

DAIMLER TRUCK

Securing the Road Ahead: Exploring Vehicle Cyber Security

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Mark Westendorp | Daimler Buses GmbH
mark.westendorp@daimlertruck.com



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What is Cyber (Security)?

How do we define Cyber and Cyber Security?



CYBER refers to the **interconnected digital space** encompassing networks, systems, and the **storage, representation and management of information** using IT technology infrastructure.

Cyber Attacks

Typically aimed at **accessing, altering, or destroying confidential information, extorting money, or disrupting** normal business **operations**.



Cyber Security

Encompasses **technologies, services, strategies, practices, and policies** designed to **protect people, data, and technical systems** from a variety of **digital attacks**.





What is Vehicle Cyber Security?

What differentiates Vehicle Cyber Security from Functional Safety?



Functional Safety

- Develop/design function so it is **safe**
- Development advances with planned standard development



- Concerned with ensuring the safety of vehicle systems by **preventing malfunctions or errors that could lead to accidents or harm.**
- Involves implementing **safety mechanisms** and **redundancies** to mitigate risks and maintain safe operation.

Cyber Security

- Develop/design infrastructure so it is **secure**
- Development is influenced by external influences (uncontrollable)



- Focuses on protecting vehicle systems from **unauthorized access, manipulation, or disruption by external parties.**
- Involves implementing **security protocols, encryption, and authentication mechanisms** to safeguard vehicle data and functionality.

What makes Vehicle Cyber Security so crucial?



Although future EE architectures might contain less ECUs, the amount of lines of code will continue to grow

The digital space in modern vehicles is constantly growing



Computing power of 20 personal computers



150 million lines of software code



Processes up to 25 gigabytes of data an hour

Charette, 2022



Own illustration based on Wilde, 2020



What is the UNECE R155?

What is the regulatory framework according to UNECE?



UN ECE Cyber Security Regulation in a nutshell

WHO?



- The **WP.29*** is part of the UNECE
- Its task is to **globally harmonizes vehicle regulations and develop technical regulations** for vehicle safety, environmental protection, and energy efficiency

WHAT?



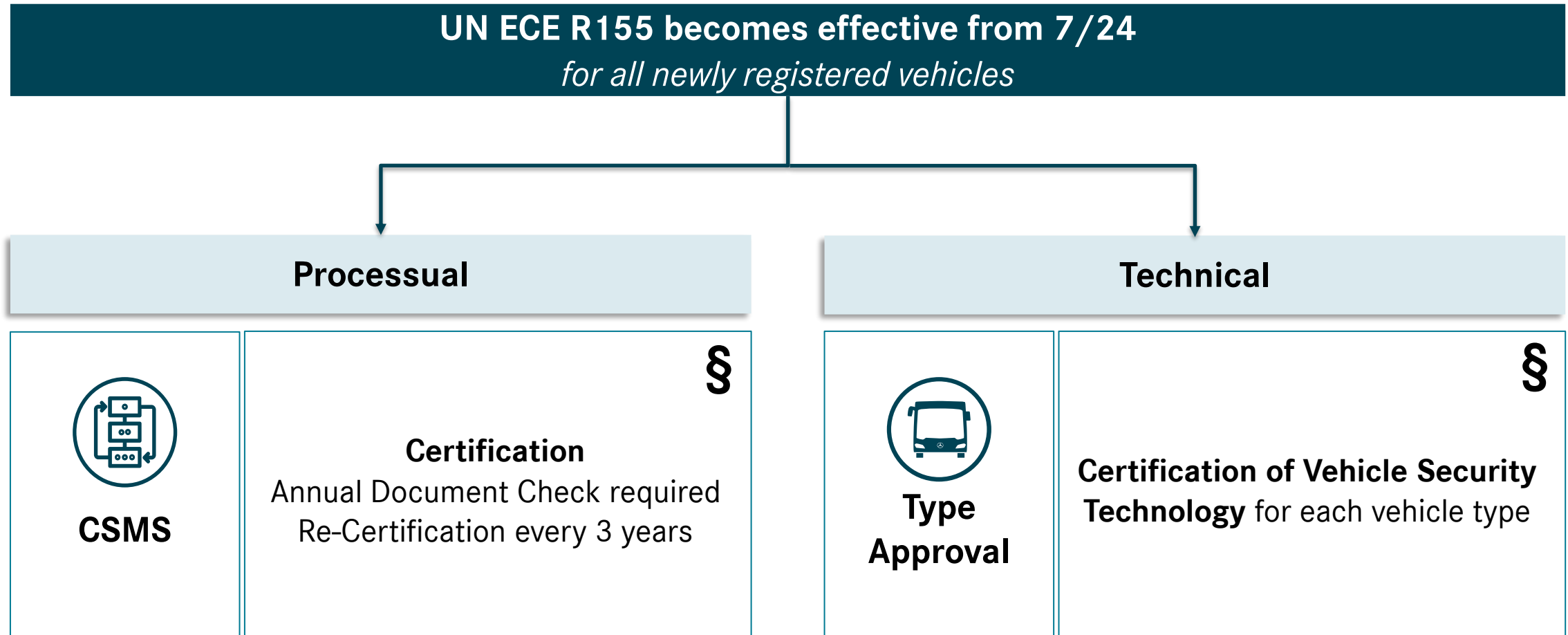
- The R155 is a **regulatory standard** addressing **vehicle cyber security**
- WP.29 **oversees the development and implementation of UN ECE R155**, ensuring global harmonization of standards

WHERE?



- The regulation applies to **vehicles registered in countries that recognize the UN-ECE regulations**, including R155: Decisive is the **country of sale/export**
- **Safe: Europe**, but other countries outside Europe are also adapting the R155**
- **Number of countries** is changing **dynamically**

How does the UN ECE R155 effect OEMs?



What are the requirements of the new regulation?



Establishing a comprehensive framework for **identifying, assessing, and managing cyber security risks** throughout the vehicle's lifecycle.

Fostering **collaboration among stakeholders** to **exchange best practices**, threat intelligence, and lessons learned in enhancing vehicle cyber security.

Adhering to **regulatory requirements** and industry standards, with **clear accountability** for **cyber security within the organization**.

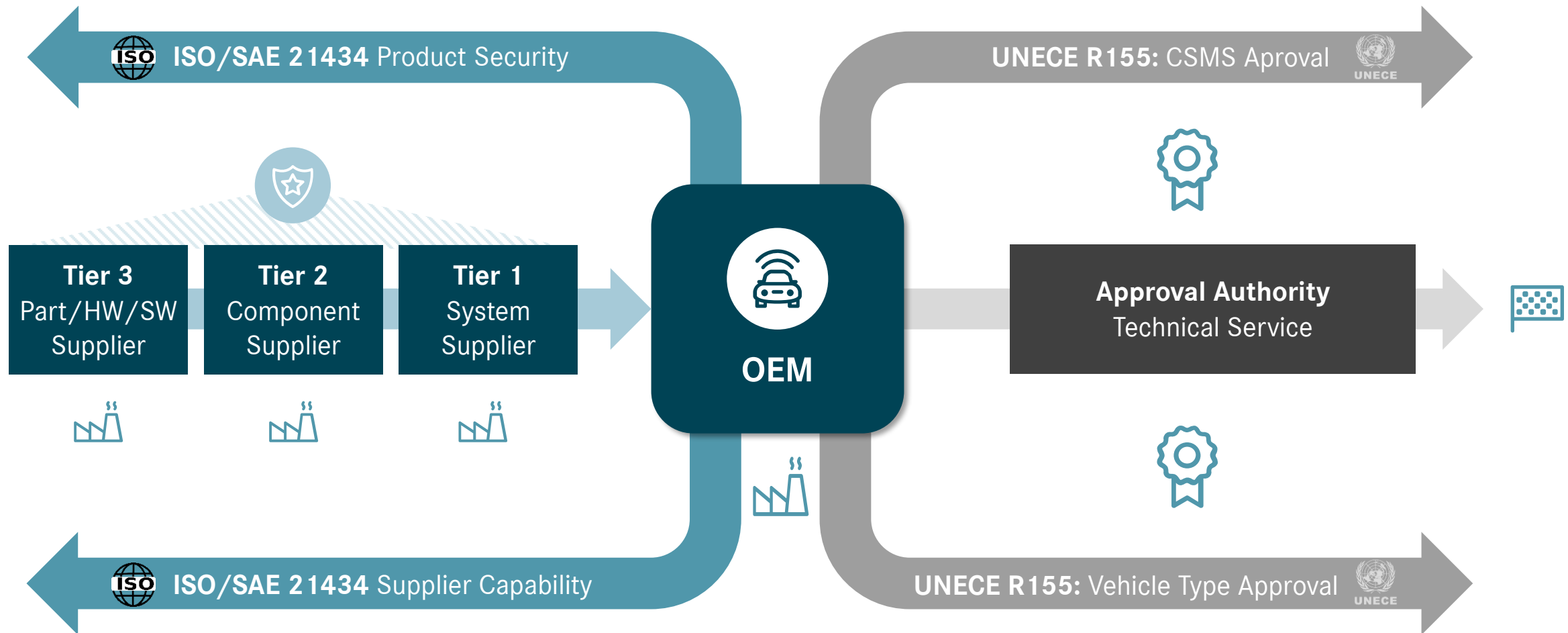


Implementing robust **technical** and **organizational measures** to prevent, detect, and respond to **cyber threats**.

Ensuring **secure communication** within the vehicle and with external systems to **protect data integrity** and **confidentiality**.

Committing to **ongoing monitoring, evaluation, and enhancement** of cyber security measures to address emerging threats.

How are ISO/SAE 21434 and UNECE R155 related?







How does Daimler Buses position?



What is Daimler Buses' position regarding compliance with UNECE R155?





CSMS





Certified in 05/2022





Type Approval



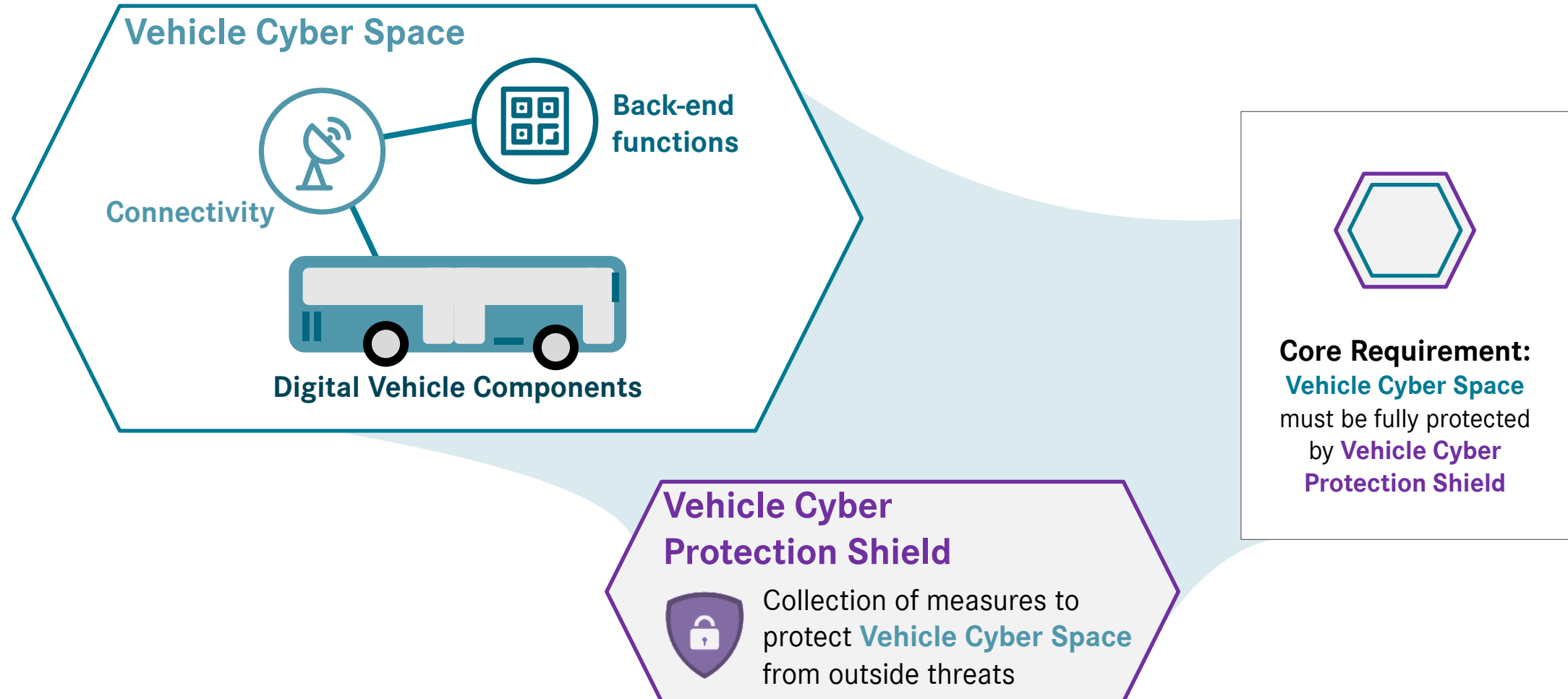


Regularly certified since 04/2023



Daimler Buses has a **certified CSMS** and **vehicles** verifiably **meet** the **Typa Approval requirements** for vehicles within the scope of R155

How does the new regulatory context effect Vehicle Cyber Protection?



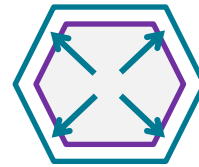
How do we now secure the Vehicle Cyber Space?



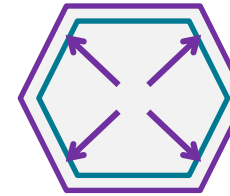
Trigger

Required Activities

Development of new Features



Digital functionality added to **Vehicle Cyber Space** (e.g. Brakes, ADAS) creating new vulnerabilities



Vehicle in development:

Adjust **Vehicle Cyber Protection Shield** to new features

Vehicle post-development:

Perform **Vehicle Cyber Protection Shield** updates on vehicle series production to enable new features

Discovery of new Threats or Vulnerabilities



New Vulnerabilities reducing effectiveness of **Vehicle Cyber Protection Shield** (e.g. spectre², meltdown²)



Vehicle in development:

Update **Vehicle Cyber Protection Shield** to protect from new potential threats

Vehicle post-development:

- a) Update **Vehicle Cyber Protection Shield** on vehicles in series production
- b) Update **Vehicle Cyber Protection Shield** on vehicles in the field

Core Requirement:
Vehicle Cyber Space must be fully protected by **Vehicle Cyber Protection Shield**

IN A NUTSHELL



Vehicle cyber security safeguards against **unauthorized access**, **manipulation**, or **disruption** of vehicle systems.



As of **7/24**, manufacturers and vehicles must undergo **approval procedures** outlined in **UNECE R155**.



Daimler Buses maintains a **certified** Cyber Security Management System (**CSMS**), ensuring **compliance** with **R155 approval requirements** for vehicles operating within its jurisdiction.