AECC

AUTOMOTIVE EDGE COMPUTING CONSORTIUM

A Statement of Requirements to Accelerate Deployment of Interoperable Telco APIs for Connected Mobility

Executive Summary

The automotive industry is entering a new phase where intelligent driving, in-vehicle AI agents, and mobility digital twins will drive massive traffic growth, tighter latency requirements, and stronger service assurance needs than today's mobile networks deliver globally. AECC has highlighted a global scaling gap between emerging connected-vehicle demands and current network design, and calls for standardized, scalable, programmable network infrastructure exposed via APIs.

- What's changing: connected mobility requires consistent, programmable network capabilities across operators, markets, and vendor stacks—not bespoke integrations.
- What MNOs can win: new revenue streams through monetization of differentiated connectivity (e.g., QoS/QoD) and edge capabilities, while reducing integration friction for global automotive customers.
- What must be solved: fragmented and incomplete API exposure, operational complexity at scale, and lack of global interoperability for multi-operator, multi-vendor edge-cloud environments.

This whitepaper proposes an approach to build an interoperable Telco API foundation focused on (1) multi-network switching across the vehicle lifetime and usage-scene management, (2) Quality on Demand (QoD) for predictable differentiated connectivity, and (3) adaptive communications that use network insight to optimize user experience and cost.

1 The Problem: Connected Mobility Needs a Unified Telco API Foundation

Connected vehicles and mobility services increasingly rely on continuous, predictable connectivity across diverse environments: factories, ports, cities, highways, and cross-border travel. However, the current market is characterized by inconsistent API exposure, varying operator feature availability, and operational complexity when orchestrating network and edge resources at scale.

1.1 Symptoms Seen by Automotive Service Providers

- Fragmented and incomplete APIs across operators and markets, requiring per-country custom integration.
- Manual, error-prone operations to configure routing, edge resources, QoS policies, and handovers across distributed infrastructures.
- Limited global interoperability and efficiency for multi-operator service delivery, reducing scalability and increasing cost.

1.2 Why This Matters to MNOs

Automotive OEMs are global customers. When network capabilities cannot be consumed consistently via APIs, the resulting integration friction slows deployment, increases operational cost, and limits monetization. Conversely, interoperable exposure of differentiated connectivity and edge capabilities enables repeatable, productized revenue across markets. Federation multi-operator consistency and standardized API exposure are essential to prevent fragmentation and support scalable cross-market deployment.

2 Why Now: AECC and GSMA Fusion as the Vehicle for Cross-Industry Alignment

The timing for action is critical. The automotive industry is rapidly scaling connected and software-defined vehicle services, while mobile networks are transitioning toward programmable, API-exposed capabilities. However, without clear, unified, cross-industry alignment, this transition risks fragmenting into isolated, non-scalable implementations. AECC and GSMA Fusion together provide the mechanism to close this gap now.

2.1 AECC: Aggregating Automotive Demand into Clear Network Requirements

AECC represents a collective automotive voice spanning OEMs, suppliers, MNOs and technology partners, and has formally communicated that current global mobile network design does not scale to future automotive demands. AECC translates operational pain points—such as high uplink demand, strict latency needs, and lifecycle vehicle connectivity across networks—into common, actionable requirements for the telecom industry.

2.2 GSMA Fusion: Converting Demand into Interoperable, Federated Capabilities

GSMA Fusion is designed to convert vertical-sector demand into globally interoperable, federated network capabilities leveraging GSMA initiatives such as Open Gateway. Through GSMA Fusion, the focus shifts from isolated API exposure to a common execution model—where network capabilities such as QoD, connectivity insight, and edge enablement can be consumed consistently by global mobility platforms.

2.3 Market Transition: From Connectivity to Programmable Capabilities

- Networks are evolving beyond best-effort connectivity toward programmable capabilities that applications can request and verify (e.g., QoD).
- Edge and distributed computing are becoming essential to manage growing uplink traffic volumes and latency-sensitive workloads.

- Interoperability and federation are key to make these capabilities consumable globally for automotive use cases.

3 Joint View: Capability Scope, Reference Use Cases, and Requirements

This section consolidates (a) the priority capability scope, (b) representative vehicle-lifetime and usage-scene journeys, and (c) the resulting requirements for MNO implementation.

3.1 Capability Pillars for Connected Mobility

The joint capability set centers on three pillars:

Pillar A — Multi-Network Switching across the Vehicle Lifetime

Vehicles operate across production/shipping, in-use, and maintenance stages. In each stage, they traverse different network domains (private/local networks, public mobile networks, and in some cases non-cellular access). A unified Telco API foundation should enable policy-driven switching with minimal service disruption and clear governance.

- Public↔private network swap: seamless transition between local/private coverage (e.g., ports, factories, service centers) and public networks.
- Multi-carrier continuity: redundancy and cross-border operation with consistent outcomes.
- Access network swap: when required, coordinated switching decisions may include Wi-Fi or satellite based on verified connectivity conditions.
- Identity & profile lifecycle: eSIM and SIM swap management aligned with automotive provisioning and service activation flows.

Pillar B — Quality on Demand (QoD) and Differentiated Connectivity

QoD enables applications to request and verify connectivity characteristics (e.g., latency, throughput, reliability) for specific sessions or workloads. For automotive services, QoD underpins safety-relevant and premium experiences and supports clear monetization models.

- Session-scoped QoD invocation: request → verify → release with observable outcomes.
- Differentiated connectivity: class-based policies that can be packaged and priced for enterprise customers.
- Priority communications for critical flows: remote driving, incident alerts, urgent OTA patches, and prioritized uploads.

Pillar C — Adaptive Communications (Insight → Decision → Control)

Adaptive communications combines network insight (current and predicted conditions) with programmable controls (QoD, switching orchestration, and where relevant steering/offloading) to optimize experience and cost dynamically. This reduces human intervention and improves resilience in congested areas and during transitions between network domains.

- Predictive connectivity: anticipate degradation and trigger proactive actions (QoD or switch).
- Context-aware policies: adjust based on location, usage scene, and service criticality.
- Edge-assisted optimization: use edge compute for real-time analytics and local distribution when needed.

Outcome for MNOs

- Productize API-based capabilities with predictable SLAs and global consistency.
- Reduce bespoke integration and operational overhead by standardizing exposure and governance.
- Unlock new revenue from automotive OEMs and mobility platforms through repeatable offerings.

3.2 Reference Journeys: Usage-scene Management (Illustrative)

A usage-scene approach treats connectivity as an adaptive service that follows the vehicle as it moves between places (e.g., port, office, home, service center) and activities (e.g., updates, assistance, remote driving). Applications continuously select the best connectivity posture for the scene, using insight and programmable control.

- Port / logistics hub: public↔private swap for shipping operations; “line-out-of-sight” notifications; prioritized uploads.
- Office / urban driving: route selection influenced by congestion and weather (e.g., avoid crowded areas; select route without rain); selective QoD for safety-relevant updates.
- Home / consumer environment: communication and entertainment with cost-aware policies; location-based services and geofencing.
- Service center / maintenance: appointment planning, OTA/HD map updates, and diagnostics using dedicated network or private connectivity where available; remote driving support when necessary.

3.2.1 Three Illustrative Use Cases

Use case 1 — Network swap for adaptive communications

This scenario illustrates how adaptive communications enables seamless network swapping—across public and private networks, multiple carriers, and access technologies—to maintain service continuity as vehicle context changes. Rather than treating network switching as a reactive or manual operation, the vehicle uses predictive insight and policy-based control to proactively determine when and how to swap networks with minimal impact on applications. This capability is essential for vehicle lifetime connectivity, where vehicles routinely transition between environments such as factories, ports, dense urban areas, highways, and service centers.

Key functions:

- Detection of coverage boundaries and quality degradation
- Comparative evaluation of candidate networks and carriers
- Seamless execution of network swap with minimized interruption
- Post-swap verification and policy re-application

Typical APIs / enablers:

- Predictive Connectivity API – anticipate coverage loss or congestion
- Switching Orchestration API – execute public↔private and multi-carrier swaps
- Quality on Demand (QoD) – protect critical traffic during transition
- Location & Geofencing APIs – trigger policies at network boundaries
- eSIM / SIM Lifecycle APIs (where applicable) – manage profile and subscription continuity

Use case 2 — V2C cloud cruise assistant

Services based on data from multiple vehicles in the same location and sending information to vehicles in that location. This scenario demonstrates how edge analytics and differentiated connectivity work together to create localized, real-time driving assistance.

Key functions:

- Data collection from multiple cars
- Analysis of data at the edge
- Network coverage awareness
- Differentiated connectivity for time-sensitive information

Typical APIs / enablers:

- Dedicated Network API – provides controlled and predictable connectivity in defined areas to support localized, cooperative vehicle services
- Quality on Demand (QoD) API – ensures differentiated performance for time-sensitive data exchange between vehicles and cloud/edge services
- Edge Cloud / Offloading API – enables local data aggregation and real-time analytics close to vehicles to minimize latency and backhaul traffic
- Location & Geofencing APIs – provide contextual awareness to identify relevant vehicles, trigger localized services, and enforce policy boundaries

Use case 3 — Urgent traffic event

Rapid detection and broad distribution of urgent traffic information using vehicle-sourced data. This scenario demonstrates low-latency edge processing combined with priority connectivity to reach affected vehicles quickly.

Key functions:

- AI at the edge
- Data collection from multiple cars
- Data analysis and broad distribution

Typical APIs / enablers:

- Quality on Demand (QoD) API – provides prioritized, low-latency connectivity for time-critical traffic alerts and safety-relevant information dissemination
- Dedicated Network API – enables controlled and predictable connectivity to support rapid aggregation and distribution of urgent event data within affected areas
- Location & Geofencing APIs – identify impacted vehicles, define distribution boundaries, and trigger context-aware alert delivery based on geographic relevance

3.3 Requirements for MNOs: Network, API, and Operational Enablers

Network enablers

- 5G Standalone readiness to support differentiated connectivity and consistent exposure of core capabilities.
- Edge computing footprint and operations to support low-latency analytics and local distribution for vehicle-generated data.
- Support for federation principles to enable cross-operator service consistency for global OEM rollout.

API enablers

- QoD with clear parameters, policy constraints, and observability (request, verify, release).
- Differentiated connectivity primitives that align with product packages and SLAs.
- Predictive connectivity to inform adaptive decisions and proactive switching.
- Switching orchestration APIs for public↔private swap, multi-carrier continuity, and minimized switching time.
- eSIM and SIM swap lifecycle APIs (where applicable) to align provisioning and profile management with mobility operations.
- Location and geofencing APIs to enable context-aware service behavior and governance.
- Edge cloud/offloading enablers to support edge analytics and workload placement when needed.

- Dedicated network capability exposure (e.g., for private coverage zones or enterprise offerings).

Operational governance

- Privacy-by-design data handling, including consent/refusal mechanisms where required.
- Fit-for-purpose location precision and transparent data governance to build trust with OEMs and end users.
- Security and authentication alignment for API access by mobility platforms and partners.
- Operational KPIs: QoD fulfillment rate, switching time, service continuity success, and incident response latency.

3.4 API Catalog Snapshot

An interoperable foundation should expose a coherent catalog of capabilities that can be composed per use case. The following set reflects typical building blocks referenced in industry demos and discussions.

Capability	Purpose in mobility services
Dedicated network	Access to dedicated/private connectivity in defined areas or for defined services.
eSIM	Profile management to support provisioning and lifecycle connectivity operations.
SIM swap	Controlled profile or subscription switching to support continuity and operational transitions.
Geofencing	Policy triggers and controls based on geographic boundaries.
Location	Context for scene detection, routing decisions, and governance.
Quality on Demand (QoD)	Request/verify session-level performance for critical flows.
Differentiated connectivity	Service classes for performance tiers and monetization.
Predictive connectivity	Forecasted network conditions to enable proactive adaptation.
Edge cloud / edge offloading	Compute placement and low-latency processing close to vehicles.

3.5 Use Case to Capability Mapping

Use case	Primary capabilities	Typical APIs / enablers
V2C cloud cruise assistant	Edge analytics + adaptive communications	Dedicated network; QoD; Edge offloading; Location; Geofencing
Urgent traffic event	Low-latency distribution + differentiated connectivity	QoD; Dedicated network; Location
Remote driving	Highest reliability & low latency; continuity	QoD; Predictive connectivity; Switching orchestration; Security/authentication
OTA / navigation / intelligent driving updates	Policy-based QoD + cost control	QoD; Dedicated network (optional); Edge cloud (optional)
Public↔private network swap / adaptive comminutions	Multi-network switching	Switching orchestration; eSIM/SIM swap (where applicable); Connectivity insight
Prioritized video call	Differentiated connectivity	QoD; Dedicated network; Edge offloading (optional)
Avoid crowded area	Context-aware adaptive policies	Location; Geofencing; Predictive connectivity; QoD (selective)

4 Ecosystem Collaboration and Call to Action

Delivering connected mobility at global scale requires a coordinated ecosystem model where responsibilities are clear and outcomes are measurable. This section summarizes collaboration roles and the executive actions required to move from alignment to deployment.

4.1 Collaboration Model (who does what)

- OEMs and mobility platforms: define experience KPIs, usage-scene policies, and service portfolios across the vehicle lifetime.
- MNOs: deliver programmable network capabilities via interoperable APIs, backed by operational SLAs and security governance.
- API aggregators (where used): accelerate multi-operator reach while preserving governance, commercial controls, and data protection.

- Cloud/edge providers: support distributed compute placement and lifecycle operations for edge analytics and local distribution.

4.2 Call to action for MNO

To capture the connected-mobility opportunity, MNOs should align now on interoperable Telco API exposure for QoD and adaptive communications, and prioritize multi-network switching capabilities that work across private/public domains and multi-carrier contexts. GSMA Fusion provides the vehicle to translate this demand into common requirements and accelerate deployment at global scale.

Participate in the AECC's Proof-of-Concept Program

Organizations interested in collaborating with the AECC on a POC can initiate the process by contacting ProofofConcept@aecc.org. For a glimpse into how AECC's ongoing POCs successfully address data challenges, access POC case studies and on-demand videos at https://aecc.org/proof-of-concepts/.