

An introduction to Vertiv

Architects of Continuity™

**Data Centers
Communications Networks
Commercial and Industrial Facilities
Updated April, 2023**





Technology underpins and enriches almost every aspect of our lives.

Technology drives the global demand for data.

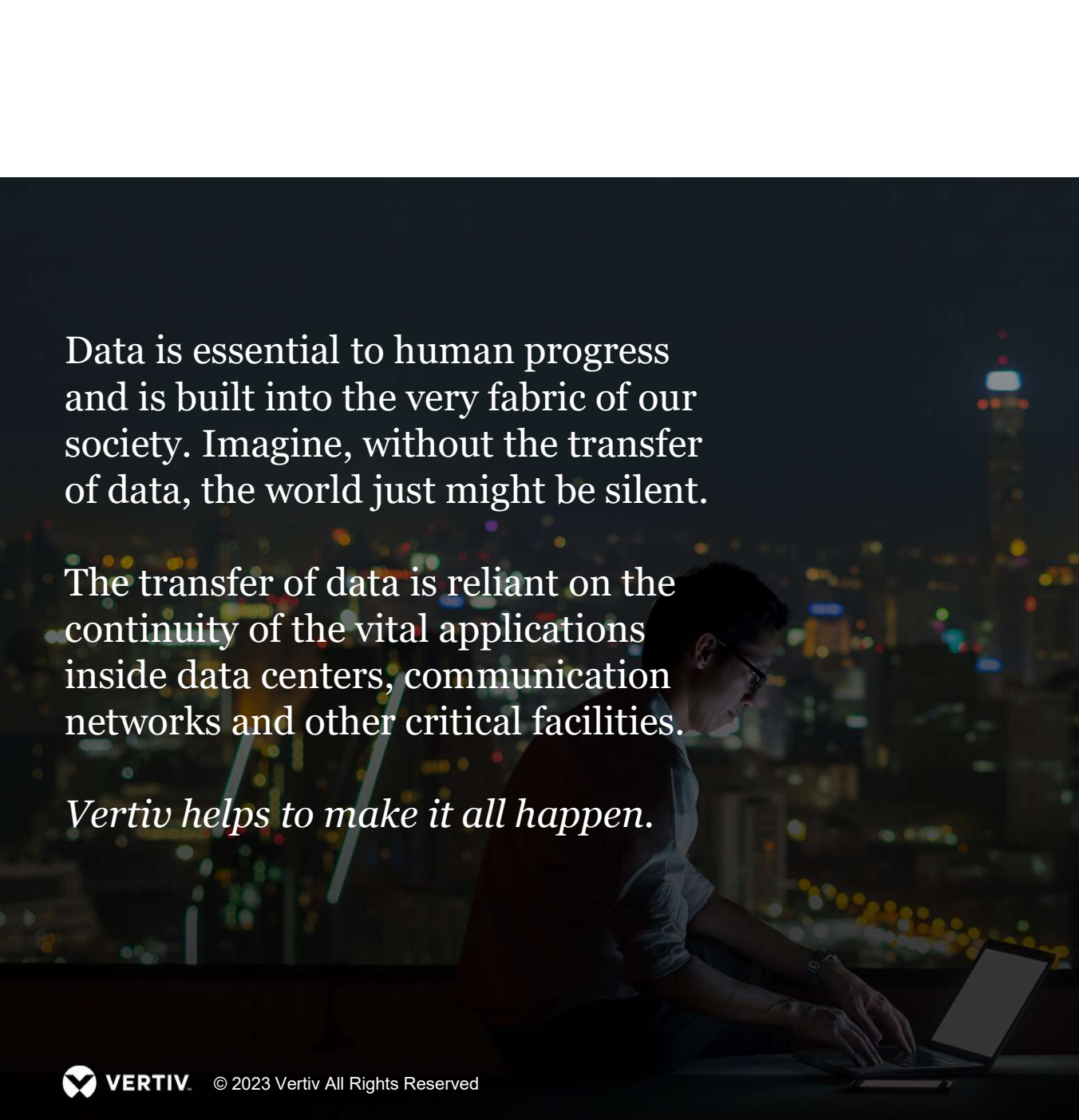
Vertiv provides the products and services infrastructure needed to manage that data.



NYSE: VRT

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Architects of Continuity™



Data is essential to human progress and is built into the very fabric of our society. Imagine, without the transfer of data, the world just might be silent.

The transfer of data is reliant on the continuity of the vital applications inside data centers, communication networks and other critical facilities.

Vertiv helps to make it all happen.

We do this by:

Bringing together hardware, software, analytics and services.

Enabling uninterrupted operations, optimal performance and scalability.

Doing it differently through visionary expertise, immersive collaboration, relentless agility, intelligent ecosystems and scalability.

Architects of Continuity™



Architects of Continuity™

ar•chi•tect noun

1. Visionary builder of future-ready digital infrastructures

con•ti•nu•i•ty noun

1. Reliable, safe, uninterrupted operations
2. Bringing customers' current reality to future aspiration

Building future-ready digital infrastructures that deliver continuity.

Discover Vertiv



Vertiv at-a-glance – Fiscal 2022



Sales
~\$5.7B



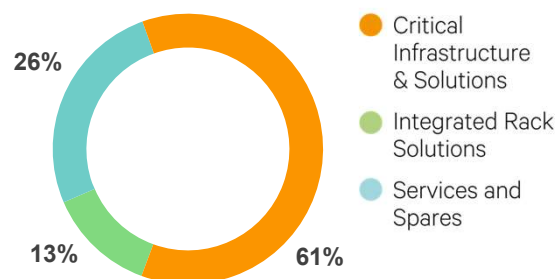
Employees
Vertiv ~27,000



Customers Include

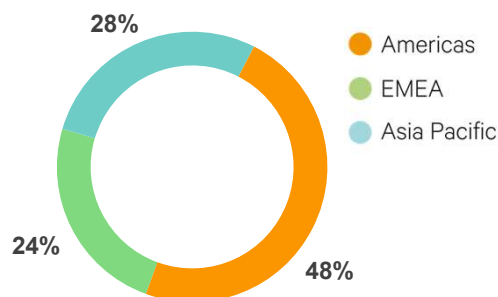
Alibaba, Alstom, America Movil, AT&T, China Mobile, Equinix, Ericsson, Reliance, Siemens, Telefonica, Tencent, Verizon, Vodafone

Manufacturing Sites: 24
Service Centers: 220+
Reach: 130+ countries



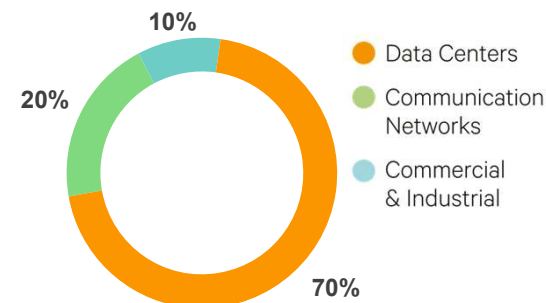
Offering*

Broad range of power, thermal, and IT and edge infrastructure, solutions and services portfolio



Geography*

Global, well-established footprint, and supply-chain network



End Market*

Customers who operate in some of the world's most critical industries

Market breakdown rounded to nearest 5%

*by revenue



Our focus on *data centers*

*Enabling reliability, efficiency and scalability:
Hyperscale/Cloud, Colocation, Enterprise and Edge.*

- Expertise from design through construction and commissioning derived from decades of experience
- Innovative solutions that reduce costs, improve management and speed deployment
- World-class services that drive uptime and deliver insights into performance
- Product, system and integrated solutions for: Enterprise, Colocation, Hyperscale and Edge



Our focus on *communication networks*

Provide smart, fast, flexible solutions for advanced networks and network management: Small Cell, Macro Site, Central Office and Data Center.

- Innovation-enabling flexible architectures
- Fast deployment, turnkey solutions, seamless service
- Intelligent systems for smart, holistic network management
- Future-forward solutions supporting 5G and a variety of sites, including: Small Cell, Macro Site, Central Office and Data Center



Our focus on *commercial and industrial*

Delivering reliability and simplifying complexity in industrial and rugged environments: Healthcare, Manufacturing, Rail/Mass Transit, Power Generation and Oil and Gas.

- Robust protection in even the most extreme conditions
- Solutions customized to meet specific needs and budgets
- Expert technical teams who get there fast
- Products, solutions, services and expertise for: Healthcare, Rail/Mass Transit, Power Generation and Oil and Gas



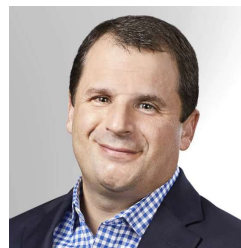
Vertiv Leadership



Giordano Albertazzi
CEO, and President,
Americas



**Yibin "Edward"
Cui**
President,
Greater China



David Fallon
Chief Financial
Officer



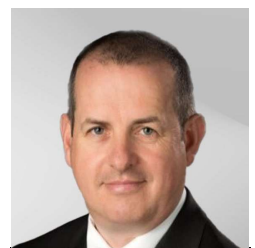
Stephanie Gill
Chief Legal
Counsel



Sheryl Haislet
Chief Information
Officer



Pat Johnson
Executive Vice
President, Integrated
Rack Solutions



Mike Kitson
Chief Procurement
Officer



Stephen Liang
Chief Technology
Officer/Executive
VP Infrastructure &
Solutions



Cheryl Lim
Chief Human
Resources
Officer



John "Cub" Marion
Executive VP
Quality, VOS and
Process



Philip O'Doherty
Managing
Director,
E+I Engineering



Anand Sanghi
President,
Australia, New
Zealand,
Southeast Asia



Rainer Stiller
Chief Marketing
Officer



Karsten Winther
President, EMEA



Our Presence

Meeting our customers' demand for data – wherever they are.



Worldwide

Manuf. and Assembly Locations: 24
Service Centers: 220+
Service Field Engineers: 3,500+
Technical Support/Response: 220+
Customer Experience Center/Labs: 19

Americas

Manuf. and Assembly Locations: 10
Service Centers: 80+
Service Field Engineers: 1,600+
Technical Support/Response: 90+
Customer Experience Center/Labs: 5

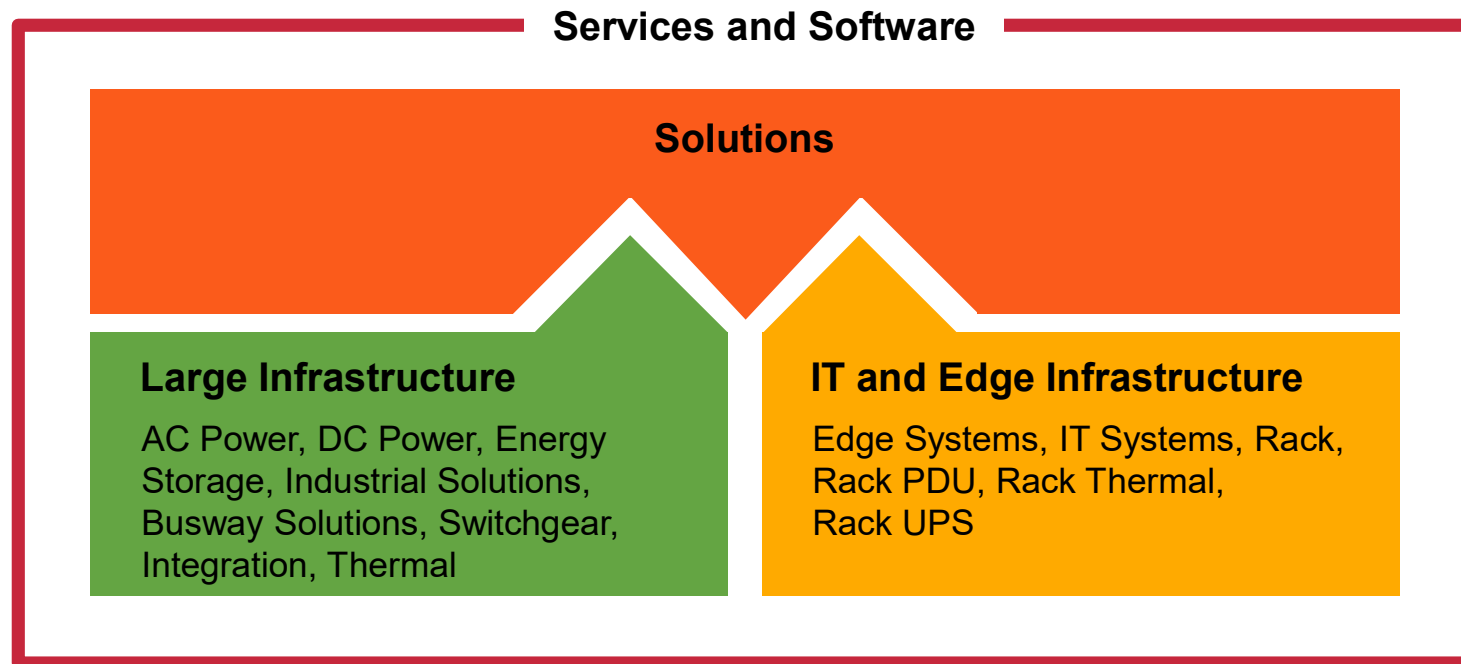
Europe, Middle East, and Africa

Manuf. and Assembly Locations: 10
Service Centers: 65+
Service Field Engineers: 650+
Technical Support/Response: 100+
Customer Experience Center/Labs: 5




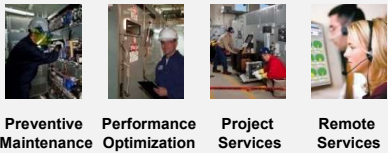




Asia Pacific

Manuf. and Assembly Locations: 4
Service Centers: 75+
Service Field Engineers: 1,250+
Technical Support/Response: 30+
Customer Experience Center/Labs: 9

Vertiv brings together hardware, software, and ongoing services to enable our customers' vital applications run continuously and perform optimally.



Our Portfolio

| POWER MANAGEMENT | THERMAL MANAGEMENT | INTEGRATED RACK SOLUTIONS | SERVICES |
|---|--|---|---|
| <p>Description</p> <ul style="list-style-type: none"> Small, medium and large uninterruptible power systems (UPS) Industrial-grade UPS AC power distribution systems and busway Switchgear and Busbar 12V to 400V DC and HVDC power systems Custom DC UPS systems, DC battery chargers and distribution Rack power distribution | <ul style="list-style-type: none"> Small thermal systems including room and row/ rack cooling Air handling and chiller: large systems located outside the data room that provide climate control | <ul style="list-style-type: none"> IT and infrastructure management solutions Rack PDUs Integrated solutions | <ul style="list-style-type: none"> Diverse array of services to handle ongoing customer equipment and product needs Maintenance, project and training services Tailored customer offerings |
| <p>Select offerings</p>  |  |  |  |
| <p>Brands</p>  |  |  |  |

Vertiv Acquires E+I Engineering

December 2021

E+I rounds out the Vertiv™ power portfolio, filling gaps and allowing a broader market reach.

Mission Critical

- Hyperscale
- Colocation
- Telecom
- Enterprise

Consumer-Industrial-Government

- Healthcare
- Government
- Institution
- Water Treatment
- Oil & Gas
- Utility

Presence

- Facilities on 3 Continents
- 2000+ Employees
- 30+ Countries traded with
- 30+ Years in operation

Capabilities

- Engineering
- Manufacturing
- Assembly
- Integration
- Global Service

Factory Locations















- Anderson, SC –USA
Headquarters
- Donegal, Ireland –European
Headquarters
- United Arab Emirates –Middle
East/Far East



“One-Stop” Solution For All Types of Data Center Deployments

Vertiv and E+I – More powerful together

DATA CENTER CRITICAL POWER INFRASTRUCTURE

| | Critical Power Switchgear | UPS Input Switchgear | UPS | UPS Output Switchgear | Static Transfer Switch | Power Distribution Unit | Busway | Remote Power Panel | Rack PDU | Modular Power Solutions | EMS Software | Services |
|--|---|---|---|---|---|---|---|---|---|---|---|---|
| |  |  |  |  |  |  |  |  |  |  |  |  |
|  | | | ✓ | | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ |
|  | ✓ | ✓ | | ✓ | | | ✓ | | | ✓ | ✓ | |

Award-winning leading provider of innovative power, thermal and IT infrastructure solutions and services for digital infrastructure.

- ✓ Recognized leadership across served markets, offerings and geographies
- ✓ Strong project-management capabilities differentiates Vertiv from other market participants
- ✓ Rewarded by customers for the ability to collaboratively work to provide solutions for critical needs
- ✓ At the forefront of energy efficiency applications
- ✓ Multiple awards won as independent company



The CEO Forum Group has selected Rob Johnson and Vertiv for the 2020 Transformative CEO Award in Innovation in the category of Communication Infrastructure. This is bestowed for excellence in building and protecting the critical telecommunications networks around the world and in data security and delivery of uninterrupted power. Most significantly, Vertiv's communication infrastructure has become our backbone during the COVID-19 crisis.

2022

FROST
&
SULLIVAN

**EMEA Prefabricated Modular
Data Centre Industry
Excellence in Best Practices**

2021

FROST
&
SULLIVAN

**Asia-Pacific Critical Power
Infrastructure Industry
Excellence in Best Practices**

2021

FROST
&
SULLIVAN

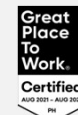
**Asia-Pacific UPS Industry
Excellence in Best Practices**

2021



100 Employer Excellence of China

2021



**Philippines Great Place to
Work**

2021



**China Excellence
in HR Digital**





Environmental Impact at Vertiv


Vertiv is committed to working with our customers in solving the complex challenges related to critical digital infrastructure. We recognize that the energy-efficient design, development, use, and disposal of our products is critical to the longevity of our industry and to the greater world.

We are in the process of building and rolling out a more comprehensive strategy to understand, manage, and reduce the environmental impact of our solutions and operations.

Within our Solutions

**Design**
Build upon principles of efficient design

**Process**
Align to design and manufacturing processes

**Solution**
Deliver energy and water efficient solutions

Within our Operations

**Measure**
Review scope 1 & 2 emissions, water, and waste data

**Aim**
Align actionable goals across the organization

**Achieve**
Deliver impactful environmental improvements

**VERTIV.**

Vertiv™ Liebert® APC
The Inverter Snow-Chiller
Range with Eco-Friendly
Refrigerant
from 650 to 3000 kW

**Sustainability
Spotlight**



Liebert® APC: The Coolest Solution for a Sustainable Data Center

Today, you face challenges that critical infrastructure must face as well: increasing energy costs, reducing carbon footprint, and ensuring reliability. There is also a growing demand for sustainable solutions. The Liebert® APC Snow-Chiller Range is the perfect solution for your data center. It is a high-efficiency, low-carbon, and reliable solution that can help you reduce your carbon footprint and improve your data center's sustainability.

The Liebert® APC Snow-Chiller Range is a high-efficiency, low-carbon, and reliable solution that can help you reduce your carbon footprint and improve your data center's sustainability. It is a high-efficiency, low-carbon, and reliable solution that can help you reduce your carbon footprint and improve your data center's sustainability.

| Features | How You Benefit |
|---|--|
| • Inverter drive compressor | • Low inrush current and higher part load efficiency allowing for savings in the electrical infrastructure design and lower running costs |
| • Low GWP and non-flammable R450A refrigerant | • Compatible with eco-friendly refrigerant (R450A) is a low global warming potential (GWP) refrigerant that reduces carbon footprint and CO2 emissions |
| • Optimized condensing coils | • Increased condensing capacity and more condensing heat lead to a better overall efficiency and lower operating costs |
| • Liquid line system | • The possibility of using clean water inside the data center lowers the risk of environmental pollution and greatly lowers installation costs |
| • Fault-tolerant system | • Outstanding cooling capacity |
| • Compact frame | • Possibility to increase floor cooling density |



Reduce environmental impact for our customers and across Vertiv

Top technologies to support customers' goals on energy and water efficiency, and the adoption of renewables



Renewable energy

Leveraging renewable energy sources and relying less on the electrical grid is achievable through innovative infrastructure technologies.

- Vertiv™ Liebert® EXL S1 UPS with Dynamic Grid Support, backed by lithium-ion batteries during instances of grid instability, **can contribute to decarbonization and a switch to green energy, such as solar, wind or hydro.**

Intelligent power management

New power system architectures and intelligent controls drive up system utilization and improve efficiency.

- Vertiv™ Liebert® Trinerger™ Cube UPS is a scalable system that offers a path to growth, **modes for optimized energy consumption, and compatibility with lithium-ion batteries.**

Lithium-ion batteries

Lithium-ion batteries can provide **TCO savings of up to 50% compared to VRLA batteries.** They are smaller and lighter, can operate at higher temperatures, and have a life of 8-10 years vs. 3-5 years for VRLA. Vertiv offers lithium-ion models for small to large applications

- The rack/tower convertible Vertiv™ Liebert® GXT5 and Vertiv™ Liebert® PSI5 UPS feature models with internal lithium-ion batteries. Larger systems, including Liebert EXL S1, Liebert Trinerger Cube and Liebert® NXL UPS, are compatible with Liebert® HPL Lithium-Ion energy storage system.



Liebert EXL S1 UPS
with Dynamic Grid
Support



Liebert Trinerger Cube UPS



Liquid cooling

High density racks can put a strain on data center efficiency, unless you adopt a liquid cooling solution designed specifically to deal with those densities.

- Vertiv™ Liebert® VIC liquid immersion cooling solution and the Vertiv™ Liebert® XDU thermal management system support liquid cooling in a range of capacities.

Water- and energy-efficient thermal management

Using large amounts of water to drive down cooling energy consumption is no longer an option in many areas. Water-efficient thermal management systems support low PUEs with zero water use.

- Vertiv offers **zero water use** through Vertiv™ Liebert® DSE free cooling economization system, and Vertiv Liebert® AFC air cooled chiller with free cooling economization.

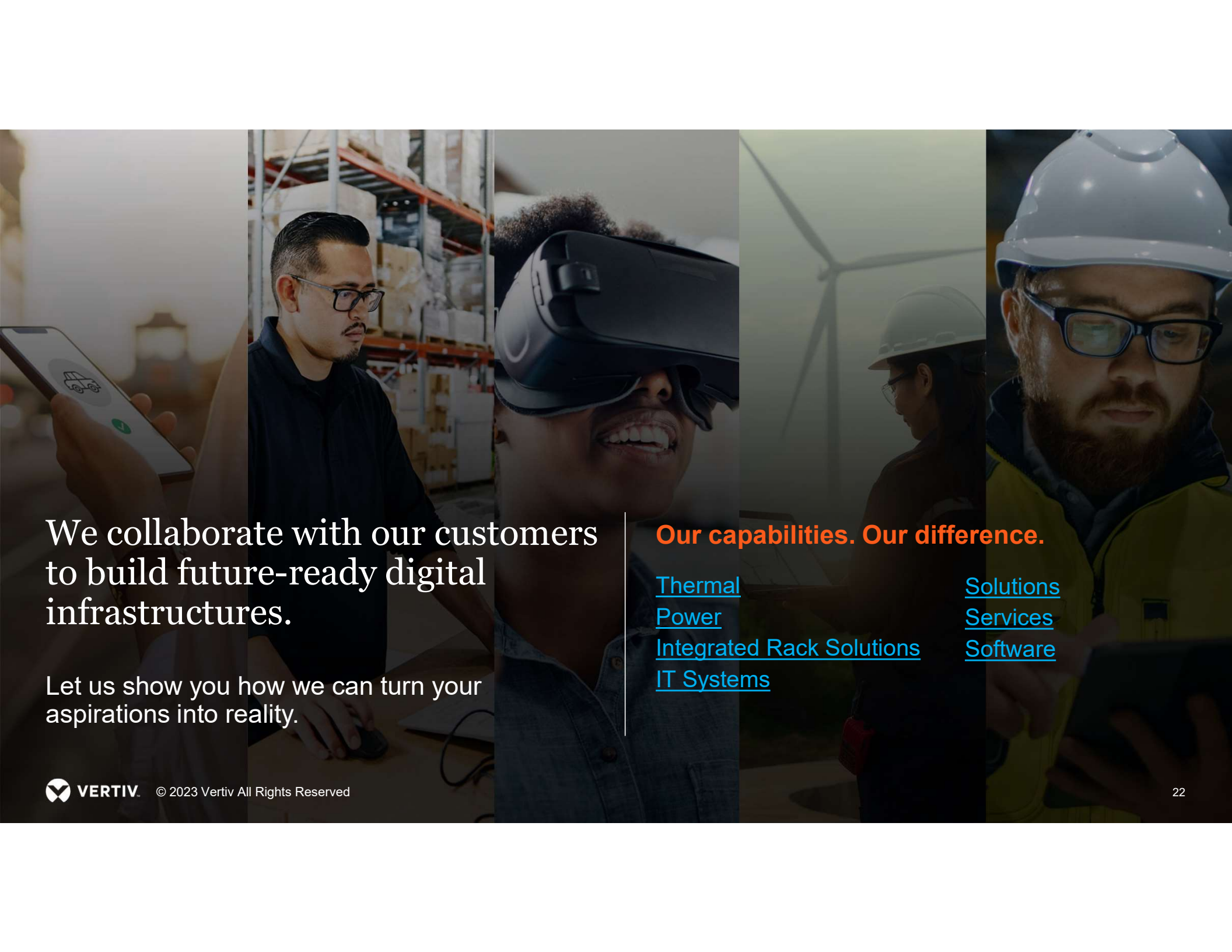
Hybrid Systems Integrating Renewables

- Vertiv™ NetSure™ fully-integrated DC power system with rectifier, solar and controller to **provide maximum efficiency** for mobile communication
- Vertiv™ NetSure™ Control Unit (NCU) allows for **advanced energy controls** for a wide range of DC power applications

Our Latest Energy and Water Efficient Product Launches

- Liebert® GXT5 Lithium-Ion UPS
- Liebert® EXM2 UPS - up to 98.8% efficient
- Liebert® EXL S1 UPS w/ Dynamic Grid Support
- Liebert® VIC liquid cooling solution





We collaborate with our customers
to build future-ready digital
infrastructures.

Let us show you how we can turn your
aspirations into reality.

Our capabilities. Our difference.

[Thermal](#)

[Power](#)

[Integrated Rack Solutions](#)

[IT Systems](#)

[Solutions](#)

[Services](#)

[Software](#)

Vertiv[™] Thermal Management



Vertiv capabilities

Thermal Management

A complete line of energy-efficient and reliable technology

- Perimeter, in-row and high-density cooling
- Free cooling chillers, heat rejection and economization
- Evaporative free cooling
- Custom air-handling solutions
- Small systems for edge applications, small computer rooms and network closets
- Liquid cooling
- Modular smart solutions to add capacity with IT growth

Controls to optimize efficiency and uptime

- Unit and supervisory controls with machine-to-machine communication and real-time monitoring
- Advanced algorithms for system auto-tuning, energy optimization, and capacity management



Vertiv capabilities

Thermal Management

PERIMETER COOLING



IN-ROW COOLING, AISLE COOLING



FREECOOLING CHILLERS



EVAPORATIVE FREE COOLING



MONITORING AND CONTROLS



LIQUID COOLING



PACKAGED DX AND CUSTOM AIR HANDLING



Vertiv difference

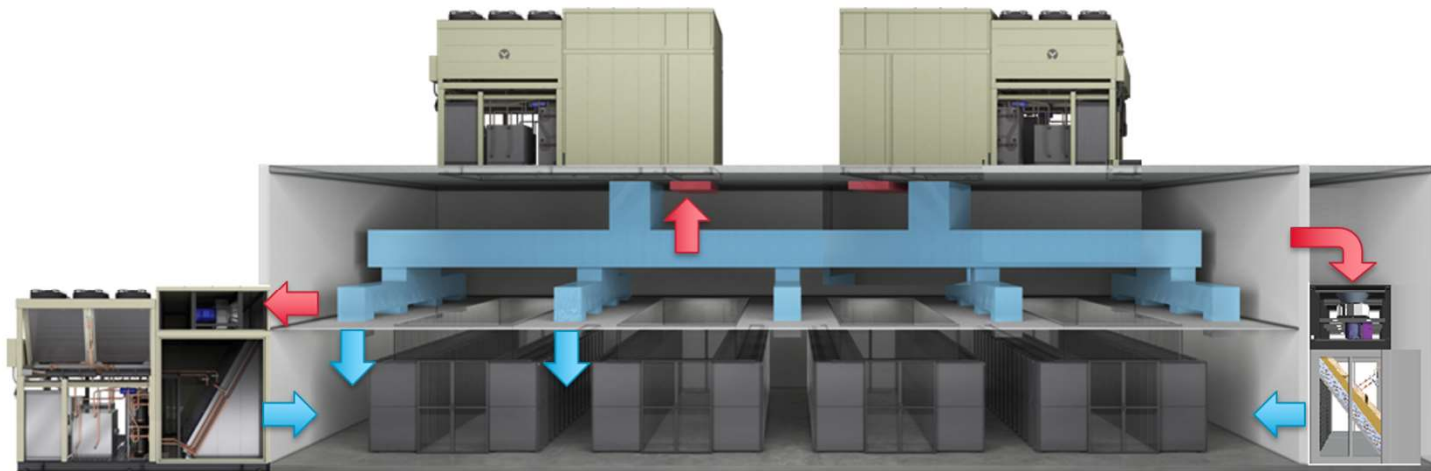
Thermal Management

Unmatched efficiency and reliability for mission-critical applications

- We deliver the highest level of protection and uptime
- Industry-leading efficiency levels (Power Usage Effectiveness as low as 1.1)
- Up to 50 percent lower capital and operating costs.
- Industry-leading, award-winning technologies

Deep design and application knowledge

- We partner with each customer to develop and deploy solutions that best meet their needs
- Intelligent, self-optimizing solutions that enable customers to spend less time managing cooling and more time managing their facilities



Product family spotlight: Vertiv™ Liquid Cooling Solutions

Overview

Keeping with demand related to increased AI, ML and rising rack densities, data center operators are investigating liquid cooling options as an alternative to air cooling. Liquid cooling leverages the higher thermal transfer properties of water or other fluids to support efficient and cost-effective cooling of high-density racks and can be up to 3,000 times more effective than using air. Liquid cooling also provides several other benefits regarding performance, TCO and space maximization.

Key Product Offerings

Rear-Door Heat Exchangers – Passive or active heat exchangers replace the rear door of the IT equipment rack with a liquid heat exchanger. (Ex. Liebert® DCD Chilled-Water Cooling Unit)

Direct-to-Chip Liquid Cooling – Direct-to-chip cold plates sit atop the board's heat-generating components to draw off heat through single-phase cold plates or two-phase evaporation units. (Ex. Liebert® XDU Coolant Distribution Units)

Immersion Cooling – Single-phase and two-phase immersion cooling systems submerge servers and other components in the rack in a thermally conductive dielectric liquid or fluid, eliminating the need for air cooling. (Ex. Liebert® VIC)



Customer spotlight: Green Mountain

Thermal Management



Customer Need

One of the largest data centre operators in the Nordics, Green Mountain is clearly committed to the environment as exemplified by its DC1-Stavanger facility that is built deep in a Norwegian mountain. When procuring a cooling system for a data centre extension at this facility, product and supplier sustainability were key considerations, in addition to compact size, due to space constrictions..

Solution

Vertiv™ Liebert® PCW chilled water perimeter units

Benefit

- 5 megawatts (MW) of additional cooling capacity
- Third-party certification guarantees that the Liebert PCW complies with the latest standards and performs as advertised
- High energy-efficiency solution designed for modern IT, great PUE
- Compact solution
- Enhanced components and control strategies
- Quick deployment
- Able to interact with demo equipment in Vertiv™ Customer Experience Centres in Italy



“Sustainability affects everything we do and is very important whenever we build new colocation data centres. All our customers can see where we get our energy. It is a key differentiator for us.”

- Alexander de Flon Ronning, Design and Product Manager Green Mountain



VERTIV

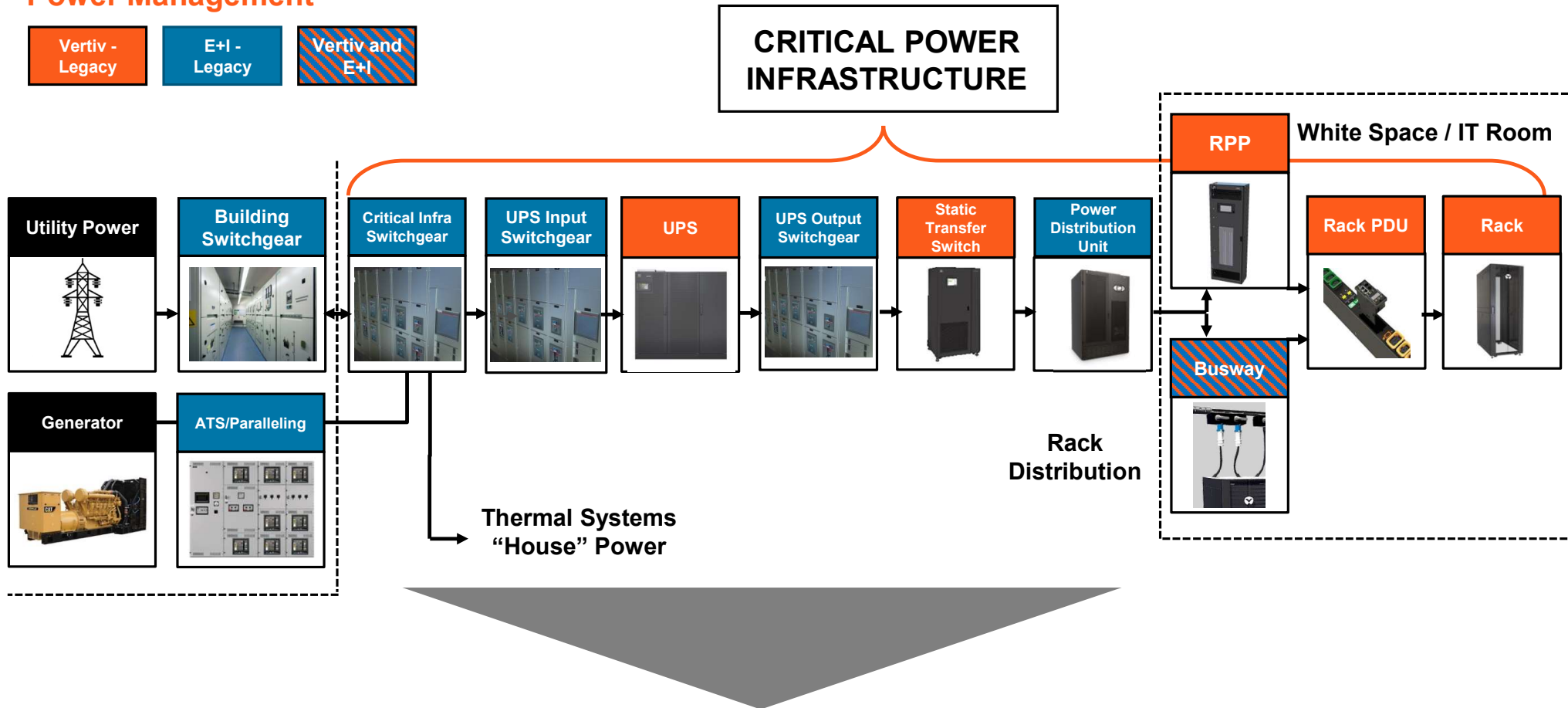
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Vertiv™ Power Management



Vertiv Capabilities

Power Management



Vertiv Capabilities

Power Management

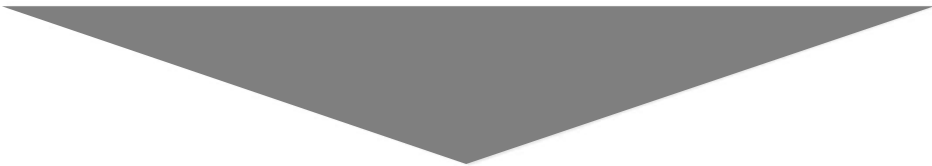
Vertiv - Legacy

E+I - Legacy

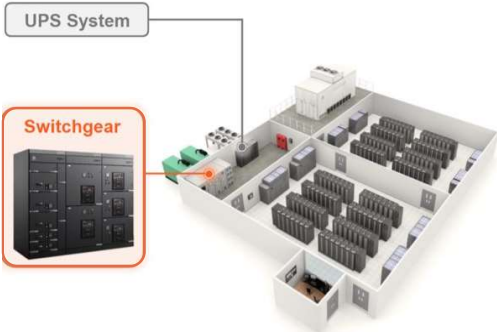
Vertiv and E+I



Thermal Systems
"House" Power



Integrated Power Skid



Data Center building



Power System

Vertiv difference

Power Management

Continuous operation and optimal performance of your vital applications

- Comprehensive range of power solutions for data centers, communication networks, commercial and industrial networks
- Industry-leading safe and reliable power solutions for heavy-duty, data center and edge of network applications
- Advanced Lithium-ion battery solutions for single- and three-phase applications
- Complemented by our full software suite and global service organization



Product family spotlight:

Vertiv™ Lithium-Ion Battery and UPS Products

Overview

Lithium-ion batteries (Li-ion) are a common power source for millions of consumer devices. Now, they're being adopted for use with Uninterruptible Power Supply (UPS) applications, as a means of ensuring uptime for mission-critical infrastructure in data centers. Li-ion batteries offer more reliable performance, last 2-3 times longer, require less maintenance, and have a higher power density than lead acid batteries.

Key Product Offerings

Vertiv™ Liebert® PSI5 Lithium-Ion UPS

- Faster recharge times, up to 10x more charge/discharge cycles.
- Capable of operating at higher temperatures without any degradation in performance.

Vertiv™ HPL Lithium-Ion Battery Energy Storage System

- Designed and optimized for data center applications.
- Uses high-power, proven lithium-ion NMC (Nickel-manganese-Cobalt) battery modules.
- Delivers safe, reliable and efficient energy to critical operations.



Customer spotlight: eStruxture

Power Management



Customer Need

At the time of eStruxture's founding, the company realized that its customers lacked choice when it came to cloud- and carrier-neutral colocation and connectivity solutions. The company founder realized that the existing carriers and smaller providers either lacked a pan-Canadian presence or the capital to invest in meeting customers' growing and evolving requirements — needs he could meet with Vertiv as a partner.

Solution

- Liebert® EXL S1 UPS units with lithium-ion batteries installed in parallel 2+1
- Liebert® DSE free-cooling economization system with Liebert® iCOM™ controls
- Liebert® PPC power conditioning and distribution cabinet with branch monitoring
- Liebert® RX distribution cabinet with branch monitoring
- Vertiv™ VR racks with Vertiv™ Geist™ rack power distribution units

Benefit

- Optimized use of computing space that allows for additional customer offerings such as dedicated halls with office space, storage, and disaster recovery options
- Ability to support customers with high-density requirements by offering up to double the capacity of most competitors with 30 kW per rack standard
- New facility ready for turnover six months earlier than previous builds



Working with Vertiv ... enabled us to deploy capital expenditures in a phased fashion that is in line with our revenue growth. By not having to over-build from the outset, we have great flexibility and agility in expanding alongside our customers.

- Todd Coleman, eStruxture
President and CEO



Vertiv[™] IT and Edge Infrastructure



Vertiv capabilities

IT and Edge Infrastructure

Support for Edge applications that require moving processing and storage closer to the customer.

Use Cases

Data Intensive

- Restricted Connectivity
- Smart Cities / Factories / Home and Building
- HD Content Distribution
- High-Performance Computing
- Virtual Reality

Human-Latency Sensitive

- Web Site Optimization
- Augmented Reality
- Smart Retail
- Natural Language Processing

Machine to Machine

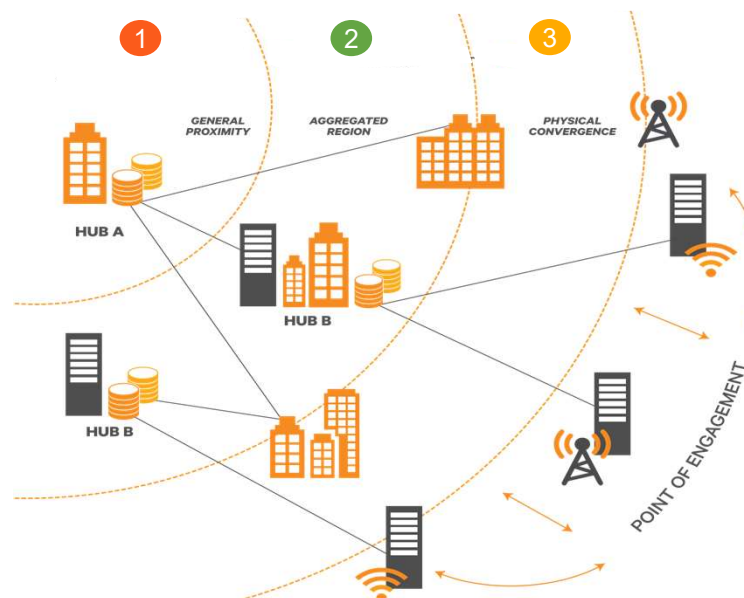
- Smart Security
- Smart Grid
- Low-Latency Content Dist.
- Arbitrage Market
- Real-time Analytics
- Defense Force Simulation

Life Critical

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

Architecture

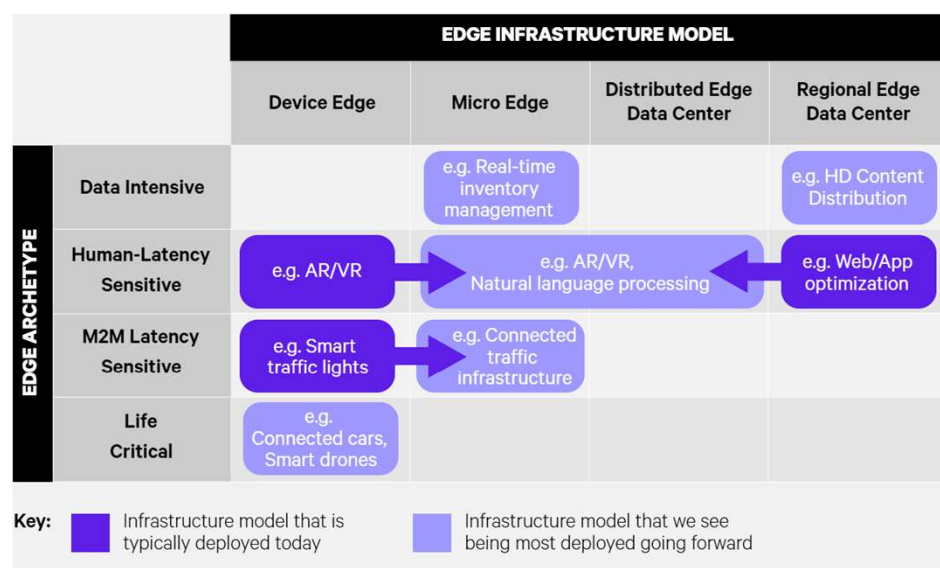
- 1 Traditional**
 - Cloud / Data center
- 2 Local**
 - Aggregation sites
 - Metro data centers
- 3 Edge**
 - Rooms / Building



Edge Archetypes, and Edge Archetypes 2.0

Building on Vertiv's initial work on the [Edge Archetypes](#), which provided a taxonomy for categorizing edge use cases, [Edge Archetypes 2.0](#) goes a step further to define four distinct edge infrastructure models.

As the edge of your network proliferates and becomes more sophisticated and mission-critical, a haphazard approach to site configuration becomes inefficient, expensive, and ultimately, unsustainable. No two edge sites are exactly alike, but they often share key characteristics that establish parameters for important decisions around equipment selection and architecture.



| | | EDGE INFRASTRUCTURE MODEL | | | |
|-----------------|------------------------------|---|---|---|---|
| | | Device Edge | Micro Edge | Distributed Edge Data Center | Regional Edge Data Center |
| CHARACTERISTICS | Location | Smart devices (e.g. in vehicle, street lamp, IoT) | Enterprise site (e.g. retail, factory floor, IT closet, municipalities) | Enterprise site (e.g. warehouse, office), telecoms site, parking lot, tier 2/3 city | Tier 2/3 city |
| | Number of Racks | 0 | 0-4 racks | 5-20 racks | 20+ racks |
| | Power | Up to 1 kW | Up to 20 kW | Up to 200 kW | Up to 4000 kW |
| | Tenancy | Single Tenant | Single Tenant | Single Tenant / Multi-Tenant | Multi-Tenant |
| | External Environment | Controlled (within Device), Harsh & Rugged | IT Closet, Commercial & Office, Harsh & Rugged | Harsh & Rugged, Commercial & Office, Conditioned & Controlled | Conditioned & Controlled |
| | Passive Infrastructure | May or may not have power and filtration, no cooling, etc. | Has power with limited cooling and filtration, etc. | Tier 1+ | Tier 3+ |
| | Edge Infrastructure Provider | Device manufacturer or in-house solution within enterprise / government | Hardware OEM, data center provider, telecoms operator or in-house solution within enterprise / government | Colocation provider, hyperscale cloud provider (public cloud), telecoms operator | Colocation provider, hyperscale cloud provider (public cloud) |
| | Expected Deployments | Millions | Hundreds of thousands | Thousands | Hundreds |

* by 2030 per major region



Vertiv capabilities

IT and Edge infrastructure – Integrated rack solutions

Flexible portfolio of point products for IT and Edge infrastructure.

Racks



Rack PDUs



**UPS Systems
(1P & 3P)**



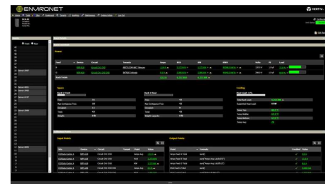
Edge Thermal



**IT Monitoring and
Management**



Software



Services



Product spotlight: Vertiv™ VRC-S.

A plug-and-play, edge-ready micro data center system

Product Overview

The Vertiv™ VRC-S is a pre-integrated, enclosed micro data center solution designed to be up and running at an edge or other small site in just a matter of days. Just add a UPS and users have everything they need to rapidly deploy a comprehensive IT solution in edge and other small applications.

Key Features and Benefits

- Simplifies IT management in edge applications, saving time and hassle with an all-in-one, pre-integrated micro data center solution.
- Integrates power distribution, up to 3.5 kW of cooling capacity , and intelligent, outlet level monitoring in a plug-and-play solution.
- Enclosed system increases cooling efficiency and protection for sensitive equipment.
- Available in eight pre-built standard options with four rack sizes and two voltages (120V or 208V)

Industry Trends Addressed

- Simplifies management challenges related to edge applications.
- Offers remote monitoring capabilities.



Vertiv difference

IT and Edge Infrastructure

A leader in Edge infrastructure

- Easy integration of components
- Fully customizable for your IT needs
- Rapid deployment for quick installation
- Remote monitoring and management
- End-to-end service

Edge infrastructure portfolio benefits

- From racks and enclosures, to power protection and distribution, to cooling and thermal management solutions, our compact and reliable small-space infrastructure delivers the reliability you need to grow your edge network
- Pre-built, factory-integrated systems can give you the flexibility of a custom solution with the convenience of an off-the-shelf product



Customer spotlight: Athletic Apparel Retailer

Edge – Data Center

Customer Need

Having several older data center facilities with aging power and cooling infrastructure, along with a renewed focus on sustainability, the company's supply chain needed to upgrade its critical assets from core to edge in order to operate more effectively and efficiently when meeting shifting consumer demand.

Solution

- Liebert® GXT4 UPS
- Vertiv™ VR racks
- Vertiv™ Geist™ monitored rack power distribution units
- Liebert® CRV in-row, air-cooled cooling system
- Liebert® DataMate air-cooled systems with outdoor, split system condensing units
- Subzero aisle containment
- Liebert® Liqui-tect™ leak detection system
- Liebert® Nform monitoring software

Benefit

- Rapid deployment to the edge with decreased capital expenditures
- \$200,000 in reduced downtime costs
- 50% reduction in utility costs
- Enhanced 24x7 customer responsiveness capabilities



The Vertiv enclosures ... did not require large amounts of additional electrical, plumbing and cabling. Having 208- and 408-volt access, waterless CRAC units, and fully enclosed cabinets limited wiring, while PDUs reduced cabling outside of the main structure and the edge deployment.

- Lead Supply Chain Engineer



Vertiv™ IT Monitoring and Management



Vertiv Capabilities

IT Systems

Data center IT infrastructure and operations

- Centralized, secure access to IT devices from any vendor over IP – in traditional enterprise data centers, co-location and remote or edge applications

Control room solutions

- Real-time access to high-resolution content across multiple workstations – in broadcast and post-production applications

Desktop productivity and security

- User access to multiple desktop computers with a single keyboard and mouse – in the office environment, test labs and locations with access to both secure and un-secure machines



Vertiv Capabilities

IT Systems

SERIAL CONSOLE



CONSOLIDATED MANAGEMENT APPLIANCE



RACK MANAGEMENT



MANAGEMENT SOFTWARE



HIGH PERFORMANCE KVM



DESKTOP SECURE KVM AND KM



4K IPKVM



Vertiv difference

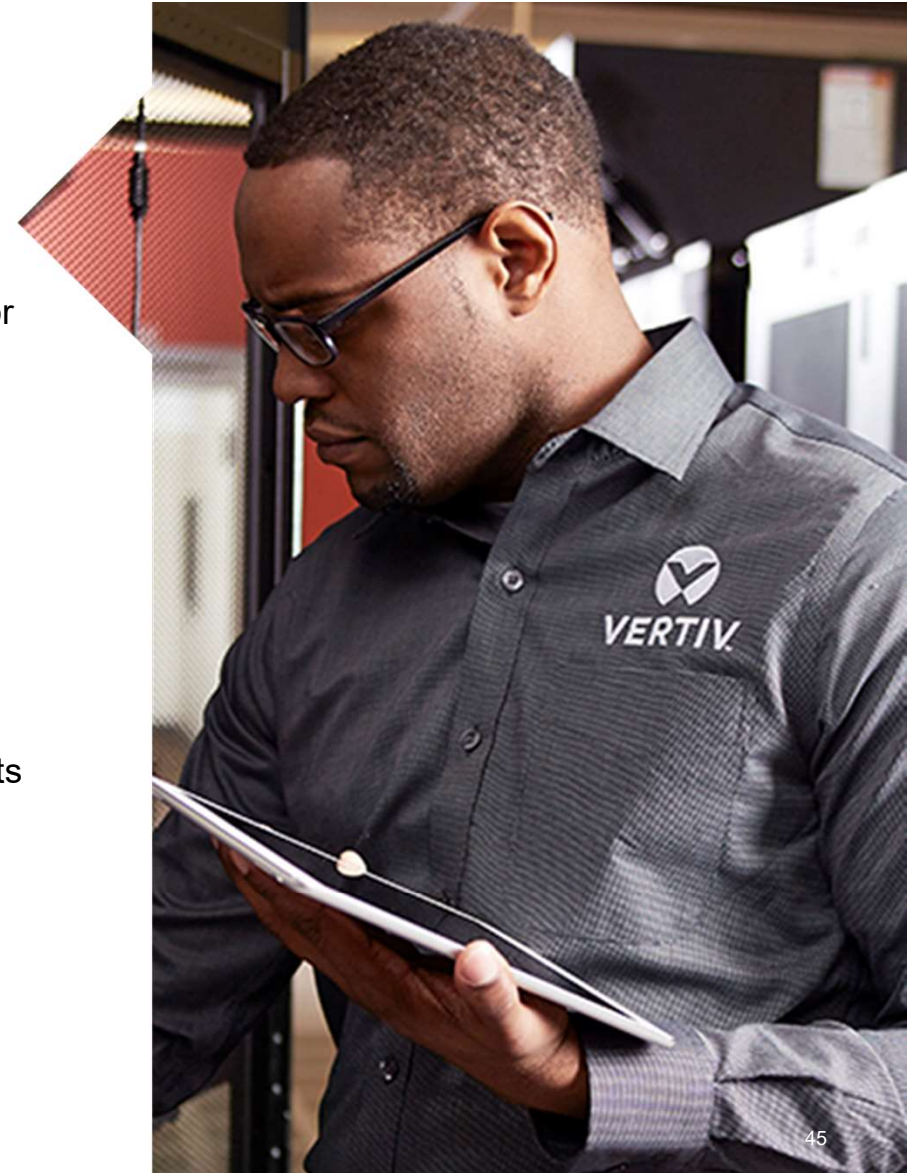
IT Systems

The leader in IT management

- A portfolio unmatched for remote data center IT access and control for IT infrastructure and operations professionals. Our portfolio spans devices and software and is supported by cutting-edge services
- Our IT management products and services make us not only an outstanding performer in the traditional data center but our portfolio is also uniquely positioned to deliver outstanding performance in edge applications

Vertiv™ IT management customer benefits

- Improved IT operations with an ecosystem of IT Management products
- Streamlined workflows in environments using multiple workstations
- Secured access between security levels in sensitive environments
- Sourcing from a single supplier



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Product spotlight:

Vertiv™ Avocent® ADX Ecosystem

Scalable, resilient and extensible ecosystem for ever-changing IT management needs

Product Overview

The Vertiv™ Avocent® ADX Ecosystem is built upon a secure common architecture which seamlessly integrates and scales to create an open yet resilient IT management platform. Avocent ADX Ecosystem provides the highest performance and agility and security, and enables automation, management, monitoring and control multiple devices like no other solution in the market.

Key Features and Benefits

- Fastest and most feature-rich KVM experience on a single device.
- All digital architecture for flexible and scalable deployments.
- Most expansive management of IT devices.
- Resilient and secure technology supporting 100+ simultaneous users.
- Common architecture with open standards, platforms and APIs.

Industry Trends Addressed

- Edge growth and cloud migration.
- Demand for more remote access in the data center.



Customer spotlight: Columbus Crew

High Performance KVM



Customer Need

Those who follow professional soccer may recognize the Columbus Crew as champions of the 2020 MLS Cup. The Crew now plays in the country's most modern and fan-friendly professional sports stadium, Lower.com Field, which relies on critical digital infrastructure solutions from Vertiv to drive fan comfort, convenience and entertainment. The largest fan-facing system – the stadium LEDs and video scoreboard – required a safe, reliable and seamless high performance KVM switching system to ensure a positive fan experience.

Solution

Vertiv™ Avocent® HMX high performance KVM transmitters and receivers, for a combination of ~50 servers and clients

Benefit

- IP-based system allows critical servers to be securely located remotely from user workstations
- Multiple devices may be controlled from one keyboard, video monitor and mouse set in an any-to-any matrix configuration
- Seamless switching between computers in less than a second
- 4K video support
- Zero-U transmitters require no rack space or power
- Fully redundant system with auto failover



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We are always looking for partners that provide great value. When considering the performance to price ratio for the Avocent HMX high performance KVM...it just made sense to rely on a Vertiv KVM on this project.

- Brock Raum, system engineer, BeckTV



Customer spotlight: DigitalGlue IT Systems



Customer Need

DigitalGlue (a Vertiv reseller and systems integrator), on behalf of a Hollywood production studio, sought equipment that supported today's video resolution quality while establishing a path for eventual migration to 4K broadcasting. To reduce disruption and save time and money, the studio specifically required a solution that would be compatible with the facility's existing CAT 6/7 ethernet cables and network switches

Solution

Vertiv™ Avocent® HMX 5000 Series IP-based KVM Switch

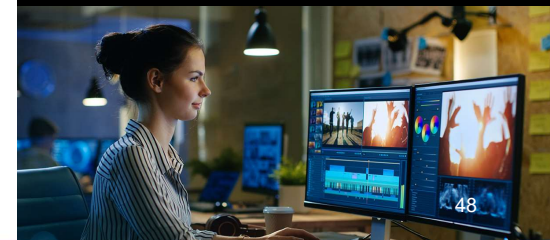
Benefit

- Zero-configuration networking simplified implementation by automatically obtaining the media access control (MAC) address of devices as they are attached to the network
- Switch times were reduced to less than a second greatly improving workflow
- Customizable hotkeys led to an enhanced user experience
- Productivity improved with the ability to access two different computing resources from one dual-monitor edit station
- USB extenders enabled the integration needed to perform color correction sessions
- The quality of the digital video at the workstation was improved
- System scalability supported growth by enabling hundreds of users to securely connect in real time with multiple servers and workstations



The Avocent HMX 5000/6000 KVM is highly scalable and configurable, which makes it so easy to connect multiple users to multiple servers and workstations. It's really an ideal solution for a large Hollywood studio.

- Sean Busby, DigitalGlue President



Vertiv[™] Prefabricated Modular and Integrated Solutions



Vertiv capabilities

Solutions

Our customized, standard solutions offer you the ideal combination of best value and rapid delivery. Our factory-integrated solutions offer you a low-risk, high-value global solution that can be rapidly delivered and assembled on site.



**Rapid
Design**



**Facility
Integration**



**Simple
Assembly**



**Global
Service**



Prefabricated Modular and Integrated Solutions - Benefits

Rapidly Deploy. Standardize. Repeat.

Speed data center builds with pre-integration, prefabrication, and flexible designs when you can't wait

Reduce Risks

Control budget, improve safety, and mitigate risk for stakeholders without compromising quality

Energy Efficient Design

Lower site PUE and reduce environmental impact while controlling costs

Zero Floor Space

Recover precious white space and scale as you grow



Vertiv capabilities

Solutions

CABINET



Cabinets integrated with rack PDU and cooling units; could **include storage and IT gear in addition to all hardware**; could be a combination of off-the-shelf products

ROW



Integrated sets of **cabinets with PDU, cooling units, and monitoring systems** as needed; could be a combination of off-the-shelf products

AISLE



Integrated, often enclosed, sets of rows **with cooling and power infrastructure**

MODULAR



Integrated, comprehensive set of modular infrastructure in a **free-standing enclosure** for data centers and other related applications

Network Closet, Micro, Edge, Core and Critical Facilities, Cloud and Colo, Cable Landing Stations



Vertiv difference

Solutions

Our Methodology

Complete Critical Infrastructure Solutions and Deep Domain Knowledge

Vertiv applies ultra-modern technology and mass-production principles to enable exceptional scale, velocity, and quality for every project regardless of size or complexity.

 **Structural Engineering**

 **Thermal Management**

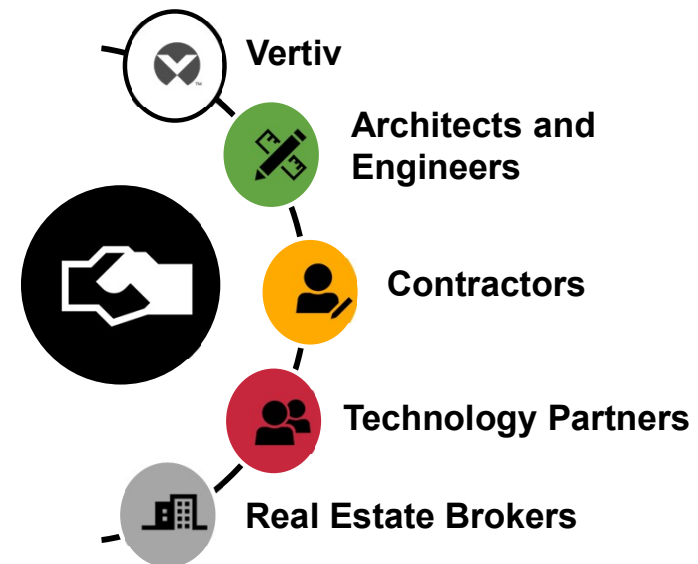
 **Power Management**

 **Software Controls**

 **Life Cycle Services**

Our Partners

Vertiv uses modular integration techniques to help our customers, contractor, and consulting partners more effectively design and build data centers.



Customer spotlight: Orange's Padus Lab to Showcase Next-Generation Prefab Solutions for Telecom Equipment Hosting



Customer Need

Telecommunications is a multi-trillion-dollar industry. Because of the nature of their business, major global telecom players like France's Orange S.A., are faced with a unique social responsibility. As part of the Engage 2025 plan, Orange has committed to achieving net-zero carbon emissions by 2040. To help bring their goal to fruition, Orange chose Vertiv to provide a next-generation prefabricated edge computing site.

Solution

Prefabricated modular data centre: Vertiv™ NetSure™ 400V HVDC power system and battery cabinets; Vertiv™ Knurr DCM™ server racks; Vertiv™ Liebert® DCD heat exchangers; Vertiv™ Liebert® HPC-S freecooling chiller; Vertiv™ Liebert® PCW chilled water perimeter unit; Vertiv™ Liebert® HPW wall-mounted air conditioning unit

Benefit

- Rapid two-day installation period
- Edge computing site suitable as a replicable standard for multiple geographies
- Collaboration of business, technology, and academic experts to drive innovation
- A technical education site available for both employees and the local community
- A design that enables drastic energy consumption reductions



The Padus Lab will assess new means of producing, storing, and managing energy in ways that are as green as possible and also serve as an edge computing model for deploying future Orange networks across the globe."

- Dominique Bodéré, ITN Energy Optimisation & Ecoefficiency Project Manager, Orange



Vertiv™ Services

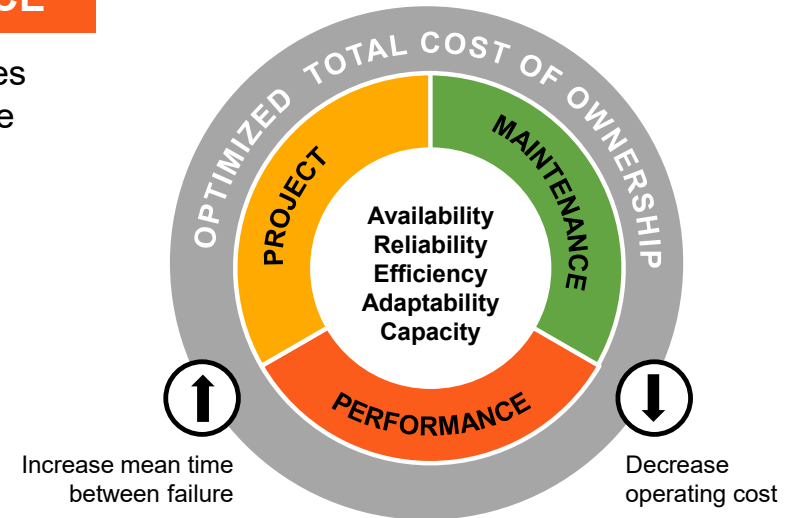


Service capabilities

Services

A complete lifecycle approach to service, from project launch to ongoing maintenance and performance optimization.

| PROJECT | MAINTENANCE | PERFORMANCE |
|--|---|--|
| <p>When launching new facilities or powering up new equipment, you want to do it right – right from the start</p> <ul style="list-style-type: none">• Plan• Design• Engineer• Integrate• Commission• Project Management | <p>Services to ensure that your business-critical infrastructure operates reliably, safely and efficiently</p> <ul style="list-style-type: none">• Preventive and corrective maintenance• Remote services and monitoring• Cap / Fan / Battery replacements• Repair• Spare parts | <p>Full range of services designed to optimize infrastructure performance and reduce process complexity</p> <ul style="list-style-type: none">• Assess• Audit• Model• Configure• Upgrade• Train |



Vertiv difference

Services

Vertiv ensures continuous uptime of your critical operations so you can perform at your peak and maximize your resources. Whether you are in a data center, communications facility, government agency, or industrial plant, we collaborate with you every step of the way.



Expertise

Decades of knowledge to predict and prevent system issues



Reliability and Safety

Around-the-clock direct access to more than 3000 field engineers and 400 technical support team experts.
Average of one month each year of training and regularly certified to country-specific regulations and standards.



Global Coverage

A standardized support approach across the globe



Broad Capabilities

A complete life-cycle approach, with a wide range of programs and services to support infrastructure needs



Customer spotlight: Tech Insurer Services

Customer Need

Heavily reliant on call center availability, this provider of insurance and services related to cell phones, consumer electronics, and home appliances needed an infrastructure service partner to help ensure power system protection.

Solution

- Vertiv™ design, upgrade, and maintenance services
- Liebert® EXL S1 and Liebert® EXM UPS systems
- Vertiv™ Geist™ monitored rack power distribution units
- Liebert® XD, Liebert® DS and Liebert® DataMate thermal management systems

Benefit

- Partnership with solution architect that established a tri-bus system configuration, which enabled timely deployment of the newest technologies, ensuring availability and delivering a 20% increase in UPS efficiency
- Peace of mind having access to a team of local, technical experts that can maintain nearly all of its critical equipment and guarantee a two-hour service response time
- Advantageous pricing and cost savings achieved by having just one service support team to call – savings that supported business expansion
- Competitive advantage due to technical knowledge transfer that created a more informed workforce



None of our competitors could match us as far as available local head count and response time. Because the provider has multiple sites with a robust inventory of cooling units, rack PDUs, and UPS to service, it wanted to have one place to call when an issue would arise.

- Bob Walick, Owner and President of Walick-Kemp, a Vertiv Partner



Vertiv™ Software



Vertiv capabilities

Software

- Monitoring of the critical infrastructure that is vital to the delivery of service from IT installations and data centers
- Management of power and energy usage across the entire power infrastructure used to power the IT and facilities equipment
- Management and control of the use of expensive resources like space, power, cooling allowing the maximum use of these resources when deploying IT assets
- Remote monitoring of equipment performance with automated or manual recommendations on how to gain improved efficiency or resilience
- Enable capturing of stranded data to provide new insights into critical infrastructure operations and performance

DATA CENTER MONITORING

ENERGY MANAGEMENT

POWER MANAGEMENT

CAPACITY MANAGEMENT

REMOTE MANAGEMENT

CHANGE MANAGEMENT

DATA ENABLEMENT



Vertiv difference

Software

Expertise

Encapsulates our long experience in data center systems engineering and management.

- Comprehensive capability across data center inventory, power, thermal and space management
- Deep, rich connectivity across all domains covering IT and facilities equipment from all vendors
- Tightly integrated hardware and systems offerings for optimal performance and efficiency

Scale

Global software and services capabilities for all data center operating models.

- Modular software architecture that allows customers to choose the right components as needs dictate
- Installed base of over 5,000 global customers across numerous industries and geographies
- Extensive, experienced channel and business partner ecosystem to serve customers globally

Commitment

Extensive and ongoing investment in products and research to continue our leadership position in critical infrastructure management.

- Solid track record of partnering with customers to address their unique needs



Customer spotlight: Global Furniture Retailer

Software

Customer Need

As new technologies such as in-store kiosks and augmented reality displays multiplied, the retailer was searching for innovative ways to offload its use of centralized and cloud data centers for managing hundreds of remote “brick and mortar” storefronts. Additionally, stores continued to generate higher volumes of local, customer-related data, requiring a more distributed data processing model for supporting the stores.

Solution

Vertiv™ manufactured and HPE-labeled serial console
Vertiv™ Avocent® DSView™ management software

Benefit

- Increased system resiliency
- Reduced data center support costs
- Simplified remote management of edge computing systems
- Maximum uptime from future-ready IT solution



The software allows the retailer to perform centralized management ... administrators can reboot serial consoles from any location, as well as dispatch hundreds of firmware and driver updates simultaneously with the simple push of a button.

- Hewlett Packard Enterprise
Product Manager



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