

VYATTA, INC.

White Paper

Why Vyatta is Better than Cisco

How standard hardware, evolving deployment models and simplified application integration make Vyatta a better choice for next generation networking



Executive Summary

Cisco Systems has engineered themselves into a corner and continues to expand an operating system and hardware product lines that are out of touch with today's users needs. The complexity and list of legacy issues in IOS (Internetwork Operating System) coupled with their reliance on specialized processors and hardware have slowed Cisco's ability to innovate to a crawl. Cisco proprietary hardware includes processors that are slower than today's x86-based servers and the majority of key routing, security and voice functionality (once the key to their dominance) are available in the public domain in the form of open-source community code. Despite slow engineering cycles and outdated hardware, Cisco's ability to charge exorbitant prices for their base products and enhancements has not wavered....until now.

Vyatta's open-source, Linux-based software approach to networking is changing the way networks are being purchased and deployed. Using Vyatta open-source software and standard x86 hardware, Vyatta has created a networking solution that is more flexible, affordable and scalable than its Cisco counterparts. Vyatta solutions offer industry-standard routing and management protocols, support for most commonly used network interfaces, and configuration via a single command-line interface (CLI) or web-based graphical user interface (GUI). In customer deployments worldwide, Vyatta has proven that a standard x86-based server outperforms so called "specialized" hardware from Cisco and it does so for half the price or less.

By eliminating the reliance on specialized hardware, Vyatta has opened up new possibilities for how networking technologies are being consumed, including standard hardware, server blades, and in virtualized environments. Vyatta's open-source model, massive hardware universe and strong community of users are creating a mass movement in the networking industry that is challenging consumers of networking technology to rethink their allegiance to proprietary networking vendors like Cisco.

Specialized hardware vs. Standard x86 hardware

Cisco's reliance on special purpose hardware has created a situation where their business value is tied to that hardware. Most of their profit margins come from being in the hardware business, an unfortunate scenario that has left them unprepared for the day when commodity standard hardware would compete with and outperform their own specialized custom-built solutions. With Vyatta, that day has come.

PROPRIETARY HARDWARE – PURCHASE, AUCTION, REPLACE

It is no secret that Cisco's proprietary hardware is overpriced and that their products contain processors that are outdated and are easily bogged down by any application above & beyond basic routing. The most glaringly obvious issue in the Cisco product line is the intentionally imposed limitations of a particularly product family. Eliminating functionality from products (Ex. No VoIP support or power over Ethernet on 1800 series) and limiting connectivity options and scalability on others (no Gigabit Ethernet on 1800 series, no T3 interface until 3845, 1 GB Max Memory on 7200 series) has created a large product line consisting of very specialized networking devices. These hardware and software limitations impede a users' ability to scale a network and force customers into "box replacement" model.

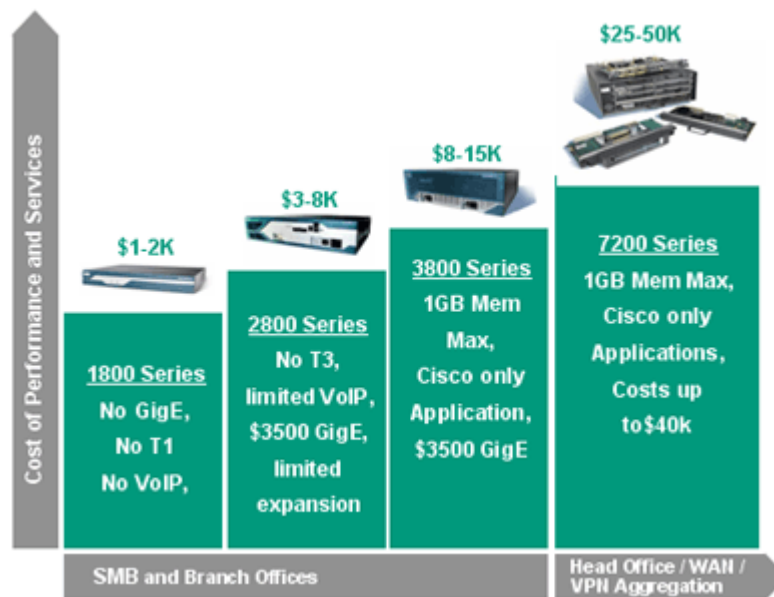


Figure 1: Cisco Product Family Limitations

X86 HARDWARE - PRICE, AVAILABILITY, SCALABILITY

Unlike Cisco, Vyatta runs on standard, off-the-shelf x86 hardware platforms. By exploiting the x86 architecture, Vyatta customers benefit from the

economics of commodity hardware and components available from their choice of vendors (see [Vyatta Hardware Catalog](#)). The general availability of x86 hardware drives prices down to commodity levels and eliminates potential supply chain and order delays simplifying the deployment and upgrade of networks.

With Vyatta, the only limits come from the hardware platform itself. Instead of replacing an entire product, Vyatta customers can simply replace or upgrade components instead of entire systems.



Figure 2: Vyatta Single Platform Price Performance and Scalability

X86 PERFORMANCE

LAN THROUGHPUT - TWICE THE PERFORMANCE, HALF THE PRICE

In third party testing performed by The Tolly Group, it was proven that standard hardware can indeed outperform proprietary solutions from Cisco. In testing which measured the throughput and performance of the open-source, x86-based Vyatta system versus the proprietary Cisco 2821 Integrated Services Router the key results were as follows:



Tolly Report Highlights:

1. (Vyatta) Outperforms the Cisco 2821 router consistently in Layer 3 Ethernet bidirectional zero-loss throughput, achieving up to twice the performance at half the price
2. (Vyatta) Operates at wire-speed across two onboard Gigabit Ethernet ports when forwarding 1,024-byte frames or higher
3. (Vyatta) Delivers lower frame-loss than the Cisco 2821 for all packet sizes and achieves zero frame loss with packets of 1,024 bytes and higher
4. (Vyatta) Leverages standard hardware and the structural cost benefits of the x86 ecosystem offer a flexible, extensive faster solution at attractive price points.

BGP WAN EDGE PERFORMANCE – 3X FASTER CONVERGENCE, 3X ROUTE CAPACITY, 4X PRICE/THROUGHPUT ADVANTAGE

In third party testing performed by The Tolly Group, it was proven that Vyatta on standard hardware outperformed the Cisco 7204VXR. In testing which measured the routing table capacity, route convergence times and throughput and performance of the open-source, x86-based Vyatta system versus the proprietary Cisco 7204VXR (with NPE-G1 and NPE-G2 processors) the key results were as follows:

**Tolly Report Highlights:**

1. (Vyatta) Supports BGP route table size of 4.5 million routes
 - 3X more than Cisco 7204VXR/NPE-G1 with max memory
 - 1.5X more than Cisco 7204VXR/NPE-G2 with max memory
2. (Vyatta) Provides BGP Convergence time more than 3X faster than the Cisco 7204VXR/NPE-G1 and 2X faster than the Cisco 7204VXR/NPE-G2
3. (Vyatta) Operates at Layer 3 wire speed across three Gigabit Ethernet port in full mesh when forwarding 512-byte frames or higher while Cisco routers failed to achieve wire speed
4. (Vyatta) Delivers from 4X to 3.3X price/throughput advantages over the Cisco 7204VXR/NPE-G1 and Cisco 7204VXR/NPE-G2

The full documents, Tolly Report: Vyatta® 1.1.2 Competitive Gigabit Ethernet LAN Routing Throughput Evaluation versus Cisco 2821 Integrated Service Router, and Tolly Report; Vyatta BGP Performance Evaluation versus Cisco 7204VXR Router can be downloaded from <http://www.vyatta.com/documentation/whitepapers.php>

PRICE COMPARISON

When a product delivers higher performance, uses processors that are faster, offers scalability that is virtually unlimited and components that are readily available you would expect to pay more. In the networking world this is not the case. An apples-to-apples comparison shows that Cisco is charging exorbitant prices for their proprietary products where systems and components are often 100x their standard counterparts. Where a standard single port fast Ethernet card is as little as \$20 for a standard server, Cisco charges as much as \$1400 (Cisco Part # HWIC-1 FE) and where an additional 1GB of memory can cost as little as \$100 for a standard server, Cisco charges as much as \$5000 (Cisco Part # MEM2851-256U1024D).

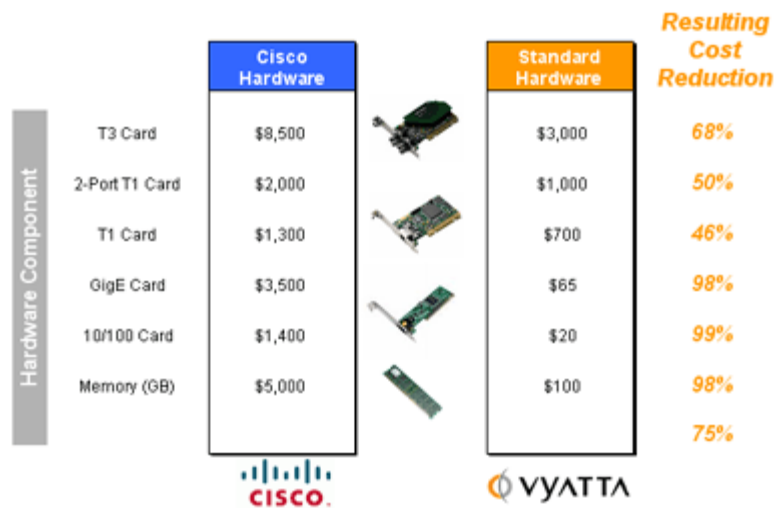


Figure 3: Vyatta vs. Cisco Component Price Comparison

Deployment models – Their way or your way?

Vyatta has created a fundamental change in how networking components are deployed. Users are no longer tied to the old Cisco model of purchasing pre-built hardware solutions and connecting via available interfaces and modules. With Vyatta’s open source, software approach to networking, users now have options for implementing network technologies. Vyatta’s systems can be built on:

1. Standard x86 servers (IBM, Dell, Sun, SuperMicro...)
2. Server blades (IBM, HP...)
3. Virtual machines (VMware or Xen)

These features make Vyatta the most flexible networking solution available. Where required, it can be deployed on separate physical systems for maximum performance or it can be deployed virtually for maximum economic efficiency.

STANDARD HARDWARE PLATFORMS

By deploying on standard x86 hardware, Vyatta users can choose hardware that fits the requirements for their specific application. Rather than being forced to choose from 4 or 5 Cisco product families that have limited functions and scalability, Vyatta users can choose a platform that can grow with their network. In addition, if a Vyatta user happens to outgrow a particular server hardware platform, that system can easily be repurposed to perform other computing functions, an option Cisco users do not have.

SERVER BLADES

Server blades have evolved as a way to consolidate single function servers and maximize computing power in a given space. Vyatta’s ability to

leverage the x86 ecosystem also means that Vyatta can be deployed in a server blade architecture. Network managers migrating to blade servers can now implement router, firewall and VPN functionality within those systems.

VIRTUALIZATION

Traditionally, virtualization has been seen as a server technology, allowing multiple distinct operating systems and applications to run in virtual machines, sharing the same server hardware. With Vyatta, virtualization can also be applied to networking using standard virtualization systems such as VMware and Xen.

Vyatta allows network engineers to create virtual machines to perform networking functions on the fly, allowing new networks to be brought online without adding new hardware and keeping operational expenses low. Vyatta secure routers can be virtualized “horizontally,” with multiple Vyatta instances sharing the same hardware system, or “vertically,” with Vyatta sharing the system with Linux or Windows applications.

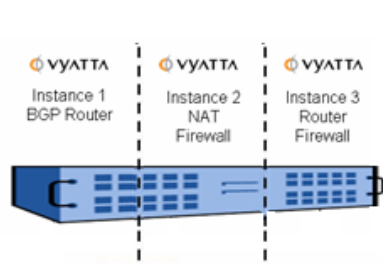


Figure 4: Horizontal Virtualization

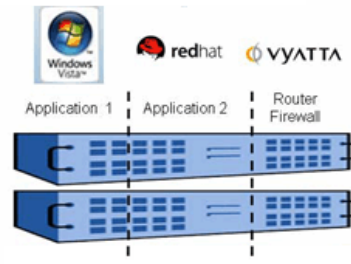


Figure 5: Vertical Virtualization

Cisco has announced a virtualization strategy on some high-end product families which allows for “horizontal” virtualization within Cisco hardware. While this allows Cisco customers to benefit from maximizing computing resources with a given system, it offers no deployment flexibility and the licensing model offers little economic benefit.

Application Integration – Add Features, Not Costs

Another key issue with Cisco solutions is that users are forced to use Cisco only applications for firewalling, IDS, etc., and more often than not, pay an additional fee for each of those applications. Cisco’s proprietary model does not offer users the ability to add tools and applications from outside vendors. Vyatta understands that “best of breed” solutions or even old favorite “tried and true” applications can come from many sources, including the open source community. Vyatta chose an open source business strategy from its onset to allow users to build networking solutions their way.

CISCO – PROPRIETARY CODE – VENDOR LOCK-IN

Cisco's proprietary code forces a vendor lock-in scenario where customers are required to use and pay for Cisco specific features and applications or look to an outside vendor. Basic secure routing and networking functionality such as firewall, VPN, IDS/IPS, management and traffic analysis are either completely unavailable in a specific product family or are often considered upgrades from the basic IOS.

Not only is the availability of features and applications closely controlled by Cisco, users also have no way of knowing when new features will be integrated or available for purchase. Cisco does not publish a product roadmap and their development cycles for IOS range from 12 to 24 months, leaving customers with no choice but to wait.

VYATTA – OPEN SOURCE – ADD & GO

In direct contrast to Cisco's force-fed, homegrown, elitist approach to features and applications, Vyatta has built its product and reputation on its ability to let customers build networks their way. Being open source and Linux-based allows Vyatta users to add applications of their choosing whenever they want. This opens a new world of options for custom networking solutions from integrating security applications or PBX functionality on the customer edge to traffic analysis and monitoring in an enterprise network.

Vyatta's commitment to open source stems from its core components (Debian, XORP, IPtables, OpenSwan) its integrated applications (Wireshark, TCPDump) and industry leading partners (Digium/Asterisk, Hyperic) This commitment also extends to the Vyatta user community, where customers have access to all versions of Vyatta code, a public [product roadmap](#) and are encouraged to vote on [feature requests](#). Collaborating with the Vyatta user base allows Vyatta engineers to best understand where and how Vyatta solutions are being used and in turn deliver code refreshes and new features every six months or less.

Conclusion

Vyatta's open source approach to networking simplifies cost structures, addresses evolving architectures and encourages customization, all things that are uncommon among proprietary networking vendors like Cisco. Vyatta's ability to combine mature open-source, Linux-based packages into a cohesive software offering, de-couple routing and security technologies from special purpose hardware and deliver a solution that can outperform its proprietary counterparts for a fraction of the cost has sparked a revolution in the networking technology market.