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## ITK DTS Transport Requirements

# Document Management

## Revision History

Version	Date	Summary of Changes
1.0	31/05/2014	First version issued by HSCIC

## Reviewers

This document was reviewed by the following people:

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## Reference Documents

Ref no	Doc Reference Number	Title	Version
1.			
2.			
3.			
4.			

### Document Control:

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# 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 Data Transfer Service (DTS) Transport.

## 1.2 ITK Architecture Documentation Set

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

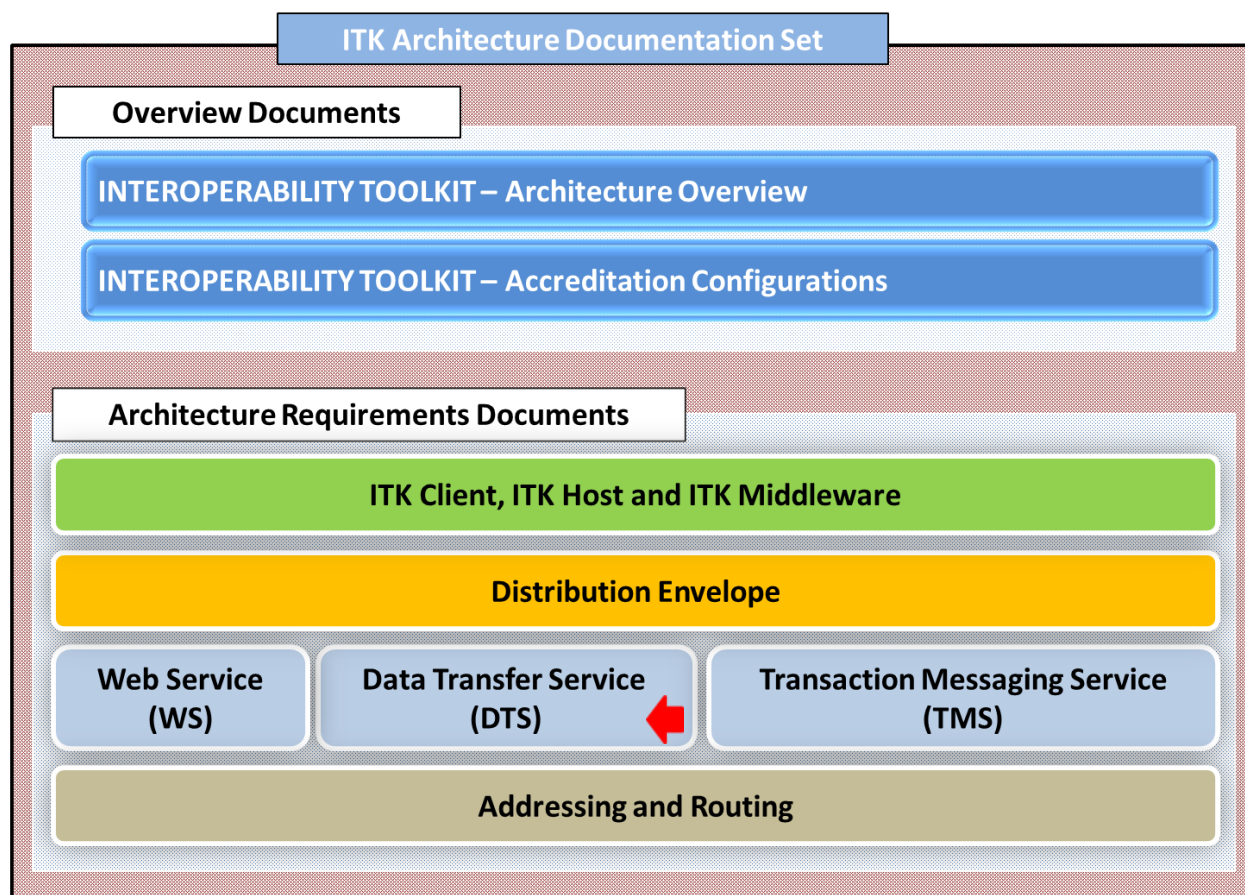


Figure 1 – ITK Architecture Documentation Set

## 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 DTS 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 <b>MUST</b> 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 DTS and ITK

### 2.1 Transport Structure and Behaviour

DTS 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.

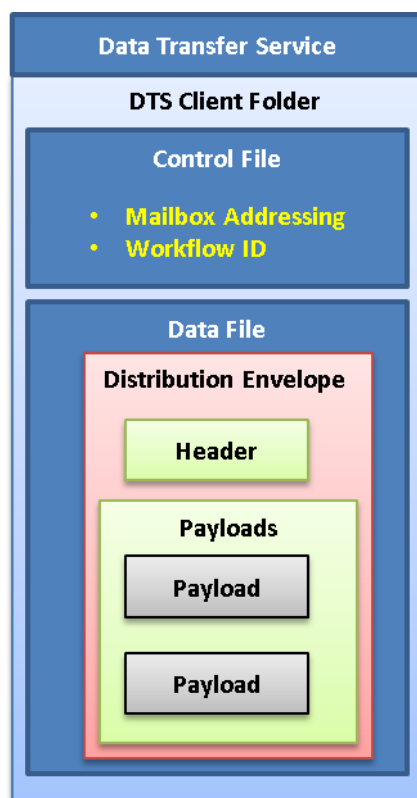


Figure 2 - An ITK DTS Message Structure

#### 2.1.1 DTS Data File

When DTS is used as an ITK transport, the distribution envelope is the DTS “data file”.

#### 2.1.2 DTS Control File

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

#### 2.1.3 DTS Transmission

Once the distribution envelope has been written as a data file, and the control file written, responsibility is passed to DTS. The ITK routing specification requires that failures be notified to the message sender: so the DTS 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 DTS status reports show that the transfer was successful, no further action is taken.

## 3 ITK DTS Accreditation Requirements

### 3.1 Invocation Styles and Messaging Configurations

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

<b>DTS-ADR-02</b>	<b>An ITK-DTS router SHOULD be able to use both direct DTS mailbox addressing, and ITK addressing</b>	<b>Y</b>	<b>Y</b>	<b>N</b>	<b>N</b>
1	A distribution envelope address may be specified either as an explicit DTS mailbox address, or an ITK address for which a DTS mailbox is resolved as the appropriate physical route. The ITK-DTS router SHOULD be able to process both cases.				

### 3.2 DTS Interface

Ref	Description	Client	Host	MW	SMSP
<b>DTS-SND-01</b>	<b>An ITK-DTS interface MUST consider the DTS transmission incomplete until the DTS transfer report has been received and processed</b>	<b>Y</b>	<b>Y</b>	<b>N</b>	<b>N</b>

<b>DTS-SND-02</b>	<b>DTS interface MUST be configured to retry</b>	<b>Y</b>	<b>Y</b>	<b>N</b>	<b>N</b>

<b>DTS-SND-03</b>	<b>The ITK-DTS interface MUST make the DTS transmission files</b>	<b>Y</b>	<b>Y</b>	<b>N</b>	<b>N</b>
<b>NB</b>	The ITK-DTS interface writes the complete distribution envelope as the data file, and constructs the control file.				

<b>DTS-SND-04</b>	<b>An ITK-DTS interface MUST first write data and control files to a separate directory, and then move them to the DTS client outbound directory</b>	<b>Y</b>	<b>Y</b>	<b>N</b>	<b>N</b>
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1	To avoid DTS detecting and trying to send an incompletely written data file, the ITK-DTS interface <b>MUST</b> write to a separate directory, and then move the completed file (data, then control), to the DTS client's outbound directory.
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<b>DTS-SND-05</b>	<b>The ITK-DTS interface MUST check the contents of the transfer report</b>	<b>Y</b>	<b>Y</b>	<b>N</b>	<b>N</b>

<b>DTS-SND-06</b>	<b>The ITK-DTS interface MUST populate the control file Workflow ID field</b>	<b>Y</b>	<b>Y</b>	<b>N</b>	<b>N</b>
1	The Workflow ID <b>MUST</b> be agreed with the DTS Service Manager – email address is dtsteam@hscic.gov.uk				

### 3.3 Configuration

Ref	Description	Client	Host	MW	SMSP
<b>DTS-CFG-01</b>	<b>The DTS client configuration MUST conform to the DTS specifications</b>	<b>Y</b>	<b>N</b>	<b>N</b>	<b>N</b>
NB	The latest DTS Specifications are available from the DTS Service Manager.				

### 3.4 Logging

Ref	Description	Client	Host	MW	SMSP
<b>DTS-LOG-01</b>	<b>The ITK-DTS interface MUST audit a transmission</b>	<b>Y</b>	<b>Y</b>	<b>Y</b>	<b>N</b>
NB	For sending, the interface <b>MUST</b> log: <ul style="list-style-type: none"> <li>Filename used for DTS transfer</li> <li>Transmission date and time</li> <li>Transmission destination</li> <li>ITK service and, if present, interaction id from the handling specification</li> <li>ITK tracking id</li> <li>Transmission result (status from the transfer report)</li> <li>The auditIdentity values from the distribution envelope</li> </ul>				

<b>DTS-LOG-02</b>	<b>The ITK-DTS interface MUST audit receiving a message</b>	<b>Y</b>	<b>Y</b>	<b>Y</b>	<b>N</b>
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For receiving, the interface MUST log:

- Filename used for DTS transfer
- Transmission date and time
- Transmission sender
- ITK service and, if present, interaction id from the handling specification.
- ITK tracking id
- The auditIdentity values from the distribution envelope.

## 4 ITK DTS Messaging in Practice

### 4.1 DTS Recipient Resolution

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

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

#### 4.1.1 Direct addressing

A DTS 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 “DTS 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 DTS 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 DTS interface is available for its use.

#### 4.1.2 ITK Routing

As described in the ITK Addressing and Routing module specification an ITK routing node may resolve a DTS 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:*	DTS:80310
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<sup>1</sup> 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”.

<sup>2</sup> 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 DTS, to mailbox ‘80310’”.

## 5 DTS Client Configuration Requirements

Using DTS either as an ITK physical route or as a directly-addressed transport assumes the availability of an installed and configured DTS client, as described in the DTS Installation Guide

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

Configuration Item	Setting	Description
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.
SaveSent	Y	MUST be set to Y unless the sending system saves copies of files itself, before passing them to DTS.
ServerRetry	Y	MUST be set to Y to force the DTS client to retry sending files to the DTS server unless the system provides alternative retry facilities.
TransferReport	Y	MUST be set to Y in order to detect successful transfer to the DTS server.
Encrypt	N	DTS transmissions are encrypted on-the-wire and hence the encrypt setting <b>SHOULD NOT</b> be used. The setting <b>MAY</b> 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.
Compress	Y	<b>SHOULD</b> 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.

**Table 1 : DTS Client Configurations**

## 6 Sending via the DTS Client

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

### 6.1 DTS Client File Structure

A DTS 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.

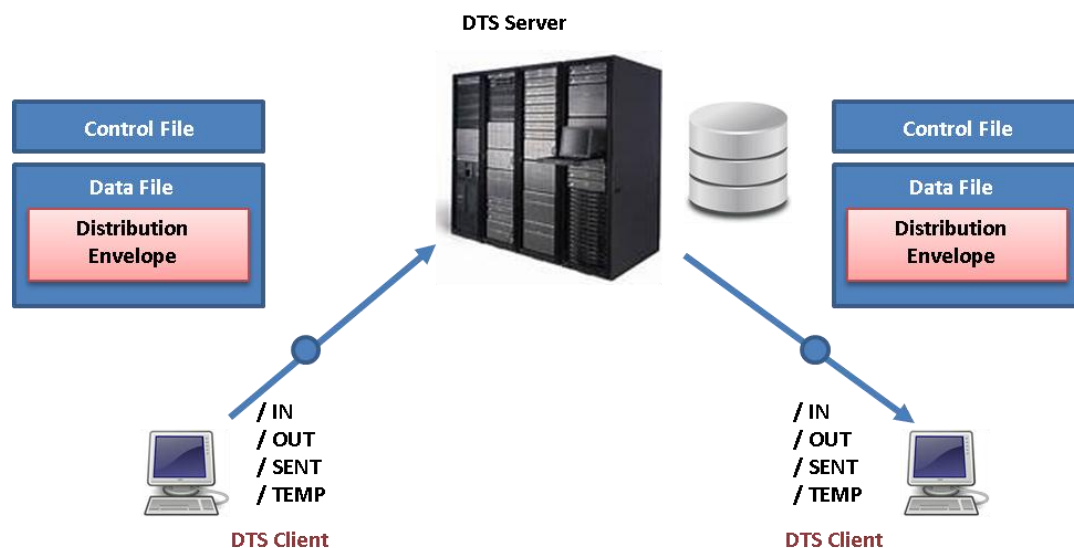
The DTS Client File Interface specification requires the data and control files to be named according to a scheme:

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

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

The "site id" is a DTS concept, identifying the DTS end point by user name, and is part of the mandatory site-specific configuration. Use of the "APP" part is optional with respect to DTS. Where the DTS 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 DTS**

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's 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.

## 6.2 Populating the Control File

Population by an ITK router is as follows.

Data Item	Source
Version	Fixed value: 1.0.
AddressType	Fixed value: DTS.
MessageType	Fixed value: Data.
FromDTS	DTS name as given in site configuration file ClientIdentity" element.
ToDTS	DTS recipient name as resolved by the router.
LocalId	Distribution envelope tracking id.
WorkflowID	Interaction id from handling specification if present, alternatively distribution envelope service name <sup>3</sup> .

**Table 2 : DTS Control File Configurations**

## 6.3 Transfer Report

Specifying the TransferReport option in the DTS client configuration file causes DTS to return a status file when the transfer has successfully completed, in addition to the service's automatic behaviour of returning the status file to report an error.

The router MUST check the contents of the returned transfer report.

The status file is a copy of the control file, returned with a StatusRecord added. The router 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 .

\* \* \* End of Document \* \* \*

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<sup>3</sup> WorkflowID MUST be populated for ITK use of DTS to ensure continued compatibility with future versions of the DTS client specification.