



ENABLING
HIGH-PERFORMANCE
BUILDINGS
WITH CONNECTED
INFRASTRUCTURE

designed to be better.™



EXECUTIVE SUMMARY

The ability of a physical building to support improved employee productivity and business results by providing a “high performance” environment is a competitive advantage. It is also a lasting source of operational efficiency. These high-performance buildings (HPB) not only deliver best-in-class connected infrastructure, but also provide the means to interconnect technology solutions that often exist in silos. The high-performance building will be the catalyst for integration of the IT and facilities organizations to optimize the workplace as well as future investments to become true digital businesses.

INTRODUCTION

The high-performance building concept has evolved:

- Initially, the concept of the HPB focused primarily on energy efficiency and building management. However, new definitions from authorities such as the National Institute of Building Sciences (NIBS) include a greater focus on productivity.
- High Performing Buildings Magazine has documented that smart buildings have intrinsic and effective support for key technologies such as the Internet of Things (IoT), wireless solutions, and others that enable a digital business.
- The HPB has infrastructure that delivers improved collaboration and the integration of digital technologies within a single cohesive environment, while providing a platform for the inclusion of future technologies as they become available.

The business benefits of a high-performance building are many. The most apparent to both employees and management is that collaboration becomes “frictionless” as the barriers between the network, audio/visual technology, power availability, video, and other functions disappear. As a result, employees can focus on their work, rather than integrating or trying to operate individual technology solutions. The time spent trying to work with features or capabilities that are used infrequently can be highly frustrating and time consuming. The ability to focus on the tasks at hand also allows employees to work in “real time” mode, which improves the overall speed of the business and is critical in today’s highly competitive environment. Finally, from a management perspective, this newfound efficiency provides continuous ROI and streamlined processes, improving results and competitiveness.

HPBS REQUIRE CONNECTED INFRASTRUCTURE

Inherent in the idea of a high-performance building is the requirement for ubiquitous connectivity that delivers new functions and capabilities that integrate not only many different technologies, but also many different types of “traffic.” In some cases, the single biggest difference between the status quo and the HPB will be the use of one, comprehensive connected infrastructure for provisioning and management. The holistic approach is critical to ensuring that all of the components work together effectively. Finally, a high-performance building will require a high-bandwidth network that meets service-level agreements (SLAs) and expected performance levels.

Deploying a single, fully capable connected infrastructure delivers critical business advantages. Benefits include:

- Faster adoption of new collaboration and productivity solutions to support improved business process.
- Greater agility to make changes or introduce new business activity.
- Ability to replace many disparate network infrastructure deployments with a single solution that will substantially reduce costs.
- Simpler to secure the network: The security team will only have to protect one well-documented network as opposed to trying to protect numerous undocumented implementations.

CONNECTED INFRASTRUCTURE – THE PATH TO HIGH-PERFORMANCE BUILDINGS

A high-performance building encompasses a number of different components, so organizations must have a cohesive framework for building their strategy to create and utilize high-performance physical workspaces. Legrand’s connected infrastructure provides this framework, and details the five unique elements that will drive the strategy.



PERFORMANCE

The term “performance” is used in its broadest sense. Connected infrastructure encompasses the underlying capabilities of networks and systems as well as organizational and employee performance. The ultimate return from investments in high-performance buildings is organizational performance that delivers better business results. A recent study by Legrand shows that the single highest return from high-performance buildings is increased employee productivity.

Collaboration is now a critical capability that enables many of the business processes that drive improved outcomes. There are two important technology facilitators of collaboration that are now becoming a focus: the integration of audio/visual functionality into the IP network, and the “huddle space.”

Next-generation A/V systems will comprise two distinct styles. There will be the AV centric solutions that are not part of the LAN payload and must be able to deliver performance beyond what many legacy systems offer. The second style is when the AV traffic becomes part of an integrated productivity network. Keys to this change are the enhancements to IP networks to support Audio Visual Bridging (AVB) and the follow-on initiative, Time Sensitive Networking (TSN). The new technology provides time-synchronized, low-latency streaming services through IEEE 802 networks. The result is that integrating A/V systems and functionality on the existing IP network is dramatically simplified and will extend the use of these systems. Legrand’s wireless adapter makes it simple to connect any notebook or device to a larger screen without cables or complex connections to allow real-time sharing of video from the personal device.

The huddle space is designed to act as an open physical location that facilitates impromptu group interaction and collaboration that is enhanced by a number of supporting technologies. According to Knoll’s Metrics of Distributed Work, the utilization of small meeting rooms like the huddle space is 20% higher than for larger rooms.

Technology is critical to the optimal use of this type of space. Foremost is the need for a range of connections, including power, A/V, and network. The connectivity options must go beyond the basics to meet present and future demands. Support for peer-to-peer and point-to-point connections is a requirement that is on today’s feature list. Going forward, additional connection types may include Miracast, for wireless connections to a large display; and ZigBee, for ubiquitous connection for a large number of device types.

The small physical space demands a connected infrastructure solution that does not dominate the area, yet offers numerous ports and power connections. Solutions for these new demands include table boxes, overfloor raceways, wall boxes and floor boxes that integrate directly with the environment and offer numerous connection and port options without intruding into the space.



TIME

The resource of time is always in short supply for modern digital businesses. Improving network service levels is an important way to more efficiently utilize time. In addition, reducing the time to deploy new technologies and allowing existing solutions to support faster business processes or collaboration are both in great demand. The high-performance building with connected infrastructure solutions is an integral component in meeting both of these goals.

The most obvious way that connected infrastructure, as deployed within an HPB, delivers on this requirement is to enable the use of new technologies faster than was previously possible. Many of the newest technologies in the HPB deliver faster speeds or greater throughput, resulting in the need for a cabling solution that can support this level of performance. Upgrading cable can be a time-consuming, manual task that will delay a project or stretch the timeline. It is important that cable is installed in an efficient and effective manner that will allow any needed changes at a later date. The use of proper cable management products like wire mesh tray, ladder racks and racks with integrated management features are essential in ensuring timely updates. Solutions that support both fiber and copper, enable greater cable density, and simplify cabling deployment help to shorten deployment time frames.

Time savings can also be found by simplifying the networks and wiring systems provided to end users. When users must deal with separate networks for A/V and IP, and a range of wireless options, the resulting complexity can result in substantial confusion and lost time. And each of these network options may have unique physical connectors or access scripts that only add to the user's difficulties. We've all experienced meetings where the presenter takes 5 to 10 minutes to figure out how to connect to the room display. That results in lost time for every attendee.

There are a number of solutions available in the marketplace that help address these issues and help realize time savings. Wireless HDMI solutions, most likely Miracast or WiDi, can be added to conference rooms so the presenter can wireless connect to displays and projectors without the need for a physical connection. If you would like to go with a more traditional approach, the solutions mentioned earlier, like table boxes and overfloor raceways will help route cables seamlessly to the point of use while integrating with the environment.



SPACE

Optimizing "space" in the HPB includes a myriad of factors that lead to improved business results. The connected infrastructure solution must enhance the use of space from a physical footprint perspective in addition to the space devoted to network and connectivity solutions. It is also important to increase the "space" available on the network from a traffic perspective.

Optimizing the physical space of an HPB is possible with the increased use of sensors coupled with advanced analytics to provide far deeper insight into how the facility is used. While some buildings have basic sensors with limited reporting, the next generation of buildings takes this approach to an entirely new level. This future state is a combination of big data/analytics coupled with a much larger set of data about the physical structure.

In the future, there will be broad use of the concept of "architectural intelligence," a framework for how HPBs will move forward. The starting point is dramatic functional improvements in the type and intelligence of sensors, that deliver more frequent and detailed information on many more aspects of space usage. For example, Legrand's new building sensor offerings include solutions for managing office equipment for energy efficiency, and presence sensors to provide occupancy/usage metrics. This larger and more comprehensive data set is then evaluated using advanced analytics, similar to many big data initiatives. This results in the ability to better manage how the building supports the employees and optimize how space is configured and used.

The second element of space optimization focuses getting more out of the existing cable plant by using more modern physical network products. Modern networks will support mixed traffic and mixed media within the same physical space. For example, the ability to mix network and A/V traffic on a single network may mitigate a major expense for installing new cable. An additional way to optimize the use of space dedicated for the cabling to support connected infrastructure is to increase the number and density of cables that can be routed throughout the HPB. The ability to run more cable through risers and along horizontal runs without having to devote more space to the cabling is very important.



EXPERIENCE

A high-performance building positively impacts the experience of the employees who use it and the specialists who manage it. The daily routines as well as the long-term capabilities of both groups benefit from the technologies and network enhancements that can be installed right now, as well as those that are on the near-term horizon. For this reason, having a cohesive short- and long-term plan for the “experience” aspect is important to understanding how individual solutions will fit.

For those who manage and deploy HPB technologies, the convergence of “everything over IP”—including power, data, and lighting—is an important trend. The Cisco Digital Ceiling Framework is looking to bring together manufacturers within the building network and help support this migration and convergence within HPBs. Manufacturers like Legrand have joined this framework to help accelerate this new way of deploying previously disparate services through our physical infrastructure and connectivity products.

Converging services and functions over IP within the HPB also delivers many operational benefits for the building management team. First, it is now possible to respond to demands for new services or basic moves/adds/changes with far greater agility and speed. With a single common platform for power, data, and lighting, changes can be made with minimal modifications and a new level of building intelligence can be realized since these building functions can now talk to each other seamlessly.

The use of the IP backbone also makes it simpler to run the HPB with a set of improved and more comprehensive management tools. Providing a single management console that can deliver status and usage information across the physical location allows the team to more actively and effectively manage the facility than was possible in the past.

For employees, the experience in an HPB is a major upgrade over legacy locations. Seamlessly integrated A/V and data services that are easily used at the desk, the huddle room, or the larger conference facility simplifies collaboration and eliminates the frustration of trying to “figure out” collaboration tools that are used infrequently. Wireless presentation gateway technology is an example of one of these important technologies that improve the employee experience. However, these gateways also require point-to-point high-bandwidth dedicated infrastructure to bridge the LAN and AV ports. It is also important to remember that in many deployments, AV will be its’ own technology solution distinct from the LAN. Even in these cases there must be a cohesive plan that supports the AV environment within the greater whole. After all, **AV is the last 100 meters between the network drop and the human imagination.**

Another improvement is the confluence of services that will be provided over IP. Employees will be able to take more control over the environmental aspects of their personal workspace, allowing them to easily tailor it. In addition, an HPB will simplify daily tasks such as connecting and providing power for personal devices.



SUSTAINABILITY

Improving the sustainability of the HPB was one of the earliest focal points of this initiative. Yet, sustainability as measured by just energy savings is much too narrow of a perspective. There are new low-voltage options for lighting that use LEDs, enabling the lighting architecture to evolve not only in the deployment process but also in the management of the lighting system. Power-over-Ethernet (PoE) standards can now be used to power LED lights due to their lower wattage requirements, enabling twisted-pair cabling to be used instead of a separate power infrastructure for lighting.

When coupled with intelligent low-power lighting, most HPBs will easily meet new sustainability and energy conservation demands that are part of modern building certifications.

However, there is more to the sustainability benefit.

The simplification of the cable plant and the focus on the IP network to provide more services make it possible to reduce the amount of cable used in new deployments or upgrades. It also becomes possible to reduce cable waste from either removal or replacement in the future. In addition, the increased use of wireless technologies that reduce the overall amount of cabling used enhances sustainability. However, it is essential that the wireless network is well integrated with the wired network to achieve the greatest amount of sustainability.

SUMMARY

As more organizations focus on becoming “high performers,” there is a corresponding need for buildings that can support this goal. Thus, the concept of the high-performance building was born. The HPB encompasses a large number of different technologies and capabilities. To bring order to this and assist organizations in developing a pathway to their HPB of the future, Legrand’s connected infrastructure provides a detailed framework for services to support the initiative.

Connected infrastructure comprises five separate focal points that work together to provide a framework for understanding the physical building infrastructure, improving employee productivity and results, and providing a much more effective management platform for facilities and IT.

Developing and implementing a plan for a high-performance building is a new undertaking for the vast majority of organizations. Those who are driving the HPB initiative need the latest information and thought leadership. The use of well-documented and proven frameworks such as Legrand’s connected infrastructure will simplify that process and support a positive outcome.



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