Integrating the Healthcare Enterprise

IHE Patient Care Coordination Technical Framework Supplement

Cross Enterprise Basic eReferral Workflow Definition Profile (XBeR-WD)

Trial Implementation

Date: August 16, 2012
Author: IHE PCC Technical Committee
Email: pcc@ihe.net

25 **Foreword**

This is a supplement to the IHE Patient Care Coordination Technical Framework V8.0. Each
supplement undergoes a process of public comment and trial implementation before being
incorporated into the volumes of the Technical Frameworks.

30 This supplement is published for Trial Implementation on August 16, 2012 and may be available
for testing at subsequent IHE Connectathons. The supplement may be amended based on the
results of testing. Following successful testing it will be incorporated into the Patient Care
Coordination Technical Framework. Comments are invited and may be submitted at
http://www.ihe.net/pcc/pcccomments.cfm.

35 This supplement describes changes to the existing technical framework documents and where
indicated amends text by addition (**<u>bold underline</u>**) or removal (**~~bold strikethrough~~**), as well as
addition of new sections introduced by editor's instructions to "add new text" or similar, which
for readability are not bolded or underlined.

"Boxed" instructions like the sample below indicate to the Volume Editor how to integrate the
relevant section(s) into the relevant Technical Framework volume:

40

Replace Section X.X by the following:

General information about IHE can be found at: www.ihe.net

Information about the IHE Patient Care Coordination domain can be found at:
45 http://www.ihe.net/Domains/index.cfm

Information about the structure of IHE Technical Frameworks and Supplements can be found at:
http://www.ihe.net/About/process.cfm and http://www.ihe.net/profiles/index.cfm

The current version of the IHE Technical Framework can be found at:
http://www.ihe.net/Technical_Framework/index.cfm

50

CONTENTS

Introduction to this Supplement

This supplement is written according to the specific template defined for Workflow Definition profiles. The structure of this document differs from a PCC Content Profile. In particular the XBeR-WD profile establishes a common set of rules to share between participants involved in an eReferral workflow.

The eReferral process, and workflow related to it, are applicable to many different sharing infrastructures. In this profile we present a specific XDS based use-case.

In Volume 1 we present a typical Use-case, describing many possible evolutions of the related workflow. We define the Workflow Participants involved and their ability within the workflow itself.

In Volume 2 we explain how to use an instrument the XDW Workflow Document (See ITI Technical Framework and supplements) to track and manage this workflow. In particular, we analyze in detail features of each step of the workflow, and rules to follow to go through these steps.

At the end of the supplement (Appendix A) is presented a complete example of a Workflow Document produced during an eReferral workflow.

More technical details related to the management of the workflow document are presented in the Appendix B.

Open Issues and Questions

- *none*

Closed Issues

- *(Reviewers should evaluate the need to define options within the Workflow Definition to facilitate implementation of the workflow definition profile. Should there be options on the (1) support of specific workflow tasks/status, (2) reference content document profiles, (3) remaining options from XDW ? These would be formalized and placed in Section X.4 Option of Volume 1. The requirements for support of options related to the XDW Profile may not be properly placed in Section X.4 and should be moved to Volume 2.)* Answer: The workflow Definition profile defines a section Options where are described alternative paths, or alternative rules for the evolution of the process.

- *(Reviewers should evaluate the proposed table in Section 6.5 that describes the documents created during the workflow process, their requirements, their nature and their related PCC(or other) document content profiles that define them and, in case that these are not present, the note that the PCC may/should define them in the future. How specific should a workflow definition profile be in terms of referenced documents conformance requirements?)* The Workflow Definition profile defines only "documents labels" to define the role of an attachment of the profile.

4

125

130

- *(In many parts of this document we present XML examples to better understand how the Workflow Document can track information related to the process. This structure will be affected by CPs proposed to the ITI domain (CP-643, CP-637). So these XML parts may change sections X.2.1.1, X.2.2.1, X.2.3.1 and Appendix A)* Small xml parts are removed from text, we left only the appendix A to show a complete example of Workflow Document.

Volume 1 – Profiles

X XBeR-WD Profile

135 The Cross Enterprise Basic eReferral Workflow Definition profile builds upon the ITI Cross Enterprise Document Workflow (XDW) profile to manage the workflow related to an eReferral.

The management of the workflow related to clinical processes is a critical complement to the use by different sectors of document sharing related IHE profiles with their different types of document and information. IHE ITI has approved in Trial Implementation the Cross-Enterprise
140 Document Workflow profile but the work done by ITI has been on the definition of the technical infrastructure to manage a clinical workflow and not on the definition of the clinical processes, work left to the different IHE Domains.

The Cross Enterprise Basic eReferral Workflow Definition Profile defines the workflow related to the eReferral. This workflow is involved in many clinical and organizational processes for its
145 important role in the process of digitalization. The definition of a workflow with fixed rules and tasks is needed in a cross enterprise scenario in which many participants are involved to support a referral process

X.1 Purpose and Scope

The management of the workflow related to clinical process is a fundamental topic with the
150 increasing of the use by different sectors of document sharing related IHE profiles with their different types of document and information.

This profile is built upon the ITI XDW Profile to manage the Cross Enterprise Basic eReferral Workflow. The management of the workflow related to the eReferral is involved in many clinical and organizational processes for its important role in the process of digitalization. The
155 lack of a workflow management, at the moment, blocks the use of the eReferral in an extended way. The eReferral, without an instrument to manage its workflow, is only an order without any information about the status of the order itself. The definition of a workflow with fixed rules and task is needed in a cross-enterprise scenario in which many actors are involved in the same process.

160 The creation of an eReferral by a GP, or Primary Care Provider (PCP) opens a clinical process that involves many actors and that is a cross-enterprise workflow. The purpose of the XBeR-WD profile is to precisely define the workflow associated with an eReferral Document, the actors involved and the digital documents related with this process (produced in this or in other processes, but related to the eReferral workflow).
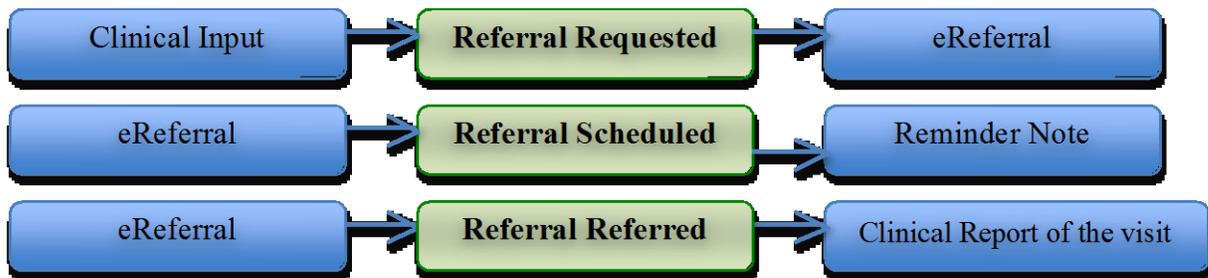
X.2 Process Flow

A common workflow pathway that illustrates the simplest process enabled by XBeR-WD profile, is the use-case where the patient attends a consultation to his GP for a health problem. The practitioner examines him and some of his reports in relation with his health problem. After the visit the practitioner prescribes an exam.

The workflow connected to these organizational and clinical actions is composed of four steps:

A. a physician refers a patient to another healthcare provider for a specialist's consultation;

B. the Health Care Provider (HCP), from the Hospital Information System, schedules the visit;

C. the HIS admits the patient in hospital and the specialist can start the consultation which may span one or more visits;

D. the specialist completes the consultation and produces a report;

These steps can be tracked in 3 different tasks of the workflow, (figure X.2-1):

1. Referral Requested: that tracks step A, performed by the Requester of the referral

2. Referral Scheduled: that tracks step B, performed by the Scheduler of the visit (This task is optional and doesn't need to be tracked if the option "Process without scheduling phase" is selected)

3. Referral Referred: that tracks steps C and D, performed by the HCP and the specialist.

Figure X.2-1: tasks involved in the eReferral process
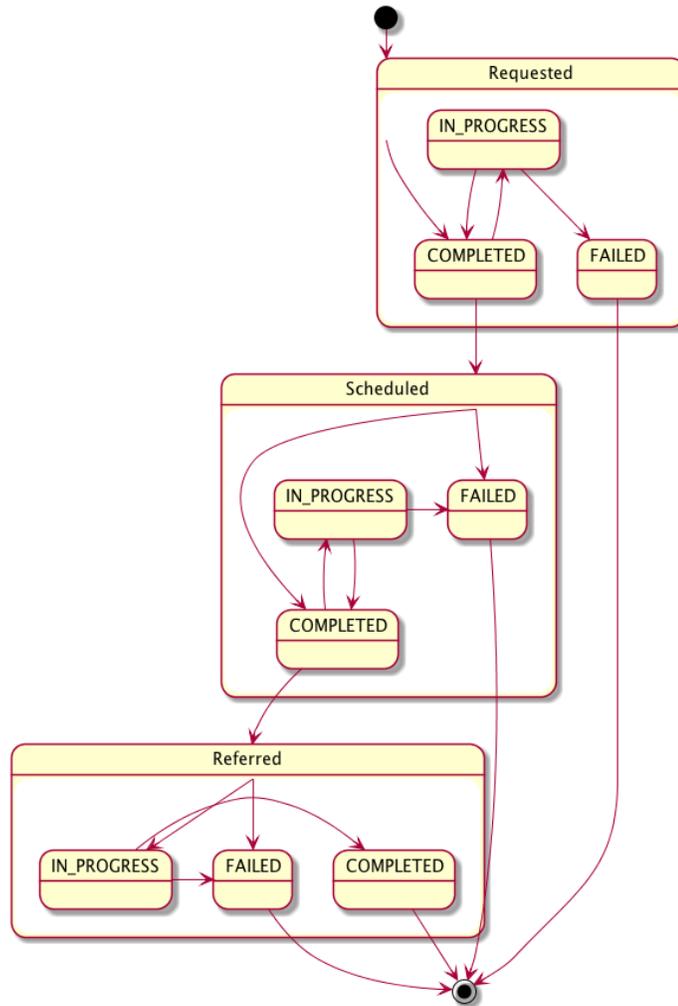
190

Figure X.2-2: XBeR Workflow Definition complete process flow

Table below (Table X.2-1) lists the various documents that shall, or may be referenced as either
input or output documents for each task/status pair defined by the XBeR-WD profile.

195

Table X.2-1: Documents referenced for each task/status pair

Task Name	Task Status	Input Docs	Option	Output Docs	Option
Referral Requested	COMPLETED	Clinical input	O	eReferral	R
	IN_PROGRESS	N/A	-	N/A	-
	FAILED	N/A	-	Exception Report	R

| Task Name	Task Status	Input Docs	Option	Output Docs	Option
Referral Scheduled	COMPLETED	eReferral	R	Reminder Note	O * These may change if Workflow Options are selected
	IN_PROGRESS	N/A	-	N/A	-
	FAILED	N/A	-	Exception Report	C: if the visit can't be scheduled
Referral Referred	IN_PROGRESS	eReferral	R	N/A	-
	COMPLETED	eReferral	R	Clinical Report of the visit	R
	FAILED	N/A	-	Exception Report	R

X.3 Workflow Participants and Process Flow

In this section we present the Workflow Participants involved in the eReferral process and, using
the figure X.3-1, we describe in detail process transactions and interactions between them.

A Workflow Participant is an abstraction of system along with users involved in the eReferral
process. They can be identified, based on their roles in the process, as one of four specific
participants. Each of these workflow participants has specific rights and duties in the process.
They drive the process from one step to another, performing determinate actions on the
workflow.

Workflow Participants	Description
Referral Requester	*Health Professional (e.g. GP) that initiates the referral workflow. Produces the eReferral and the related supporting document.*
Referral Scheduler	*Participant responsible for the scheduling of the referral, by providing an appointment for the patient*
Referral Performer	*Participant responsible for execution of the visit. This workflow participant encapsulate many entities within the enterprise that responds to the referral request and produce the clinical report of the visit ending the eReferral process*
Workflow Monitor	*Participant that tracks progress of the workflow and reacts to certain exception conditions. This participant can be standalone or grouped with one of the above Workflow Participants*

9
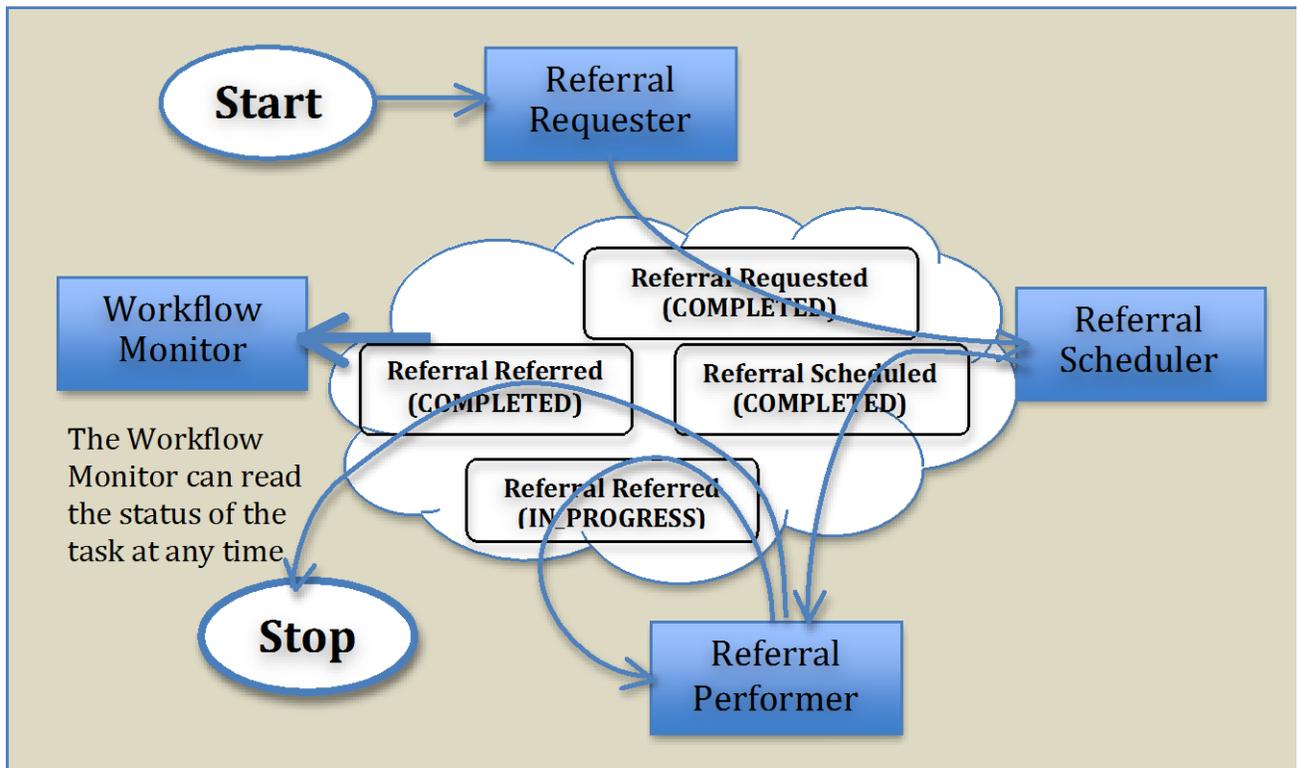
Figure X.3-1: Process transaction between Workflow Participants

X.3.1 Use Cases

Mr. Rossi has a terrible head-ache and goes to his GP Dr. Smith to have a consultation. Dr. Smith analyzes the clinical history of the patient and sees that this is a frequent symptom for Mr. Rossi. Dr. Smith cannot understand the reason for this health problem, so decides to refer his patient to another specialist. Mr. Rossi choses Dr. Bianchi as the specialist to perform the consultation and schedules a visit. On the day of the visit, Dr. Bianchi studies the reports that have been sent with the eReferral by Dr. Smith, performs the visit and produces a Report for the GP. Mr. Rossi returns to Dr. Smith's office, who analyzes the report and decides to prescribe a drug for the patient.

In this section we present the detailed use-case of reference. In the first part of this section (subsection X.3.1.1) we present the detailed chronological sequence of steps involved in the simplest process flow, without failing situations or scheduling cancellation. In the second one (subsection X.3.1.2) we present potential exception situations and the scheduling cancellation phase.

X.3.1.1 Basic process flow
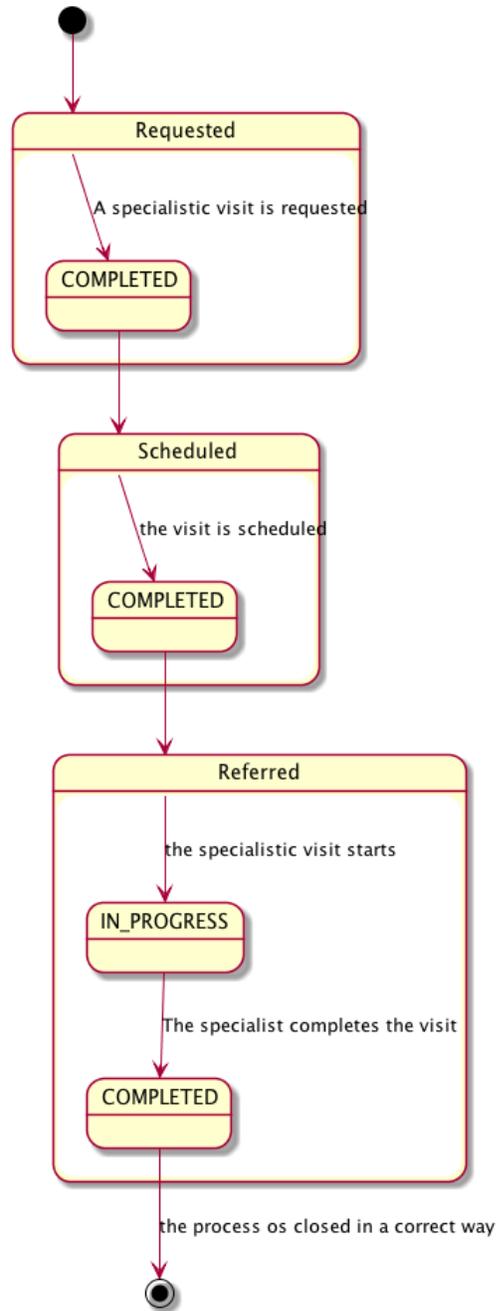
230

A. A physician refers a patient to another healthcare provider for a specialist's consultation

In this task the GP examines the patient and reviews the patient's most recent laboratory reports. The GP refers the patient to a specialist, creating an eReferral Document and referencing the laboratory reports.

The GP's software, as a Referral Requester, produces the eReferral Document and one Workflow Document to track the clinical workflow of the eReferral. As shown in column A of Figure X.3.1.1-1, at this moment the Workflow Document created has only one task ("Referral Requested") characterized by:

- a task status "COMPLETED"
- the references to the laboratory report analyzed by the GP as inputs of the task
- the reference to the eReferral document produced as outputs of the task.

In order to share documents that are produced during the task, the Referral Requester submits the eReferral Document and the Workflow Document to the XDS Document Repository.
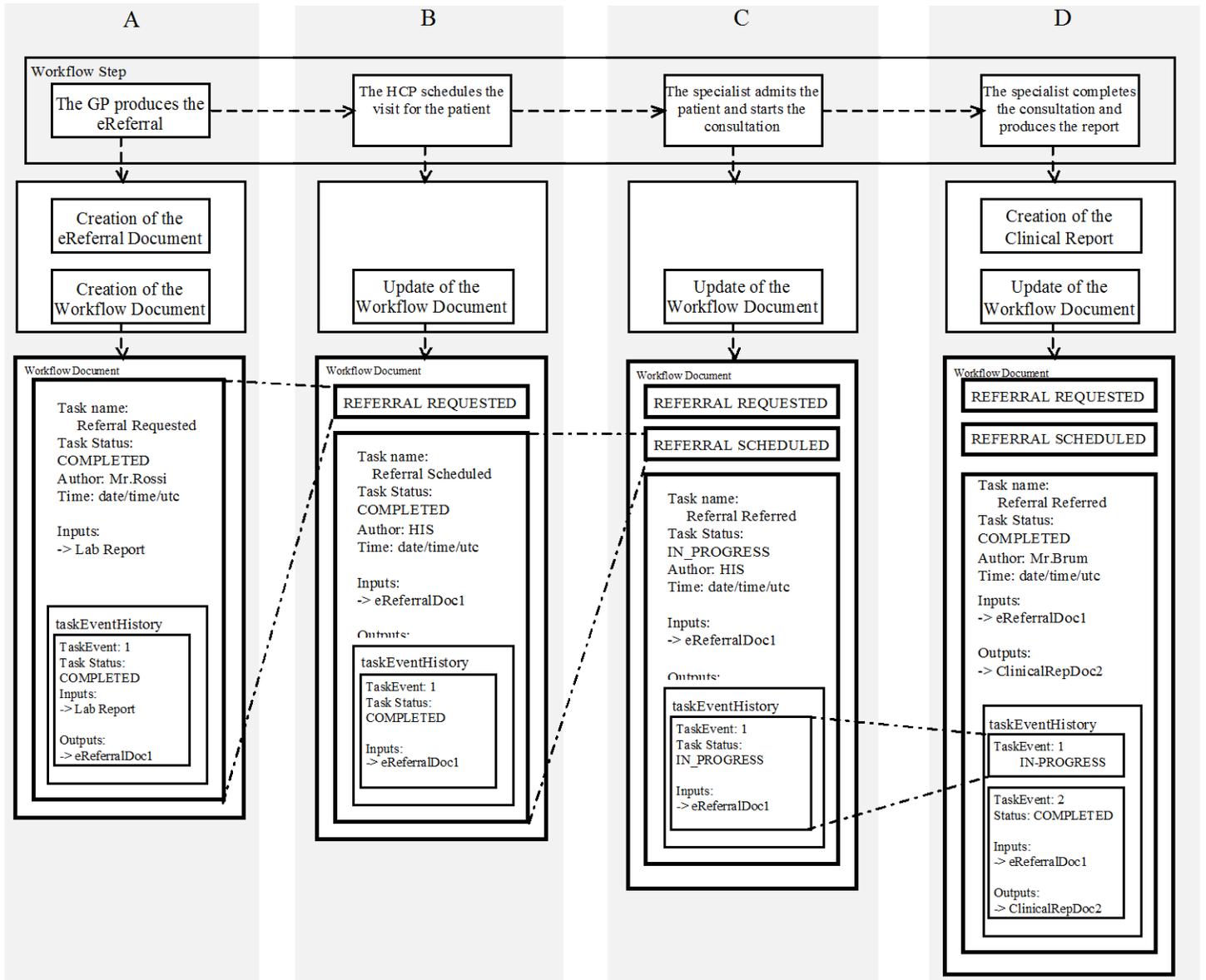
Figure X.3.1.1-1: Management of the Workflow Document in a basic process flow

250   From this moment the eReferral is available to a wide range of care providers.

B. The HCP, from the Hospital Information System, schedules the visit

255 The patient can call or go to healthcare provider of his choice (or suggested by the GP) to
schedule the exam.

During this step the HCP, as a Referral Scheduler, checks in which step the eReferral is and he
schedules the visit. Once the visit has been scheduled, the Referral Scheduler updates the
Workflow Document to track that the visit has been scheduled. As shown in column B of Figure
X.3.1.1-1, at this step of the workflow, the Workflow Document is updated with a new version in
260 which a new task "Referral Scheduled" is added to the content of the previous version of the
Workflow Document.

The task "Referral Scheduled" is characterized by:

- a task status "COMPLETED"
- the references to the eReferral document produced by the GP as inputs of the task.

265 The Referral Scheduler provides the updated version of Workflow Document to the XDS
Document Repository/Registry through a Replace of the previous version of the Workflow
Document. From this moment no other HCP can schedule the same visit.

C. The patient is admitted by the HCP the day of the visit and the specialist can start the
270 **visit**

The patient is admitted by the HCP on the scheduled day and time. During this task, the HCP, as
a Referral Performer, consults the eReferral and the Workflow Document related to understand
the task that needs to be performed and the process of the visit can start.

The Referral Performer accesses the document by using his software, and an XDS Document
275 Consumer, to query and retrieve the Workflow Document and the eReferral document, to check
the reservation

As shown in column C of Figure X.3.1.1-1, at this step of the workflow, the Workflow
Document is updated with a new version in which a new task "Referral Referred" is added to the
content of the previous version of the Workflow Document. The task "Referral Referred" is
280 characterized by:

- a task status "IN_PROGRESS"
- the references to the eReferral document produced by the GP as inputs of the task.

The Referral Performer provides the updated version of Workflow Document to the XDS
Document Repository/Registry through a Replace of the previous version of the Workflow
285 Document

From now the Workflow Document and the eReferral document are available for the specialist.

D. The specialist completes the consultation and produces a report

290   The specialist performs the visit and, at the end of the consultation the specialist's software, as a
Referral Performer, produces a report of the consultation itself and he terminates the visit
process.

In this task, the Referral Performer updates the Workflow Document changing the status of the
"Referral Referred" task.

295   As shown in column D of the Figure X.3.1.1-1 the Workflow Document, the "Referral Referred"
task is characterized by:

- a task status "COMPLETED"

- the references to the eReferral document produced by the GP (the laboratory report was not
used by the specialist) as inputs of the task

300   - the references to the report of the consultation as output of the task

The history of the changes of status of the task is tracked inside the task as a list called
taskEventHistory.

The Referral Performer provides the updated version of Workflow Document to the Document
Repository through a replace of the previous version of the Workflow Document

305   At any time the Referral Requester may review the Workflow Document and the new documents
produced related to this workflow. This is accomplished through a query and retrieve by the
GP's software of the active Workflow Document from the XDS Document Registry and the
XDS Document Repository. Although not shown in this use case, it would also be possible to
manage a system of subscription and notification to communicate the progress between the
310   different steps through the use of the Document Metadata Subscription (DSUB) profile or the
Notification of Document Availability (NAV) profile.

X.3.1.2 Failing situations

We can consider four different failing situations which may arise during this eReferral
Workflow:

315

320

Af. Failing of the requesting process
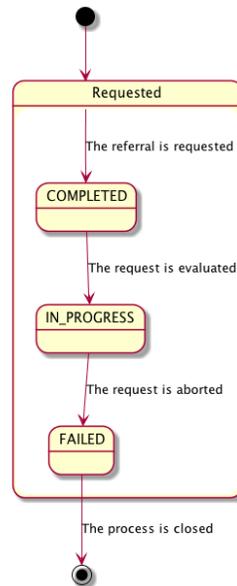
325   In the first case the Referral Requester want to abort the process just created. The GP's software,
as Workflow Monitor, adds a new teaskEvent to the Workflow Document, to evaluate the
request, changing the status of the Referral Requested task into status IN_PROGRESS. The
Referral Requester in this situations can confirm the request, changing again the status into
COMPLETED. If the GP decides to abort the process, a new taskEvent is added to the workflow
330   document changing the status of the Referral Requested into FAILED.

The task Referral Requested is characterized by:

- task status is "FAILED"

- the reference to the eReferral document and the Exception Report as outputs of the task

After updating the Workflow Monitor submits the newer version of the Workflow Document to
335   the Document Repository/Registry. This eReferral process is closed (changing the
workflowStatus of the Workflow document in status "CLOSED")

340

345   **Bf. Failing of the scheduling process**
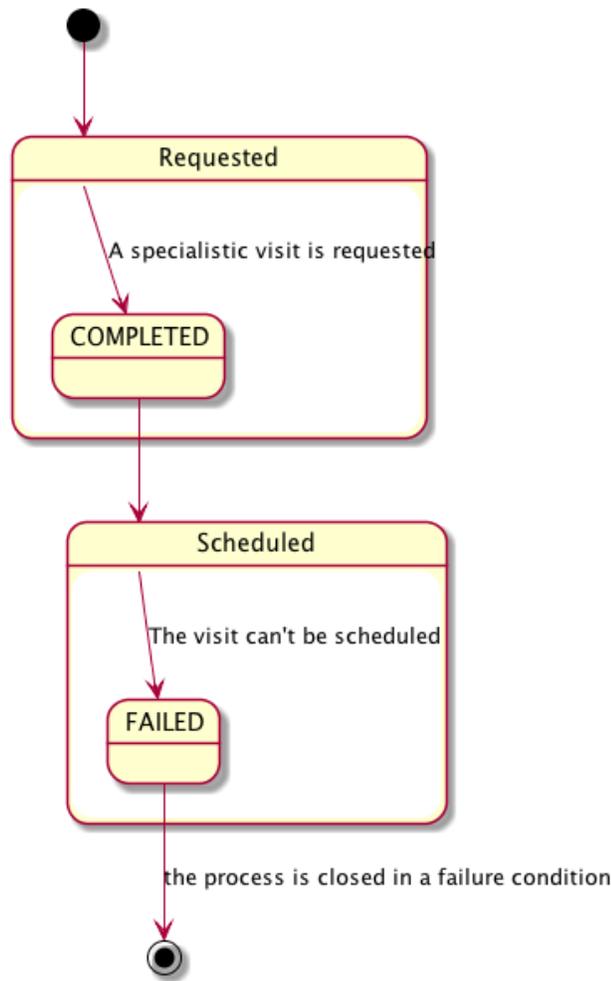
In the second case, the patient cannot schedule his specialist consultation, because there is some problem or inconsistency in the eReferral document. So in this phase the Hospital Information System, as Referral Scheduler, query and retrieve the eReferral Document and the Workflow
350   Document related, to check the status of the eReferral and potential errors connected to the scheduling process. If the Referral Scheduler finds any problems, the scheduling phase fails and the eReferral Workflow is closed. The Workflow Monitor produces a report for the exception and updates the Workflow Document adding a new task named "Referral Scheduled" which is characterized by:

355   • task status is "FAILED"

• the reference to the eReferral document as inputs of the task

• the reference to a report which contains reasons of the exception as outputs of the task

After updating the Workflow Monitor submits the newer version of the Workflow Document to the Document Repository/Registry. This event shall be notified to the Referral Requester. This

360 eReferral process is closed (changing the workflowStatus of the Workflow document in status "CLOSED") and, if necessary, another new process is started by the Referral Requester producing the second eReferral document and the second Workflow Document to track the new correct process. In this case the Workflow Document that tracks the second eReferral contains only one task named "Referral Requested" which is characterized by:

365 • task status is "COMPLETED"

• as inputs of the task the references to :

  • the Laboratory Report

  • the reference to the workflow document that reflects the previous eReferral process failed

  • the Exception Report

370 • the references to the eReferral document produced as outputs of the task.

For further technical details see Appendix B

375

380

385

390

395

Cf. Failing of the reception phase
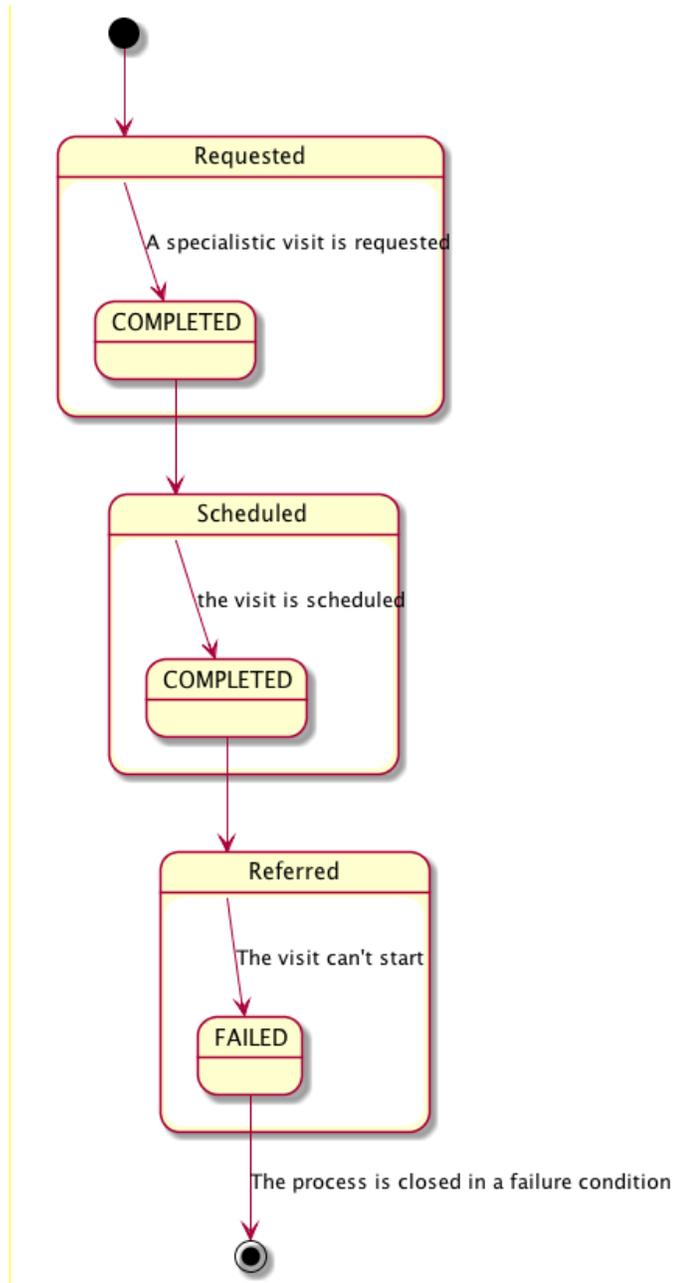
400

In the third case, when the Referral Performer checks the reservation of the patient he finds some problems, and cannot accept the patient for the consultation. In this case the Workflow Monitor updates the Workflow Document adding a new task named "Referral Referred" which is characterized by:

405
- task status "FAILED"
- the references to the eReferral produced by the GP as inputs of the task
- a report that describes the reason for the exception of the task as outputs of the task

The previous version of the Workflow Document is replaced by the new one. This event shall be notified to the Referral Requester. This eReferral process is closed (changing the workflowStatus

410 of the WF document in status "CLOSED") and, if necessary, another new process is started by the Referral Requester producing the second eReferral document and the second Workflow Document to track the new process. In this case the Workflow Document that tracks the second eReferral contains only one task named "Referral Requested" which is characterized by:

- task status is "COMPLETED"

415
- as inputs of the task the references to :
  - the Laboratory Report
  - the reference to the workflow document that reflects the previous eReferral process failed
  - the Exception Report
- the references to the eReferral document produced as outputs of the task.

420

For further technical details see Appendix B

425

430

435

Df. Failing of the visit
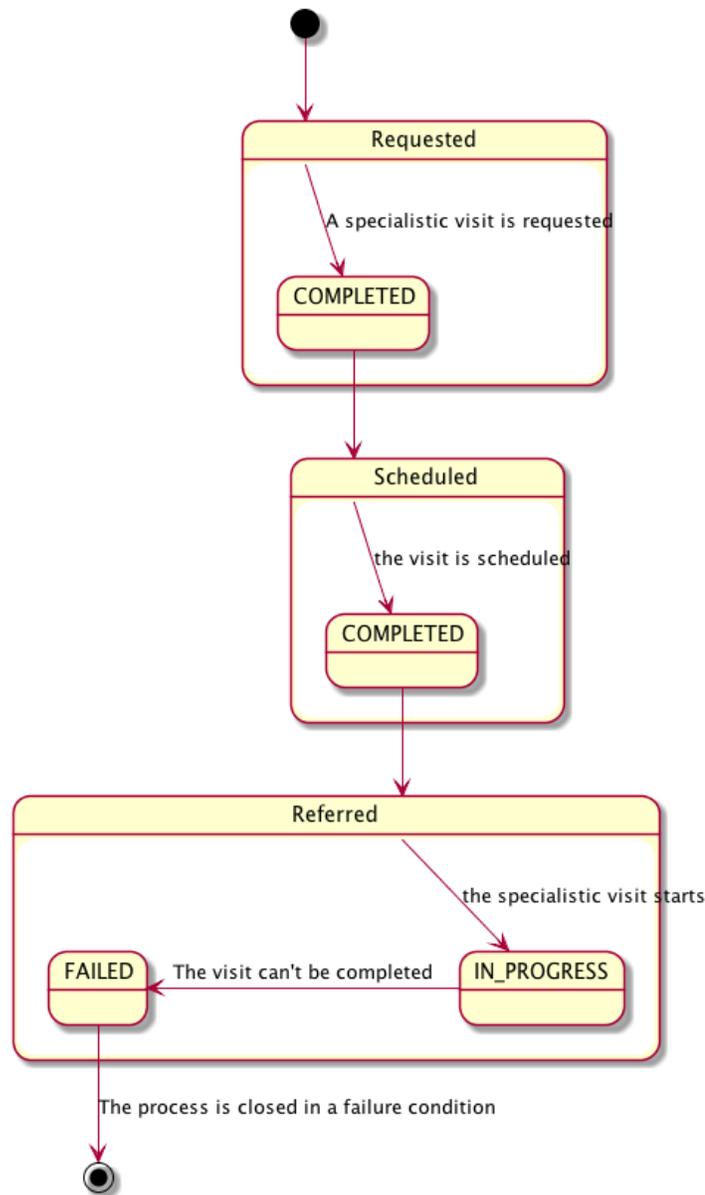
In the fourth case the patient is admitted to perform the visit but, once the specialist sees all the
information related to the clinical process, he decides that the visit can't be performed. In this
case the Referral Performer updates the Workflow Document adding to the task named "Referral
Referred" a new TaskEvent. At this moment the "Referral Referred" task is characterized by:

- task status "FAILED"
- the references to the eReferral document as inputs of the task
- the references to a report which contain reasons of the exception as outputs of the task

440

445

After updating the Referral Performer submits the newer version of the workflow Document to the Document Repository/Registry. This event shall be notified to the GP. This eReferral process is closed (changing the WorkflowStaus of the WF document in status "CLOSED") and, if necessary, another new process starts producing the second eReferral document and the second Workflow Document to track the new correct process started by the Referral Requester. In this case the Workflow Document that tracks the second eReferral contains only one task named "Referral Requested" which is characterized by:

450

- task status is "COMPLETED"
- as inputs of the task the references to :

455
  - the Laboratory Report
  - the reference to the workflow document that reflects the previous eReferral process failed
  - the Exception Report
- the references to the eReferral document produced as outputs of the task

460   For further technical details see Appendix B

BA. Scheduling cancellation process
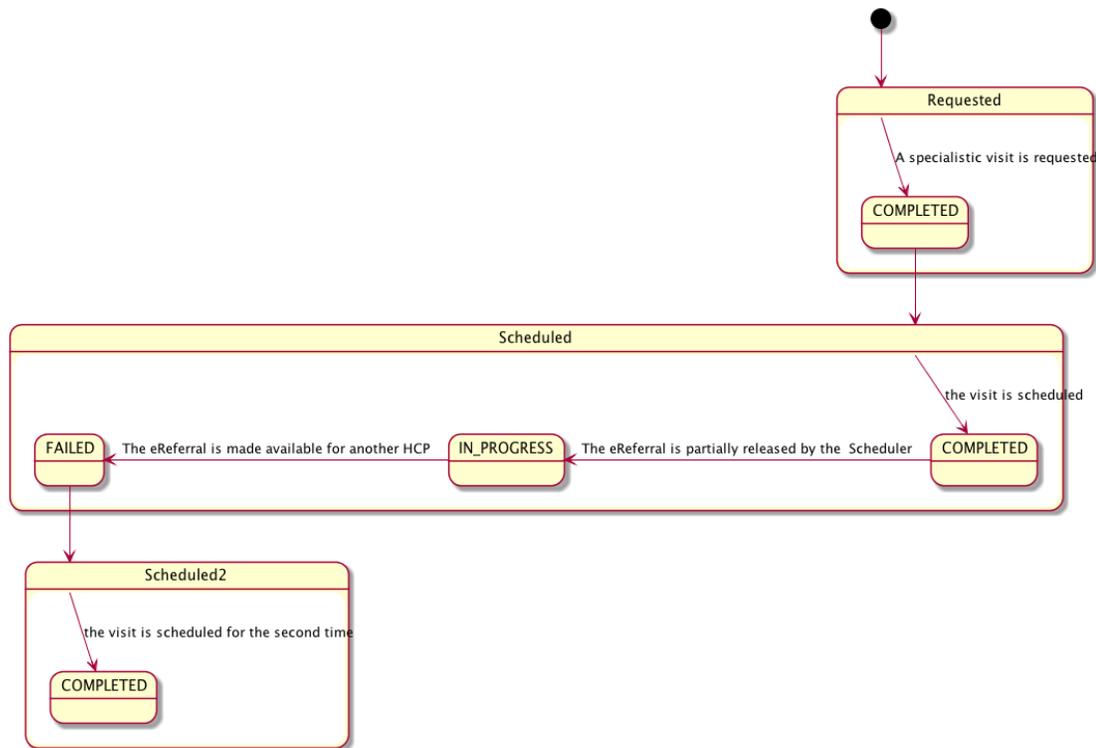
We can consider the situation in which it's necessary to cancel the visit and make the eReferral available again for another scheduling step.

The Referral Scheduler queries and retrieves the Workflow Document to check the status of the eReferral document related. A visit has already been scheduled (Referral Scheduled task in status=COMPLETED), so, in this situation, it isn't possible to schedule another visit. The reception phase hasn't already been performed but the eReferral process is still in-progress (WorkflowStatus of the Workflow Document "OPEN"). In this situation the Referral scheduler shall act on the Referral Scheduled task, adding a new taskEvent to track the information that the eReferral document is released, in order to make it available for another scheduling phase. The task Referral Scheduled is characterized by:

- a task status "IN_PROGRESS"

No inputs or outputs shall be added by this step. The eReferral document is now available to the same HCP to schedule the visit, changing the status of the task Referral Scheduled into "COMPLETED".

The task "Referral Scheduled" is characterized by:

- a task status "COMPLETED"
- the references to the eReferral document produced by the GP as inputs of the task.

If the patient choose another healthcare provider, before to schedule the visit for the second time it is necessary that the first healthcare provider closes the Referral Scheduled task adding a new taskEvent characterized by status "FAILED". In this case the workflowStatus is still "OPEN".

The Referral Performer that checks the status of the process retrieving the Workflow Document can find more than one Referral Scheduled task, but only one in status COMPLETED (the others are in status=FAILED).

X.3.2 Options

In this section we describe which variations from the normal process are allowed. It is mandatory for implementers to explicity define which workflow options, if any, are addressed by their products (see section 4).

Options that may be selected for this Profile are listed below along with the Workflow Participants to which they apply.

This Workflow Definition Profile is intended to be combined with other IHE Profiles. These other profiles may have their specific options. These are not addressed in this section, which focuses only on the Options identified for this Workflow Definition Profile.

X.3.2.1 Process without Scheduling phase

The process can develop without a scheduling phase. This allows this profile to be implemented in many other real use-cases. If the "Process without Scheduling phase" option is chosen, rules to manage the process shall change.

500   If this workflow definition option is implemented the Referral Performer can start the visit while
the eReferral process is in the Referral Requested status. The scheduling phase is not needed, and
the goal of the workflow is strictly related to create a process to give some specialistic clinical
feedback to the Referral Requester.

These rule changes are addressed in the Task Specification section Y.3:

505   • Task "Referral Requested":
    • Successors: Referral Referred

    • Task "Referral Scheduled":
    • Cardinality 0..0

    • Task "Referral Referred"
510   • Ancestors: Referral Requested

X.3.2.2 Reminder Note Option

If this option is selected it is required that a Reminder Note is created as output of the task
Referral Scheduled.

X.4 Workflow Definition Actors and Options

515   Workflow Participants introduced in Section X.3 are expected to be supported by Workflow
Definition Actors that represents abstractions of IT systems. Compliance to this workflow
definition profile and its options are based on selecting the implementation of one or more of
these Workflow Definition Actors.

X.4.1 Workflow Definition Actors

520   Table X.4.1-1 specifies the mapping of Workflow Participants to Workflow Definition Actors.

Table X.4.1-1: XBeR-WD Workflow Pariticipants grouping with Workflow Definition Actors

Workflow Participant	Workflow Definition Actor
Referral Requester	Referral Requester Actor
Referral Scheduler	Referral Scheduler Actor
Referral Performer	Referral Performer Actor
Workflow Monitor	Workflow Monitor Actor

X.4.2 Workflow Options

Options that may be selected for this Profile are listed below along with the Workflow Definition
525   Actors to which they apply. Although this Workflow Definition Profile is intended to be

___

combined with other IHE Profiles, the specific options of these other Profiles are not addressed
in this section, which focuses only on the Options identified for this Workflow Definition
Profile.

Table X.4.2-1 specifies the options that are available, if any for each selected Workflow Actors.

530

Table X.4.2-1: XBeR Profile Workflow Definition Actors and Options

XBeR-WD Workflow Definition Actor	option	Volume & Section
Referral Requester actor	*No options selected*	
Referral Scheduler actor	*Reminder Note Option*	PCC TF-1: X.3.2.2
Referral Performer actor	*Process without Scheduling Phase Option*	PCC TF-1: X.3.2.1
Workflow Monitor actor	*No options selected*	-

X.4.3 Workflow Definition Profile Grouping with other Profiles

This Workflow Definition Profile is intended to be combined with other IHE Profiles. The
535   profiles that are candidates for such combinations and the associated rules are specified in this
Section.

Figure X.4.3-1 presents an overview for the major classes of IHE Profiles that shall or may be
grouped:

540   • The Workflow Definition Profile SHALL be grouped with the XDW Profile.

   • The Workflow Definition Profile SHOULD be grouped with one or more Document Content
     Profiles matched to the input and output reference "Document Labels" in the Workflow
     Definition Profile (Defined in Vol.2). The Workflow Definition Profile provides only
     "Document Labels" for these input and output reference documents and not the actual
545   specifications. This selection of the actual document content specification (IHE Content
     profiles or others), need to be made by the environment that deploys the Workflow
     Definition Profile.

   • The Workflow Definition Profile, the XDW Profile and the selected Document Content
     Profiles shall be grouped as decided by the deployment environment, with the suitable
550   Integration Profile supporting a document transport service such as XDS for Document
     Sharing, XDR/XDM for point-to-point directed transport, or other functionally equivalent
     profiles.
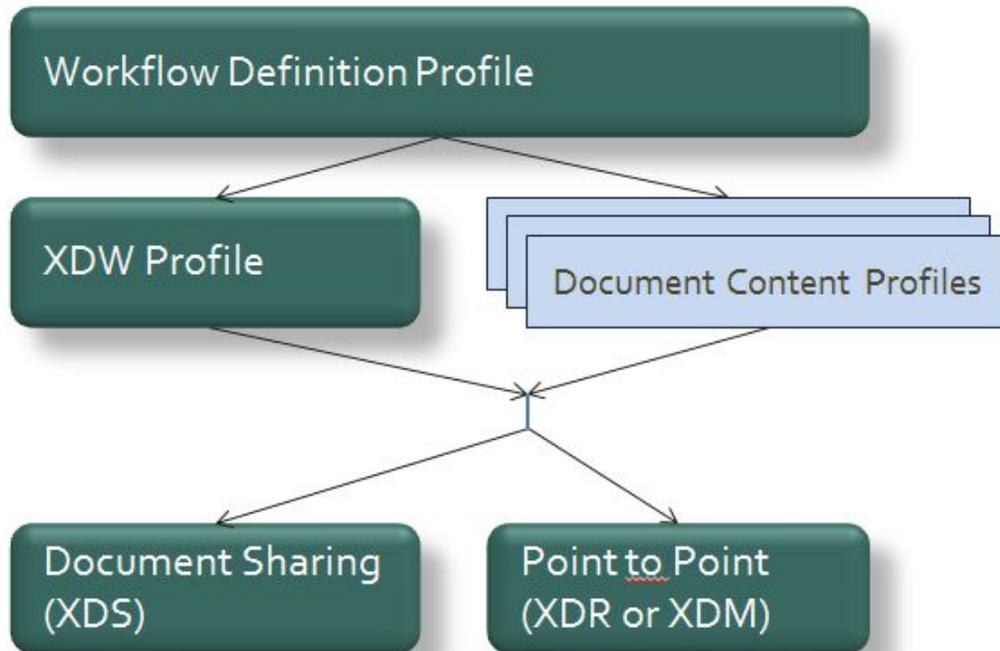
555

Figure X.4.3-1 Grouping of profiles

The grouping of XDW actors with each of the XBeR-WD workflow definition actors is specified
in Table X.4.3-1. These XDW Actors support the creation, consumption and update of the XDW
workflow document which is the shared data structure which is tracking the evolution of the
560   workflow. This allows the XBeR-WD workflow definition actors, at any point in the workflow
to access the most current status of the workflow and share the tasks performed with all other
workflow definition actors.

Note: See IHE ITI TF-1: Section 30.3 (XDW Supplement) for other groupings that are needed for the XDW Actors to permit
sharing of a Workflow Document with IHE XDS, XDR or XDM Profiles..

565   Table X.4.3-1: XBeR-WD workflow definition actors grouping with XDW Profile Actors

Table X.4.3-1: XBeR-WD Workflow Definition Actors grouping with XDW Actors

Workflow Definition Actor	Shall be grouped with:
Referral Requester actor	XDW Content Creator XDW Content Consumer XDW Content Updater
Referral Scheduler actor	XDW Content Updater XDW Content Consumer
Referral Performer actor	XDW Content Updater XDW Content Consumer

Workflow Definition Actor	Shall be grouped with:
Workflow Monitor actor	XDW Content Updater XDW Content Consumer

X.5 Security Considerations

570   For this section please refer to the section ITI TF-1: 30.5.

Volume 2 – Content Modules

Y.1 XBeR Workflow Definition - XDW Workflow Document – Common Attributes

575 This workflow definition profile is assigned a specific OID that shall be used to assign an identifier to the workflowDefinitionReference element of a Workflow Document that tracks an eReferral process.

type of Workflow	Workflow Definition Reference
eReferral workflow	1.3.6.1.4.1.19376.1.5.3.1.5.1

The XBeR-WD Workflow Definition does not introduce new metadata and all the metadata
580 elements used are the common XDS document metadata specified in ITI TF-3:4.1.5 and in ITI TF-3:5.4.6. In this section only the use of some specific metadata for the use of XDW in the XBeR-WD context is specified.

XDS Metadata Attribute	Definition
typeCode	For the Workflow Document which tracks the XBeR-WD process the code for the typeCode shall be: This code will be assigned by LOINC
classCode	For the Workflow Document which tracks the XBeR-WD process the code for the classCode is defined by the XDW profile. See XDW Supplement Section 5.4.6.1.
eventCodeList	**Rule 1:** An XBeR-WD workflow shall be created with code OPEN and shall remain in this status until it is set to CLOSED. **Rule 2:** An XBeR-WD workflow should be set to CLOSED when: - one of the tasks has the status FAILED (except for the scheduling cancellation process); or - when you complete the workflow with the Referral Referred task in status COMPLETED. See ITI TF-3: 5.4.5.7 for a general description of this attribute.
serviceStartTime	It is the time at which work began on the first task for this workflow.
serviceStopTime	It is the time at which the status of the overall Workflow is changed from OPEN to CLOSED. It shall be empty when the workflow is still in OPEN state.

585

Y.2 XDW Content Modules

The main instrument of the Cross-enterprise Basic eReferral Workflow Definition Profile is the
Workflow Document defined in the XDW Profile. This document does not include clinical
information about the patient directly. It shall only contain information necessary for organizing
590 and defining work tasks. All clinical information regarding any task shall be provided through
separate documents that are referenced from the associated input or output documents. Detailed
knowledge of the Cross-enterprise Document Workflow (XDW) profile is indispensable in
understanding the following sections. For more details, refer to ITI TF-3: 5.4.

595

Y.3 Tasks Specifications

Workflow Description Overview:

Task Type	Requi-rement For task initiation	Task Statuses *valid when task initiated	Task Property	Input Docs	Option	Output Docs	Option
Referral Requested	At XDW doc creation	COMPLETED* IN_PROGRESS FAILED	Cardinality: 1..1 Removable: no	Clinical Input	O	eReferral	R
						Exception Report	C: (If the request is aborted just created)
Referral Scheduled	When Referral Requested is COMPLETED, or Referral Scheduled is FAILED (in case of scheduling cancellation)	COMPLETED* IN_PROGRESS FAILED*	Cardinality: 1..n Removable: no * These may change if Workflow Options are selected	eReferral	R	Exception Report	C: (If the visit can't be scheduled)
						Reminder Note	O * This may change if Workflow Options are selected
Referral Referred	When Referral Scheduled is COMPLETED	IN_PROGRESS* COMPLETED FAILED*	Cardinality: 1..1 Removable: no	eReferral	R	Exception Report	C: (if task status is failed)
						Clinical Report of the visit	R

600   In the next sections we define rules and constraints defined for the creation and update of the XDW Workflow Document related to the eReferral process.

The set of rules defined here is necessary to manage transition between tasks. For each task are defined:

- The task attributes: ID, name, type description;

605   • The sequence of the tasks: the previous and the next task;

- Which Workflow Participant is allowed to create each task and to change the status;
- The task event;
- The input and output documents.

610   The rules in the workflow definition ensure that the different participants in a workflow operate
jointly to advance within tasks and to move from one task to another in a consistent way.

Y.3.1 Task: "Referral Requested"

Task attributes	Rules for the task "Referral Requested"
Task id	Unique id of the instance of the task
Task type	**Referral Requested**
Task name	Referral Requested
Task description	A Referral process is requested for a patient by the Referral Requester
Task dependencies	Ancestors: none Successors: Referral Scheduled * These may change if Workflow Options are selected
Status allowed	**COMPLETED**: An Ordering task is always set to COMPLETED when confirmed or just created. **IN_PROGRESS**: If the request have to be evaluated **FAILED**: If the Referral Requester wants to abort the process just created
Status transactions (*)	If the request has to be evaluated there is a transaction of status from COMPLETED to IN_PROGRESS. If the request is confirmed there is a transaction of status from IN_PROGRESS to COMPLETED. If the request is aborted there is a transaction of status from IN_PROGRESS to FAILED. <table><tr><th>Initial Status</th><th>Final Status</th><th>eventType</th></tr><tr><td>none</td><td>COMPLETED</td><td>create</td></tr><tr><td>COMPLETED</td><td>IN_PROGRESS</td><td>release</td></tr><tr><td>IN_PROGRESS</td><td>FAILED</td><td>fail</td></tr><tr><td>IN_PROGRESS</td><td>COMPLETED</td><td>complete</td></tr></table>
Input	Optional Clinical Report or Laboratory Report

Output	• Required
	    o eReferral: if the status is completed
	    o Exception Report: if the status is FAILED

Owner	Referral Requester or Workflow Monitor

Task attributes	Rules for the task "Referral Requested"
Owner changes	No
<taskEvent>	1 if the request is not evaluated after creation. 3 in other cases.
Task Removal allowed	No
Task duplication	No

(*) The element eventType stores the type of event that produces the change in the task status. In
615 the "Status transactions" we want to associate the specific type of event to the status transaction
produced. For further details on eventType element see XDW profile.

Y.3.2 Task: "Referral Scheduled"

Task attributes	Rules for the task "Referral Scheduled"		
Task id	Unique id of the instance of the task		
Task type	**Referral Scheduled**		
Task name	Referral Scheduled <i>		
Task description	An appointment is scheduled by the Referral Scheduler chosen by the patient		
Task dependencies	Ancestors: Referral Requested in status COMPLETED or Referral Scheduled in status FAILED Successors: Referral Scheduled, Referral Referred		
Status allowed	**COMPLETED:** if the appointment is scheduled **IN_PROGRESS:** if the visit is released by the HCP **FAILED:** if the appointment can't be scheduled or cancelled.		
Status transactions	If the appointment of the patient is cancelled, it shall be a transaction of status from COMPLETED to IN_PROGRESS. If the visit is scheduled again by the same HCP the status changes from IN_PROGRESS to COMPLETED. If another HCP is expected to schedule the visit the status shall change from IN_PROGRESS to FAILED		
	Initial Status	**Final Status**	**eventType**
	none	COMPLETED	create
	none	FAILED	fail

Task attributes	Rules for the task "Referral Scheduled"		
	COMPLETED	IN_PROGRESS	release
	IN_PROGRESS	COMPLETED	claim
	IN_PROGRESS	FAILED	expire
Input	• Required o eReferral		

Output	• Required
	   o Exception Report: If the visit can't be scheduled
	
	• Optional
	   o Reminder Note
	* These may change if Workflow Options are selected		

Owner	Referral Scheduler or Workflow Monitor		
owner changes	Yes, in case of cancellation of the appointment		
<taskEvent>	Only One if the appointment isn't cancelled, two if the eReferral is released, three if the visit scheduled by the specific HCP is completely cancelled.		
Task Removal allowed	No		
Task duplication	Yes		

620 **Y.3.3 Task: "Referral Referred"**

Task attributes	Rules for the task "Referral Referred"
Task id	Unique id of the instance of the task
Task type	**Referral Referred**
Task name	Referral Referred
Task description	A specialist consultation is started and performed by the Referral Performer
Task dependencies	Ancestors: Referral Scheduled (in status COMPLETED) * These may change if Workflow Options are selected Successors: none
Status allowed	**IN_PROGRESS:** if the patient can be admitted **COMPLETED:** if the visit is completed producing a Report

Task attributes	Rules for the task "Referral Referred"
	FAILED: if the visit can't be completed
Status transactions	The task born IN_PROGRESS and it shall be a transaction of status into status COMPLETED when the visit is completed with a Report, or into status FAILED when the visit can't be completed.

Initial Status	Final Status	eventType
none	IN_PROGRESS	create
IN_PROGRESS	COMPLETED	complete
none	FAILED	fail
IN_PROGRESS	FAILED	fail

Task attributes	Rules for the task "Referral Referred"
Input	Required eReferral

Output	• Required
	    o Clinical Report of the Visit: if the visit is completed
	    o Exception Report: if the visit fails

Owner	Referral Performer or Workflow Monitor
owner changes	no
<taskEvent>	Only one (failed): if the patient can't be admitted in the healthcare structure Two in the other cases
Task Removal allowed	No
Task duplication	No

625

Y.4 Input and output documents

The WS-HumanTask element that permit to store the reference of an object in input or output
630   sections is described in IHE ITI TF-3:5.4.3

In table Y.4-1 we define the kind of document involved in the eReferral process. For each type
of document this table defines the Documents Labels of the document. This Label describes the
function or the role that the document performs in the course of the process or during the
execution of a task, and defines the type of information conveyed and expected by the owner of
635   the tasks.

Table Y.4-1: Documents involved in the eReferral process

Document Label	Example of content profile
eReferral	XDS-SD
Clinical Report of the Visit	XDS-SD EDR PPOC XD-LAB ECDR CIRC DRPT APSR
Exception Report	XDS-SD
Clinical Input	XDS-SD PPOC XD-LAB ECDR CIRC DRPT APSR
Reminder Note	XDS-SD

640 **Appendix A- Complete example of eReferral Workflow Document**

In this Appendix we propose a complete example of a Workflow Document related to the
eReferral process as we can see it when the visit is completed successfully.

```xml
<?xml version="1.0" encoding="UTF-8"?>
<ns3:XDW.WorkflowDocument
    xmlns:ns1="urn:hl7-org:v3"
    xmlns:ns2="http://docs.oasis-open.org/ns/bpel4people/ws-humantask/types/200803"
    xmlns:ns3="urn:ihe:iti:2011:xdw"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xsi:schemaLocation="urn:ihe:iti:2011:xdw file:C: XDW-2011-09-13.xsd">
  <ns3:id root="1.2.3.4.5"/>
  <ns3:effectiveTime value="20110401031520"/>
  <ns3:confidentialityCode code="1.24.3.3.3"/>
  <ns3:patient>
     <ns3:id root="1.3.6.1.4.1.21367.13.20.1000" extension="33333"
     assigningAuthorityName="IHERED"/>
  </ns3:patient>
  <ns3:author>
     <ns3:assignedPerson>
         <ns1:name>
             <ns1:family>Brum</ns1:family>
             <ns1:prefix>Dr.</ns1:prefix>
         </ns1:name>
     </ns3:assignedPerson>
  </ns3:author>
  <ns3:workflowInstanceID>urn:oid:1.2.3.4</ns3:workflowInstanceID>
  <ns3:workflowDocumentSequenceNumber>3</ns3:workflowDocumentSequenceNumber>
  <ns3:workflowStatus>CLOSED</ns3:workflowStatus>
  <ns3:workflowStatusHistory>
     <ns3:documentEvent>
         <ns3:eventTime>2006-05-04T18:13:51.0Z</ns2:eventTime>
         <ns3:eventType>create</ns2:eventType>
         <ns3:taskEventIdentifier>urn:oid:1.1.1.1.4</ns2:taskEventIdentifier>
         <ns3:author>Mr. Rossi</ns2:author >
         <ns3:previousStatus></ns2:previousStatus>
         <ns3:actualStatus>OPEN</ns2:actualStatus>
     </ns3:documentEvent>
     <ns3:documentEvent>
```

```
            <ns3:eventTime>2006-05-07T09:53:45.0Z</ns2:eventTime>

            <ns3:eventType>complete</ns2:eventType>

            <ns3:taskEventIdentifier>urn:oid:1.1.1.1.7</ns2:taskEventIdentifier>

            <ns3:author>Dr. Brum</ns2:author >

            <ns3:previousStatus>OPEN</ns2:previousStatus>

            <ns3:actualStatus>CLOSED</ns2:actualStatus>

        </ns3:documentEvent>

    </ns3:workflowStatusHistory>

<ns3:workflowDefinitionReference>urn:oid:1.2.3.4.5.6.7.8.9</ns3:workflowDefinitionReference>

    <ns3:TaskList>

    <ns3:XDWTask>

        <ns3:taskData>

                <ns3:taskDetails>

                    <ns2:id>urn:oid:1.1.1.1.1</ns2:id>

                    <ns2:taskType>REFERRAL REQUESTED</ns2:taskType>

                    <ns2:name>Referral Requested 1</ns2:name>

                    <ns2:status>COMPLETED</ns2:status>

                     <ns2:createdTime>2006-05-04T18:13:51.0Z</ns2:createdTime>

                     <ns2:lastModifiedTime>2006-05-04T18:13:51.0Z</ns2:lastModifiedTime>

                    <ns2:renderingMethodExists>false</ns2:renderingMethodExists>

                    <ns2:actualOwner>Dr. Rossi</ns2:actualOwner>

                    <ns2:createdBy>Dr. Rossi</ns2createdBy>

                </ns3:taskDetails>

                <ns2:description>code for the type of visit requested</ns2:description>

                <ns2:input>

                    <ns2:part name="Laboratory Report">

                        <reference uid="urn:oid:1.2.3.4.4.3.2.2.3"
home="urn:oid:1.2.3"/>

                    </ns2:part>

                </ns2:input>

                <ns2:output>

                    <ns2:part name="eReferral">

                        <reference uid="urn:oid:1.2.3.4.4.4" home="urn:oid:1.2.3"/>
                        </ns2:part>

                </ns2:output>

         </ns3:taskData>

        <ns3:taskEventHistory>

                <ns3:taskEvent>

                    <ns3:id>1</ns3:id>
```

```
                        <ns3:eventTime>2006-05-04T18:13:51.0Z</ns3:eventTime>

                        <ns3:identifier>urn:oid:1.1.1.1.1</ns3:identifier>

                        <ns3:eventType>create</ns3:eventType>

                        <ns3:status>COMPLETED</ns3:status>

                </ns3:taskEvent>

        </ns3:taskEventHistory>

    </ns3:XDWTask>

    <ns3:XDWTask>

        <ns3:taskData>

                <ns3:taskDetails>

                        <ns2:id>urn:oid:1.1.1.1.1</ns2:id>

                        <ns2:taskType>REFERRAL SCHEDULED</ns2:taskType>

                        <ns2:name>Referral Scheduled 1</ns2:name>

                        <ns2:status>COMPLETED</ns2:status>

                        <ns2:createdTime>2006-05-05T08:53:45.0Z</ns2:createdTime>

                        <ns2:lastModifiedTime>2006-05-05T08:53:45.0Z</ns2:lastModifiedTime>

                        <ns2:renderingMethodExists>false</ns2:renderingMethodExists>

                        <ns2:actualOwner>HIS</ns2:actualOwner>

                        <ns2:createdBy>HIS</ns2:createdBy>

                </ns3:taskDetails>

                <ns3:description>code for the type of visit booked and visit
info</ns3:description>

                <ns2:input>

                        <ns2:part name="eReferral">

                        <reference uid="urn:oid:1.2.3.4.4.3.2.2.3" home="urn:oid:1.2.3"/>
                                </ns2:part>

                </ns2:input>

        </ns3:taskData>

        <ns3:taskEventHistory>

                <ns3:taskEvent>

                        <ns3:id>1</ns3:id>

                        <ns3:eventTime>2006-05-05T08:53:45.0Z</ns3:eventTime>

                        <ns3:identifier>urn:oid:1.1.1.1.1</ns3:identifier>

                        <ns3:eventType>create</ns3:eventType>

                        <ns3:status>COMPLETED</ns3:status>

                </ns3:taskEvent>

        </ns3:taskEventHistory>

    </ns3:XDWTask>

    <ns3:XDWTask>

        <ns3:taskData>
```

```
            <ns3:taskDetails>
                    <ns2:id>urn:oid:1.1.1.1.1</ns2:id>
                    <ns2:taskType>REFERRAL REFERRED</ns2:taskType>
                    <ns2:name>Referral Referred</ns2:name>
                    <ns2:status>COMPLETED</ns2:status>
                    <ns2:createdTime>2006-05-07T08:50:00.0Z</ns2:createdTime>
                    <ns2:lastModifiedTime>2006-05-07T09:53:45.0Z</ns2:lastModifiedTime>
                    <ns2:renderingMethodExists>false</ns2:renderingMethodExists>
                    <ns2:actualOwner>Dr. Brum</ns2:actualOwner>
                    <ns2:createdBy>HIS</ns2:createdBy>
            </ns3:taskDetails>
            <ns3:description>code for the type of visit</ns3:description>
            <ns2:input>
                    <ns2:part name="eReferral">
                            <reference uid="urn:oid:1.2.3.4.4.3.2.2.3"
home="urn:oid:1.2.3"/>
                    </ns2:part>
            </ns2:input>
            <ns2:output>
                    <ns2:part name="Clinical Report of the visit">
                            <reference uid="urn:oid:1.2.3.4.4.4" home="urn:oid:1.2.3"/>
                    </ns2:part>
            </ns2:output>
    </ns3:taskData>
    <ns3:taskEventHistory>
            <ns3:taskEvent>
                    <ns3:id>1</ns3:id>
                    <ns3:eventTime>2006-05-07T08:50:00.0Z</ns3:eventTime>
                    <ns3:identifier>urn:oid:1.1.1.1.1</ns3:identifier>
                   <ns3:eventType>create</ns3:eventType>
                    <ns3:status>IN_PROGRESS</ns3:status>
                    <ns3:startOwner>HIS</ns3:startOwner>
                    <ns3:endOwner>Dr. Brum</ns3:endOwner>
            </ns3:taskEvent>
            <ns3:taskEvent>
                    <ns3:id>2</ns3:id>
                    <ns3:eventTime>2006-05-07T09:53:45.0Z</ns3:eventTime>
                    <ns3:identifier>urn:oid:1.1.1.1.1</ns3:identifier>
                    <ns3:eventType>create</ns3:eventType>
                    <ns3:status>COMPLETED</ns3:status>
```

```
            </ns3:taskEvent>
        </ns3:taskEventHistory>
    </ns3:XDWTask>
  </ns3:TaskList>
</ns3:XDW.WorkflowDocument>
```
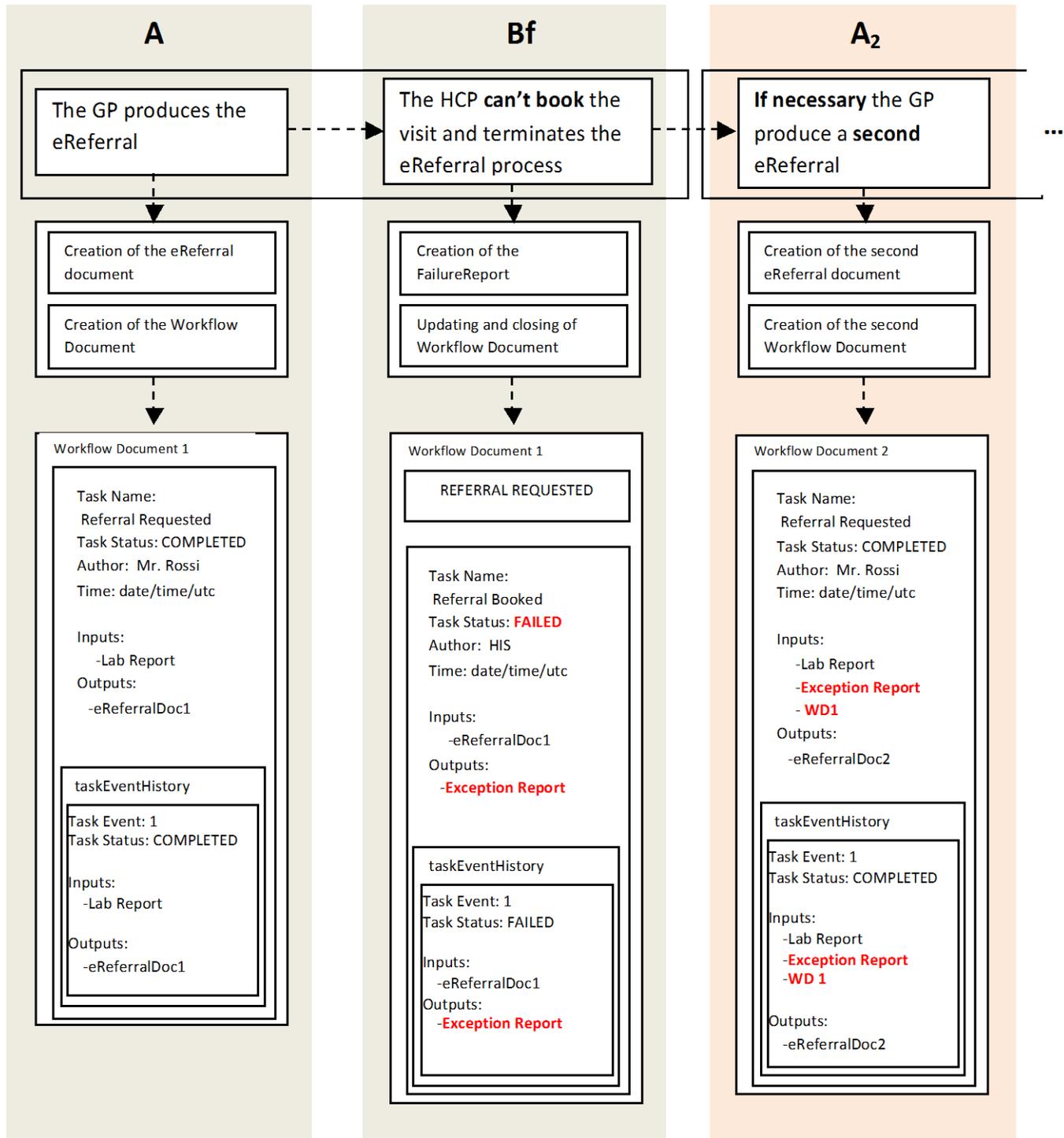
645

650

655

660

Appendix B: Technical development of WD related to the eReferral process

665   In this Appendix we present more technical information related to the use-case scenario
described in Volume 1 of this profile.

B.1 Management of the "Failing of Scheduling"

A	Bf	A₂

A

The GP produces the eReferral

Creation of the eReferral document

Creation of the Workflow Document

Workflow Document 1

Task Name:
 Referral Requested
Task Status: COMPLETED
Author: Mr. Rossi
Time: date/time/utc

Inputs:
   -Lab Report
Outputs:
  -eReferralDoc1

taskEventHistory

Task Event: 1
Task Status: COMPLETED

Inputs:
  -Lab Report

Outputs:
  -eReferralDoc1

Bf

The HCP **can't book** the visit and terminates the eReferral process

Creation of the FailureReport

Updating and closing of Workflow Document

Workflow Document 1

REFERRAL REQUESTED

Task Name:
 Referral Booked
Task Status: **FAILED**
Author: HIS
Time: date/time/utc

Inputs:
   -eReferralDoc1
Outputs:
  -Exception Report

taskEventHistory

Task Event: 1
Task Status: FAILED

Inputs:
  -eReferralDoc1
Outputs:
  -Exception Report

A₂

If necessary the GP produce a **second** eReferral

Creation of the second eReferral document

Creation of the second Workflow Document

Workflow Document 2

Task Name:
 Referral Requested
Task Status: COMPLETED
Author: Mr. Rossi
Time: date/time/utc

Inputs:
   -Lab Report
   -Exception Report
   - WD1
Outputs:
   -eReferralDoc2

taskEventHistory

Task Event: 1
Task Status: COMPLETED

Inputs:
  -Lab Report
  -Exception Report
  -WD 1

Outputs:
  -eReferralDoc2

670 **Figure B.1-1: Management of the workflow document: scheduling failing**

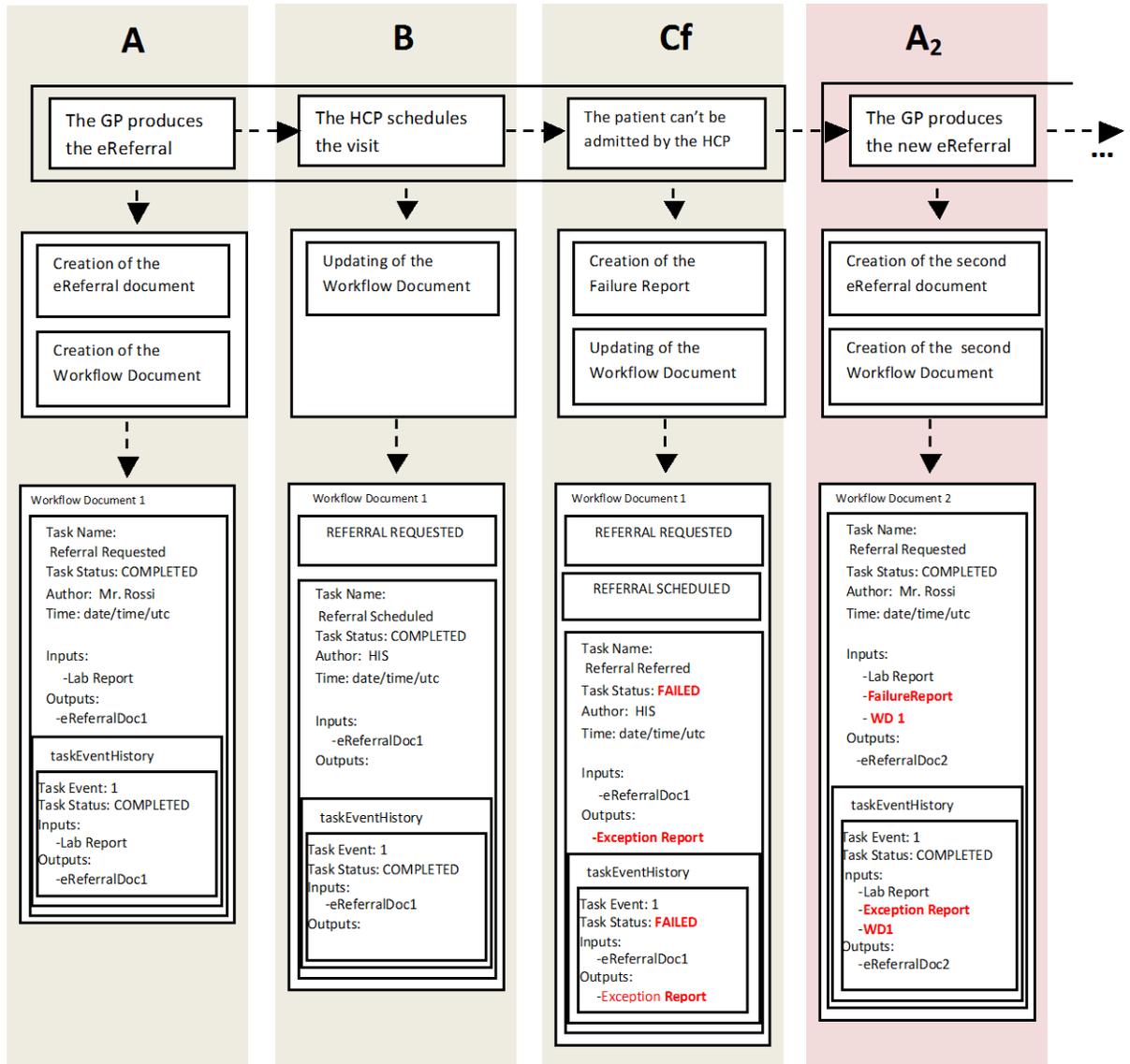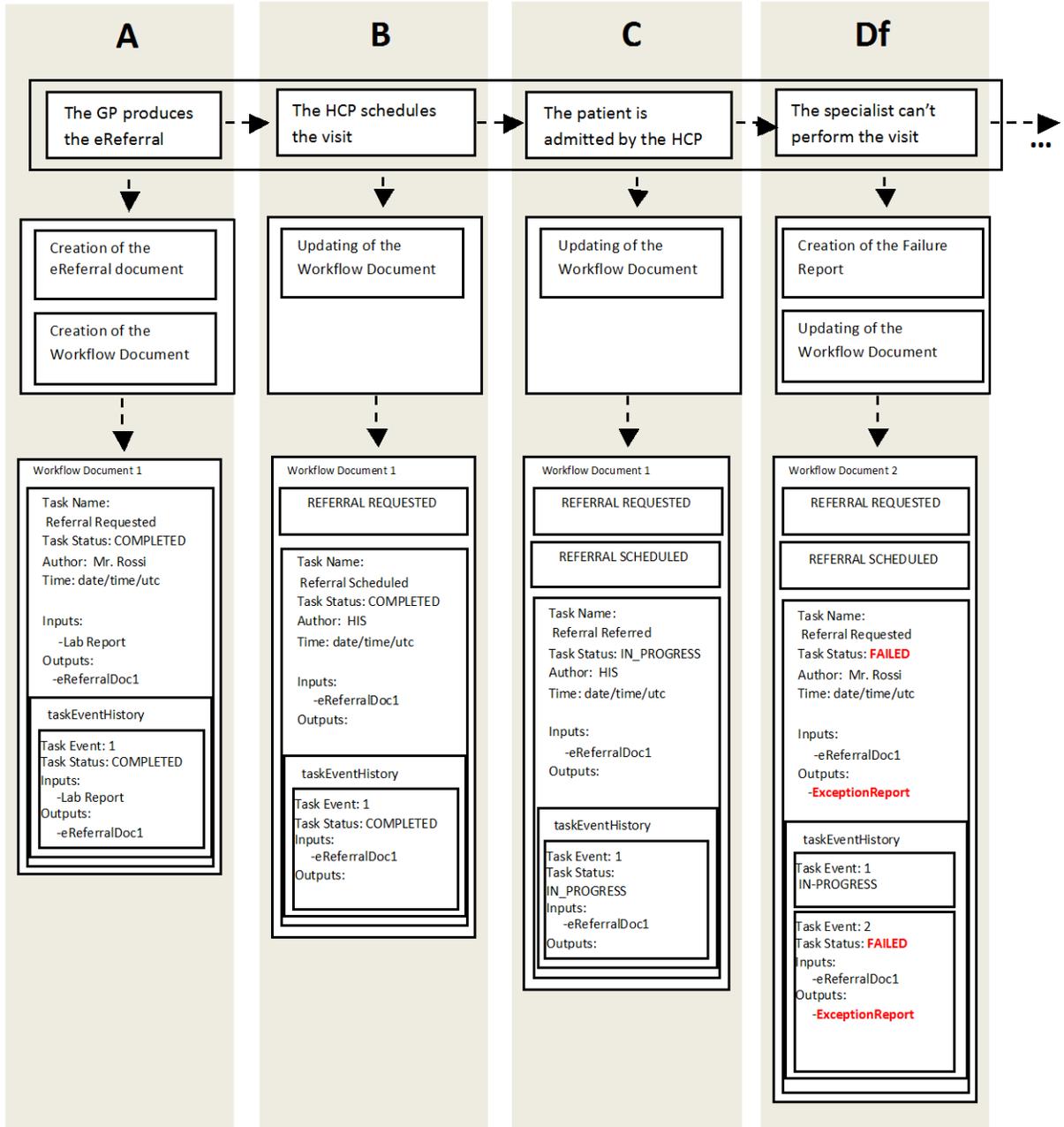## B.2 Management of the "Failing of the reception" phase

Figure B.2-1: Management of the workflow document: reception failing

675

B.3 Management of the "Failing of the visit"

680

Figure B.3-1: Management of the workflow document: referring failing