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ITK2.2 MESH Transport Requirements

Document Management

Revision History

Version	Date	Summary of Changes
1.0	Oct 2016	First version of ITK 2.2 issued by NHSD

Reviewers

This document was reviewed by the following people:

Reviewer name	Title / Responsibility	Date	Version
George Hope	ITK Architecture Lead	Oct 2016	1.0
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Approved by

This document was approved by the following people:

Name	Signature	Title	Date	Version
Shaun Fletcher		Head of Architecture	May 2016	1.0

Reference Documents

Ref no	Doc Reference Number	Title	Version
1.	Various	NHSD - MESH Reference Material http://systems.hscic.gov.uk/ddc/mesh/guidance	
2.			
3.			
4.			

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Contents

1 Introduction

This document forms part of the overall document set for ITK Architecture.

1.1 Purpose of Document

This document defines a set of requirements for ITK MESH Transport, formerly the service was called DTS (Data Transfer Service).

1.2 ITK Architecture Documentation Set

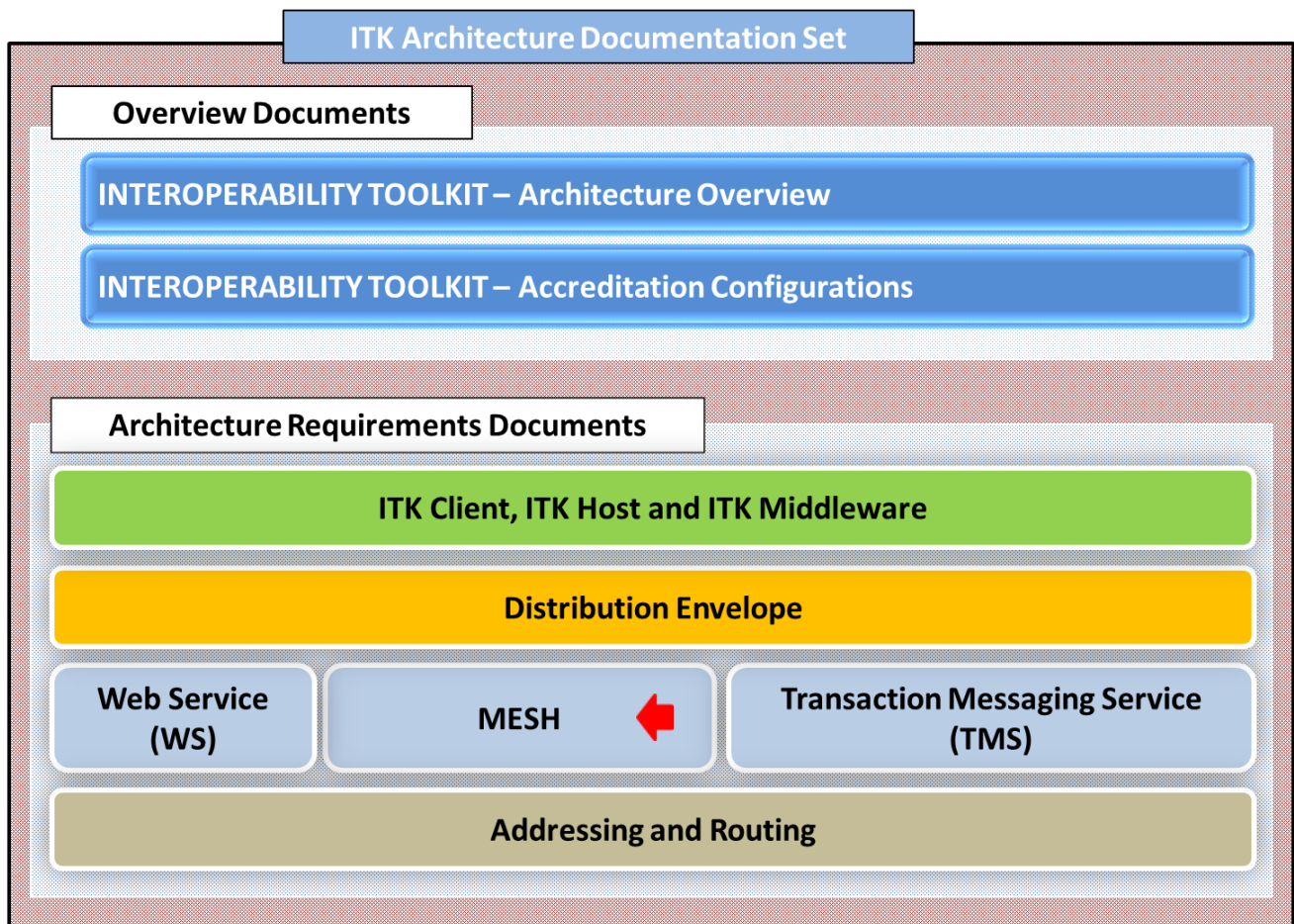The position of this document in relation to the document set is shown below.

Figure 1 – ITK Architecture Documentation Set

1.3 Audience

The primary audience are supplier technical and product development staff who are interested in developing a Toolkit Implementation.

1.4 Document Scope

The document covers the ITK MESH Transport Interoperability requirements required for accreditation.

1.5 Document Overview

The rest of this document covers a number of areas of functionality. Within each area the functionality is described, and a number of formal requirements are listed in bold type, with additional detail provided in smaller type below this.

1.6 Requirements Presentation

The requirements are presented in the format given below:

Ref (1)	Description (2)	Client (3)	Host (4)	MW (5)	SMSP (6)
COR-REL-03	**Toolkit Implementations MUST retain responsibility for processing until a request completes**	Y	N	Y	N
NB (7)	Specifically, any response returned from the initial part of the asynchronous invocation does NOT indicate a transfer of responsibility. It is only a transport acknowledgement, and it does NOT imply that the message has necessarily been persisted, nor does it indicate a transfer of responsibility, nor promise that subsequent application processing will be completed.				

Clarification Notes

(1) The requirement reference

(2) The Description of the requirement

(3), (4), (5) and **(6)** Shows the requirements applicability for accreditation

(7) Provides further details relating to the requirement and supplementary notes

Colour Coding Notes

- The fill colour of the Reference relates to a particular document from the document map.
- Where requirements are universally applied the fill colour will always be blue. Where requirements are conditional and may impact accreditation the fill colour will be Orange.
- See the Accreditation Configuration spread sheet for related details.

1.7 Reference Implementation

An ITK reference implementation pack is available as a training and development aid and it contains example code snippets for typical Healthcare Interoperability scenarios.

http://developer.nhs.uk/library/interoperability/nhs-interoperability-framework/

2 MESH and ITK

2.1 Transport Structure and Behaviour

MESH is used to transmit instances of ITK messages. Messages consist of one or more payloads embedded in a "distribution envelope" which carries information to help with routing and delivery, audit and acknowledgement.
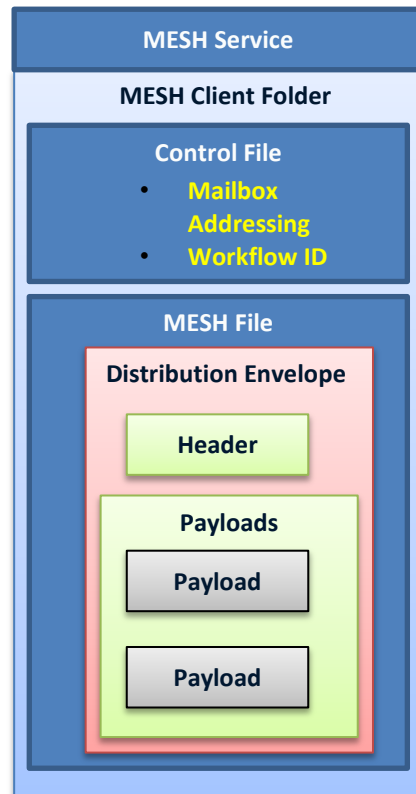

Figure 2 - An ITK MESH Message Structure

2.1.1 MESH Data File

When MESH is used as an ITK transport, the distribution envelope is the MESH "data file".

2.1.2 MESH Control File

The MESH control file is constructed from information in the distribution envelope, plus any site-specific local configuration.

2.1.3 MESH Transmission

Once the distribution envelope has been written as a data file, and the control file written, responsibility is passed to MESH. The ITK routing specification requires that failures be notified to the message sender: so the MESH status reports for the transfer must be checked. In the case of a failure, an ITK infrastructure "negative acknowledgment" is returned, routed back to the address given in the "sender address" of the distribution envelope.

Where the MESH status reports show that the transfer was successful, no further action is taken.

3 ITK MESH Accreditation Requirements

3.1 Invocation Styles and Messaging Configurations

Ref	Description	Client	Host	MW	SMSP
MESH-ADR-01	**MESH MUST NOT use SMTP addresses**	**Y**	**Y**	**N**	**N**
1	For ITK use, the MESH capability for SMTP addresses and the MESH eSMTP service MUST NOT be used.				

3.2 MESH Interface

Ref	Description	Client	Host	MW	SMSP
MESH-SND-01	**An ITK-MESH interface MUST consider the MESH transmission incomplete until the MESH transfer report has been received and processed**	**Y**	**Y**	**N**	**N**
MESH-SND-02	**MESH interface MUST be configured to retry**	**Y**	**Y**	**N**	**N**
MESH-SND-03	**The ITK-MESH interface MUST make the MESH transmission files**	**Y**	**Y**	**N**	**N**
NB	The ITK-MESH interface writes the complete distribution envelope as the data file, and constructs the control file.				
MESH-SND-04	**An ITK-MESH interface MUST first write data and control files to a separate directory, and then move them to the MESH client outbound directory**	**Y**	**Y**	**N**	**N**
1	To avoid MESH detecting and trying to send an incompletely written data file, the ITK-MESH interface MUST write to a separate directory, and then move the completed file (data, then control), to the MESH client's outbound directory.				
MESH-SND-05	**The ITK-MESH interface MUST check the contents of the transfer report**	**Y**	**Y**	**N**	**N**

MESH-SND-06	**The ITK-MESH interface MUST populate the control file Workflow ID field**	Y	Y	N	N
1	The Workflow ID for each payload MUST be agreed with the MESH Service Manager – email address is MESHteam@hscic.gov.uk				

3.3 Configuration

Ref	Description	Client	Host	MW	SMSP
MESH-CFG-01	**The MESH client configuration MUST conform to the MESH specifications**	Y	N	N	N
NB	The latest MESH Specifications are available from: http://systems.hscic.gov.uk/ddc/mesh/guidance				

3.4 Logging

Ref	Description	Client	Host	MW	SMSP
MESH-LOG-01	**The ITK-MESH interface MUST audit a transmission**	Y	Y	Y	N
NB	For sending, the interface MUST log: • Filename used for MESH transfer • Transmission date and time • Transmission destination				

MESH-LOG-02	**The ITK-MESH interface MUST audit receiving a message**	Y	Y	Y	N
	For receiving, the interface MUST log: • Filename used for MESH transfer • Transmission date and time • Transmission sender				

BELOW ARE THE NEW REQUIREMENTS – NOTE ALL THE REFERENCES ARE UPDATED

3.5 MESH Client Configuration Requirements

Using MESH either as an ITK physical route or as a directly-addressed transport assumes the availability of an installed and configured MESH client, as described in the MESH Installation Guides - http://systems.hscic.gov.uk/ddc/mesh/guidance

The MESH client site configuration includes the following, whilst the MESH guide describes these settings as "optional", for ITK they MUST be configured as described below to ensure tracking and error detection in ITK use:

Ref	Description		Client	Host	MW	SMSP
MESH-CLT-01	**The ITK-MESH Client configurations to be used are given below**		**Y**	**N**	**Y**	**N**
1	PollMode	Reverse	**MUST** be set to Reverse to enable bi-directional transfer, including retrieval of transmission reports. It MUST NOT be set to "Upload" or "Download" when sending or receiving files containing CDA documents or other ITK messages.			
2	SaveSent	Y	**MUST** be set to Y unless the sending system saves copies of files itself, before passing them to MESH.			
3	ServerRetry	Y	**MUST** be set to Y to force the MESH client to retry sending files to the MESH server unless the system provides alternative retry facilities.			
4	TransferReport	Y	**MUST** be set to Y in order to detect successful transfer to the MESH server.			
5	Encrypt	N	MESH transmissions are encrypted on-the-wire and hence the encrypt setting SHOULD NOT be used. The setting MAY be used between two end points using "direct addressing" where a good business reason exists, and where bi-lateral arrangements are in place to enable decryption to take place.			
6	Compress	Y	**SHOULD** be set to Y unless there are good business reasons otherwise – for example that the content is already compressed (using the distribution envelope specification for doing so), or known to be already encrypted.			

3.6 Transfer Report

Specifying the Transfer Report option in the MESH client configuration file, causes MESH to return a status file when the transfer has/has not successfully completed.

MESH also has the automatic behaviour of returning a status file to report an error.

MESH-TFR-01	The ITK-MESH interface MUST audit receiving a message	Y	N	Y	N
NB	The status file is a copy of the control file, returned with a StatusRecord added.				
1	The sender **MUST** check the contents of the returned transfer report.				

2	The sender **MUST** correlate this with the distribution envelope it has tried to send. Where the transfer was successful the router must log the success but takes no further action. A failed transfer is logged, and the router MUST return information about the failure to the distribution envelope sender address, using a generic ITK infrastructure NACK and the `"urn:nhs-itk:ns:201005:InfrastructureAcknowledgment"` service .

3.7 Populating the MESH Sending Control File

The MESH control file affects infrastructural behaviours, and therefore needs constraining to enable system wide interoperability:

Ref	Description		Client	Host	MW	SMSP
MESH-CTL-01	**The MESH Control File configurations to be used are given below**		Y	N	Y	N
1	Version	Fixed value: 1.0.				
2	AddressType	Fixed value: DTS.				
3	MessageType	Fixed value: Data.				
4	FromDTS	MESH name as given in site configuration file ClientIdentity" element.				
5	ToDTS	MESH recipient name.				

MESH-TFR-02	The ITK-MESH and use of eSMTP.	Y	N	Y	N
NB	MESH MUST NOT be used for routing ITK messages to eSMTP endpoints.				

4 ITK MESH Messaging in Practice

4.1 MESH Recipient Resolution

MESH provides transport between a sending node, and one or more receiving nodes which are identified by either a "MESH mailbox name" or an SMTP (email) address.

MESH MUST NOT be used for routing ITK messages to eSMTP endpoints.

4.1.1 Direct addressing

A MESH address is explicit where it is identified by the OID "2.16.840.1.113883.2.1.3.2.4.21.1". In the OID catalogue, this value is declared as labelling a "MESH Mailbox Address Identifier", for example:

```
<itk:addressList>[1]

 <itk:address type="2.16.840.1.113883.2.1.3.2.4.21.1" uri="B80310HC"/>

</itk:addressList>
```

In this case, the sender has explicitly addressed the message to the MESH mailbox with the name "B80310HC", which in this case gives both the target organisation, and a workflow identifier. Explicit addressing of this type is only valid where the sender "knows" that a MESH interface is available for its use.

4.1.2 ITK Routing

As described in the ITK Addressing and Routing specification an ITK routing node may resolve a MESH mailbox as the physical route appropriate for a particular recipient address. For example:

```
<itk:addressList>

 <itk:address uri="urn:nhs-uk:addressing:ods:B80310:discharges"/>[2]

</itk:addressList>
```

The router might in this case have a routing table entry that looked like:

urn:nhs-uk:addressing:ods:B80310:*	MESH:80310

---

[1] In this example, which is a fragment of a distribution envelope, the prefix "itk" would have been bound earlier in the complete message, to the ITK namespace "urn:nhs-itk:ns:201005".

[2] In this example the OID is omitted, because the distribution envelope supplies the default OID for an ITK address, of "2.16.840.1.113883.2.1.3.2.4.18.22".

Whilst the format and storage for routing tables are a matter for router vendors, the meaning of the entry is that "a message for any address inside urn:nhs-uk:addressing:ods:B80310 should be sent over MESH, to mailbox '80310'".

5 Sending via the MESH Client

When a router resolves that a message is to be sent over MESH, it MUST construct copies of the data and control files in a separate, temporary directory before moving the files into the MESH client's "OUT" directory. This is required to avoid MESH trying to transmit the files before the router has finished writing them.

5.1 MESH Client File Structure

A MESH transfer involves two files: "data" and "control". The data file is the complete distribution envelope. The control file is constructed from addressing information in the distribution envelope, and installation-specific configurations.

The MESH Client File Interface specification requires the data and control files to be named according to a scheme:

```
<siteid><APP><sequence>.dat
<siteid><APP><sequence>.ctl
```

The "site id" is a MESH concept, identifying the MESH end point by user name, and is part of the mandatory site-specific configuration. Use of the "APP" part is optional with respect to MESH. Where the MESH client use for ITK routing is shared with other communications, the system SHOULD use "APP" to distinguish them. Sending systems MAY use the "APP" part of the file name to record the "service" from the distribution envelope – and receiving systems MAY use this information, where recognised, in making early routing decisions.

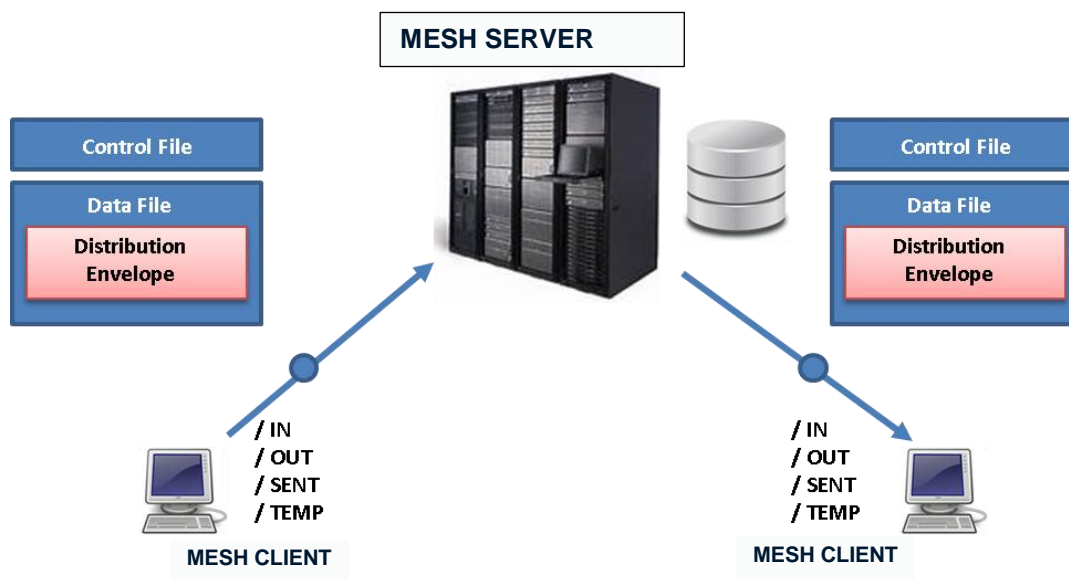The router is responsible for maintaining the sequence number.

Figure 3 – A Schematic Diagram of MESH

Note that there is no part of the filename which corresponds to the identity of an ITK message. There is therefore an association between the data and control file names, and the tracking id value from the routed message' distribution envelope. Whilst this is held in the control file the router MUST also record and persist this association at least until the outcome (success or failure) of the transfer is known. Both the file names and the tracking id

MUST be recorded in the router log files, alongside audit identity details from the distribution envelope.

* * * End of Document * * *