The AECC Hierarchical Architecture

Static-Rare ➡ Transient-Frequent ➡ Unified Solution

Cloud-Edges-Vehicles:

- Combines v2v **immediacy**, v2c **programability**
- Solves v2v **interoperability**, v2c **lag & volume**

✓ Crowd Sourced HDMaps data collection
✓ Intelligent Driving, Blockages, Parking
✓ Cruise Assist, AV Support, Heads-Up
✓ Financial mobility and Insurance
M Active Vehicles (TriState, LA, Tokyo, Osaka, Paris, Delhi...)

- 0.5 Tbps 1M FPS → Steered to 1K Geolocations ↔ 10 Metro Edges
- Reduced to 10 x 1Gbps Edge → Cloud

- 10 x 100Gbps MetroEthernet → Edge GPU Clusters

- 0.5 Tbps 1M FPS → Steered to 1K Geolocations ↔ 10 Metro Edges

- Any given sec: 10% of Moving Vehicles Capturing Every Meter 10 FPS x (70KB) = 5Mbps
M Active Vehicles (TriState, LA, Tokyo, Osaka, Paris, Delhi..)

High Resolution (1m²) Transient Conditions 1500B MTU / Sec

Calculate Changes Impacted Area

Any given sec: Join 1M Vehicles. CurrentLocation X 1K Geolocations. ImpactedTiles (100s) = 100Bs
“Air Traffic Control” for Every Meter of Every Road

Driving Experience and AV Support
Auto Network-Compute Grid

- Crowd scan of streets & roads
- Share-Nothing Federated-Shards
- Non-blocking, No false-dependencies

Shards Delegated ➔ Edge Locations
AECC Parking Geolocation PoC Tokyo

KDDI-Oracle-Nexar

Edge Location A Cluster X

Central Cloud (ex China, USA)

Edge server 1-1

GW router

Edge server 2-1

3. Decision and management for parking space event

Edge Cloud 1 (ex Tokyo)

Edge Location B Cluster Y

3. Decision and management for parking space event

Edge Cloud 2 (ex Tokyo)

3. Decision and management for parking space event

Geolocation Producer

3. Detection and management for parking space event

3. Detection and management for parking space event

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Geolocation Consumer

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Geolocation Consumer
AECC Key-Issues of Geolocation Edge Distribution

Geo-Association: Vehicles ↔ Servers

**key-issues:**

1. Transparent re-resourcing per traffic density in Geolocation Service Area
2. Geoprivacy of vehicles uploading or subscribing to Geolocation Service
3. Seamless context-switching for vehicles while driving between geos
4. Identity preservation while toggling between carriers while in geo-area
Layering Solves Key Vehicle to Geolocation Services Association: Allocation, Context, Privacy, and Identity Issues
MEC Anchored Layering Optimally distributes Edge Workloads
Distributed Network based JOIN of Vehicles, Location X Events, Locations. Optimized notification latency and bandwidth.
Mobility Routing ➡ AECC ➡ 3GPP

Architecture for enabling edge application (3GPP TS 23.558)
Upstream: Mobile to Metro Queuing and Steering

Downstream: Geo Subscription and Push Replication