Graphic

HISTORY OF TELCOMMUNICATION HUBS AND DATA CENTERS

TECHNOLOGICAL ERA

1880's-1910
Telegraphs & Telephones

The world's first commercial telephone exchange on January 28, 1878. The operator would use a cord to physically connect the caller's line to the desired party's line on the switchboard. The switchboard was built by George W. Coy and made from scrap parts, including carriage bolts and teapot lid handles.

1910s-1940
Mechanical Switching

During this era, the operator was eliminated by the Strowger switch. This technology converted the pulses from a rotary dial into mechanical steps (up and across) of a wiper arm, which physically connects wires in a grid of terminals, completing the circuit between the caller and the recipient.

1940s - 1970s
Mainframe Computers

Mainframe computers were integrated into switching centers to help process calls. The first of the electronic switching systems (ESS) replaced mechanical relays with digital information controlled by computers. Telecom hubs began to gain computing power and act as larger connection points for greater communication. Traffic was generally still analog.

1970s - 1990s
Microcomputers

Previous telecommunication hubs expanded to serve multiple clients rather than just one company. This system, often referred to as colocation, arose due to the fact that hardware sizes shrunk drastically in this era. With operations in each building densifying, central meeting points for internet traffic developed in facilities that still stand to this day.

1990s - 2010s
Hyperscale Data Centers

With the expansion of the internet in the late 90's, businesses began to require more infrastructure to reliably house their virtual systems. These buildings became closer to what we know as data centers today with features like backup power sources, climate control, etc. These facilities became optimized for data storage, processing, and delivery. This era also begins environmental concerns on excessive energy use.

2022 -
AI

Today, internet processes have shifted greatly to rely more on artificial intelligence as a means of easily generating and sharing information. AI now demands powerful GPUs, pushing facilities to rely more on liquid cooling.

INNOVATION / EVENTS

1880 1890 1900 1910 1920 1930 1940 1950 1960 1970 1980 1990 2000 2010 2020 2030

DIGITAL REVOLUTION

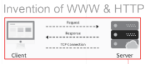
1896 Invention of the Radio

subset timelime 2: satellite & GPS

1957 Invention of Satellite

1973 Invention of GPS

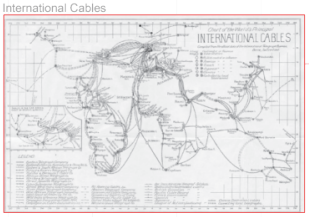
1991 Invention of WWW & HTTP



1997 Invention of WIFI

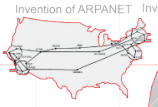
subset timelime 3: internet & protocols

1900 International Cables

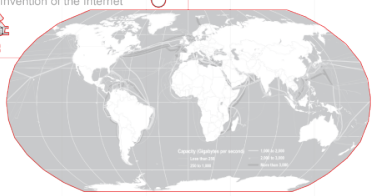


subset timelime 1: cables & materialization

1968 Invention of ARPANET



1980's Invention of the Internet



CONTEXT

1880's-1910
With Westward Expansion came the need for long-distance communication.

The Industrial Revolution further pushed telecom development.

1910s-1940
Mechanical switching was invented as a response to the unreliability of manual switchboards.

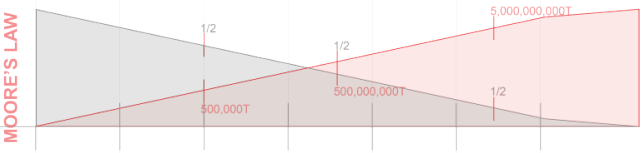
1940s - 1970s
Mainframes were a key component in establishing technical dominancy among international power struggles throughout WWII.

1970s - 1990s
Microcomputers fueled the arm race during the later stages of the Cold War and proliferated further due to the digital revolution.

1990s - 2010s
Hyperscale data centers were a response to a newly globalized market place with the need for an omnipresent online presence.

2022 -
Optimism about the possibilities of AI as well as its inherent security benefits post 9/11 swayed the US to adopt wide scale AI programs.

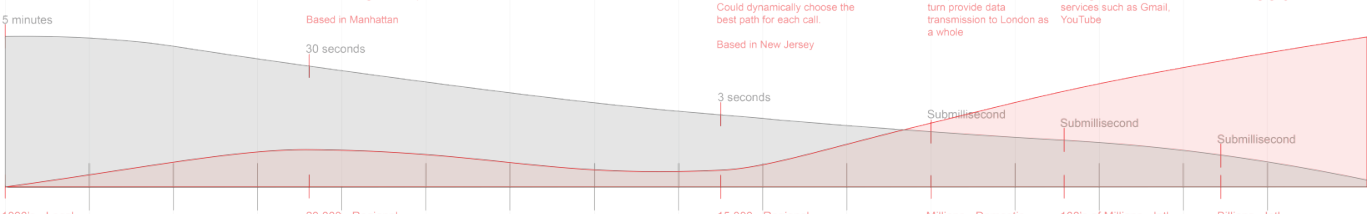
MOORE'S LAW



COST VS. TRANSISTORS

Transistors form logic paths, which are the basic circuits that perform the operations and calculations in a computer's processor.

ACCESS



1880 Only began with 21 customers based in New Haven, CT

1916 Long distance telephone lines connected regional companies

Based in Manhattan

1965 The computer knew the status of all lines, trunks, and circuits. Could dynamically choose the best path for each call.

Based in New Jersey

1990 Access privatized to companies that would in turn provide data transmission to London as a whole

2006 Run by Google and based in Oregon Connects to services such as Gmail, YouTube

2024- Accessed worldwide by those engaging with AI

SPEED

1880 1000's - Local
Telephone operator manually connected customer to party they were attempting to reach.

1916 20,000 - Regional
Connection wait times

Varied based on call volume

1965 15,000 - Regional
Most effective path for calling dynamically chosen by SPC software

1990 Millions - Domestic
Use of modems to connect phone lines began in this era

2006 100's of Millions - Intl.
Modern tech optimized to speeds of data transfer we are familiar with today

2024- Billions - Intl.
Fastest technology feasible

POWER

1880 100's of watts
1 House
Power drawn from batteries

1916 2,000 Kilowatts
1 House
Automatic switching became stronger with the invention of the Strowger arm

1965 4,000 Kilowatts
1 House
Transmitted not only voice but also digital data foundation of modern routing algorithms established

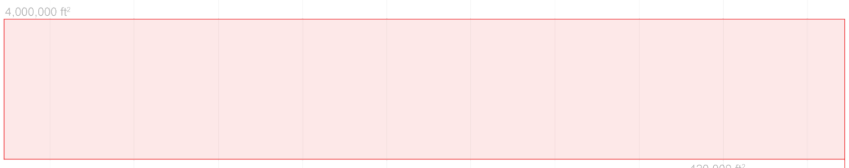
1990 8,000 Kilowatts
1 House
2-3 kW power per rack

2006 100 Megawatts
10 Houses
150,000 servers with each rack drawing 10kW said to use enough energy to power a mid-size city powered via evaporative cooling

2024- 1,200 Megawatts
112 Houses
Technology is liquid cooled shift to solar and battery utilization for power

Measured against the average yearly household kW use (10,585 kW)

SQUARE FOOTAGE



1880 400 ft²
Boardman Building

1916 165,000 ft²
Walker-Lispenard Building

1965 7,500 ft²
New Jersey Bell Central Office

1990 99,000 ft²
Telehouse North

2006 420,000 ft²
Google's Dalles Facility

2024- Abilene Phase Two

CASE STUDY

Revision #5
Created 12 September 2025 18:44:07 by Rayne
Updated 13 September 2025 14:41:18 by Rayne