BTR: Scalability, Sustainability, and Manageability Define the New Digital Infrastructure Agenda for Data Centers

SILVER SPRING, MD, UNITED STATES, June 26, 2025 /EINPresswire.com/ -- AI and digital transformation strategies are accelerating across sectors, positioning data centers as both strategic enablers and potential chokepoints in the modern enterprise. Yet amid record-high demand for compute-intensive workloads, the industry faces fundamental constraints: power shortages, cooling limitations, and workforce scarcity. These challenges are driving a redefinition of what constitutes a “future-ready” data center.

Cliff Federspiel, Vigilent

During a recent BizTechReports executive vidcast, data center infrastructure expert Cliff Federspiel offered a strategic lens into how the market is adapting. As founder, president, and CTO of Vigilent, a firm specializing in AI-powered data center management systems, Federspiel’s perspective reflects the pressures and priorities shaping investment decisions from hyperscalers to mid-sized enterprises.

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“The data center market is not just growing—it’s transforming under pressure,” Federspiel noted. “Power constraints, density demands, and operational complexity are creating a new calculus for both operators and customers.”

Aligning Demand with Infrastructure Realities

AI workloads, high-performance computing, and latency-sensitive applications are stretching the

physical limits of traditional data center design. Rack densities that once hovered around 5 to 10 kilowatts are now pushing past 40 and 100 kilowatts, with industry players beginning to design for racks in the 600 kW to 1 MW range.

This trend is occurring alongside an infrastructure paradox: while it's possible to build the shell of a data center faster than ever before, securing utility power resources is increasingly difficult.

"Utilities simply can't deliver power at the same speed that developers can build facilities," Federspiel observed. "This disconnect is forcing operators to reconsider where and how they expand."

As a result, market leaders are exploring distributed architectures, including microgrids and modular buildouts in previously underutilized locations. In some cases, older telco facilities and secondary markets are being refurbished to meet rising demand closer to end users—especially for edge applications like autonomous vehicles and real-time analytics.

This trend reflects a key strategic shift: location decisions are no longer based solely on real estate costs or tax incentives. Power availability and latency alignment now define the next frontier for data center development.

Managing Density Without Compromising Uptime

Consequently, cooling and energy management are now board-level concerns in the data center economy. As density increases, traditional airflow containment strategies are giving way to more advanced solutions like rear-door heat exchangers and liquid cooling systems. At recent industry conferences, observed Federspiel, direct-to-chip liquid cooling has emerged as the design of choice for high-density environments.

Yet, despite industry buzz, he emphasized that liquid cooling adoption remains limited in the broader market. "The majority of data centers are still air-cooled," he said, "but high-performance and AI workloads are pushing operators to reevaluate their cooling infrastructure much sooner than planned."

Meanwhile, staffing challenges are compounding operational stress. With an aging workforce and limited pipeline of new talent, operators are increasingly relying on intelligent software platforms—like asset management, and automated cooling control—to fill the gap.

The stakes are high: a poorly optimized environment not only consumes more energy and reduces equipment lifespan but can also expose operators to service level agreement (SLA) violations, customer churn, and reputational risk.

Rising Costs Meet Growing Expectations

From an economic perspective, while demand for capacity is booming, it's not translating into blank-check opportunities. Infrastructure constraints, sustainability mandates, and customer expectations are reshaping the economics of data center operations.

It is in this context that mid-size enterprises, in particular, are emerging as an influential customer segment. As they seek alternatives to public cloud models—often to support performance, compliance, or cost control objectives—they are driving growth in the colocation (colo) market. But this influx of demand is also changing expectations.

"Enterprise customers should start to think like hyperscalers," said Federspiel. "They should ask for telemetry, transparency, and infrastructure that scales with their needs."

Hyperscalers, for example, routinely demand full visibility into their colocated infrastructure. They require real-time access to environmental and power performance data and enforce strict adherence to SLAs. Enterprise buyers that follow suit can negotiate stronger vendor partnerships and avoid technical debt.

This shift also introduces a new financial dynamic: data center providers that invest in manageability and sustainability can command a premium, while those clinging to legacy approaches may find themselves locked out of future enterprise deals.

From Visibility to Autonomy

At the heart of the modernization conversation is data—specifically, the ability to gather, interpret, and act on infrastructure telemetry in real time. The convergence of IT and operational technology (OT) systems has enabled operators to turn once-isolated environmental signals into enterprise assets.

"We're seeing a shift from rule-of-thumb management to data-driven operations," said Federspiel. "Facilities that invest in automation and analytics are more agile, more efficient, and more attractive to enterprise clients."

AI-based control systems—such as those used to optimize cooling based on real-time thermal dynamics—are not just reducing energy use. They're extending equipment life, improving SLA compliance, and helping operators deliver customer-centric service at scale.

From a market perspective, these systems are no longer "nice to have." They are becoming prerequisites for competitiveness in an environment where staffing is tight, workloads are volatile, and sustainability is a strategic priority.

What Enterprise Buyers Should Demand

With infrastructure under strain and the market shifting, enterprise decision-makers evaluating

data center partners must adopt a more sophisticated procurement mindset. Federspiel offered a simple but powerful framework: focus on facilities that are scalable, sustainable, and manageable.

* Scalability means modular design, adherence to infrastructure standards, and readiness for technologies like liquid cooling.

* Sustainability goes beyond carbon. Enterprises should prioritize water-efficient cooling strategies and ensure vendors can comply with regional environmental standards.

* Manageability demands full visibility into power, cooling, and asset performance, supported by AI and automation tools that offset staffing challenges.

Colocation providers that already support hyperscalers are often well-positioned in all three areas. Enterprise buyers can leverage these relationships by requesting the same level of transparency and control that large cloud players demand.

A Call for Smarter Infrastructure Strategy

The data center sector stands at a pivotal moment. While demand shows no sign of slowing, capacity alone is no longer enough. The winners in this new infrastructure economy will be those that embrace engineering flexibility, sustainability by design, and intelligent operations.

Mid-market enterprises, long seen as passive infrastructure consumers, now have an opportunity to be more active, informed participants. By applying the same rigor to data center selection as they would to supply chain partners or cloud providers, they can secure long-term resilience in a fast-evolving digital landscape.

“This is a golden age of infrastructure,” Federspiel concluded. “But only for those who are prepared to manage its complexity—and make smart, strategic choices along the way.”

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