

Enter the Era of Self-managing Networks with DreamHost and Cumulus Linux

INDUSTRY: Web Hosting

BUSINESS OBJECTIVE: Optimize Performance and Transparency

PARTNERS: Agema, Penguin

DreamHost's large-scale, high-capacity cloud network is greatly enhanced by the use of Cumulus Networks' technology, giving us hardware platform flexibility, significantly improved automation and management, and fantastic performance. Cumulus Linux represents a fundamental shift in how service providers build out cloudscale networks.

— Jonathan LaCour, VP Product and Development at DreamHost

Overview

DreamHost is a leading Web hosting and cloud services provider with over 375,000 customers worldwide that hosts 1.3 million blogs, Web sites, and applications. The company offers a wide spectrum of Web hosting and cloud services, including Shared Hosting, Virtual Private Servers (VPS), Dedicated Server Hosting, Domain Name Registration, the cloud storage service DreamObjects, the cloud computing service DreamCompute, and the managed WordPress service DreamPress.

DreamHost sets itself apart from the cloud crowd by developing innovative and flexible Web and cloud services using open source software. And the Cumulus Networks open approach makes complete sense in this environment. DreamHost's Cumulus Linux deployments coincided with the launch of public cloud services. DreamCompute is engineered for scale and efficiency using best-of-breed open source solutions, including the OpenStack cloud platform, scalable Ceph™ block storage and Cumulus Linux, and VMware NSX's network virtualization. DreamHost is well known for constantly striving to lower cost and deliver the best services by contributing to and leveraging world-class open source software.

Objectives

- Performance and transparency in a single, easy-to-deploy, cost-effective solution
- Ability to leverage existing investment in tools for network automation without reinventing the wheel — or in this case — the network!
- Incorporate a self-managing model proven to be effective in the server world across the network

For DreamHost, the need for speed and transparency across the data center was imperative. Equally as important was the need to successfully employ the same self-managing model — used in the server world for

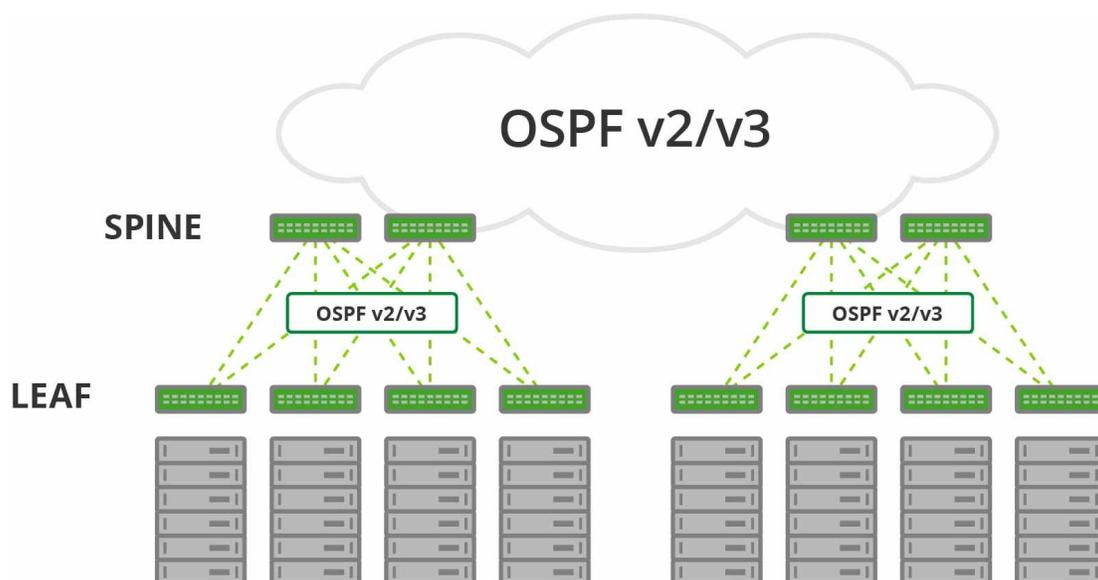
years — across the company's networking operation. This means that when DreamHost receives a shipment of servers, they get installed and configured automatically and are never touched after that point except for minor automated updates/changes. The same tried and true methodology applies to networks now. Network architects can spend their cycles architecting the network and bringing differentiated value to the network. And a single Tech Ops team can manage the combined technical operations, resulting in significant savings in OPEX. This is what DreamHost strived for and what Cumulus Networks helped them achieve. When NephoScale faced capacity limitations and recognized the need to upgrade their 1G environment to 10G, the team investigated options that would allow high capacity at scale, automation, and programmability. These criteria reflected their need to respond quickly to customer demands. After comparing Cisco, Arista, Dell/Force10, and open networking switches running Cumulus Linux, Nephoscale settled on Cumulus Linux to provide flexible solutions that can scale affordably.

Solution

DreamHost's environment consists of customer points of delivery (PODs) and command & control PODs for orchestration/management, running Cumulus Linux in a leaf/spine architecture, interconnected at 40G. Alternative platforms were considered in the new architecture, but Cumulus Linux provided far better performance and transparency at the right cost.

Each customer POD comprises:

- Hypervisor servers: every machine is a Linux Ubuntu server running KVM on commodity hardware
- Storage servers with Dell hardware running Ceph, a massively scalable, open source, software-defined storage system that runs on commodity hardware
- Leaf/spine network architecture with switches running Cumulus Linux on industry-standard switches loaded with Open Network Installer Environment (ONIE), the open source network OS installer



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The data network is based on various 10G switches including Agema's with 10G interconnections to the spines. Spines are interconnected at 40G. Layer 2 domains terminate at the TOR. All switches run OSPF v2/v3 and the network is dual stack IPv4/v6.

The storage infrastructure is 100% IPv6 — legacy applications and hypervisor-based environments have been IPv4 until now — and all customers receive a /64 network of public IPv6 space.

Chef recipes can be used for configuration and inventory management.

DreamHost uses VMware NSX to simplify multi-tenant operations, and the cloud orchestration is simplified via OpenStack. With Cumulus Linux supporting Layer 2 gateway services for VMware NSX, DreamHost can now look into wire-rate gateway services at the edge for translation into public VLAN.

A few highlights:

- Dual stack IPv4/v6 network
- Storage network is entirely IPv6
- OSPF v2/3 running on every switch
- 10G Ethernet to every server
- 40G Ethernet between spines
- Opscode Chef for server/network orchestration
- VMware NSX network virtualization
- OpenStack cloud orchestration

Overall, the network is simple. Plain OSPFv2/v3 makes network operations from configuration to troubleshooting easy.

Results

Cumulus Networks' solutions provide DreamHost the transparency, Linux toolsets, affordable solutions, and resilient approach that they wanted in the most expedient, cost-effective manner possible.

- Significant reduction in CAPEX and OPEX:
 - Solution resulted in over 80% savings (includes hardware, optics, licenses, service)
 - Automated configuration cut the need for multiple resources
 - Ability to choose any optic at 1/10th the price of incumbent solutions
- Visibility, programmability, and a well-known API resulting in full transparency
- Resilient, simple design with reduced Mean Time to Recovery (MTTR)

Affordable Solutions

Cumulus Networks opens the ecosystem to include a variety of networking gear, an open Linux operating system, and an open ecosystem of applications, thus lowering CAPEX and OPEX. In particular:

- Hardware is roughly 1/3 the price of incumbent vendors.
- Choice of optics, with no vendor lock-in at about 1/10th the cost of incumbent vendors.
- One license: If you want routing, you get routing. If you want VXLAN, you get VXLAN. There is no extra license, so license management becomes simple, and there is no associated maintenance window for upgrading a license.
- Full configuration savings above 80%: With a fully configured 10G switch, the overall cost delta including optics/license is \$14,000 with a Cumulus Linux solution versus \$75K-100K with an incumbent vendor.
- Streamlined workflow: OPEX savings are tremendous since the configuration is automated (one Tech Ops team can take care of automation). On the rare occasion that an issue arises, replacement times are so short they're almost non-existent.

Transparency

Traditional networking vendors tend to be complex. They have their own hardware and operating system, their own command line interface (CLI), their own API, and their own processes to integrate new functionality. Instead, Linux is an operating system that the DreamHost team is familiar with, and that provides visibility, programmability, and a well known API. Cumulus Linux is Linux and therefore provides the transparency of Linux for networking gear.

Familiar Toolsets

Another important factor in deciding on Cumulus Linux was the use of familiar tools. Orchestration tools in particular are very important. DreamHost has been using Opscode's Chef for server orchestration; using the same tools for automation of the network with just small changes to support Chef recipes saves a lot of time and manual operations.

DreamHost previously used the Quagga routing suite for DDoS mitigation, so it was easy to re-purpose familiar technologies for switches. They used collectd for server monitoring, and they can now leverage the same tools in the context of networks.

The IT team is knowledgeable about Linux, so they were able to leverage their in-house developers' expertise to extend the system while utilizing existing Cumulus Linux tools such as PTMd to verify proper cabling operations against a topology graph.

Resilient Design

Devices are bound to fail, and the best highly available designs work around failures. This means using resilient leaf/spine architectures with redundant fixed boxes, simplifying configurations to remove all of the complicated HA protocols from the network, and having a simple automated solution with all familiar tool chains.

Cumulus Linux, being Linux, makes things so simple that ANYONE can deploy new gear. And Cumulus Networks provides affordable solutions which enable design for failure, including affording extra high-capacity 10G switches, on-site spares for resilient designs with Mean Time to Recovery (MTTR) reduced to minutes overall.

For DreamHost, the expectations around speed and transparency were met and exceeded with bottom line benefits. The company was able to successfully replicate the proven self-managing model of the compute side of their business and scale without the burden, weight and expense of vendor lock-in. DreamHost continues to leverage the support of Cumulus Networks' Linux operating system to expand its networking operation in the most effective and efficient way possible.



Cumulus® Linux® Network OS

About Cumulus Networks

Cumulus Networks demystifies the complexity of networking and enables better, faster, easier networks to support your business. Our network operating system, Cumulus® Linux®, allows you to build and operate your network with the mindset of web-scale pioneers like Google and Amazon, radically reducing the costs and complexities of modern data center networks. More than 400 organizations, including some of the largest-scale data center operations in the world, run Cumulus Linux. Cumulus Networks has received venture funding from Andreessen Horowitz, Battery Ventures, Sequoia Capital, Peter Wagner and four of the original VMware founders.

For more information visit cumulusnetworks.com or follow [@cumulusnetworks](https://twitter.com/cumulusnetworks).

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