IDS@BKM – GAINING TRANSPARENCY IN AUTOMOTIVE SUPPLY CHAINS

IDSA Winterdays · Paris · December 4, 2019

VOLKSWAGEN

thyssenkrupp

Fraunhofer ISST
OVERVIEW

- Problem and Vision
- Use Case Scope and Focus
- Technical Concept
  - Requirements
  - Data Sovereignty
  - Prototype Mockups
- Lessons Learned
- Request for Feedback from IDSA Community
  - Legal Aspects
  - Proof of Economic Efficiency
OEM group wide parts supplies controlled by corporate logistics
Scenario 1 – Optimize DCM Process

- Close correlation between Demand & Capacity Planning (DCP) and Production Schedule
  - Problem: Deviation in consumption and output leads to contradiction of delivery schedules
    - Double set-up of safety-stocks: Suppliers and OEM
- DCM process as supervisory authority

[Diagram showing the flow of parts and communication between tiers and OEMs]
Scenario 2 – Optimize Shortage Handling

- Conventional exchange of data (Excel-email-telephone) in case of shortage
- Increase of complexity in case of shortage
Scope of the Project

- **Objective**
  1. Improvement and increase of planning basis and reliability
  2. Early detection of shortage situation at any stage of the supply chain
  3. Support in case of shortage

- **Requirements**
  - Match of concept and prototype with other relationships within the supply chain
  - Avoidance of setting up a tailored solution limited to Volkswagen and thyssenkrupp only
  - Exchange of inventory, demand and capacity information coequal with data sovereignty is mandatory
  - Option of iterative request for capacity data in the supply chain
  - Ensurance of mutual benefits as driver of adoption to other relations

Secure and sovereign data exchange
Selected Supply Chain
Phase 1 – since June 2019

- Focus
  - Optimize DCM
  - Optimize shortage management
- Project scope
  - Concept
  - Prototype

Objectives
- Identify Requirements
- Test technology boundaries
- Develop Prototype

2nd-Tier

e.g. ACT Module

1st-Tier

Salzgitter (Germany)

Ilsenburg Valvetrain (Germany)

Engine construction

Vehicle construction

\[\text{Focus:} \text{ Optimize DCM, Optimize shortage management, Concept, Prototype}\]

\[\text{Objectives:} \text{ Identify Requirements, Test technology boundaries, Develop Prototype}\]
Selected Supply Chain
Phase 2 – Continuation

- Focus
  - Optimize DCM
  - Optimize shortage management
- Project scope
  - Adjust concept
  - Customize prototype
- Objectives
  - Confirm requirements
  - Enhance and validate concept
  - Improve prototype

- Physical Supply Chain
  - IDS
  - Volkswagen
  - thyssenkrupp

2nd-Tier

1st-Tier

Engine construction

Vehicle construction

2nd-Tier

Phase 2

e.g. ACT Module

Salzgitter (Germany)

Volkswagen

Ilsenburg Valvetrain (Germany)

Volkswagen

Volkswagen

Audi

Audi
Vision: Standardized Data Exchange through Information Propagation Based on IDS

- Procedure
  1. Determine information requirement on own supply chain level
  2. Transmission of information requirement to respective suppliers, if available information are not sufficient
  3. Transmission of requested information

Recursive
Repeat 1–3 on each supply chain level

Requirements

General
- Exchange of more information than today
- **Transferability to other supply chain participants**
- **Ensurance of mutual benefits** as driver of introduction to other relations
- Parametrizability of algorithms and connections (e.g. interval or time of transmission)

Visualization and Export
- Data to be visualized in dashboards
- Technical security of dashboards in order to guarantee maximum **data sovereignty**
- Transfer data to dedicated systems if permission is granted

Data transmission
- Availability of **data on demand**
- Periodical transfer of information
- **No live-push of data**

Governance
- Dataset defined by sender (last snapshot vs. history) turn up in IDS connectors
- **Origin (data connection) and supplied terms of use must be stored per information object**
- Consensus procedure to log data access (signature mechanism)
- Any data **connection to be defined and accepted separately**
- Terms of use to be attached in case of export of information to other systems
Data Exchange Concept

1st-Tier IDS Connector
Logic
Policies
Log
Filter
REST-API

1st-Tier IDS Connector
Logic
Policies
Log
Filter
REST-API

2nd-Tier IDS Connector
Logic
Policies
Log
Filter
REST-API

OEM IDS Connector
Logic
Policies
Log
Filter
REST-API

Usage policies and data
Sovereign data exchange

Other Systems
No Data Sovereignty

Other Systems
No Data Sovereignty

Other Systems
No Data Sovereignty

Data flow  Control flow
## Data Sovereignty – Access Control

**Access Control**
Define parameters and boundaries of data to be transmitted between IDS Connectors

**Usage Control**
Define policies and rules to be obtained by IDS Connectors

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Data</strong></td>
<td></td>
</tr>
<tr>
<td>Type</td>
<td>Demand / Output</td>
</tr>
<tr>
<td>Granularity</td>
<td>Location (overall, site, part group, part)</td>
</tr>
<tr>
<td>Horizon</td>
<td>Time based (e.g. week 2-4)</td>
</tr>
<tr>
<td><strong>Update</strong></td>
<td></td>
</tr>
<tr>
<td>Type</td>
<td>Scheduled (e.g. 1x/week, 1x/day)</td>
</tr>
</tbody>
</table>

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**Notes:**

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# Data Sovereignty – Usage Control

## Dimension

<table>
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<tr>
<th>Dimension</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allowed processing</td>
<td>Demand and Capacity Management</td>
</tr>
<tr>
<td>Access data via interfaces</td>
<td>Allow API access to data</td>
</tr>
<tr>
<td>Data retention</td>
<td>Duration (time based: e.g. five hours, two days, one week, unlimited)</td>
</tr>
<tr>
<td>History of data</td>
<td>Number of snapshots (1..n)</td>
</tr>
</tbody>
</table>

## Access Control

Define parameters and boundaries of data to be transmitted between IDS Connectors

## Usage Control

Define policies and rules to be obtained by IDS Connectors

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A Selection of Possibilities for Protecting Data in Frontends

- Protect interfaces with captcha input if crawling is detected
- Limit the number of data updates to $x$ incidents per day in case of on-demand requests
- Increase data retrieval effort
  - Narrow data view for required information
  - Show data as image
  - Disable text selection, copy/paste, print, keyboard shortcuts, etc.
- Tracking Dots / Watermarks or similar for tracking screenshots
- Prevent photographing by text interlacing (effect is like a picture of a rotating rim)

https://github.com/JonasCz/How-To-Prevent-Scraping
Mockups
Schedule

- **3 Months**
  - Onboarding and project scoping

- **3.5 Months**
  - Concept development

- **5 Months**
  - Prototype development

- **1 Month**
  - Piloting and evaluation
Lessons Learned

- Guideline of meetings & discussions: “…it’s a use case only…”
- Agree to clear definition of technical terms to be used in drafts, technical specifications etc,
  - Ongoing maintenance of a common key-word-glossary
- Get rid of incomprehensible IT-terminology e.g. in discussions, presentations etc.
- Reiterate frequently conclusions, statements, evidences, propositions
- Frequent information exchange from other projects with similar scopes
- Frequent matching of findings and conclusions with other projects
- Signalize management awareness and interest to attendees
- Keep things simple!
Input - Support – Discussion welcome

Legal Aspects
- Ongoing process
- Input from Experts required

Economic Efficiency
- Definition of KPIs
- Early notice of potential shortage situation (e.g. days/weeks ahead)
- Reduced time of shortage analysis
- Decrease of number of shortage events/FTE
- Cost-impact of shortage events and measures in order to avoid
- Standardized questionnaires to capture the before/after-effect
The Experts

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