Project Haystack

Making Data from Diverse Systems Easy to Work With

What is Project Haystack?

- A community of people and organizations working to address one of the key challenges in using smart device data…

  Device data has poor "semantic modeling" (information describing the meaning of the data)

  - Manual, labor-intensive process is required to "map" data from equipment systems before it can be used to create value

  - This adds cost, time, complexity and slows the use of data

Project Haystack is…

- Standardized methodology for describing data that makes it easier and more cost-effective to analyze, visualize and derive value from our operational data
  - Built around tags: snippets of information that document attributes of any entity that we wish to describe
  - Tags work together within a data model to describe systems of places and things in a logical, replicable way that is easily understood
- A "MARKUP LANGUAGE" for data

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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 the industry agreed on a markup language (HTML)

- If you use HTML I can read the "data" on your website (text)

- Haystack does the same thing (and more) for device data

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The Challenge – A Use Case

- Analyze this: zn3-wwfl4 = 24.6

- Hmmmm… What does the number represent? Deg C, F, KW, kPa???

- Need to know units. Lets say it is Deg C

- Hmmmm… Is 24.6 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?

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A Use Case

- Example of Haystack tags to describe a point in a system:

```
AHU1-SAT = sensor, discharge, air, temp, deg F, ahuRef -> AHU-1

Point Name          descriptive tags              association tag
```

Enabling A Future Where A Push Of A Button Can Turn Device Data Into True Intelligence

Haystack – What it Enables

- Applications that just work!

- Example: Equipment Graphics that auto-generate just by reading the meta data associated with points

- Example: Control logic can "find" all similar devices it should be applied to (think of room controls or VAVs)

- 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

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Haystack 1 (2011)

- Pioneered the concept of applying semantic modeling to equipment and device data using the simple approach of applying "tags" to items to define what they "meant"

  - Tags described things like units of measure, as well as facts and characteristics about data. For example, the tags: discharge, air, temp, sensor, point, unit:"°F"

  - Tells us that a number represents a numerical value of discharge air temperature expressed in degrees F produced by a sensor

  - Provided a **standardized vocabulary** to markup "things" and the data they produced

Haystack 2 (2013) + 3 (2016)

- Introduced a REST API

- Provided a standard way to query a system that applied the Haystack semantic model to its data

  - An open API was important to ensure customers had a standard way to easily access the data in their systems. The community responded by creating numerous open source implementations in a range of programming languages

- Added new data types to help machines better understand and process the different types of data formats for the IoT

- Added a more formal Working Group structure

2018 - BACnet Collaboration with Haystack

RSS

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

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Haystack 4 (2019)

- Based on a collaboration effort and 8 years of experience by the worldwide community in applying Haystack across thousands of buildings worldwide, Haystack 4 extends the model to the next level of sophistication in semantic modeling

- Developed a **taxonomy** and an **ontology** to support the ability to represent machine-readable relationships of things, their data and each other
  - Taxonomy - Defining the relationships of things; think of a classification tree
  - Ontology - Capturing relationships between things

- Support for RDF/Linked Data
  - Resource Description Framework - a family of World Wide Web Consortium (W3C) specifications for metadata data models – extensively used in software development

Benefits and Value

Owner/Operator	Facility Management	SI/MSI	OEMs
• Faster time to outcomes • Control and understanding of information • Data Uniformity • Common schema between and formats and data exchange • Data interoperability • Tagging in accordance with agreed-upon industry definitions	• Consistent data throughout your facilities • Integration of data into one place to deploy common applications • Cost-effective to perform analytics	• Less time curating and formatting data • Simplifies workflow when processing data • Data portability; repeatable across all building types • Common schema towards making all buildings smart	• Deliver value added services • Consistent and faster data configuration tasks • Assurance of data interoperability • Unified data communication

Anyone can use Haystack – open source, no cost

Project 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
http://haystackconnect.org

- Project Haystack 501(c) Corporation formed June 2014

- Haystack Connections Magazine highlights widespread adoption and use worldwide
https://marketing.project-haystack.org/project-haystack-media/connections-magazine

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Resources

- Latest Issue Project Haystack Connections Magazine
https://marketing.project-haystack.org/project-haystack-media/connections-magazine

- CABA White Paper March 2016:
https://marketing.project-haystack.org/images/white-papers/CABA-White-Paper-on-Project-Haystack.pdf

- Guide Specification:
https://marketing.project-haystack.org/project-haystack-resources/guide-specifications

- Detailed Reference Implementation:
https://marketing.project-haystack.org/images/white-papers/Reference-Implementation--Applying-Haystack-Tagging-for-a-Sample-Building.pdf

- Find Resources and Software downloads here:
http://project-haystack.org/download

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Consider Joining the effort. Learn more here:

https://project-haystack.org/
https://marketing.project-haystack.org/

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Key Takeaways

- Deployed, working, proven in THOUSANDS of applications
- Open source, community-driven, ZERO cost to access documentation and use
- Extensible beyond community developed 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 and Excel worksheets
- Human readable and machine readable
- Accessible/understandable by real users – technicians and engineers that do systems integration

Thank You!

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