

Capitalizing on Telco Cloud in the Era of Digital Transformation

By: Susana Schwartz

Microsoft Azure is [impressing analysts](#) with double-digit growth in its commercial cloud services during the past year, working with carriers that are aggressively pursuing digital transformation, such as AT&T, Verizon, Telstra, Telefonica, and Deutsche Telekom, as well as technology providers that possess a deep OSS/BSS acumen, such as WeDo Technologies, Amdocs and Apttus. Pipeline had the opportunity to talk to Microsoft's Eric Troup, CTO, worldwide media and telecommunications, and Rick Lievano, worldwide director of industry technology strategy, telecommunications industry. Below, we summarize some of the key trends driving the move to public cloud in telecom, and how Microsoft Azure is relevant in its deepening commitment to telecom, open source, and telecom-related standards.



Nearly a century ago, Nikola Tesla anticipated, "When wireless is perfectly applied, the whole earth will be converted into a huge brain." Today, the company bearing his name can do over-the-air software updates to fix cars that would otherwise have to go to dealers or mechanics during recalls or engine problems.

As with Tesla in the automobile industry, GE in industrial IoT, John Deere in precision farming, or any of those driving digital innovation, it is cloud-driven, software-defined platforms that enable what Chetan Sharma coined as "[connected intelligence](#)." Billions of end points communicating the data of "things" will further advance brilliant factories, telemedicine, smart cities, connected cars, augmented and virtual reality, robotics, AI and everything that characterizes the digital economy. That digital economy will have a total potential economic impact of \$3.9 trillion to \$11.1 trillion per year by 2025, [according to McKinsey Global Institute](#).

At the heart of that economic impact are the communications service providers (CSPs), network and mobile operators that own not only the networks, but the communications enablement and management systems that all enterprises and web-scale, digitally inspired companies will need to connect, collaborate and innovate.

Business leaders in all sectors will build "communications clouds" (a.k.a. "telco clouds"), which will elevate communications as an enabler to every feature or function affecting customer experience (CX). That will be important to all sectors moving on the continuum toward on-demand, customer-configured services and zero-touch provisioning and deployment of services.

CSPs have a chance to capitalize on this enormous opportunity by helping enterprises seeking to integrate text, voice, video, chat, and screen sharing into all aspects of CX (internal for employees and external for customers and partners), as well as automate, orchestrate, analyze, and improve processes and interactions.

Capitalizing on that opportunity will depend on how quickly CSPs move toward hybrid cloud, as many today are building multiple, separate clouds in silos — usually by business unit. This approach often leads to bespoke application implementations and future operational pain when trying to migrate applications across cloud infrastructure for scale, cost reductions and efficiencies.

In anticipation of those pain points, CSPs are increasingly resisting vendors and solutions that will lock them into a single environment, as the very purpose of becoming software-defined digital service providers is to knock down walled gardens that promote siloed OSS/BSS architectures and NFV infrastructure managers.

Hybrid Cloud will be the Foundation for Multicloud Environments in Telecom

"Historical and sovereignty concerns have led CSPs to be particularly protective of their data, so data governance is a constant in everything they pursue in the digital world," said Rick Lievano, worldwide director of industry technology strategy, telecommunications industry.

Indeed, CSPs are notorious for wanting to maintain control, and as such have traditionally kept critical data and functions on-premise, especially when relevant to sensitive customer, regulatory, licensing, compliance, or security data.

"CSPs are still protective, but seeking more choices in how they can implement their applications in the cloud, wanting the flexibility to migrate applications and data among private and public clouds at will," added Lievano.

As a result, hybrid cloud may ultimately become the platform of choice for telcos wanting to participate in tomorrow's multicloud environments, in which all clouds will have to interoperate. Microsoft Azure is banking on the belief that software-defined cloud approaches will prevail, as they enable digital ecosystem platforms to either live in one datacenter or to span multiple datacenters.

"This will foster rapid assembly of cloud resources into tenant overlays and service chains," said Eric Troup, CTO, worldwide media and telecommunications. He believes that within their own environments, and through the cloud offerings they open up to enterprise customers, CSPs should continue to advocate for the choice to build new applications directly in their own private environments or in virtual data centers. They should work with their vendors and partners to create seamless connections between virtual environments and the dedicated environments in which legacy applications sit. "Then, they can achieve the flexibility and agility needed to test services before going into production," he added.

Lievano proceeded to outline key characteristics CSPs should seek in their evolution toward hybrid cloud:

Expansive Ecosystem

In terms of scalability and interoperability, there must be support from leading ISVs with specific vertical expertise. As cloud capabilities are extended to leading telecom vendors, there is a transformation of how they view their products and how their CSPs customers do as well. Microsoft Azure partners WeDo and Aptus explained how their views are evolving with cloud:



The advertisement features a dark blue background. At the top, the text "New Multimedia Research Center" is displayed in white. Below this, there is a graphic of a document with a bar chart and a pie chart. To the right of the graphic, the text "Search OSS/BSS topics across various media types" is written in orange, followed by "Company Brochures, Analyst Reports, Whitepapers, Videos and more" in white. A red button with the text "Click here" is positioned below the text. At the bottom of the advertisement, a dark blue banner contains the text "Pipeline Research Center - Start Your Search Today!" in white. Below the banner, a light gray bar contains the text "Click this ad for more information" in gray.

"We are involved in a very new approach, as traditionally, telecom fraud management software vendors didn't provide CSPs the full access to their systems without a certain amount of investment. We have come to see the importance of allowing customers that 'aha' moment, where they realize they can have an always-updated cloud FMS," said Rui Paiva, CEO of WeDo

Technologies. "We have our fraud management product up and running in a cloud environment, and now CSPs can test it before buying it," said Paiva, explaining that by joining forces with Microsoft Azure, WeDo has been able to build an elastic architecture that onboards a new customer in less than two minutes. It also auto scales through the use of Large-Scale Container Orchestration with Kubernetes.

Kevin White, vice president of partner alliances at Apttus agrees that cloud is helping vendors achieve their customers' goals. "The telco industry is depending on innovation in the cloud and CRM more than ever before. The industry is being challenged to clarify its strategic identity while modernizing operations to address both internal and external CX." For some of its customers, Apttus has provided a series of Azure-powered solutions that allow them to simplify their revenue models and business operations, as well as achieve other capabilities, such as: configure and price complex bundles, drive personalized services and product recommendations, provide customer self-service portal capabilities and even offers full intelligent-agent capabilities. "This has all become part of a comprehensive, omnichannel strategy," added White.

Whether time to market, agility, CX, or other objectives, it is becoming increasingly important for CSPs to consider not only the strength of their cloud platforms, but the breadth of the ecosystem so that it becomes possible to leverage vertical industry expertise for more comprehensive and compelling cloud offerings.

Multitenancy

As CSPs build content delivery that is truly multicloud and multiservice in nature, service providers have to consider multitenancy and understand the differences between the tenant and platform — the platform (PaaS, IaaS, bare metal) managing its own resources and OSS responsibilities, and the tenant (an application hosted on the platform) following software architecture best practices to optimize operations. IT workloads, digital services and 5G evolved packet core (EPC) virtual network functions (VNFs) are examples of tenants.

CSPs will want to maintain a distinct separation between the tenant, such as the VNF or service orchestration layer, and the platform resource management and orchestration layer. The VNF software must be truly cloud aware and portable across cloud platforms. In their forays into cloud, CSPs should first look at network functions that are most easily rearchitected to be cloud aware. Then, they can run optimally as SaaS on a multitenant "commodity cloud," with the more difficult, low-latency control plane VNFs addressed in a second or third wave.

Location and Footprint

While location may not seem incredibly relevant to cloud offerings, the ability to leverage data centers anywhere in the world with hybrid capabilities is essential, particularly when operating in places where regulations dictate that data reside in-country, not to mention the critical importance of privacy, compliance and transparency. Location also has a significant impact on latency, making datacenter proximity another key consideration.

"If you consider Azure's got the largest regional DC footprint, with 40 regions — more than AWS and Google combined — it is easy to see why it's important to CSPs that want data and apps in-region," said Lievano.

He noted that with the recent release of [Azure Stack](#), an Azure Cloud can be collocated in any CSP datacenter in any part of the world, extending Azure's reach beyond its 40 regions and into Timbuktu.

Sovereign Cloud

For extremely sensitive data, it is important that cloud provide service providers the option for "sovereign clouds," which would ensure workloads and underlying data are managed by data

trustees. Trustee access is secured through sophisticated key systems, as Microsoft does with [Microsoft Cloud Germany](#), a sovereign cloud operated by a German data trustee. Another examples is the [Microsoft Azure Government cloud](#), a sovereign cloud exclusive to the U.S. government. These are examples of clouds that are managed independent of the service provider for regulatory reasons, yet they still provide localization for regional cloud applications.

Security and privacy

Bullet-proof security is a mission-critical mandate in cloud environments due to the evolving and increasing threat landscape. The critical security capabilities to seek include:

- Managing and controlling identity and user access;
- Encryption of data, communications, and operation processes;
- Secure connections among virtual machines (VMs) to one another and to on-premises datacenters; and
- Threat management through anti-malware for cloud services and VMs, as well as intrusion detection, denial-of-service (DDoS) attack prevention, regular penetration testing, and data analytics and machine learning tools.

In terms of security, CSPs must concentrate on vendors and partners that prioritize security.

"Microsoft Azure constantly strives to be the most comprehensive in terms of security certifications in the cloud," noted Troup. Indeed, Microsoft Azure was the first to conform to ISO/IEC 27018 — the only international set of privacy controls in the cloud. Additionally, the company [has procured more security and compliance certification than any other cloud provider](#).

"We make extensive investments in the area of security, privacy, and compliance so that they are built right into our platform," agreed Lievano, noting Microsoft Azure has the foundational technology "from the decades of experience running some of the world's largest online services." He added that security and privacy are baked into everything from code development through to incident response, and that Microsoft Azure continuously participates in international compliance programs that have independent verification.

In addition to security, Lievano urges that CSPs work toward automated policy enforcement across clouds, with an emphasis on orchestration across public and private domains. This, he believes, will be critical to streamlining operations, optimizing costs, and rapidly developing applications at scale.

Orchestration Across Public and Private Clouds

"The cloud environment itself is becoming a part of the greater orchestration and management story, as CSPs look to deploy and manage applications, without friction, across both public and private clouds," stated Lievano, who explained that would become particularly important in the evolution toward 5G and hyperscale cloud environments that support digital services. As mentioned before, those services will require communication among literally billions of devices and the endpoints for IoT, augmented reality, connected car, and other use cases that will exist in a distributed cloud.

For these reasons, Microsoft believes CSPs will move to cloud environments in which they can combine hyperscale cloud (big datacenters) with their own 5G clouds, and then workloads at the network edge. "We call it, '[the intelligent edge](#),' where billions of devices will come on to networks through the IoT and other use cases like cognitive services," noted Troup.

This is paramount to the growing number of apps and services that cannot tolerate latency, as in life-and-death scenarios with [smart health](#) or driverless vehicles, the sophistication of orchestration among devices, 5G connectivity, edge cloud computing and big cloud computing. "These are the scenarios that drove us to create [Azure IoT Edge](#), so that developers can run on the device some of

the same code they currently run in the cloud—a runtime that works on Windows and Linux, requiring minute amounts of processing power, such as that available on Raspberry Pi.”

Open Source

As CSPs work toward seamless and frictionless orchestration across multiple platforms, Microsoft Azure has made tremendous strides in adopting and leading Linux and open source efforts. “We have become a top Linux contributor, with two out of three new workloads on Azure being some variant of Linux,” pointed out Lievano. [“We even made Linux Bash available to developers on Windows 10!”](#)

Today, more than 40 percent of VMs running on Azure are open source, and Docker containers are used as part of the Azure [Service Fabric](#) orchestration. [Microsoft supports Kubernetes, containers and other non-Windows architecture approaches and DevOps tools](#). “Microsoft is a top contributor to GitHub, with 60,000 developers working there and contributing fixes back to GitHub, and we will continue to support a wide range of architecture approaches and software orchestration down to the container level,” added Troup, who believes that in addition to committing to open software development, CSPs should seek cloud partners that are entrenched in standards development so that cloud plays a role in those standards.

Microsoft is also walking the walk in standards-based, software-defined service delivery, such as that evolving under the TM Forum’s Digital Ecosystem Reference Architecture (DERA); ETSI MANO and Open MANO work, as well as supporting and contributing to: Open Network Automation Platform (ONAP) and other key open cloud organizations such as [Cloud Foundry](#) and the Cloud Native Computing Foundation, which create open source building blocks for next-gen cloud.

Building the Telco Cloud, Together

As Microsoft Azure, its partners and its customers work to achieve the above objectives, the challenge will be keeping pace with the accelerating advancement of hyperscale cloud platforms and the latest software architecture and DevOps trends. “That is difficult to do, so going it alone makes no sense,” added Troup.

He believes most CSPs recognize a move toward public cloud is the optimal way to access the resources and functionality they would otherwise struggle to build and deploy in house. This is true not only in telecom, but in all industries where demands for security, reliability, hyperscale, agility, and adaptability are growing. Those demands will further drive interest in public cloud services, which Gartner predicts will reach [a total \\$246.8 billion in 2017, up from \\$209.2 billion in 2016](#).

CSPs will certainly be a part of that momentum, as the public cloud will be the fastest and most efficient way to leverage the resources they need. “CSPs want to play a significant communication-enablement and management and orchestration role in the era of the IoT, robotics, AI and [Cognitive Services](#). We believe hybrid cloud models will be the surest path for those that want to become digital service providers,” said Lievano.

Already there is evidence of that fact, as AT&T is integrating with Microsoft Azure to help IoT developers quickly build IoT solutions using AT&T IoT Platforms and to build [hybrid options that offer the best of both public and private worlds](#). Also, [Telefónica](#) is revolutionizing the way it interacts with customers by leveraging Microsoft Azure and its Cognitive Services.

[“There are many examples of how CSPs are partnering with Microsoft,”](#) says Lievano of the increasing interest in Microsoft Azure. “They want to be free of dependence on server acquisition, provisioning processes, and high costs.”

CSPs also want to speed the deployment of innovative communications and cloud services to their enterprise customers. Public cloud platforms will bring speed-of-innovation advantages to CSPs, freeing IT staff from having to deploy, patch, and support on-prem apps and freeing marketing to innovate with increasingly compelling and personalized digital services.

As these trends take shape, it will be clouds (a cloud of clouds) that enable the multitude of devices and next generation use cases to come to fruition. The momentum that Microsoft is experiencing related to cloud is an indication CSPs are ready to capitalize on the advantages of the cloud. Behind that momentum lie a specific set of key criteria that are required for the unique specification for the telco cloud. Microsoft has embraced these principals in Azure, even when it appears the company is shifting from its traditional approach (as with its embrace of open source).

Microsoft is also uniquely positioned for the telco cloud, with a special combination of deep domain expertise, advanced cloud technology, and broad telecom ecosystem. It has been focused specifically on developing an open, multivendor, hybrid cloud and commodity offering for telco. Microsoft's approach is being well received by both CSPs and analysts alike, as they see its approach as a key to successful digital transformation at the right time. And timing is everything, as more of these once future use cases are becoming a reality each day, and the time to capitalize on them is now.