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## The Need for an Agile Services-Driven Network

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The telecommunications industry is quickly reaching an inflection point that is forcing communications service providers to rethink their approach to network architectures. First and foremost, 5G and fiber-to-the-premise buildouts are fueling massive increases in access and transport bandwidth. On the consumer side, there is rising demand for increasingly sophisticated services with defined performance characteristics such as high capacity and guaranteed ultra-low latency performance. These services include cloud gaming, telemedicine, and symmetrical home working, which in turn are fueling even more bandwidth demand. Finally, service providers are experiencing competition from new sources such as webscale content providers like AWS, Azure, and Google Cloud, which are slowly chipping away at provider revenues by offering Internet and cloud connectivity services to businesses.



With how networks are designed today, services are delivered in a pre-defined, non-programmable way. This approach takes an overly simplistic view of services, leaving providers unable to respond to increasingly complex service demands and a competitive environment.

These technological and market changes, however, are causing service providers to consider how they can optimize today's networks to meet tomorrow's demand—while also capturing new customers and reducing churn to new competitors in the space who are able to offer these services more quickly. For providers that are serious about their ability to navigate these factors to remain competitive and meet customer demand, it's time to consider re-engineering the network to be services-driven, and step away from the transport-optimized approach of today.

# The Transition to Services-Defined Networking

At the core of a services-driven approach is the focus on the services that providers deliver, rather than on the network plumbing required to deliver the services. Services dictate which network resources are used, how they connect, and the performance required from these connections. The network then instantiates resources and dynamically adapts connectivity to meet these needs.

The challenge of course is understanding how to design a network that is capable of supporting different performance needs. A single, uniform network that handles all service types would require massive over-engineering and be unreasonably expensive. The alternative—to build and maintain separate networks for each service type—is both incredibly intensive and unreasonably expensive, and would hinder providers' abilities to introduce new service types in the long term.

The only feasible way to design this network is to virtually slice it through a method called network slicing. In this method, a single network offers shared network resources that can be optimized on a service-by-service basis. To create the dynamic control required by this kind of network, a combination of soft and hard network slicing must be implemented.

Hard slices allocate resources through their own dedicated traffic paths, keeping the services they carry fully isolated from others. This ensures that mission and business critical applications are shielded from competing demands on the network resources they use and are guaranteed a certain level of performance. Soft slices, on the other hand, usually compete for resources, such as their position in a buffer queue. As a result, services running over soft slices can only be engineered to have an average level of performance, typically called “best effort,” with performance rising and falling whenever the demand-to-bandwidth ratio for these resources is adjusted.

On a technological level, these networks will require a fully integrated programmable transport layer, composed of both packet and optical capabilities. Service-oriented operations software will provide the intent-driven linkage between the service requests coming from the orchestration layer and the configuration required in the transport layer. Together, technologies and techniques like virtualization, orchestration, automation, analytics, and cloud will create a programmable network that enables network as a service. This will power the transition of a static network to an agile one that proactively ensures the services delivered across the network meet service parameters and policies in the most efficient, cost-effective way—a truly great departure from today's rigid, manual networks.

## Maximizing Profitability with Agile Services and an API Economy

With the massive investment required for building a new network, it's natural to wonder whether providers will see a ROI with a services-driven approach. Looking at the bigger picture of how a services-driven network works, we can see the value in taking this approach. By focusing on frequent but calculated changes to the network, services-driven networks help increase application performance while supporting the rapid rollout of business applications and services. With better performance comes greater customer satisfaction, translating to long-

lasting customer relationships. And, of course, faster deployment of new revenue-generating services translates to faster time to market and bigger bottom lines over time.

Beyond these cause-and-effect outcomes, the transition to a 5G world—one of the driving factors necessitating an agile network for its ability to seamlessly transport data from billions of connected devices—presents a huge revenue generation opportunity for service providers in the form of the API economy. 5G and associated Internet of Things (IoT) will usher in services such as massive machine type communications in smart buildings, city systems, power grids, digital health, and autonomous vehicles. These services will generate massive amounts of data on a consistent basis, which carriers will be able to monetize through application programming interfaces (APIs)—a software intermediary that allows applications to communicate with each other.

This concept is not a new one. OTTs worldwide make massive use of APIs, including Netflix, Google, and Uber. Uber drivers, for example, know where the ride requestor is located through the use of APIs, which pull location information from Google Maps' API.

Telecom providers can benefit from an API economy by exposing their services and infrastructure through APIs to create new revenue streams. They can integrate their services with other platforms, such as e-commerce, healthcare, transportation, and more. This collaboration can lead to new business opportunities, increased customer base, and enhanced market reach.

In addition, telecom providers generate vast amounts of informative data from customer interactions, network traffic, and IoT devices. By exposing APIs that provide access to anonymized and aggregated data, they can monetize this data by offering it to third-party developers, advertisers, or other businesses. This can create additional revenue streams and leverage the value of the data they possess.

Finally, based on their centralized position, telecom providers are in an ideal position to serve as API integrators. They can aggregate data from various API providers and, in turn, provide information in standardized form for analytics, security and Blockchain to application developers.

## Taking the Plunge

Despite the competitive need for and huge revenue potential of agile service network transformation, many operators are reluctant to invest in the architecture required to make it a reality. While re-engineering networks is a challenging and expensive endeavor, providers who offer services with varying bandwidth, latency, and availability guarantees will be rewarded with the ability to quickly deliver new revenue-generating services and business models.

Whether focusing on connectivity services or leading the charge to the API economy, the key to commercial success will be to move fast. By dynamically mapping service intentions to the required network capabilities, agility helps service providers focus more on providing a stellar experience, adding new services, and moving up the value chain, and less on the technology behind these benefits. But the market won't wait; providers should use this time now to define their goals for the post-5G world and plan their network transformation for the greatest business success.