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Home /   Automation, Controls /   What are the building blocks for designing smart building?
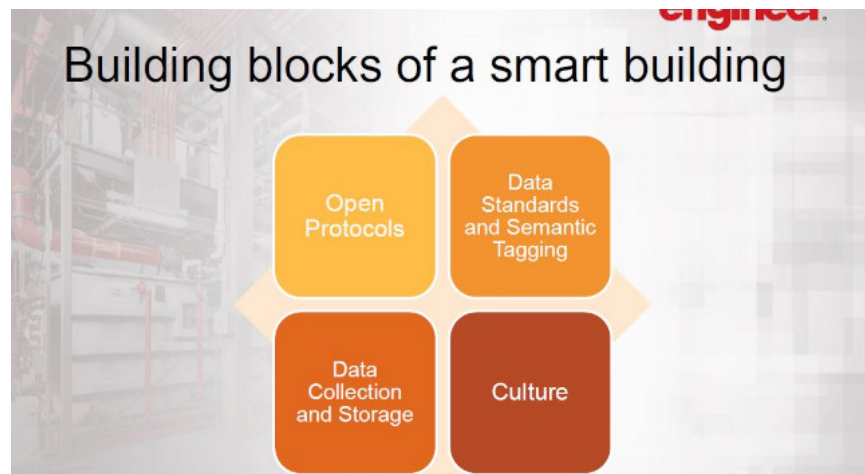
What are the building blocks for designing smart building?

Julianne Laue discusses reviews data requirements in smart buildings, and how they become the building blocks of the system

BY JULIANNE LAUE, PE, LEED AP BD+C, BEMP, BEAP, MORTENSON, MINNEAPOLIS
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Courtesy: Consulting-Specifying Engineer

Smart building insights:

- Industry expert Julianne Laue, PE, LEED AP

BD+C, BEMP, director of building performance, Mortenson, Minneapolis, explains the building blocks for smart buildings. This transcript is from a May 2020 webcast and has been edited for clarity.

Let's discuss building blocks of a smart building. When we say this, the building blocks are not necessarily meant to be steps or checklists or things to go through, but really the foundations of where to begin or what to know or what to understand and things to be considered.

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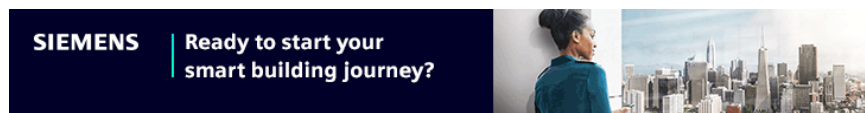
The first building block that we were looking at is to have to do with protocols. You probably know the story of Babel, where that people tried to build a structure that would reach up to the heavens, but since they all spoke different languages, they were unable to functionally communicate and eventually, the project failed. Building automation and smart buildings now is a lot like that. For these buildings and these systems to operate, all the parts need to communicate with the rest of the parts and all the smart components need to be linked in communication with the monitoring dashboards and everything that give the managers and the people operating the buildings the visibility and control.

A lot like in the story of the Tower of Babel. There are many different languages and players when it comes to smart buildings. And so open protocols allow all of these to talk together so that we can actually build this tower and we can actually have these project successes. Simply put, if you populate a building with the equipment that uses incompatible protocols, then you're going to have a building that can't communicate and ultimately

functionally meet the goals. And so open protocols are absolutely essential in the operation of smart building.

Data standards and semantics tagging. We actually have an interesting discussion on the

selling of semantic while we were preparing for this. And the definition of semantics, I had to go back and really look and read about what that definition was. And it's to study the meaning of language, which again goes back to that idea of open protocols and being able to talk to each other. I think we take this for granted with when we go out to websites and web browsers and that industry.
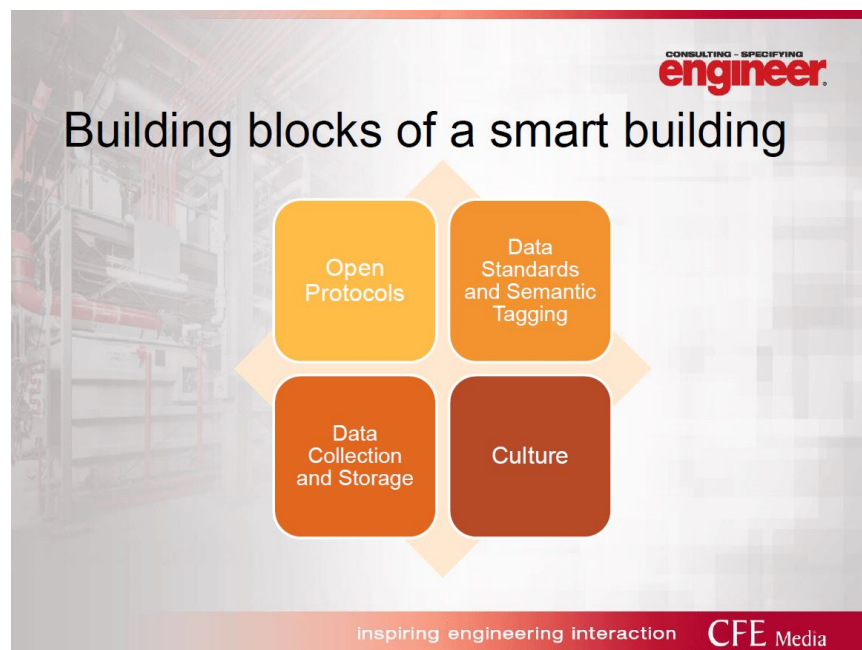
Open protocols, data standards and semantic tagging, data collection and storage and culture create the building blocks of smart buildings. Courtesy: Consulting-Specifying Engineer

The reason you can point to a web browser at someone else's website and see what they have to say is that they've all agreed upon how website data should be marked up or tagged. And that's where we're going here with the data standard and semantic tagging. If you were to go back to the list that I had earlier in my recommendations

for going out and searching and finding all that information, the same applies here. Again, looking for those, those keywords that lead to validity in those standards.

The lack of clear data standards, without that, a lot of challenges can appear and these can impact project scope and budget. And this is another piece too, where now being on the construction side of things, scope and budget alignment and cost is key and essential to the success of any project. Anything that can interrupt that can cause problems early on. And for those of you too, who have been in the design world, these lead to things like value engineering, which we don't want to see. If you leave things open to interpretation, you present risk that there will potentially also be two problems with interoperability.

When we go into the design and construction costs, you may want one sensor, but we end up with three. We want them integrated and everything, but the cost can escalate quickly if there are integration issues. Another potential issue in that is maintenance. Designs come full circle. And we feel we do a great job designing system. But the true test again, is with that user and those that maintain the systems. Trying to maintain redundant internet of things devices and the associated data can become really cumbersome when those systems are not integrated and compatible and they're not tagged.

In my experience, when the systems and the data and the information become troublesome or cumbersome or time consuming, people stop using them. And they talk about failures and they talk about that it's more time than it's worth.

If you're truly interested in the various standards, go and do your research. Scour the internet. Maybe because I'm mechanical engineer, I'm drawn to ASHRAE standards. What that standard is and why it's important was that the 2018 AHR Expo, it was announced that the ASHRAE BACnet Committee, Project Haystack and Brick Initiative were going to be working together to integrate Haystack tagging and brick data modeling concepts into this new proposed standard. The actual title of it is designation and classification of semantic tags for building data.

With all of that great data becomes this whole idea of we're going to collect and we're going to store it. When we do all of this, when we collect data and we store it and then we analyze the data, we're actually creating more data. There's an increased need for that. The handling of smart building data can be challenging. The density of the sensors and the actuators as well and as the sensing frequency, they can really give great insight to help optimize operation. That results in large quantities of data. Because we want to see real time data and historical data that again means that we not only collect it, but we store it. I want to be able to access that data forever. I want to know what happened 10 years ago. I want to know what's going on now and way back.

Challenges in data storage include the scalability, the ability to process the data, flexibility, interoperability and privacy. In a health care situation, there's definitely privacy. If you're actually a consumer at a sports and entertainment venue, you also want some level of privacy. Managing all of that is pretty tricky. And with smart buildings, that's that big data and the data sets are large, complex and they're all coming from different sources. There's a lot of

decisions that need to be made around the data and smart buildings. I'll go back and reference the first bullet on this page. As you're thinking about data and you're thinking about how you're going to do it, remember the goals, understand your owners and all of those owner groups that have been talked about to understand their priorities of how they're going to use the data. They don't just have it and let it sit that it's actually useful to that.

It also supports the business goals of your clients. We're looking for those returns on investments and working for those things that make sense. We really have to go back and support that all the way through design construction and into operation. Because in the case, it's too complex or it's too much or it's not supporting the mission, then we've lost the intent of why we installed it in the first place.

That leads me to the last building block that we've mentioned and that's the culture. I'm not referring to data culture anymore and I'm not even necessarily referring to the culture of the vendors with the products or what's out there. The biggest driver, again, in the implementation of smart building technology and the tagging and the storage and the analytics and everything we've talked about so far is based on our clients and their culture. They determine the success or failure. I've done what I thought was really cool, amazing designs, only have people not like them or not use them. I think anyone can relate to that too as you walked into these smart spaces.

If you can't get something to work, can't figure out how to turn the lights on in your hotel room or how to connect to the computer in a conference room or the big screens and all of that stuff. Or if it's not comfortable the way you're using. And it's

a thought that may maybe comes to mind, but it doesn't come out of your mouth, but, "Who's the goofball that designed this?" Or, "Who bought this?" Or, "This stinks." I don't want to supply those things to my clients.

Really going back to understanding the culture of the client in the organization and going back that a K-12 public school or a higher ed institution or a lab or a sports stadium, will have different goals and we'll have different needs. There isn't a one size fits all approach to that. The systems and integrations have to have and the success is dependent really on the culture of that company and how they're going to define success.

From a smart building platform selection point of view and the reason this is more complex now than ever before is because the vendor community has done a tremendous job of adding new functions and features. And we've got a plethora of selection options that are available to us in the marketplace now.

And that's what makes the platform a smart building platform selection so critical. And there are different perspectives to consider by selecting this platform. Most of the time, our clients look at it from two aspects, whether the platform is going to be proprietary or open and cost point of view. From the word proprietary, in this case, is used to demonstrate whether the vendor's product can be serviced by multiple systems integrators or different vendors or do you have to go to one single vendor every time there is some work associated with it? That's the way we are using proprietary here.

There are some very good reasons to go with the proprietary platform. Some of them include specific functionality that some of the vendors

have built into it that could solve a particular problem. In case our clients do go with a proprietary platform, we are then helping cost model it from future cost point of view, through open book pricing methodologies. Another area to look at by selecting this platform is software.

Early in my career, I developed a spec for a client and I said, the graphics should be intuitive. And every single vendor that we reached out to could meet that intuitive graphic requirement. I quickly recognized that we have to have measurable, demonstrable requirements while selecting these platforms. Now instead of intuitive graphics, a way to approach that topic could be, how many clicks does it take to start a trend or create a report or troubleshoot an alarm?

Julianne Laue, PE, LEED AP BD+C, BEMP, BEAP, Mortenson, Minneapolis

Author Bio: Julianne Laue is the director of building performance at Mortenson. She is a 40 Under 40 award winner, and a member of the Consulting-Specifying Engineer editorial advisory board.

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