

# Azure Basic Concepts

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Source: <https://azure.microsoft.com/en-us/global-infrastructure/geographies/>  
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# Selecting Regions

- Almost every resource in Azure should be placed in a Region

**Create a virtual machine**

**Project details**

Select the subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.

Subscription \* ⓘ

Resource group \* ⓘ   
[Create new](#)

**Instance details**

Virtual machine name \* ⓘ

**Region \* ⓘ**

Availability options ⓘ

Image \* ⓘ   
[Browse all public and private images](#)


# How to Select Region?

- Geographical proximity to system's audience



# How to Select Region?

- Services' availability

TABLE KEY:  Generally Available  In Preview  In Preview (hover to view expected timeframe)  Future availability (hover to view expected timeframe)

Products	CANADA		UNITED STATES							
	Non-regional	Canada Central	Canada East	Central US	East US	East US 2	North Central US	South Central US	West Central US	West US
<a href="#">Azure Functions</a>		✓	✓	✓	✓	✓	✓	✓	✓	✓
Consumption plan		✓	✓	✓	✓	✓	✓	✓	✓	✓
Consumption plan Linux		⏴		✓	✓	✓	✓	✓		✓
Premium plan		✓		✓	✓	✓	✓	✓	✓	✓
Premium plan Linux		✓		✓	✓	✓	✓	✓	✓	✓
<a href="#">Event Grid</a>		✓	✓	✓	✓	✓	✓	✓	✓	✓

Source: <https://azure.microsoft.com/en-us/global-infrastructure/services/>  
<https://t.me/learningnets>

# How to Select Region?

- Availability Zones



# How to Select Region?

- Pricing

REGION: Norway West	OPERATING SYSTEM: Windows	TYPE: (OS Only)	TIER: Standard
INSTANCE: D2 v3: 2 vCPUs, 8 GB RAM, 50 GB Temporary storage, \$0.264/hour	VIRTUAL MACHINES 1 x 730 Hours		

## Savings Options

Save up to 72% on pay-as-you-go prices with 1-year or 3-year Reserved Virtual Machine Instances. Reserved Instances are great for applications with steady-state usage and applications that require reserved capacity. [Learn more about Reserved VM Instances pricing.](#)

### Compute (D2 v3)

- Pay as you go
- 1 year reserved (~36% discount)
- 3 year reserved (~56% discount)

\$125.56  
Average per month  
(\$0.00 charged upfront)

### OS (Windows)

- License included
- Azure Hybrid Benefit

\$67.16  
Average per month  
(\$0.00 charged upfront)

**= \$192.72**  
Average per month  
(\$0.00 charged upfront)

# How to Select Region?

- Pricing

REGION: West US	OPERATING SYSTEM: Windows	TYPE: (OS Only)	TIER: Standard
INSTANCE: D2 v3: 2 vCPUs, 8 GB RAM, 50 GB Temporary storage, \$0.209/hour	VIRTUAL MACHINES 1		730 Hours

## Savings Options

Save up to 72% on pay-as-you-go prices with 1-year or 3-year Reserved Virtual Machine Instances. Reserved Instances are great for applications with steady-state usage and applications that require reserved capacity. [Learn more about Reserved VM Instances pricing.](#)

### Compute (D2 v3)

- Pay as you go
- 1 year reserved (~32% discount)
- 3 year reserved (~57% discount)

\$85.41  
Average per month  
(\$0.00 charged upfront)

### OS (Windows)

- License included
- Azure Hybrid Benefit

\$67.16  
Average per month  
(\$0.00 charged upfront)

**= \$152.57**  
Average per month  
(\$0.00 charged upfront)

# Resource Groups

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- A logic container for resources
- Used for grouping resources by a logic boundary
- Free
- Examples:
  - Development / Test / Production resources
  - Team A resources

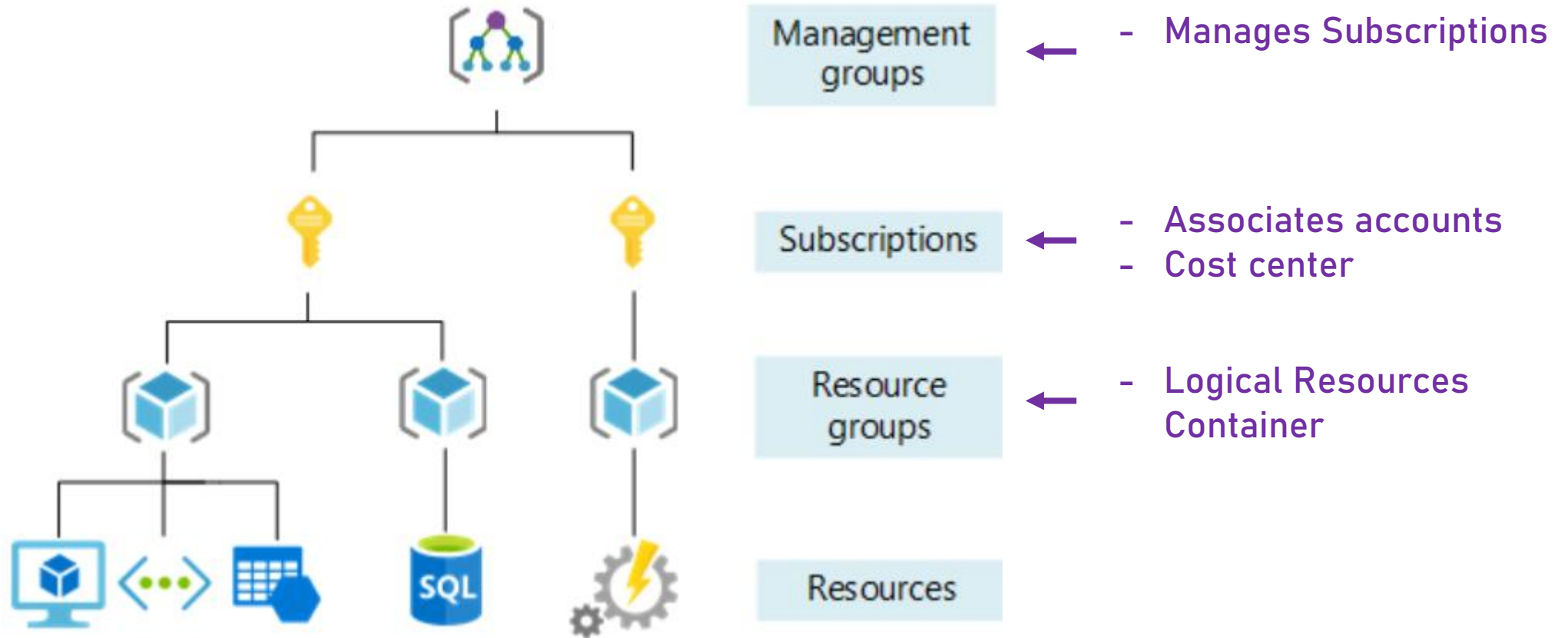
# Resource Groups vs Subscriptions

## Subscription

### Logical Container

Contains the various resources you provision in the cloud (VMs, DBs, networks etc.)

# Resource Groups vs Subscriptions



Source: <https://docs.microsoft.com/en-us/azure/cloud-adoption-framework/ready/azure-setup-guide/organize-resources?tabs=AzureManagementGroupsAndActivity>  
<https://t.me/learningnets>

# Resource Groups Naming Conventions

- It's best practice to have an "rg" or "RG" as part of the resource group name

- Could be prefix or suffix

RG-Project-Dev

Finance-Resources-rg

# Resource Groups

- Almost every resource in Azure is placed in a Resource Group

**Create a virtual machine**

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Subscription \* ⓘ

**Resource group \* ⓘ**  [Create new](#)

**Instance details**

Virtual machine name \* ⓘ

Region \* ⓘ

Availability options ⓘ

Image \* ⓘ  [Browse all public and private images](#)

# Storage Account

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- Used to store almost anything in Azure
- Used transparently by various services
- For example:
  - Database backups
  - VM Disks
  - Diagnostics data

# Storage Account

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- Used also for explicit data storage
- We'll discuss it later...
- Quite cheap

# SLA

- Service Level Agreement
- The uptime % of a cloud service

SLA (%)	Yearly Downtime Allowed
95	18d 6h 17m 27s
99	3d 15h 39m 29s
99.9	8h 45m 56s
99.99	52m 35s

# SLA

- ALWAYS check the SLA of the service used

## SLA for App Service

Last updated: July 2016

We guarantee that Apps running in a customer subscription will be available 99.95% of the time. No SLA is provided for Apps under either the Free or Shared tiers.

# SLA

- **ALWAYS** check the SLA of the service used

## SLA for Azure SQL Database

Last updated: July 2019

Azure SQL Database is a fully managed relational database with built-in regional high availability and turnkey geo-replication to any Azure region. It includes intelligence to support self-driving features such as performance tuning, threat monitoring, and vulnerability assessments and provides fully automated patching and updating of the code base.

- Azure SQL Database Business Critical or Premium tiers configured as Zone Redundant Deployments have an availability guarantee of at least **99.995%**.
- Azure SQL Database Business Critical or Premium tiers not configured for Zone Redundant Deployments, General Purpose, Standard, or Basic tiers, or Hyperscale tier with two or more replicas have an availability guarantee of at least **99.99%**.
- Azure SQL Database Hyperscale tier with one replica has an availability guarantee of at least **99.95% and 99.9%** for zero replicas.

# SLA Calculation

- To get the actual system SLA, multiply the SLAs of the participating services

App Service SLA = 99.95%

Azure SQL SLA = 99.99%

Actual SLA =  $99.95 \times 99.99 = 99.94\%$  = 5h 15m 34s annual downtime

# Cost

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- Almost everything in the cloud costs money
- Few pricing models:
  - Per resource (ie. VM)
  - Per consumption (ie. Function Apps)
  - Reservations

# Cost

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- **ALWAYS** check resource's cost before provisioning
- Check for more cost-effective alternatives
- Look for reservations when available and relevant

# Azure Calculator

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<https://azure.microsoft.com/en-us/pricing/calculator/>

# Architects and the Cloud

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- Software Architects designing regular system need to know:
  - Non-Functional Requirements
  - Technology Stack
  - Component's Architecture
  - Communication Patterns

# Architects and the Cloud

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- Cloud-based systems require, in addition:
  - Infrastructure knowledge
  - Security
  - Hands-on
- We'll learn all that in this course 😊