PICA8 OPEN NETWORKING®

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Solution Brief

Secure White-Box Networks for the Enterprise

The new best practice: A dual-control Linux Network Operating System (NOS) paired with disaggregated L2/L3 white-box switching brings innovation back to the enterprise

The intent-based Networking suite of technologies—and the white-box networking market it ushered in (open software running on multiple hardware platforms) are collectively on track to become a $12.7 billion market by the year 2020. In the last 12 months, white-box networking has escaped the event horizon of its birth in the data center and has expanded into wholly new market segments, specifically mainline enterprises—and their remote branch offices—and SMBs.

With the maturation of underlying Network Operating System (NOS) technologies over the last few years, 2018's white-box-centric solutions—now sporting higher specs, bulletproof reliability and global support—are successfully penetrating a number of enterprise verticals, where maintaining differentiation depends on keeping a technological edge against the competition. These next-gen white-box solutions are surpassing the limitations that legacy L2/L3 network equipment, architecture, and support have historically placed on their users. As a result, enterprise companies are now rediscovering their ability to differentiate in their own markets based on new technology that also slashes their networking equipment and operational costs.

With hundreds to thousands of devices needing to be connected in each location, managing network services in Enterprise offices presents significant challenges. Network services support everything from the core Data Center to employee and IoT devices; internal and guest Wi-Fi; Internet access; forward-deployed specialized data centers; and VoIP phones and video. Today, all of these services have to be delivered and managed in a cost-effective way.

As the market leader in open intent-based access and enterprise networking, Pica8® has accepted these challenges and now offers a compelling solution—open-standards-based network operating system (NOS) software (PICOS™) paired with high-spec white-box switches—that gives users a permanent technological edge via Pica8's unique, blended IP switching capability. Only Pica8's CrossFlow™ dual-control plane architecture allows for completely interrupt-free security and analytics policy management of outlying offices by core IT operations teams. Pushing out security updates and new network sensor requirements no longer interrupts business or requires on-site support. Equally important, this new networking industry best practice comes without the high costs associated with proprietary integrated hardware, vendor lock-in or egregious legacy support contracts.

This solution brief describes Pica8's approach to providing easy-to-use low-cost enterprise networking—starting at the data center and then running through large enterprise HQs, regional locations, and small remote/branch offices.

Large enterprise offices are frequently hundreds to thousands of miles away from corporate headquarters. Typically, few, if any, IT staff are on site in these remote offices (with large regional offices or data centers being exceptions to this rule). This means centrally controlled and administered networks from the corporate data center are clearly desirable from a budgetary perspective.

Enterprise opportunities to migrate to NOS and white-box switching

It's to an Enterprise's advantage to choose a precipitating event for a network upgrade and then plan out its transition to this new, modern networking paradigm. White-box networking allows companys to keep control of their networks' operational consistency and performance; retain support contracts for software (e.g. maintaining SOX compliance); and use cost-effective repair-and-replace depot service for hardware, thereby minimizing both initial purchase CAPEX and ongoing OPEX costs. Ideal opportunities to start an access network upgrade include:

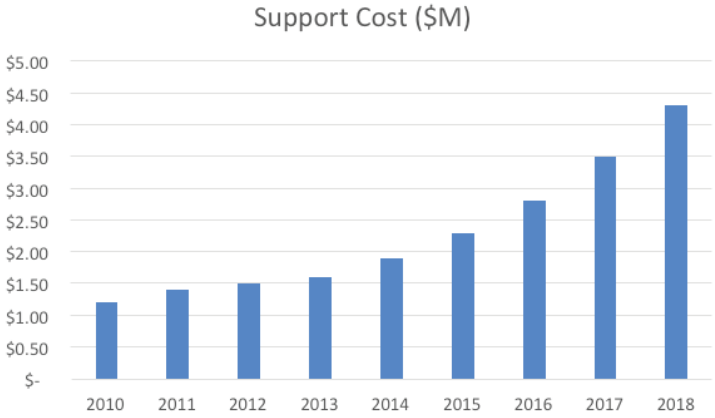
- **A new IT system, office addition, opening a new operation, or office consolidation**

A new IT system, an office addition, the opening of a new operation or an office consolidation represent obvious opportunities for network upgrades. Planning for this upgrade begins with a review of available NOS and white-box vendor market alternatives. Next comes the selection of the best NOS that fits a company's operational methodology—typically one that minimizes network management and activation requirements.

The final stage is the evaluation of actual hardware capabilities and costs, followed by an examination of application engineering alternatives that will best fit the network and its available physical space. A hardware placement and selection strategy should automatically drop out of this exercise. Make sure to choose the NOS whose automated activation, network management, unique programmability features and performance are best-in-class for your particular needs. No two networks are alike and those that offer unnecessary features will only add OPEX expense in the long run courtesy of higher support pricing. Unneeded features are best left in a road map.

End of Life (EOL) support price escalation

The end of life (EOL) opportunity to upgrade to a modern network architecture typically comes as a result of a vendor's declining sales combined with the aging equipment still in use. In the EoL scenario, integrated software/hardware product vendors typically raise their support costs—often significantly—to recover their costs related to the delivery and support of aging systems.



Sometimes, this is dictated by discontinued parts in their hardware offering. Support costs can also be driven by an unsupported operating system that was originally tailored to specific hardware. Vendors often trigger price hikes to cover support expenses on an ever-shrinking base. Either of these scenarios drives up vendor costs, and causes them to pass the costs along to the customer. In any event, they will happily provide "opportunities" to make a one-time "lifetime purchase" of their hardware either upon EOL notice or at some point a little further down the road.

End of Support (EOS)

Typically end of support (EOS) follows an EOL notification by 2-5 years. It's important to note that for public companies, SOX compliance mandates a change to supported software. So an EOS notice becomes an automatic trigger for an upgrade. By the time your network reaches end of support, it's best to have planned the migration to NOS and white-box networking in order to stay in regulatory compliance.

Conversely, when the time comes to move on to new hardware, the portability of a perpetually supported NOS license is critical in that it can run on a plethora of switching hardware—and vendors—to create the right mix for a specific deployment. (Hyper-converged infrastructure (HCI) vendors follow this model.)

At the high end of medium- and large-enterprise offices (or service provider networks), standalone white-box hardware (regardless of platform type) is generally the most desirable because of the flexibility it affords as modular building blocks for large networks.

In smaller enterprise network, such as in retail stores and remote or branch offices, either fully integrated networking or best-of-breed platforms with an easy-to-use NOS deliver the most value in "greenfield" replacements of aged, low-performance IT infrastructure.

White-Box strategies for the enterprise

Data center top of rack, large enterprise office, large retail store or service provider network building

1

Pica8 in the Data Center - PICOS running on blade-server switch cards in a virtual server lineup, as a data center IP fabric with a spine-leaf topolgy, or as a top-of-rack (TOR) switch:

2

A NOS on rack-mounted switches, switch-routers, switch-router-threat managers in a blade server or in a modular rack-mount configuration:

blade server

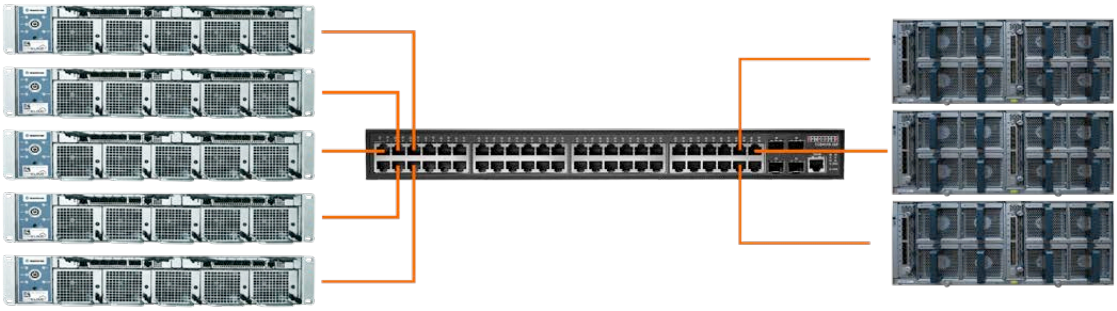
Network Block
48x10GbE Ports
6x40GbE

Storage Block
12-112TB Flash
Usable Capacity

Compute Block
2-8 Nodes, 16-28 Cores,
32/56 HT, 128-512Gb
RAM/Node

3

A NOS on a white-box access stack serving the LAN and WAN, or a data center's server monitoring and system management network:



White-Box strategies for the enterprise

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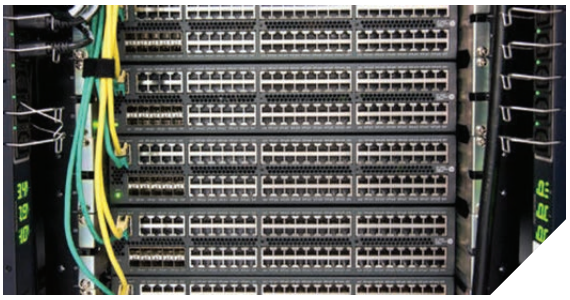
4

A NOS on a stack of white-boxes for large port count, eliminating chassis purchase and enabling future additions to be made with higher performance and lower cost white-box hardware:



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A NOS available in a number of Hyper-Converged Infrastructure solutions, including sitting on blade-server switch cards in forward deployed "data centers in a box":

Small business office, retail store or small distributed switching locations in large buildings

6

A NOS on white box switches sized by port range for smaller port counts (6 - 24 LAN ports) with 1 or 2 WAN ports:

PICOS

A modern NOS on white-box switching hardware: A cost-effective and future-proofed best practice for enterprise access networks

On the hardware side of the access networking equation, the list of reasons to upgrade to a disaggregated hardware/software network is a long one, delivering >50% CAPEX/OPEX savings (compared to highly discounted "integrated" switch pricing from legacy vendors); offering higher-spec switch processors; higher-reliability chasses and more. But as compelling as these rationale are, it's actually the new dual-control plane software control capabilities of the Pica8 PICOS NOS that have created a new benchmark for differentiated network services, making the network as a sensor concept a reality and providing an automatic mechanism for future proofing a company's network investment.

Until recently, the state-of-the-art for IP switches came in the form of "hybrid" L2/L3 switches where some ports of an L2/L3 operated with traditional L2/L3 stack software and other ports were under the control of an SDN controller. The blended IP switching capabilities of PICOS—where both the L2/L3 control plane and the SDN control plane can operate and interact on the same ports—have simply made these first-generation hybrid switches obsolete.

The myriad use cases for this new blended IP switching functionality finally allow for the practical insertion of SDN-like functionality into existing legacy L2/L3 networks in a seamless manner. For example, if SecOps detects suspicious activity coming from some set of Mac addresses, they can use OpenFlow to remotely push out a new rule to every switch in the network to deny—or redirect—flows from those addresses with absolutely no interruption of service anywhere in the network, even in, say, branch offices or retail stores.

Finally, network disaggregation has not only become exciting again, it has found its compelling business case.

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