Sonnedix Uses N3uron to Standardize Monitoring and Data Management Across Its Global

Sonnedix is an international renewable energy producer with over 15 years of sustainable growth. Sonnedix develops, builds, and operates renewable energy projects for the long term, with a focus on providing green, affordable electricity to its customers, and acting as a true social citizen wherever it operates. Sonnedix works towards a shared purpose: to power a bright future.

At the time of writing this article, Sonnedix had a total capacity of over 11GW, including a development pipeline of more than 6GW, across Chile, France, Germany, Italy, Japan, Poland, Portugal, Spain, USA, and UK. The company continues to expand its global footprint across Organization for Economic Co-operation and Development (OECD) countries, through acquisitions and development of renewable energy projects.

The Challenge

Sonnedix manages a diverse portfolio of power plants featuring various devices and equipment brands. Their goal was to standardize fleet monitoring and data acquisition under a single SCADA system to reduce the tool footprint and provide users with a unified interface. This approach aimed to offer a consolidated view of cross-site operational data in a centralized system.

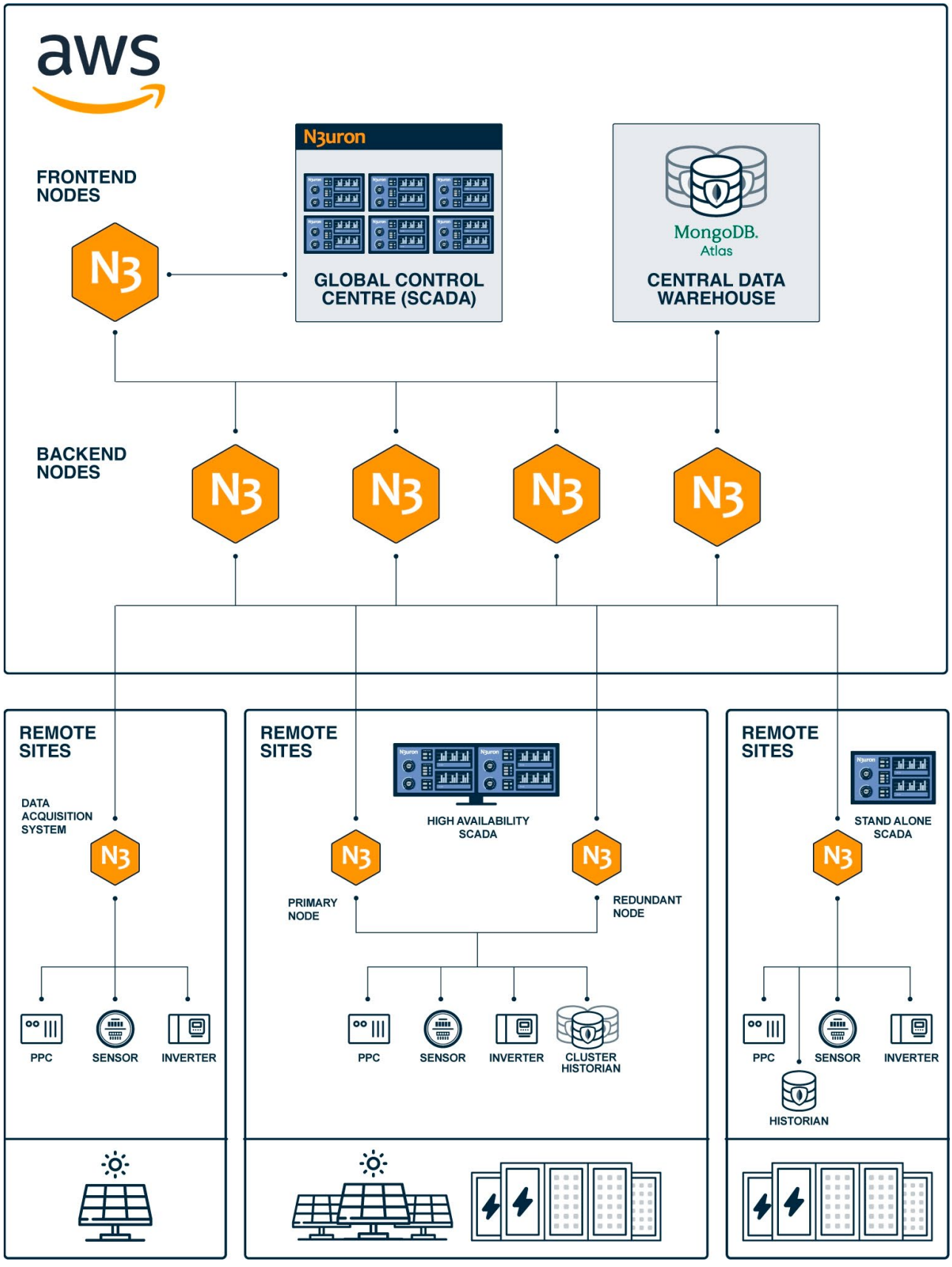
Implementing a standardized SCADA solution across all new construction projects worldwide while retrofitting existing plants and integrating new acquisitions presented several challenges. These included the wide variety of devices and insufficient project documentation, the complexity of coordinating multiple system integrators, and extensive hardware and software deployments. Sonnedix required a robust IIoT and DataOps platform that could ensure rapid deployment, seamless integration, and enhanced data management—all within tight deadlines for over 25 projects per quarter.

Solving pain points

To build its solution, Sonnedix chose N3uron because it is specially designed for deploying distributed architectures across plants (enabling seamless data sharing and scalability) and for interoperability (ensuring integration with third-party applications and cloud services by supporting the most extensively used standard OT and IT protocols). While N3uron is compatible with all the leading SCADA systems currently available on the market, Sonnedix chose to develop its SCADA solution entirely using N3uron's Web Vision module to create a user-friendly, fully web-based HMI application.

N3uron met Sonnedix's need to standardize its solution around a robust IIoT connectivity commercial software, and one that provides competitive access to system integrators, support for solar industry protocols, and an unlimited licensing model. This model offered unrestricted tags, devices, and connections at a predictable and affordable price, supporting Sonnedix's growth without hidden fees.

"With a highly diverse portfolio of power plants from 0.5 MW to 200 MW, covering different technologies such as Solar, Wind, and batteries, it was essential for us to maintain flexibility and not be limited by a licensing system based on tags, number of devices, or integrated MW," said Adam Aguero Lara, Operational Technology Lead at Sonnedix.



Standardizing Fleet Monitoring and Data Acquisition

Sonnedix architecture involved deploying a N3uron node at each plant. These local nodes manage large volumes of data with minimal hardware requirements and connect seamlessly to backend nodes hosted in AWS, Sonnedix's chosen cloud provider, via N3uron Links. Backend nodes handle tasks such as historical data storage in Sonnedix Central Data Warehouse on MongoDB Atlas — running scripts, and exposing data through REST API Server, MQTT, or any other mechanism required to integrate with services and applications within Sonnedix's ecosystem. A frontend node runs Web Vision, N3uron's web-based HMI visualization and monitoring application, which maintains real-time bidirectional data exchange with the backend nodes via N3uron Links.

Whenever scaling is required, Sonnedix simply deploys a new backend node and connects additional plants to it.

As Sonnedix is continuously onboarding new plants, the project is ongoing. At the time of writing, the project scope spanned 107 sites, each with a local Neuron node, and 15 remote nodes. The number of tags per site ranged from tens of thousands to hundreds of thousands. Sonnedix has several local Historians and consolidates all the historical data in MongoDB Atlas, hosted on AWS Cloud. The scope of the project also encompassed 6,205 Inverters, 1,643 energy meters, and 272 pyranometers.

Powerful Capabilities for Centralized Energy Monitoring

Sonnedix used specific N3uron features and modules to build its solution:

- **Support for specific communication protocols:** N3uron's client modules for Aurora, SolarMax, SMA, IEC 102, IEC 104, DLMS, and Xantrex protocols enabled quick and seamless integration with a wide range of industry-specific devices and systems.
- **Modbus Client:** N3uron's Modbus Client module allows users to quickly and easily connect N3uron to any Modbus-compatible device.
- **Derived Tags:** Sonnedix used Derived Tags to transform raw data into actionable insights. Derived Tags is a N3uron module that enables custom logic, advanced calculations, and data aggregation for operational data analysis at the Edge.
- **Fleet Manager Service:** Fleet Manager is a cloud-based service that provides a secure and seamless way to remotely manage N3uron nodes from a web browser. It provided Sonnedix with remote node connection and management across multiple users and sites, with secure access to any connected node from anywhere.
- **Web Vision:** Web Vision, N3uron's visualization module for real-time and historical data, provided Sonnedix with a pure web HMI/SCADA interface for centralized plant monitoring. Ultra-lightweight, Web Vision runs on minimal computing resources without impacting performance. Its reliance exclusively on open web standards makes it compatible across devices.
- **N3uron Links:** N3uron Links are secure tunnels that enable seamless, firewall-friendly, real-time communication between nodes. N3uron Links also include a built-in Store & Forward mechanism to preserve data integrity even when the system experiences intermittent connectivity.

"For us, improving data availability and avoiding data gaps was important. For that reason, functionalities such as Store & Forward were key. This feature allowed us to store data locally during a communication outage and then forward it to our central database once connectivity was restored," said Adam Aguero Lara.

Time and Cost Efficiencies Gained

The project's Proof of Concept (POC) and Pilot phase extended from June 2022 - January 2023. The production environment and N3uron implementation (as owner requirement for all Sonnedix sites) were deployed in February-March 2023 and continue to date.

N3uron enabled Sonnedix to standardize monitoring, data acquisition and control across its portfolio of sites. N3uron's modular design, seamless integration with industrial and IT systems, and scalability gave Sonnedix the deployment ease, customization, and interoperability it sought.

"The adoption of N3uron has enabled our Monitoring team to be more time efficient by using a standard first layer SCADA system, ensuring that the data is structured uniformly. This integration has allowed the SCADA team to drastically reduce onboarding time of a new construction asset from the 4-6 months previously to just 1 or 2 weeks".

– Adam Aguero Lara,
Operational Technology Lead at Sonnedix..

For example, on the data management and security fronts, N3uron's compatibility with Atlas MongoDB and with Lightweight Directory Access Protocol (LDAP) solved Sonnedix's data storage and data access challenges respectively.

Leveraging N3uron Templates, Sonnedix defined standardized asset models for edge computing, tags, calculations, and alarms. These templates not only simplified data model creation but also dramatically reduced the amount of time invested in deploying a new project, while ensuring consistency and reliability across all sites.

On the remote monitoring front, by using N3uron Fleet Manager Service, Sonnedix gained centralized management for its fleet and providers, enabling seamless monitoring, alert configuration, and efficient backups.

Implementation of N3uron achieved substantial time savings for Sonnedix: *"The adoption of N3uron has enabled our Monitoring team to be more time efficient by using a standard first layer SCADA system, ensuring that the data is structured uniformly. This integration has allowed the SCADA team to drastically reduce onboarding time of a new construction asset from the 4-6 months previously to just 1 or 2 weeks,"* said Adam Aguero Lara.

Using N3uron also achieved significant cost savings for Sonnedix: "Despite a slightly higher initial capital expenditure (CAPEX), the project has led to a substantial reduction in operational expenditures (OPEX)," said Adam Aguero Lara.

For Sonnedix, N3uron reduced technical debt and increased autonomy. This is what set apart the N3uron project implementation process, compared to that of using other products.

"With other service-based products, we had total technological and resource dependency, with almost no control over the roadmap, resources, or supply chain. N3uron as a development base allows us to adapt to workload demands and company growth, resolve hardware supply chain issues, and define our own roadmap," said Adam Aguero Lara.

N3uron delivered the flexibility and control Sonnedix sought, enabling the company to innovate and respond more efficiently to their sites' distinct needs. Additionally, N3uron's growing list of system integrators gave Sonnedix options to select from to adapt to demand.

Sonnedix's Future Plans for N3uron

In 2024, Sonnedix integrated its first Battery Energy Storage System (BESS) asset and established N3uron as its required SCADA for all BESS and hybrid sites. Sonnedix is now conducting its first wind asset integration and preparing its team and N3uron integrators for future hybridization. This strategic move underscores Sonnedix's commitment to leveraging advanced technological solutions for enhanced operational efficiency and scalability.

"Our future plans for N3uron are clear and ambitious: we plan to use it as our standard SCADA platform. We aim to standardize our fleet with N3uron and connect it to a central IIoT hub for portfolio monitoring. This centralization will not only improve the efficiency of our operations but will also ensure greater uniformity in the management of our assets," said Adam Aguero Lara.