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COMPETING AT THE PACE OF DIGITAL-NATIVE PLAYERS – CSPS' CRITICAL SHIFT FROM MONOLITHIC TO PLATFORM-BASED DIGITAL ENABLEMENT

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1. Executive summary – Digital enablement platforms

Communications service providers (CSPs) are engaging in the next round of transformation to compete with other CSPs and aggressive digital-native web-scale companies like Amazon and Netflix. To be more competitive, CSPs need greater agility and faster time-to-market (TTM) capabilities. A new, key method for achieving greater agility and TTM is by deploying platform-based digital enablement capabilities. For many CSPs, the most natural place to start is with digital enablement of customer engagement.

Deploying digital enablement capabilities on top of a platform is a revolutionary change to the way CSPs deploy technology, impacting their business internally and externally. This revolutionary change embodies new web-scale methods including cloud architecture, microservices, artificial intelligence (AI) and a DevOps development process. The result is shortened development and deployment time for new automation capabilities that have been throttled by traditional OSS/BSS methods.

A digital enablement platform can help with a wide range of systems. However, changing an entire BSS is risky, costly and time-consuming. CSPs can leave the core BSS in place for the present but begin their transformation by applying the platform and benefit from improved customer engagement.

CSPs are facing, and will continue to face, rapid change in customer engagement. Customers expect CSPs to keep pace with the digital experience provided by web-scale players. Digital experience started with web self-service and recently extended to smartphone apps and social media. AI is maturing and beginning to support a variety of use cases, such as automated attendants. It is impossible to predict what will come next, but we know future changes will occur more rapidly than past ones. A digital enablement platform focused on care, commerce, omni-channel and other areas that directly impact customer engagement and experience will help CSPs cope with these rapid changes in digital experience.

To provide greater agility and TTM, a digital enablement platform leads CSPs to operate in a lean manner. The platform uses cloud-native microservices that are lightweight, self-contained and loosely coupled. It enables CSPs and their suppliers to use DevOps methodology to rapidly develop and deploy new capabilities. These methods have been widely deployed by the web-scale players, and in other industries. A digital engagement platform is a way for CSPs to benefit from these methods to ensure greater agility and TTM (see Figure 1).

However, new technologies and approaches do not exist in a vacuum. They must coexist for a time with the large set of current legacy systems and operational processes currently in use. Fortunately, the digital enablement platform offers CSPs the flexibility to adopt one of several available approaches that delivers best value (irrespective of CSPs' status in the transformation journey). Two techniques that are proving useful for CSPs currently engaged in deploying platforms are the following:

- Working in a dual-speed architecture mode via an overlay architecture – when existing systems are adequate but certain aspects required greater level of agility. The existing systems are expected to eventually be replaced, but may coexist for many years.
- Evolving existing systems into a platform over time – this approach works if the incumbent vendor has a strong roadmap for moving deployed systems to the platform.

CSPs intending to undertake digital transformation projects should engage with a digital partner that has a wealth of experience in the telecoms sector, and works with cloud-native microservices architecture and agile DevOps

processes. In addition, the digital BSS partner will support the CSP across the entire transformation journey, from strategic planning, design and delivery, and implementation, to providing ongoing support and training.

Figure 1: Adopting a microservices-driven platform with DevOps principles delivers multiple benefits [Source: Analysys Mason, 2018]
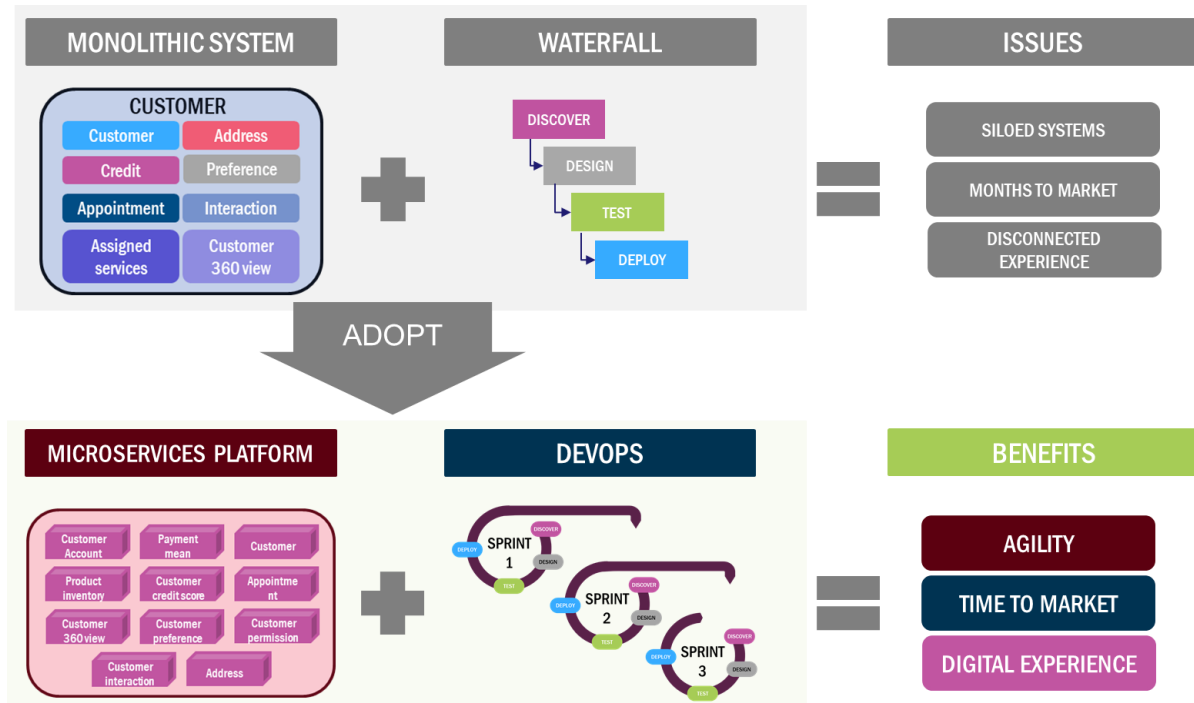
2. Digitalisation for CSPs is a necessity rather than a luxury

Nearly all CSPs have embarked on some sort of digital transformation process, which can be wide-ranging. Those CSPs most committed to transforming their businesses have already invested heavily in extensive changes. Figure 2 calls out three broad dimensions of a CSP's digital transformation.

Overall, digital transformation will take a long time. Along the way, new technologies and methodologies will come into play that were not originally part of the digital transformation plans. One of the most fundamental characteristics of digital transformation is the agility to embrace new needs and new technologies without completely disrupting the work that has been accomplished and the work already planned. A digital enablement platform is one of the new methods that helps CSPs to be more agile and adapt to new demands.
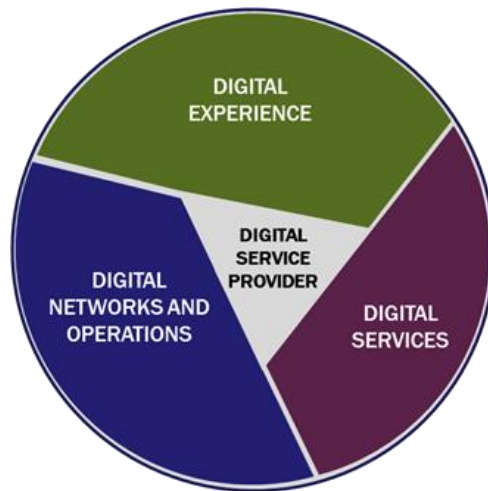
Figure 2: Three key capabilities of digital service providers [Source: Analysys Mason, 2018]

2.1 Improved customer engagement is an important method for CSPs to reduce churn

Nearly all CSP markets are saturated, with limited to no subscriber growth. It is therefore critical that CSPs reduce churn and protect their existing customer base. We know from recent studies that poor customer experience is an important and growing reason for churn[1].

CSPs should deliver a simple and consistent experience to their customers across all channels, at all times and in a contextual manner (see Figure 3). They also need to manage customer journeys that increasingly span multiple channels[2], especially for digital-savvy customers. Very few CSPs do this today, and nearly all need to make significant improvements in customer engagement. It was traditional development methods that led to these problems. Subsequently, well-intended improvements were developed and deployed in highly fragmented systems that rarely worked well together. A digital enablement platform is a revolutionary new method to improve customer engagement in ways that maintain the overall customer experience context.

Figure 3: Key characteristics for consideration to enhance customer experience [Source: Analysys Mason, 2018]

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[1] Based on Analysys Mason's connected consumer survey

[2] In the same survey, customer use of digital channels correlated with a +13% increase in net promoter score (NPS).

2.2 Most CSPs are looking to improve their operational digital maturity across key customer experience characteristics

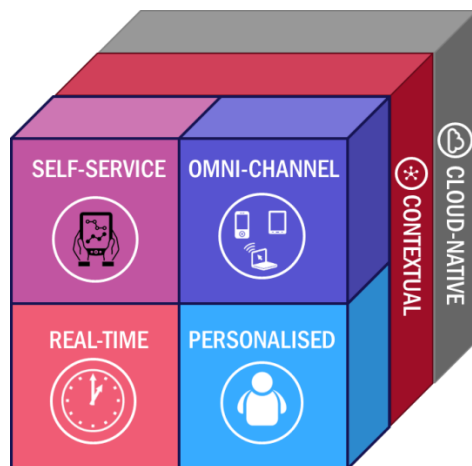CSPs that plan to take digital initiatives need to assess and understand their current digital maturity to enable them to plan their future strategy. Analysys Mason's in-depth assessment of CSPs' digital capabilities highlights a lack of maturity across all key characteristics (see Figure 4). Our research highlights that CSPs have taken initiatives to build presence on digital channels. However, in most cases, this simply means that they have expanded their functional capability from a single channel to multiple channels. CSPs must enable contextual consistency across channels to achieve a true omni-channel experience. This requires integrating the channels, which many CSPs still have not achieved. This is also essential to provide a truly personalised engagement. Furthermore, CSPs can provide up-to-date tariff usage information to customers in near real-time, but operational insights, such as marketing campaign performance, is lacking.
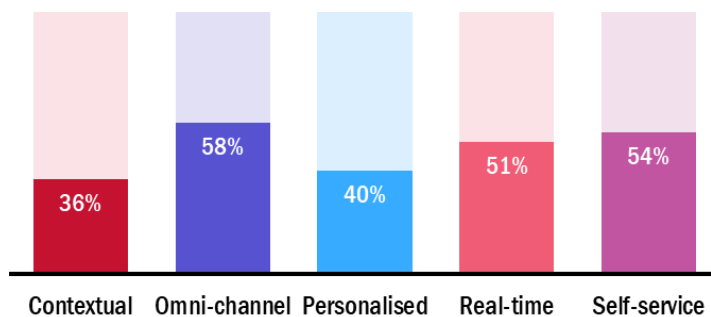
Figure 4: CSPs' progress in key experience traits, based on Analysys Mason DXI[3] assessment score (n = 11) [Source: Analysys Mason, 2018]

2.3 Digitalisation needs to touch all aspects of a CSP's IT organisation

CSPs have been slow to adopt modern software techniques that have been developed over the past 20 years and implemented by web-scale companies. This change in technology – to techniques that are honed to the new web world – is critical for CSPs to adopt. At present, they need to focus on transforming the following three key aspects of the business:

- software architecture
- software development
- software implementation

Software architecture

Most CSPs' current software architecture restricts them from becoming fully digital. Most of the currently deployed systems are monolithic in nature – every change requires the entire application and data models to be updated. This means that even a minor change may take weeks. Furthermore, as CSPs plan to replace these systems with microservices-driven software, many of their BSS systems are still not mature enough to be run by microservices. Moreover, due to their critical nature, CSPs cannot afford the downtime required to upgrade them.

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[3] Analysys Mason, as part of its 'Digital Experience Index (DXI)' research initiative, has assessed more than 50 operators, globally, on their ability to deliver digital experience to its consumer customers.

As a result, CSPs need to focus on transforming their portfolio to be run by:

- a modular, loosely-couple microservices-based architecture, where major internal system calls are replaced with internal and open APIs (Figure 5)
- a journaling structure for microservices, where the data is carried across the interface, rather than accessed via separate database calls
- a flexible orchestration function that sequences the microservices
- an infrastructure that creates and scales microservices as needed by the demand loads on the system.
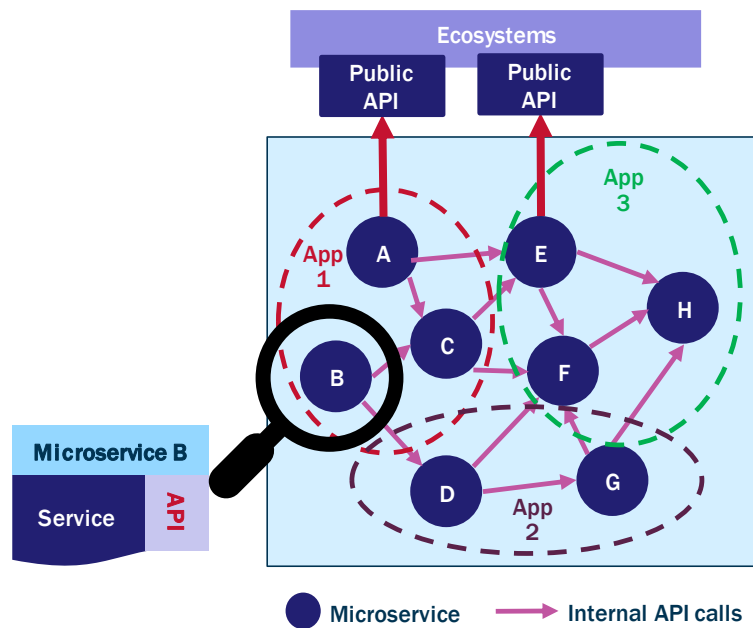
Figure 5: Microservices architecture [Source: Analysys Mason, 2018]

Software development

As CSPs transform to digital, the methodologies used to develop current systems pose challenges to integration with new systems, resulting in additional challenges, such as time to develop and integrate. The current workforce at CSPs also needs to be re-trained in the new ways of working. To operate in a digital environment, CSPs need to adopt:

- implementation of agile software techniques such as scrums, continuous testing and integration, and massive automated regression testing.

- use of post-agile software methodology called DevOps, where a more integrated team supports the development and subsequent operations of the system.

Software implementation

In the past, CSPs were used to transformation projects that took years to implement. Moreover, any new updates to deployed systems were delivered via yearly cycles. Going forward, CSPs need to learn and adopt software implementation techniques that have been defined by web-scale players and refined at a web-scale player level. It is the adoption of these techniques that has helped web-scale companies set modern benchmarks for innovation and customer experience. As such, CSPs need to use the continuous integration/continuous deployment (CI/CD) approach in the production environment. Here, multiple software "drops" to the field may be made in a very short time. This is made possible by the loosely coupled microservices-based architecture and the massive automated regression testing. This will replace the three- to six-month acceptance testing currently done by many CSPs.

3. The digital enablement platform delivers on CSPs' demand for agility and consistency

The digital enablement platform offers CSPs an opportunity to become more agile and flexible with their internal operations and external engagements with customers. It is imperative that CSPs undertake initiatives to transform soon, as there is an increasing demand for consistency and personalisation from the customer, as well as for simplifying the customer engagement processes across their lifetime with the CSP.

3.1 The key characteristics of an enablement platform

The digital enablement platform has been developed using modern software architecture and software development and deployment methodologies. Such platforms have been in use web-scale companies for many years. However, when developing the platform for telecoms, the vendor needs to have an in-depth understanding of CSPs' business and operations. The platform is designed to address the challenges highlighted in Section 2, which include:

Technology (cloud-native architecture and microservices) – Rather than using monolithic software architecture, the enablement platform has been built using modern, loosely-coupled software architecture. This approach allows the platform to scale on demand in the cloud environment, offer enhanced reliability and use microservices. Based on a recent Analysys Mason survey, CSPs are planning major deployments of cloud-native systems (see Figure 6). This will provide CSPs with the agility and flexibility required to meet rapidly evolving customer expectations.

DevOps (software development and implementation processes) – The DevOps approach brings the software development and operations functions together right from the start of the product lifecycle. Many CSP IT departments are moving from waterfall through to agile to leading-edge DevOps processes. DevOps captures the concept of CI/CD, enabling continuous software releases that can be deployed in live operations every few weeks. For CSPs, this means that they can improve their TTM for new capabilities, and can innovate using 'launch fast, fail fast' principles.
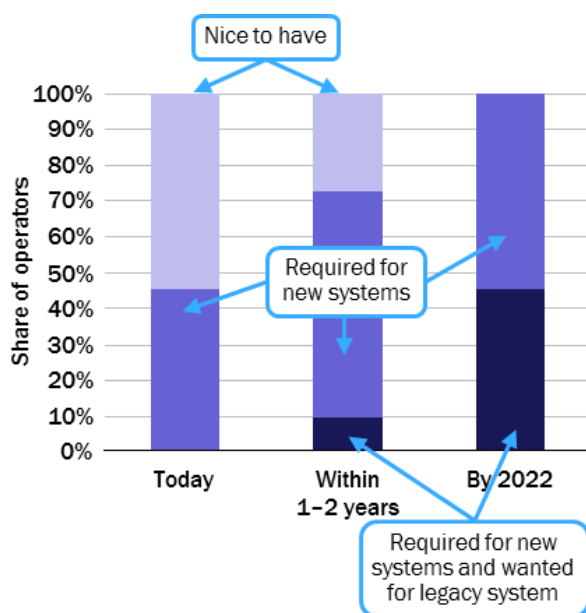

Figure 6: Migration plan for BSS/OSS to microservices architecture [Source: Analysys Mason, 2018]

Approach (open and collaborative) – The platform works on the principle of delivering maximum agility and benefit to CSPs. It enables a single-function focused microservices framework, de-coupled from the operations framework, to allow for flexibility to work with operational tools from third-party vendors. In addition, the platforms are based on industry standards and offer RESTful APIs via microservices, which are available for use for integration with third-party systems.

Intelligent systems (AI driven) – The platform can leverage available big data analytics and AI capabilities to deliver enhanced performance and efficiency, including recommendations for improving task-related performance as well as business process automation.

Furthermore, utilising the loosely coupled microservices-driven architecture, the platform acts as the driving engine to enable CSPs to have different types of engagements in an agile manner. Some of the core components (see Figure 7) and capabilities of the platform include:

- Enablement platform – the heart and engine that drives a CSP's engagement operations. This layer constitutes all microservices that CSPs can leverage for all types of engagements. The focus of the platform is to reduce large customer engagement processes into granular microservices, by breaking down business domains first into sub-domains and then into microservices (see Figure 8). The objective is that every function stands independent, but is loosely coupled, thereby enabling fast development, on-demand scalability and easier integration with openness to own and third-party vendor solutions. Two major components of the platform are as follows:
  - It includes all microservices that are agnostic to an engagement-type. For example, a customer 360-degree view microservice can be used for marketing, sales and customer service functions
  - Engagement-driven solutions – the focus of this layer is on bundling microservices that help CSPs serve any engagement function across the customer lifecycle. For example, a marketing package may include microservices that support the marketing functions, such as a promotion microservice, pricing microservice or product microservice.
  - The commerce catalog also forms part of the enablement platform, and is driven by microservices, enabling agility, openness and collaboration. This is important because the agility and TTM needs of CSPs require a catalog that empowers their business users to build and launch offers in real time. In addition, by leveraging its analytical and intelligence capabilities, the catalog allows for tracking the performance and adoption of offers and campaigns, thereby enabling continuous optimisation.
- Channel applications – this layer acts as the interface to the end customer; for example, smartphone applications and web portals.
- Standardised processes, but with orchestration flexibility, to support a variety of functions.
- Flexible data master architecture with a local master product and service catalog for efficient and secure data operations, but also providing the openness to other platforms or legacy systems.

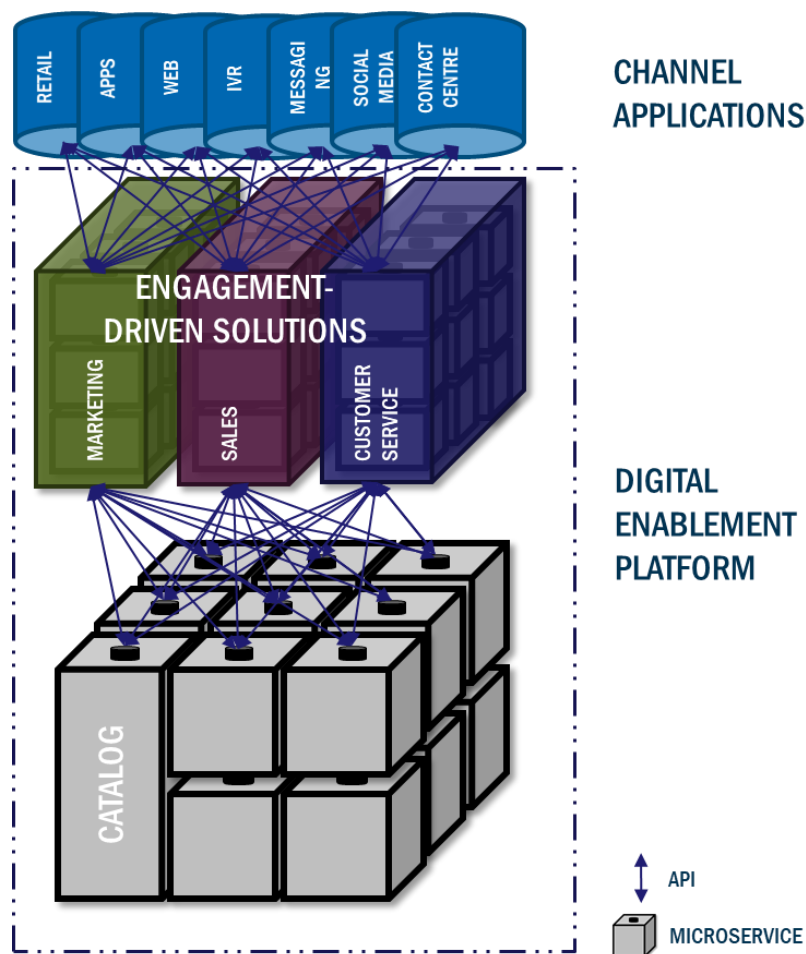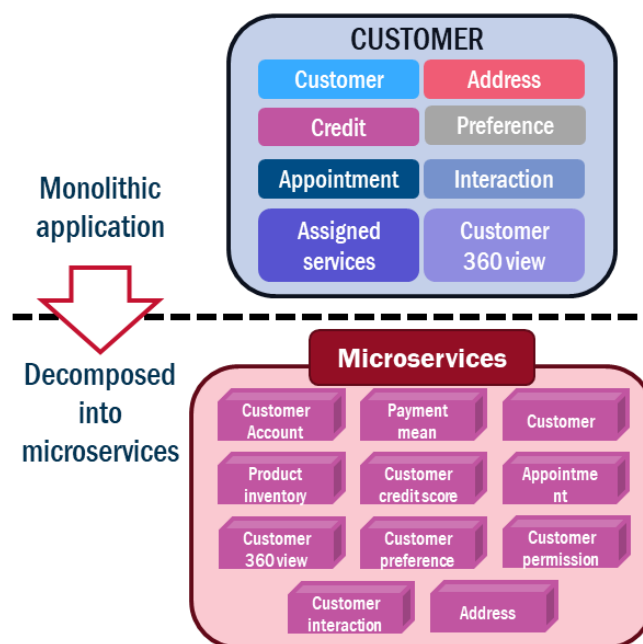*Figure 7: Microservices-driven platform-based architecture [Source: Analysys Mason, 2018]*

Figure 8: Decomposition of monolithic application to microservices [Source: Analysys Mason, 2018]

3: The digital enablement platform delivers on CSPs' demand for agility and consistency

3.2 Benefits of the digital enablement platform

The digital enablement platform delivers the desired agility to CSPs by providing microservices as building blocks. It also enables CSPs to address changing customer expectations by improving TTM and utilising new software development and deployment methodologies. The loosely-coupled and modular nature of the platform enables them to innovate quickly, while delivering consistent and contextual experiences to customers across multiple touchpoints in an efficient and continuous manner. Some of the business functions that the enablement platform helps CSPs serve include:

- delivering an omni-channel experience with consistent information available across all channels
- managing personalised customer journeys that span disparate channels
- customer profiling and micro-segmentation to improve marketing and sales use cases
- providing a "local master" product catalog, with microservices interfaces and open RESTful APIs that can be synched to other catalogs or serve as an enterprise-level catalog
- integrating the view of the customer as they move through the lifecycle of marketing, sales, and support.

In addition to supporting a variety of business functions, the digital enablement platform also delivers operational benefits to CSPs. These include:

- improved TTM for new applications, from months to days or hours.
- need to configure information once, to be made available across all channels; for example, new pricing information needs to only be configured once, and can be exposed to all channel applications.
- reduced cost and increased efficiency due to automation of business processes.

4. CSPs can deploy the digital enablement platform using a variety of approaches

There are four main approaches that CSPs choose from when deploying new functionality to improve their BSS. The approach most commonly used by CSPs is the 'Adjunct' approach, where new systems are added adjacent to the current stack. However, the problem with this approach is that it undermines the ability of the CSP to have the functionality integrated with other systems.

To improve agility and TTM, CSPs need to move away from adjunct-based, silo-creating methods, and deploy digital enablement platforms using one of the other approaches (see Figure 9):

1. Evolution – evolve the current system; best when that system is performing reasonably
2. Dual-speed architecture – digital enablement platform as an overlay on current systems
3. Replace – replace current systems with the platform-driven architecture.

4.1 Evolve the current system with planned upgrades

In the evolve approach (see Figure 9), CSPs with a recent push into an improved BSS can integrate the digital enablement platform to deploy new customer engagement capabilities alongside other BSS functions that have already been deployed. This is done with the expectation that the entire BSS will move to the digital enablement platform. For this to be successful, the incumbent vendor needs to have a strong roadmap for evolving the

deployed systems. For example, vendors are beginning to re-architect their existing customer engagement functionality to deliver microservices-driven architecture, and utilise DevOps principles to support rapid development and deployment of new capabilities.

4.2 Build a dual-speed architecture

In the dual-speed architecture[4] approach, customer engagement functionality built on digital enablement platform interfaces with a well-established BSS base through APIs. Many CSPs have an established BSS which they do not wish to change. Using the dual-speed approach allows CSPs to improve agility and TTM in customer engagement without the risks and cost of changing the base BSS. For example, in digital experience transformations projects, the digital enablement platform delivers customer engagement functionality, such as sales and customer service, and interfaces with legacy billing and charging systems, using APIs.

Figure 9: Three approaches to adopting a digital enablement platform [Source: Analysys Mason, 2018]
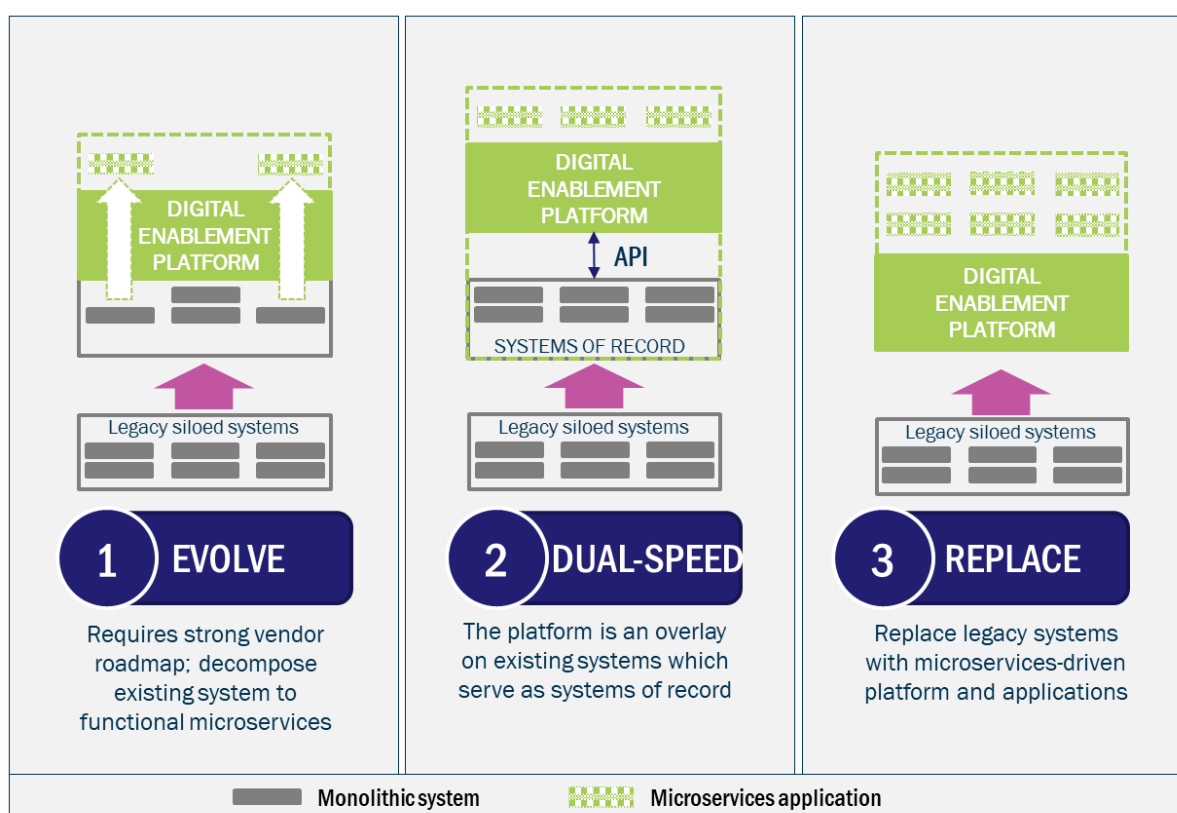
4.3 Replace existing systems with new digital enablement platform

Some CSPs are bold enough to pursue a full BSS transformation, motivated by the threat from digital-native web-scale companies. These CSPs will benefit greatly from using the digital enablement platform across all BSS functions as the modern technology and methods of the digital enablement platform are an excellent basis for such all-encompassing transformations. However, transformations using this approach take a long time to complete, are complex in nature and involve many projects that must run in parallel.

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[4] Bossert, Oliver; Ip, Chris; Laartz, Jurgen, https://www.mckinsey.com/business-functions/digital-mckinsey/our-insights/a-two-speed-it-architecture-for-the-digital-enterprise

5. CSPs need a partner to support and guide them through their digital journey

CSPs looking to undertake digital transformation initiatives should collaborate with a solutions provider that can support its entire transformation journey – including assessing current maturity, strategic planning, solution design and delivery, implementation, as well as training and ongoing support (see Figure 10).
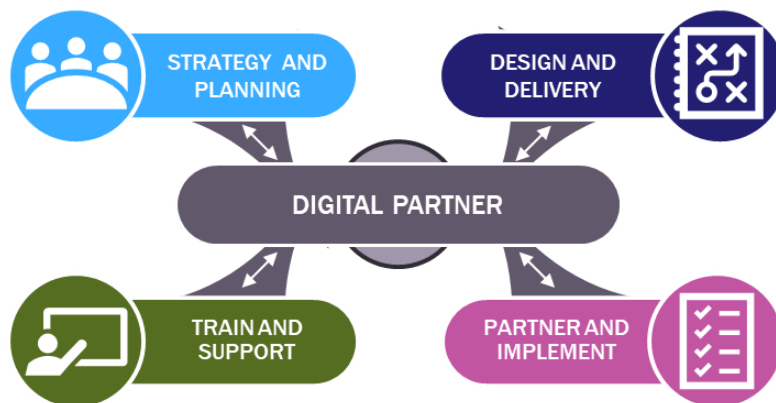

Figure 10: Digital partner focus and experience [Source: Analysys Mason, 2018]

Strategy and planning

There are numerous approaches available to CSPs when they start their transformation process. The approach that they select will depend on various factors. A good digital partner should help CSPs:

- assess their current maturity
- understand their business objectives
- support CSPs, based on its experience of working within the telecoms sector, in developing a strategy best suited to their individual needs.

This approach would align to any of those described in Section 4.

Design and delivery

To deliver digital experiences, a CSP solutions provider should have a strong portfolio of products that has been designed using modern agile architecture, and should have experience of working with the latest development and deployment methodologies. It is also important that the partner has experience working within the telecoms sector and understands the complex nature of the CSP's current architecture, legacy systems and current ways of operating. Furthermore, the partner should be open and flexible in collaborating with the CSP, as well as working with other third-party vendors.

Implement

The ideal partner should have should have a team in place that possesses strong expertise and leverages a standardised set of processes to support the implementation plan. Furthermore, it should have the knowledge and experience of working with microservices architectures, DevOps methodology and CI/CD delivery mechanisms. This is particularly important because CSPs' complete transformation to digital architecture will take several years. This means that CSPs will be operating in a hybrid environment (a combination of cloud-

native and monolithic systems) and will require the support of their partners throughout the transformation journey.

Train and support

As CSPs transition to a new way of working, they need to acquire a new workforce or train their current workforce to operate in an agile and DevOps environment. A partner with experience of operating these methodologies can be of immense help through this transition, and long after.

6. Now is the time to move to a platform

Marc Andresson, inventor of the web browser, said that "Software is eating the world." And while it does, it is fundamentally changing the way we view software – not as an adjunct for business and network operations to make them a bit more efficient, but rather as the core of our business. CSPs need to move to a software-platform driven business model to realise the agility and TTM ambitions. The technology is proven, the benefits clear, the processes well-understood, the time available – a few years.

About the authors

Atul Arora (Senior Analyst) is the lead analyst for the Customer Engagement programme at Analysys Mason, and a contributor to the Digital Experience, Software Forecast and Strategy and Telecoms Software Market Shares programmes. His areas of interest include the digital transformation of CSPs' customer engagement systems, omni-channel commerce and care, and support for customer journeys and personalisation. Atul also works on custom projects for telecoms operators and vendors, which include providing strategic advisory and undertaking market assessment work. He holds an MSc in Neuroscience from University College London and a bachelor's degree from Jaypee University (India).

Mark Mortensen (Research Director) is the Research Director and Practice Head for customer-facing systems in Analysys Mason's Telecoms Software and Networks Research stream. He is also the lead analyst for the Digital Experience research programme. His interest areas include the conversion of CSPs to modern DSP operations, the effect of network virtualisation on operations, and the evolution of software architectures in the cloud world. The first 20 years of Mark's career were at Bell Laboratories, where he started software products for new markets and network technologies, and designed the interaction of BSS/OSS with the underlying network hardware. Mark was Chief Scientist of Management Systems at Bell Labs, and has also been president of his own OSS strategy consulting company, CMO at the inventory specialist Granite Systems, VP of Product Strategy at Telcordia Technologies, and SVP of Marketing at a network planning software vendor. Mark holds an MPhil and a PhD in Physics from Yale University and has received two AT&T Architecture awards for innovative software solutions. He is also an adjunct professor at UMass Lowell in the Manning School of Management, specialising in business strategy. Mark has also participated on the GSMA Global Mobile Awards judging panel.

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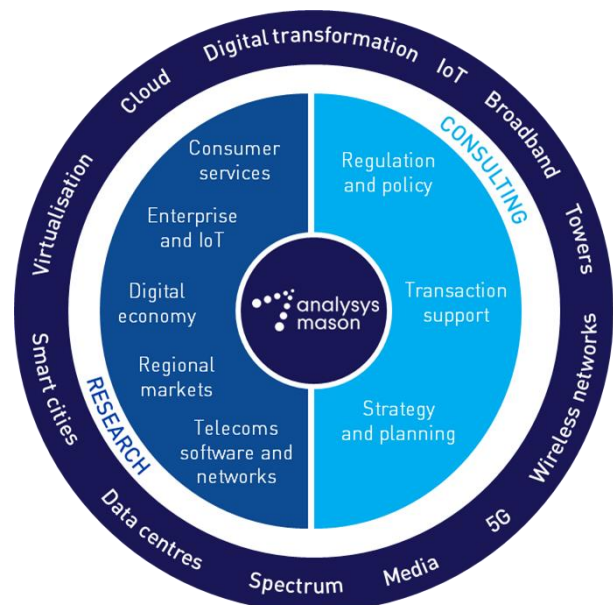
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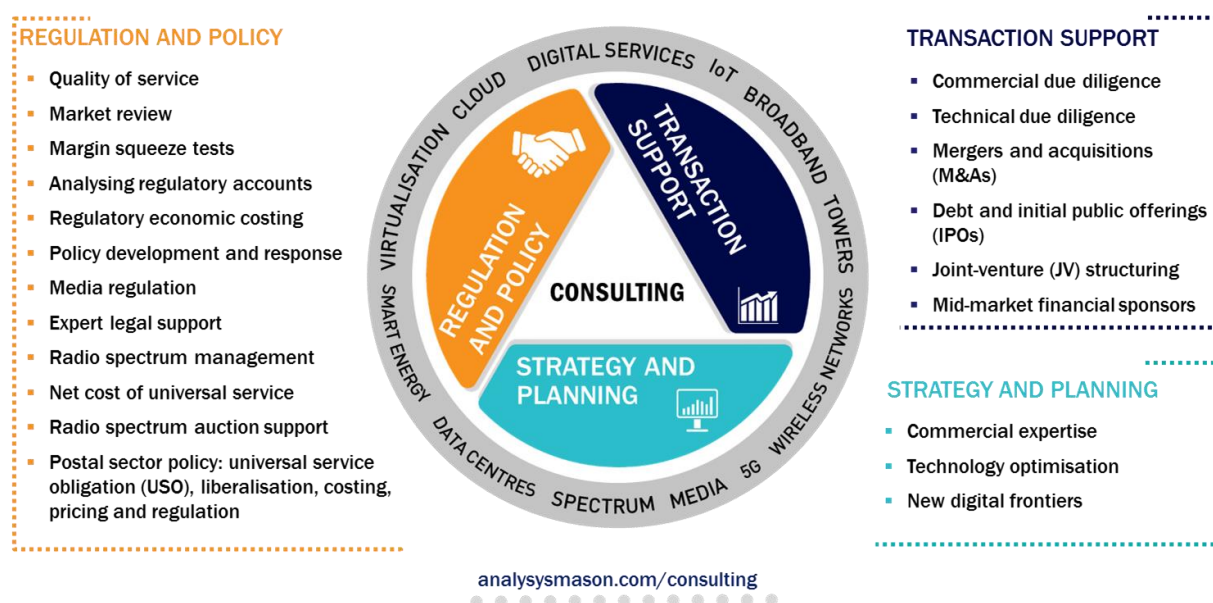
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