

## Data Centers Around the World: A Quick Look

Brian Daigle, Office of Industries, [brian.daigle@usitc.gov](mailto:brian.daigle@usitc.gov)

*Data centers, spaces dedicated to holding data servers to store and process data, have grown rapidly as data demand has risen exponentially. The United States, home to many of the world's leading data producing and data consuming firms (including Facebook, Amazon, Microsoft, and Google), has historically had far more data centers than any other market. Using CloudScene<sup>1</sup> data, this EBOT looks at the global trends for data storage and processing, with a closer look at the global and U.S. data center markets. It will also briefly note some of the policy issues that may contribute to increased data center demand.*

### The Exponential Increase in Data

In 2010, U.S. research firm IDC determined that 1.2 zettabytes (1.2 trillion gigabytes) of new data had been created globally, a 50 percent increase from the previous year. That year, it also estimated that the annual amount of data produced would grow to 35 zettabytes by 2020, a level that was reached by 2018. In 2020, data creation was approximately 59 zettabytes. IDC now notes that by 2025, newly created data will be 175 zettabytes; this would equate to a 146-fold increase in the 15-year period between 2010 and 2025.<sup>2</sup> One industry observer noted that between 2018 and 2020, more data were created than in all of human history before 2018.<sup>3</sup> In valuation terms, the data processing and storage market<sup>4</sup> is estimated to grow from \$56 billion in 2020 to \$90 billion by 2025.

Broadening scope, IDC estimates that the global revenue for the data market and business analytics sector (which includes the services that support the data market) totaled \$189.1 billion last year, rising to \$274 billion by 2022.<sup>5</sup> Banking represents the largest data generator by revenue (13.9 percent), followed by discrete manufacturing (11.3 percent), process manufacturing (8.2 percent), and professional services (8.2 percent).

### Data Center Industry

The significant rise of data generation and use across a variety of industries has led to a rise in demand for data servers and data centers. According to CloudScene data<sup>6</sup> of 110 countries with available information, as of January 2021 there were nearly 8,000 data centers globally. Among these countries, six house a majority of data centers: the United States (33 percent of total), the UK (5.7 percent), Germany (5.5 percent), China (5.2 percent), Canada (3.3 percent), and the Netherlands (3.4 percent) (figure 1 below). 77 percent are located in OECD member states, and approximately 64 percent are in NATO countries.

In the United States, there are over 2,600 data centers spread across the country. While northern California is known as the location for many data-intensive firms (Google, Facebook, Uber, Twitter, Yelp, for example), Dallas currently has the highest number of data centers (149). This is followed by the Bay Area (147), and Los Angeles (139). Interestingly, U.S. data centers are located over a wide variety of jurisdictions, reflecting the wide use of data throughout the U.S. economy (and a reflection of cheaper energy prices in some locations): taken together, the top 10 data center locations constitute less than 40 percent of all U.S. data centers, and nearly every U.S. state

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<sup>1</sup> CloudScene is an Australian data intelligence firm that characterizes itself as the “largest market intelligence platform and independent global marketplace for buying and selling cloud and connectivity services.” Cloudscene, “About Cloudscene,” n.d. (accessed March 31, 2021). <https://cloudscene.com/about-us>

<sup>2</sup> Outlook Series, “[US Leads Big Data and Business Analytics Spend](#),” April 5, 2019.

<sup>3</sup> BusinessWire, “[IDC Forecasts Revenues for Big Data will Reach \\$189.1 Billion This Year](#),” April 4, 2019.

<sup>4</sup> A “data market” is defined as an online space where data can be purchased. The type of data that can be bought and sold differs by industry and type. Some types of data include business intelligence and research data, advertising information, demographic and personal information (often used for advertising). TechTarget, “[Data marketplace](#),” n.d. (accessed April 23, 2021).

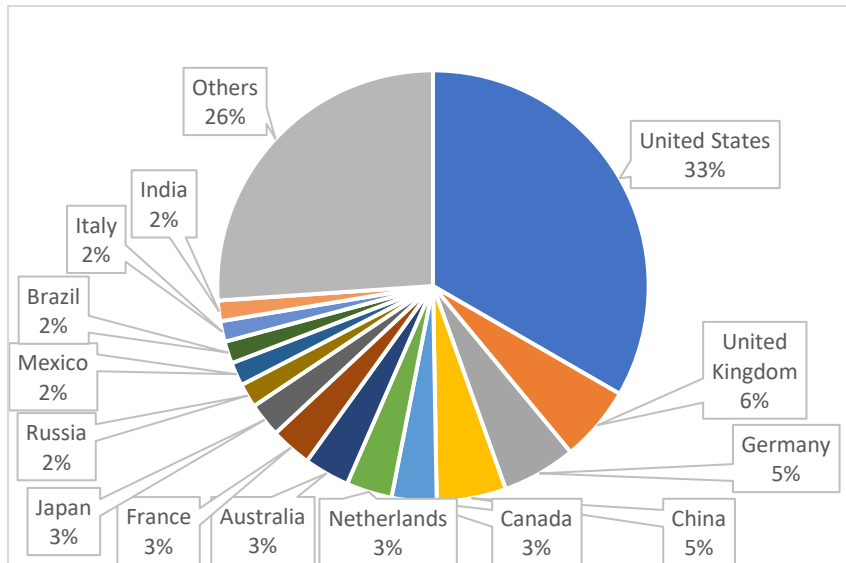
<sup>5</sup> CloudScene, “[Browse Markets](#),” n.d. (accessed April 2, 2021).

<sup>6</sup> CloudScene, “[Browse Markets](#),” n.d. (accessed April 2, 2021).

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contains at least 1 data center. Data center operators are also diversified in the United States: the top 5 data center operators (Lumen Technology, Verizon, Digital Realty, AT&T, and Equinix), constitute about 25.9 percent of total U.S. data centers.

**Figure 1: Data center share of global total by major country (%)**



Source: CloudScene

### Issues that May Impact Data Center Locations

Demand for data centers differs by country, reflecting a variety of market forces and policies. For some jurisdictions, higher numbers of data centers may reflect demand from industry sectors. The UK, for example, has the 2<sup>nd</sup> largest share of data centers, and is one of the world's largest financial hubs. The United States and China (1<sup>st</sup> and 4<sup>th</sup>, respectively) have substantial data demands across a variety of sectors, while Germany (3<sup>rd</sup>) has a significant manufacturing and industrial capacity with large data demands.

In other instances, government policies can direct the location of data centers in their jurisdictions with data localization measures. These measures, which legally mandate that certain (or all) data of individuals in their jurisdiction be held within that jurisdiction, can cover narrow classes of information (like health data) or much wider amounts of information. [Russia](#), [China](#), [Turkey](#), Australia, France, Germany, and other countries have data localization requirements, though with wide variation in scope and enforcement. The Russian and Chinese data localization laws in particular are extensive and require wide swathes of data be held in domestically located servers.<sup>7</sup> Several of these countries' data localization measures have been directly cited by non-domestic firms as the rationale for locating data within the country that otherwise would not have been located there; following the introduction of Turkey's data localization law in 2021, several U.S. firms (Facebook, Twitter, Google) announced that they would be locating Turkish data within Turkey, while LinkedIn opted not to operate in Russia due to a desire to not set up a data center within the Russian Federation.<sup>8</sup>

Finally, other issues may be contributing to the rise of data centers in certain regions beyond their domestic needs. Looking at the share of data centers per country measured against GDP, 5 of the 10 countries with the greatest relative share of data centers as a proportion of their share of GDP are in Eastern Europe (Latvia, Moldova, Estonia, Bulgaria, and Ukraine). In other words, given the small GDP of these countries, one would expect fewer data centers than they currently have. Several of these countries have limited cybersecurity enforcement resources but with access to multiple international markets (particularly the EU), which may be contributing to the concentration of data centers. Despite these advantages, the limited enforcement capabilities may expose these data servers to increased cybersecurity risks.<sup>9</sup>

<sup>7</sup> Internet Society, "[Internet Way of Networking Use Case: Data Localization](#)," September 30, 2020.

<sup>8</sup> Politico EU, "[Turkey's social media law: A cautionary tale](#)," March 29, 2021; IAPP, "[Why LinkedIn was Banned in Russia](#)," January 23, 2017.

<sup>9</sup> GFCE, "[Cybersecurity in Ukraine: National Strategy](#)," June 7, 2017; ZDNet, "[Cyberattack fears raise the alarm in Eastern European countries](#)," January 20, 2021.

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