

# Cumulus Linux

## The first, true Linux OS for data center networking

Cumulus Networks is transforming networking with the industry's first, full-featured Linux operating system for networking hardware.

### Cumulus Linux

Cumulus Linux is a Linux operating system for industry standard hardware. The operating system is designed for data center network infrastructures. It accelerates networking functions on a variety of switches, and it acts as a platform for modern data center networking tools, enabling networks to be managed like servers.

Cumulus Linux enables networks that are:

- **Open:** Cumulus Linux is Linux. It is not just based on Linux, it is Linux and offers the entirety of the Linux experience on networking hardware with a platform for a rich ecosystem of applications. Existing open source and commercial Linux applications run natively on Cumulus Linux. Beyond leveraging Linux networking tools/suites and accelerating them in networking hardware, Cumulus Networks enhances for gaps, innovates to provide modern tools and functionality for data center networking and contributes them back to the community.
- **Responsive:** With Linux as the API, new applications can be developed and integrated rapidly, enabling innovation cycles on par with software and application cycles.
- **Affordable:** Industry standard switches and transceivers yield large CapEx savings, while Cumulus Linux simplifies network management, automation and customization, resulting in significant OpEx savings.

*Open Networking enables an open ecosystem by disaggregating the networking hardware from the network operating system. Cumulus Networks unleashes the power of Open Networking and accelerates its adoption with Cumulus Linux, the operating system for Open Networking.*

Cumulus Linux is the ultimate choice when it comes to flexibility and innovation, enabling the best of breed hardware and technology ecosystem.

### Modern Data Center Networking

Cumulus Linux is first and foremost a networking-focused Linux distribution. It enables modern data center architectures while providing a transition path for traditional data center architectures, with support for Layer 2, Layer 3 and overlay architectures.

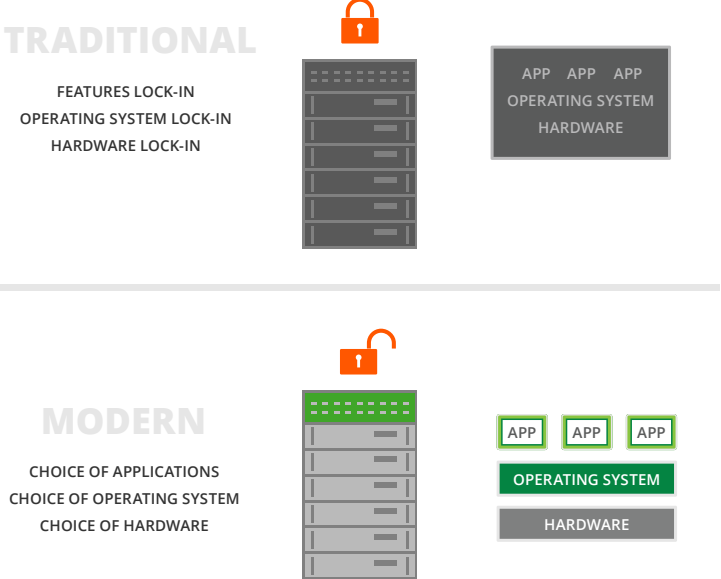
- High capacity IP fabrics enable scale, simplicity and rapid evolution
- Auto-provisioning: Zero touch install and zero touch provisioning simplify operations
- Automation: Manage switches like servers with automation tools
- Modern data center orchestration, management, monitoring and troubleshooting with consistent tools across the infrastructure
- Prescriptive Topology Manager verifies physical/logical topology consistency based on a user-specified network graph
- Overlay networks enable flexibility and rapid provisioning of multi-tenant networks



### Broad Networking Hardware

The same Cumulus Linux distribution accelerates networking constructs on a broad range of industry standard switches from different vendors. Choose the vendor of choice, choose from a wide range of platforms with various port densities, form factors and capabilities. Cumulus Networks certifies Cumulus Linux operations for all products on the Hardware Compatibility List (HCL). Look for the HCL table and platform-specific information at [cumulusnetworks.com/hcl](http://cumulusnetworks.com/hcl).

Industry-standard hardware comes pre-installed with the Open Network Install Environment (ONIE). ONIE is the key component to decoupling networking hardware from its operating system. It is the enabler for choice of operating system and is a prerequisite to loading Cumulus Linux on industry-standard switches. The installer environment provides for zero touch installation of the network operating system of choice to enable a seamless OS installation experience. You can find more information at [onie.org/](http://onie.org/).



### Broad Technology Ecosystem

Cumulus Linux is the foundation for a **rich technology ecosystem**. Being Linux, it is a platform that can leverage existing Linux applications, and it is the foundation for development and rapid integration of third party applications. Modern data center network orchestration tools such as Ansible, CFEngine, Chef and Puppet work on Cumulus Linux. Modern data center monitoring tools such as collectd and Ganglia work on Cumulus Linux. Leverage scores of applications across compute and network from the 40K+ Debian applications available. Customize the platform and build applications for specific business needs to innovate faster!

### Cumulus Linux Distribution

The Cumulus Linux software distribution is based on Debian. It is a networking focused Linux distribution and comprises of 250+ packages. Below is a summary of the packages included in the main distribution.

Functionality	Description
Operating System Install & Upgrade	Server-style upgrade/patching across minor releases, server-style process restart/termination. Support for zero touch OS installation using ONIE loaded on industry standard switches.
Extensibility	Linux is the API — Any language supported in Linux today, including scripting with Bash, Perl, Python, Ruby.
Hardware Management	The switch hardware abstraction layer accelerates Linux kernel networking constructs in hardware including the routing table, ARP table, bridge FDB, IP/EBtables, bonds, VLANs, VXLAN bridges. Hardware management also includes jumbo frames support and environmental management. Forwarding Table Profiles on the ASIC allows flexible partitioning of resources.
Layer 3 Features	Enhanced Quagga IPv4/v6 routing suite including OSPFv2, OSPFv3, BGPv4/v6. Virtual Routing and Forwarding (VRF) Equal-Cost Multi-Path (ECMP) and ECMP Resilient Hashing for IPv4 and IPv6 traffic. Bidirectional Forwarding Detection (BFD) across all platform & interface types, IPv4 and IPv6, BGP and OSPF, VXLAN.



Cumulus Linux Distribution (continued)

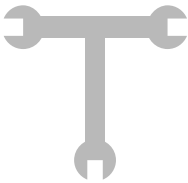
Functionality	Description
<b>Layer 2 Features</b>	<p>Bridge management with STP (IEEE 802.1d), RSTP (IEEE 802.1w), PVRST, PVST, bridge assurance, BPDU guard, BPDU filter.</p> <p>VLANs, VLAN trunks (IEEE 802.1q), LACP (IEEE 802.3ad), LACP bypass, unicast/broadcast storm control, LLDP, CDP, IPv6 neighbor discovery, IPV6 route advertisement.</p> <p>MLAG (clagd daemon).</p> <p>IGMPv2/v3 snooping, MLDv1/v2 snooping.</p> <p>Virtual Router Redundancy (VRR - Active-active first hop redundancy protocol).</p>
<b>Network Virtualization*</b>	<p>VXLAN support</p> <p>L2 gateway services integration with VMware NSX</p> <p>VXLAN Head End Replication</p> <p>VXLAN Active-Active bridging with MLAG</p> <p>Controller-less Network Virtualization with LNV</p>
<b>Management</b>	<p>Native Linux management tools such as OpenSSH, SCP, FTPS.</p> <p>Automated install and provisioning: zero touch install and zero touch provisioning.</p> <p>Management VRF</p> <p>DHCP, v4/v6 DHCP relays.</p> <p>Authentication with LDAP, authorization with sudo NTP.</p> <p>Interface configuration management (ifupdown2).</p> <p>Advanced management/orchestration through third party add-on packages.</p> <p>Power management for external devices with PoE and PoE+</p>
<b>Monitoring &amp; Troubleshooting</b>	<p>Traditional monitoring with SNMPv2 and network specific MIBs, hardware monitoring via watchdog, analytics with SPAN, ERSPAN, ACL-based counters, DOM optics data, thermal sensors, real time queue-depth and buffer utilization reporting.</p> <p>Troubleshooting with dnsutils, syslog, reachability tools, hardware inventory, log files, server-style filesystem, and merchant silicon specific commands.</p> <p>Advanced troubleshooting and ease of use with Prescriptive Topology Manager.</p>
<b>Security</b>	<p>Access control lists (ACLs) L2-L4 classification through IP/EPTables, CPU protection through hardware enforced ACL-based rate limiting, DoS control.</p>
<b>QoS</b>	<p>Link PAUSE.</p> <p>Classification based on Class of Service (CoS) (IEEE 802.1p) or DSCP (queuing, scheduling (DWRR and Strict Priority), buffer allocation)*.</p> <p>Ingress ACL-based classification/policing.</p>
<b>Extended Support</b>	<p>Extended support available for Cumulus Linux 2.5</p>

\*Check the appropriate hardware guide for platform-specific support.

### Cumulus Linux Third Party Packages

Cumulus Networks supports a vast ecosystem of **technology partners and solutions**. Some of these packages are not core Cumulus Linux functions but are core to modern data center networking. Packages for these solutions are provided in the add-on repository (unless the application is agent-less) and are fully supported.

Packages	Description
Orchestration	Ansible, CFEngine, Chef, Puppet
Monitoring	collectd, Ganglia, Graphite, hsflowd, Nagios/Icinga, NetSNMP



TECH SUPPORT

### Cumulus Linux Support

Cumulus Networks provides world-class support and services to help our customers and partners fully leverage the power of Cumulus Linux. We provide a full range of enterprise support services that include 24/7 access to the Cumulus Networks GSS and online support tools, advanced RMA for our selected hardware manufacturers, and even onsite support for enterprise customers. We are here to make sure our customers and partners can quickly and easily manage and troubleshoot solutions from Cumulus Networks. For more information, refer to [cumulusnetworks.com/support/overview/](http://cumulusnetworks.com/support/overview/).

### Cumulus Linux Availability

Cumulus Linux is commercially available through perpetual licensing model that gives customers the right to use Cumulus Linux for the lifetime of the Open Networking hardware it runs on. Combined with the license, customers can purchase Software Updates and Support for 1-, 3-, and 5-year terms.

Software Updates and Support includes:

- All software upgrades including major & minor software releases
- All software updates including maintenance & security patches
- Technical support

---

### 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](http://cumulusnetworks.com) or follow [@cumulusnetworks](https://twitter.com/cumulusnetworks).