

# The Fast-Changing Future of Systems Integrators: How to Stay Ahead of the Curve in a Radically Changing Market





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## Introduction

Systems Integrators have a challenging role in today's rapidly evolving building automation market. Long established design and installation practices have been disrupted by migration from serial to IP networking, new wireless IoT technologies, and increasing expectations from both specifiers and end-users for easier-to-use solutions. For larger projects, a much higher degree of integration is expected. Beyond the linking of lighting and HVAC, integration with business applications such as room booking, wayfinding, and asset management is needed. All of these systems need to be managed via a “single pane of glass” (SPoG) approach to visualization to reduce the otherwise complex set of user interfaces for end users. This is a far cry from the days when all we needed was a networked HVAC control system! To keep up, or even get ahead, a new generation of software technology will be required to fulfill current and future requirements.

Most of the software currently available for building automation applications was architected 15-25 years ago, so although suppliers have made many significant iterations to the original versions, the core design of the software pre-dates the newer IT, IoT, and mobile oriented needs of today's market. At best, features to support mobile touchscreen use, semantic tagging and data-modeling have been added-on rather than incorporated into the design. The exception to this is J2 Innovations' FIN Stack software, designed from the beginning with mobile touchscreen use in mind, and natively based on Project Haystack's data-model and tagging standard.

This white paper discusses the various trends that are changing and driving success in the smart buildings sector, highlights how your business can utilize the new technology offered by FIN Stack to deliver easier to use building automation and integrated smart buildings solutions in faster, more efficient ways.

## How building controls are changing and where the market is going

Some of the key factors determining the changing direction of the buildings control industry are:



Internet of Things (IoT)



End user dashboards



Packaged equipment



Remote management



The need for data



Cybersecurity threats



Competitive costing and value



Convergence of Information Technology (IT) with Operational Technologies (OT)

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Although the building automation market has long used the term “Systems Integrator” (SI) to describe specialist controls sub-contractors who install, configure, and commission the building’s controls system, the amount of integration of multiple systems has for most projects been confined to control of the HVAC equipment, sometimes with the addition of metering and lighting management. As end-user expectations of “smart buildings” have steadily increased, new value propositions have been brought into play by both existing and new entrants involving the deployment of additional sensors for air-quality, presence detection, and geo-location. This has led to the emergence of a new breed of companies

known as “Master Systems Integrators” (MSI). Such companies offer a higher level of systems integration expertise and a greater understanding of the IT aspects of Smart Buildings, to address the increasingly complex requirements found in the specifications for larger building projects.

Currently only a small minority of controls specialist contractors can justify calling themselves an MSI, but it is becoming clearer now that all Systems Integrators will soon need to “up their game” to some extent as the innovations pioneered on larger projects filter down to the rest of the market. Fortunately, new software technology is now becoming available that addresses the trends listed above, enabling SIs to more easily deliver smart building solutions that are both simpler to use (for the end-user) and faster to engineer (by the SI).

So, let’s look at the areas mentioned above in a little more detail, to see how SIs can adapt to get ahead of the competition and provide better end results for customers.

## Advancing technology

### Internet of Things

The Internet of Things (IoT) is an umbrella term that covers a raft of technologies that have enabled new business propositions. Fundamentally IoT is about connecting devices to a software application (usually hosted at cloud level) that delivers new business value in some way, such as by monitoring desk utilization to provide hot desk management services or tracking people's location within a building to provide wayfinding and space management services. Typically, the new sensors required to deliver such propositions use wireless technology to enable easy retrofit deployments, and as such they are mostly separate from the already installed building automation system(s). Currently many of these IoT solutions are designed to send their sensor data directly to the cloud application which then web serves dashboard type visualizations to users. The additional real-time data these systems collect would also be useful

to help optimize the environmental controls in the building, so there is a requirement to integrate the IoT data with the data from the BMS. However, for an SI to respond to a customer's request to achieve this, they need software capable of supporting REST or MQTT type integrations since that is how the new breed of IoT software expects to integrate with other systems. Whilst most HVAC integrations can now be achieved using the BACnet protocol, and most electrical integrations via Modbus, this is not at all the case for IoT integrations, and much of the BMS supervisory software currently used is not well suited to this. This situation is leading Systems Integrators and specifiers to think afresh about the software they use on their projects to capitalize on the new opportunities that the IoT brings. What is needed is a Building IoT (BloT) integration platform that spans the BMS, the IoT system(s) and the business applications.

Unless a well featured BloT-oriented software framework is used on a project, the engineering will be a lot more complicated and is unlikely to deliver all the functionality the customer requires, as well as reducing the SI profitability due to the high level of skilled labor required. If out-dated technology is used that isn't compatible with IoT, then customers won't be able to benefit from valuable analytics, reporting, control, and data which can be delivered by a modern data management application based on semantic tagging.

It's predicted that the global number of connected devices in operation in smart buildings is set to increase from 1.7 billion in 2020 to just under 3 billion by 2025, showing a CAGR of 10.8%. Therefore, if customers feel they're not getting the most up-to-date, multi-functional and IoT-friendly system, there is a risk they will go elsewhere.

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## Packaged plant

Due to the high cost of working on a construction site, there has, for some time, been a trend towards the controls for equipment being installed, and sometimes even commissioned, at the factory, so the HVAC or other equipment arrives on-site as “packaged plant”. This reduces the scope of work for the SI. Instead of needing to procure, install and configure controls and associated sensors and actuators for the AHUs, chillers etc. they are only required to make a network connection and provide visualization graphics for supplied plant items, although control of the related pumps and valves, or dampers still tends to be custom configured per project within the BAS. The advantages of packaged plant for the equipment manufacturer are obvious, not least is that they can ensure the controls fitted are programmed to provide the optimal performance for their specific equipment. To minimize the time required to integrate the packaged plant item, the automation software needs to support a “template” for it, which is a pre-configured file which fully defines all the data-points required, and, in some cases the graphical visualization, and operating manual documentation. Either the manufacturer or the SI can create these templates, and

in future, as more of the BAS applications support templates, the speed with which equipment can be added to the overall system will dramatically increase. On projects that utilize templating, especially where large numbers of each plant item (such as VAVs or FCUs) are installed, the system engineering time saved can be as much as 80%. There is no doubt that more and more equipment will be packaged in the future since the cost benefits are significant, so SIs need to adapt their approach to embrace this and invest in templating the equipment they are required to integrate. Ideally

the building services consultant on the project will specify that the manufacturer should provide a template or at the very least a standardized way defining the data points that need to be connected since specifying BACnet is not enough to enable the automation of the system integration process; SI engineering time is required to configure the BACnet device integrations. If Project Haystack tagging is used then the SIs' integration task is greatly simplified, and much closer to a “plug'n'play” approach. As FIN Stack natively supports Haystack, inclusion of templated devices is automatic.

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## Convergence of IT with OT & Cyber-Security

Even before the rise of IoT applications, and since BAS manufacturers began to deliver IP based controllers, there has been a desire on the part of building specifiers to converge the information technology (IT) systems with operational technology (OT) systems. In the early stages of the migration, from BAS serial networking to IP, there were many concerns on both sides; the IT departments were concerned about the BAS somehow compromising their business-critical IT infrastructure, either due to poor cyber-security or due to bandwidth issues. On the OT side there were concerns about the reliability of the IT infrastructure since the environmental control and other services like lighting have to be working 24/7. Now that IP networking has become so ubiquitous the unification of the infrastructure is happening since installing separate IP networks in parallel is an extra

unnecessary cost. Virtual LANs and a better understanding on both sides of the bandwidth management issues, has made such convergence easier. A much greater disruptive factor though is the commercial aspect as to who contracts to install and commission the overall integrated systems. There is now a clear trend towards IT focused companies acquiring more OT skills and domain knowledge so that they can take over the MSI role on larger projects. Fortunately for SIs, IT businesses currently tend not to have sufficiently deep expertise in HVAC control, so there is an opportunity to find new ways of working cooperatively with the IT sub-contractor(s).

Whether the converged IP infrastructure is delivered by the Systems Integrator or by the IT provider there is strong need to be working with a platform that fully supports the IT requirements and enables

such converged network solutions to be delivered efficiently and securely. Solutions that will ensure your customers are set up for success, not failure, are needed which involves working with IT and IoT oriented protocols such as REST and MQTT, rather than just the conventional BMS ones.

One of the biggest pre-occupations of IT is how to deliver a cyber-secure solution. Historically, BAS software has offered relatively poor cyber-security, mostly due to the aging architecture mentioned earlier, as well as the applications only being able to run on Windows rather than the inherently more secure Linux OS. There have been well-publicized examples of poorly configured systems being hacked. This is yet another reason for SIs to select a modern software framework that has been designed to provide a high level of cyber-security.

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## Customer requirements, usability, and productivity

### The need for – and value of – data

Buildings are an expensive asset, both to build and maintain. As building automation technologies have developed and lower cost sensor technologies have become available, more and more building related data is being generated in real-time. The value of analyzing and basing decision-making on this real-time data is becoming more and more apparent. To enable this data to be processed automatically by computer software it needs to be structured by use of data-modeling and semantic tagging methodology such as Haystack or Brick.

In the past, there's never been a focus on data for Systems Integrators; it's

not necessarily been deemed as an important factor of the initial integration. However, the way things are heading, there's going to be more and more pressure to supply this early in the project, rather than see it as an extra that the customer must sort for themselves at a later date, should they require it – which, let's face it, they will.

These days, building managers want to be as productive and efficient as they possibly can, using the state-of-the-art technology and standards which SIs could be working with. Standards like Project Haystack, which is an open to all initiative, defines how data is abstracted using a data-model and semantic tagging, making data easier to obtain and exchange between systems and

applications. FIN Stack's use of Haystack tagging creates new possibilities, as fault detection diagnostics and analytics rules can be easily applied across a whole project, with automated sequences generating reports that can pick up on things such as sensor and actuator faults, which is beneficial to the building's maintenance and can save both time and money.

Standardizing on the use of Haystack isn't just better for the customer, it's also efficient for the Systems Integrator, too. Simplifying integration and configuration tasks means getting the job done quickly and making more profit yet giving the customer a better end-result and, most importantly, giving them valuable data at their fingertips.



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## The desire for end user dashboards and increased productivity all-round

With the need for such detailed data comes the requirement for user-friendly dashboards so that customers can effectively manage all their building's systems in one central location. That's the direction the market is heading in, rather than just relying on the use of equipment graphics and floor plan schematics, which is what most Systems Integrators have become so accustomed to in the past.

Interactive dashboards which simplify the representation of the data flowing from the building(s) makes everyone's life easier but require careful thought and well-designed layouts to be effective.

This is a skill SIs will increasingly need to acquire as end-users have heightened expectations as result of their experience of dashboards in their business applications and elsewhere.

This trend can have a positive impact on the role of Systems Integrators, as there are options out there, such as FIN Stack, that now make it much easier to create customized dashboards for each project.

As well as being easier to configure and more flexible, FIN Stack's dashboard app can be used to visualize data from multiple systems and manufacturers, providing a seamless single pane of

glass (SPoG) experience\*. After all, why have maintenance engineers switching between multiple screens to check the status of systems when you can integrate all of the data into one single user interface? This type of improved results and ease of use can make both you and your customers more productive. So, it works both ways. As you provide quicker and better results for your customers by working with a system like J2 Innovations' FIN Stack, you'll be able to work with more customers, plus you're allowing them to do more with their data. Everybody ends up being more efficient and happier. It's a win-win situation.



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## The changing working environment

### The future is remote

As internet capabilities have grown it has been clear for some years that more work can be achieved remotely, but the COVID crisis throughout 2020 and beyond has accelerated this trend. This has also impacted the building management market as businesses have needed to manage more building services related issues remotely. While the pandemic led to a short-term decline in the Smart Building markets around the world in 2020, they have bounced back in 2021, with the need for remote work fueling changes as to how buildings are managed. The long-term consequence will be significant for building automation and especially for remote connectivity.

Now, more than ever, there's an increasing requirement for remote building management that's efficient and safe – from both a health point of view and a cyber-security perspective. Increasingly, Systems Integrators are expected to provide their users with accessibility to fully manage Building Automation Systems (BAS) from anywhere via mobile devices, as well as desktop browsers.

If, up until this point, you haven't been working with a framework that can deliver this sort of functionality for your customers, it won't be long before it is regarded as essential for all projects.



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### Staying ahead of cyber security threats

The growing threat of cyber security being compromised is something that Systems Integrators should have to be dealing with. As building automation is getting smarter, so, too, are those willing to damage the safety and security of the buildings the systems are integrated with.

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What's often the case in these scenarios is that the hacks aren't so much the fault of the system in place, but more so to do with the way in which they're being managed and operated. This could be anything from users not acting on alerts quickly enough or, in the high-profile case of the 2013 Google Australia office hack in Sydney, the company was still opting to run an out-of-date version of a legacy system.

It should therefore be a priority for both SIs and building operators to ensure they employ the latest most secure connectivity software to avoid becoming another one of those statistics. Mitigating the risk of getting hacked in such a way that damages business and reputation involves both good operating procedures and deployment of a secure connectivity solution that not only provides an end-end encryption of the data connection, but also makes managing user permissions easier and more secure. FIN's Edge2Cloud service provides exactly these features leveraging world-class security technology to enable easy, and yet highly secure, remote access.

If you're not operating with the most up-to-date and protected software, you and your customers are running the risk of falling victim to cyber criminals.

## Conclusion

### Adaptation is key

When it comes down to it, all the key points listed above lead to the conclusion that Systems Integrators and systems specifiers can no longer continue to go about their work in the way that has been the norm in the past. Carrying on as if nothing is changing simply isn't an option anymore. The rapid technological advancements and unprecedented world events are causing disruptive change to building automation markets. The opportunity is there for those who can adapt and respond by embracing the latest generation of systems and associated software. Doing so will not only ensure survival but also the potential to flourish in this rapidly evolving business environment.

For Systems Integrators, to successfully carry your business forward and stay one step ahead of your competition, there is a need to step outside of your comfort zone and have the confidence and motivation to change. With a future that looks so different, there is a risk you will get left behind.

Outdated software applications that are complicated to configure will lose out to newer "next generation software" able to offer end users and those who install and commission systems a simpler and easier way to interact and manage buildings. Adoption of data standardization will enable the various building systems to become more easily integrated than has been possible previously.

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### It's possible to keep costs down

With all these new trends, as well as increased labor costs due to the market's skills shortages, it may feel like dealing with the pressure to improve smart buildings' performance while decreasing system costs is too difficult, especially as the complexity of projects is increasing. This is a solvable challenge.

One way in which you can reduce costs and increase value is to use a software framework that:



Is faster to engineer, so reducing installed cost and increasing scope for working with more customers



Utilizes a standardized data model and tagging to make multiple system integration much easier



Provides visualization tools to enable rapid customization to meet end-user requirements in a cost-effective way



Uses Cloud and IoT technology to simplify deployment and remote management

## What software is needed?

If you were to shop around, there are most likely several different solutions that could be used side by side to tackle each of the hurdles and changes we've discussed above. Doing so is not only complicated and clunky when it comes to integration, it's just not cost-effective. There's only one solution that can provide the answer to every single one of these problems on its own, with all features as standard and no additional costs – and that's J2 Innovation's FIN Stack.

Its endless capabilities include, but are not limited to:



Reducing systems engineering/  
configuration time.



Supporting IoT and IT style protocols  
(e.g., MQTT, JSON and REST)



Offering more intuitive user experience,  
both for its end users and System  
Integrators' own project engineers



Enabling data-modeling  
and semantic tagging



Delivering better dashboard  
visualization for end users



Having the ability to integrate with  
systems beyond building services  
(e.g., room booking and asset  
management systems)



Having secure remote access,  
thanks to Edge2Cloud technology



Annual Life Cycle Management (LCM)  
program to keep systems up-to-date  
and for optimum performance

## An exciting future for Systems Integrators

Now is not the time to be worried or apprehensive about the future of the industry. Open market software such as FIN Stack is here to simplify building management. The demand for automated system configuration, greater functionality, and the constant desire to make buildings smarter should be seen as an exciting and challenging opportunity for Systems Integrators.

Your role may be changing, but your work will become more fulfilling and rewarding as you get the chance to work with new systems, processes and data tagging platforms, constantly striving to take the lead in the world of building automation.

Find out more about FIN Stack at: [j2inn.com/finstack](https://j2inn.com/finstack)

and Project Haystack at: [project-haystack.org](https://project-haystack.org)

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