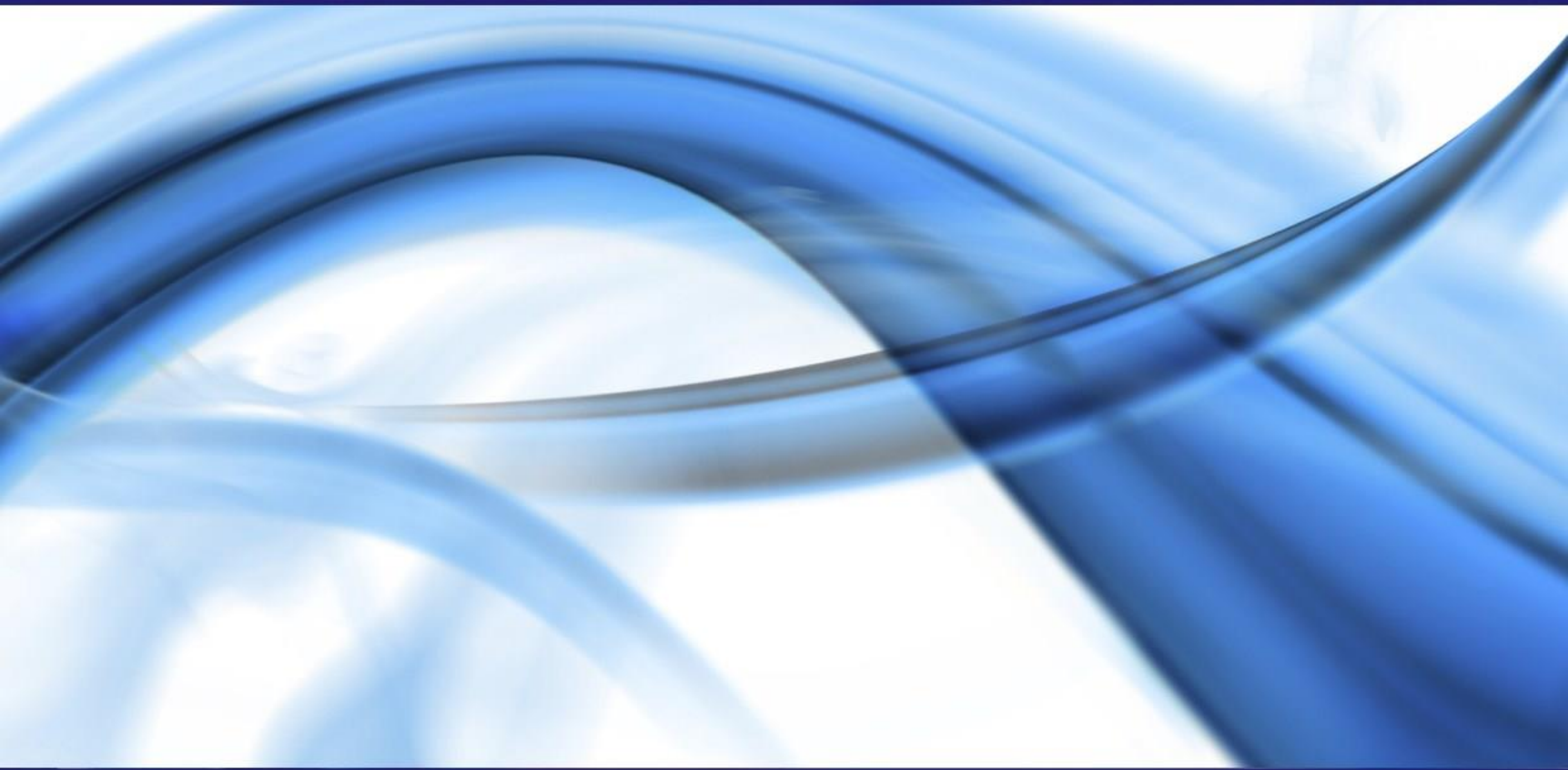

White paper for Openet

The crux of CSP-to-DSP transformation: agile architecture and open platforms

May 2018

John Abraham

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1. Executive summary

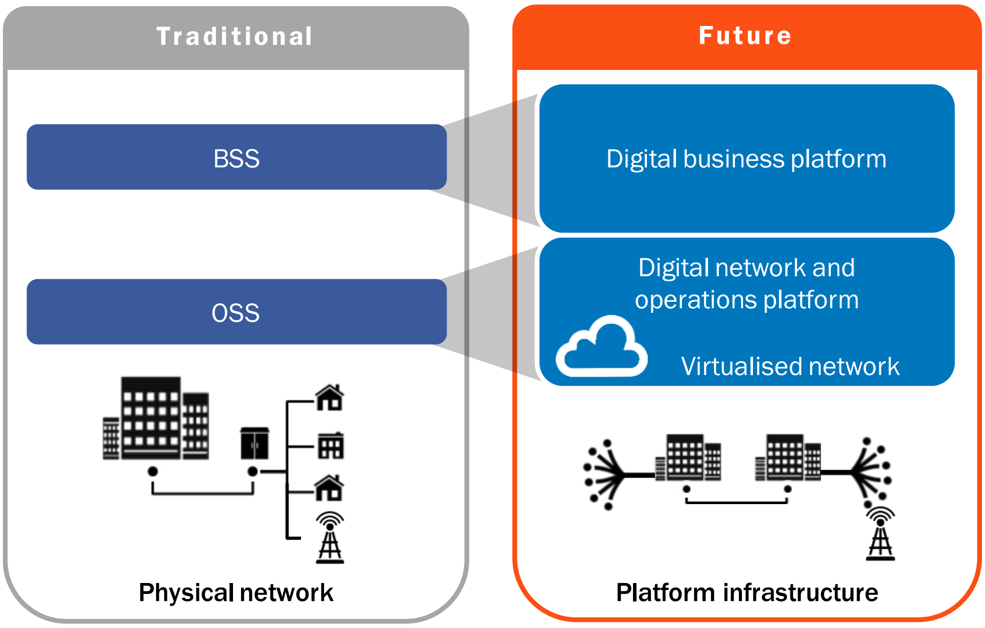
Most communications service providers (CSPs) worldwide are pursuing some sort of digital transformation. Across the industry there is broad acceptance that there is no one-size-fits-all approach to transforming the underlying infrastructure and that every CSP's digital transformation journey is a unique one. This is because a CSP's approach to digital transformation depends on a number of factors, the most important of which include its strategic priorities, competitive pressures, region of operation and state of existing infrastructure.

The bigger question for CSPs is how best to transition from a CSP to a digital service provider (DSP) without disrupting ongoing operations. One of the biggest bottlenecks in a CSP's digital transformation journey is its existing systems and architecture frameworks. Most CSPs are weighed down by legacy infrastructure and proprietary hardware systems, which severely restrict their ability to extract value from the deployment of new software systems. These traditional systems are deployed as monolithic software applications that cannot fully support modern requirements such as horizontal scalability, reusable modules, continuous integration/delivery and cloud-based deployment. CSPs therefore need to adopt modern methods of application development, architecture frameworks and deployment models in order to transform into software-powered entities.

A microservices-based, cloud-native systems framework can provide CSPs with significant gains in efficiency and agility, in addition to decluttering a complex architecture. Achieving this visionary architecture will require extensive industry collaboration and may involve profound market disruption. A cloud-native framework has the potential to radically alter how CSPs engage with vendors, since it enables seamless interconnection among a variety of vendor partners, which can help to create an ecosystem of plug-and-play partners for software applications.

To accelerate their transition into DSPs, CSPs will need to embrace next-generation BSS and OSS systems (see Figure 1). The next generation of BSS and OSS systems, called the digital business platform (DBP) and digital network and operations platform respectively, will be designed for the cloud and will be based on a software platform model of operations. This will require CSPs to design and prepare for cloud-based architecture and delivery model models, which will also enable them to engage with a larger ecosystem of partner services.

Figure 1: Overview of the transformation of BSS and OSS to platforms for business and operations [Source: Analysys Mason, 2018]



Source: Analysys Mason

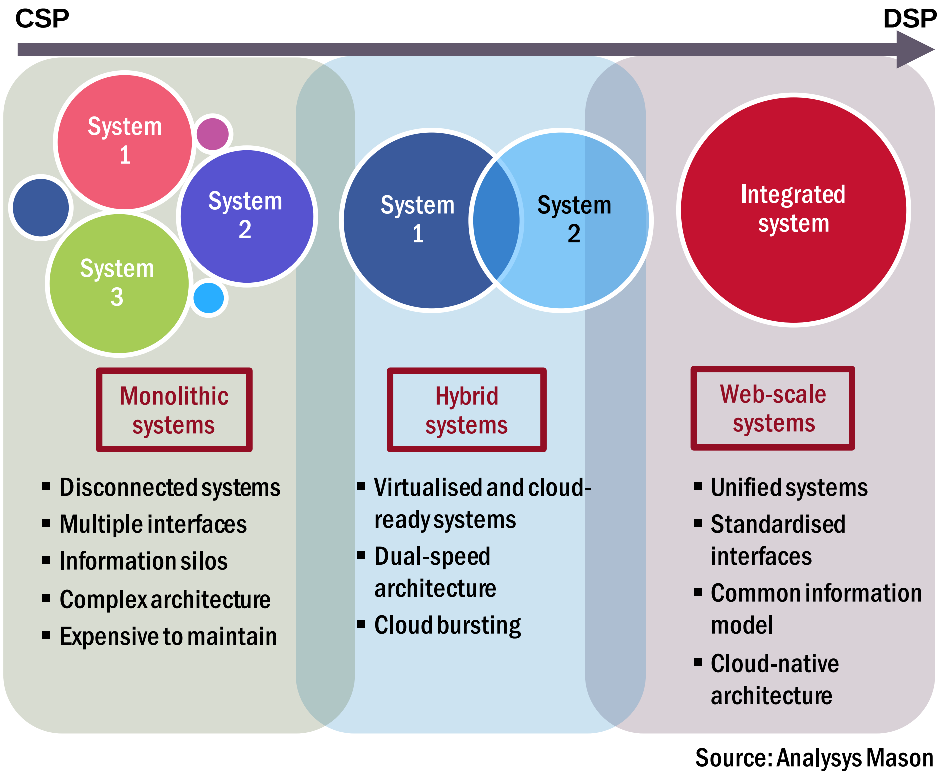
This white paper discusses the key factors which are driving CSPs to evolve their architecture and operations frameworks, and how the evolution to a cloud-native microservices-based architecture can significantly transform how CSPs engage with vendors.

2. Current state of play: why CSPs need to evolve their architecture

Existing BSS systems with their legacy frameworks represent a key bottleneck for CSPs in their journey to become DSPs. Many CSPs have built up extensive infrastructure over many decades, including the associated support systems needed to support specific requirements. As a result they now have disparate architecture frameworks with multiple information silos, often at the departmental level. Traditionally, every time a new system requirement or use case was defined, an adjunct system was added to the CSP infrastructure to specifically support the new use case. Such a use-case centred approach to new system deployment increased overall system complexity, as well as significantly reducing the CSP's agility.

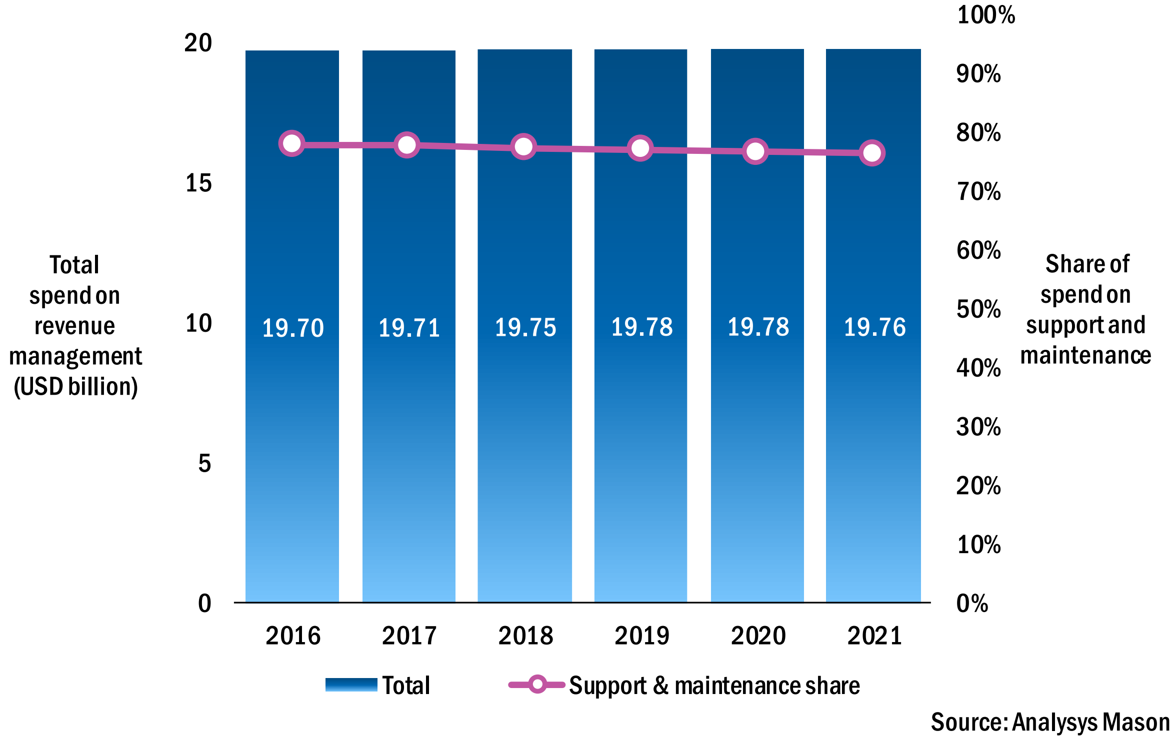
In addition, CSPs' traditional system architectures were primarily based on monolithic architecture frameworks. Monolithic software systems are self-contained units which typically include a database, user interface and server application. While such systems are simpler to develop and deploy, they impose severe constraints when it comes to scalability, extendibility and performance. The ongoing development of such systems is difficult and they are often expensive to support. In addition, most CSPs have multi-vendor environments which makes monolithic architecture even more cumbersome. This is driving CSPs to shift their architecture away from complex and slow monolithic systems towards web-scale frameworks adopted by digital-native companies. Such a transformation can take several years and will involve a significant period of hybrid operations in the intermediate period, when CSPs will need to balance both legacy and cloud-based system frameworks in their infrastructure (see Figure 2).

Figure 2: A systems overview of CSP-to-DSP transformation [Source: Analysys Mason, 2018]



For most CSPs today, ongoing development of disparate systems, legacy frameworks and information silos has driven up their support and maintenance costs. For revenue management systems, for instance, which are the most deeply integrated of CSPs' BSS systems, support and maintenance could make up as much as 80% of a CSP's total spend (see Figure 3). Leading CSPs are therefore looking at ways to reduce their legacy maintenance costs so that they can divert funds to deploy all-new stacks.

Figure 3: Spend on support and maintenance as a % of total CSP spend on revenue management systems [Source: Analysys Mason, 2018]



3. Cloud-native computing: the future of systems architecture

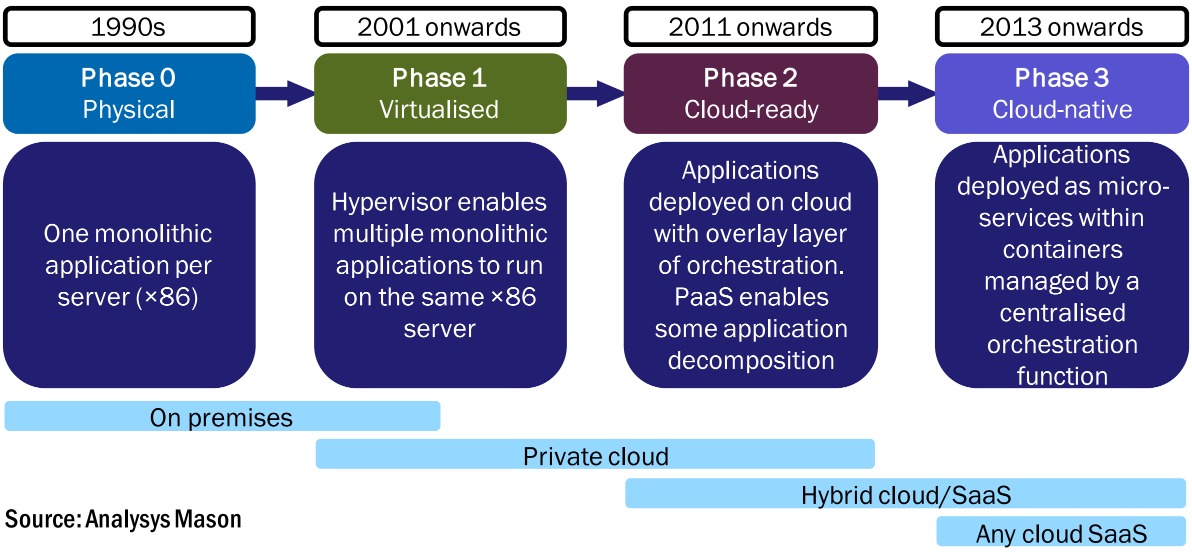
Traditionally, software applications have been designed as sets of tightly coupled functions/tiers that need to be deployed and executed together as monolithic entities. CSPs that want to become DSPs are finding that monolithic software architecture is too cumbersome and slow to support the pace of change required in a digital economy. Nor does this kind of architecture perform well in a cloud environment. This is because a monolithic architecture does not enable the differentiated and highly efficient scaling of individual application components, or the agile scheduling of components to maximise their performance and minimise resource consumption.

Applications in a cloud-native architecture are developed as microservices that are stateless (i.e. they do not individually have persistent data storage) and loosely coupled. Larger systems can be composed of microservices, since the latter's loosely coupled status means they are reusable in different application contexts. There is no generally agreed size for a microservice. The greater the granularity of microservices, the more flexibility CSPs have to compose them into new applications, but they must also consider performance, security and other trade-offs. Microservices share a common data framework, which allows for greater interoperability between compliant microservices from different vendors. Each one can also be easily updated at runtime without affecting others in the composition. Versioning and roll-backs are also simpler than for monolithic applications.

An important component of cloud-native computing is the 'DevOps' operations framework. Under a DevOps model, development and operations teams which were traditionally kept separate are brought together. This allows for greater coordination from development, deployment to operations, which has a huge impact on the CSP's agility. With a conventional software development framework, support and maintenance can account for up to 80% of a CSP's systems investments (see Figure 3 earlier), as their complex frameworks require large support infrastructures. In contrast, a DevOps framework can dramatically reduce a CSP's support and maintenance footprint through its use of automation and other principles such as continuous integration and continuous delivery (CI/CD), which supports rapid integration and deployment of new software functionality.

The delay in CSPs adopting cloud-native architecture frameworks is impeding their progress to becoming DSPs. The ability to develop and deploy software at cloud-native speeds and cost efficiencies will become the new benchmark for DSPs as telcos continue their evolution from virtualised to cloud-ready to cloud-native (see Figure 4). The software-driven business of FANG companies (i.e. Facebook, Amazon, Netflix and Google) established the principles of cloud-native computing: horizontal scalability; reusable, loosely coupled and open components; continuous integration and delivery; and container-based deployment. These characteristics result in the highest levels of efficiency, resilience and speed when delivering software in the cloud, as well as driving significant savings through higher automation and lower support costs.

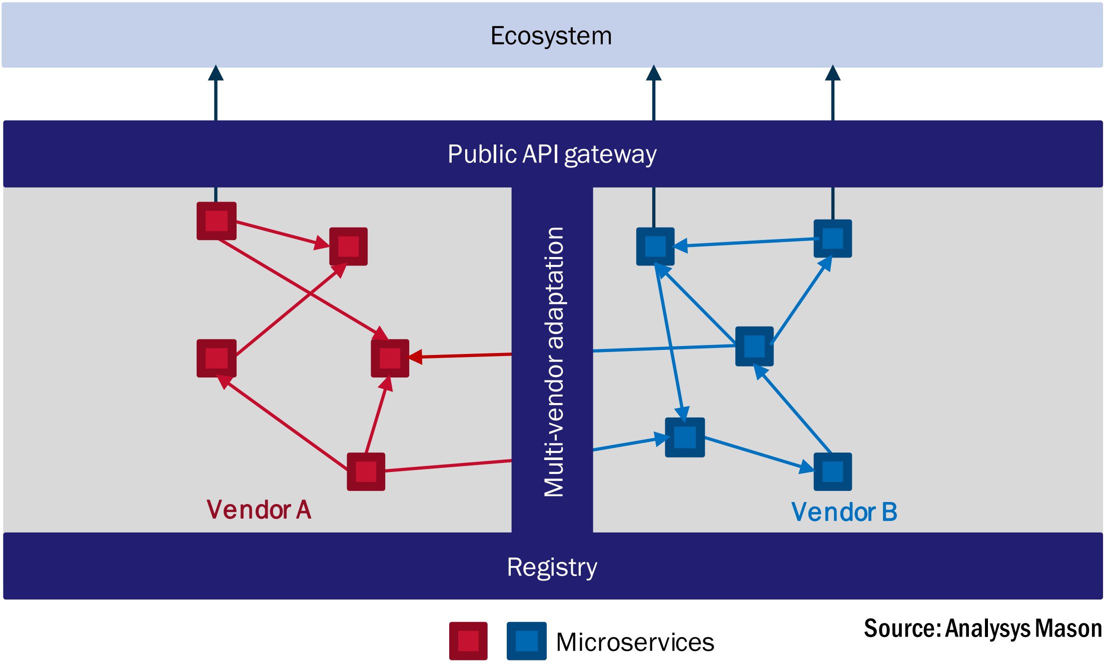
Figure 4: Evolution of cloud-native computing [Source: Analysys Mason, 2018]



Source: Analysys Mason

Cloud-native architecture can also drive greater synergies for a multi-vendor environment, through extensive use of standardised application program interfaces (APIs) which enable seamless interconnection between applications. In theory, this can enable telcos to choose specific applications from multiple vendors which can then be deployed seamlessly (see Figure 5). This approach can give telcos greater control over their core architecture framework, by creating an ecosystem of potential partners, some of whom could even be cross-industry (unlike the traditional approach, where CSPs are tied down to a very limited number of telco-focused vendors).

Figure 5: Microservices-based multi-vendor architecture [Source: Analysys Mason, 2018]



4. Business and operations platforms of the future

As CSPs increasingly embrace cloud-based technologies and business models, which arguably is the most extensive of technology changes telcos have undergone to date, there is a need to plan for incorporating next-generation BSS and OSS systems to enable a software-driven architecture model.

The next generation of BSS and OSS systems – namely the digital business platform (DBP) and digital network and operations platform (DNOP) respectively –will be designed for the cloud and will be based on a software platform model of operations.

4.1 Digital business platform

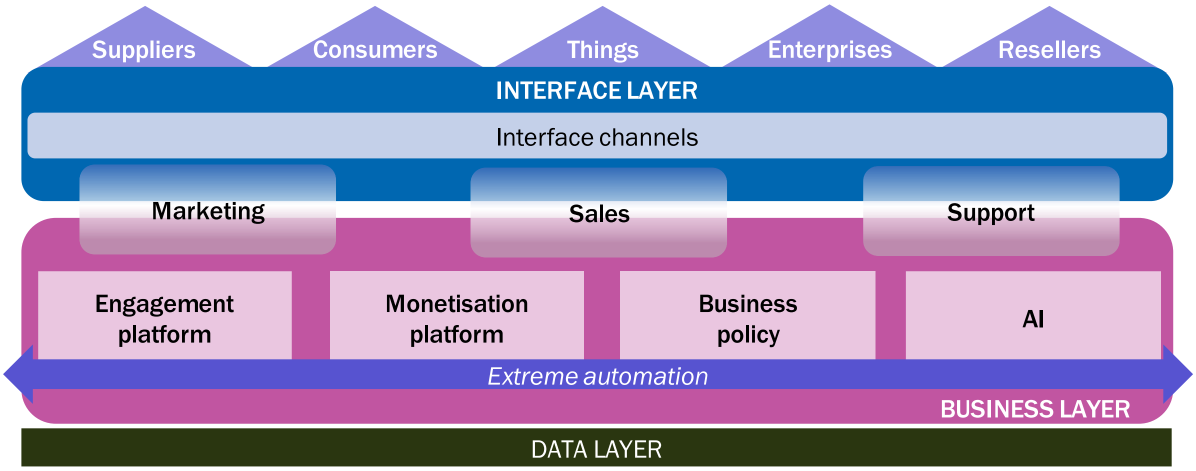
A digital business platform is a framework for a federated system to automate the definition, instantiation, execution and lifecycle management of CSP customer engagement, partner enablement and monetisation functions. The digital business platform of the future will support a wide variety of channels to consumers and enterprises, both digital and assisted. This will include digitised support for 'things' as they become consumers of CSPs' services. Adopting a digital business platform will require CSPs to adopt cloud-based delivery models for all software support systems. For most CSPs, this will involve activities such as changing their team structure to suit online delivery models, adopting new process frameworks, and ensuring the seamless transition of customers and services from legacy systems.

It is expected that most CSPs will adopt a hybrid approach to start with, as they steadily evolve to adopt a cloud-based operations framework model. Tier 1 CSPs from developed markets are expected to embrace cloud-native deployment in the medium term. Smaller CSPs and mobile virtual network operators (MVNOs) will consider vendor-driven 'anything as a service' (XaaS) deployment models.

As can be seen in Figure 6, the digital business platform framework will have three types of functional element:

- the **interface layer** will include all aspects of the system that relate to interaction with end users (e.g. consumers, things and enterprises)
- the **business layer** will include systems that enable engagement and monetisation, with advanced AI used to drive automation
- the **data layer** will contain all relevant information about CSP customers, partners and services and provide support for emerging machine-learning and data-mining capabilities.

Figure 6: Overview of digital business platform [Source: Analysys Mason, 2018]

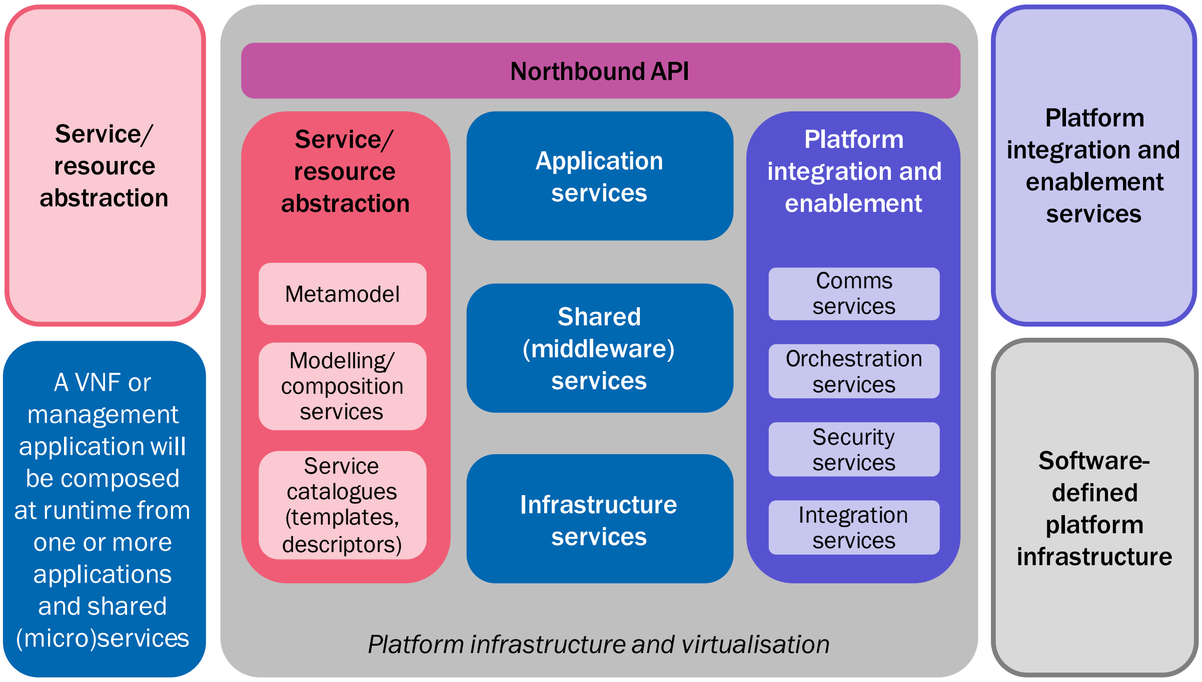


Source: Analysys Mason

4.2 Digital network and operations platform

A digital network and operations platform (DNOP) will be needed to drastically reduce the ongoing cost of network operations and support 5G. A DNOP encompasses both software-defined network (SDN) components and the software-driven management and control of those components, as well as the customer-facing services composed from them (see Figure 7). Leading CSPs are defining and building all-new DNOPs designed from the ground up to manage and execute an NFV/SDN-enabled 5G network and a programmable wide area network. CSPs will source DNOP services from different suppliers, including vendors and open-source communities. CSPs will differentiate themselves by curating their own sets of DNOP services, and extending and changing these over time to meet market needs.

Figure 7: Overview of DNOP architecture for the automated delivery and management of the cloud-native network [Source: Analysys Mason, 2018]



Source: Analysys Mason

5. Openet

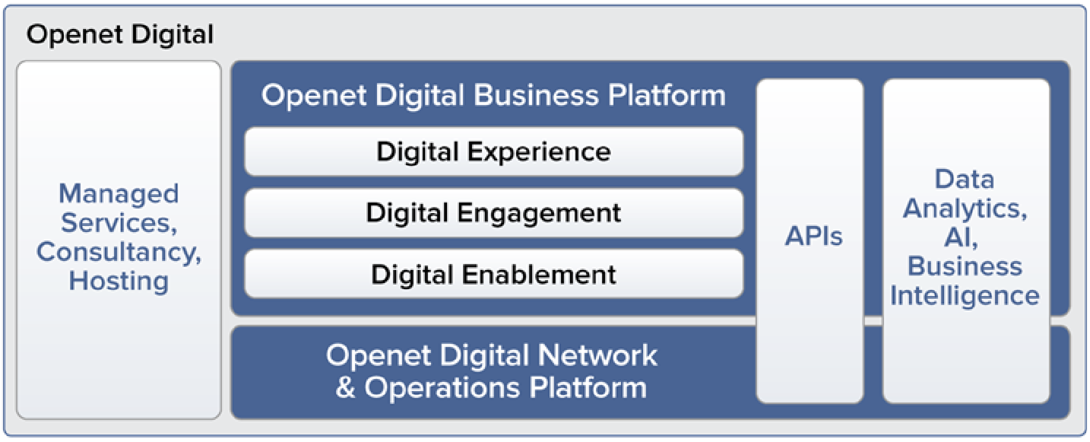
Openet's Digital Business Platform is an end-to-end digital BSS platform built on open APIs. The platform adopts a best-of-breed approach, with solutions from Openet and its technology partners. The Openet Digital Business Platform can be implemented within as little as 14 weeks for greenfield sites and has been shown to reduce legacy BSS/OSS costs by up to 90% for some CSP deployments.

The platform enables CSPs to quickly implement systems from scratch using pre-integrated solutions and pre-defined use cases. This approach is often used for 'digital first', sub-brands/MVNOs and also as a 'plan B' to run alongside lengthy and expensive transformation projects.

Openet's Digital Business Platform is available on premises, or on private, hybrid and public cloud.

Openet and its partners also provide support for a DNOP framework, to deliver end-to-end open digital OSS/BSS platforms, as illustrated in Figure 8.

Figure 8: Overview of Openet's Digital Platforms offering [Source: Openet, 2018]



6. Conclusion

Modern software methodologies and software based on new cloud-native architecture and DevOps-centred delivery models will be at the heart of how CSP support functions are designed, developed and deployed in the future. To accelerate their digital transformation, CSPs need to embrace the evolution of traditional BSS and OSS to next-generation digital business platforms and digital network and operations platforms driven by the rise of software-driven architectural models for engagement, monetisation, network and operations. This can be highly disruptive and transformational in terms of how CSPs run their businesses, as it will enable their operations to be supremely agile, and well equipped to engage with a wider ecosystem of partners and services.

About the author

John Abraham (Principal Analyst) is part of the BSS practice in Analysys Mason's Telecoms Software and Networks Research team. He leads our Monetisation Platforms programme and our research into digital experience for monetisation platforms, as part of the Digital Experience programme. John also contributes to our research into cloud-native architecture models, which is covered as part of the Software-Controlled Networking programme. John has been part of the telecoms industry since 2006, and joined Analysys Mason in early 2012. He has worked on a range of telco projects for operators in Africa, Europe, India and the Middle East. Before joining Analysys Mason, he worked for several years for a BSS vendor and before that for Dell Inc in India. John holds a bachelor's degree in computer science from Anna University (India) and an MBA from Bradford University School of Management (UK).

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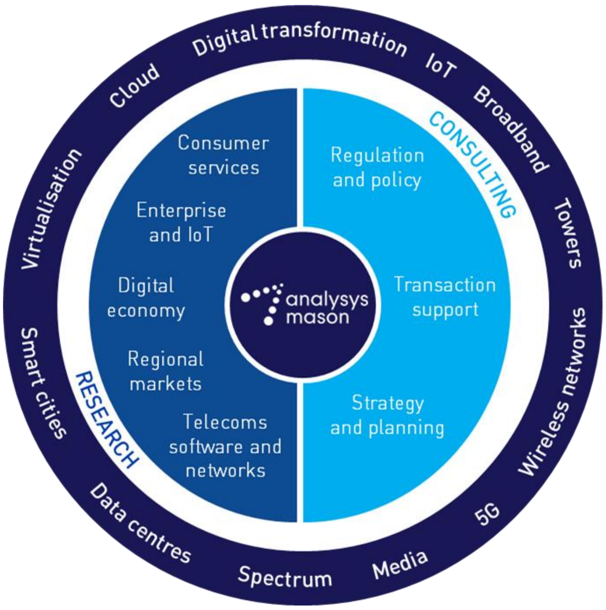

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