20/20 Vision for Communication Service Providers

Service Providers Leverage SDN/NFV to Empower Change

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Executive Summary

Unprecedented change is occurring in the telecommunications industry. Driven by new and emerging technologies, consumer expectations are changing and competitors are constantly entering the market.

Faced with these changes, senior executives at traditional communications service providers cannot stand still. Tinkering with their business models does not deliver long-term success. Fundamental change is needed.

This white paper examines the key trends influencing the disruptive changes in the market, explores the three options traditional service providers have for reinventing their businesses, and highlights the characteristics needed to succeed.

Introduction

Over the last few years, the pace of change in the telecommunications industry has increased rapidly and continues to accelerate. First, there was the connection age, where the focus was on developing the network and linking people and places. In this era, service providers used their capital to extend their reach and coverage, and services were fairly basic—simple wired telephony, for example.

More recently, what might be called the capacity age has emerged, characterized by shorter technology cycles and the ability to deliver more advanced and bundled services such as wired telephony, mobile, Internet connection, messaging, information services, and the start of mobile apps. As a result, providers have seen exponential usage growth, and the focus has moved to investing in the capacity required to support it.

Now a new age—content and applications—is dawning, where connectivity and capacity are ubiquitous and taken for granted, only noticed when they aren't available. These resources are so commonplace, it is debatable whether users are even willing to pay for them anymore. In most major cities, free Wi-Fi is so widely available, consumers hardly need a mobile contract.

In this environment, network effects and platform economics govern the new Web services companies that have sprung up. User experience is the difference between winning and losing. Many of the new Web companies—Google, Facebook, and many others—build out a simple, open platform, enticing users to jump on board. Before long, consumers feel compelled to use the platform because everyone else is using it. Global "over-the-top" (OTT) expansion is so rapid and relatively inexpensive that the platform is soon supporting hundreds of millions of users, erecting a huge barrier to entry.

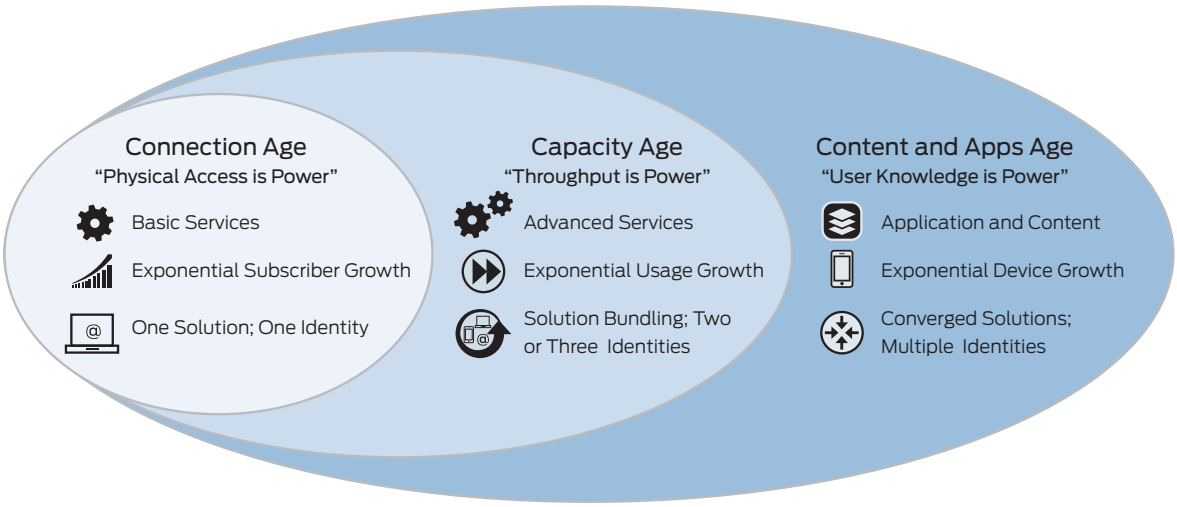

Figure 1: Content and applications drive service provider evolution

While it's easy to overstate the similarities between traditional telcos and the new Web services companies, the lessons are clear. Juniper Networks is helping CSPs around the world build out platforms that are open ecosystems for innovation—a distributed telco cloud to recapture users' attention.

However, we believe CSPs need to think carefully about the three key underlying trends that are shaping market evolution today:

- Customer expectations
- Competitive pressures
- Contextual challenges

Customer Expectations

Cloud computing shows no signs of slowing, and it is having a significant impact on customer expectations. Consumers have grown accustomed to services such as online shopping, web-based ticketing, stock quotes, cloud storage, and website hosting being available on demand, in real time, with a single click.

This experience is spilling over into all aspects of peoples' lives, including network services. Corporate IT and the network are being "consumerized." If users want a new service, they don't want to wait four to six weeks for it to be provisioned—they want it now and expect it to be tailored to their specific requirements. A one-size-fits-all approach just won't work anymore.

Some service providers have started experimenting with offering dynamic networks, but they are only scratching the surface. As customer interest grows, and operational and business support systems catch up, providers start to offer a raft of new, instantly available services such as bandwidth on demand, virtual firewalls, and virtual home gateways.

At the same time, the number and variety of connected devices are increasing exponentially. While predictions for how big the Internet of Things (IoT) varies, one point is a given—it is expected to consist of billions of devices. With everything from refrigerators to cars, industrial machinery to field-based assets, and public transport to city infrastructure becoming connected, it's clear that the applications they support are very different from those on laptops and mobile phones.

Competitive Pressures

Just as customer expectations are increasing exponentially, competition is fiercer than ever.

Prices are under pressure across the board as telecommunications companies compete to attract wired, mobile, and data services customers. The problem is compounded by OTT providers entering the market. An entire generation has grown up without having to pay for many services.

As if margins weren't under enough pressure from price reductions, increases in OpEx and CapEx for replacing infrastructure are driving them down even further.

At the same time, in many countries, there is not enough available spectrum to keep pace with demand. Recent auctions have seen prices for available spectrum rise to new heights, and bidding is expected to become more aggressive as governments and private organizations around the world seek to monetize their assets. Conversely, while service providers struggle to gain the spectrum they need, OTTs are looking to take advantage of lightly licensed spectrum or even build their own access networks, which are just "good enough."

To overcome these problems, some service providers are shifting their strategy by offering end-to-end services to satisfy customer demands. Service providers are shifting to cloud-based services, built in their own data centers or partnering with OTT providers in cloud brokerage agreements. However, these new services often aren't differentiated from existing suppliers and struggle to take off. As a result, service providers must decide whether they are willing to compete, cooperate, or concede parts of their business to these companies.

The news is not much better for pay-TV companies, which have traditionally offered both voice and data services. Consumers are deserting them in favor of on-demand viewing options from both online broadcasting companies and content owners.

Contextual Challenges

Increasing customer expectations and fiercer competition must be viewed in the context of other challenges facing service providers.

The regulatory environment, for instance, is a significant factor. Regulations are already complex and fragmented globally, and it seems likely they are to become even more complicated in the future.

To enforce net neutrality rules, the Federal Communications Commission (FCC) is considering classifying service providers and wireless operators as "utility-like" services.

Also, while intentions are benign, European data privacy laws might hamper foreign businesses in terms of regulatory compliance, although some members of the European Union (EU) are not in agreement with various sections of the act or its implementation timelines and methods.

In addition, in the post-Snowden world, a number of countries are creating new data sovereignty requirements as well. Meanwhile, the EU continues to reign in data roaming laws that were a lucrative part of the wireless industry.

Finally, network convergence also has an impact. Fiber consolidation continues, with millions being spent on fiber deals in 2015. To address these developments, service providers have to move from today's disparate systems and networks to a consolidated and virtualized environment that leverages multiple assets in the future.

Technology Brings Opportunities

Despite these conditions, the outlook isn't all gloomy. There are technology developments that allow service providers to drive material cost savings and create new revenue-generating opportunities.

Software-defined networking (SDN) and Network Functions Virtualization (NFV) not only promise to help service providers significantly reduce their capital equipment costs, they can also slash ongoing maintenance and support budgets.

Wi-Fi, small cells, and gigabit fiber can also be leveraged in ways that are impossible with siloed network, while 5G and the unlicensed spectrum offer opportunities to address increasing demands for capacity and bandwidth.

Big data applications require low latency and, as a result, increase the importance of a high-performance network. In this era a distributed telecommunications cloud might help service providers differentiate themselves from Web services companies that do not have the same network reach or ability to provide mobile edge computing.

Services to OTT players can also boost service provider revenue and profit. For example, there are still billions of unbanked individuals in the world. For financial services companies that want to extend their offerings to these people, while a physical network is totally uneconomical, mobile networks are already proving a viable alternative.

Weighing the Options

So what options do service providers have? In reality, there are a variety of positions service providers could adopt. However, for the purposes of clarity, it is helpful to consider three distinct business models.

Utility Service Provider

The utility service provider might be forced to become a wholesale connectivity provider—a carrier for carriers. There is still a need for organizations to fulfill this role, but it's not an easy path.

Since utility service providers compete on price alone, it is hard for them to differentiate themselves. They must be ruthless at managing margins and extracting maximum productivity from their people and assets in order to drive down cost per bit. They are anonymous to end consumers and only own a few strategic customer relationships. To achieve the economies of scale needed, consolidation in this market is highly likely.

Smart Pipe

Smart-pipe operators go one step beyond simply offering connectivity services. They still need to be competitive on price but also offer more value-added services such as embedded communications, virtualized networks, and basic platforms on which third-party applications and services can be built.

Smart-pipe operators still only own the limited number of customer relationships that are linked to their connectivity services and, as they add very little value to application developer offerings, it is likely they only get a limited revenue share from them, if any at all.

Next-Generation Service Provider

The true next-generation service provider creates ecosystems that provide high-value platforms enhanced by data analytics. They orchestrate end-to-end services and provide a one-stop-shop for consumers and corporations to purchase tailored services that meet their individual requirements. They also experiment with new cloud-based services aimed at new customer segments and geographies.

Next-generation service providers own the customer experience. They also make it their business to onboard individual customers, IoT devices, and OTTs fast, and they provide seamless user experiences that drive trust and loyalty.

Winning Characteristics

Whatever business model they adopt, service providers are immersed in a transformation process to acquire new key characteristics to ensure their success in the content and applications age.

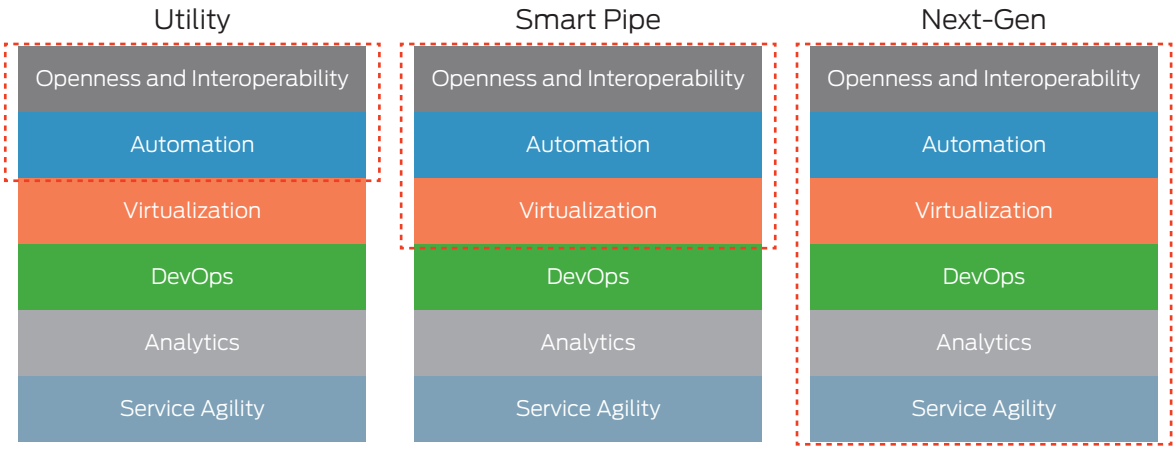

Figure 2: Key characteristics to adopt to succeed in each service provider position

How to Succeed as a "Utility" Player

Utility players find it hard to differentiate their solutions. Their setup is primarily concerned with providing wholesale services.

Key Characteristics

- Openness and interoperability seamlessly interface with other operators, not only in terms of technology integration but also with the business partnership.
- Automation of network elements is part of the intense pursuit of lowering costs per bit.
- Table stakes of extensive network coverage and capacity continue to be essential.

How to Succeed as a "Smart-Pipe" Player

Smart-pipe players operate basic platforms on which third-party applications and services are built. Third parties directly own their relationships with the customers, while smart-pipe players own the relationships for connectivity services. Smart-pipe players do not get revenue share from the third parties, as they do not provide any additional value.

Key Characteristics

- Utility carriers need openness, interoperability, and automation.
- Virtualization brings the flexibility and agility required of a smart pipe. Virtualized networks help these players:
  - Achieve cost leadership and leverage rapidly increasing cost effectiveness of COTS hardware.
  - Enable platforms that support rapid deployment of new OTT services by third-party partners.

How to Succeed as a "Next-Generation" Player

Next-generation service providers operate end-to-end ecosystems, with higher-value platforms enhanced by big data analytics. To address the IoT and OTT services market, they leverage network effects by onboarding platform devices and users. They might also provide E2E services in select verticals.

The key distinction here is that next-generation players make use of service orchestration and a consistent one-stop-shop customer marketplace to provide a seamless user experience, in accordance with the rules for success in the content and apps age.

The value proposition that next-generation players bring to nimble innovative startup/ISV partners is their ability to scale, go-to-market capabilities, security, SLAs, and customer relationship management competencies, especially with enterprise customers. Service vendors might not have these capabilities at scale when starting out, and next-generation players cannot pursue the long tail of applications/verticals by themselves, so they need to provide value to each other. By hosting marketplace services for OTT service providers, next-generation service provider players can participate in the long tail of applications/verticals and gain revenue share from vendor partners in the ecosystem.

Key Characteristics

- The openness, interoperability, and automation needed by utility carriers
- The virtualization capabilities of smart-pipe players
- Slick DevOps capabilities to deliver new services rapidly
- Sophisticated analytics to help provide a seamless user experience
- Service agility to respond to market trends.
- Emulate OTT players with services offered from the cloud and at the customer's premises (for example, SD-WAN)

Conclusion

For many years the telecommunications industry has been undergoing rapid change, and it shows no signs of slowing. Where simply connecting people and places was once the goal, today that is taken for granted by consumers, as is the provisioning of capacity. In the digital economy, connections and capacity are cheap, if not free. Applications and content are the new currencies of success.

Faced with this environment, service providers must decide on their strategy. Do they become utilities—highly efficient, low-price operations wholesaling connectivity? Or do they try to dominate the other end of the spectrum and deliver high-value customer experiences based on new innovative applications and content?

Whatever position they choose, the status quo cannot prevail. Networks and organizations need to adapt to take advantage of new technologies and drive competitive advantage. To remain relevant in today's market and avoid marginalization, service providers need to initiate a foundational transformation to build a sustained long-term competitive advantage. Juniper Networks defines this foundational transformation as a profound change in the business model, service development process, skills, and culture.

Key Factors Required to Win in the Content and Applications Age

Openness and Interoperability

Both across the value chain and up and down the solution stack, working with a variety of hardware, software, and systems across their OSS and BSS networks are essential, as is the ability to orchestrate cloud solutions.

Automation

With customers expecting instant access to services, service providers need to automatically provision them. Adopting standards-based automation solutions not only dramatically cuts deployment times but also significantly reduces costs with the longer-term goal of autonomy: the "self-driving network."

Virtualization

In order to improve the end-user experience and radically change the economics of their business, service providers need to shift many of their traditional network services to the cloud, so that customers can focus on what they need rather than where the assets powering the services are physically located.

DevOps

With a DevOps mindset, service providers can rapidly and continuously provide new functionality and services to customers, enabling them to stay one step ahead of the competition. However, that requires fundamental changes to their culture, processes, and skill sets.

Analytics

Big data and analytics offer service providers the opportunity to move beyond simply collecting data, allowing them to diagnose problems, predict network and customer behavior, and prescribe relevant solutions. This also creates endless new revenue opportunities to collect, aggregate, analyze, and then sell the information gleaned from the network.

Service Agility

By building on virtualization and automation, service providers become more agile, able to respond more rapidly to customer demands and substantially reduce the time to market for new products. Transform to an experimentation culture prevalent in Web services companies.

The Juniper Difference

Juniper focuses on creating solutions for the benefit of service providers and has the deep network and routing track record to prove it. We are well-positioned to deliver a commercially scalable portfolio of products and services, both virtual and physical, and we know how to deliver it within a complicated environment. Understanding that not every service provider is ready to jump headfirst into a virtual world, Juniper can also help execute hybrid solutions.

While we understand the current world of physical/dedicated boxes, BGP, MPLS, and so on, we also appreciate all that can be realized within the virtual world and are committed to building a bridge between the two. Juniper offers carrier-grade virtual platforms and proven, dedicated architectures to handle the elasticity needed for uncertain, moderate throughput applications, as well as the scale and performance needed for high-volume applications.

Juniper also offers a comprehensive automation solution, including automated network operations with automation tools such as Juniper Networks Junos OS APIs and Junos Extension Toolkit; and automated service creation with Contrail Networking, Contrail Cloud Platform, and Contrail Service Orchestration.

Juniper eases the migration by running a common operating system—Junos OS—across its entire infrastructure, ensuring that the feature sets of its virtual routers and firewalls are consistent with the corresponding hardware-based products. Additionally, with the Cloud CPE solution, users can virtualize functions both at the customer premise and inside the carrier cloud.

From our overall corporate philosophy to our product strategy, we believe in an open and interoperable ecosystem—an approach that has always been a key part of our challenger mentality. The Contrail SDN Controller shares the same source code as the open-source OpenContrail product, with significant contributions from the open-source community, and Juniper's Contrail Cloud Platform offering is built around OpenStack.

In addition, Juniper prides itself on belonging to and actively participating in all of the relevant open standards organizations. For example, while the NETCONF and YANG protocols were standardized by the IETF, Juniper was largely responsible for their development.

Our consultative approach to the entire migration effort ensures that the transition is painless, efficient, and as productive as possible, as quickly as possible. Juniper Professional Services teams can assess customers' current situations, identify key integration issues, provide guidance and solution recommendations, and support them through the entire deployment and operation, making the most of user investments in both time and money.

About Juniper Networks

Juniper Networks challenges the status quo with products, solutions and services that transform the economics of networking. Our team co-innovates with customers and partners to deliver automated, scalable and secure networks with agility, performance and value. Additional information can be found at Juniper Networks or connect with Juniper on Twitter and Facebook.

Corporate and Sales Headquarters
Juniper Networks, Inc.
1133 Innovation Way
Sunnyvale, CA 94089 USA
Phone: 888.JUNIPER (888.586.4737)
or +1.408.745.2000
Fax: +1.408.745.2100
www.juniper.net

APAC and EMEA Headquarters
Juniper Networks International B.V.
Boeing Avenue 240
1119 PZ Schiphol-Rijk
Amsterdam, The Netherlands
Phone: +31.0.207.125.700
Fax: +31.0.207.125.701

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