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A PRIMER FOR LOCAL GOVERNMENTS:

UNDERSTANDING DATA CENTERS

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).

Why Talk about Data Centers?

Significant increases in the use of AI, and to a lesser extent, cloud computing and other digital services, is driving greater demand for the physical infrastructure that supports these services and technologies. Data centers are the unseen backbone of our digital economy, yet their presence and impacts, both positive and negative, are often overlooked in local governance discussions. In fact, data center facilities can provide significant benefits for communities, including tax revenue, enhanced digital connectivity and new jobs, but also present challenges such as increased energy demand, water usage and land use considerations.

Local leaders can take a proactive approach to planning data center development by addressing sustainability, zoning and infrastructure concerns to shape these facilities so that they are designed and operated to best serve community interests. This fact sheet outlines basic elements of data centers to help policymakers begin these discussions.

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.[1]

Colocation Centers
These third-party facilities lease out space, power and cooling infrastructure to multiple organizations. Businesses use these centers to reduce infrastructure costs.[2]

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.[3]

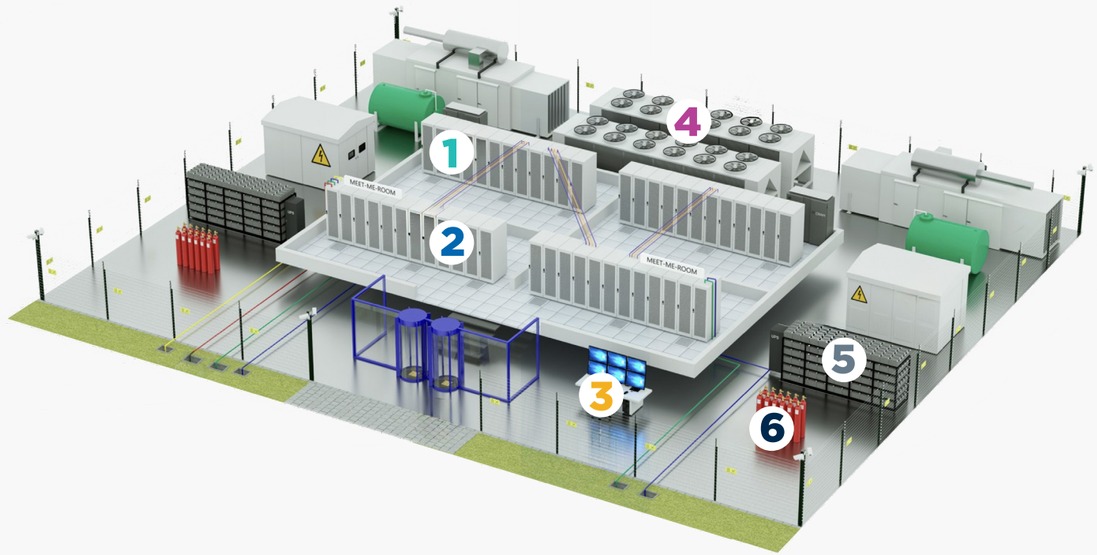
Design Features of Data Centers

Data centers are typically located near necessary infrastructure like high-voltage power lines and high-speed fiber optic networks. They can also require substantial land use. This means you can often find data centers in suburban or rural areas, or industrial zones, where these needs can be met. In addition to proximity to power sources, proximity to end-users helps reduce delays in data transfer and can improve the speed of cloud and AI-powered service delivery. Climate can be another influential factor for the location of data centers. Because servers require cooling, differences in environment can increase the strain on air-conditioning or water-based cooling systems.

In terms of their appearance, data centers tend to resemble warehouses[4] — large and windowless — to support a highly controlled environment optimized for equipment performance, energy efficiency, and physical security. Flat roofs are common and necessary for housing mechanical equipment like HVAC units, but also offer opportunities for sustainability features such as solar panels or reflective coatings. While functional needs inform design choices, local leaders can consider the impact these facilities have on the character of their community.

Components of Data Centers

Data centers consist of several critical components that ensure efficient operation and reliability.



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.

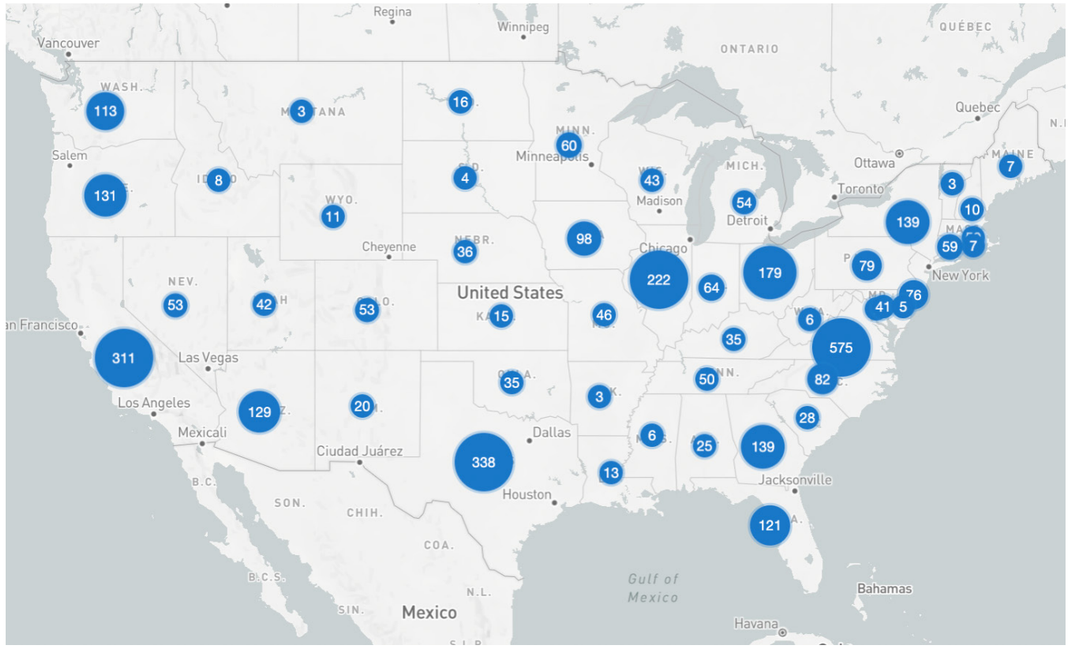
4 Cooling Systems
Prevent overheating by using air or liquid cooling methods to maintain optimal operating temperatures for computers.

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 and Impact of Data Centers

USA Data Centers



Source: https://www.datacentermap.com/usa. To view the interactive map, visit the USA Data Center website.

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. By 2030, 70 percent of all data center needs could be tied to supporting advanced AI applications and use cases.[5] Innovation in cooling technologies, energy efficiency, AI algorithms and semiconductor design could alter current projects.

The global data center industry is projected to grow from $269 billion in 2025 to more than $580 billion by 2032, with an annual growth rate of 11.7 percent.[6] 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.[7]

There is a growing strain on infrastructure as AI-driven demand accelerates. Within the U.S., states like Virginia and Texas are seeing the fastest growth in data center construction. These same states are also experiencing some of the sharpest increases in commercial energy consumption.[8]

Preparing for the Future

As digital infrastructure continues to expand to accommodate demand, city leaders are increasingly likely to encounter proposals for new data center development. Local leaders may need to coordinate with state regulators, utilities and tech companies when considering data center development. Additional considerations for city leaders include looking at the environmental impacts of data centers, as well as zoning, permitting and integration into community development plans.

Endnotes

1 IBM. (2024, March 21). What is a hyperscale data center? https://www.ibm.com/think/topics/hyperscale-data-center#:~:text=Hyperscale%20data%20centers%3A%20The%20IDC,Energy%20draw%3A%20Over%20100MW

2 Miet, H. (2024). Local Guidelines for Data Center Development. Urban Land Institute. https://knowledge.uli.org/-/media/files/research-reports/2024/uli-data-center-whitepaper_hm_2024-11-12_final-final-round.pdf?rev=940681fe19a247739647418d4f469d86&hash=91D3EEEC1C7EB7F5E92C0945DEA97973

3 IBM. (2024, March 21). What is a hyperscale data center?

4 https://research.google/pubs/the-datacenter-as-a-computer-an-introduction-to-the-design-of-warehouse-scale-machines-second-edition/

5 Srivathsan, B., et al. (2024, October 29). AI power: Expanding data center capacity to meet growing demand. McKinsey. https://www.mckinsey.com/industries/technology-media-and-telecommunications/our-insights/ai-power-expanding-data-center-capacity-to-meet-growing-demand

6 Ibid.

7 Synergy Research Group. (2025, March 19). Hyperscale Data Center Count Hits 1,136; Average Size Increases; US Accounts for 54% of Total Capacity. https://www.srgresearch.com/articles/hyperscale-data-center-count-hits-1136-average-size-increases-us-accounts-for-54-of-total-capacity

8 U.S. Energy Information Administration. (n.d.). Electricity Data Browser. https://www.eia.gov/electricity/data/browser/