FNT

// simplify complexity

Combines advanced infrastructure management and monitoring

Supports predictive maintenance, improving performance and uptime

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.

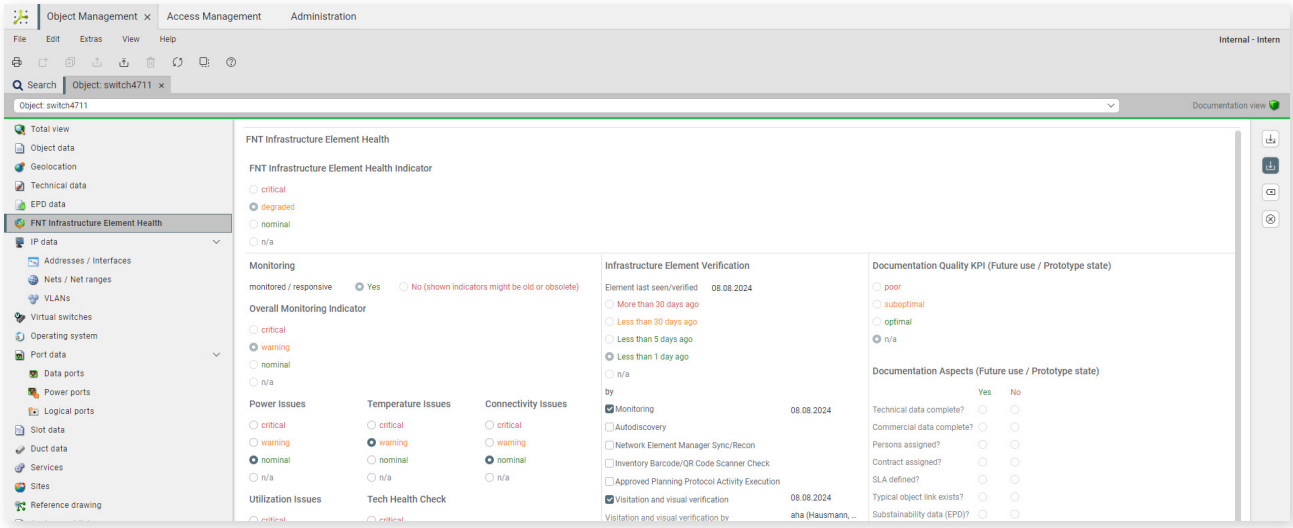
Achieving this delicate balance hinges on the establishment of a comprehensive digital infrastructure twin – a virtual representation of the physical and virtual landscape. This digital twin serves as a powerful tool for analyzing improvement potential, streamlining workforce processes for operation, 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: Easily execute constant KPI-based quality control of documentation quality.



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.

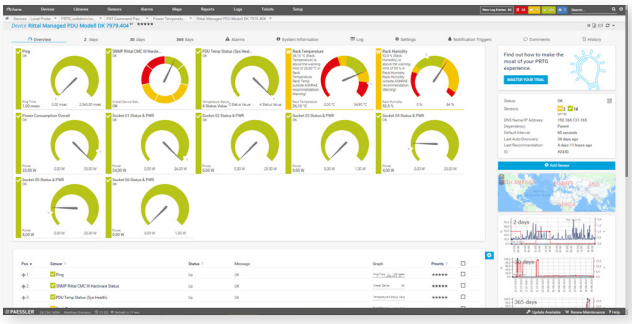
Data gathering techniques, such as monitoring based on a multitude of protocols ranging from classic SNMP via BUS protocols like ModBUS/TCP and MQTT messaging as well as the API-based monitoring of virtual environments, and sensor data integration, are essential for capturing a holistic view of the infrastructure's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

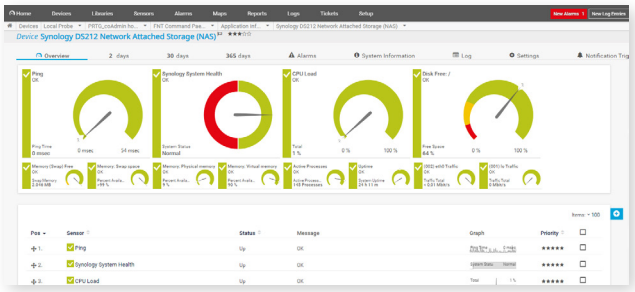


DCIM infrastructure health dashboard with temperature, humidity, and power consumption monitoring total and per individual power port.

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

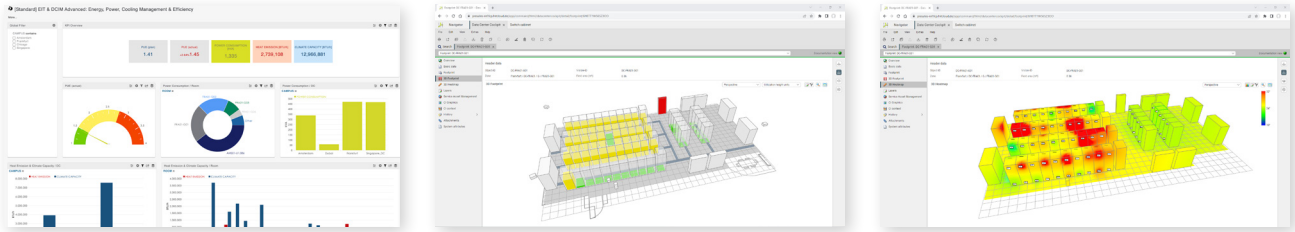
Application Infrastructure:
Optimizing Performance and Resources

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.

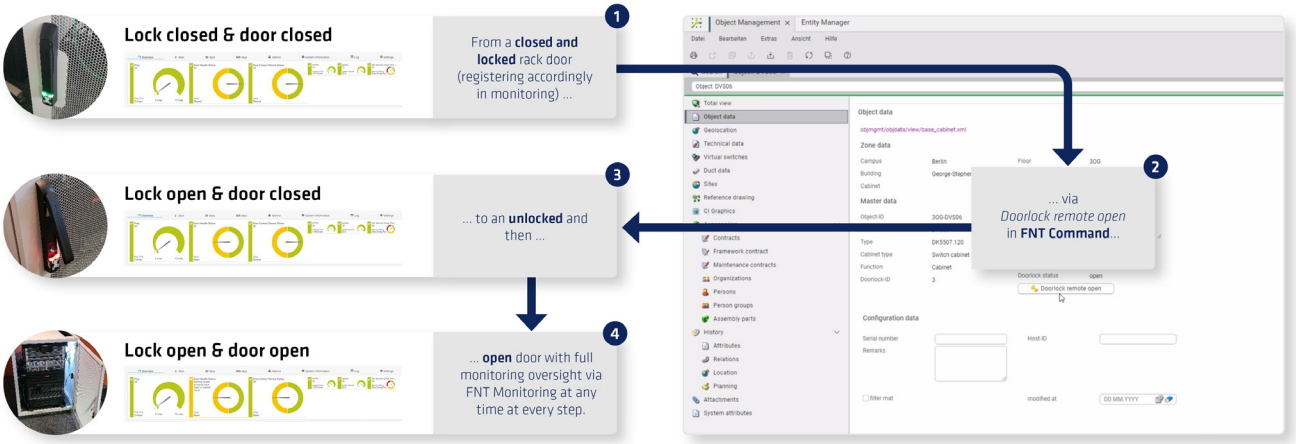
The FNT Command platform features strong DCIM capabilities in the form of the Data Center Cockpit and the associated dashboards supporting capacity planning, hotspot detection and avoidance. The data derived out of the environmental monitoring scenarios is utilized to support these features and is visualized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



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.

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 adjustments to physical access rights. 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. This ensures that organizations can respond quickly to potential issues, even when offsite or on the go, 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.

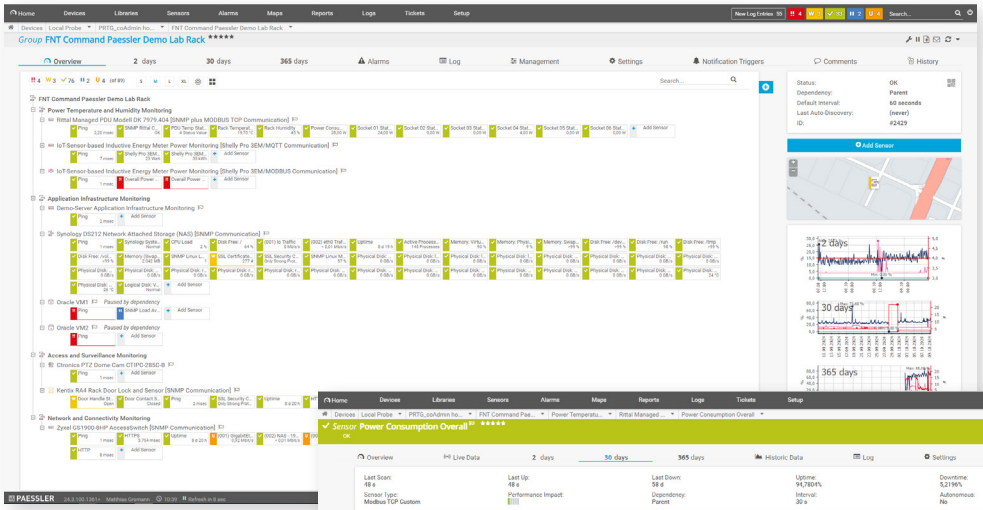
The importance of such a mechanism, on top of the already existing audit trails and change tracking that provides a historical record of modifications, cannot be overstated. It allows the quick identification of gaps in synchronization. By promoting transparency about the synchronization status, *FNT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

DOCUMENTATION QUALITY – ENSURING COMPREHENSIVE AND RELIABLE DATA

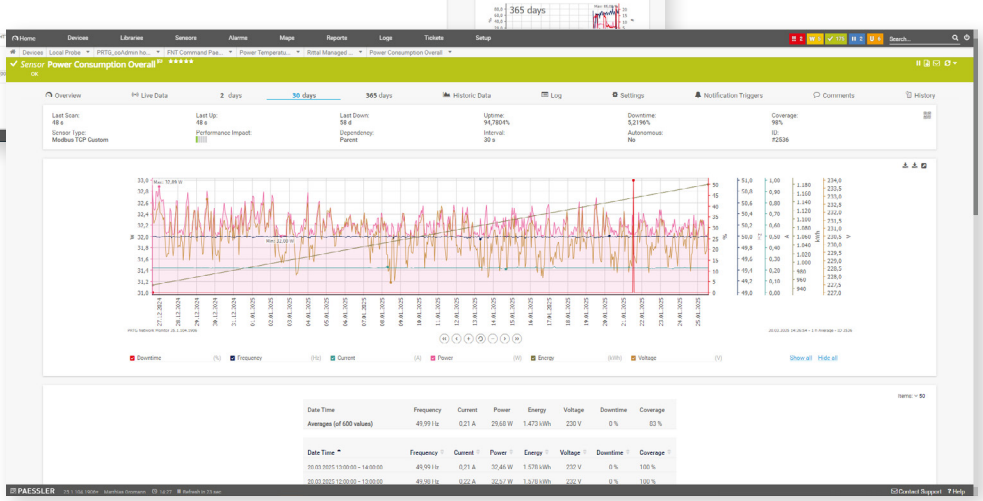
Comprehensive and reliable documentation is the bedrock of effective infrastructure management. It enables efficient troubleshooting, informed planning, and compliance with regulatory requirements.

To achieve this, *FNT Infrastructure Health and Monitoring* categorizes documentation into distinct aspects: technical, configuration, and organizational are the primary categories. Technical aspects cover physical attributes such as height, width, weight, power consumption, and heat output. Configuration aspects detail hardware specifications, software installations, and virtual environment setups. Organizational aspects identify responsible groups and individuals, as well as contractual relationships.

Simple and easy-to-interpret indicators for documentation coverage enable the operator of the infrastructure to identify gaps and initiate countermeasures such as enhancing documentation procedures, training personnel or simply enforcing guidelines with organizational units remiss of complying with processes. Defining required attributes for each infrastructure element type is an essential ability to ensure consistency and completeness. By representing a means of analyzing and prioritizing documentation quality, *FNT Infrastructure Health and Monitoring* empowers organizations to make informed decisions based on reliable data.



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



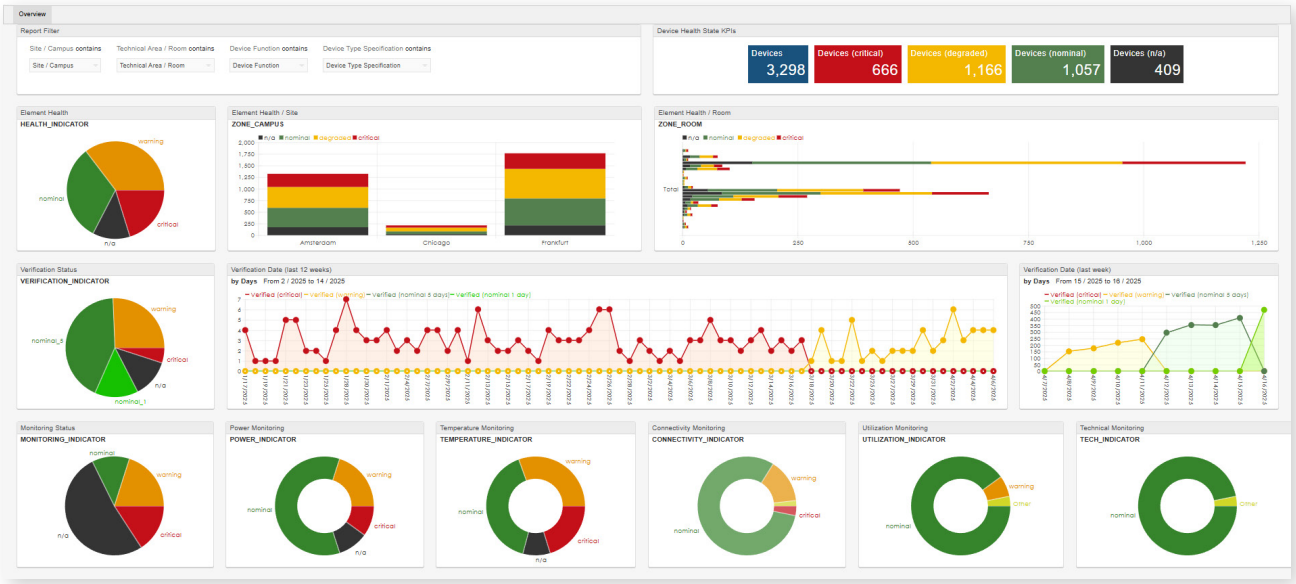
Power monitoring: Power consumption over time and in total for energy efficiency optimization and reporting.

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 identify and address potential issues to minimize down-time and ensure reliable operations.

Cost Savings: Reduce energy consumption and maintenance costs through predictive monitoring and efficient resource allocation.

Improved Operational Efficiency: Optimize resource utilization and streamline infrastruc-ture management with real-time insights.

Regulatory Compliance: Meet industry and legal standards with comprehensive monitor-ing and detailed reporting.