



ZebOS-XP

Scalable High Performance Platform for Cloud and Software-Defined Networking

The future of networking is software, and ZebOS-XP is the next generation, high performance platform for cloud and software-defined networking.

The networking industry is moving away from the hardware dominated solutions and adopting networks defined by software platforms. The industry demands of breakneck speeds requirements of billions of new mobile users, the advent of Big Data, and the emergence of IT as a service has necessitated this industry change.

The widespread availability of commercial networking chipsets changes the economics of the network, driving commoditization of hardware and the emergence of software-defined networking (SDN). IP Infusion is at the core of this networking revolution. The emergence of cloud computing and network virtualization introduces new requirements to innovate at software speeds. In cloud computing and network virtualization, the challenge is to remove the network as a bottleneck to ubiquitous computing. IP Infusion addresses these challenges with an SDN architecture that features:

- Split Control Plane design
- Modularity and programmability
- High degree of scalability
- Hardware abstraction to operate on a variety of silicon switching chipsets
- Embedded operating system (OS) abstraction to run on a variety of control processors

Modern Next Generation Terabit Scale Aggregation, Transport and Data Center Networks power businesses through a new generation of business critical, time sensitive high bandwidth applications and services. Software Defined Networking, Data Center Virtualization, Cloud computing, High-performance computing, Data warehousing, and Disaster recovery strategies, among others prevalent in the current environment, are prompting a whole new set of requirements for network infrastructure.

Features and Benefits

ZebOS-XP (ZebOS Extended Performance) network platform designed to meet the needs of all of today's high performance terabit scale networks and devices.

- **Resilient:** To provide critical business-class availability
- **Modular:** To be capable of extension to evolve with business needs and provide extended lifecycles
- **Portable:** For consistency across platforms
- **Secure:** To protect and preserve data and operations
- **Flexible:** To integrate and enable new technologies
- **Scalable:** To accommodate and grow with the business and its requirements
- **Easy to use:** To reduce the amount of learning required, simplify deployment, and ease of manageability

The ZebOS-XP (extended performance) software platform provides superior scaling and performance.

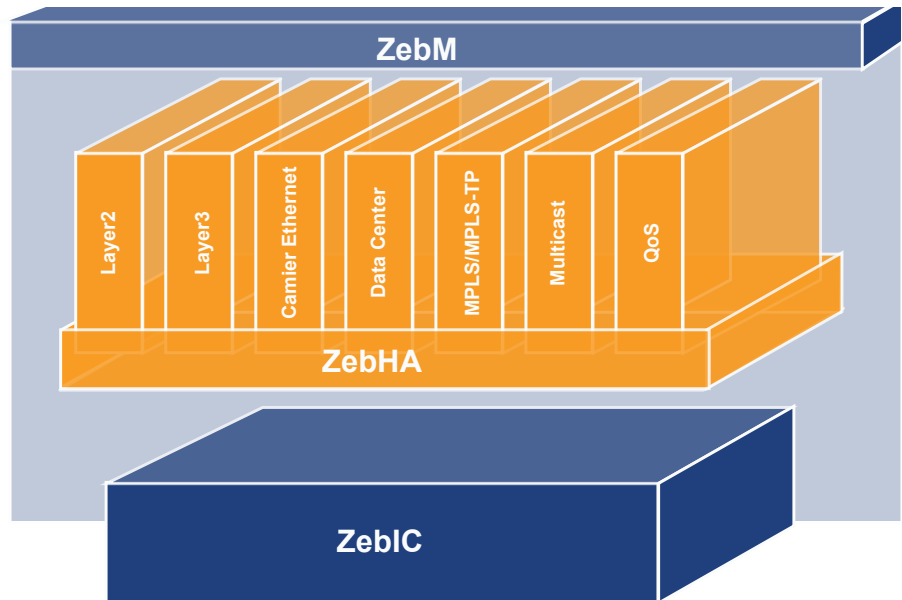
ZebOS-XP (ZebOS Extended Performance) network platform is designed to meet all the above mentioned criteria across all modern high performance network platforms that run it. This data sheet introduces IP Infusion ZebOS-XP Network Platform and summarizes the new features and capabilities it offers.

Control Plane supporting 200+ Protocols Building on a Proven Foundation

ZebOS-XP is a highly-evolved modular operating system that builds on more than 15+ years of innovation and experience in high-performance switching and routing. ZebOS-XP has its roots in the original ZebOS operating system used worldwide in business-critical networks. As a direct result of having been deployed and evolving from nearly a decade in the extremely critical storage area networking space, ZebOS-XP can deliver the performance, reliability, and lifecycle expected in terabit scale aggregation, transport and data center networks. ZebOS-XP contains significant performance improvements. It features:

- System infrastructure built from ground up for scale and performance
- Support for multi-slotted chassis designs
- Hooks for supporting software-defined networking
- Split control plane design

IP Infusion's ZebOS-XP Network Platform



- Modularity and programmability
- High degree of scalability
- 200+ routing and switching protocols
- Support for large scale multi-tenant virtual networking
- Hardware abstraction to operate on a variety of silicon switching chipsets
- Embedded operating system (OS) abstraction
- Runs on a variety of control processors
- Configuration management APIs
- Extensive third-party validation
- 64-bit Compliant and SMP safe operation

ZebOS-XP® Platform Standards Support Overview*

Layer 2	<ul style="list-style-type: none"> ■ Management: SNMP, Agent X, IMI, IMISH, RMON2, LLDP, E- LMI, Port Authentication ■ Virtual LANs: VLANs, GVRP, MVRP, Port and Protocol Classification ■ High Availability: SAF compliant HA middleware Stateful swtichover support for basic Layer2, xSTP and LACP 	<ul style="list-style-type: none"> ■ EEE LANs: MAC Bridging, LACP, GARP ■ Spanning Tree: STP, RSTP, MSTP ■ Layer 2 Multicast: MRP, MSRP, IGMP, MLD, GMRP
MPLS and MPLS-TP	<ul style="list-style-type: none"> ■ RSVP-TE, P2MP, Graceful Restart ■ LDP, Graceful Restart ■ DiffServ, DiffServ-TE ■ Traffic Engineering, CSPF ■ OAM: Pseudowire VCCV, BFD, fault management ■ Segment Routing Support ■ L2VPN (VPLS and VPWS) ■ L3VPN ■ High Availability: Stateful swtichover support for LDP 	<ul style="list-style-type: none"> ■ VPNs, Layer 2 VPN, Pseudowire, BGP VPN, IPv6-VPN, ■ VPLS (BGP/LDP signaling) ■ MPLS-TP, linear protection, packet loss and delay measurement, lock instruct and loopback, fault management, CV, CC, and RDI, MPLS-TP OAM(Y.1731)

* For a comprehensive list of standards supported, please contact your IP Infusion Sales Representative.

ZebOS XP® Platform Standards Support Overview* Cont.

Layer 3	<ul style="list-style-type: none"> Unicast Routing: RIPv2, RIPv6, BGP4, BGP4+, IS-IS, OSPFv2/OSPFv3, VRRP, ECMP High Availability: Graceful Restart, SAF compliant HA middleware Stateful Switch Over support for OSPF and BGP. OAM: BFD 	
Carrier Ethernet (Metro Ethernet)	<ul style="list-style-type: none"> High Availability (HA): Ethernet Linear Protection Switching, Ethernet Ring Protection Switching (ITU G.8032), OpenSAF 4.2 Framework Metro Ethernet Forum (MEF) Support: MEF 2, MEF 10.1, Phase 2, MEF 10.2, MEF 11, MEF 13, MEF 16, MEF 17, MEF20, MEF 22.1 	<ul style="list-style-type: none"> Scalability: Provider Bridging, Provider Backbone Bridging, Provider Backbone Bridge-Traffic Engineering Ethernet OAM and Resiliency Enhancements: Ethernet in the First Mile, Connectivity Fault Management Timing and Synchronization: PTP (IEEE 1588v2), SyncE
Data Center Ethernet	<ul style="list-style-type: none"> Data Center Bridging (DCB): Priority-based flow control, Enhanced transmission selection, Quantized congestion notification, DCBX 	<ul style="list-style-type: none"> TRILL, RBRidges, ESADI Shortest Path Bridging (SPB), SPBV & SPBM QoS: DiffServ, QoS at the MAC level Edge Virtual Bridging (EVB) Multi Chassis Link Aggregation
Hardware Integration and Embedded OS Abstraction	<p>Already integrated with these chipsets through ZebIC*</p> <ul style="list-style-type: none"> Broadcom BCM56440, BCM56630, BCM56845, BCM56846 Marvell Lion (Presteria CX 8248/8234) PMC-Sierra WinPath3 	<ul style="list-style-type: none"> Already qualified on these operating systems*: WRL 5.0, Kernel version 3.4.10 Fedora 17, Kernel version 3.4.44 Debian 8, 64 bit VXWorks 6.9 <p>* Additional integrations are available through Professional Services</p>

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About IP Infusion

IP Infusion, the leader in disaggregated networking solutions, delivers the best network OS for white box and network virtualization. IP Infusion offers network operating systems for both physical and virtual networks to carriers, service providers and enterprises to achieve the disaggregated networking model. With the OcNOS™ and VirNOS™ network operating systems, IP Infusion offers a single, unified physical and virtual software solution to deploy new services quickly at reduced cost and with greater flexibility. Over 300 customers worldwide, including major networking equipment manufacturers, use IP Infusion's respected ZebOS platform to build networks to address the evolving needs of cloud, carrier and mobile networking. 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>.

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