

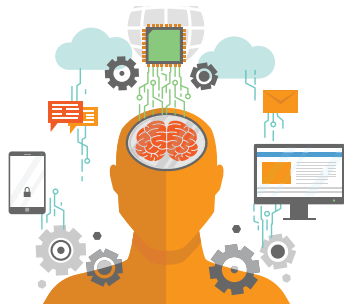


Vertiv In Manufacturing

Providing Unmatched Protection and Reliability for Critical Equipment



WELCOME TO MANUFACTURING 4.0



AI takes Center Stage

- To improve manufacturing processes, manufacturers are increasingly eyeing investments in automation such as robotics and machine learning.
- Research & markets expect AI spend in manufacturing to reach \$17.2B by 2025, growing at a CAGR of 49.5%
- A key benefit in automation is that it reduces risks especially in industrial sites such as those using heavy machinery or those in dangerous operating environments.



A Leaner Supply Chain System

- To stay above the competition, an organization's supply chain needs to be optimized to deliver greater value to customers.
- Aside from pricing and stock availability, manufacturers will increasingly focus on simplifying supply chain management to be able to operate more efficiently, manage stocks better and reduce operational cost.
- Many will digitize their supply chains through the use of RFID, business intelligence, as well as tools to improve logistics, optimize network and inventory, and procurement.



Predictive Maintenance Gain Traction

- There is growing adoption of predictive maintenance technologies that could not only reduce a company's maintenance cost, but also avert unplanned outages and extend equipment life.
- The use of predictive maintenance tools to monitor equipment performance, as well as the integration of IoT and automation, could save manufacturers valuable time, money and resources.

INFRASTRUCTURE CHALLENGES



Protecting Critical Manufacturing Equipment

- Growing customer demands and expectations are putting pressure on manufacturers to make sure they meet or even exceed production schedules.
- Protection of manufacturing equipment is critical, as downtime means lost productivity, penalties, damaged reputation and lost revenues.
- There are many causes of downtime, but many equipment-related failures can be preventable.
- Therefore, it is important to maintain reliability through regular facility testing and by utilizing solutions that protect against common causes of breakdowns such as power surges and electrical spikes.



Managing Critical IT infrastructure at the Edge

- With increased reliance on automation and artificial intelligence, manufacturers must be able to come up with ways to seamlessly integrate technology into everyday manufacturing operations.
- 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 technology integration through the use of predictive tools as well as power availability.



Protecting the IT Backbone

- Digitization and automation are increasingly being adopted by manufacturers to improve efficiency and overall operations.
- Manufacturers must be able to come up with ways to seamlessly integrate technology into everyday manufacturing operations.
- Equipment should be optimized and designed to accommodate technology integration through the use of predictive tools as well as power availability.
- IT infrastructure becomes all the more critical in the age of automation and IoT, and IT managers must have the right infrastructure in place not only to support the uptick in compute requirements, but also to manage the entire manufacturing facility better and smarter.
- The use of Artificial Intelligence (AI), Machine Learning (ML) & Robotics in manufacturing means an uptick in computing power and demand. Necessary solutions that are rugged and efficient are critical to support corporate demands in a manufacturing environment.



Real-Time Information for Real-Time Response

- As they strive to create a leaner, more efficient supply chain systems, manufacturers need to be aware of key supply and demand information in real time, right up to the shop floor – to be able to adjust production SKUs and schedules.
- A facility or IT manager will need to be able to see a problem before it becomes a problem – and be able to do something about it.
- Predictive monitoring tools can aid in having a smarter supply chain network. These tools must be able to predict, diagnose and provide action on all areas of the manufacturing network (from the environment, equipment or IT network) to ensure process continuity at all times.

VERTIV SOLUTIONS

Customized industrial UPS solutions, engineered to meet your needs



Liebert® RG
Ensures reliable, trouble-free operation of CNC machines



Liebert® Hipulse U
Utmost Reliable Power Solution for Critical Business Applications



Liebert® ITA2 (5 - 20kVA)
Compact, Efficient & Robust UPS For Critical Applications



Liebert® EXL S1
New T-free Monolithic UPS Generation Delivering Secure Power and Maximized Energy Saving



Liebert® APM
The Compact Row-Based UPS With FlexPower Technology™



Liebert® CRV4
4th Generation Row-Cooling with Elevated Performance



Liebert® LPC
Precise cooling for labs and testing facilities



SmartAisle™

- Pre-configured, rapidly deployable integrated IT infrastructure for core deployments
- Replaces traditional bricks-and-mortar design with flexible, efficient solutions



SmartRow™ 2

- Rapidly deployable IT infrastructure for core or branch deployments
- Integrated with full suite of power, cooling and monitoring solutions for maximum efficiency and availability
- Expandable and flexible depending on IT requirements



SmartCabinet™ Premium

- Integrated, pre-configured infrastructure that brings “plug-and-play” convenience to small spaces and edge locations
- Offers high efficiency and availability with the Liebert ITA2 UPS and integrated Thermal Management solution
- Comes with intelligent monitoring capabilities through the Liebert RDU software



Liebert® EXM
Efficient and Flexible Power-Optimized For Medium-Size UPS Applications



Liebert® DM
High-performance cooling applications for small computer rooms and network closets



Liebert® Trinerity Cube
Highest efficiency and reliability for enterprise data centers



Avocent® HMX
Providing seamless access to multiple computing resources



Liebert® SRC™
Small Room Cooling



Vertiv™ Smart Infrasight



Geist™ PDU
Reliable power distribution helps manage power capacity and increase functionality

Global Service

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



Services ensure that your vital applications stay up and running. We do this through our vast array of project, maintenance and performance capabilities, supporting you in making better decisions to operate more efficiently and reduce complexity.



Truly Global Geographical Coverage and Capacity
Largest Customers Engineers workforce



Knowledge, Reputation and Experience
Technology, R&D access, Field knowledge

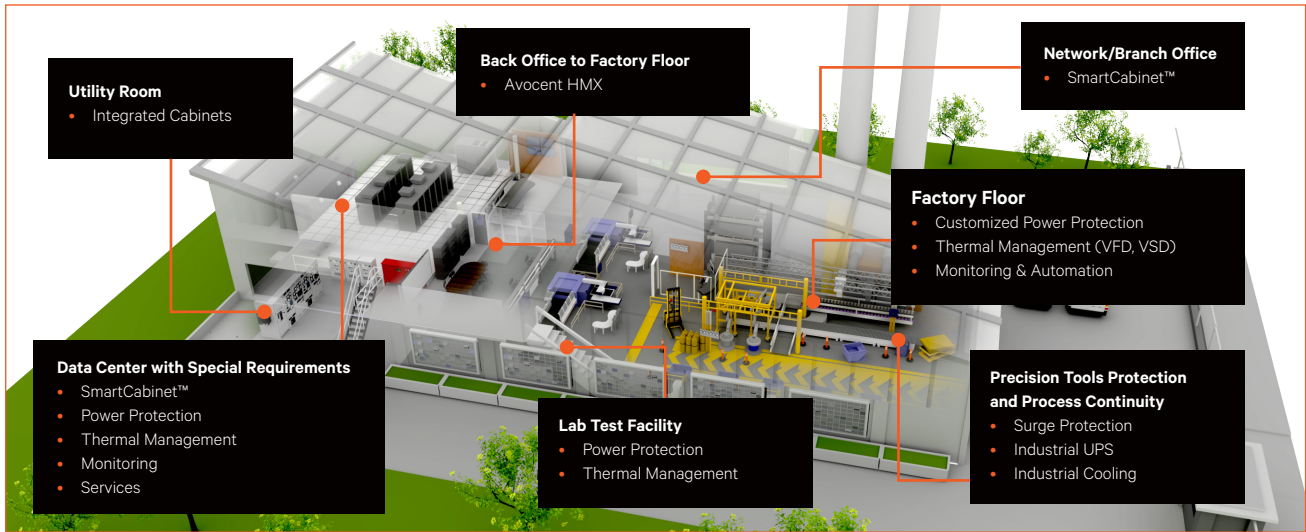


Consistent Service Delivery and Offering
Offering diversity, Breadth of technologies



Single Service Partner and System Level Expert
Reliability – we are the trusted partner

Vertiv in Manufacturing | Case Studies



GLOBAL AUTOMOTIVE MANUFACTURER



Overview

As part of its modernization efforts and to improve business processes, the customer set out to build a new office server room to handle business demands. The customer was looking for an innovative solution that would allow them to be ahead of the competition, while addressing their IT and infrastructure demands. Vertiv's SmartRow™ solution was deemed the best fit for the customer's new server room compared to a conventional infrastructure build with its integrated solution combining power, thermal and infrastructure management.

Vertiv Solution

- SmartRow™
- Liebert® UPS
- Liebert® Thermal Management

GLOBAL TECHNOLOGY FIRM



Overview

The customer underwent a major data center reorganization in 2015. The relocation of its IT equipment offshore presented significant challenges to the existing power and thermal infrastructure supporting the new reduced IT load in their Sydney data center. One of the challenges facing the firm was to determine the inefficiencies caused by relocation of its IT assets. At the same time, it wanted to reassess the capabilities of its three 63KW CRAC (computer room air conditioning) units that were approaching end of life. By applying Vertiv's eCap™ Energy Optimization Service, the customer was able to reduce total data center energy consumption by as much as 33%.

Vertiv Solution

- eCap™ Energy Optimization Service

PHILIPPINE-BASED SEMICONDUCTOR FIRM



Overview

To support its growing business, the customer set out to expand its regional manufacturing site. In its expansion, the customer needed reliable equipment, support and services to support its new facility, which will be used for assembling and testing chips for computers, aerospace, telecommunications and automotive industries. Vertiv's UPS, battery monitoring solutions and 24x7 services helped the customer in its facility upgrade, providing the reliability and availability it needed.

Vertiv Solution

- Liebert® UPS
- Liebert® Thermal Management 60TR single unit
- Maintenance Services
- Battery Monitoring

JAPANESE ELECTRONICS MANUFACTURER



Overview

The customer's legacy data center needed an upgrade as it was facing efficiency issues, making it prone to downtime. The customer approached Vertiv for a solution to support a conventional data center setup, but able to accommodate demands of flexibility and scalability. The Vertiv SmartRow's rapid deployment and space-saving design allowed the customer to quickly set up a new data center with limited to no downtime at all.

Vertiv Solution

- SmartRow™ 4+1

Remote & Site Monitoring Services

System-wide monitoring solutions

- 24 hour help desk support by expert engineers
- Remote preventive maintenance for proactive identification of anomalies
- Remote battery testing
- Alarm management
- Field incident resolution
- Equipment optimization advice
- 24/7 customer access via internet
- Third party equipment integration
- Customized reports
- Integration with high level platforms via SNMP

LIFE™ Remote Monitoring & Diagnostics

Maximized system availability via real-time diagnosis and resolution of operating anomalies

- 24 hour monitoring and service delivery by expert engineers
- Monitoring and trending of system data
- Diagnosis through expert data analysis allowing effective proactive maintenance and prevention of future anomalies
- Prompt alarm identification and resolution
- Alarm notification
- On-site corrective maintenance dispatching
- Third party equipment integration
- Customer reporting

Vertiv Data Center Optimization Services

Complete infrastructure audits maximize system availability and enhance data center efficiency

- Airflow, heat and power assessments
- Temperature measurements
- Floor plan layout
- Reporting
- Recommendation
- EC fans enhance energy savings on installed equipment
- iCOM Control enables modern communication capabilities of multiple units

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