



Combines advanced infrastructure management and monitoring

Early deterioration detection of service quality and fast troubleshooting

Provides actionable insights through data-driven decision-making

FNT Infrastructure Health and Monitoring

The Foundation of a Resilient Digital Infrastructure

THE IMPERATIVE OF A DIGITAL INFRASTRUCTURE TWIN

In today's digital age, managing high-performing, resilient, and flexible IT, data center, and network infrastructures presents a formidable challenge. These infrastructures, often comprising tens of thousands of physical elements like servers, storage systems, switches, and cables, alongside complex virtual environments such as virtual servers, databases, and Kubernetes clusters, demand a management approach that is both highly reactive and cost-effective.

Achieving this delicate balance hinges on the establishment of a comprehensive digital infrastructure twin – a virtual representation of the physical and virtual landscape. This digital twin serves as a powerful tool for analyzing improvement potential, streamlining workforce processes for operation, maintenance, and evolution, and ensuring thorough documentation.

To realize the full potential of such a digital infrastructure twin, *FNT Infrastructure Health and Monitoring*, an optional capability of the FNT Command Platform, prioritizes three critical capabilities:

Monitoring – Real-Time Observability:

Enable real-time monitoring of the infrastructure elements and visualize an abstraction.

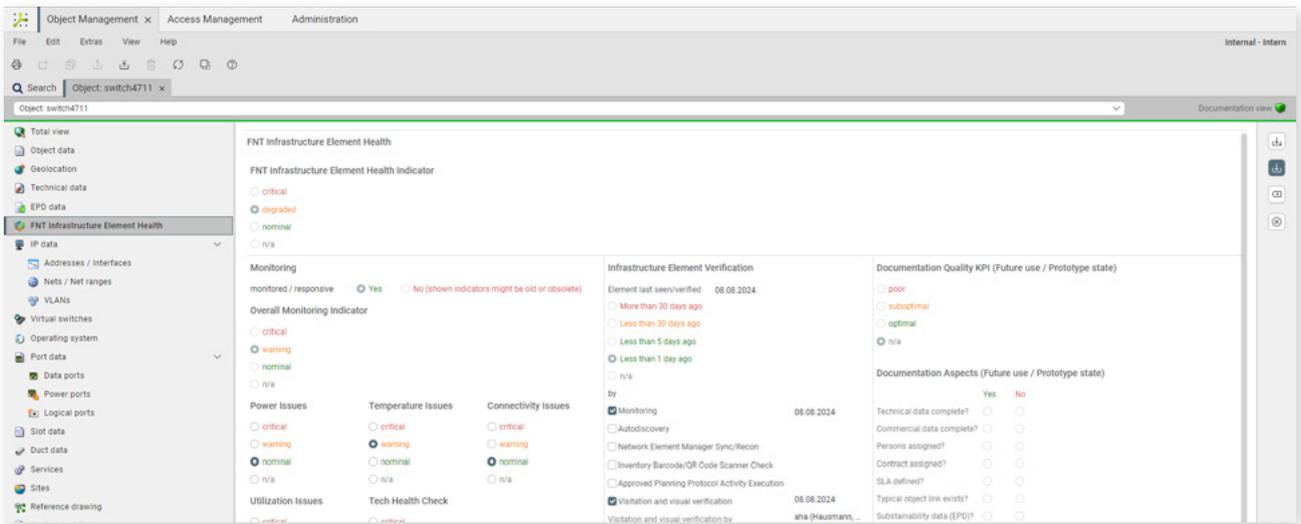
Synchronization Transparency – Bridging the Digital-Physical Gap:

Achieve transparency about the synchronization between the digital and physical realms with infrastructure element verification.

Documentation Quality – Ensuring Comprehensive and Reliable Data:

Automatic target/actual comparisons ensure true documentation quality, make deficiencies transparent, and enable their efficient resolution





FNT Infrastructure Element Health: Each infrastructure element is showing transparently all three aspects of monitoring, element verification (“last seen”) and documentation quality. In this example a temperature warning triggers subsequent indication of overall health degradation.

MONITORING – REAL-TIME OBSERVABILITY

The cornerstone of effective infrastructure management is real-time observability. Comprehensive monitoring provides the necessary insight into the exact state, behavior, and performance of infrastructure elements. This extends beyond simple uptime checks to encompass detailed performance metrics, resource utilization, and environmental conditions such as temperature and humidity. Such monitoring must include both physical elements – servers, storage, network devices, and cabling – and virtual elements such as virtual servers, load balancers, databases, and Kubernetes environments. Data points and their analysis do not only allow current state determination, but also provide crucial insight about capacity utilization and reserves still available.

Data gathering techniques, such as monitoring based on a multitude of protocols ranging from classic SNMP via BUS protocols like ModBUS/TCP and MQTT messaging as well as the API-based monitoring of virtual environments, and sensor data integration, are essential for capturing a holistic view of the infrastructure's health.

By providing continuous, granular data, monitoring enables proactive problem-solving, minimizes downtime and optimizes resource utilization.

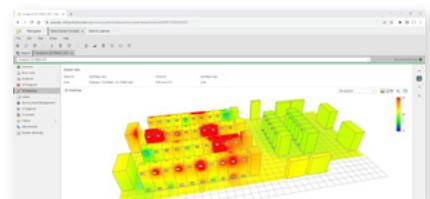
Overview of use-case scenarios utilizing the monitoring capabilities of FNT Infrastructure Health and Monitoring

Environmental Monitoring: Control Over Critical Parameters

A key use case scenario of infrastructure observability is environmental monitoring, which measures parameters such as temperature, humidity, and power consumption in real time. This information not only enables the early detection of potential issues but also provides valuable insights to enhance operational efficiency. For instance, temperature deviations indicating cooling issues can be quickly identified and addressed before they lead to system failures.



DCIM infrastructure health dashboard with temperature, humidity, and power consumption monitoring total and per individual power port.



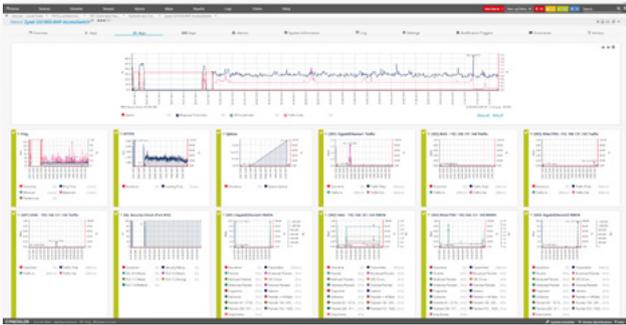
The measurement data of FNT Infrastructure Health & Monitoring powering FNT Analytics dashboards to manage energy, power and cooling efficiency as well as the 3D footprint views of FNT Data Center Cockpit for capacity planning and the heatmap overview.

The FNT Command platform features strong DCIM capabilities in the form of the Data Center Cockpit and the associated dashboards supporting capacity planning, hotspot detection and avoidance. The data derived out of the environmental monitoring scenarios is utilized to support these features and is visualized on a higher situational awareness level.

Network Oversight by Port Monitoring:

Ensure Service Quality and Detect Anomalies

Keep port status of active network devices under supervision and analyze traffic on network connections for better quality of service and traffic quality analysis including the detection of unusual traffic volume.

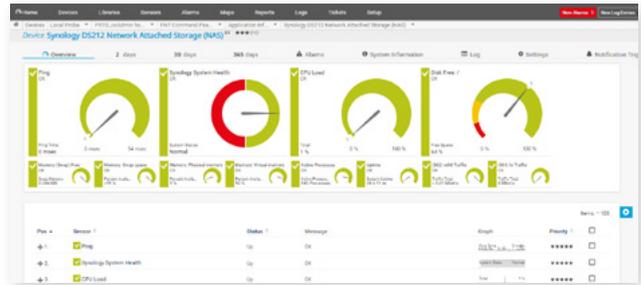


Monitoring HTTPS traffic, uptime and traffic on all individual ports.

Application Infrastructure:

Optimizing Performance and Resources

Monitoring of application infrastructure enables real-time tracking of the health and performance of servers, databases, and storage solutions. Critical metrics such as CPU utilization, storage capacity, and database performance are captured and visualized, allowing organizations to efficiently manage their resources. This facilitates maintenance planning and ensures that applications remain stable even under high loads.



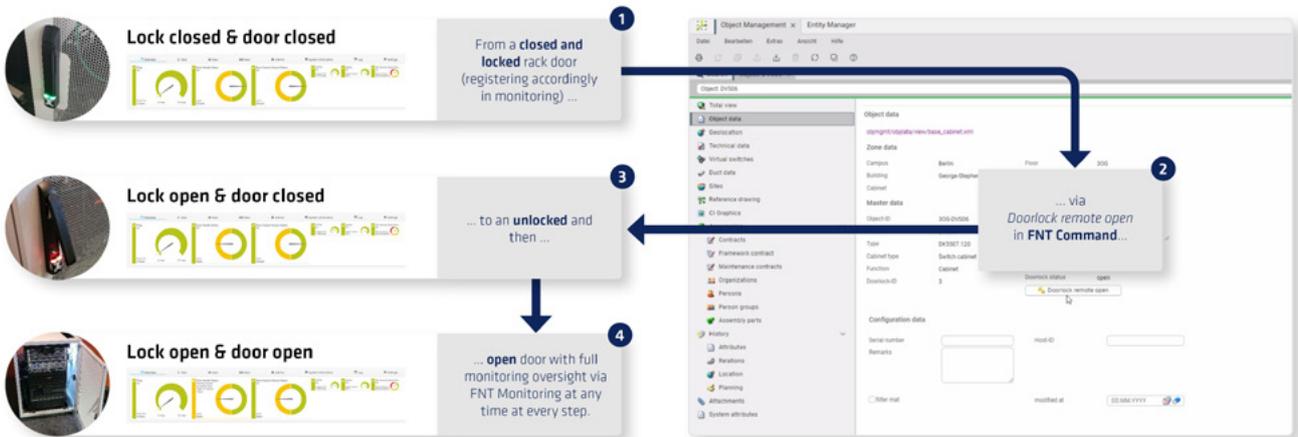
Storage Monitoring: Health and utilization of the storage device and remaining available storage space in total, per disc, per partition.

Access and Security Controls:

Flexibility and Protection

With remote control capabilities, companies can manage access to sensitive infrastructure components effectively. This feature not only improves security but also increases

flexibility by allowing real-time decisions to grant or deny access. It is complemented by logging functions that provide transparency and help document access at any time.



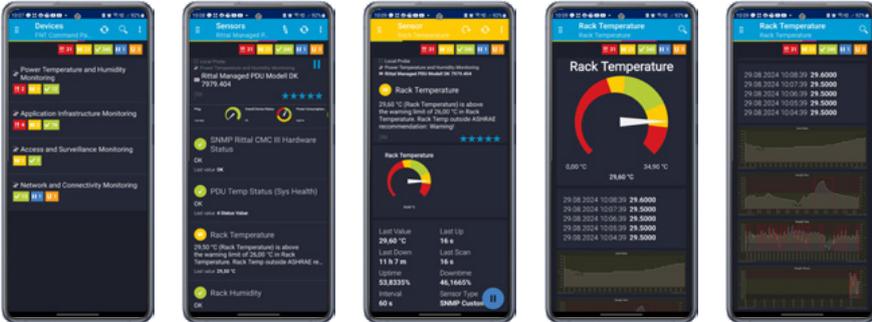
Opening rack door locks and monitoring door status

Mobile Accessibility:

Infrastructure at Your Fingertips

Mobile accessibility enables users to access monitoring data via a specially designed app, viewing alerts and status reports in real time on the go. This ensures that

organizations can respond quickly to potential issues, enhancing both efficiency and responsiveness.



Mobile Access to Monitoring: From the sensor group overview via single device overview to the individual sensor gauge and graphs over time.

SYNCHRONIZATION TRANSPARENCY – BRIDGING THE DIGITAL-PHYSICAL GAP

Maintaining alignment between the digital twin and the physical reality is crucial. The dynamic nature of IT infrastructures, with frequent changes and updates, necessitates a mechanism to ensure the virtual representation remains accurate.

The “last seen” mechanism – the visualization of interaction timestamps with the FNT Command Platform regardless whether they stem from user interaction or FNT Integration Center-based synchronization and data imports and updates – serves this purpose, providing clear visibility into the currency of documented data.

This involves tracking when infrastructure elements were last observed through autodiscovery systems, integration with network element managers, barcode scanning during inventory checks, audit confirmations, or human interactions during maintenance and configuration changes.

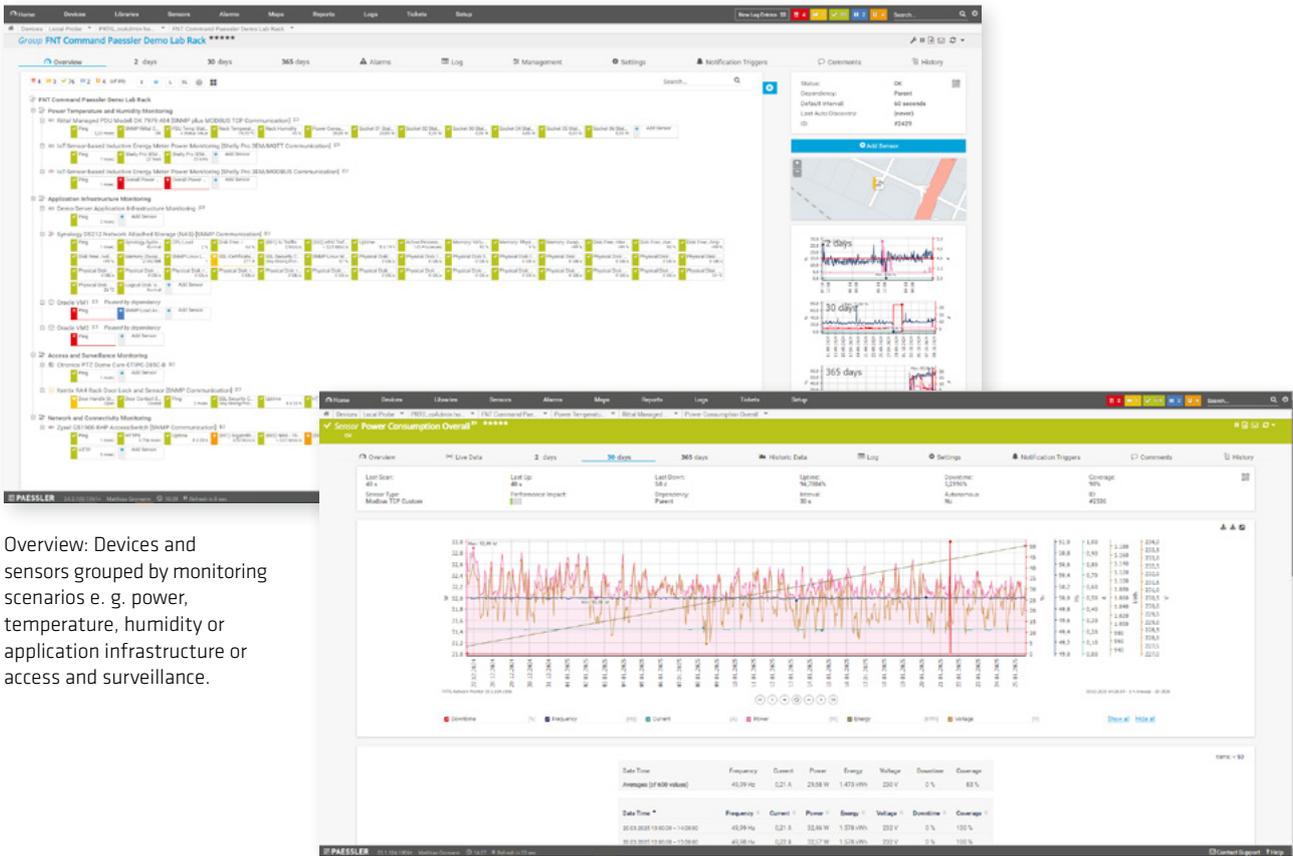
The importance of such a mechanism, on top of the already existing audit trails and change tracking that provides a historical record of modifications, cannot be overstated. It allows the quick identification of gaps in synchronization. By promoting transparency about the synchronization status, *FNT Infrastructure Health and Monitoring* fosters confidence in the accuracy of the digital twin.

DOCUMENTATION QUALITY – ENSURING COMPREHENSIVE AND RELIABLE DATA

Comprehensive and reliable documentation is the bedrock of effective infrastructure management. It enables efficient troubleshooting, informed planning, and compliance with regulatory requirements.

FNT Infrastructure Health and Monitoring paves the way for a new level of documentation quality. This is achieved through regular, automated comparisons between the current actual state and the defined target state of the documentation, ensuring that discrepancies are made transparent. The strict mandatory-field approach common in many other solutions often makes the documentation process more difficult for employees and frequently results in documentation being bypassed altogether.

In contrast, *FNT Infrastructure Health and Monitoring* offers greater flexibility while continuously monitoring documentation quality, thereby supporting management in process optimization. In this way, the true root causes of deficiencies become visible – such as incorrectly configured or poorly designed fully automated reconciliations between operational systems and the digital twin, or a lack of knowledge about documentation processes in individual departments – and can be addressed in a targeted and efficient manner.



Overview: Devices and sensors grouped by monitoring scenarios e. g. power, temperature, humidity or application infrastructure or access and surveillance.

Power monitoring: Power consumption over time and in total for energy efficiency optimization and reporting.

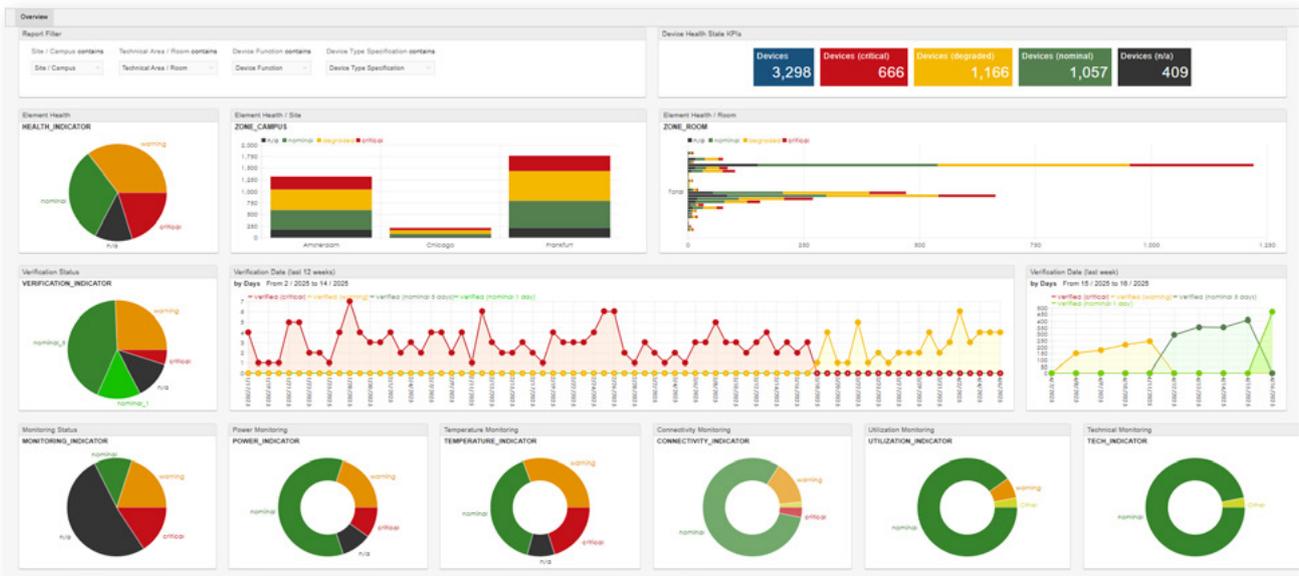
CONCLUSION: REALIZING THE POTENTIAL OF FNT INFRASTRUCTURE HEALTH AND MONITORING

The *FNT Infrastructure Health and Monitoring* solution, built upon the three pillars of real-time monitoring, transparent synchronization, and meticulous documentation quality, represents a transformative approach to IT infrastructure management.

By providing continuous observability, ensuring data currency, and maintaining comprehensive documentation, this solution enables organizations to enhance infrastructure reliability, reduce operational costs, and improve compliance. The benefits of implementing this approach

include proactive problem-solving, enhanced security, and improved overall efficiency.

Looking ahead, future innovations such as AI and machine learning integration for predictive maintenance, automation of synchronization and documentation processes, and enhancements in visualization and reporting will further elevate the capabilities of *FNT Infrastructure Health and Monitoring*, ensuring it remains at the forefront of infrastructure management solutions.



The combination of data out of all three pillars of FNT Infrastructure Health and Monitoring comes together in a powerful umbrella dashboard fostering deep insights into the overall health status and resilience of the operated infrastructure.

KEY BENEFITS OF FNT INFRASTRUCTURE HEALTH AND MONITORING



Enhanced Resilience: Proactively detect and address emerging issues before they escalate. By safeguarding uptime and stabilizing operations, organizations strengthen service continuity and ensure dependable delivery of critical business processes.



Cost Optimization: Constant monitoring and informed capacity planning reduce unnecessary energy usage, extend asset lifecycles, and minimize avoidable maintenance costs - leading to sustainable, long-term savings across the digital infrastructure.



Improved Operational Efficiency: Gain transparency into infrastructure usage and eliminate inefficiencies. Real-time insights help streamline processes, reduce unnecessary complexity, and create a leaner operational model that supports business agility and growth.



Regulatory Compliance: Achieve compliance with confidence. High-quality documentation and audit-ready reporting support adherence to industry standards and legal requirements while reducing the administrative burden of preparing for audits.