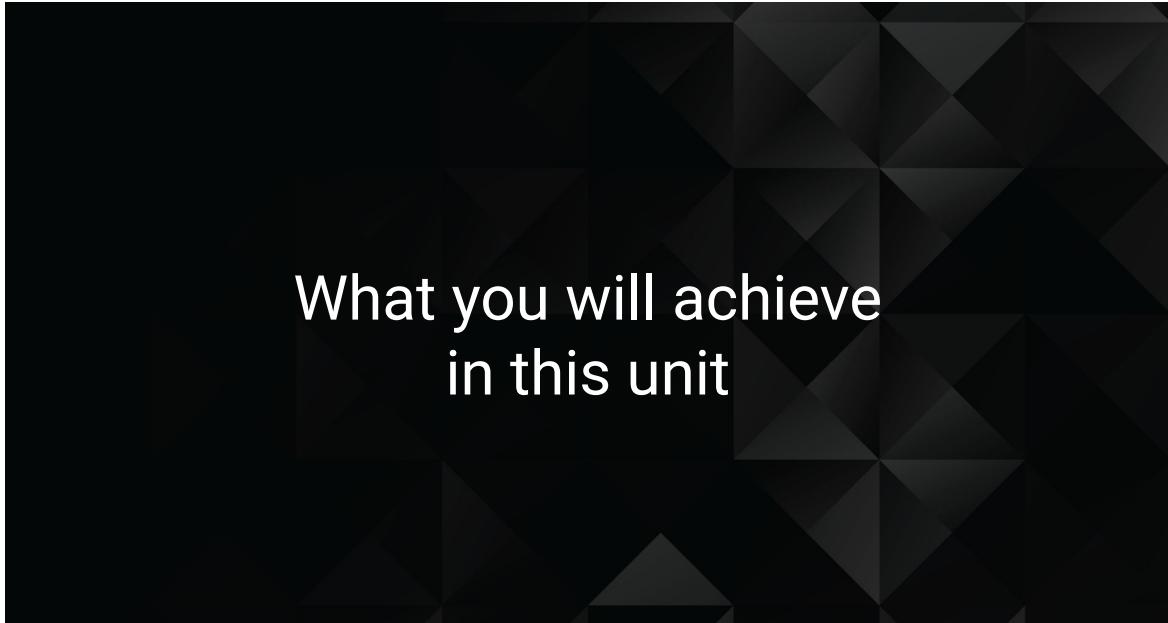


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The Cloud Toolbox

You will gain hands-on experience in the following Amazon Web Services (AWS) tools:



Amazon SageMaker: To deploy ML models



Amazon Lex: To create conversational interfaces.



Amazon S3: To store files in the cloud.



AWS Lambda: To create serverless applications.

Conversational Interfaces (Chatbots)

> Test bot (Latest) ⓘ Ready. Build complete.

You're now ready for testing. Type an utterance below to begin conversation with your chatbot.

Clear chat history

Chat with your bot...

Hello, I can help you to convert dollars to crypto.

Hey, I would love to assist you with investing for retirement.

> Test bot (Latest) ⓘ Ready. Build complete.

You're now ready for testing. Type an utterance below to begin conversation with your chatbot.

Clear chat history

Chat with your bot...

Congratulations!

You already mastered these skills that will empower the cloud applications you will create.



Python



APIs



Time Series



Classification Algorithms



NLP

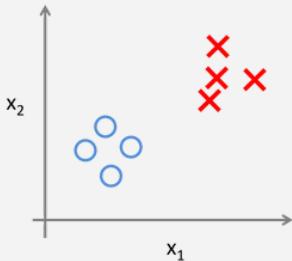


A large, dark rectangular area featuring a subtle geometric pattern of triangles, serving as a background for the final slide content.

Unsupervised Learning

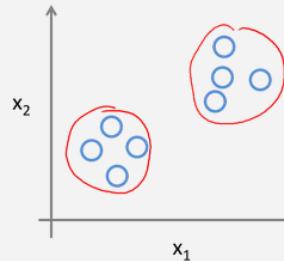
Supervised vs. Unsupervised Learning

Supervised Learning



- Input data is labeled.
- Uses training datasets.
- **Goal:** Predict a class or value.

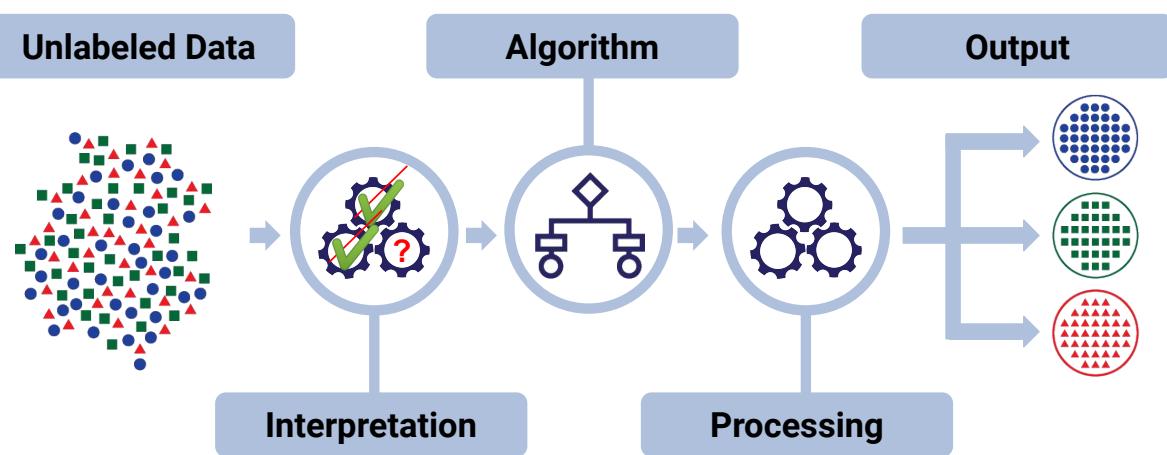
Unsupervised Learning

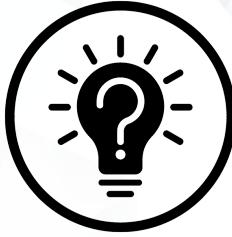


- Input data is unlabeled.
- Uses just input datasets.
- **Goal:** Determine patterns or grouping data.

Unsupervised Learning at a Glance

Unsupervised learning uses unlabeled data to find patterns or group data.





If unsupervised learning deals with unlabeled data, what kind of questions or business problems do you think we can afford?

Unsupervised Learning

We can group customers on a retail chain by shopping habits, so we can send customized offers by e-mail or using a mobile app to increase sales.

This New Technology Integration Helps Footwear Firms Offer More Personalization

BY MADELEINE STREETS OCT 3, 2019 11:51AM PT

CREDIT: STANISIC VLADIMIR/SHUTTERSTOCK

As consumers begin to demand more curated shopping experiences both on- and offline, retailers are aiming to boost levels of personalization. But to do that well, they first need to know who the customer is.

Unsupervised Learning

Having thousands of transactions per day on credit card operations, it's hard to identify anomalous or fraudulent transactions.

We can use unsupervised learning to find patterns among transactions data to identify anomalies and potential fraudulent transactions.

The screenshot shows the Finextra website's 'Regulation & Compliance' section. The main headline is 'HSBC introduces financial crime detection systems'. The article discusses how HSBC's Global Trade and Receivables Finance (GTRF) business has deployed an industry-leading Anti-Money Laundering (AML) system and an automated sanctions checking system. It mentions the use of big data, advanced analytics, and 'contextual monitoring' to detect financial crime in international trade. The article is dated 26 September 2019. To the right, there are advertisements for AWS Cloud Series, TEMENOS, HID, and Refinitiv.

(FinExtra)

Unsupervised Learning

We can use unsupervised learning to cluster stock data, so we can create investment portfolios according to the resulting groups.

The screenshot shows an article from The Economist titled 'March of the machines'. The headline states that the stockmarket is now run by computers, algorithms, and passive managers. The article questions the function of markets and financial stability. Below the headline is a cartoon illustration of a man in a suit holding a newspaper while a bird flies over a chart, with a server tower in the background. The text continues with a historical perspective on investing, mentioning Ray Dalio and Kenneth Jacobs.

(Economist)



How can we understand our customers?

Supervised Vs. Unsupervised Learning

Supervised Learning Approach

- Is this person a female or male?
- Is this person happy?
- How much is this person going to expend next month?



Upbeat Millennial
purchases Matcha tea drinks most often

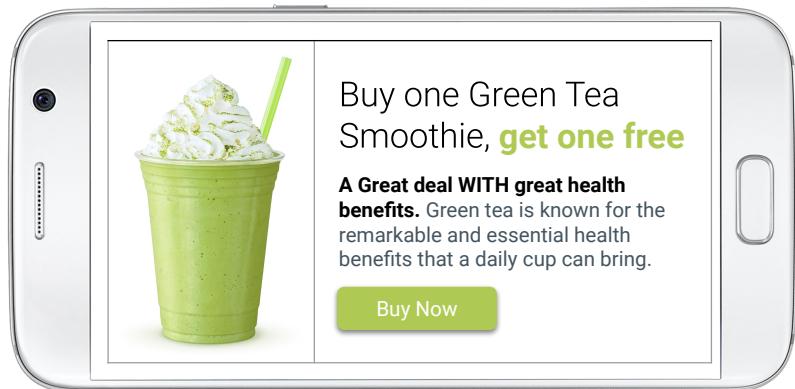
Behaviors
Average Purchase per month: \$64.32

Motivations
The most important factor in purchase is knowing that their tea is sustainably sourced.

Supervised Vs. Unsupervised Learning

Unsupervised
Learning Approach

- How can I create a customized offer to customers?



Applications of Unsupervised Learning

Clustering

Allows automatic splitting of the dataset into groups according to similarity.

It can be used for customer segmentation and targeting.



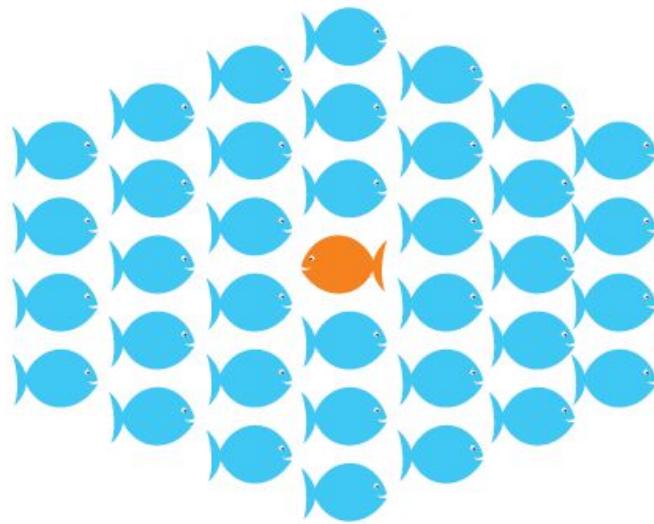
Applications of Unsupervised Learning

Anomaly Detection

Automatically discovers unusual data points in a dataset.

It's useful in:

- identifying fraudulent transactions
- discovering faulty pieces of hardware
- identifying an outlier caused by a human error during data entry



Customer Segmentation

This is the division of potential customers in a given market into discrete groups.
That division is based on customers having similarities such as:

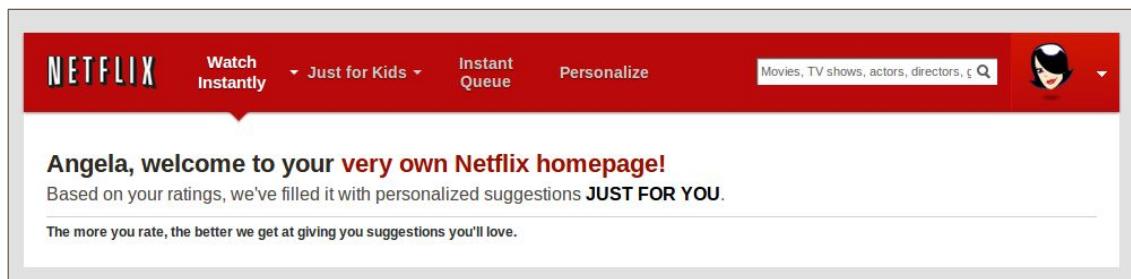
- Customer needs
(e.g. a particular product can satisfy some of them)
- Responses to online marketing channels
- Buying habits
(e.g. best day for buying, weekly spend)



Customer Segmentation in Action

Some facts about how customer segmentation is driving revenue in leading companies:

75% of Netflix viewer activity
is driven by recommendation



springtab.com

Customer Segmentation in Action

Some facts about how customer segmentation is driving revenue in leading companies:

35% of Amazon's sales are generated
through their recommendation engine



Recommended for You

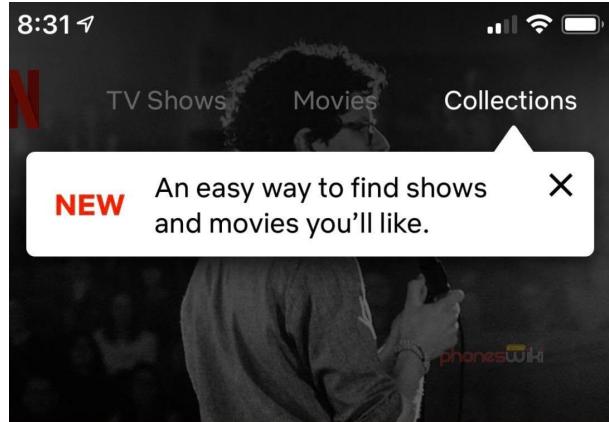
Amazon.com has new recommendations for you based on items you purchased or told us you own.

[\(Source\)](#)

Customer Segmentation in Action

Some facts about how customer segmentation is driving revenue in leading companies:

Netflix's recommendation system saves the company an estimated **\$1 Billion** per year through reduced churn



([Source](#))

Customer Segmentation in Finance

How a bank could use customer segmentation to improve their products?

The 10 Best Gas Rewards Credit Cards Of 2019

Editor's Pick | 508 views | Oct 10, 2019, 11:22am

Jason Steele Contributor
Advisor, Contributor Group @ Personal Finance

f Editorial Note: Forbes adheres to strict editorial integrity standards. The content on this page may contain partner offers and/or affiliate links, and Forbes may receive compensation if you click through a link on this page. To the best of our knowledge, all content is accurate as of the date posted, though offers contained herein may no longer be available. See our Advertiser Disclosure for more details.

v We reviewed dozens of credit cards to find those that pay increased rewards when you fill up your tank. The result is our list of the 10 best gas rewards credit cards.

in Lots of companies sell marketing clouds.
Listrak
delivers results.

Email | Marketing Automation | CRM
Predictive Analytics | SMS

([Forbes](#))

Customer Segmentation in Finance

How can an investment portfolio be improved using customer segmentation?

B2C BUSINESS 2 COMMUNITY

How Customer Segmentation Can Help You

Before we talk about the most effective types of customer segmentation, let's take a quick look at how customer segmentation can benefit your brand.

1. Develop Effective Retention Strategies

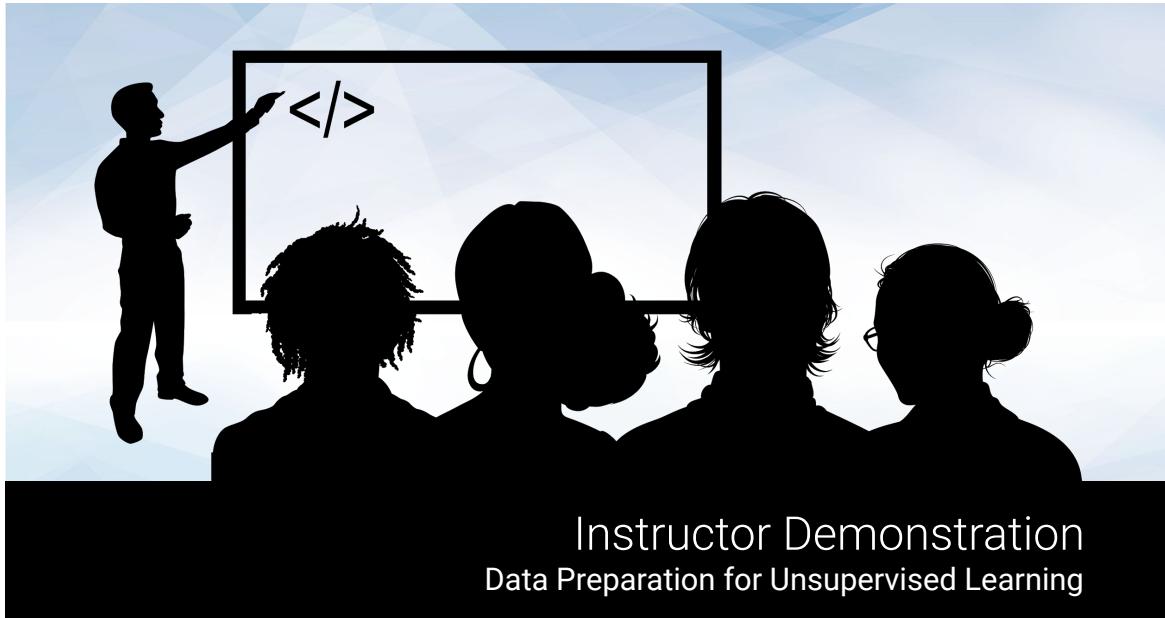
Did you know that [\\$1.6 trillion](#) was the estimated cost incurred by businesses due to lost customers in 2016? And, once customers leave, 68% of them don't ever go back to the same brand again. If that doesn't motivate you to retain your customers, maybe you should also consider that acquiring new customers is [5X as expensive](#).

Customer segmentation can help you develop more focused strategies to retain customers. For example, you may want to identify your top-paying customers and create exclusive offers for them. Or you may even want to re-engage people who haven't purchased in a while. The possibilities are endless.

2. Provide Superior Customer Experience

[81% of consumers](#) reported getting frustrated working with brands that don't provide a good customer experience. A bigger concern is that 44% of customers who are unhappy with the experience will vent on social media. This can harm your reputation and your

(Business2Community)





Activity: Understanding customers

In this activity, you will perform some data preparation tasks on a dataset that contains data from purchases on an e-commerce website made by 200 customers.

Suggested Time:
20 minutes

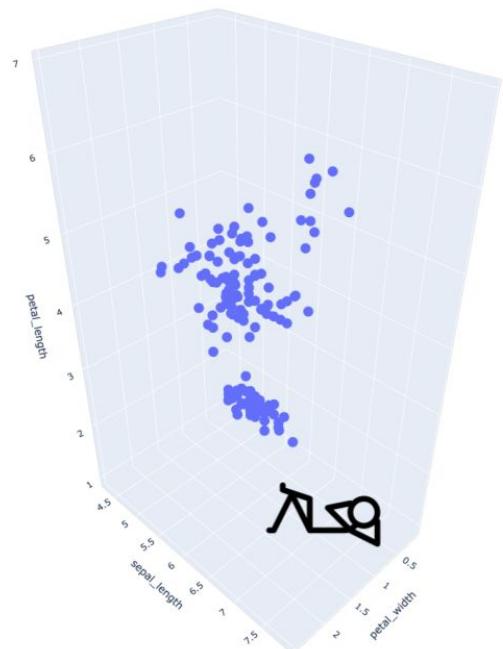


Time's Up! Let's Review.

The K-Means Algorithm

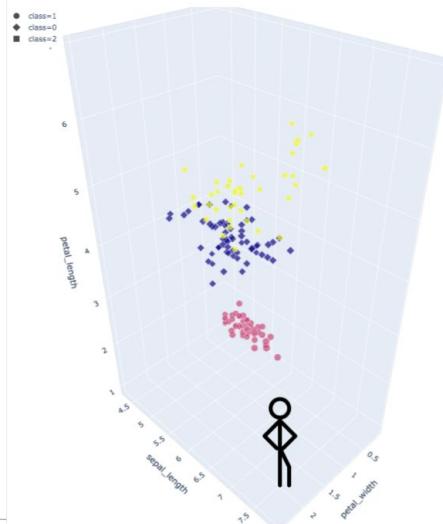
What K-Means can do for me?

- Imagine that you are in a room full of spheres (data points), and you want to learn more about them, so you start to observe.
- You realized that every sphere represents a flower and that axes represent features of flowers.
- After observing the flowers, you discovered that there are some patterns when you combine the three features.



What K-Means can do for me?

- At this point, K-Means comes to the rescue!
- K-means is an unsupervised learning algorithm used to identify clusters and solve clustering issues.

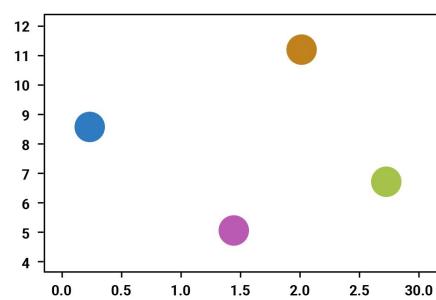


How K-Means Algorithm Works

- K-Means algorithm groups the data into **k clusters**, where belonging to a cluster is based on some similarity or distance measure to a centroid.
- A **centroid** represents a data point that is the arithmetic mean position of all the points on a cluster.

K-means Clustering

Initial Clusters



How K-Means Algorithm Works

Algorithm at a glance

01

Randomly initialize the k starting centroids.

02

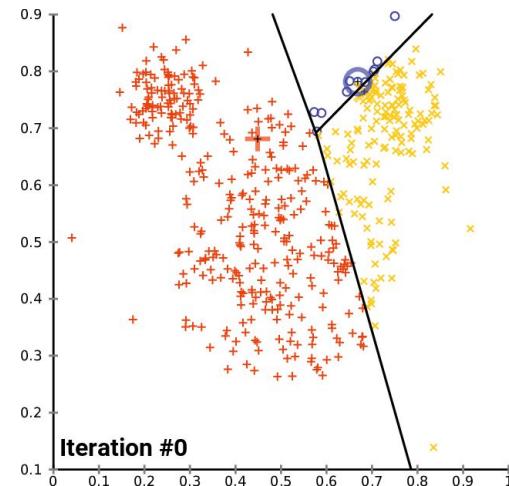
Each data point is assigned to its nearest centroid.

03

The centroids are recomputed as the mean of the data points assigned to the respective cluster.

04

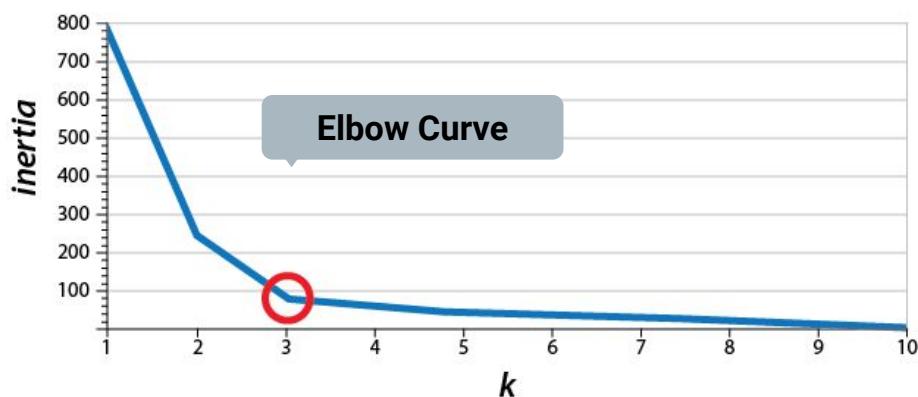
Repeat steps 1 through 3 until the stopping criteria is triggered.



What is the Best Number for k ?

This is done using an **elbow curve**, where the x axis is the K -value and the y axis is some *objective function*.

A common objective function is the *inertia*.





Activity: Customer segments for e-commerce

In this activity, you will identify the best number of clusters on a customers clustering scenario using the Elbow Curve, next you will use K-Means to cluster data and make conclusions about the obtained results.

Suggested Time:
20 minutes



Time's Up! Let's Review.

A silhouette illustration set against a light blue background with diagonal stripes. On the left, a man stands at a podium, pointing towards a large rectangular frame. Inside the frame, the HTML closing tag '</>' is displayed. In front of the frame, the silhouettes of four people's heads are visible, facing towards the right, representing an audience watching the presentation.

Instructor Demonstration
Speeding up ML algorithms with PCA



Activity: PCA in Action

In this activity, you will use PCA to reduce the dimensions of the consumers shopping dataset.

Suggested Time:
20 minutes

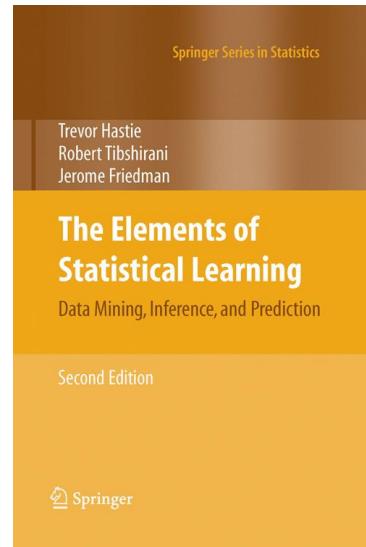


Time's Up! Let's Review.

Do you want to learn more?

Focus on
Chapter 14, Unsupervised Learning

This book is freely shared by authors at
stanford.edu



The Elements of Statistical Learning: Data Mining, Inference, and Prediction
Second Edition
by Trevor Hastie, Robert Tibshirani, Jerome Friedman
(Springer 2009)



Welcome to The Cloud
and Amazon Web Services



Hello Cloud!

The Cloud is a term used in the internet world to refer to different services, such as:

Data Storage

e.g.

- Google Drive
- DropBox
- Microsoft OneDrive

Computing Power

e.g.

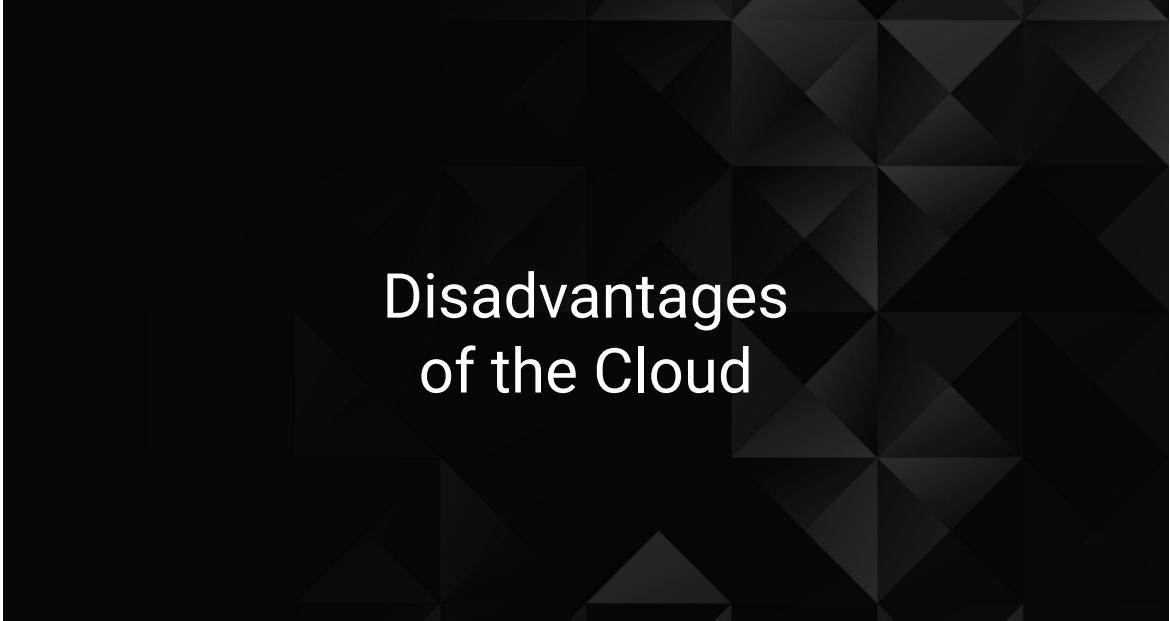
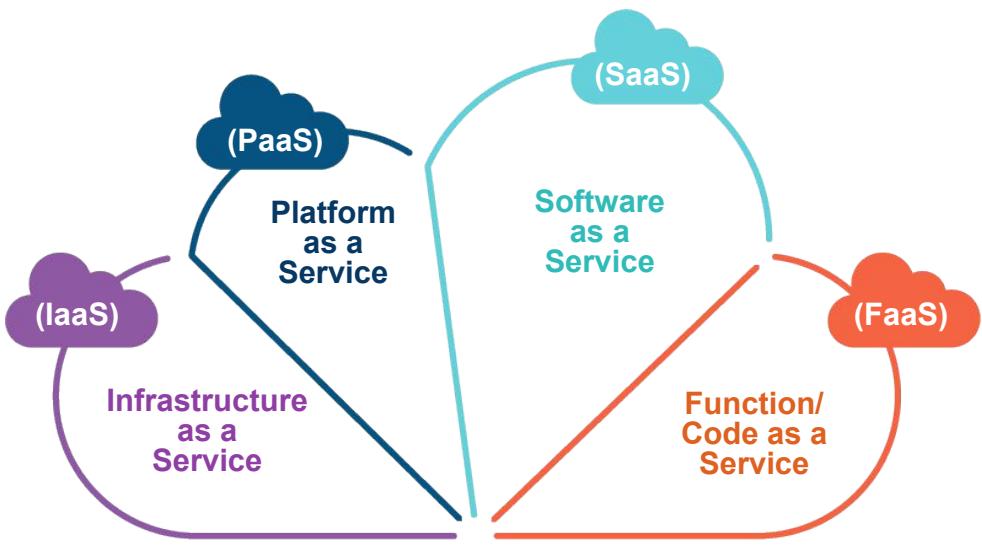
- Amazon Web Services
- Microsoft Azure
- Google Cloud

Collaboration Platforms

e.g.

- G-Suite
- Microsoft Office 365
- Zoho

Models of Cloud Services



Disadvantages
of the Cloud

Disadvantages of the Cloud

Having to trust a 3rd party provider with your data.

THE WALL STREET JOURNAL.
English Edition | October 10, 2019 | Print Edition | Video
Home World U.S. Politics Economy Business Tech Markets Opinion Life & Arts Real Estate WSJ Magazine

TECH

Capital One Breach Casts Shadow Over Cloud Security

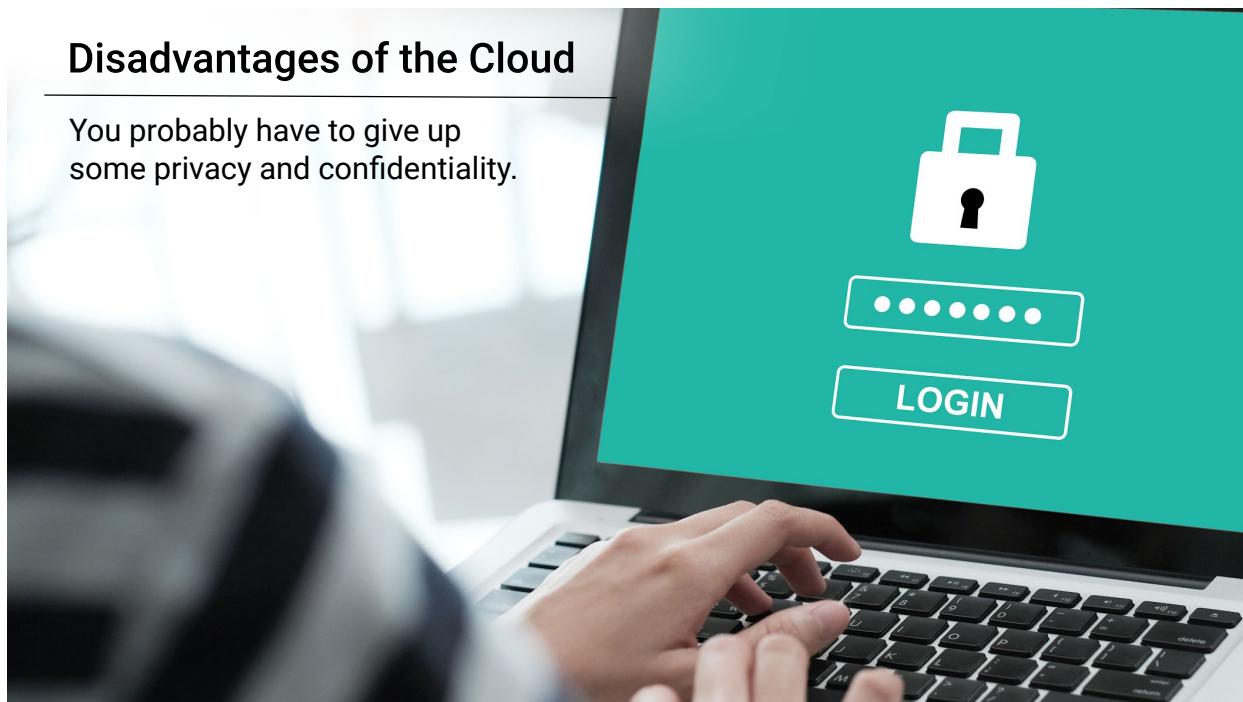
Massive data exposure highlights sustained risk from poor information-protection practices



[WSJ.com](https://www.wsj.com)

Disadvantages of the Cloud

You probably have to give up some privacy and confidentiality.



Disadvantages of the Cloud

You depend on the SLAs of a provider for issues to be addressed

Service Level Agreement

Agreement Overview



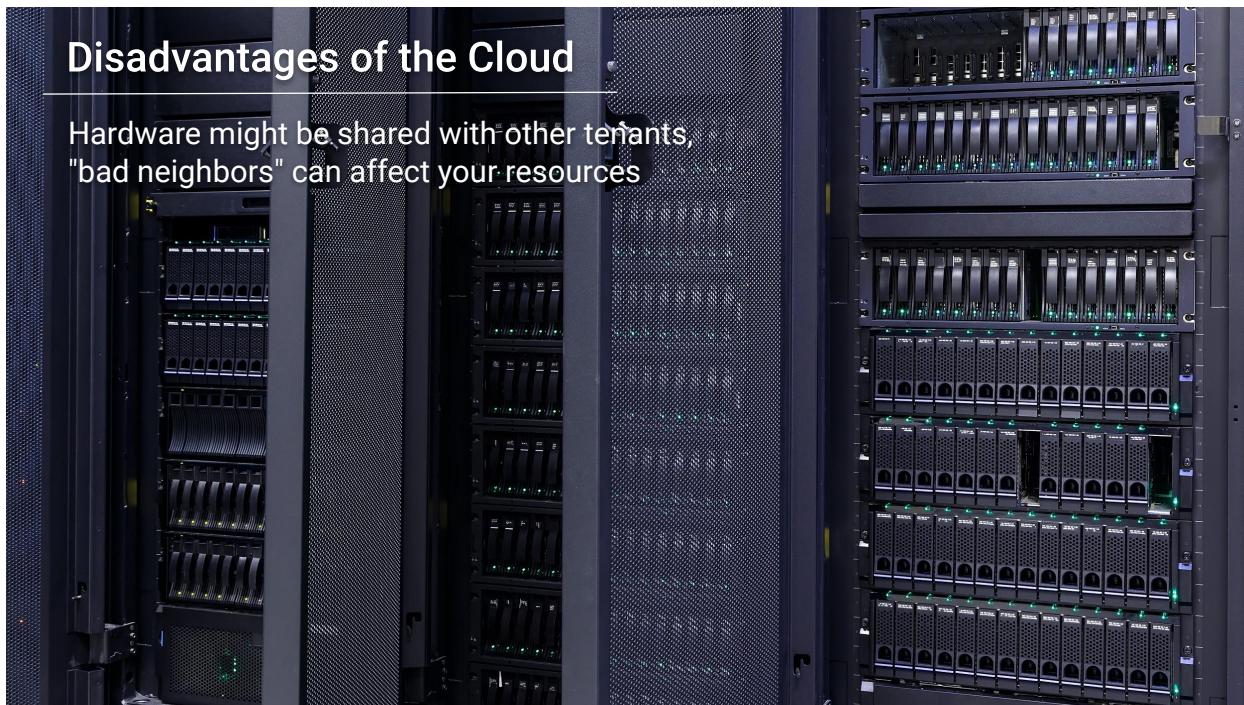
Disadvantages of the Cloud

Incidents such as hardware failure are inevitable.



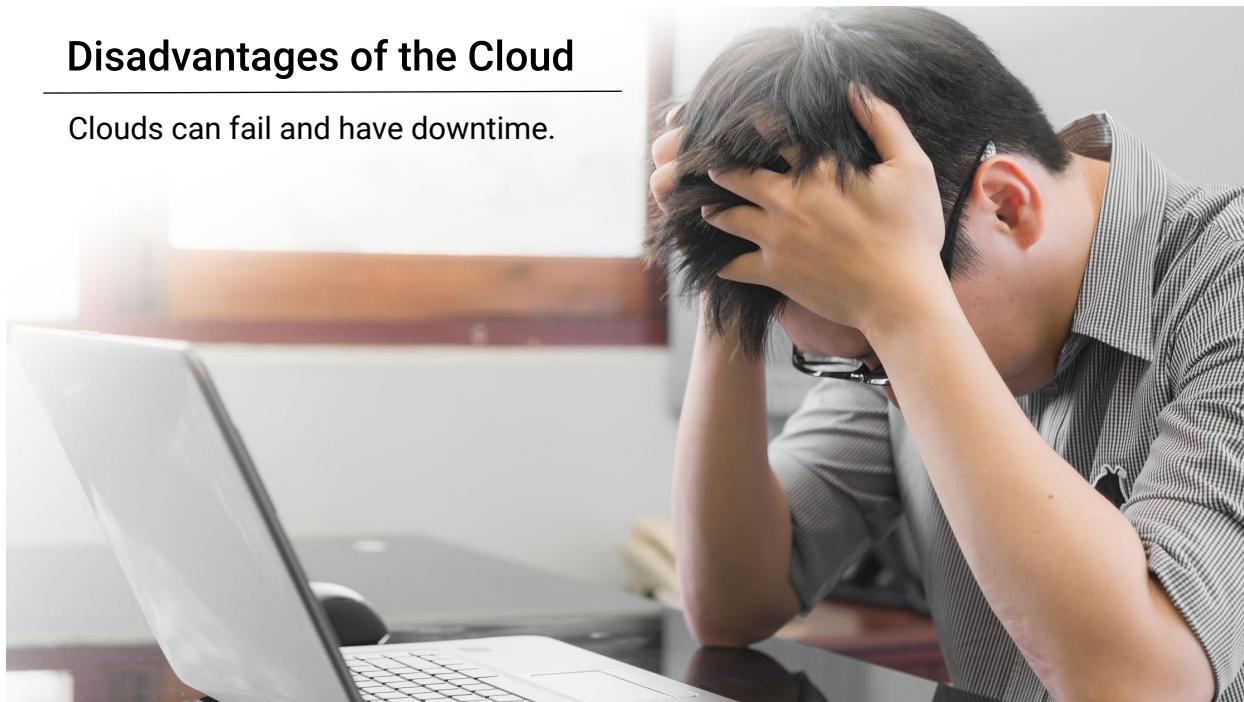
Disadvantages of the Cloud

Hardware might be shared with other tenants,
"bad neighbors" can affect your resources



Disadvantages of the Cloud

Clouds can fail and have downtime.



Computing Power: Amazon Web Services

 AWS comprises more than 140 services across these categories:



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Activity: Explore SageMaker

In this activity you will explore SageMaker.

Suggested Time:
5 minutes



Questions?