SIMPLIFYING BUILDING AUTOMATION

LEVERAGING SEMANTIC TAGGING WITH A NEW BREED OF SOFTWARE

Contents

1

Introduction

THE DEMANDS OF IT-OT CONVERGENCE

Information Technology (IT) and Operational Technology (OT) are converging. As building systems get smarter and IT-OT integration deepens–understanding the data we are gathering, how we collect it, and how it can be used, becomes increasingly important. One answer to these questions comes from interoperability frameworks that tie together various systems and enable us to utilize the masses of data we are now collecting.

A fundamental problem facing the industry is that most device data has inadequate labeling. This essentially means that devices don't contain information describing the meaning of the data they produce. If they do, there is no standardized way to describe the labels used. The lack of standardization means each installation requires many hours of error-prone, manual labor to process and map all the data before it can be used. It is adding significant cost and disruption, pricing out or putting off many customers, thereby limiting market growth.

However, a new breed of framework is emerging that leverages the most promising standards for data tagging to make data more accessible to analyze, visualize, and gain value from. The idea is to create machine-readable and people-readable tags to reduce the amount of engineering required on the backend for implementation and operation. **This could open up building automation, unshackling the smart building industry, and bringing the benefits of automation to the majority of existing building stock.**

This potential disruption all comes down to tags–coded information added to the devices to describe the data they work with. These tags are essentially "metadata" (data about data) that applications can understand and make sense of. Tags can be applied on the device, controller or server level but in a standardized way, allowing applications to automate the discovery and use of the data. Through APIs, this allows for a smooth and regularly updated exchange of tag data across building systems.

By standardizing, the entire industry enables a smarter and more efficient ecosystem. Addressing this lack of a standardized naming convention will help to break a significant industry barrier, thereby increasing the operability and adoption of smart building systems. **As connectivity becomes commonplace, having this streamlined way for understanding the data we are gathering will unlock the true value and potential of the IoT.** However, we need that new breed of framework to leverage tagging and navigate the complex building data landscape in the IoT age.

> **"Today, using building system data beyond the system generating it requires significant time and effort because these contextual models must be built by hand. This means that the opportunity to use data to reduce energy use, and improve operational efficiency and performance is being stifled by the labor costs associated with manual mapping of system data and the inconsistency of those efforts."**
>
> **John Petze,**
> Partner at SkyFoundry

2

Building Automation–
A Complex Data Landscape

THE EVOLUTION OF DATA IN BUILDINGS

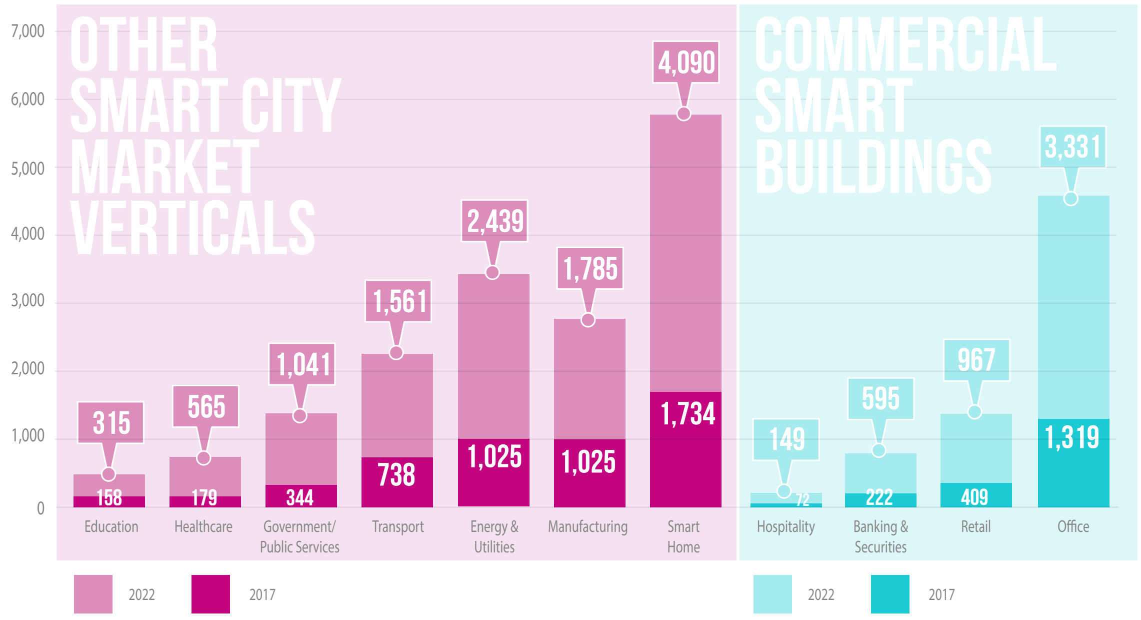
Through the continued emergence of the IoT, our built environment is increasingly being flooded with data. In buildings, the push for automation has created a complex network of information streams from various smart devices, all feeding into an ever-expanding data lake. This size brings a complexity that makes it more challenging to understand the data flows and effectively “fish” for actionable intelligence.

The IoT means more applications. The Figure below from Memoori’s report on the IoT in Smart Commercial Buildings demonstrates the increasingly complex data networks in buildings.

The research estimates that the global market for the Internet of Things in Buildings (BIoT) will continue to grow significantly, rising from $34.8Bn at the end of 2017 to $84.2Bn by 2022, representing a Compound Annual Growth Rate (CAGR) of 19.4%.

More applications mean more devices. Memoori’s assessment of the number of connected devices in operation by Smart City market vertical is that it will rise from 7.2 Billion in 2017 to 16.8 Billion by 2022, at a CAGR of 18.4%. We expect commercial smart building device numbers to rise from 2 Billion devices to represent 30% of all smart city devices (5 Billion) by 2022.

SMART CITY RELATED IOT DEVICE PROJECTIONS BY MARKET VERTICAL (MILLIONS OF DEVICES, 2017 TO 2022)



More devices mean more data. An IDC Data Age Study estimates global volumes of data will reach 163 zettabytes by 2025. That is 10 times the 16.1 zettabytes of data generated in 2016.

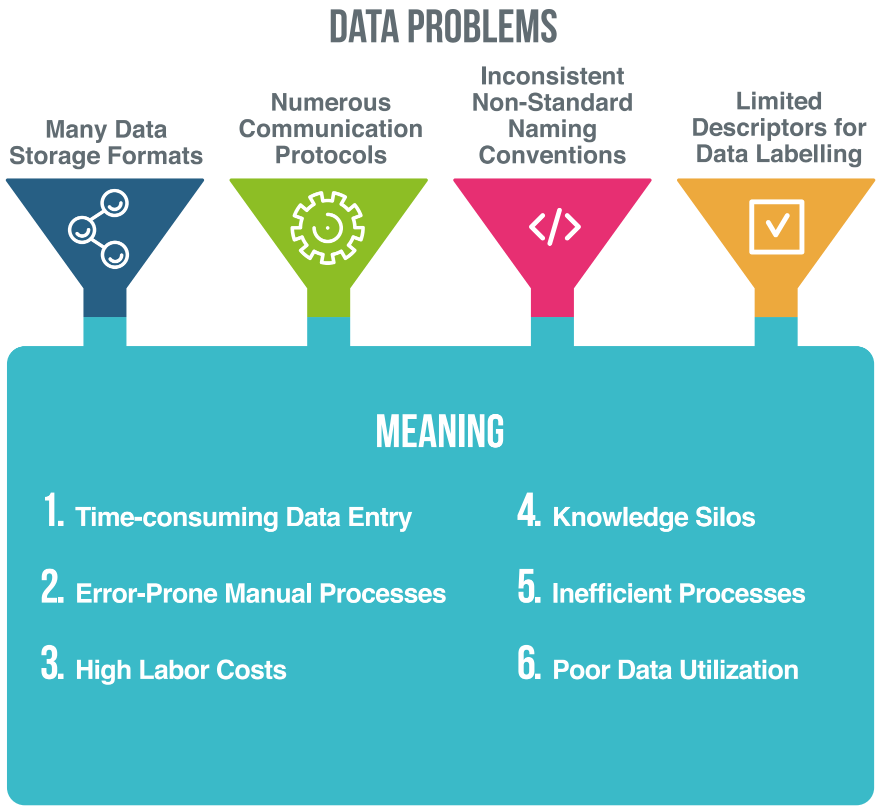
THE EVOLVING DATA PROBLEM IN BUILDINGS

> "In the building automation world, engineers had to rely on data labels – typically a single text field of 16-32 characters – in order to quickly understand where a specific device fits into the system,"
>
> **Chris Irwin,**
> VP Sales EMEA and Asia at J2 Innovations.

The primary barrier to using building data for automation is the diversity of devices, systems, data formats, communication protocols, and naming conventions in use, as well as limited descriptors to represent all that information. The reality is that we don't have an effective method to define the meaning of the majority of data produced by devices and equipment. Consequently, many buildings rely still on the know-how of resident employees, resulting in knowledge silos that create inefficiencies and potential disruptions.

Remembering abbreviations and coded labeling comes naturally to the human mind, which attaches meaning to the characters to represent the full description. However, this process is somewhat personal, so each project uses a different syntax depending on the specific consultants and engineers working on the job, then issues occur with any change in personnel.

COMPLEX DATA UTILIZATION LANDSCAPE IN BUILDINGS



Furthermore, simple names alone cannot describe every element of the increasingly complex data generated by IoT systems. More sophisticated tagging is required. However, without a standardized approach to tagging, manual, labor-intensive "data wrangling" processes will always be required before analysis, visualization, and other forms of value creation can begin.

This reality forms a major barrier to the effective and efficient use of device data across the building sector and beyond. The lack of standardized naming conventions and adequate semantic information in control and equipment systems makes the integration and implementation of tagging a highly complex process. **One that threatens to add enough time, cost, and disruption to put off many potential adopters.**

THE NEED FOR A SOFTWARE EVOLUTION

For building automation, the problem has come to the fore as current software buckles under the strain of growing IoT data demands. Today the market still clings on to proprietary software supplied by the major BAS manufacturers, which have served building automation well but do not offer the flexibility and data handling abilities for the rapidly emerging IoT age.

The building is evolving with a wide range of new applications, so the software we use to manage those smart systems must evolve to keep pace. In the not-so-distant future, we expect building automation to be dominated by open software frameworks. These modular architectures will be supported by multiple vendors, and offer well-documented APIs to enable third-party development or customization.

The value proposition is no longer focused solely on energy and operational efficiency. Occupant-centric features such as productivity-boosting or space utilizing data processes attract the most attention.

While previous frameworks can, in theory, do everything, the data-driven evolution of the smart building often requires lighter and more flexible software that is focused on generating value from this new data landscape.

“A vision is emerging of a connected world in which building equipment and systems coordinate with each other to efficiently meet their owners’ and occupants’ needs and buildings regularly transact business with other buildings and service providers,” write DB Hardin et al. in a DoE report titled ‘Buildings Interoperability Landscape’.

“However, while the technology to support this collaboration has been demonstrated at various degrees of maturity, the integration frameworks and ecosystems of products that support the ability to easily install, maintain, and evolve building systems and their equipment components are struggling to nurture the fledging business propositions of their proponents,” the report continued.

Much of the market is struggling with the complexity of configuration and lack of integration wizards to ease the process. Many demand customizable architecture, which is a prohibitively expensive endeavor for some frameworks. Others see that the future is semantic tagging and prefer software that is built entirely on the system, rather than one that has tagging bolted-on as an extra. Established frameworks may have more connectors for legacy systems than other frameworks, but this is becoming less relevant in a world of easy BACnet upgrades. Today, most proprietary protocols have a conversion route to BACnet.

The market is beginning to demand easily utilizable data from various sources for reporting, visualization, analysis, supervisory control, and to enable better decision making. Our limited ability to understand this complex data landscape is a significant barrier to utilizing the rapidly increasing amount of valuable data produced by maturing smart building systems. The standardization of semantic tagging presents a viable solution to overcoming this obstacle and unlocking the potential of the IoT.

5

How Tagging Simplifies Building Automation

TAGGING FOR BUILDING AUTOMATION

Many believe that pragmatic use of naming conventions and taxonomies is the best way to make data more cost-effective to analyze and visualize, which will ultimately help us derive value from our operations. The impact of making data simpler to use will be warmly welcomed in the smart building industry and other increasingly intelligent sectors. Such a development has implications across business and society as the IoT ushers in the data age.

As the existing protocol standards do not communicate the metadata or context associated with all the measured and controlled parameters in a common way, human engineering effort is still needed to "connect the dots" and enable the systems to interact in a meaningful way. What has been missing is data tagging, which can provide the context needed for software applications to understand the meaning of the data.

By creating a standardized model to associate metadata with those existing data items, we can associate meaning through metadata tags with the existing point names, thereby opening up a world of opportunities for building automation. **Then, by developing a standardized and regularly updated library of "tags" to provide consistency of metadata terminology, we can enable analytical tools to interpret data and generate insight. This boosts the performance of building automation as a whole and makes it simpler.**

By introducing metadata tagging:

- application suites can quickly find and interpret the data they need to provide value to the user.
- software can automatically generate relevant building information by interpreting tags on the control system data.
- hours of manual work is eliminated, thereby reducing project cost and increasing value creation.

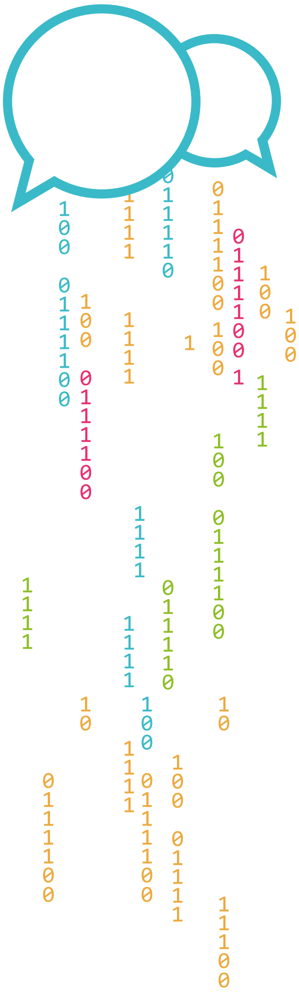
By introducing proper metadata analytics:

- applications can rapidly consume masses of data from devices, equipment and building systems.
- patterns can be interpreted in operational data to identify faults, deviations and trends that would otherwise have gone unnoticed.
- efficiency and predictive maintenance are improved to increase the life and operational performance of all building systems.

Standardization is the first step. It will facilitate the rise of automation software that natively supports data tagging through digital architecture. The automation of otherwise manually engineered tasks can save as much as 80% of the time for engineers during the integration and implementation phases. This reduces cost and disruption, making the switch to a tagging-based approach, and smart transformation in general, significantly more feasible for a broad spectrum of the buildings market.

TAGGING METHODOLOGY

In a world where all data is tagged, and all tags are standardized, the opportunities for automation, optimization, real-time monitoring, as well as performance analytics across the BMS and disparate functional systems, become easily attainable.



That world has now arrived with a drive towards standardization in the data tagging space. **Project Haystack stands out as a leading tagging methodology framework for building automation. It promises to bring much-needed simplicity to this complex data landscape through semantic tagging and data modeling.**

The definition of a meta model based on tagging according to Project Haystack takes the form <tag>: <value> where value denotes instance data and tag defines its semantics. To facilitate better customization of buildings, designers may select the same tag names but with different semantics. Semantic interoperability, however, requires the mapping of tag semantics across all domains.

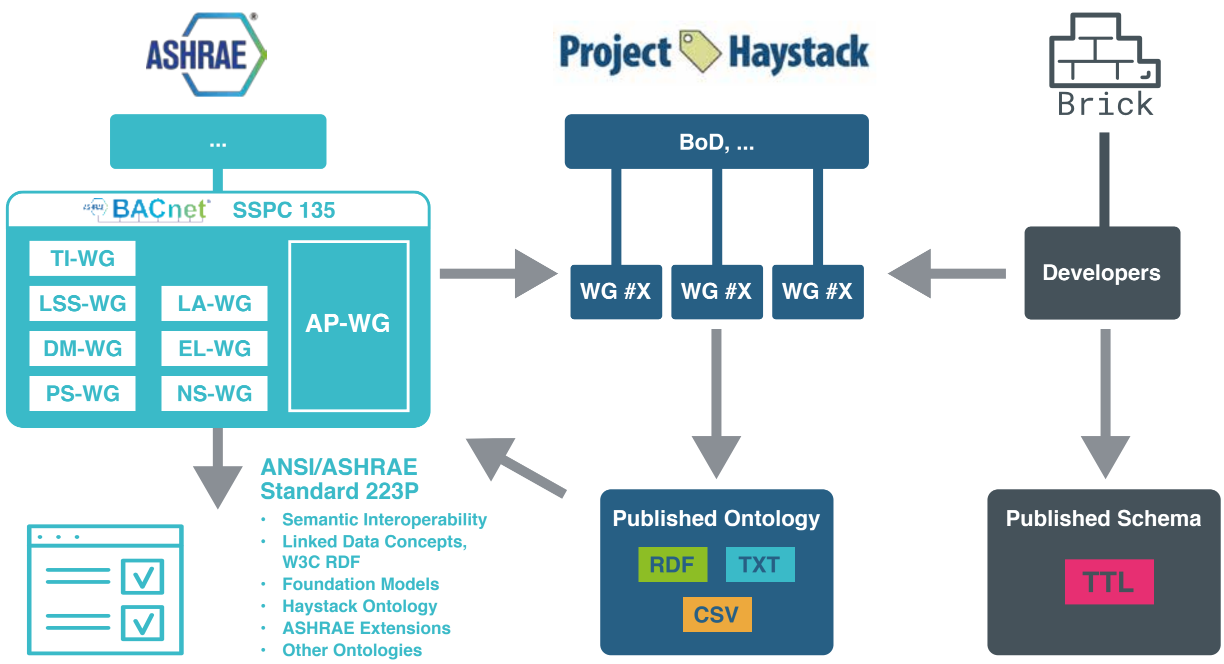
“While in theory, the global community could define all tags and their semantics; such an approach seems too bureaucratic and impractical,” say Ned Smith, Jeff Sedayao, and Claire Vishik, in a report titled: Key Semantic Interoperability Gaps in the Internet-of-Things Meta-Models. “A better approach may be to enable machine interpretation of tag entailment semantics through ontologies. But there is no single authority for ontology definitions hence tag entailment should include an ontology authority.”

The latest edition of Haystack, version 4, has now significantly extended its scope to include greater data structure or ontology aspects. Furthermore, in February 2018, the ASHRAE BACnet committee, Project Haystack and the Brick initiative announced they are actively collaborating to integrate Haystack tagging and Brick data modeling concepts into the new proposed ASHRAE Standard 223P for semantic tagging of building data.

Defined as “designation and classification of semantic tags for building data” the ASHRAE Standard 223P 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 will enable interoperability on semantic information across the building industry, particularly in building automation.

ASHRAE SSPC 135 AP-WG



This landmark unified effort aims to formally standardize an application data modeling solution that can be implemented in a variety of ways. It could be used for exchanging data over established communication protocols like BACnet, for example, or be applied to data stored in databases and cloud applications. Ultimately, ASHRAE Standard 223P is intended to be adopted as an ISO standard.

DATA MODELING

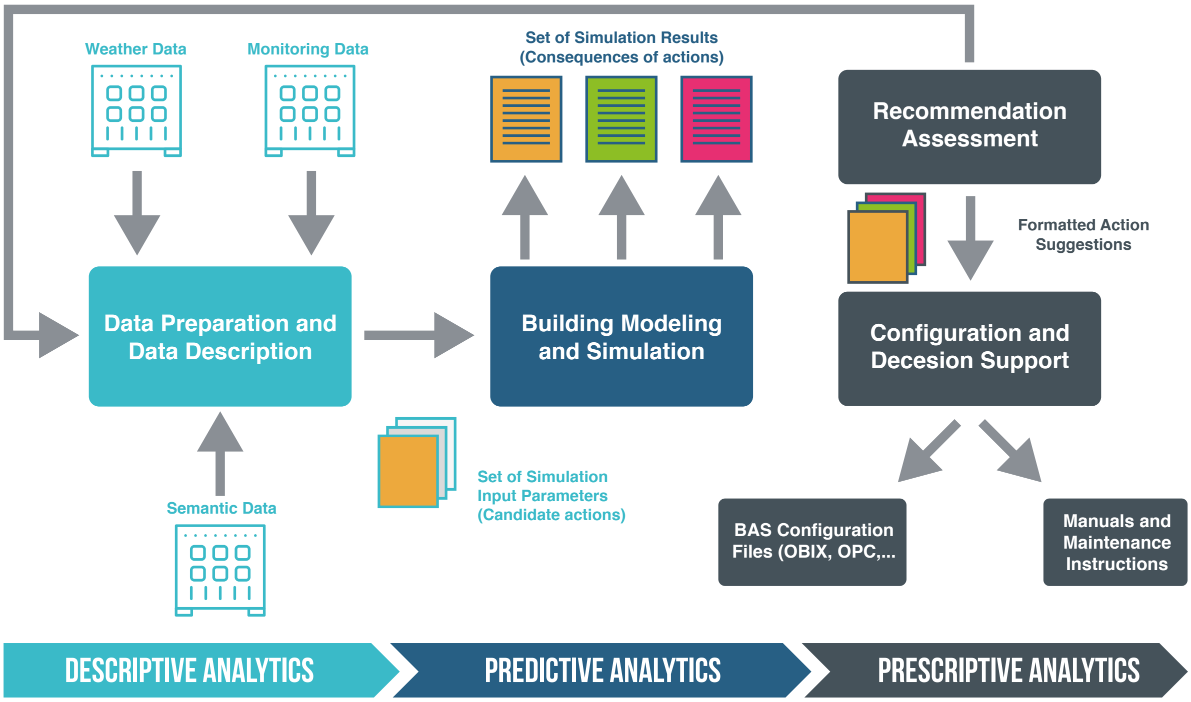
Even well-described building data is challenging to put into action. The broad range of data regarding system structure, device characteristics, operational data, monitoring data, and external sources of information must be consolidated in order to effectively analyze and use. It is necessary to develop reliable semantic models, that represent human expert knowledge about established building systems. Modeling plays a crucial role in the architecture of advanced data analytics as demonstrated on the following page.

"The bottom line is that transformative cost savings and process improvements are possible when data standards are allowed to break down the barriers that form between different commercial equipment and software in a building. Haystack is empowering exactly this sort of transformative work and is only set to become more effective as adoption grows and the ASHRAE unified data semantic modeling effort continues."

Jim Meacham,
Principal and Co-Founder of Altura

ARCHITECTURE OF THE ADVANCED DATA ANALYTICS FRAME WORK

SCHACHINGER ET AL (2016)



If you consider control logic in BAS, for example, where documented information often limits data integration and re-use in heterogeneous information silos made up of diverse data formats. Existing data formats and models are not set-up to fully describe control logic data. However, semantic/ontology based modeling offers a much more versatile source for information-driven processes, which can increase the performance of building equipment.

“Several advantages can be identified from applying the ontology-based modeling approach in the described domain. The generic modeling approach allows us to define and express relationships between disparate information domains including building elements and equipment, explicit models of control logic, static information on BAS, and monitoring data. Furthermore, this method allows to model control logic in a more detailed and structured manner,” explain Georg Ferdinand Schneider, Pieter Pauwels, and Simone Steiger in a 2017 paper.

The value of semantic tagging and modeling is already proven. The approach has been validated in many building projects across the world and adopted by many of the leading building technology providers and integrators. The industry is in agreement that we must move past standardized point names and that we must find a solution that works with existing systems if we are to move forward.

With standardization underway, we now need a new breed of software to leverage tagging and bring order to the chaotic world of smart building data for the benefit of all stakeholders.

TAGGING IN PRACTICE–

BENEFITS OF TAGGING FOR BUILDING STAKEHOLDERS

Standardization of tagging is attracting the attention of progressive actors in every stakeholder group within the smart buildings industry. Each group has its own motivations and data challenges but the solutions provided by standardized tagging offer benefits for all.

FOR BUILDING OWNERS AND OPERATORS, TAGGING PROVIDES:

- data standardization across a property portfolio in all asset classes.
- greater control and understanding of information generated by buildings.
- data uniformity for enhanced analytics and deeper insight.
- a common schema between traditional tools and formats for data exchange.
- more scope for interoperability, optimization, and real-time monitoring.
- makes performance analytics across the BMS and disparate functional systems easily attainable.
- the right data available to the right people at the right time across the operation.

FOR FACILITY MANAGEMENT, TAGGING PROVIDES:

- consistent data streams from the diverse range of equipment and devices in operation.
- organized data inventories to find the information they need in an instant.
- integrated data, all in one place, so common applications can be deployed rather than rebuilding data sets for each building.
- a broad solution covering most building concepts used in typical BMS.
- greater value from operational datathrough enhanced analytics.
- a wealth of cost-saving opportunities.
- faster results and insights from data–less grunt work.
- a way to help the smart building industry expand and mature.

FOR SYSTEM INTEGRATORS, TAGGING PROVIDES:

- freedom, by reducing the time needed to clean and format data sets.
- time to focus on visualization and analytics for value generation.
- the ability to manage implementation properly by reducing manual data integration.
- simplified workflows when processing building data.
- cross-domain deployments of portable applications, regardless of the underlying building system.
- greater re-use of software, instead of custom software development for each building type.
- an effective format for the extraction, management, and return of data from subsystems.

FOR SYSTEM INTEGRATORS, TAGGING PROVIDES:

- a platform to deliver services on top of their equipment and devices.
- a consistent and faster method for data configuration tasks.
- assurance of interoperability, beyond error-prone manual processes.
- a unified communication among various building sub-systems for better equipment integration.
- greater collaboration with different stakeholders from all parts of the built environment.

SMART

FOR ALL SMART BUILDING STAKEHOLDERS, TAGGING PROVIDES:

- highly automated data processes.
- the ability to garner more value from their data.
- a wealth of cost-saving opportunities.
- faster results and insights from data–less grunt work.
- a way to help the smart building industry expand and mature.

4

Overview of FIN 5

One of the new breed of software solutions making waves in this new data-rich era for building automation is FIN 5, developed by California-based J2 Innovations. The FIN 5 architecture is the only platform for building automation and IoT that is fully based on the use of semantic tagging.

The new software framework natively supports the Project Haystack open standard and was a founding member of the Haystack organization. By leveraging tagging, J2 has developed one of the most innovative software platforms for building automation and IoT applications with its 2019 iteration–**FIN 5.**

FIN was born out of the desire for simplicity after founder Jason Briggs became frustrated with repetitive tasks in the overly complex building automation landscape. The first iteration of the FIN system was the FIN Builder in 2010, which offered simplified and enhanced visualization graphics for 3rd party automation systems. FIN Builder later evolved into the FIN Framework, an approach to open frameworks that facilitated a full application suite for building automation and IoT.

FIN 5 goes even further to provide monitoring, control, scheduling, alarming, visualization, integration, and analytics capabilities designed for OEM partners to customize and incorporate into their products or systems.

“With system integrators and OEM developers in mind, FIN made big enhancements to their essential application–DB Builder. The continued focus on tagging has truly changed the effort required for building of a production-ready BMS database forever. With this simpler design and straightforward approach to data integration, projects can now be deployed way faster with less engineering time,” says Alexander Baydar, Building Controls Integration Manager, TEC Systems

The release of FIN 5 has brought new features, most notably an enhanced database and system configuration UI, to enable faster engineering. The software includes a new template creation wizard for more straightforward integration of controllers, minimizing configuration time for OEMs and systems integrators. J2 Innovations also added additional open APIs to help users further develop the connector framework, opening up the software for greater third-party system and device integration.

Since J2 Innovations’ acquisition by Siemens in May 2018, a stronger emphasis has been placed on ensuring the FIN Framework follows the latest standards in quality control and cybersecurity. The firm now follows “security by design” with regular testing of critical components and much faster update cycles.

“Many of the quality assurance processes Siemens incorporates in their design and development are now fundamentally part of J2 Innovations’ new quality culture. I believe we’ve been able to strike a good balance between innovative and robust products,” said Alex Rohweder, COO, J2 Innovations after the product announcement.

More recently, J2 Innovations has released information about their upcoming cloud services for the FIN 5 software suite. As part of the framework, FIN Cloud will support secure remote connections via the AWS (Amazon Web Services) cloud. This is expected to greatly simplify remote connectivity for multi-site building operators and mobile workers.

“FIN Cloud provides OEM partners with powerful support for SaaS architectures, using the Haystack open standard protocol over MQTT for Edge to Cloud connectivity. FIN Cloud simplifies remote site management by use of fully authenticated certificate-based security, with the connection to the cloud “pushed” from the site to avoid the complexity and difficulty of working with IT departments,” J2 stated during the June product release.

The FIN framework is already widely used by a range of system manufacturers involved in BAS, HVAC, lighting, and shading control in buildings. The software is most popular with those trying to avoid the risk and high cost of in-house development. **In the commercial building space, the new FIN 5 architecture promises to be one of the fastest and simplest ways to become Haystack compatible.**

5

How FIN 5 Leverages Tagging to Elevate Building Automation

Being fully based on semantic tagging, the FIN 5 framework offers a range of new benefits from the early implementation stages, to operational performance, third party system integration, and preparing future technological developments in the building space or beyond.

INTEGRATION & IMPLEMENTATION

FIN originally stood for "Fluid INtegration" representing the framework's focus on improving workflows and engineering efficiency.

FIN 5 presents a new template creation wizard that makes integrating controllers faster and easier, further reducing configuration time for systems integrators and OEMs. Integration has been a significant obstacle for those looking to develop the use of semantic tagging in their operations and a barrier to entry for those firms intent on avoiding disruption. This makes the FIN 5's template creation wizard a welcome addition and a positive step for the broad adoption of building automation.

J2 Innovations do not supply any hardware but have designed the software to work with a wide range of hardware platforms. The minimum requirement is that the hardware is capable of running at least a constrained version of Linux. In addition, several OEM controls manufacturers have already ported FIN to their custom hardware with on-board serial ports and direct I/O. The wide variety of connectors supported by FIN 5 include:

BACnet IP	Sedona	nHaystack	RSS
Modbus IP	Hue	SQL	EnOcean
Modbus RTU	SNMP	CSV	Insteon
KNX	ONVIF	XML	JSON
OPC UA	Obix	ASCII file reader	MQTT

Many existing building controls installations support the BACnet IP open standard protocol or can be upgraded to add that support. FIN Framework can connect to all the existing BACnet IP controllers and will tag the BACnet data so that it is more useful for analytics and energy management purposes.

J2 has been investing significantly to re-code FIN so it can run directly on Linux, without the need for a Java Virtual Machine (JVM), which sets a minimum "footprint" in terms of processor power and memory. This also means that the new version of FIN, called FIN Edge, whilst not fully deterministic, is better suited for primary control applications that require very fast response times.

Those upgrading from FIN 4 should find implementation of FIN 5 easier with almost all elements automated. Graphics, control logic, alarm logic, schedules, connectors, integrations, web services, and templates all transfer without any effort. The new folio database requires a script to be run in order to transfer the database to the new format. Upgrades to future versions of the software are expected to be just as easy and progressively quicker.

"FIN enables me to develop our control logic far more easily and quickly than another framework tool I used previously; in FIN I do not need to implement lots of virtual points; I can just add extra tags to my actual data points. This ability dramatically reduces the number of modules required for our control strategy, we only require about a fifth of the modules previously required, and development time is greatly improved," one FIN 5 user told us.

ENHANCING BUILDING OPERATIONS

FIN 5 leverages data to enable better use of data, offering far-reaching benefits for building operations. It is built on the demand for an open, fast and secure system for managing large flows of data from the rapidly expanding IoT in buildings.

FIN 5 provides new features such as an intuitive graphical UI for touchscreen and browser-accessible supervisory applications, offering easy to create dashboarding, smart alarming, and fault detection diagnostics. Custom graphics creation is semi-automated by tagging, making the process of re-creating plant schematics and floor plans much less time-consuming.

How the open, fast, secure approach benefits building operation:

Open...

- By designing for openness, FIN 5 supports all the major protocol standards used in buildings today, aiding integration with multiple building systems and IoT deployments.
- Being open, FIN 5 can utilize several open source libraries (AM Charts for dashboards or React UI tools for functionality) to supply OEM developers with resources.
- Built on the open-source Project Haystack, automated configuration can deliver context-sensitive information to give a highly intuitive user experience.

Fast…

- FIN 5 is based on the Folio 3.0 database, for significantly faster large query performance.
- The Folio 3.0 database also enables clustering and replication, speeding FIN 5 processes.
- FIN 5's new DB Builder UI tool offers multiple tree views and drag & drop selection for greater engineering efficiency.
- Auto-generated configuration enables the creation of an entire project from a spreadsheet using the FIN 5 import utility wizard.
- Device configuration is simplified in FIN 5 by using expanded templating.
- FIN 5 saves time on all aspects of a project, from control logic, to graphics, summaries, O&M manuals, and OEM specific features.

Secure...

- Now part of Siemens' cybersecurity initiative, J2 ensures all aspects of the framework are continually monitored for vulnerabilities and threats, with regular updates.
- Following new software quality processes, FIN 5 offers enhanced documentation for both users and developers.
- FIN 5 passed ISTS penetration testing and has been designed to comply with the IEC62443 security standard.

FIN EDGE

At the edge, FIN will be able to function on less powerful processors with less RAM and flash memory, enabling its cost-effective use in application-specific controllers for variable air volume (VAV) or fan coil unit (FCU) control, and similar edge applications.

The relativized logic capabilities of FIN already make it ideal for managing large numbers of edge devices, as customers testify to.

"In our applications the number of sensors per zone can vary. A massive bonus for us using FIN is that I can use Axon script to invoke all sensors that are required by my control logic, so, because all the sensor data is tagged, all the sensors for each zone are automatically included without me needing to alter the strategy to accommodate more or less sensors," another FIN 5 user explained. "Also in FIN I can easily re-use our control logic and graphics many times since the tags automatically connect the correct data for each zone controller."

FIN Edge requires FIN Framework for configuration, and is scheduled for release quite soon; it is already available for early OEM engagements. Similarly, the first version does not support full web server Graphical User Interface (GUI), but this is expected to be added later.

FIN CLOUD

FIN Cloud is an extension of FIN Framework, accessible via a browser rather than an app. It allows users to access FIN instances from anywhere, scaling up to hundreds of thousands of sites. Like FIN EDGE, the official release of FIN Cloud is scheduled for 2020. However, the service is already available for early OEM engagements to support their deployment of cloud services solutions.

FIN 5 enables OEMs to deploy on thousands of sites which can all be instantly accessed remotely via the cloud, without the complexity of VPNs or the need to open multiple firewall ports. This is made possible by pushing all data from the site and ensuring all connected devices are uniquely registered on the system. Hosted on AWS, FIN cloud is considered highly secure, with fully authenticated remote access to building data.

FIN 5 offers multi-platform deployment from Linux-based edge controllers to servers and hosted in the cloud. At the control level, FIN 5 provides a comprehensive engine with configuration UI that supports line by line, function block, and state machine control logic options. While at server level FIN 5 can run on Linux, Windows, and MacOS, providing an advanced graphical UI for touchscreen and browser-accessible supervisory applications.

Hosted in the cloud, FIN 5 can be containerized for ease of deployment. By using AWS, the architecture provides highly secure authenticated remote site connectivity to simplify multi-site portfolio management.

FUTURE FIN

FIN 5 is a breakthrough software framework for semantic tagging in building automation. Its emergence marks the beginning of a new chapter of openness and collaboration in the sector.

J2 Innovations, for example, has added additional open APIs to help OEMs and developers further extend the FIN 5 architecture. By also improving the connector framework to make it even more open for third party system and device integration.

FIN 5 offers faster customization for OEMs to develop additional features and functionality on top. Early clients include a smart window company that provides automated shading for cooling and energy conservation. J2 was able to customize their solution to create images on buildings by transforming each windowpane into a pixel. In addition, a US-based refrigeration firm created custom connections on FIN 5 to enable intelligent management of equipment.

FIN 5's improved API documentation provides a new developer UI reference system, making it comparatively easier to find information and guidance when needed. J2's innovation cycles have sped up too, with updates expected regularly and new platform versions anticipated every 18 to 24 months. FIN 5 will not be limited to buildings. Future releases are expected to develop the use of tagging across the built environment and broader data landscape.

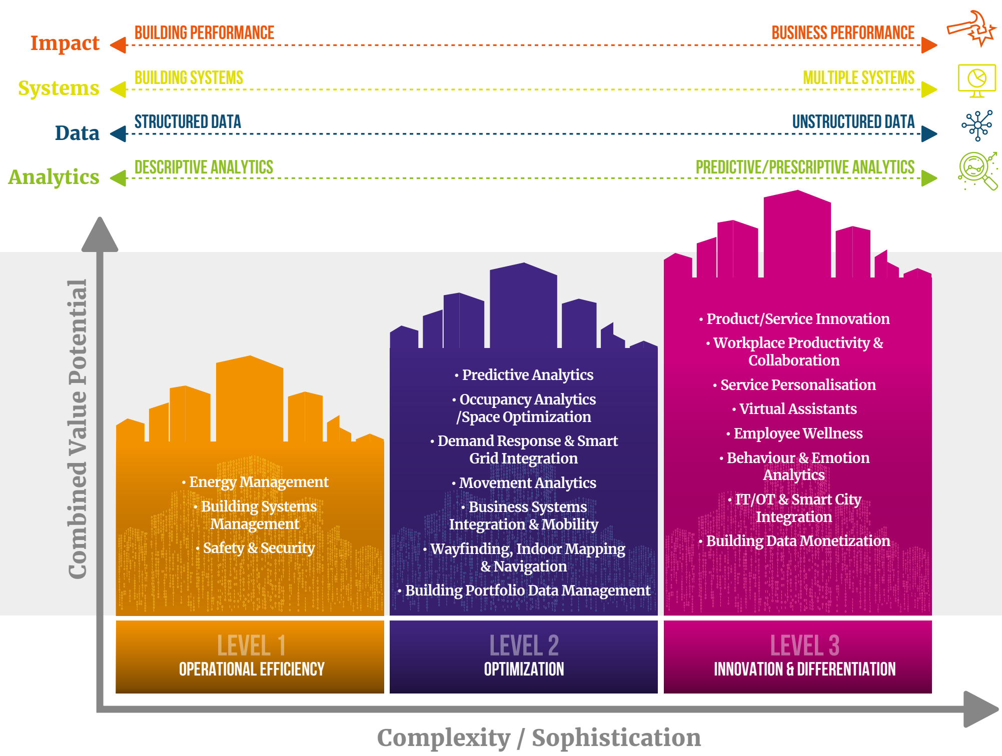
6

Conclusion

The problem of data complexity in building automation is widely recognized in the smart building industry and exacerbated by the rapid rise of the IoT. Those in the industry that choose to stay in their comfort zones and live with complexities of traditional BMS technologies will find it increasingly difficult to generate value from their growing data lakes. Those who seek simplified engineering solutions designed for the data age will undoubtedly look to semantic tagging, which shows great promise.

Most agree that we cannot continue with the current labeling approach. The evolution of buildings demands that data be given greater meaning, forming the foundation required to develop all manner of data-driven applications and ever more actionable intelligence. Tagging offers a compelling building automation solution based on the reliably futureproof philosophies of openness and simplicity.

SMART BUILDING BIG DATA SOLUTION MATURITY



Source: Memoori Analysis

"From the data gathering framework, it is a short path to deploying indoor air quality monitoring, thermal comfort optimization, occupancy awareness, personalized lighting controls, real-time conference room scheduling – all smart building apps with investment returns that are more difficult to quantify today, but likely to deliver much greater value to property owners and tenants over the long run. Eventually, the metadata can extend to BIM documents, further strengthening the feedback loop between design decisions and real-world results."

Ruairi Barnwell,
Building Optimization lead for Architecture & Engineering firm DLR Group

FIN 5 still has a limited depth of ecosystem compared to established frameworks, but that will change as the recently released software suite matures. As it does, FIN 5 could be a big part of a movement that is leveraging semantic tagging to lead us into a more intelligent future for buildings. These frameworks are making real data intelligence available to all by reducing the cost and complexity of bringing together data streams of building systems and new-age IoT services.

In an ideal world, data would be self-describing, and our next best step towards that goal appears to be standardized semantic tagging. Software like FIN 5 represents a significant step up for those on tradition BMS but, more importantly, it gives the chance for those who don't have BMS (due to cost and complexity) to enter the market. FIN 5 offers a form of simplified engineering, designed to provide greater flexibility, which will help all stakeholders thrive in the chaotic world of smart building data.

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