



MOVING TO A SECURE, AUTOMATED MULTICLOUD ENVIRONMENT

Successful digital transformation requires high-bandwidth, reliable interconnection of applications, data centers, and clouds

INNOVATIVE DATA-DRIVEN STRATEGIES are enabling organizations to connect with customers and increase operational efficiency as never before. These new initiatives are built on a multitude of applications, such as big-data analytics, supply chain, and factory automation. On average, organizations are now 53% digital as they create new ways of operating and growing their businesses, according to the [Computerworld 2017 Forecast Study](#).

As part of this transformation, enterprises rely increasingly on multivendor, multicloud environments that mix on-premise, private, and public cloud services and workloads. This shift is causing enterprises to increase network capacity; 55% of enterprises in the Computerworld study expect to add network bandwidth in the next 12 months.

Simply adding bandwidth is not enough, however. The new multicloud environment is forcing IT leaders to rethink how their networks are designed, built, and managed. [A 2017 PwC survey of enterprise data center buyers found that](#) workloads are increasingly distributed across multiple environments. These workloads, ranging from customer service to backup and recovery, are experiencing a notable shift from on-premise to public cloud environments, as more organizations push away from the traditional data center model.

As the cloud opens up new opportunities for agility and innovation, 72% of organizations say cloud deployments are also adding complexity for their networking teams, according to the [Network World 2017 State of the Network Study](#). In response to these challenges, enterprises must pave a path toward the multicloud capable of interconnecting not only servers within data centers, but also multiple data centers and clouds, while ensuring tighter security, scalable capacity, and high reliability.

JUNIPER
NETWORKS

IDG
STRATEGIC
MARKETING SERVICES

Evolving Priorities of Enterprise IT Leaders

CIO	VP / Manager of IT
Security	Security
Automation and Orchestration	Automation and Orchestration
TCO Savings	Technology Innovation
Agility	TCO Savings
Technology Innovation	Agility

A recent PwC survey of enterprise IT leaders reveals the top priorities for data center networking solutions.

(Source: PwC Enterprise data center buyer survey)

THE MULTICLOUD NETWORK

To enable digital business strategies, a multicloud network must provide:

Security. The prevalence of threats and fear of data loss place security at the highest priority level among IT leaders. In the PwC survey, 64% of IT decision-makers said their biggest pain point today is ensuring a secure connection between public and private cloud environments.

Automation and DevOps support. A methodology for highly efficient application development, DevOps requires the automated and orchestrated provisioning of infrastructure resources, including networking, so that developers can quickly create applications for changing business needs. According to the PwC survey, the use of both public and private clouds for DevOps will increase in the next three years.

High-speed switches with port density. Applications across the distributed infrastructure use ever-increasing quantities of data, requiring high throughput. High port density is needed to interconnect large numbers of applications running in corporate data centers, public cloud services, and private clouds.

Simplified network management. As network infrastructure proliferates, it becomes increasingly important to consolidate network management so that administrators gain a comprehensive view of the multicloud network from a single pane of glass.

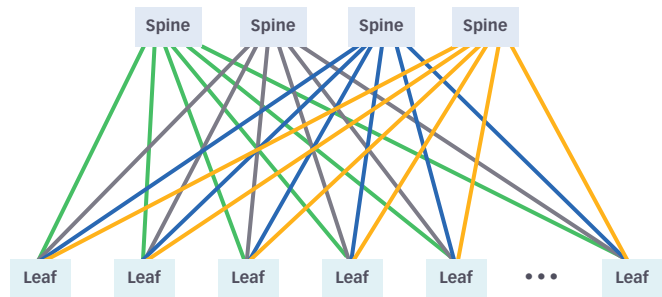
Universal building blocks. Network switches that can act as universal building blocks across different fabrics will provide both capital and operational savings compared with purchasing, deploying, and supporting many different switches.

SPINE-AND-LEAF TOPOLOGY IN A MULTICLOUD ENVIRONMENT

The use of disaggregated applications that must communicate with each other increases the amount of “east-west” traffic. Formerly confined to a data center, this inter-application traffic may expand to encompass data centers in different locations, as well as public cloud services and private clouds.

In a spine-and-leaf topology, leaf switches comprise an access layer, typically linking servers, while spine switches have connections to the leaf switches and connect to routers and firewalls. As all leaf switches connect to all spine switches, latency is reduced and reliability increased (see diagram), compared to traditional hierarchical architectures.

Building a fabric with spine-and-leaf network switches



(Source: Juniper)

DATA CENTER FABRICS

When universal switches are deployed in a leaf-and-spine topology, they can be managed as a single unified entity – a fabric. A management solution should consolidate and simplify management across the fabric. Viewing the entire network from one console enables a network administrator to study traffic trends and quickly spot bottlenecks as they emerge. In turn, this enables adjustments in routing priorities as needed to assure consistent traffic flow.

DATA CENTER EDGE REQUIREMENTS

The presence of multiple data centers places increased importance on the ability to interconnect them at the edge through switches that support Layer 3 routing. Ethernet virtual private networking (EVPN) is also essential, so that high-speed Ethernet links can run across a secure VPN between data centers. Support for multiprotocol label switching (MPLS) is also required to enable improved routing performance for different types of traffic, including EVPN. In addition, when an organization uses multiple data centers (including backup data centers), data center interconnect (DCI) functionality at the edge enables rapid adaptation to changing bandwidth requirements.

The changing demands on enterprise IT

THE ROLE OF IT is fundamentally changing from what used to be cost-efficient enablement to more strategic contribution to the enterprise. For companies born before the digital era, IT is a key player on the path to digital transformation. For companies founded more recently with technology at their cores, IT represents a foundational pillar on top of which everything else is built.

With the shift in role, a focus on security and automation is surpassing IT's decades-long emphasis on TCO. Whether facing the continuous risks of a dynamic threat landscape, the threat of digital disruption, or the inability to keep pace with the latest trends, virtually every enterprise has a need to be more agile. The continued evolution of computing, storage, and applications has exposed the network as a bottleneck to continuous change.

Put simply, enterprise IT is more critical than ever, and the network represents both risk and opportunity as IT leaders plot out its evolutionary path. As technology evolves, it drives changes in expectations of and approaches to IT. This, in turn, shifts how solutions are viewed and evaluated.

Security is more than just a CISO consideration

The [PwC Enterprise data center buyer survey](#) reveals that networking leaders have elevated security to the top priority for their data center networking strategies. This signals an all-hands-on-deck mentality. Basically, within IT, you're either part of the solution, or you're part of the problem.

Automation has overtaken TCO

Automation has overtaken TCO as a primary driver for enterprise IT. The focus on automation, agility, and innovation suggests that future benchmarks for data center networking will be more about IT's keeping pace than containing costs. In essence, if the network stands in the way of digital transformation and

new service delivery, then CIOs and their networking teams will find corporate life more difficult.

Cloud is imminent

Companies are not going to simply retool their existing environments for more secure, more automated networking. PwC's research indicates that this movement to the cloud is happening across all major classes of workloads, from customer service to broader business applications. The move to the cloud means that security and automation will need to address both the current state of IT and the likely hybrid- and multicloud future state.

Operating within constraints

While the PwC findings indicate that security and automation are top data center networking priorities, this does not mean that IT leaders can operate without constraints. The reality is that enterprise networks will be expected to better support their companies' security and automation objectives, but that support will have to come without floating the overall spend to unaffordable levels. This means that enterprise IT will have to carefully navigate a transition that requires straddling both legacy and multicloud technologies, which will have different tools and processes.

The rise of multicloud networking

The changes in enterprise IT imperatives will force a rethinking of how networks are planned, built, and managed. With the cloud playing a prominent role, enterprises will evolve from relying on primarily enterprise-grade networks to building out multicloud networks. Multicloud networking adds a new set of principles and capabilities to what the industry already knows, making networks more secure, highly automated, less capital-intensive, and ultimately better suited for innovation, both on and within the network.

CONSIDER JUNIPER NETWORKS

Juniper Networks addresses all these needs through a comprehensive, complementary family of technologies that map to IT leaders' data center priorities:

Security. Juniper switches provide secure connectivity to the public cloud with vSRX virtual next-generation firewall technology and the ability to handle speeds up to 100gbps. Juniper's software-defined secure network (SDSN) solution includes automated remediation, real-time intelligence, and machine learning across multivendor environments.

Network automation. Junos OS enables the network automation needed for DevOps implementations in every switch and integrates with popular DevOps orchestration frameworks such as Ansible, Puppet, Chef, Salt, and Scale.

Improved total cost of ownership. High port density lowers TCO by reducing the amount of space and power needed for the switch device. Running Junos OS across all routers, switches, and firewalls lowers training and administration costs. Juniper Space Network Director provides management across the entire fabric from a single pane of glass, eliminating the cost of multiple network-management platforms and the training required to manage them.

Software-defined automation

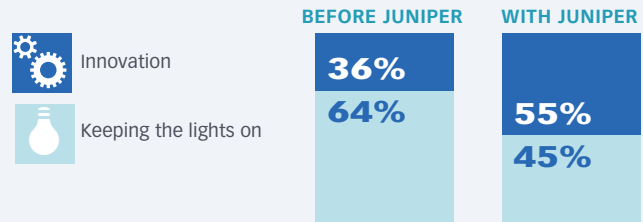
A self-driving network relies on intent rather than precise instructions provided through thousands of lines of complex configuration. In a software-defined world, the SDN controller acts as the point of control, translating intent into multivendor device primitives that drive the network. This architectural change in network management is the major driver behind PwC's survey findings that SDN is becoming an essential part of enterprise IT plans for the future.

Juniper integrates its Contrail SDN controller with its fabric underlay to leverage the power of intent-based networking and SDN in delivering the world's most automated data center infrastructure. With AppFormix, Juniper layers on application visibility to create a closed-loop system capable of tuning the infrastructure dynamically based on real-time conditions in and around the network.

With Juniper's data center fabric architectures and Junos OS' handling of most routine, day-to-day operations, customers can spend more time innovating and less time just keeping the lights on. In fact, Juniper customers report a whopping 55% increase in time spent on more value-driving activities.

Automation and Reliability Benefits

DOUBLE THE TIME FOR INNOVATION



EFFICIENCIES FROM AUTOMATION AND RELIABILITY

TIME FREED UP FOR INNOVATION



Agility. The ability to add Juniper QFX switches to a fabric with minimal configuration speeds deployment and streamlines management. Juniper Virtual Chassis Fabric enables management from a single IP address, eliminating the need for an IP address for each device. Virtual Chassis Fabric is designed specifically for data center traffic, delivering consistent performance for both virtualized and non-virtualized workloads. Junos Fusion allows multiple distributed devices to be managed as a single, logical device.

Innovation. A switch fabric consisting of Juniper QFX Series spine-and-leaf switches fulfills the needs of enterprise networks that interconnect data centers, public cloud services, and private clouds.

CONCLUSION

Digital business strategies are built on disaggregated applications running in multiple data centers, public cloud services, and private clouds. To support these applications, the enterprise network must evolve to provide secure, reliable, high-bandwidth interconnection for applications, data centers, and clouds. The Juniper solution provides a multicloud network that delivers the security, network automation, improved TCO, and agility organizations need to succeed in the age of digital business. ■

The self-driving network eliminates the complex programming and management tasks required today to run your network. Autonomous networks will self-configure, monitor, manage, correct, defend, and analyze, all with very little human intervention. They'll predict performance issues before users are affected. For more insights, visit www.juniper.net/automateyournetwork.