

Independent market research and competitive analysis of next-generation business and technology solutions for service providers and vendors

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Turning 5G Services into Revenue with Dynamic Real-Time Commerce

A Heavy Reading white paper produced for MATRIXX Software



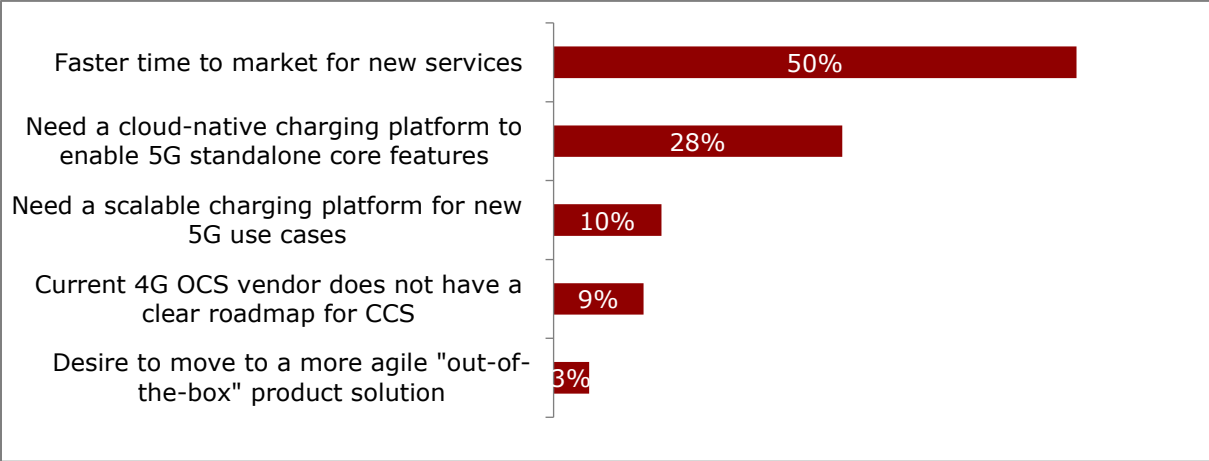
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EXECUTIVE SUMMARY

The mobile industry is investing heavily in 5G. According to Omdia research, 78 5G networks were launched across 37 countries by the end of 2Q20. The GSMA expects mobile operators to spend a massive 80% of mobile capex, or \$1.1tn, worldwide on 5G networks between 2020 and 2025.

Operators are moving to the next phase of deploying new 5G core networks. More than 50% of operators said they would deploy a 5G standalone core network by the end of 2021 and a further 30% said they would do so by 2023, according to a recent Heavy Reading survey. This will enable more advanced enterprise 5G services enabled by network slicing, edge cloud, and massive Internet of Things (IoT). Operators then have a real opportunity to develop these new markets and diversify relatively stagnant revenue.

Figure 1: Primary driver for deploying a new converged charging system in a 5G standalone core network



n=104 mobile operator respondents
Source: Heavy Reading global survey, 4Q20

5G core networks bring webscale capabilities to mobile networks if they can be effectively exploited. Leading operators are increasingly incorporating 5G charging, enhancing B2B flexibility and potential, adding IoT, and improving wholesale business processes.

A key strategic priority for operators is to accelerate the adoption of a real-time-centric business model at the heart of 5G. Why? With its cross-segment coverage and rich monetization levers, a holistic "powered by 5G" business approach will enable operators to break through the innovation glass ceiling that has restricted growth and competitiveness. In that environment, a faster time-to-market for new services is the primary driver for deploying a new 5G converged charging system (CCS). A real-time and dynamic monetization engine capable of executing that new real-time-centric model is an architectural imperative for operators.

INTRODUCTION

The 5G standalone core was standardized in 3GPP Releases 15 and 16, and it is now in the process of being deployed by various operators. Many operators are updating their IT stacks to allow the new services that strategists have been dreaming of to finally be monetized. These include remote healthcare, smart manufacturing, enterprise private networks, fixed wireless broadband, augmented and virtual reality (AR/VR), real-time communications enabling smart city infrastructure, and in-car infotainment.

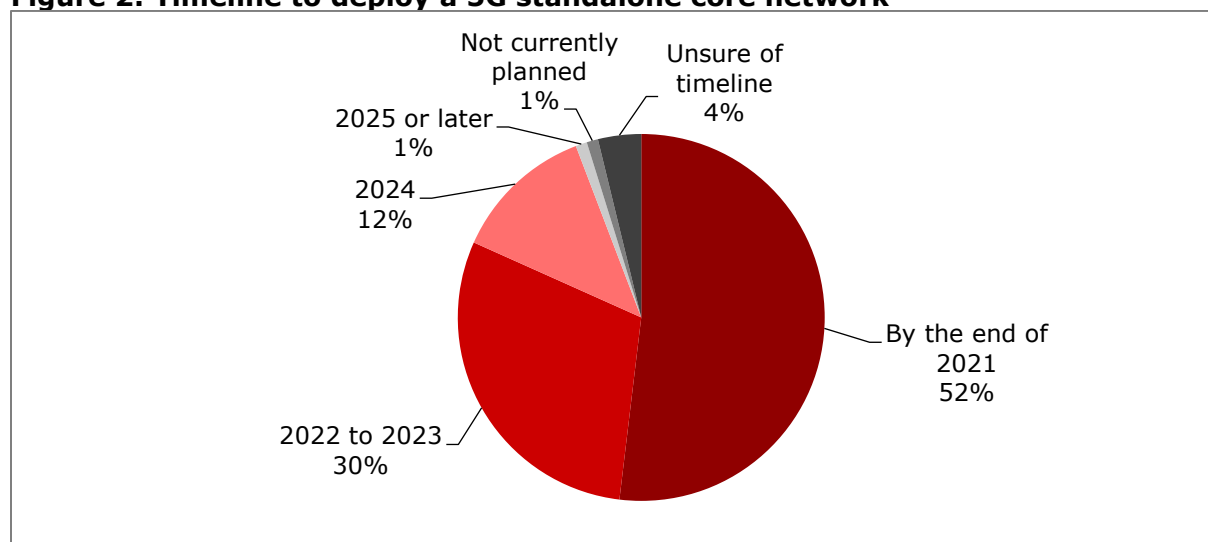
5G operators can experiment with speed-based tiers, premium pricing for low latency applications (e.g., cloud gaming), and new charging models for enterprise network slicing. Each logical “slice” meets service-specific requirements for network priority, latency, data rate, quality of service (QoS), and other key performance indicators.

This paper looks at operator plans for monetizing 5G core standalone networks, the business drivers behind dynamic and real-time charging, and key requirements for 5G CCS. Research is based on a Heavy Reading global survey with key networking and IT decision makers in mobile operators commissioned by MATRIX Software in 4Q20.

STANDALONE 5G CORE NETWORKS ARE BECOMING REAL

Mobile operators have typically begun by deploying non-standalone 5G, leveraging existing backhaul network capacity and adding 5G New Radio (NR). As these first 5G networks are established, the strategic direction, technical challenges, performance characteristics, and primary use cases and services are becoming clearer.

Figure 2: Timeline to deploy a 5G standalone core network



n=104 mobile operator respondents

Source: Heavy Reading global survey, 4Q20

More than half of mobile operators (52%) are planning to deploy 5G standalone core networks in the next year or by the end of 2021. 5G standalone core networks will enable operators to launch more advanced services and realize the full operational efficiency and revenue potential of 5G.

Operators in Asia Pacific and North America, which were first to launch non-standalone 5G networks, are leading the charge. More than 70% plan to deploy 5G core networks by the end of 2021.

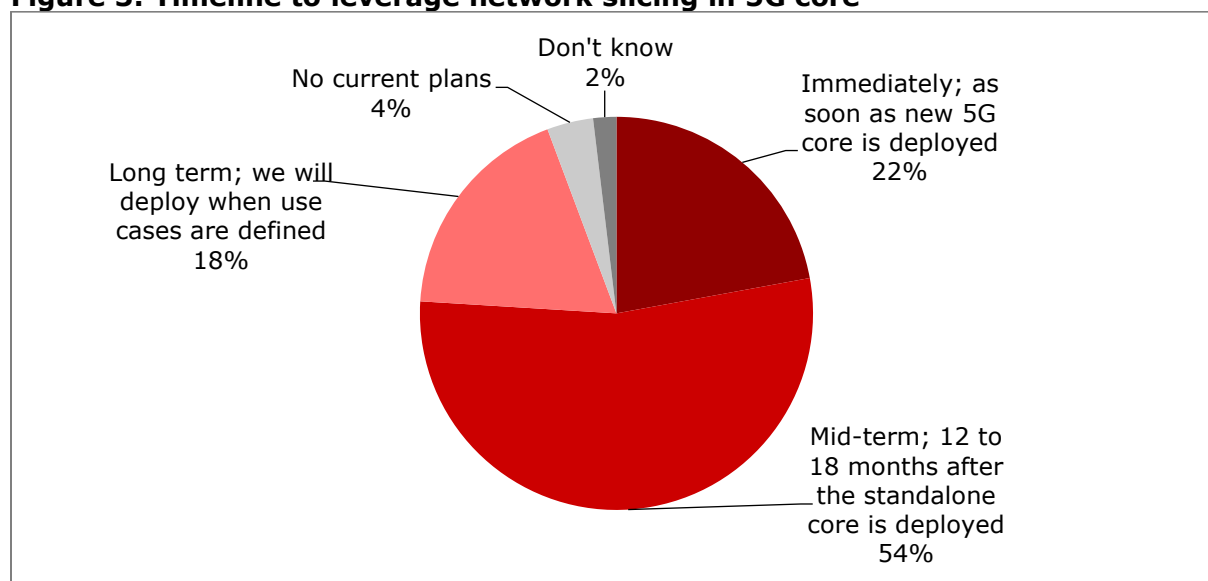
ACCELERATED TIMELINE TO DEPLOY NETWORK SLICING

More than three-quarters (76%) of mobile operators expect to leverage network slicing as part of their 5G strategy within the first 18 months of deploying 5G core networks. One in five operators will launch network slicing immediately once the new 5G core is deployed. This percentage increases to over 40% of operators in Asia Pacific. The primary business drivers in Asia Pacific are to deploy industry-specific network as a service (NaaS) offers. In North America and Europe, initial interest is around enhanced consumer AR/VR offerings.

Network slicing uses the principles of modern cloud architecture to run multiple logical networks as virtually independent business operations on a common physical infrastructure. In theory, the number of slice types is limitless, as there could be slices for different applications (e.g., video gaming and VR) or even individual customers. Enterprise customers could be offered a mobile network slice (a virtual private instance) or a NaaS deployment with guaranteed uptime, for example, to support factory automation. Network slicing could also allow much more granular configuration of mobile virtual network operator (MVNO) wholesale services than is possible today. Charging will need to be dynamic and real-time based on the network load and performance characteristics of the accounts, subscribers, and devices attached to slice(s).

This will enable more advanced use cases and services that rely on edge computing and virtualized network functions (e.g., content caching, AR/VR, and real-time communications to support smart city and connected cars). Edge cloud computing can be deployed wherever low latency, localized processing of data, or computation offload are important.

Figure 3: Timeline to leverage network slicing in 5G core



n=104 mobile operator respondents
Source: Heavy Reading global survey, 4Q20

BENEFITS OF DYNAMIC COMMERCE IN DRIVING NEW 5G REVENUE

Networks and IT systems are becoming cloud-native platforms with distributed virtualized network functions and modular containerized charging capabilities. These are critical to transforming legacy siloed operations into dynamic, open, and customer-centric processes that are flexible enough to support real-time operations and a diverse range of services and use cases.

The 5G standalone core promises to open the full capabilities of ultra-reliable low latency communications (URLLC), massive machine-type communications (mMTC), network slicing, and edge computing that will support new advanced services. Content providers are looking for ways to use 5G networks to deliver new content and services such as cloud gaming, AR/VR, high resolution video streaming (4K and 8K), etc. with a high quality user experience. This is where NaaS based on network slicing (virtual logical slices with QoS guarantees) or private 5G campus networks can open up opportunities for operators.

As new enterprise applications and edge cloud use cases are enabled by 5G, new protocols and interactions between telco networks and enterprise systems will transform value chains. Consider that enterprises will be able to upload and run programs or partial workloads inside the mobile network just a millisecond away from the user. A digital marketplace to onboard enterprises and wholesale customers for service design and provisioning and a digital portal for account, customer, and service management will be critical in driving scale.

Figure 4: 5G NaaS with a dynamic monetization component

Service	Delivery	Partner	Monetization
Real-time multi-user cloud gaming, content, VR	NaaS** or network slice* for cloud gaming, VR, streaming video	Partnership revenue share or white label/wholesale model (gaming company, video, content, VR/AR)	Charging based on usage/session, time/QoS upgrade Variable based on time of day/traffic, QoS guarantees, location, device, etc.
Connected traffic infrastructure: Smart sensors or cameras trigger real-time actions, rerouting vehicles or changing traffic lights	NaaS or 5G network slice for critical data comms and public safety	Public sector cities or MNVOs	Charging based on usage/volume
Connected cars: Infotainment, e-calls, V2V2X comms to other vehicles, infrastructure, road users	NaaS or network slice; the first deployments in commercial vehicles expected early 2021	B2B2X, OEMs for wholesale or partnership revenue share, retail direct to car owners and occupants (possible with slicing)	Charging based on session/event, streamed video, etc.

Service	Delivery	Partner	Monetization
Smart spaces: Neutral host networks	NaaS or network slice; B2B2X to retailers or consumers, IoT, enhanced experiences, 5G FWA	Airports, ports, shopping malls, sports arenas	Charging based on usage/device/session
Private 5G campus networks (e.g., manufacturing)	Private networks (enterprise buys spectrum) or provided by operator as a network slice, as a service, or as dedicated private network equipment	Manufacturers, hospitals, ports, etc.	Charging based on usage/device/application/usage by department or user group

* As a "slice" (virtual private instance) of a mobile operator's radio and core network.

** NaaS: Network as a service, where a service provider owns and manages the radio and core network components and advises on the deployment model.

Source: Heavy Reading

CONVERGED CHARGING SYSTEM KEY TO DYNAMIC COMMERCE IN 5G

The 3GPP 5G core architecture defines a completely new monetization approach using a new service-based architecture. This will be used to drive policy control in the 5G core and also to allow new types of charging triggers and business models. There will also be a critical bridging period where 5G charging transactions scale to meet the expected fourfold increase in transaction load that a combined CCS/online charging system (OCS) will need to handle during the 4G to 5G transition period.

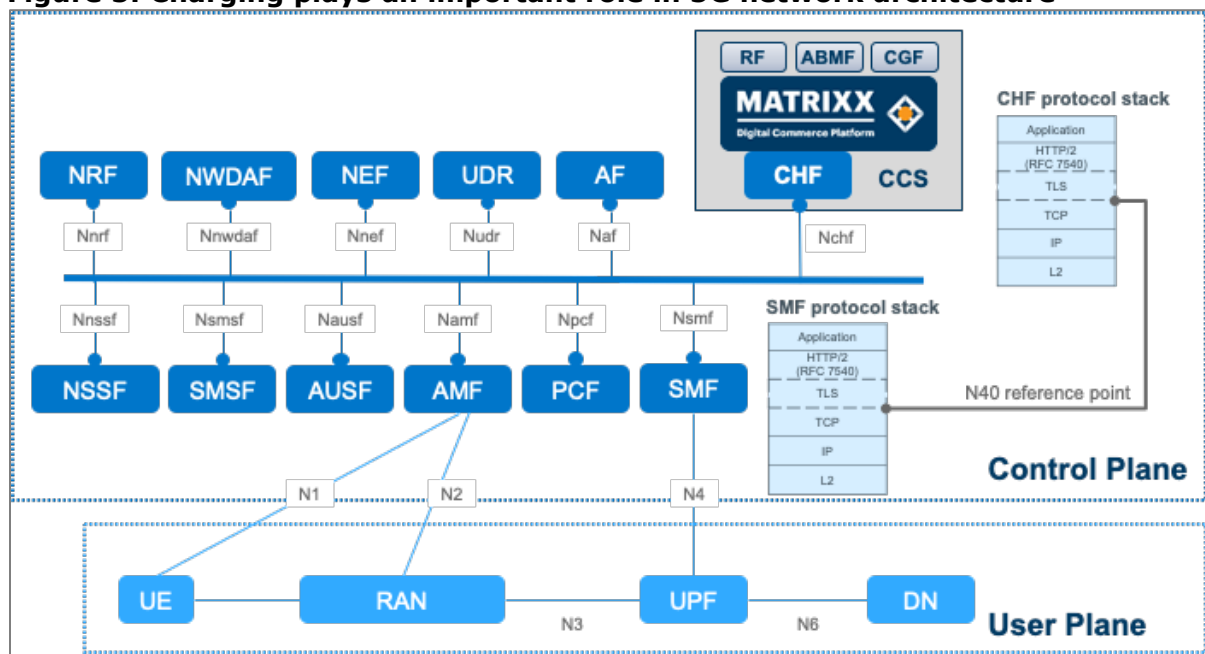
These standards replace the 4G OCS and its separate offline charging system with a new 5G CCS, which includes a 5G charging function (CHF). They also replace the previous Diameter-based protocols with the 5G service-based interfaces (SBI).

With the new architecture, the CCS plays a major role not just in the traditional prepaid business segment, but also in supporting all customers. All transactions, whether prepaid or postpaid, consumer or enterprise, or voice, data, or applications, will need to be handled by the CCS across mobile, Wi-Fi, and fixed networks.

The CCS has to meet real-time IT business rules *and* interoperate and interact with 5G network elements (PCF, SMF, NWDAF, etc.). A 5G-ready convergent charging solution should include a network charging function that connects directly to the 5G network. The CCS should also be capable of charging based on the following network functions:

- The session management function (SMF) for 5G data connectivity charging
- The access and mobility management function (AMF) for geolocation charging
- The network data and analytics function (NWDAF) for network slicing utilization charging
- The policy control function (PCF) for spending limit control

Figure 5: Charging plays an important role in 5G network architecture



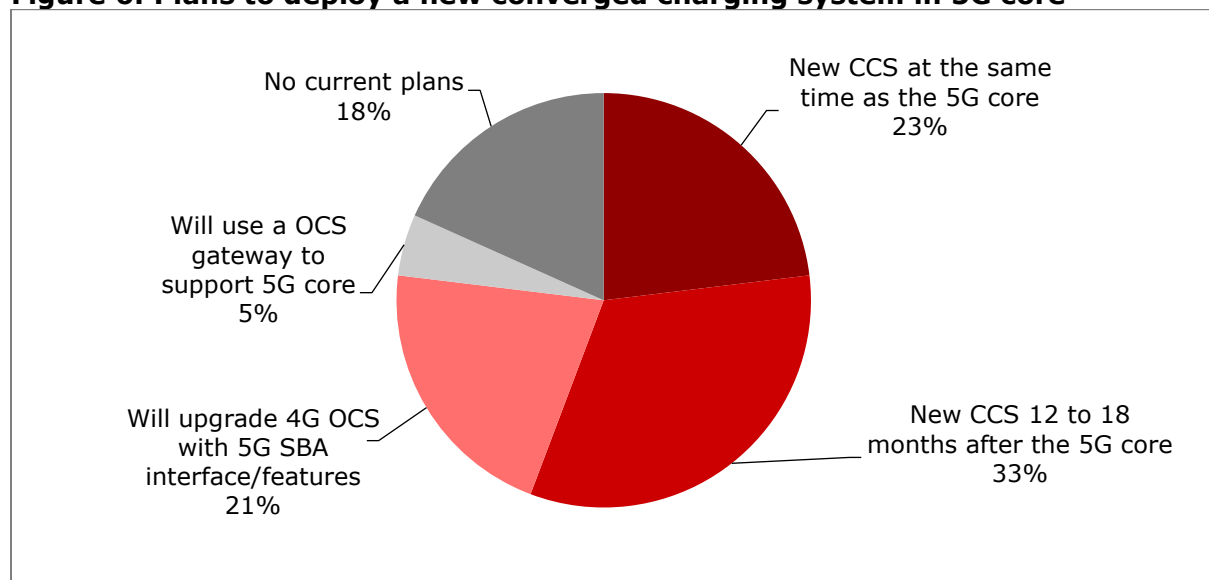
Source: MATRIXX Software

THE MAJORITY WILL DEPLOY NEW 5G CONVERGED CHARGING SYSTEMS

Most initial 5G deployments required basic charging capability and could maintain the 4G LTE charging architecture and the existing business support system (BSS). With the next phase of investing in the 5G standalone core and service innovation, new rating and charging capabilities are a top IT investment priority for more than half (56%) of operators (see **Figure 6** below). The primary drivers are being faster to market with new 5G services (50%) and having a cloud-native charging capability (28%; see **Figure 1** in the **Executive summary**).

As more operators deploy 5G core networks, having highly scalable, dynamic, and flexible rating and charging capabilities will be mandatory for differentiating services and pricing in the market while also ensuring healthy ARPU levels. Critical 5G services with real-time communications and charging, massive IoT, and network slicing will require the rating and charging of services at a different scale than is currently being done. Operators will need the flexibility to charge at increments other than by megabytes consumed and must be able to support charging based on QoS, network slice conditions, access and mobility management functions, or network slice as a service, among other things.

Figure 6: Plans to deploy a new converged charging system in 5G core



n=104 mobile operator respondents

Source: Heavy Reading global survey, 4Q20

KEY ATTRIBUTES OF CONVERGED CHARGING VENDORS

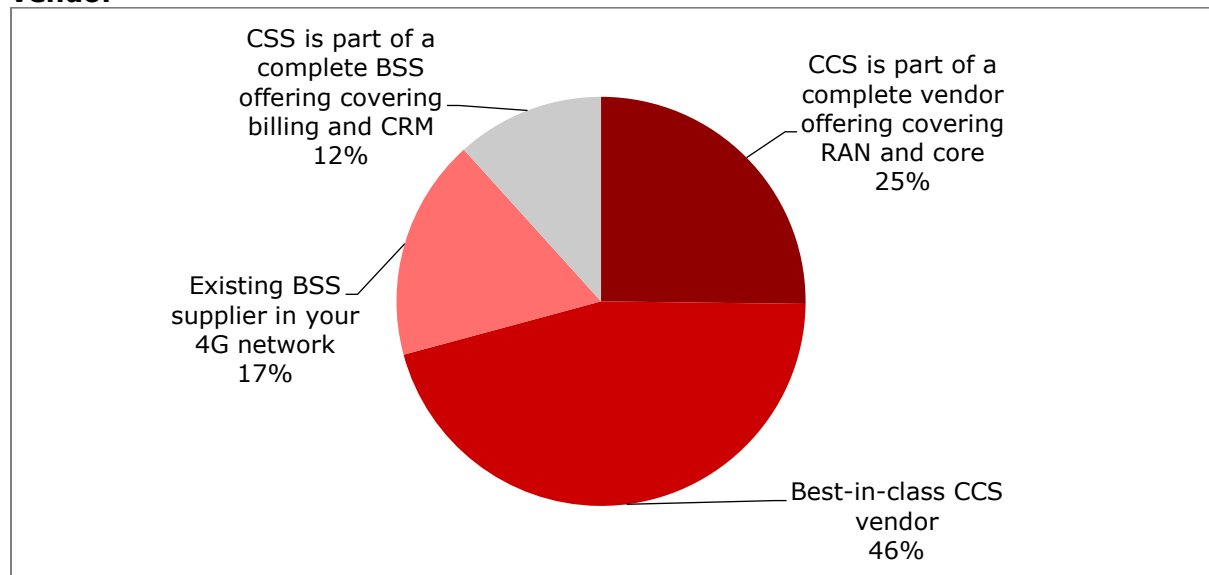
The combined drivers to upgrade legacy systems and massively improve time-to-market of new offers and services is rapidly changing the way CTO and CIO teams evaluate CCS vendors and architectures.

Nearly half (46%) of mobile operators surveyed by Heavy Reading prefer best-of-breed vendors for new 5G CCS. 95% also say it is important for a CCS vendor to prove interoperability with 5G core network vendors, followed closely by having a proven cloud-native deployment option (91%) and network slicing support (89%).

The CTO of Rakuten Mobile in Japan, which is building a greenfield 5G cloud-native network and operations, has stated that it sees itself more as an IT and webscale company than a telecoms operator. Rakuten does not use traditional requests for proposal to procure network and IT technology; instead, it chooses the best vendors that come to Rakuten with offers and ideas.

Entering the highly competitive North American mobile market as a greenfield player, Dish Network is driving a radical, technology-led business innovation model across its planned consumer, enterprise, and B2B2X partner offers. It selects best-in-class vendors with a cloud-native architectural approach that share its ethos of disruptive innovation. The business drivers for 5G monetization include a focus on time-to-market agility and new business model development in areas such as dynamic rating, session-based charging, and network slicing to create a network on-demand offering for enterprise customers.

Figure 7: Most important criteria when selecting a converged charging system vendor



n=104 mobile operator respondents

Source: Heavy Reading global survey, 4Q20

CONCLUSION

Operators are at a crucial time, as they have an opportunity with 5G to grow revenue and expand into new markets. In order to avoid 5G becoming another 3G or 4G with unlimited data plans and limited revenue growth, the operator business model has to truly evolve beyond the connectivity play and monthly billing cycle. New service propositions and agile commercial platforms are needed to create value, innovate with partners, and impress customers with an exceptional service experience.

Speed to market, agility, commercial flexibility, and a move to real-time operations and monetization are key to developing innovative 5G industry solutions and new enterprise offers together with partners. Overall digital transformation and IT simplification goals and outcomes should guide a best-of-breed approach to selecting a 5G monetization platform to support a diverse set of business and consumer services and partners, including webscalers, systems integrators, and industries:

- **Engage early** with commercial teams to understand the service propositions that are priorities and work with charging vendors around proofs of concept for partner enablement, digital marketplaces, use case-guided transformation maps, features, and capabilities. Not all agility claims are created equal.
- Consider vendors that can **bring new ideas** and that **offer best-in-class capabilities** through design, architecture, and integration. It is also important to bridge new 5G functionality with support for existing services and private and public cloud deployments.
- **Recognize time-to-market** is critically important. How long will it take to deploy? Also ensure vendors demonstrate the ability to deliver high performance real-time rating, charging, and policy transactions at scale across the business.

ABOUT MATRIXX SOFTWARE

MATRIXX Software is the global leader in 5G monetization for the communications industry. Serving many of the world's largest operator groups, regional carriers, and emerging digital service providers, MATRIXX delivers a cloud-native digital commerce solution that enables unmatched commercial and operational agility. Unifying IT and networks, MATRIXX delivers a network-grade converged charging system (CCS) enabling efficient hyperscaling of infrastructure to support consumer services, wholesale, and enterprise marketplaces. Through its relentless commitment to product excellence and customer success, MATRIXX empowers businesses to harness network assets and business agility to succeed at web scale.

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