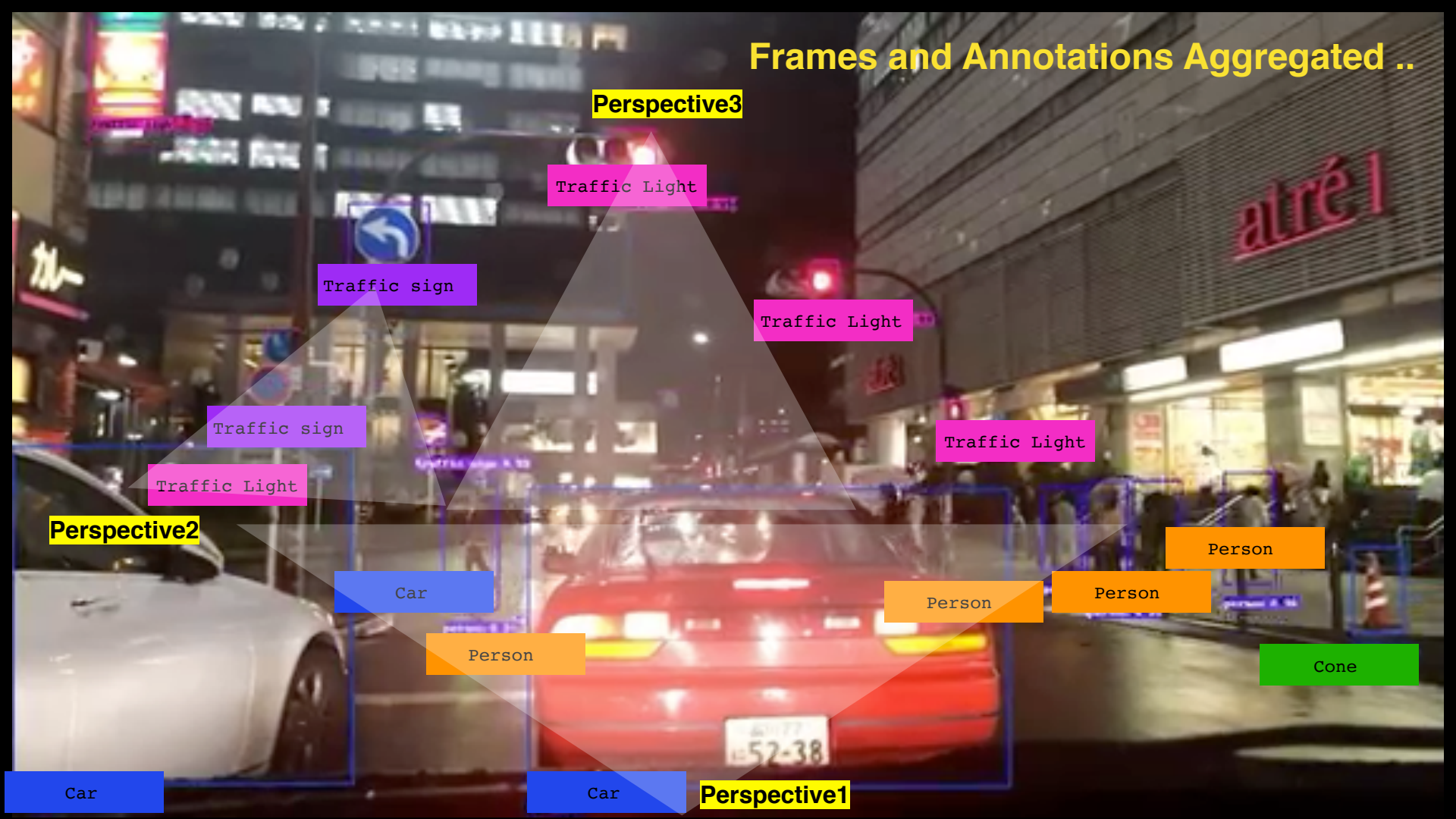
LISP-Nexagon

IETF May 2020 Interim

Sharon Barkai

AI Car-Cams Put To Safe & Protected Shared-Use

Video Feed + “Subtitles” (Annotations)


Frames and Annotations Aggregated ..
Perspective3
Traffic Light
Traffic sign
Traffic Light
Traffic sign
Traffic Light
Traffic Light
Perspective2
Car
Person
Person
Person
Person
Cone
Car
Car
Perspective1

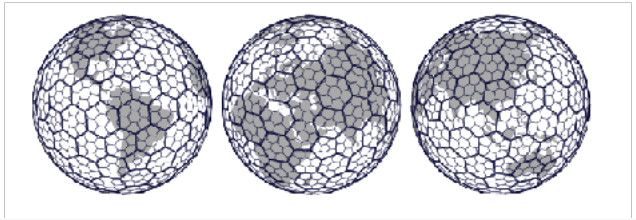
IP Channels: Multipoint (cams) to Multipoint (apps)

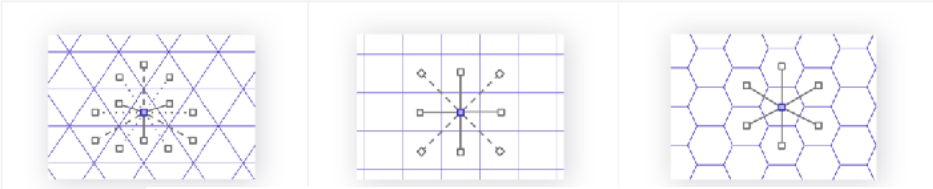
Hair-pinned Through Addressable Geo-Tiles

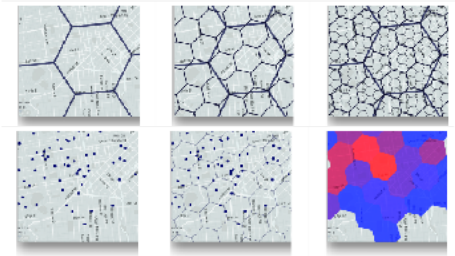
H3 Geo-Spatial Grid: Addressable (EID) & Routable (LISP)

Hierarchical Resolutions with Consistent Neighboring

- Resolution 15 ~1 meter^2
- Resolution 14 is 7x R15
- R9 is 7^6 m^2 (few blocks)

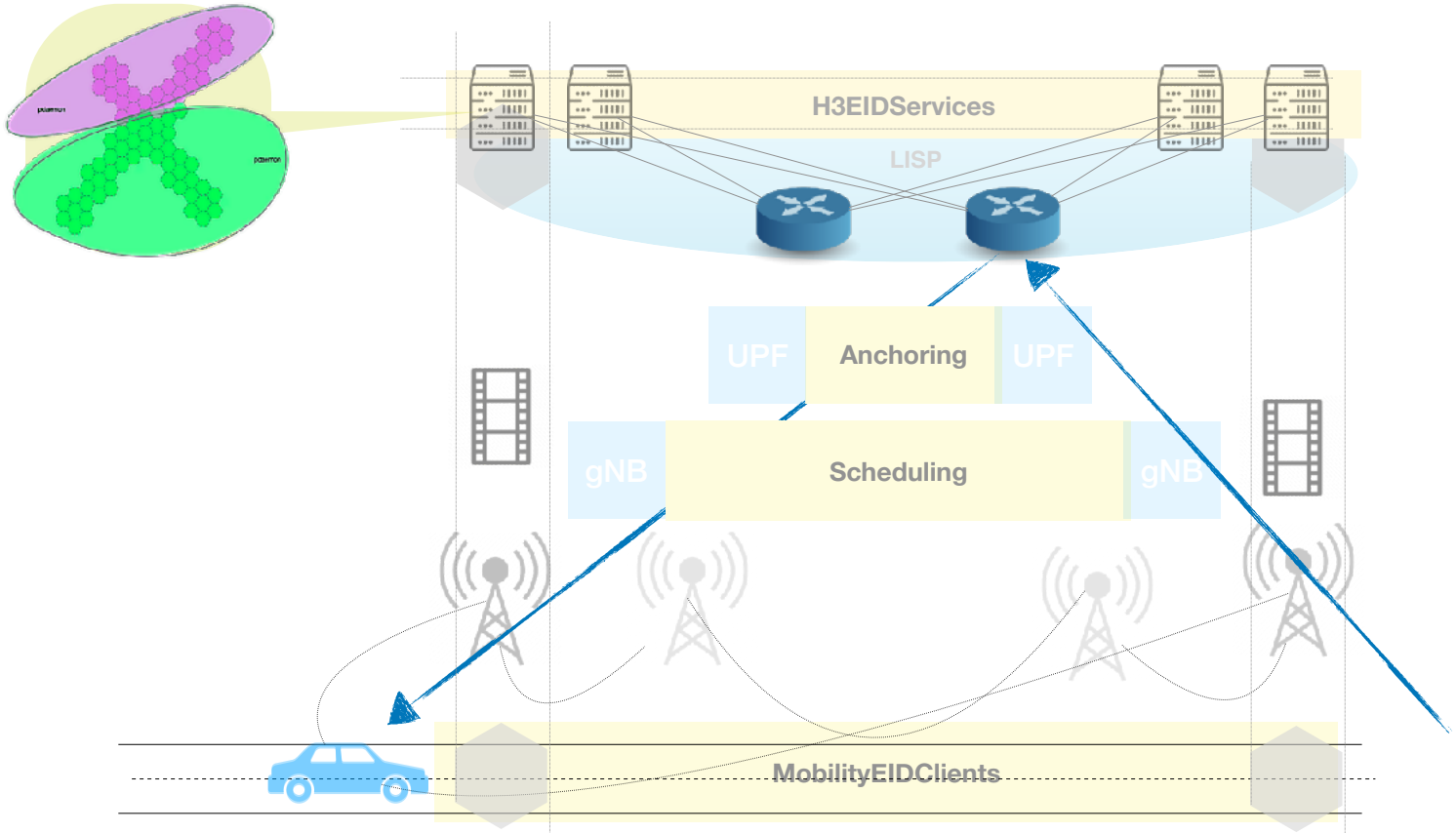






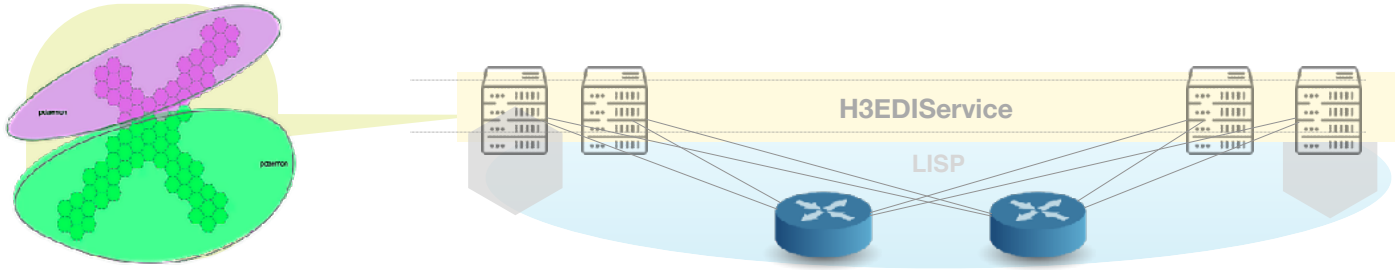
Nexagon Mobile-Edge Example

MobilityEIDClients <=> H3EIDServices

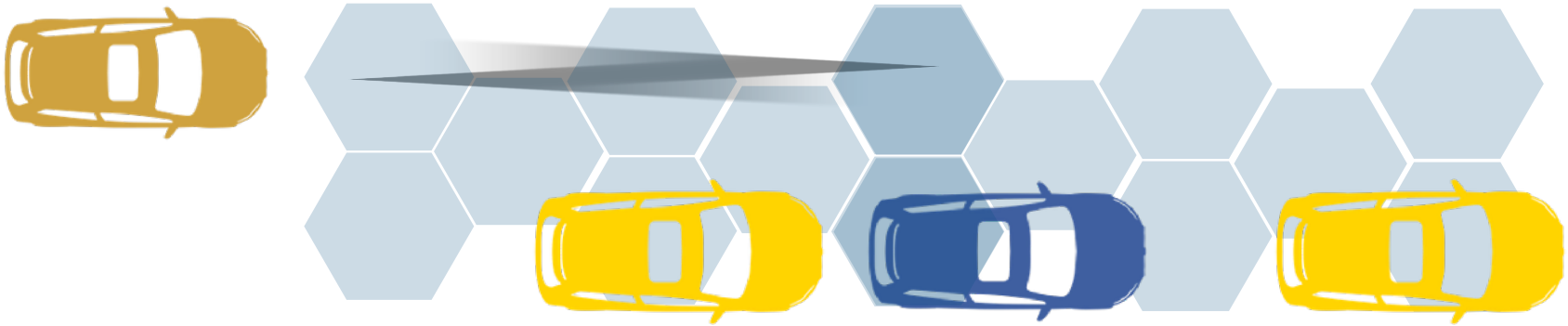


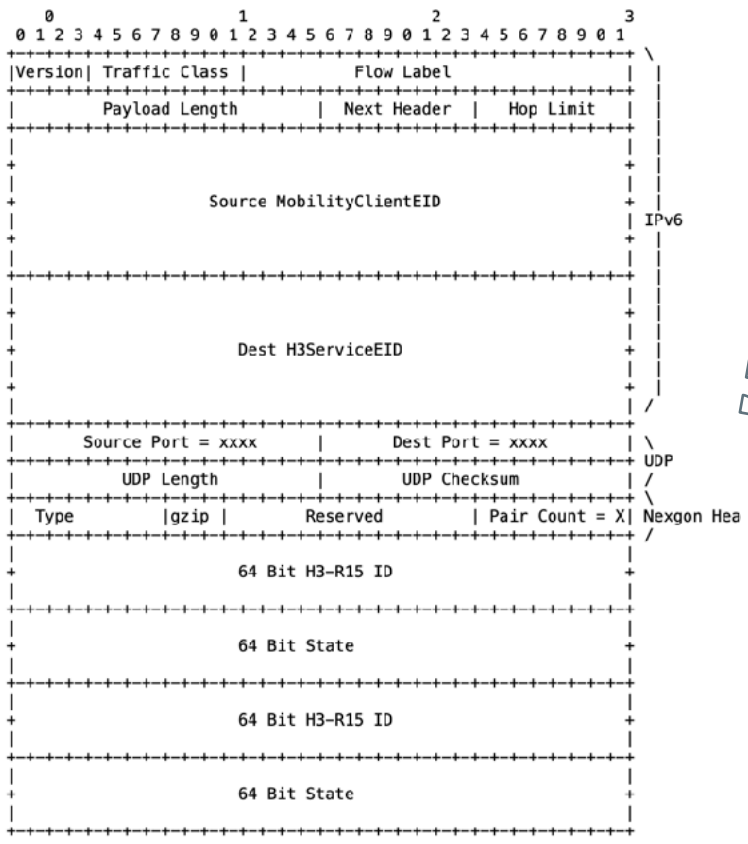
Nexagon Use-Case Example

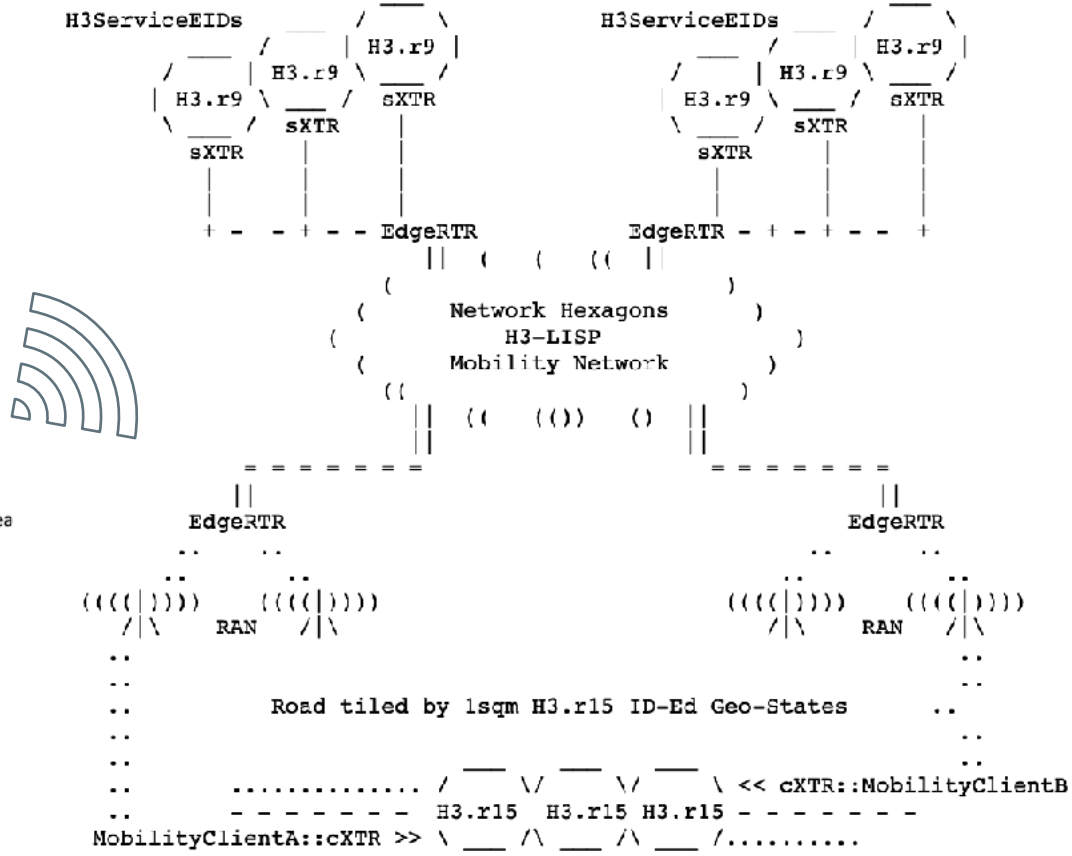
Cars Finding Free-Parking For Other Cars



What - Where R15HID::Parking	What - Where R15HID::Parking	Nexagon Enum Tuples Header	Mobility Client EID (ephemeral)	H3 Service EID (R9)	SIM-Cam RLOC	Edge RTR RLOC




0 1 2 3
Version
Traffic Class
Flow Label
Payload Length
Next Header
Hop Limit
Source MobilityClientEID
Dest H3ServiceEID
IPv6
Source Port = xxxx
Dest Port = xxxx
UDP Length
UDP Checksum
UDP
Type
gzip
Reserved
Pair Count = X
Nexgon Hea
64 Bit H3-R15 ID
64 Bit State
64 Bit H3-R15 ID
64 Bit State


H3ServiceEIDs
H3.r9
sXTR
EdgeRTR
Network Hexagons
H3-LISP
Mobility Network
RAN
Road tiled by 1sqm H3.r15 ID-Ed Geo-States
H3.r15
MobilityClientA::cXTR >>
<< cXTR::MobilityClientB

The LISP-Nexagon Informational

MobilityEIDClients <=> H3EIDServices

I

MobilityEIDClients Parse “StreetView” Video Live

- Localize Annotations (R15) Publish H3EIDService (R9)
- Using Access-Tunnel to LISP (map-assisted) RTRs

II

MobilityEIDClients Subscribe to (R9) Tiles-Of-Interest

- Send MLD-Report to RTR with (S= R9 EID, G= Theme EID)
- Head-RTRs Replicate H3EIDChannels to Subscribed RTRs

Discussion I: MobilityClient & EIDService Localization

Using Vision

- Anchor Frames
- Accurate Expensive Localization
- Stale Outdated Dynamic Content

- Fresh Image
- Accurate Detection
- Inaccurate Localization

Discussion I: MobilityClient vs EIDService Localization

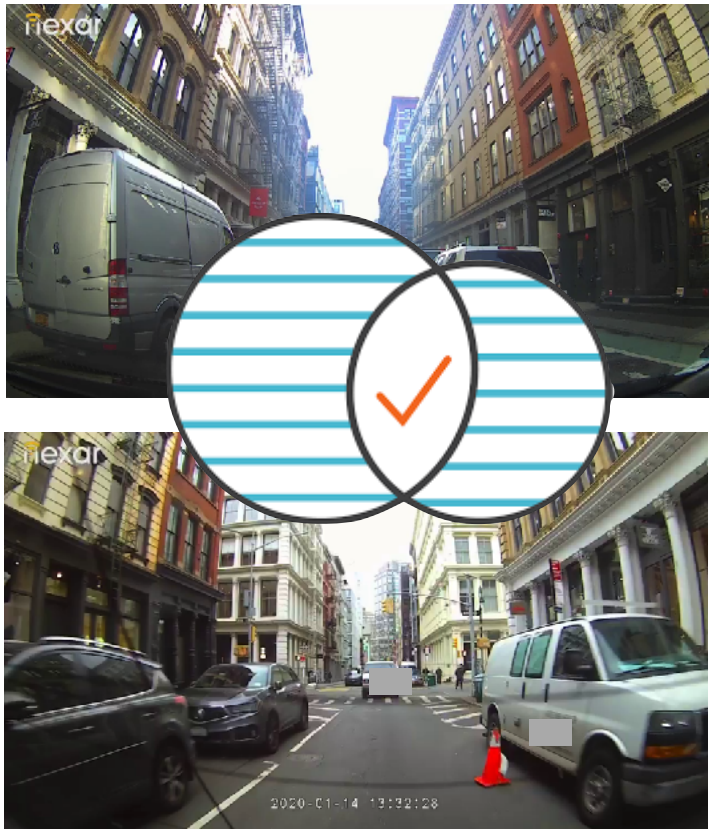
GPS => R9 EID Destination, Frame => R15 Localization

- Frame + H3ID::Annotation
- Easy match to Anchor Frames
- Frame Discarded After Matching

VS

- Heavier Upload (5G)
- Costlier Edge Compute
- Street Surveillance Potential

Stateless Anonymization
Stateful Localization



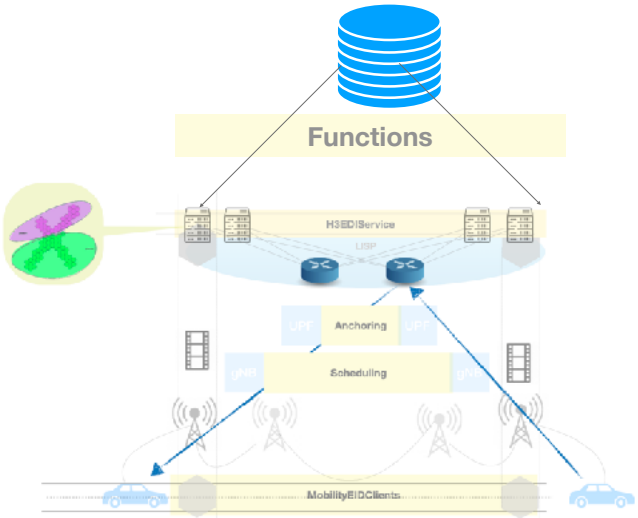
Discussion II: EID-States Based Network Function Virtualization

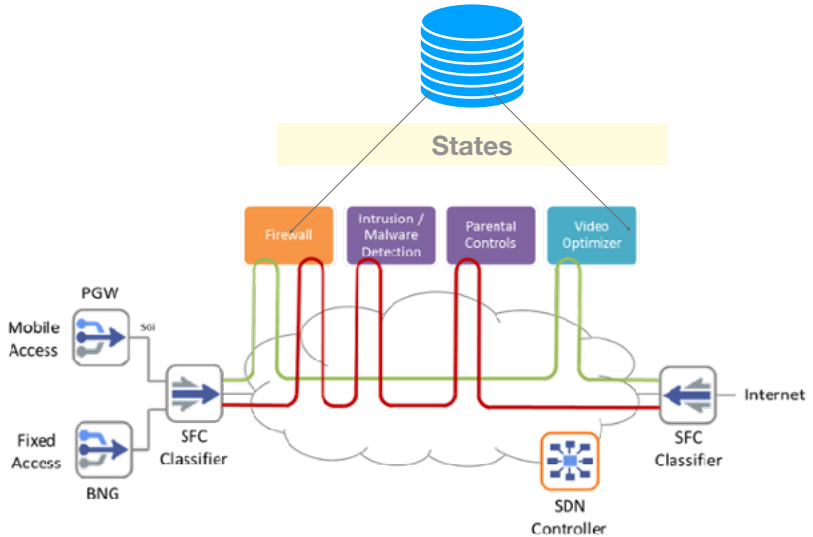
VNFs: Localization, Clustering, Tile Propagation

- Addressable EID States Overlay
- Pre-Fetched Functions to States
- Invoke State.Functions(Packets)

VS

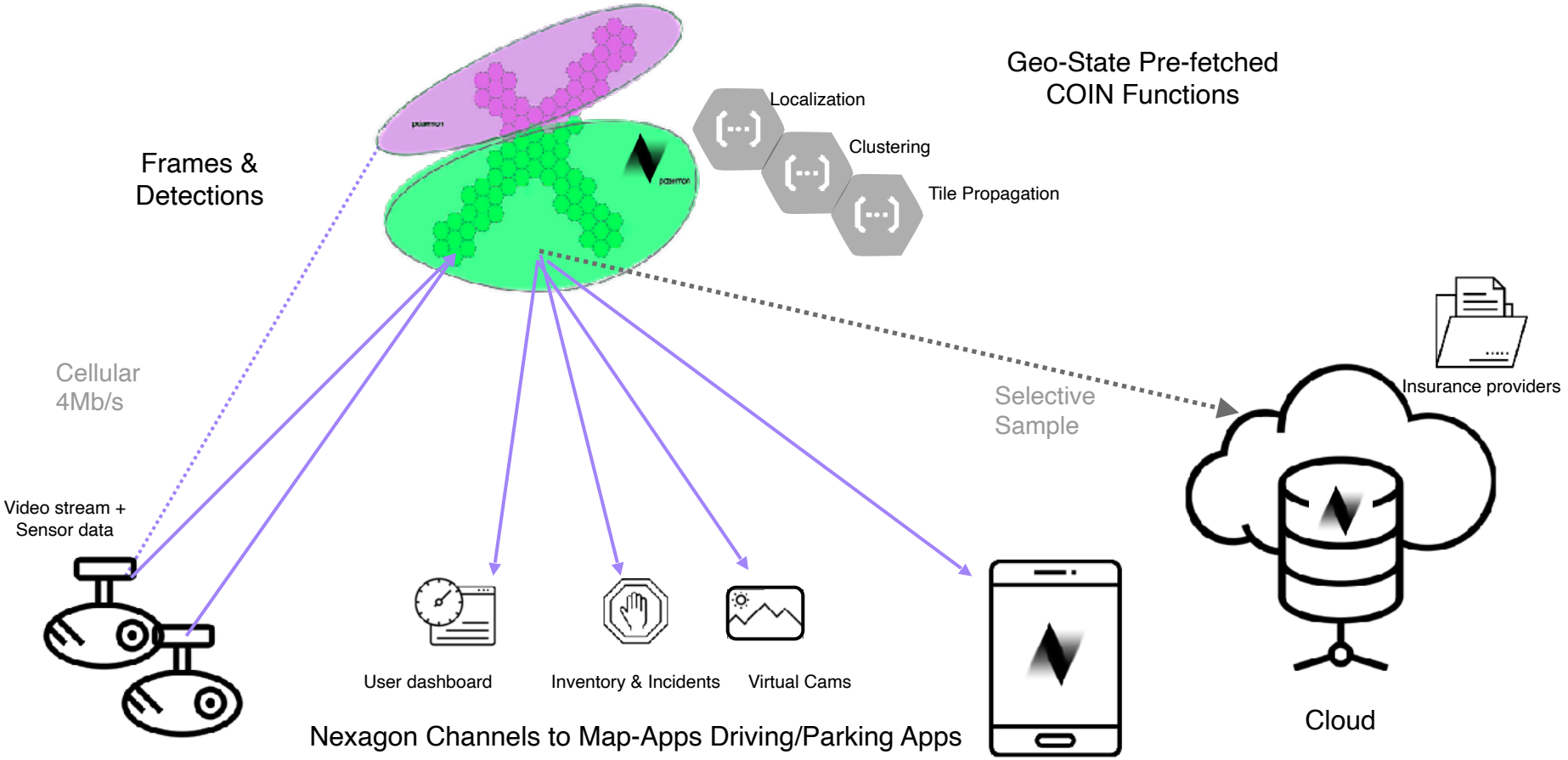
- Addressable Functions Overlay
- Pre-Fetched States to Functions
- SFC Packets through Functions





EID Based MP2MP Channels

Cloudless Early Discard



Nexagon RFC Schedule

Thank You