

IETF-120 CATS WG

Use Cases for Computing-Aware Intelligent Transportation Systems ([draft-jeong-cats-its-use-cases-00](#))

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Vancouver in Canada

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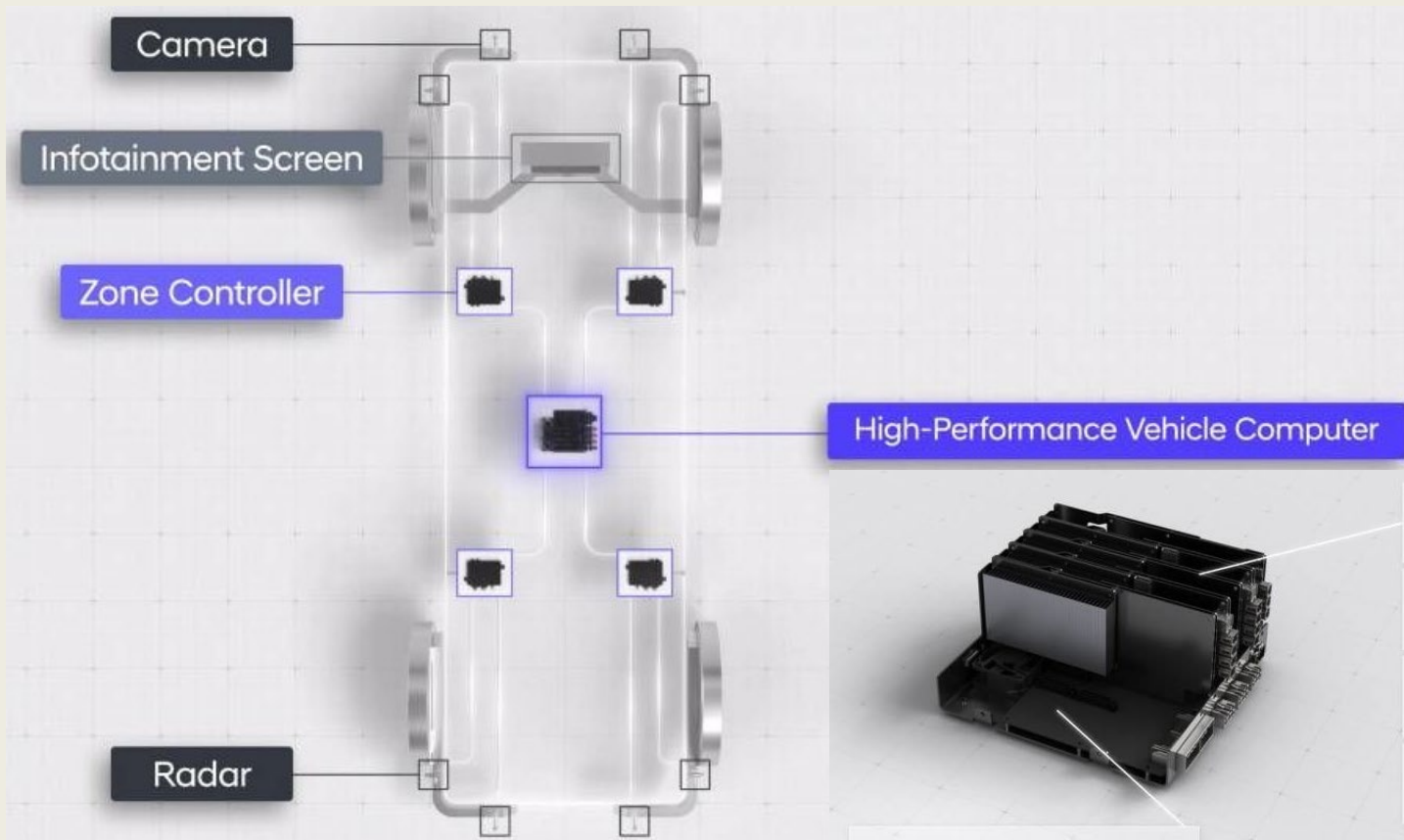
Motivation of this Draft



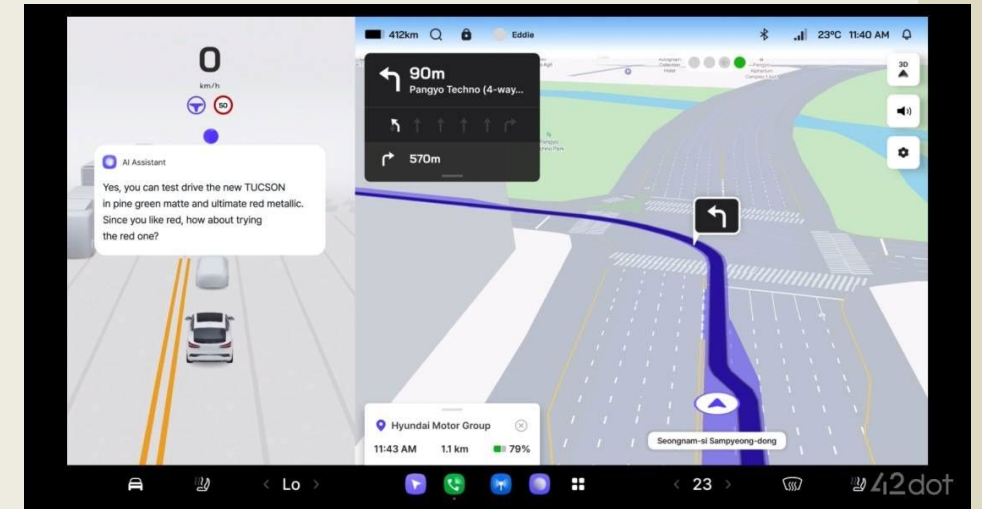
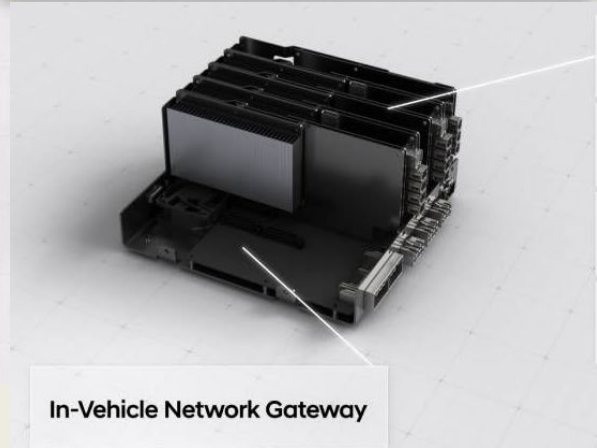
- ❑ draft-jeong-cats-its-use-cases-00
 - ❑ This draft is intended to give two concrete use cases to CATS Use Cases Draft in terms of ITS:
 - ❑ [draft-ietf-cats-usecases-requirements-03](#)
- ❑ Two ITS Use Cases in this Draft
 - ❑ Context-Aware Navigation Protocol (CNP)
 - ❑ Edge-Assisted Cluster-Based MAC Protocol (ECMAC)



Introduction: Software-Defined Vehicle (SDV)



High-Performance Vehicle Computer

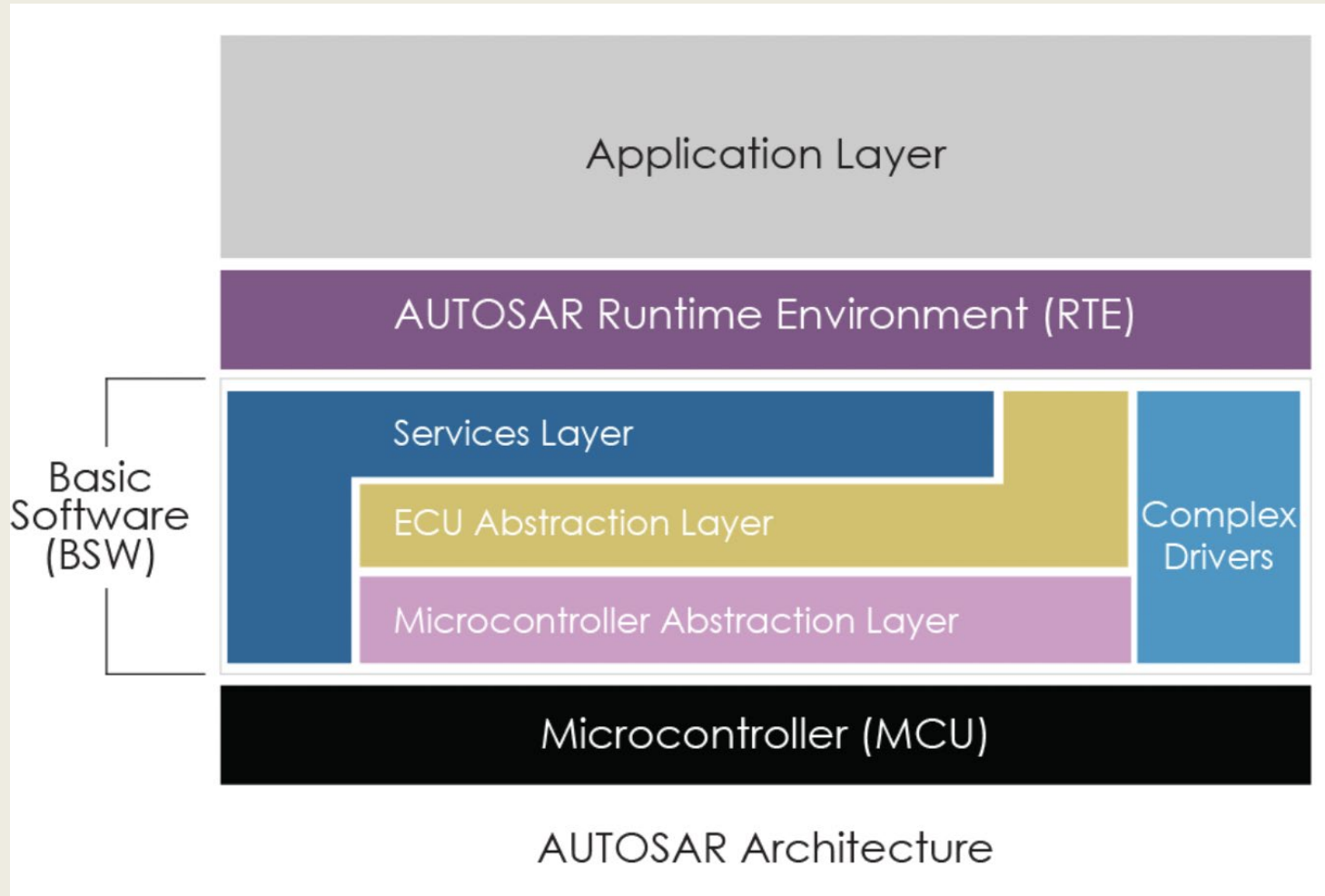


[Source] <https://www.hyundai.com/worldwide/en/brand-journal/mobility-solution/sdv>



Related Work: AUTOSAR

(AUTomotive Open System ARchitecture)



[AUTOSAR Classic Platform]

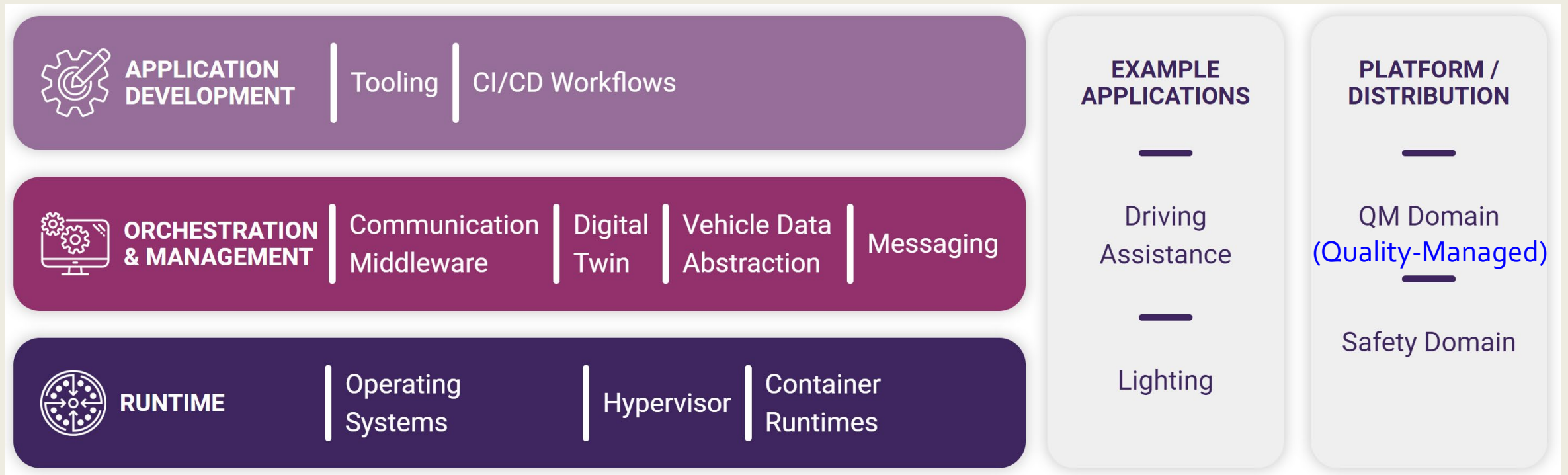
<https://www.autosar.org/standards/classic-platform>

[AUTOSAR Adaptive Platform]

<https://www.autosar.org/standards/adaptive-platform>



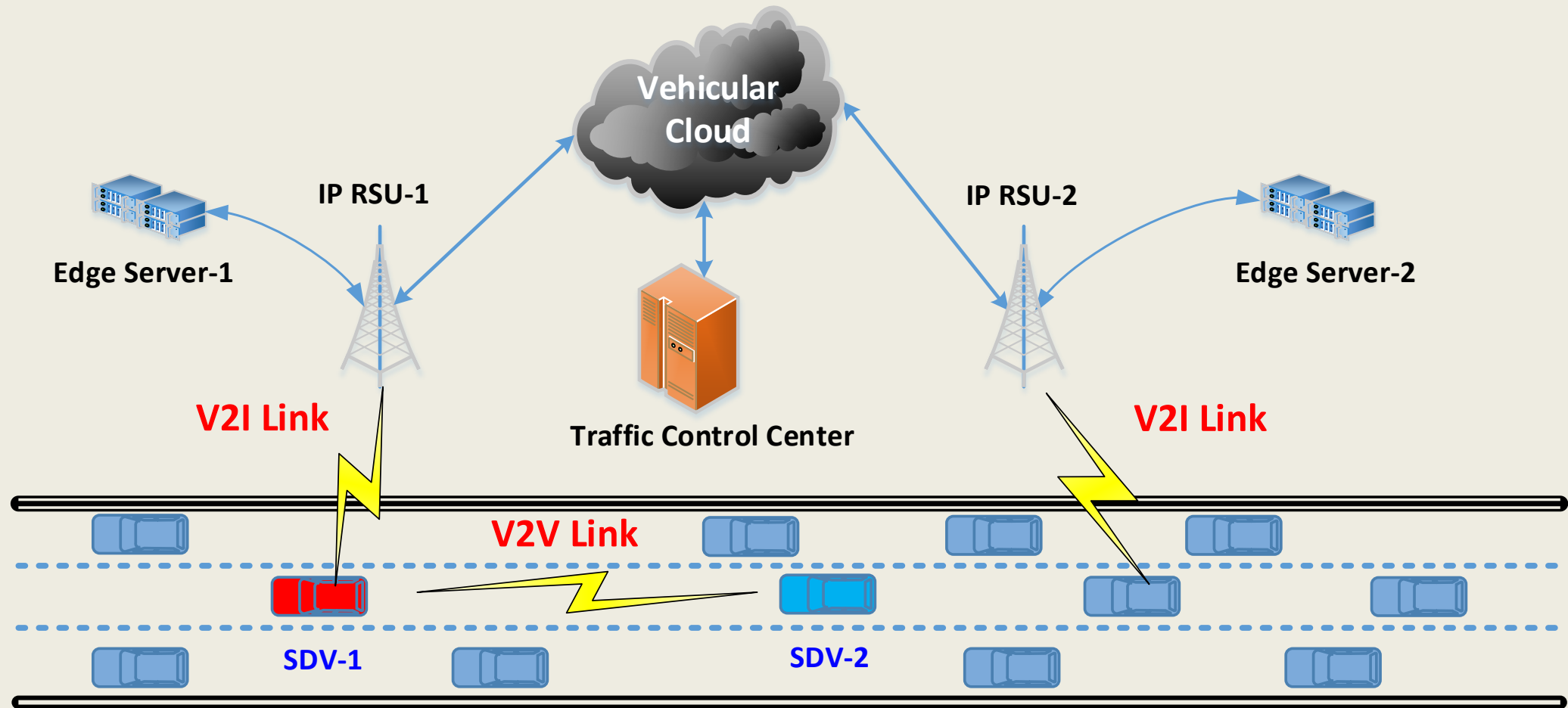
Related Work: Eclipse SDV



[Source] <https://sdv.eclipse.org/>

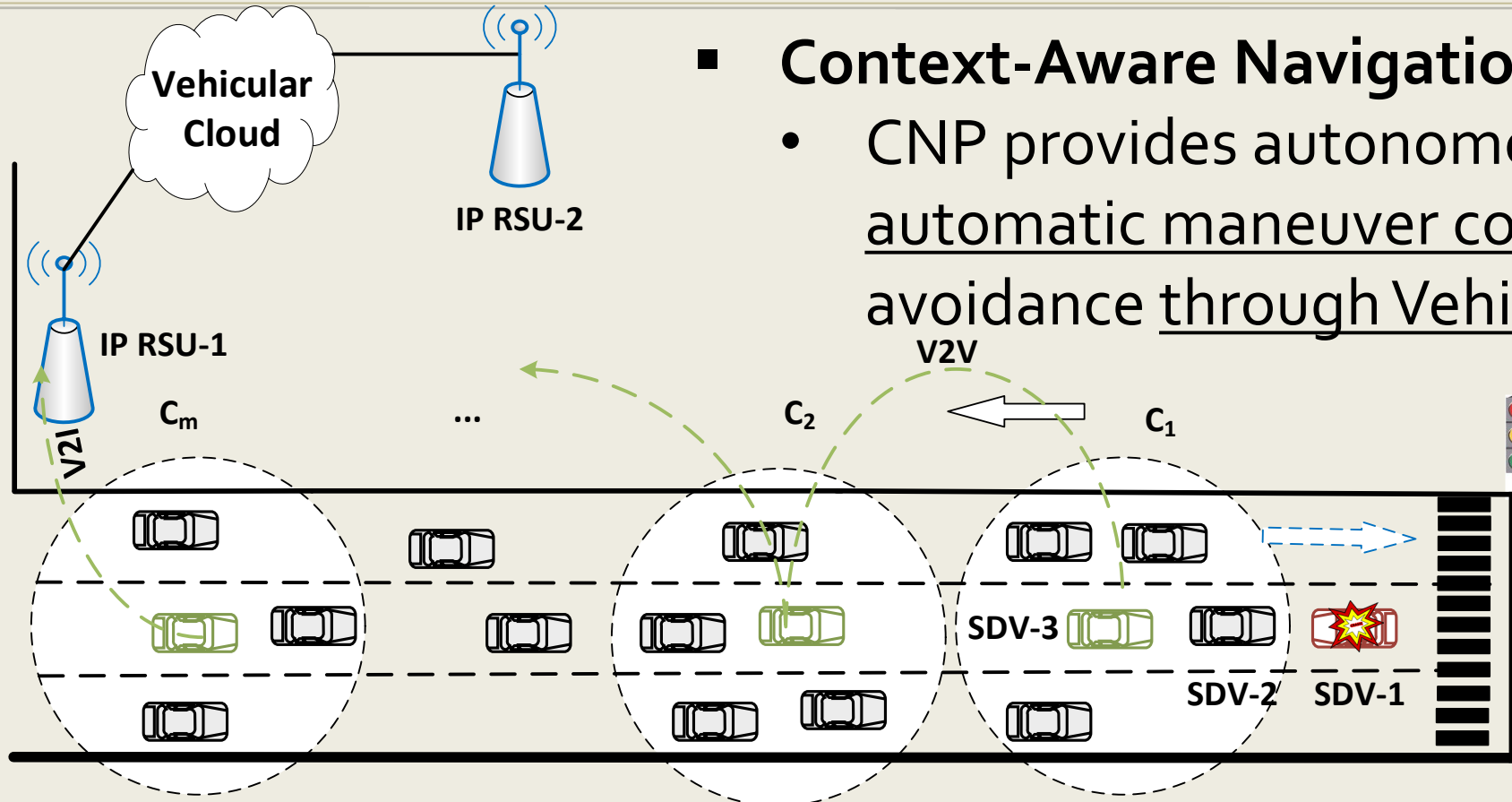


Vehicular Network Architecture

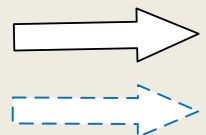


[Source] J. Jeong et al., "[A comprehensive survey on vehicular networks for smart roads: A focus on IP-based approaches](#)", Elsevier Vehicular Communications, Vol. 29, June 2021.

Use Case 1: Context-Aware Navigation Protocol



- **Context-Aware Navigation Protocol (CNP)**
 - CNP provides autonomous vehicles with automatic maneuver control for accident avoidance through Vehicular Cloud.

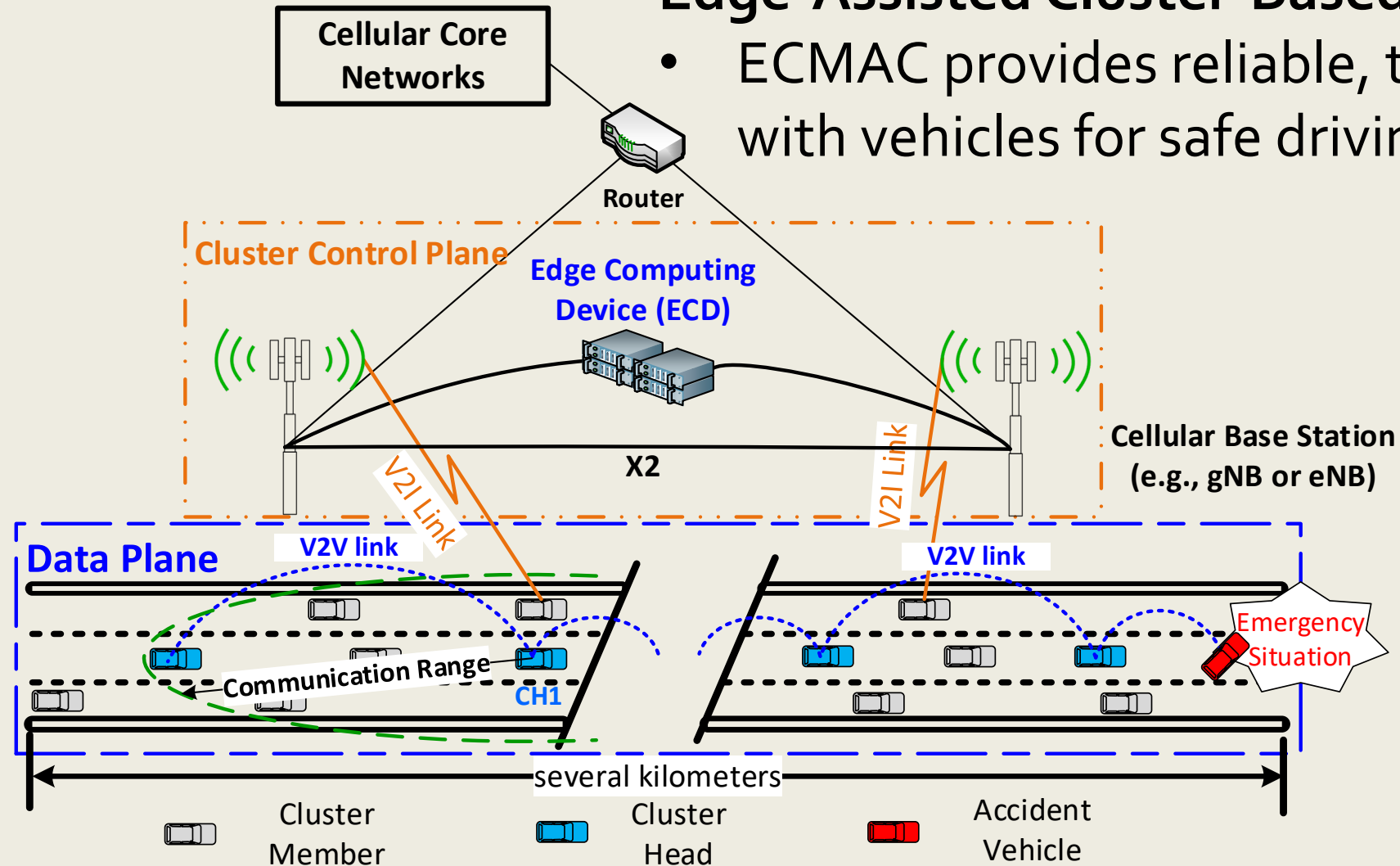


C₁, C₂, C₃ ... Emergence vehicle clusters

[Source] B. Mugabarigira, J. Jeong et al., "[Context-Aware Navigation Protocol for Safe Driving in Vehicular Cyber-Physical Systems](#)", IEEE Transactions on Intelligent Transportation Systems, Vol. 24, No. 1, January 2023.

Use Case 2: Edge-Assisted Cluster-Based MAC Protocol

- **Edge-Assisted Cluster-Based MAC Protocol (ECMAC)**
 - ECMAC provides reliable, timely communications with vehicles for safe driving through Vehicular Cloud.



[Source] Y. Shen, J. Jeong et al., "[ECMAC: Edge-Assisted Cluster-Based MAC Protocol in Software-Defined Vehicular Networks](#)", IEEE Transactions on Vehicular Technology, April 2024.



Next Steps

- ❑ This draft can enrich Section 4.2 (Computing-Aware Intelligent Transportation) in CATS Use Cases Draft:
 - ❑ <https://datatracker.ietf.org/doc/html/draft-ietf-cats-usecases-requirements-03#name-computing-aware-intelligent>
- ❑ I would like to ask the CATS WG to consider this draft to be merged into the CATS Use Case Draft.
- ❑ If the authors of the CATS Use Case Draft agree on my request, I will work on merging with them.