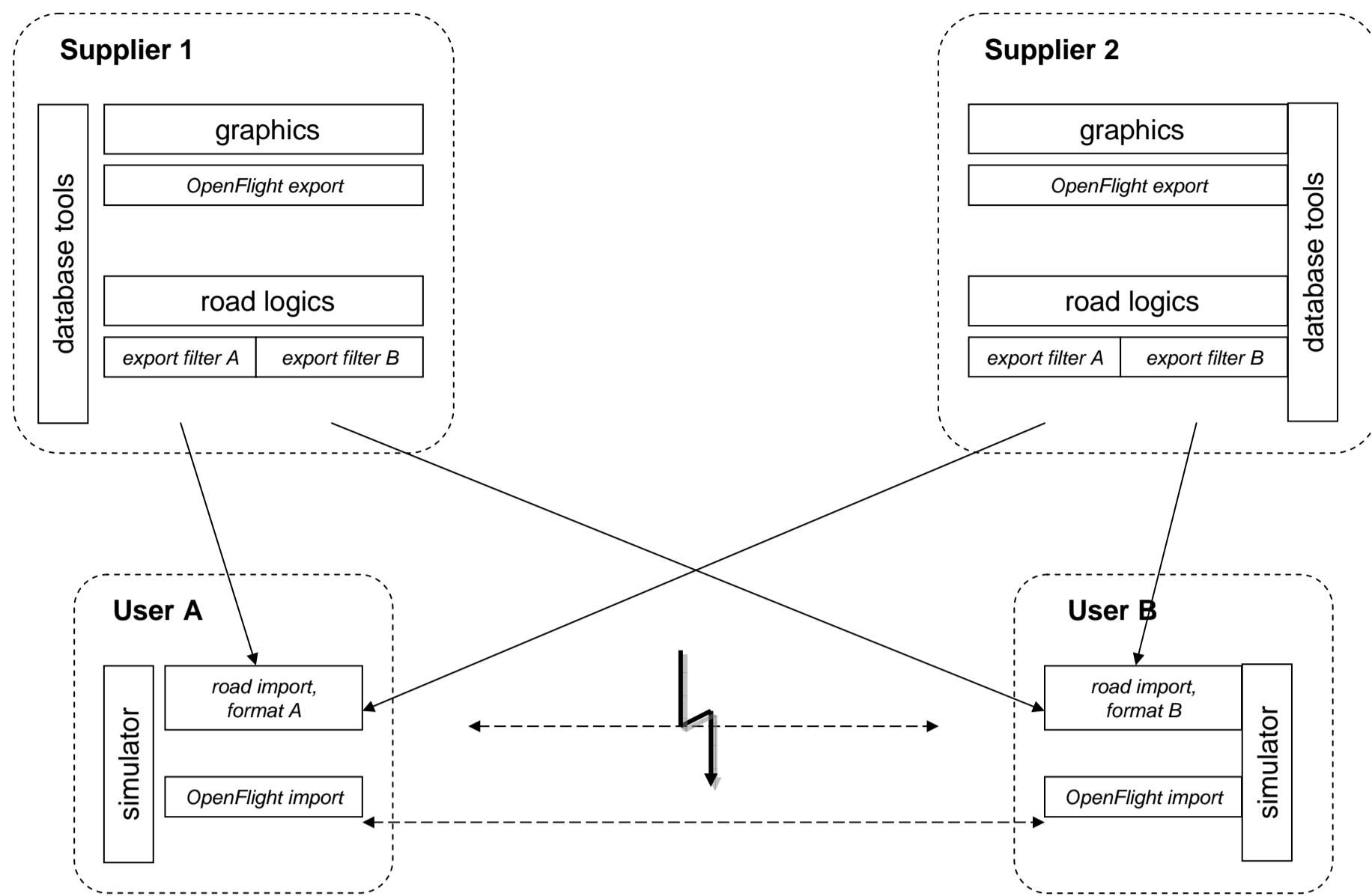


OPENDRIVE 2010 AND BEYOND – STATUS AND FUTURE OF THE DE FACTO STANDARD FOR THE DESCRIPTION OF ROAD NETWORKS

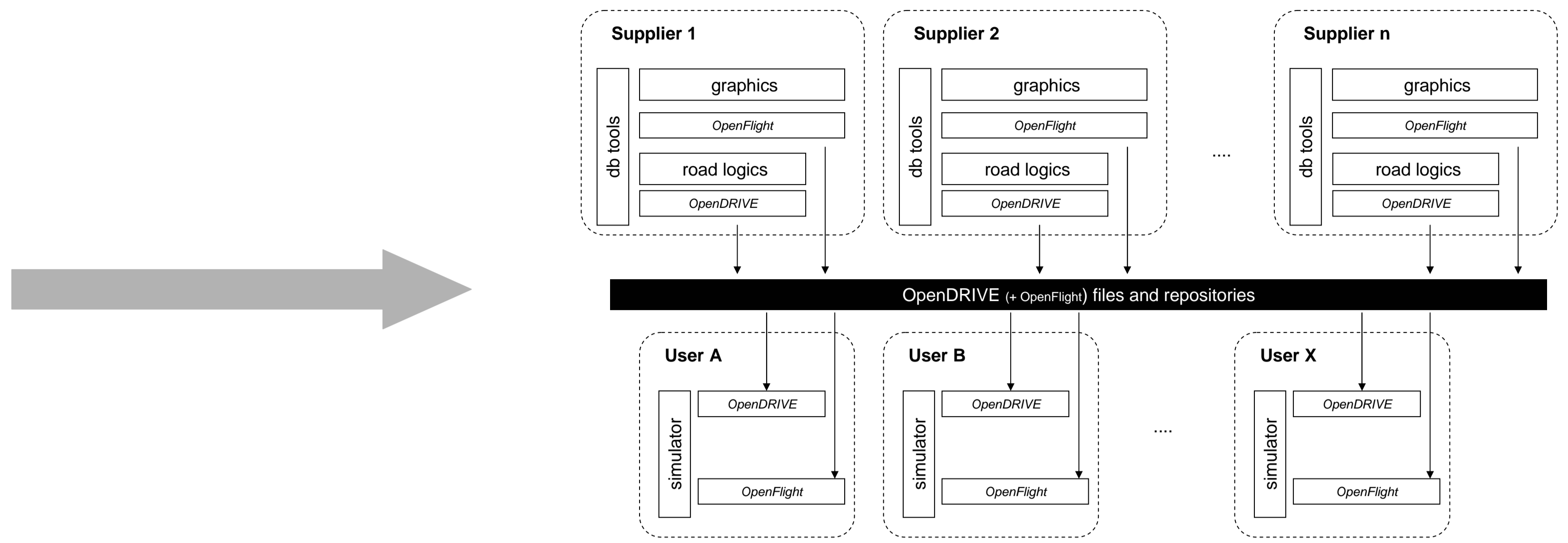
DSC 2010, Marius Dupuis – VIRES Simulationstechnologie GmbH, Martin Strobl – BMW Group Research and Technology, Hans Grezlikowski – Daimler AG

A Simple Idea



From Custom Solutions to a Common Solution

Achieving for road logics what had already been done for graphics

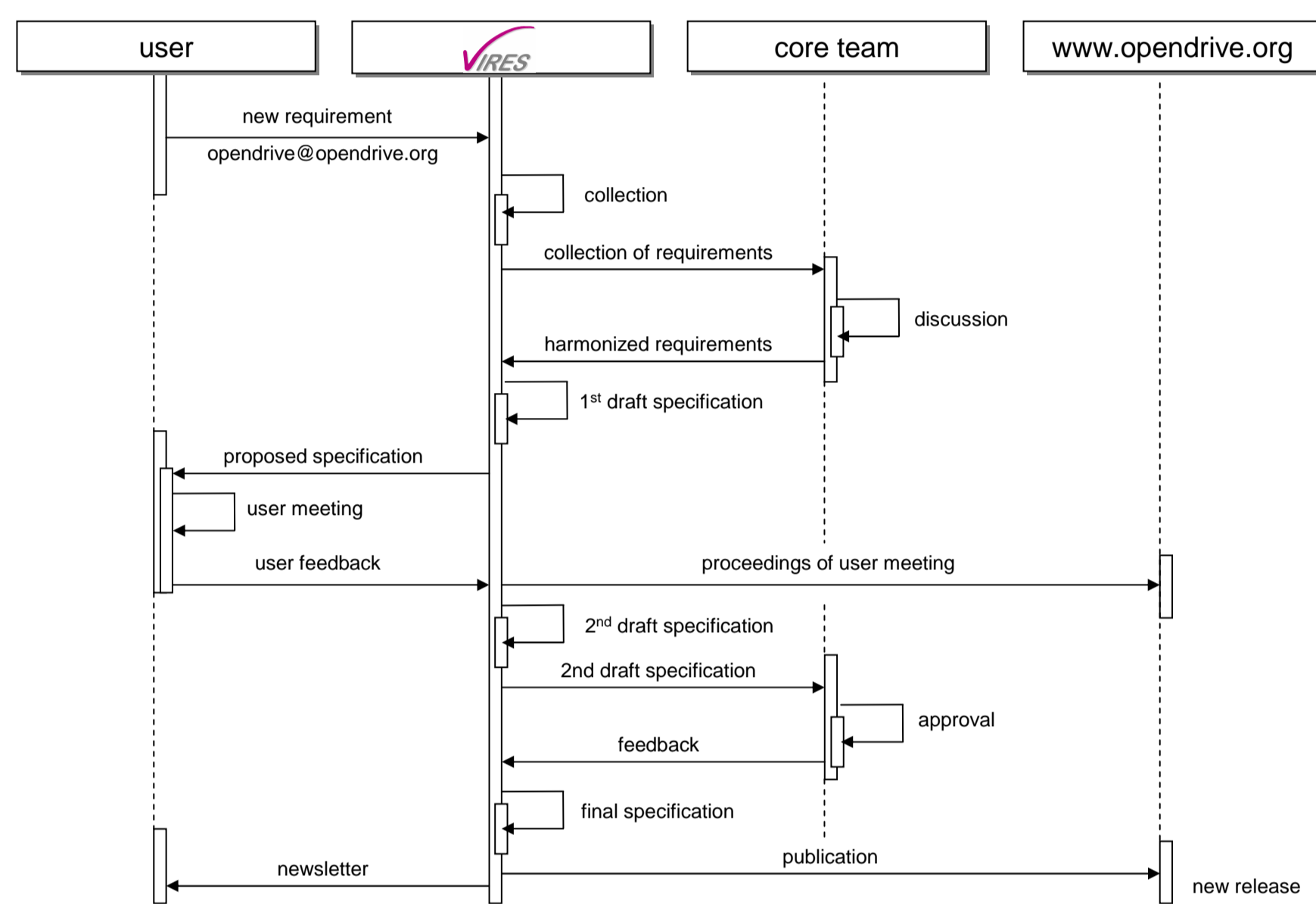


OpenDRIVE: Setting Standards Since 2006!

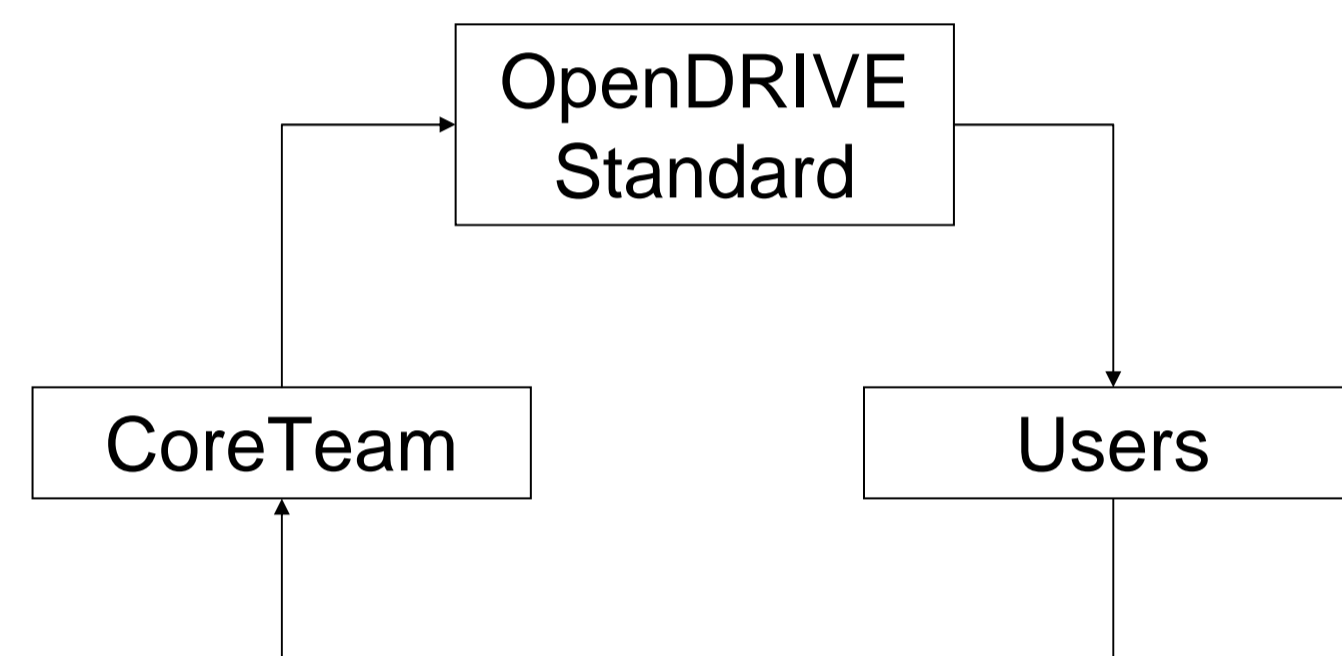
A Well Managed Format

OpenDRIVE is Managed by a Core Team of Driving Simulation Professionals

User requirements meet user experience



The OpenDRIVE Revision Process in Detail



Core Team

- Martin Strobl / BMW Forschung und Technik GmbH, Germany
- Hans Grezlikowski / Daimler AG, Germany
- Andreas Richter / Deutsches Zentrum für Luft- und Raumfahrt e.V., Germany
- Dr. Günther Nirschl / Fraunhofer-Institut IVI, Germany
- Ekkehard Klärner / Krauss-Maffei Wegmann GmbH & Co. KG, Germany
- Dr. Bernhard Bock / Rheinmetall Defence Electronics GmbH, Germany
- Ingmar Stel / TNO, The Netherlands
- Marius Dupuis / VIRES Simulationstechnologie GmbH, Germany
- Mats Lidström / VTI, Sweden

A Usable Format

Database Exchange Between BMW Group Research and Technology and Daimler

- more than just a proof-of-concept -

2009

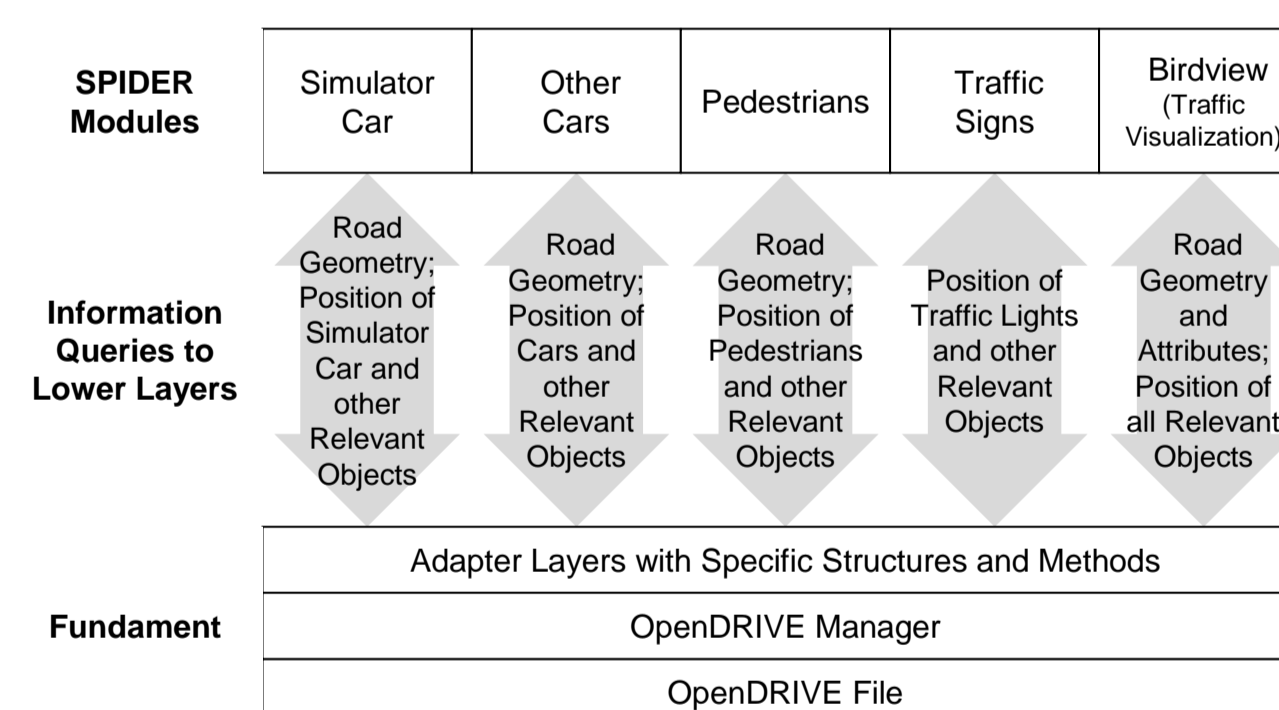
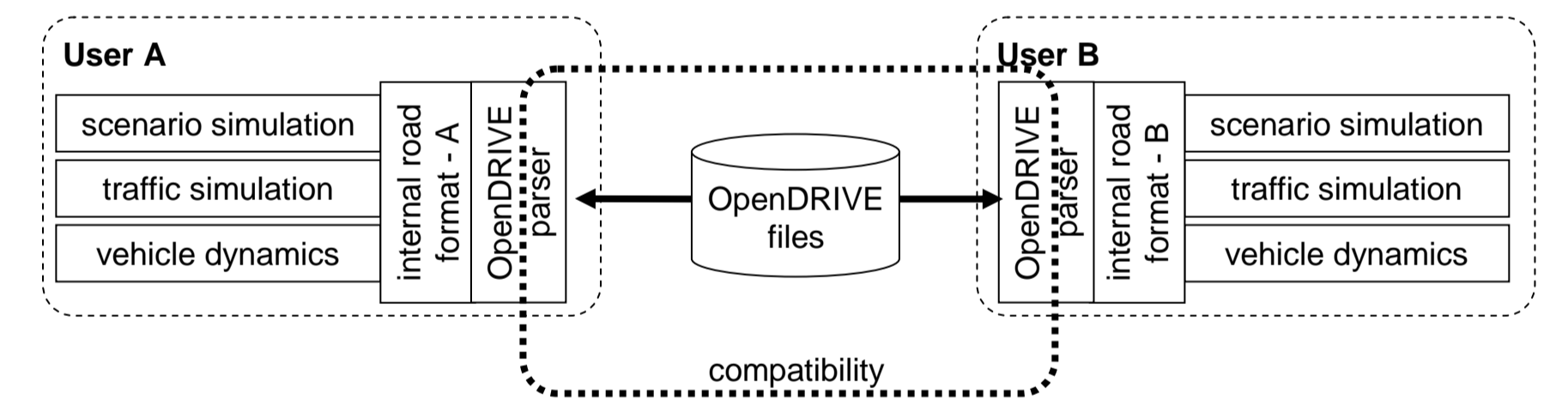
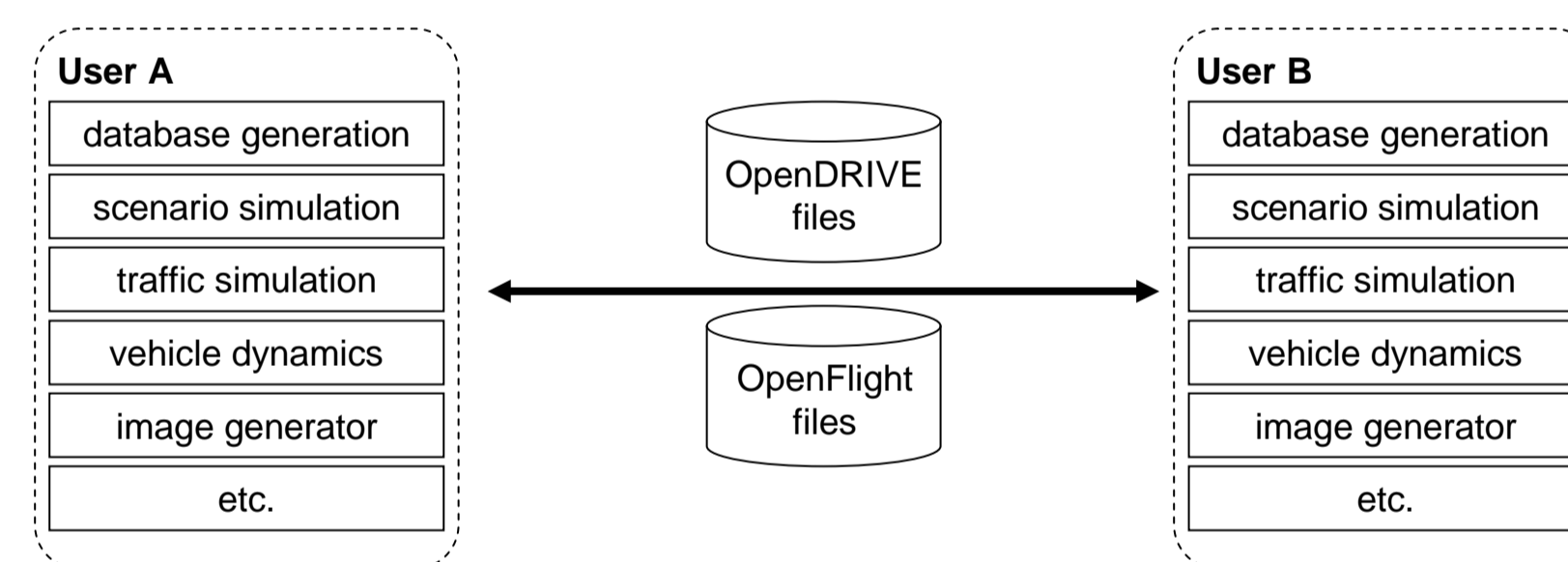
- Exchange of OpenDRIVE / OpenFlight database tiles for mutual use

Simulators

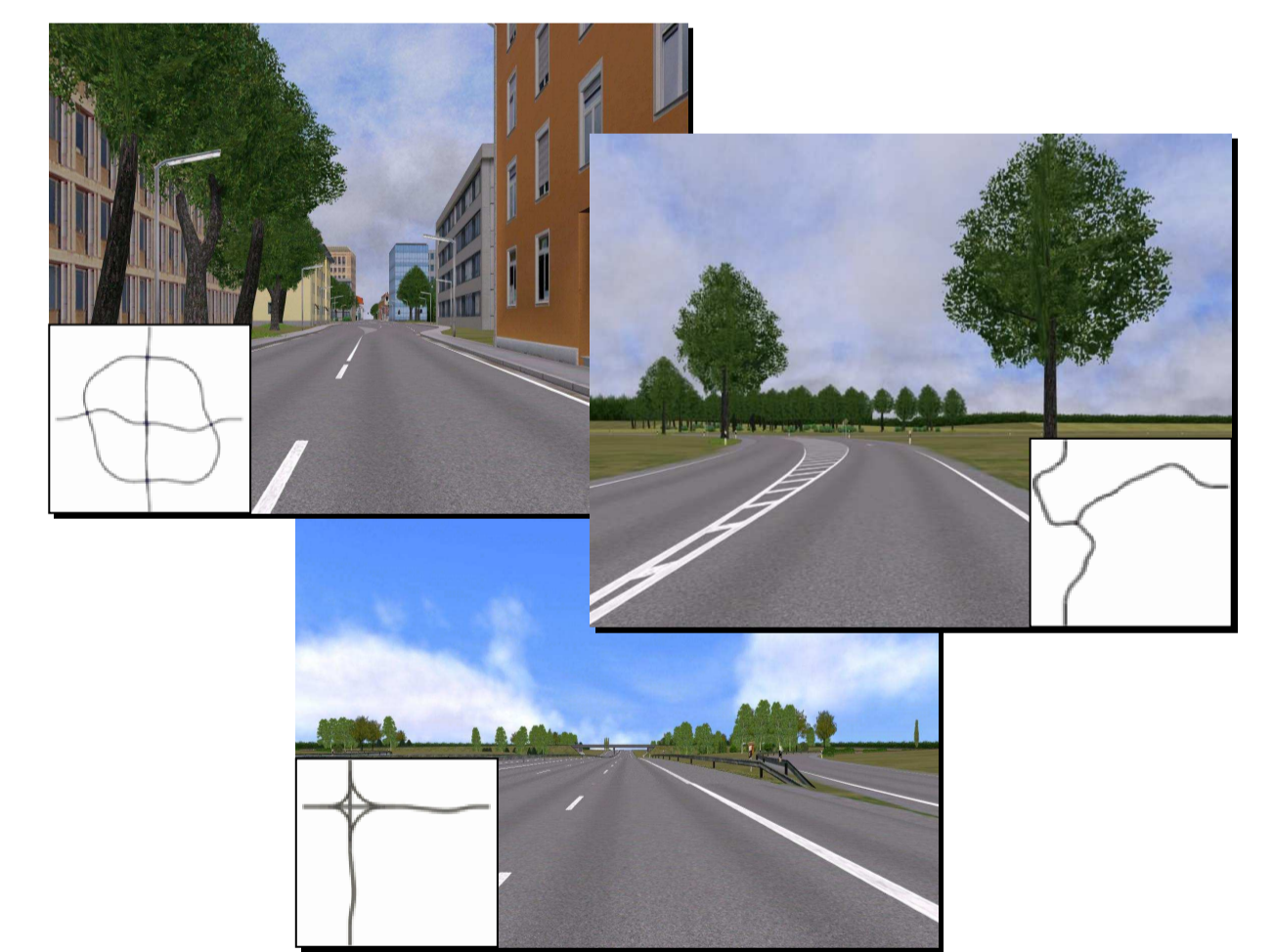
- Similar concepts but different software

Lessons Learned

- the exchange of databases actually works!
- details of the databases had to be harmonized in order to interpret technically consistent OpenDRIVE files in the same way within the run-time software (traffic etc.)



Software Layout (schematic) for the Simulators Involved in the Database Exchange



An Established Format

OpenDRIVE – Supported by a Broad User Base

vendor-independent solutions

Beyond Logics

User Base

- international
- simulator manufacturers
- simulator operators
- universities
- research institutes

Implementations

Various implementations of OpenDRIVE are founded on the format only and are, therefore, independent of any manufacturer



User List (just to name a few...and in alphabetic order)

Audi	Electronics Venture GmbH	Link to website...
BMW Group	Research and Technology	BMW Group Research and Technology applies OpenDRIVE® and is convinced by its key benefits like the facts that OpenDRIVE® is a comprehensive and community proven approach for describing road networks as well as it enables the exchange of software components and databases. Link to website...
DAIMLER		Daimler uses OpenDRIVE® in its driving simulators as an efficient road description standard and profits from well-proven utilization and exchange between different applications. Link to website...
Deutsches Zentrum für Luft- und Raumfahrt	DLR Institute of Robotics and Mechatronics	The OpenDRIVE® standard is used for road definitions in the context of simulations for the assessment of mechatronic vehicle components and vehicle dynamics control systems. Link to website...
Fraunhofer	IVI	OpenDRIVE® supports the efficient development of road networks in the Fraunhofer IVI driving simulator and facilitates the exchange with other research partners. Link to website...
KMW		Link to website...
MBtech	Mercedes-Benz technology	The MBtech Group uses OpenDRIVE® in its tool suite along the automotive development and testing chain as it is a very clever, flexible and de-facto standard format for road networks. Link to website...
Realtime		RTI has found the OpenDRIVE® standard to be comprehensive in its coverage of features needed for our autonomous traffic driving on correlated data. Link to website...
TESIS		Link to website...
TUM	Technische Universität München	The OpenDRIVE® standard facilitates efficient exchange of data between universities and industrial partners. Link to website...
VIRES		With OpenDRIVE® we were able to standardize key components of our tool-chain and make them available to a broad customer base without further adaptations. Link to website...
vti	Swedish National Road and Transport Research Institute	VTI, Swedish National Road and Transport Research Institute, is an independent and internationally prominent research institute within the transport sector. VTI is a world leader in several areas, for instance in simulator technology. VTI's high fidelity vehicle simulators use OpenDRIVE® as the standardized road database in order to enhance the software environment and be compatible with external simulator facilities. Link to website...

Excerpt from OpenDRIVE Website

OpenDRIVE is complemented by OpenCRG, an open source project for the standardization of road surface descriptions.

OpenCRG®
managing the road surface ahead



www.opencrg.org