

Use Case: Private LTE and 5G



The need for a private LTE network solution

Wireless technologies have proliferated to almost all corners of the globe and continue to evolve toward full mobile broadband capability. In consumer markets, service providers are delivering rich, collaborative, connected experiences to anyone with a smartphone or tablet. In enterprise markets, organizations of all sizes have incorporated the personal productivity benefits of mobility and integrated mobile devices and applications into business-changing processes and next-generation workflows. In industries such as public safety and security, maritime, oil and gas, mining, transportation and defense, the evolution from legacy voice-only networks is slow because companies must replace proprietary purpose-built network equipment. These industries can't rely on commercial networks to support their own services alongside consumer services. These companies require a level of agility, flexibility, and customization that can be contradictory to the interests of mass market services.

Private LTE and 5G network benefits

- Delivers reduced latency for low delay-centric applications such as industrial automation (2ms), autonomous operations, high-definition video surveillance.
- Features an infrastructure with ultra-high-level resiliency for applications such as end-user safety and mission-critical applications.
- Increases mobility because Private LTE has been designed for high-speed mobility and allows increased mobile roaming with security.
- Offers configurable quality of service which is ideal for mission-critical lifeline and production-critical automation use-cases.

Deliver a premium mobile broadband experience

Using a private LTE solution can help industries transition from expensive legacy voice-only land and mobile radio (LMR) communication networks to the comprehensive media and application-serving networks of today. Private LTE makes it easier to deploy a private, 3G or 4G Long-Term Evolution LTE broadband network.

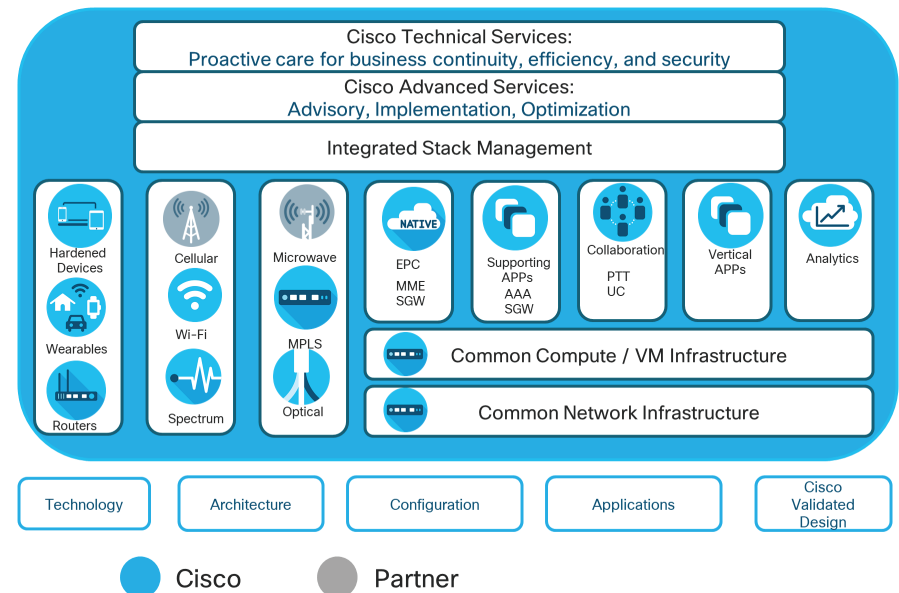
Private LTE brings flexible scale in a small form factor. It offers a high-capacity solution that can scale both upwards and downwards. Depending on the traffic profile, a single-server instance can support up to 500,000 sessions with 3-Gbps throughput. Private LTE delivers a virtualized architecture, which reduces the scale and cost to deliver LTE packet cores. By creating a cost-effective distributed and independent network architecture, the final design can reflect true business needs instead of being an economic compromise. Private LTE offers these benefits:

- End-to-end IP and LTE quality of service with application delivery prioritization within LTE that extends from user equipment networks through LTE and backhaul transport and into the packet data network.
- Comprehensive mapping of IP differentiated services code point (DSCP) to LTE quality of service to IP DSCP to 802.11p class of service to ensure consistent treatment of traffic across the broader network.
- Resiliency with nonstop dependability and redundancy mechanisms that occur at every layer of the protocol stack and that encompass foundational infrastructure, application deployment, intra-application features, and customer session management.
- Broad set of user equipment options that include data modems, ruggedized devices, routers, and hardened smartphones.
- Router and interface card options with embedded support to enable end-to-end control of traffic and security.
- Traffic separation from the public cellular network with the use of separate frequencies or Citizens Broadband Radio Service (CBRS) 3.5-Gbps Priority Access License (PAL).¹

The Cisco approach: Premium Mobile Broadband

The Cisco Premium Mobile Broadband (PMB) solution takes a holistic approach to private LTE. The solution offers an end-to-end architecture that includes mobile customer premises equipment (CPE), access, transport, core, and the application layer. The solution brings a high level of versatility and supports different deployment models that can range from centralized to distributed and critical infrastructure. PMB is a radio-agnostic solution and is interoperable with a range of radio solutions.

Figure 1. Cisco PMB private LTE solution



Cisco PMB can be interconnected with commercial networks, so users can roam as required. Different network deployment models can be supported, so you can start with a simple overlay network using VPN technologies. In this case, the user connects to a commercial network and establishes a VPN to their company network. Another deployment option is the mobile virtual network operator (MVNO) model. In this situation, the enterprise has a direct contract with the service provider and terminates the LTE sessions from its users on their controlled mobile core network.

The Cisco PMB solution takes advantage of our mobility and collaboration solutions. For its mobility infrastructure, Cisco has virtualized its carrier-grade Evolved Packet Core (EPC), which provides the same functionality and reliability as large MNO networks. The solution can be deployed on common, off-the-shelf (COTS) hardware in a form factor that is suitable for enterprises.

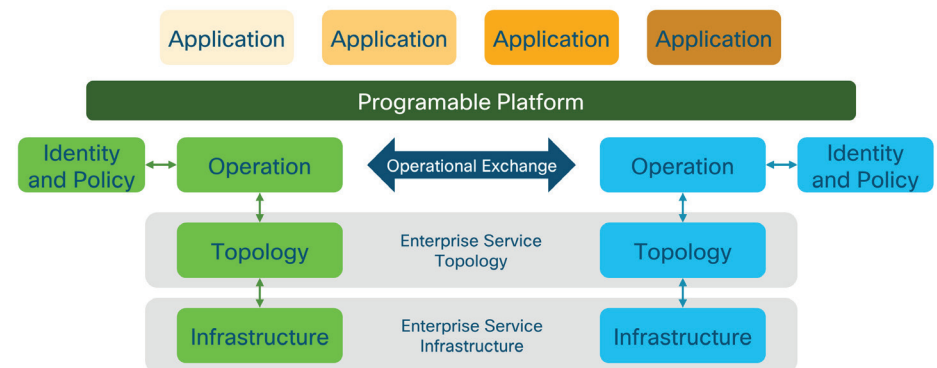
Private LTE is a good option for industries that can't run their own services alongside consumer services. For example, Beach Energy is Australia's largest onshore oil producer and major natural gas business. The company needed to improve its equipment utilization and optimize its mobile fleet. Beach Energy is rolling out a private 4G/LTE network to help improve communications across its Cooper Basin gas fields. The network provides wide coverage, telemetry, automation, and carrier-grade remote monitoring, which helps them resume rock extraction as quickly as possible after each blast. Beach Energy holds the 2100-MHz spectrum licenses in the area, which works with smartphones or tablets that have a Beach Energy-issued SIM. The Cisco PMB solution works across many radios, device types, and mobile operator networks and enables Beach Energy's critical machine-to-machine communications. The Beach Energy private LTE network operates independently of public LTE networks and also in coordination with them.²

Deploying the solution

The Cisco PMB solution can be deployed by a service provider, directly by an enterprise, by an information and communications technology (ICT) systems integrator, a vertical or specialist system integrator, or by a Cisco ecosystem partner. It can be deployed as a standalone network infrastructure, as a managed network, or as a complete managed service.

Cisco also can deliver Cisco Umbrella for security, Cisco Policy Suite, Cisco Instant Connect, IP Interoperability and Collaboration System (IPICS), Cisco IoT (formerly Jasper Control Center), and more. Cisco PMB enables service providers to solve enterprise business needs for private LTE services and deliver them from the cloud.

Figure 2. Private mobile network consumed like a cloud service



Learn more about Private LTE and 5G

For other use cases, customer case studies, and more information about Private LTE, visit www.cisco.com/go/telco

The Private LTE addressable opportunity is significant

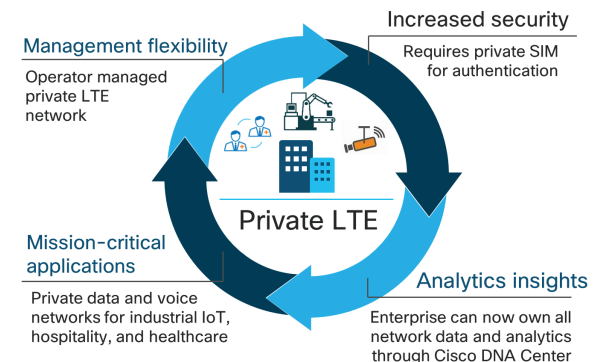
According to research firm SNS Telecom, when compared to previous generations of cellular technologies, LTE not only adds capacity, it can reduce operating expenses (OpEx) with a cost-effective radio access network (RAN) implementation and a simpler IP-based infrastructure. Following the transition to LTE, many mobile operators and private network operators have claimed considerable OpEx savings of up to 50 percent, even with a limited frequency spectrum.³

According to Harbor Research, Private LTE that is deployed in industrial and business markets is expected to generate nearly \$70 billion in estimated revenue by 2023. This \$70 billion opportunity will be driven by the enablement of over 760 million device shipments by the end of the forecast period.

Harbor Research cites these examples of opportunities for private LTE:

- Mining Private LTE Market 2023 Opportunity – \$5.5 billion in Private LTE systems revenue.
- Shipping Port Private LTE Market 2023 Opportunity – \$2.4 billion by 2023.
- Factory Private LTE Market 2023 Opportunity – \$18.3 billion in Private LTE revenue.⁴

Figure 3. Private LTE benefits



1 The Priority Access tier consists of Priority Access Licenses (PALs) that will be assigned using competitive bidding within the 3550-3650 MHz portion of the band. Each PAL is defined as a non-renewable authorization to use a 10-MHz channel in a single census tract for three years.

2 IT News. “Beach Energy rolls out private 4G network in the Cooper Basin.” <https://www.itnews.com.au/news/beach-energy-rolls-out-private-4g-network-in-the-cooper-basin-413473>

3 SNS Telecom. “The Private LTE &5G Network Ecosystem: 2018 – 2030” <http://www.snstelecom.com/private-lte>

4 Harbor Research. “The Private LTE Opportunity for Industrial and Commercial IoT.” <http://harborresearch.com/private-lte-opportunity/>