

High-Value Solutions That Make Edge Computing Effective and Efficient

Edge computing is quickly gaining mainstream status as a way to bring IT infrastructure closer to the far-flung areas where data is now collected—not just in and around the data center. Edge computing is a great fit for a variety of use cases, but it requires a purpose-built solution optimized for high performance, low latency and easy, reliable connectivity.

WHITE PAPER

It wasn't long ago—four years, in fact—that more than 90% of data was created and processed within the confines of the traditional data center. But things have changed—dramatically so. By 2025, multiple analysts predict that most data will be created and processed outside the data center.

The reasons why are now clear. The growth of remote computing, cloud computing and hybrid IT, as well as the transformative impact the COVID-19 pandemic has had on where work is done, have catalyzed this data revolution. Additionally, the huge groundswell of demand for smart, interconnected commodity devices and the internet of things (IoT) phenomenon have shaken up the very essence of IT and digital infrastructure.

It's not just about the massive amounts of structured and, especially, unstructured data; it's also about the fact that information and insights must be available where and when data is being captured and processed. That may be in a remote office, in a connected vehicle, on a factory assembly line or on a battlefield.

With every organization demanding not just real-time access to data but also real-time insights, it has become more essential than ever that edge computing become a central element of every digital strategy.

By 2028, global spending on edge computing will exceed \$61 billion, representing a 38.4% compound annual growth rate, according to recent research.¹ Nearly three quarters of respondents to an IDC study called edge “a strategic investment.”²

But actually implementing edge computing requires smart planning, with a keen understanding of the need for high performance, low latency, superior connectivity and rock-solid availability and resilience. This puts big pressure on organizations to ensure that they have the right infrastructure at the edge to fully leverage its promise and exciting functionality.

Why Organizations Need Edge Computing Today More Than Ever

The traditional, centralized computing model has been turned on its head as organizations look to capture, share and learn from data residing on the edge. In fact, with the growing importance of cloud computing, connected systems and devices outside the data center, ubiquitous remote computing, work-from-home operational models, the IoT, and hyper-distributed processing and data capture, edge computing has become a standard requirement for today's and tomorrow's IT model.

This has been further accelerated by the twin, related models of hybrid cloud and multi-cloud computing, as the very definition of where and how IT services are delivered is reimagined and redefined. Without edge computing, organizations miss a huge opportunity to harness data from every point in the information chain, from the corporate data center to the cloud to the edge.

IoT, in its many iterations, is a driving force. Whether you're talking about IoT for operational, industrial, medical or even military requirements, edge computing is a must-have capability across the enterprise. Without it, organizations risk falling behind in their ability to capture mission-critical insights in real time.

This has put significant pressure on IT organizations to rethink the very nature of their compute, storage, graphics and network infrastructure. Such infrastructure must support hyperscale performance, nearly infinite storage capacity with high IOPS and low latency, turbo-speed graphics processing, and ubiquitous, always-reliable connectivity.

¹ “Edge Computing Market Worth \$61.14 Billion by 2028, CAGR: 38.4%,” Grand View Research, May 2021

² “IDC Infrastructure for Edge Survey, 2020: Motivations, Challenges, and Technology,” IDC, August 2020

Top Use Cases for Edge Computing

Organizations that are looking for increased flexibility, agility and insights from endpoints and data sources away from data centers and traditional computing environments can benefit from edge computing. With both private and public sector enterprises looking to gain real-time insights from data on the edge, the race is on to incorporate that data into systems in a wide range of use cases.

Take retailing, for example. Let's say your store has an IP-based video surveillance system. That system is undoubtedly generating real-time data feeds on what is happening throughout the store environment, both inside the retail storefront and in off-site areas such as inventory centers and shipping and receiving docks. Integrating that data with in-store "smart shelves," point-of-sale data and stock-out applications can help generate a richer, more accurate picture of why certain merchandise levels are diminishing faster than others. Is it due to unanticipated demand, slow replenishment patterns, supply chain disruptions or employee theft?

There are numerous other use cases where enterprises can glean important, hyper-accurate and real-time insights to help them make smarter decisions. These include:



Autonomous vehicles



Industrial controls



Smart grids



Factory automation



Traffic management



Seismic/energy exploration



Medical/healthcare applications



Ruggedized battlefield applications

These and many other edge computing use cases have expanded beyond tests, experiments and niche applications to mission-critical systems where real-time insights from the edge can better inform smarter and faster decisions. In each of these use cases, high performance is a must, as is low latency, reliable connectivity and the ability to support very large data sets of unstructured data.

What to Look for in an Edge Infrastructure Solution

With the growing importance of edge computing use cases, organizations should look for infrastructure solutions that meet the performance, utility and resiliency required out in the field, from a remote office to a battlefield across the globe.

Those solutions must deliver an experience steeped in reliable and consistent availability, easy deployment, quick time to value and cloud-like benefits including cost efficiency, flexibility and scalability. At its essence, edge infrastructure solutions must deliver:

- High performance, in terms of compute power, storage I/O, graphics processing and network connectivity.
- Low latency, to support real-time insights across a broad range of use cases.
- High storage capacity that is easily expanded at a moment's notice.
- Easy clustering of compute, GPU, storage and network fabric.
- Reliable, secure performance in environmentally harsh and operationally demanding environments, such as remote industrial settings and other field applications, especially for military use cases.
- Ability to process large, unstructured data sets quickly, accurately and securely.
- Centralized, automated management of both individual infrastructure components and multiple clusters across wide geographic areas.
- Ability to provide cloud-like IT services to disparate localized user groups, such as infrastructure as a service or platform as a service.
- Easy integration of IoT systems, including those controlling critical infrastructure such as power grids, traffic management systems and SCADA applications.

How Western Digital Makes Edge Computing Efficient, Effective and Reliable

One of the great things about edge computing is its applicability and utility in a variety of use cases and physical environments. So organizations looking for edge computing infrastructure solutions should seek out systems from suppliers that can meet a wide range of needs.

Western Digital, a decades-long leader in a wide range of mass storage infrastructure—from the notebook to the data center, including nontraditional IT settings like streaming video recording devices—has a number of storage solutions for edge computing environments. Its Ultrastar® Edge family comes with purpose-built servers for both commercial and militarized and ruggedized requirements, delivering both high performance and low latency.

Western Digital's Ultrastar Edge transportable edge server makes data capture and analytics at the cloud edge easier, more affordable and more purposeful, with greater attention to performance than legacy infrastructure repurposed for demanding edge use cases. Ultrastar Edge is designed for high transportability, configured with a wheeled travel case so it can be easily moved to remote locations; it also can be rack mounted when necessary.

Ultrastar Edge is a high-performance solution, driven by 40 CPU cores and 512 GiB of memory, a lightning-fast GPU for artificial intelligence and machine learning requirements, more than 60 TB of flash memory storage and integrated 100 Gigabit Ethernet networking. Additionally, to optimize data protection and security in nontraditional IT settings, it has a Trusted Platform Module for cybersecurity, as well as support for FIPS 140-2 Level 2 physical security.

Western Digital's militarized and ruggedized version—Ultrastar Edge-MR server—is specifically designed for harsh environments such as military settings, environmentally demanding factories and outdoor environments, R&D labs and applications marked by electromagnetic emissions.

The configuration of Ultrastar Edge-MR is similar to that of its commercial counterpart, but it includes an integrated Faraday cage to insulate the server against external electromagnetic events, while limiting the potential for detection during sensitive operations. It comes with a ruggedized shell with an internal suspension system to reduce the potential for shock and vibration during transit and in remote operation.

Conclusion

Edge computing is having a substantial impact on organizations' ability to do more with the increasing amount of data they are capturing on the far reaches of their IT architectures—far, far beyond the realm of data centers and traditional on-premises infrastructure. With endpoints now being redefined both technologically and geographically, organizations are looking for solutions to help them turn all their data into real-time insights to help them make smarter, faster decisions.

Western Digital offers decision-makers innovative edge computing solutions for both commercial and military applications. Those solutions offer the performance, resiliency, flexibility and agility demanded for edge computing applications, along with the ability to create a cloud-like experience but in a more localized environment.

For more information on Western Digital's storage solutions for edge computing use cases, please visit www.westerndigital.com.