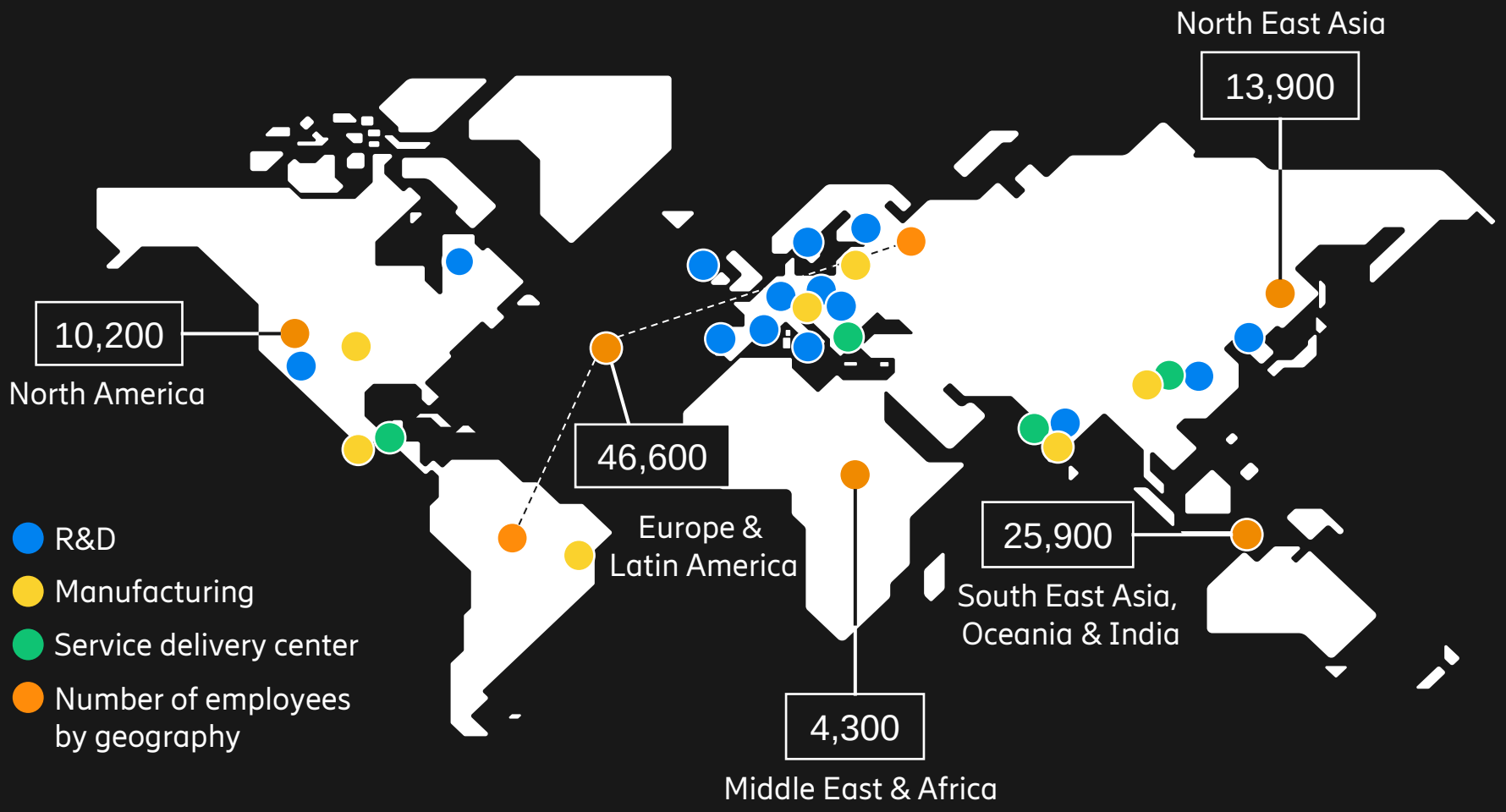
5G & Immersive Media

Digital Futures – Industrial Metaverse
KTH, Stockholm, 8 April 2022

Per Fröjdh, PhD
Vice President International Standards
Ericsson, CTO Office

Ericsson global capabilities, working with customers in more than 180 countries



100,800
Highly skilled people worldwide

26,000
Dedicated to R&D

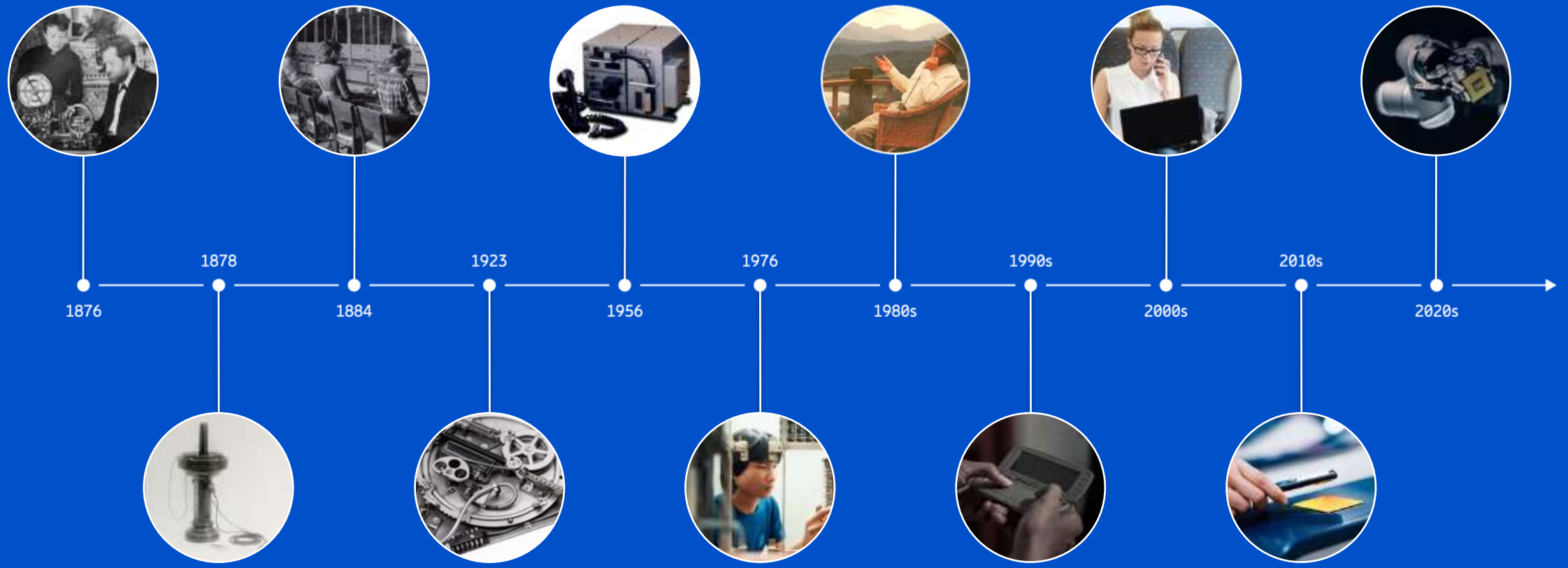
57,000
Patents

28,000
Managed Services professionals

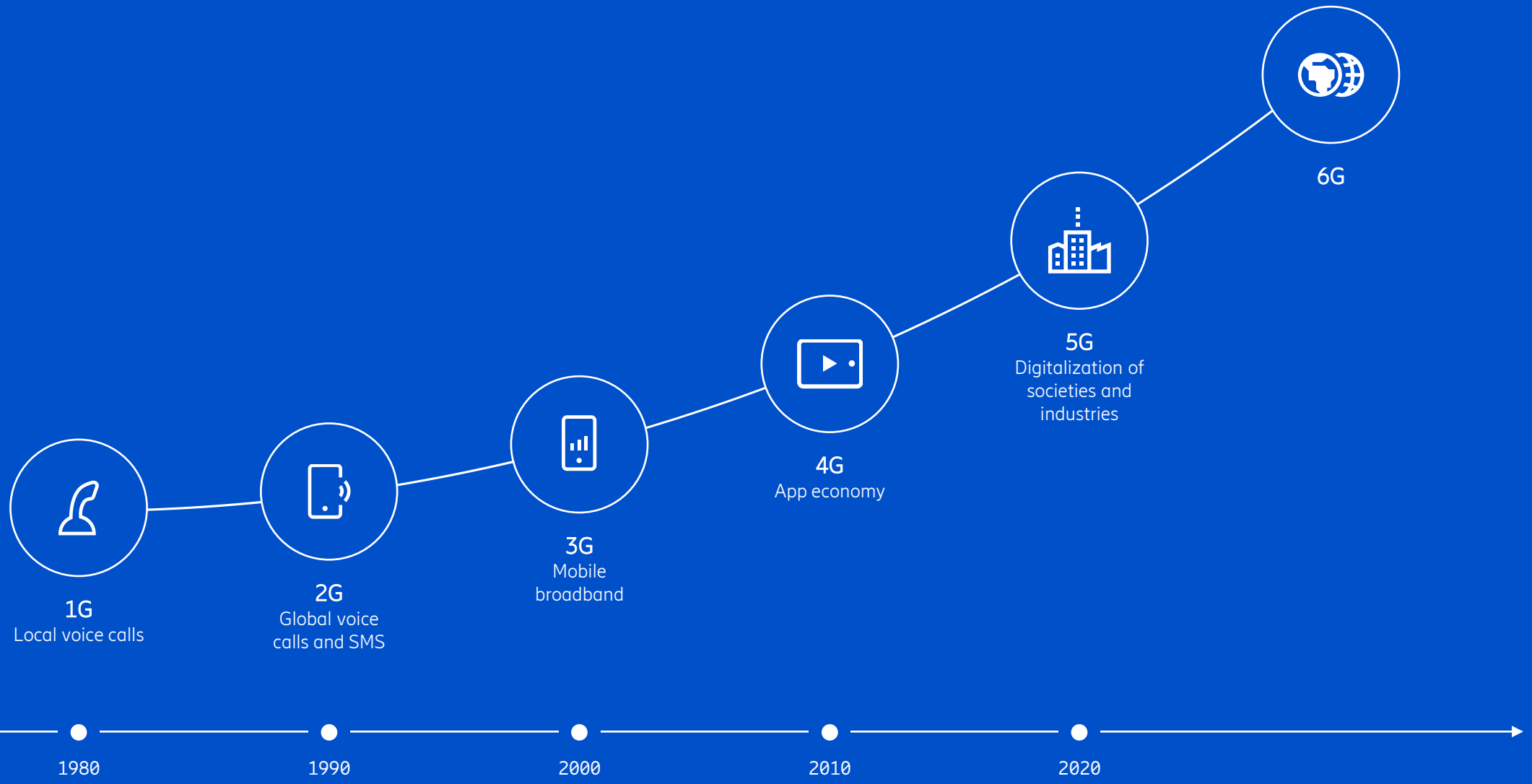
Data as of Dec 31st 2020

Enabling communication since 1876

146 years of innovation



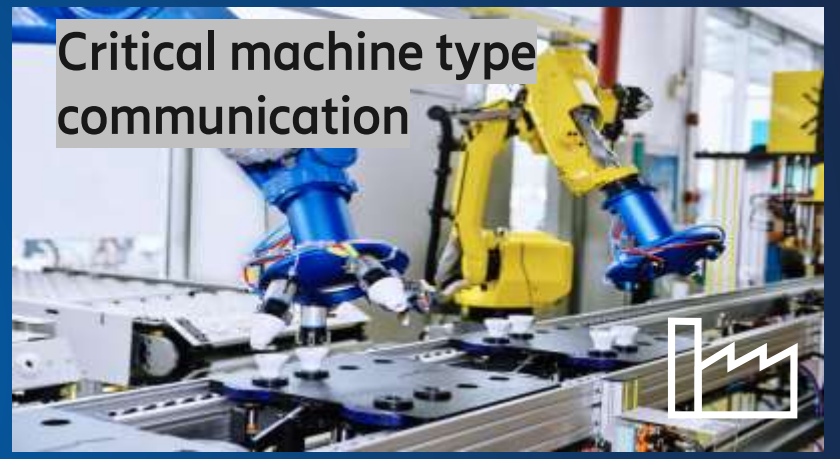
Driving the evolution of mobile networks



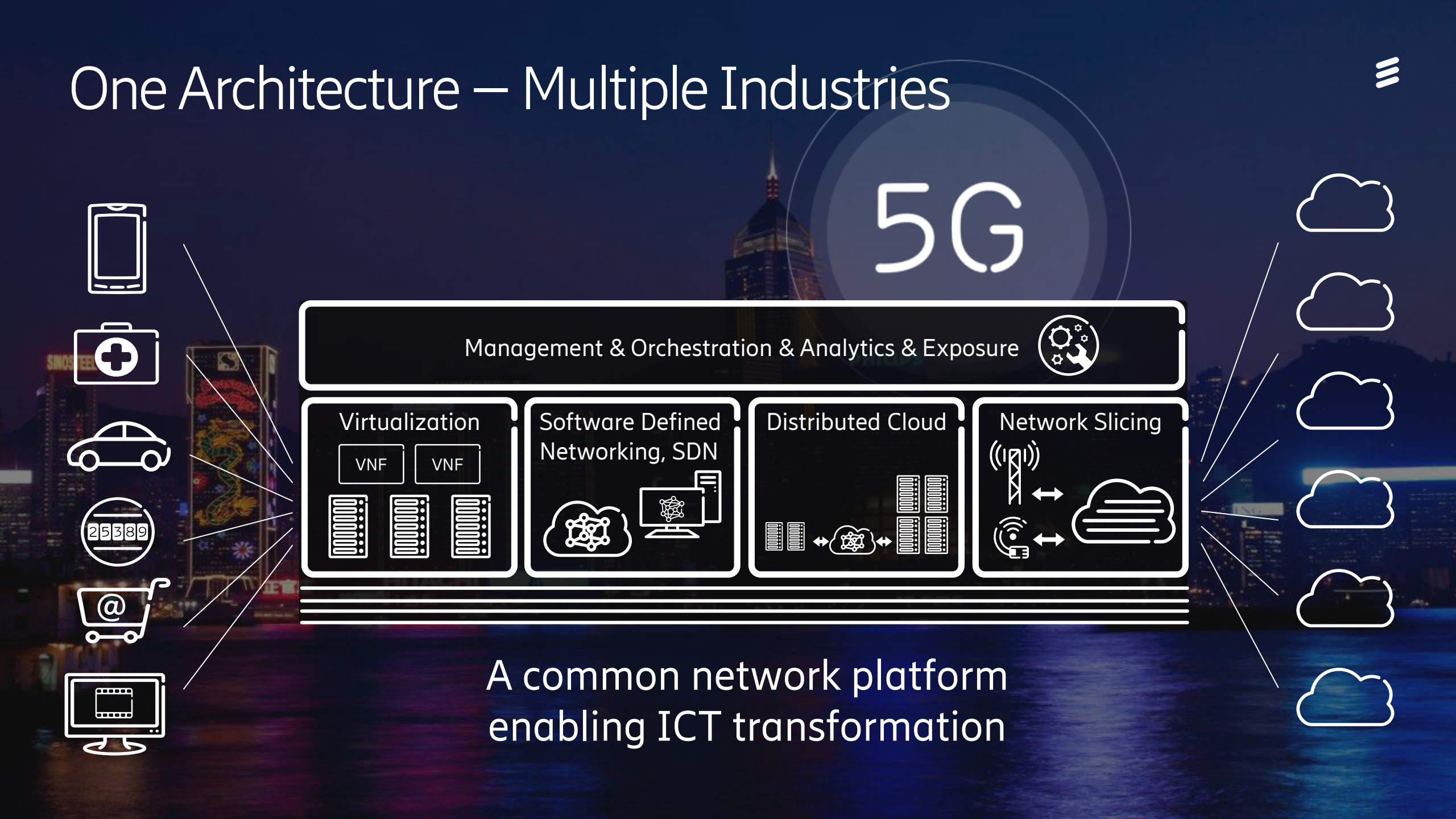
5G is developed from use cases

Industry and society transformations

Increased data traffic and performance



One Architecture – Multiple Industries



A common network platform enabling ICT transformation

5G enables change

Elevating experiences

Transforming industries

Advancing societies

5G Specifications by the numbers

	Speed Peak rate down/up	Low Latency	Availability Reliability Security*
4G	1/0.2 Gbps	10ms	99.99X%
5G	**20/10 Gbps**	**1ms**	**99.999%**

	Mobility	Position accuracy	Device density
4G	220mph	150ft	250 per mi^2
5G	**310mph**	**3ft**	**2.5 Mn/mi^2**

By 2026, Ericsson forecasts:

8.8Bn Worldwide mobile subscriptions

3.5Bn 5G subscriptions

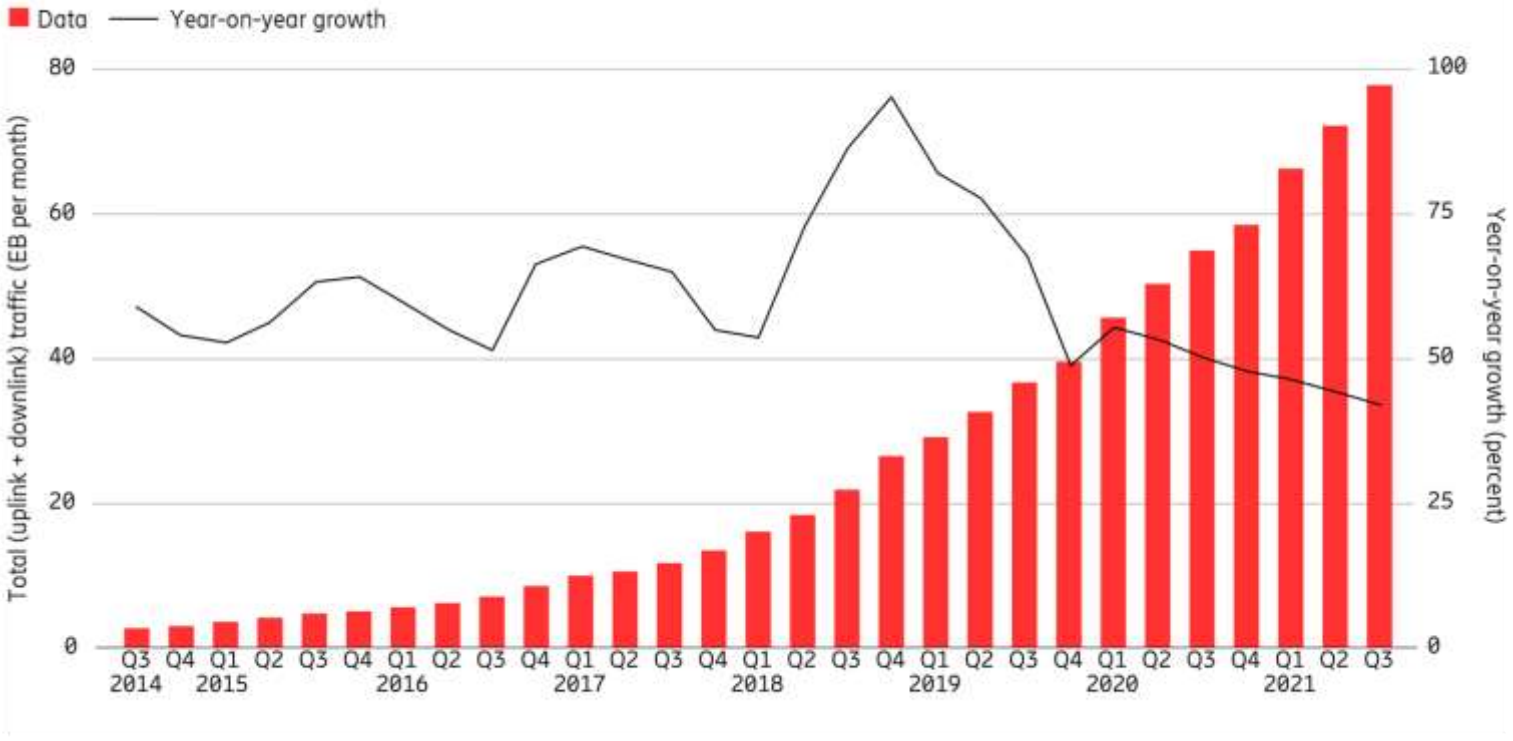
50% 5G coverage for the global population

77% of all mobile data traffic will be video

Mobile network data traffic growth

In 2026, 77 percent of all mobile data traffic will be video

Global mobile network data traffic and year-on-year growth (EB per month)



Note: Mobile network data traffic also includes traffic generated by fixed wireless access (FWA) services.

Main drivers for video traffic growth

- Video part of most online content (news, ads, social media, etc.)
- Growth of VoD services
- Video streaming services
- Changing user behavior – video being consumed anywhere, any time
- Increased segment penetration, not just early adopters
- Evolving devices with larger screens and higher resolutions
- Increased network performance through evolved 4G deployments
- Emerging immersive media formats and applications (HD/UHD, 360-degree video, AR, VR)

5G
USE CASES

Media in 5G

5G drives Media
Media drives 5G

5G Key Aspects for Media

5G
USE CASES

VR/AR/Latency

Network Slicing

Fixed Wireless Access

Hybrid

Evolution of Communication

Writing & Print

Calling

Internet

Social Media

What's next?


Immersive Media

Why XR?

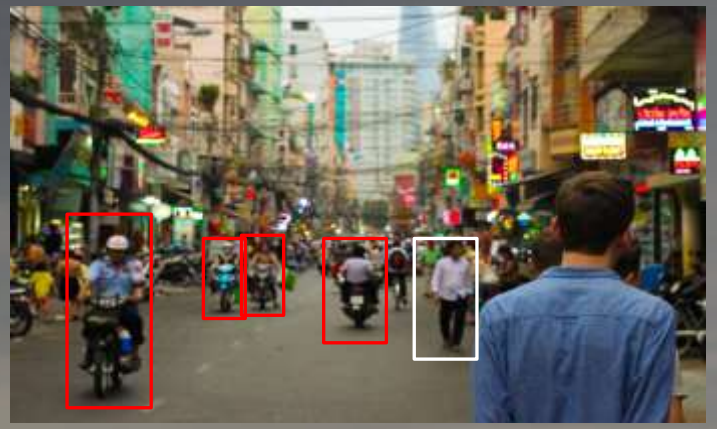
"There's nothing smart about using the same interface for every application"

Apple iPhone announcement 2007

Why 5G for XR?

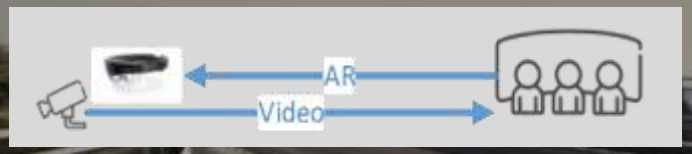
- Mobility (non tethered)
- Uplink and low latency → VR
- Computing power on a (edge) server → AR
- Battery life (offload computations)
- Multiple users – cellular only stable solution

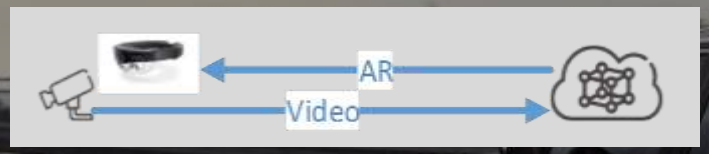
Example AR Use Cases



- Truly mobile (Wireless)
- Device battery → Cloud
- Low latency
- High bitrate

→ 5G for AR!

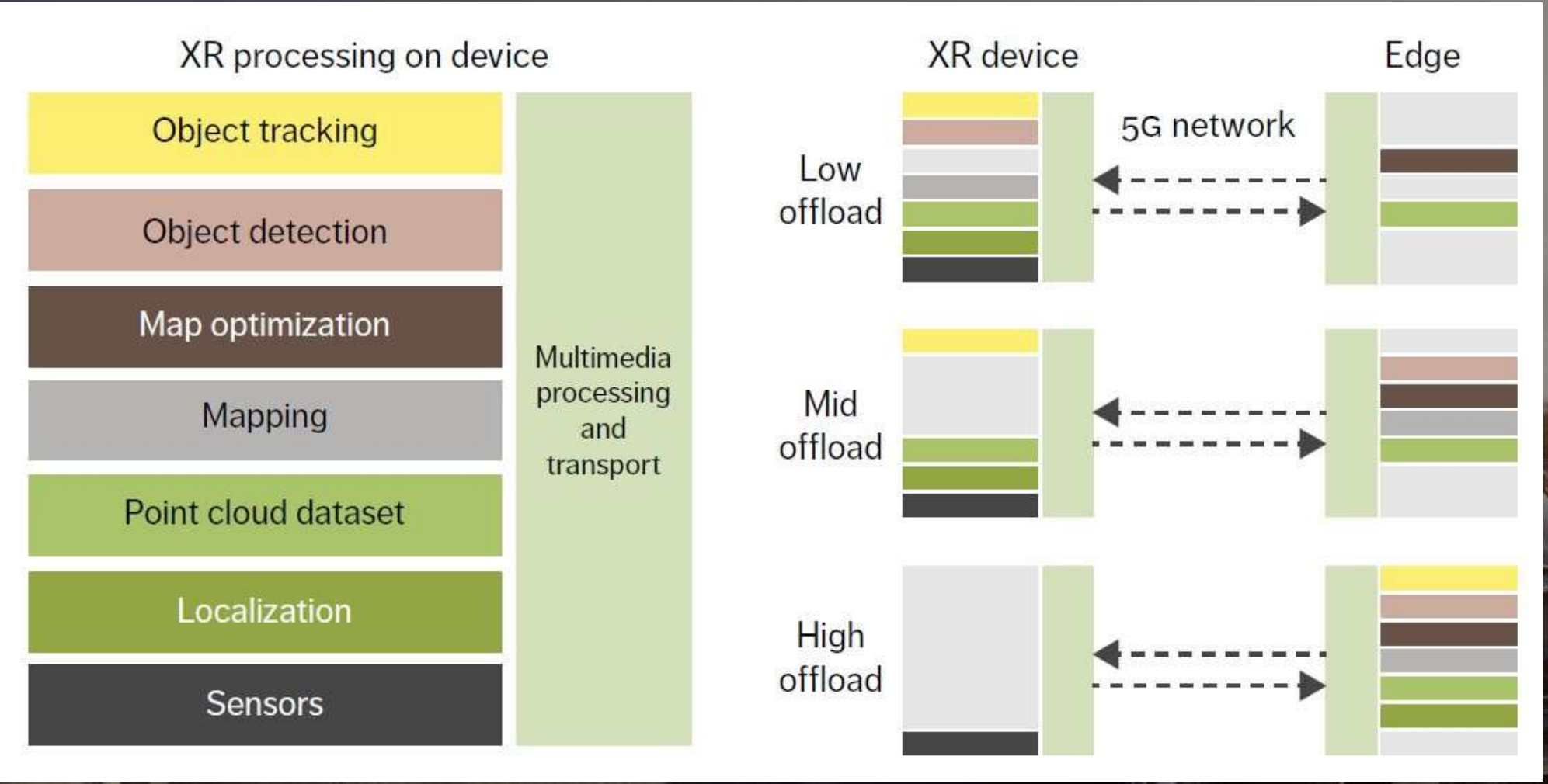




Industry application

Image analysis (cloud processing)

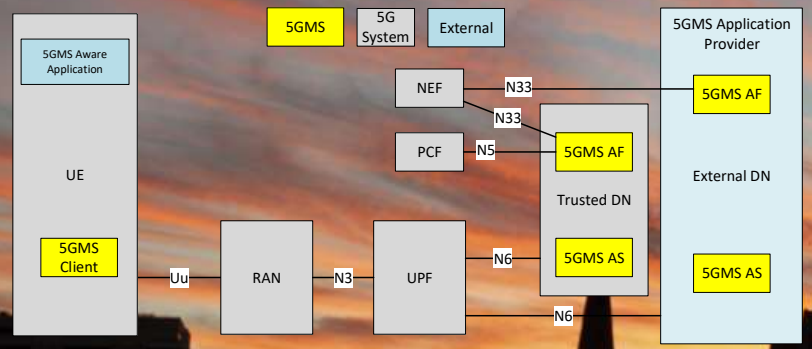
Split architecture options with 5G connectivity



Standardization

3GPP 5G Media Streaming Architecture (5GMSA)

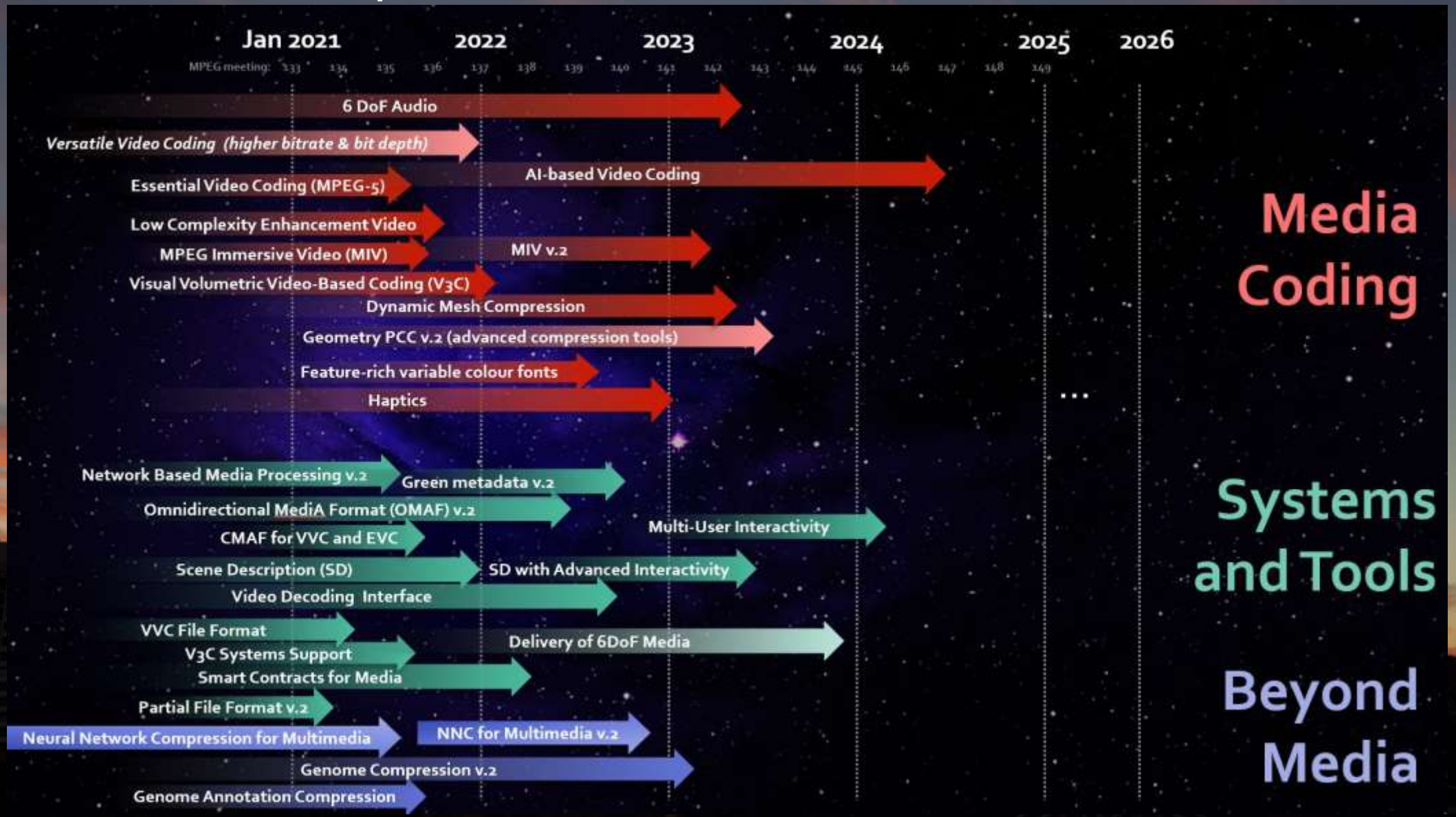
- Unicast downlink streaming
- Uplink streaming
- Network slicing
- Edge Computing



Content formats

- Audio/Video streaming services
- Emerging services beyond 2D video and TV
  - 6DoF (6 Degrees of Freedom) VR
  - Augmented Reality and
  - Mixed Reality applications

MPEG Roadmap



An example of our current activities

MPEG-I (ISO/IEC 23090)

Coded Representation of Immersive Media

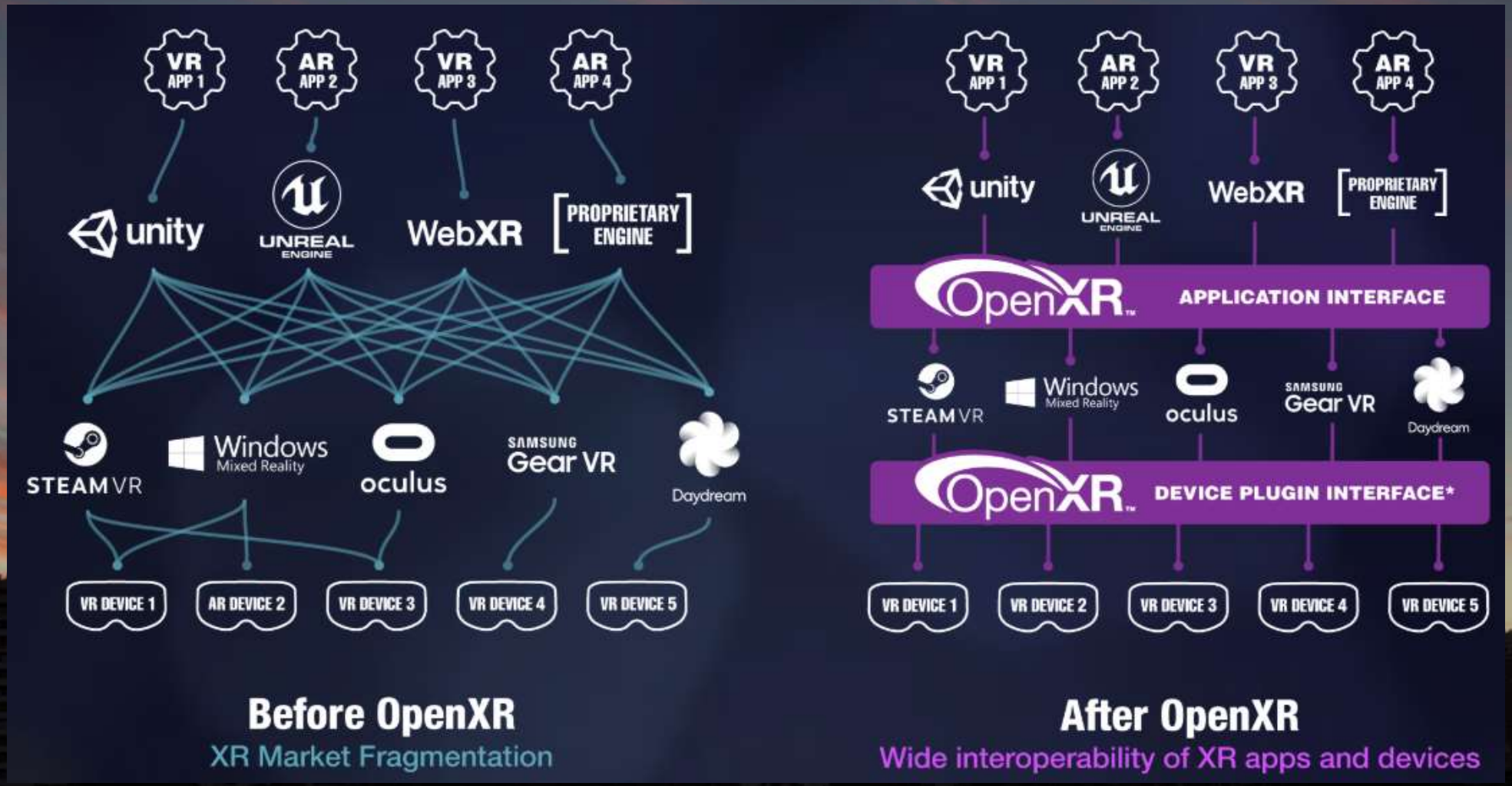
Parts:

1. Architectures for Immersive Media (Technical Report)
2. Omnidirectional MediA Format (OMAF)
3. Versatile Video Coding
4. Immersive Audio
5. Video-based Point Cloud Compression (V-PCC)
6. Metrics for Immersive Services and Applications
7. Metadata for Immersive Services and Applications
8. Network-Based Media Processing
9. Geometry-based Point Cloud Compression (G-PCC)
10. Carriage of Video Point Cloud Data
11. Implementation Guidelines for Network-based Media Processing
12. MPEG Immersive Video
13. Video Decoding Interface for Immersive Media
14. MPEG-I Scene Description
15. Conformance testing for versatile video coding

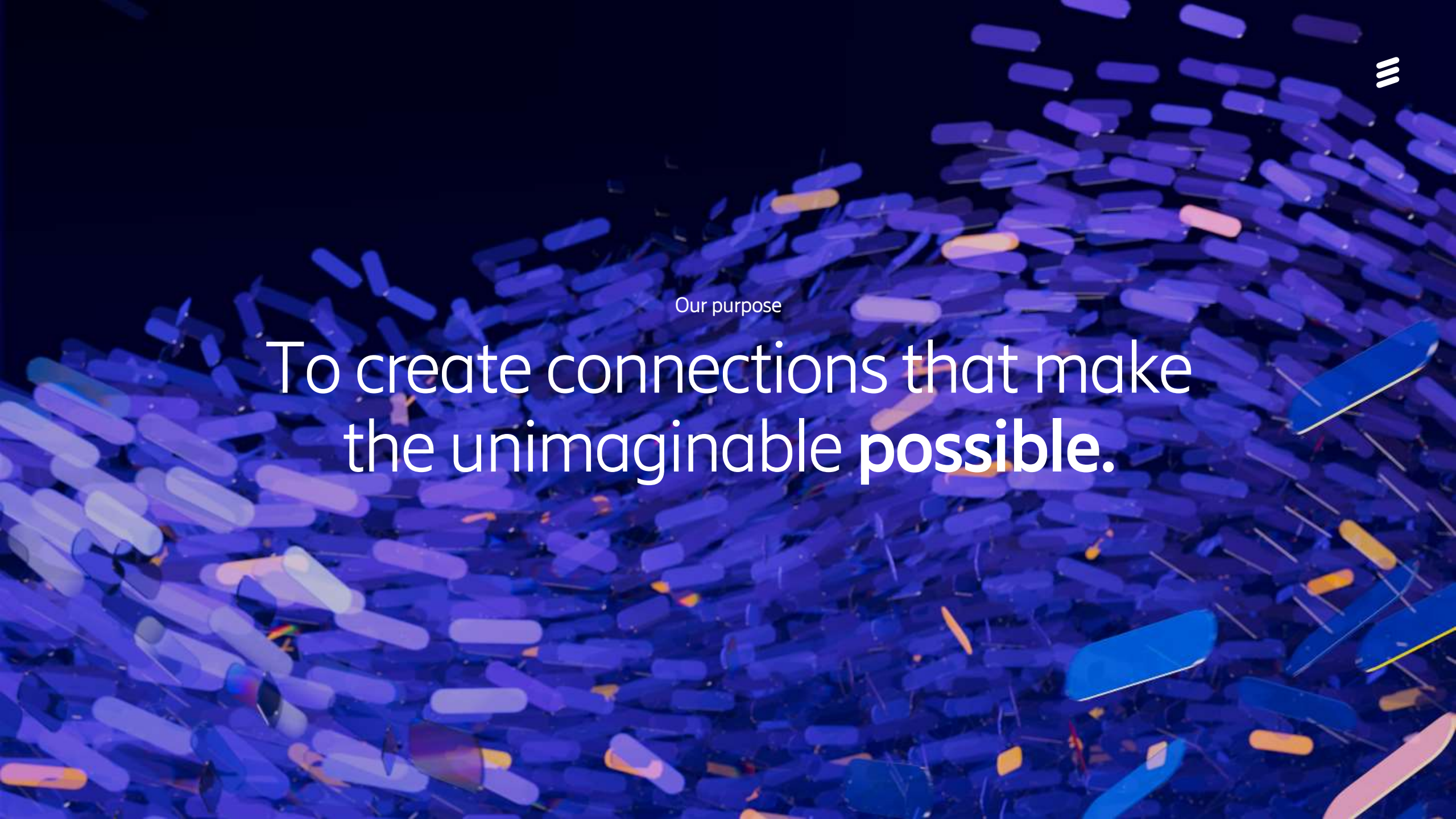
Parts:

16. Reference software for versatile video coding
17. Reference software and conformance for OMAF
18. Carriage of geometry-based point cloud compression data
19. Reference software for V-PCC
20. Conformance for V-PCC
21. Reference software for G-PCC
22. Conformance for G-PCC
23. Conformance and reference software for MPEG Immersive Video
24. Conformance and reference software for Scene Description for MPEG Media
25. Conformance and reference software for carriage of V-PCC data
26. Conformance and reference software for carriage of G-PCC data
27. Media, renderers, and game engines for render- based systems and applications
28. Efficient 3D graphics media representation for render-based systems and applications

Khronos OpenXR




Ericsson Group presentation
Imagine a world where limitless connectivity means limitless possibility


Our purpose
To create connections that make the unimaginable **possible.**

Imagine Possible

ericsson.com/future-technologies