DATA CENTER Frontier Special Report

Hyperscale Data Centers

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The Impact of Hyperscale Data Centers

The hyperscale data center is reshaping the global IT landscape, shifting data from on-premises computer rooms and IT closets to massive centralized data center hubs. Workloads are consolidating in the world's largest and most efficient facilities. These cloud campuses offer economies of scale, enabling hyperscale operators to rapidly add server capacity and electric power.

Hyperscale companies have become the largest customers for leasing wholesale and build-to-suit data center space. As a result, these customers hold huge sway over data center development, which has evolved rapidly to adapt to hyperscale requirements.

It has become routine for these hyperscale companies—especially the top tier of Amazon Web Services, Google, Facebook, Microsoft and Apple—to invest $1 billion to $3 billion in a single campus.

The growth of hyperscale cloud campuses is part of a larger densification of America's IT infrastructure, which features data centers in many new places. This digital transformation will create layers of distributed infrastructure, from the core to the edge of the network.

In the process, the rise of hyperscale computing has created a new paradigm in the data center business. Hyperscale companies have become the largest customers for leasing wholesale and build-to-suit data center space. As a result, these customers hold huge sway over data center development, which has evolved rapidly to adapt to hyperscale requirements.

In this special report, we will examine how hyperscale data centers have changed how we compute, how data center space is built and sold, and has altered the supply chain for digital infrastructure. We also share Data Center Frontier's take on how hyperscale computing will evolve.

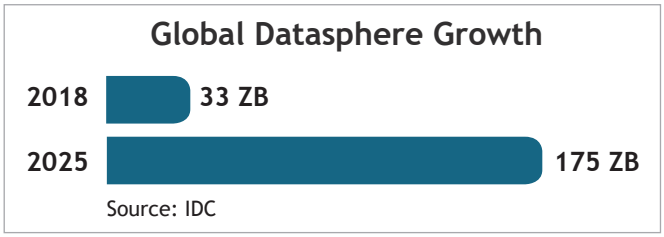
The Hyperscale Transformation

As the name suggests "hyperscale" is defined primarily by scale. Everything about hyperscale computing is bigger, and is optimized to process, store and transport massive amounts of data. The hyperscale operator is providing IT services for millions and even billions of users.

The scale of these businesses requires large data centers. Their global scope requires a distributed network of these large data centers, and low-latency connectivity between them.

The rise of hyperscale computing is driven by the benefits it provides to customers and operators. There are four huge trends influencing this growth:

- Cloud Computing, which allows users to shift their IT operations to a service model, with remote data centers housing data and applications, which can run from an app or web browser.
- Social Media, which has transformed modern communication, allowing individuals to connect with distributed networks of friends and family. Social media has also become a powerful marketing and audience-building tool for businesses and non-profit organizations.
- Software Platforms, which are disrupting multiple industries, using software and logistics to streamline the sale and delivery of products and services. Software is "eating the world" and in the process it is creating streams of data that must be stored and analyzed.
- Content Delivery, including global distribution of "over the top" streaming video, and the explosive growth of eSports and cloud-hosted gaming platforms.



This digitization of our economy is projected to generate an ocean of data, fed by a growing universe of intelligent things—sensors, cameras, smartphones, tablets, drones, robots and connected cars. IDC predicts that the "global datasphere" will grow from 33 zettabytes (ZB) in 2018 to 175 ZB by 2025.

Cisco predicts that machine-to-machine (M2M) applications will account for 51 percent of the total devices and connections by 2022. On the consumer end, use of video is growing, both in social sharing and "over the top" delivery of streaming media.

Almost no one is using less data today then they did yesterday. They will consume even more data tomorrow.

Some of the world's largest and most sophisticated investors are pumping money into the sector, perceiving a long-term growth opportunity in digital infrastructure.

The primacy of data is a secular trend that has been building for years and will only accelerate with the arrival of next-generation technologies like artificial intelligence (AI), the Internet of Things and augmented reality. 5G wireless will move data with higher speed and greater volume.

The response has been a growing industrialization of digital infrastructure, as data center developers optimize every component of the network, from subsea cables all the way down to the chips on server boards. When applied at scale, these optimizations ripple across huge facilities and platforms, making infrastructure more efficient and affordable.

As a result, hyperscale computing is attracting significant investment. Google, Amazon, Microsoft and Facebook all have in-house R&D programs to design custom silicon for servers and network equipment. Meanwhile, some of the world's largest and most sophisticated investors are pumping money into the sector, perceiving a long-term growth opportunity in digital infrastructure.

The trends are neatly summed up by analyst and tech executive Bernard Golden: "Simply put, we are on the cusp of an enormous transformation as computing resource provisioning transitions from expensive and complex to cheap and low-friction."

The hyperscale data center has emerged as the physical form factor to power this digital transformation. In the process, it is bringing significant change to the data center industry.

Who are the Hyperscale Players?

The hyperscale market is composed of two tiers of companies, with slightly different characteristics. Both sets of customers have requirements that go beyond the traditional scope of the turn-key wholesale data center suite.

TIER 1

THE MEGA HYPERSCALE OPERATORS

These companies are the dominant players in cloud services and social media. This includes Google, Microsoft, Amazon Web Services, Facebook and Apple. Chinese cloud giant Alibaba is also reaching the scale to be included in this group. Their deal sizes range from 10 megawatts (MWs) to 70 megawatts, and can include multiple data halls in a single building, multiple data halls across several buildings, a build-to-suit project, or even a multi-building campus.

TIER 2

SAAS, PLATFORM COMPANIES & CLOUDLETS

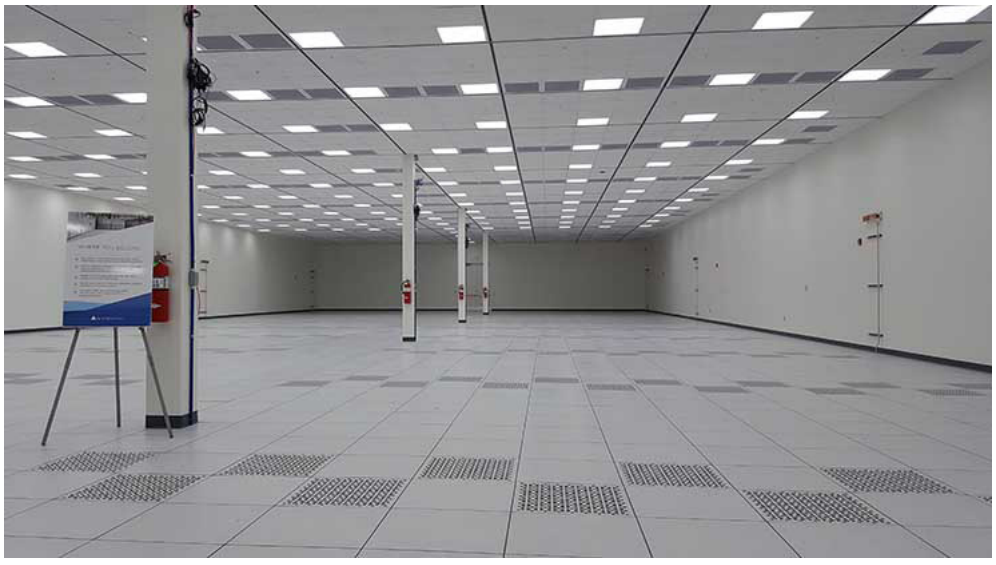
The second tier of hyperscale customers includes cloud providers like Oracle, Baiduand and China Telecom, along with SaaS providers like Salesforce, SAP, Workday, Paypal, Dropbox and platform companies like Uber and Lyft. These customers are seeking 2 to 5 megawatts at a time, and covet the ability to “land and expand” by growing into adjacent space.

Providers seeking hyperscale deals are now offering data halls ranging from 30,000 to 60,000 SF, with some building open rooms as large as 140,000 SF.

Prior to 2016, the wholesale data center market rarely saw deals larger than 10 MWs.The super-sizing of hyperscale requirements has altered the provisioning of wholesale data center space, which offers turn-key data halls with power, connectivity and cooling in place.

For many years, wholesale providers standardized on a form factor featuring data suites of approximately 1.2 MWs of IT capacity and 10,000 to 12,000 square feet (SF). Providers seeking hyperscale deals are now offering data halls ranging from 30,000 to 60,000 SF, with some building open rooms as large as 140,000 SF.

This trend is driving a segmentation of the data center industry, as some companies are optimizing their construction process and supply chain to compete for hyperscale deals, some are targeting more traditional enterprise wholesale requirements, and retail colocation players are focusing on interconnection and cloud on-ramps.



Build or Buy?

The Tier 1 hyperscale companies have the ability to either build their own data centers, lease space from wholesale data center providers, or partner with developers on build-to-suit projects. Their decisions are often guided by cost and how quickly they need the capacity. In some cases, data center REITs have won Tier 1 hyperscale deals on their ability to deploy data center space faster than in-house construction operations.

Approaches vary among Tier 1 providers. Amazon Web Services often leases powered shells – buildings with the power and fiber connectivity already in place, but no developed technical space—and then completes the buildout itself. Powered shell leases are also common in international markets.

Tier 2 hyperscale companies have shown a strong preference for leasing wholesale space and working closely with data center developers to create roadmaps for long-term growth.

In some geographic markets, hyperscale companies opt for wholesale space so they can start small as they initiate service, and then add capacity incrementally as needed. This is a common approach in international markets, as well as in edge deployment to enhance latency or connect segments of global networks.

Key Factors in the Build Versus Buy Decision

- **Control and Security**
  Some companies desire higher levels of access control, physical setbacks, and dedicated power and cooling infrastructure. These policies guide decisions between a segregated company-built campus or multi-tenant environment.
- **Construction Capacity**
  Can the in-house construction organization keep pace with the global scope of the business? Hyperscale companies are often simultaneously deploying capacity in multiple locations.
- **Speed to Market**
  Capacity forecasting is difficult, even for hyperscale operators. Sometimes growth demands "REIT speed" construction of new capacity to keep pace with demand in key markets.
- **Cost of Capital**
  With build-to-suit projects, decisions are often guided by whether providers can offer a lower cost of capital or cost-per-megawatt.

The Outsized Influence of Hyperscale Customers

Synergy Research estimates that there are 439 hyperscale data centers worldwide. Meanwhile, 451 Research says it tracks 6,100 data centers globally. Although hyperscale data centers represent less than 10 percent of data centers by number, they represent an outsized share of new investment in infrastructure and servers.

Capital expenditures by the 20 largest global hyperscale providers surged 43 percent in 2018 to almost $120 billion, according to Synergy Research. In some markets, hyperscale leasing represents the lion's share of activity. JLL estimates that hyperscale deals of 6 MWs or more represented 83 percent of leasing in Northern Virginia in 2018.

Meanwhile, server sales for companies that focus on custom hardware for hyperscale operators have been rising. IDC reports that about 30 percent of server sales in the first quarter of 2019 went to specialists in hyperscale gear, including ODM (original design manufacturing) vendors and Open Compute specialist Inspur.

"Hyperscalers will continue to heavily influence the IT infrastructure industry, both by the scale of their infrastructure investments and with the innovations those investments generate," said Kuba Stolarski, research director, Computing Platforms, Worldwide Infrastructure, at IDC.

Over time, the global population of hyperscale facilities could grow to 10,000 or more data centers, according to an analysis by James Hamilton of AWS, who predicts that the need for latency and redundancy will create interconnected cloud clusters across the globe. The rapid adoption of AI will help drive this growth, which underscores the outsized impact of the hyperscale sector going forward.

How a Hyperscale Data Center is Different

The design and construction of hyperscale facilities diverge from traditional enterprise data center space in a number of ways. Here are some examples:

REAL ESTATE AND SITE SELECTION

Hyperscale operators grow faster than enterprise companies. As deal sizes have grown, building and campus standards have grown as well. Facebook's early campuses featured three data center buildings of about 330,000 SF each. The company's recent campuses have room for up to seven buildings of about 450,000 SF. This trend has also been reflected in new campuses being built by data center REITs, which are now typically designed for between 100 MW and 150 MW of capacity, with long-term roadmaps for up to 350 MWs or more.

POWER SOURCING

Most major hyperscale operators are deeply committed to sustainability, and have ESG (Environmental, Social and Governance) policies that commit them to reducing their carbon footprint, and in some cases operating with 100 percent renewable energy. As a result, the ability to procure solar, wind or hydro-electric power is critical in landing hyperscale tenants. Depending upon the market, renewables can be provisioned through local utilities or by intermediaries (power brokers) that arrange power purchase agreements (PPAs) or other vehicles to offset a data center's energy requirements. A growing number of data center providers are developing teams that specialize in navigating the complexities of the energy markets.

POWER INFRASTRUCTURE

Energy efficiency is extremely important to hyperscale players, who seek to operate at low Power Usage Effectiveness (PUE) ratings. This can include a simplified power distribution design that reduces or eliminates conversions between AC and DC or "stepping down" voltage for servers. As an example, Google brings 48-volt power to its server motherboards, rather than the traditional 12 volts, reducing energy usage by as much as 30 percent. Some hyperscale operators also can innovate in the design of uninterruptible power supplies (UPS), foregoing centralized UPS systems in favor of in-row units or server-level solutions using on-board batteries or even fuel cells.

SOFTWARE-FOCUSED RESILIENCY

Cloud computing is bringing change to how companies approach uptime, introducing architectures that create resiliency using software and network connectivity. This includes the use of availability zones (AZs) by cloud platforms, especially Amazon Web Services. AZs are clusters of data centers within a region that allow customers to run instances of an application in several isolated locations to avoid a single point of failure. The adoption of cloud regions and AZs has become important in site selection and the configuration of data center footprints for hyperscalers.

COOLING METHODOLOGY

Hyperscale operators have been innovators in cooling, pioneering the use of fresh air cooling, higher operating temperatures for server inlet air, and other strategies designed to reduce the use of energy for air conditioning. Cooling has been the focus of constant refinement and optimization for hyperscale users, some of whom have adopted Kyoto Cooling (indirect air), membrane-based evaporative cooling (Facebook), water to the chip (Google), or rear-door chilling units (LinkedIn).

DATA HALLS

Wholesale providers have shifted to larger data halls spanning between 35,000 to 85,000 SF and supporting as much as 9 megawatts of critical power. This positions providers to compete for larger deals, including AZs for cloud providers seeking to provide geographic diversity for workloads. Developers are also refining their construction techniques, providing better per-megawatt costs on projects using larger rooms. If a hyperscale tenant doesn't emerge, these rooms can be subdivided to house smaller requirements (albeit with the tradeoff of slightly lower returns).

The Geography of Hyperscale Data Centers

In the early days of the hyperscale trend, major cloud computing campuses were often closer to cows than cities, helping create data center building booms in rural areas of Oregon, Iowa and North Carolina. That's starting to change, as cloud growth and new workloads push data storage closer to end users.

The result: More huge data centers are coming to the suburbs of major American cities, shifting servers closer to consumers. This shift in architecture will gain momentum in coming years, boosting the concentration of hyperscale capacity near tech-centric population hubs with Phoenix, Dallas, Chicago, Northern Virginia and other markets.

Perhaps an even larger trend is globalization, as hyperscale providers seek to position data center capacity to serve growing audiences in Europe, Asia, South America and even Africa.

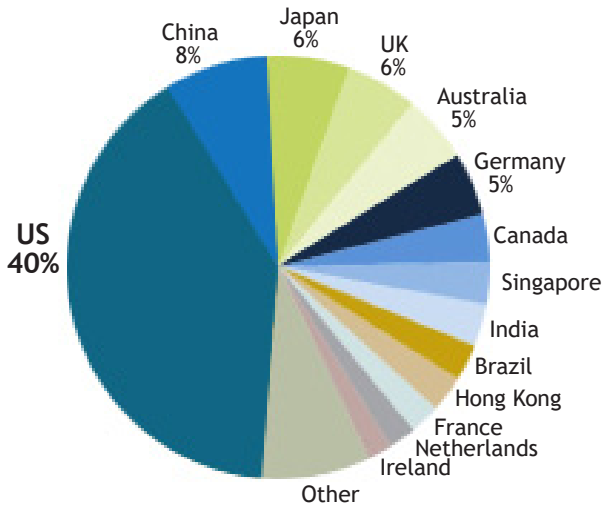
"Cloud provider demand continues to drive strong growth in the top data center markets and we expect that to spread beyond the top 20 global markets in the coming years," said Kelly Morgan, VP of Datacenter Services & Infrastructure at 451 Research. "Some individual markets may see supply growth of 20% or higher, while other slower-growth markets will offset that to provide single-digit growth overall."

> More huge data centers are coming to the suburbs of major American cities, shifting servers closer to consumers.

This global growth has driven significant merger activity as the industry's largest players—including Digital Realty, Equinix, CyrusOne and Iron Mountain—have acquired companies that provide regional expertise and existing footprints in Europe, Asia and South America.

Hyperscale Data Center Operators

Data Center Locations by Country
December 2018



Source: Synergy Research Group

- In Europe, there is strong investment in data center space in the major business centers of Frankfurt, London, Amsterdam and Paris (known collectively as the FLAP markets).
- In Asia-Pacific markets, the data center business is growing in China, Japan, Singapore, Australia and India.
- In South America, Brazil has seen robust growth, attracting major investment from several global providers.
- In the Middle East, cloud regions have recently been opened in Bahrain (AWS) and the UAE (Azure), reflecting growing customer interest in infrastructure in the region.
- Although Africa has lagged other regions in Internet infrastructure growth, there are signs of hyperscale interest. Google recently announced plans to build a dedicated subsea cable to boost connectivity along the East coast of Africa. Google's investments in dedicated cables has historically been focused on providing network traffic to its data center campuses. The new cable suggests infrastructure could gradually expand beyond South Africa, currently the primary data center hub on the continent.

Hyperscale Data Centers and Service Providers

The growth of hyperscale computing has major implication for data center service providers, driving segmentation within the service provider universe. Wholesale providers that aspire to compete for hyperscale deals have worked to optimize their supply chains and construction operations to deliver capacity at the cost, speed and scale these customers require.

Enterprise interest in cloud connectivity has also influenced the retail colocation sector, placing a premium on interconnection and cloud "on-ramps" to support hybrid IT strategies.

DEAL SIZE

As we've noted, prior to 2016 deals larger than 10 MWs were rare. In 2018 there were 11 deals of 10 MWs of more in 2018, according to North American Data Centers, including a whopping 72 MW lease in Northern Virginia. These deal sizes require different approaches to inventory and construction. Some providers are optimizing designs based on hyperscale requirements for Availability Zones.

VERTICAL CONSTRUCTION

Larger deals have also brought more multi-story construction, particularly in property-constrained markets. Building vertically allows developers to maximize the square footage on each acre of property. The most prominent example is Facebook's 1.8 million SF project in Singapore, which features an 11-story purpose-built data center structure. More typical is the shift to three-story designs in Ashburn and four-story buildings in Santa Clara.

LAND BANKING

Hyperscale operators are focused on long-term growth, which is prompting developers to pursue "land banking" strategies, acquiring land for future projects in markets where development sites are scarce. This practice has accelerated in regions like Northern Virginia, Silicon Valley and Phoenix, where developers are locking down land amid rising prices and a dwindling supply of premium sites.

Hyperscale operators are focused on long-term growth, which is prompting developers to pursue "land banking" strategies, acquiring land for future projects in markets where development sites are scarce.

SPEED TO MARKET

The challenges of capacity planning created an opportunity for wholesale providers who could deliver space more quickly. This has brought innovation in construction, including a larger focus on pre-fabricated components and lean construction. Developers are also optimizing their supply chain, typically by bulk-ordering equipment with a long lead time for delivery (like generators and UPS units) and storing them in warehouses for rapid deployment.

DEAL STRUCTURES

Leasing strategies are also becoming tools to win hyperscale deals. Recent hybrid deals combine elements of build-to-suit projects and speculative builds. Tenants lease a large powered shell, gaining control of the entire building so they don't have to worry that it will be leased to competitors. The tenant then can add capacity quickly, with the landlord building new data halls as the tenant needs the capacity—rather than when space is available on the developer's next building or campus. Developers and tenants are also discussing more right-of-first-offer vehicles on data halls and land, as well as lease-to-purchase options.

The Future of Hyperscale

The hyperscale data center has become the form factor for a new paradigm for delivering IT services. It is reshaping the global infrastructure for data centers and cloud computing platform, and disrupting the business of how IT space is bought, built and provisioned.

More change lies ahead. At Data Center Frontier, we believe the next 10 to 15 years will be an era of continuous advancement, as next-generation technologies accelerate the digitization of the global economy.

Some of the world's largest investors are raising billions of dollars to invest in digital infrastructure, citing extraordinary demand for capital to fuel the shift to a data economy.

This period will be marked by two overarching themes:

- **Innovation on the front end,** as technology companies and service providers race to deploy and commercialize new technologies like AI, the Internet of Things, augmented reality, 5G wireless and autonomous vehicles.
- **Industrialization on the back end,** as new investment streamlines the global supply chain, bringing new levels of speed and efficiency to the delivery of hyperscale capacity.

There will be business opportunities driven by scale, and others driven by specialization. Here are some of the trends we see:

NEW MONEY, NEW PLAYERS

Some of the world's largest investors are raising billions of dollars to invest in digital infrastructure, citing extraordinary demand for capital to fuel the shift to a data economy. Infrastructure funds and sovereign wealth funds are creating new companies and investing in data center construction. These investors have been key players in the formation of STACK Infrastructure, EdgeCore Internet Real Estate and Evoque Data Center Solutions, and have brought fresh capital and energy to Vantage Data Centers, Cologix, Aligned Energy and T5 Data Centers.

Massive cloud campuses will be supported by subsea cables, cable landing stations, network nodes, and edge data centers extensions, all of which become part of the strategic conversation for hyperscale computing.

SEGMENTATION AND DIFFERENTIATION

As the data center industry becomes more competitive, both new players and incumbents will seek ways to differentiate and win hyperscale business. Cost of capital will be a major differentiator, and in some markets this will mean pressure on pricing. But providers will also have opportunities to create distinctive offerings in areas beyond cost and speed, including renewable procurement capabilities, on-site generation, earthquake and disaster protection, and interconnection and network services.

IT'S A GLOBAL GAME

Hyperscale operators have global ambitions, and data center providers are racing to establish expertise and footprints in Europe, the Asia-Pacific region, South America and Africa. The ability to operate in any market will be a critical strategy for both hyperscalers and their providers.

CONNECTIVE TISSUE FOR THE GLOBAL NETWORK

Also important, but not as well understood, is the ability to help hyperscalers tie together their global operations and networks. Massive cloud campuses will be supported by subsea cables, cable landing stations, network nodes, and edge data centers, all of which become part of the strategic conversation for hyperscale computing.

EDGE WILL EVOLVE SLOWLY, THEN ACCELERATE

Edge computing promises to extend data processing and storage, moving it closer to the growing universe of devices and sensors at the edge of the network. Edge computing is evolving in tiers, with opportunities in regional data hubs, small cities at telecom towers and on devices. At DCF we think of it in terms of "edge, edgier and edgiest." These distinctions are still evolving, and are being closely tracked by hyperscale companies and data center providers, who are seeking to clarify their strategies for emerging opportunities in edge computing. Companies are deciding where they're going to play, and when the business will arrive. Just as there are many edges, there are many ways to compete and capture business.

M&A ACTIVITY WILL ACCELERATE

As edge computing, 5G and autonomous technologies evolve, we'll see a very active merger and acquisition environment featuring the hyperscale operators and the providers who support them. Some of these deals will be strategic, as key players add new capabilities to target promising niches. Some deals will be guided by geography and interest in new markets. Some deals will be opportunistic, particularly for early movers whose capital and deal flow fail to keep pace with their roadmaps and aspirations.

At DCF, we believe many players are skeptical about the timing of demand from edge computing and 5G, and may need to play "catch up" when the business materializes. M&A is the best way to accomplish this.

MOONSHOTS WITH GAME-CHANGING POTENTIAL

Hyperscale operators have been consistent innovators, have active R&D operations, and are not afraid to try radical new approaches. An example is Project Natick, Microsoft's underwater data center program, which runs servers on the ocean floor. "Since 50 percent of the world's population lives close to bodies of water, we think this is the way we want to think about the future of data center regions and expansion," said Microsoft CEO Satya Nadella. Is Project Natick just a science experiment? If it succeeds, who will help Microsoft build this type of infrastructure? We suspect we will see other potentially game-changing projects emerge from hyperscale R&D labs.

ONE THING IS CERTAIN

Relationships and experience will be more important than ever. Hyperscale operators want dependability in delivery, and consistency in design and performance. They are increasingly seeking partners rather than just vendors.

SPONSOR: Iron Mountain Data Centers

Iron Mountain Data Centers, a division of Iron Mountain incorporated, is a leading provider of data center and colocation services. Our global portfolio consists of hyperscale-ready, strategic edge, and underground data centers comprising over 3.5 million SF across fifteen locations in five countries.

More than 1,200 customers including cloud providers, global enterprises, and local market organizations choose Iron Mountain Data Centers for our thirty-year proven track record, risk mitigation, and operational efficiency. Iron Mountain colocation facilities are sustainable and provide the most logical venue for hybrid IT with easy access to the carriers, cloud providers, exchanges, and IT services necessary for digital transformation.

Hyperscale data centers need to be able to support thousands of services and millions of virtual machines. Systems are optimized for storage and speed with a flexible and agile environment and scalability.

Comprehensive compliance support ensures highly regulated enterprise and public sector customers are protected as they change their organizations to thrive in a multi-cloud world.

Iron Mountain offers some of the world's most secure data centers. Our multi-layered approach to security in our highly-protected facilities includes a combination of technical and human security measures.

OPTIMIZED FOR HYPERSCALE

Hyperscale data centers are in a league of their own. They need to be able to support thousands of services and millions of virtual machines. Systems are optimized for storage and speed with a flexible and agile environment and scalability.

The biggest benefit of a hyperscale colocation solution is the ability to quickly scale up or down. Hyperscale data center providers like Iron Mountain offer the security, reliability, scalability and sustainability that hyperscale cloud providers need.

Our hyperscale data centers support wholesale deployments with consumption-based power pricing, the ability to secure low electrical rates on a long-term basis and optimal PUE through geothermal cooling and containment innovations.

INFRASTRUCTURE EVERYWHERE YOUR DATA NEEDS TO BE

From Amsterdam to Virginia to New Jersey, our hyperscale data centers bring you closer to end users. Iron Mountain has a global portfolio of hyperscale colocation facilities to meet your specific needs.

Iron Mountain operates international data centers in Amsterdam, London and Singapore to support global customers. It is actively preparing to deploy capacity in Frankfurt.

Beyond its existing footprint, Iron Mountain operates more than 1,400 facilities in 50 countries, and brings significant real estate expertise and the relationships required to quickly source opportunities in new markets.

GREEN POWER: BUILDING BLOCK FOR FUTURE HYPERSCALE GROWTH

The rapid growth of hyperscale computing has underscored the data center industry's important role in retooling the economy for a sustainable future.

Iron Mountain recently became the first provider to implement a new reporting protocol that makes it easier for companies to apply green energy credits from their use of third-party colocation space to their corporate sustainability goals.

Iron Mountain has achieved a 100% renewable energy utilization rate for Data Center operations worldwide in 2019.

The Iron Mountain Green Power Pass (GPP) provides an annual certificate validating that 100 percent of the power a tenant uses is from qualifying renewable resources. Participating customers receive a detailed report on their power consumption and full documentation on the amount, source, and chain-of-custody of the wind, solar or other renewable electricity associated with that facility.

The Green Power Pass is the latest step in the growing focus on sustainability at Iron Mountain, which has arranged power purchase agreements (PPA) of renewable energy to offset the use of electricity in its data centers. Iron Mountain has achieved a 100% renewable energy utilization rate for Data Center operations worldwide in 2019.

A BRIDGE TO THE CLOUD

Iron Mountain is a global leader in storage and information management services with more than 42,000 data management customers and 120 exabytes in storage. Our recently expanded Data Restoration and Migration Services (DRMS) enable customers to accelerate digital transformation efforts with seamless data migration in and out of any cloud or location. Our cloud partners include Amazon Web Services (AWS), Microsoft Azure, and Google Cloud. Iron Mountain recently announced it has joined the AWS Partner Network (APN) as a Select Technology Partner.

Iron Mountain partners with customers to formulate a data strategy that helps save time and money and maximizes the value of tape-based data migrated to the cloud. The expanded DRMS accelerates IT modernization, aligning to an organization's digital transformation initiative while providing data protection to meet with regulatory and compliance requirements.

We are guardians of changemakers. **For more, visit www.ironmountain.com/data-centers**