OcNOS® Data Center Solution

Application Note

Overview

Web-scale networking requires new solutions to build hyperscale and cloud data centers equipped with a web-scale operations toolset. IP Infusion's NOS running on open networking switches combines the key principles of best-in-class hardware and software. Open Compute Network Operation System (OcNOS) is an ideal solution to build both Layer-3 and Layer-2 Data Center fabric as it provides a rich set of robust control plane features, delivering lower network costs and at the same time providing vendors the best of breed selection for hardware platforms.

OcNOS provides a common software for multiple deployment use-cases over varying platforms. It is designed using several inbuilt abstraction layers allowing the software to be run over multiple Control Plane CPUs and Forwarding chipsets. It is highly modular with multiple processes handling individual functions. OcNOS provides high interoperability as it is built using definitions based on industry standards and popular vendor specific extensions.

A key concept that will enable next generation Data Center networks, is the separation of the networking software from the switching or routing hardware. One of the biggest advantages of disaggregation is CAPEX reduction, followed by OPEX savings and deployment flexibility.

Telecom and Hyperscale Data Center operators need a new approach for network platform development and procurement to enable:

- Faster introduction of technologies, designs, and features by means of a collaborative ecosystem of hardware and software component vendors

- Flexibility in network design and service deployment via plug-n-play hardware and software components that can cost-effectively scale up and down

- Unit-cost reduction through use of standard hardware and software technology components with very large economies-of-scale wherever appropriate.

One of the OcNOS hallmark values is its robustness and resiliency operation in the field. OcNOS Solutions have been deployed by over 300 OEM and end-users, with hundreds of thousands of commercial deployments spanning Access, Core, Transport and Data Center Networking. It is a feature rich solution with extensive legacy and new protocol coverage.

OcNOS also significantly reduces the operational cost as it can be used to address multiple solutions such as Data center, Optical Transport, Cell Site Router, Provider Aggregation & Passive Optical Networks.

There is extensive support for multiple hardware vendors, providing continuity of supply and allowing for best of breed selection.

The standards-based Management infrastructure seamlessly integrates into off-the-shelf or home-grown network management systems with ease.

1.0 Use Cases

1.1 Datacenter Layer 2 and Layer 3

OcNOS can be used as a hybrid of Layer 2 / Layer 3 to limit the size of failure domain and scale up the data center. Layer 3 routing can be used in Tier 1 (core) and Layer 2 in Tier 3 (access). Tier 2 can be based on either Layer 2 or Layer 3. A hybrid model has the advantage of seamless Virtual Machine mobility and requires less IP subnets for the data center.
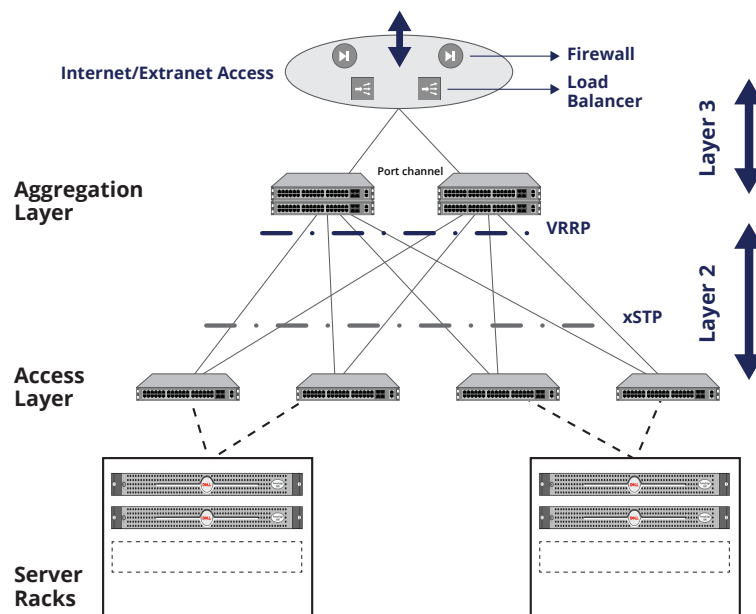
Typical Network Topology:
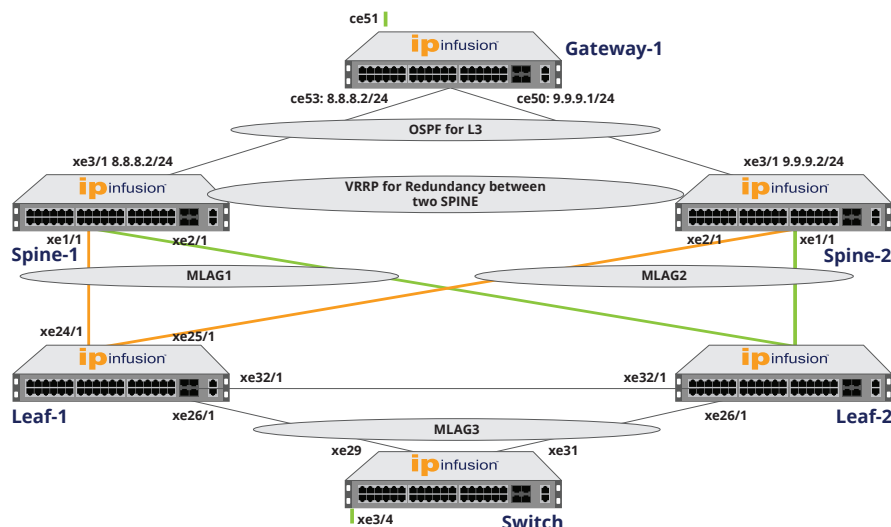
**The major features of this solution are:**

- Leaf switches are configured with Multichassis Link Aggregation (MLAG) for redundancy and increased bandwidth.

- Spine routers distribute traffic within the sites. And uses VRRP for redundancy.

1.2 CLOS Topology – L3 eBGP

A highly resilient and horizontally scalable network can be designed using OcNOS as a full L3 BGP (eBGP) CLOS fabric. BGP is used for its simplicity to configure and troubleshoot a large uniform topology such as CLOS, and high vendor interoperability.

**Typical network topology:**

- Fully routed design from TOR. A L3 only design simplifies the network design and the network operations.

- Redundant server connection to the TOR switch.

- Build a large scale data center using uniform nodes.
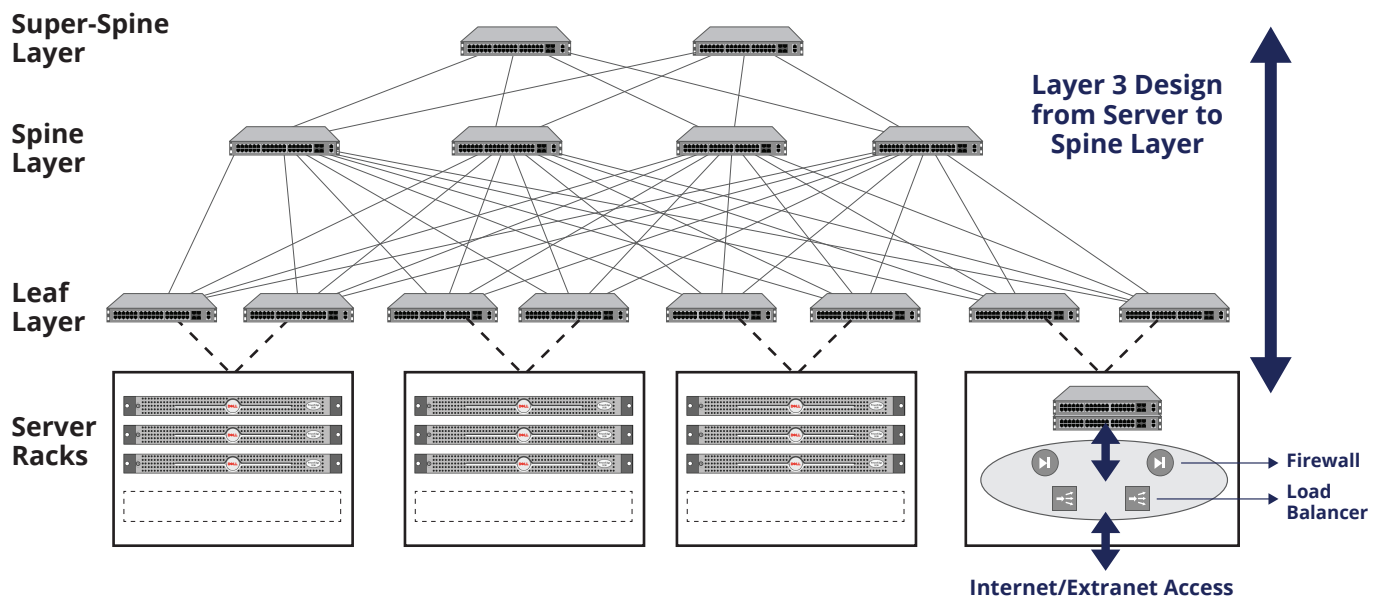
Leaf Spine Architecture with Core service layer in a Leaf Service Block

1.3 EVPN-VXLAN Overlay with a L3 CLOS Design

EVPN VXLAN runs on a Layer 3 routed network. Thus, when deploying EVPN VXLAN on a data center, firstly the core data center has to be Layer 3 in design. Leveraging eBGP feature, OcNOS enables EVPN-VXLAN overlay deployment in data center with a L3 CLOS architecture. The main advantage of eBGP lies in its ability to scale for large scale designs, easy compatibility and cross vendor availability. Besides when used with EVPN, it reuses BGP with only a separate address family thus keeping the protocol complexity to minimal.
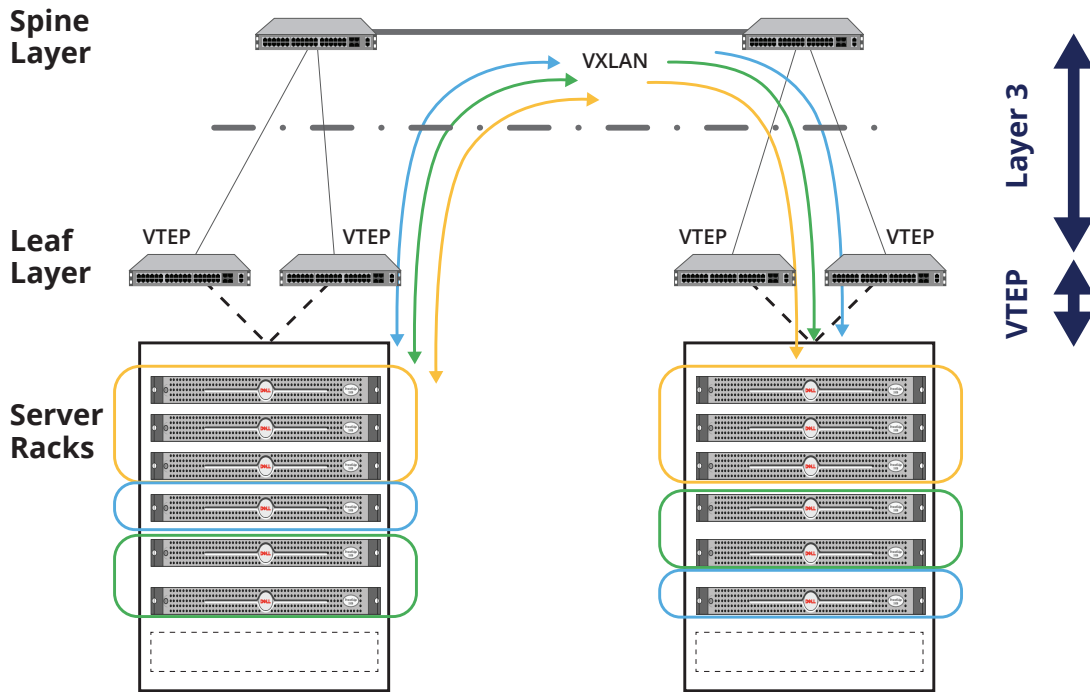
- Fully routed design from TOR - A L3 only design simplifies the network design and simplifies the operation.
- Build a large scale data center using uniform nodes – horizontal scaling vs scale up.
- Enable EVPN VXLAN on all the Leaf and Spine nodes.
- Connect hosts which are multihomed to two Leaf switches, providing redundancy.

More Information

For more information about the OcNOS Data Center solution,
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