



Database Deployment Automation Using Database Project & Azure DevOps

Olivier Van Steenlandt

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#DataSatMadrid

Database Deployment Automation Using Database Projects & Azure DevOps

Olivier Van Steenlandt



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Platinum



Gold



Silver



Gracias a todos los Sponsors y Colaboraores

Quiz Final + Premios + Networking (18:30h)

Quédate al divertido Quiz
para participar en el
Sorteo
(sólo entre asistentes)

Y más ...!



About me

Olivier Van Steenlandt



Datawarehousing & Reporting Teamlead



Core Member @ dataMinds.be



Speaking / Blogging



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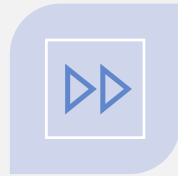
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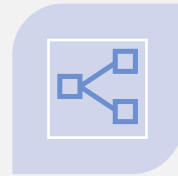
Schedule



Current
Situation



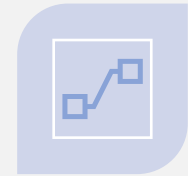
Moving
forward



Branching



Demo



Summary

Current Situation



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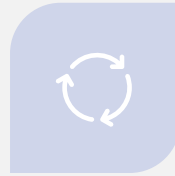
Current Situation

Environments



Development
(Acceptance)
Production

Process



Manual
Deployments

Tools



Database Project
Azure DevOps

Database Projects



Visual Studio



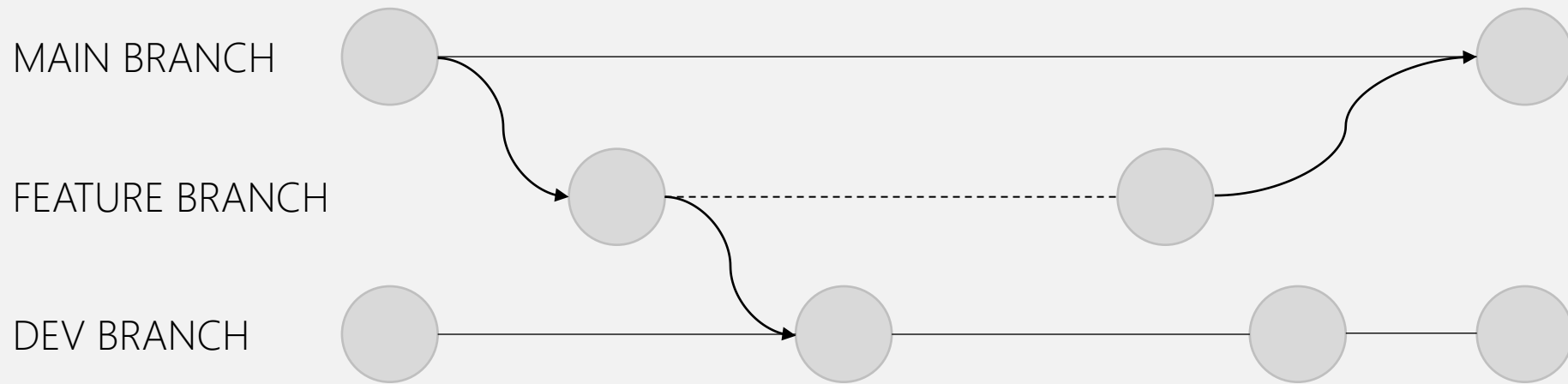
Visual Studio
Code



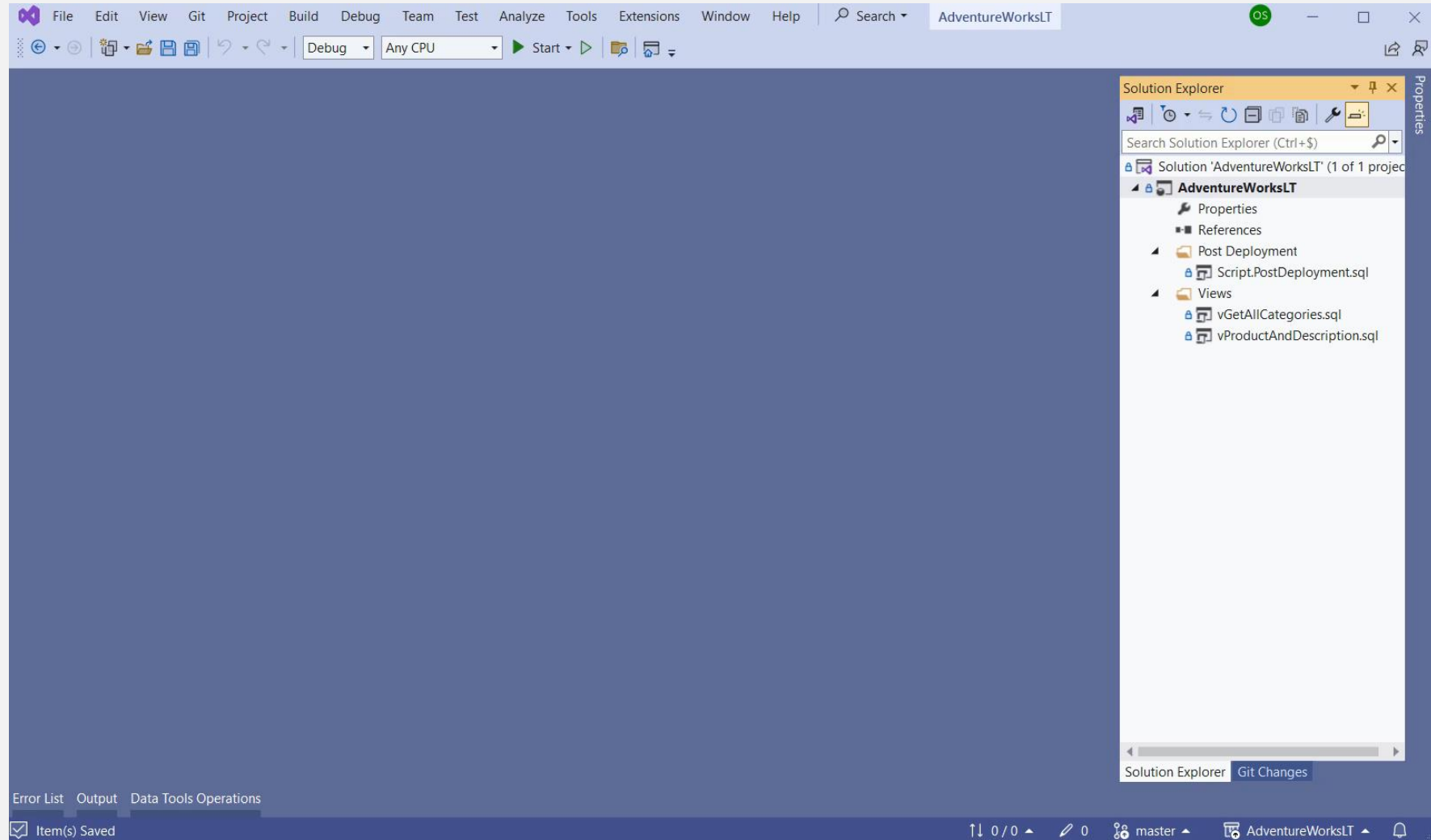
Azure Data
Studio

Branching Strategies

Feature Branching



Development



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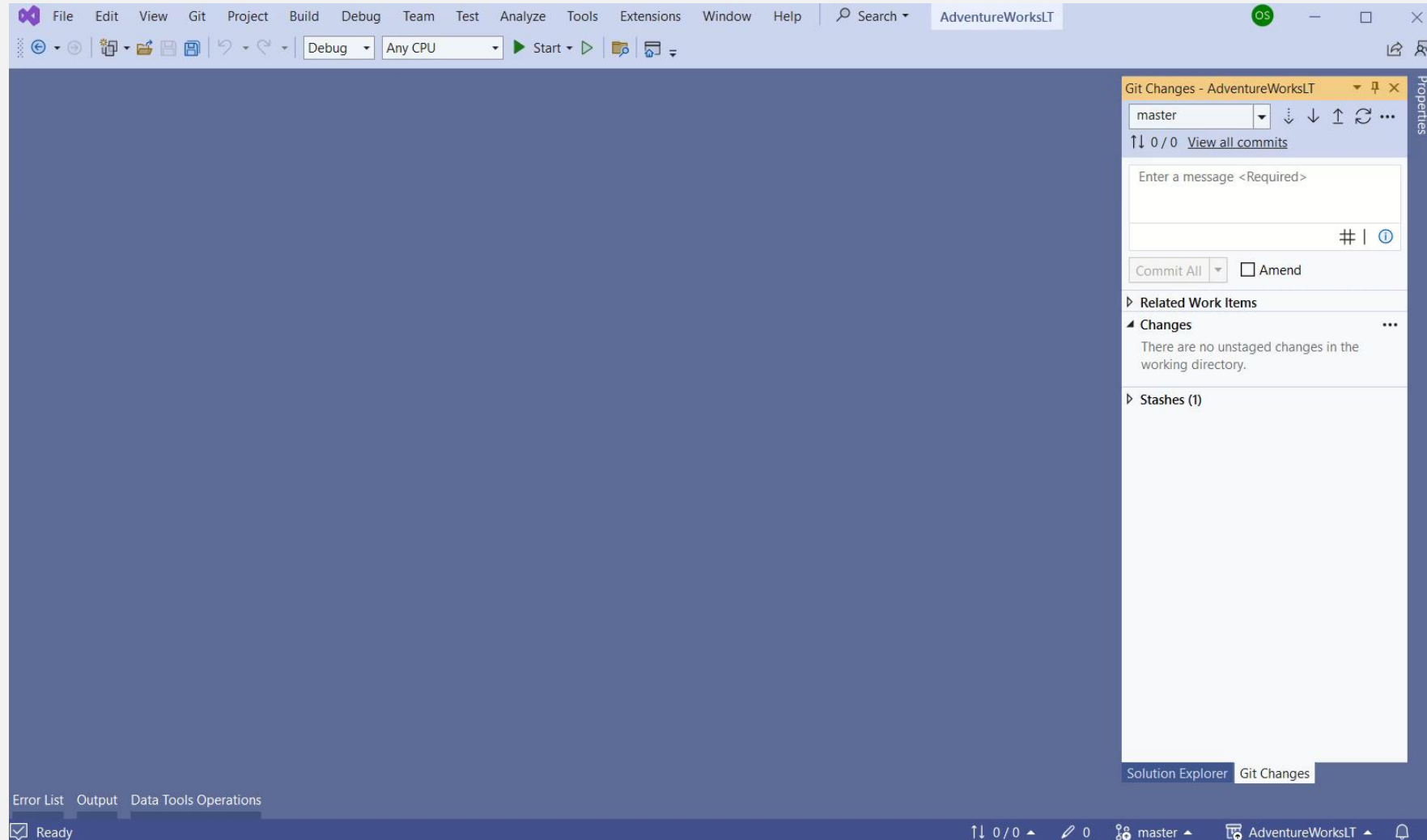
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Manual Deployments



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Moving Forward



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Deployment automation - why?

Less manual work

Time-saving

Less room for mistakes/misconfiguration



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Mistakes?

Wrong Target Database

Deploy to PRD by accident

Publish Settings

Dropped all indexes

→ Publishing Profiles!



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Azure DevOps

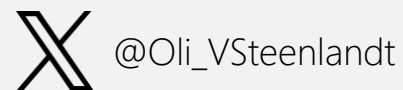
Repos

Pipelines

(Test Plans)

(Artifacts)

(Boards)



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Azure DevOps - Pipelines

CI/CD component

→ GUI

→ YAML



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YAML

Set of instructions

Manage pipelines as code

Indent sensitive



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Deployment Automation

On-Prem

Self-Hosted Agent

[Blogpost: Install a Azure DevOps Agent](#)

Cloud

Hosted Agent



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Deployment Automation

Azure SQL

- > Azure SQL Database deployment task (built-in)

- > Command line

SQL Server

- > SQL Server database deploy task (built-in)

- > Command line

Deployment Automation

DacFx

API Library

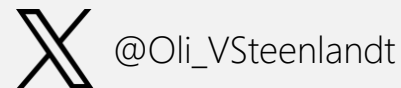
SqlPackage

CLI for DacFx

Database development &
Deployment Automation

.dacpac / .bacpac

Available for: SQL Server, Azure SQL, Azure SQL MI, Azure Synapse Analytics, Microsoft Fabric



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Branching



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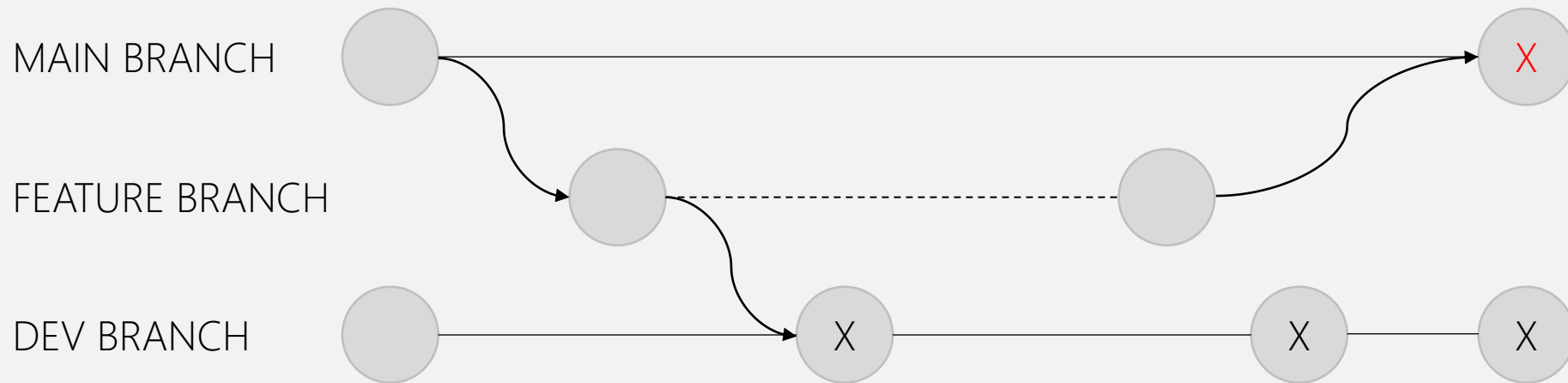


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Branching Strategy

Feature Branching

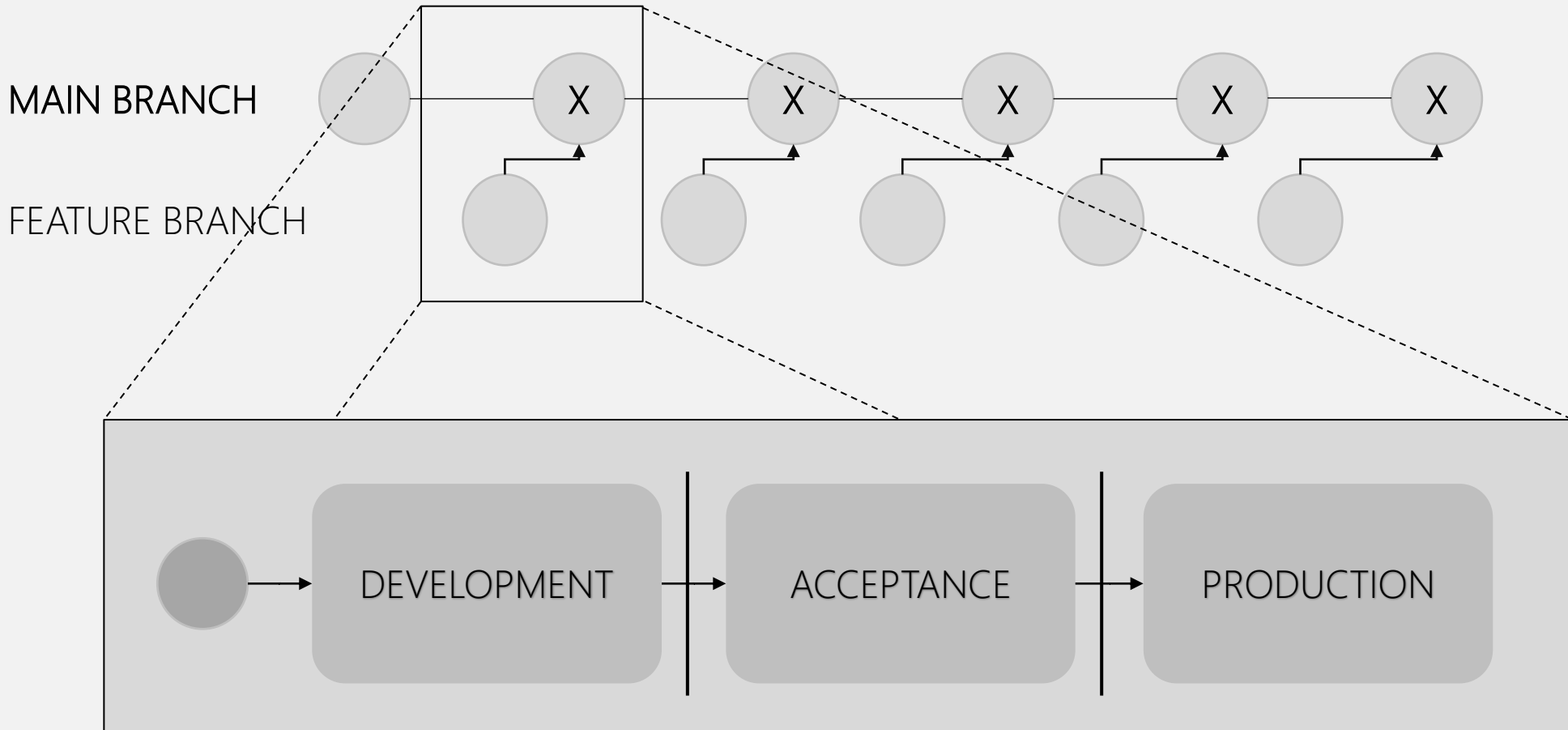


X = Automated Build and deployment to development

X = Automated Build and deployment to production

Branching Strategy

Trunk Based Branching



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Validation Step

Manual Validation Step

Useful for Trunk Based Branching
Explicitly agree to deploy



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Demo



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Demo

Separate Build & Release Pipeline



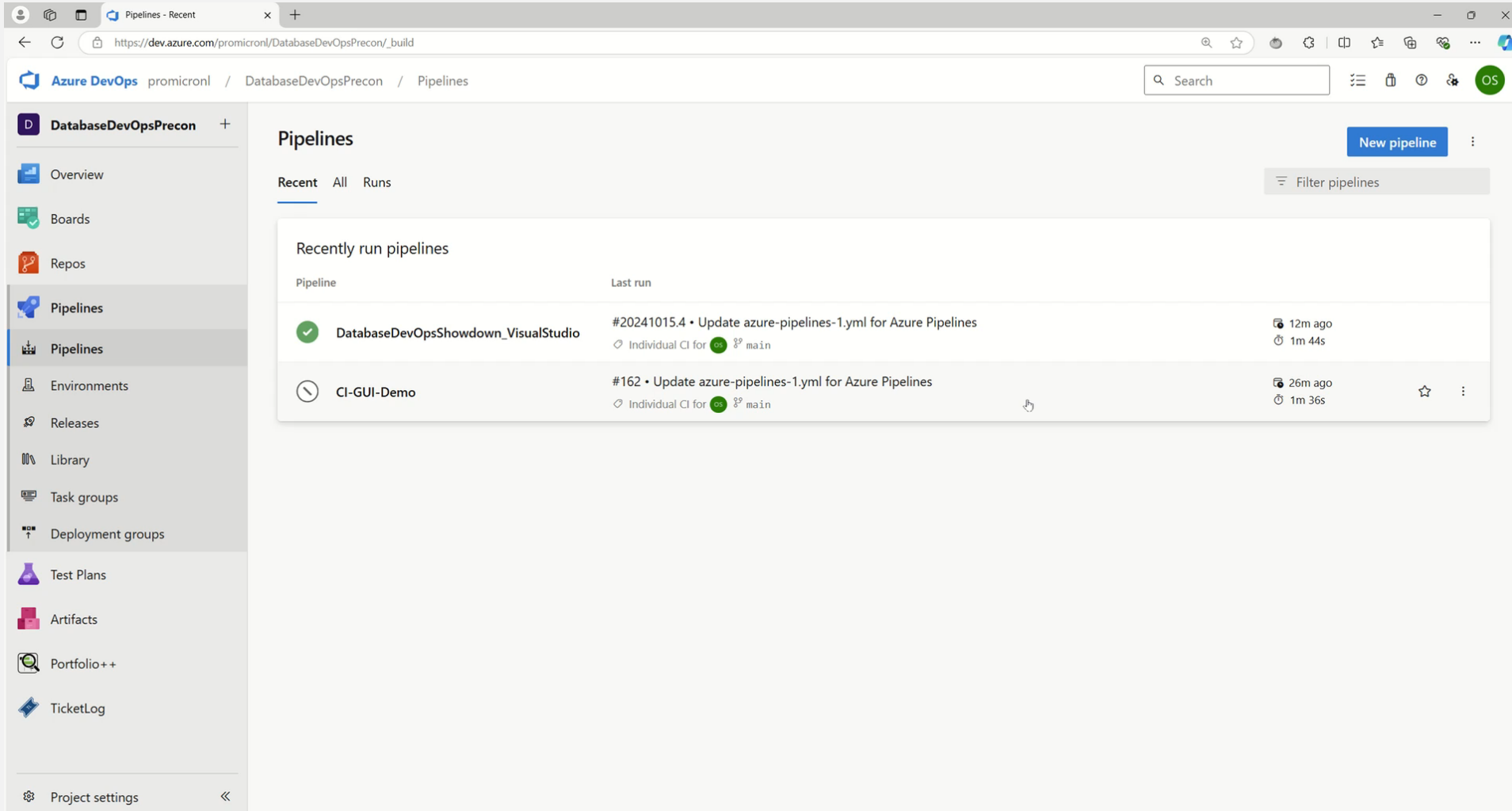
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YAML Build Pipeline

The screenshot shows the Azure DevOps web interface for a project named 'DatabaseDevOpsPrecon'. The left sidebar contains navigation links: Overview, Boards, Repos, Pipelines (selected), Environments, Releases, Library, Task groups, Deployment groups, Test Plans, Artifacts, Portfolio++, and TicketLog. The main area is titled 'Pipelines' and shows a table of 'Recently run pipelines'.

Pipeline	Last run
✓ CI-GUI-Demo	#155 • resolved merge conflicts Manually triggered for main 7m ago 1m 51s

YAML Deployment Pipeline



The screenshot displays the Azure DevOps web interface for a project named 'DatabaseDevOpsPrecon'. The left sidebar contains navigation links for Overview, Boards, Repos, Pipelines (selected), Environments, Releases, Library, Task groups, Deployment groups, Test Plans, Artifacts, Portfolio++, and TicketLog. The main area is titled 'Pipelines' and shows a list of recently run pipelines. The first pipeline, 'DatabaseDevOpsShowdown_VisualStudio', is a successful build (#20241015.4) for 'Update azure-pipelines-1.yml for Azure Pipelines', completed 12 minutes ago in 1m 44s. The second pipeline, 'CI-GUI-Demo', is also a successful build (#162) for the same update, completed 26 minutes ago in 1m 36s. Both pipelines are triggered by 'Individual CI for main'.

Pipeline	Last run
DatabaseDevOpsShowdown_VisualStudio	#20241015.4 • Update azure-pipelines-1.yml for Azure Pipelines Individual CI for main
CI-GUI-Demo	#162 • Update azure-pipelines-1.yml for Azure Pipelines Individual CI for main



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YAML Deployment Pipeline

```
1 pool:
2   name: On-Prem
3
4 stages:
5   - stage: PublishToSQLServer
6     jobs:
7       - job: PublishToSQLServer
8         steps:
9           - checkout: none
10
11       Settings
12       - task: DownloadPipelineArtifact@2
13         inputs:
14           buildType: 'specific'
15           project: '67cc0d45-d30b-4bac-8f1d-7fd9abf93d04'
16           definition: '10'
17           specificBuildWithTriggering: true
18           buildVersionToDownload: 'latest'
19           artifactName: 'build-yaml-art'
20           itemPattern: '**/*.dacpac'
21           targetPath: '$(Pipeline.Workspace)/artifact'
```



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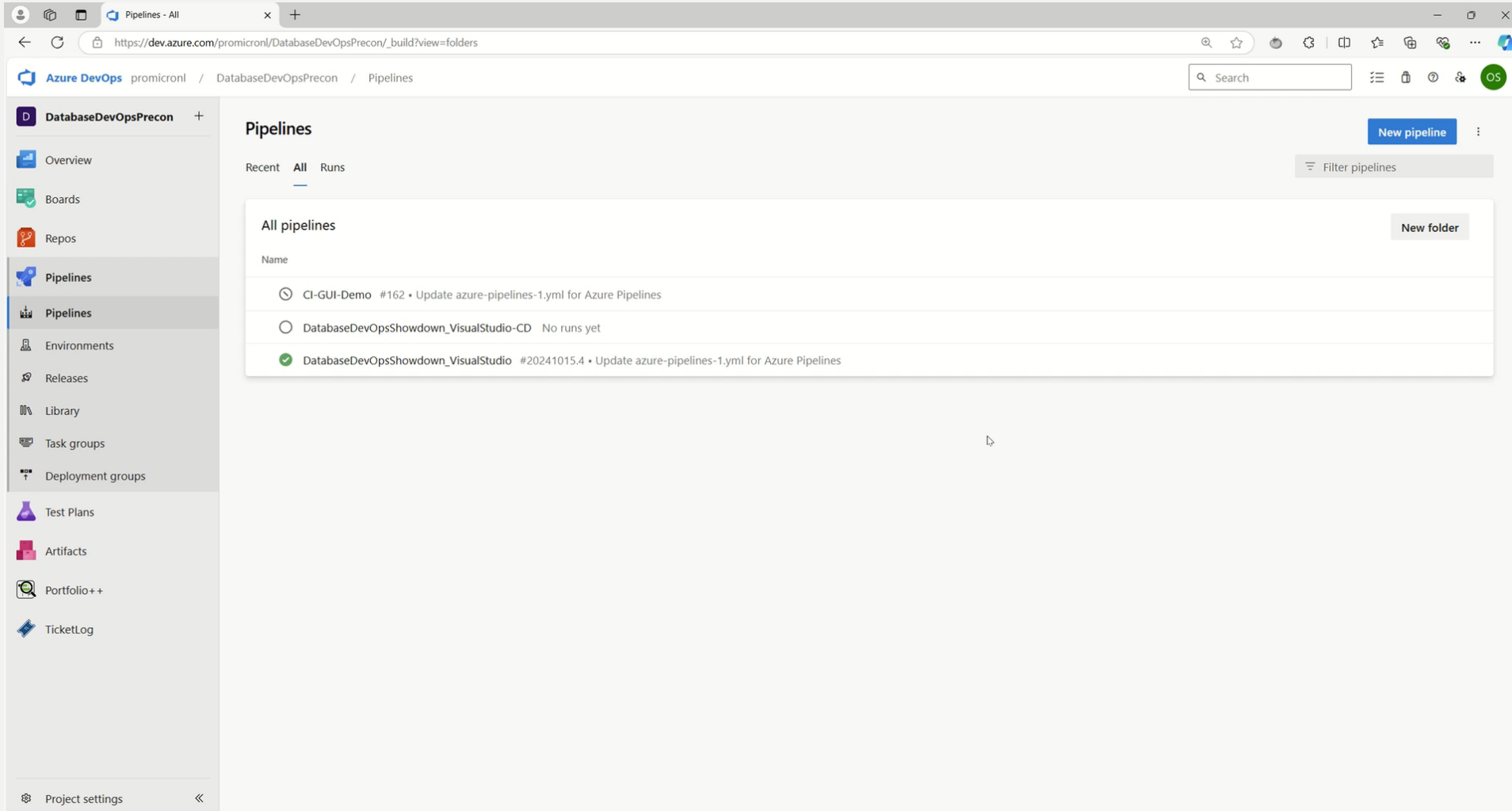
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YAML Deployment Pipeline Execution



The screenshot displays the Azure DevOps web interface for a project named 'DatabaseDevOpsPrecon'. The left sidebar contains navigation links for Overview, Boards, Repos, Pipelines (selected), Environments, Releases, Library, Task groups, Deployment groups, Test Plans, Artifacts, Portfolio++, and TicketLog. The main area is titled 'Pipelines' and shows a list of pipelines under the 'All' tab. The list includes three entries: 'CI-GUI-Demo #162 • Update azure-pipelines-1.yml for Azure Pipelines', 'DatabaseDevOpsShowdown_VisualStudio-CD No runs yet', and 'DatabaseDevOpsShowdown_VisualStudio #20241015.4 • Update azure-pipelines-1.yml for Azure Pipelines'. A 'New pipeline' button is visible in the top right corner of the main area.

Name
CI-GUI-Demo #162 • Update azure-pipelines-1.yml for Azure Pipelines
DatabaseDevOpsShowdown_VisualStudio-CD No runs yet
DatabaseDevOpsShowdown_VisualStudio #20241015.4 • Update azure-pipelines-1.yml for Azure Pipelines



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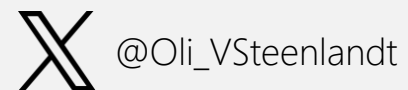


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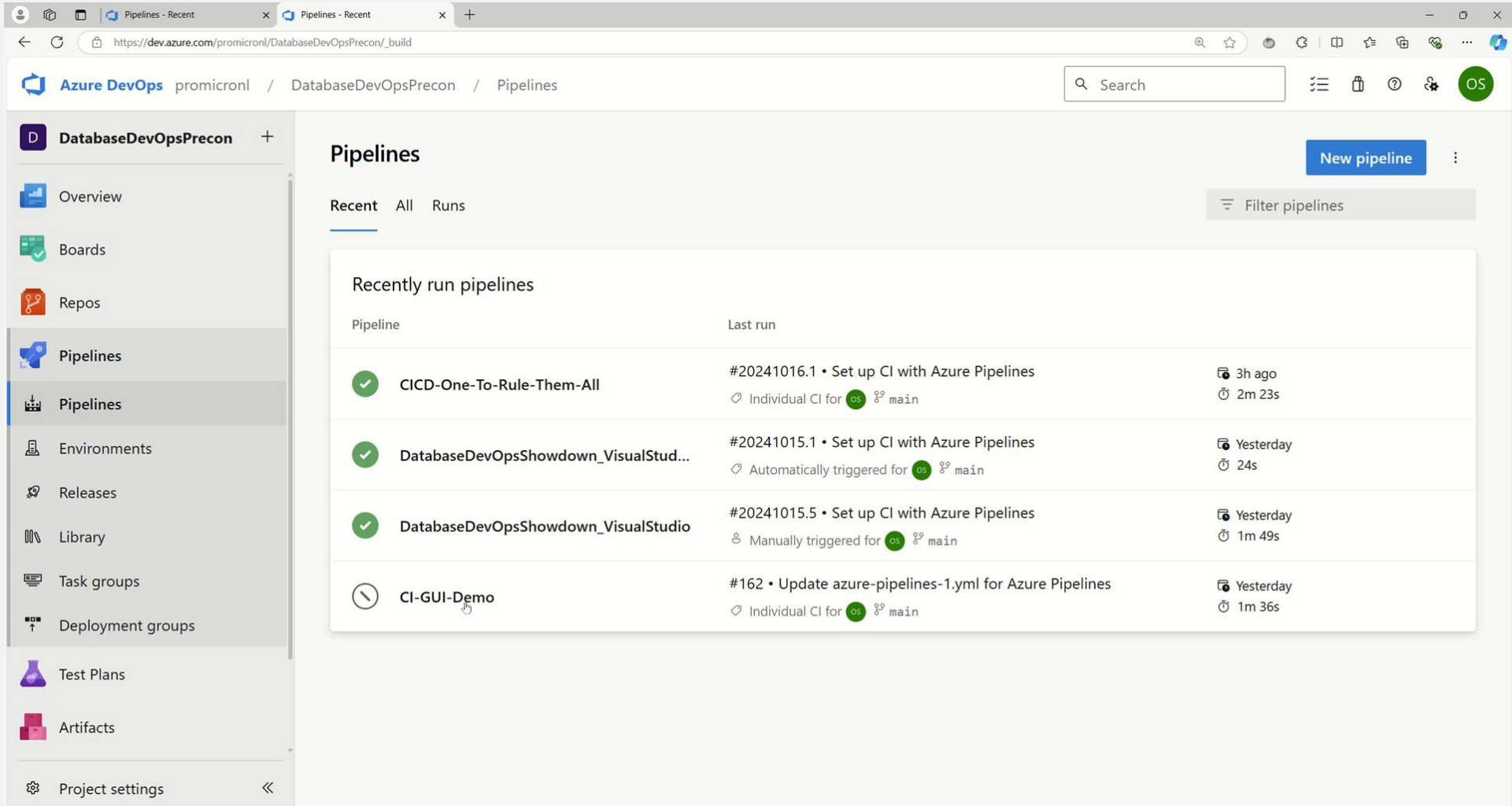
Demo

One to rule them all















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One to rule them all



The screenshot shows the Azure DevOps web interface for a project named 'DatabaseDevOpsPrecon'. The left sidebar contains navigation links: Overview, Boards, Repos, Pipelines (selected), Environments, Releases, Library, Task groups, Deployment groups, Test Plans, Artifacts, and Project settings. The main area is titled 'Pipelines' and shows a list of 'Recently run pipelines'.

Pipeline	Last run
 CICD-One-To-Rule-Them-All	#20241016.1 • Set up CI with Azure Pipelines Individual CI for   main 3h ago 2m 23s
 DatabaseDevOpsShowdown_VisualStud...	#20241015.1 • Set up CI with Azure Pipelines Automatically triggered for   main Yesterday 24s
 DatabaseDevOpsShowdown_VisualStudio	#20241015.5 • Set up CI with Azure Pipelines Manually triggered for   main Yesterday 1m 49s
 CI-GUI-Demo	#162 • Update azure-pipelines-1.yml for Azure Pipelines Individual CI for   main Yesterday 1m 36s

Manual Validation Step

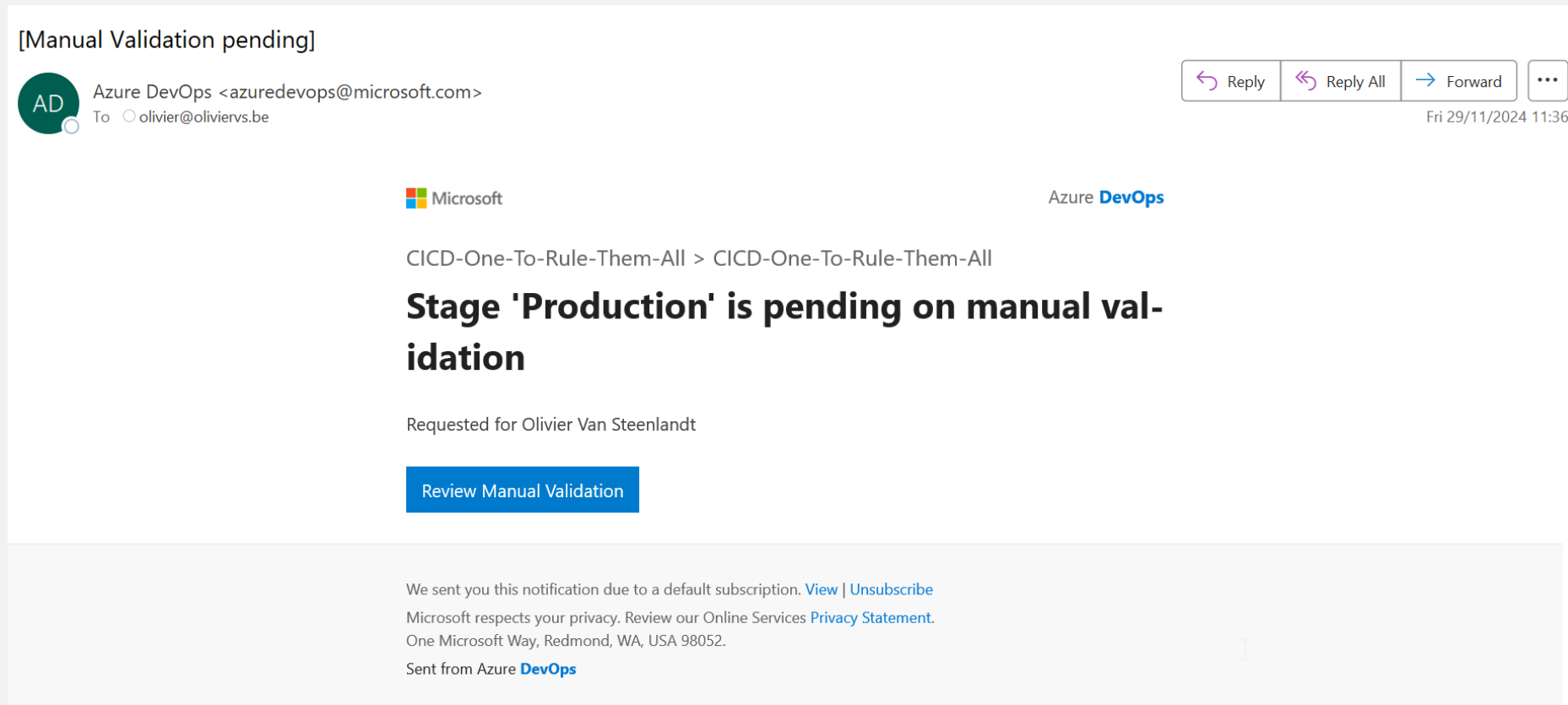
The screenshot shows the Azure DevOps interface for a pipeline run. The browser address bar displays the URL: https://dev.azure.com/olivervansteenlandt/DeploymentAutomation/_build/results?buildId=259&view=results. The breadcrumb navigation path is: olivervansteenlandt / Deployment Automation / Pipelines / CICD-One-To-Rule-Them-All / CICD-One-To-Rule-Them-All. The page title is "Summary Associated pipelines Code Coverage". The main content area shows a manual run by Olivier Van Steenlandt. Below this, a message states: "1 manual validation needs your review before this run can continue" with a "Review" button. The pipeline stages are listed as follows:

Stage	Status	Jobs	Time
Build	Completed	1 job completed, 1 artifact	1m 36s
Development	Completed	1 job completed	1m 14s
Production	In Progress	0/2 completed, 0/1 manual validations passed	3m 38s
Waiting for approval	Pending		3m 38s
Deploy Database Project Adve...	Pending		

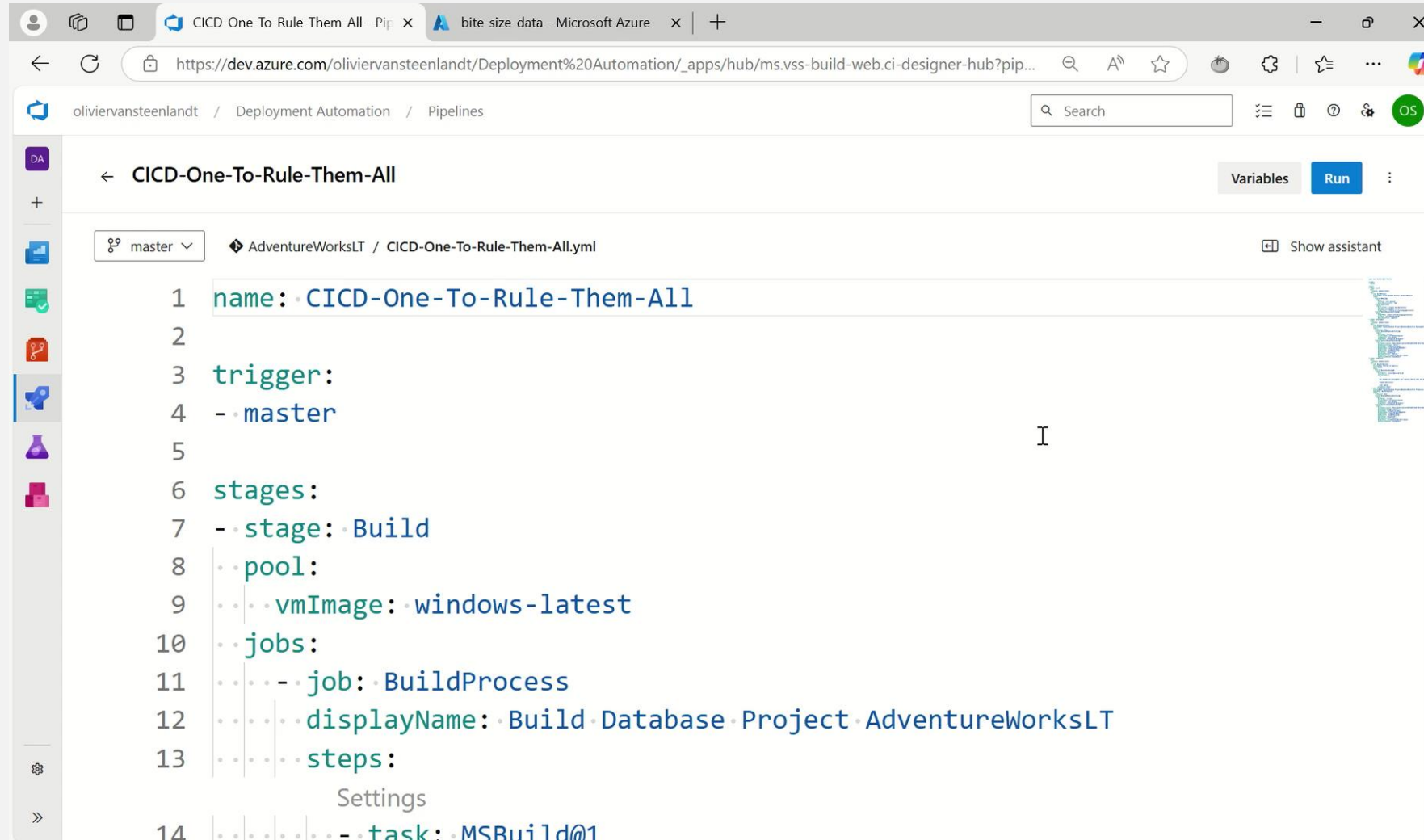
A "Cancel" button is visible at the bottom of the Production stage details.



Manual Validation Pending



Manual Validation Step - Technical



The screenshot shows the Azure DevOps Pipelines interface for a pipeline named 'CICD-One-To-Rule-Them-All'. The pipeline is configured with a 'master' trigger and a 'Build' stage. The stage uses a 'pool' with 'vmImage: windows-latest' and contains a 'job' named 'BuildProcess'. The job has a 'displayName' of 'Build Database Project AdventureWorksLT' and a 'steps' section. The first step is a 'task' named 'MSBuild@1'.

```
1 name: CICD-One-To-Rule-Them-All
2
3 trigger:
4   - master
5
6 stages:
7   - stage: Build
8     pool:
9       vmImage: windows-latest
10    jobs:
11      - job: BuildProcess
12        displayName: Build Database Project AdventureWorksLT
13        steps:
14          - task: MSBuild@1
```



Summary



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Moving Forward

Automated Unit Testing

tSQLt – Opensource

Microsoft.Data.Tools.UnitTest – SSDT

Linting

Code Analysis in Visual Studio

SqlScriptDOM



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Benefits & Challenges

Time saving (+)

Less room for mistakes (+)

YAML (+)

Strict ruling for indents (-)

Managed as code (+)



Thank you!

Questions?



Datawarehousing & Reporting Teamlead



Core Member @ dataMinds.be



Speaking / Blogging



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