



CLIMATE
CONDITIONING
COMPANY, INC.

Buyer's Guide:

Edge Critical
Infrastructure Solutions

Table of Contents

01 Why You Need an Edge Strategy

02 The 4 Edge Archetypes

Data Intensive

Human-Latency Sensitive

Machine-to-Machine Latency Sensitive

Life Critical

03 Where Can the Edge Take You?

I Want to Update/Upgrade

I Want to Grow/Expand

I Want to Centralize My Visibility

04 How the Edge Can Help Your Industry

Education

Government

Healthcare

Manufacturing

Retail

05 Launch Your Edge

Remote Access & Control

Remote Monitoring

Racks & Enclosures

Rack Power Distribution

Thermal Management

Uninterruptible Power Supply (UPS)

01

Why You Need an Edge Strategy

The Edge has more features, platforms, and functions, and is required to perform more intelligent tasks than other layers of the complex IT landscape.

The Edge has more features, platforms, more functions, and is required to do more intelligent jobs than other layers of the complex IT landscape. The flexibility the Edge provides enables the ability to scale with data center growth.



What is the Edge?

The Edge is an evolution, not a revolution. From a network closet to a data center, each customer's deployment comes with its own set of requirements. Edge computing is part of a distributed computing topology in which information processing is located close to the edge - where things and people produce or consume that information.

The Potential of the Edge

Edge computing can impact businesses in a big way. By moving computing and storage away from the core, there is greater speed and flexibility, providing more value to you and your data. Edge computing will be the driving force supporting these initiatives, enabling enterprises to deploy technology-based services to customers more quickly.

Why an Edge Strategy is Important

Many remain unaware of the benefits an Edge strategy could bring to their organization. The key advantages of an Edge strategy are:

Speed of Delivery

It reduces the need to transport information to a core data center which can lead to delays in data being received and processed. By placing computing resources at the Edge, apps that process payments, display retail catalogs or deliver content can operate in real-time.

Availability

Many organizations operate multiple sites across different countries or cities. By enabling computing resources at the Edge, it is possible to keep these remote sites functioning regardless of failings at the core.

02

The 4 Edge Archetypes

Defining the Four Edge Archetypes and their technology requirements, a global, research-based analysis of network Edge use cases identifies four main archetypes for Edge applications and the technology required to support them.

The 4 Edge Archetypes



Data Intensive



**Human-Latency
Sensitive**



**Machine-to-Machine
Latency Sensitive**



Life Critical



Data Intensive

The Data Intensive Archetype represents use cases where the amount of data makes it impractical to transfer over the network directly to the cloud, or from the cloud to the point-of-use, because of data volume, cost, or bandwidth issues.

The challenge with the Data Intensive Archetype is moving huge amounts of data generated by devices and systems at the source to a central location for process.

- Restricted Connectivity
- Smart Cities
- Smart Factories
- Smart Home/Building
- Hd Content Distribution
- High-Performance Computing
- Virtual Reality
- Oil and Gas Digitization
- High Network IT Infrastructure Costs

Bandwidth	Latency	Availability	Security
High	Medium	High	Medium



Human-Latency Sensitive

The Human-Latency Sensitive Archetype covers use cases where services are optimized for human consumption. As the name suggests, speed is the defining characteristic.

The challenge of human latency is the need for speed. In applications such as e-commerce, speed has a direct impact on the user experience. Websites that are optimized for speed using local infrastructure have increased page views and sales.

- Website Optimization
- Augmented Reality
- Smart Retail
- Natural Language Processing

Bandwidth	Latency	Availability	Security
Medium	High	Medium	Medium



Machine-to-Machine Latency Sensitive

The Machine-to-Machine Latency Sensitive Archetype covers use cases where services are optimized for machine-to-machine consumption. Because machines can process data much faster than humans, speed is an essential feature for this archetype.

The challenge of the Machine-to-Machine Latency Sensitive Archetype is an even greater need for speed than the Human-Latency Sensitive Archetype. For example, the systems used in automated financial transactions, such as commodities and stock trading, are latency sensitive. In these cases, prices can change within milliseconds and systems that don't have the latest data when needed cannot optimize transactions, turning potential gains into losses.

- Smart Security
- Smart Grid
- Low-Latency Content Distribution
- Arbitrage Market
- Real-Time Analytics
- Defense Force Stimulation

Bandwidth	Latency	Availability	Security
Medium	High	High	High



Life Critical

The Life Critical Archetype encompasses use cases that directly impact human health and safety. In these use cases, speed and reliability are paramount.

The challenges of the Life Critical Archetype include technology requirements and scalability for factors like autonomous vehicles, technology use in healthcare, and constantly evolving technology.

- Digital Health
- Connected/Autonomous Cars
- Drones
- Smart Transport
- Autonomous Robots

Bandwidth	Latency	Availability	Security
Medium	High	High	High

03

Where Can the Edge Take You?

Your network edge is always evolving to wherever your customers are and whatever they need.

I Want to Update/Upgrade

Need more capacity at edge sites to handle new demands

Key Considerations:

- Sizing the uninterruptible power supply (UPS) to meet all the requirements
- Evaluating heat loads to determine need for dedicated cooling
- Enabling connectivity for remote monitoring

Need to quickly implement new IT infrastructure to support edge technology

Key Considerations:

- Evaluating potential for standardizing infrastructure to simplify processes
- Feasibility of using factory integration to receive IT-ready infrastructure
- Determining the availability and skill level of resources to install edge technology

Distributed sites are more critical and need higher reliability infrastructure

Key Considerations:

- Evaluating line interactive versus double conversion UPS topologies
- Enabling connectivity for remote monitoring
- Ensuring adequate resources are available for UPS service

Managing a growing edge of network that is becoming more critical

Key Considerations:

- Identifying the key variables required for monitoring
- Ensuring that power and thermal infrastructure are equipped for connectivity
- Ensuring that resources are available to monitor and respond to alerts

I Want to Grow/Expand

Need to match infrastructure to edge technology requirements

Key Considerations:

- Sizing the UPS to meet current and future requirements
- Evaluating heat loads to determine need for dedicated cooling
- Enabling connectivity for remote monitoring

Need to tailor IT infrastructure to availability and requirements of new sites

Key Considerations:

- Evaluating line interactive versus double conversion UPS topologies
- Enabling connectivity for remote monitoring
- Ensuring that adequate resources are available for UPS service

Must remotely monitor and manage new edge sites

Key Considerations:

- Identifying the key variables required for monitoring
- Ensuring that power and thermal infrastructure are equipped for connectivity
- Ensuring that resourcing is available to monitor and respond

Simplify IT infrastructure configuration and deployment

Key Considerations:

- Evaluating potential for standardizing infrastructure to simplify processes
- Determining feasibility of integration services to receive IT-ready infrastructure
- Determining the availability and skill level of resources to install edge technology

I Want to Centralize My Visibility

Need to match IT infrastructure to edge technology requirements

Key Considerations:

- What local resources are available for installation and servicing remotely
- Ensuring a timely response to service requirements, such as low battery capacity

Need to connect infrastructure into monitoring or management systems

Key Considerations:

- Sizing the UPS to meet current and future requirements
- Evaluating heat loads to determine need for dedicated cooling
- Enabling connectivity for remote monitoring

Need to select a monitoring and management platform

Key Considerations:

- Identifying the key variables required for monitoring
- Ensuring that power and thermal infrastructure are equipped for connectivity
- Ensuring that resources are available to monitor and respond to alerts

Need to enable remote access to IT systems

Key Considerations:

- Evaluating potential for standardizing infrastructure to simplify processes
- Determining feasibility of integration services to receive IT-ready infrastructure
- Determining the availability and skill level of resources to install edge technology

04

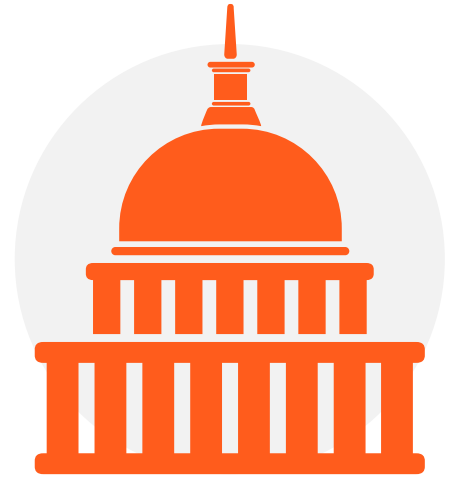
How the Edge Can Help Your Industry

Your business is looking to IT to support new edge applications and migrate computing and storage closer to customers, associates, and devices. But, you can't do it alone. No matter your challenge, Vertiv has the solution.

The Edge Industries



Education



Government



Healthcare



Manufacturing



Retail



Education

As IT becomes an integral part of the classroom, how can schools and universities protect their existing infrastructure and support technology requirements?

Needs

A More Interactive Learning Experience

- Mobile learning allows students from different locations to attend classes remotely via virtual classrooms.
- This poses a challenge to the traditional brick-and-mortar educational approach and is driving institutions to innovate and thrive.

The Future of Adaptive Learning

- Courses are tailored according to the personal needs and requirements of each student.
- This is supported by BYOD (bring your own device), where gadgets, formerly considered “distractions”, are now considered “learning supplements.”

Challenges

Managing Distributed IT

- A typical campus normally has multiple buildings. Typically, an IT manager is responsible for managing the entire campus.
- The IT manager needs visibility, access, and control of the IT assets spread throughout the campus.

Data Protection and Security

- IT managers must ensure that sensitive student data and information are protected against cyber attacks and other threats.
- On the data center level, assets must be protected through centralized monitoring for insight, security, and ease of management.



Government

With years of partnering with federal customers, our power, thermal, management, services and monitoring solutions come with continued support.

Needs

Reliable Remote Control

- The “power of being there” no matter your location has never been more relevant than it is today. Helping customers access their data centers remotely is in our DNA.

Remote and On-Premise Security

- IT managers must ensure that sensitive data and information are protected.
- A federal agency’s IT assets must be protected, from hardware to software.
- At every level, data and assets must be protected through centralized monitoring for maximum security and ease of management.

Challenges

Reliable Remote Access

- With a new breakdown of workers still in the office and at home, IT managers now require remote access and control to view conditions and troubleshoot where needed.

Integrated and Scalable Infrastructure

- With changing budgets every year, federal agencies need to scale up quickly to meet their new demand.
- Mainly purchasing IT assets during a short buying season, means that the ease of purchasing is at the top of their minds for agency personnel.



Healthcare

As patients become more empowered to make better choices when it comes to their health, the IT infrastructure must support these new technologies.

Needs

Digital Health

- Digital health is being used to improve patient care, workflow, and healthcare service delivery.
- Now is the time to upgrade critical IT infrastructure to support the next generation of digital healthcare.

Preparing for Interoperability

- Interoperability promises a seamless exchange of information across a vast network of providers involved in a patient's care.
- An integrated system is expected to propel value-based patient care, increase operational efficiencies, and lower costs.

Challenges

Growth at the Healthcare Edge

- With rising healthcare costs, new service delivery models are helping to drive down costs and to provide services within the community.
- Rethinking healthcare IT architecture and deploying small, branch data center locations supports a variety of healthcare functions to ensure fast, easy access to information.

Optimizing Healthcare Operations

- The healthcare industry is among the most complex and becoming even more so as a result of industry consolidation.
- Connected devices put key operating parameters at your fingertips, which improves communications.



Manufacturing

In manufacturing, Vertiv provides unmatched protection and reliability for critical manufacturing equipment.

Needs

AI Takes Center Stage

- To improve manufacturing processes, manufacturers are investing in automation. Research and markets expect AI spending in manufacturing to reach \$17.2B by 2025.
- A key benefit in automation is that it reduces risks, especially in industrial sites.

A Learner Supply Chain System

- Stay above the competition. Manufacturers will increasingly focus on simplifying supply chain to be able to operate more efficiently, manage stocks, and reduce costs.
- Many will digitize their supply chains through the use of RFID (radio frequency identification), business intelligence, as well as tools to improve logistics.

Challenges

Critical Manufacturing Equipment

- Protection of manufacturing equipment is critical, as downtime means lost productivity, damaged reputation, and lost revenues.
- It is important to maintain reliability through regular facility testing and by utilizing solutions that protect against common causes of breakdowns.

Managing Critical IT Infrastructure

- AI and robotics are increasingly being used on the manufacturing floor to speed up manufacturing processes.
- Manufacturing equipment should be optimized and designed to accommodate integration of technology through the use of predictive tools, as well as, power availability.



Retail

Perfecting the retail customer experience requires speed and agility across your organization – from stores and distribution centers to data centers and online platforms.

Needs

Experience Economy

- The focus on experiences rather than just pushing products is what has been driving the latest retail digital transformation.
- New concepts, such as cashierless stores, would not be possible without security to continue delivering on the customer experience.

Internet of Things

- Digital transformation is evident at a warehouse or distribution center. The supply chain is already highly automated and will only get more advanced.
- Realizing the full value of smart factories will require robust edge infrastructure.

Challenges

Future Scalability

- Finding the right solutions partner is crucial to understanding what products can update into a stronger, more agile data center.
- Focusing on the customer experience requires speed and agility across the organization, especially in the application of new technologies.

Deploying Technology

- By integrating operations, a retailer can begin aggregating and analyzing the customer-related data to define a customer experience.
- To become more developed, retailers need to adopt distribution center technologies.

05

Launch Your Edge

Vertiv offers a broad portfolio of industry-leading, performance-driven Edge solutions for your new data center. Browse these featured products, systems, and software to find the perfect IT to launch your Edge.

Remote Access & Control: Avocent® Serial Consoles

The Avocent® ACS8000 advanced console server series continues its long-running success story with a new, ground-up platform of innovation, integrating important new connectivity features such as cellular, gigabit fiber, USB, and sensors.

PRODUCT HIGHLIGHT: AVOCENT® ACS8000

Type: Server & Console Management

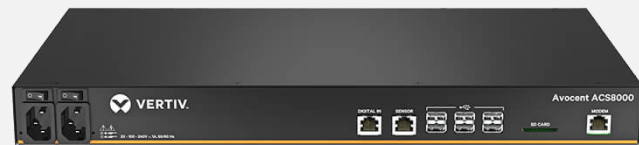
CPU: Dual Core ARM Cortex-A9 MPCore with CoreSight

Memory: 1GB DDR3L RAM

Power: 100-240 VAC

Connectivity: NEW 4G LTE

Ports: NEW Environmental Sensor Port



Remote Monitoring: Vertiv™ Environet™ Alert

With Vertiv™ Environet™ Alert, companies in the industry can acquire critical facility monitoring software that is affordable and easy to use. This Edge solution provides superior monitoring, alerting, trending and data organization.

PRODUCT HIGHLIGHT: VERTIV™ ENVIRONET™ ALERT

Type: Monitoring Software for Data Center Hardware

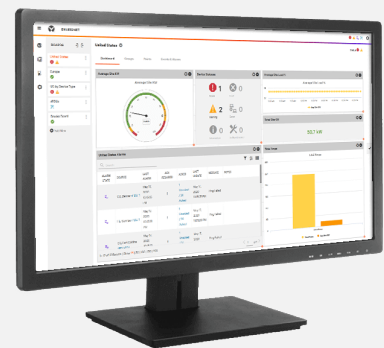
CPU: 4 CPU 2.0 GHz or Higher

Disk Space: 100 GB

Monitoring: Real-time notifications

Scale: Scale to thousands of devices

Communication: SNMP and Modbus TCI/IP direct connection



Racks & Enclosures: Vertiv™ VR Rack

Standardize your deployments around the world and bring them online faster with the Vertiv™ VR rack. The Vertiv VR supports a wide variety of equipment, including: servers, storage, switches, routers, PDUs, UPSs, console port servers and KVM switches.

PRODUCT HIGHLIGHT: VERTIV™ VR rack

Type: Rack Enclosures

Doors: 77% Perforated

Rails: 19" Integrated Alignment

Panels: Split-Locking Security

Cables: High density cable entry top cover (2000+ Cat 6 cables)

Height: 42U, 54U, and 48U frames with 2.5" more usable depth



Rack Power Distribution: Vertiv™ Geist™ C13/C19 Outlet

Reduce the complexity of IT power infrastructure deployments with the Vertiv™ Geist™ Combination C13 / C19 Outlet. The Combination Outlet C13 / C19 is a 2-in-1 receptacle functioning as both an IEC C13 and C19.

PRODUCT HIGHLIGHT: VERTIV™ GEIST c13/c19 outlet

Type: Combination Power Outlet

Retention: High; P-Lock Compatible

Outlets: All C13/C19; Connect C14, C20

Circuits: Customizable, Color-coded P-Lock Tabs

Compliance: UL Certified and CE Marked

Compatibility: All products now and in the future



Thermal Management: Vertiv™ Liebert® CRV

Vertiv™ Liebert® CRV, row-based cooling unit is optimized to ensure maximum cooling capacity in a minimal footprint. Targeted for small and medium data centers, as well as edge computing locations the unit provides cooling at the server rack level.

PRODUCT HIGHLIGHT: Vertiv™ Liebert® CRV

Type: Efficient Cooling for IT Management

Power: 10-40kW

Controls: Vertiv iCOM Control

Input Voltage: 208V-230V (dependent on model); 60Hz

Refrigerant: R410A (Water, Glycol, or chilled water available)

Sensors: Real-time Environmental Control



UPS: Vertiv™ Liebert® GXT5

The Vertiv™ Liebert® GXT5 UPS is an online double conversion UPS solution in a compact and flexible rack/tower design. This single-phase UPS family provides superior protection and remote management capability.

PRODUCT HIGHLIGHT: Vertiv™ Liebert® GXT5

Type: UPS

Power: 0.9-1.0 PF

Voltage: 500-3000VA 120V and 208/120V models

Efficiency: Up to 98% ECO mode

Interface: Color LCD; Gravity Sensitive

Battery: Auto-detecting External Cabinets

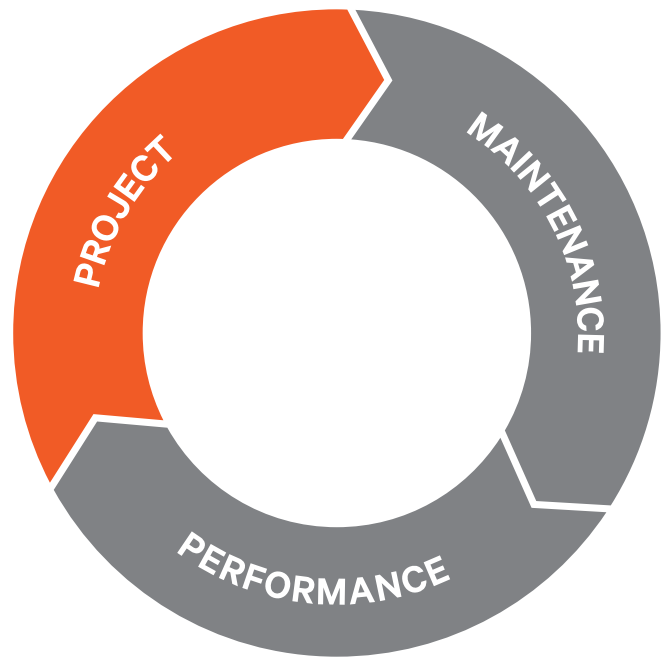


Expertly Managed Professional Services

A complete life-cycle approach to service, from project launch to ongoing maintenance and performance optimization.

We strive to keep your network infrastructure highly available, efficient, and adaptable, so you can:

- Increase mean time between failure
- Decrease operating cost
- Implement future technologies while maximizing your resources



PROJECT

When launching new facilities or powering up new equipment, you want to do it right.

- Plan
- Design
- Engineer
- Commission
- Project Manage

MAINTENANCE

Services to ensure that your infrastructure operates reliably, safely, and efficiently.

- Preventive and corrective maintenance
- Remote services and monitoring
- Cap/Fan/Battery replacements
- Repair & spare parts

PERFORMANCE

Full range of services designed to optimize performance and reduce complexity.

- Assessment
- Model
- Configure
- Upgrade
- Train

Need Help Launching Your Edge Site?

Contact your local Vertiv office to begin a discussion on determining the best Edge solutions for your IT Infrastructure needs.
Contact us today.