Module 1

Introduction to Cloud Computing and Microsoft Azure

Module Overview

- Cloud technology overview
- Overview of Azure
- Managing Azure with the Azure portal
- Managing Azure with Windows PowerShell
- Overview of Azure Resource Manager
- Azure management services

Lesson 1: Cloud technology overview

- What's Cloud Computing like?
- Introduction to cloud computing
- Live Session
- Five Characteristics of Cloud
- Types of cloud services
- Technical Perspective

What is the cloud like?

An approach to computing that's about internet scale and connecting to a variety of devices and endpoints

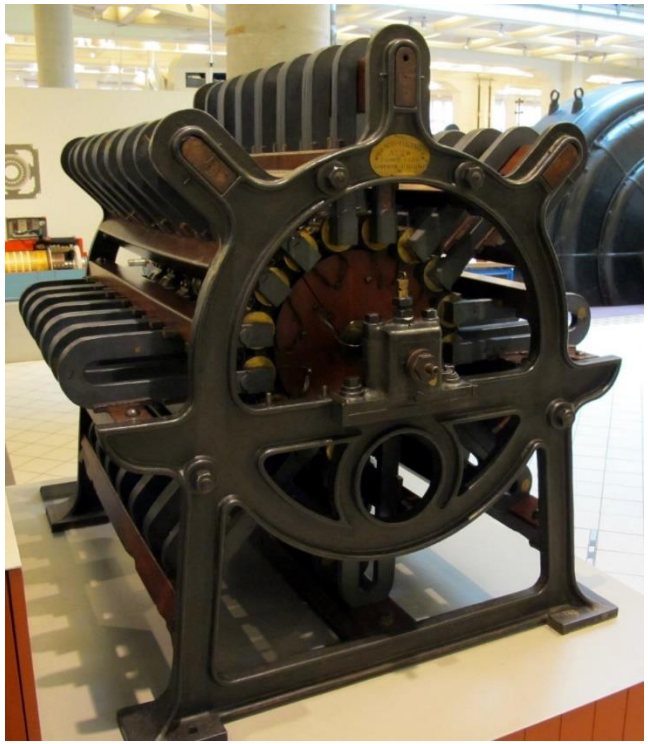
Global
Footprint

Windows Azure

Pay only for what you use

From your own vehicle to public service

Analogy to Electrical Industry

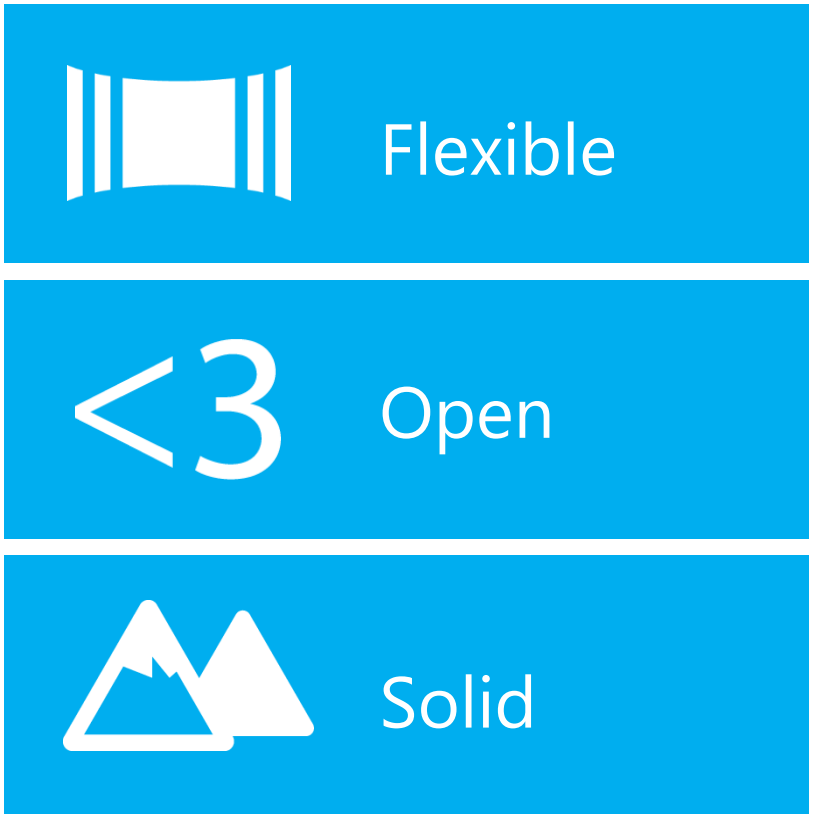


Live Session

- Amazon Web Services (AWS), is a subsidiary of Amazon.com, which offers a suite of cloud computing services that make up an on-demand computing platform.

Windows Azure

Comprehensive set of services that enable you to quickly build, deploy and manage applications across a global network of Microsoft-managed datacenters



countries and territories

Australia
Austria
Belgium
Brazil
Canada
Chile
Colombia
Costa Rica
Cyprus
Czech Republic
Denmark
Finland
France
Germany
Greece
Hong Kong
Hungary
India
Ireland
Israel
Italy
Japan
Korea
Luxembourg
Malaysia
Mexico
Netherlands
New Zealand
Norway
Peru
Philippines
Poland
Portugal
Puerto Rico
Romania
Russia
Singapore
Spain
Sweden
Switzerland
Trinidad & Tobago
UK
United States

New Countries:

Algeria
Argentina
Belarus
Bulgaria
Croatia
Dominican Rep
Ecuador
Egypt
El Salvador
Estonia
Guatemala
Iceland
Indonesia
Jordan
Kazakhstan
Kenya
Kuwait
Latvia
Liechtenstein
Lithuania
Macedonia
Malta
Montenegro
Morocco
Azerbaijan
Nigeria
Oman
Pakistan
Panama
Paraguay
Qatar
Saudi Arabia
Serbia
Slovakia
Slovenia
South Africa
Sri Lanka
Taiwan
Thailand
Tunisia
Turkey
UAE
Ukraine
Uruguay
Venezuela
Bahrain

Get a Server

Demo

Deploy an Application

Demo

Run a Website

Demo

Scalability

Demo

Cloud Computing

The NIST Definition of Cloud Computing

Cloud computing is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction

NIST's Essential Characteristics

1. On-demand Self Service
2. Broad Network Access
3. Resource Pooling
4. Rapid Elasticity
5. Measured Service

Service Models

IaaS

Infrastructure-as-a-Service

host

PaaS

Platform-as-a-Service

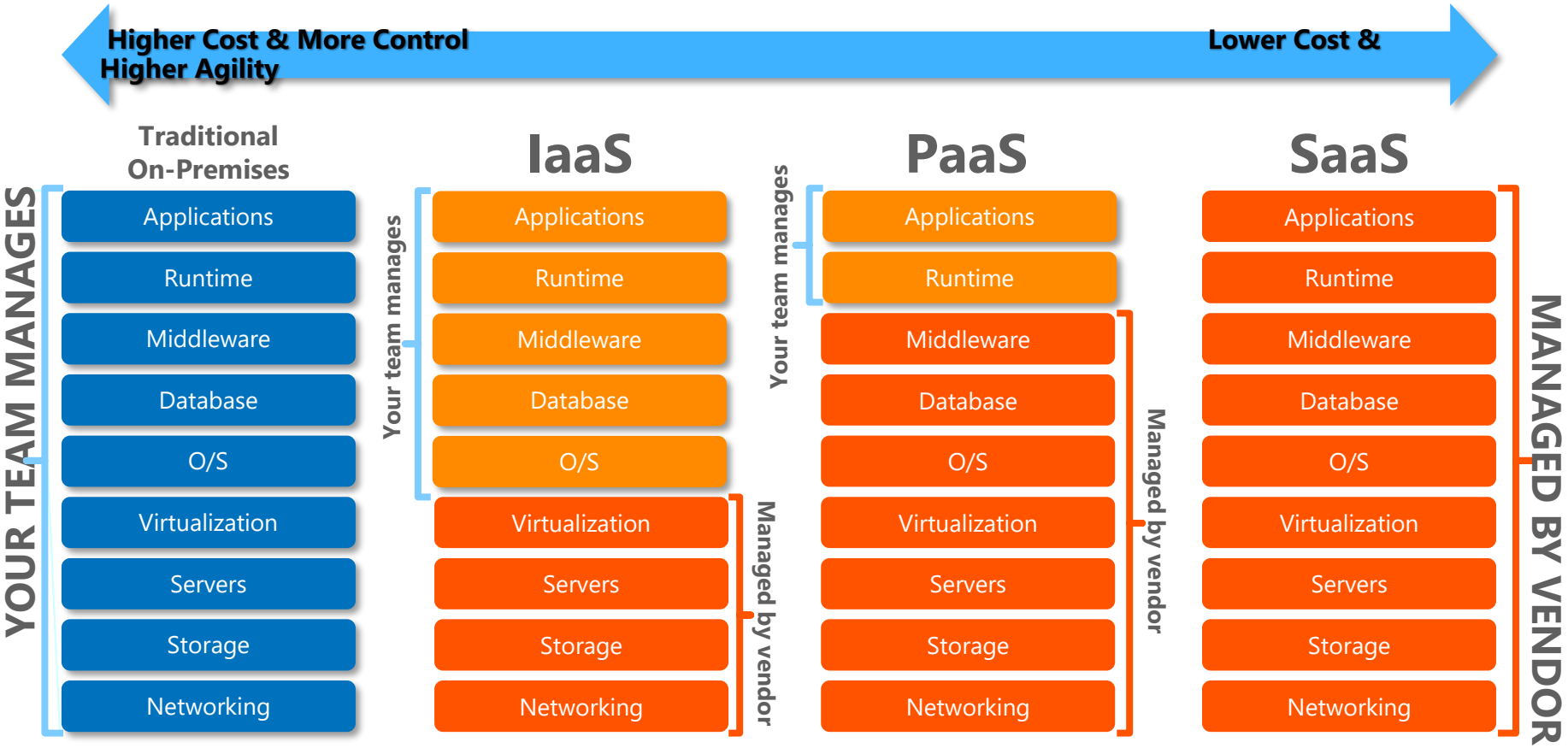
build

SaaS

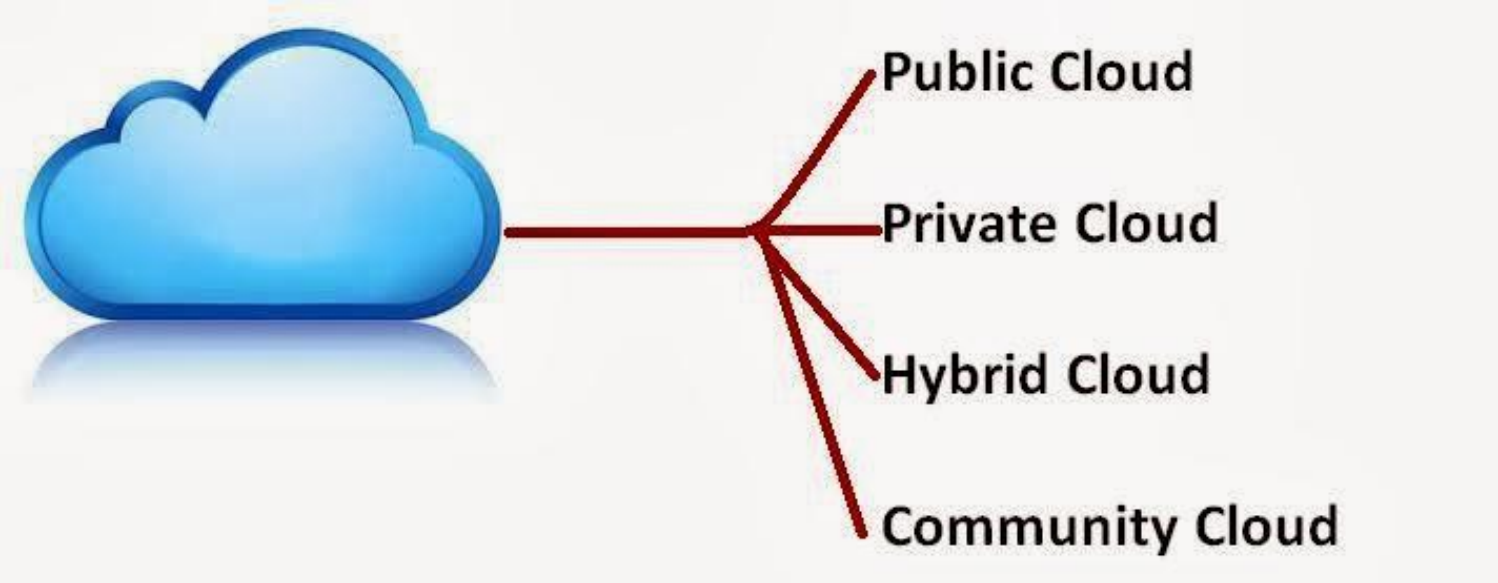
Software-as-a-Service

consume

Cloud Service Models

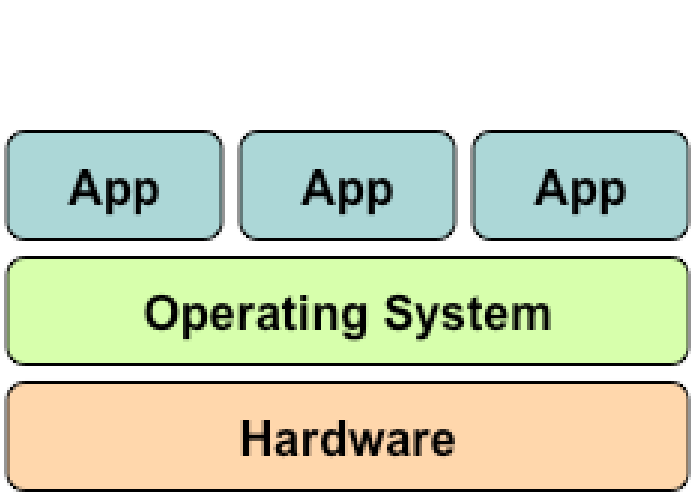


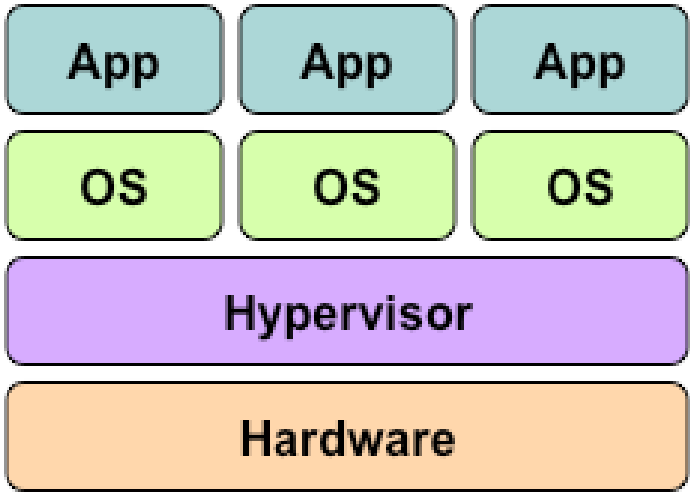
Deployment Models



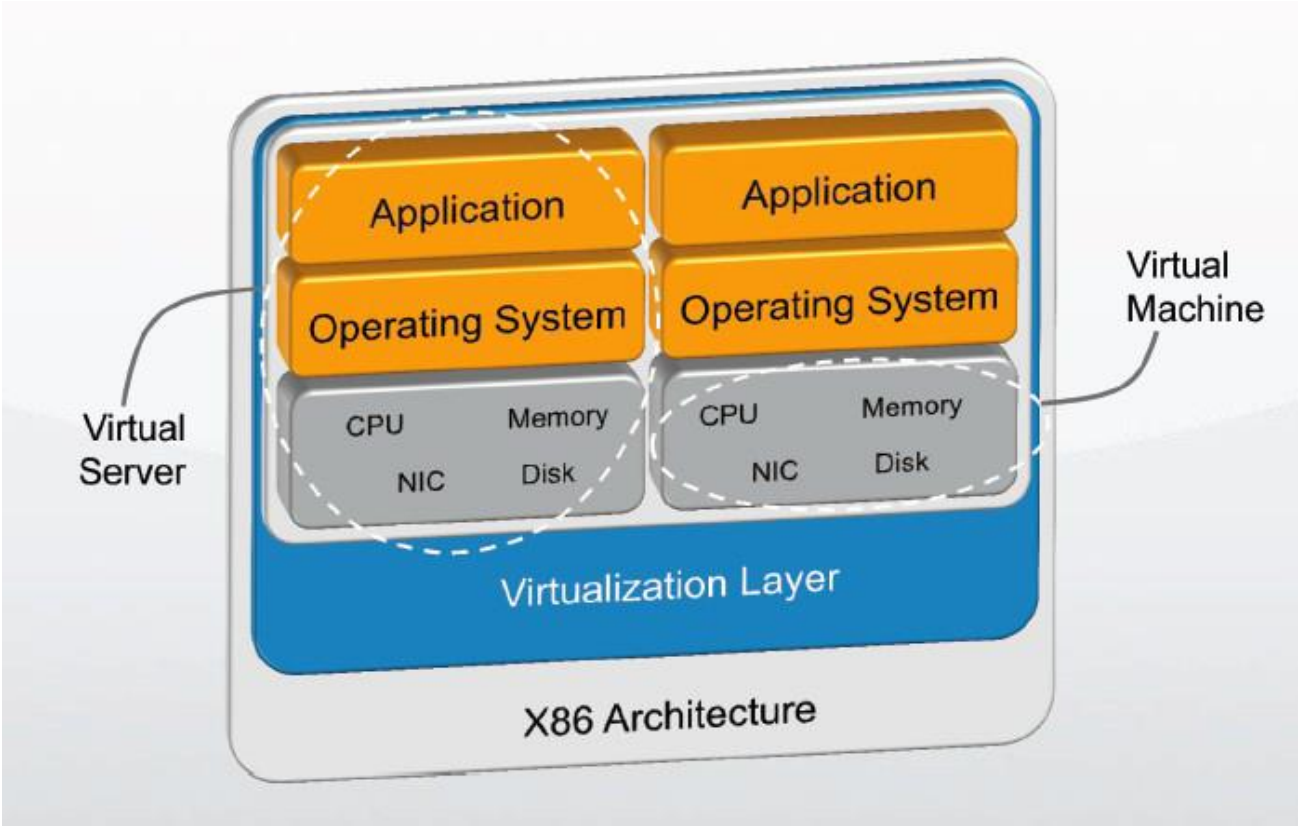
Technical Perspective

Virtualization Technology

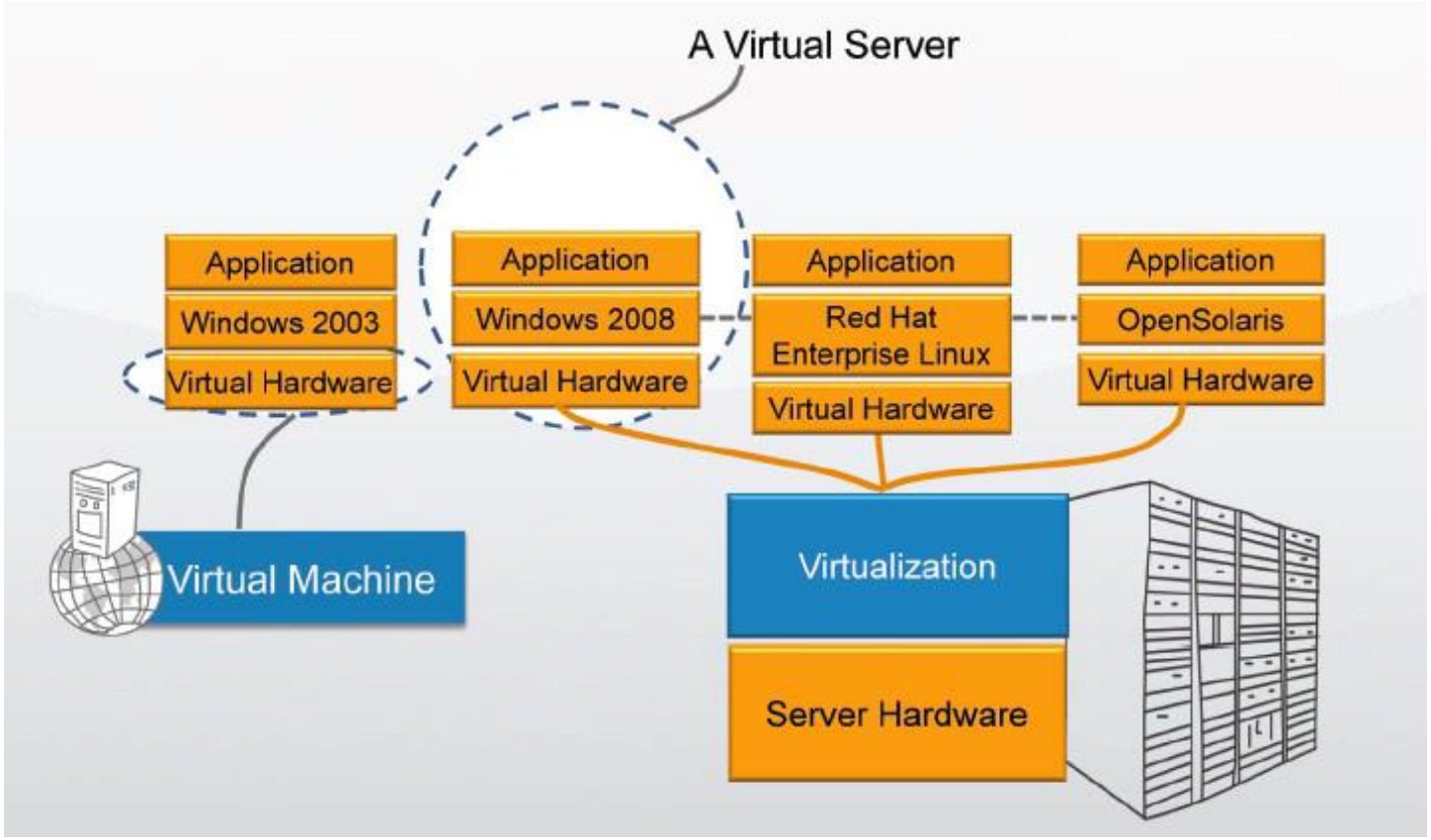




Virtualization Technology



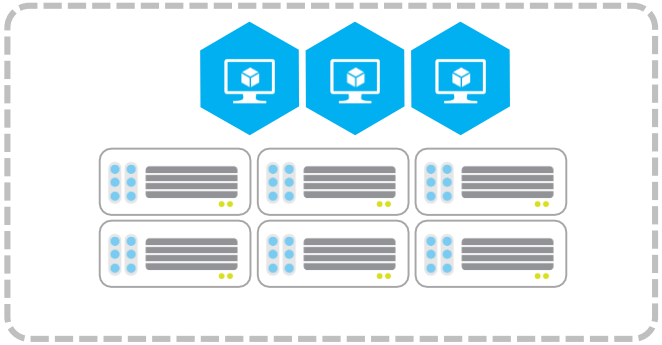
Virtualization Technology



Virtual machine portability

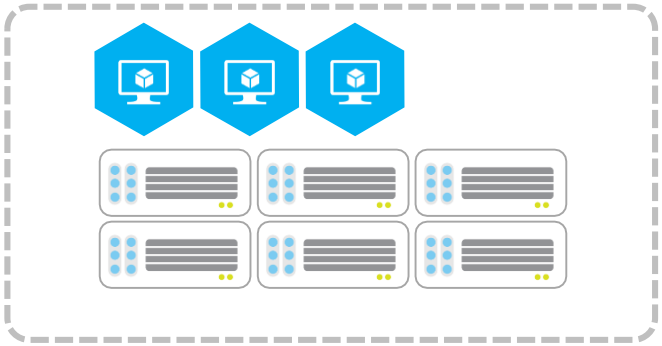
Windows Azure

Your Data Center



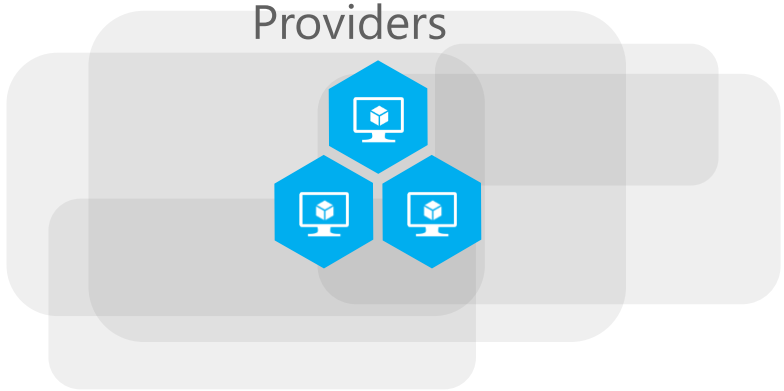
Windows Azure

Your Data Center

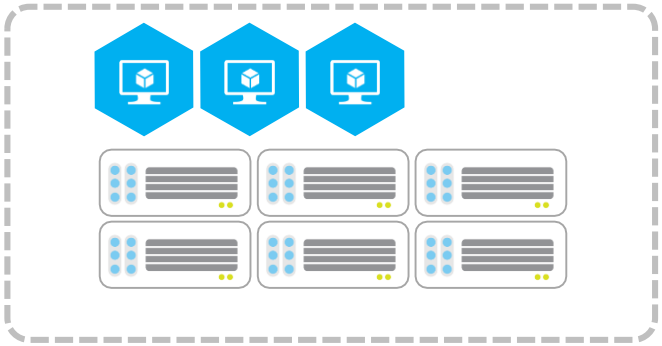


Windows Azure

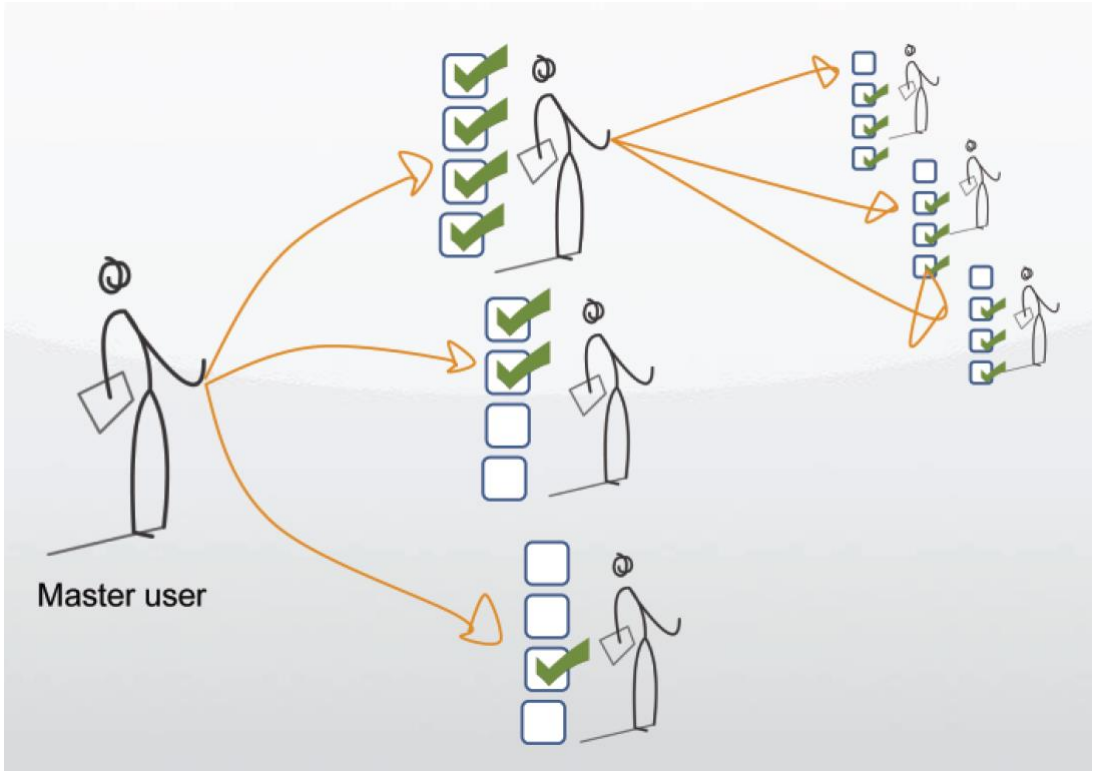
Other Service Providers



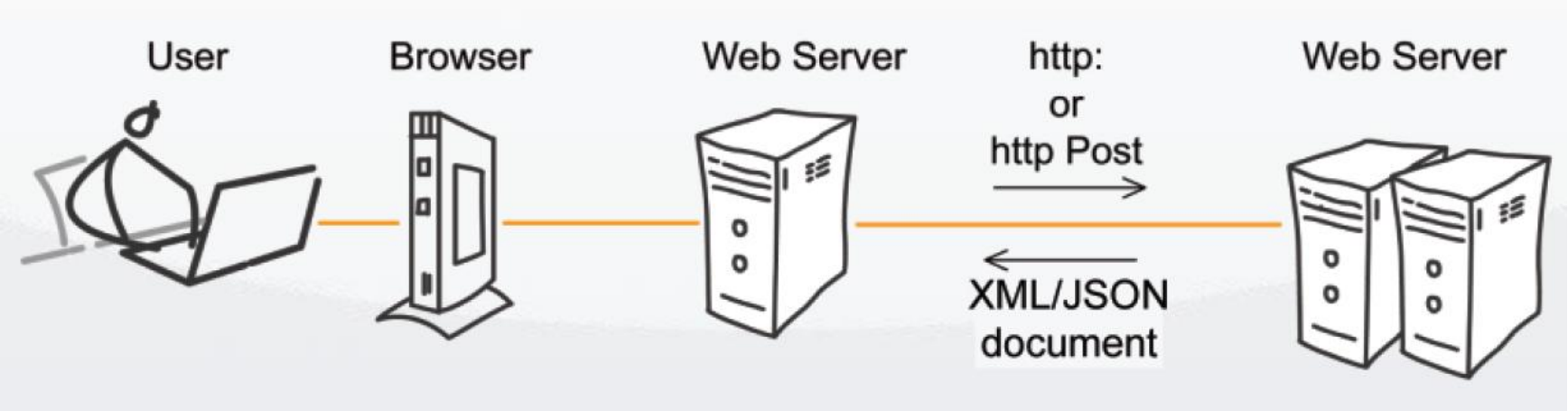
Your Data Center



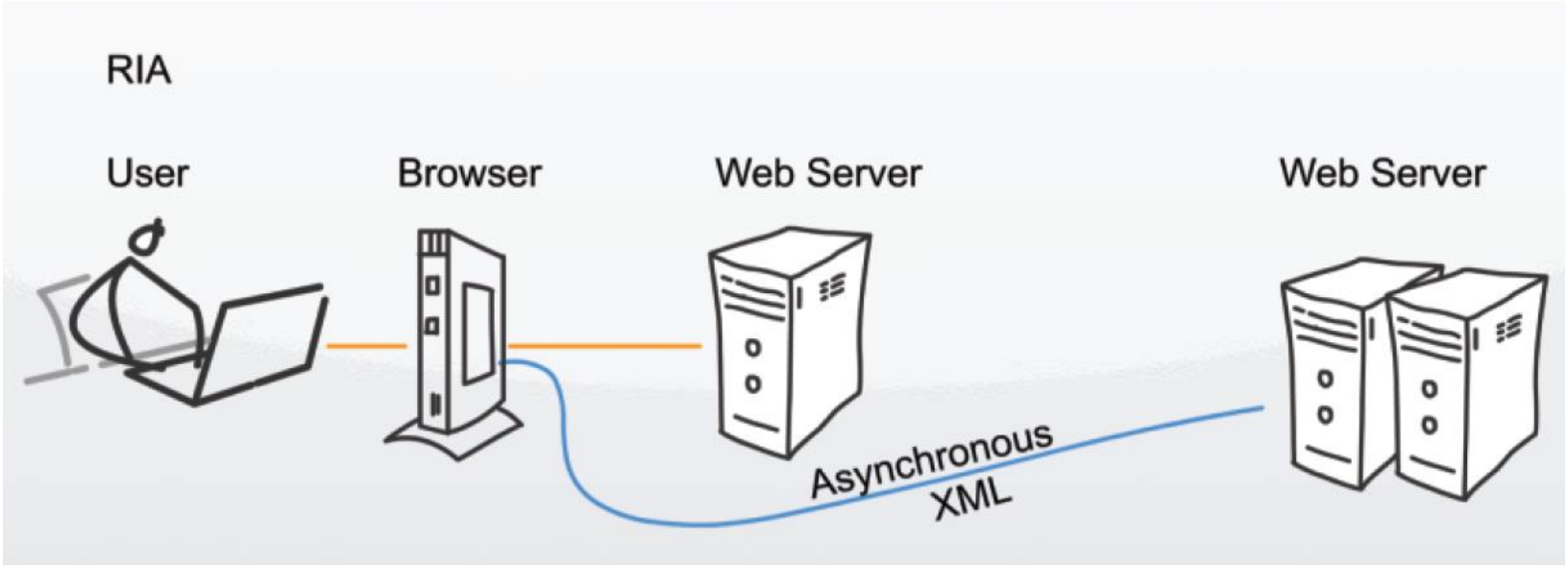
Authorization and Its Delegation



Cloud and SOA



RIA



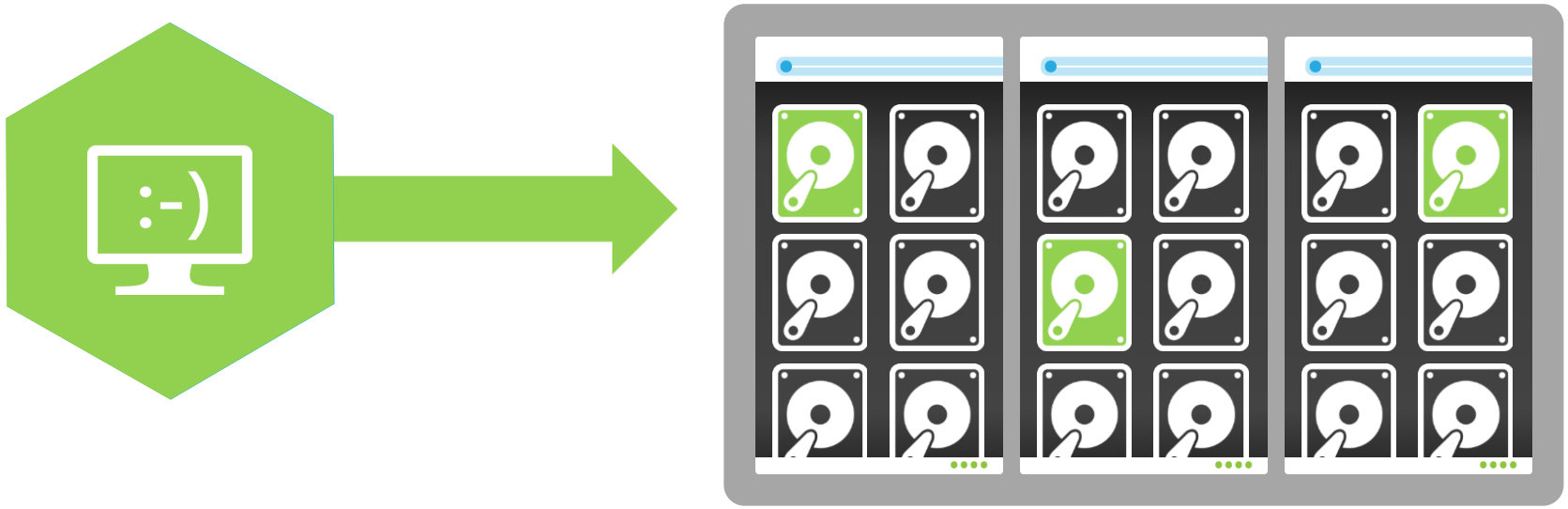
Data Backup

Demo

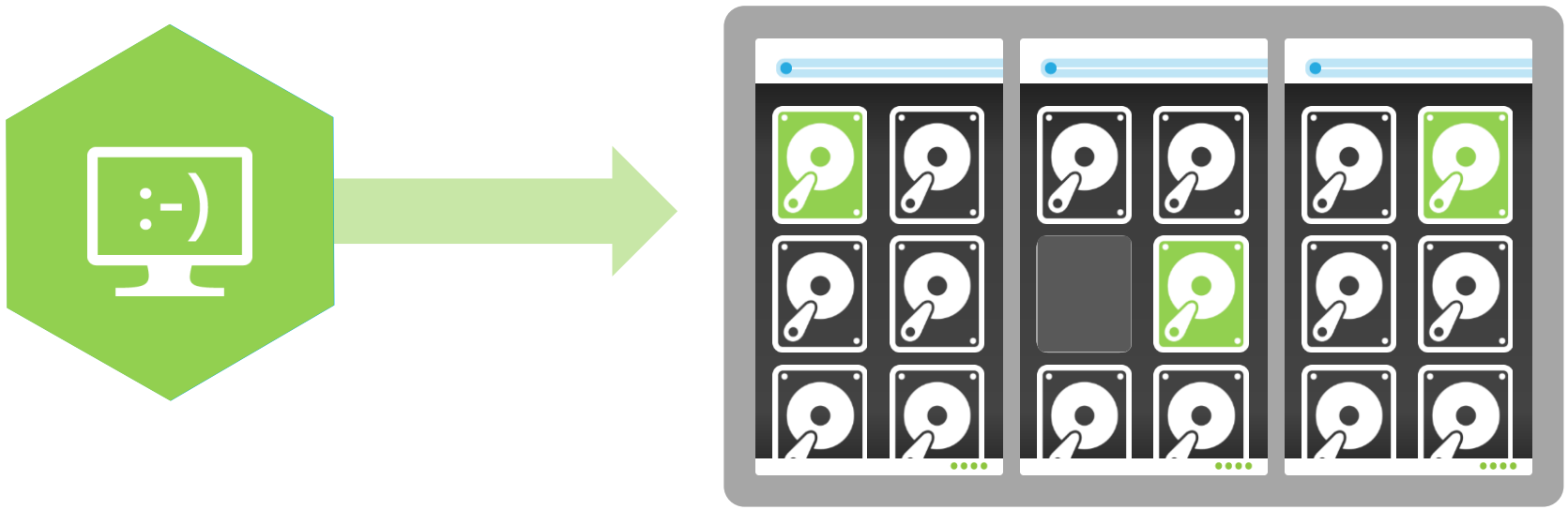
VM with persistent drive

Windows Azure Storage

VM with persistent drive



VM with persistent drive



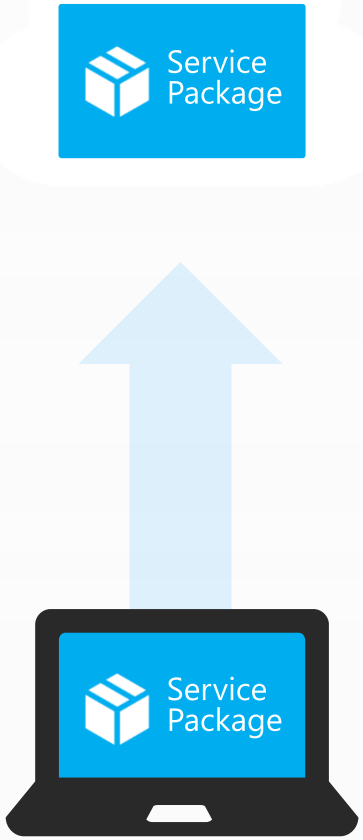
VM with persistent drive

Reliable and always on

Windows Azure Storage

Cloud services: Deployment

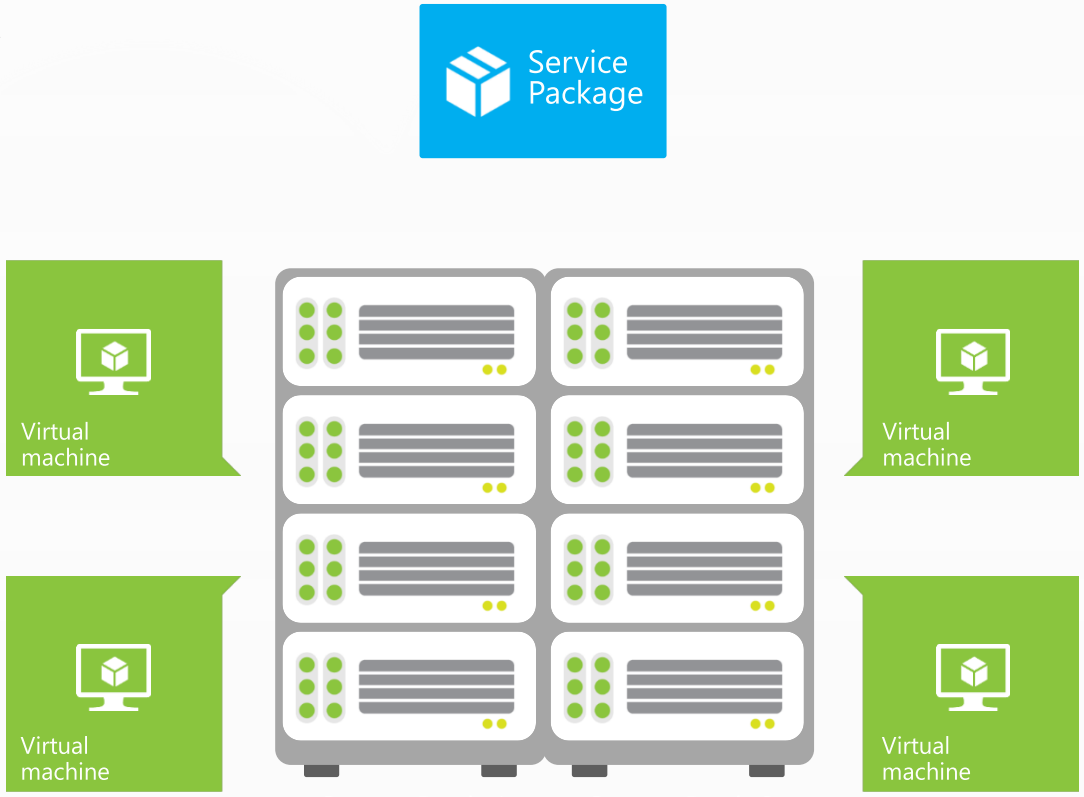
Demo


Service Package
Service Package

Provision Role Instances

Deploy App Code

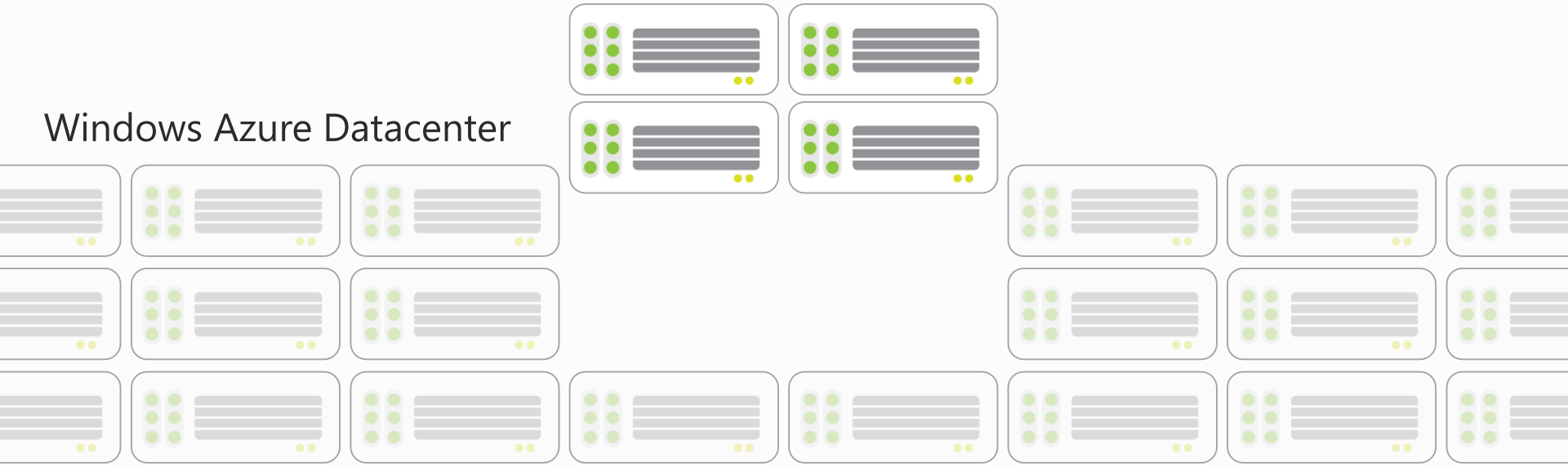
Configure Network



Provision Role Instances

Deploy App Code

Configure Network



Provision Role Instances

Deploy App Code

Configure Network

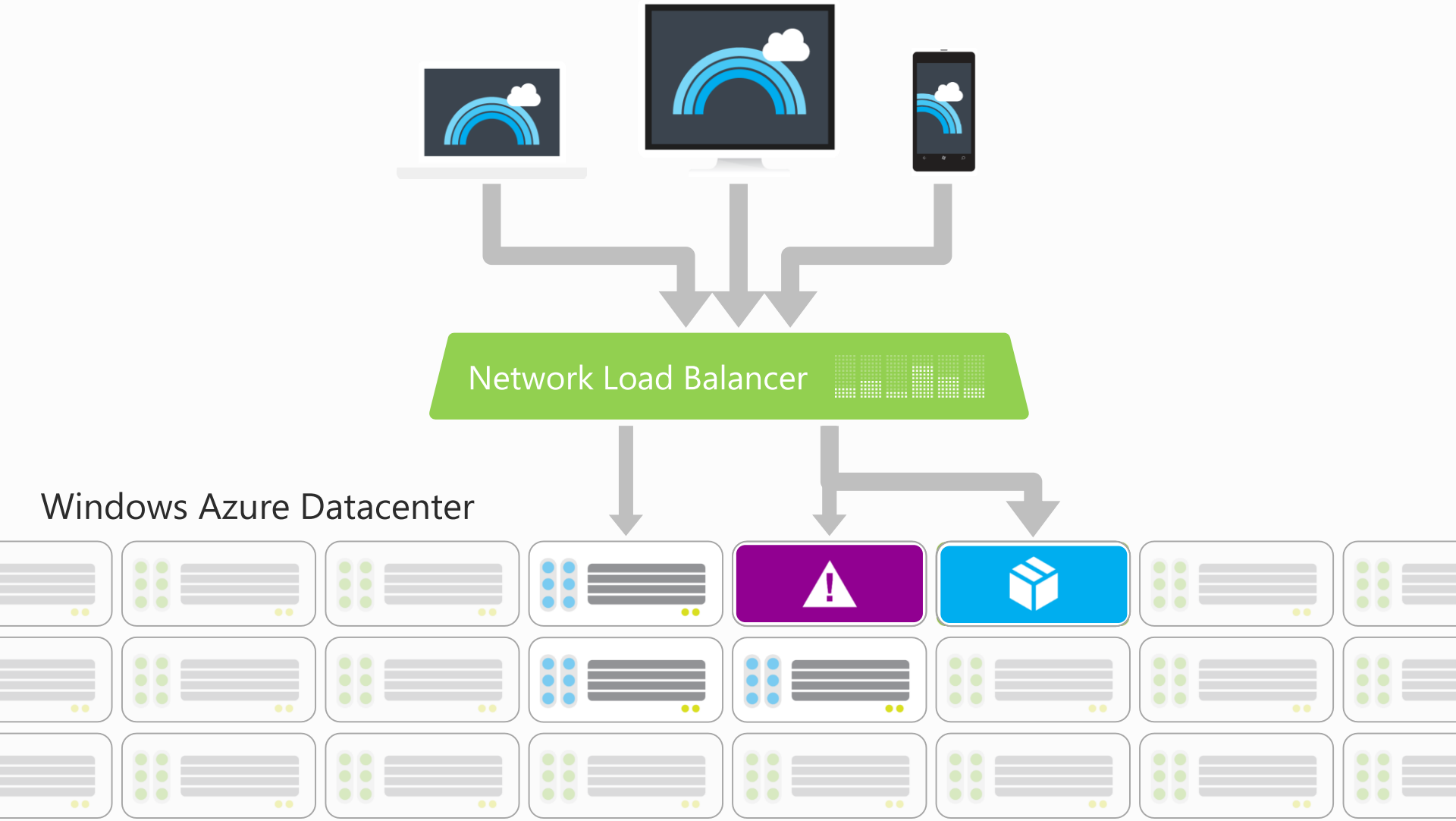
Windows Azure Datacenter

Provision Role Instances
Deploy App Code
Configure Network

Network Load Balancer

← Network load-balancer configured for traffic

Windows Azure Datacenter



Windows Azure

Lesson 2: Overview of Azure

- Understanding Azure datacenters
- Understanding Azure services
- Compute hosting options provided by Azure
- Understanding the Azure service model
- Understanding other Azure resources
- Demonstration: Working with Azure resources
- Azure management tools

Understanding Azure datacenters

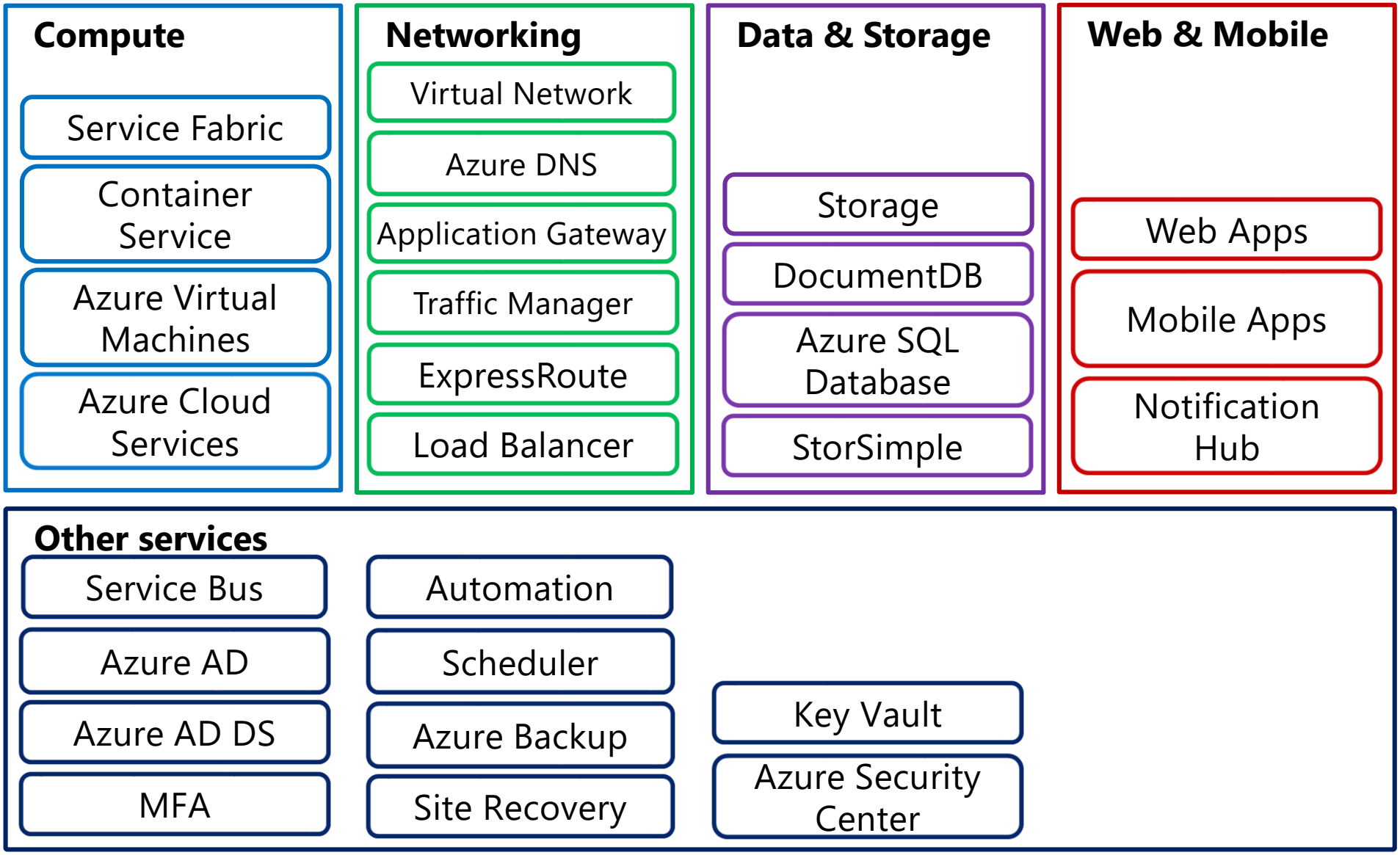
Azure datacenters are located in the following geographic areas:

Americas	Europe	Asia Pacific
• Central US • East US • East US 2 • North Central US • South Central US • West Central US • West US • West US2 • US Gov Arizona • US Gov Iowa • US Gov Texas • US Gov Virginia • Canada Central • Canada East • Brazil South	• France Central • France South • Germany Central • Germany Northeast • North Europe • West Europe • UK South • UK West	• Australia East • Australia Southeast • China East • China North • Central India • South India • West India • Japan East • Japan West • Korea Central • Korea South • East Asia • Southeast Asia

Understanding Azure datacenters

- Global distribution
- Management by Microsoft
- Modular architecture:
  - Clusters of thousands of servers in pluggable units
  - Full power redundancy and contingency
  - High-speed, redundant intra-datacenter networks
  - High-speed inter-datacenter and Internet connectivity
  - Triple-redundant data storage and geo-replication
- High power and water efficiency
- Servers that run Windows Server
- Azure Service Fabric

Understanding Azure services



Windows Azure

app services

- cloud services
- caching
- identity
- service bus
- media
- mobile services
- web sites
- integration
- hpc
- analytics

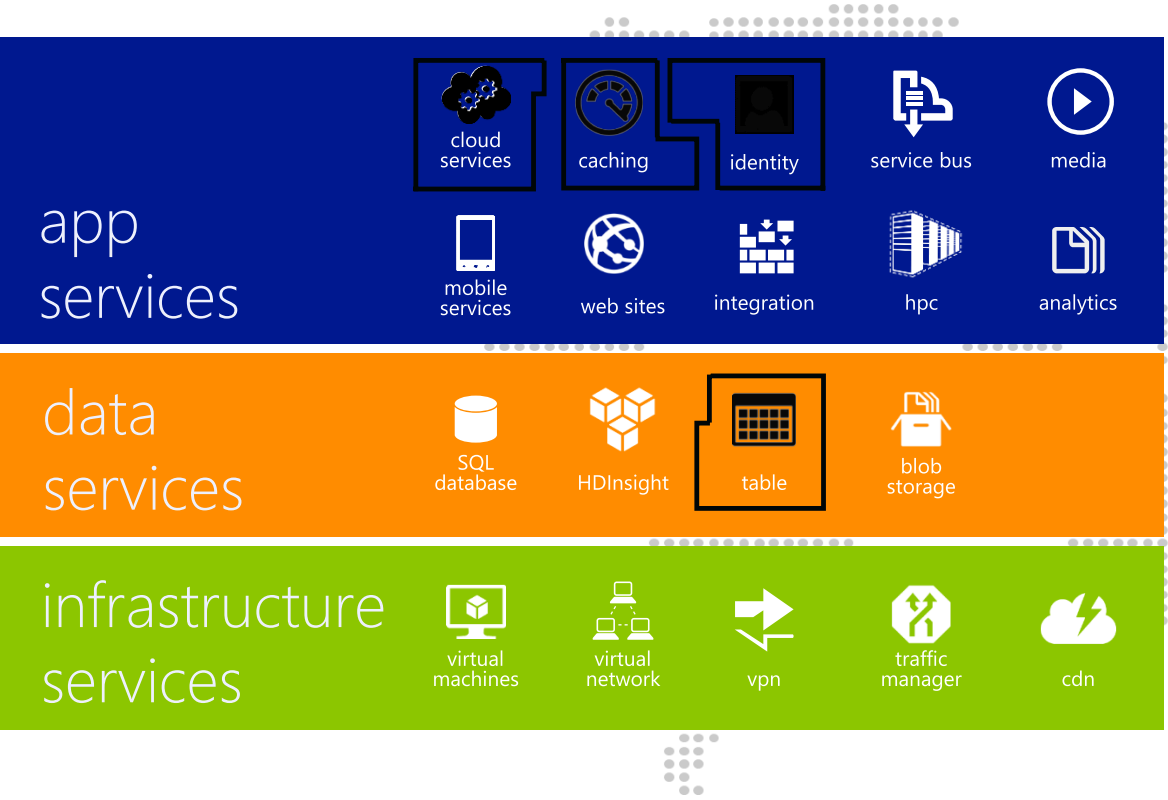
data services

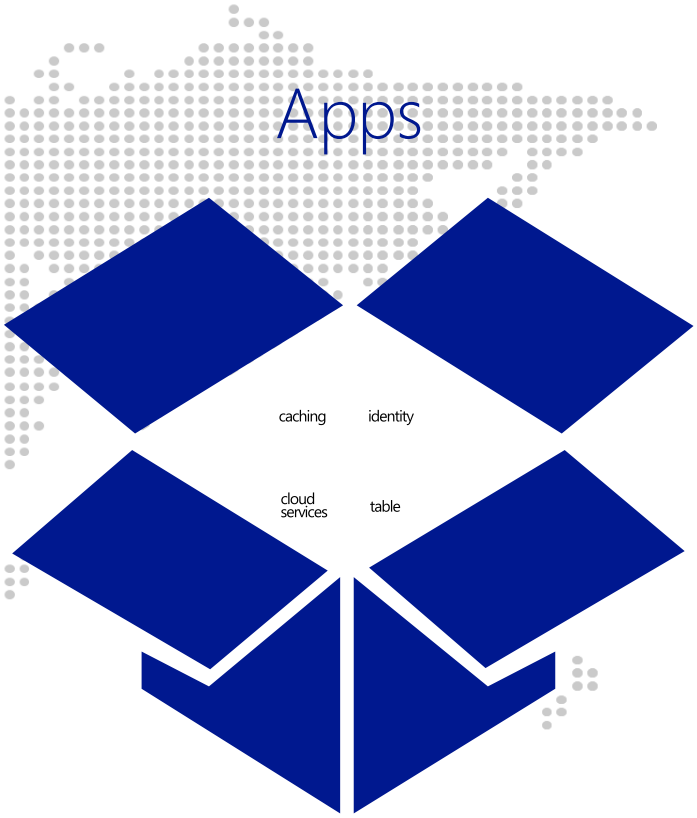
- SQL database
- HDInsight
- table
- blob storage

infrastructure services

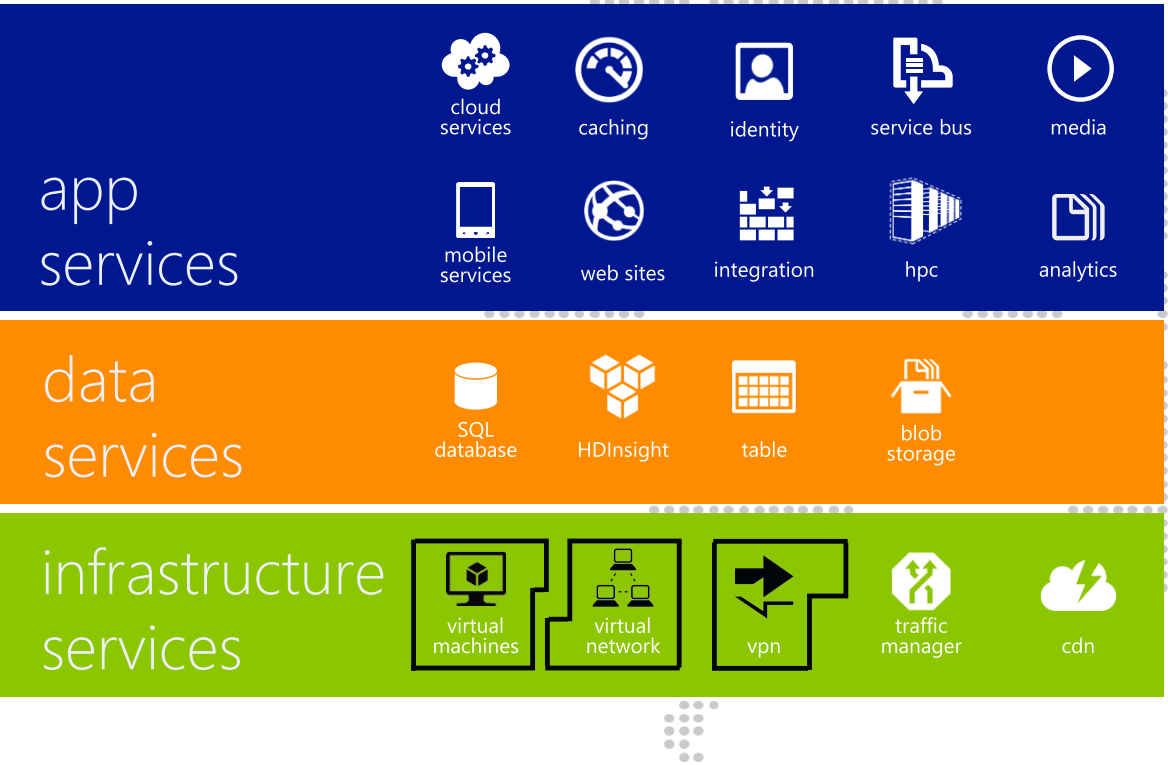
- virtual machines
- virtual network
- vpn
- traffic manager
- cdn

Windows Azure

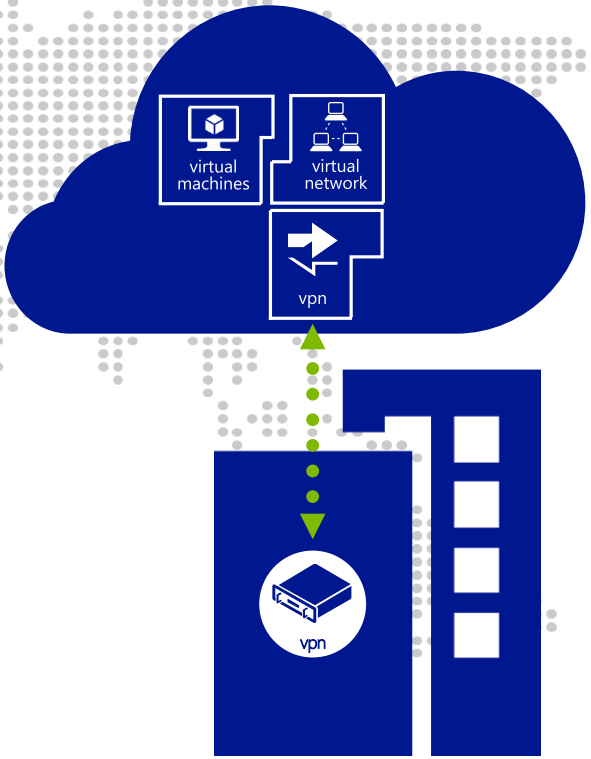




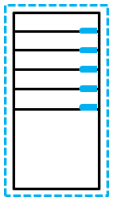
Windows Azure



Azure datacenters, your datacenters.



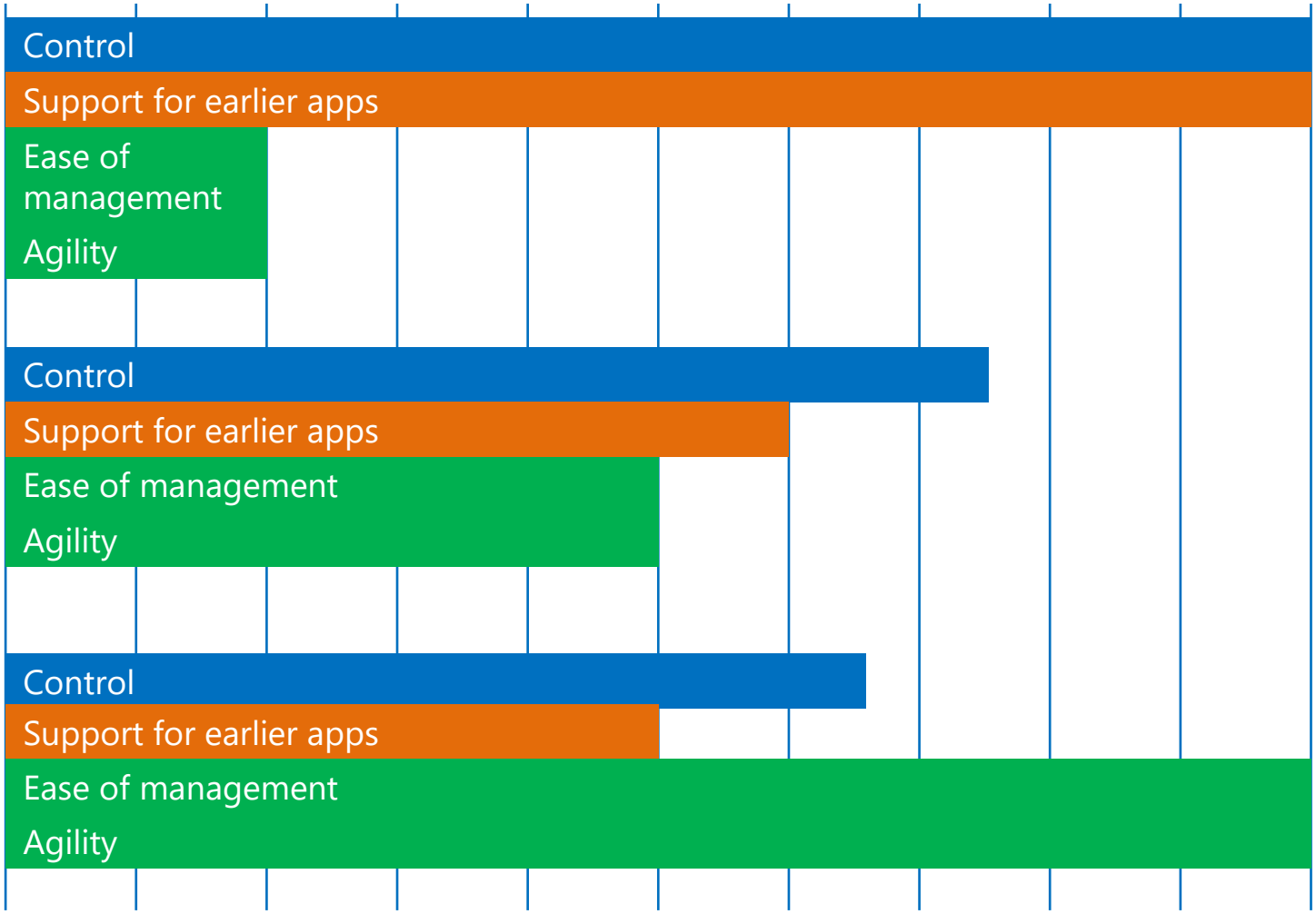
Compute hosting options provided by Azure



Azure Virtual Machines

Azure Cloud Services

App Service



Understanding the Azure service model

- Azure is a pay-per-use, multi-tenant service
- The purchase options are:
  - Pay-As-You-Go
  - Microsoft reseller
  - Enterprise Agreement
- The support options are:
  - Developer
  - Standard
  - Professional Direct
  - Premier

Understanding other Azure resources

- Azure Marketplace: certified, open source, and community apps, and developer services
- GitHub: APIs, SDKs, and open source projects
- Azure Trust Center: information and guidance around security, privacy, and compliance

Demonstration: Working with Azure resources

In this demonstration, you will see how to:

- Use the Azure Marketplace
- Use GitHub
- Use the Azure Trust Center

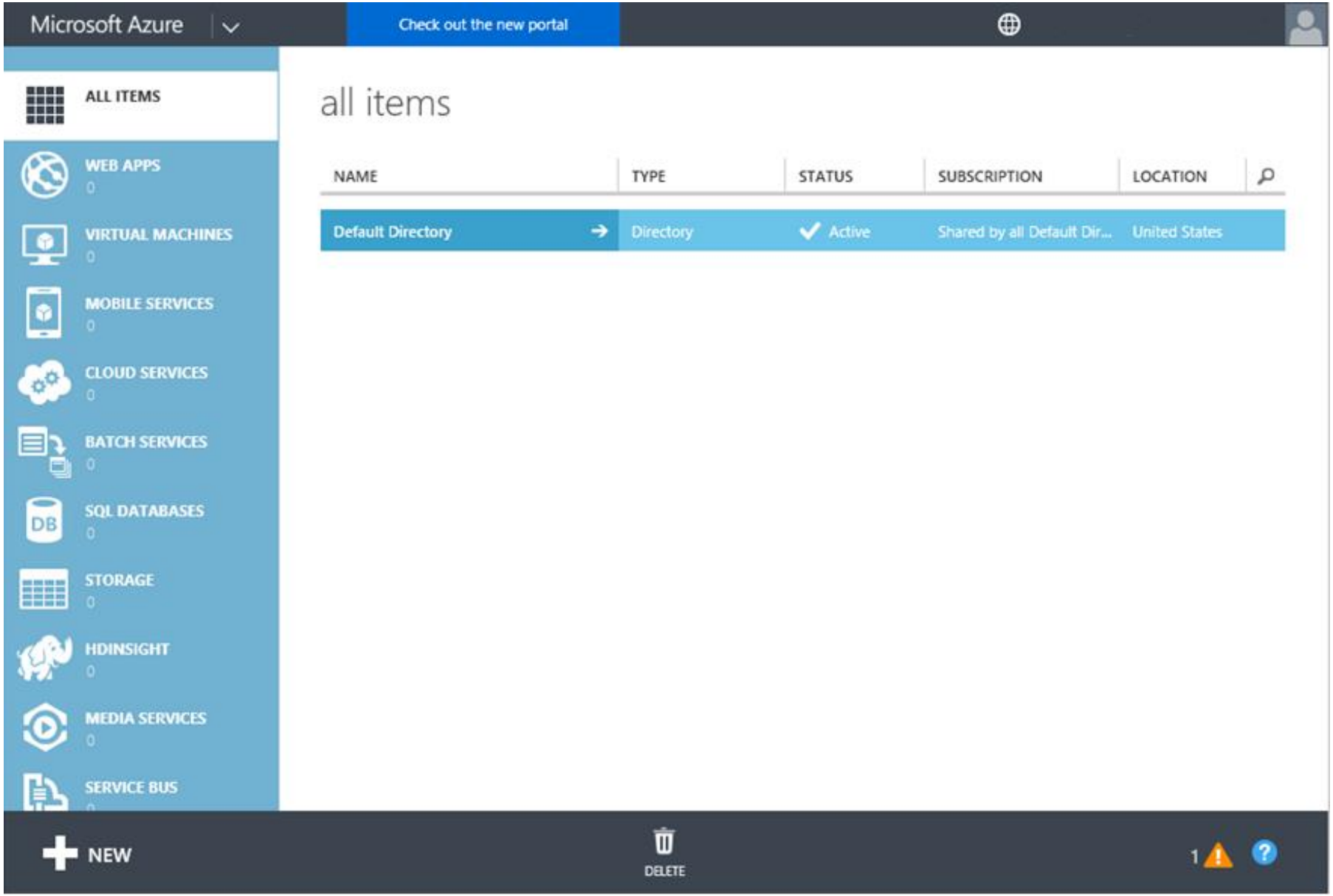
Azure management tools

- Azure portals
- Windows PowerShell
- Azure CLI
- Azure Automation
- Visual Studio

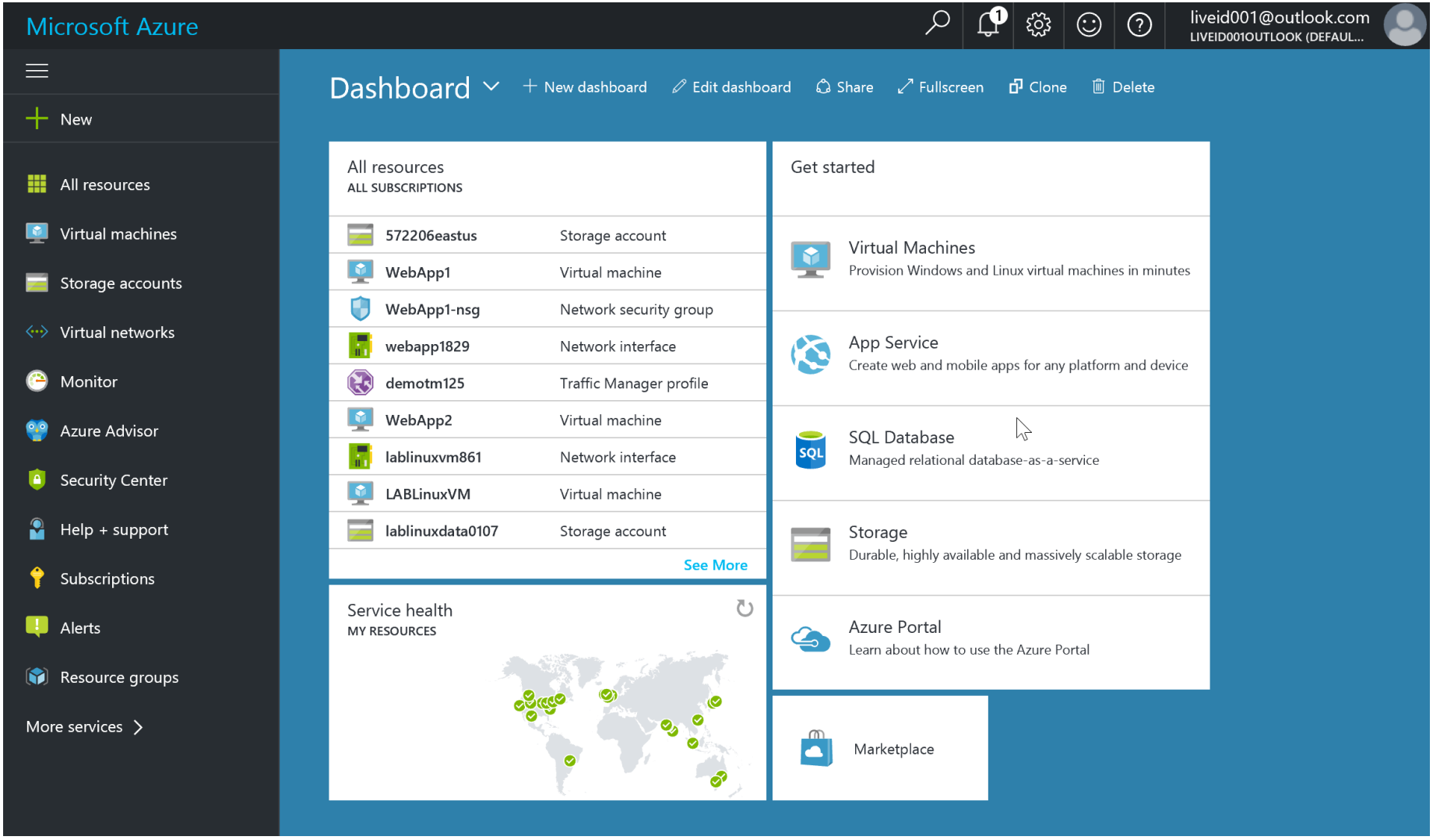
Lesson 3: Managing Azure with the Azure portal

- Using the Azure classic portal
- Using the Azure portal
- Managing account subscriptions with the Azure portal
- Demonstration: Using the Azure portals

Using the Azure classic portal



Using the Azure portal



Managing account subscriptions with the Azure portal

- The Subscription and Billing blades at https://portal.azure.com
  - View cost by resource and burn rate charts
  - Perform cost analysis
  - View billing information
- The subscriptions page at http://account.windowsazure.com/subscriptions
  - Manage payment methods
  - Download usage details
  - Edit subscription details
  - Edit partner information
  - Change subscription address
  - Cancel subscription

Demonstration: Using the Azure portals

In this demonstration, you will see how to:

- Use the Azure classic portal
- Use the Azure portal
- Use the Azure account portal

Lesson 4: Managing Azure with Windows PowerShell

- Azure PowerShell modules
- Authenticating to Azure by using Windows PowerShell
- Azure PowerShell cmdlets for Azure classic deployment model and Azure Resource Manager
- Demonstration: Using Azure PowerShell

Azure PowerShell modules

PowerShell modules for Azure include:

- Azure Resource Manager
- Azure Service Management (classic)
- Azure Storage
- Azure Active Directory V2 PowerShell
- Azure AD Module for Windows PowerShell - Azure AD
- Azure Automation authoring toolkit

Authenticating to Azure by using Windows PowerShell

- Azure AD Authentication:
  - Use a Microsoft account
  - Use a *work or school* account

```
Login-AzureRmAccount
```

- Certificate-based authentication:
  - Azure Resource Manager:
    - Generate a certificate on the local computer
    - Create an Azure AD application associated with the certificate
    - Create a service principal associated with the application
    - Assign the Reader role to the service principal
  - Classic:
    - Generate a management certificate in Azure or on the local computer
    - Store the private key on the local computer and the public key in Azure

Azure PowerShell cmdlets for Azure classic deployment model and Azure Resource Manager

Functionality or command	**Classic**	**Azure Resource Manager**
Create a resource group	New_AzureResourceGroup	New-AzureRmResourceGroup
Create a virtual machine	New-AzureVM	New-AzureRmVM
Create a web app	New-AzureWebsite	New-AzureRmWebapp
Sign in to Azure	Add-AzureAccount	Login-AzureRmAccount
GUI Element	The Azure portal and the Azure classic portal	The Azure portal only

Demonstration: Using Azure PowerShell

In this demonstration, you will see how to:

- Create a resource group
- Create a storage account
- Delete a resource group with its resources

Lesson 5: Overview of Azure Resource Manager

- What is Azure Resource Manager?
- Resources and resource groups
- Azure Resource Manager deployment methodologies

What is Azure Resource Manager?

Azure Resource Manager core concepts:

- Resources:
  - Individual building blocks of Azure-based solutions
  - Managed by resource providers
- Resource groups:
  - Custom collections of resources
  - Typically represents common lifecycle of its resources
  - Commonly used to delegate permissions to its resources
  - Aggregates billing data and auditing events of its resources
  - Each resource belongs to only one resource group
- RBAC
- Tagging
- Policies and locks

Resources and resource groups

- Resource groups enable logical groupings of resources
- Resources are assigned to a resource group when created
- Most resources can be moved between resource groups

Azure Resource Manager deployment methodologies

- Imperative:
  - Based on Azure PowerShell or Azure CLI scripts
  - Specified by each provisioning step
- Declarative:
  - Based on Azure Resource Manager templates:
    - JSON-formatted
    - Describes the end state
    - Idempotent
    - Support versioning
    - Allows for OS configuration via VM Agent extensions
  - Azure determines provisioning steps based on the end state
    - You can specify resource dependencies

Lesson 6: Azure management services

- OMS
- Logging and diagnostics in Azure
- Azure access management

OMS

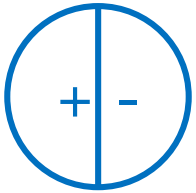
1

Sign up by using OMS and create a workspace

Sign up by using Azure management portal and create a workspace

2

Add solutions



3

Connect servers directly to workspace

Connect servers to workspace by using Systems Center Operations Manager

Connect servers to workspace by using Azure Diagnostics

4

Collect logs from your data sources

5

Analyze data by using solutions and your custom searches

Logging and diagnostics in Azure

The primary logging and analysis components in Azure are:

- Activity logs
- Azure Diagnostics
- Metrics

Azure access management

- Azure administrative roles:
  - Account administrator
  - Service administrator
  - Co-administrator
- Use RBAC to provide granular access to resources and resource groups

Lab: Managing Microsoft Azure

- Exercise 1: Using the Azure portals
- Exercise 2: Using the Azure Resource Manager features in the Azure portal
- Exercise 3: Using Azure PowerShell

Estimated Time: 50 minutes

Lab Scenario

A. Datum Corporation wants to expand their cloud presence by taking advantage of the benefits of Azure. You have been asked to explore and compare the available IaaS v2 features by using the Azure portals and Windows PowerShell.

Lab Review

- Why did you use Azure PowerShell cmdlets that contained Rm in the lab?

Module Review and Takeaways

- Real-world Issues and Scenarios
- Tools