

Advanced Hardware Integration Software

Broadcom BCM56845 Integration with the ZebOS Platform

Advances in silicon and integration with the highly modular and portable ZebOS network software platform have led to changes in how network equipment is developed. These factors have also led to the emergence of software-defined networking (SDN), moving from a hardware-dominated development environment to one driven by software, speed, and agility.

Over the past three decades processors have accelerated the growth of the computing and storage markets. A similar trend is developing today for network computing. The availability of high-speed silicon for computer networking allows you to build more modular, scalable, and high-performing networks.

However, high-performance networking equipment with off-the-shelf silicon that can deliver the performance and scale required by today's carrier and data center networks requires

robust and tightly integrated control plane software. Many network equipment manufacturers might not have the depth of integration expertise to meet today's tight time-to-market and cost demands.

IP Infusion's Advanced Hardware Integration Software (AHIS) is the first solution to provide a scalable, hardware-independent architecture that enables you to efficiently incorporate networking capabilities into your products.

As you transition to SDN, you need a control plane architecture that can isolate hardware development from software development and allow rapid portability of new networking services across a wide-range of silicon. IP Infusion's AHIS enables you to accelerate your transition to SDN by enabling developers to develop, integrate, and test the target platform while the actual hardware system is still under development.

IP Infusion Advanced Hardware Integration Software Delivers

Business Agility and Competitive Advantage

- ▶ Integrated reference designs with proven development and verification tools
- ▶ Flexibility to move quickly to higher price/performance chipsets. Abstraction of control plane from hardware provides portability of software across chipsets spanning multiple product lines.
- ▶ Modular, interchangeable, extensible component architecture, enabling the addition of features for new markets using the same tested platform.
- ▶ Develop once, then port to new hardware
- ▶ Finish design ahead of schedule with comprehensive training and professional services

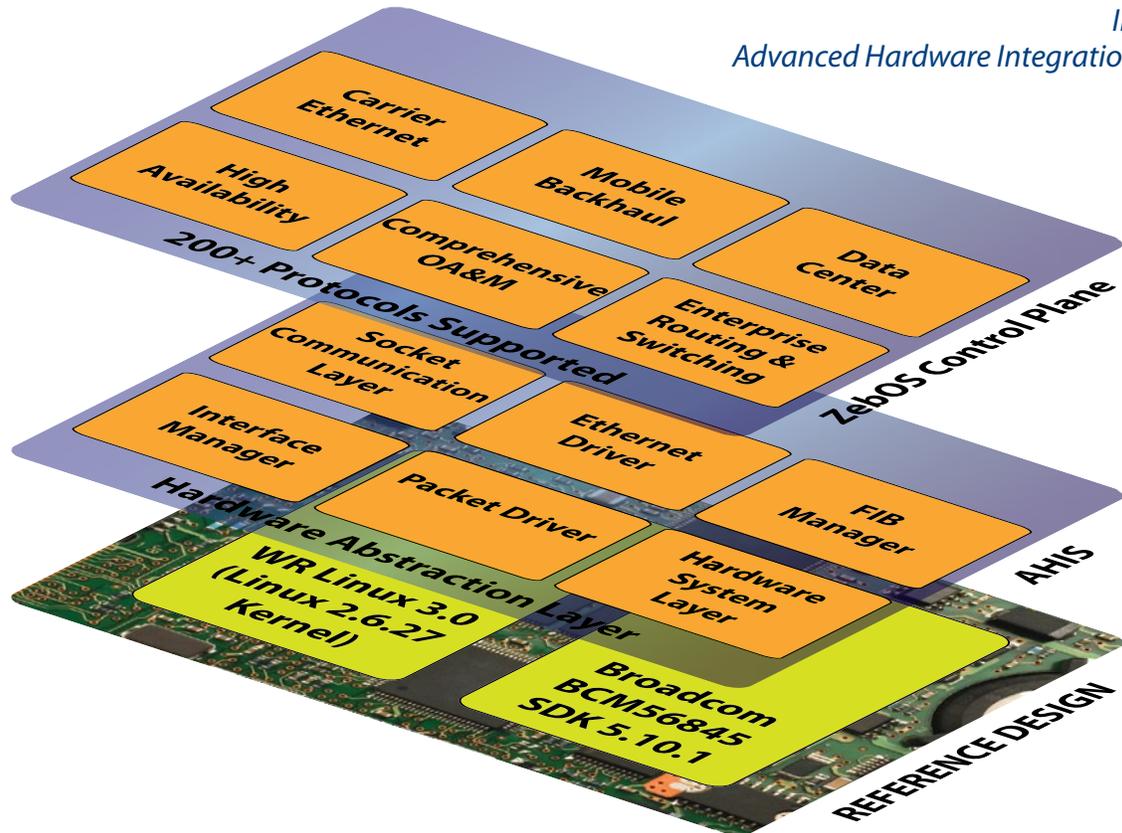
Reduced Development Risks

- ▶ Tested ZebOS platform integrated on standard OSs and popular chipset Software Development Kits (SDKs)
- ▶ ZebOS platform that has been in production networks for more than a decade in five-9s environments
- ▶ Minimal need to rewrite software to port to new chipsets
- ▶ Seamless migration path to newer technologies
- ▶ Over 20,000 test cases in a wide-range of market segments, including mobile backhaul/access, carrier transport/Carrier Ethernet, and data center
- ▶ Industry testing for interoperability, including UNH, IPv6 readiness, as well as in-house MEF testing

Improved Return on Investment

- ▶ Reduced in-house development costs to bring up new hardware and software
- ▶ Reduced costs through system integration with domain-optimized protocol modules
- ▶ Increased profitability and margins

*IP Infusion's
Advanced Hardware Integration Software*



IP Infusion's AHIS integrates the control plane with the reference designs of the popular chipsets in the networking industry. The software integration is built using a vendor-specific chipset SDK and reference operating system recommended by the vendor. The integrated software solution enables you to accelerate the delivery of next generation networking solutions.

The diagram above highlights the various hardware integration software components. ZebOS acts as a control plane manager responsible for identifying the best path. It is also responsible for programming fast path forwarding and slow path forwarding entries. To accomplish these tasks, ZebOS implements the following components.

The **Hardware Abstraction Layer (HAL)** implements the control plane interface for communication with the hardware. The HAL has two major functions:

- › Encapsulating and sending control messages
- › Processing system responses

The **Socket Communication Layer** provides reliable communication between the control plane and the forwarding plane.

The **Interface Manager** is an interface database, which maintains physical and virtual interface-related information of the system.

The **Ethernet Driver** is responsible for transmitting packets.

The **Packet Driver** is responsible for receiving packets.

The **Forwarding Information Base (FIB) Manager** is a forwarding database and maintains records of all system forwarding.

The **Hardware System Layer** implements the interface for the hardware and the operating system.

IP Infusion partners with Broadcom to provide AHIS for the Broadcom BCM56845 chipset

The BCM56845 is part of the BCM56840 series, the eighth generation of Broadcom's leading StrataXGS® switch architecture supporting up to 64 ports of 10 Gigabit Ethernet (10GbE) with the flexibility to support 40 Gigabit Ethernet (40GbE).

AHIS provides the following advantages for Broadcom BCM56845 customers who are building the next generation data center switches.

- › Optimized routing and switching performance in a wide-range of network system designs configurations—pizza box and chassis in the data center networks
- › Optimized power management
- › Software and hardware high availability
- › Software portability to new platforms and the ability to leverage Broadcom solutions across a wide range of markets

IP Infusion AHIS Support for the Broadcom BCM56845

<i>Target Devices for Enterprise Networks and Data Centers</i>	<i>Feature Support</i>	<i>Professional Services Support</i>
<ul style="list-style-type: none"> ‣ Enterprise L2 switches ‣ Edge routers ‣ Access routers 	<ul style="list-style-type: none"> ‣ VLAN, xSTP, LACP, RPVST+, GMRP, GVRP, 802.1X, IGMP Snooping, MLD Snooping, LACP, Static Aggregation, VLAN Classification ‣ OSPF, OSPFV3, RIP, RIPng, BGP4, BGP4+ ‣ IGMP, PIM-SM, PIM-DM, DVMRP, PIM-SSM 	<ul style="list-style-type: none"> ‣ Development for custom solutions
<ul style="list-style-type: none"> ‣ Top of the rack switches (Data Center) 	<ul style="list-style-type: none"> ‣ VLAN, xSTP, LACP, RPVST+, GMRP, GVRP, 802.1X, IGMP Snooping, MLD Snooping, LACP, Static Aggregation, VLAN Classification ‣ OSPF, OSPFV3, RIP, RIPng, BGP4, BGP4+ ‣ IGMP, PIM-SM, PIM-DM, DVMRP, PIM-SSM 	<ul style="list-style-type: none"> ‣ High Availability (HA) + intra chassis stacking
<ul style="list-style-type: none"> ‣ Blade switches (Data Center) 	<ul style="list-style-type: none"> ‣ VLAN, xSTP, LACP, RPVST+, GMRP, GVRP, 802.1X, IGMP Snooping, MLD Snooping, LACP, Static Aggregation, VLAN Classification ‣ OSPF, OSPFV3, RIP, RIPng, BGP4, BGP4+ ‣ IGMP, PIM-SM, PIM-DM, DVMRP, PIM-SSM 	<ul style="list-style-type: none"> ‣ HA for line card configuration and online insertion and removal in a modular chassis when needed

Please contact us to learn more about our Advanced Hardware Integration Software:

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About IP Infusion

IP Infusion is a leading provider of intelligent network software for enhanced Ethernet and IP services. Tier one and two OEMs rely on IP Infusion's ZebOS software and global professional services to bring products to market faster, and to differentiate them from competitors with less cost. Products built on IP Infusion technology are deployed in networks with five-9s reliability across five continents—as well as a growing number of enterprises—to improve network performance, decrease network infrastructure costs, and grow revenue. IP Infusion is headquartered in Sunnyvale, Calif., and is a wholly owned and independently operated subsidiary of ACCESS CO., LTD., of Tokyo, Japan.

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