ISA: Intelligent Service Adder v.1
User's Guide

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1 Introduction

In this document we explain the tool ISA, which stands for *Intelligent Service Adder*. This tool facilitates to a medical specialist to introduce to the K4CARE Actor Profile Ontology (APO) the knowledge about new care units, like Rehabilitation or Oncology. ISA guides the user during the all the process in order to avoid the possibility of having an incomplete, incoherent or redundant definition of the new concepts.

Before starting to use ISA, the user must know the structure and contents of the APO ontology that describes the Home Care Nuclear Services (HNCS). See [1] to obtain these details.

The APO contains the skills, concerns, aspirations, etc. of the people that they represent together with the healthcare services that those people offer to or receive from the K4CARE model (e.g. medical services such as drug prescription, clinical consultations, laboratory analysis; social services such as counselling, information, advice, social support).

To have a basic idea of the APO structure, Figure 1 shows a view of the APO using the Protégé tool for developing ontologies. The main concepts are the following:

- *Service*: a home care activity that involves the work of one or more home care actors in a coordinated way.

- *Action*: represent the single steps that should be done to perform a service.

- *Procedure*: the representation of the way a Service is provided in terms of the available Actions and the rest of services.

- *SDA*: corresponds to the graphical notation of procedures, detailing the sequences of states, decisions and actions.

- *Entity*: is subdivided into two main classes. One class (*Actor*) classifies all the single Actors (e.g. patient, stable members as the nurse, the physician in charge of the patient, the head nurse, the social worker and the family doctor, and additional care givers). The other class (*Group*) classifies the sorts of working teams with specific health care liabilities. *Entities* store information about the services that they can initiate and the actions that they can perform.

- *Document*: store information in any action. Can be read or write depending on the permissions of the different types of actors.

- *CareUnitElement*: the basic care unit is called HCNS (Home Care Nuclear Service), however, other additional care units (HCAS) can be considered.

Those concepts have multiple relations between them. Moreover, some of them are refined into more concrete subclasses, forming hierarchies of different depth (see Figure 2). In order to keep help the user, the ISA tool forces an order of definition of the different concepts in the domain. By forcing that order, the system is able to assure that the user do not miss any important information, and also auto-completes the relations that can be automatically deduced, reducing the amount of work of the user.
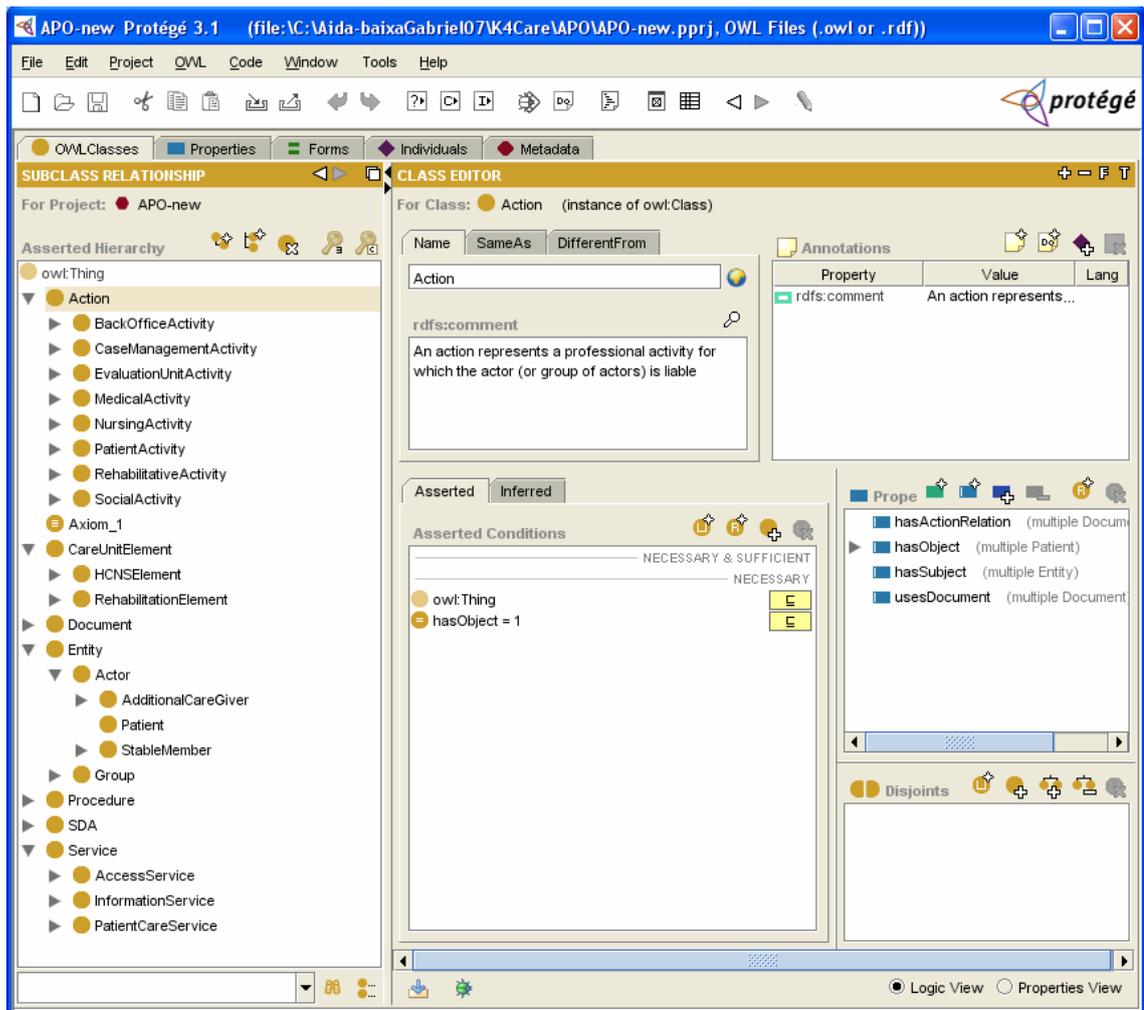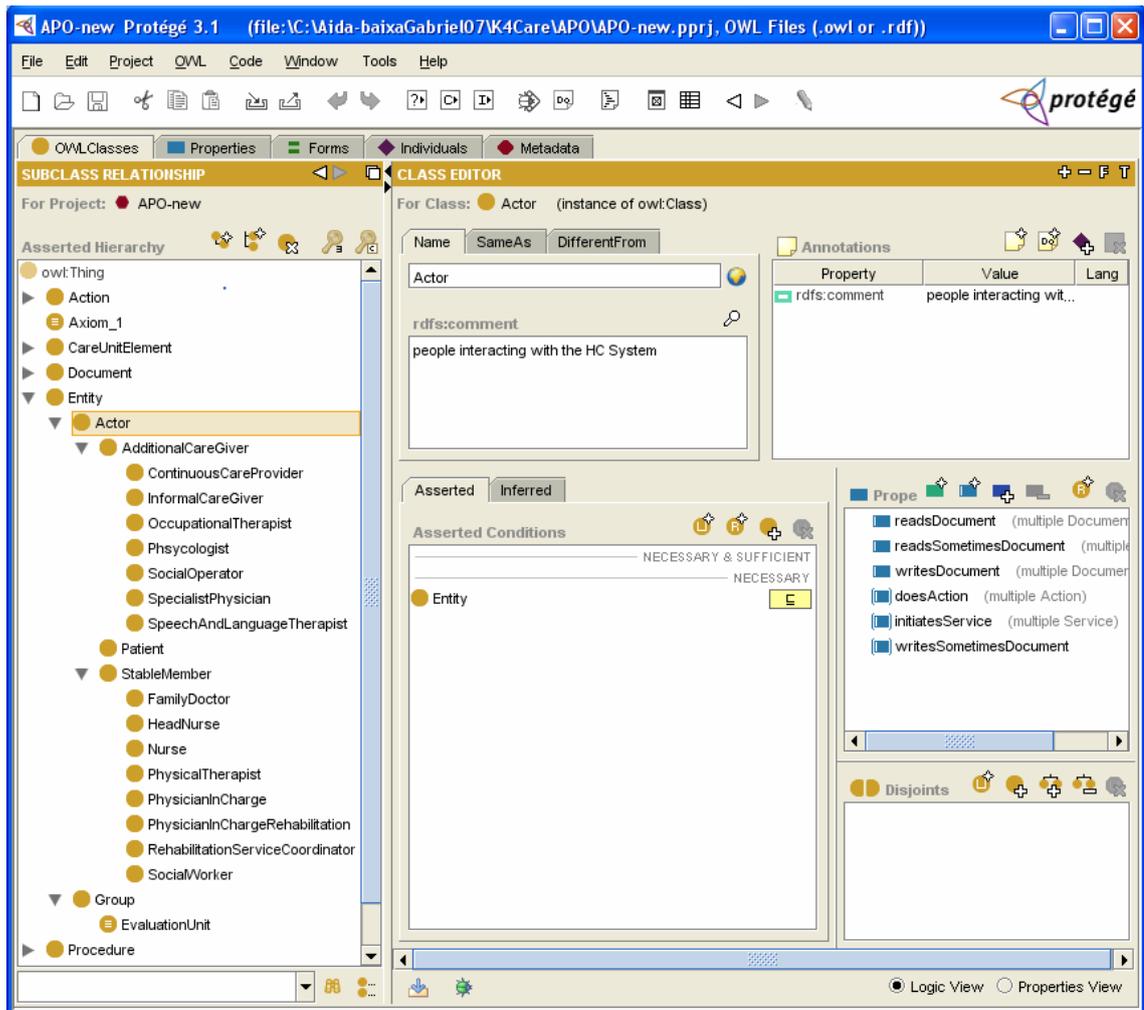

Figure 1 APO ontology

Figure 2 Entity hierarchy

2 System Requirements and Installation

ISA is written in Java, so it is compatible with any operating system. The only software requirement is to have installed a Java Runtime Environment (JRE), which can be downloaded from: http://java.sun.com

To install the tool, the "ISA-K4CARE.rar" file must be decompressed. ISA needs 16Mb of empty space. To run the system, just execute the file "ISA.bat".

3   Starting

When the ISA system is started, first the presentation window is shown. Figure 3 shows the ISA presentation window.
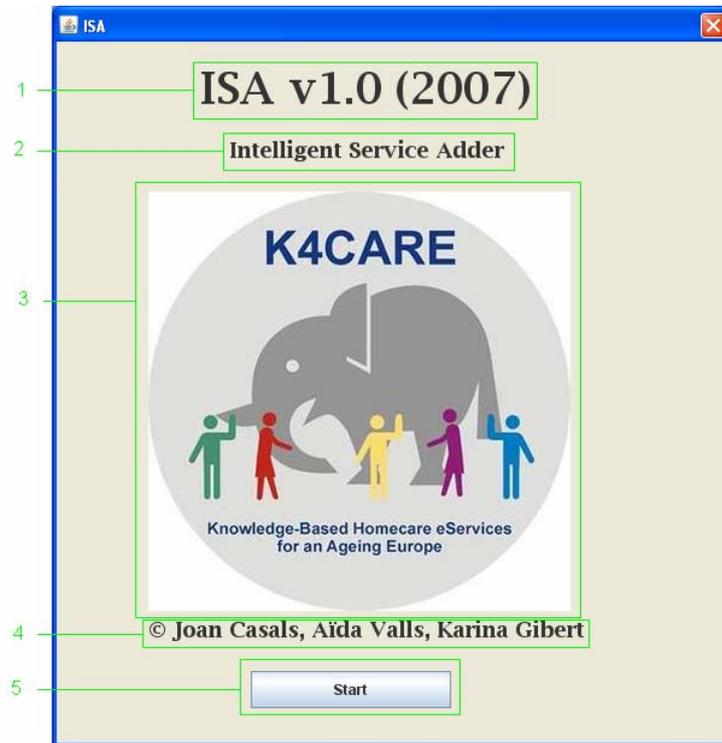

Figure 3 Presentation window

Elements details:

1. ISA version.

2. ISA name.

3. K4CARE logo.

4. ISA authors

5. To start, this button should be clicked; the user will go to 4.

4   Existing Care Units

The main window presents the existing care units and allows to the user to look them or to create a new one.

In the APO version 1, the user can find the description of the nuclear services in HCNS and the services related with Rehabilitation. This will be taken as a reference for the examples in this manual.
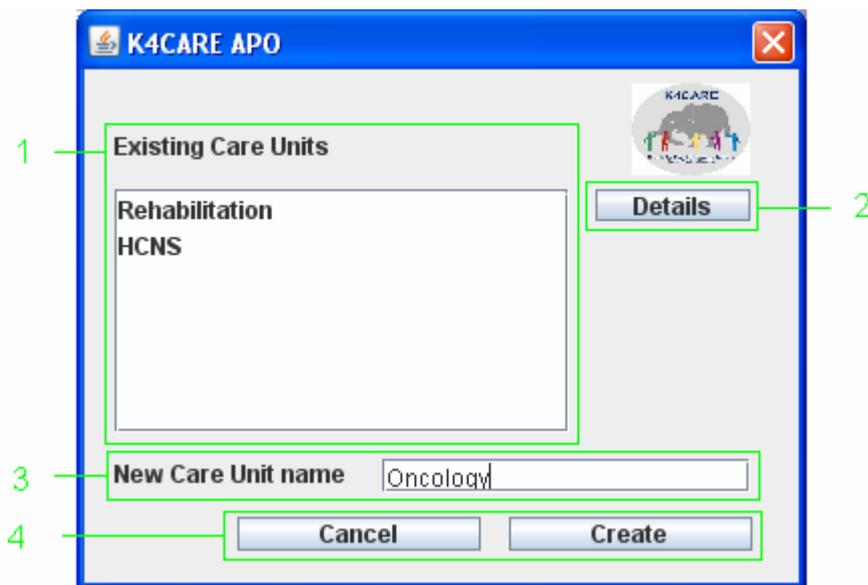

Figure 4 Existing care units window

Elements details:

1. Here the existing care units are shown.

2. If clicked it will show the details selected care unit details (See 5).

3. Here is indicated the name of the new care unit to create.

4. These buttons allow to 'accept' or to 'cancel' if the user wants to create a new care unit with the specified name or if he wants close the system, respectively. If clicked 'accept' the user will go to 6.

5   Care unit details

The window presented in the Figure 5 allows to the user to see all the services defined for a concrete care unit. Then the user can select any service (like Consultation in Figure 5) and obtains the information about the people capable of initiating that service (FamilyDoctor in this example), and the list of actions that belong the corresponding procedure[1]. If an action of this list is selected, ISA shows the actors that can perform the action and the associated documents.
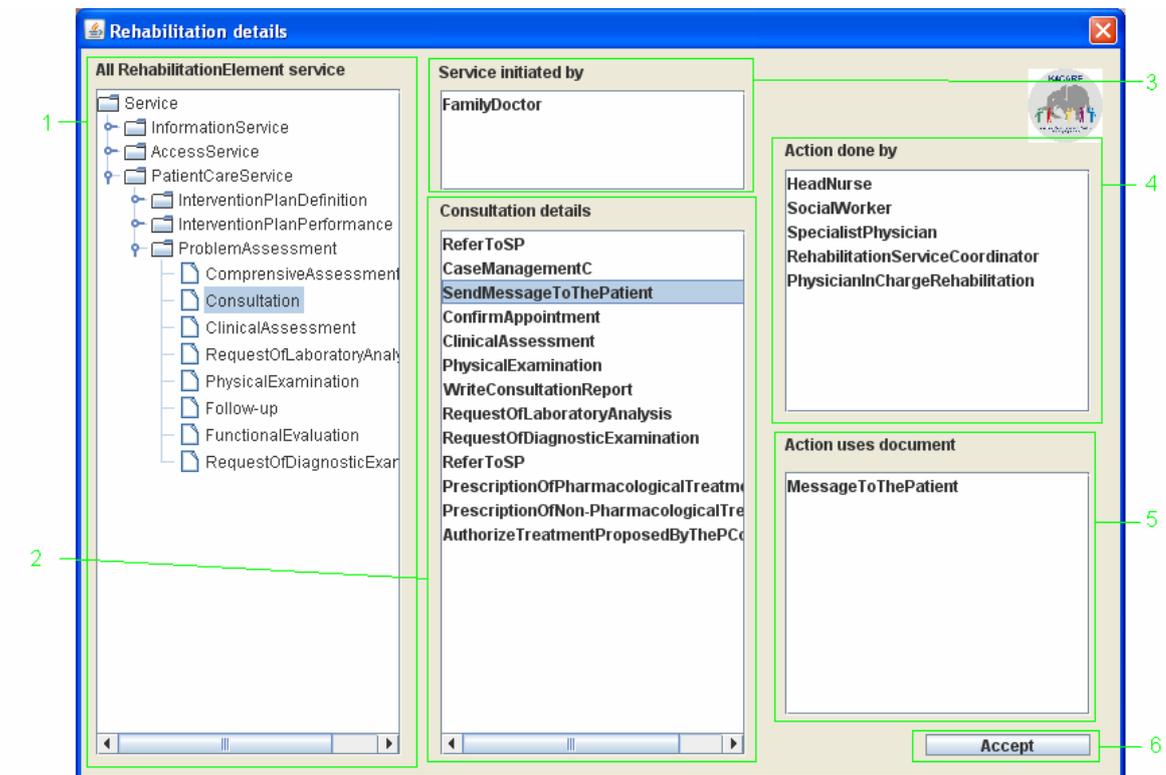

Figure 5 Service details window

Element details:

1. Here are presented all the services of the care unit.

2. This is the list of steps needed to perform the selected service.

3. Here is presented the list of service initiators.

- [1] This is only a list of steps without any order. The order between them must be indicated using the SDA* notation.

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4. Here are presented the actors that can perform the selected action.

5. Here are presented the documents used by the selected action.

6. When accept is clicked, the user returns to the 'create care unit' window.

6 New care unit services

The first step in the definition of a new care unit is the identification of it services, for this reason, this is the first thing that ISA requests to the user.

To define the services, the system shows all the existing services of one type (access, patient care or information), and allows the user to decide which ones can be reused. This window also permits to define new services. Once defined all the services of one type, the user may click the button 'next' and continue with the definition of another group, until all the service types are treated.
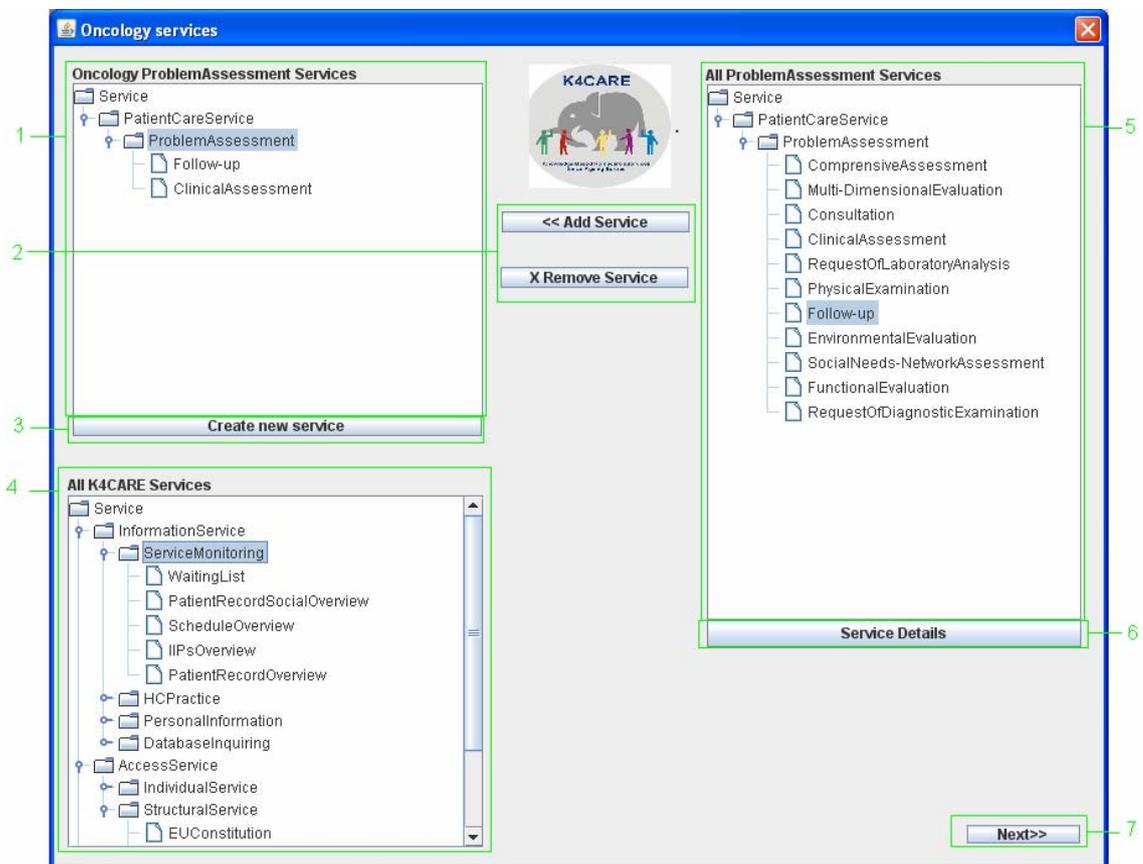

Figure 6 New care unit services

Elements details:

1. The tree shows the set of services of a concrete type which belong to the new care unit. Those services can be reused from the ones previously existing in another care unit, or they can be created from scratch.

2. With the use of these buttons the user can add or remove existing services from '5' to '1'.

3. Clicking this button the user can create a new service.

4. This tree shows all the K4CARE services.

5. Here are shown all existing K4CARE services of a concrete type.

6. By clicking this button the user can observe the details of the selected service (See 13).

7. By clicking this button the user will go to the definition of a new type of services.

7   Create Action

Actions are the basic elements of the services. Each action needs at least one actor that is able to perform it. One or more documents can be created and used in the execution of an action. The actors and documents are linked to actions in the definition of Procedures.

To begin the definition of an action the user must indicate its name and classify it into the hierarchy of actions. ISA provides the window shown in Figure 7. This window allows to the user to create new actions and new groups of them, in order to enhance the hierarchy of actions.
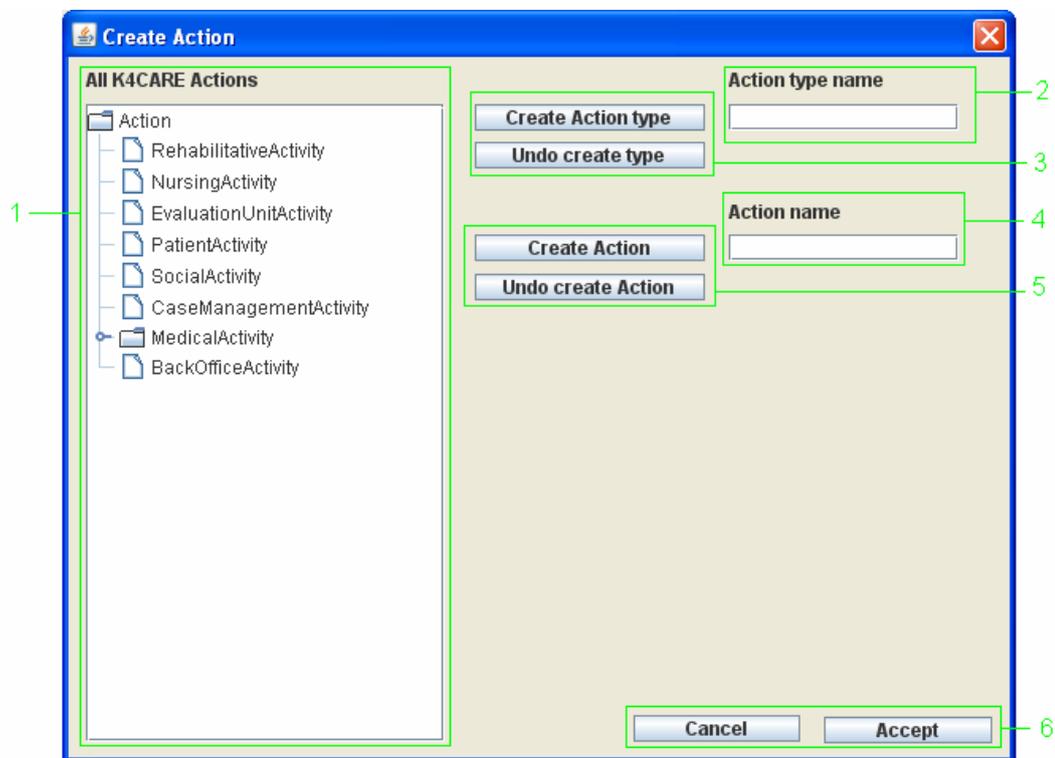

Figure 7 Create action window

Elements details:

1. This tree organizes all the types of actions defined inside the K4CARE model.

2. If the user wants to create a new action group, with the use of this textbox, he can introduce the name of it.

3. Those buttons allow to the user to create or eliminate an action group. Note that an action group previously defined can not be removed.

4. This text box allows to the user to introduce the name of the new defined action.

5. Those buttons allow to the user to create or eliminate an action. Note that the user can not eliminate the previously defined actions.

6. With this buttons the user can accept or decline the changes performed.

8   Create Actor

When the creation of an actor is needed, the window shown Figure 8 is used. This allows choosing the type of the Actor, and its name. If the type Group is chosen, the following step require to the user to detail which are the group members.
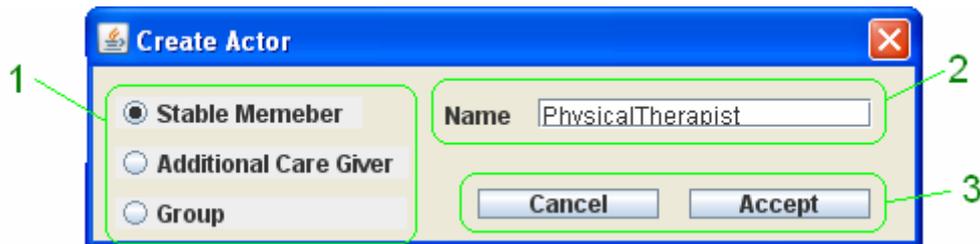

Figure 8 Create actor window

Elements details:

1. These radio buttons allow choosing between to create a 'stable member' an 'additional care giver' or a group of Actors.

2. Here the name of the new actor may be introduced.

3. These buttons allow to 'accept' or to 'cancel' if the user wants to validate the introduced Actor or if he wants to decline the introduction, respectively.

The Figure 9 shows the window that allows the user to define which are the members of the new created group.
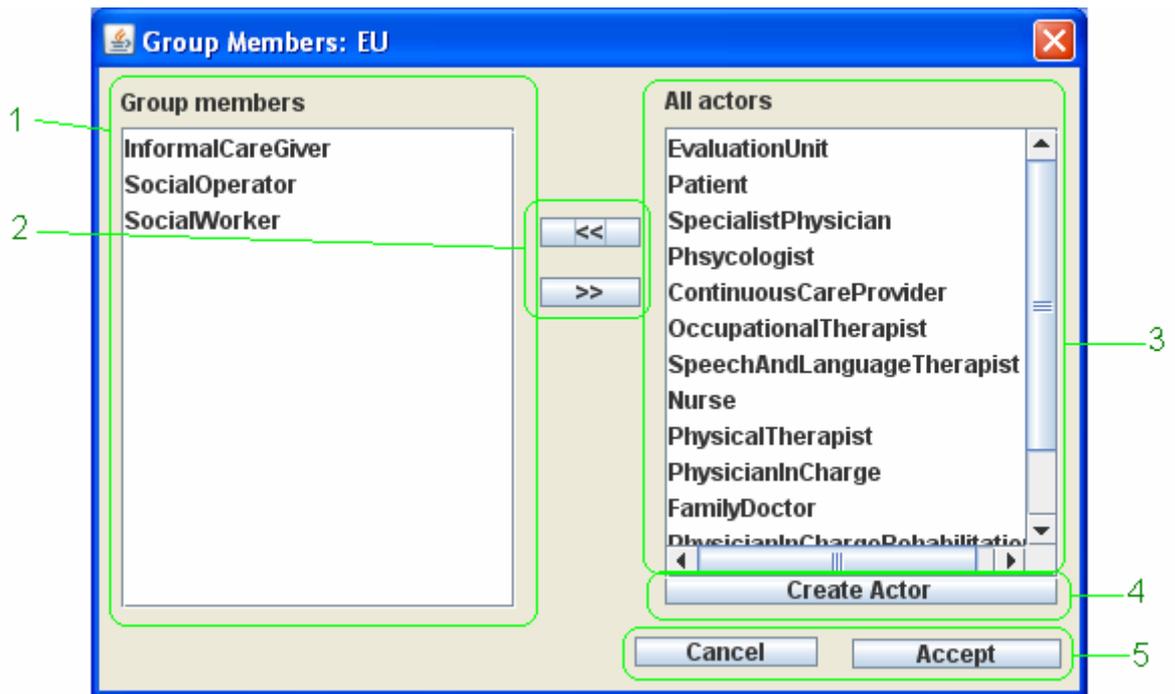
Figure 9 Group members window

Elements details:

1. Here is shown the list of actors that form the Group.

2. These buttons allow adding or removing the group members. The button <<
   adds new Actors and the button >> removes Actors.

3. Here is shown the list of all K4CARE actors.

4. By clicking this button the user can create a new actor that will be added to the
   Group.

5. These buttons allow to 'accept' or to 'cancel' if the user wants to validate the
   introduced Actor or if he wants to decline the introduction, respectively.

6. Allows to create a new K4CARE actor, it drives the actor to the window shown
   by Figure 8.

9   Create Document

To create a new Document, the system shows to the user the window presented in the Figure 10. This window allows choosing between the creation of a 'patient care document', an 'access service document' or an 'information service document'.
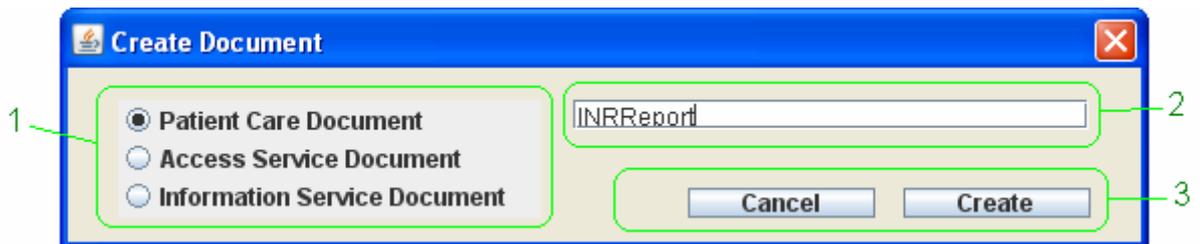

Figure 10 Create document window

Elements details:

1. These radio buttons allow choosing between the creation of a 'patient care document', an 'access service document' or an 'information service document'.

2. Here the name of the new Document may be introduced.

3. These buttons allow to 'accept' or to 'cancel' if the user wants to validate the introduced Document or if he wants to decline the introduction, respectively.

10 Create Service

It allows the user to introduce the service name, the Actors that can initiate it, and the different steps (Actions and/or Services) that compose it.
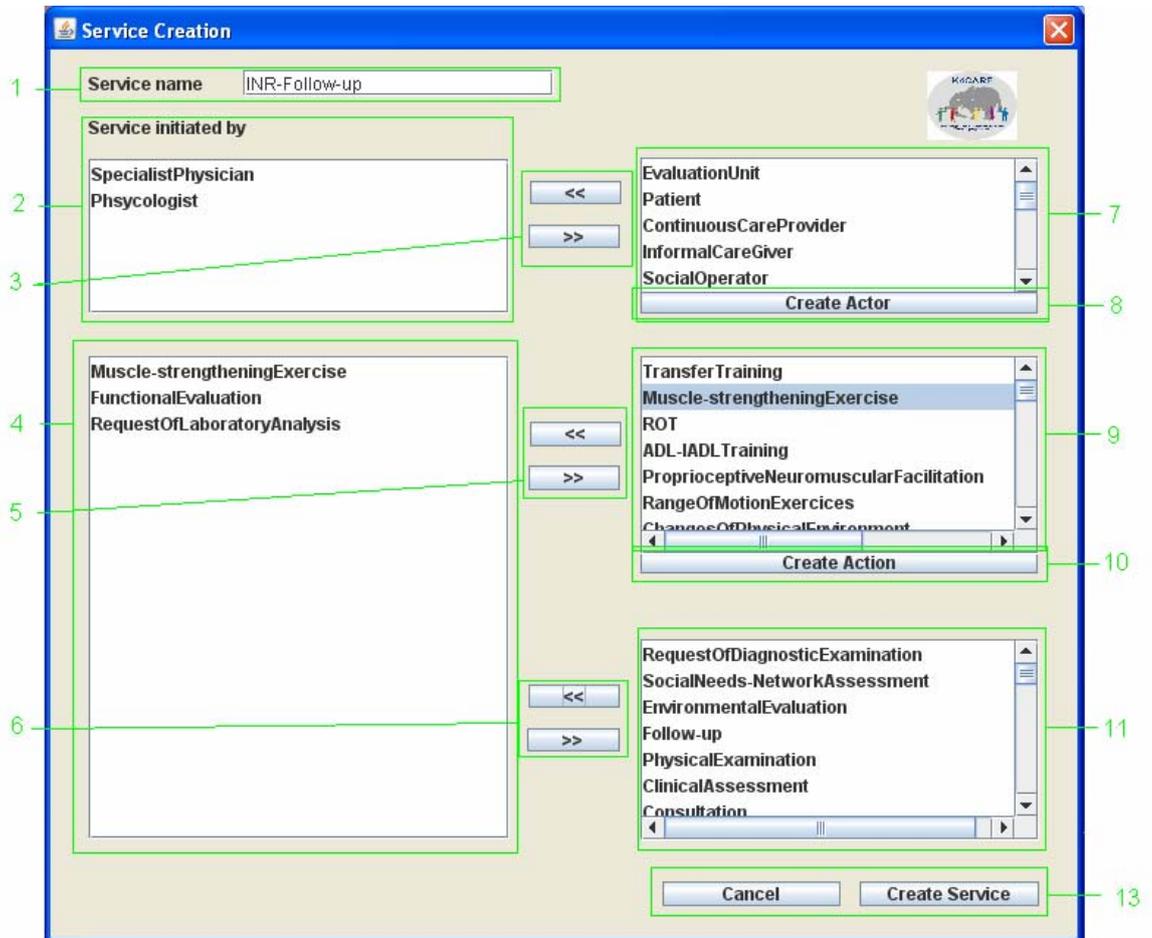

Figure 11 Service creation window

Elements details:

1. Here the user has to introduce the name for the new Service.

2. Here the system shows the different service initiators.

3. By the use of the '<<' button the selected Actor in 7 is added to the service initiators and by clicking '>>' the selected actor in 2 is removed from the set of service initiators.

4. Here are shown the set of steps that should be done to perform the Service.

5. With the use of these buttons the user can add an action from 8 to the service procedure by clicking '<<' (This will show a new window (see Section 10) to detail the action and can remove actions by clicking '>>'.

6. With the use of these buttons the user can add services from 9 to the service procedure ('<<') and can remove services from it, by clicking '>>'.

7. This shows the list of all K4CARE Actors.

8. By clicking this button the user can create a new Actor (See 8).

9. This shows the list of all K4CARE Actions.

10. By clicking this button the user can create a new Action (See 7).

11. This shows the list of all K4CARE Services.

12. Finally the user can create the service by clicking 'create service' or decline its creation by clicking 'cancel'.

11 Create Procedure

A new procedure is needed for new services or for existing services that are reused but that have some differences in the procedure for the new care unit. The window shown by Figure 12 allows the user to define new procedures. During the Procedure definition, the user can detail which are the steps that compose it and which are the actors and documents needed.
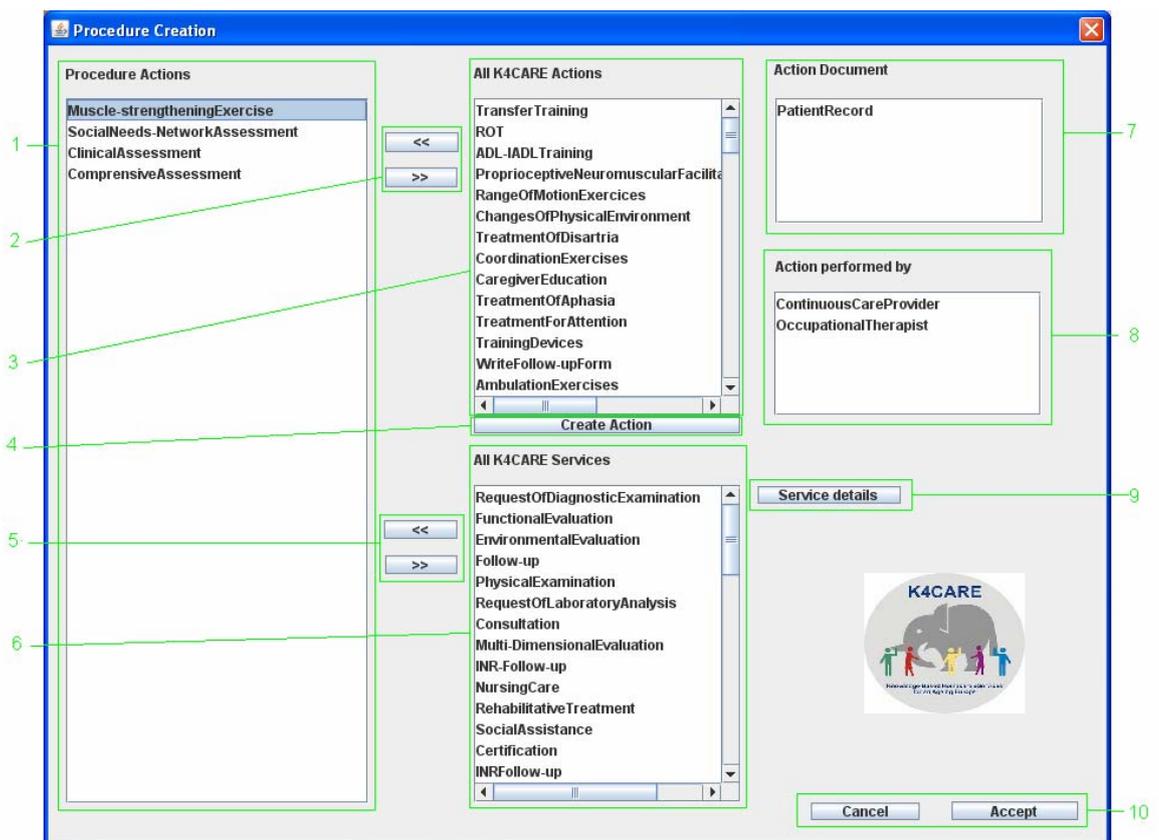

Figure 12 Procedure creation window

Elements details:

1. Here are shown the steps that are part of the procedure.

2. With the use of these buttons the user can add an action by clicking '<<' (This will show a new window (see Section 10) to detail the action) and remove an action from the list by clicking '>>'.

3. This list shows all the K4CARE defined Actions.

4. By clicking this button the user can create a new action. Details in Section 7.

5. With the use of these buttons the user can add a service to the procedure ('<<') or remove one of it ('>>').

6. This list shows all the K4CARE services.

7. This list shows all the documents used by the step selected in the list of procedure actions (1).

8. This list shows all the Actors that can perform the step selected in the list of procedure steps (1).

9. By clicking this button the user can observe the details of the selected service. Details in 13.

10. Finally the user can validate the procedure by clicking 'accept' or decline it by clicking 'cancel'.

12 Action details

The window shown by Figure 13 allows the user to indicate which Actor performs an Action inside a service and which document uses.
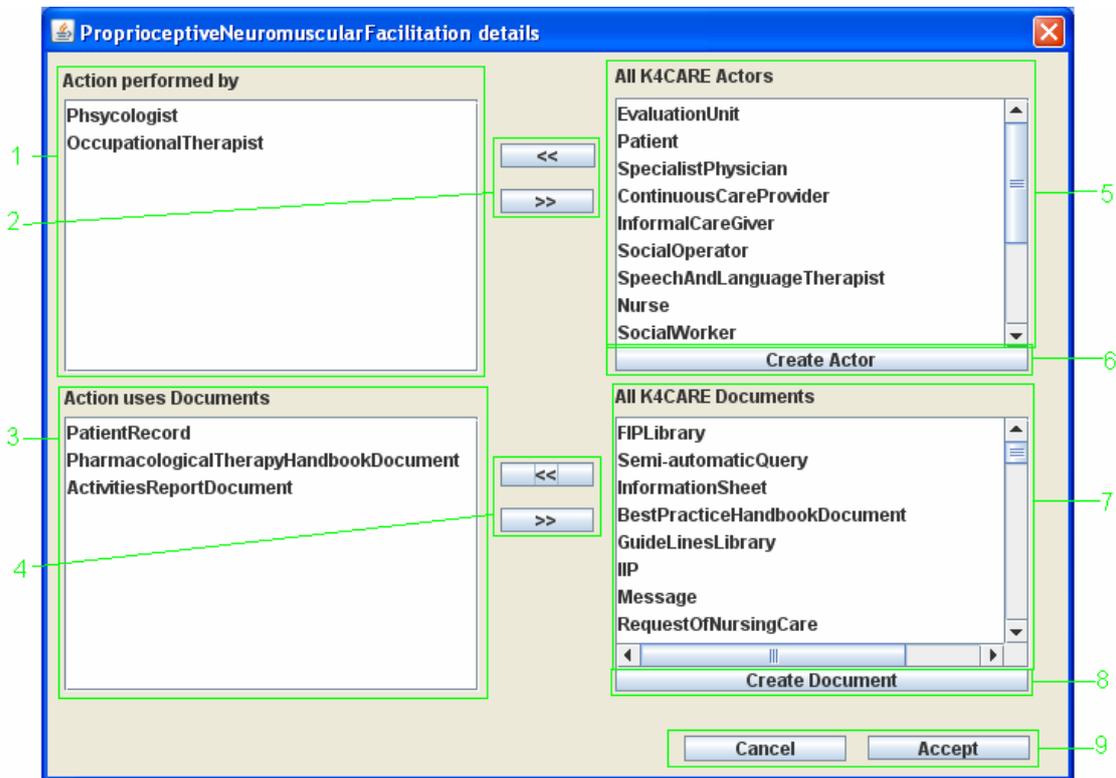

Figure 13 Action details window

Elements details:

1. Here is shown the list of Actors that can perform the Action.

2. With the use of these buttons the user can add Actors ('<<') or remove them ('>>') from the list of Actors (1).

3. Here is shown the list of documents used by the Action inside the Process.

4. With the use of these buttons the user can add Documents ('<<') or remove them ('>>') from the list of Documents (3).

5. The list of all K4CARE Actors.

6. This button allows creating new Actors (See 8).

7. The list of all K4CARE Documents.

8. This list allows adding new Documents (See 9).

9. Finally the user can validate the Action details ('accept') or decline them ('cancel').

13   Service details

The window presented in Figure 14 allows to the user to look the different procedures that are related with a service.
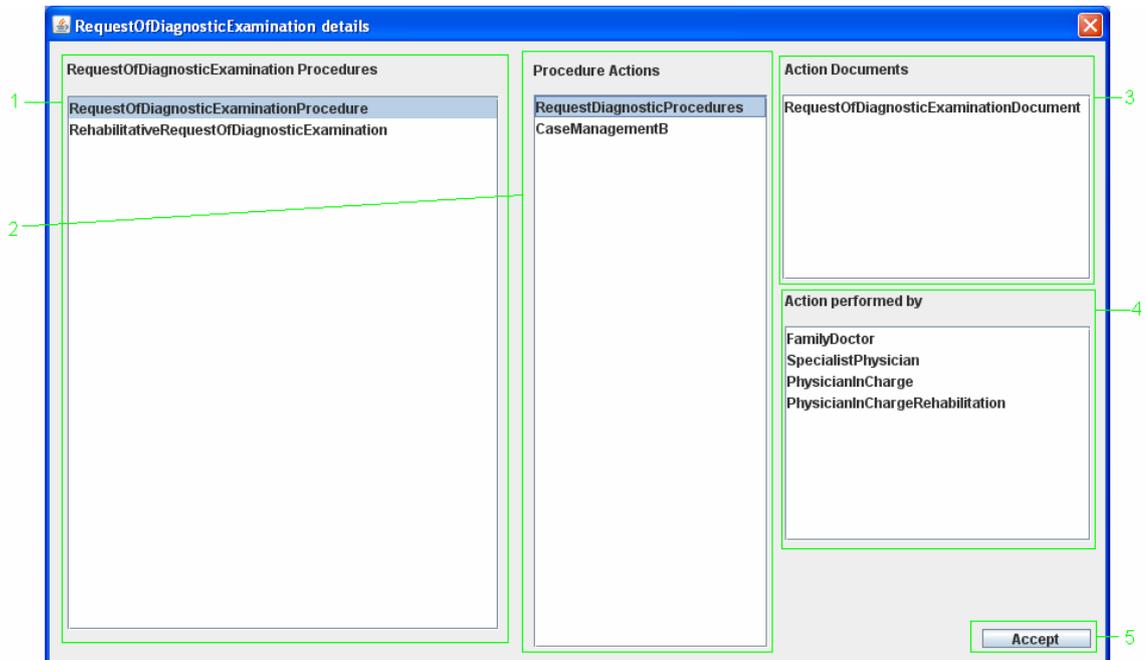

Figure 14 Service details window

Element details:

1. Shows a list that contains all the procedures of the service.

2. This list shows all the steps of the selected procedure in 1.

3. This is the list of documents used by the selected action in 2.

4. This is the list of actors that can perform a concrete action selected in 3.

5. When the user has validated the details of the service, he can close it by clicking the 'accept' button.

14 References

[1] Casals, J., Master Thesis, *European HC model, Design and Implementation of the APO*, Master in Artificial Intelligence, Universitat Rovira i Virgili, Tarragona, June 2007.

[2] Casals, J., Gibert, K., Valls, A., Enlarging a medical actor profile ontology with new care units, Workshop From Knowledge to Global Care, *11th. Int. Conference on Artificial Intelligence in Medicine*, Amsterdam, The Netherlands, July 2007.

[3] Casals, J., Gibert, K., Valls, A., *Deliverable DO4.1: Sample APOs*, K4CARE document (first version), March 2007.