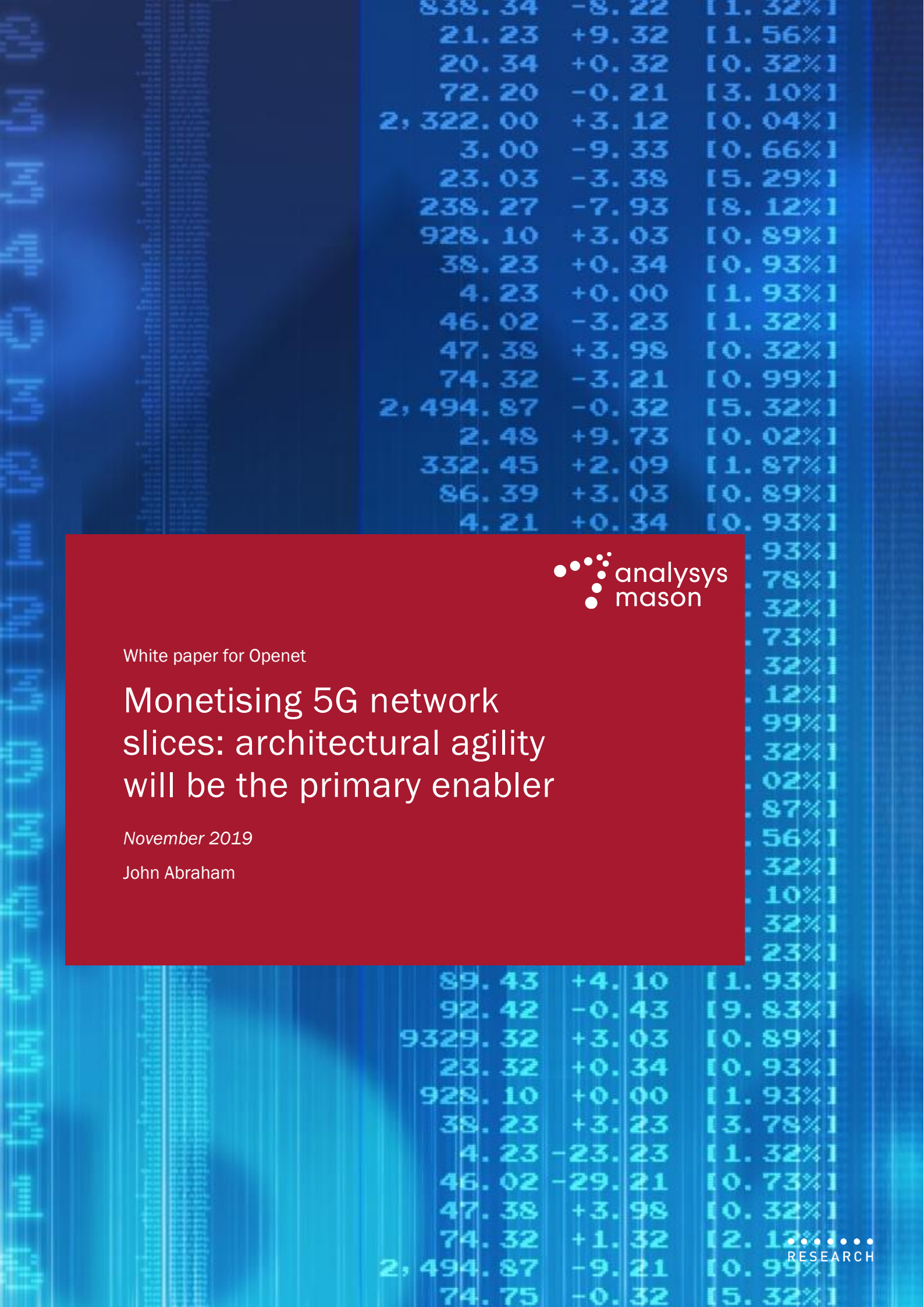

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White paper for Openet

Monetising 5G network slices: architectural agility will be the primary enabler

November 2019

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RESEARCH

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1. Executive summary

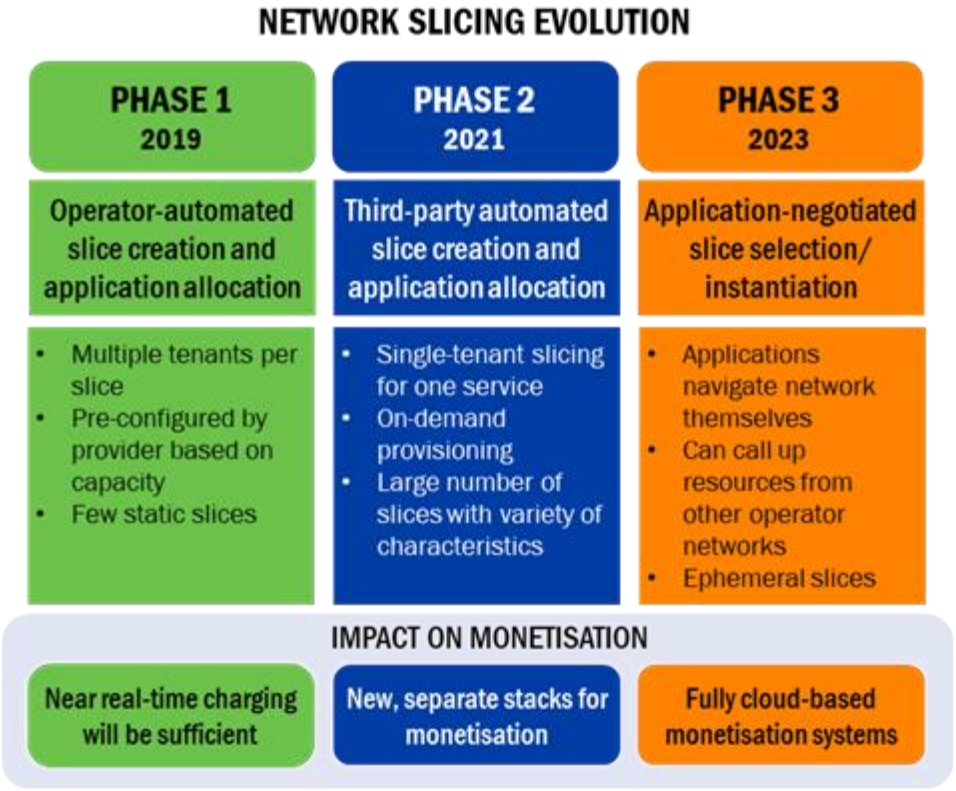
5G will not only affect the telecoms industry; it is expected to radically transform business and industrial processes in a range of sectors by enabling the adoption of new technologies. The roll-out of 5G services has started in earnest, and leading communications service providers (CSPs) are in various stages of planning, designing or deploying new infrastructure. However, few CSPs have validated the business case for deploying 5G networks, despite the pressure from competitors and investors to do so. The primary cause for concern is the lack of clarity regarding which 5G use cases will be successful, which makes it challenging to formulate investment strategies. In addition, 5G will require CSPs to develop new business models in order to increase their engagement with multiple enterprise and industry verticals.

Network slicing has emerged as a leading technology for unlocking the value of 5G for enterprises and industries. Network slicing is expected to change the economics of the connectivity business by enabling new providers to enter the market (including web-scale players) and allowing vendors to compete with their customers by offering networks-as-a-platform that can be innovatively sliced. The realisation of 5G-enabled network slicing use cases will not happen in the short term (Figure 1), but CSPs must consider the technology when preparing their investment strategies.

The effective monetisation of 5G network slices is a strategic priority for CSPs. A key concern is that existing monetisation systems are not capable of supporting the complex use cases that network slicing will enable. In fact, many of the initial network slicing use cases may be unproven at launch and will require CSPs to experiment in order to understand the application adoption and appropriate revenue models. This calls for an extremely agile monetisation platform that is both configurable and scalable.

To achieve this, CSPs should change how they procure and deploy new monetisation platforms. Traditionally, CSPs have adopted a use-case-based approach to deploying new monetisation platforms or upgrading existing systems; use cases are first identified and only then are the existing technical capabilities reviewed. However, in order to effectively monetise network slicing, CSPs should focus on architectural agility and configurability while deploying new systems.

Figure 1: Evolution of network slicing and impact on monetisation



Source: Analysys Mason, 2019

This white paper discusses why 5G and network slicing will transform how CSPs invest in monetisation systems. We recommend the following.

- CSPs should focus on configurability and architectural agility when selecting new monetisation platforms. CSP monetisation systems have traditionally been highly customised for specific requirements; this not only increases deployment and support costs but also exacerbates the complexity of the overall architecture. The dynamic requirements of 5G and the lack of clarity regarding use cases means that CSPs must shift away from this approach and prioritise agility, scalability and modular architecture models with limited customisation.

- CSPs should prepare for cloud-based delivery models. Legacy deployment models have been one of the main reasons for the high support and integration costs for CSPs, especially in multi-vendor environments that support mission critical use cases. Cloud-based delivery models provide seamless upgrade paths while also helping to drive automation.

- CSPs should invest in expanding their in-house software expertise. Software proficiency is a crucial building block for future operating models and can also be an important competitive differentiator. This may be achieved through initiatives ranging from organisation and culture changes to enable technology-centred process flows to co-working with vendor partners on the development of new software functions.

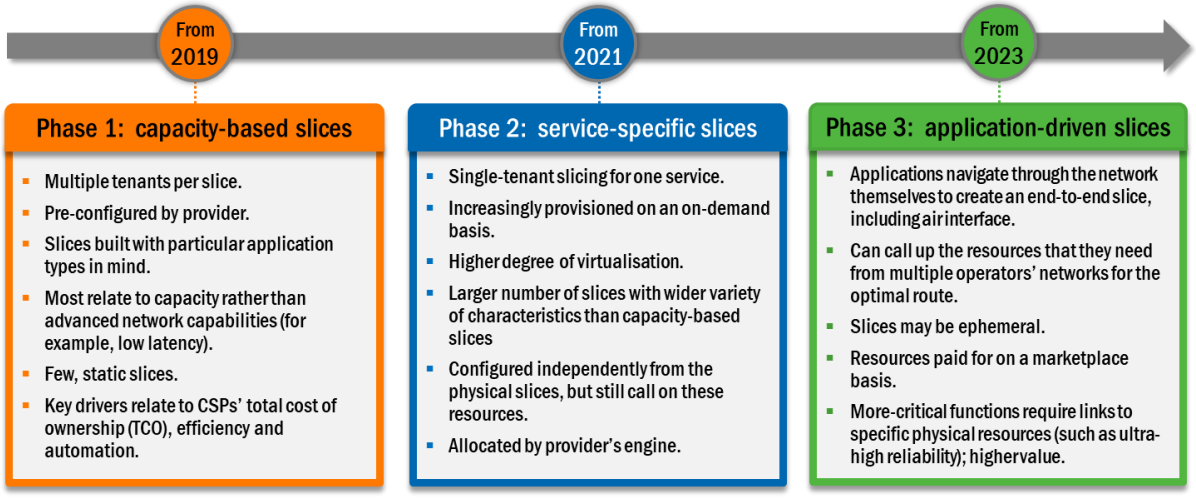
2. Network slicing: what now and where next?

Today's networks have a proprietary architecture that cannot be optimised to address the individual needs of different services. However, this is changing, because virtualisation is laying the foundations for telecoms networks that will behave entirely differently to those that exist currently, where applications will automatically navigate the optimal path through a flat, highly responsive network, representing the logical evolution of what is called network slicing.

Network slices represent end-to-end, virtualised connectivity across multiple network domains, including fixed/mobile access, transport and data centres. Network slices are different from virtual private networks (VPNs) in that network slices are created on demand and are independently controlled, managed and customised, with a degree of isolation that was previously achievable only with dedicated physical networks. Virtualisation technologies will be used to 'slice' the physical network into multiple, separate virtual networks, which provide differentiated latency, performance, reliability, availability and other characteristics, tuned to the needs of each use case/service.

Connectivity and services will be transformed in three phases (Figure 2).[1] Phase 1 will at least partially use existing capabilities to support capacity-based slices, and will focus primarily on cost efficiencies using improved operational automation and resource utilisation (including traffic management), with a limited use of virtualisation. Phase 2 will support single-tenanted, service-specific slices for a wider variety of users than phase 1, while in phase 3, the application itself will call up the resources that it needs for an optimal end-to-end route. The monetisation potential for CSPs and vendors in phases 2 and 3 will be far greater than that in phase 1 due to the development of platforms to support differentiated capabilities.

Figure 2: The three phases of network slicing



Source: Analysys Mason, 2019

1 For more information, see Analysys Mason's Network slicing: the future of connectivity in a 5G and fibre era.

From a monetisation perspective, it is neither feasible nor desirable to have multiple systems to support different use cases through the evolution of network slicing. The architectural agility of the underlying support systems is key to ensuring that CSPs' current investments are futureproof.

3. 5G is driving a paradigm shift in CSP buying behaviour

5G is radically different from previous generation networks and is driving deep-seated changes in how CSPs engage with and procure vendor solutions. Many of these changes are driven by external factors such as new business models and new customer profiles, but CSPs acknowledge the importance of transforming their internal cultures and organisation structures to fully embrace the emerging 5G-enabled opportunities.

The following four factors are instrumental in changing how CSPs procure new monetisation platforms (Figure 3).

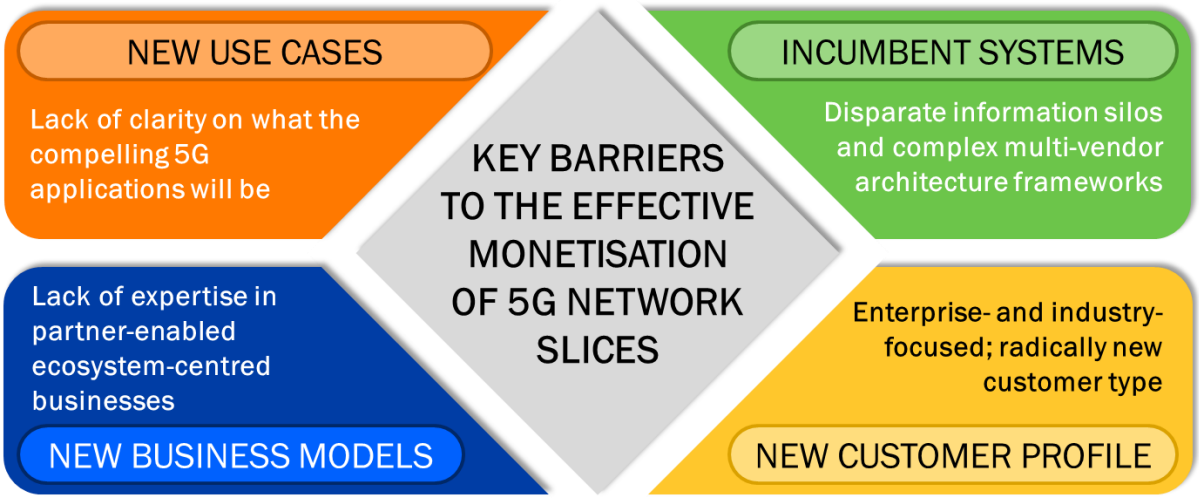
- **New use cases.** The lack of clarity regarding use cases is changing how CSPs upgrade or replace their underlying support systems. CSPs have traditionally adopted a use-case-centred approach to investing in monetisation systems. Using this approach, CSPs begin by identifying the use case that needs to be supported and then map the necessary requirements to existing systems. Wherever an existing system falls short, a decision is made to invest in a new system, either as an adjunct or as a new stack. The lack of clarity regarding 5G-enabled use cases has made CSPs apprehensive about investing in new support platforms that are designed with a use-case-centred approach.

- **Incumbent systems.** Most CSPs typically maintain separate stacks for consumer and enterprise use cases. The consumer systems are reasonably capable of supporting modern use cases, but the enterprise-focused stacks are archaic, and have a limited ability to support common use cases. The deficiency of incumbent systems means that CSPs need to accelerate the adoption of new systems, especially for the effective monetisation of enterprise-focused use cases.

- **New customer profiles.** The initial wave of 5G deployments will be strongly focused on consumer use cases such as enhanced mobile broadband, but the long-term business case for CSP 5G investments is heavily reliant on expanding business with multiple enterprise and industry verticals. For many CSPs this calls for wider engagement with an altogether new customer profile. Large-scale changes to CSP workflows will need to be made, and process models must become better at addressing new requirements. Urgent changes to the underlying systems framework will also be required to enable models for deeper engagement.

- **New business models.** CSPs should be willing to experiment with different business models in order to effectively support new use cases for new customer types. The degree to which CSPs are able to support dynamic business models will influence their opportunities in the 5G value chain. For instance, a key requirement for supporting new industrial and enterprise use cases is the ability to support multi-dimensional, multi-step value chains; this requires advanced partner management, monetisation and settlement capabilities.

Figure 3: Key challenges to monetising network slices



Source: Analysys Mason, 2019

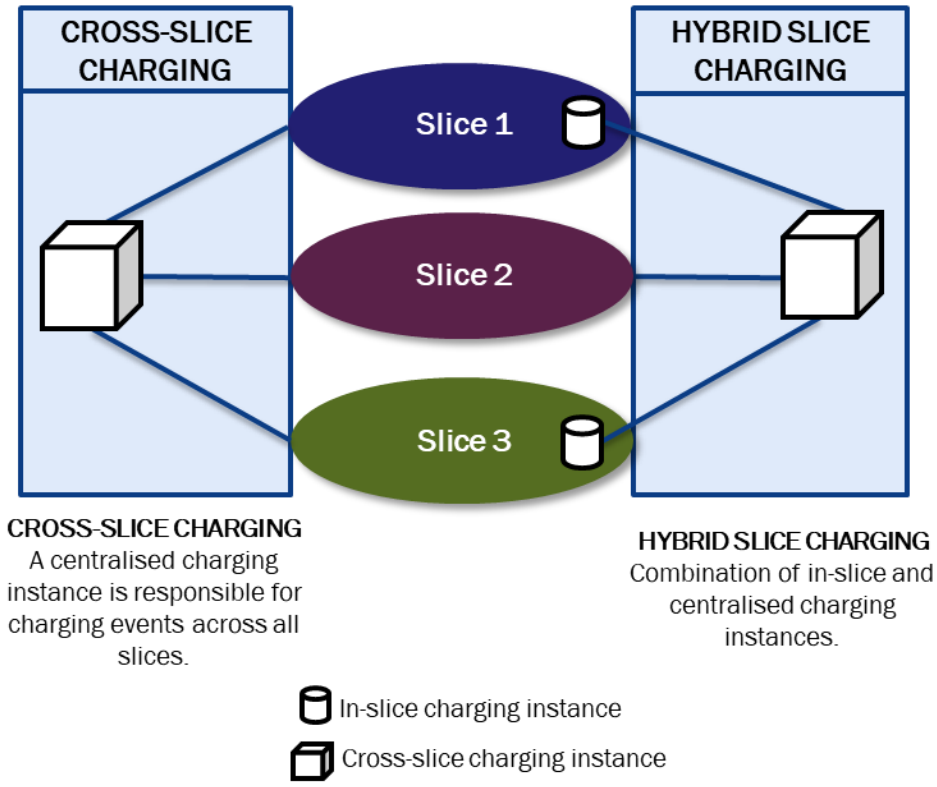
4. Platform agility will be the key to the effective monetisation of network slicing

The evolution of network slicing use cases should be an important consideration for CSPs as they plan to upgrade or replace their monetisation platforms because such platforms need to be agile and flexible enough to support future business models without major upgrades.

CSPs' services on network slices may be charged for in one of three ways (Figure 4).

- **Cross-slice charging**. A single, centralised charging engine is deployed to charge for all services across all slices. 3GPP recommends the cross-slice charging approach.
- **In-slice charging.** Multiple charging instances will be deployed (one per slice). Each instance is responsible for charging for all services that run within the slice.
- **Hybrid slice charging.** This is a combination of the two options listed above. A centralised charging engine that can charge across all slices is complemented by in-slice charging systems for selected slices to support specific use cases that require ultra-low latency transactions.

Figure 4: High level view of network slicing charging models



Source: Analysys Mason, 2019

In order to ensure that their investments into support platforms are futureproof and effectively monetise network-slicing-based use cases over the next decade, CSPs should focus on the following.

- **Agile, configurable architecture.** Traditionally, software applications have been designed as sets of tightly coupled functions that need to be deployed and executed together as monolithic entities. Such applications are unable to make use of the flexibility and resource utilisation potential of the cloud because their monolithic architecture does not support the differentiated and highly efficient scaling of individual application components, or the dynamic scheduling of components to maximise their performance and minimise resource consumption. The operating models of the future will rely on microservices-based cloud-native-compliant architecture frameworks. Applications designed for such frameworks are developed as loosely coupled microservices that can be independently scaled and dynamically reused within other applications, which radically improves system agility.

- **Cloud-based delivery models.** Software applications of the future must be compatible with cloud-based delivery frameworks that allow for the seamless integration and delivery of new updates without human intervention. DevOps practices and continuous integration/continuous delivery (CI/CD) pipelines are essential in order to fully reap the benefits of microservices-based architecture. The widespread adoption of such operating models within CSP environments is unlikely in the short term, but will be key to ensuring the effectiveness of CSP investments in monetisation systems in the long term.

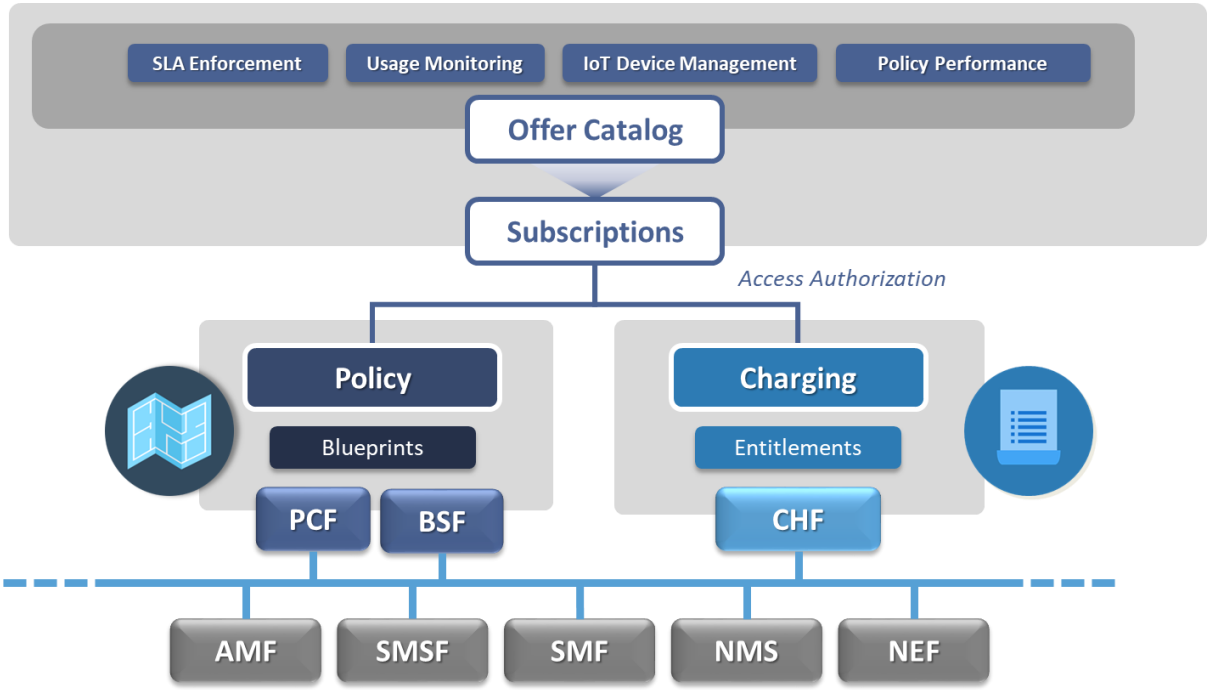
- **In-house software expertise.** Software is a crucial building block for the operating models of the future. In-house software competency and expertise can be crucial competitive differentiators and can help CSPs to reduce the reliance on expensive support and maintenance contracts.

5. Openet overview

Openet is an Ireland-based provider of BSS solutions for the telecoms industry. Its portfolio of offerings is aimed at supporting CSPs in digital transformation and 5G monetisation, and includes charging, policy management and data management solutions. The company has long-standing client relationships with multiple Tier 1 and 2 CSP clients worldwide.

Openet has adopted cloud-native technologies and DevOps delivery models across its portfolio of offerings. Openet's policy control and real-time charging solutions for 5G services (Figure 5) are built using its library of microservices. They are 5G-compliant and use service-based architecture and open-source frameworks to assist with deployment and management. The company actively engages with a number of technology and delivery partners to provide end-to-end stacks for larger digital transformation projects.

Figure 5: Openet's 5G policy and charging portfolio overview



Source: Openet, 2019

6. Conclusion

5G has the potential to radically transform business models for enterprise and industry by accelerating the adoption of new technologies. There is therefore a significant emphasis on identifying new use cases that will enable CSPs to monetise and recover their investments into new infrastructure and services. To effectively support the monetisation of network-slicing-based use cases, CSPs should do the following.

- Pivot away from a use-case-centred approach to procuring new systems and instead focus on configurability and architectural agility when selecting new monetisation platforms.

- Prepare for cloud-based delivery models to replace legacy deployment models that are expensive to support and maintain and slow to respond to new requirements.

- Invest in expanding in-house software expertise because software proficiency will be an important differentiator and key building block for future operating models.

CSPs need to plan ahead as they begin to roll out 5G services in order to ensure that their investments into support systems are futureproofed. CSPs must be ready for emerging business models and multi-dimensional value chains that have yet to be fully determined.

7. About the author

John Abraham (Principal Analyst) leads our digital transformation research, including three research programmes: Customer Engagement, Monetisation Platforms and Digital Experience. His areas of focus include customer journeys and experience, the impact of 5G on BSS systems, telecoms enterprise opportunities, cost transformation, ecosystems and value chains, and micro-services-based architecture models. John has over a decade of experience in the telecoms industry. At Analysys Mason, he has worked on a range of telecoms projects for operators in Africa, Europe, India and the Middle East. Before joining Analysys Mason, he worked for Subex, a BSS vendor, and before that for Dell in India. John holds a bachelor's degree in computer science from Anna University (India) and an MBA from Bradford University School of Management (UK).

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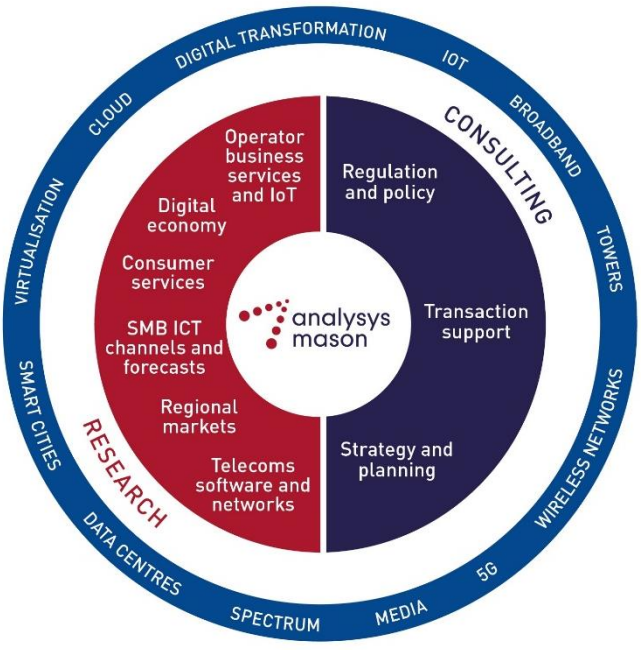

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