

## The next act in cloud computing

*Re-imagining the network as part of the cloud will both create and destroy value in the telecoms sector – it's time to start exploring the possibilities*

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The internet and cloud services – collectively “the web” – have become the key enablers of both the digital and real economies. Their impact can be felt in countless new applications for commerce, entertainment, news, and social networking, as well as many new forms of innovative communications, for example Streamweaver – a social multi-angle audio and video recording amongst thousands of others. The success of the web has resulted in a fourfold traffic increase in the past five years. And, as a result of exponential growth in the number of connected devices, traffic will continue to grow at a similar pace, driven by an insatiable appetite for video content from OTTs<sup>1</sup> from Facebook to Netflix. However, this continued expansion is at risk: the underlying “best effort” distributed architecture of existing networks is ill-suited to highly variable new media types and time-sensitive traffic on such a large scale. This fact is already evident today to anyone trying to use most OTT web applications for voice, music or video services.

### The centralized management model

Faced with this challenge the debate has now shifted from what and whether to fix, to how and when to fix. In this process a handful of visionary carriers are busy re-imagining the future of networking in the cloud era. This group, which includes Deutsche Telekom, British Telecom, Telefónica, Verizon, and NTT, among others, has decided to rewrite its own future. Under the auspices

The cloud and the internet form the backbone of global commerce and have enabled countless new businesses and innovations. The network behind it, though, has grown in an unplanned way, and consequent weaknesses in the architecture of the web must be addressed. The telecoms industry has therefore decided to disrupt itself to secure the future. In this article the authors examine why the industry has chosen this path and how by re-imagining their networks as part of the cloud they could create significant new value, both for companies engaged in web commerce and for themselves.

Picture by Kts / dreamstime

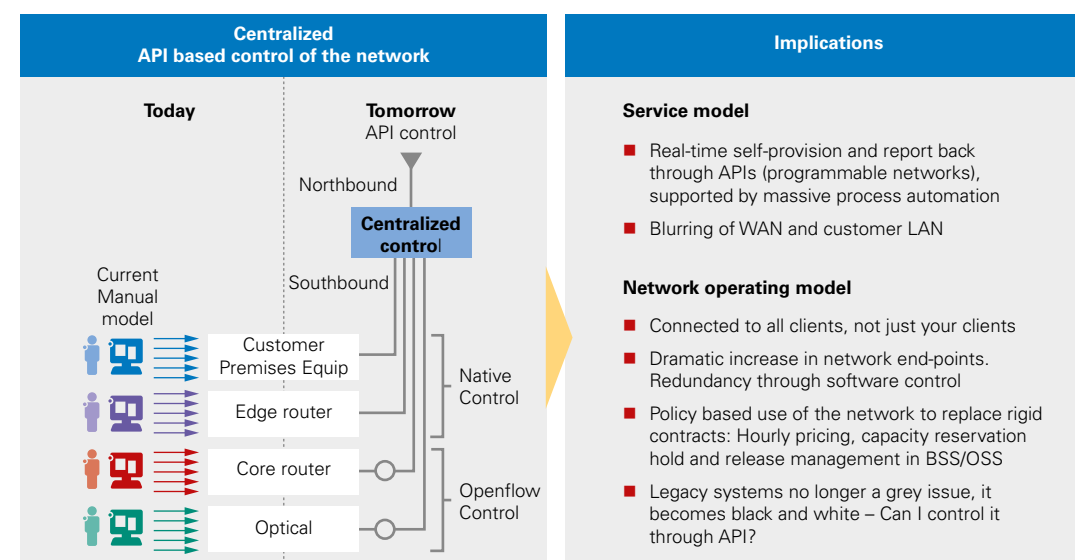
<sup>1</sup> “OTT” refers to Over-The-Top: Any app or service that provides a product over the Internet and bypasses traditional distribution

of the Open Networking Foundation and the European Telecommunication Standards Institute NFV, this select group is attempting to transform the industry from within, drawing inspiration from the internet giants' technology and operating models. A central feature of this involves substituting proprietary networking equipment with software to enable "centralized management" of the network, running (as far as possible) on standardized hardware. This does not mean that functions built into proprietary equipment are no longer required; on the contrary, in the end-state, these functions will be fulfilled using the same "software-defined" and "application-virtualization" techniques that are common practice in the cloud, allowing the network to become an integral part of the fabric of the cloud. Effectively, these carriers have decided that the way forward for the telecoms network is to adopt non-carrier-grade or not-engineered-for-carrier-networks IT technologies and operating practices. This has the potential to be hugely disruptive and transformative.

What can we expect from the network-enabled cloud? It's still early days to know the exact details. However, what we can say is that moving from the "distributed model" towards "centralized control" of the web promises to be no less exciting than the original development of the cloud and the Internet themselves. Implemented correctly, the move would allow a step change in the customer experience, ensuring that traffic is moved smoothly from data centers to customers' PCs, tablets and mobile telephones. This becomes possible because web applications will be able to talk not only to "virtualized" computers and storage resources in the cloud, but also to the underlying router or switches that connect to the end user device. This enables them to request or manipulate services provided by the underlying network, and also to expose the state of the network back to the web application. Some of the implications are shown in the table below.

### Driving the change

To help define the roadmap for the future, Arthur D. Little is collaborating with Bell Labs to build the economic case for change. Our analysis shows that early adopter carriers will enjoy significant



API: Application Programming Interface  
BSS/OSS: Business Support Systems/Operations Support Systems

Table 1 Schematic of future network and implications of network automation

Source: Arthur D. Little

operational efficiency through the implementation of standardized equipment designs, and will be able to reduce headcount as a result of end-to-end network automation. Over time we expect this high level of automation will translate into new types of network-based services. These services, enabled by end-to-end control, will allow the network to be manipulated by web applications themselves in self-defined, instantly created virtual private networks. However, these could also end the one-to-one relationship enjoyed today between carriers and their clients. Herein lies both the opportunity and the greatest risk of self-disruption for the telecoms industry and its customers.

To shape the agenda, we see five broad action items for carriers and their clients to drive change:

1. Thought leadership on the **compliance issues linked to the use of cloud computing**. Of particular importance is how to measure and compare these with the existing baseline of outsourced and/or in-house data centers.



2. Focus on **developing the use cases** for the adoption of next generation network services through industry forums, as a precursor to designing technical and operating models.
3. Define the **technical requirements, standards, certification processes and architectures** that can satisfy compliance, as well as operational control, data security, localization and privacy across different industries.
4. Align the evolution of **network service catalogues and business models** to ensure timely and relevant investment in new platforms and systems as well as the retirement of legacy network systems.
5. Finally, **build alliances and/or joint ventures amongst carriers and with clients** (think SkyTeam, oneworld, Star Alliance etc.) to service client needs globally, Customers will want choice and control before they make the leap to these new models.

Making the business transition is anything but simple for either individual carriers or their clients. Success will require leadership, building trust, changes in attitudes towards collaboration, and many uncomfortable choices when it comes to developing and implementing new network products and services. For operators that get it right, a future of differentiated network services, and perhaps even a privileged position in cloud services awaits. In our view, the time is right to begin to explore the possibilities.

Picture by Vasilij Koval / dreamstime



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