

# 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



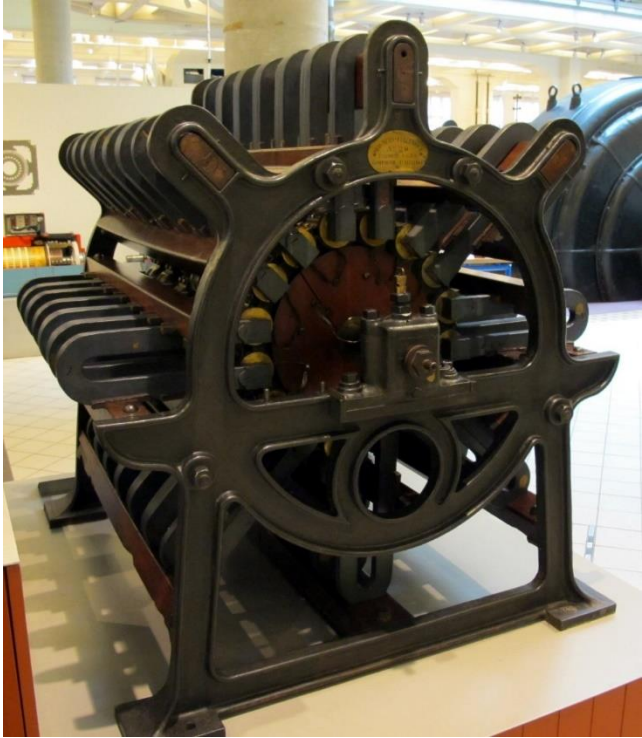
Global  
Footprint

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



Flexible



Open



Solid

Australia	Luxembourg			
Austria	Malaysia			
Belgium	Mexico			
Brazil	Netherlands			
Canada	New Zealand			
Chile	Norway			
Colombia	Peru			
Costa Rica	Philippines			
Cyprus	Poland	Argentina	Kuwait	Saudi Arabia
Czech Republic	Portugal	Belarus	Latvia	Serbia
Denmark	Puerto Rico	Bulgaria	Liechtenstein	Slovakia
Finland	Romania	Croatia	Lithuania	Slovenia
France	Russia	Dominican Rep	Macedonia	South Africa
Germany	Singapore	Ecuador	Malta	Sri Lanka
Greece	Spain	Egypt	Montenegro	Taiwan
Hong Kong	Sweden	El Salvador	Morocco	Thailand
Hungary	Switzerland	Estonia	Azerbaijan	Tunisia
India	Trinidad &	Guatemala	Nigeria	Turkey
Ireland	Tobago	Iceland	Oman	UAE
Israel	UK	Indonesia	Pakistan	Ukraine
Italy	United States	Jordan	Panama	Uruguay
Japan	New Countries:	Kazakhstan	Paraguay	Venezuela
Korea	Algeria	Kenya	Qatar	Bahrain

## countries and territories

# 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

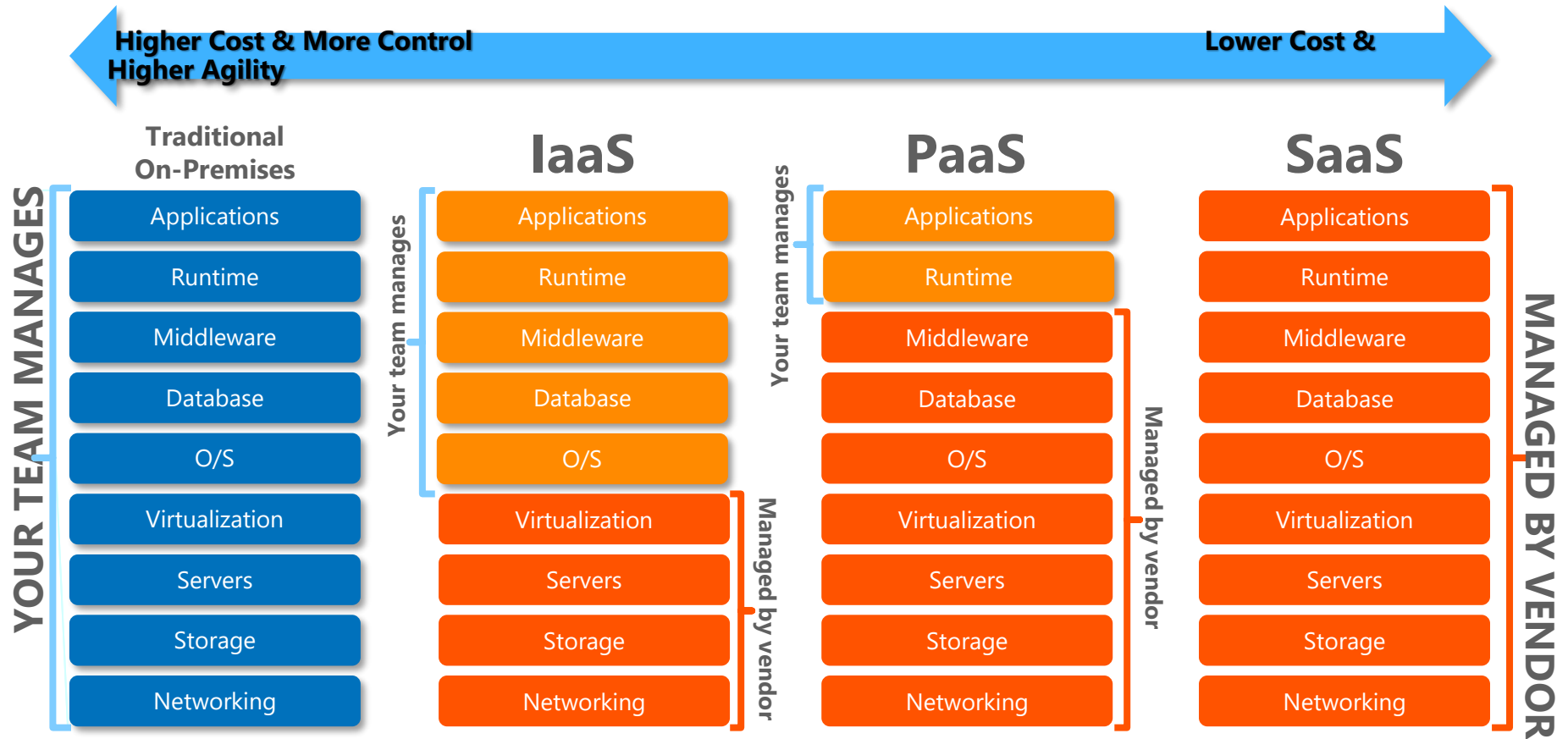


SaaS

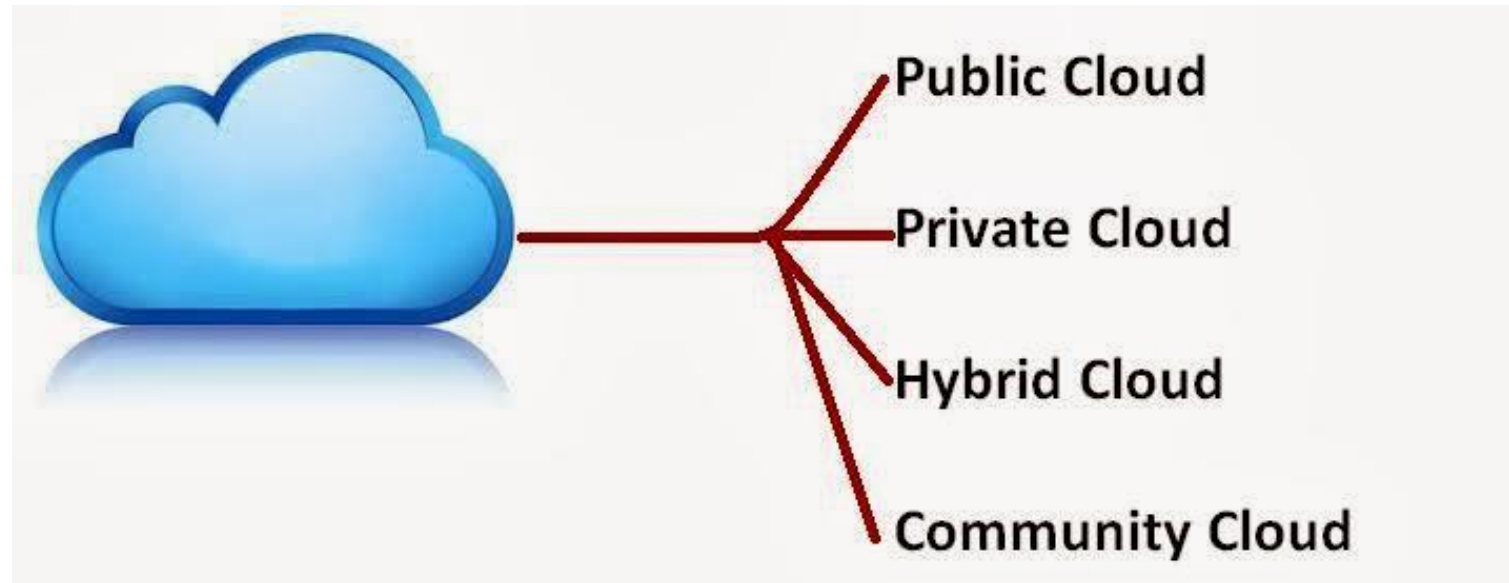
Software-as-a-Service

consume

# Cloud Service Models



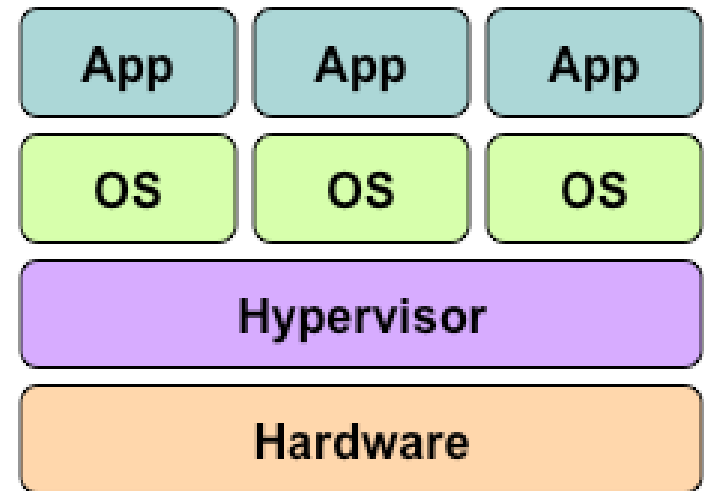
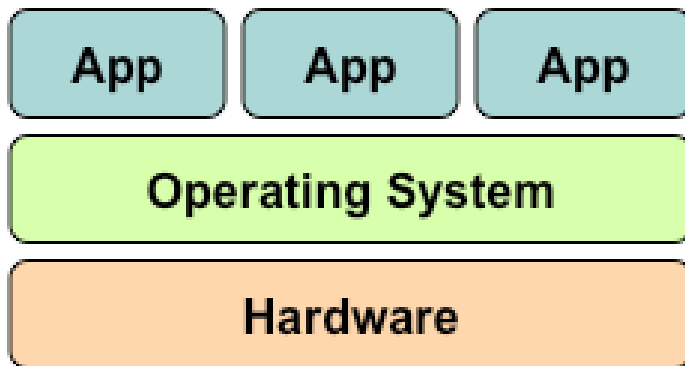
# Deployment Models



# Technical Perspective

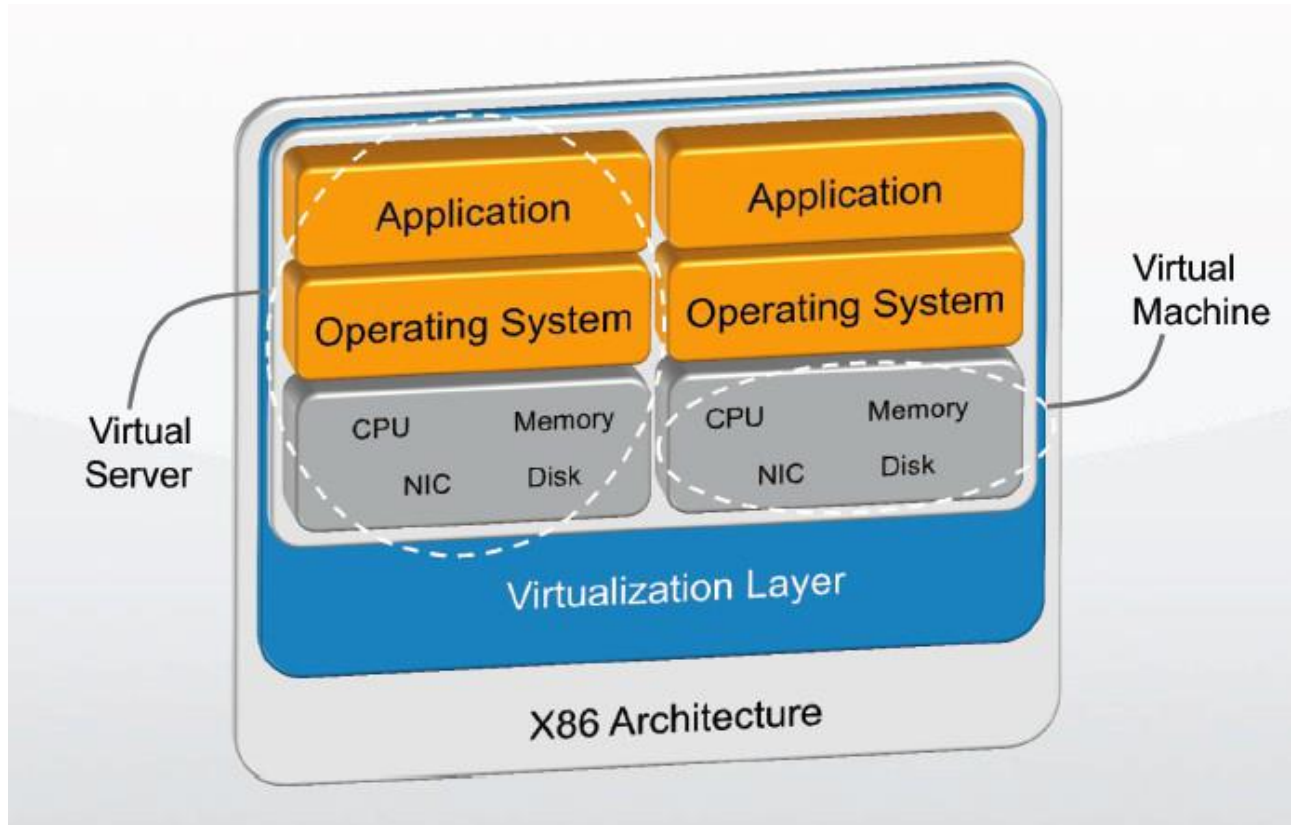


# Virtualization Technology

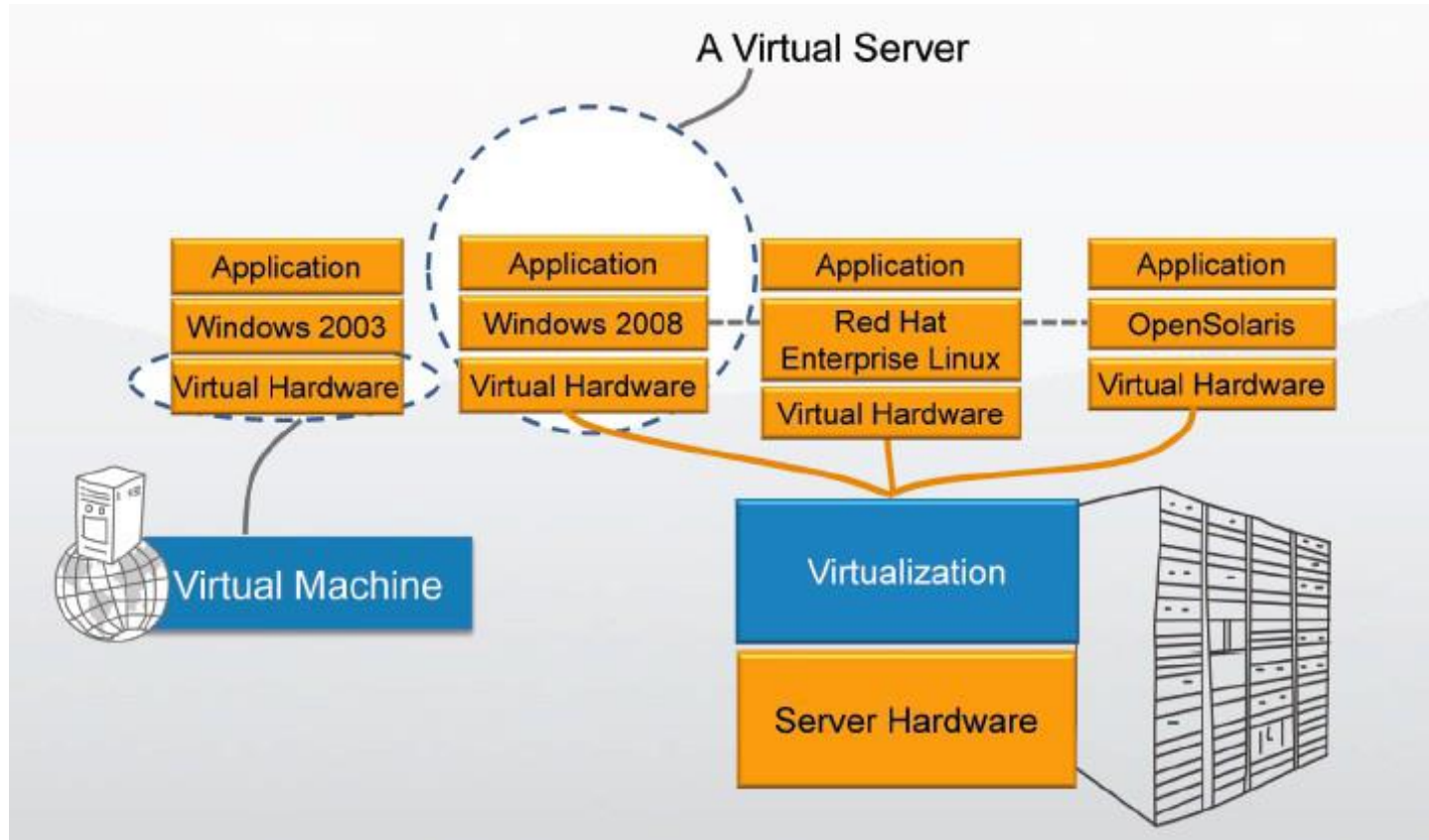




# Virtualization Technology

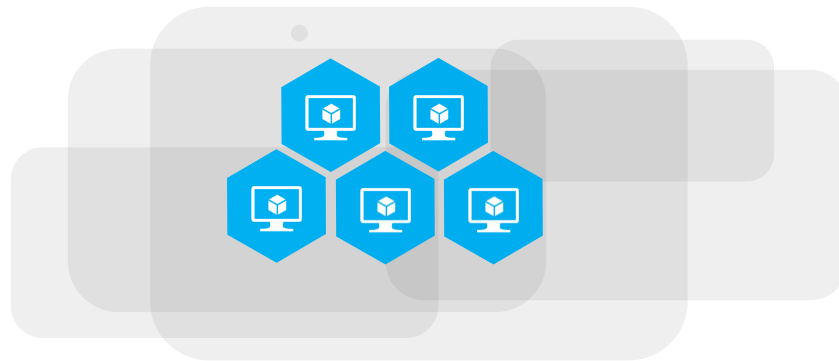


# Virtualization Technology

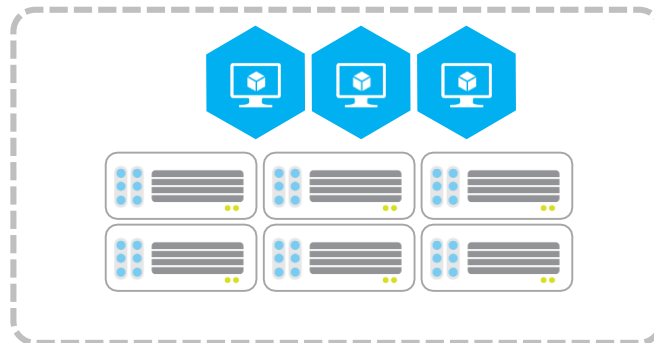


Virtual machine portability

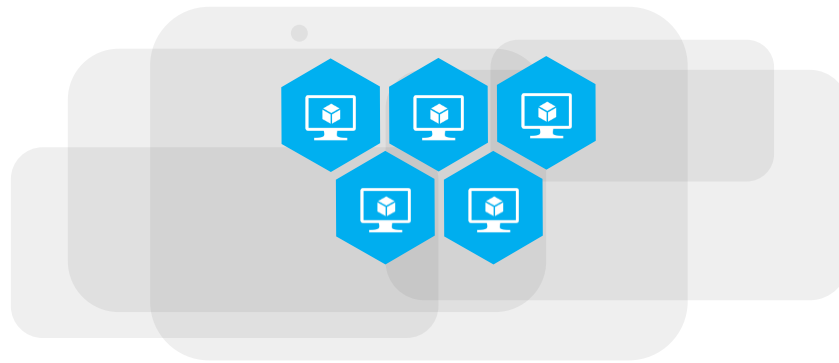
## Windows Azure



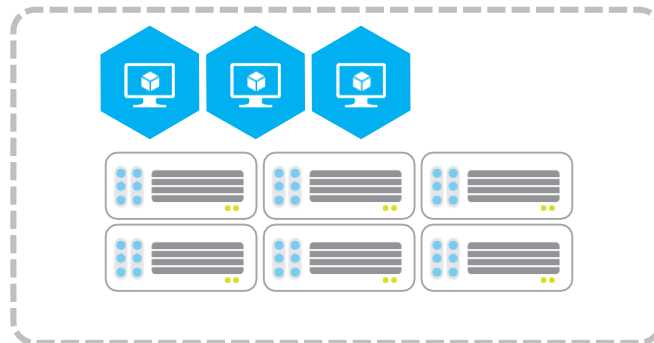
## Your Data Center



## Windows Azure



## Your Data Center



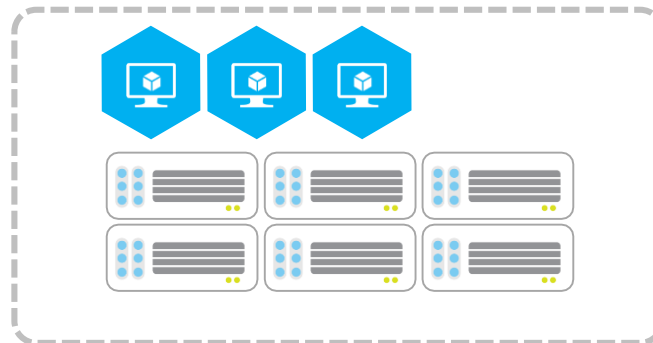
Windows Azure



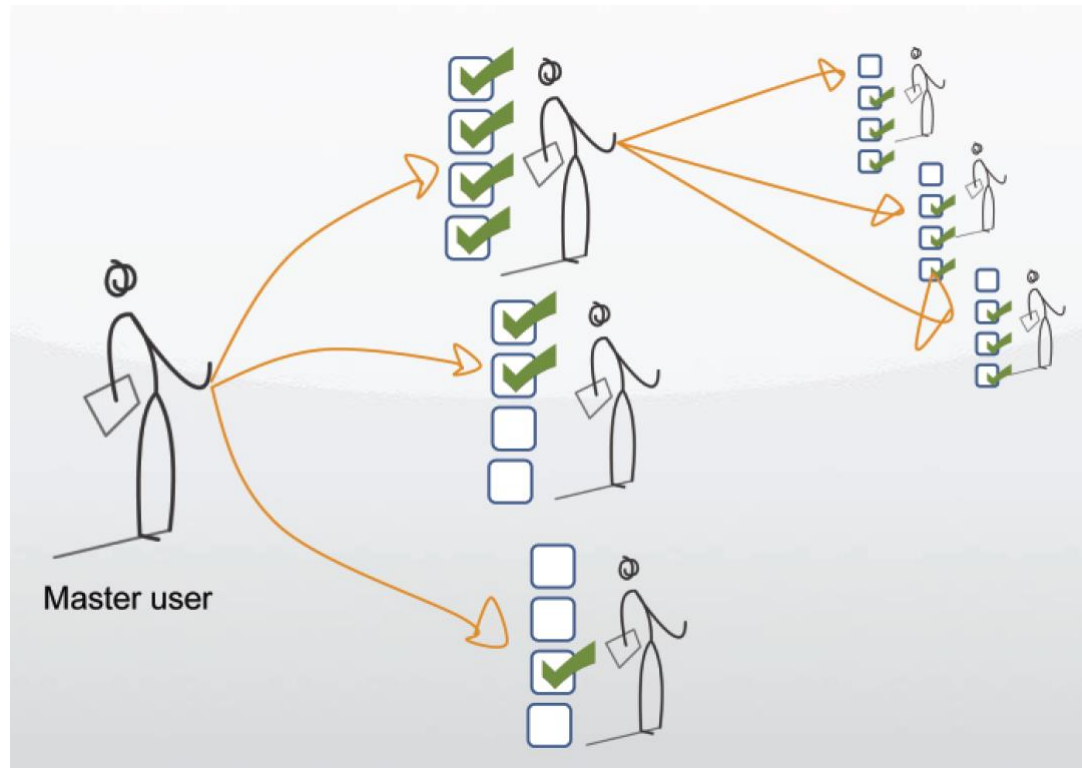
Other Service  
Providers



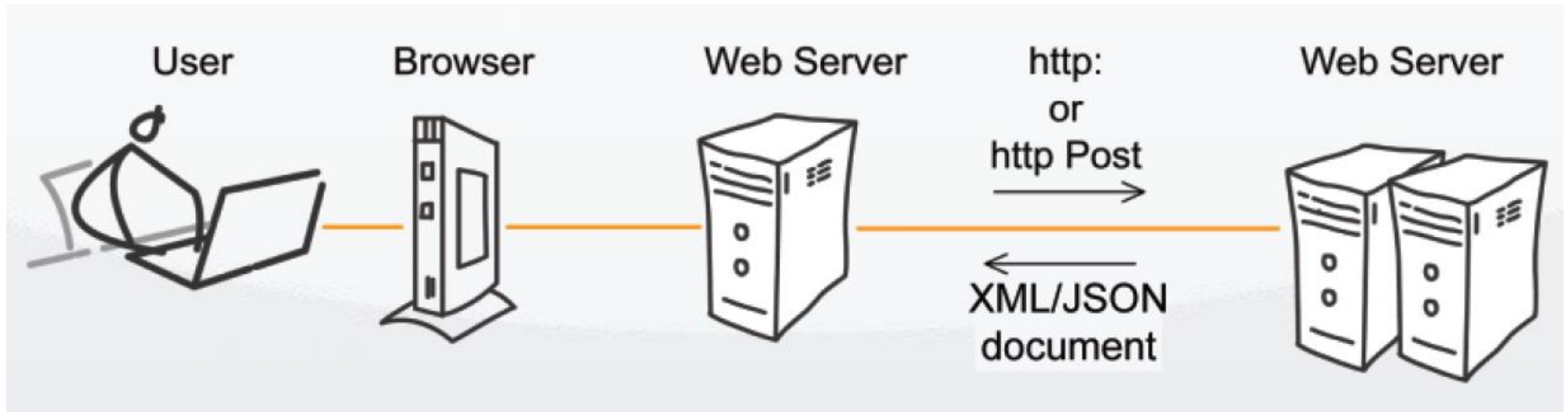
Your Data Center



# Authorization and Its Delegation

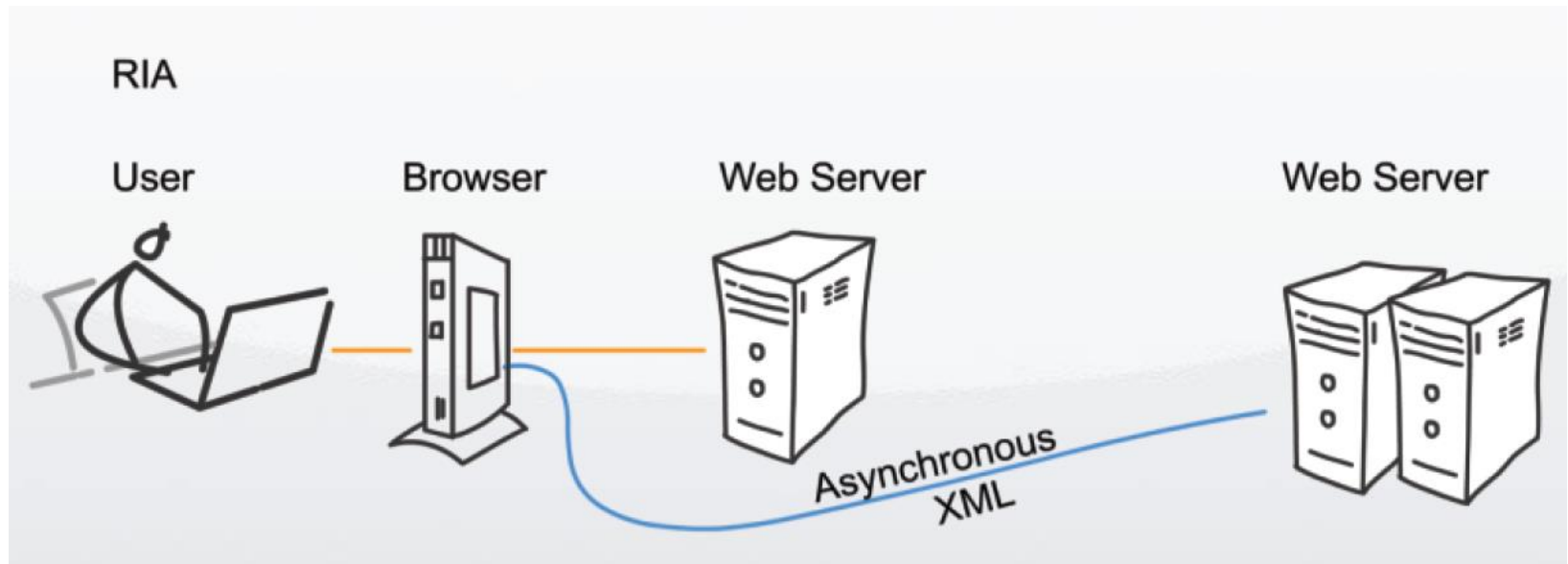


# Cloud and SOA





# RIA



# Data Backup



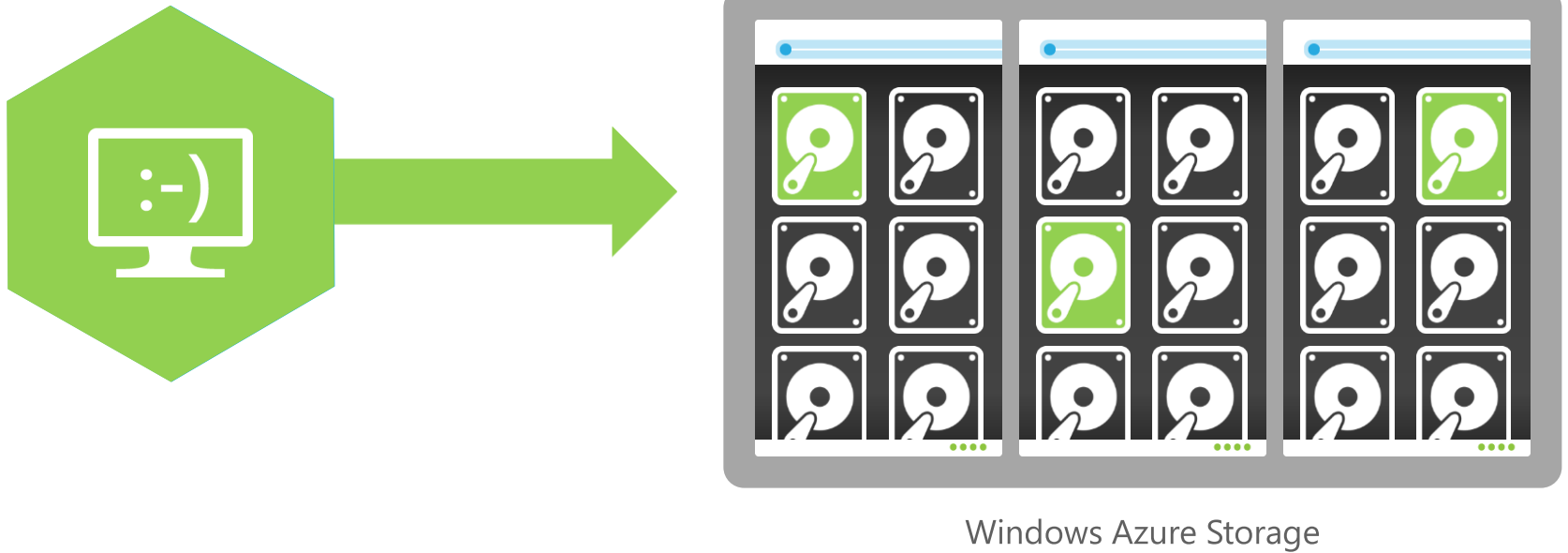
Demo

# VM with persistent drive

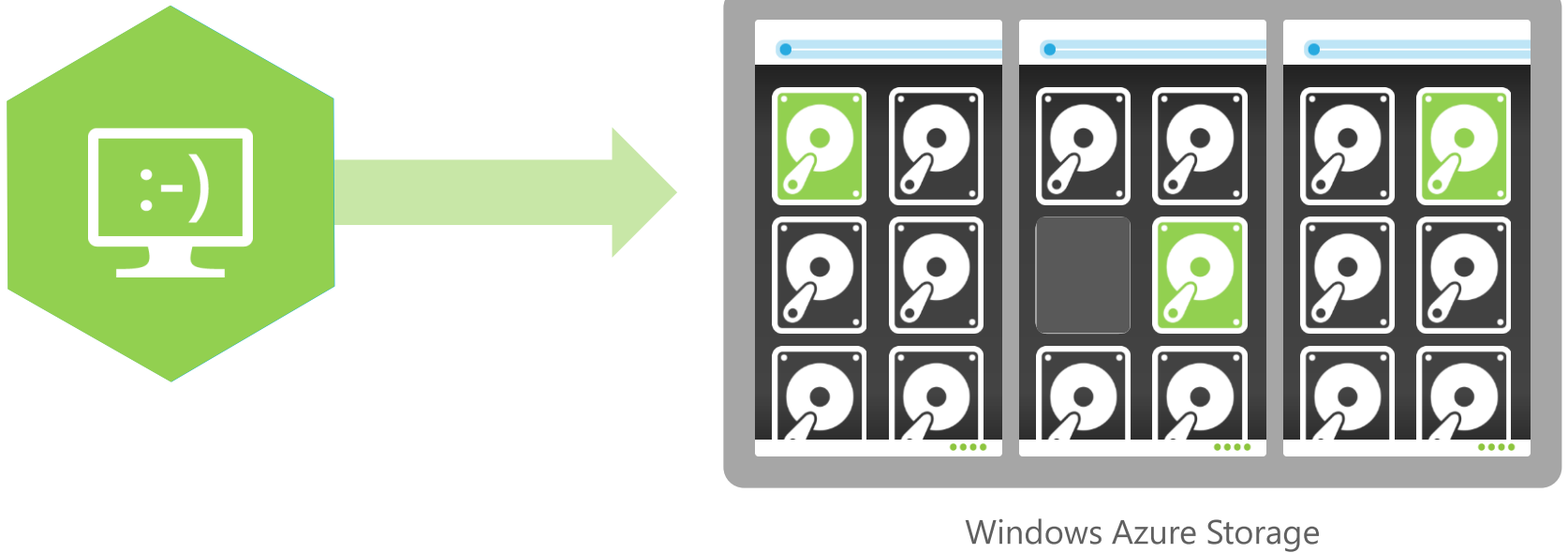


Windows Azure Storage

# VM with persistent drive



# VM with persistent drive



# VM with persistent drive

Reliable and  
always on



Windows Azure Storage

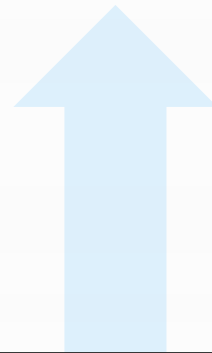
# Cloud services: Deployment



Demo



Windows Azure

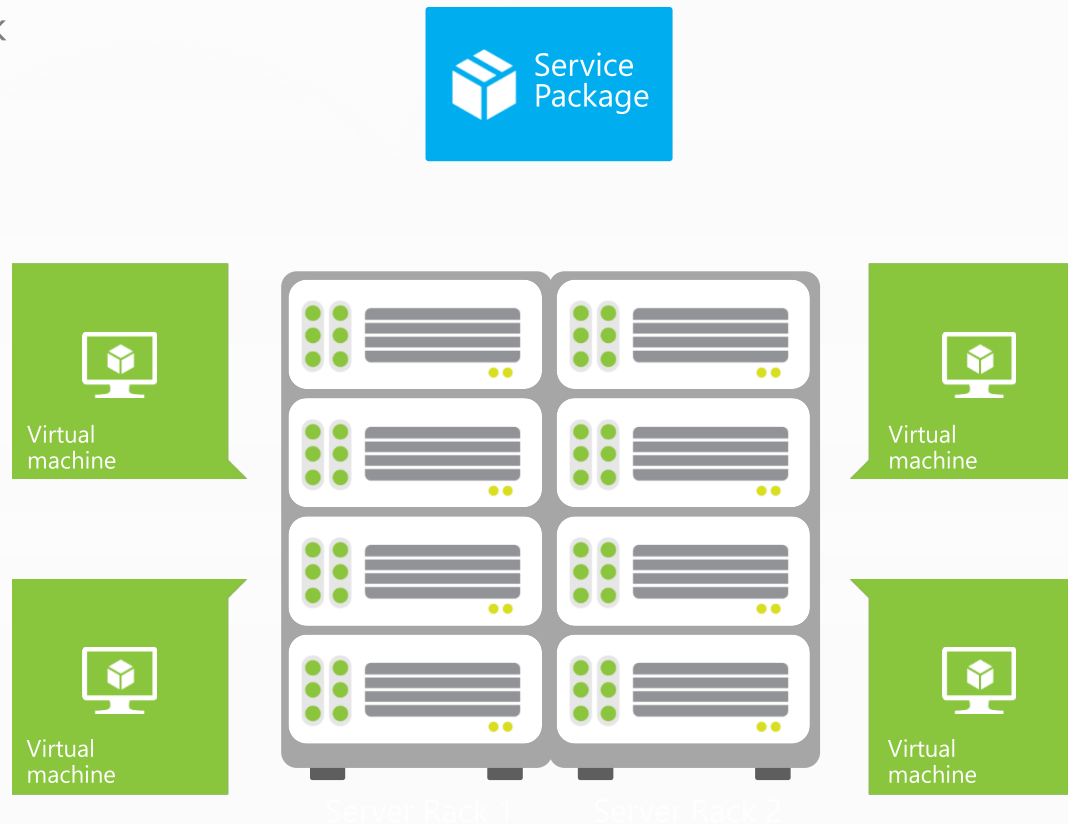




## Provision Role Instances

Deploy App Code

Configure Network



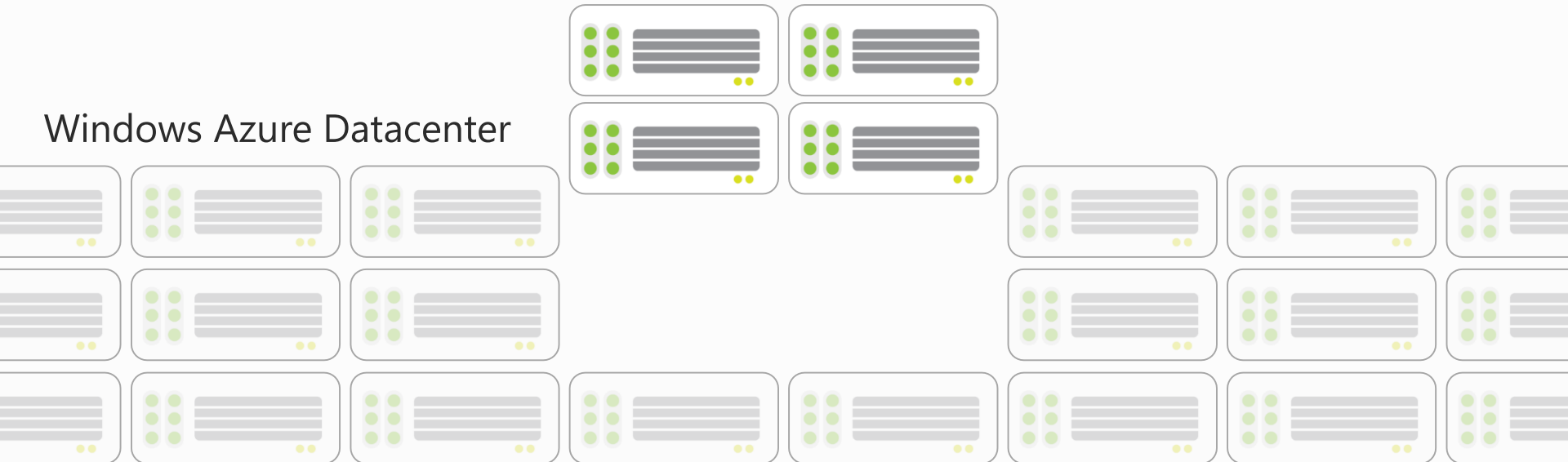
## Provision Role Instances

Deploy App Code

Configure Network



## Windows Azure Datacenter



Provision Role Instances

Deploy App Code

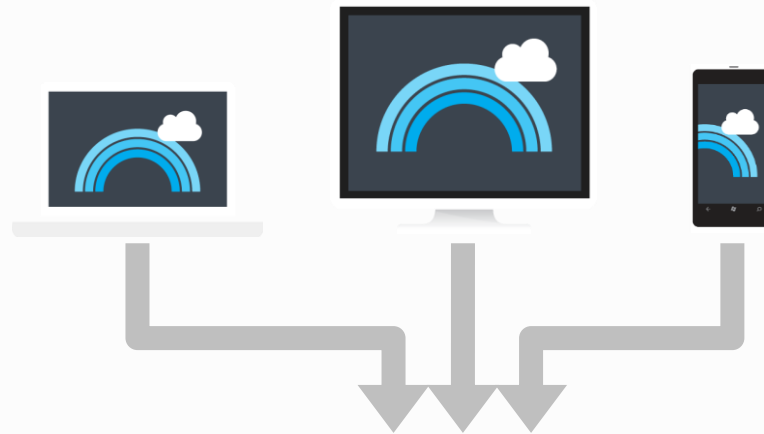
Configure Network



Windows Azure Datacenter



Provision Role Instances  
Deploy App Code  
Configure Network

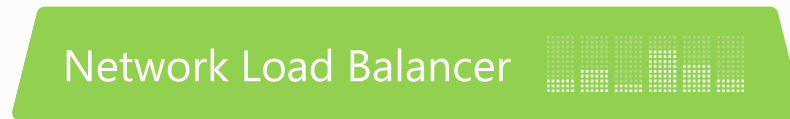
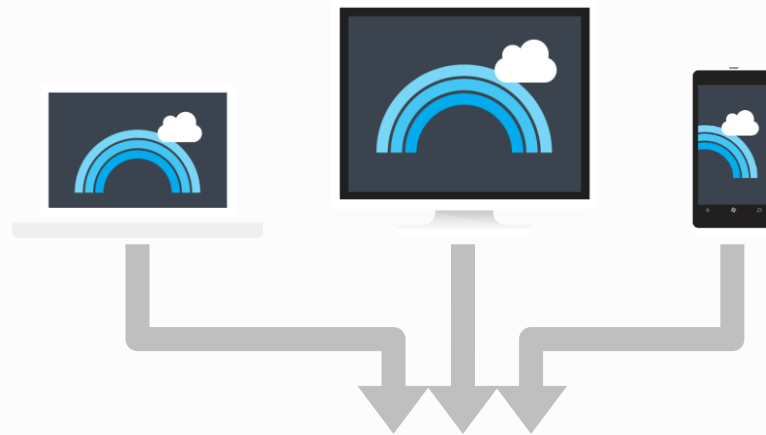


Network Load Balancer

← Network load-balancer configured for traffic

Windows Azure Datacenter





Windows Azure Datacenter



## 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
<ul style="list-style-type: none"><li>• Central US</li><li>• East US</li><li>• East US 2</li><li>• North Central US</li><li>• South Central US</li><li>• West Central US</li><li>• West US</li><li>• West US2</li><li>• US Gov Arizona</li><li>• US Gov Iowa</li><li>• US Gov Texas</li><li>• US Gov Virginia</li><li>• Canada Central</li><li>• Canada East</li><li>• Brazil South</li></ul>	<ul style="list-style-type: none"><li>• France Central</li><li>• France South</li><li>• Germany Central</li><li>• Germany Northeast</li><li>• North Europe</li><li>• West Europe</li><li>• UK South</li><li>• UK West</li></ul>	<ul style="list-style-type: none"><li>• Australia East</li><li>• Australia Southeast</li><li>• China East</li><li>• China North</li><li>• Central India</li><li>• South India</li><li>• West India</li><li>• Japan East</li><li>• Japan West</li><li>• Korea Central</li><li>• Korea South</li><li>• East Asia</li><li>• Southeast Asia</li></ul>



# 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

## Compute

Service Fabric

Container  
Service

Azure Virtual  
Machines

Azure Cloud  
Services

## Networking

Virtual Network

Azure DNS

Application Gateway

Traffic Manager

ExpressRoute

Load Balancer

## Data & Storage

Storage

DocumentDB

Azure SQL  
Database

StorSimple

## Web & Mobile

Web Apps

Mobile Apps

Notification  
Hub

## Other services

Service Bus

Azure AD

Azure AD DS

MFA

Automation

Scheduler

Azure Backup

Site Recovery

Key Vault

Azure Security  
Center

# Windows Azure

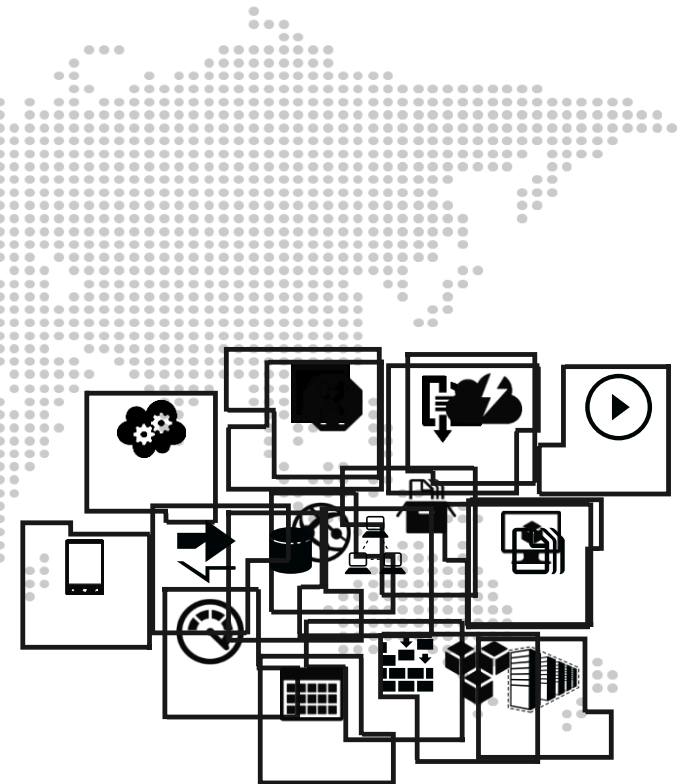
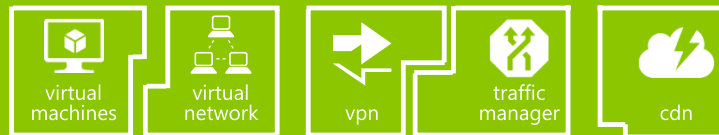
## app services



## data services

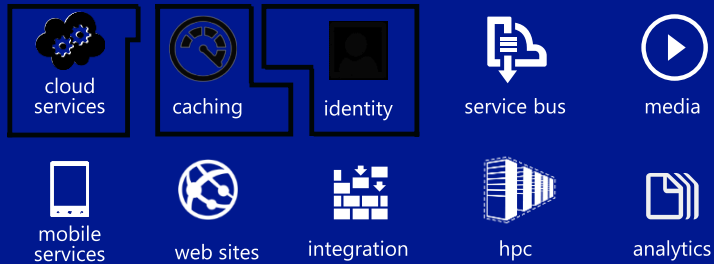


## infrastructure services



# Windows Azure

## app services



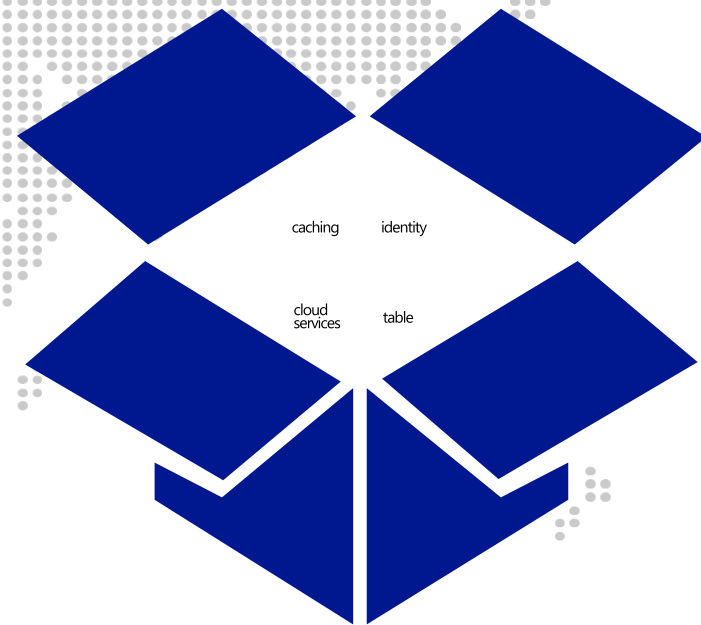
## data services



## infrastructure services



Apps



# Windows Azure

## app services



cloud services



caching



identity



service bus



media



mobile services



web sites



integration



hpc



analytics

## data services



SQL database



HDInsight



table

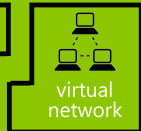


blob storage

## infrastructure services



virtual machines



virtual network



vpn

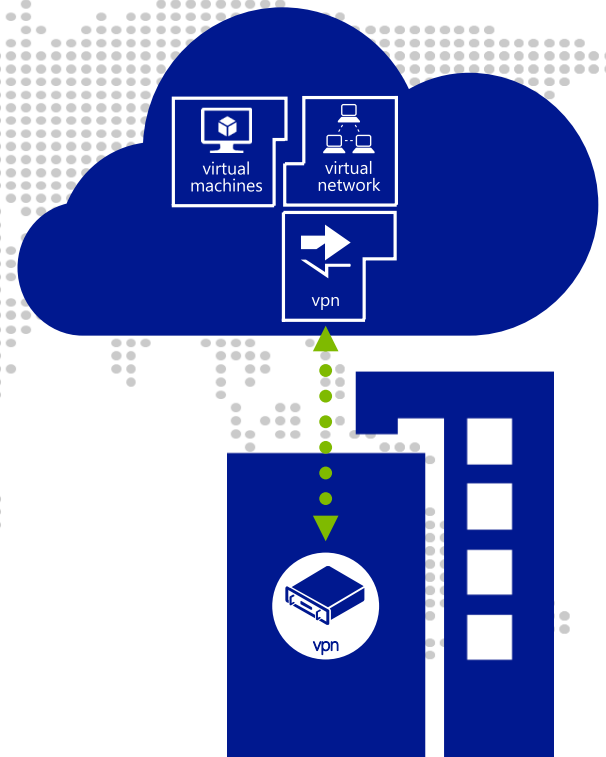


traffic manager

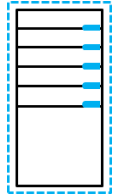


cdn

Azure datacenters,  
your datacenters.



# Compute hosting options provided by Azure



Azure Virtual  
Machines

Control

Support for earlier apps

Ease of  
management  
Agility

Control

Support for earlier apps

Ease of management  
Agility

Control

Support for earlier apps

Ease of management  
Agility

Low

Medium

High



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

The screenshot displays the Microsoft Azure classic portal interface. The top navigation bar includes the 'Microsoft Azure' logo, a dropdown arrow, a link to 'Check out the new portal', a globe icon, and a user profile icon. The left sidebar contains a grid icon for 'ALL ITEMS' and a list of service categories, each with an icon and a count of zero: WEB APPS, VIRTUAL MACHINES, MOBILE SERVICES, CLOUD SERVICES, BATCH SERVICES, SQL DATABASES, STORAGE, HDINSIGHT, MEDIA SERVICES, and SERVICE BUS. The main content area is titled 'all items' and features a table with the following columns: NAME, TYPE, STATUS, SUBSCRIPTION, and LOCATION. A single row is visible, representing the 'Default Directory' with a right-pointing arrow icon, 'Directory' type, 'Active' status (marked with a checkmark), 'Shared by all Default Dir...' subscription, and 'United States' location. The bottom dark bar contains a '+ NEW' button, a trash can icon labeled 'DELETE', and a notification area showing '1' warning icon and a help icon.

Microsoft Azure | Check out the new portal

all items

NAME	TYPE	STATUS	SUBSCRIPTION	LOCATION
Default Directory →	Directory	✓ Active	Shared by all Default Dir...	United States

+ NEW DELETE 1 ?

# Using the Azure portal

Microsoft Azure

New

All resources

Virtual machines

Storage accounts

Virtual networks

Monitor

Azure Advisor

Security Center

Help + support

Subscriptions

Alerts

Resource groups

More services >

Dashboard

+ New dashboard

Edit dashboard










Share

Fullscreen

Clone


Delete

All resources  
ALL SUBSCRIPTIONS


	572206eastus	Storage account
	WebApp1	Virtual machine
	WebApp1-nsg	Network security group
	webapp1829	Network interface
	demotm125	Traffic Manager profile
	WebApp2	Virtual machine
	lablinuxvm861	Network interface
	LABLinuxVM	Virtual machine
	lablinuxdata0107	Storage account

See More

Service health  
MY RESOURCES




Get started




Virtual Machines

Provision Windows and Linux virtual machines in minutes




App Service

Create web and mobile apps for any platform and device




SQL Database

Managed relational database-as-a-service




Storage

Durable, highly available and massively scalable storage



Azure Portal

Learn about how to use the Azure Portal



Marketplace

# 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

<b>Functionality or command</b>	<b>Classic</b>	<b>Azure Resource Manager</b>
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

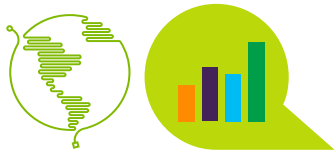
- OMS
- Logging and diagnostics in Azure
- Azure access management



# OMS

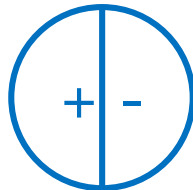
1

Sign up by using OMS and create a workspace



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