

JUNIPER'S SOLUTION FOR SMART BUILDINGS

Modernizing buildings to provide innovative tenant services and reduced operational costs

Challenge

In many existing buildings, lighting, HVAC, fire alarms, security cameras, and other infrastructure devices are siloed within separate platforms that don't share information. Having multiple platforms leads to redundant sensors, multiple management platforms, and increased capital expenditures.

Solution

Juniper's Solution for Smart Buildings combines Juniper switches with PoE, Juniper Mist Wired Assurance, and Juniper Connected Security to connect, power, and provide security to building infrastructure.

Benefits

- *Helps IT operations with Day 0 to Day 2 and beyond with the combination of Juniper Mist Wired Assurance, AI, and Marvis Virtual Network Assistant*
- *Shares key facility metrics for space and energy utilization*
- *Integrates with building management software, fire alarms, meeting endpoints, and other applications and devices using APIs*
- *Provides PoE up to 90 watts per port*

We are in a digital age where owners and facility teams are looking for technologies that can help them modernize their buildings. Smart modifications can create smart buildings that use energy more efficiently, deliver differentiated services to occupants, attract tenants, minimize cost, and reduce the environmental impact of the building over its lifetime. Reaching smart building status isn't difficult, but it does require adding technology that connects all the building components over a single infrastructure that shares sensor data from a variety of devices and platforms. Juniper's Solution for Smart Buildings converges building infrastructure, including lights, blinds, and heating, ventilation, and air conditioning (HVAC) over Power over Ethernet (PoE), so that companies can reduce operational expenses and deliver innovative, cost-effective services to current and future tenants.

The Challenge

Inside traditional buildings (commercial and enterprise), tenants and business owners rely on different components like lighting, HVAC, blinds, badging, fire alarms, phones, wireless, security cameras, and other Internet of Things (IoT) endpoints. Most of these building components use one cable for power and a separate cable for control. Each of these building infrastructure and network components works on proprietary protocols that require their own management platforms. Over time, these infrastructure elements have developed independently but they still do not share data across other networks within a building.

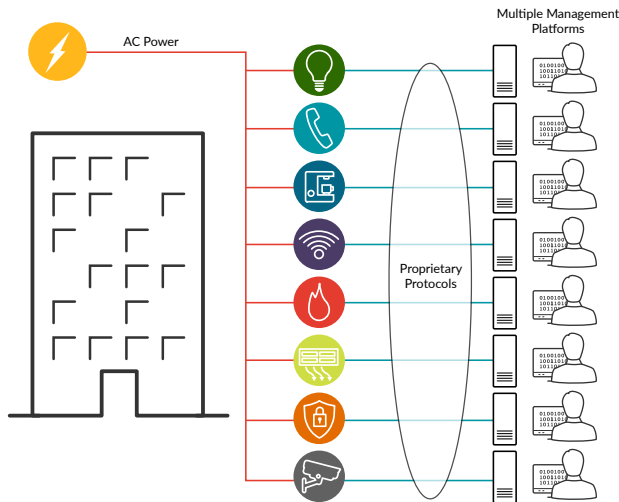


Figure 1. Traditional buildings rely on multiple management platforms and proprietary protocols that do not share data.

Lighting is an excellent example of a system that could benefit from being connected to the network. Lighting installations in traditional buildings are labor-intensive and expensive. The power requirements vary by country and require additional labor costs for high-voltage electricians. Lighting networks use occupancy sensors to switch on/off in a room or zone, while HVAC systems have their own occupancy sensors to control the variable air valve in a room or zone.

Both lighting and HVAC work on siloed networks, and they end up using redundant occupancy sensors. Managing these networks gets complex as the building owners and facility managers deploy siloed networks with multiple management platforms, multiple sensor networks, and multiple teams managing different networks. This complexity adds up to higher capital and operating costs.

As the networking industry evolved, the Institute of Electrical and Electronic Engineers (IEEE) developed 802.3af (up to 15.4 W) and 802.3at (up to 30 W) standards. Some of the building infrastructures like phones, wireless access points, and security cameras are already powered by PoE. In 2018, IEEE ratified 802.3bt (up to 90 W) and the power requirements of building components like lighting have gone down over time. IEEE 802.3bt and lower power requirements for building infrastructure are at an intersection where we can converge most of the building infrastructure endpoints over PoE. One of the main advantages with PoE is IEEE 802.3af/at/bt standards are the same across different countries. The single Ethernet cable gives them both power and control.

There are other benefits as well. Installing building infrastructure over PoE is faster and cheaper as it involves a low voltage electrician. As we converge most of the building infrastructure over IP and PoE, the endpoints can be controlled over a single

IoT protocol. The data from one network can be shared across other networks using APIs that help avoid installing redundant sensors. The data from several types of sensors (occupancy, temperature) are collected, analyzed, and can be presented from a single, centralized system. Also, fewer staff are needed to manage the networks. What smart building owners quickly realize is that converging building infrastructure over PoE helps lower both capital and operating expenses.

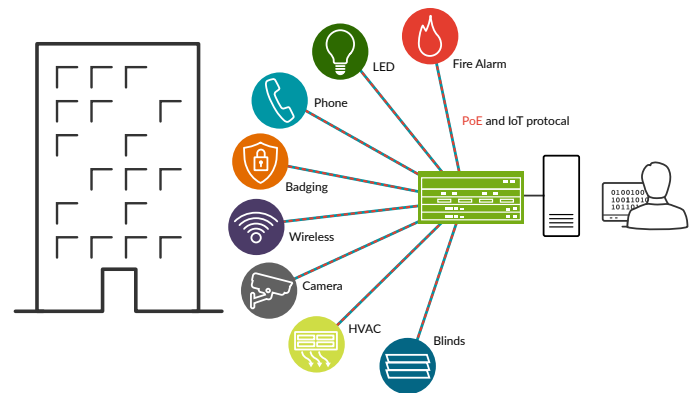


Figure 2. When smart buildings are connected by PoE, they can be managed from a single management platform.

Juniper's Solution for Smart Buildings

Juniper's Solution for Smart Building combines industry-leading switches with PoE, network management that automates operations through AI, and security for every point of connection. The highly reliable Juniper Networks® EX Series Ethernet Switches are a secure, cloud-ready portfolio of access switches ideal for enterprise, branch, campus, and data center networks. EX Series switches can deliver up to 90 watts of power per port and power up multiple smart building IoT devices.

For management, Juniper Mist™ Wired Assurance, a cloud-based service driven by Mist AI, onboards, configures, manages, and troubleshoots the EX Series switches. Juniper Mist Wired Assurance cloud service dashboards help identify endpoint devices by showing the device logos using Link Layer Discovery Protocol–Media Endpoint Discovery (LLDP-MED). This visual representation of endpoints and location helps the IT team better manage the network from Day 1 and beyond. Juniper has validated some smart building PoE devices as part of its Smart Building solution. Mist AI also delivers AI-powered automation and service levels to ensure a better experience for connected devices, which helps to reduce the total number of service tickets arriving at the help desk and decreases the mean time to resolve an issue.

Juniper Connected Security converges networking and security by extending security to every point of connection in a smart building. With Connected Security, the smart building is better prepared to protect facility and building applications and devices.

Benefits

Juniper's Solution for Smart Buildings gives building owners access to an incredible amount of data that is collected continuously over the network. When owners and facility managers can connect the endpoints from multiple systems and gain insight from this data, they can:

- Reduce the total number of service tickets
- Reduce mean time to resolve an issue
- Utilize office space more efficiently and easily track assets
- Integrate with lighting and HVAC systems
- Optimize energy usage
- Monitor temperature and building air quality
- Increase employee productivity by providing custom profile settings for lighting and temperature.
- Integrate with other applications:
 - Building management software (Johnson controls)
 - Meeting collaboration tools
 - Safety and security systems

Solution Components

Juniper's Smart Building Solution helps modernize existing and new buildings. It combines industry-leading switches with PoE, network management that automates operations through AI, and security for every point of connection. Juniper offers an AI-driven, programmable, and an open portfolio of access and core/distribution switches for enterprise campus networks. Along with Juniper switches, Juniper Connected Security enforces security policies for devices and applications while helping to reduce overall attack surface. Juniper Mist Wired Assurance manages the network and connected devices from a single platform.

EX4400 Ethernet Switch (PoE/PoE+/PoE++) and Fast PoE

The PoE-enabled Juniper Networks EX4400 Ethernet Switch supports connecting devices such as phones, surveillance cameras, IoT devices, and 802.11AX/Wi-Fi 6 access points such as the Juniper Series of High-Performance Access Points (AP43, AP33, AP32, and AP12 Access Points). EX4400 switches provide a PoE power budget of up to 1800 W and support up to 90 W per port based on the 802.3bt PoE standard.

EX Series PoE switches deliver up to 90 W per port and can be used as a power source. The EX4400 switches also support a fast PoE capability that delivers PoE power to connected endpoints during a switch reboot, even before the switch is fully operational. This is especially beneficial in situations where the endpoint only needs power and is not necessarily dependent on network connectivity.

Juniper Connected Security

Juniper Connected Security unifies network elements into a single sensor or domain to deliver context-aware threat alerts. It dynamically enforces security policy with software-defined containment designed to reduce the overall attack surface. And once connected, automated security safeguards users, applications, and IoT infrastructure.

Juniper Mist Wired Assurance

The EX4400 switch is onboarded, provisioned, and managed by Juniper Mist Wired Assurance cloud service. The EX4400 delivers rich telemetry that enables AI for IT Operations (AI Ops) with simplified operations from Day 0 to Day 2 and beyond.

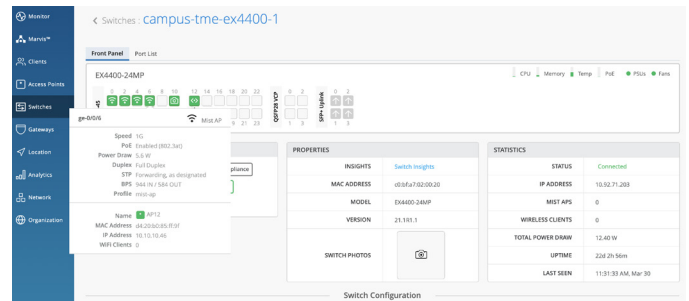


Figure 3. Switches are managed and configured with templates from Juniper Mist Wired Assurance.

Juniper Mist Wired Assurance provides detailed switch insights for easier troubleshooting and improved time to resolution. Its dynamic profiling and configuration templates help with faster and easier deployment on Day 0.

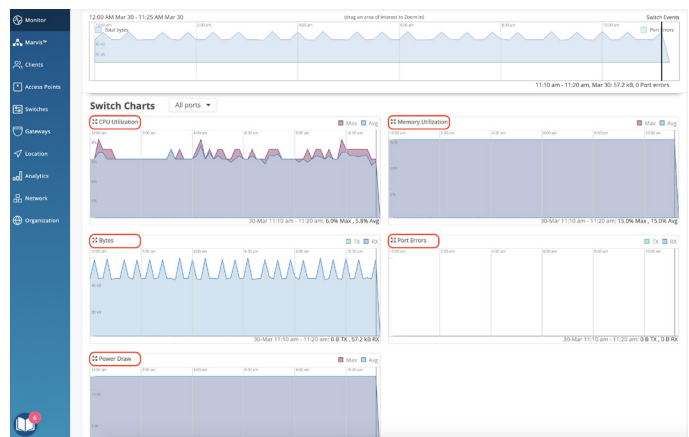


Figure 4. Juniper Mist Wired Assurance showing switch insights.

Juniper Mist Wired Assurance lists all PoE endpoints and the power drawn by each point under the wired client page.

Name	MAC Address	Role	Wireless Class	Interface	Power Draw
09:50:18:80:07:20:019	08:00:00:07:20:019	1	--	Mist-eip-eth-sw-1	0W
LD_Switch	5c:5c:5c:5c:5c:5c	2	0	Mist-eip-eth-sw-1	11.9W
LD_Switch_2	5c:5c:5c:5c:5c:5c	2	2	Mist-eip-eth-sw-2	11.9W
LD_Switch_3	5c:5c:5c:5c:5c:5c	2	0	Mist-eip-eth-sw-3	11.2W
LD_Switch_4	5c:5c:5c:5c:5c:5c	2	4	Mist-eip-eth-sw-4	11.9W
LD_Switch_5	5c:5c:5c:5c:5c:5c	2	3	Mist-eip-eth-sw-5	11.8W
LD_Switch_6	5c:5c:5c:5c:5c:5c	2	0	Mist-eip-eth-sw-6	11.9W
LD_Switch_7	5c:5c:5c:5c:5c:5c	2	0	Mist-eip-eth-sw-7	12.2W
LD_Switch_8	5c:5c:5c:5c:5c:5c	2	0	Mist-eip-eth-sw-8	14.6W
LD_Switch_9	5c:5c:5c:5c:5c:5c	2	--	Mist-eip-eth-sw-9	2.8W
LD_Switch_10	5c:5c:5c:5c:5c:5c	2	--	Mist-eip-eth-sw-10	2.8W
LD_Switch_11	5c:5c:5c:5c:5c:5c	2	--	Mist-eip-eth-sw-11	2.8W
LD_Switch_12	5c:5c:5c:5c:5c:5c	2	4	Mist-eip-eth-sw-12	4.4W
LD_Switch_13	5c:5c:5c:5c:5c:5c	2	--	Mist-eip-eth-sw-13	7.2W
LD_Switch_14	5c:5c:5c:5c:5c:5c	2	--	Mist-eip-eth-sw-14	0W

Figure 5. Power draw by each PoE endpoint.

Juniper Mist Wired Assurance service-level expectations and Marvis Virtual Network Assistant help the IT team on Day 2 activities such as managing and troubleshooting.

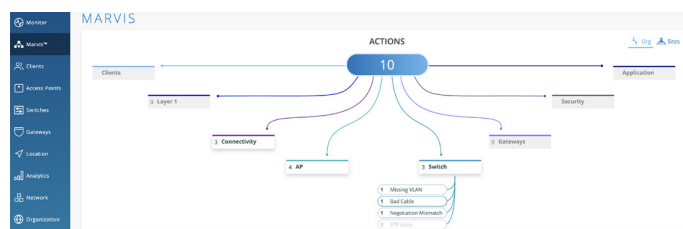


Figure 6. Marvis offers possible problem-solving actions for wired switches

Summary—Powering Smart Buildings with Juniper Switches and Mist AI

Juniper’s Smart Building Solution provides a proven blend of industry-leading products that helps modernize today’s buildings. Juniper’s AI-driven campus switches connect and power smart building IoT devices over IP and PoE. Juniper Mist Wired Assurance brings AI operational management to access layer switching to help simplify Day 0 to Day 2 operations and beyond. Juniper Mist Wired Assurance cloud service dashboard also helps facility managers with different analytics such as space utilization and energy utilization, providing a visual view of different PoE endpoints connected to switch ports as well as APIs so that third-party applications can access and share this data.

Next Steps

To learn more about Juniper’s Solution for Smart Buildings, please contact your Juniper account representative or go to www.juniper.net.

About Juniper Networks

Juniper Networks brings simplicity to networking with products, solutions and services that connect the world. Through engineering innovation, we remove the constraints and complexities of networking in the cloud era to solve the toughest challenges our customers and partners face daily. At Juniper Networks, we believe that the network is a resource for sharing knowledge and human advancement that changes the world. We are committed to imagining groundbreaking ways to deliver automated, scalable and secure networks to move at the speed of business.

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