Hospital Information
& TCP Interface Specification Document for Healthlink Online

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1.1 Version History

Document History	
Healthlink Online Version	3.0
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Document Version History	Comment	Healthlink Application Version	Date
Version 1	Initial Draft	1	03rd June 2015
Version 1.1	Added Synchronous option	1	29th February 2016

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Introduction

2.1 Document Purpose

This document gives overall information about enabling the Healthlink services for Hospitals and Health Care facilities. It explains in detail how the hospital system should produce the HL7 message files and send those over TCP/IP to Healthlink system over VPN and by using our services

To know more about Healthlink Online Message Specification then, please refer to Healthlink Online Message Specification.pdf for further details.

This document IS NOT an attempt to inform the reader about HL7. Please refer to the HL7 specification for further detail on the full HL7 specification.

2.2 Overview

Healthlink is a National Messaging System, allowing any Hospital, or secondary healthcare facility, to send messages to GP's via a central database managed by Healthlink. Healthlink provides a web interface for GP's to view and download messages that are addressed to them.

Healthlink Online exclusively supports HL7 Version 2.4

The Abstract Message Definitions for the HL7 Message Types that Healthlink uses are included in Appendix 1 on Healthlink Online Message Specification.pdf. Due to their complexity the schema's are not suitable for inclusion in this document. They are available at this web address: visit visit http://www.hl7.org/Special/committees/xml/drafts/v24-200303.zip link. We recommend XML Spy Professional for viewing the schema' s in a readable format.

There are certain fields in the various HL7 segments that have special meaning within the Healthlink Implementation. This means that raw data available from a Hospital Information System, in many cases, may need to be mapped to a standard code before including this data in a HL7 message destined for Healthlink. Failure to map to these standard codes will, at best, reduce the meaning of the message to the Healthlink end users, where at worst it will cause the message to fail parsing into the database and the message will not be delivered.

2.3 Message Types

There are two distinct meanings for the term *message type* in this document. HL7 Defines a message type, such as ORU R01which is an *Unsolicited Transmission of Observation Message.* We will refer to such a message type as a HL7 Message Type.

Healthlink also defines its own message types. For example, the ORU R01 HL7 message type is used for two *Healthlink* message types: the Laboratory Result Message and the Radiology Result Message.

2.4 Message Encoding

In version 2.4, only XML encoding is supported for the TCP/IP based protocol.

The National Healthlink Project conforms to the Irish National Messaging standards for message exchange between Primary and Secondary care providers (HeBE Messaging Standards). This standard is based on HL7 v2.4 in XML encoding.

The messages supplied must at least conform to the corresponding XML Schema for XML encoding.

3 The Healthlink Messages

3.1 Healthlink Message Types

Hlink Message Type	HL7 Abstract Message Type	Healthlink Link Message Type ID
Laboratory Order	OML O21	1
Inpatient Admission	ADT A01	2
Outpatient Clinic Letter	REF I12	3
A&E Notification	ADT A01	4
Discharge Summary	REF I12	5
Death Notification	ADT A03	6
Radiology Result	ORU R01	7
OPD Appointment	SIU S12	8
Waiting List	SIU S12	9
Laboratory Result	ORU R01	10
Laboratory NACK	ORL_O22	11
Discharge Notification	ADT A03	12
Acknowledgement	ACK	13
Neurology Referral	REF_I12	14
Neurology Referral Response	RRI_I12	15
Co-op Discharge	REF_I12	16
Cardiology Result	ORU R01	17
Oesophageal and Gastric Cancer Referral	REF_I12	18
A&E Letter	REF I12	19
Prostate Cancer Referral	REF_I12	20
Prostate Cancer Referral Response	RRI_I12	21
Breast Cancer Referral	REF_I12	22
Breast Cancer Referral Response	RRI_I12	23
Lung Cancer Referral	REF_I12	24
Lung Cancer Referral Response	RRI_I12	25
Chest Pain Referral	REF I12	26
Chest Pain Referral Response	RRI I12	27
MRI Request	REF I12	28
MRI Request Response	RRI I12	29
General Referral	REF I12	30
General Referral Response	RRI I12	31

3.2 How Healthlink Handles Exceptions

Messages may deviate somewhat from the specification laid out in this document, while still being fully compatible with the system.

3.2.1 Additional Elements & Fields

Healthlink Online Version 3 will allow hospitals to provide any valid HL7 v 2.4 messages. Healthlink recommend that for integration purposes that you should allow for any valid HL7 message to integrate into your system. If a message contains additional elements and fields that you do not require, they should not cause an integration error.

3.2.2 Additional Repeating Segments

In general the only repeating segments that are expected in Healthlink is the repeating OBR and OBX segments in the Laboratory Results message. Healthlink Online Version 3 will however allow for any valid repeating segments.

3.3 General Guidelines

3.3.1 Hospitals Filling CE Data Type Components

Hospitals are given the following guidelines when filling the CE data types.

The CE Data Type has CE components labelled CE.1 through to CE.6 in the XML Encoding.
With Healthlink, Hospitals should use the CE element for the following:
- holding data that is based on defined tables (Healthlink Online Message Specification.pdf)
- holding data based on defined and recognised coding systems
- holding data that is not bound to any tables or coding systems, i.e. free text

- holding data that is based on local hospital tables or coding systems

When filling data that is based on defined tables from Healthlink Online Message Specification.pdf:
CE.1 must contain the reference to a *value* in the used table
CE.2 must contain meaningful descriptive text
CE.3 must contain a reference, for example:
> HL7#### (# is a digit [0-9]) for HL7 Defined tables
> L to indicate Local code
> LN to indicate LOINC code

When filling data that is based on the local hospital tables or coding systems
CE.1 - Enter the code here
CE.2 - Must contain a meaningful description
CE.3 - Must contain the name of the coding system used in CE.1
Note: `CE.1 and CE.3 should uniquely identify value in CE.2`

3.4 Special Characters and Escape Sequences

Escape sequences are most used when messages are encoded in the standard way, although they are still required for certain situations in the XML encoding.

3.4.1 Special Characters

Healthlink will not accept deviations from the suggested special characters:

Delimiter	Suggested Value	Encoding Character Position	Usage
Segment Terminator	<cr> (hex 0D)	-	Terminates a segment record. This value cannot be changed by implementors.
Field Separator	|	-	Separates two adjacent data fields within a segment. It also separates the segment ID from the first data field in each segment.
Component Separator	^	1	Separates adjacent components of data fields where allowed.
Subcomponent Separator	&	4	Separates adjacent subcomponents of data fields where allowed. If there are no subcomponents, this character may be omitted.
Repetition Separator	~	2	Separates multiple occurrences of a field where allowed.
Escape Character	\	3	Escape character for use with any field represented by an ST, TX or FT data type, or for use with the data (fourth) component of the ED data type. If no escape characters are used in a message, this character may be omitted. However, it must be present if subcomponents are used in the message.

The above characters should be replaced by the following:
\E\ Escape character converted to escape character (e.g., '\')
\F\ Field separator converted to field separator character (e.g., '|')
\R\ Repetition separator converted to repetition separator character (e.g., '~')
\S\ Component separator converted to component separator character (e.g., '^')
\T\ Subcomponent separator converted to subcomponent separator character (e.g., '&')

3.4.2 Formatted Text

Healthlink Online Version 3 allows for the following valid HL7 v 2.4 formatting commands in XML encoding only.

Escape character to be used in V2 XML encoding	Meaning
<escape V=".br"/>	Begin new output line. Set the horizontal position to the current left margin and increment the vertical position by 1.
<escape V=".in*n*"/> where *n* = number	Indent <number> of spaces, where <number> is a positive integer. This command cannot appear after the first printable character of a line.

The following five characters should not be used in XML documents:
    <, >, &, ', "
    They should be replaced with:
    < for <
    > for >
    & for &
    ' for '
    " for "

3.5 Common Segments to all Messages

Note: Please refer to Healthlink Online Message Specification.pdf for all Healthlink Message Segments.

4 Interfacing with Healthlink Online

The following details Healthlink Online's requirements for how the hospital system sends and receives their HL7 Xml messages using TCP/IP and the access to those services.

4.1 HL7 xml message prefix and suffix

Over TCP/IP, every message needs to have an identifier that indicates where it begins and where it ends. For each xml message sent/received a prefix must be included before the message start and a suffix after the message ends. The default hexadecimals are 0xB for prefix and 0x1C 0xD (two bytes) for suffix.
Example in Bytes:
    0xB = 11
    0x1C, 0xD = 28, 13

Note:
    Be the message inbound, outbound or acknowledgment, it must always contain this prefix and suffix.

4.2 Outbound Listener

The Healthlink Outbound software is a windows service that works as a TCP/IP listener, setup on a specific port, to receive HL7 outbound messages from the hospital system. This service is configured to accept *Synchronous* and *Asynchronous* connections, so if performance is an issue, several messages can be sent simultaneously for faster processing. Another option to improve the speed, at which our service received the messages, could be to setup running parallel services.

With each HL7 Xml message sent, a unique connection is created and an acknowledgment message is sent back to the hospital, which can be successful or unsuccessful with the specified error in it.

A few examples of outbound messages sent by the hospital system, would be Lab Results, Radiology Result, A&E Notification, …

In order to be able to perform a successful initial parse and detection of the HL7 message, these 3 mandatory segments must exist:
- MSH.3\HD.1 for message type detection. Integer Type.
- MSH.4\HD.2 - Sending Hospital HIPE Code which also corresponds to Sending Application. Integer Type.
- MSH.10 - Message Control ID which uniquely identifies all messages from the sending hospital. Example by using date format for this value : `"Lab[yyyyMMddHHmmssfff]"`

Note:

- The value pair of HIPE Code and Message Control ID must be unique.

Example of a Lab Result Message:

```
[prefix]
<ORU_R01>
<MSH>
        <MSH.1>|</MSH.1>
        <MSH.2>^~\&amp;</MSH.2>
        <MSH.3>
                <HD.1>HOSPITALSYSTEM.HEALTHLINK.10</HD.1>
                <HD.2/>
                <HD.3/>
        </MSH.3>
        <MSH.4>
                <HD.1>[Hospital Name]</HD.1>
                <HD.2>[Hospital Hype Code]</HD.2>
                <HD.3>L</HD.3>
        </MSH.4>
        <MSH.5>
                <HD.1/>
                <HD.2/>
                <HD.3/>
        </MSH.5>
        <MSH.6>
                <HD.1>Doctor,Test</HD.1>
                <HD.2>TDOC-TEST</HD.2>
                <HD.3>L</HD.3>
        </MSH.6>
        <MSH.7>
                <TS.1>201506031100</TS.1>
        </MSH.7>
        <MSH.9>
                <MSG.1>ORU</MSG.1>
                <MSG.2>R01</MSG.2>
        </MSH.9>
        <MSH.10>LAB20150611151819004504</MSH.10>
        <MSH.11>
                <PT.1>P</PT.1>
        </MSH.11>
        <MSH.12>
                <VID.1>2.4</VID.1>
        </MSH.12>
        <MSH.15/>
</MSH>
…
<ORU_R01/>
[suffix]
```

This outbound service will act as a communication link between the Hospital Bridge and the Healthlink Central Servers. This connection is established through two different TCP/IP ports for each of our Test and Live environments.

This windows service will be configured to start automatically and any errors or alerts will be logged and sent to Healthlink.

4.3   Inbound Listener

The Healthlink Inbound service is a windows service that consists of transmitting messages over TCP/IP, over a specific port, from the Healthlink Bridge server to a listener setup in the Hospital system.
This service works with Synchronous connections, sending HL7 Xml messages over a single unique connection and always expecting back a successful or unsuccessful acknowledgment message. If no ack is retrieved during this transmission, by default the same message will *retry indefinitely*, every *10m* until one is returned back.
A few examples of inbound messages sent to the hospital system, would be Lab Orders, Referrals …

This inbound service will act as a communication link between the Hospital Bridge and the Hospital system Servers. This connection is established through two different TCP/IP ports for each of our Test and Live environments.

This windows service will be configured to start automatically and any errors or alerts will be logged and sent to Healthlink.

4.4   NHN

With the introduction of the Healthlink servers into the NHN network, a possibility opens to skip the use of the Healthlink Bridge service, which would allow the Hospital Systems to connect and transmitting messages directly to our central Service.
On the other hand, we added compression, asynchronous TCP connections and other performance features to our Hospital Bridge services, so in some cases it might be beneficial to keep the Healthlink Hospital Bridge server running.

4.5   MSH.3 set-up

This HL7 segment is required in a specific format for Healthlink in order to identify the message type sent by the Hospital System.

Below is a table outlining a sample set of how to define HL7 identification for Healthlink.

Message Type	Example
Inpatient Admission	*HospitalSystem.Healthlink.*2
AE Notification	*HospitalSystem.Healthlink.*4
Discharge Summary Notification	*HospitalSystem.Healthlink.*5
Death Notification	*HospitalSystem.Healthlink.*6
Radiology Result	*HospitalSystem.Healthlink.*7
OPD Appointment	*HospitalSystem.Healthlink.*8
Waiting List	*HospitalSystem.Healthlink.*9
Lab Result	*HospitalSystem.Healthlink.*10
Discharge Notification	*HospitalSystem.Healthlink.*12
Acknowledgment Message	*HospitalSystem.Healthlink.*13
COOP – Out of Hours	*HospitalSystem.Healthlink.*16
Cardiology Result	*HospitalSystem.Healthlink.*17

4.6   Flexibility

Due to the variety of information systems involved in this project, flexibility of the Healthlink Online system has been of utmost importance. The system is flexible in the following respects:

- It allows for messages that may be produced by different information systems within a single hospital. There is no restriction on the location that each Healthlink Message type is transmitted from, other than it being accessible from the bridge machine by TCP/IP. This also means the solution is open to the many operating systems that can provide TCP service.
- It accepts up to 250 simultaneous/asynchronous connections, which can still be increased if required.
- Message transmission was optimized for performance by using compression and other methods, which results in less network bandwidth usage and faster transmissions.
- Healthlink Bridge can now be skipped and connections be established directly to the Healthlink Central Bridge Server. However this will only be possible after Healthlink joins the NHN network which will be in the near future.

4.7   Dealing with Messages to and From Agency Hospitals

Healthlink deals primarily with the exchange of messages between hospitals and GP's. In certain instances it is necessary to exchange information with specialist agencies or hospital departments.

The common segments outlined in this document pertain to the exchange of information between hospitals and GP's. The MSH.4 and MSH.6 fields will be as follows for Agency messages:

Outbound: (e.g. Lab Result Messages from a Hospital to an Agency)

4	Sending Facility MSH/MSH.4/HD.1	RNC	50		N	The name of the sending hospital	For Lab Order this will be HealthlinkOnline as this is where the message is being generated.
4	Sending Facility MSH/MSH.4/HD.2	RC	50		Y*	The DOH Code as assigned by the Dept of Health. For Inbound messages (Lab Orders and Referrals) this is GP Code or Medical Council Number	This is a Key Field in that this field must map to a Primary Key in our Hospital Table. *The displayed hospital name is derived by a mapping of the DOH code to the associated name in the Healthlink Central Database.
4	Sending Facility MSH/MSH.4/HD.3	RNC	50		N	The string 'DOH' to indicate the coding system used to identify the sending facility.	

6	Receiving Facility MSH/MSH.6/HD.1	RNC	50		N	The Agency Name	The name in the format Surname, First name
6	Receiving Facility MSH/MSH.6/HD.2	RC	50		N	The Hospital's Agency Code that identifies the Agency on the Hospital Information System. Note This must be a unique code on the HIS. The receiving facility regardless of weather it's a GP or an Agency must be unique for each hospital	Agency messages will not affect the Practice Management System Vendors integration modules, as the GP is not the recipient.
6	Receiving Facility MSH/MSH.6/HD.3	RNC	50		N	The coding system used in HD2	Should be L to represent Local coding

Inbound Messages (e.g. Lab Orders from the Agency to the Hospital Laboratory):

4	Sending Facility MSH/MSH.4/HD.1	RNC	50		N	This field will contain the Agency or department name along with the name of the person in that Agency who placed the order (Surname, Firstname). It is in the following format: AgencyName.Username e.g St Mary's. Symth, Mary	
4	Sending Facility MSH/MSH.4/HD.2	RC	50		Y*	The DOH code of the sending agency and the Healthlink UserID in the format DOHCode.UserID e.g 100.2134 where 100 is the DOH code for St Mary's and 2134 is the Healthlink User ID for Mary Smyth.	This is a Key Field in that this field must map to a Primary Key in our Hospital Table. *The displayed hospital name is derived by a mapping of the DOH code to the associated name in the Healthlink Central Database.
4	Sending Facility MSH/MSH.4/HD.3	RNC	50		N	The string 'DOH' to indicate the coding system used to identify the sending facility.	
5	Receiving Application MSH/MSH.5/HD.1					This identifies the receiving application within the receiving hospital. E.g. Lab information system or radiology information system within the Regional hospital LIS.Healthlink.1	
5	Receiving Application MSH/MSH.5/HD.2					The receiving application pickup folder number.	Usually the same as the Healthlink message number
5	Receiving Application MSH/MSH.5/HD.3					L	
6	Receiving Facility MSH/MSH.6/HD.1	RNC	50		N	The Hospital's Name	
6	Receiving Facility MSH/MSH.6/HD.2	RC	50		N	The receiving hospital code (from the DOH Code list	
6	Receiving Facility MSH/MSH.6/HD.3	RNC	50		N	The coding system used in HD2	Should be L to represent Local coding

5 Healthlink Bridge

5.1   Purpose

The bridge is a middleware application. It transfers messages from each hospital to the central Healthlink system.

5.2   Bridge Package

The bridge uses of the following applications:

- The Healthlink Bridge software (Bespoke, installed by Healthlink)
- The HL7 Message Archive software (Bespoke, installed by Healthlink)
- Healthlink Bridge Commands software (Bespoke, installed by Healthlink)
- NetSupport vx.x (Software can be provided by Healthlink, installed by Hospital personnel)
- Microsoft Messaging Queue-MSMQ (Part of OS, to be configured by Hospital personnel)
- Remote Desktop for newer versions of the Windows Operating System 2008+
- Winrar (Bespoke, installed by Healthlink)

5.3   The Bridge

Note: For Private Hospital Implementation, please see <u>section 7.1</u> in <u>Appendix 1</u>.

Each hospital will be responsible for providing a machine running Windows 2008+ Server, called the Healthlink Bridge server. The machine should be situated on a DMZ within the Hospital and have access to the TCP port of each machine that has the Hospital System software installed.

The installation and configuration of the Bridge software is undertaken by Healthlink, where it is expected that the hospital will provide the bridge machine, install Windows OS Server and place the server in a separate Healthlink DMZ behind their hospital firewall. The TCP connectivity between the Healthlink Bridge machine must also be established and secured by the participating Hospital. Each Bridge server is linked to the Healthlink central system using a firewall at each end creating a VPN.

Once the bridge software has received each message from the Hospital system via TCP/IP, it will immediately transmit the same message, using a new connection, onto the Healthlink Online central messaging system.

MSMQ is used to send any error or warning alerts from the Bridge Server to Healthlink.

The bridge software is a standard application which can be configured for multiple hospitals or if required a different setup by hospital. Its configuration setting is a simple XML document. Healthlink configures this settings file.

The settings file contains the following details:

- TCP/IP listener and client ports.
- TCP/IP buffer, prefix suffix and other related settings.
- Directory location for encrypted/compressed messages backup.

This windows service is configured to auto start with windows and will be running 24/7.

5.4   The HL7 Message Archive Executable

This application purges any files older than 1 month that are stored on the Bridge server.
This exe is scheduled to run once a day.

6 Healthlink Hospital Requirements

6.1   Acknowledgement

Acknowledgments are an integral part of Healthlink Online V3 TCP/IP version. It works as a mandatory audit/confirmation of message successful delivery and processing for both Healthlink and the Hospital systems.
Healthlink Message Type ID: 13

Note: Please refer to ACK_Message_Hospital_Specification_v0_3.doc or higher for Acknowledge Messages Implementation.

6.1.1 Auditing

Every acknowledgement message will contain information related to each message sent or received. This data on the Healthlink side is stored and parsed into the database and is used for auditing purposes.

Note: For TCP/IP connections the acknowledgement messages are a mandatory requirement to complete the whole process.

6.1.2 Outbound Monitoring

This message type is also the only response for every hl7 message sent and consists in both positive and negative results.
On the hospital side, for the outbound service, there will be a responsibility to monitor every ack received, and if that response is negative, procedures must be in place to fix the issue found and resend the same failed HL7 message accordingly.

6.2   Scheduling

Some hospitals use real time triggers to send their messages. It is important to know the setup of each hospital in order to provide accurate details for users and development requirements. If real time triggers are not used, the function that converts hospital messages into HL7 messages should be scheduled. This information should be forwarded to the Healthlink Development Unit.

If any changes are required to the scheduling of source systems it is the responsibility of the participating hospital to inform the National Healthlink Project of this change.

6.3   Security/Networking

Each Hospital provides a machine(s) for the HL7 Message process; this machine is linked to the Hospital Information System producing the messages and also to the Bridge server. The HL7 one month backup directory should be protected from users as sensitive patient data is being stored here, even though it's compressed and encrypted by the Healthlink software. The security of this machine is the responsibility of the Hospital in question. This machine should be kept locked at all times except when it is being used by an authorised user. The username, password and IP address needs to be given to Healthlink administration in order for the Bridge to operate.

The Healthlink Bridge server should have the following operating system installed:

- **Windows server 2008/2012 standard edition or superior**

The following component should be installed on this machine:

- **Message Queuing**

In Windows 2008, this can be installed through control panel, Programs and features, Turn windows features on or off and select Microsoft Message Queue (MSMQ) Server. This setup might require the use of the OS cd.

In Windows 2012, this can be installed through Server Manager initial screen, Manage, Add Roles and Features and under Features select Message Queuing. This setup might require the use of the OS cd.

The server hosting the Bridge software is linked to the central Healthlink system using a VPN protected by a firewall on the Hospital side and on the Healthlink side.
The following services are required on the specified firewalls to allow for message transmission:

Phase 1: AES 256/SHA1
        DH Group: 2
        Negotiation: 24 hours
        AgressMode: Yes

Phase 2: AES 256/SHA1
        Perfect Forward Sec   No
        Negotiation: 60 mins
        Local IP: [ipaddress]
        FW IP: [ipaddress]

Ports:
        From Healthlink to Hospital
                TCP 5405 – Netsupport Remote desktop Application
                TCP 3389 – Microsoft Remote desktop Application
                Healthlink Inbound Service
                        Test Environment
                                TCP: 9667
                        Live Environment
                                TCP: 9669
                        Service Support:
                                TCP: 9800

        From Hospital Bridge to Healthlink
                Healthlink Outbound Service
                        Test Environment
                                TCP: 6667
                        Live Environment
                                TCP: 6669
                        Service Support:
                                TCP: 9800

        From Hospital Bridge to/from Healthlink
                MSMQ
                    TCP: 1801
                    RPC: 135, 2101, 2103, 2105
                    UDP: 3527, 1801

6.4   Partition

To better handle the Bridge Server for maintenance and to avoid disk space issues in the long term, we recommend a different partition to be used, other than the one that contains the system files; a new partition to host the Healthlink Services and Hospital Backup messages. Usually, 30 to 50GB is enough, but it depends on other factors like the number of hospitals and/or number of messages per hospital.

6.5   Backups

Note: For Private Hospital Implementation, please see section 7.2 in Appendix 1.

The Healthlink Bridge server should be backed up daily. The software application can be re-installed from the Healthlink source but it is imperative that this system can be brought back up in real time so the users are not affected if an operations issue occurs. The bridge holds up to one month of messages to enable resending facilities and auditing of messages.

All Healthlink Windows services Folders and subfolders that contain the encrypted messages must be backed up. All Healthlink services on the Bridge have Healthlink in the name, so it will be easier to identify. Healthlink windows

services will always be running and doesn't keep any file locked, except when creating a backup after downloading from the ftp, which only takes a few milliseconds.

For a quick recovery in case of a system crash, a system image / snapshot of the windows operating system to an external source should also be created.

Virus protection software should be installed on each bridge server and updated accordingly.

The maintenance including the daily backup and security of the Healthlink Bridge Server is the responsibility of the participating hospital.

6.6   Fail over solution

A server must be identified for use as a fail over server for the Healthlink Bridge Server should any hardware issues be encountered while in operation. It will be the responsibility of the participating hospital to maintain this server and to make either the automatic or manual changeover should the need arise. The same IP should be kept when powering up the failover server, in order to reuse the same vpn connection from the live server.

A failover solution for the HL7 pickup machine is the responsibility of the participating hospital.

6.7   Message Clear down and regeneration

The Healthlink Bridge application is responsible for the clear down of messages from the source directory upon successful transfer to the Healthlink Bridge server.
Each hospital must have the ability to regenerate messages from the source system based on the date and time of message creation for up to three months.

6.8   Procedures for Making Changes to the source system

The procedure for making any required changes to the source system that generates Healthlink messages is as follows:

1. Participating Hospital must inform Healthlink of their intension to implement a change to the source system.
2. A detailed account of the change must be supplied to Healthlink.
3. A specification of the new message format must be supplied to Healthlink.
4. Test messages must be generated by the source system in a test environment and not in the live environment.
5. Sample test message structures must be sent to Healthlink for validation.
6. Healthlink must test these new messages in the Healthlink test environment, which encompasses a test message agent, test database, the test Healthlink Online application and testing with each of the practice management systems that integrate Healthlink messages.
7. Once full testing has been completed Healthlink will contact the participating hospital and schedule when the agreed change can be implemented to the live environment.

When any new message types are being produced from the source system, they should be tested on a test environment before being pushed out for live Healthlink message delivery. The procedures outlined above must also be followed for any new messages being added to the Healthlink messaging service.

Anyone involved in the Healthlink project from the Hospital side should be given a copy of this document and all procedures outlined in this document should be adhered to. This will facilitate the Healthlink project to continue to offer a standardised quality based service to the primary care community on a national level.

6.9   Data Protection Agreement

Each hospital/Hospital must enter into a formal data protection agreement with the National Healthlink Project to adhere to the Data Protection Act's.

7 Appendix 1   Private Hospital Implementation

7.1   The Bridge

Each hospital needs a Bridge server running Windows 2008+, with the Healthlink Bridge application to connect the Hospital to the central Healthlink database. This Bridge will be situated on a DMZ within the Healthlink site and have access to the TCP port of each machine that has the Hospital System software installed.

The installation and configuration of the Bridge software is undertaken by Healthlink, where it is expected that the hospital will provide the bridge machine, install Windows OS Server and place the server in a separate Healthlink DMZ behind their hospital firewall. The TCP connectivity between the Healthlink Bridge machine must also be established and secured by the participating Hospital. Each Bridge server is linked to the Healthlink central system using a firewall at each end creating a VPN.

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To better handle the Bridge Server for maintenance and to avoid disk space issues in the long term, we recommend a different partition to be used, other than the one that contains the system files; a new partition to host the Healthlink Services and Hospital Backup messages. Usually, 30 to 50GB is enough, but it depends on other factors like the number of hospitals and/or number of messages per hospital.

7.3   Backups

The Healthlink Bridge server should be backed up daily. The software application can be re-installed from the Healthlink source but it is imperative that this system can be brought back up in real time so the users are not affected if an operations issue occurs. The bridge holds up to one month of messages to enable resending facilities and auditing of messages.

All Healthlink Windows services Folders and subfolders that contain the encrypted messages must be backed up. All Healthlink services on the Bridge have Healthlink in the name, so it will be easier to identify. Healthlink windows services will always be running and doesn't keep any file locked, except when creating a backup after downloading from the ftp, which only takes a few milliseconds.

For a quick recovery in case of a system crash, a system image / snapshot of the windows operating system to an external source should also be created.

Virus protection software should be installed on each bridge server and updated accordingly.

The maintenance including the daily backup and security of the Healthlink Bridge Server is the responsibility of the participating hospital.