

Partnering to Provide Private 5G

How siticom Employed an Open Ecosystem to Simplify Campus 5G Network Deployments for Enterprises in Germany

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metaswitch

A Microsoft Company

Introduction

Private 5G networks enable enterprises to modernize business processes and improve how services are delivered or products are made and distributed across nearly every sector, including agriculture, automotive, education, healthcare, logistics, manufacturing, and transportation.

Germany is one of the first countries to make dedicated spectrum available for local, private use by enterprises. For the first time, enterprises in Germany can implement their own high-performing wireless networks, typically referred to as Campus Networks, that support mission-critical applications with the reliability, security, and privacy they require.

When coupled with local edge computing, the high-speed, low latency communications and large-scale IoT connectivity that is possible with 5G creates new opportunities for enterprises. Private 5G networks unlock access to valuable data within business operations and enable real-time local data processing, which provides a foundation for applying Artificial Intelligence (AI), analytics, and automation to traditional business processes. In short, 5G is transformative for enterprises.

Typically, private 5G networks support multiple use cases. An enterprise might start with a massive IIoT application monitoring data from hundreds of sensors and then leverage the same infrastructure to support real-time critical communications as well as diagnostics on factory machines via remote-controlled video cameras.

Through the power of established partnerships and their status as a leading systems integrator in Germany, siticom is ideally positioned to guide businesses through the complexities of deploying 5G campus networks that meet important technical requirements and critical financial goals.

The following highlights some common private 5G network scenarios that siticom is focusing on in Germany:

Universities and research institutions are deploying 5G networks to provide reliable, high capacity, low-latency communications test environments to support various studies and projects around industrial use cases or smart campus technologies.

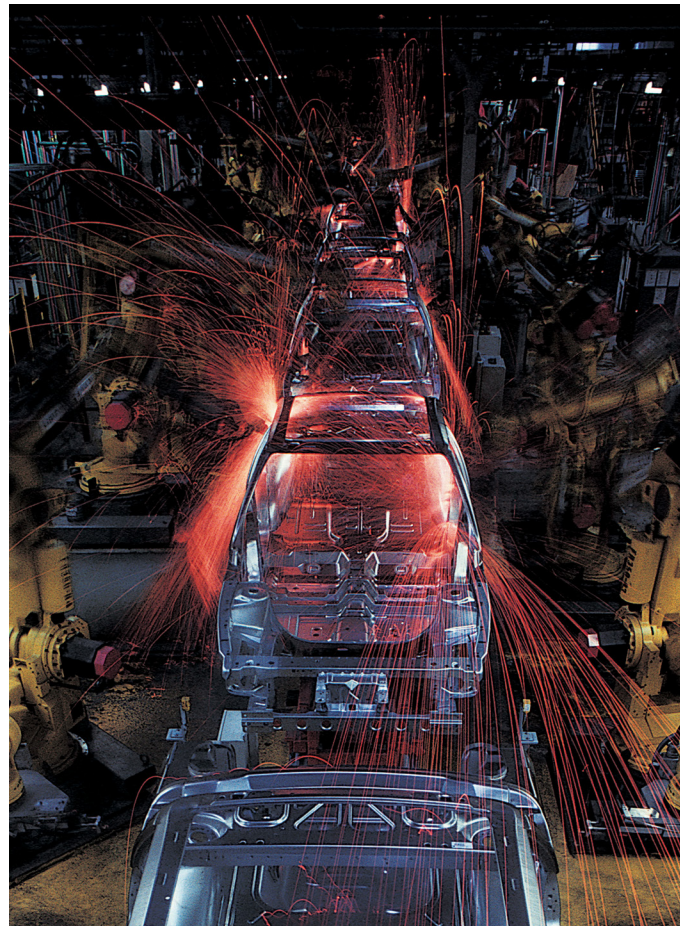
Energy companies leverage massive IoT capabilities to gather data from sensors for real-time monitoring of critical production and transmission systems.

In the **healthcare** sector, private 5G networks in hospitals or doctors offices help medical professionals deliver better health services, through remote diagnostics, real-time patient monitoring via wearable medical devices, as well as improving how health providers process massive amounts of private patient data.

To support **autonomous vehicle** applications, such as driverless public transport or vehicle platooning, 5G networks provide continuous, reliable, low-latency coverage to ensure safe and efficient transportation.

In **industrial** sectors, reliable and secure low-latency communication supports AI-based automation, smart manufacturing, mission-critical operations, remote maintenance, and robotics.

Once an enterprise has acquired a local spectrum license or decided on using an unlicensed band, building the 5G network is a complex challenge. The following explains how independent Systems Integrator (SI) siticom's expertise and open ecosystem approach simplify private 5G network deployments by bringing together trusted technology partners, including Metaswitch and Airspan, along with local edge computing resources.

The siticom logo features the word "siticom" in a light blue, lowercase, sans-serif font. Above the letters "i" and "c" is a stylized yellow cloud shape that arches over the text.

Leveraging its network virtualization and software-defined networking expertise, siticom creates secure, reliable, end-to-end private network solutions that are tailored to enterprise requirements.



Who Provides Private 5G Networks?

Many companies in the mobile services ecosystem are positioning themselves as solution providers for private 5G networks, including large network equipment suppliers and mobile network operators, but no single entity has all the technology and experience needed to meet enterprise requirements or the flexibility to customize solutions and operate the networks.

The ideal private 5G solutions are built from an open ecosystem of industry-leading, trusted technology providers, integrated by SIs or managed solution providers (MSPs), and delivered to enterprises as a managed service. The open ecosystem approach simplifies the end-to-end implementation of private networks, which allows enterprises to focus on their core business while retaining control over their operations and proprietary information.

While managing multi-vendor solutions can be challenging, MSPs and SIs overcome such hurdles by attracting partners that have an open mindset, proven ability in developing virtualized networking solutions for cloud environments, as well as providing local operational expertise for enterprises. The right ecosystem partners will also have the agility and flexibility to adapt solutions for each enterprise customer's unique requirements.



Private 5G Network Requirements

Architecturally, an essential difference in private 5G networks is the implementation of highly localized edge computing capacity.

Private 5G networks are fundamentally different from traditional Wireless Local Area Networks (WLANs) and public mobile networks in terms of network architecture and the criticality of the services supported. While consumers are accustomed to varying service quality in wireless networks and might tolerate occasional glitches in video streaming, industrial applications that rely on real-time data processing cannot accept delays or inconsistent bandwidth.

The deployment of data processing resources on the enterprise premises, in close proximity to the data-generating end devices, enables very low-latency communications. In a private 5G environment, data remains securely within the enterprise's local network perimeter and enterprises have control over how data is stored, moved and shared.

Compared to existing private and public wireless networks, 5G networks require expertise across a wider range of network and IT systems. These include 5G radio frequency (RF) technology and planning, the new radio access network (RAN), 5G core components, edge computing, cloud native network virtualisation, security and IT integration. SI's must also possess local market experience and a solid understanding of sector-specific requirements.

The technical requirements for private networks vary depending on the use case. The criteria for a hospital will be different than those for a car manufacturer. However, at a high level, there are a set of common requirements that apply to most deployments.



High Capacity, Low Latency, and Reliability:

Enterprises expect campus networks to deliver consistent 5G high data rates, low latency, and low error rates to ensure reliability.

Coverage: Private 5G network coverage requirements depend on the use case and whether the network is deployed in an outdoor or indoor environment or both. Critically, unlike WLANs and public networks, the local 5G network must provide consistent coverage to support mission critical use cases such as autonomous vehicles.

Security and Network Control: Private 5G networks must be highly secure and protected from cyberattacks. Data privacy is also essential, as proprietary data and trade secrets cannot be exposed or shared with third parties through the implementation of the local 5G network.

End-to-End: Enterprises require a complete solution that comprises the design, deployment, management, and operation of the 5G network. This includes the 5G radio and core network elements as well as the virtualization platform, edge servers, radio planning, and IT integration. If enterprises sourced various components of the network and attempted the integration themselves, they would delay and add cost to the project.

Aligning with Business Requirements

In addition to the basic technology requirements, MSPs and SIs also must demonstrate that they can meet customers' specific business requirements.

Local Presence: For SIs and ecosystem partners, having an established presence in the local market is essential not only for providing support but also for abiding by local laws and regulations in areas such as security, data privacy, or radio emissions.

Sector-Specific Experience: SIs must also be able to demonstrate a thorough understanding of the customer's sector and unique business challenges, ideally through previous direct experience.

Domain Expertise: Since private 5G networks involve more than just 5G radio and core networks, SIs need ecosystem partners with domain expertise across the entire solution, including network virtualization, software-defined networking, and edge computing.

Operational Capability: In addition to designing and implementing the private network solution, SIs should also operate the entire network. This includes the management and orchestration of the virtualization environment, SIM card management, as well as the 5G radios and core network.

Flexibility: They need to demonstrate flexibility in their ability to adapt and tailor campus network solutions to meet specific enterprise requirements.

Commitment: They must be able to deliver private network solutions on time, as contracted, and meet service level agreements for quality of service.

Solution Requirements

Private 5G networks are in an early stage of development. Some of the technology components are evolving and use cases are being validated. The following highlights key technology enablers and considerations.

Spectrum: In Germany, shared spectrum in the 3.7GHz - 3.8GHz range and 26GHz band is available for lightly licenced local private networks.

Open RAN: Through the disaggregation of hardware and software, standardized open interfaces, and commercial off-the-shelf (COTS), Open RAN enables cost-effective and flexible 5G networks that are ideal for private network use cases. The flexibility of Open RAN systems enables 5G radios to be quickly deployed and managed anywhere on the premises.

MEC: Multi-Access Edge Compute specifications standardize the implementation of local edge computing resources on or near the enterprise premises. Depending on customer requirements, the computing resources can be implemented on virtual machines, in containers, or on bare metal in serverless private, public, or hybrid cloud environments.

RF Design: There are many different types of obstacles that can impair 5G signals, such as thick walls or industrial machinery that higher radio frequencies can't penetrate. Whether the network requires indoor or outdoor coverage or both, the environment is a critical factor in the network design and 5G radio planning phase.

Connectivity: It is important to consider the underlying interworking requirements for each solution. For example, Virtual Local Area Networking (VLAN) or complete Software-Defined Wide Area Network (SD-WAN) technologies can be used to connect the 5G core components to the RAN or off-premise compute resources.

Operational Requirements: A private network solution must include comprehensive management, integration with existing systems, network operation, and support underpinned by Service Level Agreements (SLAs). Custom software development may also be needed to meet specific requirements.

Anatomy of a Private 5G Network

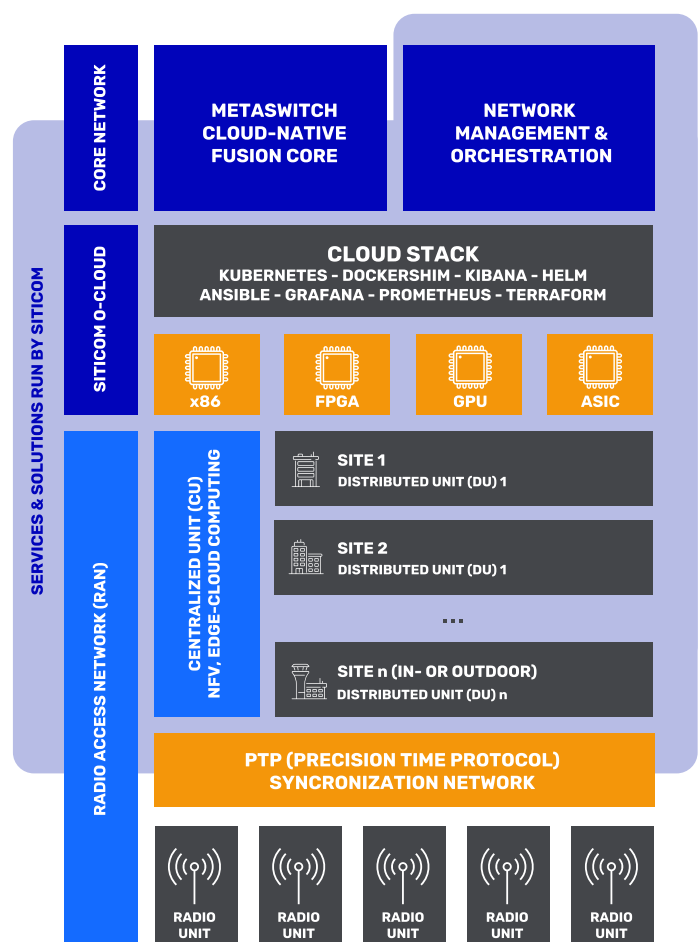
The primary building blocks of a private 5G solution are a 5G Open RAN, the 5G Core network, edge computing, and a comprehensive suite of services, including RF planning, management, operation, IT integration, and orchestration of the local cloud environment. siticom brought together solutions from its open ecosystem partners to create a complete, commercial campus 5G offering.

Metaswitch Fusion Core for the Private Enterprise 5G Edge

With the ability to spin up Fusion Core in just a few minutes, the high performance and highly programmable 5G core network functions are easy to deploy and manage. Built using microservices methodologies, the cloud native functions are deployable within private, public or hybrid compute clouds. Fusion Core comprises the user plane, control plane, service-based architecture, and management. The user plane function (UPF) integrates the industry's most powerful data packet processing engine and is optimized for small edge compute footprints.

Airspan 5G OpenRANGE

The Airspan 5G OpenRANGE vRAN solution includes small form factor radio hardware and cloud-native software to deliver a complete Central and Distributed Unit (CU/DU) solution. The portfolio comprises indoor and outdoor radio units in a range of sizes from small cells to macro cells to support any private wireless environment. This flexible radio access network offering is tailored to specific enterprise requirements, delivering high-bandwidth, secure communications for any application. Airspan's OpenRANGE portfolio complies with O-RAN Alliance specifications and fully supports all applicable 3GPP standards.



siticom 5G services architecture (Source: siticom)

siticom

siticom provides a one-stop shop for campus 5G networks in Germany. With a team of experts in all areas of IT infrastructure and communications networks — including cloud connectivity, optical networks, virtualization, and network operation -- siticom delivers stress-free, large-scale projects from the initial consultation and design phase to the implementation and operation of private networks.

Excelling at delivering advanced IT and communication solutions for enterprises, siticom understands that there is no one-size-fits-all approach for private 5G networks. Their team of experts ensures they meet every unique technical and business challenge by leveraging the resources of an extensive partner ecosystem.

Using this ecosystem, siticom builds the entire IT and network solution, including the virtualized core and Open RAN network functions, edge compute nodes and virtualization platform. In addition, siticom provides the management and orchestration of the network infrastructure and ensures the private network is fully integrated with existing IT and networks. Beyond the basic network components and operations, siticom also delivers services including RF planning and design, deployment and 24/7 network support.



Delivering on the promise of private 5G

siticom has built an end-to-end 5G campus network for a leading European research institute, which hosts manufacturers, localization systems suppliers, systems integrators, and mobile operators and provides an environment for testing customer use cases. The 5G network components include the Metaswitch Fusion 5G Core and Airspan 5G OpenRange Open RAN network functions, which run on the customer premises in VMware virtual machines.

siticom recognizes the importance of having partners that are flexible, open, and agile and that have a history of driving innovation and developing high-quality products and software. Their partners work together to understand customer requirements and build the best end-to-end solution. Through this open ecosystem approach to delivering IT and network solutions as a service, siticom simplifies and accelerates private 5G networks for enterprises.

To learn how siticom can help you deploy a campus 5G network to support your digital transformation initiatives, visit

www.siticom.online





Conclusion

5G will have a transformative impact on enterprises across industries in Germany. With access to spectrum, enterprises can build their own campus 5G networks for high-speed, low-latency communications and IIoT connectivity to support multiple industrial use cases.

siticom, Metaswitch, and Airspan have proven, through commercial experience, that the simplest model for deploying private 5G networks is the open ecosystem approach. Trusted partners, each with domain expertise, have the flexibility to combine cutting-edge technology and tailor a complete network solution to specific enterprise requirements.

For enterprises, an end-to-end solution from an open ecosystem simplifies private networks and makes 5G technology easy to consume. Rather than having to navigate through unknown wireless networking territory, enterprises are free to focus on their specific use cases and unique business goals.

About siticom

siticom GmbH is a technology innovation company founded in 2010 with a focus on the digital transformation of infrastructure and networks of tomorrow. siticom's portfolio is geared towards the complex technological challenges of the future. The solutions and services range from technical and strategic advice to engineering services for planning and realizing network infrastructures in communication networks and corporate networks. Thanks to a highly innovative, flexible grid of system partners, siticom is able to implement high-quality solutions at short notice. The combination of consulting, design and architecture bundled with the assumption of system and implementation responsibility as well as test-automation distinguishes siticom as an independent system integrator. For more information, please visit [siticom.online](https://www.siticom.online) or email: 5G@siticom.de

About Metaswitch

Metaswitch is a recognized leader in the development of ultra-high-performance, cloud native communications software. Metaswitch products are designed to run on the customer premises, or in private, public and hybrid clouds. Our award-winning solutions power more than 750 fixed, mobile and converged service providers worldwide. Metaswitch is a Microsoft company. For more information, please visit www.metaswitch.com

About Airspan

Airspan is a multi-award-winning 4G & 5G network densification solution provider. Airspan has an expansive product portfolio of indoor and outdoor, compact Femto, Pico, Micro and Macro base stations. The perfect tool kit to exploit the full potential of technologies such as mmWave, Sub 6GHz, Massive MIMO and open vRAN architectures. As well as an industry leading fixed wireless access and backhaul solution portfolio for PTP and PTMP applications using Wi-Fi 6.

Airspan also addresses non-mobile carrier and private network deployment including the needs of fixed Internet Service Providers, and a number of vertical market segments including Connected Automated Vehicles (CAV's), Air-to-Ground in-flight connectivity, Smart Grids, Public Safety, Transportation and Oil & Gas. www.airspan.com