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Ingenuity for life

Building for the digital world

Converging IT and OT for a smart building foundation

White Paper

The role of IT professionals is fundamentally changing

In today's buildings, everything is connected and seamless communication has never been more important. Nearly every device is generating and/or processing data. In fact, in 2018, sales of Internet of Things (IoT) semiconductors will surpass 37 billion[1] units in three categories—sensors, processors, and connectivity—and many of them will be used in the industrial sector to drive building automation, industrial automation, and lighting projects. In other words, everything is becoming connected, integrated, and driven by data. IT and those who maintain it are crucial to ensuring IoT communication continues to flow and that data becomes intelligence.

The transition towards truly intelligent buildings promise great rewards for the people who visit, live in, work in, and own them. But delivering on those smart building promises tomorrow means laying the right foundation today, and that presents distinct challenges for IT professionals.

The IT landscape has changed and continues to change at an ever-increasing rate. Gone are the days of managing a few servers, some antivirus software, and a couple of locations. IT professionals are now charged with keeping businesses productive and information flowing across a wider variety and increased complexity of technologies than ever before. Virtualization, software defined infrastructure, the proliferation of remote workers and an ever-changing cybersecurity threat landscape are just a few of the challenges faced by today's IT experts. As if those challenges weren't enough, the intersection of all these newly connected IoT devices with existing IT systems requires new designs, configurations, technologies, and operational techniques.

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How can you maximize your investment while overcoming the challenges presented by the convergence?

	Past	Present	Future	
communication	• LAN / data and network • Telephony / IP telephony	• Mobile devices • Power over ethernet (POE) • Collaboration	• 100w POE • Software defined networking • 4D networking	• Ambient backscatter • IPV6 global adoption • Dynamic power requirements
	• Wireless	• Advanced wireless features • Hyperlocation services • Bluetooth and beaconing	• 5G LTE • Li-Fi • LoRa WAN 802.11ah	• 6Lowpan • Millimeter wave technology
applications	• Few servers • Few monolithic applications • Local/centralized computing	• Multiple virtual servers • Many applications with APIs • Identity management • Distributed / cloud based infrastructure • Obsolescence management	• Edge computing • Proliferation of micro-services • API-based computing and containerization	• Server swarms • Machine learning • AI-written applications and dynamic code
data security	• Antivirus and firewalls	• Cybersecurity threat landscape – Live monitoring, traffic analysis and threat detection – Authorization – Authentication – Segmentation – Regulations and standards	• 802.1X • Machine learning • AI threat detection and defense	• Identity-based security • Always on biometrics • Software-defined security
geography	• Few locations	• Multiple locations • Remote workers • Location services • Distributed IT needs	• Globalization	
human factor	• Few skillsets	• Many skillsets • Energy management • Building systems • BMS / controls – Lighting – Physical security – access control and surveillance – Life safety – fire and mass notification – Conveyance	• Artificial intelligence and machine learning • Advanced analytics • Fog computing • Robotics	

Indicates Operational Technology (OT)

Whereas yesterday's building systems stayed well within the domain of building engineers, today's systems blur the lines between facilities and IT departments, breaking down the silos that once existed between information technologies and operational technologies. Careful, coordinated efforts between these two entities is essential to delivering on the promise of intelligent buildings. These efforts go far beyond the selection of individual technologies, and instead require redefining the approach to building, design, planning, and construction.

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Delivering on the promise of intelligent buildings requires a new perspective

People spend most of their lives inside of buildings, and those buildings rely on the range of power, HVAC, and life safety systems—or operational technologies (OT)—to operate. Today, we are in the midst of building controls technological evolution. With the advent of internet connectivity, our world has become overwhelmingly digital. We depend on connected devices to enhance nearly every area of our lives, and the rising availability of IoT devices throughout all building systems will ultimately enable truly intelligent buildings.

In the not-distant future, IT and OT networks will be fully integrated and work in harmony. But because the majority IoT projects undertaken today fail[2], successfully overcoming the challenges inherent in these projects will be essential to delivering on the long-term vision of intelligent buildings.

Understanding why these projects fail

According to Gartner Research, IoT projects fail for a variety of reasons, but at the heart are three key issues:

Lack of team knowledge

The project team did not have the domain knowledge necessary, and lacked the supporting resources to effectively design, integrate, implement, and execute on their IoT project vision.

Poor planning

From creating a vision and setting objectives to coordination and collaboration, poor planning is at the core of IoT project failure.

Lack of data analytics capabilities

It doesn't matter how much data the building generates if the analytics capabilities are not in place; data itself doesn't improve building performance. It's all about the ability to analyze that data, understand what it's telling you, and make better decisions as a result.

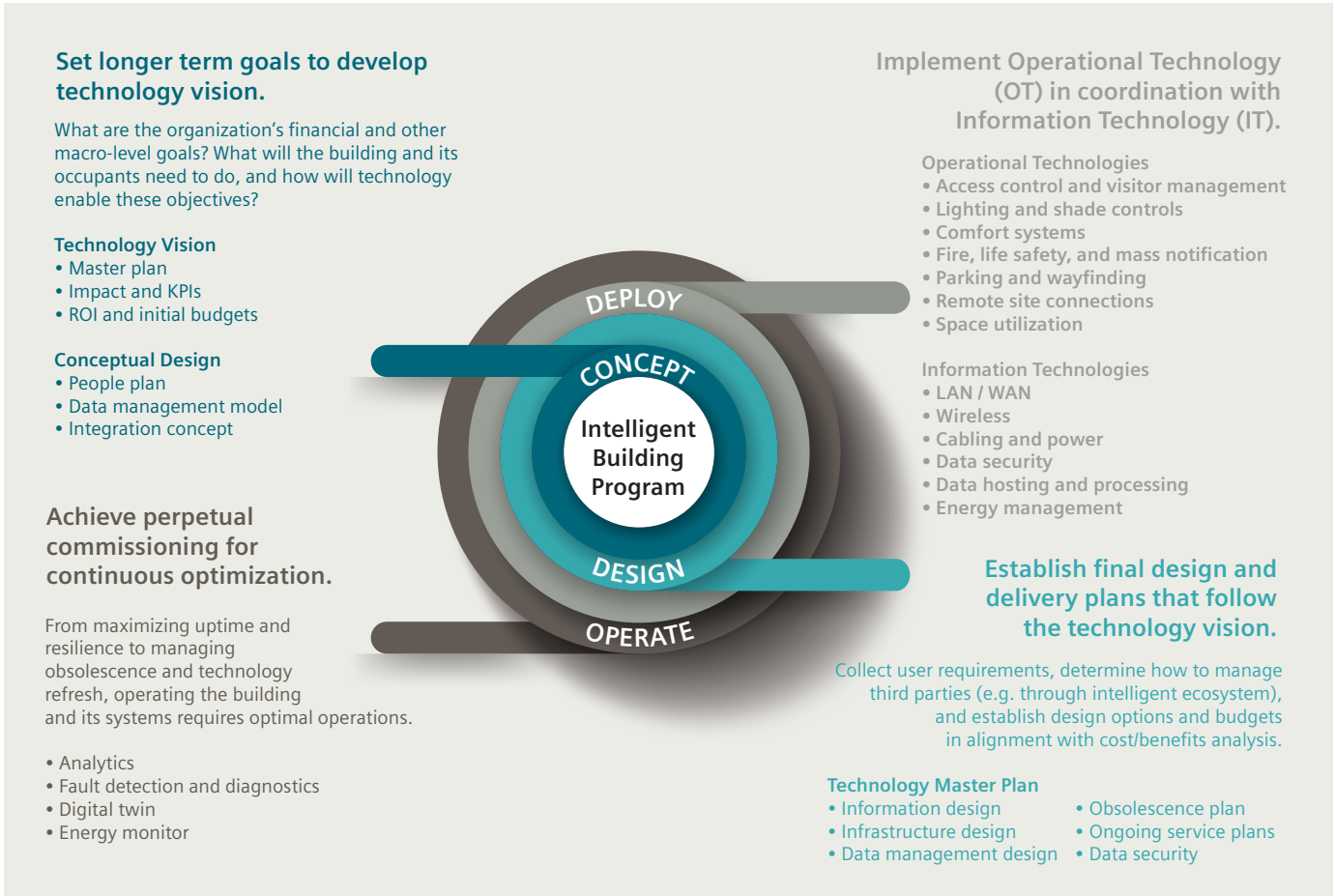
In other words, the IoT technologies themselves are not the cause of project failure. Failures stem from unfamiliarity with IoT technologies and are exacerbated by the traditional ways in which the design and implementation teams approach the project.

Similarly, building construction projects struggle with the same challenges -- particularly as IT and OT systems continue to converge. Consider how proposals for building management systems and operational technologies are traditionally not solicited until about halfway through the construction cycle, and the IT systems are designed even later, during the Furniture, Furnishings & Equipment (FF&E) phase.

With this standard approach, building construction is nearly complete when some of the most important decisions start to be considered. Although it is not impossible to complete the construction project in this way, it does come with great risk: cost overruns, retrofits in brand new buildings, timeline slippage, and an inability to marry the building technologies and systems with business goals—meaning that organizations may not be able to capture the right data that is needed to optimize efficiency and work toward other key performance indicators (KPI). Worse, expensive retrofits may be warranted, even before the building opens.

A new approach drives risk out of projects

To overcome the risks inherent in this traditional approach to IoT and construction projects, building technology partners are recommending an entirely new process for building in the digital world. Instead of waiting until the FF&E stage to begin selecting technology components—when it is significantly more difficult to retrofit IT and OT requirements into building designs—the Intelligent Building Program provides a new and converged framework.



Even before the earliest stages of construction, the right technology partner is engaged, helping define, refine, and establish the organization's long-term vision and ensuring technology is in place to enable those objectives. This technology partner understands the need for integrated IT and OT systems and how to overcome the challenges of this integration during the construction process. Together, technology partner and building owner establish the KPIs that will measure long-term success, and then determine how best to achieve those goals through the program. As an integral part of the team, the technology partner works to address the building's requirements for smart operations and designs the systems that enable that intelligence.

This Intelligent Building Program brings together integrated building management systems with information technologies and networks to provide a comprehensive approach to building technology solutions, coordinating the range of disciplines required to make smart buildings possible and, from a cybersecurity standpoint, safer.

In the end, this new approach to the construction process maintains the integrity and performance of both IT and OT systems by increasing the visibility and security of building systems and devices.

Selecting a technology partner for the digital world

Gone are the days of building engineers managing building technologies while IT professionals managed information technologies. Today, these domains are converging, and the Intelligent Building Program makes it possible to create a truly intelligent building. By bringing together a comprehensive team of building experts, the latest information technologies, and an end-to-end delivery structure, your building is smarter and lays the right foundation for future adaptability—all while minimizing the risks inherent in traditional, siloed processes.

When you select a building technology partner that works within this framework, you also benefit from:

Risk mitigation
- Consultative support for long-term vision and technology planning
- Smart deployment and technology roadmap planning
- Alternative engineering approaches that leverage integration to drive out costs
- Design scalability and system consolidation

Experience and expertise
- Technology, product, and industry partnerships
- Pre-validated, lab-tested, and certified solutions
- Extensive training

Data analytics
- Device-level, site-level, and cloud-based solutions
- Creation of insights to guide and prioritize performance optimization actions

Coordination and collaboration
- Business continuity and system uptime
- Multidimensional compliance

Early collaboration improves design efficiency, enabling both information and operational technologies to integrate seamlessly, reducing complexity for IT departments that are already grappling with ever-expanding workloads, skillsets, and expectations.

Selecting the right technology partner for this digital world means more than simply understanding what the Intelligent Building Program entails; it means working with experts in emerging technologies, experts who understand how the technology roadmap today helps create a building that's ready for anything tomorrow has to offer.

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Sources
[1] IHS Markit IoT Trend Watch 2018.
[2] Cisco.com. 2017 Newsroom.

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