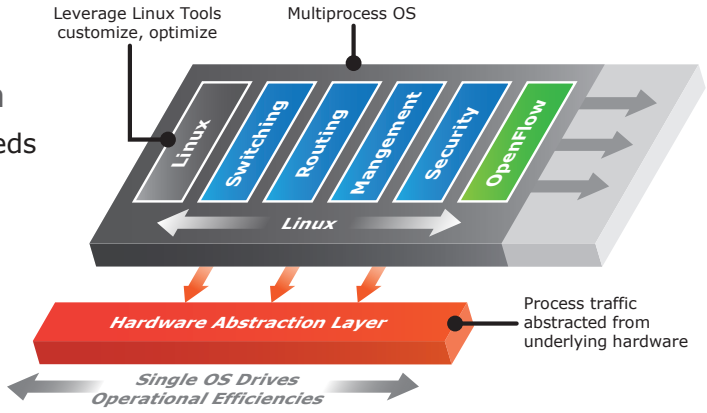
Pica8 Operating System

PicOS™

The first open switch for open networks leveraging unique hardware-agnostic operating system

Two powerful modes of operation to suit your needs

- **Open vSwitch (OVS) Mode:** providing industry-leading OpenFlow* support & integration with CloudStack or OpenStack
- **Layer 2 / Layer 3 Mode:** enabling seamless integration into existing networks



Overview

Pica8 is the first to offer hardware-independent open switches. Physical white box switch hardware run PicOS™, an open network operating system that supports standards-based Layer 2 / Layer 3 protocols with OpenFlow support.

What makes PicOS open?

- PicOS is hardware independent: the operating system is not tightly coupled to switching ASICs, CPU or memory hardware
- We expose Debian Linux, so you can use your existing tools for programming and optimizing Pica8 open switches to support your network
- PicOS has the most complete OpenFlow support, through Open vSwitch (OVS) integration

Leverage Pica8's operating system — PicOS — with two powerful modes of operation

	Layer 2 / Layer 3 Mode	Open vSwitch (OVS) Mode
OPEN	• Switching platform with Debian Linux on board and accessible • Programmable and customize by leveraging vast high-quality Linux tools	• Industry-leading OpenFlow 1.3 support through Open vSwitch (OvS) 1.10 integration • Leverage production-ready OVS switches for your CloudStack and OpenStack projects
FLEXIBLE	• High-performance Layer 2 / Layer 3 switching platform for both IPv4 and IPv6 networks, seamlessly integrating into existing architectures • Tune the fabric to meet your application needs, selectable store-and-forward or cut-through switching modes for ultra-low latency	• Interoperable with multiple Open Source OpenFlow controllers such as Ryu, Floodlight, NOX, and Trema • Leverage different controllers and reference architectures
ADAPTIVE	• PicOS a multiprocess OS, ensures each process has independent memory space, thread control, and interrupt handling for improved feature scaling	• Seamlessly add new protocols to PicOS, a multiprocess OS • Investment protection as your application needs change

* Only OpenFlow features available in hardware are supported, to ensure optimum performance

PROTOCOLS AND STANDARDS SUPPORTED

Layer 2 Features

- Jumbo frames up to 9,216 bytes
- Provide non-blocking wire speed L2 switching
- 128K MAC address entries (32K for the P-3290 and P-3295)
- Flow control
  - IEEE 802.3x for full-duplex mode
  - Back-pressure flow control in half-duplex mode
- Broadcast, unicast, and multicast storm protection
- IGMP snooping, up to 1K groups
- VLAN support
  - IEEE 802.1Q VLANs
  - 4,094 VLANs
  - Port-based VLANs
- Spanning Tree
  - IEEE 802.1D STP
  - IEEE 802.1w RSTP
  - IEEE 802.1s MSTP
  - Per-VLAN Spanning Tree (PVST)
- Link aggregation
  - Up to 48 trunk groups
  - Up to 8 ports per trunk group
  - IEEE 802.3ad Link Aggregation & LACP
- Port mirroring (many-to-one)
- LLDP
- Q-in-Q
- Multi-chassis Link Aggregation (mLAG)

Layer 3 Routing Features

- Maximum Routes (IPv4, IPv6): 12,000
- ECMP: 32
- RIPv2
- OSPFv2
- OSPF/ECMP
- BGP-4
- VLAN routing
- VRRP
- IP routing
- DHCP-relay including DHCP option-82 and ARP inspection

Layer 3 Multicast

- PIM-SM
- IGMPv1/v2

IPv6 Layer 3 Routing Features

- RIPng
- OSPFv3
- IPv6 routing

Security

- User/password protected system management
- L2/L3/L4 ACLs
- TACACS+ AAA
- SSHv1/v2
- SSLv3/TLS v1
- DoS attack protection

Quality of Service

- IEEE 802.1p-based CoS
- 8 priority queues per port
- DSCP-based CoS
- Policy-based DiffServ

Network Management

- Command line interface (CLI) via console port
- Telnet and SSH remote login
- SNMPv1/v2c
- AAA Radius support
- IPFIX (NetFlow) / sFlow

Open vSwitch (OVS) 1.10

- Compatible with OpenFlow 1.3 specification
- Interoperable with RYU, Floodlight, Trema and NOX
- GRE, MPLS, OpenFlow (MPLS support on P-3780 and P-3922 only)

Operational Programming Tools

- Debian 7.0 Linux distribution
- Modular PicOS: Service daemon for L2/L3 Mode and OVS Mode
- C/C++, Ruby, Python
- Configuration Management: Puppet, Chef, CFEngine (user-installed)

Standards Compliance

- 802.1D Bridging and Spanning Tree Protocol
- 802.1s Multiple Spanning Tree Protocol
- 802.1w Rapid Spanning Tree Protocol
- 802.1p QOS/COS
- 802.1Q VLAN Tagging
- 802.3ad Link Aggregation with LACP
- 802.3ab 1000BASE-T
- 802.3z Gigabit Ethernet
- 802.3ae 10 Gigabit Ethernet
- 802.3ba 40 Gigabit Ethernet

RFCs MIBs

- RFC 1157 SNMPv1
- RFC 1212 Concise MIB definition
- RFC 1213 MIB II
- RFC 1215 SNMP traps
- RFC 1256 ICMP router discovery
- RFC 1493 Bridge MIB
- RFC 1573 Interface Evolution MIB
- RFC 1643 Etherlike MIB
- RFC 1757 RMON1 MIB
- RFC 1901 Community based SNMPv2
- RFC 1905 Protocol Operations for SNMPv2
- RFC 1906 Transport Mappings for SNMPv2
- RFC 1907 Management Information Base for SNMPv2
- RFC 1908 Coexistence between SNMPv1 and SNMPv2
- RFC 1997 BGP Communities Attribute
- RFC 2021 RMON2 probes
- RFC 2096 IP Forwarding table MIB
- RFC 2233 The Interface Group MIB using SNMPv2
- RFC 2439 BGP Route Flap Damping
- RFC 2545 Use of BGP-4 Multiprotocol Extensions for IPv6 Inter-Domain Routing
- RFC 2665 Ethernet-like Interfaces
- RFC 2796 BGP Route Reflection - An Alternative to Full Mesh IBGP
- RFC 3065 Autonomous System Confederations for BGP
- RFC 3392 Capabilities Advertisement with BGP-4
- RFC 4893 BGP Support for Four-octet AS Number Space
- Pica8 Private MIB

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