



Managing Vehicle Life Cycle: Engineering, Production & Operation, using Digital Twin and Simulation, based on VSS

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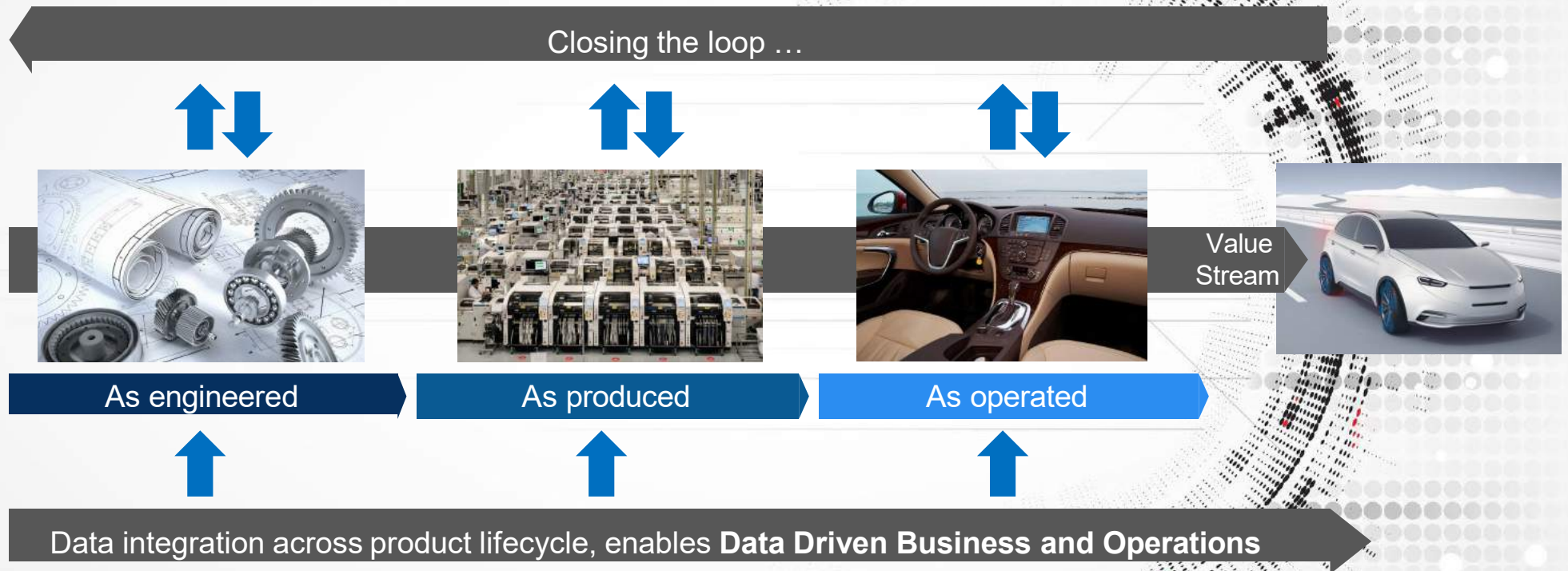
Agenda & Background

COVESA Members Highlights

- COVESA's Vehicle Signal Specification (VSS) is a common approach for describing vehicle data.
- The automotive industry is adopting the use of Digital Twin and Simulations in the design and manufacturing of vehicles.
- Data and data models, such as VSS are critical for both Digital Twin and Simulations.
- Bosch's speakers will explore the VSS standard and its siblings with a particular focus on its fitness for commercial vehicles.
- Using VSS for vehicle life cycle, in engineering, manufacturing and operations, will provide tremendous benefits to the industry by removing silos approaches.

Digital Twin Concepts Applied to Vehicle Data

We are working on the Data Driven Life Cycle



Mercedes -Benz Using NVIDIA Omniverse for Digital Twin

•Mercedes -Benz is using digital twins for production with help from NVIDIA Omniverse, a platform for developing Universal Scene Description (OpenUSD) applications to design, collaborate, plan and operate manufacturing and assembly facilities.

•The Kecskemét plant is the first with a full digital twin of the entire factory.

•Benefits:

- Accurate Simulation for Assembly Line Optimization
 - 50% Reduction in Coordination Processes with Suppliers
 - 2x Speed for Hall Construction, Improved Process Quality
 - Preventing Costly Production Shutdowns with Non-disruptive Production Line Validation
 - Factory Layout Optimization via Simulations
 - Efficient New Line Design and Change Management with Reduced Downtime, Enhanced Product Quality
- The use of digital twins can accelerate planning and implementation of projects by weeks, as well as ensure significant cost savings for launching new manufacturing lines.



VDA 5050 Version 2.0.0, January 2022

- The interface is based on the requirements from **production and plant logistics in the automotive industry**.
 - According to the formulated requirements, the requirements of intralogistics cover the requirements of the logistics department, i.e., the logistical processes from goods receiving to production supply to goods out, through control free navigating vehicles and guided vehicles.
- The communication interface is designed to support the following requirements:
 - Control of a minimum of 1000 vehicles
 - Enabling the integration of vehicles with different degrees of autonomy
 - Enable decision, e.g., regarding the selection of routes or the behavior at intersections
- Communication is done over wireless networks, considering the effects of connection failures and loss of messages.
- The message log is Message Queuing Telemetry Transport (MQTT), which is to be used in conjunction with a JSON structure.

VDMA Offices





Proposed Charter for the BoF

Points requiring investigation:

- Can we align VDA 5050 interface/model based on the requirements from production and plant logistics in the automotive industry with COVESA CVI/VSS data and service models for connected vehicle?
- Can we create the life cycle management for vehicle design, production/assembly and postproduction?
- This should include the Digital Twins, for vehicle and factory, and “connected” simulation tools.