Issue 23 - March 2015

SkyFoundry Insider

SkySpark® Adds More New Features and Tools to Enhance Analytics, Reporting & Connectivity

At SkyFoundry we have the unique advantage of receiving continuous input from over 90 partner companies around the world that today have deployed SkySpark® across over 8500 facilities. And this is in addition to the end customers that contribute input directly. With different business models, applications and areas of focus these companies encounter a wide range of project requirements and challenges.

This continuous flow of feedback keeps our technical team busy but also give us excellent insight into the real world challenges encountered in deploying analytics across equipment systems, data and facilities of all types, and drives continued enhancements and new capabilities.

In this issue of the Insider we will help our readers catch up on the wealth of new features we've added to SkySpark in the last few months. So lets get to it!

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SkySpark Continues to be the Leader in Allowing Users to Program Their Own Analytic Rules

Our goal — *if you can think of it you can implement it in SkySpark®*. SkySpark's Axon scripting language enables users to program everything from simple limit and time based analytic rules all the way to rules based on complex math and statistical calculations. Recent releases have added new functionality, built-in functions and application notes to help users address the challenges encountered with the wide range of data available from different building systems.

New Advanced Mathematical Functions

The math extension has been enhanced to include a new suite of functions to work with mathematical matrices. Matrices are commonly used for advanced statistics and other mathematical disciplines. SkySpark now provides first class support for matrices as an optimized type of Grid, allowing easy interoperability with the rest of the Axon stack. New functions for working with matrices include: toMatrix, matrixTranspose, matrixDeterminant, matrixInverse, matrixAdd, matrixSub, matrixMult.

More Built-in Functions and Tools – Focus on Assessing Data Quality

It happens – data loggers miss logging intervals, sensors have errors and communications links drop. The fact is that data quality is something every energy professional should be aware of. Whether it is a failure at the controller or data logger level, overload of an network connection bandwidth, or other issues: the result can be missing data entries in history logs. Analytic functions to detect data quality issues can be some of the first rules you apply to your data. A range of new analytic functions to detect AND correct data quality issues have been added to SkySpark with detailed application notes showing how to implement them for different data quality challenges. Topics include:

- Missing Data
- Using Standard Deviation to Detect Bad Data
- Identifying "Target Values" that should or should not be present
- Detecting "Outliers"
- Measuring Rate of Change and creating Sparks based on exceptions

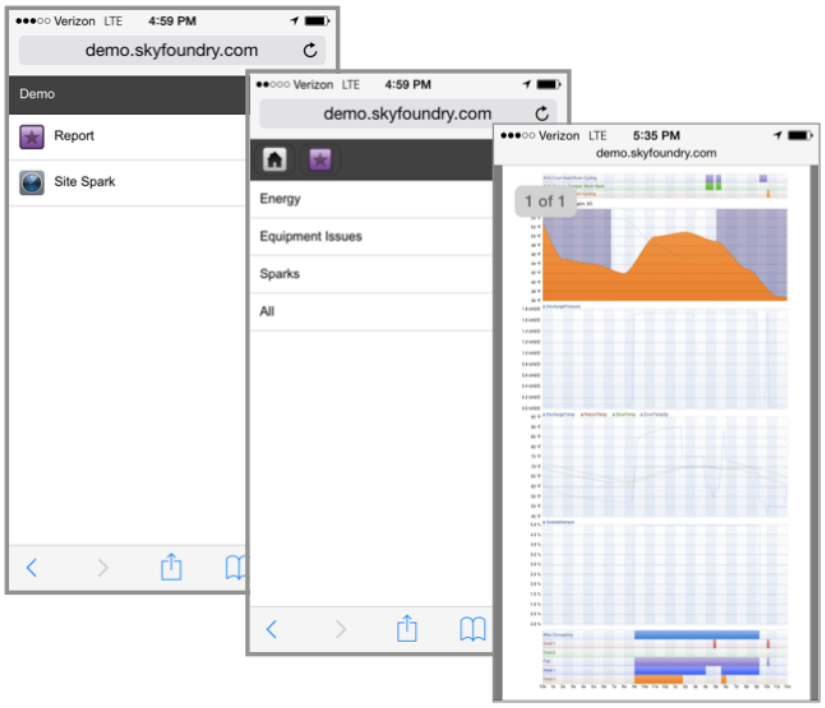
With the most recent release SkySpark documentation and training materials include detailed examples showing the implementation for these, and other analytic techniques.

Mean Kinetic Temperature

What is MKT? It's a simplified way of expressing the effect of thermal changes on perishable items. MKT is interesting in the fact that it gives higher weighting to higher temperatures than a standard mean would because higher temperatures accelerate the degradation of perishable items at a non-linear rate. This measure is especially useful with in pharmaceutical industry applications. A new SkySpark application note shows how to implement MKT in in your analytic functions.

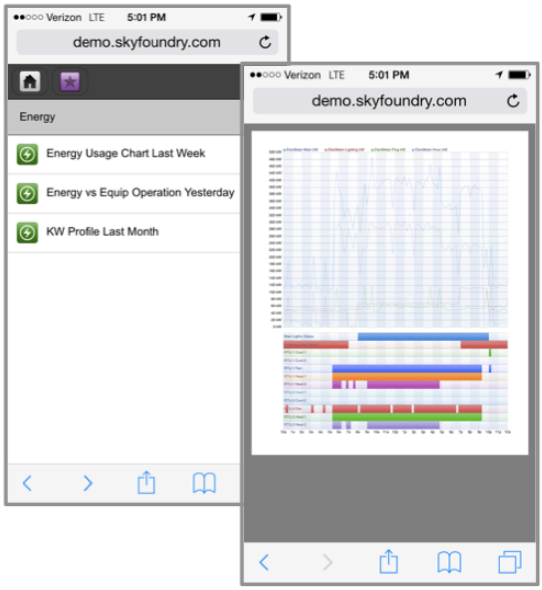
New Reporting Tools
Enhancing Mobile Reporting and Emailing of Reports

Now view ANY saved Report on your mobile device!



There is no question its an increasingly mobile world – but that doesn't mean that everything that you do on your PC should be done the same way on your mobile device. SkyFoundry has worked to create a useable, lightweight, responsive set of tools to view analytic results and reports on your mobile device, and we have just dramatically enhanced the mobile app with the ability to view **ANY saved report** as a PDF.

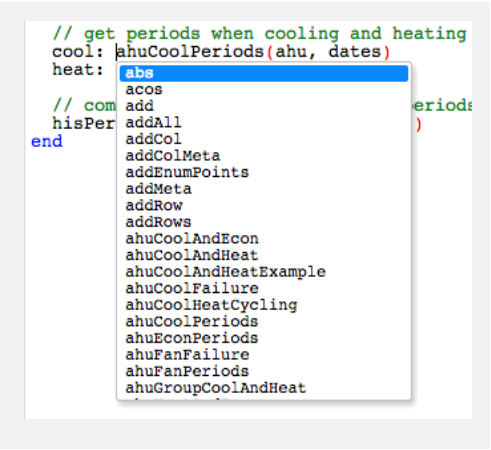
The new feature allows mobile users to navigate the Report App and choose any Report from any SkySpark App (such as Energy) for display on their mobile device. That means virtually any SkySpark view can now be



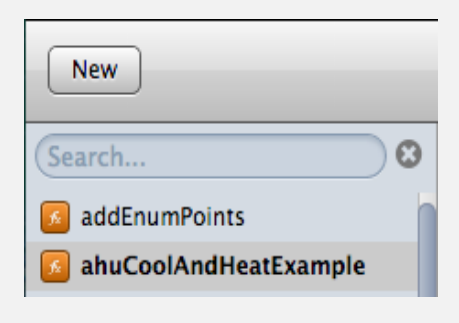
And getting the SkySpark mobile app couldn't be easier – there is nothing to download from any App store – SkySpark automatically detects your mobile device and delivers HTML – There is no App to download and manage!!!

All New Editor – The Function App is Now a Comprehensive IDE for Programmers

All Buildings Are Different! One of the great strengths of SkySpark is that it is user-programmable, combining the power of our built in library of analytic functions (now numbering over 500 and growing), with the ability to create customized analytic rules that fit the unique needs of individual buildings, equipment systems and projects. With SkySpark you're never limited to only the analytic rules developed by the factory. Rules are written with a scripting language called Axon, and the editor tool – known as the Function App – has been greatly enhanced. Some of the new features include:



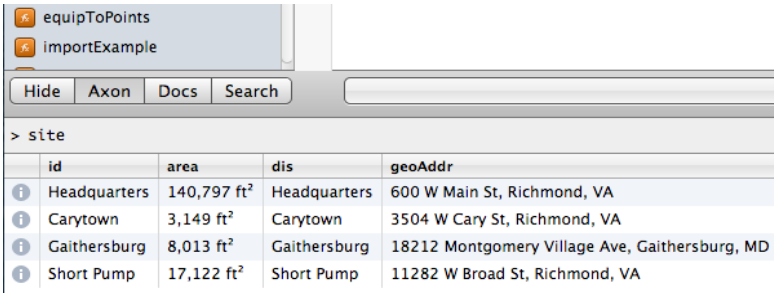
Auto-complete: when typing in a function name hitting Ctrl+Space will provide the list of available function names to auto-complete.



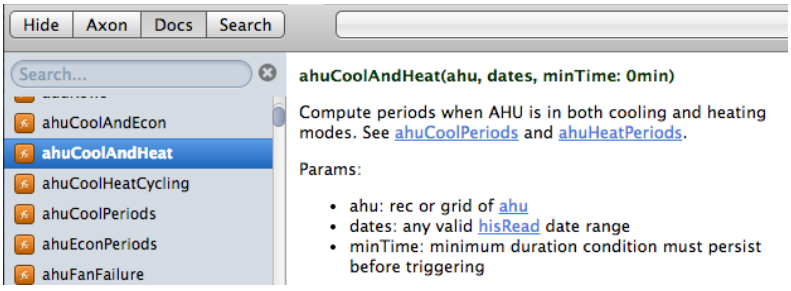
Function Search: the function sidebar supports searching functions by function name.

Utility Bar: the bottom of the FuncApp now provides a utility bar that you can open to enable new features: Axon, Docs, or Search (see below).

Axon Utility: the Axon utility provides a simple place to test Axon expressions without leaving the Function App (see right).

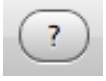


Docs Utility: this utility bar provides the ability to see the documentation for functions from within the FuncApp.



Search: The new search utility bar provides the ability to perform text search. You can toggle the search to be within the current function or you can search across all your functions at once. Search matches, called marks, will be shown in the table and highlighted in the editor.

Keyboard Navigation: We've put a lot of work into allowing full navigation strictly by the keyboard – programmers love this – its fast. For example Ctrl+F to search, then use Ctrl+1 to focus back to the editor and hide the search bar. *But who can remember all of the shortcuts? I know I can't.* The new help button shows all the keyboard shortcuts available.

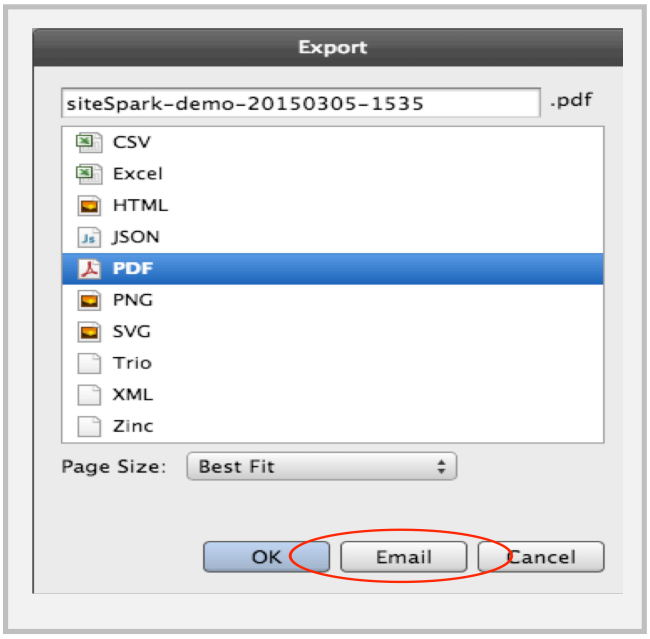


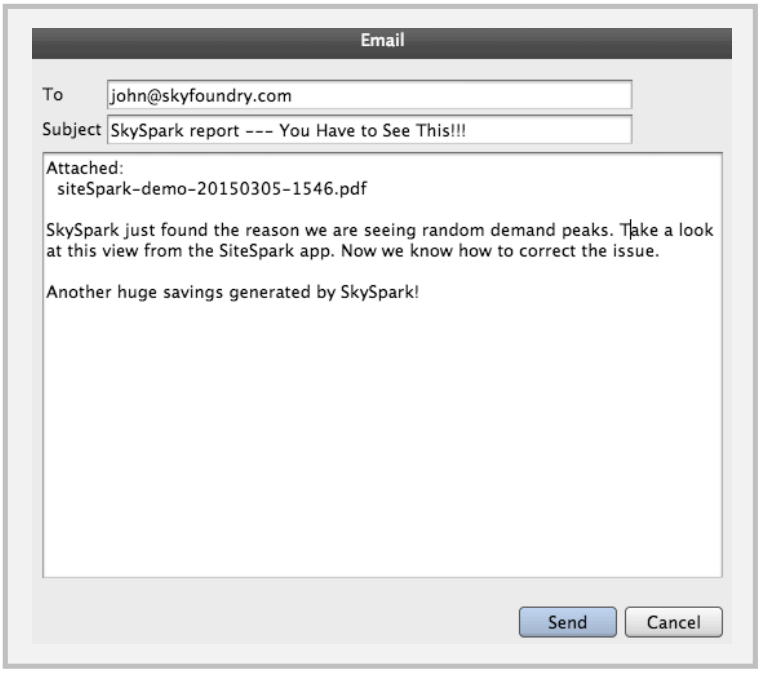
New Reporting Tools

Emailing of Reports is Even Easier and More Flexible

Instantly email ANY View or Report with the new Email button!

The new Email button lets you instantly email any SkySpark view to anyone you want – no programming, exporting or attaching required. Just click on the Download icon, select email and enter the recipients email address. They will get a PDF document of the view as an attachment.





Beyond making it easy for operators to manually email views and reports, SkySpark can also automatically send emails. Automatic email generation has always been part of SkySpark, but new options extend email capabilities for even greater flexibility

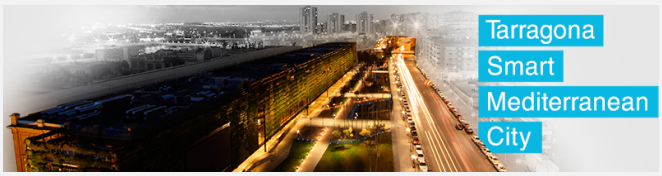
SkySpark can automatically email notifications to users when sparks are detected. Users with password access can simply click on the link in the email to be brought right to the Spark Detail View.

SkySpark can also send reports to users that do not have password access to the application. SkySpark can auto-generate PDF documents and attach them to email messages for viewing on PC's or mobile devices.

Industry Recognition

SkyFoundry in the News

SkyFoundry Featured Speaker at Smart Cities Event in Tarragon Spain



The city of Tarragona Spain will be host to the Mediterranean Games in 2017. As part of the effort to bring the games to the region the city has embarked on an aggressive effort to implement smart city technologies and dramatically reduce energy consumption. You can find a video on the smart city initiative here: https://www.youtube.com/watch?v=UGZbtEf8w44

John Petze was a featured speaker and provided an educational presentation on the concepts and benefits of applying operational analytics to data from equipment systems at the recent Conferencia BioEconomic® Eficiencia Energética. John's co-presenter was Alex Ros, a specialist in energy management, and CEO of of **GreenHiT, SkyFoundry's** new distributor for Spain. The presentation was very well received and created significant discussion after the session. John's presentation can be found here: http://www.bioeconomic.es/Ponencias/Tarragona2/GH.ppsx

Conference Program: http://www.bioeconomic.es/Programas/conferencia%20tarragona%202.pdf

Big Data Cuts Buildings' Energy Use

Sensors and Analytic Software Help Make Buildings More Efficient

Courtesy Environmental Systems Inc as published in the Wall Street Journal 9/30/14

Retailers Buy In

Large retailers are getting into the act. Kohl's Corp. pledged seven years ago to use roughly a third less energy than the national average for retailers of its size by 2015. Achieving the goal required much more data about energy use than the company had, says Tari Emerson, Kohl's director of sustainability.

One hurdle: Every Kohl's store has different energy needs and use patterns. They're different sizes, in different regions, in different types of buildings of different ages, and the schedules for when they are restocked at night differ. They use different equipment and systems.

So Kohl's invested in software from SkyFoundry LLC and Environmental Systems Inc. that helps Ms. Emerson analyze how all those factors affect energy use and design a plan for each store to reduce energy consumption. The software also takes readings of every store's energy use every 15 minutes, allowing her to quickly spot and deal with any anomalies.

ESI Environmental Systems, Inc.
Building Solutions. Building Performance.

See the full article on ESI's website here:
https://www.thinkesi.com/Managed-Services-Building-Efficiency

Update on Project Haystack: The Organization, Open Source Effort, and Haystack Connect 2015

Project-Haystack.org was founded in March of 2011 by a group of people that saw a major unfilled need in the automation market – that being a uniform way to make to make device data self-describing so that it could be easily used across applications. The community works on standards and tools to streamline working with data from the Internet of Things. One of the primary activities is the development of standardized semantic data models and web services to achieve the goal of making it easier to unlock value from the vast quantity of data being generated by the smart devices that permeate our homes, buildings, factories, and cities. Applications include automation, control, energy, HVAC, lighting, and other environmental systems.

Project-Haystack effort is an open-source community-based effort. Today there are over 650 registered members of the community. In June of 2014 Project-Haystack established a formal 501C non-profit Corp with a board of directors from industry. You can find the press release announcing the 501C Corp here:

http://www.ireachcontent.com/news-releases/project-haystack-announces-formation-of-non-profit-corporation-263428181.html

And a new Associate Membership class will be announced at Haystack Connect in May.

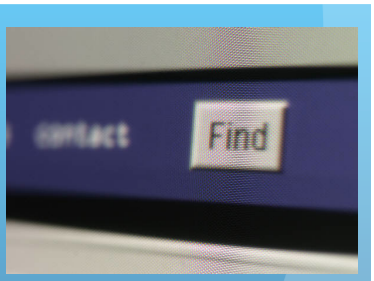
People discover the benefits of Project-Haystack it as they encounter the challenge of integrating data from diverse systems and devices and realize that there "must be a better way". Haystack is really more than one thing – its the data modeling methodology, community effort, the consensus developed tagging libraries, the web services type communication protocol, and the complimentary applications being developed by various community members and companies. This 6-minute video provides a good overview: http://youtu.be/5C6GwLbYqTw

Haystack Connect 2015 is on!

One of the major activities the community undertakes is the production of the Haystack Connect conference. The 2013 inaugural Haystack Connect event was a great success and attendees voiced resounding support for making it an ongoing industry event. The 2015 event will be held May 18-20 at the amazing Cheyenne Mountain Resort in Colorado. Full details including: Event registration, Hotel registration, Call for Papers and Sponsorship/Trade Show materials are available on the HaystackConnect.org web site: http://haystackconnect.org/

SkyFoundry was one of the founding members of the effort and is proud to be a Project Haystack Supporter

SkySpark® – Analytics for a World of Smart Devices



The past decade has seen dramatic advances in automation systems and smart devices. From IP connected systems to support for web services and xml data schemas, it is now possible to get the data produced by the wide range of systems and devices found in today's buildings and equipment systems.

Access to this data opens up new opportunities for the creation of value-added services to reduce energy consumption and cost, and to identify opportunities to enhance overall facility operations.

Access to the data is just the first step in that journey, however. The new challenge is how to manage and derive value from the exploding amount of data available from these smart and connected devices. *SkySpark directly addresses this challenge.*

The new frontier is to efficiently manage and analyze data to *find what matters*.

SkySpark Adds SNMP Connector – Enables Direct Connection to IT Equipment for Data & Analytics

SNMP

Energy consuming equipment goes far beyond the systems that provide heating and cooling in buildings. One of the biggest factors in overall building energy use is now IT equipment. Much of that equipment communicates using a protocol known as **SNMP – Simple Network Management Protocol**.

Computer and network equipment can be managed using SNMP and can also report essential data about their operation and energy use. As SkySpark is increasingly used in data centers and other IT-heavy facilities we recently added the SNMP protocol to standard connectors that come with SkySpark. This built-in connector eliminates the need for gateways and other hardware to connect to IT equipment for data collection and analytics.

SkySpark Connectors include: Bacnet® IP, oBix, Modbus TCP, Haystack, SNMP, Sedona, SQL via JDBC and CSV via import.
(SNMP new in v2.1.10)