



Global Activities of NTT Group

NTT Communications Corp.— Acquisition of Virtela and Provision of Arcstar Global Network Services

Takashi Ooi

*Director, Member of the Board, and Head of Network Services
Division, NTT Communications*

Abstract

In May 2014, the Network Services Division of NTT Communications and Virtela Technology Services Incorporated jointly became the first provider to announce the global deployment of NFV (network functions virtualization)-enabled cloud-based network services. This article highlights how the new technology can address enterprise pain points and how it has benefited NTT Communication's customers since the launch.

Keywords: NFV, SDN, cloud

1. Introduction

In January 2014, NTT Communications (NTT Com) finalized the acquisition of Virtela Technology Services Incorporated (Virtela), one of the leading innovators in global cloud-based networking (**Photo 1**). This helped expand the service coverage of Arcstar Universal One—NTT Com's enterprise network service—to 196 countries/regions worldwide. Moreover, Virtela has brought in expertise that will accelerate NTT Com's network functions virtualization (NFV) and software-defined networking (SDN) development. The acquisition has delivered a clear message that we will lead the way to transform the traditional carrier business into a cloud-like service model.

Vendors and service providers have long been evaluating SDN and NFV with the aim of building a more flexible, agile network infrastructure that addresses enterprise needs. However, the evaluations have been limited to laboratories and field trials, with very few commercial deployments. Just a few months



Photo 1. From left: Ron Haigh, President and board member at Virtela; Vab Goel, Founder and Chairman of the Board of Directors at Virtela; and Takashi Ooi, Director, board member, and Head of Network Services Division at NTT Communications.

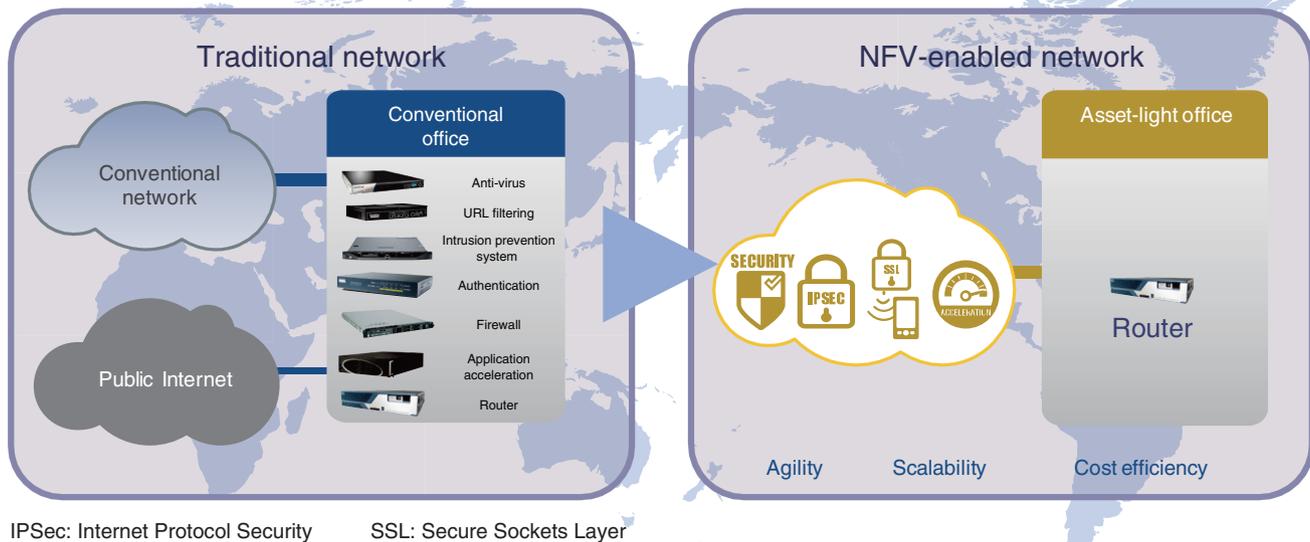


Fig. 1. NFV-enabled network.

after the completion of acquisition, NTT Com and Virtela announced the global launch of an NFV-enabled cloud-based network service. NTT Com has thus become the first global carrier to commercially deploy NFV-based service for enterprise users.

2. Enterprise wide area network (WAN) pain points today

The typical enterprise network now comprises hundreds or even thousands of network devices: firewalls, intrusion detection/prevention appliances, application accelerators, and more. They are typically proprietary hardware running a vendor-specific operating system. They are designed to be resilient and reliable, but they are also inflexible in the sense that it takes weeks and months to deliver them. Furthermore, enterprises must bear the capital cost of purchasing these devices, as well as the operational expenses of managing them. Recruiting skilled staff locally to operate the devices can also be challenging, depending on where the branch office is located.

Despite the competitive environment we are faced with today, traditional enterprise network services cannot scale quickly and flexibly to meet the changing business needs. Everyone is suffering: end-users are experiencing poor application performance and a lack of support for flexible work arrangements; network administrators are struggling to cope with configuration requests that can take days or weeks to

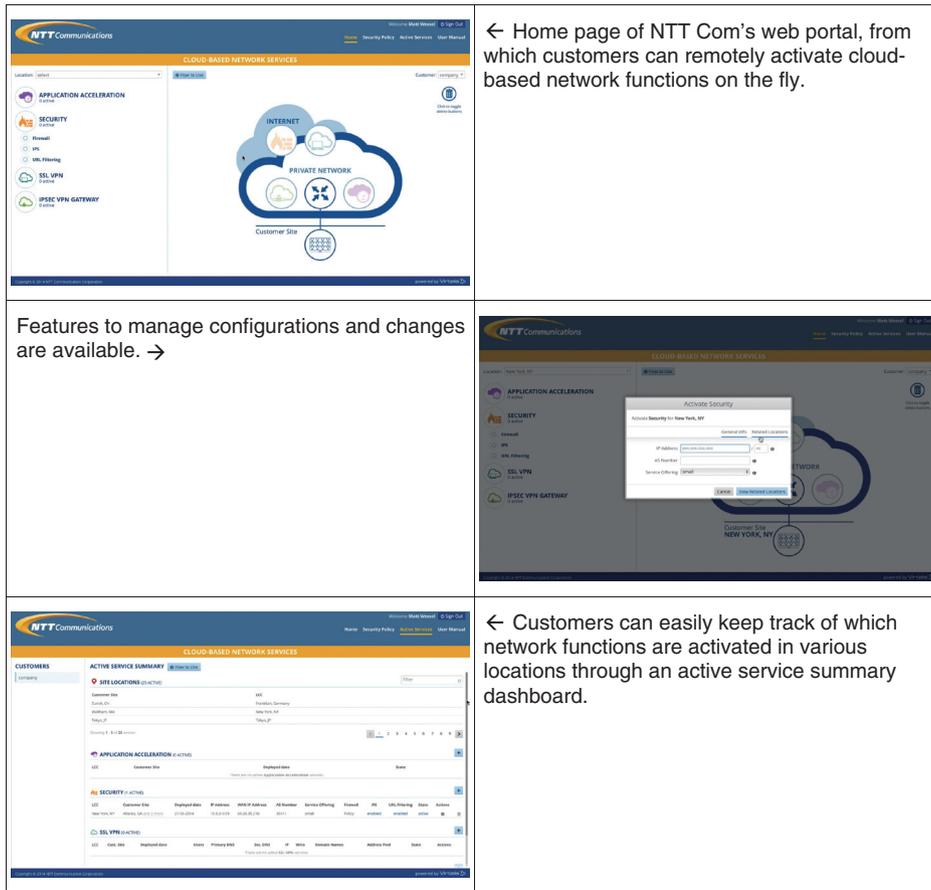
handle while keeping track of multiple devices distributed worldwide; and security teams are fighting a war against 24/7 security threats. Information technology (IT) directors frequently have to overprovision, for instance, by investing in a heavy-duty firewall to provide temporary connectivity for a fixed-term project office.

Two new approaches to network architecture could help to transform networks into something more cloud-like. It offers agility, greater flexibility, and reduced complexity to help enterprises keep up with business.

3. Network functions removed from customer premises with NFV

NFV is an initiative by the European standards body, ETSI (European Telecommunications Standards Institute) to provide a technology akin to server virtualization. It removes the operating systems of proprietary hardware such as firewalls or application accelerators, and moves the functions to an array of standardized servers within our point of presence (POP). Each of these servers can also be virtualized so that we can add more processing power and virtual ports at will, and the software controlling the data flows is always up-to-date and configurable via a simple interface.

This means that our customers will no longer need to purchase and manage thousands of network devices themselves (Fig. 1). Network functionality can be



← Home page of NTT Com's web portal, from which customers can remotely activate cloud-based network functions on the fly.

Features to manage configurations and changes are available. →

← Customers can easily keep track of which network functions are activated in various locations through an active service summary dashboard.

Fig. 2. NTT Com's SDN-enabled web portal.

delivered as a service from our private network. The only onsite equipment needed is a router, and this in future may also move to the carrier's POP.

4. Friendly support from SDN-enabled web portal

Another technology supporting the cloud-based network is SDN, which is frequently mentioned in the same breath as NFV. The two technologies are complementary; if NFV is an abstraction of the network services, SDN is an abstraction of the network architecture.

SDN breaks a network down to its constituent parts. The network control is decoupled from packet forwarding. In a traditional network device, the control layer needs to be constantly updated when there is a change in network paths so that it can direct packets onwards. With SDN, a centralized controller has a complete view of the entire network, and knowledge

of all network paths and device capabilities sits in a single application. In other words, all of the network functions can be programmed remotely through a simple web portal. Our customers would only need to login to the portal and make a few clicks to provision the needed function per site. This reduces the service deployment lead time from weeks to minutes (Fig. 2).

5. Benefits of NFV and SDN today

Arcstar Universal One—NTT Com's secure private network service for enterprise users—now operates in 196 countries, with NFV and SDN at its core. NFV and SDN combined are transforming the network in the way cloud services is transforming the server infrastructure (Fig. 3).

The service enables our customers to become more agile and responsive to end-user needs with real-time activation and configuration changes through a web portal. New services can be provisioned in minutes as



Fig. 3. Arcstar Universal One—NTT Com’s secure private network service for enterprise users.

opposed to weeks and/or months, meaning that enterprise pain points relating to onsite service deployment are removed.

The web portal also enables customers to scale resources up and down without having to purchase or manage additional devices. This means that IT resources are the right size for each situation, and customers save costs by only paying for what they consume during their required period. In fact, one customer has reported that they have reduced their original network spending by approximately 40%. Reducing the capital and operational expenses means that a portion of the enterprise IT budget can be allocated to strategic projects that support business growth.

NTT Com’s cloud-based network services available today:

- **Cloud-based secure web gateway**—Offers firewall, intrusion prevention system (IPS), and URL (Uniform Resource Locator) filtering options, and enables secure Internet off-load for branch offices via the nearest NTT Com gateway. Enterprises can achieve better end-user experience while ensuring consistency in their web security policy across distributed branch offices.
- **Cloud-based application acceleration**—Optimizes application performance over the Arcstar Universal One Network, enabling global ICT (information and communication technology)

consolidation and faster access to cloud-hosted applications by improving application response times and improving throughput.

- **Cloud-based SSL (Secure Sockets Layer) VPN (virtual private network)**—Enables remote workers or partners using any device with a browser to access the enterprise network resources securely, for improved productivity regardless of location.
- **Cloud-based IPSec (Internet Protocol Security) VPN gateway**—Establishes quick enterprise network connections from any site with Internet access. Connections can be customer-enabled so are ideal for enabling temporary connections and/or third party access.

6. Approaches to address enterprise network needs in the future

Enterprise network architectures have changed significantly over the past years, from hub-and-spoke topologies based on leased lines to fully meshed multiprotocol label switching (MPLS), and now to a hybrid WAN model that uses both MPLS and Internet.

Not so long ago, an enterprise would implement hybrid MPLS-Internet connectivity in an *active-standby* configuration as a back-up solution for fairly large sites. However, over the years, enterprise business needs for connectivity have evolved due to the emergence of public cloud services and the desire for

greater mobility. Network administrators can no longer fulfill enterprise business needs by sourcing a single MPLS connection between datacenters and branch offices but are required to design a hybrid network within the given budget. To address these challenges, NTT Com now delivers a hybrid WAN in an *active-active* model, with a path selection solution that enables our customers to identify the end-to-end path for specific applications.

We will also be launching Multi-Cloud Connect, which will improve the performance of cloud-hosted applications. The service provides direct connection to major cloud service providers, including Amazon Web Services^{*1}, Microsoft Azure^{*2}, and Office 365^{*2}, from our MPLS network. All of these services are accessed via the Internet, meaning that end-to-end performance is often degraded due to traffic congestion and latency issues. Multi-Cloud Connect will

improve application response time by enabling traffic to flow over secure, high performing MPLS and bypassing the Internet. In addition, Multi-Cloud Connect is also connected to Enterprise Cloud—NTT Com's private cloud service—to support the hybrid cloud environment.

Virtela operates today as a primary global vehicle, operating Arcstar Universal One services and providing the value-added features. Together, we will continue to strive to be the front runner in innovation and deliver pain point solutions for enterprises.

*1 Amazon Web Services is a trademark of Amazon.com, Inc. and its affiliates in the United States and other countries.

*2 Microsoft Azure and Office 365 are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.



Takashi Ooi

Director, Member of the Board, and Head of Network Services Division, NTT Communications Corporation.

He received an MBA from Boston University, USA, and an M.S. in physics from the University of Tokyo, Japan. He has contributed to the success and innovation of NTT for nearly 30 years, having built his career entirely within the parent company and its subsidiaries. Over the course of three decades, he has gleaned direct insight and experience in the many facets and functions of the global organization's operations. He has led the network installations of multinational companies and contributed to the development of network services and international relations with business partners including regional/local carriers. In 2013, he oversaw the post-merger integration process of NTT Communications' complete acquisition of Virtela, a leading cloud-based network services company, which successfully resulted in an enhanced portfolio of services for enterprise customers.



Vab Goel

Founder, Chairman of the Board, Virtela Technology Services Incorporated.

He received a B.S. in electrical engineering from George Mason University, Virginia, USA. Prior to founding Virtela in 2000, he served as Vice President of Internet protocol (IP) Network Engineering and Advanced Technology at Qwest, where he created and implemented the Qwest IP Network and Data Center Strategy designed to enable seamless services with open standards and a strong customer focus. He also served Qwest as Vice President of Emerging Technologies, a group he also founded. In that position, he was responsible for identifying new networking technologies. He also fostered strategic relationships with start-up companies. Vab also worked at Sprint, where he was a principal architect for the Sprint Internet backbone and contributed to the company's IP and optical network strategy. He is also a venture capitalist at Norwest Venture Partners (NVP), where he focuses on mobile, security, cloud, networking, services, and Internet investments. He serves on the board of World View Enterprises and Virtela. He also works closely with Apigee, Pontis, and Mist Systems.



Ron Haigh

President & Founding member, Virtela Technology Services Incorporated.

He received a B.E. in electrical engineering from the University of Missouri-Rolla, USA, and an M.E. in electrical engineering from the University of Texas at Austin, USA. He has an extensive background in developing breakthrough technology solutions in the fields of cloud computing and high performance networking. Prior to becoming a founding team member at Virtela, he was a senior member of the technical staff at Qwest and a group leader at Lawrence Livermore National Labs (LLNL). While at Qwest, he drove the industry's first all-optical network strategy and solution. During his years at LLNL, he led projects for multiple DoE (Department of Energy), DoD (Department of Defense), and DARPA (Defense Advanced Research Projects Agency) programs in the United States, and received DOE's Award of Excellence. He holds five patents.