Network softwarization and slicing in 5G

Outline

Mobile networks evolution

The next generation

Softwarization

Slicing

A brief history of mobile networks

|		Users	Providers
1G	Analog phone calls	Mobility	New market
2G	Digital calls, messaging, data	Security, Accessibility	Capacity for more users, efficiency
3G	Better data, new use-cases	Performance, use cases	Use cases, value added services
4G	Better data, New use-cases	Performance, use cases	Use cases, value added services

Use cases are diverging
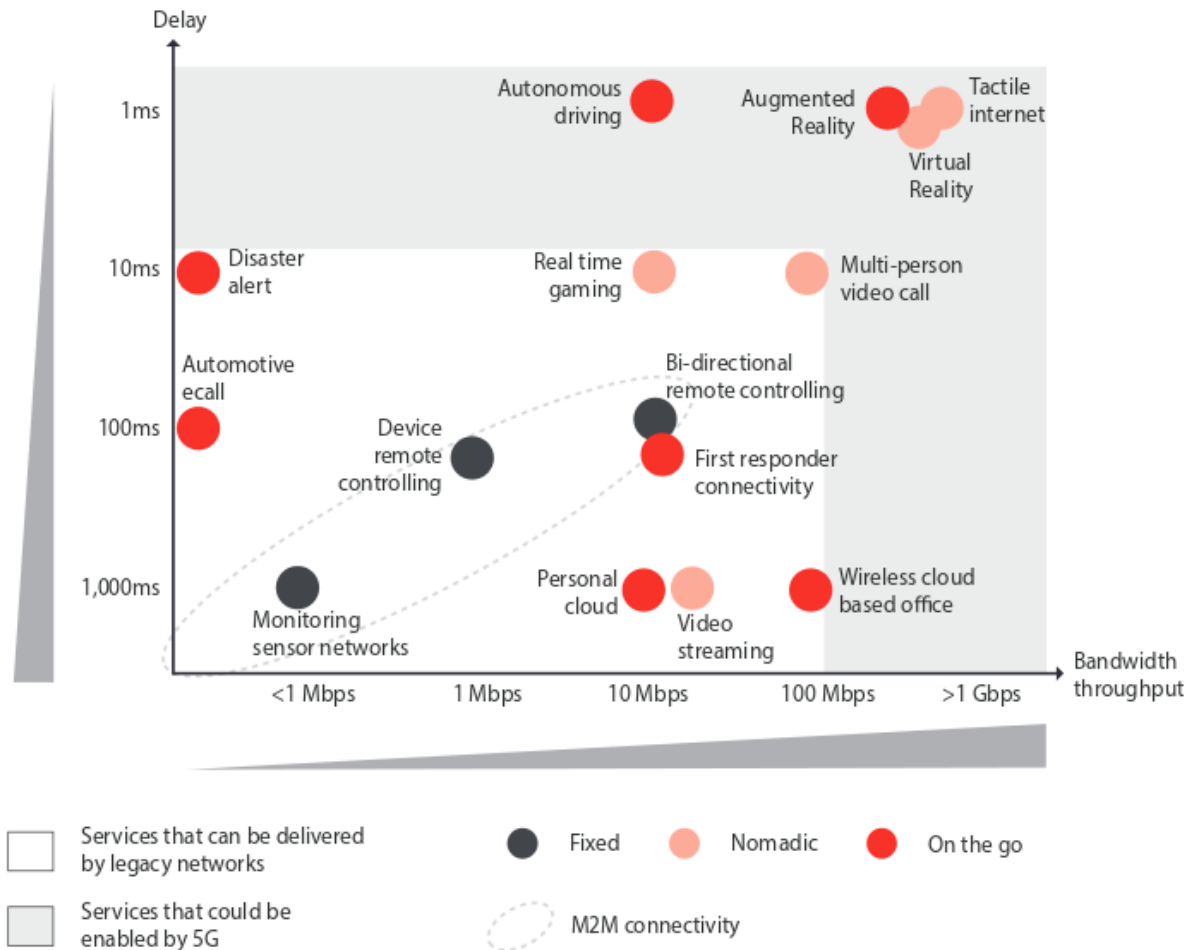
Bandwidth and latency requirements of potential 5G use cases [1]

Current mobile networks are inflexible
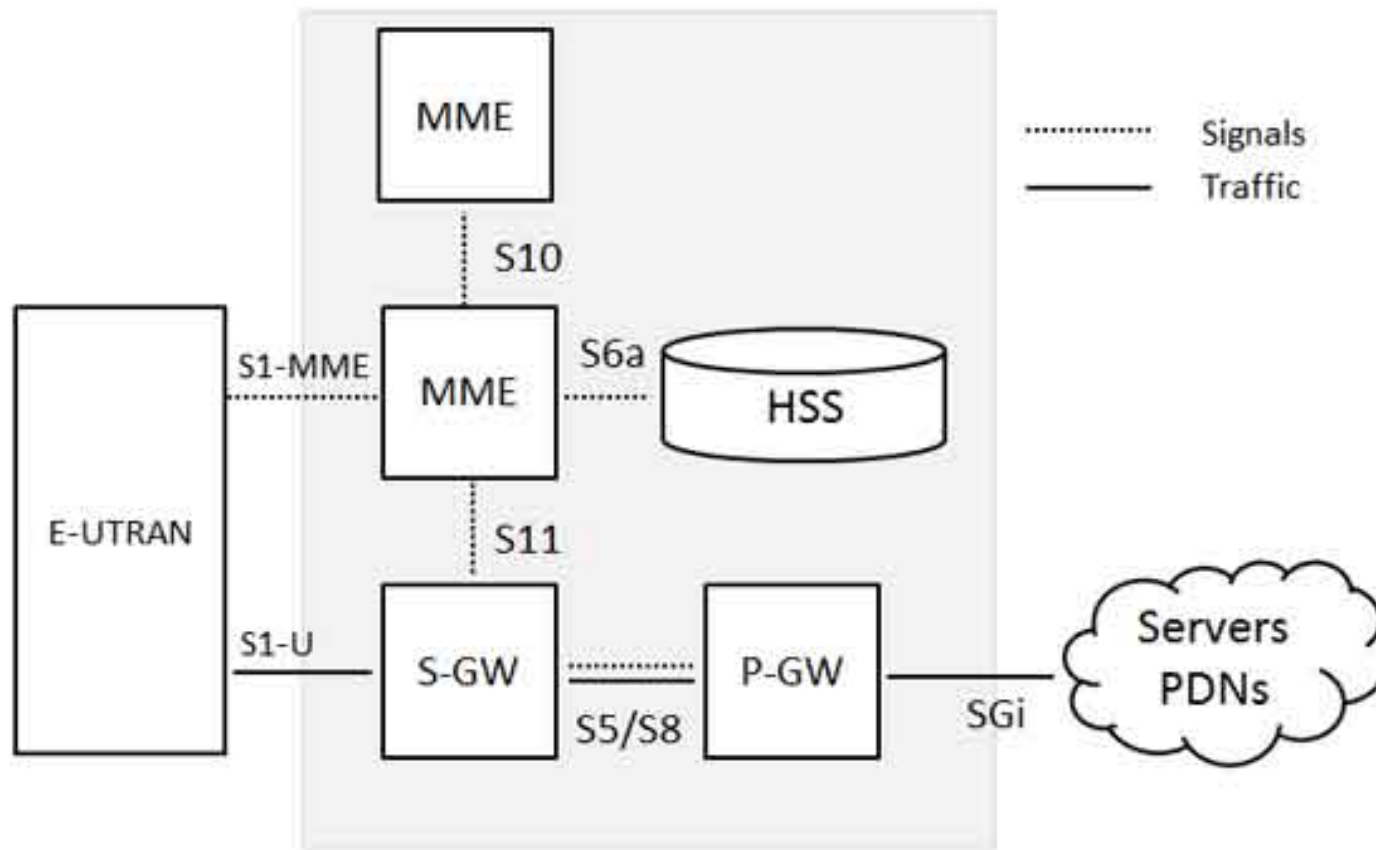
Components of the 4G architecture
[https://www.tutorialspoint.com/lte/lte_network_architecture.htm]

What can softwarization offer

Lower cost   **?**

Higher efficiency   **?**

Better scalability

Better flexibility

Reliability   **?**
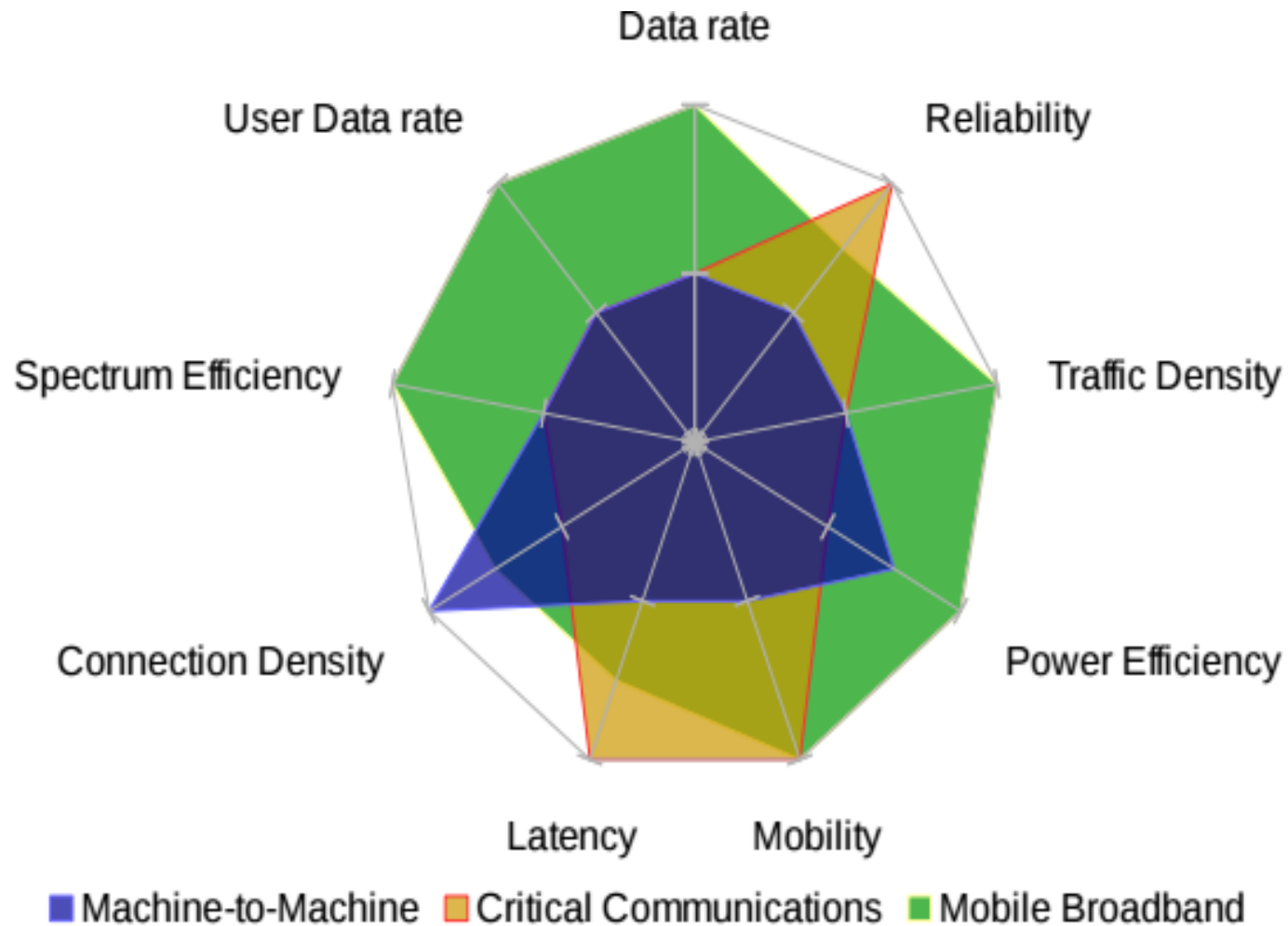
Research topics

What is the NF architecture going to look like?

How will providers design their networks?

How will the networks map to functions?

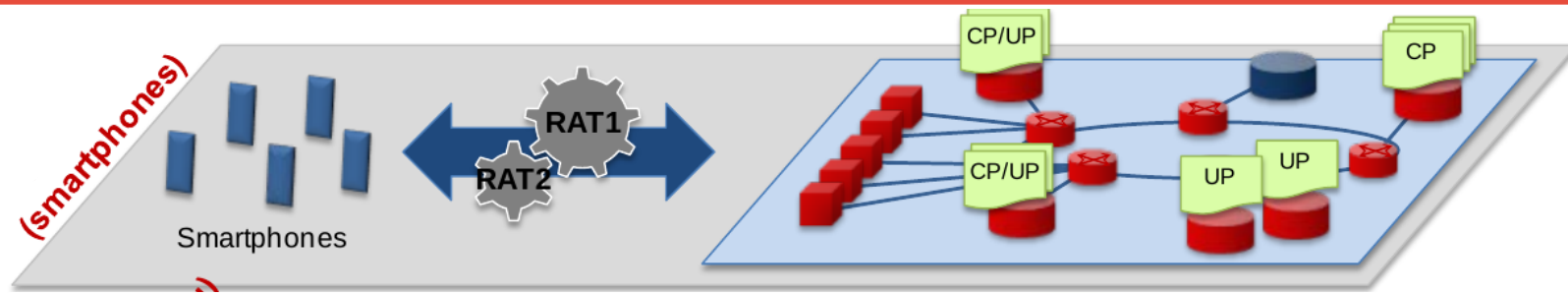**How will infrastructure map to functions?**

Each use-case brings a different set of requirements

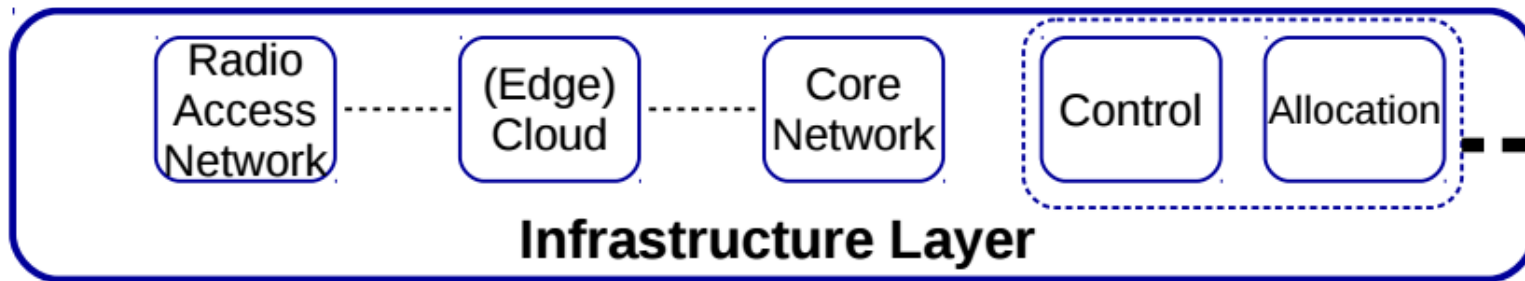Key 5G use cases and their requirements [2,3]

Network slices implemented on the same infrastructure [1]

Generic 5G architecture

5G architectural framework [2]

A more standardized and capable measurement framework is needed

How will management and orchestration work?

How do we determine what and where to measure?

How do we actually do it in a efficient way?

How do we use the intelligence?

References

[1] NGMN Alliance. 5G White Paper, Feb 2015.

[2] X. Foukas, G. Patounas, A. Elmokashfi and M. K. Marina, "Network Slicing in 5G: Survey and Challenges," in IEEE Communications Magazine, vol. 55, no. 5, pp. 94-100, May 2017.

[3] ITU-R. IMT Vision – Framework and overall objectives of the future development of IMT for 2020 and beyond, Sept 2015.

[.] 5G PPP Architecture Working Group. View on 5G Architecture, Jul 2016.

[.] A. S. Rajan et al., "Understanding the bottlenecks in virtualizing cellular core network functions," in Local and Metropolitan Area Networks (LANMAN), 2015 IEEE International Workshop on, 2015, pp. 1–6.

[.] J. Prados-Garzon, J. J. Ramos-Munoz, P. Ameigeiras, P. Andres-Maldonado, and J. M. Lopez-Soler, "Modeling and Dimensioning of a Virtualized MME for 5G Mobile Networks," IEEE TRANSACTIONS ON VEHICULAR TECHNOLOGY, vol. 66, no. 5, p. 4383, 2017.

[.] Z. A. Qazi, M. Walls, A. Panda, V. Sekar, S. Ratnasamy, and S. Shenker, "A High Performance Packet Core for Next Generation Cellular Networks," 2017, pp. 348–361.

[.] P. Neves et al., "Future mode of operations for 5G – The SELFNET approach enabled by SDN/NFV," Computer Standards & Interfaces, Feb. 2017.