PicaPilot™
Automated Switch Orchestration and Management Solution

Product Overview

PicaPilot™ automated switch orchestration and deployment software for Pica8's PICOS® open networking NOS flattens legacy three-tier campus deployments into a single-tier that can be easily managed via a single, IP address. Designed as an uber-modern white box replacement for both existing enterprise switch stacks and legacy chassis switches, PicaPilot seamlessly extends the proven data center best-practice white-box leaf-spine architecture into every corner of campus and branch-office networks along with the complete enterprise feature set that is built into PICOS.

When deployed in an access-edge stack configuration, for example, a PicaPilot-based network has, for all practical purposes, no future expansion or flexibility limits. Any population of PICOS-supported switches –for 1G to 100G and from multiple vendors – can be part of a single stack. This unique mix-and-match capability also means that as a chassis replacement, PicaPilot and PICOS can surpass the scalability of today's modular chassis switches as well.

How it Works

PicaPilot is application software that runs alongside the company's PICOS NOS on every switch and, in its initial release, comes with a choice of four pre-defined workflow templates – one for chassis switch replacement and three for switch stacks – that cover the vast majority of enterprise deployment cases, allowing customers to auto-deploy/provision, manage and gain more visibility into their new branch office and campus infrastructure.

Instead of using proprietary "stacking ports and cables," PicaPilot-enabled switches are joined into a single logical unit using high-speed Ethernet interconnect cables in a standard MLAG topology. This MLAG topology creates a higher-availability, higher-performance switch fabric for this logical cluster of switches(as compared to the legacy architecture it is replacing). All members of this single-layer logical switch have full access to the WAN uplinks, and all links are active and forwarding.

A PicaPilot logical switch is managed as a single entity even though it has both access (leaf) and aggregation (spine) switches via a designated primary spine switch. All configuration takes place in this switch alone and then automatically pushed out to all the other switches in the cluster, thus creating a single switching unit. Switches can be added and deleted from an active PicaPilot logical switch at will without affecting performance in any way or requiring a spine-switch restart.

There are two spine switches in a PicaPilot deployment. These are attached both to WAN links above and leaf switches below, but, again, PicaPilot spines and leaves appear as a single-layer to a network operator. The number of leaf switches varies by pre-configured workflow – from just a handful for small deployments to many dozens in PicaPilot's initial release. In its initial product release, PicaPilot workflows are optimized for two spine switches and up to 16+ leaf switches. Additional pre-configured workflows that both expand deployment options and scalability will be delivered in subsequent releases of the software.

In each PicaPilot logical switch, all switch configuration, firmware management, fault detection, and troubleshooting are done via the primary spine switch, vastly simplifying element management overhead. Because all the switches have similar configurations, configuration files are easily replicated among all the nodes, with all configuration management executed on the primary spine switch via a centralized, enhanced PicaPilot CLI.

The spine switches are interconnected by a pair of redundant high-speed Ethernet peer links – typically 10G links in stack configurations and 40G links in chassis replacements. The inter-spine links' primary roles are to keep the L2 state information synchronized between the two spine switches, and to carry traffic between spine switches in case of any spine-leaf link failure. If a primary spine switch were to fail, the secondary spine switch automatically takes over the primary spine switch's role.

PicaPilot traffic flowing from leaf switches to spine switches have redundant paths and are evenly distributed using hashing. All traffic from one leaf switch to another flows through redundant paths to and from both spine switches. PicaPilot's MLAG-based topology – there is no requirement for Spanning Tree Protocol (STP) with PicaPilot so available bandwidth also increases – guarantees that no single failure of a switch or an interconnect link will cause a switch to be isolated.

Key Features and Benefits

- Flexible configurations: from a co-located small stack cluster, to large, scalable chassis-replacement distributed switch deployments

- Typically reduces the number of managed network elements in an enterprise network by 10x to 50x

- Permanently removes constraints on network capacity expansion from enterprise networks

- Supports mix-and-match switch types from a number of established white box switch vendors (see Hardware Compatibility List)

- Provides chassis-equivalent high availability via a resilient MLAG topology

- Delivers superior value by combining a full enterprise-grade feature set – voice VLANs, VoIP phone support, QoS, PoE management, and much more – with the white-box leaf-spine economic model proven in today's web-scale data centers

- Ensures low cost of operations with single IP management, plug-and-play configuration, and centralized software updates automatically distributed to all switches from the primary spine switch

- Presents one identical workflow for managing anything from a few switches in a closet to dozens of switches across a campus

- PicaPilot logical switches can be nested below higher-capacity PicaPilot switches to scale up larger deployments (if desired)

- Simple, perpetual licensing

Flexible Configuration Examples

PicaPilot offers industry-leading, flexible support for any combination of spine and leaf switches, based on its included configurable topology templates.

FOR STACK-EQUIVALENT CONFIGURATION

For a typical enterprise wiring closet or branch office deployment, 10 access switches (such as the Edge-Core AS4610 series switches) can be joined into a single managed logical switch with up to 448 Gigabit Ethernet ports and 40 10-Gigabit Ethernet ports. This particular stack configuration has two spine switches and eight leaf switches.
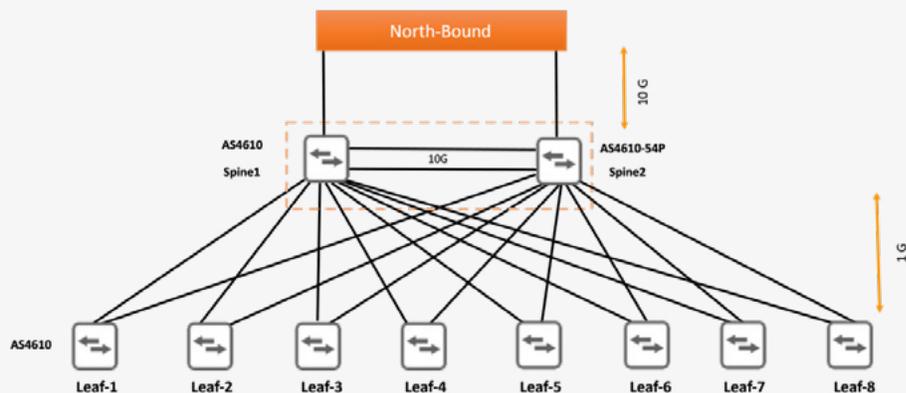

Figure 1 - PicaPilot stack-equivalent configuration

FOR CHASSIS-EQUIVALENT CONFIGURATION

For larger scale enterprise deployments – for example, to replace a modular chassis or even for a campus-wide deployment – up to 16 Gigabit Ethernet leaf switches (such as the Edge-core AS4610 series switches) in this sample configuration can be connected to two 10-Gigabit Ethernet spine switches, (such as the Edge-core AS5812 series switches), to form a single managed PicaPilot logical switch with up to 768 Gigabit Ethernet ports, 9610-Gigabit Ethernet ports, and eight 40-Gigabit Ethernet ports.
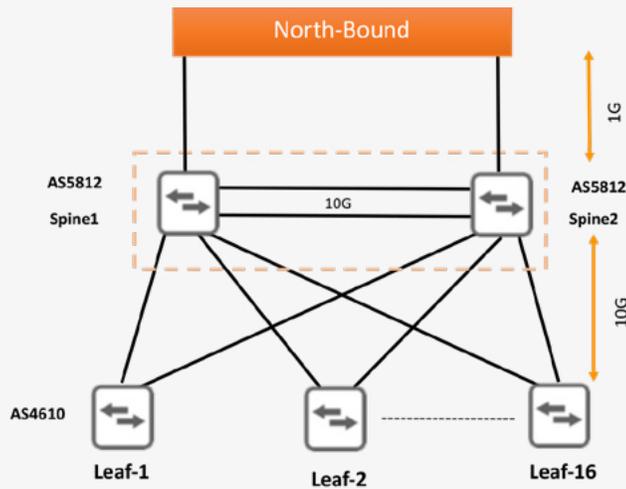
Figure 2 - PicaPilot chassis-comparable configuration

Licensing/Ordering

PicaPilot is a switch-based application requiring PICOS Enterprise Editionsoftware.

P-OS-100G-EE	PicOS -100GE Switch Enterprise Edition
P-OS-100G-PP	PicOS -100GE Switch PicaPilot Add-on license (requires Enterprise Edition)
P-OS-10G-EE	PicOS -10/25/40 GE Switch Enterprise Edition
P-OS-10G-PP	PicOS -10/25/40 GE Switch PicaPilot Add-on license (requires Enterprise Edition)
P-OS-1G-EE	PicOS -1GE Switch Enterprise Edition
P-OS-1G-PP	PicOS -1GE Switch PicaPilot Add-on license (requires Enterprise Edition)
P-OS-1G-EE-24	PicOS -1GE 24-Port Switch Enterprise Edition
P-OS-1G-PP-24	PicOS -1GE 24-Port Switch PicaPilot Add-on license (requires Enterprise Edition)

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