Find Your Edge:

Robust solutions for dynamic edge applications

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Introduction

The modern data center excels at handling data. But data is no longer created, consumed, and stored in the traditional data center, or even in the cloud. Today's data is streaming in constantly from a variety of sources and locations in and outside of your corporate infrastructure.

The unbounded and ephemeral place where the digital and physical worlds intersect and data is securely collected, generated, and processed to create new value is called "the edge."[1]

Businesses frequently look at edge ultrastructure as a journey, defined by investments in their current centralized data center and the various constraints put upon the infrastructure by the distributed edge. To be clear, the edge is meant for certain niche applications. Is one of these relevant to your business? Read on to learn more about localized, decentralized computing and the characteristics of the infrastructure that best support these endeavors.

Your Business at the Edge

The edge exists wherever the digital world and physical world intersect and data is securely collected, generated, and processed to create new value. It is all about managing diverse constraints while delivering immersive real-time digital experiences to your customer.

Per Forrester, "Edge computing allows firms to flexibly design and deploy software between central, distributed, and edge locations." According to seven key industries ranging from telco to financial services to media:

53% of decision makers are either currently implementing, planning to implement, or interesting in implementing edge computing within the next 12 months.[2]

Edge processing will improve your economic model or competitiveness. The costs to transmit all data can be prohibitive for some applications. Processing local, letting lower valued data age out and transmitting only what is valued by the business saves bandwidth and storage costs. Edge is top of mind and it's important to understand where it does belong and where it doesn't. The technology is crucial in locations ranging from healthcare environments to sports stadiums.

The number of industry use cases continue to increase. Companies are considering both customer experience—the instantaneous recommendations on your smartphone when you enter a store—and employee experience. Today IT workers connect from anywhere, and the remote office/branch office is rapidly being replaced by the Smart Office (or facility).

For example, 43% of global telecom decision makers whose firms are using edge computing believe it will give them the power to harness present and future AI demands.[3]

Read on to understand the infrastructure characteristics most vital at the edge, particularly if you are in a sector like oil or manufacturing that is far from the cool, clean, sanitized location of the traditional, centralized data center.

Requirements for an Edge Server

There are several characteristics of a server that is necessary for edge environments. Think small, tough, power efficient, and remotely managed. This allows your compute to thrive in environments outside the data center without the typical comforts and supports of the rack.

Dimensional

- Edge locations typically do not have enough space to support servers with traditional form factors.
- Save on power and cooling expenses.
- Prevent costly IT buildouts with a dense, adaptable compute solution.

Environmental

- Withstand challenging conditions (Industrial, Remote Enterprise, Telco, and Military).
- Extreme temperature toleration, optional filtered bezel.
- Save on repair and maintenance costs.

Remote management

- Servers and key services can be deployed and provisioned remotely.
- Manage critical situations quickly from the comfort of your data center.
- Works for situations where you don't have IT staff on the ground at the edge.

Security

- New nodes outside the data center require the same level of protection that IT infrastructure inside the data center enjoys.
- Many solutions require real-time responses; streaming telemetry provides continuous monitoring of edge devices.

Latency/Bandwidth

- Applications must respond in as quickly as 1 ms to a growing number of real-time applications.
- Accelerated performance with storage, memory, and low latency at the edge is key for these applications.

The Best Dell EMC PowerEdge Servers for the Edge

Good: PowerEdge T340

The T340 fits for ROBO environments due to its convenient tower form factor and the fact that it allows for both remote manageability and high availability. The high availability is due to the redundant power supply it has. This means that it can reliably run nearly all the time. For example, if a server fan went out in the T140, it would have to be powered down to get the fan fixed, but with the T340, the server can keep running while the fan is being repaired. The T340 is also known for its higher storage capacity over the T140, so this would be helpful for the edge because it would be able to store a decent amount of data. Some good examples of where the 1 socket towers are located are bank branches, dentist offices, law offices, and retail outlets, all of which network back to a corporate data center.
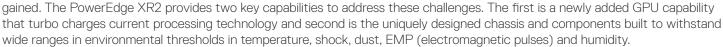
Better: PowerEdge XE2420

Edge infrastructure must fit the edge environment. It needs to work well in space-starved back rooms or dusty sheds. Compact and tough are the name of the game, and flexibility is top of mind when it comes to matching the demands of your business. The PowerEdge XE2420 provides low latency and high performance, allowing you to push the barriers of edge computing. Its dual-socket, 2U computing is configurable enough to support telco and retail business models as well as virtualization and workload orchestration on the edge. Short-depth, it's designed to fit those compact spaces we talked about, not to mention extremes in temperature. Concerned about dust? There's a filter option for the bezel to take care of that.[4]

Best: PowerEdge XR2

Today and looking forward, you face two daunting challenges outside the data center. The first is the need for faster performance, and second, they the need to migrate compute resources closer to where data is created and consumed. Solving these two challenges will substantially reduce data latency and the cost in transferring that data where analytics can be performed and insights gained. The PowerEdge XR2 provides two key capabilities to address these challenges. The first is a newly added GPU capability that turbo charges current processing technology and second is the uniquely designed chassis and components built to withstand wide ranges in environmental thresholds in temperature, shock, dust, EMP (electromagnetic pulses) and humidity.

Key Industries Suited to the Edge

We have identified key sectors—telco, retail, and manufacturing—that all put edge to good use as they seek to create value and manage their data in the field. In reality, almost all applications can have some sort of edge component.

| Telco

The 5G revolution is here. Can your compute keep up? The current telco edge network is comprised of legacy infrastructure unable to meet the challenges of the new options available. Key concerns as this relates to your telco edge infrastructure:[5]

- Importance or rapid deployments
- Quick-scaling infrastructure
- The right compute for the right environment.
- Necessity of tight security and remote management.

| Retail

Retailers are evaluating new retail applications that provide AI services and customer insights, smart inventory management, and new methods of tracking supply chain deeper. Their worlds have become extremely data-driven, based on sensors, video cameras, radio-frequency identification (RFID) chips, and point-of-sale (POS) devices. Traditional hardware is often no longer appropriate for these space-constrained locations which tend to lack onsite support. Key concerns as this relates to your retail edge infrastructure:[6]

- Creating a seamless customer experience
- Utilization of sensors to improve efficiency in store
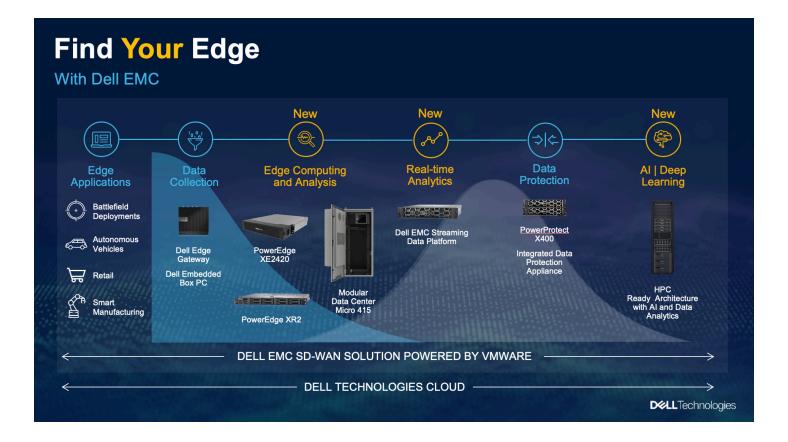- Generating insights from customer transaction data at lightning speed

| Manufacturing

In order to capture the advantages that come with low-latency data, manufacturers are shifting applications and underlying compute resources to the edge. Each factory and production line is capable of generating vast amounts of data and accompanying insights for the customer that takes advantage of them. These insights are posed to optimize current processes and lower operational costs. However, for manufacturers to work at the edge, they need servers that can handle the environment on the factory floor. Key concerns as this relates to your manufacturing edge infrastructure:[7]

- Which servers offer high reliability in harsh environments?
- Low-touch server management
- Importance of easy servicing of these servers

Services and Solutions

Dell Technologies Gateway Solutions

We realize that it's important to deliver the full breadth of solutions to you as you build out your edge from the near edge to the far edge. Your concerns may lie with edge applications, data collection, real-time analytics, or even AI and deep learning. We've got you covered. Dell's deployment of Edge Gateways and Embedded Box PCs rounds out the Dell-branded part of the overall solution. Partners are brought in to address unique requirements for proof of concept hardware or down-stream sensors and components.

Find Your Edge

With Dell EMC

Edge Applications	Data Collection	Edge Computing and Analysis (New)	Real-time Analytics (New)	Data Protection	AI	Deep Learning (New)

- Battlefield Deployments
- Autonomous Vehicles
- Retail
- Smart Manufacturing

Dell Edge Gateway
Dell Embedded Box PC

PowerEdge XE2420
PowerEdge XR2

Modular Data Center Micro 415

Dell EMC Streaming Data Platform

PowerProtect X400
Integrated Data Protection Appliance

HPC Ready Architecture with AI and Data Analytics

DELL EMC SD-WAN SOLUTION POWERED BY VMWARE

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Dell is one of the few vendors that has the hardware expertise plus the virtualization software platform (VMware) to build out this type of full ecosystem. We can securely move the corporate infrastructure closer to where data is created and consumed and experiences are being created.

Conclusion

The explosion of data being generated outside the data center means your business cannot afford to ignore the host of opportunities multiplying constantly in this hyper-distributed space. The right infrastructure means you can take advantage of data generated at the far reaches of your network. By choosing compact, rugged, and remote-deployed servers, you can take advantage of all the edge has to offer. To learn more, visit delltechnologies.com.

[1] https://www.dellemc.com/resources/en-us/asset/white-papers/products/servers/dell-technologies-edge-pov.pdf

[2] "A Decoder Ring For Edge Computing", Forrester, December 13, 2019

[3] "Edge Computing Will Radically Alter Your Infrastructure Strategy", Forrester Research, December 4, 2018

[4] https://www.dellemc.com/resources/en-us/asset/sales-documents/products/servers/poweredge-xe2420-server-brochure.pdf

[5] https://www.dellemc.com/en-us/collaterals/unauth/briefs-handouts/products/servers/poweredge-xe2420-product-brief-telco.pdf

[6] https://www.dellemc.com/en-us/collaterals/unauth/briefs-handouts/products/servers/poweredge-xe2420-product-brief-retail.pdf

[7] https://www.dellemc.com/en-us/collaterals/unauth/briefs-handouts/products/servers/poweredge-xe2420-product-brief-manufacturing.pdf

Glossary

Core Data Center

Central IT data center and/or cloud infrastructure. (independent and location agnostic)

Edge Computing

The delivery of computing capabilities to where data is being generated or consumed in order to improve the performance, operating cost, and reliability of applications and services. By shortening the distance between devices and the cloud or data center resources that serve them, and reducing network hops, edge computing mitigates the latency and bandwidth constraints and improves operational efficiencies of current and future applications.

Edge Server

- **Short Definition –** Compute, storage, network, and management brought closer to the location where data is generated, consumed, processed, or stored.

- **Full Definition –** Secure purpose-built, standards-based enterprise x86 servers with SDDC capabilities, storage, networking and with remote management capabilities located at the Edge / ROBO sites addressing constraints, capacity requirements, and meeting corporate governance.

End-Point Device

Actual sensors, actuators, and data generators with communication capabilities, which performs defined actions or functions or service.

Edge Cloud

Cloud-like capabilities located at the edge, including from the user perspective access to elastically-allocated compute, data storage and network resources. Often operated as a seamless extension of a centralized public or private cloud, constructed from micro data centers deployed at the edge.

Edge Node

A compute node, such as an individual server or other set of computing resources, operated as part of an edge computing infrastructure. Typically resides within an edge data center operating at the infrastructure edge, and is therefore physically closer to its intended users than a cloud node in a centralized data center.

Edge Storage

The infrastructure for data storage at the edge, which could be additive and working in conjunction but possibly independent of edge compute.

Edge Networking

A wired or wireless network infrastructure layer needed at the edge to enable connectivity and other networking function. Virtual Networking operates in conjunction with this infrastructure. This includes switches, routers, WL access points, network gateways, and others that are possibly standard or purpose built.

Edge Solution

A secure customer application environment from endpoint devices to the core data center or cloud, including the technology stack with associated software and coordinated services.

Software Edge

From a software development and application deployment perspective, the point physically closest to the end user where application workloads can be deployed. Depending on the application workload and the current availability of computing resources, this point may be at the device edge, but will typically be within the infrastructure edge due to its cloud-like capability to provide elastic resources.

Multi-access Edge Computing (MEC)

MEC allows for the deployment of services such as radio-aware video optimization, which utilizes caching, buffering, and real-time transcoding to reduce congestion of the cellular network and improve the user experience. MEC is an open application framework sponsored by ETSI to support the development of services tightly coupled with the Radio Access Network (RAN). Formalized in 2014, MEC seeks to augment 4G and 5G wireless base stations with a standardized software platform, API, and programming model for building and deploying applications at the edge of the wireless networks.