WORLD ECONOMIC FORUM

A PRESENTATION FOR THE FUTURE NETWORKED CAR SYMPOSIUM

The path to safer roads with automated vehicles

13 March 2023

Maria J. Alonso

ADAS/AD can clearly benefit society …

… of **accidents** occur due to human error

… of **accidents** can be **prevented** by autonomous vehicles[1]

… but these benefits should not be taken for granted

1. 94% of accidents occur due to human failure (e.g., recognition error) and can be prevented by advanced AD algorithms; Source: The National Motor Vehicle Crash Causation Survey (NMVCCS) conducted from 2005 – 2007 (N of incidents = 2,189,000); Goldman Sachs, UBS, IHS, Statista, BCG market model, own calculation.


Collaboration is key

Automotive in the Software-Driven Era Initiative

The challenge | Critical automotive and new mobility disruptions in recent years rely heavily on leading-edge software development. Whereas some solutions are highly competitive, others benefit from public-private and cross industry collaboration.

Our ambition | Unlock the potential of cross-industry and public-private collaboration for Automotive in the Software-Driven Era in order to help improve safety, inclusivity, sustainability and overall system resilience.

30+ players from automotive, new mobility and tech

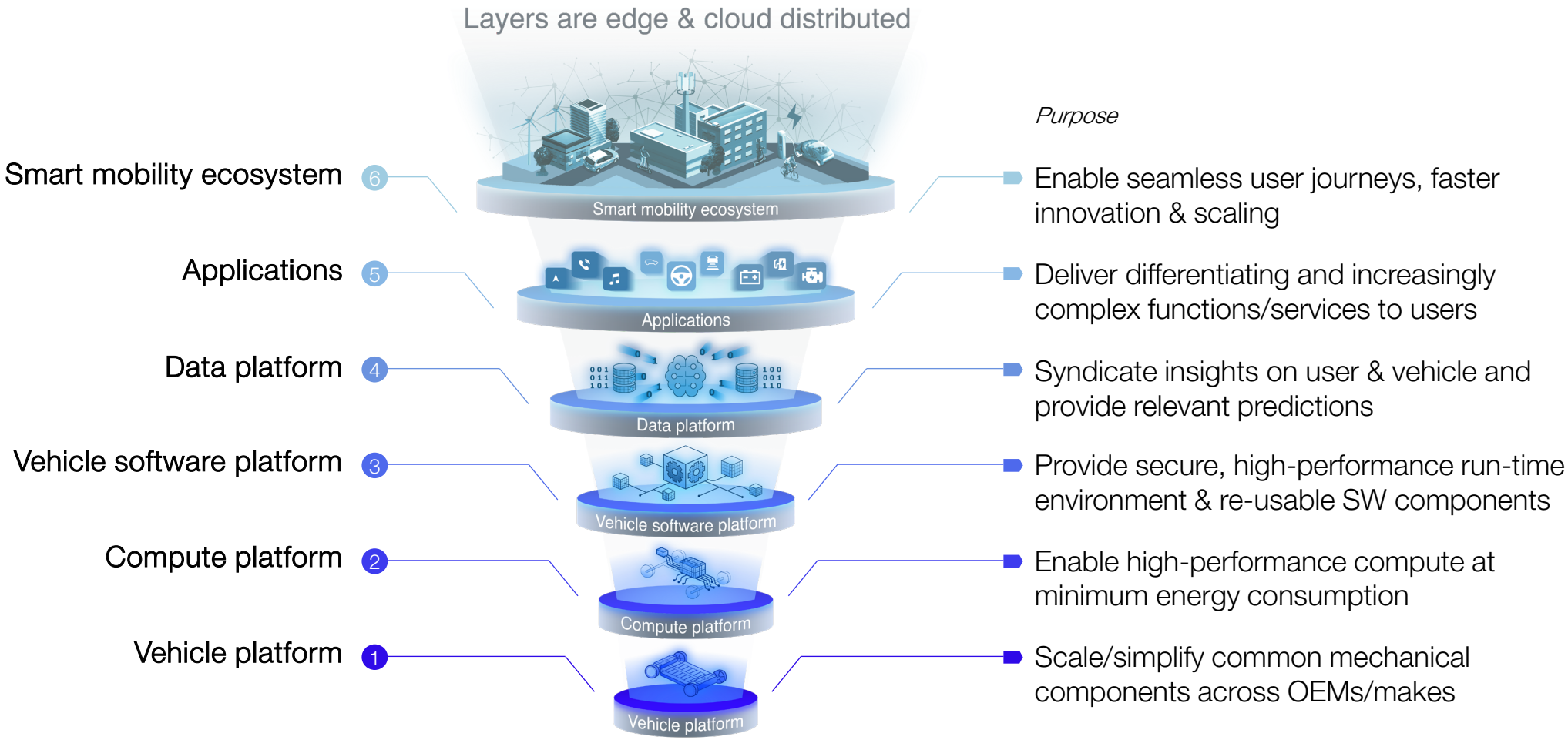
There are big challenges around the software-defined vehicle. Strong, long-term industry collaboration is key to overcome them in an efficient, timely and safe way.

Dr Markus Heyn
Chairman Bosch Mobility

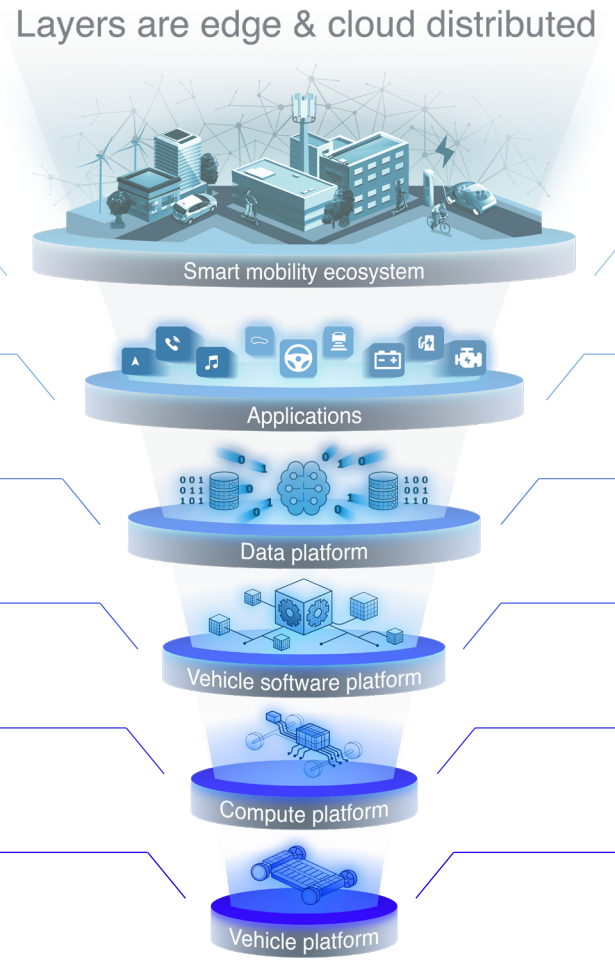
To maximize the societal, economic, and environmental value of data sharing, we need to work collaboratively. Our multi-stakeholder discussions in the Automotive in the Software-Driven Era Initiative are an important step ahead.

Dr Katharina Amann
CEO Volkswagen Car Insurance

A “common lingua franca”: Six layers of the Software-Defined Vehicle



Exemplary ADAS use case



Smart mobility ecosystem 6

Applications 5

Data platform 4

Vehicle software platform 3

Compute platform 2

Vehicle platform 1

Exemplary ADAS use case

Vehicle shares obstacle information with others

ADAS application classifies object, calculates trajectory and initiates steering

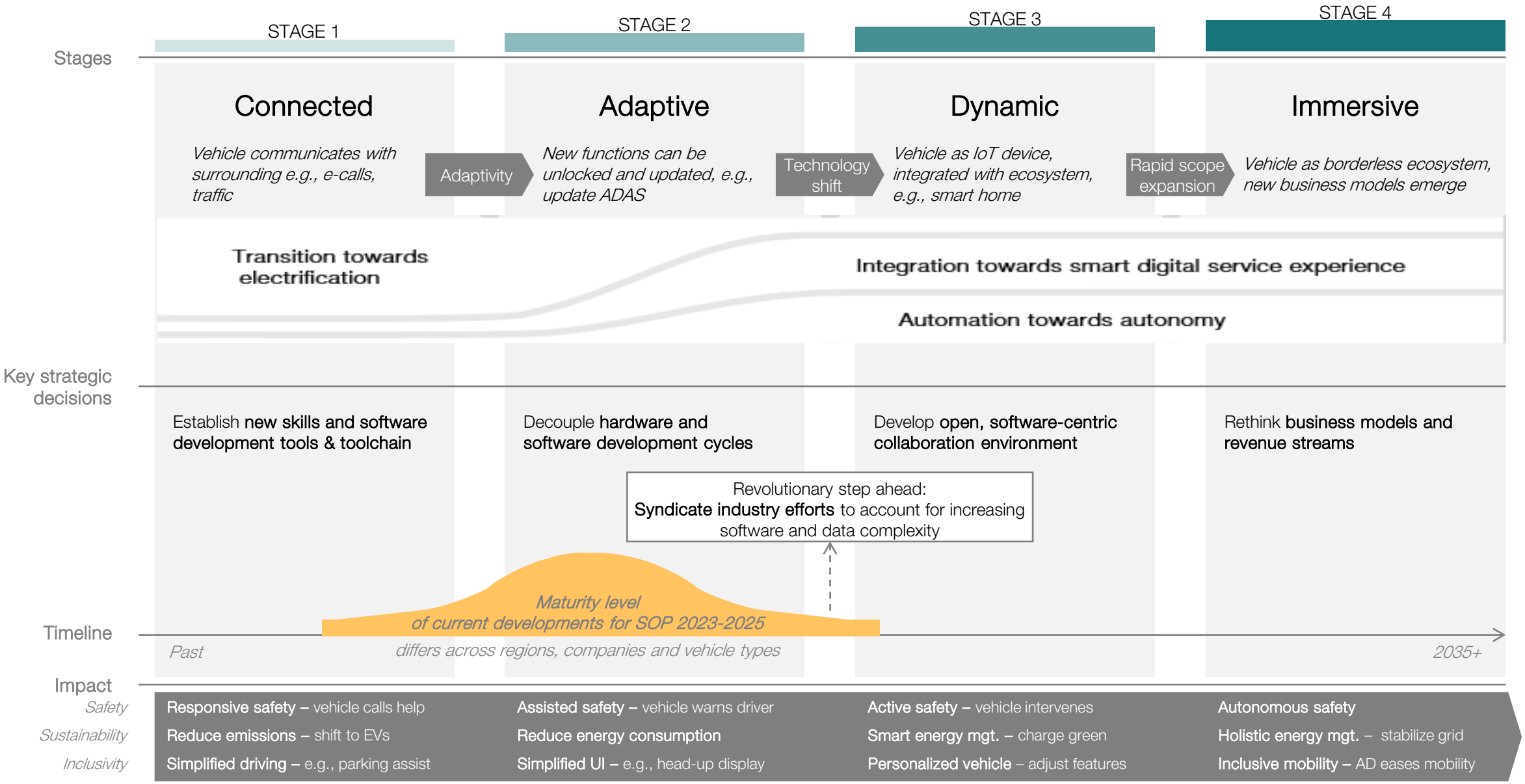
User 360 data allows algorithm to check if driver is attentive

SW core orchestrates all ADAS related SW processes

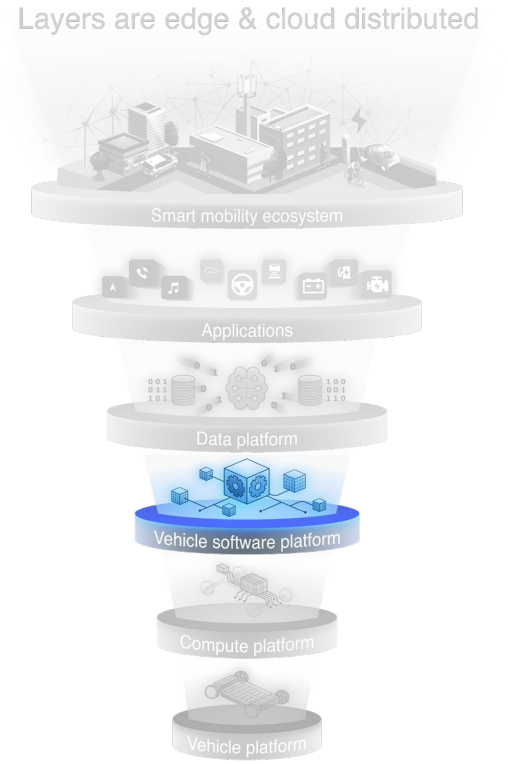
Chip executes SW needed for perception in relation to object

Sensor (e.g., lidar, camera) detects object (start), **Actor** executes (end)

4 key stages in the transformation towards the Software-Defined Vehicle



Vehicle software platform collaboration outline



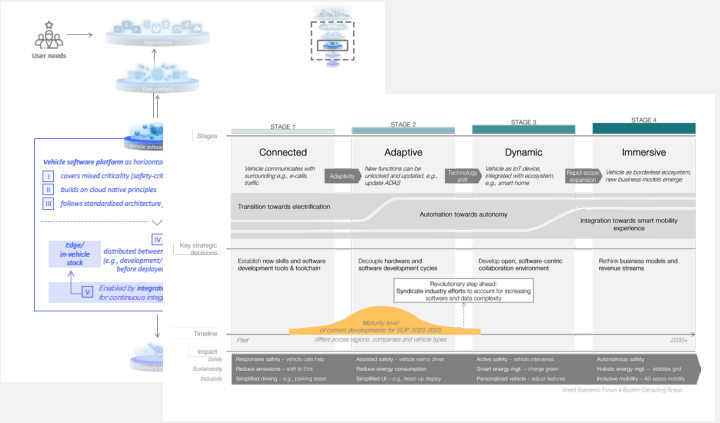
Collaboration on the vehicle software platform can result in

Decreased

error rate in software integration[1]

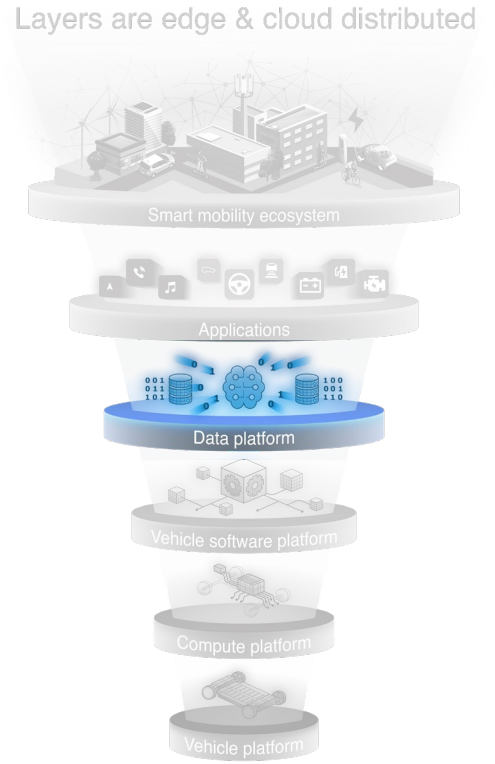
Working on ideal picture and roadmap

- **Covers mixed criticality** | Platform covers both, safety-critical and non-safety-critical workloads across all domains
- **Standardized architecture** | Follows industry-wide architecture framework (e.g., SOAFEE)
- **Integrated toolchain** | Enabled by interoperable tools for continuous integration / continuous delivery (CI/CD)



1. Enabled by fewer interfaces and more standards. Source: BCG analysis.

Acceleration options for information sharing



Action areas

- **Define roles and responsibilities** in relation to e.g., data privacy, and sovereignty
- **Set data standards** to exchange information efficiently (e.g., data format, interfaces, aggregation level))
- **Harmonize regulations** across countries
- **Design tech infrastructure** balancing central vs. decentral storage and learning needs
- **Identify value pools** for all groups involved (e.g., OEMs, suppliers, insurers)

...

Non-AV-related data-sharing examples

Exchanging data for resilient supply chains

Catena-X Automotive Network

Network to exchange information e2e in the automotive supply chain to increase transparency, flexibility, and resilience

Sharing data for safer air transport

IATA

Data sharing platform (IDX) to exchange and assess flight incident reports globally, continuously improving safety for everyone

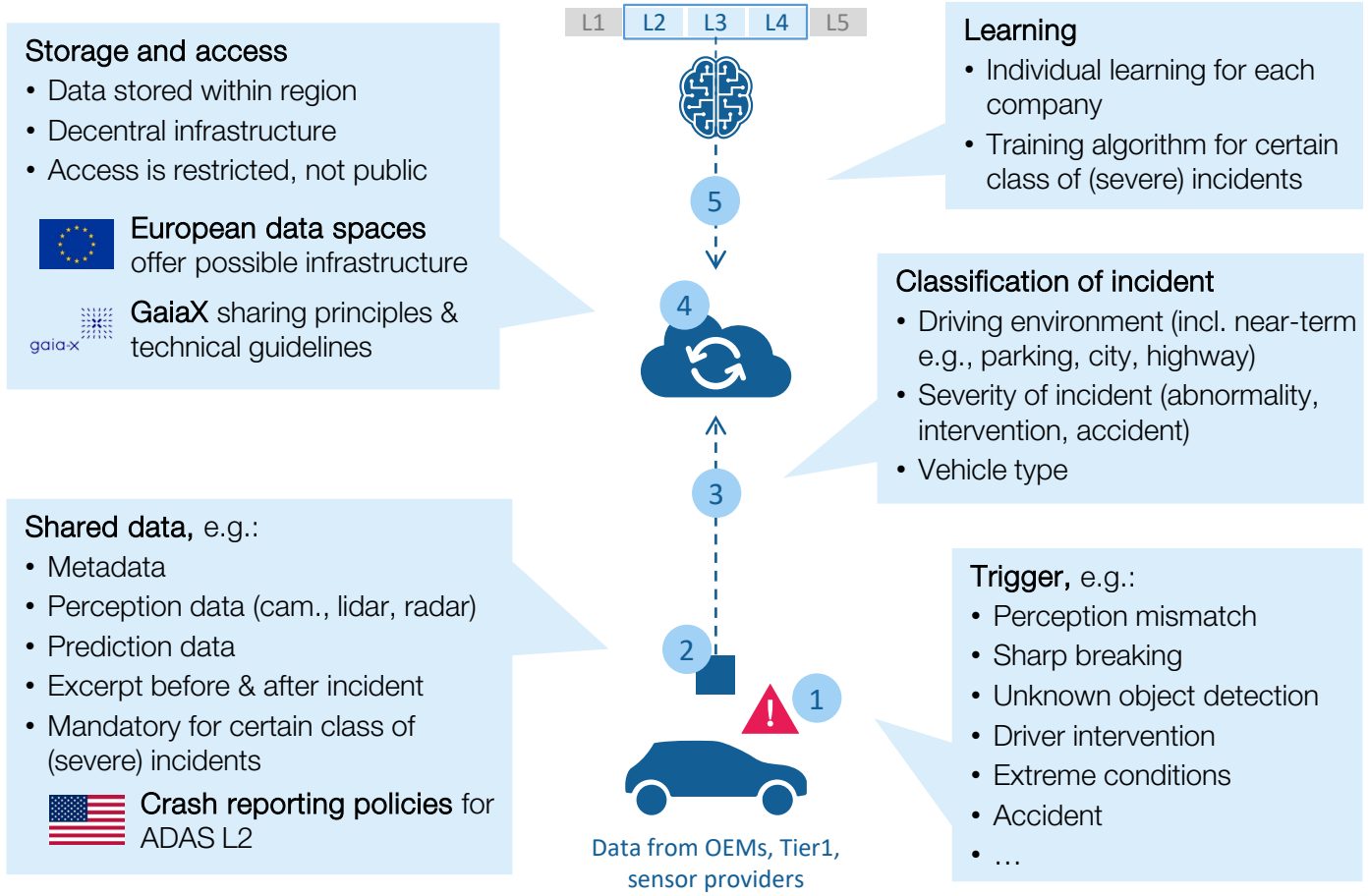
Co-creating for improved healthcare

SIEMENS Healthineers

Platform innovation ecosystem to co-create software for magnetic resonance systems, collaborating with hospitals & research institutes

Acceleration options for information sharing

Could we exchange **in-depth vehicle sensor and behavior data** of incidents to improve ADAS/AD algorithms (L2-L4)?



Storage and access
- Data stored within region
- Decentral infrastructure
- Access is restricted, not public

European data spaces offer possible infrastructure

GaiaX sharing principles & technical guidelines

Learning
- Individual learning for each company
- Training algorithm for certain class of (severe) incidents

Classification of incident
- Driving environment (incl. near-term e.g., parking, city, highway)
- Severity of incident (abnormality, intervention, accident)
- Vehicle type

Shared data, e.g.:
- Metadata
- Perception data (cam., lidar, radar)
- Prediction data
- Excerpt before & after incident
- Mandatory for certain class of (severe) incidents

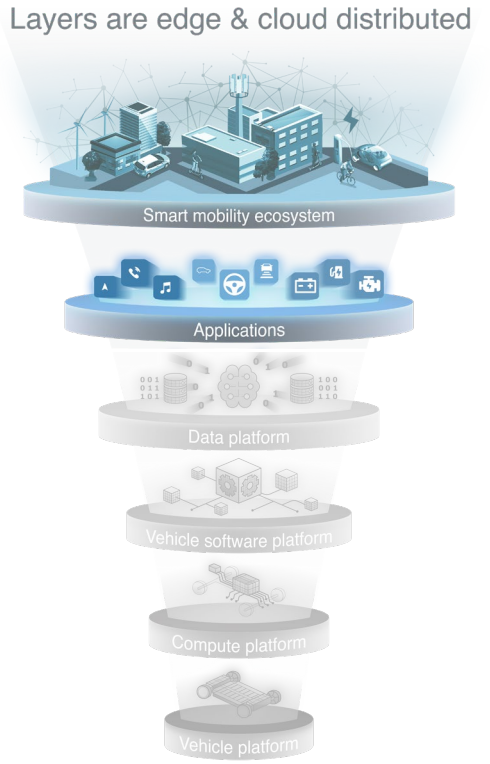
Crash reporting policies for ADAS L2

Trigger, e.g.:
- Perception mismatch
- Sharp breaking
- Unknown object detection
- Driver intervention
- Extreme conditions
- Accident
- …

Key aspects to make data-sharing work

- **Why** | Two potential directions to create value: Road safety and innovation sped
- **What** | Sharing can range from obstacle information to full sensor set –impacting value and risk potential
- **How** | Extracting value from shared data requires joint standards and infrastructure

Hypercharge impact and value of the smart mobility ecosystem



Reach out to collaborate in this effort

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Global Future Council on the Future of Autonomous Mobility

Autonomous mobility applications are hitting our roads, waters, and the sky. They will transform the way people and things move, yet their upcoming influence on where we live and work, and how we interact with our surrounding environment, is still unclear. How can we ensure that autonomous mobility is deployed such that it unlocks additional societal and environmental benefits?

Co-chairs

Missy Cummings, Director of the Centre for Robotics and Autonomous Systems, George Mason University

Katharina Amann, CEO, Volkswagen Car Insurance, Allianz SE