



# Electronic Information Environment (EIE)

## Service Specification Document/Interface Control Document

### Master Data

### Navy Industry Bill Of Materiel Service– External

**External – In the above context is intended to reflect that this content is for Industry partners who have been contracted to participate in an In-Service-Support phase of a Weapon System or Platform that the Department of National Defence has acquired.**

## EIE Project

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# Table of Contents

1	Introduction.....	1
1.1	Intended Audience.....	1
1.2	References .....	1
2	Business Information.....	2
2.1	Business Processes.....	2
2.2	Business Triggers.....	3
2.3	Unit of Work .....	3
3	Business Constraints.....	4
4	Service Use Case.....	5
4.1	Service Context .....	5
4.2	Successful Request and Technical Response .....	6
4.3	Alternate Scenarios.....	7
5	Service Description – Bill Of Materiel Service .....	10
5.1	Service Overview .....	10
5.2	Service Properties.....	10
5.3	‘SendBOM()’ Operation .....	11
5.4	‘SendBOMAck()’ Operation.....	11
5.5	‘SendBOMError()’ Operation .....	11
6	Information Model .....	13
6.1	BOM .....	13
6.2	As Designed Structure.....	15
7	Operation Message Model.....	16
7.1	BOM Input Body.....	16
7.2	BOM Output Body.....	17
7.3	BOM Fault Body .....	18
7.4	BOM Acknowledgement Input Body .....	19
7.5	BOM Error Input Body .....	20
7.6	Summary of Operation to Input/Output/Fault Body Mapping .....	21
8	Service Operation Details.....	23
8.1	Detailed Operation Characteristics – SendBOM() .....	23
8.2	Detailed Operation Characteristics – SendBOMError() .....	24
8.3	Detailed Operation Characteristics – SendBOMAck() .....	26
8.4	Service Bindings .....	28
9	Definitions, Acronyms, Abbreviations.....	29
10	Appendix A - Entity Relationship Model.....	30
11	Document History .....	31

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# List of Figures

---

Figure 4-1 BOM Service Context ..... 5

Figure 4-2 BOM Message Flow ..... 7

Figure 4-3 BOM Message Flow with Type 1 Error..... 8

Figure 6-1 Information Model – Bill Of Materiel ..... 14

Figure 6-2 Information Model – As Designed Structure ..... 15

Figure 7-1 BOM Input Body..... 17

Figure 7-2 BOM Output Body..... 18

Figure 7-3 BOM Fault Body ..... 19

Figure 7-4 BOM Acknowledgement Input Body ..... 20

Figure 7-5 BOM Fault Input Body..... 21

Figure 7-6 BOM Operations to Input/Output/Fault Mapping ..... 22

Figure 10-1 BOM ERD..... 30

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## 1 Introduction

This document establishes an interface between Canada Electronic Data Exchange (EDE) system and ISS Contractor responsible for maintenance of a ship class subject to Performance Based Contracting (PBC). This interface will be used by Canada to send Bill Of Materiel (BOM) messages to the ISS Contractor. To support the BOM transfer between Canada EDE and the ISS Contractor, both systems need to support specific Web Service operations as well as request and response Extensible Markup Language (XML) schemas as described in this document. The Bill Of Materiel service includes an operation for the ISS Contractor to report acknowledgement messages back to Canada.

### 1.1 Intended Audience

- ISS Contractor System Designers
- Canada EDE Designers
- ISS Contractor Testers
- Canada EDE Testers

### 1.2 References

All references are to the baseline version of the reference at the time of publication of this document.

- [Ref. 1] Business Process Catalogue Annex P: Navy Canada Maintenance Management System Data Initialization In Support of Performance Based Contracting (PBC);
- [Ref. 2] Electronic Information Exchange Service Interaction Model;
- [Ref. 3] DRMIS Master Data Business Guidelines Air Force ISSCF fleets;
- [Ref. 4] Industry Data Package Service Specification;
- [Ref. 5] BUC 2.1 Exchange Master Data – Outbound;
- [Ref. 6] Master Data Initialization for Industry/ISSC Service Operational Model.

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## 2 Business Information

Business Information is based on the Electronic Information Environment (EIE) Business Process model for Data Initialization [Ref. 1], the Business Use Case [Ref. 5], and the Defence Resource Management Information System (DRMIS) Master Data Business Guidelines Air Force ISSCF fleets [Ref. 3].

A Materiel Master Record (MMR) identifies all items required to support the weapon system maintenance and supply processes in DND. MMRs include all materiel (spares, consumables, serialized or not, tools, test equipment, etc.) subject to materiel management processes.

A Material BOM will be created with the MMR of the positional structuring element Equipment Master Record (EMR) as the BOM header. The non-serialized MMR elements to be included in the technical structure are included in the BOM as BOM items. By using the MMR of the structure element EMR the BOM will automatically be included in each aircraft structure. A structure node and material variant will have to be included in the allowed structure (Master Parts List (MPL)) for the positional structuring element EMR. All EMR in the technical structure requiring non-serialized MMR to be shown below have to have the BOM header MMR included in their data definition.

Individual catalogue profiles are assigned to each non-serialized MMR included in the BOM similar to assigning individual profiles to a FLOC or EMR.

BOMs are considered part of “As-Designed” data and apply to the ship class as a whole, not just individual Weapon System (WS) instances.

The goal of the ISS Contractor BOM service is to provide to a means for Canada to send to ISS Contractor the BOMs for a ship class and for ISS Contractor to acknowledge receipt of the BOM data or report errors in the data or transmission.

Within Canada, maintenance business processes are supported by two types of information systems, known generically as:

- Canada Maintenance Management System (CMMS), and
- Canada Supply System (CSS).

Currently both functions are supported within Canada by the Defence Resource Management Information System (DRMIS).

### 2.1 Business Processes

For some PBC contracts, the WS supplier is responsible to produce a complete set of master data for each ship class. The initial LSAR data set for the ship is provided to Canada by the shipbuilder and will be the basis for the initial data load into CMMS. Canada will provide CMMS master data associated with platform, including BOM data, to the ISS Contractor through the EDE.

See [Ref. 1] for further details.

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## 2.2 Business Triggers

As per the Data Initialization Business Process [Ref. 1], the following business events may result in BOM data being sent from Canada EDE to Industry<sup>1</sup>:

- The ISS Contractor initiates a Master Data demand request for a ship
- ;

For Master Data a direct<sup>2</sup> communication will take place between Industry and Canada DND to advise ISS Contractor of the availability of new Master Data. ISS Contractor will, through Canada EDE, initiate the request for transfer of the Master Data to ISS Contractor.

## 2.3 Unit of Work

According to PBC, Industry assumes the responsibility for Configuration Management (CM) of every WS in a ship class. With this responsibility Industry must be certain of the consistency of Master Data between their source system and CMMS. This is particularly difficult for Master Data, as Master Data packages may be very large (i.e., on new WS delivery) and there is a high degree of inter-dependence between Master Data business objects.

To achieve consistency, Master Data business objects are always sent from Canada to ISS Contractor in a single **unit of work**. The unit of work is a logical “package” of Master Data business objects (possibly of more than one type) with a unique identifier. Every individual Master Data message has a reference to its containing unit of work. A unit of work will have a **manifest** which explicitly defines the exchange types and number of **business objects**<sup>3</sup> per exchange type, in the unit of work.

For further discussion on units of work, including retry and error scenarios please see the EIE Service Interaction Model [Ref. 2] and Master Data Operational Model [Ref. 6].

---

<sup>1</sup> Within this document, Industry and ISS Contractor are synonymous and are used interchangeably

<sup>2</sup> Phone, fax, email, but not through Canada EDE services.

<sup>3</sup> When multiple business objects are combined in a single message, the manifest count always applies to the number of business objects irrespective of the number of messages.

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### 3 Business Constraints

#### Terminology

The input to the service is a **BOM message** which consists of one or more **BOM business objects** and metadata (e.g., message header) required for correct message processing between Industry and Canada EDE.<sup>4</sup>

#### Constraints on Usage of the Service

- 1) The Industry BOM service shall only be invoked by the Canada EDE System..
- 2) Canada DND systems shall ensure the BOM data for a WS is sent only to the Industry system which is properly authenticated and authorized to see maintenance and materiel data for that ship class.
- 3) Canada must define a unit of work with a unique identifier prior to sending Master Data; each Master Data message must reference its containing unit of work.
- 4) The unit of work for Master Data always contains an explicit manifest.
- 5) Master Data messages will be signed using digital certificates between Canada EDE and Industry. Please see Service Interaction Model [Ref. 2] for details.

#### Constraints on Behaviour of the Service

- 6) Canada EDE **does** expect that within a single message there can be more than one Master Data business object - all business objects must be of the same exchange type as defined by the interface and declared in the message header.
- 7) Industry will authorize invocations of operations of the BOM service.
- 8) Canada EDE may attempt to re-send Master Data messages (i.e., repeat operation invocations) in response to technical errors. This behaviour is controlled by parameters for each operation. Please see Service Interaction Model [Ref. 2] for details.

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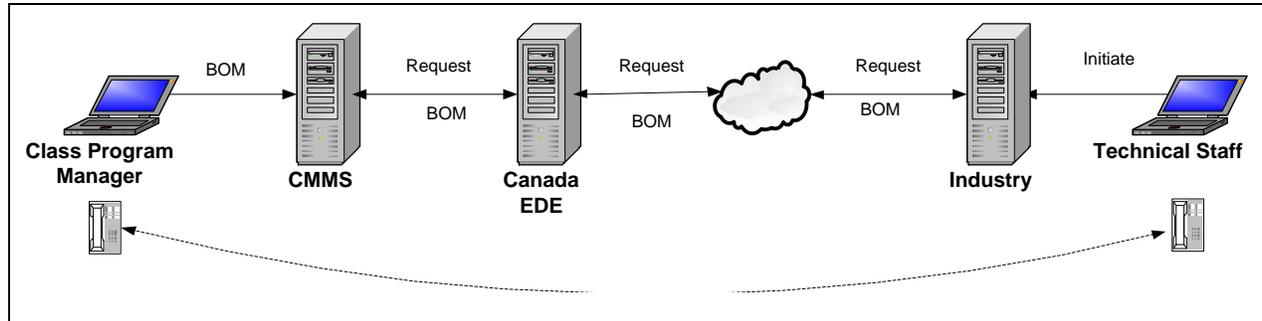
<sup>4</sup> BOM messages are defined in section 7. BOM business objects are defined in section 6. The message / business subject distinction is used throughout the document.

## 4 Service Use Case

The requirements for the BOM service are defined by one use case with several scenarios.

### 4.1 Service Context

A high level view of the context of the service is shown in Figure 4-1 below. For simplicity this view omits error scenarios. These are discussed in Service Use Case Scenarios.



**Figure 4-1 BOM Service Context**

The following steps occur:

- Class Program Manager creates a new Master Data Package including BOM business objects.
- Class Program Manager advises Industry of availability of data package through direct communication.
- Industry initiates, through EDE, data request for transfer of the Master Data to Industry.
- Canada EDE forwards initiation request to CMMS.
- Canada EDE responds by providing a unit of work declaration message with a manifest that will specify the exchange type and the expected number of business objects for exchange type in the unit of work.
- Industry acknowledges the unit of work message.
- Canada EDE will have to wait for the acknowledgement message from Industry, after which it can begin invoking the appropriate services to initiate the transfer of Master Data business objects.
- Canada EDE begins to send package of Master Data as individual messages, each message contains one or more Master Data business objects (all of the same exchange type).
- For each message received, Industry returns a technical response.
- Industry collects complete package of Master Data.
- After Industry processing, Industry accepts or rejects the Master Data package (in its entirety). The result is communicated to CMMS via Canada EDE.

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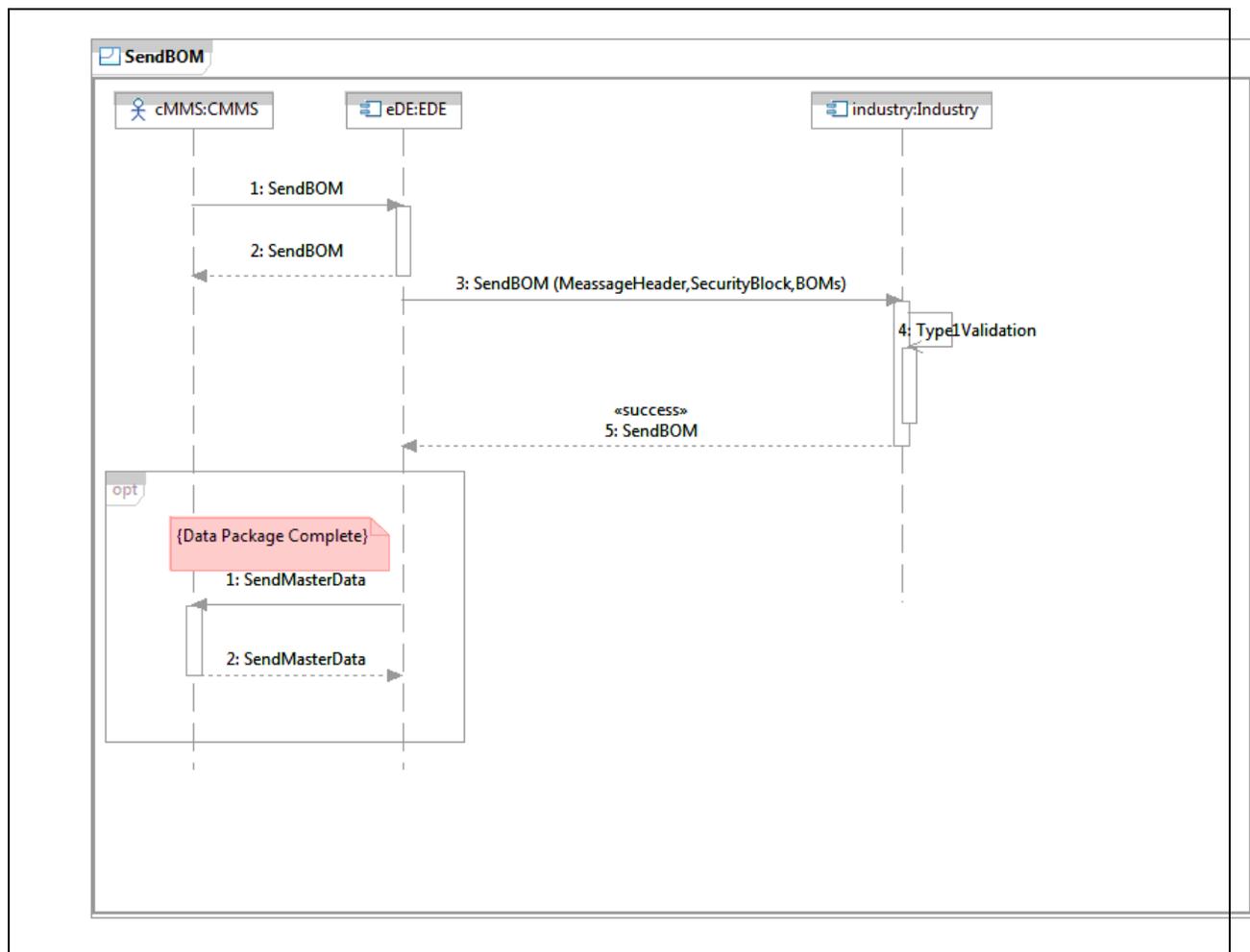
Once the initiating Master Data request is received by Canada, Canada may send business objects in the Master Data package (BOM plus any others) in any order. This mode of interaction is termed *Business Asynchronous*.

The “technical response” referred to above either (i) confirms a party in the exchange has accepted a message for further processing, or (ii) contains a fault message. A technical acceptance does not preclude subsequent “business” errors. Error scenarios are described below.

## 4.2 Successful Request and Technical Response

This is the main or “Happy Day” scenario. This scenario describes the interaction between Canada EDE and Industry for the BOM Service. Some validation steps and technical responses are not shown in the following sequence diagram (Figure 4-2) – full details are in the Service Interaction Model [Ref. 2].

The “technical response” either (i) confirms a party in the exchange has accepted a message for further processing, or (ii) contains a fault message. A technical acceptance does not preclude subsequent “business” errors. Error scenarios are described below.



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**Figure 4-2 BOM Message Flow**

Main Flow	
Scenario	“Happy Day:” Canada successfully sends BOM business objects to Industry.
Pre-Condition	Canada has prepared a data package containing one or more BOM business objects. Canada EDE has received initiation request and responded with creation of unit of work and manifest. Industry has replied to Canada EDE that unit of work is successfully created.
Post-Condition	BOM business objects successfully received by Industry.
Steps	<p>.</p> <ol style="list-style-type: none"> <li>1) CMMS sends BOM message to Canada EDE.</li> <li>2) Canada EDE returns a “success” response to Canada CMMS.</li> <li>3) Canada EDE invokes ‘SendBOM()’ operation passing UOW ID and one or more BOM business objects. (See <a href="#">Input Body</a> definition.) Canada EDE waits for technical response.</li> <li>4) Industry initiates “Type 1” validation. In this scenario there is no error. Industry accepts “custody” of the BOM business objects in the message.</li> <li>5) Industry returns to Canada EDE a “success” technical response for the SendBOM() operation. (See <a href="#">Output Body</a> definition.)               <ol style="list-style-type: none"> <li>a. Industry begins internal processing of the message. In this scenario there is no error.</li> <li>b. Industry saves BOM business objects for further processing once unit of work is complete.</li> </ol> </li> </ol> <p>Once Industry has received a complete data package from Canada EDE, Industry will process the received data. The details of this process are out of scope of this specification.</p>

Please see Industry Data Package Service Specification [Ref. 4] for the scenario of confirmation from Industry Master Data has been deployed to operations.

### 4.3 Alternate Scenarios

The BOM Message Flow with Type 1 Error sequence diagram is shown in Figure 4-3. The following scenarios apply to all uses of the BOM service.

Alternate Scenarios distinguish between “**Type 1**” and “**Type 2**” errors. Type 1 errors are those errors detected prior to the service provider accepting custody of a message. Type 2 errors are those errors detected during internal processing prior to business validation by the target “back-end” business system. Please see the Service Interaction Model [Ref. 2] for details.

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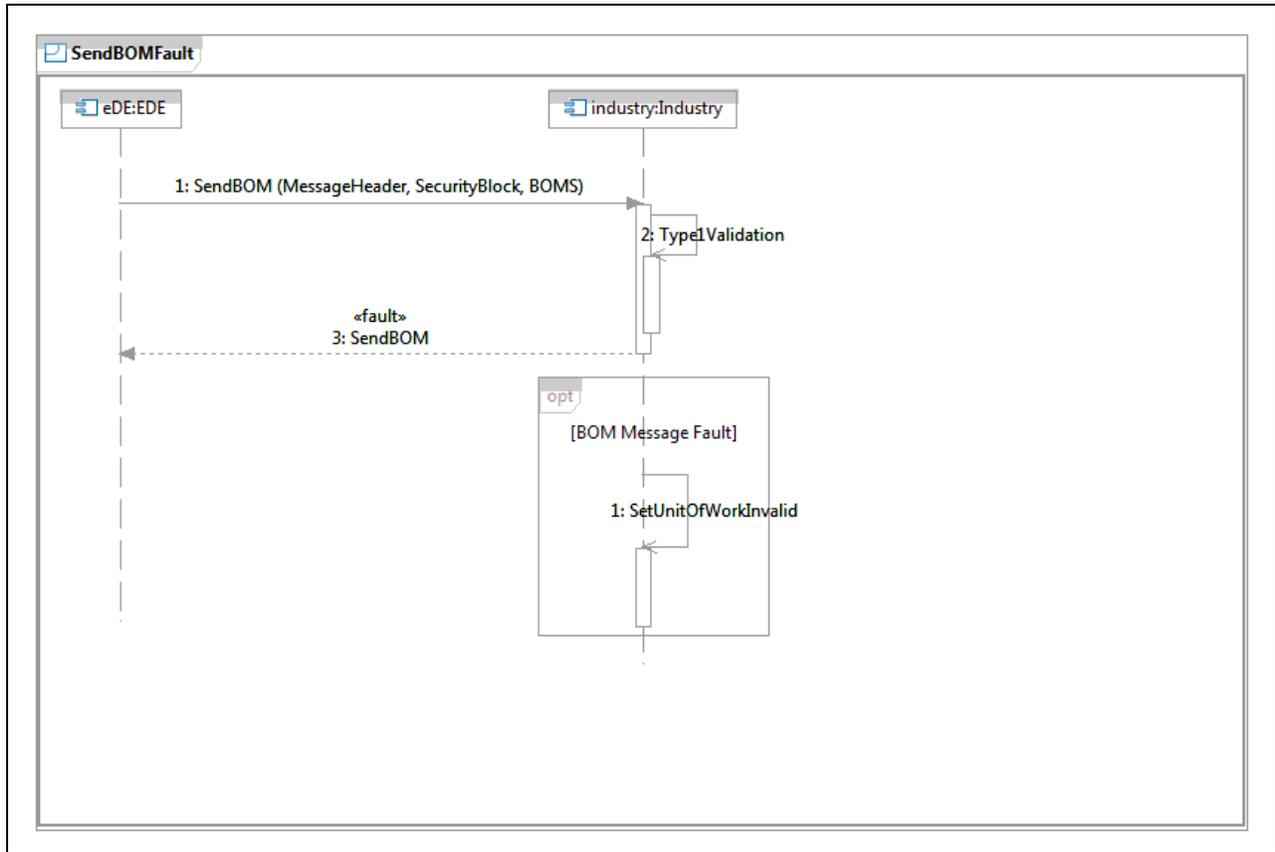


Figure 4-3 BOM Message Flow with Type 1 Error

Alternate Flow 1	
Scenario	Type 1 Errors detected by Industry prior to accepting custody of the message. Detailed specification of Type 1 errors are in Service Interaction Model [Ref. 2].
Pre-Condition	Same as main Flow.
Post-Condition	Industry sends technical response containing a fault message to Canada EDE. Canada EDE ceases sending Master Data (of <b>any</b> exchange type) for this unit of work.

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Steps	<ol style="list-style-type: none"> <li>1) Canada EDE invokes 'SendBOM()' operation containing one or more BOMs.</li> <li>2) Industry checks for Type 1 errors – an error is found;</li> <li>3) Industry constructs the fault message and sends the fault message to Canada EDE in the technical response to the original SendBOM() operation invocation. (See <a href="#">Fault Body</a> definition.)</li> </ol> <p>In the same iteration through the loop where an BOM Message fault was found:</p> <ol style="list-style-type: none"> <li>1) Industry updates unit of work status to Invalid and deletes the Master Data received so far in the invalid unit of work.</li> </ol>
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Note that in this scenario (depending on timing factors) Canada EDE may receive additional fault technical responses for other Master Data operations which were invoked for an invalid unit of work.

<b>Alternate Flow 2 (Industry Service unresponsive)</b>	
Scenario	Canada EDE does not receive technical response within ACK_TIME_INTERVAL.
Pre-Condition	Canada EDE has invoked the operation but does not receive the technical response within the time specified for the BOM service.
Post-Condition	Canada EDE marks the message as Dead Message.
Steps	<ol style="list-style-type: none"> <li>1) Canada EDE does not receive any response from Industry within the allowed ACK_TIME_INTERVAL.</li> <li>2) Canada EDE will retry sending the message up to the defined maximum retry count and/or Time to Live interval.</li> <li>3) If there is no response, then Canada EDE marks the request message as Dead and handles it via the Dead Message protocol (See Service Interaction Model [Ref. 2]).</li> </ol>
<b>Alternate Flow 3 (Industry Business Error)</b>	
Scenario	Industry reports a business error when attempting to load one or more Master Data business objects.
Pre-Condition	All business objects have been received by Industry, and Industry starts its data load process.
Post-Condition	Industry sends technical problem through TPMS interface to Canada EDE.
Steps	<ol style="list-style-type: none"> <li>1) Industry invokes Canada EDE TPMS operation and receives a positive technical response.</li> </ol>

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## 5 Service Description – Bill Of Materiel Service

### 5.1 Service Overview

Bill Of Materiel service requires interacting web services exposed by Canada EDE System and Industry. Industry will implement and expose a service and operation which Canada EDE will use to send the BOM input message (see Section 7 for message definition). After receipt of the input message, Industry will return a technical response back to Canada EDE.

As part of the Bill Of Materiel service Industry will implement and expose two operations:

- An error reporting operation optionally used by Industry to report business errors<sup>5</sup>;
- An acknowledgement service optionally<sup>6</sup> used by Industry to report successful delivery of BOM business objects to Industry systems.

Message interaction is further described in Service Interaction Model [Ref. 2].

### 5.2 Service Properties

Service Property	Description
Enterprise Service Name (Business)	Bill Of Materiel Service
Enterprise Service Name (Technical)	BillOfMaterielService_Industry (Abbreviated in this document to BOM service.)
Purpose	This service supports the Canada EDE Master Data business processes. On the occurrence of business triggers, Canada EDE uses this service to send BOM messages to Industry.
Business Response Time Interval	Will be determined between Canada and Industry on a per ship class basis.
Service Domains	Master Data
Business Owner	ADM (IM)
Service Grouping	Master Data
Source Provider	SendBOM() - Industry SendBOMAck() – Canada EDE SendBOMError() – Canada EDE

<sup>5</sup> Use of business errors is determined between Canada and Industry on a per ship class basis.

<sup>6</sup> Use of this positive acknowledgement is determined between Canada and Industry on a per ship class basis.

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Service Property	Description
Target Service Consumers	SendBOM() - Canada EDE SendBOMAck() – Industry SendBOMError() – Industry
Business Process Supported (now)	Master Data processes: <ul style="list-style-type: none"> <li>Send Platform Data to ISS Contractor</li> </ul>
Business Process Supported (future)	None currently identified.
Business Objective Supported	See <a href="#">Section 2: Business Information</a> .
Expected life time	The full lifecycle of the subject weapons system.

### 5.3 'SendBOM()' Operation

This operation is used by Canada EDE to send an BOM input message to Industry. Industry's implementation of this operation will perform Type 1 validation on the BOM message. Industry will return a status or fault information to Canada EDE in a technical response. If the status is SUCCESS, Industry accepts custody of the message for further processing. Any returned fault implies Industry does NOT accept the message and error processing (as per Section 4.3 Alternate Flow 1) is performed.

### 5.4 'SendBOMAck()' Operation<sup>7</sup>

This operation is used by Industry to report back to Industry that a set of BOM business objects have been accepted into Industry systems. The specific BOM business objects which were accepted are identified by a list of business identifiers (see Section 7). Canada EDE's implementation of this operation will perform Type 1 validation on the acknowledgement message. Canada EDE will return a technical response to Industry.

This operation may be optionally used with an Industry which does not operate on an optimistic model as defined in the Service Interaction Model [Ref. 2].

### 5.5 'SendBOMError()' Operation<sup>8</sup>

This operation may be used by Industry to send a business error message to Canada EDE after internal message processing detects a Type 2 error condition (see Service Interaction Model [Ref. 2]). The specific BOM business objects which are in error are identified by a list of business identifiers (see Section 7). Canada EDE's implementation of this operation will perform Type 1 validation on the error message. Canada EDE will return a technical response to Industry.

<sup>7</sup> Use of this positive acknowledgement is determined between Canada and Industry on a per ship class basis.

<sup>8</sup> Use of business errors is determined between Canada and Industry on a per ship class basis.

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Further processing of BOM messages is terminated regardless of Canada's response to the 'SendBOMError()' invocation.

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## 6 Information Model

This section describes the **business objects** which are used in the BOM service. The Unified Modeling Language (UML) notation is used. A **functional view**<sup>9</sup> of the information model is provided in the Master Data Business Guidelines [Ref. 3] and the Business use Case [Ref. 5].

The purpose of this section is to provide a bridge between the functional view of the information model and the concrete details of the design as ultimately expressed in an XML Schema.

Note that all date or time values must be in **Coordinated Universal Time (UTC)**. If an explicit time zone offset is not provided it is assumed to be zero.

The XML Schema is the authoritative source for purpose of the information exchange.

### 6.1 BOM

A Bill Of Materiel business object is used to represent a set of non-serialized MMRs which are supplied when the parent element is ordered.

Figure 6-1 shows the Information Model used in the Bill Of Materiel service. This section primarily discusses the structure of the information model, details of attributes may be found in the Data Initialization Business Use Case [Ref.7] and Data Initialization Business Process [Ref. 1]. In the following *underlined italic* text refers to specific classes in Figure 6-1.

The class *BillOfMaterielHeader* contains one instance of *MMR\_ID* pointing to its MMR and a list of *BillOfMaterielItem* business objects. Each *BillOfMaterielItem* business objects contains one instance of *MMR\_ID* pointing to its MMR, a unique ItemNumber and an ItemQuantity attribute. Additional fields are described in the Master Data Guidelines [Ref. 3].

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<sup>9</sup> The Functional View details the collection of fields which make up BOM business objects.

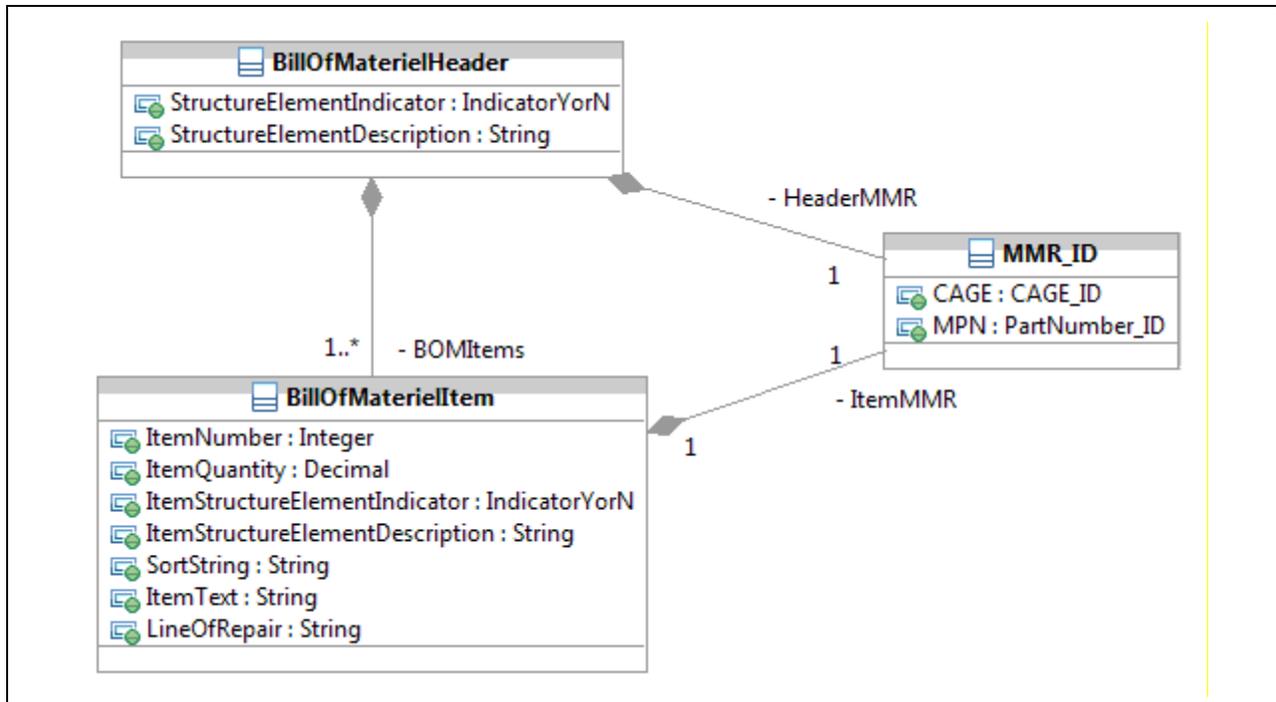


Figure 6-1 Information Model – Bill Of Materiel

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## 6.2 As Designed Structure

The Bill Of Materiel is part of the WS “As Designed” structure. An overview of “As Designed” structure is shown in Figure 6-2 below; each business object is described in one of the Service Specification documents.

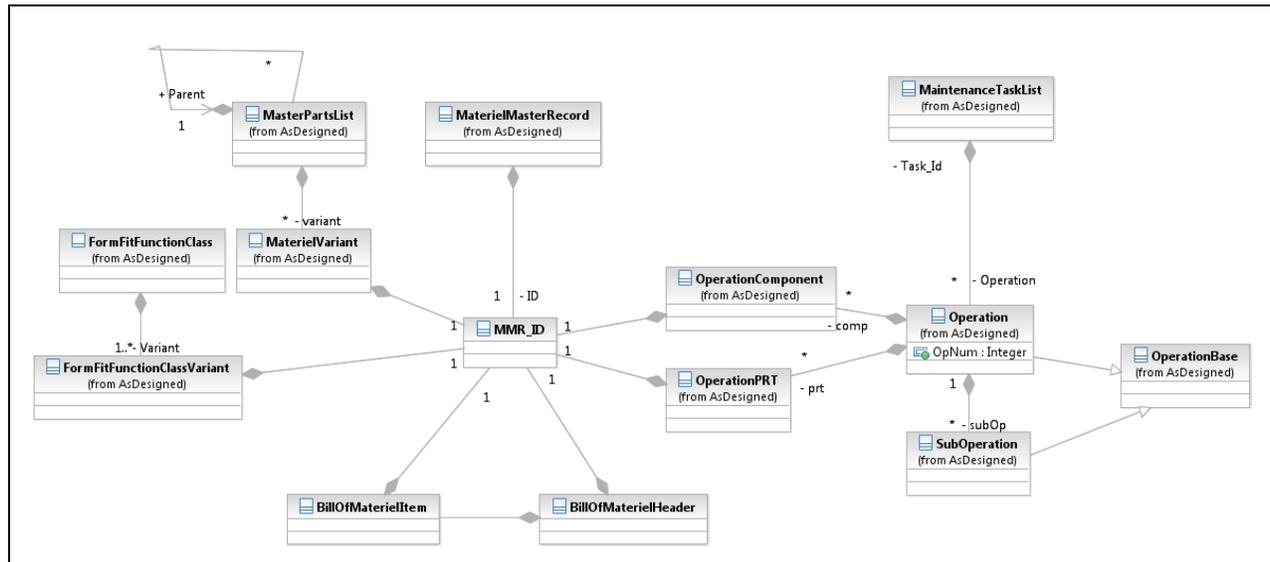


Figure 6-2 Information Model – As Designed Structure

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## 7 Operation Message Model

This section describes how the business objects described above (Section 6 Information Model) are aggregated for the purpose of PBC information exchange.

All Master Data services follow the request/response model and each operation definition includes a distinct input, output and fault message. See Service Interaction Model [Ref. 2] for definition of the common MessageHeader and SecurityClassification elements. BusinessContext allows Canada EDE to include contextual information with an input message. The 'Purpose' field is a value agreed between Canada EDE and Industry and may affect handling of the message. The remaining fields are populated by Canada EDE and may be replayed in error messages<sup>10</sup>.

Several message constructs (i.e., Fault Body, Acknowledgement Input Body and Error Input Body) include one or more **Business Identifiers** (BizIDs). The BizID consists of a set of key fields in the BOM Input Body sufficient to uniquely identify a business object and its context. The fields which make up the BizID are explicitly identified in the XML Schema files.

Note that all date or time values must be in **Coordinated Universal Time (UTC)**. If an explicit time zone offset is not provided it is assumed to be zero.

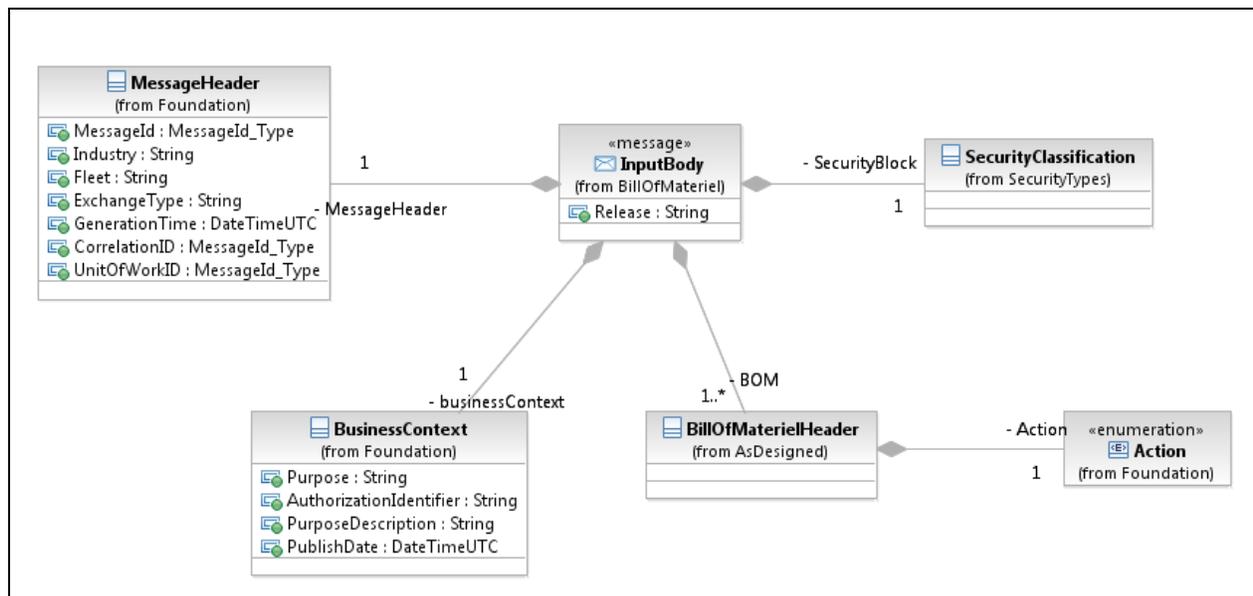
### 7.1 BOM Input Body

As shown in Figure 7-1, a BOM input body consists of:

- A Message Header;
- A Security Block;
- A Business Context;
- One or more BOM business objects.

---

<sup>10</sup> Business Context is further discussed in the Unit of Work service specification.



**Figure 7-1 BOM Input Body**

The MessageHeader UnitofWorkID must equal the UnitofWorkID value of an existing valid unit of work.<sup>11</sup> The MessageHeader CorrelationID must equal the MessageId of the UnitofWork message. Purpose and ContextDescription fields must match the corresponding fields in the Unit of Work which envelopes this input message.

The BOM InputBody also contains an attribute ‘Release’ which designates the release of the BOM service. The ‘Release’ attribute uses an “X.Y” numbering convention and the value is hard-coded in the XML schema for every service. The value will be incremented when a new version of the service is released<sup>12</sup>.

The ‘Release’ attribute is mandatory in every instance of the InputBody to allow any input body instance to be traced back to the appropriate release. A ‘Release’ attribute appears in all message bodies.

Within each BOM business objects there is an attribute named ‘Action’ which is set by the service consumer as a directive to CMMS on handling the business object. See Service Interaction Model [Ref. 2] for definition of valid values of ‘Action’.

## 7.2 BOM Output Body

The output of the SendBOM() operation is the BOM OutputBody. As shown in Figure 7-2, the output body consists of:

- A Message Header;
- A Custody object.

<sup>11</sup> Type 1 validation will check if the unit of work is in a non-error state.

<sup>12</sup> The rules for incrementing the ‘Release’ attribute for a service will be in a separate document.

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The BOM OutputBody has no security block. The BOM OutputBody must not contain any sensitive or protected information.

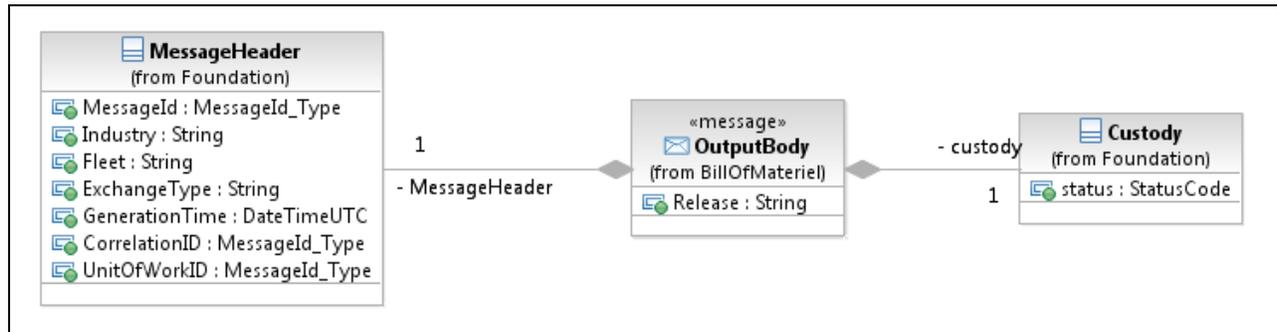


Figure 7-2 BOM Output Body

For a BOM OutputBody:

- The MessageHeader Message Id is a **new** unique value;
- The MessageHeader GenerationTime is the time the **output** message is generated;
- The MessageHeader CorrelationID is set to the MessageId of the BOM Input Body;
- The MessageHeader Exchange Type must be set to the Exchange Type of the BOM InputBody;
- The value of the Custody status field is “success”<sup>13</sup>.

### 7.3 BOM Fault Body

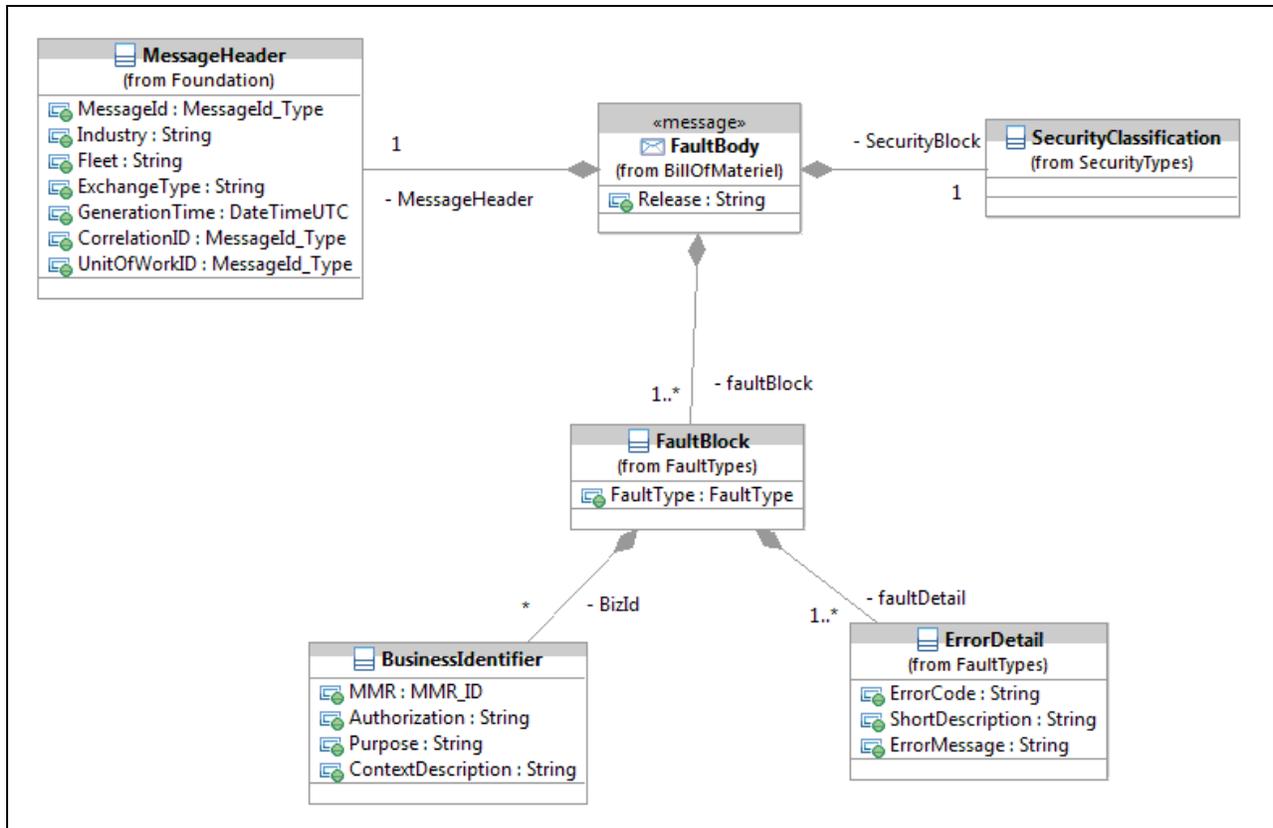
A fault returned by the SendBOM() operation uses the BOM FaultBody element. As shown in Figure 7-3, the BOM FaultBody consists of:

- A Message Header;
- A Security Block;
- One or more FaultBlocks.

Each fault block pertains to zero to many business objects, to the level of granularity which the Service Provider can provide. If the system cannot determine a Business Identifier then this is omitted. To report differing faults on more than one business object, extra fault blocks can be included in the fault message.

<sup>13</sup> As stated in Section 5.3, the main significance of the output is that, by its presence, there is no fault.

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**Figure 7-3 BOM Fault Body**

MessageHeader is mandatory, but only MessageId and GenerationTime are mandatory within the header (both are new values, as for the Output Body). This is for the scenario where the input message is so damaged that the necessary attributes cannot be found.

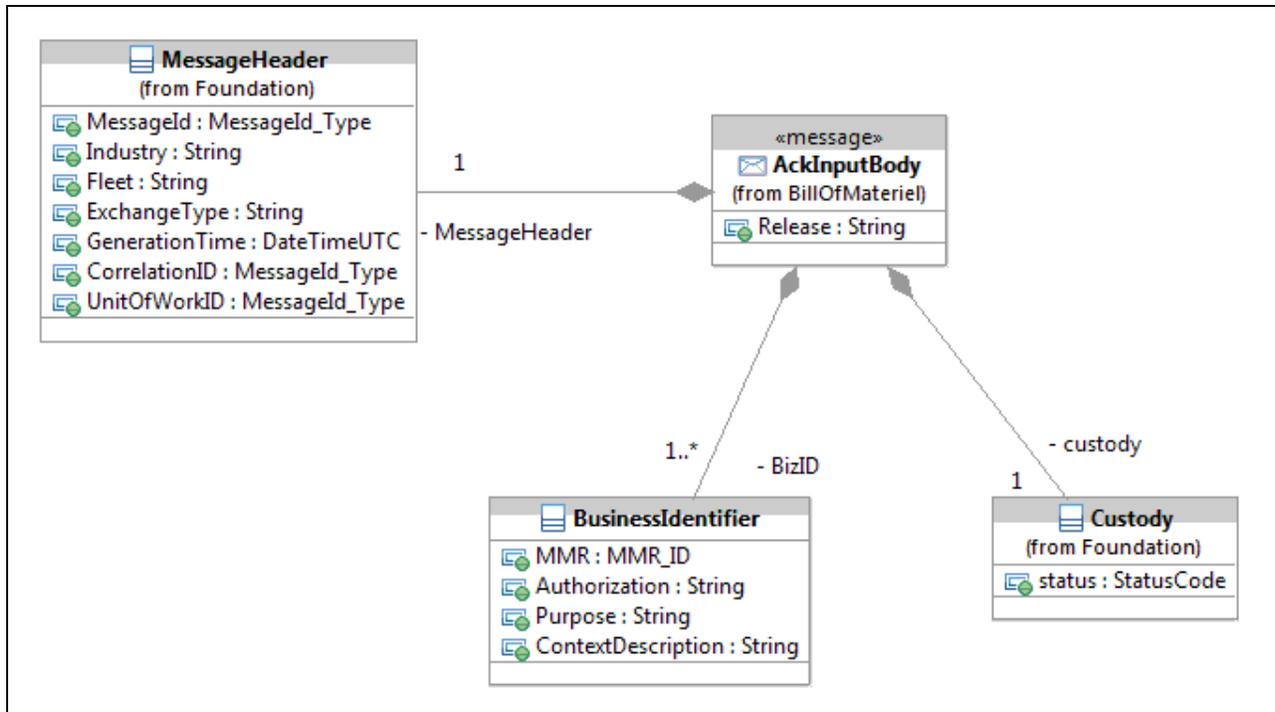
CorrelationID is set to the MessageId of the input message – whenever it is available.

SecurityClassification is optional for the scenario where the input message is so damaged that the necessary attributes cannot be determined.

### 7.4 BOM Acknowledgement Input Body

The input to the SendBOMAck() operation consists of a Message Header, a list of business identifiers, and a “success” status indicating the business objects were accepted in Industry systems (see Figure 7-4).

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**Figure 7-4 BOM Acknowledgement Input Body**

The MessageHeader has a new unique MessageId and the CorrelationID is set to the MessageId of the BOM InputBody which is being acknowledged.

### 7.5 BOM Error Input Body

The input to the SendBOMError() operation consists of a Message Header, a Security Block and a list of Error Blocks, as shown in Figure 7-5. Each Error Block references a business object (by business identifier) and a list of one or more errors pertaining to the business object.

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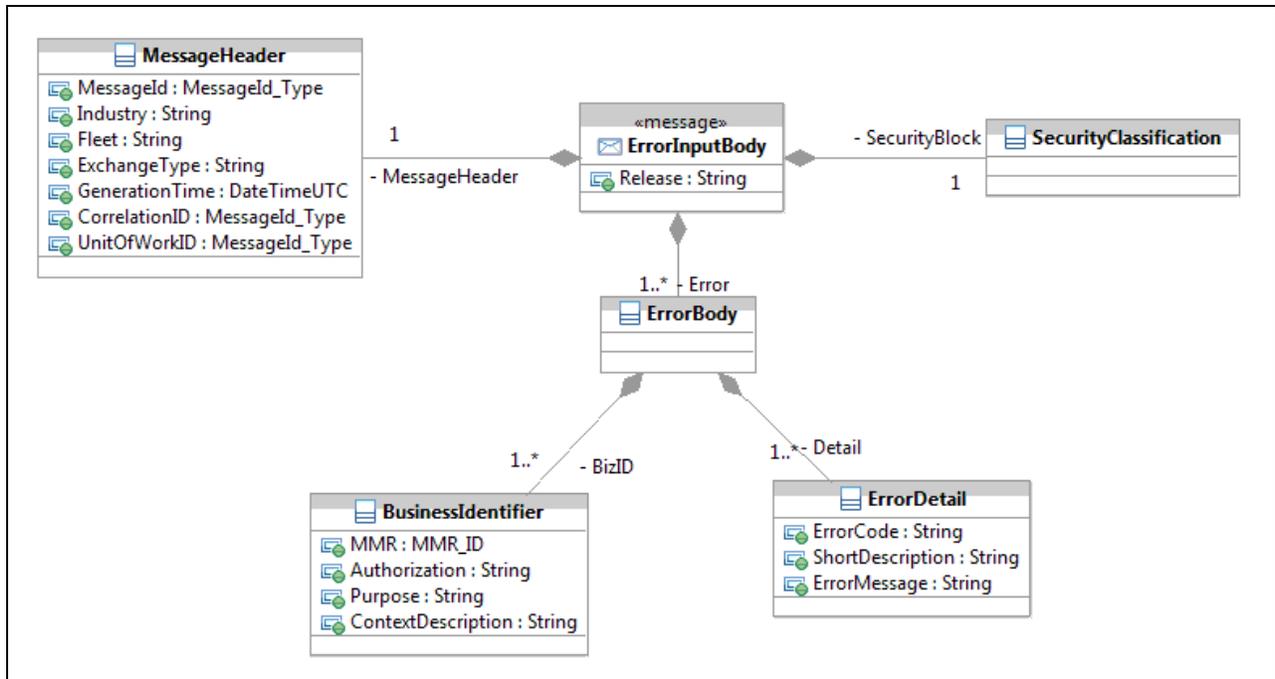


Figure 7-5 BOM Fault Input Body

MessageHeader and SecurityClassification are mandatory as in this scenario (after Type 1 validation has passed) the input message is well-formed.

The MessageHeader has a new unique MessageId.

If the error is a Type 2 error detected by Industry, then the CorrelationID and UnitOfWorkID are set based on the Message Header of the BOM InputBody for which the errors are being reported.

CorrelationID

## 7.6 Summary of Operation to Input/Output/Fault Body Mapping

The following diagram in Figure 7-6 shows the mapping for each of the three operations in the BOM service - SendBOM(), SendBOMAck() and SendBOMError() - to their respective input, output and fault bodies as further defined in the BOM Web Service Definition Language (WSDL) file.

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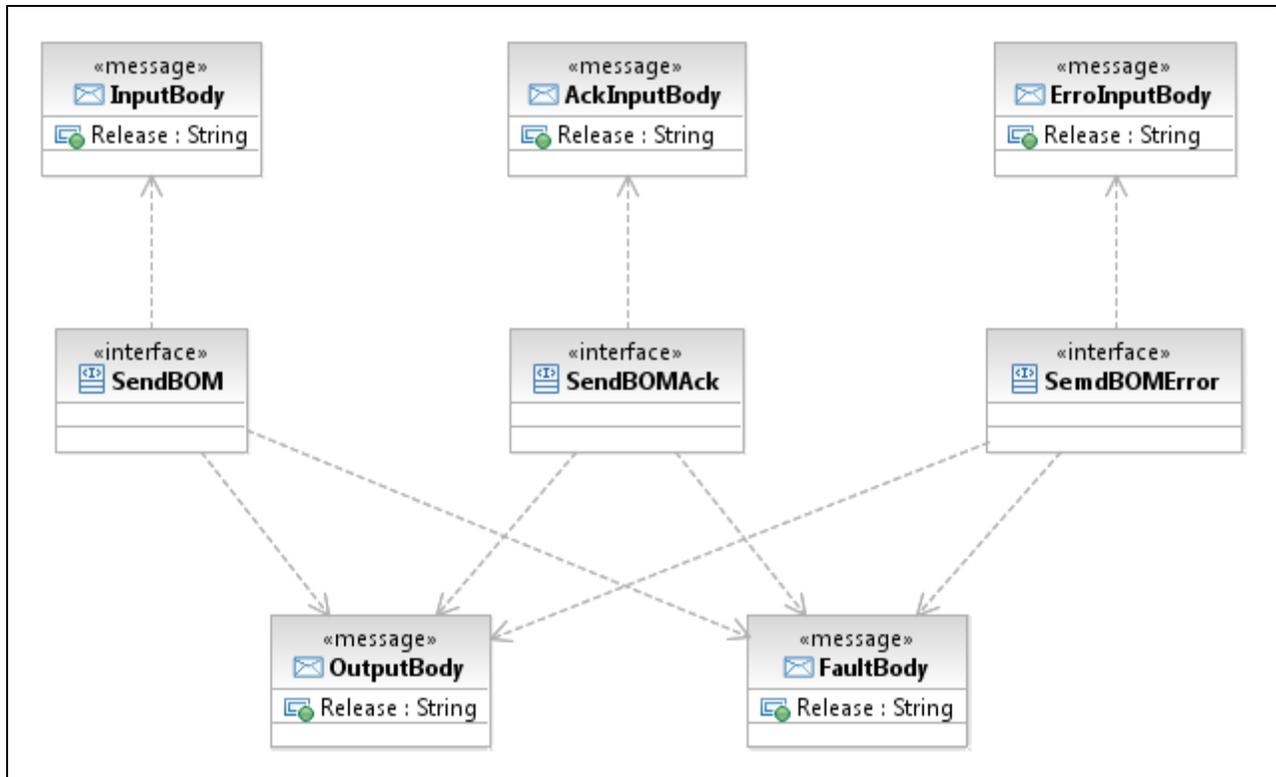


Figure 7-6 BOM Operations to Input/Output/Fault Mapping

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## 8 Service Operation Details

### 8.1 Detailed Operation Characteristics – SendBOM()

Canada EDE will invoke the exposed Industry BOM service through this operation. The input will consist of a BOM InputBody (as above).

Please refer to Service Interaction Model [Ref. 2] for definitions of the terminology used in the non-functional requirements section.

Please refer to Bill Of Materiel WSDL files for implementation details.

#### Detailed Operation Characteristics

Interface Definition	Description
Operation Name	Send BOM
Operation Technical Name	SendBOM()
Operation Description	This operation is invoked by Canada EDE to send one or more BOM business objects to Industry.
Target Operation Provider	Industry
Target Operation Consumer	Canada EDE
Properties	<i>Request/Response</i> message exchange pattern.
Input Message Definition	Please refer to Operation Message Model <a href="#">Section 7.1 BOM Input Body</a> for details.
Output Message Definition	Please refer to Operation Message Model <a href="#">Section 7.2 BOM Output Body</a> for details.
Fault Definition	Please refer to Section <a href="#">7.3 BOM Fault Body</a> for details. Please see Service Interaction Model [Ref. 2] for Type 1 faults.

#### Non-Functional Requirements

Non-Functional Requirements/Technical Details	
Frequency	A-periodic according to business triggers (Section 2.2). Will be determined between Canada and Industry on a per ship class basis.
Peak Throughput Time	Based on Service Level Agreements (SLA) to be determined between Canada and Industry on a per ship class basis.
Peak Throughput Volume	Based on Service Level Agreements (SLA) to be determined between Canada and Industry on a per ship class basis.
Payload Size	<2Kb per business object

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Non-Functional Requirements/Technical Details	
Attachments	None
Attachment Size	N/A
ACK Time Interval	Nominal value is 2 minutes – to be confirmed between Canada and Industry on a per ship class basis.
Retry Time Interval	Nominal value is 10 minutes – to be confirmed between Canada and Industry on a per ship class basis.
Number of Retries	Nominal value is 3 retries – to be confirmed between Canada and Industry on a per ship class basis.
Biz. Response Time Interval	N/A
Time to Live Span	24 hours from the creation of the unit of work.
Service Op Availability	During core processing hours. The specific period will be defined during later phases of service realization 95% available uptime is the goal of the service
Downtime Requirements	The service cannot be used during established maintenance windows, which is currently expected to be for about 2 hours per week. The unavailability window may be accumulated and invoked during major maintenance periods, but ensuring that the overall availability of the service is still maintained.
Dead Message Handling	Alternative communication channel applies to report that this operation is not available when Canada EDE cannot successfully send BOM business objects to Industry. See Service Interaction Model [Ref. 2].

## 8.2 Detailed Operation Characteristics – SendBOMError()

Industry *may* use this operation to inform Canada EDE of business errors detected in internal processing and faults returned from Industry systems.<sup>14</sup>

Refer to Bill Of Materiel WSDL files for implementation details.

### Detailed Operation Characteristics

Interface Definition	Description
Operation Name	Send BOM Error
Operation Technical Name	SendBOMError()

<sup>14</sup> Use of business errors is determined between Canada and Industry on a per ship class basis.

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Interface Definition	Description
Operation Description	This operation is invoked by Industry to send one or more BOM errors to Canada EDE.
Target Operation Provider	Canada EDE
Target Operation Consumer	Industry
Properties	<i>Request/Response</i> message exchange pattern.
Input Message Definition	Please refer to Operation Message Model <a href="#">Section 7.5 BOM Error Input</a> Body for details. Please refer to Service Interaction Model [Ref. 2] for Type 2 faults for the error inputs which may be sent in this operation.
Output Message Definition	Please refer to Operation Message Model <a href="#">Section 7.2 BOM Output</a> Body for details.
Fault Definition	Please refer to Section <a href="#">7.3 BOM Fault Body</a> for details. Please see Service Interaction Model [Ref. 2] for faults which may be returned by this operation.

### Non-Functional Requirements

Non-Functional Requirements/Technical Details	
Frequency	Same as SendBOM() operation. Worst case is one error per BOM business object.
Peak Throughput Time	Same as SendBOM() operation.
Peak Throughput Volume	Same as SendBOM() operation.
Payload Size	5KB – estimated for one ErrorBlock with one BizID and two ErrorMessage's
Attachments	None
Attachment Size	N/A
ACK Time Interval	Nominal value is 2 minutes – to be confirmed between Canada and Industry on a per ship class basis.
Retry Time Interval	Nominal value is 10 minutes – to be confirmed between Canada and Industry on a per ship class basis.
Number of Retries	Nominal value is 3 retries – to be confirmed between Canada and Industry on a per ship class basis.
Biz. Response Time Interval	N/A
Time to Live Span	60 minutes.

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Non-Functional Requirements/Technical Details	
Service Op Availability	During core processing hours. The specific period will be defined during later phases of service realization 95% available uptime is the goal of the service
Downtime Requirements	The service cannot be used during established maintenance windows, which is currently expected to be for about 2 hours per week. The unavailability window may be accumulated and invoked during major maintenance periods, but ensuring that the overall availability of the service is still maintained.
Dead Message Handling	Alternative communication channel applies to report that this operation is not available when Canada EDE cannot successfully send BOM business objects to Industry. See Service Interaction Model [Ref. 2].

### 8.3 Detailed Operation Characteristics – SendBOMAck()<sup>15</sup>

Industry *may* use this operation to inform Canada EDE of successful processing of business objects by Industry systems. Usage of this operation is to be confirmed between Canada and Industry on a per ship class basis.

Refer to Bill Of Materiel WSDL files for implementation details.

#### Detailed Operation Characteristics

Interface Definition	Description
Operation Name	Send BOM Acknowledgement
Operation Technical Name	SendBOMAck()
Operation Description	This operation is invoked by Industry to send one or more BOM acknowledgement objects to Canada EDE.
Target Operation Provider	Canada EDE
Target Operation Consumer	Industry
Properties	<i>Request/Response</i> message exchange pattern.
Input Message Definition	Please refer to Operation Message Model <a href="#">Section 7.4 BOM Ack Input Body</a> for details.
Output Message Definition	Please refer to Operation Message Model <a href="#">Section 7.2 BOM Output Body</a> for details.

<sup>15</sup> Use of this positive acknowledgement is determined between Canada and Industry on a per ship class basis.

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Interface Definition	Description
Fault Definition	Please refer to Section <a href="#">7.3 BOM Fault Body</a> for details. Please see Service Interaction Model [Ref. 2] for faults which may be returned by this operation.

### Non-Functional Requirements

Non-Functional Requirements/Technical Details	
Frequency	To be confirmed between Canada and Industry on a per ship class basis. Depends on pace of back-end processing.
Peak Throughput Time	To be confirmed between Canada and Industry on a per ship class basis. Depends on pace of back-end processing.
Peak Throughput Volume	To be confirmed between Canada and Industry on a per ship class basis. Depends on pace of back-end processing.
Payload Size	~ 1KB per acknowledgement
Attachments	None
Attachment Size	N / A
ACK Time Interval	Nominal value is 2 minutes – to be confirmed between Canada and Industry on a per ship class basis.
Retry Time Interval	Nominal value is 10 minutes – to be confirmed between Canada and Industry on a per ship class basis.
Number of Retries	Nominal value is 3 retries – to be confirmed between Canada and Industry on a per ship class basis.
Biz. Response Time Interval	N/A
Time to Live Span	60 minutes.
Service Op Availability	During core processing hours. The specific period will be defined during later phases of service realization 95% available uptime is the goal of the service
Downtime Requirements	The service cannot be used during established maintenance windows, which is currently expected to be for about 2 hours per week. The unavailability window may be accumulated and invoked during major maintenance periods, but ensuring that the overall availability of the service is still maintained.
Dead Message Handling	Alternative communication channel applies to report that this operation is not available when Canada EDE cannot successfully send BOM business objects to Industry. See Service Interaction Model [Ref. 2].

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## 8.4 Service Bindings

### 8.4.1 SOAP Over http

The implementation of this service will use a Simple Object Access Protocol (SOAP) binding with document style messages and http transport.

The business objects (Section 6) are bound to the SOAP Body element. The SOAP Header is used for EIE adopted WS-\* standards-based elements (e.g., WS\_Security assertions) and, typically, MessageHeader and SecurityMarkings elements.

In this binding the http response is used for each operation's technical response (i.e., output or fault messages).

See the Bill Of Materiel Service WSDL file for the precise binding.

### 8.4.2 SOAP Over JMS

Not currently supported.

### 8.4.3 XML files via SFTP

As an interim measure while an industry partner implements their web service infrastructure, Canada EDE supports sending XML files to a secure DND SFTP site for Industry consumption.

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## 9 Definitions, Acronyms, Abbreviations

Term	Description
BOM	Bill Of Materiel
CM	Configuration Management
CMMS	Canada Maintenance Management System
CMP	Class Program Manager
CSS	Canada Supply System
DND	Department of National Defence
DRMIS	Defence Resource Management Information System
EDE	Electronic Data Exchange
EIE	Electronic Information Environment
EMR	Equipment Master Record
FLOC	Functional Location
ISS	In Service Support
ISSCF	In Service Support Contracting Framework
MER	Master Equipment Record
MPL	Master Parts List
MPN	Manufacturer Part Number
MMR	Materiel Master Record
PBC	Performance Based Contracting
SFTP	Secure File Transfer Protocol
SOAP	Simple Object Access Protocol
UTC	Coordinated Universal Time
WS	Weapon System
WSDL	Web Service Definition Language
XML	Extensible Markup Language

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## 10 Appendix A - Entity Relationship Model

### Information Model – Entity-Relationship View

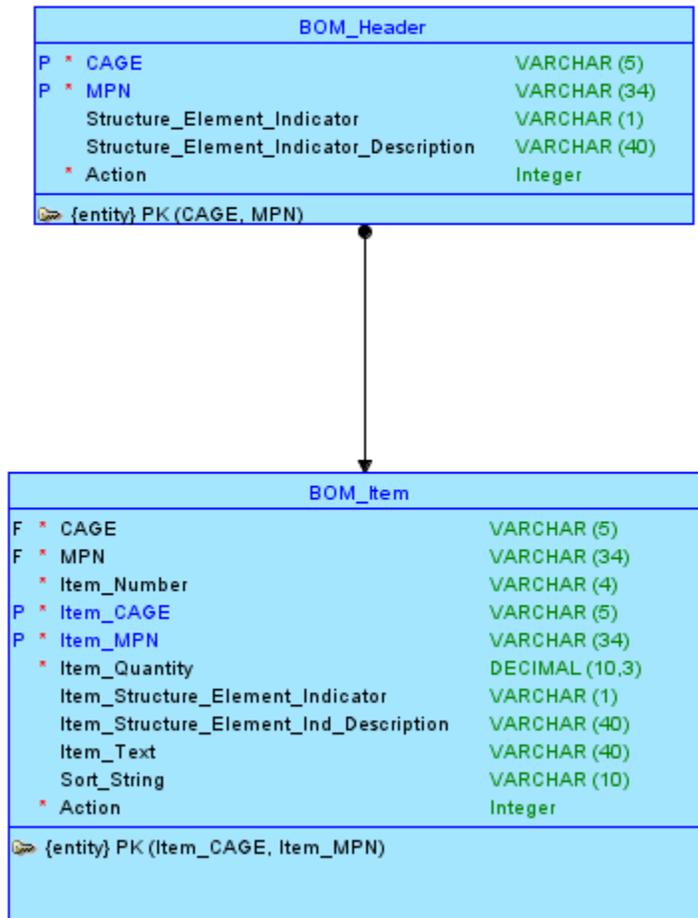


Figure 10-1 BOM ERD

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## 11 Document History

Version Number	Description	Date
1.0	Ready for Navy RFP	20 October 2015

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