

Enabling a Pragmatic Journey to the Cloud

Juniper solutions help you get the most from your cloud with intelligence, adaptability, and seamless scale

Challenge

Organizations cannot expect to make a smooth journey to the cloud unless they fully understand how the potential challenges of network security, availability, and reliability can affect the desired business objectives of reducing costs, increasing agility, and enhancing revenue.

Solution

Juniper Networks offers cloud solutions that are simple, open, and smart. Designed to help organizations of all sizes and types build clouds that are uniquely adaptable, intelligent, and scalable, Juniper solutions enable a seamless transition to the cloud.

Benefits

Juniper's cloud infrastructure drives business agility, improves the user experience, and lowers the costs required to support business objectives. Because Juniper cloud solutions leverage an open architecture, using Juniper in your cloud will allow you to maintain flexibility and freedom of choice.

Although the network may not be the first thing you think of when planning your move to the cloud, the right network foundation is essential. A cloud is only as good as the network it runs on. If users can't access the resources they need because the network is down or slow to react to changes, the benefits of the cloud quickly dissipate. Juniper solutions make the transition to the cloud both smooth and successful.

The Challenge

We've entered a time of transformation. The status quo no longer works. We're seeing new business models, new ways to reach customers, and new ways for those customers to buy and consume products and services—all enabled and even driven by the cloud.

We're also seeing technological transformation, where innovation trends—such as mobility, big data, and especially cloud computing—are driving IT to reimagine infrastructure.

Make no mistake; the cloud is here to stay. According to a Gartner study released in September 2013, Nearly half of large enterprises polled have deployed a private cloud service, and only 11% have no plans to do so through 2014.¹ The worldwide market for public cloud services alone is expected to reach \$72 billion in 2014.²

Many organizations are turning to cloud technologies and services to drive down costs and increase business agility. Others are looking to profit directly from the evolution to the cloud by offering cloud-based products and services. But for most organizations, the move to the cloud is a journey that happens over time. And regardless of how an organization is looking to use the cloud, some fundamental questions need to be answered.

- What types of applications and services can most benefit from being moved to the cloud and why?
- Who is in charge of procuring and managing cloud applications and technologies—IT or the lines of business?
- What type of technology should be used to build your cloud(s)?
- Should you leverage open source software or rely on commercial solutions?
- How do you keep a handle on costs if you have a hybrid infrastructure that includes public and private clouds, as well as on-premise resources spread across multiple data centers?
- How can you leverage the cloud to increase revenues?
- And a question that may not be immediately obvious: What network infrastructure should you put in place to support your cloud initiatives?

Without the right network infrastructure in place, the journey to the cloud can be a daunting one. Networks that are proprietary, complex, and static may not be able to handle the increased demands of a cloud-enabled IT or business strategy. They may even be roadblocks on the journey to the cloud. Rigid proprietary networks, for example, can result in technology lock-ins that can force network rip-and-replace for every industry transition. At the other end of the spectrum, individual point products that are only loosely integrated can add to the overall complexity of the cloud environment.

¹Gartner, Inc., "Private Cloud Matures, Hybrid Cloud Is Next," by Thomas J. Bittman, September 2013

²Forrester Research, Inc., "The Public Cloud Market Is Now In Hypergrowth," April 2014

The answer is an open ecosystem that gives you the flexibility to attain agility, reduce costs, and increase revenues as you leverage your cloud infrastructure.

The Juniper Networks Cloud Solution

Juniper is here to help you as you progress through your cloud journey. We have solutions to help you build the cloud that best fits your unique business objectives.

Juniper is the trusted leader in cloud networking, offering clear solutions that are designed to help you through each stage of your cloud transition. With a cloud solution that is uniquely adaptable, intelligent, and scalable, Juniper delivers the most agile infrastructure that maintains customer choice, flexibility, and freedom.

Features and Benefits

Adaptability, seamless scalability, and intelligence distinguish Juniper solutions from those of other network providers.

Adaptability

Adaptability is what enables a Juniper network to evolve in a nondisruptive fashion as your needs—and technologies—evolve. When new technologies come along (SDN is a recent example), you don't want your network to be forced into a disruptive upgrade cycle. Juniper solutions are built with a forward-looking and open architecture, so the network can adapt as you journey to the cloud. Below are some specific examples of how Juniper solutions provide adaptability:

- Investment protection: Juniper delivers a seamless and consistent product upgrade life cycle based on a single OS and a nondisruptive, evolutionary approach.
- End-to-end cloud networking solution: Our complementary portfolio of networking, security, and software works together seamlessly to create a single, coherent network from the customer premise to the cloud.

- Simple and nondisruptive SDN migration: Juniper Networks® Contrail virtual networking solution provides a simple and open approach to software-defined networking (SDN) that leverages existing routing protocols; and Juniper routing and switching platforms have an open architecture that facilitates integration with third-party SDN controllers and overlay technologies.

Seamless Scalability

Since the dawn of the Internet, traffic has continued to grow at a steady and rapid pace. It's a trend with no end in sight, and one that is only accelerated by trends such as cloud computing. The network you build your cloud on needs to be able to scale in a seamless fashion, so that when the time comes to scale up or out it doesn't involve a forklift upgrade. Take the following bullets as just a few examples of how Juniper delivers the seamless scale needed for the journey to the cloud:

- **Scalable switching fabric:** The Juniper Networks QFabric® System delivers the most scalable, high-performance switching fabric for data centers and clouds.
- **Scale-out SDN:** Contrail delivers a unique scale-out architecture that enables unparalleled scale for network virtualization.
- **Highly scalable routing:** Juniper routing platforms—such as the Juniper Networks MX2020 3D Universal Edge Router and PTX Series Packet Transport Routers—deliver industry-leading scale.

Intelligence

Networks by nature carry a lot of valuable information: information on traffic flows, application behavior, peak usage rates and times, and many other things. An intelligent, High-IQ Network is able to capture these insights so that the network and the cloud overall can operate much more efficiently. While intelligent networks are important everywhere, nowhere are they

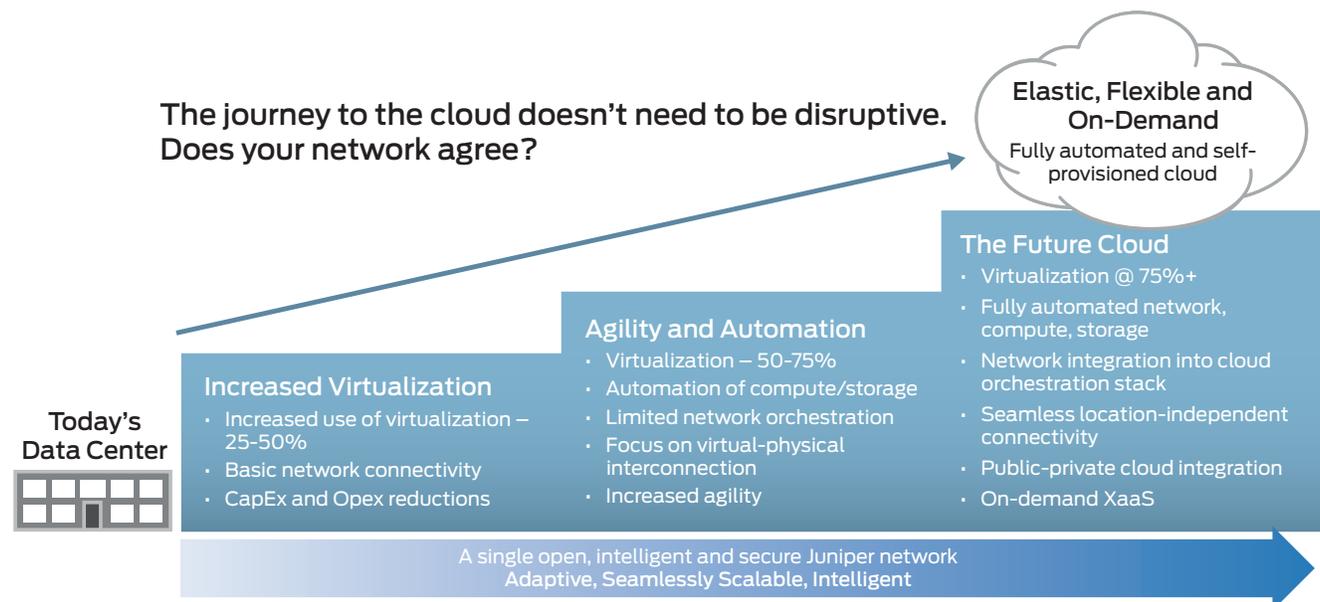


Figure 1: The journey to the cloud

more important than within a cloud. Knowing when VMs are moving, or scaling up or down, or when new users are accessing the cloud will help your cloud deliver better performance to your customers and your employees.

A few examples of the intelligence baked into Juniper solutions are listed below:

- **Network programmability and agility:** The Juniper Networks NorthStar network controller brings cloud-like flexibility and elasticity to network flows, enabling dynamic re-provisioning of networks to connect customers and clouds.
- **Network insights and analytics:** Intelligence built into the Contrail and NorthStar SDN products enable users to glean insights from both physical and virtual networks to optimize performance.
- **Dynamic service chaining:** Contrail can dynamically spin up and chain together Juniper and third-party virtualized network services in an intelligent service chain.

Solution Components

Juniper Networks' vision for the journey to the cloud minimizes business and technological transformation risks as it streamlines the journey, no matter where on that journey you happen to be. As a proven, trusted advisor, Juniper travels with you—at your pace—and aligns solutions to your business vision and desired outcomes.

Figure 1 depicts how a typical organization might evolve to make its data centers more cloud-like, with capabilities added at a pace dictated by specific business objectives. Some companies may choose to follow a stepwise pattern as outlined below, while others may be ready to make the jump (or have already done so) directly to a cloud infrastructure. Regardless of the pace taken, the end state is the same—a fully dynamic, elastic, and on-demand cloud enabled by automation.

At each phase of the journey pictured below, the network delivers increased capabilities (such as automation), but the underlying network itself doesn't need to change. Instead, with a Juniper cloud infrastructure solution, the network evolves alongside your business. No rip-and-replace is required.

Stage 1: Increased Virtualization—One of the first steps an organization may take on its journey to the cloud is to increase the level of server virtualization in its data center. Many organizations have already virtualized some or all of their servers and are quite familiar with the savings associated with virtualization technologies. Due to the agility and flexibility it offers, virtualization is also a key enabler for cloud adoption.

As you begin to increase the levels of virtualization used in your data center, the network has to deliver certain characteristics.

Being able to connect virtual machines (VMs) securely to each other and back to the physical world is an important functionality, and requires a degree of integration with the hypervisor platform and the management or orchestration tools. Because the number of virtualized resources is relatively small at this early stage, it's not so critical that the network be automated.

As the level of virtualization increases, however, so too does the need for automation. Virtualization and automation go hand-in-hand: one of the benefits of virtualized resources is that applications can be scaled up, down, or out based on demand. It only makes sense to do this in an automated fashion, which leads us to the next phase in the journey to the cloud.

Stage 2: Agility and Automation—At this stage, organizations are driven by the need to reduce operational expenses (OpEx) and begin building their own private clouds. They often maintain a hybrid IT infrastructure that mixes public clouds, private clouds, and an on-premise infrastructure that requires rigorous management. Juniper helps enterprises by building a simple infrastructure that's easy to use, manage, and troubleshoot. Using an open framework, Juniper's networking infrastructure seamlessly integrates into orchestration and automation toolsets to work in even the most varied multivendor environments.

Here, the focus from a network perspective is on increased agility and integration with IT orchestration platforms. This increased agility and automation helps the network respond when VMs are moved or scaled. If your network infrastructure doesn't support the open APIs required to integrate with the orchestration platforms of your choosing, you may be faced with an upgrade cycle here.

Stage 3: The Future Cloud—The desired end state of the journey to the cloud is, of course, a fully elastic, flexible, and on-demand cloud. These three characteristics—elasticity, flexibility, and on-demand access—are what truly separate a cloud from a traditional data center. To deliver these capabilities, the cloud infrastructure must be fully automated. Compute, storage, and networking resources should be able to respond in near real time to changing demands. Administrators should be able to change policies, configurations, and programming through a simple point-and-click process.

In the final phase, all aspects of the data center infrastructure are fully automated—this means your network as well. For many, this means the adoption of an SDN solution like Juniper Networks Contrail. However, there are other ways to achieve full network automation as well. Here you have the added choice of which type of SDN solution you pick: a virtual network overlay solution; or a controller-based model that works with your existing physical network infrastructure.

Different Organizations, Different Cloud Journeys

Enterprise IT: These companies have virtualized some or all of their data centers to lower their capital expenditures (CapEx). They seek to grow their businesses using cloud infrastructure and services.

Enterprises with Private Clouds: These enterprises are in highly regulated industries such as financial services and healthcare that require stringent data protection, data segregation, and service availability capabilities. They seek to reduce operational expenses (OpEx) as they deploy to the cloud.

Service Providers: For service providers and multi-system operators (MSOs), the cloud offers a tremendous opportunity to grow revenue and increase competitive differentiation. These organizations want to reach Stage 3—a fully automated and self-provisioned cloud—as quickly, efficiently, and cost-effectively as possible.

Regardless of the pace at which your business adopts cloud services or builds out your own private cloud, you should require one thing of your network—that it not get in your way. Your network should enable your adoption of the cloud, not inhibit it. While this may seem obvious, not all networks are designed this way. Choosing the wrong network solution may mean a disruptive and costly upgrade cycle at each step of the cloud journey.

The message is clear; the network must move at the speed of business. Today, that means the network must evolve seamlessly as the business advances on its journey to the cloud.

Next Steps

To learn more about the journey to the cloud, please visit www.juniper.net or contact your account manager

About Juniper Networks

Juniper Networks is in the business of network innovation. From devices to data centers, from consumers to cloud providers, Juniper Networks delivers the software, silicon and systems that transform the experience and economics of networking. The company serves customers and partners worldwide. Additional information can be found at www.juniper.net.

Summary—Juniper Enables You to Make the Cloud Journey on Your Own Terms

The journey to the cloud doesn't need to be—and in fact, it shouldn't be—disruptive. It can be an evolutionary process, or it can be completed all at once as a leap of faith. It is important to remember that the journey to the cloud can and should be undertaken at your pace, driven by the requirements of your business.

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