

# Describe Cloud Concepts

## - AZURE FUNDAMENTALS

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Introduction to Cloud technologies  
& AZ-900 certification preparation

# Introduction

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Steven VINCENT - Burgundy School of Business -  
Oct. 2023 -

# Professional Experience

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**Digital Marketing intern**  
Akor Consulting  
2018



**Data Engineer**  
PwC Luxembourg  
06.2020 - 03.2022



**Data Engineer**  
Société Générale  
03.2022 - Now

# The Different Data Roles

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## Data Analyst

In charge of building dashboards and analysis

## ML Engineer

In charge of building machine learning pipelines

## Data Engineer

In charge of developing Big data ETL data pipelines and data acquisition

## BI Engineer

In charge of Data Warehouse, views, reports (Low Code ETL development)

## Data Scientist

In charge of building predictions models and getting data insights

## Data Architect

In charge of choosing and improving the data infrastructure

## DataOps Engineer

In charge of data change management (CI/CD, Devops, release)

# Installation

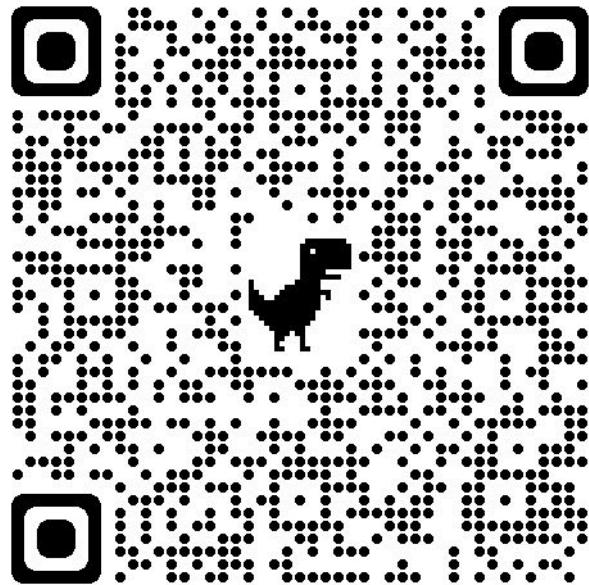
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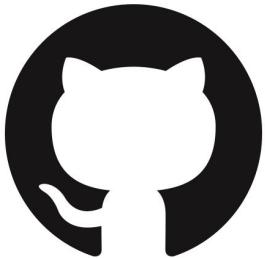
# Environment setup

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[https://steven-vcnt.github.io/Steve  
n-Vcnt/BSB%20Courses/0.installati  
on/](https://steven-vcnt.github.io/Steven-Vcnt/BSB%20Courses/0.installation/)



# Create your GitHub Account



GitHub is a platform for software development and version control using Git, allowing developers to store and manage their code.

[GitHub](#)

The screenshot shows a GitHub repository page for the user 'Steven-Vcnt'. At the top, there are navigation links: 'Code' (which is highlighted in red), 'Issues', 'Pull requests', 'Actions', 'Projects', 'Wiki', 'Security', 'Insights', and 'Settings'. Below the navigation is the user profile for 'Steven-Vcnt' (Public). It shows 'main' (with a dropdown arrow), '2 branches', '0 tags', and 'Go to file' and 'A' buttons. A warning message states: 'Your main branch isn't protected. Protect this branch from force pushing or deletion, or require status checks before merging.' Below this is a list of recent commits:

Commit	Message	Author
ceca1e8 2	Update README.md	Steven-Vcnt
.github/workflows	Create ci.yml	
docs	init website	
README.md	Update README.md	
mkdocs.yml	init website	

At the bottom of the repository page, there is a 'README.md' section containing the text 'Hi there 🙌 ✨'.

# Databricks free edition



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and AI technologies

# Install Visual Studio Code



Visual Studio Code is an IDE developed by Microsoft which aims you to program in different languages like Python.

[Visual Studio Code – Code Editor | Microsoft Azure](#)

The screenshot shows the Visual Studio Code interface with the following details:

- EXPLORER** pane on the left showing the project structure: `IMMODATAREPORTING` (expanded), `_streamlit`, `streamlitReporting`, `.gitignore` (selected), `README.md` (modified), `requirements.txt`, and `streamlit_app.py`.
- EDITOR** pane on the right displaying the `README.md` file content:

```
① README.md M X ⓘ .gitignore U ⓘ .gitignore (Untracked) U ⓘ streamlit_app.py A
① README.md > ⓘ # Welcome to Streamlit!
1
2
3 Edit `/streamlit_app.py` to customize this app to your heart's desire :heart:
4
5 If you have any questions, checkout our [documentation](https://docs.streamlit.io).
6 forums!(https://discuss.streamlit.io).
7 | source streamlitReporting/bin/activate
```

- TERMINAL** pane at the bottom showing the message: "The default interactive shell is now zsh. To update your account to use zsh, please run `chsh -s /bin/zsh`. For more details, please visit https://support.apple.com/kb/HT208050. macbook-air-de-lorenzo:6:ImmoDataReporting lorenzo\$".

# Install GitHub Desktop



GitHub Desktop aims to facilitate the use of Github and manage easily your repositories, commits, branches.

[GitHub Desktop](#)

The screenshot shows the GitHub Desktop application window. At the top, the menu bar includes File, Edit, View, Repository, Branch, and Help. The current repository is "desktop" and the current branch is "file-status-too...". A pull request titled "#17192" is open, last fetched 8 minutes ago. The main view displays a list of changes with three files selected: "app\src\ui\lib\list\section-list.tsx", "app\src\ui\lib\tooltip.tsx", and "app\src\ui...\tooltipped-content.tsx". The code editor shows the diff for the third file, specifically line 140, which adds a function for row focus. Below the code editor, a "Stashed Changes" section is visible, containing a commit message "Bring `onRowKeyboardFocus` to `Se" and a "Commit to file-status-tooltip" button.

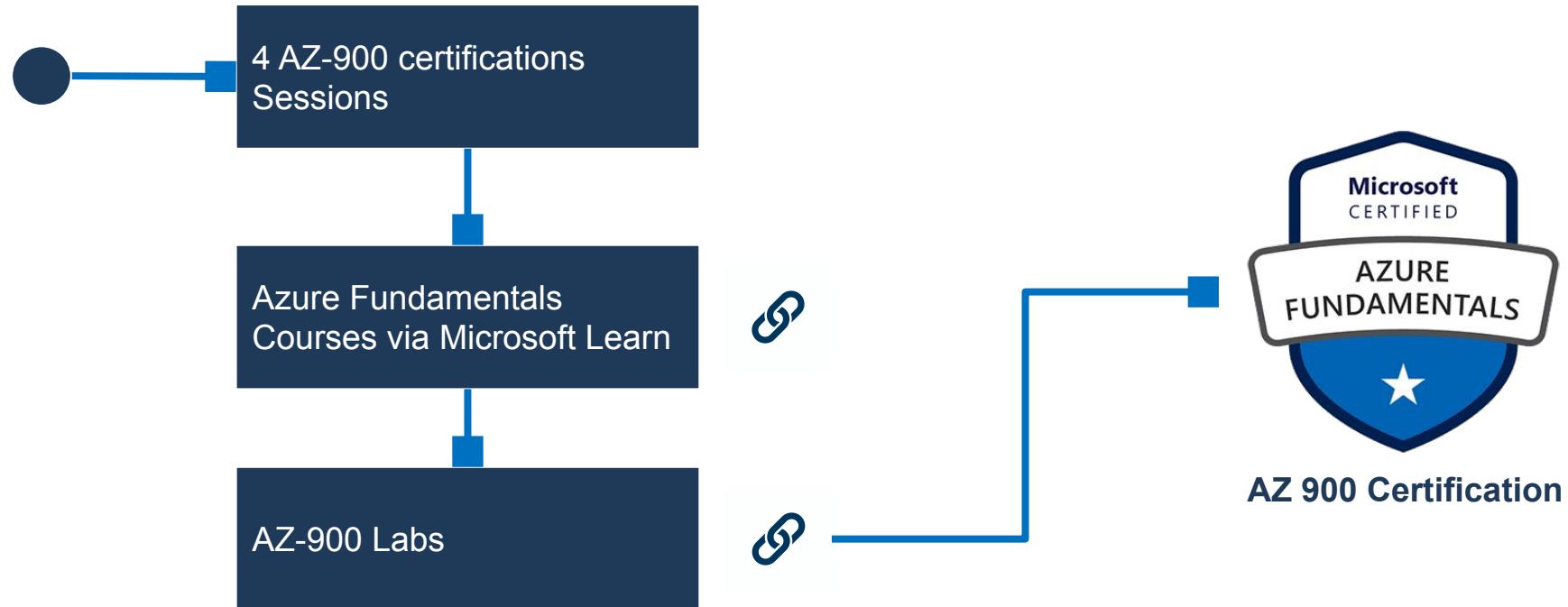
```
@@ -137,10 +137,19 @@ interface ISectionListProps {  
    source: IMouseClickSource  
  ) => void  
  
  /** This function will be called when a row obtains  
   * readonly onRowFocus?: ()  
   * indexPath: RowIndexPath,  
   * source: React.FocusEvent<HTMLDivElement>  
   * ) => void  
  
  /** This function will be called only when a row loses  
  + readonly onRowKeyboardFocus?: ()  
  + indexPath: RowIndexPath,  
  + e: React.KeyboardEvent<any>  
  + ) => void  
  
  /** This function will be called when a row loses  
  + readonly onRowBlur?: ()  
  + indexPath: RowIndexPath,  
  + source: React.FocusEvent<HTMLDivElement>
```

# Azure Certification introduction - AZ 900

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# AZ 900 Azure Fundamentals



# Skills measured

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Demonstrating your knowledge of cloud concepts, models, and services and showing your expertise in Azure.

AZ-900 Domain Area	Weight
Describe cloud concepts	25-30%
Describe Azure architecture and services	35-40%
Describe Azure management and governance	30-35%

# Benefits of azure certifications

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- Showcase that you understand the fundamentals of Azure (LinkedIn, Resume)
- Official Certification from Azure
- Certification is worth 100\$
- Once passed, you can renew for free your certification and stay updated on changes and new technologies

## Licenses & certifications



Microsoft Certified: Azure Data Engineer Associate

Microsoft

Issued Oct 2021 · Expired Oct 2022

Credential ID I001-2372

Show credential

# How to read the exam study guide

---

## **Describe cloud concepts (25-30%)**

### Describe cloud computing

- Define cloud computing
- Describe the shared responsibility model
- Define cloud models, including public, private, and hybrid
- Identify appropriate use cases for each cloud model
- Describe the consumption-based model
- Compare cloud pricing models

Functional group (skill set)

Objective (specific skill)

May include topics: You should be able to perform each of these before taking the exam

# Exam basics

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## How to pass the exam?

- Scores are reported on a scale of 1 to 1000.
- You need a passing score of 700 or greater
- 700 may not equal 70% of the points

## How many questions?

- 35 to 50 questions
- Questions may be worth more than 1 point depending on the difficulty of the question
- Go with your gut and don't overthink
- Answer all the questions as there is no penalty for guessing
- You can mark items for review and take another look, some questions cannot be revisited

## How much time?

- 65 minutes: 45 minutes to answer questions and 20 minutes for miscellaneous

## What type of question?

- It is more than just multiple-choice questions
  - Build list
  - Hot area
  - Active screen
  - Drag and drop

**Answer every question!**

# Question example

## Item Stem

Technical Environment	
Business Plan / Problem	
Goal Statement	You need to ensure that you are monitoring cost consumption of Azure usage.
Question Statement	What tool should you use?

## Item Options

Option A	Resource monitor
Option B	Pricing calculator
Option C	Budget alerts
Option D	

# Exam Sandbox



Exam AA-001\_Sandbox

AA-001\_Sandbox

Welcome !

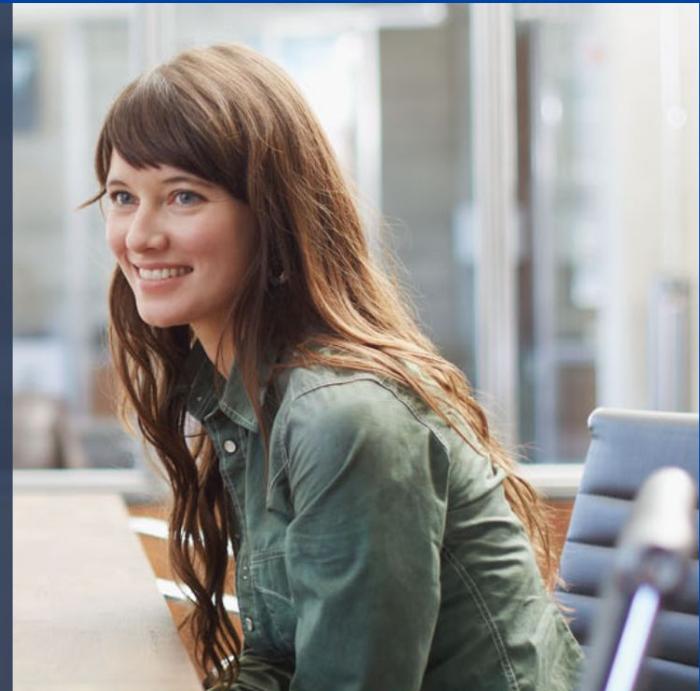
Maximum time for this session, including instructions, survey, and exam: 8 hours

Number of exam questions: 10

Number of case studies: 1

Maximum time for exam: 8 hours

Minimum score required to pass this exam: 700



Color Scheme



Next

# **Describe cloud concepts**

---

# Chapter study guide

---

## Describe cloud concepts (25–30%)

### Describe cloud computing

- Define cloud computing
- Describe the shared responsibility model
- Define cloud models, including public, private, and hybrid
- Identify appropriate use cases for each cloud model
- Describe the consumption-based model
- Compare cloud pricing models

### Describe the benefits of using cloud services

- Describe the benefits of high availability and scalability in the cloud
- Describe the benefits of reliability and predictability in the cloud
- Describe the benefits of security and governance in the cloud
- Describe the benefits of manageability in the cloud

### Describe cloud service types

- Describe infrastructure as a service (IaaS)
- Describe platform as a service (PaaS)
- Describe software as a service (SaaS)
- Identify appropriate use cases for each cloud service (IaaS, PaaS, SaaS)

# CLOUD COMPUTING

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# Cloud computing components & key characteristics

## Cloud components:



Computing power



Storage



Networking



Artificial  
Intelligence



IoT (Internet  
of Things)

## Key characteristics:

Scalability

Elasticity

Agility

Fault tolerance

Disaster recovery

High availability

# Main types of cloud computing

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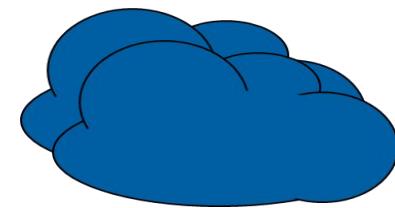
**Public Cloud**  
Cloud computing delivered via internet and shared across organizations



**Hybrid Cloud**  
Cloud computing using private and public cloud



**Private Cloud**  
Cloud computing dedicated to your organization



**Multi-Cloud**  
Use of different Public Cloud in the same time (AWS - Azure)

# On-premise vs Cloud Infrastructure

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Cost



Global Scale



Security



Performance



Speed

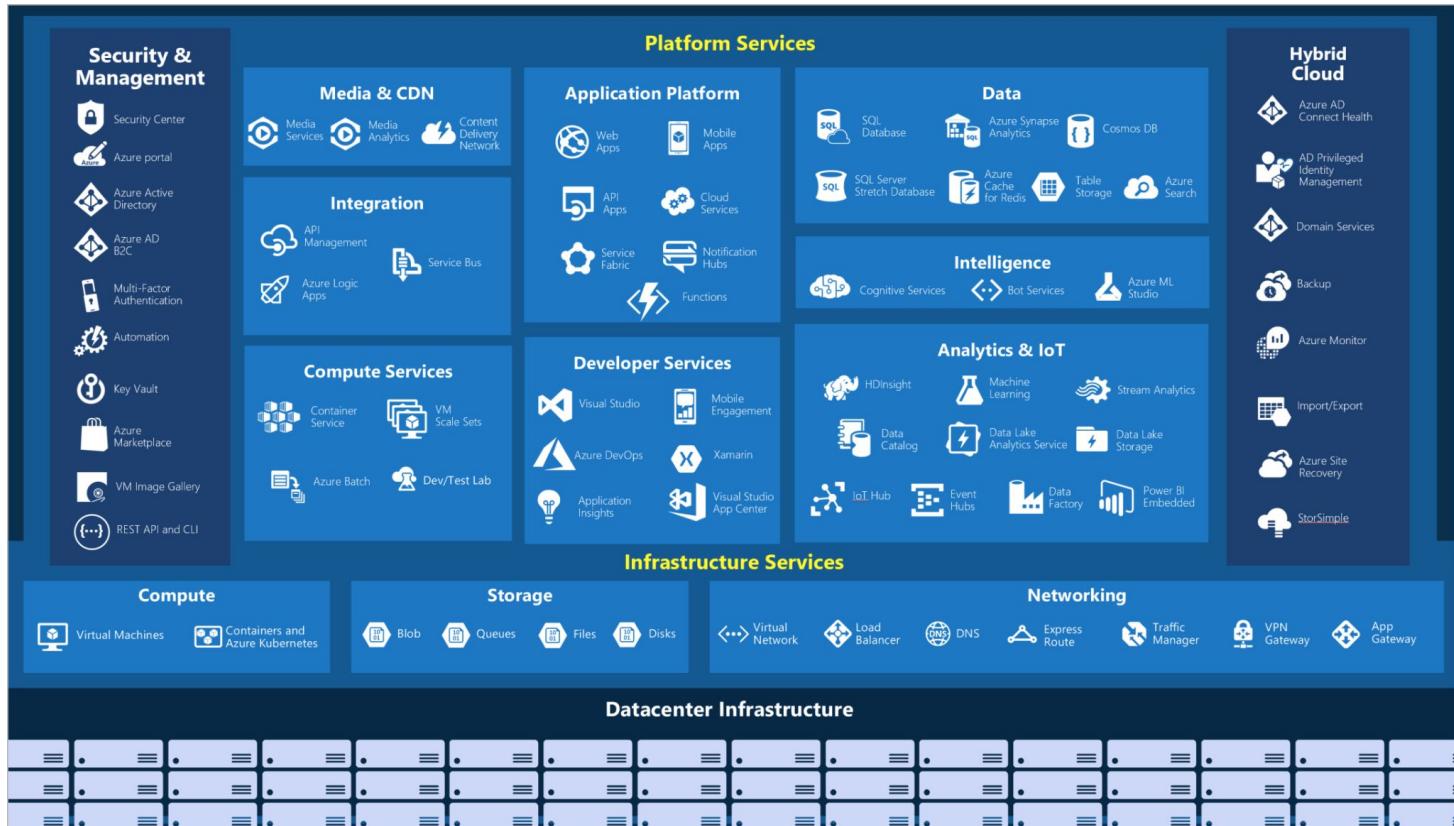


Reliability



Productivity

# Microsoft Azure platform

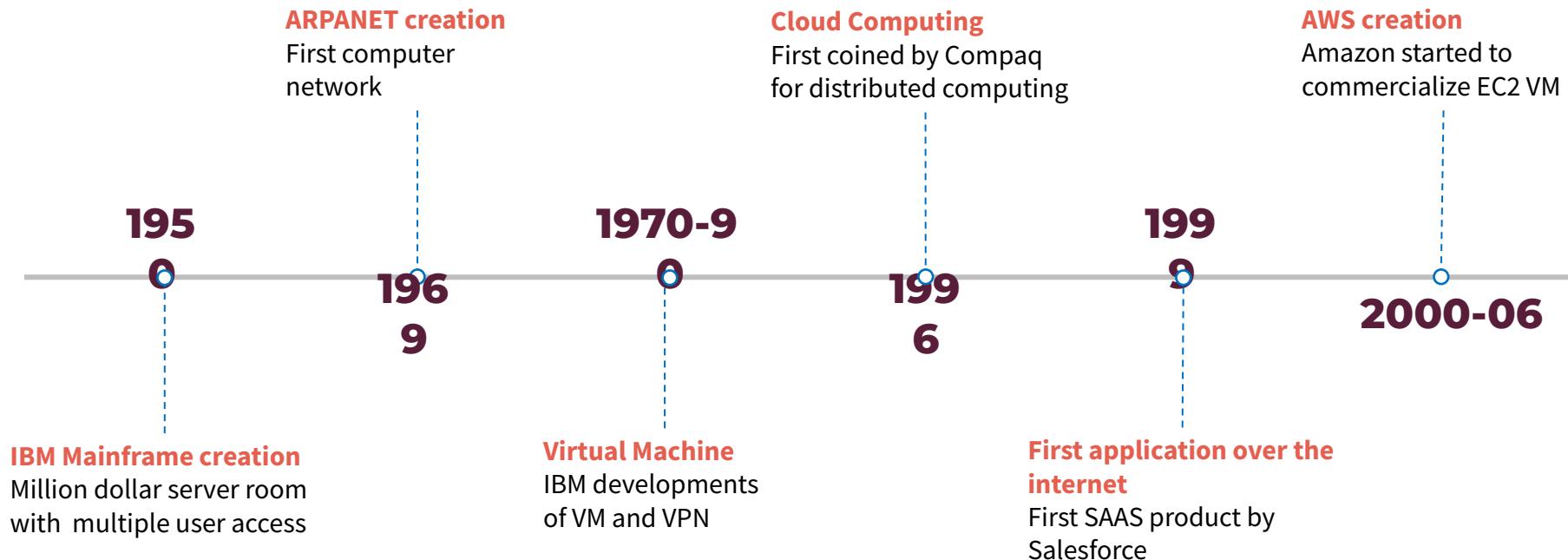


# DEVELOPMENT OF CLOUD COMPUTING

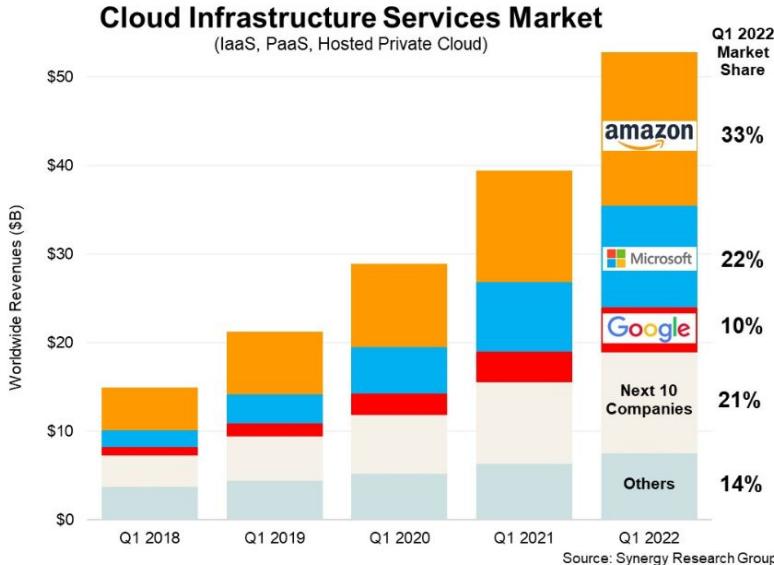
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# History of Cloud Computing



# Overview of the Cloud ecosystem



Cloud market shares

## Operating Income (Loss)

Operating income (loss) by segment is as follows (in millions):

### Operating Income (Loss):

North America

International

AWS

Consolidated

	Year Ended December 31,	
	2020	2021
\$ 8,651	\$ 7,271	
717	(924)	
13,531	18,532	
<u>\$ 22,899</u>	<u>\$ 24,879</u>	

Amazon annual report 2022

# Amazon Annual report Net Sales in Millions

	Year Ended December 31,		
	2014	2015	2016
<b>Net Sales:</b>			
North America	\$ 50,834	\$ 63,708	\$ 79,785
International	33,510	35,418	43,983
AWS	4,644	7,880	12,219
Total consolidated	\$ 88,988	\$ 107,006	\$ 135,987
<b>Year-over-year Percentage Growth:</b>			
North America	23%	25%	25%
International	12	6	24
AWS	49	70	55
Total consolidated	20	20	27
<b>Year-over-year Percentage Growth, excluding the effect of foreign exchange rates:</b>			
North America	23%	26%	25%
International	14	21	26
AWS	49	70	55
Total consolidated	20	26	28
<b>Net Sales Mix:</b>			
North America	57%	60%	59%
International	38	33	32
AWS	5	7	9
Total consolidated	100%	100%	100%

Amazon annual report 2017

	Year Ended December 31,	
	2020	2021
<b>Net Sales:</b>		
North America	\$ 236,282	\$ 279,833
International	104,412	127,787
AWS	45,370	62,202
Consolidated	\$ 386,064	\$ 469,822
<b>Year-over-year Percentage Growth:</b>		
North America	38 %	18 %
International	40	22
AWS	30	37
Consolidated	38	22
<b>Year-over-year Percentage Growth, excluding the effect of foreign exchange rates:</b>		
North America	38 %	18 %
International	38	20
AWS	30	37
Consolidated	37	21
<b>Net sales mix:</b>		
North America	61 %	60 %
International	27	27
AWS	12	13
Consolidated	100 %	100 %

Amazon annual report 2022

# **Cloud computing and its benefits**

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# Capital Expenditure vs Operational Expenditure

## Capital Expenditure

Capital expenditure is the cost a business incurs to acquire assets that will provide benefits beyond the current year.

Long-term investment

Upfront cost

Full responsibility & Ownership

Deductible over the lifetime of a tangible asset

Overbuying for future capacity requirements

## Operational Expenditure

Operating expenses refer to the money a company spends to run day-to-day operations.

Short-term investment

Pay-as-you-go pricing

Limited responsibility & Ownership

Deducted in full within the same year they are incurred

Flexibility of resource allocation

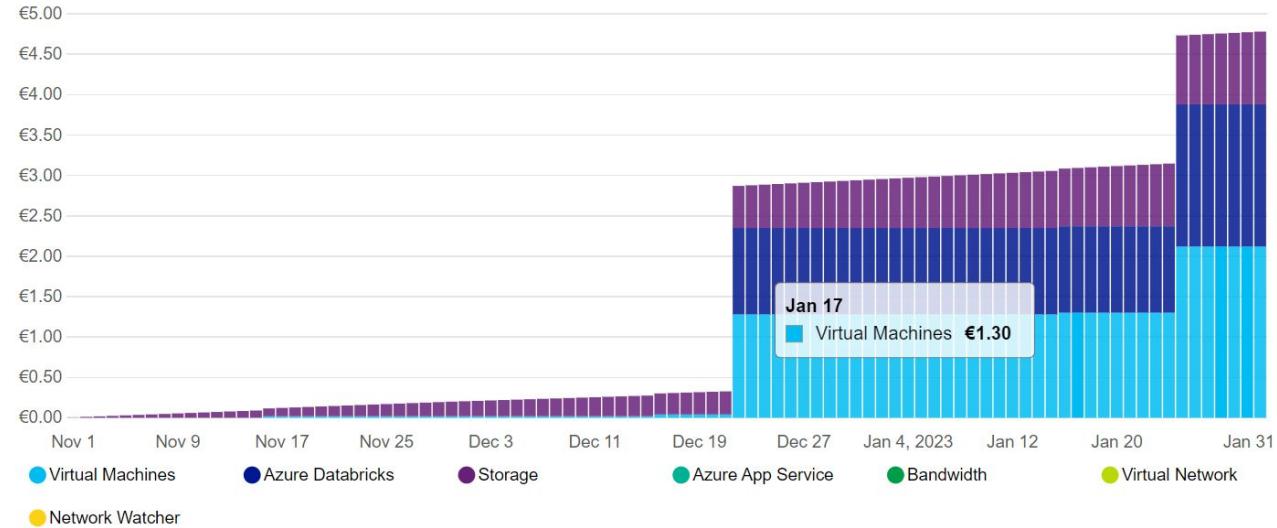
# Consumption based model

No upfront costs

No wasted resources

Pay for additional resources  
when needed

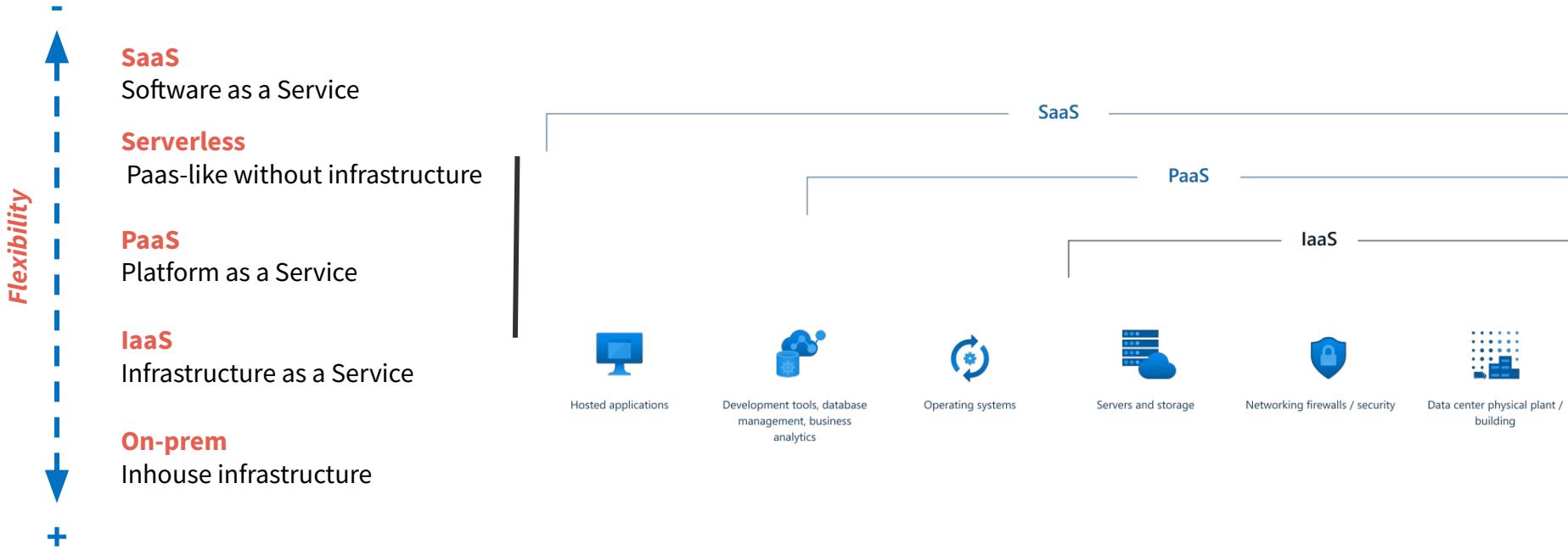
Stop paying at any time



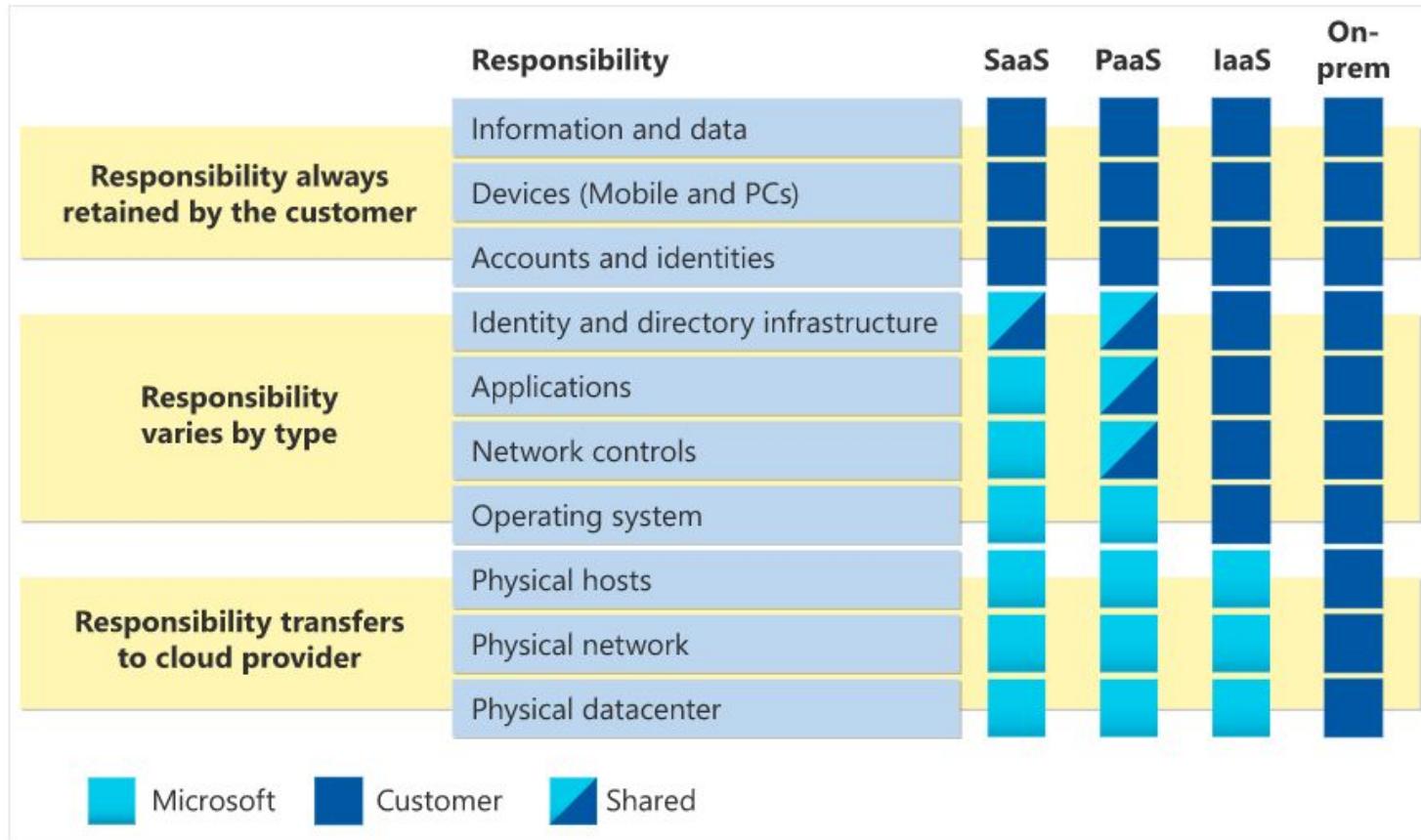
# Describe cloud service types

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# On-prem, IAAS, PAAS and SAAS



# Shared Responsibility Model



# Service types example

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IAAS	PAAS	SAAS
<ul style="list-style-type: none"><li>- Lift-and-shift migration</li><li>- Testing &amp; development</li></ul>	<ul style="list-style-type: none"><li>- Development Framework</li><li>- Analytics or business intelligence</li></ul>	<ul style="list-style-type: none"><li>- Email and messaging.</li><li>- Business productivity applications.</li><li>- Finance and expense tracking.</li></ul>

# Quizz session

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[https://steven-vcnt.github.io/Steven-Vcnt/BSB%20Courses/1.describe\\_cloud\\_concepts/](https://steven-vcnt.github.io/Steven-Vcnt/BSB%20Courses/1.describe_cloud_concepts/)

Describe Cloud Concepts



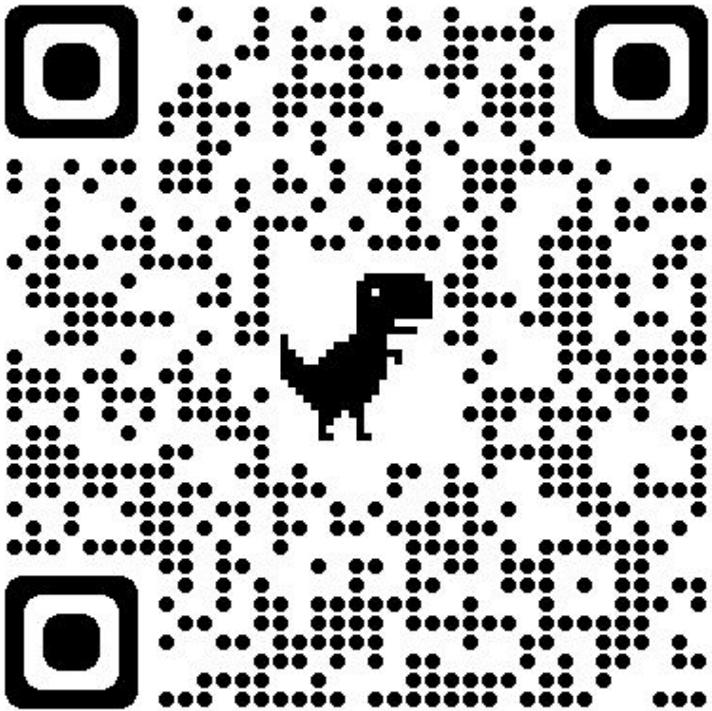
# WORKSHOP

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# Python Basics

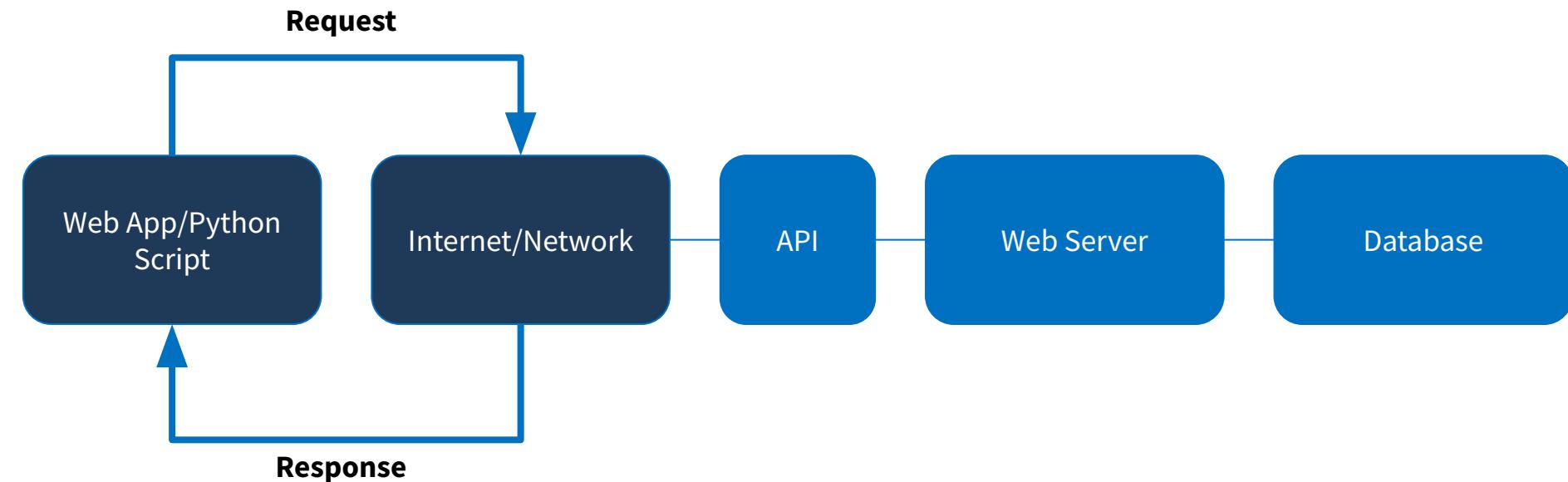
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<https://steven-vcnt.github.io/Steven-Vcnt/BSB%20Courses/2.pythonBasics/>



# API - Application Programming Interface

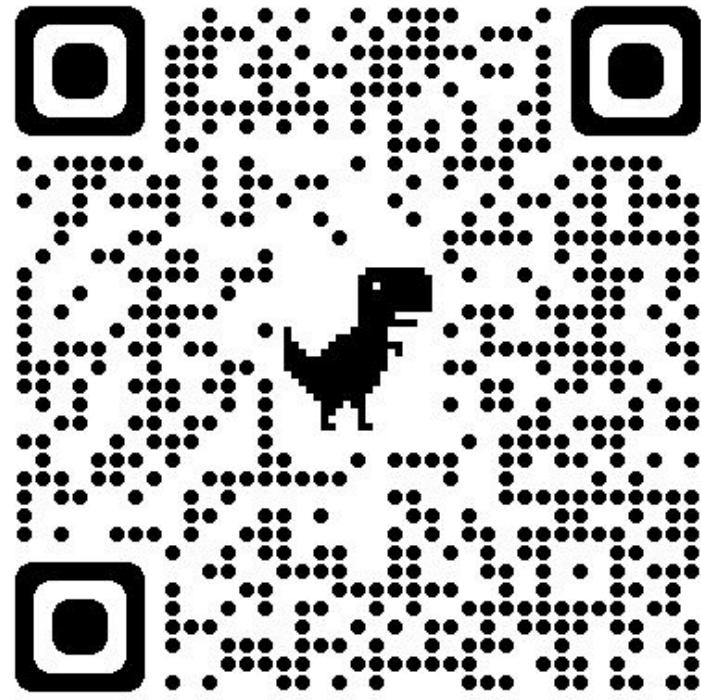
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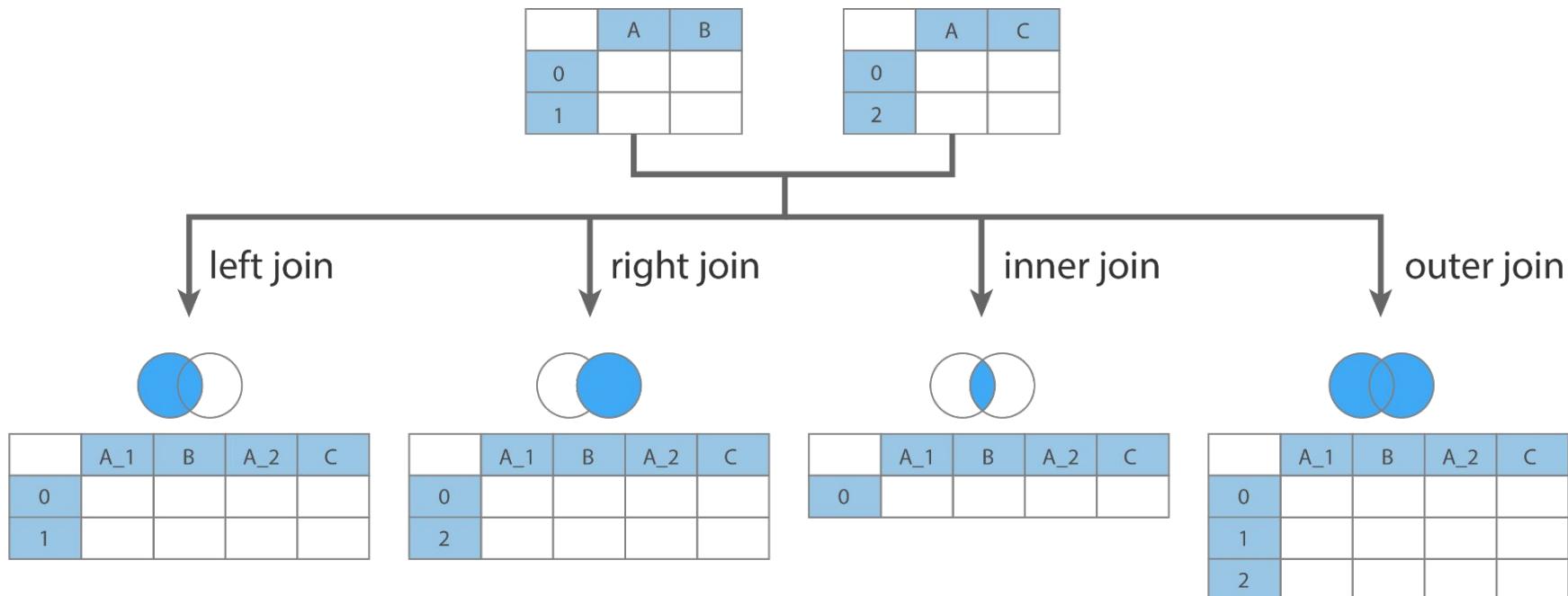
# API Basics

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[https://steven-vcnt.github.io/Steven-Vcnt/BSB%20Courses/3.api\\_basics/](https://steven-vcnt.github.io/Steven-Vcnt/BSB%20Courses/3.api_basics/)



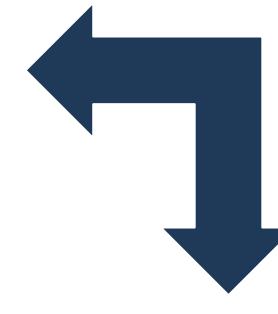
# Pandas DataFrame Join



[Python Pandas DataFrame Join, Merge, and Concatenate | by Jiahui Wang |  
Towards Data Science](#)

# pd.json\_normalize() - Normalize JSON data into a flat table

```
data = [  
    {  
        "id": 1,  
        "name": "Cole Volk",  
        "fitness": {"height": 130, "weight": 60},  
    },  
    {"name": "Mark Reg", "fitness": {"height": 130, "weight": 60}},  
    {  
        "id": 2,  
        "name": "Faye Raker",  
        "fitness": {"height": 130, "weight": 60},  
    },  
]
```



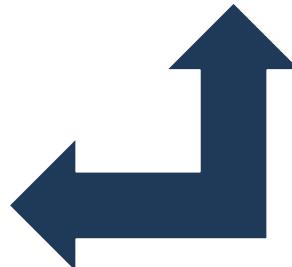
	<b>id</b>	<b>name</b>	<b>fitness.height</b>	<b>fitness.weight</b>
0	1.0	Cole Volk	130	60
1	NaN	Mark Reg	130	60
2	2.0	Faye Raker	130	60

[pandas.json\\_normalize — pandas 2.1.1 documentation](#)

# Pivot & Unpivot table

City	Population	Unit
Paris	2	M
Lyon	500	K
Saint-Emilion	1,8	K

Unit	Paris	Lyon	Saint-Emilion
K	None	500	1,8
M	2	None	None

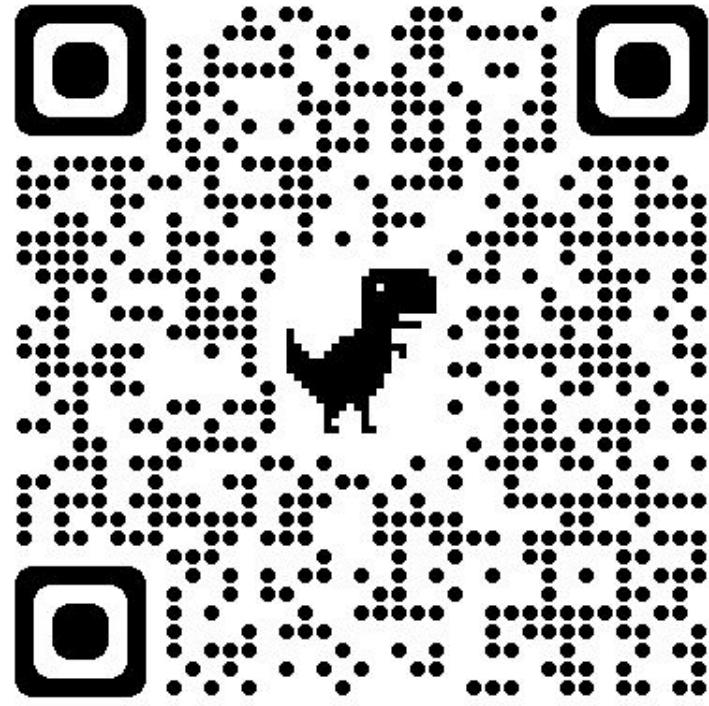


[pandas.melt — pandas 2.1.1 documentation](#)

# Azure Setup

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[https://steven-vcnt.github.io/Steven-Vcnt/BSB%20Courses/4.azure\\_setup/](https://steven-vcnt.github.io/Steven-Vcnt/BSB%20Courses/4.azure_setup/)



# Setup Azure Student Account

Create a new account the bsb mail address : [Azure for Students – Free Account Credit](#)

The screenshot shows the Azure for Students landing page. At the top, there's a navigation bar with the Azure logo, a search bar, and links for Learn, Support, Contact Sales, and Sign in. The main heading is "Build in the cloud free with Azure for Students". Below it, a subtext says "Use your university or school email to sign up and renew each year you're a student". There are two prominent buttons: a green "Start free" button and a blue "Learn about eligibility >" link. Below the main section, there are two boxes: one saying "Start with \$100 Azure credit" and another saying "No credit card required", separated by a plus sign. At the bottom, it says "Free services" and "Get popular services free while you have your credit."

Explore ▾ Products ▾ Solutions ▾ Pricing ▾ Partners ▾ Resources ▾

Search

Learn Support Contact Sales Sign in

Build in the cloud free with Azure for Students

Use your university or school email to sign up and renew each year you're a student

[Start free](#)

[Learn about eligibility >](#)

Start with \$100 Azure credit

No credit card required

+

Free services

Get popular services free while you have your credit.

# Setup Azure Environment



Resource groups

+ Create

View



Cost Management +  
Billing

View



Storage accounts

+ Create

View

Container that holds  
related resources for an  
Azure solution

Better manage cloud  
spend by managing costs  
across all your clouds with  
a single, unified view.

Contains all of your Azure  
Storage data objects,  
including blobs, file  
shares, queues, tables,  
and disks.