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BATCH : DATA ENGINEERING

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Azure DevOps CODING CHALLENGE

QUESTIONS:

- 1) Create Azure DevOps Environment and configure Azure DevOps Git Repository, configure on your local git to implement this upload few test files on the same.
- 2) Leverage the practices of CI/CD Using Azure Data Engineering and explain the architecture of the Azure Synapse.

ANSWERS:

1) AZURE REPOS:

Azure Repos is a version control system that is part of Microsoft's Azure DevOps service family. This service is used to manage source code in software development projects. Azure Repos supports team-based software development processes, providing developers with a platform to collaborate, track code changes, and manage version history.

—> For configuring Azure DevOps Git Repository, the Git Push Command is used. The git push command uploads content from a local repository to a remote repository. Pushing refers to the process of moving commits from one repository to another.

IMPLEMENTATION:

i) firstly login the azure portal and search for azure devops organizations and then click on my azure devops organizations.

The screenshot shows the Microsoft Azure portal interface. The search bar at the top contains the text "azure de". A dropdown menu is visible, showing search results for "Azure DevOps organizations". The results are categorized into Services, Dev centers, Projects, and Marketplace. The "Services" category is selected, showing "Azure DevOps organizations" as the top result. The "Dev centers" category shows "Keywords: Azure Deployment Environments". The "Projects" category shows "Keywords: Azure Deployment Environments". The "Marketplace" category shows "Project", "OpsHub Integration Manager - Integrate Azure DevOps with Jira, Rally, IBM...", "Dev center", and "Build Agents for Azure DevOps".

Below the search results, the "Azure DevOps" section is visible. It includes the heading "Azure DevOps" and the text "Plan smarter, collaborate better, and ship faster with a set of modern dev services". There is also a link to "My Azure DevOps Organizations" and a link to "Get started using Azure DevOps Billing management for Azure DevOps".

The bottom of the screenshot shows the Windows taskbar with the time 4:23 PM and date 2024-02-28.

ii) Create a new project in Azure DevOps.

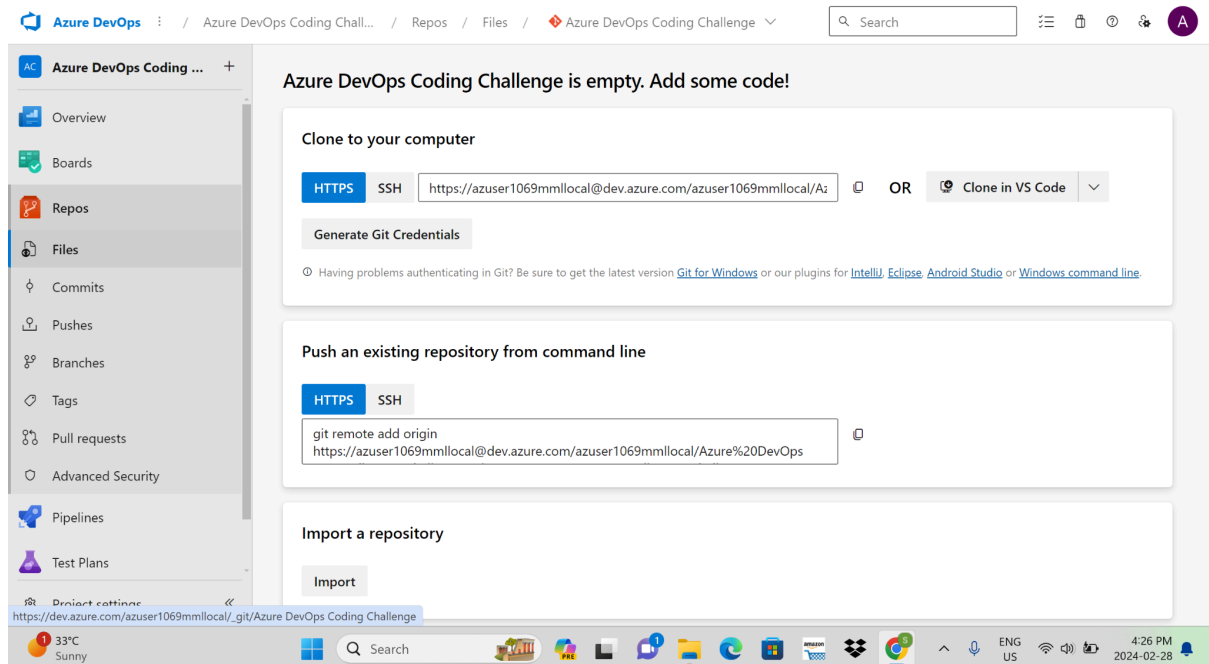
The screenshot displays the Azure DevOps web interface. On the left, the user profile for 'azuser1069_mml.local' is visible, including their email and location (India). The main area shows the 'Azure DevOps Organizations' page for 'dev.azure.com/azuser1069mmllocal'. A 'Create new organization' button is at the top right. Below, the 'Projects' section lists '1069 AZURE PROJECT -1' with an 'Open in Visual Studio' action. A 'New project' link is also present.

The 'Create new project' dialog box is open, showing the following fields and options:

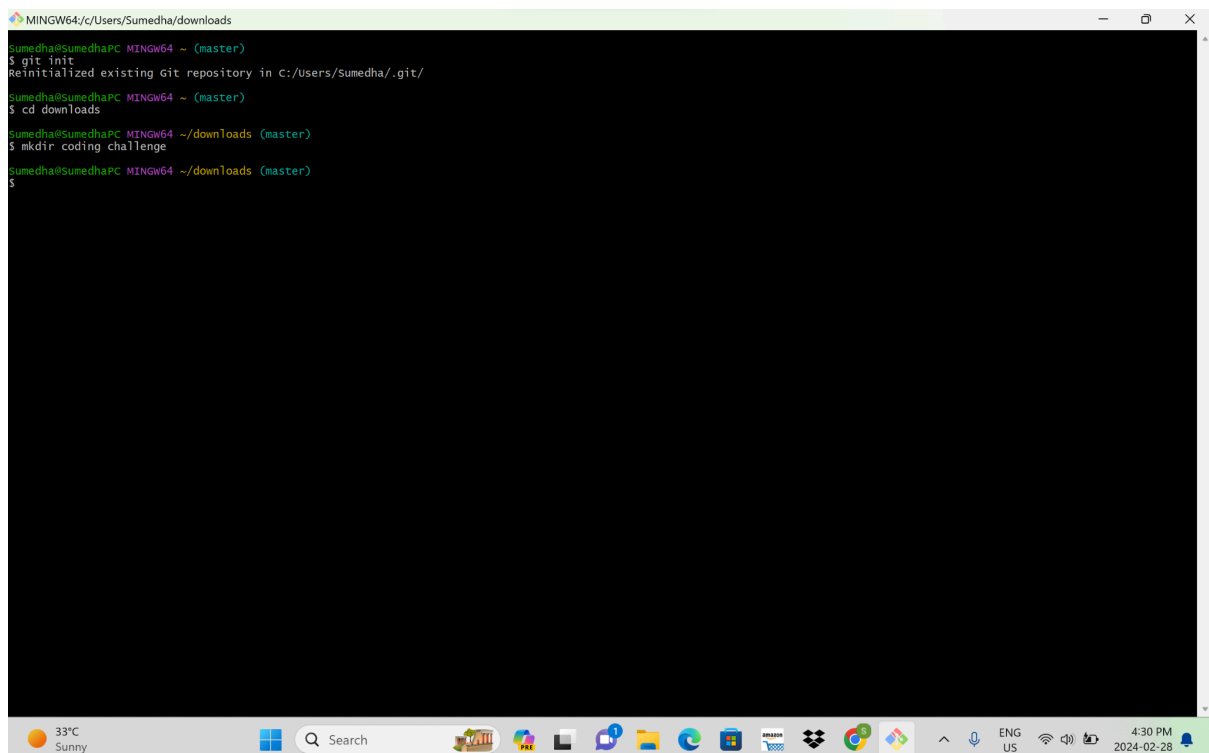
- Project name:** Azure DevOps Coding Challenge
- Description:** (Empty text box)
- Visibility:** The 'Private' option is selected, indicating that only people with access can view the project.
- Advanced:** A dropdown menu is visible, currently showing 'Advanced'.
- Buttons:** 'Cancel' and 'Create' buttons are at the bottom right.

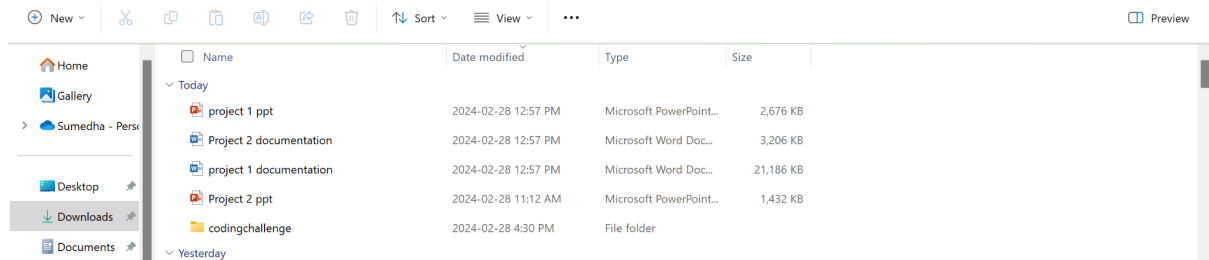
The background interface shows the 'azuser1069mmllocal' organization page with tabs for 'Projects', 'My work items', and 'My pull requests'. The 'Projects' tab is active, showing the '1069 AZURE PROJECT -1'.

iii) Now Inside project navigate to Repos and create a new Git repository.



iv) Now open Git on your local machine and clone the Azure DevOps repository to your local environment.
→for that we need to first create a folder in our local





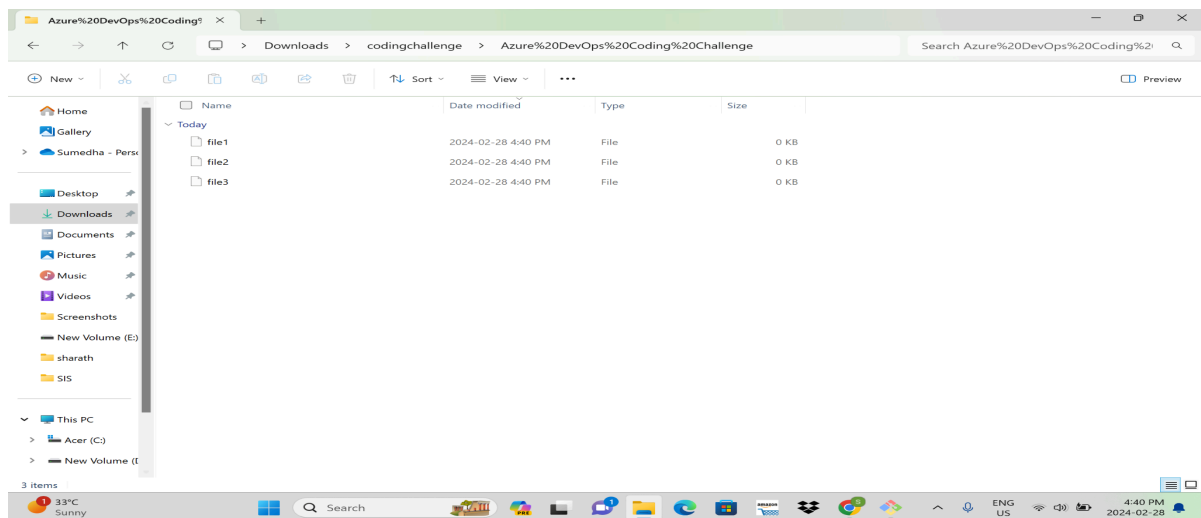
v) Then we need to clone the azure repository into that folder by git clone "that repository path".

```
Sumedha@SumedhaPC MINGW64 ~/downloads/codingchallenge (master)
$ git clone https://azuser1069mmllocal@dev.azure.com/azuser1069mmllocal/Azure%20DevOps%20coding%20challenge/_git/Azure%20DevOps%20coding%20challenge
Cloning into 'Azure%20DevOps%20coding%20challenge'...
warning: you appear to have cloned an empty repository.
Sumedha@SumedhaPC MINGW64 ~/downloads/codingchallenge (master)
$
```

vi) Then we need to add the file into those repository in the local by git touch file will be created in local and by git add.. Files will added

```
Sumedha@SumedhaPC MINGW64 ~/downloads/codingchallenge (master)
$ cd Azure%20DevOps%20coding%20challenge/
Sumedha@SumedhaPC MINGW64 ~/downloads/codingchallenge/Azure%20DevOps%20coding%20challenge (master)
$ touch file1 file2 file3
Sumedha@SumedhaPC MINGW64 ~/downloads/codingchallenge/Azure%20DevOps%20coding%20challenge (master)
$ git add .
Sumedha@SumedhaPC MINGW64 ~/downloads/codingchallenge/Azure%20DevOps%20coding%20challenge (master)
$ git commit -m "codingchallenge"
[master (root-commit) b3ccc89] codingchallenge
3 files changed, 0 insertions(+), 0 deletions(-)
create mode 100644 file1
create mode 100644 file2
create mode 100644 file3
Sumedha@SumedhaPC MINGW64 ~/downloads/codingchallenge/Azure%20DevOps%20coding%20challenge (master)
$
```

After adding the file in the local :



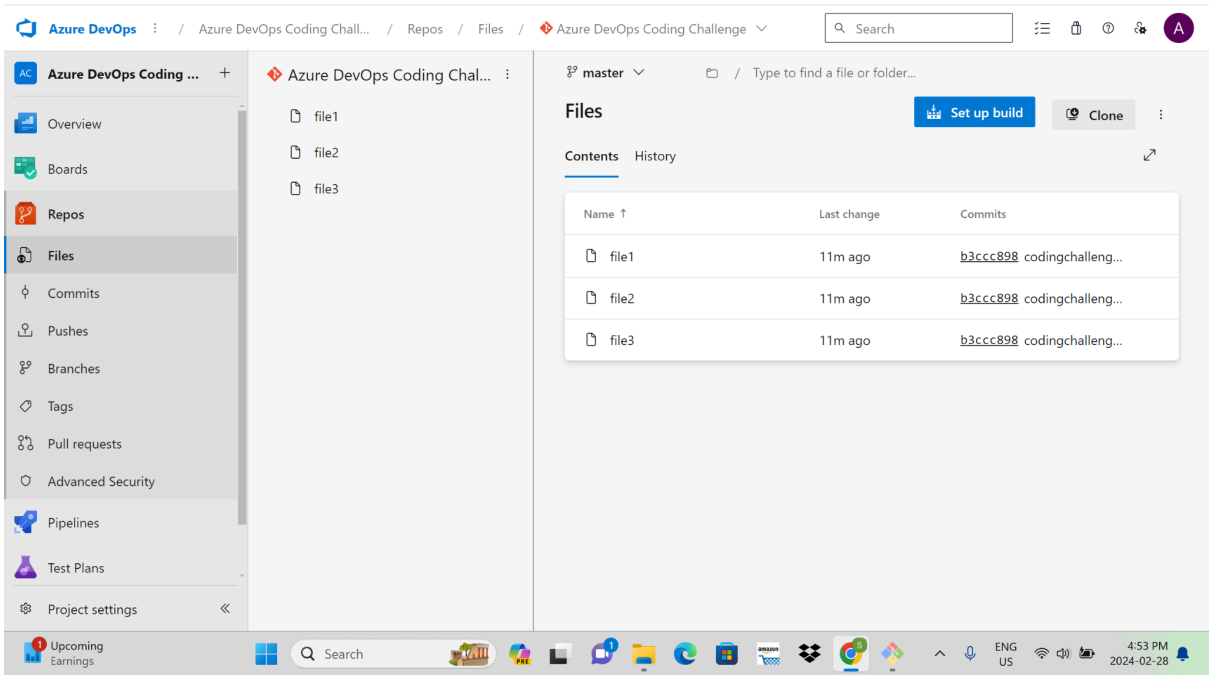
vii) Then we need to write the command to go to the azure project .
viii)Then we need to push the files into the repository from the local by “git push”.

```
sumedha@sumedhaPC MINGW64 ~/downloads/codingchallenge (master)
$ cd Azure%20DevOps%20Coding%20Challenge/

sumedha@sumedhaPC MINGW64 ~/downloads/codingchallenge/Azure%20DevOps%20Coding%20Challenge (master)
$ git push -u origin --all
Enumerating objects: 3, done.
Counting objects: 100% (3/3), done.
Delta compression using up to 8 threads
Compressing objects: 100% (2/2), done.
Writing objects: 100% (3/3), 215 bytes | 215.00 KiB/s, done.
Total 3 (delta 0), reused 0 (delta 0), pack-reused 0
remote: Analyzing objects... (3/3) (4 ms)
remote: Validating commits... (1/1) done (0 ms)
remote: Storing packfile... done (83 ms)
remote: Storing index... done (50 ms)
To https://dev.azure.com/azuser1069mm1/local/Azure%20DevOps%20coding%20challenge/_git/Azure%20DevOps%20coding%20challenge
 * [new branch] master -> master
branch 'master' set up to track 'origin/master'.

sumedha@sumedhaPC MINGW64 ~/downloads/codingchallenge/Azure%20DevOps%20Coding%20Challenge (master)
$ |
```

ix)Thereby all the files have been pushed from the local to the azure repository .



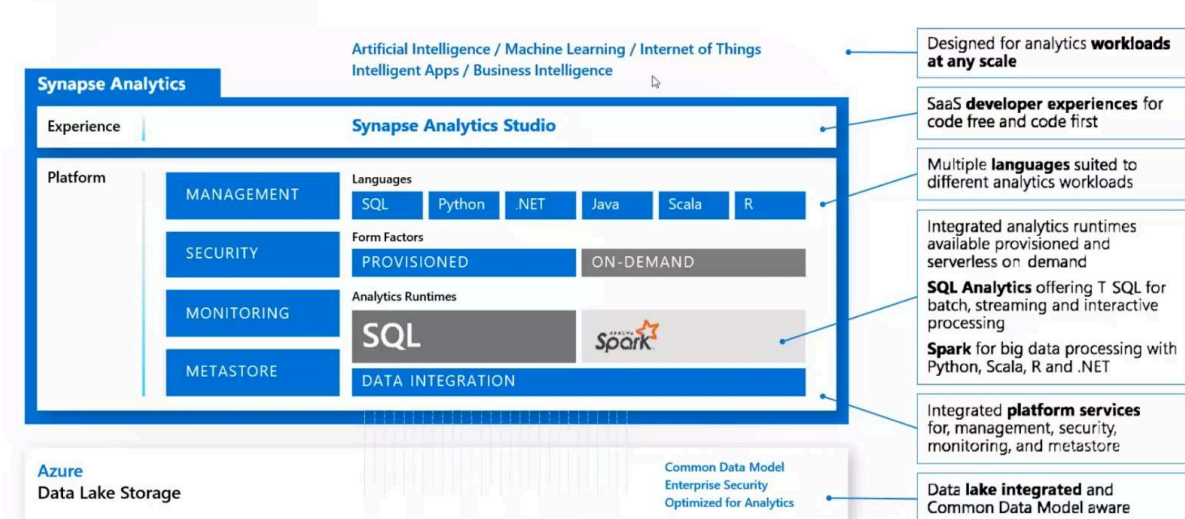
2)CI/CD PIPELINE:

Continuous Integration and Continuous Deployment (CI/CD) pipelines automate steps in software delivery, reducing errors and ensuring consistent releases. Automation spans development, testing, production, and monitoring phases, improving code quality, speed, and security. Manual execution is possible, but true value arises from automation.

AZURE SYNAPSE ARCHITECTURE:

Azure Synapse Analytics

Integrated data platform for BI, AI and continuous intelligence



Azure Synapse Analytics integrates data warehousing and Big Data analytics on a single cloud platform. Its architecture involves key components:

i)Integration Layer:

—>**SQL Pools:** Processes structured data with optimized analytics.

—>**Apache Spark Pools:** Uses Spark for big data analytics and machine learning.

—>**Data Lake Storage:** Integrates with Azure Data Lake Storage for flexible data storage.

ii)Data Ingestion and Integration:

—>**Azure Data Factory:** Orchestrates data pipelines for ingestion and transformation.

—>**Mapping Data Flows:** Enables visual design and execution of data transformation logic.

iii)Query Optimization:

—>**Query Processing Engine:** Executes SQL queries efficiently across the MPP architecture.

—>**Query Distribution:** Dynamically distributed query execution tasks, optimizing resource utilization.

iv)Security and Governance:

—>**Azure Active Directory Integration:** Manages identity and access control.

—>**Data Encryption:** Secures data at rest and in transit with industry-standard encryption.

—>**Auditing and Monitoring:** Tracks user activities, query performance, and system health.

iv)Data Visualization and Reporting:

—>**Power BI Integration:** Seamlessly connects with Power BI for creating interactive dashboards and reports.