ASAM | Association for standardisation of automation and measuring systems

Report from the ASAM International Conference 2015

Big Data in Future Car Development

Dec. 08. – 09. 2015, Dresden, Germany

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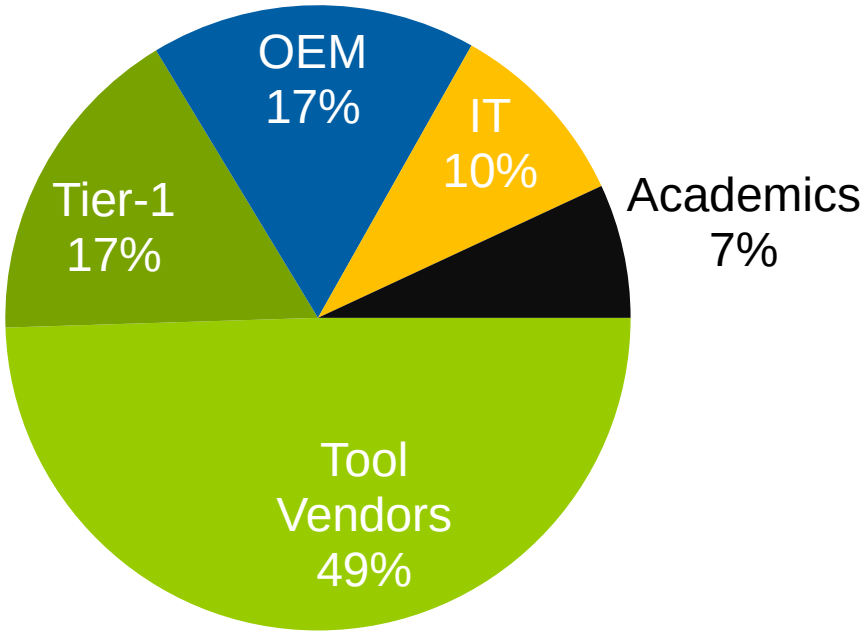
Big Data in Future Car Development

- Time: 08.-09. December 2015
- Location: International Congress Center, Dresden
- Purpose: Bringing experts from the automotive industry and IT-industry together to discuss solutions for Big Data topics.

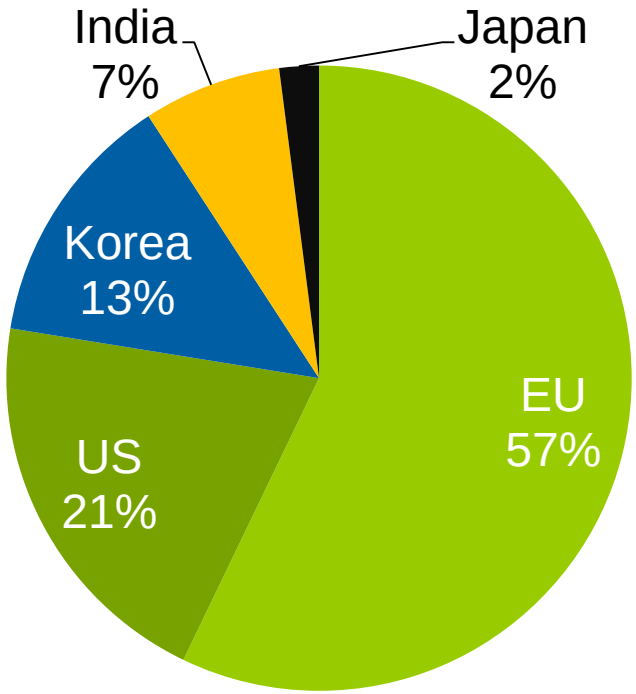
Attendance Statistics

- Total number of attendees: 132
- Attendees from outside Germany: 40 (from 12 different countries)
- Number of Exhibitors: 8

Distribution by User Group



Distribution by Region



Impressions

Session I: Big Data - Automotive Reality

Toscan Bennett, GM Europe

How Connected Cars Revolutionize the Driving Experience?

Alexander Huesmann, BMW

Big Data in the Context of Field Operational Tests (FOT) Performed at BMW

Matthias Tschersich, Elektrobit Automotive

Car-As-A-Sensor

Udo Schüppel, FSD Fahrzeugsystemdaten

Privacy by Design

Session I: Big Data - Automotive Reality

- GM OnStar System: "The key to customer loyalty"
  - Automatic crash response and emergency call service.
  - Remote control via smartphone App.
  - Vehicle diagnostics.
  - In development: Support for Android Auto & Apple CarPlay.
  - In development: Wifi Hotspot.
- BMW Field Operational Test: Collect data from real driving situations
  - Obtain statistical field data for the development of driver assistance systems
  - Typical research questions:
    - how often certain events occur (e.g. car on emergency lane, congestions)
    - how critical they are (e.g. minimum distance to the front vehicle)
    - how drivers handled the event
  - Research of the "Travel Jam Assist" feature of the 5-series:
    7 test vehicles. 80.000km driven. 50h with active travel jam assist.
  - Result: 125 overrides from the driver e.g. vehicles changing lanes, highway exits or construction area.
  - Conclusion: recognized need for future sensors and features.

Source: Opel Group, BMW AG

Session II: Big Data Drives Functionality

Jochen Kramer, Karlsruhe Institute of Technology (KIT)

Layer Model to Abstract Functions of Complex Intervening Driver Assistance System

Stefan Holz, Gigatronik

Validation of Driver Assistance Systems

Michael Rahier, University of Applied Sciences Aachen

Hybrid, ASAM ODS Compliant Context Modelling as Basic Concept of a Rule-Based Evaluation of Big Fleet Data

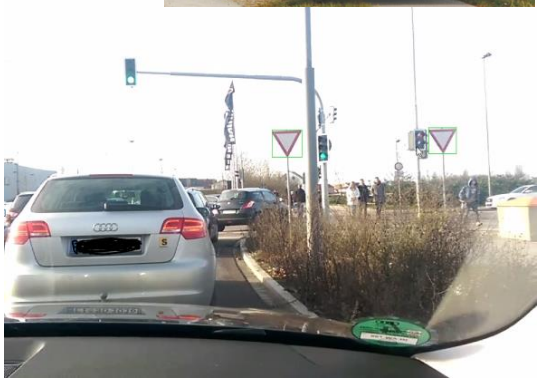
Blake Johnson, Stanford University

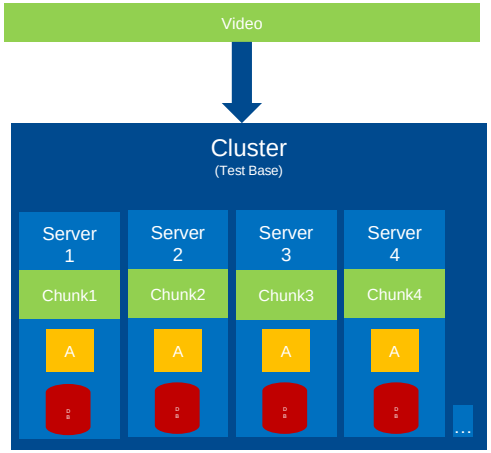
Impact of Big Data Technologies on Engineering Based Products and Services

Session II: Big Data Drives Functionality

Gigatronik: Validation of Driver Assistance Systems

- Traditional control systems: Sensors deliver time-series data
  ➔ processing via math functions
- Driver assistance systems: Sensors deliver data streams, e.g. video
  ➔ processing via complex image procession routines
- Problem: How to test driver assistance systems efficiently?
- Solutions:
  - create big library of recorded video sequences
  - distribute testing on computing clusters for parallel processing
- Test system uses latest technologies:
  - openMDM & ASAM ODS
  - HDFS
  - HBASE
  - YARN
  - Spark





Source: Gigatronik

Session III: Big Data Drives Automotive R&D

Thomas Kriegel, Audi

From Big Data to Smart Data - What is the Benefit of Great Data Volumes in Engineering and Manufacturing?

Thorsten Pohl, GM Europe Engineering

Simulation Data Management at General Motors Europe

Larry Hilkene, Cummins

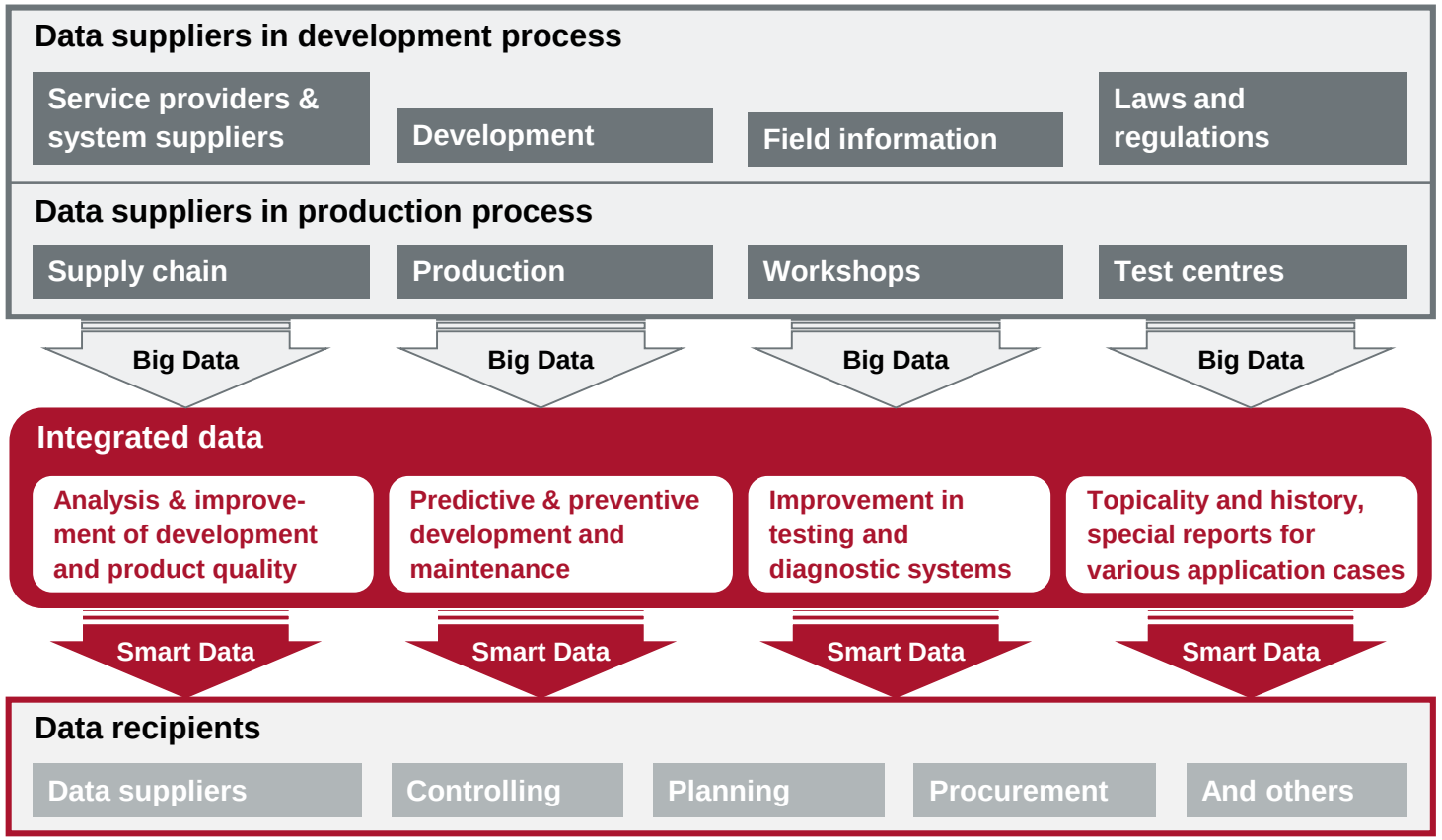
Big Data at Cummins and its Impact on Testing

Christian Rechner, Audi
Andreas Pawlik, NorCom Information Technology

A Scale-out Approach to Managing, Searching and Analyzing ASAM ODS-Based Measurement Data

Session III: Big Data Drives Automotive R&D

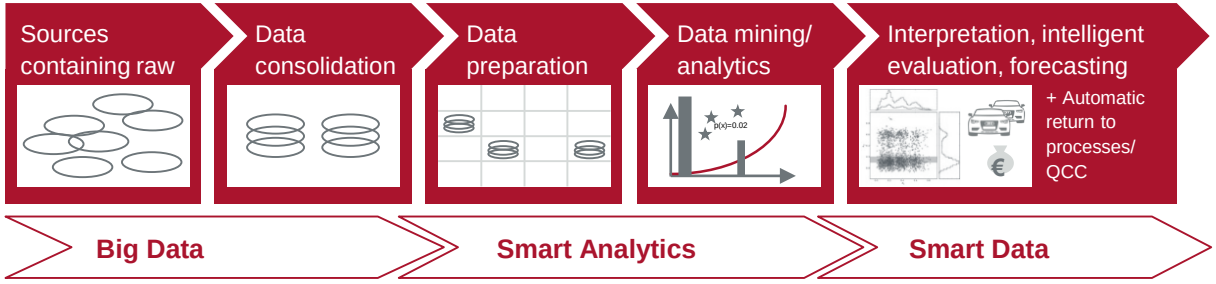
- Audi: "From Big Data to Smart Data"
  - Problem:



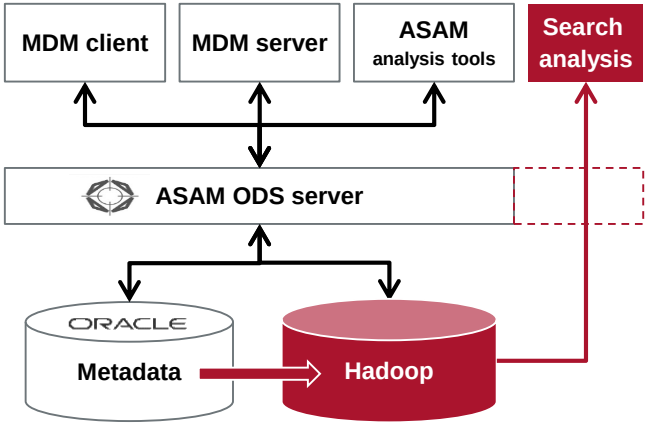
Source: Audi AG

Session III: Big Data Drives Automotive R&D

- Audi: "From Big Data to Smart Data"
  - Solution:



- Transformation of an ASAM-ODS-based system into a Big Data system with minimum data redundancy
- Creation of the possibility of searching for and analyzing measurement data via the complete database



Source: Audi AG

Session IV: IT Goes Automotive

Sören Auer, Fraunhofer-Institute for Intelligent Analysis & Information Systems (IAIS)

From Linked Data to Big Data - How the Interlinking of Distributed and Heterogeneous Data can Facilitate Automotive Development, Production and Services

Mark Quinsland, DataStax

Applying Patterns from the Internet of Things to Complement ASAM ODS

Greg Clifford, Cray

Fast Data, Big Compute- an HPC Perspective on Automotive Analytics and Simulation

Richard Crisp, IBM

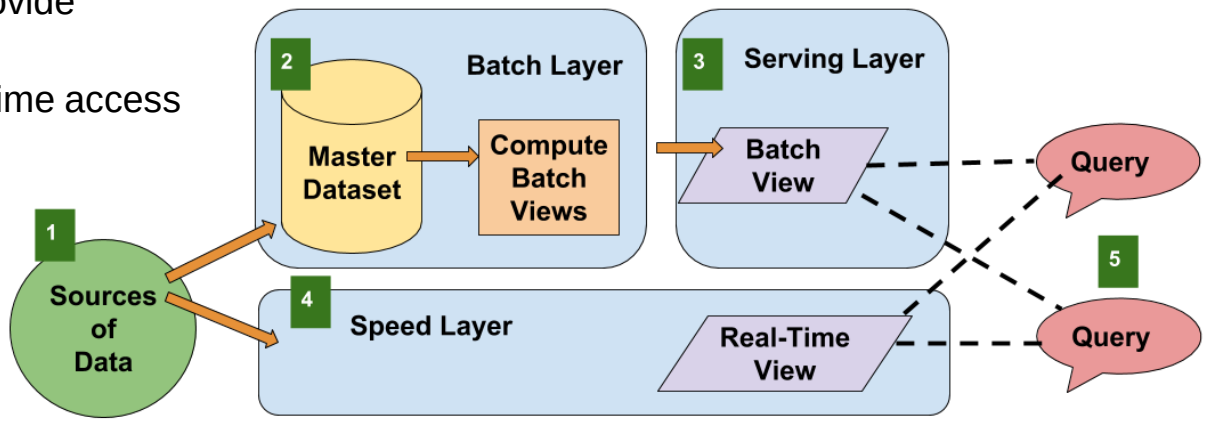
Big Data and Internet of Things - Insights Affecting the Automotive Industry

Session IV: IT Goes Automotive

DataStax: IoT Design Patterns for ODS

1. All data is routed to Batch and Speed Layers
2. Batch layer computes batch (aggregate) views
3. Serving layer indexes data to provide low-latency queries
4. Speed layer provides near-real-time access
5. Queries can choose where to obtain data as required

Lambda Architecture



- Recommendations:
  - Use lambda architecture for Big Data systems
  - Standardize a logical API (not physical) for ODS
  - Remove compulsion for relational databases as physical storage format for ODS
  - Use graph databases instead

Source: DataStax