

Building the port of the future



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“In the new world, it’s not the big fish which eats the small fish, it’s the fast fish which eats the slow fish.”

**Klaus Schwab, Executive Chairman,
World Economic Forum**

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ABP goes digital with Private 5G Network from Verizon.

Associated British Ports (ABP) Southampton is one of the U.K.'s busiest ports. It handles millions of containers and vehicles each year. It has a large, complex environment with many potential hazards.

Connecting an environment like this isn't easy. ABP's productivity was being hampered by notspots across its 726 acres. This was stopping it from implementing new technology that could improve efficiency and safety.

A private 5G proof of concept from Verizon solved historical connectivity issues and led to an immediate boost in productivity. Since the new network was deployed, ABP has begun testing exciting new solutions that will help it to create a competitive edge for the future.

See how private 5G is helping ABP achieve Enterprise Intelligence in this video case study.



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Cut costs, make operations more efficient and create new revenue streams.

Private wireless networks are a catalyst for change. They are a critical enabler of technologies like artificial intelligence (AI), machine learning (ML), edge computing, the Industrial Internet of Things (IIoT) and extended reality (XR). Together, these technologies can help port operators achieve unprecedented insight, near-real-time analytics and data-driven decision making. We call this Enterprise Intelligence and it's critical for future success.

A port requires a complex ecosystem of partners to work together to deliver timely, efficient service. The demands are high, users want prompt turnaround, legislation must be followed and safety maintained. Margins are tight, so costs must be kept under control.

Operators have been striving to improve efficiency for many years. Tracking of cargo and its condition are business as usual, but many ports suffer from gaps in visibility and delays in updating information. This can affect throughput and profitability of the port. As ports are constrained by their physical size, reducing delays and improving efficiency and productivity are critical to competitiveness.

Visibility is key, but ports are large, complex environments and providing connectivity throughout can be challenging. With private 5G, it's now possible to provide more pervasive connectivity, more reliably and cost-effectively.

A private 5G network is a dedicated cellular network that covers a specified area, such as a port or campus. The owner can set which areas are covered, who can access the network, and performance characteristics like latency and traffic prioritisation.

As demand and competition rise, it is becoming increasingly important that operators take every opportunity to improve efficiency and seize every revenue opportunity. Private 5G can help overcome many of today's operational challenges and could give your operation a significant competitive advantage – or put you at a significant disadvantage if your competitors implement them first.

Over the coming pages we look at how private 5G networks can provide immediate benefits and support medium and long-term innovation, efficiency improvements and growth.

4x

The Organisation for Economic Co-operation and Development (OECD) has predicted that global container handling in ports could rise up to four times 2010 levels by 2030 and five to six times by 2050.

OECD¹

Verizon works closely with long-term partners, including Intel and Nokia, to deliver high-performance, reliable and secure private wireless solutions. To find out more about these partnerships and how they can help your business achieve its goals, see page 16.

Start by improving connectivity.

Private 5G networks aren't just about innovation and new solutions. They can help alleviate the problems associated with interference, reflection and "notspots" to provide reliable site-wide connectivity. This is critical to getting the most from the applications that you've already got.

Fast, reliable connectivity is important for the efficient and safe operation of a port. Effective communication between the port authorities, terminal operators, shipping lines and trucking companies helps to ensure the smooth and timely handling of cargo. Without that, there can be delays, confusion and errors in the movement of goods and people.

Reliable communication is also essential to quick and coordinated responses to potentially dangerous situations, mitigating danger to people and damage to goods and equipment.

But connecting a large, complex environment like a seaport isn't easy. Wired connections aren't really viable and the weaknesses of wireless technologies that work fine elsewhere, like Wi-Fi, are often exposed when faced with the challenges the environment poses.

Cellular technologies, such as private 5G, are designed for outdoor use. And Verizon has decades of experience at providing pervasive cellular coverage in a wide range of environments – from wide open plains to densely packed cities.

Private 5G is able to support a lot of devices – up to a million per square kilometre – and even those moving at speed. It can provide the reliable, secure connectivity needed to support and expand existing applications, from voice communications to granular, near-real-time asset tracking port-wide.



Provide reliable connectivity

Private 5G can reach the ports other technologies cannot. With reliable connectivity across landside, terminal and waterside areas, you can get more out of your existing apps and create a foundation for innovative new solutions.





Improve efficiency and cut delays

Private 5G can help make your existing apps available everywhere. This includes voice services, such as push-to-talk. Giving shore workers reliable communications can help increase efficiency, reduce delays and improve customer satisfaction.



Accelerate inventory movement

With reliable connectivity it's possible to track assets in greater detail and in near real-time. This can help improve visibility, enabling better utilisation of space, faster location of assets and fewer losses. With granular, up-to-date information you can move inventory through the port more quickly, improving turns and revenue.

Next, leverage proven solutions.

Port operators have been cutting costs and improving efficiency for years. But it's getting harder and harder to find innovations that give a sustainable competitive advantage. Instead of worrying about where the next 5% or 10% improvement will come from, leaders are thinking about transformation that will deliver order-of-magnitude change.

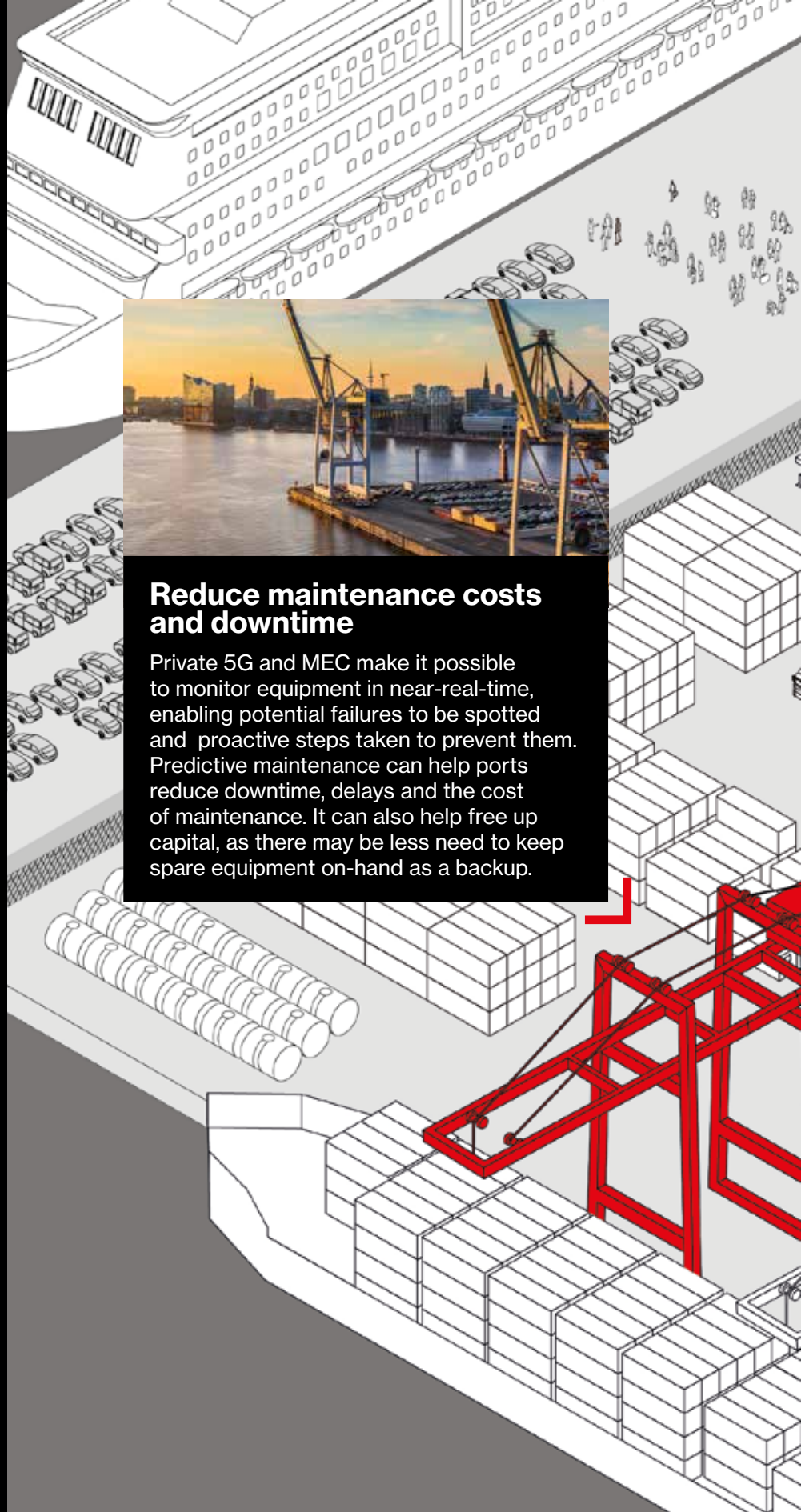
Port operators were some of the earliest adoptors of private 5G and have driven the development of solutions to their specific challenges. Many of these include the use of multi-access edge computing (MEC) to enable near-real-time responsiveness.

In recent years, the trend has been to move IT workloads to the cloud. This can have many advantages, including increasing scalability and reducing over-allocation and spending. And that's great for many applications, but when responsiveness is critical, the round trip to a remote data centre and back can make a big difference.

MEC takes computing "to the edge". Processing can be done on-site, virtually eliminating lag due to data transfer. This can enable a multitude of new solutions to help port owners and operators:

- Make better use of space
- Accelerate the handling of consignments
- Reduce maintenance costs
- Cut equipment downtime
- Improve worker safety

The corresponding reduced reliance on external data links can reduce communications costs and improve resilience. Applications could keep operating as normal, keeping cargo flowing, even if the internet connection is lost or degraded.



Reduce maintenance costs and downtime

Private 5G and MEC make it possible to monitor equipment in near-real-time, enabling potential failures to be spotted and proactive steps taken to prevent them. Predictive maintenance can help ports reduce downtime, delays and the cost of maintenance. It can also help free up capital, as there may be less need to keep spare equipment on-hand as a backup.



Automate surveillance and inspection

Not only can private 5G enable reliable port-wide video security, combined with MEC, it can help automate the analysis of footage and trigger appropriate responses in near-real-time. This can help improve efficiency, safety and security.



Improve worker safety

Ports can be dangerous places. With private 5G and MEC, you'll be able to bring the power of AI to worker safety. Intelligent video analytics can enable the automation of safety checks, such as:

- Confirming that employees are wearing the right protective gear
- Monitoring access to restricted areas
- Identifying signs of worker fatigue
- Watching out for "person down" incidents

This can help avoid incidents, injuries, regulatory penalties, reputational damage and downtime.

Then start to innovate and differentiate.

Innovation is risky, but not innovating could be even more dangerous. When there's disruption all around you, standing still isn't really an option. Organisations that don't seize opportunities to differentiate themselves are likely to find their margins squeezed even more, their market share under greater pressure and their ability to recruit and retain the best talent compromised.

Private wireless networks are key to our Enterprise Intelligence vision. Organisations that achieve Enterprise Intelligence will be more agile, more resilient to events beyond their control, and ultimately more successful.

For port operators, that means using private 5G, MEC and AI/ML models to create solutions that can transform their operations.

Verizon is working with ports around the world – including Associated British Ports (Southampton) in the U.K. and Virginia International Terminals in the U.S. – to design, build, deploy and manage solutions to help them:

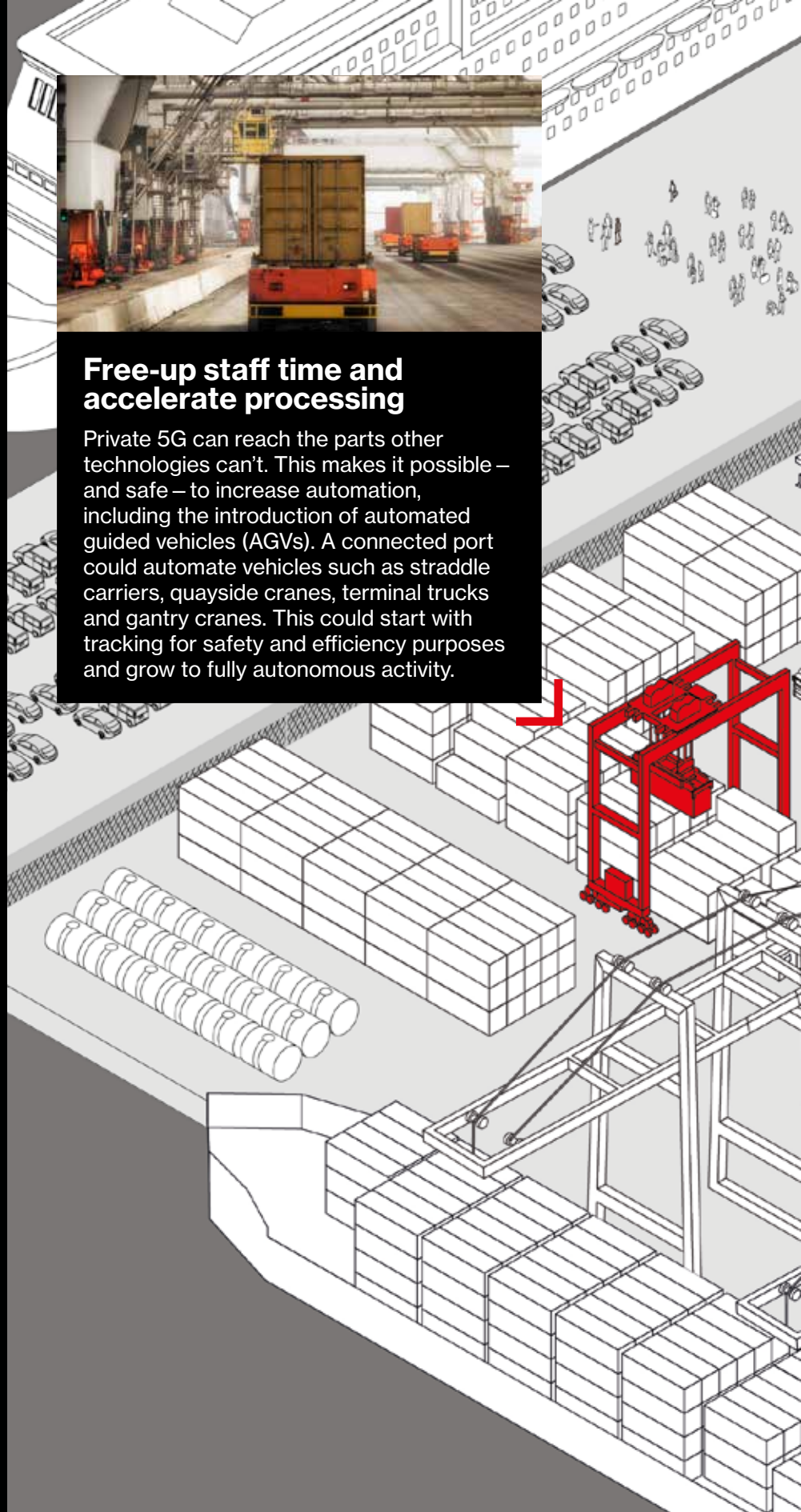
- Increase the automation of operations
- Make better use of scarce resources
- Move from being reactive to proactive

The insight that Enterprise Intelligence gives organisations will give them the confidence to act and the ability to deliver.



Free-up staff time and accelerate processing

Private 5G can reach the parts other technologies can't. This makes it possible – and safe – to increase automation, including the introduction of automated guided vehicles (AGVs). A connected port could automate vehicles such as straddle carriers, quayside cranes, terminal trucks and gantry cranes. This could start with tracking for safety and efficiency purposes and grow to fully autonomous activity.





Improve planning

The combination of private 5G and MEC can enable operators to gather granular data in near-real-time and use it to build detailed virtual replicas of their operations. These digital twins can help improve space utilisation and identify potential process improvements. They can also be used to test new ideas without the cost and disruption of a physical pilot – and virtual pilots could be port-wide, not just in a small area, giving better insight.



Make your operations greener

Private 5G can help ports decrease emissions, reduce energy use and improve sustainability. For example, private-5G-enabled cargo tracking can cut the number of empty containers being transported, reducing the number of trips required and consequently emissions. Private 5G can also support the deployment of renewable energy sources on site. And real-time monitoring can enable ports to measure their environmental impact and help identify areas where improvements can be made to become more sustainable.

Don't wait for the future, start building it now.

Private 5G isn't just about what you'll be doing in two, or five, years' time. With Verizon's private cellular network solutions you can think big, even if you want to start small.

Even just a single antenna can support multiple proofs of concept and live projects. This could enable you to deliver tangible benefits immediately and invest in your future by providing a platform for innovation.

Verizon has a comprehensive portfolio of solutions and industry-leading partners. Together, our offerings can help you get started with private 5G and scale as you start to see the rewards.

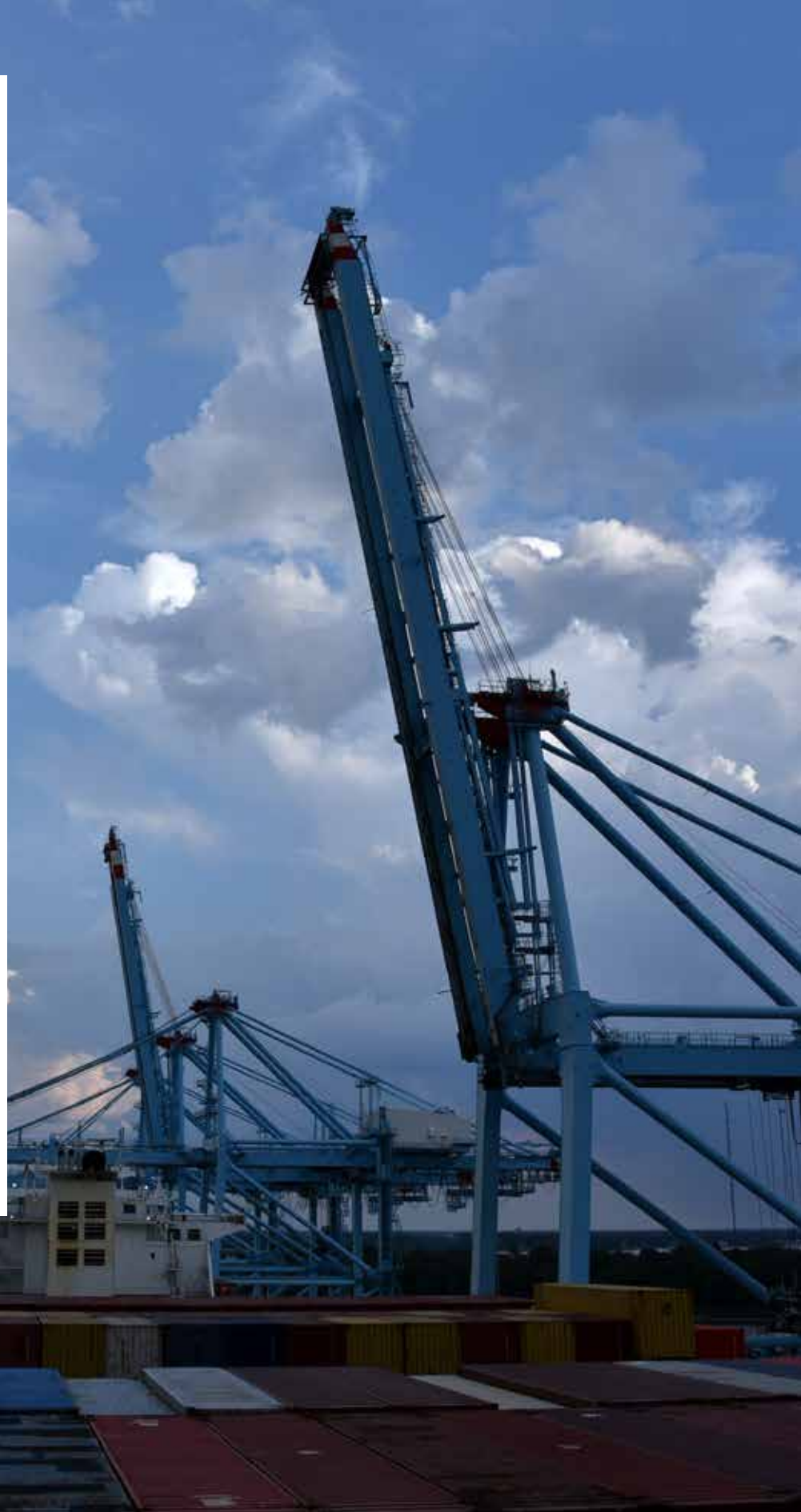
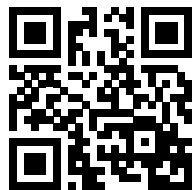


Private 5G delivers secure day-to-day networking and the bandwidth needed for industrial use and innovation.

Virginia International Terminals (VIT) is one of the most technologically advanced container terminal operators in the world. In its last fiscal year it handled 2 million containers (3.7M TEUs).

VIT has selected Verizon to provide private 5G connectivity across its Virginia International Gateway facility, a 275 acre marine terminal. It is using the private 5G network for both industrial outdoor use and office broadband. Key projects include replacing Wi-Fi and exploring the use of autonomous over-the-road trucks.

“Verizon’s 5G private network is right for us because it’s flexible, scalable, and powerful enough for both industrial outdoor use and office broadband,” said Rich Ceci, SVP of Technology and Projects, VIT. “The development of autonomous vehicles technology applied to over-the-road trucks has significant environmental impacts, and addresses a major shortfall of truck drivers that is currently plaguing the transportation industry. We view Verizon as the premier 5G supplier in the market and are excited to be working with them.”



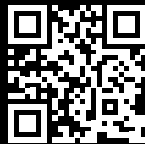
Next steps

Explore use cases



ABP builds the port of the future

Adopting Verizon Private 5G Network has helped solve historical connectivity issues at Southampton, one of the U.K.'s largest ports.



vz.to/41JDFKB



Port of Virginia trials UAVs

Private 5G Network is being used to trial autonomous trucks and other advanced solutions at Virginia International Terminals 275-acre site.



vz.to/420d0ZK



Private 5G use case visualiser

See how 5G is transforming operations in transport and associated industries – from improving sustainability to increasing automation.



bit.ly/427Wx6a

Learn more



Let's talk about private 5G.

Let's talk about private 5G

In their own words: Six industry experts answer questions about private 5G, implementation, use cases and more.



bit.ly/44moqcy

Let's connect



Get in touch

Contact us to find out how private 5G could help you streamline your operations, improve safety, boost sustainability and increase competitiveness.



bit.ly/41J80t5



Arrange a meeting

Book a meeting with a member of our team to find out how private 5G could help your business.



bit.ly/41J80t5

Or visit verizon.com/contact-us

Why us?

The partnership between Verizon, Intel and Nokia brings together three recognised world leaders in their fields. This formidable alliance creates a phenomenal set of world-class capabilities to develop, deploy and manage private network solutions.



Verizon operates one of the world's largest cellular networks – and the most reliable 5G network in the U.S.² This gives us tremendous insight into the challenges of maintaining security and performance, and how to address the challenges that this poses. But our expertise isn't limited to private 5G:

We manage global WANs for over 4,500 businesses and public sector organisations.

- We have vast experience of not just integrating systems, but then managing them 24/7, too.

We've carried out many large transformation projects for global organisations.

- We understand the challenges and can help de-risk your project.

We process over 60 billion security events each year.

- Analysing this vast amount of data gives us tremendous insight into emerging threats.

We manage over 500,000 network and security devices.

- When a customer comes to us with a problem, we can normally say that we've seen it before, and we know how to fix it.

We can also bring extensive industry knowledge to the table. We have experts that focus on specific industries, such as transport and logistics, including ports. They understand the needs of that industry and the processes, cost models and KPIs that companies in the industry use. This enables them to make intelligent recommendations on how to de-risk and accelerate change and achieve the best results.



Intel's complete set of network and edge solutions – from silicon to accelerators, software and reference solutions – are best suited to meet the demands of private networks. We can help define the requirements, from the connected device to the edge and the cloud, to recommend optimised placement of network functions, security, AI, analytics and other workloads. We're working with Verizon to offer versatile deployment options that enable innovation, flexibility and agility while helping to enable total cost of ownership (TCO) savings.



Verizon is one of only a few technology providers on the planet that owns the assets and possesses the expertise to combine and deliver an integrated private 5G solution for business. Nokia is the recognized global market leader for private wireless solutions. Together, we provide enterprises with secure, high speed, low latency private 5G network solutions. These networks provide dedicated, high-capacity bandwidth and range for critical communications, and a powerful edge computing platform for digital applications. We can help your organisation meet the growing demands of automation and more.

1 OECD, TRANSCONTINENTAL INFRASTRUCTURE NEEDS TO 2030 / 2050, 2010

2 **Most reliable 5G network based on more first place rankings in RootMetrics® 5G data reliability assessments of 125 metro markets conducted in 2H 2022. Tested with best commercially available smartphones on three national mobile networks across all available network types. Your experiences may vary. RootMetrics rankings are not an endorsement of Verizon. Visit [rootmetrics.com](https://www.rootmetrics.com).**





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