Jindal Steel Optimizes Real-Time Data Streaming and Reduces Cloud Costs with N3uron

Jindal Steel, a global powerhouse in the steel and energy sectors, has successfully modernized its industrial data infrastructure as part of a massive, global digital transformation initiative to maintain its competitive edge.

To achieve this, they partnered with SD IoTecs (a division of Panzer IT), a technical leader in industrial digital transformation and high-performance data integration. While Panzer IT managed the strategic partnership and project acquisition, SD IoTecs spearheaded the developer-level implementation, utilizing N3uron to bridge the gap between heavy industrial protocols and modern web-based visualization.

The Challenge

In the heavy industrial sector, real-time visibility across global operations is critical for maintaining operational efficiency. Jindal Steel faced a growing technical bottleneck: their existing data integration layer relied on REST endpoints that required constant push/pull polling to retrieve telemetry data. This architecture was no longer sustainable for their scaling needs, resulting in high API churn and noticeable latency that hindered real-time decision-making.

From a financial perspective, the constant handshakes and continuous data requests led to excessive compute and bandwidth consumption within their AWS environment. With over 160 clients—including a web-based Progressive Web App (PWA) and various VB.NET-based applications—the overhead of legacy polling was directly impacting the bottom line and the overall stability of the user experience.

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calls required for modern visualization. We chose N3uron because it offered a 100% web-based environment and, more importantly, eliminated the restrictive tag limitations that often stall large-scale industrial projects. Its ability to support a Unified Data Hub was the strategic key to transforming our data architecture into a truly scalable, future-ready system," according to SCADA DC Administrator at Jindal Steel Bhabani Shankar Dash.

The Solution: A Modern Unified Data Hub

To overcome these obstacles, SD IoTecs designed a robust solution centered on N3uron, acting as the primary on-premise gateway. While the work performed by SD IoTecs focused on WebSocket development and scripting, it represents a critical building block within Jindal Steel's broader digital ecosystem.

The architecture was engineered to ingest telemetry from a diverse array of sources, including multiple Kepware OPC UA servers and BACnet devices, effectively normalizing thousands of tags into a unified data model. The transformative element of the project was the move to **WebSocket streaming**. By leveraging the **N3uron Scripting Module**, the team

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replaced the resource-heavy polling model with a subscription-based mechanism where clients open a persistent connection and receive updates only as data changes.

"N3uron enabled us to replace REST polling with WebSocket streaming, improving deployment speed, diagnostics, and bandwidth efficiency while lowering integration and cloud operating costs. It is a cornerstone of our broader digital transformation strategy," according to SCADA DC Administrator at Jindal Steel Bhabani Shankar Dash

Advanced Scripting and Payload Optimization

One of the most valuable aspects of N3uron for this project was the flexibility provided by its Scripting module. SD IoTecs implemented custom payload optimization and compression logic to minimize data size before transmission to the cloud. Furthermore, they developed a dynamic subscription mechanism ensuring that each client only receives the specific tag streams required for their active visualization page, eliminating unnecessary data traffic and further reducing AWS processing costs.

The solution now facilitates dual-protocol delivery: data is published via N3uron's internal **OPC UA Server** for industrial applications and simultaneously streamed through the **WebSocket Server** for high-priority, real-time web visualization. *"The modular foundation of N3uron enables us to build a scalable and repeatable architecture. The ability to implement custom logic and subscription patterns tailored to each client is exactly what a global project of this magnitude requires,"* said Bhabani Shankar Dash.

The Modular Flexibility Advantage for Rapid Scaling

Following N3uron's modular success model, several key modules were implemented to achieve the project goals:

– **Scripting Module:** Scripting allowed to create custom logic for data normalization, packaging, and payload optimization. It was essential for implementing the dynamic subscription mechanism and the compression logic that reduced AWS bandwidth and processing costs**.**

– **OPC UA Client:** OPC UA Client acted as one of the primary modules to ingest raw data from third-party compliant industrial servers and field devices across the plant.

– **OPC UA Server:** OPC UA Server enabled the publishing of processed and normalized data to various industrial applications.

– **BACnet Client:** BACnet Client was used to connect with BACnet-compatible devices, providing real-time data monitoring and control capabilities.

– **N3uron Links:** N3uron Links are secure tunnels that enable seamless, firewall-friendly, real-time communication between nodes. Jindal Steel uses N3uron Links to aggregate data to its central cloud-hosted N3uron instance. N3uron Links also includes a built-in Store & Forward mechanism to preserve data integrity even when the system experiences intermittent connectivity.

– **WebUI:** WebUI, the interface used to configure N3uron and monitor data collected by N3uron, is used by Jindal Steel for browser-based configuration, diagnostics, and occasional on-site troubleshooting.

The Result

The implementation has delivered immediate improvements in both system performance and operational costs. By establishing persistent connections through WebSockets, Jindal Steel has eliminated the overhead of constant API calls, resulting in a much more responsive and stable environment for their 160+ clients.

"We chose N3uron over other solutions because it eliminated restrictive tag limitations and offered a 100% web-based environment. Its ability to support a Unified Data Hub was key to transforming Jindal Steel's data architecture into a truly scalable, future-ready system," according to Technical Lead at SD IoTecs Darshan Jain.

After two months of production and over six months of rigorous testing, the architecture has proven its reliability. The reduction in cloud bandwidth and processing fees is being actively monitored, with significant savings expected to validate the optimized architecture over time.

"With timely and effective support from the N3uron team, we were able to identify and resolve platform-level challenges within the agreed timeframe, ensuring a stable and efficient system for recurring tag reads," said Darshan Jain.

Future Plans Using N3uron

"Our future plans involve scaling N3uron into a redundant, full-stack tag repository to deliver dependable, low-latency telemetry data and simplified integrations across our entire infrastructure," said Bhabani Shankar Dash.

This future phase will see N3uron ingesting data from **Siemens, IEC-61850, and IEC-104** devices, providing a unified and dependable telemetry feed for both on-premise and cloud-based applications across the organization.