WEEK 5 : CI/CD Automation with Azure DevOps

Pre-requisites:

Before beginning, ensure:

- You have **SSH Public Key** or **Personal Access Token (PAT)** configured.
- Tools Installed:
    - **Git**
    - **Python 3.x**
    - **VS Code / any IDE**
- Your local project folder contains:
    - Python script for **ELT and alerting**
    - Azure DevOps **YAML pipeline file**

Step 1: Create Python and YAML Files in Local Project

1. Create a Python file (e.g. elt_&_alert.py)
   Example:

```
# elt_energy_alert.py

import pandas as pd


def load_data():
    # Simulate device energy usage data
    data = {
        'device_id': ['AC01', 'WM02', 'FR03'],
        'date': ['2025-07-01'] * 3,
        'kwh_used': [8.5, 12.4, 9.3]
    }
    return pd.DataFrame(data)
```

```
def transform_data(df):
    return df[df['kwh_used'] > 10]


def alert_high_usage(df):
    for _, row in df.iterrows():
        print(f"ALERT: {row['device_id']} used {row['kwh_used']} kWh on {row['date']}!")


def run_elt():
    df = load_data()
    high_usage = transform_data(df)
    alert_high_usage(high_usage)


if __name__ == "__main__":
    run_elt()
```

Create Azure Pipeline YAML (azure-pipelines.yml)

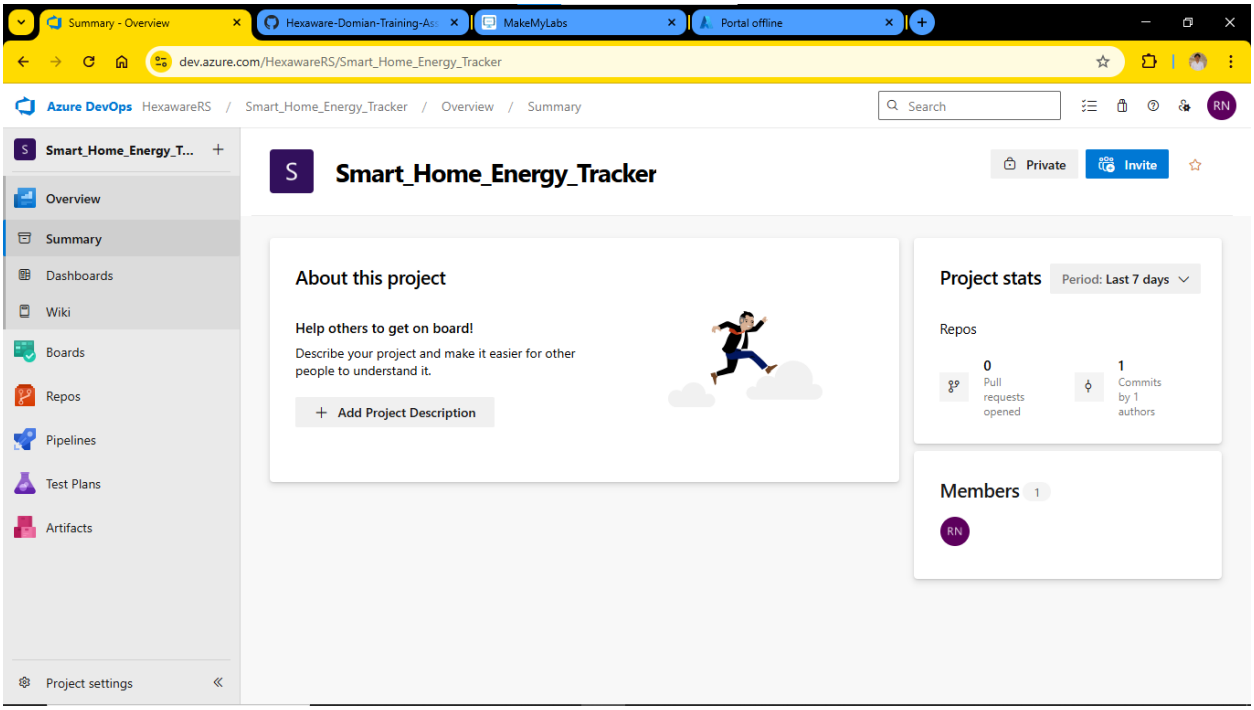
```
trigger:
  - main
pool:
  vmImage: 'ubuntu-latest'


steps:
  - task: UsePythonVersion@0
    inputs:
      versionSpec: '3.x'
```

```
- script: |
    pip install pandas
    python Smart_Home_Energy_Usage_Tracker/
  displayName: 'Successfully Run'
- script: |
    pip install pandas
    python elt_energy_alert.py
  displayName: 'Run ELT + Alert Script'
```

Step 2: Create a New Azure DevOps Project

1. Go to Azure DevOps Portal.
2. Click **New Project** → Provide name and visibility → Click **Create**.
3. Navigate to **Repos** → Click **Clone** → Copy the **SSH** URL.



Step 3: Push Local Project to Azure Repo via SSH

Open **Command Prompt / Git Bash**, then run the following:

Go to the directory where your local project exists

cd path\to\your\project-folder

Initialize git repository

git init

Add files to git

git add .

Commit the files

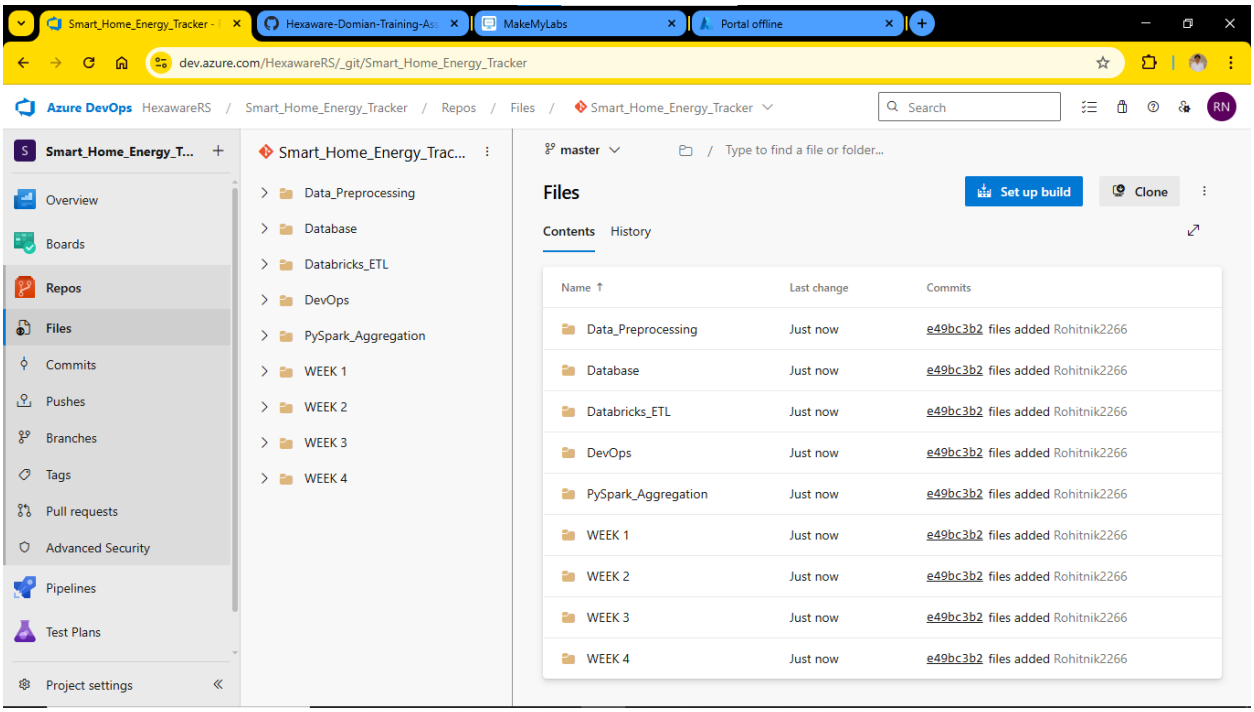
git commit -m "Initial commit"

Add Azure DevOps repo as remote (replace with your SSH link)

git remote add origin git@ssh.dev.azure.com:v3/YourOrg/YourProject/YourRepo

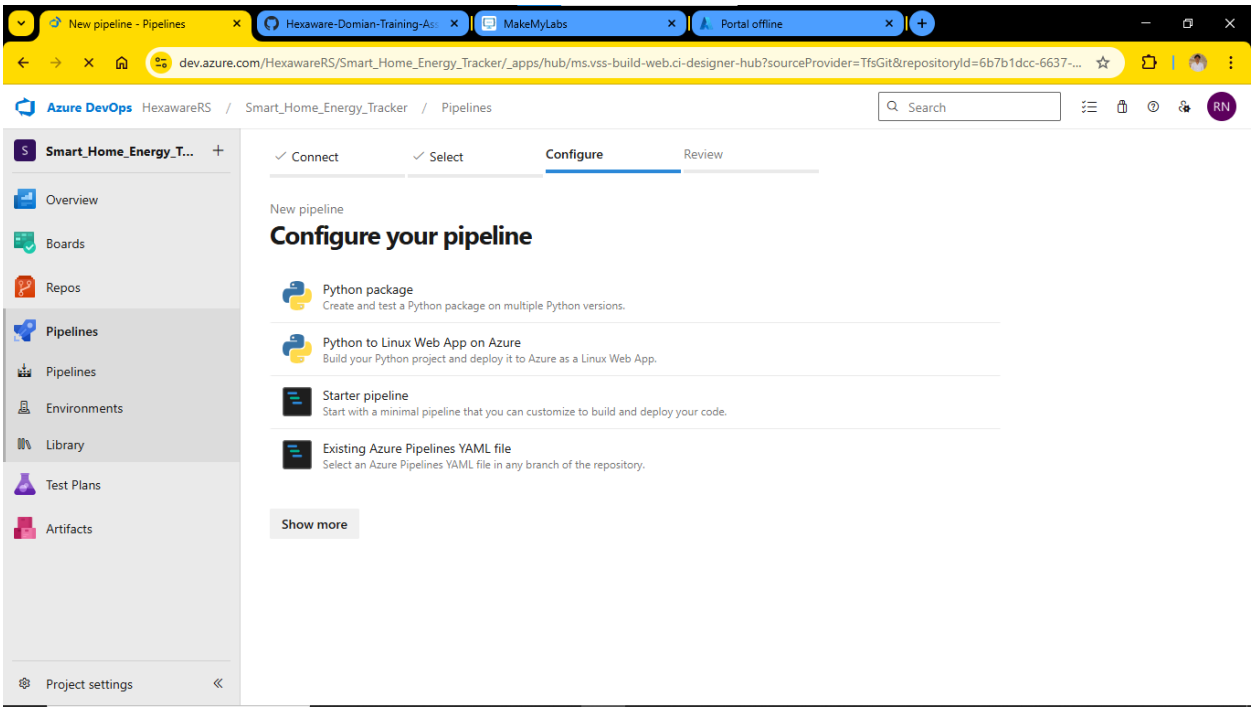
Push the code to Azure repo

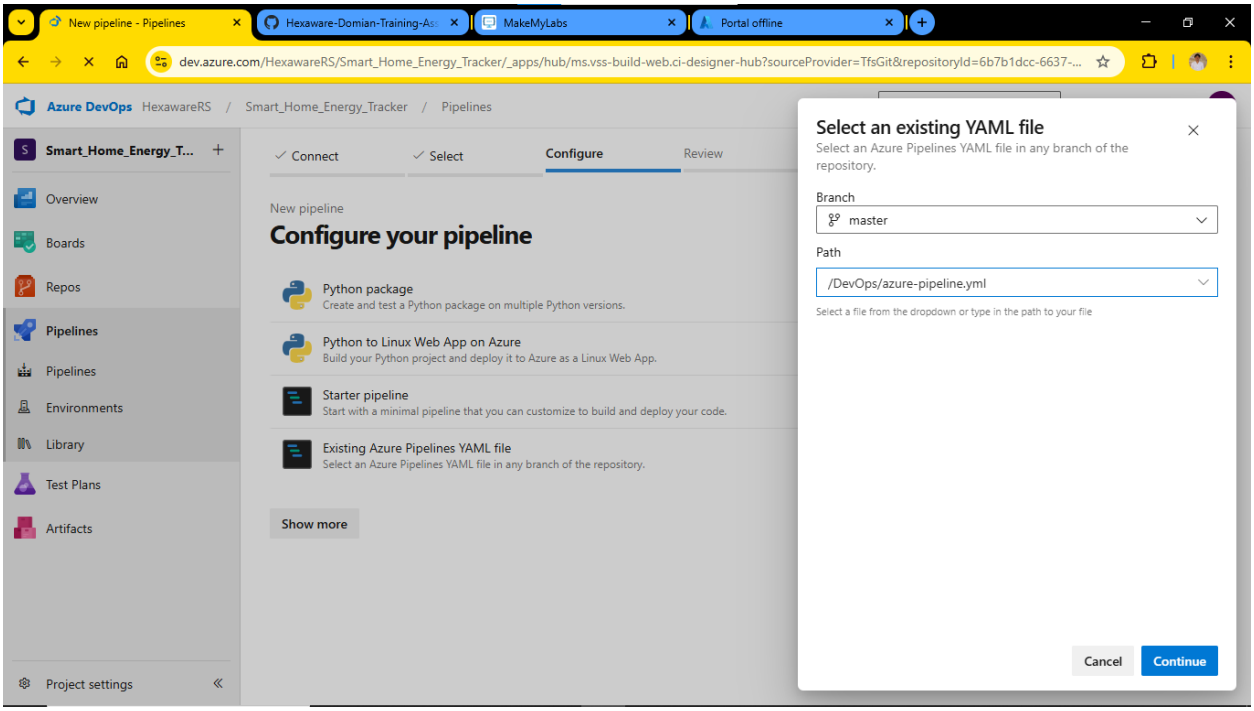
git push -u origin main



Step 4: Configure and Run the Azure Pipeline

1. Go back to your Azure DevOps project.
2. Navigate to **Pipelines** → Click **Create Pipeline**.
3. Choose:
    - **Code in Azure Repos Git**
    - Select your repository
    - Choose **"Existing Azure Pipelines YAML file"**
4. Select:
    - **Branch:** main
    - **Path:** /DevOps/azure-pipelines.yml
5. Click **Continue**, then **Run** the pipeline.




New pipeline - Pipelines
Hexaware-Domian-Training-As
MakeMyLabs
Portal offline
dev.azure.com/HexawareRS/Smart_Home_Energy_Tracker/_apps/hub/ms.vss-build-web.ci-designer-hub?sourceProvider=TfsGit&repositoryId=6b7b1dcc-6637-...
Azure DevOps HexawareRS / Smart_Home_Energy_Tracker / Pipelines
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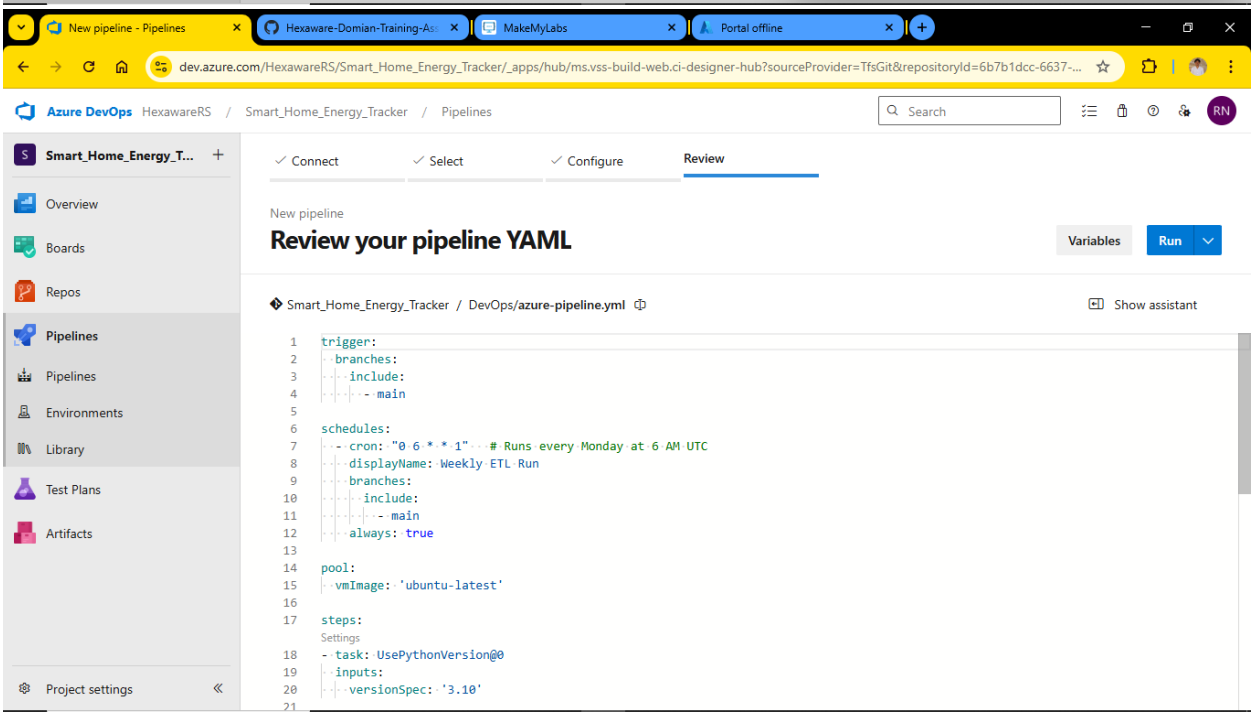
Overview
Boards
Repos
Pipelines
Pipelines
Environments
Library
Test Plans
Artifacts
Project settings
Connect
Select
Configure
Review
New pipeline
Configure your pipeline
Python package
Create and test a Python package on multiple Python versions.
Python to Linux Web App on Azure
Build your Python project and deploy it to Azure as a Linux Web App.
Starter pipeline
Start with a minimal pipeline that you can customize to build and deploy your code.
Existing Azure Pipelines YAML file
Select an Azure Pipelines YAML file in any branch of the repository.
Show more
Select an existing YAML file
Select an Azure Pipelines YAML file in any branch of the repository.
Branch
master
Path
/DevOps/azure-pipeline.yml
Select a file from the dropdown or type in the path to your file
Cancel
Continue


New pipeline - Pipelines
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MakeMyLabs
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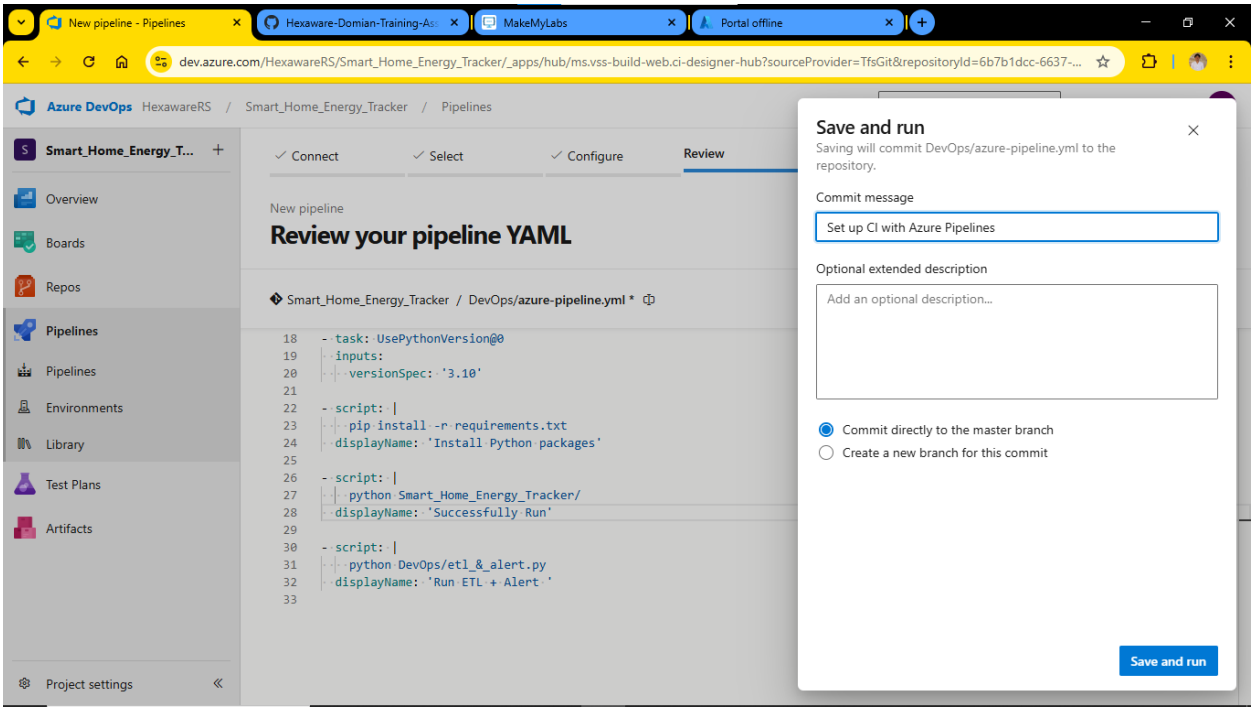
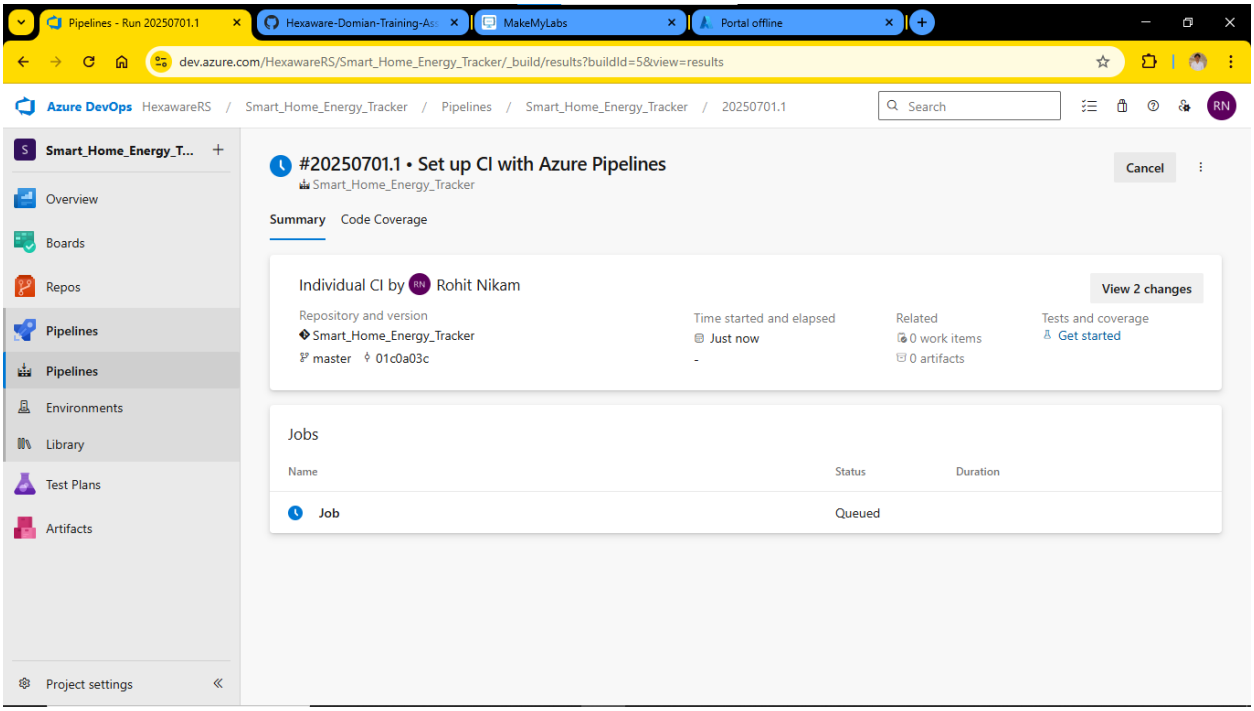
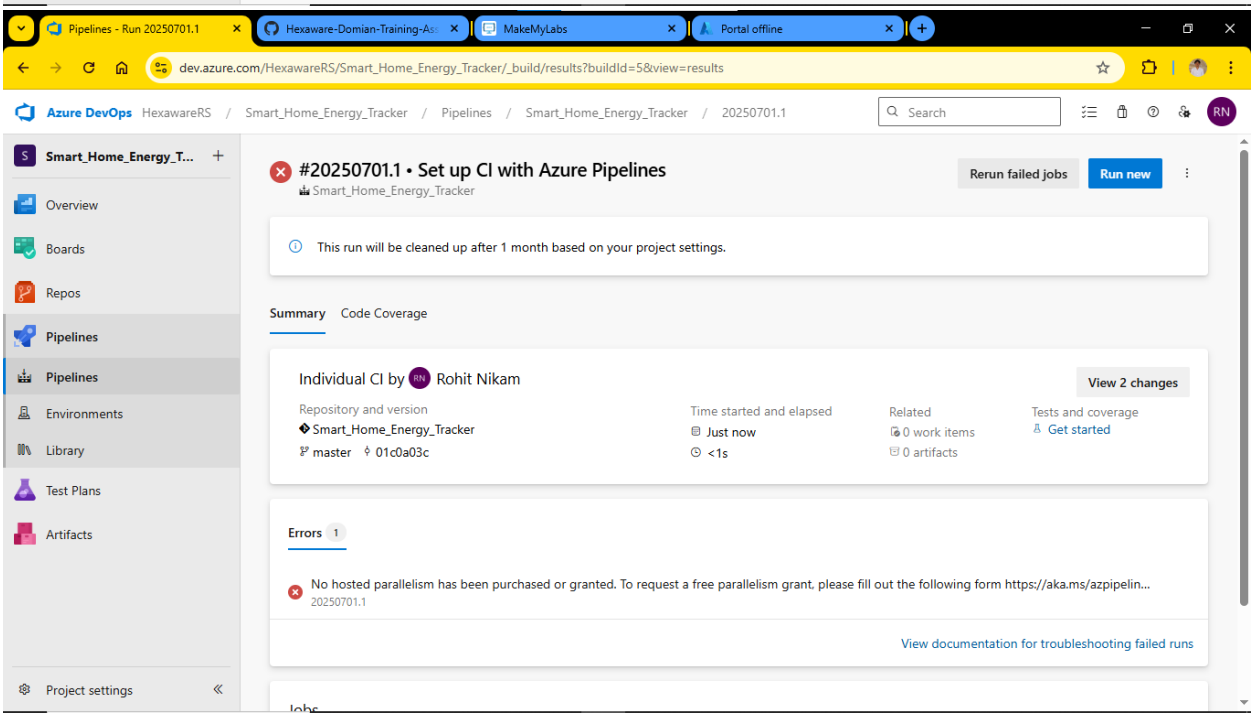
dev.azure.com/HexawareRS/Smart_Home_Energy_Tracker/_apps/hub/ms.vss-build-web.ci-designer-hub?sourceProvider=TfsGit&repositoryId=6b7b1dcc-6637-...
Azure DevOps HexawareRS / Smart_Home_Energy_Tracker / Pipelines
Search
RN
Smart_Home_Energy_T...
Overview
Boards
Repos
Pipelines
Pipelines
Environments
Library
Test Plans
Artifacts
Project settings
Connect
Select
Configure
Review
New pipeline
Review your pipeline YAML
Variables
Run
Smart_Home_Energy_Tracker / DevOps/azure-pipeline.yml
Show assistant
trigger:
branches:
include:
- main
schedules:
- cron: "0 6 * * 1" # Runs every Monday at 6 AM UTC
displayName: Weekly ETL Run
branches:
include:
- main
always: true
pool:
vmImage: 'ubuntu-latest'
steps:
Settings
- task: UsePythonVersion@0
inputs:
versionSpec: '3.10'



✅ Final Output

- The pipeline will run automatically.
- It will set up the environment, run your all file and alert.py, and display output in logs.
- If everything is set correctly, you'll see **“Successfully Run” and “Run ETL + Alert”** message.


Pipelines - Run 20250701.1
Hexaware-Domian-Training-As
MakeMyLabs
Portal offline
dev.azure.com/HexawareRS/Smart_Home_Energy_Tracker/_build/results?buildId=5&view=results
Azure DevOps HexawareRS / Smart_Home_Energy_Tracker / Pipelines / Smart_Home_Energy_Tracker / 20250701.1
Search
RN
Smart_Home_Energy_T...
Overview
Boards
Repos
Pipelines
Pipelines
Environments
Library
Test Plans
Artifacts
Project settings
#20250701.1 • Set up CI with Azure Pipelines
Smart_Home_Energy_Tracker
Cancel
Summary
Code Coverage
Individual CI by RN Rohit Nikam
View 2 changes
Repository and version
Smart_Home_Energy_Tracker
master 01c0a03c
Time started and elapsed
Just now
-
Related
0 work items
0 artifacts
Tests and coverage
Get started
Jobs
Name
Status
Duration
Job
Queued


Pipelines - Run 20250701.1
Hexaware-Domian-Training-As
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Portal offline
dev.azure.com/HexawareRS/Smart_Home_Energy_Tracker/_build/results?buildId=5&view=results
Azure DevOps HexawareRS / Smart_Home_Energy_Tracker / Pipelines / Smart_Home_Energy_Tracker / 20250701.1
Search
RN
Smart_Home_Energy_T...
Overview
Boards
Repos
Pipelines
Pipelines
Environments
Library
Test Plans
Artifacts
Project settings
#20250701.1 • Set up CI with Azure Pipelines
Smart_Home_Energy_Tracker
Rerun failed jobs
Run new
This run will be cleaned up after 1 month based on your project settings.
Summary
Code Coverage
Individual CI by RN Rohit Nikam
View 2 changes
Repository and version
Smart_Home_Energy_Tracker
master 01c0a03c
Time started and elapsed
Just now
<1s
Related
0 work items
0 artifacts
Tests and coverage
Get started
Errors 1
No hosted parallelism has been purchased or granted. To request a free parallelism grant, please fill out the following form https://aka.ms/azpipelin...
20250701.1
View documentation for troubleshooting failed runs
Jobs