Microsoft

AZ-900
Learning path 03: Management and governance

Learning path outline

Learning path 03—outline

You will learn the following concepts:

1 **Cost management**
- Cost and pricing calculators
- Cost management and tags

2 **Governance and compliance**
- Blueprints, policies, and resource locks
- Service Trust portal

3 **Resource deployment tools**
- Portal, PowerShell, CLI, and others
- Azure Arc and Azure Resource Manager

4 **Monitoring tools**
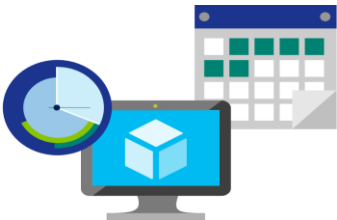- Azure Advisor, Azure Service Health, and Azure Monitor

Cost management

Cost management—objective domain

- Describe factors that can affect costs in Azure.

- Compare the pricing calculator and Total Cost of Ownership (TCO) calculator.

- Describe the Azure Cost Management Tool.
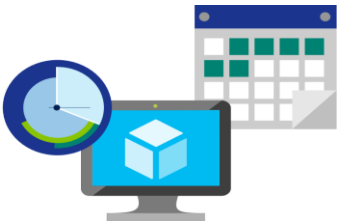
- Describe the purpose of tags.

Factors affecting costs (part 1)

These are some of the factors affecting costs:

1) Resource type	2) Consumption	3) Maintenance
Costs are resource-specific, so the usage that a meter tracks and the number of meters associated with a resource, depend on the resource type.	With a pay-as-you-go model, consumption is one of the biggest drivers of costs.	Monitoring your Azure footprint and maintaining your environment can help you identify and mitigate costs that aren't necessary, such as shutting down underused virtual machines.

Factors affecting costs (part 2)

These are some of the factors affecting costs:

4) Geography	5) Network traffic	6) Subscription
The same resource type can cost different amounts depending on the geographic area, which has an impact on Azure costs.	While some inbound data transfers are free, the cost for outbound data or data between Azure resources is impacted by billing zones.	The type and configuration of your subscription can also impact your cost. For example, the free trial lets you explore some Azure resources for free.

Explore Azure Marketplace

Azure Marketplace allows customers to find, try, purchase, and provision applications and services from hundreds of leading service providers, which are
all certified to run on Azure.

- Open-source container platforms.

- Virtual machine and database images.

- Application build and deployment software.

- Developer tools.

- And much more, with 10,000-plus listings!

Pricing calculator

The **pricing calculator** is a tool that helps you estimate the cost of Azure products. The options that you can configure in the pricing calculator vary between products, but basic configuration options include:

- Region
- Tier
- Billing options
- Support options
- Programs and offers
- Azure dev/test pricing

Your Estimate

∧ Virtual Machines   ⓘ   1 D2 v3 (2 vCPUs, 8 GB RAM) x 730 Hours (...   Upfront: USD 0.00   Monthly: USD

Virtual Machines

REGION: OPERATING SYSTEM: TYPE: TIER:
West US   Windows   (OS Only)   Standard

CATEGORY: INSTANCE SERIES: INSTANCE:
All   All   D2 v3: 2 vCPUs, 8 GB RAM, 50 GB Temporary storage, USD 0.209/hour
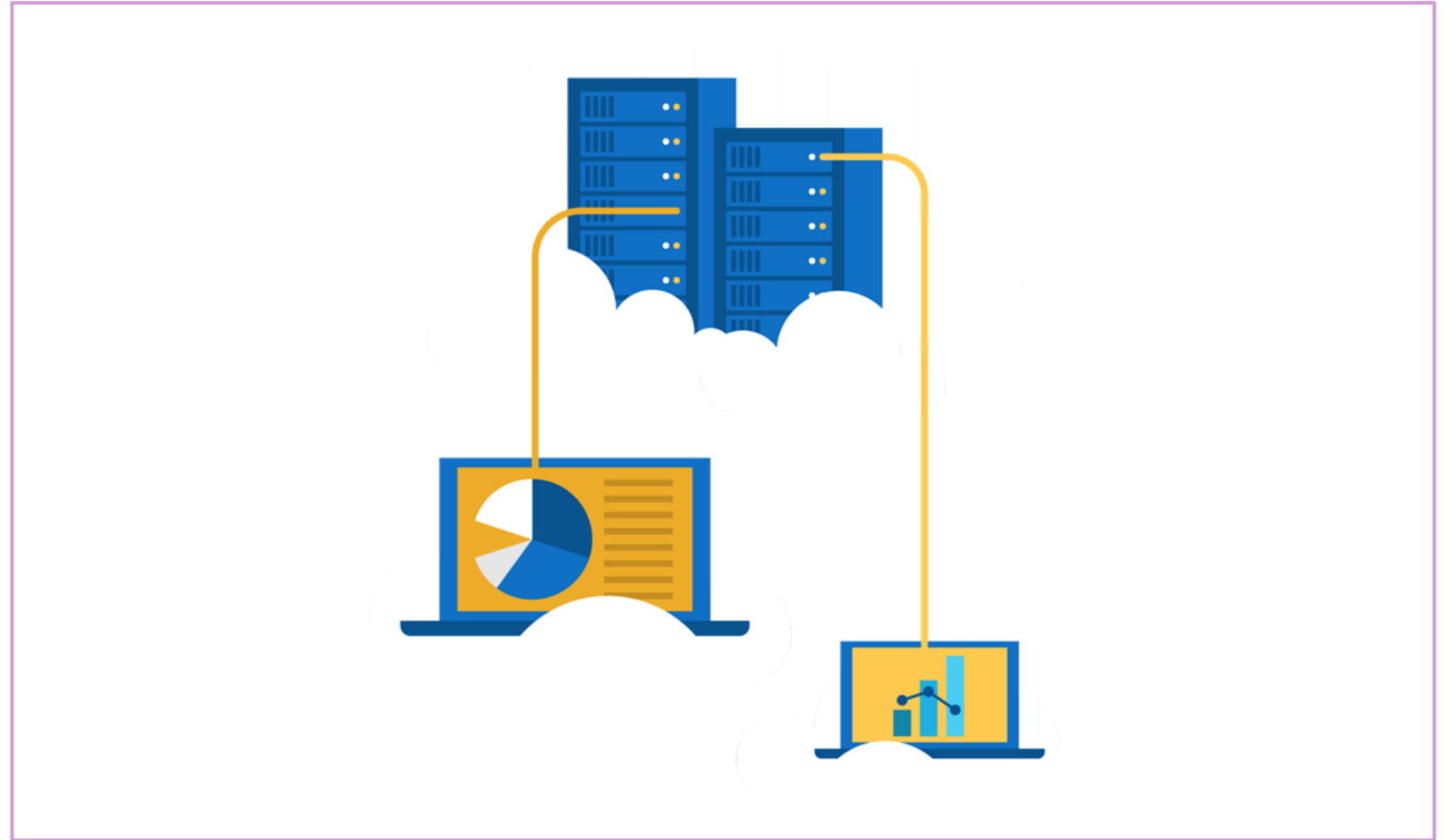
Virtual machines
1   ✕   730   Hours
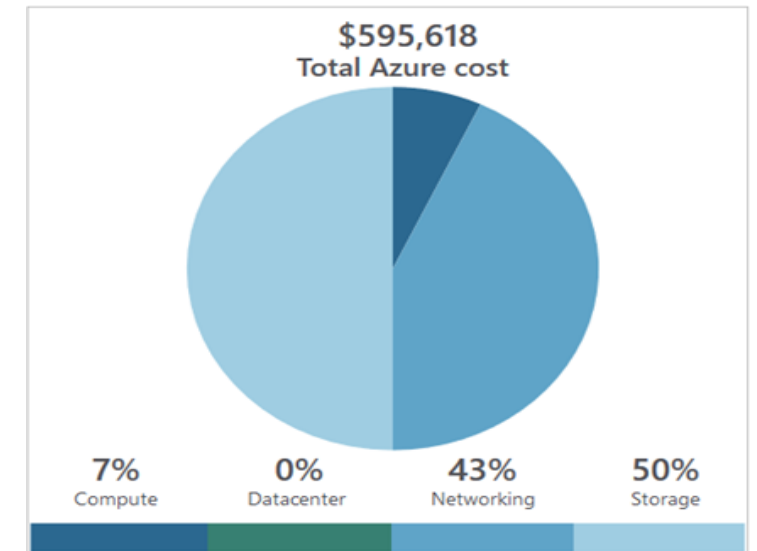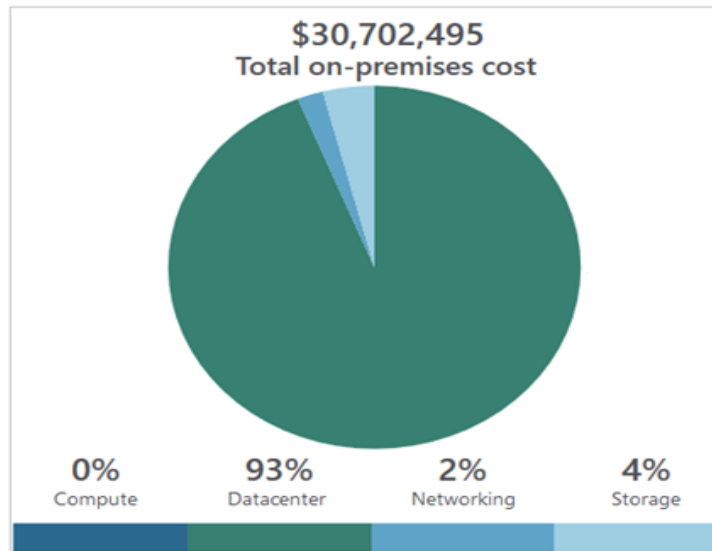
Exercise—use the Azure pricing calculator

Use the Azure pricing calculator to generate a cost estimate for an Azure virtual machine and related network resources.

1. Configure the pricing calculator.
2. Review the pricing estimate.

Total Cost of Ownership (TCO) calculator

- A tool to estimate cost savings you can realize by migrating to Azure.

- A report compares the costs of on-premises infrastructures with the costs of using Azure products and services in the cloud.

$30,702,495
Total on-premises cost

| 0% | 93% | 2% | 4% |
| Compute | Datacenter | Networking | Storage |

$595,618
Total Azure cost

| 7% | 0% | 43% | 50% |
| Compute | Datacenter | Networking | Storage |

Exercise—use the Azure TCO calculator

Use the Total Cost of Ownership (TCO) calculator to generate a cost comparison report for an on-premises environment.

1. Configure the TCO calculator.
2. Review the results and save a copy.
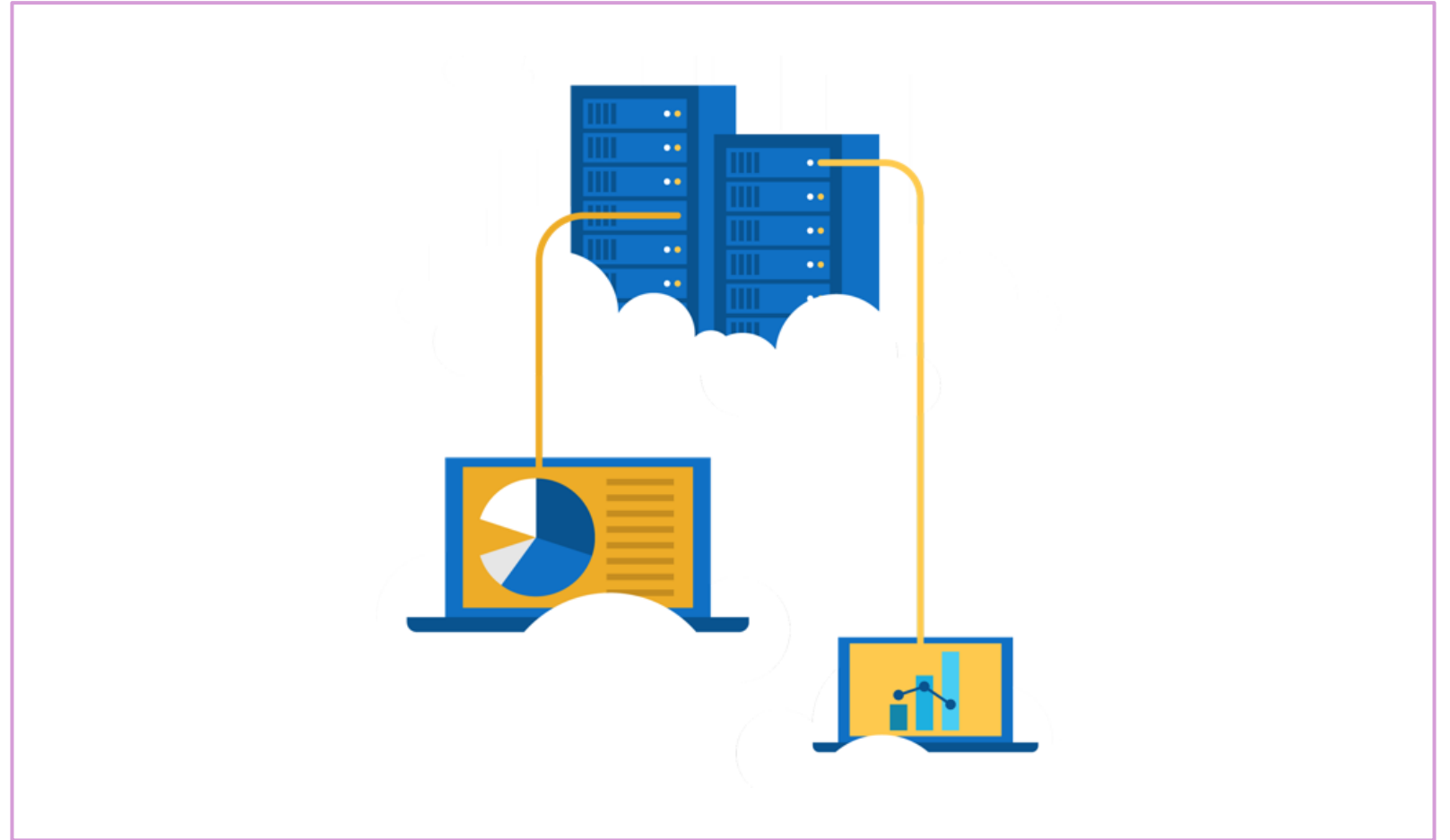
Azure Cost Management

- Reporting: Billing reports

- Data enrichment

- Budgets: Set spend budget

- Alerting: When cost exceed limits

- Recommendation: Cost recommendations
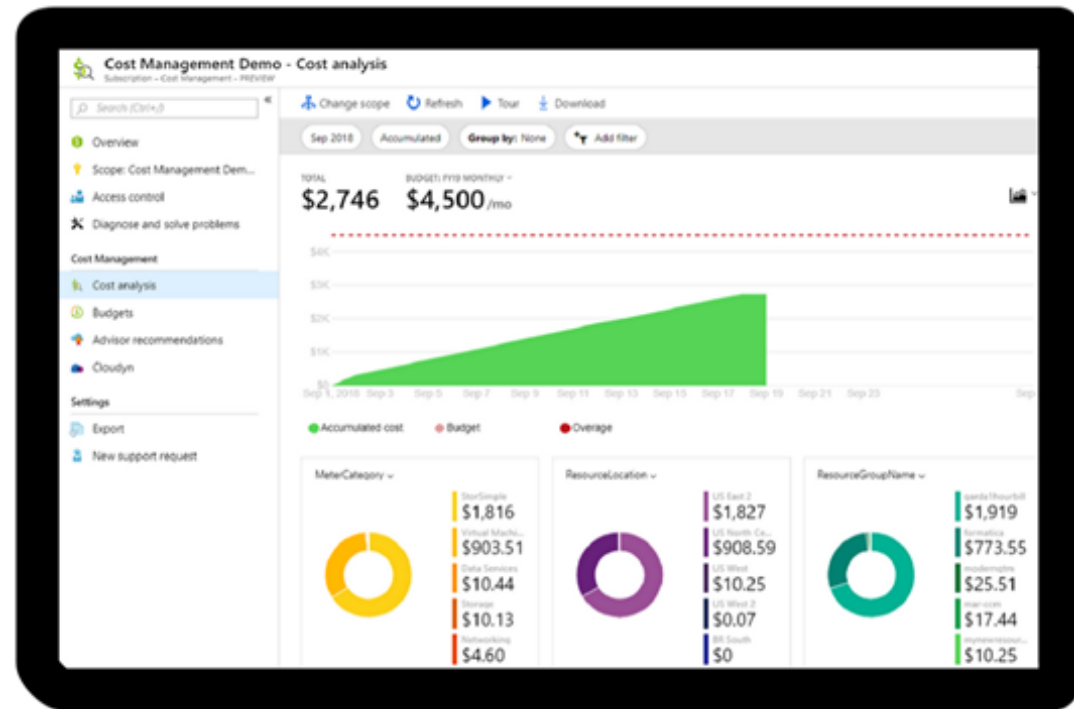
Tags

- Provides metadata for your Azure resources.

- Logically organizes resources into a taxonomy.

- Consists of a name-value pair.

- Very useful for rolling up billing information.

owner: joe
department: marketing
environment: production

cost-center: marketing
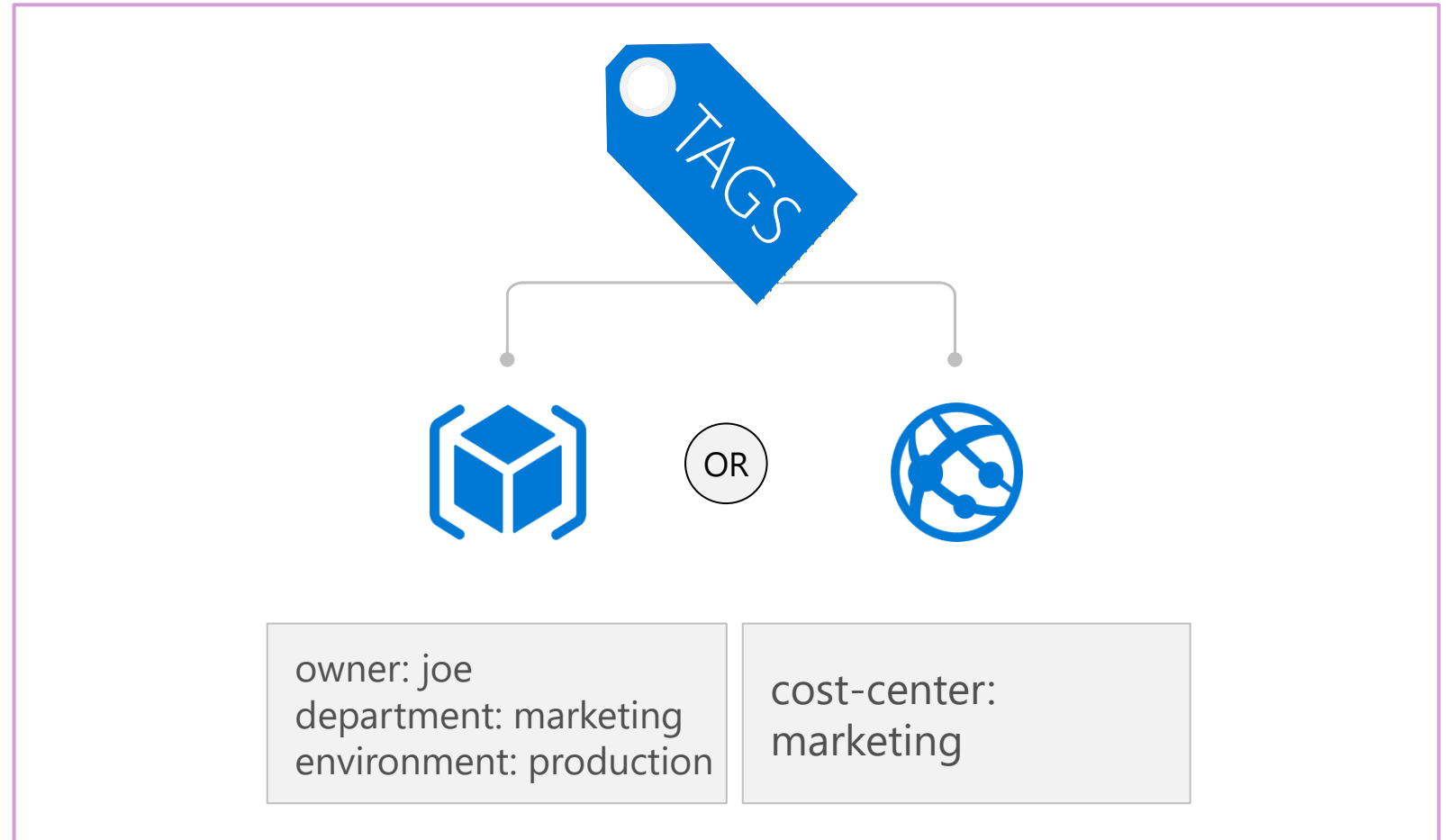
Governance and compliance

Governance and compliance—objective domain

- Describe the purpose of Azure Policy.

- Describe the purpose of resource locks.

- Describe the purpose of the Service Trust portal.

- Describe the purpose of Microsoft Purview.

Azure Policy

Azure Policy helps to enforce organizational standards and to assess compliance at scale. Provides governance and resource consistency with regulatory compliance, security, cost, and management.

- Evaluates and identifies Azure resources that do not comply with your policies.
- Provides built-in policy and initiative definitions, under categories such as Storage, Networking, Compute, Security Center, and Monitoring.
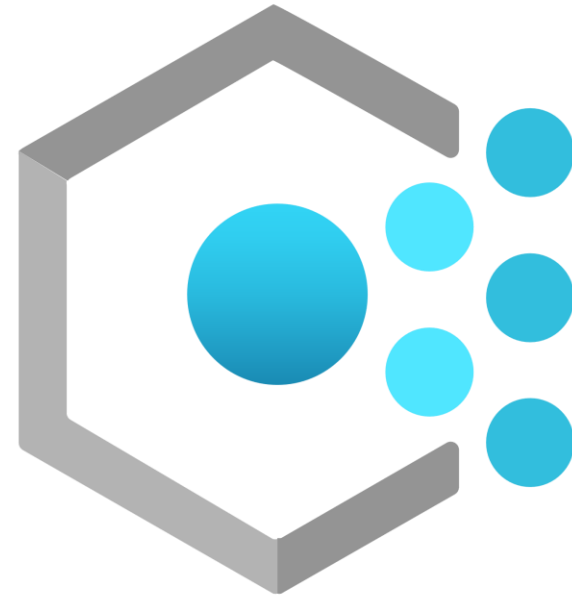
Resource locks

- Protect your Azure resources from accidental deletion or modification.

- Manage locks at subscription, resource group, or individual resource levels within the Azure portal.

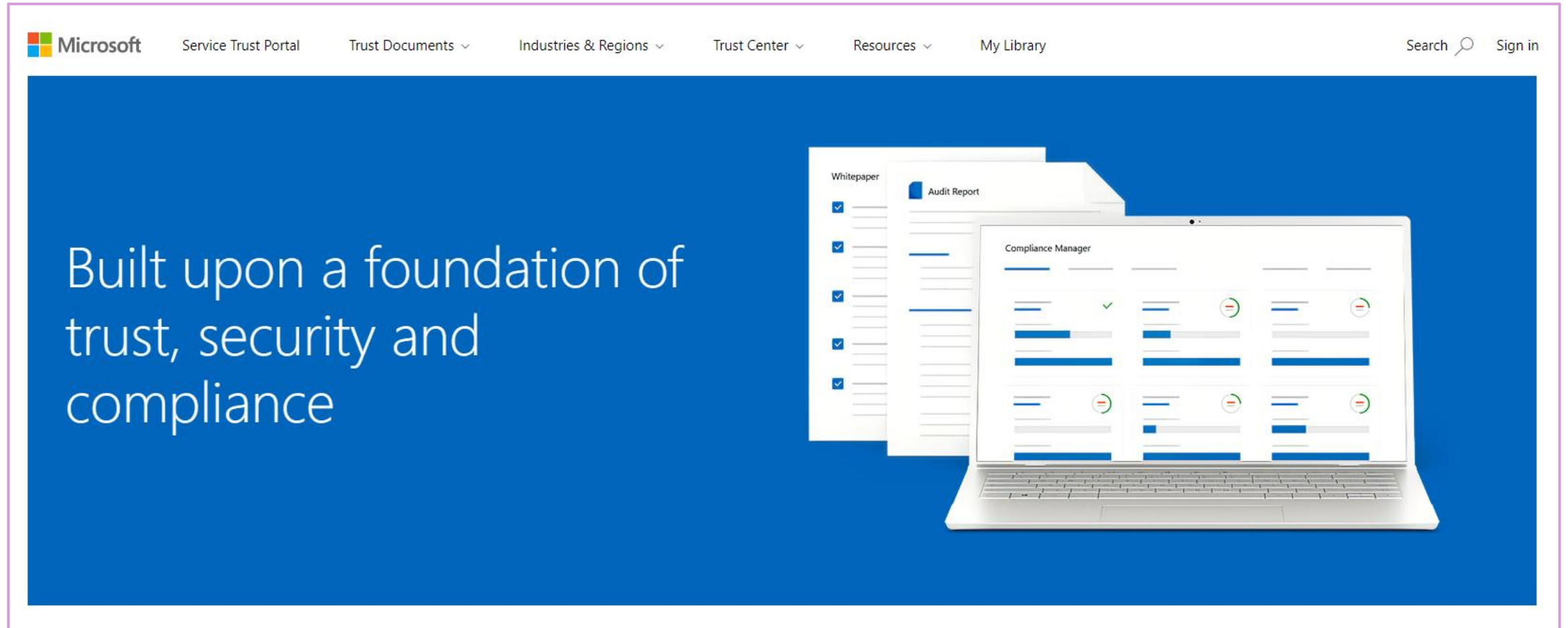| Lock Types	Read	Update	Delete
Delete	Yes	Yes	No
ReadOnly	Yes	No	No

Walkthrough—manage resource locks

Create a resource and add a lock to prevent modification

1. Create a resource.

2. Add a ReadOnly resource lock to prevent resource modification.

3. Update lock and retest.

4. Remove the resource lock.

5. Delete the resource.

Service Trust portal

Microsoft Purview

Microsoft Purview is a family of data governance, risk, and compliance solutions that helps you get a single, unified view into your data. Microsoft Purview brings insights about your on-premises, multicloud, and software as a service data together.

- Automated data discovery
- Sensitive data classification
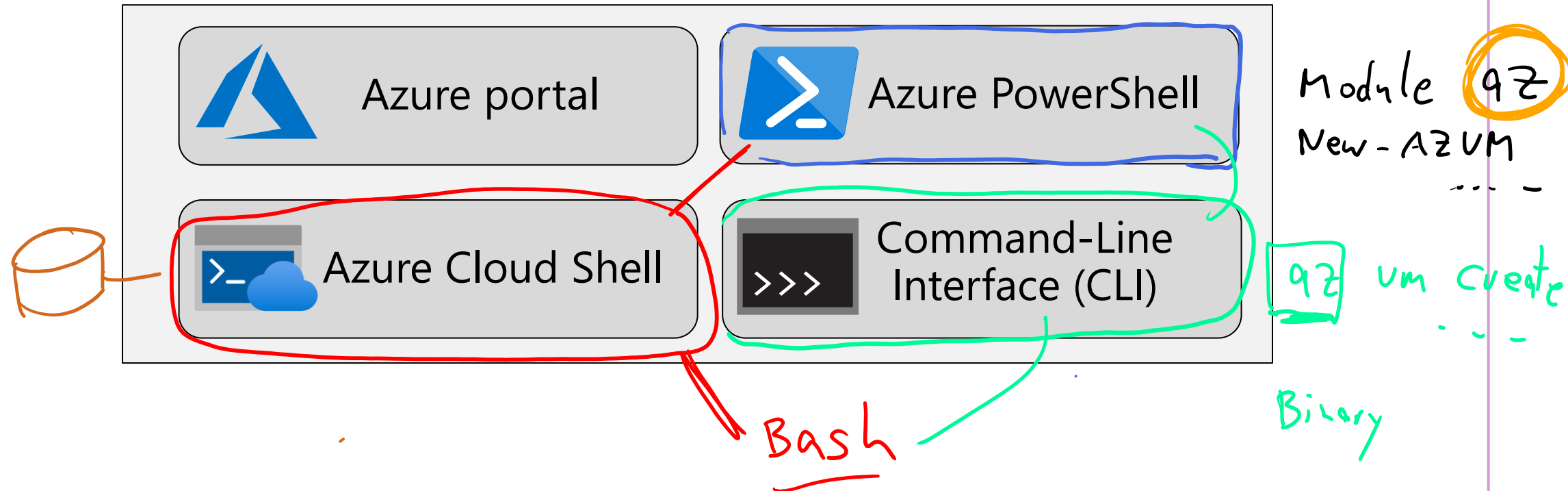- End-to-end data lineage

Management and deployment tools

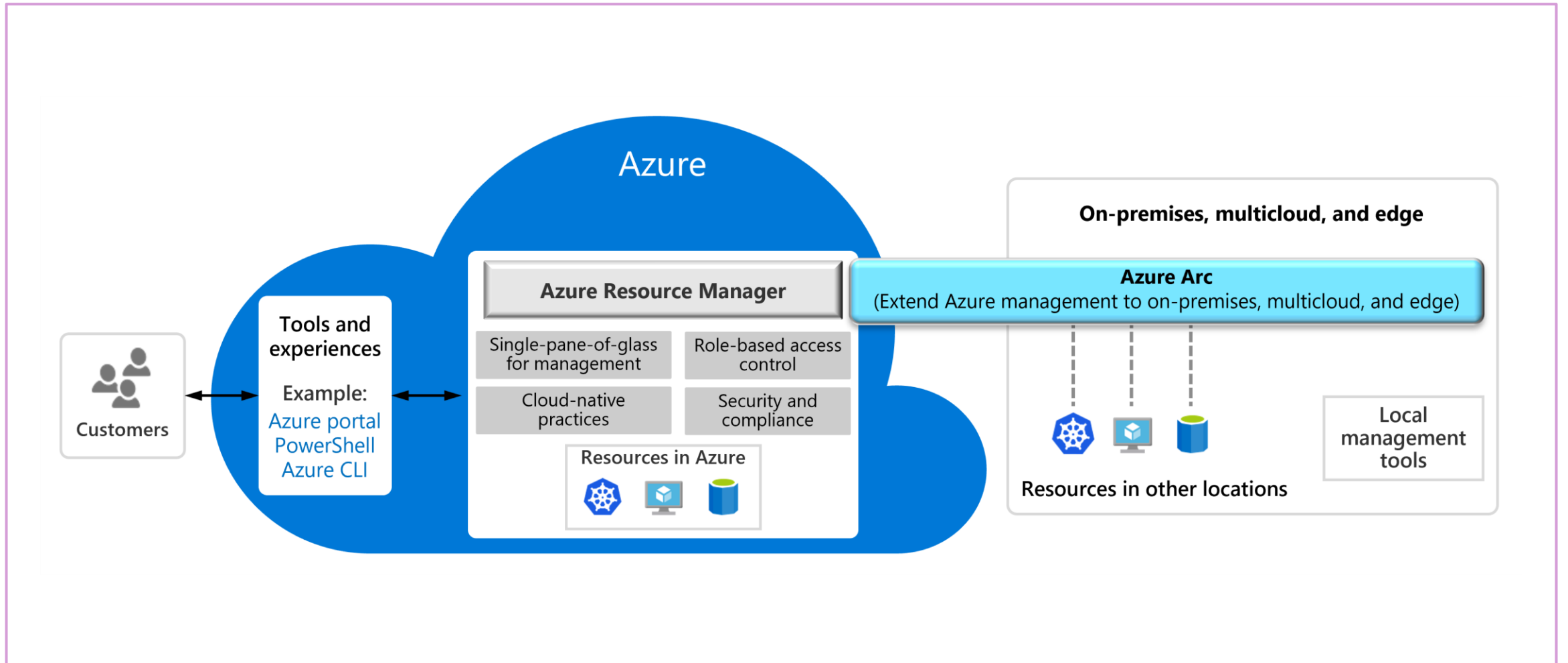# Management and deployment tools—objective domain

- Describe Azure portal.

- Describe Azure Cloud Shell, including Azure CLI and Azure PowerShell.

- Describe the purpose of Azure Arc.

- Describe Azure Resource Manager (ARM) and Azure ARM templates.

Tools for interacting with Azure

Azure portal

Azure PowerShell

Azure Cloud Shell

Command-Line Interface (CLI)

Module az
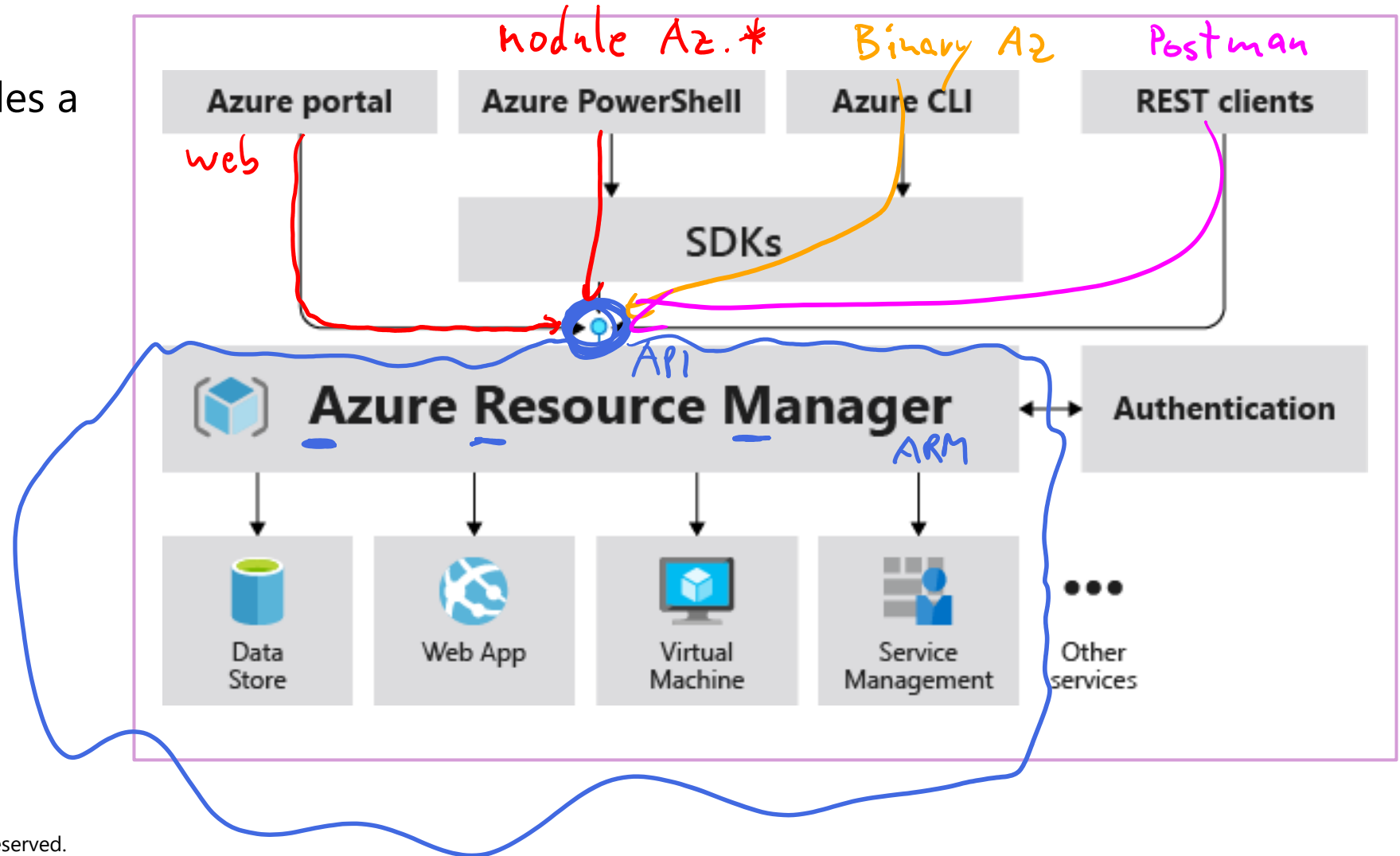New-AZVM
- - - -

az vm create
- - - -

Bash

Binary

Azure Arc

Azure Resource Manager

The **Azure Resource Manager (ARM)** provides a management layer that enables you to create, update, and delete resources in your Azure subscription.

Azure portal   Azure PowerShell   Azure CLI   REST clients

module Az.*   *Binary Az*   *Postman*

web

SDKs

API

Azure Resource Manager   *ARM*   Authentication

Data Store   Web App   Virtual Machine   Service Management   ••• Other services
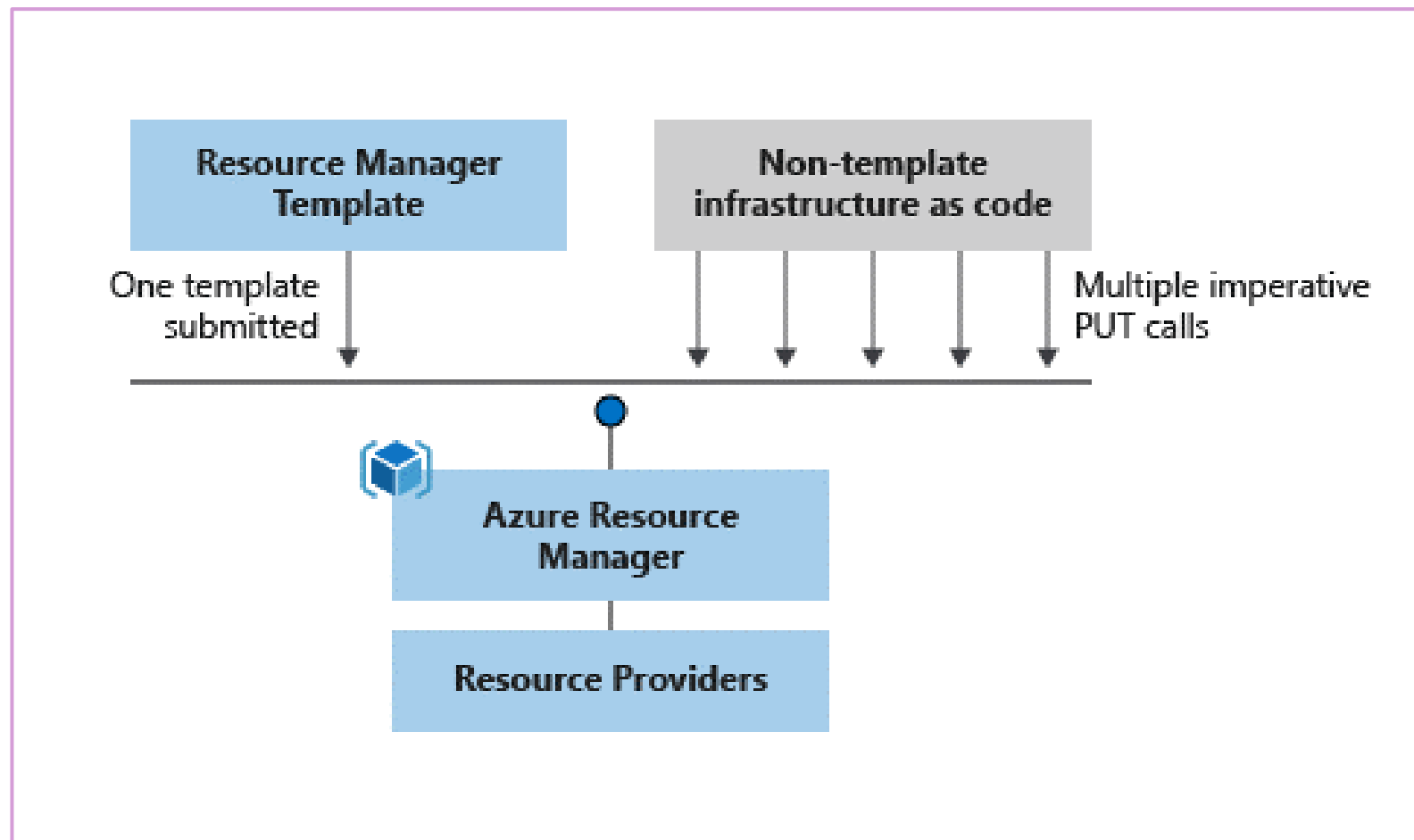
Infrastructure as code

- Ensure consistency in deployment across your cloud ecosystem.

- Manage configuration at scale.

- Rapidly provision additional environments based on a standard configuration and build.
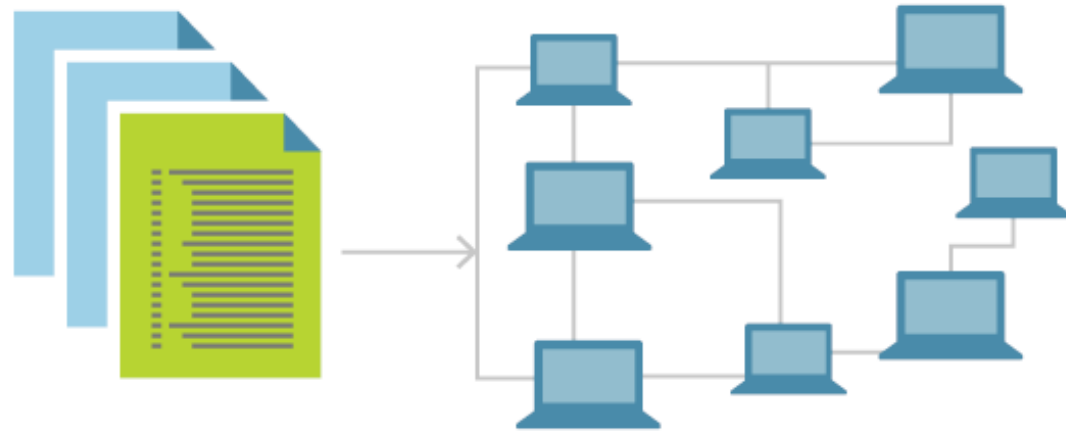
Azure Resource Manager (ARM) templates

Azure Resource Manager (ARM) templates are JavaScript Object Notation (JSON) files that can be used to create and deploy Azure infrastructure without having to write programing commands.

- Declarative syntax
- Repeatable results
- Orchestration
- Modular files
- Built-in validation
- Exportable code

Resource Manager Template

Non-template infrastructure as code

One template submitted

Multiple imperative PUT calls

Azure Resource Manager

Resource Providers

Bicep

```bicep
Bicep

param location string = resourceGroup().location
param storageAccountName string = 'toylaunch${uniqueString(resourceGroup().id)}'

resource storageAccount 'Microsoft.Storage/storageAccounts@2021-06-01' = {
  name: storageAccountName
  location: location
  sku: {
    name: 'Standard_LRS'
  }
  kind: 'StorageV2'
  properties: {
    accessTier: 'Hot'
  }
}
```

Azure monitoring tools

Azure management tools—objective domain

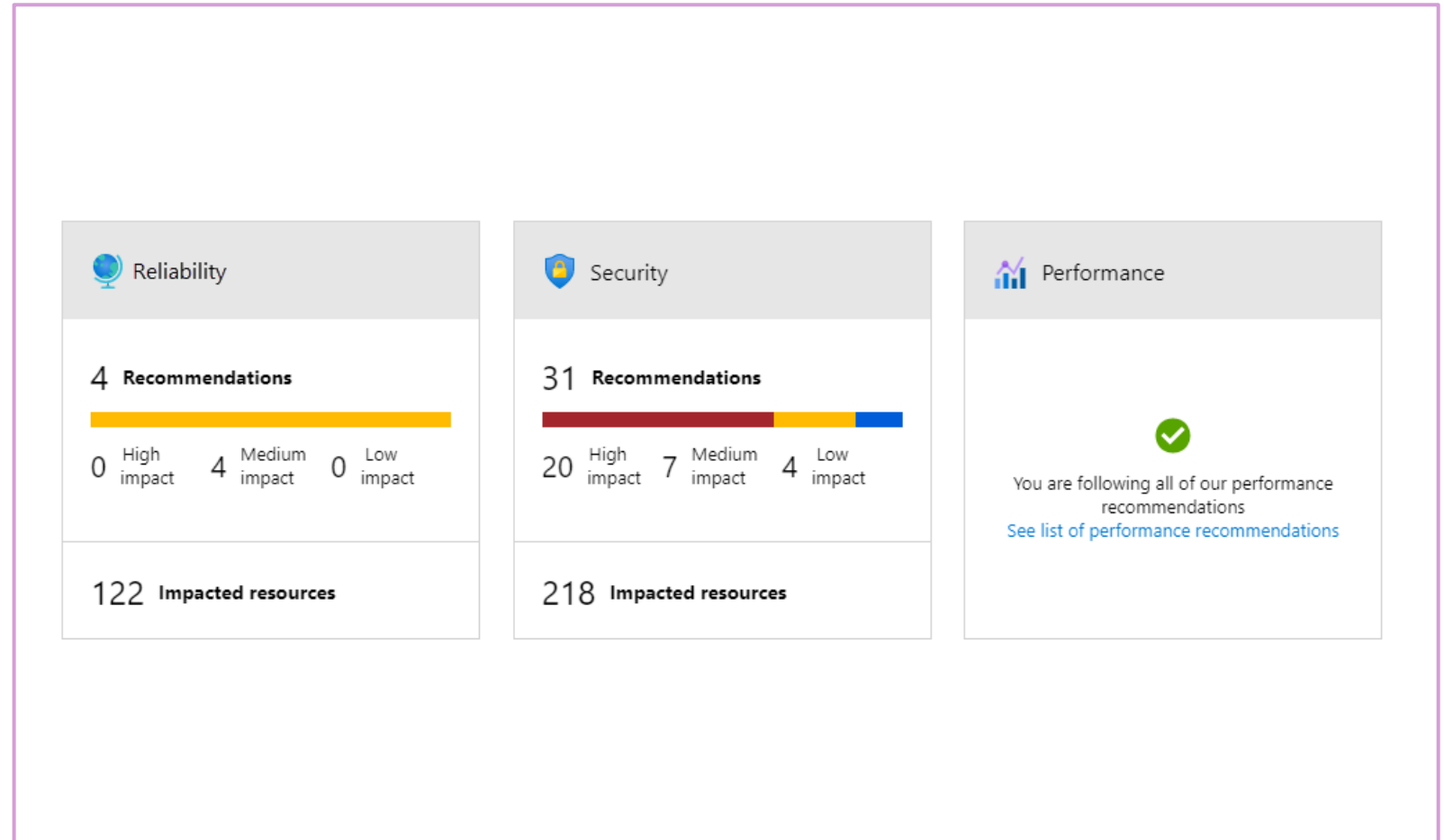**Describe the functionality and usage**

- Describe the purpose of Azure Advisor.

- Describe Azure Service Health.

- Describe Azure Monitor, including Azure Log Analytics, Azure Monitor Alerts, and Application Insights.

Azure Advisor

Azure Advisor analyzes deployed Azure resources and makes recommendations based on best practices to optimize Azure deployments.

- Reliability
- Security
- Performance
- Cost
- Operational excellence

🌐 Reliability

4 **Recommendations**

0 High impact   4 Medium impact   0 Low impact

122 **Impacted resources**

🛡️ Security

31 **Recommendations**

20 High impact   7 Medium impact   4 Low impact

218 **Impacted resources**

📊 Performance

✅

You are following all of our performance recommendations
See list of performance recommendations

Azure Service Health

Azure Service Health is a collection of services that keep you informed of general Azure status, service status that may impact you, and specific resource status that is affecting you.

Azure Status: Global view of the health of all Azure services across all Azure regions.

Service Health: Focused view on only the services and regions that you're using. If a service is experiencing a problem in a region you're not using, it won't show up here.

Resource Health: Tailored view of your actual Azure resources. It provides information about the health of your individual cloud resources.

Azure Monitor

Azure Monitor maximizes the availability and performance of applications and services by collecting, analyzing, and acting on telemetry from cloud and on-premises environments.

- Application Insights
- Log Analytics
- Smart alerts
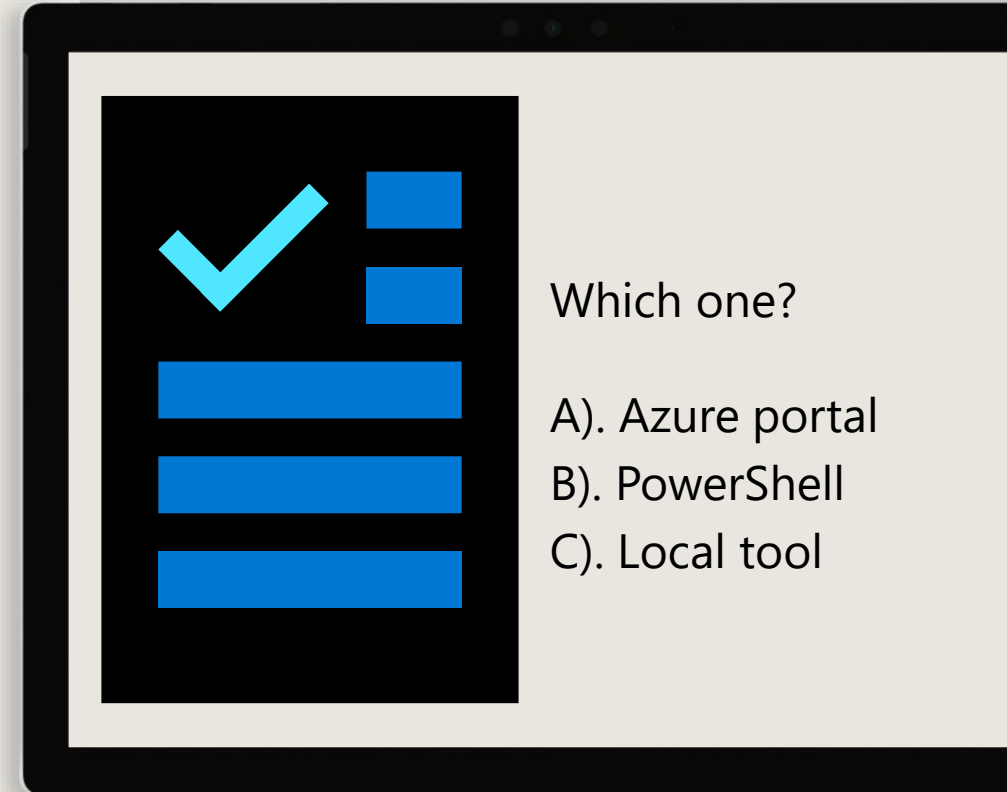- Automation actions
- Customized dashboards
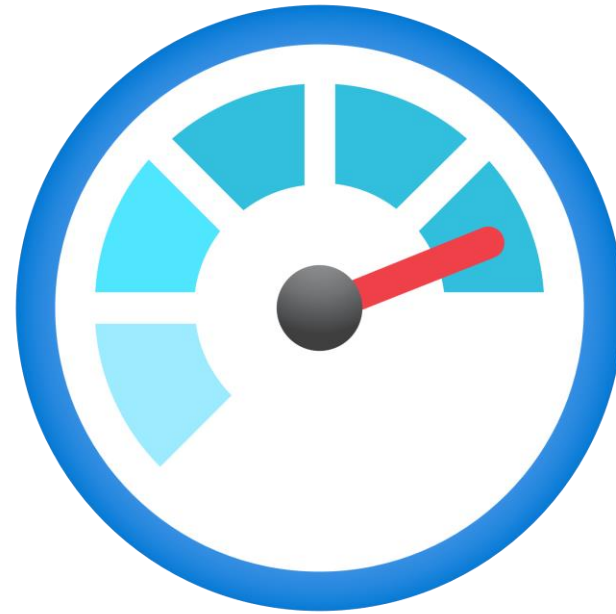
Knowledge check

Populate with instructions to use the polling tool of your choice

Learning path 03

1. Use your smartphones or mobile devices.
2. Go to (**insert polling app link of your choice**).
3. Enter code: **123-45-678.**
4. Please participate in the quiz for this section.

Which one?

A). Azure portal

B). PowerShell

C). Local tool

Learning path 03 review
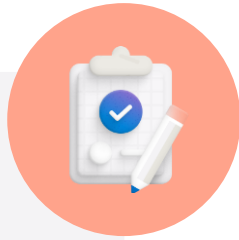
Microsoft Learn Modules (learn.microsoft.com/training)

- Cost management

- Governance and compliance

- Resource deployment tools

- Monitoring tools