VERTIV™

Securing Your Rail Infrastructure

Vertiv
In Rail Transport

The Evolution of the Rail Industry

Personalized Mobility

- There is a growing focus on enhancing customer experience with the goal of enabling passengers to stay connected before, during, and after their commute.

- Passengers are now able to access real-time information on train routes and travel times and be alerted of any incidents to make their commute more convenient and comfortable.

- Integration of e-commerce features on some train stations, allowing passengers to do their shopping online and pick up their items at the nearest train stations.

Sustainability for Growth

- As the rail system becomes digital, there is also a shift towards a more sustainable transport model.

- Operators continuously seek innovative technologies that increase efficiency and resiliency while strengthening the overall rail infrastructure.

- The goal is to be able to harness technologies while lowering operating costs and ensuring the safety and availability of the entire rail network.

Protecting the Digital Rail System

- With increased reliance on technology and customer experience, operators need to ensure that all personal data and information collected from passengers remain protected at all times.

- At the same time, operators must also ensure that their equipment is optimized and protected against sudden breakdowns and outages.

- There is a need for a two-pronged approach to security: physical and digital.

Infrastructure Challenges

Managing Costs While Enhancing Infrastructure Performance

- Rail operators must be able to guarantee a more efficient and resilient system, while minimizing operating and maintenance costs
- The challenge is to integrate new technologies and systems into the existing network to enhance overall performance and introduce automation
- At the same time, existing equipment should also be designed to meet the environmental demands of rail networks

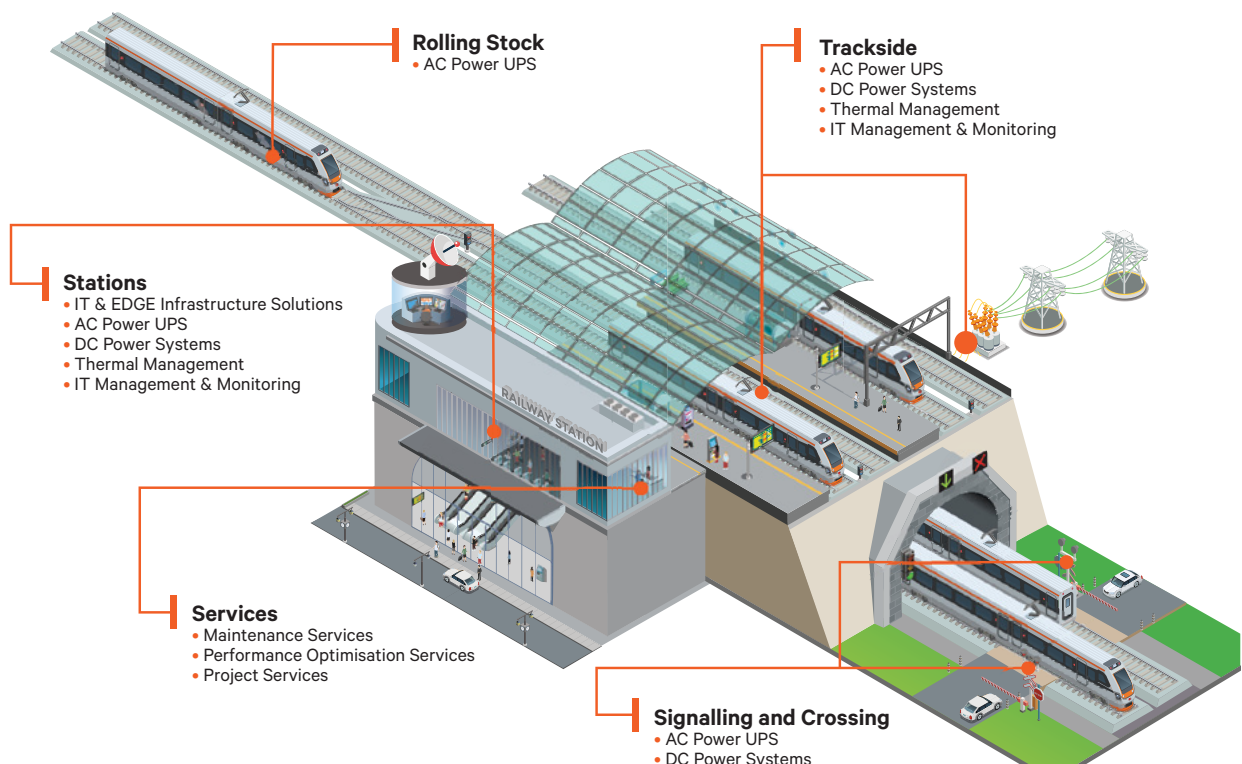## Enabling a Smart Transport Network From Core to Edge

- With increased reliance on automation, rail operators must be able to manage multiple applications within the network, from the main data center to various train hubs across a particular region
- It is important to ensure seamless integration of all applications across the system for effective implementation of new technologies
- Different infrastructure requirements for both core and edge computing applications

Maintaining Reliability and Safety

- Immediate access to data to address critical issues instantly
- Data security to maintain a reliable communication network
- Protection against power disruption and disturbances across every location

Vertiv End-to-End Critical Infrastructure

Rolling Stock
- AC Power UPS

Trackside
- AC Power UPS
- DC Power Systems
- Thermal Management
- IT Management & Monitoring

Stations
- IT & EDGE Infrastructure Solutions
- AC Power UPS
- DC Power Systems
- Thermal Management
- IT Management & Monitoring

Services
- Maintenance Services
- Performance Optimisation Services
- Project Services

Signalling and Crossing
- AC Power UPS
- DC Power Systems

Vertiv Core to Edge Solutions

AC Power UPS

Vertiv™ Liebert® EXS
(10 to 60kVA)

- Double conversion efficiency up to 96.6%
- ECO mode efficiency up to 99%
- Input current total harmonic distortion correction (THDi) <3%
- Input/output and bypass circuit breakers
- Integrated manual bypass
- Integrated parallel load bus and synchronization port (LBS)
- Flexible battery combinations of VRLA and lithium

Vertiv™ Liebert® APM2
(30 to 600kW)

- Ultra high efficiency up to 97% in double conversion mode, flat efficiency curve
- Each 30kVA module delivers 30kW, unity PF
- Distributed controller: Each module has its own DSP
- Input PF >.99, THDi <3%
- Standard built in LBS function and smart parallel
- Capable to handle 0.5 lagging/leading loads
- Flexible battery combination of VRLA and lithium

Vertiv™ Liebert® EXM2

- Double conversion efficiency up to 96.6%
- ECO mode efficiency up to 99%
- Input current total harmonic distortion correction (THDi) <3%
- Input/output and bypass switches
- Integrated manual bypass
- Integrated parallel load bus and synchronization port (LBS)
- Flexible battery combinations of VRLA and lithium

Thermal Management

Vertiv™ Liebert® HPF

- Compact & Easy to Install Solution with R410A Refrigerant Included
- Provides enhanced energy savings with direct freecooling through the use of outside cold air
- New generation of EC fans to increase overall unit efficiency.
- Compressor's modulating capacity and electronic expansion valve
- Team-working with up to 16 units exploits standby, rotation and cascade modes
- Fast and easy installation: all components easily accessible for simplified maintenance and service.

Vertiv™ Liebert® PDX
(from 15 to 165 kW)

- **Energy Efficiency:** With variable speed compressors to increase full and part load efficiency, to reduce starting current and to improve power factor
- **Cooling Continuity:** manage power failures and restore working conditions when power is back. Downtime minimized through the prevention of alarms and failures
- **Flexibility:** wide range of air configurations available and a full set of options and accessories to adapt to any type of data center design
- **Smart Control:** Vertiv™ Liebert® iCOM™ control manages Liebert® PDX units as well as outdoor heat rejection condensers (Vertiv™ Liebert® MC or Vertiv™ Liebert® HPA)

Vertiv™ Liebert® HPM
(from 4 to 30 kW)

- Designed to allow maximum flexibility of application in technological environments,from data processing centers to control rooms and electronic centers for telecommunication granting complete environmental control and reliability
- Direct expansion (freecooling, dual fluid and constant) or chilled water versions
- Upflow, downflow and displacement airflow patterns
- Complies with the European ErP 2015 Directive requirements
- EC Fans for optimized airflow distribution

DC Power Systems

Vertiv™ NetSure™ 7100

NetSure™ 7100 systems help reduce your equipment footprint while meeting the higher power demand of your evolving network. These compact systems feature high-power density rectifiers that help minimize operation costs and carbon emissions.

Vertiv™ NetSure™ Inverter Systems

Free up floor space by powering your AC and DC loads from a single system with a common battery bank. Add a stand-alone NetSure™ Inverter cassette to existing sites or use Vertiv™ NetSure™ 7100 Converged systems with Vertiv™ eSure™ Inverters for new deployments.

Vertiv™ NetSure™ HVT

This 400V high voltage DC (HVDC) power solution minimizes AC to DC conversion steps and optimizes power system architecture to improve overall efficiency, reliability and scalability.

Vertiv™ NetSure™ M Series

A robust and energy-efficient outdoor enclosure solution for radio and IT edge equipment that delivers hours of battery backup. Increase cooling capacity with patent-pending humidity control supported by energy-efficient fan filter solutions, improved battery ventilation, and compatibility with lithium-ion batteries.
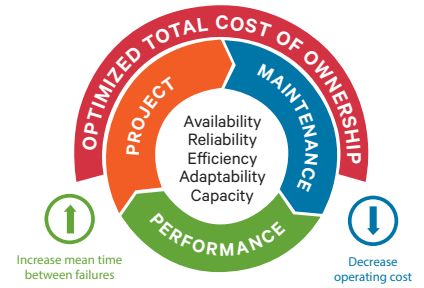
IT Management & Monitoring

Managing and monitoring critical environments at multiple sites around the clock with comprehensive infrastructure management and monitoring systems for both IT and facilities. Solutions and services that provide continuous oversight of data centers, computer rooms and network closets, as well as wireless, wireline and enterprise telecom applications.

Services

Global Services

A service model embracing the entire product lifecycle going from project start up to continuous maintenance and performance optimization.

OPTIMIZED TOTAL COST OF OWNERSHIP

PROJECT · MAINTENANCE · PERFORMANCE

Availability
Reliability
Efficiency
Adaptability
Capacity

Increase mean time between failures

Decrease operating cost

Services ensure your vital applications are available and healthy through our project management, maintenance, and performance optimization capabilities so you can operate more efficiently, reducing risks and difficulties.

Global Geographic Coverage and Capabilities
The largest and best-trained engineering staff.

Knowledge, Reputation, and Experience
Technology, access to research and development, and field knowledge.

Consistent execution of broad offering of technologies and solutions.

Expert Ally
Reliability: we are your most dependable business partner.

Railway Operator in Western Europe

To support this customer's railway signaling and point machines, a highly reliable modular power supply was desired. Feeding DC power back-up systems with inverters from catenary power allowed this network to operate both its AC and DC powered equipment in a very cost-efficient way.

Vertiv Solution

- Vertiv™ NetSure™ HVT
- Vertiv™ NetSure™ 7100 System