Electronic Information Environment (EIE)

Service Specification Document/Interface Control Document

Master Data

Navy Measurement Document 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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The information being provided is to illustrate the model that exists for business processes and information exchange within the Performance Based Contracting (PBC) solution for the Department of National Defence. The information is provided to facilitate an understanding of the business architecture and the solution architecture that exist for the PBC program. The content is not intended to reflect the end state specifications for all of the PBC EIE related services.

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1 Introduction

This document establishes an interface between Canada Electronic Data Exchange (EDE) system and the ISS Contractor responsible for maintenance of a ship class subject to Performance Based Contracting (PBC). This interface will be used by ISS Contractor to send Measurement Document (MDOC) messages to Canada EDE. To support the MDOC transfer between Canada EDE and 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 Measurement Document service includes an operation for Canada EDE to report acknowledgement messages back to Industry[1].

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. 1M] PBC Business Process Catalogue Annex M: Navy Supply Process Model - In the Context of Performance Based Contracting (PBC);

[Ref. 1P] Business Process Catalogue Annex P: Navy Canada Maintenance Management System Data Initialization In Support of Performance Based Contracting (PBC);

[Ref. 1L] Annex L: Navy Maintenance Process Model – In the Context 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] Navy Part Issue Service Specification;

[Ref. 5] Navy Materiel Master Record Service Specification;

[Ref. 6] Data Package Service Specification;

[Ref. 7] EIE Business Use Case BUC 2.2 Exchange Master Data – Inbound.

[1] Within this document, Industry and ISS Contractor are synonymous and are used interchangeably

2 Business Information

Business Information is based on the EIE Business Process model for Data Initialization [Ref. 1P] and the Defense Resource Management Information System (DRMIS) Master Data Business Guidelines Air Force PBC 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. An MMR is required before the item or part can be referenced or transacted upon in Canada's systems. For PBC managed weapon systems, materiel is always identified by the combination of the manufacturer CAGE code and the Manufacturer Part Number (MPN).

The serialized parts[2] which make up a Weapon System (WS) are tracked with an Equipment Master Record (EMR). Every EMR references an MMR to define the EMR type and its location relative to the WS "As-Designed" structure.

Another view of the WS used in maintenance is the *Functional Location* (FLOC) hierarchy. A functional location refers to a physical part of a WS which is intrinsic to the body of the WS and cannot be removed or replaced by normal maintenance procedures.

An EMR or FLOC may have associated Measurement Points to define data about the EMR/FLOC for maintenance purposes. The measurement point defines the *measurement code* to determine what is measured. A measurement point's actual measurement values – as they are recorded over time - are saved in a structure called a Measurement Document (MDOC). The measurement values may be entered manually, may be inserted by a Health and Usage Monitoring System "HUMS[3]" type system, or may be propagated automatically from other measurement points.

Measurement Documents are considered part of "As-Built" data and apply to an individual Weapon System (WS) instances.

The goal of the MDOC service is to provide to ISS Contractor a means of sending to Canada the MDOCs for a ship class and for Canada to acknowledge receipt of the MDOC 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] In other words, parts with serial numbers.

[3] "HUMS" refers in general to a system to upload data from on-board (the WS) computers to CMMS.

2.1 Business Processes

2.1.1 MDOCs in Supply Materiel Processes

During Supply Materiel business processes Canada DND will demand parts and ISS Contractor will supply parts to be installed on a WS. When a part is provided by ISS Contractor, its MDOCs must be sent from ISS Contractor to Canada so that Canada may properly track the part during its life-time with DND.

See [Ref. 1M] for further details.

2.1.2 MDOCs in Maintenance History Processes

As part of the Maintenance History business processes ISS Contractor can perform maintenance which can result in removal and installation of serialized parts on a WS. Industry must send to Canada the MDOC data associated with these removal and install activities to allow Canada to properly track the part during its life-time with DND.

See [Ref. 1L] for further details.

2.1.3 MDOCs in Master Data Processes

The ISS Contractor may perform Engineering Change activities on a ship resulting in changes to the Master Data configuration of the WS, including EMR structure. In these instances, the ISS Contractor will provide Master Data, including MDOC data, for the updated configuration of the WS in accordance with the approved Engineering Change. Master Data must be approved by designated DND staff with the requisite qualifications prior to being used in Production.

See [Ref. 1P] for further details.

2.2 Business Triggers

2.2.1 Supply Materiel Business Triggers

Please see Business Triggers in the Part Issue Service Specification [Ref. 4].

2.2.2 Maintenance History Business Triggers

As per the Maintenance History Business Process [Ref. 1L], the following business events may result in MDOC data being sent from Industry to Canada EDE:

- Uninstall (removal) of a serialized part from the ship;
- Installation of a serialized part on the ship;

2.2.3 Master Data Business Triggers

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

- Prior to delivery of subsequent WS in the ship class[4];
- The result of an engineering change.

For Master Data a direct[5] communication will take place between ISS Contractor 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 ISS Contractor.

[4] For WS where Master Data provided by Industry partner.

[5] Phone, fax, email, but not through Canada EDE services.

2.3 Unit of Work

According to PBC, ISS Contractor assumes the responsibility for Configuration Management (CM) of every WS in a ship class. With this responsibility 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 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**[6] per exchange type, in the unit of work.

In a similar manner, Measurement Document records sent as a result of a supply transaction are sent in a single **unit of work** associated with the Part issue transaction. Please refer to Part Issue Service Specification [Ref. 4] for details.

Likewise for maintenance history, Measurement Document records sent as a result of a removal or installation action are sent in a single **unit of work** associated with the 'EMR history' transactions – Measurement point, Measurement Document and Maintenance Plan.

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

[6] 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 ***MDOC message*** which consists of one or more ***MDOC business objects*** and metadata (e.g., message header) required for correct message processing between Canada and Industry. [7]

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.

[7] MDOC messages are defined in section 7. MDOC 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 MDOC service are defined by one use case with several scenarios.

4.1 Service Context

4.1.1 Supply Materiel Service Context

When used in the context of a Supply Materiel business process the service context is the same as the Part Issue service. Please see Service Context in the Part Issue Service Specification [Ref. 4].

4.1.2 Maintenance History Service Context

When used in the context of a Maintenance History business process, the service context is Industry-performed Maintenance.

4.1.3 Master Data Service Context

When used in the context of a Master Data business process the service context is the same as the Materiel Master Record Service. Please see the Materiel Master Record Service Specification [Ref. 5].

4.2 Successful Request and Technical Response

This scenario applies for usage of the service in both Supply Materiel and Master Data business processes.

This is the main or "Happy Day" scenario. This scenario describes the interaction between Canada EDE and Industry for the MDOC Service. Some validation steps and technical responses are not shown in the following sequence diagram (Figure 4-1) – 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.

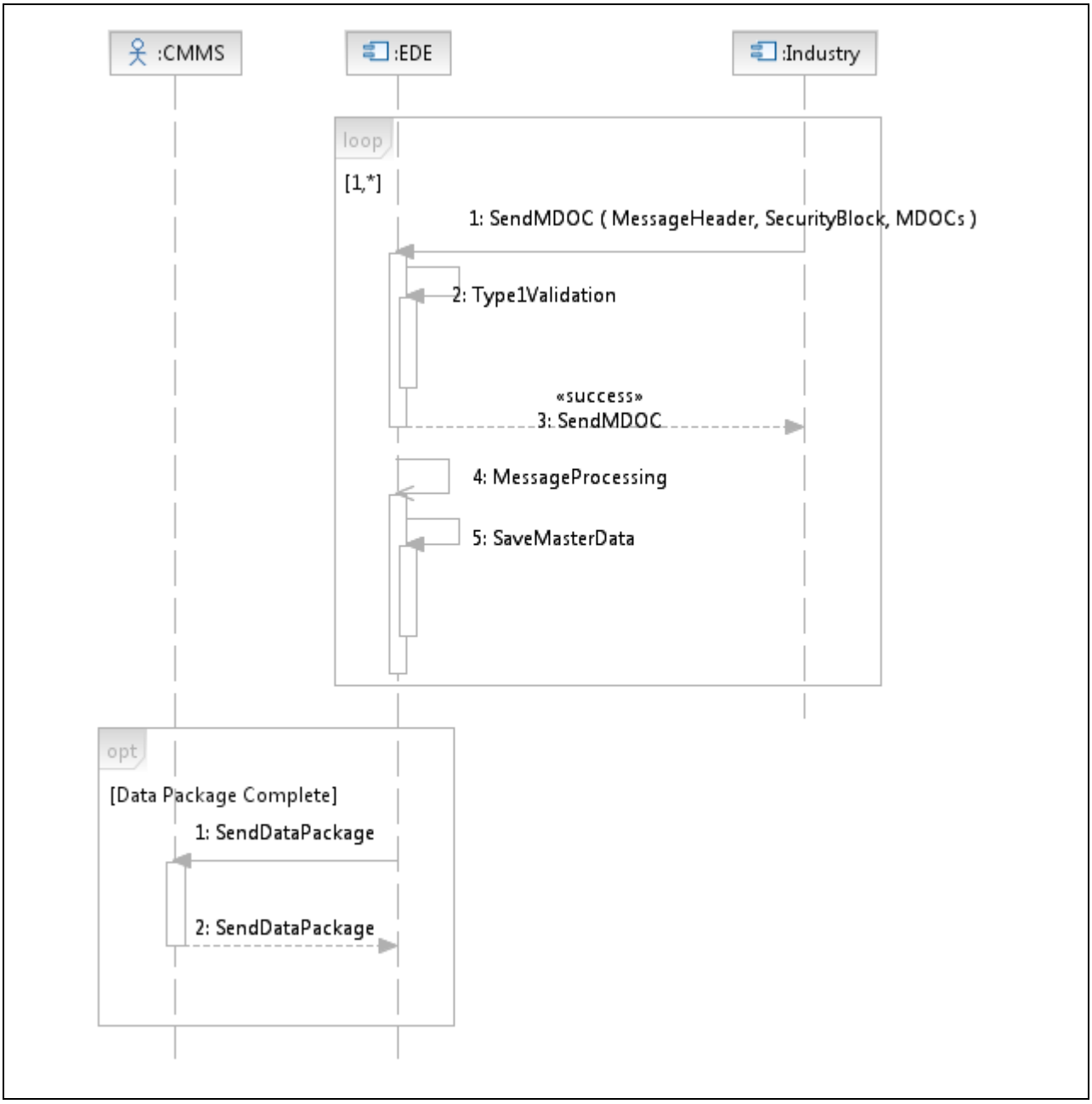

Figure 4-1 MDOC Message Flow

Main Flow	
Scenario	"Happy Day:" Industry successfully sends MDOC business objects to Canada.

Pre-Condition	A business trigger – specific to the business process – has occurred. Industry has prepared a data package containing one or more MDOC business objects. If a unit of work is required, Industry has initiated creation of the unit of work and Canada EDE has confirmed creation.
Post-Condition	MDOC business objects successfully received by Canada EDE.
Steps	**Industry begins a loop to send MDOC messages to Canada EDE[8].** 1) Industry invokes 'SendMDOC()' operation passing UOW ID and one or more MDOC business objects. (See Input Body definition.) Industry waits for technical response. 2) Canada EDE initiates "Type 1" validation. In this scenario there is no error. Canada EDE accepts "custody" of the MDOC business objects in the message. 3) Canada EDE returns to Industry a "success" technical response for the SendMDOC() operation. (See Output Body definition.) 4) Canada EDE begins internal processing of the message. In this scenario there is no error. 5) Canada EDE saves MDOC business objects to send to CMMS once unit of work is complete. **Industry continues loop to send more MDOC business objects (if any) to Canada EDE.** 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.

Please see Data Package Service Specification [Ref. 6] for the scenario of confirmation from CMMS Master Data has been deployed to operations.

4.3 Alternate Scenarios

The MDOC Message Flow with Type 1 Error sequence diagram is shown in Figure 4-2. The following scenarios apply to all uses of the MDOC 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.

[8] In practice, MDOC messages may be interleaved with other Master Data messages from the same unit of work, or other units of work.

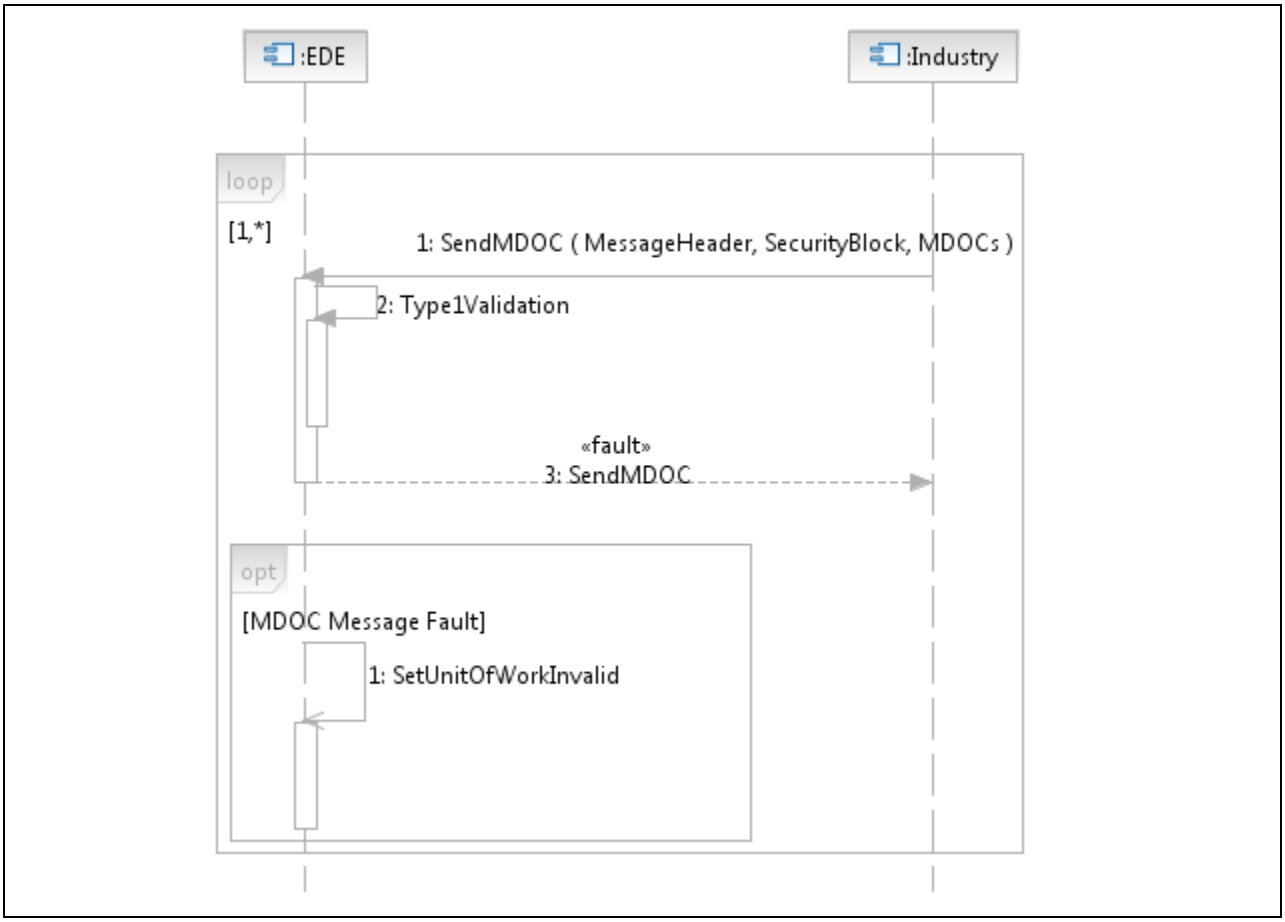

Figure 4-2 MDOC Message Flow with Type 1 Error

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 to Industry. Industry ceases sending Master Data (of **any** exchange type) for this unit of work.

Steps	1) Industry invokes 'SendMDOC()' operation containing one or more MDOCs. 2) Canada EDE checks for Type 1 errors – an error is found; 3) Canada EDE constructs the fault message and sends the fault message to Industry in the technical response to the original SendMDOC() operation invocation. (See Fault Body definition.) In the same iteration through the loop where a MDOC Message fault was found: **1)** Canada EDE updates unit of work status to Invalid and deletes the Master Data received so far in the invalid unit of work.

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.

The MDOC Message Flow with Type 2 Error sequence diagram is shown in Figure 4-3.

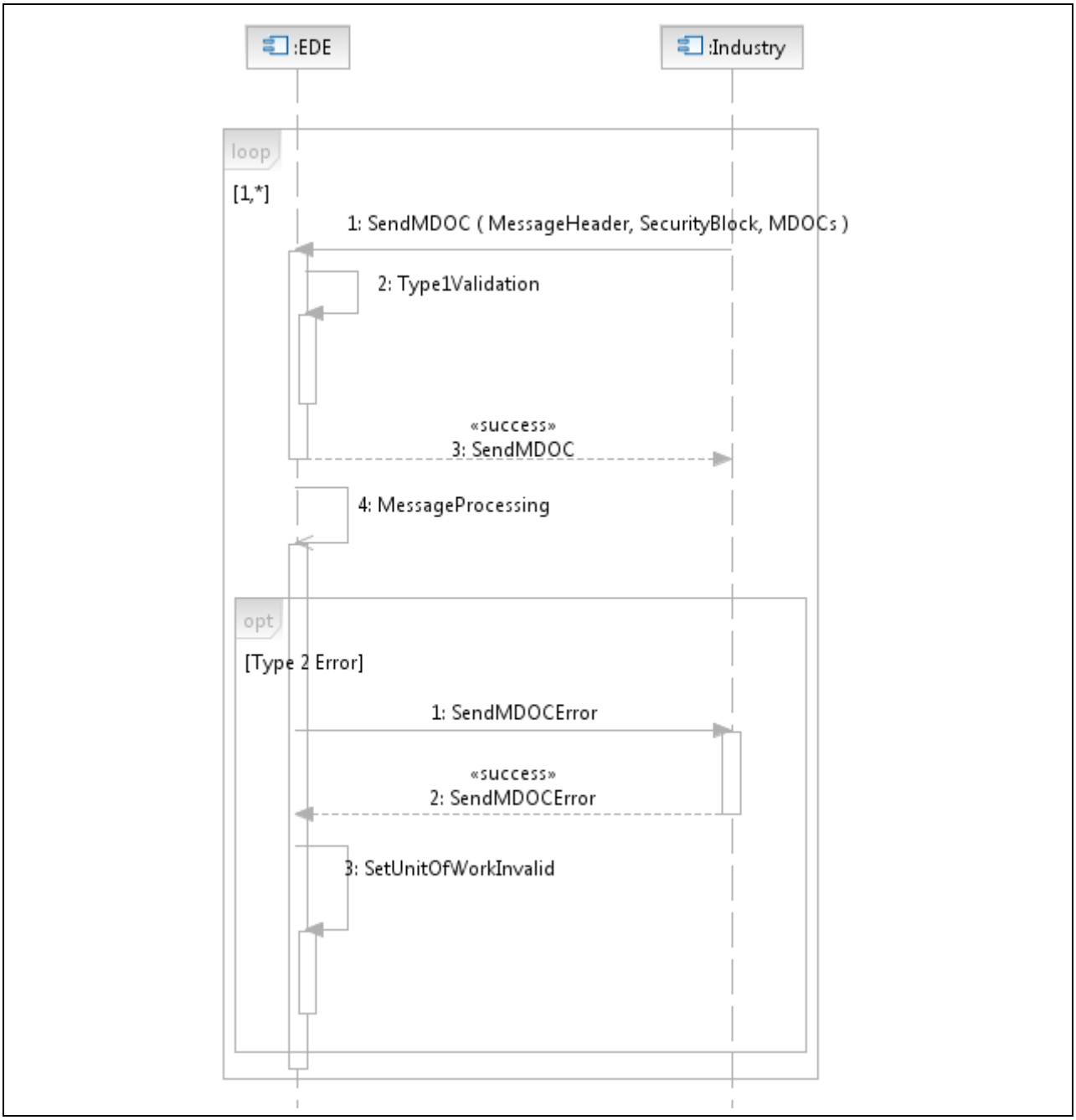

Figure 4-3 MDOC Message Flow with Type 2 Error

Alternate Flow 2 (Canada EDE Service unresponsive)	
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 MDOC service.
Post-Condition	Industry marks the message as Dead Message.
Steps	1) Industry does not receive any response from Canada EDE within the allowed ACK_TIME_INTERVAL. 2) Industry will retry sending the message up to the defined maximum retry count and/or Time to Live interval. 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].
Alternate Flow 3 (Business Validation Failure) -applicable to Supply Materiel and Maintenance History Context	
Scenario	CMMS business validations fail on one or more Master Data business objects.
Pre-Condition	A complete unit of work (including MDOC business objects) has been received by Canada EDE. Canada EDE begins sending to CMMS.
Post-Condition	Canada EDE sends error information to Industry. Canada EDE deletes the data package in the unit of work.
Steps	1) Canada EDE invokes CMMS MDOC operation and receives a positive technical response. 2) MDOC business object(s) fail CMMS's system-enforced business rules. 3) Canada EDE sends business error information to Industry using the SendMDOCError() operation of the MDOC service.
Alternate Flow 4 (CMMS Business Error) - Applicable to Master Data context	
Scenario	CMMS reports a business error when attempting to load one or more Master Data business objects.
Pre-Condition	All business objects have been received by CMMS, and CMMS starts its data load process. Canada CMMS sends TPMS message to Canada EDE.

Post-Condition	Canada EDE sends technical problem through TPMS interface to Industry.
Steps	4) Canada EDE invokes Industry TPMS operation and receives a positive technical response.

5 Service Description – Measurement Document Service

5.1 Service Overview

Measurement Document 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 MDOC 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 Measurement Document service Industry will implement and expose two operations:

- An error reporting operation used by Canada EDE to report technical errors (Section 4, Alternate Flow 2) and business errors (Section 4, Alternate Flow 4);
- An acknowledgement service optionally[9] used by Canada EDE to report successful delivery of MDOC 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)	Measurement Document Service
Enterprise Service Name (Technical)	MeasurementDocumentService (Abbreviated in this document to MDOC service.)
Purpose	This service supports the Canada EDE Master Data and Supply business processes. On the occurrence of business triggers, Industry uses this service to send MDOC messages to Canada EDE.
Business Response Time Interval	Will be determined between Canada and Industry on a per-ship class basis.
Service Domains	Master Data, Maintenance History and Supply Materiel
Business Owner	ADM (IM)
Service Grouping	Master Data
Source Provider	SendMDOC() - Canada EDE SendMDOCAck() – Industry SendMDOCError() - Industry

[9] Use of this positive acknowledgement is determined between Canada and Industry on a per-ship class basis.

Service Property	Description
Target Service Consumers	SendMDOC() - Industry SendMDOCAck() – Canada EDE SendMDOCError() – Canada EDE
Business Process Supported (now)	Master Data processes: • Initial Data Load; • Engineering Change; Supply processes: • Part Issue (including PUK issue); Maintenance History processes: • Industry-performed maintenance;
Business Process Supported (future)	None currently identified.
Business Objective Supported	See Section 2: Business Information.
Expected life time	The full lifecycle of the subject weapons system.

5.3 'SendMDOC()' Operation

This operation is used by Industry to send an MDOC input message to Canada EDE. Canada EDE's implementation of this operation will perform Type 1 validation on the MDOC 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 'SendMDOCAck()' Operation

This operation is used by Canada EDE to report back to Industry that a set of MDOC business objects have been accepted into CMMS. The specific MDOC 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 'SendMDOCError()' Operation

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 MDOC business objects which are in error are identified by a list of business identifiers (see Section 7). 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 MDOC messages is terminated regardless of Industry's response to the 'SendMDOCError()' invocation.

6 Information Model

This section describes the **business objects** which are used in the MDOC service. The Unified Modeling Language (UML) notation is used. A functional view[10] 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.

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

6.1 MDOC

A Measurement Document business object is used to represent actual recorded values for measurement points defined on EMRs or FLOCs.

Figure 6-1 shows the Information Model used in the Measurement Document service. This section primarily discusses the structure of the information model, details of attributes may be found in the EIE Business Process model for Data Initialization [Ref. 1P]. In the following *underlined italic* text refers to specific classes in Figure 6-1.

The class *MeasurementDocument* represents recorded values corresponding to Measurement Points. *MeasurementDocument* is similar to *MeasurementPoint*, in particular the included *EMR_FLOC_REF* and the two fields MeasurementName (the physical property to measure) and MeasurementPosition (to distinguish multiple measurements of the same physical property) which link to a unique *MeasurementPoint*. Both MeasurementName and MeasurementPosition have description fields for further detail.

Attributes of the *MeasurementDocument* class store the actual measured value and the time it was measured.

In some cases a *MeasurementPoint* may include a reference to a code table (in an attribute named 'Code_Group'). In this scenario, when creating a measurement document the user may select a value from the referenced code table and the selected value will be included in the *MeasurementDocument.* The class *CatalogueCode*[11] represents the selected code, with its associated code group name and descriptions.

[10] The Functional View details the collection of fields which make up MDOC business objects.

[11] The same class is used in Maintenance History services.

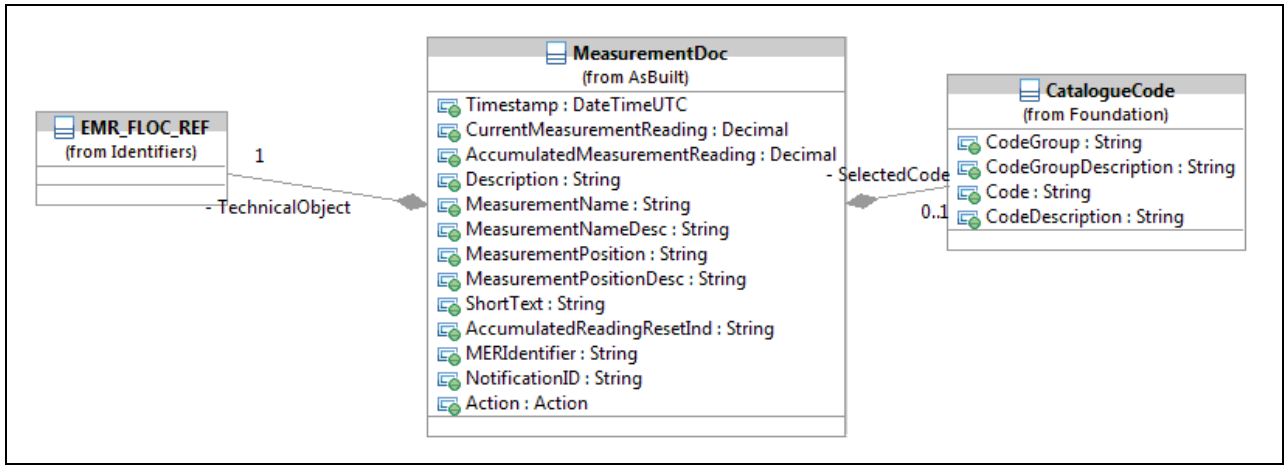

Figure 6-1 Information Model – Measurement Document

6.2 As Built Structure

The Measurement Document is part of the WS "As Built" structure. An overview of "As Built" structure is shown in Figure 6-2 below; each business object is described in one of the Service Specification documents.

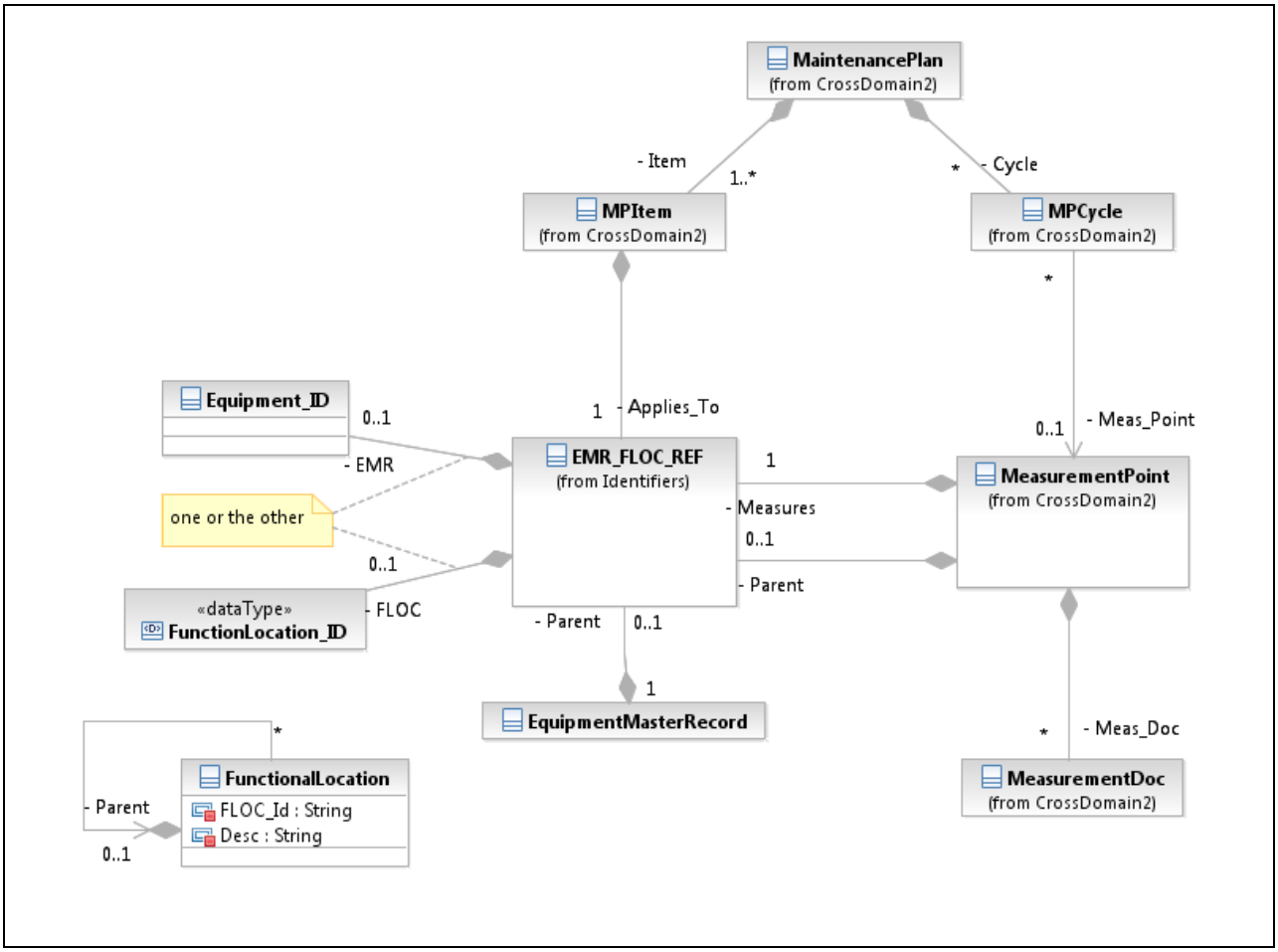

Figure 6-2 Information Model – As Built Structure

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[12].

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 MDOC 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 MeasurementDocument.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 MDOC Input Body

As shown in Figure 7-1, an MDOC input body consists of:

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

[12] Business Context is further discussed in the Unit of Work service specification.

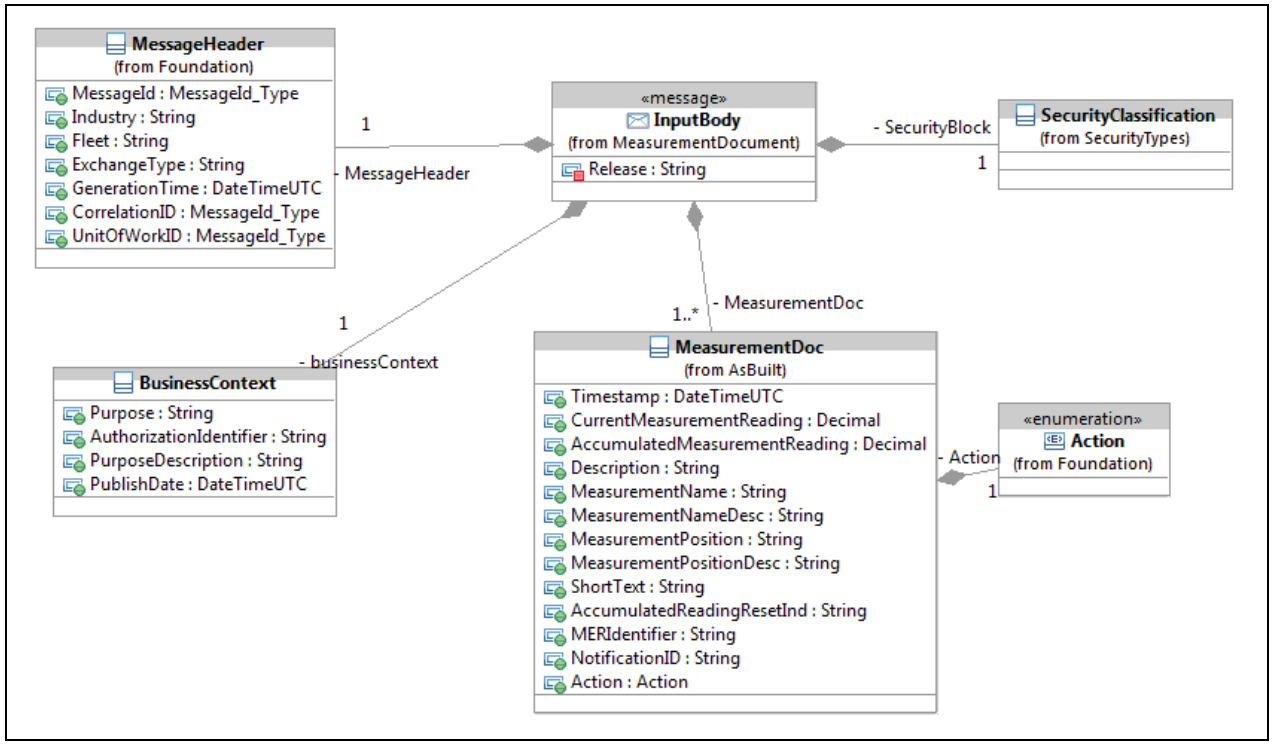

Figure 7-1 MDOC Input Body

The MessageHeader UnitofWorkID must equal the UnitofWorkID value of an existing valid unit of work.[13] The MessageHeader Correlation ID must equal the MessageId 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 MDOC InputBody also contains an attribute 'Release' which designates the release of the MDOC 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[14].

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 MDOC 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 MDOC Output Body

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

[13] Type 1 validation will check if the unit of work is in a non-error state.

[14] The rules for incrementing the 'Release' attribute for a service will be in a separate document.

- A Message Header;
- A Custody object.

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

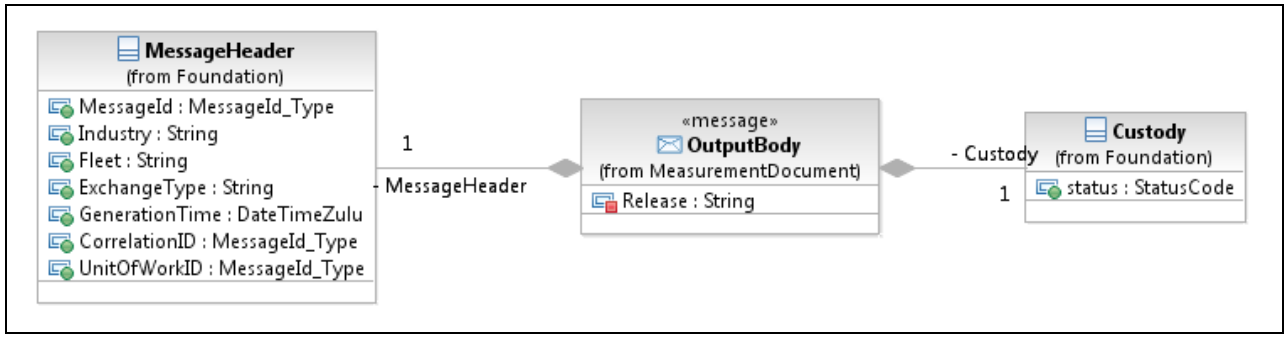

Figure 7-2 MDOC Output Body

For an MDOC OutputBody:

- The MessageHeader Message Id is a **new** unique value;
- The MessageHeader GenerationTime is the time the **output** message is generated;
- The MessageHeader Correlation ID is set to the MessageId of the MDOC Input Body;
- The MessageHeader Exchange Type must be set to the Exchange Type of the MDOC InputBody;
- The value of the Custody status field is “success” [15].

7.3 MDOC Fault Body

A fault returned by the SendMDOC() operation uses the MDOC FaultBody element. As shown in Figure 7-3, the MDOC 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.

[15] As stated in Section 5.3, the main significance of the output is that, by its presence, there is no fault.

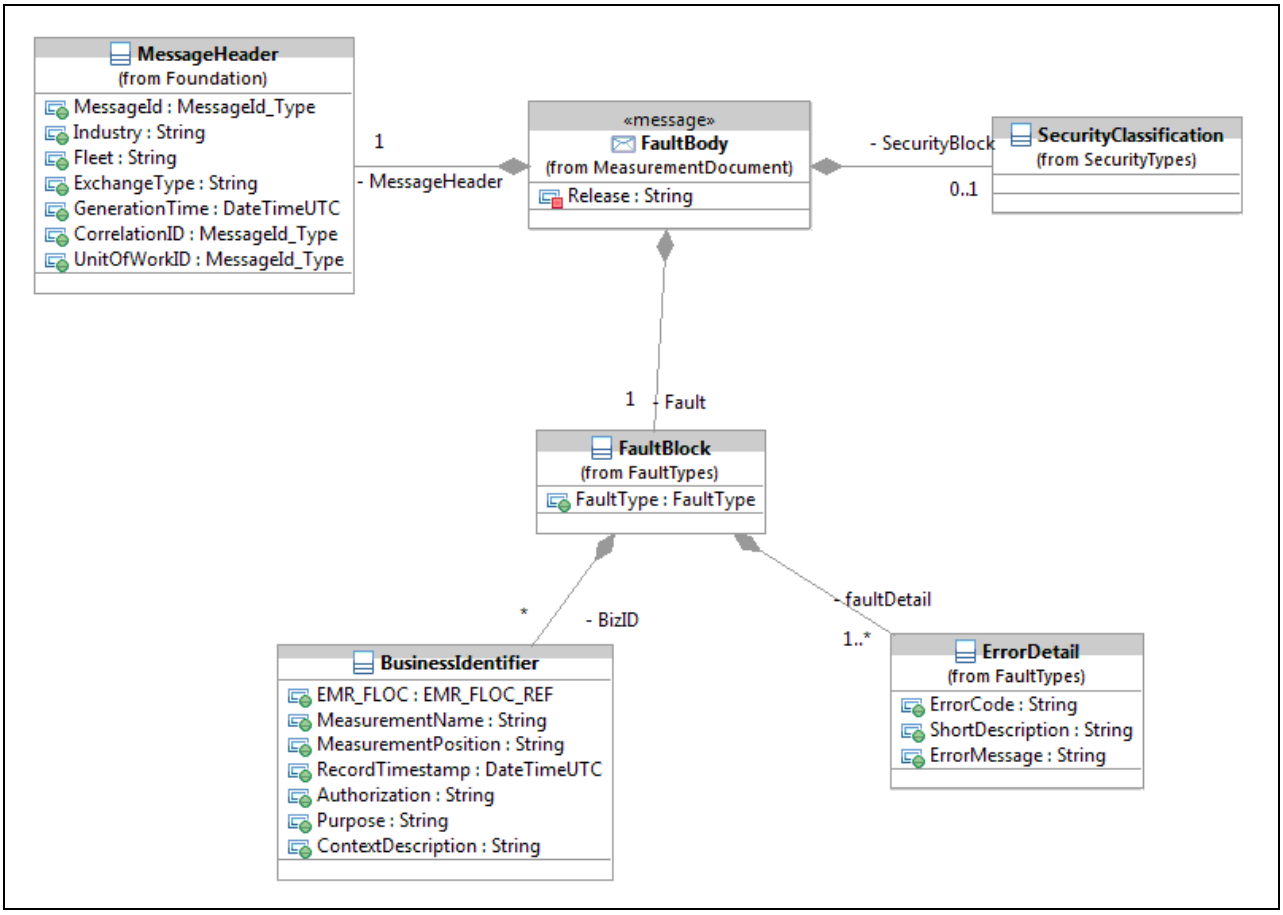

Figure 7-3 MDOC Fault Body

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 MDOC Acknowledgement Input Body

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

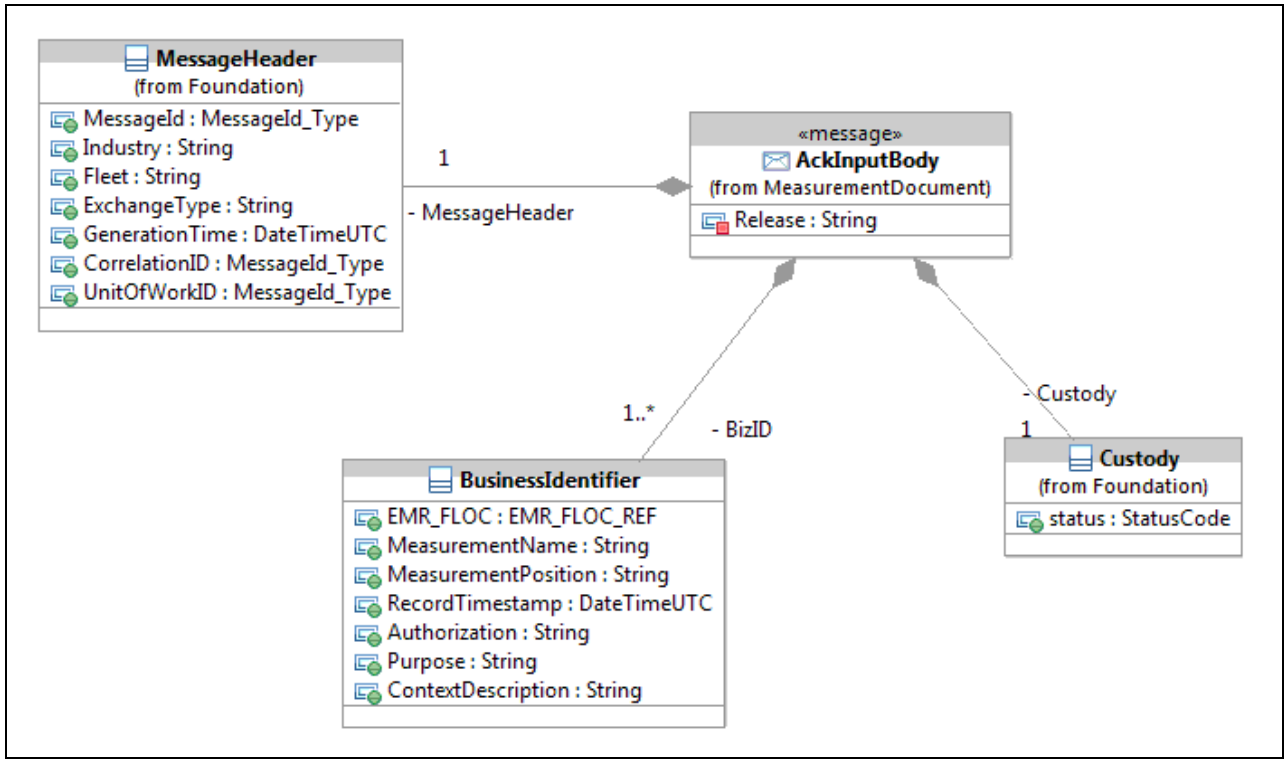

Figure 7-4 MDOC Acknowledgement Input Body

The Message Header has a new unique MessageId and the CorrelationID is set to the MessageId of the MDOC Input Body which is being acknowledged.

7.5 MDOC Error Input Body

The input to the SendMDOCError() 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 list of one or more errors pertaining to the business object.

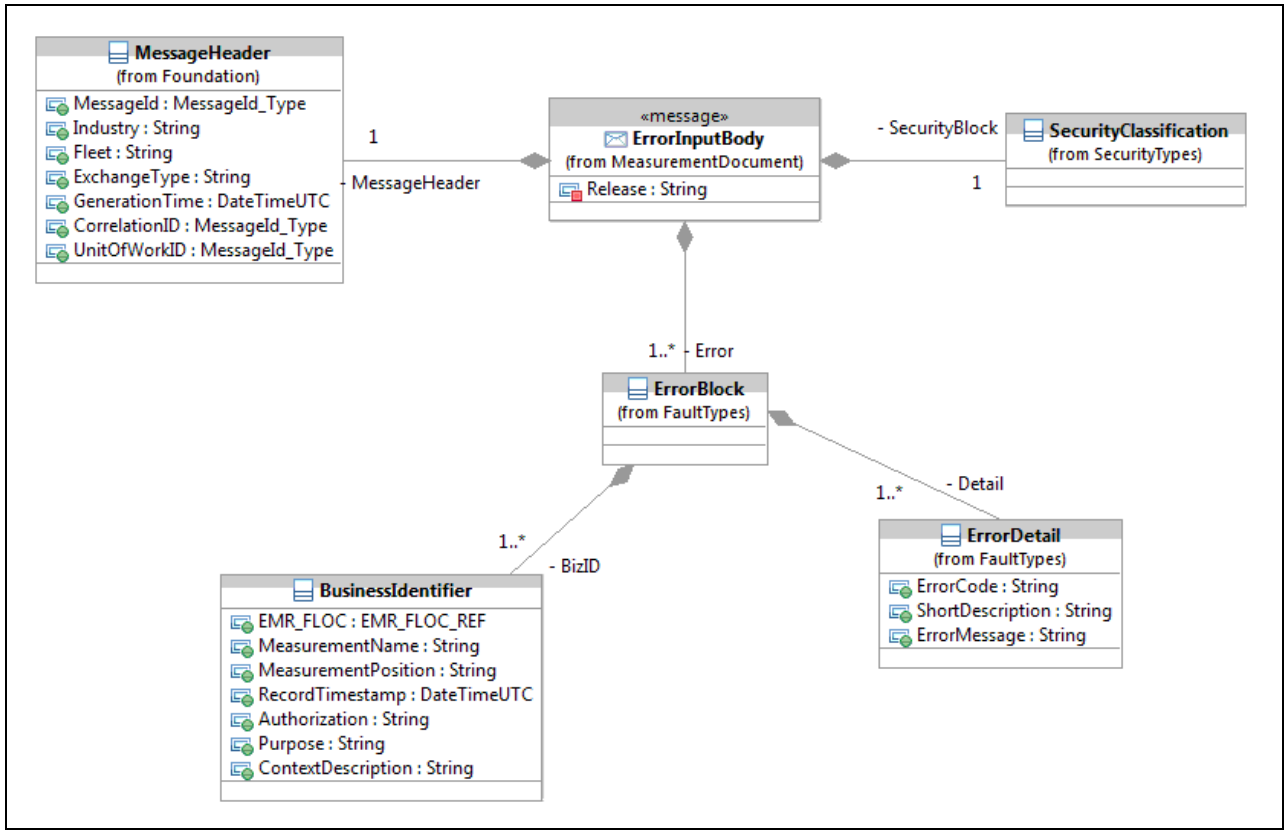

Figure 7-5 MDOC Fault Input Body

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 Canada EDE then the CorrelationID and UnitOfWorkID are set based on the MessageHeader of the MDOC 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 MDOC service - SendMDOC(), SendMDOCAck() and SendMDOCError() - to their respective input, output and fault bodies as further defined in the MDOC Web Service Definition Language (WSDL) file.

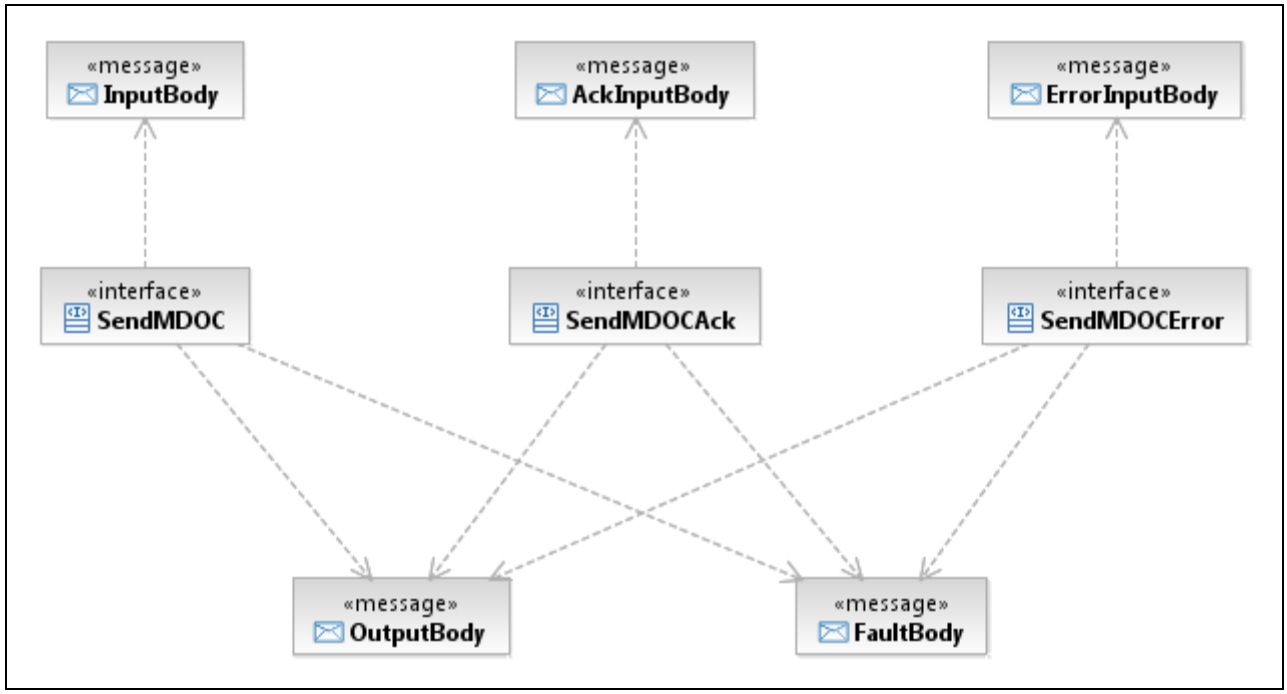

Figure 7-6 MDOC Operations to Input/Output/Fault Mapping

8 Service Operation Details

8.1 Detailed Operation Characteristics – SendMDOC()

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

Detailed Operation Characteristics

Interface Definition	Description
Operation Name	Send MDOC
Operation Technical Name	SendMDOC()
Operation Description	This operation is invoked by Industry to send one or more MDOC business objects to Canada EDE.
Target Operation Provider	Canada EDE
Target Operation Consumer	Industry
Properties	*Request/Response* message exchange pattern.
Input Message Definition	Please refer to Operation Message Model Section 7.1 MDOC Input Body for details.
Output Message Definition	Please refer to Operation Message Model Section 7.2 MDOC Output Body for details.
Fault Definition	Please refer to Section 7.4 MDOC Fault Body 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	<1Kb per business object.

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	For Master Data context: - 24 hours from the creation of the unit of work. For Supply Materiel and Maintenance History context: - 2 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 MDOC business objects to Canada EDE. See Service Interaction Model [Ref. 2].

8.2 Detailed Operation Characteristics – SendMDOCError()

Canada EDE will use this operation to inform Industry of errors detected in internal processing and faults returned from delivery to CMMS.

Refer to Measurement Document WSDL files for implementation details.

Detailed Operation Characteristics

Interface Definition	Description
Operation Name	Send MDOC Error
Operation Technical Name	SendMDOCError()

Interface Definition	Description
Operation Description	This operation is invoked by Canada EDE to send one or more MDOC errors to Industry.
Target Operation Provider	Industry
Target Operation Consumer	Canada EDE
Properties	*Request/Response* message exchange pattern.
Input Message Definition	Please refer to Operation Message Model Section 7.5 MDOC Error Input 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 Section 7.2 MDOC Output Body for details.
Fault Definition	Please refer to Section 7.3 MDOC Fault Body 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 SendMDOC() operation. Worst case is one error per MDOC business object.
Peak Throughput Time	Same as SendMDOC() operation.
Peak Throughput Volume	Same as SendMDOC() 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.

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 Industry cannot successfully send MDOC business objects to Canada EDE. See Service Interaction Model [Ref. 2].

8.3 Detailed Operation Characteristics – SendMDOCAck()

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 Measurement Document WSDL files for implementation details.

Detailed Operation Characteristics

Interface Definition	Description
Operation Name	Send MDOC Acknowledgement
Operation Technical Name	SendMDOCAck
Operation Description	This operation is invoked by Canada EDE to send one or more MDOC acknowledgement objects to Industry.
Target Operation Provider	Industry
Target Operation Consumer	Canada EDE
Properties	*Request/Response* message exchange pattern.
Input Message Definition	Please refer to Operation Message Model Section 7.4 MDOC Ack Input Body for details.
Output Message Definition	Please refer to Operation Message Model Section 7.2 MDOC Output Body for details.
Fault Definition	Please refer to Section 7.3 MDOC Fault Body 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.
Dead Message Handling	Alternative communication channel applies to report that this operation is not available when Industry cannot successfully send MDOC business objects to Canada EDE. See Service Interaction Model [Ref. 2].

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 Measurement Document Service WSDL file for the precise binding.

8.4.2 SOAP Over JMS

Not currently supported.

9 Definitions, Acronyms, Abbreviations

Term	Description
CM	Configuration Management
CMMS	Canada Maintenance Management System
CSS	Canada Supply System
DND	Department of National Defence
DRMIS	Defense 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
MDOC	Measurement Document
MER	Master Equipment Record
MPN	Manufacturer Part Number
MMR	Materiel Master Record
NATO	North Atlantic Treaty Organization
NSN	NATO Stock Number
PBC	Performance Based Contracting
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

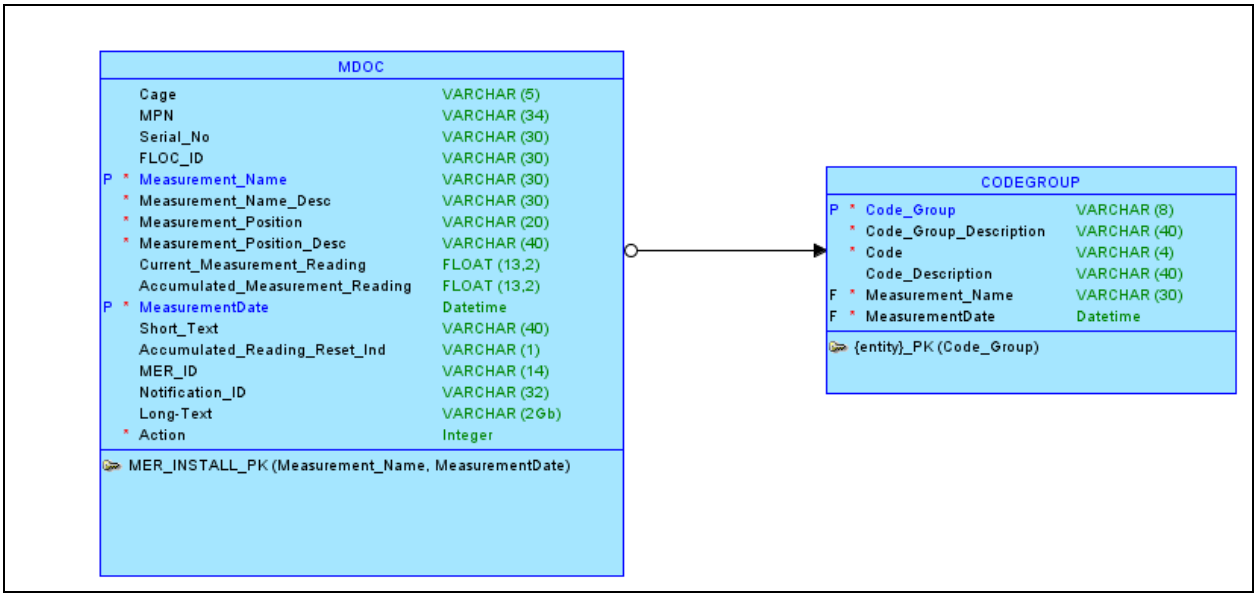

Figure 10-1 MDOC ERD

11 Document History

Revision Number	Description	Date
1.0	Ready for Navy RFP	26 October 2015