Network slicing:
Top 10 use cases to target

An overview of industries and use
cases that will drive the majority of
the revenue potential

Introduction

The majority of businesses have largely relied on one shared network for non-critical work, which includes conference calls, email, online service portals, local office Wi-Fi, digital payments and other applications. However, as more devices require connectivity as part of the Internet of things (IoT), businesses are exploring connectivity use cases that align with high-availability and scalability, which is charting the path to network slicing.

As part of our research into network slicing and the opportunities it presents for communications service providers (CSPs), Ericsson worked with Arthur D. Little to analyze more than 70 external market reports on the global digitalization of industries. Our goal was to identify the revenue potential and most promising industry segments and use cases, including those that are near-term, for network slicing that CSPs can pursue.

Arthur D. Little (ADL) reviewed more than 400 digital use cases in 70 industries. Ultimately, ADL's research shows that six industries will have about 90% of the addressable revenue potential, and one or two use cases in each industry will account for most of the addressable revenue in each.

These industries are:

– **Healthcare:** 21% of addressable revenues

– **Government:** 17% of addressable revenues

– **Transportation:** 15% of addressable revenues

– **Energy and utilities:** 14% of addressable revenues

– **Manufacturing:** 12% of addressable revenues

– **Media and entertainment:** 11% if addressable revenues

For CSPs, when selecting target industry segments and corresponding use cases, there are several things to consider. First of all, there needs to be a solid enterprise strategy around industries or verticals to target, as well as the local market possibilities. Existing enterprise relationships and partners in the local market can help establish an obvious starting point in the selection process. Certainly, it's important to consider the global market potential for any given industry and use case, but a CSP has to start somewhere to gain experience

and demonstrate value, so it makes the most sense to prioritize the local situation and requirements from the current enterprise partners at hand.

In our research, we have seen that enterprises are expecting CSPs to collaborate with other vendors and develop new complete offerings and services. They are expected to understand the enterprise's business and also to be able to act with speed and innovation. Those CSPs that can deliver will find enterprises are happy to buy from and work with them as partners.

In the near term, we believe CSPs will focus on developing solutions for a few industries with an immediate need for cellular connectivity-based services. CSPs have a chance to do that by taking different roles in the value chain, as we saw in our report "Network slicing: A go-to-market guide to capture the high revenue potential." In this report, we provide an overview of the top 10 industry segments. And each segment we provide a sample use case which, in most cases, will have significant potential in the short to medium term.

We hope that you will find these resources valuable as your organization creates its network slicing market strategy.

Figure 1: Ten use cases with a strong case for slicing
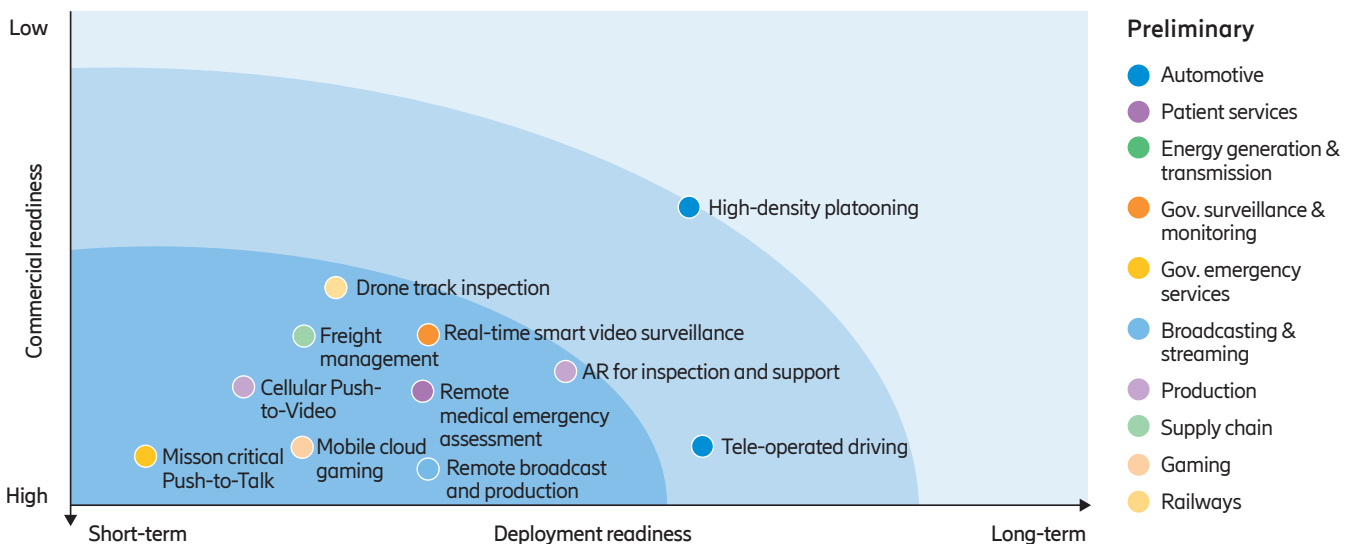
1. Automotive:
A USD 23 billion market opportunity
Tele-operated driving alone is a USD 300 million near-term opportunity

The automotive industry has witnessed a wide range of companies and entrants providing vehicles and related services. Consistently ranked as the most important connected services by customers in all regions, safety and navigation devices are contributing to the growth of connectivity in the automotive industry. Another major factor is the monetization of car and driver data to uncover new market opportunities and services. Additionally, the vision for fully autonomous vehicles is to drastically reduce accidents in the future.

The automotive industry will need to overcome challenges like the varying regulatory systems across the globe, which can affect autonomous vehicle adoption and advancements. In the future, services will be a large part of vehicle-related services. As connectivity and customer expectations increase, so too will subscription management complexity.

Benefits of network slicing

To address regulatory challenges, isolated traffic through network slicing can help ease the barriers to entry. Slicing also guarantees a certain level of QoS and allows service providers to configure the network to meet specific security needs. As service content varies across end customers, slicing provides easier scalability as well as simplified network management for enterprises.

Through network slicing, CSPs can help the automotive industry achieve key use cases, including tele-operated driving, coordinated groups of platooning vehicles driving closely together, automated lane change and real-time situational awareness.

Segment overview
Automotive

Segment scope
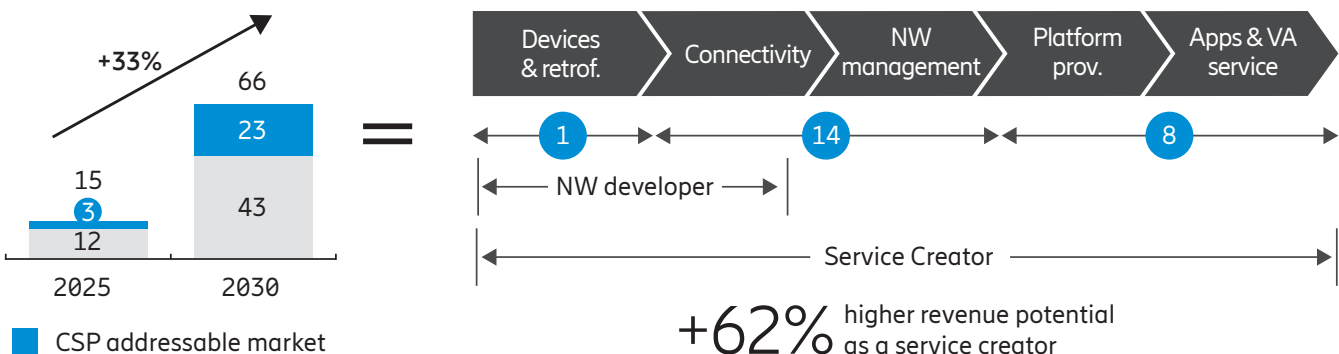Manufacturing, maintenance, and services for connected vehicles

Typical CSP customers
Fleet operators

Key slicing cases:

Tele-operated driving	Platooning
Low Latency	Low Latency
Automated lane change	Real-time-situational awareness
Availability	Availability

CSP Segment slicing revenue potential
CSP revenue will step from typical CSP customers like fleet operators. Slicing-enabled revenue from the automotive industry is expected to reach USD 66 billion in 2030, of which CSP-addressable revenue will be USD 23 billion.

+33%

66
23
15
3
12
43

2025   2030

■ CSP addressable market

=

| Devices & retrof. | Connectivity | NW management | Platform prov. | Apps & VA service |

1   14   8

NW developer

Service Creator

+62% higher revenue potential as a service creator

Use case deep dive: Tele-operated driving

True autonomous driving needs guaranteed safety, which is a key challenge in the future — autonomous vehicles may face conditions they cannot immediately negotiate. For fleets and fleet operators, specifically, shortages in driver talent are a major concern. Driver salaries can be one of the largest components of transportation costs for logistics service providers.

With the use of tele-operated driving, drivers can directly control an autonomous-capable vehicle from a remote location, such as a control center, during certain periods of time. Potential tele-operated driving usage would include operating industrial vehicles in mining, forestry, agriculture and other wide-area applications. Remote driving can help handle unexpected situations that automated systems would be unable to navigate otherwise. In this sense, remote driving helps enable near-term autonomous vehicles from a safety and regulatory viewpoint.

The key features of tele-operated driving enabled by network slicing include:

– High availability

– Ultra low latency

– Real time HD video streaming enabled by high throughput

– Security allows only authorized people or service providers to access vehicle controls

Key benefits to automotive organizations include reduced driver compensation costs, as well as reductions in fuel costs from more fuel-efficient driving, damage from fewer accidents, insurance premiums, as well as reduced driver travel and sustenance costs.

There are additional advantages beyond the economic benefits. This use case can help reduce emissions from increased autonomous vehicle penetration, as well as improve road safety.

Use case assessment
Tele-operated driving

♡ Improved road safety from enabling autonomous vehicles

Reduced driver, fuel, damage and insurance costs

Reduced emissions from increased AV penetration

0.3 USDbn ▶ **7%**

CSP addressable slicing potential (2025)

Share of segment

Slicing brings guaranteed real-time control of vehicles with wide area coverage and enables autonomous driving by providing ultra-low latency, ultra-high reliability, high throughput and traffic isolation

2. Healthcare – patient services: A USD 23 billion market opportunity

Remote treatment in emergencies alone is a USD 200 million near-term opportunity

The patient services industry is composed of hospitals and various healthcare players who provide mobile healthcare services to patients. It's a growing industry. The percentage of the population over 60 continues to grow and is forecasted to rise from 13.5% of the population in 2020 to 21% by 2025. In addition to an aging population, people are increasingly adopting sedentary lifestyles, unhealthy food habits and ever larger amounts of screen time, all of which increases the prevalence of many diseases.

Technical and medical advances are also driving growth within this segment. Surgery is far safer than it was even ten years ago, and it continues to improve. Remote patient monitoring and virtual and augmented reality (VR/AR) are enabling more efficient use of healthcare expertise, because physicians can provide guidance and advice to other practitioners no matter where they may be located.

Big data is also playing an increasingly large role in patient services, improving staffing accuracy, chronic care treatment and medical error reduction. And with healthcare digitization investments growing year-over-year by roughly 20%, the pace of digital innovation will likely continue at a rapid pace.

Nevertheless, there are significant technical challenges in this segment, especially around connectivity. Current wireless connectivity solutions do not provide the required level of reliability

and control to enable advanced use cases and to support the exponential growth in the number of connected devices. Additionally, new technologies will produce staggering amounts of data, which will require a corresponding massive level of throughput.

Cybersecurity attacks are also a significant threat. Healthcare hacking incidents grew 42% in 2020 over 2019, according to HIPAA Journal[1], and these attacks compromised more than 31 million healthcare records. Ransomware attacks on healthcare organizations more than doubled in 2020 over the previous year.

Network slicing can help address several of these challenges. First, slicing quality of service (QoS) guarantees reliability and control, and capacity can be adjusted as demand increases. If high availability is required, a network slice can provide the level required. Additionally, isolated traffic in slices can be configured to meet specific security requirements, which hardens security, lowers the regulatory barrier and improves general public trust.

Benefits of network slicing
Near term, those use cases with highest commercial and deployment readiness include remote assessment of potential life-threatening conditions in emergency through video, service robots supporting senior citizens, collecting data for early detection of diseases through precision medicine, as well as using robotics for rehabilitation with real-time control.

Segment overview
Patient services

Segment scope
Provision of healthcare services to patients through use of mobile ICT

Typical CSP customers
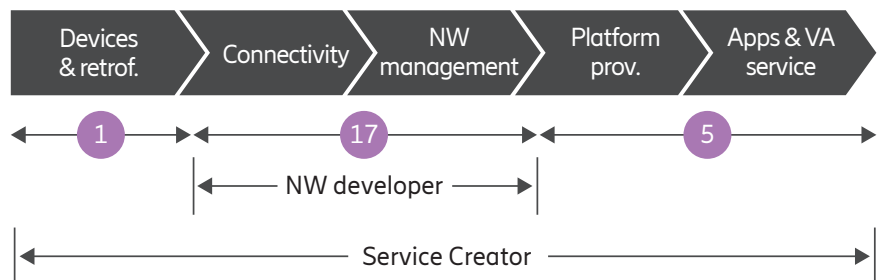Healthcare providers, hospitals, governments

Key slicing cases:

Remote medical energy assessment	Robotics for assisted living
Throughput	Security
Precision medicine	Rehabilitation robotics
Availability	Latency

[1] HIPAA Journal. "2020 Saw Major Increase in Healthcare Hacking Incidents and Insider Breaches." 16 March 2021.

CSP Segment slicing revenue potential
In 2030, slicing-enabled revenue in patient revenues are expected to be USD 62 billion in 2030, with CSP addressable revenue reaching USD 23 billion.

+23%

62
22
6
16
23
38
2025   2030

■ CSP addressable market

=

Devices & retrof. ▶ Connectivity ▶ NW management ▶ Platform prov. ▶ Apps & VA service

1   17   5

NW developer
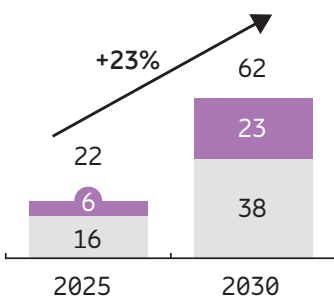
Service Creator

+38% higher revenue potential as a service creator

Use case deep dive: Remote treatment in emergencies

Remote treatment during emergencies could save more lives through earlier identification of an emergency condition. Almost 800,000 people suffer from stroke annually in the US and 20% of these cases are fatal, and the aging population puts greater strain on the healthcare system.

Every second counts when dealing with strokes or heart attack, and healthcare organizations believe that remote emergency assessment can make a big difference, In fact, in 2030, it's estimated that emergency vehicles will respond to 5.4 million more emergencies over 2020 thanks to connected ambulances.

Here's what remote assessment of an emergency health condition such as stroke or heart attack will look like. Emergency vehicles will have secure, reliable, low-latency mobile HD video starting from initial contact with the patient, all the way to the ER. Video and sensor data can be sent to AI deployed on edge computing resources, which will process and analyze

the data to make a rapid assessment and enable timely action.

To work, however, video streams must not break and they must maintain high resolution. Delay, lag or poor quality will interfere with diagnosis, so connectivity must have high quality of service (QoS).

A 5G network slice can provide this level of QoS, with HD video streaming from emergency vehicle to waiting room enabled by five-nines availability, traffic isolation for increased security and high throughput. Real-time data analysis at the edge can provide instant feedback, helping emergency personnel to more rapidly diagnose the patient's issue so they can begin appropriate treatment earlier, saving lives and improving outcomes.

And beyond providing lifesaving treatment faster, charging and billing features of the slice will enable accurate measures and payment of dynamic usage and allocation to different emergency medical service players.

Depending on the CSP's level of experience and the relationships they have within the patient services sector, they can act as network developers or service creators.

In the network developer role, mobile network operators will need to partner with a systems integrator, who will manage the customer and guarantee service level agreements (SLAs). The revenue model will likely be based on the number of connected EMS vehicles, the level of the SLA and the geographical area that is covered. The CSP will receive a share of the revenue for the service for providing connectivity.

As a service creator, the CSP takes a customer-facing role and commits to an end-to-end SLA. System integrators can act as a go-to-market partner, with the CSP paying solutions providers either as a share of revenue or project-based fees.

Use case assessment
Remote emergency assessment

+5.4mn	Increase in emergencies responded to annually by 2030
♡	More lives saved through earlier identification of emergency condition
+31mn	Increase in patients treated in A&E2 annually by 2030

Slicing enables ultra-reliable and real-time data and video streamig over the wide area analysis at the edge, as well as charging/billing for dynamic use

0.2 USDbn ▶ **3%**

CSP addressable slicing potential (2025)

Share of segment

3. Energy generation and transmission: A USD 20 billion market opportunity
Cellular push-to-video alone is a USD 1 billion near-term opportunity

The energy generation and transmission sector consist of various players managing, producing and supplying energy. This includes generation of energy from fuel sources, distribution etc.

Energy generation and transmission is experiencing growth in several ways. Investments in this sector reached USD 302 billion by 2019 worldwide, up from USD 168 million in 2009. Advancements are creating new opportunities to increase efficiency and reduce costs, through remote monitoring and control. There's also pressure from customers and employees to take on corporate social responsibility and sustainable development. New regulations, policies, and directives are encouraging and stimulating the adoption of clean energy generation and consumption.

However, there are several key challenges related to connectivity that need to be addressed. High reliability is critical to ensure real-time control, in case of a malfunction. Growing amounts of data will need to be analyzed in real time and over large geographical areas, so organizations will need to address data availability and management to ensure operational efficiency. The increase in devices makes it critical for networks to have the ability to handle an exponential increase in connected equipment, devices and sensors.

Connectivity costs are expensive, but options like WAN are insufficient to

meet requirements. Full coverage is a requirement for use cases that require extensive geographic coverage, such as remote-controlled wind farms. Network security is critical to safe operations. In this segment, an increasing amount of the communication is found outside the physical infrastructure of plants creating more vulnerability to several mission critical operations.

Benefits of network slicing

Network slicing is able to address several of the connectivity challenges in the energy generation and transmission sector. Network slicing guarantees reliability and real-time control through QoS. QoS is also guaranteed through slicing and 5G will be able to provide better coverage than fixed solutions, as well as a more flexible option in demanding terrain.

Network slicing also provides the ability to configure for high availability and is scalable. To address security challenges, network slicing allows for isolated traffic to be configured to meet varying requirements. Finally, CSPs will be able to deploy slices on a global level with predictable costs.

Four main energy generation and transmission near term use cases include: Virtual power plant, connected remote windfarms, cellular push-to-video and grid voltage monitoring.

Segment overview
Energy generation & transmission

Segment scope
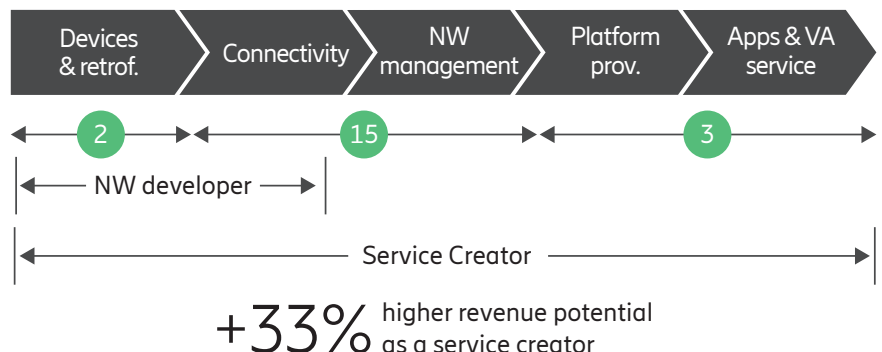Extraction, manufacturing, distribution, and refinement of energy

Typical CSP customers
Small and medium sized energy companies/power plants

Key slicing cases:

Virtual power plant	Connected remote windfarms
Reliability	Reliability
Cellular Push-to-Video	Grid voltage monitoring
Throughput	Security

CSP Segment slicing revenue potential
For CSPs, typical customers include small and medium-sized energy companies and power plants. By 2030, slicing-enabled revenue is expected to approach USD 46 billion and addressable revenue will reach USD 20 billion.

+31%

47
20
27

12
5
7

2025   2030

■ CSP addressable market

Devices & retrof. → Connectivity → NW management → Platform prov. → Apps & VA service

2   15   3

NW developer

Service Creator

+33% higher revenue potential as a service creator
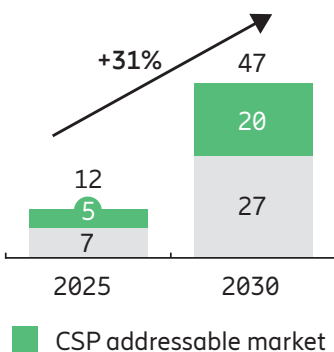
Use case deep dive: Cellular Push-to-Video

In the energy generation and transmission industry, field technicians are conducting manual inspections, which require frequent trips. The industry as a whole relies on legacy network systems for many mission-critical processes, and these legacy systems are costly to maintain and are prone to issues.

Cellular push-to-video allows inspectors and maintenance workers to stream video capture of an issue to the cloud. From there, the video will become immediately available for a supervisor and/or manager to give real-time support.

Network slicing provides three main features for cellular push-to-video:

— Real-time situational high-quality image capturing, and data transmission is enabled by high throughput

— Low latency can enable AR/VR experiences as well as real-time data analytics

— Traffic isolation can allow for secure video transmission

There are substantial maintenance cost savings enabled through this use case. Push-to-video enablement can help reduce service costs. Deployments experience reduced downtime as a result of fixing issues faster. Additionally, there are reduced systems costs from replacing legacy systems. Cellular push-to-video increases worker safety. With the ability to use video remotely, the need for transportation to a site for a service call reduces demands as well.

The CSP role in energy generation and transmission could move into full connectivity provision. CSPs will need to partner with a solution provider to bring the full solution to market, which will allow the CSP to act as a network developer and generate revenue from a subscription fee for connectivity and network services. With technology and go-to-market partnerships, CSPs can gain effective market access, overcoming specific industry challenges such as sales/IT integration. Hardware developers would likely receive a fixed fee while software developers and go-to-market partners would most likely receive a revenue share.

By 2030, CSPs could address USD 1 billion in revenue potential.

Use case assessment
Cellular Push-to-Video

8%   Reduced service cost

10%   Reduced need for transport

1 USDbn ▶ **6%**

CSP addressable slicing potential (2025)   Share of segment
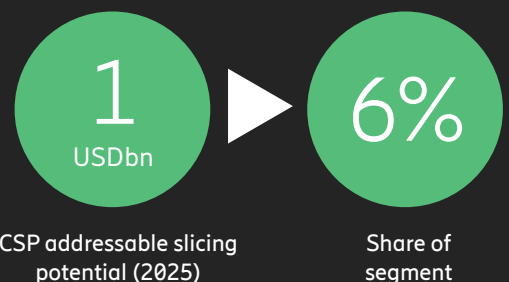
Slicing brings secure, real-time situational high-quality image capturing and data transmission enabled by high throughput and traffic isolation

4. Public sector:
A USD 19 billion market opportunity

Surveillance and monitoring alone counts for a USD 500 million near-term opportunity

In the government/public sector, Public Safety Authorities (PSA) uses surveillance and monitoring to proactively manage public safety, performed in contrast to the reactive approach of emergency services, which is a growing area.

Governments are being increasingly targeted by ever more sophisticated cyber threats with the objective of stealing specific information. The Internet of Public Safety Things (IoPST) is emerging from IoT and smart cities, which gives governments access to an incredible amount of big data. According to the U.N., urban populations will grow to 68% by 2050, which will increase the need to use technology and innovation to manage an increasingly complex public safety environment. Growing data security and privacy regulations will also put pressure on governments to ensure secure communications practices.

The operation and success of surveillance and monitoring technologies are dependent on the key enabling factor - connectivity. There are several challenges that must be overcome in order to harness the growing opportunity in the public sector. For one, many government departments operate in silos with little cooperation between them and their legacy systems. Legacy systems are part of a fragmented ecosystem of standards, devices, technologies and services. This hinders interoperability and ability to integrate systems.

Additionally, limited IT budgets hinder quick and full-scale IoT deployments. With the increasing amount of connected devices, including cars, meters, lighting, new entry points for attack are emerging and will also need flexible network solutions that can support the span of devices.

Benefits of network slicing

Network slicing breaks down data silos and enables sharing across agencies and organizations while meeting performance and security requirements. The configurability of 5G slicing allows for management of all wireless access points with a single, secure network. Isolated traffic is protected within the slice and network security can be configured according to specific needs.

Slicing creates an opportunity to deploy new, low-energy and cost-effective sensors at scale with capacity able to be adjusted with demand.

Four main surveillance and monitoring uses in provision of proactive public safety highlight the need for traffic isolation: Real-time smart surveillance, massive mission-critical IoT, real-time location information on firearms usage and interagency communications.

Segment overview
Surveillance & monitoring

Segment scope
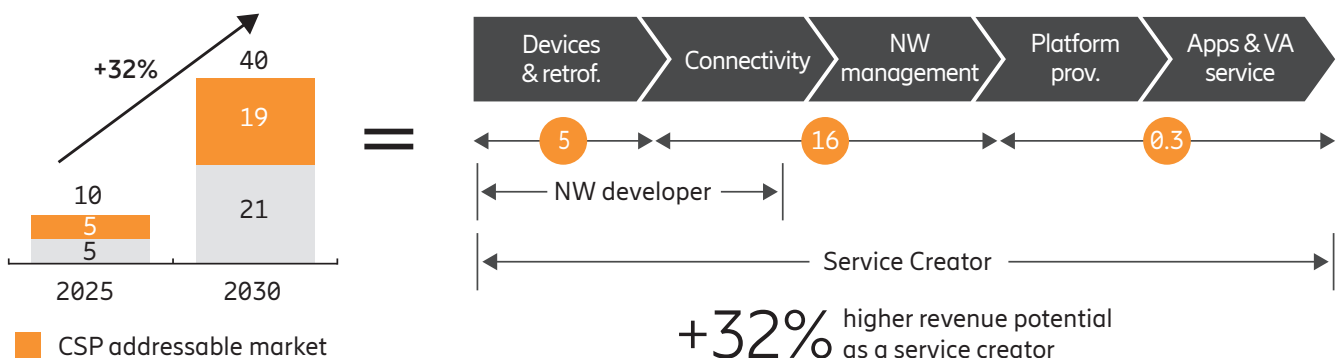Provision of proactive public safety through surveillance & monitoring activities

Typical CSP customers
Governments, public safety authorities, ICT solution providers

Key slicing cases:

Real-time smart surveillance	Massive mission critical IoT
Security	Availability
Real-time location info of firearm usage	Inter-agency communication
Availability	Security

CSP Segment slicing revenue potential
For CSPs, typical customers include government agencies, municipalities, public safety authorities, and information and communications technology (ICT) solution providers. By 2030, slicing-enabled revenue is expected to grow to USD 40 billion with addressable revenue reaching USD 19 billion.

+32%

40
19
10
5
21
5
2025   2030

■ CSP addressable market

| Devices & retrof. | Connectivity | NW management | Platform prov. | Apps & VA service |

5   16   0.3

NW developer

Service Creator

+32% higher revenue potential as a service creator

Use case deep dive: surveillance and monitoring

With surveillance and monitoring, countless hours of video feed is created, making it impossible for human security camera operators to monitor and analyze everything at all times. This limitation greatly reduces the potential of optimized video surveillance. Also, traditional, closed-circuit television (CCTV) deployments rely on fixed connections, which are costly to implement and maintain, especially at scale.

Real-time smart video surveillance allows teams to integrate many different types of surveillance video feeds — traffic, urban, management and civil defense — and receive automated alerts when human attention is needed. This is made possible by cloud computing and intelligent video analysis with identity masking at the edge. Network slicing presents four main features:

—   Real-time UHD (ultra-high definition) capabilities with very low delay and jitter for automatic analysis

—   High network security protects data through traffic isolation

—   High availability

—   More economical deployments when compared to mobile network operators (MNO)

Key benefits include improved public safety at lower costs. With surveillance, the potential for violent crimes can be reduced by 50%, per ADL analysis; Also municipalities gain better situational awareness in urban areas, faster response times to critical situations and an overall increase in safety assurance for residents. Identity masking with edge computing allows citizens to maintain privacy, which has long been a key issue.

By no longer having to install and maintain fixed connection cameras, deployments can reduce the costs and reliance on expensive, inflexible hard-wired cables.

Automation and intelligent decision making allows faster, more effective and precise responses to emergency situations. Also, less CO2 is emitted due to less travel.

The existing high level of trust with government agencies enables CSPs to elevate beyond being a service provider to being a service creator with a full-service offering. The "per device" subscription model will be predominant and technology partners would receive a revenue share or project-based fee for implementing the solution in the CSP network. CSPs move into a position to address a USD 500 million revenue potential.

Use case assessment
Real-time smart surveillance

♡ Improved public safety; 50% violent crime reduction reached

⌄ Reduced CO2 impact from less travel

⚙ Higher operational efficiency through automation and intelligent decision making

Slicing brings high network security through traffic isolation as well as high throughput enabling real-time video analysis at the edge

1 USDbn ▶ **12%**

CSP addressable slicing potential (2025)   Share of segment
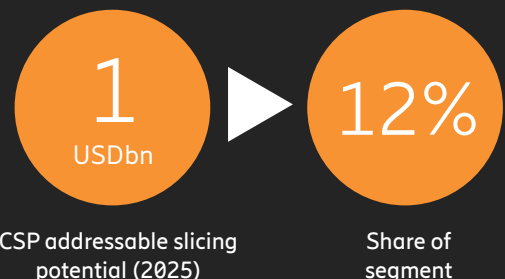
5. Government emergency services: A USD 13 billion market opportunity

Mission critical push-to-talk alone is a USD 200 million near-term opportunity

Emergency services is composed of key players within emergency and mission-critical operations. These include first responders like police, fire and public safety departments, in addition to their solution (hardware, ICT, infrastructure) providers. Ambulance services are excluded from this category.

Growth in the emergency services sector can be attributed to several factors. There are new mobile-enabled use cases for first responders emerging (AR helmets, real-time video) which puts more demand on networks. Legacy networks such as TETRA and P25 cannot meet current throughput and low latency demands. Additionally, governments must ensure secure communications to protect citizen privacy, which cellular connectivity can help address.

Municipalities and government agencies in the emergency services sector experience challenges with their current connectivity standards, which hinders their ability to respond effectively and precisely in situations where lives may be at stake. The lack of network reliability and real-time control inhibits the use of digital equipment, such as robotics and drones, where connectivity failures result in serious consequences.

Outdated networks and fragmented standards, devices, technologies and systems make integration and interoperability difficult. Departmental budgets are limited, hampering quick and full-scale adoption of new technology. The increasingly connected workforce and IoT presence is requiring government operations to depend on wide area networks more than ever before.

Benefits of network slicing

As with the previous use case (surveillance and monitoring), network slicing eliminates data silos and allows secure, unhindered, high-performant data sharing across agencies, which is critical when responding to emergency situations.

Network slicing of a 5G network enables higher quality of service (QoS), guaranteeing real-time control and greater reliability. The configurability of 5G slicing also promotes interoperability, which allows for easier management of all wireless access points via a single WAN or LAN network. It also makes 5G a scalable, dynamic, flexible and cost-effective option and its isolated traffic within the slice is more secure with network security being highly configurable to suit specific needs.

The main areas where network slicing enhances the provision of emergency and mission-critical services are: Mission-critical push-to-talk communications, visors and helmets enabled with AR/VR, drones, and bomb-defusing robots — all of which require reliable, low-latency, high-bandwidth connectivity.

Segment overview
Emergency services

Segment scope
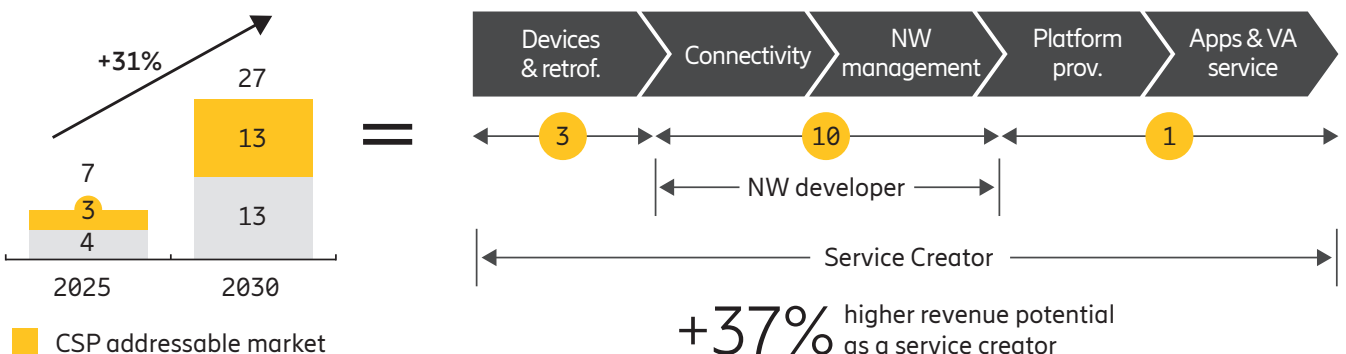Provision of emergency and mission-critical operations and services

Typical CSP customers
Governments, public safety authorities, defense & military

Key slicing cases:

Mission critical Push-to-Talk	Drones for emergency services
Security	Latency
Visor/helmet with AR/VR	Bomb diffusing robots
Latency	Latency

CSP Segment slicing revenue potential
For CSPs, typical customers include government agencies, municipalities, public safety authorities, and defense and military agencies. By 2030, slicing-enabled revenue is expected to grow to USD 27 billion with addressable revenue reaching USD 13 billion.

+31%

2025	2030
7	27
3	13
4	13

■ CSP addressable market

Devices & retrof.	Connectivity	NW management	Platform prov.	Apps & VA service
3	10		1	

NW developer

Service Creator

+37% higher revenue potential as a service creator

Use case deep dive: mission-critical Push-to-Talk (PTT)

With mission-critical communications, multiple standards for networks are hindering innovation and scalability, along with being costly to maintain. Along with increasing global usage, this poses the need for harmonization of networks and standards.

In emergency situations, reliable and instant communications between stakeholders are imperatives. In many instances, a failure of communication capabilities can result in lost lives.

A dedicated slice of a 5G network enables:

— High network security through network isolation

— Highly reliable communication and data access anytime

— Greatly improved coverage compared to LMR (land mobile radio) solutions

— Ability for CSPs to deploy global slices allowing government agencies to flexibly use the solution abroad

Public safety and military agencies gain several benefits, including economic advantages. As a result of network slicing, organizations can achieve reduced costs for operations, connectivity, integration and deployment as well as in equipment unit costs from global scalability and harmonized spectrum usage.

The capabilities of mobile broadband allow first responders and other agencies to improve productivity by working smarter, faster and more effectively. Additionally, wider, highly available coverage enables safer and for efficient responses and operations.

Incumbent CSPs are in a strong position to leverage existing high levels of trust to take on the role of service creator with a full-service offering. For CSPs, global revenues could potentially reach USD 200 million by 2025.

Use case assessment
Mission-critical Push-to-Talk

Reduced connectivity costs from replacing legacy NW

Better coverage enabling safer operations

Productivity gains from utilzing mobile broadband

Slicing brings high network security through traffic isolation as well as high throughput enabling real-time video analysis at the edge

0.2 USDbn

▶

6%

CSP addressable slicing potential (2025)

Share of segment
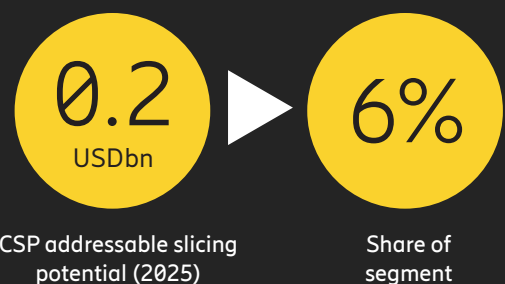
6. Broadcasting & streaming: A USD 12 billion market opportunity

Remote broadcasting alone counts for a USD 200 million near-term opportunity

Broadcasting and streaming is a fast-growing industry. Consumer spending on ultra-high definition (UHD), virtual reality and 360-degree video is expected to grow at a 35% compound annual growth rate (CAGR) through 2023, when the market will reach approximately USD 31 billion in revenues.

But it's also an industry that's undergoing significant change and disruption. The ways in which people produce, distribute and consume entertainment content are changing fast. First, consumers are shifting rapidly from a linear mode of viewing, where a broadcast entity chooses what and when programming will be available to consumers who passively view it, to a non-linear mode, where consumers choose from a very wide variety of content to enjoy on-demand. This phenomenon has created an enormous need for big data analytics to better understand consumer viewing preferences and habits.

Technological advancements, such as higher resolution video, improved home connectivity and new devices features and capabilities are changing the formats and even types of media being consumed.

Finally, traditional broadcasters are facing a strong challenge from streaming companies, who provide content on-demand, including original movies and series that have proved very popular.

Benefits of network slicing

CSPs can help broadcasters overcome these barriers to remote live broadcasting with a network slice. With 5G connectivity, production organizations can produce and deliver media broadcasts remotely via the 5G network, so there's no need for specialized vehicles like OB vans or fixed transmission lines onsite.

The ultra-low latency of a network slice combined with its quality of service can provide the required reliability and throughput to enable real-time control of cameras, and because CSPs can deploy slices globally at a predictable cost, broadcasters can now produce niche events that were not previously economically viable. 5G will provide better coverage than fixed solutions, and the ability to isolate traffic through a slice can be configured to meet broadcasters specific security needs. Bandwidth and throughput can even be configured in slices to enable live, user-generated HD content.

There are a number of near-term uses cases in the industry that network slicing can enable:

— **Remote broadcast and production:** In this use case, most of the personnel involved in a live broadcast of an event can control cameras, mix and edit content and change views on the fly, even if they are working from a location hundreds or thousands of miles away from the event. See more details below

— **Second scene VR / UHD broadcasting:** This is similar to live broadcasts of an event on a giant screen at a secondary location, but here broadcasters would do so using virtual reality (VR), UHD and 4K.

— **On-site live event experience:** This use case is similar to second scene broadcasting, but in this case UHD video would be broadcast at the site of the live event for instant replays, for example.

— **Ad-hoc / temporary mass events:** These kinds of broadcasts require quick and flexible allocation of additional bandwidth to an event location.

Segment overview
Broadcasting & streaming

Segment scope
Production, distribution and consumption of media content

Typical CSP customers
Broadcasters, both world and unilateral feed

Key slicing cases:

Remote bradcast & production	Ad-hoc/ temporary mass events
Throughput	Throughput
Second-scene bradcast	On-site live experience
Time-to-market	Throughput

CSP Segment slicing revenue potential
In this sector, the ADL analysis indicates that by 2030, slicing-enabled revenue in 2030 will be about USD 33 billion. Of this total, CSPs' addressable revenue will reach USD 12 billion.
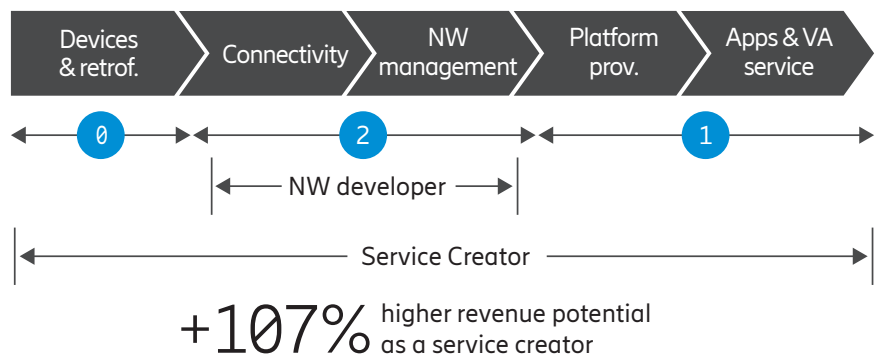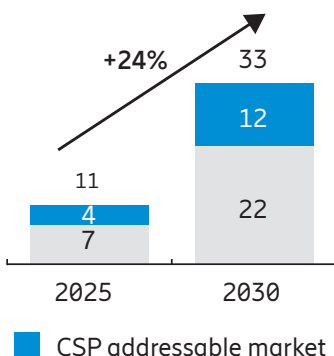
Use case deep dive: Remote broadcasting

Broadcasting and streaming services face significant challenges when it comes to live events. The current setup for conducting live broadcasts is expensive, requiring satellite connections to support broadcast-grade HD/UHD event productions. Live broadcasts are also sometimes difficult to produce due to lack of connectivity, especially for events that take place outside of urban centers. And yet, the demand for live broadcast production continues to grow.

Remote production of live broadcasts could reduce the cost of producing these events significantly, enabling broadcasters and streaming companies to profitably provide more live events, including those that appeal to niche audiences. But before they can begin widespread remote production of live events, there are a number of significant challenges to overcome.

First, ultra low latency is required to provide lag-free switching between camera angles in live feeds. Additionally,

live broadcast relies on multiple connectivity options as backup, because fiber, satellite and bonded cellular are not always available.

These connectivity options are expensive, which limits the number of productions that can be provided — broadcasters are less likely to produce events with a niche audience. As a result, producing and broadcasting from remote locations is challenging due to limited coverage and satellite's expense.

Finally, it's critical that connections be highly secure, as cyberattacks on broadcasts are a serious problem.

The economic benefits to broadcasters and streaming companies are strong. Remote production of live broadcasts via a network slice can reduce costs by 10-20% by reducing:

— Personnel costs, because fewer people are needed onsite;

— Onsite equipment costs

— Onsite broadcasting (OB) van costs

— Travel costs

Additional benefits include a reduction in greenhouse gas emissions due to less travel and increased access for the public to niche events.

CSPs' most likely role is that of a network developer, as providing key broadcast solutions is currently outside of CSPs' expertise. Currently, Arthur D. Little estimates that in live sporting events alone, CSPs will see an addressable market of USD 200 million by 2023.

That said, once a CSP has gained some experience as a network developer within the sector, there could be future opportunities to capture more of the value chain.

Use case assessment
Remote broadcast & production
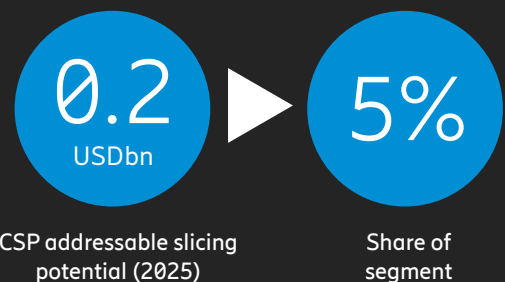
10-20% Production cost reduction

🌱 Reduced CO$_2$ impact from less travel

♡ Increased access to enjoy niche events for the public

Slicing brings guaranteed QoS enabling possibility for remote UHD camera operations, removing the need for fixed-transmission lines onsite

0.2 USDbn ▶ **5%**

CSP addressable slicing potential (2025)

Share of segment

7. Manufacturing – production:
A USD 10 billion market opportunity

AR for inspection and support alone is a USD 1 billion near-term opportunity

The production segment of manufacturing consists of several players focused on the preparation, processing and fabrication of goods from raw materials. It's a segment that's undergoing significant transformation, spurring the growth of advanced manufacturing facilities.

A key growth driver is the rapid technological adoption and demand for mass customization. Consumers and enterprises want more personalized production of goods, which adds additional value and creates a larger addressable market.

Therefore, production facilities are adopting smart factory technologies, which incorporate cooperative robots, extensive deployment of IoT, AI and other technologies that enable extensive automation and flexibility on the production floor, creating a shift from traditional production methods to digital ones. The smart factory market size is expected to grow from USD 165 billion in 2019 to USD 250 billion by 2024.[2]

Big data analytics plays a large role, because it improves and enables quality control, asset optimization, demand forecasting and preventative maintenance, which reduces costs.

As discussed, automation is becoming pervasive to increase efficiency and use of robotics will reduce the ratio of human-machine working hours from 69:31 in 2018 to 56:44 by 2022.[3]

Manufacturing faces significant connectivity challenges to implement Industry 4.0 and smart factory automation. E.g. mission-critical use cases like collaborative robots require real-time control and access, meaning high throughput and ultra-low latency. Additionally, the high density of connected devices will require flexible network solutions to manage so many connections.

Smaller manufacturers need affordable network solution implementations and maintenance. As they are enmeshed with their customers, partners and suppliers, they need to share data securely and efficiently internally and with third parties.

Benefits of network slicing

Network slicing addresses many of these challenges and enables valuable use cases or manufacturing. With a network slice, the CSP can guarantee the level of reliability and control required through QoS for collaborative robots. Slices can be configured to provide high availability, with the ability to scale rapidly as needs grow. Traffic isolation enables network security to be finely tailored to meet specific requirements.

CSPs will be able to deploy these slices on a global level to provide predictable costs, and interoperability with other systems can be provided through an infrastructure layer that's shared with public services.

Key use cases include AR devices enabling quality inspection and diagnosis for maintenance workers, technicians and operators throughout a plant, remotely controlled robots, 3D video-driven interaction between collaborative robots and humans, as well as optimizing processes inside the factory.

Segment overview
Production

Segment scope
Preparation, processing fabrication of goods from raw material

Typical CSP customers
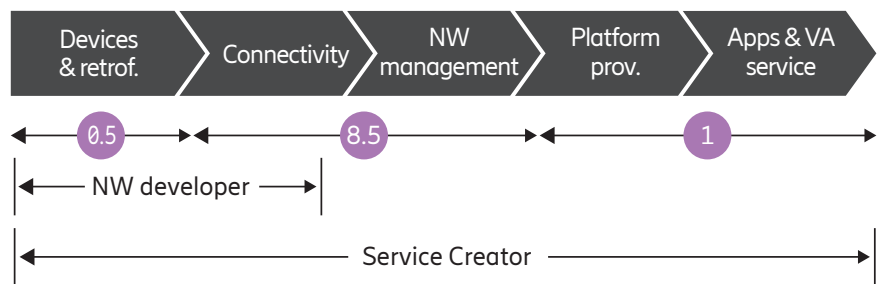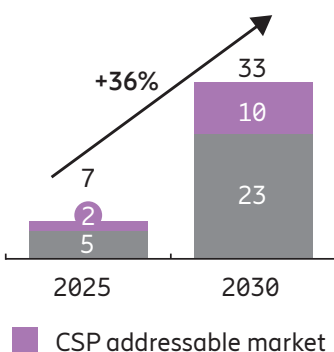Small and medium sized manufacturing companies

Key slicing cases:

AR for quality inspection and diagnosis	Remotely controlled robots
Throughput	Low latency
3D robot-human interaction	Process optimization inside factory
Traffic isolation	Throughput

[2] Statista. Global size of the smart factory market in 2019 and 2024. 5 February 2021. https://www.statista.com/statistics/872289/worldwide-smart-factory-market-size/. Retrieved 6 May 2021.

[3] World Economic Forum. The Future of Jobs Report 2018. 2018. http://www3.weforum.org/docs/WEF_Future_of_Jobs_2018.pdf. Retrieved 8 May 2021.

CSP Segment slicing revenue potential
CSPs addressable revenues are expected mainly from network and connectivity services. Slicing-enabled revenue in 2030 will be around USD 33 billion, with CSP-addressable revenue expected to reach USD 10 billion.

+36%

33
10
23

7
2
5

2025   2030

■ CSP addressable market

| Devices & retrof. | Connectivity | NW management | Platform prov. | Apps & VA service |

0.5   8.5   1

NW developer

Service Creator

+15% higher revenue potential as a service creator

Use case deep dive: Augmented reality for quality inspection and support
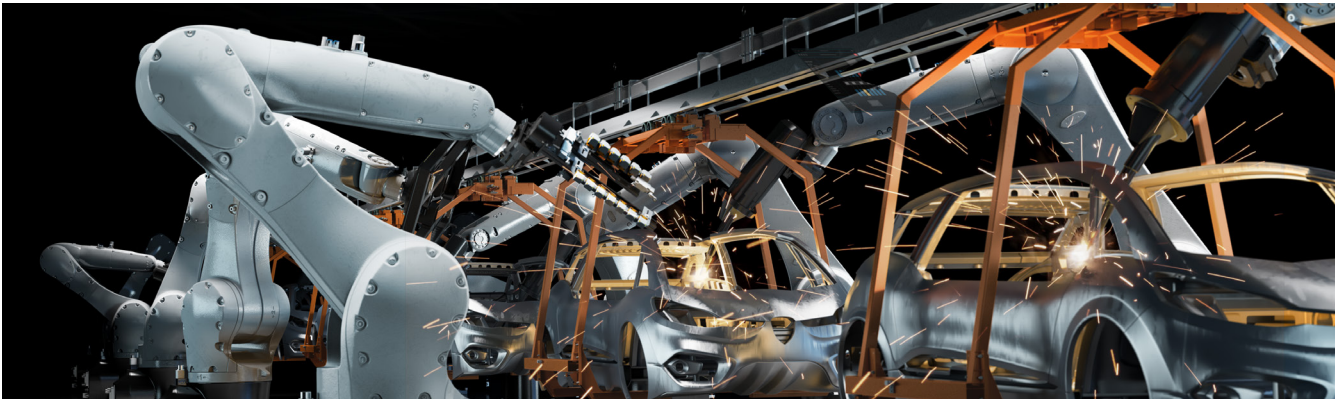
In manufacturing, it's currently ten times more costly to remedy a quality issue[4] when it's detected by the customer than when it's detected in the factory. Additionally, more than one-third (36%) of manufacturers find it difficult to compare CAD models to as-built assemblies and manufacturers are experiencing a lack of skilled labor, with one-fourth of quality technicians retiring over the next five years.

Production facilities can increase worker efficiency and catch more product defects in the factory using AR, because it enables remote support for technicians, maintenance and operators throughout the facility. Additionally, measurements and HD video can be taken instantly for visualization remotely by remote experts who can provide support.

Real-time HD video and image transfer can be supported by a network slice that provides high throughput, high reliability and ultra-low latency. AR devices will transfer images and videos to a factory cloud where data will be processed and managed. Security can be enabled by traffic isolation, and self-service features

can enable granular device management and user permissions. And thanks to widespread coverage, devices can be traced throughout the factory at all times.

The CSP-addressable slicing revenue from this use case will be about USD 1 billion by 2025.

The total economic benefit of AR for inspection and support totals about 0.5% of steady state annual revenues. These benefits arise from the following:

— Maintenance cost savings: 8% of benefit

— Decreased cost of service trips: 2% of benefit

— Decreased cost of operator labor: 47% of benefit

— Decreased downtime: 10% of benefit

— Decreased cost of quality inspections: 34% of benefit

Additionally, this use of AR reduces the CO2 impact from service experts' travel by 50%, because they will be able to do much of their work remotely. It also provides a better ergonomic environment. With AR devices, instructions can be displayed

directly in the glasses, enabling the worker to conduct the troubleshooting more effectively, so they spend a shorter amount of time in an uncomfortable position.

If CSPs choose to act as a network developer in this use case, they would provide connectivity and management, with revenue coming from a subscription model for connectivity and network services based on SLAs and factory size.

However, if CSPs have sufficient domain expertise and strong relationships with other providers within the production ecosystem, they can act as a service creator and capture more of the value stream. Here, the CSP would establish technology and go-to-market partnership to gain market access and overcome specific industry challenges such as sales and IT integration. The CSP would manage the provisioning of platform capabilities and data management, which will require close collaboration with the system integrator. Hardware partners would receive a fixed fee, while connectivity and service will likely be subscription based. Go-to-market and software providers will likely receive a revenue share.

Use case assessment
AR/VR for quality inspection and support

8%	Maintenance labor cost savings
10%	Decrease downtime in production
50%	Reduced CO$_2$ impact from service expert travels

Slicing brings guaranteed real-time control, high network security, real-time data transfer enabled low latency, traffic isolation, and high throughput

1.0 USDbn ▶ **9%**

CSP addressable slicing potential (2025)

Share of segment
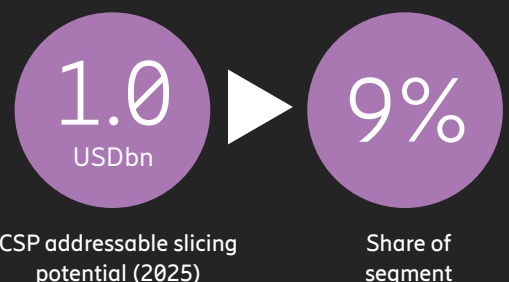
[4] Spectral Applications. Augmented reality in quality control. http://spectralapplications.com/augmented-reality-quality-control/. Retrieved 8 May 2021.

8. Supply chain:
A USD 9 billion market opportunity
Freight management alone is a USD 100 million near-term opportunity

The supply chain is composed primarily of players and activities that supply material for production, distribute finished commodities to end-customers and provide inventory and warehouse management services. It's a fast-growing space. Supply chain management alone is expedited to grow from USD 18 billion in 2020 to USD 30 billion in 2025, for a compound annual growth rate of 11%[5]. Global e-commerce, which requires a robust supply chain to meet demand and deliver product to customers, accounted for 14% of all retail sales in 2019, and that figure is expected to reach 22% by 2023. Globalization and a growing population will have a significant impact on production, creating new and larger addressable markets.

Technology is also driving the need for the kinds of robust, customized services that network slices can provide. Big data analysis is providing previously unattainable insights into consumer behavior and usage patterns, as well as more efficient maintenance on critical supply chain assets.

But the sector faces a number of connectivity challenges that are holding back the implementation of advanced use cases. For example, a lack of connection reliability inhibits real-time data transfer and could prevent the full utilization of IoT functions. Additionally, different types of IoT devices have unique network requirements that must be handled without harming overall network performance.

Limited coverage limits full traceability and real-time updates on goods en route, and an increase in the number of sensors, connected systems and processes will require a much more flexible, scalable network.

Benefits of network slicing

Network slicing addresses several of these challenges. A network slice with QoS can guarantee reliability and control, and the ability to configure a slice based on need can accommodate any level of connection density. A network slice can provide guaranteed geographic coverage, and costs can be predictable as CSPs deploy slices on a global level. Plus, because network slices can be easily scaled, capacity can be adjusted as demand increases. Finally, to harden network security, slices can employ traffic isolation.

Through network slicing, CSPs can help supply chain companies enable key use cases, including remote quality inspection or diagnostics; real-time product monitoring of performance, quality variations and changing factors in the environment; freight management and tracking across larger, distributed areas; as well as the integration of multiple video feeds and video recognition algorithms for intelligent video surveillance.

[5] Statista. "Size of the global supply chain management market worldwide from 2019 to 2027." 28 October 2020. https://www.statista.com/statistics/1181996/supply-chain-management-market-size-worldwide/. Retrieved 8 May 2021.

Segment overview
Supply chain

Segment scope
Supply and distribution of goods, inventory and warehouse management
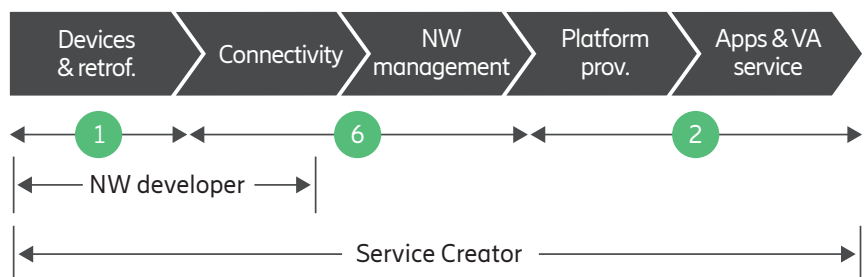
Typical CSP customers
Distributors, 4 party logistics provider, manufactures etc.

Key slicing cases:

Remote quality inspection/ diagnostics	Real-time product monitoring
Throughput	Low latency
Freight management	Intelligent video surveillance
Low latency	Availabilty

CSP Segment slicing revenue potential
CSPs' addressable revenues will come mainly from network and connectivity services. Slicing-enabled revenue from the supply chain industry is expected to reach USD 20 billion in 2030, of which CSP-addressable revenue will be around USD 9 billion.

+21%

	2025	2030
	8	20
Green	3	9
Gray	5	11

■ CSP addressable market

=

Devices & retrof.	Connectivity	NW management	Platform prov.	Apps & VA service
1		6		2

NW developer
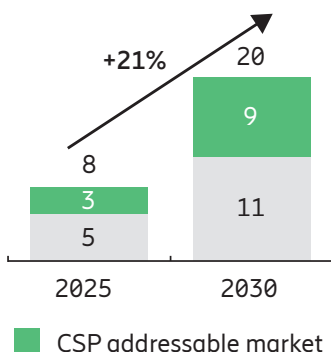
Service Creator

+40% higher revenue potential as a service creator

Use case deep dive: Freight management

As 5G rolls out, cheaper IoT sensors will increase single-item monitoring, accelerate faster inventory checking and help avoid revenue leakage via theft and loss. To provide this service reliably and avoid cyberattacks locating inventory, there will be a demand for ultra-high security. Additionally, as shipments traverse through highly populated metropolitan areas, tracking abilities won't be slowed down by a strained network. A network slice facilitates the ability for logistics managers to account for cargo from end to end, during all points of its trip.

Managers need these capabilities, because currently, 90% of logistics providers say a lack of supply chain visibility is one of the biggest challenges in the industry today[6], 40% of companies see the lack of good track and trace tools and reliable mobile connectivity as key barriers. 60% agree that improvements in these areas would improve capabilities to deliver, and 88% of logistics providers say that B2B customers expect same-day delivery[7].

Network slices will enable reliable and secure real-time tracking, monitoring and coordination of freight and assets distributed in large areas. Low energy sensors placed inside trucks, containers, boxes or on individual items monitor key indicators such as location, temperature or humidity. Smart locks enable monitoring and alarming of theft, and suppliers,

carriers and customers get complete, secure supply chain transparency enabling end-to-end supply chain optimization.

5G network slicing will enable seamless integration with local mobile private networks without compromising security or performance. Dynamic self-management of network security will ensure that data remains safe, and blockchain can be used in tandem with slicing to provide trust in data sharing among players.

Key benefits to supply chain companies include a reduction in high-value freight theft, which accounted for USD 2 billion in losses in 2019[8]. Companies who take advantage of freight management powered by a network slice will be able to provide higher-end customer service, differentiating themselves from their competitors. Automation will shorten lead times and make more efficient use of labor, while real-time, end-to-end monitoring will reduce damage to sensitive goods.

There are additional benefits beyond those that are economic. These same systems can provide full, trusted environmental transparency, along with increased safety for workers on the road.

If CSPs choose to take on the role of network developer, which is appropriate if they lack specific domain expertise and end-customer

relationships, they will mainly focus on connectivity and network management. In this role, CSPs will need to rely on partners to bring full solutions offerings to market, and the revenue model will be subscription fees based on the number of sensors, SLAs and the scale of geographic coverage.

However, if CSPs possess strong domain expertise and deep relationships with end-customers, they can capture more of the value chain as a service creator. Through technology and go-to-market partnerships, CSPs can gain more effective market access and overcome specific industry challenges. Hardware would likely be one-time sales and these partners would receive a fixed fee, while go-to-market and software partners would likely receive a share of revenue. Connectivity would remain subscription based.

By 2025, CSPs could address potentially USD 100 million in revenue.

[6] Moor Insights & Strategy. Can Jabil Revolutionize the Supply Chain? 20 July 2015. https://www.jabil.com/dam/jcr:66273b14-209e-4ed5-8938-6fcf71049f82/can-jabil-revolutionize-the-supply-chain.pdf. Retrieved 8 May 2021.

[7] Ericsson. Pre-emptive logistics — the road ahead. July 2020. https://www.ericsson.com/4a310f/assets/local/reports-papers/industrylab/doc/pre-emptive-logistics-report.pdf. Retrieved 8 May 2021.

[8] Arthur D. Little Analysis with data from BSI and TT Club. BSI & TT Club Cargo Theft Report 2020. 19 February 2020. https://www.ttclub.com/-/media/files/tt-club/bsi-tt-club-cargo-theft-report/bsi-and-tt-club-cargo-theft-report-2020.pdf. Retrieved 8 May 2021.

## Use case assessment
Freight management

🌱 Reduced fuel consumption from less air resistance

⚙️ Reduced damage costs from fewer accidents

♡ Improved raod safety

0.1 USDbn ▶ **3%**

CSP addressable slicing potential (2025)

Share of segment

Traffic isolation, reliable and secure connection, dynamic self-management are all guaranteed by slicing enabling real-time monitoring and data transfer
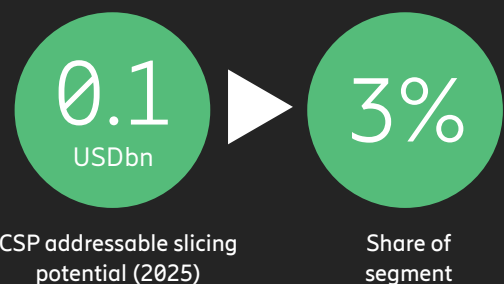
9. Gaming:
A USD 7 billion market opportunity

Mobile cloud gaming alone is a USD 1 billion near-term opportunity

The gaming industry is composed of key players that develop, publish and distribute games, as well as the ecosystem players that enable the consumption and development of games, and this sector is growing rapidly.

The consumer demand for mobile games is growing alongside the increase in the number of 5G smartphone users. The advancement of 5G opens up a much larger addressable market for new gaming services, including new cloud-based gaming services. With the advent of the cloud and new hardware, AR, VR and XR devices and high-resource cloud data centers will drive new gaming opportunities.

In the past, fixed networks have tethered many gamers to their home or gaming console. Additionally, high-quality video transmission requires large bandwidth support, otherwise video compression degrades the user experience. In particular, VR and other highly interactive games requires very high throughput and low latency for an enjoyable gaming experience. If too many players experience negative effects from lagging play, many may quit as a result.

Benefits of network slicing

The gaming industry can overcome any adverse gaming experiences with network slicing. Slicing can assure guaranteed throughput levels, and slices can be configured to meet network capacity needs. Slicing also opens up a wider area for advanced gaming, since gamers are no longer relegated to fixed networks only. If cloud services use slicing, compression time can be optimized without affecting latency or user experience.

The ultra-low latency from edge computing can open up advanced gaming, making immersive VR possible where it was not previously feasible on public networks.

The key use cases for network slicing in the near term will include streaming of smartphone games rendered in the cloud, computer and console cloud gaming, VR cloud gaming and e-sport events.

Segment overview
Gaming

Segment scope
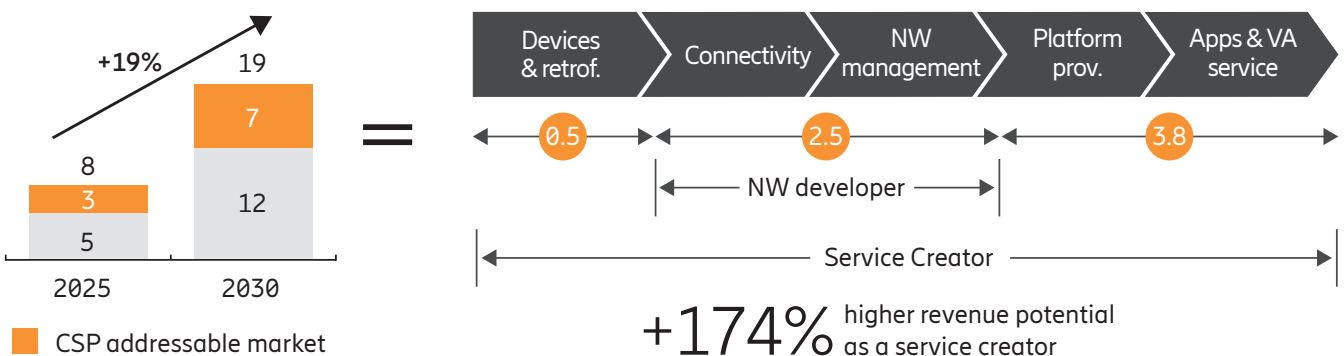Development, publishing and distributing video games to consumers

Typical CSP customers
Cloud service providers, gaming platforms

Key slicing cases:

Smartphone cloud gaming	Computer/ console cloud gaming
Latency	Latency
VR cloud gaming	E-sport events
Latency	Latency

CSP Segment slicing revenue potential
For CSPs, typical customers include cloud service providers as well as gaming platforms. By 2030, slicing-enabled revenue is expected to reach USD 19 billion and addressable revenue will reach USD 7 billion.

+19%

	2025	2030
	8	19
orange	3	7
grey	5	12

■ CSP addressable market

= Devices & retrof. → Connectivity → NW management → Platform prov. → Apps & VA service

0.5   2.5   3.8

NW developer

Service Creator

+174% higher revenue potential as a service creator

Use case deep dive: Smartphone cloud gaming

When it comes to mobile cloud gaming, users can face a host of problems in the midst of a high-stakes gaming session. For one, highly interactive games require twice the power of what current mobile broadband can reach. Additionally, lag and delays in gameplay is a serious issue in gaming that can degrade the user experience (and customer retention).

Smartphone cloud gaming enables users to stream mobile games that have been rendered in the cloud, which overcomes device limitations. The game fully operates on the server side, where images are rendered, compressed and transmitted to the user. This method enables more high-end mobile gaming, which can open new opportunities.

Network slicing provides four main features for smartphone cloud gaming:

– Lag-free mobile gaming with low latency

– High resolution experience due to high throughput

– Guaranteed quality of experience

– Charging and billing to game platforms and cloud service according to network usage

There are significant economic benefits enabled through this use case. Smartphone cloud gaming can pave the way for higher price points for games, especially for gamers that pay a premium for a high quality of gaming experience. The games that weren't previously feasible on smartphones can become a

reality, now that they're able to run on the device via the cloud. The new and higher-end games attract new customers, too.

The roles for CSPs could cover double revenue streams. Acting as a network developer or transmission partner would be the first natural step, since it will be a stretch for MNOs to move into key broadcast solution areas without domain expertise. As a service creator, CSPs can bundle gaming platforms with a B2C mobile subscription, creating the potential to address a larger value chain share. The CSP can bundle solutions into game-as-a-service offerings; for example, using a subscription fee with unlimited gaming.

By 2025, CSPs could address USD 1 billion in revenue potential.

Use case assessment
Smartphone cloud gaming

95% Willing to pay more for 5G services if given better QoE

58% already pay a premium for better QoE; 60% would pay 50% more for even better

Increased audience reach – "Netflix for games"

Slicing brings guaranteed lag-free, high resolution mobile gaming experience enabled by <30 ms E2E latency and high throughput

1
USDbn

▶

35%

CSP addressable slicing potential (2025)

Share of segment

10. Railway:
A USD 3 billion market opportunity
Drone track inspection alone is a USD 3 million near-term opportunity

In the rail industry, which is composed of entities operating railway vehicles, infrastructure and customer services, network slicing will enable use cases such as automated driving, and real-time monitoring among others.

The industry's growth is a result of several key drivers. Automation has a significant impact on reducing costs through improving energy consumption and decreasing down time. Digitalization allows for real-time monitoring, preventative maintenance and enhanced customer services. Big data analytics will play a significant role in providing insight to operations resulting in efficiency improvements.

Connectivity is key to the industry's growth however, there are several challenges that the rail industry will need to handle in order to be successful. Connectivity costs can be expensive for railway operators. Reliability is a vital component to ensure safe and secure operations. High throughput will be necessary to stream data from, for example, video sensors capturing large volumes of data about the railway infrastructure.

Railway operations require a network with full coverage because of the large geographical area serviced. Network

security must also be at a high level to ensure operational safety across the industry. As automation and digitization grows in the segment, an exponential increase in connected devices is expected and networks will be required to have the ability to adjust and manage it.

Benefits of network slicing

Network slicing addresses several of these challenges. Slicing guarantees reliability and real-time control through its QoS. Slices can also be configured to specific bandwidth needs, including very high throughput, and can be configured to handle increases in connection density. QoS is guaranteed through slicing as 5G will provide better coverage than fixed solutions. It also provides a flexible option in demanding terrain.

As far as network security, isolated traffic provides configurable security to meet specific needs. Slices can also be configured and adjusted to handle and manage an increase in connected devices, making them highly scalable.

Network slicing enables some key use cases that rely on high network performance, including drone track inspections, predictive maintenance, tele-operated driving and virtual coupling.

Segment overview
Railways

Segment scope
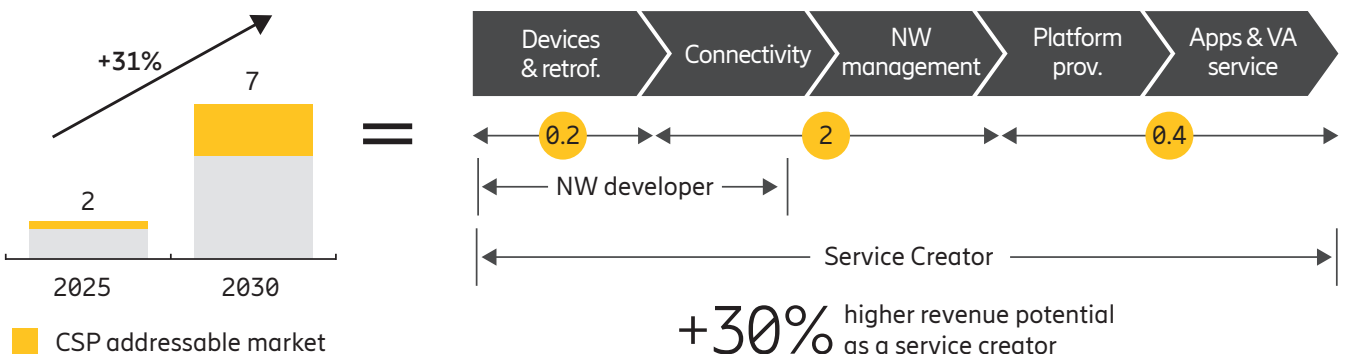Operations and maintaining railway vehicles and infrastructure

Typical CSP customers
Railway operators, railway authorities

Key slicing cases:

Drone track inspections	Tele-operated driving
Throughput	Latency
Predictive maintenance	Virtual coupling
Throughput	Latency

CSP Segment slicing revenue potential
For communications service providers (CSPs), typical customers include railway operators and railway authorities. By 2030, slicing-enabled revenue for the railway industry will approach USD 7 billion. Addressable revenue in the segment is expected to reach USD 3 billion by 2030.

+31%

7

2

2025   2030

■ CSP addressable market

Devices & retrof.	Connectivity	NW management	Platform prov.	Apps & VA service

0.2   2   0.4

NW developer

Service Creator

+30% higher revenue potential as a service creator

Use case deep dive:
Drone track inspection

Manual track inspection is expensive and occupies the tracks, preventing trains from using the route during the process. With limited resources, the amount of inspections that can take place are limited and as a result, hazards and faults are rarely discovered early. Ultimately, this results in safety issues and the need for additional maintenance.

With drone track inspections, railways can quickly and safely execute inspections in rough terrain without occupying the tracks. Additionally, drones can be equipped with a variety of sensors to support thermal imaging, HD cameras and light detection and ranging (LIDAR).

Network slicing provides three main features:

— Five-nines reliability and high security through traffic isolation

— Real time data analysis of track conditions enabled by high throughput and low latency

— National coverage enables end-to-end remote inspections

There are several benefits that can be gained from drone track inspections. Drone track inspections reduce the costs for complex inspections. The ability to detect potential hazards that could cause delays early-on, and increased inspections will result in safer tracks and lower

maintenance costs. Drone track inspections also significantly improve safety in comparison to manual track inspections.

Without domain expertise, CSPs will need to partner with a solution provider that will bring the full solution to market. Acting as the network developer, CSPs can create a revenue stream from a subscription fee for connectivity. Additionally, CSPs can act as a service creator; with go-to-market partnerships and technologies, they can capture even more of the value chain. Again, creating revenue from a subscription fee. By 2025, CSPs could address a USD 3 million global revenue potential.

Use case assessment
Drone track inspections

Reduction of costs for general and complex inspections

Early detection of potential hazards, limiting delay of commercial operations

Increased frequency in inspection improving railway safety

3.4 USDbn ▶ **1%**

CSP addressable slicing potential (2025)

Share of segment

Slicing brings guaranteed real-time control of drones and allows real-time high-quality image/video analysis enabled by low latency with high reliability and throughput

Ericsson enables communications service providers to capture the full value of connectivity. The company's portfolio spans Networks, Digital Services, Managed Services, and Emerging Business and is designed to help our customers go digital, increase efficiency and find new revenue streams. Ericsson's investments in innovation have delivered the benefits of telephony and mobile broadband to billions of people around the world. The Ericsson stock is listed on Nasdaq Stockholm and on Nasdaq New York.

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