

Top 5 Considerations in Choosing Networking Solutions for the Cloud Era

IT and network decision-makers are under growing pressure to modernize their data center or cloud network infrastructures. As business requirements continue to evolve, networks need to become more agile, reliable, secure, cost-efficient and simpler to manage. Those responsible for building and operating these networks must have flexibility and choice in deploying solutions that address the challenges of their specific environments.

The shift to cloud models is, of course, a critical factor in driving the need for network modernization, along with the expansion of initiatives around mobility, big data, social networking and the Internet of Things. All of these activities are driving significant growth in traffic volume and variety. Legacy networks that were built for client-server models typically lack the performance, security, simplicity, agility and interoperability required for the cloud era. In addition, many were built on proprietary platforms that limit innovation and prevent enterprises from moving quickly to embrace new technologies.

To address the challenges of the cloud era, IT leaders and network builders are increasingly faced with a wide range of potential technology solutions. Having choice and flexibility gives network operators unprecedented ability to simplify and flatten the network, thus improving operational efficiency.

Making the right choices is the key to success. For example, knowing where and when to leverage switches that are based on merchant silicon versus custom, purpose-built silicon can have a significant impact on the performance of the network. Likewise, embracing management solutions that enable simplicity and automation can eliminate many of the costly and risky manual processes involved in network deployment and operations. Organizations are also moving toward software-defined networking (SDN) and network functions virtualization (NFV) as their next-generation architectural models.

However, while SDN and NFV may be the future, the best path to getting there is anything but clear. The solutions that network decision-makers deploy today not only have to address current challenges, but they also have to represent a sound long-term investment. How do you ensure that the investments you make today will not lead to a dead end two years from now? How do you modernize your network infrastructure without disrupting operations? How do you deploy a network architecture that is an enabler of innovation and not a bottleneck?

In this article we examine the top five considerations in choosing the right solutions to make sure your network can deliver the performance, security, agility, innovation and simplicity you need for now and for the future.

CONSIDERATION NO. 1: The Right Switch for the Job

Switching needs are evolving from providing basic high-speed port connectivity to more complex requirements that involve multidimensional scale and performance. At the same time, network builders have more options than ever. The keys to choosing the right switch are to understand where you are using the switch (and for what purpose), evaluate all of your options, and work with a vendor that gives you choice and does not lock you into one type of switch or a proprietary network/fabric architecture.

If you are deploying a switch at the spine or core level, for example, you will want to ensure that the switch is optimized for maximum performance, port density, logical scale and flexibility. Therefore, you may want to have the option of choosing a switch that uses custom silicon as opposed to a white box or other switch based on merchant silicon. If the switch is to be used at the access or leaf layer, performance and port density probably won't be as important, so you can be more cost-efficient and use a switch based on merchant silicon.

Ask your vendor if it offers core switches built on custom silicon as well as access layer switches that leverage merchant silicon. You will be able to save money and optimize your resources because you will be able to deploy both types of switches side by side in a single network.

Related Resource: [Top 10 Data Center Network Switch Considerations](#)

CONSIDERATION NO. 2: Modernized Network Topologies That Are Flatter, Faster and Open

Most network architects are looking to move away from the three-tier architecture of the client-server era toward a two-tier spine-leaf architecture that addresses the data center challenges of the cloud era. This means flatter networks that use fabric technology to address the shift in network traffic, the bulk of which now flows between servers or between servers and storage (east-west) as opposed to between servers and clients (north-south).

As you adopt modernized network topologies, they should support the path toward SDN and NFV. You want an architecture that is more virtualized, distributed and open, enabling you to respond quickly to business demands through pooled resources and centralized management that utilizes open automation and orchestration tools. Key considerations are:

- Collapsing aggregation layers to simplify the network architecture
- Flexibility to support future growth, so you don't have to re-architect as requirements change
- Backwards compatibility so your investment is protected as your needs grow
- The ability to manage the entire network as if it were a single switch
- Seamless connectivity to whatever architecture is already deployed in the network
- An architecture that is open and doesn't lock you into a single vendor solution

Related Resource: [MetaFabric Architecture Solution Brief Switching Solution Brief](#)

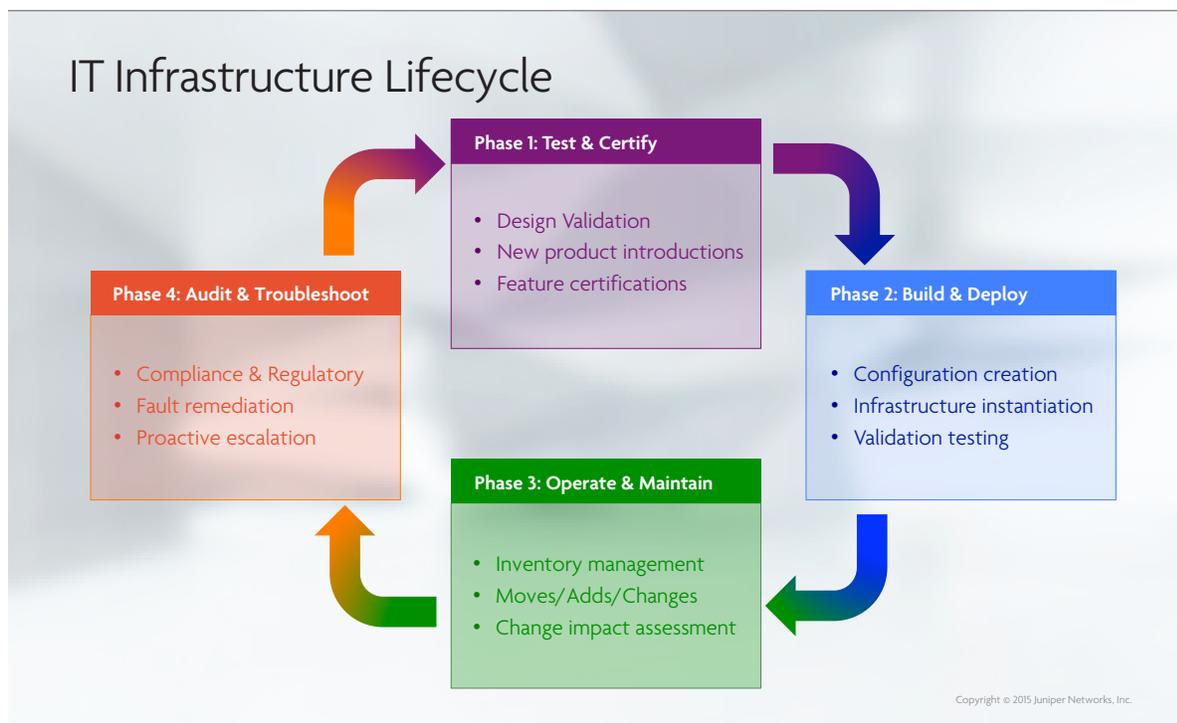
CONSIDERATION NO. 3: A Broad Set of Automation and Orchestration Tools

In the cloud era, it is important that network services be virtualized and distributed. You want to be able to quickly turn up new services on demand and not have them tied to a physical appliance, which takes time to deploy and/or needs to be bought and provisioned in advance of a change. Moves, adds and changes need to become fully automated.

Network automation enables you to be more agile and less prone to human error for common tasks that have typically been handled by manual processes, such as provisioning a new switch. You also need orchestration tools that allow you to centrally integrate automation in concert with all of the other elements of the data center. If a server or new storage device is added, for example, changes to network configurations should happen automatically and immediately.

A few points to consider when evaluating automation and orchestration tools:

- You need to be able to apply automation and orchestration across all stages of the infrastructure lifecycle: testing and automation; building and deployment; operations and maintenance; and auditing and troubleshooting (see illustration below).
- Your solutions should give you the option to leverage orchestration tools such as OpenStack and CloudStack, even if you are not using those tools today. They should also support SDN solutions from a variety of vendors, while integrating seamlessly with IT automation tools such as Puppet or Chef.
- Security should be integrated into the solution, so that when you are adding a new firewall, for example, you don't have to go through manual processes to ensure that it is protecting the servers and applications it is supposed to be protecting.



CONSIDERATION NO. 4: Deep Analytics and Telemetry Capabilities

In the cloud era, virtually all of your business-critical applications are running on the network. If there is any kind of problem or bottleneck, the impact on the business can be profound. In today's environment, you need to be proactive in addressing problems before they affect application performance. Therefore, you need tools that provide analytics and telemetry capabilities in real-time so that you can prevent problems from occurring or you can quickly troubleshoot/fix them if they do take place.

Here are some of the key considerations:

- Visibility into application workloads and behavior across both the physical and virtual network infrastructures. You should have an analytics engine that performs coordinated end-to-end data collection, analysis, correlation and visualization operations to present an application-centric view of the network.
- Real-time views of physical and virtual topologies, including views of activity during virtual machine (VM) creation, deletion and moves. You also want tools that monitor and analyze the health of the entire network fabric to increase service availability.
- Real-time and trended monitoring of virtual machines, ports, users and RF (radio frequency) environments, as well as queue depth for microbursts, devices and networks. This is particularly important in supporting increased mobility throughout the business. By analyzing the entire network you can better identify heat maps, over- and under-utilized ports and top VMs, users, devices and ports.

Related Resource: [Cloud Analytics Engine](#)

CONSIDERATION NO. 5: Simplified Integration With SDN and NFV

It is clear that SDN and NFV are the emerging technologies for network architecture and design. With SDN and NFV, the control function is separated from the forwarding function and is directly programmable. According to one survey, SDN and NFV technologies will influence almost 80% of the purchasing decisions associated with all networking revenue by the end of 2020, "affecting virtually every customer segment in the networking space."¹

For network decision-makers, the key is to invest in technologies today that enable a simple and seamless integration path to SDN and NFV. There are different models for each, some of which are proprietary, some of which are more open. Your network architecture should be flexible enough to support both. SDN and NFV require the physical underlay network to be aligned as closely as possible with the overlay network.

Related Resource: [Software-Defined Networking](#)

¹ "SDN and NFV Market Size Report & Forecast Predicts \$105B Impact by 2020," SDxCentral, May 5, 2015

Taking the Next Step

Organizations are moving quickly to embrace cloud models. The network can't be an inhibitor to innovation. Instead, it must be an enabler. Moving forward, IT and network decision-makers need to modernize their networks to keep pace. They need to invest in the right technologies today and work with a vendor that has a clear vision for how the network will evolve.

Juniper Networks is one such company that is delivering leading-edge networking solutions today that enable the next-generation of data center and clouds. Juniper provides open solutions; switches based on both custom and merchant silicon; support for leading and emerging automation and orchestration tools; and integrated management solutions for deep analytics and telemetry that enable IT to be proactive in addressing network problems in real-time. In addition, Juniper provides a simple path to SDN and NFV.

MetaFabric—Juniper's vision for flexibility, choice and automation in data center networks—helps customers solve problems inside the data center as well as the challenges of connecting data centers to one another and to public cloud resources. Juniper solutions such as Contrail, vMX, QFX Series, Junos, Cloud Analytics Engine and many others are part of a comprehensive blueprint for a single end-to-end network that supports and enables a multi-data center, multi-cloud environment—for now and for the future.

For more information on how Juniper can help your organization, please review the following resources.

Juniper.net/datacenter

[5 Tenets of Instant Evolution](#)
