



IHE-RO 2013 Test tools

Treatment Delivery Workflow II

Test scenarios & rules overview

Table of Contents

| | |
|--|----|
| Scope of this document | 3 |
| Test Scenario TDD Retrieval of worklist..... | 5 |
| Test Scenario TMS Retrieval of Worklist..... | 7 |
| Test Scenario OST Store and Retrieve Static..... | 10 |
| Treatment Delivery Input Instances..... | 10 |
| Test Scenario TDD Retrieve Static Treatment Delivery | 12 |
| Input Instances | 12 |
| Test Scenario TDD Deliver initialization | 15 |
| Test Scenario TMS Deliver Initialization..... | 18 |
| Test Scenario TDD Deliver success..... | 21 |
| Test Scenario TMS Deliver success | 27 |
| Test Scenario TDD Deliver Cancel..... | 29 |
| Test Scenario TMS Deliver Cancel | 36 |

Scope of this document

General scope

This document contains an overview of the IHE-RO project scenarios and the rules these scenarios apply. A description of the supplied data sets is provided as well.

For this profile the following workflow is applicable for this profile. The test scenarios are divided over 2 stages: prepare and delivery.

Session configuration (AE title, port number and IP address)

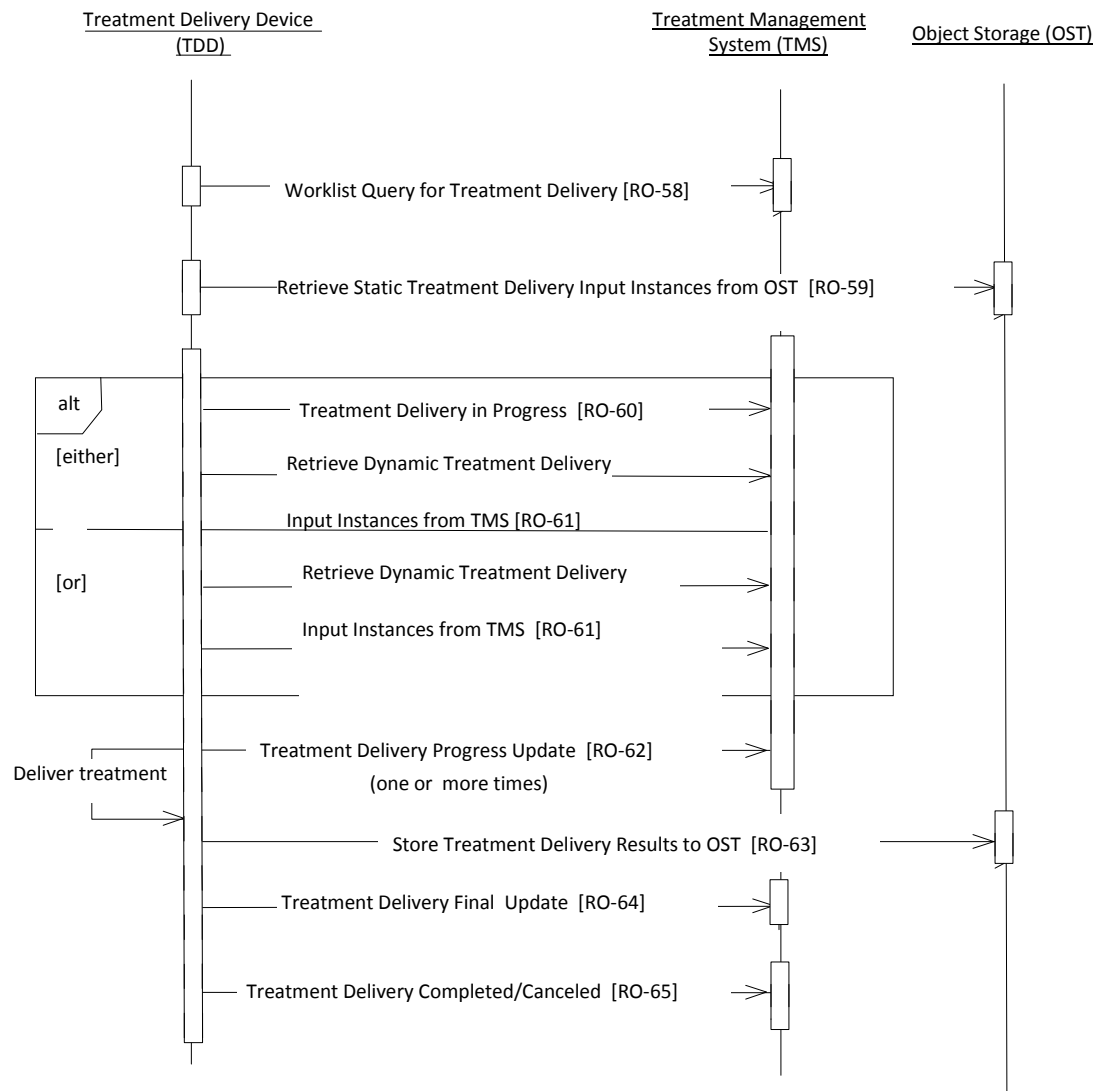
In all TDW-II scenarios AE titles and IP addresses of the various actors used in the TDW-II scenarios must be edited with the TesttoolConfigurationEditor.

Note that this configuration is used *instead* of the session file!

For more information about using this tool, see 'ConfigurationToolUserManual.pdf'.

Workflow scenario order

The TDW-II scenarios are to be executed in a particular order. When a scenario is executed for which not all prerequisite scenarios have been executed successfully, a warning is reported. Though the scenario can still be executed, the test tool cannot guarantee a 100% correct validation.



Test Scenario TDD Retrieval of worklist

Description:

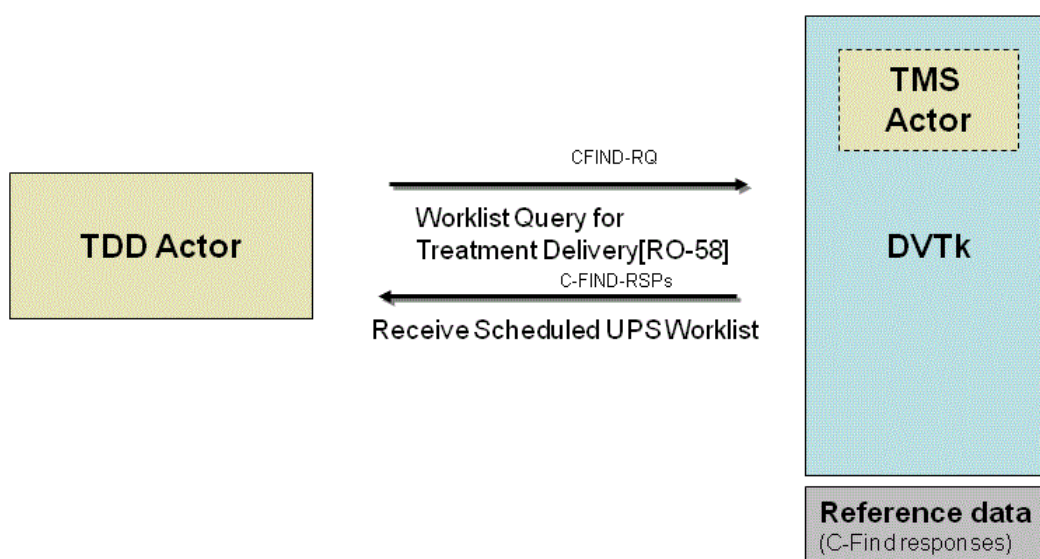
This test scenario tests the retrieval of the worklist by the TDD under test. It is the first step in the overall test scenario.

The scenario will test either with a new treatment request or a continuation (resume) request.

Test scenario entry point: None, this is the first TDD test scenario that has to be executed.

Stage: Prepare

1. (optional) Add the RT-dataset you want to use by means of the test tool configuration editor (see Instructions for use test scenarios)
2. Start the scenario. Select if it is a resume treatment. The test tool starts listening for incoming messages.
3. Note: if the RT Plan or RT Beams Delivery Instruction is missing from the test data, the test will abort with an error.
4. Send a query from the TDD actor. Either a resumed or new treatment has to be sent. The query has to comply with the corresponding query keys.
5. When the request is sent by the TDD Actor the scenario returns one work item C-Find responses (and an additional C-FIND success response).
Work item includes at least references to a RT Plan and a RT Beams Delivery Instruction
6. When the communication is finished, press 'stop listening and start validation'.
7. The test tool validates the C-Find request and shows the results



Additional technical information:

The test tool is not an actual Treatment Management System. When a C-FIND-Req is received the query fields 'Patient Name' and 'Patient ID' will be used for creating the corresponding C-Find-Resp. The RT Objects that are placed in the UPSdata directory (by the test tool configuration editor) will be sent if the 'Patient Name' and 'Patient ID' of these objects match with the 'Patient Name' and 'Patient ID' of the C-Find-Req. All other query fields will be ignored.

Expected transactions from actor:

Validation of transaction:

TDW-RO-58: Worklist Query for Treatment Delivery

Worklist Query for Treatment Delivery [RO-58]

| Attribute | Tag | Query Keys Matching | | Code Rule |
|--|-------------|---------------------|------------------------------------|---------------------------------------|
| | | SCU | Value | |
| Affected SOP Class UID | (0000,0002) | | PULL 1.2.840.10008.5.1.4.34.6.3 | |
| Procedure Step State | (0074,1000) | R+* (Note 1) | SCHEDULED | IsRequiredRuleValueRule |
| Scheduled Station Name Code Sequence | (0040,4025) | R* | | IsRequiredRule |
| >Code Value | (0008,0100) | R+* (Note 2) | | OptionalRule |
| >Coding Scheme Designator | (0008,0102) | O+* (Note 3) | | OptionalRule |
| Scheduled Procedure Step Start Date and Time | (0040,4005) | R+* (Note 5) | (only format check needed) | IsRequiredRuleDateTimeRule |
| Scheduled Workitem Code Sequence | (0040,4018) | R+* (Note 6) | | IsRequiredRule |
| >Code Value | (0008,0100) | R+* | 121726 | IsRequiredRuleValueRule |
| >Coding Scheme Designator | (0008,0102) | R+* | DCM | IsRequiredRuleValueRule |
| Patient's Name | (0010,0010) | R+ (Note 11) | | IsRequiredRule / InterOperabilityRule |
| Patient ID | (0010,0020) | R+ (Note 11) | | IsRequiredRule / InterOperabilityRule |

Note 1: A Procedure Step State of 'SCHEDULED' shall be supplied.

Note 2: Code Value for the Scheduled Station Name shall contain the string used to definitively match the TDD instance with its representation on the TMS. It is not necessarily human-readable.

Note 3: Coding Scheme Designator for the Scheduled Station Name is a private coding scheme, and is not used explicitly in this profile.

Note 5: A 'reasonable' date time range (such as the rest of the current day) shall be supplied to limit the size of the returned result set. If operating in a mode where the patient 475 is selected on the TMS, the TMS is permitted to over-filter the result set based upon this selection and return just the worklist items for the selected fraction.

Note: 11: Shall be empty.

Test Scenario TMS Retrieval of Worklist

Description:

This scenario tests the retrieval of the worklist from a TMS actor. Different query keys can be used to test the response of the TMS.

Test scenario entry point: None, this is the first TMS test scenario that has to be executed.

Stage: Prepare

1. Make sure that TMS Actor (system under test - SUT) is active and listening and a workitem is present.
2. Start the scenario, and select a new treatment or a resume of an interrupted treatment is requested
3. A pop-up will appear in which you can enter the query keys for the worklist from the TMS actor.

Worklist Query for Positioning and Delivery

Date/Time Range

ScheduledProcedureStepStartDateAndTime (0040,4005)

2014-01-01, 00:00:00 - 2014-02-01, 23:59:59

Station Info

ScheduledStationNameCodeSequence (0040,4025)

CodeValue (0008,0100)

CodingSchemeDesignator (0008,0102)

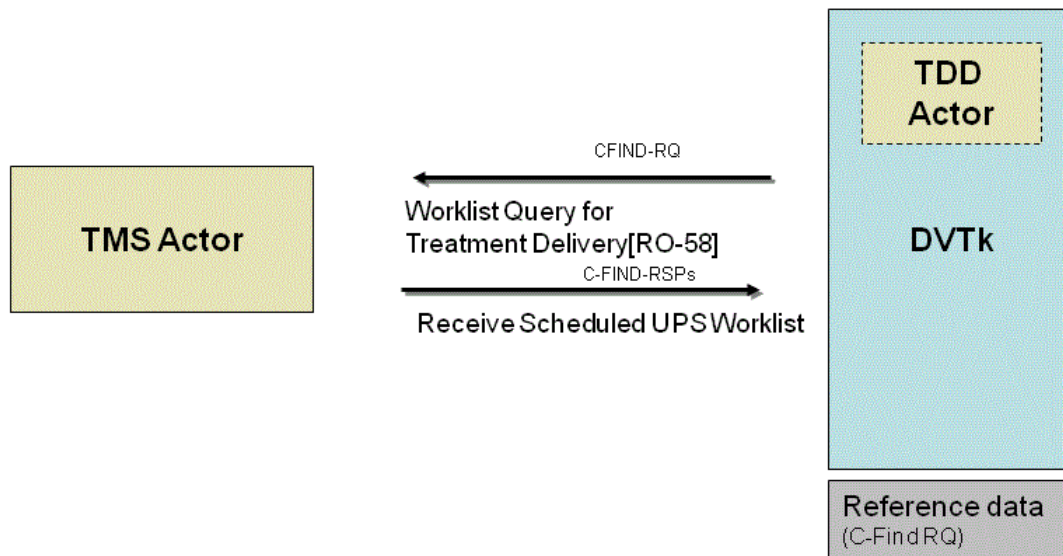
Patient Info

PatientsName (0010,0010)

PatientID (0010,0020)

4. Send the query to the TMS actor by pressing 'send'. The test tool starts to listen for incoming messages.
5. Wait for the C-Find responses from the TMS actor.

6. The test tool automatically detects the responses and starts validating the C-FIND responses.



Expected transactions from actor:

Validation of transaction:

TDW-RO-58: Worklist Query for Treatment Delivery

Used scenario dataset:

This scenario uses a predefined request which can be modified by the user

Additional technical information:

When the test tool sends a C-Find-request, all values will be send as needed according to specifications.

The standard request consists of a query that uses the date/time range of the present day. It is possible to change the date/time range in the pop-up. The different fields in the pop-up should be manipulated in such a way, that exactly one Procedure Step will be found in the TMS (consisting of one work item). The station info should either be completely filled or completely empty. The patient info can be used to further narrow the query. The remainder of the query has all the IHE required attributes listed in the request. The TMS should be able to generate a value for all of them.

Worklist Query for Treatment Delivery [RO-58]

| Attribute | Tag | Query Keys Return | | Code Rule |
|--|-------------|-------------------|----------------------------|--|
| | | SCP | Value | |
| Affected SOP Class UID | (0000,0002) | | 1.2.840.10008.5.1.4.34.4.3 | IsRequiredRuleValueRule |
| SOP Class UID | (0008,0016) | R | | IsRequiredRule |
| SOP Instance UID | (0008,0018) | R | | IsRequiredRule |
| Unified Procedure Step State | (0074,1000) | R | | IsRequiredRule |
| Procedure Step Label | (0074,1204) | R+ | | IsRequiredRule |
| Scheduled Station Name Code Sequence | (0040,4025) | | | |
| >Code Value | (0008,0100) | R | | IsRequiredRule |
| >Coding Scheme Designator | (0008,0102) | R | | IsRequiredRule |
| >Code Meaning | (0008,0104) | R (Note 4) | | IsRequiredRule |
| Scheduled Workitem Code Sequence | (0040,4018) | R | (see below) | IsRequiredRule |
| >Code Value | (0008,0100) | - | (see below) | IsRequiredRule / ValueRule |
| >Coding Scheme Designator | (0008,0102) | - | (see below) | IsRequiredRule / ValueRule |
| >Code Meaning | (0008,0104) | R | | IsRequiredRule |
| Scheduled Processing Parameters Sequence | (0074,1210) | R | (see below) | IsRequiredRule |
| Input Information Sequence | (0040,4021) | R+ (Note 8) | (see below) | IsRequiredRule / CFindRspInputInformationSequenceRule |
| Study Instance UID | (0020,000D) | R+ (Note 9) | | IsRequiredRule |
| Patient's Name | (0010,0010) | R+ | | IsRequiredRule |
| Patient ID | (0010,0020) | R+ | | IsRequiredRule |

| TMS Retrieval of worklist – testscenario | | | | |
|--|-------------|----------|---|--|
| Attribute | Tag | IHE-Rule | Description | Code Rule |
| Scheduled Workitem Code Sequence | (0040,4018) | R | | IsRequiredRule |
| >Code Value | (0008,0100) | R | '121726' (RT Treatment with Internal Verification) | IsRequiredRule / ValueRule |
| >Coding Scheme Designator | (0008,0102) | R | DCM | IsRequiredRule / ValueRule |
| Input Information Sequence | (0040,4021) | R | The Input Information Sequence (0040,4021) shall contain reference to a least the following items (additional items may be required for continuation procedures): 1. The RT Plan SOP Instance to be delivered. Its specified location shall be an OST Archive. Note that a specific product implementation could fulfill the roles of both a TMS and an OST Archive, in which case one AE Title could be used to retrieve all input SOP Instances for the UPS. 2. An RT Beams Delivery Instruction SOP Instance. Its specified location shall be the TMS. | IsRequiredRule / CFindRspInputInformationSequenceRule |

| TMS Retrieval of worklist – test scenario | | | | |
|---|-------------|-------------------|---|----------------------------|
| Attribute | Tag | Query Keys Return | | Code Rule |
| | | SCP | Description | |
| Scheduled Processing Parameters Sequence | (0074,1210) | | | |
| >Value Type | (0040,A040) | R+* (Note 1) | 'TEXT' | IsRequiredRule / ValueRule |
| >Concept Name Code Sequence | (0040,A043) | R+* | | |
| >>Code Value | (0008,0100) | R+* (Note 2) | 'ccc001' | IsRequiredRule / ValueRule |
| >>Coding Scheme Designator | (0008,0102) | R+* (Note 3) | 'DCM' | IsRequiredRule / ValueRule |
| >>Code Meaning | (0008,0104) | R+* (Note 4) | 'Treatment Delivery Type' | IsRequiredRule / ValueRule |
| >Text Value | (0040,A160) | R+ (Note 5) | If the user selected "Resume at the start of the testscenario the value has to be: CONTINUATION Otherwise the value has to be: 'TREATMENT' | IsRequiredRule / ValueRule |

Assumptions : Only the first Respons will have the Input Information Sequence

Test Scenario OST Store and Retrieve Static

Treatment Delivery Input Instances

Description:

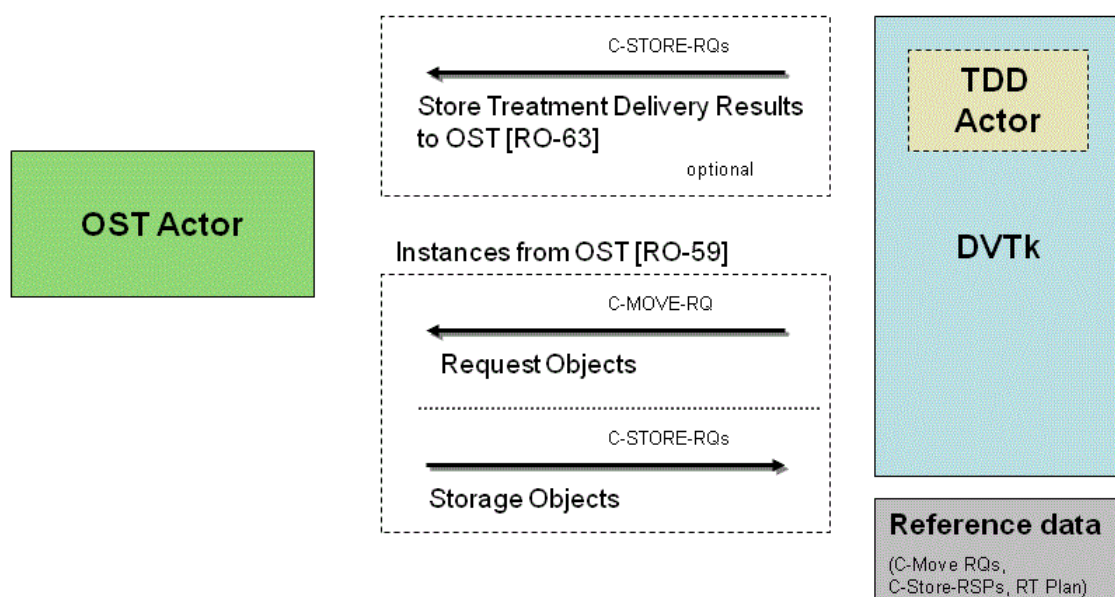
This scenario tests if the static input instances of the workitem can be retrieved from the OST actor.

The OST retrieve AE title has to be configured in the testtool configuration utility.

Test scenario entry point: First execute the **TMS Retrieval of worklist test scenario**

Stage: Prepare

1. Make sure that the referenced RT-Plan is present at the OST
 2. Make sure OST (system under test - SUT) is active and listening, and that at least one RT-Plan is present.
 3. Start the test scenario.
 4. The test tool sends the C-Move request. (based on the previous received Input Information Sequence of the C-Find Response of TDW-RO-58)
 5. The test tool starts listening and automatically detects the C-Move response(s) and starts to listen for incoming C-STORE request(s).
 6. The OST has to send C-Move response(s) and C-Store request(s)
 7. When the object are received from the OST actor press 'stop listening and start validation'.
 8. The Test tool will validate the received messages and RT-objects for IHE compliance
- (The validation overview can be found in the Rule Overview tab)



Notes:

C-Move and C-Store dimse services are executed on two different associations.

This test scenario does not cover validation of an unsafe delivery procedure.
(SOP-instances in the Input Information Sequence received when the Procedure Step State is IN PROGRESS)

Assumption: OST sends C-Move Responses for progress update during C-Store procedure. (some implementations of a PACS do not send C-Move Responses until completion)

Expected transactions from actor:

Validation of transactions:

TDW-RO-59: Retrieve Instances from OST

Used scenario dataset:

SOP Class support to OST:

RT Plan Storage

Additional technical information

The C-MOVE request that the test tool sends to the TMS consists of work items that were found in the C-FIND request of TDW-RO-58. In the input information sequence should be a reference to the RT Plan Storage file that is stored on the TMS. The "Retrieve AE Title" (0008,0054) should have a value that is the same as configured in the test tool configurator. If there is a mismatch, the test tool will not be able to create a C-MOVE request, since it verifies if those AE titles are the same.

Retrieve Static Treatment Delivery Input Instances from OST [RO-59]

| UPS C-STORE-RQ | | | | |
|---------------------------|-------------|----------|-------------------|----------------|
| Attribute | Tag | IHE-Rule | Description | Code Rule |
| Affected SOP Instance UID | (0000,1000) | | Should be present | IsRequiredRule |

| Received objects | | | | Received objects |
|------------------|--|---|-------------|------------------|
| Received | | IHE-Rule | Description | Code Rule |
| RT-Plan | | <p>In the C-Move request the following IHE rule should be checked:</p> <p>At least an RT-Plan should be requested, other objects are optional, but all objects that are requested should be in the input information sequence of the worklist.</p> <p>However this is impossible to validate because there is no reference between the Sop Instance UID and the Sop Class UID.</p> <p>Therefor we check that at least one RT-Plan is send by the OST</p> | | IODReceivedRule |

Test Scenario TDD Retrieve Static Treatment Delivery

Input Instances

Description:

This test scenario allows a TDD actor to retrieve the static delivery input in stances (RT Plan) form the OST actor.

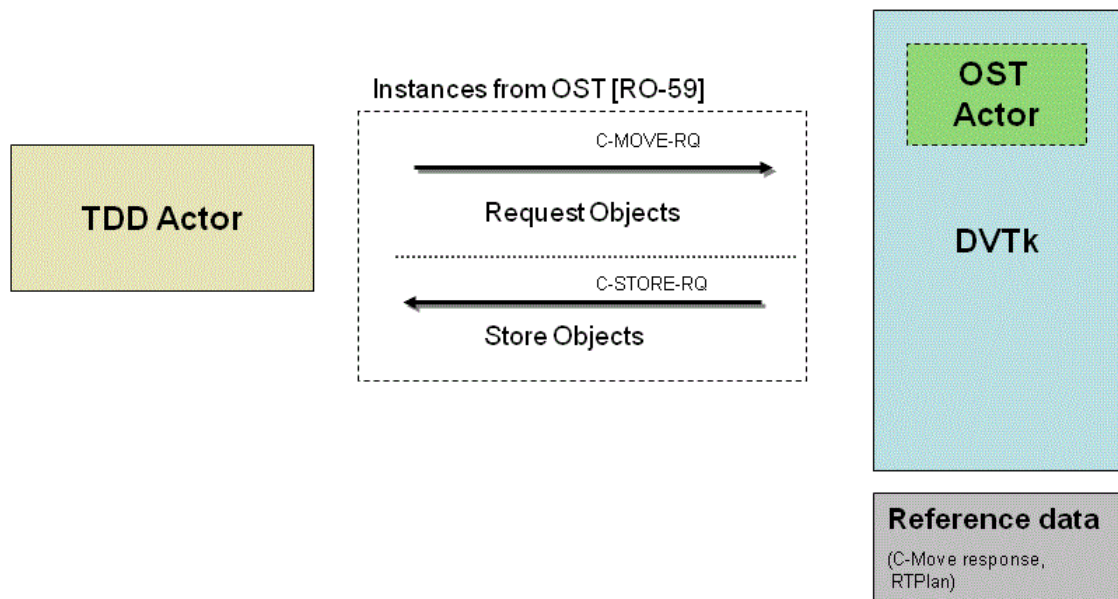
The OST emulator configuration and available instances are configured with the testtool configuration editor

Test scenario entry point: First execute the **TDD Retrieval of worklist** – test scenario.

Stage: Prepare

1. Make sure that at least one RT-Plan is present (see step 1 of the TDD Retrieval of worklist test scenario where to place the files)
2. Start the test scenario.
3. The test tool waits for an incoming C-Move request
4. Send a C-Move request with the TDD
5. The test tool sends C-Move pending responses to the TDD actor and the test tool sends C-Store requests to the TDD actor (based upon the C-MOVE-RQ)
6. The TDD Actor should send one or more C-Store responses to the test tool, depending on the C-Move request.
7. When the DICOM objects are successfully stored, the test tool will send a C-MOVE success response.
8. When the communication is finished, press 'stop listening and start validation'.
9. The test tool validates the C-Move requests and C-Store responses for IHE-compliance. At least one RT-Plan should be received.

(The validation overview can be found in the Rule Overview tab)



Additional technical information

Expected transactions from actor:

Validation of transaction:

TDW-RO-59: Instances from OST

Used scenario dataset:

SOP Class Support to OST:

RT Plan Storage

Note:

Test tool as OST does not support any DIMSE service other than C-STORE, thus C-ECHO command is not supported. OST is not an actual PACS, it only implements commands needed for the testscenarios.

Retrieve Static Treatment Delivery Input Instances from OST [RO-59]

| UPS C-MOVE-RQ | | | | |
|---|-------------|----------|---|-----------------------------------|
| Attribute | Tag | IHE-Rule | Description | Code Rule |
| Query/Retrieve Level | (0008,0052) | | IMAGE | ValueRule |
| SOP Instance UID (VM is 1-n, that means there can be more then one SOP instance UID present) | (0008,0018) | | <p>The SOP Instance UID's should be present in the Input Information sequence of the selected UPS.</p> <p>>Referenced Series Sequence >>Reference SOP Sequence >>>Referenced SOP Class UID</p> <p>Note: At least an RT-Plan should be requested, other objects are optional, but all objects that are requested should be in the input information sequence of the worklist (This can not be validated here this is validated in the TMS Treatment Delivery Static InputInstances Scenario)</p> | RequestedCMoveSopInstanceUIDsRule |
| Affected SOP Instance UID | (0000,1000) | | <p>The Retrieve (Study Root – MOVE) SOP Class shall be supported.</p> <p>Value = "1.2.840.10008.5.1.4.1.2.2.2"</p> | ValueRule IsRequiredRule |

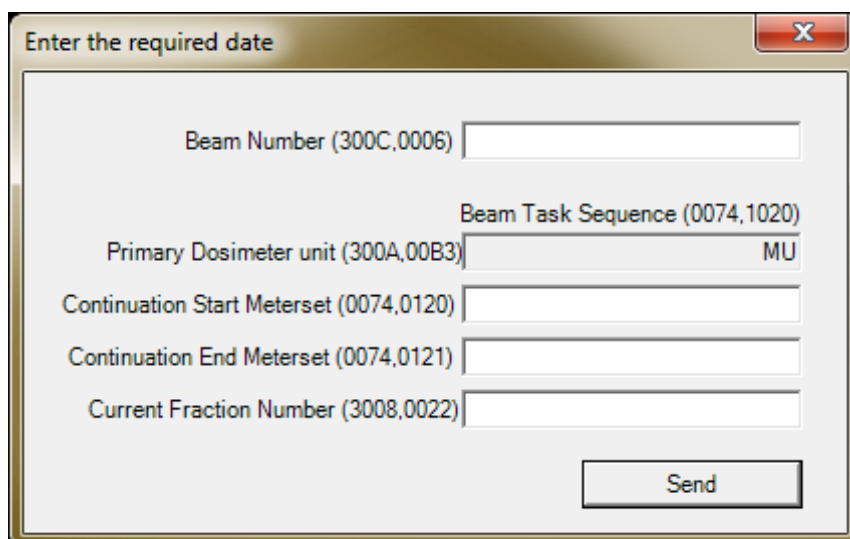
Test Scenario TDD Deliver initialization

Description:

Test scenario entry point: First execute the TDD Treatment Delivery Static Input Instances from TMS – testscenario

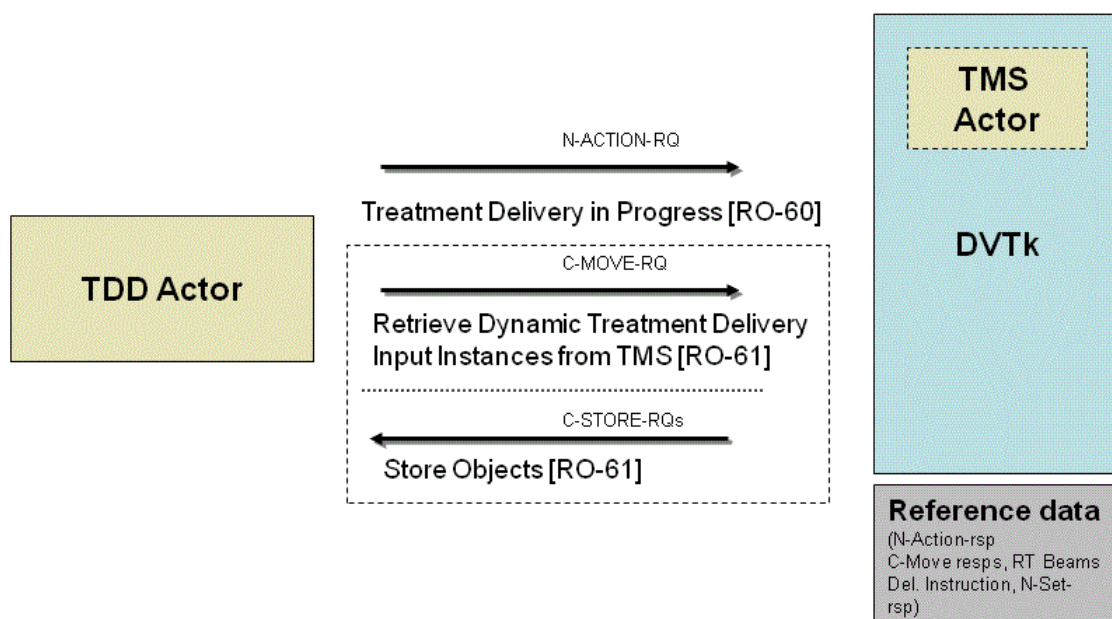
Stage: Deliver

1. Make sure that at least one RT-Beams Delivery Instruction is present (see step 1 of the TMS Retrieval of wordlist test scenario where to place the files)
2. Start the test scenario, a pop-up window will appear, choose if it is a resumed or a new treatment that is to be validated.
3. In case of a resume the RT-Beams delivery instruction continuation data can be entered using the dialog.



4. The test tool starts to listen for incoming messages.
5. The TDD now has to send the N-Action request with the procedure state IN PROGRESS (RO-60)
6. The test tool will automatically respond with a N-Action response
7. The test tool waits for an incoming C-Move request for the RT Beams delivery instruction
8. The test tool sends C-Move pending responses to the TDD actor and the test tool sends a C-Store request to the TDD actor (based upon the C-MOVE-RQ)
9. The TDD Actor should send a C-Store response to the test tool, depending on the C-Move request.
10. When the DICOM object is successfully stored, the test tool will send C-MOVE success response.
11. When the communication is finished, press 'stop listening and start validation'.
12. The test tool validates the C-Move request and C-Store response for IHE-compliance.

(The validation overview can be found in the Rule Overview tab)



Notes:

C-Move and C-Store dimse services are executed on two different associations.
This test scenario does not cover validation of an unsafe delivery procedure.(SOP-instances in the Input Information Sequence received when the Procedure Step State is IN PROGRESS)
Assumption: TMS sends C-Move Responses for progress update during C-Store procedure. (some implementations of a PACS do not send C-Move Responses until completion)

Expected transactions from actor:

TDW-RO-60: Treatment Delivery in Progress
TDW-RO-61: Retrieve Dynamic Treatment Delivery Input 665 Instances from TMS

Used scenario dataset:

SOP Class to TMS:
RT Beam Delivery Instruction Storage

Treatment Delivery in Progress [RO-60]

| UPS N-ACTION in Progress Request Requirements | | | |
|---|-------------|----------------------------|---------------------------------------|
| Attribute Name | Tag | Description | Code Rule |
| Requested SOP Class UID | (0000,0003) | 1.2.840.10008.5.1.4.34.6.1 | IsRequiredRule / ValueRule |
| Requested SOP Instance UID | (0000,1001) | | IsRequiredRule / InterOperabilityRule |
| Action Type ID | (0000,1008) | 1 | IsRequiredRule / ValueRule |
| Transaction UID | (0008,1195) | SCU sends an unique value | IsRequiredRule / HasValueRule |
| Procedure Step State | (0074,1000) | IN PROGRESS | IsRequiredRule / ValueRule |

Retrieve Dynamic Treatment Delivery Input Instances from TMS [RO-61]

| UPS C-MOVE-RQ | | | | |
|---|-------------|--|--|-------------------------------|
| Attribute | Tag | IHE-Rule | Description | Code Rule |
| Query/Retrieve Level | (0008,0052) | | IMAGE | ValueRule |
| SOP Instance UID (VM is 1-n, that means there can be more than one SOP instance UID present) | (0008,0018) | | <p>The SOP Instance UID's should be present in the Input Information sequence</p> <p>>Referenced Series Sequence >>Reference SOP Sequence >>>Referenced SOP Class UID</p> <p>Note: At least the RT Beams Delivery Instruction should be requested from TMS, other objects are optional, but all objects that are requested should be in the input information sequence of the worklist</p> | RequestedCMoveSopInstanceUIDs |
| Affected SOP Class UID | (0000,0002) | Study Root Query Retrieve 1.2.840.10008.5.1.4.1.2.2.2 | | IsRequiredRule ValueRule |

Test Scenario TMS Deliver Initialization

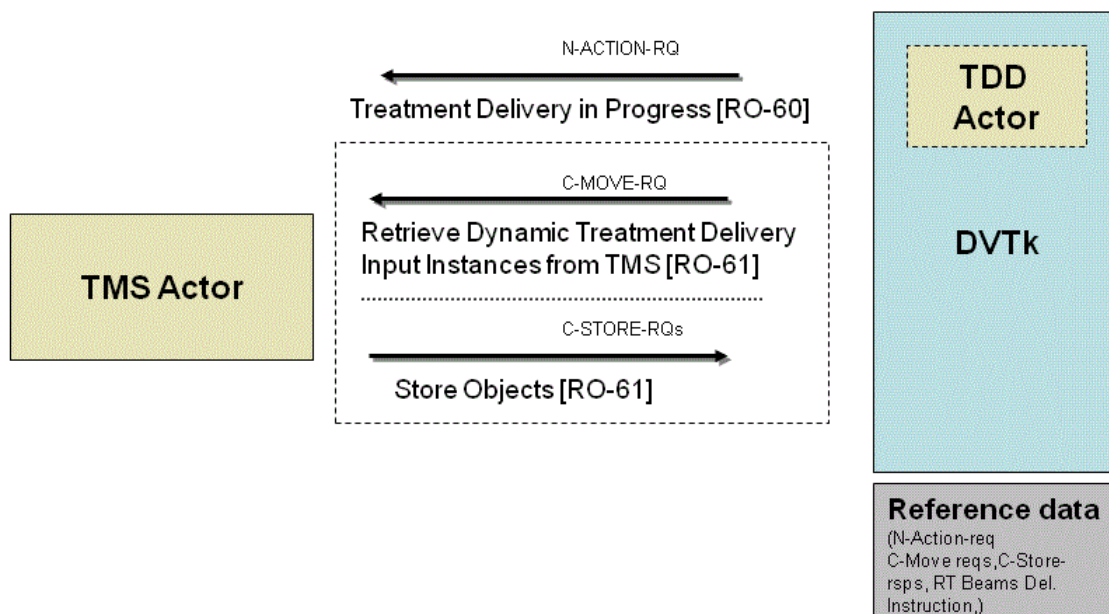
Description:

This scenario will test the TMS actor on the start of the workitem and the retrieval of the RT Beams delivery instruction.

Test scenario entry point: First execute the **TMS Treatment Delivery Static Input Instances from TMS – testscenario**

Stage: Deliver

1. Make sure that at least one RT-Beams Delivery Instruction is present (see step 1 of the TMS Retrieval of worklist test scenario where to place the files)
 2. Start the TMS to listen for incoming messages
 3. Start the test scenario, a pop-up window will appear, choose if it is a resumed or a new treatment that is to be validated.
 4. The test tool will send the N-Action request with procedure state IN PROGRESS
 5. The TMS has to respond with a N-Action response
 6. The TMS should be ready for an incoming C-Move request
 7. The test tool will send a C-Move request to the TMS to retrieve the RT Beams delivery Instruction
 8. The TMS has to send C-Move pending responses to the test tool and the TMS has to send a C-Store requests to the test tool (based upon the C-MOVE-RQ)
 9. The test tool will send a C-Store responses to TMS.
 10. When the RT Beams delivery Instruction is successfully stored, TMS will have to send a C-MOVE success response.
 11. When the communication is finished, press 'stop listening and start validation'.
 12. The test tool validates the RT-Beams Delivery Instruction C-Store for IHE-compliance.
- (The validation overview can be found in the Rule Overview tab)



Expected transactions from actor:

TDW-RO-60: Treatment Delivery in Progress

TDW-RO-61: Retrieve Dynamic Treatment Delivery Input Instances from TMS

Used scenario dataset:

SOP Class support to Archive:

RT Beam Delivery Instruction Storage

Treatment Delivery in Progress [RO-60]

| UPS N-ACTION in Progress respons Requirements | | | |
|---|-------------|-------------|--|
| Attribute Name | Tag | Description | Code Rule |
| Status Command Element | (0000,0900) | 0 | ValueRule |
| Affected SOP Instance UID | (0000,1000) | | OptionalRule / ConditionalSequenceRule |
| Procedure Step State | (0074,1000) | IN PROGRESS | IsRequiredRule / InterRelationRule / ValueRule |

Retrieve Dynamic Treatment Delivery Input Instances from TMS [RO-61]

| RT Beams Treatment Delivery IOD | | | | |
|--------------------------------------|-------------|---|--|---|
| RT BEAMS DELIVERY INSTRUCTION MODULE | | | | |
| Attribute | Tag | IHE-Rule | Description | Code Rule |
| Beam Task Sequence | (0074,1020) | | | IsRequiredRule |
| >Beam Task Type | (0074,1022) | Not specified in IHE, this is an assumption and is to be communicated with the IHE-RO Technical committee | Value should be TREAT (= Beam treatment only) | ValueRule |
| >Treatment Delivery Type | (300A,00CE) | Not specified in IHE, this is an assumption and is to be communicated with the IHE-RO Technical committee | When the user selected a new treatment the value should be: TREATMENT for the first sequence item of the Beam Task Sequence When the user selected continuation of an interrupted treatment the value should be: CONTINUATION for the first sequence item of the Beam Task Sequence | ValueRule IsRequiredRule When resumed: TreatmentDeliveryTypeRule |
| >Primary Dosimeter Unit | (300A,00B3) | | Should be present when Treatment Delivery Type has the value CONTINUATION | done in TreatmentDeliveryTypeRule |
| >Continuation Start Meterset | (0074,0120) | | Should be present when Treatment Delivery Type has the value CONTINUATION | done in TreatmentDeliveryTypeRule |
| >Continuation End Meterset | (0074,0121) | | Should be present when Treatment Delivery Type has the value CONTINUATION | done in TreatmentDeliveryTypeRule |

| UPS C-STORE-RQ | | | | |
|---------------------------|-------------|----------|--|--|
| Attribute | Tag | IHE-Rule | Description | Code Rule |
| Affected SOP Instance UID | (0000,1000) | | <p>The Retrieve (Study Root – MOVE) SOP Class shall be supported.</p> <p>Value = "1.2.840.10008.5.1.4.1.2.2.2"</p> | <p>ValueRule</p> <p>IsRequiredRule</p> |

| Received objects | | | | |
|-------------------------------|--|--|-------------|-----------------|
| Received | | IHE-Rule | Description | Code Rule |
| RT-Beams Delivery Instruction | | <p>In the C-Move request the following IHE rule should be checked:</p> <p>At least an RT-Beams Delivery Instruction should be requested, other objects are optional, but all objects that are requested should be in the input information sequence of the worklist.</p> <p>However this is impossible to validate because there is no reference between the Sop Instance UID and the Sop Class UID.</p> <p>Therefore we check that only the RT-Beams Delivery Instruction is sent by the TMS.</p> | | IODReceivedRule |

Test Scenario TDD Deliver success

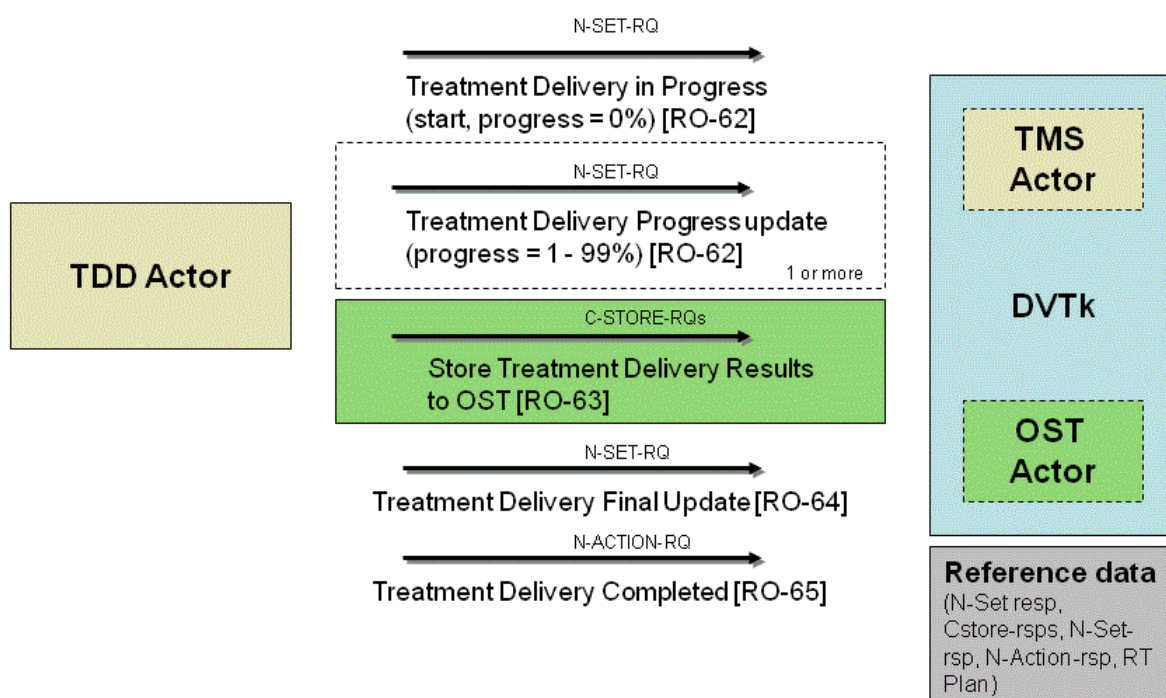
Description:

This testscenario tests the behaviour of the TDD actor on the completion of the workitem. Both the TMS and the OST are emulated by the testtool.

Test scenario entry point: First execute the **TDD Deliver initialization – testscenario**

Stage: Deliver

1. Start the scenario. (no choice has to be made if it is a resumed or a new treatment)
2. The test tool workitem procedure state is IN PROGRESS and it expects a N-Set request with a progress of 0% to indicate start of workitem.
3. The test tool has to receive the N-Set request(s) with progress > 0% and < 100% from TDD and will send N-Set-Response(s)
4. The test tool has to receive the N-Set request with progress 100%
5. The test tool has to receive a RT Beams Treatment Delivery Record send to the OST by the TDD.
6. The test tool has to receive the N-Set request with progress 100% and an output Information sequence from TDD and will send N-Set-Response
7. The test tool has to receive N-ACTION request from TDD with Unified Procedure Step Progress = COMPLETED
8. The test tool validates the N-Set Requests, N-Action request, C-Store request and the RT Beams Treatment Record Storage for IHE compliance.
(The validation overview can be found in the Rule Overview tab)



Expected transactions from actor:

TDW-RO-62: Treatment Delivery Progress Update

TDW-RO-63: Store Treatment Delivery Results to OST

TDW-RO-64: Treatment Delivery Final Update

TDW-RO-65: Treatment Delivery Completed

Used scenario dataset:

SOP Class support to OST:

RT Beams Treatment Record Storage

Treatment Delivery Progress Update [RO-62]

| UPS N-SET Attribute Requirements for UPS Progress Update Transaction | | | | |
|--|-------------|--|---|---|
| Attribute Name | Tag | Type SCU/SCP | IHE-RO Additional Notes/Requirements on SCU | Code Rule SCU |
| Requested SOP Instance UID | (0000,1001) | 1/- | | InterOperabilityRule |
| Transaction UID | (0008,1195) | (see DICOM Standard 2011, P3.4 CC.2.8.1.2.1) | | IsRequiredRule / InterOperabilityRule |
| Unified Procedure Step Progress Information Module | | | | |
| UPS Progress Information Sequence | (0074,1002) | 3 | Required by IHE-RO in all instances of this transaction. | IsRequiredRule |
| >Unified Procedure Step Progress | (0074,1004) | 1 | 0% - 100% (in our scenarios) | IsRequiredRule / ValueListRule |
| >Unified Procedure Step Discontinuation Reason Code Sequence | (0074,100e) | 3 | Not required to be supplied for this profile. | |
| Unified Procedure Step Performed Procedure Information Module | | | | |
| UPS Performed Procedure Sequence | (0074,1216) | 1 | | IsRequiredRule |
| >Performed Processing Parameters Sequence | (0074,1212) | 3 | Required by IHE-RO if UPS Performed Procedure Sequence is provided | IsRequiredRule |
| >>Value Type | (0040,A040) | 1 | 'TEXT' | IsRequiredRule / ValueRule |
| >>Concept Name Code Sequence | (0040,A043) | 1 | | |
| >>>Code Value | (0008,0100) | 1 | '121700' | IsRequiredRule / ValueRule |
| >>>Coding Scheme Designator | (0008,0102) | 1 | 'DCM' | IsRequiredRule / ValueRule |
| >>>Code Meaning | (0008,0104) | 1 | 'Referenced Beam Number in Progress' | IsRequiredRule / ValueRule |
| >>Text Value | (0040,A160) | 1 | Integer string equal to the value of Referenced Beam Number (300C,0006) | IsRequiredRule / PIMTextValueRule |
| >Output Information Sequence | (0040,4033) | 2 | Shall be empty | IsRequiredRule / EmptySequenceRule |
| >Non-DICOM Output Information Sequence | (0040,4032) | 2 | Shall be empty | IsRequiredRule / EmptySequenceRule |
| >Performed Workitem Code Sequence | (0040,4019) | 3/1 | | OptionalRule |
| >>Code Value | (0008,0100) | 1/1 | | ConditionalSequenceRule(InterOperabilityRule) |
| >>Coding Scheme Designator | (0008,0102) | 1/1 | | ConditionalSequenceRule(InterOperabilityRule) |
| >>Code Meaning | (0008,0104) | 1/1 | | ConditionalSequenceRule(InterOperabilityRule) |

Store Treatment Delivery Results to TMS [RO-63]

| C-STORE-RQ | | | | |
|---------------|-------------|----------|--------------------------------------|-----------|
| Attribute | Tag | IHE-Rule | Description | Code Rule |
| SOP Class UID | (0008,0016) | | Value should be one specified below. | ValueRule |
| | | | | |

| | |
|-----------------------------------|-------------------------------|
| SOP Class Support for OST | |
| SOP Class Name | SOP Class UID |
| RT Beams Treatment Record Storage | 1.2.840.10008.5.1.4.1.1.481.4 |

| Received objects (TDD Deliver succes – test scenario) | | | |
|--|---|-------------|-----------------|
| Received | IHE-Rule | Description | Code Rule |
| RT Beams Treatment Record Storage | A C-STORE Request shall be sent from the Performing Device to the OST. An instance of the RT Beams Treatment Record Storage IOD | | IODReceivedRule |

UPS Final Update [RO-64]

| | | | | | |
|--|-------------|---|-----------------|--|--|
| UPS N-Set Final State Attribute Requirements | | | | | |
| Attribute Name | Tag | Req. Type N-SET (SCU/SCP) | Final State | IHE-RO Additional Notes/Requirements on SCU | Code Rule |
| Requested SOP Instance UID | (0000,1001) | | | | InterOperabilityRule |
| Transaction UID | (0008,1195) | (see DICOM Standard 2011, P3.4 CC.2.8.1.2.1) | R | transaction UID should be the one we have send earlier (from N-action-RSP) | IsRequiredRule / InterOperabilityRule |
| SOP Common Information Module | | | | | |
| Specific Character Set | (0008,0005) | 1C/1C (Required if extended or replacement character set is used) | Set if required | Only ISO-IR 100 (Latin-1) shall be supported. | |
| SOP Class UID | (0008,0016) | Not allowed | R | Affected SOP Class (0000,0002) is always 'UPS-Push' SOP Class | NotPresentRule |
| SOP Instance UID | (0008,0018) | Not allowed. | R | Affected SOP Instance (0000,1000) supplied by C-FIND responses of UPS query | NotPresentRule |
| Unified Procedure Step Progress Information Module | | | | | |
| Procedure Step State | (0074,1000) | Not Allowed. Use N-ACTION | R | | NotPresentRule |
| Unified Procedure Step Scheduled Procedure Information Module | | | | | |
| Scheduled Procedure Step Priority | (0040,4003) | 3/1 | R | Supplied implicitly by TMS – not required in N-SET. | |
| Scheduled Procedure Step Modification Date and Time | (0040,4010) | -/1 SCP will use time of SET | O* | Supplied implicitly by TMS – not required in N-SET. | OptionalRule |
| Unified Procedure Step Performed Procedure Information Module | | | | | |
| UPS Performed Procedure Sequence | (0074,1216) | 3/2 | R* | Supplied by this transaction in IHE-RO, if UPS was not 'CANCELED' prior to radiation delivery. May be supplied otherwise | IsRequiredRule (success scenario) NotPresentRule(cancel scenario) |

| | | | | | |
|--|--------------|-----|-----|---|--|
| >Actual Human Performers Sequence | (0040,4035) | 3/1 | RC* | Shall be provided if known. Not required to be known in IHE-RO. | |
| >>Human Performer Code Sequence | '(0040,4009) | 3/1 | RC* | Shall be provided if known. Not required to be known in IHE-RO. | |
| >>Human Performer's Name | (0040,4037) | 3/1 | RC | Shall be provided if known. Not required to be known in IHE-RO. | |
| >Performed Station Name Code Sequence | (0040,4028) | 3/2 | R* | Supplied by this transaction in IHE-RO. | OptionalRule |
| >>Code Value | (0008,0100) | 1/1 | R | Name of machine performing UPS. Supplied by this transaction (RO-64: UPS Final Update) in IHE-RO. Same value as the C-Find response of RO-58 | ConditionalSequenceRule (InterOperabilityRule) |
| >>Coding Scheme Designator | (0008,0102) | 1/1 | R* | Any private coding scheme designator. Supplied by this transaction (RO-64: UPS Final Update)) in IHE-RO. Same value as the C-Find response of RO-58 | ConditionalSequenceRule (InterOperabilityRule) |
| >>Code Meaning | (0008,0104) | 1/1 | R* | Value shall be 'Performed Station Name'. Supplied by this transaction (RO-64: UPS Final Update)) in IHE-RO. Same value as the C-Find response of RO-58 | ConditionalSequenceRule (InterOperabilityRule) |
| >Performed Procedure Step Start DateTime | 0040,4050 | 3/1 | R | Supplied by this transaction in IHE-RO | IsRequiredRule / HasValueRule |
| >Performed Workitem Code Sequence | (0040,4019) | 3/1 | R* | Supplied by this transaction (RO-64: UPS Final Update)) in IHE-RO | OptionalRule |
| >>Code Value | (0008,0100) | 1/1 | | Performed work item code value. Supplied by this transaction (RO-64: UPS Final Update)) in IHE-RO. Same value as the C-Find response of RO-58 | ConditionalSequenceRule (InterOperabilityRule) |

| | | | | | |
|--|-------------|-----|----|---|--|
| >>Coding Scheme Designator | (0008,0102) | 1/1 | | Value shall be 'DCM'. Supplied by this transaction (RO-64: UPS Final Update)) in IHE-RO. Same value as the C-Find response of RO-58 | ConditionalSequenceRule (InterOperabilityRule) |
| >>Code Meaning | (0008,0104) | 1/1 | | Value shall be consistent with Code Value as described in Supplement 74 PS 3.16 Annex B. Supplied by this transaction (RO-64: UPS Final Update)) in IHE-RO. Same value as the C-Find response of RO-58 | ConditionalSequenceRule (InterOperabilityRule) |
| >Performed Procedure Step End DateTime | 0040,4051 | 3/1 | R* | Supplied by this transaction in IHE-RO | IsRequiredRule / HasValueRule |
| >Output Information Sequence | (0040,4033) | 2/2 | R* | Supplied by this transaction (RO-64: UPS Final Update) in IHE-RO. May be empty (null) in N-SET if no output objects are created. | IsRequiredRule |
| >>Type of Instances | 0040,E020 | 1 | R* | Supplied by this transaction in IHE –RO Value shall be "DICOM" | IsRequiredRule |
| >>Study Instance UID | (0020,000D) | 1/1 | R* | Supplied by this transaction (RO-64: UPS Final Update)) in IHE-RO | |
| >>Series Instance UID | (0020,000E) | 1/1 | R | Supplied by this transaction (RO-64: UPS Final Update)) in IHE-RO | |
| >>Referenced SOP Sequence | (0008,1199) | 1/1 | R | Supplied by this transaction (RO-64: UPS Final Update)) in IHE-RO | |
| >>>Referenced SOP Class UID | (0008,1150) | 1/1 | R | Supplied by this transaction (RO-64: UPS Final Update)) in IHE-RO. See transactions RO-22: Store Position Acquisition Results to Archive, RO-23: Store Position Registration Results to Archive, RO-24: Store Delivery Results to Archivefor permitted SOP Classes. | |

| | | | | | |
|--------------------------------|-------------|-----|----|--|----------------|
| >>>Referenced SOP Instance UID | (0008,1155) | 1/1 | R | Supplied by this transaction (RO-64: UPS Final Update)) in IHE-RO | |
| >>DICOM Retrieval Sequence | (0040,E021) | 1C | R | | IsRequiredRule |
| >>>Retrieve AE Title | (0008,0054) | 1 | RC | Supplied by this transaction (RO-64: UPS Final Update) for IHE-RO (File Media Set not supported) | |
| >>>Storage Media File-Set ID | (0088,0130) | 2 | | Never supplied for IHE-RO (File Media Set not supported) | |
| >>>Storage Media File-Set UID | (0088,0140) | 1 | | Never supplied for IHE-RO (File Media Set not supported) | |

Treatment Delivery Completed/Canceled [RO-65]

| UPS N-ACTION Completed/Canceled Requirements | | | |
|--|-------------|----------------------------|---------------------------------------|
| Attribute Name | Tag | Description | Code Rule |
| Requested SOP Class UID | (0000,0003) | 1.2.840.10008.5.1.4.34.6.3 | IsRequiredRule / ValueRule |
| Requested SOP Instance UID | (0000,1001) | | IsRequiredRule / InterOperabilityRule |
| Action Type ID | (0000,1008) | 1 | IsRequiredRule / ValueRule |
| Transaction UID | (0008,1195) | | IsRequiredRule / InterOperabilityRule |
| Procedure Step State | (0074,1000) | Completed | IsRequiredRule / ValueRule |

Test Scenario TMS Deliver success

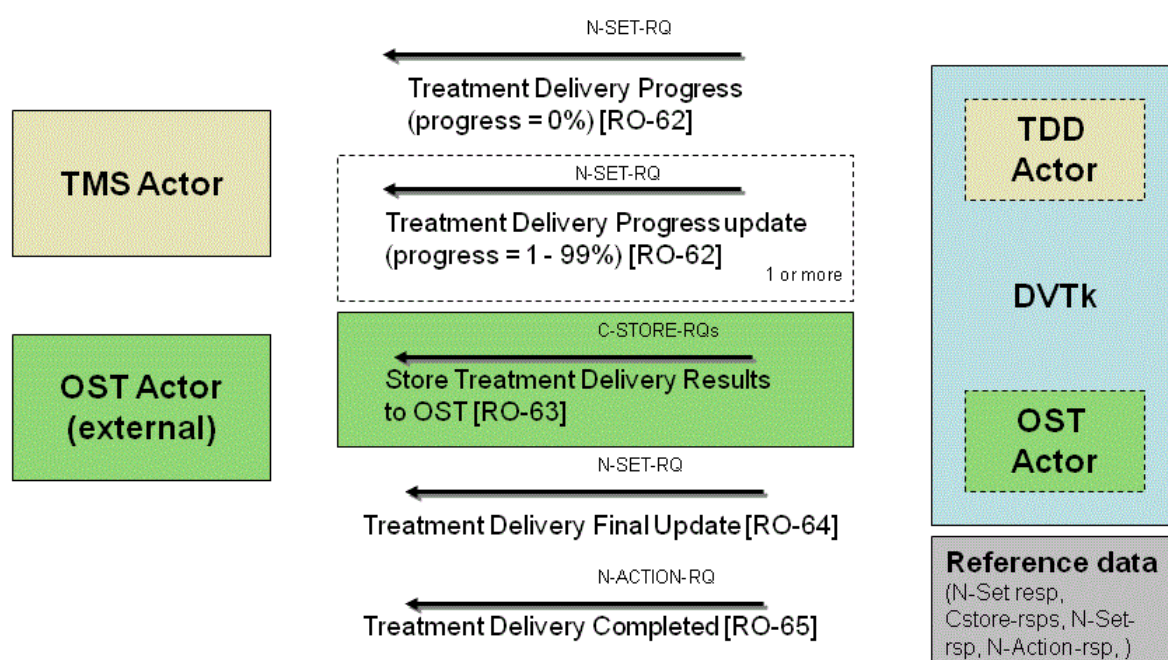
Description:

This testscenario tests the behaviour of the TMS actor on the completion of the workitem. Both the TMS and the OST are used by the testtool.

Test scenario entry point: First execute the **TMS Deliver initialization – testscenario**

Stage: Deliver

1. Make sure TMS (system under test - SUT) is active and listening, and that a RT Beams Treatment Record is present. The RT Beams Treatment Record should be based on the RT-Plan and the RT Beams Delivery Instruction of the previous test scenarios.
 2. Start the scenario.
 3. The test tool sends the N-Set request with a progress of 0%
 4. The test tool sends the N-Set request with a progress of 50%
 5. The test tool sends the RT Beams Treatment Record to the OST. (RO-63) This is the treatment record that the user has placed in the user data directory.
 6. The test tool sends the N-Set request with a progress of 100% and an output information sequence with the RT record (RO-64 Final Update)
 7. The test tool sends the N-ACTION request with Procedure Step Progress = COMPLETED
 8. The test tool validates the N-Set responses, N-Action response and C-Store response for IHE compliance.
- (The validation overview can be found in the Rule Overview tab)



Expected transactions from actor:

Validation of transactions:

- TDW-RO-62: Treatment Delivery Progress Update
- TDW-RO-63: Store Treatment Delivery Results to OST
- TDW-RO-64: Treatment Delivery Final Update
- TDW-RO-65: Treatment Delivery Completed/Canceled

Used scenario dataset:

SOP Class support to OST:

RT Beams Treatment Record Storage

Treatment Delivery Progress Update [RO-62]

| UPS N-SET Attribute Requirements for UPS Progress Update Transaction | | | | |
|--|-------------|--|---|---|
| Attribute Name | Tag | Type SCU/SCP | IHE-RO Additional Notes/Requirements on SCU | Code Rule SCP |
| Requested SOP Instance UID | (0000,1001) | 1/- | | |
| Affected SOP Class UID | (0000,0002) | | UPS PUSH | ValueRule |
| Affected SOP Instance UID | (0000,1000) | -/1C | | IsRequiredRule / InterOperabilityRule |
| Transaction UID | (0008,1195) | (see DICOM Standard 2011, P3.4 CC.2.8.1.2.1) | | IsRequiredRule / InterOperabilityRule |
| status code | (0000,0900) | | | ValueRule: Check if we receive a status succeed |

UPS Final Update [RO-64]

| UPS N-Set Final State Attribute Requirements | | | | | |
|---|-------------|--|-------------|--|------------------------------------|
| Attribute Name | Tag | Req. Type N-SET (SCU/SCP) | Final State | IHE-RO Additional Notes/Requirements on SCU | Code Rule SCP |
| Requested SOP Instance UID | (0000,1001) | | | | |
| Affected SOP Class UID | (0000,0002) | | UPS PUSH | | InterRelationRule |
| Affected SOP Instance UID | (0000,1000) | | | | IsRequiredRule / InterRelationRule |
| Transaction UID | (0008,1195) | (see DICOM Standard 2011, P3.4 CC.2.8.1.2.1) | R | transaction UID should be the one we have send earlier (from N-action-RSP) | IsRequiredRule / InterRelationRule |
| UPSProgressInformationSequence | (0074,1002) | | R | | IsRequiredRule |
| UPSProgressInformationUnifiedProcedureStepPrd | (0074,1004) | | | | IsRequiredRule / ValueRule |

Treatment Delivery Completed/Canceled [RO-65]

| UPS N-ACTION Completed/Canceled Requirements | | | |
|--|-------------|--|---------------------------------------|
| Attribute Name | Tag | Description | Code Rule |
| Status Command Element | (0000,0900) | 0 | ValueRule |
| Affected SOP Class UID | (0000,0002) | | InterRelationRule |
| Affected SOP Instance UID | (0000,1000) | | IsRequiredRule / InterRelationRule |
| Procedure Step State | (0074,1000) | COMPLETED | IsRequiredRule / ValueRule |
| Transaction UID | (0008,1195) | (see DICOM Standard 2011, P3.4 CC.2.8.1.2.1) | IsRequiredRule / InterOperabilityRule |

Test Scenario TDD Deliver Cancel

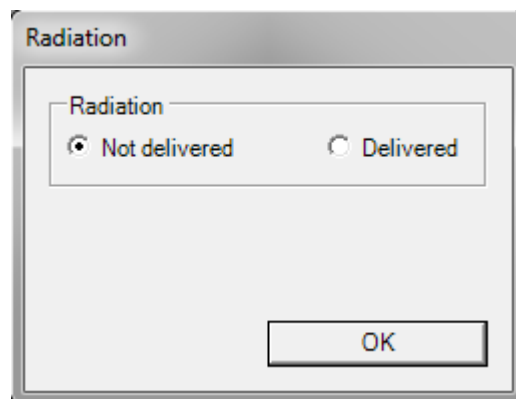
Description:

This testscenario tests the behaviour of the TDD actor on the cancelation of the workitem. Both the TMS and the OST are emulated by the testtool.

Test scenario entry point: First execute the **TDD Deliver initialization – testscenario**

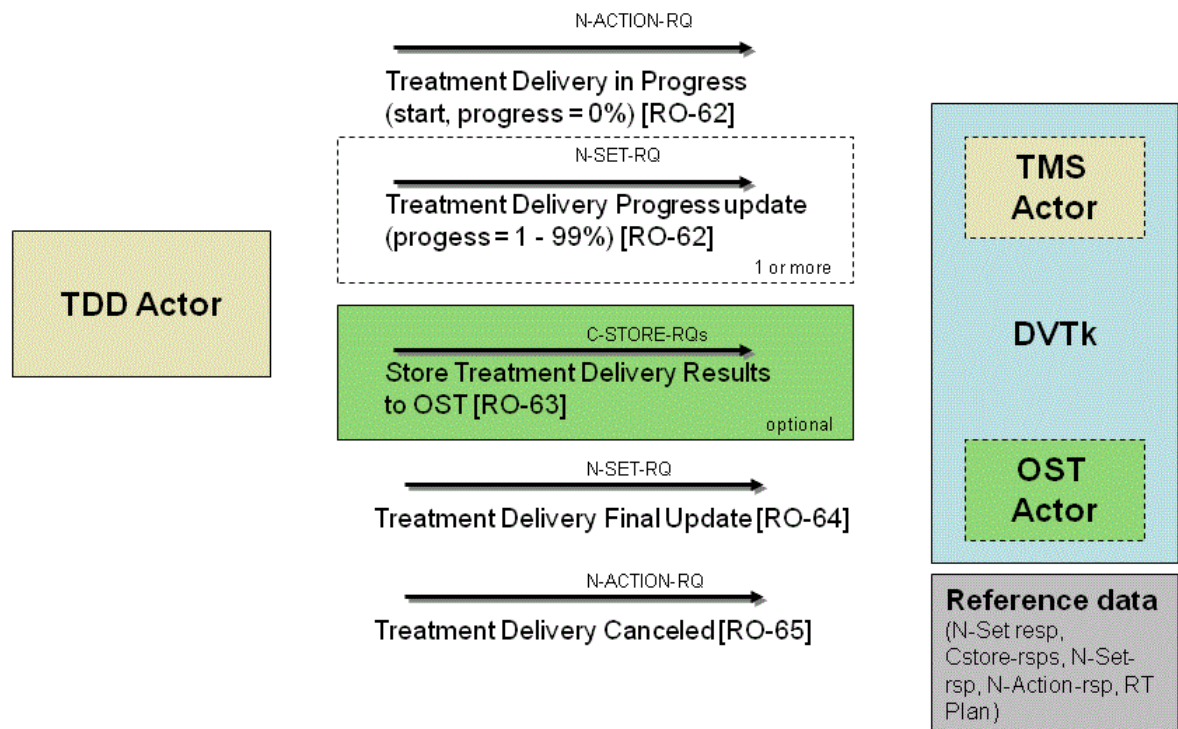
Stage: Deliver

1. Start the scenario. (no choice has to be made if it is a resumed or a new treatment)
2. The user will be given a choice if an interrupted treatment with or without radiation is to be validated



With radiation delivered:

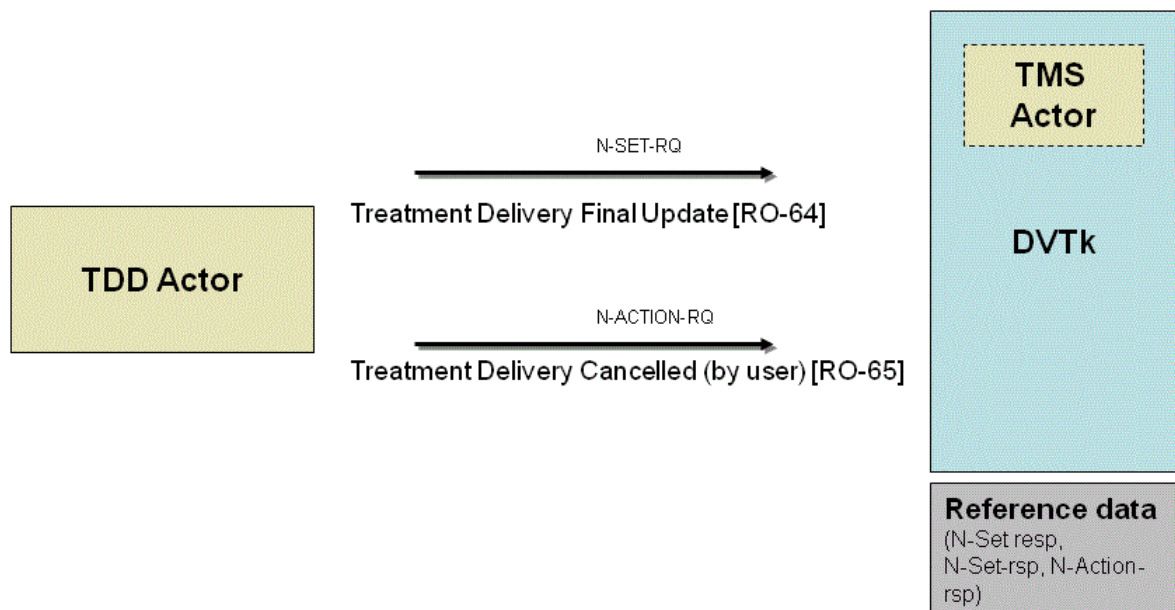
3. The test tool expects that the workitem procedure state is IN PROGRESS and expects a N-Set with progress = 0%
4. The test tool has to receive the N-Set request(s) with progress > 0% and < 100% from TDD and will send N-Set-Response(s)
5. The test tool has to receive a RT Beams Treatment Record to the **OST** from TDD. (RO-63)
6. The test tool has to receive the N-Set request from TDD for a progress of < 100% and a output information sequence (RO-64 Final Update)
7. The test tool has to receive N-ACTION request from TDD with Unified Procedure Step Progress = CANCELED
8. The test tool validates the N-Set Requests, N-Action request, C-Store request and the RT Beams Treatment Record Storage for IHE compliance.
(The validation overview can be found in the Rule Overview tab)



Without radiation delivered:

3. The test tool has to receive a the N-Set request from TDD for a progress of 0% (RO-64 Final Update)
4. The test tool has to receive N-ACTION request from TDD with Unified Procedure Step Progress = CANCELED
5. The test tool validates the N-Set Request, N-Action request, for IHE compliance.

(The validation overview can be found in the Rule Overview tab)



Expected transactions from actor:

Validation of transaction:

TDW-RO-62: Treatment Delivery Progress Update

TDW-RO-63: Store Treatment Delivery Results to OST

TDW-RO-64: Treatment Delivery Final Update

TDW-RO-65: Treatment Delivery Completed/Canceled

SOP Class to TMS:

RT Beams Treatment Record Storage

Treatment Delivery progress Update [RO-62]

| UPS N-SET Attribute Requirements for UPS Progress Update Transaction | | | | |
|--|-------------|--|---|---|
| Attribute Name | Tag | Type SCU/SCP | IHE-RO Additional Notes/Requirements on SCU | Code Rule SCU |
| Requested SOP Instance UID | (0000,1001) | 1/- | 1.2.840.10008.5.1.4.34.6.1 | InterOperabilityRule |
| Transaction UID | (0008,1195) | (see DICOM Standard 2011, P3.4 CC.2.8.1.2.1) | | IsRequiredRule / InterOperabilityRule |
| Unified Procedure Step Progress Information Module | | | | |
| UPS Progress Information Sequence | (0074,1002) | 3 | Required by IHE-RO in all instances of this transaction. | IsRequiredRule |
| >Unified Procedure Step Progress | (0074,1004) | 1 | 0% or 100% (in our scenarios) | IsRequiredRule / ValueListRule |
| >Unified Procedure Step Discontinuation Reason Code Sequence | (0074,100e) | 3 | Not required to be supplied for this profile. | |
| Unified Procedure Step Performed Procedure Information Module | | | | |
| UPS Performed Procedure Sequence | (0074,1216) | 1 | | IsRequiredRule |
| >Performed Processing Parameters Sequence | (0074,1212) | 3 | Required by IHE-RO if UPS Performed Procedure Sequence is provided | IsRequiredRule |
| >>Value Type | (0040,A040) | 1 | 'TEXT' | IsRequiredRule / ValueRule |
| >>Concept Name Code Sequence | (0040,A043) | 1 | | |
| >>>Code Value | (0008,0100) | 1 | '121700' | IsRequiredRule / ValueRule |
| >>>Coding Scheme Designator | (0008,0102) | 1 | 'DCM' | IsRequiredRule / ValueRule |
| >>>Code Meaning | (0008,0104) | 1 | 'Referenced Beam Number in Progress' | IsRequiredRule / ValueRule |
| >>Text Value | (0040,A160) | 1 | Integer string equal to the value of Referenced Beam Number (300C,0006) | IsRequiredRule / PIMTextValueRule |
| >Output Information Sequence | (0040,4033) | 2 | Shall be empty | IsRequiredRule / EmptySequenceRule |
| >Non-DICOM Output Information Sequence | (0040,4032) | 2 | Shall be empty | IsRequiredRule / EmptySequenceRule |
| >Performed Workitem Code Sequence | (0040,4019) | 3/1 | | OptionalRule |
| >>Code Value | (0008,0100) | 1/1 | | ConditionalSequenceRule(InterOperabilityRule) |
| >>>Coding Scheme Designator | (0008,0102) | 1/1 | | ConditionalSequenceRule(InterOperabilityRule) |
| >>>Code Meaning | (0008,0104) | 1/1 | | ConditionalSequenceRule(InterOperabilityRule) |

Store Treatment Delivery Results to TMS [RO-63]

| C-STORE-RQ | | | | |
|---------------|-------------|----------|--------------------------------------|-----------|
| Attribute | Tag | IHE-Rule | Description | Code Rule |
| SOP Class UID | (0008,0016) | | Value should be one specified below. | ValueRule |

| SOP Class Support for OST | |
|-----------------------------------|-------------------------------|
| SOP Class Name | SOP Class UID |
| RT Beams Treatment Record Storage | 1.2.840.10008.5.1.4.1.1.481.4 |

| Received objects (TDD Deliver succes – test scenario) | | | |
|--|---|-------------|-----------------|
| Received | IHE-Rule | Description | Code Rule |
| RT Beams Treatment Record Storage | A C-STORE Request shall be sent from the Performing Device to the OST. An instance of the RT Beams Treatment Record Storage IOD | | IODReceivedRule |

UPS Final Update [RO-64]

| | | | | | |
|--|-------------|---|-----------------|--|--|
| UPS N-Set Final State Attribute Requirements | | | | | |
| Attribute Name | Tag | Req. Type N-SET (SCU/SCP) | Final State | IHE-RO Additional Notes/Requirements on SCU | Code Rule |
| Requested SOP Instance UID | (0000,1001) | | | | InterOperabilityRule |
| Transaction UID | (0008,1195) | (see DICOM Standard 2011, P3.4 CC.2.8.1.2.1) | R | transaction UID should be the one we have send earlier (from N-action-RSP) | IsRequiredRule / InterOperabilityRule |
| SOP Common Information Module | | | | | |
| Specific Character Set | (0008,0005) | 1C/1C (Required if extended or replacement character set is used) | Set if required | Only ISO-IR 100 (Latin-1) shall be supported. | |
| SOP Class UID | (0008,0016) | Not allowed | R | Affected SOP Class (0000,0002) is always 'UPS-Push' SOP Class | NotPresentRule |
| SOP Instance UID | (0008,0018) | Not allowed. | R | Affected SOP Instance (0000,1000) supplied by C-FIND responses of UPS query | NotPresentRule |
| Unified Procedure Step Progress Information Module | | | | | |
| Procedure Step State | (0074,1000) | Not Allowed. Use N-ACTION | R | | NotPresentRule |
| Unified Procedure Step Scheduled Procedure Information Module | | | | | |
| Scheduled Procedure Step Priority | (0040,4003) | 3/1 | R | Supplied implicitly by TMS – not required in N-SET. | |
| Scheduled Procedure Step Modification Date and Time | (0040,4010) | -/1 SCP will use time of SET | O* | Supplied implicitly by TMS – not required in N-SET. | OptionalRule |
| Unified Procedure Step Performed Procedure Information Module | | | | | |
| UPS Performed Procedure Sequence | (0074,1216) | 3/2 | R* | Supplied by this transaction in IHE-RO, if UPS was not 'CANCELED' prior to radiation delivery. May be supplied otherwise | IsRequiredRule (success scenario) NotPresentRule(cancel scenario) |

| | | | | | |
|--|--------------|-----|-----|---|---|
| >Actual Human Performers Sequence | (0040,4035) | 3/1 | RC* | Shall be provided if known. Not required to be known in IHE-RO. | |
| >>Human Performer Code Sequence | '(0040,4009) | 3/1 | RC* | Shall be provided if known. Not required to be known in IHE-RO. | |
| >>Human Performer's Name | (0040,4037) | 3/1 | RC | Shall be provided if known. Not required to be known in IHE-RO. | |
| >Performed Station Name Code Sequence | (0040,4028) | 3/2 | R* | Supplied by this transaction in IHE-RO. | IsRequiredRule |
| >>Code Value | (0008,0100) | 1/1 | R | Name of machine performing UPS. Supplied by this transaction (RO-64: UPS Final Update) in IHE-RO. Same value as the C-Find response of RO-58 | ConditionalSequenceRule(InterOperabilityRule) |
| >>Coding Scheme Designator | (0008,0102) | 1/1 | R* | Any private coding scheme designator. Supplied by this transaction (RO-64: UPS Final Update)) in IHE-RO. Same value as the C-Find response of RO-58 | ConditionalSequenceRule(InterOperabilityRule) |
| >>Code Meaning | (0008,0104) | 1/1 | R* | Value shall be 'Performed Station Name'. Supplied by this transaction (RO-64: UPS Final Update)) in IHE-RO. Same value as the C-Find response of RO-58 | ConditionalSequenceRule(InterOperabilityRule) |
| >Performed Procedure Step Start DateTime | 0040,4050 | 3/1 | R | Supplied by this transaction in IHE-RO | IsRequiredRule |
| >Performed Workitem Code Sequence | (0040,4019) | 3/1 | R* | Supplied by this transaction (RO-64: UPS Final Update)) in IHE-RO | OptionalRule |
| >>Code Value | (0008,0100) | 1/1 | | Performed work item code value. Supplied by this transaction (RO-64: UPS Final Update)) in IHE-RO. Same value as the C-Find response of RO-58 | ConditionalSequenceRule(InterOperabilityRule) |

| | | | | | |
|--|-------------|-----|----|--|---|
| >>Coding Scheme Designator | (0008,0102) | 1/1 | | Value shall be 'DCM'. Supplied by this transaction (RO-64: UPS Final Update)) in IHE-RO. Same value as the C-Find response of RO-58 | ConditionalSequenceRule(InterOperabilityRule) |
| >>Code Meaning | (0008,0104) | 1/1 | | Value shall be consistent with Code Value as described in Supplement 74 PS 3.16 Annex B. Supplied by this transaction (RO-64: UPS Final Update)) in IHE-RO. Same value as the C-Find response of RO-58 | ConditionalSequenceRule(InterOperabilityRule) |
| >Performed Procedure Step End DateTime | 0040,4051 | 3/1 | R* | Supplied by this transaction in IHE-RO | IsRequiredRule |
| >Output Information Sequence | (0040,4033) | 2/2 | R* | Supplied by this transaction (RO-64: UPS Final Update) in IHE-RO. May be empty (null) in N-SET if no output objects are created. | IsRequiredRule |
| >>Type of Instances | 0040,E021 | 1 | R* | Supplied by this transaction in IHE –RO Value shall be "DICOM" | IsRequiredRule |
| >>Study Instance UID | (0020,000D) | 1/1 | R* | Supplied by this transaction (RO-64: UPS Final Update)) in IHE-RO | |
| >>Series Instance UID | (0020,000E) | 1/1 | R | Supplied by this transaction (RO-64: UPS Final Update)) in IHE-RO | |
| >>Referenced SOP Sequence | (0008,1199) | 1/1 | R | Supplied by this transaction (RO-64: UPS Final Update)) in IHE-RO | |
| >>>Referenced SOP Class UID | (0008,1150) | 1/1 | R | Supplied by this transaction (RO-64: UPS Final Update)) in IHE-RO. See transactions RO-22: Store Position Acquisition Results to Archive, RO-23: Store Position Registration Results to Archive, RO-24: Store Delivery Results to Archive for permitted SOP Classes. | |

| | | | | | |
|--------------------------------|-------------|-----|----|--|----------------|
| >>>Referenced SOP Instance UID | (0008,1155) | 1/1 | R | Supplied by this transaction (RO-64: UPS Final Update)) in IHE-RO | |
| >>DICOM Retrieval Sequence | (0040,E021) | 1C | R | | IsRequiredRule |
| >>>Retrieve AE Title | (0008,0054) | 1 | RC | Supplied by this transaction (RO-64: UPS Final Update) for IHE-RO (File Media Set not supported) | |
| >>>Storage Media File-Set ID | (0088,0130) | 2 | | Never supplied for IHE-RO (File Media Set not supported) | |
| >>>Storage Media File-Set UID | (0088,0140) | 1 | | Never supplied for IHE-RO (File Media Set not supported) | |

Treatment Delivery Completed/Canceled [RO-65]

| UPS N-ACTION Completed/Canceled Requirements | | | |
|--|-------------|-------------|---------------------------------------|
| Attribute Name | Tag | Description | Code Rule |
| Requested SOP Class UID | (0000,0003) | UPS PUSH | IsRequiredRule / ValueRule |
| Requested SOP Instance UID | (0000,1001) | | IsRequiredRule / InterOperabilityRule |
| Action Type ID | (0000,1008) | 1 | IsRequiredRule / ValueRule |
| Transaction UID | (0008,1195) | | IsRequiredRule / InterOperabilityRule |
| Procedure Step State | (0074,1000) | "CANCELED" | IsRequiredRule / ValueRule |

Test Scenario TMS Deliver Cancel

Description:

This testscenario tests the behaviour of the TMS actor on the cancelation of the workitem. Both the TMS and the OST are used by the testtool. The scenarios can be executed with or without radiation delivered.

Test scenario entry point: First execute the **TMS Deliver initialization – testscenario**

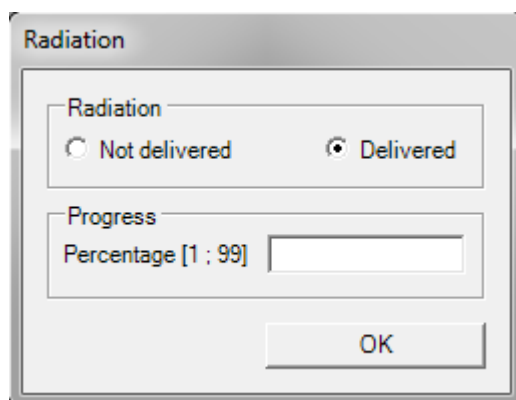
Stage: Deliver

1. Make sure TMS (system under test - SUT) is active and listening, and that a RT Beams Treatment Record for an interrupted treatment is present.

The RT Beams Treatment Record should be based on the RT-Plan and the RT Beams Delivery Instruction of the previous test scenarios.

2. Start the scenario.

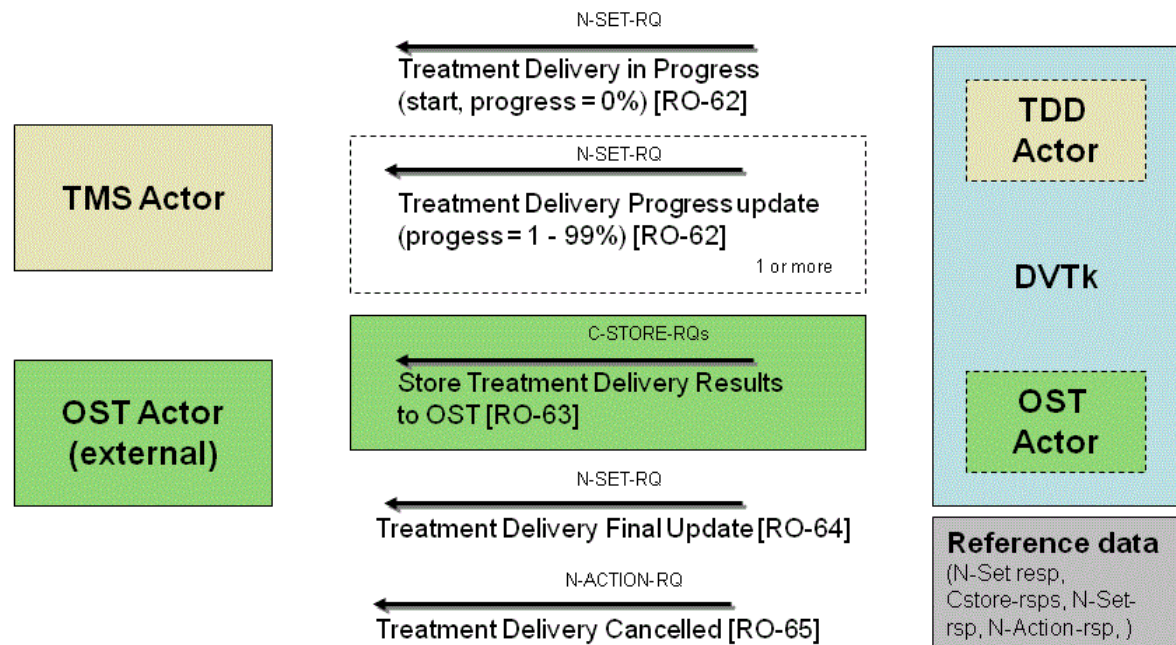
3. The user will be given a choice if an interrupted treatment with or without radiation is to be validated. When delivered is chosen, a percentage has to be filled in. This percentage is the progress which belongs to the RT Beams Treatment Record.

A screenshot of a dialog box titled "Radiation". It contains two radio buttons: "Not delivered" and "Delivered". The "Delivered" radio button is selected. Below the radio buttons is a section labeled "Progress" with a text input field. The text "Percentage [1 ; 99]" is displayed to the left of the input field. At the bottom right of the dialog box is an "OK" button.

With radiation delivered:

4. The test tool sends the N-Set request with a progress of 0%
5. The test tool sends the N-Set request with the user defined progress%
6. The test tool sends the RT Beams Treatment Record to the configured OST.
7. The test tool sends the N-Set request for the user defined progress and an output information sequence with the RT record (RO-64 Final Update)
8. The test tool sends the N-ACTION request with Unified Procedure Step Progress = CANCELED
9. The test tool validates the N-Set responses, N-Action responses and C-Store response for IHE compliance.

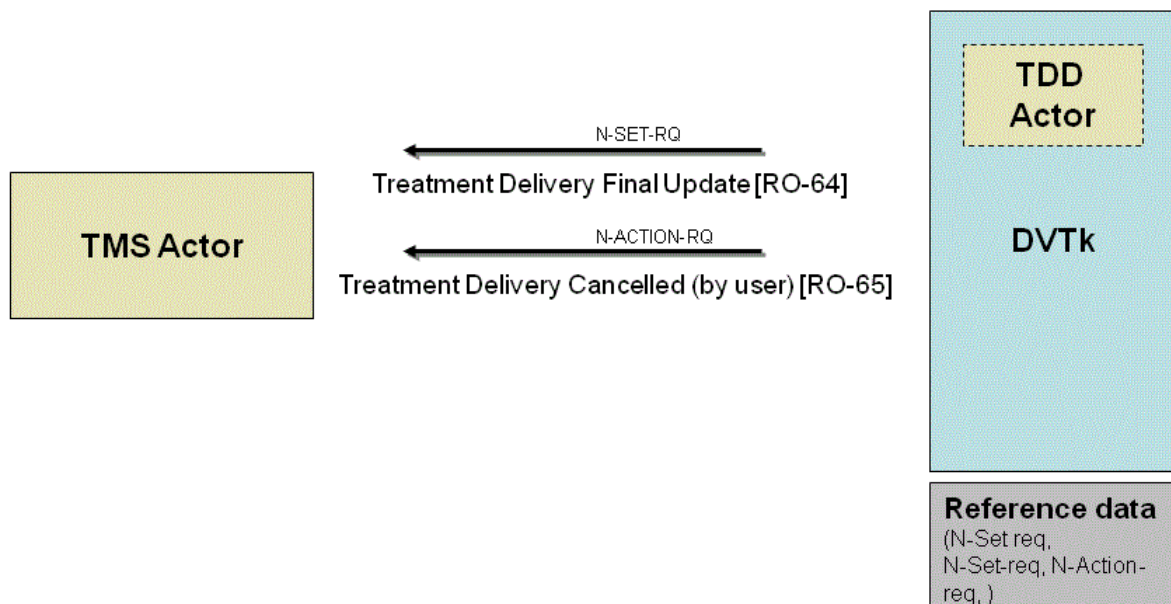
(The validation overview can be found in the Rule Overview tab)



Without radiation delivered:

4. The test tool sends the N-Set request for a progress of 0% (Final Update)
5. The test tool sends the N-ACTION request with Unified Procedure Step Progress = CANCELED
6. The test tool validates the N-Set responses, N-Action responses and C-Store response for IHE compliance.

(The validation overview can be found in the Rule Overview tab)



Note:

This test scenario applies when the delivery is interrupted with or without radiation having occurred.

In order to test the resume functionality, the **TMS Retrieval of worklist – test scenario** has to be executed, followed by the other test scenarios

Validation of transaction:

TDW-RO-62: Treatment Delivery Progress Update

TDW-RO-63: Store Treatment Delivery Results to OST

TDW-RO-64: Treatment Delivery Final Update

TDW-RO-65: Treatment Delivery Completed/Canceled

SOP Class to TMS:

RT Beams Treatment Record Storage

Treatment Delivery Progress Update [RO-62]

| UPS N-SET Attribute Requirements for UPS Progress Update Transaction | | | | |
|--|-------------|--|---|---|
| Attribute Name | Tag | Type SCU/SCP | IHE-RO Additional Notes/Requirements on SCU | Code Rule SCP |
| Requested SOP Instance UID | (0000,1001) | 1/- | | |
| Affected SOP Class UID | (0000,0002) | | UPS PUSH | ValueRule |
| Affected SOP Instance UID | (0000,1000) | -/1C | | IsRequiredRule / InterOperabilityRule |
| Transaction UID | (0008,1195) | (see DICOM Standard 2011, P3.4 CC.2.8.1.2.1) | | IsRequiredRule / InterOperabilityRule |
| status code | (0000,0900) | | | ValueRule: Check if we receive a status succeed |

UPS Final Update [RO-64]

| UPS N-Set Final State Attribute Requirements | | | | | |
|---|-------------|--|-------------|--|---|
| Attribute Name | Tag | Req. Type N-SET (SCU/SCP) | Final State | IHE-RO Additional Notes/Requirements on SCU | Code Rule SCP |
| Requested SOP Instance UID | (0000,1001) | | | | |
| Affected SOP Class UID | (0000,0002) | | | UPS PUSH | InterRelationRule |
| Affected SOP Instance UID | (0000,1000) | | | | IsRequiredRule / InterRelationRule |
| Transaction UID | (0008,1195) | (see DICOM Standard 2011, P3.4 CC.2.8.1.2.1) | R | transaction UID should be the one we have send earlier (from N-action-RSP) | IsRequiredRule / InterRelationRule |
| UPSProgressInformationSequence | (0074,1002) | | | | IsRequiredRule |
| UPSProgressInformationUnifiedProcedureStepPrd | (0074,1004) | | | Between 0 - 99 | IsRequiredRule / ValueInRangeRule |
| status code | (0000,0900) | | | | ValueRule: Check if we receive a status succeed |

Treatment Delivery Completed/Canceled [RO-65]

| UPS N-ACTION Completed/Canceled Requirements | | | |
|--|-------------|-------------|---------------------------------------|
| Attribute Name | Tag | Description | Code Rule |
| Status Command Element | (0000,0900) | 0 | ValueRule |
| Affected SOP Class UID | (0000,0002) | UPS PUSH | InterRelationRule |
| Affected SOP Instance UID | (0000,1000) | | IsRequiredRule / InterRelationRule |
| Procedure Step State | (0074,1000) | CANCELED | IsRequiredRule / ValueRule |
| Transaction UID | (0008,1195) | | IsRequiredRule / InterOperabilityRule |