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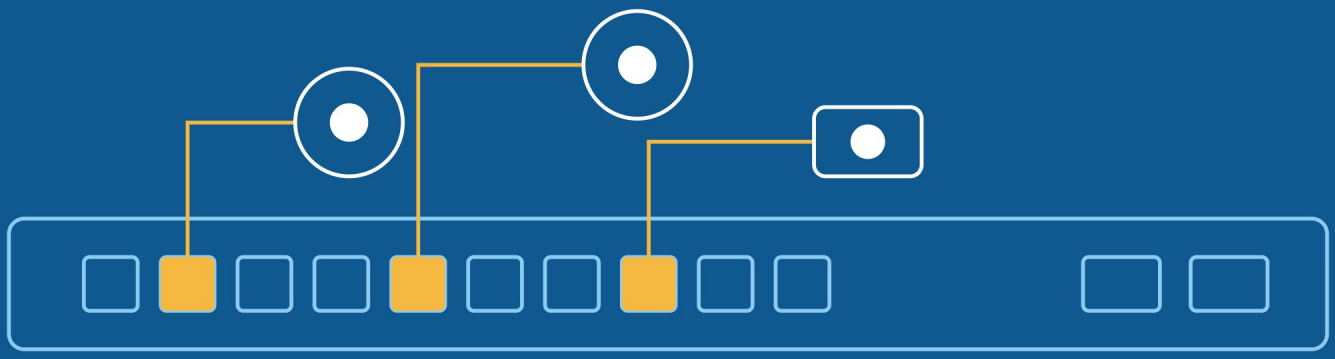

FOR IT TEAMS PLANNING A REFRESH

Network Refresh Buyer's Guide

What to check before investing in PoE++, multi-gig switches and new wireless access points.

WHAT THIS GUIDE COVERS

PoE++ power requirements

Confirm the PoE type and class each device needs, not just the PoE++ label.

Multi-gig and cabling

Check supported speeds at both ends, and test existing cable before reuse.

Infrastructure and planning

Uplinks, power resilience and UPS, plus a worked example and worksheet.

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Technical Assistance

INSA Integra's engineers can help you plan and implement your network refresh. Our team can assess PoE power budgets, multi-gig port requirements, cabling, uplink capacity, and resilience needs, then support equipment selection, configuration, deployment, and validation.
Contact us to discuss your network refresh or other networking and cybersecurity requirements.

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Why Planning Matters

A successful network refresh requires switches that deliver both the power and bandwidth your devices need. An Access Point (AP) may connect successfully yet operate with limited features because of insufficient power, or restricted throughput because of its Ethernet connection. Some devices will benefit from PoE++ and multi-gig speeds, while PoE+ and 1 GbE may remain sufficient elsewhere.

This guide provides a planning worksheet to help you define requirements and review a quote.

Assessing both requirements before purchasing helps avoid pitfalls and unexpected upgrade costs.

1.0 Understanding PoE++

Power over Ethernet signifies electrical power and data are transmitted over the same cable. The Power Sourcing Equipment (PSE) supplies power and may be a PoE switch or injector and the endpoint is the Powered Device (PD). Cable losses mean the power available at the device is lower than the switch output.

Name	IEEE standard	Power Class	Power at PSE [Watt]	Max power available at PD [Watt]
PoE (Type 1)	802.3af	3	15.4	13
PoE+ (Type 2)	802.3at	4	30	25.5
PoE++ (Type 3)	802.3bt	6	60	51
PoE++ (Type 4)	802.3bt	8	90	71.3

The table shows the highest power class within each type. For comparison, 802.3bt Class 5 provides 45 Watt (W) available at the switch with up to 40 W delivered at the device. [1][2]

Confirm the required type, class, and operating mode rather than relying on the PoE++ label alone.

Power requirements vary by access point model and features usage. The HPE Aruba Networking 730 Series supports unrestricted operation on 802.3bt (Type 3) Class 5 while with 802.3at (Type 2) Class 4, USB is disabled when Intelligent Power Monitoring is disabled. [2][3] Restrictions vary by model. Standards-based PoE negotiates power with compatible endpoints. [2]

Confirm required features, accessories, and peak requirements for cameras and other endpoint devices.

2.0 Understanding Multi-Gig Ethernet

Multigigabit Ethernet supports link rates such as 2.5 and 5 Gb/s between traditional 1 and 10 GbE options. GbE describes the nominal Ethernet link rate in gigabits per second. A 10 GbE label does not confirm support for intermediate speeds.

Check the exact speeds supported at both the switch port and endpoint. [4]

An AP serves multiple clients. If their combined traffic exceeds the capacity of the APs wired connection, that connection can become a bottleneck. In addition, a device with a 1 GbE interface is limited to that link speed even connected to a faster port. [4][5]

Prioritize multi-gig where compatible devices and expected traffic justify the additional capacity.

2.1 Cabling Requirements

- Cat5e supports 2.5GBASE-T up to 100 m. Support for 5GBASE-T requires assessment and testing, particularly on longer or tightly bundled runs. Do not specify Cat5e for a new 10GBASE-T installation. [4][6]
- Cat6 supports 2.5 and 5GBASE-T up to 100 m. For 10GBASE-T, reach is commonly planned up to 55 m, subject to alien crosstalk and installation conditions. Suitability must be established by testing. [4][6]
- Cat6A supports 10GBASE-T up to 100 m and is the preferred specification for new runs intended to support that speed. [7]

Before reusing cabling, test for the intended Ethernet application. Include length, insertion loss, return loss, and crosstalk, with alien crosstalk (interference from adjacent cables) assessment where required. Retain the test reports and verify negotiated link speeds after installation. [4][6][7]

Assess the complete channel, including patch cords, connectors, and terminations.

3.0 Supporting Infrastructure Requirements

Beyond port speed and per-device power, consider the following requirements:

Topic	What to look for/plan for
Switching performance	Switching capacity and packet forwarding rate should suit expected traffic. Plan for: port-group or stacking limitations that could restrict performance. [8]
Uplink capacity	Connections to the core, firewall, and servers should be sized for expected concurrent traffic and growth. Plan for: sufficient remaining capacity under failure conditions.
Power resilience	Dual power supplies may be required for power availability needs. Plan for: sufficient PoE budget after a power supply failure. Define device priorities if available power is reduced. [9]
Uninterruptible Power Supply (UPS) capacity and runtime	Consider power required for the switch, connected devices, and other protected equipment. Verify expected runtime meets operational requirements. Plan for: A separate UPS input-load calculation. The PoE budget alone may be insufficient.
Device compatibility	Confirm proposed switch and firmware support the actual endpoint models and their required features.
Complete equipment scope	Review compatibility of optics or Direct Attach Copper (DAC) cables, modules, and power supplies. Verify required licences, management, support, and installation. Itemize one-time costs and recurring charges.

Confirm the proposed network configuration meets requirements.

4.0 Network Refresh Planning Example

The following illustrates switch power allocations, not measured device consumption, for a hypothetical office with six APs, four Pan-Tilt-Zoom (PTZ) cameras, and ten phones connected to one 24-port switch.

Device	Quantity	Required port speed	PoE Class assumed	Switch power allocation per device	Totals
Access point	6	2.5 GbE	Class 5	45 W	270 W
PTZ camera	4	1 GbE	Class 6	60 W	240 W
IP phone	10	1 GbE	Class 2	7 W	70 W
Total	20				580 W

Using switch allocation consistently, avoids mixing device consumption with switch power capacity. [1][2]

Confirm the proposed switch reserves and manages power requirements.

An example 25% power allowance budget pushes the planned allocation of 580 W to 725 W.
(580 W × 1.25 = 725 W)

The switch needs six ports supporting 2.5 GbE and Class 5 PoE, four additional Class 6 ports, and ten ports suitable for the phones. Four ports remain spare. The 25% allowance applies to planned power needs only. Planning needs to also take into account the speed and PoE class requirements of future devices connected to the spare ports.

Assuming a proposed switch with dual power supplies provides 740 W of PoE capacity typically but only 370 W when one power supply fails and the project requires all attached devices remain powered during failure. In this example the candidate switch meets the normal power target but fails the resilience requirement.

In the situation where reduced service is acceptable, decide which devices must stay powered, verify their combined allocation fits the surviving budget, and test the configured priorities. Document the reduced-service requirement before selecting equipment. Dual Power Supply Units (PSU) alone do not establish high availability.

Select a switch with enough power capacity to meet power allocation needs.

5.0 Network Refresh Planning Worksheet

Complete one worksheet per switch or independently managed power budget.
Attach additional device rows and supporting reports as needed.

Customer / site: _____ Location / switch ID: _____

Contact: _____ Date: _____ Existing switch: _____

1. Why are you refreshing the network

☐ End of support ☐ End of life ☐ Security / patching ☐ Performance ☐ Growth / more devices

Other / details: _____

2. Number of ports required

Total ports needed at deployment: _____ Future additions: _____

3. How many access points will connect to this switch

At deployment: _____ Future additions: _____

List existing and proposed AP models in the table below.

4. How critical is this environment

Services that must stay available: _____ Acceptable downtime: _____

UPS backup available: ☐ Yes ☐ No ☐ Unsure

5. Is stacking required

Existing: ☐ Stacked ☐ Standalone ☐ Unsure Proposed: ☐ Stacked ☐ Standalone ☐ Unsure Switches: _____

6. What uplink speed is required

Current: _____ Gbps Proposed: _____ Gbps / ☐ Unsure Connects to: _____

Redundant uplinks needed: ☐ Yes ☐ No ☐ Unsure

Current performance concerns: _____

7. What cabling is installed and will it change

Installed: ☐ Cat5e ☐ Cat6 ☐ Cat6A ☐ Fibre ☐ Other _____ ☐ Unsure

Plan: ☐ Retain ☐ Partially replace ☐ Fully replace ☐ Unsure Test reports available: ☐ Yes ☐ No

8. What PoE capability is required

☐ PoE ☐ PoE+ ☐ PoE++ ☐ None ☐ Unsure

List the devices that will connect after the refresh. Include equipment being retained as well as new equipment. Exclude devices being removed or replaced.

Device Type/Model	Quantity at deployment	Future additions	Required port speed [Gbps]	Required features or accessories

For technical review

Confirm exact PoE type / class, device operating mode and speed. Attach the port map and power calculation.

Ports needing multi-gig: _____ Required speeds: _____

Speed and PoE together: ☐ Verified ☐ Review

Required switch-side PoE allocation, including growth: _____ W Available normally: _____ W

Normal budget: ☐ Fits ☐ Review

Failure scenario: _____ PoE required: _____ W

Available: _____ W ☐ Fits ☐ Review ☐ N/A

Availability design: ☐ Dual PSUs ☐ Switch redundancy ☐ Uplink redundancy ☐ UPS ☐ Review ☐ N/A

Validate cabling, traffic capacity and availability against the agreed needs.

Reviewed by: _____

Status: ☐ Ready ☐ Ready with conditions ☐ Further assessment required

Technical References

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