

Service Assurance for Manufacturing Plants with Omnis Smart Edge Monitoring

IT system performance is critical to manufacturers. Any degradations or outages quickly have a ripple effect through the business, lead to production delays and/or quality issues, and ultimately impact revenue. Applications such as Manufacturing Execution Systems (MES), Computer-Aided Design and Computer-Aided Manufacturing (CAD/CAM), Supervisory Control and Data Acquisition (SCADA) systems, and other manufacturing-focused services are critical to running the production lines.

Comprehensive visibility and service assurance for these applications are keys to success. Manufacturing applications may be centralized in private or public data centers and co-locations, such as CAD/CAM; they may be cloud-based or software-as-a-service (SaaS), such as customer resource management apps (CRM) - Salesforce.com; or they may be locally based within a factory, such as those operating automated assembly lines. Local plant communications, as well as cloud services, bypass the central data center, where performance visibility may already be employed. This complicates monitoring and control from central IT.

Also complicating centralized monitoring are the design and use of network resources in remote manufacturing facilities. Local factory networks range in size and scope, very much like the factories themselves. Regardless of whether the company selects “network in a box” designs that leverage virtualized server technologies or small, private data centers, seamless performance within the factory itself and with corporate data centers, cloud, and SaaS services is essential to maintaining the company’s business objectives. Monitoring the headquarters data center(s) is essential, but only a part of the story. Lack of network and application visibility in the factory networks leads to delays or failures in detecting service degradation.

Omnis™ Smart Edge Monitoring reimagines service assurance in these complex scenarios. Its comprehensive visibility and control comes from leveraging wire-data and synthetic testing, NETSCOUT’s® patented and highly scalable Adaptive Service Intelligence® (ASI) technology. It provides the foundation for the robust data sources available to monitor and analyze service delivery across today’s manufacturing infrastructures with the nGeniusONE® Service Assurance solution.

Manufacturing Plant Problems Addressed by Omnis Smart Edge Monitoring

Depending on traditional data center network design or virtualized server design choices deployed for the individual factory networks, points of visibility include:

- The segment coming into the factory network from the WAN / MPLS / SD-WAN / Internet Service Provider (ISP), also known as the WAN Network Edge. Deployed before the Firewall and VPN concentration (Figure 1), InfiniStreamNG® (ISNG) appliances provide visibility and control at the point where traffic is passed from the factory to a third-party for monitoring, troubleshooting, and capacity planning activities.
- The segment on the factory side of the VPN controller. The ISNG appliance provides performance and utilization details on user activity and applications prior to encapsulation and hand-off to the next technology domain.
- In the core of a factory data center, the server farms, also known as the Data Center Service Edge (Figure 1). ISNG

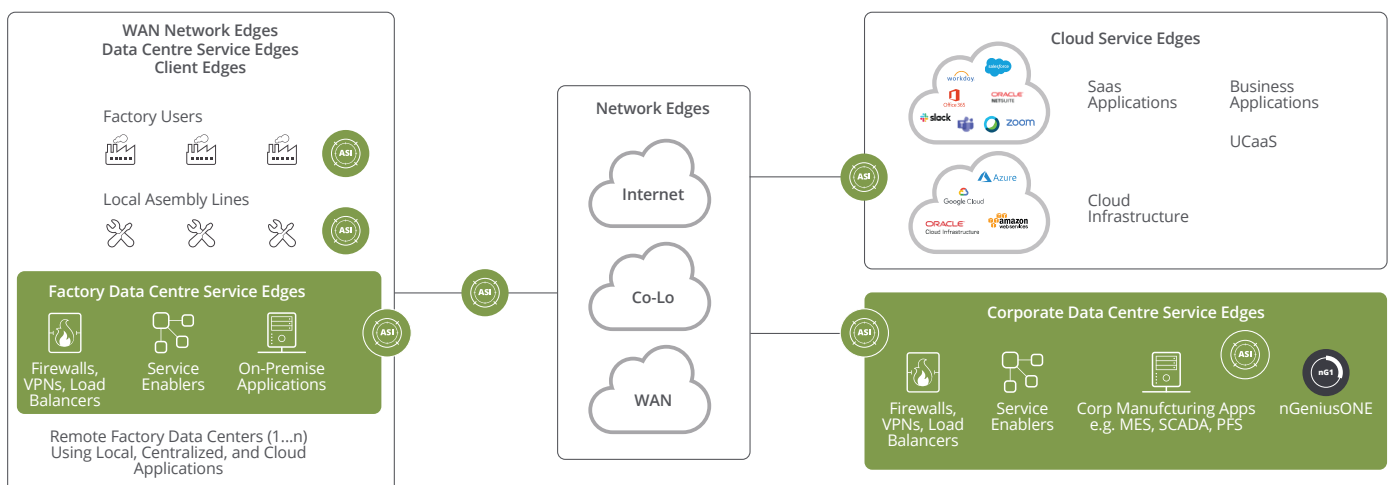


Figure 1: Complex, manufacturing network environments, with multiple remote factories, and centralized, local, and cloud application services, typically have gaps in visibility at client, network, and service edges, where technology domains exist. Ensuring efficient end-through-end visibility for service assurance requires comprehensive visibility across those unmanaged domains.



appliances monitor this high concentration of critical north-south traffic conversations in the factory network for end-through-end service assurance of applications between corporate data center and the factory, on the production floor, and among the employees at the plant.

- Within a **virtualized network-in-a-box**, e.g. with VMware ESX blades, where both the **WAN Network Edge and Service Edges** exist, for monitoring the east-west conversation traffic across the virtualized services, e.g. SD-WAN, database servers, and application servers. The vSTREAM® virtual appliance expands the reach of ASI to analyze virtualized traffic within the local factory, automated assembly line, and corporate data centers, as well as the cloud.
- **End-user experience monitoring** within the production and employee factory environments, known as the **Client Edge** (Figure 1), for early detection of degradations, even when users are not active. The nGenius®PULSE nPoint 3000 hardware and software sensors leverage synthetic testing, including configurable business transaction tests (BTTs), for visibility into availability and performance of user experience with internal factory, corporate data center, cloud-based, and SaaS applications across both Wi-Fi and Ethernet areas of the plant. This smart data is sent to ISNG appliances with Omnis Cloud Adaptors for monitoring, trending, and alerting in nGeniusONE.

With expanded visibility into any or all of these areas of the factory network, IT teams can more proactively detect and triage performance issues, particularly in complex, distributed manufacturing environments. Ultimately this reduces Mean Time to Repair (MTTR) and helps keep manufacturing lines, applications, and employees productive and operating efficiently. The challenges that Omnis Smart Edge Monitoring solution uniquely addresses in the factory environment include performance issues such as:

- Delays or bottlenecks in connecting to corporate data center resources, e.g. MES, over the WAN.
- Degraded responsiveness of several applications felt by remote users, being impacted by local wi-fi or ethernet, ISP or third-party WAN, or corporate data center performance.

- Slow response times using corporate CAD/CAM or Plant floor performance management systems (PFS).
- Intermittent issues with automated production line operations between manufacturing machines that impact efficient, ongoing assembly of products.
- Poor-quality voice using data center-based, multi-vendor VoIP implementation.
- Performance issues for business data services for specific end user(s) or plant(s).
- Trend and track potential degradations in SaaS applications, e.g. Salesforce.com, even when factory employees may not be active.
- Troubleshoot access and/or quality issues with collaboration services (UCaaS), e.g. Zoom, Microsoft Teams, Cisco Webex.

How Omnis Smart Edge Monitoring Supports Service Assurance for Manufacturers

The Omnis Smart Edge Monitoring solution provides manufacturing IT teams with an efficient, comprehensive end-through-end analysis of virtually any application, over any network infrastructure, from any factory end-point location to evaluate and troubleshoot performance issues that may impact the experience of your users and applications.

Using a consistent set of smart data and logical workflows, the solution enables seamless, contextual transitioning across multiple layers of analysis to facilitate an efficient and informed hand-off of problem resolution tasks between different Plant, IT, and vendor groups. Ultimately, not only is internal company collaboration between the IT and factory teams improved, so too is vendor partnering. In the end, the reduced troubleshooting time and overall MTTR mean that greater reliability and availability in production line operation, employee productivity, and data center-based manufacturing applications can be achieved.

Seamless Top-Down Workflows

nGeniusONE, the cornerstone of Omnis Smart Edge Monitoring, leverages the power of ASI to help manufacturing IT teams address factory floor, as well as internal and customer-facing business applications. The data is efficiently organized so it can be viewed by a range of keys, such as locations, cloud services, Quality of Service (QoS), servers, applications, etc. This enables nGeniusONE to offer a top-down, workflow-

based approach to problem identification, service triage, and resolution.

The Omnis Smart Edge Monitoring solution streamlines service edge and end-user experience monitoring for overall service assurance and performance management by providing the following analysis capabilities:

- **Dashboards** – Provide views using packet monitoring and synthetic testing for availability and performance of applications from various user locations with details that are populated in the nGeniusONE dashboard. The dashboard delivers real-time health status, metrics, alarms, and early warning of application and end-user performance problems. Manufacturers can configure dashboards to view composite services, such as MES, SCADA, MRP, CRM, PFS, and UC&C, including application server components, integrated Web and cloud components, key middleware, backend databases, and service enablers in a single view to quickly spot performance or end-user experience issues. They can also be created for each individual factory and all their services; each application hosted in the corporate data center and used by the factory; services that only operate within the factory; specific cloud services; and even general service dependencies, like DNS, HTTP, and LDAP.
- **Service Test Logs** – Driven from synthetic and configurable BTTs in nPoints, trend results of each step of a custom test are tracked to ensure all applications within a service are working and available. For instance, for a manufacturing application like PFS, IT can test and trend an employee log-in to the system, open a build report, download a build request, close a quality ticket, through to log-out tests to quickly ascertain when responsiveness issues emerge and where. With this baseline of what is considered normal performance for an application, it will be simple to recognize deviations from norm.
- **Service Dependency Map** – The Service Dependency Map provides visibility into all the dependencies among various components that deliver a broad spectrum of factory, CAD/CAM and business IT services. This enables IT teams to analyze the service delivery environment and discover the client-server relationships and messaging performance.

- **Service Monitors** – From dashboard alerts, IT operators can drill-down to specific Service Monitors, e.g. Voice Media, Web, or DNS Monitor, where performance metrics by specific message types provide in-depth details on the scope and nature of the performance degradation. The Universal Monitor view provides a variety of metrics based on smart data from network traffic packets or synthetic test monitoring. The IT teams gain a consolidated view of details that may include application request workloads, number of sessions per server, application and network latencies, and/or network errors, providing holistic visibility into the performance of the overall service and supporting elements.
- **Session Analysis** – Enables IT teams to evaluate transaction latencies, network-related information (e.g., average response time and QoS class assignments), as well as detailed session and application flow information for mission critical services, such as MES and SCADA. Enables session-level investigation with hop-by-hop transaction breakdown from smart data provided by ISNG and vSTREAM appliances at network and data center/cloud service edges.
- **Data Mining** – Coming from packet analysis, data mining provides deep-dive, protocol-level analysis and forensic evidence.

The nGeniusONE platform provides a consistent set of service-oriented workflows to enable seamless, contextual transitioning across multiple layers of analysis for efficient and informed hand-off of incident response tasks across different groups, fostering IT team collaboration and more informed partnering with manufacturing leadership.

Benefits of Omnis Smart Edge Monitoring

- **Optimize Ongoing Operations of Manufacturing Plants** – with proactive detection and notification of plant-affecting issues. Reduce business impact from issues with early-warning notifications when performance or availability suffers.
- **Lower MTTR Production Impacting Issues** – with automated root cause analysis. Trended Service Test Logs and Situation Analysis identify sources of various performance issues, as well as the impact.
- **Improve IT Productivity** – with visibility into global factory operations for end-through-end, comprehensive performance and availability analysis. IT teams can quickly research and collaborate with each other and third-party providers on factory, centralized, SaaS, and cloud-based application issues.
- **Cost-effective, Pervasive End-through-End Monitoring** – Analysis using ISNGs, vSTREAMs, and nPoints allows comprehensive, cost-effective instrumentation in remote users, locations, and manufacturing lines.
- **Assure Business Success** – Provides the most comprehensive visibility, detection, and troubleshooting solution available for IT to proactively support manufacturing requirements for high-performance, high-availability services throughout their production and business processes.

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