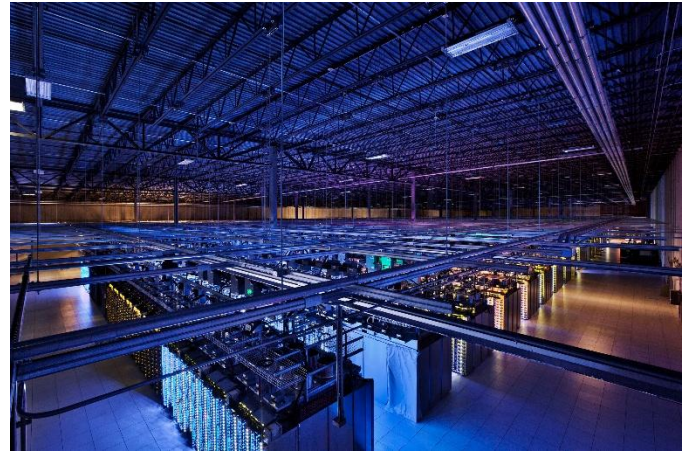


What is a Data Center?

Data centers are facilities that provide critical infrastructure to power modern digital services. There are different types of data centers, often shaped by the primary function(s) of the facility. Most data centers house servers (connected computers) and data storage systems capable of vast numbers of calculations and computing applications. Often referred to as “the cloud,” data centers provide the necessary hardware for internet connectivity, large scale software systems, and the computational demands of traditional and generative artificial intelligence (AI).

Data center facilities can provide benefits, including tax revenue, but also present challenges such as increased energy demand, water usage and land use considerations.



Types of Data Centers

Enterprise & Internal Data Centers

Privately owned and operated, these facilities manage proprietary information technology (IT). The average on-site data center typically houses between 2,000 and 5,000 servers on a site ranging from 20,000 to 100,000 square feet. They draw around 100 megawatts (MW) of power.

Colocation Centers

These third-party facilities lease out space, power and cooling infrastructure to multiple organizations. Businesses use these centers to reduce infrastructure costs.

Hyperscale Data Centers

Built by major technology companies such as Amazon, Google and Microsoft, these large-scale centers handle enormous computing demands, including AI and cloud services. A hyperscale data center is defined as containing at least 5,000 servers, occupying at least 10,000 square feet of physical space and having an energy draw of over 100 MW of power.



Appearance and Components of Data Centers

In terms of appearance, data centers tend to resemble warehouses — large and windowless — to support a highly controlled environment optimized for equipment performance and physical security. Flat roofs are common and necessary for housing mechanical equipment like HVAC units. The general components of a data center are depicted below.

NOTE: These components are not to scale.



Source: <https://datacenteruniversity.be/whats-inside-a-data-center>. To view this interactive graphic visit the Data Center University website.

1 Servers

The backbone of data processing and storage, servers are computers connected together to run applications and computing tasks.

2 Storage Systems

Data centers house vast amounts of digital information, stored on solid-state drives or hard disk drives.

3 Networking Equipment

Includes routers, switches and firewalls that manage data traffic and security.

4 Cooling Systems

Prevent overheating by using air or liquid cooling methods to maintain optimal operating temperatures for computers.

5 Power Infrastructure

Includes backup generators and uninterruptible power supplies to ensure continuous operation.

6 Security Systems

Physical and cyber security measures such as biometric access controls, surveillance cameras and fire suppression systems.

Growth & Impact of Data Centers

Digital services are driving greater demand for the physical infrastructure that supports these services and technologies. Global demand for data center capacity is expected to surge, driven largely by the rapid growth of AI workloads. Demand for AI-capable data centers — which need more computing power and energy — is expected to rise sharply.

Demand could grow by 22 percent annually, potentially reaching an energy demand of 219 gigawatts (GW) in 2030 compared to 60 GW in 2024. There are more than 3,000 data centers in the U.S. It is estimated that of the roughly 1,100 hyperscale data centers globally, over half are located in the U.S. as of late 2024.

There is a growing strain on infrastructure as AI-driven demand accelerates. As digital infrastructure continues to expand, additional considerations include looking at the human health and environmental impacts of data centers (such as noise and light pollution, emissions, water consumption, and more), as well as integration into community development plans.

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