SkyFoundry Insider

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In This Issue

Blinded by Science... (Thomas Dolby)

Data Science That Is

Data is diverse, applications are diverse, project scope and requirements are diverse…

One size does not fit all.

You need flexibility and a range of tools and capabilities to address real world project needs

The results and benefits provided by data analytics are quite frankly amazing. Sophisticated systems like those in our facilities are too complex to be effectively monitored, reviewed and assessed by humans. There is simply too much data and too many inter-relationships and dependencies. As in most human endeavors, we need tools. When understanding and deriving value from data is the question, **analytics** is that tool.

The value of applying analytics to equipment, sensor and device data has been proven across applications in virtually every market with every type of system and data.

You need it. You want it. But what does it take to do it? We will explore these questions and many of the factors involved in the successful use of analytics in this issue of the SkyFoundry Insider.

Is it live or is it Memorex™?

DATA. Live data, streaming data, real time, historical data… It's not one or the other. It all has value. The real questions are…

What data do you have?

Where is it located?

How can you access it?

We propose that the goal of applying analytics is to create financial value. In many cases that can be accomplished quickly with small amounts of easily available data. It might be live, or it might be data already stored in files or existing databases. It can even be manually entered data.

With SkySpark you can work with ALL of it. SkySpark is not limited to a single protocol or method of acquiring data.

SkySpark provides native support for: Bacnet® IP, Modbus TCP, Obix, SNMP, Sedona, OPC UA, MQTT, SQL, CSV import (manual batch or automated), integration via a REST API and of course the Haystack API.

And, a built in Connector Development Toolkit enables our partners and customers to create their own connectors to address specialized data acquisition needs.

The result – **flexibility**. The ability to use your data, wherever it may be, whatever form it may be stored in.

What data do you have? SkySpark works with it all

Let's Get This Party Started… (Pink)

Getting Started on Your Analytics Journey

Lewis and Clark, the great American explorers of the early 1800's didn't know what they would find on their journey west across the Louisiana purchase to the Pacific, but there was enough belief in the potential value that the exploration was funded and undertaken.

Similarly, embarking on a project that applies data analytics to facility and equipment system data should be viewed as a process of exploration, very different from other investments commonly made by facility management professionals.

We have a tendency to look at anything we do in the built environment as something that can be pre-engineered down to the finest detail. We wouldn't break ground to build a new facility without having completed the detailed engineering work to ensure success.

It's logical that we would want to apply the same thought process to pre-design every facet of a data analytics project. Applying analytics to data, however, is very different for several important reasons. As a result, owners should look at data analytics projects differently than other investments.

Difference 1: The End Result is Unknown

Perhaps the biggest difference is that you don't know the end result that will come from applying data analytics. Until you acquire data and apply analytics you don't know what your data can tell you. And, until you know what your data is telling you, you can't determine what actions you will take in response to those results, and what benefits will ensue.

Difference 2: My Data May be Different Than Yours

Equally important, is the highly variable nature of the data facility owners and operators have at their disposal. Not all equipment systems have the same capability to provide data. Some are limited due to age or feature set, others may be limited by proprietary restrictions, Often, we see owners and operators are not fully aware of the data they have available and the challenges they involved in accessing it. That is in fact, part of the exploration process.

Analytics Is a Journey and Mindset

Achieving benefits from analytics requires action to address findings (See Page 4). It should not be viewed as an "install it and forget it" investment. Buildings change, equipment systems degrade, old issues reoccur, new issues appear – our facilities are dynamic, and "stuff" happens.

Continuous analytics of operational data catches deficiencies and faults to inform operators of how their systems are really performing – providing operators with the actionable information they need to effectively manage their assets and reduce operating costs and generate value for their organizations.

Is Anybody Out There? Anybody Home?

(Def Leppard)

We found an issue, a spark, a fault! Hooray! ***Now what?***

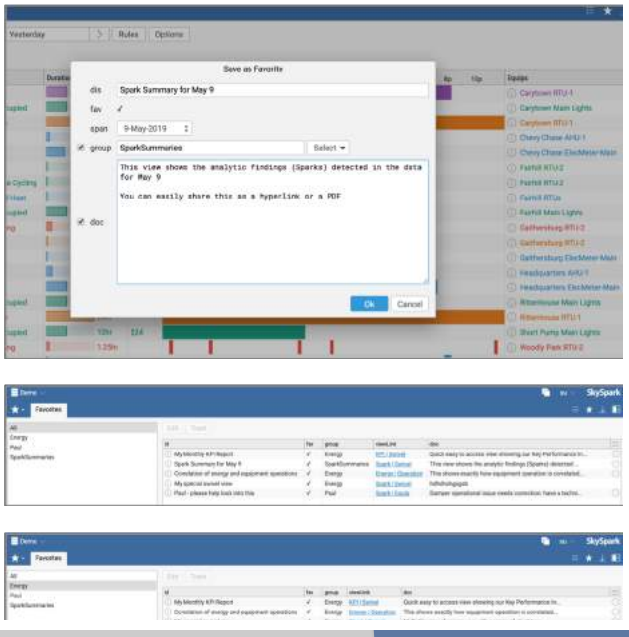
One of the pioneers in applying analytics to building systems, Paul Oswald, (previous President of ESI now a division of CBRE and long time SkyFoundry partner) made a bold claim in a presentation a while back. His claim – "analytics do not save money". Wow. The audience was silent and perplexed. Should we pack up our desk and find a new job? Not hardly.

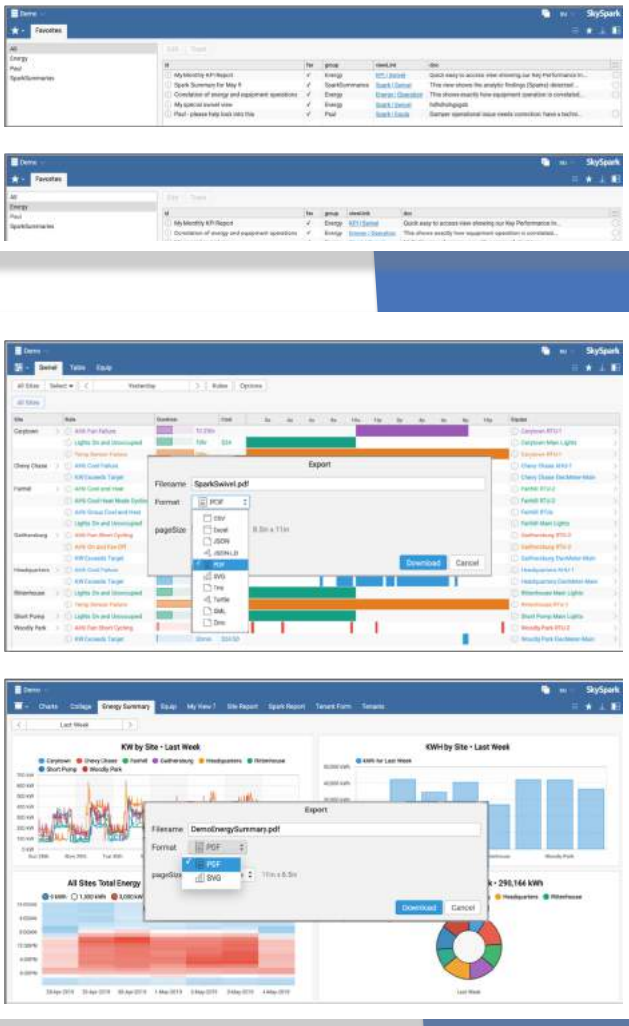
Paul's point was that analytics is the tool to identify issues, faults, deviations ***and their financial impact***, but we only save money and improve operational results by taking action. It may seem obvious, but this is a key consideration of any successful project that is sometimes overlooked.

Is the owner/operator/service provider able and ready to respond and address the issues detected by analytics? There needs to be a plan, processes, and resources to be able to take advantage of the insights analytics provide.

How does SkySpark help? Tools like Favorites (top) for saving and easily sharing views of issues, the ability to easily export of views, reports and data in a wide range of formats (bottom), all support the the workflow process needed to derive benefit from analytics. And, SkySpark can be integrated with the CMMS to automatically generate workorders for internal staff or external service organizations.

These are all facets of achieving benefit from analytics and moving to truly data-driven facility operations. SkySpark's flexibility and openness for integration make these solutions possible.





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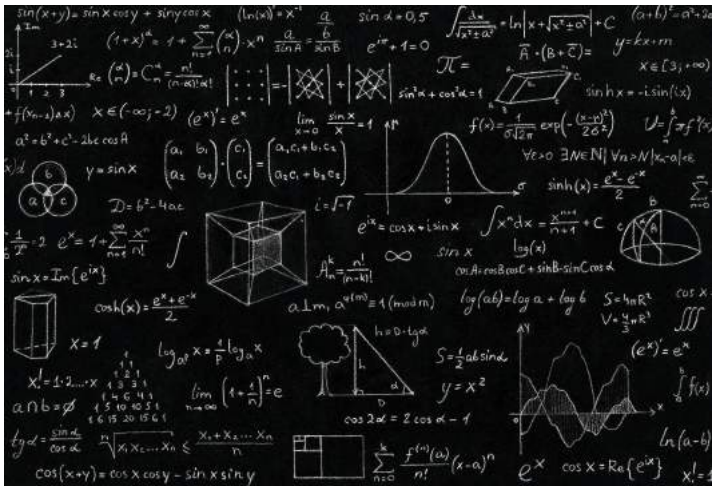
AI, ML, Statistics, Trig, Calculus, Pattern Recognition, Frequency Domain…

Oh My!!!



Confusing? Sometimes it seems that the goal of many vendors is to baffle and befuddle with buzzwords.

The terms above are all just tools in the data scientist's toolbox. They all fit a different need or application. No one is better than the other. You simply need the right tool for the job and SkySpark has them. When's the last time you asked your mechanic "exactly what tool will you be using on my engine?"

We combine a built-in library of over 500 analytic functions with full programmability. That means the right tool is always available for the job, but you are never boxed in or dependent on us. And our training programs are available to end users and implementation partners alike.

But if you're an end user, building owner or operator you don't need to worry about any of these terms. SkyFoundry's worldwide network of authorized partners do the implementation for you. Whether you want SkySpark deployed on-premise inside your secure firewall, or you want to take advantage of a managed service with consulting and even service dispatch, SkyFoundry partners provide you with choice.

Today's SkyFoundry's partner network consists of over 135 authorized partners on 6 continents providing solutions across applications of all types giving you more choice in selecting a provider than with **ANY** other analytics software option in the market.

Proven in applications of all types

SkySpark is used successfully in all types of facilities with deployments across well over **1 Billion square feet** (over 92,903,040 m²) of space on 6 continents. Applications include:

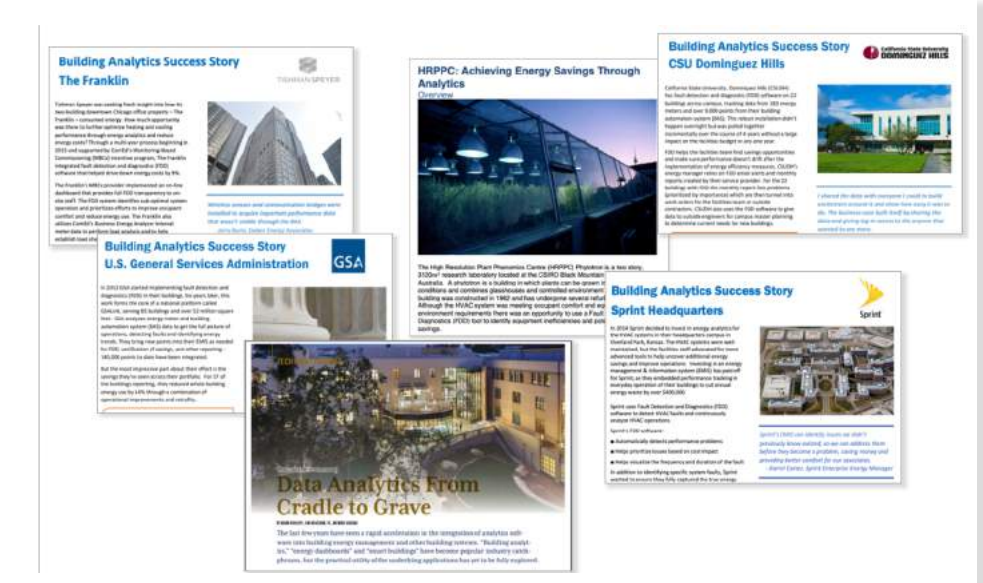
- Commercial office buildings (owner occupied, REITs)
- Utilities (demand response, load management)
- Government and Military facilities
- Data Centers
- Industrial facilities
- Multi-site Retail and Quick Serve Restaurants
- Higher Education
- Indoor Agriculture
- Laboratories (Government, research and universities)
- Entertainment/Hospitality (casinos, shopping centers, hotels)
- Smart Cities
- Facility management service providers
- Oil Rigs

See Success Stories on page 6

Success Stories

Today SkySpark is deployed across well over 1 BILLION sq. ft (>92M sq. meters) of facilities worldwide consisting of over 13,000 facilities.

Why? Because it works to deliver financial value to building owners and operators, and because our worldwide network of authorized partners give owners freedom of choice and deep expertise in applications of all types.



Featured Success Stories

Case studies continue to come in from our partners around the world. You can find these case studies and many more at:

https://skyfoundry.com/library

Find the newest case studies shown at the top of the list.

These success stories are made possible by our worldwide network of authorized partners, many of which are shown below. Learn more at: http://www.skyfoundry.com/partners/

SkyFoundry Recognized in Latest Harbor Research Report on Smart Cities

May 2019

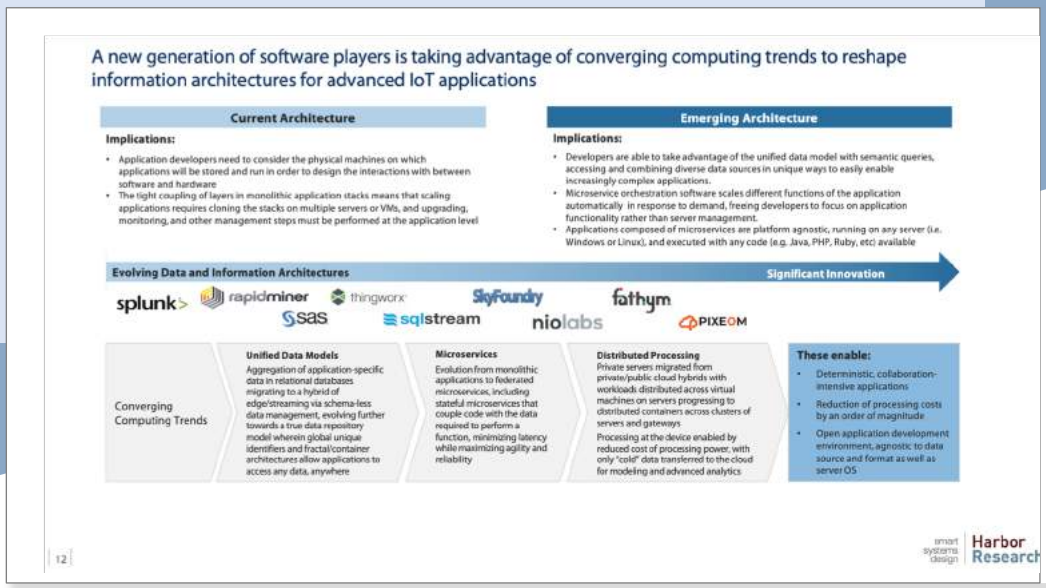
Fault Detection, energy management, smart cities, smart factories, M&V, the applications for SkySpark are as diverse as the structures that make up the built environment itself. SkySpark provides the flexibility and features to address applications of all types because from day one we have designed it to be a comprehensive platform for collecting, managing and performing analytics on all types of machine, sensor and device data. SkySpark foundational features along with our suite of Apps make it possible to work with virtually any type of IoT and equipment data.

Throughout the years SkySpark has achieved recognition for its technology and capabilities. Most recently, SkySpark was again identified by Harbor Research in their **Information Architecture, Open Data, and the Future of Smart Cities** May 2019 report as *"one of the new generation of software players taking advantage of converging computing trends to reshape information architectures for advanced IoT applications"*.

Key to that recognition is **SkySpark Everywhere's distributed architecture**, which allows data collection, storage, analytics and visualization to be performed at the edge in small low-cost IoT devices, on the cloud or in between. The flexibility and capability of SkySpark Everywhere is unequaled in the industry.

The most recent notice adds to a long list of recognition and awards going back to 2011 when SkySpark won the Realcomm **"Digie" Award for Best New Automation Technology** and 2012 when SkySpark was selected as one of the two winners of **IBM's "SmartCamp"** North America competition a global competition for technology companies that are using business analytics and big data technology to drive innovation in a variety of industries including retail, transportation, buildings and energy.

We are proud to see SkySpark continue to be recognized for its industry leading capabilities and results for customers of all types.



Flexibility – With SkySpark You Are in Control

SkySpark allows maximum flexibility to deploy where you want — On-Premise, in the Cloud, at the Edge, or even as a Desktop Tool. Any platform that supports Java can run SkySpark, including Windows, macOS, and Linux.

SkySpark offers the most flexibility data analytics solution in the market, starting with support for all the major Operating Systems.

Next choose how you want to access data. SkySpark supports a wide range of data acquisition options including: Bacnet IP, Modbus TCP, Obix, Haystack, SNMP, Sedona, OPC UA, MQTT, SQL, CSV import (manual batch or automated), a REST API and a Connector Development Toolkit. With SkySpark you are not limited to any single product manufacturer, protocol or data type.

Want to deploy SkySpark on-premise behind your secure firewall so your data never leaves your organization and no outside access is allowed? No problem – SkySpark has you covered.

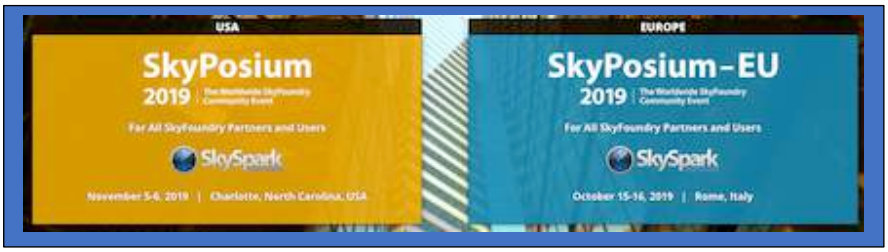
Connect to Your Data

Or maybe having analytics provided as a managed service is a better fit for your organization – SkySpark has you covered there as well. Many SkySpark partners offer managed solutions on 6 continents around the world.

Then there is our unique combination of full programmability with a library of over 500 analytic functions. This approach provides the flexibility to select and define analytic rules that meet your unique application needs, equipment systems and data sources.

With SkySpark you're never limited.

SkyPosium 2019 Preview



SkyPosium, our user community events, are back for 2019. The EU event will be held in **Rome, Italy** October 15-16, 2019 and the US event will be held in **Charlotte, North Carolina**, November 5-6. Full details including event registration and links for hotels reservations can be found on our Calendar page at: http://www.skyfoundry.com/calendar

SkyFoundry's SkyPosium events are designed for the entire community of SkySpark users—our reseller partners, end users, engineering consultants, SaaS providers and OEMs, with sessions for everyone from end users to advanced programmers — everyone that uses or applies SkySpark.

With the majority of sessions delivered by community members, SkyPosium's unique format provides attendees with the ability to learn best practices and share experiences among actual users and practitioners.

The 1 ½ day event starts with a plenary session for all attendees on Day 1. Day 2 includes two tracks – one focusing on applications with presentations by community members based on their real world projects and the other a full day developer-level training session.

If you are involved with SkySpark as an end user or partner, whether in sales or a technical role, you do not want to miss these important and informative events. REGISTRATION for both events is OPEN at: https://www.skyfoundryevents.com/

Recently the Project Haystack organization (https://project-haystack.org/) announced that Haystack 4, the next generation of the Project Haystack data modeling standard, was released for public review.

The understanding of the need for semantic modeling of device and equipment data has matured significantly in the last decade and the requirements and techniques for applying semantic modeling to equipment data are advancing rapidly. Haystack 4 builds on the 8+ years of experience in applying Haystack across thousands of buildings worldwide, the input from practitioners in the community throughout that time, as well the collaborators that have participated in the activities of Haystack Working Groups.

Major enhancements to the Haystack 4 data modeling standard include:

- A formalized structure to define “types” and “subtypes” to support definition of hierarchical taxonomies of equipment systems and sub-components.
- The enhanced ability to define taxonomies and ontologies for complex equipment systems enables semantic modeling of energy and resource flows through systems.
- Support for RDF/Linked Data. Haystack 4 systems can export their data model to RDF (Resource Description Framework), which is a format understood by computers and commonly used in the data science community for simulation and modeling.
- Enhanced querying and search based on the ability to infer relationships due to the more advanced data modeling features of Haystack 4.

A new website with comprehensive documentation on Haystack 4 has been launched at www.project-haystack.dev and Haystack 4 was a major focus of Project Haystack’s biennial Haystack Connect conference which took place May 13-15 in San Diego, California. Conference presentations are available at: https://www.haystackconnect.org

Learn More About SkySpark®

Join us for a comprehensive demonstration webcast.

We publish our calendar of upcoming sessions and other events here: https://skyfoundry.com/calendar

Or contact us at: info@skyfoundry.com