european COMMUNICATIONS

Accelerating SDN/NFV Commercialisation

Underpinning New Digital Service Innovation with Agile Next-generation IT

A 2017 *European Communications* research study and best practice guide.

published in partnership with Netcracker

Arguably the most critical business challenge communications service providers (CSPs) face today is acquiring the ability to launch, sell, deliver, operate, bill for and manage continuous streams of new services powered by a rapidly growing ecosystem of new virtualisation technologies and capabilities.

Current Analysis has called network functions virtualisation "the most important transformation the network industry has undertaken in its history.[1]" But unless virtualised network capabilities can be harnessed to bring innovative and appealing new products and services to market swiftly, sell and provision them on the fly, and bill for them accurately, CSPs and their customers will not see the benefit.

Yet it is here that operators continue to face challenges. Beyond system integration complexities and a lack of real-time provisioning capability, many service providers have not adapted their culture, processes or skillsets to deliver a more dynamic product mix and customer experience. This is especially problematic when the game keeps changing, to the point that it is becoming increasingly impossible to predict where future demand and opportunities might lie.

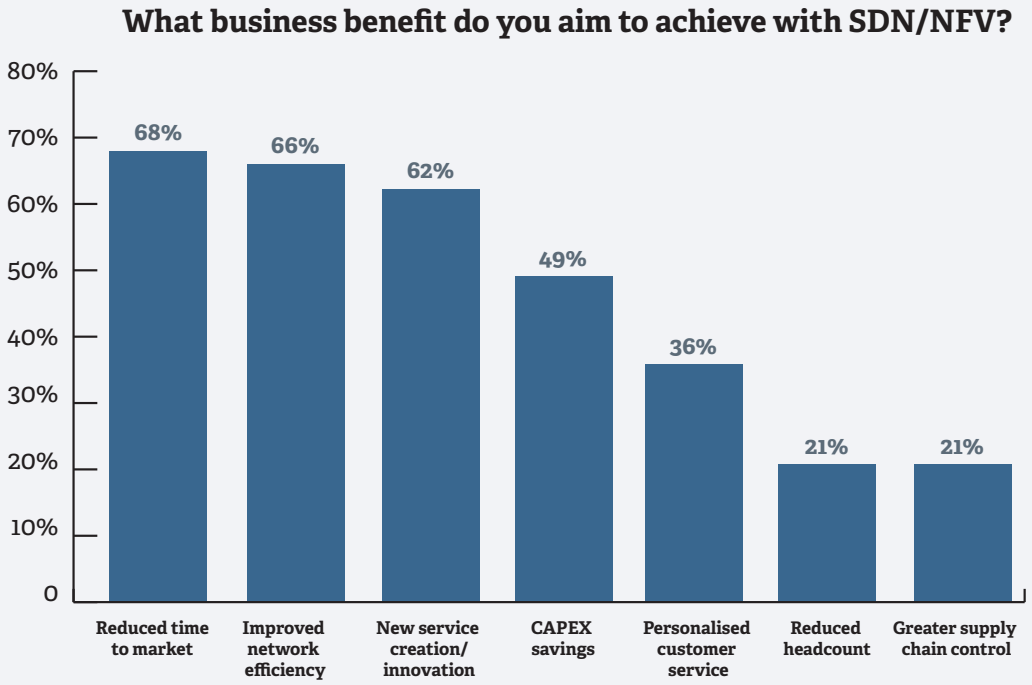
To take stock of the situation and to help operators identify a clear way forward, European Communications conducted new research in late 2016 involving 60 service providers in Europe, North America and Asia. The study, commissioned by Netcracker Technology, explored where operators are currently on the path towards SDN/NFV-based service transformation, the benefits they hope to deliver, the outstanding challenges, and the expected timescales. The survey spanned a range of service provider profiles, while respondents' functions ranged from network planning, operations and R&D, to sales and marketing and board-level roles.

Clarity of purpose: Expedited delivery of innovative new services

Encouragingly, the survey confirms that the main drivers for CSPs' strategies around software-defined networking/network functions virtualisation (SDN/NFV) are new service creation and reduced time to market – priorities that are on par with improved network efficiency. Get the balance right, and service providers can expect to maximise the benefits of their investments, provided they can follow through to expedited provisioning and on-the-fly consumption monitoring and billing.

Around two-thirds of operators taking part in the survey cited these as being clear goals (see Figure 1), compared with just under half who cited capex savings. This suggests that, although savings on capital expenditure are an expected benefit of virtualised network provisioning, they are not the primary driver. Only a third of operators cited the scope for offering more personalised services as a targeted benefit, even though

Figure 1: Virtualisation priorities



this ability is inherent in dynamic service provisioning, where there is a clear line of sight across operations and supporting processes and data. It might be argued that amid the urgency to become more responsive, agile and innovative, service providers are also heeding the call to simplify their offerings rather than veer off into new complexity.

The vision, then, has matured at least. The challenge is for CSPs to execute it.

Inertia threatens progress: Operators slow to get going

What's surprising, given industry-wide consensus on the pivotal role SDN/NFV has to play in securing their future, is how rudimentary many operators' plans still are and how limited their progress has been to date. Just a fifth of respondents in the survey had already rolled out some services and claimed to have business support systems (BSS) that are ready to support new, more dynamic models of provisioning, monitoring and billing.

While 44 percent say they're working on aligning the back office, more than a third (36 percent) of service providers admit they have not yet begun to update their BSS capability to manage virtualised services (see Figure 2). This is despite recognition that full commercialisation of SDN/NFV-based offerings could take 2 to 3 years, or more, depending on the route CSPs take (see Figure 3).

That's a long time to wait to become more dynamic and competitive in an unforgiving market already subject to huge disruption. Some early adopters are more optimistic: 7 percent believe they'll see the benefit as soon as by the end of 2017; a further 18 percent by next year. But at the more sceptical end of the spectrum, 9 percent of operators estimate it could be more than five years before their SDN/NFV efforts are fully commercialised.

Feeling the way: Easy conversions are the first target

Those CSPs that have already made headway have typically gone after the low-hanging fruit, the more tangible and understood services, particularly B2B propositions including IP VPN services and SaaS, both cited by just under a third of respondents with already-launched SDN/NFV-enabled offerings (see Figure 4).

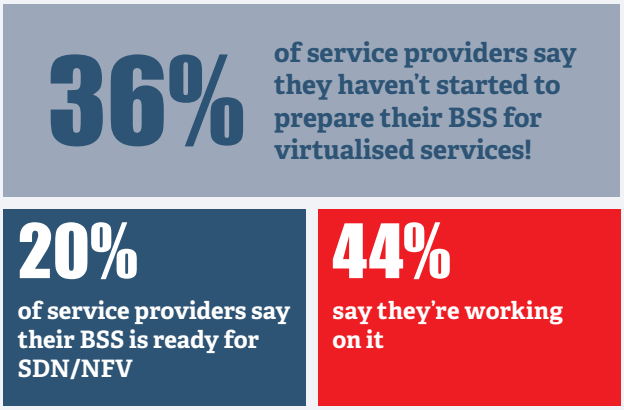


Figure 2: BSS readiness

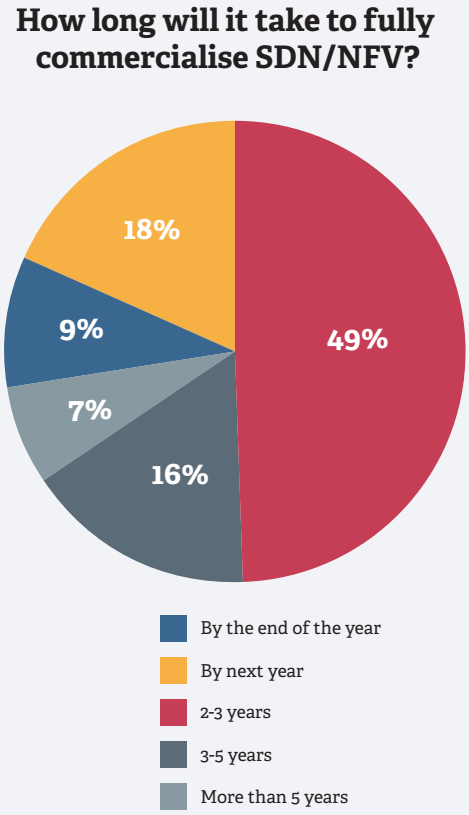


Figure 3: How long before the money rolls in?

This finding is supported by Technology Business Research's 2016 NFV/SDN Telecom Market Forecast (covering 2015-2021), which suggests that operators are testing NFV and SDN by transitioning domains that are relatively easy to convert first[2].

Although there is a general feeling that there is also plenty of scope for consumer services based on SDN/NFV, 41 percent of service providers find SDN/NFV equally applicable to consumer and enterprise services, while almost a third (27 percent) feel the

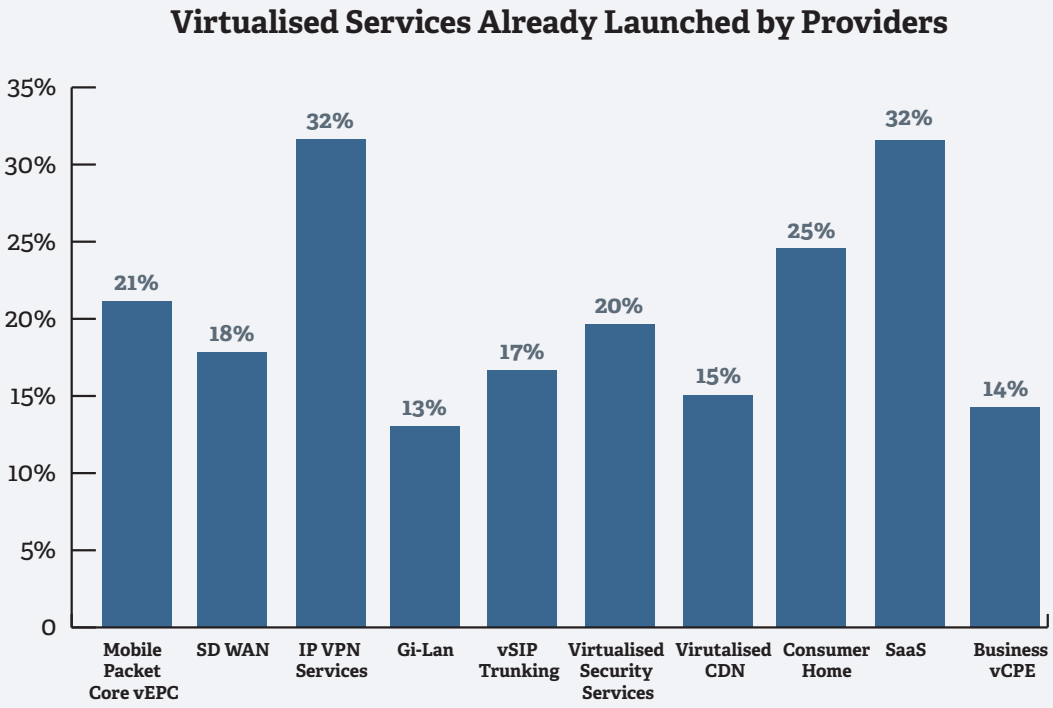


Figure 4: Virtualised services already launched

technology is most applicable to enterprise services (see Figure 5). Nearly 20 percent find SDN/NFV slightly more applicable to the enterprise segment than to the consumer segment. This isn't surprising, given that businesses in almost every sector are striving for greater agility, enabled by more easily accessible and dynamically provisioned network services.

Looking ahead, the most popular enterprise services planned for imminent launch include SD WAN, mobile vEPC, Gi-LAN, virtualised security and vCPE (see Figure 6) – virtualised security services being of particular interest within a 6-12 month timeframe. Longer-term plans (1-2 years ahead) include more of the same. The trends are not universal however: a Gi-LAN offering (the part of a mobile network between evolved packet core and the Internet gateway) is not on the agenda for 40 percent of respondents.

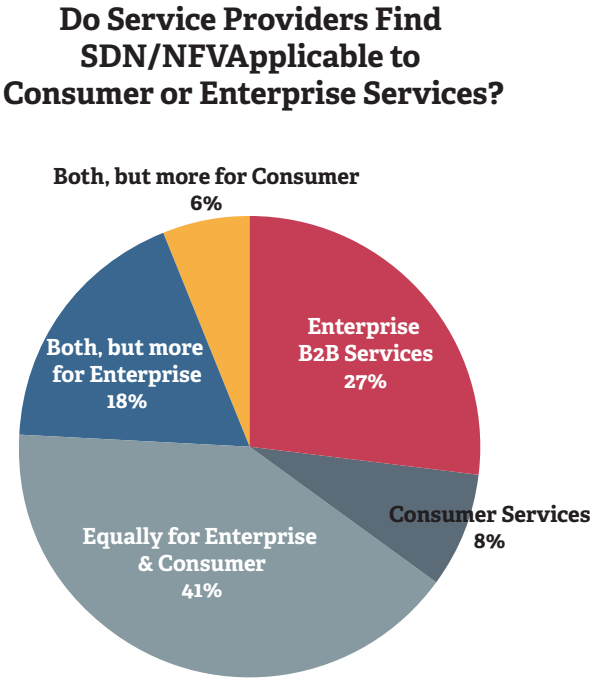


Figure 5: Which market segment has the most potential?

The devil in the detail: Barriers to progress

Few expect the transition to virtualised offerings to be plain sailing, however. Among the top inhibitors to SDN/NFV progress are practical barriers. A lack of unified, vendor-agnostic hybrid

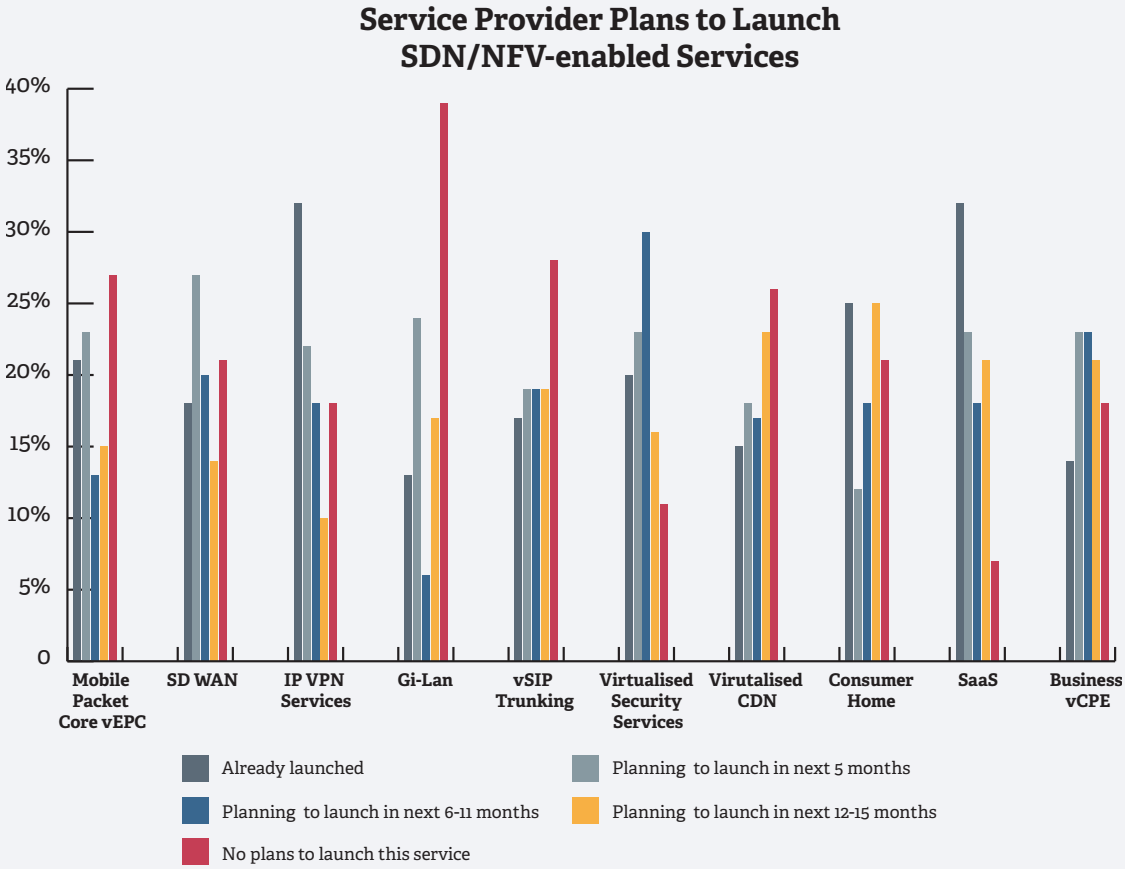


Figure 6: Enterprise offerings on the near horizon

orchestration was the most common complaint (integration complexity being a further issue), compounded by issues building a robust business case (see Figure 7).

Seamless, end-to-end orchestration is essential to coordinate the resources and networks underpinning cloud-based services and applications, allowing service providers to capitalise on new opportunities and deliver something appealing to customers[3]. Market intelligence firm SNS Research estimates that CSP investments in orchestration platforms will account for over $1.6 billion in revenue by the end of 2020, representing nearly 10 percent of all service provider SDN and NFV spending[4].

Although standards bodies like ETSI have attempted to improve integration and orchestration, it seems the benefits of this aren't yet being felt: respondents cited cohesive industry standards as being high on their wish list to help alleviate some of these issues.

Organisational issues were acknowledged in the research as well. Traditional operators are mired in old functional silos and outdated ways of working, so they must look at the cultural as well as process and systems based changes that are needed to support the new, more dynamic CSP paradigm.

Obstacles to agility: Technology frustrations

The survey suggests that the support and product sets available from SDN/NFV technology vendors and products may not be fulfilling all of their needs, particularly in enabling unified, vendor-agnostic orchestration of complex, hybrid network environments. Almost half of respondents (46 percent) expressed ambivalence about what was on offer and 17 percent were frustrated (unhappy or very unhappy) by the solutions they'd looked at (see Figure 8).

At an operational level, respondents acknowledged that they would need to have a whole spectrum of next-generation OSS components in place to manage services end to end

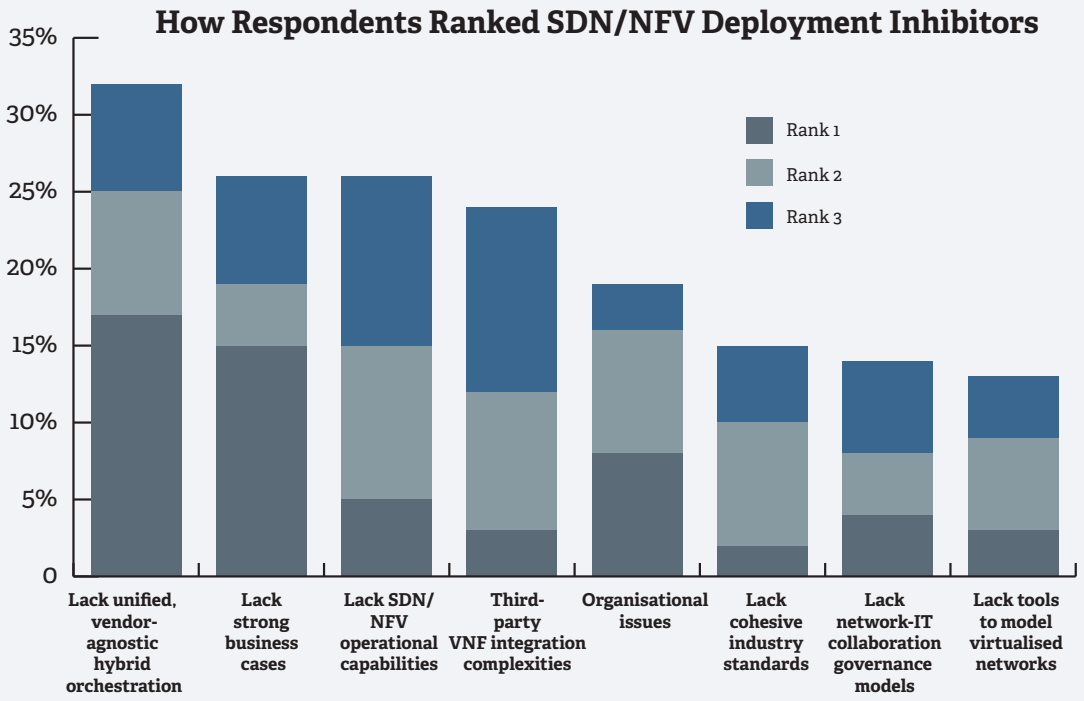


Figure 7: What's getting in the way?

(see Figure 9), including integrated service and device configuration; seamless orchestration for hybrid environments; automated real-time network topology, discovery and reconciliation; and big data analytics-driven planning and capacity management.

Nine out of 10 CSPs ranked orchestration as the function most critical to bringing virtualised services to market, without neglecting existing revenue producing services, while six in 10 said disparate product catalogues would reduce operational efficiencies and increase difficulty in creating appropriate service bundles quickly. Almost three-quarters (nearly 73 percent) of service providers rated virtualisation-ready catalogues for bundling telecom services with VNFs and cloud services as very important or critical to SDN/NFV success. Even more (77 percent) consider real-time transaction management and support for a variety of pricing models (83 percent) as very important or critical.

Yet, despite near consensus on the importance of these capabilities, most operators do not currently have them in place. This is preventing service providers from bringing virtualised services to market effectively and creating the types of digital experience now expected, including:

- custom bundling across native and third-party partner services

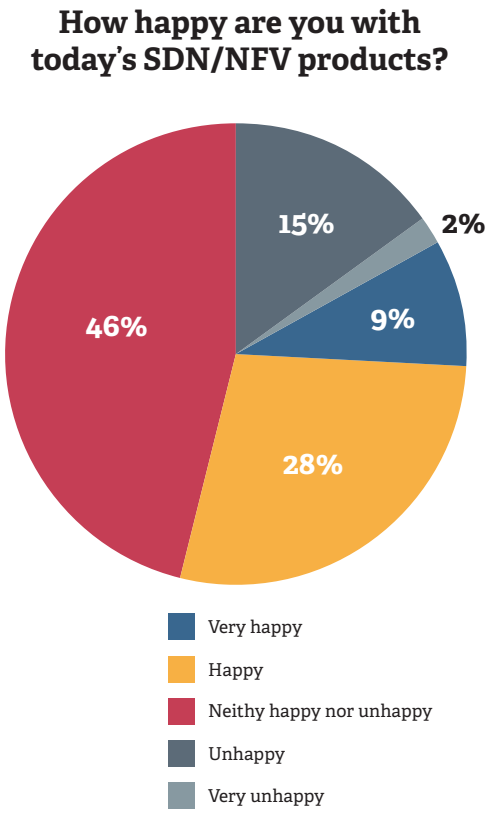


Figure 8: Technology satisfaction

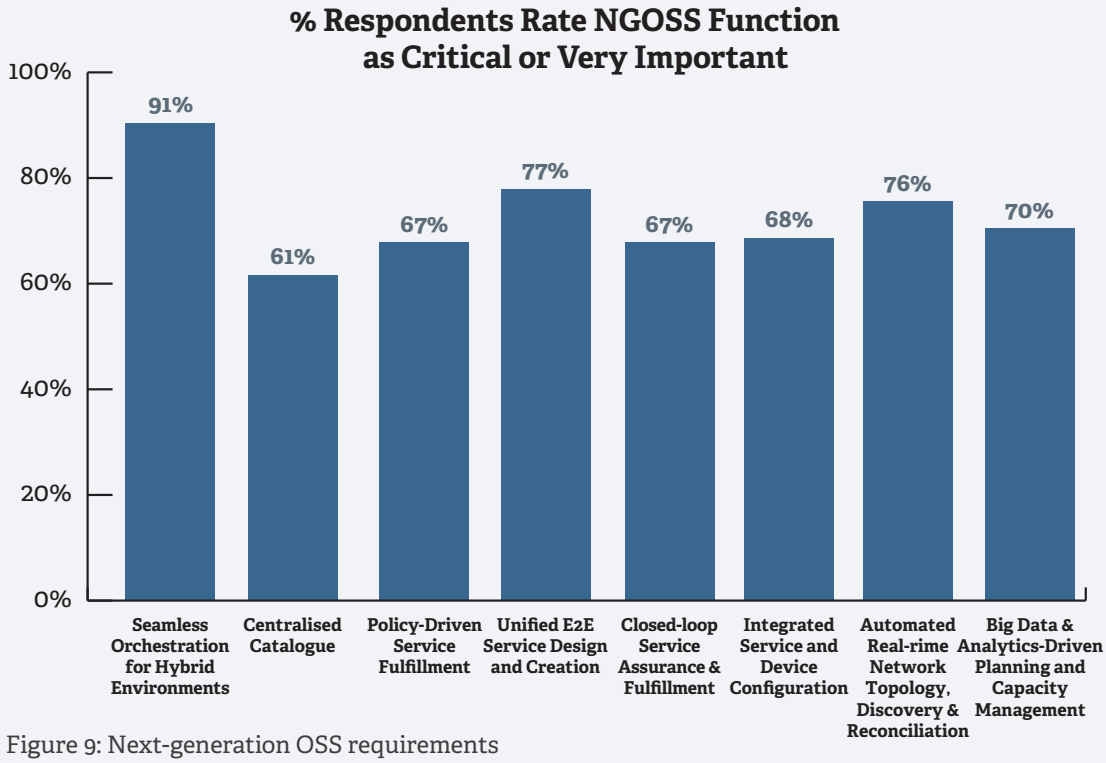


Figure 9: Next-generation OSS requirements

- pricing based on a variety of consumption or subscription-based factors
- policy-driven controls around charging events
- analytical outputs relating to reporting, behaviour, performance and quality of experience.

This sophistication must follow right through to the back office to allow services to be billed accurately. BSS capabilities need to be far more agile and responsive, able to support real-time transaction management; integrated partner management and settlement; a variety of pricing models; integrated self-service portals; embedded analytics; and tight linkage with policy (see Figure 10). Service providers are not suggesting that a few small tweaks or additions to their existing BSS will suffice. Rather, they are clearly stating that virtualised services require a new generation of BSS capabilities to become fully commercialised and brought to market.

Spreading the risk: Optimising supplier numbers & aligning skills

Given that new technology acquisition is a necessary aspect of SDN/NFV adoption, service providers face the classic decision of whether to take a 'best of breed' approach and cherry-pick capabilities from a variety of vendors, or to limit the scope for complexity and focus on having fewer, more accountable partners. Introducing new players can appear to threaten the equilibrium, potentially creating new risk. However, opting for an inadequate option is likely to be riskier still with so much at stake.

According to the research, most service providers (59 percent) plan to work with two or three SDN/NFV vendors to gain access to the range of features they need, while a quarter expect their number of technology partners to exceed five (see Figure 11). Just 4 percent said they would put all their eggs in one basket.

Successful migration to and commercialisation of SDN/NFV requires much more than a technology fix, however. Operators also need to adapt to new ways of thinking, working and planning. Digital transformation in any industry is as much about adopting a new mind set and culture as it is embracing new technology[5]. This includes agile approaches to bringing new innovation to market quickly, and a willingness to experiment while accepting and managing the risk of some failure. Traditional, long-winded 'waterfall' project approaches don't lend themselves to the speed now required if CSPs want to capitalise on new ideas and bring them to market ahead of the competition.

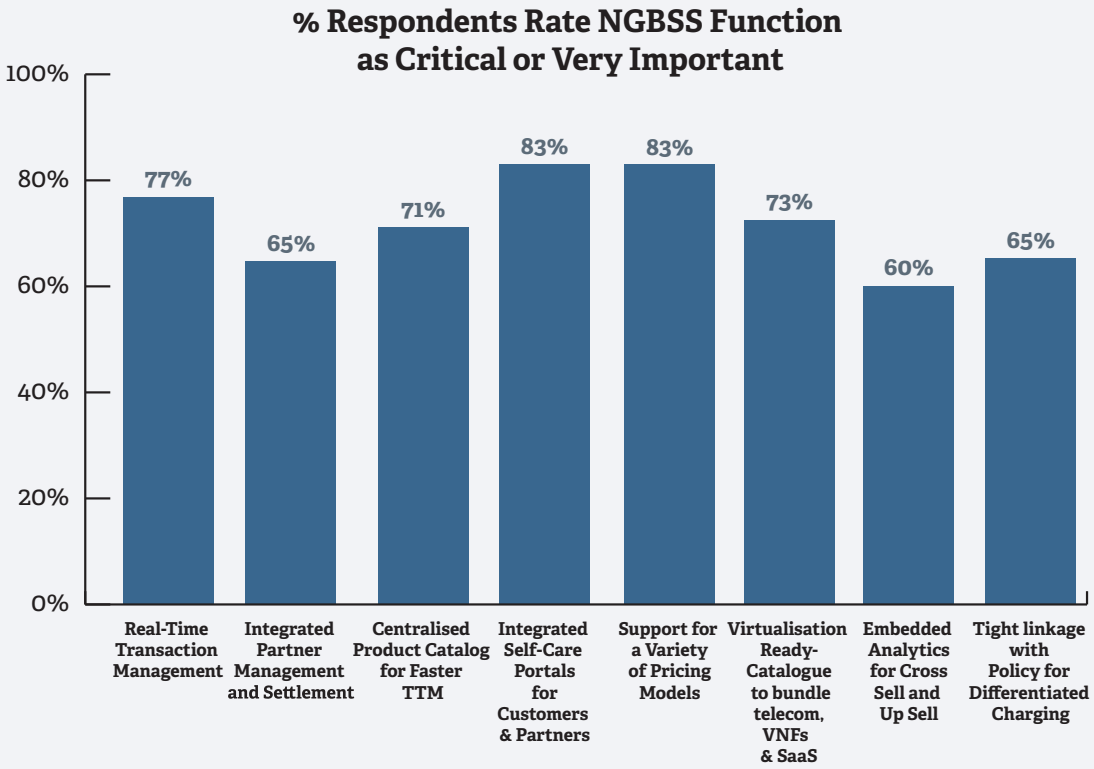


Figure 10: Key attributes for next-generation back-office systems

In the survey, just 14 percent of operators felt confident that they already had the right skills to launch SDN/NFV-based propositions; 15 percent said the opposite. Those that felt they were on the case were primarily pursuing strategies that involve retraining existing staff (38 percent) and/or hiring new staff (24 percent). Only 9 percent felt partnering with external experts to be the best route to relevant talent, despite high levels of competition for very new skills that are in short supply on the job market (see Figure 12).

Given how urgently service providers claim to be moving towards SDN/NFV, they may need to review whether their approaches to vendor partnerships and internal skills alignment are appropriately paced.

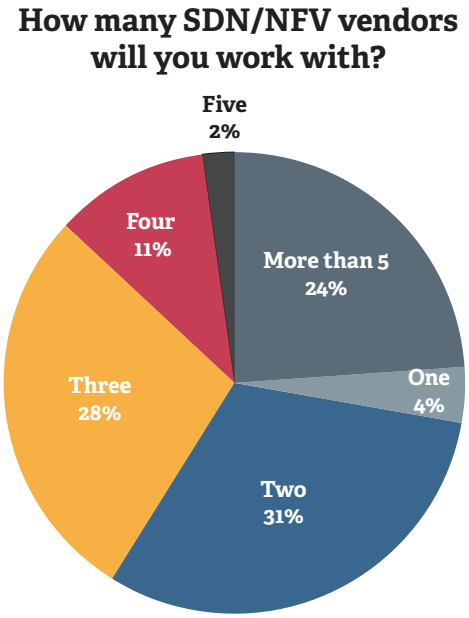


Figure 11: Number of SDN/NFV vendors service providers plan to utilize

Less haste, more speed: The right approach should shrink turnaround times

Most service providers admit it currently takes them at least six months, if not longer, to roll out new services. This is a situation they expect to improve radically once they have transitioned to SDN/NFV: to under a month, or even a week or less in some cases, (See Figure 13). A quarter of CSPs expect to be able to launch new enterprise services within a week with SDN/NFV.

Only 5 percent can do so today. More than two-thirds of CSPs cite improved speed to market as the number one benefit to embracing SDN/NFV.

Measuring the customer benefit: The quality-of-experience impact

The expected impact of SDN/NFV on managing the customer experience is less clear (see Figure 14). It is possible that operators fear this may become more complicated, at least initially, as more variables come into play. But this is something they need to think through clearly. If customers don't have positive experiences with responsiveness and the performance of virtualised services, time to revenue is going to become a bigger challenge for CSPs following SDN/NFV deployment. The risk is that they do not make that all-important first impression as a competent digital service provider (DSP).

Best practice advice: Critical success factors

While each operator will have its own commercial priorities and face its own specific organisational and practical challenges, early transitions to virtualised service offerings have enabled some important insights into what works best – something later adopters can learn from. General advice must be to:

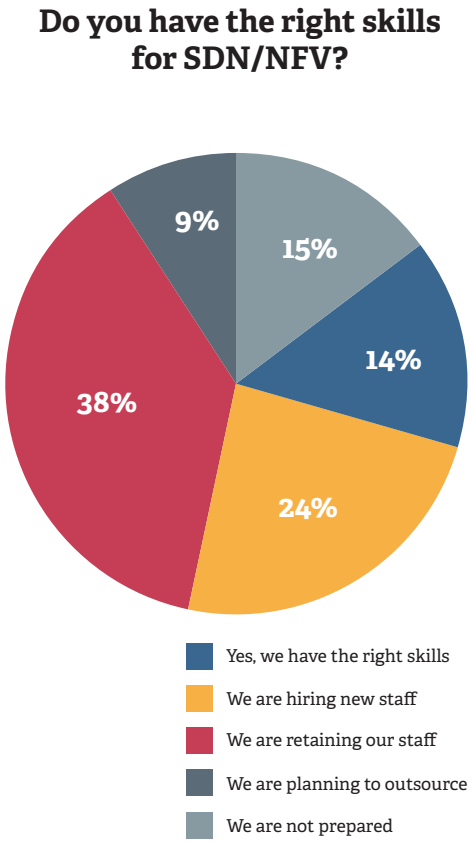


Figure 12: How ready are your people?

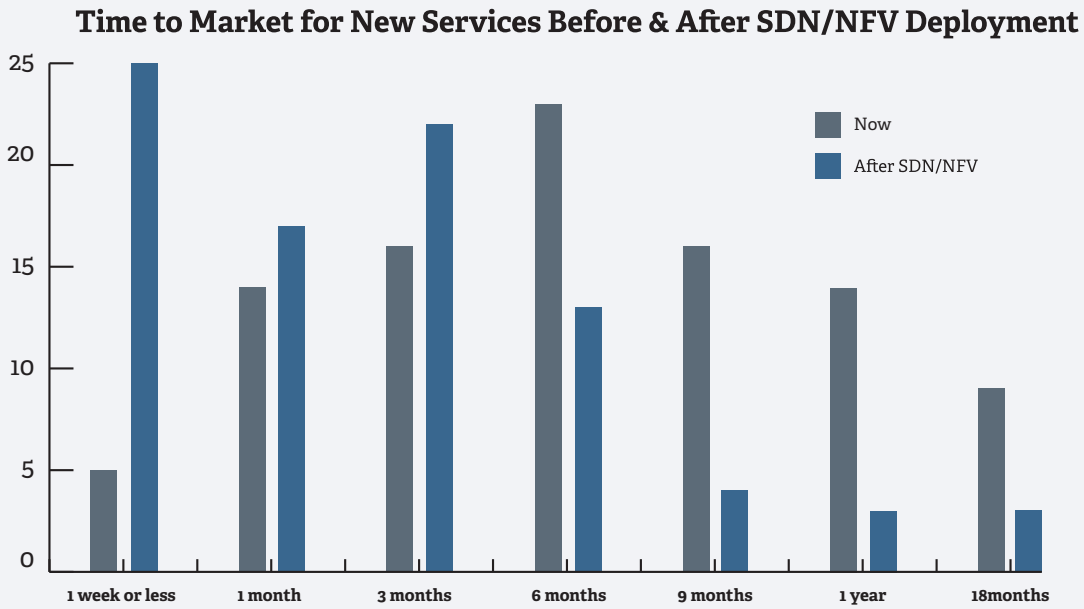


Figure 13: How quickly can you roll out services?

Figure 14: Impact on managing the quality of experience for customers or partners

- Approach an SDN/NFV plan pragmatically. A technology and operational shift must take place, where the priorities of the business are aligned with those being addressed by IT. For many operators, it is a paradigm shift in terms of transformation, and as such, no operator can afford to put their existing revenue streams at risk or to invest unlimited budgets without a reasonable sense of where this will take them. It is also necessary to assess what will be involved, particularly the very real, practical obstacles that will need to be overcome.
- Establish a clear and robust business case. "Lack of a strong business case" was ranked second most often as the greatest inhibitor to SDN/NFV adoption in the survey, and more than 50 percent of those who ranked it said it was the primary stumbling block. A business case can have a double edged goal, where the initial phases are to meet operational efficiency goals, and the latter phases become focused on expanded revenue targets. What is most important is to ensure the pragmatism in the initial planning stages transfers to the build out of the business case.
- Perform an in-depth technology review of systems, processes and internal resource requirements, paying particular attention to problematic silos and any other factors that are hampering real-time visibility across network and business operations. This is best performed by a vendor partner through a professional services engagement, allowing the business to maintain continuity of existing resources and reduce the risk of day-to-day operational disruptions. The service provider and vendor partner should set expectations for the technology review, and the service provider then receives a deliverable that provides an overview and SWOT of current operations.
- Plan migration stages, priorities and checkpoints with the vendor or SI partner to ensure important milestones are met along the way. These milestones become opportunities to do "health checks" on the progress of the transformation and to review any positive or negative affects it may be having on the business. Existing business lines and supporting systems and processes need to be protected, so the transition needs to be incremental and non-disruptive to the business as usual.
- A hybrid product catalogue strategy that consolidates two or more enterprise product catalogues into a single convergent catalogue should be central to the transformation. Operators can expect a hybrid service environment to morph out of any SDN/NFV transformation, thus ensuring hybrid service creation processes and procedures using standards-based environments wherever possible will avoid future silos or integration complexity.
- OSS functions should be fully integrated to support SDN/NFV functions, either as a unique set of solutions that can integrate where necessary to existing solutions, or as an integrated hybrid OSS that can unify order management, service orchestration and related fulfilment processes. Speed of deployment and real-time billing depend on everything being streamlined and visible end to end, thus any OSS/BSS decisions should be based on the best case scenarios for the operator.
- Embed an analytics strategy across the entire transformation, whereby a comprehensive data management strategy is in place to ensure properly aligned decisioning for service creation delivery and monetization, determine next best actions, and ultimately ensure service delivery success.
- Finally, don't underestimate the particular skills requirements that go with such a transformation. Recruiting and even reskilling may not be nearly as straightforward as operators

might hope. Strategic partnerships which extend beyond the pure technology are likely to be important. Be ready to work with vendors who can provide long-term resources, either as fixed price managed services or flexible outsourced contract services. This will help provide an additional level of guarantee as the service rollout takes place.

Achieving agility: At-a-glance checklist

What to aim for with OSS/BSS to maximise SDN/NFV potential and keep control of costs:

- Support for dynamic, policy-driven, real-time processes
- Ability to map virtual to physical resources and track their status
- Ability to scale capacity on demand
- Support for service chaining
- Support for dynamic, flexible pricing and revenue share models
- Support for automated operations with limited or no human involvement
- Tight connection between assurance and fulfilment processes
- Intuitive and user-friendly service creation environment
- Integrated analytics – based on real-time traffic measurement, customer behaviour, customer usage, etc.
- Service exposure via open APIs, creation of open business partner ecosystem
- Alignment with SDN/NFV standards such as ETSI NFV Management and Orchestration (MANO) and TM Forum ZOOM
- Ability to model new types of resources and support new interfaces, e.g. NETCONF, YANG and different RESTful implementations
- Support for hybrid networks made of both virtualised SDN/NFV-based components and traditional network technologies

The Netcracker Approach to SDN/NFV

Netcracker's approach to SDN/NFV is based on meeting all of the critical success factors highlighted above. As service providers work to determine their best courses of action, Netcracker's partner-centric approach aims to help each operator design, build and execute on its SDN/NFV strategy effectively and efficiently based on the transformational roadmap in place. The company is positioning market-leading, standards-based infrastructure, applications, consulting and professional services together with a pragmatic operational plan that focuses on an operator's near-term and longer term opportunities, whether they are related to operational efficiency or focused on revenue generation.

Netcracker's SDN/NFV technology development is centred on its Agile Virtualization Platform and Practice. Introduced in May of 2016, the Agile Virtualization Platform and Practice (AVP) was the culmination of many years of analysis, customer feedback, solution development and testing. Today, Netcracker's AVP solution offers:

- Support for the Design, Build, and Management of hybrid networks across heterogeneous environments including traditional networks, SDN/NFV-enabled networks and Private/Public Cloud data centre infrastructure.
- End-to-end service lifecycle orchestration for complex hybrid services allowing customers to order and configure both virtualised services and traditional services that combine connectivity, network services, and IT applications.
- Omni-channel and Self-service capabilities that allow B2B and B2C customers and partners to order, configure and customize products and services on-demand; reducing time-to-market, lowering support costs and improving the customer experience
- Iterative development processes that combine agile and traditional development methodologies to match and optimise the customer's capabilities with goals to reduce time-to-market and to ensure quality of the service delivered.

Netcracker also recently launched its Network as a Service (NaaS) solution to help operators speed the creation, deployment and monetisation of services across B2B and residential markets. Netcracker states that NaaS is the industry's first full-service solution specifically designed to help service providers deliver new on-demand services without taking any unnecessary risks associated with launching virtualisation initiatives at scale. It brings together traditional network services, value-added services and cloud applications in a single, partner-driven cloud marketplace.

All of Netcracker's solutions adhere to industry standards. The company actively participates in key SDN/NFV standard bodies

and can adapt its solutions as industry standards continue to evolve. With the expectation that service providers' needs and demands and will evolve over time, Netcracker's ultimate goal is to be the strategic partner that can help them meet all cost, efficiency and revenue objectives.

For more information regarding Netcracker's SDN/NFV and BSS/OSS solutions, please contact sales@netcracker.com or visit Netcracker online at www.netcracker.com.

About Netcracker Technology

Netcracker Technology, a wholly owned subsidiary of NEC Corporation, is a forward-looking software company, offering mission-critical solutions to service providers around the globe. Our comprehensive portfolio of software solutions and professional services enables large-scale digital transformations, unlocking the opportunities of the cloud, virtualization and the changing mobile ecosystem. With an unbroken service delivery track record of more than 20 years, our unique combination of technology, people and expertise helps companies transform their networks and enable better experiences for their customers.

Resources

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