

OpenStack and Cumulus Linux

Solving your business challenge

OpenStack is rapidly becoming the de facto standard in cloud computing. OpenStack helps organizations in all verticals discover increased flexibility and speed to market. As enterprises and service providers start to adopt deployment and operational models of web-scale companies, it's crucial that the cloud architecture is designed and deployed properly with best practices.

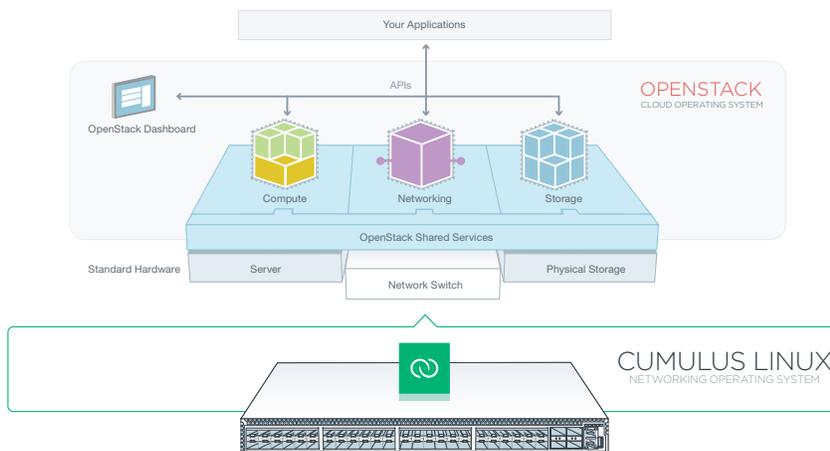
However, OpenStack has complex networking requirements. In fact, many user surveys suggest it as having some of the most challenging requirements in networking. As components interact at different levels of the system stack, OpenStack adds complexity in the following ways:

- **End user requests can vary greatly in terms of use cases, applications and physical infrastructure. It can be difficult to find the right solution that has been thoroughly designed and tested.**
- **Physical server nodes have network requirements that are independent of those used by instances, which need to be automated, fully self-service and account for security.**

The solution you're looking for

Large-scale cloud providers are showing success through deploying a repeatable and scalable infrastructure that adopts a scale-out model rather than a standard scale-up model espoused by traditional virtualization vendors. Cumulus Linux can provide a solution for both a simple VLAN or the modern VXLAN implementation.

All nodes within an OpenStack cloud require some form of network connectivity. In some cases, nodes require access to more than one network segment. The design must account for sufficient network capacity and bandwidth to ensure that all communications within the cloud — traffic across the network (also known as east-west) as well as in and out of the system (also known as north-south) — have sufficient resources available.



- **OpenStack networking can be implemented in multiple separate ways. This overview focuses on Neutron, as it is the most commonly deployed networking method in production OpenStack clusters.**
- **This implementation is highly flexible. Tenants can be isolated using either traditional VLAN or overlay topologies such as VXLAN. Each may be coupled with layer 2 and/or layer 3 topologies from the spines all the way to the compute nodes using the Cumulus Routing on the Host open source package.**

OPENSTACK

Over time, the OpenStack community has continually added more features and functionality across software layers. The disaggregation of physical storage and servers from software has helped drive this rapid development cycle. It's this abstraction which lets OpenStack system architects use commodity server hardware to rapidly build tenant environments. Neutron, the OpenStack project for networking services, has seen new features like DVR, FWaaS and LBaaS emerge in recent releases. Despite Neutron's advances, traditional networking vendors have lagged behind the advances of their server counterparts.

CUMULUS LINUX

Cumulus Linux is the first full-featured Linux OS for data center networking, running seamlessly on industry-standard bare metal switches. Since Cumulus is based on Linux, operators can use DevOps tools, like Ansible, to deploy the network along with other components of the architecture and significantly reduce total cost of ownership. The solution can be configured via the Cumulus ML2 plugin, with Cumulus Routing on the Host or with an overlay/underlay topology using 3rd party SDNs.



Solution benefits

BUSINESS BENEFITS

- **Business agility:** By enabling true cloud capabilities through a scale-out, web-scale architectural approach, Cumulus Linux enables OpenStack deployments to achieve the same goals that hyper-scale web companies can in terms of automation and business agility — such as minimal downtime, improved SLAs, scalability and the ability to respond to market dynamics in a full self-service and on-demand manner.
- **CapEx:** OpenStack represents the emergence of a commodity cloud approach. By deploying OpenStack in conjunction with Cumulus Linux, greater vendor choice in hardware can be achieved, leading to lower their CapEx by over 45%*.
- **OpEx:** Beyond CapEx, significant benefits of deploying OpenStack with Cumulus Linux are realized through vast reductions in OpEx, an average of 74%*, including improvements in automation, self service and rapid prototyping with Cumulus VX that enable networks to be managed in conjunction with compute resources.
- **Support:** While open source solutions provide low cost alternatives to commercial options, support is always a consideration for companies deploying OpenStack. Cumulus Networks and its hardware partners complete a rigorous certification of the combined solution so that it is thoroughly tested and supported like a traditional data center switch.

* Cumulus Linux TCO report.

TECHNICAL BENEFITS

- **Scale out:** To deploy OpenStack in the most scalable manner possible, compute and storage resources are deployed using a high performance, non-blocking, layer 3, clos-based, leaf-spine network fabric, which is enabled by Cumulus Linux.
- **High availability:** Host HA is a set of layer 2 and layer 3 features, including high availability for hosts and switches. It utilizes features such as LACP bonds between hosts and leafs and MLAG between switches, thus providing greater redundancy and greater system throughput.
- **Automated cloud deployment:** The Cumulus Linux framework simplifies the network and allows for easy automation with technologies such as ONIE, zero touch provisioning and automation tools. This enables the use of a completely unified tool set to install and configure both switches and servers. From a simple configuration file, an entire pod of switches and servers can be brought up with minimal human intervention. The combination of bare metal hardware with a consistent Linux platform enables you to leverage automation to deploy compute, storage and networks together.

Conclusion

A well-designed cloud provides a stable IT environment that offers easy access to needed resources, usage-based expenses, extra capacity on demand, disaster recovery and a secure environment. This requires careful consideration of a multitude of factors, both technical and non-technical:

- **Cumulus Linux has experienced tremendous customer traction and adoption due to a variety of use cases, surpassing more than 600 customers, including 28% of the Fortune 50.**
- **Both Cumulus Linux and OpenStack run on top of industry-standard bare metal hardware. The software defines the performance and behavior of the environment and allows the administrator to exercise version control and programmatic approaches that are already in use by software development teams.**
- **These technologies complement each other and can be combined to achieve the best-in-class cloud computing capabilities and help combine the vision of a flexible, open, standards-based software stack without proprietary vendor lock-in.**

Get Started!

- **Try Cumulus Linux with Cumulus VX:** cumulusnetworks.com/vx
- **Download the latest version of Cumulus Linux:** cumulusnetworks.com/downloads/
- **For partner distributions related to OpenStack:** www.openstack.org/marketplace/distros/
- **To get a copy of an OpenStack project, you can clone a repository from git.openstack.org and browse the source code at git.openstack.org/cgit.**

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