WENHAM CARTER GROUP

TELECOMS SOFTWARE

SDN and NFV in the service provider space

A Wenham Carter Career Perspective

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MARKETSANDMARKETS RESEARCH

The global SDN and NFV market size is expected to grow from $3.68 billion in 2017 to $54.41 billion by 2022, at a compound annual growth rate (CAGR) of 71.4%.

$54.41 BILLION

PROJECTED IN 2022

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INTRODUCTION

SDN (software defined networking) and the closely related topic of NFV (network functions virtualisation) has featured heavily in conversations around telecoms software since the technology started to gain commercial traction in the early 2010s and by projections, it's about to explode; according to a report published this year by MarketsandMarkets, the global SDN and NFV market size is expected to grow from $3.68 billion in 2017 to $54.41 billion by 2022, at a compound annual growth rate (CAGR) of 71.4%.

Certainly, SDN and NFV have huge potential to transform networks in the telecoms space, making them more automated, agile and responsive, providing better customer experience, a reduction in Capex and Opex and better return on investment for communication service providers (CSPs). However, market dynamics and certain technological complexities have meant that CSPs have yet to fully realise the benefits of SDN and NFV. Here we look at the background of SDN and NFV, before focusing on the benefits, limitations and challenges they face with respect to service provider networks. We'll then discuss the dynamics within the vendor space as new entrants and incumbents jostle for their place in the new landscape of lower barriers to entry and increased competition.

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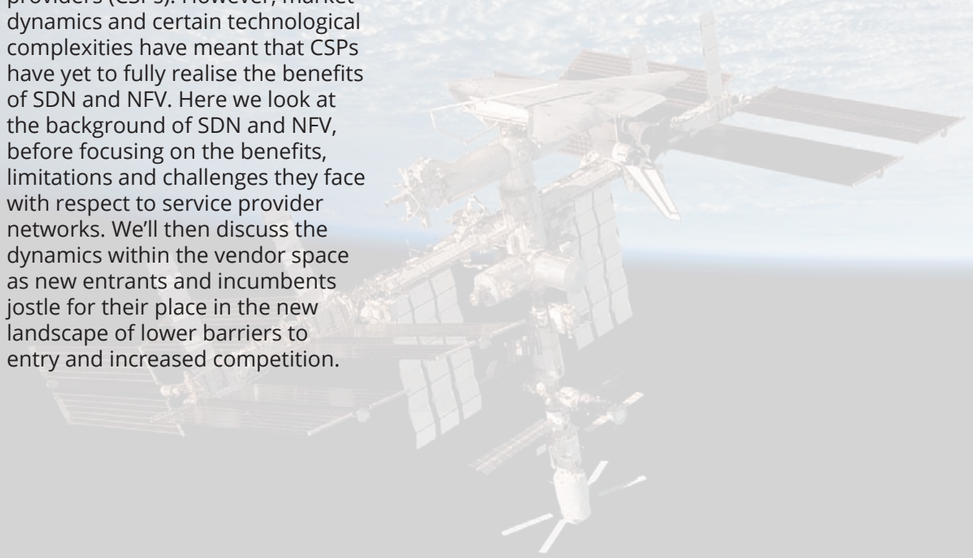

In brief

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BACKGROUND TO SDN AND NFV

SDN as we know it today emerged from research at Berkeley and Stanford in 2008 and initially it was defined broadly as one thing: the separation of network control from network packet data handling. SDN meant the controller and the packet handlers no longer needed to be on the same backplane, reducing the need for expensively configured hardware and simultaneously removing the need for both to be supplied by the same vendor.

In software defined networking, the data plane still handles packets under the direction of a control plane, but the controllers are just applications running on standard x86 hardware, meaning the network is centrally controlled and more programmable. SDN controllers use a standard protocol (OpenFlow) to communicate with data plane devices. Other network appliances, such as firewalls, routers, and load balances, can be virtualised and run as SDN applications on standard x86 hardware (network function virtualisation, or NFV), reducing the need for dedicated hardware.

SDN evolved as a response to two different issues. Firstly, building and managing large IP/Ethernet networks was becoming increasingly complex – it seemed that traffic management and operational efficiencies could be improved by exercising central control over packet forwarding. Secondly, the emergence of cloud computing creates a new model for application deployment where tenants must share public cloud data centres in segmented ways. Applications must be deployed on flexible resource pools without losing control over performance and security.

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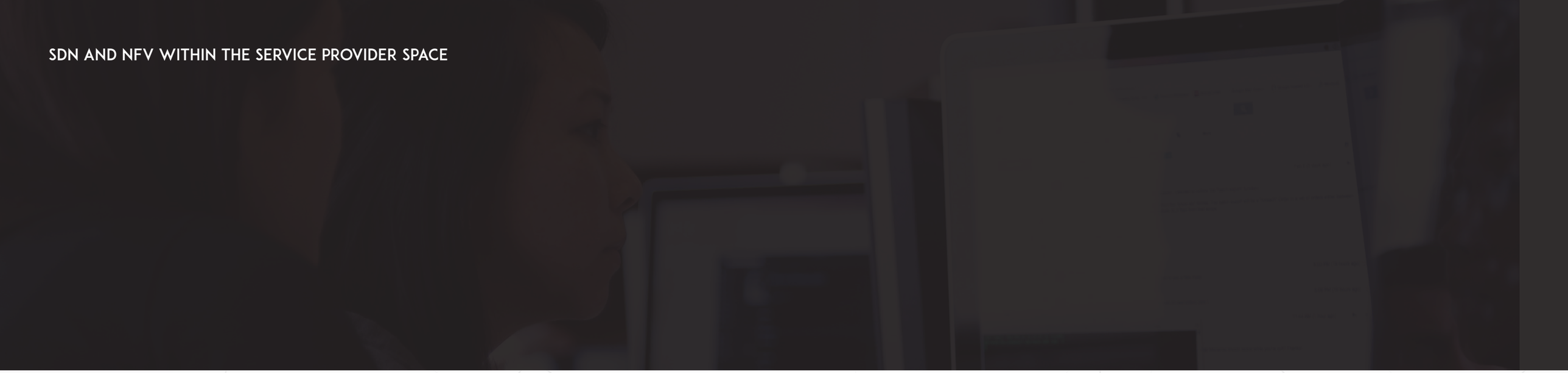


SDN AND NFV

SDN and NFV presents many benefits for service providers, helping them to meet customer needs in a secure, flexible (and hopefully more profitable) way. Crucially, SDN provides a more responsive and programmable physical network, faster automated service delivery at scale, and improved operational agility.

In the wake of the internet of things and 5G connectivity (and greater demand for data) these features are more critical than ever. Using a software defined architecture, networks can be scaled up or down as a response to demand in a matter of hours, rather than weeks and months as was previously required.

CSPs are feeling the pressure from cloud providers like Amazon Web Services (AWS), Microsoft and Google, who can deliver agile, over the top services rapidly to their customers. SDN and NFV are allowing traditional telco players to compete with cloud providers and even provide additional revenue streams, such as managed services to enterprise.

There are also security benefits too. By implementing at the software (rather than hardware) level, SDN enables deployment and automation of a variety of more sophisticated security controls, including network segmentation, identity and access management and data loss prevention: particularly crucial when CSPs are dealing with continuously evolving cybersecurity threats.

Improving cost effectiveness (both Capex and Opex) will be a key goal of CSPs who are implementing SDN and NFV transformation. SDN and NFV reduces the need for large physical investment in hardware, as network functionality transitions to software, and hardware is commoditised as a result.

CSPs subsequently become less susceptible to the dreaded 'vendor lock in', leading to more competition in the vendor space that has the potential to further drive down costs.

It is expected that NFV and SDN investments will reach nearly $21 billion by 2020. But who in the CSP space is leading? AT&T's SDN and NFV initiatives, such as Domain 2.0, have garnered the most attention, with the firm publicly sharing its ambition to virtualise and control more than 75% of its network using a software defined architecture by 2020. Orange has also been prominent, collaborating with AT&T and Colt on a project to ensure SDN interoperability by API standardisation, creating common specs for equipment, and streamlining the processes for spinning up virtual network functions.

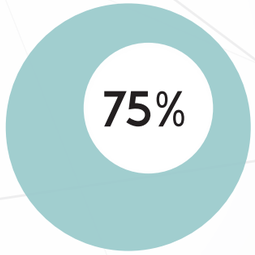
Challenges to widespread CSP adoption

There are, however, some factors that have been, and will continue to, slow SDN and NFV deployments for some CSPs. One key challenge is that of linking virtual networks to existing OSS/BSS systems.

A service may be able to scale up or down rapidly, but until provisioning, configuration, billing and fault management are automated and intelligent, SDN and NFV cannot be fully leveraged.

Furthermore, SDN and NFV will bring down the cost of capacity – resulting in more service density and an increase in service management. This creates a greater workload for OSS/BSS systems, which will need to adapt to deal with increased demands on the network.

For example, billing systems will need to support more billing events as service instances grow. Customer data needs to be aggregated in an efficient manner, with unique subscribe profiles, multiple applications and policies.
NFV infrastructure must reallocate resources dynamically between different virtual network functions to meet network traffic variations. Legacy OSS systems cannot support this real-time dynamics and policy-driven real-time service variation because in traditional OSS configuration, the network is assumed to be statically configured; with services changing infrequently, fixed service parameters, and no customer-driven or application driven real-time changes.



CSP leaders

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OSS systems are traditionally designed for services with subscription periods of months or years, not the days or even hours that might apply to state of the art cloud services.

In SDN and NFV, the network is not static, but dynamic, with the SDN controller enforcing application and subscriber policies by dynamically optimising network resource utilization. New generation OSS systems must accommodate these dynamic network changes while maintaining full FCAPS support.

SDN and NFV are truly transformative technologies, and are changing the business models of CSPs in the process. This will inevitably have a knock-on effect in the vendor space. Incumbent telcos' profits are already being squeezed with the ubiquitous demand for faster, more flexible connectivity at low costs, and growing competition from OTT cloud providers.

Although SDN and NFV technologies have clear potential to meet those needs and provide a better ROI, service providers are careful about what they spend their Capex budgets on, demanding from their vendors interoperability and flexibility. Attempts to break up the monolithic vendor oligopoly can already be seen - the Orange / AT&T / Colt collaboration to create standardised APIs is one notable example.

As a result, SDN has been adopted in some form by the large network equipment manufacturers, all of whom are bringing to market different products based on the foundation of SDN. Some vendors are creating different SDN controllers for different products within their product families, often recommended to be deployed alongside existing element management systems.

In other cases, companies are bringing to market SDN powered network management systems that combine NFV centralised control plane and open APIs (programmability). As the vendor product space becomes defined less by product suites and more about selling pieces that can interact with other vendor products, vendors are having to diversify and partner to meet these challenges.

Recent mergers, acquisitions and partnerships in the vendor space (notably the Alcatel-Lucent/ Nokia merger and the integration driven partnerships such as that between Cisco and Ericsson) are reactions to such challenges.

Moving towards x86 hardware and standardisation of network OSS interfaces represents a shift in the centre of gravity away from monopolistic, hardware centric vendors. The new challenges for vendors will be to leverage their expertise in software development in the new open software ecosystem. Their value is now not in the integration of physical hardware, but software being executed by a common server.

As a result, the new paradigm presents much lower barriers to entry to firms developing application network solutions that work with other services. This is driving M&A activity, with larger players including Nokia, Juniper, Cisco and Huawei all completing acquisitions of software firms within the last year, with a focus on security, application management and service orchestration. Independent software vendors that are virtualising different network elements are also gaining traction, including Affirmed, Edgewater, Metaswitch, Mavenir, Radisys and 6Wind.

Many of the large networking firms have SDN and NFV initiatives, and NFV programs are emerging from leading IT suppliers including Dell, HP, Intel / Wind River, Red Hat and Oracle. It is clear that incumbent vendors are feeling the pressure and recognising that CSPs are looking for a cheaper, more flexible, software defined approach to networking – for many it's a case of 'disrupt or be disrupted'.

As we discussed earlier, OSS and BSS systems provide a potential bottleneck for widespread SDN and NFV transformation, which gives OSS and BSS vendors an opportunity in the market. If these vendors can link SDN and NFV silos and build service agility and efficiency on top of both SDN and NFV, then the OSS/BSS space will be driving the business case for widespread SDN and NFV adoption. If they don't move fast enough, then it will be pure NFV vendors that will be driving this forward and are likely to reap the benefits.

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LOOKING TO THE FUTURE

A new ecosystem in the service provider networking space

SDN and NFV technologies are truly transformative. They are turning traditional networks into software programmable domains, running on simplified, low-cost hardware – and driving the convergence of IT and telecoms.

In the same way that the Internet and IP technologies introduced over the top service provisioning, SDN and NFV will finally shift network processing, analysis and management to the cloud, enabling global network service provisioning over multi local SDN and NFV infrastructures.

Although this transformation is well underway, their potential has not yet been fully realised in the service provider space.

SDN and NFV, when fully implemented, will provide significant benefits to CSPs. Services can be orchestrated in a more agile and dynamic way, distributed across shared infrastructure. SDN control enables programmability, agility and openness in the network infrastructure, commoditising hardware and overall reducing costs while allowing CSPs to service their customers better.

Leaving aside the immediate Capex and Opex savings, there are also other key benefits for CSPs. Virtualised infrastructure enables operators to trial new service connects, rapidly launch and monetise new offerings, and discard minimal wasted investment offerings that fail to achieve expectations (fail fast). In reducing the time to market for new services, operators will be able to enter new markets, which is also key in driving competition.

The dynamic created by SDN and NFV has the potential to radically alter the value chain. Vendors are jostling for position in this new landscape, with start-ups and new entrants emerging and larger players buying up specialist smaller SDN and NFV vendors. Who wins and loses remains to be seen, but what's certain is that SDN and NFV will continue to define the telco networking space for the foreseeable future.

WENHAM CARTER: To sum up

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- Vendors are jostling for position in this new landscape, with start-ups and new entrants emerging and larger players buying up specialist smaller SDN and NFV vendors.
- Who wins and loses remains to be seen, but what's certain is that SDN and NFV will continue to define the telco networking space for the foreseeable future.

TELECOMS SOFTWARE

Do you work within the telecoms software space?

We would love to hear from you. If you're looking for career advice or help hiring talent for your business, please contact our telecoms software team.

1. http://www.marketsandmarkets.com/Market-Reports/software-defined-networking-sdn-market-655.html

2. https://www.prnewswire.com/news-releases/marketresearchcom-service-provider-nfv-and-sdn-investments-to-reach-21-billion-by-2020-says-sns-research-report-300014302.html

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