

connections

Covering Semantics, Tagging and Interoperable Data Strategies
for Smart Buildings, the Internet of Things and More.



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Project Haystack Members



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Welcome to the inaugural edition of *Project-Haystack Connections*, a source for our international community to share news and information about Project Haystack methods, semantic data modeling and data analytics success strategies.

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Welcome

Since its formation in March of 2011, the Project-Haystack organization has grown tremendously by filling a critical need to support the effective utilization of smart, connected devices, often referred to as the Internet of Things. Project-Haystack provides the industry with an open-source, collaborative environment where industry experts work together to address the challenge of utilizing semantic modeling (also known as tagging) to make data self-describing, thereby streamlining the interchange of data among software applications.

The community has developed and promotes a flexible, extensible, data modeling approach and models for common equipment systems and the data they contain. The work of the community includes detailed documentation describing the data modeling techniques, significant libraries of consensus-approved equipment models, and software reference implementations in a variety of popular programming languages which enable developers to easily adapt their software applications to consume smart device data that is “marked up” with Project-Haystack data descriptions.

The work developed by the Project-Haystack community streamlines the process of managing,

presenting and analyzing the vast amount of data produced by smart devices and equipment systems, and the techniques and conventions can be used with virtually any type of data from manual entry in spreadsheets to modern communication protocols. The community’s work is not tied to any vendor or communication protocol.

Value from data will only be realized if organizations can understand and leverage the data they produce. Project-Haystack is an enabling technology that is helping to lower the cost, and accelerate the development, of data-oriented solutions that reduce energy and operational costs in facilities of all types. Project-Haystack is about combining data from smart devices, with new concepts about how devices, information, people and systems interact to deliver business outcomes that drive value in the built environment and wider IoT market. Business value is driven by the streamlined interoperability of connected systems, devices and things. By making data self-describing Project-Haystack enables more seamless integration across applications to improve operations, reduce costs and maximize occupant experiences.

*John Petze, Project Haystack, Executive Director,
Principal SkyFoundry*

*Marc Petock, Project Haystack, Secretary,
Vice President, Marketing, Lynxspring*

“You may have an IP connection. You may have BACnet or another open API. But you need to ask about naming. How does data get modeled? Is it tied to the application? If so, you’re at risk of being locked in by that platform vendor.”

*Rob Murchison
IntelligentBuildings® LLC
Realcomm IBCon
June 2015*

Click on the links to view a narrated slide presentation and a general session from the last Haystack Connect™ conference. You will learn that Project-Haystack is...

1 a Community

People collaborating in open source way on standard semantics for smart devices & data

2 a Methodology

An efficient way to map data, also known as tagging and meta data definition

3 a Set of Models

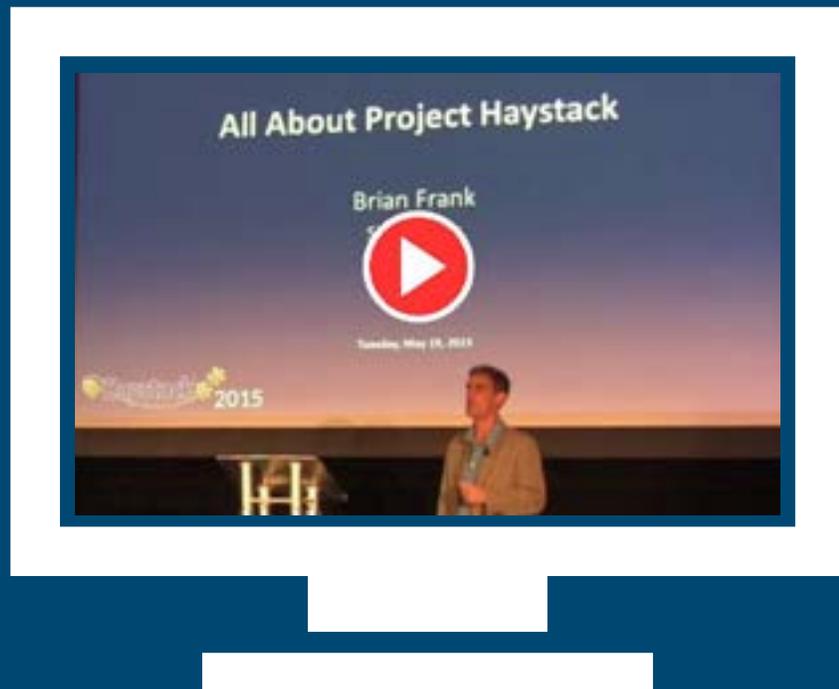
Self-describing models that make it easier and more cost-effective to derive value from data

4 a REST API

A means for developers to assure the easy exchange of tagged data among applications

5 a Movement

A fast evolving industry effort gaining supporters, recognition and momentum



Semantic Web

We have entered an era where data has become a tangible resource which can be directly utilized to create value. While much of the focus of the Project-Haystack community is related to how the operational data from control and equipment systems can be used to improve facility operations, reduce energy costs, and enhance overall operational efficiency, the need to make data across the web more self-describing and easier to use is a major area of focus by many in the larger Internet community—a community that dwarfs the size of the buildings technology market.

Understanding how data semantics are affecting digital society as a whole provides a helpful perspective on the need to address this challenge within the intelligent buildings space. Understanding data semantics in a wider sense will help the buildings and IoT industries move forward in adopting solutions. A January 2015 article circulating in the general IT press provides good context for the discussion about the what the semantic web brings to bear. The author, Software Engineer, Brian Sletten, says:

“Adoption of a new way of seeing the world is one of the most difficult things to engender. Beyond simple intransigence, technical impedance, sunk cost thinking, fears and incentive mismatch, the dominant paradigms must be exhausted before people are ready to consider a new approach”

Wright State University, which has a program focusing on the semantic web, also highlights the importance of creating technologies to support the “semantic web” and provides a viewpoint from outside of the buildings industry. The program, called Kno.e.sis (Ohio Center of Excellence in Knowledge-enabled Computing), researches, develops, and applies semantic and knowledge-enabled techniques. Those wishing to understand data semantics at a deeper level can find more information at www.knoesis.org.

The Takeaway: The building management/energy management industry did not invent the concept of data semantics, and it is not the only community to understand the importance of addressing this need. Our industry needs to adopt a methodology that fits the unique needs of our device-oriented applications and that can be easily utilized by our industry.

This content is an excerpt from a section of a Continental Automated Buildings Association (CABA) whitepaper about Project-Haystack. CABA whitepapers serve as authoritative guides to assist industry stakeholders make decisions about particular products, services and technologies. [Click here to download the complete whitepaper.](#)



Get the Bigger Picture

Read the whole article about
data semantics and the Web at

 DATAVERSITY

“We don’t hear about \$20 million investments in Semantic Web technologies though. Is it because the technologies are unnecessary? Overly complex? Poorly understood? There may be elements of truth to these complaints, but at a more fundamental level, Semantic Web technologies don’t require consensus to use, and technologies that don’t require consensus to use don’t require \$20 million budgets. If I have the capacity to accept your data as a spreadsheet, a relational database, a REST API, an XML document, etc. and extract content from it on my own, then I can do data integration on the Edge and I don’t need your permission to do so. To the extent that there have been Semantic Web successes, they have generally been behind-the-scenes successes. They do not require the kind of political and financial capital that these other huge initiatives do, and that makes all the difference in the world.”

*Brian Sletten
Software Engineer
January 2015*



Not only does Project-Haystack have members with headquarters in the Asia-Pacific, Europe and the Middle East as well as North America, the fast-growing innovators that comprise our membership are quickly expanding internationally as they win contracts on other continents, bringing Project-Haystack techniques along.

From almost the moment that Project-Haystack was launched in 2011, it has had the advantage of a global membership. Our organization proactively seeks perspectives from different parts of the world because different countries and cultures from different climates and geographies often have different approaches to the design, construction, operations & maintenance phases of a building's life cycle. New members like Grosvenor Engineering Group of Australia and KNX® of Europe keep us growing in a geographically balanced trajectory. It is a point of strength that the Project-Haystack movement has this global balance. In the end, to be successful the entire value chain needs to appreciate how important the semantic conventions and tagging process are to moving the science of building management forward. And value chains tend to extend around the globe. It helps that Haystack data modeling techniques can be used with virtually any type of system data. Our methodology is not tied to any vendor, or communication protocol. It can be used with legacy system data and with more modern systems that allow tags to be defined in the end device. It can also be used with file data – like csv files, and Excel files. So anyone from anywhere who has a vested interest in making sense of building system and energy data should consider getting involved in Project-Haystack. Whether you are a domain expert in the design, installation or operation of building systems, your expertise would be an asset to the organization. Champions of semantic data modeling can emerge from Mechanical-Electrical-Plumbing (MEP) design firms, construction firms, utilities, energy service companies, corporate real estate departments, building equipment manufacturers, and property managing and property owning concerns. And they are emerging from all over the world.



"When connecting disparate systems in a building, open and standard protocols help but leave a big gap. Historically, you've had to look at the points in a BAS to interpret what data means. You may have had sufficient clues to identify a piece of data as a temperature, but is it a sensor temp? A room temp? Or a return air temp? There was no way for descriptive information to answer those questions to be captured and communicated between systems and applications. The result was that an inordinate amount of time and project cost was spent on this part of the project. I joined Project-Haystack at the outset in 2011 to address this challenge." - Richard McElhinney

A View on Project Haystack From Airmaster Australia

Richard McElhinney, Chief Software Architect, Airmaster Australia, has been a contributor to Project-Haystack since early 2011, developing the first Niagara AX semantic modelling implementation, which has evolved into the current NHaystack add-on module. Airmaster and its subsidiary BUENO Systems have been driving adoption of Haystack methodology. For example, a very large property management customer is specifying Project-Haystack as a requirement for all new BMS projects. Airmaster Australia has also used Haystack semantic modeling for a very large multi-building / multi-vendor systems integration at one of Australia's most recognized universities.



RICHARD MCELHINNEY

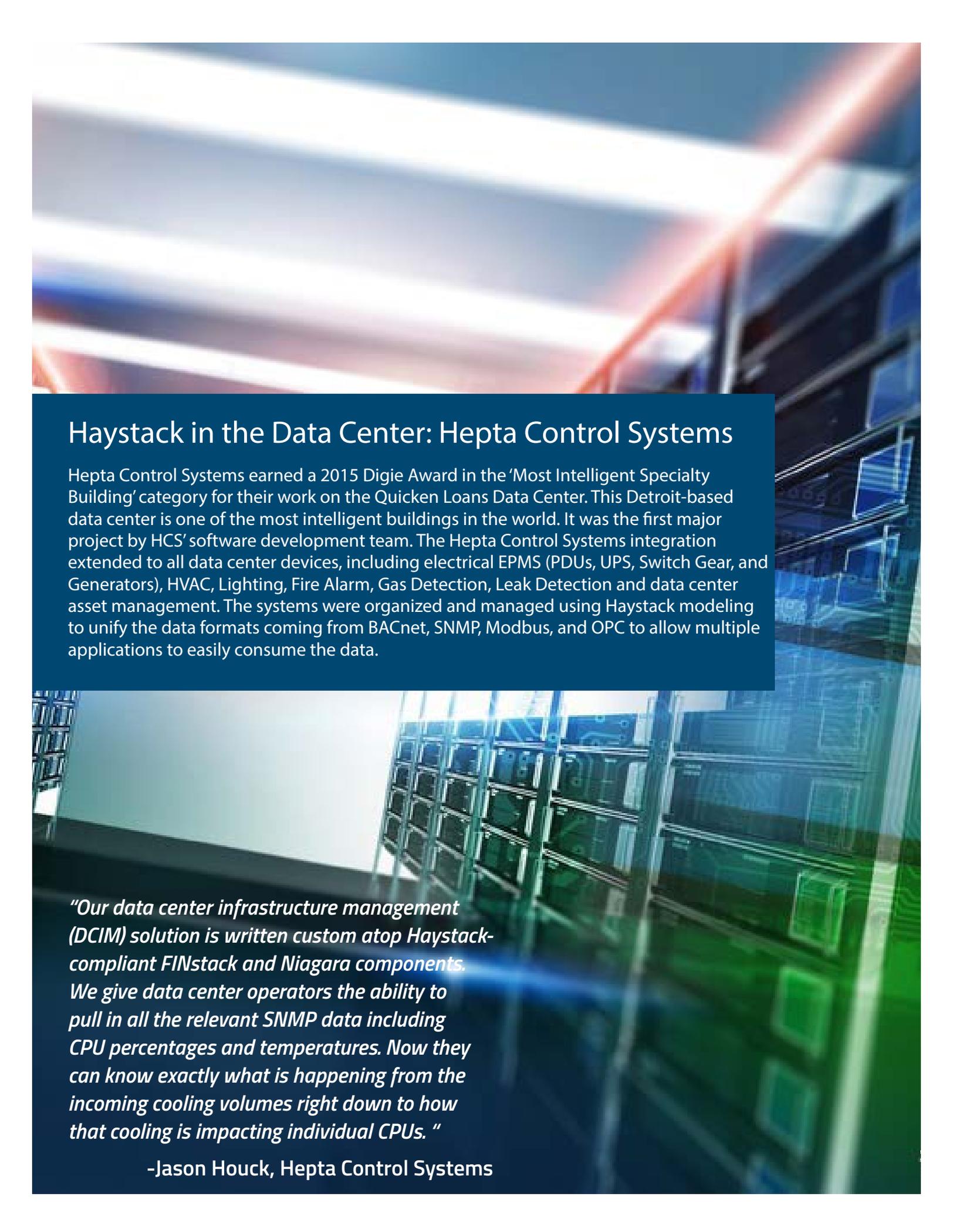
"If Facebook did application serving like building automation has done it traditionally, it would take two days between when you post an update and when it would be published to your social network. Facebook publishes instantaneously because tagging tells the algorithm exactly where to look for and put things. Haystack tagging serves a similar purpose. It allows a large property owner to do an ad hoc query and get an immediate answer like 'Tell me what all the discharge air handlers across my whole portfolio are reading right now.' If we can all agree on tagging conventions, application software for functions like analytics and work order management has fast ROI due to lower implementation costs."

-Scott Muench, J2 Innovations

Project Haystack: J2 Innovations App Serving Platform

J2 Innovations is the developer of the FIN Stack™ application server built upon Project Haystack tagging and data modeling. It is designed to encourage community collaboration and seamlessly supports add-on applications such as automated analytics. When combined with the custom graphic tool FIN Builder and the FIN Mobile app, it empowers systems integrators to build an entire customer solution using a unified toolset optimized for efficient workflow. Punto Polanco, the first building in Mexico to use FIN Stack, has been awarded Building of the Year by the IMEI, Mexican Institute for Intelligent and Sustainable Buildings.





Haystack in the Data Center: Hepta Control Systems

Hepta Control Systems earned a 2015 Digie Award in the 'Most Intelligent Specialty Building' category for their work on the Quicken Loans Data Center. This Detroit-based data center is one of the most intelligent buildings in the world. It was the first major project by HCS' software development team. The Hepta Control Systems integration extended to all data center devices, including electrical EPMS (PDUs, UPS, Switch Gear, and Generators), HVAC, Lighting, Fire Alarm, Gas Detection, Leak Detection and data center asset management. The systems were organized and managed using Haystack modeling to unify the data formats coming from BACnet, SNMP, Modbus, and OPC to allow multiple applications to easily consume the data.

"Our data center infrastructure management (DCIM) solution is written custom atop Haystack-compliant FINstack and Niagara components. We give data center operators the ability to pull in all the relevant SNMP data including CPU percentages and temperatures. Now they can know exactly what is happening from the incoming cooling volumes right down to how that cooling is impacting individual CPUs."

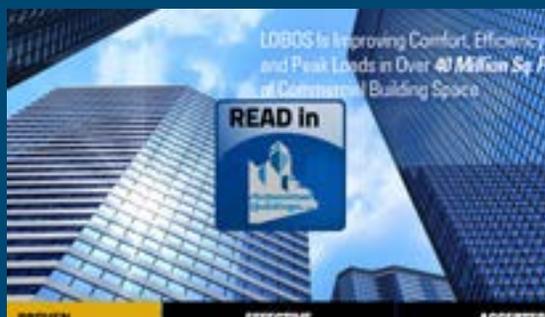
-Jason Houck, Hepta Control Systems

"We had a two-phase challenge: How would LOBOS™ EE get data out of Niagara™ and into FDD. And how could we do that with minimal effort? Project Haystack, and in particular, the nHaystack Niagara™ service solved both problem sets for us easily. Utilizing the nHaystack service, all of our existing points in the Niagara environment had Haystack tags added. Because the points that are tagged were standard on all of our builds, we had everything necessary to export data to any external application that utilizes the Haystack standard. "

**- Kevin J. Tock, Former Director,
Product Development
Enerliance/Yardi**

Haystack for App Integration: Enerliance/Yardi

The LOBOS™ (LOad Based Optimization System) from Enerliance/Yardi has evolved the way its large commercial facilities customers consume energy and participate in demand response (DR), [Constellation Place in Century City, California, is a good example](#). When LOBOS developers faced the challenge of integrating its auto-DR software with newer Fault Detection & Diagnostics (FDD) apps, they deployed Haystack methodology. Read about that experience in the article linked to below. Also, view the new video about how LOBOS works.



Connected Building Commissioning: Altura Associates

Altura Associates serves as a trusted advisor to building owners embarking on new construction and major retrofit projects that are striving to meet aggressive environmental and sustainability goals. Altura has advanced the use of Haystack models and tagging methodology for many of its projects, including healthcare facilities, entertainment complexes, university campus buildings and high-rise offices. You can also read about their approach to building commissioning in the ASHRAE Journal article linked to here as well as at AutomatedBuildings.



"When it comes to the building controls industry, the diversity of equipment manufacturers, data communication protocols, network architectures, controls system software, and the proprietary programming behind these products remains a challenge when integrating data into a single platform on a large scale. Analytics integration can be eased greatly by enforcing standard industry protocols like BACnet and powerful open-source tagging and data modeling conventions like Project Haystack. A well-planned data platform can evolve into a building energy management system that will serve the building's on-going commissioning needs through its useful life."

- Greg Shank, Altura Associates

Haystack to Match a Fast, Secure IoT Strategy: Controlco

Controlco is expert in the integration of physical hardware solutions for implementing secure high-speed Internet of Things (IoT) backbones in large commercial buildings. It was also an early leader in the development of analytics, diagnostics and work order management software. It has segued all this experience into a full-service Building IoT business that also includes applications hosting and component parts sales. Controlco has first-hand experience in deploying optical fiber connectivity all the way to edge devices and speaks to the cost-effectiveness, security, comfort, and energy performance advantages of this approach in a recent article. Read it at the AutomatedBuildings.com page linked to below.



"When the entire industry adopts a consistent approach to web semantics, setting up machine-to-machine communications will be possible without lengthy integration projects. This in combination with high-speed IP connectivity all the way to edge devices will change the momentum. Once it starts to build, complete industry transformation may be here sooner than anyone thinks."

- Brian Turner, Controlco

Tutorials

Part I: Describing the Meaning of Data—An Introduction to Data Semantics and Tagging

John Petze, Principal, SkyFoundry

In order to utilize operational data in value-added applications such as analytics, analysis, visualization and reporting tools, we need to know the meaning of our data. For example, if we obtain a data item from a building automation system (BAS) and it has a value of 77.6 we can't do any effective analysis until we understand whether it is 77.6 degrees F, or degrees C, or PSI, RPM, or kW, etc. "Units" therefore is one good example of an essential *descriptor* that we need in order to understand and use our data, but it is by no means the only one.

Continuing with our example, if all we know are the units (Deg F for example), we still don't know much about the significance of the value 77.6. If its a zone temperature it might be a bit warm for occupants. If it's a return air temperature it's right where we want it to be.

Let's say the sensor with the value of 77.6 is named zn3-wwfl4. If I am intimately familiar with the building system and the naming conventions used when it was installed, I may be able to determine that means Zone 3, West Wing, Floor 4. That would give me a bit of information to work with. If I know the building really well, I may also be able to tell that zn3-wwfl4:

- Is a zone temperature
- Is an exterior zone
- Is south facing
- Is supplied by a VAV box
- Is served by AHU-1
- Is operated on occupancy schedule #1 which is 7:30 AM - 6:30 PM
- Has an occupied cooling setpoint of 74 degrees F

Armed with this additional information I could determine that a value of 77.6 is not proper for 9:00 AM on a weekday — it's too hot and will lead to occupant complaints. What enabled me to make that determination, however, was a significant amount of information about the meaning of the specific sensor. Information that I happened to have because of my personal knowledge of the building — but information that was not recorded in the control system (or any single location), and is not available in any consistent *machine readable* format. Herein is the challenge to using the wealth of data produced by today's systems and devices —the ability to represent, communicate and interpret the meaning of data. This "data about data" is often referred to metadata or data semantics.

Cont...



Having appropriate metadata about the sensor point zn3-wwfl4 would enable us to understand the impact of the current value of 77.6 without relying on personal knowledge of the building. As described above, if we knew the schedule associated with the room that the sensor is associated with we could determine that it is over temperature during occupied hours and the occupant is most likely uncomfortable.

Without the necessary metadata, however, we can't determine the impact of the current value and its relationship to proper system operation. So in order to provide effective use of sensor data we need to combine metadata with the sensor value zn3-wwfl4. When done manually, this process is referred to as mapping or "data wrangling". This step in the utilization of machine data has historically been a time consuming manual process that adds significant cost to the implementation of new software applications such as analytics, data visualization and reporting.

Interestingly, with all of the power they have gained over the last decade, and the adoption of standard communication protocols, most building automation systems provide little to no ability to capture semantic information about the data they contain. There has been no standardized approach to representing the meaning of the data they generate or contain. The systems provide "points" with a name, which typically is ad hoc and follows no universal standard, a value, and units but little other information. The result is that a the labor intensive, process is required to "map" the data before any effective use of the data can begin. Clearly, this creates a significant barrier to effective use of the data available from smart devices.

A Metadata Tagging Example

So how can we capture all of this information, share it and associate it with the data items in our automation systems and smart devices? We cannot do it simply by trying to use standardized point names. Even in our simple example referenced here, we have more metadata that can be effectively captured in a point name. Add to that the fact that we may want to add numerous other metadata items over time that go far beyond our example and it's obvious we need another approach. An effective solution needs to have the following characteristics:

1. It should de-couple the point name from the representation of the associated metadata. The concept of tags to represent the metadata works well here. Tags represent "facts" about data items and can be associated with the point names to provide the semantics that describe the point. They tell us about the meaning of the point, but they do not replace the point name or change it in any way. This is essential for any solution to work with existing systems. The reality is that we have millions of points in thousands of systems and their point names cannot be changed. It's simply not an option – and it isn't necessary. What is needed is a standardized model for associate metadata with those existing data items to enable us to associate meaning with the existing point names.
2. It should utilize a standardized library of tags to provide consistency of metadata terminology. This will enable automated tools to interpret data meaning. The library needs to allow updating by industry experts as new applications are encountered. The metadata methodology therefore needs to be extensible.

" ...information that was not recorded in the control system (or any single location), and is not available in any consistent machine-readable format is the challenge to using the wealth of data produced by today's systems and devices..."

```

id:          150a3c6e-bef0ee0e      (RecId)
dis:         zn3-wwfl4              (Str)
sensor:      ✓                      (Marker)
air:         ✓                      (Marker)
temp:        ✓                      (Marker)
unit:        °F                    (Str)
curVal:      77.60 °F              (Number)
equipRef:    Carytown AHU-4        (Ref)
siteRef:     Carytown              (Ref)
tz:          New York              (Str)
zone:        ✓                      (Marker)
vav:         ✓                      (Marker)
floor:       4                     (Number)
scheduleRef: occSchedule-1        (Ref)

```

Given our earlier example, a record representing the point zn3-wwfl4 with its associated metadata might look like this

The “point” has a unique id and then is described by a series of tags. In our example we have the following:

dis: The display name we want associated with the sensor point. This could be the original descriptor from the system supplying the data, or it could be a new name/descriptor.

sensor: a marker tag that tells us this is a sensor point (versus a control point)

air: a tag that tells us this sensor is measuring air

temp: a tag telling us this sensor is measuring temperature (versus pressure for example)

unit: a tag that tells us the units of measure

curVal: a tag that holds the most current value supplied by the system

equipRef: a tag that associates this point with a specific piece of equipment.

siteRef: a tag that tells us the site (building) this point is associated with

tz: a tag that tells us the time zone of the site

zone: a tag that tells us this is a zone (space) in a building

vav: a tag that tells us that this sensor is measuring a zone supplied by a VAV box.

floor: a tag that tells us which floor of the building the sensor is located on.

scheduleRef: a tag that tells us which occupancy schedule is associated with the area this sensor is measuring.

The indicators in parenthesis tell us the type of tag: recID: RecID — a unique identifier, Number, String, Marker, and Reference, which points to an associated entity.

With these tags it is now possible for both humans and machines to interpret the meaning of this point. This enables streamlined value creation. For example,

a graphical visualization software application could interpret this information to automatically generate a graphical view of the sensor within the appropriate zone. An analytics application could automatically apply appropriate rules to this sensor to identify improper conditions.

Tutorials, Part 2: Haystack Ops—Understanding Data Transfers Between Systems and Applications

Alper Üzmezler, Founder and Managing Partner, BASSG, LLC

In addition to defining an easy to use, flexible methodology for expressing the meaning of data items using “tags,” Project Haystack also addresses one of the greatest challenges that smart building system integrators face when deploying an Internet of Things platform for building operations: data transfers between systems and applications.

In order to generate value from data, applications first need to know what a particular piece of data means and where it belongs. That's where the tags come in. Secondly, the application needs to know how to extract the data from one application/location and push it to other applications with all of its tagging intact. A successful data transfer operation entails all of this.

You might visualize a Haystack-enabled data transfer in terms of how a rechargeable battery works. A battery must be periodically charged to replenish its electrons. Applications that use sensor and machine data for visualization or analytics need to be replenished with data as well. There are a few ways to move electrons from the electricity source to a battery. One option is to place the battery into a matching charger that has been designed to transfer electrons into the energy-depleted battery.

Continuing with our analogy, the agent doing the transfer in the Haystack modeling scenario is a function commonly called “Ops” which is supported by the Haystack REST API. Ops can acquire historical data from the source and store it within the application that will use it. In this analogy, the Ops engine is the battery charger and it makes the connection with Haystack records to get historical data. The data is analogous to



A single battery is analogous to a record with no historical data.



Just as you can re-charge a battery in a matching charger, you can transfer new data into a Haystack model with the Ops function.

electrons. Ops move the data into into the storage database which is analogous to the battery's chemical chambers.

Taking this analogy one step further, consider the concept of a wireless charger. These devices have wireless charging beds designed such that when you place a matching battery in close proximity, the charging function is initiated automatically instead of requiring a user to "plug in a wire" for charging. Similarly, you can set up Haystack Ops to commit historic data to a record in an automated way without additional human interaction.

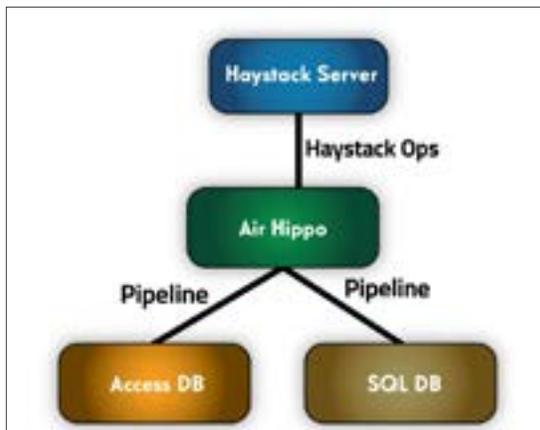
BASSG has successfully demonstrated this within the Air Hippo application. Air Hippo can automatically grab data from a source and push it into a Haystack compliant database. In this way it acts like a battery charger. As a specific example, Air Hippo can pull data from an Alerton Access™ database and push it into another Haystack device, database or service.

Haystack Ops are a powerful tool for systems integration because they provide application developers with an easy, automated way to read data and push data to the Haystack server.

In the next article in this series, I will write about markers and how they serve in the development of standard modeling practices for the Internet of Things.



Wireless chargers are a 'touchless' way to recharge a battery. Similarly, you can set up Haystack Ops to commit historic data to a record in an automated way without additional human interaction.



Alper Uzmezler, founder and CEO of BAS Services and Graphics, LLC (BAS SG) is a constant innovator in building automation technology and BAS analytics delivery.

Resources

The Project-Haystack community developed a range of reference implementations to enable product manufacturers and application developers to quickly implement Haystack tagging and communications in their product. Currently reference implementations are available in Java, C++, Dart, Niagara and Javascript (NodeJS). Here's a current list of downloadable software kits. Click to learn more and to reach the download page.

Wiki

Haystack Wiki: Source for docs, and tag definitions.

JAVA

Haystack Java Toolkit: Light weight J2ME compliant client and server implementation

Niagara

NHaystack: Niagara module to add Haystack tagging and REST API

C++

Haystack CPP: C++ Haystack client and server implementation

DART

Haystack DART: Client library for Dart programming language

Node

Node Haystack: node.js client/server implementation



Haystack Guide Specification

[Click to download](#)

Technical Overview

[Click to download whitepaper](#)

Defines the concept of tags breaking down and explaining the essential data elements

REST API Description

[Click here to open](#)

Explains simple mechanism to exchange "tagged" data over web services

Applications Description

[Click to download whitepaper](#)

Outlines how to use the modeling standard in applications related to buildings, energy, and facility management.

Events



March 16, 2016
Ronald Reagan
Bldg & Intl. Trade
Center, DC



April 26-28, 2016
Handlery Hotel
San Diego, CA

Annual industry gathering in Washington, DC

Project-Haystack is an Education Partner for the 2016 Building Energy Summit®. Here are some of the Hot Topics this year:

- Smart Buildings and The IoT
- Net Zero Energy Buildings
- Data, Analytics, and Building Operations
- Portfolio Energy Management
- The Impact of Green Buildings on Health and Wellness
- COP21 and Global Sustainability Initiatives

Four educational tracks dedicated to supporting the following business areas are planned: Business / Financial ; Technical / Operations; Government; Corporate/ Enterprise. Click below to see the schedule and to register.



[See Schedule At-A-Glance](#)



Register

CABA Intelligent Buildings & Digital Home Forum

This event brings together leading organizations involved in the integration of intelligent building systems and connected home technologies. CABA estimates that over 150 industry stakeholders will gather to discuss current trends in the intelligent and integrated buildings and connected home sectors. CABA's Forum will be an opportunity to attend the organization's Council meetings and network with the majority of CABA Board of Directors during the entire event. The Forum will also feature evening networking receptions. The majority of CABA's Board members will be in attendance. Bonus: visit Lightfair International which is happening concurrently in San Diego this week.



[See Speaker Line-up](#)



Register

Milestones

Report on Haystack semantic modeling, membership growth and technology advancement.
by Richard McElhinney, Founding Haystack Board Director and VP

The second Haystack Connect Conference was held in Colorado Springs, Colorado, in May 2015. Post the conference, Brian Frank organised a number of working groups to work on fleshing out more tags in a number of areas. There was a lot of enthusiasm and a large number of sub-systems that people were keen to provide some input on. As I understand it there were a lot of emails and communication for these working groups in the immediate weeks following the conference. **Let's keep the momentum going.** If you're interested in assisting with fleshing out more standard models for any particular subsystem then please make yourself known on the [Project Haystack forum](#).

Project Haystack has always been about community. Right from the start Project Haystack has been conducted as an open source project with input from a growing number of volunteer community members. However, as part of formalising Project Haystack into a non-profit corporation was the desire to formally include more people and organisations who see the value in advancing Project Haystack as a standard for semantic modelling. At the Haystack Connect Conference in May, the Project Haystack Corporation was pleased to announce the ability for people and organisations to officially become members of Project Haystack. This announcement was met with a great deal of positivity. [Find the new members list here.](#)

Having a well documented standard is great but at some point we need to put some meat on the bones and actually implement what we're talking about. Right from the start Project Haystack had a Java Toolkit available as a compliant client and server reference implementation. Not long after was a Project Haystack module for Niagara AX. Now there is a complete list of technologies that can satisfy just about every corner of the software technology spectrum.

Regarding recent activity, most of this can be seen on the forum, but here are some highlights:

- Project-Haystack has been assigned a BACnet vendor ID: #876
- Updates to the Project Haystack REST API to include Create, Read, Update, Delete (CRUD) standardised functions
- A Project Haystack tagging rule database and database validation tool
- New units for water and steam consumption

These are just a few of the things going on with Project Haystack. For more information please see the website and if any of this interests you then ***please get involved!***



Membership

Founding Members



Founded in 1988, Airmaster delivers professional management in air conditioning, ventilation, heating, process cooling and building automation throughout Australia and South East Asia. It has grown to comprise a team of more than 500 employees with offices in all states of Australia. Its comprehensive service offering extends beyond Service and Maintenance to also include Control and Automation, Energy Management, Installation and Design.



J2 Innovations was founded in 2009 to bring powerful engineering tools, visualization and software technology to those involved in BAS installations. It is the developer of FIN Stack, a software technology that combines the core functionality of a Building Automation System (BAS) for connecting and controlling devices with the added benefits of a Building Operating System (BOS) to manage and leverage data. The technology uses Project Haystack tagging and data modeling to provide unprecedented capabilities and functionality.



Enerliance/Yardi is the company behind LOBOS, the original Load Based Optimization System. This intelligent HVAC platform brings never-before-seen levels of efficient operation to large commercial buildings and campuses. Compatible with most modern HVAC systems, LOBOS significantly reduces energy consumption while enabling automated demand response participation and system-level fault detection and diagnostics, all with an emphasis on improving tenant comfort.



LynxSpring is changing the way devices, systems, and people communicate and collaborate across enterprises and out to the edge. Its technologies, solutions and services are enabling users to go further to manage and operate their facilities and equipment smarter, safer, securely, more efficiently, and at peak performance levels. It is remaking the way control systems are built, secured and distributed with brands like JENEsys®, JENEsysONE™, LYNX CyberPRO™, Helixx™ and Onyx™ brands



SkyFoundry's mission is to provide software solutions for the age of the "Internet of Things". Areas of focus include building automation and facility management; energy management; utility data analytics; remote device and equipment monitoring; and asset management. SkyFoundry products help customers derive value from their investments in smart systems.



Siemens Building Technologies consists of three Business Units: building automation (BAU); control products and systems (CPS); fire safety and security (FSS). These business units combine offerings for building security, life safety and building automation within one company as a service and system provider, and as a manufacturer of respective products. By virtue of the unique combination of these business sectors, the company occupies a leading position worldwide.



WattStopper specializes in energy saving controls for the electrical industry. It is part of the Legrand Building Controls system division and is most recognized as the leader in occupancy sensing technologies. Over the past decade and more the brand has grown into a systems-capable company and leads the connectivity of open lighting control systems in the intelligent building. It is committed to open standards with our control systems, leading the transformation from proprietary solutions to BACnet and IP platforms.

Associate Members



Altura Associates is a professional services firm that goes beyond the traditional consulting model. Rather than simply providing a one-size-fits-all solution, our team works closely with our client organizations to develop programs that offer immediate and lasting impacts, build capacity, and drive long-term value. The team combines expertise in mechanical/ electrical engineering, energy management, environmental science, and financial analysis.



BASSG is an innovator in building automation technology and BAS analytics delivery. Its BASSG branded in-house developed easy-to-deploy, multi-system software tools reduce BAS implementation and facility management energy costs. BASSG also has multiple distributorships and can be a one-stop provider for everything-BAS at unbeatable value.



BUENO is the Australian leader in data and information driven operational property services. BUENO delivers superior data related and technology driven services based on fault detection, optimization and business intelligence that simplify their clients operations and enhance their effectiveness across all building sectors and building information systems.



Building System Solutions builds open-architected solutions that integrate HVAC, security card access, video surveillance, lighting, and irrigation into a single unified, interoperable workflow. Its ZEUS IoT offering visualizes and analyzes valuable building systems and energy consumption data. The team includes Certified Energy Managers and IT Professionals and is designed to combine building controls technology with advanced energy saving techniques to reduce utility costs.



The Continental Automated Buildings Association - CABA is an international not-for-profit industry association dedicated to the advancement of integrated technologies for homes and buildings. The organization was founded in 1988 and is supported by an international membership of over 300 organizations involved in the design, manufacture, installation and retailing of products relating to home and building automation. Educational Institutions and public organizations, including utilities and government organizations are also members.



Connexx Energy is a recognized leader and implementer of 'last mile' energy solutions for Smart Grid and Smart Buildings and is the developer of Connexion, a versatile, secured Enterprise Energy Intelligence and Management platform for facility, energy, and business operational information. Connexion streamlines the secure integration and creation of smart energy data into the corporate business intelligence layer. It enables users to simply and efficiently deploy intelligent energy practices to make real-time decisions and data driven calculations about the ongoing energy and operational performance of any building.

Controlco

Controlco - Controlco delivers leading-edge automation and solutions to address the Internet of Things for commercial buildings, (BLoT). Controls deliver the industry's best software and hardware products, develops software applications, and provides hosting services to improve business performance and peace-of-mind. With dedicated sales and implementation teams, Controlco offers total solutions for all building and energy management needs in this BLoT world. Since 1958, Controlco has completed successful implementations in energy monitoring, enterprise-wide energy dashboards and customized energy-saving strategies for hundreds of clients in North America. The company actively participates in controls and integration projects of all sizes and continues to grow its data center capacity.



Grosvenor Engineering Group a leading Australian provider of intelligent hard technical services, design and construction solutions delivered via a unique data driven approach to asset maintenance and life cycle management. The ultimate aim is to add value to buildings by making them safer, comfortable, and more productive and energy efficient at the lowest cost possible.



Intelligent Buildings, LLC, a nationally recognized smart real estate advisory services company providing planning and implementation of next generation strategy for new buildings, existing portfolios and smart communities. Their work includes "The Smartest Building in America", the largest energy analytics project in North America, the smart buildings standards for the U.S. and Canadian governments, conception and management of a Clinton Global Initiative and the recently released Intelligent Buildings CyberSafe service.



KMC Control is an American manufacturer of open, secure, and scalable building automation solutions. From secure hardware devices to smart and connected software, KMC delivers embedded intelligence and optimized control.. It is committed to providing industry-leading Internet of Things-enabled automation solutions with leading tech suppliers to increase comfort, convenience and to help reduce energy usage. The KMC Commander™ IoT platform as a service (PaaS) makes system interconnectivity, data visualization, and energy optimization for small and medium buildings easier and more cost effective than ever before.



KNX Association represents KNX technology now used in applications for lighting and blind control, security systems, HVAC, monitoring, alarming, water control, energy management, smart metering as well as household appliances, audio/video and more. KNX provides a single, manufacturer-independent design and commissioning tool (ETS), with a complete set of supported communication media and configuration modes. It is approved as a European and an International standard.

Editor's Note

Therese Sullivan, Founder, BuildingContext.me

To say that the work being done by the Project-Haystack membership is trailblazing seems an understatement, so I'm taking it to the next level and comparing it to the Lewis & Clark expedition. The 1805 "Portage" around the waterfalls of the Missouri River in Montana was the hardest part of the Corps of Discovery journey according to many of the journals. The crew had to figure out a way to move all their boats and supplies upstream above the falls so they could continue on to the mouth of the Columbia River. The captains foresaw that they would face challenges like this, and they had the right people along with them to implement land movement solutions.

Data doesn't flow obstacle-free in today's multi-protocol world either. There are more than a few "Portage" problems in the type of Building IoT workflows that many dream to implement. The Haystack tagging and transport methodologies are the equivalent of the Corp's highly valued carpentry and blacksmithing skills. It is these that got the Lewis & Clark expedition up and around those waterfalls. In

putting together this collection of Project Haystack stories I've learned so much about what it takes to architect and deploy a Buildings IoT workflow securely.

In the '[Around the World](#)' series, I've provided short abstracts and quotes to each case study, but I encourage you to click through to read about how Controlco is leveraging IP connectivity, how Altura is teaching customers to completely rethink the design/construction/O&M life cycle, how BASSG is empowering Smart Building system integrators to master their data movement challenges. You should read them all. At the beginning of the 19th Century, it was one thing for a President in Washington, DC, or a financier in New York to think about the riches and adventures that could be had by jumping in a boat to ride the rivers to the Pacific. But, it was quite another thing to do it. Today, there is so much talk about the promise of the Internet of Things, yet it is quite another thing to build it. In this first issue of *Project Haystack Connections* we are talking about the latter. And it is certainly fun to be the one keeping the journal.



Therese and media colleagues Ken Sinclair, Eric Stromquist and Ken Smyers. Reach Therese at therese@buildingcontext.me

Get Involved!

Project  Haystack is an open-source community-based effort. Want to get involved? There are many ways.



Contribute your expertise

Participate in the open [forum discussions](#).



Become a Member

Project-Haystack Corporate Associate Membership has many advantages. Email us to learn more.



Attend Haystack Connect 2017

We are planning our third bi-annual conference now. More information to be available later this year.



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Haystack Connect 2015 brought together our membership in Colorado Springs, CO, for a conference and expo.

Project Haystack

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