

# Azure Fundamentals

# What is Cloud Computing?

- **Computing services over the internet**, which is otherwise known as the cloud.
- These services include servers, storage, databases, networking, software, analytics, and intelligence.
- Cloud computing offers faster innovation, flexible resources, and economies of scale.

You typically pay only for the cloud services you use, which helps you:

- Lower your operating costs.
- Run your infrastructure more efficiently.
- Scale as your business needs change.

To put it another way, cloud computing is a way to rent compute power and storage from someone else's datacenter. You can treat cloud resources like you would your resources in your own datacenter. When you're done using them, you give them back. You're billed only for what you use.

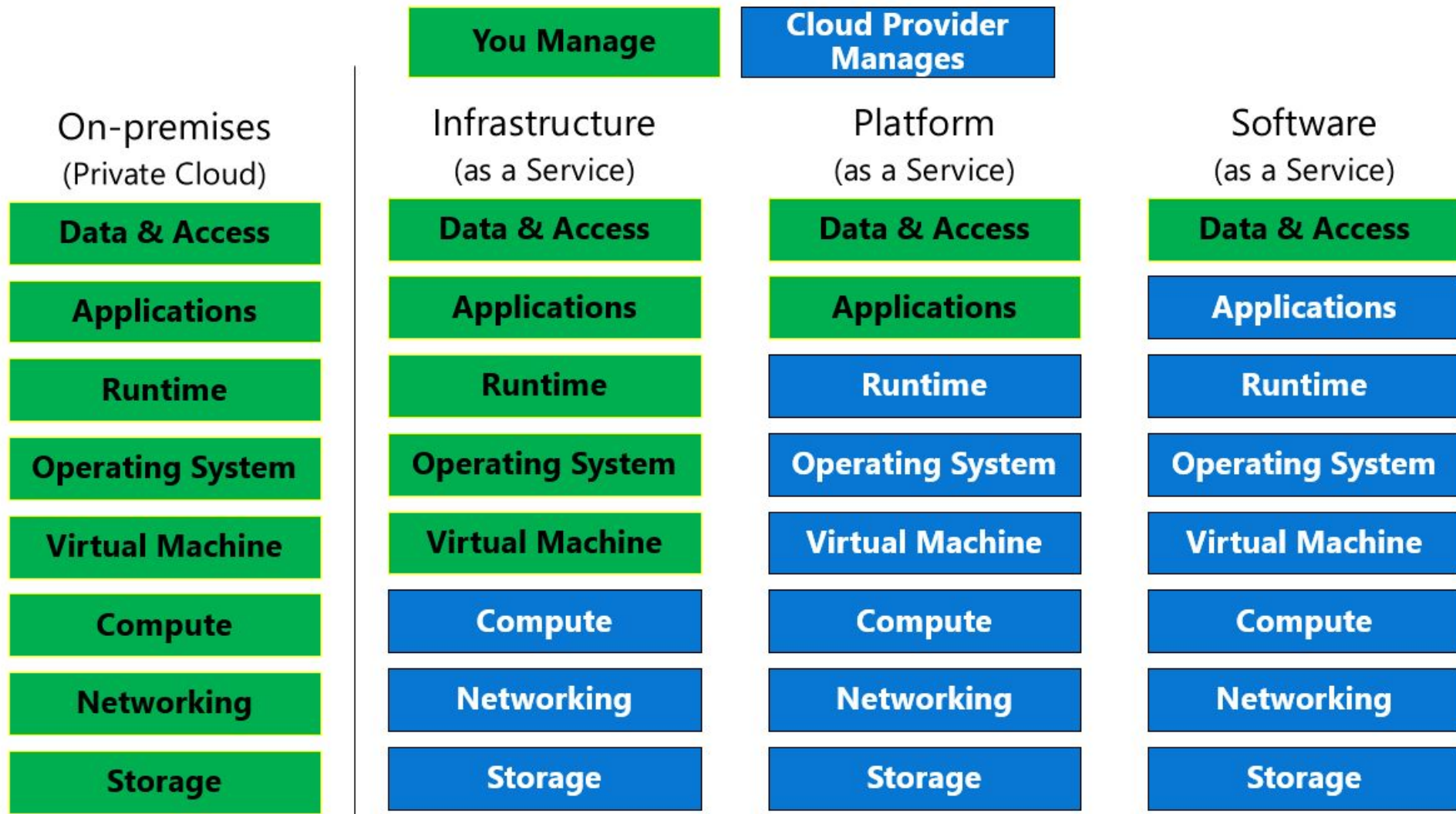
# What are some cloud computing advantages?

- **Reliability:** Depending on the service-level agreement that you choose, your cloud-based applications can provide a continuous user experience with no apparent downtime even when things go wrong.
- **Scalability:** Applications in the cloud can be scaled in two ways, while taking advantage of autoscaling:
  - *Vertically:* Computing capacity can be increased by adding RAM or CPUs to a virtual machine.
  - *Horizontally:* Computing capacity can be increased by adding instances of a resource, such as adding more virtual machines to your configuration.
- **Elasticity:** Cloud-based applications can be configured to always have the resources they need.
- **Agility:** Cloud-based resources can be deployed and configured quickly as your application requirements change.
- **Geo-distribution:** Applications and data can be deployed to regional datacenters around the globe, so your customers always have the best performance in their region.
- **Disaster recovery:** By taking advantage of cloud-based backup services, data replication, and geo-distribution, you can deploy your applications with the confidence that comes from knowing that your data is safe in the event that disaster should occur.

# What are cloud service models?

Computing model	Description
IaaS	This cloud service model is the closest to managing physical servers. A cloud provider keeps the hardware up to date, but operating system maintenance and network configuration is left to the cloud tenant. For example, Azure virtual machines are fully operational virtual compute devices running in Microsoft's datacenters. An advantage of this cloud service model is rapid deployment of new compute devices. Setting up a new virtual machine is considerably faster than procuring, installing, and configuring a physical server.
PaaS	This cloud service model is a managed hosting environment. The cloud provider manages the virtual machines and networking resources, and the cloud tenant deploys their applications into the managed hosting environment. For example, Azure App Services provides a managed hosting environment where developers can upload their web applications without having to deal with the physical hardware and software requirements.
SaaS	In this cloud service model, the cloud provider manages all aspects of the application environment, such as virtual machines, networking resources, data storage, and applications. The cloud tenant only needs to provide their data to the application managed by the cloud provider. For example, Office 365 provides a fully working version of Office that runs in the cloud. All that you need to do is create your content, and Office 365 takes care of everything else.

# What are cloud service models?





## Security & Management

- Security Center
- Azure portal
- Azure Active Directory
- Azure AD B2C
- Multi-Factor Authentication
- Automation
- Key Vault
- Azure Marketplace
- VM Image Gallery
- REST API and CLI

## Platform Services

### Media & CDN

- Media Services
- Media Analytics
- Content Delivery Network

### Integration

- API Management
- Service Bus
- Azure Logic Apps

### Compute Services

- Container Service
- VM Scale Sets
- Azure Batch
- Dev/Test Lab

### Application Platform

- Web Apps
- Mobile Apps
- API Apps
- Cloud Services
- Service Fabric
- Notification Hubs
- Functions

### Developer Services

- Visual Studio
- Mobile Engagement
- Azure DevOps
- Xamarin
- Application Insights
- Visual Studio App Center

### Data

- SQL Database
- Azure Synapse Analytics
- Cosmos DB
- SQL Server Stretch Database
- Azure Cache for Redis
- Table Storage
- Azure Search

### Intelligence

- Cognitive Services
- Bot Services
- Azure ML Studio

### Analytics & IoT

- HDInsight
- Machine Learning
- Stream Analytics
- Data Catalog
- Data Lake Analytics Service
- Data Lake Storage
- IoT Hub
- Event Hubs
- Data Factory
- Power BI Embedded

## Hybrid Cloud

- Azure AD Connect Health
- AD Privileged Identity Management
- Domain Services
- Backup
- Azure Monitor
- Import/Export
- Azure Site Recovery
- StorageSimple

## Infrastructure Services

### Compute

- Virtual Machines
- Containers and Azure Kubernetes

### Storage

- Blob
- Queues
- Files
- Disks

### Networking

- Virtual Network
- Load Balancer
- DNS
- Express Route
- Traffic Manager
- VPN Gateway
- App Gateway

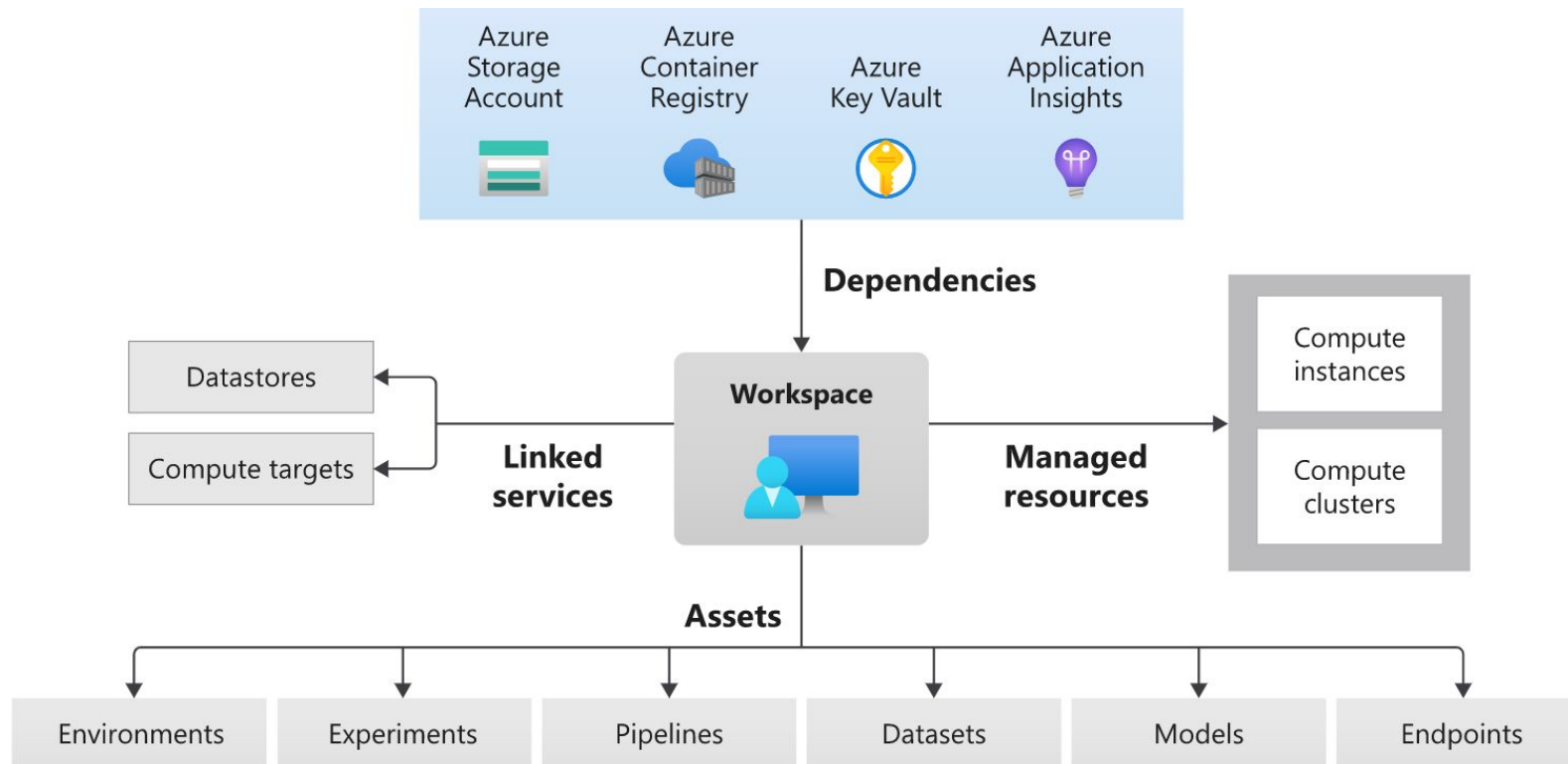
## Datacenter Infrastructure

# Azure Machine Learning

Enterprise-grade machine learning service to build and deploy models faster

# Accelerate the end-to-end machine learning lifecycle

Empower data scientists and developers with a wide range of productive experiences to build, train and deploy machine learning models and foster team collaboration. Accelerate time to market with industry-leading MLOps—DevOps for machine learning. Innovate on a secure, trusted platform, designed for responsible machine learning.

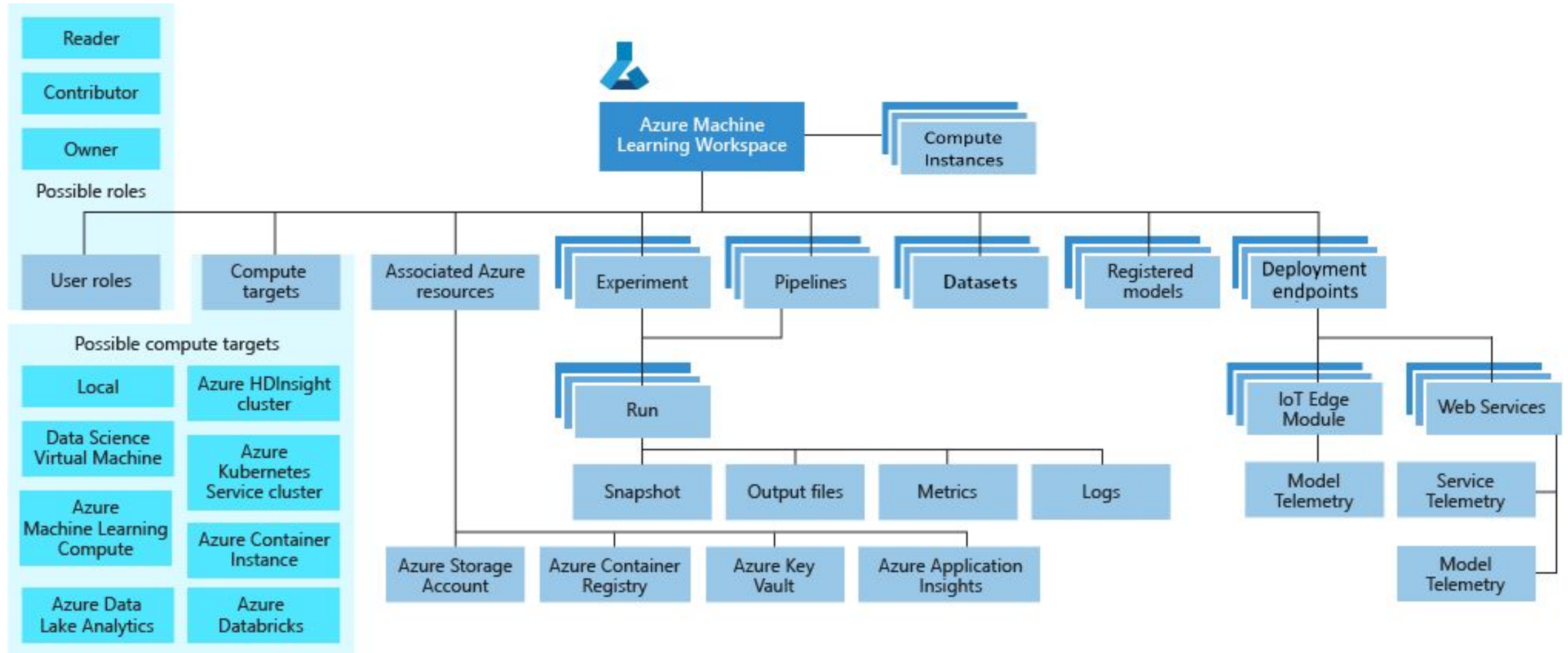




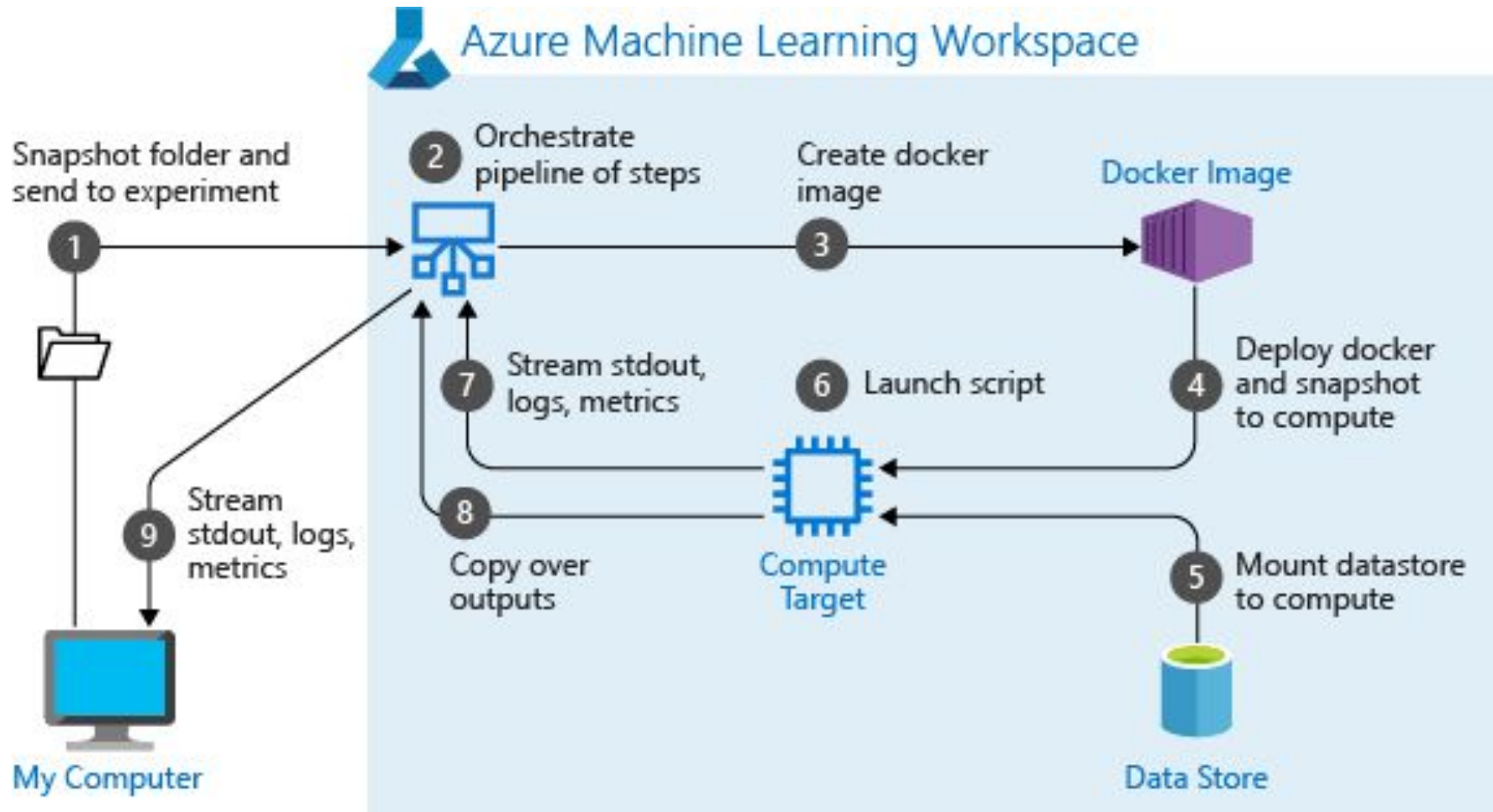
# Azure ML - Demo

- [Setup Local Env](#)
- [Tutorials at](#)  
<https://github.com/AlmaBetter-School/MachineLearningNotebooks/tree/master/tutorials>

# Azure Machine Learning Concepts



# Azure ML Pipelines



# MLOps – Best Practices

**5 Best Practices** to optimize your MLOps lifecycle on Azure:

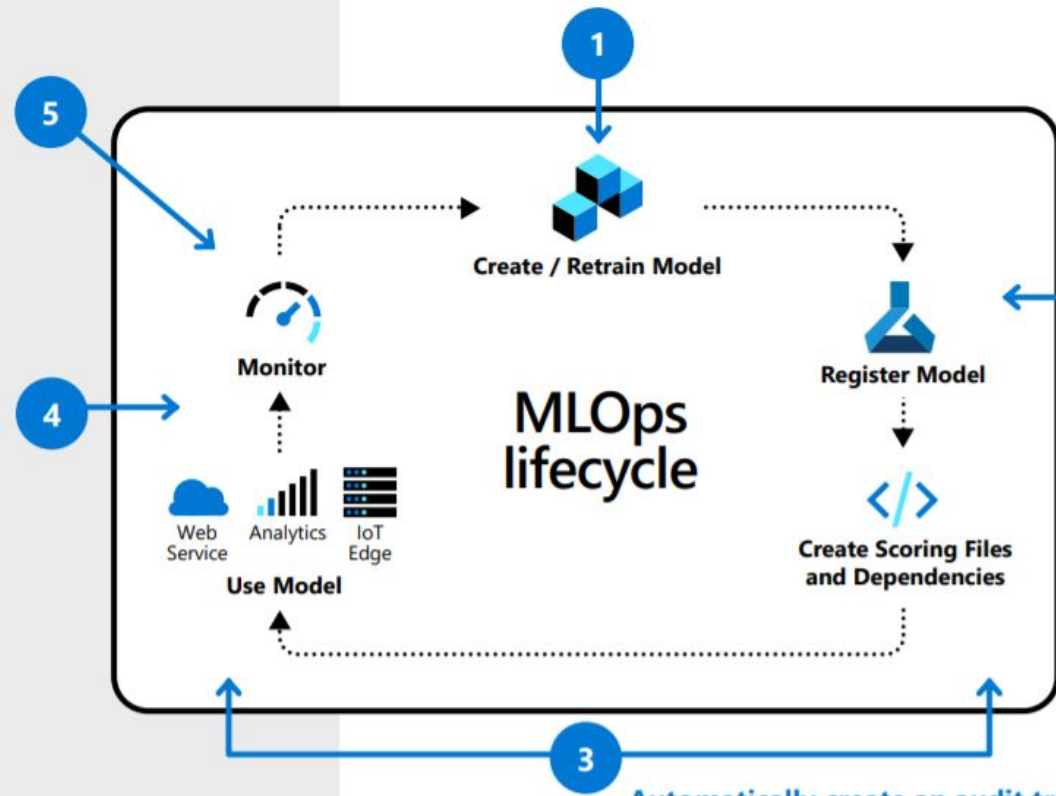
**Observe data drift and** feed back model information to improve future training.

**Deploy and monitor performance** so you can release models with confidence and know when to retrain.

**Create models with reusable ML pipelines** using the Azure Machine Learning extension for Azure DevOps. Store your code in GitHub so it automatically integrates into your MLOps pipeline.

**Automate your MLOps rollout** using Azure DevOps + Azure Machine Learning for version models with rich metadata and event management.

**Automatically create an audit trail** for all artifacts in your MLOps pipeline ensure asset integrity and meet regulatory requirements.



# References

- <https://github.com/AlmaBetter-School/MachineLearningNotebooks>
- <https://azure.microsoft.com/en-us/services/machine-learning/mlops/>
- <https://docs.microsoft.com/en-us/azure/machine-learning/>