

OcNOS® Data Center Solution

Data Sheet

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®) can be used to build both Layer-3 and Layer-2 Data Center fabric as it provides a rich set of control plane features, providing robust quality, ensuring lower costs and at the same time providing vendors the best of breed selection for hardware platforms.

OcNOS provides a common software for multiple deployments and hardware. It is designed using several inbuilt abstraction layers which allows the software to run over multiple control plane CPUs and forwarding chipsets. It is highly modular with multiple processes handling individual functions. As the OcNOS solution is built using standards based definitions, as well as popular vendor specific extensions, it allows for high interoperability.

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 Datacenter 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.

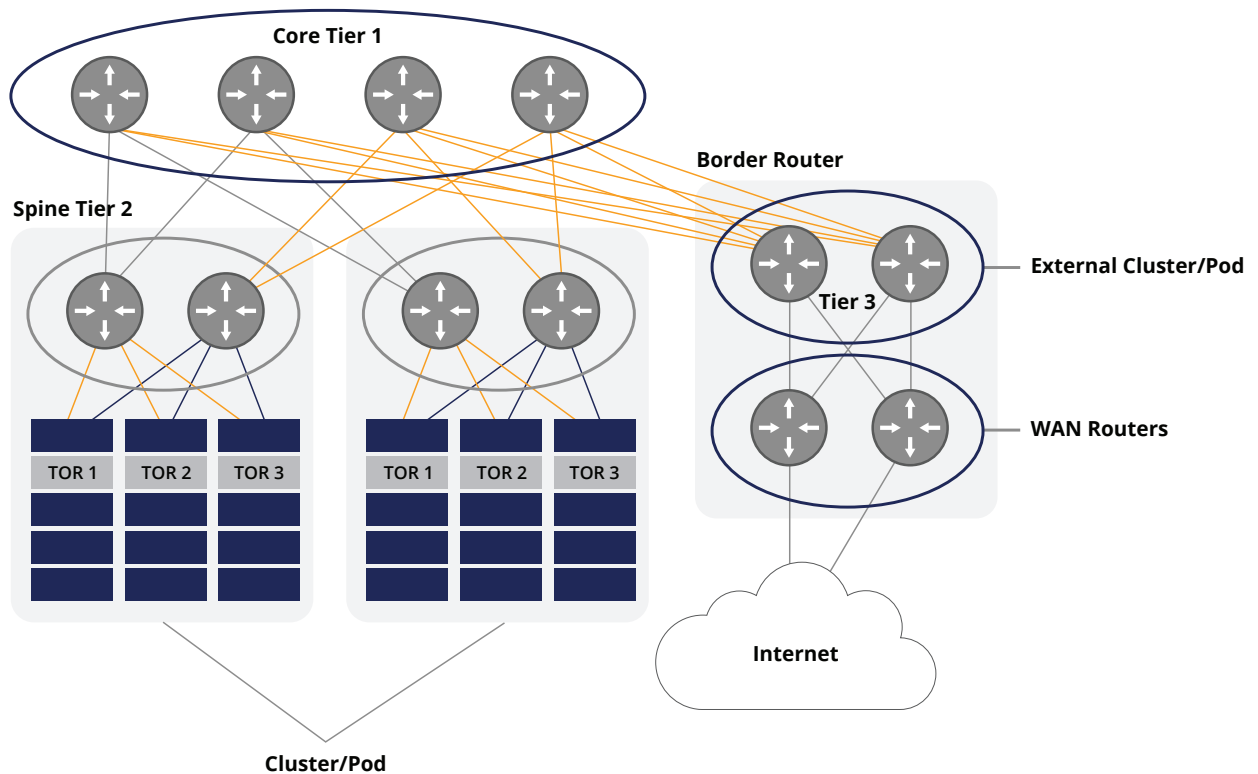
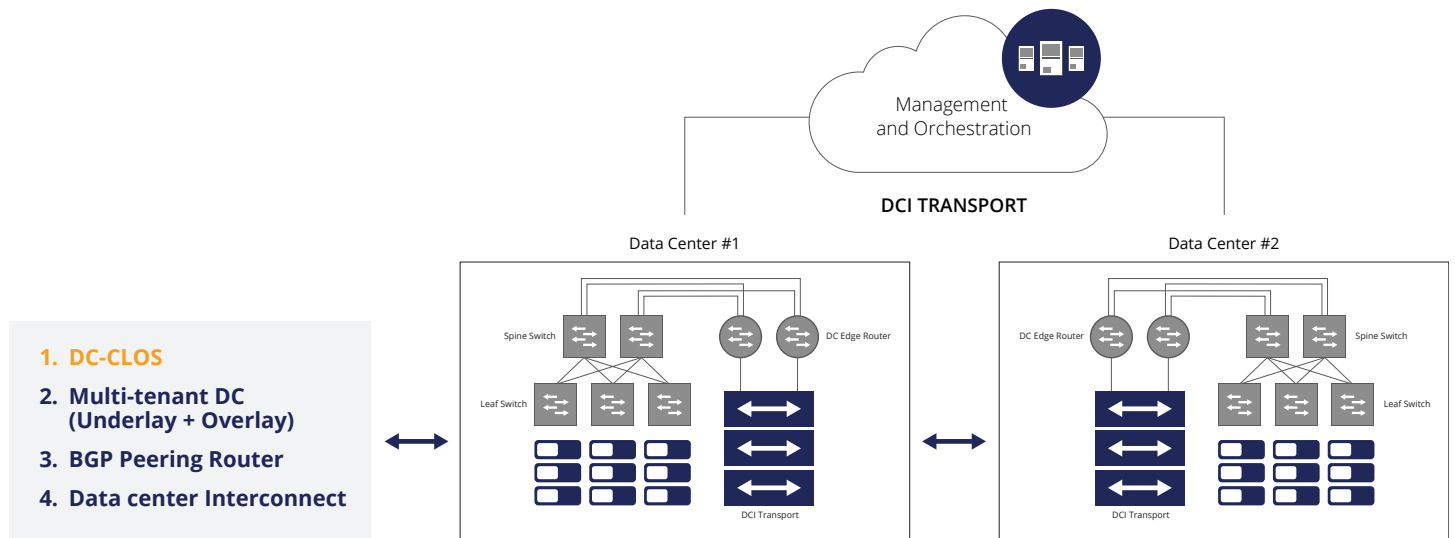
OcNOS provides a unique value proposition in helping build modern Data Centers. It provides robust quality with over 300 OEM and End-users, with hundreds of thousands of deployment in solutions spanning access, core, transport and data centre networking. It is a feature rich solution with extensive legacy and new protocol coverage.

OcNOS also drastically reduces the operational cost as it can be used to address multiple solutions such as Data center, Optical Transport, Cell Site Router, Provider Aggregation and 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 plugs into off-the-shelf or home-grown network management systems with ease.

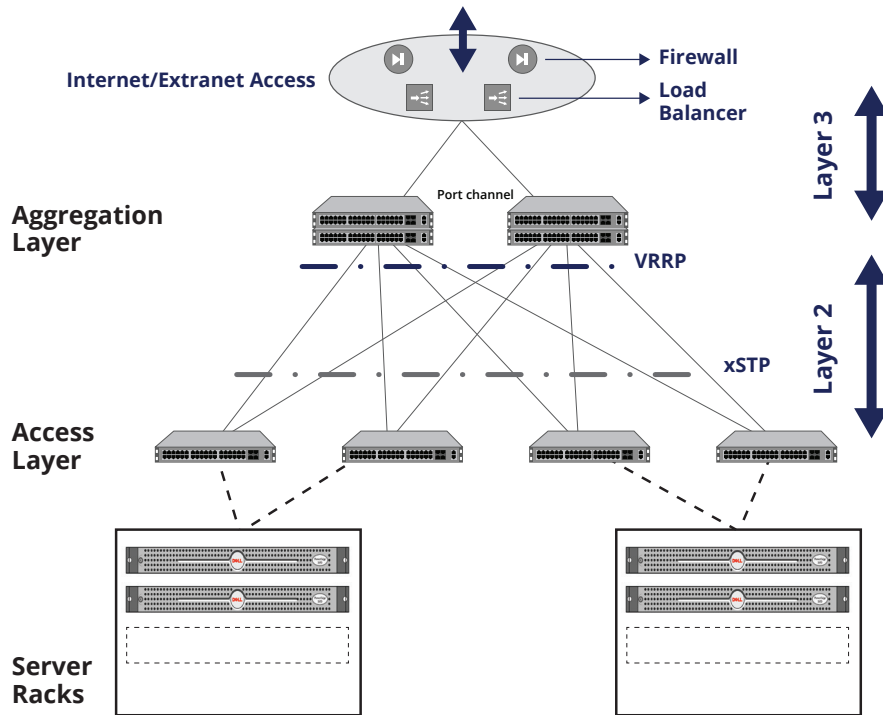
1.0 Data Center Architecture - Data Center and DCI Solutions



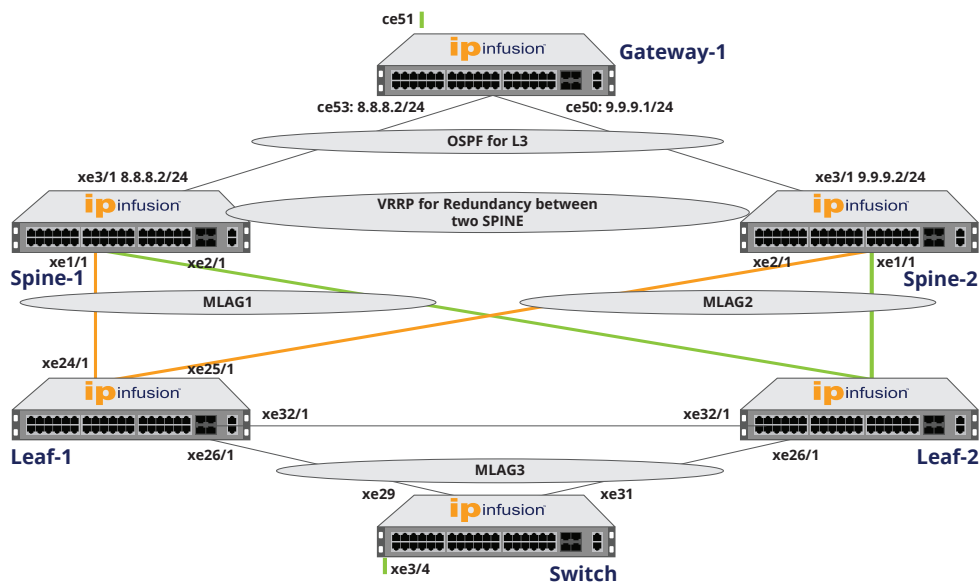
2.0 Use Cases

2.1 Datacenter Layer 2 and Layer 3

Hybrid of Layer 2 / Layer 3 can be used to limit the size of failure domain and scale up the datacenter. 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:

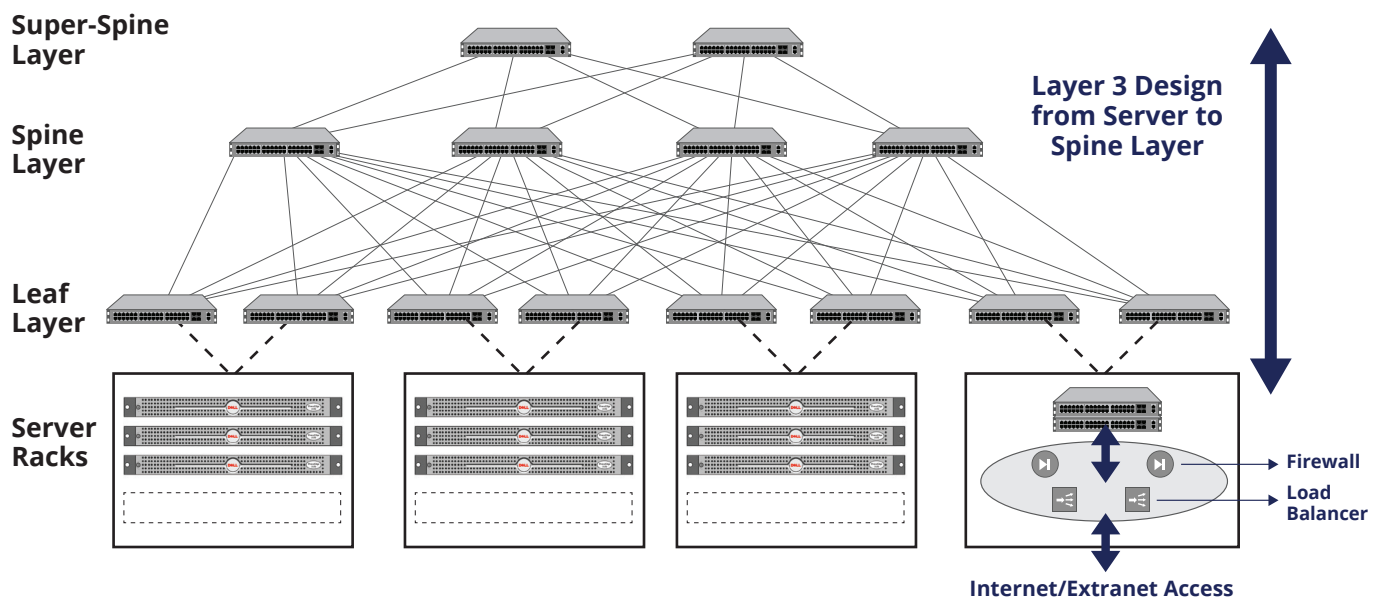
- Leaf switches are configured with MLAG for redundancy and increased bandwidth.
- Spine routers distribute traffic within the sites. And uses VRRP for redundancy.

2.2 CLOS Topology - L3 eBGP

This design is based on a full L3 BGP (eBGP) CLOS fabric to provide a resilient and horizontally scalable network design. BGP is used for its simplicity to configure and troubleshoot a large uniform topology such as CLOS, and high vendor interoperability.

Typical network topology:

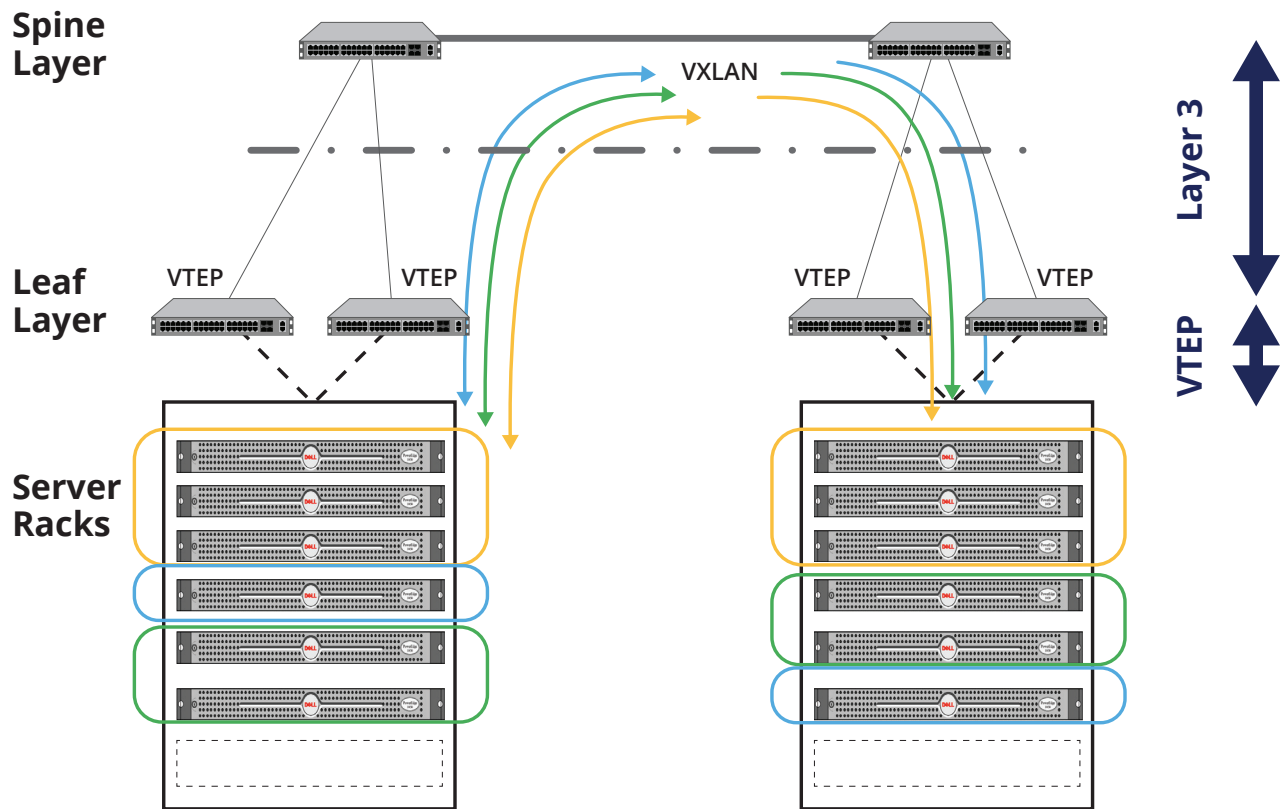
- Fully routed design from TOR. A L3 only design simplifies the network design and the network operations.
- Redundant server connection to the TOR switch.
- Build a large scale data center using uniform nodes.



Leaf Spine Architecture with Core service layer in a Leaf Service Block

2.3 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 a Layer 3 in design. The CLOS Layer 3 fabric could be built using any of the available Layer 3 routing protocols. Here, eBGP is used. 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.

3.0 Key Features

The tables below lists the software features in the latest OcNOS-DC release. Note, the following mentioned features are only indicative and the detail feature list may vary. Please refer to Feature Matrix for complete feature list on supported ODM platforms.

OcNOS-DC-IPBASE FEATURE	TECHNICAL SPECIFICATIONS – NOS SOFTWARE FEATURES
Layer 2 Switching	<p>VLAN Virtual LANs with Port-based VLANs, Routed VLAN interface, Port based VLAN interface, Private VLAN, Ingress VLAN translation for C-VLAN and S-VLAN</p> <p>Spanning Tree Protocol (STP) STP, Multiple Spanning Tree Protocol (MSTP), Rapid Spanning Tree (RSTP), Rapid Per Vlan Spanning Tree (RPVST+)</p> <p>Link Layer Discovery Protocol (LLDP) LLDP v2</p> <p>Link Aggregation Link Aggregation Control Protocol (LACP), Static link aggregation group</p> <p>Multi-Chassis Link Aggregation (Layer2 only) Multi-Chassis Link Aggregation (MCLAG), RSTP Support on MC-LAG, MC-LAG L3 Gateway using VRRP, Provider RSTP Support on MC-LAG (Spanning tree not supported on MCLAG Customer Edge Port)</p> <p>PB CVLAN/SVLAN translation (Also supports untag-pep/untag-cep option), svlan translation(Also supports cvlan modification option), Changing the outer tpid of provider network port, Remarking COS, CFI for c-tag and s- tag at CEP and PNP</p> <p>Q-in-Q L3 Termination</p> <p>BPDU Protect, Root Guard, MAC Learning disable, Static MAC Address Assignment, Port based authentication with Radius server, TFO (Trigger FailOver), Port Security</p>
Layer 3 Routing	<p>Ethernet ARP, Path MTU for IPv4 & IPv6, Transmission of IP Datagrams over Ethernet Congestion Control in IP/TCP Networks, IP Broadcast, IP Broadcast in the Presence of Subnets, IP Subnetting, Classless Inter-Domain Routing (CIDR), Requirements for IP Version 4 Routers, Route Redistribution, VLAN Routing, Route-Map Continue, Static Route Discard</p> <p>URPF Loose mode, Loose default mode, Strict mode</p> <p>BGP, RIP, OSPF, ISIS, BFD, VRRP</p>
VxLAN with EVPN	<p>VXLAN, VxLAN - QoS, VxLAN-EVC, EVPN for VXLAN, EVPN Multihoming for VXLAN, EVPN IRB with VxLAN, Prefix Route for EVPN IRB for VxLAN, VxLAN EVPN ARP/ND cache Ageing, Inter-VRF route leaking over VxLAN- EVPN, DHCP Relay Link Selection for VxLAN IRB Anycast Gateway</p>
Multicast Features	<p>PIM, IGMP</p>
Quality of Service (QoS)	<p>DiffServ Field in IPv4/IPv6 Headers, Assign matching traffic flow to a specific queue, Hierarchical & Modular QOS (Only Trident2 and Trident2+ supports HQOS, othe platforms do not), L2 and L3 QoS, Rate Limiting - 1/2/3 rate coloring, policing and marking, Shaping per queue, per port, Multiple hardware queues per port, WRR/WFQ/SP Scheduling Per Queue, WRED</p> <p>802.1p remarking, Classification based on interface, ACL, DSCP, IP precedence, RTP, 802.1p, and VLAN, Trust IEEE 802.1p/DSCP, Remarking of bridged packets</p> <p>Police Rate (SRTCM/TRTCM), Minimum and Maximum Bandwidth Per Queue</p> <p>Vlan based shaping, Priority Flow Control, Explicit Congestion Notification</p>
Management	<p>Role based CLI management and access, CLI access via console, telnet and SSH, Authentication using tacacs+/radius client, Extended ping and traceroute, SNMP v1, v2, and v3, sFlow, ErrorDisable, Debounce Timer, DHCP client, DHCP relay, NTP, syslog, File Upload/Download using FTP/TFTP/SFTP/SCP, Management VRF, Ansible, Yang, NETCONF, NETCONF – TRIM, Hitless Merge, Patch Upgrade Mechanism with & without ONIE, Loopback and VTY based ACL</p>
Security	<p>Secure interface login and password, SSH v1, v2, Storm control, Flow control, DHCP Snooping, IP Source Gaurd</p> <p>Access Control Lists (ACLs) based on: Source IP address, Destination IP address, TCP/UDP source port, TCP/UDP destination port, IP protocol type, Source MAC address, Destination MAC address, Ethertype TCP Flags, Protocol type, IP fragment flags, DSCP, CoS, IP precedence, Rule prioritization and Re sequence, On-fly modification, ARP type, sender MAC, sender IP, target MAC and target IP</p>
Hardware-Specific Features	<p>Switched port analyzer (SPAN), Remote switched port analyzer (RSPAN), Unified Forwarding Table (UFT), Dynamic load balancing (RTAG7 hash), Port Breakout</p> <p>Hardware revision check, TCAM space monitoring, TCAM space monitoring SNMP support</p>
Chassis Monitoring	<p>Temperature monitor, Fan control, Power Monitoring, CPU load monitoring, Board information (EEPROM), Fan and PSU FRU information, Hardware MIB and Traps</p>
Digital Diagnostics Monitoring	<p>Temperature monitor, Power Monitoring(Power, Current, Voltage), Hardware MIB and Traps</p>

4.0 Solution Ordering Guide

4.1 SKU - OCNOS-DC-IPBASE

SKU	PORT DENSITY	ODM	SWITCHES
OCNOS-DC-IPBASE-720	48 x 10G + 6 x 40G		Redstone XP-2060
		Dell	S4048-ON, S4048T-ON
		Delta	AG7648
		Edgecore	AS5812-54X, AS5812-54T, AS5835-54X
OCNOS-DC-IPBASE-1280	32 x 40G	Dell	S6010-ON
		Delta	AG8032-PL
OCNOS-DC-IPBASE-3200	32 x 100G, 96 x 25G + 8 x 100G	Celestica	Seastone DX-010, DX-030
		Dell	Z9100-ON, S5296F-ON
		Delta	AG9032v1 & v2
		Edgecore	AS7712-32X, AS7716-32X, AS7726-32X
OCNOS-DC-IPBASE-1800	48 x 25G + 6 x 100G	Edgecore	AS7326-56X
OCNOS-DC-IPBASE-6400	64 x 100G	Edgecore	AS7816-64X

4.2 Maintenance & Support

SKU	MAINTENANCE & SUPPORT
OCNOS-MS-1Y	1-year Maintenance & Support with Upgrades - Includes Technical support resources, software updates & upgrades, email and phone support, access to Support web site including case management system. Access to technical support team 24 x 7 for Severity 1 issues, normal business hours for all other issues. "Upgrade" means a version change for the licensed software with substantial improvements, enhancements and bug fixes.
OCNOS-MS-3Y	3-year Maintenance & Support with Upgrades - Includes Technical support resources, software updates & upgrades, email and phone support, access to Support web site including case management system. Access to technical support team 24 x 7 for Severity 1 issues, normal business hours for all other issues. "Upgrade" means a version change for the licensed software with substantial improvements, enhancements and bug fixes.
OCNOS-MS-5Y	5-year Maintenance & Support with Upgrades - Includes Technical support resources, software updates & upgrades, email and phone support, access to Support web site including case management system. Access to technical support team 24 x 7 for Severity 1 issues, normal business hours for all other issues. "Upgrade" means a version change for the licensed software with substantial improvements, enhancements and bug fixes.
OCNOS-MS-1Y-Premium	1-year Maintenance & Support with Upgrades - Includes Technical support resources, software updates & upgrades, email and phone support, access to Support web site including case management system. Access to technical support team 24 x 7 for all issues. "Upgrade" means a version change for the licensed software with substantial improvements, enhancements and bug fixes.
OCNOS-MS-3Y-Premium	3-year Maintenance & Support with Upgrades - Includes Technical support resources, software updates & upgrades, email and phone support, access to Support web site including case management system. Access to technical support team 24 x 7 for all issues. "Upgrade" means a version change for the licensed software with substantial improvements, enhancements and bug fixes.
OCNOS-MS-5Y-Premium	5-year Maintenance & Support with Upgrades - Includes Technical support resources, software updates & upgrades, email and phone support, access to Support web site including case management system. Access to technical support team 24 x 7 for all 1 issues. "Upgrade" means a version change for the licensed software with substantial improvements, enhancements and bug fixes.

More Information

For more information about the OcNOS Data Center solution, contact your IP Infusion sales representative.

ABOUT IP INFUSION

IP Infusion, a leader in disaggregated networking solutions, delivers enterprise and carrier-grade software solutions allowing network operators to reduce network costs, increase flexibility, and to deploy new features and services quickly. IP Infusion is headquartered in Santa Clara, Calif., and is a wholly owned and independently operated subsidiary of ACCESS CO., LTD. Additional information can be found at <http://www.ipinfusion.com>

© 2020 IP Infusion, Inc. All rights reserved. ZebOS and IP Infusion are registered trademarks and the ipinfusion logo, OcNOS and VirNOS are trademarks of IP Infusion, Inc. All other trademarks and logos are the property of their respective owners. IP Infusion assumes no responsibility for any inaccuracies in this document. IP Infusion reserves the right to change, modify, transfer, or otherwise revise this publication without notice.

Phone | +1 877-MYZEBOS
Email | sales@ipinfusion.com
Web | www.ipinfusion.com

U.S. (Santa Clara) | +1 408-400-1912
Japan (Tokyo) | +81 03-5259-3771
Korea (Seoul) | +82 10 2733 3016

India (Bangalore) | +91 (80) 6728 7000
China (Shanghai) | +86-186 1658 6466
EMEA | +49 (208) 8290 6464