

**take  
charge!**

**using real-time charging  
to tap revenue beyond connectivity**

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## setting the scene

**Communications service providers (CSPs) have traditionally used a prepaid and postpaid model for connectivity, charging only for consumption – by the minute for voice services and per megabyte for data. Over the years, CSPs have not developed new business models, so little has changed. As a result, charging has become commoditized. But in a digital world connected via 5G, charging should be a differentiator, not a commodity.**

The creation of multi-play services – fixed, mobile, broadband and TV – and the advent of mobile prepaid accounts paved the way for real-time convergent charging, or RTCC (see panel right). CSPs needed to be able to provide a single bill to customers buying multiple services, and prepaid accounts had to be charged in real time to reconcile usage with the prepaid balance and shut off services once a balance threshold was reached.

So far, pricing for 5G appears to be more of the same – flat-rate, subscription-based connectivity – and this trend is likely to continue. But if CSPs hope to recoup their investments in 5G and grow revenues, they must find new ways to charge consumers and businesses for quality of service and for services riding on top of connectivity, whether provided by the telco or a partner. Transformation of business support systems (BSS) including adoption of real-time, converged charging is key to making this happen.

## what is converged charging?

RTCC uses an online charging system to manage real-time charging of services. Not only does this help CSPs authenticate subscribers and check account balances, but it also allows them to offer promotions and upsell services in real time. RTCC can also enable self-service, letting customers check their own usage statistics as well as create their own plans, such as setting data caps.

However, monetizing 5G requires modernization of online charging and policy control. 3GPP has standardized a new approach to charging in standalone 5G which combines legacy offline and online charging in a converged system to support advanced 5G use cases such as network slicing. Working together, policy and charging will enable CSPs to create end-to-end “slices” of a 5G network to serve customers with very different requirements for latency, availability and throughput.

## it's urgent

In TM Forum's [2021 Benchmark survey](#) of more than 200 CSPs, we asked about the most important BSS requirements and found that nearly 80% of respondents rated flexibility and scalability as urgent. More than half of respondents also said that ecosystem enablement, zero-touch account management, automated service configuration and real-time revenue management are urgent (see graphic).

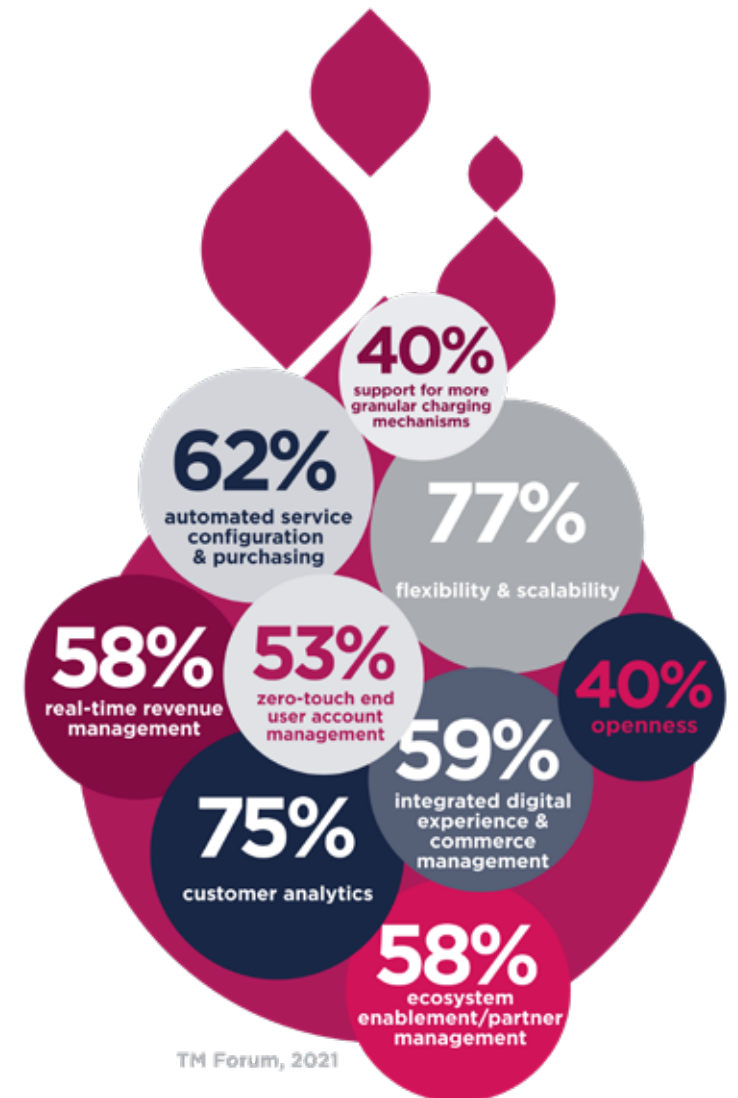
These findings are not surprising, and the capabilities cited are also needed in consumer BSS. Indeed, [an earlier TM Forum survey of CSPs](#) found that while a large majority of respondents (80%) are operating separate enterprise and consumer billing stacks today, about 40% expect them to converge, especially for consumers and small businesses.

Investing in modern, converged charging systems and pursuing new monetization strategies can increase revenues for CSPs. Based on its recent surveys and research, [McKinsey & Company](#) predicts that operators may be able to increase average revenue per consumer user by 20%.

“Depending on the road that operators take, the technologies they invest in, and the partnerships they forge, we see a potential for operators to increase average revenue per user (ARPU) by between 16 and 20 percent – if not more,” the company says.

This ebook looks at why charging must evolve and how CSPs can use it to monetize experiences and data, not just connectivity. We also explore how telcos will be able to get a bigger piece of the pie in digital ecosystems by delivering charging-as-a-service.

## urgent enterprise BSS requirements



# why charging must evolve

## A perfect storm of challenges is forcing CSPs to transform charging.



The pandemic altered customers' behavior and requirements almost overnight. In addition to reinforcing the criticality of connectivity, Covid-19 lockdowns accelerated the trend toward remote working and consumption of video and entertainment services at home. This is increasing demand for converged solutions that can support fixed and wireless services as people working and playing at home need redundancy and resilience. With converged charging, for example, CSPs can offer 5G as backup for wireline connections to the home.



5G and IoT demand flexible, real-time charging for quality of service and network slicing, plus new pricing models and settlement capabilities for services delivered by an ecosystem of partners. For example, instead of charging per megabyte for an online gaming service, operators should be able to charge by the game or by the amount of time spent playing, and they should be able to charge through a partner, such as a cloud gaming company.

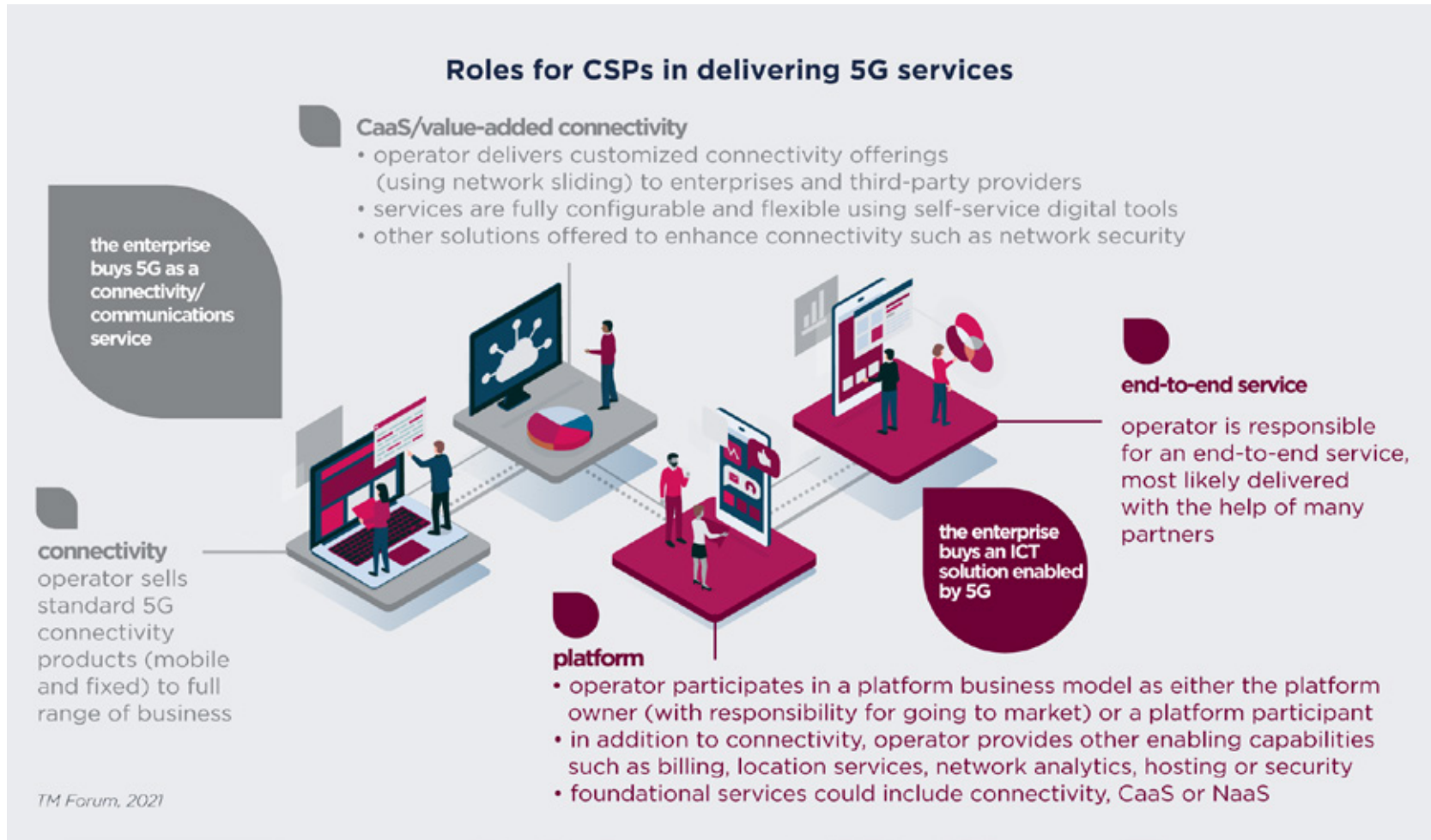


CSPs are facing escalating competition from hyperscalers, over-the-top (OTT) players and companies building private 5G networks. Digital-native companies have redefined customer experience, setting expectations for self-service and personalized offerings. CSPs need to be able to quickly develop innovative new services to compete, but they must also recognize that they may not always own the customer. In many cases competitors will become telcos' partners, and CSPs can generate new revenue from these relationships by providing them with charging-as-a-service.

**In many cases competitors will become telcos' partners, and CSPs can generate new revenue from these relationships by providing them with charging-as-a-service.**

## role playing

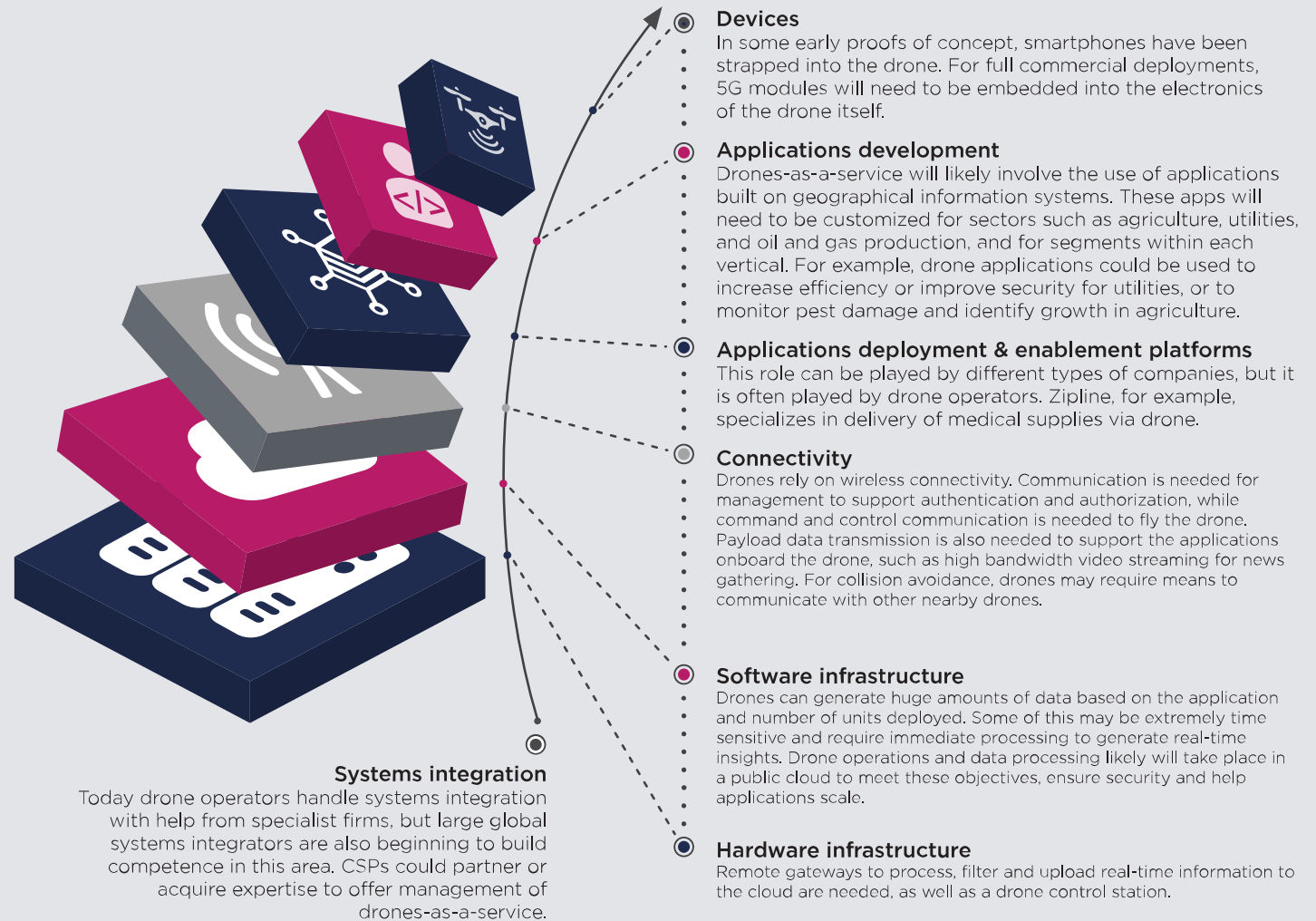
The graphic below shows the potential roles for CSPs in 5G digital ecosystems. It shows the different business models that are possible, ranging from providing only connectivity, shown on the far left, to becoming an ecosystem enabler with responsibility for an end-to-end service, shown on the far right.



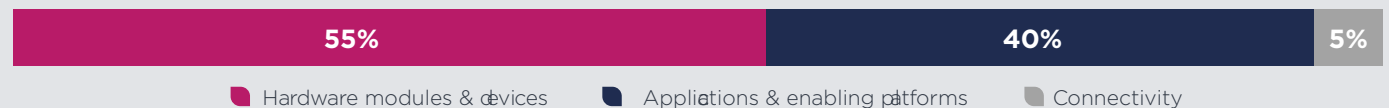
The graphic opposite illustrates all the different partners that may need to work together to deliver such an end-to-end service. Some CSPs will be content to deliver best-in-class or value-added connectivity, but most large operators are on an evolutionary path to become platform or end-to-end solutions providers. It is important to note that connectivity is typically a very small portion of the revenue in an end-to-end solution. The real money lies in IoT devices, infrastructure and applications.

So, if a CSP wants to earn a significant portion of revenue, they need to enable the ecosystem and collect incremental revenue from partners. To do so, they need modernized real-time charging and policy engines that are capable of: handling partner management and financial settlement between partners; and providing real-time usage data and analytics to improve customer experience and increase personalization.

### Drones-as-a-service shows potential roles for CSPs & partners



### Breaking down the revenue potential of an IoT deal



TM Forum, 2021

# betting on B2B2X

**For most CSPs, the path to revenue beyond connectivity lies with enterprises, particularly as 5G and IoT mature. But addressing B2B2X opportunities requires a different mindset, one that is less telco and more techco.**

Much of TM Forum's research throughout 2021 focused on how 5G and IoT are breathing new life into telcos' enterprise businesses. As mobile operators deploy standalone 5G – which relies on technologies such as cloud computing, software-defined networking and multi-access edge computing – they will be able to deliver network slicing for specific enterprise use cases such as industrial IoT, 5G drones, autonomous vehicles and remote surgery. As we have already noted, delivering many of these use cases involves multiple partners working together.

The survey for our benchmark report, [Mapping a path to telco revenue growth](#), found that five times as many CSP respondents believe B2B is a more likely source of future revenues than B2C. However, two thirds said they see opportunities in both markets. Security, IoT and cloud computing are some of the most promising B2B service categories, and healthcare and entertainment are the most promising verticals (see graphics on next page).

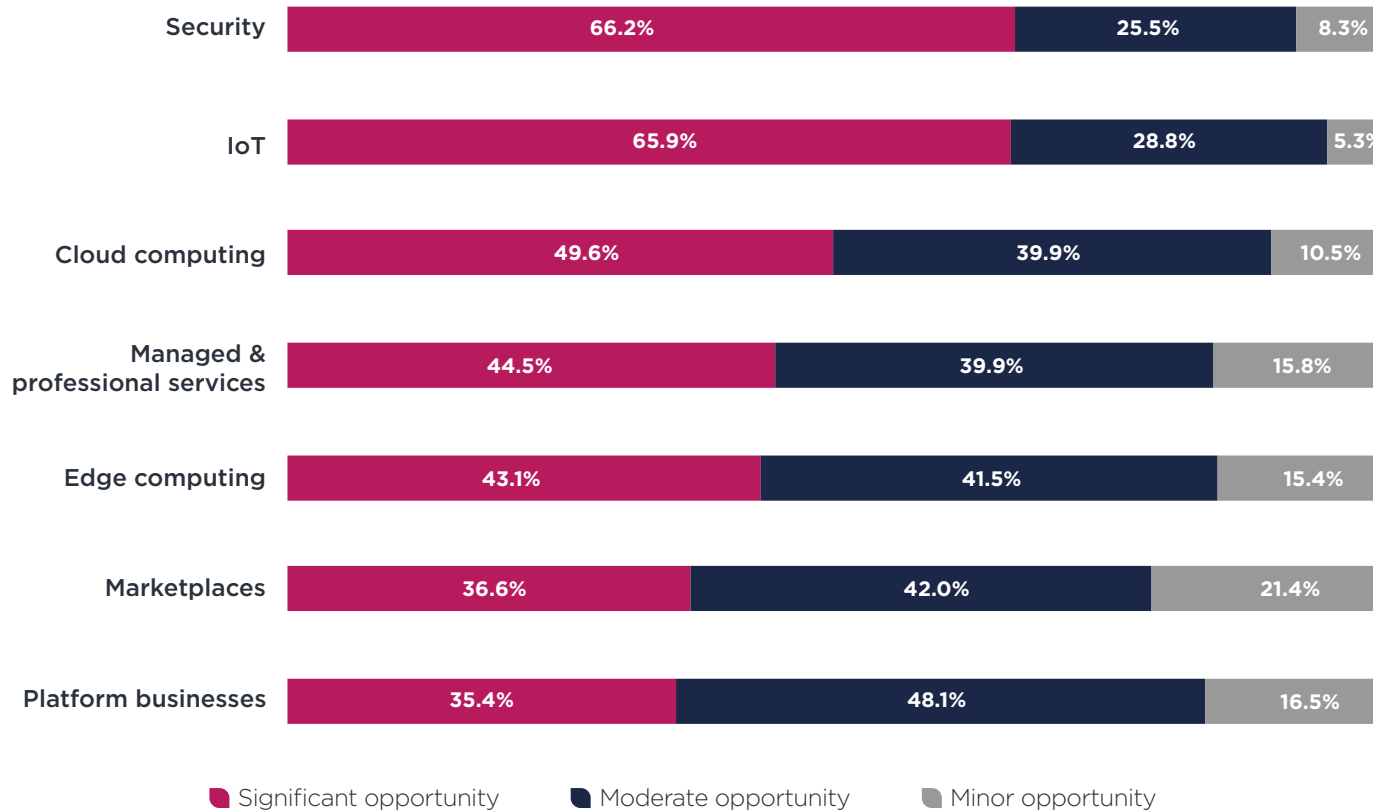
**Five times as many CSP respondents believe B2B is a more likely source of future revenues than B2C.**

**Read the benchmark report:**





### Best service categories for growth



TM Forum, 2021

### Best verticals for telco revenue growth



TM Forum, 2021

## treat partners like customers

To address these opportunities, CSPs need to understand their customers' industries and businesses. Operators have the difficult task of developing vertical expertise while at the same time creating horizontal solutions that are repeatable across industries. In many cases, CSPs will need to work with vertical specialists and hyperscale cloud providers to do this. They should treat these partners as customers, providing the same kinds of digital experiences they deliver to other enterprises.

As noted in the benchmark report: "Businesses expect to order end-to-end solutions through a self-service platform. All the complexity must sit behind the interface with the customer, which requires technical integration of services and commercial models with revenue sharing for all partners...Partners need access to real-time data about how their services are being used, and they need to be able to integrate their products with telecoms services easily."

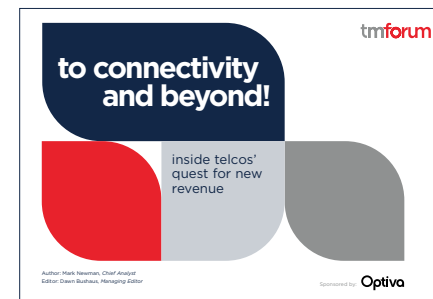
In the next chapter we look at how operators can also earn more from consumers by selling experiences.

## what can your charging system do?

To monetize enterprise 5G and IoT services, it is important for CSPs to consider the capabilities of their charging systems. Operators need converged systems that are cloud native, scalable and capable of supporting new monetization models, charging in a partner ecosystem and enhancing experiences. Following are some capabilities CSPs should look for:

- Dynamic network slicing based on slicing-related attributes
- Differential charging based on service level agreements (SLAs) and quality-of-service (QoS) data
- Location- and API-based monetization
- Self-service capabilities to empower employees, partners and customers
- Partner onboarding and management, including the ability to create packages consisting of the CSP's connectivity and partners' services, and the ability to handle real-time settlement among partners
- Real-time data analytics and insights
- Easy enhancements to enable quick configuration of new services
- Execution of real-time orchestration and policy-driven customer experience
- Monitoring of SLAs and the ability to deliver real-time feedback to applications.

**Read this ebook to learn more about telcos' quest to go beyond connectivity:**

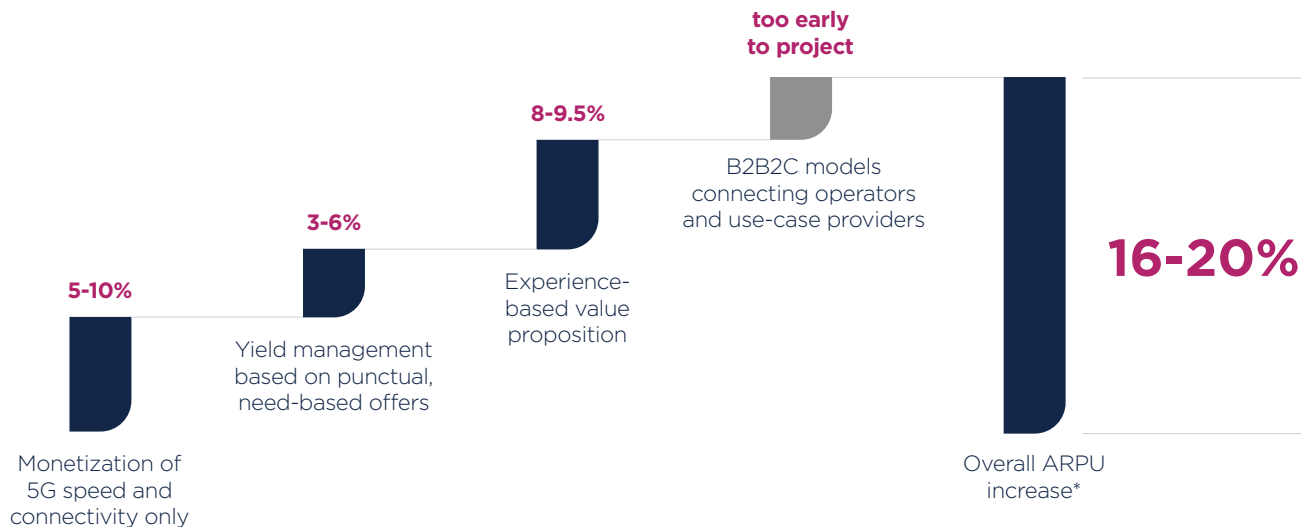


# for consumers, it's all about experience

**In order to monetize consumer 5G, CSPs need similar charging capabilities to those we looked at for enterprise services. And they need to focus on selling experiences in addition to connectivity to move beyond flat-rate, subscription-only pricing.**

McKinsey's calculation that CSPs may be able to increase ARPU by more than 20% through 5G monetization that centers on selling experiences (see graphic), are based on its work with telcos and data from surveys, including one conducted in April 2021 with 2,400 telco customers in six countries.

## Potential increase in ARPU from 5G monetization



\*The ARPU increase between the different innovations is overlapping; total ARPU increase is net of those overlaps.  
TM Forum, 2022 (Source McKinsey & Company)

McKinsey points to three innovative models that operators can use to monetize consumer 5G:



**Impulse purchases and “business class” plans** – CSPs could offer “flexible plans that allow customers to make impulse purchases to upgrade network performance when and where they so desire”, McKinsey suggests. “With 5G, operators can also introduce ‘business class’ plans, which feature premium network conditions at all times.”



**Selling 5G-enabled experiences** – Telcos could focus on using 5G’s high speed and low latency to provide customized experiences for certain groups of users like gamers or sports fans who want to stream sporting events using augmented reality. “Part of the challenge will be to explain to consumers why, exactly, they are paying for premium connectivity,” McKinsey concedes. “A model solution may lie in the home-appliance market, where an industry-wide ratings system for energy efficiency makes it easier for customers to understand pricing differentiation that would otherwise be complicated to convey.”

With charging flexibility, CSPs could also offer one-time charges on top of subscriptions. TM Forum Chief Analyst Mark Newman notes that consumers have become accustomed to the all-inclusive pricing schemes developed by companies like Netflix and Spotify and expect the same from telcos, but most people are willing to pay for “one-off” events, such as watching a new-release movie. McKinsey offers the example of a mobile operator giving a 5G subscriber the ability to view a concert or sporting event from multiple angles and access additional content using their smartphone while attending an event.

BT, for example, is already offering such a service called Matchday Experience on its BT Sport app. The service uses augmented reality and 360-degree cameras to allow users to watch live sporting events with their friends using a split-screen interface. “A new ‘pinch and zoom’ functionality enables fans to home in on their desired areas of interest to recreate the feeling of being at the ground,” [BT explains](#). “360° offers viewers the chance to select different camera angles and viewpoints not normally seen in TV broadcasts.”



**Using partnerships to deliver 5G-enabled experiences** – This is similar to offering enhanced 5G experiences, which requires the telco to develop partnerships, but in this case the partner would own the relationship with the customer rather than the CSP.

Many telco subscribers want to pay for enhanced experiences through content providers like Facebook, Microsoft and Netflix, and they want the experience to be seamless with a single bill. McKinsey’s research found that when it comes to cloud gaming, for example, 74% of subscribers would rather buy a 5G connection directly from the game app than through their mobile provider.

**When it comes to cloud gaming, 74% of subscribers would rather buy a 5G connection directly from the game app than through their mobile provider.**

# how to monetize almost anything

**With the right tools, telcos can monetize more than connectivity and experience. For example, they can monetize data such as usage behavior or location.**

A mobile operator could use location to deliver an offer from a retail partner with a physical store nearby, or it could use behavioral data to create a new personalized offer for a customer instantly. Some CSPs are also beginning to resell aggregated, anonymized data about customers' behavior and location to third parties as a service.

## evolution, not revolution

Most CSPs are only at the beginning of their journeys to transform BSS. They have started by modernizing customer engagement systems to deliver digital, self-service capabilities. Now they must adopt open digital architectures to evolve to fully automated, cloud-native operations that rely on analytics and AI to deliver zero-touch services. This includes modernizing charging and billing.

The [TM Forum Open Digital Architecture \(ODA\)](#) defines standardized, interoperable software components organized into loosely coupled domains. The components expose business services through [Open APIs](#), which are built on a common data model. By taking this approach, CSPs can develop platforms to open their network and IT assets to customers, partners and developers, eliminating the need for the IT team to be involved in creating new plans and services.

In addition, TM Forum members are working to define models for 5G monetization by studying use cases and assessing impacts to revenue management and assurance. The [Digital Ecosystem Management project](#) is creating digital ecosystem playbooks that offer practical partnering guidance for CSPs and their suppliers. This includes developing the business architecture, APIs and data models for connectivity-as-a-service and zero-touch partnering.

The whole idea is to increase innovation and revenue. If a CSP has a cloud-native API-enabled online charging system, they could even offer charging-as-a-service to their partners and customers in the same way that charging system vendors deliver these capabilities to their telco customers today. This would give operators a new path to revenue for services they may not deliver directly to customers. In the gaming example, the operator could provide charging-as-a-service to an OTT provider that owns the relationship with the gamer.

## transforming from telco to techco

Many large CSPs are adopting the ODA, and some have created platforms for IoT and network-as-a-service. But so far, most have stopped short of creating truly open platforms. Telcos still very much want to own the customer and limit partners, but this will have to change if they hope to increase revenue substantially beyond connectivity.

Vodafone Group, for example, is aiming to develop a true platform business. After spending several years digitizing customer engagement across its operating companies, the group is now centralizing its technology organization and developing a single platform architecture.

Coleman Deegen, CEO of Vodafone Spain, is one of the contributors to a recent TM Forum white paper called *The tech-driven telco*, which makes the case for adopting a single architecture for rapid innovation. He believes growth beyond connectivity will come from developing new business and revenue models with partners.

The use of platforms is “common across all OTTs – that standardization, that scalability... also the flexibility and agility to bring partners on the platforms [using] standard APIs”, Deegan said during a [panel discussion at Digital Transformation World Series in September 2021](#). “This is really, really fundamental, particularly in a world where we’re moving out of our core business, which is also being disintermediated and disrupted as we go along.”

Deegan thinks opportunities for operators to partner in B2B2X models will grow as enterprises digitize their businesses. “The digitalization of society is a big, big lever,” he says. “And telcos can play a big part in that.”



[Watch the telco-to-techco panel discussion](#)

## key steps to success

**CSPs are facing daunting competitive and financial pressures. They are committed to investing in building next-generation networks, but there is no guarantee that they will be the companies to profit from them. Indeed, if they focus solely on selling connectivity, they won't be. Telcos need to be able to monetize anything and everything.**

Following are steps they can take to make it happen:



### **Adopt real-time converged charging**

Real-time converged charging systems enable centralized management of all users and services, and they will be critical in 5G networks. Operators need modern, component-based systems that can work with policy control engines to deliver advanced services like network slicing. They should consider the capabilities of their charging systems and look for solutions that are cloud-native, use Open APIs and can automate partner management so that they can earn revenue through partners.



### **Focus on selling experiences**

Telcos have a long history selling subscription-based connectivity, and early 5G services are just more of the same. Operators must figure out how to charge enterprise and consumer customers and partners for quality of service and experiences as well as connectivity. McKinsey calls the “speed tiering” that results from network slicing a critical enabler of its three models for innovation outlined in Chapter 3. While there may be an industry-wide perception that mobile subscribers won't pay for speed alone, McKinsey's research suggests otherwise. The company's survey shows that nearly three quarters of telco customers “have a positive or neutral feeling about their operators offering different speeds to mobile users with different needs”.





## Think like a techco and commit to open platforms

Most CSPs are considering how to evolve into techcos capable of delivering rich experiences to consumers, enterprises and partners. This may be easier for large operators with skills and budget than smaller ones, but both will need to work with technology suppliers that offer cloud-native, standards-based solutions.

CSPs that want to pursue platform business models or deliver end-to-end services must create and participate in open platforms that make it easy for partners to do business with their own customers. Automated partner onboarding and management capabilities are particularly important.

TM Forum's Open Digital Architecture, Open APIs, and work on connectivity-as-a-service, marketplaces and zero-touch partnering can help by enabling CSPs to evolve to a fully automated, cloud-native operations environment that relies on analytics and AI to deliver zero-touch services. But widespread agreement and collaboration among CSPs and suppliers is necessary to get there.

As Vodafone's Coleman Deegan notes, most CSPs are facing the same challenges: "We're dealing with competitors...who have massive standardization [and] very new technology at the cutting edge. We have to be there as well if we want to compete into the future. For us it's not an option; it's an obligation."

**Operators must figure out how to charge enterprise and consumer customers and partners for quality of service and experiences as well as connectivity.**



[Read the white paper](#)


## 5 must-haves to accelerate monetization innovation

**While CSPs focus on securing their position and role in the new and growing hyper-connected digital economy, they need to manage their inventory and assets to ensure their valuable role and contribution to the new ecosystem. Beyond connectivity, CSPs have wide and long-lasting experience managing mission-critical business support systems (BSS). This includes their real-time charging engine, which can become a cornerstone element for CSPs' play if equipped with the right functionalities and capabilities.**

The following are five steps CSPs need to follow to evolve their charging engine.

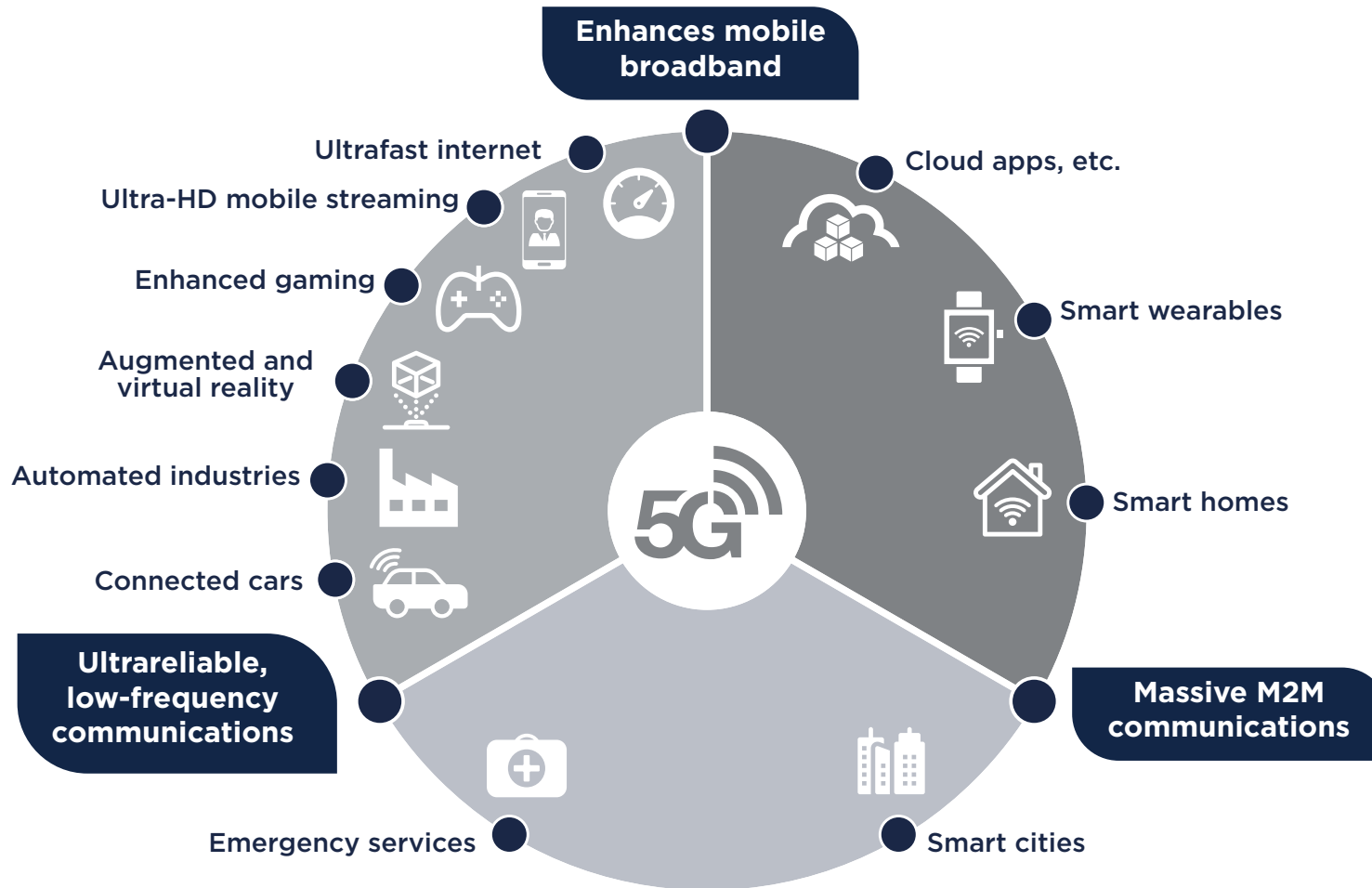
### **Charge anything with true convergent charging capability**

Although convergent charging is not a new capability, it has been hard for CSPs to implement because they are still burdened by the technical debt of highly customized legacy systems. These cannot deliver on the promise as they were originally designed only for connectivity services and measured in quantities, such as minutes, bytes, and messages for fixed, mobile, etc.

-  **Charge any attribute when expanding to 5G** - Convergent charging should enable charging beyond the traditional attributes and allow flexible charging, e.g., applying slice specific charging based on the slice identification (sNSSAI), slice type (SST), calling location/device (based on uPFID), session quality based on QoS information, and SLA-based charging. The CCS will interact with multiple network functions to enable all the new 5G use cases, which are AMF, NEF, NWDAF, and evolving ones not yet specified by 3GPP.

The logo for Optiva, featuring the word "Optiva" in a white, sans-serif font against a dark blue background.

## 5G Use Cases: OSS/BSS Network Slicing




- Cross-domain slice correlation, orchestration and monetization
- SLA-based charging
- Slice-differentiated charging
- Real-time quotation, pricing, configuration
- Cross-slice charging
- Complex B2B2X partner settlement

Source: Gartner (November 2018)





**Extendable to any service** – From OTTs to home security, health, wearables hub, connected industry, transportation and smart cities, the ability to onboard new services easily is an important capability to facilitate the new digital economy. While traditional OCS requires dedicated development or heavy customizations on the existing systems, advanced convergent charging solutions (CCS) should extend the system service and data model with simple GUI-based configuration.


 **Flexible bundling** – One of the main characteristics of the evolving digital world, from consumer to enterprise and ecosystems, is that multiple service types and technologies are bundled together. This requires the CCS to bundle different services with different payment partners and charging attributes together with a single package and enhance the offering with cross-discounting, loyalty-related activities, and shared allowances.

## Facilitate and support a partner ecosystem

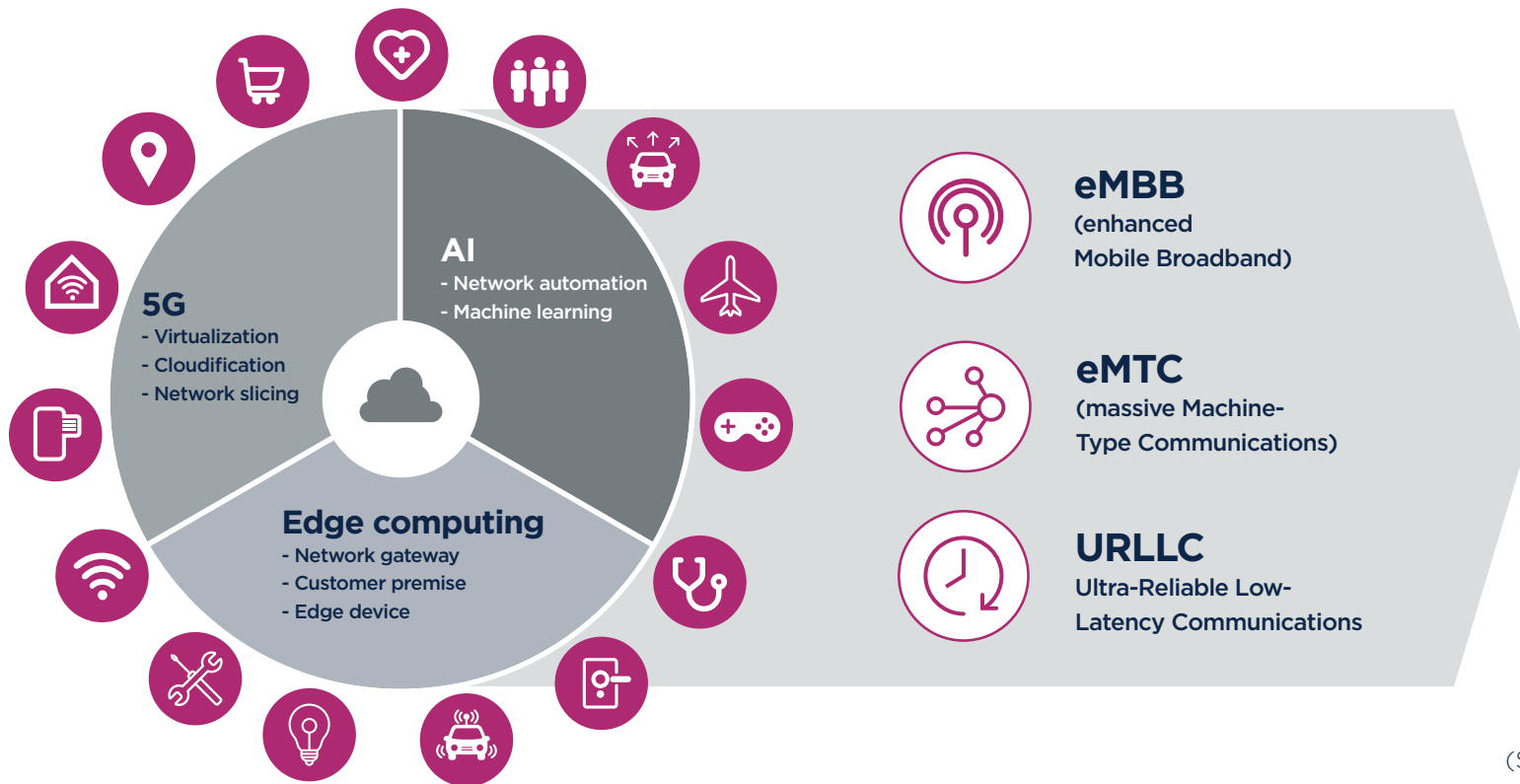
As the connectivity arena becomes more competitive with new network providers (e.g., hyperscalers, private network providers, new players), CSPs' dominance is at risk. Therefore, they are required to change their approach and become more partner-friendly to increase the ability to “do business together.”

 **Fast onboarding as the partner ecosystem will grow and expand** – CSPs, who want to stay competitive and become the connectivity partner of choice, need to provide toolings and flexible integrations for fast onboarding without heavy development and long timelines. Learning from the cloud services, CSPs need to support open architectures and standard APIs to allow their partners to integrate services with a simple action. This will also ensure that heavy investment is not required on the CSP side, ensuring a scalable growing ecosystem at low costs.

 **Self-serve driven by the cloud digitalization and “marketplace” experience** – Partners expect self-enabled configuration for services, pricing, and charging definition. Advanced CCS needs to support simple service and charging definitions (API or GUI with guided logic-driven capabilities) that are accessible not only to the CSP's operational team but also to the partners. It also needs to support user and role definitions and isolation and testing capabilities to reduce vulnerabilities since CCS is a mission-critical system within the heart of the ecosystem.

 **New commercial models** – The partner ecosystem will allow new and innovative commercial models in the B2B2x where ‘x’ can be partners, consumers, or other enterprises. The CCS is required to support and reconcile the new world of possibilities and easily configure them. Models such as revenue sharing, billing on behalf, sponsored services, and more are a partial list of new models that will be required in this new world.

**CSPs have important competitive advantages that make them valuable to emerging ecosystems and prepare them to take the lead in offering horizontal, cloud-based technologies to ecosystems and end users.**



- ### Examples of 5G applications
- Smart factories
  - Agricultural drones
  - Robotic surgery
  - Smart homes
  - AR/VR shopping
  - Assistive robots
  - Collaborative gaming
  - Smart cities
  - Autonomous cars


TM Forum, 2022  
(Source: IBM Institute for Business Value)

## Drive experience as the new currency

With the introduction of new 5G use cases, CSPs have the opportunity to drive further improvement in customer experience and monetize them, leveraging advanced CCS capabilities.




**URLLC and charging processing at the edge** – Part of the URLLC requirement is ensured experience at low latency. With advanced charging capabilities that are distributed to the edge, actual quality of service is processed in real-time and with low latency, discrepancies are identified, and corrective actions can be taken to ensure the committed experience is met.

**AI-enabled experience** – With the data and usage patterns available from the network and CCS, adaptive pricing, experience, and offerings are enabled on the CCS platform. This is possible with two major elements: data flow from the CCS to the AI platform and the ability to consume the information and follow up on them with optimized pricing, offerings, and personalized actions.

-  **Corrective experience with real-time triggering** – Leveraging the real-time CCS processing, a flexible complementary built-in triggering model allows CSPs to take action and improve customer experience through personalization of notification, offer upsell, network slicing optimization, and more.

## Ensured cloud economics

Migrating to the cloud through a cloud-native solution is just the first step to ensuring cloud economics. Further investment in technology foundation, functionality, and implementation is required to fully take advantage of the potential cloud economics.

-  **Scale smart with differentiated pattern processing** – The expected exponential growth in traffic due to 5G, massive IoT, and cross-industry heavy network use cases will require an increase in process scaling. New capabilities are needed to disconnect between the traffic and processing growth through differentiated processing (from full to light or aggregated processing) based on the monetary or experience value of the event, ensuring that the processing scale is at a lower and more efficient level and cost.
-  **Enhanced automation for improved Opex** – As the ecosystem and use cases will grow, the need for accelerated configuration and rollout of new functionalities will create a potential new bottleneck in delivery, installation, and testing. Cloud-based automation and operational efficiency driven by cloud foundation methodologies, such as the use of a centrally managed product with minimal customization, preconfigured OOTB offers and end-to-end automated testing will reduce the effort and associated cost for system management and operations.
-  **Test fast, fail fast, and GROW** – In search of the holy grail of successful use cases, it's important to provide an advanced charging solution that supports fast configuration and testing at a small scale and the ability to grow if successful or re-evaluate and fail fast.

**The blending of edge computing, AI, and 5G will provide a foundation to support new ground-breaking use cases in almost every industry.**

## Charging as a service

As CSPs are searching for their new role, exploring the possibility to transition from telco to techno provider, their IT assets and expertise and specifically their mission-critical enterprise charging solution can become an asset to be shared in the new partner ecosystem.



**Private network** – While building private networks for enterprises to offer localized business applications, CSPs can also provide and operate, within the network, a distributed charging solution supporting commercial models and ensured experience at the edge.



**Partner settlement** – In a growing and expanding ecosystem, charging on critical events between partner and settlement is a new need that CSPs have experience and the tooling to provide, e.g., charging on-location information exchange, scoring exchange, and more.



**Charging for hire** – CSPs can offer their partners the ability to utilize the CSP's charging system for their own (the partner's) business needs where monetization models are required, like ITC, energy, utilities, and more. Therefore, partners can leverage cloud scalability, operational efficiency, and a modern convergent charging platform based on open standards.

## About Optiva

Optiva is a provider of mission-critical BSS and monetization solutions for the telecom industry, founded in 1999. Optiva Charging Engine is Optiva's flagship multi-industry convergent charging solution. It adheres to 3GPP, TM Forum, and CNCF specifications. It is designed based on the belief that innovation required for the 5G era is possible only by combining the most advanced cloud-native technology with disruptive functionality. Therefore, its design is driven by the future needs and challenges of a connected world and advanced methodologies and delivery approaches. Some of the largest CSPs, such as Vodafone India, KDDI, and Claro Peru, utilize Optiva convergent charging engine, and it was the first to be migrated to the public cloud with Google Cloud. Today, Optiva brings public cloud capabilities to the private cloud and enhances innovation and flexibility to create future-flexible central charging solutions geared to creating partner ecosystems and driving CSPs' future monetization opportunities.

To learn more, visit [Optiva.com](https://www.optiva.com)

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