

# Role of a Execution Agent in the Orchestration of an Azure DevOps Pipeline

E4 - Informatique

Luisa dos Anjos Oliveira de Barros

# Objective of the Study

Problematic: **How do execution agents enable scalable and reliable pipeline orchestration in Azure DevOps?**



Analyze how Azure  
DevOps agents  
operate



Understand their  
role in pipeline  
execution



Study their interaction  
with YAML  
configurations

# Industrial Context



Validation processes must be:

- Reproducible
- Automated
- Traceable and Reliable results

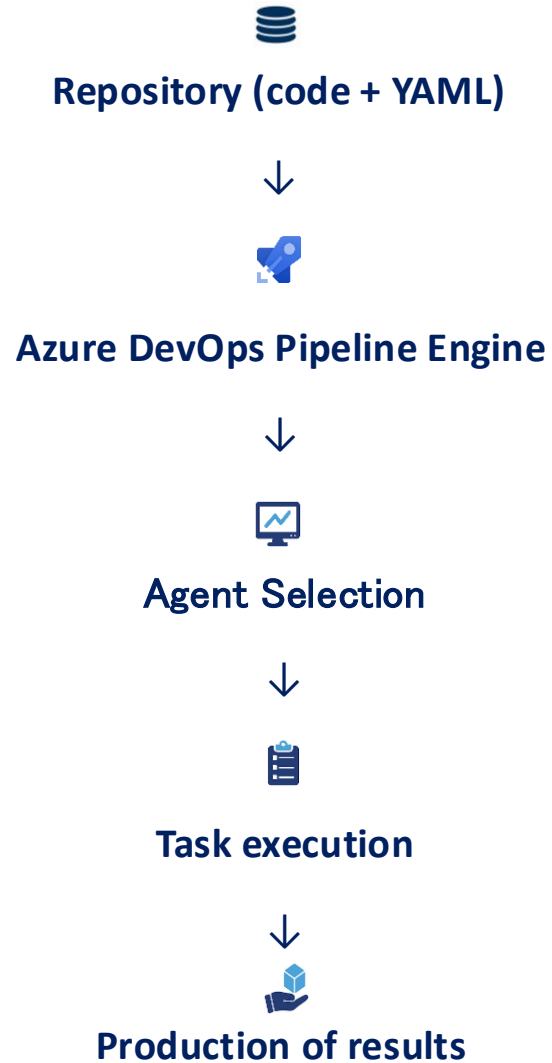


CI/CD pipelines allow:

- Automating compilation
- Running automated tests
- Deploying applications
- Tracking validation results

# General Pipeline Architecture

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# Pipeline Execution Cycle

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**1**

**Commit /  
trigger**

**2**

**Job queued  
on Azure  
DevOps server**

**3**

**Agent  
Selection**

**4**

**Task  
execution**

**5**

**Results  
returned**

# About Agents



What they do:

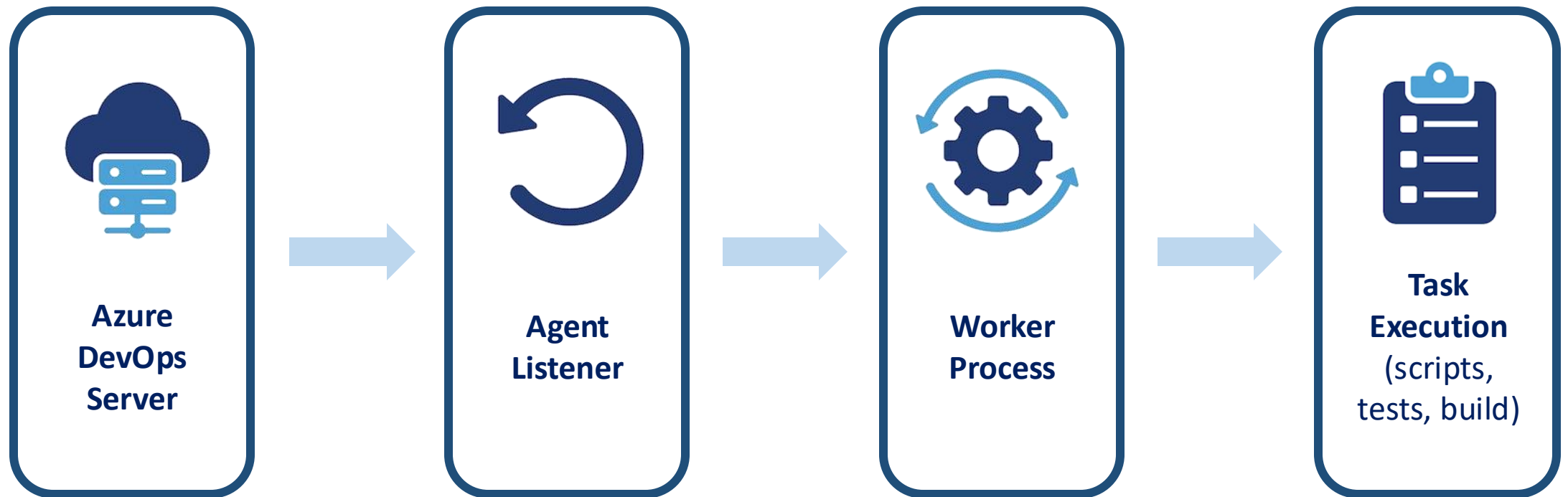
- **Receives jobs**
- **Executes tasks**
- **Sends back the results**



They can be:

- Microsoft-hosted agents
- **Self-hosted agents**

# Agent Architecture



# Agent Selection

- In the YAML file
- Extract from the studied pipeline:

The screenshot displays the Azure DevOps web interface. On the left is a sidebar with navigation options: Overview, Boards, Repos, Pipelines (selected), Environments, Releases, and Library. The main area shows the configuration for a pipeline named 'HIL\_eFCV-MAX'. At the top of the main area, there's a breadcrumb 'dev\_Luisa' and the file path 'HIL\_eFCV-MAX / azure-pipelines.yml'. Below this, the YAML code is displayed with line numbers 11 through 25. The 'pool' section is highlighted in blue, showing the agent pool name and the specific agent selected. The agent selection is based on the variable 'Agent.Name'.

```
11 type: string
12 ... default: 0.6.0
13
14 trigger:
15   - master
16   - feature/*
17
18 pool:
19   name: completion-downhole-srpc-windows-hosted
20   demands:
21     - Agent.Name equals cpl-dwl-win-x64-SLB-2D68MQ2
22
23 name: $(Date:yyMM).$(DayOfMonth).$(Rev:r)
24
25 variables:
```



# Task Execution by the Agent

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Once selected, the Agent executes the steps defined in the YAML pipeline.

**1**

Checkout  
repository

**2**

Download  
MeFCV  
application  
artifact

**3**

Unzip the  
artifact

**4**

Run TestStand  
tests

**5**

Publish test  
results as  
artifacts

# Intérêt technique

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## Environment Isolation

- Dedicated workspace
- Prevents interference



## Reproducibility

- Execution in the same environment
- Consistent validation results



## Scalability

- Parallel pipelines execution
- Time efficiency



## Automation

- Minimize human intervention
- Continuous integration of code

# State of the Art



**Azure DevOps**  
Agents



**GitHub Actions**  
Runners



**GitLab CI**  
Runners



**Jenkins**  
Agents

# References

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## Microsoft

[Azure DevOps Agents Documentation](#)

[Azure Pipelines Overview](#)

[YAML schema for Azure Pipelines](#)

## Others

[GitHub Actions Runners](#)

[GitLab CI/CD Runners](#)

[Jenkins Distributed Builds](#)

[Humble, J., Farley, D. — Continuous Delivery \(2010\)](#)

A decorative vertical bar on the left side of the slide, featuring a repeating pattern of stylized circular motifs in a light gray color.

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**Thank you!**