



Hewlett Packard
Enterprise

HPE Altoline Switch Series

Accelerating the disaggregation of cloud data center networking

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Setting the context

Q: What does network disaggregation mean?

A: Network disaggregation refers to decoupling of the currently integrated hardware and software components of network switches, giving you the choice of networking switch hardware and network operating system that fit your needs. Instead of buying an integrated, or tightly coupled, switch that requires an operating system from the switch vendor, you have the option of choosing the open networking switch and the operating system separately, similar to what you do when purchasing servers today.

Q: What is the difference between disaggregation and SDN?

A: Software-defined networking (SDN) and network disaggregation are two different concepts that can coexist in the same networking environment. SDN is a networking architecture that aims to automate and simplify the entire network by making networking elements programmable. SDN achieves that by separating the control plane (software) of the networking elements from the forwarding plane (hardware). SDN also introduces the concept of an SDN controller, a software application that controls the network via southbound APIs and programs the network via northbound APIs. On the other hand, network disaggregation is a concept that targets individual networking elements, such as switches, by separating the integrated switch hardware component (HPE Altoline switch) from its software component (network operating system). SDN can be deployed in disaggregated networking environments. When loaded with operating systems that support OpenFlow. HPE Altoline switches can be used as part of SDN solutions, including network virtualization.

The HPE strategy

Q: How is HPE disaggregating cloud data center networking?

A: HPE is accelerating the disaggregation of cloud data center networking via a business model that is based on a unique go-to-market model with direct sales and support, the Linux® network operating system, and open networking HPE Altoline switches. You get more choice, higher scale, and lower total cost of ownership (TCO).

- HPE is participating in a joint venture with Accton Technology that is dedicated to providing data center disaggregated networking switches to hyperscale customers, service providers, and early adopter enterprises. This joint venture makes HPE the first Tier-1 systems vendor to offer servers and switches in a business model that includes the features and cost requirements of cloud data center operators. This approach brings you quality worldwide local support, a reliable supply chain, and technology services that only HPE can deliver. HPE provides you with a single source for your hardware, software, support, and integration needs for disaggregated networking solutions. Coupled with our leadership in the data center server market, we are uniquely positioned to offer integrated product offerings at the rack-and-pod level.
- HPE is partnering with Cumulus Networks and Pica8. The HPE and Cumulus Networks partnership expands your choices for open networking to include HPE Altoline switches with the ONIE boot loader and Cumulus Linux networking operating system. Now, web-scale cloud data center managers have the choice of building networks with field-proven HPE switches and Comware operating system, or utilizing HPE Altoline switches with Cumulus Linux to enable consistent automation and orchestration across both servers and networking. HPE is partnering with Pica8 to make open networking easy by bringing you one of the most advanced SDN OSs in the marketplace. With either Cumulus or Pica8, you can count on HPE for trusted quality and decades of data center experience.
- HPE Altoline switches are a new family of HPE-branded disaggregated “brite box” switches, also known as branded white box switches. The new HPE Altoline switches are dedicated to supporting the disaggregated data center networking model and providing a solid platform for the customer choice of open networks with the ONIE boot loader and Cumulus Linux network OS. The set of switches includes 10/100/100BASE-T switches in addition to 10/25/40/50/100 GbE switches that enable you to deploy high-performance spine-and-leaf data center networks as well as 1/10/25 GbE leaf and 40/100G spine switches with Clos fabric architecture for high scalability and agility.

Q: Why is HPE supporting this approach for networking?

A: HPE continues to expand our networking offerings to meet emerging customer needs. As the web-scale and cloud service providers segment emerged with its own special requirements, HPE moved to put in place special business partnerships to support the server needs of service providers. With HPE Altoline switches, HPE demonstrates its commitment to serve the special networking needs of cloud data center customers through unique business arrangements that deliver the excellent value of our networking solutions. A cornerstone of the cloud data center IT segment is the direct go-to-market and support models. Unlike other competitors, HPE’s joint venture with Accton meets your requirements in these areas.

By working with Cumulus Networks, HPE selected a partner that is addressing the needs of cloud data centers for the Linux operating system so they can use a wide range of configuration, management, and orchestration tools. Linux is already supported on HPE servers and has a networking stack used by many customers. Cumulus Linux OS provides hardware acceleration, Layer 2 and Layer 3 support, and an open ecosystem of applications and tools that enhance the networking experience. Pica8 PicOS provides customers SDN benefits and network admins with the familiar CLI with which they are comfortable.

Q: What are the advantages of the HPE-branded Altoline switches?

A: Altoline switches, as the term brite box (branded white box) indicates, are branded under the HPE Altoline product family. This allows you to buy with confidence, trusting in the quality and global support that you expect from the HPE brand.

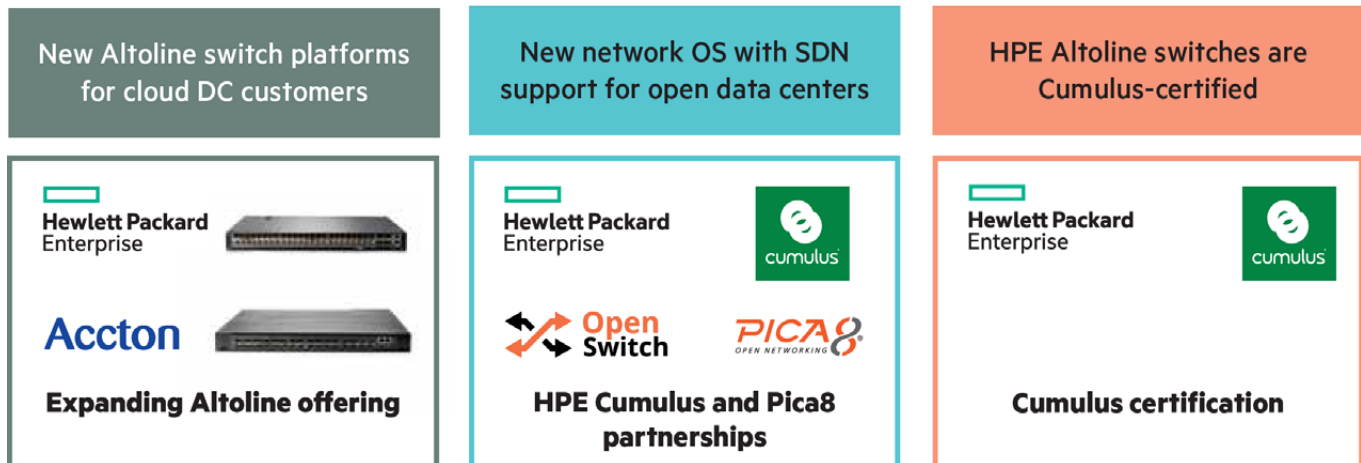


Figure 1: Accelerating the disruption of cloud data centers

Benefits

Q: What are the main benefits of the HPE Altoline open networking switches?

A: The HPE Altoline switch series offers a solution that addresses your need for faster time to service, reliable partners that can navigate you through the worldwide supply chain, and a choice of disaggregated switch hardware and software with worldwide local support. The HPE Altoline switches are aimed at meeting your requirements by delivering exceptional value in these areas:

- Choice
 - Select the right networking solution for your application environment
 - Proven HPE networking brite box hardware and support
 - Choice of Cumulus Linux operating system or Pica8 operating system with SDN support for open networking
 - Robust ecosystem of open source and commercial Linux tools
 - Unique go-to-market model with dedicated joint venture
 - Worldwide local sales, support, and services
- Cloud scale
 - Scaling the cloud infrastructure to meet the needs of customer-facing applications
 - Networks that get out of the way by serving as scalable transport
 - Capacity deployment when you need it

- Speed-of-service delivery
 - Zero-touch provisioning of HPE Altoline switches with ONIE boot loader and Cumulus Linux, which reduce deployment time from days to minutes
 - Accuracy of provisioning is increasingly important in larger deployments
- Higher value
 - Vastly improved TCO economics by more than 64 percent
 - Lower acquisition costs with hardware and software disaggregation
 - Reduced operating costs
 - Rapid infrastructure provisioning, IT automation, and workflow orchestration contribute to OPEX savings
 - Affordable capacity at scale
 - Efficient scaling from initial deployments to web-scale
 - Speed of innovation increases the value of the network
 - Leverage development tools and ecosystem of open source and commercial Linux tools consistent with those used for the server infrastructure

Service and support

Q: Who provides warranty and hardware support on HPE Altoline switches?

A: Altoline switches offer you the support you have come to expect from HPE. We offer you three years of 10-business-day advance replacement of defective parts. We manage the supply chain logistics so that you deal only with HPE as your single point of contact. HPE Technology Services offers you options for different levels of service that better suit your needs, such as four hours, or next-business-day replacements. The flexibility of ordering, delivery, and replacement is backed by the high-quality support provided on HPE networking equipment.

Q: Who provides you with repairs, spares, and replacement part support on HPE Altoline switches?

A: HPE offers you support for repairs, spares, and replacement parts. HPE offers the support you have come to expect from the company. Ordering and delivery flexibility is backed by the high-quality support provided on HPE networking equipment.

Q: Who provides you with software support on HPE Altoline switches?

A: When buying the new HPE Altoline switches, you can also purchase a Cumulus Linux software subscription. HPE Technology Services provides customer support for HPE Altoline switches with Cumulus Linux. In other words, you can rely on HPE as your one-stop shop for support.

Q: Are Altoline switches supported by HPE Technology Services?

A: Yes, HPE Altoline switches are supported by HPE Technology Services. We know that you may prefer the added comfort of having HPE support coupled with the expertise of HPE Technology Services to help enable your data centers to be available to support your business applications and better serve your customers.

HPE partnerships and joint ventures

Q: Is the arrangement between HPE and Accton exclusive?

A: The joint venture between HPE and Accton Technology builds on the long-term business relationship between the two companies. This joint venture relies on and benefits from the expertise of both companies to design, produce, and deliver HPE open networking switches to you in a timely manner.

Q: Why did HPE choose to partner with Accton Technology?

A: We have chosen to strengthen the long standing HPE and Accton partnership as we work together to provide you with the right go-to-market and purchase business models, coupled with access to HPE's worldwide local sales, support, and services. Accton's engineering excellence and ability to deliver superior value throughout the entire supply chain, together with HPE's networking industry strong position and recognized

service and support, delivers world-class disaggregated networking platform by bringing high-density, easy to deploy and manage, cost-competitive solutions to the cloud data center market.

Q: Why did Accton Technology choose to partner with HPE?

A: This joint venture between HPE and Accton Technology builds on the long-standing business relationship of the two companies. It brings together the expertise of both companies to reduce supply chain risks. HPE's worldwide local sales, support, and services complement Accton's abilities to design, produce, and deliver disaggregated networking switches to customers worldwide in a timely fashion.

Q: Where do you buy HPE Altoline open networking switches?

A: You can buy the new HPE Altoline open networking switches from HPE.

HPE and Cumulus networks partnership

Q: Is the arrangement between HPE and Cumulus Networks exclusive?

A: This is a non-exclusive agreement that gives HPE Technology Services the ability to add Cumulus Networks Linux network OS to HPE Altoline disaggregated switches. Hewlett Packard Enterprise has many business partners and continues to work with new partners where joint efforts deliver benefits to our customers.

Q: Why did HPE choose to partner with Cumulus Networks?

A: Hewlett Packard Enterprise is committed to providing a choice of network operating systems that fit customers' business requirements as they develop web-scale data centers. Within the open source community, the company is one of the leading contributors to the OpenStack® initiative. Cumulus Networks shares this commitment to the customer. With Cumulus Linux as part of the new cloud data center disaggregated networking solutions, you can leverage both open source and commercial Linux tools for data center automation, monitoring, and orchestration as you build scalable, affordable, more easily managed cloud data centers.

Q: Why did Cumulus Networks choose to partner with HPE?

A: HPE is a trusted global provider of enterprise data center solutions. Within HPE Altoline disaggregated switches, Cumulus Networks Linux OS enables high-capacity disaggregated networks that are easy to deploy and affordable. Together, the companies help your organization modernize your data center networks for affordable capacity and ease of configuration, management and orchestration.

Q: Why did HPE and Pica8 choose to partner?

A: HPE is partnering with Pica8 to make open networking easy by bringing you one of the most advanced SDN OSs in the marketplace. With Pica8, you can also count on HPE for trusted quality and decades of data center experience.

Q: Is the network operating system on the HPE Altoline switches HPE branded?

A: The network OS available with the HPE Altoline open networking switches is Cumulus Networks branded.

Q: Are you able to buy the HPE Altoline switches without the Pica8 PicOS, or Cumulus Linux network operating system?

A: True to the concept of disaggregation, you can buy the hardware and software components separately. Considering the fact that Pica8 PicOS and Cumulus Linux are the network OSs available with HPE Altoline box switches, it is a distinct advantage that you buy the hardware and software elements together.

General topics

Q: Why are HPE Altoline switches targeted for special market segments?

A: The web-scale cloud data center segment continues to be a fast-growing market segment with distinct needs for high scalability and diverse uses. More important, the web-scale service provider community tends to have deep engineering and technical IT resources that allow you to trade in the procurement convenience of the current tightly-coupled networking model for the flexibility and ability to custom configure disaggregated switches. Many web-scale IT organizations use the Linux operating system and require the ability to have consistent orchestration across both servers and the network. So, it is natural to introduce open networking HPE Altoline switches to serve the needs of the web-scale cloud data center market segment. It is also prudent to support early adopter enterprises that implement the same IT models as the service providers.

HPE is offering the disaggregated switches to web-scale cloud data center operators with a preference for direct purchasing, customer-facing applications, and the DevOps IT model. This includes service providers, e-commerce operations, and Web 2.0 operators and ever increasing number of early adopter enterprises. In essence, HPE Altoline switches are suited for organizations that have adopted or are moving to web-scale, cloud-based IT.

HPE Altoline switch offerings are part of a “fit-to-function” solution that serves hyperscale organizations, service providers, and large organizations with customer-facing applications and DevOps IT.

Q: How does this effort impact the HPE Networking brand?

A: Supporting web-scale cloud data centers with HPE Altoline switches in ways that satisfy your needs broadens the reach and appeal of the HPE Networking brand. This is a step in the right direction for the HPE brand.

Q: Is the HPE Comware operating system available for the HPE Altoline switches?

A: In the unlikely event that HPE is faced with special customer requirements that can only be met with Comware on disaggregated switches, HPE may consider looking into the merits of tailoring Comware 7 operating system for HPE Altoline switches, making it available to load onto the disaggregated switches in the future.

Q: Can the HPE Altoline switches offer features that are equivalent to HPE Comware OS?

A: HPE Altoline switches give you the choice to create disaggregated networking environments that suit your business requirements. As a result, you can utilize open source and commercial Linux tools that can offer features comparable to some of the HPE Comware capabilities. The idea of behind offering a disaggregated solution is to not duplicate Comware capabilities but you do still have the choice of buying HPE networking switches with the Comware operating system.

Q: Will HPE offer an open source network operating system for the Altoline family of switches?

A: HPE will continue to expand the hardware, software and services offerings for the Altoline family of switches. It is natural that HPE will, in the near future, offer a hardened and curated version of the OpenSwitch open source network operating system.

Q: Which models are part of the new HPE Altoline family of switches?

A: The HPE Altoline family of switches includes:

- **Altoline 6900 1G Leaf ToR**—48 x 10/100/1000BASE-T RJ-45 ports with 4 x 10 GbE SFP+ ports, and 2 x 20G QSFP+ stacking ports
- **Altoline 6920 10 GbE Leaf ToR**—48 x 10 GbE SFP+ ports with 6 x 40 GbE QSFP+ uplink ports
- **Altoline 6940 10/40 GbE Spine/Leaf ToR**—with 32 x 40 GbE QSFP+ ports supporting 10/40 GbE
- **Altoline 6960 25/100 GbE Spine/Leaf ToR**—32 x 100 GbE QSFP 28 ports supporting 100/50/25 GbE or 40/10 GbE

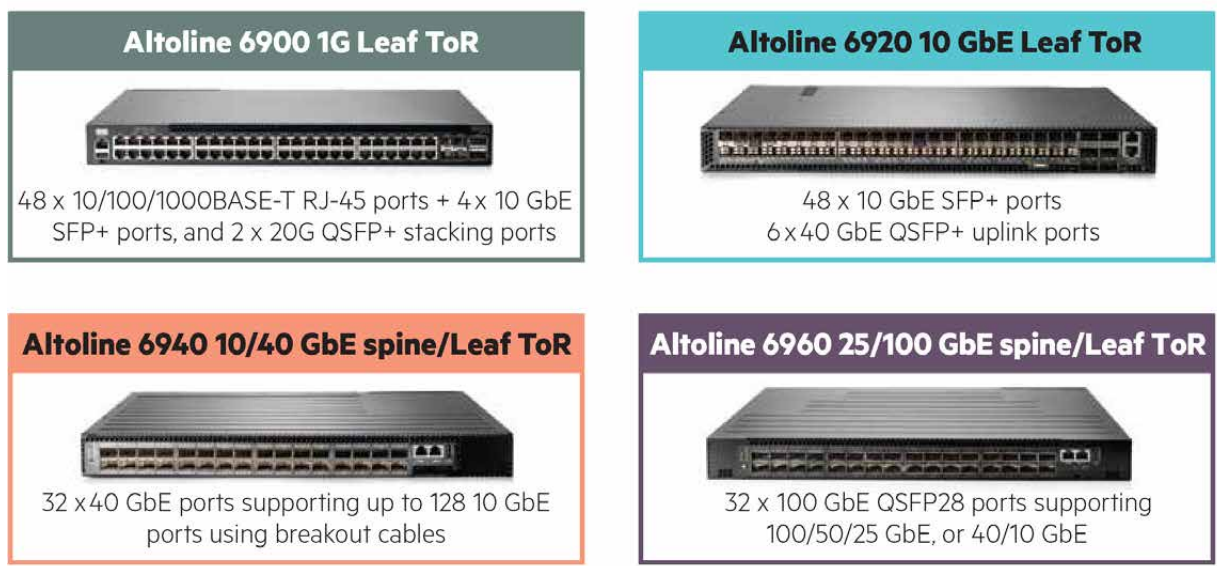


Figure 2: HPE Altoline disaggregated data center switch offerings

Q: Are HPE Altoline switches managed by HPE IMC?

A: The HPE Altoline switches with Cumulus Linux operating system do not use HPE IMC, but can utilize management tools that are part of the Linux ecosystem, such as Chef and Puppet.

Q: What management tools are available for HPE Altoline switches?

A: You can choose from a wide range of rich development, diagnostics, management, and orchestration tools available for Linux as part of the open source and commercial Linux environments.

Q: Are HPE Altoline switches available worldwide?

A: Yes, HPE Altoline switches are available to web-scale data center customers worldwide.

Q: What is the pricing structure for the HPE Altoline switch solution?

A: Please consult your sales consultant for pricing on Altoline switches.

The competition

Q: How is the HPE Altoline switch offering different from other vendors' announcements in this area?

A: The HPE Altoline offering is aimed at meeting the special requirements of web-scale data centers. In order to appreciate the HPE difference, take a closer look at the business and IT operating models at play here. If you are a cloud data center customer, most likely you have adopted direct purchasing practices, and opted for choice of open networking switch hardware and Linux network operating systems. Web-scale data centers are also run by IT teams with a DevOps model and a deep bench of technical and engineering resources, not to mention requirements for global support in the countries and places where they operate.

Only HPE Altoline solutions address your needs with:

- Dedicated sales teams
- Joint venture go-to-market model
- A choice of brite box hardware and Linux network operating system
- Branded switches that are backed by worldwide local support and the world-renowned HPE Technology Services

In short, the HPE Altoline solution directly meets your requirements through a unique, joint venture go-to-market route and global sales and support expertise that streamline operations and reduce supply chain risks. You can see the HPE Altoline difference as other vendors have failed to address customer requirements. Other vendors' versions of supporting cloud data center customers fail to provide the right go-to-market and purchasing models, targeting "do-it-yourself" IT groups rather than the right customer segments. Competing offerings amount to little more than "buy my hardware, pick your operating system of choice, then you are on your own." Not exactly a comforting approach.

Q: How do HPE Altoline switches compare to offerings from other vendors?

A. HPE is the only vendor delivering a choice of third-party OSs (OpenSwitch, Cumulus, Pica8) on Open Compute Project-compliant brite box switches (Altoline), with hardware and software backed by world class support services. Also, HPE Altoline switches are part of an open networking ecosystem that is much more comprehensive than what Dell can offer. HPE has created an open networking ecosystem with a variety of applications and tools that are among the top customer preferences for cloud scalability and programmability. HPE Altoline competitive differentiators vs. Dell Open Networking switches include:

- Most complete and open brite box solution in market
- Complete data center switch and server disaggregation solution
- Network virtualization and Cloud Orchestration; supports servers and switches
- Best software support services in the open networking market
- Complete solution backed by HPE Technology Services, #1 WW Network Consulting Services

Frequently asked questions

A: The HPE Altoline switch offering is a trusted solution that is HPE branded and backed by HPE's leading global support and services:

- HPE is the world leader in contributing to the open source OpenStack community, reflecting HPE's unwavering commitment to open source and open standards.
- HPE has the experience of building successful open standards solution and is one of the leading providers of data center open infrastructure covering servers, storage, and networking.
- HPE is the second largest networking switch vendor with market share that is larger than the next five competitors.
- HPE has the experience and the business relationships with web-scale data center customers, understands their business needs, and knows how to provide the appropriate products, support, and services.
- Linux is a known quantity to cloud data center customers. Along with HPE switches, customers can have a familiar experience when using Cumulus Linux.
- Customers may choose to work with a familiar CLI available with Pica8 PicOS.
- Cumulus Linux is gaining momentum and its adoption can accelerate with HPE resources and expertise behind it.
- HPE understands the special needs of web-scale IT customers and has the resources necessary to deliver Altoline switches, support them, and manage the special needs of the cloud data center segment across the entire spectrum of business and technology processes.

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