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HONING THE
EDGE
Understanding Edge Data Center Applications

Dave Mullen and Michael Lawrence

More and more, technologies require near instant feedback from the network. Whether it is autonomous vehicles, smart building technology, or IoT sensors, data transfer latency needs to be shorter. However, extremely low latency simply cannot be accomplished without bringing the data center's computing power closer to the connected device's location — to the edge of the network.

Utilizing the edge is about compute enabled, low latency, highly secure networks running modern software applications. Companies in every industry can leverage edge data center technologies, but only if they have a clear understanding of how these data centers will be applied. Edge data centers are not universal in their design, and the cabling infrastructure will be determined by the application.

Segmentation of Edge Applications

Roughly 90% of processed data is in a centralized data center or cloud, a figure that is subject to rapid change. Gartner predicts that more than 50% of data processed will be at the edge by 2025. The outflow of data processing to the edge is spurred not only by lower latency demands but also by the new capabilities of 5G.

IN THIS **ISSUE**

LEVITON **POLL**

What type of edge data centers are you involved in or considering?

49% Not Currently Considering

34% On-Premises

Regional Cloud
10%

Service Provider
8%
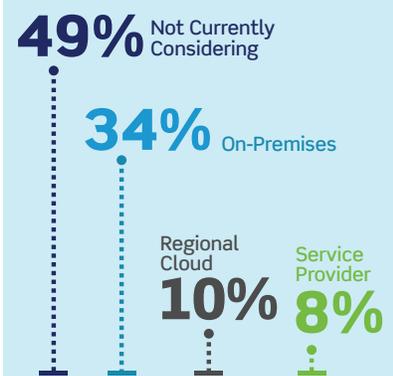
From a June 2023 survey of 113 network professionals.

Understanding Edge Data Center Applications

With speeds up to 10 Gbps at peak, and 100+ Mbps average, 5G is a compelling accelerant moving data processing to the edge. Compared to 4G/LTE Advance, 5G offers a 100x increase in traffic capacity and network efficiency, and a 10x decrease in end-to-end latency.

A good general definition of edge computing comes from James Stranger, the chief technology evangelist at CompTIA. **According to Stranger, the edge is "the practice of capturing, storing, processing and analyzing data near the client, where the data is generated, instead of in a centralized data-processing warehouse."** But simply storing data at the edge of the network, rather than in a traditional hyperscale cloud data center, doesn't necessarily mean there is only one edge. Increased demand for 5G, and IoT applications utilizing 5G, continue to influence significant shifts in computing out of the cloud and into the specialized applications of edge data centers.

Edge applications can be simplified through segmentation:

User Edge

On -premises data centers designed to run specific applications for low latency and critical business functions.

Access Edge

Telecommunications organizations operating micro data centers in facilities in secondary cities. These may be applied to smart cities, IoT, and transportation.

Regional Edge

Regional colocation facilities and cloudlets that may be developed by existing hyperscale data center operators. Some use cases are smart buildings, health care facilities, and smart grid utilities.

Even though the edge is part of an overall data center strategy, edge facilities must function as stand-alone data centers across multiple branches, or regions, where installation and maintenance can vary. Different segments of the edge encompass the different types of data processing needs, which are all ultimately motivated by unique network demands and specifications. Latency, reach, and network infrastructure are different depending on the various applications.

	User Edge	Access Edge (Service Provider)			Regional
Category	On-Premises	Tower Edge	Outer Edge	Inner Edge	Regional Edge
Geographical Reach and Service	On-Site	Local	Domestic	Domestic	Regional
Number of Cabinets (TYP)	~1	~2	~5	~10	100+
Latency	<10ms	<20ms	<30ms	<40ms	<50ms
Panel Density (LC ports / per RU)	144/96/72	144/96/72	144/96/72	144/96	144/96
Typical Fiber Type	Multimode	Multimode	Multimode/ Single-mode	Multimode/ Single-mode	Multimode/ Single-mode
Data Rates	10G	10G/100G	100G/400G	100G/400G	100G/400G/800G

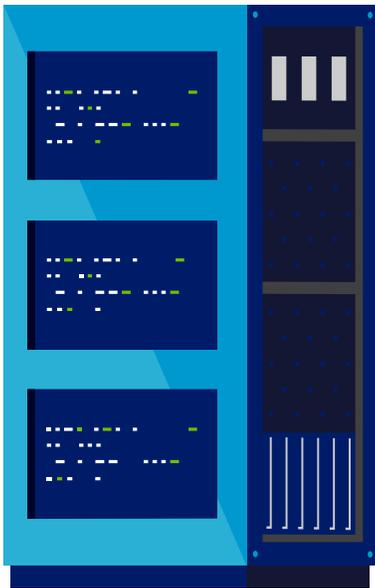All values in this table are typicals and not definites.
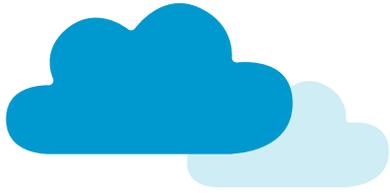
Data Rates and Cabling Infrastructure

It is important to recognize that the effect of 5G deployments goes beyond adding more edge computing — it will also place more strain on the core cloud computing performed in centralized data centers. Roughly 90% of data is still processed in these data centers today, and 5G will speed up the introduction of 400 Gb/s and 800 Gb/s optics and switches in hyperscale and cloud data centers to move data faster. 400 Gb/s switch options entered the market in late 2018 and early 2019, and adoption of these new switches took off in 2020. The new 400 Gb/s switches, based on 12.8 Tb/s chips, provide much faster speeds and greater network density. Today, 200 Gb/s and 400 Gb/s switches make up 20 percent of total data center switch shipments, according to a Dell'Oro 1Q 2023 Ethernet Switch Data Center Report.

However, as we now see more 200 Gb/s, 400 Gb/s, and eventually 800 Gb/s in hyperscale cloud data centers, we will also see 100 Gb/s optics deployed at servers and in edge data centers. 100 Gb/s is now a fundamental building block in data centers, and there will remain a strong demand for 100 Gb/s.

It is also important to note that the majority of 100, 200, and 400 Gb/s transceiver options are for single-mode networks because of bandwidth and distance capabilities. This trend is also partially a result of the decreasing cost of single-mode optics, prompted by their adoption by cloud companies with major purchasing power, and recent standards committee activities that specify more single-mode options for higher speeds. As this trend continues, centralized and near edge data centers may find single-mode solutions to be more enticing.

Network Security at the Edge

Networks for micro data centers use a combination of copper and fiber cabling, usually with copper connectivity and fiber uplinks. As micro data centers are sometimes located in more exposed or even ruggedized environments, cabling and connectivity should be robust and protected within the rack. These data centers may not have back up power or the high levels of security, fire detection, or cooling that are all part of a centralized data center. Secure connectors and assemblies that lock into ports might be a greater priority, along with locking cabinets and additional security.

As edge data centers are often distributed in more remote locations, intelligent port management may be helpful in monitoring networks from a central location. Intelligent patching allows for real-time visibility of the status of network connections. Managing and tracking connections is a simple means to identify unauthorized access and to control disruptions caused by human error. As the number of edge data centers grows, intelligent patching is scalable to accommodate increased demand, offering continual network security as the network grows.

Ultimately, edge and micro data centers can end up having very different requirements than large data centers. These differences include the physical infrastructure, and there are numerous considerations you can encounter. Looking for more guidance on edge data center applications? **Learn more in our on-demand webinar, Honing the Edge.**

Gartner predicts more than

50%

of data processed will be **at the edge by 2025**

Source: Gartner "Predicts 2022: The Distributed Enterprise Drives Computing to the Edge"

Enable Greater Network Distances with an Enhanced OneReach™ System

Increasingly, networks need to connect and power devices inside and out. The typical security system requires cameras, emergency phones, and wireless access points located outside in parking lots, parking garages, and in various other places on the campus. The OneReach solution is revolutionary for these remote applications.

OneReach network extenders combine fiber optic strands for data transmission up to one gigabit per second and copper conductors for Power over Ethernet (PoE) in a single composite cable. OneReach takes PoE data to all new distances, allowing network extensions up to thousands of feet away. While traditional PoE installations deliver up to 328 feet, the OneReach System can deliver power and data up to 10,000 feet to support cameras, emergency phones, and wireless access points at remote locations.

Recently, Leviton made new enhancements to the OneReach PoE Extender System. The new enhancements include:

- **New 2-port and 4-port remote PoE devices** meet IEEE 802.3 PoE to network powered devices requiring up to 100 watts (up to PoE Type 4, Class 8), supporting more power-hungry devices such as pan-tilt-zoom security cameras and point-of-sale kiosks.

- **The 2-port and 4-port Remotes** meet the rigors of outdoor applications with IEC 61000 4-5 Level 4 Surge Immunity (4000 V). This is a significant improvement over the previous built-in basic 1,500 V TVSS.

- **New 2U Power Injector Chassis** creates a space saving footprint, with more terminal block connections for additional power supply or port and media module capacity.

- **New one-slot Power Supply Module** offers a quieter cooling fan and reduced size from the current model.

These c(UL)us Listed enhanced devices replace current Leviton OneReach multi-port remotes, chassis models, and power supply modules.

"Reliable power and data transmission for remote security cameras and wireless access is more important than ever in places like college and corporate campuses, sports stadiums, and large distribution centers," said **Teresa Hoffman, product manager for Leviton Network Solutions**.

> Leviton is dedicated to delivering a simple, reliable, high performance PoE network channel extension system, and **we are constantly investing in improvements to support our customers**.
>
> **Teresa Hoffman**

Want to learn more? Visit **Leviton.com/OneReach**

NEWS YOU CAN USE

PRODUCT

Behind the Display Solutions

Organize the tangle of cables behind the display. Leviton makes it easy to consolidate data, TV, audio, and electrical connections behind flat panel displays. The **Recessed Entertainment Box** and Wireless STRUCTURED MEDIA™ Center offer two appealing flush in-wall solutions for managing connections invisibly behind wall units. These multimedia enclosures are ideal for both new construction (stud-mounted) and retrofit (wall-mounted) applications.

SPOTLIGHT

Electric Vehicle Trends

Global investment in electric vehicle manufacturing and battery production is expected to exceed $626B by 2030. 3.1 million electric vehicles were sold in 2020, representing 4.7% of all new passenger car sales. EV sales are projected to jump to 48% of passenger car sales by 2030. What's contributing to the manufacturing boom?

Firstly, corporations and governments around the world have adopted commitments to reduce their emissions to address the climate crisis. Fleets of electric vehicles offer emissions reductions.

Additionally, as battery costs decline, more car manufacturers have the potential to reach price parity with internal combustion vehicles. Some estimates claim price parity could come as early as 2024. Lastly, governmental policies, like the Inflation Reduction Act and California's Clean Cars, have codified tax credits for EV manufacturers and consumers. The booming electric vehicle market will require smart manufacturing and charging infrastructure to maintain its growth. Leviton is an experienced partner to EV factories and EV customers.

Learn more at **Leviton.com/NS/EV**

TECH TIPS

Antibacterial or Antimicrobial?
What is the difference?

For environments where surface cleanliness is a daily pursuit, parsing the differences between products labeled antibacterial or antimicrobial can be a challenge. This is especially true as these two terms tend to be used interchangeably. For one, **an antimicrobial product has a substance capable of killing or inhibiting the growth of one or more microorganisms**, such as bacteria, fungi, and protozoa.

On the other hand, **an antibacterial product specifically refers to substances that are designed to kill or inhibit the growth of bacteria**. In other words, when a product is labeled antimicrobial, it may be treated to protect against one or many microorganisms. The best practice is to confirm with the manufacturer about how the product is protected.

Antimicrobial

Antibacterial
BACTERIA

MILDEW

MOLD

ALGAE

VIRUS

ASK THE EXPERTS

Q: What is the benefit of sub-jacketed fiber?

A: Sub-jacketing allows compliant fiber groups to be installed in individual routing paths, giving network managers more options with breakouts in racks, cabinets, and cable management routing. Leviton OPT-X™ SJX cable and assemblies use sub-jacketed fibers. SJX is designed for higher fiber-breakout flexibility, the latest transceiver options, and long cabling runs.

NEWS YOU CAN USE

INDUSTRY

Ed Fenton, Ronald Tessier

Ronald Tessier, Senior Director of Operations for US Copper Cables at Leviton, was recently awarded with the **2023 Distinguished Career Award** by the Wire & Cable Manufacturers' Alliance (WCMA). We're thankful for all Ronald does to ensure that Leviton brings the best to our customers. **Congratulations, Ronald!**

Questions?
Comments?
Ideas?

We want to hear from you!
Email: **crosstalk@leviton.com**