

IP Controllers & the Edge

by Marc Petock

Introduction

Over the last five years, we have seen a rise in the use of Internet Protocol (IP) and edge computing. IP protocol and edge adoption rates are increasing at all levels within the building operating architecture making it more reliable, resilient, and cost-effective.

This shift shouldn't come as much of a surprise. This rise has given way to the preference of IP Edge native controllers. This has facilitated buildings to move from smart to smarter. The built environment has become hyper-distributed, with IP and the Edge playing a significant shift in the way we are connecting, acquiring information, interacting with it, and making decisions.

The past several years have demonstrated that device and system connectivity in buildings is continuing in an upward trajectory and are delivering undeniable value to owners, operators, and occupants alike. IP Edge controllers are enabling us to expand our reach to a new range of systems, equipment, devices, and applications providing relevant outcomes for operating and managing buildings.

So, what is the edge?

Simply put, it is a means to connect, collect and process data at the device-level rather than in the Cloud, at the enterprise or at a remote data center. It represents device-level execution of application components traditionally associated with enterprise applications, at a place where we can process and analyze data as close to the original sources as possible.

Gartner recently noted that, by 2025, more than 75% of all data will be processed and acted upon on the edge. That is a shift in the way businesses must think about connectivity and data generated from building operational technology. This is due in part to the greater acceptance of IoT and the availability of more computer processing power at lower costs, allowing us to move from just "connected devices" to "connected intelligence".

When it comes to devices and equipment that can reside on the edge, there are several. Equipment such as RTUs, chillers, plant level controllers, meters, sub-meters, sensors and HMI's, security cameras, gateways, routers, wireless access points, field devices, and lighting are all good examples.

Factors contributing to IP Edge Controllers:

The breadth of connectivity options that are now available

Data volume

Advent of new software and applications

Real-time requirements

Power and “smartness” of hardware

Affordability

Open systems, open source, open programming, open hardware technologies

Adoption of the network edge with IoT

Flattening of the traditional architecture driven by IP

Bandwidth challenges

Need for reduced data overload

Amount of data that needs to be exchanged

Benefits & Value

When it comes to the benefits and value, IP Edge controllers deliver speed, latency reduction, scalability, security, bandwidth conservation, reduced operational costs, and more data that has the potential to provide enhanced insights and data governance.

They also enable owners and operators to be more aware and reactive in real-time to what is happening within their facilities. That, in turn, enables one to unlock new operational efficiencies and become more effective with the resources at their disposal.

The edge plays a valuable role in providing efficiency, security, and compliance and changing our building environment landscape to support an IP, horizontal architecture. Furthermore, by applying analytics at the edge, we can make more informed decisions and initiate action.

This leads to a variety of advantages including proactive intervention, intelligent automation, and highly personalized experiences. It also enables building systems easier to use, extending the lifetime value of the equipment and delivering more personalized environments for occupants.

The use of IP Edge controllers in buildings and facilities offers several benefits and delivers value that contribute to efficient operations, improved functionality enhanced user experiences and better business outcomes.

Here are some key advantages:

Control & Management

IP Edge controllers allow for centralized control and management of most every building system, equipment, and device within the building operations architecture. This includes HVAC, lighting, access control, security systems, IAQ and occupancy sensors and more.

With IP Edge controllers, these systems can be monitored, controlled, and managed from a single open, scalable platform/interface streamlining operations, and reducing complexity.

Connectivity

IP Edge controllers and networks speak the same language from end-to-end. They do not need any translation between the server, operating systems e.g., with gateways or by other means.

Integration & Interoperability

IP Edge controllers facilitate the integration and interoperability of diverse and siloed systems and equipment and the data that is available from them.

By leveraging IP-based protocols, and communications standards, different equipment, devices, and systems can communicate with each other seamlessly.

This integration and interoperability enable coordinated actions and automated responses, improving efficiency and enhancing overall performance.

Energy Efficiency and Sustainability

IP Edge controllers play a crucial role in optimizing energy use within buildings and facilities. They enable intelligent control of the systems and equipment allowing for precise adjustments based on occupancy, schedules, or environmental conditions.

By optimizing energy consumption, IP controllers contribute to energy efficiency, cost savings, and sustainability efforts.

Enhanced User Experience

IP Edge controllers provide improved user experiences by offering intuitive interfaces and personalized control. Occupants or facility managers can access and control various building systems remotely through web-based or mobile applications.

This flexibility empowers users to customize settings, monitor performance, and adjust preferences according to their needs, enhancing comfort and satisfaction.

Enhanced Productivity

Using IP Edge devices allows building owners to solve problems quickly and easily through real-time information about building performance.

Combined with visualization, this information can help proactively prevent issues and quickly solve problems.

Remote Monitoring & Troubleshooting

IP Edge controllers enable remote monitoring and troubleshooting capabilities. Facility operating personnel and service providers can remotely access and monitor building systems, receive real-time alerts or notification, and proactively address issues.

This reduces response times, minimizes downtime, and improves maintenance efficiency.

Scalability & Flexibility

IP Edge controllers offer scalability and flexibility in expanding or adapting building systems. As new devices or systems are added, IP-based infrastructure allows for easy integration and expansion without requiring significant reconfiguration.

This scalability ensures that the building's control infrastructure can accommodate future upgrades or technological advancements.

Data & Analytics

IP Edge controllers facilitate access to data and the collection of it from various building systems and equipment, generating valuable insights for optimization, decision-making and delivering business outcomes.

By analyzing data on energy usage and consumption, occupancy patterns and equipment performance, facility personnel can identify areas for improvement, implement energy-saving measures, or predict maintenance needs, leading to better operational efficiency and outcomes.

Cost Savings

IP Edge controllers contribute to cost savings in multiple ways. By optimizing energy consumption, reducing maintenance expenses through proactive monitoring, and streamlining operations, they help lower operating costs over time.

Additionally, IP Edge systems often eliminate the need for complex wiring infrastructure, resulting in

reduced installation and maintenance expenses as the controllers can go straight to a supervisor or to the Cloud. Overall, devices and systems which are IP based are comparatively inexpensive and reduce capital and operational costs.

Smarter Building Integration

A network of IP Edge controllers serves as a foundation for smart building technologies and Internet of Things (IoT) applications.

They allow for seamless integration with sensors, analytics platforms, and other smart devices, enabling advanced functionalities such as

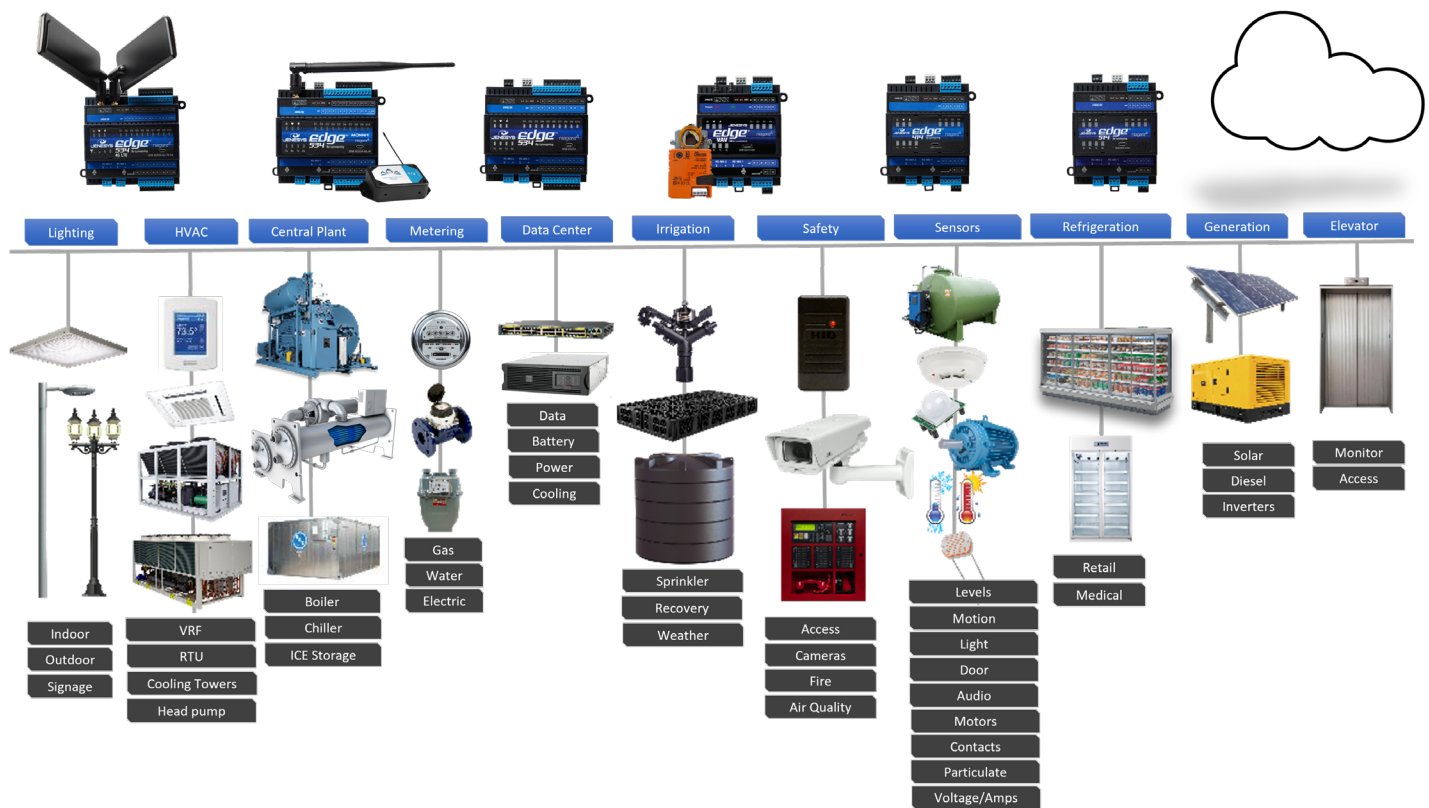
occupancy-based lighting, predictive maintenance, space utilization optimization, and more.

Security & Resiliency

A well-implemented IP Edge based solution provides unparalleled system resiliency, ensuring peak building operations are maintained. Because IP-based solutions are highly encrypted, they help protect operations and data while safeguarding against malicious activity.

The access controls and authentication measures incorporated in IP improve the overall security of building automation systems.

The Horizontal IP Edge Architecture



The use of IP Edge controllers provides for the ability to deploy a Horizontal building architecture and topology.

This IP Edge horizontal infrastructure relies on open standards, open protocols, open communications, and non-proprietary solutions enabling any device to communicate with each other, to the Cloud and interact with any application.

With IP as the backbone of an enterprise-wide architecture, everything that requires a standalone network today simply becomes part of the IP master. This enables interoperability at the very highest level.

Implementation of an IP Edge Horizontal Building Platform Architecture provides numerous benefits, which directly address today's IoT applications, data

at the device level, a simpler user experience and cybersecurity. In addition, with only one platform to learn and one set of software tools at all levels of the architecture, the result is faster deployment, an easier learning curve, more reliable applications, and a cost-effective solution.

An IP-based architecture does not require the elimination of existing controls throughout a

building or campus. A good IP-based system can talk to backward compatible, or previous-generation, equipment - whether they use BACnet, LON, Modbus, MQTT or any other protocol.

This preserves the investment in controls hardware, which can be significant depending on the size and complexity of a facility.

A Horizontal IP Edge Topology Architecture offers several advantages including:

Uses commonly accepted IT practices at the connectivity, integration, automation, and enterprise levels. This allows you to install edge devices on the existing IT infrastructure within a building or enterprise - and use standard IT communication services over an Intranet, Wide Area Network (WAN), or public Internet

A simplified environment for connecting, collecting, processing, and integrating data from multiple different devices

One Web-based interface allows you to access, monitor, and control the devices from a supported Web browser connected to the network

The user interface and online system configuration software embedded in the devices allows configuration, commissioning, data archiving, monitoring, commanding, and system diagnostics from the device with Web browser software

The use of one platform for all controllers - primary, field, equipment, plant, unitary, VAV and various applications support connectivity to open network standards

Expandable I/O point capacity allows you to connect multiple I/O modules to the field controllers, which greatly expands field-level control capabilities

Devices have the power to independently exchange information with the rest of the network and not depend on it to perform critical functions

The convergence of the building management system and the IT network, via IP-based control, has cost advantages in terms of installation and maintenance

Scalability and advanced control capabilities

Summary

IP Edge controllers are an integral part of many organizations building operational strategies. Building owners and operators are looking for faster, real-time analysis of the massive volumes of data produced by their systems to improve operational decision-making. In conclusion, IP Edge controllers and devices represent a unified element connecting smart devices today and are becoming more prevalent within buildings of all types. It gives building owners and operators the flexibility, control, cybersecurity, and the robust technology infrastructure required to enable the operational and business outcomes they need.



Lynxpring's JENESYS Edge portfolio is a series of flexible, programmable and application specific IP Edge controllers and accompanying extension modules enabling IP connectivity, integration, interoperability, data access and control at the edge.

The portfolio is ideal for any building and facility including small to mid-sized facilities, multi-site environments; plant and equipment control such as air handling units, roof top units, boilers, fan coil units, heat pumps and more and IoT applications requiring smart, edge technology.

This powerful portfolio meets today's requirements to connect, manage and control closer to where the data is whether it be equipment, a single facility, or a multi-site environment. The versatility, functionality and broad footprint of these controllers using the industry's most widely deployed platform makes them powerful, cost-effective, and economical solutions for system integrators, building operators and equipment manufacturers.

About Lynxpring

Embracing open software and hardware platforms, Lynxpring develops, manufactures, distributes, and supports edge-to-enterprise solutions and IoT technology that create smart buildings, smart equipment, and smart applications.

The company's technologies and solutions provide connectivity, control, integration, interoperability, data access and management enabling users to extract insight, value, and outcomes from operational data. Lynxpring's solutions are deployed in millions of square feet of commercial settings in the United States and internationally.

More information about Lynxpring is available at: <https://www.lynxspring.com>

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