The network infrastructure is the backbone of the emerging intelligent connected world. Over the next several years, the number of connected devices and machines is expected to triple or even quadruple. This rising demand for wireless and wireline connectivity is having a profound impact on the network infrastructure and will create new challenges for equipment providers and operators alike. Equipment providers must find ways to support new use cases, expand capacity, and reduce costs. Operators must find ways to expand and enhance their services; add new services that increase the average revenue per user and device; and lower total cost of ownership.

Wind River® Open Network Software is a complete network switch software environment that provides comprehensive control plane network software as well as the tools and resources needed to create, modify, and update network layer functionality. The software environment is designed to target data center use cases, such as top-of-rack switches and micro-server platforms. Using Open Network Software, true software defined networking (SDN) solutions can be designed, implemented, and deployed cost-effectively.

Open Network Software is open and extensible and embraces current and emerging networking technologies (such as SDN and OpenFlow). The modular architecture and complete separation between data plane and control plane enable integration with different hardware platforms and make the solution scalable to highly distributed systems and multi-core processors and platforms, as well as small, embedded single-board systems. The standard and open APIs of Open Network Software allow extensibility of the software through add-on software components (open source, third-party, and homegrown embedded control plane applications or network orchestration software). A comprehensive Application Development Kit enables third parties to augment Open Network Software with value-added capabilities over time, when needed.

Open Network Software exposes its external interfaces using embedded database tables, which the external programmer can access using the management API. Setup, configuration, and functionality can be influenced and modified through the management API via Command Line Interface (CLI), Simple Network Management Protocol (SNMP) v2 or v3, NETCONF, or XML-RPC.
**BENEFITS**

- Easy integration with any switching hardware
- Extensibility and innovation via third-party or home-grown applications
- Massively scalable programmability via scripted management API
- Easy maintenance, troubleshooting, and support
- Stability and robustness due to application separation
- Reduced development and production time and cost due to the reuse of existing trusted software and powerful standard APIs

**KEY FEATURES**

**Modular and Extensible Software Platform**

Wind River Open Network Software exposes the low-level capabilities of the switch data plane such as forwarding tables, classification, and editing engines, as well as typical port-based technology such as link aggregation, virtual local area network (VLAN) control, and quality-of-service (QoS) mechanisms, allowing new application modules to participate in the operation of the network in an unprecedented way. Application module separation guarantees stable and secure operation in diverse configurations.

**Well-Defined System Interfaces**

Open Network Software uses Internal Remote Procedure Call (IPC) as the communication mechanism between the various applications and software components. The IPC enables very simple and well-defined system interfaces used for integration of third-party control plane modules. The IPC also provides control plane applications with mechanisms for describing, publishing, and subscribing to unsolicited events.
Programmatic XML-RPC Management Interface
Open Network Software provides an XML-RPC management interface. XML-RPC is the most widely used RPC system. XML-RPC is particularly well suited for remote management of very large-scale networks, such as mega-data centers via scripting.

Object Oriented Design
The heart of Open Network Software is an object model defined in an XML descriptive language. The object model describes the internal database schema as well as specific access methods derived from it. The database schema represents every piece of data that the management API needs to access.

Hardware Switch Independence
A switch adapter subsystem implements the abstraction layer over silicon- or software-based switches, providing a unified interface for the Open Network Software upper layer applications to configure and monitor the silicon layer. Running Open Network Software over different switch silicon implies simply using a different switch adapter.

Application Development Kit
A complete development environment enables seamless extensibility of Open Network Software through a large ecosystem of networking applications. New applications can be easily and rapidly developed, and homegrown or third-party application software can be simply integrated with Open Network Software trusted run-time software. The Application Development Kit includes the development environment and tools, libraries, header files, documentation, and sample code, so development can start quickly on customized protocols and applications.

Python-Based Automated System Test Environment
With Open Network Software, system testing is fully automated and supports multiple hardware environments. Open Network Software includes a system-test directory structure that includes all related tests.

Development Environment with Switch Simulation
Open Network Software is available to network software developers with a functional switch simulator, SimSwitch. SimSwitch is infinitely scalable and provides seamless connectivity to physical switches. Its programmable interconnections make SimSwitch especially useful in automated test environments.

Native Suite of Basic Networking Protocols
Open Network Software supports a suite of network protocols such as Link Aggregation (LAG), Spanning Tree (STP/RSTP/MSTP), Access Lists (ACL), QoS, and Data Center Bridging (DCB), as well as Open Shortest Path First (OSPF) and Border Gateway Protocol (BGP) routing. Additional application modules support the OpenFlow protocol and advanced tunneling functionality.
USE CASES

Wind River Open Network Software is a network switching platform with native network protocol support and extensibility via third-party application integration. The platform is ideally suited for the following use cases:

- Top-of-rack switches in large data centers
- Blade server and micro-server switches
- Network appliances such as firewalls, load balancers, video distribution controllers, and so on
- Backplane controllers for modular devices using Ethernet-based backplanes

TECHNICAL SPECIFICATIONS

- Wind River Linux
- Fedora 16 and 17
- Ubuntu 12.0.4
- Intel® multi-core processors such as Xeon®; other processors supportable via Wind River Professional Services
- Intel ‘Alta’ family of switching ASICs; other switching ASIC technologies supportable via Professional Services or third-party support
- Protocol support

Layer 1 (Platform Dependent)
- Jumbo frames
- 1 gigabit RJ45 Ethernet
- 1 gigabit optical Ethernet SFP/copper
- 10 gigabit optical Ethernet SFP+/copper
- 40 gigabit optical/copper
- 40 gigabits split into 4x10 gigabits

Layer 2 Data Center
- CEE v1.01 – DCB
- IEEE 802.1Qaz – ETS
- IEEE 802.1Qbb – Priority Flow Control (PFC)
- IEEE 802.1Qau – Congestion Notification (CN)

Layer 2
- IEEE 802.1Q – VLANs with port-based VLANs
- IEEE 802.3ac – VLAN tagging
- IEEE 802.1AX – LAG
- IEEE 802.1D – STP
- IEEE 802.1S – MSTP
- IEEE 802.1W – RSTP
- IEEE 802.1AB – Link Layer Discovery Protocol (LLDP)
- IEEE 802.1Qaz – Enhanced transmission selection for bandwidth sharing between traffic classes

Advanced Layer 2 Functionality
- Storm control
- Flow control
- IGMP snooping
- Port mirroring
- Root guard
- BPDUs guard
- Static MAC filtering
- ACL
- QoS (with Diffserv)
- COS
- Uplink Failure Detection (UFD)
Wind River is a world leader in embedded and mobile software. Wind River has been pioneering computing inside embedded devices since 1981, and its technology is found in more than 1 billion products. Wind River is headquartered in Alameda, California, with offices in more than 20 countries. To learn more, visit Wind River at www.windriver.com.

Wind River Open Network Software is a hardware-agnostic network switching platform. Users wishing to adapt Open Network Software to specific hardware configurations, or requiring development or integration of unique functionality, can depend on Wind River Professional Services for assistance. With deep expertise in the design and implementation of networking solutions, Wind River is committed to assisting its customers with their specific requirements.

Wind River Open Network Software is backed by our award-winning global support organization. Customers can get the help they need in the language and time zone that work best for them. We also offer comprehensive network equipment design services to help our customers extend the capabilities of their own engineering team.

HOW TO PURCHASE
Visit www.windriver.com/company/contact to find your local Wind River sales contact. To have a sales representative contact you, call 800-545-9463 or write to inquiries@windriver.com.

Layer 3
- Inter-VLAN routing
- Address Resolution Protocol (ARP)
- OSPFv2
- Equal cost multi-path (ECMP)
- ICMP
- BGP4
- VXLAN
- IPv4/IPv6 dual protocol stack
- Load balancing

System Management
- XML-RPC
- NETCONF
- CLI
- SNMP v1/v2/v3
- Telnet/SSH
- DHCP
- OpenFlow

Authentication
- RADIUS/TACACS+Local

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