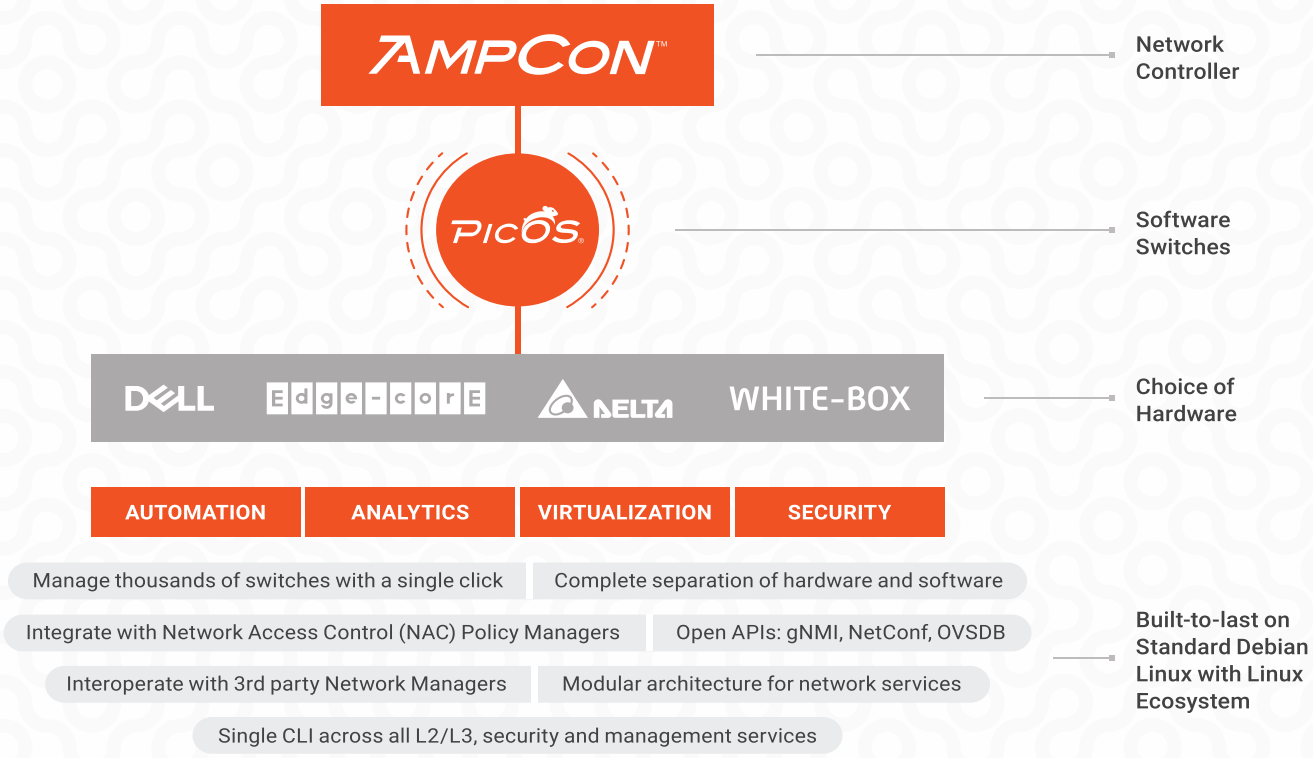
Enterprise Networking Software for Campus, Distributed Sites and Data Center Networks

Open Networking is Networking Freedom

Pica8 software is the industry's open networking standard for enterprise networks within distributed campuses and data centers. Pica8's AmpCon Controller for centralized management and automation and PicOS Software Switches for virtualization and security have successfully replaced Cisco DNA Center and Catalyst Switches within Fortune 500 enterprises.



Pica8 software runs on the industry's broadest choices of access and aggregation switches from Dell and Edgecore with full support for multi-gig and PoE hardware, enabling users to build high-powered, next-gen enterprise networks with open networking methodologies.

Pica8 Support

Pica8 provides world-class support and services to help our customers and partners fully leverage the power of open enterprise networking software. Pica8 offers a full range of services that include access to our Support and License portals, online or phone support teams and tools 24/7/365, advanced RMA for selected hardware, and on-site support for customers of all sizes. We want to ensure our customers and partners can quickly and easily implement, manage and troubleshoot their solutions.

For more information, visit http://www.pica8.com

AmpCon Network Controller

AmpCon is a network controller that automates Zero Touch Provisioning (ZTP), deployment, configuration and lifecycle management for PicOS Software Switches. It provides a Web UI and is deployed as a software appliance that runs in a virtual machine (VM) running in the data center or cloud. AmpCon supports remote deployment and scalability for 1000s of PicOS Software Switches.

- Ease of use with centralized policy management and automation:
  - Deployment and configuration management of remote switches at scale
  - Security and network compliance
  - Scheduled backups and upgrades
  - Customize automation with Ansible Playbooks
- Automate management of PicOS Software Switches, which have complete interoperability with existing Cisco and legacy infrastructure
- Infinite expandability with open APIs

All-in-one Switch Automation Platform

AmpCon includes a perpetual license and support, and each license includes a block of PicOS Software Switches. The PicOS blocks include a choice of the following number of Software Switches: 10, 25, 50, 100, 200, 400, 1000.

When purchasing AmpCon, there are no restrictions on the PicOS Software Switches for features or performance. PicOS can be deployed on a broad choice of white box hardware, with no restrictions for 1G to 100G, multi-gig, PoE, etc., and all features are included. Mix and match or change hardware as needed. Once AmpCon is purchased, PicOS Software Switches are owned forever. However, a valid AmpCon support contract is required for software updates.

An increase in hardware costs does not impact Pica8's software price. Pica8 software is separate from hardware.

SECURITY

- TACACS+ Authentication for Role-based Access Control (RBAC)
  - Super User
  - Admin
  - Operator
  - Read Only
- Operation Audit Logs
- Encrypted Communication
- Password/Key Masking
- Initial Security Configuration

AmpCon SERVER INSTALLATION

- VM CPU Specification
  - Clock Speed: 2.0 GHz or faster
  - Number of Cores: 4 CPU cores
- 16 GB Memory
- 100 GB Hard Disk
- 1G NIC (10G preferred)

VMware Hypervisor ESXi 5.x and 6.x (Hyper-V and KVM support scheduled for next release)

PicOS Software Switches

PicOS Software Switches install on 1G to 100G interface open switch hardware from leading vendors such as Dell and Edgecore as an alternative to legacy hardware switches. PicOS comes in two flavors: Enterprise Edition and SDN Edition.

PicOS Enterprise Edition

A PicOS Enterprise Edition license includes the Debian Linux OS, L2/L3 switching and routing features, and OpenFlow 1.3.

Highlights

- Full-featured enterprise routing stack
- Network Virtualization across Campus and Data Center networks with EVPN VXLAN fabric
- Identity-based policies are automatically applied through complete integration with Policy Managers such as Cisco ISE and Aruba ClearPass
- Full featured 802.1x implementation to enterprise access layer for IoT, authorized users and guests
- Support next generation enterprise access switches with multi-gig Ethernet and up to 100 W PoE for deployment of next generation 8x8 Wi-Fi 6E access points
- Support next generation aggregation and core switches with 96x25G and 64x100G ports
- CrossFlow™ dual control plane technology for improved OpenFlow integration, scale and management (Layer-2 / Layer-3 and OpenFlow running simultaneously on switch ports)

Boot with CLI or Linux

- Easy to install leveraging Open Network Install Environment (ONIE) boot loader as well as Zero-Touch Provisioning (ZTP) tools
- Unlike competitive offerings, PicOS runs as an application on an unmodified Linux kernel. This gives PicOS users full access to all other Debian applications with a standard apt-get command. It also enables automation tools such as Ansible, Chef, Puppet and Salt to automate network provisioning, and allows users to add additional agents and controllers as needed
- Service provisioning through multiple open programming interfaces and enabling DevOps automation

PicOS SDN Edition

A PicOS SDN Edition license includes the Debian Linux OS and a full set of OpenFlow features through Version 1.4.

Highlights

- Leverages OpenFlow to control MPLS, GRE, NVGRE or VXLAN tunnels, delivering on the promise of open programmability
- Support for all major OpenFlow controllers, including OpenStack Neutron ML2, ONOS, Open Daylight, HPE's VAN, NEC's ProgrammableFlow Controller, and Ryu
- OpenFlow 1.4 User-Defined Fields for looking deep into packets of interest

OpenFlow

- Web interface/GUI for OVS configuration
- Interoperable with Open Daylight, ONOS, HPE's VAN, NEC's ProgrammableFlow Controller, and RYU
- Table Type Patterns (TTP) support for Unicast and Multicast pipelines
- Configure a LAG as MTP (Mirrored Traffic output Port)
- 802.1ag Connectivity Fault Management (CFM) in PicOS OVS / OpenFlow mode
- Memory table management allows for greater flow scale

Both PicOS Versions Include:

- Open network operating system built on the robust Debian Linux environment
- Allows leverage of a vast array of standard Linux tools as a common management and operations framework
- Zero Touch Provisioning (ZTP) functionality coupled with ONIE delivers a true white box-to-application environment

Protocols and Standards

LAYER 2 FORWARDING AND PROTOCOLS SUPPORTED

- Jumbo frames
- Flow control & PFC
  - IEEE 802.3x for full-duplex mode
  - Back-pressure flow control in half duplex mode
- Broadcast, unicast, and multicast storm protection
- IGMP (v1/v2) snooping
- IGMP snooping query per-VLAN
- VLAN support
  - IEEE 802.1Q VLAN
  - 4,094 VLANs
  - Port-based VLANs
- Spanning Tree
  - IEEE 802.1D STP
  - IEEE 802.1w RSTP
  - IEEE 802.1s MSTP
  - PVST (Per VLAN Spanning Tree)
- BPDU/LACP tunneling
- UDLD
- IEEE 802.3ad Link aggregation
  - Up to 128 trunk groups depending on model
  - Up to 8 ports per trunk group
- Port mirroring (many-to-one)
- Port security*
- Private VLAN
- LLDP – Link Layer Device Discovery Protocol /LLDP-MED
- Q-in-Q
- Multi-chassis Link Aggregation (MLAG)
- MLAG with Spanning Tree support
- VXLAN Tunnel Endpoint (VTEP) support*
- 802.1p in Layer 2 forwarding
- 802.1X support
- PTP E2E Mode

LAYER 3 ROUTING FEATURES

- Dual stacked IPv4 and IPv6 addressing
- IPv4 and IPv6 static route configuration
- ECMP: 32 next hops
- ECMP resilient hashing (depends on ASIC support)
- RIPv2
- OSPFv2 (IPv4)
- BFD (Bidirectional Forwarding Detection)
- MP-BGP (IPv4, IPv6)
  - Static MPLS LSP
  - Labeled BGP (RFC3107)
- VRRP
- DHCP-relay including DHCP option-82
- IGMPv1/v2/v3
- PIM-SM and PIM-SSM
- EVPN
- VXLAN Tunnel Endpoint (VTEP)
- VxLAN over mLAG
- GRE tunneling over LAG interfaces
- OSPFv3
- MP-BGP for IPv6 NLRI

QUALITY OF SERVICE

- IEEE 802.1p-based CoS
- 8 priority queues per port
- TOS or DSCP-based CoS
- ACL classification, metering, and remarking
- SP, WRR, WFQ scheduling
- Tail drop
- WRED congestion control
- Policy-based DiffServ
- Map Traffic to Different Queues
- Voice VLAN
- Buffer management

SECURITY

- User/password protected system management
- L2/L3/L4 ACLs
- TACACS+ AAA
- SSHv1/v2
- SSLv3/TLS v1
- DoS attack protection
- COPP – Control Plane Policing & Statistics
- Dynamic ARP Inspection
- Enable/disable USB port for USB memory
- Dynamic ARP inspection

OVS / CrossFlow

- *Network Address Translation (NAT) (depending on ASIC support)
- Drop counters statistics on ASIC
- QoS (1R2C/2R3C, WRR, WRED)
- Support for User-defined-flows (UDF) with L2/L3/L4 offset for inner headers matching*
- Map Traffic to Different Queues
- ECN (Explicit Congestion Notification) on UC (unicast) and MC (multicast) queues
- *SCTP (Stream Control Transmission Protocol) traffic filtering
- VLAN push/pop operation in L2 MPLS
- Based on Open-vSwitch (OVS) 2.3
- Compatible with OpenFlow 1.4 specification
- TCAM Flow Optimization for better scalability and performance
- Interoperable with Open Daylight, ONOS, HPE's VAN, NEC's ProgrammableFlow Controller, and RYU
- OpenFlow encapsulation: L2oGRE, L3oGRE, NVGRE, PBB, VXLAN, MPLS (depending on ASIC support)*
- gNMI, OVSDB

Network Management

- AmpCon Controller for centralized ZTP, configuration management, lifecycle management and network operations automation
- Command line interface (CLI)
- Telnet and SSH remote login
- Centralized control plane policing and filtering
- SNMPv1/v2c/v3
- AAA RADIUS support
- IPFIX (NetFlow)/sFlow

Operational Programming Tools

- Automate PicOS installation via ONIE
- Auto provisioning with scripting capacity (Zero Touch Provisioning)
- Debian 10.0 Linux distribution
- Modular PicOS: Service daemon for L2/L3 Mode and OVS Mode • Standard Debian Based package upgrade (apt-get)
- Extensible CLI with Scripts and APIs
- Configuration Commit / Check / Rollback
- C/C++, Ruby, Python, Perl
- Configuration Management: Puppet, Chef, CFEngine (user-installed), Ansible, Salt
- NETCONF/YANG model support for L2/L3 mode.

IEEE 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
- 802.1X Port-based Network Access Control (PNAC)
- 802.1ah PBB (MAC in MAC)
- 802.3ad Link Aggregation with LACP
- 802.3ab 1000BASE-T
- 802.3bz 2.5GBASE-T and 5GBASE-T
- 802.3ae 10 Gigabit Ethernet
- 802.3by 25/50 Gigabit Ethernet
- 802.3ba 40 Gigabit Ethernet
- 802.3ba 100 Gigabit Ethernet
- 802.3af
- 802.3at
- 802.3bt

RFC – SPECIFIED 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 Ether-like 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
- RFC3107 - Labeled BGP
- RFC4607 - PIM SSM
- RFC3376 - IGMPv3
- RFC6241 NETConf
- Pica8 Private MIB
- UCD-SNMP-MIB

* Supported on select platforms, depending on ASIC

See our hardware compatibility list for supported hardware. https://www.pica8.com/resources/?resourcelib_category=hardware-compatibility

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