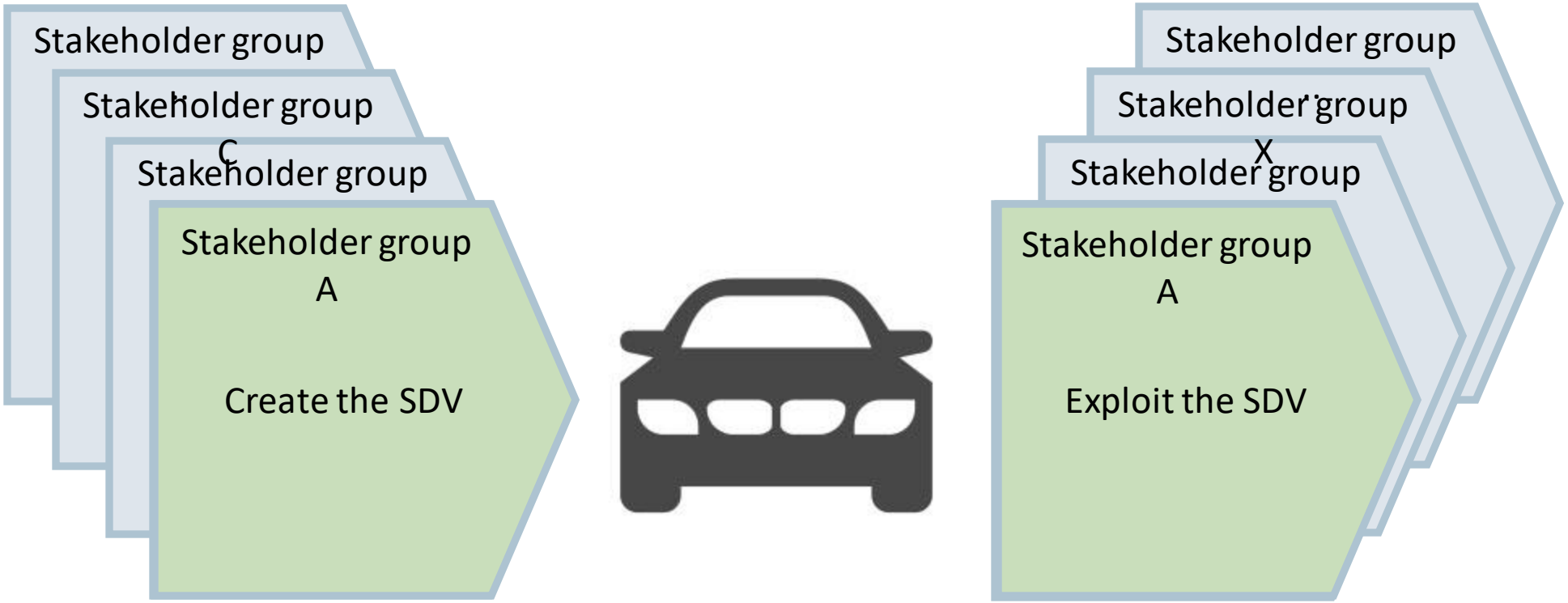
COVESA

GRAHAM SMETHURST

What's an SDV and why is it needed?

& HOW CAN WE IMPLEMENT ONE?

THE SOFTWARE DEFINED VEHICLE (SDV) CREATION VS. EXPLOITATION



- What´s an OEM´s motivation to create an SDV?
- What´s an OEM´s motivation do this collaboratively?
- What´s an SDV and a possible approach to creating it?

THE SOFTWARE DEFINED VEHICLE (SDV)
WHAT´S THE MOTIVATION TO CREATE AN SDV? – AN OEM PERSPECTIVE

Create the SDV

Exploit the SDV

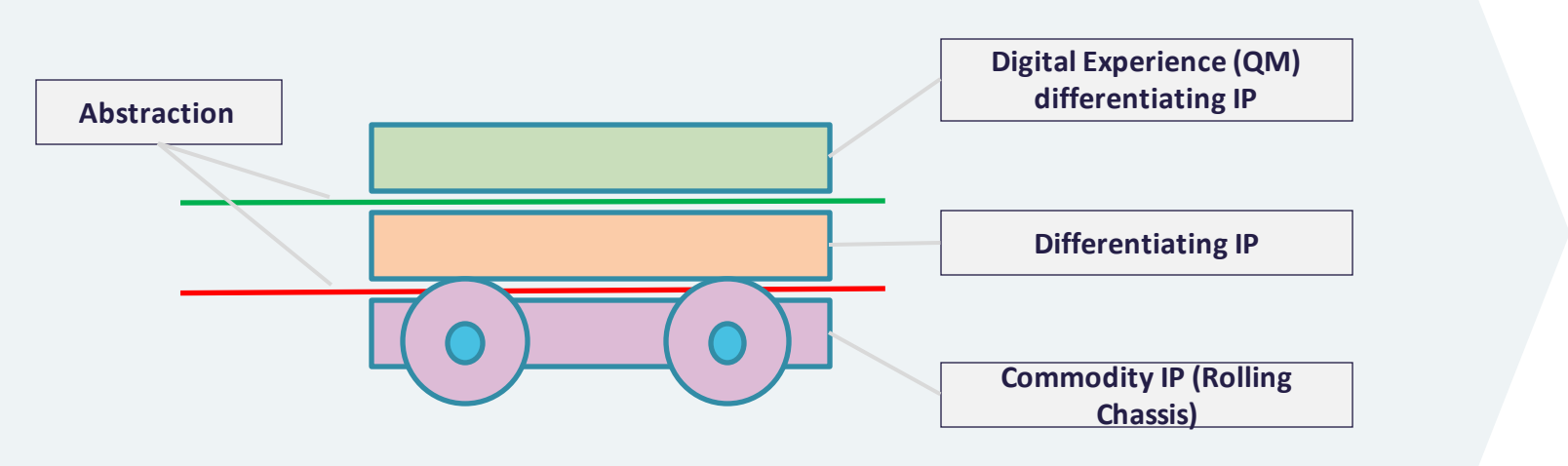
- Increased development speed – creation, integration, test.
- Reduced time to market, increased update frequency
- Long-term product support
- Targeted deployment of developer skills
- Enable flexible component sourcing by creating areas of automotive commodity

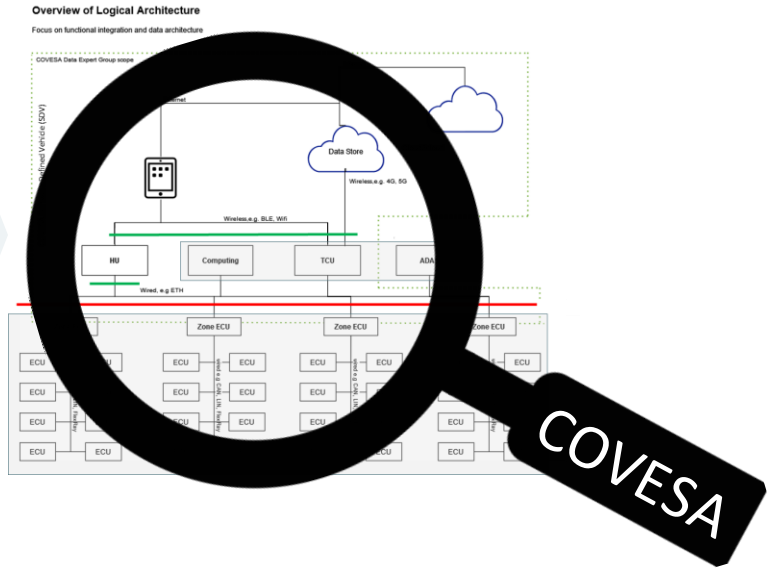
OEM In-house community

- Technical consistency between automotive OEMs at selected data touchpoints.
  - Integrating the vehicle in the digital life of each customer
  - Integrate the vehicle in the pervasive ecosystems – „vehicle as a device“
  - Gain access to data in adjacent industry sectors

External Community

APPROACH TO CREATING THE SDV? - OEM PERSPECTIVE
IMPROVED EFFICIENCY & SPEED IN DEVELOPMENT + FLEXIBILITY IN SOURCING.





(1) Separating differentiating IP from commodity IP (Red-Line)

- We believe that some vehicle functions could be made commodity.
- User experience can be built using commodity functionality (using off-the-shelf industry components), controlling it via defined software interfaces (Vehicle abstraction API).

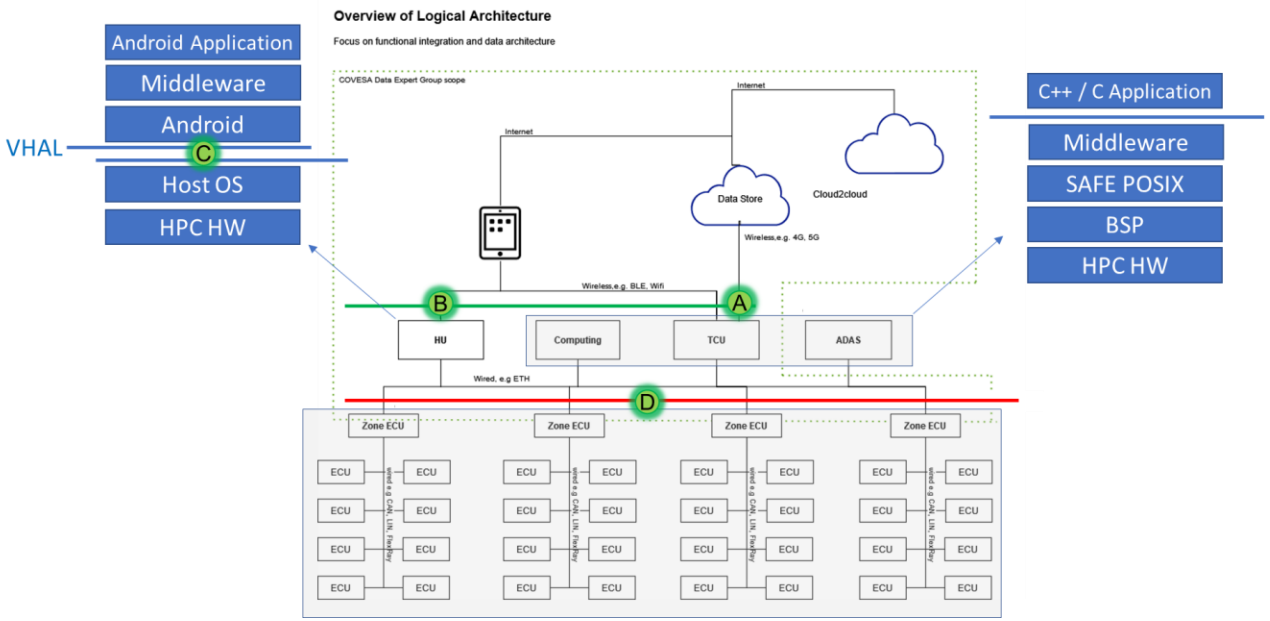
(2) Encapsulating automotive technologies to simplify the rapid development and frequent deployment of evolving digital experiences (Green-Line)

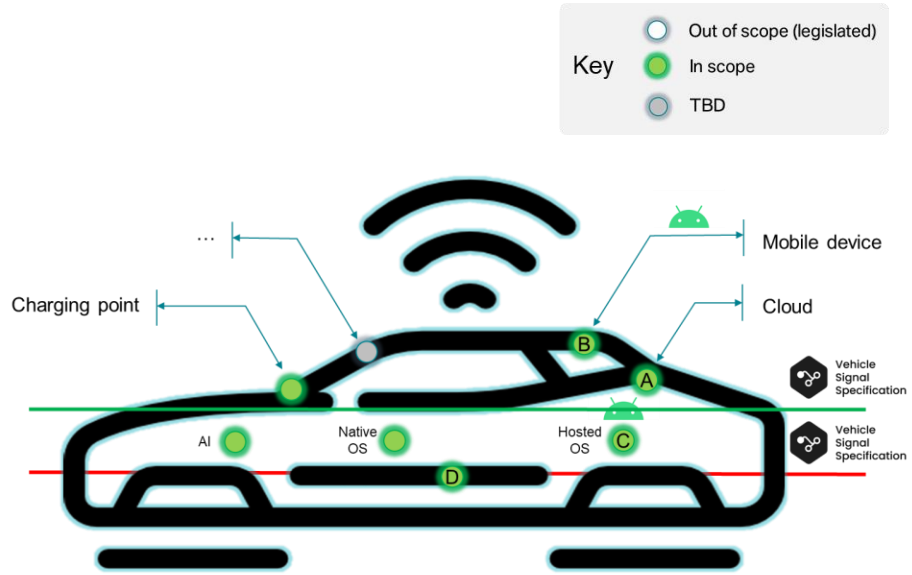
- The digital developer must be provided with access to relevant vehicle capabilities without the need to understand automotive complexity, this can be achieved by establishing a managed Developer API.

(3) Separating safety critical / safety related functionality from non-safety critical (QM)

- The separation of safety and non-safety functionality would allow the non safety functionality to be updated independently from the safety content without the risk of negative impact.
- To be able to deliver frequent and evolving digital experience updates it is necessary to apply different development, integration and test methods to those necessary in safety critical functionality.

COVESA CONTRIBUTION TO SOLVING THE SDV CHALLENGE

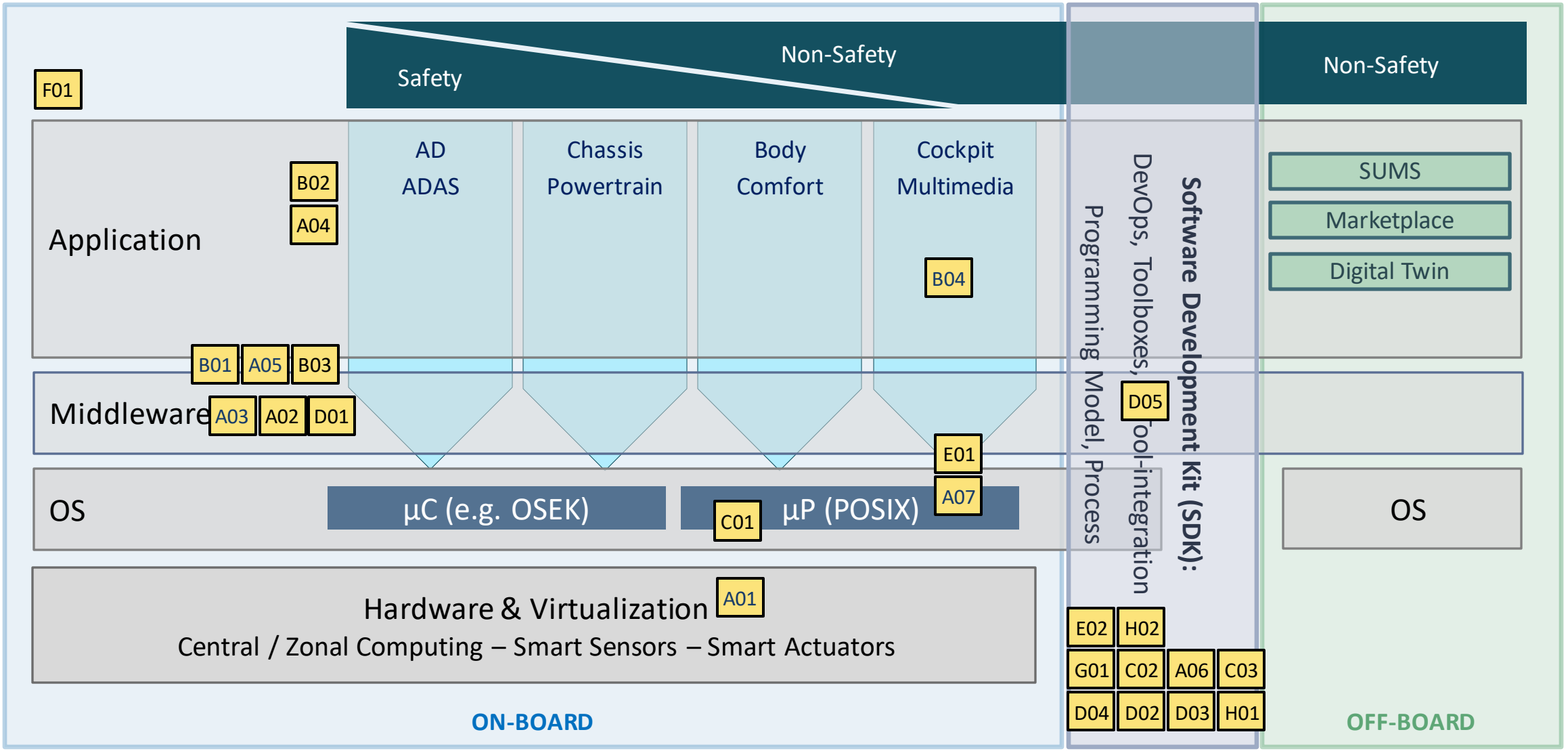




Although COVESA can make an extremely valuable contribution to solving parts of the SDV challenge, the scope of SDV is bigger than COVESA alone.

HOW TO ALIGN SDV ACTIVITIES WORLDWIDE?

SDV Architecture/Landscape (HAL4SDV)



CONSOLIDATION OF HAL4SDV PAINPOINTS EU COMMISSION + PROJECT PARTNERS

BUILDING BLOCKS

A Hardware/Software Abstraction

1. HW Abstraction – Hypervisor
2. Middleware for automotive HPC
3. Communication Middleware (DDS and other solutions)
4. Defragmentation of interfaces
5. Interface concept for service oriented and signal-oriented functions
6. Data Architecture for Automotive
7. Container/isolation for complex application (like HMI)

B API

1. VSS – Vehicle Signal Specification
2. Efficiently integrating SDV
3. Mapping for internationalization
4. Plug & charge according to ISO standards available as open implementations

C Development Process Tools

1. Linux Ecosystem for Safety
2. Memory safe languages for critical systems
3. Open tool for architecture modelling following a model-based-systems-engineering approach for overall vehicle definition

D Integration, Testing, Simulation

1. Tooling for performance
2. Tools interoperability in automotive SW dev area
3. Software testing on integration – level
4. Virtualisation for vehicle subsystems
5. Reprocessing / replay and simulation

ENABLER

E SW Maintenance & Updateability

1. Isolation of applications
2. Sustainable maintenance

F Open Source

1. OSS blueprints for compliance with EU regulations (e.g. cyber security)

DEFINITIONS

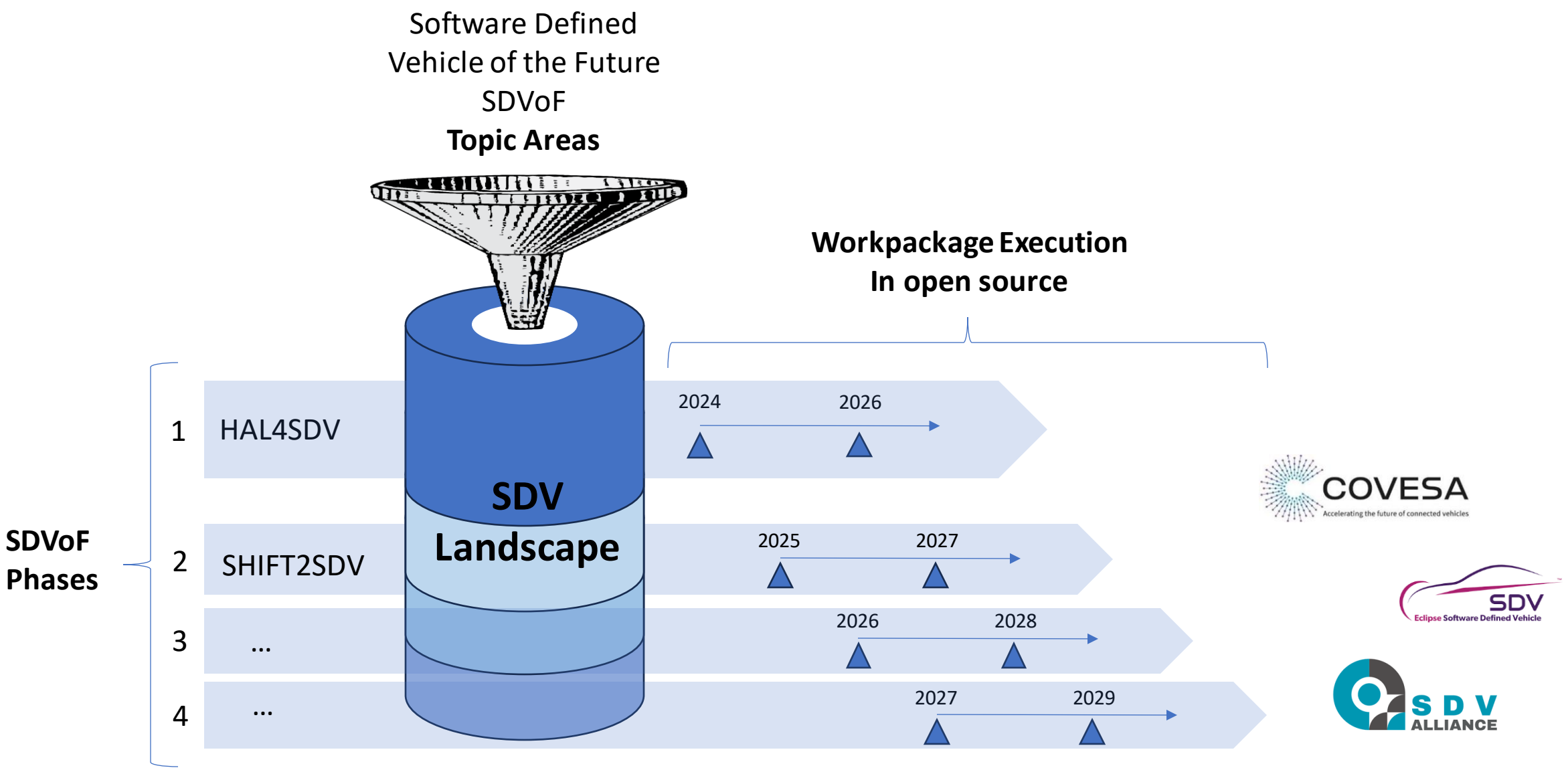
G Mindset & Ecosystem

1. Define and show “automotive grade”

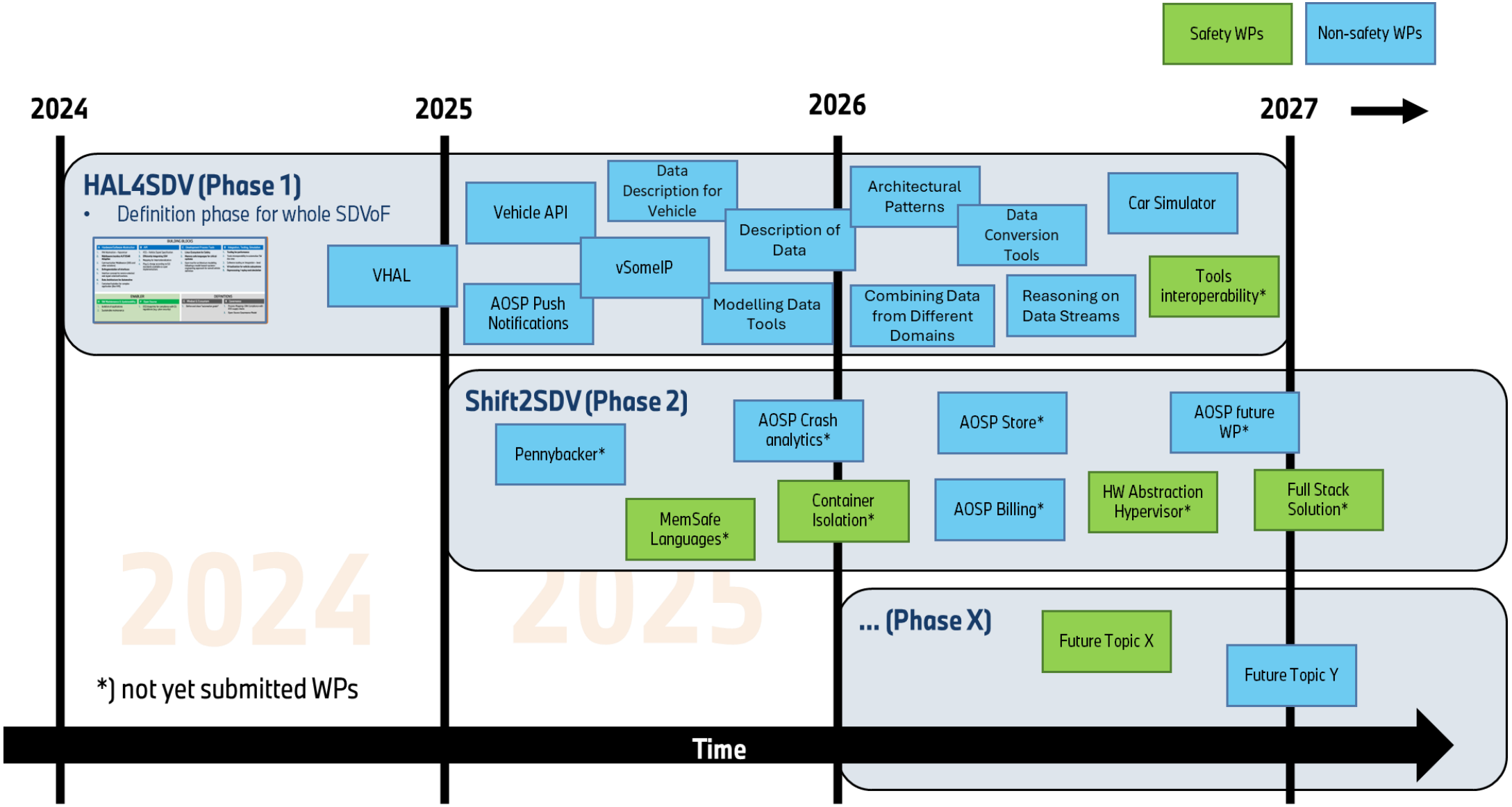
H Governance

1. Process Mapping: CRA Compliance with OSS supply chains
2. Open-Source Governance Model

ALIGNMENT OF SDV ACTIVITIES IN EUROPE?



EU INIATIVE SDVoF - TIMELINE AND OPERATIONAL SCALING



SUMMARY

- The SDV is currently an aspiration, not yet a reality.
- To develop the SDV requires structure, discipline and co-operation across companies and alliances.
- COVESA must make clear, on a world stage, which areas of SDV we intend to take the lead.
- The full potential of the SDV will only be realized if it meets the in-house needs of the vehicle OEMs **AND** the needs of additional stakeholders that would like to exploit the existence of SDVs.
- **Invite:** EU SDV Project Breakfast Meetup – South America Room - 07.30 tomorrow morning 17th April.

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