NISTIR 4452

MESSAGE HANDLING SYSTEMS INTEROPERABILITY TESTS

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Chapter 1. Background Information

1.1 Introduction

This document contains the X.400 Interoperability test suite that was originally developed by the OSINET Technical Committee. OSINET is a regional Open Systems Interconnection (OSI) network that was established to promote OSI through activities related to interoperation testing. This interoperability test suite has been coordinated internationally through OSINET's participation in OSI^{ONE}, an association of regional OSI networks.

Special acknowledgement is given to George Lotridge, IBM Corporation, who has acted as the editor of the X.400 Interoperability test suite for OSINET.

1.2 Overview

Interoperability testing tests the ability of two or more vendor-specific implementations to interoperate. The complexity of OSI protocols makes exhaustive testing impractical on both technical and economic grounds. There is also no guarantee that a system which has passed a set of interoperability tests will interoperate without error with other systems or conform to any specification. However, successful completion of interoperability testing does provide a level of confidence that the system will interoperate with other systems and behave in a consistent manner in representative instances of communication.

The CCITT X.400 series of Recommendations define the system model, service elements, user facilities, protocols, and other items required for a complete Message Handling System. This document defines the tests necessary to demonstrate interoperability among heterogeneous implementations. The document contains a core set of mandatory tests and a much larger set of optional tests. Developers of OSI profiles (e.g., NIST, TOP, etc.) may specify the set of tests that must be successfully completed to meet their specific requirements (see Appendix B, "Profile Requirements Specifications"). Test participants are free to select additional tests to run from the remaining optional tests. Tests may be added in the future to satisfy the requirements of national and international profile developers.

1.2.1 Categories of Tests

The tests are categorized. The categories are:

- SR - Send/Receive Tests
- RL - Relay Tests
- LM - Limitation Tests

- RT - Reliable Transfer Service Tests

1.2.2 Groupings of Tests

The tests are grouped into sections.

Section 2.1, "Send/Receive Tests - Required" contains those tests which basically establish confidence that the two partner implementations can interwork. All Test Requirements Specifications shall include at least these basic tests.

Section 2.2, "Send/Receive Tests - ORName Attributes" deals with different variations on ORNames. The tests in this section must be considered and agreed upon individually by the testing partners. In each test, the originator's MTA must support the generation of the name attributes specified in the test. The destination MTA must process the name attributes in such a way as to yield the expected results.

Section 2.3, "Send/Receive Tests - UA defined services" consists of tests that are applicable only if the originator's UA generates the defined service(s) and/or data elements and the other UA's participating in the tests can perform the processing required to yield the expected results. Each test in this section must be considered and agreed upon individually before the testing begins.

Section 2.4, "Send/Receive Tests - MTA defined services" consists of tests that are applicable only if the originator's MTA generates the defined service(s) and/or data elements and the other MTA's participating in the tests can perform the processing required to yield the expected results. Each test in this section must be considered and agreed upon individually before the testing begins.

Section 2.5, "Limitation Tests" tests the limits of an implementation's capabilities. Most of the limits checked are imposed by the profile (e.g., EN/ENV, NIST, etc.) to which an implementation claims conformance. Exact values of each of the limits must be coordinated between test partners prior to testing.

Section 2.6, "Relay Tests" tests message relay functions of the MTA. These tests require at least a third participant and are applicable only if all three participating MTA's provide the Relay service element. Each test in this section must be considered and agreed upon individually before the testing begins.

Section 2.7, "Reliable Transfer Services Tests" tests the Reliable Transfer Service. Each test in this section must be considered and agreed upon individually before the testing begins.

1.2.3 Objectives

Most of the tests verify the ability of one partner to generate Message Transfer and/or Interpersonal Message service elements and the ability of one or more other test partners to recognize or process these elements correctly. In some cases, an initiating message is required before the message containing the service elements can be generated.

1.2.4 Selecting Tests for Execution

The test cases are grouped together into one "Required" and several "Optional" sections. The tests defined in the Required section **must** be executed if the test results are to be registered; tests in the Optional sections may be selected based on partners' functional capabilities and their testing objectives.

Each of the test cases defined in this document is designed to be executed between two testing partners, with one partner being designated as "Originator" and the other being designated as "Recipient." Accordingly, each of the partners should execute each of the tests twice; once as Originator and once as Recipient. Some partners may not be able to serve as both an Originator and a Recipient for certain of the optional test cases.

1.2.5 Judging Success or Failure of a Test

In order to determine if a test has been successful, each test uses one or more of the following notifications:

- Delivery/Non-Delivery Notification
- Receipt/Non-Receipt Notification
- Specific Acknowledgement

Whenever possible, passive cooperation (i.e., Delivery/Receipt notifications, etc.) is used to reduce the amount of time that a test partner must spend to complete an Originator's test. In some cases, a Specific Acknowledgement from the message recipient(s) is used to help determine the success or failure of a test case. To identify the test, the Originator should place the Test Number into the Subject field of the IP message and the Test Purpose into the body of the message, along with any specific instructions to the Recipient. When generating a Specific Acknowledgement, the Recipient should similarly place the Test Number of the test message being acknowledged into the Subject field; any additional information required to evaluate the successful completion of the test should be placed into the message body.

Note: Within most test cases the procedure specifies whether or not a Delivery Notification is to be requested. This refers specifically to the user-requested Delivery Notification element (UserReportRequest bit in the PerRecipientFlag field of the RecipientInfo field), **not** the MTA-requested Delivery Notification element (ReportRequest bit in the PerRecipientFlag field of the RecipientInfo field). When a Delivery Notification is

requested the ReportRequest element is set to **Confirmed**; when a Delivery Notification is not requested, it is set to **Basic**.

1.2.6 ORName Addressing

The Test Procedure will not list the name attributes (e.g. Country, Administration Management Domain, Private Management Domain, etc.) required for message delivery where they are obvious. The Interpersonal Message ID (IPMessageID) is mandatory in the IP message heading and will also not be specified in the Test Procedure.

Most of the tests do not specify the entire ORName used for an originator or recipient of a message. The test partners must agree to an O/R naming convention for valid and invalid ORNames, based on their implementations' requirements, prior to testing. It is suggested that, unless otherwise specified or implied, the following ORName attributes be used:

```
CountryName ("Country")
AdministrationManagementDomain ("ADMD")
PrivateManagementDomain ("PRMD")
OrganizationName ("OrgName")
OrganizationalUnits ("OrgUnits")
PersonalName ("PN"), consisting of:
   SurName ("SN")
   GivenName ("GN")
```

The order of the ORName attributes in this list is the hierarchy that is assumed in all of the test cases contained in this document. In particular, if a test case specifies an ORName as being "qualified down to OrgName," then that ORName should consist of (at most) Country, ADMD, PRMD, and OrgName - no OrgUnits or PersonalName attributes should be included.

Note: The subject of ORNames and addresses can become complex in some cases. While the attributes suggested in the preceding list will generally suffice, they do not cover all possible circumstances. You may wish to refer to more detailed discussions of O/R naming schemes. One such discussion can be found in *SPAG SERVICES: Guide to the Testing of Interoperability of X.400 Message Handling Systems Implemented to ENV41201*, specifically chapter 5, "The Naming Scheme."

1.2.6.1 ORNames for Required Tests

The required tests will make use of two unique ORNames local to each MTA being tested and one unique ORName on a third MTA. Arrangements may need to be made to use a third MTA. The details of these ORNames should be exchanged between the test partners.

1.2.6.2 ORNames for Optional Tests

There are additional ORNames required for some of the Optional tests. Where required, there are suggested ORNames in the tests. However, test partners should agree to these before performing the optional tests.

Chapter 2. X.400 Interoperability Test Descriptions

In the following sections, each test is listed, specifying the test number, the test Category, the test Purpose, the test Procedure, and the Expected Results. The required tests are listed first and the additional sections follow.

2.1 Send/Receive Tests - Required

2.1.1 Test SR-001

Category: Send/Receive

Purpose: Test message delivery to a single recipient.

Procedure:

1. Originator creates a message to one valid remote X.400 Primary recipient.
2. Originator sends the message with Delivery Notification requested.

Expected Results: Originator should receive a Delivery Notification for this test message.

2.1.2 Test SR-002

Category: Send/Receive

Purpose: Test message non-delivery to a single recipient. Non-delivery is due to an invalid O/R attribute value.

Procedure:

1. Originator creates a message to one invalid remote X.400 Primary recipient. The Surname attribute should be invalid (i.e., indicate a non-existent user).
2. Originator sends the message - does not request a Delivery Notification.

Expected Results: Originator should receive a Non-Delivery Notification (due to Unrecognized ORName) for this test message.

2.1.3 Test SR-003

Category: Send/Receive

Purpose: Test message delivery to multiple recipients at the same destination MTA.

Procedure:

1. Originator creates a message to two valid remote X.400 Primary recipients.
2. Originator sends the message with Delivery Notification requested.

Expected Results: Originator should receive one combined or two separate Delivery Notifications for this test message.

2.1.4 Test SR-004

Note: This test requires THREE participant MTA's - recommend using an impartial third-party MTA.

Category: Send/Receive

Purpose: Test message delivery to multiple recipients at different destination MTA's.

Procedure:

1. Originator creates one message to two valid remote X.400 Primary recipients, each in a different management domain - PRMD or ADMD).
2. Originator sends the message with Delivery Notification requested.

Expected Results: Originator should receive two separate Delivery Notifications for this test message.

2.1.5 Test SR-005

Category: Send/Receive

Purpose: Test message delivery to local and remote recipients.

Procedure:

1. Originator creates a message to two valid X.400 Primary recipients, one remote and one local.
2. Originator sends the message with Delivery Notification requested.

Expected Results: Originator should receive two separate Delivery Notifications for this test message.

2.2 Send/Receive Tests - ORName Attributes

The tests in this section must be considered and agreed upon individually by the testing partners. In each test, the originator's MTA must support the generation of the name attributes specified in the test. The destination MTA must process the name attributes in such a way as to yield the expected results.

2.2.1 Test SR-101

Category: Send/Receive

Purpose: Test message delivery based on valid SurName.

Procedure:

1. Originator creates a message to one valid remote X.400 Primary recipient. The recipient's ORName is specified down to the PersonalName attribute. The PersonalName contains only a valid SurName component.
2. Originator sends the message - does not request a Delivery Notification.
3. Recipient generates a specific acknowledgement back to the originator stating that the message was received.

Expected Results: Originator should receive a specific acknowledgement for this test message.

2.2.2 Test SR-102

Category: Send/Receive

Purpose: Test message non-delivery based on invalid SurName.

Procedure:

1. Originator creates a message to one invalid remote X.400 Primary recipient. The recipient's ORName is specified down to the PersonalName attribute. The PersonalName contains only an invalid SurName component.
2. Originator sends the message - does not request a Delivery Notification.

Expected Results: Originator should receive a Non-Delivery Notification (due to Unrecognized ORName) for this test message.

2.2.3 Test SR-103

Category: Send/Receive

Purpose: Test message delivery based on completely specified PersonalName

Procedure:

1. Originator creates a message to one valid remote X.400 Primary recipient. The recipient's ORName is specified down to the PersonalName attribute. The PersonalName is fully specified and contains the following components:

   NIST Profile: SurName, GivenName, Initials, and GenerationQualifier

   EN/ENV Profile: SurName, GivenName, and Initials

   Note: Both implementations must support the same profile(s) to execute this test.

2. Originator sends the message with Delivery Notification requested.

Expected Results: Originator should receive a Delivery Notification for this test message.

2.2.4 Test SR-104

Category: Send/Receive

Purpose: Test message non-delivery based on ambiguous SurName.

Procedure:

1. Partner's MTA defines two users with the same SurName but different GivenNames (e.g., "Lincoln, Abraham" and "Lincoln, John").

2. Originator creates a message to one of the valid remote X.400 Primary recipients. The recipient's ORName is specified down to the PersonalName attribute. The PersonalName contains only a valid SurName component.

3. Originator sends the message - does not request a Delivery Notification.

Expected Results: Originator should receive a Non-Delivery Notification (due to Ambiguous or Unrecognized ORName) for this test message.

2.2.5 Test SR-104-A

Category: Send/Receive

Purpose: Test message non-delivery based on ambiguous GivenName.

Procedure:

1. Partner's MTA defines two users with the same SurName and GivenName but different Initials (e.g., "Lincoln, Abraham A." and "Lincoln, Abraham B.").
2. Originator creates a message to one of the valid remote X.400 Primary recipients. The recipient's ORName is specified down to the PersonalName attribute. The PersonalName contains only valid SurName and GivenName components.
3. Originator sends the message with Delivery Notification requested.

Expected Results: Originator should receive a Non-Delivery Notification (due to Ambiguous or Unrecognized ORName) for this test message.

2.2.6 Test SR-104-B

Category: Send/Receive

Purpose: Test message non-delivery based on ambiguous Initials.

Procedure:

1. Partner's MTA defines two users with the same SurName, GivenName, and Initials but different GenerationQualifier (e.g., "Lincoln, Abraham A. II" and "Lincoln, Abraham A. III").
2. Originator creates a message to one of the valid remote X.400 Primary recipients. The recipient's ORName is specified down to the PersonalName attribute. The PersonalName contains only valid SurName, GivenName, and Initials components.
3. Originator sends the message with Delivery Notification requested.

Expected Results: Originator should receive a Non-Delivery Notification (due to Ambiguous or Unrecognized ORName) for this test message.

2.2.7 Test SR-105

Category: Send/Receive

Purpose: Test Message Transfer System response to an over-specified ORName (over-specified with GivenName).

Procedure:

1. Partner's MTA defines one user qualified down to PersonalName, with only the SurName component being significant for message delivery. Partner's MTA has **no** Alternate Recipient defined.

2. Originator creates a message to that user. The recipient's ORName is specified down to the PersonalName attribute. The PersonalName contains only the valid SurName and a GivenName.

3. Originator sends the message with Delivery Notification requested.

Expected Results: Originator should receive a Non-Delivery Notification (due to Unrecognized ORName) for this test message.

Note: Refer to NIST SP 500-162, section 7.5.3.5, "ORName Protocol Elements," which states that "Overspecified ORNames... are to be non-delivered or sent to the alternate recipient as appropriate."

2.2.8 Test SR-105-A

Category: Send/Receive

Purpose: Test Message Transfer System response to an over-specified ORName (over-specified with Initials).

Procedure:

1. Partner's MTA defines one user qualified down to PersonalName, with only the GivenName component being significant for message delivery. Partner's MTA has **no** Alternate Recipient defined.

2. Originator creates a message to that user. The recipient's ORName is specified down to the PersonalName attribute. The PersonalName contains only the valid SurName and GivenName and some Initials.

3. Originator sends the message with Delivery Notification requested.

Expected Results: Originator should receive a Non-Delivery Notification (due to Unrecognized ORName) for this test message.

Note: Refer to NIST SP 500-162, section 7.5.3.5, "ORName Protocol Elements," which states that "Overspecified ORNames... are to be non-delivered or sent to the alternate recipient as appropriate."

2.2.9 Test SR-106

Category: Send/Receive

Purpose: Test message delivery based on Organization Name attribute.

Procedure:

1. Originator defines his/her MTA routing such that the OrganizationName attribute is necessary for routing to the Recipient's MTA.
2. Partner's MTA defines one user qualified down to OrganizationName, with the OrganizationName being significant for message delivery.
3. Originator creates a message to that user. The recipient's ORName is specified down to the OrganizationName attribute.
4. Originator sends the message with Delivery Notification requested.

Expected Results: Originator should receive a Delivery Notification for this test message.

Note: This will test the Originator MTA's ability to route on the Organization Name attribute, which demonstrates NIST "Class 1" routing within that MTA.

2.2.10 Test SR-107

Category: Send/Receive

Purpose: Test message delivery based on one Organizational Unit attribute

Procedure:

1. Originator defines his/her MTA routing such that one OrganizationalUnit attribute is necessary for routing to the Recipient's MTA.
2. Partner's MTA defines one user qualified down to OrganizationalUnit, with one OrgUnit component being significant for message delivery.
3. Originator creates a message addressed to two Primary recipients. The recipients' ORNames are specified down to the OrgUnit attribute. The two ORNames are the same up to the OrgUnit - one includes the OrgUnit of the valid recipient and the other has an invalid OrgUnit.
4. Originator sends the message with Delivery Notification requested.

Expected Results: Originator should receive a Delivery Notification for the valid recipient and a Non-Delivery Notification (due to Unrecognized ORName) for the invalid one.

Note: This will test the Originator MTA's ability to route on the Organization Unit attributes, which demonstrates NIST "Class 2" routing within that MTA.

2.2.11 Test SR-107-A

Category: Send/Receive

Purpose: Test message delivery based on two Organizational Unit attributes.

Procedure:

1. Originator defines his/her MTA routing such that two OrganizationalUnit attributes are necessary for routing to the Recipient's MTA.
2. Partner's MTA defines one user qualified down to OrganizationalUnit, with two OrgUnit components being significant for message delivery.
3. Originator creates a message addressed to two Primary recipients. The recipients' ORNames specified down to the OrgUnit attributes. The two ORNames are the same up to the second (least significant) OrgUnit - one includes the least-significant OrgUnit of the valid recipient and the other has an invalid least-significant OrgUnit.
4. Originator sends the message with Delivery Notification requested.

Expected Results: Originator should receive a Delivery Notification for the valid recipient and a Non-Delivery Notification (due to Unrecognized ORName) for the invalid one.

Note: This will test the Originator MTA's ability to route on the Organization Unit attributes, which demonstrates NIST "Class 2" routing within that MTA.

2.2.12 Test SR-107-B

Category: Send/Receive

Purpose: Test message delivery based on three Organizational Unit attributes.

Procedure:

1. Originator defines his/her MTA routing such that three OrganizationalUnit attributes are necessary for routing to the Recipient's MTA.

2. Partner's MTA defines one user qualified down to OrganizationalUnit, with three OrgUnit components being significant for message delivery.

3. Originator creates a message addressed to two Primary recipients. The recipients' ORNames specified down to the OrgUnit attributes. The two ORNames are the same up to the third (least significant) OrgUnit - one includes the least-significant OrgUnit of the valid recipient and the other has an invalid least-significant OrgUnit.

4. Originator sends the message with Delivery Notification requested.

Expected Results: Originator should receive a Delivery Notification for the valid recipient and a Non-Delivery Notification (due to Unrecognized ORName) for the invalid one.

Note: This will test the Originator MTA's ability to route on the Organization Unit attributes, which demonstrates NIST "Class 2" routing within that MTA.

2.2.13 Test SR-107-C

Category: Send/Receive

Purpose: Test message delivery based on four Organizational Unit attributes.

Procedure:

1. Originator defines his/her MTA routing such that four OrganizationalUnit attributes are necessary for routing to the Recipient's MTA.

2. Partner's MTA defines one user qualified down to OrganizationalUnit, with four OrgUnit components being significant for message delivery.

3. Originator creates a message addressed to two Primary recipients. The recipients' ORNames specified down to the OrgUnit attributes. The two ORNames are the same up to the fourth (least significant) OrgUnit - one includes the least-significant OrgUnit of the valid recipient and the other has an invalid least-significant OrgUnit.

4. Originator sends the message with Delivery Notification requested.

Expected Results: Originator should receive a Delivery Notification for the valid recipient and a Non-Delivery Notification (due to Unrecognized ORName) for the invalid one.

Note: This will test the Originator MTA's ability to route on the Organization Unit attributes, whieh demonstrates NIST "Class 2" routing within that MTA.

2.2.14 Test SR-108

Category: Send/Reeeive

Purpose: Test for delivery and non-delivery based on PersonalName attribute.

Procedure:

1. Originator defines his/her MTA routing sueh that the PersonalName attribute (specifieally, the GivenName) is necessary for routing to the Reeipient's MTA.
2. Partner's MTA defines one user qualified down to PersonalName, with the GivenName eomponent being significant for message delivery.
3. Originator ereates a message addressed to two Primary reeipients. The reeipients' ORNames are specified down to the PersonalName attribute. The PersonalNames eontain only the SurName and GivenName components; the SurNames are the same for both but one has a valid GivenName and the other has an invalid GivenName.
4. Originator sends the message with Delivery Notification requested.

Expected Results: Originator should reeeive a Delivery Notifieation for the valid reeipient and a Non-Delivery Notification (due to Unreeognized ORName) for the invalid one.

Note: This will test the Originator MTA's ability to route on the Personal Name attribute, whieh demonstrates NIST "Class 3" routing within that MTA.

2.2.15 Test SR-109

Category: Send/Reeeive

Purpose: Test the ability of the Message Transfer System to use the Initials attribute in name diserimination.

Procedure:

1. Partner's MTA defines two users with the same SurName and GivenName but different Initials (e.g., "Lineoln, Abraham A." and "Lineoln, Abraham B.").

2. Originator creates a message to one of the valid remote X.400 Primary recipients. The recipient's ORName is specified down to the PersonalName attribute. The PersonalName contains a valid SurName, GivenName, and Initials for one of the users.

3. Originator sends the message with Delivery Notification requested.

Expected Results: Originator should receive a Delivery Notification for this test message.

2.2.16 Test SR-109-A

Category: Send/Receive

Purpose: Test the ability of the Message Transfer System to use the GenerationQualifier attribute in name discrimination.

Procedure:

1. Partner's MTA defines two users with the same SurName, GivenName, and Initials but different GenerationQualifiers (e.g., "Lincoln, Abraham A. II" and "Lincoln, Abraham A. III").

2. Originator creates a message to one of the valid remote X.400 Primary recipients. The recipient's ORName is specified down to the PersonalName attribute. The PersonalName contains a valid SurName, GivenName, Initials, and GenerationQualifier for one of the users.

3. Originator sends the message with Delivery Notification requested.

Expected Results: Originator should receive a Delivery Notification for this test message.

2.2.17 Test SR-110

Category: Send/Receive

Purpose: Test message non-delivery based on invalid PRMD.

Procedure:

1. Originator defines his/her routing such that messages with a PRMD name of "INVALIDPRMD" will be routed to the partner's MTA. Partner does NOT define "INVALIDPRMD" as a valid PRMD and does not have any default routing enabled.

2. Originator creates a message to one invalid remote X.400 Primary recipient. The recipient's ORName is specified down to the PersonalName attribute. The ORName contains only an invalid PRMD component specified as "INVALIDPRMD"

3. Originator sends the message - does not request a Delivery Notification.

Expected Results: Originator should receive a Non-Delivery Notification (due to Unrecognized ORName) for this test message.

2.3 Send/Receive Tests - UA defined services

These next tests are applicable only if the originator's UA generates the defined service(s) and/or data elements and the other UAs participating in the test can perform the processing required to yield the expected results. Each test in this section must be considered and agreed upon individually before the testing begins. Once a service element has been tested, it can remain in the tests that follow. Refer to section 2 ("Interpersonal Messaging Service") of CCITT Recommendation X.401 (1984) for a list of the UA-defined service elements.

Note: Some of the Interpersonal Message header elements being tested in tests SR-201 - SR-218 can vary in format. For example, the IPMessageID can be constructed with or without an ORName. Test participants should run several variations of the same test when this applies. Consult section 3.2.1 ("Heading") of CCITT Recommendation X.420 (1984) for a detailed description of the Interpersonal Message Header.

2.3.1 Test SR-201

Category: Send/Receive

Purpose: Test ***Originator Indication*** IPM service element.

Procedure:

1. Originator creates a message to one valid remote X.400 Primary recipient. The message should include the Originator Indication service element in the IP message content header.
2. Originator sends the message - does not request a Delivery Notification.
3. Recipient generates a specific acknowledgement back to the originator stating that the message was received and stating whether or not the message contained the Originator Indication.

Expected Results: Originator should receive a specific acknowledgement for this test message.

2.3.2 Test SR-202

Category: Send/Receive

Purpose: Test ***Primary and Copy Recipients Indication*** IPM service element - single recipients.

Procedure:

1. Originator creates a message to two valid remote X.400 recipients - one Primary recipient and one Copy recipient.

2. Originator sends the message - does not request a Delivery Notification.

3. Recipients generate a specific acknowledgement back to the originator stating that the message was received. The Primary and Copy recipients should state that they were indicated as such in the messages they received and that the other recipient was disclosed to them as well.

Expected Results: Originator should receive two specific acknowledgements for this test message.

2.3.3 Test SR-202-A

Category: Send/Receive

Purpose: Test ***Primary and Copy Recipients Indication*** IPM service element - multiple recipients.

Procedure:

1. Originator creates a message to four valid remote X.400 recipients - two Primary recipients and two Copy recipients.

2. Originator sends the message - does not request a Delivery Notification.

3. Recipients generate a specific acknowledgement back to the originator stating that the message was received. The Primary and Copy recipients should state that they were indicated as such in the messages they received and that the other recipients were disclosed to them as well.

Expected Results: Originator should receive four specific acknowledgements for this test message.

2.3.4 Test SR-202-B

Category: Send/Receive

Purpose: Test ***Primary and Copy Recipients Indication*** IPM service element - Copy recipient only.

Procedure:

1. Originator creates a message to one valid remote X.400 Copy recipient only - no Primary recipient.

2. Originator sends the message - does not request a Delivery Notification.

3. Recipient generates a specific acknowledgement back to the originator stating that the message was received, and that he/she was indicated as the Copy recipient in the message.

Expected Results: Originator should receive a specific acknowledgement for this test message.

Note: Some implementations may not allow the creation/submission of a message without at least one Primary recipient.

2.3.5 Test SR-203

Category: Send/Receive

Purpose: Test ***Blind Copy Recipient Indication*** IPM service element - single recipients.

Procedure:

1. Originator creates a message to two valid remote X.400 recipients - one Primary recipient and one Blind Copy recipient.
2. Originator sends the message - does not request a Delivery Notification.
3. Recipients generate a specific acknowledgement back to the originator stating that the message was received. The Primary and Blind Copy recipients should state that they were indicated as such in the messages they received. The Primary recipient should state that the Blind Copy recipient was not disclosed to him/her.

Expected Results: Originator should receive two specific acknowledgements for this test message.

2.3.6 Test SR-203-A

Category: Send/Receive

Purpose: Test ***Blind Copy Recipient Indication*** IPM service element - multiple recipients.

Procedure:

1. Originator creates a message to four valid remote X.400 recipients - two Primary recipients and two Blind Copy recipients.
2. Originator sends the message - does not request a Delivery Notification.
3. Recipients generate a specific acknowledgement back to the originator stating that the message was received. The Primary and Blind Copy recipients should state that they were indicated as

such in the messages they received. The Primary recipients should state that the Blind Copy recipients were not disclosed to them. The Blind Copy recipients should state whether or not the other Blind Copy recipient was disclosed to them.

Expected Results: Originator should receive four specific acknowledgements for this test message.

2.3.7 Test SR-203-B

Category: Send/Receive

Purpose: Test ***Blind Copy Recipient Indication*** IPM service element - Blind Copy recipient only.

Procedure:

1. Originator creates a message to one valid remote X.400 Blind Copy recipient only - no Primary recipient.
2. Originator sends the message - does not request a Delivery Notification.
3. Recipient generates a specific acknowledgement back to the originator stating that the message was received, and that he/she was indicated as the Blind Copy recipient in the message.

Expected Results: Originator should receive a specific acknowledgement for this test message.

Note: Some implementations may not allow the creation/submission of a message without at least one Primary recipient.

2.3.8 Test SR-204

Category: Send/Receive

Purpose: Test ***Reply Request Indication*** IPM service element - specifically, the ReplyBy IPM heading component.

Procedure:

1. Originator creates a message to one valid remote X.400 Primary recipient. The message should include the ReplyBy IPM heading component with a specific UTCTime value (e.g., "8904180900-0800" which is 9am local time in San Francisco on April 18, 1989).
2. Originator sends the message - does not request a Delivery Notification.

3. Recipient generates a specific acknowledgement back to the originator stating that the message was received and stating whether or not the message contained the ReplyBy IPM heading component with the date and time correctly formatted.

Expected Results: Originator should receive a specific acknowledgement for this test message.

2.3.9 Test SR-204-A

Category: Send/Receive

Purpose: Test ***Reply Request Indication*** IPM service element - specifically, the ReplyToUsers IPM heading component.

Procedure:

1. Originator creates a message to one valid remote X.400 Primary recipient. The message should include the ReplyToUsers IPM heading component with one ORName specified.
2. Originator sends the message - does not request a Delivery Notification.
3. Recipient generates a specific acknowledgement back to the originator stating that the message was received and stating whether or not the message contained the ReplyToUsers IPM heading component with the correct ORName.

Expected Results: Originator should receive a specific acknowledgement for this test message.

2.3.10 Test SR-204-B

Category: Send/Receive

Purpose: Test ***Reply Request Indication*** IPM service element - specifically, both ReplyBy and the ReplyToUsers (with multiple ORNames) IPM heading components.

Procedure:

1. Originator creates a message to one valid remote X.400 Primary recipient. The message should include the ReplyBy IPM heading component with a specific UTCTime value (e.g., "8904180900-0800" which is 9am local time in San Francisco on April 18, 1989). The message should also include the ReplyToUsers IPM heading component with two ORNames specified.

2. Originator sends the message - does not request a Delivery Notification.

3. Recipient generates a specific acknowledgement back to the originator stating that the message was received and stating whether or not the message contained the ReplyToUsers IPM heading component with the correct ORNames and also whether or not the message contained the ReplyBy IPM heading component with the date and time correctly formatted.

Expected Results: Originator should receive a specific acknowledgement for this test message.

2.3.11 Test SR-204-C

Category: Send/Receive

Purpose: Test ***Reply Request Indication*** IPM service element, multiple recipients - specifically, the ReplyBy IPM heading component.

Procedure:

1. Originator creates a message to two valid remote X.400 Primary recipients. The message should include the ReplyBy IPM heading component with a specific UTCTime value (e.g., "8904180900-0800" which is 9am local time in San Francisco on April 18, 1989).

2. Originator sends the message - does not request a Delivery Notification.

3. Recipients generate a specific acknowledgement back to the originator stating that the message was received and stating whether or not the message contained the ReplyBy IPM heading component with the date and time correctly formatted.

Expected Results: Originator should receive a specific acknowledgement for this test message from each of the recipients.

2.3.12 Test SR-204-D

Category: Send/Receive

Purpose: Test ***Reply Request Indication*** IPM service element, multiple recipients.

Procedure:

1. Originator creates a message to two valid remote X.400 Primary recipients. The originator requests a reply from only one of the Primary recipients.

2. Originator sends the message - does not request a Delivery Notification.
3. The Recipient from whom the Reply is requested generates a Reply back to the Originator acknowleding that a Request for a Reply was observed.
4. The other Recipient generates a specific acknowledgement back to the Originator stating that the message was received and stating whether or not a Request for a Reply was observed.

Expected Results: Originator should receive a Reply from the intended Recipient stating that a Request for Reply was observed and a specific acknowledgement from the other Recipient staing that no Request for Reply was observed.

2.3.13 Test SR-205

Category: Send/Receive

Purpose: Test ***Replying IP-message Indication*** IPM service element.

Procedure:

1. Originator creates a message to one valid remote X.400 Primary recipient.
2. Originator sends the message - does not request a Delivery Notification.
3. Recipient creates and sends a reply back to the originator stating that the message was received.

Expected Results: Originator should receive a reply for this test message. The reply should contain the InReplyTo IPM heading component with the same value as the IPMessageID of the original message.

2.3.14 Test SR-205-A

Category: Send/Receive

Purpose: Test ***Replying IP-message Indication*** and ***Reply Request Indication*** IPM service elements in combination.

Procedure:

1. Originator creates a message to one valid remote X.400 Primary recipient. The message should include the ReplyToUsers IPM heading component with one ORName specified. The ORName should specify a user local to the originator's MTA.

2. Originator sends the message - does not request a Delivery Notification.

3. Recipient creates and sends a reply stating that the message was received.

4. The "Reply-To" user generates a specific acknowledgement back to the originator stating that the message was received and includes the value of the InReplyTo IPM heading component in the message he/she received.

Expected Results: Originator should receive a specific acknowledgement for this test message originating from the ReplyToUser and containing the value of the InReplyTo IPM heading component in the reply he/she received from the recipient. This should be the same value as the IPMessageID of the original message.

2.3.15 Test SR-206

Category: Send/Receive

Purpose: Test ***Cross-Referencing Indication*** IPM service element (single value).

Procedure:

1. Originator creates a message to one valid remote X.400 Primary recipient. The message should include the CrossReferences IPM heading component with a specific IPMessageID (use the IPMessageID from SR-101.).

2. Originator sends the message - does not request a Delivery Notification.

3. Recipient generates a specific acknowledgement back to the originator stating that the message was received and stating whether or not the message contained the CrossReferences IPM heading component along with its value.

Expected Results: Originator should receive a specific acknowledgement for this test message containing the value of the CrossReferences component received by the recipient. This should match the value sent with the original message.

2.3.16 Test SR-206-A

Category: Send/Receive

Purpose: Test ***Cross-Referencing Indication*** IPM service element (multiple values).

Procedure:

1. Originator creates a message to one valid remote X.400 Primary recipient. The message should include the CrossReferences IPM heading component with two specific IPMessageIDs (use the IPMessageIDs from SR-101 and SR-102).
2. Originator sends the message - does not request a Delivery Notification.
3. Recipient generates a specific acknowledgement back to the originator stating that the message was received and stating whether or not the message contained the CrossReferences IPM heading component along with its values.

Expected Results: Originator should receive a specific acknowledgement for this test message containing the values of the CrossReferences component received by the recipient. These should match the values sent with the original message.

2.3.17 Test SR-207

Category: Send/Receive

Purpose: Test ***Obsoleting Indication*** IPM service element (single value).

Procedure:

1. Originator creates a message to one valid remote X.400 Primary recipient. The message should include the "Obsoletes" IPM heading component with a specific IPMessageID (any valid PrintableString).
2. Originator sends the message - does not request a Delivery Notification.
3. Recipient generates a specific acknowledgement back to the originator stating that the message was received and stating whether or not the message contained the Obsoletes IPM heading component along with its value.

Expected Results: Originator should receive a specific acknowledgement for this test message containing the value of the Obsoletes component received by the recipient. This should match the value sent with the original message.

2.3.18 Test SR-207-A

Category: Send/Receive

Purpose: Test ***Obsoleting Indication*** IPM service element (multiple values).

Procedure:

1. Originator creates a message to one valid remote X.400 Primary recipient. The message should include the "Obsoletes" IPM heading component with two specific IPMessageIDs (any valid PrintableStrings).
2. Originator sends the message - does not request a Delivery Notification.
3. Recipient generates a specific acknowledgement back to the originator stating that the message was received and stating whether or not the message contained the Obsoletes IPM heading component along with its values.

Expected Results: Originator should receive a specific acknowledgement for this test message containing the values of the Obsoletes component received by the recipient. These should match the values sent with the original message.

2.3.19 Test SR-208

Category: Send/Receive

Purpose: Test ***Authorizing Users Indication*** IPM service element (single ORName).

Procedure:

1. Originator creates a message to one valid remote X.400 Primary recipient. The message should include the AuthorizingUsers IPM heading component with one ORName specified.
2. Originator sends the message - does not request a Delivery Notification.
3. Recipient generates a specific acknowledgement back to the originator stating that the message was received and stating whether or not the message contained the AuthorizingUsers IPM heading component with the correct ORName.

Expected Results: Originator should receive a specific acknowledgement for this test message.

2.3.20 Test SR-208-A

Category: Send/Receive

Purpose: Test ***Authorizing Users Indication*** IPM service element (multiple ORNames).

Procedure:

1. Originator creates a message to one valid remote X.400 Primary recipient. The message should include the AuthorizingUsers IPM heading component with two ORName specified.
2. Originator sends the message - does not request a Delivery Notification.
3. Recipient generates a specific acknowledgement back to the originator stating that the message was received and stating whether or not the message contained the AuthorizingUsers IPM heading component with the correct ORNames.

Expected Results: Originator should receive a specific acknowledgement for this test message.

2.3.21 Test SR-209

Category: Send/Receive

Purpose: Test ***Expiry Date Indication*** IPM service element.

Procedure:

1. Originator creates a message to one valid remote X.400 Primary recipient. The message should include the ExpiryDate IPM heading component with a specific UTCTime value (e.g., "9904180900-0800" which is 9am local time in San Francisco on April 18, 1999).
2. Originator sends the message - does not request a Delivery Notification.
3. Recipient generates a specific acknowledgement back to the originator stating that the message was received and stating whether or not the message contained the ExpiryDate IPM heading component with the date and time correctly formatted.

Expected Results: Originator should receive a specific acknowledgement for this test message.

2.3.22 Test SR-210

Category: Send/Receive

Purpose: Test ***Forwarded IP-Message Indication*** IPM service element (with no added text).

Procedure:

1. Originator creates a message to one valid remote X.400 Primary recipient.
2. Originator sends the message - does not request a Delivery Notification.
3. Recipient receives the message and forwards it back to the originator (without adding any new text).

Expected Results: Originator should receive a message from the recipient. The body of the message should only contain the message sent by the originator along with its IPM header as received by the recipient, and indication that the message was forwarded.

Note: Many implementations do not make the distinction of multiple BodyParts (if they are of the same type) known to the User. Under these circumstances, the only real determinant method of verifying the existence of a separate ForwardedIPMessage BodyPart would be to examine a P2 trace. Since this level of scrutiny is generally beyond the means of a messaging system end-user, the results of this test may be indeterminate.

2.3.23 Test SR-210-A

Category: Send/Receive

Purpose: Test ***Forwarded IP-Message Indication*** IPM service element (with added text).

Procedure:

1. Originator creates a message to one valid remote X.400 Primary recipient.
2. Originator sends the message - does not request a Delivery Notification.
3. Recipient receives the message and forwards it back to the originator with a few lines of text added to it.

Expected Results: Originator should receive a message from the recipient. The body of the message should contain the message sent by the originator along with its IPM header as received by the recipient, the new text added by the recipient, and indication that the message was forwarded.

Note: Many implementations do not make the distinction of multiple BodyParts (if they are of the same type) known to the User. Under these circumstances, the only real determinant method of verifying the existence of a separate ForwardedIPMessage BodyPart would be to

examine a P2 trace. Since this level of scrutiny is generally beyond the means of a messaging system end-user, the results of this test may be indeterminate.

2.3.24 Test SR-210-B

Category: Send/Receive

Purpose: Test ***Forwarded IP-Message Indication*** IPM service element (multiple forwarding)

Procedure:

1. Originator creates a message to one valid remote X.400 Primary recipient.
2. Originator sends the message - does not request a Delivery Notification.
3. Recipient receives the message and forwards it back to the originator with a few lines of text added to it.
4. Originator receives the message and forwards it back to the recipient with a few more lines of text added to it.
5. Recipient receives the message and forwards it back to the originator with no new text added to it.

Expected Results: Originator should receive a message from the recipient. The body of the message should contain three forwarded messages, starting with the original message, and including all of the intermediate IPM headers and the added text.

Note: Many implementations do not make the distinction of multiple BodyParts (if they are of the same type) known to the User. Under these circumstances, the only real determinant method of verifying the existence of a separate ForwardedIPMessage BodyPart would be to examine a P2 trace. Since this level of scrutiny is generally beyond the means of a messaging system end-user, the results of this test may be indeterminate.

2.3.25 Test SR-211

Category: Send/Receive

Purpose: Test ***Importance Indication*** IPM service element (**Normal**).

Procedure:

1. Originator creates a message to one valid remote X.400 Primary recipient. The message should have the "Importance" IPM heading component set to **Normal**

2. Originator sends the message - does not request a Delivery Notification.

3. Recipient generates a specific acknowledgement back to the originator stating that the message was received and stating whether or not the message contained the Importance IPM heading component along with its value.

Expected Results: Results will vary in different implementations - Originator should receive either a specific acknowledgement for this test message stating that Importance was set to **Normal**, or that Importance was not set (since it defaults to Normal, an implementation receiving a message with Importance set to Normal may choose not to show it).

2.3.26 Test SR-211-A

Category: Send/Receive

Purpose: Test ***Importance Indication*** IPM service element (**High**).

Procedure:

1. Originator creates a message to one valid remote X.400 Primary recipient. The message should have the "Importance" IPM heading component set to **High**

2. Originator sends the message - does not request a Delivery Notification.

3. Recipient generates a specific acknowledgement back to the originator stating that the message was received and stating whether or not the message contained the Importance IPM heading component along with its value.

Expected Results: Originator should receive a specific acknowledgement for this test message stating that Importance was set to **High**.

2.3.27 Test SR-211-B

Category: Send/Receive

Purpose: Test ***Importance Indication*** IPM service element (**Low**).

Procedure:

1. Originator creates a message to one valid remote X.400 Primary recipient. The message should have the "Importance" IPM heading component set to **Low**

2. Originator sends the message - does not request a Delivery Notification.

3. Recipient generates a specific acknowledgement back to the originator stating that the message was received and stating whether or not the message contained the Importance IPM heading component along with its value.

Expected Results: Originator should receive a specific acknowledgement for this test message stating that Importance was set to **Low**.

2.3.28 Test SR-211-C

Category: Send/Receive

Purpose: Test ***Importance Indication*** IPM service element (unspecified).

Procedure:

1. Originator creates a message to one valid remote X.400 Primary recipient. The message should leave the "Importance" IPM heading component unspecified.
2. Originator sends the message - does not request a Delivery Notification.
3. Recipient generates a specific acknowledgement back to the originator stating that the message was received and stating whether or not the message contained the Importance IPM heading component along with its value.

Expected Results: Results will vary in different implementations - Originator should receive either a specific acknowledgement for this test message stating that Importance was set to **Normal** (the default value for this component), or that Importance was not set (since it defaults to Normal, an implementation receiving a message with Importance set to Normal may choose not to show it).

2.3.29 Test SR-212

Category: Send/Receive

Purpose: Test ***Sensitivity Indication*** IPM service element (**Personal**).

Procedure:

1. Originator creates a message to one valid remote X.400 Primary recipient. The message should have the "Sensitivity" IPM heading component set to **Personal**
2. Originator sends the message - does not request a Delivery Notification.
3. Recipient generates a specific acknowledgement back to the originator stating that the message was received and stating whether

or not the message contained the Sensitivity IPM heading component along with its value.

Expected Results: Originator should receive a specific acknowledgement for this test message stating that Sensitivity was set to **Personal.**

2.3.30 Test SR-212-A

Category: Send/Receive

Purpose: Test ***Sensitivity Indication*** IPM service element (**Private**).

Procedure:

1. Originator creates a message to one valid remote X.400 Primary recipient. The message should have the "Sensitivity" IPM heading component set to **Private**
2. Originator sends the message - does not request a Delivery Notification.
3. Recipient generates a specific acknowledgement back to the originator stating that the message was received and stating whether or not the message contained the Sensitivity IPM heading component along with its value.

Expected Results: Originator should receive a specific acknowledgement for this test message stating that Sensitivity was set to **Private**.

2.3.31 Test SR-212-B

Category: Send/Receive

Purpose: Test ***Sensitivity Indication*** IPM service element (**CompanyConfidential**).

Procedure:

1. Originator creates a message to one valid remote X.400 Primary recipient. The message should have the "Sensitivity" IPM heading component set to **CompanyConfidential**
2. Originator sends the message - does not request a Delivery Notification.
3. Recipient generates a specific acknowledgement back to the originator stating that the message was received and stating whether or not the message contained the Sensitivity IPM heading component along with its value.

Expected Results: Originator should receive a specific acknowledgement for this test message stating that Sensitivity was set to **CompanyConfidential.**

2.3.32 Test SR-213

Category: Send/Receive

Purpose: Test ***Auto-Forwarded Indication*** IPM service element (with no added text).

Procedure:

1. Originator creates a message to one valid remote X.400 Primary recipient.
2. Originator sends the message - does not request a Delivery Notification.
3. Recipient receives the message and forwards it back to the originator (without adding any new text). This may be accomplished either by an automatic process or by a manual one, but the "AutoForwarded" IPM heading component should be set to **True**.

Expected Results: Originator should receive a message from the recipient. The IPM header should contain an indication that the message was auto-forwarded. The body of the message should only contain the message sent by the originator along with its IPM header as received by the recipient.

2.3.33 Test SR-214

Category: Send/Receive

Purpose: Test ***Multi-Part Body*** IPM service element - two BodyParts of the same type.

Procedure:

1. Originator creates a message to one valid remote X.400 Primary recipient. The message contains two distinct body parts of the same type - IA5Text.
2. Originator sends the message - does not request a Delivery Notification.
3. Recipient generates a specific acknowledgement back to the originator stating whether or not both body parts were received.

Expected Results: Originator should receive a specific acknowledgement for this test message.

Note: Many implementations do not make the distinction of multiple BodyParts (if they are of the same type) known to the User. Under these circumstances, the only real determinant method of verifying the existence of two separate BodyParts would be to examine a P2 trace.

Since this level of scrutiny is generally beyond the means of a message system end-user, the results of this test may be indeterminate.

2.3.34 Test SR-214-A

Category: Send/Receive

Purpose: Test ***Multi-Part Body*** IPM service element - two BodyParts of different types.

Procedure:

1. Originator creates a message to one valid remote X.400 Primary recipient. The message contains two distinct body parts of different types - e.g., IA5Text and G3Fax.
2. Originator sends the message - does not request a Delivery Notification.
3. Recipient generates a specific acknowledgement back to the originator stating whether or not both body parts were received appropriately.

Expected Results: Originator should receive a specific acknowledgement for this test message.

2.3.35 Test SR-215

Category: Send/Receive

Purpose: Test ***Receipt Notification*** IPM service element (no Delivery Notification).

Procedure:

1. Originator creates a message to one valid remote X.400 Primary recipient.
2. Originator sends the message with only Receipt Notification requested - does not request Delivery Notification.
3. Recipient takes whatever action is necessary, if required, to cause a Receipt Notification to be generated back to the Originator.

Expected Results: Originator should receive only a Receipt Notification for this test message. The ***TypeOfReceipt*** component of the Receipt Notification, if present, should have a value of either **Explicit** or **Automatic** depending on whether the recipient explicitly authorized sending the notification or the User Agent automatically generated the notification when the message was received, respectively.

2.3.36 Test SR-215-A

Category: Send/Receive

Purpose: Test ***Receipt Notification*** IPM service element (in combination with Delivery Notification).

Procedure:

1. Originator creates a message to one valid remote X.400 Primary recipient.
2. Originator sends the message with both Delivery Notification and Receipt Notification requested.
3. Recipient takes whatever action is necessary, if required, to cause a Receipt Notification to be generated back to the Originator.

Expected Results: Originator should receive both a Delivery Notification and a Receipt Notification for this test message. The ***TypeOfReceipt*** component of the Receipt Notification, if present, should have a value of either **Explicit** or **Automatic** depending on whether the recipient explicitly authorized sending the notification or the User Agent automatically generated the notification when the message was received, respectively.

2.3.37 Test SR-216

Category: Send/Receive

Purpose: Test ***Non-Receipt Notification*** IPM service element (no Delivery Notification).

Procedure:

1. Originator creates a message to one valid remote X.400 Primary recipient.
2. Originator sends the message with only Receipt Notification requested - does not request Delivery Notification.
3. Recipient takes whatever action is necessary to cause a Non-Receipt Notification to be generated back to the Originator (e.g., User Agent-initiated discard or auto-forwarding).

Expected Results: Originator should receive only a Non-Receipt Notification (due to discard or auto-forwarding) for this test message.

2.3.38 Test SR-216-A

Category: Send/Receive

Purpose: Test *Non-Receipt Notification* IPM service element (in combination with Delivery Notification).

Procedure:

1. Originator creates a message to one valid remote X.400 Primary recipient.
2. Originator sends the message with both Delivery Notification and Receipt Notification requested.
3. Recipient takes whatever action is necessary to cause a Non-Receipt Notification to be generated back to the Originator (e.g., User Agent-initiated discard or auto-forwarding).

Expected Results: Originator should receive both a Delivery Notification and a Non-Receipt Notification (due to discard or auto-forwarding) for this test message.

2.3.39 Test SR-217

Category: Send/Receive

Purpose: Test multiple IPM service elements in combination.

Procedure:

1. Originator creates a message to:
   - two valid remote X.400 Primary recipients
   - two valid remote X.400 Copy recipients
   - two valid remote X.400 Blind Copy recipients (optional)

   and includes as many of the following IPM service elements as are supported by his/her implementation:
   - Authorizing Users Indication
   - Cross-Referencing Indication
   - Expiry Date Indication
   - Importance Indication
   - Obsoleting Indication
   - Originator Indication
   - Sensitivity Indication
   - Subject Indication

The message should include the ReplyBy IPM heading component with a specific UTCTime value (e.g., "9006190900-0800" which is 9am local time in San Francisco on June 19, 1990).

2. Originator sends the message with Delivery Notification requested and also Receipt Notification requested, if supported.

3. If Receipt Notification is supported, the recipients take whatever action is necessary to cause a Receipt Notification to be generated back to the Originator.

4. Recipients also Reply to the message they receive. The messages they compose should indicate:

   a. recipients (Primary, Copy, and Blind Copy) disclosed to them

   b. IPM service elements indicated in the IPM heading of the received message

   c. values of multi-value components (Authorizing Users, Cross References, etc.)

Expected Results: Originator should receive Receipt Notifications (as supported), Delivery Notifications, and Replies for each of the recipients. The replies should contain the InReplyTo IPM heading component with the same value as the IPMessageID of the original message.

2.3.40 Test SR-218

Category: Send/Receive

Purpose: Test ***Subject Indication*** IPM service element.

Procedure:

1. Originator creates a message to one valid remote X.400 Primary recipient. The message should have the "Subject" IPM heading component set to the following value (from the T61String character set):

   ```
   "%&'()*+,-./ 0123456789 :;<=>? ABCDEFGHIJKLMNOPQRSTUVWXYZ
   abcdefghijklmnopqrstuvwxyz
   ```

2. Originator sends the message - does not request a Delivery Notification.

3. Recipient generates a specific acknowledgement back to the originator stating that the message was received and whether the contents of the Subject fields was correct or not as defined by this test.

Expected Results: Originator should receive a specific acknowledgement for this test message stating that the Subject field was received correctly.

2.4 Send/Receive Tests - MTA defined services

The test cases in this section are applicable only if the originator's MTA generates the defined service(s) and/or data elements and the other MTA's participating in the test can perform the processing required to yield the expected results. Each test in this section must be considered and agreed upon individually before the testing begins.

2.4.1 Test SR-301

Category: Send/Receive

Purpose: Test ***Deferred Delivery*** MT service element.

Procedure:

1. Originator creates a message to one valid remote X.400 Primary recipient. The message should include the Deferred Delivery MT service element with a specific UTCTime value (e.g., "8904180900-0800" which is 9am local time in San Francisco on April 18, 1989). A value for the UTCTime should be chosen such that delivery would occur about 30 minutes after the message is sent.
2. Originator sends the message with Delivery Notification requested.

Expected Results: Originator should receive a Delivery Notification for this test message indicating the time the message was delivered.

2.4.2 Test SR-302

Category: Send/Receive

Purpose: Test ***Disclosure of Other Recipients*** MT service element - Disclosure requested.

Procedure:

1. Originator creates a message to two valid remote X.400 Primary recipients. Originator should specify Disclosure of other recipients when preparing the message for submission.
2. Originator sends the message - does not request Delivery Notification.
3. Recipients each generate a specific acknowledgement back to the originator stating whether or not the other Primary recipient was disclosed to them.

Expected Results: Originator should receive a specific acknowledgement from each recipient stating that the other recipient was disclosed to him/her.

2.4.3 Test SR-302-A

Category: Send/Receive

Purpose: Test ***Disclosure of Other Recipients*** MT service element - Non-Disclosure requested.

Procedure:

1. Originator creates a message to two valid remote X.400 Primary recipients. Originator should specify Non-Disclosure of other recipients when preparing the message for submission.
2. Originator sends the message - does not request Delivery Notification.
3. Recipients each generate a specific acknowledgement back to the originator stating whether or not the other Primary recipient was disclosed to them.

Expected Results: Originator should receive a specific acknowledgement from each recipient stating that the other recipient was not disclosed to him/her.

2.4.4 Test SR-303

Category: Send/Receive

Purpose: Test ***Return of Contents*** MT service element.

Procedure:

1. Originator creates a message to an invalid remote X.400 Primary recipient. Originator should specify Return of Contents requested when preparing the message for submission.
2. Originator sends the message with Delivery Notification requested.

Expected Results: Originator should receive a Non-Delivery Notification for this test message containing the contents of the original message.

2.4.5 Test SR-304

Category: Send/Receive

Purpose: Test ***Implicit Conversion*** MT service element.

Procedure:

1. Originator creates a message to a valid remote X.400 Primary recipient. The message should consist of an EncodedInformationType such that its delivery would require implicit conversion by the recipient's MTA (e.g., recipient's UA

registers with MTA as being able to receive IA5 EncodedInformationTypes but the message is sent as ISO6937).

2. Originator sends the message - does not request Delivery Notification.

3. Recipient generates a specific acknowledgement back to the originator stating that the message was converted properly.

Expected Results: Originator should receive a specific acknowledgement for this test message.

2.4.6 Test SR-305

Category: Send/Receive

Purpose: Test ***Conversion Prohibition*** MT service element.

Procedure:

1. Originator creates a message to a valid remote X.400 Primary recipient. The message should consist of an EncodedInformationType such that its delivery would require implicit conversion by the recipient's MTA (e.g., recipient's UA registers with MTA as being able to receive IA5 EncodedInformationTypes but the message is sent as ISO6937). Originator should specify Conversion Prohibited when preparing the message for submission.

2. Originator sends the message with Delivery Notification requested.

Expected Results: Originator should receive a Non-Delivery Notification (due to ConversionProhibited) for this test message.

2.4.7 Test SR-306

Category: Send/Receive

Purpose: Test recognition of ***Grade of Delivery Selection*** MT service element (**Normal**).

Procedure:

1. Originator creates a message to a valid remote X.400 Primary recipient. Originator should specify Priority = **Normal** when preparing the message for submission.

2. Originator sends the message - does not request Delivery Notification.

3. Recipient generates a specific acknowledgement back to the originator stating whether or not the Grade of Delivery was disclosed to him/her, and its value.

Expected Results: Originator should receive a specific acknowledgement for this test message stating that the message was received with a Grade of Delivery indication of **Normal**.

Note: This test simply verifies that the Grade of Delivery indication was recognized and disclosed to the recipient. It does **not** verify that the Grade of Delivery is honored by any of the participating MTA's. Some implementations do not disclose the Grade of Delivery to the recipient, so this test may not apply.

2.4.8 Test SR-306-A

Category: Send/Receive

Purpose: Test recognition of ***Grade of Delivery Selection*** MT service element (**Urgent**).

Procedure:

1. Originator creates a message to a valid remote X.400 Primary recipient. Originator should specify Priority = **Urgent** when preparing the message for submission.
2. Originator sends the message - does not request Delivery Notification.
3. Recipient generates a specific acknowledgement back to the originator stating whether or not the Grade of Delivery was disclosed to him/her, and its value.

Expected Results: Originator should receive a specific acknowledgement for this test message stating that the message was received with a Grade of Delivery indication of **Urgent**.

Note: This test simply verifies that the Grade of Delivery indication was recognized and disclosed to the recipient. It does **not** verify that the Grade of Delivery is honored by any of the participating MTA's. Some implementations do not disclose the Grade of Delivery to the recipient, so this test may not apply.

2.4.9 Test SR-306-B

Category: Send/Receive

Purpose: Test recognition of ***Grade of Delivery Selection*** MT service element (**Non-Urgent**).

Procedure:

1. Originator creates a message to a valid remote X.400 Primary recipient. Originator should specify Priority = **Non-Urgent** when preparing the message for submission.
2. Originator sends the message - does not request Delivery Notification.
3. Recipient generates a specific acknowledgement back to the originator stating whether or not the Grade of Delivery was disclosed to him/her, and its value.

Expected Results: Originator should receive a specific acknowledgement for this test message stating that the message was received with a Grade of Delivery indication of **Non-Urgent**.

Note: This test simply verifies that the Grade of Delivery indication was recognized and disclosed to the recipient. It does **not** verify that the Grade of Delivery is honored by any of the participating MTA's. Some implementations do not disclose the Grade of Delivery to the recipient, so this test may not apply.

2.4.10 Test SR-307

Category: Send/Receive

Purpose: Test ***Probe*** MT service element - valid recipient.

Procedure:

1. Originator submits a Probe request specifying a valid remote X.400 Primary recipient.

Expected Results: Originator should receive a Delivery Notification for this test message.

2.4.11 Test SR-307-A

Category: Send/Receive

Purpose: Test ***Probe*** MT service element - invalid recipient.

Procedure:

1. Originator submits a Probe request specifying an invalid remote X.400 Primary recipient (PersonalName attribute should be invalid).

Expected Results: Originator should receive a Non-Delivery Notification (due to Unrecognized ORName) for this test message.

2.4.12 Test SR-307-B

Category: Send/Receive

Purpose: Test ***Probe*** MT service element - invalid EncodedInformationType.

Procedure:

1. Originator submits a Probe request specifying a valid remote X.400 Primary recipient but an invalid EncodedInformationType (e.g., recipient's UA registers with MTA as being able to receive IA5Text but the originator specifies G3Fax).

Expected Results: Originator should receive a Non-Delivery Notification (due to Encoded Information Types Unsupported) for this test message.

2.4.13 Test SR-308

Category: Send/Receive

Purpose: Test ***Alternate Recipient Allowed/Alternate Recipient Assignment*** MT service elements, with Alternate Recipient assigned and Alternate Recipient Allowed specified.

Procedure:

1. Partner defines an Alternate Recipient to his/her MTA.
2. Originator creates a message with sufficient ORName attributes that it can be routed to the destination MTA, but it cannot be delivered because the ORName doesn't uniquely determine a recipient. Originator specifies Alternate Recipient Allowed when preparing the message for submission.
3. Originator sends the message with Delivery Notification requested.
4. Alternate recipient receives the message and generates a specific acknowledgement back to the user stating whether or not the message was received with and indication of the intended recipient.

Expected Results: Originator should receive a Delivery Notification and a specific acknowledgement for this test message. Both should indicate that the message was delivered to the Alternate Recipient and for whom the message was originally intended.

2.4.14 Test SR-308-A

Category: Send/Receive

Purpose: Test ***Alternate Recipient Allowed/Alternate Recipient Assignment*** MT service elements, with **no** Alternate Recipient assigned and Alternate Recipient Allowed specified.

Procedure:

1. Partner does **not** define an Alternate Recipient to his/her MTA.
2. Originator creates a message with sufficient ORName attributes that it can be routed to the destination MTA, but it cannot be delivered because the ORName doesn't uniquely determine a recipient.
3. Originator sends the message with Delivery Notification requested.

Expected Results: Originator should receive a Non-Delivery Notification (due to Unrecognized ORName) for this test message.

2.4.15 Test SR-308-B

Category: Send/Receive

Purpose: Test ***Alternate Recipient Allowed/Alternate Recipient Assignment*** MT service elements, with Alternate Recipient assigned and Alternate Recipient Allowed **not** specified.

Procedure:

1. Partner defines an Alternate Recipient to his/her MTA.
2. Originator creates a message with sufficient ORName attributes that it can be routed to the destination MTA, but it cannot be delivered because the ORName doesn't uniquely determine a recipient. Originator **does not** specify Alternate Recipient Allowed when preparing the message for submission.
3. Originator sends the message with Delivery Notification requested.

Expected Results: Originator should receive a Non-Delivery Notification (due to Unrecognized ORName) for this test message.

2.4.16 Test SR-309

Category: Send/Receive

Purpose: Test ***Multi-Destination Delivery*** MT service element.

Procedure:

1. Originator creates a message to two valid remote X.400 Primary recipients and two valid local X.400 Primary recipients.
2. Originator sends the message with Delivery Notification requested.

Expected Results: Originator should receive a Delivery Notification for this test message for each of the recipients.

2.4.17 Test SR-310-B

Category: Send/Receive

Purpose: Test ***Delivery Notification*** MT service element - mixed valid Primary and CC: Recipients.

Procedure:

1. Originator creates a message to one valid remote X.400 Primary recipient and one valid remote X.400 CC recipient.
2. Originator sends the message with Delivery Notification requested.

Expected Results: Originator should receive one combined or two separate Delivery Notifications for this test message.

2.4.18 Test SR-311

Category: Send/Receive

Purpose: Test ***Delivery Notification*** MT service element - single invalid Primary Recipient.

Procedure:

1. Originator creates a message to an invalid remote X.400 Primary recipient (GivenName should be invalid).
2. Originator sends the message - does not request Delivery Notification.

Expected Results: Originator should receive a Non-Delivery Notification for this test message.

2.4.19 Test SR-311-A

Category: Send/Receive

Purpose: Test ***Delivery Notification*** MT service element - multiple invalid Primary Recipients.

Procedure:

1. Originator creates a message to two invalid remote X.400 Primary recipients (SurNames should be invalid).
2. Originator sends the message - does not request Delivery Notification.

Expected Results: Originator should receive one combined or two separate Non-Delivery Notifications for this test message.

2.4.20 Test SR-311-B

Category: Send/Receive

Purpose: Test ***Delivery Notification*** MT service element - mixed invalid Primary and CC: Recipients.

Procedure:

1. Originator creates a message to one invalid remote X.400 Primary recipient and one invalid remote X.400 CC recipient (SurNames should be invalid).
2. Originator sends the message - does not request Delivery Notification.

Expected Results: Originator should receive one combined or two separate Non-Delivery Notifications for this test message.

2.4.21 Test SR-312

Category: Send/Receive

Purpose: Test ***Delivery Notification*** MT service element - mixed valid/invalid Primary Recipients.

Procedure:

1. Originator creates a message to one valid and one invalid remote X.400 Primary recipient (SurName should be invalid).
2. Originator sends the message with Delivery Notification requested.

Expected Results: Originator should receive a Delivery Notification for the valid recipient and a Non-Delivery Notification for the invalid recipient.

2.4.22 Test SR-312-A

Category: Send/Receive

Purpose: Test ***Delivery Notification*** MT service element - mixed valid/invalid Primary and CC: Recipients.

Procedure:

1. Originator creates a message to one valid and one invalid remote X.400 Primary recipient (SurName should be invalid) and copies one valid and one invalid remote X.400 CC: recipient (SurName should be invalid).

2. Originator sends the message with Delivery Notification requested.

Expected Results: Originator should receive Delivery Notifications for the valid recipients and Non-Delivery Notifications for the invalid recipients.

2.5 Limitation Tests

The tests in this section are used to check the limits of an implementation's capabilities. Most of the limits checked are imposed by the profile (e.g., EN/ENV, NIST, etc.) to which an implementation claims conformance. Exact values of each of the limits must be coordinated between test partners prior to testing.

2.5.1 Test LM-001

Category: Limitation

Purpose: Test maximum length ORName attribute values.

Procedure:

1. Originator coordinates with recipient to determine the maximum length of the ORName attributes for his/her implementation (should be based on appropriate profile - EN/ENV, etc.). For example, the EN/ENV 41.201/41.202 profile specifies:

Attribute	Maximum Length
CountryName	3 characters
ADMD	16 characters
PRMD	16 characters
OrgName	64 characters
FreeFormName	64 characters
OrgUnits	32 characters each - up to four occurrance
DDA Type	8 characters each
DDA Value	128 characters each
SurName	40 characters
GivenName	16 characters
Initials	5 characters

2. Partner's MTA defines a user with the values of each of the ORName attributes set at the maximum possible length.
3. Originator creates a message to that remote X.400 Primary recipient.
4. Originator sends the message with Delivery Notification requested.

Expected Results: Originator should receive a Delivery Notification for this test message.

2.5.2 Test LM-002

Category: Limitation

Purpose: Test maximum body length.

Procedure:

1. Originator coordinates with recipient to determine the maximum length of a message body for his/her implementation (should be based on appropriate profile - EN/ENV, etc.). For example, 2 megabytes.
2. Originator creates a message to a valid remote X.400 Primary recipient. Message body should be the maximum size allowed.
3. Originator sends the message with Delivery Notification requested.
4. Recipient should read entire message carefully.

Expected Results: Originator should receive a Delivery Notification for this test message.

2.5.3 Test LM-003

Category: Limitation

Purpose: Test message delivery to many recipients.

Procedure:

1. Originator creates a message to a large number (e.g., 100) of valid remote X.400 Primary recipients.
2. Originator sends the message with Delivery Notification requested.

Expected Results: Originator should one combined or many separate Delivery Notifications for this test message.

2.5.4 Test LM-004

Category: Limitation

Purpose: Test maximum Subject length.

Procedure:

1. Originator creates a message to a valid remote X.400 Primary recipient. The Subject field should contain the maximum number of characters allowed by his/her implementation.
2. Originator sends the message - does not request Delivery Notification.
3. Recipient should generate a Specific Acknowledgement back to the Originator, stating the number of characters he/she received in the Subject field of the message.

Expected Results: Originator should receive a Specific Acknowledgement stating the number of characters the Recipient received in the Subject field of the original note. This will likely be the the smaller of the two implementations.

2.6 Relay Tests

The tests in this section are used to verify the relay capabilities of the participating MTA's. The tests generally require three MTA's so it is recommended that another cooperating MTA, such as the NIST NIC, be used when these tests are executed between two partners as part of a bilateral agreement. In some cases, an ADMD is needed so a cooperating Public Service ADMD may be required. Note: In each of the tests in this section, the term "cooperating MTA" refers to the third-party MTA (PRMD or ADMD as appropriate) that is working in cooperation with the two test partners' MTA's to produce the test results.

2.6.1 Test RL-001

Category: Relay

Purpose: Test Administration Management Domain/Private Management Domain Relay - valid addresses.

Procedure:

1. Originator MTA defines its routes so that all messages will be sent directly to the partner's MTA for delivery or relay.
2. Partner MTA defines a relay to an attached ADMD.
3. Originator creates a message to two valid remote X.400 Primary recipients - one on the partner MTA, one on the ADMD.
4. Originator sends the message with Delivery Notification requested.

Expected Results: Originator should receive a Delivery Notification for this test message for each of the recipients.

2.6.2 Test RL-001-A

Category: Relay

Purpose: Test Administration Management Domain/Private Management Domain Relay - invalid addresses.

Procedure:

1. Originator MTA defines its routes so that all messages will be sent directly to the partner's MTA for delivery or relay.
2. Partner MTA defines a relay to an attached ADMD.
3. Originator creates a message to two invalid remote X.400 Primary recipients - one on the partner MTA, one on the ADMD.

4. Originator sends the message with Delivery Notification requested.

Expected Results: Originator should receive a Non-Delivery Notification (due to Unrecognized ORName) for this test message for each of the recipients.

2.6.3 Test RL-002

Category: Relay

Purpose: Test Relay (PRMD-PRMD) of a single message - valid ORName - with **no** Delivery Notification requested.

Procedure:

1. Partner's MTA defines a route to a cooperating third-party MTA.
2. Originator defines his/her MTA's routes such that all messages intended for delivery to the cooperating MTA are first sent to partner's MTA.
3. Originator creates a message to a valid remote X.400 Primary recipient at the cooperating MTA.
4. Originator sends the message - does not request Delivery Notification.
5. Third-party recipient generates a specific acknowledgement back to the originator.

Expected Results: Originator should receive a specific acknowledgement for this test message.

2.6.4 Test RL-002-A

Category: Relay

Purpose: Test Relay (PRMD-PRMD) of multiple messages - valid ORName - with **no** Delivery Notification requested.

Procedure:

1. Partner's MTA defines a route to a cooperating third-party MTA.
2. Originator defines his/her MTA's routes such that all messages intended for delivery to the cooperating MTA are first sent to partner's MTA.
3. Originator creates a message to two valid remote X.400 Primary recipients at the cooperating MTA.
4. Originator sends the message - does not request Delivery Notification.

5. Recipients generate a specific acknowledgement back to the originator.

Expected Results: Originator should receive a specific acknowledgement for this test message from each of the recipients.

2.6.5 Test RL-003

Category: Relay

Purpose: Test Relay (PRMD-PRMD) of a single message - valid ORName - with Delivery Notification requested and relay of Delivery Notification.

Procedure:

1. Partner's MTA defines a route to a cooperating third-party MTA.
2. Originator defines his/her MTA's routes such that all messages intended for delivery to the cooperating MTA are first sent to partner's MTA.
3. Originator creates a message to a valid remote X.400 Primary recipient at the cooperating MTA.
4. Originator sends the message with Delivery Notification requested.

Expected Results: Originator should receive a Delivery Notification for this test message.

2.6.6 Test RL-003-A

Category: Relay

Purpose: Test Relay (PRMD-PRMD) of multiple messages - valid ORName - with Delivery Notification requested and relay of Delivery Notification.

Procedure:

1. Partner's MTA defines a route to a cooperating third-party MTA.
2. Originator defines his/her MTA's routes such that all messages intended for delivery to the cooperating MTA are first sent to partner's MTA.
3. Originator creates a message to two valid remote X.400 Primary recipients at the cooperating MTA.
4. Originator sends the message with Delivery Notification requested.

Expected Results: Originator should receive one combined or two separate Delivery Notifications for this test message.

2.6.7 Test RL-004

Category: Relay

Purpose: Test Relay (PRMD-PRMD) of a single Non-Delivery Notification.

Procedure:

1. Partner's MTA defines a route to a cooperating third-party MTA.
2. Originator defines his/her MTA's routes such that all messages intended for delivery to the cooperating MTA are first sent to partner's MTA.
3. Originator creates a message to an invalid remote X.400 Primary recipient at the cooperating MTA.
4. Originator sends the message with Delivery Notification requested.

Expected Results: Originator should receive a Non-Delivery Notification (due to Unrecognized ORName) for this test message.

2.6.8 Test RL-004-A

Category: Relay

Purpose: Test Relay (PRMD-PRMD) of multiple Non-Delivery Notifications.

Procedure:

1. Partner's MTA defines a route to a cooperating third-party MTA.
2. Originator defines his/her MTA's routes such that all messages intended for delivery to the cooperating MTA are first sent to partner's MTA.
3. Originator creates a message to two invalid remote X.400 Primary recipients at the cooperating MTA.
4. Originator sends the message with Delivery Notification requested.

Expected Results: Originator should receive Non-Delivery Notifications for this test message for each of the recipients.

2.6.9 Test RL-005

Category: Relay

Purpose: Test Relay (PRMD-PRMD) of Delivery and Non-Delivery Notifications (due to unregistered PRMD name).

Procedure:

1. Partner's MTA defines a route to a cooperating third-party MTA.
2. Originator defines his/her MTA's routes such that all messages intended for delivery to the cooperating MTA are first sent to partner's MTA.
3. Originator creates a message to two remote X.400 Primary recipients at the cooperating MTA - one valid, one invalid due to invalid PRMD name.
4. Originator sends the message with Delivery Notification requested.

Expected Results: Originator should receive a Delivery Notification and a Non-Delivery Notification (due to Unrecognized ORName) for this test message.

2.6.10 Test RL-006

Category: Relay

Purpose: Test Relay (PRMD-PRMD) of a single Receipt Notification.

Procedure:

1. Partner's MTA defines a route to a cooperating third-party MTA.
2. Originator defines his/her MTA's routes such that all messages intended for delivery to the cooperating MTA are first sent to partner's MTA.
3. Originator creates a message to a valid remote X.400 Primary recipient at the cooperating MTA.
4. Originator sends the message with only Receipt Notification requested - does not request Delivery Notification.
5. Third-party recipient takes whatever action is necessary, if required, to cause a Receipt Notification to be generated back to the Originator.

Expected Results: Originator should receive a Receipt Notification for this test message.

2.6.11 Test RL-006-A

Category: Relay

Purpose: Test Relay (PRMD-PRMD) of a multiple Receipt Notifications.

Procedure:

1. Partner's MTA defines a route to a cooperating third-party MTA.
2. Originator defines his/her MTA's routes such that all messages intended for delivery to the cooperating MTA are first sent to partner's MTA.
3. Originator creates a message to two valid remote X.400 Primary recipients at the cooperating MTA.
4. Originator sends the message with only Receipt Notification requested - does not request Delivery Notification.
5. Third-party recipients take whatever action is necessary, if required, to cause a Receipt Notification to be generated back to the Originator.

Expected Results: Originator should receive a Receipt Notification for this test message for each of the recipients.

2.6.12 Test RL-007

Category: Relay

Purpose: Test Relay (PRMD-PRMD) of Receipt and Non-Receipt Notifications.

Procedure:

1. Partner's MTA defines a route to a cooperating third-party MTA.
2. Originator defines his/her MTA's routes such that all messages intended for delivery to the cooperating MTA are first sent to partner's MTA.
3. Originator creates a message to two valid remote X.400 Primary recipients at the cooperating MTA.
4. Originator sends the message with only Receipt Notification requested - does not request Delivery Notification.
5. One third-party recipient takes whatever action is necessary, if required, to cause a Receipt Notification to be generated back to the originator. The other takes whatever action is necessary to cause a Non-Receipt Notification to be generated back to the originator.

Expected Results: Originator should receive a Receipt Notification for one of the recipients and a Non-Receipt Notification for the other.

2.6.13 Test RL-008

Category: Relay

Purpose: Test Relay (PRMD-PRMD) of Receipt and Delivery Notifications.

Procedure:

1. Partner's MTA defines a route to a cooperating third-party MTA.
2. Originator defines his/her MTA's routes such that all messages intended for delivery to the cooperating MTA are first sent to partner's MTA.
3. Originator creates a message to a valid remote X.400 Primary recipient at the cooperating MTA.
4. Originator sends the message with both Receipt Notification requested and Delivery Notification requested.
5. Third-party recipient takes whatever action is necessary, if required, to cause a Receipt Notification to be generated back to the originator.

Expected Results: Originator should receive a Receipt Notification and a Delivery Notification for this test message.

2.6.14 Test RL-009

Category: Relay

Purpose: Test MTA for inter-MD loop detection - single recipient.

Procedure:

1. Partner's MTA defines his/her MTA routing such that all messages received from the Originator's MTA are relayed back to the Originator's MTA.
2. Originator's MTA defines a route to the partner's MTA.
3. Originator creates a message addressed to a single remote X.400 Primary recipient such that it will be routed to the partner's MTA.
4. Originator sends the message with Delivery Notification requested.

Expected Results: Originator should receive a Non-Delivery Notification (due to Loop Detected) for this test message.

2.6.15 Test RL-009-A

Category: Relay

Purpose: Test MTA for inter-MD loop detection - multiple recipients.

Procedure:

1. Partner's MTA defines his/her MTA routing such that all messages received from the Originator's MTA are relayed back to the Originator's MTA.
2. Originator's MTA defines a route to the partner's MTA.
3. Originator creates a message addressed to multiple remote X.400 Primary recipients such that it will be routed to the partner's MTA.
4. Originator sends the message with Delivery Notification requested.

Expected Results: Originator should receive a Non-Delivery Notification (due to Loop Detected) for this test message for each recipient.

2.6.16 Test RL-010

Category: Relay

Purpose: Test MTA for intra-PRMD loop detection - single recipient.

Procedure:

1. Originator and partner define their MTA's to be in the same PRMD.
2. Partner's MTA defines his/her MTA routing such that all messages received from the Originator's MTA are relayed back to the Originator's MTA.
3. Originator's MTA defines a route to the partner's MTA.
4. Originator creates a message addressed to a single remote X.400 Primary recipient such that it will be routed to the partner's MTA.
5. Originator sends the message with Delivery Notification requested.

Expected Results: Originator should receive a Non-Delivery Notification (due to Loop Detected) for this test message.

2.6.17 Test RL-010-A

Category: Relay

Purpose: Test MTA for intra-PRMD loop detection - multiple recipients.

Procedure:

1. Originator and partner define their MTA's to be in the same PRMD.
2. Partner's MTA defines his/her MTA routing such that all messages received from the Originator's MTA are relayed back to the Originator's MTA.
3. Originator's MTA defines a route to the partner's MTA.
4. Originator creates a message addressed to multiple remote X.400 Primary recipients such that it will be routed to the partner's MTA.
5. Originator sends the message with Delivery Notification requested.

Expected Results: Originator should receive a Non-Delivery Notification (due to Loop Detected) for this test message for each recipient.

2.7 Reliable Transfer Services Tests

2.7.1 Test RT-001

Category: Reliable Transfer Service

Purpose: Test recovery following session suspension.

Procedure:

1. Originator creates a large message to a valid remote X.400 Primary recipient.
2. Originator sends the message with Delivery Notification requested.
3. During message transmission, originator suspends the session, then re-starts the session.

Expected Results: Originator should receive a Delivery Notification for this test message.

Note: It is up to individual testers to determine how to accomplish this test for their implementation. Some implementations may provide an operator interface which would allow suspension/re-start of a session; others may have to "pull a plug."

2.7.2 Test RT-002

Category: Reliable Transfer Service

Purpose: Test message with length greater than (2 × CheckPointSize).

Procedure:

1. Originator and recipient coordinate CheckPointSizes prior to testing. The actual CheckPointSize used for the MTA-MTA association will be the smaller of the two.
2. Originator creates a message to a valid remote X.400 Primary recipient. The message should be at least twice the size of the CheckPointSize value.
3. Originator sends the message with Delivery Notification requested.

Expected Results: Originator should receive a Delivery Notification for this test message.

2.7.3 Test RT-003

Category: Reliable Transfer Service

Purpose: Test ability to send multiple messages in one session connection.

Procedure:

1. Originator creates several messages, each at least twice the size of the CheckPointSize value, to a valid remote X.400 Primary recipient.
2. Originator sends the messages with Delivery Notification requested.

Expected Results: Originator should receive a Delivery Notification for each test message sent.

Note: It is quite difficult to determine if all of the messages are being sent on one session connection without either a line trace or a protocol analyzer on the line. It is suggested that one of these methods be employed if this test is to be executed with determinant results.

2.7.4 Test RT-004

Category: Reliable Transfer Service - Association Management

Purpose: Test ability to detect an invalid MTA name.

Procedure:

1. Originator defines his/her MTA such that an invalid MTA name will be passed to the Partner on an Open Association request.
2. Originator creates a message to a valid remote X.400 Primary recipient at the Partner's MTA.
3. Originator sends the message with Delivery Notification requested.

Expected Results: The Association should be refused (due to Validation Failure, etc.) and the Originator should receive a Non-Delivery Notification for this test message (due to Timeout, etc.).

Note: This may vary, depending on the implementation. In particular, the timeout value and Retry count for message delivery may not be settable for some implementations, and their hard-coded values may make it impractical to wait for a Non-Delivery Notification.

2.7.5 Test RT-005

Category: Reliable Transfer Service - Association Management

Purpose: Test ability to detect an invalid MTA password.

Procedure:

1. Originator defines his/her MTA such that an invalid MTA password will be passed to the Partner on an Open Association request.
2. Originator creates a message to a valid remote X.400 Primary recipient at the Partner's MTA.
3. Originator sends the message with Delivery Notification requested.

Expected Results: The Association should be refused (due to Validation Failure, etc.) and the Originator should receive a Non-Delivery Notification for this test message (due to Timeout, etc.).

Note: This may vary, depending on the implementation. In particular, the timeout value and Retry count for message delivery may not be settable for some implementations, and their hard-coded values may make it impractical to wait for a Non-Delivery Notification.

2.7.6 Test RT-006

Category: Reliable Transfer Service

Purpose: Test ability to handle multiple messages from both partners simultaneously and avoid "collisions."

Procedure:

1. Both partners create multiple messages (5 or so) to each other.
2. Both partners submit messages at exactly the same time, with Delivery Notification requested.

Expected Results: Both partners should receive Delivery Notifications for each of the test messages sent.

2.7.7 Test RT-007

Category: Reliable Transfer Service - Association Management

Purpose: Test for successful establishment of Association with both an MTA Name and Password required.

Procedure:

1. Recipient defines his/her MTA such that both an MTA Name and Password are required on an incoming OPEN request.
2. Originator defines his/her MTA such that both an MTA Name and Password will be passed to the Partner on an outgoing OPEN Association request.

3. Originator creates a message to a valid remote X.400 Primary recipient at the Partner's MTA.
4. Originator sends the message with Delivery Notification requested.

Expected Results: The Association should be successfully established and the Originator should receive a Delivery Notification for this test message.

2.7.8 Test RT-008

Category: Reliable Transfer Service - Association Management

Purpose: Test for successful establishment of association with just an MTA Name - no Password required.

Procedure:

1. Recipient defines his/her MTA such that only an MTA Name is required on an incoming OPEN request - no Password is required.
2. Originator defines his/her MTA such that only an MTA Name will be passed to the Partner on an outgoing OPEN Association request.
3. Originator creates a message to a valid remote X.400 Primary recipient at the Partner's MTA.
4. Originator sends the message with Delivery Notification requested.

Expected Results: The Association should be successfully established and the Originator should receive a Delivery Notification for this test message.

2.7.9 Test RT-009

Category: Reliable Transfer Service

Purpose: Test for acceptance of RTS parameters.

Procedure:

1. Originator configures his/her system with CheckPointSize and WindowSize smaller than those which are configured at the Partner's system.
2. Originator creates a message to a valid remote X.400 Primary recipient at the Partner's MTA.
3. Originator sends the message with Delivery Notification requested.

Expected Results: The Association should be successfully established and the Originator should receive a Delivery Notification for this test message.

2.7.10 Test RT-010

Category: Reliable Transfer Service

Purpose: Test for no CheckPointing.

Procedure:

1. Originator configures his/her system with CheckPointing (i.e., non-zero CheckPointSize value).
2. Partner configures his/her system for no CheckPointing.
3. Originator creates a message to a valid remote X.400 Primary recipient at the Partner's MTA.
4. Originator sends the message with Delivery Notification requested.

Expected Results: The Association should be successfully established and the Originator should receive a Delivery Notification for this test message.

Appendix A. Service Element Cross References

The charts on the following pages cross-reference X.400 service elements with their respective test cases.

A.1 IPM Service Elements

This chart cross-references InterPersonal Message service elements with the tests that use them.

Table 1. IPM Service Element Cross Reference - Part 1

IPM Service Element	Test Cases																		
	SR-201	SR-202	SR-202-A	SR-202-B	SR-203	SR-203-A	SR-203-B	SR-204	SR-204-A	SR-204-B	SR-204-C	SR-205	SR-205-A	SR-206	SR-206-A	SR-207	SR-207-A	SR-208	SR-208-A	SR-209
Alternate Recipient Allowed																				
Authorizing Users Indication																		√	√	
Auto-Forwarded Indication																				
Blind Copy Recipient Indication					√	√	√													
Body Part Encryption Indication																				
Conversion Prohibition																				
Cross-Referencing Indication														√	√					
Deferred Delivery																				
Deferred Delivery Cancellation																				
Delivery Notification																				
Disclosure of Other Recipients																				
Expiry Date Indication																				√
Explicit Conversion																				
Forwarded IP-Message Indication																				
Grade of Delivery Selection																				
Importance Indication																				
Multi-Destination Delivery																				
Multi-Part Body																				
Non-Receipt Notification																				
Obsoleting Indication																√	√			
Originator Indication	√																			
Prevention of Non-Delivery Notification																				
Primary and Copy Recipients Indication		√	√	√																
Probe																				
Receipt Notification																				
Reply Request Indication								√	√	√	√		√							
Replying IP-Message Indication												√	√							
Return of Contents																				
Sensitivity Indication																				
Subject Indication																				

Legend:
√ = Service element explicitly tested
u = Service element used

Table 2. IPM Service Element Cross Reference - Part 2

IPM Service Element	Test Cases																			
	SR-210	SR-210-A	SR-210-B	SR-211	SR-211-A	SR-211-B	SR-211-C	SR-212	SR-212-A	SR-212-B	SR-213	SR-214-A	SR-214-A	SR-215	SR-215-A	SR-216	SR-216-A	SR-217	SR-218	
Alternate Recipient Allowed																				
Authorizing Users Indication																		√		
Auto-Forwarded Indication											√									
Blind Copy Recipient Indication																		√		
Body Part Encryption Indication																				
Conversion Prohibition																				
Cross-Referencing Indication																		√		
Deferred Delivery																				
Deferred Delivery Cancellation																				
Delivery Notification																		√		
Disclosure of Other Recipients																				
Expiry Date Indication																		√		
Explicit Conversion																				
Forwarded IP-Message Indication	√	√	√																	
Grade of Delivery Selection																				
Importance Indication				√	√	√	√											√		
Multi-Destination Delivery																				
Multi-Part Body												√	√							
Non-Receipt Notification																√	√			
Obsoleting Indication																		√		
Originator Indication																		√		
Prevention of Non-Delivery Notification																				
Primary and Copy Recipients Indication																		√		
Probe																				
Receipt Notification														√	√			√		
Reply Request Indication																		√		
Replying IP-Message Indication																		√		
Return of Contents																				
Sensitivity Indication								√	√	√								√		
Subject Indication																		√	√	

Legend:
√ = Service element explicitly tested
u = Service element used

A.2 MT Service Elements

This chart cross-references Message Transfer service elements with the tests that use them.

Table 3. MT Service Element Cross Reference - Part 1

MT Service Element	Test Cases																			
	SR-301	SR-302	SR-302-A	SR-303	SR-304	SR-305	SR-306	SR-306-A	SR-306-B	SR-307	SR-307-A	SR-307-B	SR-308	SR-308-A	SR-308-B	SR-309				
Alternate Recipient Allowed													√	√	√					
Conversion Prohibition						√														
Deferred Delivery	√																			
Deferred Delivery Cancellation																				
Delivery Notification																				
Disclosure of Other Recipients		√	√																	
Explicit Conversion																				
Grade of Delivery Selection							√	√	√											
Multi-Destination Delivery																√				
Prevention of Non-Delivery Notification																				
Probe										√	√	√								
Return of Contents				√																
Alternate Recipient Assignment													√	√	√					
Hold for Delivery																				
Implicit Conversion					√															

Legend:
√ = Service element explicitly tested
u = Service element used

Table 4. MT Service Element Cross Reference - Part 2

MT Service Element	Test Cases																				
	SR-310-B	SR-311	SR-311-A	SR-311-B	SR-312	SR-312-A															
Alternate Recipient Allowed																					
Conversion Prohibition																					
Deferred Delivery																					
Deferred Delivery Cancellation																					
Delivery Notification	√	√	√	√	√	√															
Disclosure of Other Recipients																					
Explicit Conversion																					
Grade of Delivery Selection																					
Multi-Destination Delivery																					
Prevention of Non-Delivery Notification																					
Probe																					
Return of Contents																					
Alternate Recipient Assignment																					
Hold for Delivery																					
Implicit Conversion																					

Legend:
√ = Service element explicitly tested
u = Service element used

Appendix B. Profile Requirements Specifications

The charts on the following pages cross-reference the profiles to to the applicable test cases.

Table 5. Profile Cross Reference - Part 1

Test Case Name	Profile							
	US GOSIP Version 1	TOP 3.0	UK GOSIP					
SR-001	√	√						
SR-002	√	√						
SR-003	√	√						
SR-004	√	√						
SR-005	√	√						
SR-101	√	√						
SR-102	√	√						
SR-103	√	√						
SR-104		√						
SR-104-A	√							
SR-104-B	√							
SR-105								
SR-105-A								
SR-106	√	√						
SR-107	√	√						
SR-107-A								
SR-107-B								
SR-107-C		√						
SR-108	√	√						
SR-109		√						
SR-109-A		√						
SR-110		√						
SR-201	√	√						
SR-202	√	√						
SR-202-A		√						
SR-202-B								
SR-203								
SR-203-A		√						
SR-203-B								
SR-204								
SR-204-A								
SR-204-B		√						
SR-204-C								
SR-204-D		√						
SR-205	√							

Table 6. Profile Cross Reference - Part 2								
Test Case Name	Profile							
	US GOSIP Version 1	TOP 3.0	UK GOSIP					
SR-205-A		√						
SR-206		√						
SR-206-A								
SR-207		√						
SR-207-A								
SR-208		√						
SR-208-A								
SR-209		√						
SR-210								
SR-210-A								
SR-210-B								
SR-211								
SR-211-A		√						
SR-211-B		√						
SR-211-C								
SR-212		√						
SR-212-A		√						
SR-212-B		√						
SR-213		√						
SR-214								
SR-214-A								
SR-215								
SR-215-A								
SR-216								
SR-216-A								
SR-217	√	√						
SR-218	√							
SR-301								
SR-302		√						
SR-302-A		√						
SR-303								
SR-304								
SR-305								
SR-306								
SR-306-A								

Table 7. Profile Cross Reference - Part 3

Test Case Name	Profile							
	US GOSIP Version 1	TOP 3.0	UK GOSIP					
SR-306-B								
SR-307								
SR-307-A								
SR-307-B								
SR-308								
SR-308-A								
SR-308-B								
SR-309	√							
SR-310-B								
SR-311								
SR-311-A		√						
SR-311-B		√						
SR-312								
SR-312-A	√	√						
LM-001		√						
LM-002		√						
LM-003								
LM-004		√						
RL-001		√						
RL-001-A		√						
RL-002		√						
RL-002-A		√						
RL-003		√						
RL-003-A								
RL-004		√						
RL-004-A								
RL-005		√						
RL-006		√						
RL-006-A								
RL-007								
RL-008								
RL-009		√						
RL-009-A		√						
RL-010		√						
RL-010-A		√						

Table 8. Profile Cross Reference - Part 4								
Test Case Name	**Profile**							
	US GOSIP Version 1	**TOP 3.0**	**UK GOSIP**					
RT-001		√						
RT-002	√	√						
RT-003								
RT-004	√	√						
RT-005	√	√						
RT-006								
RT-007		√						
RT-008								
RT-009		√						
RT-010		√						

Definition of Terms

B

Blind Copy Recipient. Recipient specified as "BCC:" recipient.

C

Copy Recipient. Recipient specified as "CC:" recipient.

I

IPM. InterPersonal Messaging (as defined by CCITT Recommendation X.420).

L

Local Recipient. This is an X.400 message recipient served by the same MTA as the Originator of a message.

M

MTA. Message Transfer Agent

N

NIST. National Institute of Standards and Technology

O

ORName. Originator/Recipient Name.

P

Primary Recipient. Recipient specified as "TO:" recipient.

R

Remote Recipient. This is an X.400 message recipient served by a different MTA than the Originator of a message.

S

Specific Acknowledgment. This is acknowledgment of receipt of a message and it can be one of the following:

- a Reply to the original message
- the original message Forwarded back to the originator
- a new message generated by the recipient back to the originator with a specific acknowledgment for the original message

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This document contains the X.400 Interoperability test suite that was originally developed by the OSINET Technical Committee. OSINET is a regional Open Systems Interconnection (OSI) network that was established to promote OSI through activities related to interoperation testing. This interoperability test suite has been cordinated internationally through OSINET'S participation in OSIone, an association of regional OSI networks.

The tests are organized into seven sections. Each test in a section has a name, test purpose, test procedure and expected results.

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