White Paper

Navigating a Strategic Approach to Transformation

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Introduction

Change is the new normal, driving the need for communications service providers (CSPs) to embark on a rapid and dynamic transformation of their business, technology and organizations. A key driver of this transformation is a competitive landscape that is decidedly different, with new disruptive operators leveraging the capabilities of virtualization and cloud technologies to offer new services, applications and business models that are quickly capturing the attention and monetary spend of businesses and consumers.

In order to remain relevant in this rapidly changing environment, CSPs will need to overcome a growing list of challenges, such as the proliferation and penetration of connected devices, changing consumption models, competition from non-traditional operators, equipment obsolescence, technology evolution, declining revenues and the need for better operational efficiency, to name only a few.

New virtualization technologies, particularly network functions virtualization (NFV) and software-defined networking (SDN), will play a key role in facilitating transformation. These technologies will lay the foundation for CSPs to change the economics of their business by providing an infrastructure that enables the ability to rapidly launch new services, enter new markets and geographies, as well as innovate with highly desired new business models, such as flexible pricing schemes based on real-time usage of network resources.

In today's hyper-competitive environment, the need to transform is no longer an option, but an imperative. Successful transformation may be the difference between creating an environment that offers a future wave of growth or becoming irrelevant in a market dominated by innovative disruptors.

This white paper explores why transformation is necessary, what and where transformation needs to occur, and how to transform across three areas – business, technology and organization – while highlighting Juniper's approach to transformation.

Change Is the New Normal

The need for transformation is driven by several challenges – external and internal, as well as strategic and operational – currently facing CSPs. Some examples of these challenges are shown in **Figure 1**.

Figure 1: Service Provider Key Challenges

Source: Heavy Reading

External challenges are often the most impactful on the industry. From a competitive perspective, there are numerous examples of new market entrants that have been disruptive to the telecommunications industry. These include Vonage and Skype, which changed the voice business model; Netflix, Hulu and other over-the-top (OTT) video streaming services, which completely changed the dynamics of video consumption; and every social media site, which have had tremendous impact on how consumers share information, the type of information they share, as well as customer care. Other disruptors, such as Free in France, Fastweb in Italy, Google Fiber in the U.S., Talk Talk in the U.K., and Softbank in Japan forced change in pricing models, service offerings and even the infrastructure plans of incumbent operators.

In each case, these disruptive operators changed the value proposition for the end customer through lower prices, less stringent contractual obligations, more choices and more ways to access their services.

Other companies, such as Salesforce.com, Amazon and Google, pioneered the concept of delivering enterprise applications via the cloud without being bounded by

proprietary hardware solutions. This has facilitated innovation, agility and the ability to adapt scaling as needed through on-demand delivery and customization. This has allowed these companies to not only meet the varied needs of an enterprise, but make it cost effective to offer its services to all types and sizes of enterprises.

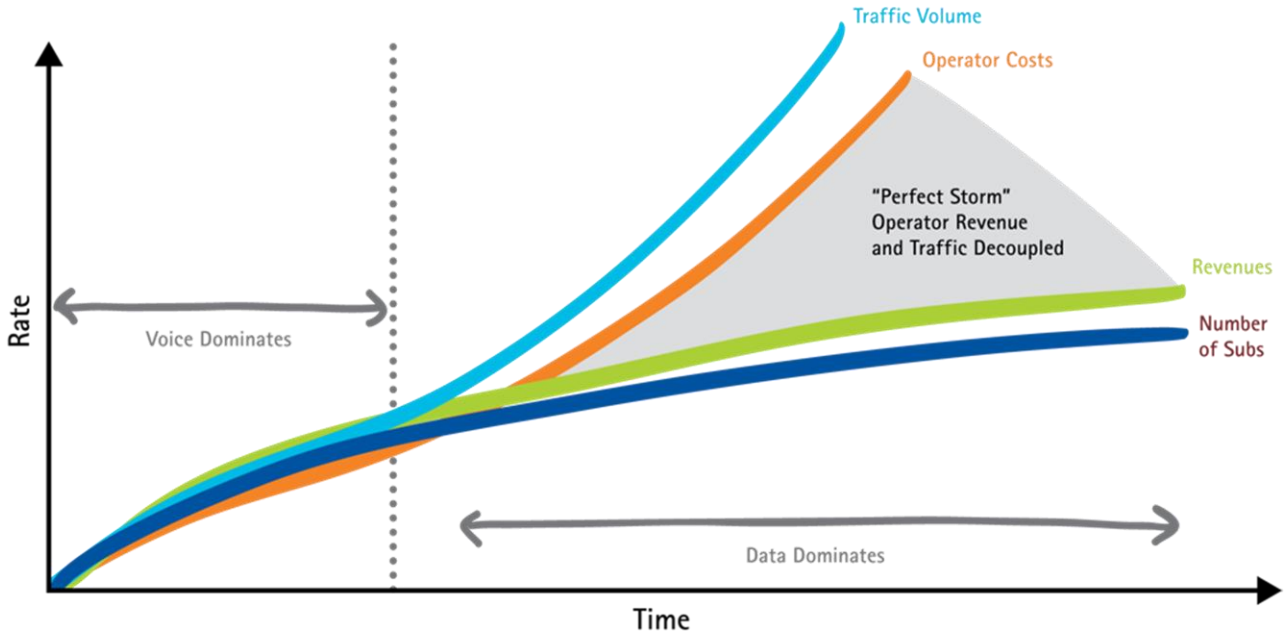
The Changing Consumer Profile

Another important trend impacting telecommunication networks and services is the changing consumer profile.

Historically, networks were built based on predictable usage patterns. In today's world, the proliferation of smartphones and connected devices, combined with a wide range of applications, creates unpredictable usage patterns that are difficult to forecast. According to the latest (Nov. 2015) Ericsson Mobility Report, the number of connected devices will increase from 15 billion in 2015 to 28 billion by 2021.

In addition to a change in consumption patterns, customer expectations are also shifting, as both consumers and enterprises increasingly expect access to their services anywhere, anytime, and on any device, on demand. The consequence is that traffic increasing faster than the number of subscribers, which results in lower profitability, as the cost to support this increase in traffic is greater than the revenue generated – a phenomenon that Accenture has dubbed the "Perfect Storm," as shown in **Figure 2**.

Figure 2: The Perfect Storm



Source: Accenture, The Future Communications Service Provider

Furthermore, enterprise customers will expect to receive the same quality of service (QoS), reliability, security and consistency of experience that is dictated by service-level agreements (SLAs).

New Technologies Offer New Opportunities

Most networks today are populated with an assortment of proprietary hardware that is difficult and costly to maintain, and with a lifecycle that continues to shorten, accelerating technology obsolescence. Furthermore, the rigid manual and complex processes necessary to deliver new services, adds both significant cost and delayed time to market.

The introduction of both NFV and SDN provides an opportunity for CSPs to reset the cost base of their network operations, while creating a flexible service delivery environment that accelerates the introduction of new services, quickly and cost-effectively.

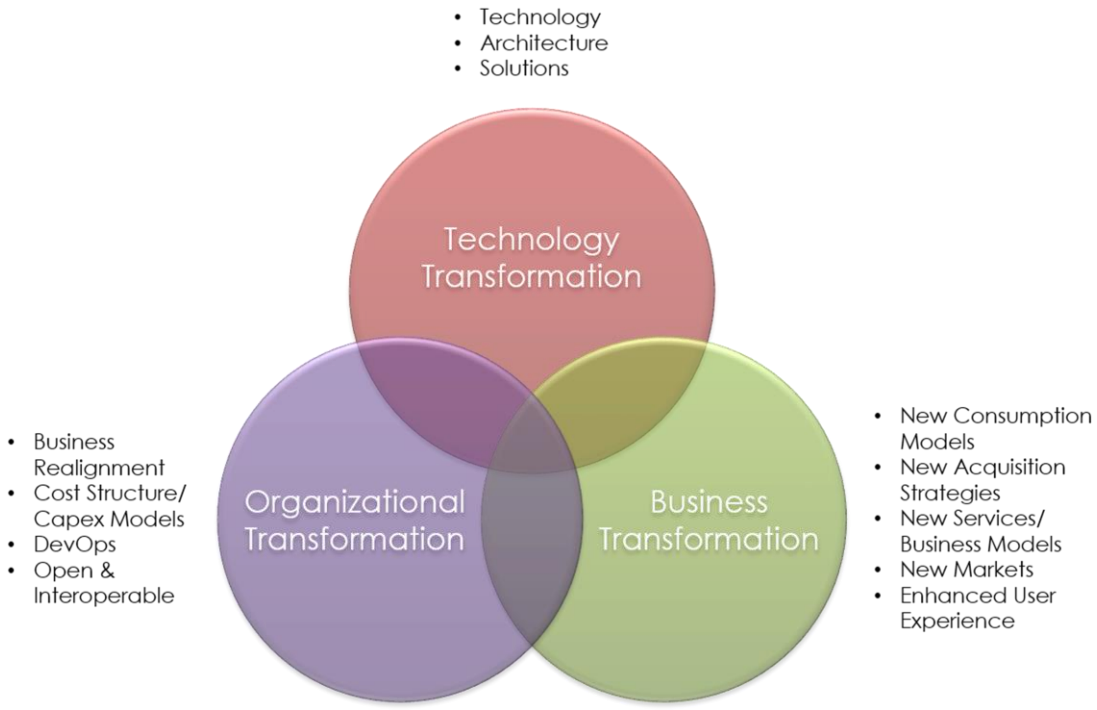
By separating hardware from software, NFV allows a network function to be programmed via software instead of by a physical piece of hardware. Additional network functions can be executed independently of location, allowing the placement of the function in the different places in support of different requirements, such as latency. This capability offers CSPs the ability to launch services in new segments, such as the Internet of Things (IoT).

The level of network programmability provided by SDN allows several network slices, customized and optimized for different service deployments, to be configured using the same physical and logical network infrastructure. One physical network can, therefore, support a wide range of services and deliver these services in an optimal way.

Adapting to Change

Although the transformation strategy will vary among CSPs concluding at different business outcomes, there are three key areas (opportunities) to transform, as shown in **Figure 3**: technology, business and organizational.

Figure 3: Three Keys Areas of Transformation



Source: Heavy Reading

The three areas of transformation are interrelated, meaning one cannot happen within the others. Technology transformation will be a key enabler to business transformation, while organization transformation is essential to the success of the other two areas. The goals of each area of transformation are as follows:

- **Business:** Enable rapid service creation and automated service delivery
- **Technology:** Develop the tools necessary to meet existing demands while supporting business transformation
- **Organization:** Ensure that the skill set is available to leverage the technology, deliver the business value and maximize the benefits of both business and technology transformation

Business Transformation

The introduction of both cloud and virtualization technologies provides a foundation for CSPs to change the economics of their business by providing the infrastructure that facilitates the ability to rapidly launch new services, enter new markets

and geographies, as well as new business models, such as flexible pricing schemes based on real-time usage of network resources.

Not only will network transformation enable CSPs the ability to offer all of their services via the cloud, but also public and private cloud services ("x as a service"), as well as an expanded service portfolio to include managed services and IT consulting. Additionally, with SDN as an enabler, CSPs will offer more automated, programmable and self-service applications, allowing customers to easily add or change services, scale bandwidth to meet their changing needs and manage their network, all in near real time.

Utilizing big data analytics, CSPs will be able to optimize the user experience by dynamically adjusting network resources to meet the requirements of a particular service. Additionally, big data analytics will offer information on user behavior and consumption patterns to create new revenue streams.

Leveraging network transformation, CSPs will be able to fully engage in the emerging IoT and 5G to support the wide range of performance criteria (capacity, speed, latency, security, availability, coverage area, etc.) that are the hallmark of these areas. An ecosystem of partners – established through the enablement of open application programming interfaces (APIs) for services – will help to maximize the value CSPs brings to the customer, enabling an even wider range of services, applications and business models.

The ability to achieve successful business transformation will result in an expanded service portfolio, which increases CSP relevance and, ultimately, revenues.

Technology Transformation

The introduction of new technologies such as NFV and SDN provides multiple benefits to CSP networks. First, capital efficiency is achieved by replacing fixed costs with variable costs. Second, operational efficiency is achieved by automating and simplifying key operational process. Third, networks based on these technologies, create an agile service creation environment that is the foundation for innovation.

By implementing virtualization technologies, CSPs will be able to build a more flexible architecture that is programmable and automated, elastic and dynamic, as well as open and interoperable. While big data analytics will provide the necessary intelligence to anticipate not only issues within the network, but the ability to dynamically adjusting network resources to better service customers.

It will be important for CSPs to choose solutions that enable integration with existing infrastructure while embracing an open-source approach that leverages investments from a community of developers and solution providers. This gives CSPs a unified approach to implementation that offers economies of scale, interoperability, reliability and scalability, as well as a shorter time to market. In addition, it enables the creation of an ecosystem of partners that can offer solutions for all customer segments.

The change in economics allows CSPs to serve new customer segments that were once unprofitable (SMBs, new geographies, etc.)

Organizational Transformation

Beyond transformation within the network and the business, another key area of focus is within the organization, including business process, skill sets and corporate culture.

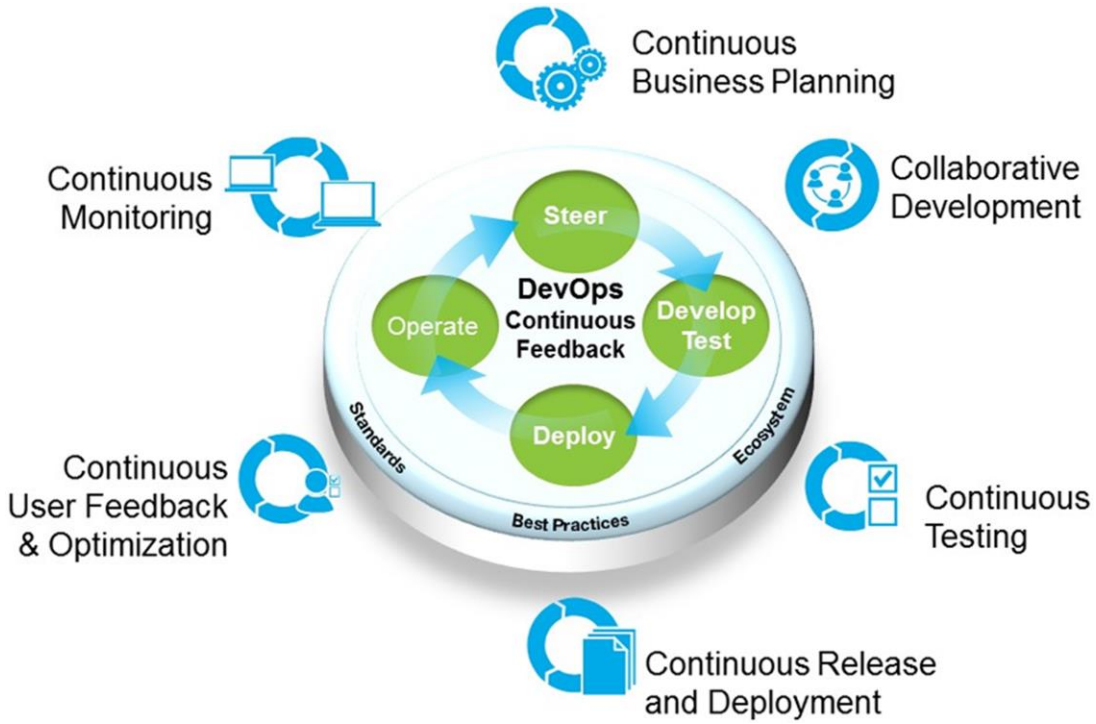
This will require alignment of the transformation vision across both the technical and business sides of the CSP, as well as commitment at all levels of the organization.

From a business process perspective, the introduction of both NFV and SDN simplifies the tasks of building services, as well as defining the workflows that activate and manage services. As such, the role of operations support system (OSS) and middleware management shifts from controlling boxes to controlling software objects. As the environment moves toward a software-centric focus, the need for an internal culture of innovation becomes increasingly important. Furthermore, with services delivered over a programmable platform, the need for software development skills becomes critical.

A DevOps approach puts in place the organization, tools, processes and culture that enables development and operational teams to work collaboratively and iteratively to accelerate the development process. A DevOps environment enables services to be created and offered in days versus months and years. By comparison, legacy waterfall development focuses on defining and then delivering all the requirements of an application, in a sequential fashion. As such, the development cycle is lengthy.

Moving toward an agile development methodology and open platforms for service delivery will help CSPs accelerate the launch of new services and innovation cycles (**Figure 4**), providing the speed required to stay responsive to market requirements.

Figure 4: DevOps Product Development Model



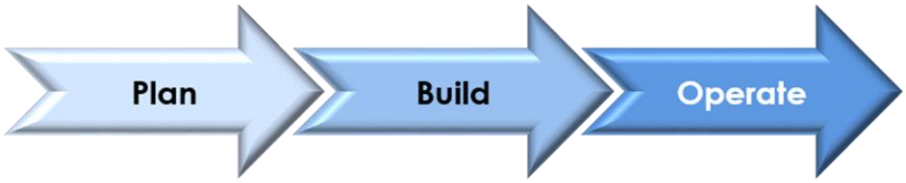
Source: Juniper Networks

Juniper's Approach to Transformation

The ability to achieve a sustainable improvement in performance, build a competitive advantage and establish a clear path for technology evolution, will require CSPs to transform across three key areas: business, technology and organization.

Transformation is a complex process and the risk of not capturing the full potential of its benefits is high. Juniper has helped CSPs around the world make the shift from time-division multiplexing (TDM) to IP and offers the right tools and services to help with this next series of transformations. To begin, Juniper follows the three phases of the Network Lifecycle – Plan, Build and Operate – as a framework for this process (**Figure 5**).

Figure 5: Juniper Network Lifecycle



Source: Juniper Networks

The **Plan** phase involves understanding the business requirements, defining the services and evaluating technology options. Juniper's Assessment Methodology follows a four-phase approach: Requirements, Baseline Analysis, Gap Analysis, and Recommendations and Impact.

The **Build** phase includes three distinct stages: Validation, Development and Trial. The validation stage implements a broad testing protocol against recommended service specifications; the development stage takes requirements from the Plan phase and develops the implementation solutions; the trial stage accelerates deployment by testing market acceptance and impact on sales and operations.

The **Operate** phase performs all the support necessary to meet service-level expectations. It may include support for proactive network monitoring, on-site engineering resources for operational assistance, and/or on-site consultants for potential service enhancements and solution optimization.

Juniper Service Provider Transformation Toolkit

To further aid CSPs in their transformation process, Juniper offers a Service Provider Transformation Toolkit that provides solutions and strategies to help CSPs achieve their transformation goals, as shown in **Figure 6**. An example of one of these tools is Juniper's Service Creation Program, which evaluates and sizes the market opportunity, determines the best new service opportunities, and identifies the most attractive market segments. This is followed by business case development, service development, service launch and demand generation.

Additionally, Junipers offers OpenLab, a collaboration hub that provides resources for innovators that want to build network-integrated application and solutions. OpenLab offers local and remotely accessible software and hardware resources,

coupled with resident educational programs and networking experts, to enable service providers and third-party developers to conceptualize, develop, test and validate solutions that harness automation capabilities and programmability of Juniper NFV solutions.

Figure 6: Juniper Service Provider Transformation Toolkit

Source: Juniper Networks

Conclusion

The ability to compete in this new market environment against innovative disruptors, such as OTT and cloud service providers, relies on the ability for CSPs to transform their businesses, technologies and organizations.

From a business perspective, CSPs must leverage technology evolution and new network architectures to create compelling new services at competitive economics.

From a technology perspective, CSPs must leverage virtualization and cloud technologies to create a carrier-grade, open network platform that can accelerate delivery cycles, drive innovation and reduce operational expenses while minimizing risk.

From an organizational perspective, CSPs must align the transformation vision across all levels of the organization and shift the focus and the skill set from network-centric toward software-centric to create a culture of innovation.

As the telecommunications landscape continues to shift, transformation is no longer an option, but a necessity. A successful transformation will create an environment that can drive new revenues, reset the cost structure and pave the way for lasting relevancy in a highly competitive and changing market.

Juniper is focused on creating solutions for the benefit of CSPs and is well positioned to deliver a commercially scalable portfolio of products and services, both virtual and physical, to guide CSPs through a successful transformation within a complicated environment.