

Deploy Code For Production

Capstone Step 9

Approach

Created Docker Container Packaging with Scripts to Deploy:

- Azure Data Lake Gen2
- Azure MySQL Database
- Azure Databricks
- Azure Data Factory (ADF)

Exported pipelines from ADF workspace as json configs

Decisions

First Attempted Coordinating Pipelines between Airflow and Azure Data Factory (ADF)

- Connectors from Airflow to ADF were riddled with bugs

Then Attempted with ADF, using Batch jobs for processing data extract scripts:

- Realized spinning up pools/jobs/tasks was overkill complexity for ETL
- I actually did get this fully working before abandoning it entirely
- Moved files to Step8/azurebatch_approach, as this could be considered failed testing

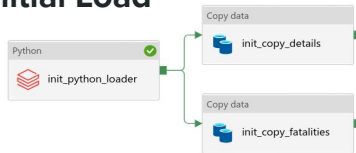
Finally settled on calling scripts using Databricks Python activity in ADF:

- Possibly over-resourced, but future-proofs against later uncertainties

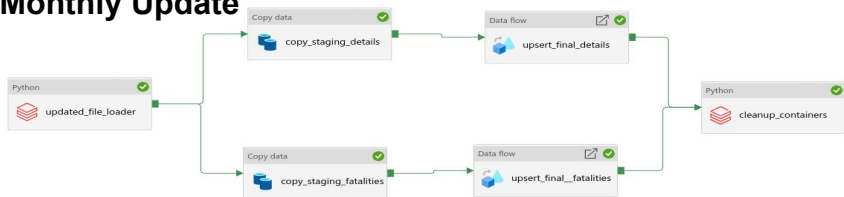
Azure Data Factory

Each pipeline tailored for different use case based on source data release cadence

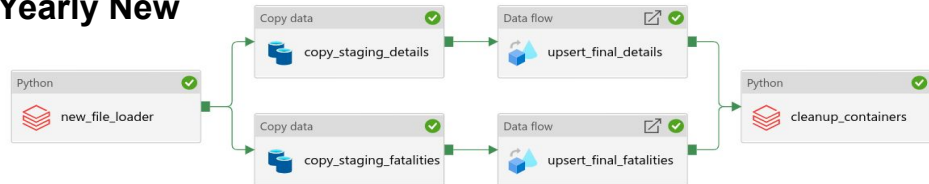
Initial Load



Monthly Update



Yearly New





“Initial Load” Pipeline

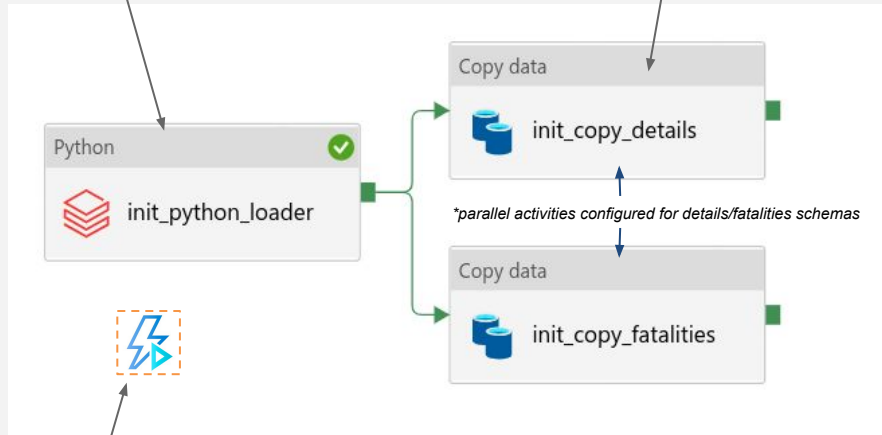
Use Case: All details/fatalities csvgz files (i.e. 1950-Present) from ncei.noaa.gov severe weather data repo (source) require ETL to MySQL (ignores “location” files as columns from that file are all available in some form within columns from “details” file)

Databricks Python Activity:

run: `initial_files_to_blob.py`
extract: all csvgz files on source url
from: source url
to: data lake “allfiles” container

Copy Data Activity

copy: new 2022 csvgz file
from: data lake “newfiles” container
to: mysql staging table



Trigger
Now!



“Monthly Update” Pipeline

Use Case: 15th of each month, ncei.noaa.gov severe weather data repo (source) drops updated csvgz file for current year+month with recent data appended and requiring ETL.

Databricks Python Activity:

run: `updated_file_to_blob.py`

if: source url's 2022 file shows modification since last ETL

then: extract updated 2022 csv.gz file

from: source url

to: data lake “newfiles” container

+ reset fresh staging tables

Copy Data Activity

copy: all data from updated 2022 csvgz file

from: data lake “newfiles” container

to: mysql staging table

Data Flow Activity

insert: only new rows based on primary key

from: mysql staging table

to: mysql final table

Databricks Python Activity

run: `python datalake_housekeeping.py 'U'`

delete old 2022 files

from: “allfiles” container

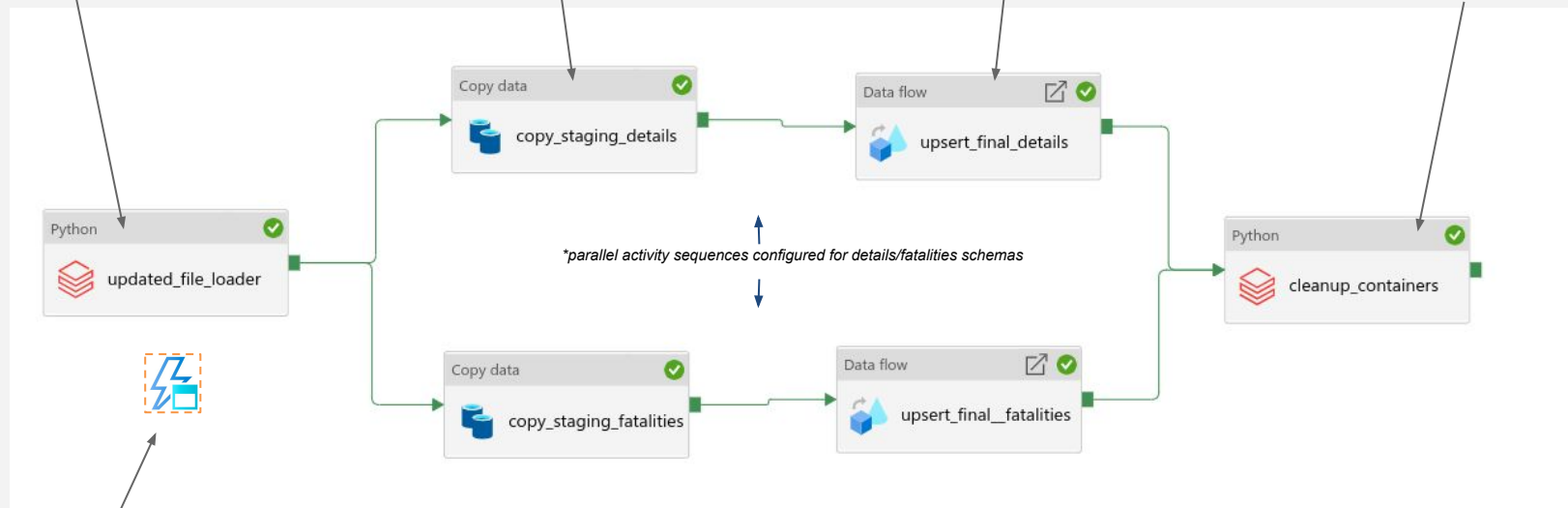
copy updated 2022 files

from: “newfiles” container

to: “allfiles” container

delete updated 2022 files

from: “newfiles” container



Trigger

schedule: @monthly on 16th



“Yearly New” Pipeline

Use Case: April 15th of each year, ncei.noaa.gov severe weather data repo (source) drops new csvgz file with fresh January data of that year requiring ETL.
(it takes 75 days for severe weather event data to be recorded, submitted, and published)

Databricks Python Activity:

run: `new_file_to_blob.py`

if: source url has dropped a new filename for new year

then: extract new csv.gz file

from: source url

to: data lake “newfiles” container
+ reset fresh staging tables

Copy Data Activity

copy: all data from new year csvgz file

from: data lake “newfiles” container

to: mysql staging table

Data Flow Activity

insert: new rows based on primary key (equates to all)

from: mysql staging table

to: mysql final table

Databricks Python Activity

run: `python datalake_housekeeping_new.py 'N'`

delete old 2022 files

from: “allfiles” container

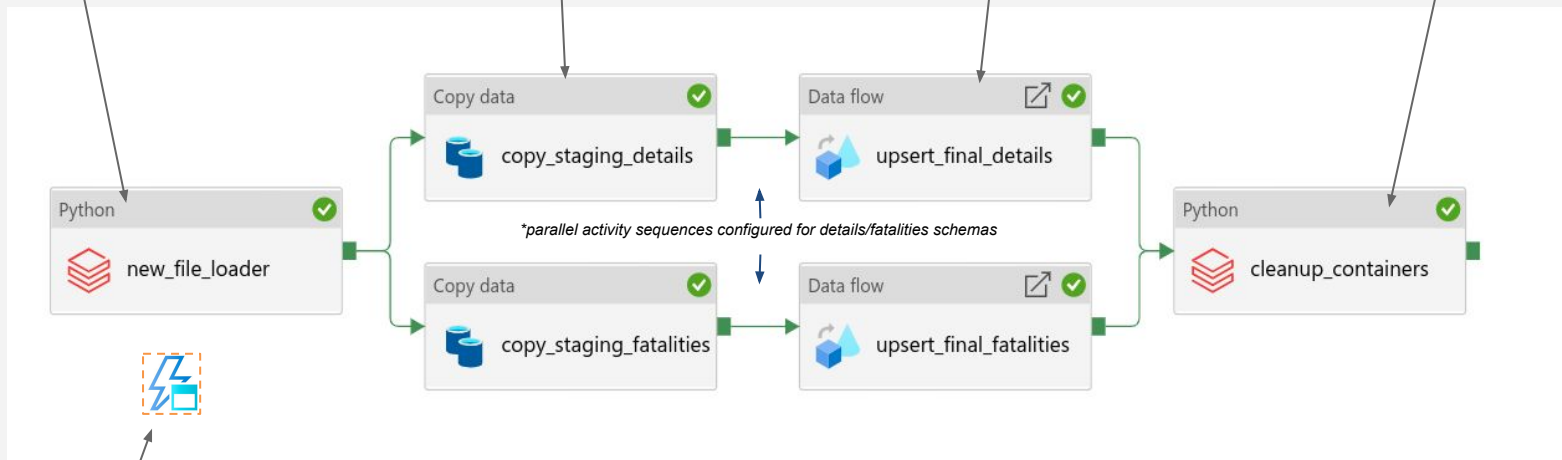
copy new 2022 files

from: “newfiles” container

to: “allfiles” container

delete new 2022 files

from: “newfiles” container



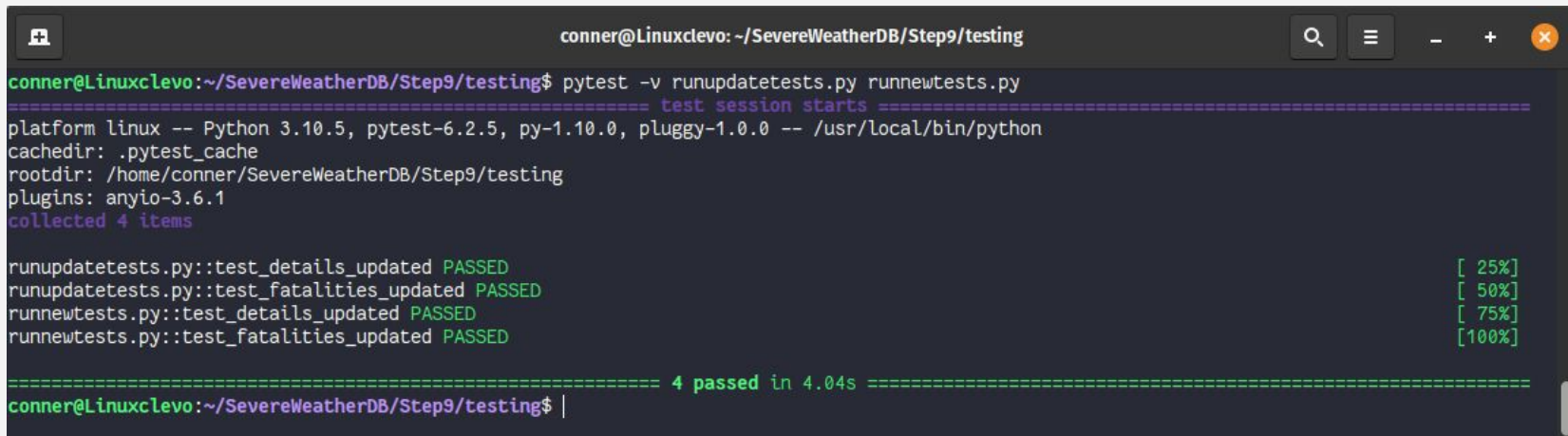
Trigger

schedule: @annually on April 16th

Testing Full Pipelines

I had already vetted the basic ingestion in Step 8 tests

This final deployment added tests for all edge cases and iterative updates



```
conner@Linuxclevo: ~/SevereWeatherDB/Step9/testing
conner@Linuxclevo:~/SevereWeatherDB/Step9/testing$ pytest -v runupdatetests.py runnewtests.py
===== test session starts =====
platform linux -- Python 3.10.5, pytest-6.2.5, py-1.10.0, pluggy-1.0.0 -- /usr/local/bin/python
cachedir: .pytest_cache
rootdir: /home/conner/SevereWeatherDB/Step9/testing
plugins: anyio-3.6.1
collected 4 items

runupdatetests.py::test_details_updated PASSED [ 25%]
runupdatetests.py::test_fatalities_updated PASSED [ 50%]
runnewtests.py::test_details_updated PASSED [ 75%]
runnewtests.py::test_fatalities_updated PASSED [100%]

===== 4 passed in 4.04s =====
conner@Linuxclevo:~/SevereWeatherDB/Step9/testing$ |
```