5G AND TRAFFIC MANAGEMENT

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5G Use Cases

Platform for addressing industry and society transformations

Human-centric use cases with improved performance

Massive machine type communication

IoT

- Smart meter
- Tracking
- Fleet management

Low BW & not-latency critical

Critical machine type communication

- Industrial applications
- Traffic safety & control
- Remote manufacturing

Stringent throughput, latency, availability

Enhanced Mobile Broadband

- VR/AR
- 4K/8K UHD
- Smartphones

high data rate as possible, while keeping

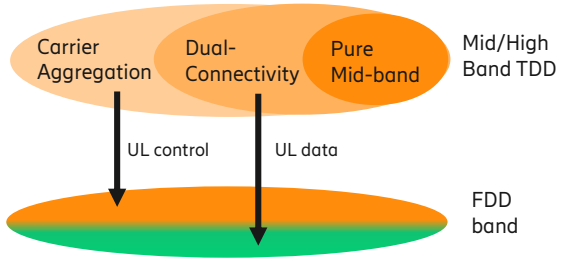
Fixed Wireless Access

- Mobile / wireless / fixed
- Enterprise
- Home

latency and end-to-end response time low

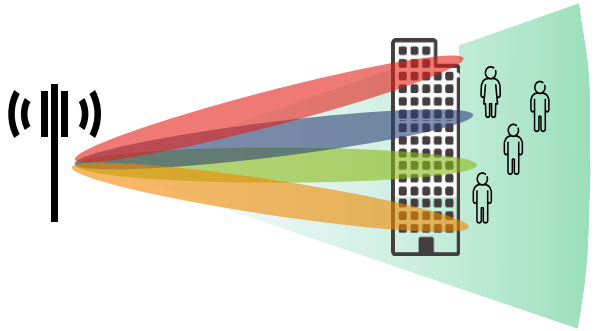
Network complexity will increase exponentially

Carrier Aggregation



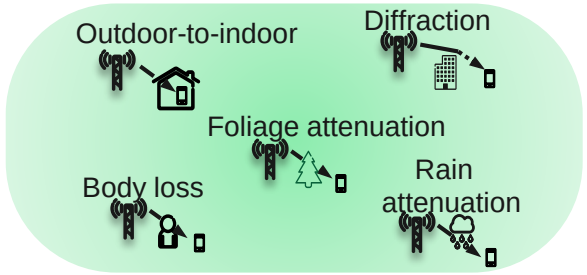
Inter-technology CA, Dual connectivity and Layer management configuration

Massive MIMO



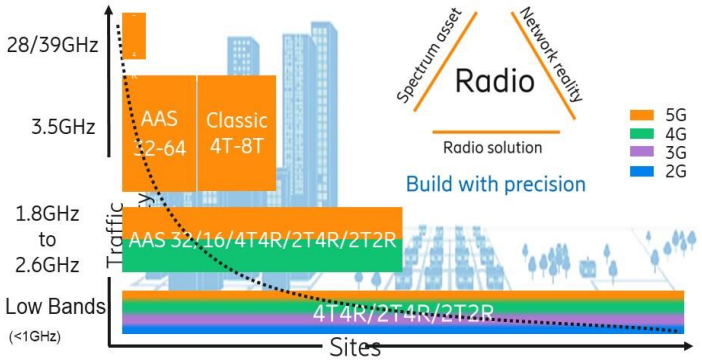
Identify and optimize the cells where AAS maximizes coverage and capacity.

High Band (mmWave)



Select locations where mmWave provides highest benefit and define optimum design.

Build with precision



Multidimensional analysis for deployment/Network Management

— New 5G services will vary in terms of required QoS

— Networks need to manage the growing complexity and volume of data traffic.

— The complexity this brings requires an orchestration solution for efficient management (considering both IAS/Specialized services)

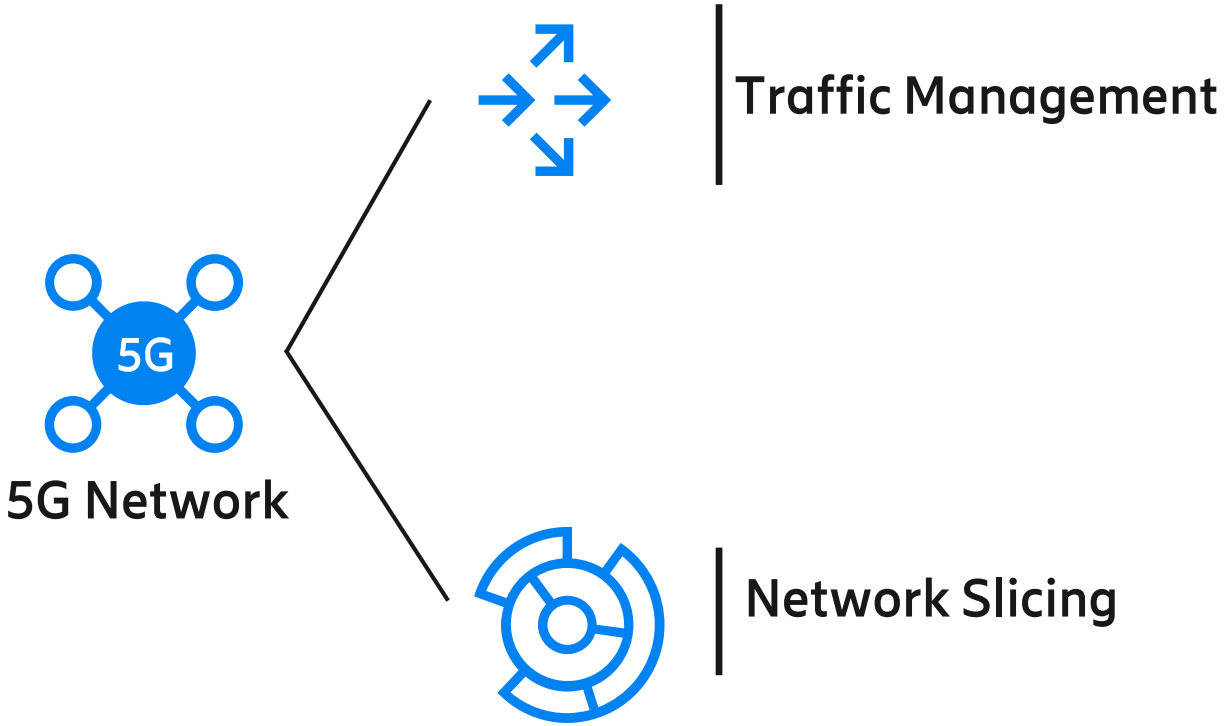
— Capacity and traffic management

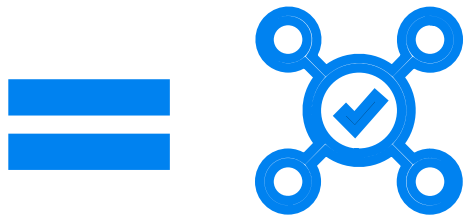
Capacity based

Traffic management based

Build with precision

Combined approach (Traffic Analysis and Logical segmentation)





Quality of Service

- 5G Class Identifier (5QI)
- Allocation Retention Priority (ARP)

Traffic Management/Identification

Packet-Level Identification

Packet Header

Port Information

IP address

QoS tags

Issues with private protocols/port id

Flow-Level Identification

Built on the concept of IP flows

A group of IP packets that share a set of common properties (e.g., source ip, destination ip, source port, destination port, protocol type)

Network observation point during a certain timeframe.

Goal is to allow an adequate 5QI to QoS Characteristics mapping

5QI operation

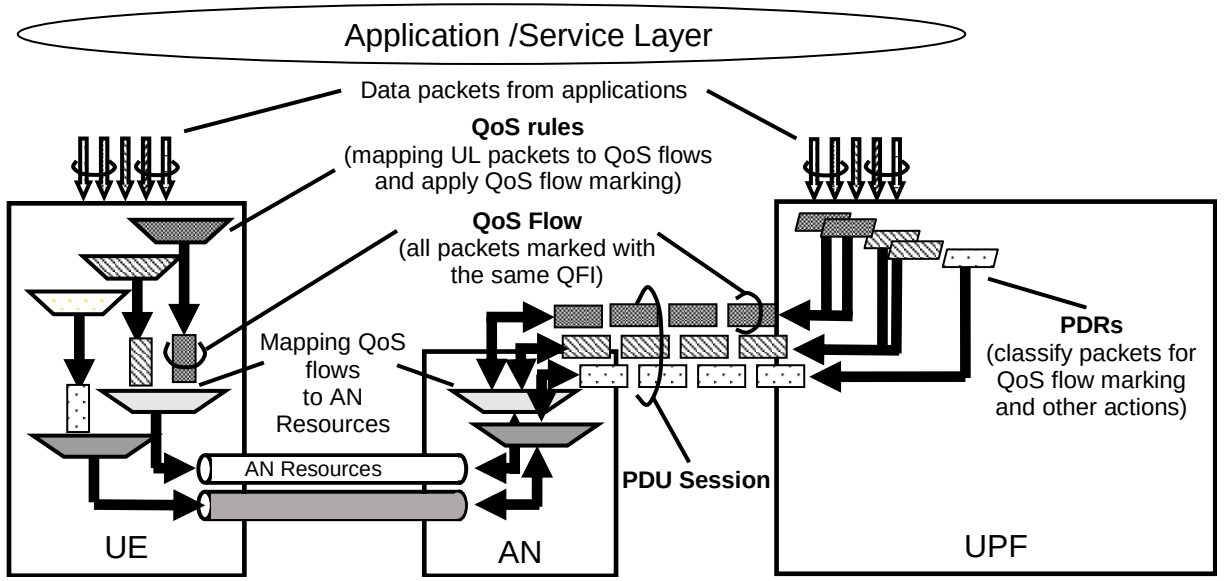


Figure 5.7.1.5-1: The principle for classification and User Plane marking for QoS Flows and mapping to AN Resources

5QI Value	Resource Type	Default Priority Level	Packet Delay Budget (NOTE 3)	Packet Error Rate	Default Maximum Data Burst Volume (NOTE 2)	Default Averaging Window	Example Services
1	GBR	20	100 ms (NOTE 11, NOTE 13)	10^{-2}	N/A	2000 ms	Conversational Voice
2	(NOTE 1)	40	150 ms (NOTE 11, NOTE 13)	10^{-3}	N/A	2000 ms	Conversational Video (Live Streaming)
3		30	50 ms (NOTE 11, NOTE 13)	10^{-3}	N/A	2000 ms	Real Time Gaming, V2X messages (see TS 23.287 [121]). Electricity distribution – medium voltage, Process automation monitoring
8		80	300 ms (NOTE 13)	10-6	N/A	N/A	Video (Buffered Streaming) TCP-based (e.g., www, e-mail, chat, ftp, p2p file sharing, progressive video, etc.)
9		90					

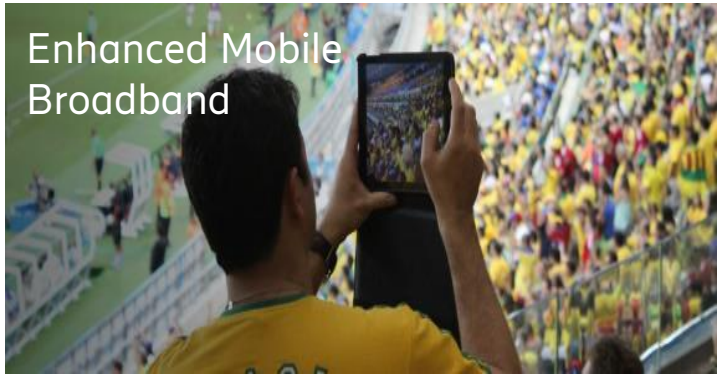
Extract from 3GPP TS 23.501 V.16.6.0 Table 5.7.4-1: Standardized 5QI to QoS characteristics mapping

Identification of QoS flows/Different QoS Guarantees (SLAs) – Corresponding Slice

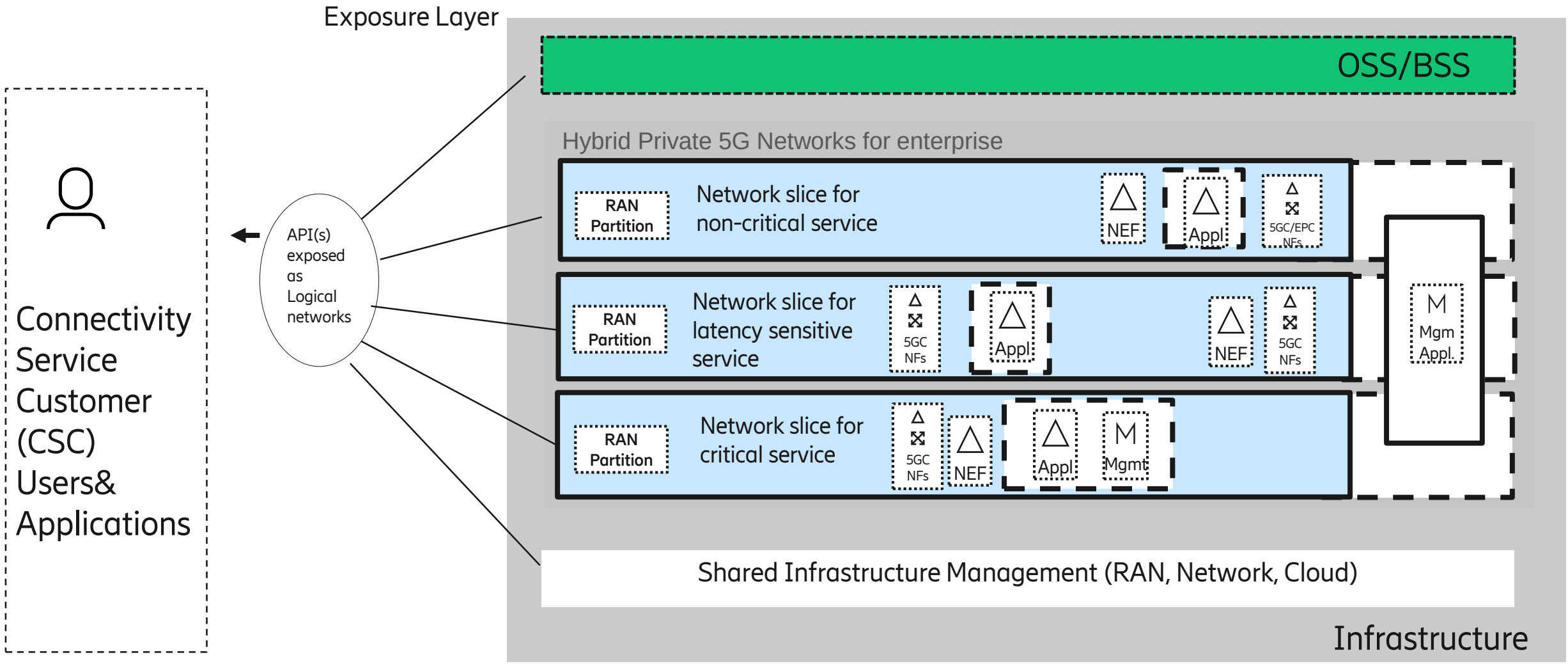
Network Slicing
– Large span of requirements and customer segments

Drivers for slicing

- Tailored customer services
  - Address new needs
  - QoS requirements
- Flexibility and agility
  - Agile response to traffic changes
- Reduced risk
  - Isolated configurations
  - Domains separation

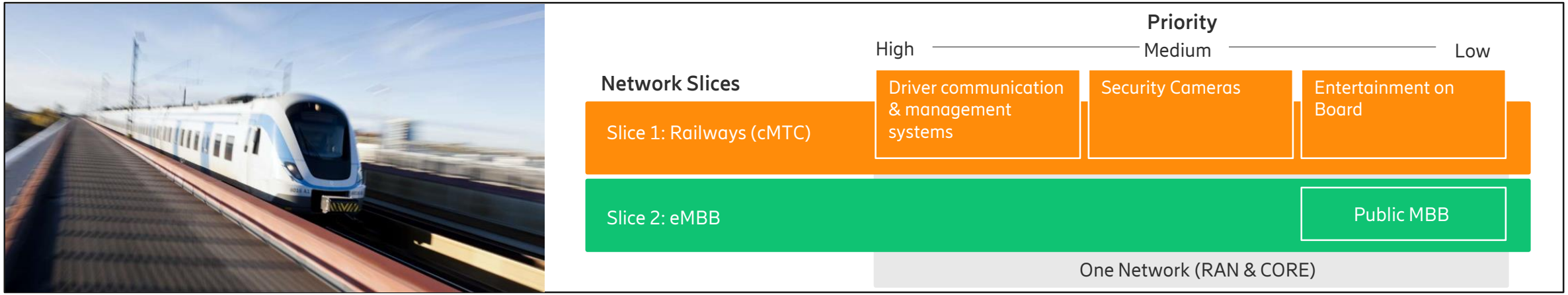


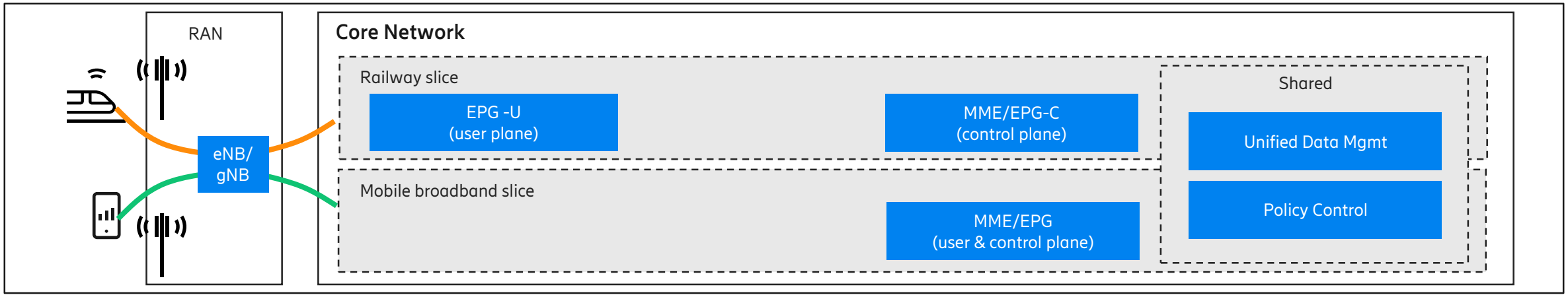
Network Slicing
Shared Infrastructure – Logical Networks



Example – Network Slicing for railways

Within each network slice, a subscriber may have one or more QoS flows





Conclusions

5G is developed to provide services with the highest Quality of Service (QoS) attributes

- Better user experience based on existing use cases (e.g. MBB).
- New use cases with tailored characteristics (e.g., ultra-low latency, ultra-reliable communication, low energy consumption)

Traffic management is key for the achievement of 5G QoS goals

- Network capacity combined with traffic policy guarantees the fulfillment of QoS indicators.
- Traffic identification and measurements are crucial elements of creating high-quality network services

Network slicing and traffic management are the tools to realize the full potential of 5G

- With network slicing a 5G network might be virtually split up into several logical networks that can be tailored to the specific quality requirements of applications or services.
- Network slicing could be used to provide Internet Access Services (IAS) with different QoS levels and non-IAS services, providing an adequate resource distribution.