New to Haystack? Start Here!

Introduction to Data Modeling, Haystack, and the Application of Tagging in the Real World

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May 2019

Overview

John

- What is Project Haystack how does it work?
 - The Challenge
 - Community
 - Examples
 - Adoption

Marc

- Why Project Haystack who is it for?
 - Owner / Operator
 - Facility Management
 - System Integrators & MSI's
 - OEM's

Scott

- How is Project Haystack Applied Today what are the payoffs?
 - Architecture and tools
 - Application examples
 - Available resources



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What is Project Haystack

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May 2019



Our Goal – Making Data from Diverse Systems Easy to Work with



The Challenge

- Most data produced by devices and equipment has poor descriptive information to define what the data means
- There has not been a standardized approach to adding semantic data (meta-data) to device data
- Names can't do the job
- Manual, labor intensive processes are required to add semantic definitions to data before analysis, presentation and other value creation can begin
- This forms a barrier to the effective and efficient use of device data – *adds cost and slows the use of data*



Project Haystack Is...

- A community of people working to address the need for a standard "semantic modeling" method for device data
- Open source no cost to use
- Worldwide community
- Proven and deployed in thousands of facilities



Project Haystack Provides...

- A standardized methodology for describing data that makes it easier and more cost effective to analyze, visualize, and derive value from our operational data
- Think of it as a "MARKUP LANGUAGE" for data



The Challenge – A Use Case

- Analyze this: zn3-wwfl4 = 76.2
- Hmmmm... What does the number represent? Deg C, F, KW, kPa???
- Need to know units. Lets say it is Deg F
- Hmmmm... Is 76.2 Deg F OK?
- What is it? Zone temp, Return air temp, chilled water temp? Lets say it's a Zone
- What is the schedule for the space? Schedule #1 = 7:30 AM 6:30 PM
- What AHU is it served by? AHU-1
- What VAV box serves it? VAV-27
- How can I convey these answers in a standard way that other software can interpret?



A Use Case





Analogy: A Markup Language for Device Data

- Why can I point my browser at your website and read what you have published?
- We didn't pre-arrange for me to be able to interpret your website code
- It works because industry agreed on a mark up language (HTML)
- If you use HTML I can read the "data" on your website (text)
- Haystack does the same thing for device data



But Haystack Is More Than One Thing...

- First a standard methodology for defining and representing device meta data (descriptive data) – a specification on how to do it
- Second Standard vocabulary (tag sets), taxonomies (equipment models) developed by consensus of the community
- Third Software Tools
 - REST API to easily exchange Haystack tagged data among applications
 - Reference implementations: Java, node.js, Dart, Python, C++ others
 - Plug-ins to enable various systems to "speak" haystack.
 - Tools to streamline the tagging process
- Fourth The ongoing effort by Working Groups to develop tagging models, extend the standard, work with other standards groups, and educate the market



Why Haystack Matters

- We want to easily utilize data from various sources for reporting, visualization, analysis, supervisory control, and decision making
- Lack of standardized naming conventions and adequate semantic information in control and equipment systems makes this a labor intensive effort
- Names on their own can't solve the challenge too much information to be carried in a name, no standardization, and they already exist the way they are – your not going to change all existing names!
- This is a major barrier to utilizing the rapidly growing amount of data produced by smart systems



The Payoff – What It Enables

- Applications that just work !
- Example: Equipment Graphics that auto-generate just by reading the meta data associated with points
- Control logic can "find" all similar devices it should be applied to (think of room controls or VAV's)
- Easier integration among software applications Apps can understand and consume data without human interaction to "map" data
- A new generation of engineering tools to streamline project implementation tasks



Haystack – Adoption and Support

- Winner of 2013 Digie Award for Best Intelligent Building Technology Innovation http://project-haystack.org/forum/topic/100
- Biennial Community-Produced Haystack Connect Conferences: 2013, 2015, 2017, 2019 <u>http://haystackconnect.org/</u>
- Press Announcement Showing Support from over 20 Companies <u>http://www.prnewswire.com/news-releases/project-haystack-</u> 212890711.html
- Project-Haystack 501C Corp formed June 2014 <u>http://www.ireachcontent.com/news-releases/project-haystack-announces-formation-of-non-profit-corporation-263428181.html</u>



BACnet Collaboration with Haystack

RICHMOND, VA. (PRWEB) MARCH 02, 2018

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ASHRAE's BACnet Committee, Project Haystack and Brick Schema Collaborating to Provide Unified Data Semantic Modeling Solution

• Formal collaboration to integrate Haystack tagging and Brick data modeling concepts into the proposed ASHRAE Standard 223P for semantic tagging of building data.

ASHRAE Standard 223P: "Designation and Classification of Semantic Tags for Building Data" provides a dictionary of semantic tags for descriptive tagging of building data including building automation and control data along with associated systems.

By integrating Haystack tagging and Brick data modeling concepts with the upcoming ASHRAE Standard 223P, the result is intended to enable interoperability on semantic information across the building industry, particularly in building automation.

http://www.prweb.com/releases/2018/03/prweb15264563.htm



Haystack – Adoption and Support

- Used in systems and software deployed in THOUSANDS of buildings to model 100's of thousands of devices (last count – well over 30K facilities!)
- Adoption by equipment manufacturers for next generation product – some on the market today
- Intel joins Project Haystack as a Board Member (March 2017)
- Dozens of systems integrators trained and using Haystack in projects every day
- Over 1600 registered users on **Project Haystack Forum**
- CABA White Paper March 2016



PROJECT Haystack – Our Members



Haystack – Key Takeaways

- Deployed, working, proven in THOUSANDS of applications
- Open source, community-driven, ZERO cost to access documentation and use
- Extensible beyond community agreed equipment models you can use Haystack methodology with your own tags/descriptors outside of standard group work on models
- Lightweight can be implemented in the smallest devices, network level controllers, standard databases all the way to text files, & Excel worksheets
- Human readable and machine readable

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- Accessible/understandable by real users technicians and engineers that do systems integration
- The standard, libraries and tools continue to advance through the efforts of a worldwide open source community



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Thank You for Joining Us!

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Introduction to Data Modeling, Haystack, and the Application of Tagging in the Real World

Why Project Haystack

MARC PETOCK

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Data Paradox

On the one hand, data seems to be everywhere, in every system ready for the "pickin".

However, everyone is asking for data, without understanding it, how and where it should be applied and how it affects workflow and business operations

> "There's the joke that 80% of data is about organizing the data and 20% is complaining about having to organize it."





Value Creation

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Haystack supports new opportunities for value creation whether you are an owner/operator; in facilities management; you are an integrator or an OEM

Ensures that multiple users are using the same versions of the organization's data

Systems and data sources are linked together and managed consistently to make sure that any data used by the organization is consistent and accurate

Ensures different stakeholders and departments throughout an organization work together with their data

Safeguards that the right data gets to the right person at the right time



Unified Data Plan Foundation

- Data that Matters
- Quality & Integrity
- Tagging & Modeling
- Governance
- Portability
- Consistency
- Best Practice
- Understanding
- Normalization
- Socialization
- Management
- Uniformity
- Interoperability
- Exchange

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DATA FOUNDATION



Owner/Operator

- Faster time to experience results from data (Reduces amount of grunt work)
- Control and understanding of information generated by your building equipment
- Data Uniformity
- Common schema between traditional tools and formats for data exchange
- Furthers transition to an **open, industry-standard methodology** around the heart and soul of your building----**DATA**
- Opportunities for interoperability, optimization, and real-time monitoring, as well as performance analytics across the BMS and disparate functional systems, become easily attainable
- Tagging in accordance with **agreed-upon industry definitions** and names found in all building asset classes
- Right data available to the right people at the right time; gaining unobstructed view
- Better control and operations of a building, not only making it easier to maintain with lower costs and resources, but enabling better experiences taking place inside the building
- Proven validated with many buildings across different parts of the world
- Adopted by many of the leading building technology providers and integrators





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Facility Management

- Consistent data throughout from equipment and devices running your facilities
- Right data inventory
- Integrate all the data into one place to deploy common applications instead of having to rebuild data sets for each building
- Covers most of the building concepts that are used in current BMS's
- Improves the cost-effectiveness
 of performing analytics and
 deriving greater value from
 operational data





System Integrators & MSI's

- Spend less time cleaning and formatting data sets, freeing you to focus on visualization and analytics; reduces the overall cost of providing these valueadding services
- Digest the data required to manage and analyze
 without requiring time consuming data integration for
 each project
- Provides meaningful information to clients; simplifies workflow when processing building data
- Cross domain applications means that portable applications can be deployed at different buildings, regardless of the provider of the underlying building system
- No costly, custom software development required; portable and repeatable across all building types
- Common schema towards making all buildings smart
- Format to extract data from the different subsystems, manage that common data in a unified way and only edit it once, and to put data back into the subsystems





OEM's

- **Deliver services atop** of their equipment and devices
- Consistent and faster data configuration tasks
- Assurance of interoperability otherwise would have to be performed manually with each deployment
- Unified communication among various building sub-systems so that their equipment data can be used and combined more easily
- Different stakeholders collaborate with data from all parts of the built environment





Data is now an irreplaceable asset

Data produced from building devices and equipment is more valuable than the cost of the devices

Haystack is not only changing the way building stakeholders operate, but also how they co-operate

The open framework is providing the foundation for the formation of multi-vendor ecosystems, in which flexible and tailored offerings can be delivered at lower cost TAKEAWAYS TAKEAWAYS AKEAW



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Project 🏷 Haystack



Introduction to Data Modeling, Haystack, and the Application of Tagging in the Real World

How is Project Haystack Applied Today

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BOARD MEMBER, PROJECT HAYSTACK VICE PRESIDENT MARKETING, J2 INNOVATIONS



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Haystack Records and Relationships

SITE

EQUIP



POINT



2019

Havstack Connect

imart Data, Smart Devices, Smart Buildings, Smart Business

Graphic: Mariorie Schott, NREL

Give Data "Meaning" across all Devices and all Applications





Architectures and Tools Using Haystack





Tags applied in server level application

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Havstack Connect

Tool

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Application Examples - Visualization and User Experience





Application Examples - Visualization and User Experience





Application Examples - Visualization and User Experience



Equipment Summary

EQUIP		Damper	Occ Mode	Room Setpoint	Room Temp
0	City Center Vav-01	47%	False	73.0°F	75.5°F
C (City Center Vav-02	47%	False	72.5°F	69.9°F
C (City Center Vav-03	47%	False	73.0°F	87.0°F
0	City Center Vav-04	47%	False	72.5°F	75.5°F
0	City Center Vav-05	47%	False	73.0°F	69.9°F
C (City Center Vav-06	47%	False	72.5°F	69.9°F
ď (City Center Vav-07	47%	False	73.0°F	87.0°F
0	City Center Vav-08	47%	False	73.0°F	75.5°F
0	City Center Vav-09	47%	False	73.0°F	87.0°F
C (City Center Vav-10	47%	False	73.0°F	75.5°F



Application Examples - Command and Control





Application Examples - Automated Analytics





Haystack – Resources

 Haystack Connections Magazine - Latest issue – Winter 2019:

https://marketing.project-haystack.org/images/connectionsmagazine/Project-Haystack-Connections-Magazine-Issue-5-Winter-2019.pdf

- Guide Specifications: <u>https://marketing.project-haystack.org/project-haystack-resources/guide-specifications</u>
- CABA White Paper March 2016: <u>http://project-haystack.org/file/22/CABA-White-Paper-on-Project-Haystack.pdf</u>
- Detailed Reference Implementation:
- <u>https://project-haystack.org/file/28/Reference-</u> <u>Implementation-Applying-Haystack-Tagging-for-a-Sample-</u> <u>Building.pdf</u>
- Find Resources and Software downloads here: <u>https://marketing.project-haystack.org/</u>

Smart Data, Smart Devices, Smart Buildings, Smart Business







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Thank You

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