



# Electronic Information Environment (EIE)

## Service Specification Document/Interface Control Document Master Data Navy Maintenance Task List 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.

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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 the ISS Contractor to send Maintenance Task List (MTL) messages to Canada EDE. To support the MTL 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 Maintenance Task List service includes an operation for Canada EDE to report acknowledgement messages back to ISS Contractor.

### 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] Data Package Service Specification;
- [Ref. 5] BUC 2.2 Exchange Master Data – Inbound.

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## 2 Business Information

Business Information is based on the EIE Business Process model for Data Initialization [Ref. 1], the Business Use Case [Ref. 5], and the DRMIS Master Data Business Guidelines Air Force ISSCF fleets [Ref. 3]. The following is from Section 4.3 of [Ref. 3].

*Maintenance task lists (MTL) in DRMIS define tasks and resources required to execute maintenance work as defined in the weapon system maintenance program. Typically, MTL do not include the detailed work instructions but rather identify the work step on the level where signatures are required and reference the technical publication that includes detailed work steps and work instructions.*

*Maintenance task list serve as templates for maintenance work orders. For DRMIS maintenance plans MTL are required and when a new work order or notification is scheduled for a maintenance plan the MTL referenced in the maintenance plan item is automatically copied into the work order or notification.*

*In addition to the required MTL for scheduled maintenance, MTL should also be created for any other maintenance work such as conditional maintenance (e.g. bird strike, hard landing), fault isolation, corrective maintenance and servicing tasks. This will allow the technician to (manually) copy into the work order and have all the MTL information available in the work order.*

MTLs 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 MTL service is to provide to ISS Contractor a means of sending to Canada the MTLs for a ship class and for Canada to acknowledge receipt of the MTL 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)
- Canada Supply System (CSS)

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

### 2.1 Business Processes

The WS supplier is responsible to produce a complete set of MTL data for the ship class. The ISS Contractor and Canada engage in a Material Identification Process. This process results in a catalogue of MMRs which are fully indexed and identified by CAGE/MPN, NATO Stock Number (NSN) according to NATO and Industry technical standards.

As the ISS Contractor assumes responsibility for the ship class under PBC, there will be a need for the ISS Contractor to send additional MTL data as required.

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After the Identification Process several other steps are followed (each step has guidelines and validations, see [Ref. 3]):

- Extract the Master Data from Industry source systems;
- Assemble the Master Data into a complete and consistent data package;
- Transmit to Canada;
- Augment and transform the Master Data according to Canada's standards;
- Load the Master Data into CMMS;
- Final validation of the Master Data.

Ultimately Master Data must be approved by designated DND staff with the requisite qualifications prior to being used in Production.

Any item represented by an MMR may require maintenance and so an MMR can have one or more associated MTLs which describe how to perform maintenance on the item. An MTL may also be associated with a Functional Location (FLOC). For Corrective Maintenance, once fault isolation is completed, a maintainer will add one or more maintenance tasks to a work order to effect repairs. For Preventive Maintenance a Maintenance Plan (MP) will define the maintenance tasks for an item or FLOC based on calendar or usage conditions.

## 2.2 Business Triggers

As per the EIE Business Process model for Data Initialization [Ref. 1] the following business events, may result in MTL data being sent to Canada EDE.

- Prior to delivery of subsequent WS in the ship class;
- The result of an engineering change;
- Updates to Industry Maintenance Programs.

In all cases a direct<sup>1</sup> communication will take place between Industry<sup>2</sup> and Canada DND to advise Canada DND of the availability of new Master Data. Canada's designated official will, through CMMS, initiate the transfer of the Master Data from Industry.

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<sup>1</sup> Phone, fax, email, but not through Canada EDE services.

<sup>2</sup> Within this document, Industry and ISS Contractor are synonymous and are used interchangeably

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### 2.3 Master Data Unit of Work

According to PBC, the ISS Contractor assumes the responsibility for Configuration Management (CM) of every WS in a ship class. With this responsibility the ISS Contractor 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 the ISS Contractor to Canada EDE 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].

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<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.



### 3 Business Constraints

#### Terminology

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

#### Constraints on Usage of the Service

- 1) Canada EDE shall ensure every Master Data message is only processed from an Industry which is properly authenticated and authorized to provide Master Data for that ship class.
- 2) Industry 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.
- 3) The unit of work for Master Data always contains an explicit manifest.
- 4) 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

- 5) 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.
- 6) Canada EDE will report Master Data technical processing errors through the corresponding Error operation of the invoked Master Data service.
- 7) Canada EDE may attempt to re-send Master Data error 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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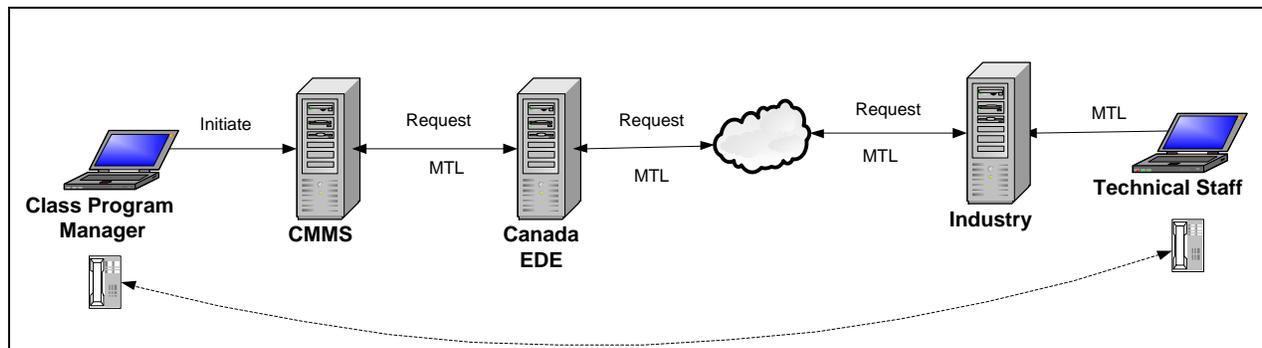
<sup>4</sup> MTL messages are defined in section 7. MTL business objects are defined in section 6. The message / business subject distinction is used throughout the document.

## 4 Service Use Case

The requirements for the MTL 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 MTL Service Context**

The following steps occur:

- Industry Technical Staff create a new Master Data Package including MTL business objects.
- Industry Technical Staff advises Class Program Manager (or designate) of availability of data package through direct communication.
- Class Program Manager initiates, through CMMS, transfer of the Master Data to Canada.
- Canada EDE forwards initiation request to Industry.
- Industry 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.
- Canada EDE acknowledges the unit of work message.
- Industry will have to wait for the acknowledgement message from Canada EDE, after which it can begin invoking the appropriate services to initiate the transfer of Master Data business objects.
- Industry 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, Canada EDE returns a technical response.
- Canada EDE collects complete package of Master Data.
- Canada EDE dispatches complete Master Data package to CMMS.

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- After CMMS processing Class Program Manager accepts or rejects the Master Data package (in its entirety). The result is communicated to Industry.

Once the initiating Master Data request is received by Industry, Industry may send business objects in the Master Data package (MTL 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 MTL 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].

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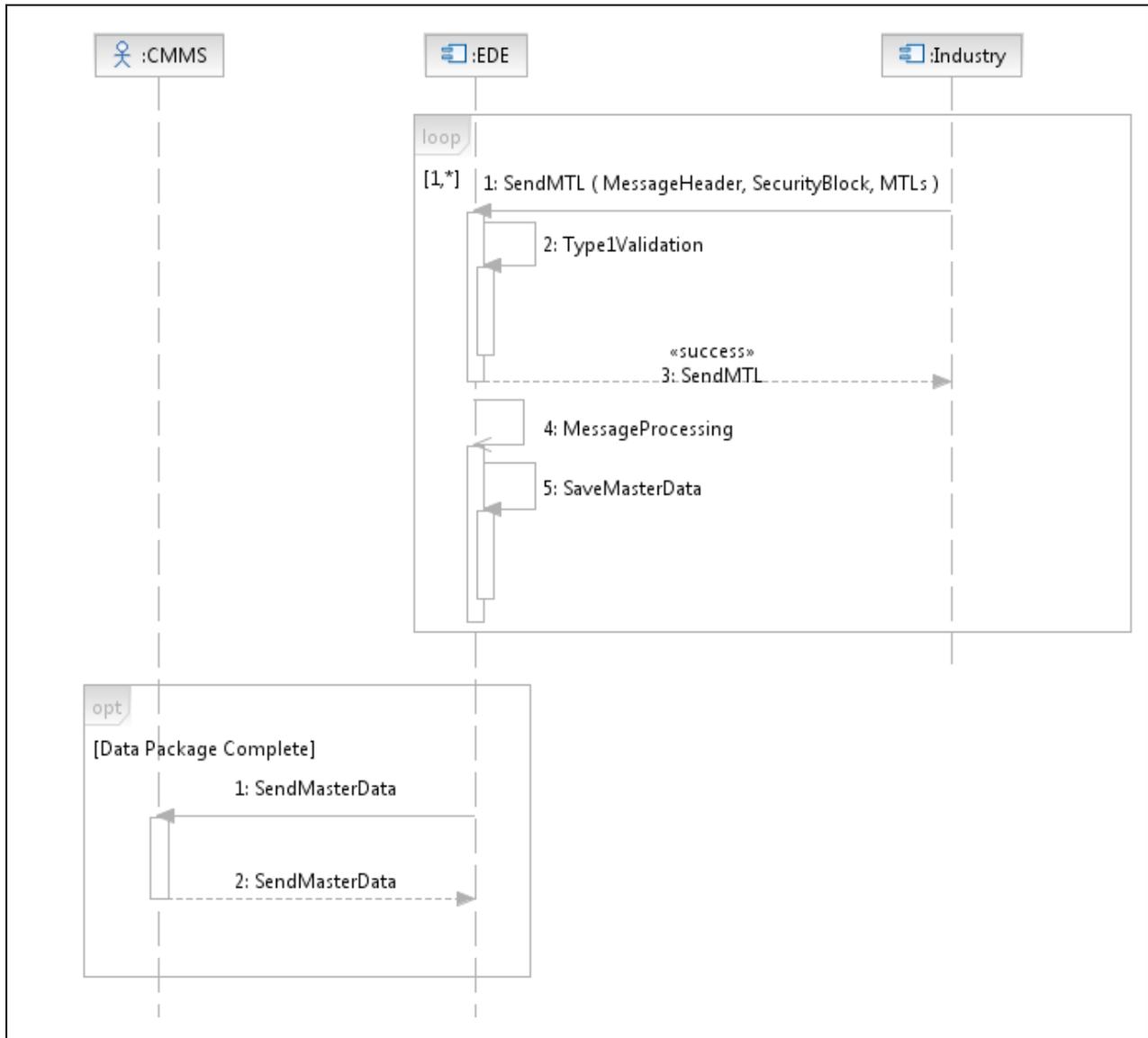


Figure 4-2 MTL Message Flow

Main Flow	
Scenario	“Happy Day:” Industry successfully sends MTL business objects to Canada.

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Pre-Condition	<p>Industry has prepared a Master Data package containing one or more MTL business objects.</p> <p>Industry Technician has advised DND CPM of the availability of new Master Data. DND CPM has initiated request in CMMS.</p> <p>Industry has received initiation request and responded with creation of unit of work and manifest.</p> <p>Canada has replied to Industry that unit of work is successfully created.</p>
Post-Condition	<p>MTL business objects successfully received by Canada EDE.</p>
Steps	<p><b>Industry begins a loop to send MTL messages to Canada EDE<sup>5</sup>.</b></p> <ol style="list-style-type: none"> <li>1) Industry invokes 'SendMTL()' operation passing UOW ID and one or more MTL business objects. (See <a href="#">Input Body</a> definition.) Industry waits for technical response.</li> <li>2) Canada EDE initiates "Type 1" validation. In this scenario there is no error. Canada EDE accepts "custody" of the MTL business objects in the message.</li> <li>3) Canada EDE returns to Industry a "success" technical response for the SendMTL() operation. (See <a href="#">Output Body</a> definition.)</li> <li>4) Canada EDE begins internal processing of the message. In this scenario there is no error.</li> <li>5) Canada EDE saves MTL business objects to send to CMMS once unit of work is complete.</li> </ol> <p><b>Industry continues loop to send more MTL messages (if any) to Canada EDE.</b></p> <p>Once Canada EDE has received a complete Master Data package from Industry, Canada EDE will send to CMMS. The details of this process are out of scope of this specification.</p>

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

### 4.3 Alternate Scenarios

The MTL Message Flow with Type 1 Fault sequence diagram is shown in Figure 4-3. The following scenarios apply to all uses of the MTL 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 CMMS. Please see Service Interaction Model [Ref. 2] for details on these groupings.

<sup>5</sup> In practice, MTL messages may be interleaved with other Master Data messages from the same unit of work, or other units of work.

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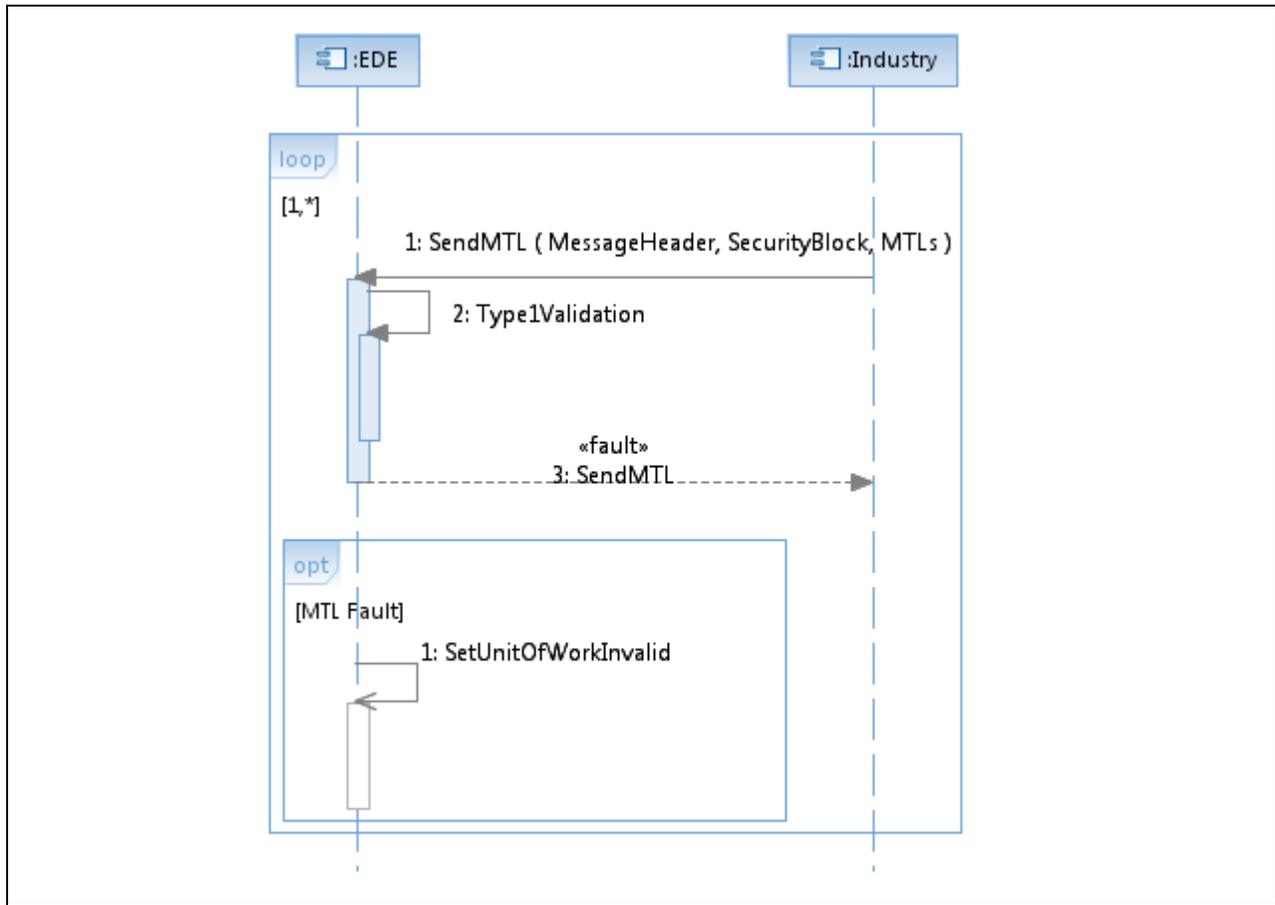


Figure 4-3 MTL Message Flow with Type 1 Fault

Alternate Flow 1	
Scenario	Type 1 Errors detected by Canada EDE 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	Canada EDE sends technical response containing a fault message (see Service Interaction Model [Ref. 2]) to Industry. Industry 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) Industry invokes 'SendMTL()' operation containing one or more MTLs.</li> <li>2) Canada EDE checks for Type 1 errors – an error is found;</li> <li>3) Canada EDE constructs the fault message and sends the fault message to Industry in the technical response to the original SendMTL() operation invocation. (See <a href="#">Fault Body</a> definition.)</li> </ol> <p>In the same iteration through the loop where a MTL Message fault was found:</p> <ol style="list-style-type: none"> <li>1) Canada EDE 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) Industry may receive additional fault technical responses for other Master Data operations which were invoked for an invalid unit of work.

<b>Alternate Flow 2 (Canada EDE Service unresponsive)</b>	
Scenario	Industry does not receive technical response within ACK_TIME_INTERVAL.
Pre-Condition	Industry has invoked the operation but does not receive the technical response within the time specified for the MTL service.
Post-Condition	Industry marks the message as Dead Message.
Steps	<ol style="list-style-type: none"> <li>1) Industry does not receive any response from Canada EDE within the allowed ACK_TIME_INTERVAL.</li> <li>2) Industry 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 Industry 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 (CMMS Business Error)</b>	
Scenario	CMMS reports a business error when attempting to load one or more Master Data business objects.
Pre-Condition	<p>All business objects have been received by CMMS, and CMMS starts its data load process.</p> <p>Canada CMMS sends TPMS message to Canada EDE.</p>
Post-Condition	Canada EDE sends technical problem through TPMS interface to Industry.
Steps	<ol style="list-style-type: none"> <li>1) Canada EDE invokes Industry TPMS operation and receives a positive technical response.</li> </ol>

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## 5 Service Description – Maintenance Task List Service

### 5.1 Service Overview

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

As part of the Maintenance Task List service Industry will implement and expose two operations:

- An error reporting operation optionally used by Canada EDE to report business errors<sup>6</sup>;
- An acknowledgement service optionally<sup>7</sup> used by Canada EDE to report successful delivery of MTL business objects to CMMS.

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

### 5.2 Service Properties

Service Property	Description
Enterprise Service Name (Business)	Maintenance Task List Service
Enterprise Service Name (Technical)	MaintenanceTaskListService (Abbreviated in this document to MTL service.)
Purpose	This service supports the Canada EDE Master Data. On the occurrence of business triggers, Industry uses this service to send MTL messages to Canada EDE.
Business Response Time Interval	Will be determined between Canada and Industry on a per-ship class basis.
Service Domain	Master Data
Business Owner	ADM (IM)
Service Grouping	Master Data
Service Provider	SendMTL() - Canada EDE SendMTLack() – Industry SendMTLError() - Industry

<sup>6</sup> Use of business errors is determined between Canada and Industry on a per-class basis.

<sup>7</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	SendMTL() - Industry SendMTLack() – Canada EDE SendMTLError() – Canada EDE
Business Process Supported (now)	Master Data processes: <ul style="list-style-type: none"> <li>• Initial Data Load;</li> <li>• Engineering Change;</li> <li>• Catalogue Update;</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 ‘SendMTL()’ Operation

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

### 5.4 ‘SendMTLack()’ Operation<sup>8</sup>

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

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 ‘SendMTLError()’ Operation<sup>9</sup>

This operation is used by Canada EDE to send an error message to Industry after internal message processing detects a Type 2 error condition (see Service Interaction Model [Ref. 2]). The specific MTL business objects which are in error are identified by a list of business identifiers (see Section 7).

<sup>8</sup> Use of this positive acknowledgement is determined between Canada and Industry on a per-class basis.

<sup>9</sup> Use of business errors is determined between Canada and Industry on a per-class basis.

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Industry's implementation of this operation will perform Type 1 validation on the error message. Industry will return a technical response to Canada EDE.

Further processing of MTL messages is terminated regardless of Industry's response to the 'SendMTLError()' invocation.

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## 6 Information Model

This section describes the **business objects** which are used in the MTL service. The Unified Modeling Language (UML) notation is used. A functional view<sup>10</sup> of the information model is provided in the Master Data Business Guidelines [Ref. 3].

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 MTL

An MTL business object is used to describe operations required to perform maintenance on a weapon system, the components, tools and test equipment, the human resources (personnel with appropriate skills) and manuals which are part required for maintenance.

An individual MTL business object comprises a hierarchical structure of operations, components, etc. as shown below. Also, it is possible to define a hierarchical structure of MTL business objects, where each individual MTL business object may have its own hierarchy of operations, components, etc.<sup>11</sup>

Figure 6-1 shows the Information Model used in the Maintenance Task List service. This section primarily discusses the structure of the information model, details of attributes may be found in the Master Data Business Guidelines [Ref. 3]. In the following underlined italic text refers to specific classes in Figure 6-1.

The hierarchical structure of MaintenanceTaskLists uses the class called HTL\_Ref to model the parent-child relationship. A MaintenanceTaskList may contain many child HTL\_Refs, each child HTL\_Ref in turn contains a reference to a **single** parent MaintenanceTaskList. Each HTL\_Ref **must** have a sequence number indicating the precedence of child MaintenanceTaskLists.

Attributes of MaintenanceTaskList describe the MaintenanceTaskList. The MaintenanceTaskList also includes a reference to the Strategy code table.

A MaintenanceTaskList **may** (see next paragraph) contain one or more Operations. An Operation **may** in turn contain SubOperations. Operation and SubOperation have common properties which are defined in OperationBase<sup>12</sup>. The common properties in OperationBase include unique identifiers for the Operation/SubOperation, description text and references to the WorkCenter and StandardText code tables. Each Operation/SubOperation **must** contain a TimeDuration object for its nominal duration. A SubOperation has its own unique Sub\_Op\_Num identifier.

<sup>10</sup> The Functional View details the collection of fields which make up Maintenance Task List business objects.

<sup>11</sup> This level of complexity is used infrequently.

<sup>12</sup> 'OperationBase' is used in this UML model but is not used in the XML schema for MTL.

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At least one *Operation* is required with the following exception. In the scenario where an existing *MaintenanceTaskList* is being updated and only a field directly in the *MaintenanceTaskList* is modified then Industry may send a *MaintenanceTaskList* business object with no *Operation* business object and all pre-existing *Operation* business objects in the *MaintenanceTaskList* business object are unaffected.

To perform an operation a maintainer may require replacement parts and tools/test equipment (referred to as **PRT's**). These are shown in the information model as classes *OperationComponent* and *OperationPRT* (*OperationPRT* includes test equipment), contained in *Operation*. Each *OperationComponent* and *OperationPRT* specifies the quantity required of the component/PRT in the operation and the UOM of the quantity<sup>13</sup>. Each *OperationComponent* and *OperationPRT* contains a reference –using class *MMR\_ID*– to the Materiel Master Record (MMR) of the required parts and tools.

In the *MaintenanceTaskList* and *OperationBase* classes, a short and long description may be added. There may be one or two long descriptions and different languages may be used<sup>14</sup> as indicated by the <<lang> stereotype.

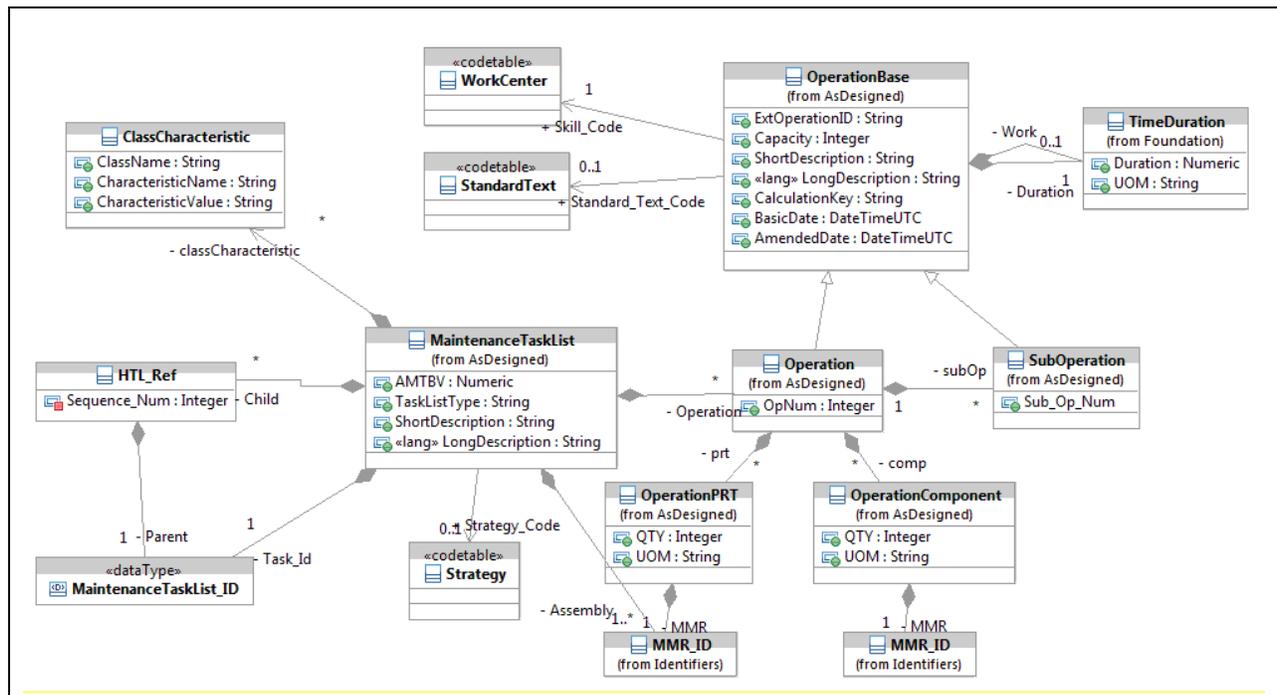


Figure 6-1 Information Model – Maintenance Task List

<sup>13</sup> “UOM” in this context is the units required in the context of the operation which may be different from the UOI in the MMR.

<sup>14</sup> The language(s) to be used are determined between DND and Industry. Language tags are based on [www.w3.org](http://www.w3.org) standards.

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## 6.2 As Designed Structure

The maintenance task 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.

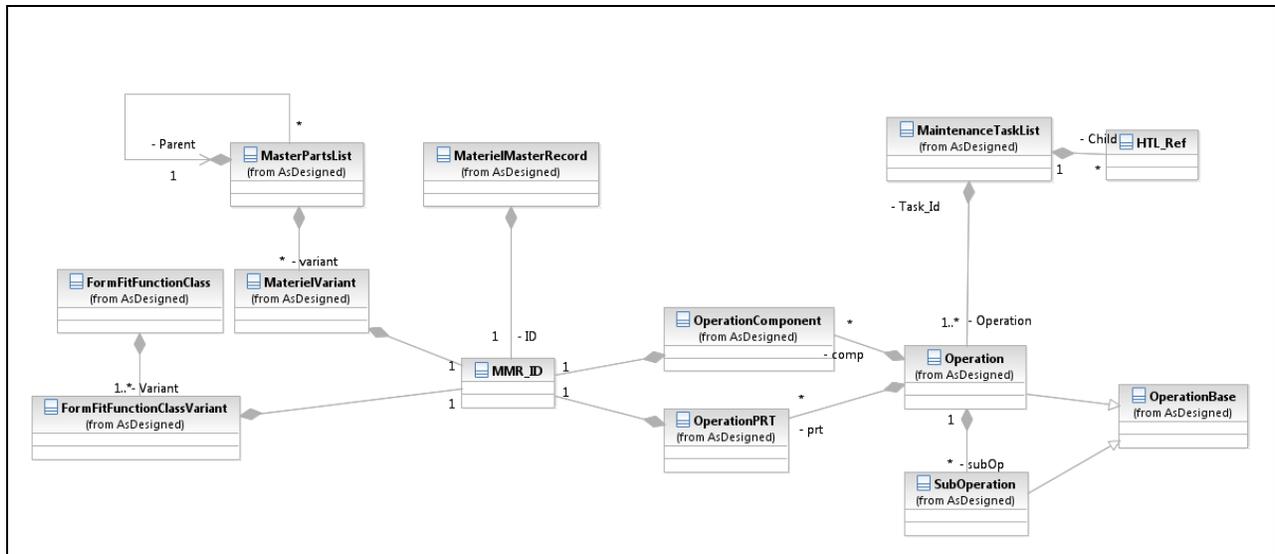


Figure 6-2 Information Model – As Designed Structure

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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 Industry 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 Industry and may be replayed in error messages<sup>15</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 MTL 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 file MaintenanceTaskList.xsd.

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 MTL Input Body

As shown in Figure 7-1 an MTL service input body consists of

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

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<sup>15</sup> Business Context is further discussed in the Unit of Work service specification.

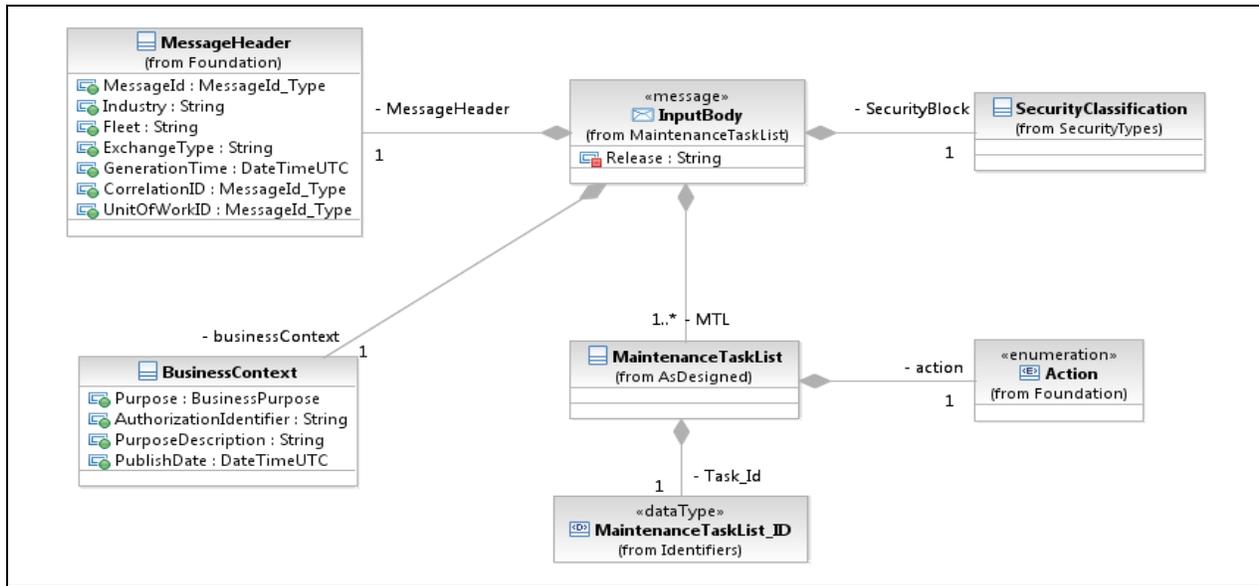


Figure 7-1 MTL Input Body

The MessageHeader UnitofWorkID must equal the UnitofWorkID value of an existing valid unit of work<sup>16</sup>. The MessageHeader Correlation ID must equal the Message ID of the message which created the unit of work. Purpose and ContextDescription fields must match the corresponding fields in the Unit of Work which envelopes this input message.

The MTL InputBody also contains an attribute ‘Release’ which designates the release of the MTL 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>17</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 MTL 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 MTL Output Body

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

- A Message Header;
- A Custody object.

<sup>16</sup> Type 1 validation will check if the unit of work is in a non-error state.

<sup>17</sup> The rules for incrementing the ‘Release’ attribute for a service will be in a separate document.

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

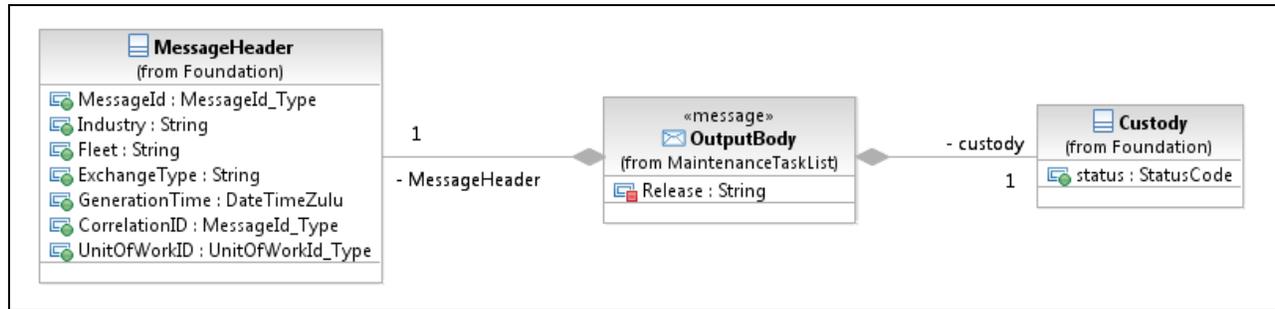


Figure 7-2 MTL Output Body

For an MTL 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 MTL Input Body;
- The MessageHeader ExchangeType must be set to the ExchangeType of the MTL InputBody;
- The value of the Custody status field is “success”<sup>18</sup>.

### 7.3 MTL Fault Body

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

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

Each fault block pertains to zero to many business object(s), 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>18</sup> As stated in Section 5.3, the main significance of the output is that, by its presence, there is no fault.

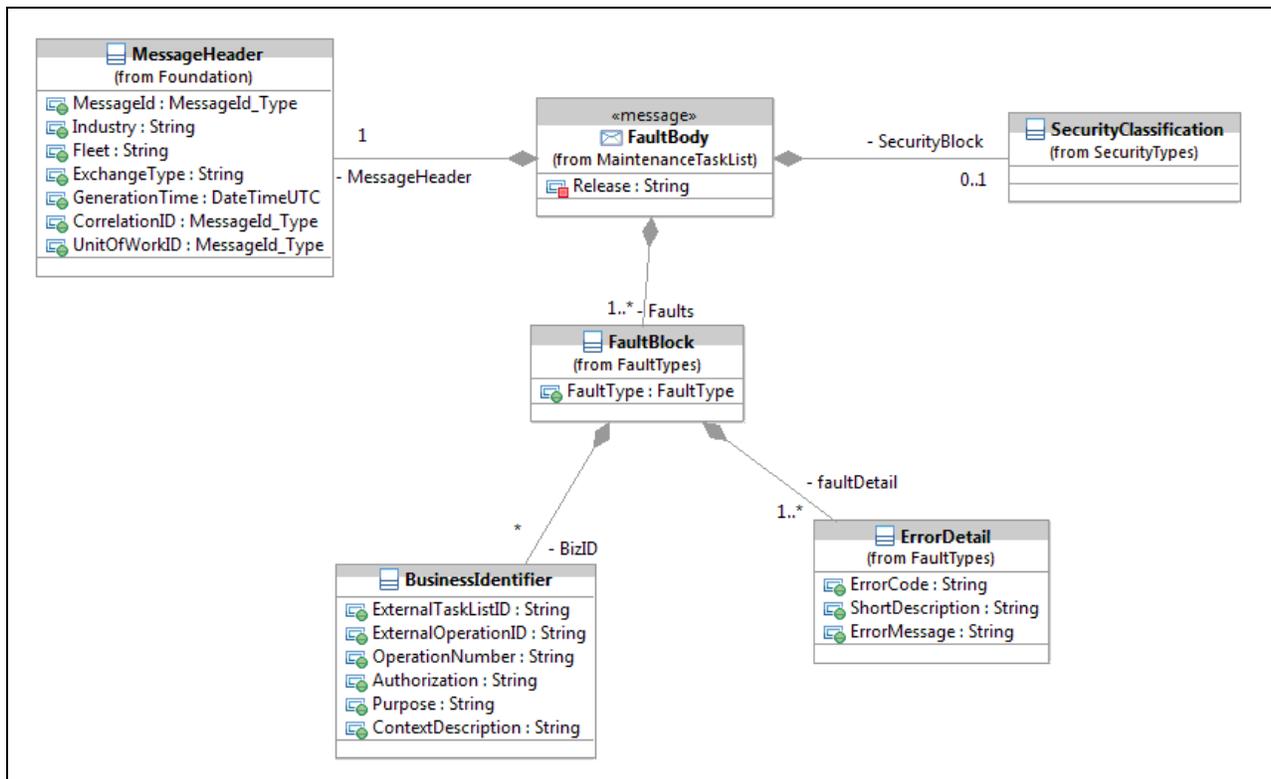


Figure 7-3 MTL Fault Body

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.

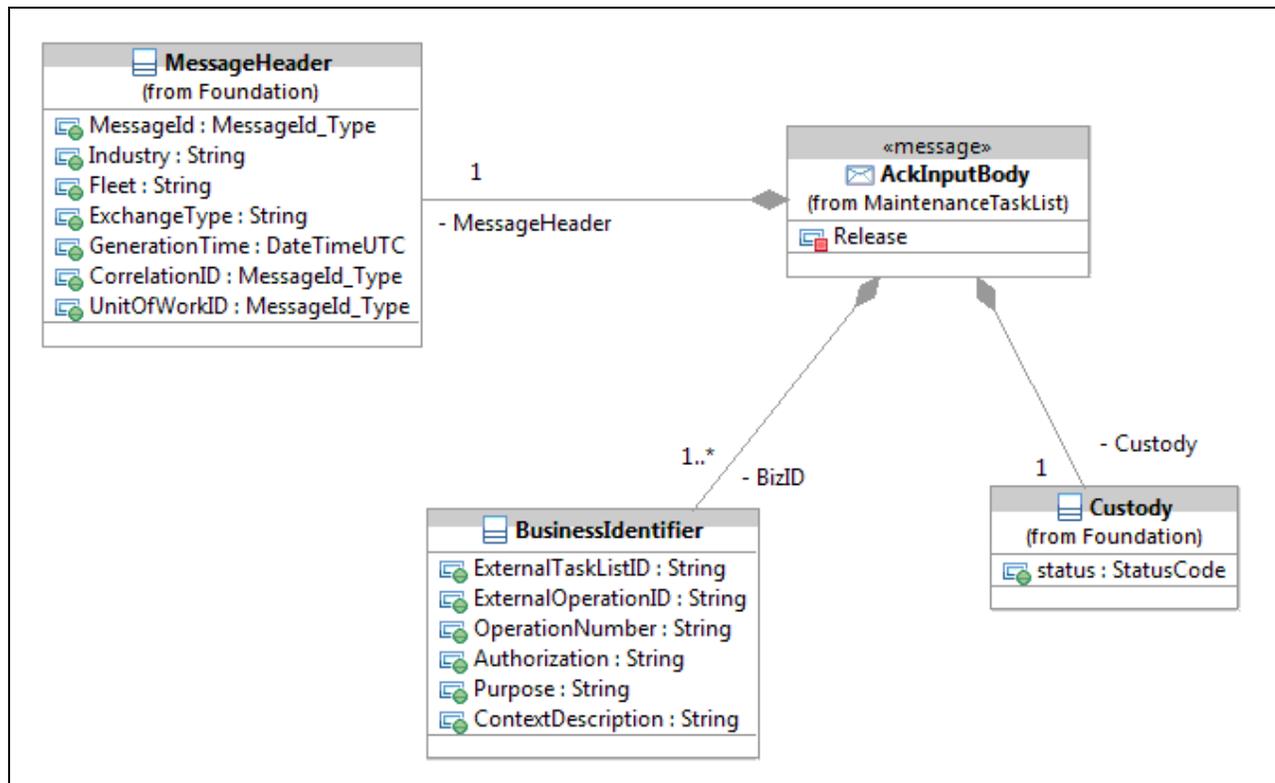
CorrelationID is set to the MessageId of the input message – whenever it is available.

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

#### 7.4 MTL Acknowledgement Input Body

The input to the SendMTLack() operation consists of a Message Header, a list of business identifiers, and a “success” status indicating the business objects were accepted in CMMS.

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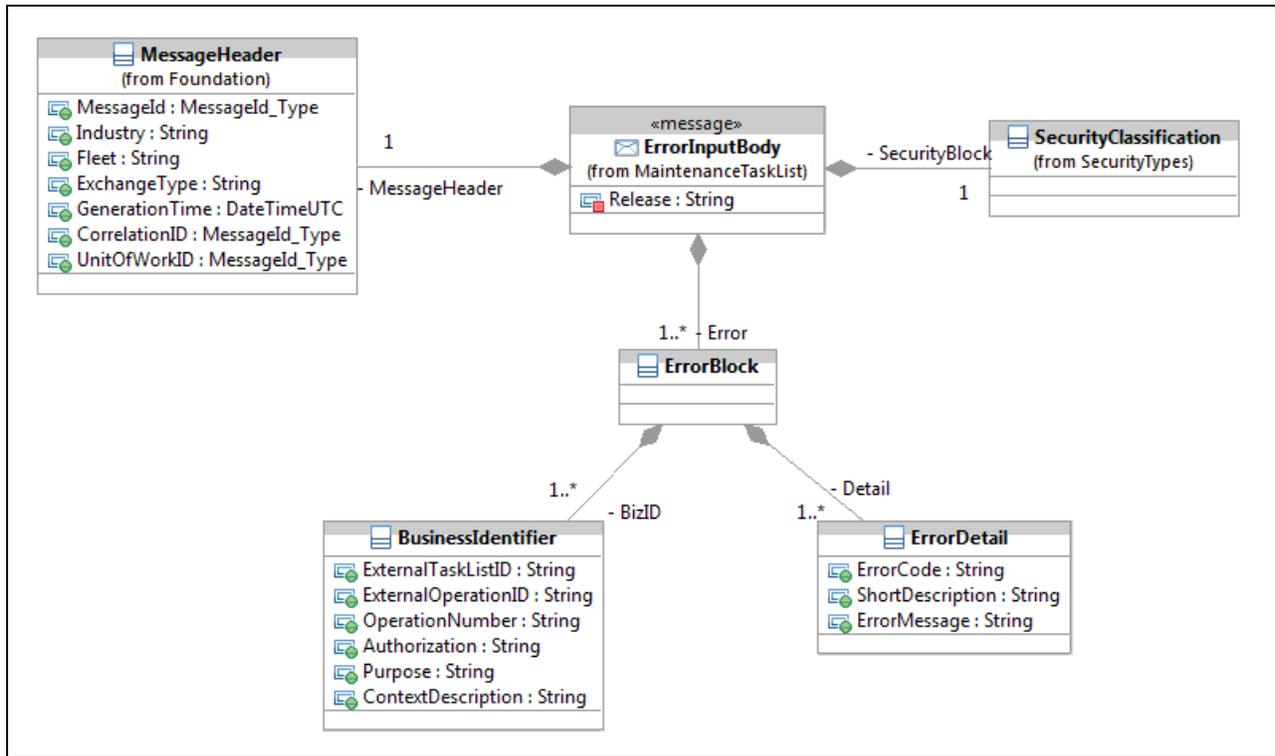


**Figure 7-4 MTL Acknowledgement Input Body**

The MessageHeader has a new unique MessageId and the CorrelationID is set to the MessageId of the MTL Input Body which is being acknowledged.

## 7.5 MTL Error Input Body

The input to the SendMTLError() 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 business object(s) (by business identifier) and a list of one or more errors pertaining to the business object.



**Figure 7-5 MTL Error 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 Canada EDE then the CorrelationID and UnitOfWorkID are set based on the MessageHeader of the MTL Input Body for which the errors are being reported.

If the error is a Business error from CMMS then the CorrelationID and UnitOfWorkID are omitted.

## 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 MTL service - SendMTL(), SendMTLack() and SendMTLError() - to their respective input, output and fault bodies as further defined in the MTL Web Service Definition Language (WSDL) file.

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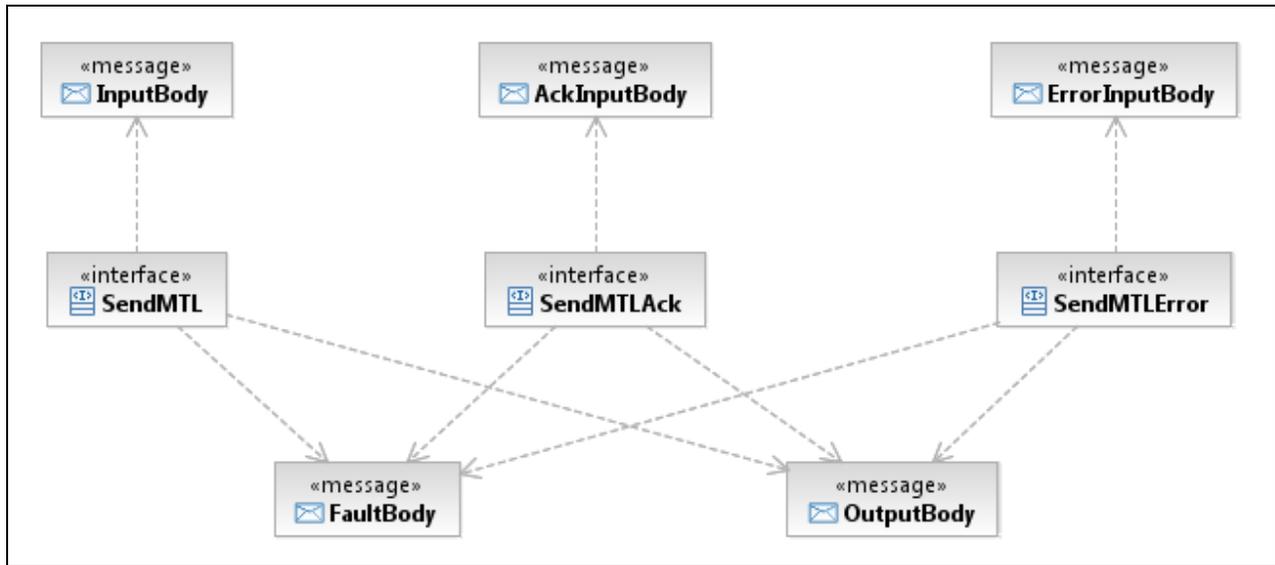


Figure 7-6 MTL Operations to Input/Output/Fault Mapping

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## 8 Service Operation Details

### 8.1 Detailed Operation Characteristics – SendMTL()

Industry will invoke the exposed Canada EDE MTL service through this operation. The input will consist of a MTL 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 MaintenanceTaskList WSDL files for implementation details.

#### Detailed Operation Characteristics

Interface Definition	Description
Operation Name	Send MTL
Operation Technical Name	SendMTL()
Operation Description	This operation is invoked by Industry to send one or more MTL business 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 7.1 MTL Input Body</a> for details.
Output Message Definition	Please refer to Operation Message Model <a href="#">Section 7.2 MTL Output Body</a> for details.
Fault Definition	Please refer to Section <a href="#">7.3 MTL 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 <a href="#">2.2</a> ). 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.

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Non-Functional Requirements/Technical Details	
Payload Size	<10Kb per business object
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 Industry cannot successfully send MTL business objects to Canada EDE. See Service Interaction Model [Ref. 2].

## 8.2 Detailed Operation Characteristics – SendMTLError()

Canada EDE *may* use this operation to inform Industry of errors detected in internal processing and faults returned from delivery to CMMS.<sup>19</sup>

Please refer to MaintenanceTaskList WSDL files for implementation details.

### Detailed Operation Characteristics

Interface Definition	Description
Operation Name	Send MTL Error

<sup>19</sup> Use of business errors is determined between Canada and Industry on a per-class basis.

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Interface Definition	Description
Operation Technical Name	SendMTLError()
Operation Description	This operation is invoked by Canada EDE to send one or more MTL errors 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 7.5 MTL 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 MTL Output</a> Body for details.
Fault Definition	Please refer to Section <a href="#">7.3 MTL Fault Body</a> for details. Please see Service Interaction Model [Ref. 2] for faults which may be returned by this operation.

### NonFunctional Requirements

NonFunctional Requirements/Technical Details	
Frequency	Same as SendMTL() operation. Worst case is one error per MTL business object.
Peak Throughput Time	Same as SendMTL() operation.
Peak Throughput Volume	Same as SendMTL() 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.

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NonFunctional Requirements/Technical Details	
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 Industry cannot successfully send MTL business objects to Canada EDE. See Service Interaction Model [Ref. 2].

### 8.3 Detailed Operation Characteristics – SendMTLack()<sup>20</sup>

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

Refer to MaterielMasterRecod WSDL files for implementation details.

#### Detailed Operation Characteristics

Interface Definition	Description
Operation Name	Send MTL Acknowledgement
Operation Technical Name	SendMTLack()
Operation Description	This operation is invoked by Canada EDE to send one or more MTL acknowledgement 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 7.4 MTL Ack Input Body</a> for details.

<sup>20</sup> Use of this positive acknowledgement is determined between Canada and Industry on a per-class basis.

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Interface Definition	Description
Output Message Definition	Please refer to Operation Message Model <a href="#">Section 7.2 MTL Output Body</a> for details.
Fault Definition	Please refer to Section <a href="#">7.3 MTL 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	~ 2KB 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.

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**Non-Functional Requirements/Technical Details**

Dead Message Handling	Alternative communication channel applies to report that this operation is not available when Industry cannot successfully send MTL business objects to Canada EDE. 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 Maintenance Task List Service WSDL file for the precise binding.

### 8.4.2 SOAP Over JMS

Not currently supported.

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## 9 Definitions, Acronyms, Abbreviations

Term	Description
CM	Configuration Management
CMMS	Canada Maintenance Management System
CMP	Class Program Manager
CSS	Canada Supply System
DND	Department of National Defence
DRMIS	Defense Resource Management Information System
Canada EDE	Electronic Data Exchange
EIE	Electronic Information Environment
EMR	Equipment Master Record
FLOC	Functional LOcation
ISS	In Service Support
ISSC	In Service Support Contractor
ISSCF	In Service Support Contracting Framework
MER	Master Equipment Record
MPN	Manufacturer Part Number
MMR	Materiel Master Record
PBC	Performance Based Contracting
NATO	North Atlantic Treaty Organization
NSN	NATO Stock Number
SOAP	Simple Object Access Protocol
UTC	Coordinated Universal Time
WS	Weapon System
WSDL	Web Service Definition Language
XML	Extensible Markup Language

## 10 Appendix A - Entity Relationship Model

### Information Model – Entity-Relationship View

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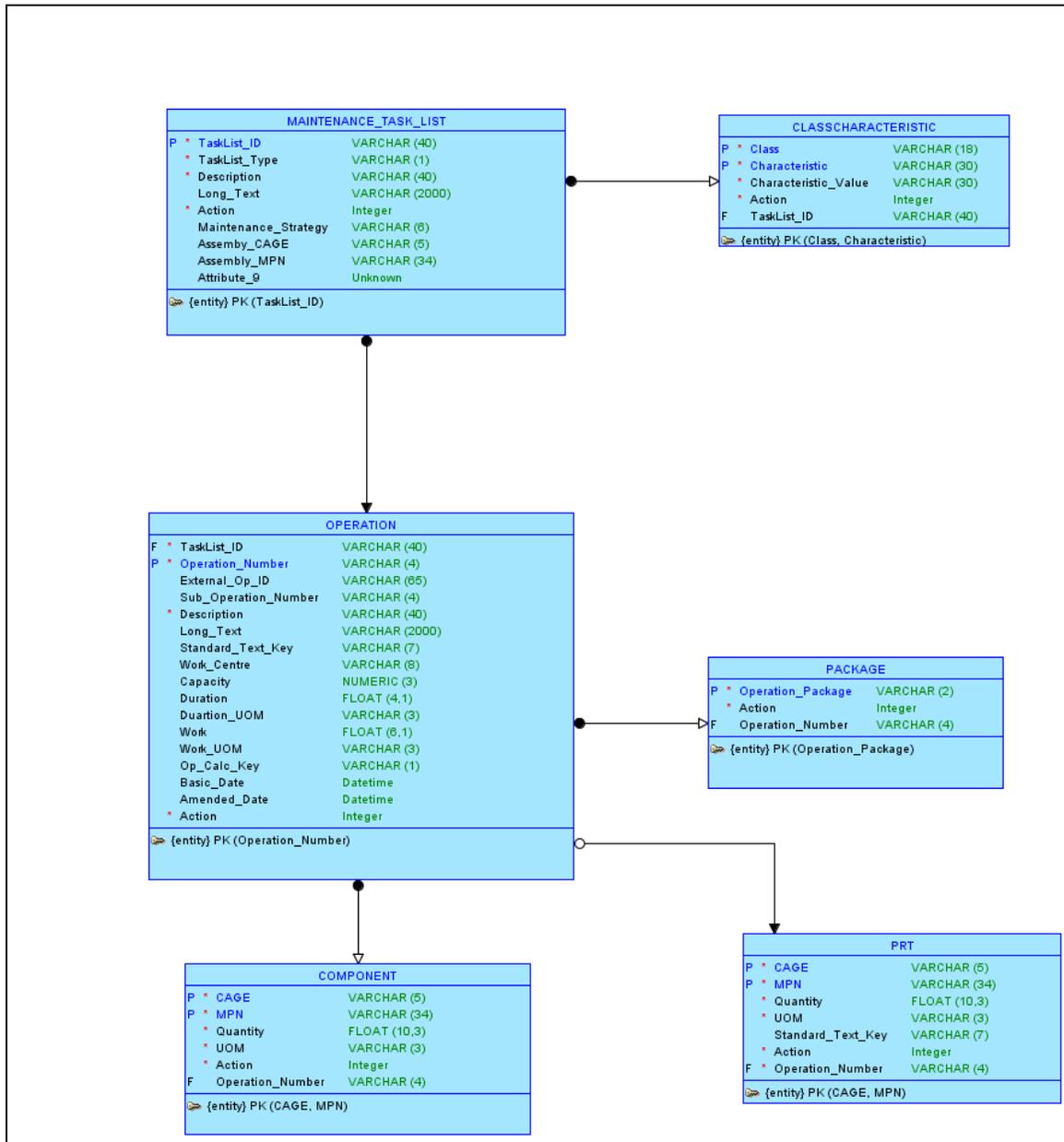


Figure 10-1 MTL ERD

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## 11 Document History

Revision Number	Description	Date
1.0	Ready for Navy RFP	23 October 2015

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