How GSIs can quickly deliver value with private 5G and MEC.

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An introduction by Dinesh Ramasvamy.

Across all sectors of industry and business, two factors are driving the adoption of new technology: the hunger for data, and the need to build in business agility and efficient processes that harness that data. In essence, when introducing new technology, businesses want to realize outcomes that deliver greater speed and efficiency, as well as operational cost reduction.

More sources of data, such as sensors, video streams, and Internet of Things, need to be connected to faster analytics at the lowest latencies, so that businesses can increase their operational resilience to quickly respond and adapt to continuous change. These imperatives are driving infrastructure architectures in two directions: edge computing, that brings cloud-scale analytics closer to the data source, and private 5G networks, capable of fully supporting high and ever-growing volumes of data with the speed, reliability, security, and scalability needed to support the agile solutions of tomorrow.

The combination of private 5G and multi-access edge computing (MEC) are now potent tools for business transformation. They are both complementary to existing infrastructure and offer an evolutionary pathway towards a new foundational approach for the future.

Private 5G's ability to provide ultra-reliable, low-latency communication supports MEC in moving workloads closer to the customer or data sources, with much higher speeds, capacities, and network loads. It also means developers can quickly deploy and test applications where they are needed.

Successful private 5G/MEC installations have been seen in multiple production deployments, with many businesses now evaluating the potential of this powerful union. Manufacturing, logistics, engineering, energy, and transport verticals as well as consumer applications are widely seen as the initial beneficiaries. This white paper is designed to provide insights into how Global Systems Integrators (GSIs) can benefit from Verizon's decades of experience in developing, building, and selling private 5G and 4G/LTE networks. Combining this experience with the deep vertical market knowledge and application layer expertise of GSIs, can truly leverage the transformational potential of private 5G and MEC.

About the author

Dinesh Ramasvamy is Managing Director, Global Solutions, at Verizon. He leads several global teams of senior leaders and subject matter experts to drive complex transformation initiatives on behalf of Verizon's customers. These initiatives encompass everything from software defined networks, big data and wearable technology; to smart cars, contact centers, grids and factories.

Dinesh's teams are challenged to imagine new possibilities, refine ideas and thoroughly engage in every customer's journey; applying Verizon's network and the power of 5G and MEC to achieve their goals. They operate across a diverse range of verticals including media, retail, healthcare, manufacturing, energy and finance.

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Common questions and misconceptions about private 5G that we are hearing from customers.

Is private 5G hard to manage?

The global cellular network has been in existence for decades, and private 5G may be the most data-centric, and may be the most closely aligned to IT network practices yet. Having said that, implementing private 5G is not without its challenges. That's why we offer private 5G as a managed service. We have the knowledge and expertise to help you get the best from the technology without the administrative burden.

Is the private 5G physical ecosystem as rich as the alternatives, such as WiFi?

5G technology is in constant evolution. Currently, it has a wide range of options, including sensors, cameras, RFID guns, and industrialized laptops, with more functionality expected in the next one to two years. Verizon has a world-class verification and approval system for 5G devices, providing full support for GSIs and their customers in specifying equipment for different use cases. The 5G cell radios themselves include nodes that are as easy to access as other technologies.

Will a private 5G/MEC deployment integrate well with existing security policies, practices, and regulatory requirements?

Yes. Even in healthcare and finance, where regulatory compliance is needed alongside the standard business data protection, privacy, and security requirements, private 5G is pre-designed to help customers keep data within a customer's premises and not subject that data to cellular networks which operate in public. In our experience of integrating managed networks with enterprise systems, we have found that 85% of network requirements are common across companies, with 10-15% being unique to each company.

How do you determine TCO and ROI of private 5G/MEC?

It can be tricky to calculate the precise TCO or ROI of private 5G/MEC but there are many calculators available online that can provide an estimate. If you're looking for a more accurate projection, we can help. Our real-world experience managing and implementing private 5G/MEC has given us unique insight into the economics of the technology.

How can GSIs leverage Verizon's 5G Innovation Labs to improve PoC success rates?

Verizon's 5G Innovation Labs exist to support GSIs and their clients. They offer practical demonstrations of a wide-range of existing 5G applications, including factory automation, security, logistics, AI/VR, and so on, as well as developer support for creating and testing 5G applications. We are also developing a Sandbox as a Service model where GSIs can load their applications and test the integrations prior to deploying to a customer site in order to speed the PoC. In-person visits or remote access are supported – expert support is always available.

Case studies.

Verizon is working with select customers, enabling them to realize significant benefits from private 5G/MEC: these case studies illustrate the real-world benefits that GSIs can use to speak to customers.

Rapid Deployment of Secure Testbed

Verizon and Marine Corps Air Station Miramar co-deployed a private 5G network to create the backbone of a Living Lab, where different technologies could be assessed. Set up to handle four kinds of usage - autonomous and connected vehicles, energy communication, base security, and drones - the system proved the viability of a rapidly deployed, secure, and high-performance network capable of simultaneous multiple uses. It also managed unmanned logistics vehicles which reduced base staff risk during COVID-19.

Real-Time Analytics of NBA Basketball Team

The Phoenix Suns NBA team is using Verizon 5G Ultra Wideband and MEC for real-time data collection, analysis, and visualization of player performance. The prior system relied on four cameras without real-time analytics.
The new performance-oriented system has 150 cameras and sensors, generating a 360-degree view that can be fully interrogated. It provides instant player body kinetics, play, and other performance data that can be immediately accessed by trainers and players alike. The plan is to scale this out for the whole stadium, giving fans a completely integrated, data-rich, and enhanced experience of games, including predictive analytics about how likely each player is to score from their current position, in an augmented reality video of the game.

Miramar
https://www.verizon.com/about/news/mcas-miramar-test-verizon-5g

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Fitting private 5G to customer needs.

Private 5G/MEC's high reliability and ability to provide high-bandwidth connections, at almost low latency, suit multiple applications and vertical environments, across many use cases.

To assist GSIs in speaking to customers, we've outlined some use case scenarios that – in Verizon's experience – are powerful conversation starters when selling private 5G/MEC.

Semi-automated and automated operations

Private 5G/MEC supports the remote operation of machinery with no (or minimal) human intervention. With its high-data-volume processing ability, private 5G easily supports wireless control of (semi-)automated operations, such as machinery monitoring. It's easy to safely integrate automated guided vehicles (AGVs) in a production environment to manage routine tasks. The high-reliability of private 5G and edge data analysis makes for more efficient information gathering from AGVs, improving their operation.

Drone inspections, worker fatigue and safety

Worker safety and fatigue levels are much easier to track with private 5G/MEC, with its ability to pull in data from a huge array of sensors. Complex industrial sites can be made safer, alerting workers to moving objects in their path, using body-mounted high-definition cameras with rapid AI processing at the edge. Private 5G elevates drone inspection activity too. Real-time drone monitoring of dangerous and hard-to-reach locations may maximize worker safety. The risk of in-person inspections is easily reduced, plus private 5G's high bandwidth means data can be streamed from multiple drones, potentially reducing cost.

Remote asset monitoring, including asset location

A big challenge for businesses is in understanding what's going on in industrial settings or across extended operational sites. Private 5G's high-reliability and high bandwidth mean sensor data is processed fast, supporting continual asset health checks. This makes remote asset monitoring and asset tracking a great deal more efficient. With this level of near real-time asset control, better-informed business decisions can be made possible.

Data and voice solutions for today

In this paper about private 5G and MEC, I am not following where a statement on "voice communications" is applicable. Private 5G is not just about enabling new or emerging use cases. It's vital to communicate how businesses can support the challenges they face today. Voice communications and traditional, human-centric use of wireless data remain important, helping private and public sector organizations, such as those in energy, healthcare and elsewhere accelerate operational efficiencies.

Two ways to start the conversation.

We realize GSIs have trusted relationships with their clients that allow for meaningful discussions about the benefits of private 5G/MEC. In our experience, we have found that there are two key conversation-starters that help customers understand private 5Gs ROI. First, help the customer to see how private 5G can speed their own business processes. Second, make it clear that private 5G brings with it a huge network-level performance boost, and can support a vast number of devices.

Private 5G strengths: how customers can benefit and how it complements existing network architectures

Private 5G has a unique combination of strengths. It has the high speeds and flexibility of WiFi, and the advanced radio engineering, topology, and tools to deploy effectively in buildings with complex layouts, across indoor/outdoor divides, across campuses. Unlike 4G/LTE, it has guaranteed throughput and low latencies with the ability to mix and match different classes of data on the same physical infrastructure through technologies such as network slicing. It can work alongside existing network technologies, such as WiFi and 4G, providing factory floor, warehouse, and delivery yard coverage for automated transport and machine monitoring. In the future, the customer may well find it cost-effective to make private 5G take on both roles, but that decision will be business-led.

Co-creating to deliver key client solutions

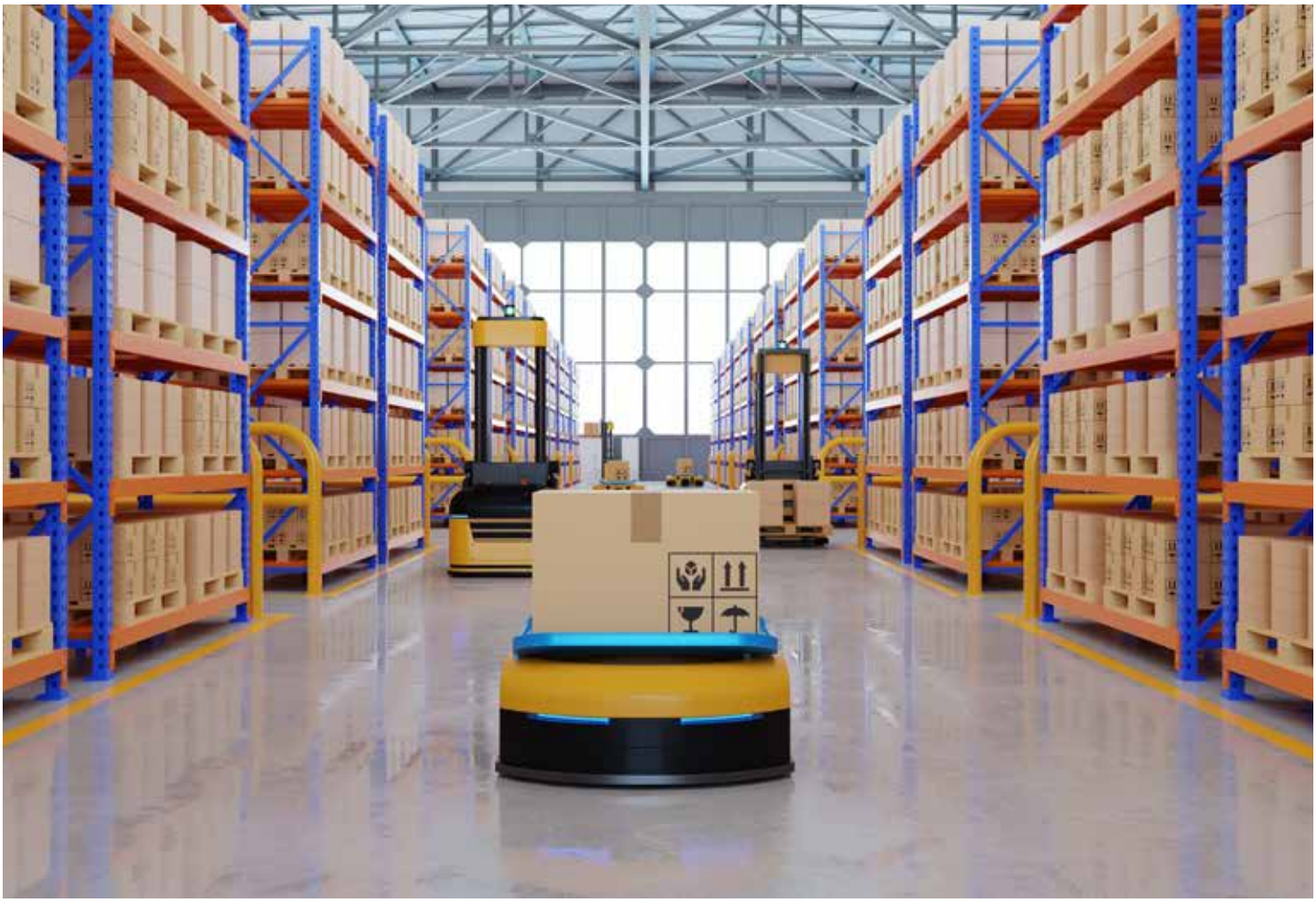
In developing partnerships, GSIs can focus on what they do best. Very often the cost and complexity of developing a private 5G network from scratch can be daunting and involves high risk for GSIs. Co-creation opportunities can be employed as a business imperative to solve any knowledge and talent gaps. The importance of design when instituting

business-critical cellular networks is essential in being able to identify and reduce points of pain, as well as support solution developments that show quantifiable benefits for customers. This applies over multiple scenarios. For example, when creating an application or system support for identifying areas of automation that can improve floor-force effectiveness, or when verifying whether computer vision can do a quality assurance task at a higher scale, and how to build out the system to support it. Also, in logistics, it could identify how added tracking and richer data about goods in transit can reduce wastage through dynamic scheduling and better just-in-time protocols.

Private 5G and emerging technologies

All new technology solutions are designed for the connected world, yet all have differing requirements within it. The Industrial Internet of Things has a huge range of sensors that can be deployed locally producing fast, continuous data – or remotely producing slow, intermittent data. It could be a steady stream of slowly-trending information that is economically connected over a high-latency link, or it could apply to alerts that need immediate responses. Virtual and augmented reality demands near real-time video processing that requires very low latency, for control of machinery or high-precision tasks, for example. Machine learning and artificial intelligence tasks may require data with any of the above attributes, or attributes uniquely suited to a task, such as batch delivery and dispatch of very large data sets.

Private 5G is unique in that it can be configured to support all these technologies – and scale to fit new needs that drive meaningful business outcomes. The underlying private 5G specification is designed for, and is already powering, a global, highly-available, and highly-secure infrastructure that supports fast transfer speeds all the way up to gigabit-level data. Private 5G can even offer support for autonomous vehicles, drones, remote sensors, and more.



A three-way partnership for mutual gain.

In offering solutions to clients, GSIs take on multiple responsibilities in the risk-reward spectrum and private 5G could easily involve a disproportionate amount of risk. The level of digital transformation required for successful private 5G delivery touches every aspect of how a business operates. It is highly disruptive and is far from being a simple light touch or add on.

Since every customer has very specific needs, relative to how they operate, each network essentially must be built from scratch. Without the support of a network expert, GSIs have to be that expert themselves, and be able to deliver on promises made to customers. The high levels of time and financial investment that can often span multiple years means that GSIs cannot, in many cases, afford to assume this burden, or potentially add to a customer's overall expenditure for private 5G/MEC.

Verizon has built its business over decades by understanding this for networks, data management, and in alignment to industry needs. Private 5G/MEC has the potential to transform how GSIs operate as well as add in new layers of support they can offer to their customers, increasing their agility and ability to react rapidly.

Partnering with Verizon enables GSIs to leverage existing strengths, so they can focus on the critical success elements of private 5G/MEC projects, such as planning, testing, and deployment. Verizon's experience in setting up and managing private 5G networks, and running a highly-available network infrastructure is the perfect complement to a GSI's expertise.

GSIs can further de-risk private 5G/MEC deployments by tapping into Verizon's many thousands of network experts, all of whom have proven experience in solving a myriad of network issues of multiple levels of complexity. These experts

can support the GSI wherever needed in the development of private 5G infrastructures. As a company, Verizon has invested $176 billion into its own networks over the last 22 years, and is trusted by a full 99% of Fortune 500 companies to solve their network issues and challenges. Verizon has also formed strategic partnerships with the entire network ecosystem: solid relationships with all large hyperscalers and numerous network hardware providers have been developed over many years of working together.

For any GSI, a range of co-creation and co-innovation opportunities can be developed that draw on the vast experience of the combined parties. Verizon's co-innovation process reduces time to opportunity and helps the GSI build a firm foundation to deliver PoCs much faster than when developing them alone. Verizon can also support the GSI in delivering security. As a leading cybersecurity provider over decades, we have all the essential security protocols in place and can work with, or to, any protocol. This removes the need for the GSI to build out the security layer from scratch.

Partnering with Verizon has many benefits for GSIs, providing them with the necessary support and network experience to expediently deliver new private 5G/MEC solutions to customers. We would like to invite you to come and use our labs, so you can experience first-hand the multiple benefits of partnering with us.

In summary: the power of partnering with Verizon.

Verizon brings decades of network experience to the GSI table. A partnership with Verizon gives GSIs a powerful way in to open up private 5G and nascent edge computing market opportunities, and most importantly, deliver significant new revenue streams.

For the GSI, there are many additional benefits of partnering with Verizon, that include:

- Creating co-innovation frameworks to deliver scale, consistency, ensure solution alignment, and decrease time to opportunity and/or time to revenue
- Using the power of the combined GSI/Verizon team to increase efficiency and speed delivery of go-to-market solutions
- Uncovering new market opportunities
- Creating repeatable and differentiated private 5G/MEC solutions
- Leveraging Verizon's long-standing technology partnerships with hyperscalers and equipment providers
- Harnessing Verizon's experience in supporting a strong network security posture and providing managed network services

Contact us to find out how Verizon's expertise can help you realize the benefits of private 5G/MEC.

Arleen Cauchi leads Partner Business Development and Co-Innovation for Verizon Business Group with responsibility for managing a partner ecosystem that helps our customers achieve business outcomes with digital transformations. These solutions combine the best from our partners with the best from Verizon leveraging professional services, managed services, FWA, IoT, private 5G, and Edge computing.

Arleen is a results-oriented leader with over 30 years' experience in sales and marketing. Her prior work experience includes several technology companies where she held roles in sales, product management, and engineering.

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