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HOW TO REDUCE RISK IN BSS TRANSFORMATION

Author: Tim McElligott, Senior Analyst
Editor: Dawn Bushaus, Managing Editor

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Report Author:
Tim McElligott
Senior Analyst
tmcelligott@tmforum.org

Report Editor:
Dawn Bushaus
Managing Editor
dbushaus@tmforum.org

Chief Analyst:
Mark Newman
mnewman@tmforum.org

Editor, Digital Content:
Arti Mehta
amehta@tmforum.org

Customer Success & Operations Manager:
Ali Groves
agroves@tmforum.org

Commercial Manager, Research & Media:
Tim Edwards
tedwards@tmforum.org

Global Account Director:
Carine Vandevelde
cvandevelde@tmforum.org

Digital Marketing Manager:
Anna Kurmanbaeva
akurmanbaeva@tmforum.org

How to reduce risk in BSS transformation

We hope you enjoy the report and, most importantly, will find ways to use the ideas, concepts and recommendations detailed within. You can send your feedback to the editorial team at TM Forum via editor@tmforum.org

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TM Forum
4 Century Drive,
Parsippany,
NJ 07054
USA

www.tmforum.org
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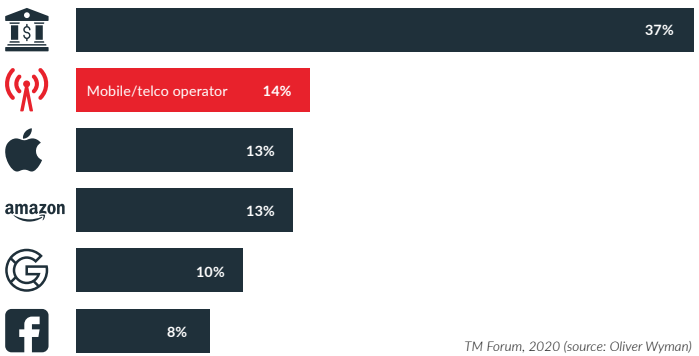
The big picture

The biggest risk in business support system (BSS) transformation lies in not transforming. By moving forward with a well-considered transformation strategy, communications service providers (CSPs) may risk making some mistakes along the way, but these can provide valuable lessons. And other risks can pay off – for example, experimenting with and creating new services or launching new business ventures.

When calculated risks are successful, revenue and customer loyalty increase and C-level executives get big rewards. This report looks at both sides of risk and assesses different options for transforming BSS based on potential risk and rewards.

The digital economy is built on data, and the winners in such an economy will be the companies that provide quality products and services at a reasonable price while building a relationship of trust with customers regarding the use of their data. CSPs have done a commendable job earning and maintaining customers' trust, but it can be lost in a moment with a single unforced error. And it's nowhere near the level of trust banks enjoy.

Who do consumers trust with their data?



TM Forum, 2020 (source: Oliver Wyman)

In its Telco 2025 survey of 8,000 consumers, New York-based management consulting firm Oliver Wyman found that nearly 40% of respondents trust banks most with their data. Only about 15% of consumers gave telcos the top rating for trust, but this showing was better than that of Apple, Amazon, Google or Facebook.

Choosing a path

Within CSP organizations, BSS plays the primary role in managing customers' data. The good news for operators is that there are many options for transformation, and they can choose a path that best suits their existing support system environments, offers an acceptable level of risk and meets customers' demands.

Read this report to understand:

- What the risks are in digital transformation and how to navigate them
- Why DevOps is important
- Why edge computing could be a key part of telcos' digital transformation strategies
- How CSPs are using, digital BSS solutions to launch in new markets
- Why using a microservices-based overlay can be a good strategy, and how Globe Telecom is increasing agility with this approach
- Why best-of-breed solutions are making a comeback
- How TM Forum's Open Digital Architecture can help CSPs transition to cloud-based BSS

Section 1

Assessing the risks of digital transformation

The odds of creating a successful business are not good. In the US, for example, 30% of new businesses **fail** during the first two years, 50% during the first five years and 66% during the first 10. The **US Bureau of Labor Statistics**, which projects slightly lower rates of failure, notes that of the 774,725 new businesses started in the US during the fiscal year that ended in March, 155,000 will be gone this time next year (and that's not taking into account the impact COVID-19 is likely to have).

Most telcos are not new or small companies, but they still struggle to be successful. Many communications service providers (CSPs) are, in fact, very large businesses that have been around for 100 years or more, putting them in a category of less than 1% of all companies.

Nine years ago, when IBM joined the exclusive club of 100-year-old companies, it did so by constantly adapting through tumultuous recessions, technology shifts and changes in leadership. IBM is risk-averse with regards to finances, but taking risks in innovation is what has kept the company going.

"Innovation is applied to business, technology and all manners of operation," Bernie Meyerson, then Vice President of Innovation at IBM, **said at the time.** "We are here because we are innovators. We would not be here if not for it."

Despite several high-profile mistakes, IBM kept taking risks with new products and new ways of doing business. CSPs and their operational and business support system (OSS/BSS) suppliers should do likewise: be innovative while minimizing the risk of transforming to an architecture that supports innovation.

Challenges pose risk

When IP was first introduced, many service providers subscribed to the notion: *IP will enable so many new services, we can't even imagine them all*. But the lackluster adoption of offerings like unified communications were a warning that new technology may not pay off as planned. Indeed, if you can't imagine it, it may not be a service; it may be a pipe dream.

CSPs are heeding the lessons. Until they know more about what customers want from technology like network slicing, virtualization, edge computing and IoT, they are treading carefully. However, support system transformation is different, because it's not about a particular technology or service – at least not anymore.

In the past, CSPs typically have implemented an entirely new BSS stack for every new service. This led to the siloed, unmanageable architecture operators are trying now to reimagine. Today, BSS is about providing the underlying agility to support any new service or business model, when or if it comes.

The graphic **on page 7** shows challenges CSPs face as they transform and the risks associated with failing at each challenge. Some of the risks are operational or financial, while others impact customers. Detailed analysis of the challenges and risks follows the graphic.

Risks of unsuccessful transformation activities

RISKS

CHALLENGES	OPERATIONAL			FINANCIAL					CUSTOMER-AFFECTING			
	Difficulty partnering & building ecosystems	Cannot achieve closed loop automation	Vendor dependency	Inability to compete	Slow time to market/ delayed time to revenue	Unplanned increase in CapEx/OpEx	Loss of marketshare /churn	Failing ARPU	Loss of customer ownership	Poor customer experience	Loss of trust/ reputation	Adverse effect on QoS
Picking the wrong path/not picking one at all				✓	✓	✓	✓	✓				
Lack of a comprehensive transformation strategy		✓		✓	✓	✓				✓		✓
Delayed legacy replacement	✓	✓	✓	✓	✓		✓	✓		✓		
Not adapting to changing regulatory framework	✓			✓		✓	✓				✓	
Untrained workforce/lack of expertise	✓	✓	✓	✓	✓					✓		✓
Data migration errors	✓	✓		✓	✓	✓		✓		✓	✓	✓
Customer migration errors		✓		✓	✓		✓	✓	✓	✓	✓	✓
Failure to adopt DevOps and CI/CD	✓		✓	✓	✓			✓		✓		
Not winning the battle at the edge	✓		✓	✓	✓	✓	✓		✓	✓		✓

Delaying digital transformation or choosing the wrong path could have a huge financial impact on CSPs and limit their ability to compete, particularly with hyperscale cloud providers delivering infrastructure as a service to enterprises. Operators are already playing catch up: Only one CSP, NTT Communications, made Canalys' 2018 list of the top 10 cloud service providers, a market the same research firm valued at $107 billion in 2019.

As they roll out 5G, CSPs need to transform their networks and back offices to deliver the kinds of services enterprise customers want using new business models that rely on partnerships.

The first step toward this is understanding what the business is capable of.

As part of a new TM Forum collaboration initiative BT, Deutsche Telekom, Verizon, Vidéotron and Vodafone are leading an effort to create an agreed, baseline Business Capability Map and Business Architecture for the telecoms industry. By using these tools, operators can play to their strengths and minimize weaknesses by maximizing their ability to partner not only with third-party providers, but also with enterprises themselves to co-create services. CSPs can do this by providing platform, network and intelligence as a service.

Lack of a comprehensive strategy

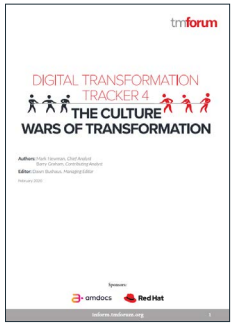
A 2018 Dell Technologies report found that telecom is among the most mature industries when it comes to digital transformation. The report also found that 78% of business leaders surveyed believe digital transformation should be more widespread throughout the organization.

Transforming individual areas or domains of a CSP's business is a good starting point. But failing to have an enterprise-wide strategy that ties all the projects together will make it difficult to get the various domains within a CSP on the same page, especially when it comes to the ability to share data. Easily sharing data helps operators develop a single vision for how to serve customers and a consistent way of interfacing with them.

Delayed legacy replacement

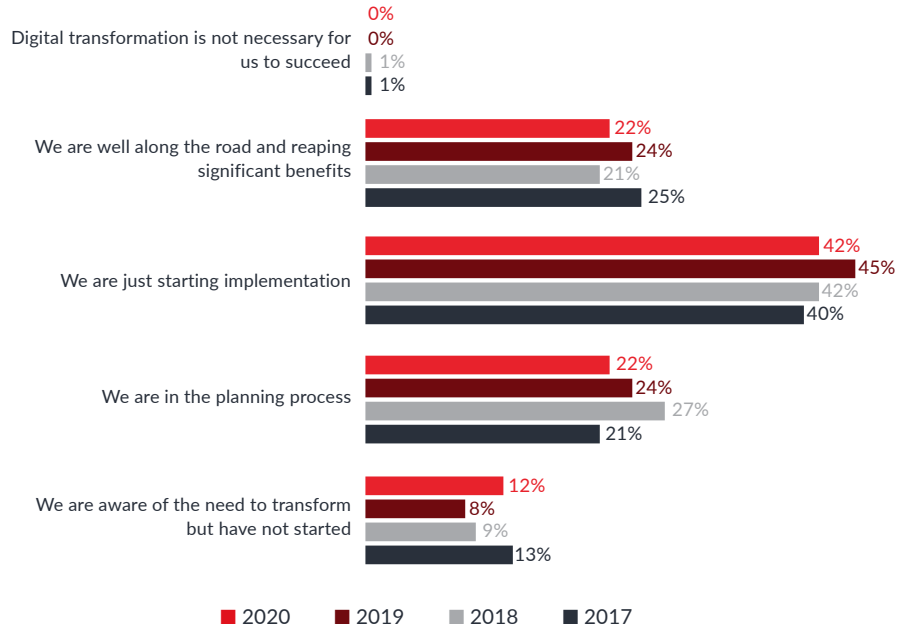
The risks associated with delaying BSS transformation checks nearly all the risk boxes. The glacial pace of replacing capital-intensive network infrastructure is understandable because operators want to realize a return on investment, but without modernizing back office systems, they have no chance of competing with platform providers.

Read this report to learn more about how CSPs can transform into platform providers:



Still CSPs are holding onto legacy OSS/BSS. Nearly one quarter of CSP respondents to our Digital Transformation Tracker 4 (DTT 4) survey conducted in late 2019 and early 2020 said they are still in the planning stage of transformation, and 42% are just getting started.

Status of CSPs' transformation programs



TM Forum, 2020

Not adapting to changing regulatory framework

As noted in the introduction to this report, consumers trust CSPs to protect their data more than they trust cloud providers. Risking this trust and failing would have repercussions across the entire business and could jeopardize the ability to roll out data-driven services. In addition, CSPs are bound by regulation protecting customers' data and trust in many countries and face severe fines for breaches. The EU's Global Data Protection Regulation (GDPR) is a good example.

Inadequate or untrained workforce

As network and operations complexity grow, many CSPs lack important skills. A recent TM Forum survey about network automation, for example, found that a full 82% of CSP respondents do not believe they have enough expertise to develop the insights required for automated decision-making and closed-loop operations. Other surveys have repeatedly found a lack of software skills within CSP organizations including in data science and DevOps practices (see *Failure to adopt DevOps* below). Operators must hire these skills internally. If they do not, they risk not being able to deliver the data-driven services enterprises want.

Migration errors

Transforming or replacing systems is difficult, but migrating the data they contain can be an even bigger challenge. Not addressing it leads to huge risks, the biggest being serious delays in rolling out services, unanticipated spending increases and degradation of service quality. CSPs must develop comprehensive data migration and management strategies to address the risks. Similarly, errors in migrating customers' data can impact their level of trust, which can lead to lower average revenue per subscriber and loss of market share from excessive churn.

Failure to adopt DevOps

CSPs must adopt Agile DevOps practices (see below) in telecom operations to increase innovation. If they don't, they risk being unable to compete with hyperscale cloud providers.

What is Agile methodology?

In February 2001, 17 software developers met to discuss lightweight development methods. The result of their meeting was the Manifesto for Agile Software Development which laid out the principles below. Today, many businesses have adopted them for software development and apply them to other parts of the business as well.

	Customer satisfaction is achieved through early and continuous delivery of software
	Changing requirements are always welcome – even in late development
	Working software is delivered frequently (within weeks rather than months)
	Close, daily cooperation between business teams and developers is required
	Projects are built around motivated individuals who should be trusted
	Face-to-face conversation is the best form of communication
	Working software is the principal measure of progress
	Development is sustainable and able to maintain a constant pace
	Continuous attention to technical excellence and good design are required
	Simplicity – 'the art of maximizing the amount of work not done' – is essential
	The best architectures, requirements and designs emerge from self-organizing teams
	The team reflects regularly on how to become more effective and adjusts accordingly

TM Forum, 2019 (source for data: The Agile Alliance)

By using DevOps practices, which include cycles of continuous integration, delivery and testing (CI/CD), CSPs can deliver services much faster. DevOps automates these cycles which will be increasingly important as operators move toward autonomous networks.

Vodafone Idea and Red Hat, for example, teamed up in October 2019 to build a network-as-a-platform offering. The companies plan to set up a DevOps team to drive more consistent innovation, co-create new solutions and extend the platform to startups and developers.

TM Forum members have explored a joint DevOps approach between CSPs and suppliers in a three-phased Catalyst proof of concept, the results of which are available in a set of documents on joint Agile delivery. In our DTT 4 survey we asked suppliers if they are involved in any continuous delivery partnerships with their customers, and although it is early days, a full 81% of respondents said they are starting along this path.

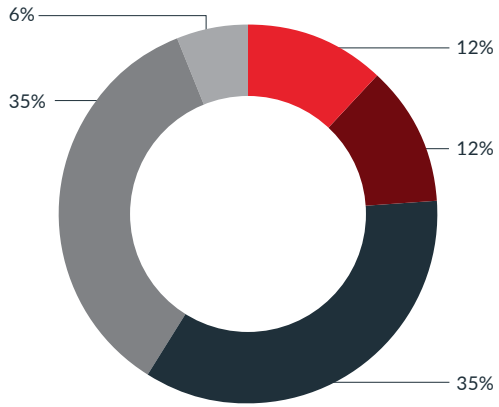
Winning the battle at the edge

CSPs are hoping to compete with hyperscale cloud providers by providing multi-access edge computing (MEC) for enterprises, especially for 5G services that have mission-critical, low-latency requirements. Failing at this challenge could lead to many financial, operational and customer-impacting risks.

Many large operators envision building an edge-platform supported by an autonomous network, on top of which they would run their own virtual network functions and customers' applications. The idea is that CSPs and their enterprise customers, such as manufacturing companies, could use the platform to co-create applications that take advantage of 5G and IoT.

In August 2019, TM Forum conducted a survey of CSPs for a report on the 5G enterprise opportunity, which found that only 6% of CSPs have deployed MEC in technology trials, all of which are using 4G technology (see graphic below). The same survey found that at least a quarter of operators plan to work with partners to deploy MEC.

How will CSPs support MEC?



Some CSPs have already announced partnerships with cloud providers. For example, AT&T is working with Microsoft to build edge facilities as part of a broader deal AT&T announced last summer introducing its "public cloud first" strategy. For its part, Microsoft has stated unequivocally that it does not intend to compete with CSPs by building its own edge facilities.

This could be a risky strategy, however, because CSPs could end up ceding control of the customer relationship to the cloud provider. A chief OSS architect for a large European mobile operator who is leaving his position to join a MEC company says CSPs should be going it alone on MEC for this reason.

"MEC is where CSPs can make a stand," he says. "Creating it is going to give an advantage to the telcos that hyperscalers don't have and a capability on the edge of the network which cloud providers cannot emulate."

Alone or with a partner, developing an MEC strategy will take careful time and consideration. Gartner predicts that 50% of the edge-computing proofs of concept conducted so far will fail to scale in commercial deployment. The research firm explains that early deployments are not replicable, led by expensive consulting groups and result in highly customized, inflexible solutions.

In the next section, we'll look at some of the options CSPs have for transforming BSS.

How to make edge computing work

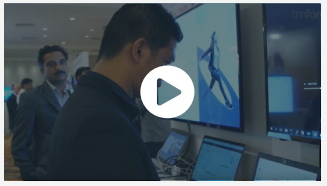
As Gartner notes, it is going to be difficult to scale edge computing. Indeed, it will require a level of automation that CSPs and their suppliers have not achieved yet.

TM Forum members are addressing this challenge in collaboration projects like the Open Digital Architecture, Open API and Autonomous Networks projects.

In a 2019 white paper, the European Telecommunications Standards Institute (ETSI) noted that one of the key operational requirements for edge computing is the concept of 'zero-touch' provisioning, which applies to all the layers of the edge stack and requires full automation of management and service assurance. TM Forum members have been exploring how to automate OSS/BSS at the edge in several TM Forum Catalyst proofs of concept.

In the Becoming EDGY project, for example, which was championed by seven CSPs (AIS, Airtel, Globe Telecom, KDDI Research, Optus, Singtel and Telkomsel), the team developed a blueprint for an edge cloud lifecycle manager. The idea is to manage workloads in edge locations centrally using a lifecycle service orchestrator.

Watch this video to learn more about the Catalyst:



Section 2

What is the best approach to transformation?

Recent TM Forum research suggests that the value of the market for business support systems (BSS) is about $30 billion, which is equivalent to roughly 2% of communications service providers' (CSPs') revenue globally. Spending on BSS is flat, in line with revenue trends. Investing in software solutions that don't cost a lot, relatively speaking, should provide a much bigger payback than current systems do, but this won't happen without digital transformation.

Suppliers need to make it easier for CSPs to partner with content and application providers in an open framework. They should be helping operators be more proactive with customers. BSS should be able to leverage emerging technologies, such as artificial intelligence (AI) and the continuous development capabilities of DevOps practices. But this, too, requires transformation.

The question is: How to transform? Each CSP must figure out which approach best fits its goals by considering:

- The amount of legacy BSS and whether it's extensible
- The number of customers and regions served
- Types of services supported
- Ability to interface with new systems

Choices also depend on the new business opportunities CSPs may want to target. Consumer services will have different requirements than enterprise services, for example, and real-time charging for multi-party services will have far different requirements than, say, network as a service.

What are the options?
The good news is that CSPs have many options for moving forward with digital transformation:

Full-stack transformation – a January 2020 TM Forum report on the merits of full-stack transformation determined that they work, but there is mounting evidence that they may not be the best approach. Many CSPs agree that modular transformation of operational and business support systems (OSS/BSS) is a better alternative to full stack transformation and represents the best way forward because it delivers faster time to value at lower cost.

Launch a new digital BSS in greenfield markets – startups like Rakuten seem to have an edge because they have no legacy to contend with. But nearly all operators can find greenfield opportunities. Whether it is entering a new geographic or demographic market or launching a new line of business, CSPs can deploy a new digital BSS rather than tying the new business into its legacy platforms. We explored this in a recent report about sub-brands, and the panel and graphic on page 14 provides additional examples of how CSPs are supporting sub-brands.

Sub-brands demonstrate BSS innovation

Mobile operators are fighting back against a growing number of mobile brands in their markets by launching sub-brands that target specific types of users, for example millennials, or that offer a wider range of pricing. Some sub-brands have been around for nearly 10 years, such as Bouygues' B&You and Orange's Sosh, initially focusing on simple, low-priced plans.

The flexibility enabled by these operators' BSS, particularly their billing systems, is a result of the good kind of risk-taking when it comes to transformation. Agile BSS does not require forcing a legacy system with millions of lines of code to do something it was not designed to do.

Whether delivered through microservices or open source tools, new features and services can be added and removed quickly, allowing operators to launch new brands in new and existing markets with less certainty of success than they would otherwise need in order to get corporate approval. There is also less impact on the major brand if the sub-brand doesn't work.

The table opposite shows some sub-brands launched by large CSPs recently. Vodafone, for example, launched its Ho sub-brand in Italy in 2017 to cater to high-end users, but in 2018 and 2019 after competitors Wind and Tre merged and Iliad entered the market, a pricing war ensued. The result was that the Ho brand only succeeded in taking on more low-margin users. However, the goal for these changes was purely short term and aimed at subscriber growth in that market.

The important message is that agile BSS allows Vodafone, TIM and others to respond quickly to market conditions, accomplish a specific goal and to revert to their original plan or to something new entirely when the time is right.

CSPs differentiate with sub-brands

CSP	Sub-brand	Market	Approach
TIM	Kena Mobile		Originally targeted high-end users in Italy but now offers low-cost bundles to customers who switch from the competition
Three.co.uk	SMARTY		Offers SIM-only data plans with variable contract lengths and a buy-back option for unused data
vodafone	Ho		Similar to TIM's Kena but allows different pricing based on which competitor's service the customer is leaving
vodafone	Voxi		Aimed at the youth market, offers SIM-only mobile plans with free data for social media apps
Singtel	Gomo		Youth - and price-focused brand locked in a battle with with Giga in Singapore
VIDEOTRON	Fizz		Digital-only service focusing on perks such as usage rollovers and rewards for users in Quebec and Ottawa
verizon	Yahoo Mobile		Unlimited talk, text and 4G LTE data, including mobile hotspot use
TELKOMSEL	by.U		Targets 44 million digital-native Gen Z subscribers (15 to 24 years old) in Indonesia with digital prepaid cellular service

TM Forum, 2020

Overlay legacy BSS with a microservices-based adjunct – cloud-native BSS solutions are broken down into functional blocks that run as microservices within containers on elastic infrastructure using Agile DevOps processes and continuous delivery workflows. This approach is ideal for greenfield deployments, but it can also be applied to legacy systems by overlaying them with microservices-based adjuncts. This is the approach Globe Telecom is taking (see page 16).

Replace specific legacy modules and manage a complex data migration – Next to full-stack transformation, targeting specific modules within a BSS stack for replacement is probably the riskiest. It costs less than full-stack transformation but can be challenging operationally. In addition, replacing individual modules of a BSS stack without changing the underlying architecture will likely lead to higher integration costs because multi-vendor environments are difficult to integrate.

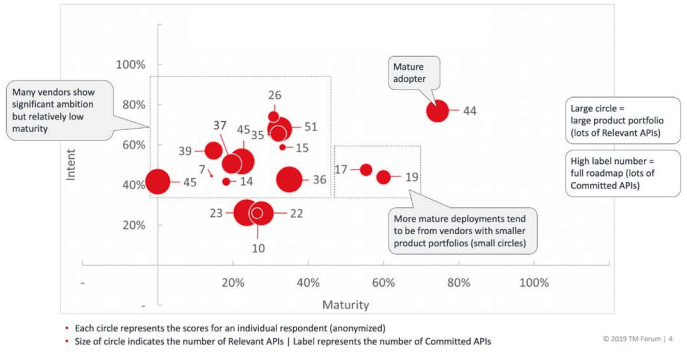
Best-of-breed resurgence

In the past 20 years, best-of-breed BSS solutions have lost some battles to large suppliers' best-of-suite solutions, but they appear to be on the verge of winning the war. Not everyone agrees with this assessment: Some suppliers still believe that the complexity of new services requires a pre-integrated suite that provides a seamless end-to-end solution.

But CSPs are adamant that they want vendor lock-in to be a thing of the past and that open architectures and common, agreed APIs are the way forward. So far, 17 of the world's largest CSPs and 37 of their technology partners have committed to using TM Forum's Open APIs. However, progress in implementing the suite of 50+ RESTbased APIs has been mixed. A recent survey of CSPs and suppliers released in November 2019 reveals that vendors' native Open API support lags behind demand from CSPs (see below).

Best-of-breed solutions fell out of favor because of the high cost of integration. As part of the Open Digital Architecture, TM Forum members are working on a reference implementation for BSS capabilities that will dramatically reduce the time and cost of integration. We'll discuss this more in the next section.

Vendors' adoption of Open APIs



TM Forum, 2020

Globe Telecom uses the overlay approach to increase flexibility

Globe Telecom, the largest mobile operator in the Philippines and one of the country's largest fixed-line providers, implemented a cloud-based, best-of-breed charging solution from Openet in 2018 as an adjunct to its legacy BSS, and the results have been impressive, with the company reducing its time to market for new services by 40% (see graphic below).

Globe Telecom delivers digital services to consumers through collaborative partnerships with companies such as Disney, Netflix, the NBA, Spotify and Astro. By adding the charging solution adjunct, the company has been able to deliver real-time charging capabilities to drive adoption of these digital and content services. Globe Telecom used the offer catalog component of Openet's charging system to build new offers and amend existing ones in a way that allows more flexible pricing models and usage options for customers. The models and options include:

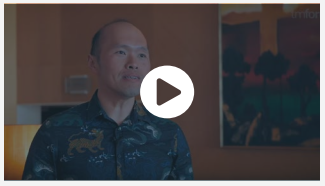
- Content-based pricing that allows for lower pricing on certain videos
- Add-on bundles that allow customers to add content services to existing service bundles
- Tiered bundles for adding more content to higher-end bundles
- App-specific bundles that allow Globe Telecom to target customers such as gamers with relevant offers

By supplementing its existing BSS, Globe Telecom was able to start with a smaller investment and grow the solution over time, thereby reducing the risk of upfront costs. The payoff has been growing revenue and the subscriber base.

An active TM Forum member, Globe Telecom is contributing the learnings from its BSS transformation to the Open Digital Architecture project. Along with KDDI Research and Singtel, the company is championing a new Catalyst proof of concept that aims to improve working relationships between CSPs and developers by exposing APIs and creating an open platform for co-creation.

"In the era of 5G, developers are our growth catalyst to develop compelling applications for CSPs to sell to them to our customers," says Vincent Seet, Enterprise Architect at Globe Telecom. "In this Catalyst we want to see how can we improve the support we give to them so they can write compelling applications for us?"

Watch this video to learn more about the Catalyst:



BSS transformation pays off for Globe Telecom in 2019

Overall revenue **up 12%** with data making up **71%**

EBITDA **up 17%**

Mobile data revenue **up 41%**

Home broadband revenue **up 12%**

Subscriber base **grew 27%** to **96.2 million**

Number of home broadband subscribers **grew 25%**

TM Forum, 2020 (source: Globe Telecom)

Section 3

Mitigating the risks as BSS moves to the cloud

Most digital transformation risks concern money: too much upfront investment, cost overruns, failed deployments and rework, and falling average revenue per subscriber (ARPU), to name a few. Cloud models address a lot of this angst, particularly when it comes to upfront investment, but CSPs have other worries about cloud, such as how to protect customers' data (particularly in the public cloud) and perceptions about the vulnerability of the container model.

These concerns linger even as cloud providers demonstrate they are taking steps to address them. In a Digital Leadership session at TM Forum's Digital Transformation World in 2019, experts from Optiva, Google Cloud and Ovum attempted to dispel what they perceive as erroneous myths about cloud-based support solutions (see graphic).

It's true that the public cloud may never attain the "five-nines'" reliability that CSPs consider standard for their networks, but it won't have to because of the ability to dynamically shift workloads. Cloud is not evolving in isolation. Virtualization is progressing, as are automation, analytics and artificial intelligence (AI). Together, these technologies will create a more predictive, proactive responsive network that can avoid and mitigate many threats to rival or beat five-nines' reliability.

As CSPs transform their networks, they need to adopt cloud-based support solutions to manage them. BSS providers who stick with a standalone product or best-of-breed solutions that cannot interoperate in an open framework or in the cloud are taking the biggest risk. Support systems of the future must be open and based on microservices. That means they either need to be cloud-based or support an open architecture that encourages a multi-vendor ecosystem and open source tools.

Transitioning to cloud with ODA

CSPs basically have two options for moving support systems to the cloud: lift and shift existing applications or rearchitect them. The former shortchanges operators on the benefits of cloud, but the latter takes too much time and is costly. TM Forum's Open Digital Architecture, part of the Open Digital Framework (see page 27), provides an evolutionary path between the two.

5 myths about public cloud

- Public cloud is not secure
- Private cloud is the same as public cloud
- All public clouds are the same
- Migrating to the cloud is the same as being cloud-native
- Public cloud is more expensive

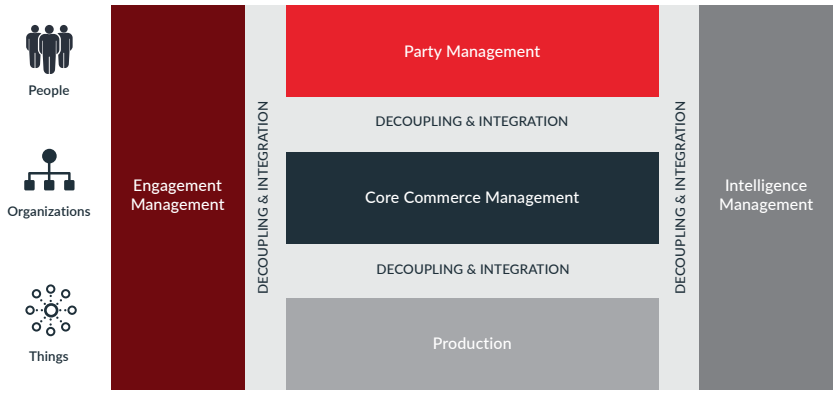
The ODA is fundamentally designed as a component-based architecture, with the business services of a component exposed as a set of Open APIs. The APIs can be, and typically are, further decomposed into a set of services and microservices. The advantage of using microservices is that they can be managed on scalable infrastructure using Agile development practices.

CSPs and other organizations can use the ODA to set an architectural vision and plan relevant roadmaps to implement it. For example, companies can use optimization, reengineering or abstraction to manage migration from their current hosting infrastructure, which is usually a mix of dedicated hardware, virtualized infrastructure, private cloud deployments and some public cloud deployments, to a cloudbased environment.

The ODA accepts that not everything has to be cloud-native and that simply cloud enabling some legacy components may be appropriate to manage costs. In addition, re-engineering or abstraction allows for the decomposition of a component into services and microservices enabling a company to move to a cloud-native deployment.

In January 2019, TM Forum's Collaboration Community published an exploratory report for members entitled Business Operating System Pioneer Project Report. Led by Orange and Vodafone, the paper made the case for creating "a common and fully interoperable framework for CSP core and future business, including their future digital services and ecosystems created by CSPs."

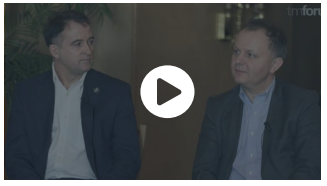
TM Forum Open Digital Architecture: a work in progress



TM Forum, 2020

A subsequent TM Forum Catalyst proof of concept developed an interoperable reference implementation of a core commerce management system including a product catalog and order management service, marking the first time TM Forum members had collaborated to develop software code for testing.

Watch these videos to learn more about the project:



> “The ODA is fundamentally designed as a component-based architecture, with the business services of a component exposed as a set of Open APIs.”

Could ODA follow in ORAN’s footsteps?

TM Forum’s ODA could have an effect on OSS/BSS architecture similar to that of the Open Radio Access Networks (ORAN) Alliance on supplier dynamics in the market for RAN systems. Both efforts lay the foundation for smaller, best-of-breed suppliers to get in the game and provide CSPs with the agility they say they are not getting from legacy suppliers. Both also foster an open framework for encouraging innovation, avoiding vendor lock-in and reducing the risks of transformation.

AT&T, China Mobile, Deutsche Telekom, NTT DOCOMO and Orange jointly launched the ORAN Alliance in early 2018. It is a global, carrier-led effort to drive new levels of openness in the radio access network of next generation wireless systems. ORAN will combine and extend the efforts of the C-RAN Alliance and the xRAN Forum into a single operator led effort. As of February, ORAN and the Telecom Infra Project (TIP) have a liaison agreement to ensure their alignment in developing interoperable, disaggregated and open RAN solutions.

How long will it take?

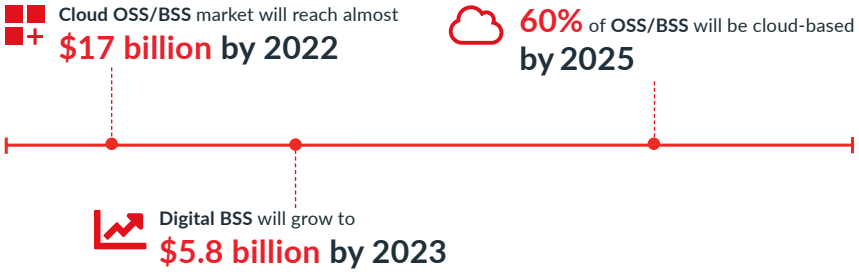
ACG Research predicts that 60% of OSS and BSS deployments will transition to cloud-based solutions by 2025, while 30% will be refactored, meaning developers will restructure the source code of an application or piece of software in a way that improves operation without altering its functionality.

The increasing speed of cloud OSS/BSS adoption is likely due in part to AT&T’s big announcement last summer that it is adopting a “public cloud first” strategy which includes partnering with Microsoft to move all non-network workloads to the cloud, including OSS and BSS.

MarketsandMarkets expects the global cloud OSS/BSS market to reach nearly $17 billion by 2022, with digital BSS growing from $2.8 billion in 2018 to $5.8 billion by 2023. If AT&T makes solid progress on its cloud transformation in 2020, the figures are likely to be even higher.

In the next section, we offer guidance to CSPs to help them assess risks and get started with BSS transformation.

Cloud OSS/BSS in numbers



TM Forum, 2020 (sources: ACG Research and MarketsandMarkets Research)

Section 4

Make it happen: Strategies for reducing risk in transformation

As this report illustrates, risk can be bad or good. Failure to address transformational challenges like replacing legacy operational and business support systems (OSS/BSS) or not hiring software and analytics experts leads to unnecessary and worrisome financial, operational and customer-impacting risks. On the other hand, taking a risk on innovation or a new line of business can be exhilarating for a company, and profitable. Following are some steps communications service providers (CSPs) can take to assess and mitigate the risks associated with digital transformation:

Understand the risks

CSPs need to weigh the risks associated with digital transformation to determine how to move forward. While financial risks are top of mind for every business, it is also important for operators to understand the operational and customer-impacting risks of not transforming their back-office support systems. Failure to evolve legacy OSS/BSS to more agile, cloud-based solutions is a huge risk that impacts nearly every part of the business, not just the bottom line.

Prioritize agility

Once a CSP has determined the best path forward and takes up the challenge of BSS transformation, the company should look first at bottlenecks in their architecture that inhibit agility. These bottlenecks could come in the form of an inflexible charging engine, or a missing capability within an otherwise dependable engine. Or it could be that the whole billing system needs to be replaced. Finding the bottlenecks helps in determining the next step.

Weigh all the options

Full-stack transformation is an option and may provide some early-adopter advantages if operators are able to accomplish it within 18 months or less. However, there are faster and easier ways to add capabilities and improve agility.

One option to consider is overlaying a microservices-based adjunct BSS, which can fill the functional gaps in support system architecture with self-contained units of software that address specific bottlenecks. Microservices can solve shortcomings in legacy systems without the need to customize systems. Replacing legacy BSS modules is another option, but if taking this route, CSPs should consider it an opportunity to assess the viability of replacing them with cloud-based systems.

Use collaborative tools

CSPs should take advantage of collaborative tools such as the TM Forum Business Architecture and the Open Digital Architecture. The baseline Business Capabilities Map, for example, which has been developed by BT, Deutsche Telekom, Verizon, Vidéotron and Vodafone and others as part of the Business Architecture, can help companies take an honest assessment of their capabilities. This allows CSPs play to their strengths and focus transformation efforts in a way that supports their overall strategy, whether it be to become a platform provider or a best-in-class connectivity provider. To join this collaboration project or to learn more, please contact Joann O'Brien.

The Open Digital Architecture is being designed as a component-based architecture, with the business services of a component exposed as a set of Open APIs. Using this approach can helps CSPs take an evolutionary path toward transformation. To join this project or to learn more, please contact George Glass.

Force suppliers to adapt

Best-of-breed solutions are back, even if they come in the form of a microservice delivered by full-suite BSS suppliers. CSPs should demand that all solutions work in an open architecture, and they should require suppliers to support Open APIs. Operators should also push suppliers to deliver cloud-native solutions capable of operating in a multi-vendor ecosystem using open source tools.

“ CSPs should demand that all solutions work in an open architecture, and they should require suppliers to support Open APIs. ”

Openet – Built for Change

OPENET

Openet is a world leading Digital BSS company that provides charging, policy and data management solutions.

Since 1999 Openet has worked with many of the world's most innovative service providers to enable insight, monetisation & control of data services. We work with partners and service providers to enable them to become 'digital service providers', sell new services, embrace new business models and capitalise on the opportunities presented by 5G. In an industry where the only constant is change, our open and innovative technology is built for change.

Openet Products

Openet Charging: Real-time convergent charging for digital and 5G services.

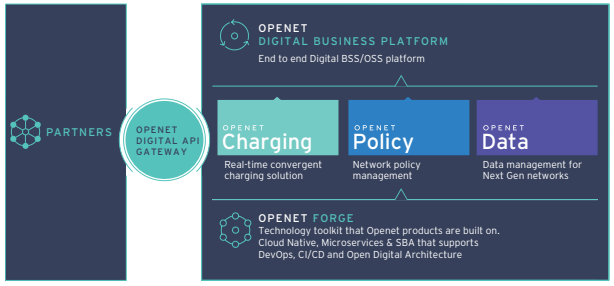
Openet Policy: Network policy control for next gen fixed, mobile and converged networks.

Openet Data: Data management, data processing and data governance solution designed to collect and manage data at 5G volumes in real-time.

Openet Digital Platform: End to end Digital BSS/OSS stack containing Openet & our partners' products.

Openet Forge: The digital enablement platform which contains Openet's library of microservices, upon which all Openet products are built.

OPENET PRODUCT PORTFOLIO



Built for Digital

Openet's solutions are designed to enable rapid service roll-out and drive new revenues from new offers and enable customers to interact though digital channels. This is because Openet's low code approach enables configuration over customisation.

This means less change requests, reduced costs, increased agility and a faster time to support new services. The use of Open Digital APIs and support for Open Digital Architecture allows fast and low-cost integration with partner systems, which enables quick and cost-effective implementation of solutions.

Built for 5G

Openet's products are built for 5G. They are designed to enable flexible policy and control, and monetisation rules to be applied across different services and network slices. They also support policy and charging in the core and also at the 5G network edge.

This agility enables operators to monetise different features of the network (e.g. QoS, latency) and open up new opportunities such as B2B, IoT, smart cities and industry 4.0. This can help operators secure a central position in the 5G value chain.

As well as being 5G standards compliant, Openet products are cloud-native (available on public and private cloud), built on mircoservices, use Kubernetes and SBA, and are proven to support DevOps in CI/CD (continuous integration / continuous development) environments. Openet also provide a data bridge between 4G and 5G to enable charging & policy on hybrid networks.

Openet – Built for Change

OPENET

CASE STUDY: TELKOMSEL

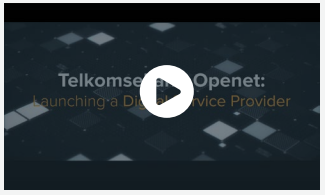
Launching a Full Digital Mobile Service in 18 Weeks

Telkomsel is one of world's biggest mobile operators with a customer base of 163 million.* The company has a strategic goal of transforming Telkomsel into a Digital Telco Company and the leader in Mobile Digital Business. As part of this digital transformation Telkomsel launched digital mobile service called by.U which was developed specifically for the Gen Z (millennial) segment (15-24 years) which is around 44 million people in Indonesia. In serving these Gen Z customers who live digital lifestyles, Telkomsel needed to set new standards in speed to service, cost to serve and agility to serve this digital native generation. To deliver this innovative digital mobile service, Telkomsel needed a Digital BSS partner who would deliver – on time and on budget.

Solution

Openet provided its Digital Business Platform to Telkomsel to provide an end to end Digital BSS suite. This includes:

- **Openet Policy Manager** – to ensure network control and deliver the best Quality of Service
- **Openet Evolved Charging** – enabling support for new pricing models, real-time charging, rules based rating, rules based self-configurable offer catalog enabling faster time to market.
- **Openet Digital API Gateway** – enabling fast interface with any 3rd party solutions
- **Openet Data Fabric** – real-time collection and management of data
- **Openet's partner systems** – in Telkomsel Openet worked with 6D who supplied complimentary solutions (e.g. CRM) to enable the end to end Digital BSS to be provided



Results

Telkomsel launched their digital mobile service, by.U, which delivers an end-to-end digital experience. Taking this digital approach eliminates system complexity, and offers a simpler process both for customers and in internal business process. Telkomsel were able to the take the vision of a new digital service and turn it into reality in record time. Openet worked with partners in this project including NTT Group, McKinsey and 6D Technologies to implement this digital vision, built on Openet's charging and policy systems alongside a suite of other digital enabling tools, in 18 weeks.

Edward Ying, Telkomsel's Director of Planning & Transformation:

"by. U as the first digital prepaid cellular service in Indonesia is a real evidence of Telkomsel's Transformation as the leading digital telco company, which prioritizes customer centricity in developing quality digital products and services for customers. We need to collaborate with a partner who shares the same ambition so we can provide a full end-to-end digital experience in customer journey. We wanted a support system that could easily be configured to allow us to quickly roll out a range of new attractive offers for our digital native customers and enable us to stand out in one of the most competitive mobile markets in the world. With this collaboration, we certainly hope that Openet's Digital BSS has the agility that we need, and also that Openet as a company has the partnership-focused attitude to ensure success."

*Telkomsel 2018 annual report

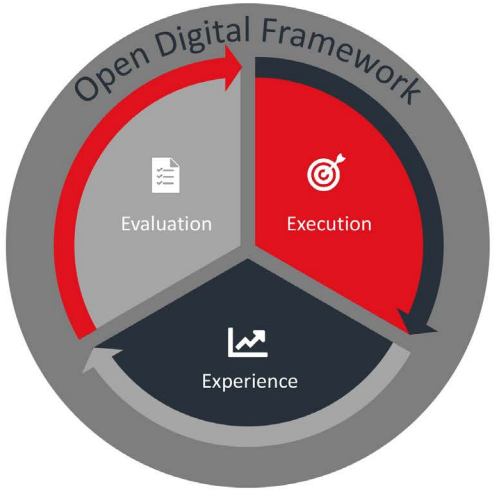
TM Forum Open Digital Framework

Delivering the tools to go from concept to cash in just 18 days

The TM Forum Open Digital Framework is an interactive, continuously evolving collection of tools, knowledge and standards that give communications service providers (CSPs) an end-to-end migration path from legacy systems to modular, cloud-native IT components. Simply put, it is a blueprint for service providers to deliver intelligent operations fit for the 5G era.

New online Digital Knowledge Centers will be available for TM Forum members to explore soon. The framework is being developed through the TM Forum Collaboration Program and Catalyst proofs of concept, and builds on the success of the Forum's established Open APIs and the Frameworx suite of standards. Specifically, it includes:

- Open Digital Architecture (ODA) – an enterprise architecture blueprint, common language and key design principles for modular, cloud-based, open digital platforms that can be orchestrated using AI
- Open APIs – 50+ standardized REST-based APIs to facilitate zero-touch integration and zero-touch partnering
- Data & AI standards – an industry-agreed data model, together with standards maximizing the potential of AI to enhance customer experience and increase operational efficiency
- Reference implementations – a framework for assembling and validating ODA components in the Forum's Open Digital Lab, fostering the creation of a services marketplace
- Practical guidance – guides and videos showing how the Open Digital Framework can be used to transform the core business and enable new business growth



- Foundational libraries – normalized models providing a common language for business processes and information that simplifies and de-risks transformation projects

The goal of the Open Digital Framework is to help service providers increase agility and drastically reduce the development cycle for products and services from 18 months to 18 days. Much of the collaborative work that is part of the framework is already available, but it helps to organize it and make it more accessible. The framework is a work in progress and will improve through crowdsourcing.

If you would like to learn more about the project or how to get involved in the TM Forum Collaboration Community, please contact George Glass.

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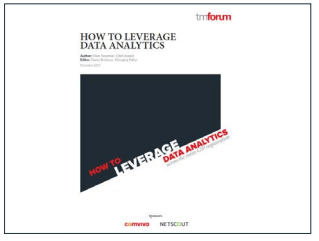
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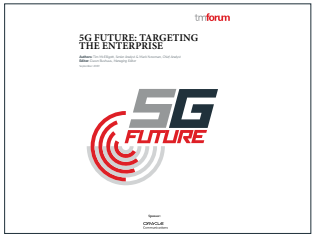
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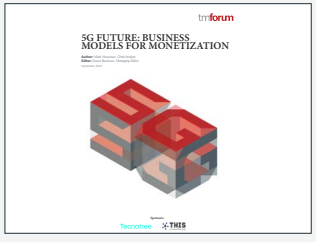
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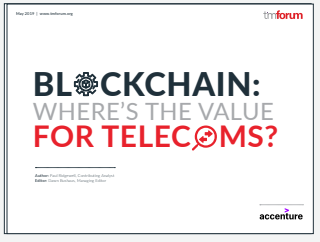
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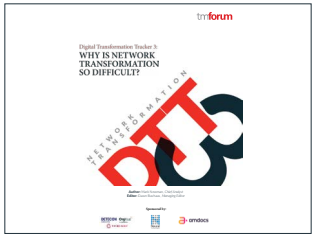
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TAKING ON
THE GREENFIELD OPERATORS
WITH DIGITAL SUB-BRANDS
ETIYA

Meet the R&M team

Report Author:
Tim McElligott
Senior Analyst
tmcelligott@tmforum.org

Chief Analyst:
Mark Newman
mnewman@tmforum.org

Editor, Digital Content:
Arti Mehta
amehta@tmforum.or

Commercial Manager, Research & Media:
Tim Edwards
tedwards@tmforum.org

Report Editor:
Dawn Bushaus
Managing Editor
dbushaus@tmforum.org

Customer Success & Operations Manager:
Ali Groves
agroves@tmforum.org

Global Account Director:
Carine Vandevelde
cvandevelde@tmforum.org

Digital Marketing Manager:
Anna Kurmanbaeva
akurmanbaeva@tmforum.org

For more information about TM Forum's Open Digital Architecture, please contact **George Glass**