Welcome to the World of Standards

ETSI

World Class Standards

NEXT GENERATION INTERNET PROTOCOLS: 5G & THE INTERNET, FINDING THE BEST PATH TOGETHER

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26th April 2016

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- Mobile network architecture
- LTE User plane protocol architecture
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Background

- Early fixed and wireless data access networks offered low speed and unreliable transmission and therefore higher layer protocols had to address many issues
- Modern fixed and mobile networks offer high data transmission speeds, low latency and reliable transmission…
- Spectrum is a finite resource which must be utilised in the most efficient manner possible - application bits per second per Hertz (Ab/sec/Hz)
- 5G will provide truly converged fixed and mobile networks (not just service/product layer) and therefore offers an opportunity for a revised and optimised protocol architecture

Rationale (1)

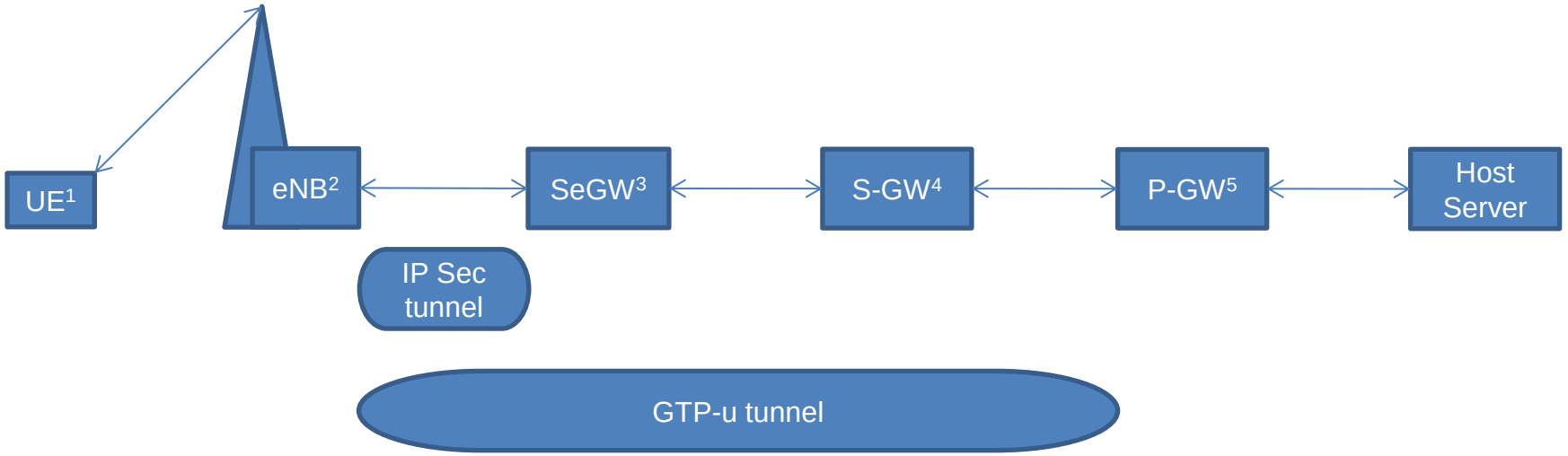
- The TCP/IP protocol suite has undoubtedly enabled the evolution of connected computing and many other developments since its invention during the 1970's
- NGP ISG aims to gather opinions on how we can build on this momentum by evolving communications and networking protocols to provide the scale, security, mobility and ease of deployment required for the connected society of the 21st century
- The industry has reached a point where forward leaps in the technology of the local access networks (such as LTE-A, G.FAST, DOCSIS 3.1 and 5G) will not deliver their full potential unless, in parallel, the entire infoComms protocol stacks evolve more holistically

Rationale (2)

- The purpose of this ISG is to review the future landscape of Internet Protocols and network architectures to identify and document future requirements and trigger coordinated follow up activities
- NGP ISG is foreseen as having a transitional nature i.e. a vehicle for the 5G community (and others of interest) to first gather their thoughts together and prepare the case for the Internet community's engagement in a complementary and synchronised modernisation effort
- Therefore NGP ISG aims to stimulate closer cooperation over standardisation efforts for generational changes in communications and networking technology

4G LTE reference diagram

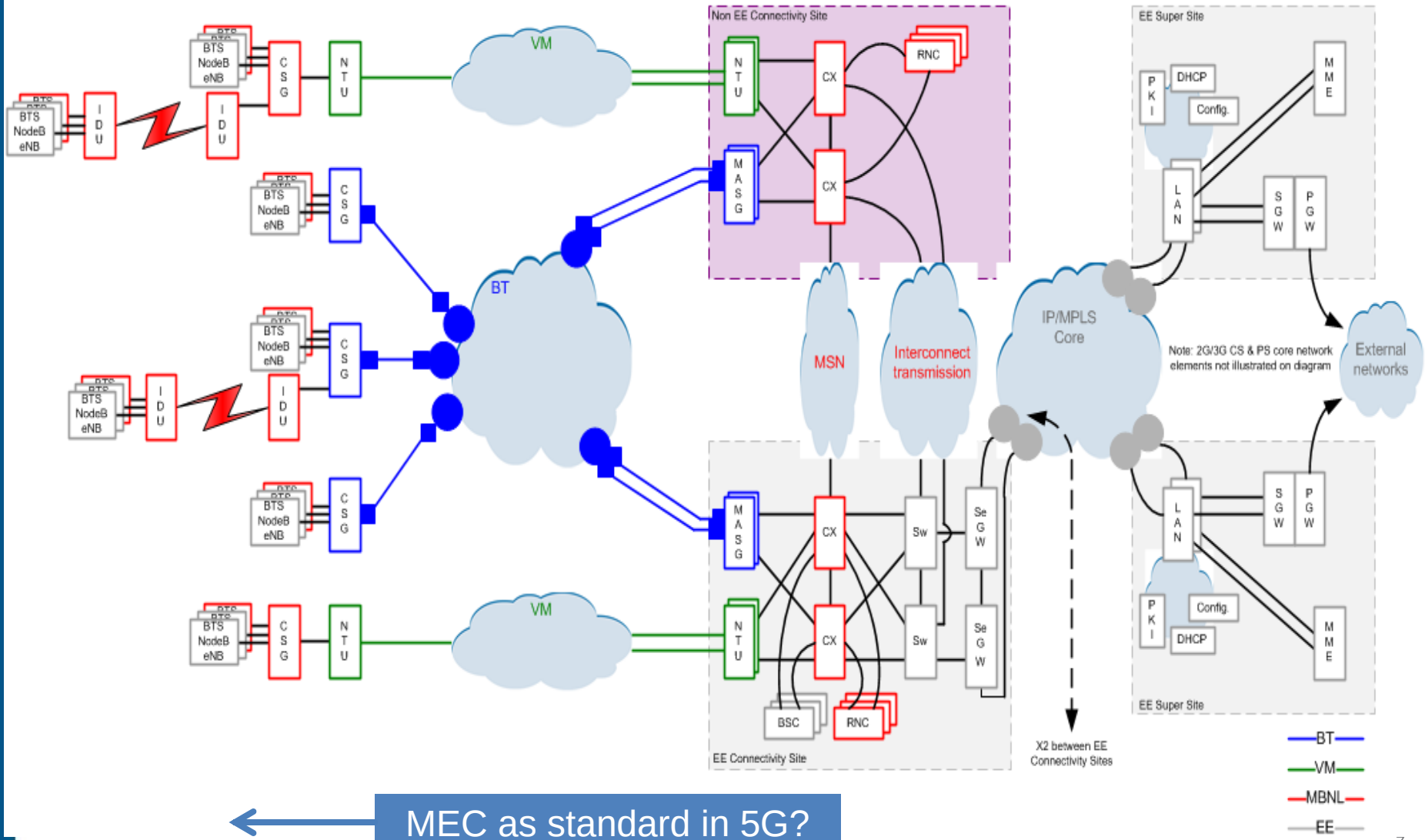
- 4G LTE networks are often deployed with IPSec to ensure authentication of network connected equipment and encrypt user traffic and signalling
- Mobility is managed through a second tunnel between the base station and Packet data-network Gateway



1: User Equipment - 2: evolved NodeB (LTE radio base-station) - 3: IP Security gateway - 4: Serving Gateway - 5: Packet data-network Gateway

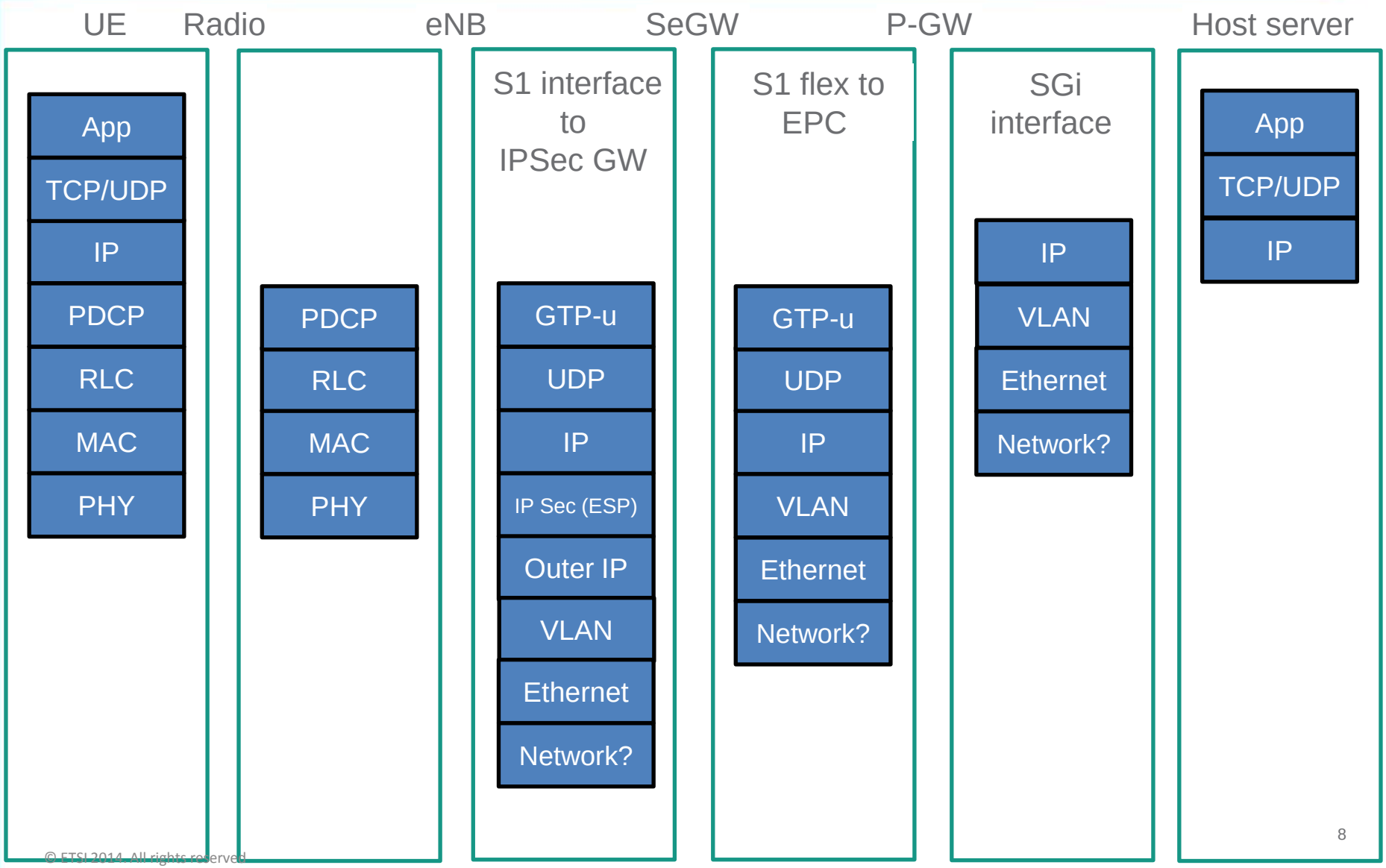
Example of real mobile network architecture

EE UK network (including MBNL shared access)



MEC as standard in 5G?

Protocol architecture - LTE User Plane



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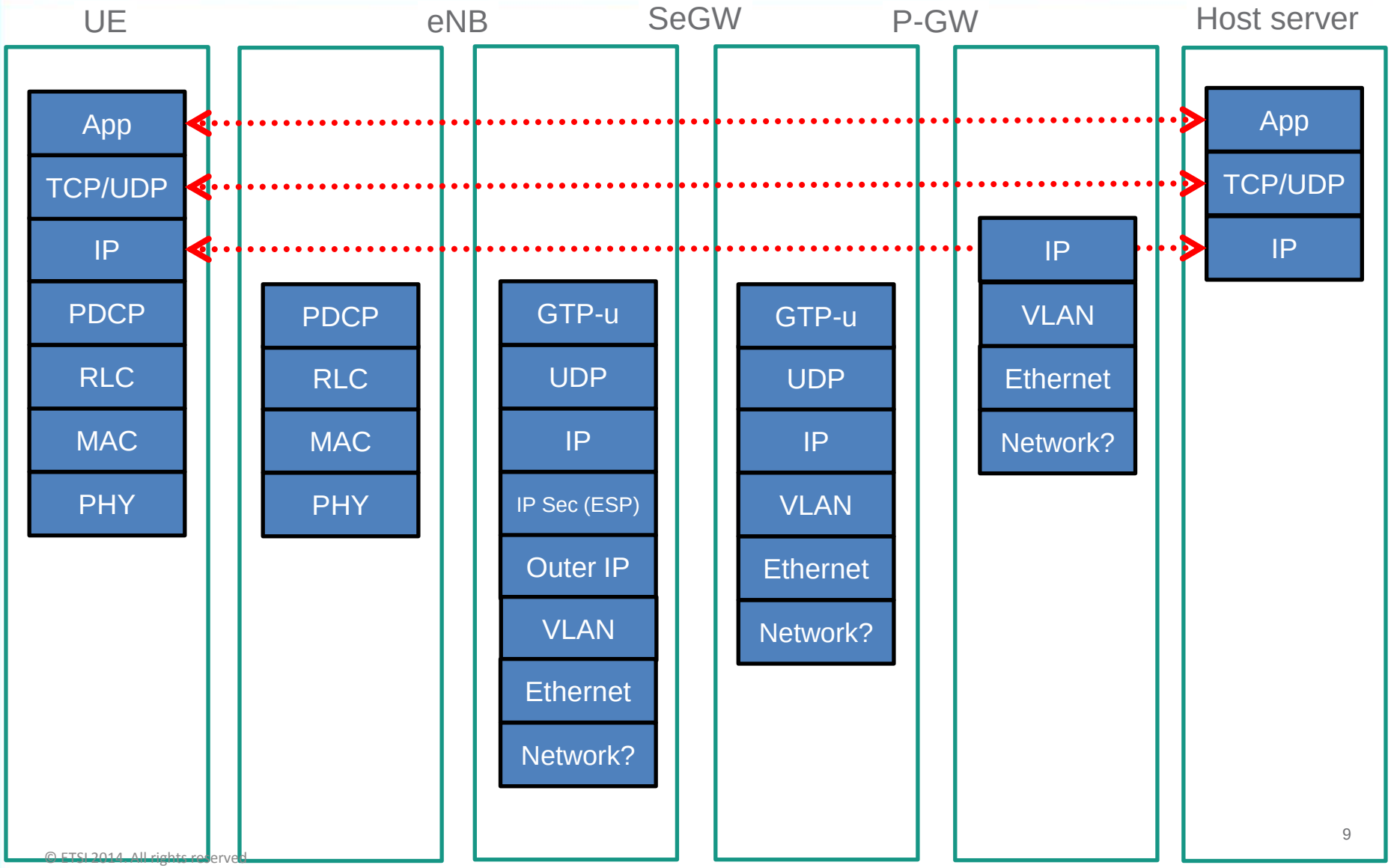

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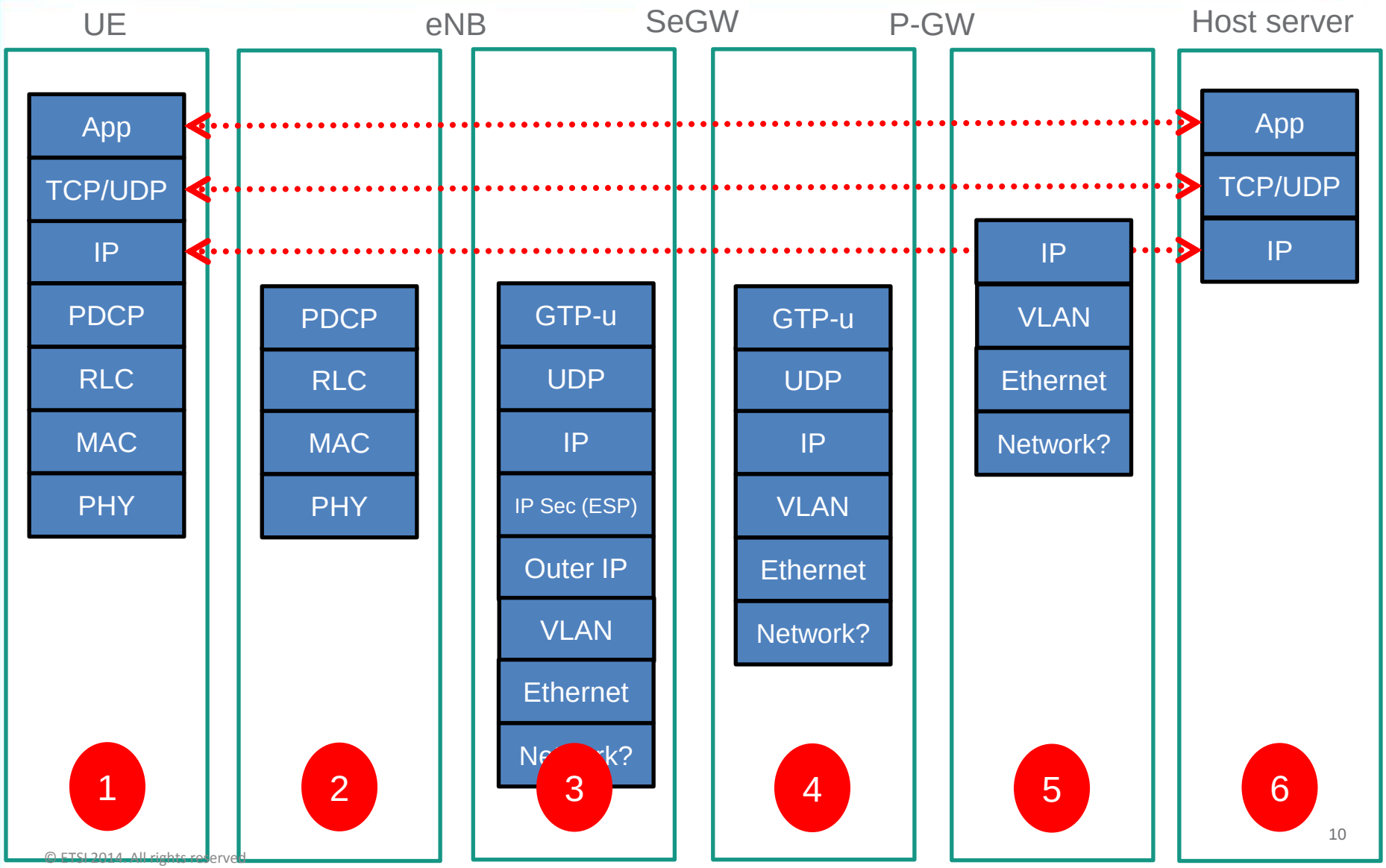

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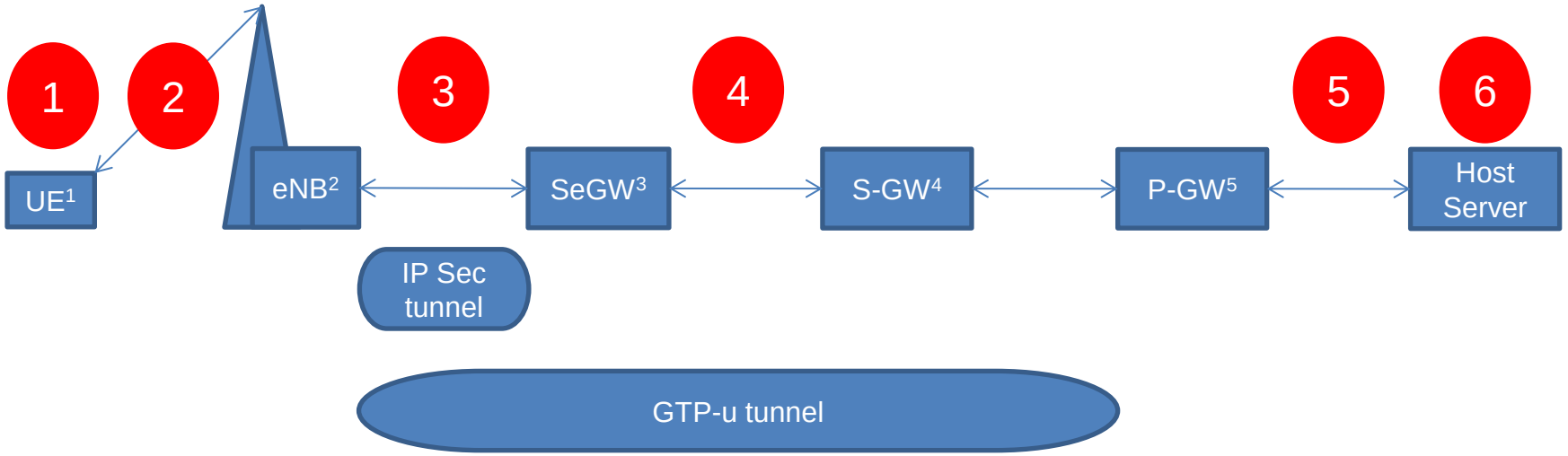

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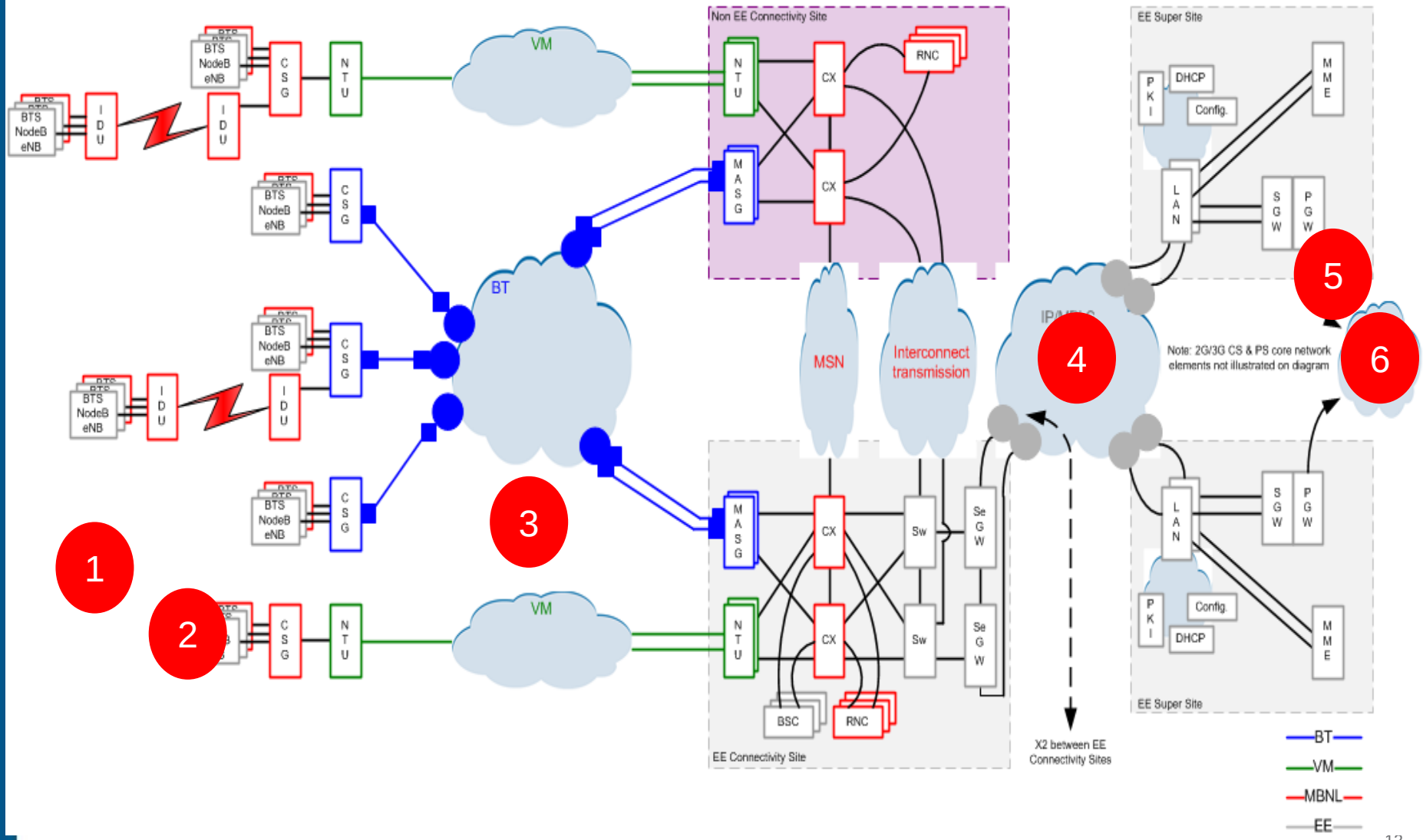
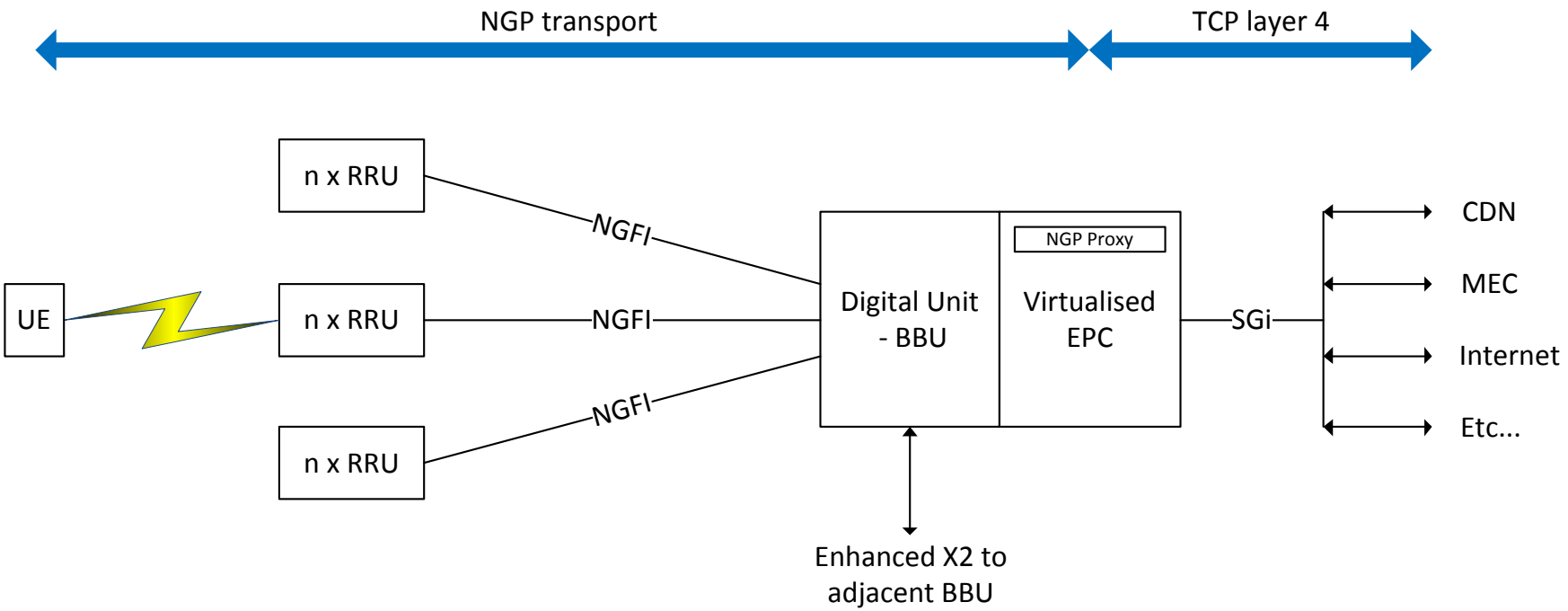
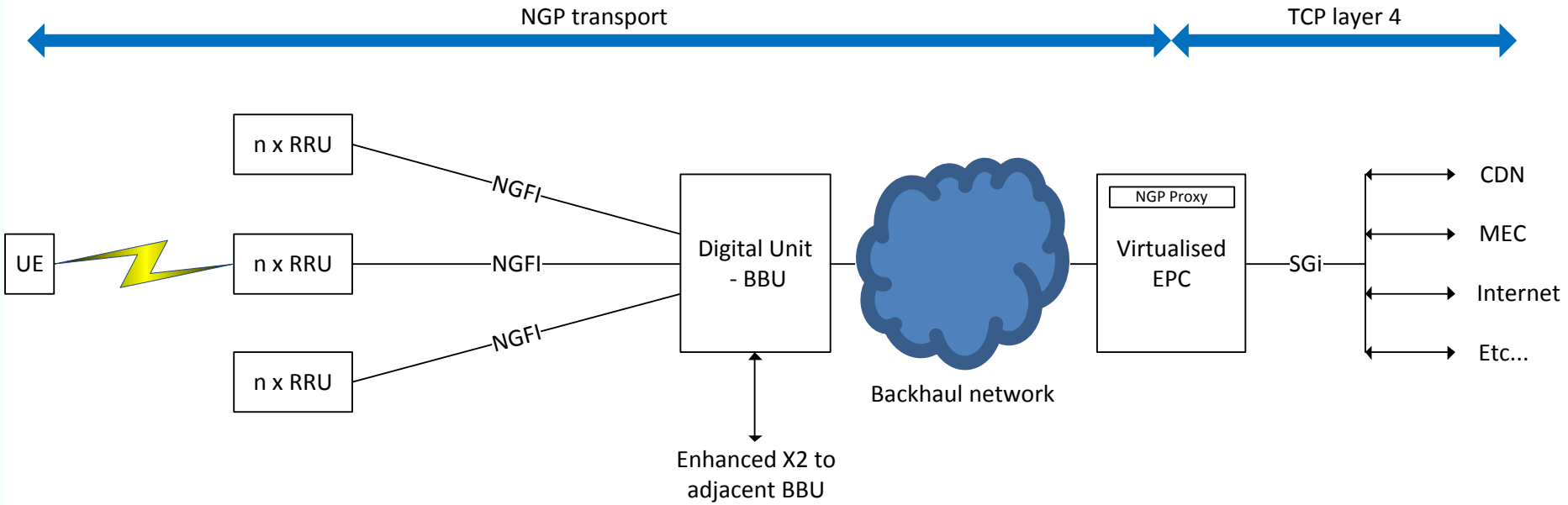


Implementation options and early wins? (1)



5G architecture scenario: Centralised/coordinated RAN with next generation fronthaul Interface (NGFI) between remote radio units (RRU)
and baseband unit (BBU).
Virtualised EPC is collocated with BBU, NGP proxy enables interworking between conventional TCP and NGP transport.
Solution optimises application bits per second per Hertz and therefore spectral efficiency by introducing an alternative to TCP for the RAN
New NGP stack must be supported in NGP proxy and User Equipment (UE).

Implementation options and early wins? (2)



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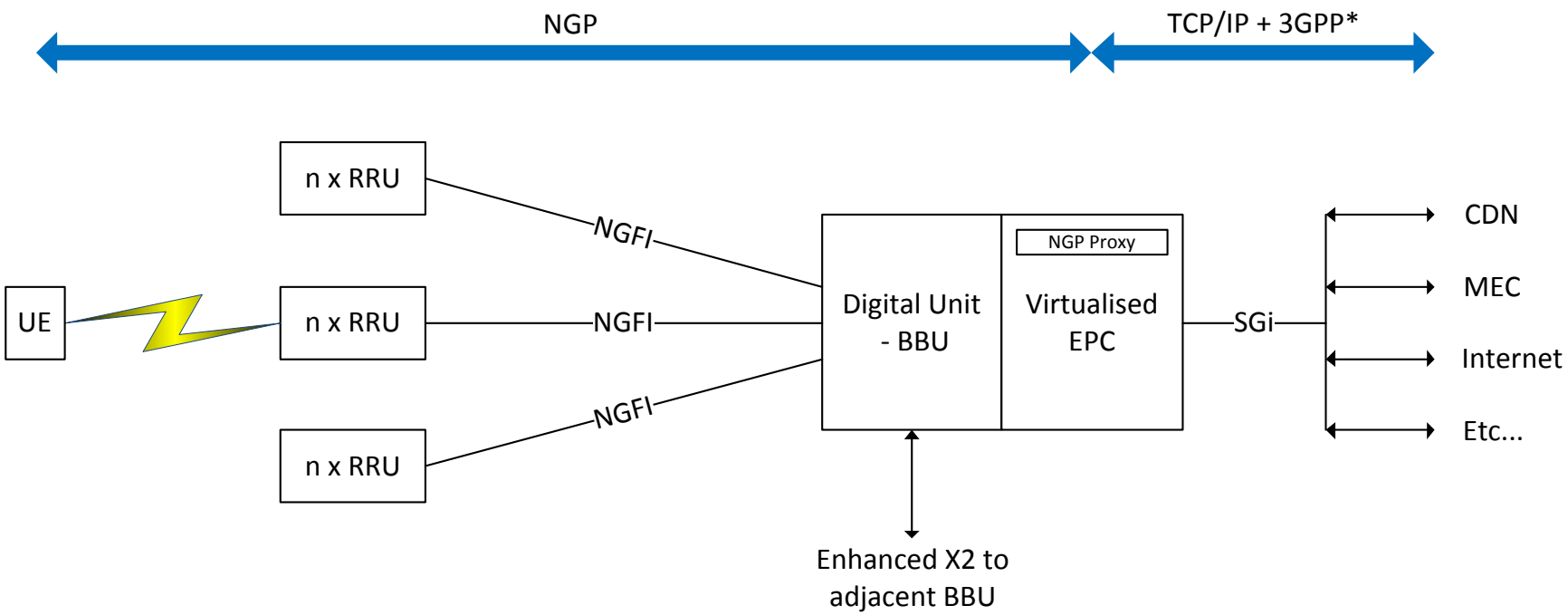

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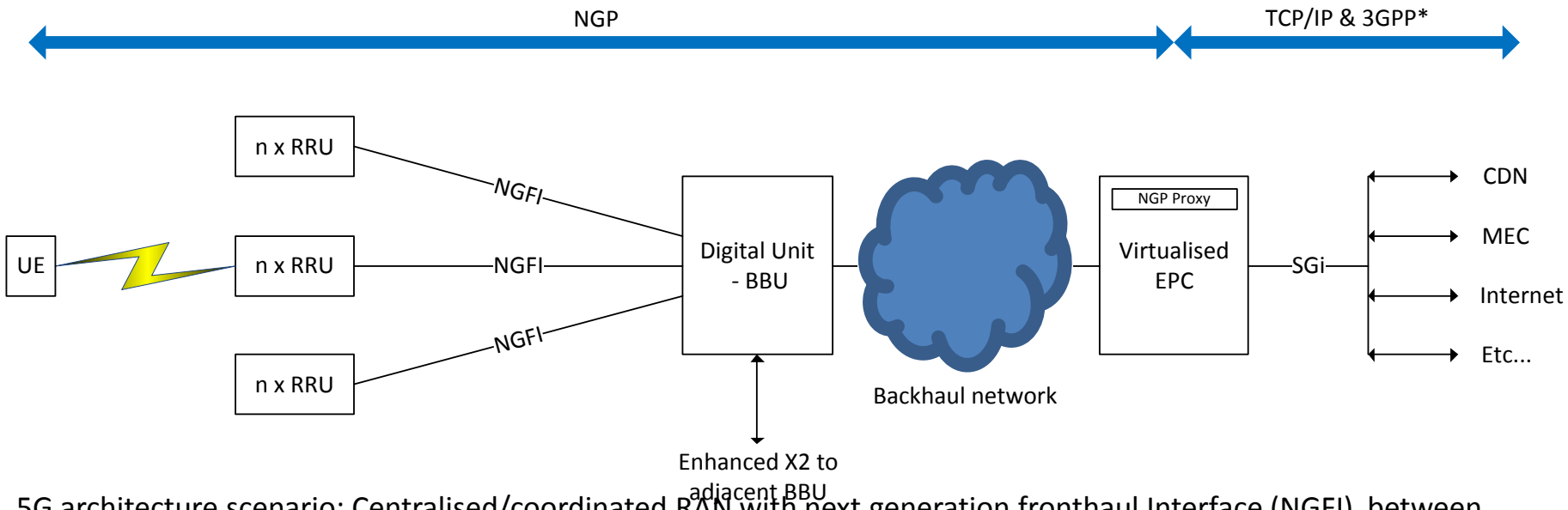
Full 5G implementation? (2)



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Spectrum considerations

- New protocols have the ability to enhance many aspects of networking and telecommunications
- Radio frequency spectrum is worthy of particular note as it's a finite resource
- Mobile network operators have invested significant sums of money in acquiring spectrum assets
- It's increasing important to maximise the efficient use of spectrum to ensure the continued evolution of our ever more connected society
- Focus on application bits per second per Hertz to truly understand radio network efficiency…

Summary of key topics under consideration

- Addressing
- Security, Identity and authentication
- Mobility
- Requirements from Internet of Things
- Requirements from video and content distribution
- Requirements from ultra-low latency use cases from different sectors (i.e. automotive)
- Requirements from network operators (i.e. challenges with E2E encrypted content)
- Requirements from eCommerce
- Requirements for increased energy efficiency within ICT sector

Welcome to the NGP ISG

The NGP ISG is open to all ETSI members and non-members

For full details of the NGP ISG including

ToR – Members and Participants agreements and how to join, please visit

https://portal.etsi.org/tb.aspx?tbid=844&SubTB=844

Thank you!