Cloud based networking

Market demands and new technologies drive service providers to continuously evolve network infrastructure

IBM

Contents

Today's challenges for service providers are numerous—having the ability to enable new revenue streams, enabling innovative services, overcoming data and cost growth and enabling customer centricity in services while facing revenue decline that stems from increasing competition from over-the-top providers—are just a few. In order to adapt rapidly to changing demands both in services and scale, a service provider requires infrastructure agility to enable their business to reach their customers as needed, when they need it.

With the goal to help reduce costs and rapidly adapt to the changing demands in services and scale, service providers are turning to the use of Network Function Virtualization (NFV) and Software Defined Networking (SDN) to enable network functions in a cloud environment. NFV/SDN enables the cloud while also enabling a whole new world of networking from the cloud.

Implementing NFV/SDN creates Infrastructure Agility to satisfy the many needs of a service provider that is moving to a cloud environment for systems of engagement, systems of record and systems of insight. NFV/SDN rapidly enables the hybrid cloud environment required but for a service provider, it also enables much more.

NFV/SDN enables a new level of infrastructure agility to enable their business to reach their customers, as needed and when they need it with the network itself, transforming the network, the operations and the business of the network. NFV/SDN creates a whole new business of networking on the cloud and from the cloud, a business of "*Cloud based networking*".

Using the power of the cloud

Cloud based networking opens a new world of innovation for the service provider. Cloud based networking allows a service provider to deliver services to their customer more rapidly and at lower cost, helps decrease the time to value and speeds the ability to scale to meet demands. However, Cloud based networking also opens up a whole new ability to assemble or "compose" new network services, enable new innovation of network services and expose those networking services for further innovation by their customers creating a world of agile network development

Cloud based networking brings IT and networking together working closely to eliminate gaps between multiple domains, locations and vendors to deliver the agility that service providers require. The three key success factors in building and operating a converged cloud infrastructure for Cloud based networking are:

- **One Cloud for Network and IT**—One cloud
infrastructure enabling network and IT with an open
architecture, enabling multiple locations, domains and
platforms
- **Realtime operational support system**—Analytics
enabled operations for fulfillment and assurance to deliver
real-time, zero-touch operations
- **Agile Network DevOps**—Agile network service lifecycle
management enabling network service development from
concept to deployment

Figure 1: There are three key success factors in building and operating a
converged cloud infrastructure for cloud based networking.

One Cloud for Network and IT

One Cloud for Network and IT is the first area of innovation
for Cloud based networking that helps rapidly enable
deployment of functions that are needed internally as well as
the functions used to deliver services externally for mobile and
wireline environments. The One Cloud enables the
environment defined by the ETSI Industry Specification Group
(ISG) for NFV on a fabric of local and wide area connectivity
that is also SDN. One cloud also embraces the opensource
enablement of these specifications through opensource projects
like Openstack, KVM, OpenDaylight and OPNFV. The One
Cloud environment is enabled by dynamic lifecycle
orchestration that when enabled with unified orchestration for
the IT requirements enables the greatest optimization of
resources across the cloud environment for a provider.

The One Cloud is an open, secure hybrid information and
communication technology cloud that takes advantage of the
best of private, public and IT environments to place workloads
where performance, service, costs are balanced—helping meet
the operating objectives of the service provider. The One
Cloud embraces multiple technologies to provide performance
and value that is enabled by a cloud that is:

- **Multifunction**—Enabling multiple functions with both
networking and applications, helping to reduce silos of
virtualization that could sub-optimize the resources as a
whole.
- **Multiplatform**—Providing the ability to utilize compute
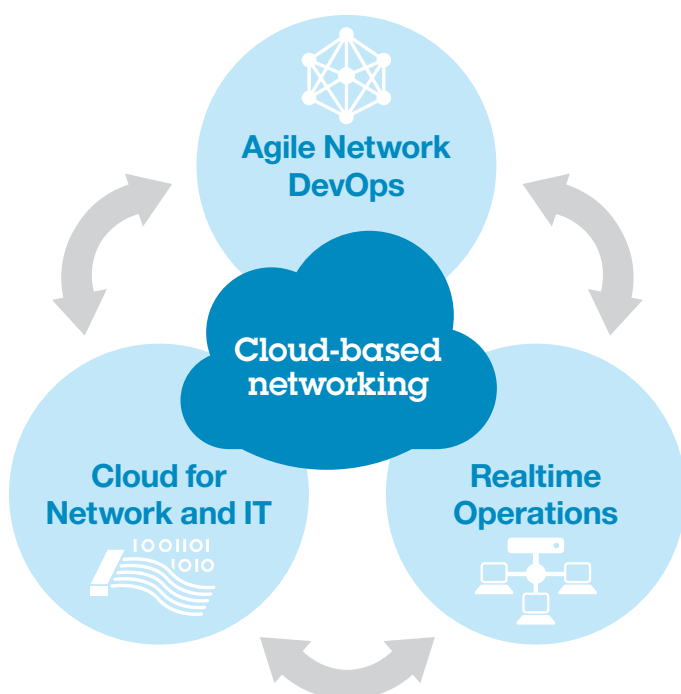for purpose technology to improve performance for both
service and cost.

- **Multidomain**—Providing the ability to allow multiple uses by domain, whether functionally (wireline, mobile, cloud reseller and others) or geographically.
- **Multilocation**—Though treated as a single cloud, multiple locations help increase resiliency and allow placement of workloads closer to where needed.
- **Multiuser**—Allowing for multiple users of a function (such as IP private branch exchange [PBX]) or the cloud.
- **Multivendor**—Allowing the use of legacy environments but also taking advantage of the competition to drive a better price performance.

Realtime operational support system

Cloud based networking requires a new way of operational support. With Cloud based networking occurring at machine speed, the operational systems that were built for manual build out need to be reviewed and enabled for network and system functions that may be scaled out and in or up and down rapidly. Being able to support networking instances supporting a network service that may exist rapidly and for a short time requires a change in the operational support systems (OSS) used today. The OSS needs to bring together the orchestration, the assurance and the fulfillment of the cloud based network in a way that meets the needs of this rapidly changing network environment. Cloud based networking requires a realtime OSS.

Realtime OSS needs to not only happen at the speed of the machine, but ahead of the machine, in a predictive manner to help prevent the problem, rather than resolving the problem. In the cloud based network, the ability to integrate all of this insight in a constantly changing manner requires the use of the machine to provide the analytics and insight, instead of depending on human knowledge and intervention. To enable predictive operations for Cloud based networking requires the use of cognitive operations to help identify the changing patterns of behavior and enabling proactively resolving problems.

Cloud based networking also has the need for supporting both physical and virtual components in one view along with multiple levels of technology across 2G, 3G, 4G and emerging 5G technology. However, there is also a need to bring the operations of the network, the IT and the service together with the user's experience and usage.

By bringing all of these views together, the Cloud based networking environment provides real time service assurance, based on the need of the business, by the network and the user. Decisions to scale, recover or retire resources can be made by more than the availability of a resource or traffic, but also the type of traffic and the experience of the user for a service. This type of operations required by Cloud based networking requires the use of advanced analytics—bringing together the silos of insight that often occur within a provider, as technology and territories are deployed. Real time OSS for Cloud based networking requires analytics driven operations to enable the levels of new network services required.

However, Cloud based networking also requires that operational support have fulfillment occurring in real time. Having one cloud requires the ability to provision the combined physical and virtual network components and have activation of those resources occurring as needed and synchronized with the rest of the cloud for application

requirements. Fulfillment needs to work with an orchestration that unifies the network and IT requirements as not all cloud demands will come through the network fulfillment process. Realtime fulfillment will need to work with a unified orchestration and also with a realtime assurance process that is analytics driven. With this type of fulfillment, the activation of resources needed are orchestrated to be available to provide the network services required. Automating this process with the new capabilities in Cloud based networking, from order to orchestration can help shorten the time required for service provisioning and activation to enable the fulfillment of an order—from days to just minutes.

Agile Network DevOps

The full value of Cloud based networking is realized with the area of innovation that comes by Agile Network DevOps. Agile Network DevOps is now possible in a world of networks that is software-based, in a cloud environment. Previously, providers could work for weeks and months just to enable new services, test new services and deploy new services for operational use. In the software development environment that is available with the cloud today, software is composed rapidly, tested and moved to production and ready for deployment through agile development methods and tools. Cloud based networking opens up the ability to use a similar approach to software-based networking to help rapidly invent new services, update services as well as remediate services.

Agile Network DevOps helps take innovation of a new service from concept to reality. Using agile methods and tools, network services and functions can be composed instead of hardwired. Network services can be tested using the same

virtual environment to allow for rapid deployment of a test environment and traffic at scale and then when the service has been tested the resources used can be commissioned for other uses both in the world of further devops or for operational use in the world of the One Cloud.

Agile Network DevOps also helps in the bringing together the new software integration environment brought on by NFV and SDN in Cloud based networking. With functions now levels of software as new releases and capabilities become available the power of the cloud can be used for software development to manage the various levels of network software, enable the compatibility and confirm the viability of network function combinations that make up the services enabled on the cloud based network.

Agile Network DevOps can also be used when combined with cloud innovation to allow for exposing new network services to an emerging cloud development environment. Network Services created can be exposed to a cloud innovation environment for new areas of innovation for mobile applications, Internet of Things and enterprise enablement. Services can be exposed and integrated with these new areas of innovation rapidly enabling a new speed of innovation by providers and their customers.

Using Agile Network DevOps helps reduce the cost and the time that is required to enable new services while maintaining the governance to enable the service levels expected. Agile Network DevOps helps improve and speed the return on investment in the network. Combining Agile Network DevOps with Realtime OSS creates a whole new end to end ability for network operations through OSS for Cloud based networking.

IBM provides the innovation required by Cloud based networking

IBM brings to market a set of rich cloud foundation capabilities to support Cloud based networking. IBM is a worldwide leader in service assurance products, services for OSS and solutions enable the cloud computing environment coupled with standards based orchestration and leading edge operations powered by network analytics. These capabilities are delivered in IBM Cloud Orchestration, IBM Softlayer, IBM Cloud Manager, IBM urban{code}® Deploy, IBM Rational®, IBM Netcool® Operations Insight, IBM Now Factory and IBM Softlayer.

IBM Network Integration services are designed to build the cloud based network that allows for the environment to be used for network delivery and multiple needs of the service provider. IBM Service Products and Network Innovation Centers enable the environment, the network services and the levels of service needed by those services.

IBM brings a set of transformation and consulting services to enable the business, operations and the support of the cloud based network. Transforming the business, the network, the people and the processes enables the new areas of innovation required to deliver Cloud based networking.
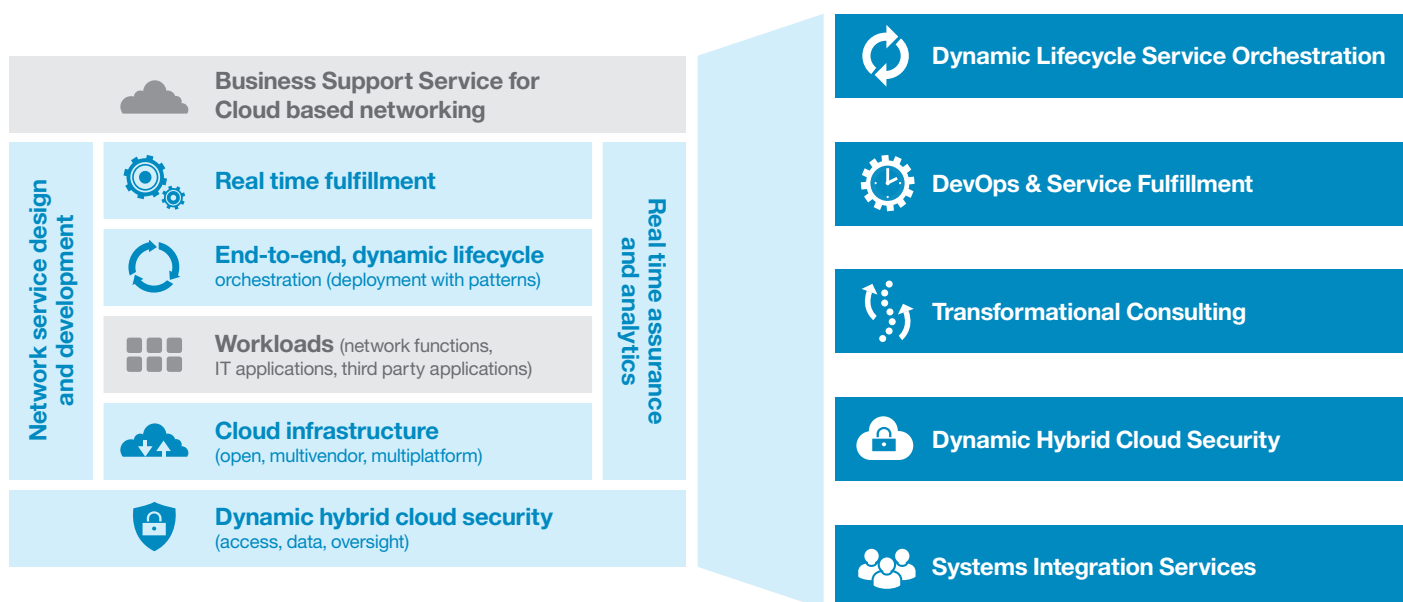

Figure 2: IBM offers a broad set of capabilities required to enable CSPs' journey to open multi-vendor Cloud based networking.

Why IBM?

IBM has the products, proven processes, people and partners that help enable Cloud based networking for service providers, bringing a deep expertise in the areas of cloud, security and analytics along with the business and industry expertise globally to enable service providers.

IBM has a long-term commitment to an open standards and implementation. IBM is a member and leading contributor to OpenStack and a platinum member of OPNFV. IBM is a founding member of OpenPower, Open Daylight and supports OASIS TOSCA, as well as ETSI NFV and MEC ISG's.

IBM has a growing ecosystem of partners and can be a vendor-neutral alternative for Cloud based networking functions. IBM publishes patterns for reuse, and embraces a growing ecosystem of partners that support this open environment. The deep transformation and integration experience from IBM helps with the business and technology changes that inherently come with Cloud based networking. These services are both pre-defined and customizable for a carrier's needs. IBM also has deep research capabilities around the world in the areas of cloud, security, analytics and Cloud based networking that is innovating new capabilities for Cloud based networking.

For more information

To learn more about IBM cloud-based networking solutions for the telecommunications industry, please contact your IBM representative or IBM Business Partner, or visit the following website: **ibm.com**/gbs/contact.