



ATLANTA, GA
OCTOBER 11-14

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2021 Fall
Technical Forum
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Wireless Access Network

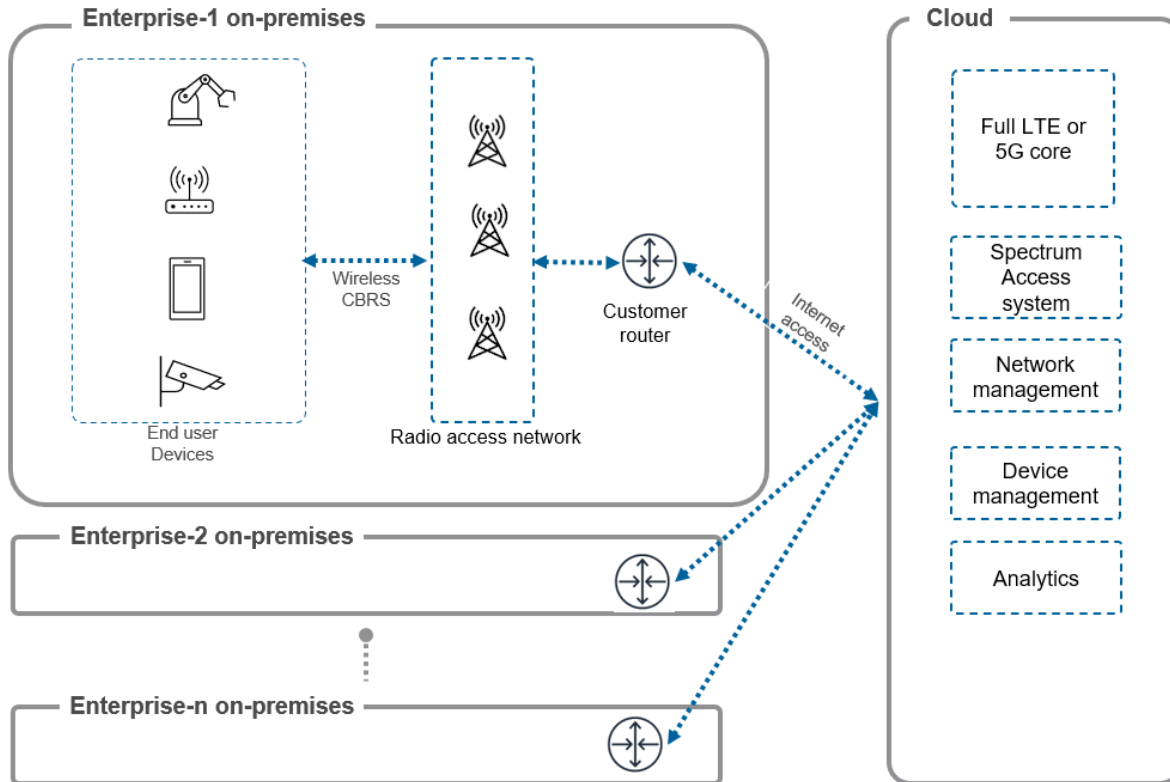
Private LTE/5G networks

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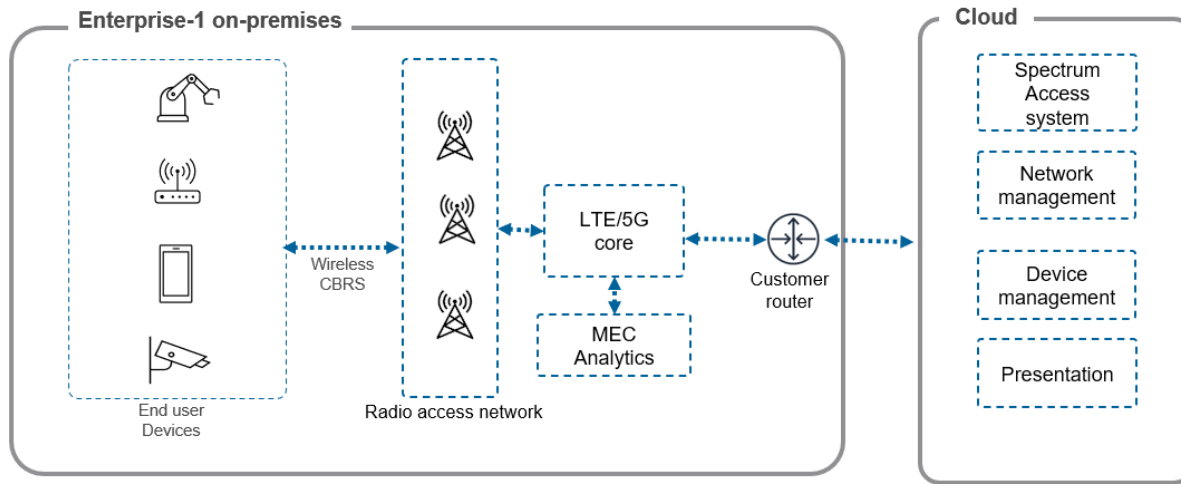
- Motivation for private LTE/5G networks
- Architectures
- Use cases
 - Industrial
 - Healthcare
 - Education
- Charter private LTE pilot in factory
 - Design
 - Deployment
 - Challenges
 - Use case

- Better coverage which facilitates use cases in different environments:
 - Campus (indoor + outdoor) environments
 - Warehouses
 - Factories
- Seamless mobility allows for critical communications and remote guided vehicles
- Ability to customize the network:
 - Bandwidth
 - Frame configurations in TDD system
 - Different QoS per device groups
 - Network slicing
- Multi-access edge compute



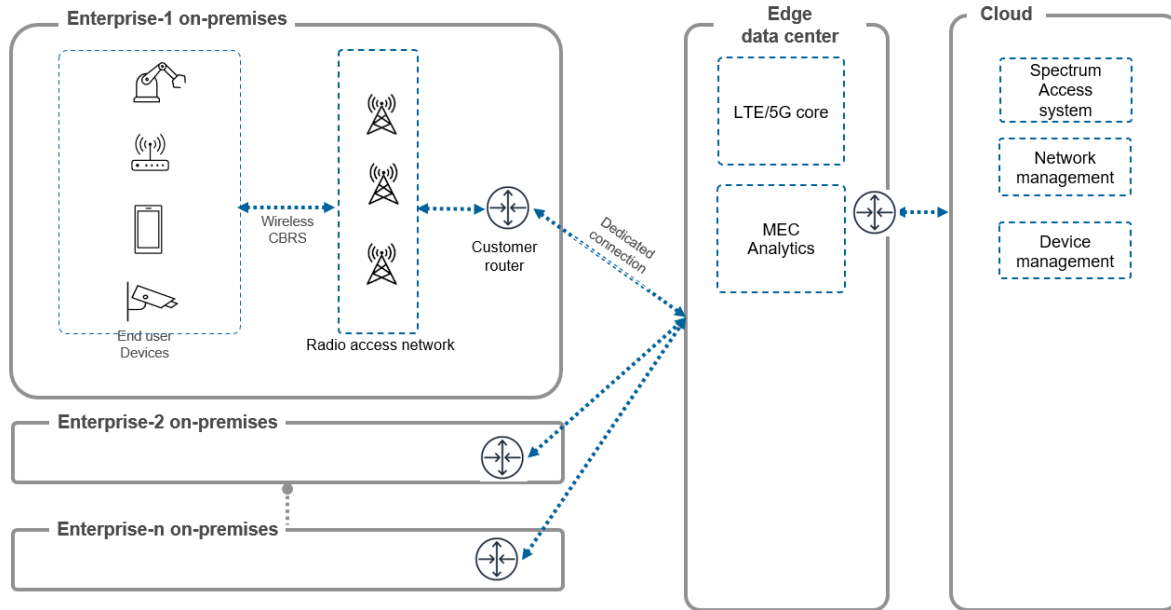
Cloud based core

- RAN on premises
- EPC or 5G core hosted in the cloud
- Ease of setup and scales quick for multiple enterprises
- Does not support many use cases because of high latency and bandwidth requirements



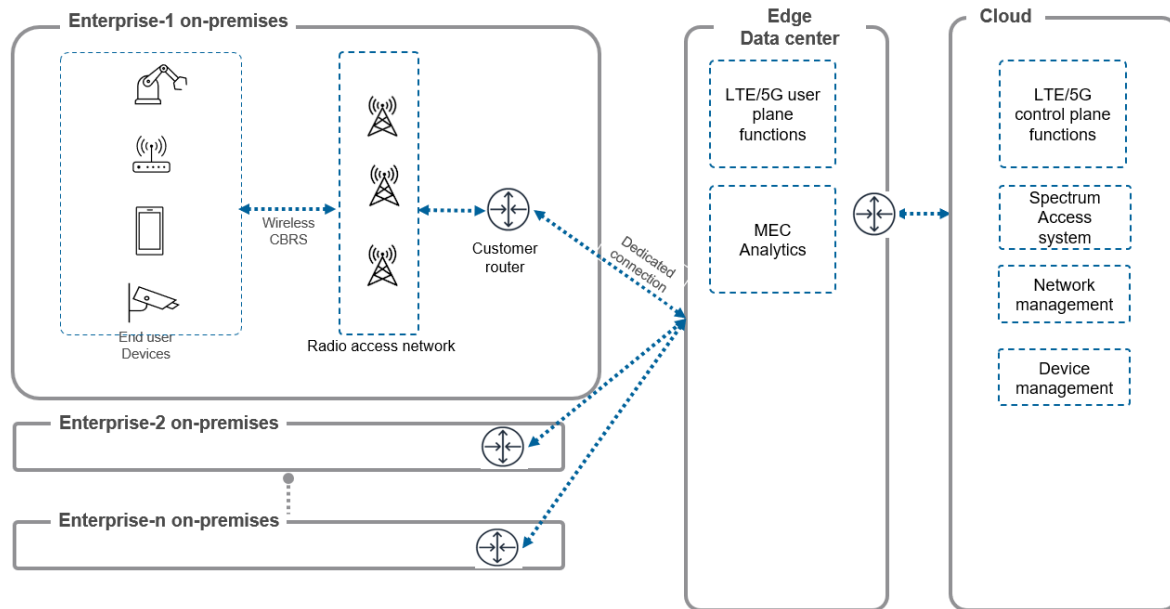
On-premises core

- RAN on premises
- All network core functions hosted on premises
- Supports low latency and high bandwidth applications
- More difficult to scale with a dedicated core for every enterprise



Core on edge data center

- Network core hosted on data center (operator or cloud service provider)
- Dedicated connection between enterprise and the core
- Scales better for multiple enterprises



Hybrid architecture

- User plane functions either on premise or on edge data center
- Control plane , SAS, network management on the cloud
- Scales better for multiple enterprises
- Still allows for lower latency applications

Industrial

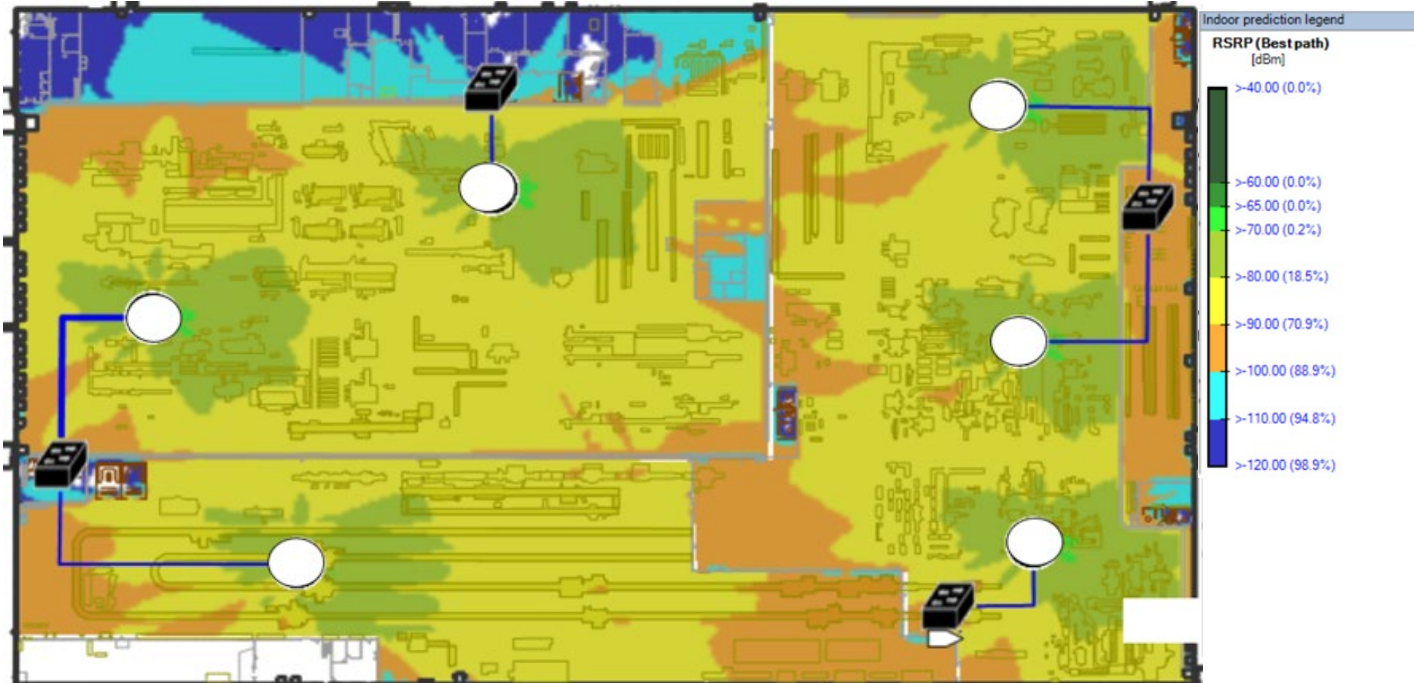
- Worker safety
- AGV and mobile robots
- Push to talk
- Predictive maintenance

Healthcare

- Secure communications
- Augmented reality

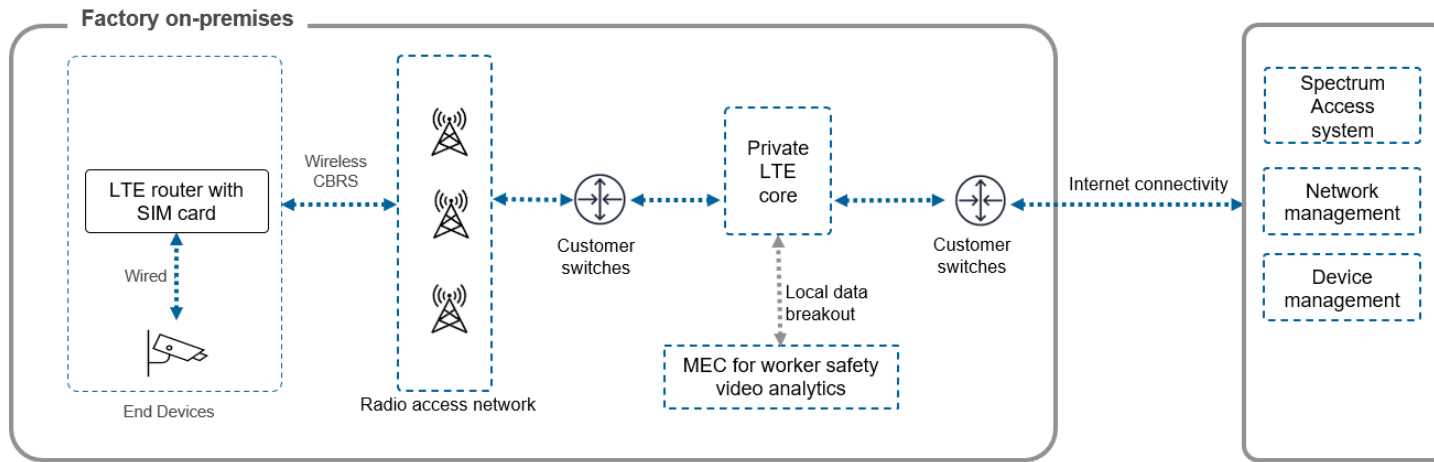
Education

- Remote learning
- Campus connectivity



Planning and design

- 600,000 sq. feet factory
- Design result - 95% of the factory covered with 7 small cells (1 added later)
- Design considered exclusion zones
- Capacity hotspots planned for later



Installation

- Cameras connected via CBRS routers
- Six LTE small cells connected via existing factory ethernet backhaul
- LTE core located on premises in MDF room
- Video analytics performed on edge



Obstructions

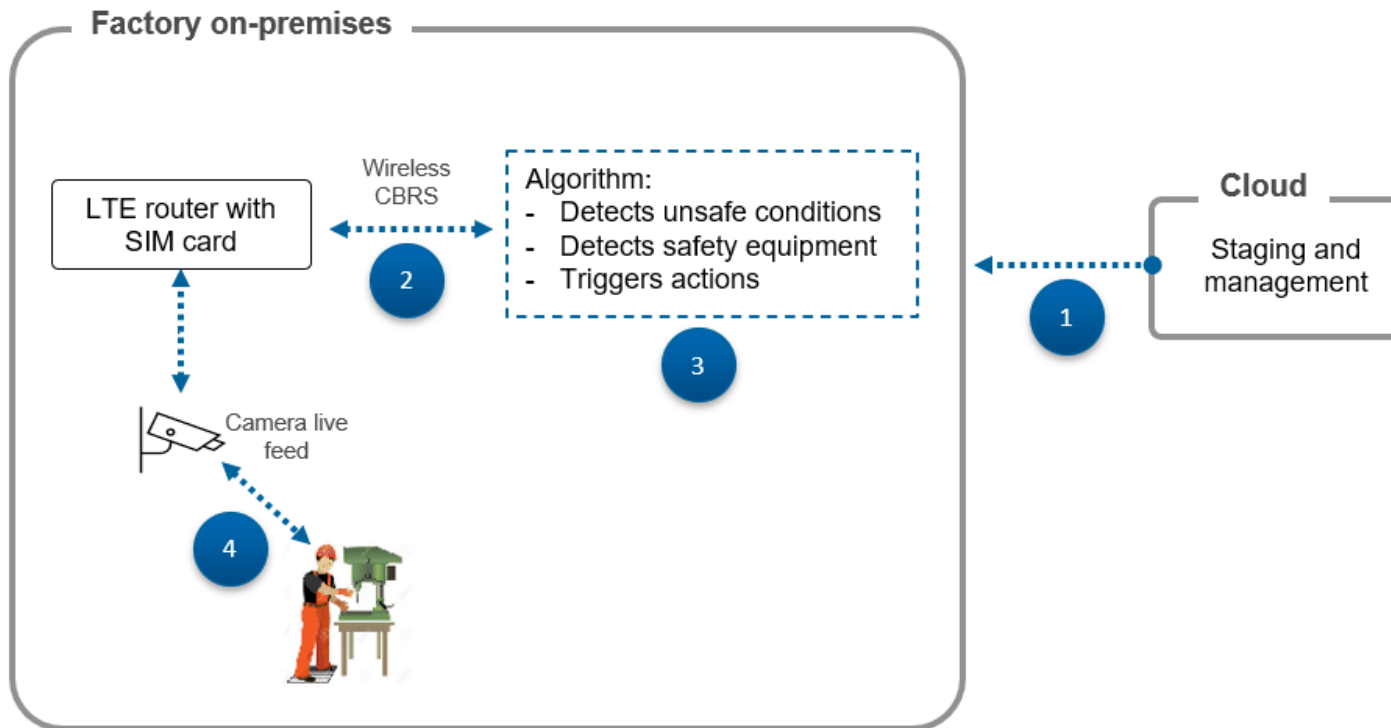


Installation challenges

Challenges

Unique challenges in industrial sites

- Various large metallic structures
- Rules around installation of access points
- Restricted areas
- Performance testing



Worker safety

1. Solution deployed to edge compute on premises
2. Live camera feed streamed over CBRS
3. Algorithm deployed on edge:
 - Detects safety equipment
 - Detects unsafe conditions
4. Trigger actions if needed

- Private LTE and 5G networks provide better coverage, seamless mobility and customization for specific use cases
- Various architectures can be supported by private 5G networks
- Use cases can be supported in different industry verticals
- Charter deployed a private LTE network in a factory
- Unique challenges presented by industrial environment
- Worker safety use case shows value of edge



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Thank You!

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