## Version Control

<table>
<thead>
<tr>
<th>Version</th>
<th>Revision Date</th>
<th>Revision Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.1</td>
<td>03 Jun 2013</td>
<td>First Draft</td>
</tr>
<tr>
<td>0.2</td>
<td>06 Jun 2013</td>
<td>Feedback from domain walkthrough, added additional flow diagram.</td>
</tr>
</tbody>
</table>

## Document Review and Approval

<table>
<thead>
<tr>
<th>Version</th>
<th>Approval Date</th>
<th>Name and Position</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td>19 Jun 2013</td>
<td>Peter O’Halloran</td>
<td>Executive Director, Health Provider Engagement</td>
</tr>
</tbody>
</table>

### Creative Commons

With the exception of any logos and registered trademarks, and where otherwise noted, all material presented in this document is licensed by the NBA under a Creative Commons Attribution 3.0 Australia (http://creativecommons.org/licenses/by/3.0/au/) licence. In essence this licence allows you to copy, communicate and adapt the work, as long as you attribute the work to the National Blood Authority and abide by the other licence terms.

The details of the relevant licence conditions are available on the Creative Commons website (accessible using the links provided) as is the full legal code for the CC BY 3.0 AU licence (http://creativecommons.org/licenses/by/3.0/au/legalcode).

The content obtained from this document or derivative of this work must be attributed as the National Blood Authority BloodNet LIS Interface Overview.
## Contents

1. Introduction .................................................................................................................................... 4  
   1.1 Purpose ................................................................................................................................... 4  
   1.2 BloodNet ................................................................................................................................. 4  
   1.3 Laboratory Information System (LIS) ...................................................................................... 4  
2. Overview ......................................................................................................................................... 5  
3. High Level Workflow ....................................................................................................................... 6  
   3.1 BloodNet/LIS Interactions ....................................................................................................... 6  
   3.2 LIS in Context of BloodNet Workflow ..................................................................................... 7  
   3.3 Import/Fate of line items between LIS and BloodNet ............................................................ 8  
   3.4 Submission of Stock Levels from LIS to BloodNet ............................................................... 8  
4. Key Web Service Scenarios ............................................................................................................. 9  
   4.1 Stock Levels ............................................................................................................................. 9  
   4.2 Import Issue Notes .................................................................................................................. 9  
   4.3 Fate ....................................................................................................................................... 10  
5. Website functions ......................................................................................................................... 11  
   5.1 Exclusions – Supplier ............................................................................................................. 11  
   5.2 Exclusions – LIS ..................................................................................................................... 11  
   5.3 Exclusions – Facility ............................................................................................................... 11  
   5.4 Stock Order Inventory Population .......................................................................................... 11  
   5.5 Action Logs ............................................................................................................................ 12  
6. Glossary ......................................................................................................................................... 13
1 Introduction

1.1 Purpose

The purpose of this document is to provide an overview of the web service interface between BloodNet and a Laboratory Information System (LIS).

1.2 BloodNet

BloodNet is a web application managed by the National Blood Authority. Its purpose to manage the ordering of blood components/products, receipting the delivery of those ordered items, and recording the fate of those items i.e. transfusing, discarding or transferring to another facility.

1.3 Laboratory Information System (LIS)

A laboratory information system manages the inventory of a laboratory.

Multiple facilities can use the same instance of a LIS as shown below:
2 Overview

The purpose of the LIS interface is as follows:

1. To automate a previously manual process of entering received items from BloodNet into the LIS System, providing the following benefits:
   - Improved efficiency;
   - Provision of additional fields (such as phenotypes) in a machine readable format that can then be used in the LIS; and
   - Prevention of data entry errors and hence improved accuracy.

2. To automate a previously manual process of entering the fate of received items from the LIS into BloodNet, providing the following benefits:
   - Improved efficiency;
   - Prevention of data entry errors and hence improved accuracy;
   - Entry of additional fate types previously not supported (i.e. transfusions).

3. To automate a previously manual process of entering stock levels into BloodNet when placing a stock order, providing the following benefits:
   - Improved efficiency;
   - Prevention of data entry errors and hence improved accuracy;
   - Provision of real-time data to assist with national supply and demand planning, particularly in times of shortages or activation of the National Blood Supply Contingency Plan (NBSCP); and
   - Pre-population of last known inventory levels from LIS when creating stock orders, minimising the amount of data entry a user needs to make when calculating their required stock.
3 High Level Workflow

3.1 BloodNet/LIS Interactions

The high level interactions between BloodNet and LIS are shown in the diagram below. The direction of the arrows indicates that the LIS invokes services in BloodNet.

![Diagram of BloodNet/LIS interactions](image)

Figure 1 - BloodNet/LIS interactions
### 3.2 LIS in Context of BloodNet Workflow

#### LIS in context of BloodNet workflow

<table>
<thead>
<tr>
<th>BloodNet User</th>
<th>BloodNet</th>
<th>Blood Service</th>
<th>LIS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Place Order In BloodNet</strong></td>
<td><strong>Order Sent to Blood Service</strong></td>
<td><strong>Order Sent to Facility</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Order Received</strong></td>
<td></td>
<td><strong>Issue Note saved in BloodNet for receipting</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Receipt Order</strong></td>
<td></td>
<td><strong>Issue Note Sent to BloodNet</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Return Receipted Order Lines</strong></td>
<td></td>
<td><strong>GetReceiptedIssueNotes</strong></td>
<td><strong>GetReceiptedIssueNotes</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>2) Checks for Receipted Order lines</strong></td>
<td><strong>GetReceiptedIssueNotes</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>3) Import order lines into LIS</strong></td>
<td><strong>GetReceiptedIssueNotes</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>3a) Mark items as imported</strong></td>
<td><strong>GetReceiptedIssueNotes</strong></td>
</tr>
<tr>
<td><strong>Fate Item</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Item fated in LIS</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Fate recorded in BloodNet</strong></td>
<td><strong>FateOfUnit</strong></td>
</tr>
</tbody>
</table>

*Figure 2 - LIS in context of BloodNet workflow*
3.3 Import/Fate of line items between LIS and BloodNet

This workflow (Section 4.2) describes the scenario where items in BloodNet are automatically imported into the LIS system, which replaces a manual process of data entry into the LIS. This is followed by the process of the LIS automatically recording the outcome for the item in BloodNet, which replaces a manual process of entering Fate into BloodNet.

1. User receipts item in BloodNet
   a. Item is now available to import into LIS
2. LIS queries BloodNet for available items
   a. Triggered by periodic querying (on a schedule) OR
   b. By LIS user triggering a request (when required basis)
3. Items are imported into LIS
   a. Once the item is imported the LIS then “Acknowledges” the issue note, this means that the item is no longer shown in the list of items from the previous step
4. This line item now follows the regular flow within the LIS.
5. When the item changes:
   a. If it is cross matched, then the LIS records this in BloodNet as a “cross match”.
   b. If it is transferred, then the LIS records this in BloodNet as a “transfer”.
   c. If it is discarded, then the LIS records this in BloodNet as a “discard”.
   d. If it is transfused, then the LIS records this in BloodNet as a “transfusion”.

3.4 Submission of Stock Levels from LIS to BloodNet

This workflow describes the scenario where stock levels are automatically sent from the LIS to BloodNet, which replaces the manual process of entering stock levels when performing stock orders in BloodNet. This also means that stock levels are automatically pre-populated for stock orders based on the last recorded stock levels from the LIS.

1. On a predefined periodic schedule, the LIS sends BloodNet its stock levels
2. When a user creates a new stock order the last recorded LIS stock levels are pre-populated into the on-hand column of their order
3. The user then amends the on-hand level if necessary and clicks the calculate button
   a. This calculates the required amounts based on the maximum allowed amount – on-hand amount
4 Key Web Service Scenarios

These scenarios cover the automated communications between BloodNet and the LIS. Note that the only communications that are called are from the LIS to BloodNet, where the LIS can query BloodNet for information, or submit information to be stored in BloodNet.

4.1 Stock Levels

This scenario covers the automatic import of stock levels from a LIS into BloodNet. This involves a web service call which is invoked periodically by a LIS which submits the current stock levels to BloodNet.

Example

1. LIS submits stock levels to BloodNet
2. Levels are recorded in BloodNet
3. When user creates new stock order in BloodNet
   a. On hand stock levels are automatically populated with last submitted stock levels

4.2 Import Issue Notes

This scenario covers the automatic import of receipted items into a LIS from BloodNet. This involves 2 web service calls, one which queries BloodNet for available items to import and one that sends an acknowledgement to BloodNet that the item has been imported into the LIS, which makes the item no longer available for import in the first query.

Example

1. User receipts items A, B, C in BloodNet
2. LIS queries BloodNet for receipted items – BloodNet then returns list of items A, B and C to LIS
3. LIS saves A, B and C
4. User receipts items D and E in BloodNet
5. LIS acknowledges that A, B, C was received into BloodNet
6. LIS queries BloodNet for receipted items – BloodNet then returns list of items D and E to LIS (as items A, B and C has been already acknowledged and returned to LIS before)
7. LIS saves D and E.
4.3 Fate

This scenario covers the automatic import of fated items from a LIS into BloodNet. This involves a web service call which is invoked by a LIS when the appropriate fate action occurs in the LIS, resulting in the fate event also being recorded into BloodNet.

Types of fate that are supported are:

- Transfused
- Discarded
- Transferred
- Cross matched

Example

1. User records a transfusion in LIS
   a. LIS then automatically records transfusion in BloodNet
5 Website functions

This covers the website functionality that is implemented in the BloodNet website to support LIS Interface.

5.1 Exclusions – Supplier

The exclusion list for suppliers allows a LIS to be configured to exclude products/components that have been ordered from a specified supplier from being imported into that specific LIS\(^1\). This would be used in the scenario that a new supplier is being integrated into BloodNet.

Scenario

- If there is a supplier whose items are not be imported into a LIS i.e. a test supplier, then they can be excluded resulting in all line items ordered from that supplier being excluded.

5.2 Exclusions – LIS

The exclusion list for products/components allows a LIS to be configured to exclude specific products/components from being imported into all facilities for a LIS.

Scenario

- When a new product or component is added, LIS’s will not be able to recognise the new item until their internal data has had that product added.
- To prevent unrecognised data being imported into a LIS, the product/component can be added to the exclusion list for the LIS.
- Once the item has been added to the LIS then the exclusion can be removed and all pending line items for that product/component will be imported as normal.

5.3 Exclusions – Facility

The exclusion list for products/components allows a LIS to be configured to exclude specific products/components from being imported into a specific facility LIS.

Scenario

- If a product or component needs to be blocked from being imported into a specific facility in a LIS, then this can be done by adding to it to the facility Exclusions list.

5.4 Stock Order Inventory Population

When a LIS enabled site makes a stock order, then the on hand levels are automatically populated in the order form. The stock order form indicates whether data has been pre-populated and how old the source data is.

\(^1\) All supplier exclusions only apply to the LIS that the administrator has access to.
5.5 Action Logs

The action log list displays the list of actions that have occurred for a facility. This is broken down by each call made to BloodNet from the LIS, and the journal log of the processing and outcomes. This functionality is for LIS administrators and NBA developers to trouble shoot issues with processed messages.
6 Glossary

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>AHP</td>
<td>Approved Health Provider, normally referred to as a ‘Health Provider’. Also known as facility.</td>
</tr>
<tr>
<td>BloodNet</td>
<td>Operated by the NBA, BloodNet is Australia’s national online ordering and inventory management system, enabling staff in pathology laboratories to place orders online for blood and blood products, record inventory levels, and to record the final fate of each unit.</td>
</tr>
<tr>
<td>Blood Service</td>
<td>Australian Red Cross Blood Service.</td>
</tr>
<tr>
<td>Cross matched</td>
<td>When the component is tested against a specific patient’s blood prior to a blood transfusion in order to determine if the donor’s blood is compatible with the blood of an intended recipient.</td>
</tr>
<tr>
<td>Discarded</td>
<td>A type of fate that should be created when a unit is disposed of for any reason (i.e. the component is no longer usable, out of date, etc).</td>
</tr>
<tr>
<td>Facility</td>
<td>Also known as Approved Health Provider (AHP).</td>
</tr>
<tr>
<td>Facility user</td>
<td>General users of BloodNet to order, receive and fate blood and blood products.</td>
</tr>
<tr>
<td>Facility administrator</td>
<td>Users of BloodNet with administrator rights which gives the ability to approve users, change templates and add news items. Once approved facility administrators will also be automatically granted facility user access to the facility indicated. Facility administrator can be a lab manager, scientist in charge (SIC) or second in change (2IC).</td>
</tr>
<tr>
<td>Fate</td>
<td>The end result of component(s). There are 4 types of blood products: transfused; discarded; transferred; and cross-matched.</td>
</tr>
<tr>
<td>Component</td>
<td>Known as Fresh Components within BloodNet. Also, commonly referred to as Fresh Blood Products within the blood sector. The most common fresh components are:</td>
</tr>
</tbody>
</table>
|                 | a. Red Cells  
|                 | b. Platelets  
|                 | c. Clinical Fresh Frozen Plasma  
<p>|                 | d. Cryoprecipitate                                                                                                                                     |
| Inventory       | Refers to the stock kept and maintained by the laboratory, and can be entered into BloodNet as stock on hand.                                                                                               |
| Issue note      | An issue note is sent out with the order to the facility both in hard copy format within the box sent from the Blood Service, and within the facilities BloodNet site. The issue note will contain information like the issue number, the date time of the issue, which Blood Service site made the issue, the issued quantity, total issue price and a link to the order number. Issue note can have different statuses such as active, completed (when the issue note is 100% receipted) and cancelled. |</p>
<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>LIS</td>
<td>Laboratory Information System – a software-based laboratory and information management system that support a modern laboratory’s operations.</td>
</tr>
<tr>
<td>Maximum Stock</td>
<td>This is the set maximum stocking point that a particular AHP aims to hold at any one time, noting that many can often go somewhat higher when required or desired.</td>
</tr>
<tr>
<td>NBA</td>
<td>National Blood Authority</td>
</tr>
<tr>
<td>Receipting</td>
<td>All blood components and blood products received by the facility from the Blood Service need to be receipted within the BloodNet Receipting page. Receipting data in BloodNet confirms that units were received by the facility.</td>
</tr>
<tr>
<td>Stock on hand</td>
<td>The number of components that an AHP has available for issue (ie not reserved for use by a specific patient) at a particular time.</td>
</tr>
<tr>
<td></td>
<td>Also known as Inventory.</td>
</tr>
<tr>
<td>Transferred</td>
<td>A type of fate. When the component is relocated to another facility.</td>
</tr>
<tr>
<td>Transfused</td>
<td>A type of fate. When the component is allocated to and transfused into a patient.</td>
</tr>
</tbody>
</table>