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Nessum's Role in the Future of Building Automation

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What is the Building Automation System(BAS)?

Building Automation System

Refers to technologies and systems that centrally monitor and control various building facilities and equipment.

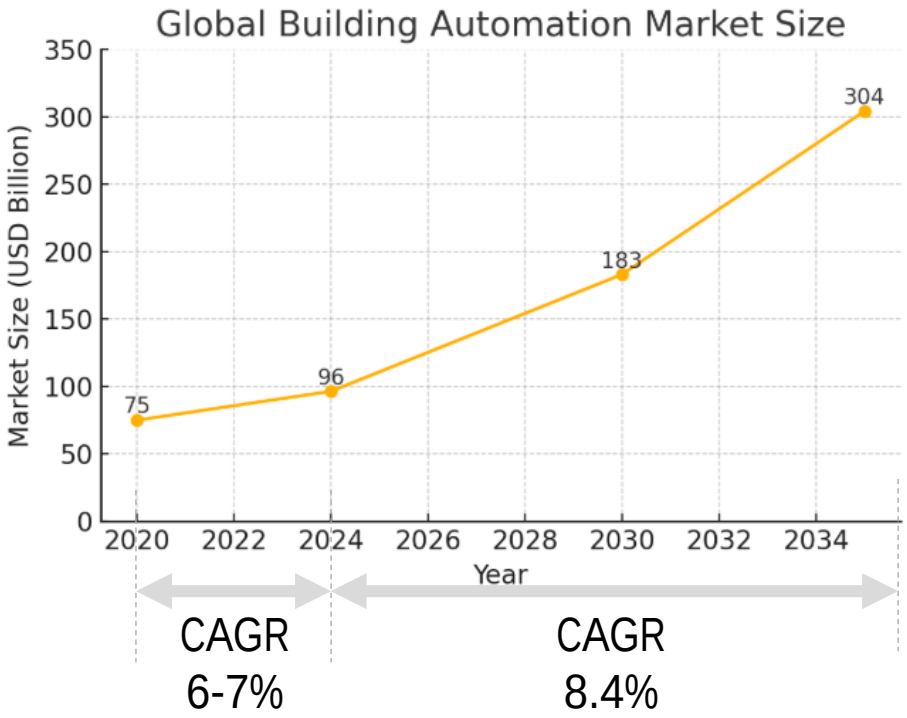
Purpose

To minimize energy consumption, reduce operational costs, enhance occupant comfort and safety, and extend equipment lifespan.

Specific Examples

- HVAC control (temperature and humidity management for boilers and air conditioning units)
- Automated lighting control (using motion sensors and timers)
- Security and surveillance (CCTV, intrusion detection, emergency alerts)
- Access control (electronic locks and entry/exit management)
- Fire and disaster prevention systems

BAS Global Market



Key Drivers of High Growth

- Increased investment in energy efficiency
- Advancements in IoT and AI technologies
- Rising demand for smart cities and smart buildings
- Need to reduce operational costs

https://www.globenewswire.com/news-release/2025/05/29/3090086/28124/en/Building-Automation-and-Control-Systems-Market-Opportunities-and-Strategies-to-2034-Top-3-Players-Hold-21-13-Market-Share-in-the-Fragmented-Industry-Led-by-Johnson-Controls-and-Hon.html

https://www.fortunebusinessinsights.com/building-automation-systems-market-107861

Protocol Market Share

Protocol (typical transport)	Estimated Global Share (device/project base, 2024)	Protocol Overview
BACnet IP (Ethernet / Wi-Fi)	**≈ 48 %**	IP-based flavour of BACnet that rides on standard IT networks, making it easier to route across VLANs/VPNs and to integrate cloud analytics; fastest-growing segment as new builds specify "all-IP" BAS backbones. (bacnetinternational.org, bacnetinternational.org)
BACnet MS/TP (RS-485 serial)	**≈ 29 %**	Legacy but still-ubiquitous BACnet variant using low-cost two-wire buses; dominates retrofit and field-level device networks (VAVs, sensors) and is typically routed upward into BACnet IP cores. (bacnetinternational.org)
KNX (TP1 twisted pair / KNX-IP / RF)	**≈ 6 %**	European-origin open standard emphasising distributed intelligence for lighting, blinds and room controllers; > 45 % of global KNX revenue is generated in Europe. (market.us)
Other open / wireless stacks (EnOcean, Zigbee, MQTT, proprietary IP)	**≈ 5 %**	Battery-less or mesh-wireless links and vendor-specific IP APIs used for retrofit IoT sensors and small commercial / residential automation; typically gatewayed into BACnet or KNX cores. (ccontrols.com)
LonWorks / LonTalk	**≈ 5 %**	1990s-vintage open protocol once co-equal with BACnet; now largely confined to legacy stock in North America & Western Europe and integrated through multiprotocol BMS routers. (bacnet.org)
Modbus RTU / TCP	**≈ 4 %**	Simple industrial protocol still common in boilers, chillers and meters; survives at the field layer and is routinely "virtual-routed" into BACnet by modern gateways. (ccontrols.com)
DALI / DALI-2 (lighting bus)	**≈ 3 %**	Digital Addressable Lighting Interface—de-facto open standard for wired luminaires; dominates professional lighting subsystems and is bridged upward to BACnet/KNX for whole-building integration. (dali-alliance.org)

Market share figures were derived through deep research based on the following sources:
https://bacnetinternational.org/wp-content/uploads/sites/2/2024/04/240419_BJ_OfBuildingAutomation_25_digital-1.pdf
https://market.us/report/knx-products-market/
https://ccontrols.com/enews/2023/1123story3.htm
https://www.dali-alliance.org/data/downloadables/2/7/8/2110_smart-buildings-show_october-2021.pdf

Comparison of Network Standards

	Nessum WIRE	RS485	Ethernet	Wi-Fi
Low cost network construction	++ **Almost no wiring required** *** A simple circuit design is required**	- **Wiring required**	- **Wiring required**	+ No wiring required, but the signal reach must be designed
Communication distance (in case of no relay)	++ 200m to 2000m (depending on the type of cables and environment)	+ **300m to 1200m**	+ **100m**	+ About 100 m (When there are no obstacles)
Effective speed	-- Several Mbps to several tens of Mbps (Dependent on the cable material and number of hops)	--- 9.6k bps to several tens of kbps (Depending on the distance)	++ A few Gbps	+ Several hundred of Mbps
Security	++ AES 128-bit encryption and Complex modulation pattern	-	- Addressed in upper layers	+ AES 128-bit encryption
Support topology	++ **Free topology**	+ **Only daisy chain topology**	+ **Only star topology**	
Portability	--	--	--	++

Legend : bad --, -, +, ++, good

Research

AHR Orlando
FEB 10-12, 2025

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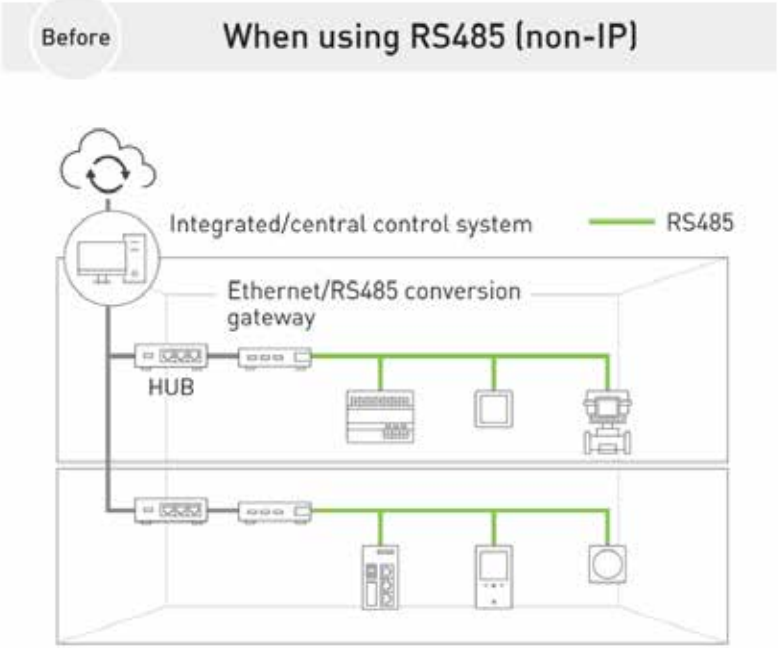
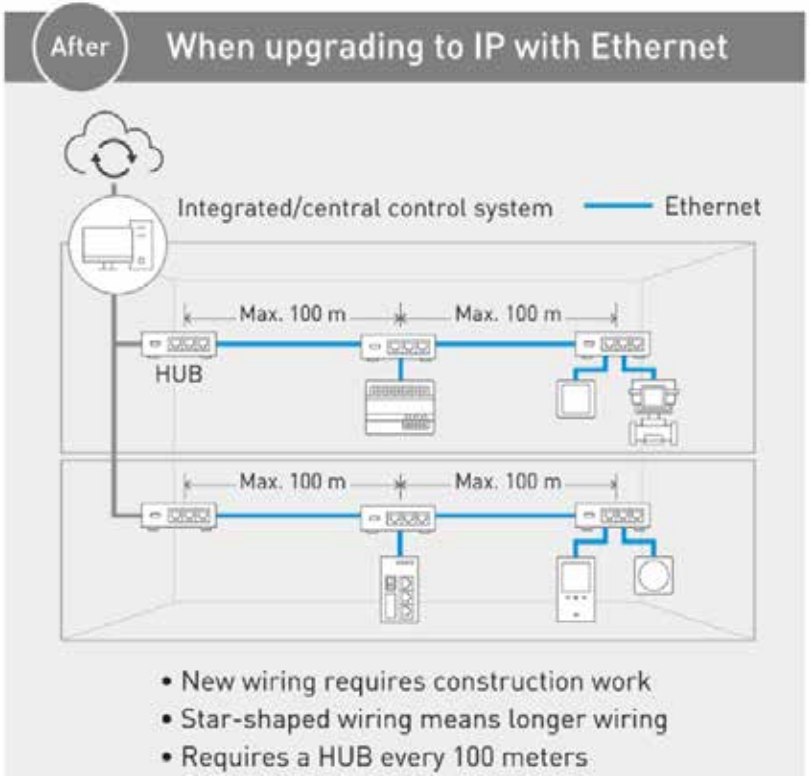
Need and Challenge

Transitioning from RS485 to IP-Based Devices

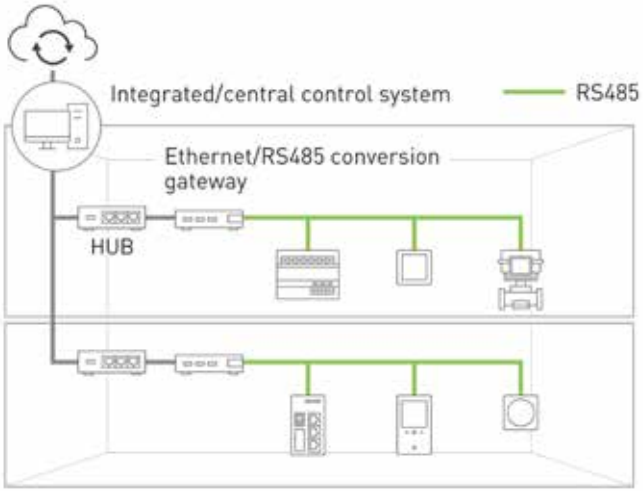




Solution using Nessum WIRE

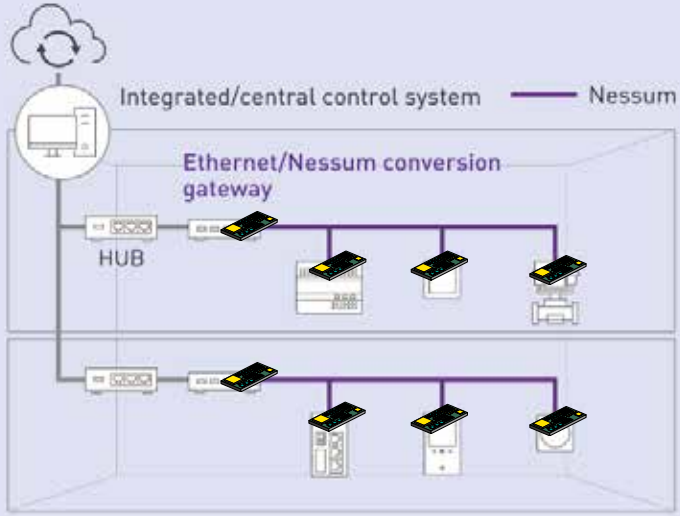
Before

When using RS485 (non-IP)



After

When upgrading to IP with Nessum



- Uses existing wiring as is – no rewiring required
- Flexibility to use a variety of wiring types
- Multi-hop technology enables long-distance communication over several kilometers

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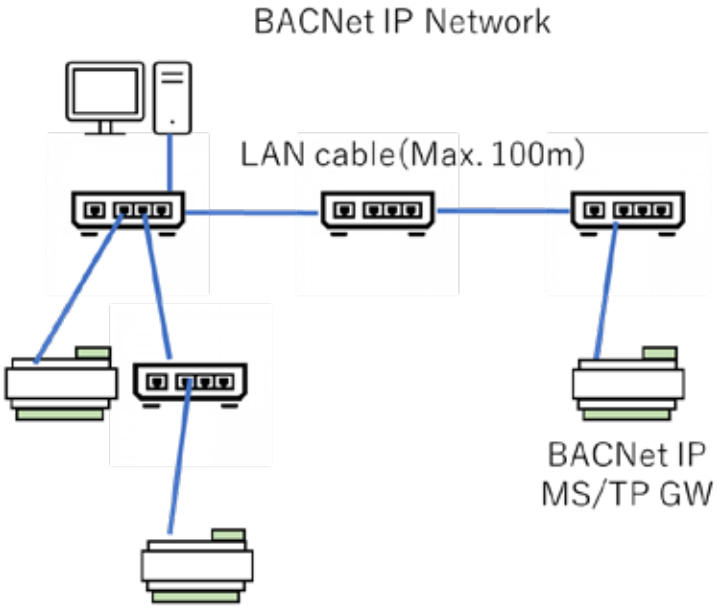
Challenge 2

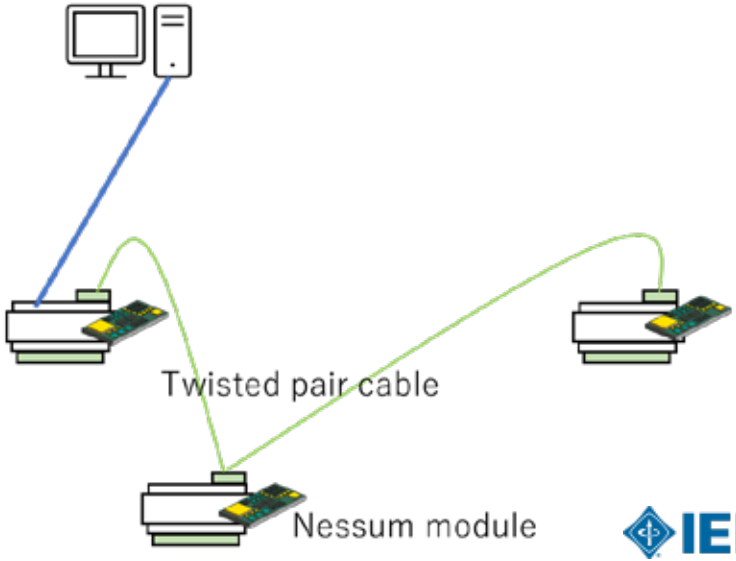
Assumed Issue

High cost of LAN cable installation for BA-based IP equipment

Solution

Free topology and long-distance communication by incorporating Nessum module.
Reduce installation cost!





Conclusion

- The building automation industry is expected to grow at a high CAGR of 8.4% through 2035.
- There is a growing demand to replace RS485-based devices with IP-enabled devices. However, the cost of replacing existing cabling with Ethernet is a major challenge.
- Leveraging Nessum enables cost-effective network deployment.
- Inquiry

  https://tech.panasonic.com/global/nessum/apply/agreement.html

Nessum WIRE vs Single Pair Ethernet

	Nessum	SPE (Single Pair Ethernet)				Ethernet
	Nessum WIRE	**10BASE-T1S**	**10BASE-T1L**	**100BASE-T1**	**1000BASE-T1**	**1000BASE-T**
Standard	IEEE 1901	IEEE 802.3cg	IEEE 802.3cg	IEEE 802.3bw	IEEE 802.3bp	IEEE 802.3ab
Communication Speed	Several to Several tens [Mbps]*	10 Mbps	10 Mbps	100 Mbps	1000 Mbps	1000 Mbps
Connection	Point-to-Multipoint **(Free Topology, < 1024 nodes)**	Point-to-Point (Star) Point-to-Multipoint (Multidrop, > 8 nodes)	Point-to-Point (Star)	Point-to-Point (Star)	Point-to-Point (Star)	Point-to-Point (Star)
Communication Distance	Several [km]*	> 25 m	> 1000 m	UTP : > 15 m STP : > 40 m	UTP : > 15 m STP : > 40 m	100 m
Transmission	Half Duplex	Half Duplex	Full Duplex	Full Duplex	Full Duplex	Full Duplex
Cable	**Any type of cable No new wiring**	SPE cable	SPE cable	SPE cable	SPE cable	Ethernet cable (Cat 5)