

HP Networking v2 zl Modules for the E5400 zl and E8200 zl Series Switches Technical NPI Training

New Product Introduction Technical Training

NPI Technical Training

Version: 11.11

03 Nov. 2010



Training for Networking Professionals

- This training is intended for networking professionals who are familiar with:
 - HP E5400 zl and HP E8200 zl modular switch series
 - K.14 software
 - Power over Ethernet (PoE/PoE+)
 - SFP/SFP+
 - ProVision ASIC



Objectives

- After completing this training you should be able to:
 - Compare and contrast the features of the new HP v2 zl modules for the HP E5400 zl and E8200 zl modular switch series
 - Be familiar with the new E5400 zl and E8200 zl chassis and module bundles
 - Understand the new energy savings features offered by the new zl modules
 - Be aware of new K.15.02.0004 software features.



Table of Contents

- Marketing Overview
- New v2 zl modules
- New E5400 zl and E8200 zl bundles
- Q & A
- Performance
- Energy saving features
- Software updates
- Q & A



Marketing Overview



E5400 zl and E8200 zl switch series

- Modular ProVision ASIC switches
- Great flexibility and scalability
- Business continuity



E8200 zl



E5400 zl

An expansive selection of V2 zl modules



J9536A (non-PoE: J9548A) Module

20-port Gig-T PoE+ / 2-port 10G SFP+ v2 zl



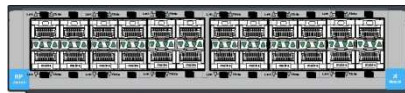
J9535A (non-PoE: J9549A)

20-port Gig-T PoE+ / 4-port 1G SFP v2 zl Module



J9534A (non-PoE: J9550A) Module

24-port Gig-T PoE+ v2 zl



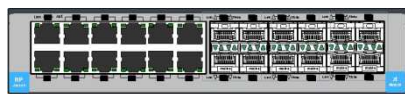
J9537A

24-port SFP v2 zl Module



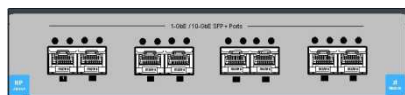
J9547A

24-port 10/100 PoE+ v2 zl Module



J9637A

12-port Gig-T PoE+ / 12-port SFP v2 zl Module



J9538A

8-Port 10G SFP+ v2 zl Module

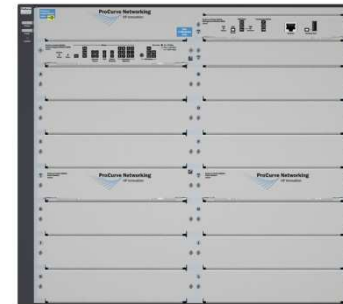
New E5400 zl and E8200 zl bundles

Chassis + Premium License

J9640A HP E8206 v2 zl Switch with Premium SW



J9641A HP E8212 v2 zl Switch with Premium SW



J9642A HP E5406 v2 zl Switch with Premium SW



J9643A HP E5412 v2 zl Switch with Premium SW



New E5400 zl and E8200 zl bundles

Chassis + module bundles

- Chassis
- Premium License
- Select v2 modules



Energy saving features

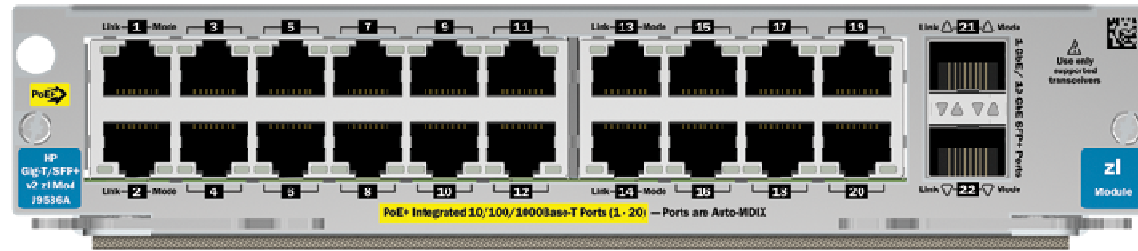
- 802.3az Energy Efficient Ethernet
- ProVision ASIC



V2 zl modules



HP 20-port Gig-T PoE+/2-port SFP+ v2 zl Module



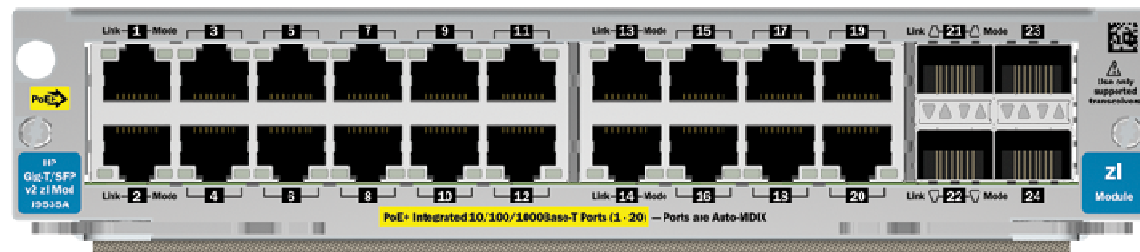
- 20 Gig-T RJ-45 ports
- 2 SFP+ ports
- PoE/PoE+ capable on all RJ-45 ports
- Maximum of 370 watts of PoE/PoE+ per zl module slot
- Uplink port can use SFP+ or SFP for 10GbE and 1GbE connectivity

New!
Gig-T and SFP+ Combo

Also available in non-PoE: J9548A

HP 20-port Gig-T PoE+/4-port SFP v2 zl Module

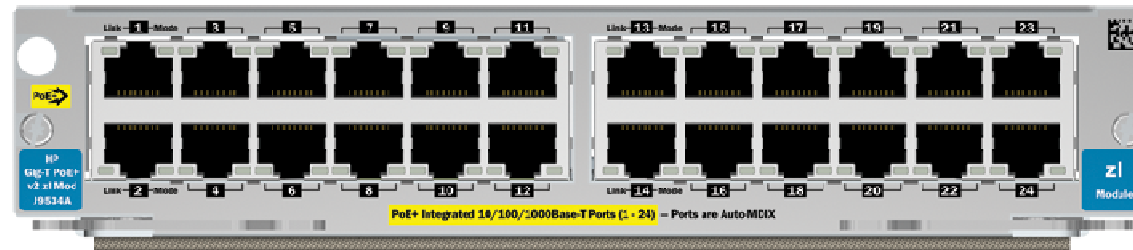
- 20 Gig-T RJ-45 ports
- 4 SFP ports
- PoE/PoE+ capable on all RJ-45 ports
- Maximum of 370 watts of PoE/PoE+ per zl module slot
- Uplinks can run at 1Gb and 100Mb data rates



Also available in non-PoE: J9549A

HP 24-port Gig-T PoE+ v2 zl Module

J9534A



New!
Available as non-PoE

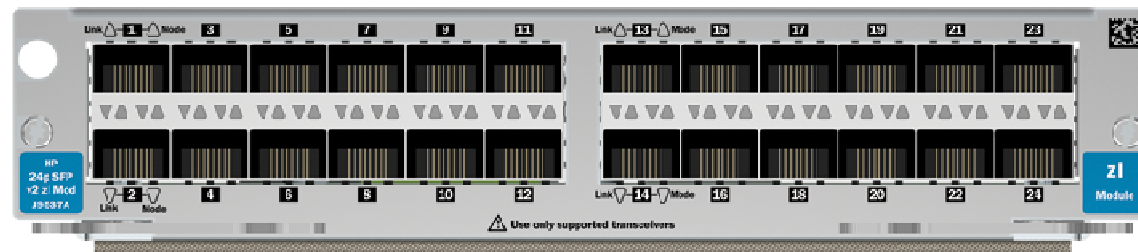
- 24 Gig-T RJ-45 ports
- PoE/PoE+ capable on all RJ-45 ports
- Maximum of 370 watts of PoE/PoE+ per zl module slot

Also available in non-PoE: J9550A

HP 24-port SFP v2 zl Module

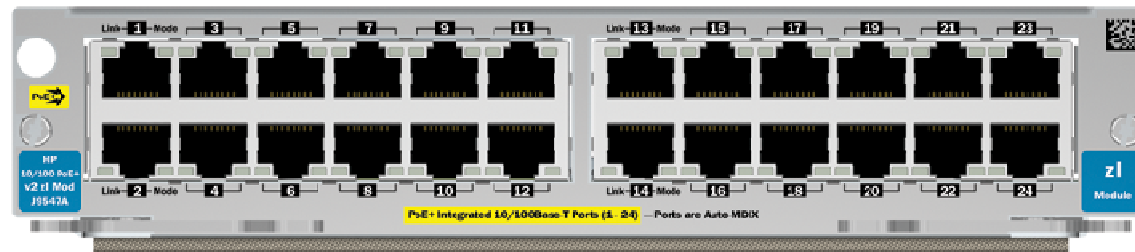
J9537A

– 24 SFP optical ports



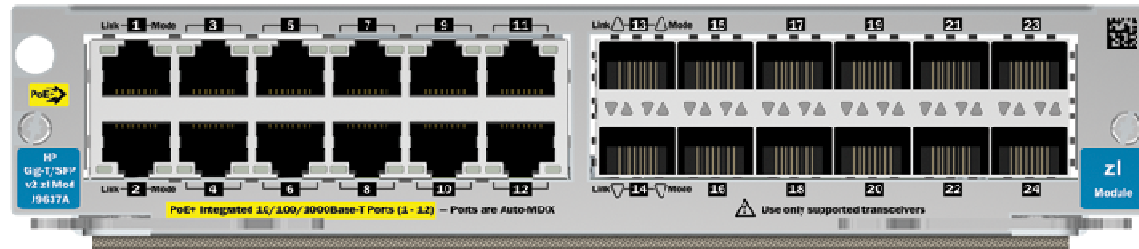
HP 24-port 10/100 PoE+ v2 zl Module

J9547A



- 24 10/100-TX RJ-45 ports
- Maximum of 370 watts of PoE/PoE+ per zl module slot

HP 12-port Gig-T PoE+ /12-port SFP v2 zl Module

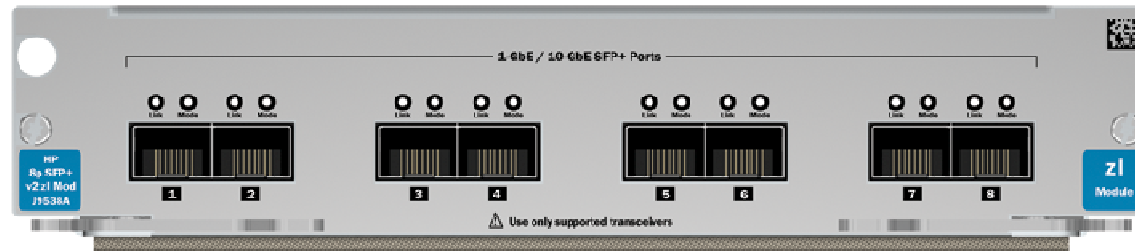


- 12 Gig-T RJ-45 ports
- 12 SFP ports
- PoE/PoE+ capable on all RJ-45 ports
- Maximum of 370 watts of PoE/PoE+ per zl module slot



HP 8-port 10-GbE SFP+ v2 z1 Module

J9538A



New!
Double SFP+ density

- 8 SFP+ ports
- Supports SR, LR, and LRM SFP+ Transceivers
- Supports Direct Attach Cables, 1m, 3m, & 7m

HP E5400/E8200 zl module accessories

SFP transceivers

- J4858C - HP X121 1G SFP LC SX Transceiver
- J4859C - HP X121 1G SFP LC LX Transceiver
- J4860C – HP X121 1G SFP LC LH Transceiver
- J9142B – HP X122 1G SFP LC BX-D Transceiver
- J9143B – HP X122 1G SFP LC BX-U Transceiver
- J9054B – HP X111 100M SFP LC FX Transceiver
- J9099B – HP X112 100M SFP LC BX-D Transceiver
- J9100B – HP X112 100M SFP LC BX-U Transceiver



HP E5400/E8200 zl module accessories

SFP+ transceivers

- J9150A - HP X132 10G SFP+ SR Transceiver
- J9151A - HP X132 10G SFP+ LR Transceiver
- J9152A - HP X132 10G SFP+ LRM Transceiver
- J9153A - HP X132 10G SFP+ LC ER Transceiver 



HP E5400/E8200 zl module accessories

Direct Attach Cables

- J9281B – HP X242 SFP+ SFP+ 1m Direct Attach Cable
- J9283B – HP X242 SFP+ SFP+ 3m Direct Attach Cable
- J9285B – HP X242 SFP+ SFP+ 7m Direct Attach Cable
- J9300A – HP X244 XFP SFP+ 1m Direct Attach Cable
- J9301A – HP X244 XFP SFP+ 3m Direct Attach Cable
- J9302A – HP X244 XFP SFP+ 5m Direct Attach Cable



Chassis and select zl module bundles



E5406 zl bundles

– HP E5406-44G-PoE+ /4G SFP v2 zl switch (J9539A)

- 1 24-port Gig-T PoE+ v2 zl Module (J9534A)
- 1 20-port Gig-T PoE+ /4-port SFP v2 zl Module (J9535A) 
- 1 1500W PoE+ zl power supply (J9306A)



– HP E5406-44G-PoE+ /2XG SFP+ v2 zl switch (J9533A)

- 1 24-port Gig-T PoE+ v2 zl Module (J9534A)
- 1 20-port Gig-T PoE+ /2-port SFP+ v2 zl Module (J9536A) 
- 1 1500W PoE+ zl power supply (J9306A)



E5412 zl bundles

– HP E5412-92G-PoE+ /4G SFP v2 zl switch (J9540A)

- 3 24-port Gig-T PoE+ v2 zl modules (J9534A)
- 1 20-port Gig-T PoE+ /4-port SFP v2 zl module (J9535A) 
- 2 PoE+ zl power supplies (J9306A)



– HP E5412-92G-PoE+ /2XG SFP+ v2 zl switch (J9532A)

- 3 24-port Gig-T PoE+ v2 zl modules (J9534A)
- 1 20-port Gig-T PoE+ /2-port SFP+ v2 zl module (J9536A) 
- 2 PoE+ zl power supplies (J9306A)



E8200 zl bundles



– HP E8206-44G-PoE+ /2XG SFP+ v2 zl switch (J9638A)

- 1 24-port Gig-T PoE+ v2 zl Module (J9534A)
- 1 20-port Gig-T PoE+ /2-port SFP+ v2 zl Module (J9536A)
- 1 1500W PoE+ zl power supply (J9306A)



– HP E8212-92G-PoE+ /2XG SFP+ v2 zl switch (J9639A)

- 3 24-port Gig-T PoE+ v2 zl Modules (J9534A)
- 1 20-port Gig-T PoE+ /2-port SFP+ v2 zl Module (J9536A)
- 2 1500W PoE+ zl power supplies (J9306A)



HP E5406 zl bundle comparison

	 HP E5406-44G-PoE+/4G-SFP v2 zl Switch w/ Premium Software (J9539A)	 HP E5406-44G-PoE+/2XG-SFP+ v2 zl Switch w/ Premium Software (J9533A)	5406zl-48G-PoE (J8699A)	5406zl-48G-PoE+ (J9447A)
Rack Units	4U	4U	4U	4U
Gig RJ-45 ports	44	44	48	44
Uplink ports	4x1 Gb	2x10 Gb	-	4x1 Gb
PoE or PoE+	PoE/PoE+	PoE/PoE+	PoE	PoE/PoE+
Power Supply	J9306A	J9306A	J8712A	J9306A
PoE/PoE+ Power	300 W @ 110-127 V 900 W @ 200-240 V	300 W @ 110-127 V 900 W @ 200-240 V	273 W @ 100-127 V 273 W @ 200-240 V	300 W @ 110-127 V 900 W @ 200-240 V

HP E5412 zl bundle comparison

	 HP E5412-92G-PoE+/4G-SFP v2 zl Switch with Premium Software (J9540A)	 HP E5412-92G-PoE+/2XG-SFP+ v2 zl Switch with Premium Software (J9532A)	5412zl-96G-PoE (J9700A)	5412zl-96G-PoE+ (J9448A)
Rack Units	7U	7U	7U	7U
Gig RJ-45 ports	92	92	96	92
Uplinks ports	4x1 Gb	2x10 Gb	-	4x1 Gb
PoE or PoE+	PoE/PoE+	PoE/PoE+	PoE	PoE/PoE+
Power Supply	2 x J9306A	2 x J9306A	2 x J8712A	2 x J9306A
PoE/PoE+ Power	600 W @ 110-127 V 1800 W @ 200-240 V	600 W @ 110-127 V 1800 W @ 200-240 V	546 W @ 100-127 V 546 W @ 200-240 V	600 W @ 110-127 V 1800 W @ 200-240 V

HP E5400 zl bundle specifications

	 New	 New	 New	 New
	E5406-44G-PoE+ / 4G-SFP v2 zl Switch	E5412-92G-PoE+ / 4G-SFP v2 zl Switch	E5406-44G-PoE+ /2XG-SFP+ v2 zl Switch	E5412-92G-PoE+ /2XG-SFP+
	(J9539A)	(J9540A)	(J9533A)	(J9532A)
Dimensions				
Depth	17.75 in (45 cm)	17.75 in (45 cm)	17.75 in (45 cm)	17.75 in (45 cm)
Width	17.5 in (44.2 cm)	17.5 in (44.2 cm)	17.5 in (44.2 cm)	17.5 in (44.2 cm)
Height	6.9 in (17.5 cm)	12.1 in (30.7 cm)	6.9 in (17.5 cm)	12.1 in (30.7 cm)
Weight				
	45.58 lb., (20.72 kg.)	74.86 lb., (34.03 kg.)	46.08 lb., (20.95 kg.)	75.36 lb., (34.25 kg.)
Acoustics				
Sound Power ¹	57 dB	64 dB	57 dB	64 dB
Sound Pressure ²	40.2 dB	57.5 dB	40.2 dB	57.5 dB
Operating Temperature Range ³	0°to 55°C ³ (32°to 131°F)	0°to 55°C ³ (32°to 131°F)	0°to 55°C ³ (32°to 131°F)	0°to 55°C ³ (32°to 131°F)

Notes:

1. Sound Power – is the total sound energy radiated by a source per unit time
2. Sound Pressure - is the pressure deviation from the local ambient pressure caused by a sound wave.
3. Operating Temperature Range is dependant on the modules and accessories used*

HP E8200 zl bundle specifications



E8206-44G-PoE+ /
2XG-SFP+ v2 zl
Switch
(J9638A)

E8212-92G-PoE+
/ 2XG-SFP+ v2 zl
Switch
(J9639A)

Dimensions

Depth	17.49 in (44.42 cm)	18.7 in (47.5 cm)
Width	17.42 in (44.25 cm)	17.5 in (44.45 cm)
Height	10.35 in (26.29 cm)	15.6 in (39.62 cm)

Weight	61.48 lb., (27.95 kg.)	102.76 lb., (46.71 kg.)
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Acoustics

Sound Power ¹	60 dB	63 dB
Sound Pressure ²	41.3 dB	47.8 dB

Operating Temperature Range ³	0°to 45°C ³ (32°to 113°F)	0°to 45°C ³ (32°to 113°F)
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Notes:

1. Sound Power – is the total sound energy radiated by a source per unit time
2. Sound Pressure - is the pressure deviation from the local ambient pressure caused by a sound wave.
3. Operating Temperature Range is dependant on the modules and accessories used*

HP E5400 zl bundle specifications

Power consumption & heat dissipation

Products	Idle Power No ports connected, no transceivers		Max Power Rating All ports connected (10/100T, 1G), max traffic, (if PoE, max PoE power)	
	Watts	BTU/Hr.	Watts	BTU/Hr.
5406zl-48G-PoE+ (J9447A)	215	733.2	950	930.3
5412zl-96G-PoE+ (J9448A)	312	1063.9	1880	1582.7
E5406-44G-PoE+ / 4G-SFP v2 zl Switch (J9539A)	152	516	974	865
E5412-92G-PoE+ / 4G-SFP v2 zl Switch (J9540A)	252	860	1893	1544

Notes:

1. Power consumption and Heat Dissipation values for specified bundles using 220 volt power source.
2. J9447A includes: 1 – J9307A, 1 – J9308A, and 1 – J9306A
3. J9448A includes: 3 – J9307A, 1 – J9308A, and 2 – J9306A
4. J9539A includes: 1 – J9534A, 1 – J9535A, and 1- J9306A
5. J9540A includes: 3 – J9534A, 1 - J9535A, and 2- J9306A



HP E5400 and E8200 zl bundle specifications

Power consumption & heat dissipation

Products	Idle Power No ports connected, no transceivers		Max Power Rating All ports connected (10/100T, 1G), max traffic, (if PoE, max PoE power)	
	Watts	BTU/Hr.	Watts	BTU/Hr.
E5406-44G-PoE+ /2XG-SFP+ v2 zl Switch (J9533A)	164	557	989	916
E5412-92G-PoE+ /2XG-SFP+ (J9532A)	267	909	1937	1693
E8206-44G-PoE+ / 2XG-SFP+ v2 zl Switch (J9638A)	191	649	1016	1007
E8212-92G-PoE+ / 2XG-SFP+ v2 zl Switch (J9639A)	288	981	1946	1726

Notes:

1. Power consumption and Heat Dissipation values for specified bundles using 220 volt power source.
2. J9533A includes 1 – J9534A, 1 – J9536A, and 1- J9306A
3. J9532A includes 3 – J9534A, 1-J9536A, and 2- J9306A
4. J9638A includes 1 – J9534A, 1 – J9536A, and 1- J9306A
5. J9639A includes 3 – J9534A, 1-J9536A, and 2- J9306A



Q&A



Performance



PoE+ overview

- Maximum power increased to 30 W (at switch)
 - 24 W delivered to powered devices (PDs)
- Enables additional devices
 - 802.11n access points, thin devices and pan-tilt-zoom cameras
- LLDP-MED enables dynamic and granular power negotiation
 - Can negotiate power in fractions of watts
- Compatible with PoE
 - PoE+ power supplies also power PoE devices



HP zl power supply specifications

Electrical Characteristics

	875W zl Power Supply (J8712A)		1500W zl Power Supply (J8713A)	1500W PoE/PoE+ zl Power Supply (J9306A)	
Input Voltage	100-127 VAC	200-240 VAC	200-240 VAC	110-127 VAC	200-240 VAC
Input Current	12 A	5.7 A	10 A	13 A	10 A
PoE Power	273 W	273 W	900 W	300 W	900 W
Frequency	50/60 Hz	50/60 Hz	50/60 Hz	50/60 HZ	50/60 Hz
PoE/PoE+	PoE	PoE	PoE	PoE+	PoE+

Notes:

1. The J8712A and J9306A use a C15 (notched) power cord
2. The J8713A uses a C19 power cord



PoE power supply interoperability

- For PoE power
 - PoE (J8712A or J8713A) power supplies or PoE+ (J9306A) power supplies
- For PoE+ power
 - PoE+ (J9306A) power supplies
- Do not use PoE and PoE+ power supplies together



SFP+ 10G Technology

- Next gen technology = lower 10G per-port cost
- DAC option
- Smaller form factor
- Thermal benefits
- Greater port-density



DAC



HP X132 10G SFP+ LC ER transceiver

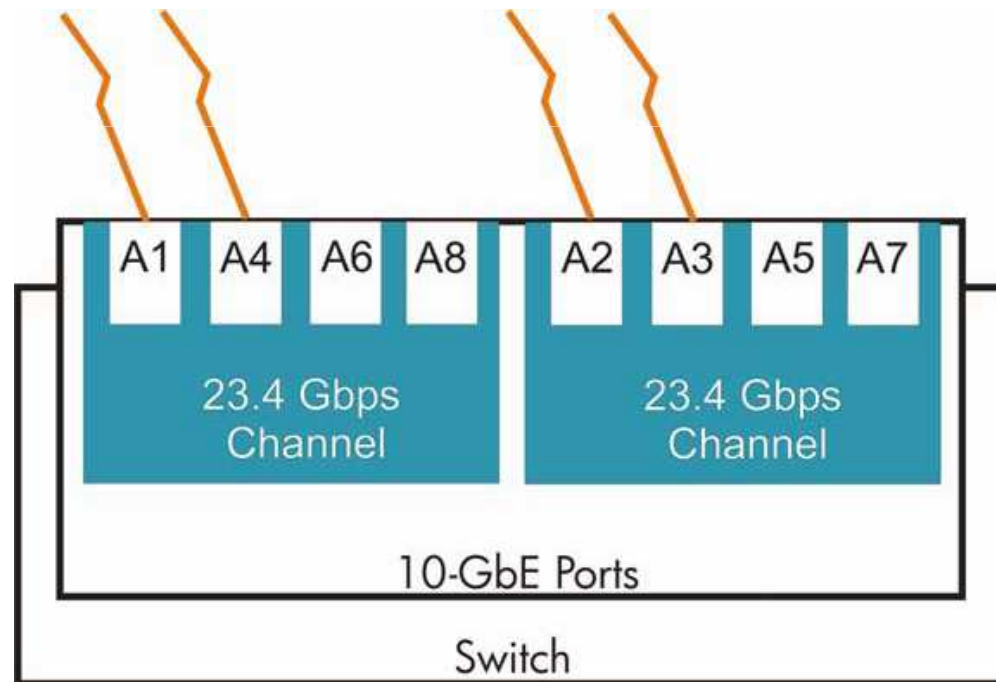
- J9153A
- Upgrade 1G connections to 10G
- Extend 10G to 40 km

NEW!



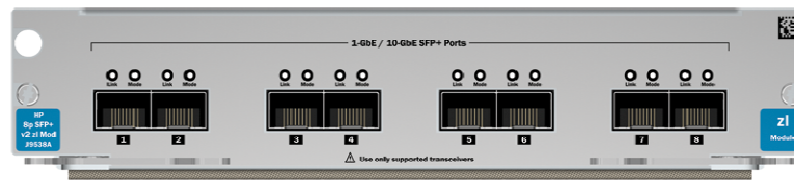
10 Gigabit performance—E8200 zl

- Bandwidth capacity increased to 23.4 Gbps on J9538A
- Aggregate of 46.8 Gbps
- 4 wire-rate 10G interfaces



10 Gigabit performance—E5400 zl

- Bandwidth capacity increased to 15.8 Gbps on J9538A
- Aggregate of 31.6 Gbps
- 2 wire-rate 10G interfaces



J9538A

E5400 zl performance comparison

With and without v2 zl modules

Capacity / Performance Feature	HP E5406 zl	HP E5406 zl w/ v2 modules	E5412 zl	HP E5412 zl w/ v2 modules
Routing/Switching capacity (Gbps, 64-byte packets)	322.8	379.2	645.6	758.4
Routing/Switching capacity (Gbps, >64-byte packets)	345.6	379.2	691.2	758.4
Switch fabric speed (Gbps)	345.6	379.2	691.2	758.4
Max 1 Gigabit ports at wire speed	144	144	288	288
Max 10 Gigabit ports (physical)	24	24	48	48
Max 10 Gigabit ports at wire speed	12	12	24	24
Routing table size (entries)	10,000	10,000	10,000	10,000



E8200 zl performance comparison

With and without v2 zl modules

Capacity / Performance Feature	HP E8206 zl	HP E8206 zl w/ v2 modules	HP E8212 zl	HP E8212 zl Switch w/v2
Routing/Switching capacity (Gbps, 64-byte packets)	322.8	496.7	645.6	993.5
Routing/Switching capacity (Gbps, >64-byte packets)	345.6	561.6	691.2	1123.2
Switch fabric speed (Gbps)	345.6	561.6	691.2	1123.2
Max 1 Gigabit ports at wire speed	144	144	288	288
Max 10 Gigabit ports (physical)	24	24	48	48
Max 10 Gigabit ports at wire speed	12	24	24	48
Routing table size (entries)	10,000	10,000	10,000	10,000



V2 zl buffering

- Configured for 2, 4, or 8 queues according to CoS
- Available shared buffer space
- 18 MB total allocation per module



V2 zl per-queue shared buffer allocation

8-queue configuration

Port Speed	CoS 1	CoS 2	CoS 0	CoS 3	CoS 4	CoS 5	CoS 6	CoS 7
1 Gig	75 KB	75 KB	567 KB	75 KB	75 KB	75 KB	75 KB	75 KB
10 Gig	228 KB	228 KB	1706 KB	228 KB	228 KB	228 KB	228 KB	228 KB

4-queue configuration

Port Speed	CoS 1,2	CoS 0,3	CoS 4,5	CoS 6,7
1 Gig	75 KB	721 KB	228 KB	75 KB
10 Gig	228 KB	2162 KB	683 KB	228 KB

2-queue configuration

Port Speed	CoS 1,2,0,3	CoS 4,5,6,7
1 Gig	1024 KB	75 KB
10 Gig	3072 KB	228 KB



Shared Pools

Port Speed	8 queues	4 queues	2 queues
1 Gig	204%	186%	178%
10 Gig	184%	177%	174%
10 Gig uplinks	223%	205%	196%



Energy Savings



Green features—v1 zl modules

Product Number	Product Name	LED Off	Low Power PHY	Module Power Off
J8702A	24-port 10/100/1000 PoE zl Module	Yes	Yes	Yes
J8705A	20-Port 10/100/1000 PoE and 4-Port Mini-GBIC zl Module	Yes	Yes	Yes
J8706A	24-Port Mini-GBIC zl Module	Yes	N/A	Yes
J8707A	1 4-Port 10-GbE X2 zl Module	Yes	N/A	Yes
J8708A	1 4-Port 10-GbE CX4 zl Module	Yes	N/A	Yes
J9307A	10/100/1000 PoE+ zl Module	Yes	Yes	Yes
J9308A	10/100/1000 PoE+ and 4-Port Mini-GBIC zl Module	Yes	Yes	Yes
J9478A	24-Port 10/100 PoE+ zl Module	Yes	Yes	Yes
J9309A	4-Port 10GbE SFP+ zl Module	Yes	N/A	Yes



Green Features–v2 zl modules

Product Number	Product Name	LED Off	Low Power PHY	Module Power Off
J9538A	HP 8-port 10-GbE SFP+ v2 zl Module	Yes	N/A	Yes
J9534A	HP 24-port Gig-T PoE+ v2 zl Module	Yes	Yes	Yes
J9535A	HP 20-port Gig-T PoE+ / 4-port SFP v2 zl Module	Yes	Yes	Yes
J9536A	HP 20-port Gig-T PoE+ / 2-port 10-GbE SFP+ v2 zl Module	Yes	Yes	Yes
J9537A	HP 24-port SFP v2 zl Module	Yes	N/A	Yes
J9547A	HP 24-port 10/100 PoE+ v2 zl Module	Yes	Yes	Yes
J9548A	HP 20-port Gig-T / 2-port 10-GbE SFP+ v2 zl Module	Yes	Yes	Yes
J9549A	HP 20-port Gig-T / 4-port SFP v2 zl Module	Yes	Yes	Yes
J9550A	HP 24-port Gig-T v2 zl Module	Yes	Yes	Yes
J9637A	HP 12-port Gig-T / 12-port SFP v2 zl Module	Yes	Yes	Yes



Provision ASIC green features

- Smart clock gating
 - Anticipates traffic across the system's logic
- Dynamic frequency control
 - Monitors and adjusts frequency
- In-system monitoring

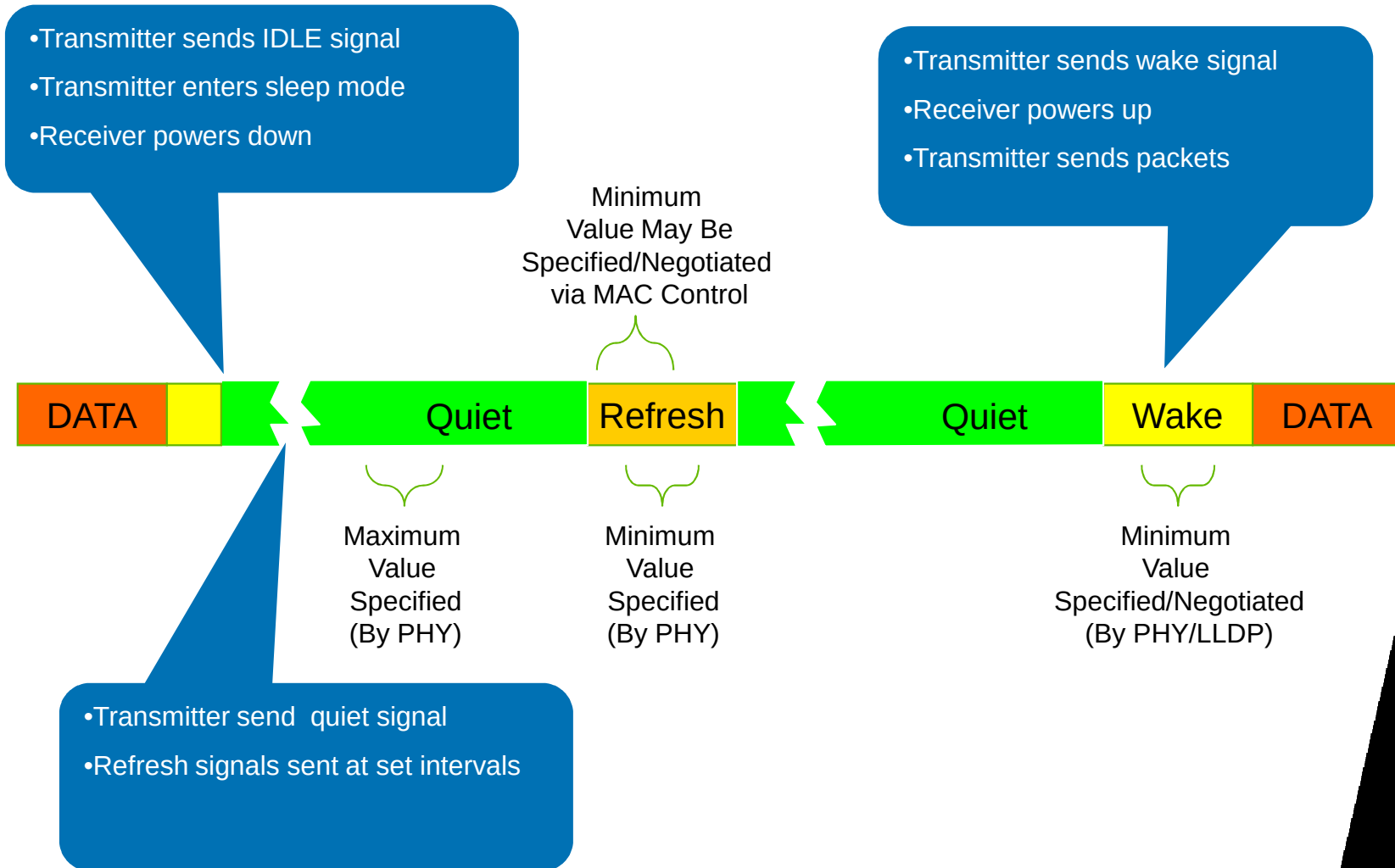


Energy Efficient Ethernet 802.3az

- Auto-negotiation above MAC layer using LLDP
- MAC and infrastructure savings through “Reconciliation Sublayer Enhancements”
 - MAC sublayer communication to reduce peer power consumption
- PHY power savings through “Low Power Idle”



Low power idle



Green CLI commands

– Savepower

- `[no] savepower <module [slot-id]||led [slot-id]||port-low-pwr [slot-id]>`
 - `[no] savepower module [slotID]`
 - *Turns power-saving options on or off for all modules or a specified module*
 - `[no] savepower led [ timer | slotID ]`
 - *Turns power-saving options on or off for the LEDs for all modules or a specified module.*
 - `[no] savepower port-low-pwr [slotID]`
 - *Enables or disables auto low power for all slots or a specified slot.*

– Energy Efficient Ethernet

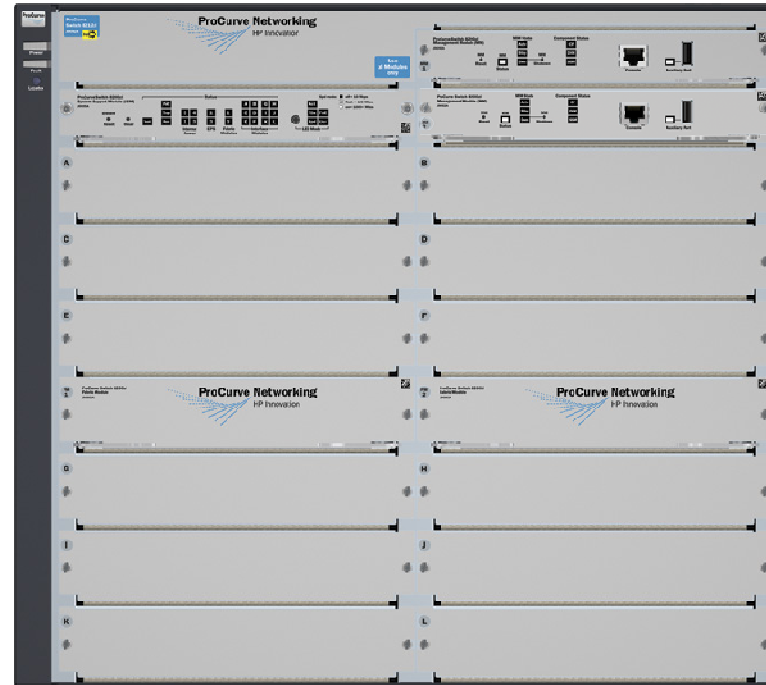
- `[no] int <port-list> energy-efficient-ethernet`
 - *Turns Energy Efficient Ethernet option on or off for all specified ports*
- `show energy-efficient-ethernet`
 - *Displays the status of ports with respect to energy-efficient-ethernet*

New Software Features



Non-stop switching for E8200 zl

- E8200 zl series enhancement
- Continuous synchronization
- Seamless transition during failover



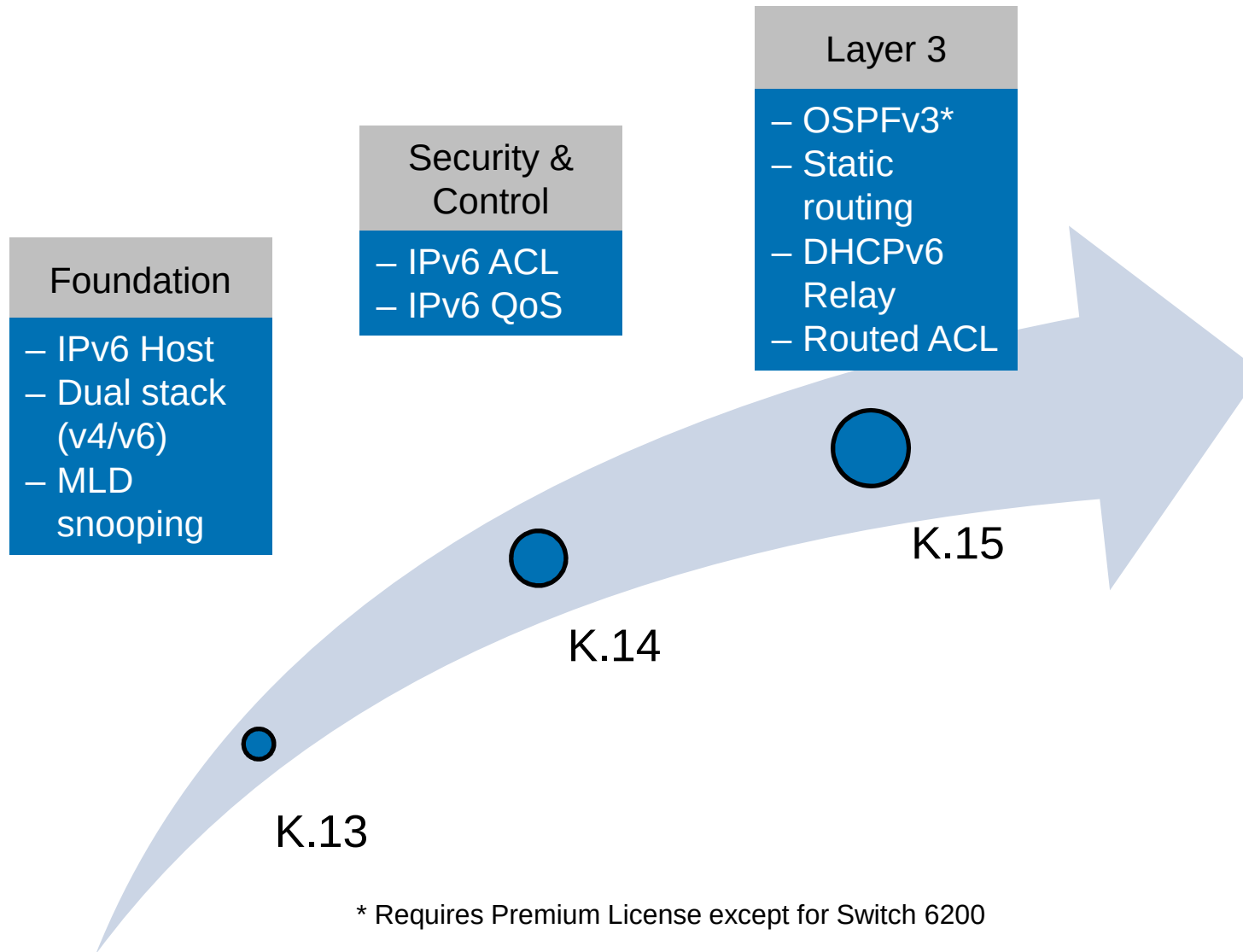
E8212 zl with active and standby management modules

Improved rate limiting

- Entire packet counted in rate limit
- More accurate rate limiting
- Better bandwidth management



Layer 3 Features for IPv6



Enhancements

- GUI redesign
- Restart a module
 - Allow restart of a specific hardware module from CLI
- OSPF diagnostics and monitoring tools
 - Log OSPF Adjacency Changes
- OSFPv3 commands
 - Enhance “show ipv6 ospf3”
 - Display neighbor, interface, SPF details
- PIM diagnostics tools
 - Debug ip pim packet : hello, register, join-prune, dr, rp
- Meshing diagnostics tools
 - Enhancement to “show mesh” command
 - “show mesh traceroute” and “show mesh mac-address” commands
- Change default setting for legacy PoE detection to “off”
 - Original setting will be retained for customers that upgrade from previous version of K code



New ProVision ASIC features

- More complicated ACL rules at wire speed
 - Supports 4 ACL TCAM passes at wire speed and up to 32 passes total per ACL
- Explicit Congestion Control (ECN) support
- Software feature HW support
 - MAC-based VLANs
 - Policy Based Routing
 - Equal Cost Multipath
 - VRF Support (including overlapping IP addresses and VLAN IDs)
 - Outbound Rate Limiting
- Better QoS visibility
 - Counts drops per queue



Summary



Summary

- New v2 zl modules double the port density of 10G SFP+ and extend PoE+ to all Gigabit copper ports
 - Gigabit non-PoE options available
- New E5400 zl and E8200 zl bundles
 - Maximize Gigabit ports with 10G
- Energy saving features
 - Provision ASIC and K.15 savings
- K.15 software enhancements
 - K.15.02.0004 first generally available version



Q&A



Outcomes that matter.

