Digital Infrastructure for Today's Technologies

Industry Insight Brief #3

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Moving Beyond Legacy Within the Digital Revolution

There are vital considerations for the design and architecture of digital infrastructure within the data center as organizations seek to leverage modern technologies that will help them stay ahead of the market. In supporting the new value equation that includes digital innovation alongside business efficiency and productivity, modernization efforts are actively cementing the data center as a critical asset of every organization and causing a shift away from legacy infrastructure.

"CIOs need to transform the 'culture' of the IT team in the next two years from a focus on acquiring/managing/ supporting products within corporate data centers to delivering the diverse and ever-evolving portfolio of cloud- and edge-based resources that underlay their organization's modern digital services."

-Richard Villars
IDC Research Vice President

As organizations around the world look to modernize their data centers into the digital era, they need to acknowledge that just because something works, it doesn't mean that it's

bringing value to the business. The following trends and technologies are helping to move organizations beyond legacy and become a significant player within the digital revolution.

Low-Latency Networking

In a recent Wall Street and Technology magazine webcast poll, attendees were asked, "What is the greatest limitation or challenge in your current infrastructure and organization around processing and analyzing real-time market data?" Of the respondents, 43.1% stated that latency was their biggest concern. Hurdles to near real-time transmission (virtually zero latency) include:

- Traditional store and process systems
- Processing both live and historical data in tandem
- The inability to accurately predict and rely on bandwidth
- Managing imperfections within a data stream
- Load distribution/load balancing and hardware performance
- Decimalized trading/finance in real-time
- Non-deterministic networks (such as Ethernet)
- Homegrown and or poorly-performing infrastructure

Take the financial trading world for example. The slightest amount of latency can result in millions of dollars' worth of losses. Research from TABB Group estimated that if a broker's electronic trading platform is five milliseconds (ms) behind the competition, it could lose at least 1% of its flow—that's $4 million in revenues per ms. Up to 10 ms of latency could result in a 10% drop in revenues. If a broker is 100 ms behind the fastest broker, they may as well shut down their electronic trading engine and become a floor broker. Similarly, Amazon found every 100 ms of latency cost them 1% in sales. To put that into perspective, a page load slowdown of just one second could cost Amazon $1.6 billion in sales each year. Latency is also a significant limiting factor in emerging real-time applications like augmented and virtual reality, artificial intelligence, and machine-to-machine communications.

Latency is typically caused by distance, inefficient network design, erroneous equipment configuration, and issues within the physical infrastructure. Hidden latency can reside in switches or other active networking equipment, or it can be a result of limited uplink speeds. Within the physical cabling infrastructure, latency can be caused by exceeding maximum channel distance and link loss requirements,

or by simply not having the right cable media to support the required speed. Poorly performing cabling infrastructure can cause retransmissions within the network that significantly contribute to latency. That is why it is imperative to strategically design the infrastructure, select high-performance, reliable components, and thoroughly test the installed cabling plant. In other words, the best way to address serious latency issues is to strategically invest in quality cabling infrastructure.

Even if it's not needed today, it is highly recommended that the data center cabling infrastructure be designed and selected to support the latest application speeds available for uplinks and server downlinks. To support low-latency networking to the edge device, today's LANs should be designed with a maximum capacity of 10 Gb/s. Shielded Category 6A or fully shielded Category 7A cabling systems within the LAN further support improved latency performance due to noise immunity, decreased propagation delay skew, lower heat rise, and improved insertion loss.

Intelligent Building Growth

Intelligent buildings are rapidly becoming the gold standard in commercial enterprise construction. According to the latest reports,

the global intelligent building market is expected to reach more than $265 billion by 2028. With the majority of building owners, operators, and executives having plans in place to implement intelligent building technologies, it's clear that there's a revolution going on inside the walls and ceilings of facilities.

To enable smarter buildings, facilities are rapidly shifting to unified networks that allow voice, data, security, audiovisual (AV), LED lighting, HVAC, and other low-voltage building systems to communicate and share data for actionable results and operational efficiency. This integration ultimately provides significant cost savings and sustainability over the life of a facility, while improving overall user experience, well-being, and productivity. A key aspect of integrated intelligent building systems is the ability of the physical infrastructure to also deliver DC power to devices using remote powering technology like Power over Ethernet (PoE). More devices today can be connected and powered over converged and unified IP- and PoE-enabled infrastructure, including:

- LED lighting and control
- Emergency lighting systems
- Wireless access points (WAPs)
- Security surveillance cameras

- Door access control devices
- Audiovisual displays and equipment
- Sound masking systems
- Public safety and cellular distributed antenna systems
- Vending machines and cafeteria point-of-sale systems
- Electrical-vehicle charging stations and smart parking devices
- HVAC, elevator control, and other building automation devices

The growth of intelligent buildings in commercial construction will also has a significant impact on data centers. With more connected devices and converged systems, more data than ever will need to be transmitted, processed, and stored via data centers. At the same time, many of the emerging applications that support an intelligent building, such as artificial intelligence, advanced data analytics, augmented and virtual reality, and machine-to-machine communication require higher bandwidth and lower latency. This will further impact data center design and deployment, including more complex systems to support a wider range of applications and the need for edge data centers that bring processing closer to users and data sources for lower latency and faster performance.
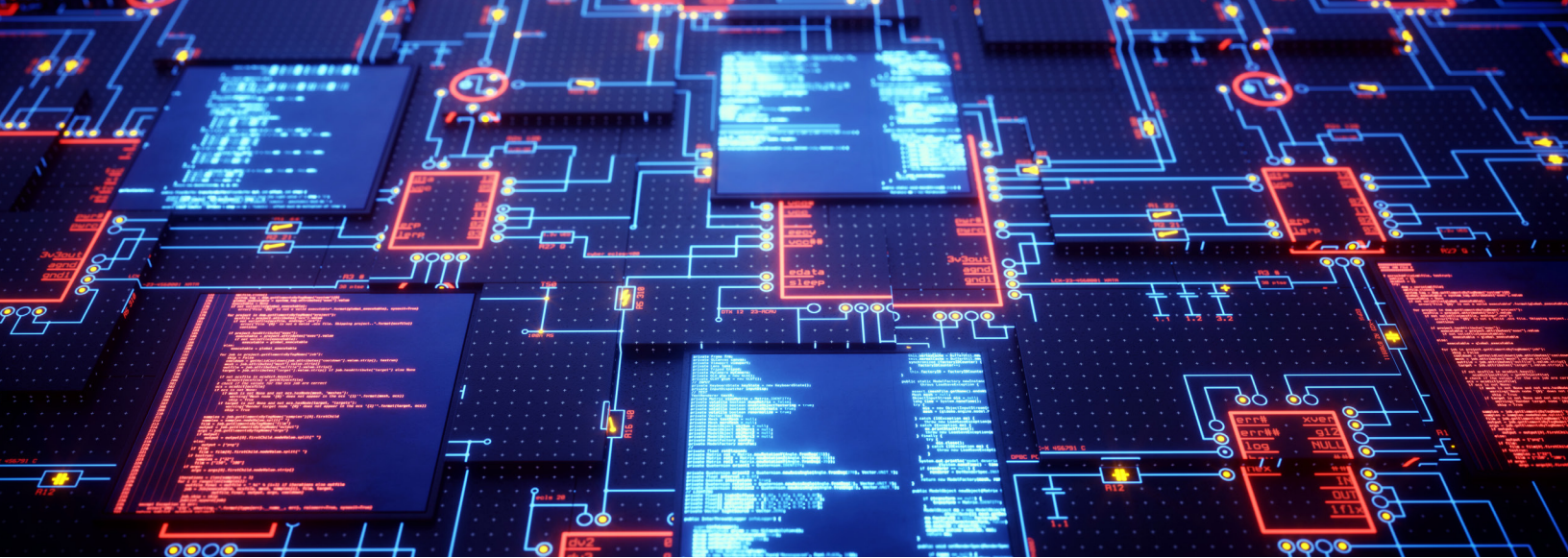
The Rise of Automation

Leaders in the digital infrastructure space are actively looking for ways to increase the value of their business, including through automation. A recent Uptime Institute survey found that 73% of data center managers expect to increase automation due to the pandemic. Even as server volume continues to climb, the use of automation will translate into smaller operations teams. The result, according to Uptime, will be "smarter, darker data centers."

> *"Following a scramble to effectively staff data centers during a pandemic, many wary managers are beginning to see remote monitoring and automation systems in a more positive light, including those driven by artificial intelligence. An adoption cycle that has been slow and cautious will accelerate."*
>
> **-Andy Lawrence and Rhonda Ascierto**
> ***Uptime Analysts***

Similarly, the latest AFCOM State of the Data Center report indicated that almost three in four respondents (70%) report using data center automation and control, most commonly for smaller tasks (37%). Nearly 18% of respondents are using these technologies for multi-tenancy and user load balancing purposes. It's important to note that these technologies are not here to replace people. Instead, a new focus is around human-centric technologies that aim to augment skill sets.

Automated infrastructure managed solutions are key to making digital infrastructure innovative and more manageable. These solutions are developed specifically to eliminate legacy infrastructure complexity and deliver highly intuitive, interactive, reliable, and efficient operations. These smarter systems provide the following benefits:

- Real-time monitoring with complete circuit diagrams and network information stored in a software-driven database that is automatically updated in near real-time as moves, adds, and changes are made, ensuring that the network condition is known at all times

- Real-time alerts for IT or security staff to know immediately when unauthorized events occur on the network, such as unauthorized devices attempting to connect to the network

- Asset management that allows for end devices to be tracked by location, equipment type, manufacturer, service, or other criteria, providing better visibility and utilization of these critical assets

- Reduced downtime by quickly identifying the location of faults in the network. Information is then displayed to guide on-site staff, drastically reducing the time required to find and fix a network outage
- Real-time view of networks across remote facilities, helping to ensure compliance with corporate IT policies and discouraging unauthorized changes to the network
- Simplified compliance with regulatory mandates such as Sarbanes-Oxley, ITIL, HIPAA, FDA 21 CFR Part II, etc. via audit log of all network events

Going Green

Respondents to the recent AFCOM State of the Data Center report also indicated trends in investing in green technologies such as renewable energy sources that help organizations meet environmental objectives, lower total cost of ownership, improve sustainability, and enhance their corporate image. When it comes to designing and deploying digital infrastructure with a focus on the environment and sustainability, it's important to select partners that are also committed to sustainability through environmental practices such as:

- Ensuring strict environmental supplier guidelines
- Closely monitoring raw materials for environmental and safety requirements, including extensive in-house testing to ensure compliance

- Proactively seeking environmentally-friendly options for manufacturing materials
- Compliance with global safety and environmental standards, certifications, and regulations such as RoHS, REACH, WEEE, LEED, etc.
- Ensure safe handling and implementing strategic recycling/reuse efforts
- Implementing environmental management system certified according to ISO 14001

ISO 14001 compliance is especially a consideration when selecting a partner as their manufacturing practices are also designed to be as energy and material-efficient as possible with continuous improvement processes in place. ISO 14001 compliance means that a company meets stringent guidelines surrounding planning, implementation, controlling, and management review. It's also important to seek out partners that establish ongoing environmental objectives and targets and continually strive to minimize waste in all aspects of their business through practices such as:

- *Process Efficiency* – Every manufacturing step is engineered to provide maximum energy efficiency and minimize waste
- *Lean Manufacturing* – Producing precisely what is needed when it is required
- *Sustainable Product Design* – Designing products in a way that reduce material usage during production and as a finished good, enable reuse/recovery of materials, and provide maximum lifecycle

Overall, leveraging intelligence and automation within digital infrastructure—both from a data center and smart building perspective—provides the information and insight needed to gain a better understanding of the infrastructure and improve decision making to achieve efficiency.

Getting Started

There's no slowdown when it comes to the adoption of digital solutions. Every metric shows more connected devices, more data flowing, and higher reliance on the modern data center. More so, we're seeing critical pieces of infrastructure being pushed further and further to the edge. When it comes to supporting the real-world trends and technologies—from low-latency applications and intelligent building technologies to automation and sustainability—companies can start their modernization journey with a few simple questions:

- Is my infrastructure ready for today's levels of connectivity?
- When was the last time I reviewed the quality and connectivity of my digital infrastructure?

- Are we effectively delivering innovative IT infrastructure solutions that will connect our users and our customers?
- Is our current infrastructure leveraging best-in-class IT infrastructure solutions that help technology and services?
- Are we prepared for the future of connectivity with cloud, Edge computing, IoT, and more?

As the world becomes more connected, this is the perfect time to evaluate solutions. Working with a reliable, trusted, and innovative infrastructure partner goes a long way in helping businesses address the answers to these questions as they pave their path within the digital revolution and seek to support new business functions in a digitally-focused economy. Infrastructure partners like Siemon have built their strategy around understanding the needs of the market, ensuring best-in-class quality and performance, providing superior service and support, and delivering solutions that maximize sustainability.

Get started on your journey today with Siemon.

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