LightReading

Designing 6G: Enabling Scalable Mobile Connectivity for our AI-driven Future

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Speakers

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Balance Economic Pragmatism and 6G Vision

Decisions made in the next 2 years will set the 6G transition path

3GPP R20 Studies underway
- *Architecture for 6G System*
- *Study on 6G Radio (6GR)*

Modular architecture to meet user requirements in 2035–2040

Day 1 architecture supported within the "economic envelope" of today's business models

Serve new forms of communication and enable high value applications

2030

- Scale SA & key sectors (logistics, auto, etc.)
- Introduce 5G Advanced, XR, NTN, positioning…
- Set a path to AI native networks
- **6G Mindset: Evolve & leverage 5G investment**

2035

- Simplified architecture; Focus on Day 1
- New spectrum (6GHz, FR3)
- Introduce sensing, network computing, AIaaS
- **6G Mindset: Explosion of AI endpoints**

2040

- Modular architecture to evolve as needed
- New forms of communication
- Integrated network/computing/device services
- **Mindset: 6G vision at global scale**

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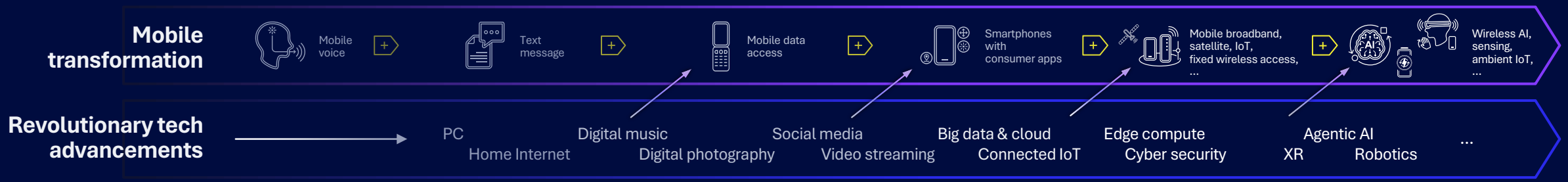
September 9th, 2025

Evolution of mobile connectivity

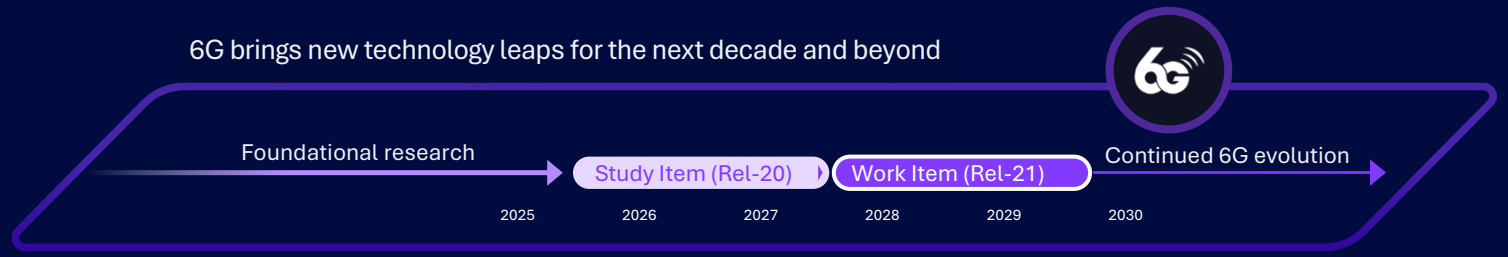
Mobile technology profoundly reshapes our world

Decade-defining leaps: enabling aligned investments and leveraging significant technology advancements

1G	2G	3G	4G	5G	6G
1980s	1990s	2000s	2010s	2020s	2030s
Analog voice	Digital voice	Wireless Internet	Mobile broadband	Connected intelligent edge	**Next-gen wireless**



Global ecosystem aligned to launch 6G in 2030



THE NEED FOR CONTINUED WIRELESS EVOLUTION

Mobile data consumption continues to grow

Global mobile data usage predicted to grow **3x** by 2030

Key drivers fueling mobile traffic increase:

- Broad 5G use
- Higher consumption of video content
- The rise of XR
- Emergence of AI-generated content and applications

AI is bringing new data traffic for mobile

AI poised to transform global wide-area network (WAN) traffic with consumer AI traffic dominating

Global WAN traffic projected to grow **5x** to **9x** from 2023 to 2033, with AI accounting for **33%** of all traffic

Sources: GSMA The Mobile Economy 2025, Nokia Bell Labs Global Network Traffic Report 2024

Changing consumer behaviors

Rise of AI agents

From app-based, user-initiated content consumption…

To persistent context-aware AI agents that observe, sense, and infer

Extension to new form factors

From smartphone only…

To an ecosystem of AI-enabled devices (watches, glasses, earbuds) working together for more natural interactions

Evolving usage patterns

From downlink-heavy traffic…

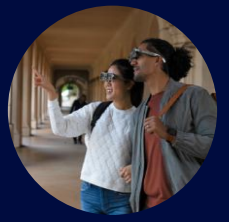
To sustained traffic growth, especially uplink, driven by AI agents continuously monitoring and sensing across IoT, robotics, AR glasses, …

Today
With smartphones…

2030+
Natural interactions via watch, glass, voice using AI Agents

“Order a ride for two people to go to the mall and remind me what to buy!”

“Show my schedule and tell me about my next patient.”



“Tell me the history of this building.”

Next-generation wireless and intelligent computing are the backbone of society

Remote IoT

Precision agriculture

Advanced air mobility

Next-gen mobile communications

Digitized education

Connected healthcare

Immersive entertainment

Smart grid and utilities

Smart manufacturing

Safer and more efficient transportation

Connected enterprises

Intelligent retail

Public safety

Wireless fiber to homes

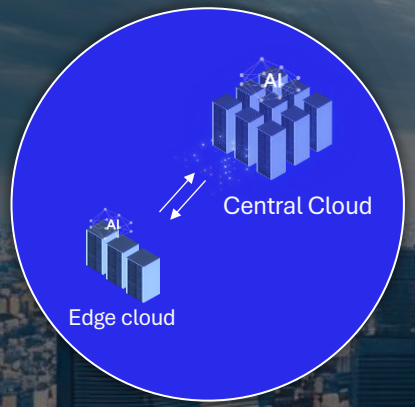
Enabling new economic opportunities merging physical, digital, and virtual worlds

Learn more about 6G

Watch: The next step in wireless innovation

https://www.qualcomm.com/6G

6G will connect an expanded set of AI-powered devices and enable new services



Enabling tiered AI inferencing
on device, at network edge, and cloud

Processing and streaming contextual data
including sensor, audio and vision data

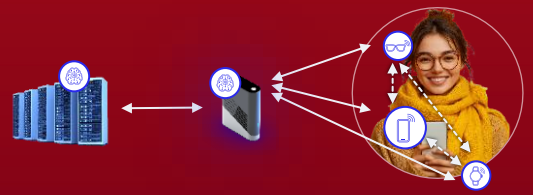
The smartphone remains the primary mobile hub for connectivity and compute

AI-powered consumer devices (glasses, watches, PCs) with cellular connectivity

AI-powered IoT devices, robots, and cars with cellular connectivity

We are driving 6G technology to enable new user experiences and services at scale

Agentic AI and Extended reality experiences



Examples: Personal assistant, “see what I see”, avatar calling

TECHNOLOGY ENABLERS

Collaborative communications

Distributed compute

AI-enabled context-aware communications

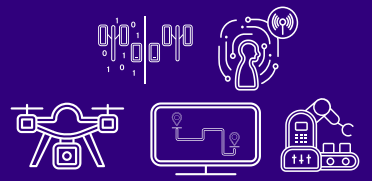
Examples: gaming and enhanced IoT services

TECHNOLOGY ENABLERS

AI-native protocol

UX-aware RAN

AI-enhanced network efficiency and services



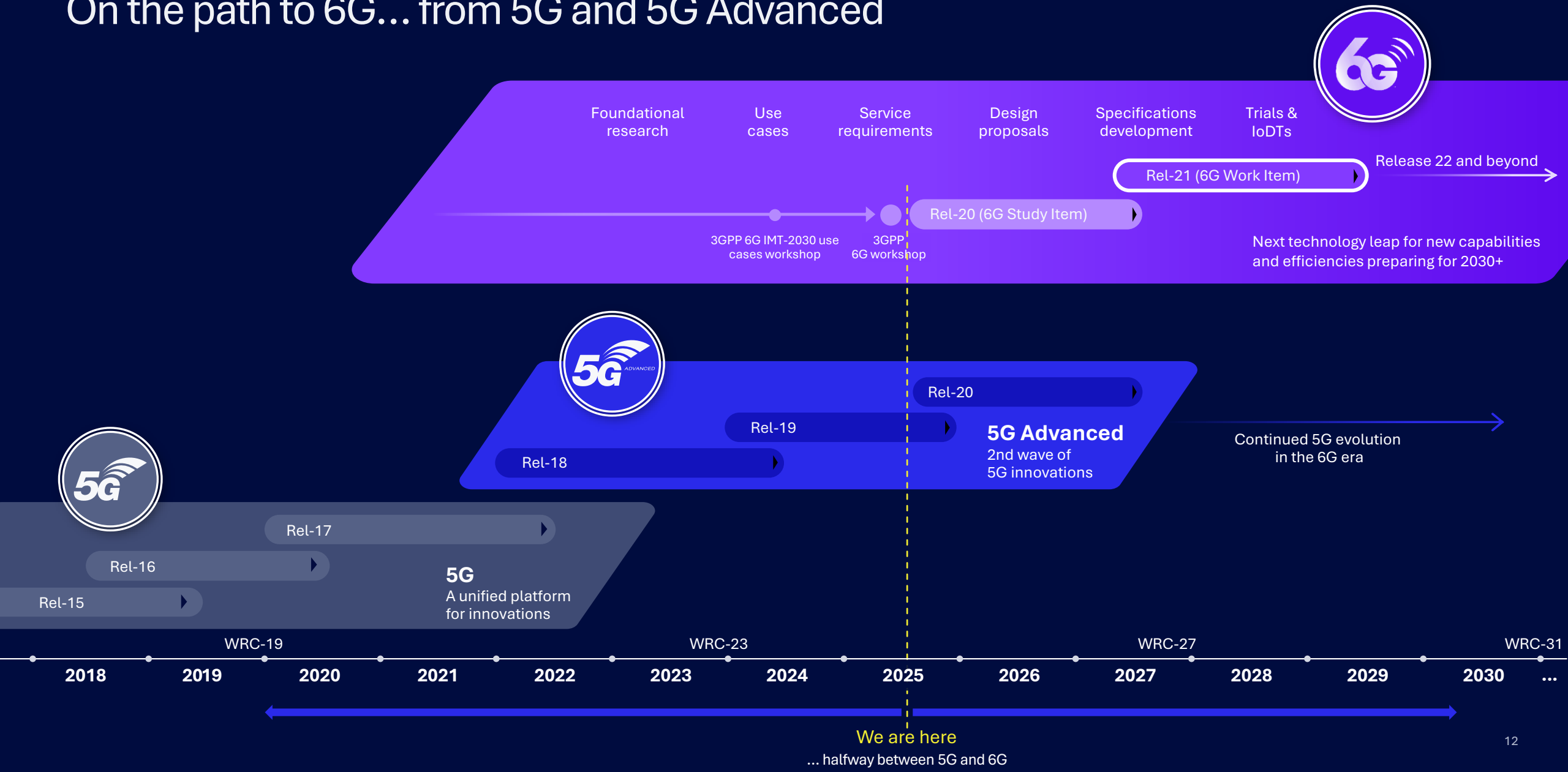
Examples: context-aware pricing, drone sensing, device tracking

TECHNOLOGY ENABLERS

Digital twin network

Inferencing and sensing

On the path to 6G… from 5G and 5G Advanced



Coverage and capacity

Driving capacity and coverage gains across all spectrum bands with 6G

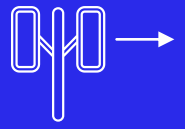
	LOW BANDS (FDD) below 1 GHz (~20 MHz BW)	MID BANDS (FDD, TDD) 1 – 7 GHz (~100 MHz BW)	UPPER MID BANDS (TDD) 7 – 24 GHz (~500 MHz BW)	mmWAVE BANDS (TDD) 24 – 71 GHz (~800 MHz BW)
	Wider Coverage ←			→ Higher Capacity
USE CASES	 Low data rate coverage and low power IoT	 Wide-area coverage layer, macro capacity layer, wide area location services	 Macro capacity layer for 6G data, FWA, NTN, wide-area sensing	 Capacity hotspots, venues, dense urban outdoor, FWA, local sensing
ENABLING TECH	Efficient waveform, coding, multiple access	FDD MIMO scaling and FDD/TDD bandwidth aggregation	Giga-MIMO at gNodeB, device antenna scaling, SBFD, RAN-sharing	Unified transmission configuration indicator (TCI), beam management

Mostly spectrum bands being used today in LTE and 5G

6G targets **50-70% gain** in low/mid-FDD bands without replacing cell RF equipment

Spectrum confinement & numerology alignment

Higher bandwidth occupancy for 6G FDD bands and tighter coordination with TDD bands



Downlink MIMO

Advanced CSF design to achieve high performance beamforming in 6G FDD

Uplink antenna / Tx power management

Advanced antenna/power management accounting for UL/DL imbalance, and MPE

Modulation, coding, and MIMO mapping

Evolved 5G coding, modulation to 6G LDPC, constellation shaping, MIMO mapping design

Uplink waveform

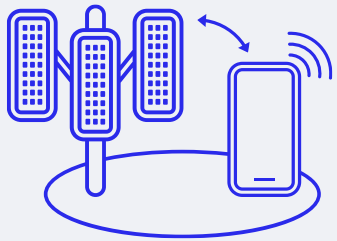
DFT-S with MIMO to yield gain over 5G NR single-layer DFT-S uplink

Reference signal and HARQ design

Combine best of LTE CRS & NR DMRS, new HARQ framework

FDD: Frequency division duplex; LDPC: Low density parity check; CSF: Channel state feedback; DFT-S: Discrete Fourier transform-spread; MPE: Maximum permissible exposure ; CRS: Cell-specific reference signal; DMRS: Demodulation reference signal; HARQ Hybrid ARQ

6G can enhance mid-band spectrum performance and efficiency



Further improving midband and higher midband TDD wide-area system design

Spectral efficiency and capacity improvement

Through e.g., modulation, coding, MIMO mapping, interleaving, data & control channel, reference signaling, beamforming, coherent MIMO

Targeting 30-50% in downlink & >30% in uplink gain[1]

Area efficiency optimization

Through e.g., area-efficient modulation, coding, memory-efficient MIMO mapping, wideband TDD-native design, MIMO CA adaptation for TDD, reduced HARQ buffering

Targeting 5-10x peak data rate with 2x+ higher area efficiency

Energy efficiency enhancement

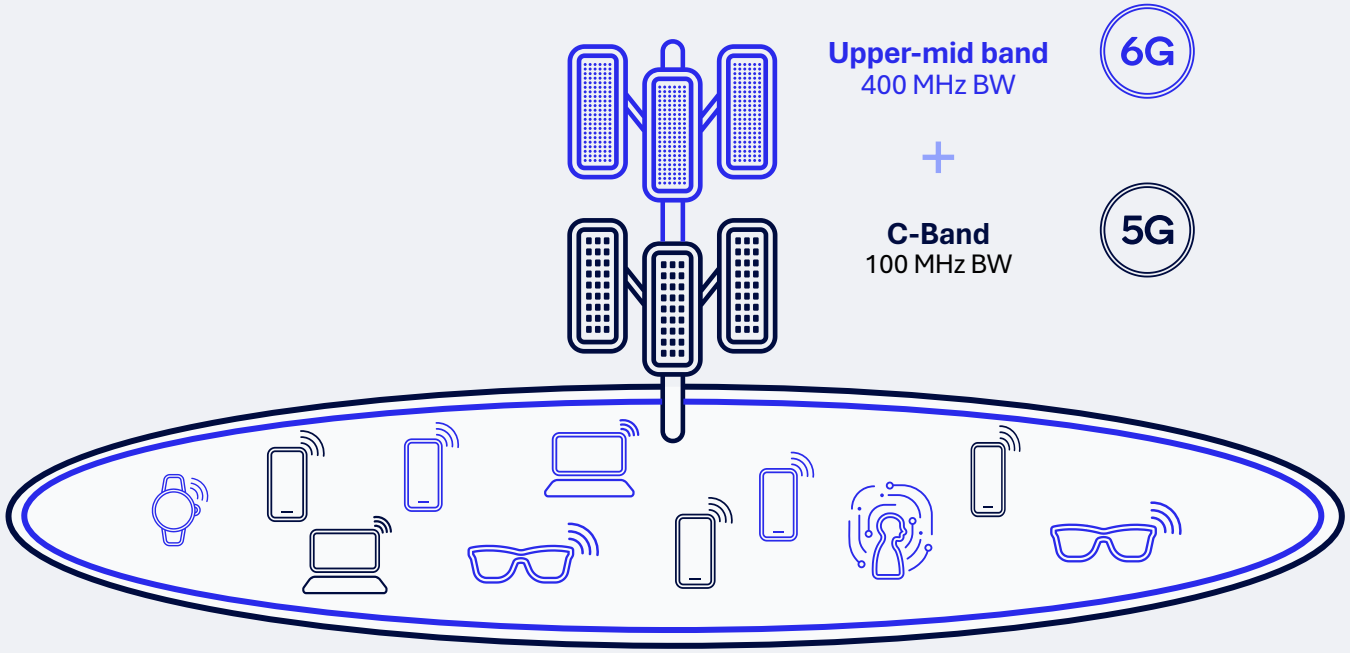
Through e.g., lean initial access, new designs for always-on signaling, enhanced adaptation framework, low-power WUS, wideband operation

Targeting 30-50% in network and device energy saving

1 Additional gain expected with antenna increase on both network and device sides

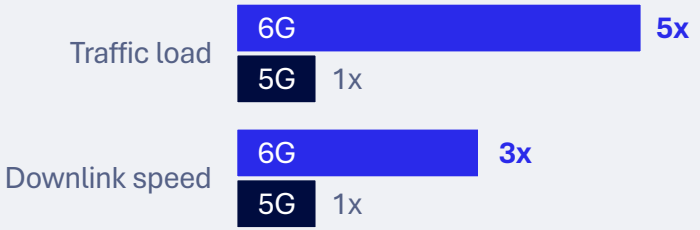
New upper mid-band spectrum will increase system capacity

Supporting more users per area and increased throughput



Supports **5x** traffic load

while maintaining at least 100 Mbps for the bottom 10% users



Provides **3x** faster average user data speeds*

Add cost-effective capacity without densification

* Without baseband gain

6G RAN will deliver new value and continued growth

Focus on improving spectral and cost efficiency

6G as a high-efficiency "G"

Substantial spectral efficiency and user experience improvement in existing FDD/TDD bands with baseband upgrade

Probabilistic shaping and nonlinear MIMO demodulation are delivering up to 3 dB gains in real-world channels

Multi-fold capacity boost in 6G new bands

Cost-effective design for deployment in existing and new bands

Energy and hardware-efficient design of 6G building blocks

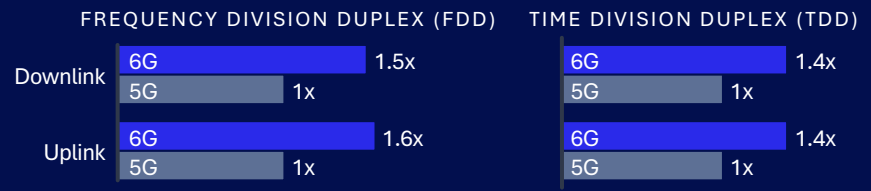
Leverage AI computation power on both device and network sides

Unified and streamlined design for eMBB and other services

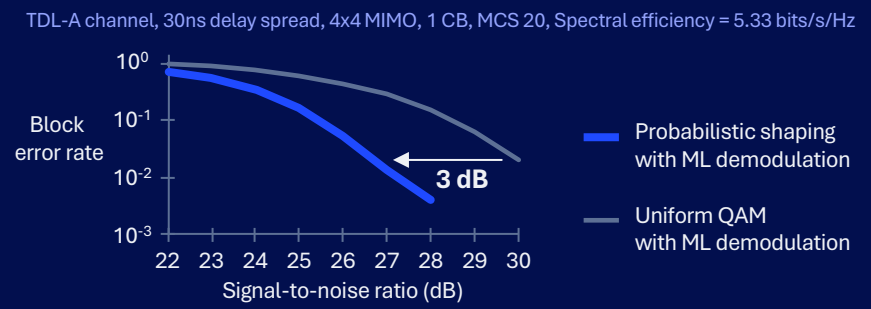
Supporting eMBB, CPE, IoT, XR / watch wearable from a single network / RAT

Streamline protocols in 6G specification to ease commercialization

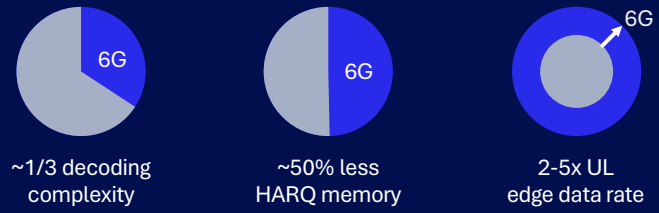
Facilitate service beyond connectivity via AI, sensing, digital twin, new device types



Higher spectral efficiency with 6G in existing 5G bands



Boosting performance with probabilistic shaping and ML demodulation



Cost-effective design and deployment

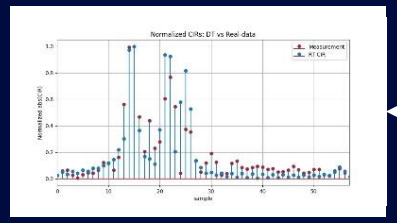
Enhancing existing services with 6G and adding new capabilities

Services beyond connectivity

Network Dimensioning

Perception-aided beam management

Channel generation for ML model tuning



Joint communication & sensing for cars

And many others...

Digital Representation of Wireless System

Digital Representation of Physical World

Wireless Performance Improvement

Digital Twin Algorithms

Service Exposure

Computer Vision

Geographic Information Systems

Machine Learning

Sensor Fusion

Technology Convergence

Inputs

Performance metrics

RF measurements

Camera

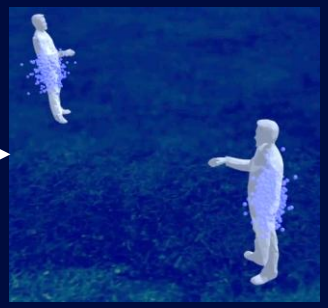
Map

CAD Drawing

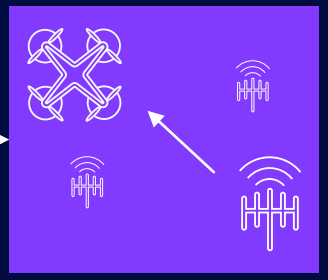
Sensors

Radar

Autonomous robot location / speed detection



Presence detection



Aerial drone tracking

And many others...

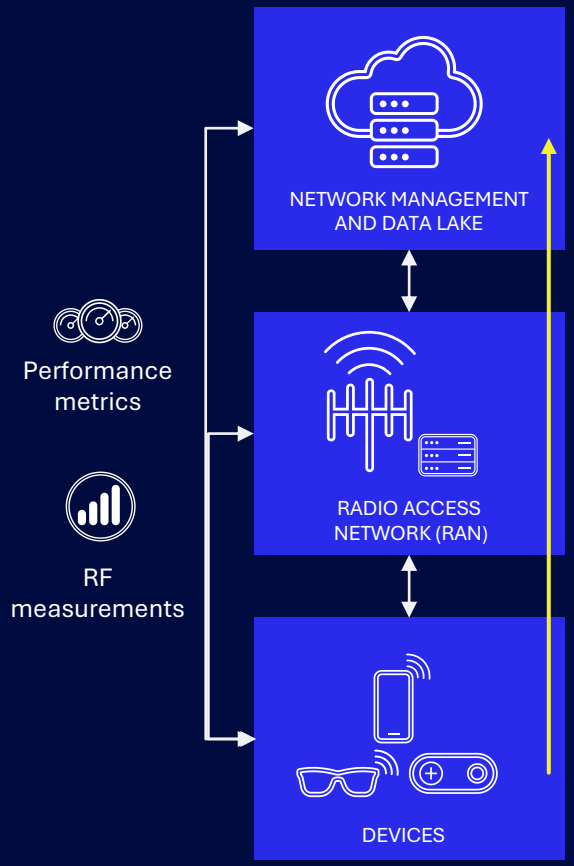
Digital Twin enables new services beyond connectivity

Monitoring and performance optimization of its real-world counterpart

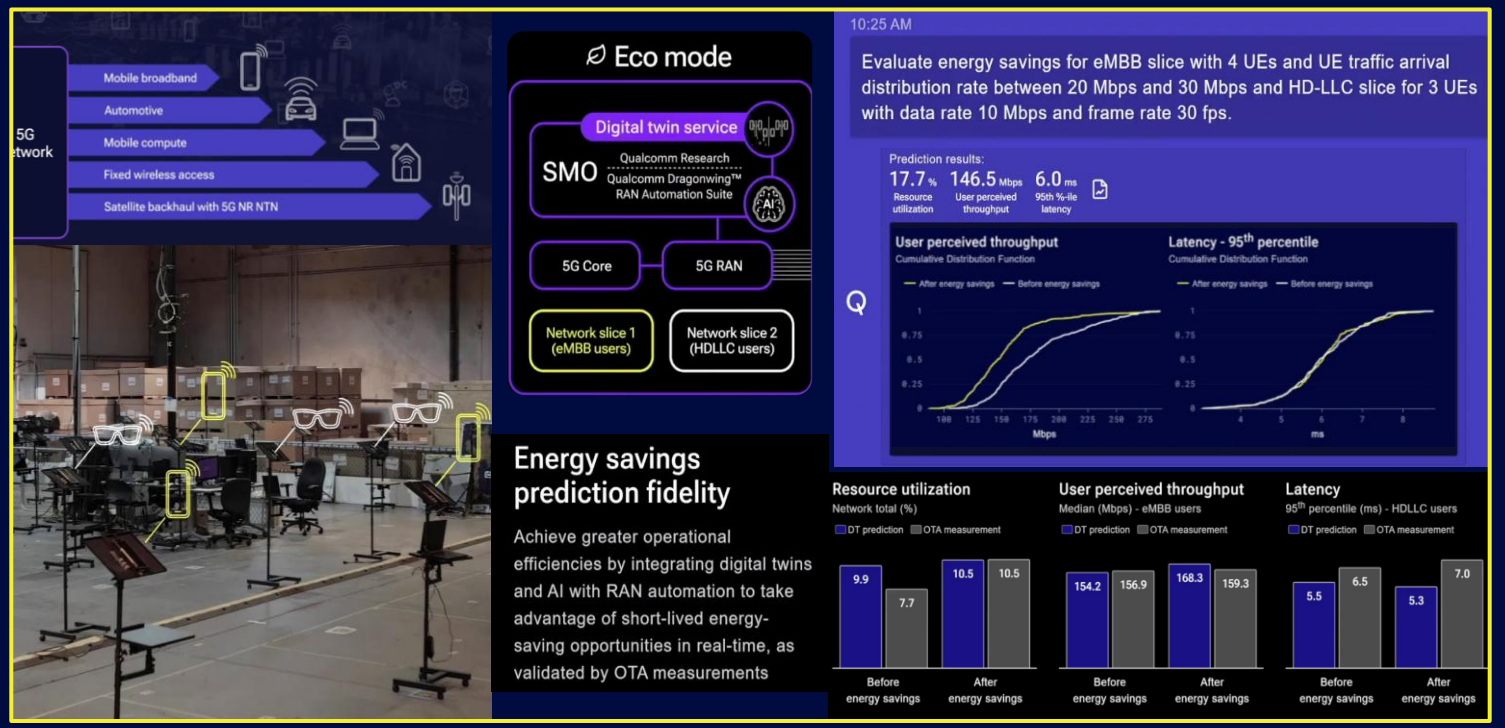
Example of 6G enabled digital twin based network automation

Reducing Operating expenses

Enabling new monetization avenues such as context-aware experiences and user-service assurances



6G device feedback can help calibrate and improve accuracy of network digital twin



Example: Automating network energy savings using digital twins.
Shutting off carriers on gNodeB based on real-time usage.

6G can enable a real-time digital twin platform

Enable live network modelling and enabling new services

SMART CITY

Incorporate device RF and sensing data

Enable environment and perimeter safety and presence detection

AUTONOMOUS TRANSPORTATION

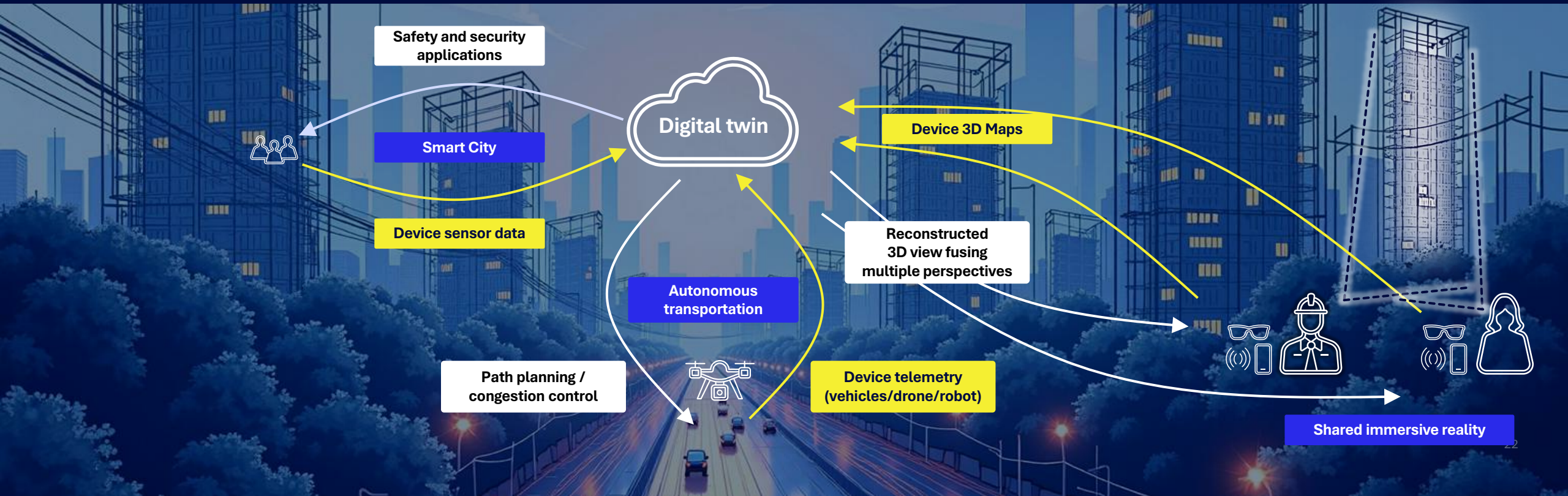
Incorporate vehicle/drone/robot telemetry

Enabling path planning, congestion control and alerts

IMMERSIVE REALITY

Incorporate 3D maps from devices

Reconstruction of 3D environment by fusing views across XR users



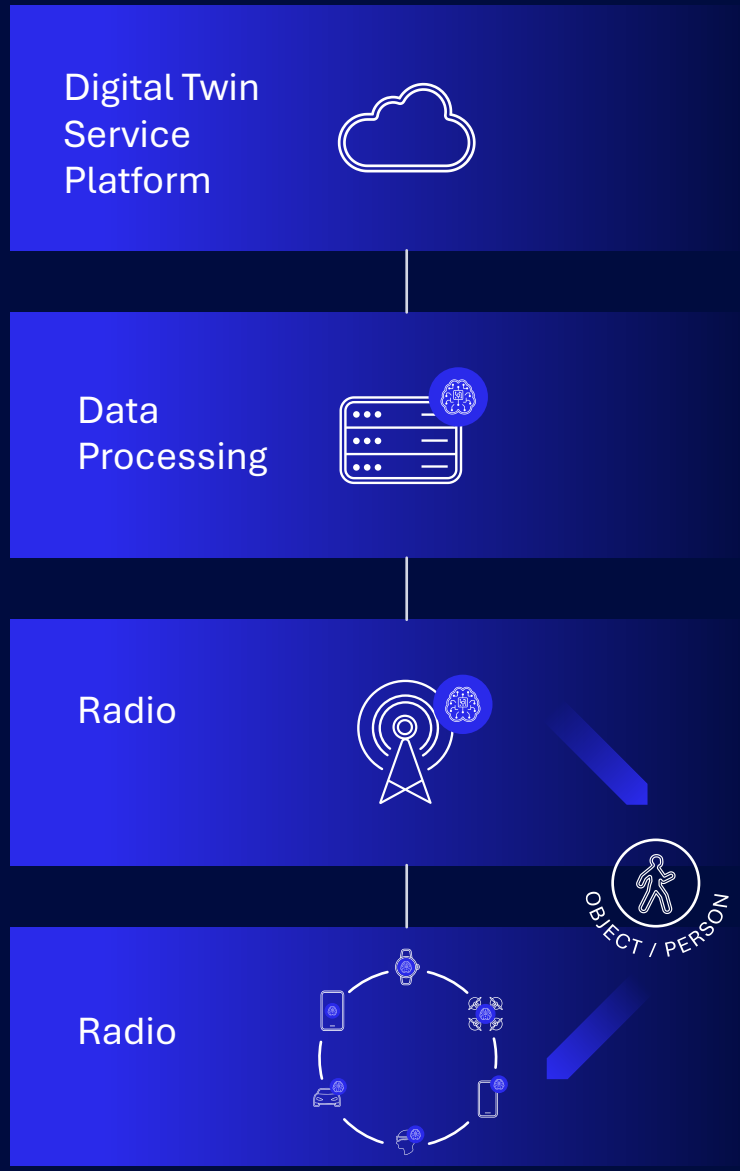
Integrated 6G wireless sensing services

Leverage existing network deployments

Utilize 6G wider-bandwidth and massive MIMO array to gain insights into real-time environment

Incorporate 6G device feedback

Include other sensor inputs (e.g., vision)



Digital Twin Enabling diverse uses

Drone detection and tracking

Obstacle monitoring on roads/railways

Automated guided vehicles (AGVs) detection & tracking

Intruder Monitoring

6G architecture

6G: Seizing the opportunity to transform mobile networking

OPPORTUNITIES

RAN architecture and interfaces largely based on 2G/3G legacy

Specialized protocols with narrow ecosystem uptake

e.g., SCTP, GTP

High costs of ownership

Increasing operational and upgrade challenges

Increasing demand for responsive networks

e.g., first-person streaming, conversational AI

TRANSFORMATION

Multi-cloud-native RAN architecture

Relocate / reuse / replace functions for a vertical-friendly 6G core

Integrate AI across the radio access protocol stack and network

Enable new deployment models

e.g., Dual-Stack 6G+5G and 6G+WLAN

Adopt best-in-class solutions from other rapidly evolving ecosystems

e.g., MLOps

Access new spectrum with wide bandwidths for improved coverage and capacity

e.g., 500 MHz-wide upper mid-band spectrum

BENEFITS

Increase deployment flexibility and scalability

Minimize costs and complexity

Increase network efficiency

Rapidly introduce new services

Optimize user experiences

Efficient **6G** Scalable

Sustainable

RAN network functions and interfaces: Transform or stagnate

Problem

Operator network platforms are falling further behind the hyperscalers

RAN architecture and interfaces are still based on 2G/3G architecture

Interfaces rely on protocols (SCTP, GTP) that work but are outdated and not widely supported

Barrier for operators to fully leverage a cloud native architecture in a cost-effective way

Solution

3GPP standards should provide flexibility to adopt best-in-class commercial solutions evolving rapidly in other ecosystems

Containerization (Kubernetes, Dockers) arrived and achieved wide scale adoption while 3GPP was stuck in the Network Function Virtualization paradigm from the Rel-14 SI

Need to define the network in a way that is forwards compatible to innovation, i.e., move to adopt more cloud-based solutions and less bespoke 3GPP solutions

AI/ML and data services are a good study if 3GPP will leverage existing solutions like MLOPs or repeat the same mistakes as in previous Gs

Dilemma: When to make the upgrade? How to fix the 3GPP mindset?

- Operators support a lot of legacy infrastructure, making upgrades harder to justify
- In the meantime, they fall further behind in network modernization
- The network becomes increasingly more expensive to operate and evolve

Expose 6G RAN services with a service-based architecture and open APIs

Evolve a programmable platform across services with compute and connectivity

Cloud-based RAN platform

Deploy RAN functions on cloud platforms with a Service Based Architecture replacing Reference Point interfaces

Implement a common API framework to support services and expose data across RAN, Core and SMO

Develop new deployment models to configure and manage services at the RAN and enable awareness across layers

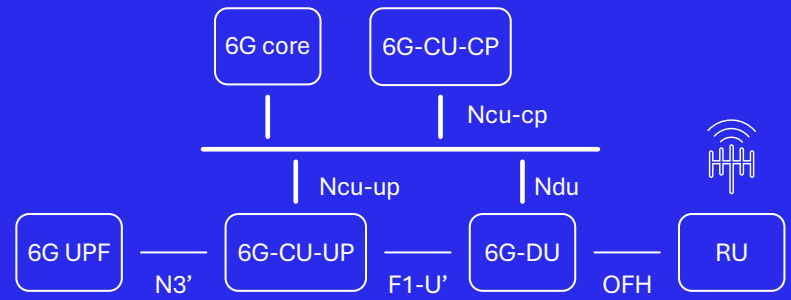
Beyond data services

Reduce latency and accelerate the introduction of new services like AI, location and sensing services by addressing the RAN directly over the RAN API framework

Simplify the evolution and deployment of new network nodes and services with dynamic configuration/scalability

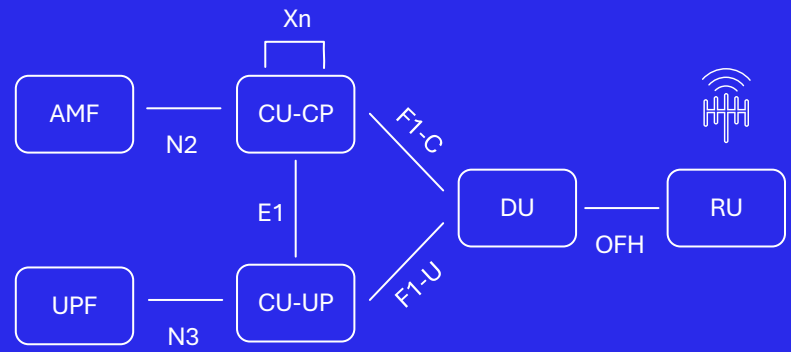
Manage connectivity and new services on the same platform, with the same APIs and cloud tools

SMO: Service management and orchestration

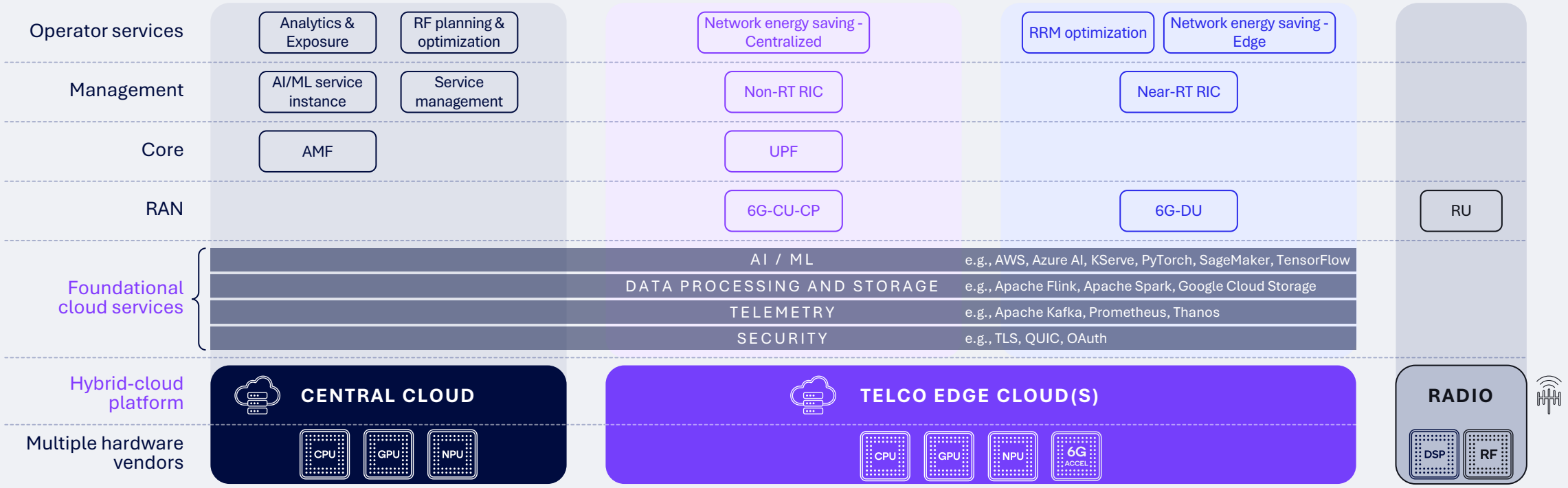


6G RAN Service Based Architecture

5G RAN Reference Point Architecture



Converge RAN, SMO and Core with hybrid-cloud platforms



Use foundational cloud services for scale

Use hybrid-cloud, multi-tenant platforms for distributed deployments of network functions

AMF: Access and mobility management function | RAN: Radio access network | RRM: Radio resource management | SMO: Service management and orchestration | UPF: User plane function

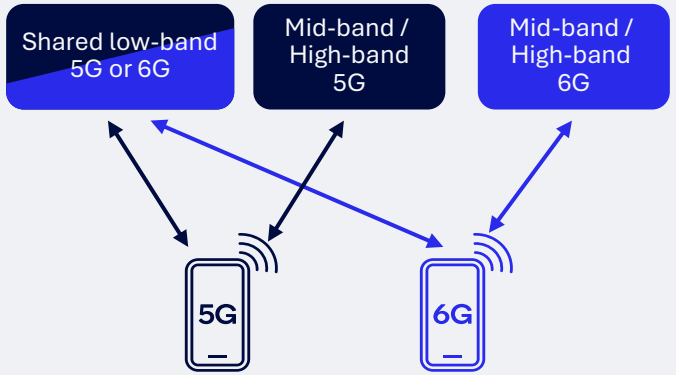
Migrating to 6G: Address diverse deployment requirements

Multi-RAT Spectrum Sharing (MRSS) complements Dual-Connectivity or Dual-Stack for enhanced 6G wide-area experiences

Upgrade 5G carriers with MRSS for seamless 6G coverage

Implement MRSS in existing 5G bands to efficiently rollout wide-area 6G networks with baseband-only upgrades

Rollout 6G in new bands for higher capacity, coverage and service needs



5G/6G Multi-RAT spectrum sharing (MRSS)

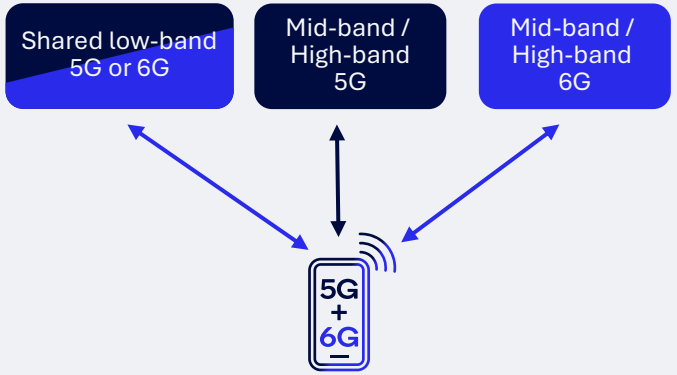
6G carriers can be deployed in 5G frequencies using CP-OFDMA-compatible waveforms

+

Improve user experiences with 5G + 6G aggregation

Aggregate 5G + 6G when 6G-only operation is not yet sufficient, before 6G is deployed on all bands

Device operates concurrently on 5G and 6G with independent transceivers for the two radio access networks



Dual-Connectivity

Device operates concurrently on 5G and 6G with aggregation supported in the RAN

OR

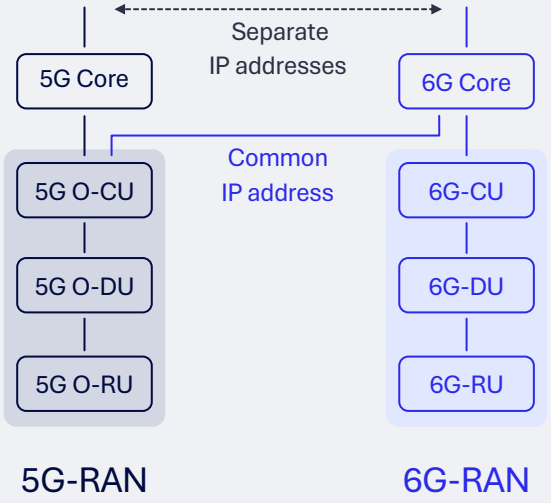
Dual-Stack

Device operates concurrently on 5G and 6G with aggregation supported in the Core

Migrating to 6G: Incorporate WLAN as a Dual-Stack option

5G + 6G Dual-Stack

AGGREGATION ABOVE RAN

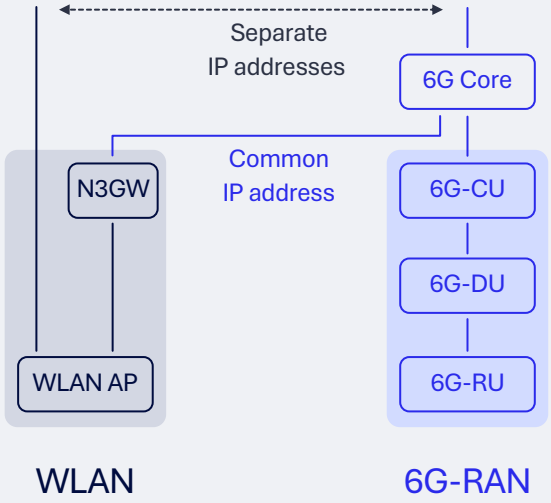


Aggregation at the application server

⊕

Traffic steering and optional aggregation managed by the core network

AGGREGATION WITH WLAN



Aggregation at the application server

⊕

Traffic steering and optional aggregation managed by the core network via the N3GW

WLAN + 6G Dual-Stack

Prioritizing infrastructure **reuse** and **extensibility** for fronthaul evolution

REUSE

Migrate open fronthaul from 5G to 6G on existing bands

Strong operator interest to keep Open Fronthaul for 6G

Reuse existing open fronthaul and radio unit (RU) when migrating existing bands to 6G with MRSS

EXTENSIBILITY

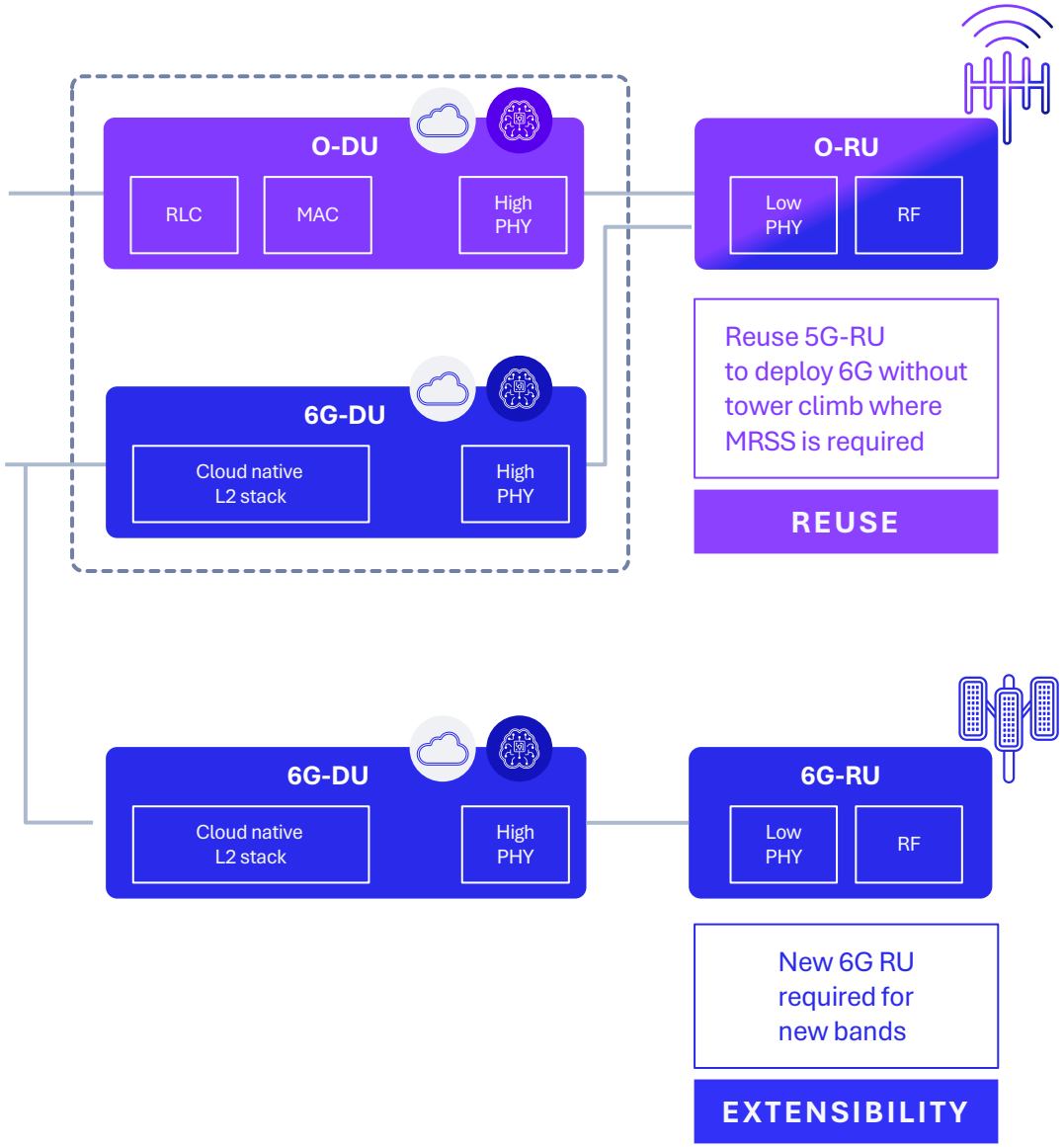
Evolve open fronthaul for new 6G features

OFH design areas under existing OFH architecture and framework

Layer-1 driven: SBFD and FD, Enhanced MIMO processing of PUCCH, SRS-based DL precoding at RU, Dense UL detection for NOMA

Layer-2 driven: Signaling simplifications, Topology aware scheduling for C-RAN

Service driven: Sharing of RU by DUs belonging to different operators, as a TCO reduction and Multiplexing performance gain opportunity



Reuse and Replace protocols and interfaces

REUSE

External interfaces (Exposed to 3rd parties)

Common for 5G and 6G for service and data interworking

Data exposure (NEF) and IP functions (UPF) should be backward compatible

Internal Core interfaces (Service Based)

Reuse HTTP2/TCP

- Potentially evolve to HTTPS3/QUIC to support cloud platform evolution

Service discovery and authorization (NRF),
and analytics (NWDAF) common for 5G and 6G

Subscription and Policy management

Common for 5G and 6G as underlying functionality should not change

REPLACE

NAS protocol

Replace 5G NAS with a modular 6G NAS protocol with independent protocols for mobility management, session management, security, etc.

- Allows for more flexible and independent evolution of functions and introduction of new verticals
- Common transport of control plane signaling between UE and CN

Adopt a corresponding 6G AMF/SMF solution

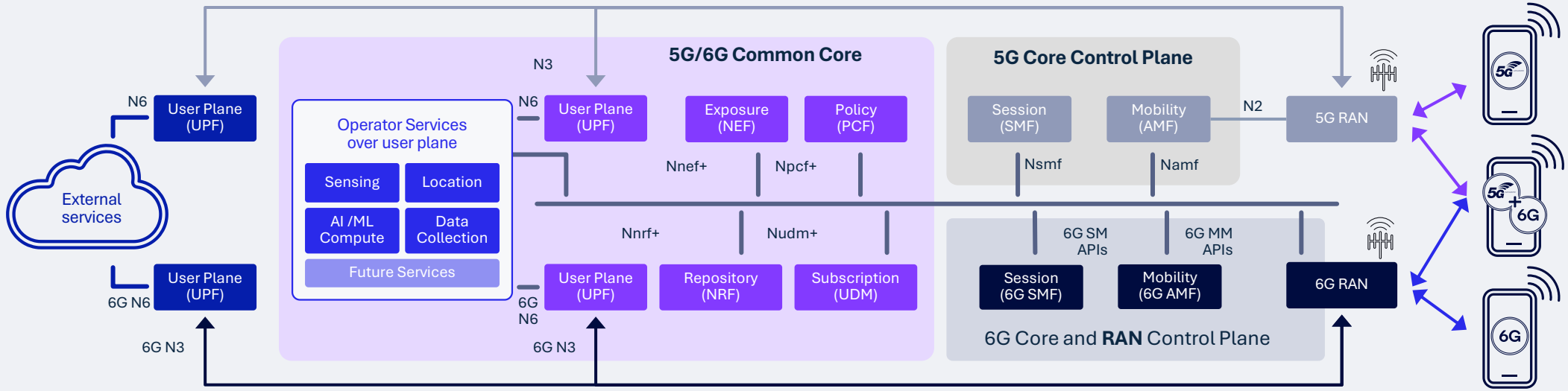
RAN to CN interfaces

Replace reference point interface with SBA based APIs

Allows for common orchestration of RAN and CN and allows RAN to benefit from cloud functionality

6G Core – **Relocate**, **Reuse** and **Replace**

6GC as an evolution of 5GC* while enabling an E2E cloud native platform with cloud services



RELOCATE

Relocate UE services to the user plane (where network is only a transport)

REUSE

Reuse API framework from 5G core for 6G core and RAN (based on 5GC service-based architecture)

Reuse 5G network functions for policy subscription, user plane, etc.

REPLACE

Replace 5G NAS with new 6G NAS functions to support mobility, session management, etc.

Evolve to a more vertical friendly 6G
while minimizing impact and migration cost to operators

- 5G functions
- 6G function (**REPLACE**)
- 5G/6G common function (**REUSE**)
- 5G/6G User-plane function (**RELOCATE**)

* Note: Many additional 5GC network functions are not shown for clarity

AI-native radio protocols – Why now?

Protocol adapts to the user experience instead of the user experience being defined by the protocol behavior

PARADIGM SHIFT

- Current configuration options in the user plane do not support a range of performance that allows the device to match QoS requirements
- Standard is defined to produce **predictable performance and simple compliance test** of protocol functions instead of allowing flexibility to adapt to various scenarios

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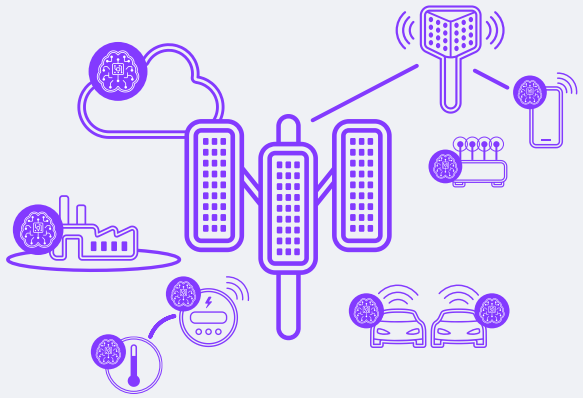

LEVERAGING AI CAPABILITIES

- Continual improvement through self-learning
- Data-driven development of **AI models responsive to user experiences and services**
- Dynamic **parameter adaptation based on fast machine learning algorithms** hosted at the device and assisted by the cloud

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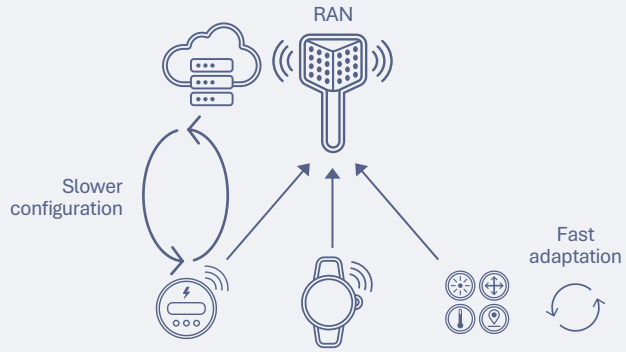


USER EXPERIENCE OPTIMIZATION

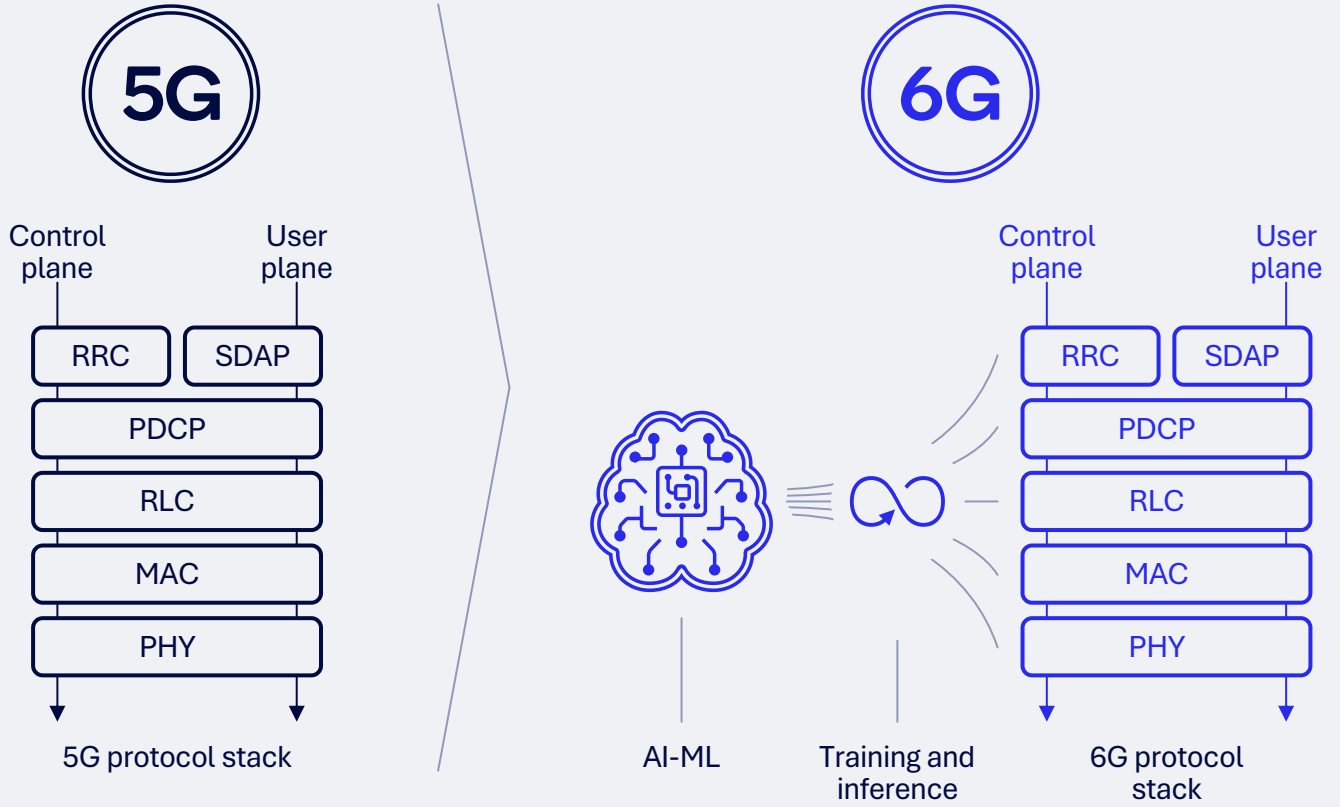
- Slower network configuration to **define a range of behavior within which the device can autonomously adapt** based on current state
- Device's contextual awareness determines how to support user experience **based on real-time application requirements and local conditions**

Deliver performance-driven user experiences with adaptive intelligence

A network protocol that adapts to optimize user experiences instead of user experiences being defined by protocol behaviors

Network parameters are set to **static** values based on worst-case network requirements

Device behaviors are **fixed** across all scenarios for **behavior-driven** compliance



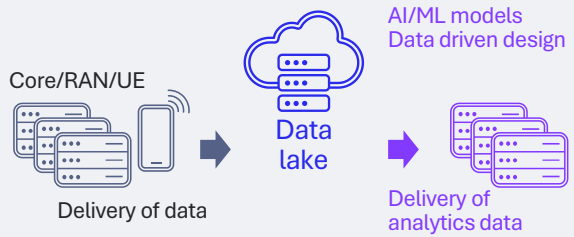
Network parameters are **adapted** intelligently within acceptable ranges under network supervision to meet key performance indicator (KPI) targets

Device behavior is **robust** for **performance-driven** compliance

A paradigm shift from conformance to adaptation and performance-driven optimization

Solve system-wide issues to support AI/ML in the 6G standard

Management of AI and ML, including model and life-cycle management across functions



DATA COLLECTION

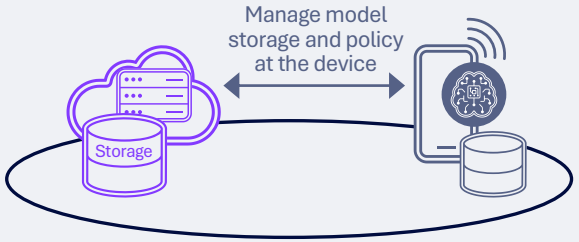
Collect data across different devices and network platforms into a common data lake

Continue to define data collection for new use cases at device and network

Make the data discoverable and accessible by SMO and other network entities

Use the data as input to:

1. Train AI/ML models
2. Device performance optimization
3. Data driven design

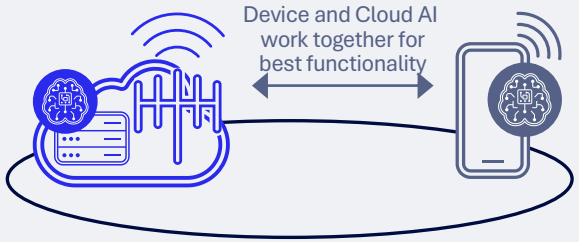


DEVICE AND NETWORK MANAGEMENT

Manage storage and policy of AI/ML models at the device (and potentially network nodes)

Enable per UE and per RAN node AI/ML model provisioning across features (hosted by Qualcomm or 3rd party e.g., OEM or operator)

Support related procedures required to enable the device for AI/ML services, e.g., device configuration and policies



AI/ML MANAGEMENT PROCEDURES

Joint Cloud/Core/RAN and device AI/ML functions to optimize connectivity and user experience

Device-side only or joint device-cloud AI/ML inference across different use cases

Leverages virtualization/containerization to scale and enable data driven device and network autonomy

DATA ANALYTICS | LIFE CYCLE MANAGEMENT | AI/ML SERVICES

Leverage hyperscale innovations in AI standards for 6G

Enablers for 6G AI/ML use cases

Data collection

Support ease of data collection and data access

Define only high-level procedures since commercial solutions exist in this space

Standardize data frameworks for identified use cases (how to measure, data format, etc.)

Ensure the efficient accessibility of cross-domain data by a 6G service/application for analysis or use in an AI/ML workflow

Machine learning operations (MLOps)

Provide flexibility to adopt rapidly-evolving best-in-class commercial solutions

Define only high-level procedures in cases where commercial solutions exist in this space

Leverage state-of-the-art model design and deployment practices and hardware+software architectures based on rapid technological advancements in the AI/ML field

Model performance

Enable interoperability during model execution

Consider model monitoring and control (activation/deactivation) for detailed specification

6G security

OPTION 1: For presentations with a single security slide or when a QR code with a link to the OnQ blog post is helpful

Secure the future of mobile connectivity with 6G

Build upon the secure 5G foundation

6G native security

Security for control messages across all layers including MAC

Forward/backward security for mobility

Flexible UP security termination point

Privacy for RAN temporary identities (RNTI)

SUPI privacy with symmetric keys

Quantum-safe security

Post-quantum crypto algorithms

Neutralize the efficiencies of Shor's algorithm

256-bit symmetric key algorithms

Counter the efficiencies of Grover's algorithm with AES-256, SNOW5G, and ZUC-256 for air interface security

Robust trust framework

Zero Trust Architecture

Robust security setup via message digest

Isolation of UE security contexts at different network functions/services

Read our blog post for more details

OPTION 2: For presentations with multiple security slides or when the QR code linking to the OnQ blog post isn't desirable

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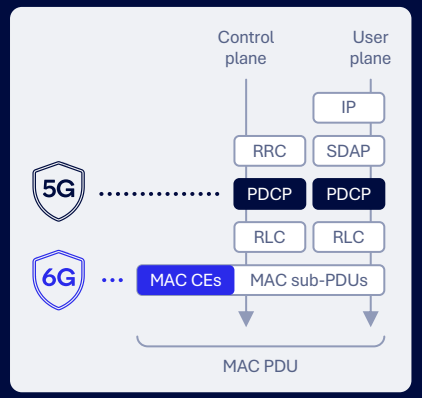
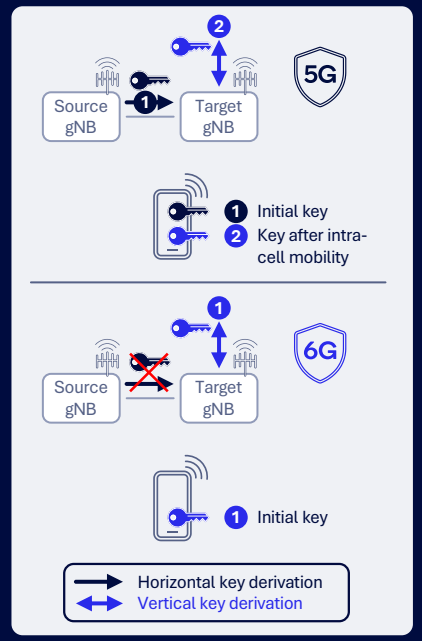
6G native security: Innovations for more resilient devices and networks

Fundamentally improving access stratum security



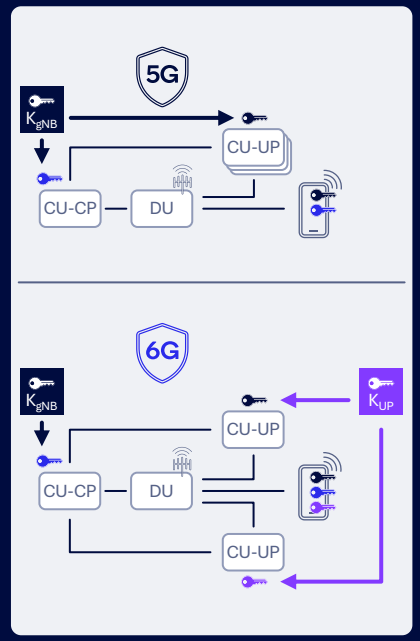
Secure control messages

Protect all control messages and user plane traffic by complementing existing PDCP security with MAC layer security



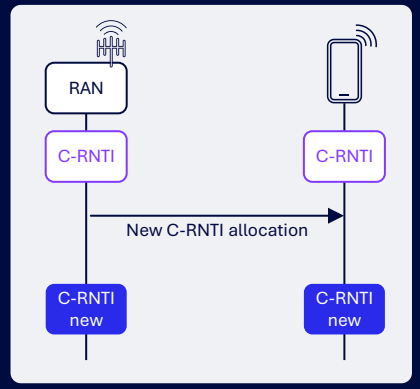
Enhanced forward[1] and backward[2] security for RAN mobility

Use vertical key derivation to secure connections through handovers even if the key at the source gNB node is compromised



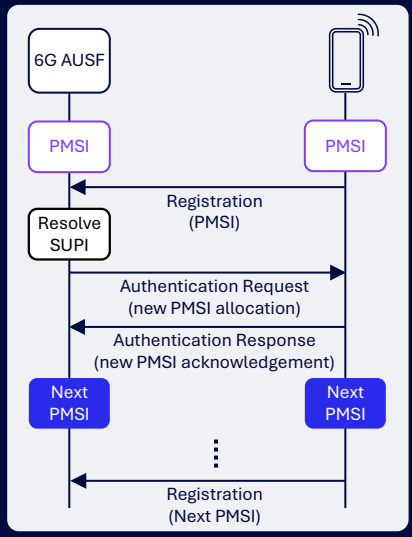
Flexible user plane security termination points

Improve security for devices with multiple PDU sessions or network slices while reducing key change overhead for highly mobile UEs



Privacy for RAN temporary identities (RNTI) with frequent reallocation

Enhance user privacy against tracking, passive eavesdropping, and targeted attacks



SUPI Privacy with symmetric keys

Minimize the impact of PQC overheads with a symmetric key-based approach to SUPI privacy that leverages USIM credentials

1. Forward security protects the connection at the handover target RAN node against compromises of keys at the source RAN node.
2. Backward security prevents the target RAN node from accessing the key used at the source RAN node after handover.

Quantum-safe security: Future-ready 6G for the quantum era

Post-quantum cryptography and 256-bit symmetric key algorithms for 6G security

Quantum properties threaten security algorithms relying on computational hardness

Shor's algorithm

Efficiently solves integer factorization and discrete logarithm problems

Quantum properties pose risks to symmetric key algorithms

Grover's algorithm

Quadratic speed-up in unstructured database searches

Post-quantum crypto algorithms

New post-quantum cryptography (PQC) algorithms are being standardized

256-bit symmetric key algorithms

256-bit symmetric key algorithms like AES-256, SNOW5G, and ZUC-256 are essential for 3GPP air interface security, along with Authenticated Encryption with Additional Data (AEAD)

Robust trust framework: Communications with integrity and confidentiality

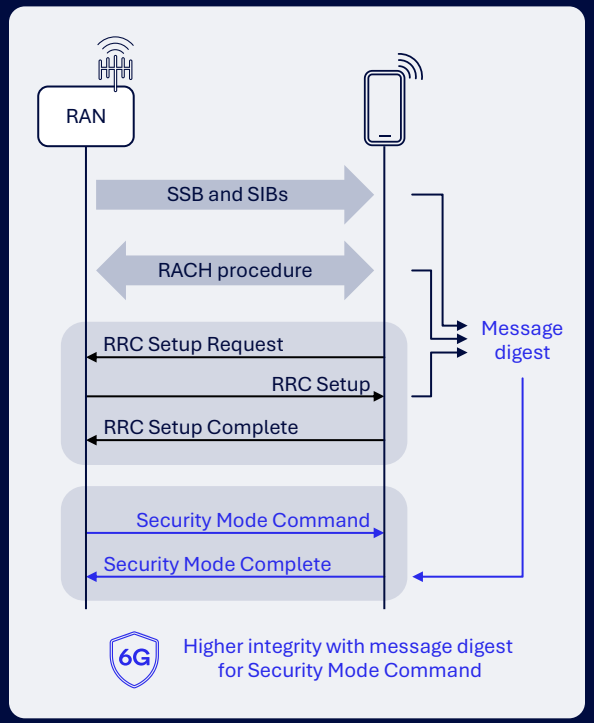
Withstand modern cyber threats with a secure, resilient and adaptable network infrastructure

NIST[1] zero trust tenets

1. All data sources and computing services are considered resources
2. All communication is secured regardless of network location
3. Access to individual [operator] resources is granted on a per-session basis
4. Access to resources is determined by dynamic policy
5. Operator monitors and measures the integrity and security posture of all owned and associated assets
6. All resource authentication and authorization are dynamic and strictly enforced before access is allowed
7. Operator collects information about the current state of assets, network infrastructure and communications and uses it to improve its security posture

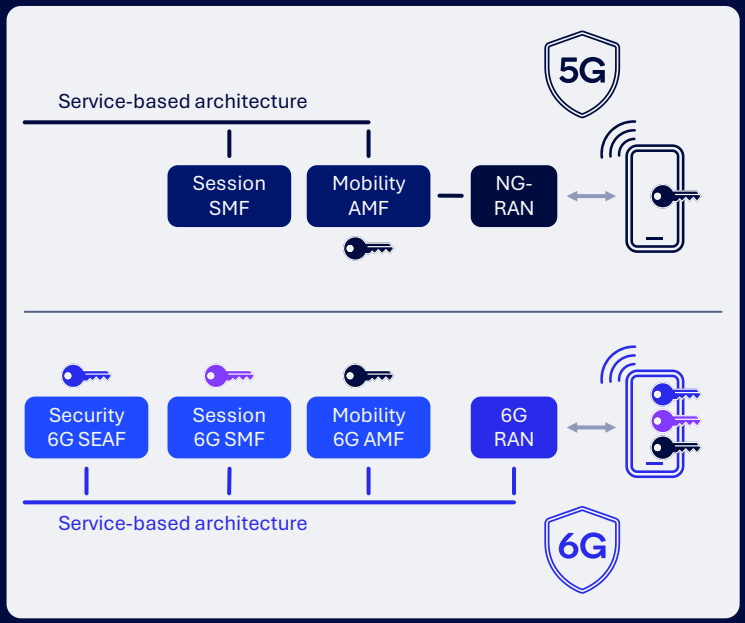
Zero trust architecture

Leverage the NIST zero trust tenets to build a robust trust framework



Robust security setup via message digest

Ensure message integrity before activating access stratum security



Isolate security contexts at each network function or service

Enhance NAS security with an independent 6G SEAF for network function relocation

1. National Institute of Standards and Technology

Conclusions

6G

Designing 6G: Enabling scalable mobile connectivity for our AI-driven future

Evolution of mobile connectivity

6G will complement AI applications to scale new mobile experiences across multiple platforms

Coverage and capacity

6G will extend the coverage and capacity of existing spectrum bands and unlock new upper mid-bands for higher capacity

Services beyond connectivity

6G will enable context-aware AI services, power digital twins that fuse RF and sensor data, and automate operations such as energy savings

Scalable architecture

A cloud-native, service-based RAN with open APIs together with MRSS or dual-stack options accelerates services, boosts flexibility, and lowers cost with AI-native protocols that adapt service delivery for optimized user experiences

Network security

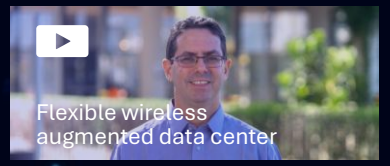
Quantum-safe cryptography and zero trust architecture extend protection across layers, add forward and backward mobility security, and strengthen user privacy

Leading wireless technology innovation

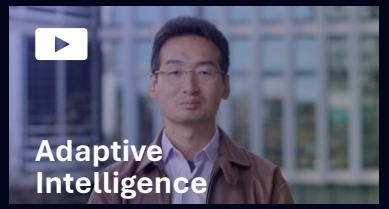
Qualcomm
Wireless Research Directions & Priorities

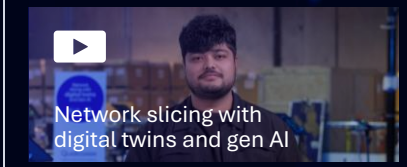
6G 5G Advanced Bluetooth UWB

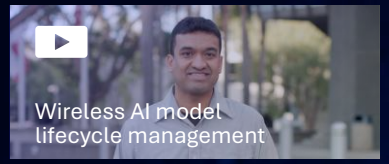
FOUNDATIONAL EVOLUTION



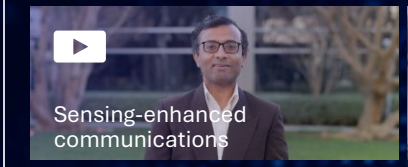
OPERATIONAL OPTIMIZATION

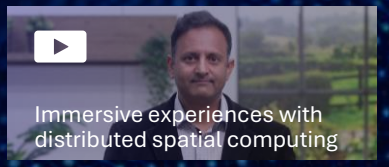






EMERGING SERVICES





Questions?

Thank you

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