tmforum

BSS strategies for

new lines of business

Author: Dean Ramsay, Principal Analyst
Editor: Joanne Taaffe, Editor in Chief, Inform

Sponsored by:

HUAWEI

contents

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

the big picture

tmforum

tmforum

As traditional consumer telecoms markets hit a saturation point and average revenue per user (ARPU) stagnates, communication service providers (CSPs) worldwide are seeking to avoid chronic revenue decline and diminishing returns on investment by significantly diversifying their existing businesses into untested areas. Seeking growth from speculative diversification, however, is fraught with challenges. Even if CSPs get the strategy right, they face considerable operational complexities, in large part because many of the telecom industry's unique IT specialisms have become the very things holding back transformation. As the spotlight falls on business support systems (BSS), we look at how they will empower CSPs to drive growth through new lines of business.

The last five years have seen a great deal of technological advancement in networking and computing, which CSPs can now use to rethink service operations and monetize the next generation of services.

At TM Forum, the impact of the changes can be seen in a shift in members' focus and conversations. Increasingly they are looking beyond how to make the technological changes for 5G and implement next generation networks to how they can capitalize on their investments.

5G is yet to produce a stable of killer applications that CSPs can count on to drive new revenue streams over the next decade. Instead, telcos are entering unfamiliar territory that will test what they can achieve in business, technology and society.

One thing is clear. The current machinery of telecoms BSS is so heavily geared towards providing traditional services, it will hinder CSPs' efforts to excel in fresh lines of business. Consequently, they will need new

frameworks and IT concepts that are supremely flexible and agile, allowing them to pivot rapidly, follow new opportunities and interact easily with IT-driven industries.

In this report we look at how the latest wave of BSS solutions will enable the industry to empower new lines of business and at some examples of how BSS is already making a significant impact for CSPs. Read the report to understand:

- The opportunities BSS transformation creates for CSPs – and why they should make the change?
- Requirements CSPs have for the new wave of BSS, with a focus on revenue management
- Why architectures and developmental models are becoming so important
- Which BSS components are changing first
- The early sources of success

One thing is clear. The current machinery of telecoms BSS is so heavily geared towards providing traditional services, it will hinder CSPs' efforts to excel in fresh lines of business.

tmforum

Section 1

New business models, new service operations

Telecoms IT has changed fundamentally over the last decade. One of biggest shifts stems from communications service providers' (CSPs') fast-growing use of cloud native systems, developed using modular microservice architectures and DevOps methodologies. CSPs are also building far fewer in-house systems and choosing to work with trusted vendor partners to produce their operational and business software stacks. In this section we look at the changes at the heart of business support systems (BSS) and how they enable CSPs to continue running their core businesses, while speculatively spinning up new business units that focus purely on diversification. Firstly, we will look at the scale of the opportunity and examine why CSPs would go to all this trouble.

The worldwide market for telecommunications services totals around $1.5 trillion, according to IDC. Recent research conducted for our upcoming Benchmark report, *Mapping a path to revenue growth,* shows that B2C revenues overall have been declining by around 1.5% annually over the last three years and that B2B revenues were flat before the Covid-19 pandemic started in 2020.

The pandemic hit many CSPs' core B2B communications businesses as the global office workforce started working from home using existing consumer broadband connections and some businesses failed. It appears that it may be a short-term problem, however, with many workers returning to the office often enough to require full-service connectivity again.

CSPs' investments point to an industry-wide belief that the next decade's revenue growth will come not from B2C markets, or indeed from traditional B2B offerings, but from new B2B and B2B2X services. As CSPs move beyond providing traditional B2B services, they are investing heavily in diversifying into areas such as IoT, cloud services, security services, Fintech and digital services, with value coming from their connectivity capabilities.

Even with a focus on connectivity, however, new B2B and B2B2X services are significantly more complex to support than a traditional B2B solution, such as providing an enterprise communications suite for a single company. Some new services involve CSPs delivering the whole solution, but many require CSPs to partner on creating new service packages or to enter established value chains with new connectivity capabilities.

> "
>
> CSPs' investments point to an industry-wide belief that the next decade's growth will come from new B2B and B2B2X services.

Our research identifies high potential for short-term growth in the following areas:

Security services – regulators force CSPs to have highly secure network operations, which has resulted in telcos developing a strong skillset that they can package for enterprises as a service.

Cloud network services – similarly, the huge amount of work CSPs are putting into migrating their own IT workloads to the cloud means they have internal pools of expertise and relationships with partners that they can use to help their business customers' cloud transformations. Our research shows that some of the more digitally advanced CSPs are achieving strong growth in selling telco cloud services to their existing enterprise customer base.

IoT – this segment is vast and is only just beginning to generate significant revenue for the telecoms industry, with a handful of large operators such as China Mobile, Vodafone and AT&T responsible for much of the growth.

B2B2X – longer and more complex value chains are rapidly becoming a reality and many B2B2C scenarios differ greatly from today's B2C propositions. The key focus here for CSPs is to avoid becoming a cheap data pipe and add as much value as possible.

Interviews with CSPs about their new lines of business reveal that today they are principally participating in the connectivity piece of the value chain. If CSPs are to tap additional revenue from those value chains – for example in the application layer – then they will need to make more fundamental changes to their IT environments.

Take the IoT segment, for example. Here CSPs are entering unfamiliar value chains in which they depend on a wide variety of other partners, including device manufacturers, sensor manufacturers, cloud service providers, application developers and others. This makes service delivery complex.

From a BSS point of view, it means that CSPs need to be able to interface with other players via standardized APIs, such as the TM Forum Open APIs (see page 14), and perform complex rating, charging, partner settlement and billing functions in a fully automated way. And because CSPs cannot afford to build each new business unit in a silo, they must also take into account wider organizational changes.

> In B2B2X value chains, the key focus for CSPs is to avoid becoming a cheap data pipe and add value.

The wider drivers of evolved BSS

Alongside growing new revenues, CSPs have other solid operational and business reasons to evolve their BSS:

- **Improved customer satisfaction –** business customers' expectations have shifted and CSPs need to deliver modern IT-centric experiences to match those provided by over-the-top (OTT) service providers and hyperscale cloud platforms. Customer experience and satisfaction is becoming one of the main KPIs by which CSPs measure the effectiveness of their IT strategies.
- **Better process automation –** CSPs' traditional telecoms connectivity divisions and new business units must minimize operational expenditure on fixing issues that result from process automation. Many BSS suppliers help by supporting open APIs and enabling interoperation in a more open ecosystem, which is designed to drive out the faults that lead to order fallout or process breakdown.
- **Lower churn –** churn is a well-studied area of telecoms operations and many CSPs have been successful in reducing it. However, new service models are likely to generate unknown causes of churn initially. Customer analytics programs should therefore have an end-to-end view that can correlate events in network operations or in processes like service fulfillment with customers' issues and churn.

Key BSS components for new lines of business

Interviews with around 30 CSPs for our Benchmark report on revenue growth revealed which BSS components they believe are the most important for addressing current business models and pivoting towards unforeseen services and partnerships. They include:

- **Centralized catalogs –** catalogs should provide a single source of truth about the form and configuration of products and services. Ordering and fulfillment processes rely heavily on the concept of a centralized product/service catalog, so it makes sense for revenue management in the BSS to use the same source of data.
- **Dynamic rating and charging –** rating is the assignment of customers' data traffic to a tariff, and charging is the application of that tariff. Many services in new lines of business, such as industrial IoT, may have a large number and wide variety of data connections within a single deployment. The requirement to rate and charge each connection using different tariffs is becoming more commonplace as customers seek accurate billing based on exact usage.
- **Advanced partner management –** CSPs increasingly want to provide zero-touch onboarding for partners such as resellers, suppliers, distributors and wholesalers as they become involved in new service ecosystems. B2B2X supply chains increasingly rely on more advanced partner management and cross-partner settlement systems and may even be a factor in the establishment of commercial partner contracts going forward.

- **Convergent billing –** billing for complex service bundles requires an end-to-end approach to service management, which mirrors the streamlining activity happening in service orchestration. Eliminating old-world issues like order fallout in the billing phase is a key priority. Within the modular architectures of new cloud-native BSS, vendors are providing features such as libraries of executable tasks, AI-driven configuration engines and customer-centric analytics to ensure fault-free operations. Billing therefore is once again becoming a big focus.
- **Self-service and automated interfacing –** many CSPs are trying to figure out the right balance between offering self-service capabilities to enterprises and using account management teams to deliver customized solutions, as business buyers demand to engage digitally, faster and with shorter activations times, much as they do with hyperscale cloud providers. For CSPs to deliver similar experiences, account management roles will have to change. Account managers likely will become more of a trusted advisor rather than the person who sorts out invoices and billing.
- **Advanced connectivity awareness from OSS –** tight integration of BSS with operational support systems (OSS) is essential to provide advanced revenue management functionality for new network services as mass 5G deployment takes place and new B2B network services such as SD-WAN start to generate more revenue.

Connectivity is still at the core

Creating customized connectivity solutions that deliver services based on network attributes such as speed, latency and location is a challenge for CSPs. Most traditional connectivity services do not require dynamic changes in the network, but if operators want to offer service level agreements for variable attributes, they will need to introduce new charging and billing capabilities. This will require tight integration between the network, IT systems and business units.

Rather than thinking of billing only in the context of services delivered to end users, CSPs need to reposition billing internally as a capability that can add value to relationships with partners. The ability to offer real-time visibility and transparency of the way partners and enterprise customers are using all the features that make up a service can be a real differentiator. As part of this approach to deliver value to partners, operators will need to invest in systems and capabilities that feed data to their customers about usage.

> Business customers' expectations have shifted, and CSPs need to deliver modern, IT-centric experiences like those provided by hyperscalers.

Co-creating with customers

CSPs should aim to build a new kind of relationship with prospective enterprise customers where they quickly experiment with new services. Experimentation requires software developers and engineers from CSPs, enterprises and other partners to collaborate on potential use cases.

While the commercial arrangements between partners are unlikely to be prioritized during the early stages of co-creation, it is important to understand what is and is not possible if the trial becomes a commercial service.

The BSS should support this concept by allowing any new partnership to set up quickly, scale up as necessary or 'fail fast' if results of the experiment fall below pre-determined commercial thresholds.

In the next section we will look at the IT ecosystems that CSPs are adopting to realize their ambitions.

To offer service level agreements for variable attributes, CSPs will need to introduce new charging and billing capabilities.

Section 2

Architectures for success in new lines of business

Many established vendors of commercial off-the-shelf business support systems (BSS) have rearchitected their software and associated services over the last few years to align with the aims of communications service providers' (CSPs') digital transformation initiatives. Driven by closer technology relationships with their operator customers, many of these changes have been in response to a need for a more open and standardized ecosystem as we emerge from the telco model into the digital operations era. Here we look at the major changes and their implications for BSS.

Cloud native architectures

The term "cloud native" describes container-based environments that run services packaged within containers. These services are deployed as microservices and managed on an elastic infrastructure using Agile DevOps processes and continuous delivery workflows.

The advantage of containers is that single applications and their dependencies are isolated in a self-contained unit, which means the application can be deployed anywhere. In this environment, hardware and operating systems are virtualized, so the operating system is shared with other hosted applications.

As the telecoms industry moves towards standalone 5G and network slicing, CSPs will need a cloud native revenue management platform to handle rating, charging, billing and partner management in a more dynamic way. 5G network slicing requires fully automated, end-to-end service management, which makes BSS as important as operations support systems (OSS) in ensuring that each slice complies with service level agreements (SLAs).

The ephemeral nature of slice-based services means that a dynamic, real-time software stack is needed to manage services optimally. Established solutions have not evolved to serve this purpose, and revenue management systems will need a radically different approach.

Consequently, revenue management is becoming a hot topic for CSPs as they work towards offering a range of new digital services, IoT deployments and next-gen connectivity and IT solutions.

"Cloud-native IT for us is the most profound change since switching from landlines to mobiles – it's that important," says an IT Director from a CSP operating in eastern Europe. "The problem that we have had is making this point with the senior management team, as many of the investments have no direct measurability and the timeframe over which we will see the benefits is quite long. But the move to the cloud is setting up the company for fifty more years of success."

5G BSS and revenue management will depend on a cloud platform, she adds. "Monetizing 5G properly will be very difficult without having our billing functions in the cloud," she explains. "5G is not just an LTE replacement for us and we want to use it as a kind of cloud platform in its own right to launch whatever services we choose. We need the cloud for that, 100%."

DevOps & CI/CD
The move to DevOps has been a profound shift for CSPs and vendors alike. From an IT perspective, DevOps is the glue that joins the new technologies and processes that make up the modern software development lifecycle. Automated testing during the development process (rather than post development) and continuous delivery of working code into deployment is a big leap forward from both an IT and a business perspective. Most CSPs are at a point in their transformational journeys where they are using DevOps and CI/CD to some degree and are now seeing some benefits in the form of operational agility.

"During the pandemic we had to switch a large number of backbone network services and a large number of customer circuits and services," says an operations consultant from a European multi-service operator. "To do that we had to make some systems changes. If we had been working with a waterfall system and a non-reactive group of vendors, that would have been big trouble for us. DevOps and microservices are incredibly quick for re-configuring, and it really made the case for more investment."

Modular microservice architectures
Microservices are smaller units of code that represent a self-contained piece of software that can run specific tasks independently within the framework and context of a wider IT architecture. This means that CSPs can construct or change larger solutions very quickly and at little cost, using pre-approved code modules that are ready for immediate use.

Microservices also lend themselves to quicker, more efficient continuous upgrade cycles. Removing the need for large customization projects to establish a new software stack is big news for CSPs that are scoping new opportunities and designing appropriate services. Microservices are the fabric of CSPs' software solutions for cloud native service operations, providing the agility and quick time-to-market that our research shows CSPs are seeking from the cloud.

Cloud-native IT for us is the most profound change since switching from landlines to mobiles – it's that important.

– IT director at a European CSP

Any software that is considered cloud native must be built from microservices using standard APIs to expose services and interconnect with other components and run on container-based cloud platforms. Many suppliers of OSS/BSS and network systems are rebuilding their portfolios using this model, and they are using common information models and Open APIs developed by TM Forum members.

Helping CSPs evolve to a cloud native architecture

TM Forum members are collaborating on best practices and standards to help CSPs with cloud migration. The TM Forum Open Digital Architecture, part of the Open Digital Framework (see page 32), is a component-based approach that enables operators to evolve to a fully automated, cloud native operations environment that relies on analytics and AI to deliver zero-touch services.
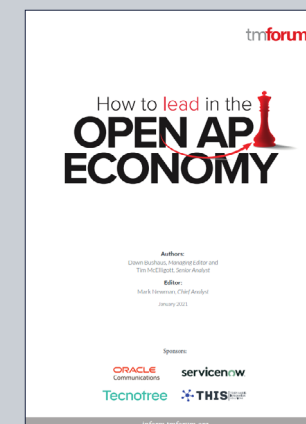
The ODA defines standardized, interoperable software components, which are independently deployable pieces of software typically built out of one or more microservices. These components expose business services through Open APIs, which are built on a common data model. Importantly, the ODA provides machine-readable assets and software code, including a reference implementation and test environment.

While the ODA offers a blueprint for migrating from legacy support systems to cloud native applications, widespread agreement, collaboration and contribution among many CSPs and vendors is necessary to advance it. An ODA Component Accelerator project is developing a reference implementation that acts as the basis for testing commercial ODA components. It is a step toward the Forum's goal of developing a market for standardized and interoperable software components to run service providers' businesses.

The test platform's roots stem from one of TM Forum's award-winning Catalyst proofs of concept called *BOS – an implementation of ODA Core Commerce Management*, which implemented a business operating system that allows CSPs to focus on innovation instead of integration issues.

To learn more about this important work or to get involved, please contact Ian Turkington.

Read this report to learn more about ODA and Open APIs:

Section 3

The ambitions of BSS evolution

The communications service providers (CSPs) we have interviewed view their revenue management solutions as part of a much wider transformation of service operations, which involves automating systems and processes to create an orchestrated ecosystem. Here we look at the how all these moving parts come together, giving CSPs the opportunity to shake off their image as lumbering monolithic entities, born in a bygone era.

"Our aim for next-generation BSS [business support systems] is for our rating, charging and billing to not be adjunct to the rest of our operational IT suite," explains an IT strategy manager at a European mobile operator. "Every component needs to be extremely interoperable with maximum data sharing. We also need the ability to change that component easily when we see fit."

He adds: "We may not need extremely different billing capabilities for our current range of products and services, but the way they are developed and built needs to be different, and we need maximum flexibility for whatever service models we move to next."

This comment highlights a definite shift by decision makers within CSP organizations, who realize that the zero-touch operational transformation they have speculated about for over a decade is now a requirement.

Many changes are needed

In our survey of more than 200 CSP respondents for our upcoming Benchmark report, *Mapping a path to revenue growth*, we asked which BSS capabilities needed to be addressed to support future enterprise business requirements. Remarkably the results illustrate that all the capabilities listed in the survey require significant change if CSPs are to create a service platform with few operational limitations. The graphic on page 17 shows the percentage of CSP respondents who rated each capability as urgent or important.

Types of services & customers

CSPs that sell to enterprises typically offer traditional voice and data services including fixed and mobile voice, broadband, audio-conferencing and video conferencing, and unified communications. They also offer private branch exchange, call center, local and wide area networks (LANs and WANs), and security services. Many offer hosting, and increasingly platform-a-service, software-as-a-service, and machine-to-machine communications or IoT, and most can deliver all these as managed services.

Important BSS capabilities

Capability	%
Flexibility & scalability	99%
Customer analytics	98%
Real-time revenue management (charging & billing)	98%
Automated service configuration & purchasing	97%
Zero-touch end user account management	97%
Ecosystem enablement/partner management	95%
Integrated digital experience and commerce management	93%
Openness (and conformance to TM Forum standards)	90%
Support for more granular charging mechanisms	81%

TM Forum, 2021

CSPs typically segment their enterprise customers based on the size of the organization. The graphic on page 18 shows how businesses are divided based on the number of employees, from self-employed and small office/home office (SoHo) users through to multinational corporations and public sector government organizations.

Serving bigger enterprises or government organizations involves a sizeable role for the account manager and greater flexibility to meet the requirements of different internal stakeholders. For example, the users, payers and owners of services are not always the same, and an organization's finance department may demand special payment and credit terms from the operator.

The way services are billed also varies. Large organizations often buy many services from a single operator, but how they are accounted for varies from one organization to the next. As CSPs turn their focus to vertical markets – where the same service could be sold to a single practitioner or a large corporation – they will need to reconsider segmentation and account management.
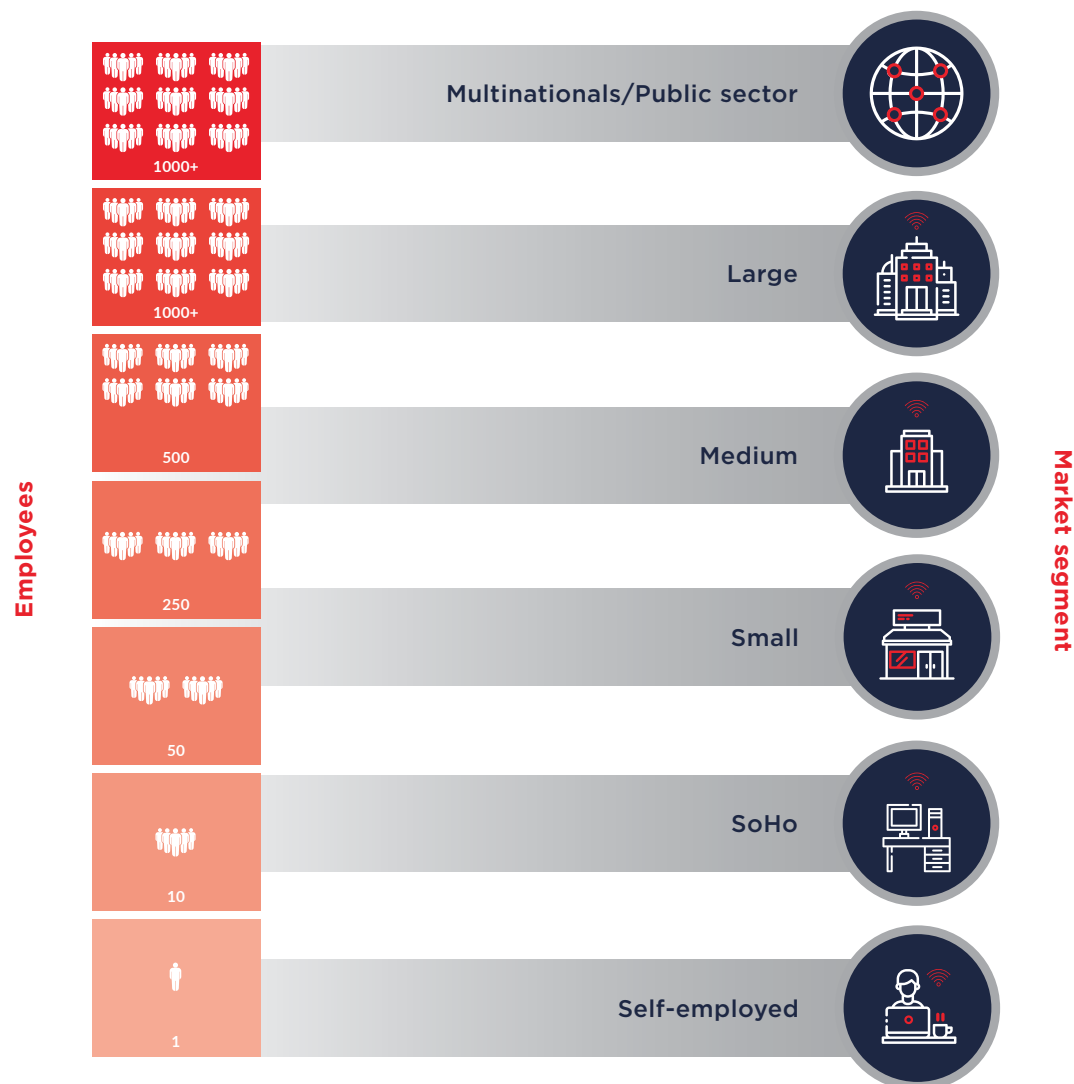
Modular BSS addresses many use cases

A large western European tier 1 operator we spoke to described its strategy for covering many types of business customers with a single ecosystem:

"In the past we have had many different business units and many different software stacks for the various categories of B2B. The containerized ecosystem we have built over the last three years allows us to pick modules of our BSS to closely fit each different service use case and size of customer. For example, we are having success with new industrial applications from both the IoT side and the straight communications packages, to provide these two service groups, we can quickly pull together a cloud native software ecosystem based on pre-approved modules, almost like a drag-and-drop operation.

The BSS can easily track dynamic pricing, it can track performance of the networks providing the connectivity, it can trigger the spin up of new virtualised network functions, it can provide edge cloud compute when needed for on-site activity, it can do many things. This new way of working is revolutionary to us and so we are starting to look not only at how it will help us to innovate new service models, but how it could streamline our existing communications business."

In the next section, we'll look briefly at how success is informing CSPs' BSS strategies.

Types of enterprise customers

Employees

Market segment

1000+	Multinationals/Public sector
1000+	Large
500	Medium
250	Small
50	
10	SoHo
1	Self-employed

tmforum

Initial success informs CSPs' BSS strategies

Deciding which segments and roles communications service providers (CSPs) want to support will help inform their decisions about what sort of business suppport systems (BSS) they need. Many operators are focusing on a few specific verticals because they believe that by committing to a discrete industry or sector, they can better understand and address customers' business issues. After all, one vertical sector differs considerably from the next. For example, dynamic rating capabilities may be crucially important for one use case but less important for another. Consequently, the services that are driving the most growth for CSPs are also informing their immediate revenue management strategy.

"The real original driver for the transformation of our BSS came from digital services in around 2010," says a BSS specialist at a North American mobile operator. "That was the first time we saw that our existing revenue management stacks could not do what we wanted them to in an efficient way. The issues came when we started to scale the services and thousands of instances of new service orders were being pushed into billing in various non-standard forms. It was taking a lot of manual intervention to make sure they all completed their processes. That was when we thought, if something like IoT takes off quickly we are in trouble."

Connectivity-driven use cases

Many new lines of business, such as IoT, leverage CSPs' chief differentiator: the network. Connectivity will be at the center of these commercial propositions, but even here CSPs need to be able to support the richness and diversity of future connectivity if they are to make the most of edge computing and network slicing. As they go beyond connectivity, telcos will have to consider which

strategies to pursue and which capabilities future BSS will need in order to support digital ecosystems, platform business models and marketplaces.

Rather than basing their go-to-market strategies purely on the size of the enterprise, operators are now looking at which vertical markets they should prioritize based on the use cases they plan to exploit. CSPs with mature businesses likely will focus on existing customers, but mobile operators that have traditionally focused on the consumer sector will need to decide which verticals hold the most potential and where they are most likely to find their own niche.

The importance of 5G for future growth

Most new enterprise 5G use cases require the participation of multiple partners including device vendors, application developers, platform providers, OSS/BSS suppliers, hyperscale cloud providers and CSPs. In addition, a specialist vertical-market service provider, IoT specialist or systems integrator may have a role in bringing together partners.

The graphic opposite from our 2020 report on enterprise 5G services illustrates a potential ecosystem using drones-as-a-service as an example. In this case, several companies could provide different pieces of the technology stack.

The early stages of "5G2B" are less of a departure from existing operations, so we are seeing more adoption of connectivity-based use cases for business, such as fixed wireless replacement using 5G. However, as we move into the standalone 5G era and network slicing becomes a more typical activity, the requirement for modernized BSS increases. Examples of cutting-edge 5G usage in the industry are becoming more common:

- 5G slice management as-a-service is being used by Orange in France, requiring cloud-native digital, ordering, catalog, revenue management and charging capabilities to provide the services on top of the slices.
- In the US, AT&T is partnering with General Motors to provide 5G IoT services for connected cars with 5G connection eSIM, ultimately paving the way for autonomous vehicle connectivity.

Drones-as-a-service show potential roles for CSPs & partners

Devices
In some early proofs of concept, smartphones have been strapped into the drone. For full commercial deployments, 5G modules will need to be embedded into the electronics of the drone itself.

Applications development
Drones-as-a-service will likely involve the use of applications built on geographical information systems. These apps will need to be customized for sectors such as agriculture, utilities, and oil and gas production, and for segments within each vertical. For example, drone applications could be used to increase efficiency or improve security for utilities, or to monitor pest damage and identify growth in agriculture.

Applications deployment & enablement platforms
This role can be played by different types of companies, but it is often played by drone operators. Zipline, for example, specializes in delivery of medical supplies via drone.

Connectivity
Drones rely on wireless connectivity. Communication is needed for management to support authentication and authorization, while command and control communication is needed to fly the drone. Payload data transmission is also needed to support the applications onboard the drone, such as high bandwidth video streaming for news gathering. For collision avoidance, drones may require means to communicate with other nearby drones.

Software infrastructure
Drones can generate huge amounts of data based on the application and number of units deployed. Some of this may be extremely time sensitive and require immediate processing to generate real-time insights. Drone operations and data processing likely will take place in a public cloud to meet these objectives, ensure security and help applications scale.

Hardware infrastructure
Remote gateways to process, filter and upload real-time information to the cloud are needed, as well as a drone control station.

Systems integration
Today drone operators handle systems integration with help from specialist firms, but large global systems integrators are also beginning to build competence in this area. CSPs could partner or acquire expertise to offer management of drones-as-a-service.
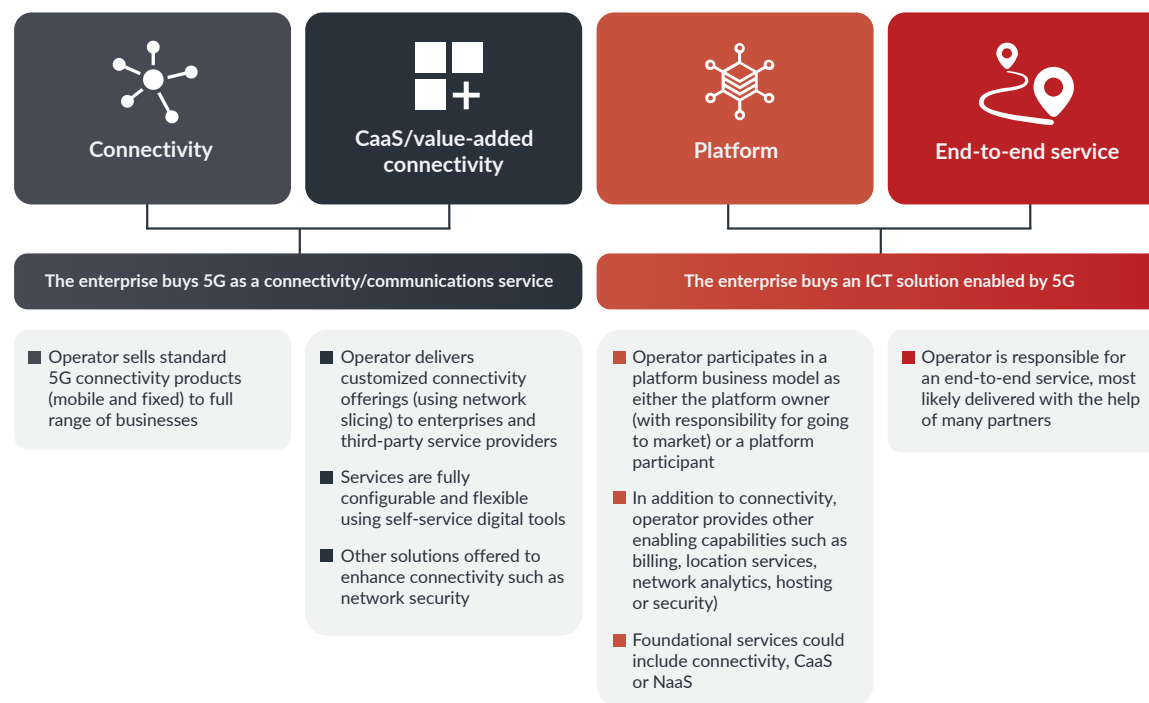
- Vodafone and Cradlepoint are providing IoT enablement platforms in Europe, a turnkey, cloud-managed solution that aims to provide a fast and secure package of connectivity and omnichannel BSS.
- A European MNO we spoke to is providing cloud gaming with edge compute. It said that B2B2X models with complex partner ecosystems and variable connectivity requirements are becoming increasingly prevalent, and it is currently expediting its BSS transformation strategy to meet the demand.

Moving beyond connectivity

For CSPs to move beyond a role as passive connectivity providers, they will need billing solutions capable of supporting partner ecosystems. However, many discussions about enterprise 5G use cases lack detail about the roles CSPs could play. These could vary as shown in the graphic opposite, which is also from our enterprise 5G report, from providing simple connectivity to delivering an end-to-end solution that includes service orchestration and systems integration.

Between the two lies the role of platform provider, which can also be called a service creator. In platform business models, CSPs can either be participants or platform owners, which is a role that is sometimes described as service orchestrator. The service creator typically adds more value to a solution than a service orchestrator.
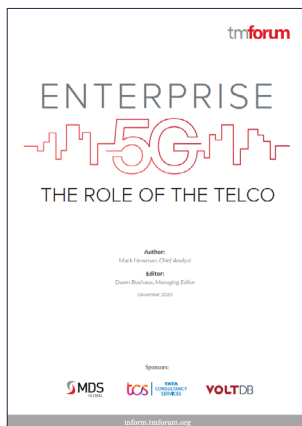
Roles for CSPs in delivering 5G services

Connectivity	CaaS/value-added connectivity	Platform	End-to-end service

The enterprise buys 5G as a connectivity/communications service		The enterprise buys an ICT solution enabled by 5G	

■ Operator sells standard 5G connectivity products (mobile and fixed) to full range of businesses	■ Operator delivers customized connectivity offerings (using network slicing) to enterprises and third-party service providers ■ Services are fully configurable and flexible using self-service digital tools ■ Other solutions offered to enhance connectivity such as network security	■ Operator participates in a platform business model as either the platform owner (with responsibility for going to market) or a platform participant ■ In addition to connectivity, operator provides other enabling capabilities such as billing, location services, network analytics, hosting or security) ■ Foundational services could include connectivity, CaaS or NaaS	■ Operator is responsible for an end-to-end service, most likely delivered with the help of many partners

A CSP could also operate a digital marketplace, which is an e-commerce B2B platform where a CSP's business customers can access self-service digital services. As the name suggests, digital marketplaces also allow the CSP's business partners to provide services through a standardized interface in the CSP's platform.

However, the CSP needs to have a modernized BSS back end to enable purchasing, partner settlements, customer experience management and a host of complex BSS functions centred around partner onboarding and revenue management.

Read these reports to learn more:

tmforum

Make it happen – Strategies for success with new lines of business

Communications service providers' (CSPs') first steps into new lines of business have been understandably difficult because of the major transformational changes they must undertake to address new business models and generate revenues that start to equal those of legacy businesses. However, several best practices are emerging for success in diversifying telecoms business.

Focus on the potential of 5G

The next phase of 5G deployment with 5G core will be a significantly more powerful network proposition for B2B. The history of technology shows us that advancements and new technology cycles often precede a wave of innovation and monetization. Standalone 5G will provide business customers with a host of new capabilities to drive their own businesses forward. Successful CSPs will listen carefully to the way those customers want to use the technology and fine-tune their services accordingly.

Modernize BSS for monetization

CSPs need to be able to try fast and scale fast – or fail fast. All the CSPs we spoke to while researching this report acknowledged that the traditional way operators launch new services cannot continue. BSS functions such as centralized product and service catalogs, convergent billing, dynamic multi-factor rating and charging, advanced partner management,

self-service and omnichannel customer touchpoints will play an important role going forward. Tightly controlling the service-level operations with these new capabilities is essential for maximizing margins on new service models.

Adopt a cloud native approach

Many CSPs' strategy for building new cloud-based software ecosystems is to not intentionally create an architecture for a specific service type, but to build a platform on which they can pivot quickly and efficiently to generate everything they need for operations and business support, regardless of service type. The building blocks for this platform are cloud native software, DevOps methodologies, CI/CD, microservice architectures, standardized frameworks, unified information models, open APIs, the use of artificial intelligence and machine learning and contextual awareness.

Start with strengths

New business lines such as IoT rely heavily of the connectivity portion of the value chain, which is obviously a core competency for mobile operators, but is invariably a small part of the total service revenue in the partner ecosystem. CSPs are garnering success in providing increasingly specialized connectivity and by incrementally adding value into the adjacent areas of the chain, such as security or the application layer.

Take a combined approach to BSS, OSS & network

Zero-touch automation in service level operations relies on a single vision for OSS/BSS functions from the outset. Creating a revenue management function in isolation, without considering how the other components of the ecosystem work, will cause unnecessary interoperation and process problems further down the line.

Develop a customer-centric transformation strategy

CSPs are developing new lines of business successfully on a speculative basis. Many CSPs are using the digitalization of their operations to build a closer relationship with their customers, giving them more control, with the analysis of business customers' requests providing a basis for the CSP's own transformation. In addition, if a CSP's enterprise customer wants to supply their own customers with a complex package of services and is coming to the CSP for connectivity, then CSPs can also consider offering their B2B2X customers the IT capabilities they require to serve their own clients.

Are you Ready for the 5G World?

The global deployment of 5G is accelerating and the 5G ecosystem is maturing. Last year, almost 70% of smartphones shipped in China were 5G capable. Moreover, there are over 1000+ projects globally across over 20 industries like steel and mining that's utilizing 5G in some way. While the pace of 5G rollout has progressed faster than many had predicted, many operators are still exploring and learning how to monetize the new capabilities promised by 5G. Moreover, the consensus is that the greatest opportunities for 5G, based on B2B services, are still to come.

Huawei is partnering with many operators globally on these projects, and generally, we see exploration in several major directions:

1. High Bandwidth VAS and Fixed Line Replacement Services

As early 5G networks primarily promise more "speed" vs. 4G (e.g. via FWA or NR technology), operators have been rolling out bandwidth intensive services like AR/VR, MMORPG games and HD video/streaming services to increase the value proposition of 5G to users. However, while these services provide a superior user experience, they remain unchanged to how similar services were charged / provided in 4G.

For example, early attempts to launch AR / VR have centered around fixed / zero monthly fees / freemium models while continuing to charge for the data usage. The approach also true of fixed line replacement offerings based on FWA,

which are largely using fixed monthly quota or bandwidth w/ overage models. Thus, there are very limited new monetization requirements on the revenue management platform seen. Despite this though, as operators are taking a more experimental approach to many of these services, especially VAS, it is widely expected that the average longevity will be much shorter while the number of such services will increase greatly.

This means that the cost / time to implement these new services becomes even more important than during 4G. This trend is also expected to continue once operators switch their focus to targeted B2B services when the next generation of 5G networks are deployed. Thus, the revenue management platform must undergo a transformation to ensure that it can launch / monetize these new services quickly and cost effectively.

2. Network Capabilities Exposure

Another strategic area of investment for many operators is around ecosystem enablement. To this end, many have been prioritizing the exposure of network capabilities to 3rd party partners (e.g. through the selling of APIs) in order to create a completely new revenue stream outside of traditional channels. While this is not necessarily tied to 5G specifically, the focus of 5G on 2B services has accelerated many operators' plans in this area. This will probably accelerate further when mature 5G networks are deployed as operators can offer superior low latency

requirements through their extensive geographic coverage. From a monetization perspective, the target end points of these use cases are different from traditional telco devices, and moreover, the revenue management platform must consider scenarios like SLA & partner settlement that often come into play.

3. Monetization of IoT

Since the 4G era, many operators in mature markets have been looking at how to monetize the IoT opportunity. While operators have used different strategies to target this opportunity, the variations have generally revolved around either selling connectivity for IoT devices, or selling an end to end package (including the devices, connectivity and even relevant services). Some operators are also exposing network capabilities to IoT partners (e.g. location services APIs).

However, from a monetization perspective, this is similar selling APIs to any other 3rd party partner, which is covered in the previous section. Based on early experience at operators, the pricing models for IoT connectivity to be supported can range from very simple (e.g. monthly flat fees), to very complex (e.g. group sharing bundle for very large accounts with smart increases as new devices are added to the group and overage).

Are you Ready for the 5G World?

The flexibility and attractiveness of these offerings can determine whether an operator is able to build a strong enough value proposition and win the bidding against other competing operators for these large account opportunities. Moreover, from an operational perspective, because the devices are no longer handsets with users who interact with the billing system individually using self care channels, but rather very large number of IoT devices which need to be managed efficiently by a single administrator, the ability to automate and tailor the management of these accounts / devices will be critical.

This is also important because the ARPU of each of these IoT connections is often less than $1/ month. So, automation plays a critical role in lowering the cost of supporting these devices. Hence, the revenue management platform must have automation capabilities built in for traditionally labor intensive tasks like account management, device management, as well as programmatic interfaces to IT systems, etc.

This is also in addition to being able to create these flexible offerings tailored to the opportunity.

4. Selling Network As An Experience & Low Latency Data Center Services in 5G

Even further down the line, as mature 5G networks become a reality, many operators will need to look at how to monetize new network capabilities like slicing to create new revenue.

Slicing brings with it new charging factors and new ways of assigning charges to different accounts. But, more importantly, if SLA based pricing takes off, then the revenue system must be able to process network QoS information and determine how that maps to individual SLAs in real time. This will require unprecedented level of performance on the revenue management platform in addition to being able to support these new models.

A Transformational Platform Able to Support All of the Above Scenarios

Many legacy platforms suffer from the following challenges which can hold an operator back as they undertake any number of the above strategic directions:

- Insufficient out of the box 5G monetization capabilities
- High Investment cost of infrastructure
- Service stability, especially during upgrades
- Long customization lead times

The failure to solve these issues can prevent the business from achieving the agility needed to compete with nimble internet companies. However, with new, yet to be defined use cases, operators can no longer accept these limitations. Operators in 5G markets, whether they themselves have launched 5G, will need to be able to support experimentation and agility like never before as the business figures out how to capture new opportunities and react to the competition.

Huawei's Converged Billing System (CBS) has been designed to support different monetization use cases with a 5G ready cloud-native convergent billing system which offers:

- **Enhanced 5G Awareness & Experience –** improved reporting, messaging, and self-serve capabilities to allow users to gain more insight into their own 5G usage. Combined with AI modelling, the system can anonymously classify users to even make appropriate usage subscription recommendations.

> Since the 4G era, many operators in mature markets have been looking at how to monetize the IoT opportunity.

Are you Ready for the 5G World?

- **Out of the Box Monetization of New 5G Experiences –** out of the box offering templates for 5G services. Built-in capability to support new services like slicing, actual speed based offers, SLA based offers allow the operator to launch new services quickly without needing time consuming customizations.

- **Multi-Cloud Native Design –** new infrastructure agnostic, multi-cloud ready, distributed fully containerized architecture allows superior performance for the data (DB) and application layers, dramatically improving the TCO and offering flexible of choice on the infrastructure to meet the operator's strategy. New system can be deployed across multiple data centers, clouds, in order to meet different business scenarios like edge services.

- **Zero Touch Operations –** common operational and upgrade processes are automated via open source tools, with native support for DevOps, allowing operators to remove manual overheads.

- **DevOps Ready –** readily support CI/CD tool chains to speed up and automate the process of upgrading / launching new capabilities.

- **Always On Reliability –** fully distributed N-Live architecture ensures that all services can be deployed within and across data centers to desired reliability. In addition, the ability to support Grey release ensures that upgrades can occur seamlessly without having there are not planned or unplanned downtime.

- **Ecosystem Ready –** pre-integrated with popular systems and offering domain oriented open APIs to simplify third party integration & customization, along with a partner ready CI development tool stack.

- **Standards Compliant –** fully compliant with 3GPP 5G charging R16 standard, having played a leading role in contributing to the standards.

These enhancements offer operators the option to take on a fail fast – fail cheaply approach where agility is key if their strategy calls for it.

Exploration and Practices of 5G Monetization

5G is the new infrastructure of the new era and it is the cornerstone of digital transformation for many traditional vertical industries. However, the process of integrating 5G networks with traditional vertical industries is often challenging. This is a brand new field.

Many questions remain about how to quickly match specific industry requirements, implement iterative optimization, and form flexible and reusable scenario assets. Most of these will questions will only be answered via gradual exploration. Here, we share some practices and thinking from our cooperation with carriers in vertical industries and IoT scenarios.

> "
>
> Many questions remain about how to quickly match specific industry requirements, implement iterative optimization, and form flexible and reusable scenario assets.

Are you Ready for the 5G World?

HUAWEI

5G 2B

For billing systems, flexible product and offering capabilities are key to TTM. Compared with traditional 2B, 5G 2B is deeply involved in vertical industries and customer requirements differ greatly. Therefore, agile configuration capabilities are more important and challenging.

In an iron and steel enterprise, we quickly supported application scenarios such as slice-based unmanned bridge crane, remote-controlled bridge crane, and remote-controlled robotic arm, and developed a standardized product and offering template asset library based on the Basic-Advanced-Flexible (BAF) model.

This asset enables carriers to quickly reuse slice offerings for other enterprises in the industry or even other industries. Currently, this flexible menu-based product-offering library can support nine vertical industries, such as smart campus, smart factory, smart port, and smart mining.

IOT

IoT applications is booming in China. One operator IoT platform built by Huawei had grown to more than 1 billion connections by the end of 2020, which becomes the world's largest IoT platform. IoT is growing at a pace that traditional 2C businesses cannot match. There's an example from one of our financial customers, its number of payment terminals increased by more than five times within one year.

Therefore, it raised the requirements for group sharing and management of tens of millions scale. To cope with the data explosion caused by 5G's high data capacity and massive connections, CBS has designed an IoT suitable architecture and adopted cloud-native, container, and distributed technologies to deliver higher performance, stability, and flexibility.

About Huawei Software
Huawei software has been developing for 28 years, supporting 3+ billion Subscribers, 320+ CSPs in 170+ Countries/Areas. We provide operation solutions and digital services such as CBS, BSS, FinTech, 5G messaging, and VRBT, to empower operators to accelerate digitalization, build ecosystem and monetize 5G new productivity.

tmforum

TM Forum
Open Digital Framework

A blueprint for intelligent operations fit for the 5G era

[The TM Forum Open Digital Framework](#) provides a migration path from legacy IT systems and processes to modular, cloud native software orchestrated using AI. The framework comprises tools, code, knowledge and standards (machine-readable assets, not just documents). It is delivering business value for TM Forum members today, accelerating concept-to-cash, eliminating IT and network costs, and enhancing digital customer experience. Developed by TM Forum members through our Collaboration Community and Catalyst proofs of concept and building on TM Forum's established standards, the Open Digital Framework is being used by leading service providers and software companies worldwide.

Core elements of the Open Digital Framework

The framework comprises TM Forum's Open Digital Architecture (ODA), together with tools, models and data that guide the transformation to ODA from legacy IT systems and operations.

Open Digital Architecture
- Architecture framework, common language and design principles
- Open APIs exposing business services
- Standardized software components
- Reference implementation and test environment

Transformation tools
- Guides to navigate digital transformation
- Tools to support the migration from legacy architecture to ODA

Open Digital Framework

Open Digital Architecture

Governance · Business · Information Systems · Deployment & Runtime · Implementation · Agile lifecycle management

Transformation Tools
- Maturity Tools
- Data
- Legacy Transformation Tools

Version 2.0.0 ©TM Forum 2021

© TM Forum | 5

Maturity tools & data
- Maturity models and readiness checks to baseline digital capabilities
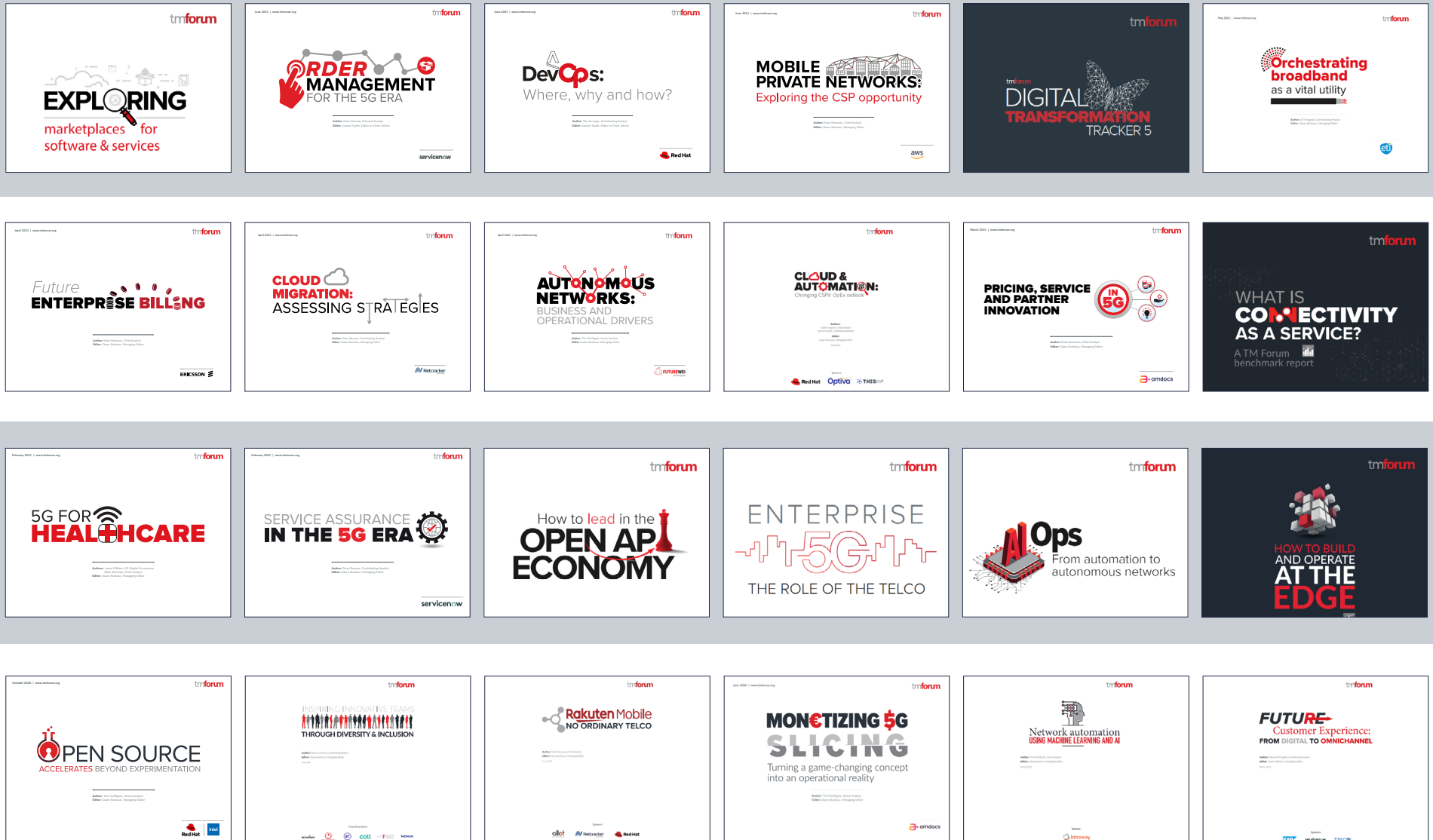- Data for benchmarking progress and training AI

Goals of the Open Digital Framework

The Open Digital Framework aims to transform business agility ([accelerating concept-to-cash from 18 months to 18 days](#)), enable simpler IT solutions that are easier and cheaper to deploy, integrate and upgrade, and to establish a standardized software model and market which benefits all parties (service providers, vendors and systems integrators).

Learn more about collaboration

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.](#)

tmforum

TM Forum
Research
Reports

tmforum

Meet the
Research
& Media team

Meet the Research & Media team

Report Author:
Dean Ramsay
Principal Analyst
dramsay@tmforum.org

Chief Analyst:
Mark Newman
mnewman@tmforum.org

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

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

Report Editor:
Joanne Taaffe
Editor in Chief, Inform
jtaaffe@tmforum.org

Managing Editor:
Dawn Bushaus
dbushaus@tmforum.org

Digital Marketing Manager:
Anna Kurmanbaeva
akurmanbaeva@tmforum.org

Global Account Director:
Carine Vandevelde
cvandevelde@tmforum.org

tmforum

To learn more about
TM Forum's Collaboration Community,
please contact **George Glass**