

Module 1: Getting Started with Azure Machine Learning

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Agenda



Introduction to Azure Machine Learning

Working with Azure Machine Learning

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Introduction to Azure Machine Learning

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What is Azure Machine Learning?

A platform for operating machine learning workloads in the cloud



Azure Machine Learning in Context



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Machine Learning Operationalization (ML Ops)

Based on *DevOps* principles, including:

- Infrastructure-as-code and configuration management
- Version control and tracking
- Continuous integration and delivery (CI/CD)
- Continuous monitoring



Azure Machine Learning Workspaces



Access Control and Permissions



Default RBAC permissions

Permission	Owner	Contributor	Reader
Create workspace	\checkmark	\checkmark	
Share workspace	\checkmark		
Create compute target	\checkmark	\checkmark	
Attach compute target	\checkmark	\checkmark	
Attach data stores	\checkmark	\checkmark	
Run experiment	\checkmark	\checkmark	
View runs/metrics	\checkmark	\checkmark	\checkmark
Register model	\checkmark	\checkmark	
Create image	\checkmark	\checkmark	
Deploy web service	\checkmark	\checkmark	
View models/images	\checkmark	\checkmark	\checkmark
Call web service	\checkmark	\checkmark	\checkmark

- 1. User signs into Azure Active Directory (AAD) and obtains token
- 2. Token grants access to Azure Machine Learning workspace
- 3. Role-based access control (RBAC) permissions control resource access
- 4. Compute resources can optionally allow access via SSH
- 5. Deployed service endpoints can use key or token-based access



Working with Azure Machine Learning

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Azure Machine Learning studio

Manage compute and data **Run experiments** View metrics and logs Manage and deploy models Manage service endpoints Label image data Use graphical modeling tools:

- Automated ML find the best model for your data
- Designer drag and drop model development

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The Azure Machine Learning SDK for Python

Python programming interface for Azure Machine Learning

```
pip install azureml-sdk
```

```
from azureml.core import Workspace
ws = Workspace.from_config()
for compute_name in ws.compute_targets:
    compute = ws.compute_targets[compute_name]
    print(compute.name, ":", compute.type)
```

Azure Machine Learning CLI Extension

Cross-platform command-line interface for Azure Machine Learning

az extension add -n azure-cli-ml

az ml computetarget list -g 'my-resource-group' -w 'my-aml-workspace'

Visual Studio Code

Cross-platform code editor and integrated development environment

Tools for machine learning provided through *extensions*.

- **Python**: Native Python coding • and debugging, and integrated notebook interface
- Azure Machine Learning: a • graphical interface for working with an Azure Machine Learning workspace



Azure Machine Learning Compute Instances

A cloud-based development workstation right in your workspace Built-in Jupyter, JupyterLab, and RStudio



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Lab: Create an Azure Machine Learning Workspace



- 1. View the lab instructions at <u>https://aka.ms/mslearn-dp100</u>
- 2. Complete the **Create an Azure Machine Learning workspace** exercise

Knowledge check

?

Which of the following Azure resources are created alongside an Azure Machine Learning workspace?

- 🕤 Storage Account
- □ Databricks workspace
- 🕤 Key Vault
- **Solution** Application Insights



Which of the following provides a web interface for managing assets in a workspace? Azure Machine Learning studio

- □ Azure Cognitive Services
- □ Azure Synapse Analytics



Which Visual Studio Code extension enables integrated management of workspace assets?Python

- ✓ Azure Machine Learning
- Jupyter Notebooks

References

Microsoft Learn: Introduction to Azure Machine Learning https://docs.microsoft.com/learn/modules/intro-to-azure-machine-learning-service

Azure Machine Learning architecture and concepts documentation <u>https://docs.microsoft.com/azure/machine-learning/concept-azure-machine-learning-architecture</u>

Azure Machine Learning studio documentation

https://docs.microsoft.com/azure/machine-learning/overview-what-is-machine-learning-studio

Azure Machine Learning enterprise security documentation <u>https://docs.microsoft.com/azure/machine-learning/concept-enterprise-security</u>

Azure Machine Learning Python SDK documentation https://docs.microsoft.com/python/api/overview/azure/ml/intro

Azure Machine Learning extension for Visual Studio Code documentation https://docs.microsoft.com/azure/machine-learning/tutorial-setup-vscode-extension



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