

A nighttime aerial view of a city with light trails from cars on a highway, creating a sense of motion and connectivity.

# PERPETUUM PROGRESS

Empowering Autonomous Mobility

Sobirania de dades i International Data Spaces

20.09.2023

Oriol Torres – CTO Perpetuum Progress GmbH



PERPETUUM PROGRESS

# PORTFOLIO OVERVIEW



Engineering  
Services

Scenario & Track  
Services

Digital Twin &  
Scenario



Consulting

Credible Simulation

Proving Simulation  
Reliability

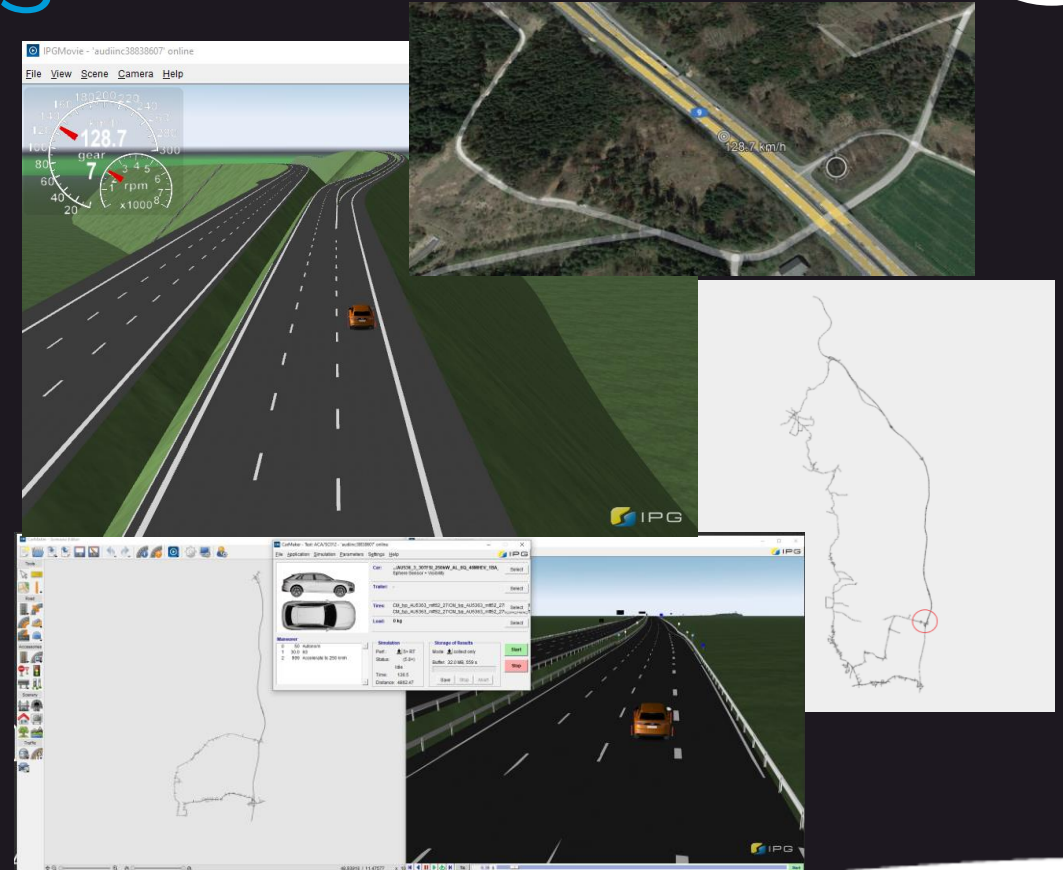


PERPETUUM PROGRESS

# ENGINEERING SERVICES



- ∞ Developing Custom Software Tools to Boost the Development Process
- ∞ Professional Software Development Process
- ∞ Merging Tools and Systems to Create “Digital Twins” of Real Environment
- ∞ Creating Digital Twins: Tracks & Scenarios



# ENVIRONMENT OVERVIEW

## PARTICIPATING IN STANDARD DEVELOPMENT



## TRANSFERRING RESEARCH RESULTS TO INDUSTRY



Technical Membership  
Research Projects



HD Sensor Data for Simulation

Consortium: Conti, THI, FMS



UNECE R157 ALKS Simulation

Consortium (20):  
BMW, Conti, DLR, msg, Fraunhofer, et.  
al.

# GAIA-X



# GAIA-X






## ∞ A Federated and Secure Data Infrastructure

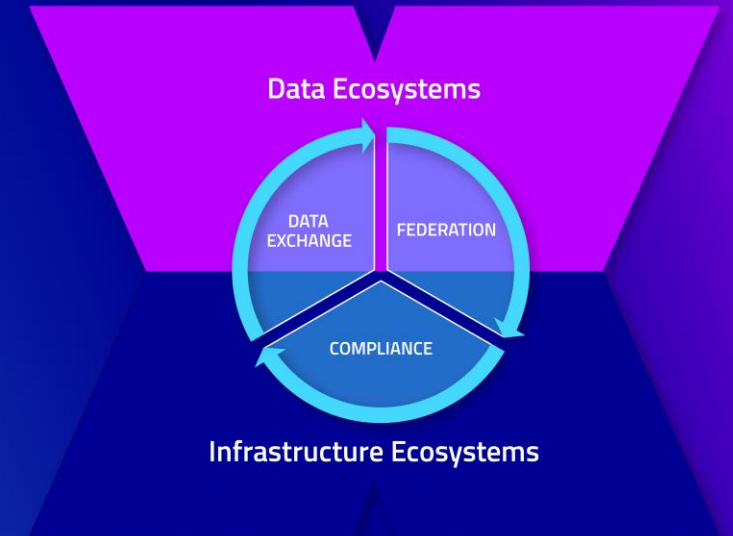
- Goal is to establish an ecosystem, whereby data is shared and made available in a trustworthy environment.

### Our X-Model

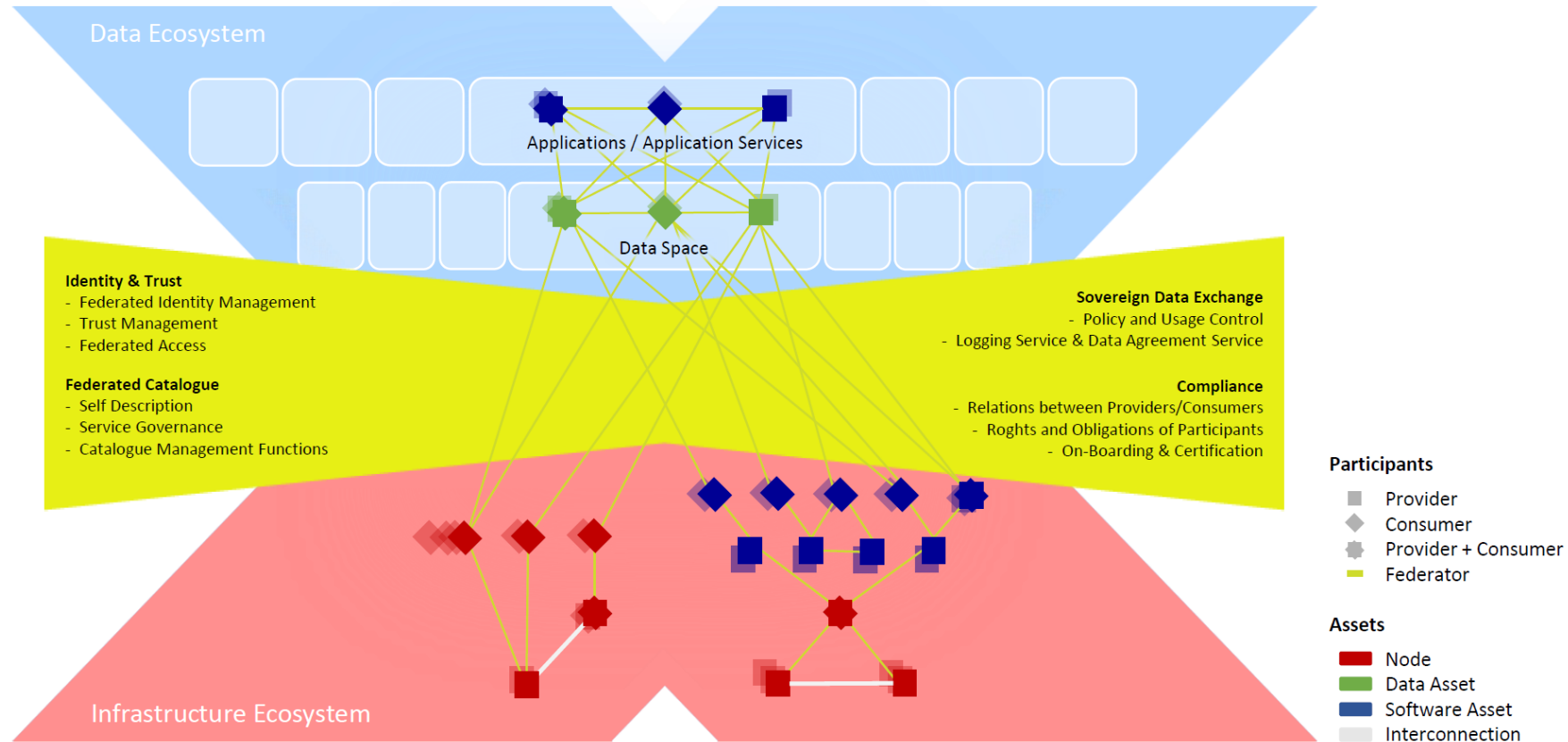
Connecting Data & Infrastructure Ecosystems



-  **Advanced Services**  
New (Cross-) Sector Innovations / Applications build from service composition.
-  **Data Spaces / Federations**  
Interoperable & portable (Cross-) Sector data-sets and services.
-  **Data Exchange**  
Anchored contract rules for access and data usage.
-  **Gaia-X Compliance**  
Decentralized services to enable objective and measurable trust.
-  **Label framework**  
Gaia-X and ecosystem specific Labels to ease market adoption through autonomy and self-determination.



# GAIA-X Federated Services

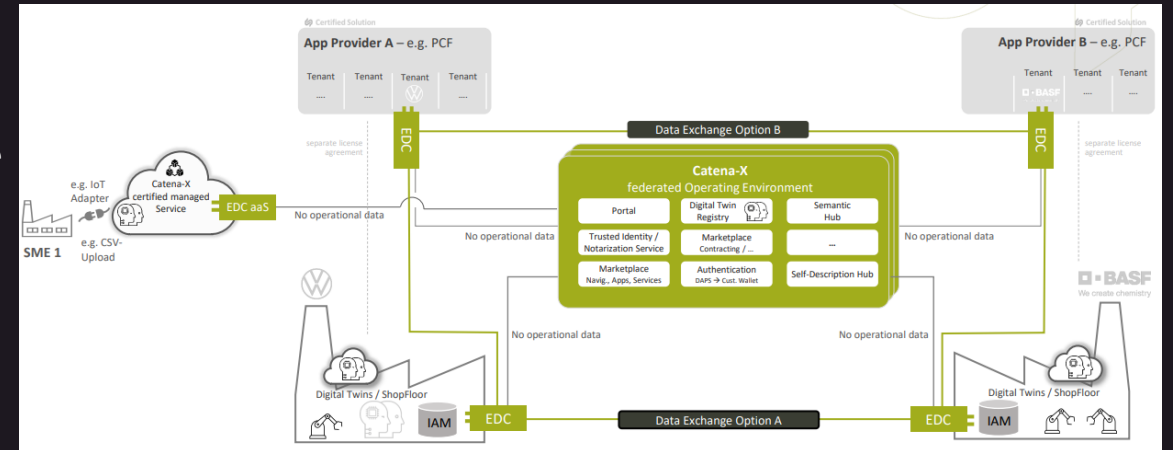


Governance Framework: GAIA-X Policy Rules and GAIA-X Architecture of Standards

# Automotive & Mobility Data Spaces

## ∞ CATENA-X

- The Catena-X Automotive Network creates the first open and collaborative data ecosystem.
- Examples: Carbon footprint , Traceability in Automotive Value Chain



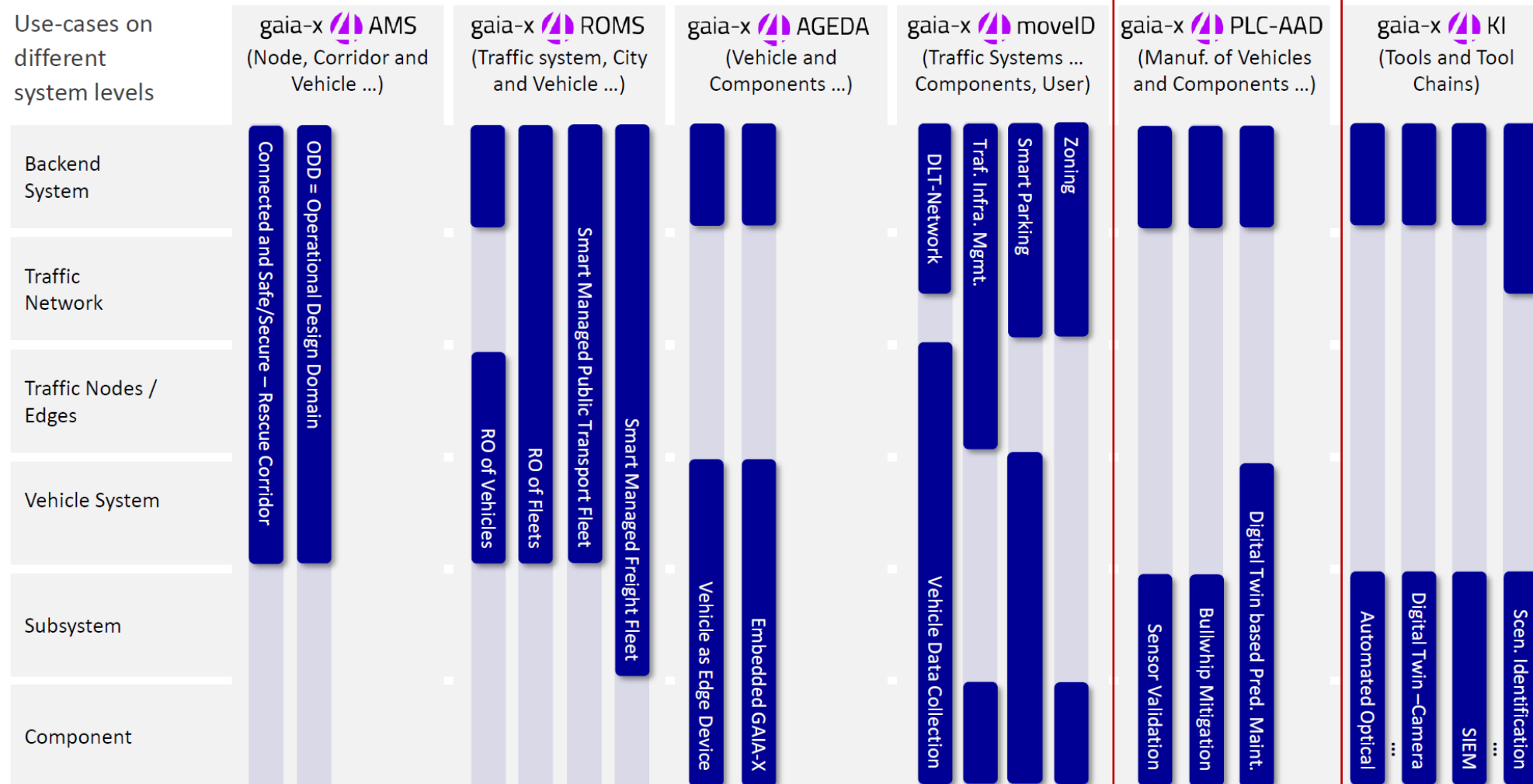
## ∞ Mobilithek / Mobility Data Space

- access to open mobility data and enables the B2B exchange of data offers






















# GAIA-X 4 Future Mobility

## Use-cases on different system levels



# GAIA-X 4 PLC-AAD : Partners

# GAIA-X 4 PLC-AAD : ADAS Development

## ∞ Use Cases on Virtual Validation

- Automated Lane Keep Systems
- Sensor Development

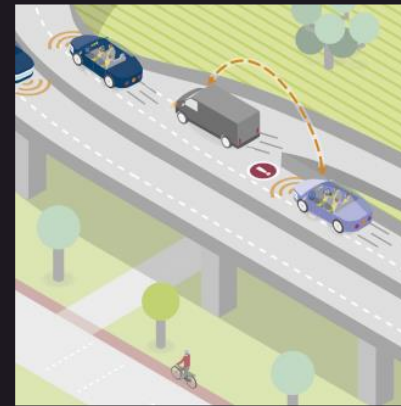


Figure: acatech Studie – Neue autoMobilität II

# GAIA-X 4 PLC-AAD : Data Exchange

## ∞ Data Assets

- Maps : ODR Files
- Scenarios: OSC Files
- Sensor & Vehicle Components Models

## ∞ Algorithm & Tools Assets

- Simulators : ADAS Simulation ex. CARLA
- Validation Tools : Quality Checkers
- Metadata Extractors

## ∞ Roles: Data User / Data Provider

# GAIA-X 4 PLC-AAD : Further Components

- ∞ SHACL Shape to restrict asset description
- ∞ EDC Connector: framework agreement for sovereign, cross-organizational data exchange.
  - Identity, contract offering, data transfer, ....
- ∞ Blockchain Extension

OVAL



# Perpetuum Progress



Engineering  
Services

Scenario & Track  
Services

Digital Twin &  
Scenario



Product  
Development

OVAL Data Space

Simulation Asset  
Management



Consulting

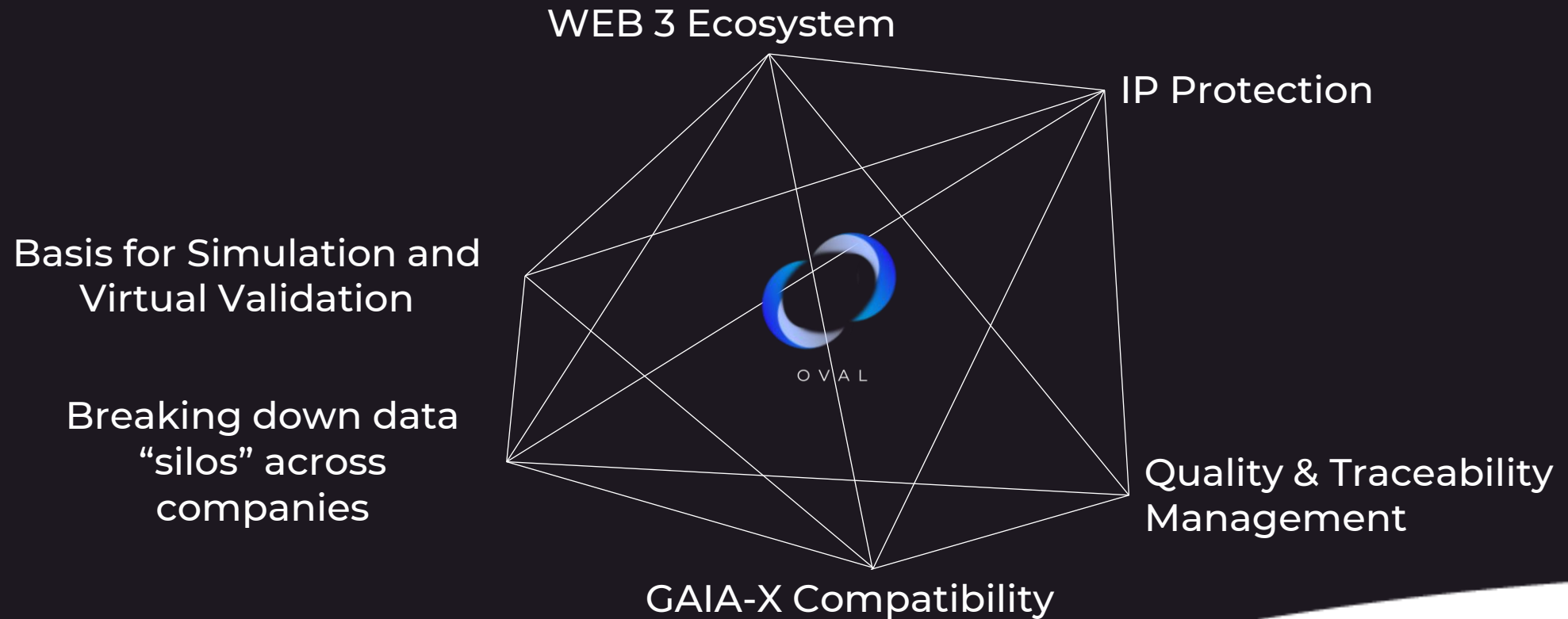
Credible Simulation

Proving Simulation  
Reliability



PERPETUUM PROGRESS

# Perpetuum Progress DATA ECOSYSTEM SOLUTION



### USE CASE :

As a **Function Developer** I need a track where I can test my algorithm with:

- Quality-Tested Digital Tracks
- Instant Use
- Transparent Costs and Contracting

## Function Developer

## Data Space

① **Compute Job**

[ OVAL-Based ]



Q-Checker  
Query

Track File

Q-  
Checker  
Checker



Q-Checker  
Results  
for Track

## Data Owners

3D  
Model

Scenario

Track



Data Asset stays on Owner Premises

### USE CASE :

As a **Function Developer** I need to test my ADAS Algorithm with different data sources. I want:

- Digital Tracks, Scenario and 3D-Models
- Instant Use
- Transparent Costs and Contracting

## Function Developer

### Algorithm ADAS

Algo Asset stays on Developer Premises



Simulation Results

## Data Space

② Download

[ OVAL-Based ] 

Query Files

3D Model

Scenario

Track

## Data Owners

3D Model

Scenario

Track

### USE CASE:

As a **HD Map provider** I want to keep the IP over my tracks so that I can generate sustainable business models out of it.

## Function Developer

### Algorithm ADAS

*Algo Asset stays on Developer Premises*



Simulation  
Results

## Data Space

③ Lease

[ OVAL-Based ] 

Query  
Files

Track  
including  
Metadata


## Map Provider

Trac  
k

Track

# OVAL - DATA SPACE




 CATALOGUE PUBLISH VERIFY LOG ECOSYSTEM







**OVAL**

Open VALidation - a distributed ecosystem for ADAS AD development.

Search for service offerings



Recently Published


-  DataSet | A7204-06 |  GENEX Testbed  
**Cut In Scenario on Testbed Lower Saxony**
-  DataSet | A4328-07 |  GENEX Testbed  
**A9 minimum sample Garching**
-  Algorithm | A4328-07 |  GENEX Testbed  
**ODR Viewer**



Q: A39

**1 result for A39**

[DATASETS](#) [ALGORITHMS](#) [DOWNLOADED](#) [COMPUTE](#)

[SORT](#) [Relevance](#) [Published](#) [Date](#) [Price](#)



 DataSet | A39-01 |  GENEX Testbed  
**Cut In Scenario on Testbed Lower Saxony**  
(ID: A39-01)  
Cut In Scenario on Testbed Lower Saxony. The scenario is a cut in scenario on a road network. The scenario is a cut in scenario on a road network. The scenario is a cut in scenario on a road network.  
**Free**  
Full





# Vision

## ∞ Virtual Homologation

- UNECE 157 „... approval of vehicles with regard to Automated Lane Keeping Systems”
  - “Simulation tool and mathematical models for verification of the safety concept may be used....., in particular for scenarios that are difficult on a test track or in real driving conditions.”

# CONTACT



Perpetuum Progress GmbH

c/o brigk

Schloßlände 26

85049 Ingolstadt



[oriol.torres@pepro.io](mailto:oriol.torres@pepro.io)



<http://www.perpetuum-progress.io/>



Follow us on LinkedIn



BARCELONA  
(2023)



INGOLSTADT  
(HQ)

