AutoMat

Automotive Big Data Marketplace for Innovative Cross-Sectorial Vehicle Data Services

Project Presentation

TRiALOG

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ATB
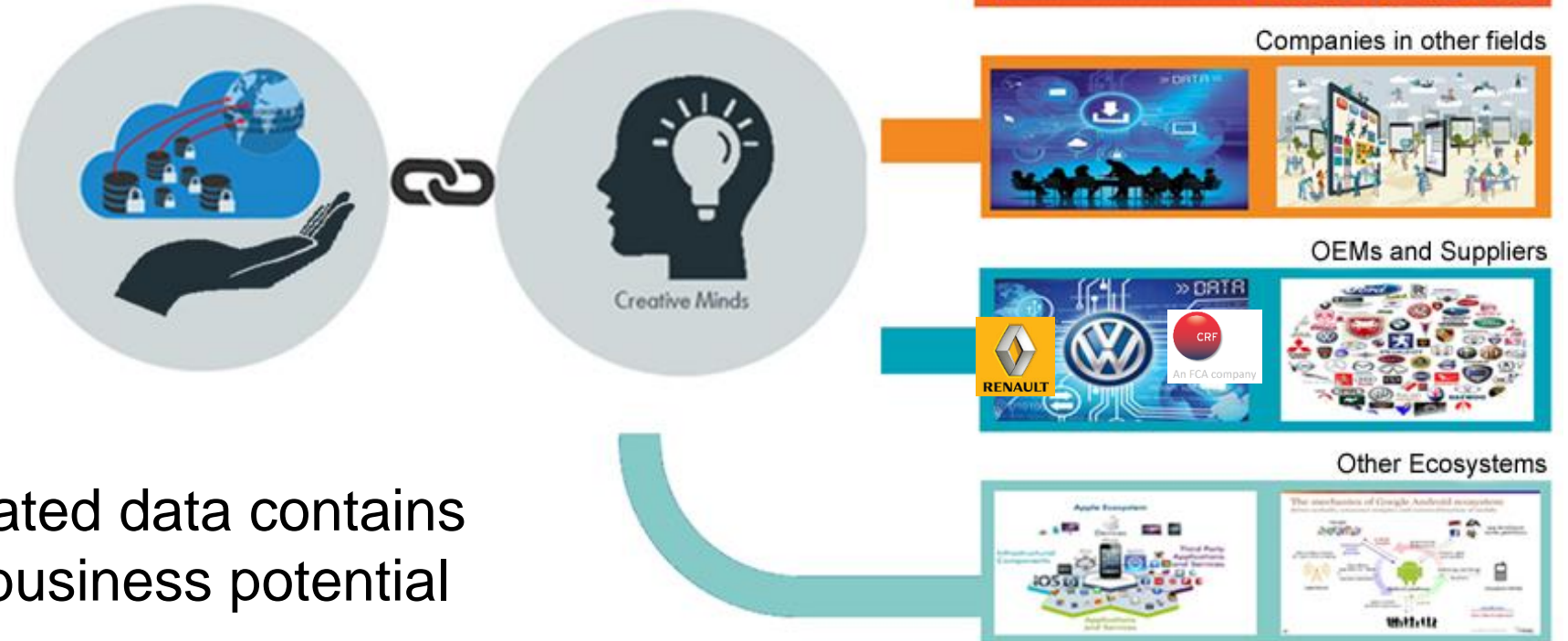
„The Next Big Thing …"

<Speaker>

The vehicle as moving collection of sensors

- Vehicles move in its surroundings, perceiving various aspects (Environment, Mobility, Driver and Passengers, Vehicle Status) via on-board sensors

- Connected sensors in vehicles provide a mobile sensor network producing over 4000 signals per second per vehicle

- Number of on-board sensors is strongly increasing and thereby the amount of data useable in near future.

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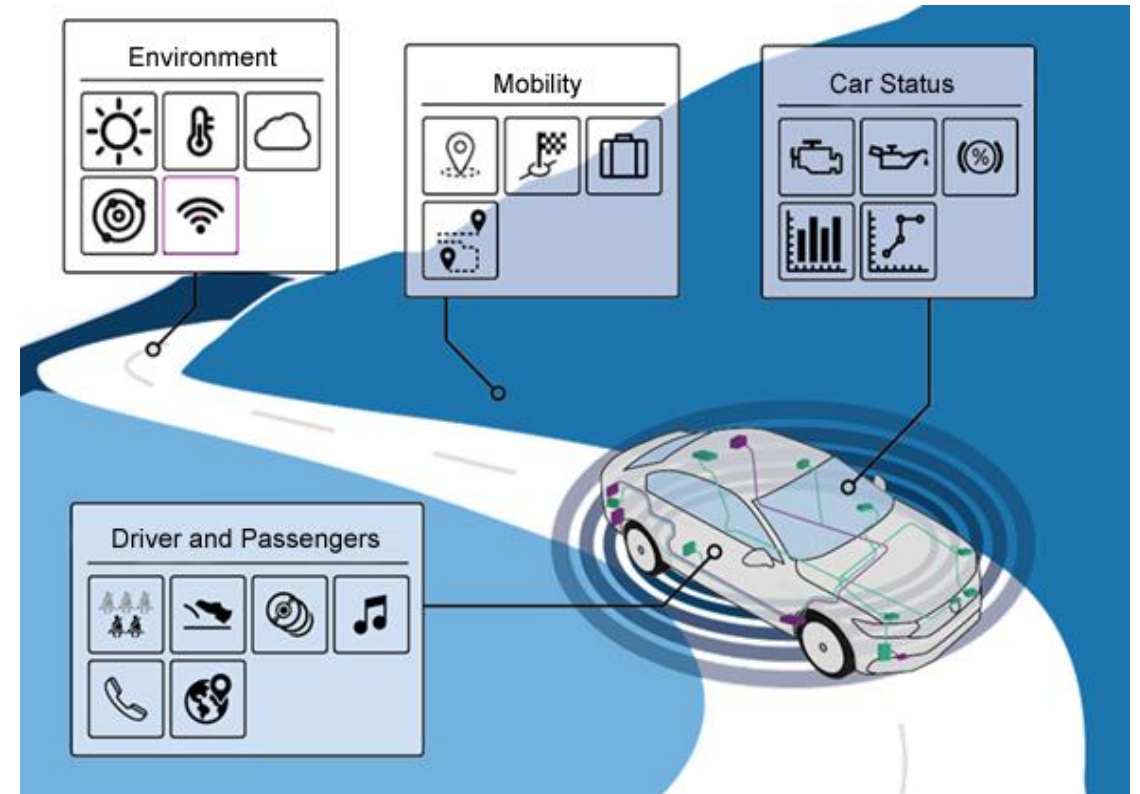
The vehicle as moving collection of sensors

- The vehicle data enables new and innovative business ideas for many stakeholders

- Great spectrum of vehicle data allows new dimensions of services

- Large amount of continuously aggregated data contains significant Big Data business potential

Creative Minds

Companies and Startups

Companies in other fields

OEMs and Suppliers

Other Ecosystems

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Present Situation

Business potentials are sealed to possible users:

- Automotive industry has not built an open vehicle data marketplace

- Vehicle data is not provided in a brand-independent format

- Proprietary OEM solutions render business potentials uneconomical
  - Negotiation with different OEMs/data suppliers/partners
  - Individual interfaces to different proprietary systems
  - Costs of realizing and providing services are to high

- No service can cover all costs of the value chain

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AutoMat's Solution Approaches

- Creation of an **open ecosystem** for provisioning of manufacturer and service provider independent vehicle data

- **Single point of data access** for service providers via the Marketplace

- Definition of **standardized and open interfaces** for unconstrained data access

- Specification of the **Common Vehicle Information Model (CVIM)** data format that enables harmonized, generic and **brand-independent datasets**

- **Broad spectrum of collected data** due to different participating OEMs

- Provision of mechanisms to guarantee of **data security, integrity and privacy**
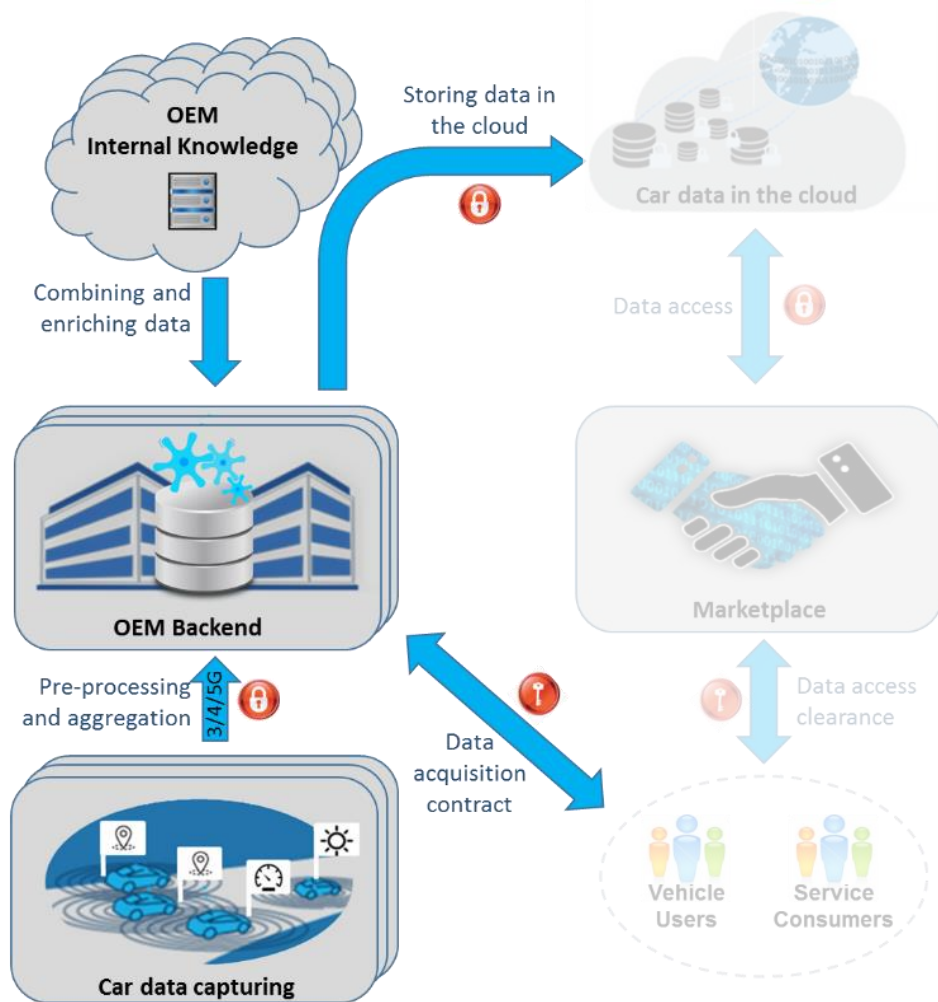
- Development of a **win-win-based value-chain**

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An Overview of the AutoMat Ecosystem

Automotive Big Data Marketplace for Cross-Sectorial Vehicle Data Services
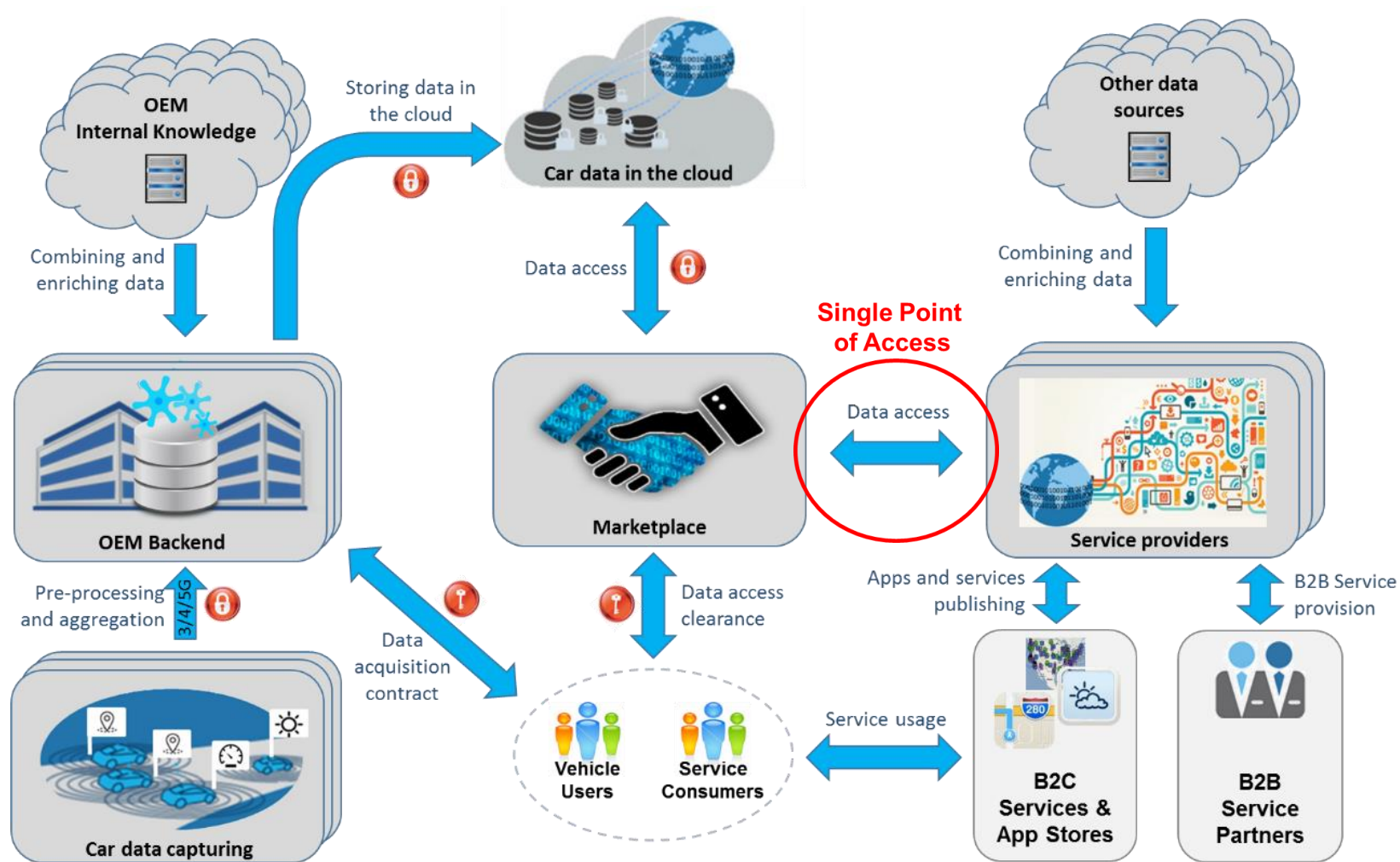
The AutoMat Ecosystem
Vehicle Data Capturing

- **Data reception** from vehicles via telematics platform
- **Refinement**, validation and data masking in OEM Backend
- Transformation into the **harmonized data format** Common Vehicle Information Model (CVIM)
- Removal of proprietary and brand-specific information
- **Data delivery** into cloud storage
- Management and re-configuration of data loggers

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The AutoMat Ecosystem
Vehicle Data Refinement and Ownership

- Data stream starts in the user's vehicle

- OEM refines raw data captured by the vehicle

- OEMs have partial usage rights over refined data

- User has usage rights over his vehicle's raw data

The Common Vehicle Information Model (CVIM)

- **Catalogue** of measureable vehicle sensor signals and information
- Support of different measurement types and signal representations
  - Time-Series representation – extended Floating Car Data (xFCD) data mining
  - Histograms representation – distribution based data acquisition
- Non-proprietary and **brand-independent** datasets
- **Harmonized** and generic data packages
- Data ownership, copyright and privacy information stored inside data packages
- Quality and completeness indicators through **OEM certification** and validation

Type	CaptureRate [int]	OnChange [boolean]	SampleStrategy	Signal definition (from sheet "Vehicle Domain Final")					
				Name	Min	Max	Resolution	SampleRate [int]	Unit
GeneralPurposeChannel	-	-	-	Identity	-	-	-	-	-
TimeSeriesChannel	1 s	No	LastKnownValue	Vehicle speed	0	512	0,0625	1 s	km/h
TimeSeriesChannel	-	Yes	LastKnownValue	Combustion engine - fuel tank state	0	255	1	1 s	%
TimeSeriesChannel	-	Yes	LastKnownValue	Combustion engine - fuel consumption	0	144	0,0022	1 s	l / h
TimeSeriesChannel	1 s	No	LastKnownValue	Torque	-500	1546	1	1 s	Nm
TimeSeriesChannel	1 s	No	LastKnownValue	Engine RPM	0	16382	1	1 s	RPM
TimeSeriesChannel	1 s	No	LastKnownValue	Oil temperature	0	6	1	1 s	
TimeSeriesChannel	1 m	No	LastKnownValue	Engine coolant temperature	-40	215	1	1 s	°C
TimeSeriesChannel	15 m	Yes	LastKnownValue	Tire pressure / TPMS	0,7	7	0,1	1 s	bar
TimeSeriesChannel	-	Yes	LastKnownValue	Clutch pedal	0	102	0,4	1 s	%

Type	AggregationStrategy	CaptureInterval [int]	Dimension	x-Bins			x-Signal (from sheet "Vehicle Domain Final")	y-Bins		
				Min	Max	# Bins		Min	Max	# Bins
HistogramChannel	Count	Infinity	1	0	512	26	Vehicle speed	-	-	-
HistogramChannel	Count	Infinity	1	0	255	57	Combustion engine - fuel tank state	-	-	-
HistogramChannel	Count	Infinity	1	0	144	46	Combustion engine - fuel consumption	-	-	-
HistogramChannel	Count	Infinity	1	-500	1546	32	Torque	-	-	-
HistogramChannel	Count	Infinity	1	0	16382	41	Engine RPM	-	-	-
HistogramChannel	Count	Infinity	1	-40	215	35	Engine coolant temperature	-	-	-
HistogramChannel	Count	Infinity	1	0,7	7	27	Tire pressure / TPMS	-	-	-
HistogramChannel	Count	Infinity	1	0	100	23	Gas pedal	-	-	-

# The AutoMat Ecosystem
Vehicle data in the cloud
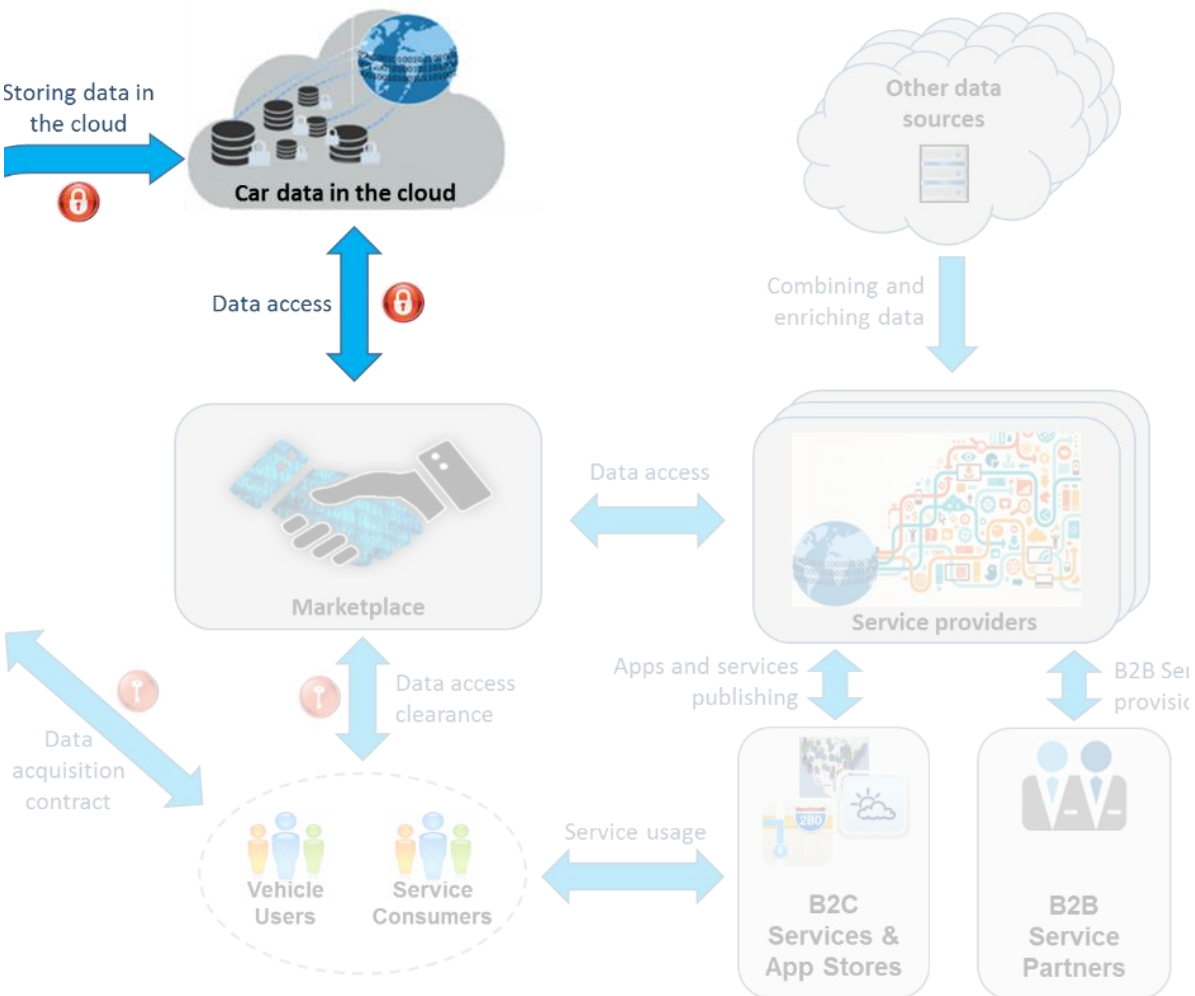
- **Storage** of harmonized Common Vehicle Information Model (CVIM) data packages

- Standardized Interfaces

- Vehicle user's **private cloud** storage vault

- User stays in **full control** of his/her data

- **Manageable authorization** and access rights in cooperation with Marketplace

# The AutoMat Ecosystem
Vehicle Big Data Marketplace
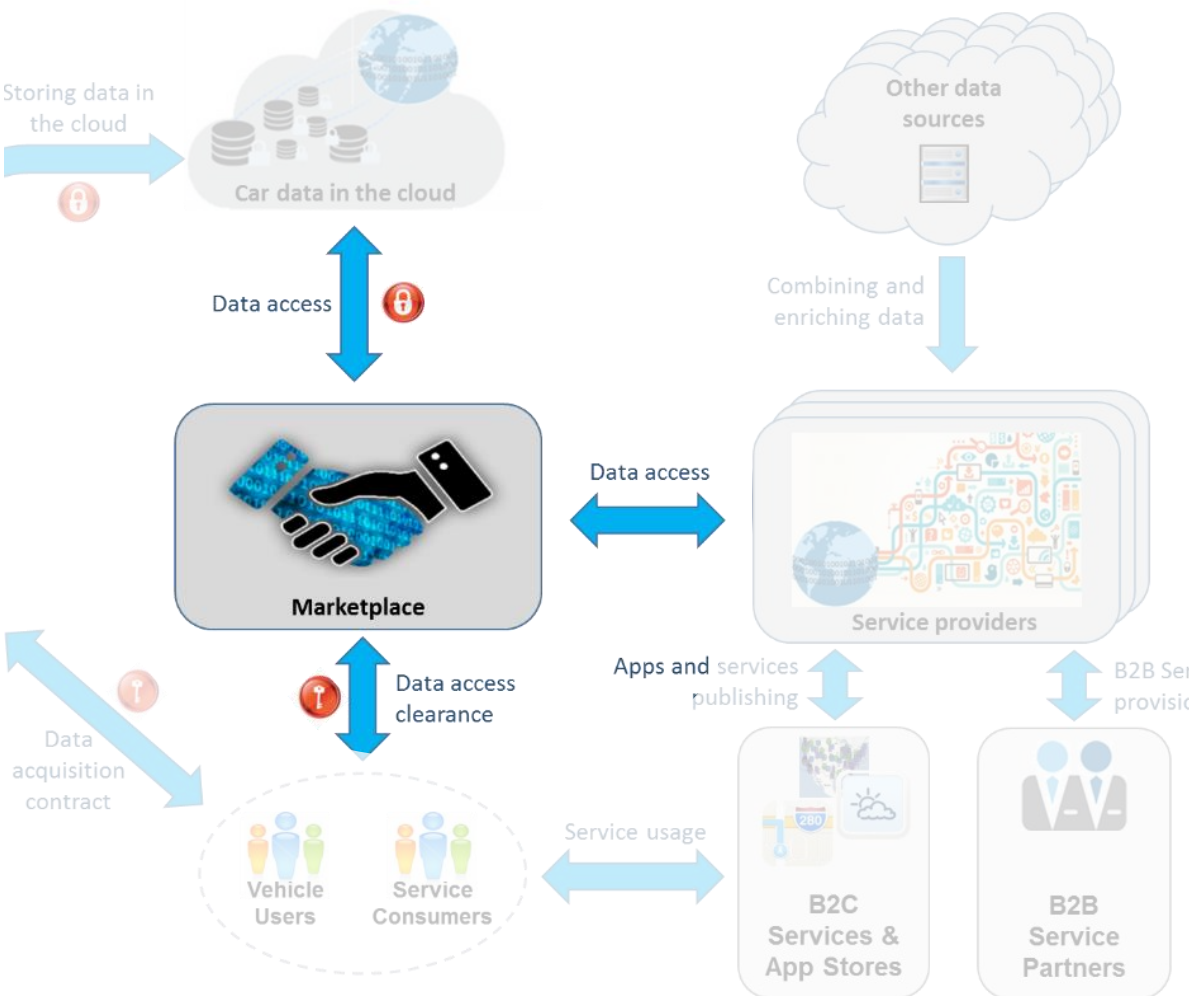
- CVIM **data catalogue** and statistics for Service Providers
- **Open Interfaces** enable barrier-free access to the Marketplace
- Processing of data requests from Service Provider
- **Data indexing** and management
- **Discovery** of requested data and identification of the according data owners
- Management of **access permissions**
- **Delivery** of data from the cloud to the Service Provider

The AutoMat Ecosystem
Service Providers
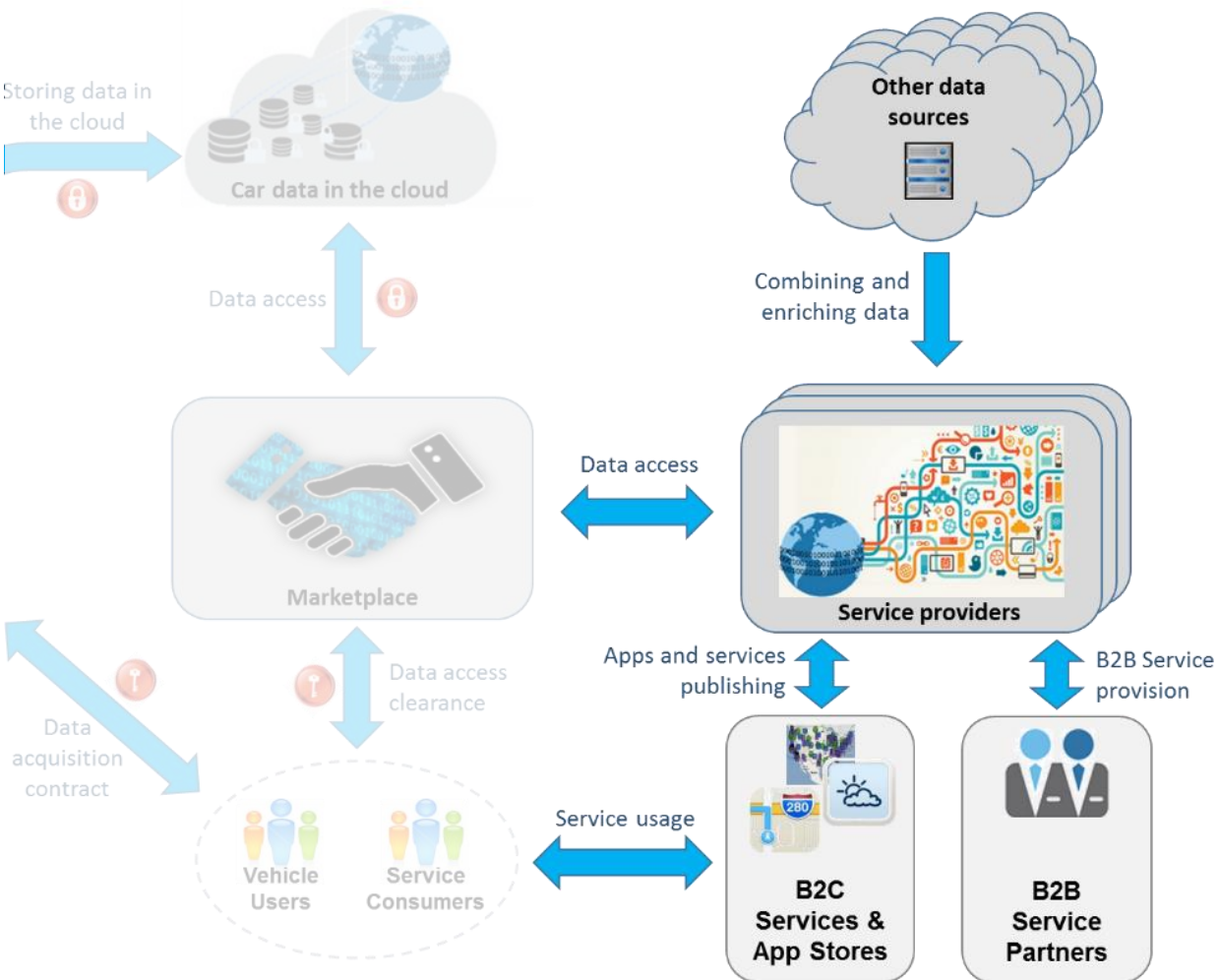
- **Service development** on basis of the harmonized CVIM data catalogue

- Forwarding and creation of **data requests**

- **Acquisition** of vehicle data from marketplace

- **Combination and enrichment** with additional data sources and algorithms

- Transformation of vehicle data into service relevant information

Success factors

- **Ecosystem**
  - ✓ External access to vehicle data enables viral growth of services provided based on such data
  - ✓ Attractive and innovative services are created in a similar fashion to the mobile device app world
  - ✓ Linking vehicle data with data from other sectors enables higher quality content
- **Data usage rights**
  - ✓ The business with data usage rights enables return flows from service providers and content providers
- **User acceptance**
  - ✓ The vehicle owner has incentives to provide his vehicle's data
  - ✓ The owner / driver can fully control which data he provides to which Service Provider

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