Azure Machine Learning overview

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Overview

Machine Learning Frameworks

R | python | TensorFlow | Microsoft CNTK | Apache Spark ML | Keras | PyTorch

Infrastructure Services

SQL Server (In-database ML) | ML SERVER | DATA SCIENCE VM

Pla… Services

AZURE SQL DB (In-database ML) | DATA LAKE ANALYTICS | AZURE DATABRICKS | HDINSIGHT | AZURE ML STUDIO | AZURE ML | BATCH AI

Software Se…

BOT SERVICES | COGNITIVE SERVICES

+

+

Customvision Services

Azure AI

AI apps & agents

Azure Bot Service
Azure Cognitive Services

Machine learning

Azure Databricks
Azure Machine Learning

Knowledge mining

Azure Cognitive Search

Machine Learning on Azure

Domain specific pretrained models
To reduce time to market


Vision


Speech


Language


Search

Familiar Data Science tools
To simplify model development


PyCharm


Jupyter


Visual Studio Code


Command line

Popular frameworks
To build advanced deep learning solutions


Pytorch


TensorFlow


Scikit-Learn


Onnx

Productive services
To empower data science and development teams


Azure Databricks


Azure Machine Learning


Machine Learning VMs

Powerful infrastructure
To accelerate deep learning

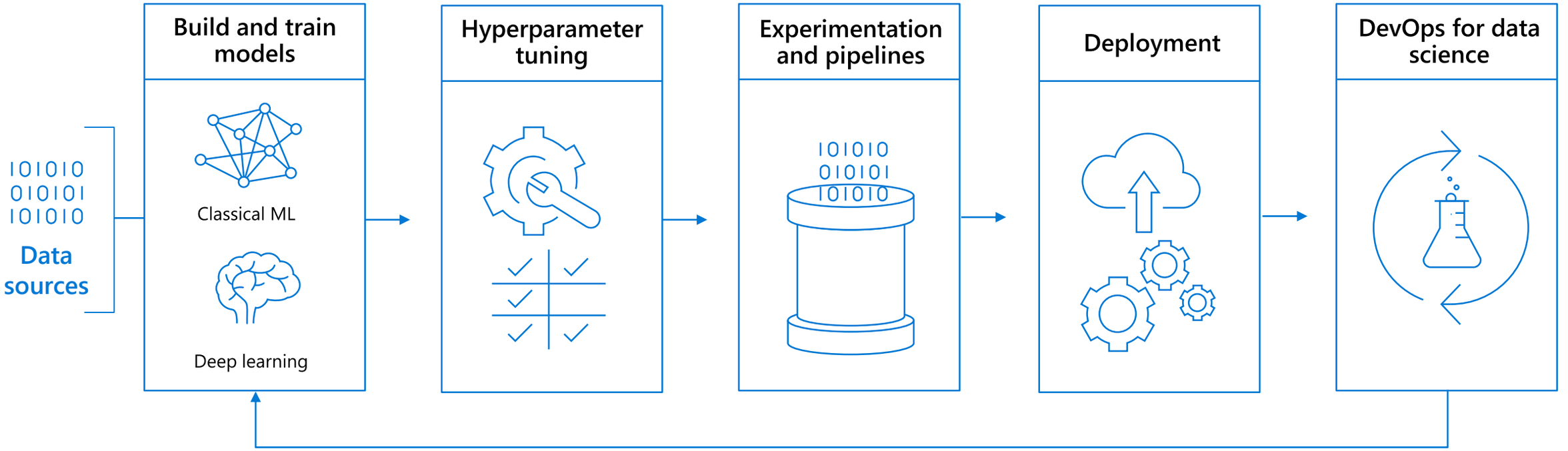

CPU


GPU

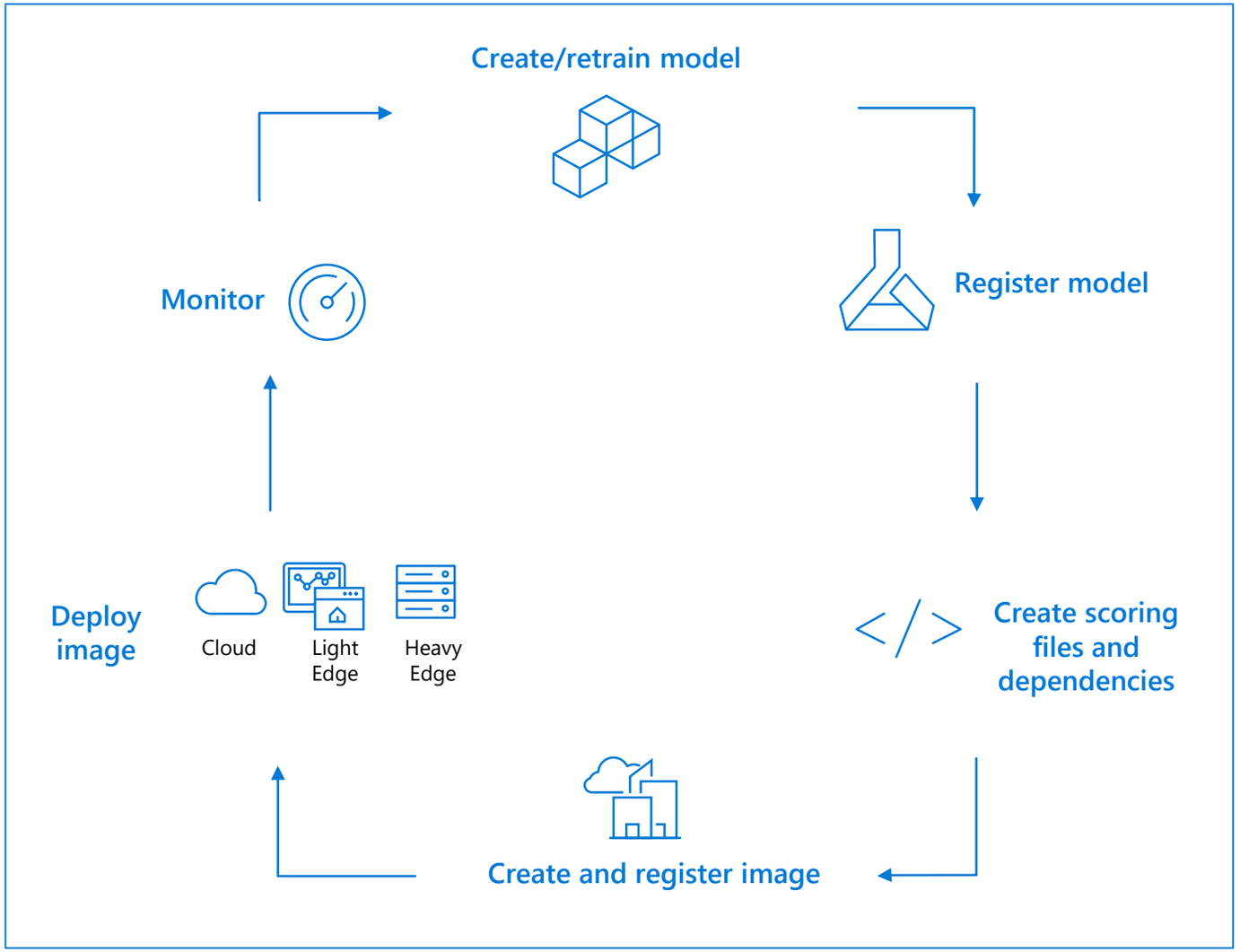

FPGA


From the Intelligent Cloud to the Intelligent Edge


Building blocks for a Data Science Project



Model management in Azure Machine Learning



Azure Machine Learning service

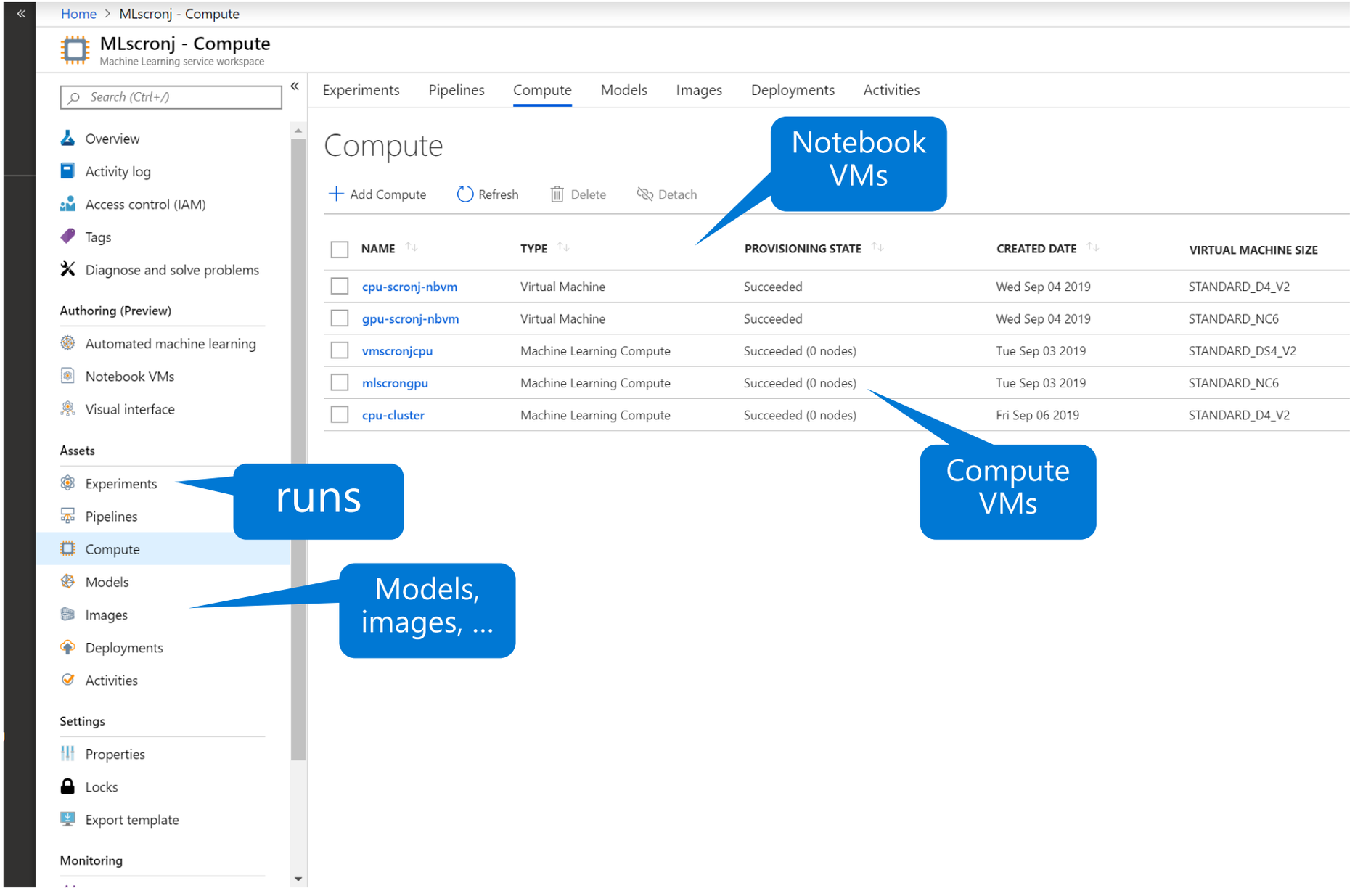
Set of Azure Cloud Services

Python SDK

That enables you to:

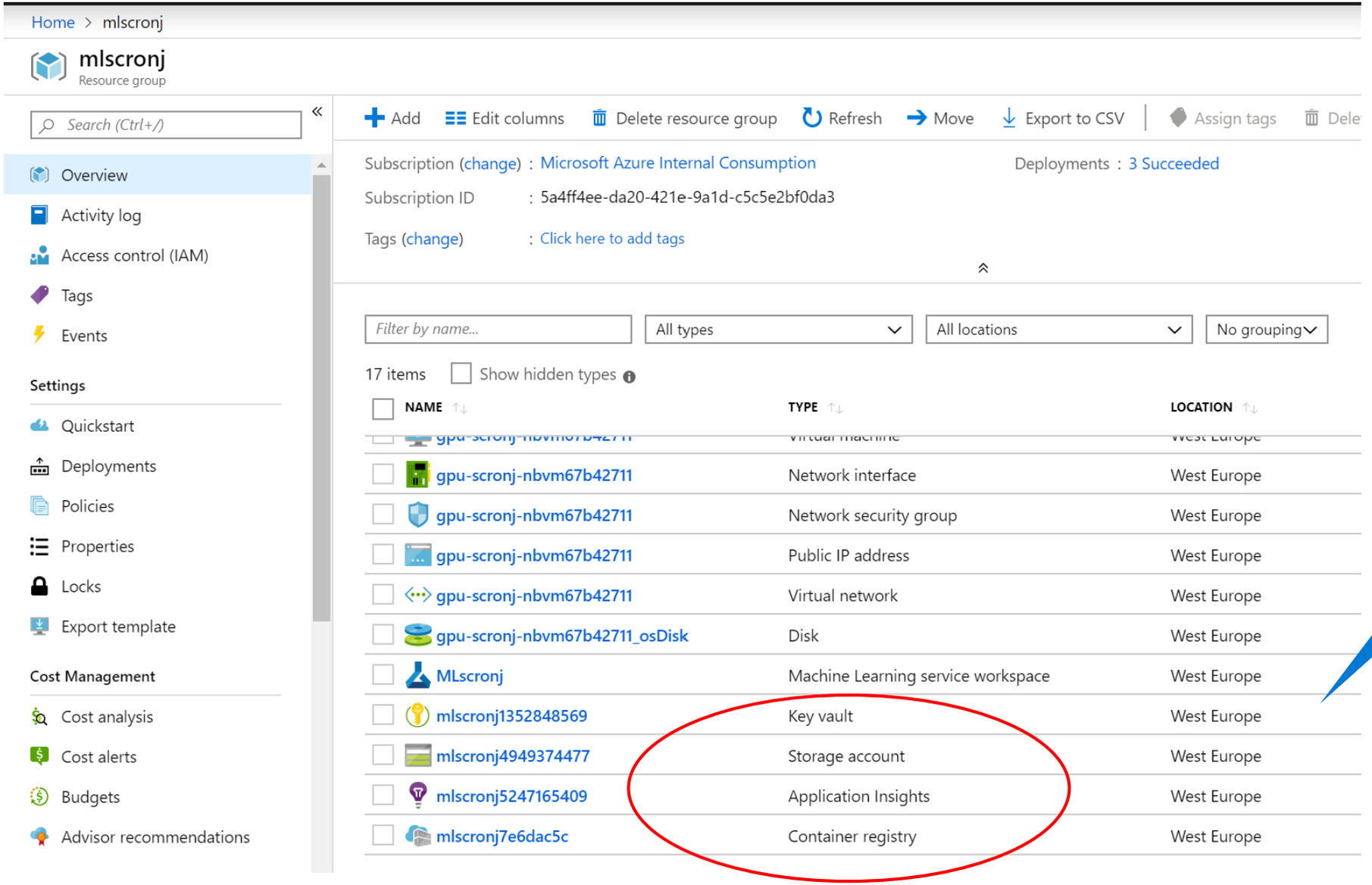
- ✓ Prepare Data
- ✓ Build Models
- ✓ Train Models
- ✓ Manage Models
- ✓ Track Experiments
- ✓ Deploy Models

ML workspace



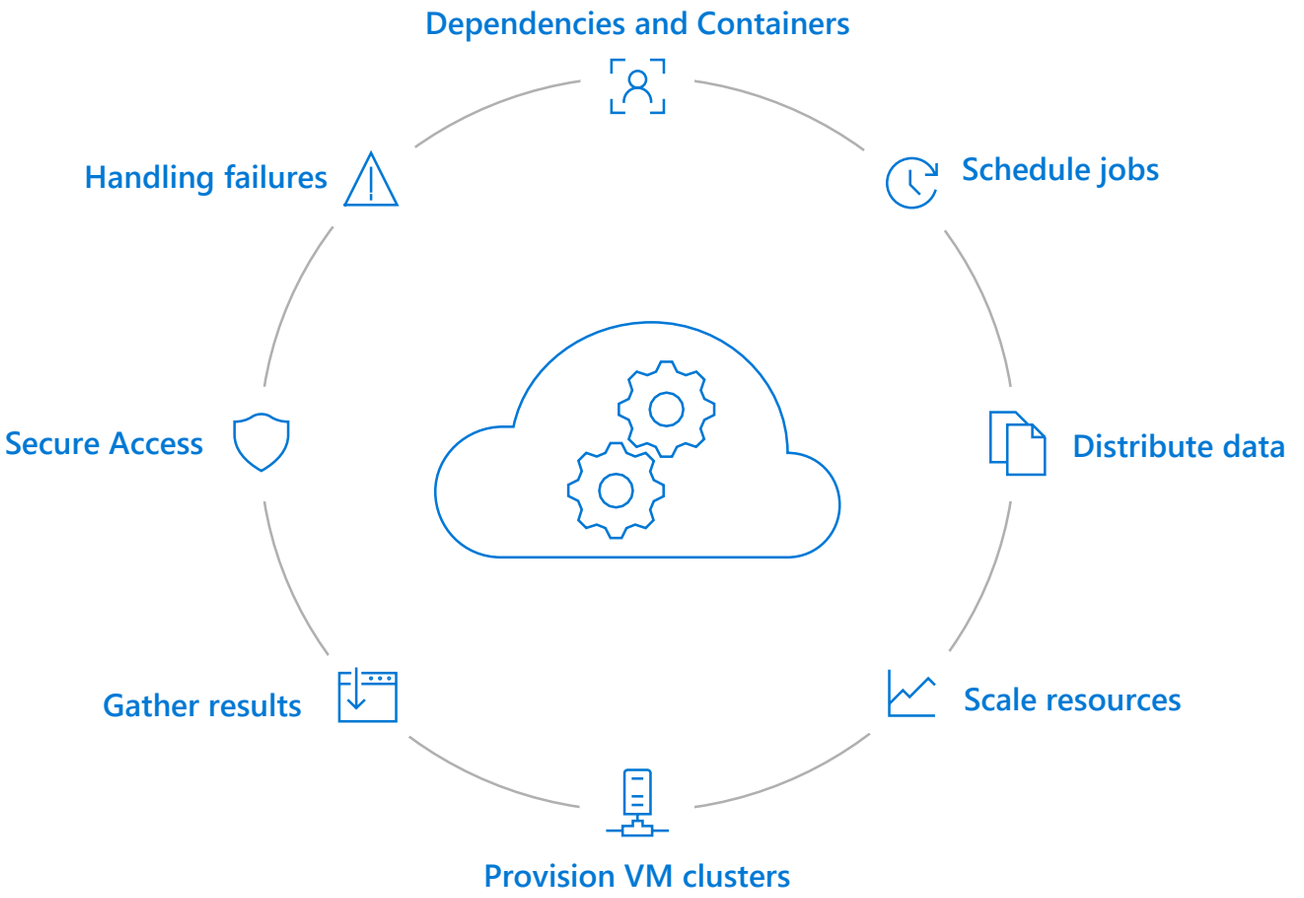
Other team members may be invited to workspace

ML Resource group

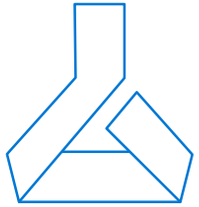


A lot of resources are created. For security, deployment, storage, …

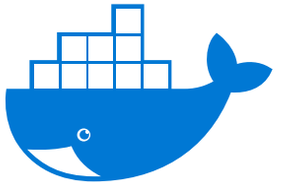
Distributed training on managed compute



Deployment from Azure ML Workspace



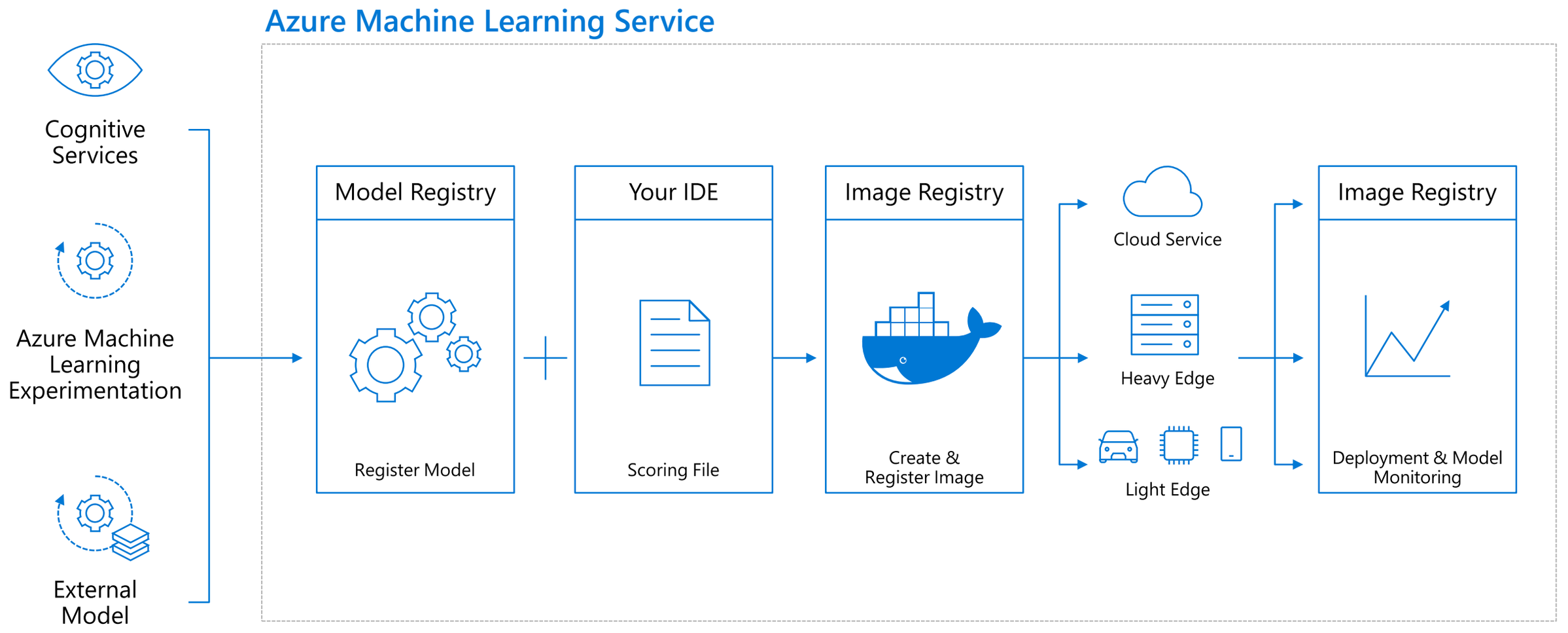
Azure Machine Learning Service



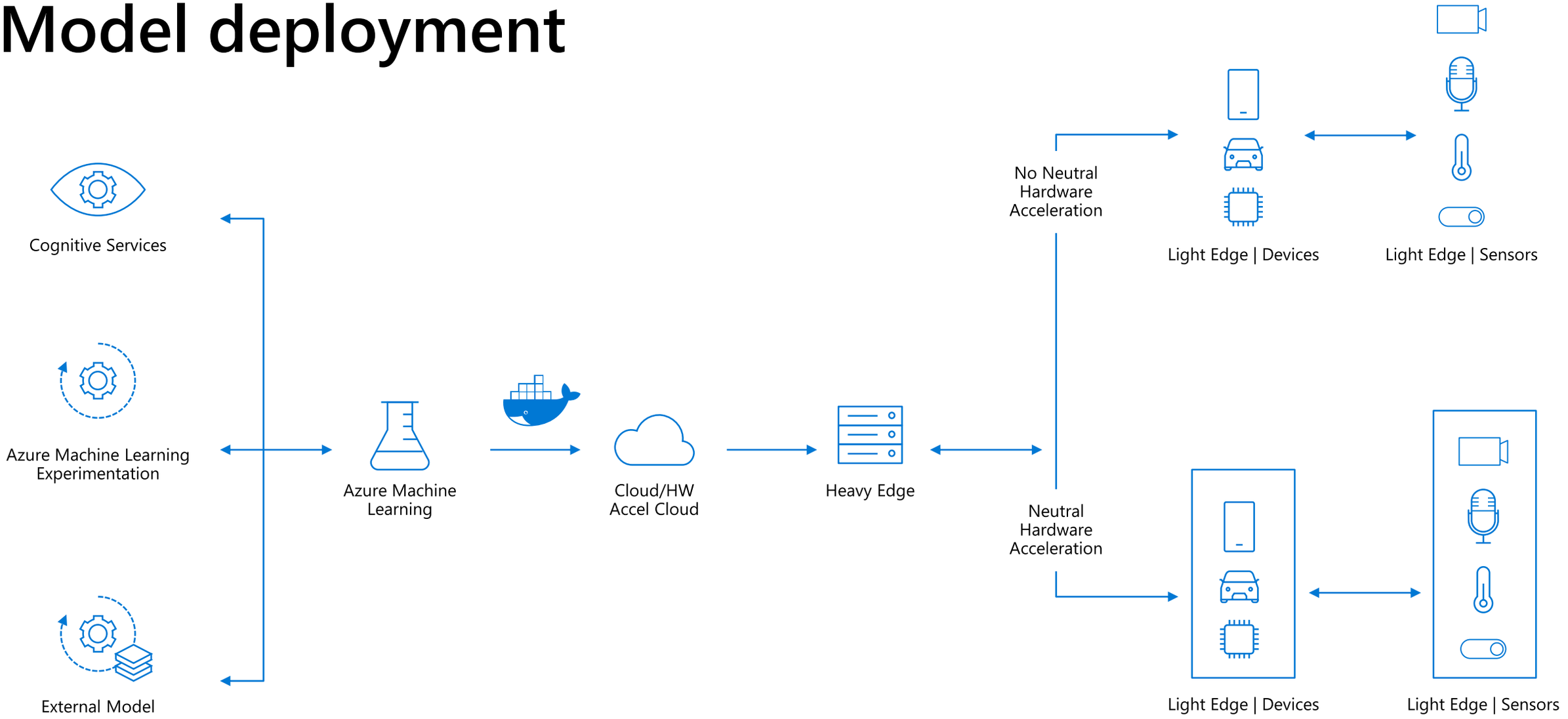
Docker

- On-prem deployment
- Azure IoT edge
- Azure Container Instance
- Azure Managed Kubernetes Service
- IoT accelerated targets
- Project Brainwave (FPGAs)

Deploy Azure ML models at scale



Model deployment



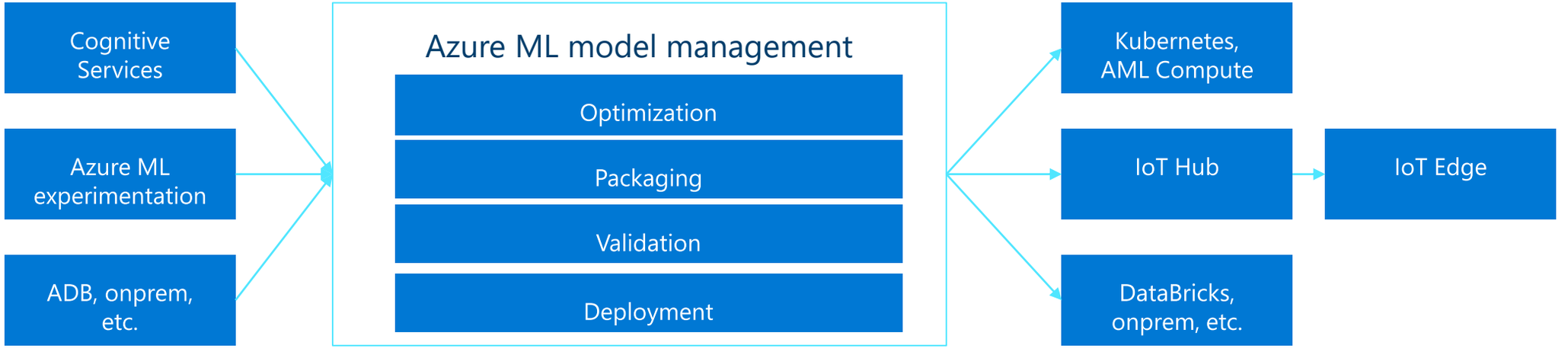
Deploy to cloud and edge

Cloud

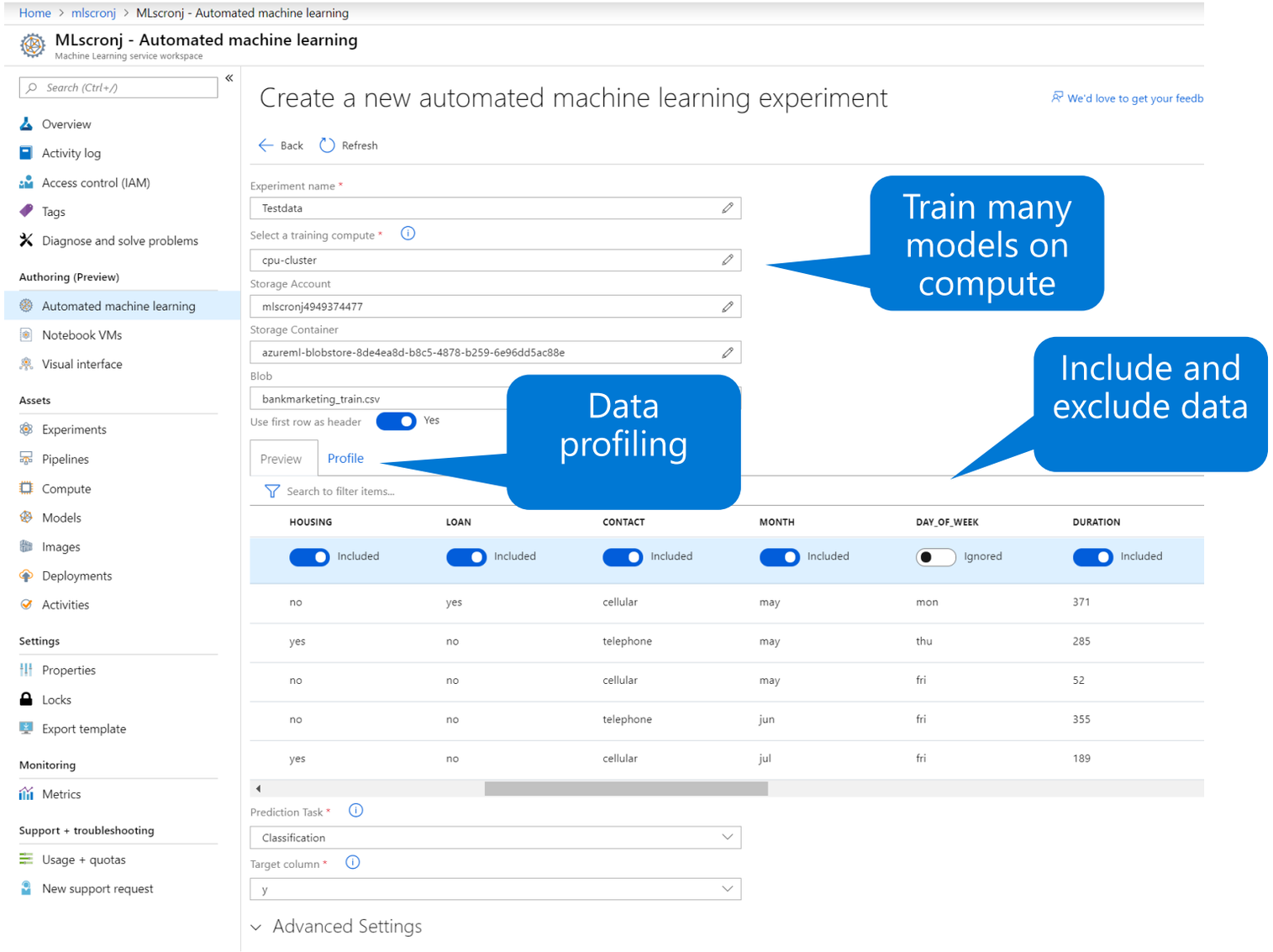
Register Model ->
Build Container ->
Deploy to AKS ->
Model Telemetry

Edge

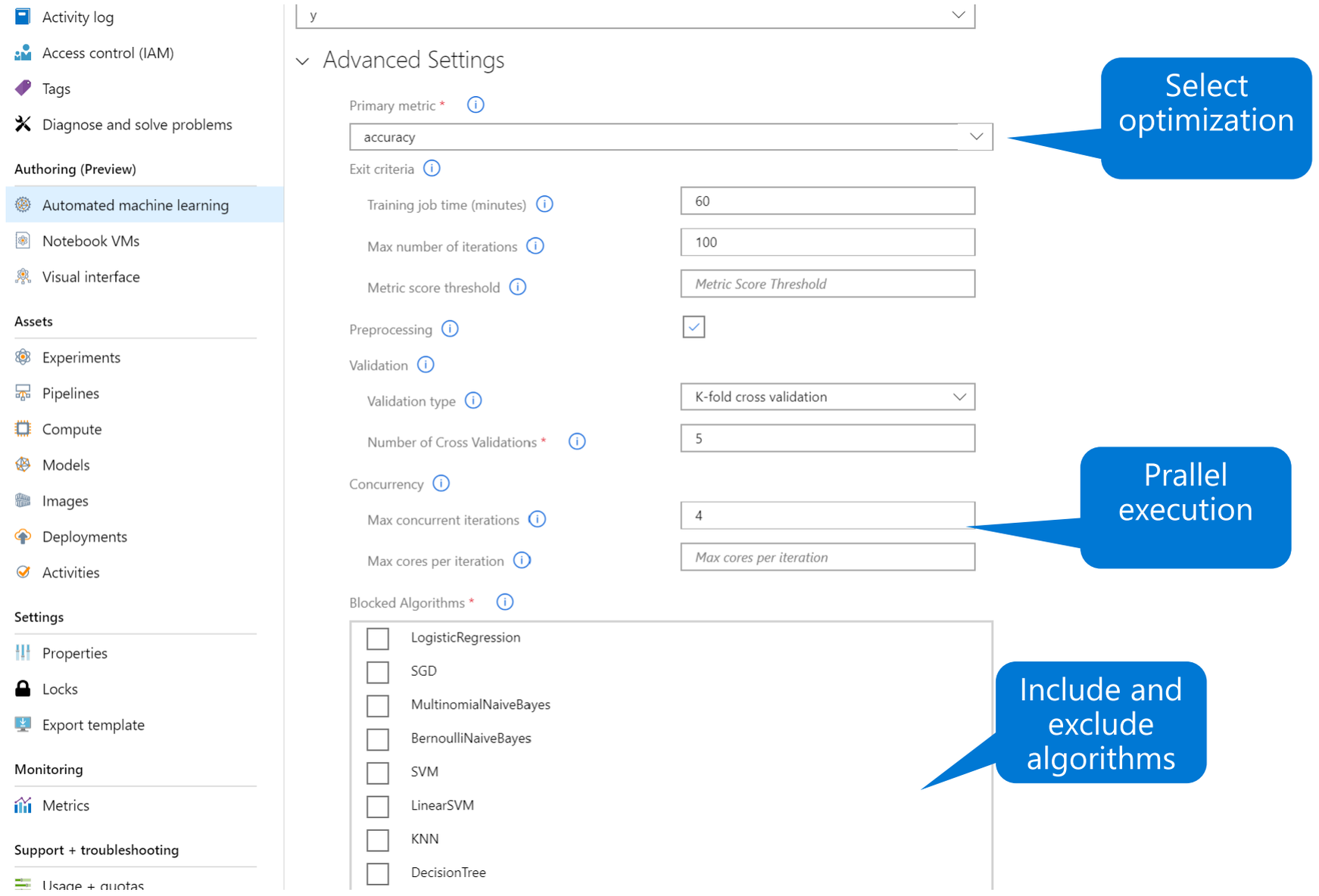
Register Model ->
Convert model ->
Build endpoint specific container ->
Register in IoTHub ->
Deploy to Iot Edge ->
Model Telemetry



Automated ML 1/3



Automated ML 2/3

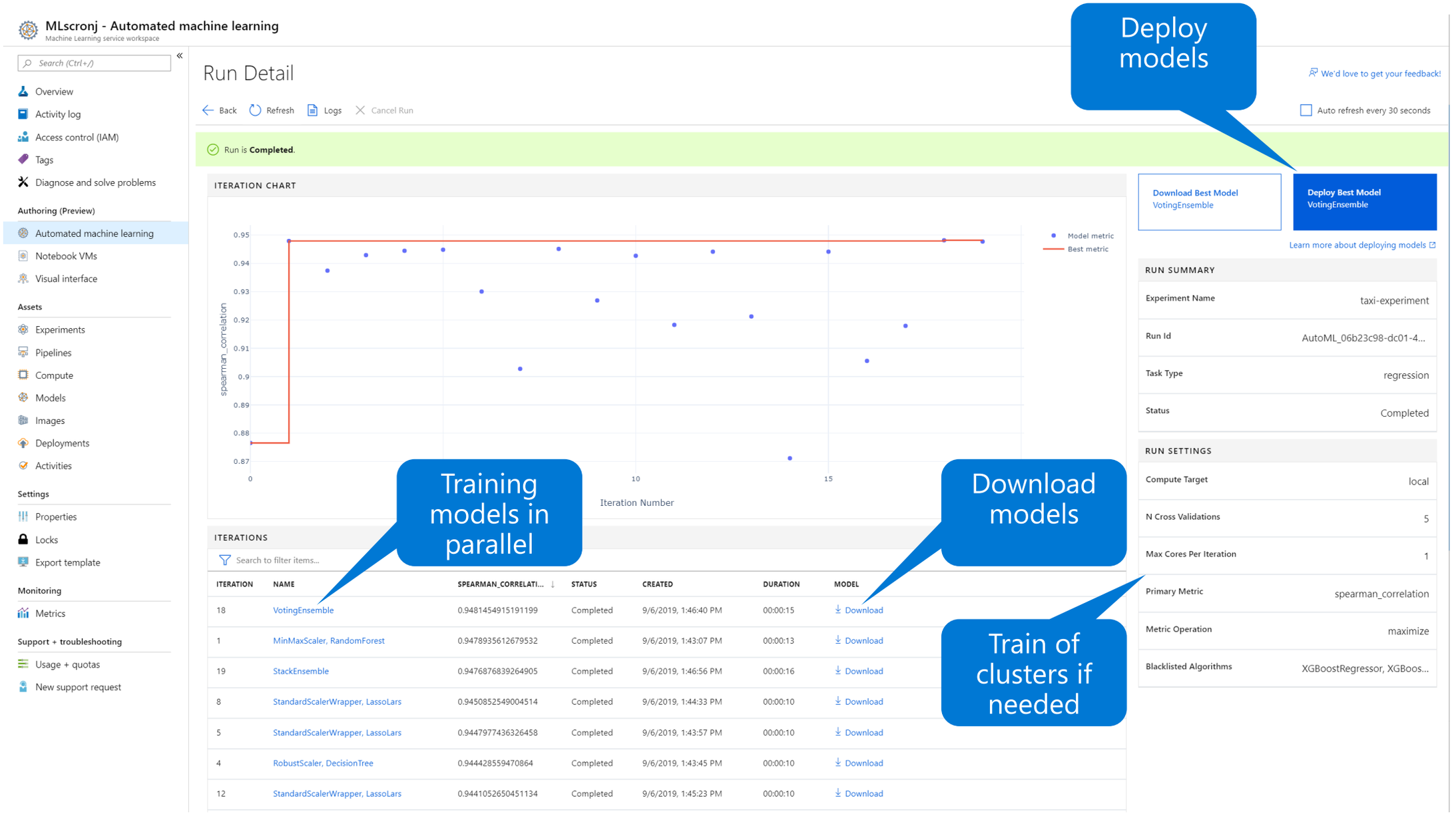


Select optimization

Prallel execution

Include and exclude algorithms

Automated ML 3/3



Databricks aspects

Databricks access to workspace

Cmd 9

```
# Step 1 - Load training data and define model training function
######################################################################
import os
import numpy as np
import pandas as pd
from sklearn import linear_model
from sklearn.externals import joblib
from sklearn.preprocessing import StandardScaler
from sklearn.metrics import accuracy_score
from sklearn.model_selection import train_test_split
import azureml
from azureml.core import Run
from azureml.core import Workspace
from azureml.core.run import Run
from azureml.core.experiment import Experiment
from azureml.core.model import Model
import pickle
import json

# Verify AML SDK Installed
# view version history at https://pypi.org/project/azureml-sdk/#history
print("SDK Version:", azureml.core.VERSION)


# Load our training data set
pathToCsvFile = os.path.join('/dbfs' + tempFolderName, 'UsedCars_Affordability.csv')
df_affordability = pd.read_csv(pathToCsvFile, delimiter=',')
print(df_affordability)

```

```
#Provide values for the Resource Group and Workspace that will be crea
resource_group = "amlscronj"
workspace_name = "amlscronj"
workspace_region = 'westeurope' # eastus, westcentralus, southeastasia

# By using the exist_ok param, if the worskpace already exists we get 
ws = Workspace.create(
    name = workspace_name,
    subscription_id = subscription_id,
    resource_group = resource_group,
    location = workspace_region,
    exist_ok = True)

print("Workspace Provisioning complete.")


# Create an experiment, log metrics and register the created model
experiment_name = "Experiment-03-40"
model_name = "usedcarsmodel"
training_set_percentage = 0.50
registered_model, model, scaler, score, run = train_eval_register_mode
```

Deployment from Databricks: to ACI or AKS

Cmd 22

```
# Step 5 - Create container image configuration
################################################
# Build the ContainerImage
runtime = "python"
driver_file = "score.py"
conda_file = "mydeployenv.yml"

from azureml.core.image import ContainerImage

image_config = ContainerImage.image_configuration(execution_script = driver_file,
                                                  runtime = runtime,
                                                  conda_file = conda_file)
```

Command took 0.02 seconds -- by scronj@mic

Cmd 23

Deploy the container image to ACI

Cmd 24

With the Container Image configuration in hand, you are almost ready to deploy to ACI. the following cell to create this configuration.

Cmd 25

```
# Step 6 - Create ACI configuration
###################################
from azureml.core.webservice import AciWebservice, Webservice

aci_config = AciWebservice.deploy_configuration(
    cpu_cores = 1,
    memory_gb = 1,
    tags = {'name':'Azure ML ACI 2'},
    description = 'This is a second ACI.')
```

Cmd 27

```
# Step 7 -Deploy the webservice to ACI
######################################
service_name = "usedcarsmlserviceaci2"

webservice = Webservice.deploy_from_model(
  workspace=ws,
  name=service_name,
  deployment_config=aci_config,
  models = [registered_model],
  image_config=image_config,
  )

webservice.wait_for_deployment(show_output=True)
```

```
Creating image
Image creation operation finished for image usedcarsmlserviceaci2:1, opera
Creating service
Running.....................
SucceededACI service creation operation finished, operation "Succeeded"
```

Command took 7.26 minutes -- by scronj@microsoft.com at 28.3.2019, 16:04:11 on databricl