

SASIG-CBDX
Collaborative BOM Data eXchange
Use Cases





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FOREWORD

Since several years, for resource optimization or provision of the new value, Automotive industry has set up new business scenarios between an OEM and other partners such as OEMs, Joint Ventures, Design partners. These new scenarios require a high level of collaboration between companies, and increased needs for data exchange in many domains.

In engineering domain, the exchange of Bill Of Materials (BOM) and Digital Mock-Up (DMU) data is crucial to support the collaboration between partners. If DMU data exchanges are already used, BOM data exchange is an emerging requirement, and is very complex. This can be explained by the fact that each company implements their own principles, rules and mechanisms for BOM data management, which introduce issues for data compatibility and mapping.

Together, the Japanese Automotive Manufacturers Association (JAMA) and Groupement pour l'Amélioration des Liaisons dans l'Industrie Automobile (GALIA) have initiated bilateral discussions to a project on this topic which has been transformed into a SASIG workgroup, supported by AIAG.

The SASIG Collaborative BOM Data eXchange (SASIG-CBDX) Project is developing a set of recommendations to guide companies to effective and efficient data exchange practices. The recommendations are partitioned into four topic areas: 1) Introduction - White paper, 2) Use case, 3) BOM basic concept, and 4) Data exchange mechanism/organization.

This document contains description of selected use cases on collaborative BOM data exchange within the automotive industry. 5 use cases are introduced and identified respectively as Vehicle Cross-Production, Vehicle Cross-Badging, Engine Carry Across, Platform Common Development and Design Supplier. It provides a company with overview and detailed explanation using process flow for each use case.



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1 INTRODUCTION ON BOM DATA EXCHANGE USE CASES

1.1 Overview of selected Use Cases

Since several years, for resource optimization or provision of the new value, Automotive industry has set up new business scenarios between an OEM and other partners such as OEMs, Joint Ventures, Design partners. These new scenarios require a high level of collaboration between companies, and increased needs for data exchange in many domains.

BOM Data Exchange can be implemented in several use cases. Each use case is characterized by a specific jobshare (activity distribution between partners), different types of BOM data exchange (eBOM, mBOM, sBOM), and consequently their own rules for the exchange and management of data.

This deliverable provides various use cases which are regarded as most representative of the current practices within the automotive industry.

5 Use Cases have been selected :

- Vehicle Cross-Production
- Vehicle Cross-Badging
- Engine Carry Across
- Platform Common Development
- Design Supplier



1.2 Basic principles of collaboration

In the next chapter and beyond, 5 selected use cases are depicted. In order to help understand each use case, this section provides how to read each diagram implying collaboration basic principles.

Each use case comprises overview, detailed explanation and detailed process diagrams.

Overview is depicted by high level of diagram including specific symbols and arrows. Collaboration partners such as OEM1/OEM2 or OEM/Supplier, roles and responsibilities performed by each partner and main process flows are presented in each diagram. Each arrow shows process flow in the use case context and is classified as either partner internal or external (cross-partner) process with a different color. Each process flow is usually accompanied with data exchange between related systems, information sharing between involved departments or delivery of physical products such as an engine component to be carried across.

Diagram is composed of 5 phases such as Planning, Engineering, Manufacturing, Sales and After-sales and collaboration outline of each phase in each use case context is explained. In collaboration of automotive industry, data exchange/sharing with eBOM and DMU plays an important role between partners.

In order to clarify the differences among selected use cases, 9 criteria (see Table 1 below) are used for the explanation of each diagram.

Criteria	Explanation
Scenario Description	Purpose and outline of the collaboration
Data Exchange Frequency	Exchange frequency and timing
Content of Exchanged Data	Exchanged data type for collaboration e.g. Product Specification, Product Configuration, Part Specification
Data Maturity	Maturity level of data exchanged for collaboration e.g. Formal, Released, WIP
Implied Systems	Systems involved in the collaboration e.g. eBOM, PLM, DMU
Data Selection/Preparation	Needed data selection and preparation for the collaboration e.g. Selection of structure variants, Formatting
Data Transfer Direction	Clarification of the sender and the receiver in the collaboration
Roles and Responsibilities	Roles and Responsibilities of each partner, when data is prepared and converted
Change Management	Necessity of change management, and how to handle the changes

Table 1 – Criteria for Use Case

In the detailed process diagram, further breakdown of data exchange, information flows and business processes are described along the lifecycle of a vehicle product.



2 USE CASE 1 – VEHICLE CROSS-PRODUCTION

2.1 Overview

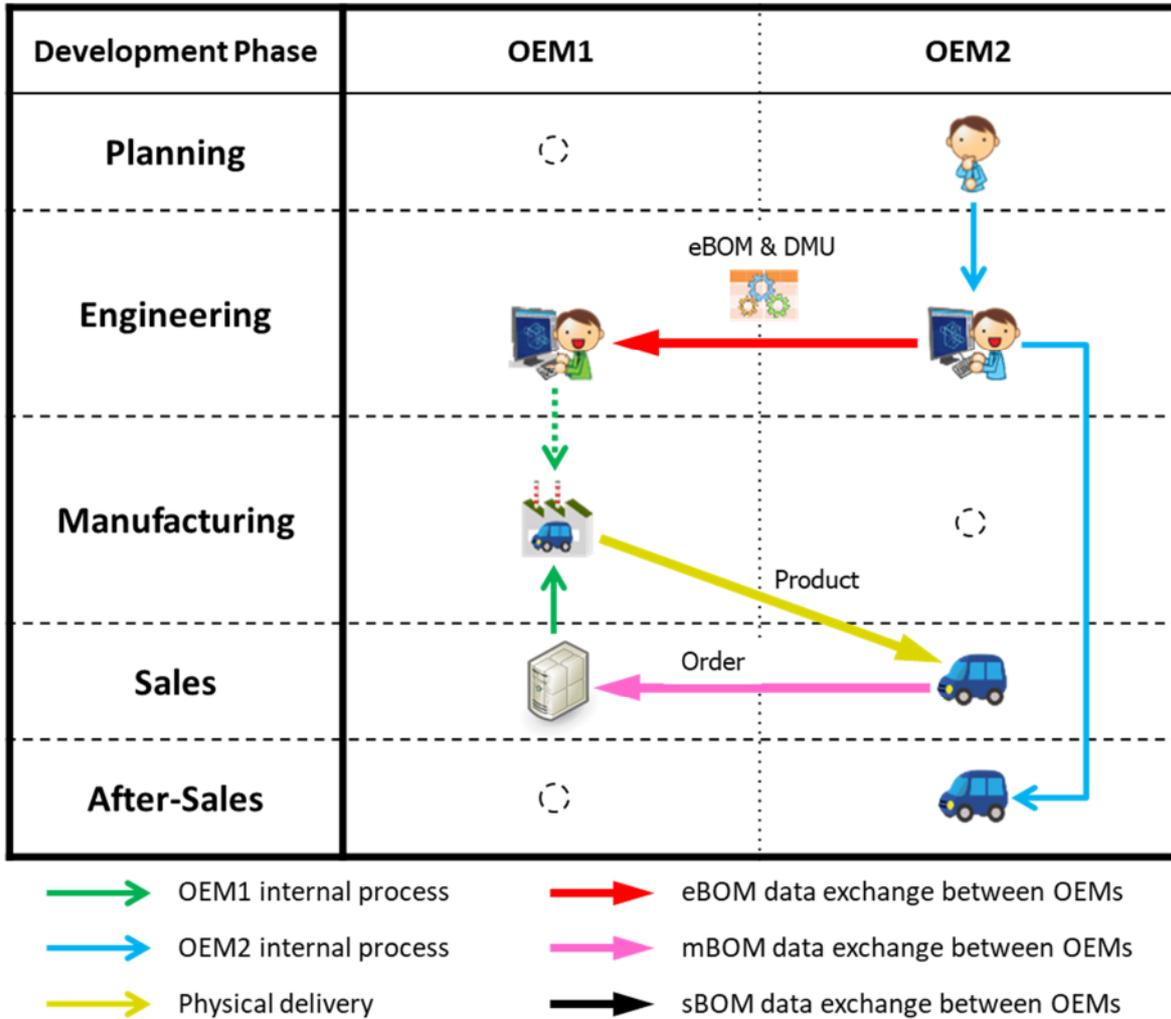


Figure 1 – Overview of “Vehicle Cross-Production” use case



2.2 Use case detailed explanation

Scenario Description :

OEM2 plans & develops a car & commissions production to OEM1.

Data Exchange Frequency :

From manufacturing preparation by OEM1, OEM2 provides OEM1 with the result of engineering development (eBOM, CAD/DMU), and regular updates following modifications after that issues have occurred

Contents of Exchanged Data :

- Product specification : car family with its decomposition in car models if necessary, specifications and their category.
- Product configuration : part usage that defines the condition of usage of each part within a car family or a car model based on its specifications.
- Part specification : definition of each part or assembly through its metadata, properties and assembly definition if necessary.

Data Maturity : Formal data

Implied Systems : eBOM/PDM/DMU

Data Selection/Preparation :

- Selection : eBOM containing list of parts corresponding to OEM1 vehicle with 3 layers of eBOM data.

Data Transfer Direction : OEM2 to OEM1

Roles and Responsibilities :

- OEM2 (Preparation) : OEM2 filter for manufacturing
- OEM1 (Conversion) : OEM1 convert for own eBOM system & rules

Change Management : Each formal version



2.3 Use case detailed process

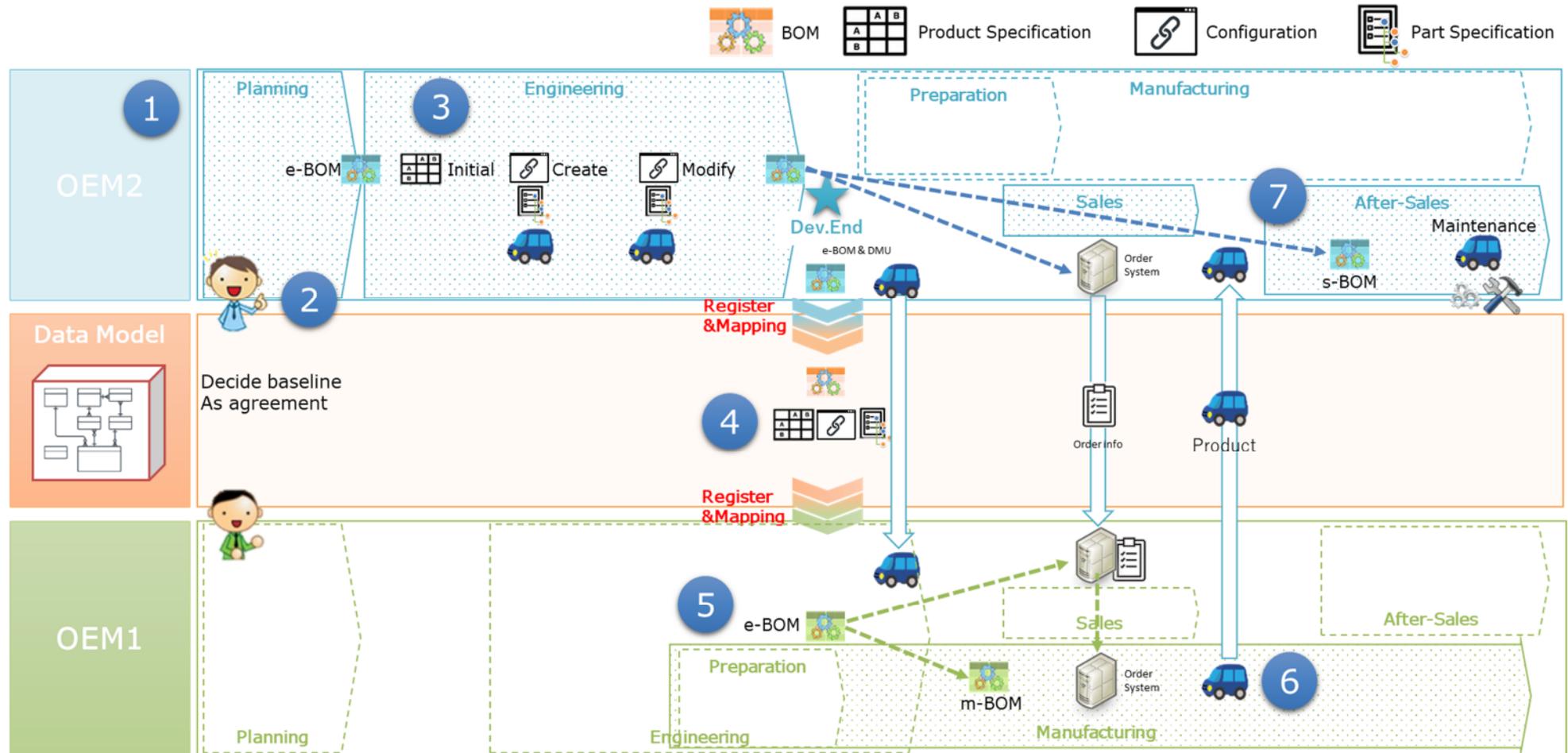


Figure 2 – Detailed process for “Vehicle Cross-production” use case



Description for process :

1. OEM2 is “leader” of collaboration.
2. OEM2 plans marketing and schedules activities
3. OEM2 develops the Engineering
4. OEM2 transmits the result of development to OEM1
5. OEM1 prepares Manufacturing
6. OEM1 produces vehicles for OEM2
7. OEM2 sells vehicles to customers



3 USE CASE 2 – VEHICLE CROSS-BADGING

3.1 Overview

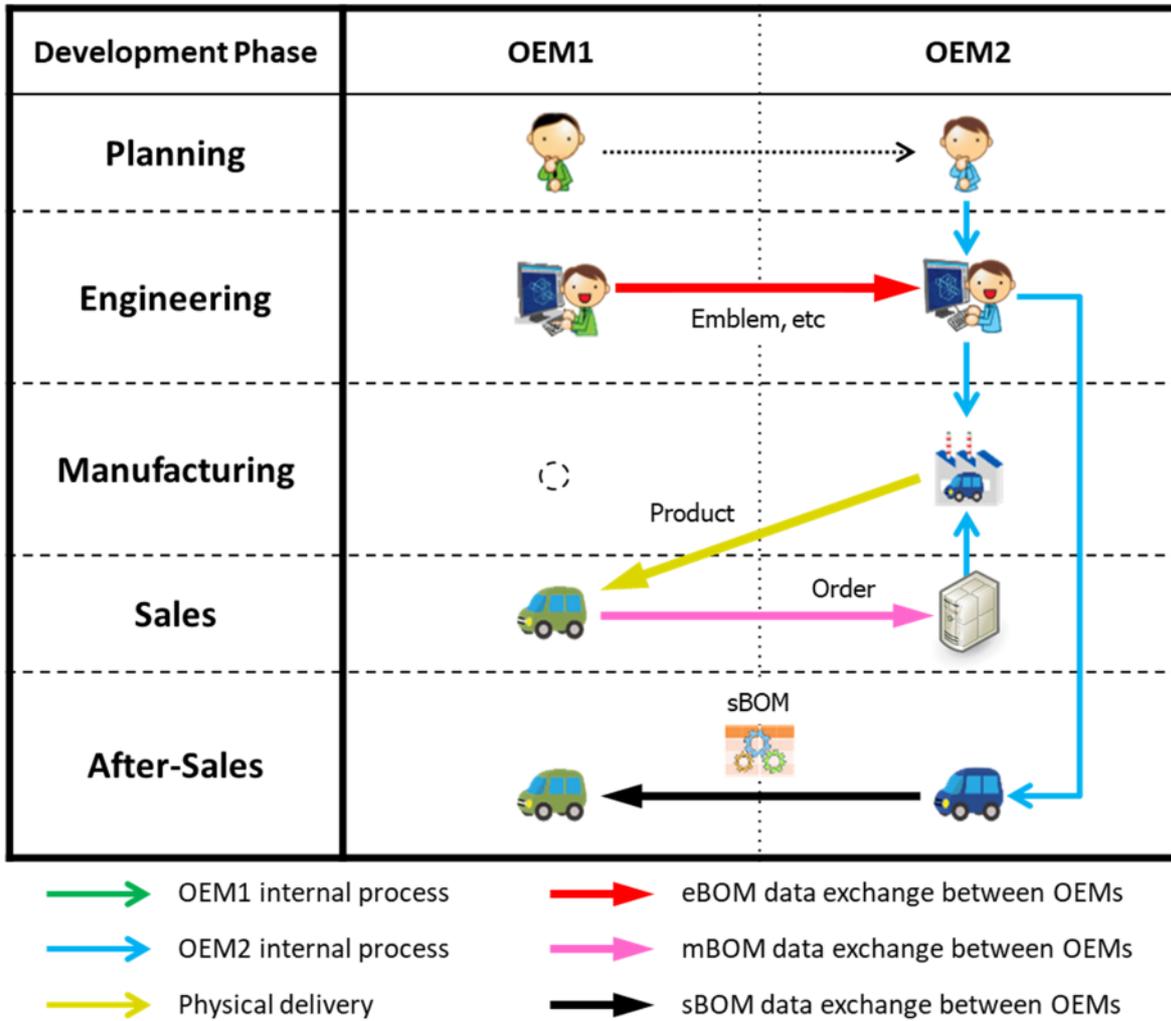


Figure 3 – Overview of “Vehicle Cross-Badging” use case



3.2 Use case detailed explanation

Scenario Description :

OEM1 and OEM2 sell same car which is developed by OEM2.

Data Exchange Frequency :

OEM1 provides OEM2 with Product specification as initial input for engineering development.

Depending on OEM's agreement, OEM2 may provide OEM1 with the result of engineering development (eBOM, CAD/DMU), and regular updates following modifications after that issues have occurred.

OEM2 provides sBOM data to OEM1.

Contents of Exchanged Data :

- Product specification : car family with its decomposition in car models if necessary, specifications and their category.
- Product configuration : part usage that defines the condition of usage of each part within a car family or a car model based on its specifications.
- Part specification : definition of each part or assembly through its metadata, properties and assembly definition if necessary. Part Structure & Attributes Emblem data.

Data Maturity : Formal data

Implied Systems : eBOM/PDM/DMU

Data Selection/Preparation :

- Selection : Parts specification of OEM1 vehicle specific parts to be taken into account by OEM2 in design activity.

Data Transfer Direction : OEM2 to OEM1

Roles and Responsibilities:

- OEM2 (Preparation) : OEM2 just output Product Specification & Configuration
- OEM1 (Conversion) : OEM1 convert for own eBOM system & rules

Change Management : Not mandatory, to be defined depending on requirements



3.3 Use case detailed process

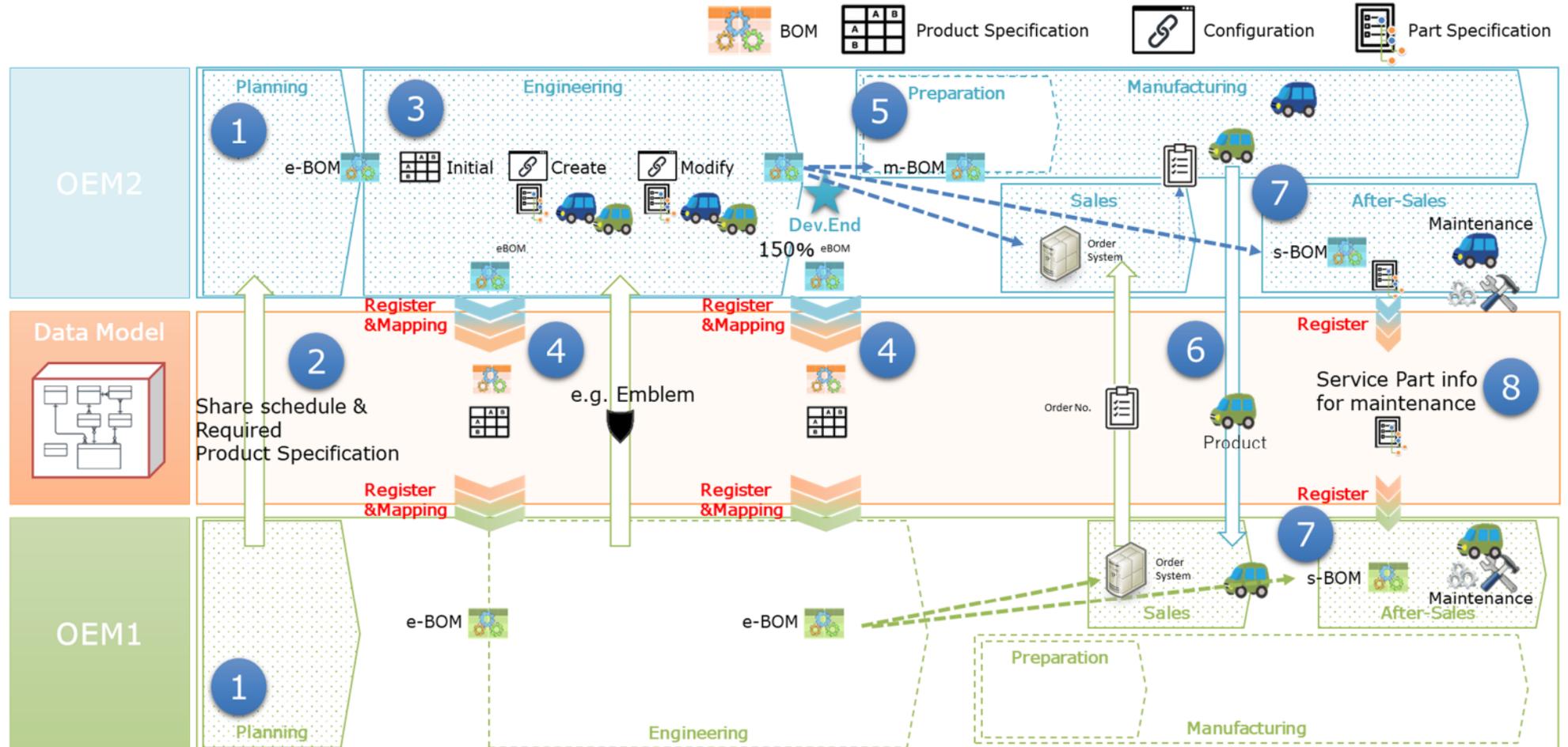


Figure 4 – Detailed process for "Vehicle Cross-Badging" use case



Description for process :

1. OEM1 and OEM2 plan their marketing
2. OEM1 and OEM2 schedule and synchronize their activities
3. OEM2 develops the Engineering
4. OEM2 transmits the result of development to OEM1
5. OEM2 prepares Manufacturing
6. OEM2 produces vehicles for him and OEM1
7. OEM1 and OEM2 sell vehicles to their customers
8. OEM2 transmits the service parts information to OEM1



4 USE CASE 3 – ENGINE CARRY ACROSS

4.1 Overview

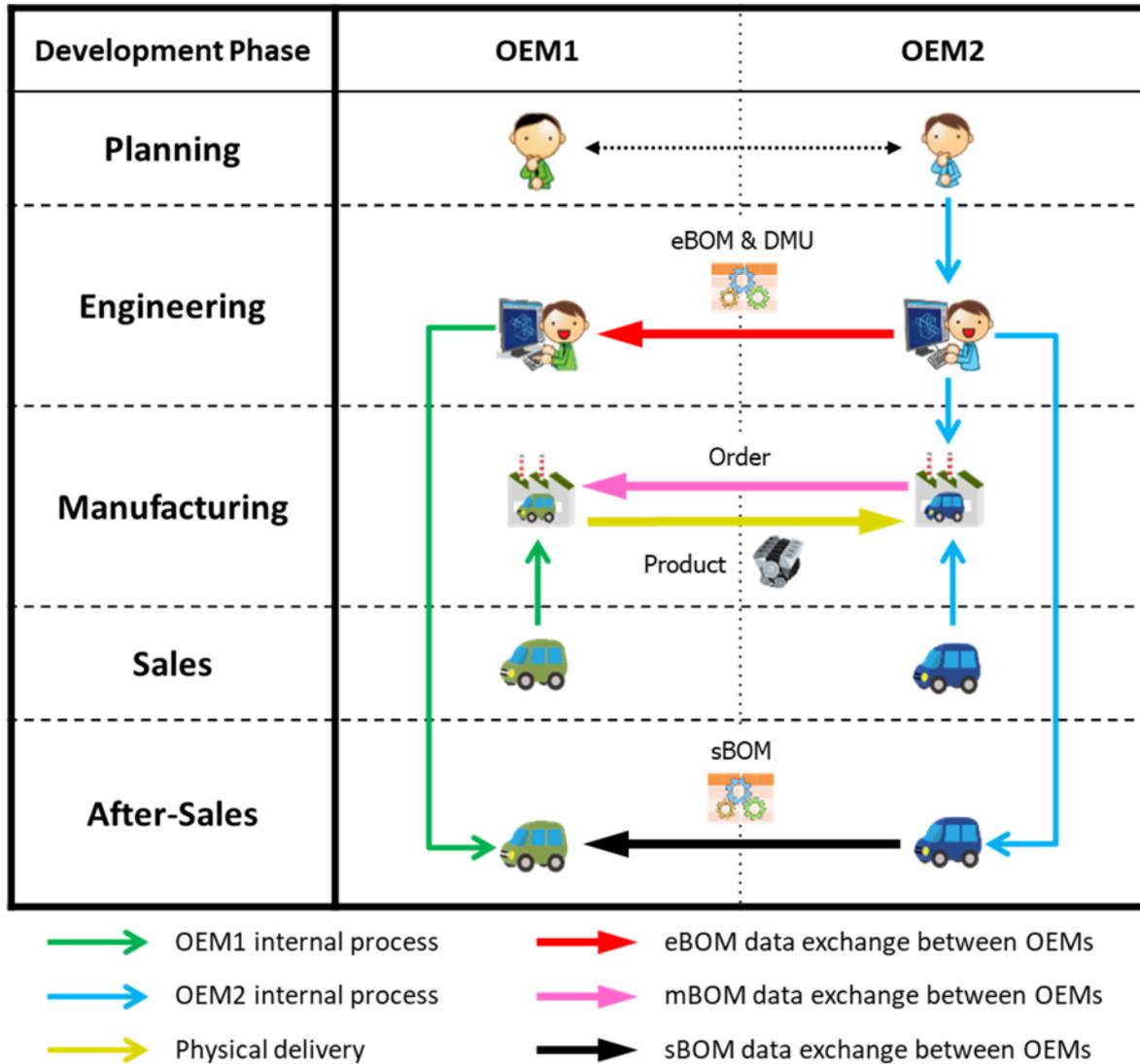


Figure 5 – Overview of “Engine Carry Across” use case



4.2 Use case detailed explanation

Scenario Description :

OEM1 and OEM2 develop each car. Both cars mount the same engine developed by OEM2.

Data Exchange Frequency :

Depending on frequency defined in OEM's agreement, OEM2 may provide OEM1 with the result of engineering development (eBOM, CAD/DMU), and regular updates following modifications after that issues have occurred.

Contents of Exchanged Data :

- Part specification: definition of each part or assembly through its metadata, properties and assembly definition if necessary.

Data Maturity : Formal data

Implied Systems : eBOM/PDM/DMU

Data Selection/Preparation :

- Selection : Parts specification of engine that is integrated into OEM1 vehicle. Optionally depending contract product specification and product configuration of engine data may be exchanged.

Data Transfer Direction : OEM2 to OEM1

Roles and Responsibilities :

- OEM2 (Preparation) : OEM2 filter for each Data groups
- OEM1 (Conversion) : OEM1 convert for own eBOM system & rules

Change Management : Once in each milestone



4.3 Use case detailed process

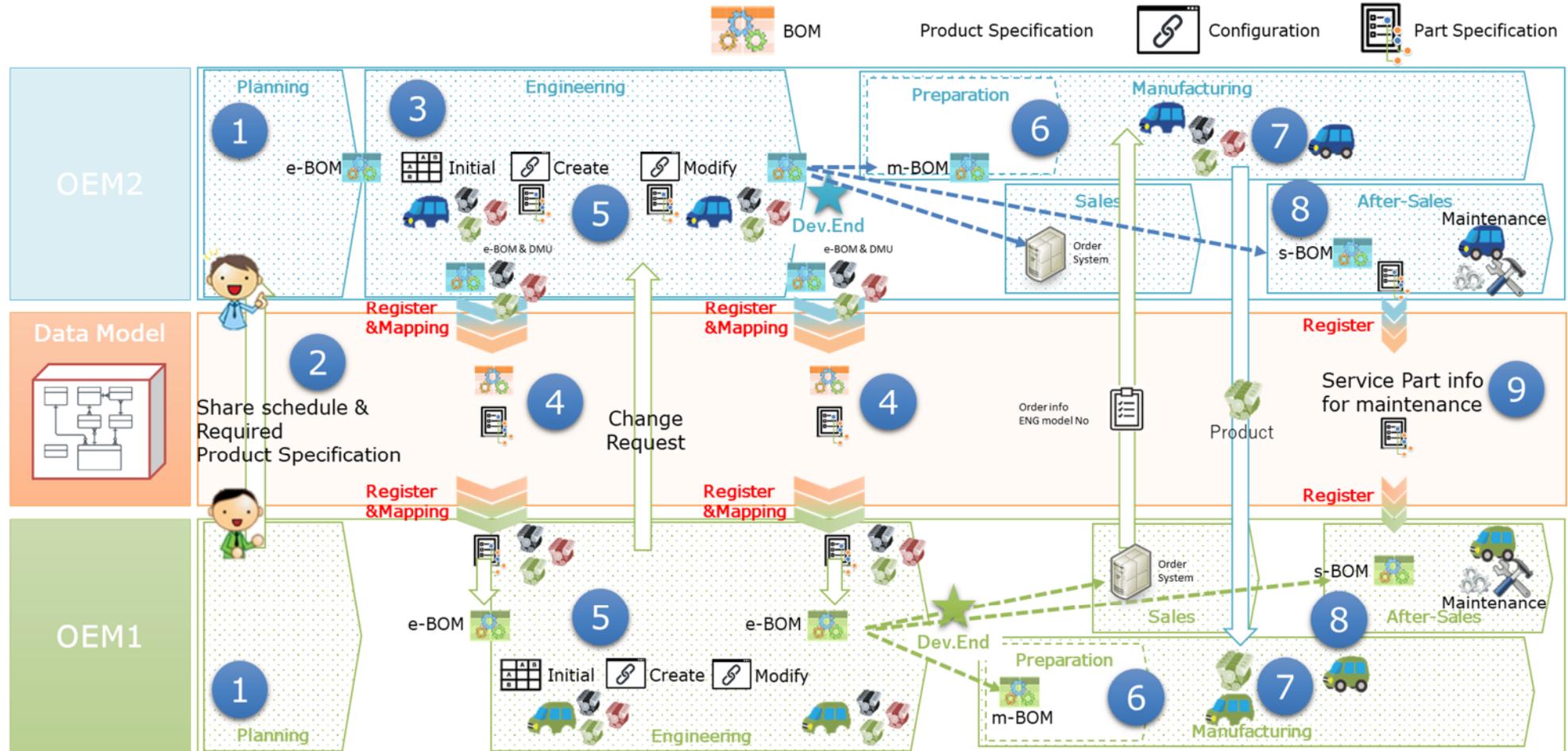


Figure 6 – Detailed process for “Engine Carry Across” use case



Description for process :

1. OEM1 and OEM2 plan their marketing
2. OEM1 and OEM2 schedule and synchronize activities
3. OEM2 is the leader of Engineering development of the engine
4. OEM1 and OEM2 develop their cars which use the engine
5. OEM1 and OEM2 prepares Manufacturing
6. OEM2 produces engines for OEM1 and themselves
7. OEM1 and OEM2 sell vehicles to their customers
8. OEM2 develops service parts BOM
9. OEM2 transmits service parts BOM information to OEM1



5 USE CASE 4 – PLATFORM COMMON DEVELOPMENT

5.1 Overview

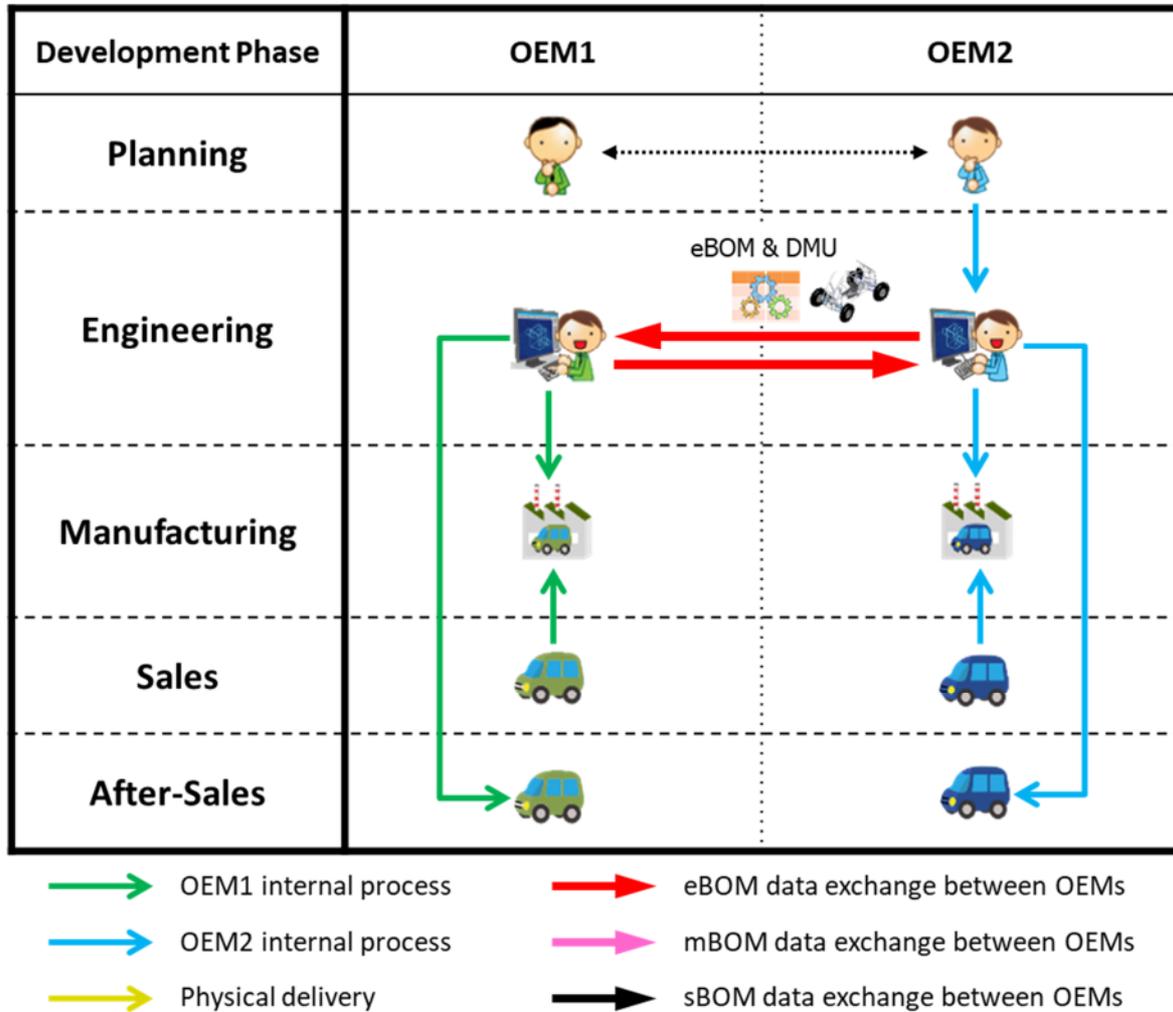


Figure 7 – Overview of “Platform Common Development” use case



5.2 Use Case detailed explanation

Scenario Description :

OEM1 and OEM2 develop each car. At the same time, OEM2 develops platform for each car.

Data Exchange Frequency :

From manufacturing preparation by OEM1, OEM2 provides OEM1 with the result of engineering development (eBOM, CAD/DMU), and regular updates following modifications after that issues have occurred.

Contents of Exchanged Data :

- Product specification: car family with its decomposition in car models if necessary, specifications and their category.
- Product configuration: part usage that defines the condition of usage of each part within a car family or a car model based on its specifications.
- Part specification: definition of each part or assembly through its metadata, properties and assembly definition if necessary.

Data Maturity : Formal data (& WIP data if necessary)

Implied Systems : eBOM/PDM/DMU

Data Selection/Preparation :

- Selection : eBOM containing list of parts corresponding to OEM1 vehicle with 3 layers of eBOM data.

Data Transfer Direction : OEM2 to OEM1

Roles and Responsibilities :

- OEM2 (Preparation) : OEM2 filter for each Data groups
- OEM1 (Conversion) : OEM1 convert for own eBOM system & rules

Change Management : Each time



5.3 Use case detailed process

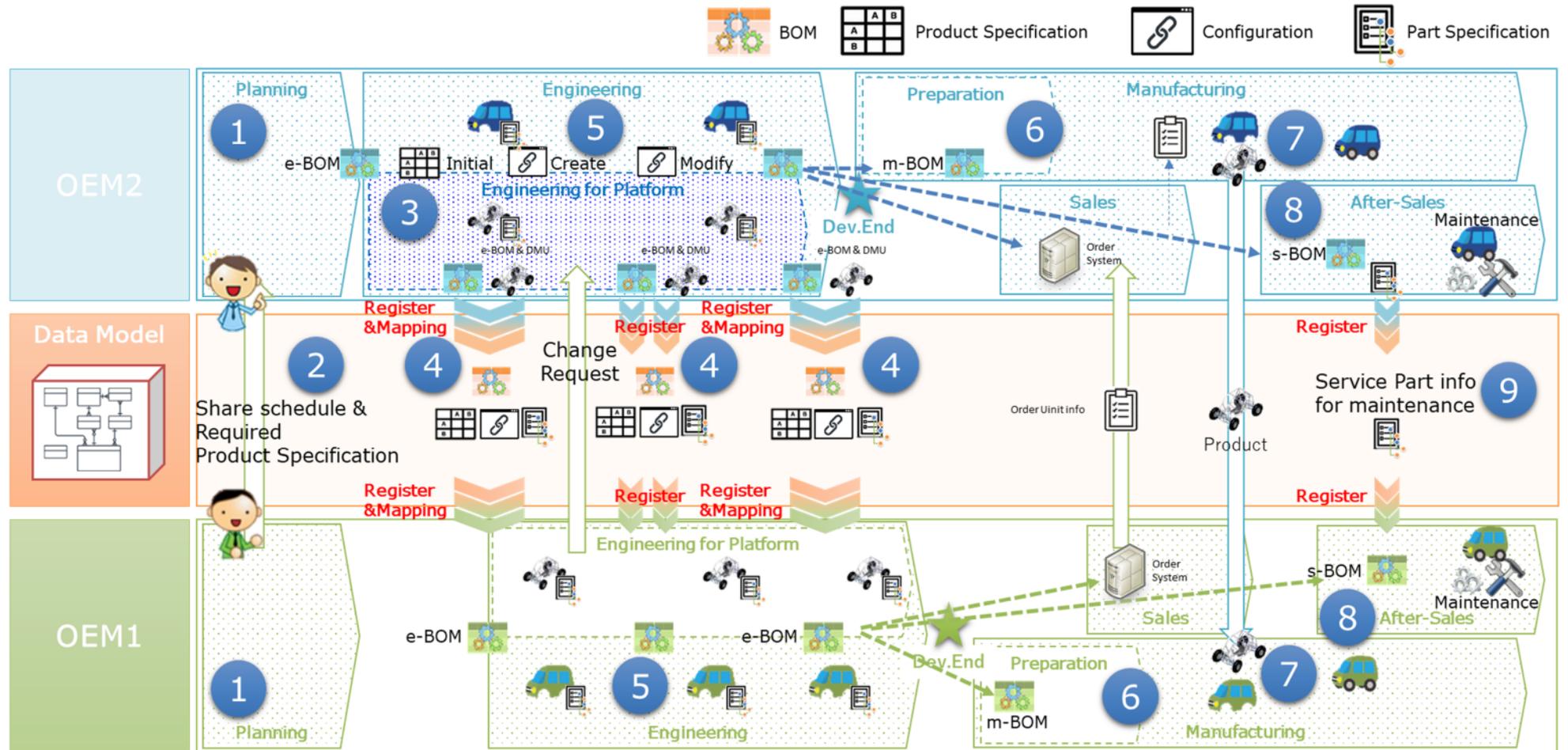


Figure 8 – Detailed process for “Platform Common Development” use case



Description for process :

1. OEM1 and OEM2 plan their marketing
2. OEM1 and OEM2 schedule and synchronize activities
3. OEM2 is the leader of engineering development of the platform
4. OEM2 transmits the platform design to OEM1
5. OEM1 and OEM2 develop their cars based on the shared platform
6. OEM1 and OEM2 prepare manufacturing
7. OEM1 and OEM2 create product including platform
8. OEM1 and OEM2 sell vehicles to their customers
9. OEM1 and OEM2 supply the service parts.



6 USE CASE 5 – DESIGN SUPPLIER

6.1 Overview

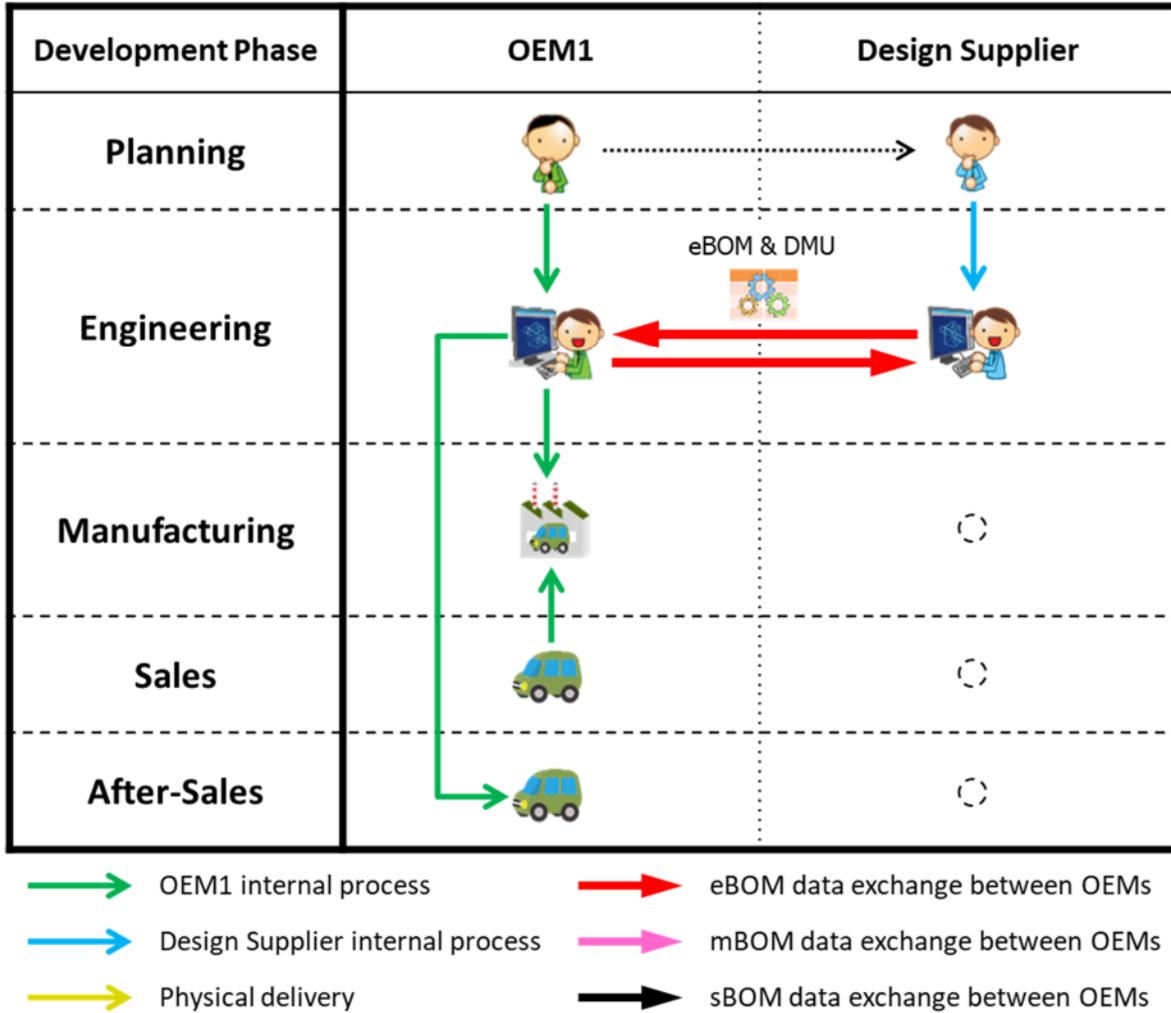


Figure 9 – Overview of “Design Supplier” use case



6.2 Use Case detailed explanation

Scenario Description :

Design Supplier is selected by OEM1 to develop the design of a vehicle product or complex subset that will be manufactured in OEM1 plant.

Data Exchange Frequency :

OEM1 provides Design Supplier with inputs that are necessary for its activities. These inputs are Digital Mock-Up components possibly with corresponding eBOM data.

Depending on frequency defined by OEM1, Design Supplier may provide OEM1 with the result of engineering development (eBOM, CAD/DMU), and regular updates following modifications after that issues have occurred.

Contents of Exchanged Data :

- Product specification : car family with its decomposition in car models if necessary, specifications and their category, that are managed and provided by OEM1.
- Product configuration : part usage that defines the condition of usage of each part within a car family or a car model based on its specifications. Product configuration data are provided by Design Supplier.
- Part specification : definition of each part or assembly through its metadata, properties and assembly definition if necessary provided by Design Supplier.

Data Maturity : Formal data

Implied Systems : eBOM/PDM/DMU

Data Selection/Preparation :

- Selection :
 - OEM1 to provide design supplier with part specification of component to be reused, optionally product configuration and product specification.
 - Design supplier to send OEM1 3 layers eBOM data of its designed component.

Data Transfer Direction : OEM1 to Design Supplier back and forth

Roles and Responsibilities :

- OEM1 :
 - Sending : OEM1 extracts and converts for own eBOM system & rules
 - Receiving : OEM1 imports and integrates in its own eBOM system the eBOM data received from Design Supplier
- Design Supplier :
 - Receiving : Design Supplier imports and integrates in its own eBOM system the eBOM data received from OEM1
 - Sending : Design Supplier filter extracts and converts for own eBOM system each Data groups to be sent to OEM1 according to OEM1 data exchange policy and rules

Change Management : Each time



6.3 Use case detailed process

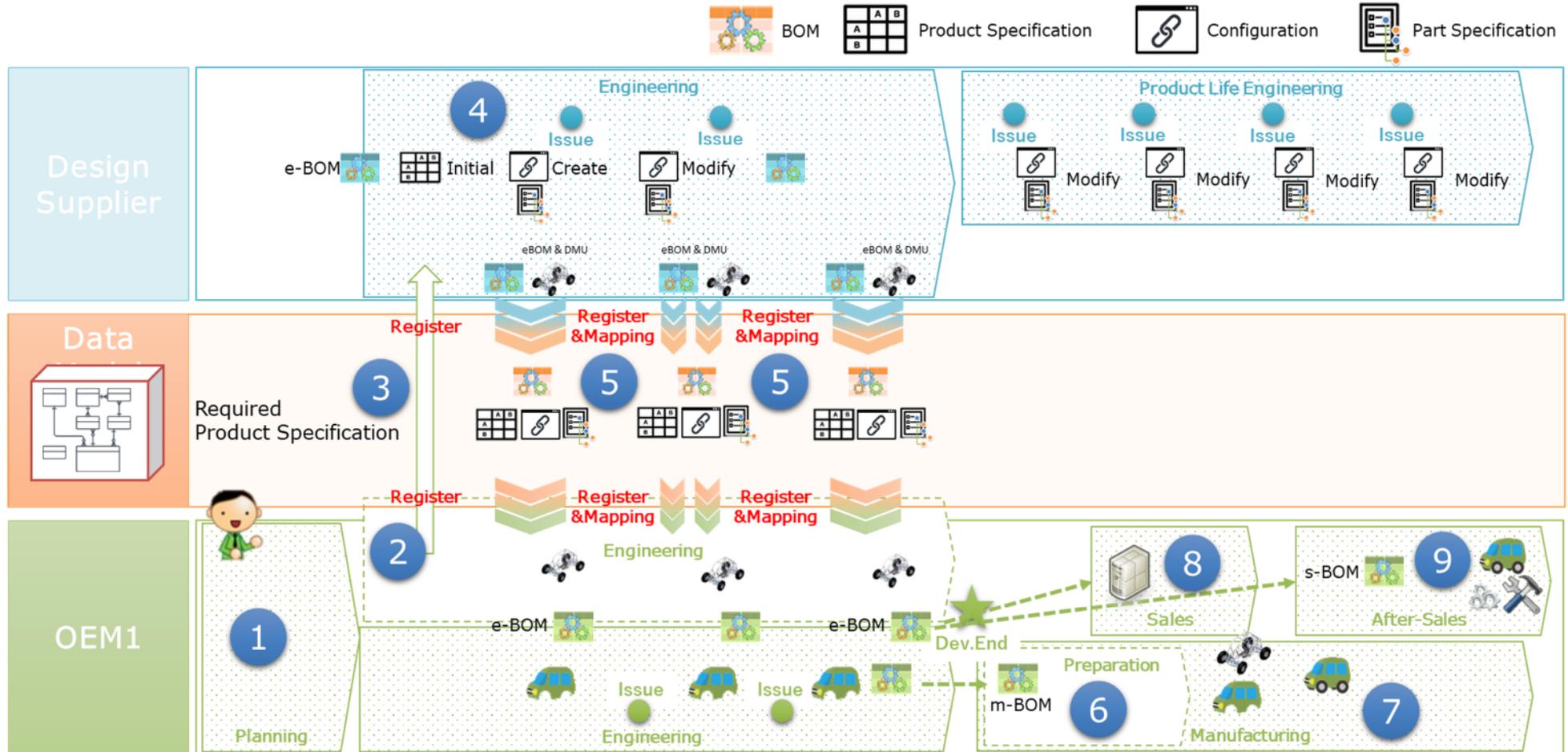


Figure 10 – Detailed process for “Design Supplier” use case



Description for process :

1. OEM1 plans its marketing
2. OEM1 contracts with Design Supplier so that it develops vehicle product or complex subset
3. OEM1 schedules activities and shares them with Design Supplier
4. Design Supplier is the leader of engineering development of vehicle product or complex subset
5. Design Supplier regularly sends back to OEM1 design updates
6. OEM1 prepares manufacturing
7. OEM1 produces vehicles
8. OEM1 sells vehicles to their customers
9. OEM1 develops its service parts information



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