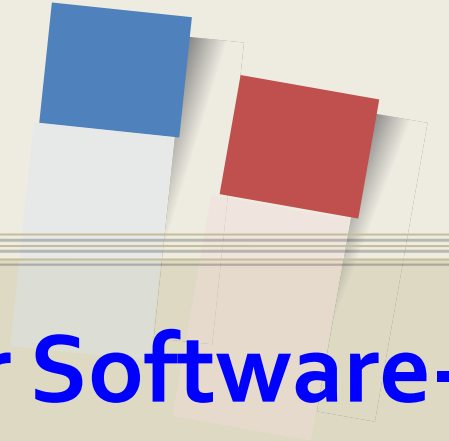# An Intent-Based Management Framework for Software-Defined Vehicles in Intelligent Transportation Systems (draft-jeong-opsawg-intent-based-sdv-framework-00)

March 20, 2024

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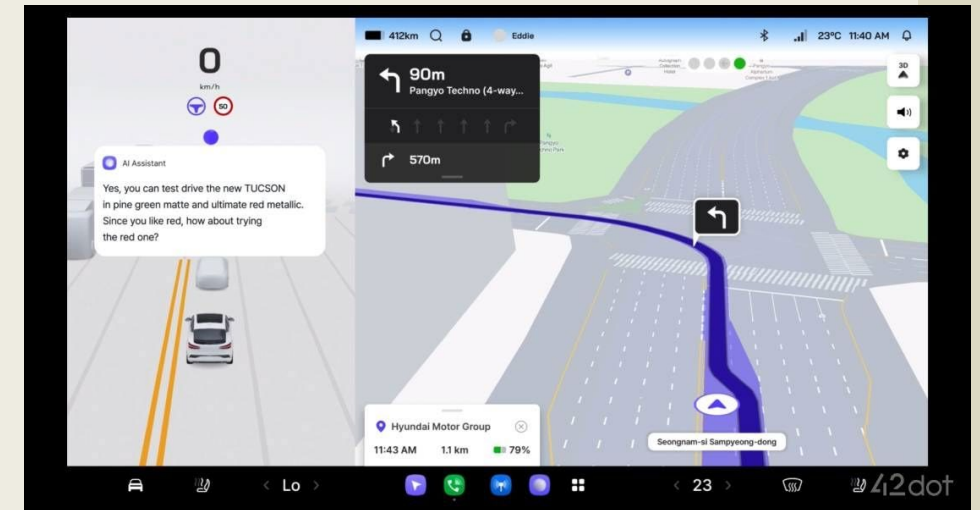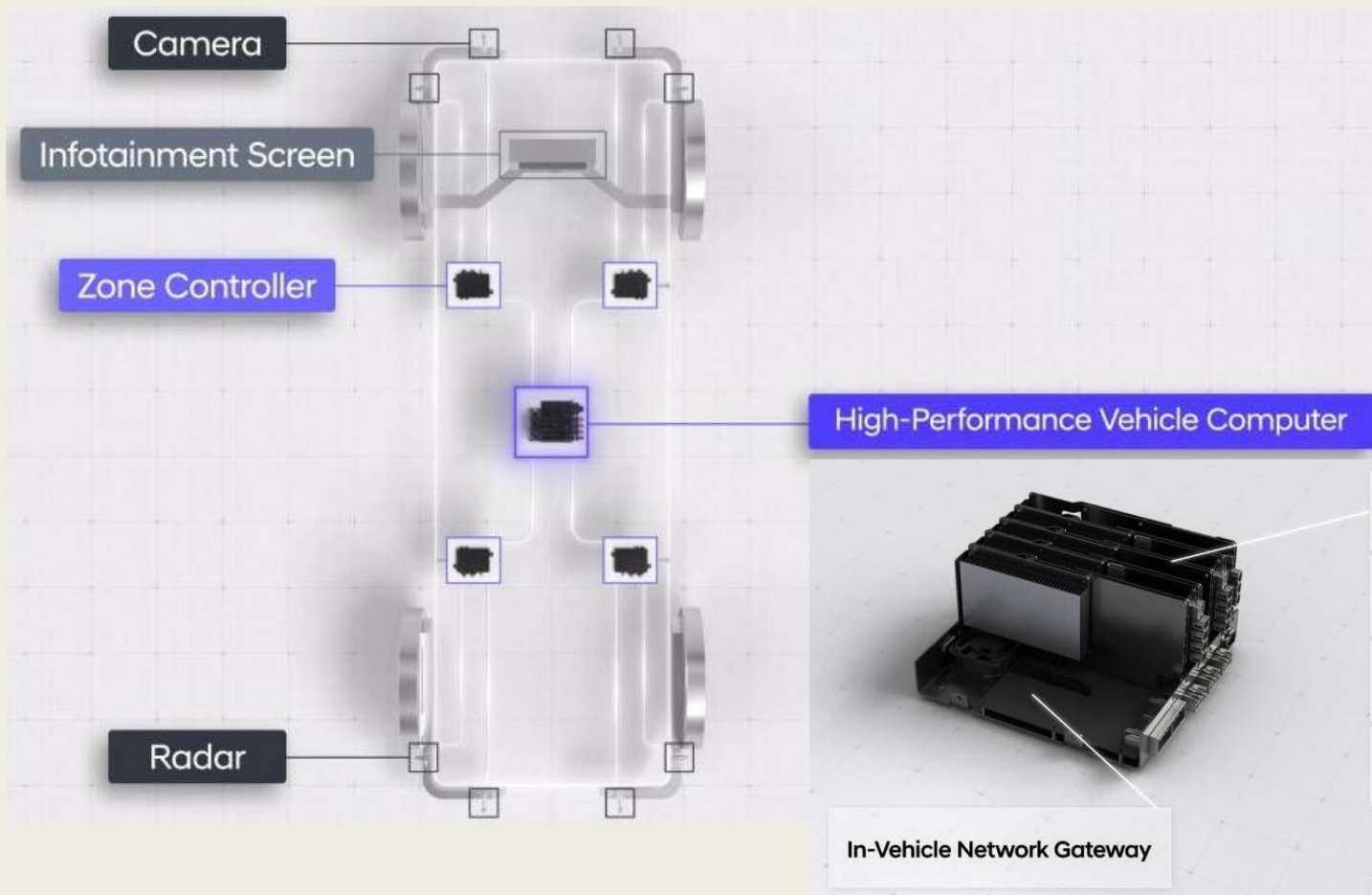Email: {pauljeong, chrisshen}@skku.edu

Contents

Introduction

❏ Software-Defined Vehicle (SDV)

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

Related Work: AUTOSAR

[Source] https://velog.io/@kiwo224/Autosar-Base-Software-BSW
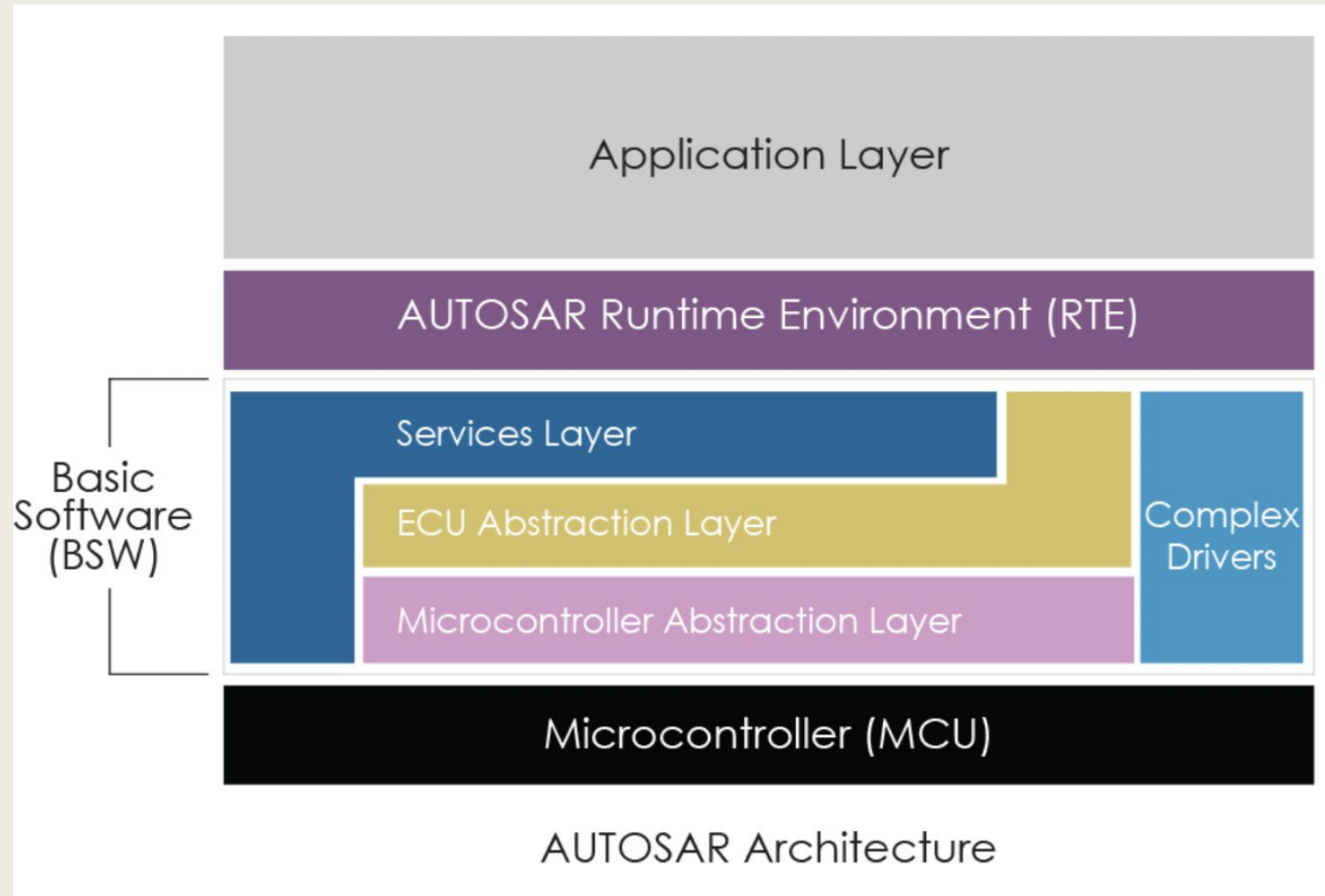
Related Work: COVESA (Connected Vehicle Systems Alliance)
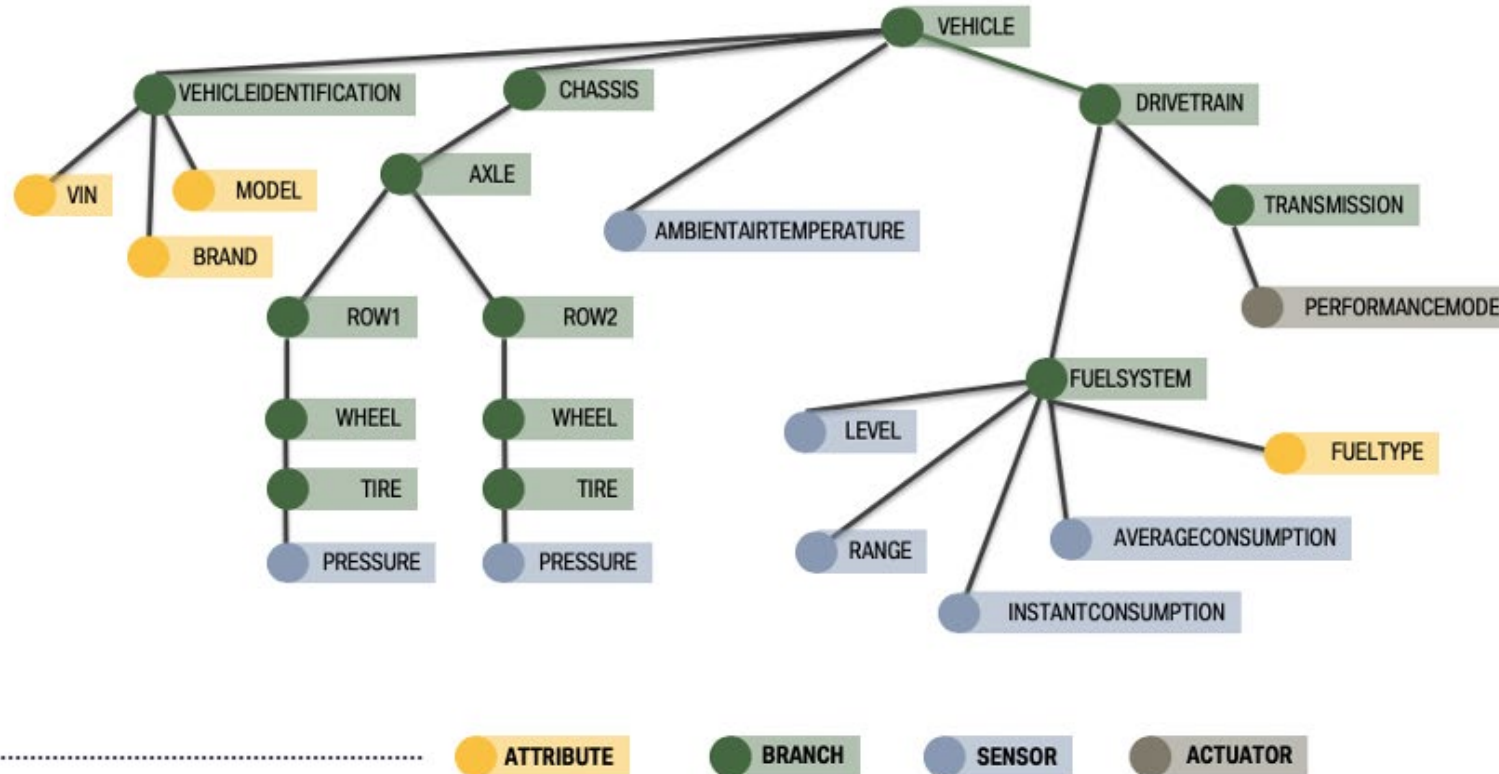
Related Work: Eclipse SDV

[Source] https://sdv.eclipse.org/
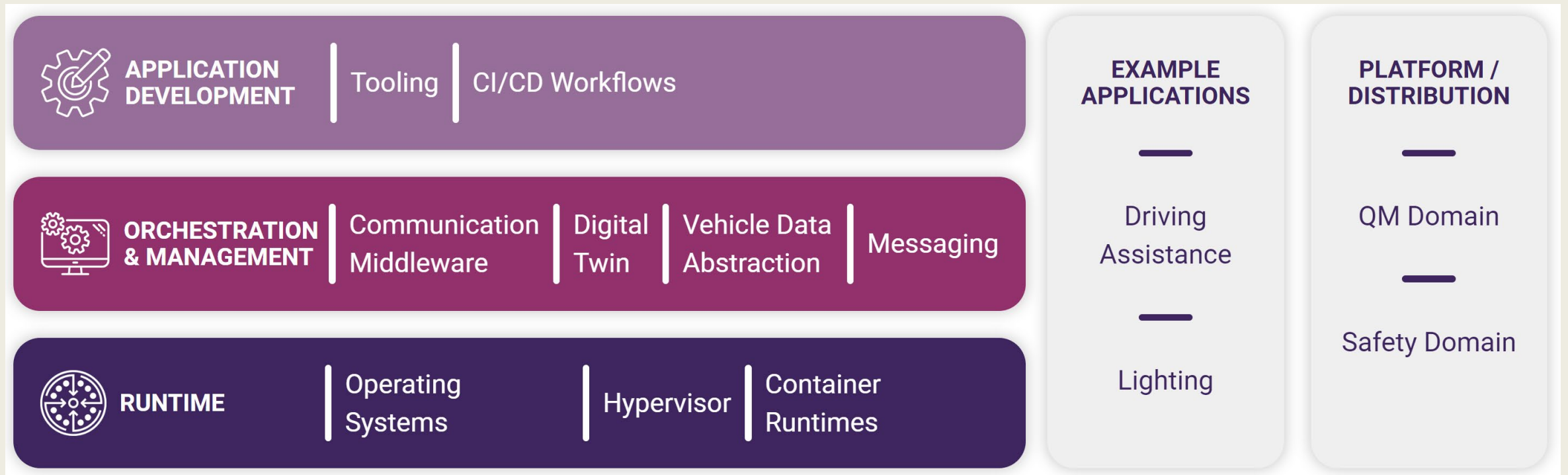
Vehicular Networks for Software-Defined Vehicles
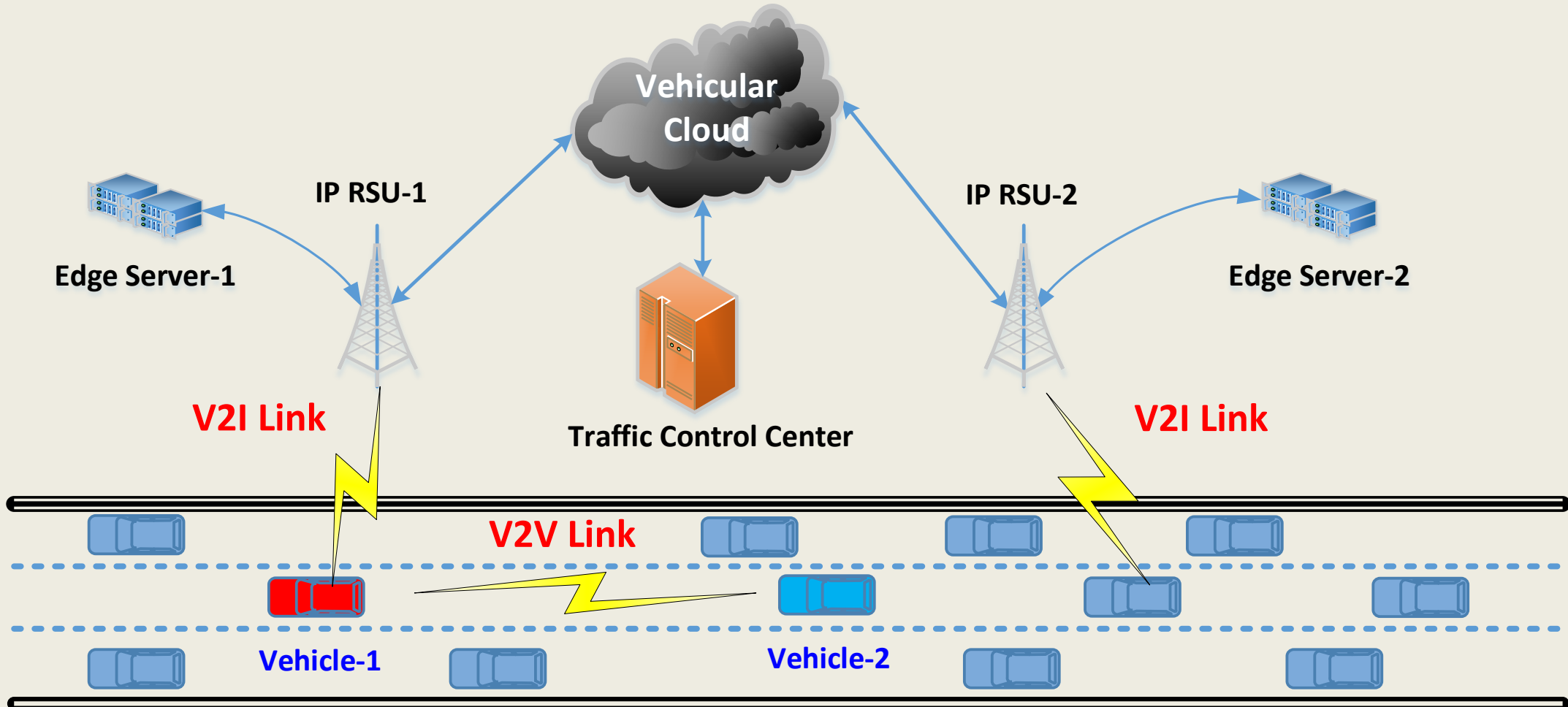
Interworking of In-Vehicle Network and Edge Network

Configuration for Network and Security Functions in In-Vehicle Network and Edge Network

2001:db8:1:1::/64

Vehicular Cloud

IP-OBU$_1$

Host$_1$

2001:db8:10:1::/64

Host$_2$

Router$_1$

2001:db8:10:2::/64

Vehicle-1 (Mobile Network-1)

IP-RSU$_1$

Host$_3$

2001:db8:20:1::/64

Router$_2$

Server$_1$ ... Server$_N$

2001:db8:20:2::/64

EN-1 (Fixed Network-1)
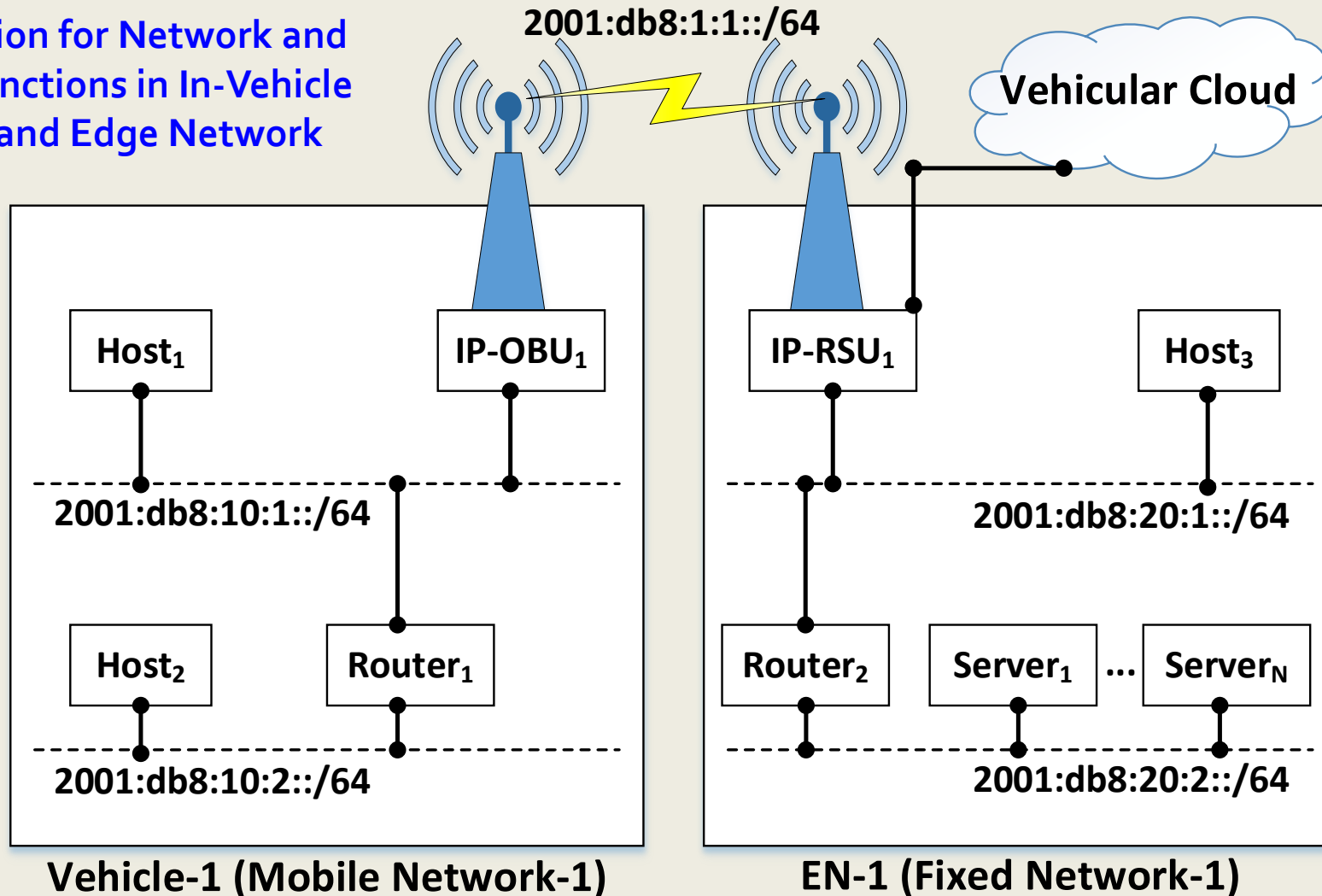
Interworking of Two In-Vehicle Networks

Configuration for Network and Security Functions in In-Vehicle Networks
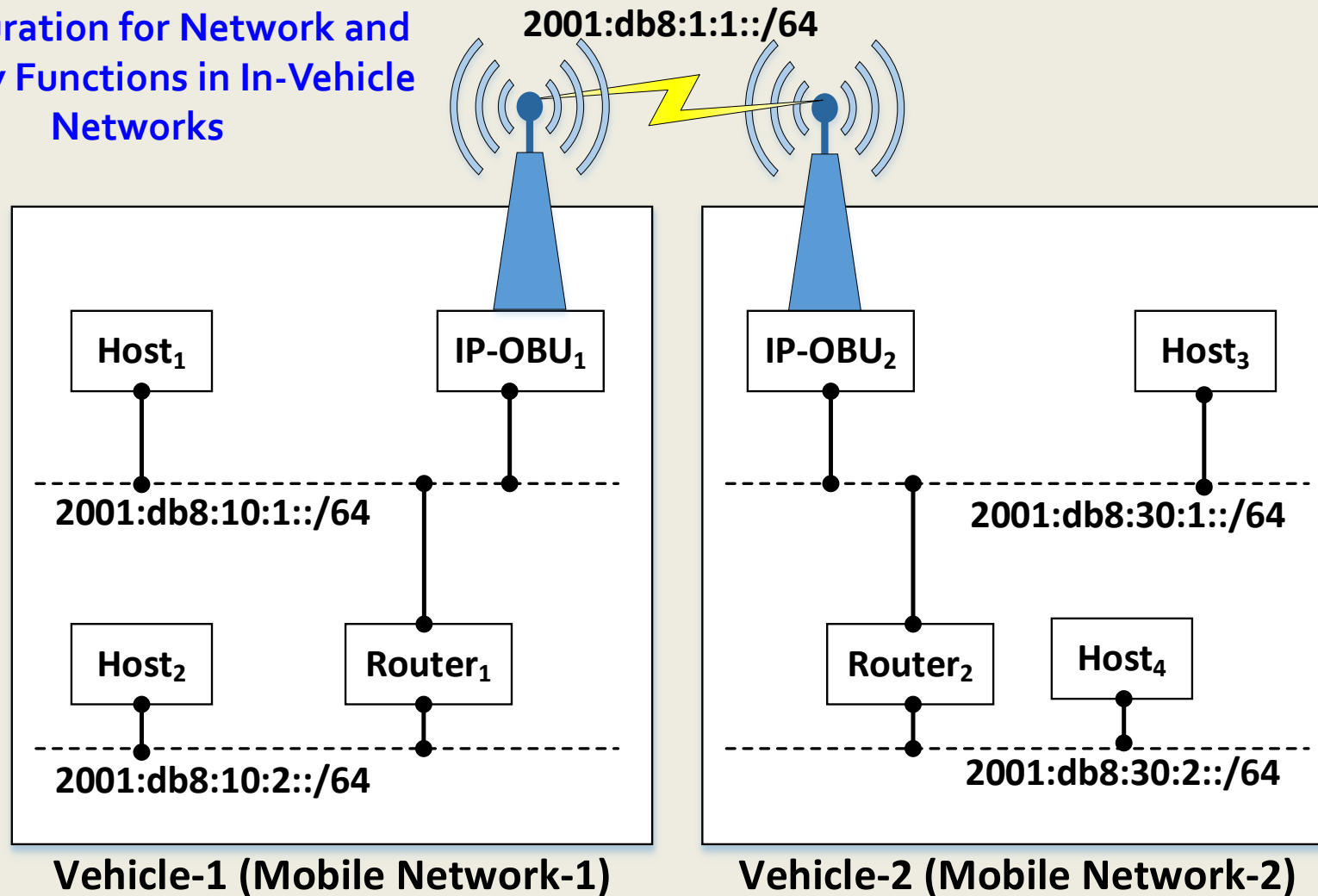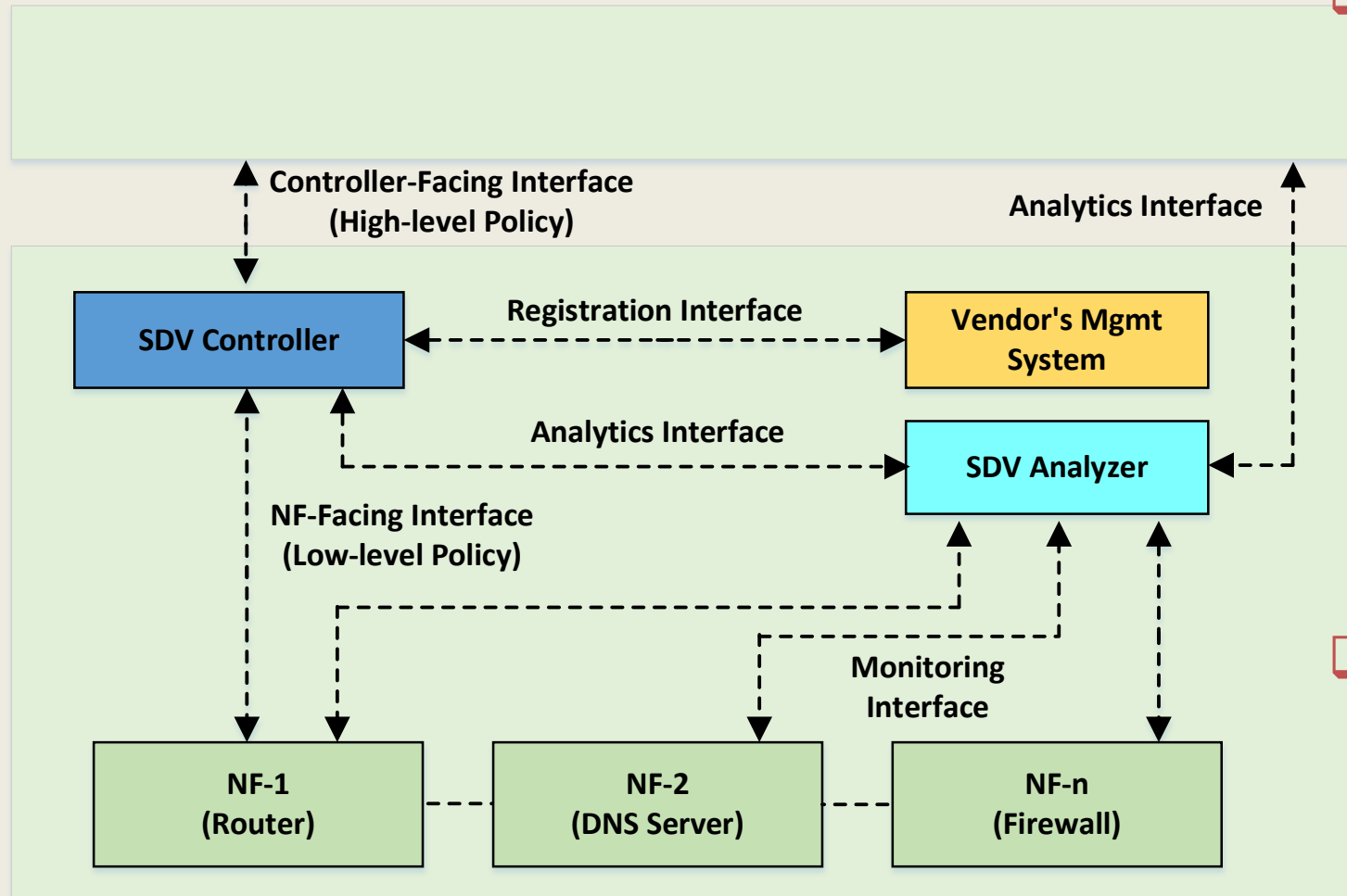
2001:db8:1:1::/64

Host$_1$

IP-OBU$_1$

2001:db8:10:1::/64

Host$_2$

Router$_1$

2001:db8:10:2::/64

IP-OBU$_2$

Host$_3$

2001:db8:30:1::/64

Router$_2$

Host$_4$

2001:db8:30:2::/64

Vehicle-1 (Mobile Network-1)

Vehicle-2 (Mobile Network-2)

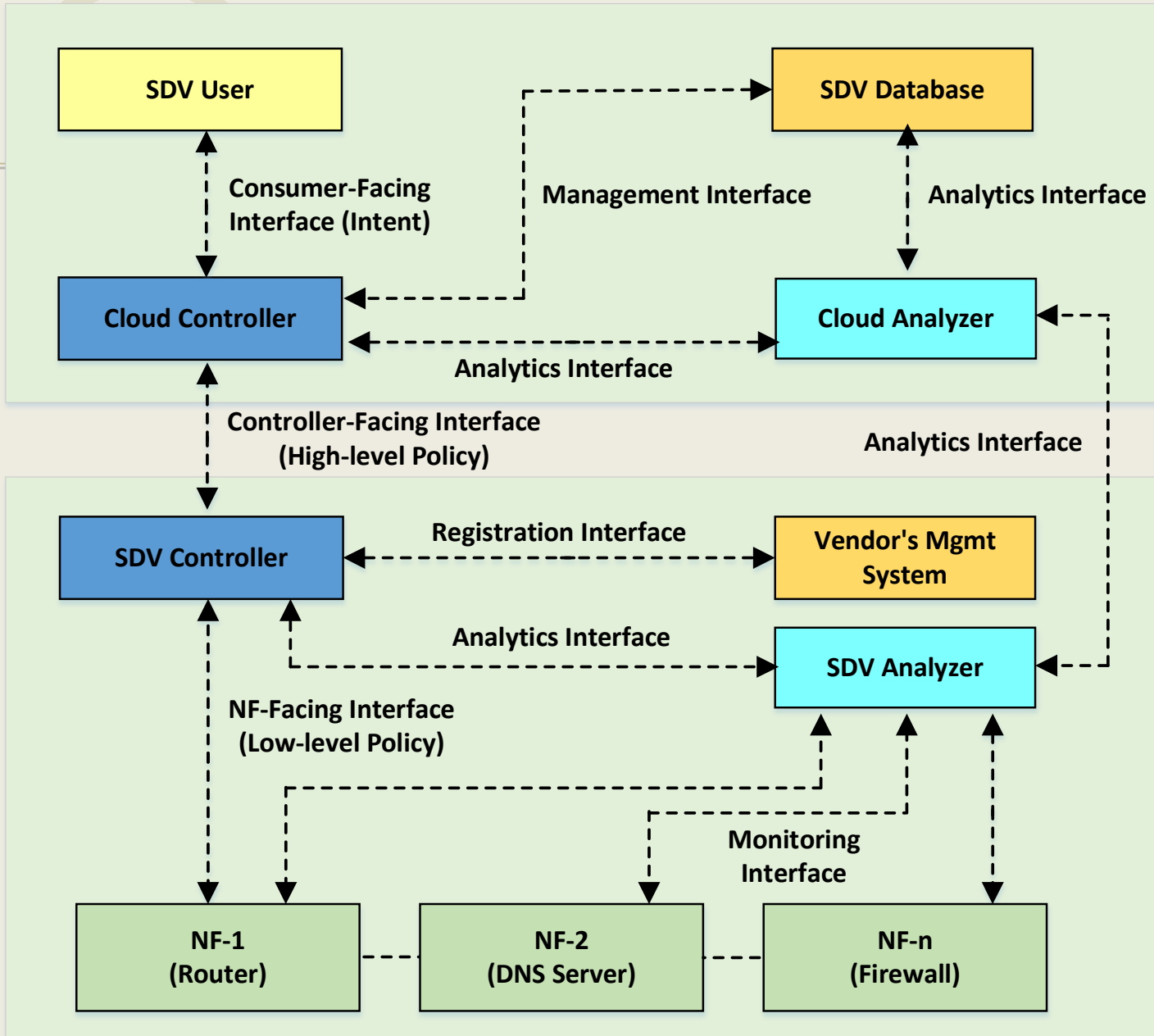# Intent-Based Management Framework for SDVs

Vehicular Cloud

□ Configuration for Network and Security

- IPv6 Network Prefixes
- Default Gateways
- DNS Servers
- Network Security Policies

□ Monitoring

- ECUs in SDVs
- Network Functions

Vehicular Cloud

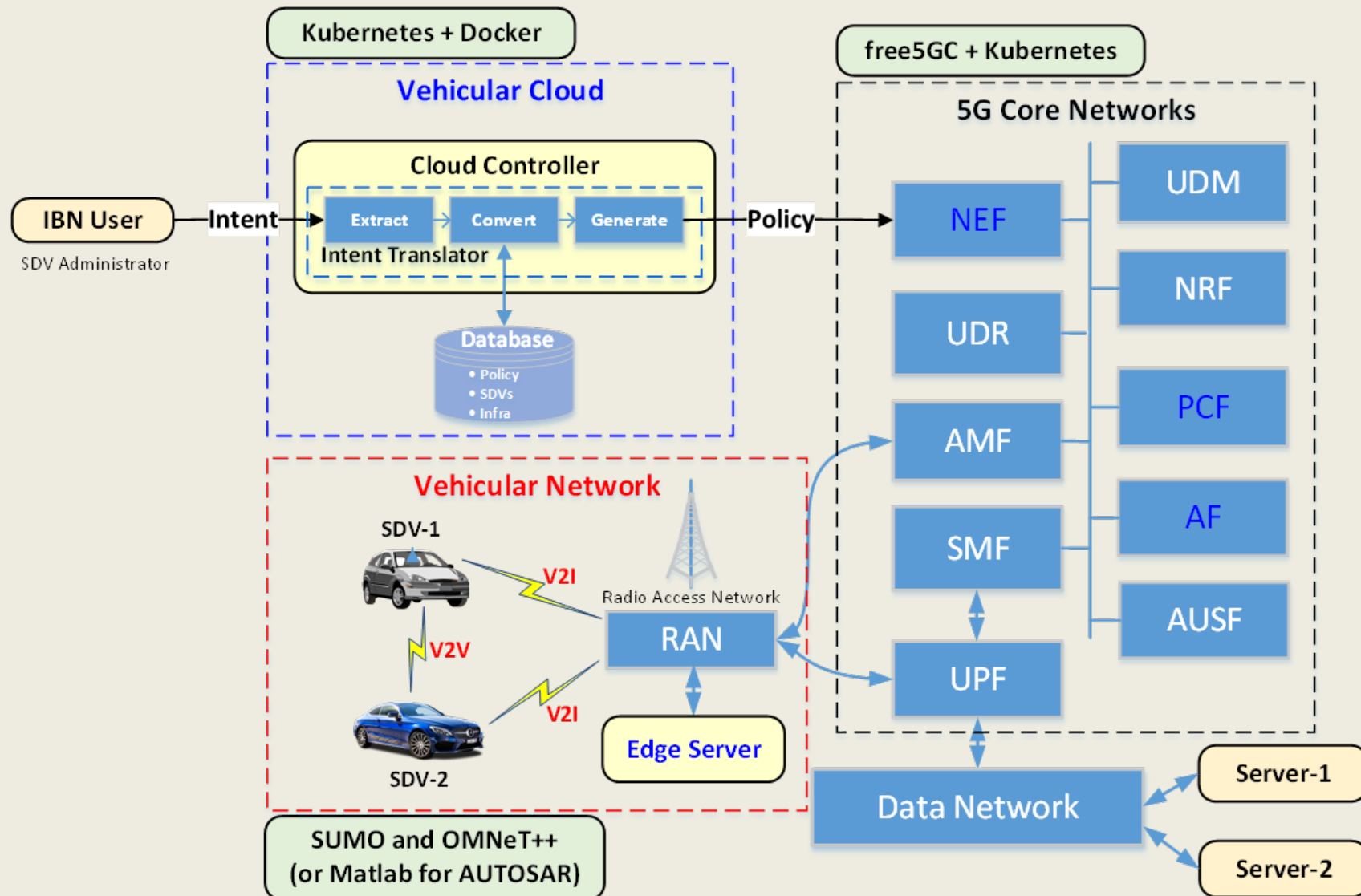**Software-Defined Vehicle (SDV)**

- ❑ Components
  - ▫ Member Modules in Vehicular Cloud or SDV

- ❑ Interfaces
  - ▫ Communication Messages for two components
  - ▫ Protocols: REST API, NETCONF, and RESTCONF
  - ▫ Documents: XML and YAML

Testbed for Intent-Based SDV Management Framework

Conclusion

❑ This draft introduces the concept and motivation of <u>Software-Defined Vehicle (SDV)</u>.

❑ It proposes an <u>Intent-Based Management Framework</u> for Networks and Security in SDVs.

❑ This framework is designed for <u>flexible interaction between a vehicular cloud and SDVs</u> with an intent-driven management.

❑ As future work, we will <u>design and implement of system components and interfaces</u> for the intent-based management for an SDV platform (e.g., AUTOSAR and Kubernetes) in 5G networks.

Thanks and Any Questions?