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Perspective

Leveraging cloud-native technology: CSP strategies for success in the 5G private market

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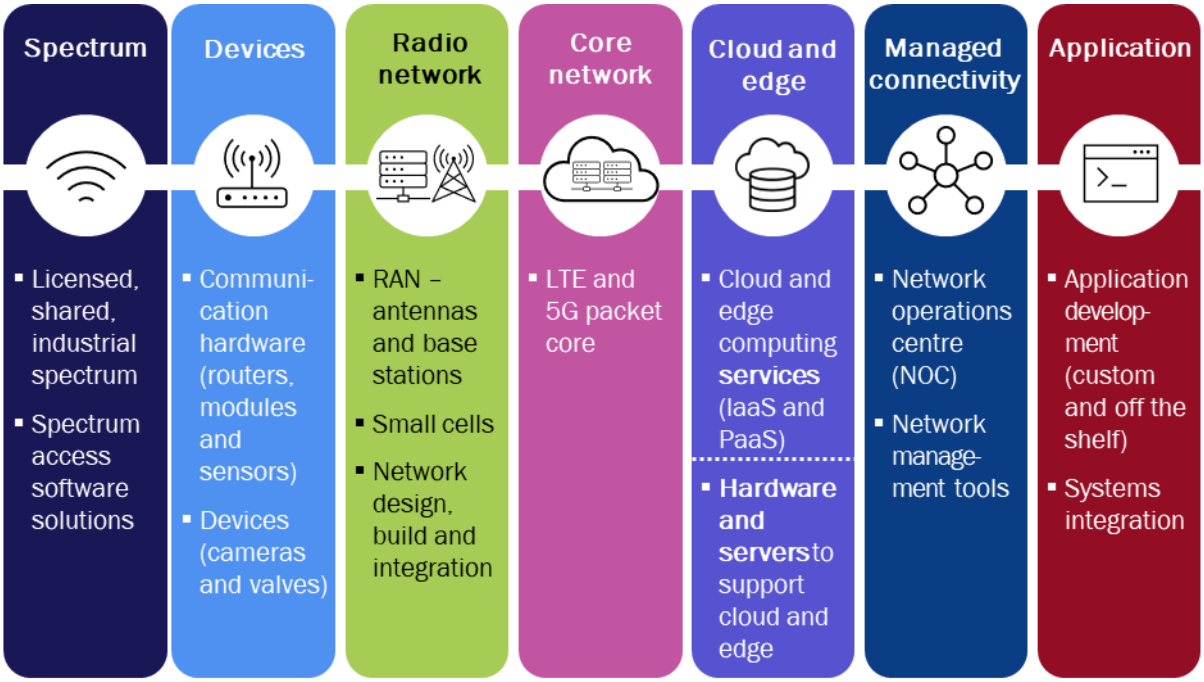
1. Executive summary

Private 5G networks offer communications service providers (CSPs) a route to new revenue streams. By building private 5G networks for their enterprise customers, CSPs can enable a wide range of applications and use cases, as well as complement or upgrade their customers' existing network technologies. However, private 5G networks have complex requirements for support, automation and integration across the value chain. Few CSPs possess the expertise to manage these requirements end-to-end for their enterprise customers. CSPs should therefore look for partners that can simplify private 5G network deployments. CSPs will then be able to focus on providing differentiated services to their enterprise customers.

1.1 CSPs have an opportunity to succeed in the private 5G network market

CSPs have long and deep experience of deploying and operating networks for enterprise customers and will want to take advantage of the enterprise demand for 5G private networks. Enterprises will naturally turn to a CSP to fulfil this demand but CSPs must do more than just put together a solution that meets enterprise needs and addresses enterprise challenges as mentioned above. CSPs also need to build a cloud-native internal platform that can manage the lifecycle of multiple disparate networks running on multiple clouds for their customers in an automated and cost-effective manner that will help them to attract enterprises and build a profitable revenue stream. CSPs that resell one of the many solutions in the market will not help them to differentiate their services. However, it will be difficult for CSPs to build their own solutions because they lack expertise in so many layers of the value chain shown (see Figure 1.1).

Figure 1.1: The 5G networks value chain



Source: Analysys Mason

Most CSPs do not have in-depth systems integration skills, or the capability to present a single supplier solution at scale and to a large enterprise customer base across many different environments and verticals. If they decide to manage and operate their customers 5G private networks rather than outsource to a third party, they will also struggle to build the cloud-native platform by themselves because they will need to manage all the 5G private networks they are looking to deploy and manage. CSPs can address the gaps in their service delivery and their ecosystem by carefully choosing partners that can help them to deliver both the platform and an end-to-end solution and will help them to form deep relationships within developer and vendor ecosystems. These partners can enable CSPs to extend their automation operations and lifecycle management into the private 5G domain, providing enterprise customers with a consistent and compliant environment.

1.2 Enterprise demand for private 5G networks is growing rapidly, but there are barriers to adoption

The private 5G market is currently small but we expect it to grow rapidly, reaching 27 000 networks in 2027.[1] We forecast strong growth in verticals such as manufacturing, mining and transport. Despite long experience in the deployment and management of private enterprise networks, CSPs' private LTE market share has been low although their share of private 5G is higher and increasing. CSPs are held back by a lack of expertise and also because, even if they are successful in finding the right partners for reselling solutions, they find it hard to differentiate themselves to appear attractive to enterprises. While CSPs move slowly, competitors such as network equipment providers (NEPs) and systems integrators (SIs) have been aggressively targeting this market and taking market share.

Private 5G networks are a substantial improvement on current enterprise network offerings in terms of capacity, coverage, reliability and latency. However, they can also take the role of a key enabler of an enterprise's technology strategy, supporting a transformation in the way that operational processes are delivered. 5G's high-performance features, in combination with applications deployed at the edge, can dramatically improve the productivity of processes such as assembly line fault detection. The implementation of 5G will, in many cases, initially be used to serve immediate business needs (such as the removal of cumbersome factory wiring). However, as a cloud-native technology, a 5G private network has the flexibility to become a platform for future technologies. The cloud platform the 5G network can host multiple other applications, not just the network and emerging applications such as artificial intelligence (AI). It will therefore be possible to have a single cloud platform that serves multiple purposes in a branch office or on a production line.

Strong enterprise demand for private 5G is restrained by several barriers to adoption. Few enterprises possess deep network expertise, which makes it difficult for them to specify and deploy a solution that addresses the complexity of their internal processes and systems. Enterprise business requirements are so unique that their diverse range of requirements can only be met by an equally diverse range of vendors. Enterprises also need an end-to-end solution that provides full lifecycle support: they need assistance across the whole private 5G value chain (see Figure 1.1) and across its entire lifecycle, including support for existing and preferred vendors, their ecosystem, the network and delivering 5G use cases. Lastly, enterprises need to address the growing compliance and security risk caused by the increased production of sensitive data generated by tools such as machine learning (ML) and AI, the use of public cloud and the greater attack surface brought about by the convergence of OT/IT (operational and information technology).

[1] See Analysys Mason's *Private LTE/5G networks: worldwide trends and forecasts 2022–2027*.

1.3 To take advantage of the 5G private network opportunity, CSPs will need to engage with the right partners to build and support a complete solution for enterprises

It will not be enough for CSPs to approach the market by emphasising their core expertise in network and spectrum. Enterprises are looking for solutions that will cover the whole private 5G networks value chain, and restricting the focus to two small parts of it will consign CSPs to the role of a commoditised component of another party's solution. Enterprises are also looking for solutions that will cover the entire lifecycle of the network, from the design stage to end of life, and have the flexibility to support multiple deployments across different types of spectrum, topologies and vendors. The solution needs to be flexible in itself as well because enterprise requirements vary across locations, and enterprises do not wish to bear the cost of building bespoke networks for every location. The private network will need to be scaled effectively and therefore will have a flexible and modular architecture, which will be based on a cloud-native design that can support multiple internal and public clouds. Lastly, the solution will have built-in end-to-end security and unified automation across all the domains of the deployment, from device to core. CSPs will also need to build a platform that can manage hundreds of different networks based on a complex technology, at price points that are attractive enough to bring in enterprise customers. Managing this complexity cost effectively will require cloud-native automation, management across multiple clouds and a pretested, preintegrated solution.

2. The market opportunity for 5G private networks

A private 5G network is a cellular network that is built specifically for an individual enterprise or organisation (such as a university). Such networks are most commonly deployed on a single site (for example, on a campus, in an entertainment venue, factory or a mine). Private 5G networks can also be deployed to address wide-area network requirements such as a utility's need to monitor a transmission network.

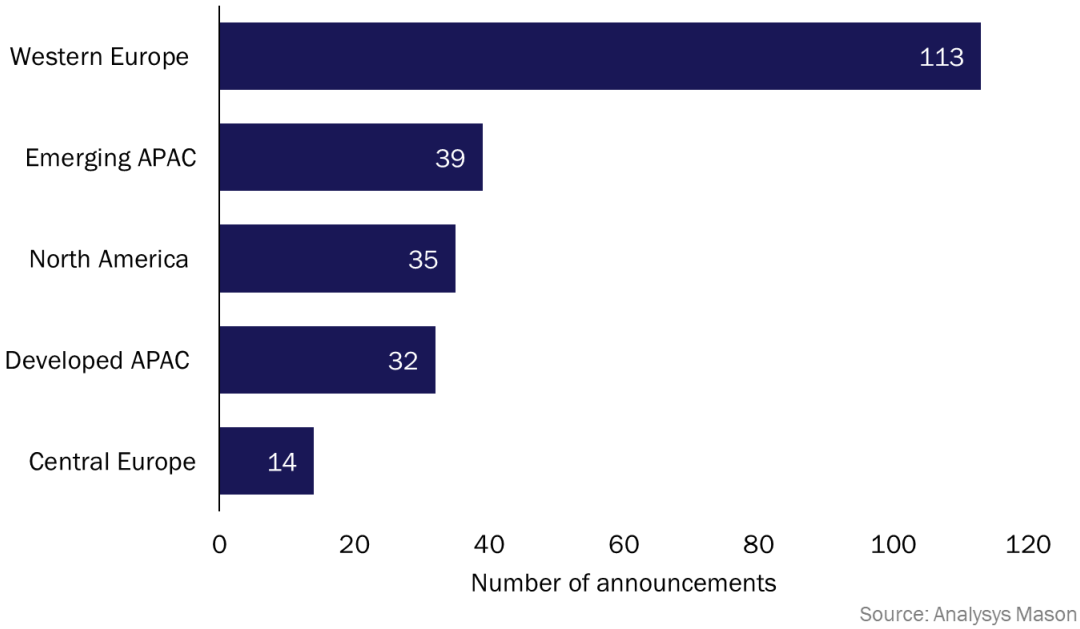
The attraction of 5G private networks is that enterprises and other organisations can use its cloud-native, high bandwidth, low-latency capabilities to support increased automation, IT/OT convergence and digital transformation. Such networks also offer greater control and visibility of data, enabling improved security and data privacy and the local data processing to generate real-time decisions and insights. Lastly, enterprises can use 5G private networks to drive process improvements and to create new digital products and services. We discuss these and other demand drivers in greater detail in Section 3.

2.1 The private 5G market is set to grow quickly

The number of publicly disclosed 5G private networks totalled 213 in 1Q 2023[2] , but Analysys Mason anticipates rapid adoption and forecasts that the total number of private 5G networks will reach 27 300 in 2027. Capex and opex for the 5G market worldwide will also rise from USD690 million in 2023 to USD5.9 billion in 2027. This increase is smaller than that for the number of networks because we expect the average spend per network to decline as the rate of adoption of private 5G networks by medium and smaller enterprises increases.

2 For more information, see Analysys Mason's *Private LTE/5G networks: worldwide trends and forecasts 2022–2027*. Note that the forecast only covers publicly disclosed networks and the real total will be higher.

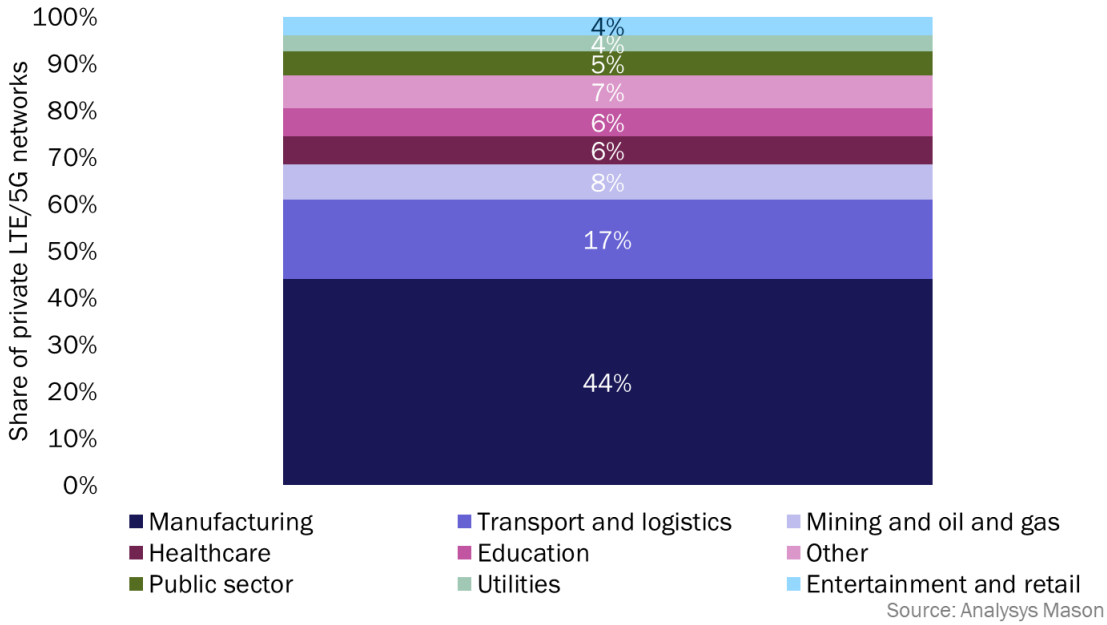
Figure 2.1: Announcements about 5G private networks, publicly announced, by geography, as of 1Q 2023



Source: Analysys Mason

The geographical spread of 5G networks is uneven, and closely tied to the availability of spectrum. Western Europe is the leading global region for 5G network deployments (see Figure2.1), but we expect that to change as and when spectrum becomes more available elsewhere. The manufacturing sector has been the early adopter of private 5G (see Figure 2.2); we estimate that 5G penetration of new networks in the sector exceeded 50% in 2021. Digital transformation of the sector is underway and 5G is perceived as an important enabler to support new use cases in automation.

Figure 2.2: Share of LTE/5G private networks by vertical, 2022

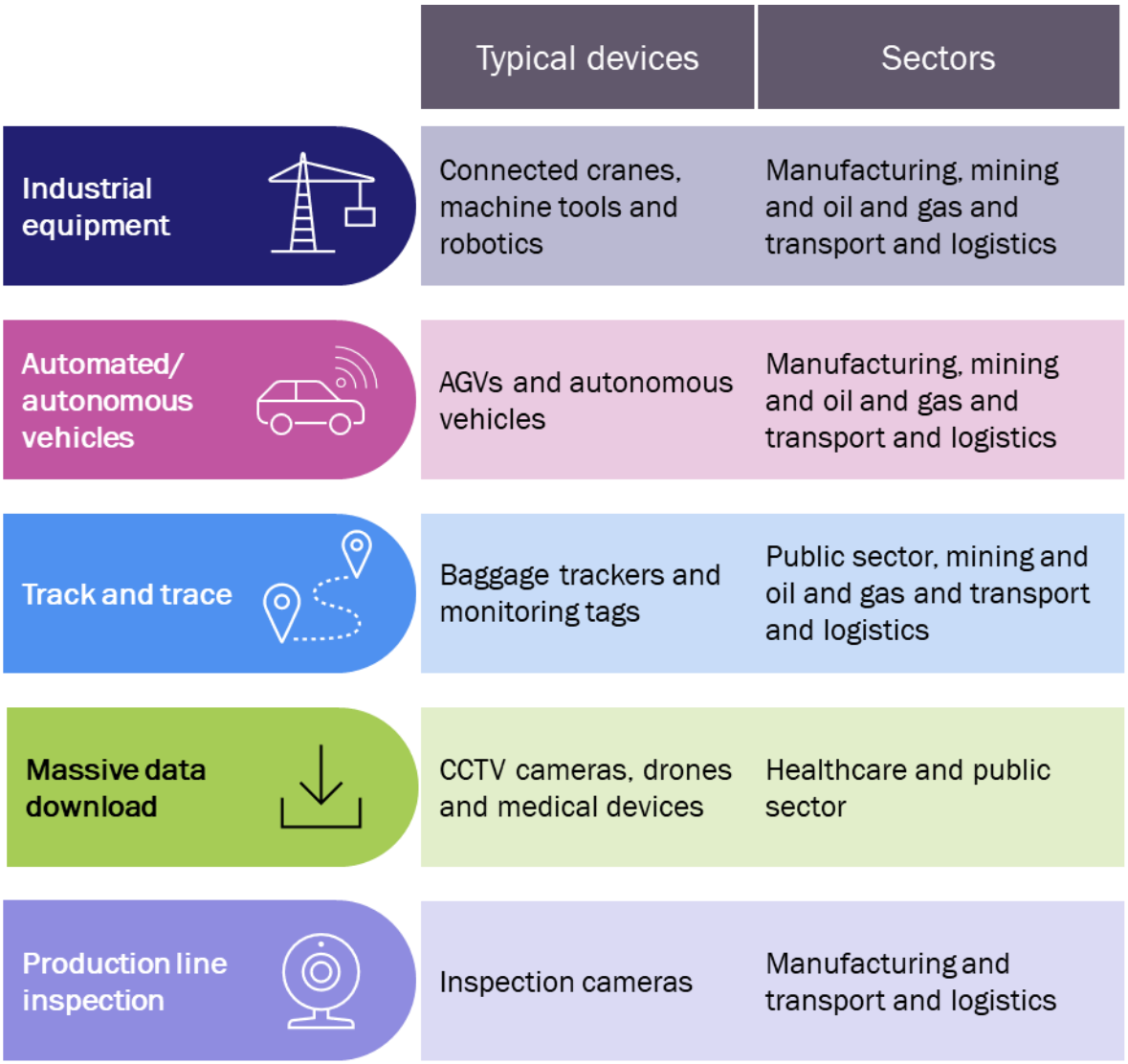


Source: Analysys Mason

The transport sector is also among the early adopters of 5G technologies. Port authorities and companies involved in the transport of goods have deployed private 5G to automate processes at ports and increase safety.

The public sector is also deploying 5G in some sub-segments where there is a large capacity requirement for massive data download (see Figure 2.3).

Figure 2.3: Summary of top applications for private 5G

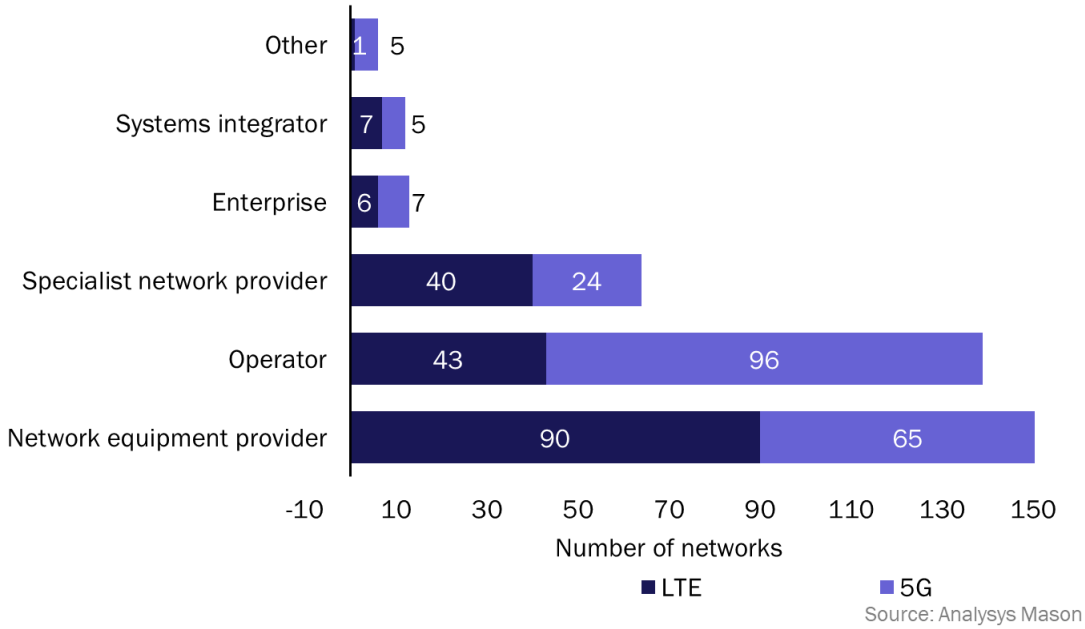


Source: Analysys Mason

CSPs were slow to establish themselves in the private wireless networks market and had a 22% share of the market in 3Q 2021, based on announcements in the public domain.[3] CSPs are in the process of building the partner ecosystems that are necessary to gain traction in the market and are also developing the necessary sales marketing and support skills. They are also developing integration skills, but these activities are taking time. Consequently, competitive categories of vendors have emerged and are taking market share (see Figure 2.4). As is the case with network equipment providers, these competitors frequently already have a successful installed base of 4G customers, which they can upgrade. CSPs are therefore lagging behind the market and need to catch up but need to do so in a differentiated way.

[3] For more information, see Analysys Mason's *Private LTE/5G networks tracker*.

Figure 2.4: Private LTE/5G networks tracker, worldwide, 1Q 2023



3. The drivers behind enterprise demand for private 5G networks

The main driver behind enterprise private 5G network demand is the need to improve operational efficiencies through automation. Enterprises are looking to transform their operations in three ways: by adopting new enterprise use cases to make surgery, manufacturing, factory floors and logistics more efficient; by bringing IT-like cloud to operational technology so that commodity IT replaces proprietary, monolithic technology and lastly, by rationalising network infrastructure onto one platform that can support many use cases.

3.1 Improving efficiencies with new use cases

Enterprises are looking for improved capacity, coverage, reliability and latency from a 5G private network deployment, features that are lacking in quantity and/or scale in their current networking solutions, and which therefore cause a negative impact on their business. Private 5G networks have the following features that can help enterprises achieve these goals and use cases.

- **Adaptability.** With a private 5G network, the factory floor or enterprise campus can be customised or quickly re-purposed. 5G will bring a step-change in the way operational processes are delivered in an enterprise setting. A successful private 5G implementation will give new flexibility to industrial hubs, enabling enterprises to adjust floorplans and workflows, opening up the possibility of a 'factory is the product' scenario where it is possible to repurpose the output of the factory in a short period of time. It will also be easier to expand than a fixed network which will require complex and disruptive re-wiring.
- **Capacity and determinism.** Greater productivity can be achieved in many industrial and non-industrial verticals (such as broadcasting, building management, retail) through automation and optimisation. The

increased capacity and quality of service (QoS) capabilities of 5G can support extensive AI/ML video inferencing (which reduces the cost of live broadcasts by remotely directing cameras), improved security through rapid identity checks and higher retail productivity through the elimination of check-out tills. AI/ML has a number of further use cases that can assist enterprises with their business goals. These include fault detection, worker safety, drone-based remote inspection, augmented reality-based (AR-based) virtual maintenance and automated guided terrestrial vehicles.

- **Location.** Accurate positioning and asset tracking improves productivity and flexibility. For example, automated guided vehicles (AGVs) can be rapidly replaced or moved into new positions.
- **Reliability.** Safety and security in high-risk industrial settings such as refineries can be improved. For example, workers can be swiftly alerted when entering a risk zone. The low latency provided by 5G also means that equipment can be halted before problems occur.

There are many further applications beyond manufacturing and industry that private 5G networks can support. The superior capacity of 5G will enable transport and logistics companies to connect thousands of devices, facilitating asset tracking. In the oil and gas sector, 5G can provide coverage in areas such as mines, or remote locations that were difficult to reach with Wi-Fi or previous generations of public cellular networks. Lastly, in healthcare, the low-latency, high-bandwidth capabilities of 5G can enable remote examinations and surgery, with the network's end-to-end security features providing the high levels of data protection and regulatory compliance that are required in this sector.

3.2 Bringing cloud to operational technology

Enterprises are bringing IT-like cloud to operational technologies so that commodity IT replaces proprietary, monolithic technology in areas such as robotic production. This process is sometimes referred to as the convergence of IT and OT. CSPs are introducing IT into their networks for the same reasons: to reduce costs and to become operationally more efficient, and a network can be viewed simply as a CSP's OT. In manufacturing, enterprises no longer want separate Siemens and Bosch and other suppliers' production environments to manage each suppliers' proprietary tooling. Instead, they want to disaggregate their suppliers' OT, run the software elements of it on the cloud or commodity hardware, and apply common cloud-native automation across all the environments/technologies and reduce capex and opex.

Private 5G networks can provide the platform that will support this convergence of existing OT and IT systems in a flexible and efficient manner. It will, however, require the integration and unified management of many different applications, devices and platforms, and enterprises need a solution that can support and manage the complexity of brownfield OT with greenfield IT and simplify it.

As well as providing these immediate benefits, enterprises are also looking for a solution that can become a platform for future application use cases and technologies. 5G can be the appropriate technology to support these next-generation applications. As it is a cloud-native network, it can run on the same cloud platform as other non-network applications. Additionally, its functionality and features can be called through APIs, just as cloud-native IT applications call their service components. Applications can therefore be co-located with private 5G networks and can directly tap into their advanced capabilities.

3.3 Rationalising network infrastructure

Instead of multiple fixed and wireless networks, which often support different use cases, enterprises can have one network technology that can support many different use cases because of the inherent design and capabilities of private 5G networks (as mentioned in Section 3.2). Although this is not currently a widespread

practice, it can be seen in more advanced deployments where the customer is looking to converge IT and OT. Instead of running several different Wi-Fi, fixed and radio networks with each dedicated to an individual workload or application, the workloads and applications can all run over a single network.

Enterprises are also looking to invest in a private wireless solution that is a large-step improvement on the networks that they currently use, such as Wi-Fi. Wi-Fi has a long history in manufacturing and logistics where it has been successfully used but it has limitations in terms of reliability, coverage and the ability to support mobility. Wi-Fi 7 is a stronger contender than previous iterations, with greater determinism and bandwidth capacity, but it still lacks the 5G Advanced roadmap and does not work well outside buildings, which limits its use for Industry 4.0 use cases that span inside, outside and across campus settings. Extending existing fixed networks is a possibility but it is not always a cost-effective solution and it is also increasingly difficult to deploy fixed networks quickly enough to match the rising increase in robotics.

4. Challenges to enterprise adoption of 5G networks

While enterprises understand the business value and efficiencies that private 5G networks can bring, there are a number of barriers that are limiting adoption of the technology. It is hard for enterprises to specify and deploy a solution because of the complexity of bringing cloud to operational technology. It is also difficult to support and maintenance of 5G networks and, lastly, securing a private 5G network will bring new problems that enterprises will need to address.

Supporting and maintaining a private 5G network is difficult. Bringing IT-like cloud to operational technology will create an environment that will be difficult to support with a private network. The 5G network is powerful but complex. The private 5G environment will span spectrum, the radio network, the core network, devices, cloud and edge as shown in the value chain (see Figure 1.1). The private 5G network will be made of many components provided by multiple vendors and it will be a heterogeneous environment containing a mixture of proprietary and commodity devices and hardware. This creates a procurement challenge because enterprises might want to work with multiple network vendors, using one network for the core and one for the RAN. Enterprises might also want to continue working with existing vendors with whom they have a long and deep relationship and, at the same time, bring in new vendors to help them achieve their transformation goals. These components will not only be complex to procure, but they will also be difficult to deploy and specify. In addition, each component will have a different lifecycle and will need some degree of integration. Private 5G networks require a complicated ecosystem to support the multiple use cases and therefore applications and devices from different vendors.

Enterprises need assistance with many aspects of the lifecycle of private 5G networks on top of support for existing and preferred vendors, their ecosystem, the network and delivering 5G use cases. Ease of use is going to be a critical component of this offering. Enterprises do not have large, specialised network teams with the skill sets to support a private 5G network independently and they will be looking for a preintegrated and pretested solution that will have components from several different vendor ecosystems. Enterprises also require a solution that is delivered out of the box and is managed across its entire lifecycle. As mentioned above, they will find it hard to specify, design and implement a network that, for example, is accurately sized to the wide variety of use cases across an organisation. Once operational, the management of the network will need to be as automated as much as possible to reduce complexity and cost.

Enterprises must address the complexity of bringing cloud to operational technology. Enterprises want to disaggregate their suppliers' operational technology in the same way that they disaggregated their IT applications 10 years ago. However, running OT as software and applying cloud-native automation across all environments will be challenging. OT manufacturers can have an equivocal attitude to opening up their proprietary platforms. Running a cloud-native environment is a challenge by itself because applications will need to run on multi-cloud environments, all of which will need to be integrated with the platforms that run workloads at the edge.

Enterprises need solutions that take a whole-stack approach to security. The sharp increase in the production of sensitive data generated by tools such as AI/ML and the leveraging of public clouds point to rising compliance and security risk. This means that enterprises need a whole-stack security solution that will provide protection across all layers, from remote easy-to-steal AGVs to securing business-critical and mission-critical data and IP generated by local AI and ML processing. The security industry has become increasingly domain-specific, so enterprises have to turn to multiple suppliers to implement and manage all the different components of a private 5G deployment.

5. The private 5G network opportunity for CSPs

CSPs can be successful in the private 5G market by delivering the efficiency improvements and operational process enhancements that their enterprise customers are seeking, and if they deliver the benefits outlined in Section 3 and address the challenges outlined in Section 4. CSPs also need to deploy, manage and support their enterprise customers' networks across their lifecycle. The fundamental challenge for CSPs is to be able to manage hundreds of different networks based on 5G's complex technology, and do so in a sufficiently cost-effective way to make a successful business of it and to persuade enterprises to invest in 5G.

5.1 CSPs need a cloud-native and multi-cloud platform

While enterprises will have challenges because of the uniqueness of their requirements and the complexity of their individual networks, that challenge is multiplied for CSPs because they will have to deploy and manage private 5G networks for tens or even hundreds of 'unique' enterprise customers. Each of these networks will have a different combination of vendors and use cases in its ecosystem, each of which will be at a different scale. An operator's private 5G environment must be able to scale to handle the different needs of different enterprises, some of which may run networks on 5 sites, some on 500 sites and some 5000. It must also support different clouds some enterprise customers will be AWS users, others will use GCP) and to do so consistently with a high level of automation, regardless of scale or cloud environment. CSPs therefore need a solution that will help them to manage that complexity across a diverse set of enterprise customers.

This points to a platform that is software-defined and capable of provisioning connectivity and applications at the same time. Such a platform will be uniform but also flexible and modular, capable of extending beyond 5G uses cases to other requirements within an enterprise customer's IT/OT environment. The requirement for scaling means that the platform needs to use cloud-native automation. A cloud-native environment will also enable the platform to take full advantage of cloud computing, open-source (for faster innovation) and should be able to provide a consistent operational experience across multiple environments from public clouds to space and connectivity constrained environments.

This cloud platform should be flexible enough to support network functions specified by the vendors' enterprise customers; it will also support those vendors across various locations and divisions. Each private 5G network will be bespoke, even within one enterprise. Integrating these platforms and capabilities will give enterprises the ability to deploy a cloud-native application delivery platform without the expense of replacing existing hardware and software.

This cloud platform will also have the flexibility to run applications beyond the initial deployment. As it is unified, it can be deployed across multiple industry verticals, and because it is extensible, it can be used to support other requirements beyond connectivity. It is therefore well-suited to being the platform of choice for enterprises that are seeking to advance their transformation strategies.

5.2 CSPs need a platform that can deliver preintegrated, pretested and highly automated solutions for enterprise customers

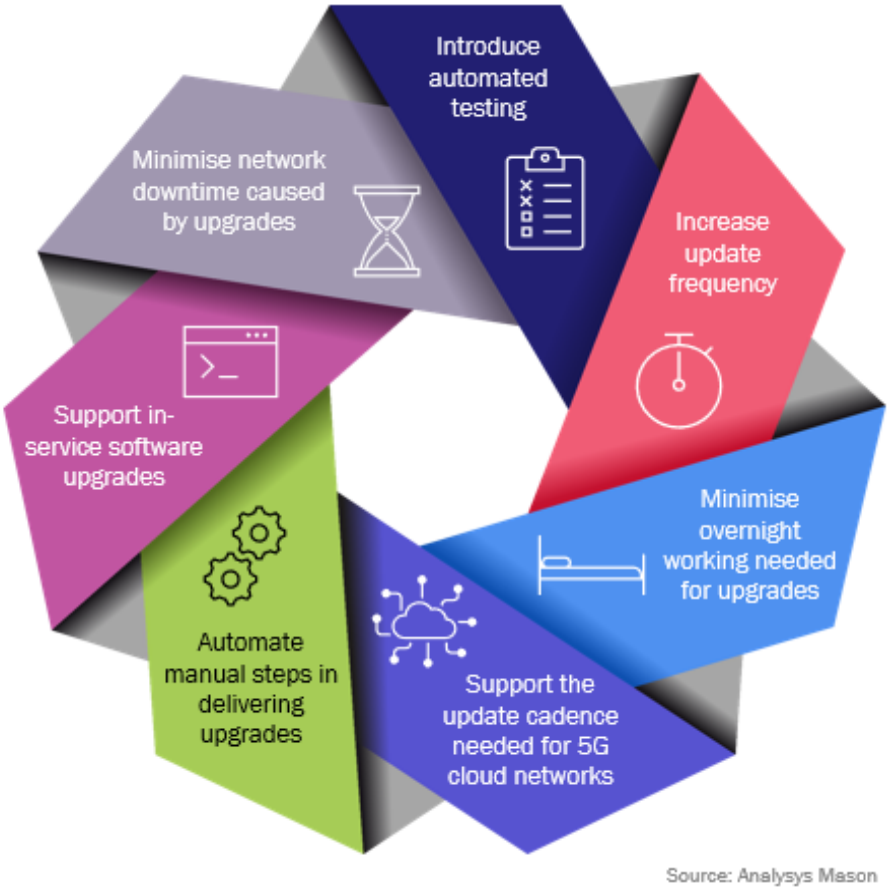
CSPs will need to manage large numbers of private networks deployed across different clouds. They will also need to do so consistently without having to use a cloud provider's native tooling. CSPs therefore need a platform that can deliver a bespoke solution for enterprise customers but is itself highly automated. This platform will feature a comprehensive automation environment that will reduce operational complexity, management overhead and simplify the support of 5G features such as deterministic connectivity, security and network quality. As well as its automation benefits, the cloud-native functionality of this platform means that it will also be able to scale resources up and down dynamically and according to usage, generating further cost savings.

Pretested and pre-integrated solutions can be combined with this automation platform to generate further value for enterprise users. Using one single pretested and preintegrated solution that is consistent across multiple different vendor ecosystems and network architectures will enable CSPs to manage faults more cost-effectively as well as deploy with lower overheads. An optimised solution stack that rightsizes hardware to software usage can also enable cost optimisation, although it is important to retain the flexibility that will match the enterprise's future roadmap.

Enterprises will be able to run this solution with minimal operations expertise on their side, and CSPs will be able to minimise costs and overheads though the platform's automation capabilities. Features such as automation, consistency and portability will make the solution easy to consume and will provide the flexibility that enterprises seek. To verify and optimise the effectiveness of managing such a heterogeneous environment, the solution needs to be measured and results visualised. Automation capabilities need to be supported by end-to-end observability and assurance.

CSPs should also consider offering a cloud-native solution that can support a CI/CD pipeline in order to benefit from its automation capabilities (see Figure 5.1). Testing can be automated, and in-service software upgrades can be introduced, with frequent automated updates, which minimises the downtime needed for network upgrades and reduces the need for manual steps throughout the application lifecycle. This CI/CD pipeline will enable CSPs and their enterprise partners to quickly update networks with patches and new releases across the many different constituent parts of their whole domain, from connected devices to network functions and edge cloud infrastructure.

Figure 5.1: CI/CD pipeline benefits for private 5G networks



5.3 CSPs will need to choose the right partners to deliver a successful private network solution

CSPs will look to partners to help them deliver this solution and platform, which will enable CSPs to successfully support their customers' private 5G networks. For the most part, CSPs cannot afford the time and resources to build in-depth systems integration skills or to develop the capabilities to install and support complex deployments across many form factors. They have network operations centres in place to manage their own public networks, and it will take time to repurpose these assets and skills to support the integration of cloud with operational technologies, as described in section 3.2.

A small number of CSPs have systems integration units that have developed software, cloud computing and horizontal platforms for IoT deployments, and are therefore in some respects well-positioned to support private 5G networks. They can also operate as a neutral supplier of technology, and therefore could provide technology from different vendors and different cloud providers. To simplify deployments, some network vendors have brought virtualised, platform-based solutions to market, but while this progress is welcome, the solution still requires a level of support beyond the internal capabilities of most enterprises. Most CSPs do not possess the complete range of integration, security and support skills necessary to present a single supplier solution at scale and to a large enterprise customer base across many different environments and verticals.

CSPs face the additional disadvantage of their traditional relationship with many of their enterprise customers. The deep relationships that CSPs have within enterprises are typically within the operations or networks divisions but less with the new, decision-making CIO office or the digital transformation team.

This commoditised relationship also means that CSPs do not have the necessary level of engagement with the enterprise's application ecosystem or specialised ecosystem. This makes it difficult for CSPs to quickly build the partner ecosystem required to deploy and manage complex private 5G networks across multiple vendors and locations.

Private 5G networks will play a critical role in achieving the transformation across industries. For CSPs to seize the opportunity in this dynamic supply chain environment, they will need to find partners that have the reach into the application developer community to embed the network capabilities into their application architectures.

CSPs need to address these gaps in their ecosystem and service delivery by carefully choosing partners that can help them to deliver an end-to-end solution across the IT/OT environment and they need to build deep relationships within developer and vendor ecosystems. The right partners can enable CSPs to extend their automation operations and lifecycle management into the private 5G domain, providing enterprise customers with a consistent and compliant environment. When selecting a partner, it is important for CSPs to look for the strength of relationship with vendors and ecosystems as well as the extent of the experience that they have in deploying private 5G networks. This can be evidenced, for example, by frameworks for one-touch deployment or templates for specific use cases.

6. Conclusions and recommendations

The private 5G networks market is only a few years old, but Analysys Mason expects it to grow rapidly because enterprises can see its potential for driving efficiency improvements and enabling future technologies. This market is at an early stage of development, so CSPs still have the opportunity to establish themselves and capitalise on the market's rapid growth. We make the following conclusions and recommendations.

- **CSPs should take advantage of the private 5G networks opportunity**. At a time when adding revenue is increasingly difficult for CSPs, private 5G networks present a clear and easily understood way for CSPs to generate new revenue streams. CSPs have long and deep experience deploying, managing and supporting private enterprise and campus networks. extending these services to the private 5G network market is a logical move that will enable CSPs to take part in a market that is growing, and will continue to grow, quickly until the end of the decade.

- **To be successful in the private 5G market, CSPs need to take action swiftly.** CSPs' expertise in networks gives them an advantage in this new market and they have captured a small but growing share of it. However, this promising start is at risk if CSPs do not move quickly. The private 5G market will be crowded and highly competitive, with many new entrants such as public cloud providers, neutral hosts and cell tower owners. First-movers such as network equipment providers, who already have a customer base of installed 4G customers, gained early market share, using their single product focus to put together compelling end-to-end solutions. CSPs risk falling behind their competitors if they do not act quickly and come to the market with a viable private 5G network proposition.

- **CSPs need a compelling enterprise offering and a platform to support its entire lifecycle.** CSPs find it difficult to build a complete solution that meets enterprise requirements across the whole 5G value chain, and it is therefore logical for them to turn to partners to fill product and skills gaps. A partner with expertise and experience in building private networks can also reduce disruption and costs through rapid turnaround and deployment and by using a solution that features an optimised stack that rightsizes hardware and software and is pretested and preintegrated. This partner will also ideally have experience of systems integration across many domains' platforms and devices that make up the 5G private networks value chain. To make this solution attractive to enterprises and cost effective, it will need to be delivered from a highly automated cloud-native platform. Lastly, CSPs need to make sure that they select a partner that can build a flexible, scalable environment that aligns closely with the customer's future technology and business goals and which will be a platform for the future applications. The right partner will simplify the deployment and operations of private 5G networks for service providers and allow CSPs to help their enterprise customers to focus on building their differentiated services.

7. About the authors

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