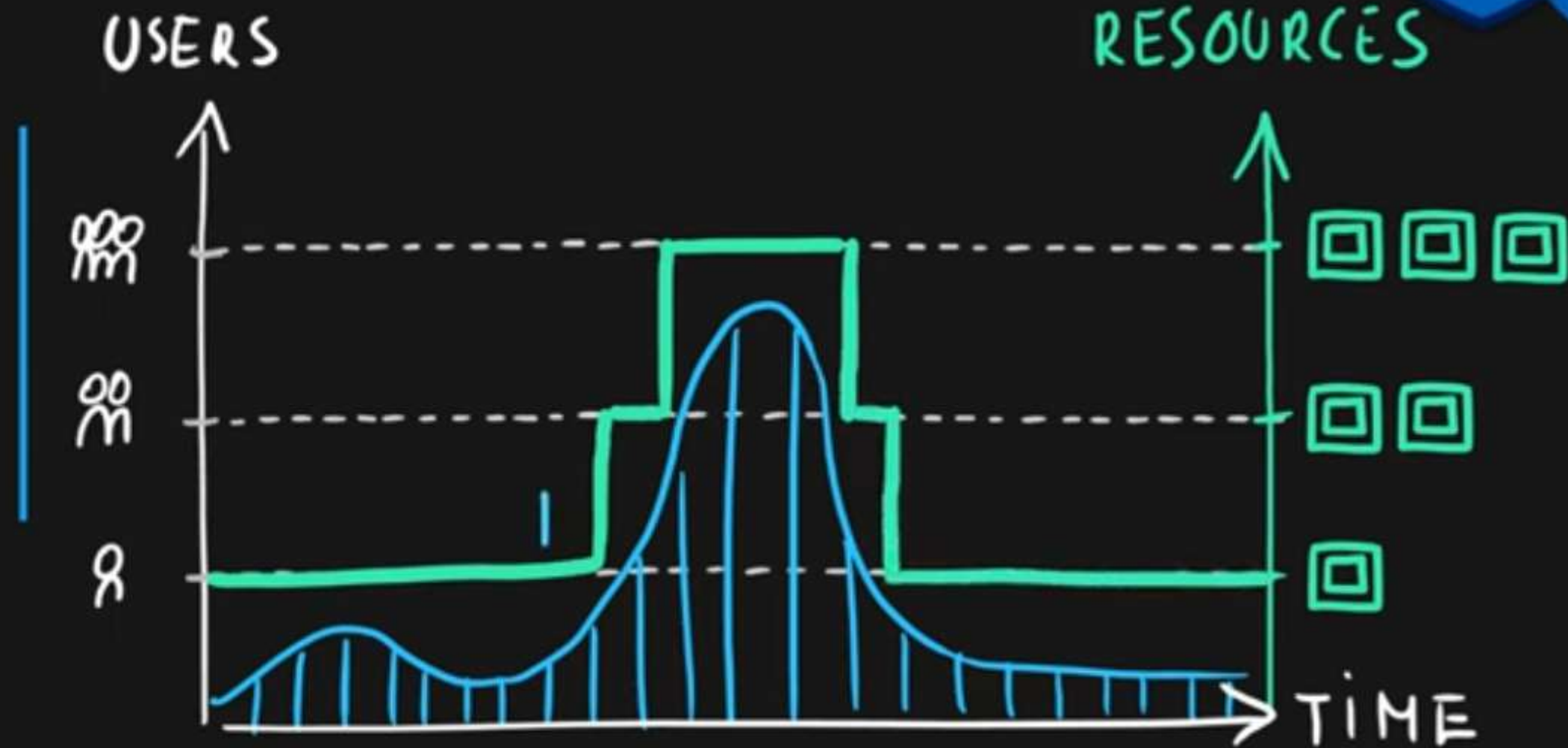


# Cloud

## Key Characteristics

- Scalability
- Elasticity



# Cloud Computing

Delivery model for services like



STORAGE



FILES



DATABASES

CO  
P



WINDOW

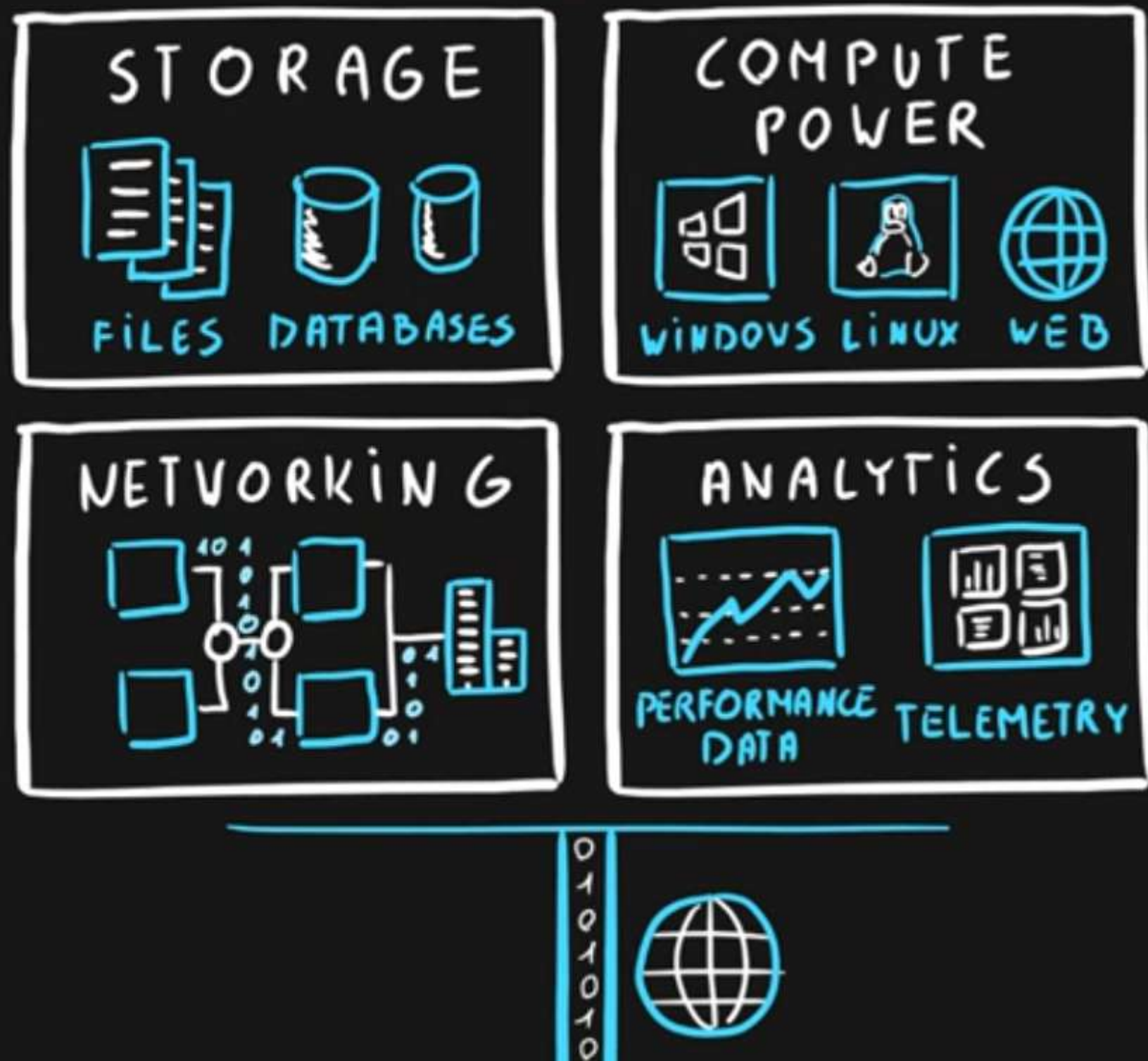
NETWORKING

AN

# Cloud Computing

Delivery model for services like

- Storage
  - Compute Power
  - Networking
  - Analytics
  - and more services...
- over the internet



Scalability is the ability to scale

Scaling is a process of

- allocating (adding) or
  - deallocating (removing)
- resources



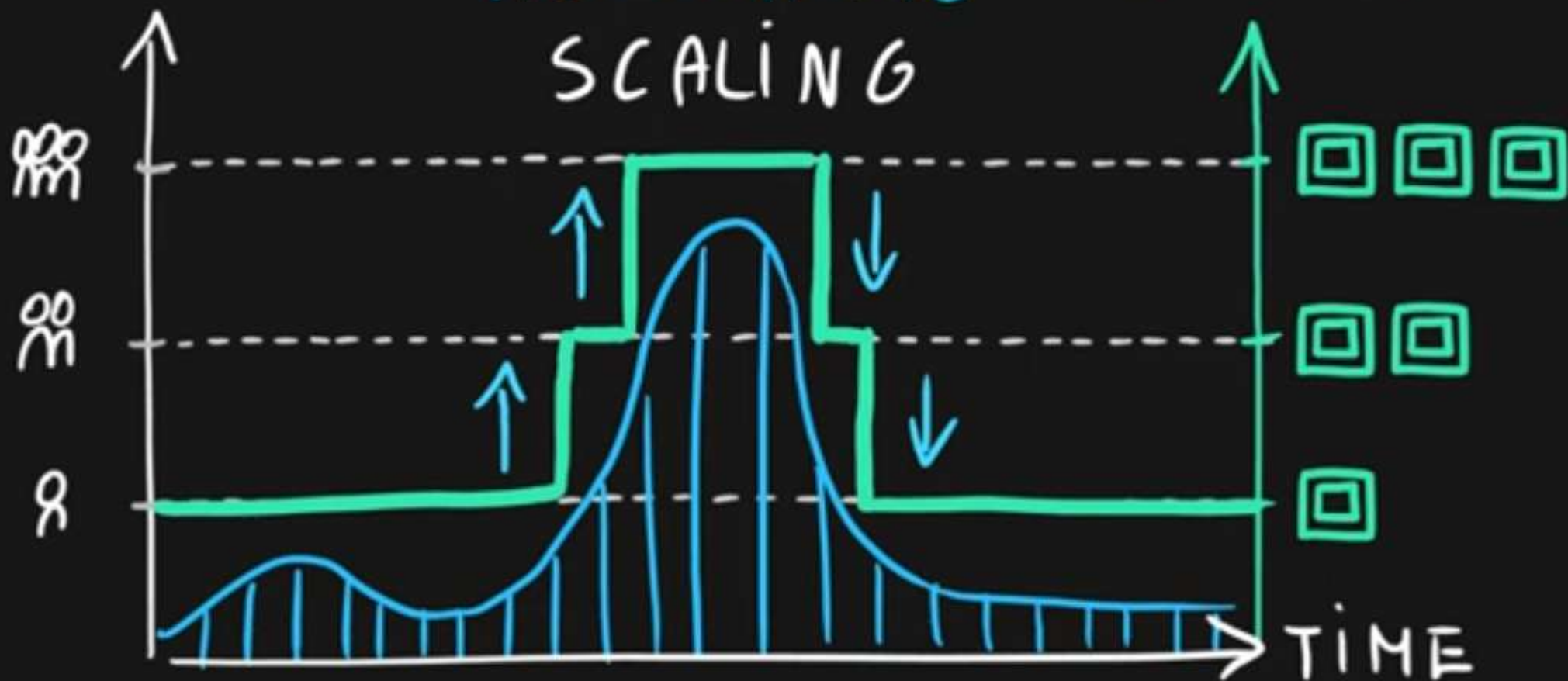


## ELASTICITY

AUTOMATIC  
SCALING

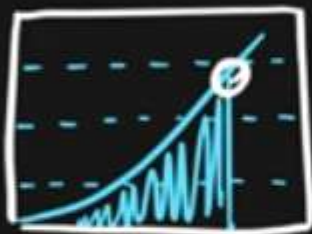
RESOURCES

USERS





MANUAL



AUTOMATED

REQUEST



TIME



CLOUD

ON-PREM

SECONDS

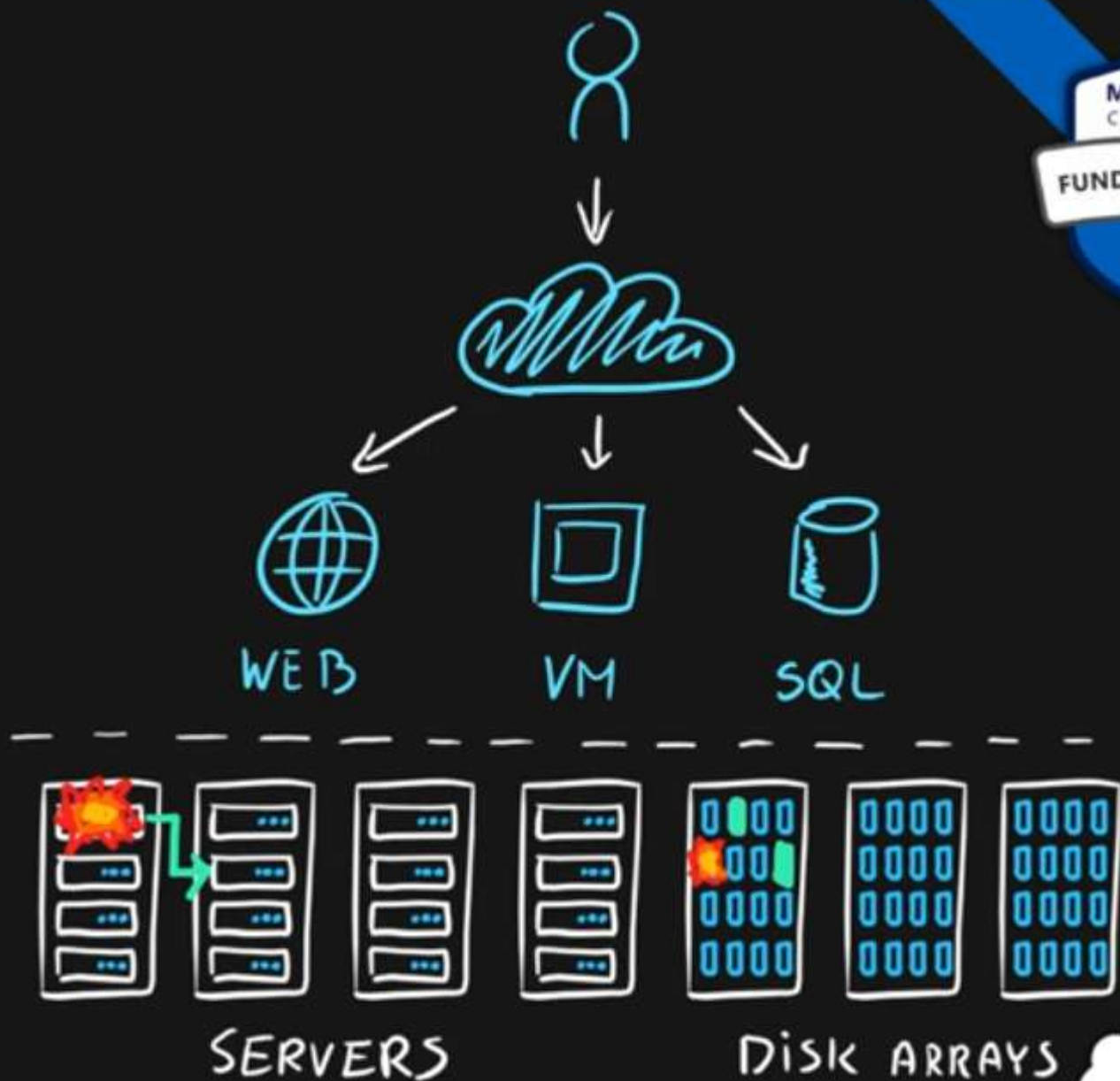
MINUTES

HOURS

DAYS

WEEKS

MONTHS





DNS



WEB



SQL



REPLICATION



WEB



SQL







$$\text{AVAILABILITY} = \frac{\text{UPTIME}}{\text{UPTIME} + \text{DOWNTIME}}$$

AVAILABILITY	YEAR	MONTH	DAY
99%	3.65 DAYS	7.31 HOURS	14.4 MIN
99.9%	8.77 HOURS	43.83 MIN	1.44 MIN
99.99%	52.60 MIN	4.38 MIN	8.64 SEC

Availability is a measure of system uptime for users/services

High availability is the ability to keep services running for extended periods of time with very little downtime










[marczak.io/az-9000#ep01](http://marczak.io/az-9000#ep01)

DELIVERY  
COMPANY

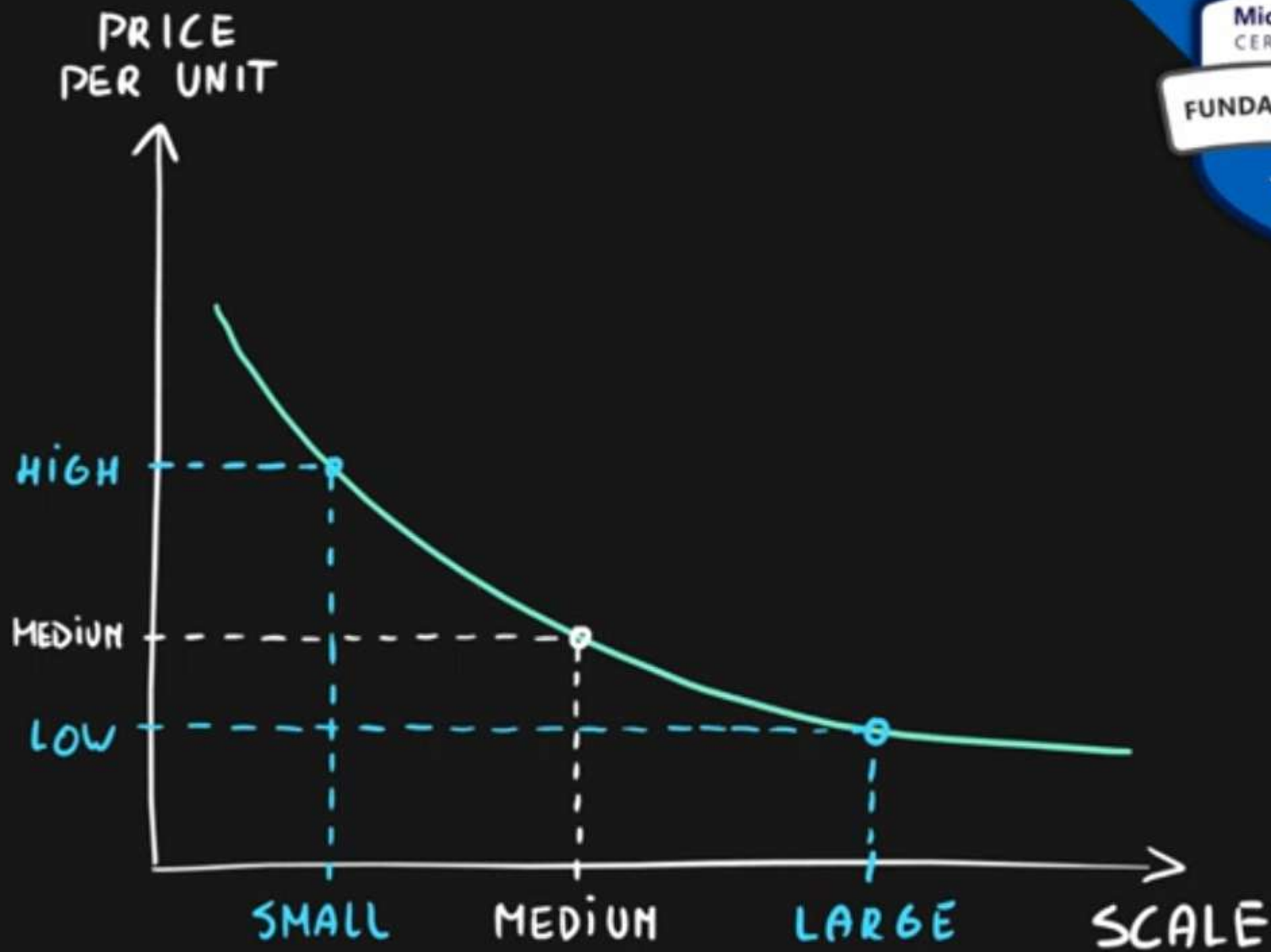


# Economies of scale

Key Characteristics

SCALE	   x3	   x300
CAR	INDIVIDUAL PURCHASE \$10K	BULK PURCHASE \$9K
MAINTENANCE	INDIVIDUAL \$100	CONTRACT \$90
INSURANCE	INDIVIDUAL \$500	BULK PURCHASE \$400
OTHER	INDIVIDUAL \$100	SHARED \$80
CUSTOMERS		
PRICE PER UNIT	\$10	\$9 





# CapEx vs. OpEx

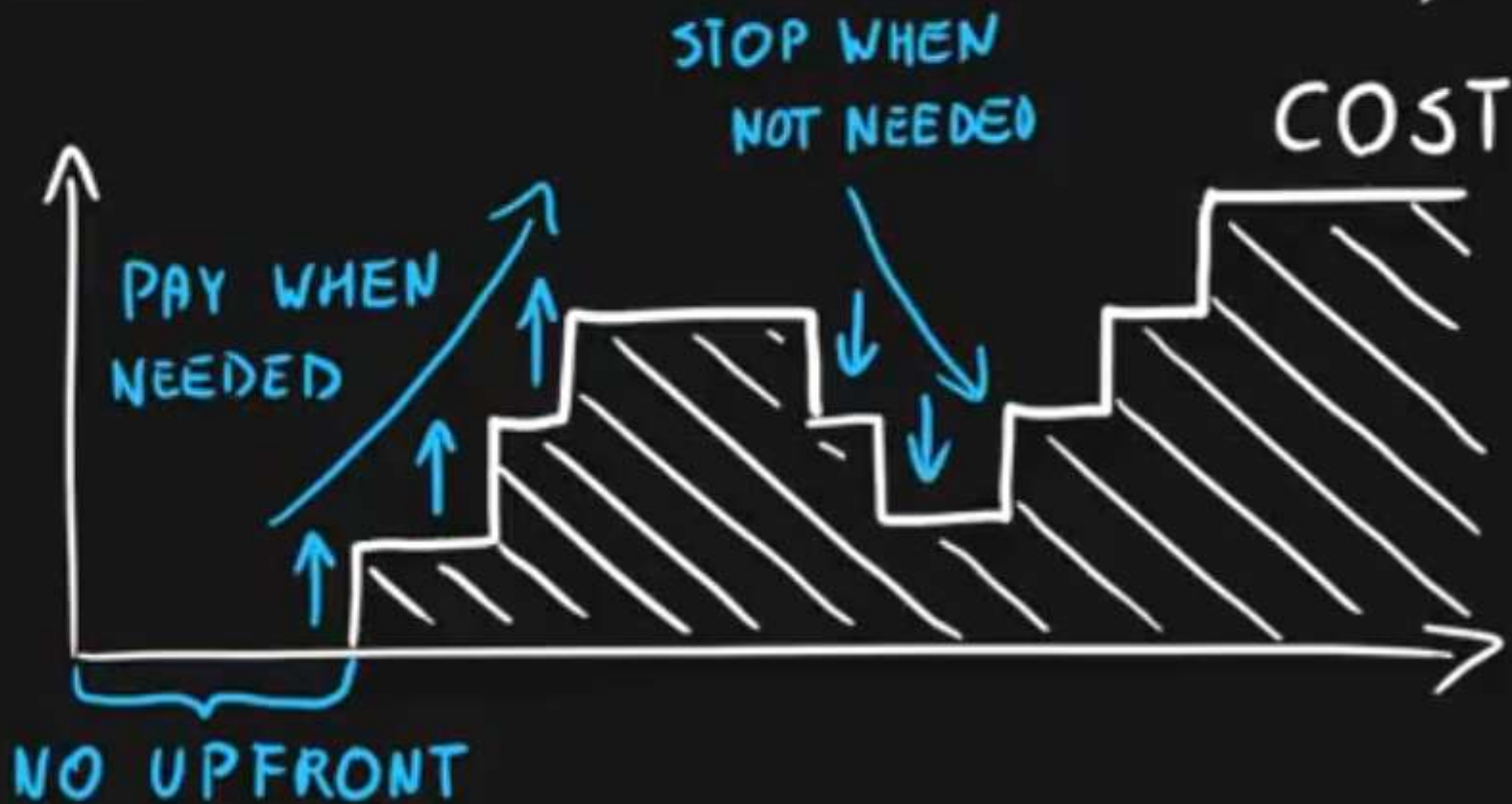
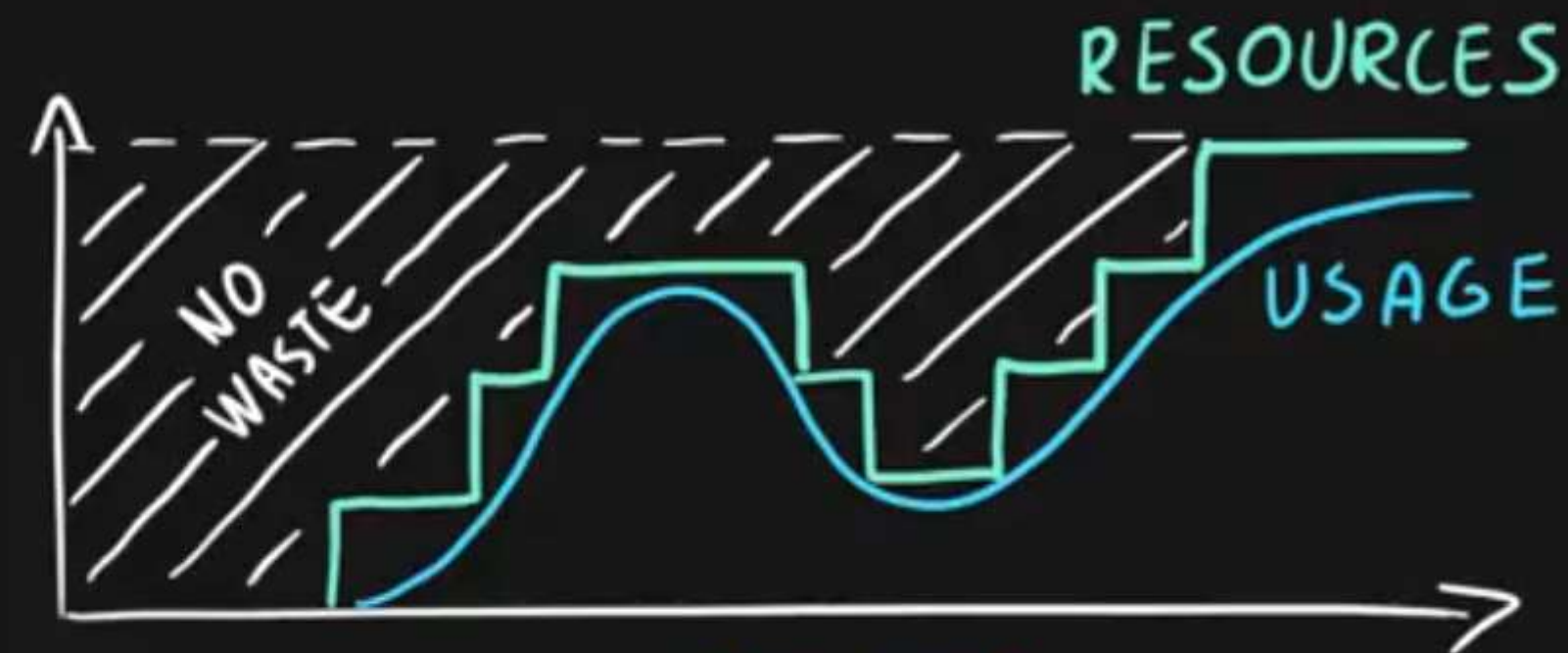
## Differences

	CapEx	OpEx
Up front cost	Significant	None
Ongoing cost	Low	Based on usage
Tax Deduction	Over time	Same year
Early Termination	No	Anytime
Maintenance	Significant	Low
Value over time	Lowers	No change

# Consumption-based Model

## Key Characteristics

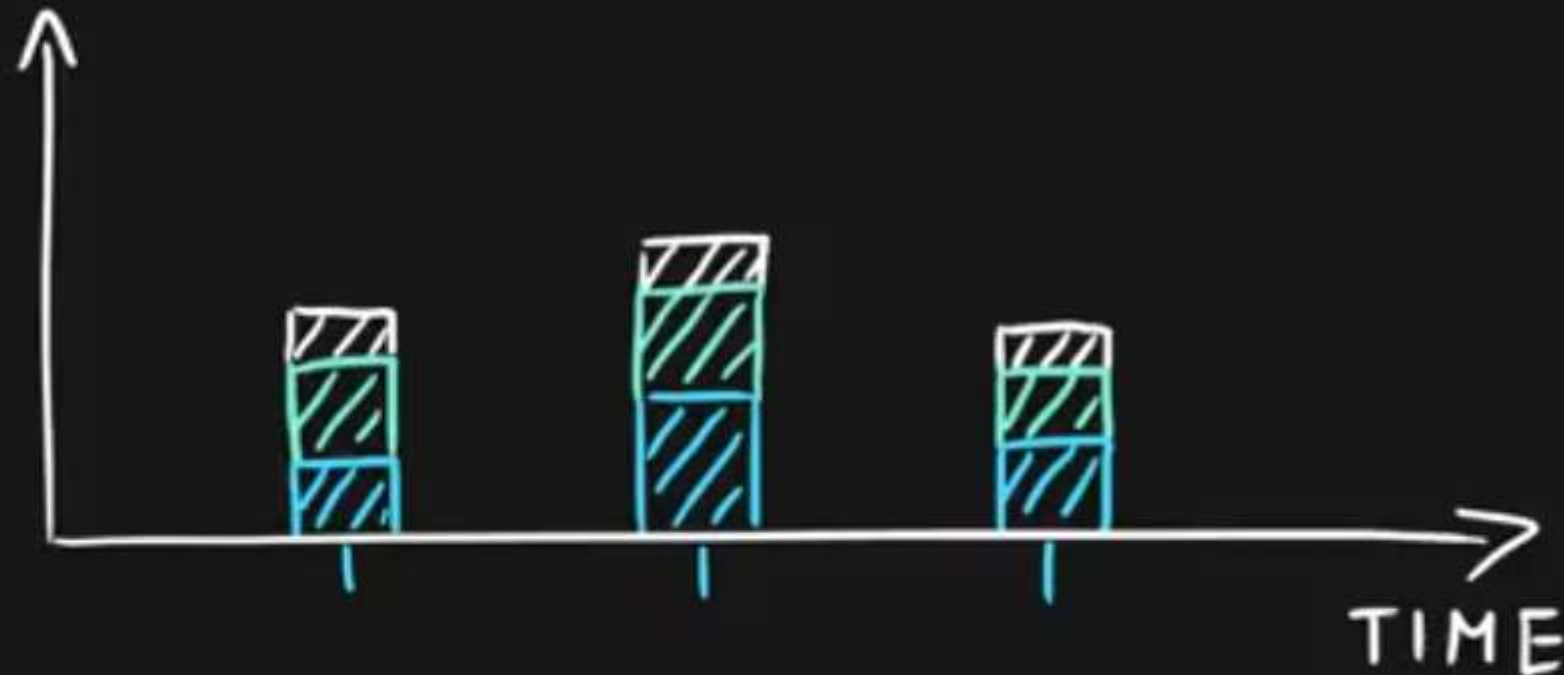
- No upfront costs
- No wasted resources
- Pay for additional resources when needed
- Stop paying at any time



# Consumption-based Model

## Key Characteristics

- Multiple pricing components per service
- Very granular usage measurement



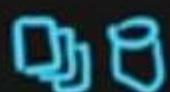
 COMPUTE

 STORAGE

 NETWORK



APPLICATIONS  
DATA



DATA



APPS

SOFTWARE

RUNTIME



IIS



DOCKER

MIDDLEWARE



SOFTWARE

PLATFORM

OPERATING  
SYSTEM



WINDOWS



LINUX

VIRTUALIZATION



SERVERS



MEMORY



MOTHERBOARD



CPU

INFRASTRUCTURE

NETWORKING



ROUTERS  
SWITCHES



INTERNET

STORAGE



HDD



SSD

# Software as a Service (SaaS)



## Key Characteristics

### Ownership

- Cloud provider manages infrastructure, platform & software
  - Infrastructure – networking, hardware & virtualization
  - Platform – operating system, middleware, runtime
  - Software – data & applications
- You manage nothing

### Use cases

- Buying of-the-shell applications



ONE DRIVE

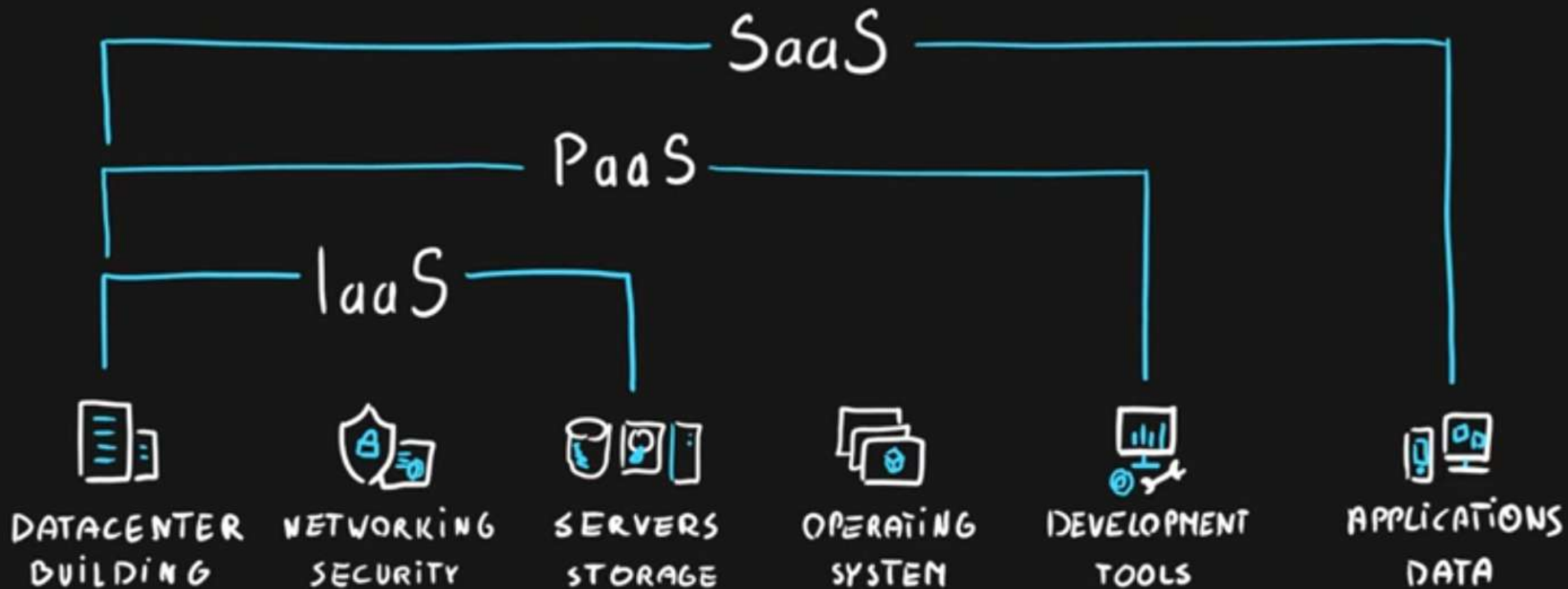


OUTLOOK



SKYPE





## Skills Learned

- Describe **Public** cloud
- Describe **Private** cloud
- Describe **Hybrid** cloud
- **Compare and contrast** the three different cloud deployment models



# Hybrid Cloud

## Advantages and Disadvantages

### Advantages

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Great flexibility

Run legacy apps in private cloud

Utilize existing infrastructure

Meet any security requirements

### Disadvantages

Can be more expensive

Complicated to manage

IT skills & expertise are mandatory

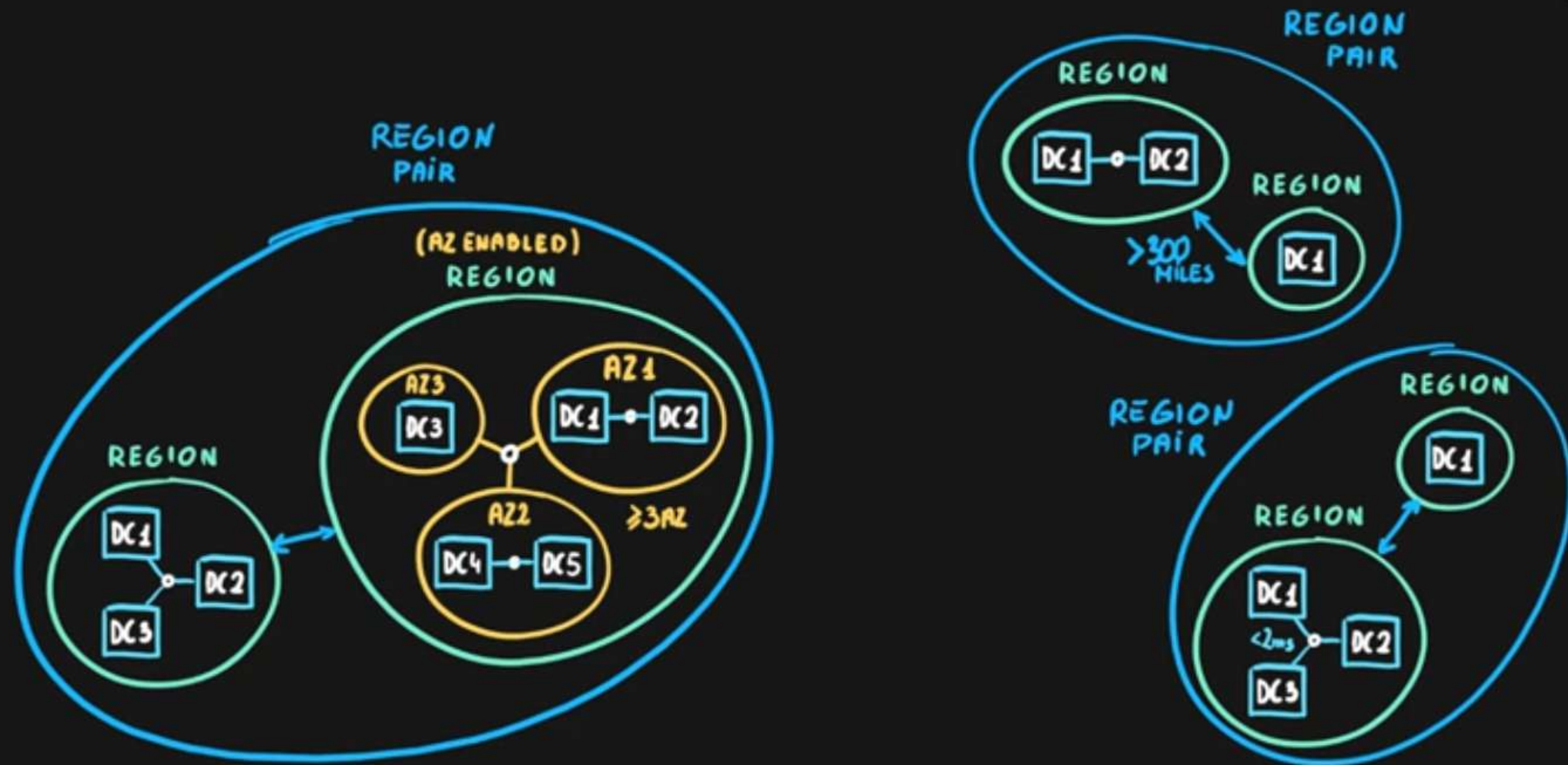
# Region

## Key Characteristics

- Geographical area on the planet
- One but usually more datacenters connected with low-latency network (<2 milliseconds)
- Location for your services
- Some services are available only in certain regions
- Some services are global services, as such are not assigned/deployed in specific region
- Globally available with 50+ regions
- Special government regions (US DoD Central, US Gov Virginia, etc.)
- Special partnered regions (China East, China North)

# Azure Infrastructure

## Overview





<...> VIRTUAL NETWORK

<.> SUBNET



VM

<.> SUBNET



VM

1. VNET  
PEERING



2. VPN  
GATEWAY

<...> VIRTUAL NETWORK

<.> SUBNET



VM



VM