New Ways for Cross-Domain Result Data Management within Powertrain Development

Dr. Gerald Sammer
Head of Product Management – Test Information Management
Testing Expo Stuttgart 2014
New Powertrain Innovations drive Data Complexity…
WHERE TO GO AND HOW TO GET THERE

Our Mission
For a world of clean and affordable mobility we provide leading technology and superior service to our customers.

The Whole Powertrain
Be the leader in technology and integration of the five elements of the powertrain including the interaction with the vehicle.

Integrated & Open Development Platform
Contribute to higher productivity and quality of customers’ powertrain development processes.

Production Orientation
Provide robust solutions for powertrain production and industrial environments.

Global Execution & Support
Provide the AVL global network of competencies and capacities to our customers.

Customer Orientation & Efficiency
Achieve an excellent level of customer orientation and efficiency in all processes so that customers promote AVL as first choice.

Our Vision
Be the industry’s preferred partner due to our competence for the whole powertrain system and our all-out customer orientated approach – AVL. Passion and Results.
What is the Integrated & Open Development Platform?

An automotive validation platform to support a seamless front loading oriented development process!
What is the Integrated & Open Development Platform?

- Efficient & Effective **Methods**
- Consistent & Scalable **Models**
- Comparable Result **Evaluation**
- Fast & Flexible **Data** Acquisition
- Compatible to Advanced **Process** Environments

AVL
Integrated & Open Development Platform
What is the Integrated & Open Development Platform?

- Office
- HiL
- Test Bed
- Drive Line
- Chassis Dyno
- Road

**Information Management**

- Efficient & Effective **Methods**
- Consistent & Scalable **Models**

Compatible to Advanced **Process** Environments

AVL

Integrated & Open Development Platform
AVL products provide services for data management

Data consistency

Methods
Models
Simulation Data
Evaluation
Calibration Data
Result Data
Processes
Further...

Data Mining

Data Integration

Data Infrastructure

Data Content
The Challenge
What lab operations is struggling with…

- Increasing data streams
- Increasing number of new data types
- Quick integration and common view of different data
- Integration of any product developer tools
The Solution
AVL Information Management Server

Clients / Users

Client Adapters

ASAM ODS SERVER SANTORIN™

Test Bed Adapters

Test Systems
**AVL Information Management Server**

### Clients
- Applications

### Test Order Preparation
- AVL Office
- AVL Concerto
- NI DIAdem
- Uniplot
- Matlab
- Excel
- Others

### Central Data Server
- Test Bed Parameters
- Result Data
- Operations Data
- Resources
- Test Methods and Processes

### Test Bed Adapters
- AVL Lynx
- AVL PUMA Open
- Measurement Devices
- 3rd Party Non-AVL

### Test Systems
- Battery
- Engines
- Vehicles
- Measurement Devices
- 3rd Party Non PUMA
AVL Information Management Server

- **Test Bed Integration**
- **Utilization Optimization**
- **Lab Planning**
- **Handle various data formats**
- **Integrate 3rd party test beds**
- **Integrate measurement devices**

Test Information Management
AVL Information Management Server
Result Processing

Needs & challenges:
- Increasing number of test results
- Different incompatible data formats
- Analysis tools from different suppliers

The solution:
- Seamless navigation across all data types
- Independent of data processing clients

Features:
- Central storage of result data independent of file format
- Flexible integration of data processing clients: AVL Concerto, DIAdem, Uniplot, Matlab, Excel
- Flexible integration of data sources (e.g. test beds): AVL Lynx, AVL Puma, 3rd party test beds, measurement devices via file plugin.

Benefits:
- Quick integration of new data sources
- Linkage of data from different sources
- Common navigation to any kind of data
- Easy plug-in of evaluation tools
AVL Information Management Server
Result Processing

Test Data Management

Evaluation

Concerto  Indicom  CAMEO  INCA  Matlab  Excel, …

Navigation

Data Access via AVL-Navigator

Central Data Storage

SANTORIN Data Backbone

Data Sources

Office  HiL  Test Bed  Drive Line  Chassis Dyno  Road
AVL Information Management Server
Result Processing

Test Data Management

- Concerto
- Indicom
- CAMEO
- INCA
- Matlab
- Excel, …

Data Access via AVL-Navigator

SANTORIN Data Backbone

- Data Format Plugins
- File Linking
- Access Methods
- Backup/Archiving

Evaluation

Navigation

Central Data Storage

Data Sources

Test Bed

Test Bed Measurements

INDICOM Files

INCA Files
AVL Information Management Server
Result Processing

Search Test
Select Test
Select Measurement

AVL Concerto Data Analysis
(e.g. Puma measurement)

INCA Data Analysis

AVL Indicom Data Analysis
Needs & challenges:
- Need for quick reaction times on problems and other events during lab operation
- Need for performance indicators for lab efficiency optimization

The solution:
- Web based status overview for all test beds
- Operational data evaluation of all test beds

Features:
- Online status of all test beds on one page
- Detail remote view for each test bed
- Remote data refresh of up to 1Hz
- Notification service based on test bed events
- Up/downtime categorization for test beds
- Graphical reporting of lab utilization

Benefits:
- Fast reaction time on test bed events with notifications and remote monitoring
- Lab performance indicators for continuous efficiency improvements of the lab
AVL Information Management Server
Planning & Scheduling

Needs & challenges:
- Many re-scheduling activities within the lab
- Hard to keep manually up-to-date resource planning information

The solution:
- Graphical planning systems for all resources

Features:
- Graphical planning overview for tests
- Automatic conflict detection for planning problems
- Different planning views
  - Gantt chart for long running tests
  - Calendar view for short tests
- Considers maintenance intervals

Benefits:
- Optimization of lab’s resource utilization
AVL Information Management Server
Test Bed Integration

- Central storage for test parameters
- Central storage for test results
- Consistent management of channel definition in order to get comparable results
- Integrated security in order to manage permissions for the whole lab
AVL Information Management Server Measurement Device Integration

- Seamless integration of any kind of data types
- Load ramps for different file formats
  - ATF-Classic
  - ATF-X
  - MDF
  - CSV
  - Excel
- Easily extendible to new formats
- Transparent navigation across all data types
AVL Information Management Server
Third Party Test Bed Integration

- Flexible integration of 3rd party test beds
- Load ramps with error handling for data import
- Notification service
- Channel mapping during import of data
- Open interface for developing new plugins
Selection of Reference

- World top 10 car makers use AVL SANTORIN
- > 300 SANTORIN installations
- > 2500 test beds
- From 1 test bed up to > 100 test beds
- Application fields: engine, powertrain, component, chassis dyno and battery test beds
New Ways for Cross-Domain Result Data Management within Powertrain Development

Dr. Gerald Sammer
Head of Product Management – Test Information Management
Testing Expo Stuttgart 2014