HP ProCurve Switch 5400zl and 3500yl Intelligent Edge Series
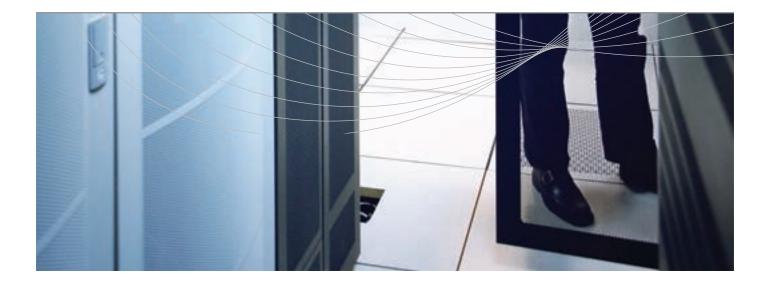
Intelligence

- More granular security and QoS policies
- Sophisticated control at wire-speed
- Closer alignment with applications for security, convergence and mobility
- Consistent user experience

Versatility

- Versatility in client connections
- Future-proofing
- Flexibility for operation in a variety of use models
- Scalable, consistent switch family

Operational Excellence

- Plug-and-play solutions
- Investment protection
- Greater efficiency in deployment, operation and maintenance
- Increased productivity

The chassis-based HP ProCurve Switch 5400zl Series and stackable 3500yl Series are next-generation Layer 3/4 Intelligent Edge switches, offering unprecedented adaptive intelligence, versatility, and operational excellence to meet current and future networking demands.

All the members of the Switch 5400zl and 3500yl Series are built on the ProVision™ ASIC, the newest ASIC innovation developed by HP ProCurve Labs. The ProVision ASIC gives the Switch 5400zl and 3500yl Series wire-speed policy enforcement, resiliency, ASIC programmability and high-level integration. These adaptive intelligences enable them to express the HP ProCurve Networking Adaptive EDGE Architecture™ vision of "control to the edge" with "command from the center."

With the Switch 5400zl and 3500yl Series, HP ProCurve has introduced switches with unparalleled adaptability. They have versatile intelligent ports that combine the capabilities of the ProVision ASIC, the performance of 10/100/1000 and integrated Power over Ethernet (PoE), for optimal flexibility in port configuration, both now and in the future. Setting a new standard for versatility and scalability, the HP ProCurve Switch 5400zl chassis Series and stackable 3500yl Series can provide from 24 to 288 10/100/1000 PoE ports per switch, with identical features, performance, and lifetime warranty.

In addition, these new Intelligent Edge switches deliver enhanced efficiency, ease of management, and investment protection that add up to a new level of operational excellence.

Responding to Real World Needs

Enterprises are demanding more from their networking infrastructures. Specifically, today's organizations need to secure their information assets; support an increasingly mobile workforce; allow for online collaboration and distributed computing capabilities; integrate control- or bandwidth-intensive applications such as voice-over-IP (VoIP), voice-over-wireless-LAN (VoWLAN), and video streaming; and prepare for future technologies with a highly scalable and flexible infrastructure.

HP ProCurve's vision and architecture for delivering on these needs is the HP ProCurve Networking Adaptive EDGE Architecture, which places control of the network at the edge, closest to the users—and the best location for enforcing network policies. Controlling traffic at this level requires switches with truly adaptive intelligence. It also requires levels of versatility and operational excellence that go well beyond the norms of the past.

In addition to providing advanced capability uniquely aligned for Intelligent Edge deployments, the Switch 5400zl and 3500yl Series also provide a rich set of platform and software features that make them well suited for enterprise distribution/aggregation layer deployments. Bringing these features together under a common ASIC architecture and a unified set of easy-to-use management tools means that the Switch 5400zl and 3500yl Series deliver unparalleled flexibility along with lower total cost of ownership and ongoing management costs.
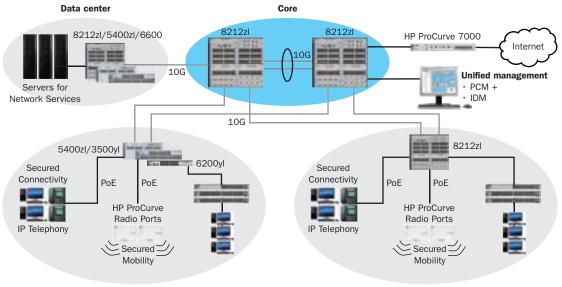
A Spectrum of Switch Offerings

Thanks to their versatility, the ProCurve Switch 5400zl and 3500yl Series can be deployed in a wide range of network designs. Unique platform form factor attributes—chassis-based and stackable—make each Series switch ideally suited for specific deployments and requirements. When selecting the right platform, customers should consider the dimensions, density, interface flexibility, expandability, and level of hardware redundancy appropriate for their deployment. important features are highlighted in the table below:

	5406zl	5412zl	3500yl-24G-PWR	3500yl-48G-PWR
Form Factor	Chassis	Chassis	Stackable	Stackable
Height (Rack Unit)	4U	7U	1U	1U
10/100/1000 Ports with PoE	Up to 144	Up to 288	24*	48*
Mini-GBIC	Up to 144	Up to 288	Up to 4*	Up to 4*
10-GbE Ports	Up to 24	Up to 48	4 (with optional module)	4 (with optional module)
Open Module Slots	6	12	1 (for 10-GbE module)	1 (for 10-GbE module)
Power for PoE	Internal: up to 1800 W With Power Shelf: up to 3600 W	Internal: up to 3600 W With Power Shelf: up to 5400 W	Internal: 398 W With HP ProCurve 620: 796 W	Internal: 398 W With HP ProCurve 620: 796 W
Performance (Mbps)	240.2	480.3	75.7	111.5
Power Redundancy	System: use 2 internal supplies PoE: N+1 and Full possible**	System: use 3 (N+1) or 4 (Full) internal supplies PoE: N+1 and Full possible**	System: use HP ProCurve 620 PoE: 398 W N+1 with HP ProCurve 620	System: use HP ProCurve 620 PoE: 398W N+1 with HP ProCurve 620
Hot Swappable	All modules	All modules	Not available	Not available
Removable Management Module	Yes	Yes	Not available	Not available
Removable Fan Tray	Yes (hot swap)	Yes (hot swap)	Yes	Yes

* Includes dual-personality ports
** See 5400/3500 Ordering Guide for more details

The following diagram summarizes the wide range of use models for HP ProCurve Switch 5400zl and 3500yl Series:

HP ProCurve Switch 5400zl and 3500yl Intelligent Edge Series

The HP ProCurve Switch 5400zl and 3500yl Series deliver intelligence, versatility, and operational excellence. The members of this family of Intelligent Edge switches share a number of important features, including the following:

- Part of the HP ProCurve Networking Adaptive EDGE Architecture (AEA): The HP ProCurve AEA is based on control to the edge along with command from the center. The Switch 5400zl and 3500yl Series provide the Intelligent Edge switching needed for security control and authentication, bandwidth shaping, data prioritization, advanced routing, WLAN management, and deep packet inspection—in short, true control at the edge.

- ProVision ASIC: HP ProCurve's latest, internally designed ProVision ASIC confers high-end wire-speed capabilities and intelligence to all the Switch 5400zl and 3500yl Series. Developed by HP ProCurve Labs, the ProVision ASIC integrates sophisticated switching functionality in a single highly reliable, high-performance chip.

  The ability of the new switches to enforce per user policies at wire speed enhances the use of HP ProCurve Identity Driven Manager (IDM), software that provides secure, automated access control—and that enhances the capabilities of the AEA Intelligent Edge.

- Scalability and versatility with the same architecture: Based on the same ProVision ASIC architecture and common software feature set, the Switch 5400zl and 3500yl Series products can provide from 24 to 288 gigabit PoE ports per switch, allowing them to be deployed in a wide variety of network environments.

- HP ProCurve ONE integrated: The HP ProCurve Switch 5400zl provides a high-performance, secure switch platform for deploying ProCurve ONE business and network applications and services within the network. Hosted on the HP ProCurve ONE Services zl Module, these applications and services can act on traffic locally, distributed throughout the network, or consolidated in a central location. That makes management easier and offers additional capabilities to adjust or improve network behavior (such as load balancing). This solution allows you to manage costs; help ensure more efficient use of space, power, and cooling; and confidently deliver ProCurve tested and certified solutions.

- Comprehensive software features: Optional Premium Licenses provide the 5400zl with advanced networking Layer 2/3 protocols and features (e.g., OSPF, PIM, VRRP, QinQ) uniquely suited for large-scale distribution solutions.

- Advance management and monitoring tools: includes innovative Remote Intelligent Mirroring, RMON, XRMON, and SFlow on every port.

- Versatile intelligent ports: These ports increase the simplicity and versatility of deploying the switches. Every 10/100/1000 copper port has PoE integrated and ties into the overall capabilities of the ProVision ASIC, providing advanced wire-speed packet processing.

- 10G expandability: The new switches' 10-GbE expandability supports bandwidth-intensive applications such as video streaming and distribution layer link aggregation, providing deployment flexibility and investment protection for future needs.

Intelligence

The intelligence of the HP ProCurve Switch 5400zl and 3500yl Series, which is crucial for the expression of the AEA vision of shifting control from the core to the edge of the network, is due in large part to the new ProVision ASIC from HP ProCurve and its wire-speed intelligence.

ProVision ASIC Confers Security, Convergence, Mobility Benefits

The ProVision ASIC is a continuation of HP ProCurve's ASIC innovation over the past 10 years, starting with the HP AdvanceStack Switch 2000 and continuing through the ProCurve Switch 5300xl Series and now the 5400zl and 3500yl Series.

Its raw performance will beat that of most competitors, and the ProVision ASIC can also deliver unparalleled intelligence without sacrificing that high performance. Its built-in wire-speed intelligence provides a rich AEA experience as well as sophisticated control features right at the edge of the network.

The 5400zl and 3500yl Series switches excel at supporting applications in three main areas:

Security

In today's environment, security is a top concern for all network managers. The HP ProCurve Switch 5400zl and 3500yl Series help with security in a number of ways, including the following:

· Granular per-user policy enforcement: Wire-speed packet processing and selection for Remote Intelligent Mirroring, ACLs, QoS, rate limiting, and other features

· Mitigation of malicious attacks through Virus Throttle, ICMP throttling, CPU DoS protection, and detection of malicious attacks

· Secure network access with IEEE 802.1X, Web/MAC auth, identity-driven and per-port ACLs; protect network with DHCP Protection, BPDU Port Protection, Dynamic ARP Protection, Dynamic IP Lockdown, and STP Root Guard

· Secure network management via TACACS+, SSHv2, secure FTP and secure encryption of all access methods—CLI, GUI, or MIB—through SSHv2, SSL, and/or SNMPv3

· Dynamic per-user policy: integrated with HP ProCurve Identity Driven Manager (IDM), the HP ProCurve Switch 5400zl/3500yl Series provide fast and effective means to set and enforce switch-level individual user's policies (e.g., ACL, QoS, and rate-limiting) automatically

Convergence

Mainstream convergence applications such as IP telephony and video-over-IP are providing new and better ways for businesses to serve their customers, reduce cost, and increase productivity. But traffic from these applications places different requirements on the switch infrastructure. The HP ProCurve Switch 5400zl and 3500yl Series offer the following features to ensure that converged traffic is delivered according to its more stringent requirements:

· Multicast support via data-driven IGMP, PIM Dense*, and PIM Sparse*

· Advance QoS, including eight hardware priority queues and selectable queue configuration; set and enforce prioritization based on multiple match criteria such as Layer 2 (IEEE 802.1p, VLAN ID), Layer 3 (DSCP, IP address), and Layer 4 (TCP/UDP port) markings

· Bandwidth shaping by enforcing ingress/egress maximum and egress guaranteed minimum bandwidths

· Support for IP telephony, through interoperability with industry-leading IP telephony vendors; LLDP-MED, which enables automatic configuration of QoS and VLAN; RADIUS VLAN, which uses standard RADIUS attribute to automatically configure VLAN for IP phones

· Support for Jumbo frame, which improves the performance of Ethernet storage area network solutions using the iSCSI standard

Mobility

The HP ProCurve Switch 5400zl and 3500yl Series allow network managers to respond to users' increasing mobility with support for wireless LAN access points as well as providing IEEE 802.3af and pre-standard PoE support. With the addition of the Wireless Edge Services zl Module, the HP ProCurve Switch 5400zl Series provides centralized wireless LAN configuration and management of advanced wireless services. This centralized approach to wired and wireless management streamlines device configuration and enables network monitoring and response to wired and wireless network threats and administration of security and role-based user policies that are enforced at the edge of the network, regardless of how or where the user connects.

· Layer 3 radio port adoption supports network-wide and auto configuration of HP ProCurve radio ports, enabling rapid deployment of a wireless LAN with minimal network reconfiguration

· Wireless mobility domain provides seamless client network connectivity as mobile users roam across subnet boundaries

· Robust guest account administration provides secure yet easy-to-implement browser-based network access for guest users

· Wireless LAN self-healing and RF interference avoidance provides network resiliency and sustains wireless network availability
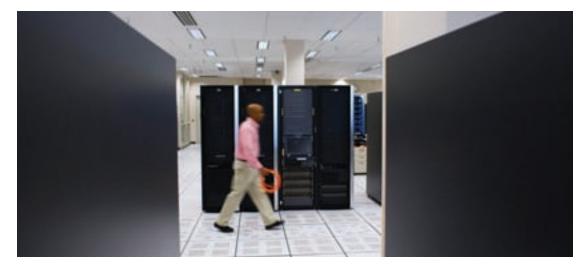
* Requires Premium License

More specifically, the ProVision ASIC offers the following benefits:

Wire-Speed Policy Enforcement Engine—The ProVision ASIC enables users to deploy more secured and granular policy at wire-speed across all ports for better protection of information assets and better support for applications that require bandwidth and QoS control. The ProVision ASIC's policy engine is superior due to HP ProCurve's implementation of a multi-stage classifier and Ternary Content Addressable Memory (TCAM). The multi-stage classifier allows the traffic to be processed efficiently, and the ProVision ASIC's TCAM can match more policy rules simultaneously at wire-speed than competitive offerings in this class. This capability results in more granular and better-performing policy enforcement.

Built-in Resiliency—The ProVision ASIC is architected to operate continuously and withstand error conditions and malicious network attacks. The Switch 5400zl and 3500yl Series use a combination of software and ProVision ASIC functionality to verify all the data

packets sent to the CPU. Excessive packets from malicious attacks or network misconfiguration can be identified and demoted to lower-priority queues before they overwhelm and shut down the CPU and the switch.

In addition, the ProVision ASIC has designed-in processes such as end-to-end data checking, embedded RAM error correction, and ECC on an external DRAM. These processes ensure the integrity of the traffic as it passes through the switch, protecting the traffic from environmental elements.

Investment Protection—The ProVision ASIC confers investment protection through a programmable network processor feature that allows some future requirements to be accommodated. The network processor is based on patented technology from HP. New algorithms can be programmed into the ASIC to support new traffic classifications by inspecting deep into the data packets. This enables the HP ProCurve switches based on the ProVision ASIC to support applications and policy rules that do not yet exist.

Higher Reliability and Lower TCO—The ProVision ASIC integrates components that are normally found on separate chips, such as the embedded processor, memory (e.g., TCAM, input), packet classifier, MAC, and network processor. Because it is so highly integrated, the ProVision ASIC leads to a reduced number of components needed throughout the switch, which translates into increased reliability and lower total cost of ownership. It also means higher port density due to the smaller overall form factor.
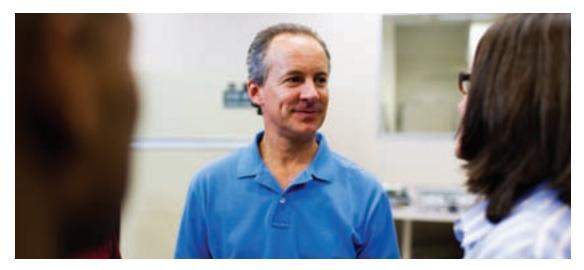
Flexibility and Scalability

An important factor in the flexibility and scalability of the Switch 5400zl and 3500yl Series is that all the copper ports provide the same 10/100/1000 performance, ProVision ASIC intelligence, and integrated PoE. These versatile intelligent ports provide flexibility for operation by enabling anyone to be connected to any Switch 5400zl or 3500yl Series, regardless of user type, application, or type of end device.

High availability is critical to enable customers to support uptime imperatives for their business while allowing them to reliably and seamlessly scale their network over time. The HP ProCurve Switch 5400z and 3500yl Series provide a wide range of platform high-availability features to meet these needs:

- Virtual Router Redundancy Protocol (VRRP), which allows groups of two routers to dynamically back each other up to create highly available routed environments
- HP ProCurve Switch Meshing, which dynamically load-balances across multiple active redundant links in a Layer 2 environment to increase available aggregate bandwidth
- Server-to-Switch Distributed Trunking, which allows a server to connect to two switches with one logical trunk; increases resiliency and enables load sharing in virtualized data centers
- IEEE 802.1ad QinQ*, which increases Ethernet's scalability and allows multiple LANs in different locations to be connected in a campus or metro network

* Requires Premium License

- OSPF ECMP* (Equal Cost Multipath), which dynamically load-balances across multiple active equal-cost paths in a Layer 3 environment
- IEEE 802.1s MSTP, which provides high link availability in multiple-VLAN environment
- IEEE 802.3ad LACP, which supports up to 60 trunks, each with up to 8 links (ports) per trunk; trunking across modules is also supported
- Hot-swappable modules, including the management module for the Switch 5400zl, and optional redundant power supplies (for the 5400zl)
- Dual flash images and multiple config files
- Uni-Directional Link Detect (UDLD), which prevents network downtime from fiber link break

Operational Excellence

The ProVision ASIC and Versatile Intelligent Port allow plug-and-play solutions across the HP ProCurve Switch 5400zl and 3500yl Series. The HP ProCurve Switch 5400zl Series also share the same hardware module with the HP ProCurve Switch 8212zl. Along with a comprehensive, unified set of configuration management tools, this capability yields efficiency in deployment, operation, and maintenance, which in turn leads to reduced costs and increased productivity.

The Command Authorization and USB Autorun features in the HP ProCurve Switch 5400zl and 3500yl Series also improve productivity in deploying, managing, and operating networks. These features allow less-experienced or remote network managers to participate in installing and managing the switches.

Another important component of operational excellence is investment protection. All the Switch 5400zl and 3500yl Series support the next-gen Internet protocol—IPv6 host, IPv4/IPv6 dual stack, MLD snooping, ACL, and QoS. The HP ProCurve Switch 5400zl Series has a removable management module (part of its chassis design) that adds investment protection for those switches. And because all the Switch 5400zl and 3500yl Series already include 10-GbE capability, 10/100/1000 to the desktop and PoE on every 10/100/1000 port, customers can avoid unnecessary upgrade cycles. Finally, HP ProCurve's industry-leading warranty and support policies help lower operation and maintenance costs, making the HP ProCurve Switch 5400zl and 3500yl Series a wise long-term investment.

The Next Generation, Now

The next-generation HP ProCurve Switch 5400zl and 3500yl Series build on the Adaptive EDGE Architecture, enhancing control at the network edge and providing increased intelligence, versatility, and operational excellence.

Historically, customers have had to choose among functionality, performance, or PoE at the edge. With this new 5400zl/3500yl family of Intelligent Edge switches, HP ProCurve is offering a no-compromise alternative: functionality, performance, and PoE at the price previously required for any ONE of these capabilities. Investments made today in these next-generation switches will last well into the future.

* Requires Premium License

Switches

J8692A: HP ProCurve Switch 3500yl-24G-PWR	1U stackable switch with 24 10/100/1000Base-T, (including 4 dual-personality ports), PoE on all 10/100/1000, and optional 10-GbE
J8693A: HP ProCurve Switch 3500yl-48G-PWR	1U stackable switch with 48 10/100/1000Base-T, (including 4 dual-personality ports), PoE on all 10/100/1000, and optional 10-GbE
J8697A: HP ProCurve Switch 5406zl Intelligent Edge	4U modular chassis switch with a management module and 6 open slots. Power supplies must be ordered separately.
J8699A: HP ProCurve Switch 5406zl-48G Intelligent Edge	Chassis bundle with two 24-port 10/100/1000 PoE modules (48 ports total), one 875W power supply in an HP ProCurve 5406 chassis. Four open slots.
J8698A: HP ProCurve Switch 5412zl Intelligent Edge	7U modular chassis switch with a management module and 12 open slots. Power supplies must be ordered separately.
J8700A: HP ProCurve Switch 5412zl-96G Intelligent Edge	Chassis bundle with four 24-port 10/100/1000 PoE modules (96 ports total), two 875W power supplies in an HP ProCurve 5412 chassis. Eight open slots.

Modules/Premium Licenses

J8707A: HP ProCurve Switch zl 4p 10-GbE X2 Module

J8702A: HP ProCurve Switch zl 24p 10/100/1000 PoE Module

J8705A: HP ProCurve Switch zl 20p 10/100/1000 + 4p Mini-GBIC Module

J8708A: HP ProCurve Switch zl 4p 10-GbE CX4 Module

J8706A: HP ProCurve Switch zl 24p Mini-GBIC Module

J9051A: HP ProCurve Wireless Edge Services zl Module

J9052A: HP ProCurve Redundant Wireless Services zl Module

J8993A: Premium License for Switch 3500yl Series

J8994A: Premium License for Switch 5400zl Series

J8694A: HP ProCurve Switch yl 10-GbE 2p CX4 + 2p X2 Module

J8713A: HP ProCurve Switch zl 1500W Power Supply

J8712A: HP ProCurve Switch zl 875W Power Supply

Accessories

J9054B: HP ProCurve 100-FX SFP-LC Transceiver

J9099B: HP ProCurve 100-BX-D SFP-LC Transceiver

J9100B: HP ProCurve 100-BX-U SFP-LC Transceiver

J4858C: HP ProCurve Gigabit-SX-LC Mini-GBIC

J4859C: HP ProCurve Gigabit-LX-LC Mini-GBIC

J4860C: HP ProCurve Gigabit-LH-LC Mini-GBIC

J8177C: HP ProCurve Gigabit 1000Base-T Mini-GBIC*

J9142B: HP ProCurve 1000-BX-D SFP-LC Mini-GBIC

J9143B: HP ProCurve 1000-BX-U SFP-LC Mini-GBIC

J8436A: HP ProCurve 10-GbE X2-SC SR Optic

J9144A: HP ProCurve 10-GbE X2-SC LRM Optic

J8437A: HP ProCurve 10-GbE X2-SC LR Optic

J8438A: HP ProCurve 10-GbE X2-SC ER Optic

J8440B: HP ProCurve Switch 10-GbE X2-CX4 Transceiver

J8439A: HP ProCurve 10-GbE CX4 Media Converter

J8696A: HP ProCurve 620 Redundant/External Power Supply for 3500yl and 6200yl switches

J8714A: HP ProCurve Switch zl Power Supply Shelf External power supply shelf for zl switches

J9009A: HP ProCurve Manager Plus 2.1 unlimited license

J9012A: HP ProCurve Identity Driven Manager 2.0 base product (500-user license)

* The J8177C is not supported in the HP ProCurve Switch 3500yl-24G-PWR or the HP ProCurve Switch 3500yl-48G-PWR.

For more information

To learn more about HP ProCurve Networking, please visit **ProCurve.eu**