

how software-as-a-service

is reshaping business support systems

Author: Ed Finegold, Contributing Analyst
Editor: Ian Kemp, Managing Editor

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We hope you enjoy the report and, most importantly, 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



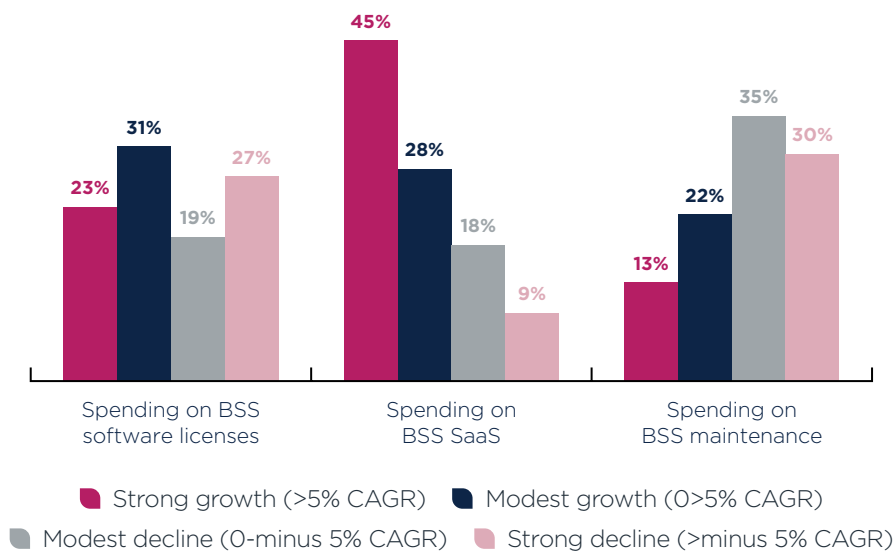
the big
picture

The telecoms industry has been shaped by many disruptive technologies over the years, but most communications service providers' (CSPs') business support systems (BSS) have long been cast from the same mold. That could be changing as many CSPs invest in BSS solutions delivered through a software-as-a-service (SaaS) model. The move is an extension of the industry-wide trend towards adoption of cloud-native technology, although not all cloud-native BSS functions are necessarily SaaS-based.

SaaS, in the context of BSS, is a model whereby a common BSS software solution, often hosted in a public cloud, is provided to multiple tenant customers paying on a subscription, scale or usage basis. While SaaS in the consumer world may infer a trial period or “freemium” offer, the same expectations do not hold for enterprise software that may become responsible for managing billions in revenue for a CSP. Rather, in the BSS arena, a key differentiator for SaaS is that it is developed, maintained and operated by the suppliers whose responsibility it becomes to ensure client satisfaction on their platforms.

The simplest and most common reason CSPs are investing in BSS provided via SaaS is to reduce their maintenance costs. According to our recent report [Evolving business support systems for future services](#), 65% of CSPs expect to reduce their spending on BSS maintenance either modestly or substantially through 2025 as a result of transitioning to SaaS and other cloud-native approaches (see graphic).

What is your expectation in terms of spending / investment for your organization between now and 2025?



Maintenance costs have grown along with many CSPs' legacy IT systems debt. Reducing those costs often means replacing BSS with SaaS platforms; or refactoring BSS onto cloud-native platforms operated in-house or in a supplier's private cloud infrastructure. Either change sets a CSP on a path where software customization and maintenance fees are minimized.

The 5G SA effect

The reason CSPs feel a sense of urgency now to evaluate new, cloud-native BSS architectures is because of 5G. The [3GPP 5G standalone \(5G SA\) charging specification](#) mandates a transition to a cloud-native, distributed platform for functions such as rating, charging, policy control and mediation. Rather than distinct, centralized systems for these capabilities, 5G SA breaks them down into common functional components that can be distributed anywhere and called via standard APIs. It also adds substantially more real-time functionality to the requirements set and eliminates the old distinctions between online and offline charging.

Though these changes do not immediately make existing BSS infrastructure obsolete, it has put the entire sector on the clock to move the heart of the BSS stack to cloud-native software technologies. It is therefore no surprise that, according to respondents in our earlier report, 73% of CSPs expect modest to strong growth in their spending on SaaS-based BSS through 2025.

The supplier market has responded to these developments. Every major BSS provider now offers some form of SaaS-based BSS, be it full stack, 5G charging-related, or oriented toward billing, customer relationship management (CRM) or digital customer experience (CX). BSS suppliers face pressure from investors who expect to see software companies shift away from revenue models that depend too much on customization and maintenance requests.

“Valuations are focused very much on being in the XaaS game,” says Luqman Shantal, CEO, Makman Consulting. “The pressure is on your P&L to move from maintenance to SaaS, so then buyers are pressured to make this change.”

But while this trend toward SaaS-based BSS seems firmly established, the transition remains in its earliest stages. For many CSPs, using SaaS-based BSS on a large scale remains a new concept.

Read this report to learn:

- Why SaaS has become a BSS priority
- How CSPs plan to change the way they invest in BSS
- What kinds of changes CSPs plan to make to their BSS
- The possible risks CSPs face in adopting or not adopting SaaS for BSS
- How TM Forum's [Open Digital Architecture \(ODA\)](#) supports SaaS adoption and integration.

Read the report to find out more:



section 1

**CSPs are
starting to
adopt SaaS
models for
BSS**

CSPs are not new to software-as-a-service (SaaS) as a concept. Plenty of them offer and use productivity and other general IT applications that are provided on a SaaS basis. In the BSS environment, however, SaaS remains the new play, though change is starting to take hold.

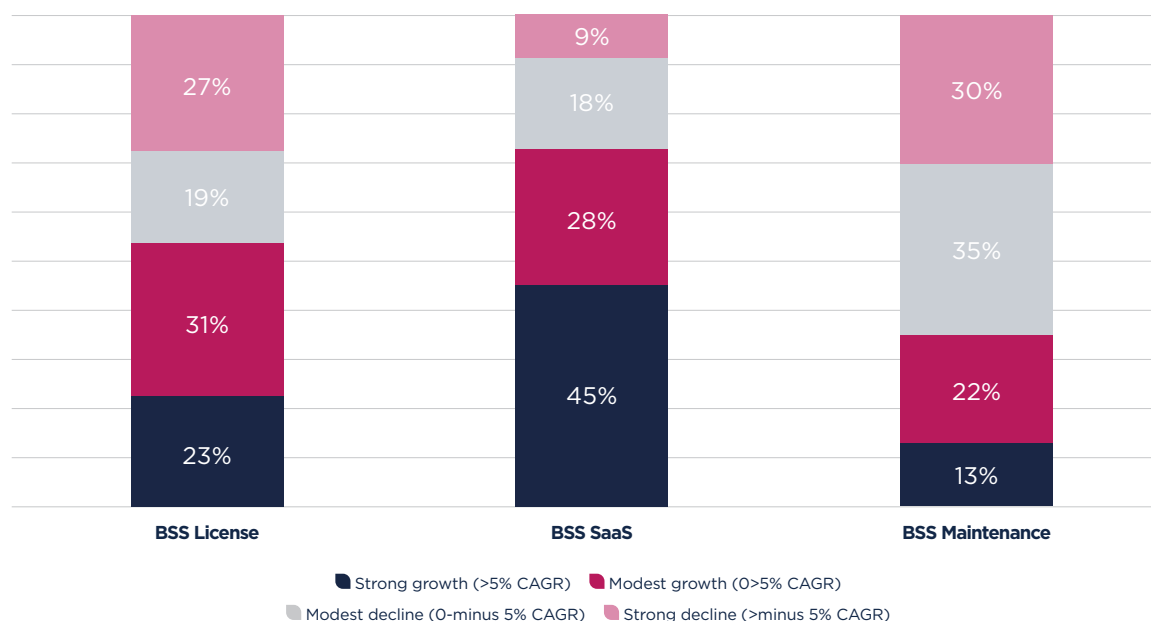
“We have seen [TM Forum] members start to leverage SaaS-based solutions from vendors as most now have a SaaS-based version of their application available alongside traditional applications that CSPs would have built and operated within their own data centers,” says George Glass, CTO, TM Forum.

In step with this demand coming from CSPs, Glass says: “We are seeing new components designed and built to run in the cloud (SaaS) that support real-time interactions including network resources associated with 5G and other network technologies that are being virtualized and software enabled.”

His observations are validated by TM Forum survey data that shows nearly three-quarters of CSP respondents expect to increase their spend on SaaS-based BSS either strongly or modestly through 2025 (see graphic).

Even with that shift towards cloud spend, however, 54% of CSP respondents still expect strong to modest growth in their spending on BSS licenses through 2025. The transition is happening, then, but probably not as fast as BSS budget holders at CSPs would prefer.

CSPs' spend on BSS through 2025



TM Forum, 2022

What do CSPs expect from SaaS BSS?

The common expectation among those investing in SaaS-based BSS is that they will reduce their software maintenance costs. This is because they are pushing for a change in how BSS software is provided, moving away from customization and toward Agile and cloud-native technologies and working methods.

But even when they share the desire to cut maintenance costs, not all CSPs have the same approach to cloud-native technology or SaaS. They can be divided roughly into three camps as shown in the graphic.

In either of the first two groups, when a CSP says it plans to spend more on SaaS-based BSS, it intends to reduce its software maintenance costs and gain substantial agility by adopting cloud-native technologies. This goes hand in hand with either replacing or refactoring most key BSS platforms, starting either from the rating and charging or network-facing side, or from the billing and CRM or customer-facing side of the BSS landscape.

Even in the third group, CSPs are not sitting still. Their responses suggest they are actively working to modernize and improve their BSS environments by refactoring critical systems onto cloud-native platforms. The lack of any anticipated change in maintenance and license spending, however, rather than spending on SaaS, suggests these CSPs are pursuing a DIY approach as they are no more or less likely to outsource application development, testing, hosting or maintenance to third parties than CSPs which are actively adopting SaaS.



Build vs. buy risks

It's tempting to think about BSS only in the context of very large operators, but SaaS-based BSS can be a relief for smaller operators – even smaller national incumbents – which may not have the resources to undergo a major IT transformation.


“I've seen operators launch 5G SA in the past year in a small country like Estonia where they're not going to go through a huge transformation, and so it's better to go the 'buy' route than the 'make' route,” says Shantal at Makman Consulting. He explains that operators in developing countries will tend to buy rather than make software solutions if they have the choice because “this shift is fundamental – it's almost impossible for them to do all of this with a less than 4% R&D budget, so I think it's a buy decision”.

And because SaaS-based BSS is still new to CSPs, it is reasonable they might approach it in a risk averse way. But the real risk may be in failing to adopt SaaS for BSS altogether.

“You need to automate and go autonomous,” says Shantal. “You cannot achieve the scale needed with headcount and still maintain the customer experience. And you cannot automate and become autonomous if you don't virtualize your BSS and OSS.” He adds that virtualization alone is not enough, however. Rather, the BSS “needs to run off hyperscale clouds, because of the mix of containerization, orchestration, elasticity and agility which, combined with sheer scale, few if any CSPs can match”.


CSPs should also carefully consider DIY risks says the Managing Director of RiskConsulting.biz, Lee Scargall, an executive risk consultant who advises CSPs in the Middle East, Africa and Europe. “From my experience, most CSPs don't have the technical know-how to build anything and they are heavily reliant on systems integrators to fulfill change requests in-house,” he says. “If they go down the DIY route, it will become constant customization over again, like the status quo.” He adds that they are likely to miss out on cost, speed, scale and security benefits as a result (see box below).

In the next section, we look at factors that may prevent CSPs from adopting SaaS-based BSS in favor of other cloud-native approaches, or from taking advantage of the full benefits SaaS can offer.



Risks of implementing public cloud BSS SaaS

- Lack of technical skillsets within the CSP to integrate and support cloud-native solutions
- Non-compliance to national (local) regulation on data privacy laws relating to sensitive customer information
- Lack of ability to customize BSS to differentiate from competitors
- Cybersecurity carried out by third-party suppliers, potentially exposing data generated and collected.



Risks of not implementing public cloud BSS SaaS

- Continue to maintain expensive and complex IT domains that are not agile or scalable
- Failure to benefit from the speed to market that public cloud BSS SaaS solutions can offer, where implementations can take months rather than years
- Public cloud solutions could provide better technical cybersecurity than on-premises and private cloud implementations.

TM Forum, 2023 (Source: Lee Scargall, Riskconsulting.biz)

section 2

why not SaaS for BSS?

CSPs have been criticized for not adopting SaaS-based BSS solutions fast or often enough, regardless of factors such as interoperability, regulation or standards readiness. Observers suggest that other major industries, like oil and gas, have been faster to create SaaS-based platforms in hyperscale clouds that move them away from perpetual licensing models such as those from application service providers (ASPs).

Makman Consulting's Shantal points to initiatives like [Open Government](#), [Open Banking](#), [Open Agriculture](#) and TM Forum's [Open Digital Architecture](#) as examples of how industries are pursuing openness. "Everything has this open mandate," Shantal says, "and it implies cloud native, automation and autonomy."

Yet despite cross-industry forces pushing software, data and networks into hyperscale clouds, the SaaS-based BSS model faces barriers from stakeholders reluctant to make the transition. Unlike an IT operations tool or a data translator, business stakeholders probably do not care if technology people make a change so long as it does not affect their everyday practices. Fundamental change to BSS, however, means not only changing how people work, but also documenting everything about how a CSP runs its business operations and then changing it.

For this reason, refactoring existing systems and processes to cloud-native technology may not be as big a step for a CSP's BSS team or organization as migrating to a SaaS-based solution. "CTIOs should see the value SaaS brings and adopt it, but I think they see it as giving

up too much ground," argues RiskConsulting.biz's Scargall. This opinion was echoed across the experts interviewed for this report.

If, for example, a CSP refactors its billing system to a cloud-native platform – as 23% of respondents to our survey expect to do (see graphic on the next page) – its internal teams, partners and contractors may be more likely to continue to operate the BSS environment and serve business stakeholders as they have in the past. As a result, they adopt new technology but surrender no responsibility or authority and change little of their daily work.

But if a CSP replaces its billing system – as those expecting strong growth in their SaaS BSS spend are more likely to do – it may result in substantial changes in responsibility, decision-making authority and daily work. It might also require a shift in strategic thinking, where the company's ability to differentiate itself through BSS customization is no longer valued as highly as other potential benefits of moving BSS to SaaS, such as faster time to market, improved automation and fewer maintenance costs.



The SaaS-based BSS model faces barriers from stakeholders reluctant to make the transition.

Legacy inertia plays a big role

It is important not to underestimate the role legacy systems and process inertia play in potentially preventing CSPs from adopting new SaaS-based BSS. Sreedhar Rao, Co-founder of Yantrie LLC, is a veteran BSS solutions architecture and delivery expert. He cites three key factors that continue to keep legacy BSS systems intact and resistant to change, much less wholesale migration to a SaaS platform:

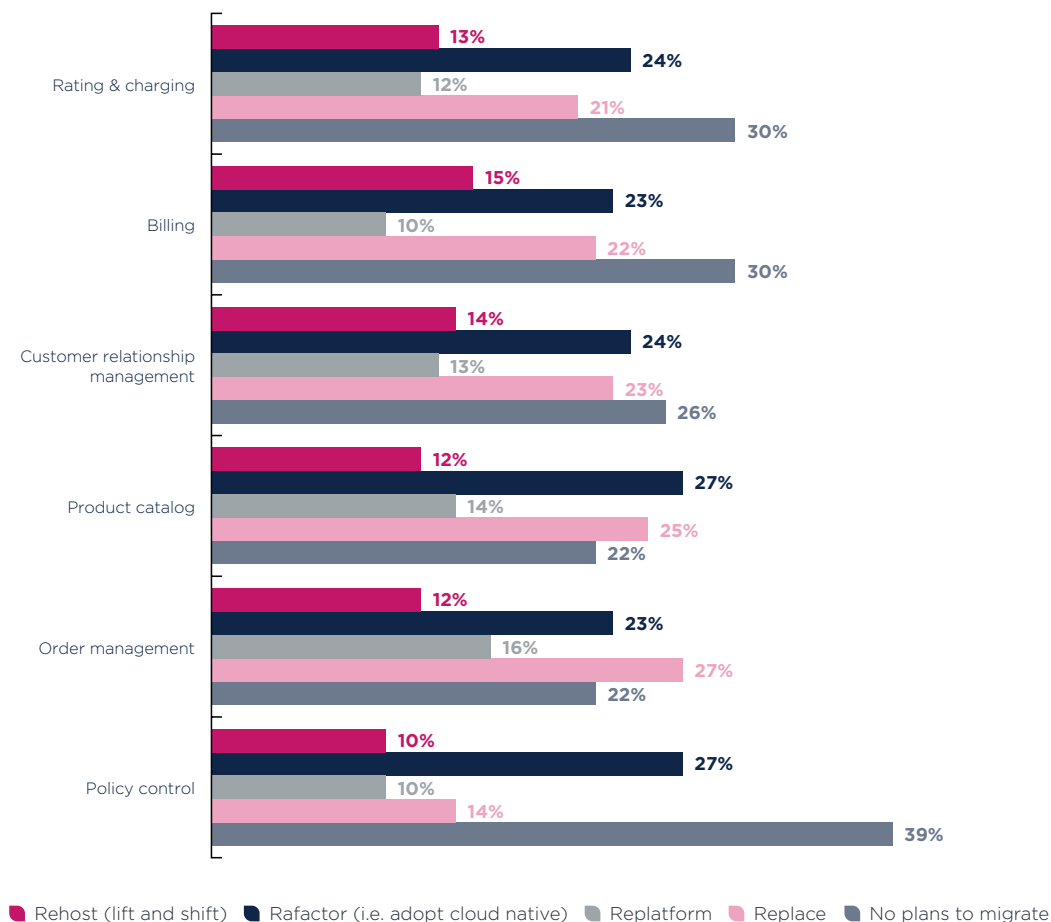


Customers don't care enough to make the case. Customers do not care how the end product or service they want is created. As a result, whether consumer, enterprise or internal customer there will be no real business case to change the BSS. Instead, teams typically focus on fixing IT issues as inexpensively as possible if and when things break.



No one wants to break a process that works. When processes, people and systems are firmly in place, even if new Agile processes are introduced the same processes tend to be repeated. Innovation and change are less important than making sure it works. Few will take the steps necessary to migrate to SaaS, such as documenting processes, when they are focused on making sure existing processes don't break.

What are your cloud migration plans for different BSS applications?



TM Forum, 2022



Stakeholders are used to being served by, not involved in, IT. Business stakeholders generally have the option to request that their IT department does something for them. In a SaaS model, that stakeholder is not just a consumer, but a part of the process. Few people are able to make that change readily.

Interoperability and regulation

An important question any supplier will face with regard to its SaaS solution is whether, once declared cloud native, it is interoperable with the similar cloud-native components of other vendors' BSS suites.

"Everyone claims to be cloud-native ready, but in reality no one is," says Shantal, referring to the BSS landscape.

The difference to look for, he says, is not only whether a vendor can demonstrate that its microservices communicate with each other via APIs or [Kafka](#), for example, but also whether those components "are ready to speak to those from [the vendor's] competitor". If the SaaS-based BSS on offer cannot demonstrate this degree of interoperability, which admittedly is complex, it could slow or prevent a CSP's desire to adopt, says Shantal.

Regulations relating to billing and customer data could also limit a CSP's options in choosing a SaaS-based BSS. Many countries require such data and even physical BSS systems to remain in-country, which presents added challenges for hyperscale SaaS models.

But those challenges are not insurmountable. "I think the regulatory angle can be an excuse," says Rao. He argues that most public clouds have dealt with data sovereignty for years and companies like Facebook and Twitter have collected "mountains of data on people" but do not seem to be limited by the regulatory requirements CSPs may claim are a barrier to SaaS-based BSS adoption.

Getting buy-in for buying in

Sometimes it can come down to persuading teams and management of the benefits of buying into new SaaS-based BSS. Rao believes many CSP operations teams would like to learn, use and become experts in SaaS-based BSS but may not have the option.

"Operations teams have been the biggest advocates for cloud in the telecom world because they are always concerned about creating the most scale with the fewest resources, and cloud is designed for that problem statement," Rao says. He adds that technical teams like SaaS because "they want to work with APIs and other new tools, but they've been unable to do that because they don't have the bandwidth or decision-making power to do so".

Meanwhile vendors will be happy to tell you all about the potential benefits of moving BSS to a SaaS platform. Typically, they include factors such as accelerating time to roll out products, process orders and collect payments, through to reducing cost to operate BSS, gaining substantial new business agility and taking advantage of unlimited scale in a public cloud.



Many CSP operations teams would like to become experts in SaaS-based BSS but may not have the option.

Another major reason for CSPs to consider SaaS-based BSS, is that it would reflect a move away from the common desire to keep all technology in-house.

“Telcos are hung up on owning technology, and that’s a fundamental mistake because technology will change,” says Rao. He argues that having the best customer experience and delivering customers what they want, when they want it, should be the focus rather than keeping the BSS stack in-house. “There is a lot of commitment to the idea that they need to build components for themselves rather than bringing a BSS into their cloud. When you try to own all the components, you take on a lot of work and you are focused on systems rather than the business.”

Security considerations

Whether moving BSS to SaaS in a hyperscaler’s public cloud introduces more risk to billing and customer data is an important question to keep in the conversation. Rao suggests public cloud implementations are actually “at an advantage” because they have a more secure and private infrastructure where data is only kept in one place. In a CSP, he points out, a mediation process might replicate sensitive data across several different data repositories feeding distinct processes. With SaaS, however, the data is in one place where applications have logged and monitored access to it to “reduce the attack surface and have much more control”, says Rao.

Scargall, a risk and data privacy expert, echoes Rao’s sentiment, arguing hyperscalers tend to have better vulnerability and patch management, along with better cyber detection facilities, than most CSPs. Furthermore, simply using a public cloud provider rather than exposing a directly addressable domain means not “painting a big red target on your back because you are so easily findable”, Scargall says.

Indeed, Rao argues that if anyone is best at SaaS-based BSS overall, it’s the hyperscalers – Amazon Web Services, Microsoft and Google. “They all have sophisticated BSS, but you never see any of it,” he says. Instead, Rao says, hyperscaler customers see everything from their own business point of view.

“You only see your business needs, KPIs, and monitors,” he says. “Your console tells you your usage, rates and costs. BSS isn’t separate, it’s just good information in your dashboard.”

The next section looks at early cases where CSPs have used SaaS and other cloud-native methods to develop new BSS initiatives or transformations.



Telcos are hung up on owning technology, and that’s a fundamental mistake because technology will change.

section 3

using Open
APIs to move
BSS toward a
SaaS model

The evolution of BSS towards a SaaS model is still in the early stages, so identifying case studies with measurable results is a challenge. Most major suppliers say they have customers for their SaaS offerings, but they haven't named them yet. However, there are examples of service providers using cloud-native technology and SaaS principles to launch new initiatives and improve business results.



Verizon uses Open APIs to automate services from multiple suppliers

B2B solutions that include more than one supplier are notoriously challenging to design, order, fulfill and bill. Yet [Verizon has created a digital enablement platform \(DEP\)](#), built using more than 20 certified TM Forum [Open APIs](#), to let its business customers automate delivery for digital services from multiple suppliers. Customers can integrate to DEP with common supply chain systems – such as ServiceNow IT Service Management, BMC Remedy or Helix – and allow them to connect multiple automations from Verizon and other suppliers into one end-to-end service. And it can help them manage inventory across multiple suppliers and automate and correlate ticket resolution and change requests.

Verizon currently exposes more than 300 APIs to customers and partners. DEP represents a subset of these, comprising capabilities such as two-way

inventory synchronization with reconciliation, incident management, change management, event management and problem management. The purpose of this approach is to give integrated applications access to a multi-cloud environment to create and deliver services, but also to provide new, linkable microservices back to the telco multicloud.

“We’re seeing the network more and more needing to be an as-a-service offer, with intelligence built into it,” says Beth Cohen, Software Defined Networking Product Technologist at Verizon.

Using Open APIs, DEP enables enterprises to draw on data from devices linked to, for example, industrial IoT or consumer IT systems. Taking data in from those devices and adding it to the network gives customers value-add in terms of intelligence and insight. And having access to an accurate and current view of software versions and the lifecycle of devices helps Verizon and its customers quickly identify any security vulnerabilities.



B2B solutions that include more than one supplier are notoriously challenging to design.

Although DEP is not a public cloud SaaS-based BSS solution, it is an example of how a service provider is using cloud-native technologies and concepts to create, integrate and automate multi-partner supplier and B2B2X solution delivery. The approach uses Open APIs designed to integrate with cloud-native components like similarly compliant SaaS applications in public clouds.



Vodafone Germany uses cloud-native BSS to improve customer experience

[Vodafone Germany faced the classic conflict](#) of too much legacy BSS debt and the need for improved customer experience (CX). So, the operator started to transform its retail, telesales and online customer channels in 2019, arguably before the market for SaaS-based BSS had fully emerged.

“We had four different BSS systems supporting the needs of our customers, but our customers don’t care which kind of stack they are in,” says Ulrich Irnich, CIO of Vodafone Germany.

The operator set out to create a new cloud-native BSS using TM Forum Open APIs. The new solution would help it to streamline and synchronize customer experiences across the three customer-facing channels. By using cloud-native systems, it could define and streamline its customer journeys and share the most effective models with operators across Vodafone Group.

Irnich says that when adopting cloud-native technology, the “technology side is easy”, with standards and cloud-native software deployment helping to speed up processes and future-proof systems. Irnich’s team used out-of-the-box Open APIs and a cloud-native platform and methodologies to enable them to deploy software faster. The difficult part, Irnich says, was in helping people to adapt to new systems and to change the ways they had become accustomed to working.

Using cloud-native systems to create streamlined customer journeys makes it simpler for national operators within the Vodafone Group to share tools and approaches that work. “We delayer BSS tech into reusable modular layers...and get applications...cloud ready,” says Irnich. “We are also working on our own open source, digital BSS system, with components which we can easily reuse.”

Results have been positive. Vodafone Germany says it is now seeing nearly 50% of customer interactions across all its digital channels flowing through online systems and an improved net promoter score approaching seven out of 10.

The next section looks at how TM Forum’s Open Digital Architecture and a standards-based approach can help CSPs develop and implement cloud-native BSS and OSS component interoperability.



Standards and cloud-native software deployment help to speed up processes and future-proof systems.

section 4

interoperability and the **Open Digital Architecture**

To provide the type of BSS experience Yantrie's Rao argues the hyperscalers are already able to deliver, CSPs will need to achieve cloud-native BSS and OSS component interoperability. That requires a standards-based approach such as that provided by TM Forum's Open Digital Architecture (ODA).

The ODA aims to replace traditional operational and business support systems (OSS/BSS) with a modern, cloud-native approach to building software for the telecoms industry. The goal is to create a software marketplace where CSPs can easily procure Lego-like IT components that can be plugged into their operations environments and managed autonomously. This speeds innovation and service creation, improves customer experience and reduces operating costs.

Changing to interoperable components will “change the cost structure of integration, making it much cheaper”, says Shantal at Makman Consulting. He argues that the combination of APIs and recent developments using event-driven, publish-subscribe systems to tackle scale “could save millions on integration” while making SaaS components interchangeable parts of a BSS cloud, or the BSS portion of a telco cloud.

TM Forum's Glass emphasizes that Open APIs and the ODA were conceived from the beginning to include SaaS components. “Most CSPs were moving their applications to the cloud – initially private, but increasingly public – and the vendors of SaaS-based applications were already adopting TM Forum Open APIs as they started moving their applications to the cloud or became SaaS-based,” he explains.

The key, Glass says, are TM Forum Open APIs, used to decouple BSS and OSS components from each other. Without becoming so granular as to create scale issues with microservices, ODA has so far defined 56 components that can expose their business functionality through the standard set of Open APIs. TM Forum has introduced an ODA Canvas, or development and live execution environment, that provides security, logging, service discovery and meshing, and an API gateway to enable one-click-to-deployment for ODA components, (see graphic on p.20).

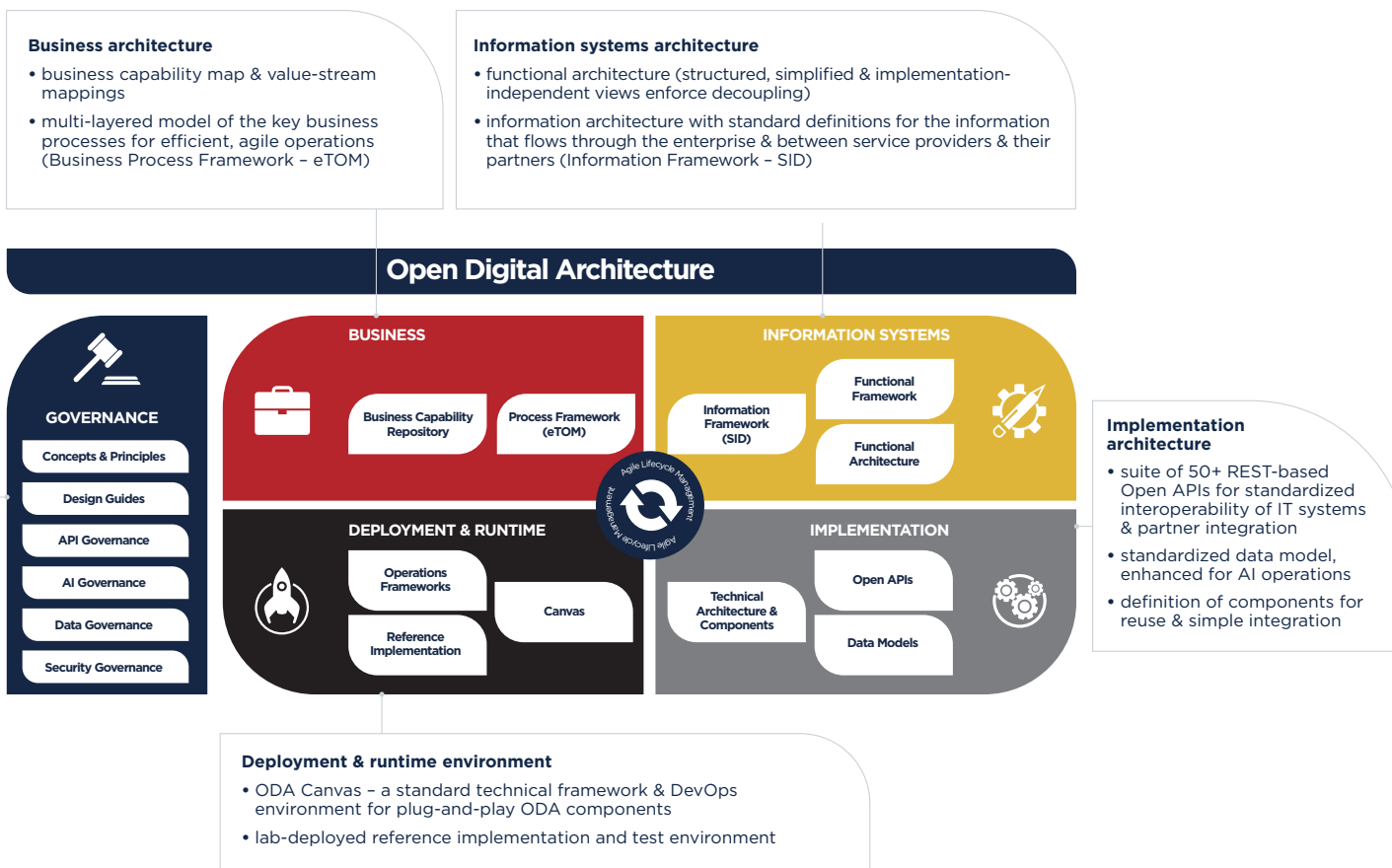
The collective purpose of cloud-native architectures, Open APIs and ODA components is to achieve the interoperability needed to automate and scale networks and services to capture projected market opportunities in areas such as 5G, IoT and Industry 4.0. With a SaaS-based BSS that is ODA-compliant, a CSP can gain the collective benefits of multi-tenancy, hyperscale clouds, and interoperable, componentized operations with no extra BSS maintenance costs.

In the next section we provide some tips on how to make SaaS-based BSS a reality.

Read the e-book to find out more about ODA:



ODA provides a common reference model



section 4

make it happen
- how to make
SaaS-based
BSS a reality

“People have a notion that SaaS or cloud will reduce their problems but also take away control. But that is not true. They can maintain control without having to have the operational headaches,” says Sreedhar Rao, the co-founder of Yantrie.

As we have seen, when CSPs expect to increase their SaaS BSS spend, it often means they intend to make big changes in their BSS environment. These include refactoring order management, product catalog, CRM, rating, charging and policy management components. They are also more likely to focus on low-code solutions and on bringing critical systems like CRM onto cloud-native platforms. CSPs that plan to increase BSS SaaS spending are also twice as likely to replace their billing, order management and product catalog systems with cloud-native components.

As more CSPs examine or undertake these changes, takeaways from experts interviewed for this report can help make SaaS-based BSS a reality.



Move to a cloud-native approach

“We strongly recommend moving to a truly cloud-native approach,” says TM Forum’s Glass. This means decomposing applications into cloud-based components, rather than wrapping legacy applications in Kubernetes containers and migrating them to clouds, which Glass calls “cloud enabled” but not cloud native.



Eschew DIY in favor of SaaS

Most large CSPs are accustomed to managing BSS in-house and keeping functions like billing under internal wraps. But in the current market, the do-it-yourself approach – which just as often means vendors and rebadged employees do it – conflicts with goals like reducing maintenance costs and winning market share. “The DIY route will be constant customization all over again,” says Scargall of Riskconsulting.biz. “CTIOs should see the value SaaS brings and adopt it.”



Consider more than one SaaS approach for BSS

Rao at Yantrie, says there are multiple ways to leverage SaaS. This includes bringing a SaaS solution into a telco cloud that “doesn’t need to be dedicated to that BSS stack – it’s for all operations”. Such approaches are efficient and offer SaaS benefits like speed and scale. Though some multi-tenancy benefits may be missed, gains will be found in “the efficiency of running multiple applications in your telco cloud”, Rao says.



The DIY approach often conflicts with goals like reducing maintenance costs and winning market share.



Adopt ODA for interoperability

As CSPs move BSS functions either to cloud-native platforms or SaaS solutions in hyperscale clouds, Glass recommends they “adopt the ODA patterns, or components and APIs, to give them loose coupling between the components, but tight integration via the industry-standard Open APIs”. This combination enables plug-and-play interoperability among components, helping with automation and reducing integration costs, as well as the ability to add and change components as needed.



Integrate, automate and become autonomous – or perish

“Do you really want to run your Kubernetes environments?” asks Makman Consulting’s Shantal when asked to argue in favor of SaaS adoption. Beyond offloading effort, however, he says the overarching reason for CSPs to adopt cloud-native and potentially SaaS-based BSS is survival. “You cannot automate and become autonomous without virtualization and being cloud native. You need to make these changes or you become a legacy CSP and you will die,” he insists.

“These changes” include taking advantage of SaaS BSS running in hyperscale clouds to maximize benefits from containerization, orchestration, elasticity and agility, as well as supporting interoperability and componentization to continue to drive the cost of integration down industry-wide.

“

The overarching reason for CSPs to adopt cloud-native and potentially SaaS-based BSS is survival.

Software-as-a-Service: How and Why CSPs are Adopting SaaS and Where it's Headed

In this highly competitive and ever-changing business landscape, CSPs are looking to differentiate by creating unique value propositions by rapidly innovating and doing so with utmost efficiency. The software-defined everything approach certainly had a great impact in optimizing cost in the telecom business by converging networks and operations on cloud infrastructure. Beyond cost optimisation, businesses are looking to leverage the cloud platform evolution – to rapidly innovate new business models while drastically reducing the time to value.

Software as a Service (SaaS) takes the same capabilities of these ecosystems and provides mechanisms to design, test and scale new business models at a rapid pace. SaaS products provide an avenue to break away from traditional IT transformation projects to actually focus on business innovation. SaaS providers are offering increasingly productized ways of launching business models by simply using compatible software components from the ecosystem which are ready to use, instead of large-scale transformation, thereby bridging the time-to-value gaps.

SaaS as the Way to Deliver New Business Models

CSPs have generally employed a use-case-based approach to upgrading or implementing new monetisation systems. Legacy frameworks hinder advancements in CSP monetisation systems because these systems are heavily customised with proprietary software and hardware and are expensive to maintain. CSPs are constantly adapting existing systems to new use cases, yet this method is notoriously slow and costly.

They want to take a more agile approach in the future by identifying new systems to deliver new services and are therefore choosing new approaches that are flexible and configurable to suit future use cases.

SaaS delivery models promise a new era for revenue monetisation. CSPs are now discovering that the systems available under SaaS models provide the agility that they need. The SaaS model shifts the responsibility of technological upkeep to the vendor, leaving CSPs to focus on implementing the monetisation solution to the business problem.

Leverage Hyperscalers to Deliver Value

TECNOTREE DIGITAL BSS SUITE 5

Multi-Cloud Deployment

aws Microsoft Azure Google Cloud

Multi-region deployment, Data Residency (Edge-cloud or hybrid), Portable Data, Standard Integration Pack • Customizable, Tenant aware business process, Secured Automated release Cycles, Multi operation Tenancy, Managed DB, Platforms, Backup and Recovery (optional), Cloud portable

KEY BUSINESS ENABLERS

Time to Market	Faster time to launch. Quick Services Enablement
Agility	On-Demand Delivery and Scalability
Capacity	Supports millions of applications, users, devices and endpoints enabling IoT
Efficiency	Optimal Resources consumptions and sharing
Analytics	High volume data processing and analysis for deliver business value
Edge Computing	Edge devices capability & intelligence for faster decision making
Latency	Ultra Low Latency support real-time control and collaboration applications

Software-as-a-Service: How and Why CSPs are Adopting SaaS and Where it's Headed

Accelerating Innovation and Monetization: Faster Time to Value

CSPs are constantly under pressure to develop and introduce new services quickly in order to remain competitive. SaaS enables service providers to deploy fresh offerings and make network infrastructure upgrades in much less time than it would take to do it manually. This enables CSPs to bring innovative services to market more quickly, which can provide a substantial competitive advantage.

In addition, telecom SaaS minimises the need for big upfront investments, lowering the cost of developing and delivering new services. Telecom SaaS can also help CSPs reduce the risks associated with innovative services. It enables CSPs to test a wide range of services with minimal investment and, if successful, rapidly scale up.

This expedited road to innovation and monetization is critical for carriers aiming to maximise their 5G investments. Streamlining network management and operation also frees up internal resources to focus on building new services and applications rather than simply operating the network.

SaaS for Cost Optimization and Flexibility

Cost optimization still plays a significant role in any business plan. Most new business models are risky, until proven – investing in SaaS, has an underlying agenda of evolving and transforming without a large bill. This provides safety to the business plans, while keeping options of evolution open.

Traditional on-premises telecommunications systems are more difficult to maintain. On the other hand, SaaS solutions are often delivered on-demand, which means you only pay for what you use. In short, with the SaaS model, CSPs and enterprises benefit from accessing the software they need rather than buying it completely, usually through a usage-based subscription; providing access and use to a variety of telecom applications and services without requiring upfront hardware and infrastructure investments.

Furthermore, SaaS-enabled network administration task automation can result in substantial savings in costs. Automating operations like provisioning, configuration, and monitoring lowers the need for costly manual labour. Telecom SaaS allows carriers to make better use of their existing network capabilities, decreasing expenses.

Finally, SaaS solutions are often housed in a public cloud, which implies that the provider maintains and updates them. This removes the need for your business to handle software upgrades and maintenance, which can be costly as well as time-consuming. This is especially critical when dealing with AI/ML algorithms, which must be retained every few months.



CSPs are constantly under pressure to develop and introduce new services quickly in order to remain competitive.

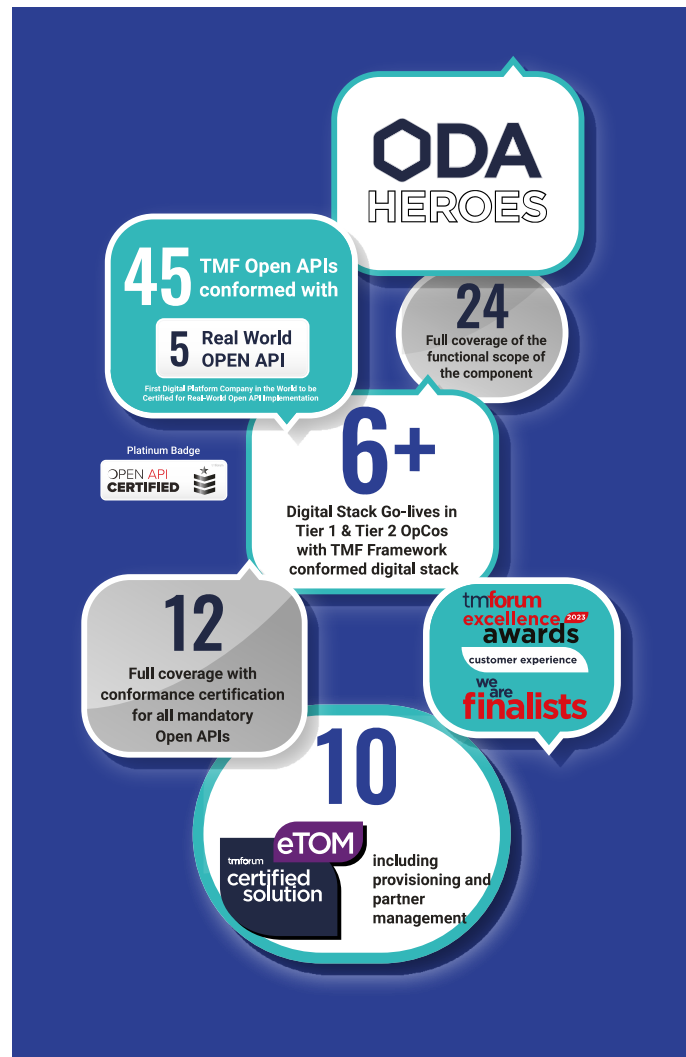
Software-as-a-Service: How and Why CSPs are Adopting SaaS and Where it's Headed

Exploring Different Models and Approaches in Software and Cloud Services

In the realm of software and cloud-based services, the two popular models to deliver these services are the API platform-based approach or a solution-based model which offers a pre-packaged approach. The API platform-based model represents a more do-it-yourself approach that employs a user-friendly interface to design, manage, secure, socialise, and monetize APIs, enabling digital transformation on-premises and across clouds. This means that developers can fuel digital apps with a highly scalable, fully managed API management platform and drive real-time innovation.

With this approach developers can interact with underlying software components to build customized solutions, with the help of APIs. This model provides flexibility, enabling businesses to tailor solutions according to their specific needs. By leveraging the power of APIs, CSPs can enable third-party integrations, foster innovation, and create ecosystems that expand their service offerings.

The solution-based model offers a pre-packaged approach which involves integrating and configuring a set of components into a cohesive solution that addresses specific business challenges or requirements. This model can be easily deployed and provides efficiency by offering ready-made solutions with pre-configured software, automation tools, and operational support. These solutions help accelerate time-to-market, reduce complexity, and streamline operations.

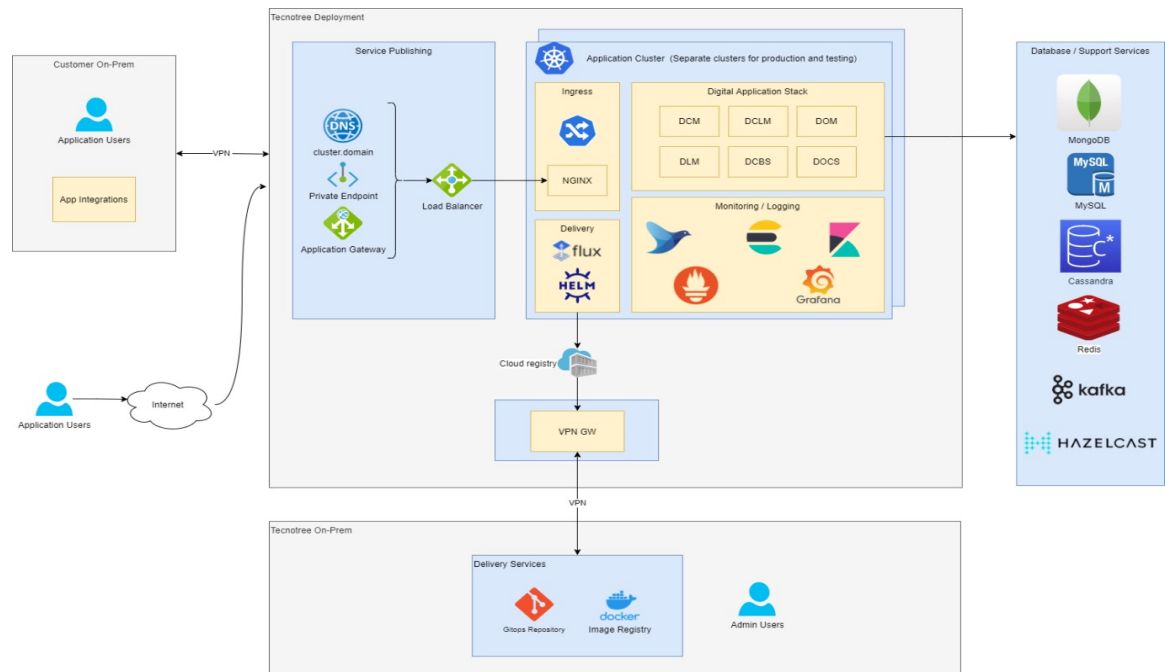


Developers can fuel digital apps with a highly scalable, fully managed API management platform and drive real-time innovation.

Software-as-a-Service: How and Why CSPs are Adopting SaaS and Where it's Headed

With the industry moving more towards "as-a-Service" (aaS) models, CSPs can expect their own operations, network stacks, and supply chains to undergo a transformation towards software-as-a-service (SaaS) models as well. This shift signifies a move towards utilizing software-based solutions for managing internal processes, networks, and supply chain operations. By embracing SaaS models, CSPs can take advantage of benefits such as scalability, cost-effectiveness, and easier management of software infrastructure. Additionally, SaaS models enable CSPs to leverage cloud-based platforms, enhance agility, and stay up to date with the latest software advancements.

As the industry continues to evolve, CSPs need to evaluate the advantages between API platform-based and solution-based models. It may be necessary to strike a balance between the two, depending on specific use cases and business requirements. Ultimately, the goal is to leverage these models to deliver enhanced services, improve operational efficiency, and stay competitive in an increasingly software-driven and cloud-centric ecosystem.



Cloud Deployment Architecture

CSP Market Appetite for SaaS Offerings

The SaaS sector has grown steadily over the years as more businesses use SaaS solutions for a wide range of business tasks, expanding beyond the early SaaS boundaries of core engineering and sales applications. CSPs are constantly under pressure to develop and introduce new services quickly in order to remain competitive. SaaS enables service providers to deploy new services and make network infrastructure upgrades in a fraction of the time it would take to do it manually.

Software-as-a-Service: How and Why CSPs are Adopting SaaS and Where it's Headed

This enables suppliers to bring innovative services to market more quickly. This accelerated path to innovation and monetization is critical for carriers aiming to maximise their 5G investments.

CSPs are at different stages of cloud transformation, depending on their respective business roadmap and investment horizons. Some CSPs are already mature in leveraging public cloud, private cloud, hybrid cloud, and multi cloud adoption, while others are in the nascent stage and have only recently begun thinking about and planning for cloud transformation across the enterprise. As a result, it is critical to identify the objectives and results for which cloud transformation is required for CSPs, as these will serve as the foundation for the business case.

Transformation is one method that CSPs might adopt, which entails rewriting fundamental systems from the ground up as cloud-native apps employing cutting-edge technologies. This strategy provides the most flexibility and scalability, but it is also the most expensive and time-consuming. A more viable alternative for cloud platforms makes a compelling argument for essential functions to be relocated to the cloud and updated as needed using new technologies. This method is less expensive and time-consuming than transformation, but it may result in some legacy system constraints.

The next step in cloud adoption for CSPs is to migrate core systems to the cloud in a way that matches their specific needs and aspirations. CSPs have several options for migrating their present on-premises core mission-critical

systems to the cloud. Moving essential systems to the cloud, regardless of approach, is a critical step for CSPs to remain competitive in today's fast-paced technology market. While this may appear to be a difficult task, CSPs have several solutions accessible to them.

Adjacent Market Opportunities Unlocked with SaaS & Cloud Adoption

1. 5G promises to be a game changer for CSPs. The arrival of the 5G era is altering the digital world, since 5G brings new opportunities such as virtualization, slicing, and edge computing.
2. Artificial intelligence (AI) has taken over every business and sector, and SaaS is no exception. It will enable businesses to implement automation, provide superior customer service, and improve data security. AI can forecast which products will be popular in the future or which marketing methods will be most effective. AI is also being directed at common causes of customers' calls into care centers – such as questions about billing and service quality – and it is making processes like fraud management and marketing more efficient. To maximize the successful application of AI, however, it is critical that CSPs close the gap between expectations and execution.



CSPs are at different stages of cloud transformation, depending on their respective business roadmap and investment horizons.

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3. Successful partnership models have further fueled CSPs' interest in new ecosystems, leading them to leverage their network and IT capabilities and partner with service aggregators to launch their own API marketplaces. CSPs have been expanding into areas such as healthcare, smart home, banking, and Industry 4.0 automation for enterprises, with partnerships central to their strategies.

The Rise of SaaS and Strategies for Future Growth

IDC data ([cited here](#)) projects the SaaS application market alone will grow more than 15% to \$302 billion by 2025. The research company says SaaS makes up roughly 60% of the cloud-based software that is marketed today including platform and system infrastructure software. SaaS applications and platforms are gaining importance because the digitization of workflows and processes enabled by these applications allows for more resilient and agile organisations.



Tecnotree

About Tecnotree

Tecnotree is a 5G-ready digital Business Support System (BSS) player, with AI/ML capabilities and multi-cloud extensibility. Tecnotree is among the first companies in the world to be Platinum Certified by TM Forum Open API standards, and our agile and open-source Digital BSS Stack comprises the full range (order-to-cash) of business processes and subscription management for telecom and other digital services industries creating opportunities beyond connectivity.

Tecnotree also provides Fintech and B2B2X multi-experience digital marketplace to its subscriber base through the Tecnotree Moments platform to empower digitally connected communities across gaming, health, education, OTT, and other vertical ecosystems. Tecnotree is listed on Helsinki Nasdaq (TEMIV).

¹ <https://inform.tmforum.org/research-and-analysis/reports/partner-ecosystems-who-does-what-and-where-does-the-money-flow/>

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

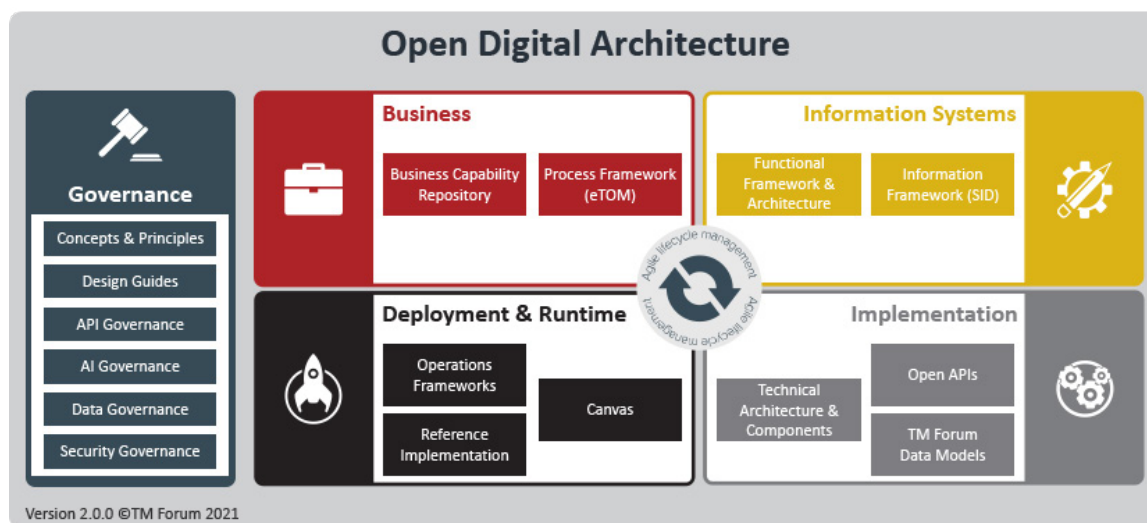
The framework comprises TM Forum's Open Digital Architecture (ODA), together with tools, models and data that guide the transformation to ODA from legacy IT systems and operations.

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



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](#).

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Report Author:
Ed Finegold
Contributing Analyst
efinegold@tmforum.org



Report Editor:
Ian Kemp
Managing Editor
ikemp@tmforum.org



Chief Analyst:
Mark Newman
mnewman@tmforum.org



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



Practice Lead:
Dean Ramsay
dramsay@tmforum.org



Global Account Director:
Carine Vandeveld
cvandeveld@tmforum.org



Head of Operations:
Ali Groves
agroves@tmforum.org



Sponsor Success Manager:
Maryssa Ramsey
mramsey@tmforum.org



Commercial Manager:
Tim Edwards
tedwards@tmforum.org



Marketing Manager
Ritika Bhateja
rbhateja@tmforum.org



Digital Media Coordinator:
Maureen Adong
madong@tmforum.org

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TM Forum
4 Century Drive,
Parsippany,
NJ 07054
USA

www.tmforum.org

Phone: +1 973-944-5100

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Paul Martin

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