THE LINUX FOUNDATION
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QoD-Centric NaaS Strategy:
Policy-Orchestrated Multi-Access Service

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Monday, May 18, 2026 · 11:20 AM CDT · Room 200F

Session Objectives

01 · OUR FOCUS

What we will explore

QoD as specified today is a session-level QoS API. As more carrier-grade multi-access deployments demand it, QoD becomes a policy-orchestrated abstraction — the commercial primitive on which NaaS is built.

Closing that distance is through mediation abstraction — and Neutral Host Networks are the most promising near-term implementation for venues where premium demand concentrates.

02 · IN SCOPE

What we will show

CAMARA QoD API and 3GPP control plane (PCF, SMF, NEF, NWDAF) plus UE-side ATSSS

Complexity matrix mapping requirements against access domains

Stadium-anchored before/after architectures with NHN mediation

Economics of mediation — wins, and the trade-off

03 · OUT OF SCOPE

What we will defer

Vendor-specific implementations or named operator deployments

TSN-grade deterministic networking for industrial control

Wi-Fi-side standards — mentioned, not detailed

Cross-footprint identity federation — identified as open interoperability puzzle

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The Evolution of Best-Effort

Slicing and prioritized traffic prove that enterprises will pay for guaranteed performance.

The demand is real; the supply is yet to scale.

	REVENUE	COST & RISK	DIFFERENTIATION
TODAY *0–12 months*	Per-session premium SKUs sold via CAMARA QoD APIs — gaming, XR, drones, broadcast contribution.	Replaces over-provisioned circuits with pay-as-you-go uplift; no long-term commit needed.	Open, standards-based APIs — build once, deploy across operators and access types.
EMERGING *1–3 years*	Outcome SLAs spanning Wi-Fi + private 5G + public 5G via ATSSS steering, switching, splitting.	Closed-loop policy through PCF / SMF / NEF / NWDAF cuts manual provisioning and trouble tickets.	Session continuity across access domains becomes the competitive moat.
DEPLOYED *3–5+ years*	Intent-based, outcome-based contracts — connectivity sold by SLA, not bandwidth.	NWDAF + AI predict and prevent SLA breaches before they impact users.	Connectivity becomes a developer primitive, similar to cloud compute.

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The Cost of Waiting is Revenue

Three forces that were misaligned a few years ago are now converging.

01

Standards are production-ready

CAMARA QoD is production-deployed across major operators. The API is no longer a research artifact — it is now commercially viable.

02

Demand is validated

Slicing and prioritized traffic already monetize the addressable few. Willingness-to-pay is proven; what is missing is the platform to scale it.

03

Access is converging

Wi-Fi, private 5G, and public 5G are becoming one policy domain — with Neutral Host Networks emerging as the control point.

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What's the Value of QoD?

An example calculation of revenue and cost: SOFI stadium with 80,000 seat-capacity.

	2026	2027	2028	2029	2030	Total
Incremental Revenue	306,816	3,681,792	7,977,216	13,039,680	19,329,408	44,334,912
Costs/Expenses						
COGS	245,000	239,000	234,500	235,000	235,500	1,189,000
Design	1,000,000	400,000	300,000	250,000	210,000	2,160,000
Engineering	1,200,000	450,000	300,000	225,000	187,500	2,362,500
Salaries	540,000	360,000	270,000	135,000	112,500	1,417,500
Marketing	76,800	1,036,800	2,995,200	5,712,000	7,378,560	17,199,360
G&A	375,000	450,000	525,000	600,000	675,000	2,625,000
Total Costs	3,436,800	2,935,800	4,624,700	7,157,000	8,799,060	26,953,360
EBITDA	(3,129,984)	745,992	3,352,516	5,882,680	10,530,348	17,381,552
					Net Present Value	13,330,993
					Modified Internal Rate of Return (MIRR)	64%
					Payback Period	1.711105331

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What Is Quality on Demand (QoD)?

No formal, standardized definition of QoD exists as of April 2026. The closest authoritative artifact is the CAMARA Project's Quality on Demand API specification v1.1.0 (Fall25 meta-release, October 2025).

OUR WORKING DEFINITION

Quality on Demand (QoD) is a programmable, session-scoped API that lets an authenticated application request a defined network-performance envelope for a specific data flow, receive a binding admission decision, and observe lifecycle events as the network admits, sustains, degrades, or terminates the session.

KEY PROPERTIES

- **Programmable** — Invoked through an API, not a sales contract
- **Session-scoped** — Has a beginning and end (vs. subscription tier)
- **Intent-based** — Application declares what it needs, not how to deliver it
- **Binding** — Network commits (AVAILABLE) or refuses (UNAVAILABLE)
- **Lifecycle-observable** — State transitions reported via QOS_STATUS_CHANGED events

WHAT CAMARA SPECIFIES TODAY

API surface — REST endpoints, profile labels QOS_E/S/M/L, four lifecycle states, CloudEvents callbacks.

WHAT CAMARA DOES NOT SPECIFY

× Per-operator mapping of profiles to 3GPP 5QI values
× Underlying enforcement (slicing vs. prioritization vs. ATSSS)
× Observability of fine-grained SLA attainment
× Multi-party billing and settlement

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Three Architectural Gaps QoD Helps Close

1 The Intent Gap

APPS KNOW

what they need — low latency for AR, sustained uplink for video, bounded transaction time for payments.

NETWORK KNOWS

what it can deliver. No programmable interface connects the two.

QoD CLOSES IT

Apps declare per-session intent; network returns a binding admission decision.

2 Network Fragmentation

TODAY'S MECHANISMS

5QI/ARP · network slicing (NSSAI) · ATSSS · Wi-Fi WMM · neutral-host policy · edge UPF placement.

EACH HAS

its own configuration, enforcement scope, and operator-specific implementation. Apps cannot reason about this.

QoD ABSTRACTS IT

Apps makes a request for best network access; the orchestration layer chooses the offer that delivers it.

3 Cross-Domain Handoff

USER MOVES

across public 5G → Wi-Fi 7 → NHN-served venue → roaming partner during a single session.

TODAY

session quality does not survive these access transitions; each domain is administered independently.

QoD PERSISTS IT

The app-facing contract survives transitions: orchestration renegotiates with each new enforcement domain.

QoD is the intent interface that resolves heterogeneous enforcement, multi-access complexity, and session continuity

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Network Functions, by What They Do

NF	Full name	Plane	Function	Why it matters for QoD
AMF	Access & Mobility Management	Control	UE registration, authentication anchor, mobility/handover control	*Entry point for any UE-side QoD signaling; not in policy path itself*
SMF	Session Management Function	Control	PDU session establishment, bearer setup, UPF selection and control	*Instantiates the QoD-requested QoS profile on a session*
PCF	Policy Control Function	Control	Policy decisions for QoS, charging, traffic steering, gating	*Authorizes the QoD request against policy rules*
UPF	User Plane Function	User	Packet routing, forwarding, traffic-class enforcement, QoS marking	*Where the QoS profile actually applies to packets*
NEF	Network Exposure Function	Control	Northbound API gateway exposing 5GC capabilities to applications	*Where CAMARA QoD requests enter the operator's control plane*
NWDAF	Network Data Analytics Function	Control	Network-wide telemetry, ML-driven analytics, predictive insights	*Feeds policy with measurements; closes the assurance loop*

ATSSS **Access Traffic Steering, Switching, Splitting** · *UE-side*
Steers/switches/splits between 3GPP and non-3GPP access. Complements network-side policy; does not coordinate it.

Three Layers, One Abstraction

01 · STANDARDIZATION

CAMARA (How Profiles are Exposed)

QOS_E	Guaranteed · contract defined
QOS_S	Stable throughput · 100–300 ms
QOS_M	Assured premium · ~50–150 ms
QOS_L	Ultra-low-latency · ~20–30 ms

API specification

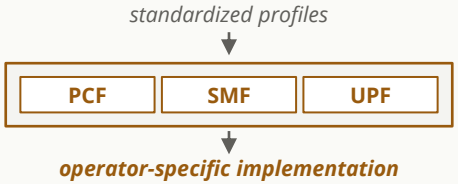
Establishes the programmable exposure of the contract.

Defines the standardized profiles (QOS_E, QOS_S, QOS_M, QOS_L) through which connectivity capabilities are exposed for application consumption.

The boundary at this layer is the API specification, not the network behavior.

02 · IMPLEMENTATION

Operators



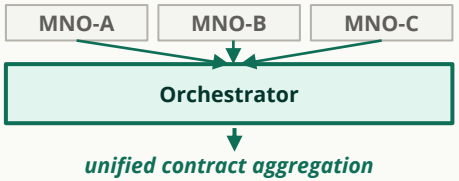
Realize the contract within the network.

Each operator translates the standardized profile into the underlying capabilities their network exposes: session policy, quality enforcement, and traffic management.

Network quality fulfillment is operator-dependent

03 · HARMONIZATION

Neutrally Hosted Orchestrators



Harmonize multiple operator realizations into a primary venue-bounded contract.

Consume each operator's exposed capabilities, federate identity across access domains, and present a unified API to applications.

The orchestrator is the layer at which multi-access exposes a well-defined integration point to applications.

Add-on offers will serve premium connectivity & experiences across any access type

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Across Verticals

Mission-critical first. Premium connectivity throughout. One architecture, five deployment scenarios.

Public Safety & Mission Critical
First-responder command · emergency response · public-safety video · mass-event ops
Mission-critical assurance becomes measurable; coverage gaps in critical venues become accountable.

Sports & Entertainment
Live broadcast contribution · in-seat AR & immersive fan experience · in-play betting · premium ticketing tier
Premium fan experiences become contractable; wireless casting and in-play betting become measurable revenue streams.

Healthcare & Hospital Campuses
Hospital operations · telemedicine · imaging transfer · campus-wide premium
Time critical workloads gain measurable assurance; hospital connectivity becomes a contractable tier.

Transportation Hubs & Campuses
Premium passenger experience · airline & transit operations · IoT-grade telemetry · multi-modal connectivity
Hub operations become contract-bound; premium passenger services become a contractable revenue tier.

Broadcast Production
Multi-camera contribution · IFB control plane · remote production · premium contribution paths
Distribution and contribution become contract-bound; broadcast-grade uplink becomes a measurable, guaranteed service tier.

NHN architecture: specified and continually developed by the OnGo Alliance (CBRSA-TS-1002, Release 3+).

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Why is QoD Strategic?

QoD is uniquely positioned within CAMARA crossing key system boundaries. Darker colors represent higher effort and complexity.

		GSMA Open Gateway / CAMARA API Family							
		Call Forwarding	Quality (QoS + QoD)	Device Location	Device Status	Edge Cloud	Know Your Customer	Number Insights	Population Data
Requirement Area	Control Plane Interaction								
	OSS / BSS Interaction								
	Session Lifecycle								
	Federated Interoperability								
	Billing Complexity								
	Mobility and Handoff								

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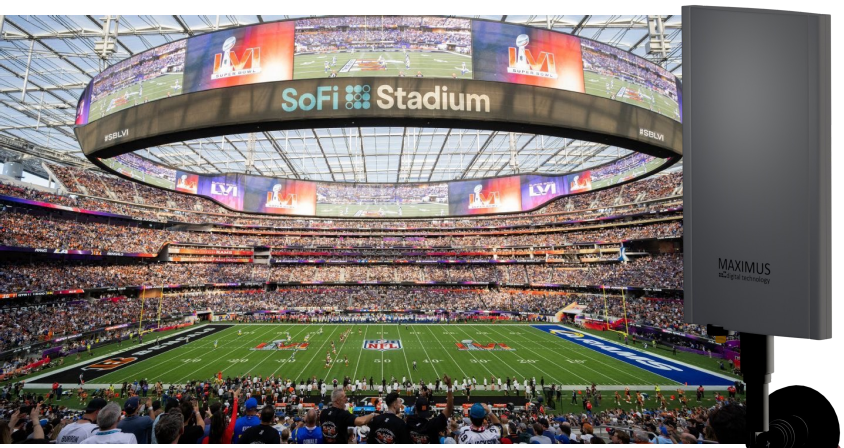
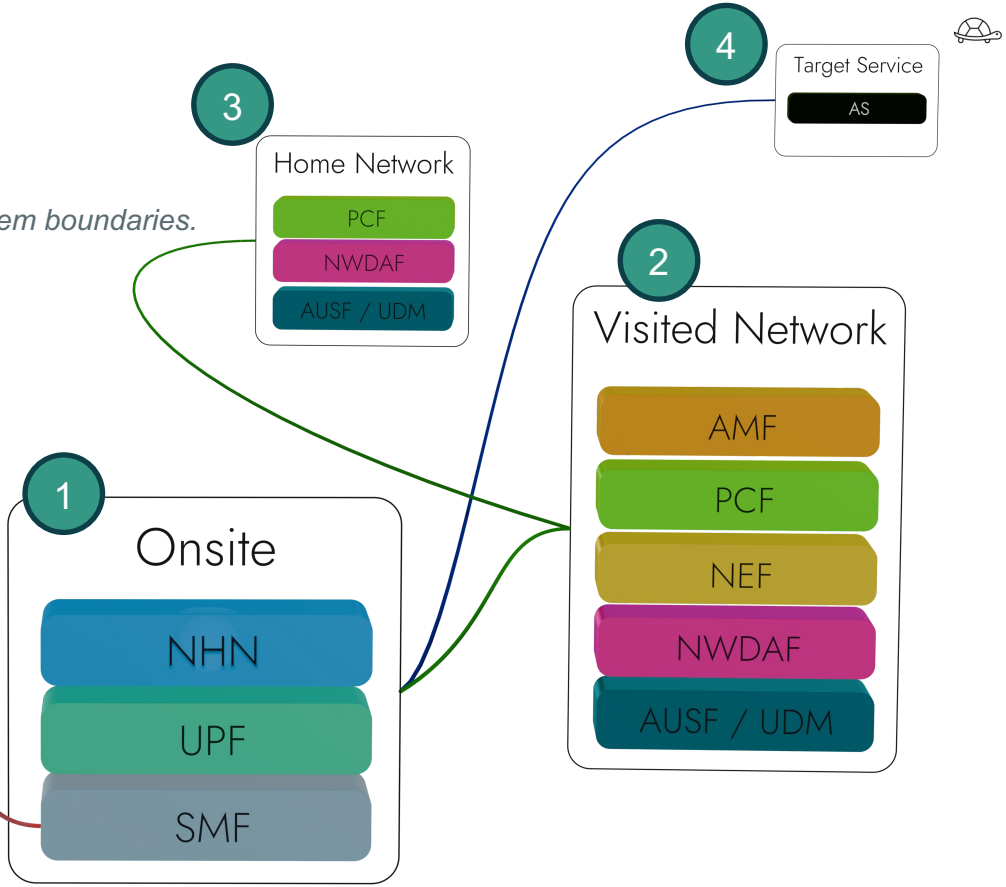
Why is QoD Complex?

QoD is uniquely positioned within CAMARA crossing key system boundaries.





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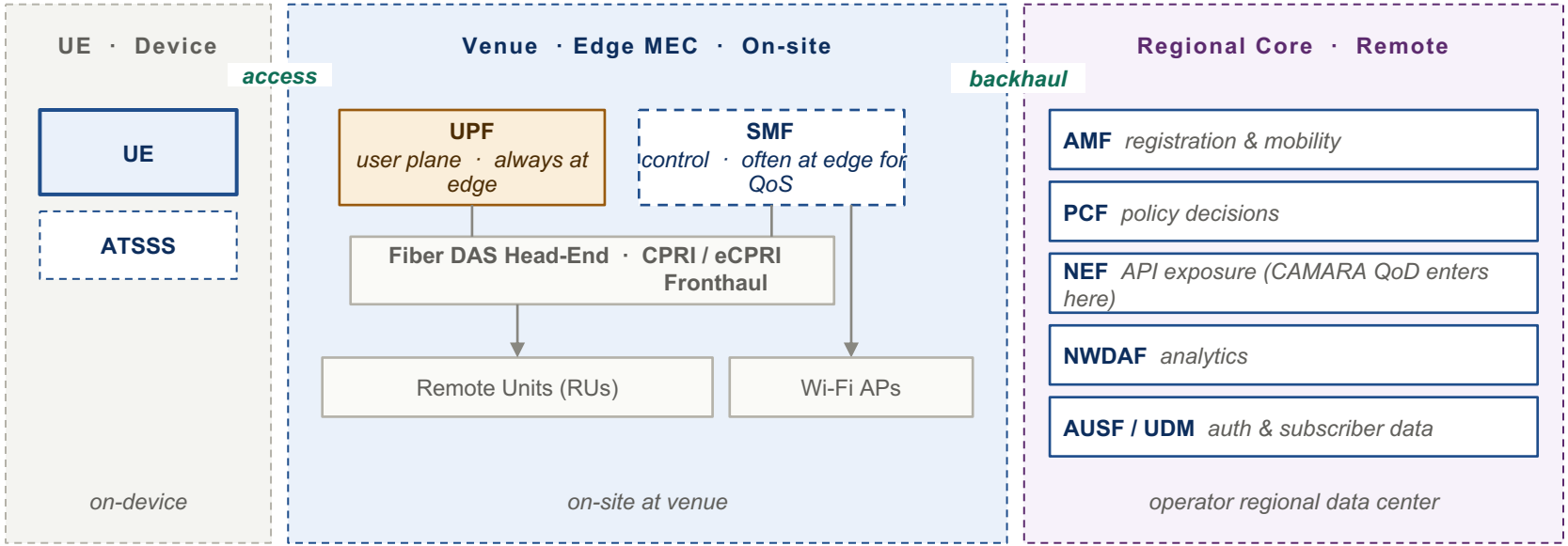
Reference Architecture — Without NHN

Without NHN: each access domain can break at any boundary.



User plane stays close to the user. Control plane lives where decisions can be made centrally or remotely.

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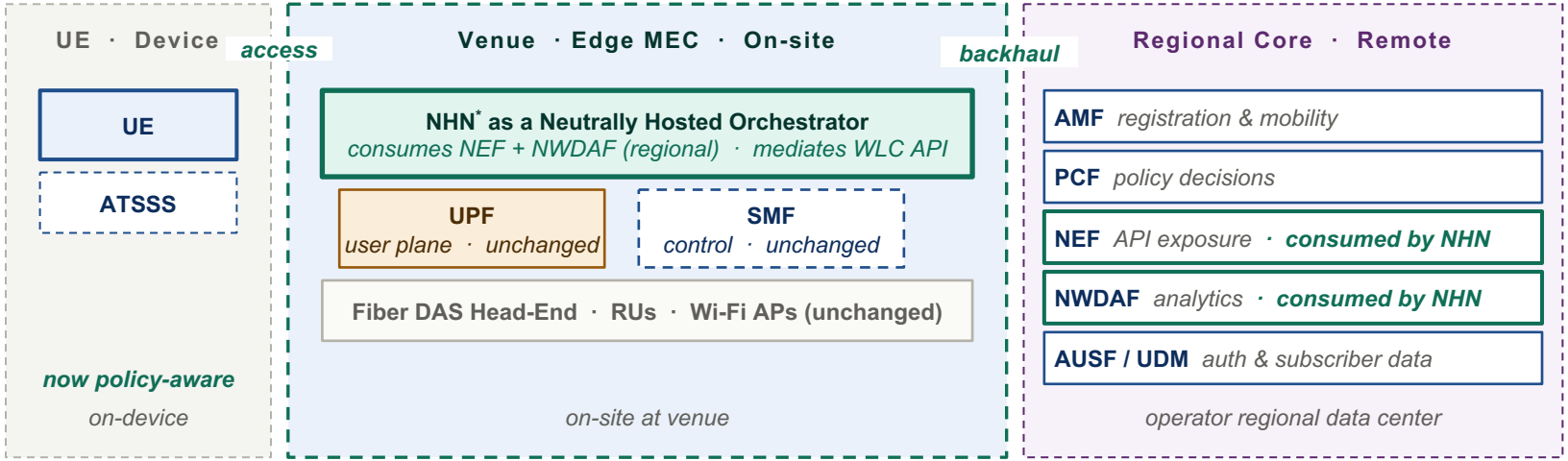
With NHN Mediated Orchestration

With NHN: the orchestrator consumes operator core and mediates interoperability complexity.



consumed by NHN · NEF, NWDAF (read), WLC (mediated) unchanged · AMF, PCF, SMF, UPF, AUSF, UDM, ATSSS

The orchestrator does not move NFs. It changes who consumes them — and reframes ATSSS as a policy-aware primitive.

** NHN architecture: specified and continually developed by the OnGo Alliance (CBRSA-TS-1002, Release 3+).*

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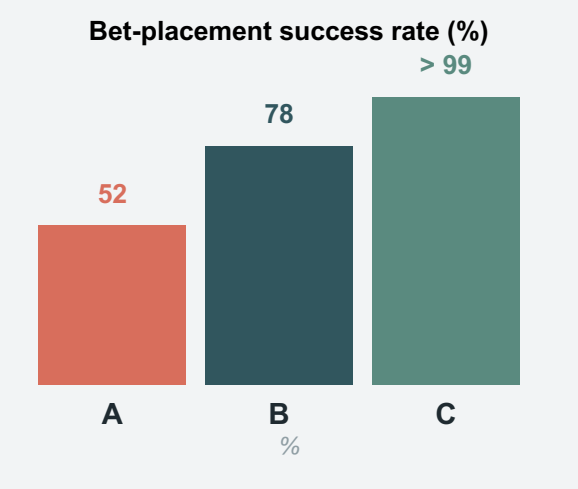
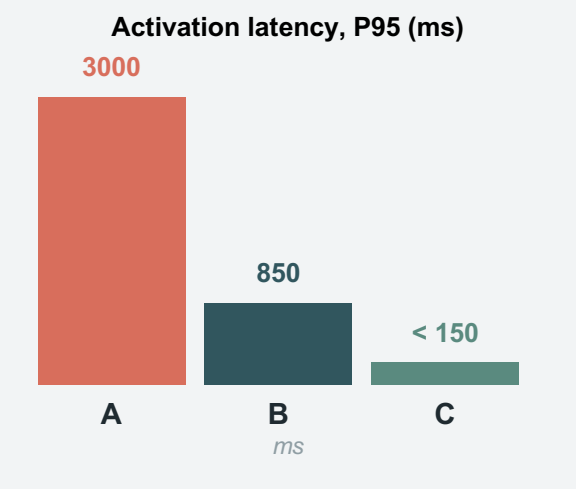
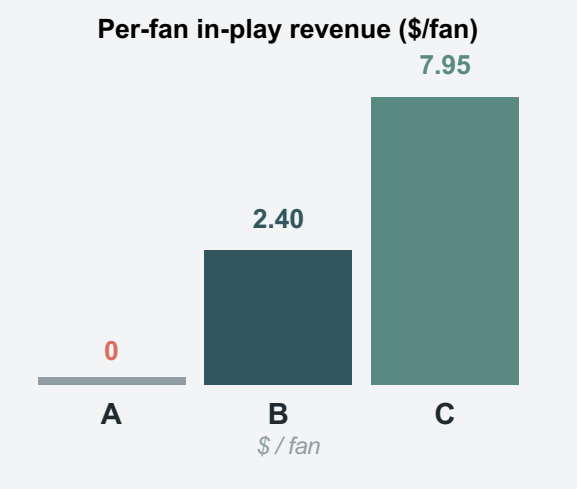
Live Betting: Quality Becomes Revenue (Simulated)

NFL Scenario: Halftime surges during an 80,000-seat venue, modeling bet-placement outcomes across the three QoD treatments.







NaaS Orchestration: A = QoS only (baseline) · B = QoS + QoD · C = QoS + QoD + NHN

NHN as first-class control domain delivers the latency budget live betting requires — and turns it into measurable per-fan revenue.

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Recap & Call to Action

QoD becomes the revenue generating accelerator on which NaaS is built *when implemented across network, access, and intent-based experiences with NHN as a first-class control domain.*

COLLABORATION OPPORTUNITIES WITH CAMARA & ONGO ALLIANCE

1 Data Models & Definitions

Normalize and standardize data models & interfaces for MNO ↔ NHN ↔ venue ↔ aggregator settlement

2 Observability Profiles

Identify fine-grained SLA telemetry (P95 latency, jitter, loss) to be exposed through the CAMARA QoS lifecycle.

3 Multi-party Reconciliation

Bridge 3GPP Converged Charging (TS 32.290) to multi-party reconciliation when applicable.

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Abstract & Authors

A U T H O R S

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QoD-Centric NaaS Strategy: Policy-Orchestrated Multi-Access Service

A B S T R A C T

Delivering predictable, high-quality network services in dense, multi-access edge environments remains a central challenge for operators pursuing a Network-as-a-Service (NaaS) strategy, where programmable APIs expose network capabilities as on-demand services. Quality-on-Demand (QoD) APIs act as the intent interface in this model, enabling applications to request session-level performance characteristics. QoD requires sophisticated new network control-plane orchestration to address heterogeneous enforcement, multi-access behavior, and session continuity issues across Wi-Fi, private 5G, and public 5G domains.

QoD refers specifically to the CAMARA Project's implementation, which provides standardized APIs for dynamic multi-access orchestration, session-level QoS enforcement, and integration with 3GPP control-plane functions, including PCF, SMF, NEF, and NWDAF together with UE-side ATSSS for traffic steering, switching, and splitting.

In this session, we overview the strategic importance of QoD APIs, the global scale of the emerging NaaS domain, and detail Open Source technologies that are foundational to the industry.