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# CyberSecurity for In-Vehicle Network

# Agenda

- Mega Trend of Automotive Industry
- Network and E/E Architecture
- Importance of CyberSecurity in Vehicle
- Challenges & Possible Solutions
- Examples of In-Vehicle Security Measures
- Conclusion

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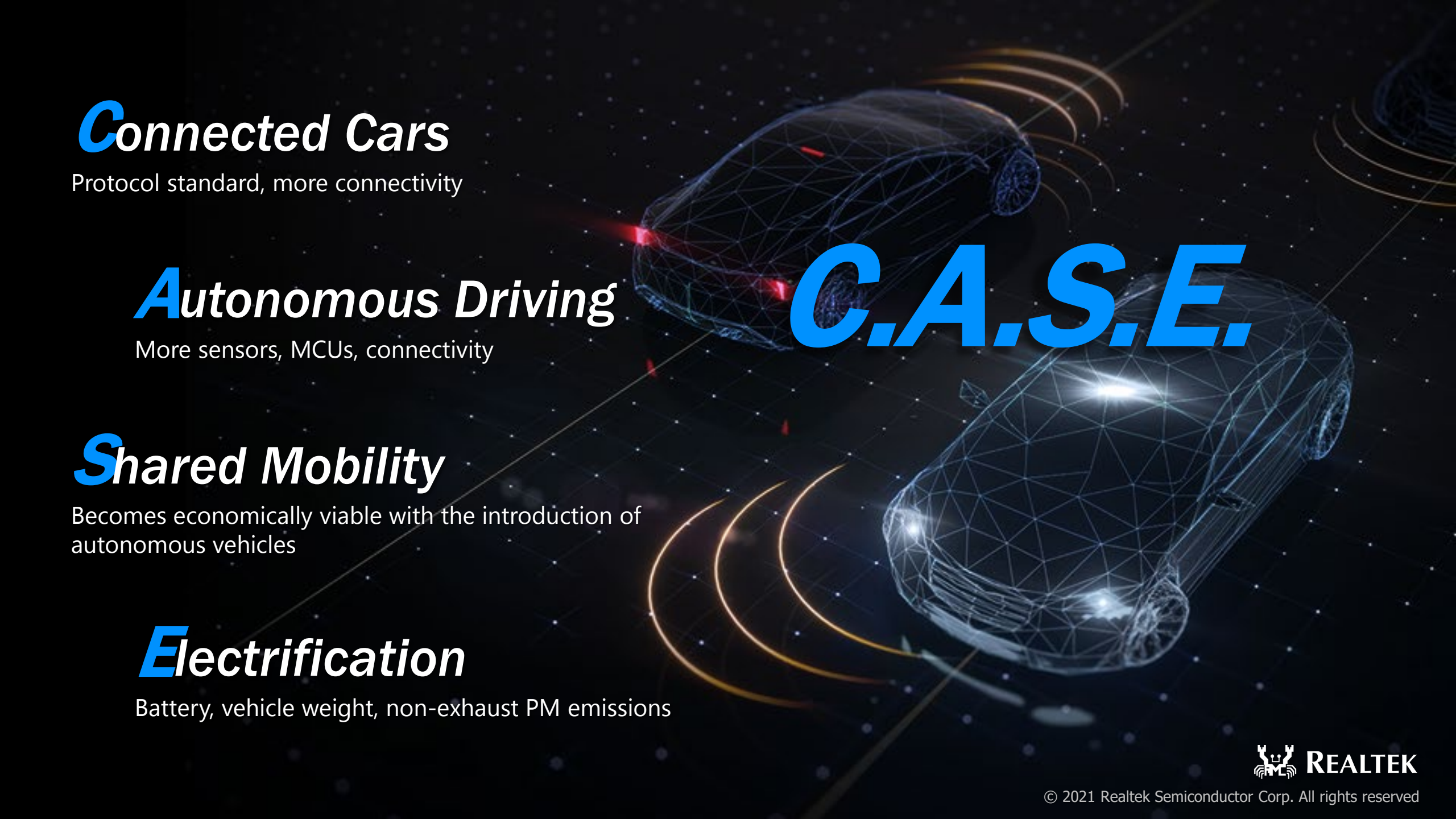


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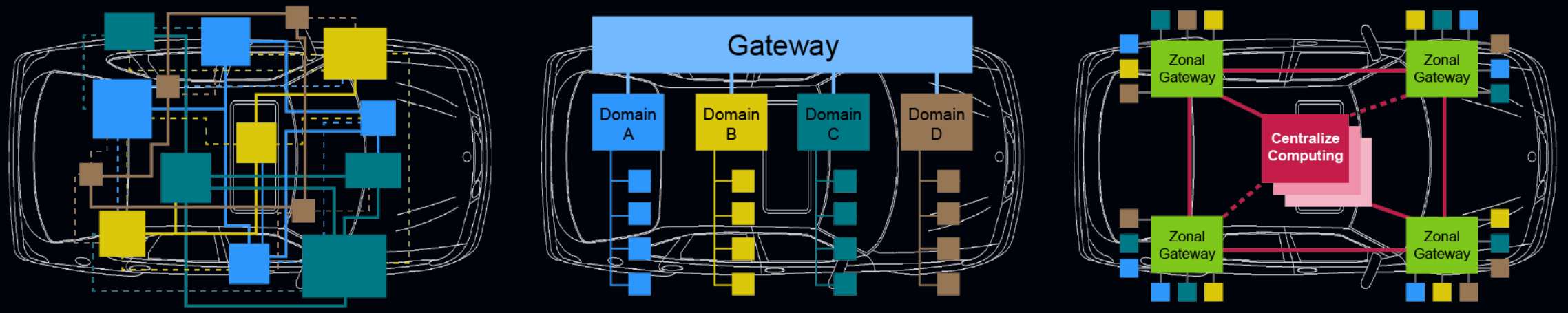
# Evolution of Automotive E/E Architectures




Yesterday Today Tomorrow

# Software Defined Car

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# Importance of CyberSecurity

## There is no safety without security

### Human Life

- Tires
- Chassis
- Windshield
- Lighting System
- Braking System
- Powertrain System
- ADAS System
- Gateway/Switch
- Sensor/Camera/Lidar


### Data

- Position
- Call Records
- PVR Records
- Browser Logs
- Transaction Certificate

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# Challenges

More than 100M LoC (Lines of Code)

Conversion from Closed to Open System

Vulnerabilities in Supply Chain

Long Life Time Software

# Possible Measures

Reliable Coding Style (MISRA)

Standard & Regulation

Monitorable and Updatable Architecture

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# Reliable Coding Style

**MISRA** is a coding standard for embedded industries, including automotive, and was developed by the **Motor Industry Software Reliability Association**.


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# Standards for CyberSecurity


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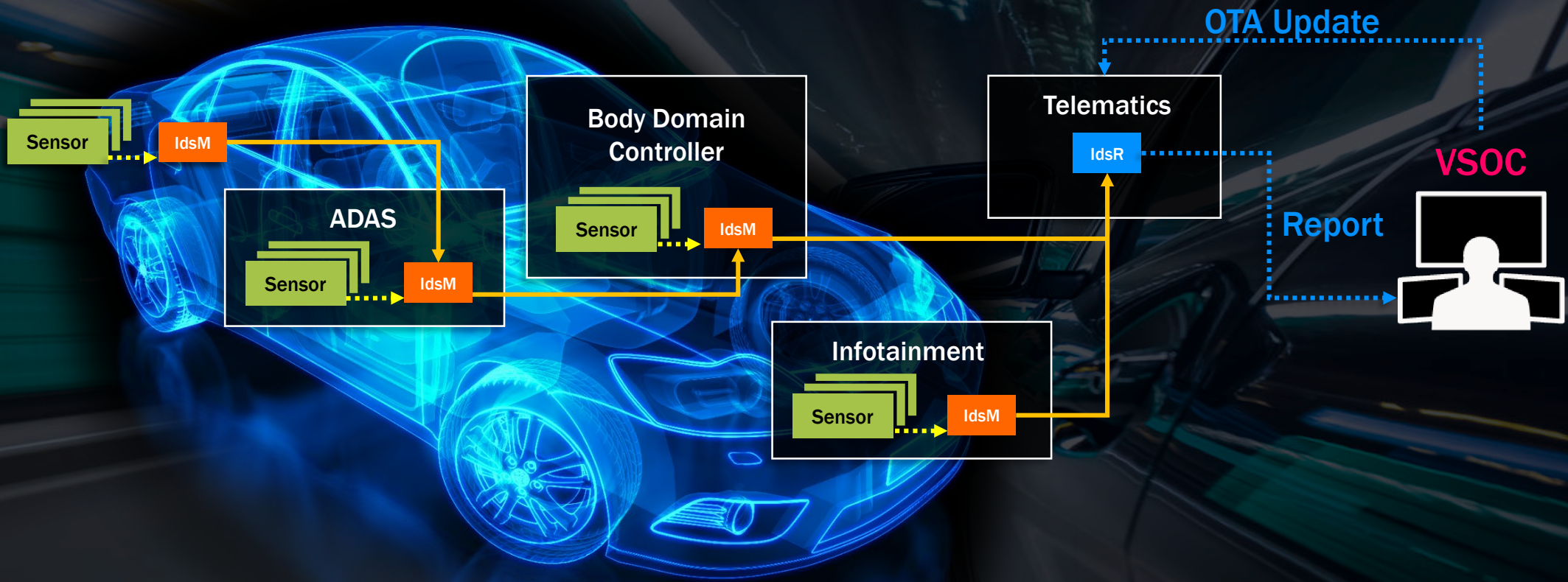
# Monitorable and Updatable Architecture




**Intrusion-Detection System Manager (IdsM)**

- Forwarding of IDS events to IDS Reporter via automotive protocol

**IDS Reporter (IdsR)**

- Reporting of IDS events to vehicle security operations center

**Vehicle Security Operations Center (VSOC)**

- Preventing, detecting, analyzing, and responding to cybersecurity incidents
- Updating security vulnerability countermeasures via OTA (Over The Air)

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# Counter Measure Techniques

| Secure Operation | Secure Communication | Threat Monitor |
| --- | --- | --- |
| • Authentication<br>• Authorization<br>• Integrity<br>• Confidentiality<br>• Availability<br>• Non-Repudiation | | • Sensitivity<br>• Traceability |

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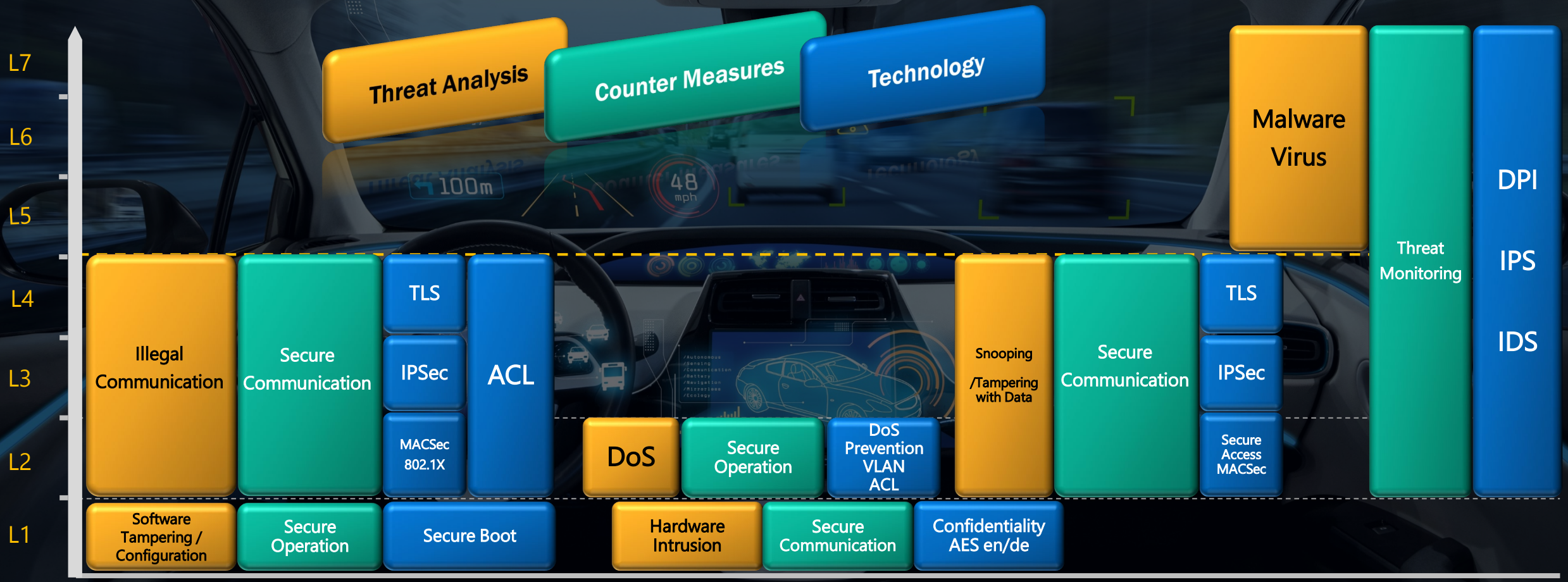
# Matrix of Cybersecurity Measures

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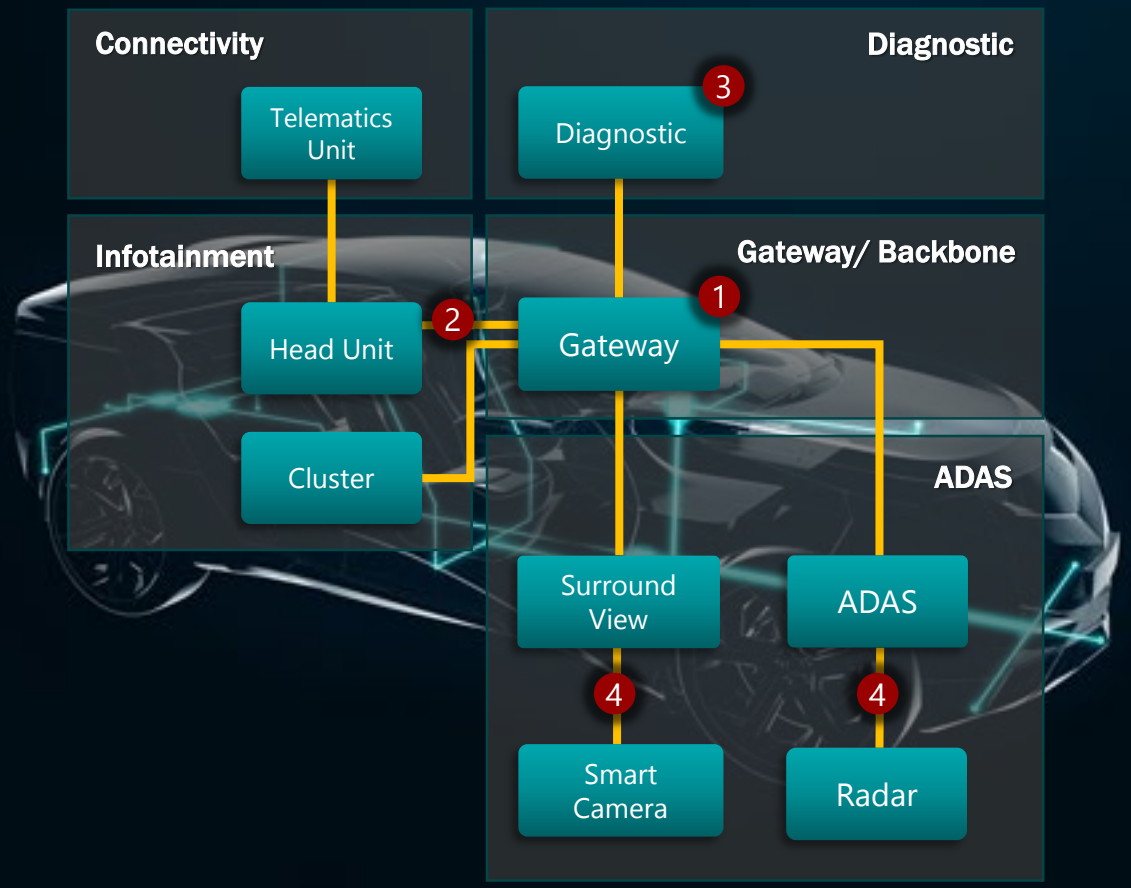
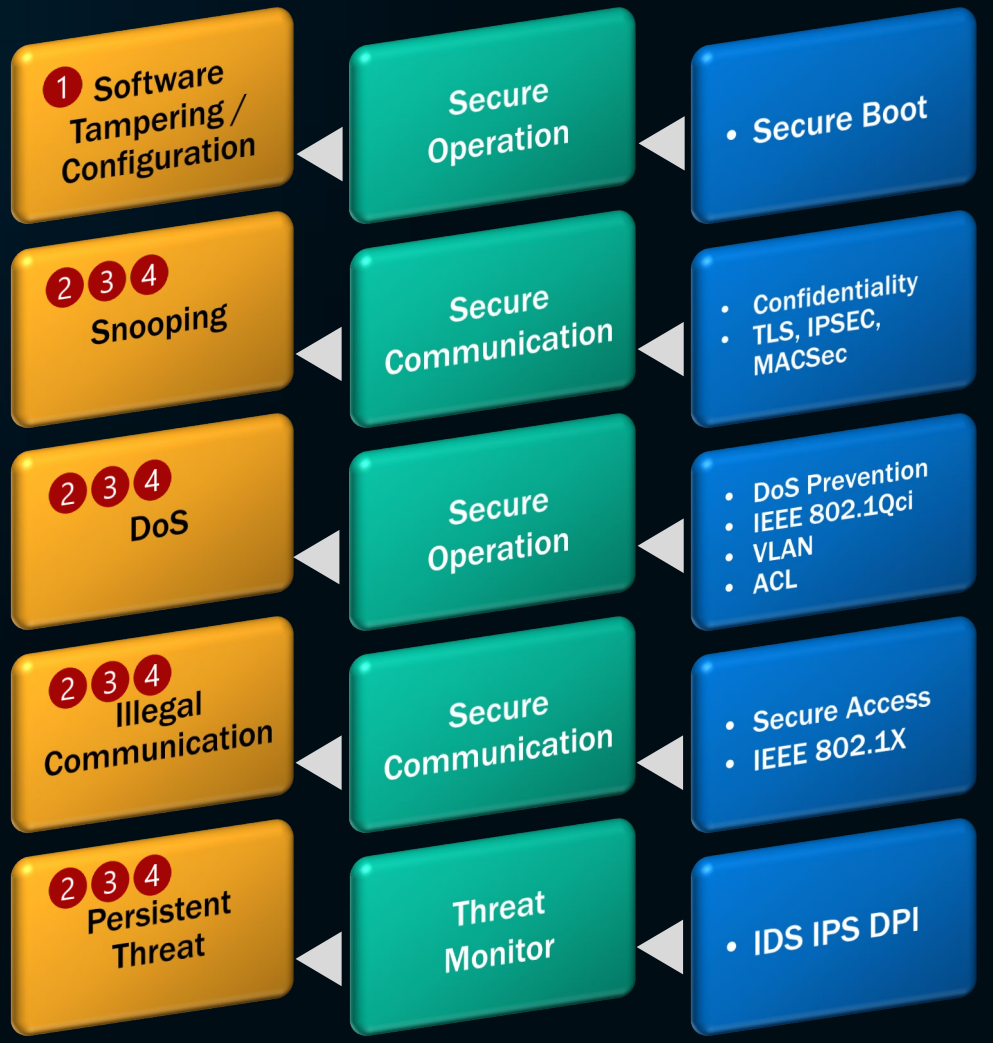
# Examples of In-Vehicle Security Measures

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# Conclusion

- Zonal gateway + central computing architecture enable the ‘Software Defined Car’ that will be necessary for OEM’s demands for differentiation
- There is no safety without cybersecurity
- Regulation and industry standards such as WP.29 and ISO21434 provide good guidelines, processes, and methodologies for the industry to ensure the integrity of security measures
- Cybersecurity measures, including threat analysis, counter measures, and technology were introduced through the OSI seven layer protocol

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