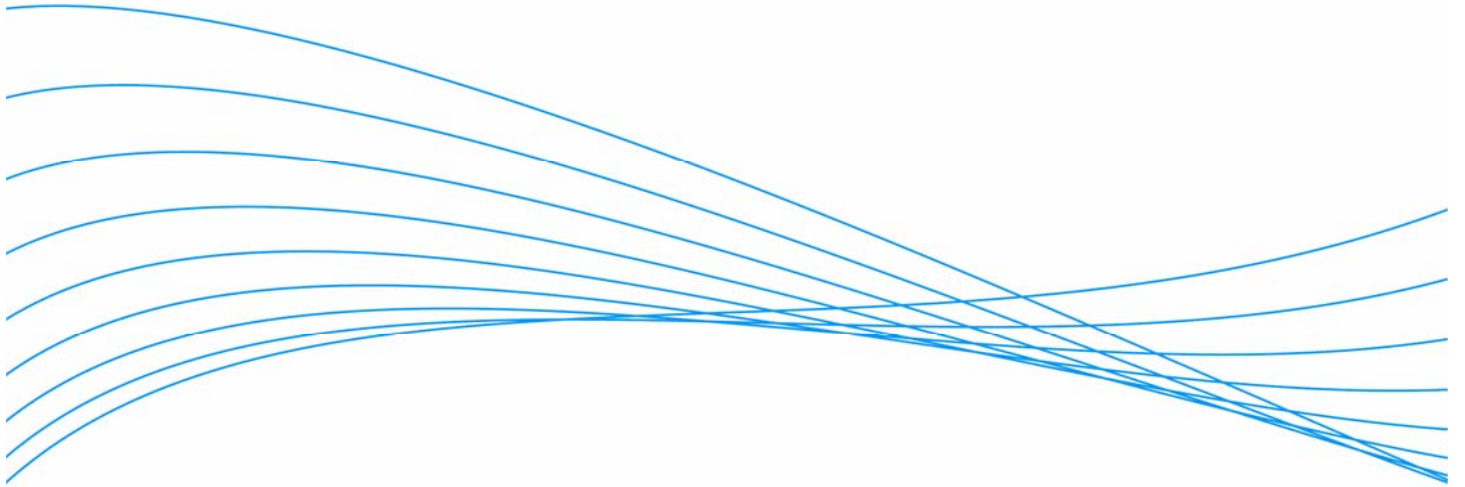


ProCurve Stacking Technology: Choosing the Best Solution for Your Network



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Executive Summary

Currently, there are no standards for managing or configuring switches connected together in stacking mode. To reduce complexity in managing a stack of switches, ProCurve Networking by HP has implemented ProCurve Stack Management, which focuses on IP address management while adhering to Ethernet standards for redundancy and connectivity.

ProCurve stacking technology enables users to manage a group of up to 16 switches with a single IP address and standard Ethernet connections. This feature is implemented consistently across the ProCurve product line. As a result, users can expand the stack with a mix of different models. Competitors' stacking technologies are either restricted to a small number of models or implemented inconsistently across the product line. Many vendors' technologies also require proprietary stacking ports and cables, which can lead to higher cost and reduced flexibility.

Some competitors' stacking technologies include a distributed fabric feature that creates "virtual" chassis to approximate the benefits of a chassis switch. This proprietary capability is achieved at the cost of increased complexity in overall network design, and the resulting solution still falls short compared to a "real" chassis solution. In addition, all of these stacking technologies require proprietary hardware and software, which translates to higher training, operation, and maintenance cost.

As an alternative to the complexity and higher cost of ownership in competitors' offerings, ProCurve offers a solution based on chassis that are easy to deploy, at a lower price than competing stackable switches with distributed fabric. When compared with competitors' offerings, ProCurve's chassis switches provide superior performance, connectivity flexibility, expandability, and redundancy.

Introduction

Switch stacking technologies available today provide two main benefits to users: the ability to manage a group of switches using a single IP address, and the ability to interconnect two or more switches in a distributed fabric, creating a “virtual” chassis.

ProCurve Stack Management allows users to manage a group of switches using a single IP address. ProCurve has focused its stacking technology on single IP address management. For users who require the benefits of chassis, ProCurve offers “real” chassis solutions in the 5400zl, 5300xl, and 4200vl series that provide superior value, performance, connectivity flexibility, expandability, and redundancy, as compared to the distributed fabric feature in competing stackable switches.

Comparison of ProCurve Stack Management vs. Other Vendors’ Stacking Technologies

ProCurve IP Address Management

With ProCurve Stack Management, users can manage a group of up to 16 total switches in the same IP subnet with a single IP address. This technology allows users to:

- Reduce the number of IP addresses needed in their network.
- Add switches to their network without having to first perform IP addressing tasks.
- Scale their network to handle increased bandwidth demand.
- Adhere to Ethernet connectivity and redundancy standards, eliminating the need for any proprietary cables and distance limitation created by other stacking technologies.

ProCurve stacking technology is implemented consistently across the ProCurve product line. Users are not required to purchase special hardware or software.

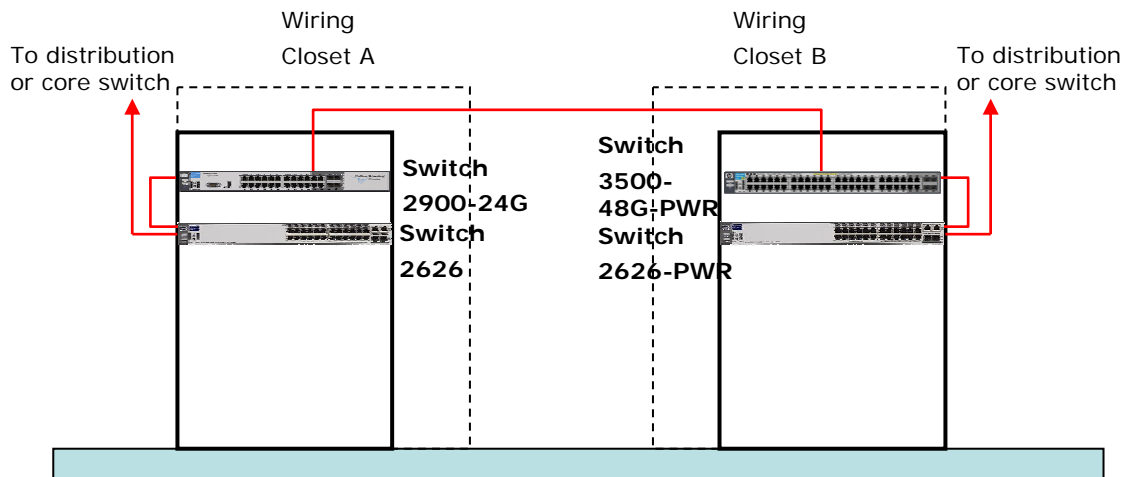


Figure 1: showing ProCurve switches connected using ProCurve Stack Management in two wiring closets on the same floor – various models are mixed and stack members can be apart (standard Ethernet and STP rules apply)

ProCurve Offerings

ProCurve switches that support stacking include:

ProCurve Switch 2510-24

ProCurve Switch 2524 and 2512

ProCurve Switch 2650 and 2626

ProCurve Switch 2810-24G and 2810-48G

ProCurve Switch 2824 and 2848

ProCurve Switch 2900-24G and 2900-48G
ProCurve Switch 3400cl-24G and 3400cl-48G
ProCurve Switch 3500yl-24G and 3500yl-48G
ProCurve Switch 4104gl and 4108gl
ProCurve Switch 4200vl series
ProCurve Switch 6108
ProCurve Switch 6200yl-24-mGBIC
ProCurve Switch 6400cl and 6410cl

Other Vendors' Offerings

While Cisco, 3Com, and Nortel stacking technologies also offer single IP address management capability, their product line offerings are limited in breadth, and the stacking technologies are implemented inconsistently across their respective product lines.

Cisco

- The clustering technology in many Catalyst switches includes IP address management. However, this technology is not implemented consistently across all switches that support this feature. For example, for a Catalyst 2900XL to be a command switch in the cluster, a model with more memory and higher cost is required. The Catalyst 1900/2820 switches are not capable of being a command switch at all.
- Cisco has one switch family with stacking technology that supports IP address management and distributed fabric. The Catalyst 3750 series with StackWise® technology allows up to nine Catalyst 3750 switches to be connected through the proprietary StackWise® ports and cable.

3Com

- 3Com Switch 4200 Series has a cluster feature that includes IP address management. This feature is enabled by proprietary HGMP (Huawei Group Management Protocol) and is not available in other 3Com switches.
- 3Com has multiple stacking technologies with IP address management and distributed fabric capability, but they are not compatible with each other. The Switch 3870 family has its own stacking technology, while the Switch 5500 family has a derivative of XRN® technology that is incompatible with earlier XRN technology in Switch 49xx and 40x0. In addition, the Switch 5500 family XRN technology does not allow mixing of different models, even within the same 5500 family.

Nortel

- Nortel implements IP address management and distributed fabric features in its BoSS switch operating system. However, Nortel also has multiple proprietary stacking connectivity hardware that leads to incompatibility in the product line. For example, the BayStack 5500 series implements FAST technology as its dedicated stacking ports, but these ports cannot be used to stack other Nortel switches. There are other inconsistencies: for example, the BayStack 470-48T cannot be stacked with BayStack 450, and the BayStack 380 switch cannot be stacked with any other Nortel switches.

These inconsistencies and limitations create increased complexity and higher cost. In contrast, ProCurve Stacking Management offers:

- The ability to manage a group of switches with a single IP address.
- Consistent implementation in a broad range of products with stacking.
- The ability to mix products in a stack, providing greater flexibility.

Distributed Fabric and ProCurve's Chassis Solution

Some stacking technologies from Cisco, 3Com, and Nortel provide the ability to connect multiple switches and have them behave in the network as a single virtual chassis. However, as mentioned previously, this distributed fabric feature is limited to specific models or switch families. In addition, different technologies provide different benefits and are incompatible with

each other. This proprietary nature locks users into a particular vendor and limits their choice and flexibility while increasing their costs of training, operation, and maintenance.

As promoted by competitors, distributed fabric provides these benefits:

- Scale network backbone.
- Allows stacked switches to function as a single device for ease of configuration.
- Increased performance in the core of the network.
- Provides fault tolerance for switches in a stack.

For users who require these benefits, ProCurve offers the following chassis-based solutions:

- Switch 5400zl series: new generation of advanced Layer 2/3/4 switches with 10/100/1000-Mb Ethernet with integrated PoE and 10-Gb Ethernet connectivity.
- Switch 5300xl series: layer 2/3/4 switches with 10/100/1000-Mb Ethernet connectivity.
- Switch 4200vl series: layer 2 and IP static routing switch with 10/100/1000-Mb Ethernet connectivity.

These ProCurve chassis switches offer superior backplane speed, flexible connectivity, performance, scalability, ease of management, and fault tolerance. They also offer a truly integrated, system-level approach to all ports in the chassis. In addition, they are priced below the competitor's stackable switches with distributed stacking capability, allowing customers to obtain the higher benefits at lower cost.

More Advantages

By offering solutions based on IP address management, ProCurve Stack Management provides the following benefits to users:

- ProCurve stacking technology allows intermediate devices to be connected between the stack master switch and member switches. Because this feature adheres to Ethernet connectivity standards, switches in multiple locations can be configured to be part of a stack. Most competitors' stacking requires close proximity of the switches being stacked.
- Competitors' stacking requires special cables and proprietary interfaces, thereby increasing the cost and reducing the flexibility of the solution. ProCurve stacking uses standard interfaces and does not require the purchase of special cables. With ProCurve, ports can be used as stacking ports or for other network connectivity needs. All ProCurve stackable switches (listed on page 3) use standard 10/100 or gigabit Ethernet interfaces as stacking ports. In addition, the Switch 3400cl and 3500yl series have optional 10-gigabit Ethernet interfaces, and the Switch 2900 and 6400 series have integrated 10-gigabit Ethernet interfaces.
- ProCurve optimizes the value of the stack. By allowing a mix of different switch models and series to operate in a stack, ProCurve gives customers more choices in the type of interfaces and functionality of the switch. This reduces the cost and increases the flexibility of the stack. Competitors' stacking technologies are available only in limited models, usually the higher-cost ones.
- Competitors' stackable switches with distributed fabric provide the capability to configure multiple switches in a stack, but at the cost of complex configuration rules. In contrast, ProCurve chassis offers a simpler way to configure a large number of ports. For stackable switches, customers can use ProCurve Manager Plus (PCM+), a comprehensive network management tool, to batch-configure multiple switches.
- Competitors' distributed fabric provides additional redundancy for switches in a stack, but at a cost of increased complexity in overall network design. The proprietary stacking ports cannot be configured with network connectivity standards such as auto-negotiation, VLAN, STP, and aggregated links. Instead, failure modes from competitors' distributed fabric must be taken into account case by case in the overall design of a redundant network. The ProCurve chassis solution provides a superior choice, offering redundancy for both a single chassis and for the overall network. For ProCurve stackable switches, standard protocols such as STP and LACP can create connectivity redundancy.
- ProCurve chassis switches are well known for their extremely high reliability. By providing trunking of uplinks from multiple ports in different modules, ProCurve switches enable customers to achieve additional redundancy. Competitors provide this benefit by allowing trunking of links from multiple switches in a distributed fabric (e.g., Nortel's Distributed Multi-

Link Trunking or 3Com's Distributed Link Aggregation), but again at the cost of increased complexity in configuration and overall network design.

IP Address Management

ProCurve

- Single IP address to manage up to 16 switches
- Available in all managed stackable switches and 4100, 4200 chassis
- Consistent implementation allows mixing different models in a stack
- Greater flexibility in network connectivity

Competition

- Inconsistent implementation across product line
- Hardware or software requirements, resulting in higher complexity and increased cost

Chassis Benefits

ProCurve chassis solution

- Higher backplane bandwidth
- Better integrated redundancy
- Greater interface flexibility
- Lower cost than competing stackables

Proprietary distributed fabric solution

- Available only in certain models or switch family
- Limits groups to 9 switches
- Hardware and software requirements increase ownership cost
- Increased complexity of overall network design

Conclusion

ProCurve Stack Management technology offers customers greater value and more flexibility in their network, especially when compared with offerings from competitive vendors.

ProCurve Stack Management technology is focused on IP address management, allowing users to manage a group of up to 16 switches with a single IP address. ProCurve stacking technology is implemented consistently across a broad switching product line, enabling switches from different families to be IP address managed as a mixed stack. Other vendors' stacking technologies are offered in limited models, are implemented inconsistently across the vendor's product line, and have limitations that lead to higher complexity.

In some vendors' stacking technologies, a distributed fabric feature creates a "virtual" chassis to approximate the benefits of a chassis switch. However, this capability requires proprietary hardware and software, leading to higher cost of ownership. ProCurve offers chassis switches that provide more integrated functionalities, with simpler configuration and at a lower price.

To find out more about
ProCurve Networking
products and solutions,
visit our web site at

www.hp.com/go/procurve



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