PICASO

A Personalised Integrated Care Platform

(Grant Agreement No. 689209)

D7.7 Second Private and Public Cloud Integration

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0.2	Marek Skokan (TUK)	2018-10-10	Version ready for collection of inputs
0.3	Armanas Povilionis (INUIT)	2018-10-12	Added sections: Risk Manager, Local/Public Access Managers, Identity Manger, Policy Manager
0.4	Peter Rosengren, Tobias Brodén (CNET)	2018-10-29	ODS update (reference to D5.6), component updates
0.5	Carlos A. Velasco (FIT)	2018-11-05	FIT components update
1.0	Marek Skokan (TUK)	2018-11-08	Deliverable for internal review
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Index:

1 Executive Summary

This deliverable is the second one in the series on the Private and Public Cloud Integration. It describes integration aspects of PICASO components that have been updated in comparison with the first version of the deliverable. It also provides reference to the PICASO recent deliverables that describes integration aspects of the components to avoid/minimise duplicity of content. To make this deliverable more readable, section 2 provides information which deliverable describes integration aspects of each PICASO component.

2   Introduction

The deliverable is the second and last document describing the integrated PICASO Private and Public Clouds. The first version of the deliverable (D7.4) provides a description of the PICASO platform components together with their dependencies dividing components into core components and integration mechanism components. Such description gives a solid perspective on the integrated PICASO Private and Public Clouds. The same perspective is given by this document. However, this document provides a description of the updated PICASO platform components only. Those components that were not updated (from the integration perspective) or are well described in the other recent PICASO deliverables are explicitly named in Section 2.2 (see table below).

2.1   Intellectual Property (IP)

The different components described here are subject to open source and commercial licences, which are subject to the licences reflected in the IP repository being created for the project.

2.2   Content and structure of this deliverable

This document accompanies the Demonstrator deliverable D7.7 and describes updates of the configuration in the integrated version of the PICASO Care Private Cloud and the Public Cloud that is deployed and used in the PICASO trials.

Note, Task 7.4 "Care System Private Cloud Integration" and Task 7.5 "PICASO Integrated Care Platform" have contributed to this deliverable.

Chapter 3 gives description of updated core components. Chapter 4 focuses on the specific components included in the integration mechanisms between the Private and the Public Cloud.

Note 1: main data models deployed as Clinician ODS and employed in the integration process are not part of this written deliverable, since the current ODS and ODS Schema subsets are described in the recent deliverable D5.6 Data Management Subset.

Note 2: the updated schema providing overall deployment view of PICASO components is presented in deliverable D7.8 on Figure 2.

The components that are updated comparing to the state covered in D7.4 are marked in column "PICASO deliverable providing description" by "D7.7". Such components are described in this deliverable

Abbreviation	Component name	Partner responsible	Work Package	PICASO deliverable providing description
AL	Activity Log (AL)	CNET	WP5	D7.4
CPO	Care Plan Orchestration (CPO)	CNET	WP6	D7.4
CM / PDV	Clinician Manager (CM) now called Patient Data Viewer	TUK	WP7	D7.4 and D6.5
DRB	Data Resource Browser	TUK	WP5	D7.7 (section 3) and D5.6
IM	Identity Manager	INUIT	WP5	D7.7 (section 4) and D5.6
MR	Metadata Registry	TUK	WP5	D7.4 and D5.6
CPM	Care Plan Manager	Fraunhofer	WP7	D7.6

PD SV	Patient Dashboard SV	CNET	WP4	D4.5
PDO	Patient Data Orchestration	TUK	WP5	D7.4 and D5.6
PM	Policy Manager	INUIT	WP5	D7.7 (section 4) and D5.6
LAM/PAM	Local/Public Access Manager	INUIT	WP5	D7.7 (section 4) and D5.6
RDS	Reference Data Server	Fraunhofer	WP7	D7.6, D7.8
RM	Risk Manager	INUIT	WP6	D7.7 (section 3) also D6.1
MB	Message Broker	CNET	WP5	D7.4 and D5.6
ODS MH	ODS Message Handler	CNET	WP5	D7.4 and D5.6

3   Core components

The following components implement the core functionality of the PICASO Clouds. Their functionality is not directly involved in the integration mechanism between Public and Private Cloud, however their data calls require Public and Private Cloud integration mechanism to be running.

3.1   Data Resource Browser

3.1.1   Description

The Resource Data Browser is a web-based, interactive interface where clinicians can search for combinations of all the information stored in the ODSes such as patients, other carers, data and care plans. The user retrieves data by querying the Data Orchestration. Such call of DRB API is delegated to Clinician Dashboard, as it integrates the authentication and authorisations services. Those data that are relevant to a certain patient selected in the Clinician Dashboard are retrieved from relevant ODSes. The Patient Data Orchestrator orchestrates data and it transforms them into predefined format suitable for DRB component. The responsibility of Patient Data Orchestrator is to filter the data from particular ODS responses based on authorisation rules managed in the Policy Manager. The final data response corresponds directly to the interactive visual Mind Map (i.e. graph) presented by the Data Resource Browser.

The Mind Map is dynamically updated (thus visualisation is changed) when the user clicks on the different nodes. The node is expanded up until the node is a leaf node. If, for example, a general practitioner searches for data related to her patient, the graph will show the actual patient as the centre node together with all relevant data categories including the carers in form of nodes around the Patient node. By clicking on one of the carers, a new carer centric graph forms showing which data are associated to the carer type. Finally, the doctor can click on a certain leaf node and see all the measurements performed. The doctor can click around the different branches and see other carers' interventions, the care plans executed, and dig further into the relevant data according to her/his access rights.

The Data Resource Browser is a read-only tool. However logging of access to data (that are accessed by DRB) is done by the Activity Log. Note, such logging is triggered by the DRB but not directly performed by this component (it is performed within the sequence that provides data response to the DRB data request - see Activity Log components for more details).
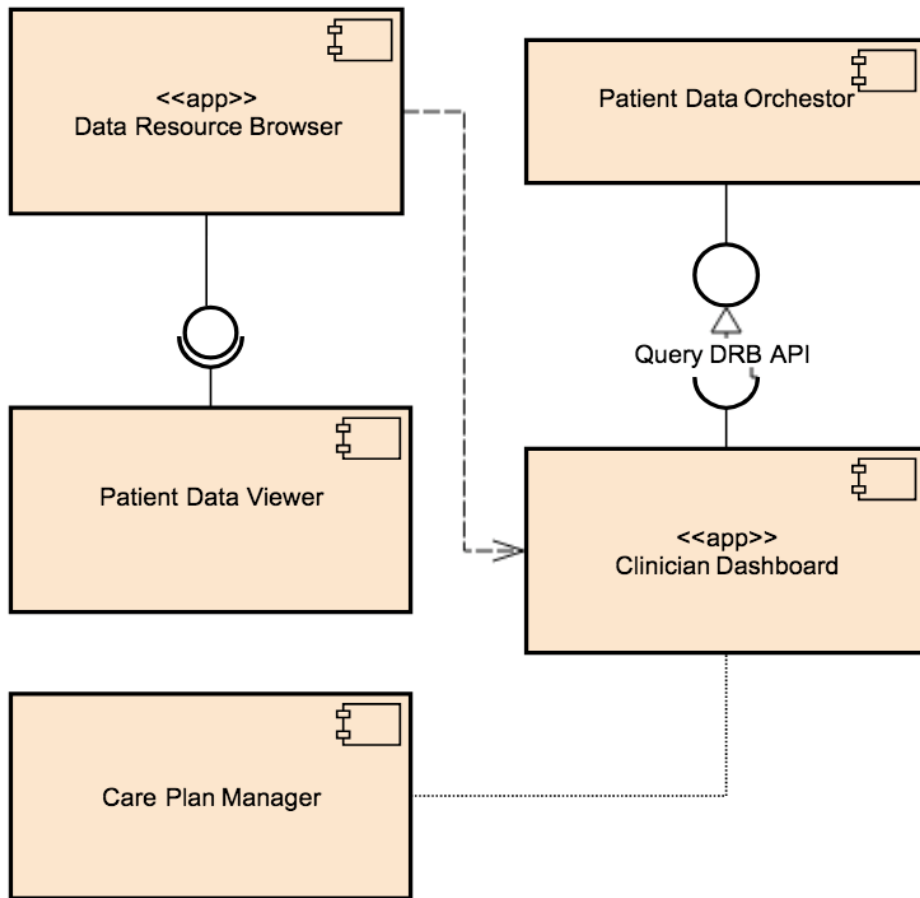
3.1.2   Dependencies

Figure 1 Component diagram representing components (squares) and providers (line with a circle) and consumers (line with a cup) of different DRB APIs.

Note, the dependencies between DRB and Care Plan Manager is over general link to the Care Plan Manager. There is no specific link constructed based on the selected DRB data category. That is why no direct dependency is depicted on the diagram presenting dependencies.
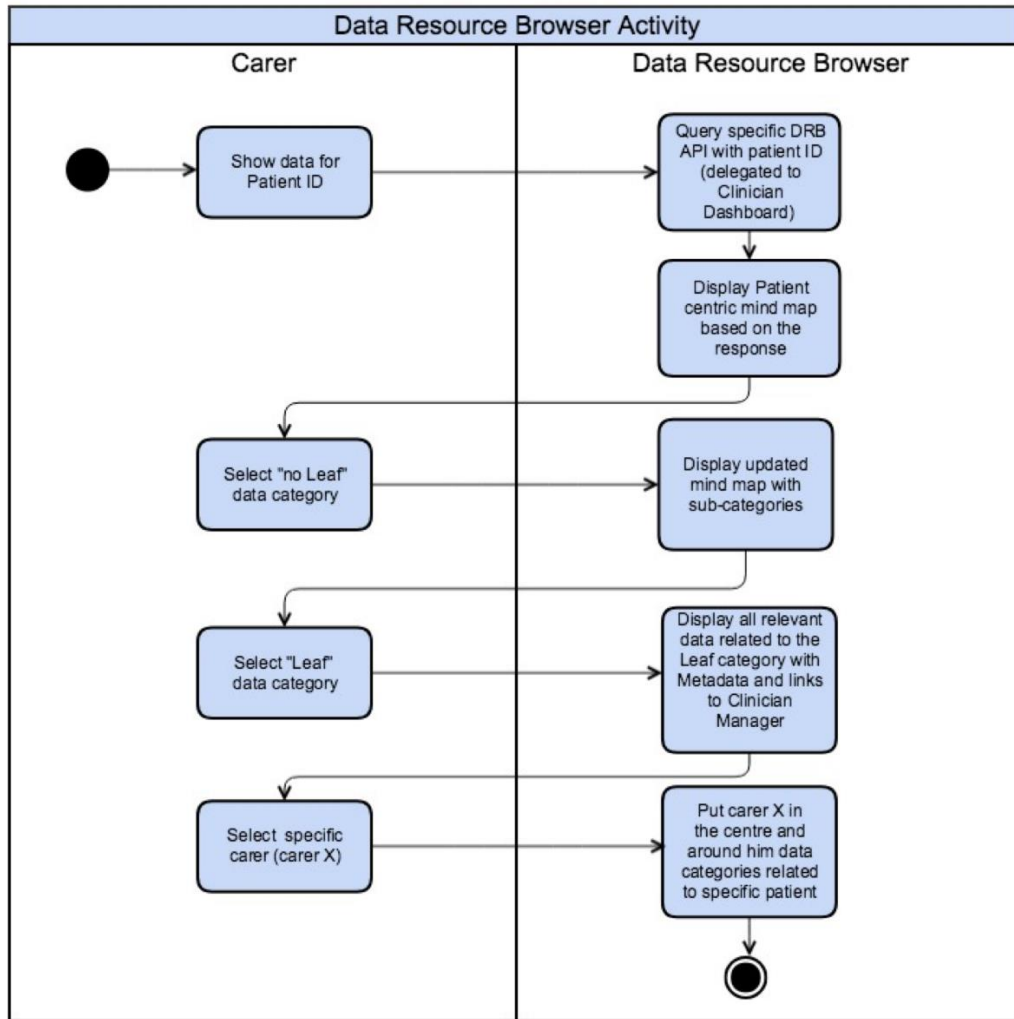
3.1.3 Use case/sequence diagram

Figure 2 Activity Diagram of DRB

3.2 Risk Manager

3.2.1 Description

The PICASO Risk Manager (RM) is a collection of risk assessment tools and prediction models. The current iteration of RM provides risk assessment for fatal cardiovascular disease event by implementing SCORE and CUORE risk assessment tools. The RM component is thorough described in its own deliverable D6.1 First Risk Manager.
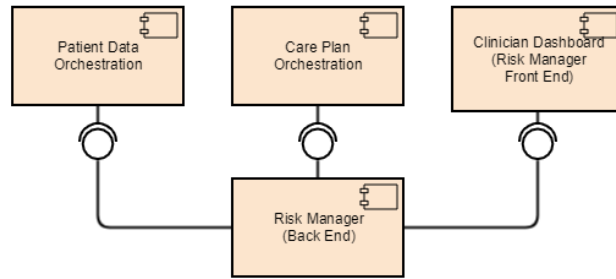
3.2.2 Dependencies

Figure 3 Component diagram representing components (squares) and providers (line with a circle) and consumers (line with a cup) of different Risk Manager APIs.
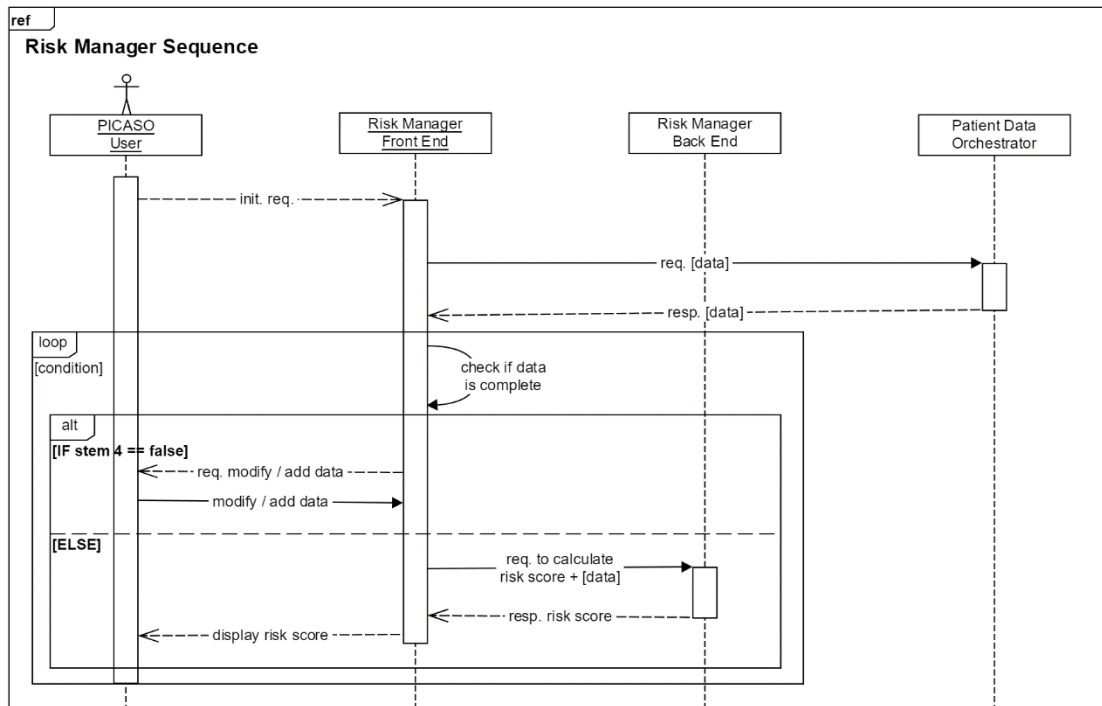
3.2.3 Use case/sequence diagram

Figure 4 Risk Manager risk score calculation sequence diagram
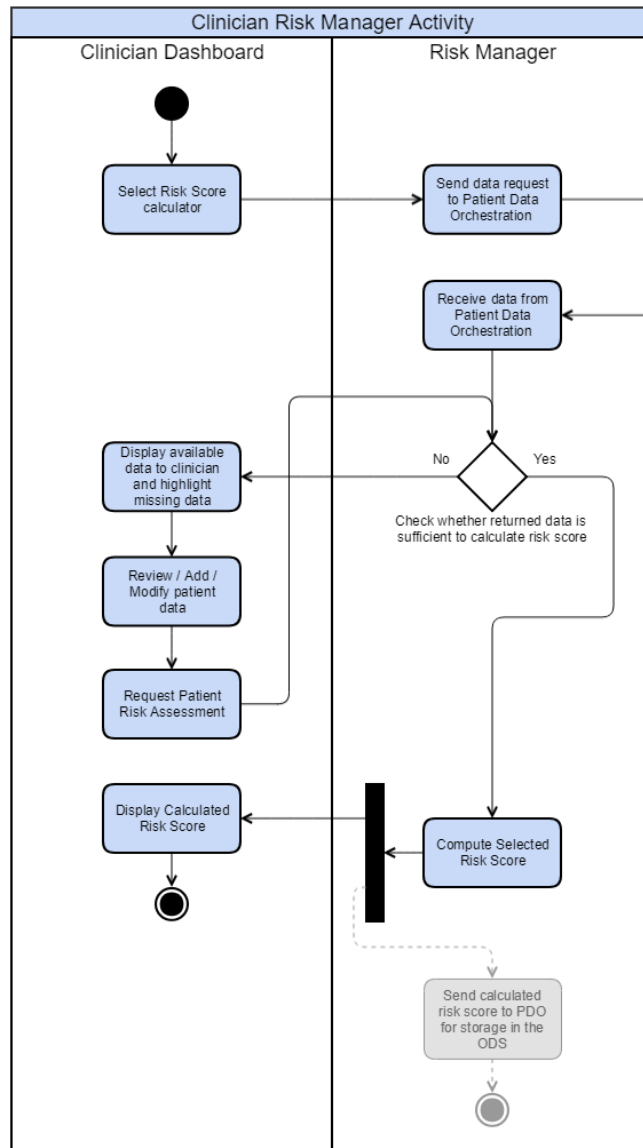
3.2.4   Activity Diagram

Figure 5 Risk Manager Activity Diagram

4   Integration mechanism components

The integration mechanism components enable integration between PICASO clouds. Thus, secure data exchange is possible between private and public clouds by employing services of these components.

4.1   Local / Public Access Managers

4.1.1   Description

The Local Access Manager (LAM) and the Public Access Manager (PAM) are components developed to ensure a secure connection to PICASO Public Cloud as well as communication between Public and Private Clouds. The network architecture of LAM component has been modified in the UDUS Cloud Instance to accommodate configurational differences between two locations. In UDUS Local Cloud Instance, the Internal Local Cloud components are connected to the same ethernet card as the incoming connections from the PAM. This modification did not change overall architecture and is in line with all functional and non-functional requirements.

4.2   Identity Manager

4.2.1   Description

The Identity Manager (IM) ensures that all actors are identified and authenticated while accessing PICASO services and that access to data is gained only if all necessary requirements are met. Since *D7.4 First Private and Public Cloud* a new API has been added to the Identity Manager (IM) component enabling an easier way to modify access credentials. Current configuration is described by Use Case diagram and Sequence Diagram below.

4.2.2   Use case Diagram

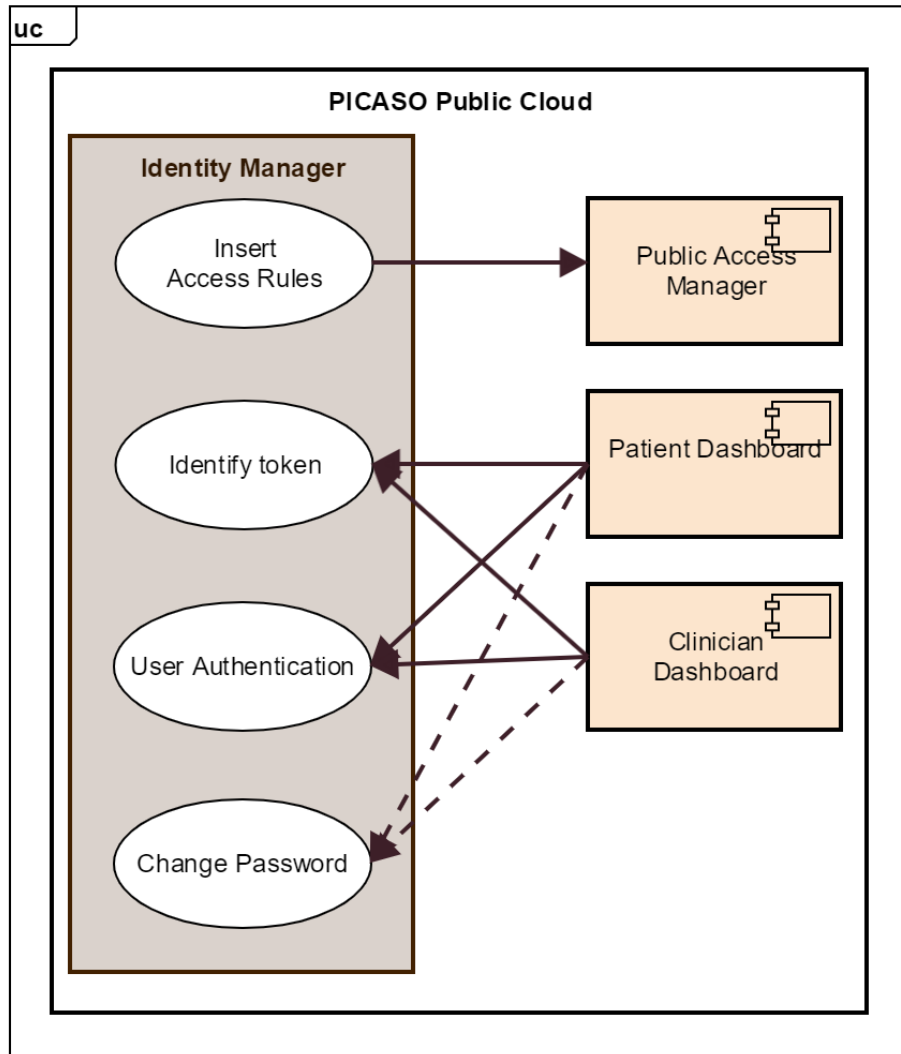**Figure 6 the new functionality to change password**

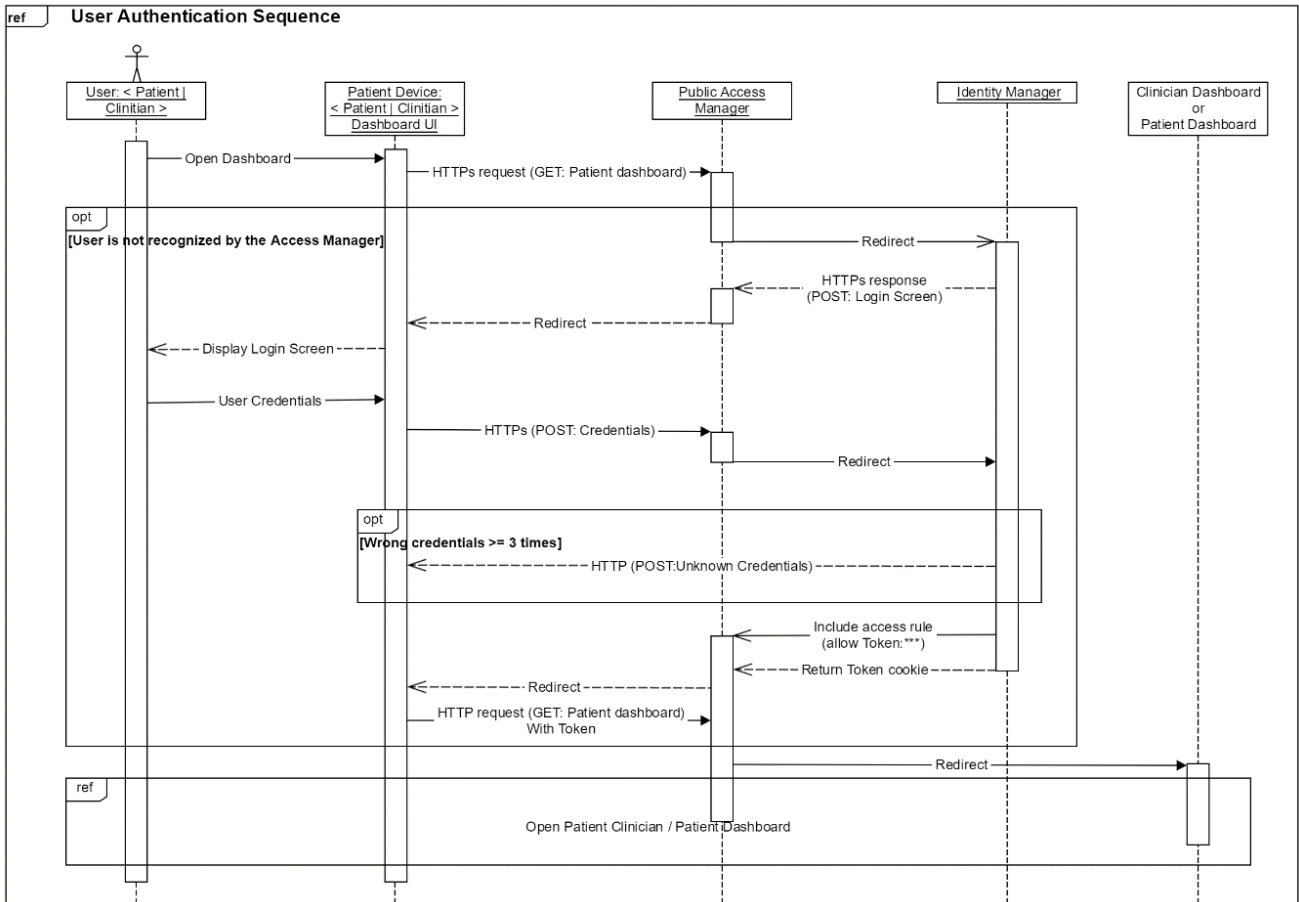### 4.2.3   Sequence diagram

Figure 7 User Authentication Sequence from IM point of view

4.3   Policy manager

4.3.1   Description

The Policy Manager (PM) enables check and manage consent policies. Since *D7.4 First Private and Public Cloud Integration* the component had multiple optimization updates, not functional changes, however multiple administrative tools have been developed to assist the lifecycle management. Tools include automated crash recovery and dummy execution tools for testing new updates.

These new tools support smooth integration updates and gives more robustness to the integration mechanism of PICASO Public and Private Cloud.

5   Conclusion and future work

The second version of Private and Public Cloud Integration is supporting the current PICASO Trials. This state is documented in more PICASO deliverables. Namely, D7.4 (previous version). D5.6, D6.1, D6.5, D7.6 and D7.8. Section 2 of this deliverable provides mapping of the components with their (currently) valid description. Such description gives integration aspects of Public and Private Cloud (scope of this deliverable). As this second version of deliverable is last in the series, all future configuration changes related to the integration aspects in scope of this deliverable will be covered in upcoming PICASO deliverables (such as D4.6, D5.7, D6.4, D6.6, D6.7 and D7.9).

6   List of Figures