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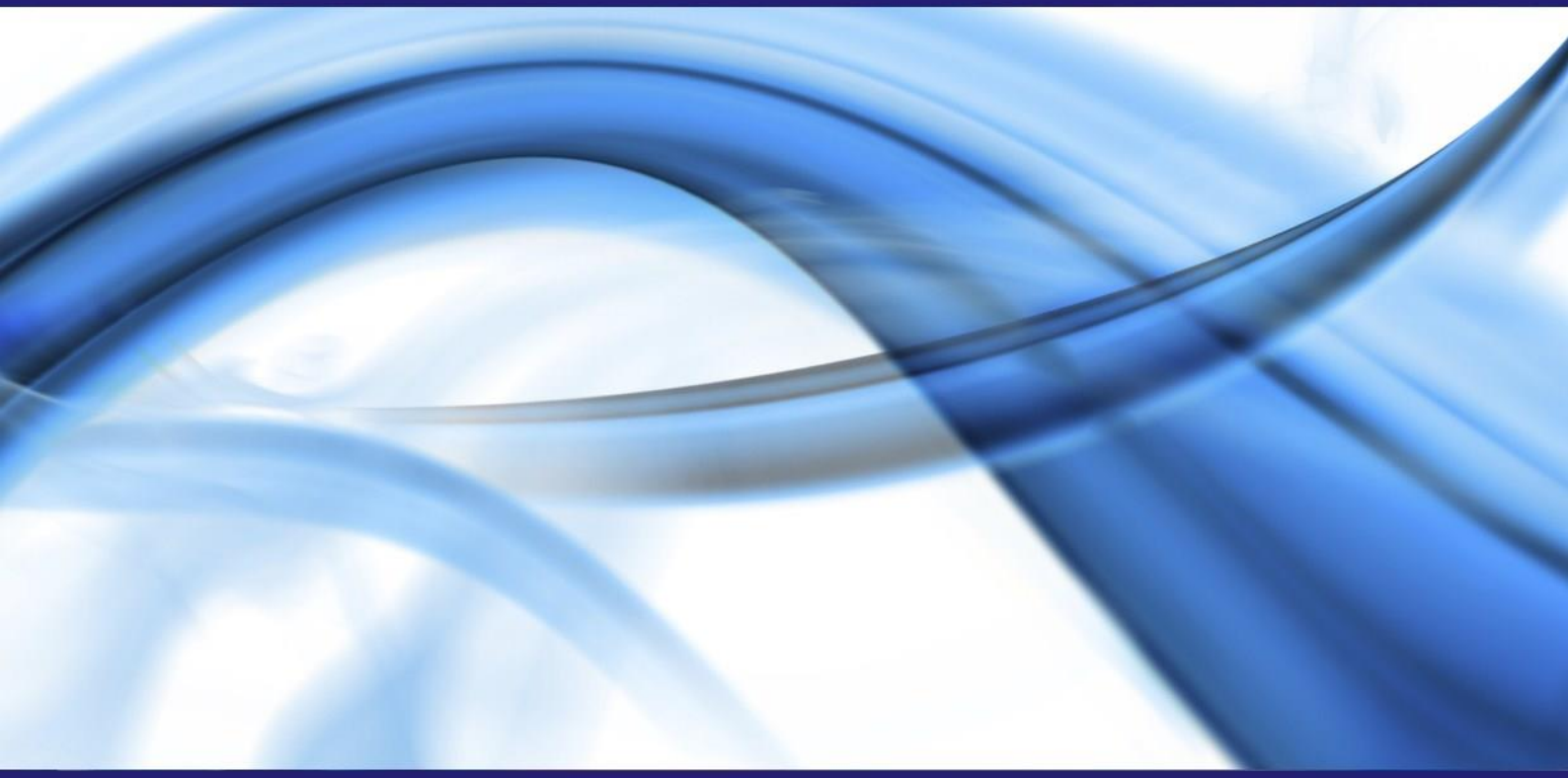

White paper

Managed Enterprise Platform as a service (EPaaS) provides a shortcut to new enterprise revenue opportunities

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1. Executive summary

Communications service providers (CSPs) have a time-limited opportunity to become the single point of contact for their enterprise customers' ICT needs if they put in place digital platforms that enable enterprises to buy business applications, IT infrastructure services, and cloud-based connectivity with a unified digital experience. Such a platform, which Analysys Mason calls an 'Enterprise Platform as a Service' (EPaaS), gives CSPs direct access to a USD300+ billion IT and IoT market on top of their enterprise connectivity market. This represents value-added revenue which CSPs have so far ceded to third parties.

Leading CSPs are already implementing EPaaS that targets this new revenue opportunity, enhances customer loyalty and differentiates them from their competitors with more limited enterprise connectivity-only offers, such as SD-WAN. However, CSPs are finding that building an EPaaS by themselves is difficult from a business, organizational, and technical perspective. Software-defined networking (SDN) and network functions virtualization (NFV) are foundational for an EPaaS, but are expensive and time-consuming to implement. CSPs risk losing a significant proportion of the high-value enterprise business to competitors because of the time and cost involved in developing an EPaaS. An EPaaS built and managed by a third party, and which can be branded by CSPs and run on premises, in the cloud or a combination of both, promises a faster and lower-risk way of expanding their presence in the enterprise market.

It is critical that a managed EPaaS:

- supports CSPs' individual business strategies, with the right mix of services in its digital marketplace to address their enterprise customers' needs and the ability to consume only the services and features that are right for them
- eases their implementation challenges by providing the full set of customer-facing and back-office systems, including portal, product catalog, partner management, billing, order management, CPQ, and platform management, and the flexibility to integrate with the CSPs' internal systems and services where appropriate
- helps with market entry, including enterprise customer education, communications and support, to drive sales.

Analysys Mason expects managed EPaaS to have a significant impact on CSPs' ability to drive new revenues from the enterprise market. In this white paper, we explain the drivers for EPaaS, the challenges of implementing such a platform, the benefits of a managed approach and the evaluation criteria CSPs should use in selecting a managed EPaaS partner. We conclude that a managed EPaaS is a welcome addition to the market, enabling CSPs to create first-mover advantage for themselves, and even in markets where cloud B2B offers already exist, build differentiated propositions using a more extensive digital marketplace than competitors have currently been able to develop themselves.

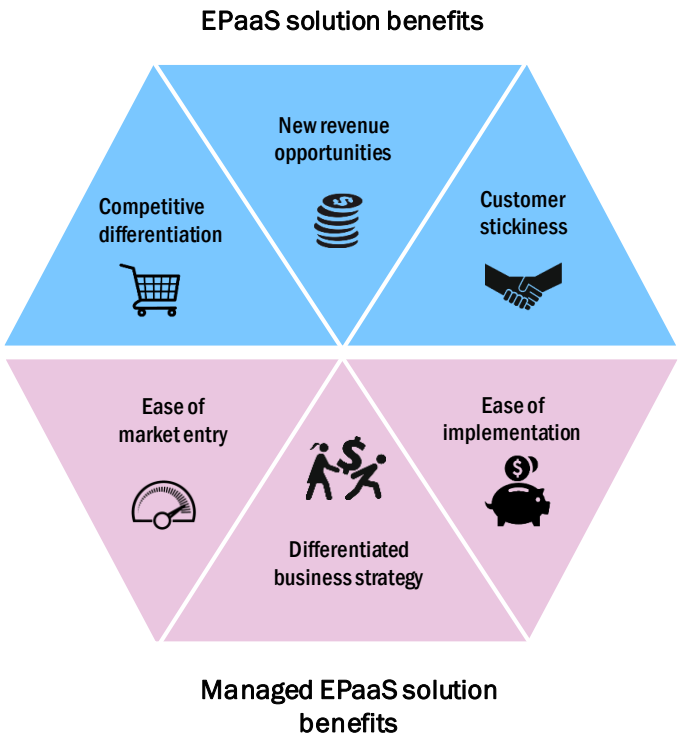


Figure 1.1: Drivers for a (managed) EPaaS [Source: Analysys Mason, 2018]

2. Staying competitive in the enterprise market

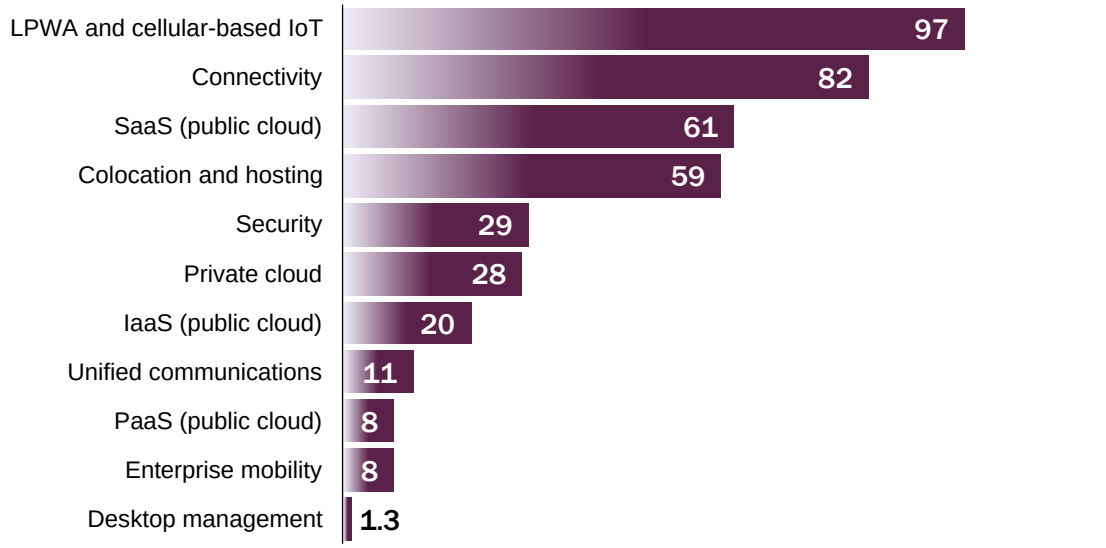
Enterprises today can respond with unprecedented speed to market conditions and new opportunities. They do this because they are increasingly distributed and digital, they support key business functions with public cloud-based systems and they base decisions on data generated by the expanding instrumentation of the world through the Internet of Things (IoT). Networks are the nervous systems of such data-driven, cloud-based companies. Communications service providers (CSPs) must evolve their enterprise connectivity services using cloud technologies to meet the dynamic needs of the digital enterprise. But CSPs should not stop here. As suppliers of critical, cloud-based connectivity, CSPs can deepen their strategic value in the enterprise market by bundling high-value applications and services that meet a broader set of enterprise needs beyond the network.

CSPs have long recognized the business case for making themselves more valuable to their enterprise customers but they have not yet capitalized on the enterprise opportunity for IT and IoT services. These represent a much larger opportunity than the USD82 billion market for enterprise connectivity alone. Analysys Mason estimates that the market for IT and LPWA/cellular IoT services amounts to USD263 billion in 2018; CSPs currently have around a 16% share of IT services. We expect this combined market to grow to USD321 billion in 2020. Figure 2.1 shows the size of individual ICT and IoT markets within the whole market.

To access this broader market, CSPs need to create a digital experience for their customers across all their enterprise services under a common brand. A digital experience enables enterprise customers to select services on-demand, manage them through a self-service portal and pay as they consume. To provide such a digital experience and become the single point of contact for all their customers' ICT needs, CSPs must put in place a cloud-based platform that encompasses multiple technologies, capabilities, and services. CSPs that do not acquire this capability risk disintermediation: they may lose a significant proportion of the high-value enterprise

business to competitors, from existing rivals to new-entrant software-defined networking (SDN) players and ICT resellers which are better equipped to address the bigger enterprise market opportunity.

Figure 2.1: Revenue for ICT and IoT business services by type in 2020



Source: Analysys Mason

3. An EPaaS can unlock enterprise market opportunities but is challenging to implement

Analysys Mason defines an Enterprise Platform as a Service (EPaaS) as a common platform for delivering three categories of network-enabled services to enterprise customers:

- business applications
- IT infrastructure services
- CSP cloud-enabled connectivity and communications service.

These are illustrated in Figure 3.1. An EPaaS presents these services in a unified way to customers through a common portal, supporting a digital experience for service selection, bundling, order, delivery, and payment. Advanced operators that have already implemented an EPaaS report that they are no longer engaged in a race to the bottom based on connectivity pricing. They can charge a premium when selling a combination of services across categories.

An EPaaS needs to deliver connectivity and communications services using the same digital paradigm it applies to business application and cloud service delivery. A key characteristic of an EPaaS is that it exploits cloud networking technologies, namely software-defined networking (SDN) and network functions virtualization (NFV). These technologies underpin two services that are the cornerstones of an EPaaS and the agility it provides to enterprise customers: SD-WAN and virtual customer premises equipment (vCPE). SD-WAN provides on-demand, programmable connectivity to multiple clouds across a choice of access networks. Virtual CPE enables CSPs to host value-added and traditional services, such as security, WAN optimization, enterprise mobility, and unified

communications, cost-effectively on customer premises or in the cloud, since these services are provided in programmable software rather than as hardware appliances that are expensive to install and manage.

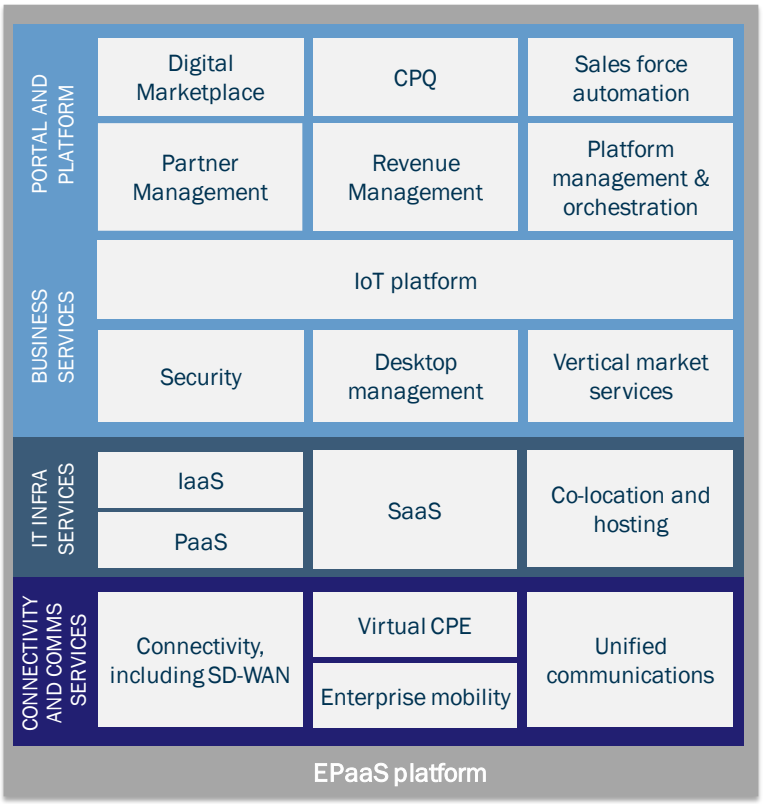


Figure 3.1: EPaaS components [Source: Analysys Mason, 2018]

Implementing an EPaaS is challenging. CSPs building such solutions for themselves typically take 12–18 months to implement the platform for the first cloud-based service. They then have the expense of operating it, including negotiating with new application and technology providers so that CSPs can continually add new features for competitive differentiation. One of the most time-consuming and costly aspects of creating an EPaaS is the adoption of SDN/NFV. This has a major impact on every aspect of delivering connectivity and communications services, from technology changes to network functions themselves, to the process and skillset changes that network operations staff need to work in a software-oriented way, to the wider commercial implications for sales, customer support, and procurement organizations of a cloud-based network.

Figure 3.2 summarizes these challenges and the effect they have on the timescale for launching an EPaaS.

Figure 3.2: Challenges associated with each phase of build-it-yourself EPaaS [Source: Analysys Mason, 2018]

Solution phase	Key challenges	Time to complete
Plan	Decide on scope of solution: an EPaaS requires more planning than a basic SD-WAN solution Build the business case, factoring in organizational changes, the cost of new process automation and systems integration Plan for culture change, including gaining organization-wide acceptance for the new, digital approach, and reskilling engineering and operations staff to work with SDN and NFV Define the EPaaS architecture, deciding on key architectural principles and technologies, for example use of open-source components within the platform Understand which platform functions to build, which to buy and	2–4 months

	which to reuse	
Pilot	Test individual vendor solutions to understand how they will fit with the EPaaS architecture Understand how multiple platform components perform together and how service chains (combinations of EPaaS services) will work	2–4 months
Implement	Build the portal and implement customer-facing processes and supporting systems. This may include building integration to existing systems where these are being reused in the platform Implement SDN and NFV, including the network cloud infrastructure and additional management and orchestration systems needed in these environments Create automated management/orchestration processes and start training personnel involved in operating SDN/NFV-based services	10–12 months
Operate	Maintain hard-coded integrations (APIs) to reused enterprise B/OSS and with physical network management systems Negotiate with application vendors to onboard new services to the platform to continue to differentiate from the rest of the market Scale up to support multiple customers and hundreds of service combinations Support customers' bring-your-own service and network function requirements	Ongoing

These challenges mean that CSPs are taking too long to bring an EPaaS to market, jeopardizing their ability to benefit from the growth opportunity that this approach represents. CSPs certainly cannot afford to take 12–18 months to deliver the first cloud-based service, such as SD-WAN, in markets where competing offers are available or imminent. Here, follower CSPs have a short window of opportunity to reach customers before they contract themselves to the early movers. Such CSPs need a shortcut to launch cloud connectivity services together with highly differentiated enterprise and vertical-specific offerings that minimize their investment risk while enabling them to deliver a credible solution.

CSPs will want to accelerate time to market for such offerings with minimum disruption to their organizations, even if they plan to become more network cloud-capable themselves in the future. The urgency of the B2B market opportunity means that CSPs cannot wait until they have a 'big vision' end-to-end network cloud platform in place across their enterprise and consumer domains. Such a platform is an excellent goal but from a pragmatic, business perspective, they need an EPaaS that can help them capture enterprise market share today.

4. A managed EPaaS shortens time to market and reduces risk

A 'Do it yourself' approach is by far the hardest route to an EPaaS. One large European operator reported that it took nine months to onboard a single virtual network function (VNF) onto its platform, at a cost of USD7 million. Others have spent months hard-coding integrations with their existing environments, which make their platforms expensive to maintain and time-consuming to expand with new features and services. To gain the greatest competitive advantage from their solutions, CSPs must be able to onboard services quickly from many different types of vendors and make them available through a common portal. However, multi-vendor integration and interoperability within an EPaaS environment is a large transformation that takes time.

Some CSPs are buying a managed SD-WAN service from a vendor to get to market faster; many are implementing SD-WAN for themselves. There are issues with both approaches. A managed SD-WAN service does not accommodate multi-vendor services, locking CSPs into a single vendor. If the CSP is implementing SD-WAN itself, it may have to support two or more different vendor SD-WAN platforms and portals to satisfy enterprise customer demand. Its portal(s) for standalone SD-WAN is(are) likely to be different from the portal(s) it has created for ICT service delivery, breaking the customer's digital experience, and multiple portals and platforms add management overhead, cost, and complexity. SD-WAN is just one EPaaS capability, with limited opportunity for commercial differentiation and added value. If a CSP offers standalone SD-WAN without a strategy for vCPE, it lacks the ability to sell third-party virtualized network functions (VNFs) from the cloud, such as security and unified communications, which bring revenue on top of its connectivity pipes. Managed SD-WAN does not provide an evolution to the broader IT and IoT services, leaving this complexity to the CSP.

A new managed EPaaS is appearing in the market, which is open and far more extensive than managed SD-WAN and shows promise in its ability to cut the cost, time to market, and risk associated with the DIY approach. This solution, which can be hosted in a private cloud, public cloud, or on the CSP's premises, meets CSP requirements for a solution they can bring to market quickly, with low business risk and organizational impact. The EPaaS supplied by a strategic third-party provider can be branded by the operator to provide differentiated enterprise and vertical-specific offerings for its enterprise customers. CSPs do not have to spend time building for themselves, or integrating, the full suite of business and operational support systems (B/OSS) that enable enterprise customers to combine and buy the three categories of business services. These systems include product catalog and pay-per-use charging and billing functionality. CSPs do not have to negotiate with a myriad of business applications and VNF service providers or concern themselves with the complexities of multi-vendor service onboarding; nor do they have to build the automation that supports all the service activation, SLA monitoring, and lifecycle management of the services and their cloud-based platform.

There are therefore three key benefits of a managed approach to an EPaaS:

- **Business strategy and differentiation**: CSPs can focus their energies on their business strategy for NaaS, PaaS, IaaS and IoT services, and winning enterprise customer deals. As the managed EPaaS comes with a digital marketplace, CSPs can differentiate themselves from the start through the services they choose to offer to their enterprise customers, based on their understanding of their local markets. For example, one CSP may choose to be first mover in its market with SD-WAN and vCPE; another may see a market opportunity for IaaS and SaaS services, while a third may prefer to start its cloud B2B journey with security or IoT services. Each can benefit differently from the variety of services in the EPaaS provider's digital marketplace and its roadmap for adding further service providers over time.

- **Ease of implementation**: CSPs do not have to address the complex technical delivery of a full-stack SDN/NFV, including its SDN and NFV capabilities and digital experience aspects. From a maintenance and operations perspective, CSPs only need to deal with one vendor – the managed EPaaS provider – rather than multiple suppliers for all the value-added services they sell. CSPs will choose the services and vendors they want, but the integration, interoperability, and commercial aspects of the services are the responsibility of the managed EPaaS provider.

- **Ease of market entry**: CSPs can shrink time to market for a full-stack SDN/NFV solution from a year or more to weeks if the solution is hosted and managed by a third party. A managed service is significantly less expensive to bring to market as a result, requiring minimal capex.

CSPs should nevertheless evaluate a managed EPaaS from the following perspectives:

- **Extent of value-added service ecosystem**. CSPs currently monetize a limited number of value-added ICT services because they have not been able to acquire and integrate such services easily into their environments or to deliver them with an acceptable digital experience. CSPs should look at the breadth of services in the managed EPaaS provider's digital marketplace to determine how rich and differentiated a portfolio they can offer to their enterprise customers from the outset. An extensive ecosystem, coupled with a pay-as-you go licensing model, should mean that CSPs can address a long tail of customers with minimal overheads. CSPs should check that the managed EPaaS provider has an active program for recruiting third-party vendors to its marketplace and a community model for co-development and collaboration that will further enrich the marketplace to the CSPs' benefit.

- **Flexibility of commercial model and relationship**. The managed EPaaS provider should support a range of business models including revenue sharing based on a risk/reward relationship. CSPs should be able to pay as they grow, without a large commitment when they first sign up for the service, and only for the licenses of the features and functions they and their enterprise customers consume. In a risk/reward relationship, the managed EPaaS provider is as committed as the CSP to winning new business. The managed EPaaS provider should have the ability to act as a third-party reseller on behalf of the CSP to drive new sales.

- **Open integration with the CSP's environment**. The managed EPaaS should either provide a full set of customer-facing and back-office systems necessary to support the entire EPaaS delivery process or make it easy to connect to CSPs' existing portal and/or management systems. The managed EPaaS should have an open, modular architecture and the flexibility for CSPs to plug in their own systems, applications, and services in place of, or in addition to, those provided with the platform. For example, one CSP may wish to play the role of final biller, ingesting the managed EPaaS's rating and charging data into its billing system, while another may choose to use both the billing and charging functions within the managed EPaaS provider's platform. CSPs with existing enterprise services should be able to migrate them onto the managed EPaaS so that they can be offered with a consistent experience alongside the services in the platform's digital marketplace. The platform should be based on open standards, open APIs, and open source components to reduce integration effort.

- **Security of the hosting environment**. CSPs that prefer the EPaaS to be hosted in the provider's facilities should check that its data centers have the highest security certifications from key organizations such as the Privacy Shield Framework, PCI, and Cloud Security Alliance. Each CSP should have a partitioned, separately managed instance of the EPaaS.

- **Future-proof technical capabilities**. Pricing will be key in the highly competitive ICT market, so CSPs will want their managed EPaaS provider to be as efficient as possible. Since critical enterprise business will depend on the hosted EPaaS, CSPs will also seek reassurance that it is highly available and resilient. Such qualities – efficiency, availability, and resilience – are best delivered using cloud-native technologies, such as microservices, containers, and orchestration, and a managed EPaaS provider will need to demonstrate its credentials in this respect.

- **Support for bringing the EPaaS in-house as a CSP's own capabilities mature**. If the EPaaS platform is based on open standards, open APIs, and open-source components, it should be easier to transfer its operation to a CSP over time and should the CSP wish to take this route. CSPs may wish to get to market quickly with a managed solution but, in parallel, develop an organizational ability to work with SDN and NFV. They will want reassurance that they can take back all or partial ownership of the EPaaS once this is in place.

5. Netcracker creates the market's first managed EPaaS: Business Cloud

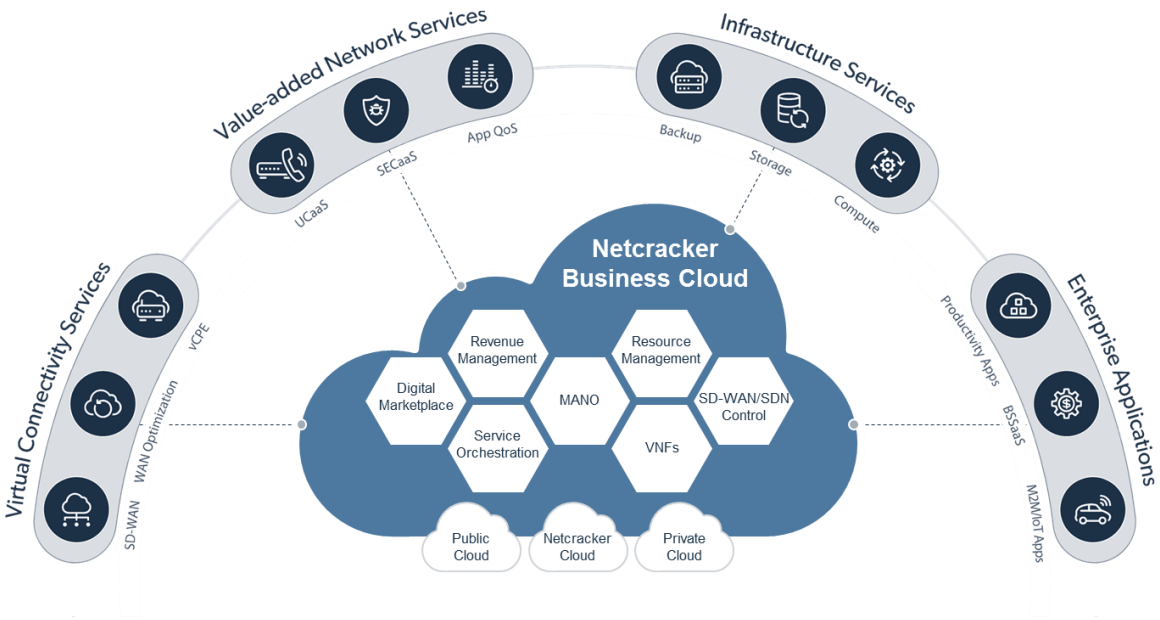
Netcracker is a wholly-owned subsidiary of NEC Corporation. It is a provider of business and operations support systems, SDN and NFV systems and professional and managed services.

Netcracker has brought to market the first managed EPaaS – Netcracker Business Cloud – which extends across all three categories of business services and leverages Netcracker's BSS capabilities, orchestration, and support for SD-WAN and vCPE. It is built using cloud-native technologies for modularity, agility, and resilience. Netcracker's Business Cloud can be hosted in its data centers, a public cloud, across multiple clouds or run on premises in a CSP's cloud. Netcracker's Business Cloud is offered in a revenue-sharing model to reduce investment risk for its CSP customers. This model incentivizes Netcracker to help CSPs sell their cloud B2B services and offers go-to-market consulting and customer support.

Netcracker runs its Business Cloud platform, including customer-facing and operational systems, and digital marketplace, in its/NEC's wholly owned data centers, which are secured using a framework endorsed by multiple government agencies. It will, however, support CSPs that wish to run all or part of the stack on their own premises or in hybrid mode across Netcracker and CSP data centers. The platform has a modular, microservices-based architecture so that CSPs can choose to use only the parts they need and replace functionality with their own systems if they prefer. CSPs can also onboard their own applications into Business Cloud and combine them with the 200+ VNFs and industry vertical IT applications in Netcracker's partner ecosystem. Netcracker expects some CSP customers to augment its ecosystem with their own, for example IoT marketplaces, as the Netcracker Business Cloud community grows. Figure 5.1 illustrates the components of Netcracker's Business Cloud.

Netcracker's first announced customer for Business Cloud, a Tier 1 operator in Latin America, took twelve weeks to create and launch two SD-WAN services for SMBs and large enterprises respectively. Another Tier 1 operator in North America launched a Netcracker Business Cloud-based IoT/M2M enterprise offering in four weeks.

Figure 5.1: Netcracker's Business Cloud capabilities [Source: Netcracker 2018]



6. Conclusion

Analysys Mason believes that a managed EPaaS is a welcome addition to a market where CSPs have struggled to implement such a solution for themselves. It can significantly cut time to market, giving CSPs a fighting chance of retaining their valuable enterprise customers in a rapidly changing market. Netcracker benefits from first-mover advantage in bringing such a solution to the market and is able to leverage its, and parent company NEC's, considerable strengths in B/OSS systems, NFV/SDN technologies, partner ecosystem development, financing, and outsourcing. Netcracker will need to demonstrate that it can continue to add value to its platform faster than CSPs can develop for themselves and that it can attract and grow a community of partners. This is not a traditional activity for the vendor.

CSPs should consider this option for EPaaS market entry carefully, especially if they operate in highly competitive markets or want to introduce differentiated enterprise services into a new and uncertain market without making a large investment. CSPs should weigh up the advantages of getting to market quickly through a vendor versus the longer and more disruptive and expensive approach of building a solution for themselves; if the EPaaS is open enough, they may consider using a combination of both. The number of greenfield markets for cloud B2B services is rapidly shrinking due to new-entrant activity round the world. With a managed EPaaS, CSPs can create first-mover advantage for themselves and, even in markets where cloud B2B offers already exist, build differentiated propositions using a more extensive digital marketplace than competitors have currently been able to develop themselves.

About the authors

Caroline Chappell (Research Director) is the lead analyst for Analysys Mason's Software-Controlled Networking research program. Her research focuses on service provider adoption of cloud and the application of cloud technologies to fixed and mobile networks. She is a leading exponent of SDN and NFV and the potential that these technologies have to enhance business agility and enable new revenue opportunities for service providers. Caroline investigates key cloud and network virtualization challenges, and helps telecom customers to devise strategies that mitigate the disruptive effects of cloud and support a smooth transition to the era of software-controlled networks. Caroline has over 25 years' experience as a telecom analyst and consultant.

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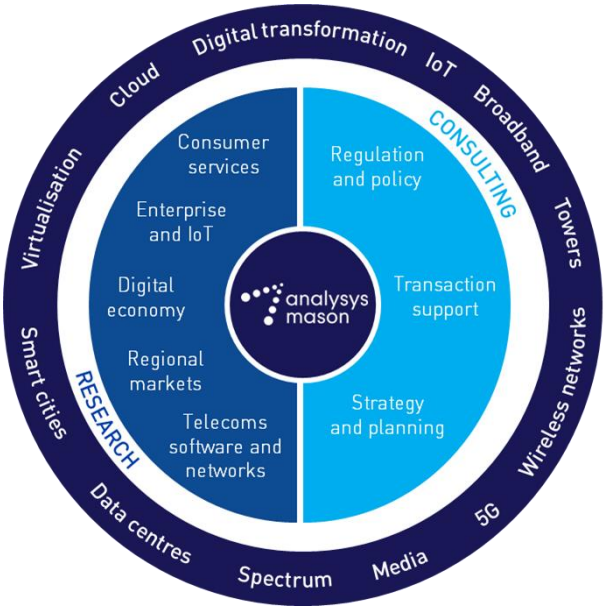

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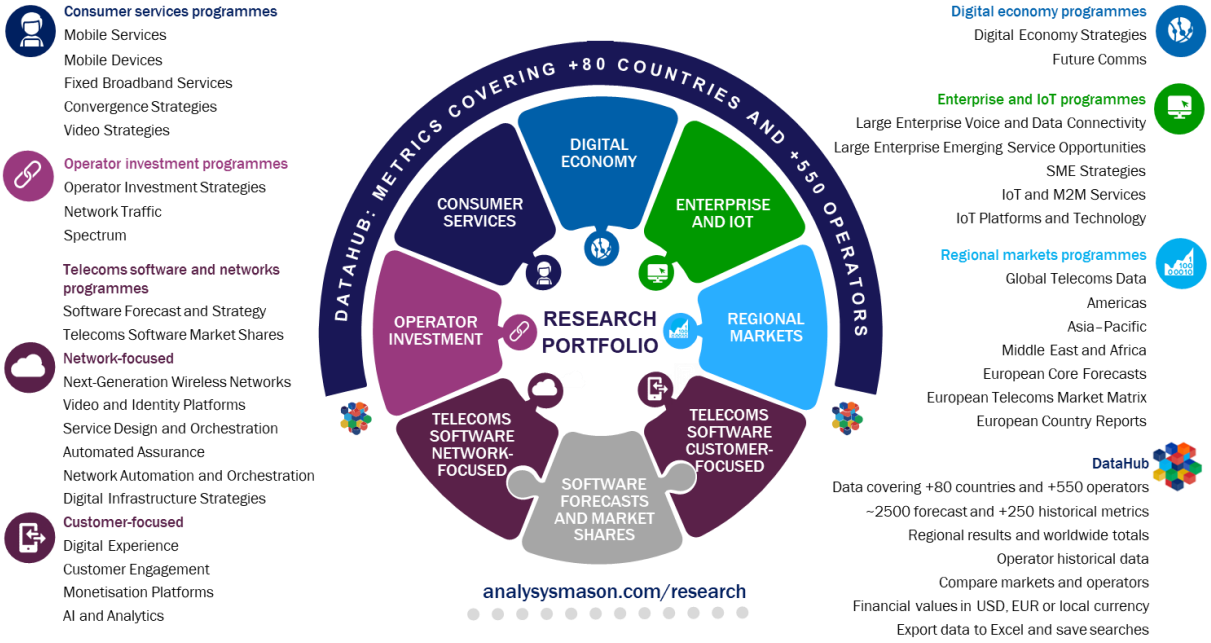

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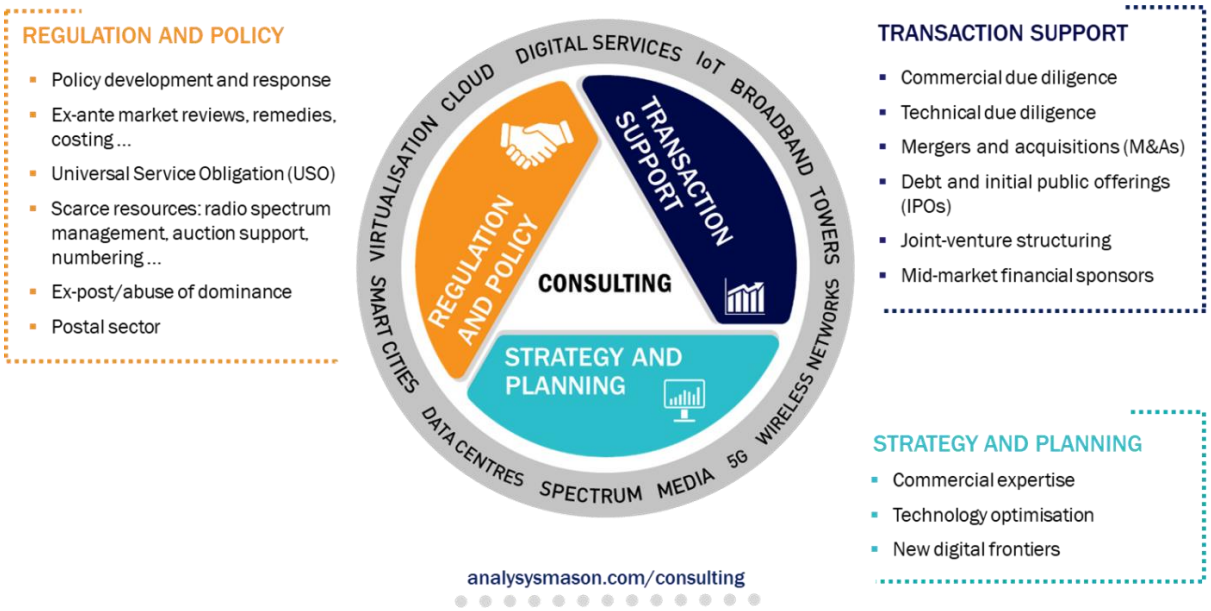

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