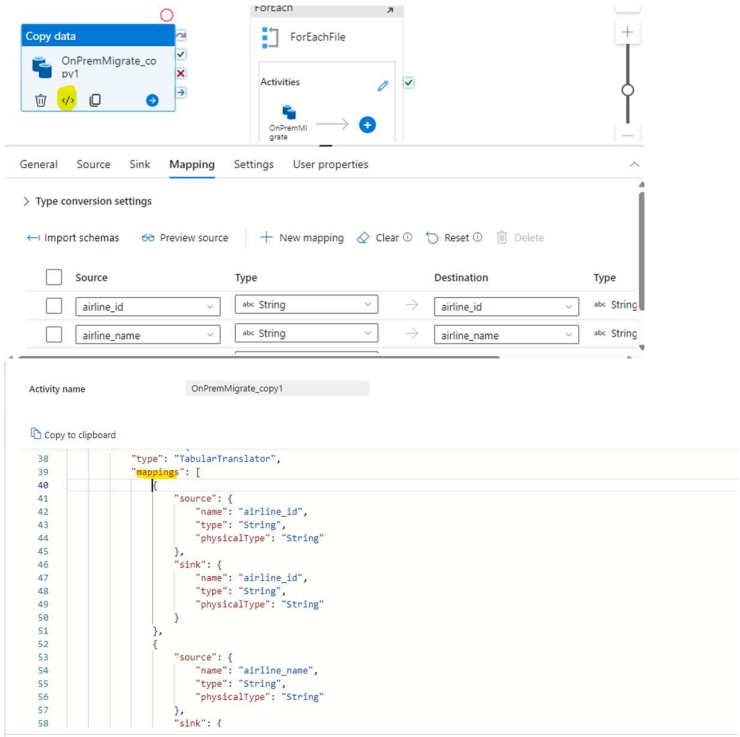


f. Now we want Dynamic mapping as well, so we will create 3 pipeline variables (one for each CSV files mapping) –



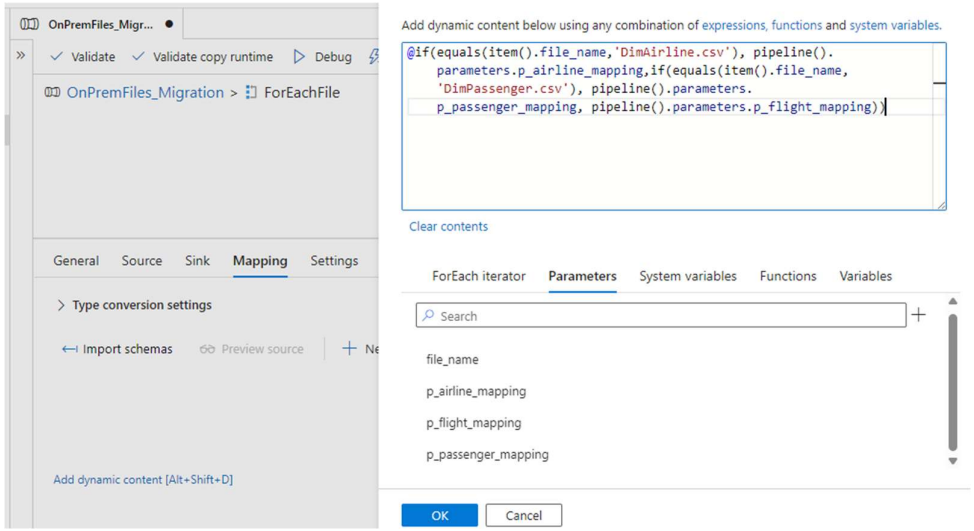
Now to get the mappings, we make a copy of our Copy Activity and instead of Parameterized file name, we put one file name at a time, import the mapping and using the code for the mapping fill the values for the Mapping parameters in the above screenshot.



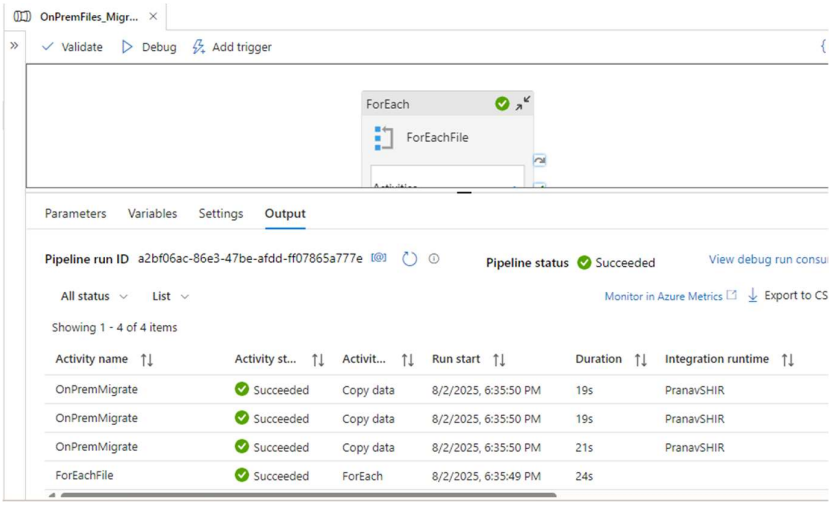


Once you fill the mapping values for the mapping parameters, you can delete the additional copy activity added to get the schemas.

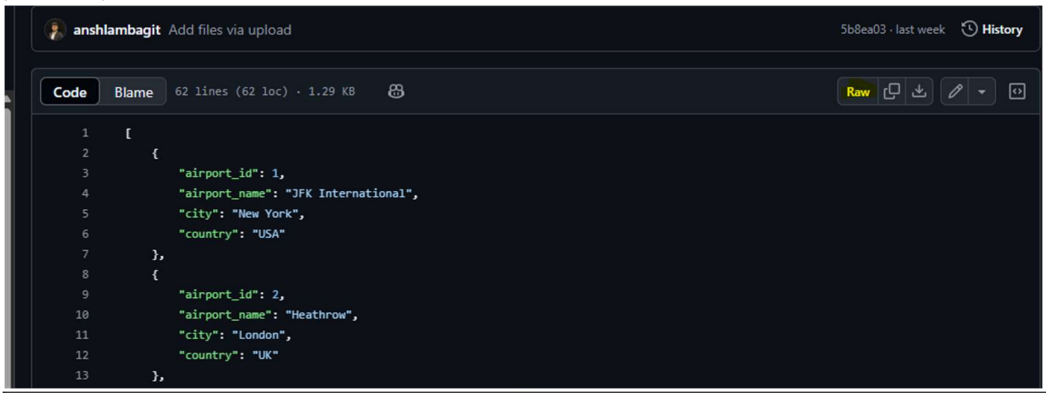
g. Now go to the Copy Activity inside the For Each Activity, and we will add dynamic content within the mapping tab here:

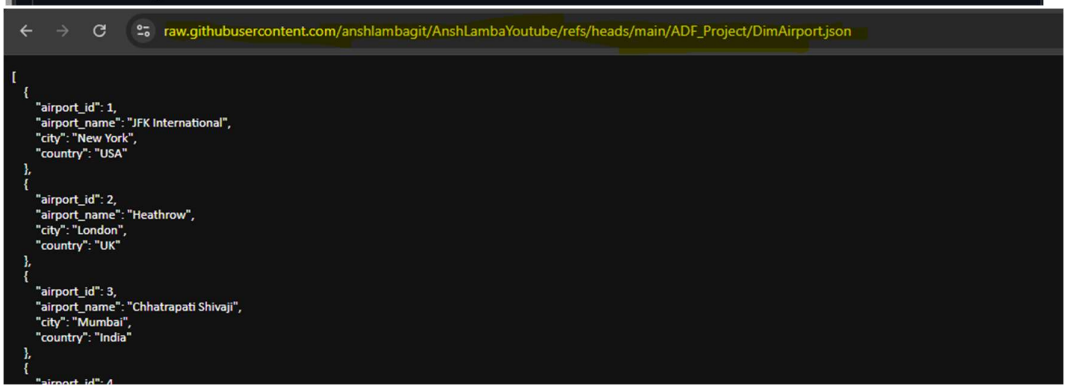


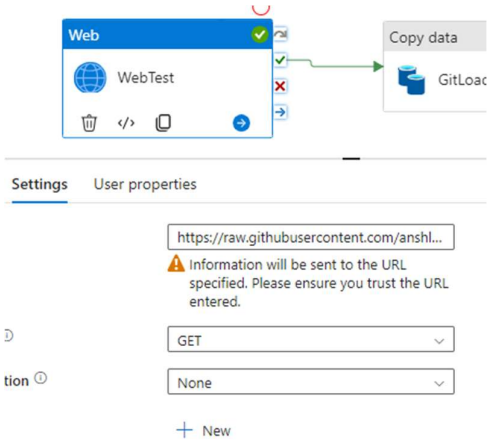
Now our ADF Pipeline is ready for the OnPrem Files ingestion.



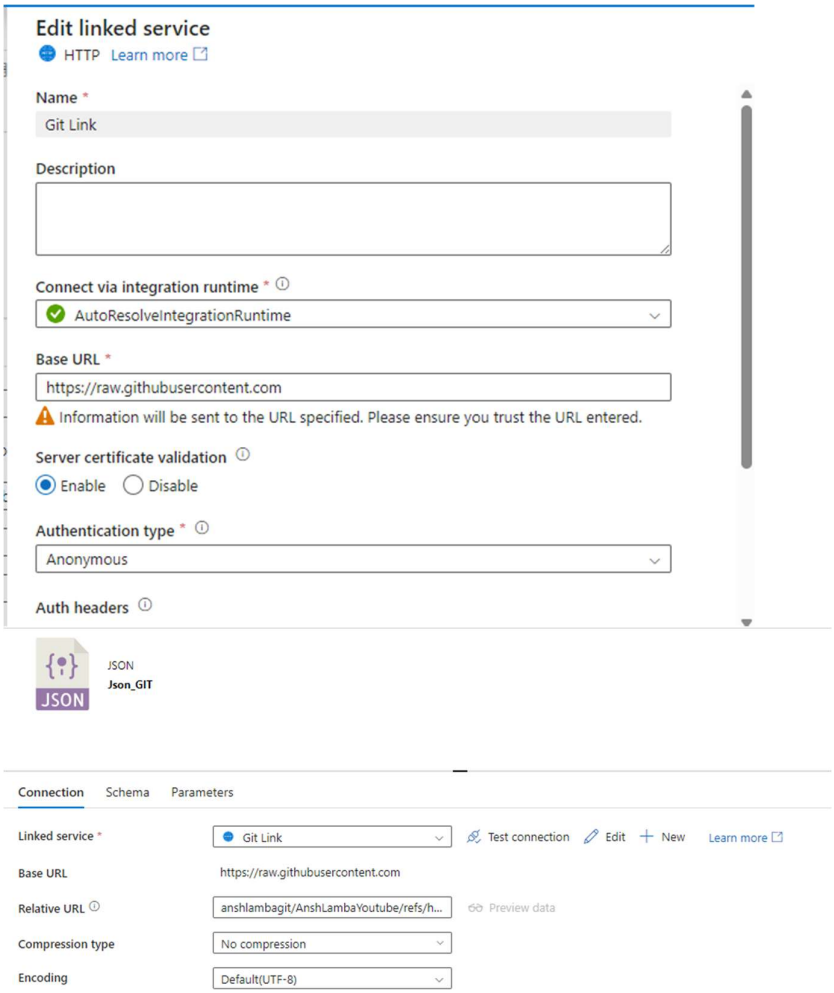
7. Now we will build pipeline for GitHub data Ingestion. We will create one Web Activity and paste our GitHub file's raw URL, put Method as GET and Authentication as None (since it is a public repo)





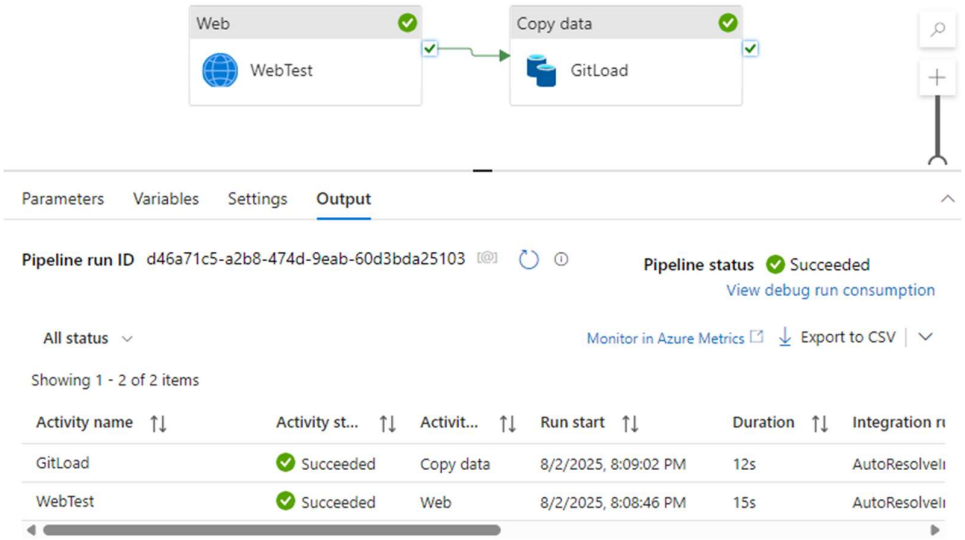


Then on success of success of Web Activity, we will run a Copy Activity. In our sink we will keep ADLS, in our Source, we will keep JSON (since the GitHub file is a JSON File), and in our linked service –



The Base URL is the Raw Git Files starting bit of URL and Relative URL is post the backslash of our base URL.

Pipeline is ready, we can run it.

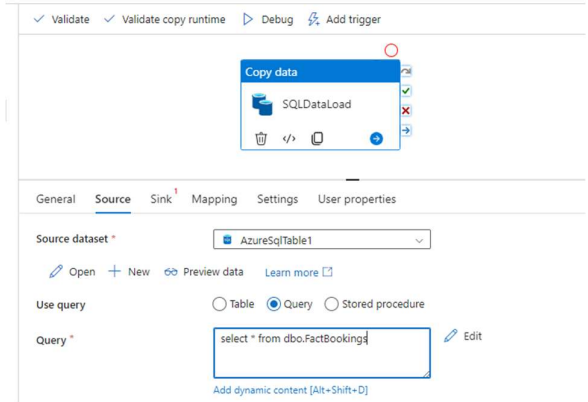


8. Now we will create another Pipeline to get data from SQL DB. First we will go to our Resource Group, search for Azure SQL and select it → then we choose SQL databases (with Single Database Option) → Give our DB a name, create a server (Give name to server, For authentication method select 'Use both SQL and Microsoft Entra authentication', create admin login and password, also set your account as Admin as well), set workload env as 'Development', in "Compute+storage" select Configure DB (Choose Serverless, and set memory according to needs and clock on Apply); now go to networking tab of SQL DB creation (set it as public endpoint, set "Allow Azure services and resources to access this server" to Yes and "Add current client IP address" to Yes) and then create your DB.

Once the resource is created, go to the Database from your Resource Group → click on Query Editor and login, and now run the script to create and insert data into dummy table for this project (Script available in this repo - fact_bookings_full.sql)

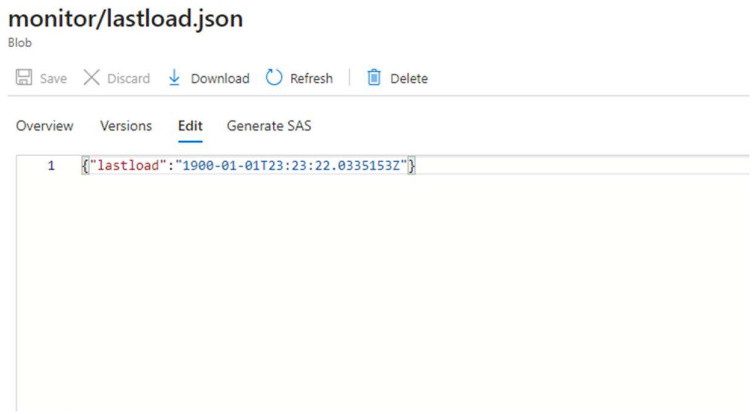
Now our table is ready, so we can go back to ADF to build a pipeline for getting data to our data lake from the SQL DB

Create a Copy activity for our SQL DB, where SQL DB is the source (create dataset and linked service) and Data Lake is the Sink (File type in Sink is Parquet this time)

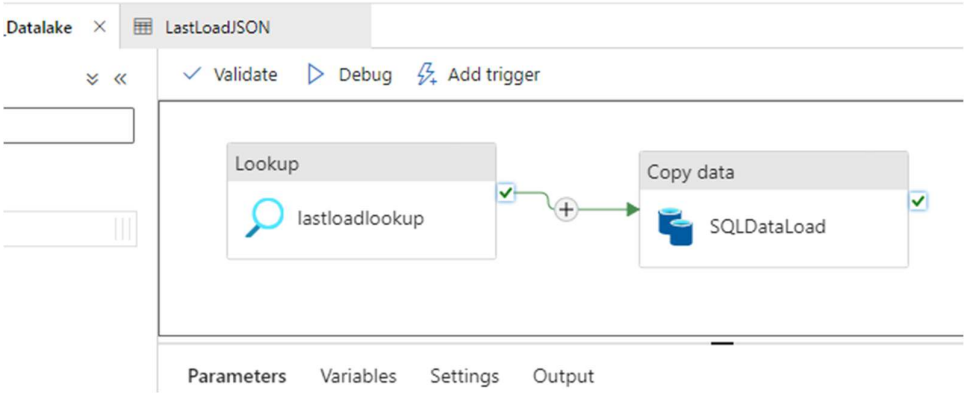


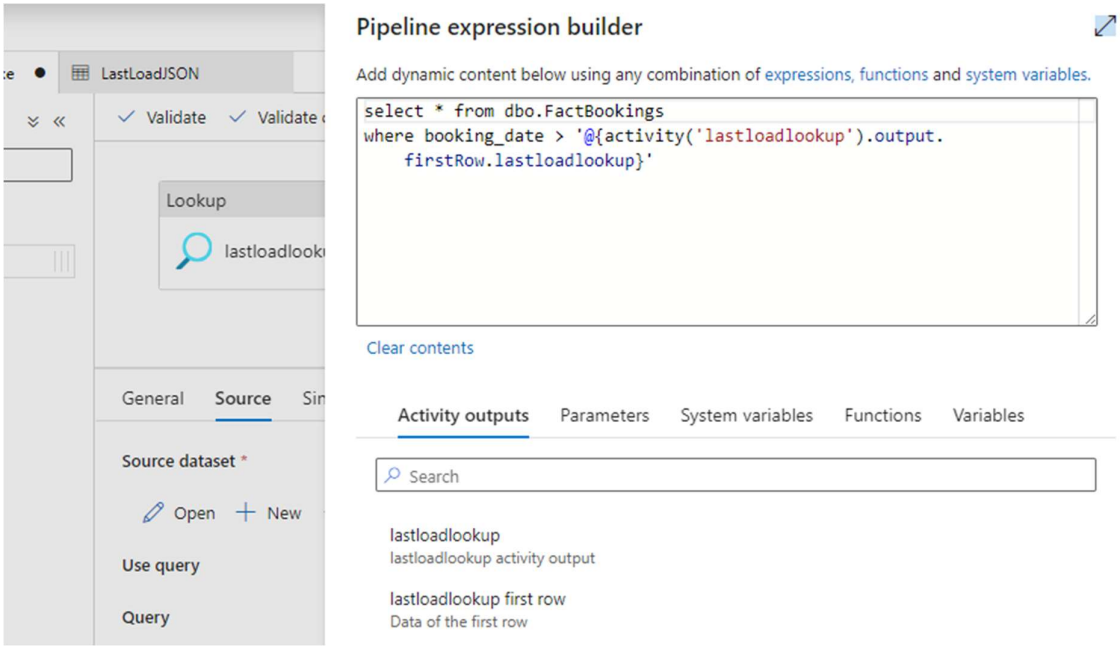
Now we want to maintain watermark json files in our data lake and load our data incrementally using those files, basis our watermark column (Booking Date) and also update these Json Files, so we will add more logic to this pipeline now:

Now we will create a folder called 'Monitor" in our data lake container, and add a JSON file there called lastload.json (This file will contain a timestamp with date 1900-01-01 so that we can have our first load as a full load, and once we update this it would become incremental in nature)

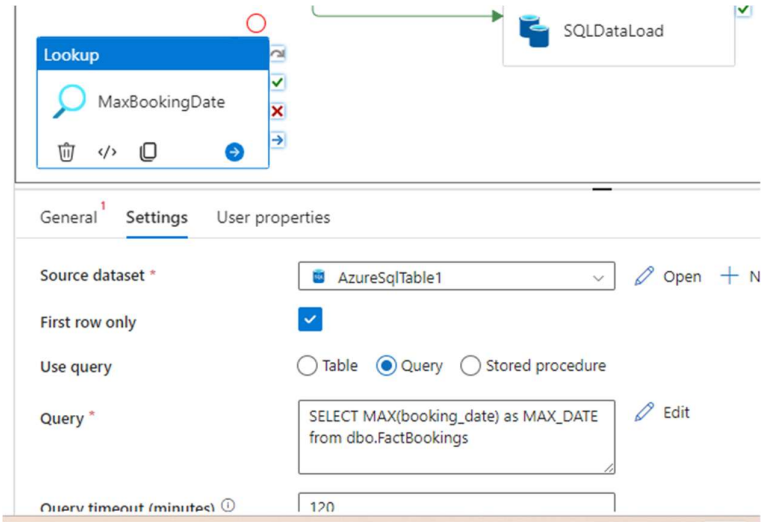


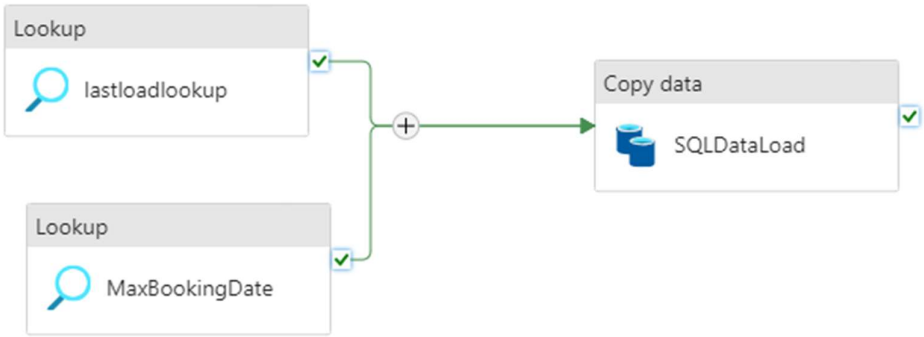
Now in our pipeline we will create a Lookup activity called "lastloadlookup" which will get the data from this above created JSON file. Now we will connect the 2 Activities, and the query in our copy activity will use the output of the Lookup activity in a filter.



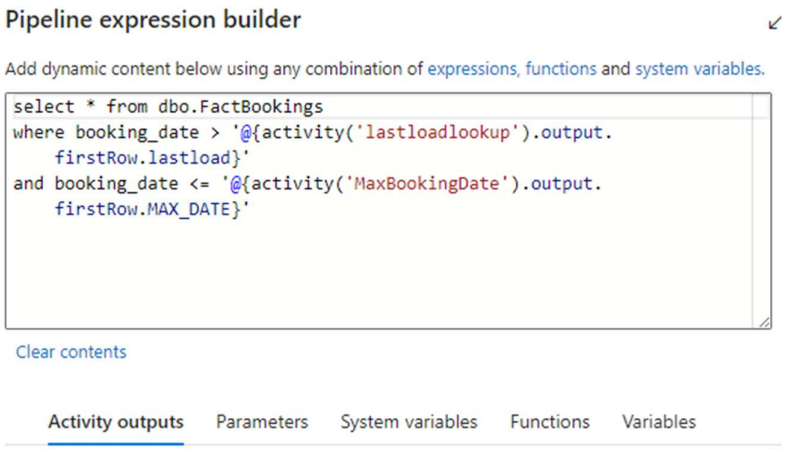


Now we have lastloadlookup, which will give the last date of data load, but we will need the max of booking date so that we know till which date the data is loaded in our last load, so that we can update the value in the json used by the lastloadlookup activity (basically updating last load date basis the most recent booking date in our data), so we create this lookup activity with the following query –

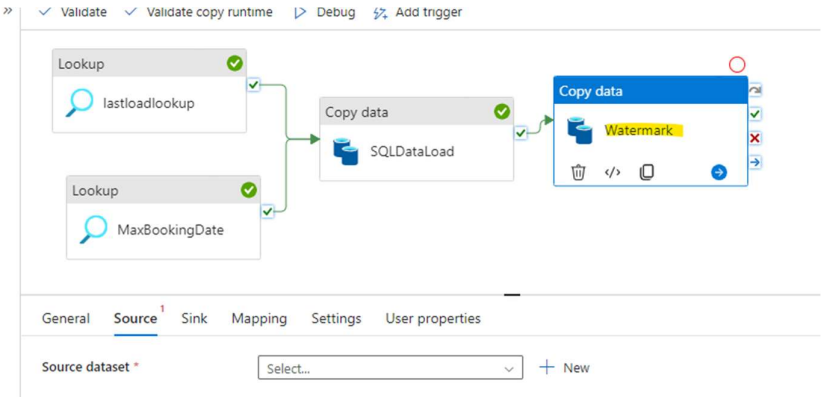


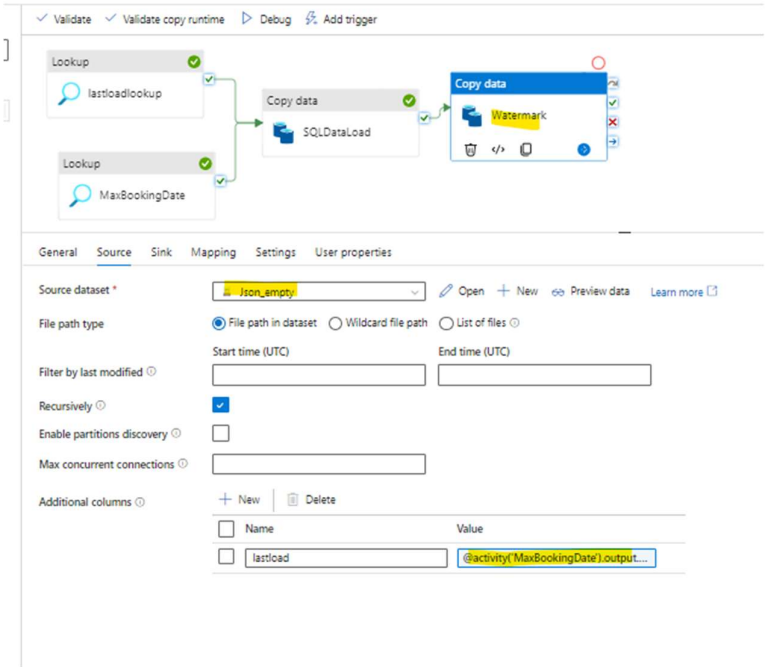


Also, we can update our Copy Activity's query:

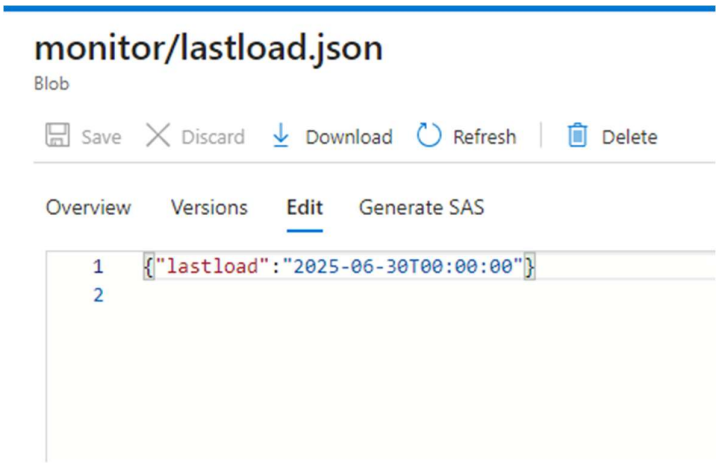


Now we will create another Copy Activity (named Watermark), which will take the output from the MaxBookingDate Activity, and it will replace the lastload. json in our monitor with a JSON file with the same name and value from the output of the MaxBookingDate Activity, thereby updating our last load date. Also, the source of this activity will be an empty.json file which is a JSON file which is empty so that we can add value to it and load it into the Sink.

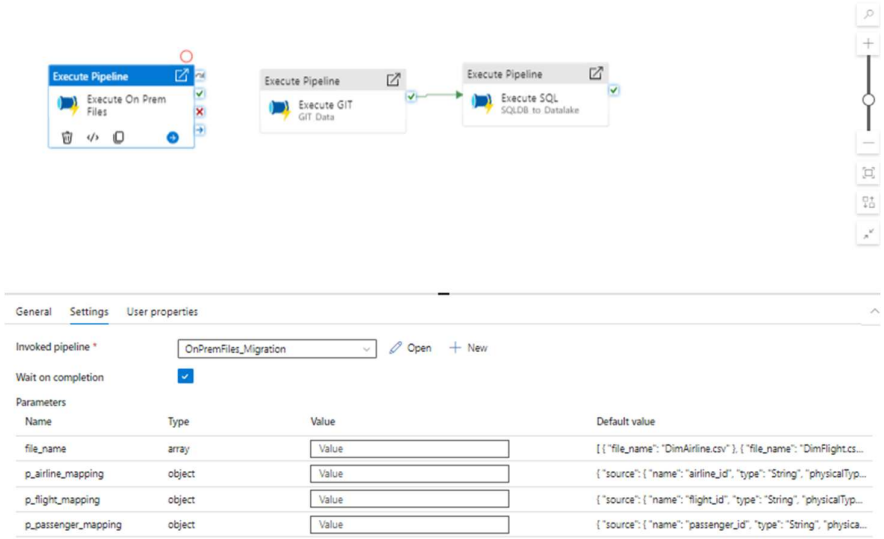




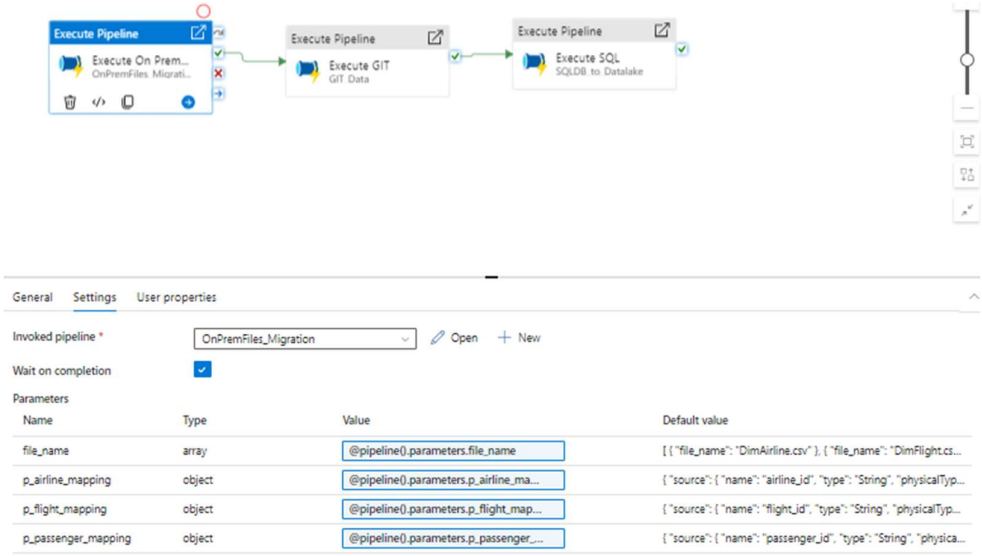
Run the pipeline, and the lastload. json will have the updated date automatically.



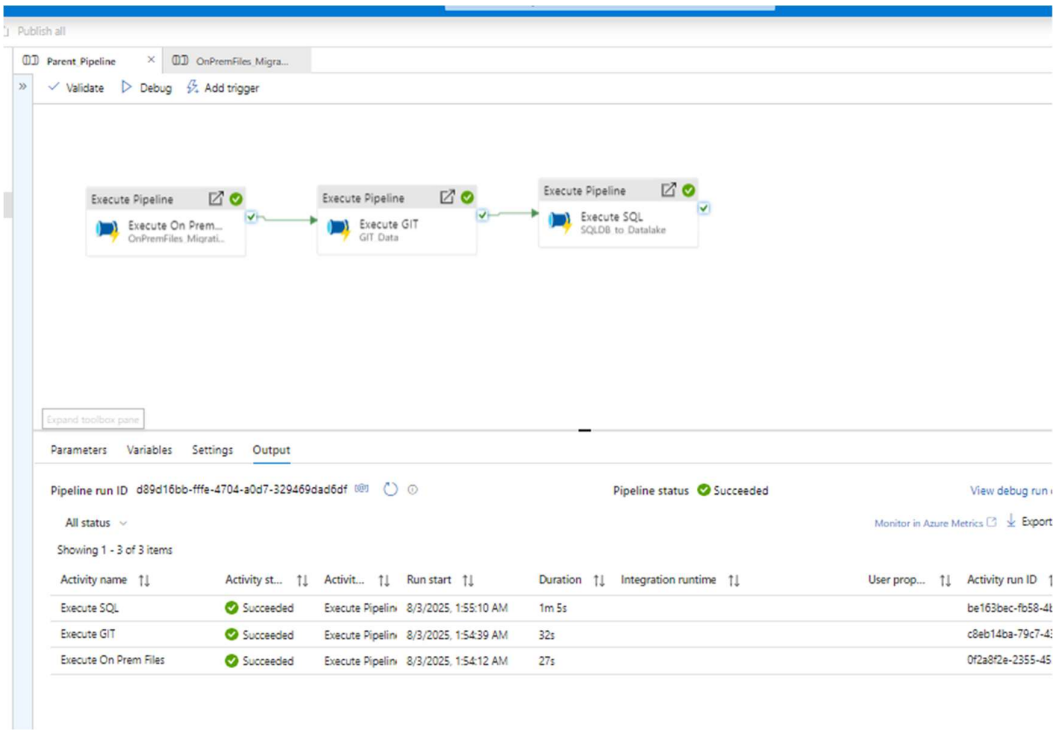
9. Now we will create a parent pipeline for executing these pipelines in our desired order.



Since our OnPremFiles_Migration pipeline is parameterized, we will have to create these parameters with the same default values in our Execute Pipeline for this pipeline, and pass it in the values shown in above screenshot.



Run the pipeline:


Publish all
Parent Pipeline
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Validate
Debug
Add trigger
Execute Pipeline
Execute On Prem...
OnPremFiles Migrati...
Execute Pipeline
Execute GIT
GIT Data
Execute Pipeline
Execute SQL
SQLDB to Datalake
Expand toolbox pane
Parameters
Variables
Settings
Output
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Pipeline status Succeeded
View debug run
All status
Monitor in Azure Metrics
Export
Showing 1 - 3 of 3 items
Activity name
Activity st...
Activit...
Run start
Duration
Integration runtime
User prop...
Activity run ID
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