Update on ADASIS activities towards autonomous driving

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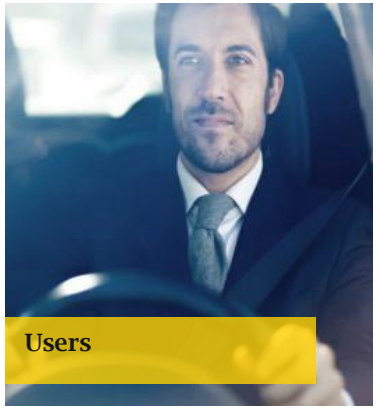
SIP-adus workshop, dynamic map (DM) session

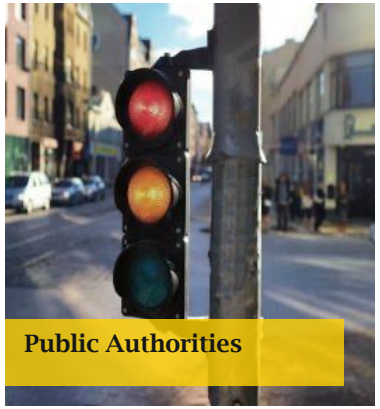
Kyoto, 12 October 2022

Content

- ERTICO and Innovation platforms for Smart Mobility deployment
- Update on ADASIS

ERTICO is bringing together 8 mobility sectors to make **mobility cleaner, safer and more efficient.**





ERTICO, about 130 partners

4 focus areas of mobility

CONNECTED AND AUTOMATED DRIVING

Accelerating automation and connectivity for safer and smarter mobility

CLEAN MOBILITY

Reducing environmental impact

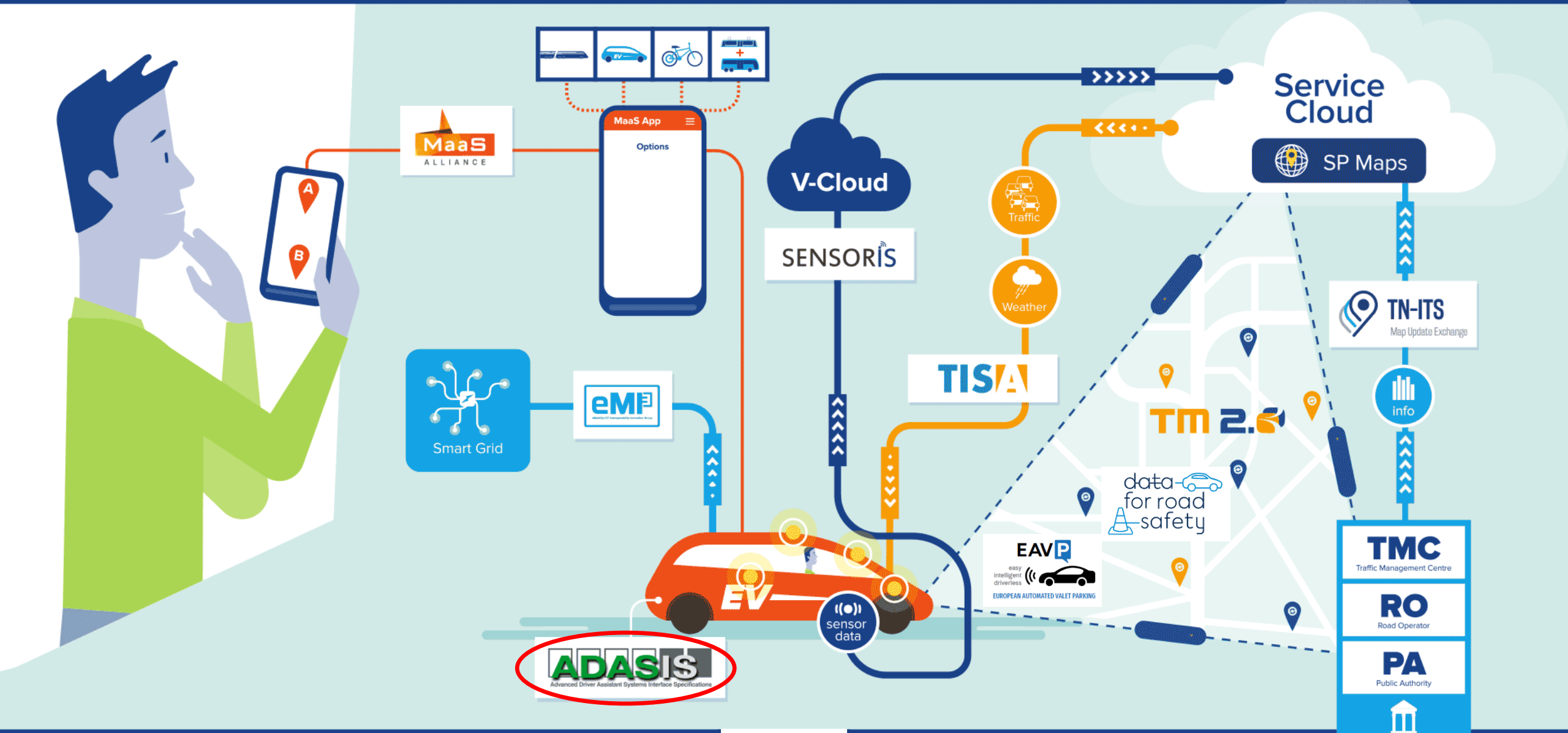
URBAN MOBILITY

Delivering seamless mobility for all

TRANSPORT AND LOGISTICS

Creating the digital infrastructure for freight transport and logistics operations

SMART MOBILITY DEPLOYMENT BY ERTICO PARTNERSHIP



ERTICO

ADASIS 20

Advanced Driver Assistant Systems Interface Specifications

2002-2022

55 ADASIS members from four sectors

- ADAS manufacturers
- Map supplier
- Vehicle manufactures
- Navigation system supplier

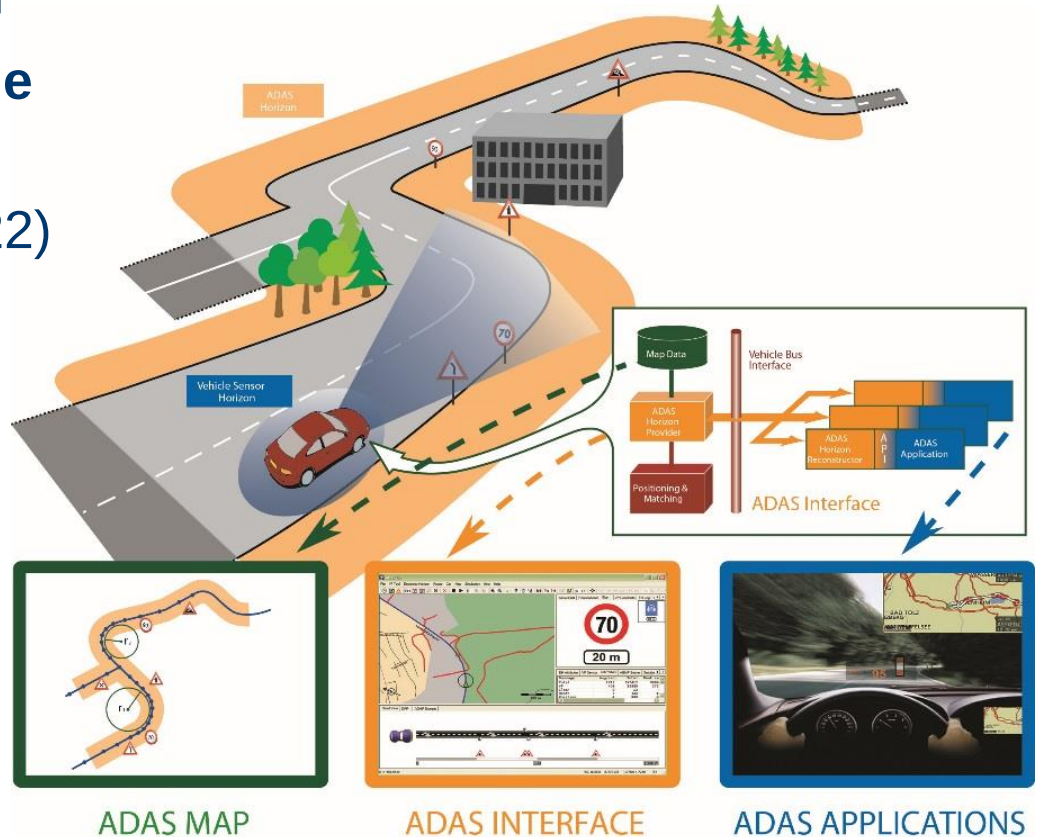
Membership (status October 2022)

Vehicle manufacturers (10)	ADAS manufacturers (15)	Navigation system manufacturers (16)	Map & data providers (14)
BMW	Aptiv (former Delphi)	AISIN AW	AutoNavi (Alibaba Group)
Mercedes-Benz	Continental Automotive	ALPINE ELECTRONICS	Baidu
Ford Forschungszentrum Aachen	CTAG	Banma Network Technology	C.E. Info Systems (MapMyIndia)
Honda	Elektrobit Automotive	Bosch SoftTec	NVDIA
Hyundai Mnsoft	Hitachi Automotive Systems	Ditu (affiliated to DiDi)	eMapgo
Nissan Motor Co.	Huawei	EnGis	Heading Data Intelligence (HDI)
STELLANTIS (was Opel)	Huizhou Desay SV Automotive	Harman/Becker Automotive	HERE
Renault	IVIS Inc (2019)	JOYNEXT (2021)	Kuandeng
Toyota Motor Europe	Knorr-Bremse	Mappers Co.	MOMENTA
Volvo Group Trucks Technology	MAGNA	Mitsubishi Electric Automotive	NavInfo
	Mando	MXNavi	Tencent
	Shenzhen Deeproute.ai Co., Ltd.	Neusoft	TomTom
	Valeo Comfort and Driving Assistance	NNG	Ways 1
	Visteon	Panasonic Automotive	Zenrin
Japanese members	ZF	TeleNav	
New members in **2022**		Veoneer (Autoliv)	

Quick overview

- **Initiated by Navtech, Constituted 2002 by ERTICO industrial partners**
- ADASIS v1 in 2005, tested & validated in EU project MAPS&ADAS until 2007
- **ADASIS v2 in 2010 enabled first predictive applications on the road in 2012**
- Since May 2018 is a Non-Profit International Association
- **End 2018 ADASIS v3.1 is released internally to enable Automated Driving** (public release 10/2020)
- 09/2021: ADASIS v3.2 released internally (public 12/2022)
- 12/2022: v3.3 & 3.4 to be released internally
- Reference implementation v3.2 for members only

ADASIS horizon addresses all major future mobility trends: connected, electrified and automated



Examples: Product applications based on ADASIS

Advanced Driver Assistant Applications

Driver assistance

- Display of dynamic speed signs
- Warning for end of traffic jam tailback
- Hazard spot warning (e.g. slippery road)

Electric vehicles (including Hybrid)

- Precise range estimation for electric vehicles
- Battery management for (hybrid) electric vehicles
- Driving strategy for hybrid vehicles

Intelligent ACC

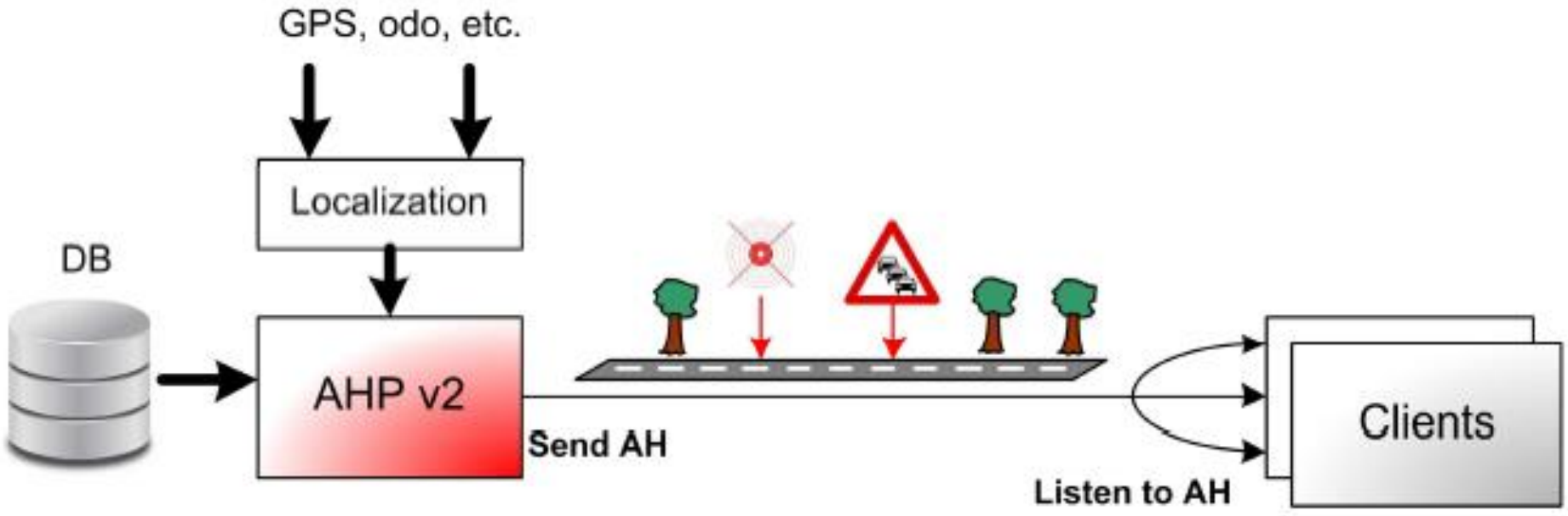
- Calculation of optimal speed on country roads based on topography, curves, speed limits and up to dynamic information

Highly automated driving

- Detailed lane model
- Provision of 3D objects for localization
- NDS Auto Drive & ADASIS V3 support

v2 architecture (on the road since 2012)

ADASIS v2 supports only 1 ADAS Horizon (AH) Provider



Primary goal is to provide localization and static information from a DB

v2.0.5 under development

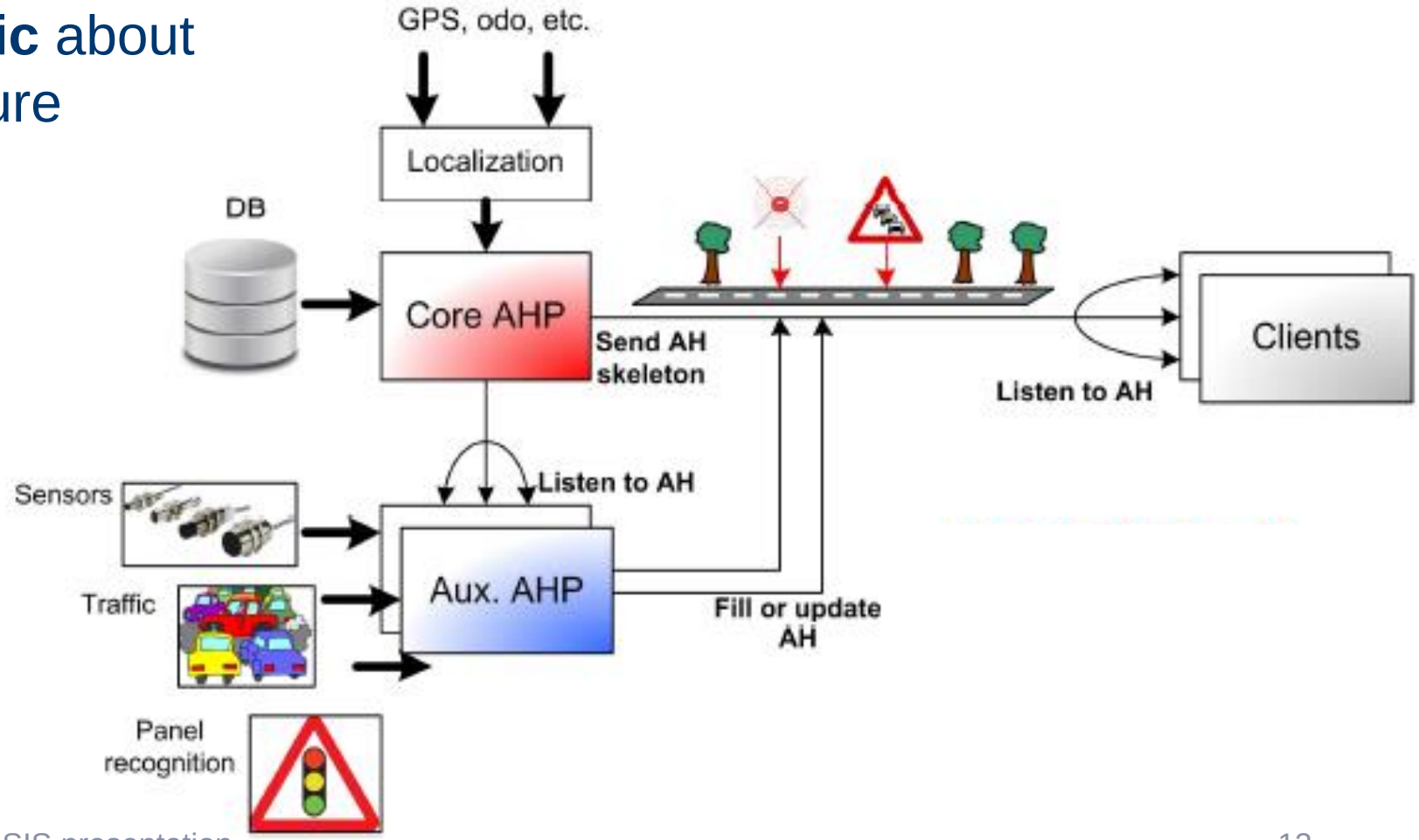
- v2.0.4 still active and public
- v2.0.5 review version Q2-Q3 2022, **final release planned 12/2022**
  - Add >70 missing warning sign types from NDS 2.4.2 … 2.5.4
  - Add byte/bit layout figures for all profile types (Big Endian + Little Indian)
  - Request to extend “Number of Lanes in Driving Direction” from 1-5 to 1-7
  - Clarify description “Right of Way”, add figures as examples
  - Introduce new profile type to represent more than one speed limit + lane specific speed limit
  - Define new profile type: advisory speed (in relation to ISA - Intelligent Speed Assistance)
  - Define new profile type: average speed / historical speed
- in parallel v2.1.0, not backward compatible (with v2.0.x), release in 2023
  - *A*dd "Speed Unit" field to SEGMENT message (allow various interpretations)

v3 architecture

ADASIS v3 must support progressive development of future autonomous vehicles

ADASIS v3 must be **agnostic** about automated vehicle architecture

ADASIS v3 brings flexibility thanks to multiple AH providers architecture



What is new in v3.2 ?

New features part of v3.2:

- Extended list of traffic signs (from NDS 2.5.3) in v3.2 reference document
- Special traffic light profile:
  - describing 3D object
  - including road attribute + including light phases (worldwide)
- Localization objects: obstacles, traffic sign face
- **Connecting paths**: bring network description into ADASIS v3 model
- Fully defined **Application API**
- **Finalised specs, robust and mature specification document**

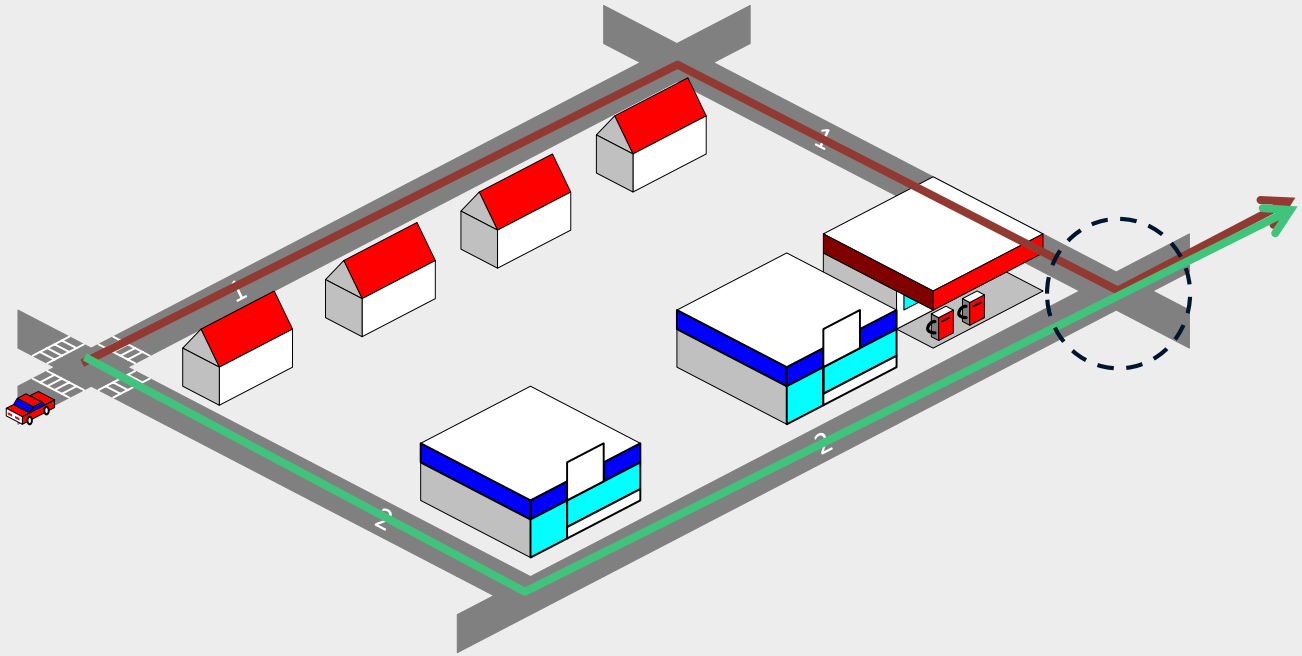
v3.2 ready to be used by autonomous-driving-software developers

Merging Paths (Issue)

Issue

two potential paths the vehicle can follow

at some point the paths merge again



Merging Paths (Issue)

Problem

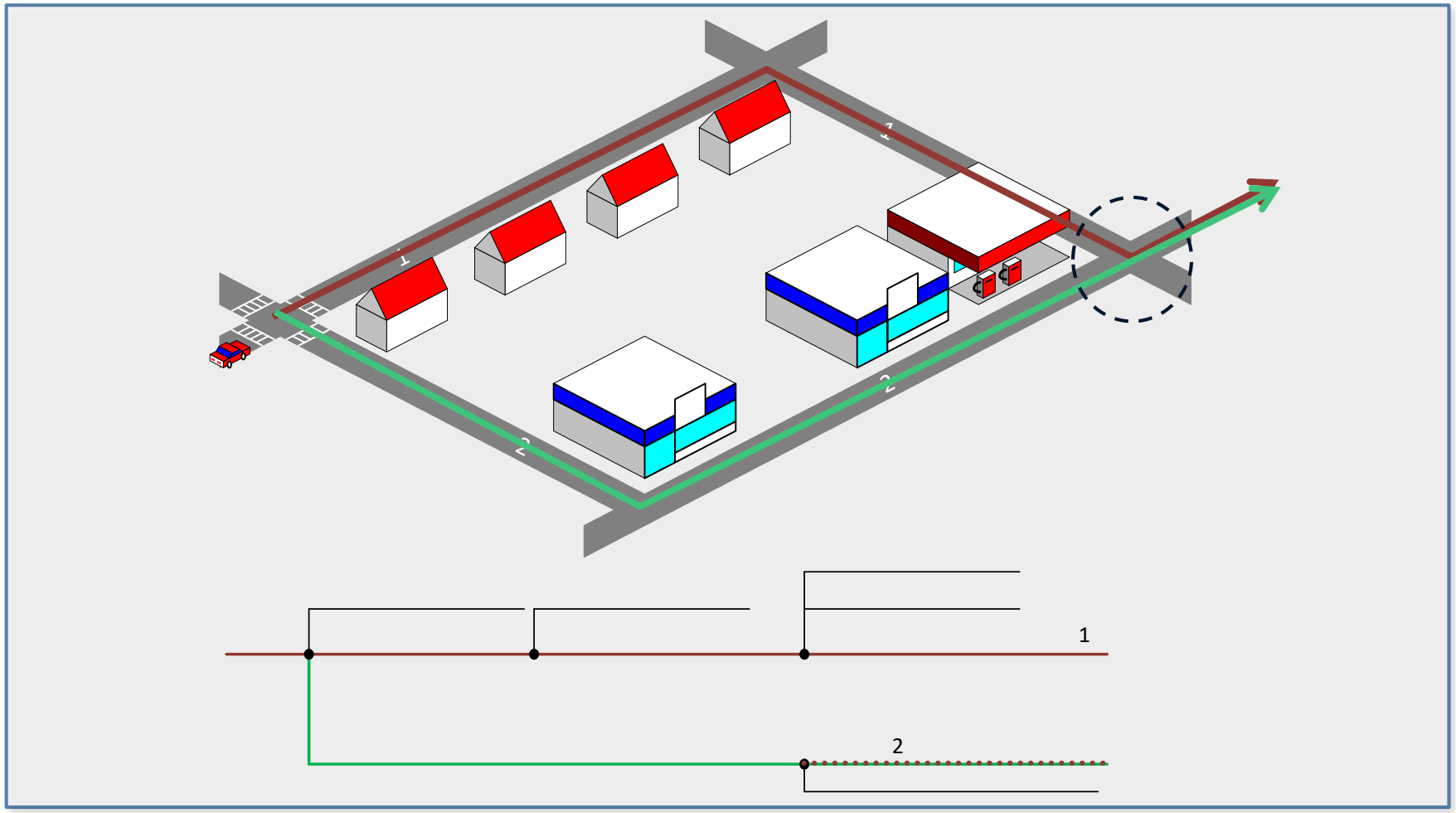
two potential paths the vehicle can follow

at some point the paths merge again

Until v3.1

Provider would ignore identity of green and brown path after merge

problem: double allocation of memory



Merging Paths (Issue)

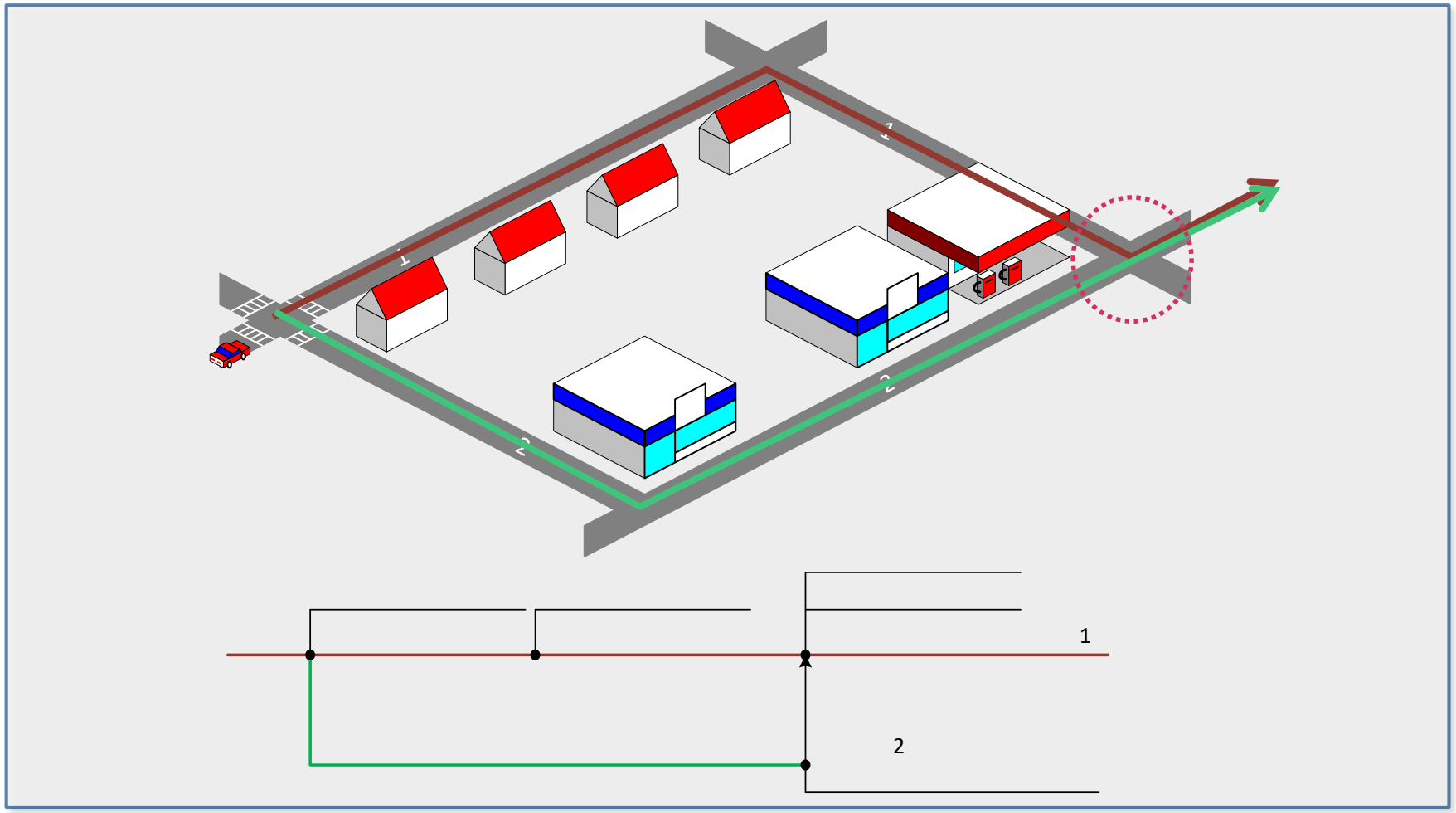
Problem

two potential paths the vehicle can follow

at some point the paths merge again

Solution

MergePoint Profile at the merge point



ADASIS v3 Evolution

Version 3.1

July 2018
Release Candiate

October 2018
Internal Release

October 2020
Public Release

Version 3.2

December 2018
1st draft published

April 2019
2nd draft published

Later 2019 & 2020
Further drafts

December 2021
Final Release v3.2.0

April 2022
Final Release v3.2.1

Reference Sys

October 2018
1st release v3.1

October 2019
2nd release v3.1

Spring 2022
3rd release v3.2.0

Version 3.3

- **Auxiliary Providers**
  (End 2022)

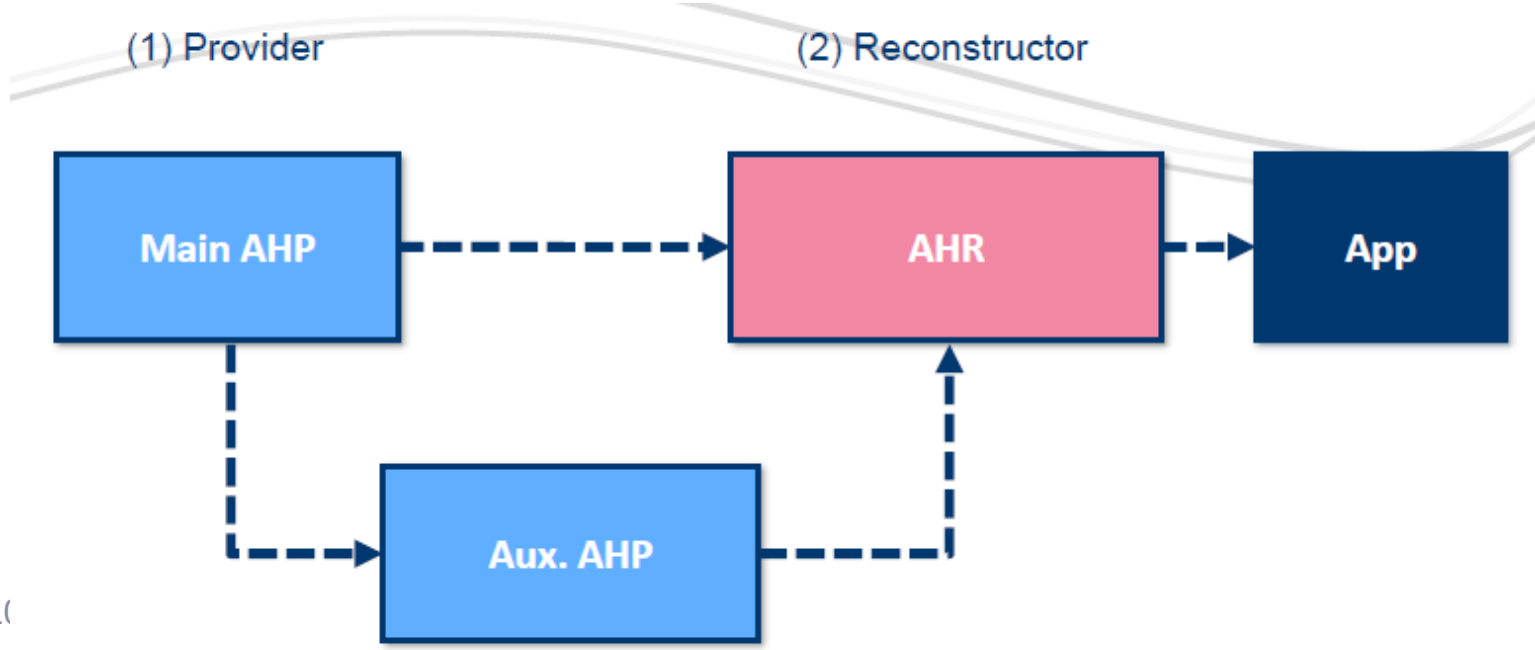
Version 3.4

- **Low Level Protocol Serialization / Deserialization**
- **Communication Schemes**

(End 2022)

v3.3: Auxiliary Provider

- Main concept and constraints:
  - Add information which comes not from map
  - More data from other sensors
  - A “client” which needs to synchronize and follow path-model from Main Provider
  - one profile per provider
  - initial concept bases on One-Way communication (unidirect.)

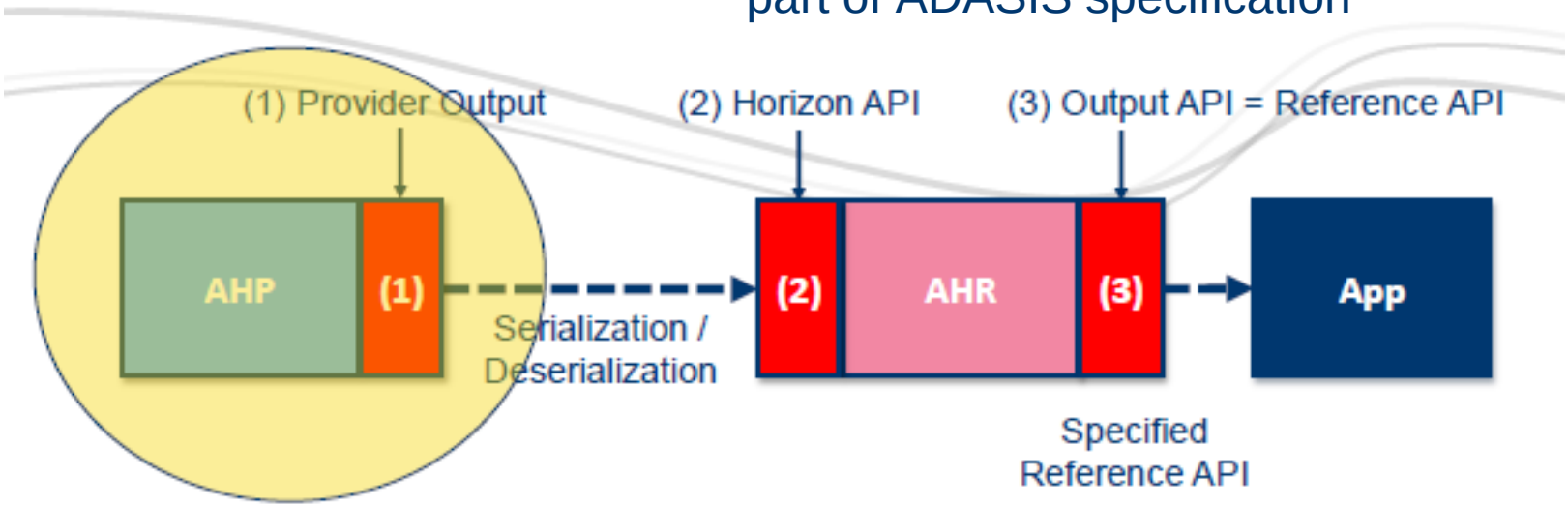


Version 3.3

- **Auxiliary Providers** ***(End 2022)***

v3.4 focus: Low Level Protocol

- Benefit for ADASIS:
  - Independency of Provider and Reconstructor
  - including road attribute + including light phases (worldwide)
- Approach for ADASIS v3
  - collect list of available standards
  - evaluate advantage/disadvantages
  - concentrate on Serialization / Deserialization, will become part of ADASIS specification



Version 3.4

- Low Level Protocol Serialization / Deserialization
- Communication Schemes

(End 2022)

Main liaison activities

Collaboration ADASIS and NDS.Live

- NDS.Life presented to the ADASIS members
- Synergies and harmonisation between ADASIS and NDS.Life to be discussed
- ADASIS actions:
  - writing of a White Paper and position paper for End 2022 or Q1/2023
  - Development of a Use Case to demonstrate the usage of ADASIS v3.x

ADASIS with SIP-adus (Kyoto, October 2022)

- Collaboration with SIP-adus FOT in which ADASIS v3.2 was implemented
- ADASIS is looking forward to discuss the results during the break-out workshop

Next steps

- v2.0.5 public release planned 12/2022, then v2.1.0 in 2023
- v3.3 Auxiliary provider (12/2022)
- v3.4 Low level protocol (12/2022)

- ADASIS White Paper and position paper 12/2022 or Q1/2023
- Use Case development to demonstrate the usage of ADASIS v3.x (Q1/2023)
- Exploitation of SIP-adus results to improve v3.x

ADASIS v3.2 is already implemented by 2 OEMs in their vehicle development

Thank you for your attention!

Any questions?

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