



**Land & Property  
Information**

A division of the Department of **Finance & Services**



## **National E-Conveyancing Implementation Support Program**

### **LODGMET VERIFICATION PROCESS MODEL AND BUSINESS RULE MAPPING**

#### **Document Information**

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<b>Date Issued:</b>	Friday, 01 July 2011
<b>Title:</b>	Lodgment Verification Process Model and Business Rule Mapping
<b>Filename:</b>	Lodgment Verification Process Model v5_00
<b>Version:</b>	5.00

## DOCUMENT CONTROL

### Published Version History

VERSION NO	DATE ISSUED	MODIFIED BY	COMMENTS
0.1	27/10/2010	Daniel Moody	Initial version
0.2	29/10/2010	Graham Witt	Quality Assurance
0.3	14/12/2010	Graham Witt	Incorporates feedback from LPI
1.00	10/3/2011	Graham Witt, Pia Nicod	Incorporates feedback from LPI
2.00	24/3/2011	Graham Witt, Pia Nicod	Incorporates feedback from LPI
3.00	29/04/2011	John Little	Change the logo and reference to LPMA
4.00	10/06/2011	Graham Witt, Pia Nicod, Greg Bowen	Incorporates feedback from workshop held with LPI on 01/06/2011
5.00	01/07/2011	Greg Bowen	Editorial changes as submitted by LPI through Jira.

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### Distribution List

NAME	POSITION / TITLE	VERSION

### DOCUMENT APPROVAL

NAME	SIGNATURE	DATE

# TABLE OF CONTENTS

<b>1</b>	<b>Overview .....</b>	<b>6</b>
1.1	Background.....	6
1.2	Purpose.....	6
1.3	Assumptions .....	7
1.4	Associated documents.....	7
1.5	How this document is organised.....	7
<b>2</b>	<b>Requirements for Lodgment Verification .....</b>	<b>9</b>
2.1	National E-Conveyancing System requirements for Lodgment Verification.....	9
2.2	LPI Requirements for Lodgment Verification.....	9
<b>3</b>	<b>Standards and approaches followed .....</b>	<b>13</b>
<b>4</b>	<b>To-Be Lodgment Verification Process Model .....</b>	<b>14</b>
4.1	Overall process architecture .....	14
4.2	BPMN Diagrams .....	14
4.2.1	Lodgment Verification Process Diagram .....	15
4.2.2	Lodgment Verification Collaboration Diagram.....	15
4.2.3	Lodgment Verification Subprocess Diagrams .....	16
4.2.3.1	A5.3 Check Lodgment Acceptability .....	16
4.2.3.2	A5.3.2 Check Land Title References.....	17
4.2.3.3	A5.3.4 Check Lodgment Fees .....	18
4.2.3.4	A5.3.5 Check Duty Assessment.....	18
4.2.3.5	A5.3.7 Check eRegistry Instrument Compliance.....	19
<b>5</b>	<b>Activity Descriptions .....</b>	<b>21</b>
5.1	A5.1 Check Message Data Integrity .....	22
5.2	A5.2 Check for Changes since Signing .....	23
5.3	A5.3 Check Lodgment Acceptability.....	23
5.3.1	A5.3.1 Check Case Completeness.....	24
5.3.2	A5.3.2 Check Land Title References.....	24
5.3.2.1	A5.3.2.1 Call A1. Land Title Reference Verification .....	24
5.3.2.2	A5.3.2.2 Record LTRs Unsuitable for Electronic Lodgment.....	25
5.3.3	A5.3.3 Check for Invalid Case Composition .....	25
5.3.4	A5.3.4 Check Lodgment Fees .....	25
5.3.4.1	A5.3.4.1 Call A4. Lodgment Fee Calculation.....	26
5.3.4.2	A5.3.4.2 Compare Lodgment Fees .....	26
5.3.5	A5.3.5 Check Duty Assessment.....	26
5.3.5.1	A5.3.5.1 Check for Dutiable eRegistry Instruments.....	26
5.3.5.2	A5.3.5.2 call B2. Duty Verification .....	27
5.3.5.3	A5.3.5.3 Record Invalid Duty Assessment .....	27
5.3.6	A5.3.6 Check Lodgment Information Report Compliance .....	27
5.3.7	A5.3.7 Check eRegistry Instrument Compliance.....	28
5.3.7.1	A5.3.7.1 Call A2. Registry Information Supply .....	28
5.3.7.2	A5.3.7.2 Create Virtual Land Titles.....	28
5.3.7.3	A5.3.7.3 Check Compliance of 1 eRegistry Instrument.....	28
5.3.8	A5.3.8 Check eNOS Information Report Compliance .....	29
5.4	A5.4 Establish Required Manual Examination .....	29
5.5	A5.5 Produce Lodgment Verification Report .....	30

<b>6</b>	<b>Process / Business Rule Mappings .....</b>	<b>31</b>
6.1	A5.1 Check Message Data Integrity .....	31
6.2	A5.2 Check for Changes since Signing .....	31
6.3	A5.3 Check Lodgment Acceptability .....	31
6.3.1	A5.3.1 Check Case Completeness.....	31
6.3.2	A5.3.2 Check Land Title References.....	32
6.3.2.1	A5.3.2.1 call Land Title Reference Verification service (A1) .....	32
6.3.2.2	A5.3.2.2 Record Unsuitable Land Title References .....	32
6.3.2.3	A5.3.3 Check for Invalid Case Composition .....	32
6.3.3	A5.3.4 Check Lodgment Fees .....	32
6.3.3.1	A5.3.4.1 call Lodgment Fee Calculation service (A4).....	32
6.3.3.2	A5.3.4.2 Compare Lodgment Fees .....	32
6.3.4	A5.3.5 Check Duty Assessment.....	32
6.3.4.1	A5.3.5.1 Check for Dutiable eRegistry Instruments.....	32
6.3.4.2	A5.3.5.2 call Duty Verification service (B2) .....	32
6.3.4.3	A5.3.5.3 Record Invalid Duty Assessment .....	32
6.3.5	A5.3.6 Check Lodgment Information Report Compliance .....	33
6.3.6	A5.3.7 Check eRegistry Instrument Compliance.....	33
6.3.6.1	A5.3.7.1 Call Registry Information Supply service (A2) .....	33
6.3.6.2	A5.3.7.2 Create Virtual Land Title.....	33
6.3.6.3	A5.3.7.3 Check Compliance of 1 eRegistry Instrument.....	33
6.3.7	A5.3.8 Check eNOS Information Report Compliance .....	33
6.4	A5.4 Establish Required Manual Examination .....	33
6.5	A5.5 Produce Lodgment Verification Report .....	33
<b>7</b>	<b>BPMN 2.0 diagramming conventions.....</b>	<b>34</b>
7.1	Process Diagrams.....	34
7.2	Collaboration Diagrams .....	35
7.3	Subprocess Diagrams.....	37
7.4	Business Rule Task .....	37
7.5	Complete BPMN 2.0 Symbol Set.....	38

# 1 Overview

## 1.1 Background

NSW Land & Property Information (LPI), along with all other Australian State and Territory land and revenue administrations, has committed to the development of a National E-Conveyancing System, which will significantly impact property transactions in Australia.

In particular, the availability of the National E-Conveyancing System will impact on the processing of lodgments in NSW. Given this, LPI ultimately needs a secure, scalable and robust environment for the management of electronic registry instruments and associated templates in preparation for the introduction of electronic conveyancing in NSW.

As part of the National E-Conveyancing Implementation Support program of work, LPI wishes to develop services for the compliance assurance of [eRegistry Instruments](#) and [eLodgment Cases](#) received at the [Land Registry](#), supported by well-defined and documented business rules.

Lodgment Verification is an automated pre-examination service for eLodgment Cases provided by Land Registries to Electronic Lodgment Network Operators. The input to the service is an eLodgment Case (contained in the request message) and the output is a Lodgment Verification Report (contained in the response message). The Lodgment Verification Report lists compliance errors (in the form of business rule contraventions) that need to be corrected for the eLodgment Case to be successfully lodged and registered.

Proposed arrangements for compliance assurance of eLodgment Cases within the National E-Conveyancing System are described in section 2 of the associated eLodgment Case Verification Requirements document.

## 1.2 Purpose

The purpose of this document is to:

1. depict the To-Be<sup>1</sup> Lodgment Verification process by way of a logical process model with the following characteristics:
  - a. It uses the BPMN notation<sup>2</sup>
  - b. It is consistent with the **NECS Message Use Case Specification**<sup>3</sup>, which defines the architecture for Land Registry services in the proposed national electronic conveyancing environment
  - c. It is consistent with the **Business Rules Approach** (as defined by the **Business Rules Manifesto**<sup>4</sup>), which is the approach selected by LPI for implementing electronic conveyancing

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<sup>1</sup> An As-Is model of this process was developed as part of the Land Registry Process Development and Modelling Project (Land Registry Process Development and Modelling for 1.6 Information Services Process Version 2.0, 21 June 2010).

<sup>2</sup> Object Management Group (OMG) (2010): Business Process Modeling Notation (BPMN) Version 2.0 (Beta 2), 4 June 2010, available at <http://www.bpmn.org/>.

<sup>3</sup> National Electronic Conveyancing Office (December 2010): Message Use Case Specification is published in Volume 5 - Data Standard Requirements in the Requirements Definition for a National Electronic Conveyancing System, available at <http://www.necs.gov.au/NECS-Requirements-Definition/default.aspx>

<sup>4</sup> The Business Rules Group (2003): The Business Rules Manifesto: Principles of Rule Independence Version 2.0, <http://www.businessrulesgroup.org/brmanifesto.htm>, 1 November 2003

- d. It is consistent with the **LPI Business Rules Methodology**<sup>5</sup>
  - e. It uses the terminology in the **NECS Vocabulary**<sup>6</sup> and the **LPI Structured Business Vocabulary (SBV)** (as currently recorded in LPI's Business Rule Repository<sup>7</sup>), which are designed to provide a common vocabulary for describing all system components.
2. map that model to the business rules<sup>8</sup> developed as part of the **Instrument Schema and Verification Requirements Project**.

### 1.3 Assumptions

This document makes the following assumptions:

1. eRegistry Instruments are transmitted as complete eRegistry Instruments rather than as eRegistry Instrument Counterparts.

### 1.4 Associated documents

This document is part of the documentation portfolio being delivered to the "NSW Instrument Schema and Electronic Case Verification" project, which consists of the following documents:

1. NSW eRegistry Instrument & eNOS Schemas
2. NSW eLodgment Case Data Content Definition
3. NSW Title Activity Check & Lodgment Fee Calculation Schemas
4. Additional Schemas<sup>9</sup>
5. NSW eLodgment Case Verification Requirements
6. Lodgment Verification Process Model And Business Rule Mapping (this document)
7. Rule Template Summary
8. NSW Registry Information Schema for Compliance Assurance.

### 1.5 How this document is organised

In this document:

1. Section 2 sets out the National E-Conveyancing System and LPI requirements for Lodgment Verification.
2. Section 3 identifies the standards followed in the To-Be Process Model and business rule mappings.
3. Section 4 contains BPMN diagrams of the To-Be Process Model for Lodgment Verification.
4. Section 5 contains Activity Descriptions of each Activity in the Process Model.

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<sup>5</sup> The LPI Business Rules Methodology is defined in two documents: Business Rule Development Methodology Review and Model Metadata Requirements and Quality Criteria.

<sup>6</sup> a standard business vocabulary for national electronic conveyancing available online at: <http://necsvocab.pbworks.com/>

<sup>7</sup> LPI's Business Rule Repository is recorded in an enterprise implementation of RuleXpress.

<sup>8</sup> These are listed as a set of constraints in the associated NSW eLodgment Case Verification Requirements document.

<sup>9</sup> This document includes Land Title Reference Verification, Registry Information Supply Request, Lodgment Verification, and Lodgment Request schemas.

5. Section 6 contains the mappings of each Activity in the Process Model to the required business rules.
6. Section 7 describes in detail those elements of the BPMN notation that have been used in this document.

This document contains a number of hyperlinks rendered in blue underlined text: an on-screen reader can depress the **Ctrl** key and click on:

1. any hyperlinked URL to navigate to that webpage
2. any Term in Title Case to navigate to that Term in the NECS Vocabulary wiki at <http://necsvocab.pbworks.com/> (provided that user has access rights to the wiki).

## 2 Requirements for Lodgment Verification

### 2.1 National E-Conveyancing System requirements for Lodgment Verification

Figure 1 shows all services to be provided by Land Registries to ELNOs (Electronic Lodgment Network Operators) in the proposed national electronic conveyancing environment. These form the Land Registry's contractual obligations under the National E-Conveyancing System. Service A5 (Lodgment Verification) is one of the most important of these services, as it provides a means of delivering major efficiencies within the Land Registry, reducing the time required to lodge and register transactions (the **registration gap**), while maintaining the integrity of the Register. It is also one of the most complex services.

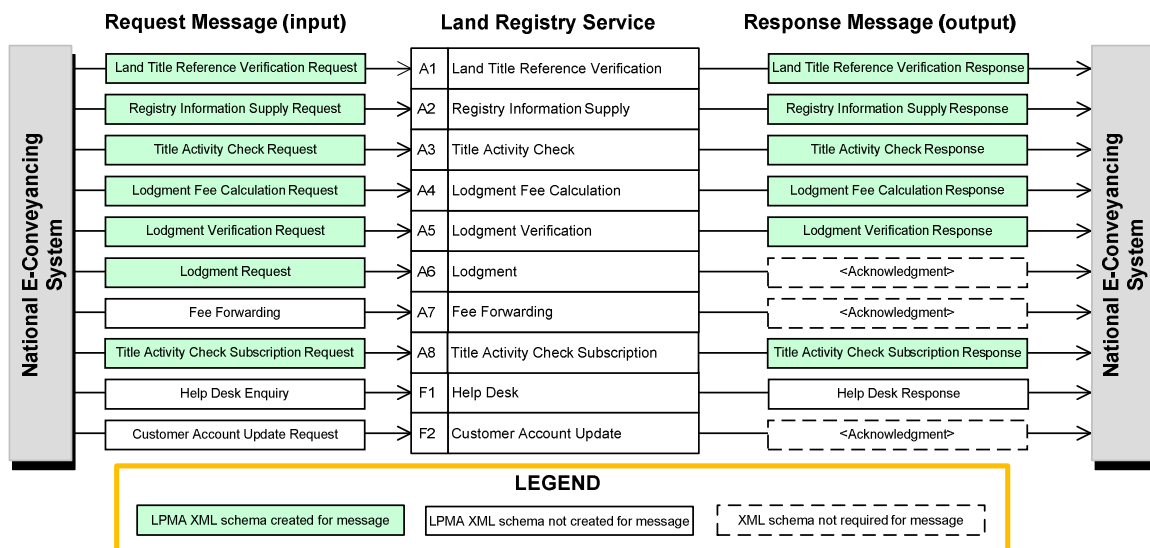


Figure 1: Services to be provided by Land Registries to ELNOs in the proposed National E-Conveyancing System environment

According to Version 1.4 of the NECS Message Use Case Specification<sup>10</sup>, the purpose of Lodgment Verification is to obtain advice from the relevant Land Registry on the acceptability of an eLodgment Case for Lodgment. The response from the Land Registry is either:

- an indication that the eLodgment Case meets all requirements for Lodgment, or
- a list of business rules with which that eLodgment Case does not comply, including Registration requirements
- a list of the manual examination processes that will need to be performed on that eLodgment Case following lodgment.

### 2.2 LPI Requirements for Lodgment Verification

According to the NECS Requirements Definition and **NECS in NSW Consultation Paper 4 (Land Registry Transaction Services for Conveyancing)**, Lodgment Verification will provide an automated compliance assurance (or pre-examination) service to Subscribers. It will determine whether an eLodgment Case complies with the requirements of legislation and the Registrar-General's Directions, so that the

<sup>10</sup> National Electronic Conveyancing Office (2010): Message Use Case Specification Version 1.4, delivered 14 October 2010, published at <http://www.necs.gov.au/NECS-Requirements-Definition/default.aspx>.

eRegistry Instruments in the case can be lodged and subsequently registered. To minimise rework and reduce the need for requisitions, business rules should be applied as early as possible in the conveyancing process, as close as possible to the point of data collection. Thus verification of eLodgment Cases containing unsigned documents is to be supported. Analysis of patterns of requisitions has revealed that the causes of most requisitions could be identified by automated compliance checks during preparation and documentation of transactions, prior to settlement and lodgment. The Lodgment Verification service should provide the following information:

1. Lodgment Fee Calculation: the lodgment fees to be paid for the eLodgment Case
2. Lodgment Acceptability Advice: a Boolean response indicating whether the eLodgment Case is acceptable for lodgment
3. Registration Compliance Report: a compliance statement based on an automated check of requirements for lodgment, listing those Land Registry business rules with which the documents in the eLodgment Case do not comply, each associated with information enabling the originator of the eLodgment Case to identify which data item(s) contravened that business rule.

To provide this information, the Lodgment Verification service needs to perform the following activities:

1. Check the structure and content of the request message (adding each check that fails to an array of failed checks):
  - a. Check the data integrity of the message containing the eLodgment Case, i.e. conformity to the XML schema<sup>11</sup> for a Lodgment Verification request message, which implies that:
    - i. the eLodgment Case therein conforms to the XML schema for an eLodgment Case, which implies that:
    - ii. the Lodgment Information Report therein conforms to the XML schema for an eLodgment Information Report that corresponds to the Template Version Number included in that eLodgment Information Report, and
    - iii. each eRegistry Instrument therein conforms to the XML schema for an eRegistry Instrument that corresponds to the Template Version Number included in that eRegistry Instrument (and is therefore an in-scope eRegistry Instrument), and
    - iv. each eNOS Information Report therein conforms to the XML schema for an eNOS Information Report that corresponds to the Template Version Number included in that eNOS Information Report;if any of these checks fail, further tests are not performed<sup>12</sup>.
  - b. Check that:
    - i. if the eLodgment Information Report has been signed, it has not been changed since being signed
    - ii. no eRegistry Instrument Counterpart that has been signed has been changed since being signed<sup>13</sup>
    - iii. no eNOS Information Report that has been signed has been changed since being signed<sup>14</sup>;if any of these checks fail, further tests are not performed<sup>12</sup>.

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<sup>11</sup> Since every service needs to perform such a check, this should perhaps be considered as part of the design of the message handling infrastructure.

<sup>12</sup> In a future release, an analogous check of the eConsent Information Reports will also be required.

<sup>13</sup> If eLodgment Cases are transmitted with complete eRegistry Instruments rather than separate Counterparts (as now appears will be the case), this check will need to reconstitute each Counterpart from the eRegistry Instrument.

<sup>14</sup> Each of these checks is to be performed by an authentication service available to LPI, which checks that the Digital Signature Hash Key associated with that document) is still valid for that document.

- c. Perform the following lodgment acceptability checks; each check that fails is added to an array of failed checks:
    - i. Check that:
      - a. all eRegistry Instrument Counterparts for each eRegistry Instrument are present and signed (each Transacting Party referred to in the common data, in each role for which signing is required, is represented in a counterpart)
      - b. each eRegistry Instrument Counterpart for the same eRegistry Instrument has the same common data<sup>15</sup>
      - c. each eNOS Information Report referenced in each eRegistry Instrument (if any) is present<sup>16</sup>.
    - ii. Check that each Land Title Reference in the eLodgment Case is suitable for electronic conveyancing (this involves a call to the separately-defined Land Title Reference Verification service).
    - iii. Check that the eLodgment Case does not contain an invalid combination of eRegistry Instruments (LPI have advised that there are no invalid combinations of the instruments currently in scope, but LPI may identify certain combinations as invalid in the future).
    - iv. Check that the set of Lodgment Fees listed in the Lodgment Information Report matches the set of fees that are required to be paid (established by calling the separately-defined Lodgment Fee Calculation service).
    - v. Check that each dutiable eRegistry Instrument (if any) has a Duty Assessment Number that is still valid (established by calling the Duty Verification service to be provided by the Revenue Office – defined in NECS Message Use Case Specification as service B2).
    - vi. Check that the content of the Lodgment Information Report is correct (this involves application of business rules<sup>17</sup>, and includes CoRD – Control of the Right to Deal – checks).
    - vii. Create a copy of the registry information (the “Virtual Land Title”) for each Land Title Reference in the eLodgment Case.
    - viii. Check that the content of the eRegistry Instrument with the lowest Lodgment Order in the eLodgment Case is correct with respect to:
      - a. each relevant “Virtual Land Title” (this involves application of business rules<sup>17</sup>, some of which require comparison with registry information), and
      - b. the associated eNOS (this also involves application of business rules<sup>17</sup>).
    - ix. Perform “virtual registration” of the eRegistry Instrument with the lowest Lodgment Order in the eLodgment Case, i.e. update the “Virtual Land Title” using the information in that eRegistry Instrument.
    - x. Repeat steps viii and ix in turn for each of the remaining eRegistry Instruments in the eLodgment Case in sequence of Lodgment Order.
    - xi. Check that the content of the eNOS Information Report is correct (this involves application of business rules<sup>17</sup>, some of which require comparison with registry information or the associated eRegistry Instrument)<sup>16</sup>.
  - d. Establish (by way of decisioning rules) which (if any) manual examination processes will need to be performed on the eLodgment Case following lodgment.
2. Produce the information required in the response message:
    - a. a Lodgment Fee Calculation report for the eLodgment Case (obtained in step 1.c.iv above from the call to the Lodgment Fee Calculation service)
    - b. the Lodgment Acceptability Advice (by setting to True if no check has failed,

<sup>15</sup> If eLodgment Cases are transmitted with complete eRegistry Instruments rather than separate Counterparts (as now appears will be the case), this check will not be required.

<sup>16</sup> In a future release, an analogous check of the eConsent Information Reports will also be required.

<sup>17</sup> These are documented in the associated eLodgment Case Verification Requirements document.

- otherwise False)
- c. the Lodgment Verification Report (by listing each check that has failed).

### 3 Standards and approaches followed

LPI have selected the following standard and approach:

1. BPMN for process modelling
2. The Business Rules Approach<sup>18</sup>.

All deliverables in this document are consistent with that standard and approach.

According to the Business Rules Approach, rules should be “separate from processes, not contained in them”. Since “rules apply across processes ... there should be one cohesive body of rules, enforced consistently across all relevant areas of business activity.”

This approach enables the same business rules to be applied by multiple processes, without the redundancy and potential for inconsistency if those rules are defined in each process in which they apply. For example, the National E-Conveyancing System Services A6 (Lodgment) and A5 (Lodgment Verification) will apply the same rules.

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<sup>18</sup> The Business Rules Group (2003): The Business Rules Manifesto: Principles of Rule Independence Version 2.0, 1 November 2003, available at <http://www.businessrulesgroup.org/brmanifesto.htm>,

## 4 To-Be Lodgment Verification Process Model

### 4.1 Overall process architecture

The Lodgment Verification process (A5) consists of the following Subprocesses and Activities:

1. A5.1: Check Message Data Integrity
2. A5.2: Check for Changes since Signing
3. A5.3: Check Lodgment Acceptability:
  - a. A5.3.1: Check Case Completeness
  - b. A5.3.2: Check Land Title References:
    - i. A5.3.2.1: Call A1. Land Title Reference Verification
    - ii. A5.3.2.2: Record LTRs Unsuitable for Electronic Lodgment
  - c. A5.3.3: Check for Invalid Case Composition
  - d. A5.3.4: Check Lodgment Fees:
    - i. A5.3.4.1: Call A4. Lodgment Fee Calculation
    - ii. A5.3.4.2: Compare Lodgment Fees
  - e. A5.3.5: Check Duty Assessment:
    - i. A5.3.5.1: Check for Dutiable eRegistry Instruments
    - ii. A5.3.5.2: Call B2. Duty Verification
    - iii. A5.3.5.3: Record Invalid Duty Assessment
  - f. A5.3.6: Check Lodgment Information Report Compliance
  - g. A5.3.7: Check eRegistry Instrument Compliance:
    - i. A5.3.7.1: Call A2. Registry Information Supply
    - ii. A5.3.7.2: Create Virtual Land Titles
    - iii. for each eRegistry Instrument:
      - A5.3.7.3: Check Compliance of 1 eRegistry Instrument
  - h. for each eNOS Information Report:
    - A5.3.8: Check eNOS Information Report Compliance<sup>19</sup>
4. A5.4: Establish Required Manual Examination
5. A5.5: Produce Lodgment Verification Report.

### 4.2 BPMN Diagrams

The to-be Lodgment Verification Process Model is depicted using the following diagrams:

1. a top-level Process Diagram, included and described in section 4.2.1
2. one Collaboration Diagram, included and described in section 4.2.2
3. a number of Subprocess Diagrams, included and described in section 4.2.3.

The Collaboration Diagram is at the same level of abstraction as the Process Diagram: the only difference is that it shows communication with external participants (in this case the ELNO and the Office of State Revenue) in addition to internal workflows.

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<sup>19</sup> In a future release, an analogous check of the eConsent Information Reports will also be required.

#### 4.2.1 Lodgment Verification Process Diagram

The diagram depicting the Lodgment Verification process is shown in Figure 2, below. Note that this Process:

1. starts with the receipt of a Lodgment Verification Request message, defined in the associated Additional Schemas document
2. has three possible End Events:
  - a. a normal result (send Lodgment Verification Standard Response message)
  - b. two error/exception results:
    - i. Data Integrity Error
    - ii. Change since Signing;each End Event results in a Lodgment Verification Error Response message being returned to the originating ELNO; all response messages from this service are defined in the associated Additional Schemas document
3. contains a Subprocess (A5.3), which is depicted in the Subprocess Diagrams in Section 4.2.3
4. contains two Activities (A5.3, A5.4)<sup>20</sup> that can take place in parallel; however the final activity (A5.5) can begin only when both of these activities have been completed.

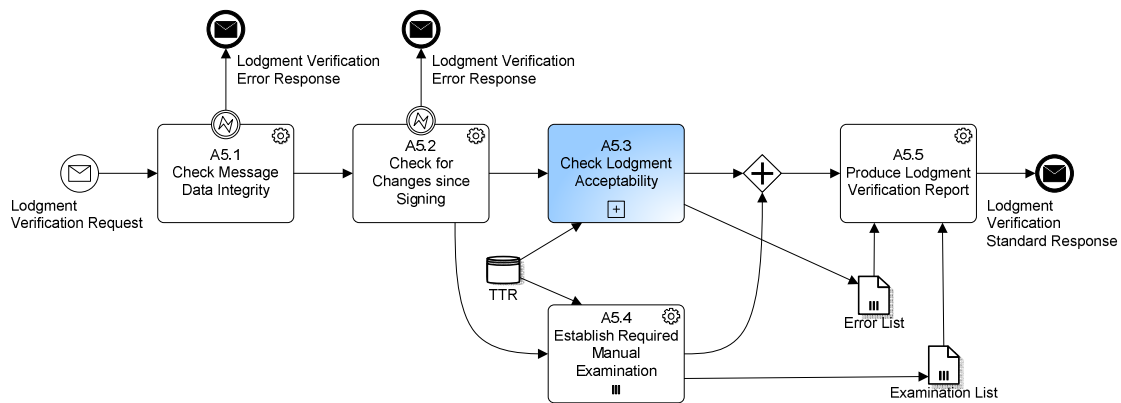


Figure 2. Process Diagram for Lodgment Verification

#### 4.2.2 Lodgment Verification Collaboration Diagram

The Collaboration Diagram provides a contextual view of the business process, showing communication (Message Flows) between the business process and external participants: the only external participants involved are:

1. the ELNO (Electronic Lodgment Network Operator)
2. the OSR (Office of State Revenue).

The Collaboration Diagram for Lodgment Verification is shown in Figure 3 on page 16. The Process Diagram (Figure 2) forms a subset of this diagram.

<sup>20</sup> The 'TTR' data resource referenced by these services is the 'Torrens Title Register' which provides the reference information necessary for some business rules applied by these services to determining compliance.

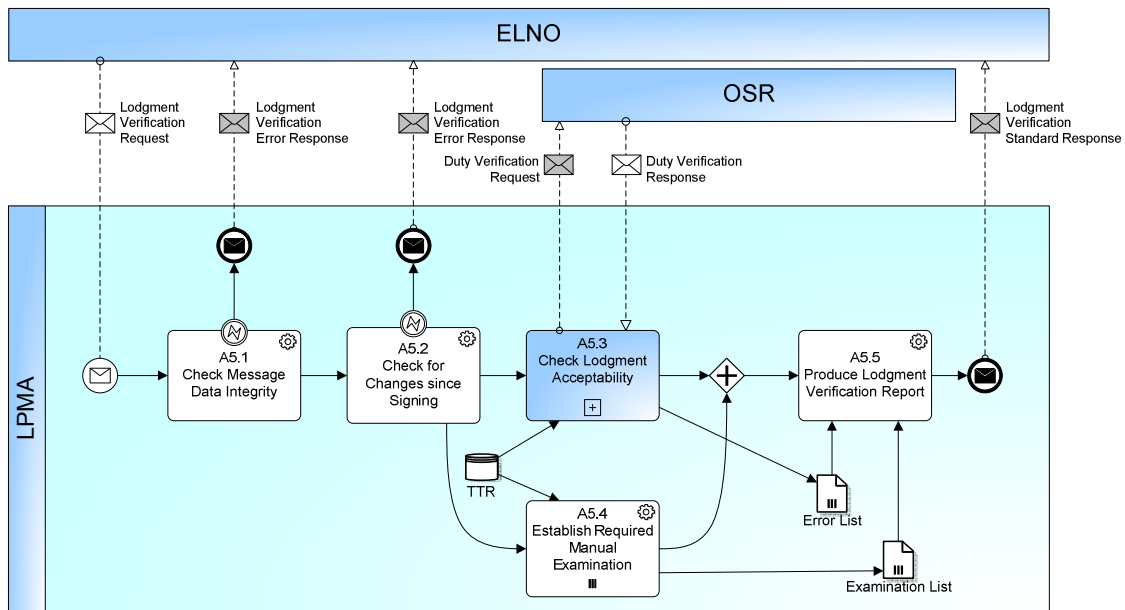


Figure 3. Collaboration Diagram for Lodgment Verification

#### 4.2.3 Lodgment Verification Subprocess Diagrams

Subprocess Diagrams (which correspond to Level 5 diagrams in the As-Is Logical Process Model) detail the Subprocess shown on the Process and Collaboration Diagrams. There are five Subprocess Diagrams:

1. A5.3 Check Lodgment Acceptability
2. A5.3.2: Check Land Title References (a Subprocess of A5.3)
3. A5.3.4 Check Lodgment Fees (a Subprocess of A5.3)
4. A5.3.5: Check Duty Assessment (a Subprocess of A5.3)<sup>21</sup>
5. A5.3.7 Check eRegistry Instrument Compliance (a Subprocess of A5.3)

##### 4.2.3.1 A5.3 Check Lodgment Acceptability

This Subprocess consists of eight parallel streams, each of which checks a different aspect of compliance by documents in the eLodgment Case; each instance of non-compliance is recorded in an Error List which is input to the Lodgment Verification Report produced by Activity A5.5:

1. Activity A5.3.1 checks that the case is complete, i.e. that for each eRegistry Instrument in the case:
  - a. all eRegistry Instrument Counterparts for that eRegistry Instrument are present (each Transacting Party referred to in the common data, in each role for which signing is required, is represented in a counterpart)
  - b. each eRegistry Instrument Counterpart for that eRegistry Instrument has the same common data
  - c. the eNOS Information Report referenced in that eRegistry Instrument (if any) is present.
2. Activity A5.3.2 checks that each Land Title Reference listed in the eLodgment Information Report is suitable for electronic lodgment.

<sup>21</sup> The Duty Assessment call to OSR may not be necessary for Lodgment Verification if the ELNO enforces Duty Assessment compliance as a pre-condition of a Lodgment Verification request.



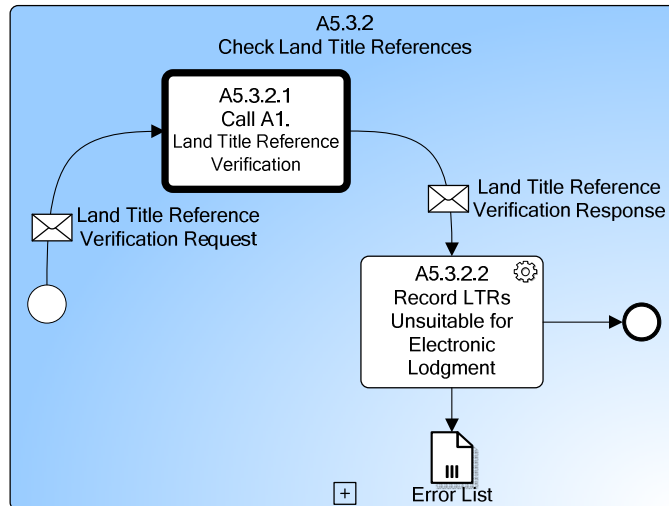


Figure 5. Subprocess Diagram for Activity A5.3.2 Check Land Title References

#### 4.2.3.3 A5.3.4 Check Lodgment Fees

This Subprocess consists of a sequence of Activities to check that the set of Lodgment Fees listed in the eLodgment Information Report matches the set of fees that are required to be paid:

1. Activity A5.3.4.1 calls the Lodgment Fee Calculation service (service A4 in the NECS Message Use Case Specification, also defined in the associated Title Activity Check & Lodgment Fee Calculation Schema document) to determine the lodgment fees to be paid for the case.
2. Activity A5.3.4.2 compares the lodgment fees listed in the eLodgment Information Report with the lodgment fees returned by the Lodgment Fee Calculation service.

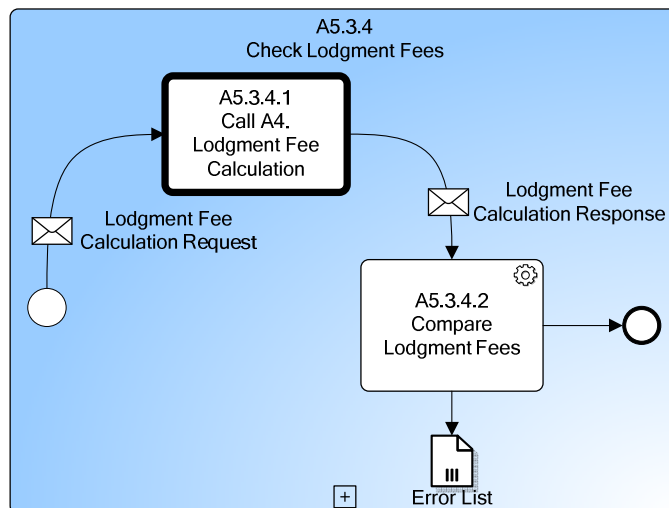


Figure 6. Subprocess Diagram for Activity A5.3.4 Check Lodgment Fees

#### 4.2.3.4 A5.3.5 Check Duty Assessment

This Subprocess consists of a sequence of Activities to check for the presence, currency and validity of a Duty Assessment Number for each dutiable eRegistry Instrument in the eLodgment Case (if any):

1. Activity A5.3.5.1 checks whether there are dutiable eRegistry Instruments and, if so, whether each contains a Duty Assessment Number. If any eRegistry Instrument is dutiable but contains no Duty Assessment Number, an error is

recorded in the Error List for each such eRegistry Instrument.

2. If at least one eRegistry Instrument is both dutiable and contains a Duty Assessment Number, activity A5.3.5.2 calls the Duty Verification service (external service B2 in the NECS Message Use Case Specification) to verify the currency and validity of the Duty Assessment Number in each such eRegistry Instrument.
3. Activity A5.3.5.3 checks the response from the Duty Verification service and records an error in the Error List for each Duty Assessment Number that is no longer current or is otherwise invalid.

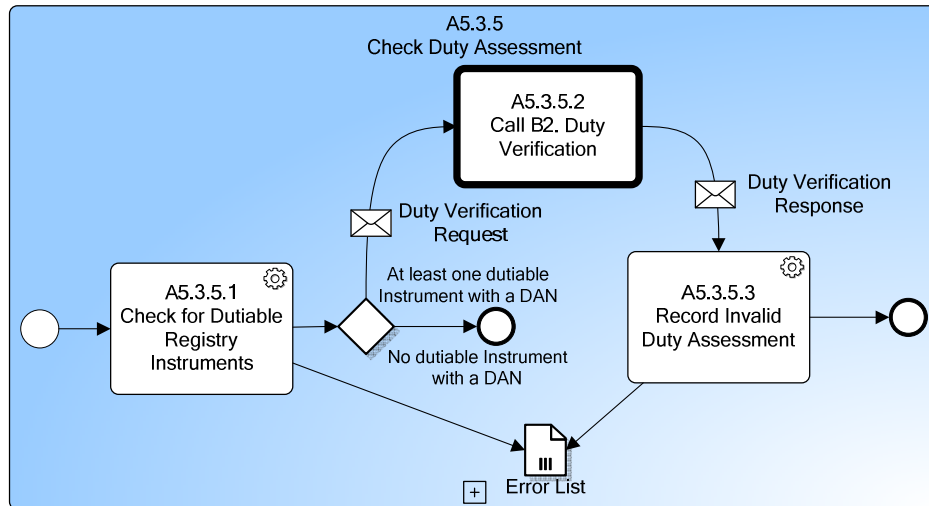


Figure 7. Subprocess Diagram for Activity A5.3.5 Check Duty Assessment

#### 4.2.3.5 A5.3.7 Check eRegistry Instrument Compliance

This Subprocess consists of a sequence of Activities to check the compliance of each eRegistry Instrument in the eLodgment Case:

1. Activity A5.3.7.1 calls the Registry Information Supply service (service A2 in the NECS Message Use Case Specification) to determine the Registry Information required for Compliance Assurance.
2. Activity A5.3.7.2 copies the registry information for each Land Title Reference in the eLodgment Case to the “Virtual Land Titles”.
3. Activity A5.3.7.3 checks for correctness the content of the eRegistry Instrument with the lowest Lodgment Order in the eLodgment Case:
  - a. in absolute terms (such as a range check on Share Fraction)
  - b. for internal consistency (such as the presence or absence of instrument-specific data items)
  - c. against the “Virtual Land Title”
  - d. against the associated eNOS
  - e. against other reference data (such as Australia Post locality/postcode data); this involves application of business rules documented in the associated eLodgment Case Verification Requirements document; each instance of non-compliance is recorded in an Error List which is input to the Lodgment Verification Report produced by Activity A5.5.
4. Activity A5.3.7.3 then performs “Virtual registration” of that eRegistry Instrument, i.e. the “Virtual Land Title” is updated using the information in that eRegistry Instrument.
5. Steps 3 and 4 are repeated in turn for each of the remaining eRegistry Instruments in the eLodgment Case in sequence of Lodgment Order.

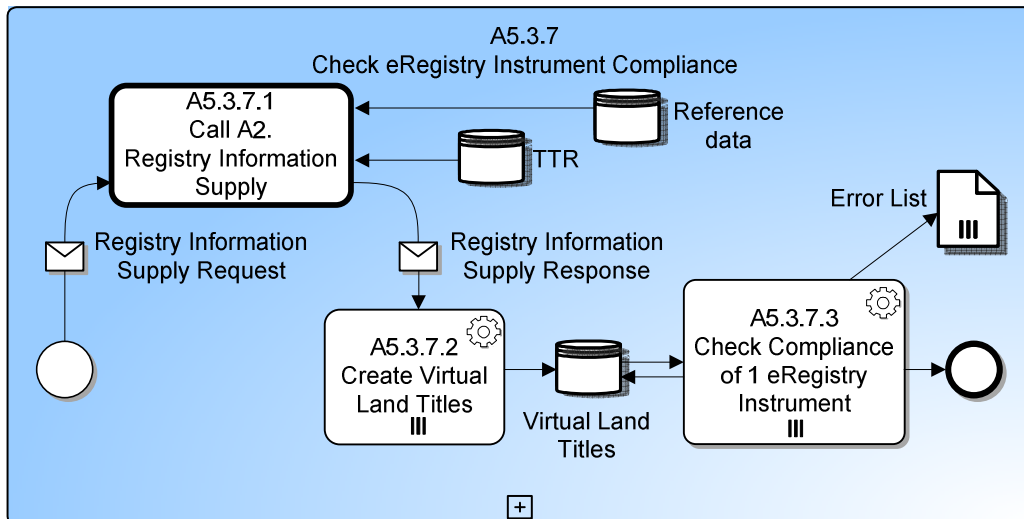


Figure 8. Subprocess Diagram for Activity A5.3.7 Check eRegistry Instrument Compliance

## 5 Activity Descriptions

For BPMN models to be executable, the attributes of each diagram element need to be specified using XML: the diagrams are just the surface layer of a complete XML language for process definition. At the requirements stage, BPMN Activities are defined using natural language, which can be refined into XML specifications at the design stage.

Lodgment Verification is a service provided by Land Registries to ELNOs, which provides an automated pre-examination service for eLodgment Cases. The input to the service is an eLodgment Case (contained in the request message) and the output is a Lodgment Verification Report (contained in the response message). The Lodgment Verification Report lists compliance errors (in the form of business rule contraventions) that need to be corrected for the eLodgment Case to be successfully lodged and registered. It also includes details of the lodgment fees payable.

## 5.1 A5.1 Check Message Data Integrity

Task Description	<p>This Task checks the data integrity of the Lodgment Verification Request message. If the check fails, an error response is sent and the eLodgment Case is processed no further as it is corrupt and will need to be resent. This corresponds to Message Failure described in the NECS Message Use Case Specifications under the heading “Response messages to invalid request messages”.</p> <p><b>Actions:</b></p> <ol style="list-style-type: none"> <li>1. Log request.</li> <li>2. Check data integrity of request message, i.e. conformity to the XML schema for a Lodgment Verification request message, which implies that:             <ol style="list-style-type: none"> <li>a. the eLodgment Case therein conforms to the XML schema for an eLodgment Case, which implies that:                 <ol style="list-style-type: none"> <li>i. the Lodgment Information Report therein conforms to the XML schema for an eLodgment Information Report that corresponds to the Template Version Number included in that eLodgment Information Report, and</li> <li>ii. each eRegistry Instrument therein conforms to the XML schema for an eRegistry Instrument that corresponds to the Template Version Number included in that eRegistry Instrument (and therefore forms part of an in-scope eRegistry Instrument), and</li> <li>iii. each eNOS Information Report therein conforms to the XML schema for an eNOS Information Report that corresponds to the Template Version Number included in that eNOS Information Report<sup>23</sup>.</li> </ol> </li> </ol> </li> <li>3. If data integrity check fails:             <ol style="list-style-type: none"> <li>a. abort processing</li> <li>b. send and log error response message.</li> </ol> </li> </ol>
Activity Type	Automated Task
Trigger	Lodgment Verification Request message received
Input	Lodgment Verification Request message
Output	On error: Lodgment Verification Error Response message, with Message Failure Reason indicating data integrity error
Issues	<ol style="list-style-type: none"> <li>1. Since every service needs to perform such a check, this should perhaps be considered as part of the design of the message handling infrastructure, along with other message integrity assurance such as hash keys (at the message level rather than as part of the message).</li> </ol>

<sup>23</sup> In a future release, an analogous check of the eConsent Information Reports will also be required.

## 5.2 A5.2 Check for Changes since Signing

Activity Description	<p>This Activity checks whether any signed document (Lodgment Information Report, eRegistry Instrument Counterpart or eNOS Information Report) in the eLodgment Case has been changed since signing. Each check is performed by an authentication service internal to LPI, which checks that the Digital Signature Hash Key associated with that document) is still valid for that document. If any document has been changed since signing, an error response is sent and the eLodgment Case is processed no further. This also corresponds to Message Failure described in the NECS Message Use Case Specifications under the heading "Response messages to invalid request messages".</p> <p><b>Actions:</b></p> <ol style="list-style-type: none"> <li>1. Check that the Lodgment Information Report has not been changed since being signed.</li> <li>2. Check that no eRegistry Instrument Counterpart has been changed since being signed<sup>24</sup>.</li> <li>3. Check that no eNOS Information Report has been changed since being signed.</li> <li>4. If any document has been changed since being signed:             <ol style="list-style-type: none"> <li>a. abort processing</li> <li>b. send and log error response message.</li> </ol> </li> </ol>
Activity Type	Automated Task (or Business Rules Task)
Trigger	A5.1 Data integrity check completed, and detected no data integrity errors
Input	documents in eLodgment Case
Output	On error: Lodgment Verification Error Response message, with Message Failure Reason(s) indicating one or more changes to documents since signing

## 5.3 A5.3 Check Lodgment Acceptability

Activity Description	This Activity applies business rules (based on the Registrar-General's directions and legislation) to determine whether the eLodgment Case is valid for lodgment.
Activity Type	Subprocess (depicted in Subprocess Diagram in Figure 4 in section 4.2.3.1)
Trigger	A5.2 Check for Changes since Signing completed, and detected no document changed since signing
Input	documents in eLodgment Case
Output	Error List: set of compliance errors (business rule contraventions) for each document in the case that contravenes one or more business rules

<sup>24</sup> If eLodgment Cases are transmitted with complete eRegistry Instruments rather than separate Counterparts (as now appears will be the case), this check will need to reconstitute each Counterpart from the eRegistry Instrument.

### 5.3.1 A5.3.1 Check Case Completeness

Activity Description	<p>This Activity checks that the case is complete.</p> <p><b>Actions:</b></p> <ol style="list-style-type: none"> <li>1. For each eRegistry Instrument in the eLodgment Case:             <ol style="list-style-type: none"> <li>a. Check that all required eRegistry Instrument Counterparts are present and signed (each Transacting Party referred to in the common data, in each role for which signing is required, is represented in a counterpart).</li> <li>b. Check consistency of information between different Counterparts, i.e. each eRegistry Instrument Counterpart for that eRegistry Instrument has the same common data<sup>25</sup>.</li> <li>c. Check that the eNOS Information Report referenced in that eRegistry Instrument (if any) is present<sup>26</sup>.</li> </ol> </li> </ol> <p>This Activity can have an error result if an eRegistry Instrument cannot be compiled due to a missing counterpart (meaning not all information is available) or the information in different counterparts is inconsistent. In this case, processing of the eRegistry Instrument in question cannot proceed.</p>
Activity Type	Automated Task (or Business Rules Task) (multi-instance: conducted for each eRegistry Instrument in the case)
Trigger	A5.3 Check Lodgment Acceptability started
Input	eRegistry Instrument Counterparts and eNOS Information Reports in eLodgment Case
Output	Add to Error List: business rule contravention(s) for each eRegistry Instrument in the case that is incomplete, inconsistent or not accompanied by the referenced eNOS

### 5.3.2 A5.3.2 Check Land Title References

#### 5.3.2.1 A5.3.2.1 Call A1. Land Title Reference Verification

This is a call to an external service defined in a separate Process Model.

Activity Description	<p>The Service checks whether each Land Title Reference is:</p> <ol style="list-style-type: none"> <li>1. valid and</li> <li>2. suitable for electronic lodgment.</li> </ol>
Activity Type	Service Call (multi-instance: conducted for each affected Land Title Reference)
Trigger	A5.3 Check Lodgment Acceptability started
Input	Land Title Reference Verification Request message
Output	Add to Error List: business rule contravention(s) for each Land Title Reference listed in the Land Title Reference Verification Response message (which contains a Land Title Reference Compliance Report for each Land Title Reference) as being invalid or unsuitable for electronic lodgment

<sup>25</sup> If eLodgment Cases are transmitted with complete eRegistry Instruments rather than separate Counterparts (as now appears will be the case), this check will not be required.

<sup>26</sup> In a future release, an analogous check of the eConsent Information Reports will also be required.

### 5.3.2.2 A5.3.2.2 Record LTRs Unsuitable for Electronic Lodgment

Activity Description	The service checks the response from the Land Title Reference Verification service and records an error in the Error List for each Land Title that is: 1. referenced in the eLodgment Information Report and 2. unsuitable for electronic lodgment.
Activity Type	Subprocess (depicted in Subprocess Diagram in Figure 5 in section 4.2.3.2)
Trigger	A5.3 Check Lodgment Acceptability started
Input	Lodgment Information Report in eLodgment Case
Output	Add to Error List: each business rule contravention by the Land Title Reference that is unsuitable for electronic lodgment

### 5.3.3 A5.3.3 Check for Invalid Case Composition

Activity Description	This Activity checks that the case does not contain an invalid combination of eRegistry Instruments (LPI have advised that there are no invalid combinations of the instruments currently in scope, but LPI may identify certain combinations as invalid in the future).
Activity Type	Automated Task
Trigger	A5.3 Check Lodgment Acceptability started
Inputs	Lodgment Information Report in eLodgment Case
Output	Add to Error List: business rule contravention for each invalid combination of eRegistry Instruments in the case

### 5.3.4 A5.3.4 Check Lodgment Fees

Activity Description	This Subprocess checks that the set of lodgment fees listed in the eLodgment Information Report matches the set of fees that are required to be paid.
Activity Type	Subprocess (depicted in Subprocess Diagram in Figure 6 in section 4.2.3.3)
Trigger	A5.3 Check Lodgment Acceptability started
Input	Lodgment Information Report in eLodgment Case
Output	Add to Error List: business rule contravention for each lodgment fee that is incorrect or missing from the Lodgment Information Report

#### 5.3.4.1 A5.3.4.1 Call A4. Lodgment Fee Calculation

This is a call to a separate service defined in a separate Process Model.

Activity Description	This Service performs a Lodgment Fee Calculation for the eLodgment Case.
Activity Type	Service Call
Trigger	A5.3.4 Check Lodgment Fees started
Input	Lodgment Fee Calculation Request message including the eLodgment Case submitted in the original Lodgment Verification Request message
Output	Lodgment Fee Calculation Response message including the calculated lodgment fees for the eLodgment Case

#### 5.3.4.2 A5.3.4.2 Compare Lodgment Fees

Activity Description	This Activity compares the set of lodgment fees listed in the eLodgment Information Report with the set of lodgment fees listed in the Lodgment Fee Calculation Response message output by the previous Activity.
Activity Type	Automated Task (or Business Rules Task)
Trigger	A5.3.4.1 Call Lodgment Fee Calculation service (A4) completed
Input	Lodgment Information Report in eLodgment Case
Output	Add to Error List: business rule contravention for each lodgment fee that is incorrect or missing from the Lodgment Information Report

#### 5.3.5 A5.3.5 Check Duty Assessment

Activity Description	This Subprocess checks for the presence and currency of the Duty Assessment Number for each dutiable eRegistry Instrument in the case.
Activity Type	Subprocess (depicted in Subprocess Diagram in Figure 7 in section 4.2.3.4)
Trigger	A5.3 Check Lodgment Acceptability started
Input	Lodgment Information Report in eLodgment Case
Output	Add to Error List: business rule contravention for each dutiable eRegistry Instrument with absent, non-current or invalid Duty Assessment Number

#### 5.3.5.1 A5.3.5.1 Check for Dutiable eRegistry Instruments

Activity Description	This Activity checks whether any eRegistry Instrument is dutiable and, if so, whether a Duty Assessment Number is present.
Activity Type	Automated Task (or Business Rules Task)
Trigger	A5.3.5 Check Duty Assessment started
Input	Lodgment Information Report
Output	Add to Error List: business rule contravention if at least one dutiable eRegistry Instrument but no Duty Assessment Number

### 5.3.5.2 A5.3.5.2 call B2. Duty Verification

This is a call to an external service defined in a separate Process Model.

Activity Description	This Service performs a Duty Verification for the eLodgment Case.
Activity Type	Service Call
Trigger	A5.3.5.1: Check for Dutiable eRegistry Instruments completed and at least one eRegistry Instrument found to be dutiable and Duty Assessment Number present
Input	Duty Verification Request message including either all eRegistry Instruments and Information Reports in their entirety or sufficient information about those eRegistry Instruments and Information Reports to enable determination of duty payable <sup>27</sup>
Output	Duty Verification Response message including Duty Assessment Validity Indicator

### 5.3.5.3 A5.3.5.3 Record Invalid Duty Assessment

Activity Description	This Activity checks the response from the Duty Verification service and records an error in the Error List if the Duty Assessment Number is no longer current or otherwise invalid.
Activity Type	Automated Task (or Business Rules Task)
Trigger	A5.3.5.2 Call Duty Verification service (B2) completed
Input	Lodgment Information Report in eLodgment Case
Output	Add to Error List: business rule contravention for each dutiable eRegistry Instrument where the associated Duty Assessment Number is present but not current or otherwise invalid

### 5.3.6 A5.3.6 Check Lodgment Information Report Compliance

Activity Description	This Activity applies business rules <sup>28</sup> to check the validity of the information contained in the eLodgment Information Report.
Activity Type	Automated Task (or Business Rules Task)
Trigger	A5.3 Check Lodgment Acceptability started
Input	Lodgment Information Report in eLodgment Case
Output	Add to Error List: each business rule contravention by the Lodgment Information Report

<sup>27</sup> It is yet to be determined whether the Duty Verification service requires as input eRegistry Instruments and Information Reports in their entirety or only the information about those eRegistry Instruments and Information Reports from which duty payable can be determined.

<sup>28</sup> These are documented in the associated eLodgment Case Verification Requirements document.

### 5.3.7 A5.3.7 Check eRegistry Instrument Compliance

This is a call to an external service defined in a separate Process Model.

Activity Description	This Activity applies business rules <sup>29</sup> to check whether the eRegistry Instruments in the eLodgment Case contain all required data items, that each data item has valid values, and that there is internal consistency between data items.
Activity Type	Subprocess (depicted in Subprocess Diagram in Figure 8 in section 4.2.3.5)
Trigger	A5.3 Check Lodgment Acceptability started
Input	eRegistry Instruments in eLodgment Case
Output	Add to Error List: each business rule contravention by an eRegistry Instrument

#### 5.3.7.1 A5.3.7.1 Call A2. Registry Information Supply

Activity Description	This Service provides the Registry Information required for Compliance Assurance.
Activity Type	Service Call
Trigger	A5.3.7 Check eRegistry Instrument Compliance started
Input	Registry Information Supply Request message
Output	Registry Information Supply Response message providing the Registry Information required for Compliance Assurance

#### 5.3.7.2 A5.3.7.2 Create Virtual Land Titles

Activity Description	This Activity copies Registry Information for each Land Title Reference specified in the Lodgment Information Report to the corresponding transient Virtual Land Title created for the eLodgment Case.
Activity Type	Automated Task
Trigger	A5.3.7.1 Call Registry Information Supply service (A2) completed
Input	Registry Information returned by A5.3.7.1
Output	Virtual Land Titles

#### 5.3.7.3 A5.3.7.3 Check Compliance of 1 eRegistry Instrument

Activity Description	This Activity applies each eRegistry Instrument in the eLodgment Case in the prescribed Lodgment Order to the Virtual Land Title to determine whether there are any barriers to registration.
Activity Type	Automated Task (or Business Rules Task) (multi-instance: conducted for each eRegistry Instrument in the case)
Trigger	A5.3.7.2 Create Virtual Land Title completed
Input	eRegistry Instruments in eLodgment Case Virtual Land Titles
Output	Set of compliance errors (business rule contraventions) Updated Virtual Land Titles

<sup>29</sup> These are documented in the associated eLodgment Case Verification Requirements document.

5.3.8 A5.3.8 Check eNOS Information Report Compliance<sup>30</sup>

Activity Description	This Activity applies business rules <sup>31</sup> to determine the validity of all eNOS Information Reports in the eLodgment Case.
Activity Type	Automated Task (or Business Rules Task) (multi-instance: conducted for each eNOS Information Report in the case)
Trigger	A5.3 Check Lodgment Acceptability started
Input	eNOS Information Report in eLodgment Case
Output	Add to Error List: each business rule contravention by an eNOS Information Report

5.4 A5.4 Establish Required Manual Examination

Activity Description	This Activity establishes (by way of decisioning rules) which (if any) manual examination processes will need to be performed on the eLodgment Case following lodgment.
Activity Type	Automated Task (or Business Rules Task) (multi-instance: conducted for each eRegistry Instrument in the case)
Trigger	A5.2 Check for Changes since Signing completed and detected no document changed since signing
Input	eRegistry Instruments in eLodgment Case
Output	Examination List: set of manual examination processes that will need to be performed on to the eLodgment Case following lodgment.

<sup>30</sup> In a future release, an analogous check of the eConsent Information Reports will also be required.

<sup>31</sup> These are documented in the associated eLodgment Case Verification Requirements document.

## 5.5 A5.5 Produce Lodgment Verification Report

Activity Description	<p>This activity produces a Lodgment Verification Report in XML format, summarising the results of the pre-examination</p> <p><b>Actions:</b></p> <ol style="list-style-type: none"> <li>1. Determine Lodgment Acceptability Advice (is eLodgment Case suitable for lodgment or not) based on presence or absence of errors in Error List.</li> <li>2. Compile Lodgment Verification Report from:             <ol style="list-style-type: none"> <li>a. Lodgment Acceptability Advice</li> <li>b. Land Title Reference Compliance Reports</li> <li>c. Lodgment Fee Calculation</li> <li>d. Error List</li> <li>e. Examination List.</li> </ol> </li> <li>3. Compile Lodgment Verification Response message from:             <ol style="list-style-type: none"> <li>a. Report Header</li> <li>b. Lodgment Verification Report.</li> </ol> </li> </ol>
Activity Type	Automated Task
Trigger	<p>The following all completed (as these each produce different components of the Lodgment Verification Report):</p> <ol style="list-style-type: none"> <li>1. A5.3 Check Lodgment Acceptability</li> <li>2. A5.4 Establish Required Manual Examination</li> </ol>
Inputs	<p>Land Title Reference Compliance Reports (from A1)</p> <p>Lodgment Fee Calculation (from A5.3.4.1)</p> <p>Error List (from A5.3)</p> <p>Examination List (from A5.4)</p>
Output	Lodgment Verification Response message

## 6 Process / Business Rule Mappings

This section maps each Activity defined in the Lodgment Verification Process Model to the business rules that Activity needs to apply.

All known required rules are documented in associated document eLodgment Case Verification Requirements as follows:

1. eRegistry Instrument Schema constraints: Section 6.4.1
2. eNOS Information Report Schema constraints: Section 6.4.2
3. eLodgment Information Report constraints: Section 6.4.3
4. Complex data type constraints: Section 6.4.4

### 6.1 A5.1 Check Message Data Integrity

The rules applied by this Activity test for request message conformity to the XML Schema Definition File for a Lodgment Verification request message, i.e.:

1. the eLodgment Case therein conforms to the XML schema for an eLodgment Case, which implies that:
2. the Lodgment Information Report therein conforms to the XML schema for a Lodgment Information Report, and
3. each eRegistry Instrument therein conforms to the XML schema for an eRegistry Instrument (and is therefore an in-scope eRegistry Instrument), and
4. each eNOS Information Report therein conforms to the XML schema for an eNOS Information Report.

The business rules applied by this Activity are those coded "XS" in the associated eLodgment Case Verification Requirements document.

### 6.2 A5.2 Check for Changes since Signing

The business rules applied by this Activity are those coded "DC" in the associated eLodgment Case Verification Requirements document.

### 6.3 A5.3 Check Lodgment Acceptability

#### 6.3.1 A5.3.1 Check Case Completeness

The rules applied by this Activity are:

1. Each eRegistry Instrument must have all required Counterparts (each Transacting Party referred to in the common data, in each role for which signing is required, is represented in a counterpart).
2. All common information must be consistent among the Counterparts that make up an eRegistry Instrument.
3. Any eNOS Information Report referenced in an eRegistry Instrument must be present.

The business rules applied by this Activity are those coded "CC" in the associated eLodgment Case Verification Requirements document.

## **6.3.2 A5.3.2 Check Land Title References**

### **6.3.2.1 A5.3.2.1 call Land Title Reference Verification service (A1)**

This Service checks whether each Land Title Reference is:

1. valid, and
2. suitable for electronic lodgment.

This Service will return business rule non-compliance information to be recorded by the next Activity.

### **6.3.2.2 A5.3.2.2 Record Unsuitable Land Title References**

The business rules applied by this Service are those coded "LT" in the associated eLodgment Case Verification Requirements document.

### **6.3.2.3 A5.3.3 Check for Invalid Case Composition**

This Activity checks that the case does not contain an invalid combination of eRegistry Instruments. The business rules applied by this Activity are those coded "VC" in the associated eLodgment Case Verification Requirements document.

## **6.3.3 A5.3.4 Check Lodgment Fees**

### **6.3.3.1 A5.3.4.1 call Lodgment Fee Calculation service (A4)**

This Service will not apply any business rules.

### **6.3.3.2 A5.3.4.2 Compare Lodgment Fees**

This Activity compares the set of lodgment fees listed in the Lodgment Information Report with the set of lodgment fees listed in the Lodgment Fee Calculation Response message output by the previous Activity.

The business rules applied by this Activity are those coded "LF" in the associated eLodgment Case Verification Requirements document.

## **6.3.4 A5.3.5 Check Duty Assessment**

### **6.3.4.1 A5.3.5.1 Check for Dutiable eRegistry Instruments**

This Activity checks whether there is at least one dutiable eRegistry Instrument with no Duty Assessment Number.

The business rules applied by this Activity are those coded "AM" in the associated eLodgment Case Verification Requirements document.

### **6.3.4.2 A5.3.5.2 call Duty Verification service (B2)**

This Service will return business rule non-compliance information to be recorded by the next Activity.

### **6.3.4.3 A5.3.5.3 Record Invalid Duty Assessment**

This Activity records an error for each dutiable eRegistry Instrument where the Duty Assessment Number is present but no longer current or otherwise invalid.

The business rules applied by this Activity are those coded "AO" in the associated eLodgment Case Verification Requirements document.

### **6.3.5 A5.3.6 Check Lodgment Information Report Compliance**

This Activity applies business rules to check the validity of the information contained in the Lodgment Information Report.

The business rules applied by this Activity are those coded "LI" in the associated eLodgment Case Verification Requirements document.

### **6.3.6 A5.3.7 Check eRegistry Instrument Compliance**

#### **6.3.6.1 A5.3.7.1 Call Registry Information Supply service (A2)**

This Service will not apply any business rules.

#### **6.3.6.2 A5.3.7.2 Create Virtual Land Title**

This Activity will not apply any business rules.

#### **6.3.6.3 A5.3.7.3 Check Compliance of 1 eRegistry Instrument**

This Activity applies business rules to check whether the eRegistry Instruments in the eLodgment Case contain all required data items, that each data item has valid values, and that there is internal consistency between data items. This is achieved by applying each eRegistry Instrument in the eLodgment Case in the prescribed Lodgment Order to each "Virtual Land Title" referenced by the eRegistry Instrument.

The business rules applied by this Activity are those coded "RI" in the associated eLodgment Case Verification Requirements document.

### **6.3.7 A5.3.8 Check eNOS Information Report Compliance**

This Activity applies business rules to determine the validity of all eNOS Information Reports in the eLodgment Case.

The business rules applied by this Activity are those coded "EN" in the associated eLodgment Case Verification Requirements document.

## **6.4 A5.4 Establish Required Manual Examination**

This Activity establishes (by way of decisioning rules) which (if any) manual examination processes will need to be performed on the eLodgment Case following lodgment.

The business rules applied by this Activity are those coded "MX" in the associated eLodgment Case Verification Requirements document.

## **6.5 A5.5 Produce Lodgment Verification Report**

The only business rule applied by this Activity is:

1. Lodgment Acceptability Advice = "no" if there are any contraventions found in A5.3 of business rules that have Enforcement Level "Strict".






## 7 BPMN 2.0 diagramming conventions

The Lodgment Verification Process Model provided in this document uses version 2.0 of BPMN<sup>32</sup>. It is represented using each of the three following BPMN diagram types:


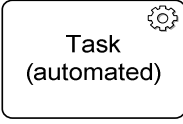
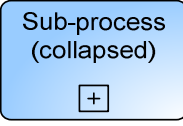


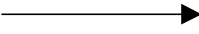
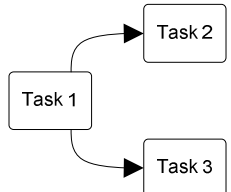
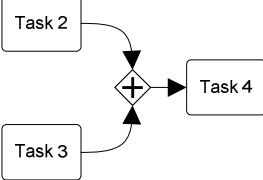
1. **Process Diagram:** this is used to show internal workflows (referred to as **orchestration** in BPMN), each of these defines an end-to-end business process consisting of activities connected by sequence flows
2. **Collaboration Diagram:** this is used to show communications (messages flows) between a process and external participants, either B2B (business to business) or B2C (business to customer) (referred to as **choreography** in BPMN).
3. **Subprocess Diagram:** this is used to decompose a complex process, possibly to multiple levels.

The symbols used in each type of diagram are listed in the following sections. Note that only those actually used in the Lodgment Verification Process Model are depicted, rather than the full set of symbols available in BPMN.

### 7.1 Process Diagrams

Construct	Symbol	Notes
Start Event (Receive Message)		<ol style="list-style-type: none"> <li>1. The Process is triggered as soon as the request message is received.</li> <li>2. Each Process must have at least one Start Event.</li> <li>3. This is not the only type of Start Event available in BPMN but is the only type of Start Event used in this process model.</li> <li>4. The structure of the received message should be defined using an XML schema.</li> </ol>
End Event (Send Message)		<ol style="list-style-type: none"> <li>1. A message is sent as soon as the Process is completed.</li> <li>2. Each Process must have at least one End Event.</li> <li>3. This is not the only type of End Event available in BPMN but is the only type of End Event used in this process model.</li> <li>4. The structure of the received message should be defined using an XML schema.</li> </ol>
Intermediate Event (error)		<ol style="list-style-type: none"> <li>1. If an error occurs during an activity, an exception path is taken.</li> </ol>
Message		<ol style="list-style-type: none"> <li>1. This symbol depicts a message sent to a Service Call or received in response.</li> <li>2. The structure of the sent or received message should be defined using an XML schema.</li> </ol>
Collection Data Object		<ol style="list-style-type: none"> <li>1. A Collection Data Object represents a collection of information flowing through the process (e.g., a list of error conditions) that does not persist beyond the lifetime of the process instance.</li> </ol>

<sup>32</sup> Object Management Group (OMG) (2010): Business Process Model and Notation (BPMN) Version 2.0 (Beta 2), 4 June 2010, available at <http://www.bpmn.org/>.

Construct	Symbol	Notes
Data Store		1. A Data Store is a place where the process can read or write data, e.g., a database. It persists beyond the lifetime of the process instance.
Task (automated)		1. A Task is an atomic Activity that cannot be broken down any further. 2. The icon in the top right hand corner indicates that the Task is automated <sup>33</sup> . 3. There are other types of Task (e.g. manual, user), but, as Lodgment Verification is a fully automated service, only automated Tasks are required.
Subprocess (collapsed or “black box” view)		1. A Subprocess is an Activity that consists of a set of lower level Activities, each defined in detail in a Subprocess Diagram at the next level. 2. Subprocesses provide a means of decomposing complex Processes.
Service Call <sup>34</sup>		1. A Service Call is a global or reusable Activity that can be used by multiple Processes. 2. This symbol is used to show calls to Services (e.g. Title Activity Check) that are defined elsewhere.
Repeated Activity <sup>35</sup>		1. A Repeated Activity is an activity (task or subprocess) that is performed for each of a set of items in parallel.
Sequence Flow		1. If two Activities are joined using a Sequence Flow arrow, the Activity at the beginning of the arrow must be completed before the Activity at the end of the arrow begins.
Parallel Split		1. This depicts parallel processing. 2. When Task 1 is completed, Tasks 2 and 3 can take place in parallel (at the same time) or sequentially in either order.
Parallel Join		1. Task 4 can begin only after Task 2 and 3 have both been completed.

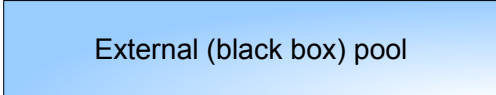

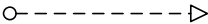


## 7.2 Collaboration Diagrams

A Collaboration Diagram is a Process Diagram with the addition of external message flows as well as the internal workflows depicted in the Process Diagram, thus showing the surrounding context of the business process. Collaboration Diagrams use the same symbols as Process Diagrams with some additional symbols, listed below:

<sup>33</sup> An automated task is referred to as a “service” in BPMN but this term is misleading in an SOA (Service Oriented Architecture) context.

<sup>34</sup> Service Calls are referred to as “Call Activities” in BPMN.

<sup>35</sup> Repeated Activities are referred to as “Multi-Instance Activities” in BPMN.

Construct	Symbol	Notes
Collapsed ("black box") Pool		<ol style="list-style-type: none"> <li>1. This represents an external participant (e.g. external organisation, customer).</li> </ol>
Expanded ("glass box") Pool		<ol style="list-style-type: none"> <li>1. This contains an end-to-end business process (i.e. a Process Diagram).</li> <li>2. The pool is notated with the name of the participant performing the process.</li> <li>3. Pools can be divided into swimlanes, each representing a different organisational unit or role, but these are not needed in this process model.</li> </ol>
Message Flow		<ol style="list-style-type: none"> <li>1. This depicts a message between the business process and an external participant.</li> <li>2. Message Flows cannot link elements in the same pool.</li> <li>3. By contrast, Sequence Flows cannot link elements in different pools.</li> </ol>
Received Message		<ol style="list-style-type: none"> <li>1. In a Collaboration Diagram this symbol can also depict a message received by a process from an external participant.</li> <li>2. Received Messages are attached to incoming Message Flows.</li> </ol>
Sent Message		<ol style="list-style-type: none"> <li>1. In a Collaboration Diagram this symbol can also depict a message sent by a process to an external participant.</li> <li>2. Sent Messages are attached to outgoing Message Flows.</li> </ol>

### 7.3 Subprocess Diagrams

Subprocess Diagrams are used to decompose complex processes to multiple levels. Any number of levels may be used depending on the complexity of the underlying process. Subprocess Diagrams use the same symbols as Process Diagrams with some additional symbols, summarised below:

Construct	Symbol	Meaning
Expanded Subprocess ("glass box" view)		<ol style="list-style-type: none"> <li>1. This illustrates how Process Diagram symbols can be used inside a Subprocess Diagram.</li> <li>2. Subprocesses may themselves contain Subprocesses (as shown in the example on the left), allowing processes to be decomposed to multiple levels.</li> <li>3. Expanded Subprocesses can either be shown as separate diagrams or nested within other process diagrams (inline representation).</li> </ol>
Parallel Box		<ol style="list-style-type: none"> <li>1. Activities vertically aligned inside a Subprocess without sequence flows between them can take place in parallel.</li> </ol>

### 7.4 Business Rule Task

Note that BPMN 2.0 provides a specialised construct (a type of Task) to support the business rules approach. A **Business Rule Task** provides a mechanism for a process to provide input to a Business Rules Engine and receive its results. Many of the tasks in this process (e.g. A5.1, A5.3.3, A5.3.6, A5.3 and A5.3.8) could be characterised as Business Rules Tasks, as their function is to apply business rules and return a list of business rule violations. Other tasks transform data (e.g. A5.5) or send and receive messages (e.g. A5.3.2.1, A5.3.4.1) in addition to applying business rules. This construct has not been used in this process model as it has not yet been decided whether a Business Rules Engine will be used to implement the Lodgment Verification service.

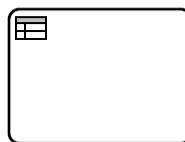


Figure 9. BPMN Business Rule Task

7.5 Complete BPMN 2.0 Symbol Set

## BPMN 2.0 - Business Process Model and Notation http://bpmb.de/poster

### Activities

- Task**: A Task is a unit of work, the job to be performed. When marked with a symbol it indicates a Sub-Process, an activity that can be refined.
- Transaction**: A Transaction is a set of activities that logically belong together; it might follow a specified transaction protocol.
- Event Sub-Process**: An Event Sub-Process is placed into a Process or Sub-Process. It is activated when its start event gets triggered and can interrupt the higher level process context or run in parallel (non-interrupting) depending on the start event.
- Call Activity**: A Call Activity is a wrapper for a globally defined Sub-Process or Task that is reused in the current process.

**Activity Markers**  
Markers indicate execution behavior of activities:

- Sub-Process Marker
- Loop Marker
- Parallel MI Marker
- Sequential MI Marker
- Ad Hoc Marker
- Compensation Marker

**Task Types**  
Types specify the nature of the action to be performed:

- Send Task
- Receive Task
- User Task
- Manual Task
- Business Rule Task
- Service Task
- Script Task

**Sequence Flow**: defines the execution order of activities.  
**Default Flow**: is the default branch to be chosen if all other conditions are false.  
**Conditional Flow**: has a condition assigned that defines whether or not the flow is used.

### Conversations

A **Communication** defines a set of logically related message exchanges. When marked with a it indicates a Sub-Conversation, a compound conversation element.

A **Conversation Link** connects Communications and Participants.

A **Forked Conversation Link** connects Communications and multiple Participants.

#### Conversation Diagram

#### Collaboration Diagram

### Choreographies

A **Choreography Task** represents an interaction (Message Exchange) between two Participants.

**Multiple Participants Marker** denotes a set of Participants of the same kind.

A **Choreography Sub-Process** contains a refined choreography with several interactions.

#### Choreography Diagram

### Events

Event Type	Start	Intermediate	End
None: Untyped events, indicate start point, state changes or final states.			
Message: Receiving and sending messages.			
Timer: Cyclic timer events, points in time, time spans or timeouts.			
Escalation: Escalating to an higher level of responsibility.			
Conditional: Reacting to changed business conditions or integrating business rules.			
Link: Off-page connectors. Two corresponding link events equal a sequence flow.			
Error: Catching or throwing named errors.			
Cancel: Reacting to cancelled transactions or triggering cancellation.			
Compensation: Handling or triggering compensation.			
Signal: Signaling across different processes. A signal thrown can be caught multiple times.			
Multiple: Catching one out of a set of events. Throwing all events defined.			
Parallel Multiple: Catching all out of a set of parallel events.			
Terminate: Triggering the immediate termination of a process.			

### Gateways

**Exclusive Gateway**: When splitting, it routes the sequence flow to exactly one of the outgoing branches. When merging, it waits one incoming branch to complete before triggering the outgoing flow.

**Event-based Gateway**: It is always followed by catching events or receive tasks. Sequence flow is routed to the subsequent event/task which happens first.

**Parallel Gateway**: When used to split the sequence flow, all outgoing branches are activated simultaneously. When merging parallel branches it waits for all incoming branches to complete before triggering the outgoing flow.

**Inclusive Gateway**: When splitting, one or more branches are activated. All active incoming branches must complete before merging.

**Exclusive Event-based Gateway**: Each occurrence of a subsequent event starts a new process instance.

**Complex Gateway**: Complex merging and branching behavior that is not captured by other gateways.

**Parallel Event-based Gateway**: The occurrence of all subsequent events starts a new process instance.

### Swimlanes

Pools (Participants) and Lanes represent responsibilities for activities in a process. A pool or a lane can be an organization, a role, or a system. Lanes subdivide pools or other lanes hierarchically.

**Message Flow** symbolizes information flow across organizational boundaries. Message flow can be attached to pools, activities, or message events.

The order of message exchanges can be specified by combining message flow and sequence flow.

### Data

A **Data Input** is an external input for the entire process. It can be used by an activity.

A **Data Output** is a variable available as result of the entire process.

A **Data Object** represents information flowing through the process, such as business documents, e-mails, or letters.

A **Collection Data Object** represents a collection of information, e.g., a list of order items.

A **Data Store** is a place where the process can read or write data, e.g., a database or a filing cabinet. It persists beyond the lifetime of the process instance.

A **Message** is used to depict the contents of a communication between two Participants.