Information Technology in Business and Society

- IT Disruption: Disruptive Technologies

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Information Technology

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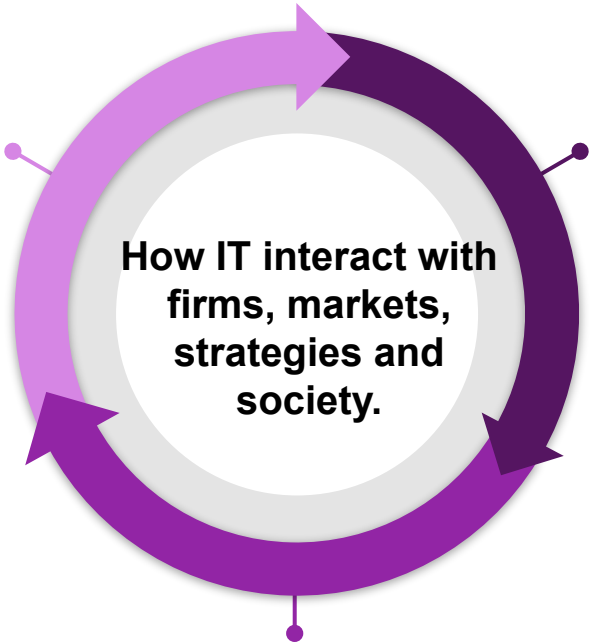
Module II: IT Disruption
- Emerging techs.
- How does IT changes the business and social world?



Introduction: Value of IT
- Conceptualizing IT's roles in organizations.

Module I: IT Management
- How to properly developing and managing IT projects or vendors?

Outline

- What’re disruptive technologies?
- Sustaining v.s. Disruptive innovations
- Identify and nurture innovations, Self disruption
- Showcasing several techs: AI, Cloud Computing, Blockchain

What’re Disruptive Technologies?

These innovations have the potential to revolutionize a whole industry.

- Broad definition:

  Creating a new market category.

  Growing from niche to mainstream

  Making existing products and categories obsolete

Disruptive Innovation

Clayton M. Christensen

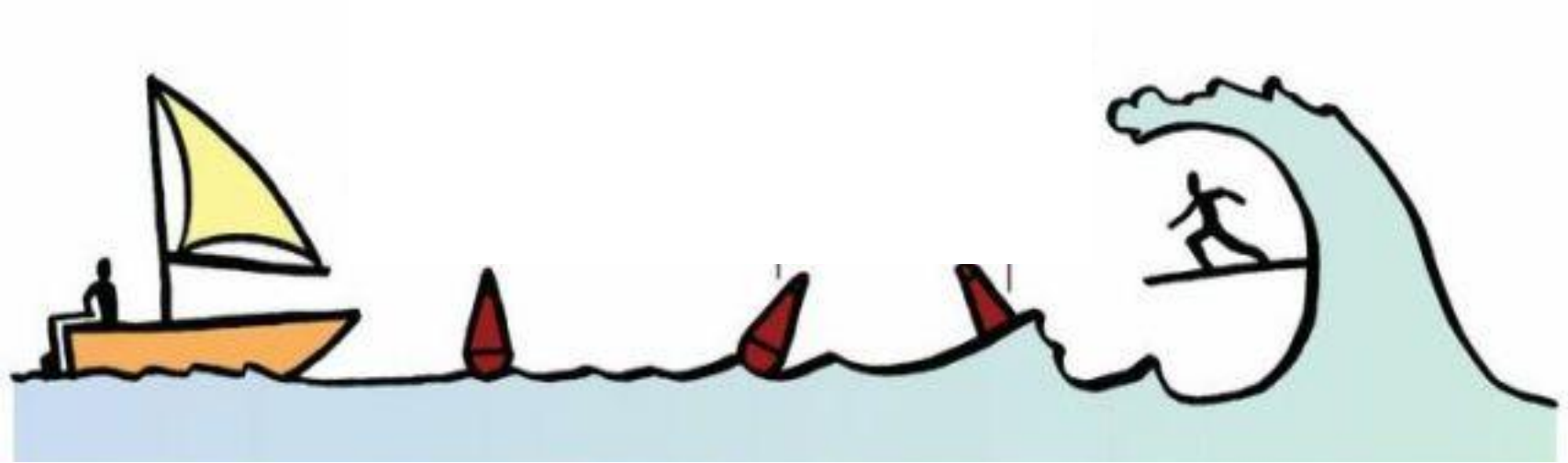
- Professor Harvard Business School
- The Innovator's dilemma: "When new technologies cause great firms to fail" (1997)
- "Meeting the Challence of Disruptive Change" (HBR 2000)

The term "Disruptive Innovation" is broadly misunderstood

Many people think it's just new and different, or radical improvements

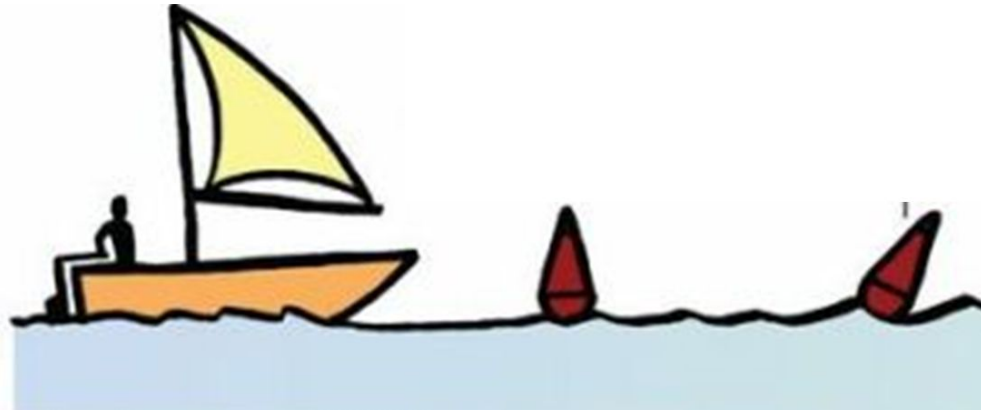
Sustaining v.s. Disruptive Innovations

- What are the key differences?



Sustaining Innovation

- Employed to improve a company's product or service to better meet **existing customers' needs**.
- Maintains a steady rate of **gradual** improvement.



Sustaining Innovation

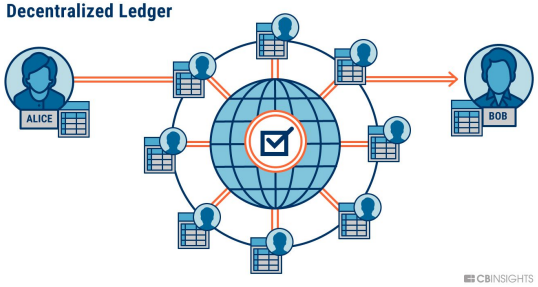
Disruptive Innovation

- Often **sacrifices** performance along dimensions that are important to current customers.
- Offers a very different package of attributes that are **not (yet) valued by existing customers.**
  - The new attributes can open up entirely new markets!

Disruptive Innovation

Sony's early transistor radios:

- Sacrificed sound fidelity
- Created a new market for small, portable radios.



Blockchain (potentially disruptive tho):

- Slow, can't handle high-freq transactions
- Transparency

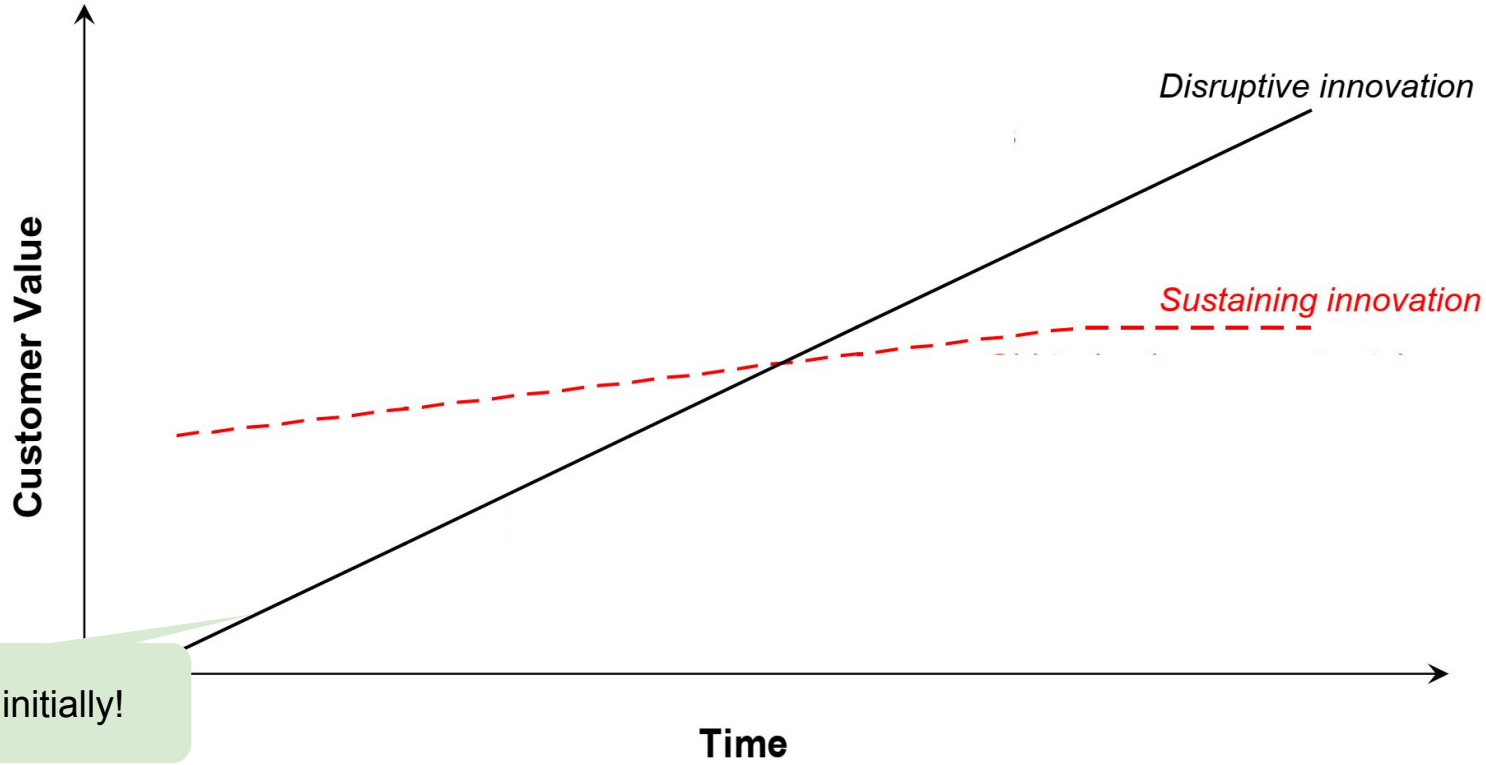
Disruptive Innovation

- Why do tech giants miss new trends? Why do some later successful disruptive innovations have hard times gathering investments?

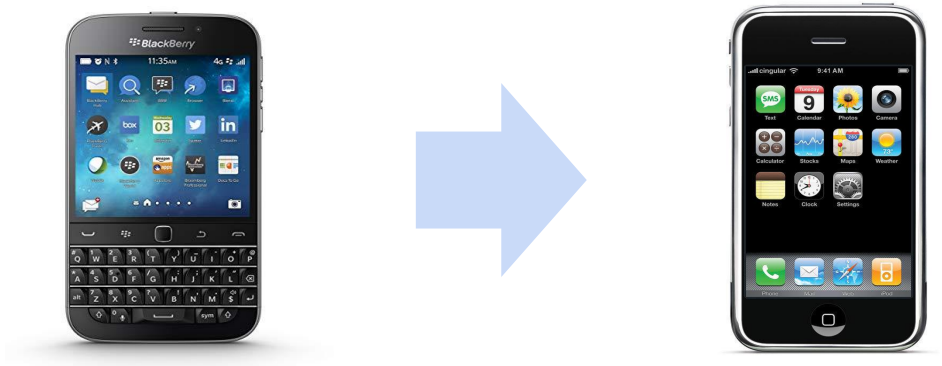
- Unattractive to established companies because:
  - Inferior performance. Lack of appeal to existing established customer base.
  - Low profit margin.

Sustaining v.s. Disruptive Innovation

- A more precise definition



Sustaining v.s. Disruptive Innovation



- Poor performer in terms of call quality, battery life, and network usage compared with the BlackBerry
- iPhone did not include the keyboard that BlackBerry users loved
- Delivered laptop-type functionality for a fraction of the price

Sustaining v.s. Disruptive Innovation

- Some more examples:

Sustaining:

- A new engine that allows Boeing to carry 10% more passengers.

Sustaining:

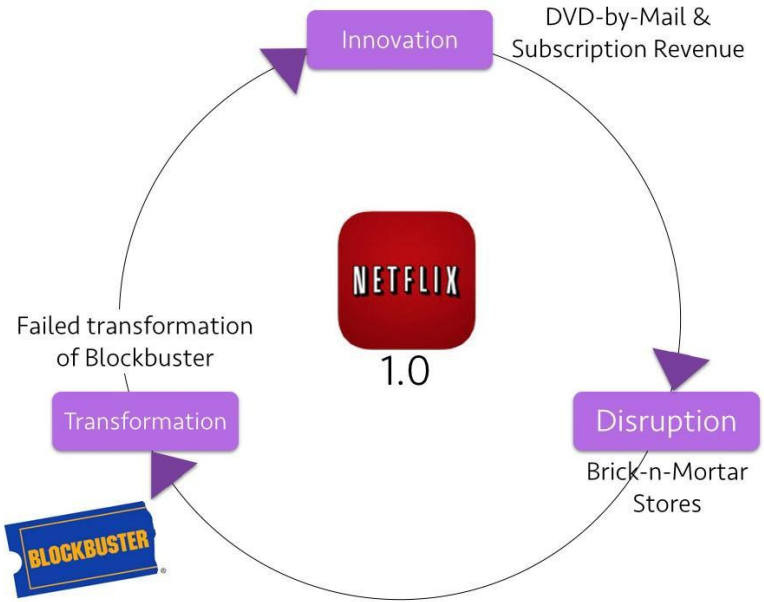
- The invention of digital camera, replacing film camera.

Netflix: Disruption of physical stores

Blockbuster	Netflix
Drive to DVD Store	Send letter
Pick up DVD	Netflix send DVD through mail
Drive to return DVD	Return DVD through mail

- Blockbuster and other video rental physical stores didn't recognize possible disruption from a **mail-order subscription** company like Netflix.

Netflix: Disruption of physical stores



- **Niche, with limited value**: Focusing movie buffs who didn't care about new releases and didn't mind waiting for DVDs to arrive.
- Blockbuster's former CEO, Jim Keyes, 2008: 'Netflix isn't even on the radar screen in terms of competition.' Turned down an opportunity to acquire Netflix.

Netflix: Disruption & self-disruption

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Digital Transformation

- In 2007, Netflix started video streaming services
- ‘No one knows more about the audiences thant Netflix’ - NY Times
- Massive data (browsing, viewing, stopping, subsription) to understand consumer preferences - recommender systems.

<u>The Netflix Challenge</u>
$1,000,000 prize for beating the existing Netflix system

Netflix: Disruption & self-disruption

- Increasingly Netflic rely on data to engineer successful, hit shows. The milestone was House of Cards. It's one of the most sophisticated attempts at **data-driven programming** ever.

Netflix: Fun facts

- Early 2013, Netflix Chief Content Officer Ted Sarandos:

  "The goal is to become HBO (representing the film industry) faster than HBO can become us."

- 7 Oscars??!!
- Netflix spent US$20 billion in 2020, more than the combined budget of the six big Hollywood studios in 2017.
- They pay the highest salaries to data people, more than Google..

To Identify & Nurture Innovations

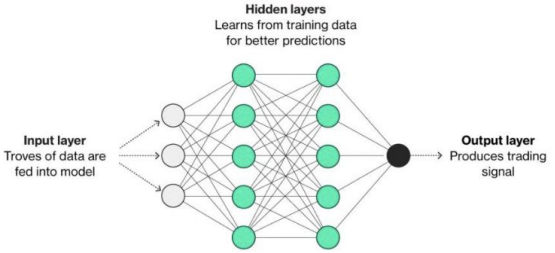
- Determine whether the technology is disruptive or sustaining. Ask the technical folks.
- Define the strategic significance of the disruptive technology. **Your best customers are the last people to ask about this** — sustaining technologies are what they care about.
- Locate the initial market for the disruptive technology. If there isn't one, create one. **Experimenting rapidly, iteratively, and inexpensively.**
- For a disruptive technology to thrive, it can't be required to compete with established products for company resources. House the disruptive technology in an independent entity.

Artificial Intelligence

- Generally refers to a branch of computer science dealing with the **simulation of intelligent behavior**.
- Alan Turing is credited with the origin of AI in the 1950s, when he speculated about “thinking machines” that could reason at the level of human being.
- In a 1951 paper, he proposed a test called "The Imitation Game“ which assesses whether a computer can imitate a human: later known as **Turing Test**.

Artificial Intelligence

- Classic AI: focuses on modeling. reasoning and logic.
- Latest AI: humans usually don't reason; humans are not always rational. Instead, AI uses statistical techniques to imitate the brain (learn from large amount of historical data to **identify patterns** in human decisions).
- Requires **large amount of data** and fast and affordable **computing power** to process data.



Artificial Intelligence

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Many Types & Tasks

- Natural language processing, Image recognition, Video analytics…

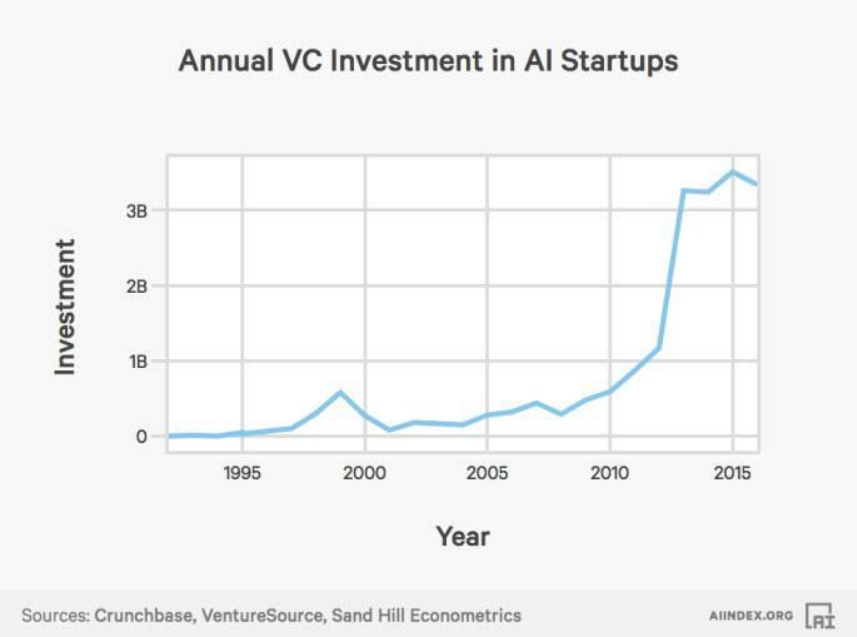
  - Sentiment analysis (Extracting insights automatically)

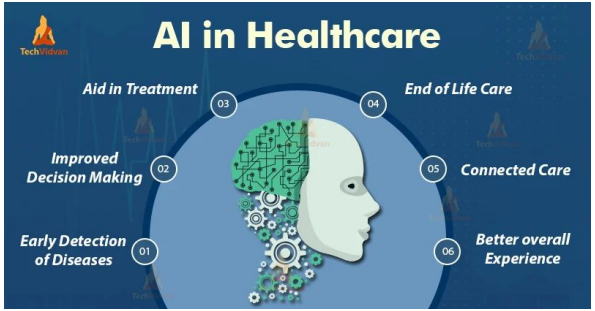
  - Conversational bots. IBM Watson (simulating answers of human experts)

- Decision AI, recommender systems..
- AlphaGo (creating “alien” solutions that humans don’t know)

Artificial Intelligence

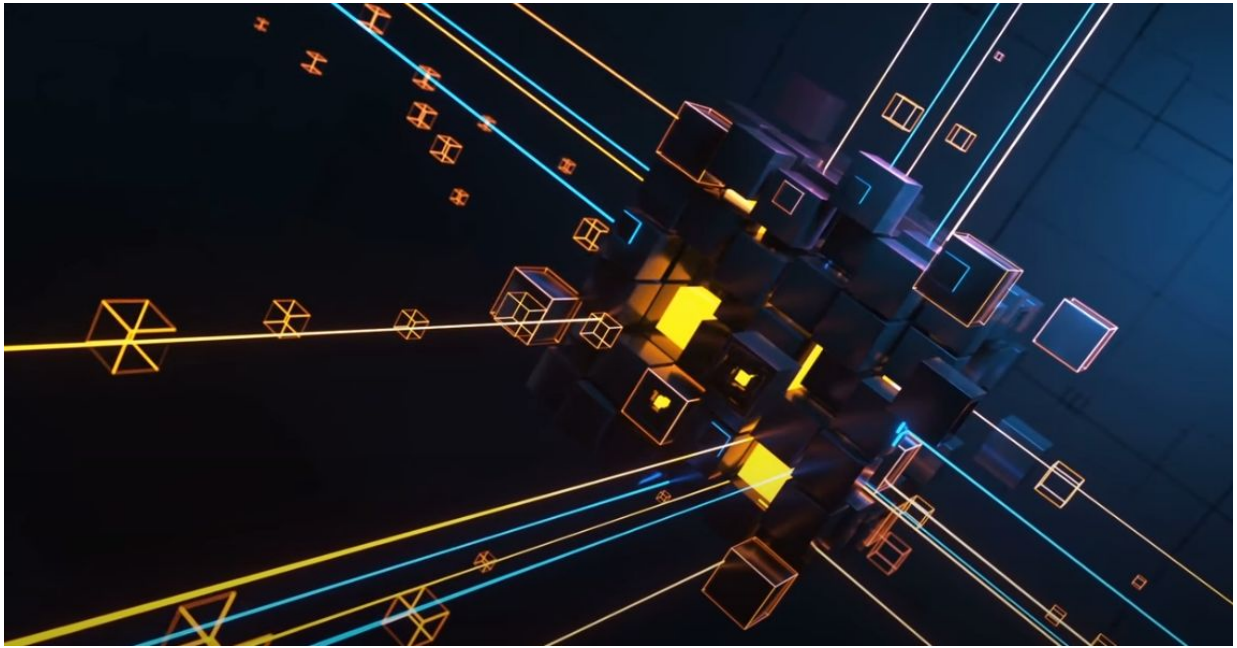
Used to be Niche, but now Widely used.





Blockchain

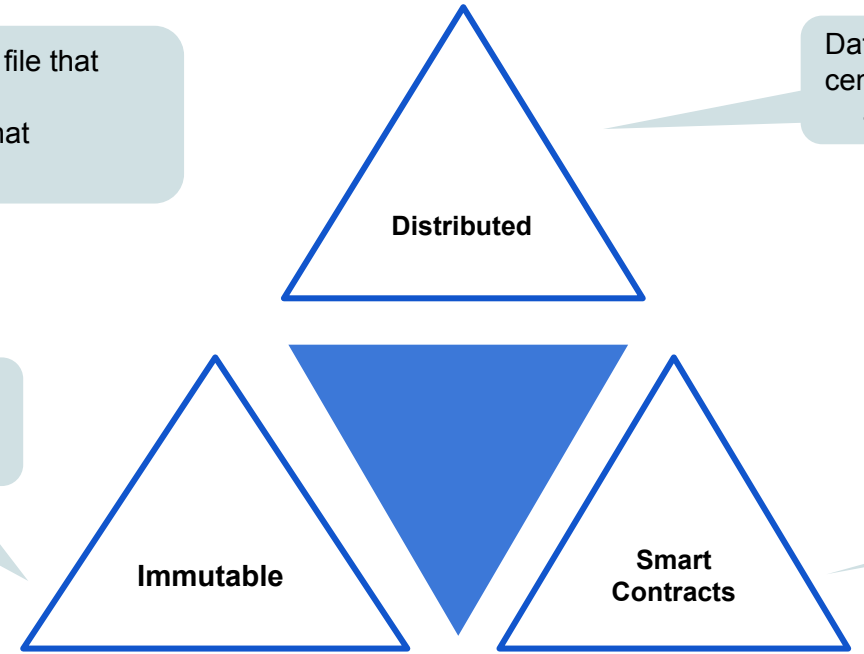
- An open distributed ledger (a file that keeps track of transactions).
- Managed by a P2P network that collectively validate the data.



Blockchain

- Three technical features of blockchain enables secure p2p transactions

An open distributed **ledger** (a file that keeps track of transactions).
Managed by a P2P network that collectively validate the data.



Data is not stored on a central server.
- transparency

Can't change what's on it.
- System based trust
- Good for tracing

Automatic, IF.. THEN ..
- Algorithmic governance

Blockchain

- A wide range of applications.

Public blockchains
- Permissionless, anyone can join.

Blockchain Voting

THE FOLLOW MY VOTE WAY

Private blockchains
- Permissionless, anyone can join.

TicketMint

Blockchain

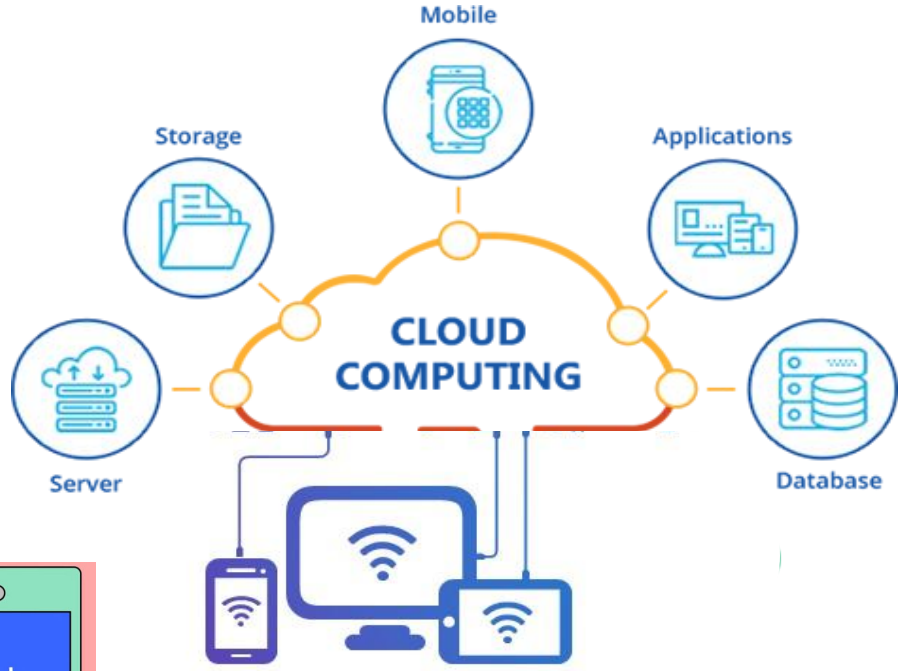
- An open distributed ledger (a file that keeps track of transactions).
- Managed by a P2P network that collectively validate the data.

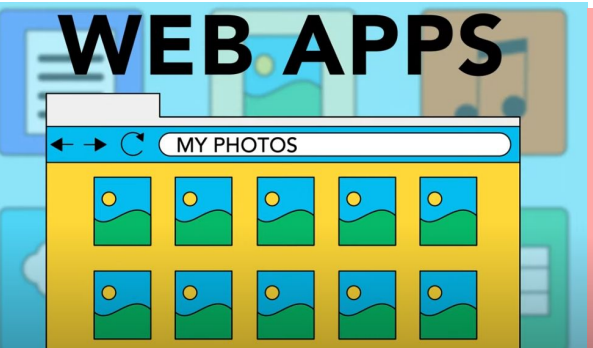
Cloud Computing

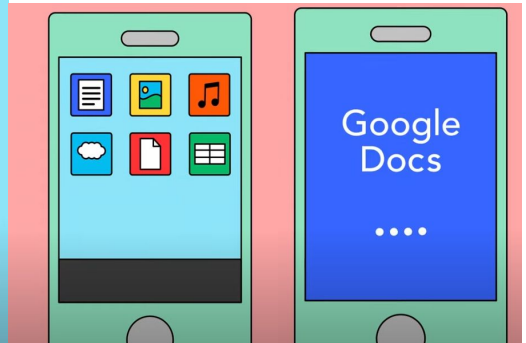
- Basically, just means things are stored on servers instead your local computer.

Benefits:

- No investing in new hardware or software. Cost reduction.
- Use it on the go!
- Scalability. Disaster recovery..







Cloud Computing - Categories

- SaaS, PaaS, IaaS

Software as a Service E.g., CRM, Industry applications, collaboration
Platform as a Service E.g., database, middleware, developing tools
Infrastructure as a Service E.g., server, storage, networking

- Public, private, hybrid cloud
  - Public cloud – Available to general public or a large industry group
  - Private cloud – Operated only for one organization
  - Hybrid cloud – Composed of two or more clouds

Cloud Computing

In the future, several factors driving its growth:

- New Improving Internet bandwidth, super fast wireless technology
- IT as a utility (electricity)!

Impact:

- Internet-based business processes or services.
- Pictures we upload to instagram are on the cloud! Whatsapp messages? Yes. Icloud? Yes.