VERTIV

Colocation Data Center Market Prospectus

Observations and Predictions
from Industry Experts

Definitely Not Business as Usual

Much of our world has transformed this year, including how we consume and store data. Since March, the global pandemic has significantly changed network traffic patterns. There has been a surge in employees working from home, using cloud-based services, while also streaming far more television, film and music. More computing power has been sent to the edge, closer to where it is needed.

In business, the pandemic appears to have accelerated an existing trend among enterprises to move their data from their own premises to colocation data centers (colos) and cloud services — often a combination of the two. The pandemic has underscored the importance of being able to scale computing power quickly, as well as being able to access data center IT and fix problems remotely.

Meanwhile, as companies' computing power continues to grow each year, an increasing number of organizations are seeking alternatives to their existing network architecture.

Colocation is often a consideration because it offers "higher availability, reliability, certified building tier levels, energy efficiency, dedicated facilities management, and the ability to scale," according to Gartner, a leading global research and advisory firm for the IT industry.

Colos are essential for companies who need to move computing closer to users to reduce latency and improve network performance for the benefit of employees and customers. They have long been used by enterprises and "hyperscalers" — cloud-based technology companies including Google, Amazon Web Services and Microsoft — to build out their network infrastructure. In fact, these hyperscalers are often setting the standards for major colocation providers around the globe with smaller providers following their lead.

By region, some of the faster-growing colocation markets are "emerging" markets in Asia and Africa. Advances in modular, prefabricated data centers and remote monitoring, are also fueling growth.

Additionally, national and international regulations are encouraging advances in the performance and energy efficiency of data centers. Experts predict that technologies including 5G mobile networks, big data, and artificial intelligence will further increase demand for colocation services during the next five years and longer.

These and other trends are analyzed in our prospectus. It includes commentary from Vertiv's experts around the world who shared their thoughts in a live event on LinkedIn titled "Location, Location, Colocation: Who in the Market Is Winning and Why?"

Prospectus Contributors:
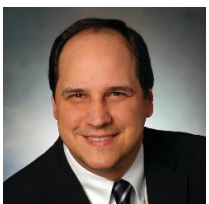
Peter Panfil
Vice President of Global Power, North America

Peter Lambrecht
Vice President Sales Data Centre Applications, Europe

Pierre Havenga
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Tony Gaunt
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Key Findings

- We see secondary European markets growing. Africa and the Middle East are catching up fast with significant infrastructure developments that will see hyperscalers move more aggressively into the region. In Asia-Pacific, emerging markets include Indonesia and Thailand and the Americas expect increased growth not only in mature North America markets but also in Latin America.

- Regulations about data sovereignty are challenging hyperscalers, who would typically store data offshore, to pursue a more localised strategy and this has increased the domestic demand for colocation.

- Colocation operators are needing to build faster so they are standardising infrastructure and using modular and scalable prefabricated solutions to allow them to quickly add capacity to meet demand without overprovisioning. They are also seeking innovative ways to generate revenue while enhancing system resilience by feeding back spare energy capacity from their uninterruptible power supply (UPS) systems into the national grids.

- The future for colocation operators looks bright with much of the growth due to investment from hyperscale data center owners and thanks to new technologies such as 5G and the increasing reliance on edge data centers.

Q. How is the colocation landscape evolving?

Data center services have practically achieved utility status, as remote work and learning require new levels of connectivity, which has led to rapid market growth in many global regions.

> *The current global situation is driving more and more people to utilize the cloud via colocation facilities and data centers as a whole. Our industry is now the fifth utility alongside electricity, gas, water and telecommunications.*
>
> — Tony Gaunt, Senior Director, Colocation Cloud and BFSI, Asia

Europe is a very mature market with colocation providers historically concentrated in the cities of London, Amsterdam, Paris and Frankfurt. However, the landscape is broadening. Secondary markets in Poland, Spain, Italy, Dublin and the Nordics are now growing thanks to the need for lower-latency for the delivery of services. This had led to hyperscalers increasing direct and indirect investment in these markets. See Figure 1.

The global colocation market is fragmented. According to 451 Research, there are roughly 1,600 companies providing colocation services worldwide. There is likely to be a lot more consolidation among colocation data center providers in months and years to come. We are seeing smaller companies first partner with the big players and then those partnerships turn into acquisitions.

"One big consolidation happened earlier this year with Digital Realty and InterXion getting together, completing their offering in Europe," said Peter Lambrecht, vice president for sales data centre applications in Europe..

Data centers are getting bigger, especially in Europe.

"Five years ago, companies were deploying 10 or 20 megawatts in a data center. Now operators are talking about a campus with 100 or 200 megawatts, and we're going to roll out that capacity in blocks of 40 megawatts."

The largest cloud platform providers have signed leases so large that they have altered data center size by a factor of 10, according to a report from real estate services company Cushman & Wakefield.

While Africa and Middle East colocation markets are less developed than Europe, the Middle East appears to be catching up fast, according to Pierre Havenga, managing director in Middle East and Africa. It is enterprise in the Middle East that is the engine of growth in colos. In Africa,
it is hyperscalers that are "moving aggressively" into the region as infrastructure is improving.

One of the region's biggest tech infrastructure projects is 2Africa. This 37,000-kilometre subsea fiber cable will connect 23 countries — 16 in Africa, two in the Middle East, and five in Europe. Not only will the project deliver internet capacity, redundancy, and reliability across Africa, it will also supplement the demand for capacity in the Middle East, and support further growth of 4G, 5G, and broadband access for hundreds of millions of people. Project investors include China Mobile International, Facebook, Telecom Egypt, Vodafone and others.

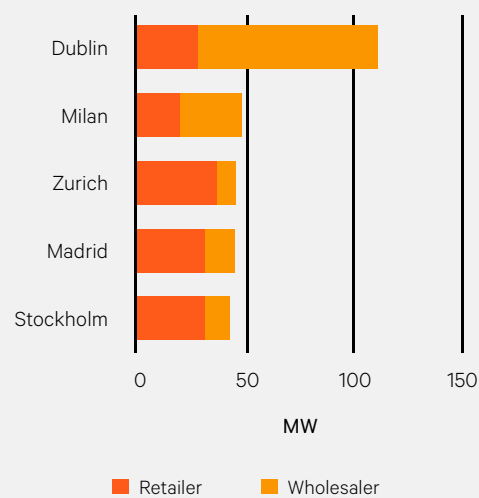**Market Supply (MW), Sample of Larger Tier 2 European Markets**

Figure 1: Source CBRE Europe Data Centres Q2 2020

Africa Cable Landing Locations

The project is expected to go live by 2024 and deliver 180 terabytes per second on key parts of the system.

Figure 2:
Source 2Africacable.com

Africa's Thriving Data Center Market

Despite a boom in consumer demand for internet data, the proliferation of smartphones, a fast-growing cloud computing market, and growing business demand for colos, Africa's colocation market has under delivered. It has been held back by sluggish broadband speeds, unreliable power supplies, a scarcity of capital, and limited infrastructure necessary to rapid growth in data centers.

However, in the past three years, the market may finally have turned the corner after large investments from large tech companies and private equity.

In 2017, Microsoft opened its first cloud data centers in Africa. Other investors have followed, including Actis, a private-equity firm which in March said it was investing $250 million in African data centers.

In Asia-Pacific (APAC), growth remains strong in the traditional markets of Singapore, Tokyo, Hong Kong, Sydney and Melbourne. It also has emerging markets such as Indonesia and Thailand.

> *"Multi-tenant data center companies, often from the United States, are starting to look into what are new APAC markets for them," Gaunt said. "There's a lot of expansion."*

Q. As colocation providers are operating or moving data across national borders, what role are regulations playing?

Regulations about data sovereignty and the environment are having an increasing effect on colocation operations around the world. These regulations vary not only by country but also by city, which can make compliance more of a challenge.

Because data sovereignty stipulates that data is subject to the laws and governance of the nation in which it is collected and processed, hyperscalers who would typically store data offshore are now pursuing more localized strategies. This trend is increasing the domestic demand for colocation.

In some regions, including Europe, regulations are also encouraging data center companies to innovate and make improvements in efficiency and sustainability. Amsterdam requires a certain power usage effectiveness (PUE) to even get a license; Frankfurt has strict noise restrictions; and cities in Switzerland have restrictions on the refrigerant quantity and type used in colos.

"Regulations are becoming more predominant and tougher, but it's often for the good of society," Lambrecht said.

Africa typically lags other markets in terms of regulations, but it is making advances. Renewable energy requirements are becoming much more common, especially given the lack of reliable infrastructure in most regions.

According to Havenga, infrastructure and regulations will encourage growth of colocation in Africa. Demographics will also support growth. The continent's median age of just 19.7 means a large and growing working population to support the market.

However, there is still plenty of room for improvements in African data center infrastructure, Havenga said. "One of our customers in Nigeria built a colocation facility eight years ago and it's still running 24x7 on diesel generators."

Q. What are some best practices helping operators meet the growing demand for their services?

The adoption of new technology is accelerating and the time to implement that technology is being compressed. In response, many colocation providers are standardizing infrastructure for consistency of supplier, product and design. They are also finding new ways to save money while also helping to support a stable national grid energy supply.

A growing number of data center owners are feeding back spare energy capacity from their uninterruptible power supply (UPS) systems into the national grids, generating revenue without compromising IT resiliency. And according to our experts, more customers are switching from 48-volt DC power supplies to 400-volt DC power — using Vertiv power conversion technologies for improved power efficiency, lower costs, and a more scalable power supply for responding to changing power demand.

Advantages for our customers include power efficiency of more than 96.5%, which reduces power consumption and operating costs, and improves flexibility in large facilities and data center layouts.

The way colos are being built is also changing. A growing number of developers are using modular and scalable solutions that allow them to quickly add capacity to meet demand without overprovisioning. It's this type of approach that allows colos to scale with demand while better controlling operating and capital costs.

T-Systems' Prefabricated Modular Data Center in Spain

About the Company

As a pan-Canadian carrier- and cloud-neutral provider of data center solutions, eStruxture Data Centers is on a mission to meet the high-density, hyperscale demands of modern enterprise applications.

Offering power densities of 30 kW a rack as standard, with more available upon request, the company provides customizable colocation and connectivity services to business across a variety of verticals.

With ample space and capacity across Canada, eStruxture is well positioned to meet the diverse needs of customers looking for retail colocation solutions or wholesale data center deployments. Its data centers are highly connected with access to all major carriers, dark fiber providers, public and private cloud providers, Internet exchanges (IXs), and more than 900 companies.

www.estruxture.com

eStruxture Data Centers' customers are building hybrid environments that mix colocation, managed services, and public cloud architectures. To support these options and provide choice in design, eStruxture focused on modularity to evolve alongside its customers.

The eStruxture team sought a partner to help build out its MTL-2 colocation facility with highly resilient electrical and mechanical infrastructure in a phased, modular approach. This and subsequent builds enable eStruxture to provide its customers with more locations, connections and capacity.

Summary

Location: MTL-2 data center in Montreal, Canada

Vertiv Solutions:

- Liebert® EXL S1 UPS units with lithium-ion batteries (LIB) installed in parallel 2+1
- Liebert® DSE free-cooling economization system with Liebert® iCOM™ controls
- Liebert® PPC power conditioning and distribution cabinet with branch monitoring
- Liebert® RX distribution cabinet with branch monitoring
- Vertiv™ VR racks with Vertiv Geist™ rack power distribution units (rPDUs)

Results:

- Optimized use of computing space allows for additional customer offerings such as dedicated halls with office space, storage, and disaster recovery options
- Ability to support customers with high-density requirements by offering up to double the capacity of most competitors with 30 kW per rack standard
- New facility ready for turnover six months earlier than previous builds

> " *Working with Vertiv helped us achieve all our goals and enabled us to deploy capital expenditures in a phased fashion that is in line with our revenue growth. By not having to over-build from the outset, we have great flexibility and agility in expanding alongside our customers, which is a central component of our growth model.* "

— Todd Coleman, President and CEO, eStruxture

According to Peter Panfil, vice president of global power in North America, prefabricated modular (PFM) data centers are especially in demand in Latin America. Prefabrication (manufacturing components off site) and modularity (building in discrete units) are changing how data centers are built. Designing, configuring, and fabricating data center infrastructure off site is creating tighter integration across systems, streamlining processes and managing the whole process more efficiently.

Havenga added, "You take a lot of the risks away by having a modular system that can be tested at a factory level and assembled, and you have a live operation in a very short period of time."

PFM solutions are proving useful in Africa as seen with the prefabricated landing station and 10-rack modular data center Vertiv built for MainOne, a West African telecommunication and network company serving the 7,000-kilometre submarine cable system along the coast of West Africa.

However, PFM is not just containerized data centers. A wide variety of customizable form factors now exist to meet almost any customer requirement for new capacity from white space to power to cooling. In fact, the market for PFM data centers is set to expand at a five-year compound annual growth rate (CAGR) of 14.4% through 2021.

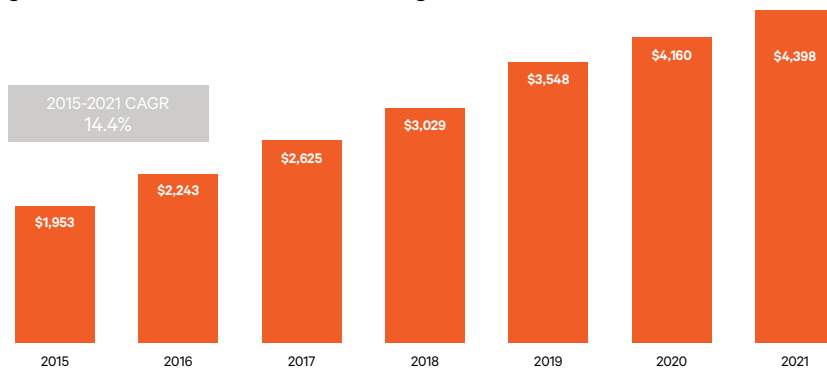**Aggregate PFM Revenue Forecast Through 2021 ($M)**

Figure 3: *Source 451 Research, 2018*

## Q. What are industry experts predicting for the future of the colocation market?

Experts agree that the industry will continue its strong growth over the next two to five years, thanks to new technologies such as 5G and improving internet connections in emerging regions such as Africa.

Much of the growth in the colocation market will also be due to investment from hyperscale data center owners such as Google, Amazon Web Services and Microsoft. Modular and prefabricated colocation solutions are becoming more common, helping companies build data centers faster, with more flexibility and potentially at a lower cost.

The fastest growth is likely to come in emerging markets, especially in Africa, Asia and Eastern Europe. Experts also predict that growth in emerging and mature markets is likely to spark further consolidation in the fragmented colocation market.

"Investment will continue to happen despite the global pandemic we are facing, and frankly because of it," Gaunt said. "We are seeing double-digit growth year on year. That's going to continue for the next five years as an absolute minimum."

Key Points on Colocation Data Center Market Growth
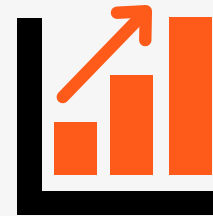
10.92% CAGR 2020-2025

Valued at $31.39 billion in 2019, the market is expected to reach a value of $58.28 billion by 2025
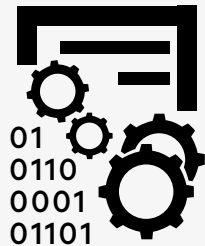
6.8 ZB in 2016 to 20.6 ZB in 2021

Increases in data production have raised the demand for data centers globally and that data is estimated to increase 35% every year

78% of the industry's capacity is in NA and APAC

While NA and APAC are the largest markets, Europe is expected to be one of the fastest growing due to increasing demand from in-region hyperscalers

Source: Research and Markets Data Center Colocation Market – Growth, Trends, and Forecast (2020-2025) Report