

# What is cloud computing?

CLOUD COMPUTING FOR EVERYONE



**Sara Billen**

Curriculum Manager, DataCamp

# The importance of the cloud



**The Register** ✅ @TheRegister · 26 Oct 2018

Amazon is at this point a money-printing cloud machine with a grocery store by the parking lot

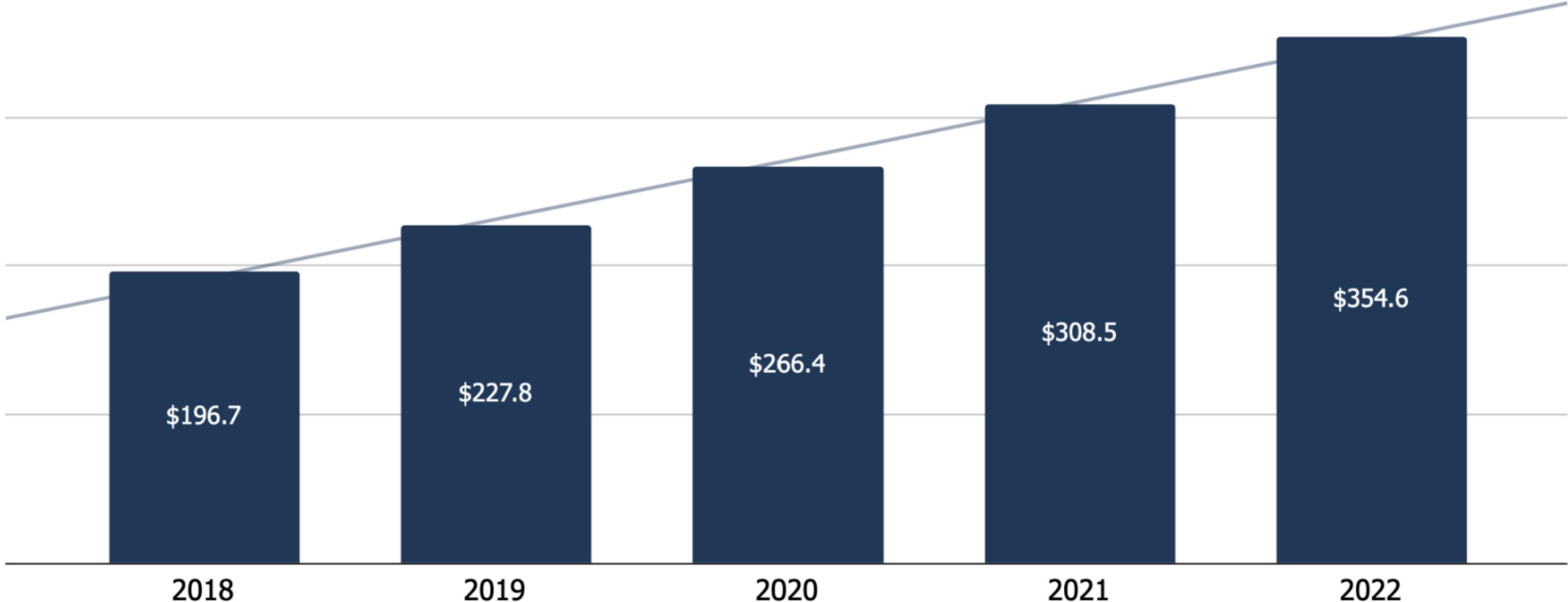


Amazon is at this point a money-printing cloud machin...

\$3bn-a-quarter in profit and most of coming in from  
AWS

🔗 [theregister.com](http://theregister.com)

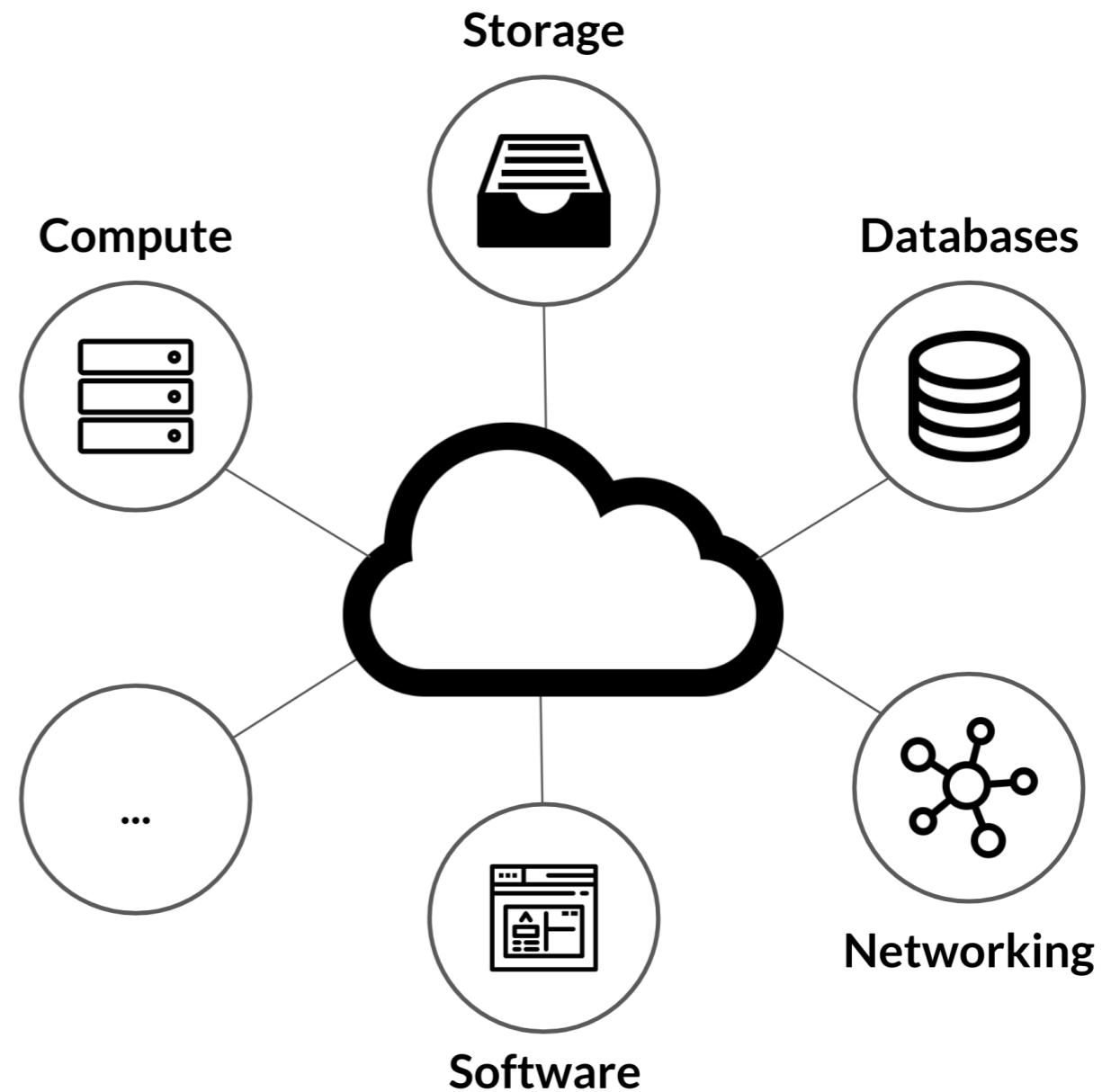
## Worldwide Public Cloud Service Revenue Forecast (Billions of U.S. Dollars)



Source: <https://www.gartner.com/en/newsroom/press-releases/2019-11-13-gartner-forecasts-worldwide-public-cloud-revenue-to-grow-17-percent-in-2020>

# Cloud computing definition

Cloud computing is the delivery of technology services - including compute, storage, databases, networking, software, and many more - over the internet with pay-as-you-go pricing.



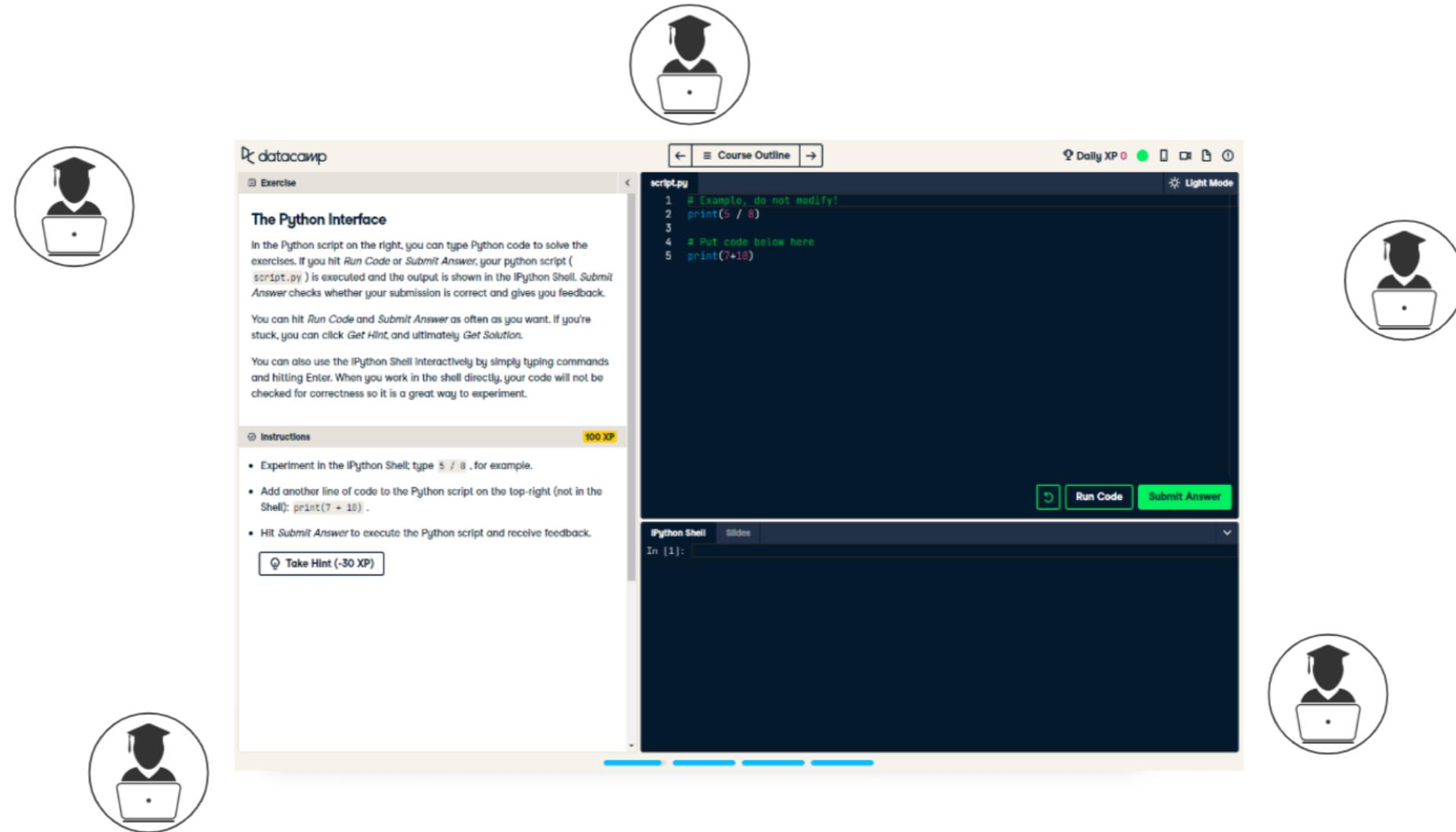
# Use case - hosting a website

The screenshot shows a DataCamp exercise interface for Python. On the left, there's an 'Exercise' panel titled 'The Python Interface'. It contains instructions about using the Python script editor and IPython shell, and a list of tasks with a '100 XP' badge. One task is 'Experiment in the IPython Shell; type `5 / 8`, for example.' On the right, the main workspace shows a code editor with a script named 'script.py' containing the following code:

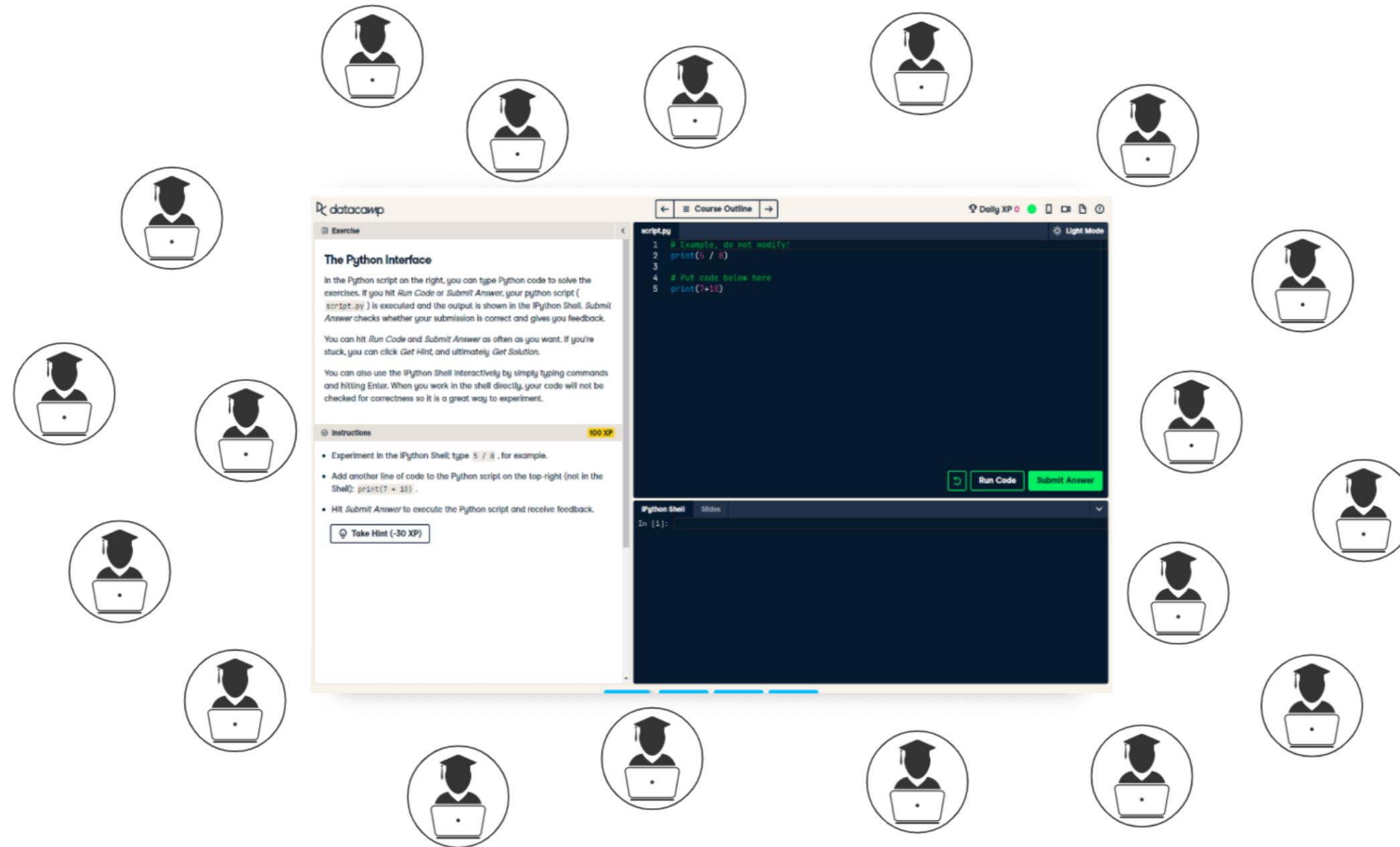
```
script.py
1 # Example, do not modify!
2 print(5 / 8)
3
4 # Put code below here
5 print(7+10)
```

Below the code editor is an 'IPython Shell' window with the prompt 'In [1]:'. At the top of the workspace are buttons for 'Run Code' and 'Submit Answer'. The top right corner of the interface shows 'Daily XP 0' and a 'Light Mode' toggle.

# Users learn on DataCamp



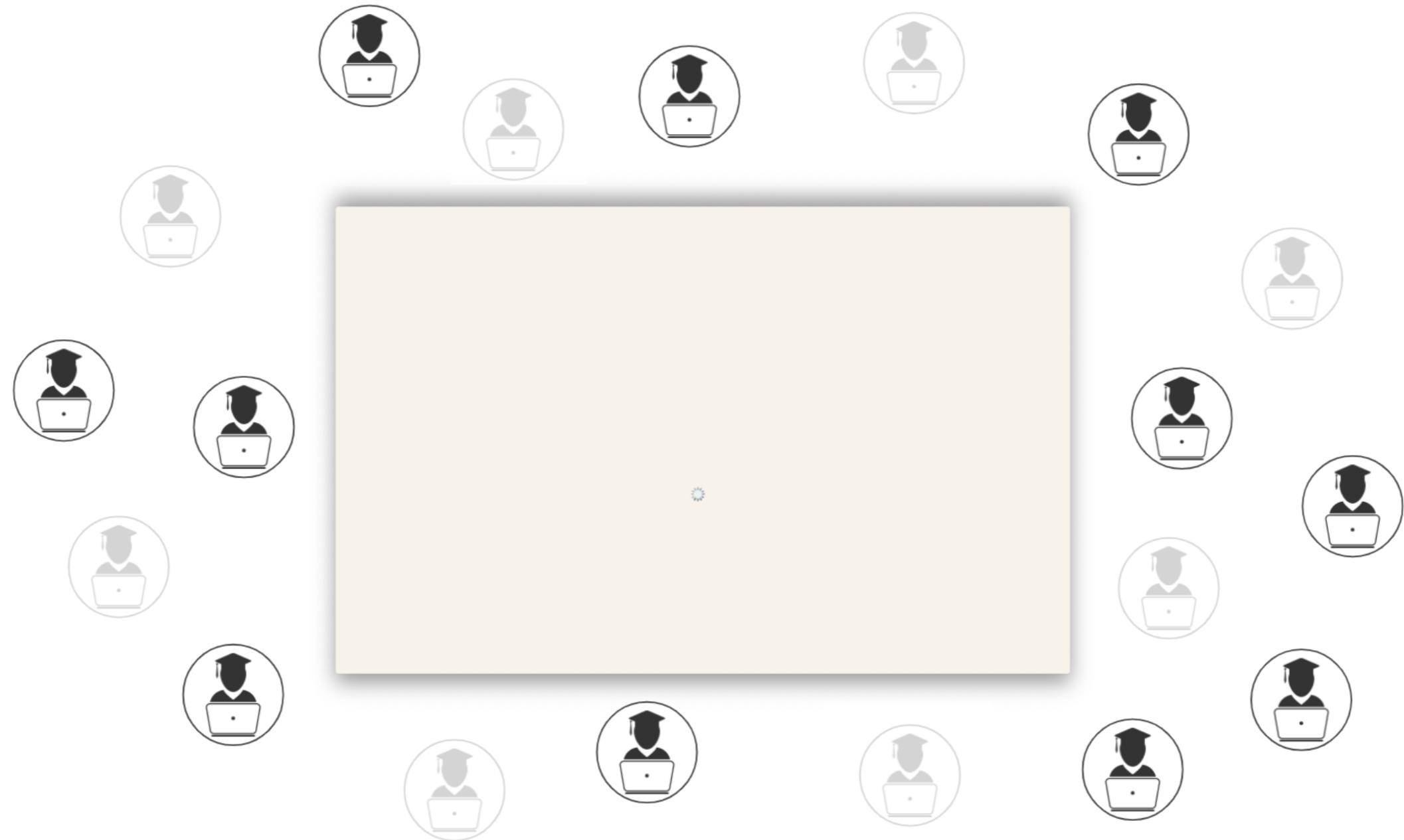
# Free week increases traffic



# High traffic leads to slow service

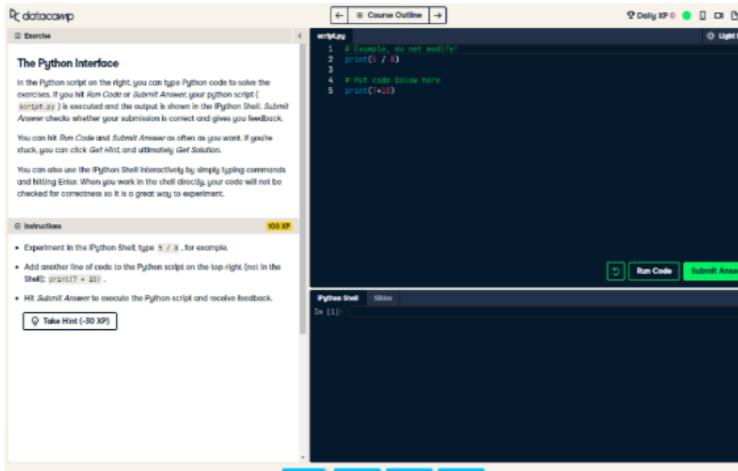


# Users stop learning on DataCamp



# Hosting a website using an on-premise server

- Server
  - powerful computer
  - you can connect to remotely
- Located on the premises

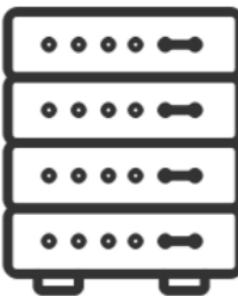


The Python Interface

```
script.py
1 # Example, do not modify
2 print(5 / 3)
3
4 # Put code below here
5
6 print(14.0)
```

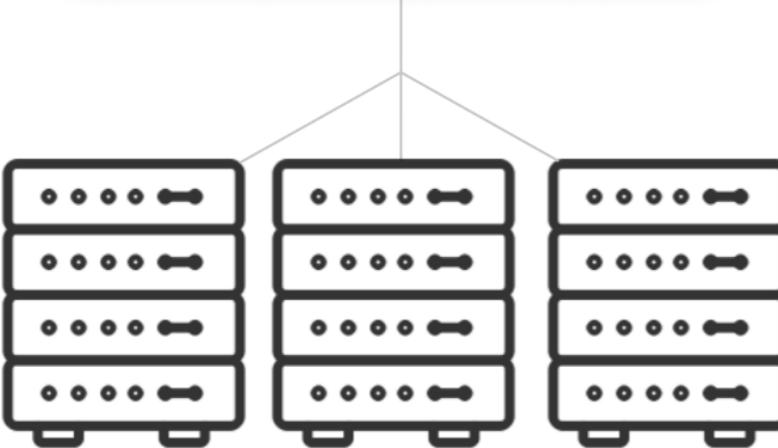
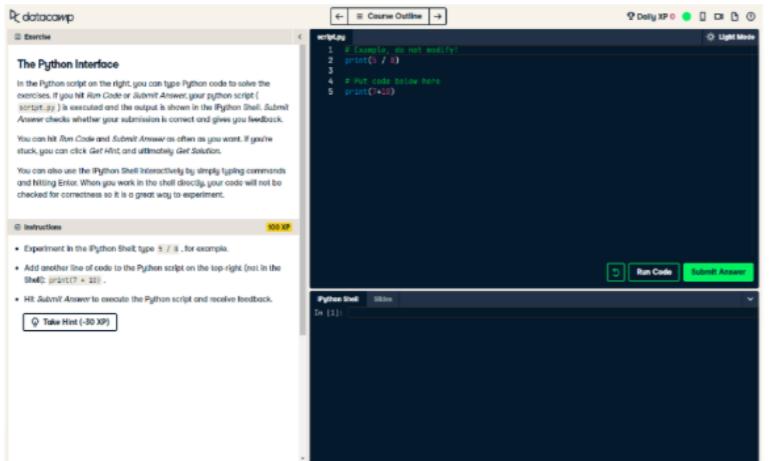
Run Code Submit Answer

Python Shell In [1]:



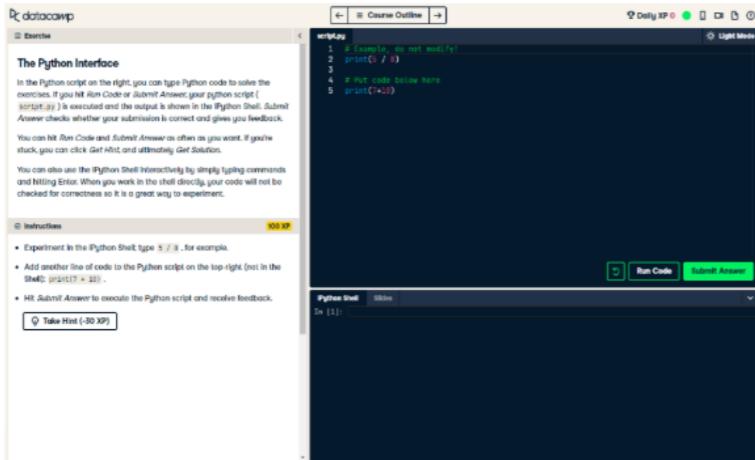
# Hosting a website using an on-premise server

- More people start using the website
- Buy/rent new servers



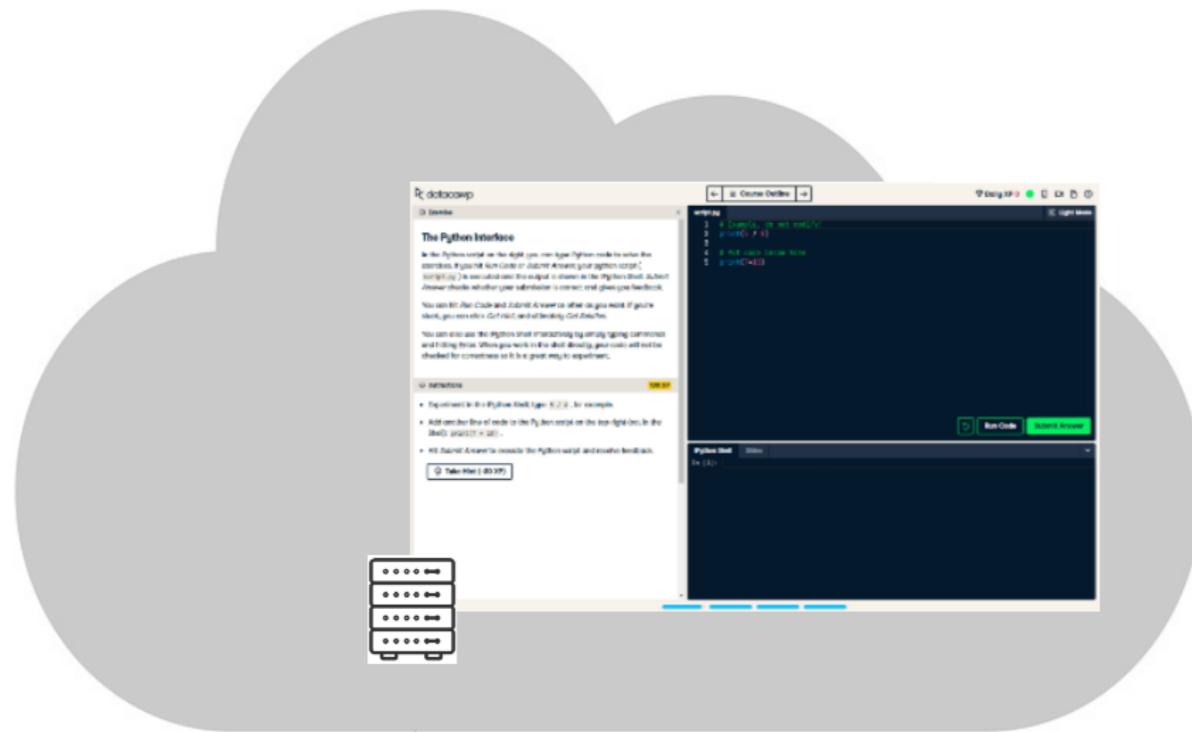
# Hosting a website using an on-premise server

- More people start using the website
- Buy/rent new servers
  - Take time to set up
  - Cost a lot of money



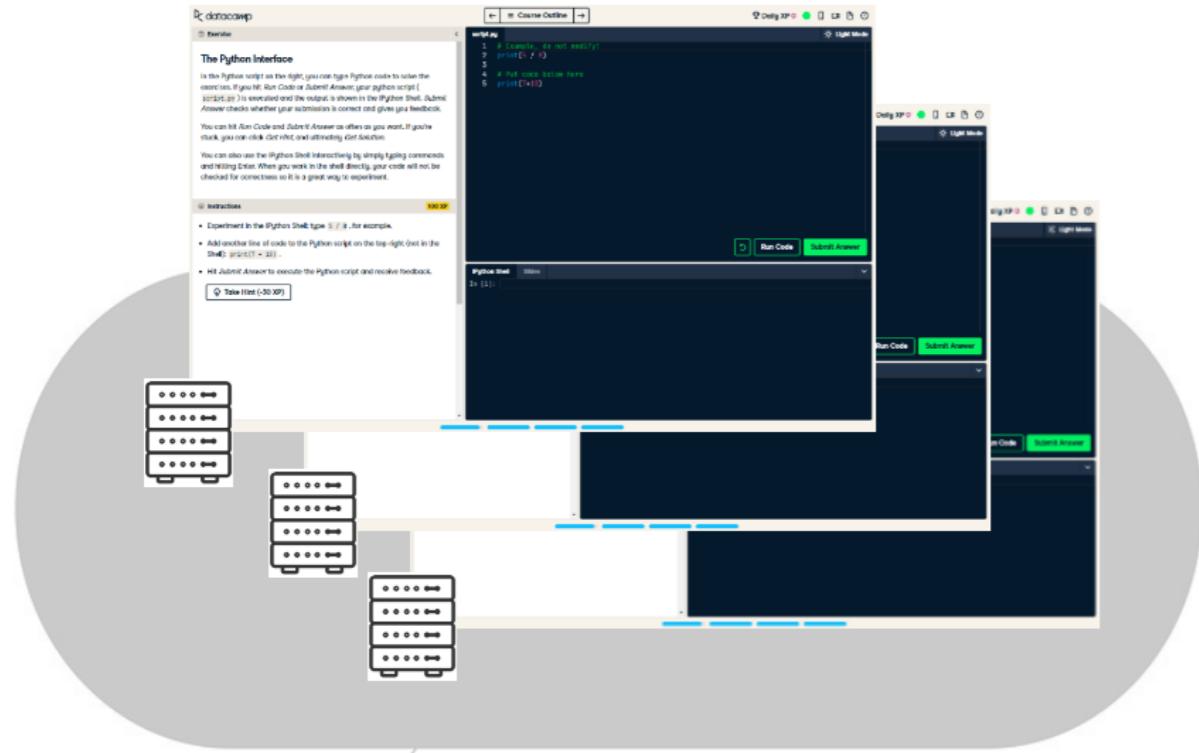
# Hosting a website using a cloud server

- Cloud server
- Access to computing power instantly when you need it

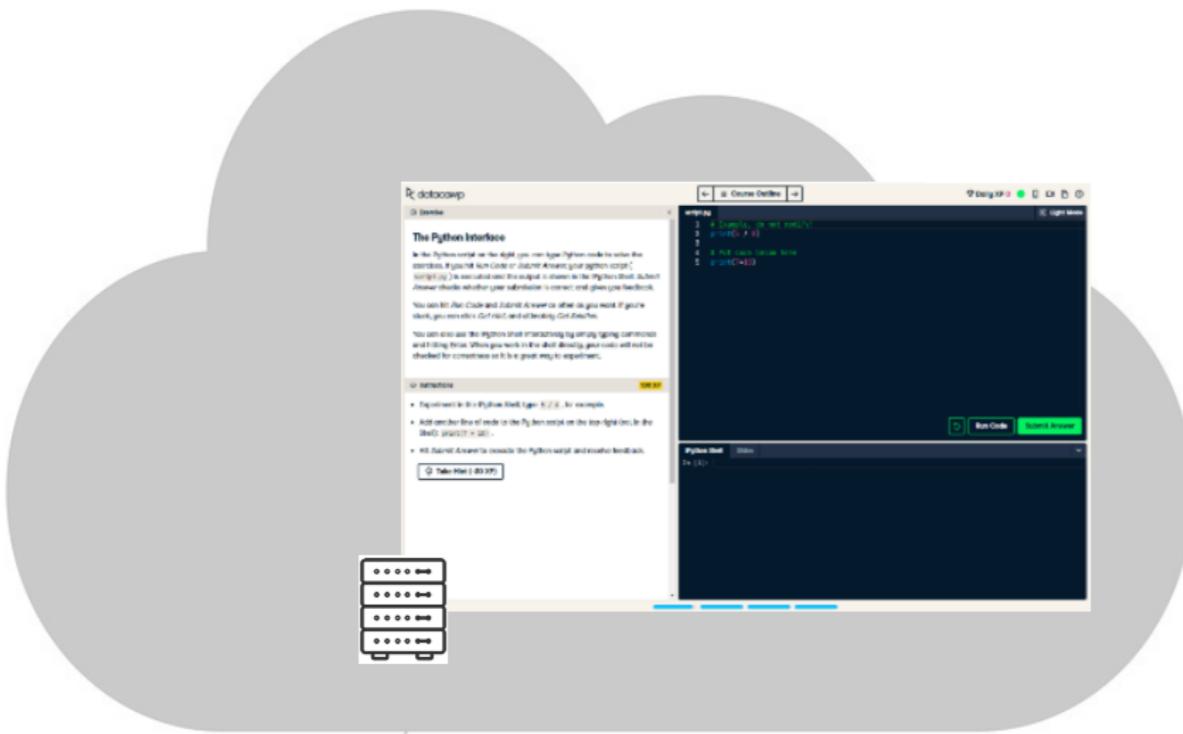


# Hosting a website using a cloud server

- More people start using the website
- Access more cloud servers



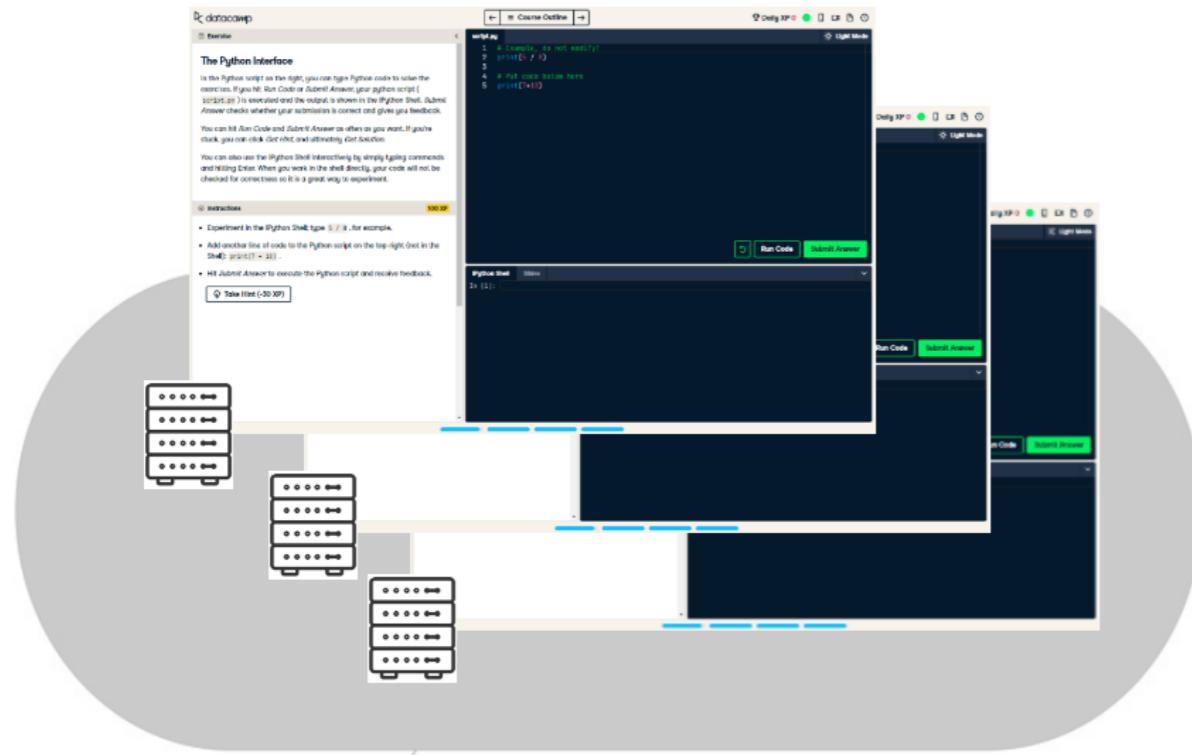
# Hosting a website using a cloud server



- More people start using the website
- Access more cloud servers
- Easily release redundant cloud servers



# Hosting a website using a cloud server



- More people start using the website
- Access more cloud servers
- Easily release redundant cloud servers
- Pay-as-you go billing



# Cloud computing vs. on-premise

## Cloud

- Scalable
- Fast set-up speed
- Pay-as-you-go

## On-premise

- Less scalable
- Takes time to set up
- Ongoing costs

*The best solution depends on the use case!*

# Other uses of cloud computing



- Store, back up, and recover data
- Create cloud-native applications
- Stream audio and video
- Deliver software on demand
- Analyze data
- Embed artificial intelligence models
- ...

# Cloud computing companies



NETFLIX



Google

# **Let's practice!**

**CLOUD COMPUTING FOR EVERYONE**

# The power of the cloud

CLOUD COMPUTING FOR EVERYONE

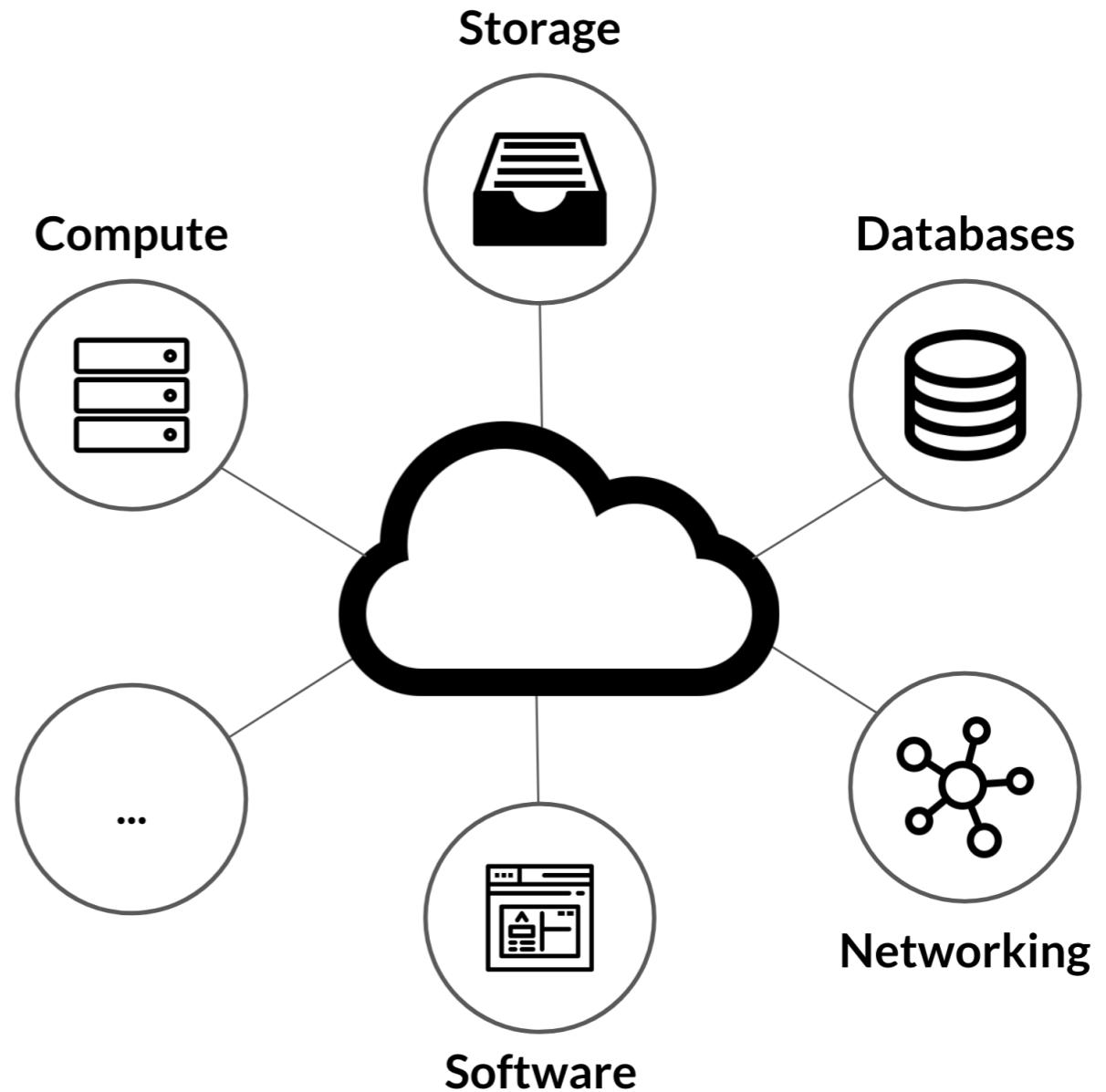


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# Cloud services

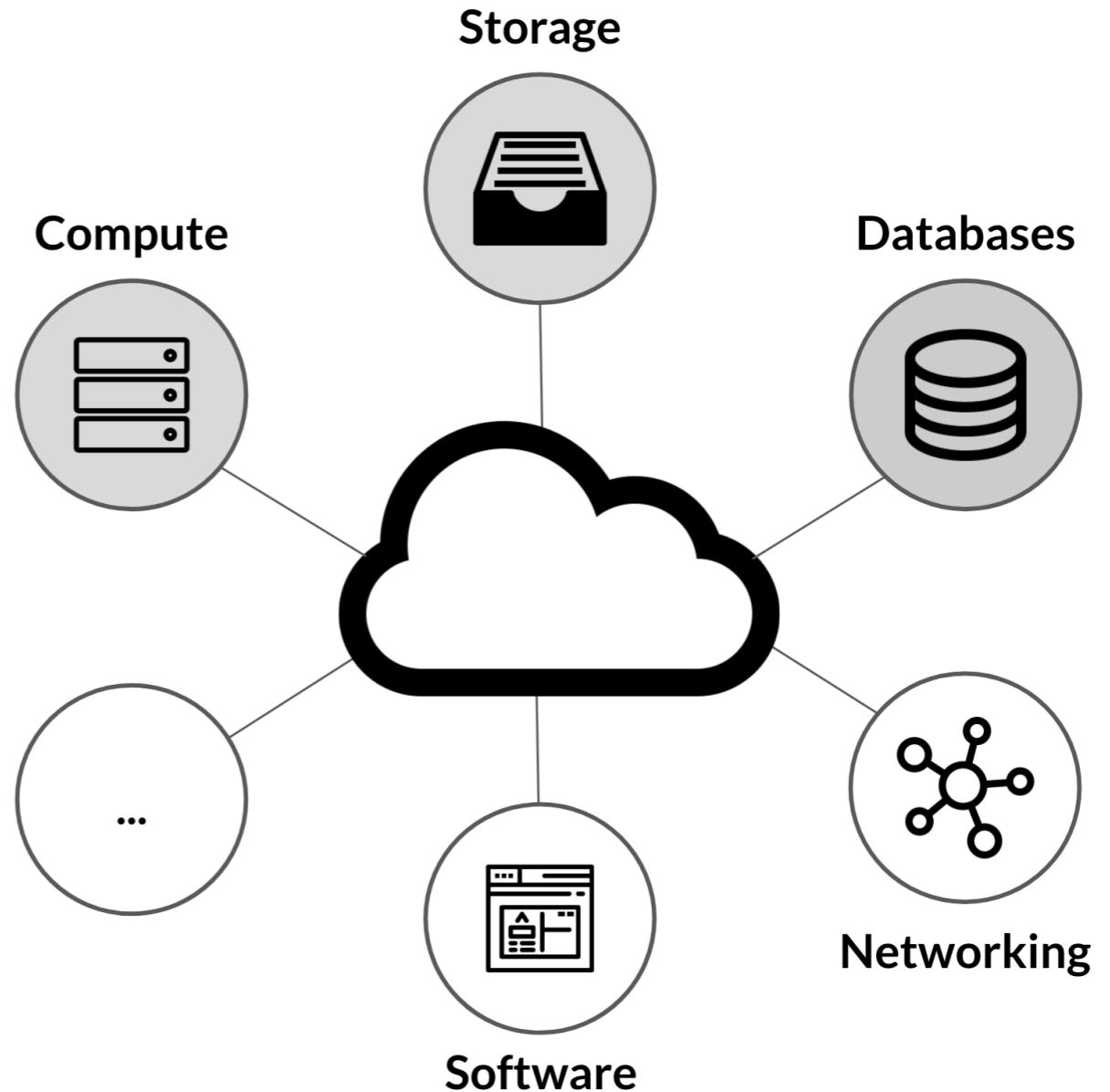
Cloud computing is the delivery of technology services - including compute, storage, databases, networking, software, and many more - over the internet with pay-as-you-go pricing.



# Cloud services

Cloud computing is the delivery of technology services - including **compute**, **storage**, **databases**, networking, software, and many more - over the internet with pay-as-you-go pricing.

- **Compute**: provide the brains to process your workload
- **Storage**: save and store data
- **Databases**: store more structured sets of data



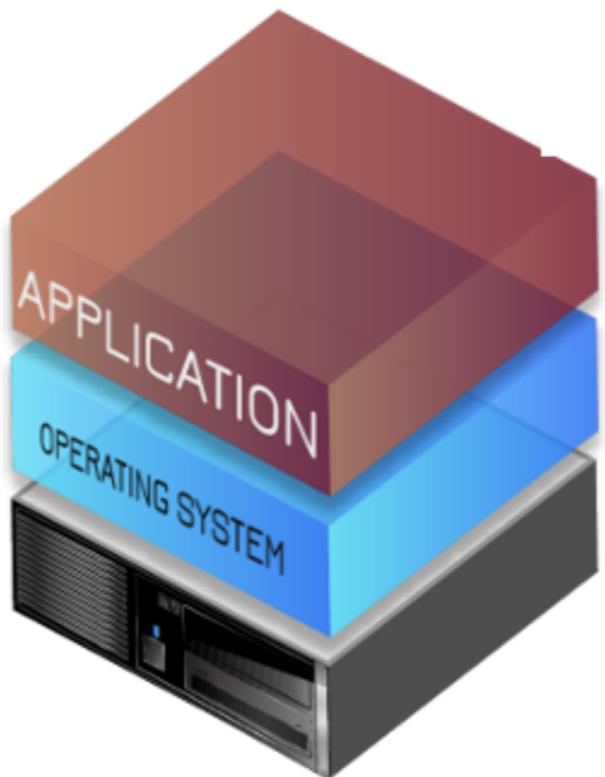
# Cloud computing characteristics

- Virtualization
- Scalability
- Cost
- Speed
- Performance
- Growth
- Reliability
- Security

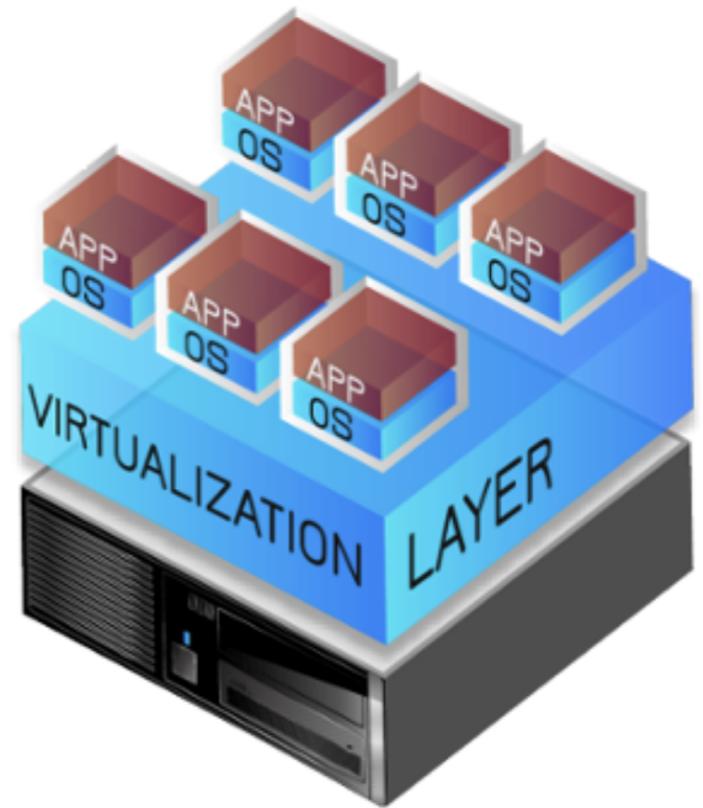
# Virtualization

Fundamental technology that powers cloud computing

- Physical server -> multiple virtual servers
- Maximizes the output of individual servers
- Economies of scale



Traditional Server



Virtualized Server

# Scalability

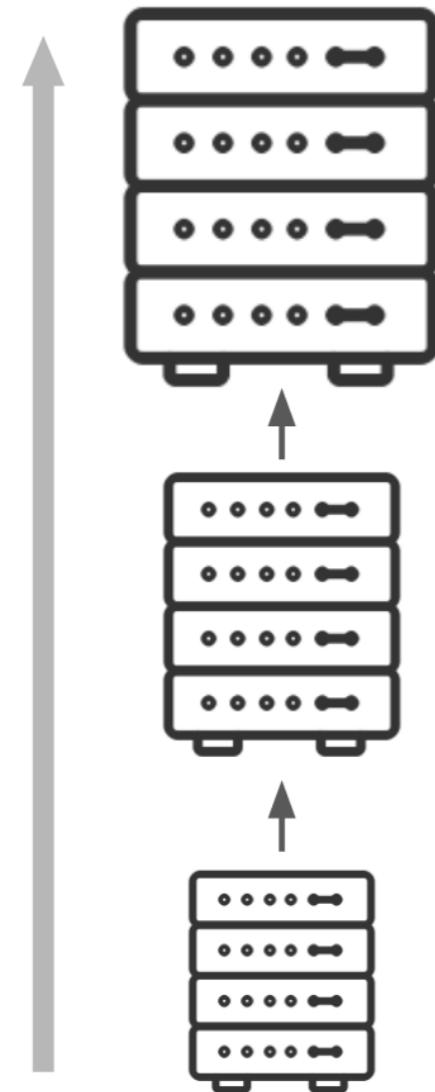
Easily add and remove resources as you need them

- Example: e-commerce site
- Needs more resources during peak times
- Scale resources as necessary



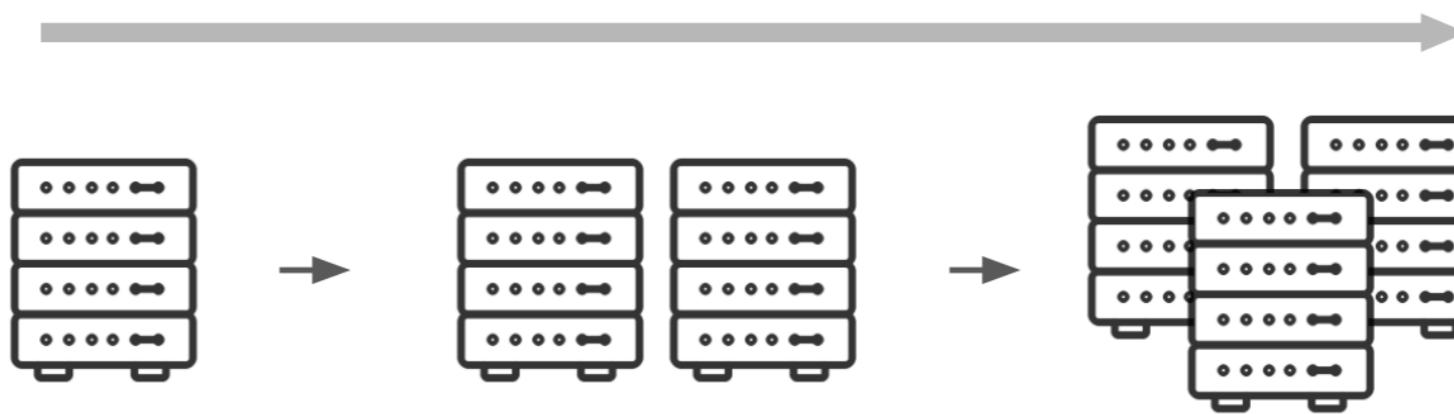
# Vertical Scaling

Increase the power of the instance



# Horizontal Scaling

Add more instances



# Cost

Only pay for resources when you are using them

- Pay-as-you-go
- No capital expenses of:
  - Buying hardware and software
  - Managing on-site infrastructure

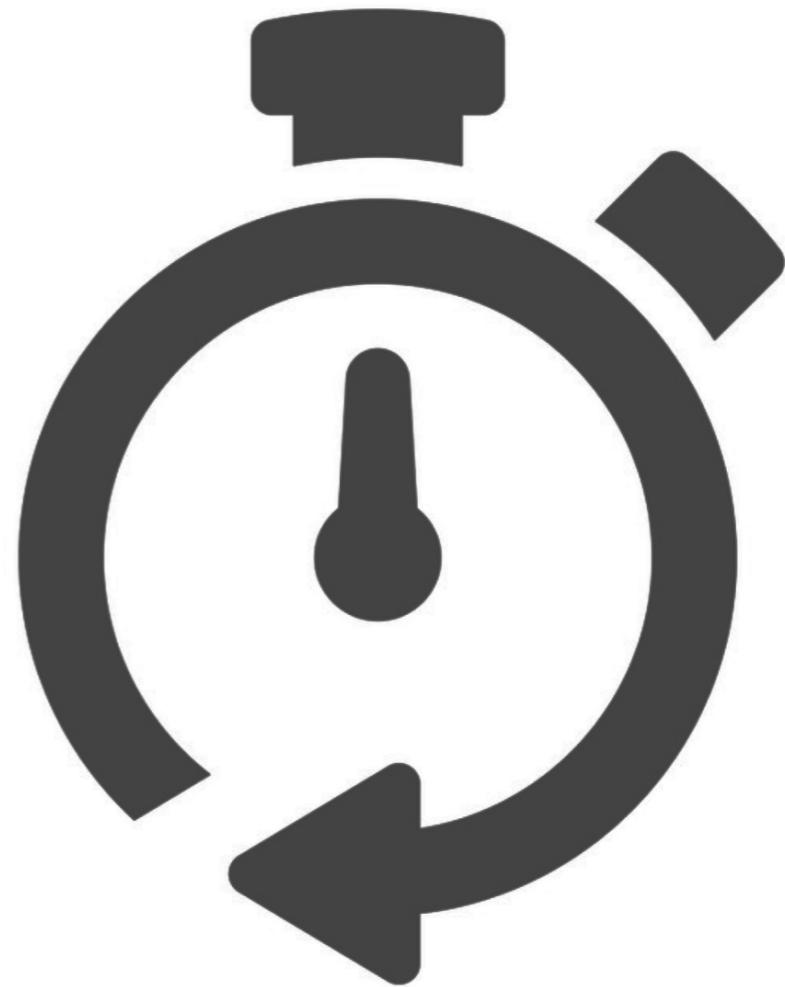


*In some cases, an on-premise solution might be more cost-efficient. The best solution depends on the use case.*

# Speed

Immediate access to ready-to-go cloud resources

- On-demand resourcing
- Fast set-up time
- Deploy services in a matter of minutes



# Performance

Access to fast and efficient computing resources

- **Data center:** houses an organization's IT operations and equipment
- Cloud gives access to:
  - Worldwide network of data centers
  - Fast and efficient computing hardware



# Growth

Grow using a wide range of resources and services

- On-demand resourcing limits growth constraints
- Provision resources across a global network



# Reliability

Guaranteed durability and availability of data and services

- Data is duplicated across data centers
- Availability is ensured even in cases of natural disasters



# Security

Secure storage and management of your data

- External party responsible for security
- Particularly risky for businesses in highly regulated sectors
- Cloud is becoming more and more secure

*In some cases, an on-premise solution might be preferred. The best solution depends on the use case.*



# **Let's practice!**

**CLOUD COMPUTING FOR EVERYONE**

# Cloud service models

CLOUD COMPUTING FOR EVERYONE



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# Car analogy

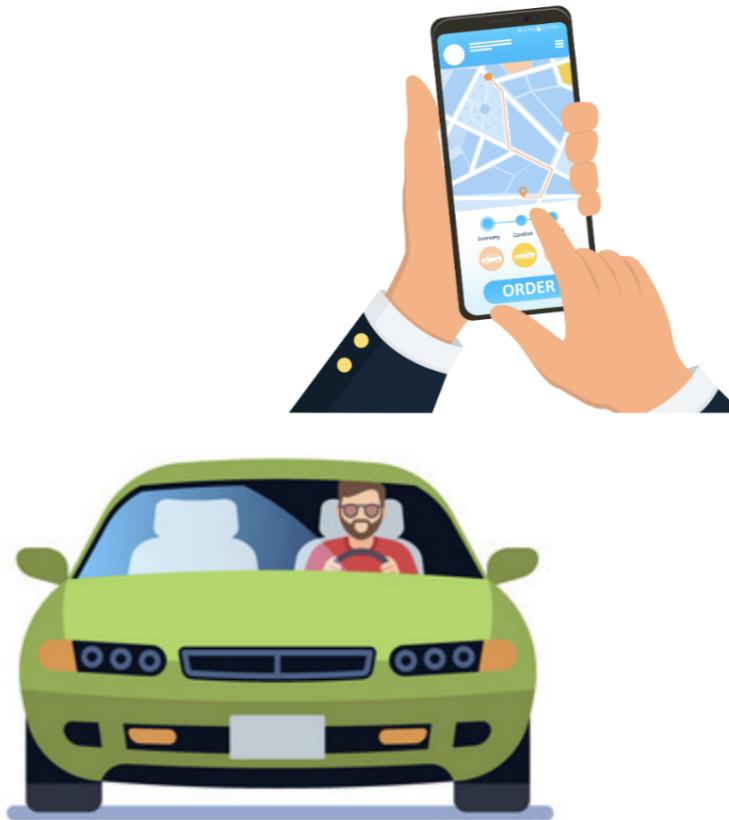
**On-premise**

Buying a car



**Cloud**

'Renting' a car



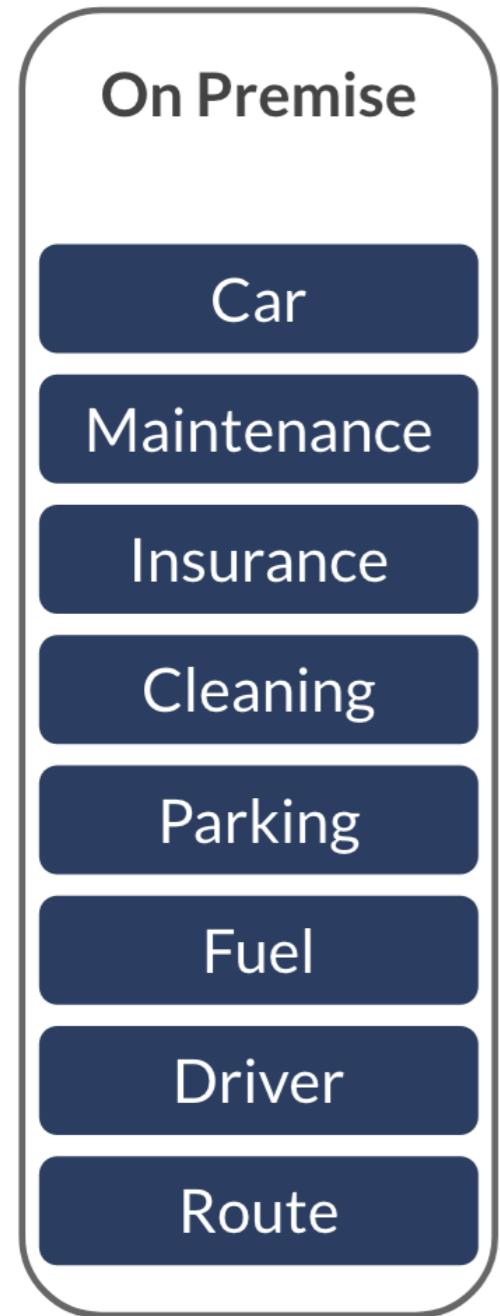
Car Owned

Car Rented

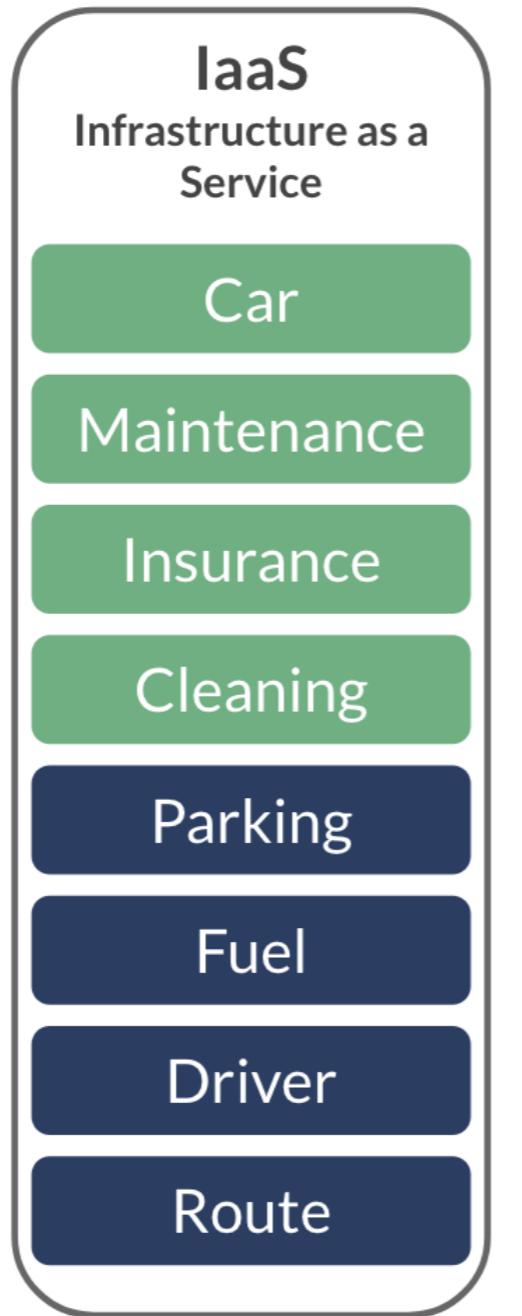
Ride Sharing

Public Transport





Car Owned

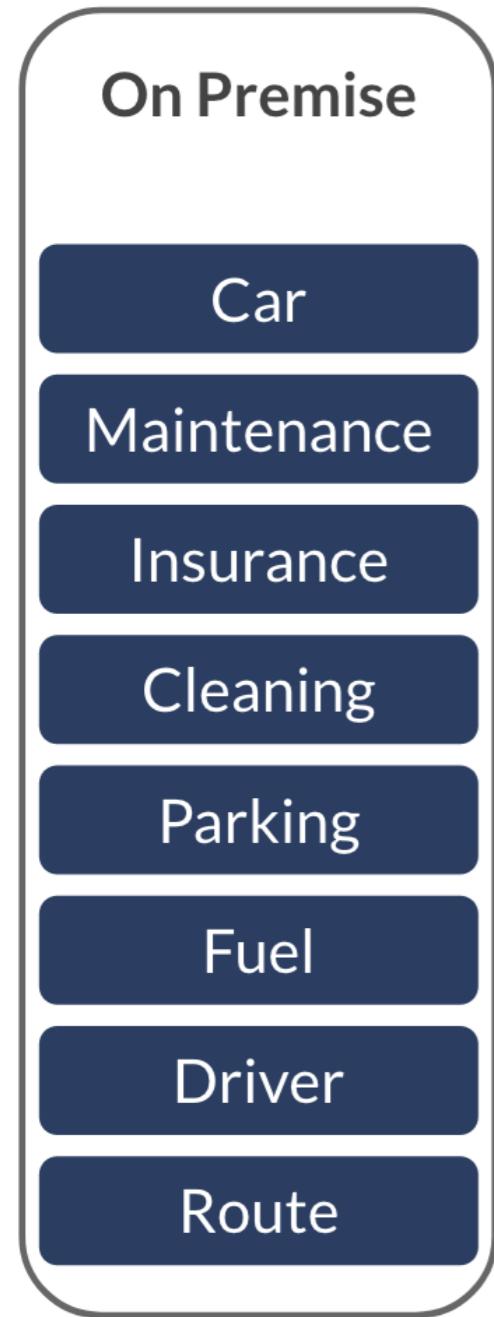


Car Rented

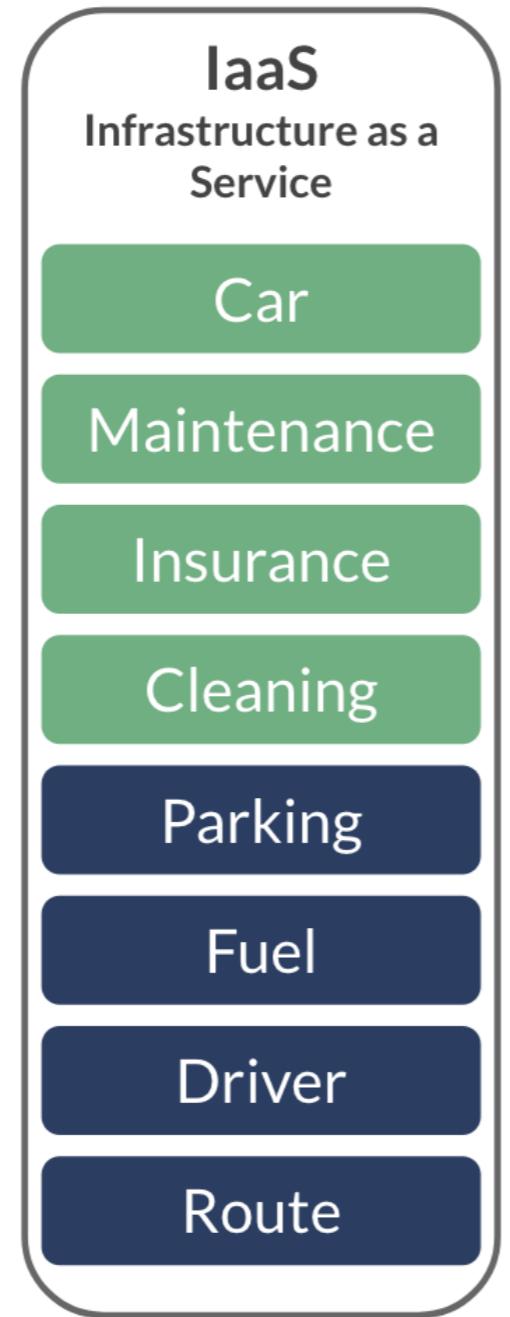
Ride Sharing

Public Transport

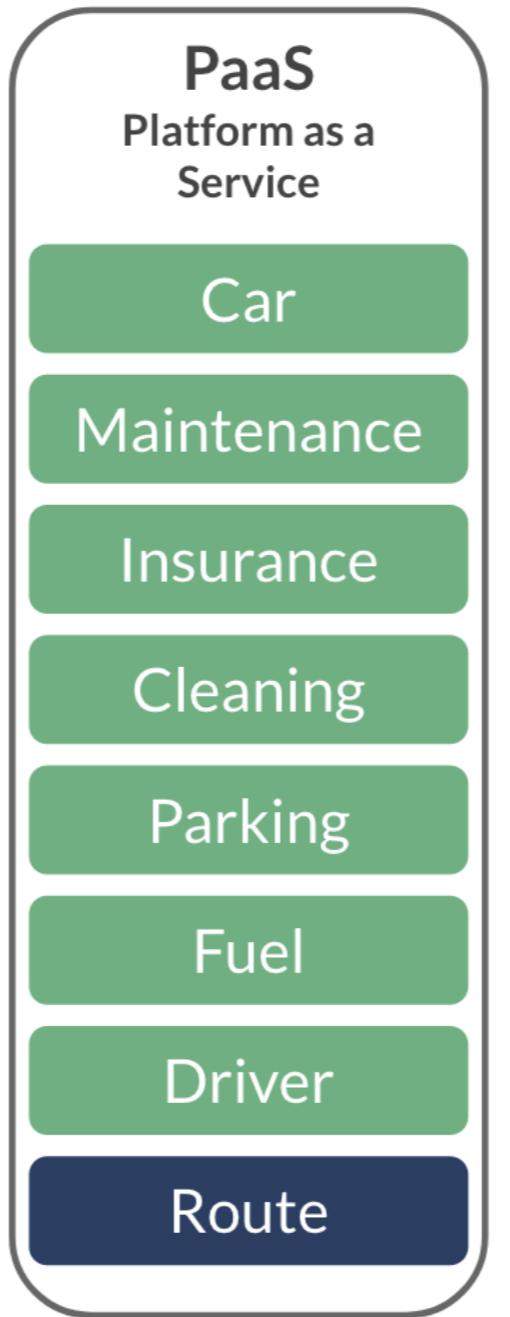




Car Owned

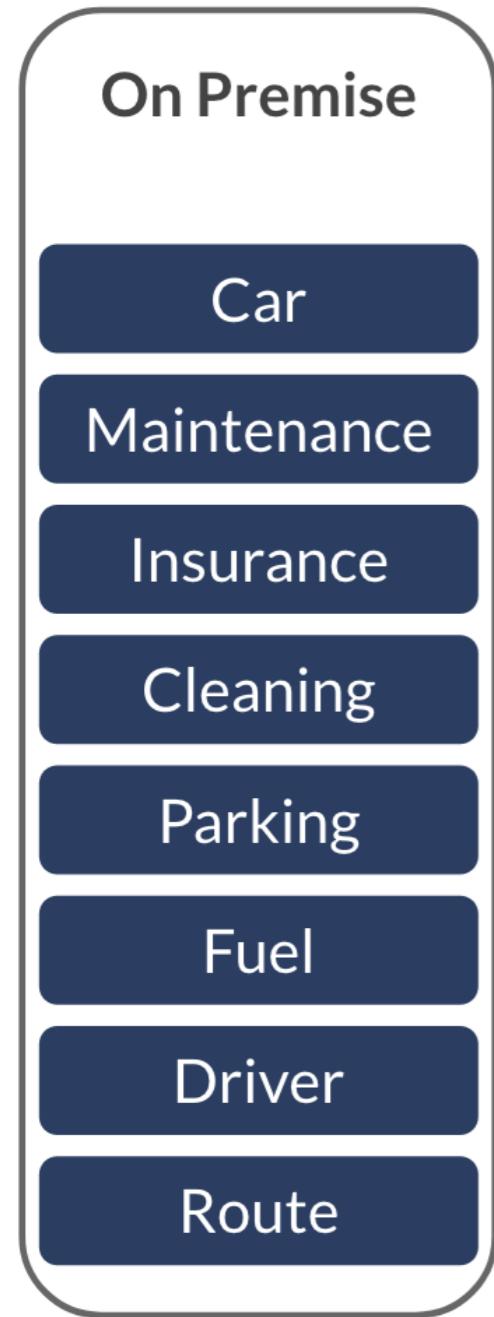


Car Rented

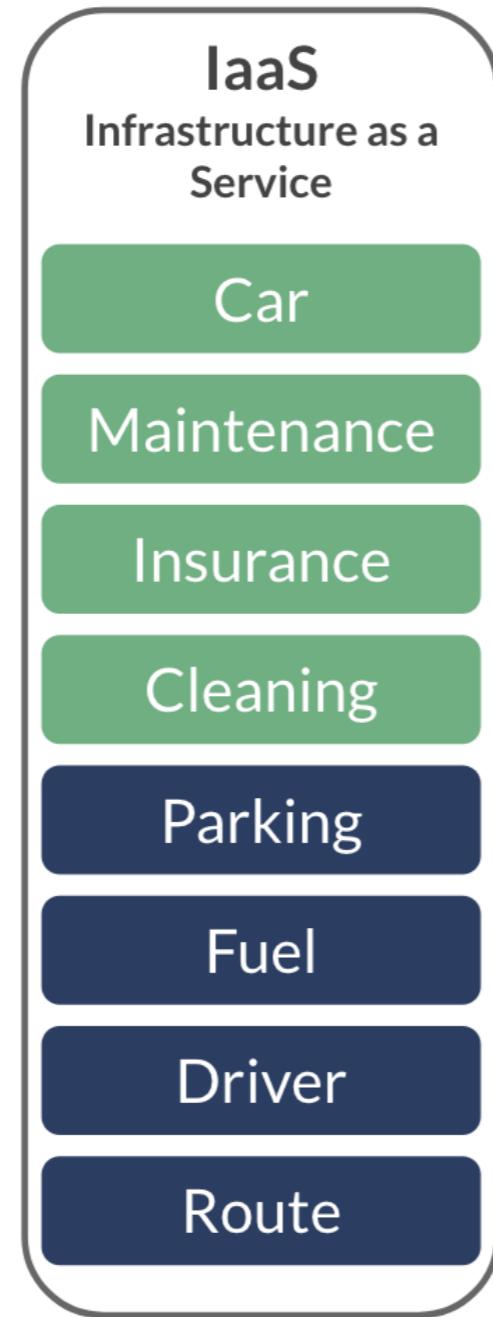


Ride Sharing

You Manage  
Vendor Manages



Car Owned



Car Rented



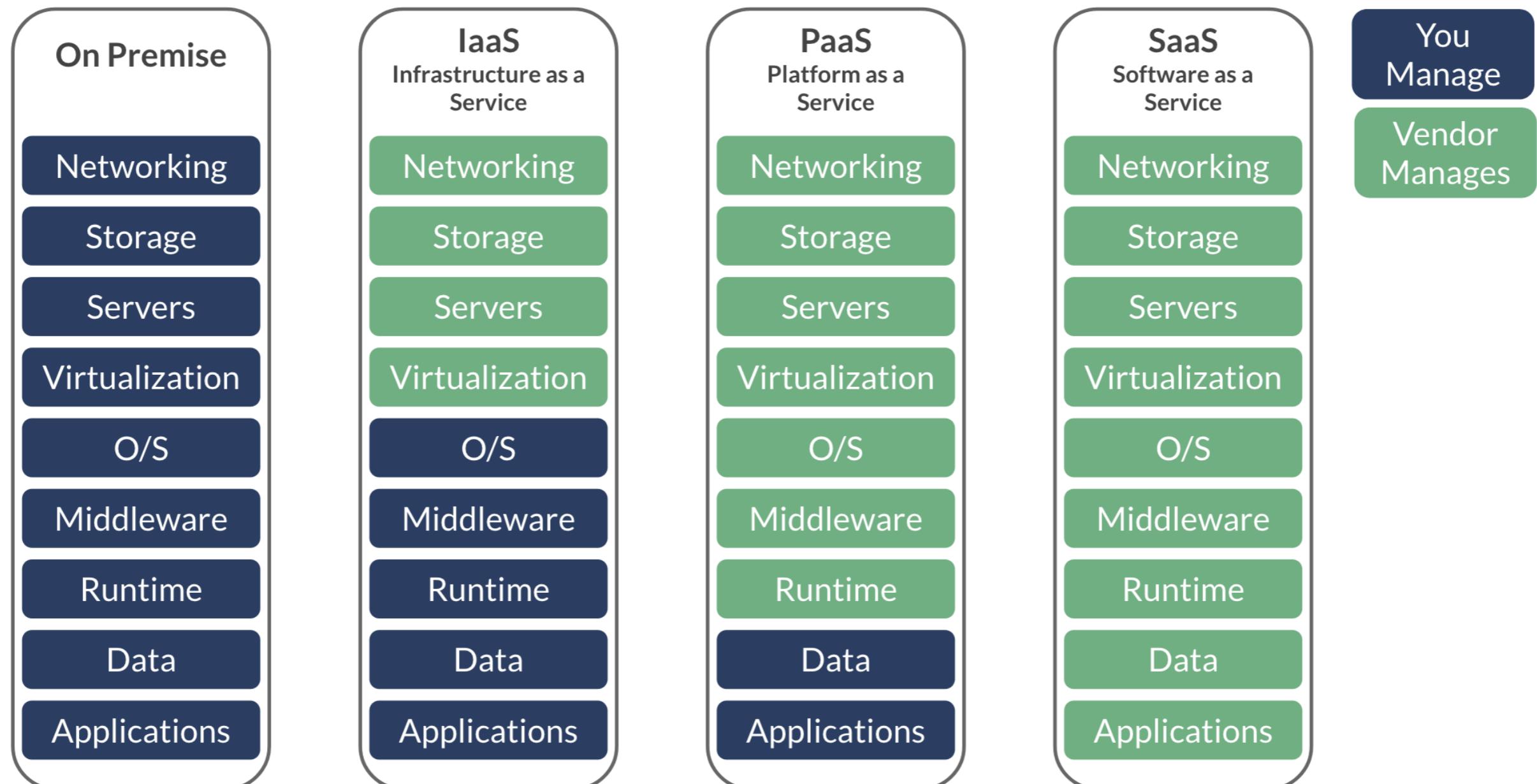
Ride Sharing



Public Transport



# Cloud service models



# Cloud service models

	<b>IaaS</b> Infrastructure as a Service	<b>PaaS</b> Platform as a Service	<b>SaaS</b> Software as a Service
<b>Definition</b>			
<b>Advantages</b>			
<b>Users</b>			
<b>Examples</b>			

# Cloud service models

	<b>IaaS</b> Infrastructure as a Service	<b>PaaS</b> Platform as a Service	<b>SaaS</b> Software as a Service
<b>Definition</b>	Cloud-based alternative to on-premise infrastructure		
<b>Advantages</b>	Scalable alternative to expensive on-premise infrastructure		
<b>Users</b>	System admins		
<b>Examples</b>	Cloud server from e.g. Google Compute Engine, Microsoft Azure, Amazon Web Services		

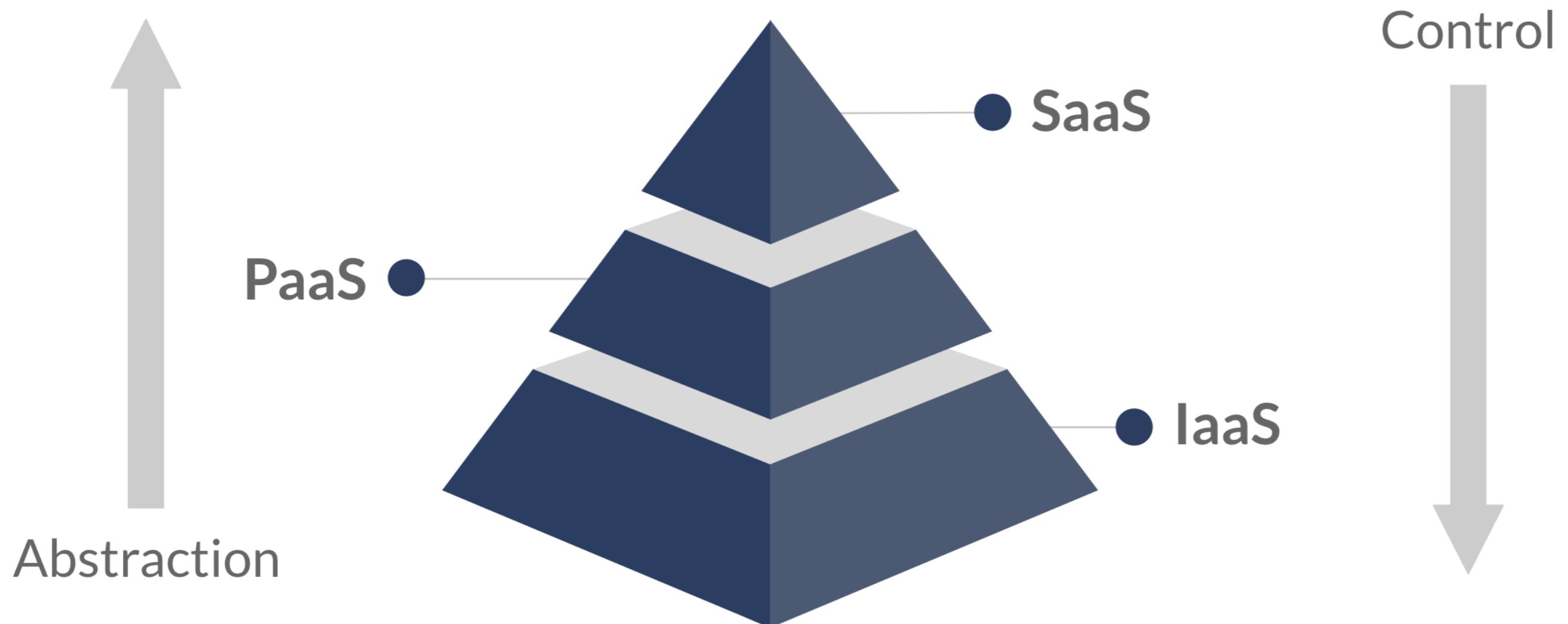
# Cloud service models

	<b>IaaS</b> Infrastructure as a Service	<b>PaaS</b> Platform as a Service	<b>SaaS</b> Software as a Service
<b>Definition</b>	Cloud-based alternative to on-premise infrastructure	Hardware and software tools over the internet used to develop applications	
<b>Advantages</b>	Scalable alternative to expensive on-premise infrastructure	Developers don't need to start from scratch when creating applications	
<b>Users</b>	System admins	Developers	
<b>Examples</b>	Cloud server from e.g. Google Compute Engine, Microsoft Azure, Amazon Web Services	Web apps, logic apps e.g. Google App Engine, Windows Azure, AWS Elastic Beanstalk	

# Cloud service models

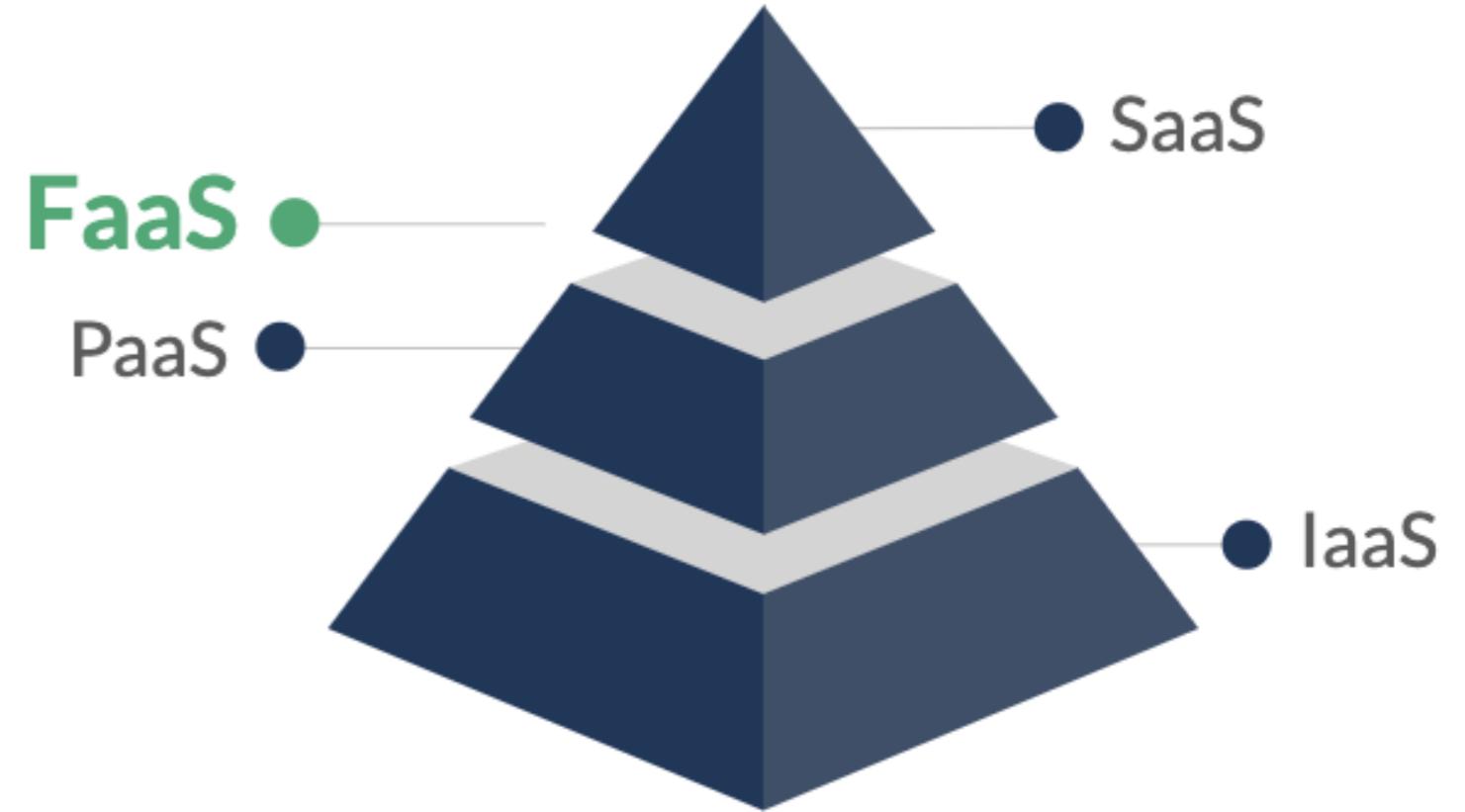
	IaaS Infrastructure as a Service	PaaS Platform as a Service	SaaS Software as a Service
Definition	Cloud-based alternative to on-premise infrastructure	Hardware and software tools over the internet used to develop applications	Software available over the internet, usually for a monthly subscription fee
Advantages	Scalable alternative to expensive on-premise infrastructure	Developers don't need to start from scratch when creating applications	No need to install software on your computer
Users	System admins	Developers	End customers
Examples	Cloud server from e.g. Google Compute Engine, Microsoft Azure, Amazon Web Services	Web apps, logic apps e.g. Google App Engine, Windows Azure, AWS Elastic Beanstalk	Internet applications e.g. Google G Suite, Microsoft Office 365, Dropbox

# The cloud pyramid



# Other cloud service models

- FaaS (Function as a Service)
  - Variation on SaaS
  - Focuses on a function (part of the software)
  - e.g., identity authentication, payment transactions
  - Uses a "serverless" billing model



# Other service models

- Hardware as a Service (HaaS)
- Storage as a Service (SaaS)
- Database as a Service (DBaaS)
- Disaster Recovery as a Service (DRaaS)
- Network as a Service (NaaS)
- ...

**XaaS (Anything as a Service)**

# **Let's practice!**

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