

AI Native 6G and Context-Aware Communications

On-device and network AI collaborate to autonomously adapt to the service context.

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AI native 6G

6G will be an AI native system. This means AI will be used across every part of the network and will be deeply integrated into the end-user experience.

AI native 6G will fundamentally change how mobile services are delivered and consumed:

- Users will interact with services through AI native modes, such as agents, conversational interfaces, gesture recognition, avatars, and sensors.
- Multi-device constellations (phones, wearables, glasses, XR headsets, audio devices, and pins) will work together as a single, coherent experience.
- On-device, edge, and cloud AI will collaborate in real time to deliver responsive, energy-efficient services.

Over time, these interaction modes will shift usage away from today's smartphone OS-centric models, and AI will become the primary user interface.

This analyst note discusses how AI native 6G networks and devices can autonomously adapt in real time to service and user needs to deliver what is known as context-aware communications.

Context-aware communications

The intersection of AI services and AI networks is shown in **Figure 1** below. In this scenario, on-device and network AI collaborate to adapt wireless connectivity to the service context. Edge inference and sensing enable rapid interpretation of service and user context.

Modern end-user AI services—such as agent-based and multimodal experiences—generate fundamentally different traffic patterns compared with classic smartphone applications. Key performance metrics shift toward the following:

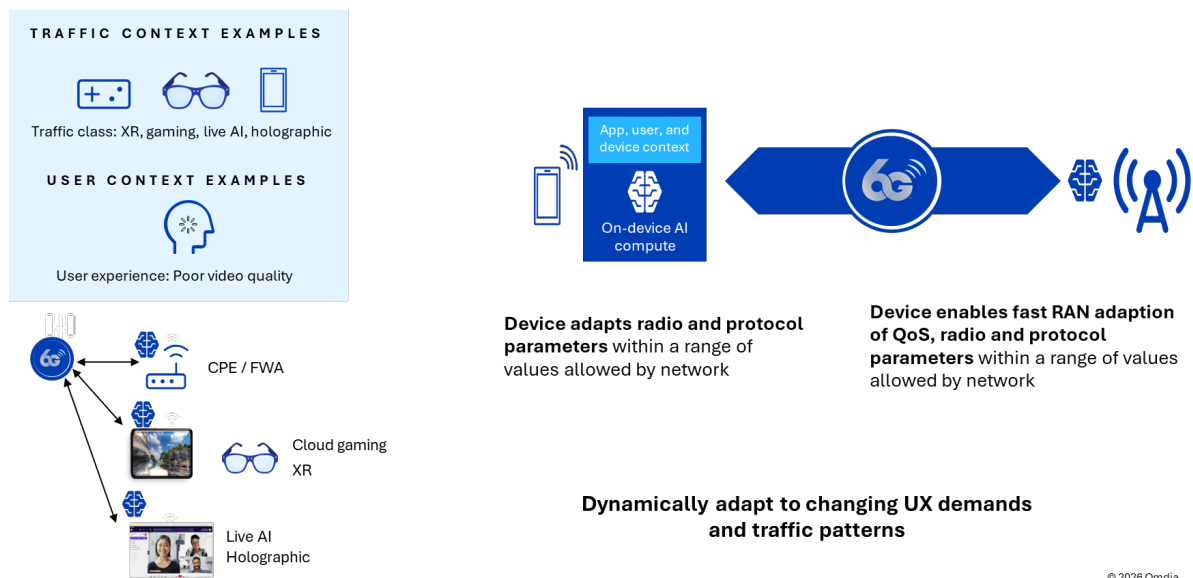
- Time-to-first-token
- Consistent user experience (UX) under rapidly changing traffic patterns
- Energy per token or task

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For multi-agent services, workloads are dynamically split across devices, edge, and cloud to reduce device power consumption, improve responsiveness, and enable access to larger models. In this scenario, the network evolves into an AI fabric that connects, coordinates, and synchronizes distributed compute workloads.

The device form factor further influences connectivity requirements. For example, eyewear devices in “see-what-I-see” scenarios may prioritize uplink capacity and power efficiency while maintaining strict latency and UX constraints.

Figure 1: Context-aware communications with on-device intelligence



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Source: Qualcomm, Omdia

On-device intelligence for fast control loops

Context-aware communications are enabled by on-device intelligence coupled with fast device-network control loops. A typical scenario is as follows:

- On-device AI detects the application type, traffic characteristics, and real-time user experience.
- Devices autonomously adapt radio and protocol parameters within policy boundaries defined by the network.
- When needed, devices provide lightweight, RAN-actionable feedback to trigger rapid network adaptation (e.g., QoS or scheduling changes), avoiding slow core network signaling procedures.

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Service-aware RAN

A service-aware RAN is critical to the long-term monetization of mobile networks. Today's 5G QoS mechanisms, however, are largely semi-static and transport-centric and are not always able to adapt quickly enough to

- Bursty, short-lived AI traffic
- Rapid shifts in content complexity
- Highly variable, uplink-heavy workloads

The result may be degraded UX during congestion and inefficient resource utilization.

In an AI native framework, the device and network continuously optimize performance and efficiency across changing radio conditions, traffic profiles, and user experiences. In this way, context-aware communications enable operators to meet stringent SLAs, deliver differentiated services, and improve spectral and energy efficiency. Such techniques are broadly applicable to diverse applications. Two examples are illustrated below.

On-device parameter selection example

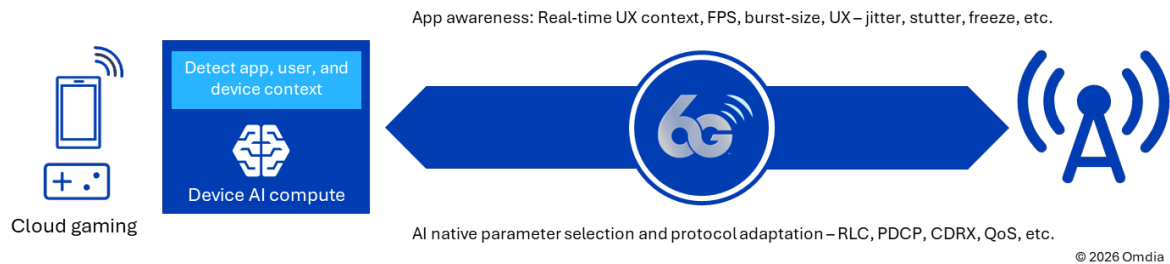
An example of how AI native parameter selection can operate dynamically to improve the user experience is cloud gaming (**Figure 2** below). On-device AI models continuously monitor application behavior and UX indicators, such as jitter, stutter, and frame freezes.

Using continuous learning, the models can predict when link adaptation may be required to ensure the gameplay experience. Based on these predictions, the device autonomously selects—from network-approved options—the radio and protocol parameters that best meet the application needs.

Examples include the following:

- Adjust RLC timers to reduce retransmission latency and smooth gameplay.
- Invoke C-DRX during predicted idle periods to reduce power consumption.
- Anticipate mobility scenarios on-device and proactively tune handover parameters, rather than reacting to delayed network measurements.

Figure 2: AI native parameter selection for context-aware communications



Source: Qualcomm, Omdia

Device-enabled fast RAN adaptation example

A second example is the “see-what-I-see” use case, where augmented reality (AR) glasses observe scenes with time-varying visual complexity.

In this scenario

- The device measures real-time UX KPIs, such as scene complexity and frame quality, as well as metrics like peak signal-to-noise ratio, locally.
- All measurements are performed on-device, without involving the application server or the core network.

The device then sends lightweight feedback—for example, a small number of bits—to the RAN to indicate whether a higher or lower bit rate is needed. The RAN can then immediately adjust scheduling priority or QoS handling within the SLA and policy envelopes defined by the core network.

This interaction establishes a fast control loop between the device and the RAN, enabling near-instant adaptation without needing to invoke slow core network signaling. The result is improved UX, higher efficiency, and tighter alignment between service requirements and network behavior.

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