SkyFoundry Insider

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Project Benefit and Xeto Update

The Department of Energy-funded Benefit Project, *Metadata for the Masses: Semantic Interoperability in the Real World*, led by Project Haystack, has completed its official three-year effort. This groundbreaking work lays a strong foundation for advancing building digitization and unlocking the full potential of data in the built environment to levels beyond what many once thought possible.

The achievements are numerous and include the innovative new open-source technology called **Xeto**—a public repository (Repo) for Xeto models and harmonization with other ontologies. Xeto, a data-only type system, is designed to build and validate Haystack data models. The Repo on **Xeto.dev** will provide a public library where the community can share and retrieve Haystack models, and it is expected to be accessible to the community later this year.

Leveraging Xeto, Haystack will offer a pathway to other ontologies, including RDF-based ontologies.

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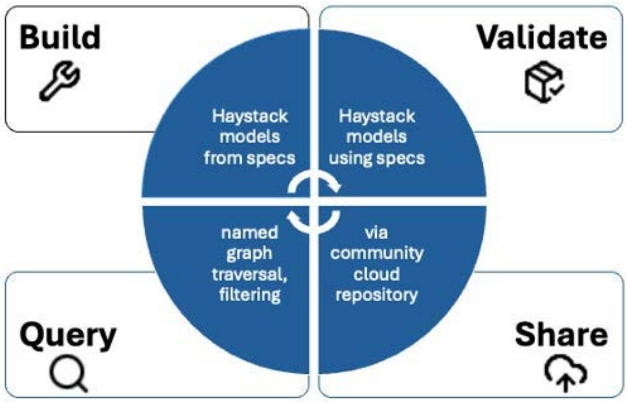


Xeto Guiding Principles

Xeto can export Haystack models to Turtle files and JSON-LD when desired. While Xeto was developed to address key challenges in the built environment, it is general-purpose enough to use with any structured data, including CSV, JSON, and SQL.

We extend our thanks to everyone who participated…all those support tickets, forum posts, Working Group sessions, Technical Advisory Group sessions, and project meetings. Contributions from dozens of organizations and their team members played a vital role in turning ideas into reality and ensuring the success of this project.

Adoption is a key step toward realizing the benefits. **Haystack5**, expected to be released later this year, will be entirely based on Xeto specs. **Haxall** and **SkySpark®** have begun their migration path to Xeto, with initial 4.0 releases already available.

Technical details can be found on GitHub at Project-Haystack/xeto.

Applying SkySpark® in Fleet and Workplace EV Charging Applications

The EV charging industry has distinct segments based on anticipated vehicle battery sizes and dwell times. Several of these segments include fleet, transit, workplace, destination, and public EV charging. SkySpark's flexibility brings unique value propositions to all these segments.

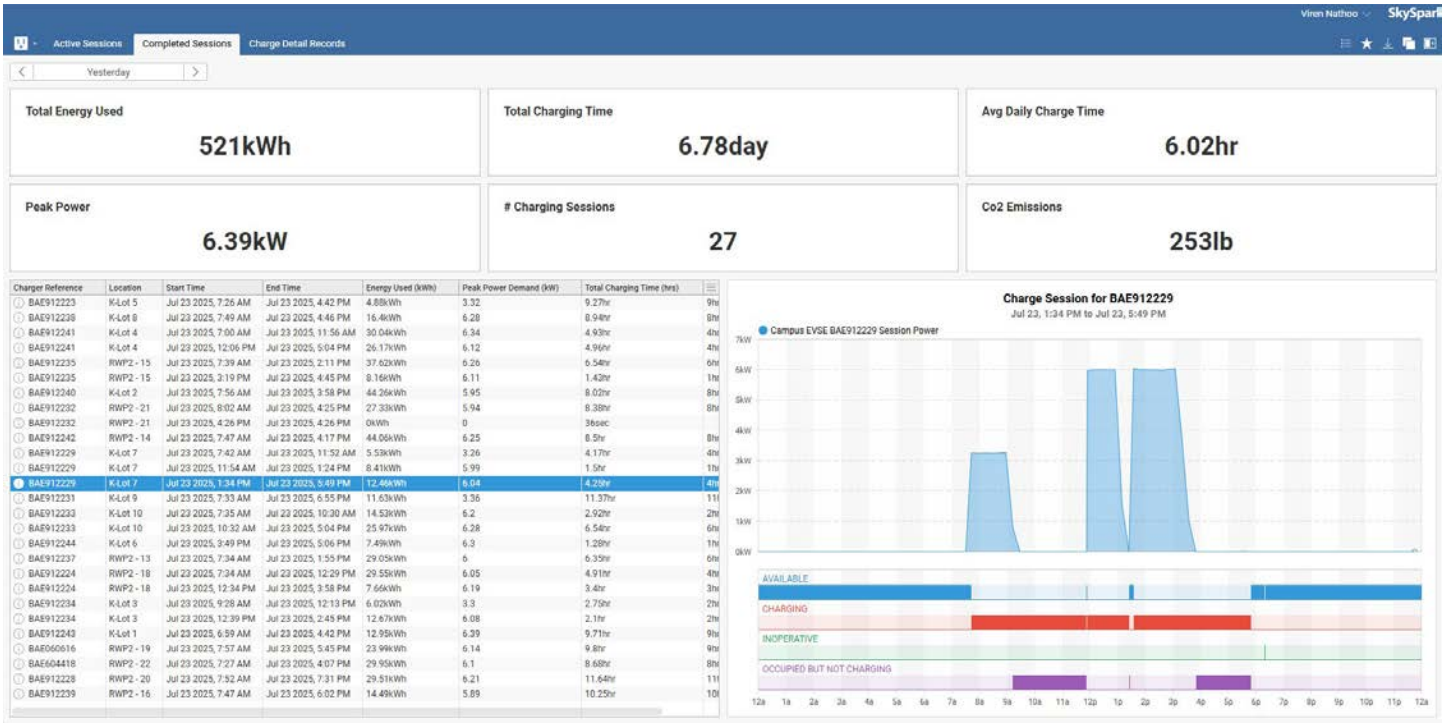
It's more than a claim; in this article we will highlight how SkySpark is actively being applied on EV charging projects by the SkyFoundry community.

Charging at the Workplace: Turning EVSE Data into Actionable Insights with SkySpark

Albireo Energy integrated SkySpark with Blink's Charging Station Management System (CSMS) to monitor EV charging usage patterns, detect anomalies, optimize load management, and support sustainability goals within a broader energy management context for their client.

SkySpark's real-time and historical data analysis provided the site operator clarity on energy consumption trends, peak demand contributions, and potential cost-saving opportunities across all facility loads, including HVAC, lighting, as well as Electric Vehicle Supply Equipment (EVSE). These insights help the facility owner improve operational efficiency and make informed decisions about energy use impact and infrastructure planning.

For example, the custom dashboard by Albireo Energy shown below reveals valuable insights into occupant charging behavior and infrastructure usage. It highlights charger status transitions — such as availability, active charging, inoperative states, and outages — offering a clear view of system reliability and user activity. The dashboard also provides a strategic overview of EV charger utilization across the campus. Metrics like peak power demand and



total energy used support infrastructure and capacity planning — especially relevant as the client evaluates expanding the number of EVSE ports at the site.

Fleet Infrastructure with Energy Analyst and SkySpark: Integrating EV Chargers with Clean Energy

As organizations modernize their infrastructure to support electric vehicle (EV) fleets and transition to clean energy sources, the need for intelligent, distributed data collection and analytics is greater than ever.

Intellastar's T-Star on-site controller, running SkySpark, offers a powerful solution for managing and optimizing critical infrastructure assets—specifically EV chargers and generators powered by clean energy sources like battery banks and generators fueled by hydrogen.

Distributed Intelligence at the Edge

Mission-critical applications like fleet EV charging benefit from applying data collection and analytics at the "edge" where they are not dependent on continuous connection to a cloud. T-Stars are rugged, Linux-based single-board computers equipped with native RS485/232/422, Ethernet, digital inputs and outputs, and dual SIM cellular modems that can be deployed on-site. Each T-Star runs SkySpark and is deployed at fleet depots and energy hubs where T-Stars interface directly with Level 2 and DC fast chargers over OCPP.

T-Stars communicate simultaneously with hydrogen fuel cell generators or hybrid gensets, collecting runtime metrics, fuel consumption, power output, and environmental data providing a true picture of the entire system.

Integrated Data Model for Chargers, Vehicles, and Power Systems

Utilizing SkySpark's distributed computing architecture T-Stars synchronize charger session logs, vehicle identification metadata, and generator runtime data into a unified semantic model. This data is securely aggregated by a central


Miami Charger Port 1 • Charge Session Count
Miami Charger Port 2 • Charge Session Count
Miami Charger Port 1 • Charge End Success
Miami Charger Port 2 • Charge End Success
Miami Charger Port 1 • Charge Session Success
Miami Charger Port 2 • Charge Session Success
Miami Charger Port 1 • Charge Start Success
Miami Charger Port 2 • Charge Start Success
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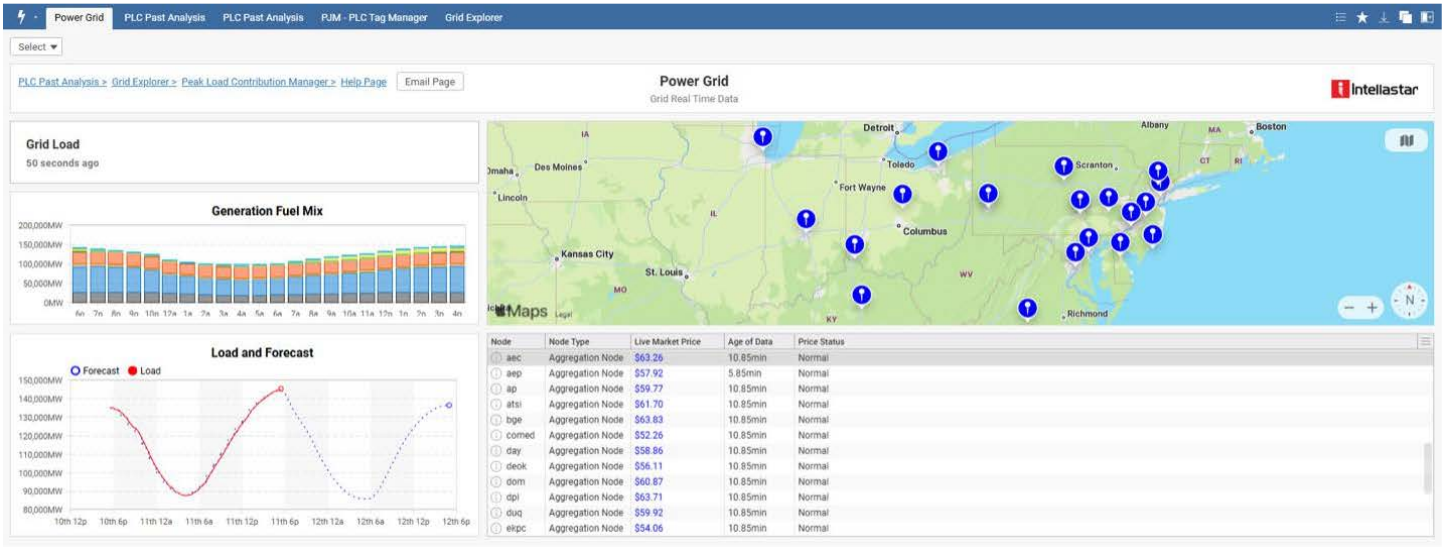

Power Grid
PLC Past Analysis
PLC Past Analysis
PJM - PLC Tag Manager
Grid Explorer
Power Grid
Grid Real Time Data
Intellastar
Grid Load
50 seconds ago
Generation Fuel Mix
Load and Forecast
Forecast
Load
Detroit
Toledo
Fort Wayne
Columbus
Scranton
Albany
Boston
Kansas City
St. Louis
Richmond

SkySpark server. Analytics identify trends and anomalies across sites, chargers, and energy sources. Each EV charging session is mapped to:

- Vehicle ID (VIN or fleet tag)
- Energy delivered (kWh)
- Time and duration
- Associated generator runtime and fuel use

This structure enables cross-domain, system-wide analysis that correlates vehicle load demand with generator fuel efficiency, charger downtime, and peak site energy draw.

Dashboards, KPIs, and Real-Time Insights

Dashboards provide operators simple visualization of key metrics across their entire infrastructure:

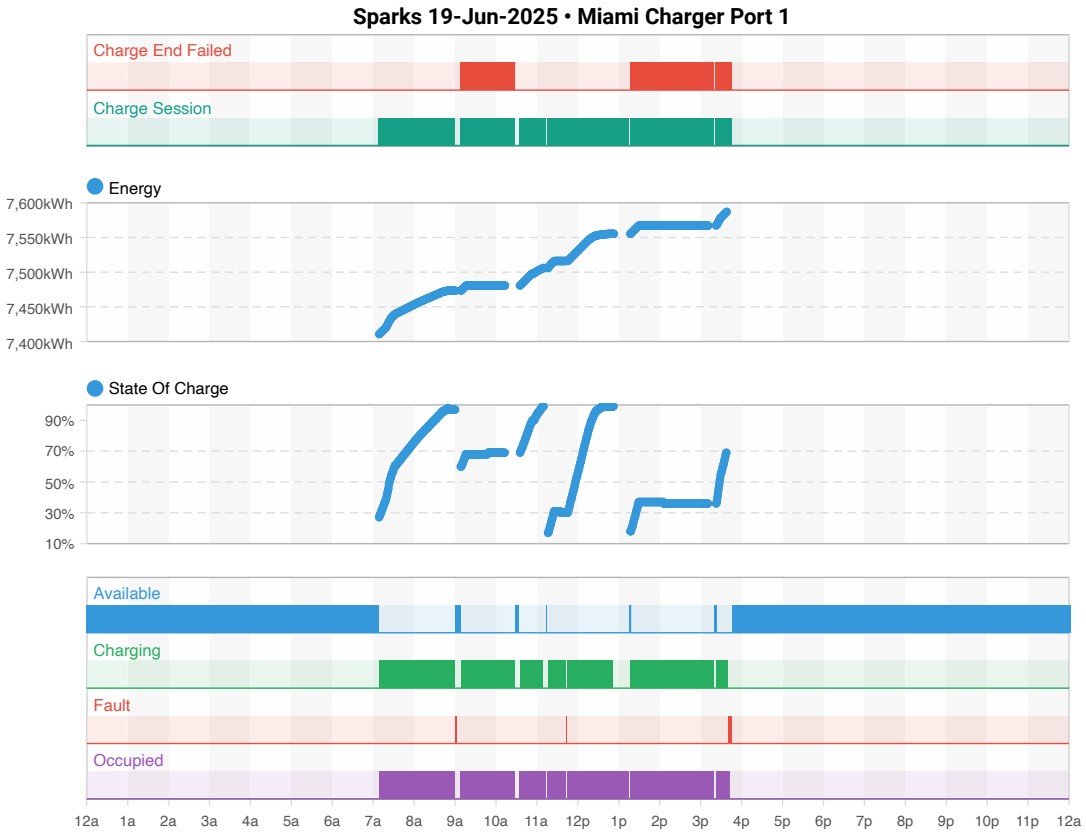
- Charger Performance Metrics (see examples in figure below)
- Charger Utilization (sessions/day, % availability)
- Vehicle Charging Efficiency (energy per mile, idle time at station)
- Fuel Replacement Ratio (hydrogen kWh vs grid kWh)
- Generator Fuel Efficiency (kWh/kg of hydrogen)
- Energy Cost per Vehicle per Day
- GHG Avoidance from generator vs traditional diesel backup

Dashboards can be grouped by site, region, or fleet role (e.g., delivery, transit, maintenance), supporting both operational oversight and ESG reporting.

Alerts, Fault Detection, and Predictive Maintenance

Leveraging SkySpark's built-in rule engine and FDD framework, the system monitors for:

- Charger hardware faults (see example in figure below)



- Unexpected drops in power delivery
- Fuel leaks or abnormal hydrogen generator behavior
- Idle time violations (e.g., vehicle plugged in but not charging)
- Communication loss between T-Star and assets

Real-time alerts are pushed via email, SMS, or webhook integrations, notifying operations teams and enabling quick response. Historical data is used to predict maintenance needs and schedule generator servicing before failures occur.

Conclusion

By combining the local intelligence of T-Star devices with the analytic depth of SkySpark, operators can deploy a scalable, vendor-agnostic system to manage EV charging infrastructure and clean power generation.

This integration empowers operators to reduce downtime, optimize energy use, lower carbon emissions, and extend the life of critical equipment—paving the way for a more sustainable and resilient transportation network.

About Albireo Energy

Albireo Energy is a leading independent building controls and energy services provider recognized by customers for creating intelligent, high-performance buildings. Albireo Energy helps building owners and their teams make decisions about building automation that achieves operating performance, decarbonization and sustainability goals.
www.albireoenergy.com

About Intellastar

Intellastar provides energy management, SkySpark services, and IoT connectivity to enhance efficiency and sustainability. Its Energy Analyst platform delivers real-time data, PLC predictions, ECM tracking, and alerts for smarter energy decisions. Intellastar supports SkySpark with licensing, hosting, and custom development, while secure IoT connectivity via private APNs ensures seamless integration.
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SkyPosium

2025 | The Worldwide SkyFoundry Community Event

October 14-15, 2025
Richmond, Virginia

The Omni Richmond Hotel

SkyPosium brings together the **entire SkySpark community**—resellers, end users, consultants, and SaaS providers—for a dynamic event featuring presentations, discussions, and networking.

The program offers two tracks: one for developers and another focused on real-world applications, with most sessions led by community members. SkyFoundry opens the event with a general session highlighting new features and roadmap insights.

A **vendor showcase** rounds out the event, offering a chance to explore complementary solutions and the latest innovations in smart building technology.

Why Attend SkyPosium 2025?

- *Real-World Case Studies* — Learn how leaders across industries are using SkySpark® to optimize energy, operations, and assets.
- *Product Deep Dives* — Be the first to explore powerful new SkySpark features, extensions, and **SkySpark4** updates..
- *Expert-Led Sessions* — Go beyond the basics with advanced training, peer presentations, and hands-on workshops.
- *Community & Collaboration* — Network with fellow SkySpark users, developers, and partners from around the world.

What Will You Discover?

- New use cases for fault detection, machine learning, and digital twins
- Best practices in SkySpark deployment and tagging
- Strategies to scale across multi-site portfolios
- Tools to accelerate ROI and operational insights

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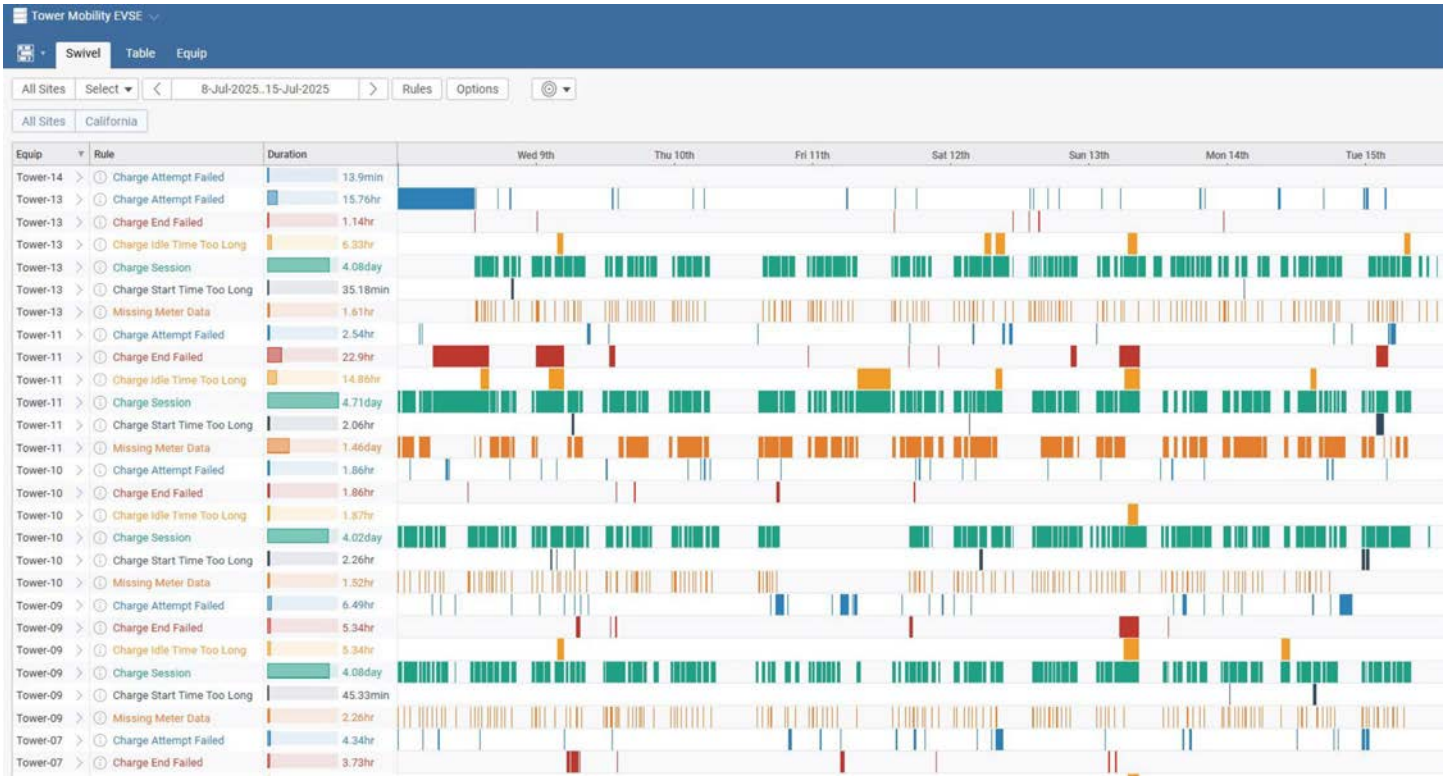
Powering Fleet Success: Analytics Driven EV Charging Station Management System for Fleet Applications

Tower Mobility partnered with kW Engineering, a trusted energy systems integrator, to implement a customized Charging Station Management System (CSMS) powered by SkySpark®. Using kW Link—kW's proprietary platform built on SkySpark—the system integrated directly with Tower's EV chargers. The kW team tailored dashboards, KPIs, and real-time alerts to match Tower's operational needs, ensuring full visibility without disrupting ongoing charge sessions.

The original article in its entirety appears here.



SkySpark's built-in rule engine and KPI rules for EVSE were used to calculate historical and real-time KPIs for each EVSE port and across all EVSE ports at the site. Some of these KPI rules were inspired by work conducted by the ChargeX Consortium, while other rules were inspired by consulting with the customer and customizing to their needs.

kW created custom histograms that provides the end-user with critical information such as Starting/Finishing State of Charge, energy consumption and total energy consumption.

TESTIMONIAL

towerEV
Solutions on wheels

***Jaime Muñoz**,*
Infrastructure Director, Tower Mobility

A SkySpark foundation delivers results... "As a company managing a fleet of EV chargers, we faced significant challenges in monitoring their performance effectively. Without clear insights into how our chargers were operating, it was tough to keep everything running smoothly. That's when we turned to kW and integrated our chargers into their fault detection and analytics platform.

The difference was immediate. Their team's flexibility stood out—they tailored custom dashboards and tooling to fit our exact needs, giving us a clear, real-time view of our charger operations. This level of personalization made all the difference in how we manage our fleet.

One of the biggest wins came when kW helped us uncover firmware issues with our chargers. They didn't just point out the problems—they guided us through addressing them, enabling us to work with the manufacturer to get them fixed. That kind of support was invaluable.

Now, we're able to ensure our chargers are fully utilized and get notified the moment an issue pops up, saving us time and headaches. Their platform and expertise have been a total game-changer for us.

We couldn't be happier with the results and wholeheartedly recommend kW to anyone looking to take control of their EV charger operations."

towermobility

Tower Mobility
Tower Mobility is a forward-thinking transportation solutions company that delivers sustainable, accessible, and innovative services. Offering a diverse portfolio to rideshare companies, government transportation authorities, and more, Tower Mobility has successfully created scalable, inclusive, and impactful transportation models.
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kW ENGINEERING

kW Engineering
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Integrating Electric Meters *Faster* in M&V and Power Monitoring Applications

Many energy conservation projects are performance based requiring measurement and verification (M&V) to validate savings. M&V guidelines and codes, such as the United States' Federal Energy Management Program M&V Guidelines 5.0 and the International Energy Conservation Code, require electric metering to validate energy conservation measures.

In mission-critical power applications (e.g., data centers & fleet EV charging) service level agreements are used to influence a service contractor's performance with the goal to achieve higher equipment uptime and lower electric utility costs while complying to electrical codes. These applications require electric metering to validate contractor and equipment performance and to identify service outages and power quality issues from the electric utility.

In both applications there is an important balance between the cost of the metering solution and the confidence level required in the outcomes from using the metering data. Historically the high level of effort to integrate with many different meters has limited the number of meters and data points leveraged in these applications. There is now an opportunity to reduce the electric metering integration level of effort to improve the outcomes from these initiatives.

Open-source electric meter device models defined by **Project Haystack** and new data validation tools within **Haxall** and **SkySpark** have unlocked the ability to capitalize on these opportunities. Now is the time for the **SkyFoundry** community to begin applying these **Xeto** models and validation tools on real-world projects. Together we can learn from one another to achieve the vision for integrating electric meters faster!

Updates on SkySpark4 and Major New Features and Capabilities

Niagara Arcbeam Connector

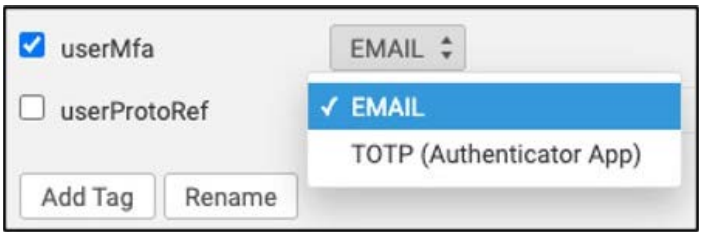
There is now a new SkyFoundry supported way to integrate SkySpark® with the Niagara Framework using the Arcbeam protocol, which has powered SkySpark clustering technology for years. That means less challenges during integration because Niagara can now initiate an outbound connection through firewalls to SkySpark which is far easier to get approved in today's complex networks. This also makes it far easier to connect an on-premise Niagara instance to a cloud instance of SkySpark.

Another huge benefit of this new capability with SkyFoundry supporting both the client and server, remote points configured in SkySpark are no longer impacted by naming/hierarchy changes made to the Niagara station. For SkySpark VARs who have worked with Niagara in the past, this means that when somebody else makes a change to Niagara that causes the path to change (after you finished your SkySpark integration), such as renaming a folder or a point, SkySpark will continue syncing current values and/or history data. So you won't get a call having to fix something you already implemented.

After installing the Niagara Arcbeam module on any instance of Niagara, whether it be a Supervisor, JACE or 3rd party hardware running Niagara, SkySpark users can leverage the full suite of connector functionality:

- Use the Learn tree to navigate and bind points to Niagara
- Subscribe to current value changes
- Sync history data
- Write values from SkySpark to points in Niagara

For anyone who has already integrated SkySpark with Niagara using the open source nHaystack module, we have provided an example migration script that makes it really easy to seamlessly switch from Haystack to Arcbeam.



Multifactor Authentication

Starting in version 3.1.11, SkySpark now supports native multifactor authentication (MFA). Adding MFA is a simple way to improve the security posture of SkySpark servers. After enabling MFA, SkySpark users are required to enter a one-time code after successfully logging in. SkySpark supports 2 MFA methods for obtaining the one-time code:

1. **Email**: User is sent a one-time code to their configured email address
2. **TOTP**: User must enroll with an authenticator app by scanning a QRCode and then with each login, access the one-time code from their authenticator app

MFA can be used with the default Haystack authentication mechanism or with any AuthMod that can be configured on the userAuth tag (SAML, LDAP, etc.). Successful/unsuccessful MFA operations are shown in the user activity logs and the HostlSessions view shows the MFA status of individual sessions.

SkySpark4 Update

Since an early preview of SkySpark4 was shown at SkyPosium 2024, there has been quite a bit of interest in further updates. We have just released our 3rd alpha build of SkySpark4. These alpha builds are primarily for Fantom developers who have developed 3rd party software that runs on SkySpark. *If your company has custom software that runs on SkySpark, make sure your developers are requesting the alpha builds by contacting* support@skyfoundry.com.

With the latest alpha, most of the architectural changes have been completed. To alleviate any concerns, you shouldn't see any functionality removed, but 3rd party code will need to be refactored, which is the goal of releasing the alpha builds.

The next step will be introducing the new rule engine, which will be completely backwards compatible with the SkySpark3 rule engine, followed by the new user interface demonstrated at SkyPosium 2024. Stay tuned for more updates as we post them on the SkyFoundry Community.

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