

# Curso de Especialização em Aprendizagem de Máquina em Inteligência Artificial

Disciplina: Computação em nuvem

**Aula 05**

*Prof. Dr. Renato Manzan*

*10 de setembro de 2020*



# XBOX as a Service

## Choose your console with Xbox All Access



**The fastest, most powerful Xbox ever.**

**\$34.99/mo.** for 24 months

No upfront cost.  
0% APR<sup>†</sup>

PRE-ORDER SEPTEMBER 22

- ✓ Xbox Series X console
- ✓ 24 months of Xbox Game Pass Ultimate



**Next-gen performance in the smallest Xbox ever.**

**\$24.99/mo.** for 24 months

No upfront cost.  
0% APR<sup>†</sup>

PRE-ORDER SEPTEMBER 22

- ✓ Xbox Series S console
- ✓ 24 months of Xbox Game Pass Ultimate



**The best value in games and entertainment.**

**\$22.99/mo.** for 24 months

No upfront cost.  
0% APR<sup>†</sup>

JOIN NOW ➔

- ✓ Xbox One S console bundle
- ✓ 24 months of Xbox Game Pass Ultimate
- ✓ 18-month console upgrade option<sup>‡</sup>

Upgrade to an Xbox Series X in 18 months<sup>‡</sup> with the purchase of an Xbox One

Fonte: <https://www.xbox.com/en-US/xbox-all-access>

# Nespresso as a Service



## PLANO 50 CÁPSULAS DESCOBRIDOR

De 1 a 2 cafés Nespresso por dia

**R\$ 110,00/MÊS**

**GANHE MAIS 10% EXTRA**

Sua conta será creditada  
com R\$ 121,00/mês



## PLANO 70 CÁPSULAS EXPLORADOR

2 cafés Nespresso em média por dia

**R\$ 155,00/MÊS**

**GANHE MAIS 10% EXTRA**

Sua conta será creditada  
com R\$ 170,50/mês



## PLANO 100 CÁPSULAS ESPECIALISTA

3 ou mais cafés Nespresso por dia

**R\$ 220,00/MÊS**

**GANHE MAIS 10% EXTRA**

Sua conta será creditada  
com R\$ 242,00/mês

Fonte: <https://www.nespresso.com/br/pt/assinatura#/>

# Nike as a Service

## How it works



1

### Select your Plan

Choose how often you want to receive a new adventure kit (from once a month to four times a year).

2

### Pick your Shoes

When it's time, pick your Nike or Converse shoes of choice.

3

### Get the Kit

Your kid's shoes (and activities) ship to your door in a box personalized for them.

4

### Begin the Adventure

Run, jump, and play your way to happier, healthier, more adventurous family.



MEMBERSHIP

## Plans fit for every kid

\$20/mo

### 4 pairs per year

Get new shoes and activities every 90 days

\$30/mo

### 6 pairs per year

Get new shoes and activities every 60 days

BEST VALUE – SAVE \$10 PER PAIR

\$50/mo

### 12 pairs per year

Get new shoes and activities every 30 days

## WHAT PARENTS LOVE



One simple monthly fee, no hidden charges



Always free shipping, returns, and exchanges



Change or cancel your plan at any time



Go green with our shoe recycling program

Fonte: <https://www.nikeadventureclub.com/>

# Objetivos da aula

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## ***1. Debriefing da atividade da aula passada***

## ***2. Apresentar os principais conceitos e ferramentas dos seguintes tópicos:***

- *Governança em Cloud Computing*
- *Escalabilidade*
- *Disponibilidade*

## ***3. Atividade para a próxima aula***

# Debriefing – Entrega Parcial 3 – Cloud Life Cycle | VM

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- **Erick Munekata:** RFs: elástica, tolerante a falhas e rápida | VM: **GCP**
- **Fernanda:** estreitar a relação com os clientes, acompanhar as campanhas, obter uma visão unificada dos clientes e acompanhar o nível de engajamento para possibilitar estratégias | VM: **AZURE**
- **Marcos Wada:** Escalabilidade, Multicloud | VM: **AWS**
- **Paulo Braga:** Validação dos objetivos da empresa. Aspectos Culturais | VM: **AZURE**
- **Paulo Sergio:** expectativas da empresa e troca de experiências com organizações com segmento semelhantes | VM: **AZURE**
- **Tarcizio:** Viabilidade do Projeto | VM: **AZURE**
- **Wal:** redução nos custos de operação, possibilidade de escalar a aplicação de acordo com a demanda | VM: **AWS**

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# *Cloud Computing Governance*

# Nuvem ?

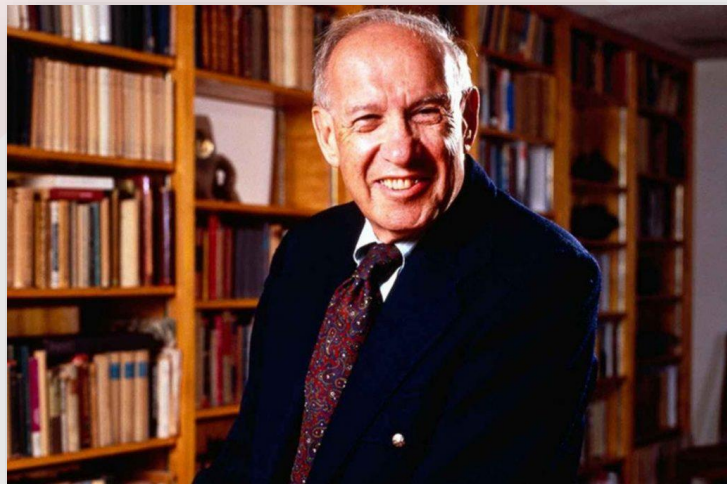
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- Por que isso agora ? Não está funcionando do que jeito que sempre funcionou ?
- Vou ser demitido ? Vou perder poder....
- O servidor não está no meu *Datacenter*... E agora ?
- O que muda na nuvem?
- Qual será o meu papel e o da minha equipe?
- Minha equipe está pronta ?
- Como realizar a gestão da nuvem?
- *Disaster recovery* ? Backup ? O que fazer em casos de desastres ?
- Escalabilidade, redundância, desempenho, custos,.....



*Nunca se esqueçam....*

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A Cultura devora a estratégia  
no café da manhã...

Fonte: <https://www.napratika.org.br/peter-drucker-pai-da-administracao-moderna/>

# Cloud Governance Context

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- *Governance is a **loaded** word. It can evoke negative responses and is often incorrectly defined as strategy, policy or procedure.*
- *Misconceptions about what governance is, the level of effort needed to set up a program, and how it supports day-to-day **operations may be the greatest barriers to an organization embarking on this necessary work.***
- *The results of good governance are measurable: some studies show that organizations with above average IT governance have **over 20% higher profits** than those with inadequate governance following an otherwise similar IT strategy*

*Fonte:* OMG – Practical Guide for Cloud Governance: <https://www.omg.org/cloud/deliverables/practical-guide-to-cloud-governance>

# Cloud Governance Definition

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- Governance, generically, may be defined as an agreed-upon *set of policies and standards*, which is based on a risk assessment and an-agreed upon framework, inclusive of *audit, measurement, and reporting procedures*, as well as *enforcement of policies and standards*.
- Ponto Crucial: **CULTURA ORGANIZACIONAL**

Fonte: OMG – Practical Guide for Cloud Governance: <https://www.omg.org/cloud/deliverables/practical-guide-to-cloud-governance>

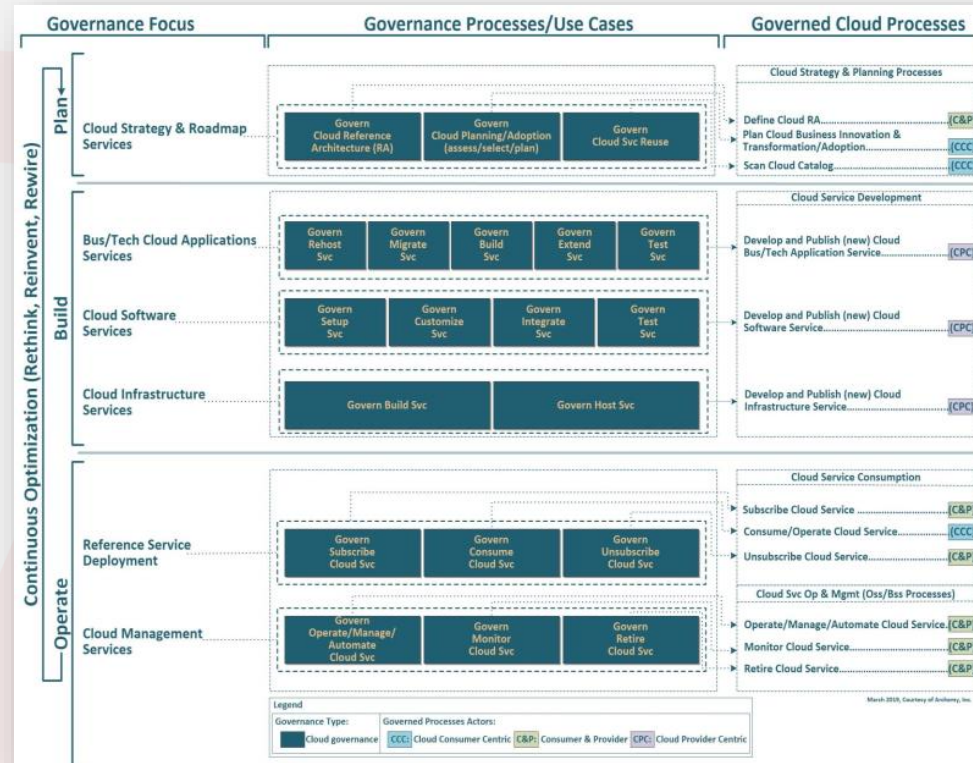
# The Need for Cloud Governance

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- The introduction of cloud computing into an organization affects *roles, responsibilities, processes* and *metrics*.
- Without cloud governance in place to provide guidelines to navigate risk and efficiently procure and operate cloud services, an organization may find itself faced with these *common problems*:
  - *Misalignment* with enterprise objectives
  - Frequent policy *exception* reviews
  - Paused projects
  - Compliance or *regulatory penalties* or failures
  - Budget *overruns*
  - *Incomplete* risk assessments

Fonte: OMG – Practical Guide for Cloud Governance: <https://www.omg.org/cloud/deliverables/practical-guide-to-cloud-governance>

# The Need for Cloud Governance



Fonte: OMG – Practical Guide for Cloud Governance: <https://www.omg.org/cloud/deliverables/practical-guide-to-cloud-governance>

# Cloud Governance – Proposed RACI Matrix

	BoD	CEO	COO	CFO	CIO	CISO	CLO
Strategy & Use Case	I	C	R, A	C	R	C	C
Business Requirements	I	C	C	R, A	R	C	C
Compliance	I	C	R	R	R, A	R	C
Contracts & SLAs	I	I	R	I	C	C	R, A
Asset & Data Governance	I	C	C	I	R	R, A	I
Information & Data Management	I	C	C	I	R, A	R, A	I
Continuity & Elasticity	I	C	R, A	I	R	C	I
Technology & Service Provider Governance	I	C	C	I	R	R, A	R
Service Orchestration & Interoperability	I	C	R, A	C	R	R	I
IT Operations Management	I	C	R, A	C	R	R	I
Sustain Governance	I, C	C	R, A	R, A	R, A	R	C
Innovation or Transformation	I, C	C	R, A	I	R, A	R	R

Fonte: OMG – Practical Guide for Cloud Governance: <https://www.omg.org/cloud/deliverables/practical-guide-to-cloud-governance>

# Cloud Governance – Governance Focus

Governance Focus	Cloud Processes Governed	Governance Use Cases
<b>Plan</b>	<p><b>Cloud Strategy &amp; Roadmap Definition</b></p> <p>The cloud services governed are focused on helping define the “Approach to Cloud,” which entails strategizing and planning the use of business/technical solutions or applications, fog and edge Services, cloud platform/infrastructure services, and cloud software. These activities should involve the Cloud Service Provider(s).</p>	<ul style="list-style-type: none"><li>• Plan/Adopt</li><li>• Reference Architecture</li><li>• Service Reuse</li></ul>

Fonte: OMG – Practical Guide for Cloud Governance: <https://www.omg.org/cloud/deliverables/practical-guide-to-cloud-governance>

# Cloud Governance – Governance Focus

Governance Focus	Cloud Processes Governed	Governance Use Cases
Build	<b>Cloud Solution / Application Service Development</b> The cloud services governed are focused on building business/technical solutions or application services “on cloud,” which covers IaaS or PaaS, Custom PaaS, SaaS, BPaaS (business process as a service), and other cloud services (“XaaS”).	<ul style="list-style-type: none"><li>• Rehost</li><li>• Migrate</li><li>• Build</li><li>• Extend</li><li>• Test</li></ul>
	<b>Cloud Software Service Usage</b> The cloud services governed are focused on building “cloud software services from cloud,” which covers third-party, SaaS, fog and edge services, cloud platform services, and on-demand solutions.	<ul style="list-style-type: none"><li>• Setup</li><li>• Customize</li><li>• Integrate</li><li>• Test</li></ul>
	<b>Cloud Infrastructure Service Usage</b> The cloud services governed are focused on using “infrastructure services for cloud,” which covers private IaaS, multi-tenant IaaS, virtual private cloud (VPC), and scalability-related solutions.	<ul style="list-style-type: none"><li>• Build</li><li>• Host</li></ul>

Fonte: OMG – Practical Guide for Cloud Governance: <https://www.omg.org/cloud/deliverables/practical-guide-to-cloud-governance>



# Cloud Governance – Governance Focus

Governance Focus	Cloud Processes Governed	Governance Use Cases
Operate	<b>Cloud Service Deployment</b>  The cloud services governed are focused on “leveraging clouds,” which covers business/technical solutions, applications, platform services, compute services (virtual machines, containers, microkernels), and storage services.	<ul style="list-style-type: none"><li>• Subscribe</li><li>• Consume</li><li>• Unsubscribe</li></ul>
	<b>Cloud Service Management</b>  The cloud services governed are focused on “management of clouds,” which covers business/technical solutions, applications, platform services, compute services (virtual machines, containers, microkernels), and storage services.	<ul style="list-style-type: none"><li>• Operate / manage / automate</li><li>• Monitor</li><li>• Retire</li></ul>

Fonte: OMG – Practical Guide for Cloud Governance: <https://www.omg.org/cloud/deliverables/practical-guide-to-cloud-governance>

# Cloud Governance – Some KPIs

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- *Ratio of planned versus actual cloud services*
- *Frequency of exceptions to policies*
- *Operational Efficiency*
- *Average time to onboard*
- *Cost reduction*
- *% of total and departmental budgets allocated to cloud services.*
- *Business Value Alignment –how the organization measures project results (earned vs. planned value, cost variance, etc.)*
- *Used vs. idle cloud services*
- *% of business service-level requirements met*

*Fonte:* OMG – Practical Guide for Cloud Governance: <https://www.omg.org/cloud/deliverables/practical-guide-to-cloud-governance>

# Cloud Governance – Microsoft Perspective

## Govern

<http://aka.ms/CAF/Gov>

### Define Corporate Policy

#### Business Risks



Document evolving business risks and the business' tolerance for risk, based on data classification and application criticality

#### Policy & Compliance



Convert Risk decisions into policy statements to establish cloud adoption boundaries.

#### Process



Establish processes to monitor violations and adherence to corporate policies.

### Five Disciplines of Cloud Governance



#### Cost Management

Evaluate & monitor costs, limit IT spend, scale to meet need, create cost accountability



#### Security Baseline

Ensure compliance with IT Security requirements by applying a security baseline to all adoption efforts



#### Resource Consistency

Ensure consistency in resource configuration. Enforce practices for on-boarding, recovery, and discoverability



#### Identity Baseline

Ensure the baseline for identity and access are enforced by consistently applying role definitions and assignments



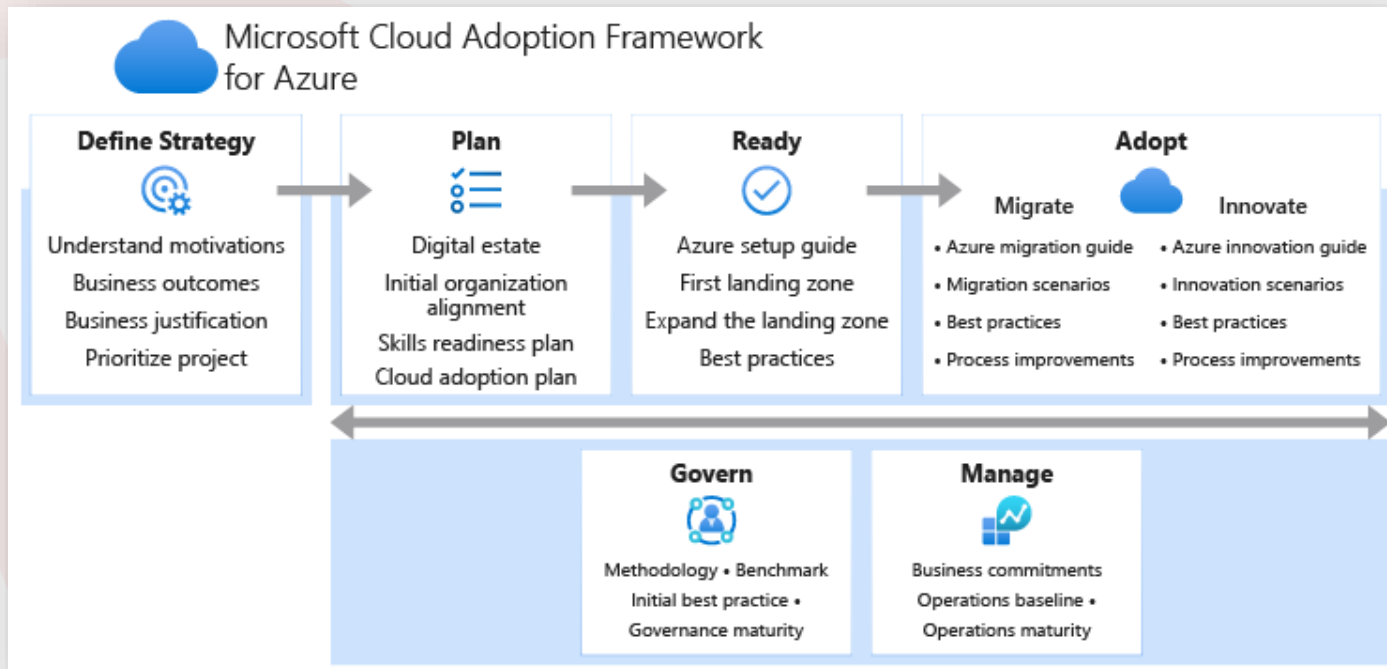
#### Deployment Acceleration

Accelerate deployment through centralization, consistency, and standardization across deployment templates

Fonte: <https://docs.microsoft.com/en-us/azure/cloud-adoption-framework/govern/governance-disciplines>

# Cloud lifecycle – Microsoft Perspective

*The Cloud Adoption Framework is a full lifecycle framework, supporting customers throughout each phase of adoption by providing methodologies as specific approaches to overcoming common blockers*



Fonte: <https://docs.microsoft.com/pt-br/azure/cloud-adoption-framework/overview>

# Cloud Life-Cycle & Cloud Governance


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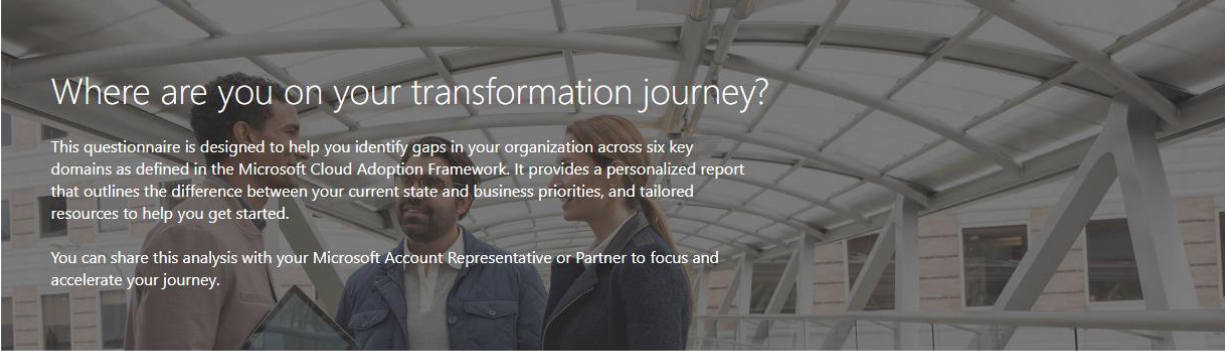


***Discussão em sala:*** Qual é a diferença entre Cloud Life-Cycle e Cloud Governance ?

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# Cloud Adoption Framework Governance Benchmark Tool

 Microsoft | Cloud Adoption Framework Governance Benchmark Tool [Login](#)



## Where are you on your transformation journey?

This questionnaire is designed to help you identify gaps in your organization across six key domains as defined in the Microsoft Cloud Adoption Framework. It provides a personalized report that outlines the difference between your current state and business priorities, and tailored resources to help you get started.

You can share this analysis with your Microsoft Account Representative or Partner to focus and accelerate your journey.

### To begin, tell us a bit about yourself

Country ▾

Industry ▾

Company Size ▾

Role ▾

Division ▾

[Privacy Statement](#)

[Get started](#)

Please [login](#) to manage, and track your results over time.

\* Fonte: <https://cafbaseline.com>

# Traditional IT vs. Modern IT

	Traditional IT	Modern IT
DNA	Intermediation	Disintermediation
Service Delivery	Wave Based	Continuous-Iteration Based
Service Stability	Design for Success (HA/Redundant)	Design for Failure (Resilient)
Delegation Levels	IT Silos	End-to-End Services
Processes	In Documents, Optimized, Redesigned	Self Service, Knowledge, Low Friction, Automated
Automation	Isolated, Manually Initiated	Systemic, Triggered, Automatic
Monitoring	Element, Fault Focused	Service, End-to-End-Capability Focused
Support	Service Desk / Contact Center	Customer Care / Self Service
Lifecycle	N-1 or Older	N, N+1
Configuration / Asset Management	Discovered / Manual Configuration	Prescribed, Declarative, Automated

Fonte: <https://cloudblogs.microsoft.com/industry-blog/government/2018/04/30/is-your-government-itsm-falling-behind/>

# Shadow IT

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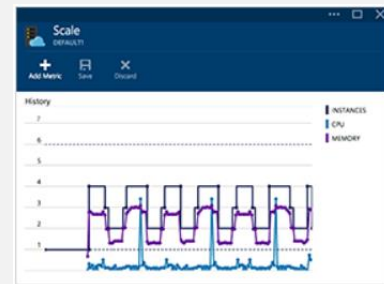
## ***Discussão em sala: Experiências de Shadow IT ?***

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# Escalabilidade

**Capability:** degree to which the maximum limits of a product or system parameter meet requirements (performance efficiency subcharacteristic)

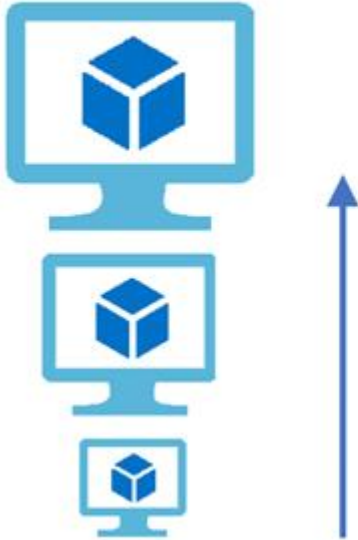


**Fonte:** “INTERNATIONAL STANDARD ISO / IEC 25010 First edition 2011-0301 Systems and software engineering — Systems and software Quality Requirements and Evaluation ( SQuaRE ) — System and software quality models.” (2013).

# Vertical and horizontal scaling

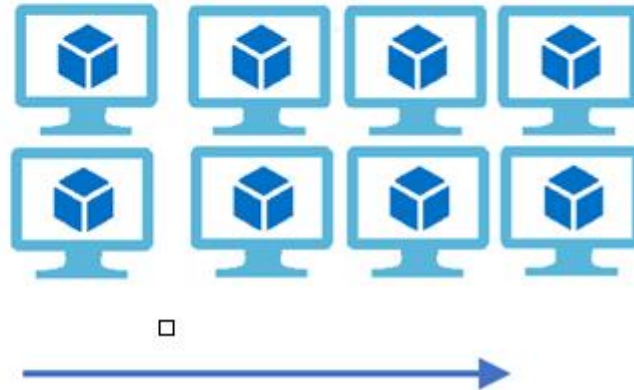
## Vertical Scaling

( Increase size of instance (RAM , CPU etc.) )



## Horizontal Scaling

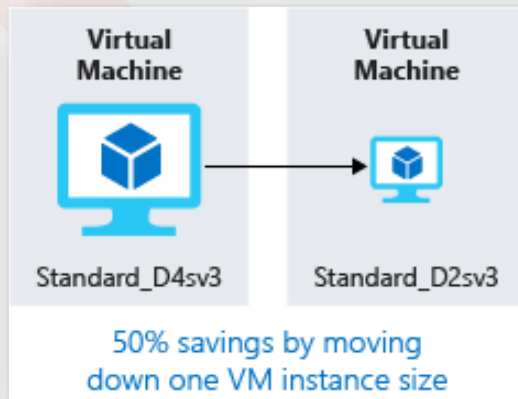
( Add more instances )



Fonte: <http://abhijitkakade.com/2019/04/horizontal-vs-vertical-scaling-azure-autoscaling/>

# Scale up/down

*Scaling up, or vertical scaling, means to increase the memory, storage, or compute power on an existing virtual machine. For example, you can add additional memory to a web or database server to make it run faster.*

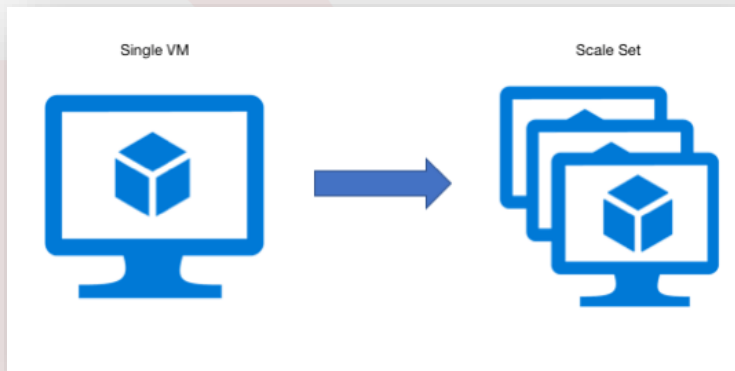


Fonte: <https://daryusman.wordpress.com/2019/01/23/scale-up/>

# Scale out/in

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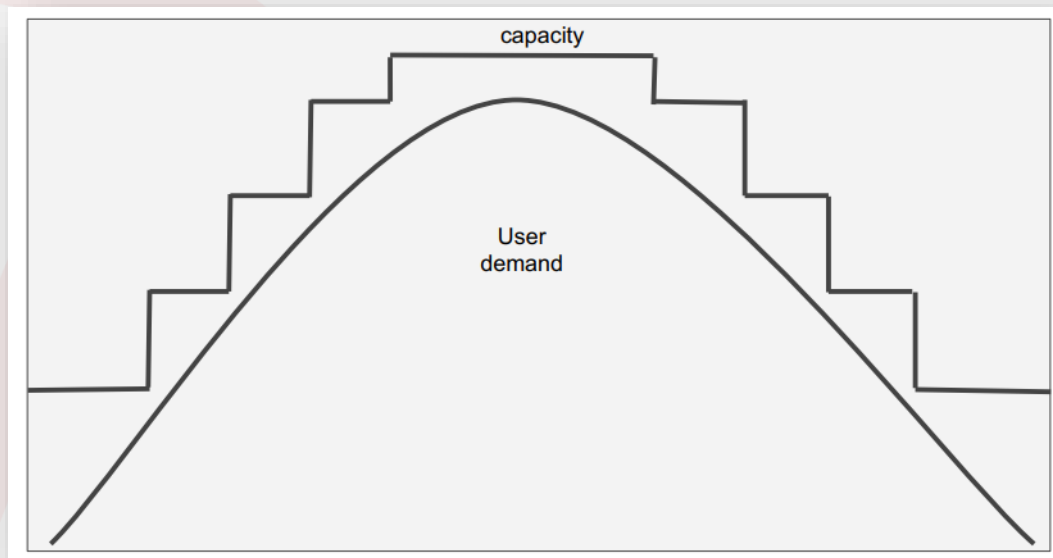
*Scaling out, or horizontal scaling, means to add extra virtual machines to power your application. For example, you might create many virtual machines configured in exactly the same way and use a load balancer to distribute work across them.*



Fonte: <https://daryusman.wordpress.com/2019/01/23/scale-up/>

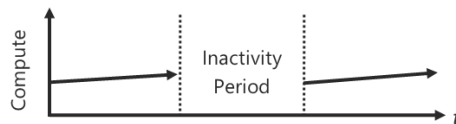
# Cloud elasticity

*The ability of a system to automatically grow and shrink based on application demand*



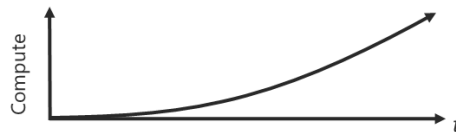
Fonte: 2019 Scott Duffy, softwarearchitect.ca - AZ-900 Microsoft Azure Fundamentals - <https://www.udemy.com/az900-azure/>

# Cloud elasticity



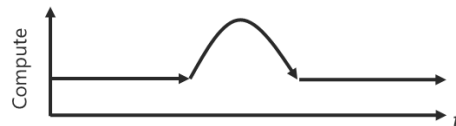
## On and Off

On and off workloads (e.g. batch job)  
Over provisioned capacity is wasted  
Time to market can be cumbersome



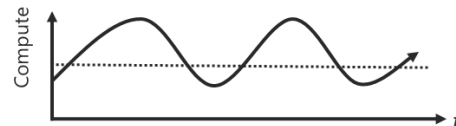
## Growing Fast

Successful services needs to grow/scale  
Keeping up with growth is a big IT challenge  
Cannot provision hardware fast enough



## Unpredictable Bursting

Unexpected/unplanned peak in demand  
Sudden spike impacts performance  
Cannot over provision for extreme cases



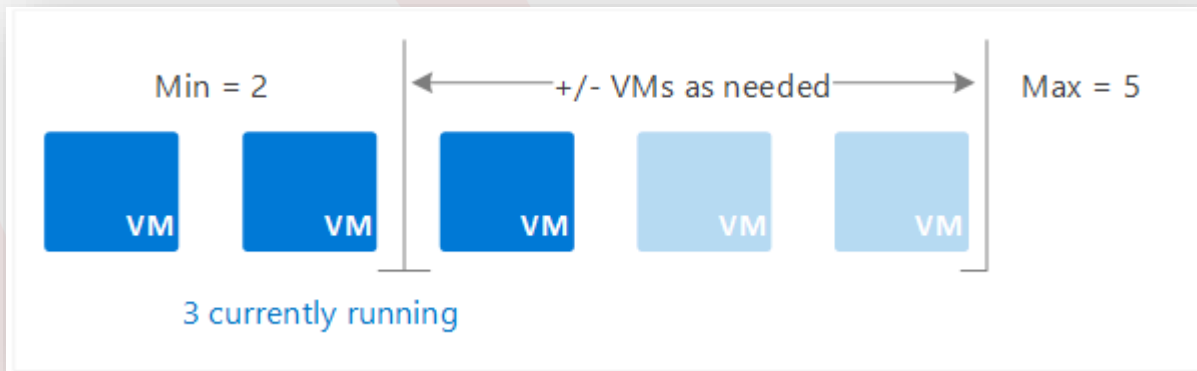
## Predictable Bursting

Services with micro seasonality trends  
Peaks due to periodic increased demand  
IT complexity and wasted capacity

Fonte: Windows Azure Overview for IT Pros - <https://slideplayer.com/slide/9894614/>

# Azure Auto Scale

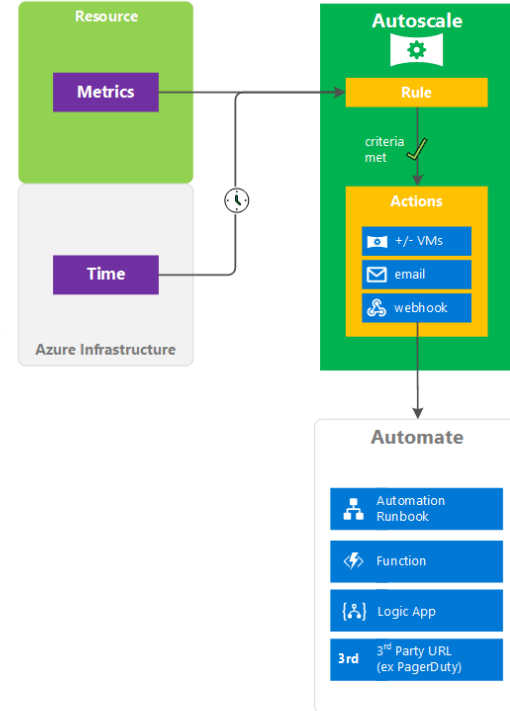
- *Autoscaling is the process of dynamically allocating resources to match performance requirements.*
- *As the volume of work grows, an application may need additional resources to maintain the desired performance levels and satisfy service-level agreements (SLAs).*



Fonte: [Overview of autoscale in Microsoft Azure](#)

# Auto scale mechanism

- When rule conditions are met, one or more auto scale actions are triggered. The auto scale process can add and remove VMs, or perform other actions.



Fonte: [Overview of autoscale in Microsoft Azure](#)



# Azure Auto Scale

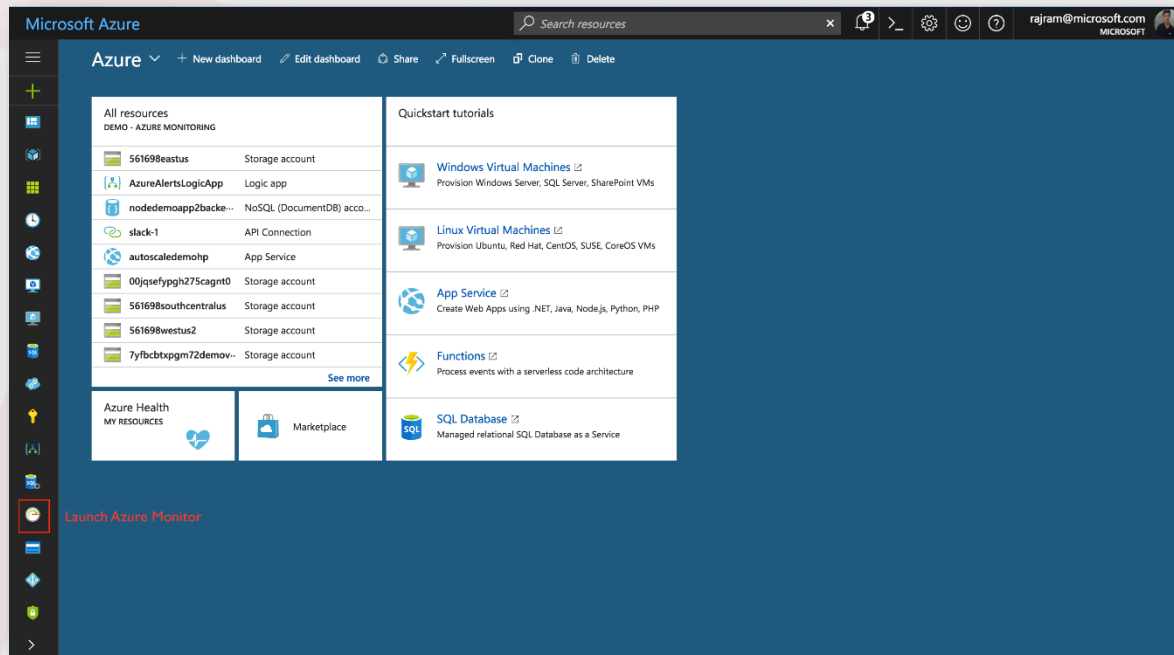
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- *Examples:*
  - *Scale out to 10 instances on weekdays, and scale in to 4 instances on Saturday and Sunday.*
  - *Scale out by one instance if average CPU usage is above 70%, and scale in by one instance if CPU usage falls below 50%.*
  - *Scale out by one instance if the number of messages in a queue exceeds a certain threshold*

*Fonte:* Auto Scaling - <https://docs.microsoft.com/pt-br/azure/architecture/best-practices/auto-scaling>

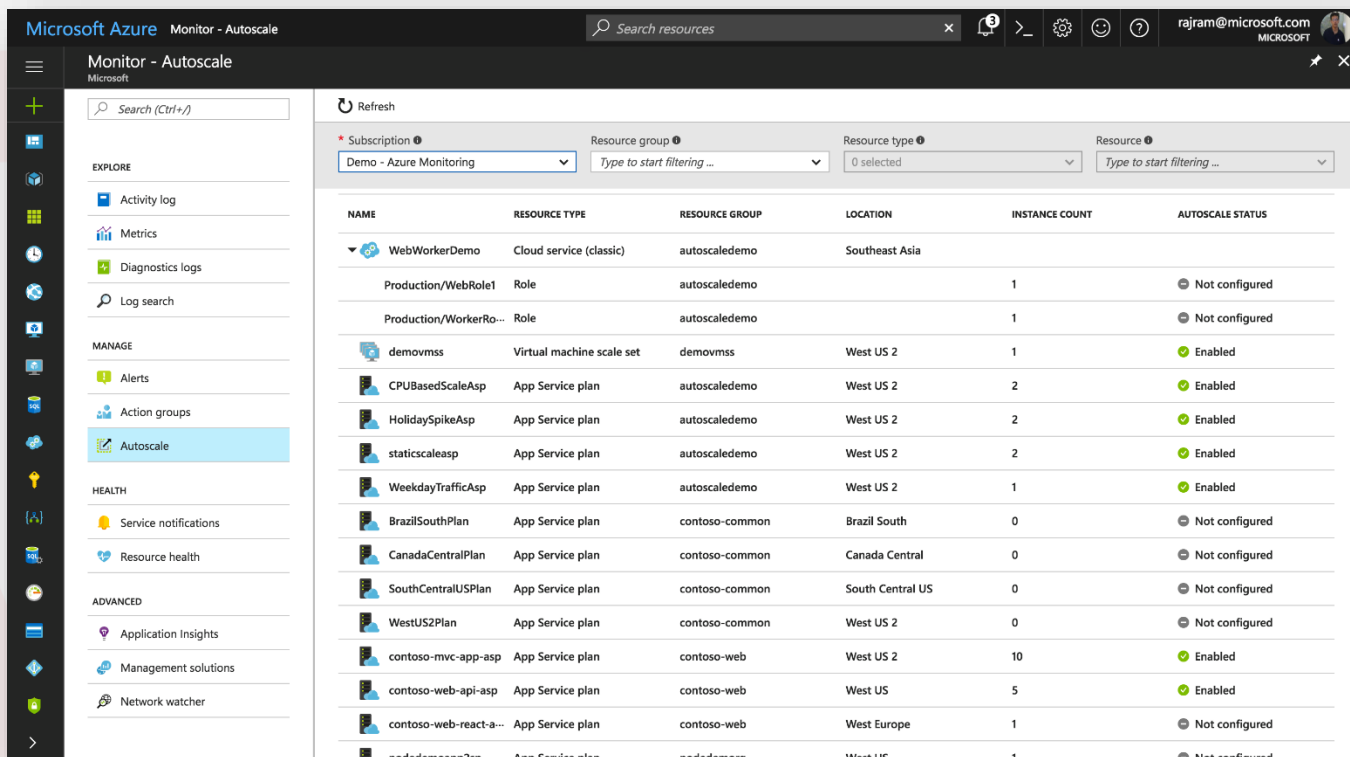
# Azure Auto Scale Setup

Azure Monitor autoscale applies [Virtual Machine Scale Sets](#), [Cloud Services](#), [App Service - Web Apps](#), and [API Management services](#).



Fonte: [Get started with Autoscale in Azure](#)

# Auto Scale Resources



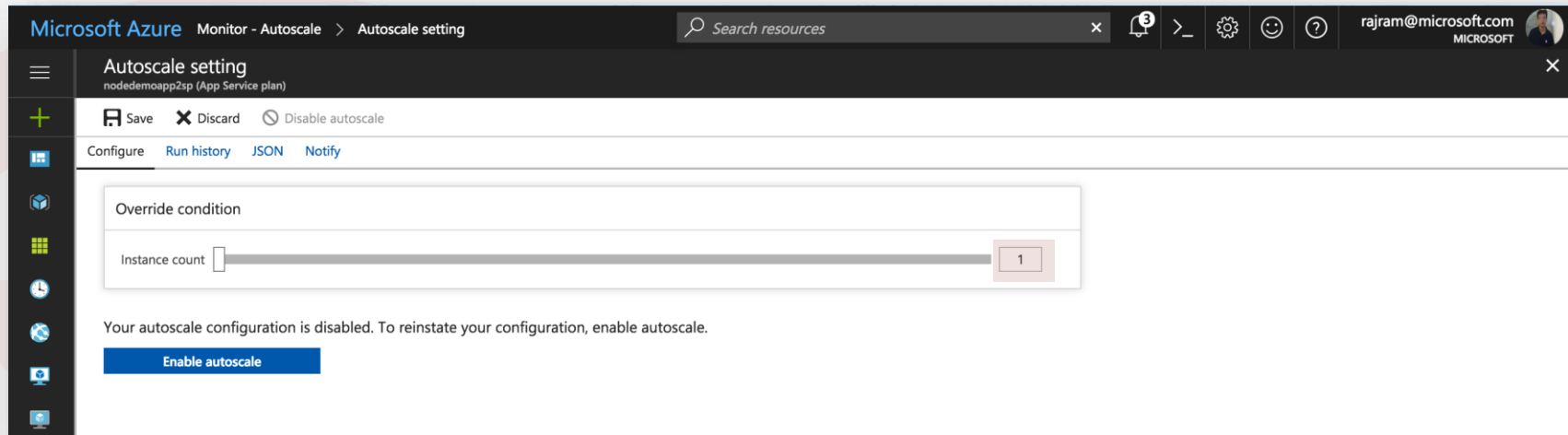
The screenshot displays the Microsoft Azure Monitor - Autoscale interface. The left sidebar contains navigation options: EXPLORE (Activity log, Metrics, Diagnostics logs, Log search), MANAGE (Alerts, Action groups, Autoscale), HEALTH (Service notifications, Resource health), and ADVANCED (Application Insights, Management solutions, Network watcher). The main panel shows a table of resources with columns: NAME, RESOURCE TYPE, RESOURCE GROUP, LOCATION, INSTANCE COUNT, and AUTOSCALE STATUS. The table lists various resources, including WebWorkerDemo, Production/WebRole1, Production/WorkerRo..., demovmss, CPUBasedScaleAsp, HolidaySpikeAsp, staticscaleasp, WeekdayTrafficAsp, BrazilSouthPlan, CanadaCentralPlan, SouthCentralUSPlan, WestUS2Plan, contoso-mvc-app-asp, contoso-web-api-asp, contoso-web-react-a..., and nodedemoapp2sn. The instance counts range from 0 to 10, and the autoscale status is either 'Not configured' or 'Enabled'.

NAME	RESOURCE TYPE	RESOURCE GROUP	LOCATION	INSTANCE COUNT	AUTOSCALE STATUS
WebWorkerDemo	Cloud service (classic)	autoscaledemo	Southeast Asia		
Production/WebRole1	Role	autoscaledemo		1	Not configured
Production/WorkerRo...	Role	autoscaledemo		1	Not configured
demovmss	Virtual machine scale set	demovmss	West US 2	1	Enabled
CPUBasedScaleAsp	App Service plan	autoscaledemo	West US 2	2	Enabled
HolidaySpikeAsp	App Service plan	autoscaledemo	West US 2	2	Enabled
staticscaleasp	App Service plan	autoscaledemo	West US 2	2	Enabled
WeekdayTrafficAsp	App Service plan	autoscaledemo	West US 2	1	Enabled
BrazilSouthPlan	App Service plan	contoso-common	Brazil South	0	Not configured
CanadaCentralPlan	App Service plan	contoso-common	Canada Central	0	Not configured
SouthCentralUSPlan	App Service plan	contoso-common	South Central US	0	Not configured
WestUS2Plan	App Service plan	contoso-common	West US 2	0	Not configured
contoso-mvc-app-asp	App Service plan	contoso-web	West US 2	10	Enabled
contoso-web-api-asp	App Service plan	contoso-web	West US	5	Enabled
contoso-web-react-a...	App Service plan	contoso-web	West Europe	1	Not configured
nodedemoapp2sn	App Service plan	nodedemo	West US	1	Not configured

Fonte: [Get started with Autoscale in Azure](#)

# Setting an auto scale resource

## Scaling up a Web App



Fonte: [Get started with Autoscale in Azure](#)

# Adding a rule for Auto Scale

The screenshot displays the 'Scale rule' configuration page in the Microsoft Azure Monitor - Autoscale interface. The page is divided into two main sections: 'Autoscale setting' on the left and 'Scale rule' on the right.

**Autoscale setting (Left Panel):**

- Autoscale setting name:** nodeappscalesetting
- Resource group:** nodedemorg
- Scale mode:** Scale based on a metric (selected), Scale to a specific instance count
- Rules:** A list of rules is shown, with a note: "Scale out and scale in your instances based on metric. For example, add a rule that increases instance count by 1 when CPU percentage is above 70%". A "+ Add a rule" button is present.
- Instance limits:** Minimum: 1, Maximum: 1, Default: 1
- Schedule:** This scale condition is executed when none of the other scale condition(s) match
- + Add a scale condition** button is at the bottom.

**Scale rule (Right Panel):**

- Metric source:** Current resource (nodedemoapp2sp)
- Resource type:** App Service plans
- Resource:** nodedemoapp2sp
- Criteria:**
  - \* Time aggregation:** Average
  - \* Metric name:** CPU Percentage (1 minute time grain)
  - \* Operator:** Greater than
  - \* Threshold:** 70
  - \* Duration (in minutes):** 10
- Action:**
  - \* Operation:** Increase count by
- \* Instance count:** (field is partially visible)
- Add** button is at the bottom.

Fonte: [Get started with Autoscale in Azure](#)

# Detailing the trigger for auto scaling

The screenshot shows the 'Autoscale setting' page in the Microsoft Azure portal. The page is titled 'Autoscale setting' and 'nodedemoapp2sp (App Service plan)'. It includes a search bar, a user profile 'rajram@microsoft.com', and a sidebar with navigation icons. The main content area has tabs for 'Configure', 'Run history', 'JSON', and 'Notify'. The 'Configure' tab is active, showing the 'Autoscale setting name' as 'nodeappscasesetting' and the 'Resource group' as 'nodedemorg'. Below this, there is a section for 'Default Auto created scale condition'. The 'Scale mode' is set to 'Scale based on a metric'. The 'Scale out' rule is defined with 'When' condition 'nodedemoapp2sp (Average) CpuPercentage > 70' and 'Increase instance count by 1'. The 'Scale in' rule is defined with 'When' condition 'nodedemoapp2sp (Average) CpuPercentage < 20' and 'Decrease instance count by 1'. The 'Instance limits' are set to Minimum: 1, Maximum: 1, and Default: 1. The 'Schedule' is set to 'This scale condition is executed when none of the other scale condition(s) match'. There are buttons to '+ Add a rule' and '+ Add a scale condition'.

Microsoft Azure Monitor - Autoscale > Autoscale setting

Search resources

Autoscale setting  
nodedemoapp2sp (App Service plan)

Save Discard Disable autoscale

Configure Run history JSON Notify

\* Autoscale setting name nodeappscasesetting ✓

Resource group nodedemorg

Default Auto created scale condition

Scale mode ☒ Scale based on a metric ☐ Scale to a specific instance count

Scale out

When nodedemoapp2sp (Average) CpuPercentage > 70 Increase instance count by 1

Rules

Scale in

When nodedemoapp2sp (Average) CpuPercentage < 20 Decrease instance count by 1

+ Add a rule

Instance limits

Minimum 1 Maximum 1 Default 1

Schedule This scale condition is executed when none of the other scale condition(s) match

+ Add a scale condition

Fonte: [Get started with Autoscale in Azure](#)

# Setting thresholds

The screenshot displays the Microsoft Azure portal interface for configuring autoscale settings. The top navigation bar shows 'Microsoft Azure Monitor - Autoscale > Autoscale setting'. The main heading is 'Autoscale setting' for 'node demo app2sp (App Service plan)'. Below this, there are buttons for 'Save', 'Discard', and 'Disable autoscale'. The 'Rules' section shows a single rule for 'Scale in' with the condition 'When node demo app2sp (Average) CpuPercentage < 20' and the action 'Decrease instance count by 1'. Below the rule, there is a '+ Add a rule' button. The 'Instance limits' section shows 'Minimum' set to 2, 'Maximum' set to 5, and 'Default' set to 2. The 'Schedule' section states 'This scale condition is executed when none of the other scale condition(s) match'. A red box highlights the 'Auto created scale condition' section, which includes the following settings:

- Scale mode: ☐ Scale based on a metric, ☒ Scale to a specific instance count
- Instance count: 1
- Schedule: ☐ Specify start/end dates, ☒ Repeat specific days
- Repeat every: ☐ Monday, ☐ Tuesday, ☐ Wednesday, ☐ Thursday, ☐ Friday, ☒ Saturday, ☒ Sunday
- Timezone: (UTC-08:00) Pacific Time (US & Canada)
- Start time: 00:00
- End time: 11:59

At the bottom of the red box, there is a '+ Add a scale condition' button.

Fonte: [Get started with Autoscale in Azure](#)

# Scale history

Microsoft Azure Monitor - Autoscale > Autoscale setting

Autoscale setting  
contoso-mvc-app-asp (App Service plan)

Save Discard Disable autoscale

Configure Run history JSON Notify

Showing autoscale events for the last 24 hours. [Click here to see more details](#)

OPERATION NAME	STATUS	EVENT Catego...	TIME	TIME STAMP	SUBSCRIPTION	EVENT INITIATED BY	RESOURCE TYPE	RESOURCE
Scaleup	Succeeded	Autoscale	14 h ago	Sun May 07 2...	Demo - Azure Monitoring	Microsoft.Insights/autoscale...	Microsoft.Web/serverFarms	serverFarms/contoso-mvc-app-asp
Scaleup	Succeeded	Autoscale	14 h ago	Sat May 06 2...	Demo - Azure Monitoring	Microsoft.Insights/autoscale...	Microsoft.Web/serverFarms	serverFarms/contoso-mvc-app-asp
Scaledown	Succeeded	Autoscale	2 d ago	Sat May 06 2...	Demo - Azure Monitoring	Microsoft.Insights/autoscale...	Microsoft.Web/serverFarms	serverFarms/contoso-mvc-app-asp
Scaledown	Succeeded	Autoscale	2 d ago	Fri May 05 20...	Demo - Azure Monitoring	Microsoft.Insights/autoscale...	Microsoft.Web/serverFarms	serverFarms/contoso-mvc-app-asp
Scaledown	Succeeded	Autoscale	2 d ago	Fri May 05 20...	Demo - Azure Monitoring	Microsoft.Insights/autoscale...	Microsoft.Web/serverFarms	serverFarms/contoso-mvc-app-asp
Scaledown	Succeeded	Autoscale	2 d ago	Fri May 05 20...	Demo - Azure Monitoring	Microsoft.Insights/autoscale...	Microsoft.Web/serverFarms	serverFarms/contoso-mvc-app-asp
Scaleup	Succeeded	Autoscale	2 d ago	Fri May 05 20...	Demo - Azure Monitoring	Microsoft.Insights/autoscale...	Microsoft.Web/serverFarms	serverFarms/contoso-mvc-app-asp
Scaleup	Succeeded	Autoscale	2 d ago	Fri May 05 20...	Demo - Azure Monitoring	Microsoft.Insights/autoscale...	Microsoft.Web/serverFarms	serverFarms/contoso-mvc-app-asp
Scaledown	Succeeded	Autoscale	2 d ago	Fri May 05 20...	Demo - Azure Monitoring	Microsoft.Insights/autoscale...	Microsoft.Web/serverFarms	serverFarms/contoso-mvc-app-asp
Scaledown	Succeeded	Autoscale	2 d ago	Fri May 05 20...	Demo - Azure Monitoring	Microsoft.Insights/autoscale...	Microsoft.Web/serverFarms	serverFarms/contoso-mvc-app-asp
Scaleup	Succeeded	Autoscale	2 d ago	Fri May 05 20...	Demo - Azure Monitoring	Microsoft.Insights/autoscale...	Microsoft.Web/serverFarms	serverFarms/contoso-mvc-app-asp
Scaleup	Succeeded	Autoscale	2 d ago	Fri May 05 20...	Demo - Azure Monitoring	Microsoft.Insights/autoscale...	Microsoft.Web/serverFarms	serverFarms/contoso-mvc-app-asp
Scaledown	Succeeded	Autoscale	4 d ago	Wed May 03 ...	Demo - Azure Monitoring	Microsoft.Insights/autoscale...	Microsoft.Web/serverFarms	serverFarms/contoso-mvc-app-asp
Scaledown	Succeeded	Autoscale	4 d ago	Wed May 03 ...	Demo - Azure Monitoring	Microsoft.Insights/autoscale...	Microsoft.Web/serverFarms	serverFarms/contoso-mvc-app-asp
Scaleup	Succeeded	Autoscale	4 d ago	Wed May 03 ...	Demo - Azure Monitoring	Microsoft.Insights/autoscale...	Microsoft.Web/serverFarms	serverFarms/contoso-mvc-app-asp

Fonte: [Get started with Autoscale in Azure](#)



# Autoscale best practices

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- *Ensure the maximum and minimum values are different and have an adequate margin between them*
- *Manual scaling is reset by auto scale min and max*
- *Always use a scale-out and scale-in rule combination that performs an increase and decrease*
- *Choose the appropriate statistic for your diagnostics metric*
- *Configure autoscale notifications*

Fonte: [Get started with Autoscale in Azure](#)

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# Disponibilidade

**Availability:** *Degree to which a system, product or component is operational and accessible when required for use.*

**Fonte:** “INTERNATIONAL STANDARD ISO / IEC 25010 First edition 2011-0301 Systems and software engineering — Systems and software Quality Requirements and Evaluation ( **SQuaRE** ) — System and software quality models.” (2013).

# The basic elements of high availability

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- **Redundancy:** ensuring that any elements critical to system operations have an additional, redundant component that can take over in case of failure.
- **Monitoring:** collecting data from a running system and detecting when a component fails or stops responding.
- **Failover:** a mechanism that can switch automatically from the currently active component to a redundant component, if monitoring shows a failure of the active component.

Fonte: [Azure High Availability: Basic Concepts and a Checklist](#)

# Technical components enabling high availability

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- **Data backup and recovery:** a system that automatically backs up data to a secondary location and recovers back to the source. This can be used to set up redundancy and failover.
- **Load balancing:** a load balancer manages traffic, routing it between more than one system that can serve that traffic. It can be aware that one of the target systems has failed, and redirect traffic to another available system, thus implementing monitoring and failover.
- **Clustering:** cluster contains several nodes that serve a similar purpose, and users typically access and view the entire cluster as one unit. Each node in the cluster can potentially failover to another node if failure occurs.

Fonte: [Azure High Availability: Basic Concepts and a Checklist](#)

# The basic elements of high availability

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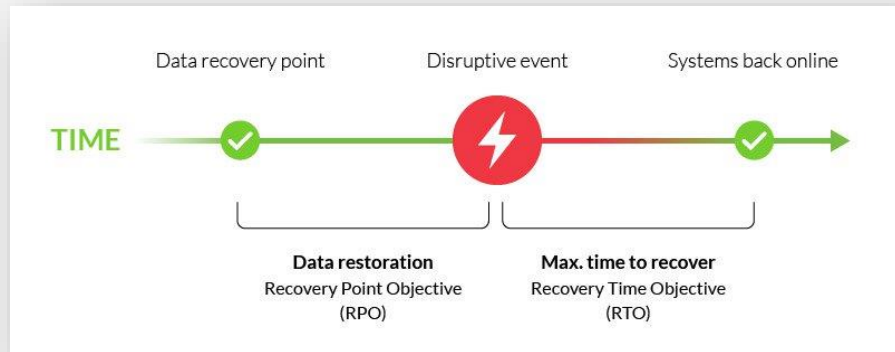
- **Redundancy:** ensuring that any elements critical to system operations have an additional, redundant component that can take over in case of failure.
- **Monitoring:** collecting data from a running system and detecting when a component fails or stops responding.
- **Failover:** a mechanism that can switch automatically from the currently active component to a redundant component, if monitoring shows a failure of the active component.

Fonte: [Azure High Availability: Basic Concepts and a Checklist](#)

# High Availability Checklist

## Define Availability Requirements

- *Percentage of Uptime*
- *Mean Time to Recovery (MTTR)*
- *Mean Time between Failures (MTBR)*
- *Recovery Time Objective (RTO)*
- *Recovery Point Objective (RPO)*



Fonte: <https://www.imperva.com/learn/availability/recovery-point-objective-rpo/>

Fonte: [Azure High Availability: Basic Concepts and a Checklist](#)

# High Availability Checklist

---

## Plan your High Availability Architecture

- *Start with a Failure Mode Analysis (FMA)*
- *Consider costs*
- *Consider resiliency*
- *Replicate data*
- *Document everything (**processo**)*

Fonte: [Azure High Availability: Basic Concepts and a Checklist](#)

# High Availability Checklist

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**Perform End-to-End Testing:** ensure reliability you should test the system under realistic failure conditions

- *Identify failures under load*
- *Run disaster recovery exercises*
- *Test health probes*
- *Test monitoring systems*

Fonte: [Azure High Availability: Basic Concepts and a Checklist](#)



# High Availability Checklist

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## Deploy Applications Consistently

- Any change can result in failure
- Consider availability in your release process
- Plan for rollback
- Use probes and check functions to detect failure in time

Fonte: [Azure High Availability: Basic Concepts and a Checklist](#)

# High Availability Checklist

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## Monitor Application Health

- Watch degrading health metrics
- Leverage logging and auditing
- Watch subscription limits

Fonte: [Azure High Availability: Basic Concepts and a Checklist](#)

Dublin, Ireland



Fonte: <https://www.afcea.org/content/smarter-commercial-cloud>

# 60+ Azure regions



\* Fonte: <https://azure.microsoft.com/en-us/global-infrastructure/geographies/>



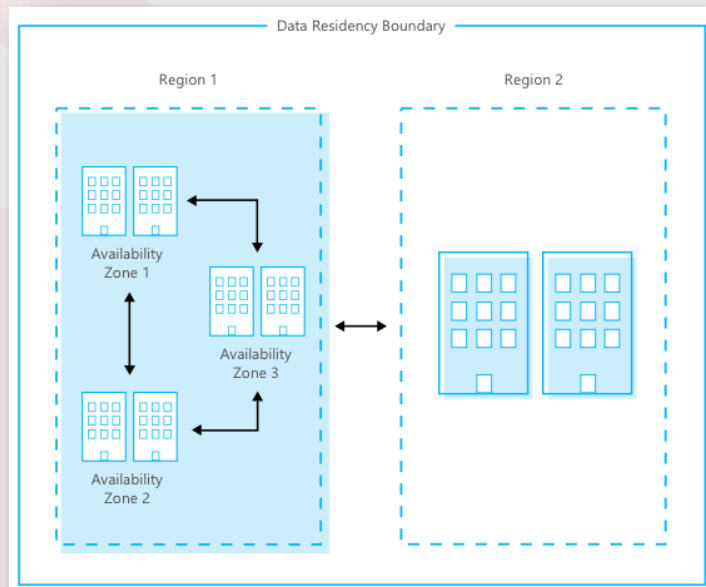
# Some definitions

<b>Region</b>	A set of datacenters deployed within a latency-defined perimeter and connected through a dedicated regional low-latency network.
<b>Geography</b>	<p>An area of the world containing at least one Azure region.</p> <p>Geographies define a discrete market that preserve data residency and compliance boundaries.</p> <p>Geographies allow customers with specific data-residency and compliance needs to keep their data and applications close.</p>
<b>Recommended region</b>	<p>A region that provides the broadest range of service capabilities and is designed to support Availability Zones now, or in the future.</p> <p>These are designated in the Azure portal as Recommended.</p>
<b>Alternate (other) region</b>	<p>A region that extends Azure's footprint within a data residency boundary where a recommended region also exists.</p> <p>Alternate regions help to optimize latency and provide a second region for disaster recovery needs.</p>

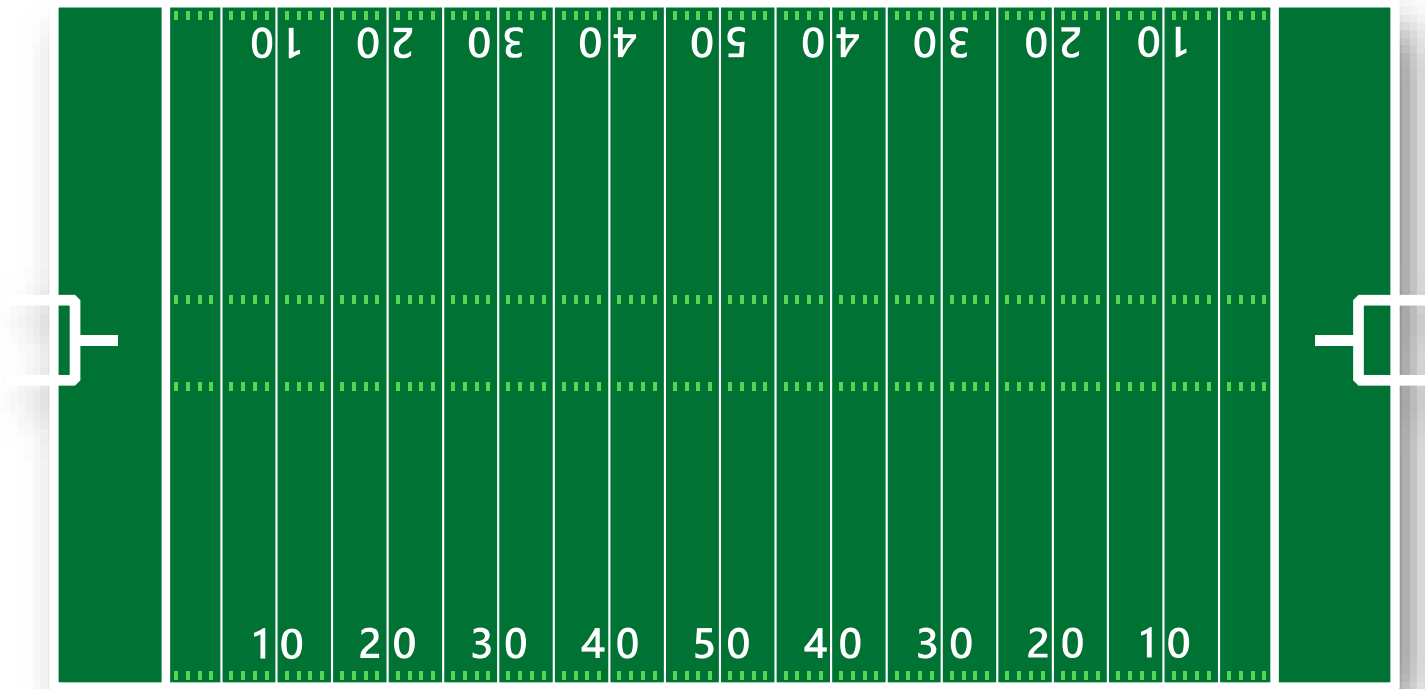
Fonte: <https://docs.microsoft.com/pt-br/azure/availability-zones/az-overview>

# Azure Region

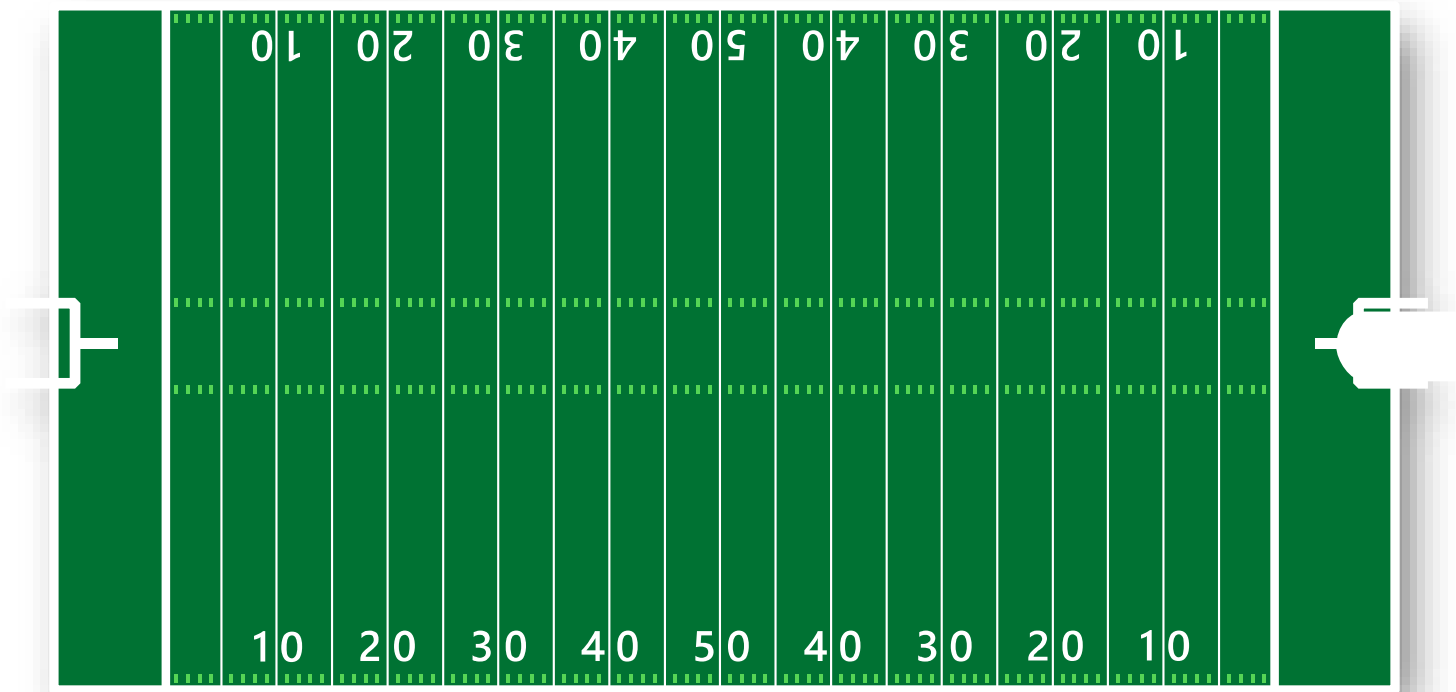
- A region is a set of datacenters deployed within a latency-defined perimeter and connected through a dedicated regional low-latency network.*



Fonte: <https://azure.microsoft.com/en-us/global-infrastructure/regions/>

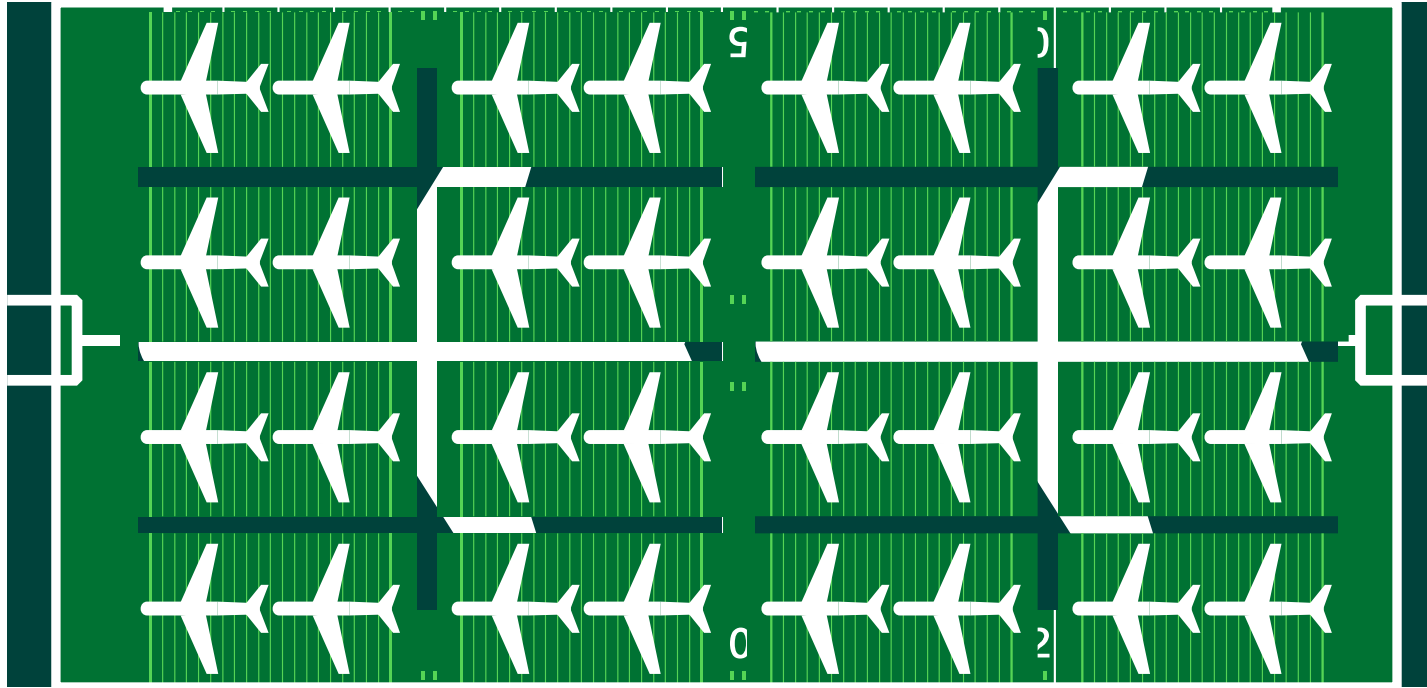


Datacenter buildings are about one  
football field in size



...large enough to hold  
two jumbo jets





That's up to 600,000 servers in each Azure region.

And there are 16 building per region...

# Availability Sets

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*Logical grouping capability for isolating VM resources from each other*

*Azure makes sure that the VMs you place within an Availability Set run across multiple physical servers, compute racks, storage units, and network switches.*

*If a hardware or software failure happens, only a subset of your VMs are impacted and your overall solution stays operational.*

Fonte: <https://docs.microsoft.com/pt-br/azure/availability-zones/az-overview>

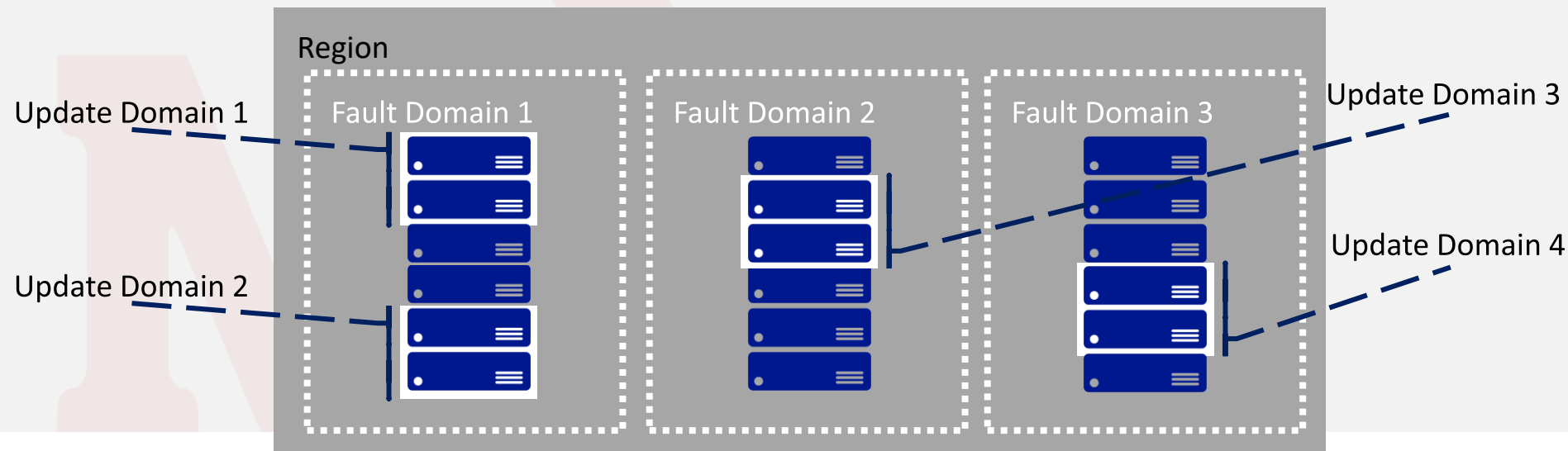
# Availability Sets

## Fault Domains

Segments clusters within a region (Up to 3)

## Update Domains

Segments updates and patches to clusters (Up to 20)



# Availability Zone

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*Availability Zones is a high-availability offering that protects your applications and data from **datacenter failures**.*

*Availability Zones are unique physical locations within an Azure region. Each zone is made up of one or more datacenters equipped with independent power, cooling, and networking.*

*To ensure resiliency, there's a minimum of three separate zones in all enabled regions.*

*Fonte:* <https://docs.microsoft.com/pt-br/azure/availability-zones/az-overview>

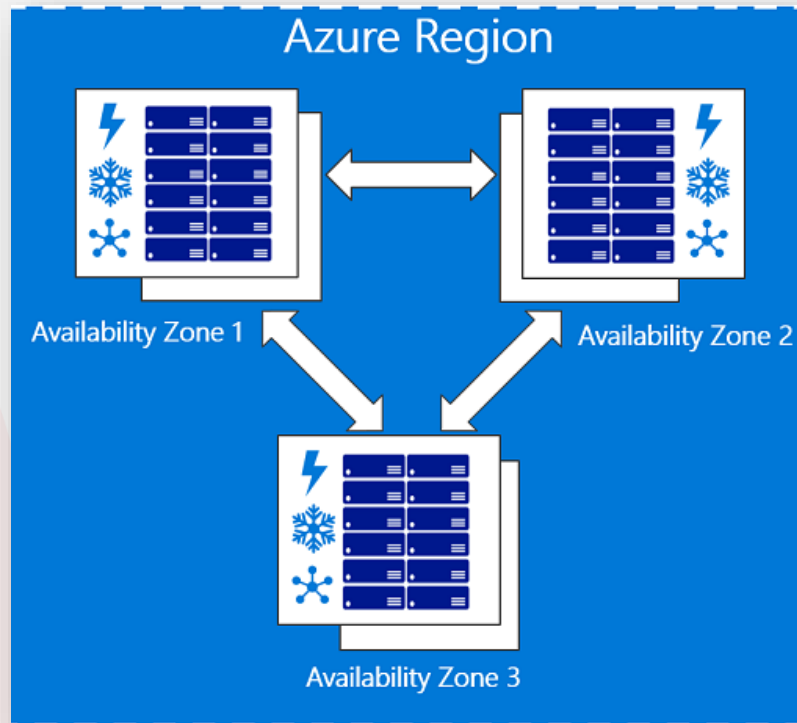
# Availability Zone

*Separate locations*

*Independent*

- *Power*
- *Cooling*
- *Networking*

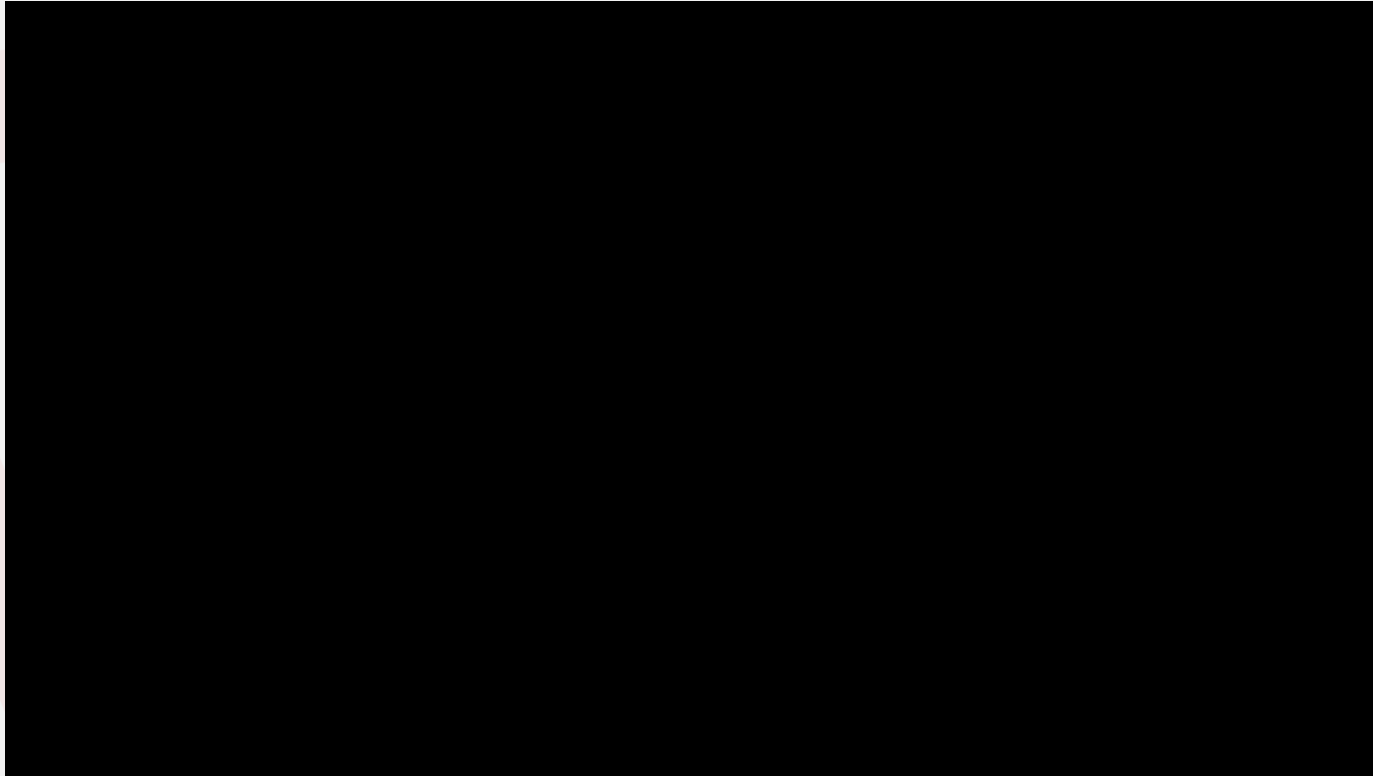
*Isolation Boundary*



Fonte: <https://docs.microsoft.com/pt-br/azure/availability-zones/az-overview>

# *Business continuity and disaster recovery on Azure*

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Fonte: [https://www.youtube.com/watch?time\\_continue=2&v=SbL3vY41USc&feature=emb\\_logo](https://www.youtube.com/watch?time_continue=2&v=SbL3vY41USc&feature=emb_logo)

# Entrega Parcial 04 – Data de Entrega: 17/09/2020 até às 12:00

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Considerando o seu tema de trabalho, responda os itens abaixo:

- Quais são os elementos de governança fundamentais que devem ser considerados em seu trabalho de curso para que o uso da nuvem seja bem sucedido ? Justifique. Sugestões de referências abaixo:
  - **Azure Governance:**
    - <https://docs.microsoft.com/en-us/azure/cloud-adoption-framework/govern/>
    - <https://docs.microsoft.com/en-us/azure/cloud-adoption-framework/govern/governance-disciplines>
  - **AWS Governance:**
    - <https://aws.amazon.com/products/management-tools/>
  - **GCP Governance:**
    - [https://cloud.google.com/solutions/policies/designing-gcp-policies-enterprise#governance\\_and\\_visibility](https://cloud.google.com/solutions/policies/designing-gcp-policies-enterprise#governance_and_visibility)
- Dos itens visto nesta aula (Escalabilidade e Disponibilidade), descreva quais mecanismos poderia usar na implementação em Cloud do seu tema de trabalho em um provedor de nuvem de sua escolha.
- **Forma de entrega:** enviar por e-mail para [manzan@uol.com.br](mailto:manzan@uol.com.br) até a data de entrega.

# Até a próxima aula

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Muito Obrigado!

*Feedbacks ?*