Design Document - Competence-based Adaptation Component

TUGraz – T3.4C – Apache 2.0 – Client side

About this component

This component will be implemented as client-side component. It decides for a given domain model and a given competence state on how the game should proceed (expressed as next game situations, represented by identification strings). The component architecture will prevent multiple component creation; only one component per game is needed.

Component mechanics

A structure of game situations, consistent of a stating game situation and possible successors, are used to identify the next game situation most suitable for the player. A mapping between game situations and competences (located in the domain model) is used to calculate the distance between the current competence state of the player (gained from the competence assessment component) and the game situations. This could for example be: Number of competences in the game situation not possessed by the player, if there are some and Infinity otherwise. A game situation with the shortest distance is recommended to be presented next.

Component interfaces

- The current and next game situation identification string can be requested from the component. A C# representation in the component interface could be:

  string getNextGameSituationId()

  string getCurrentGameSituationId()

- The player performance within the game situation can be submitted as success/failure:

  void setGameSituationUpdate(Boolean success)

Component dependencies/requirements

- The Domain Model Component supplies the game situations used for the decision of which one of them should be next for a player.
- The Competence Assessment Component is used to retrieve the current competence state of a player. Milestone s

Milestone 1

- t1.1: Creating the first version of the design document, defining the API and creating a dummy component with the API implemented

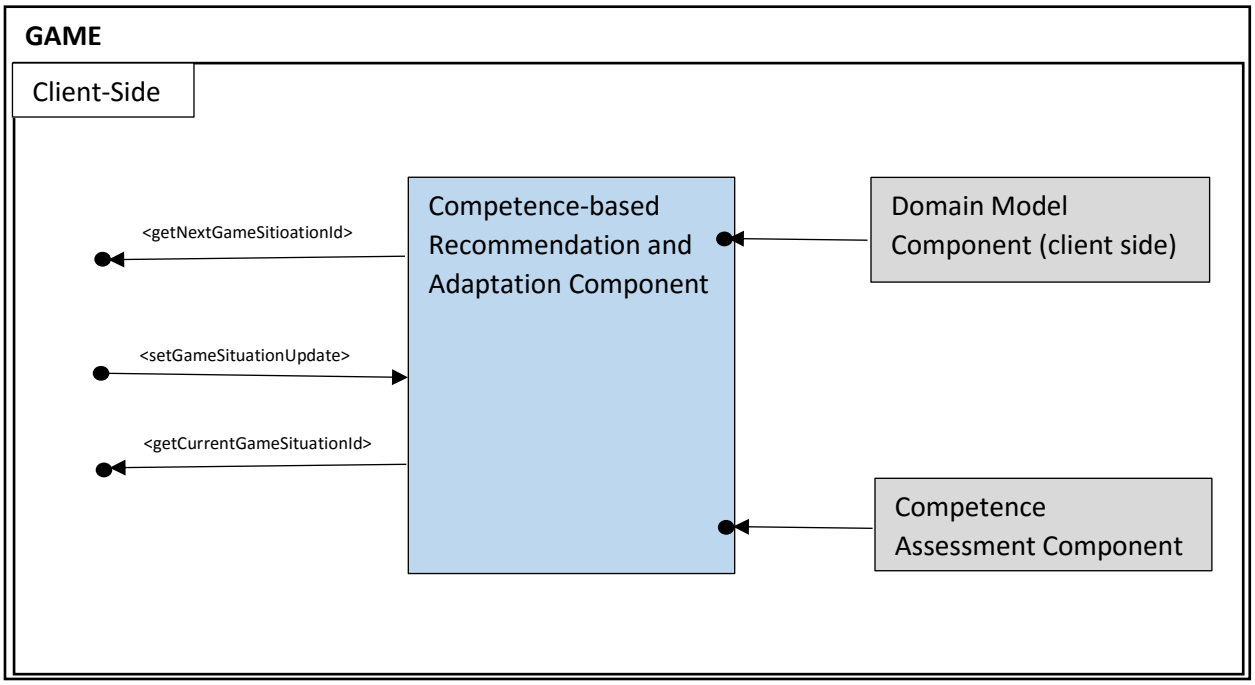
Milestone 2

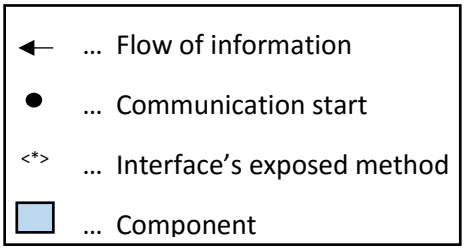
- t2.1: Create Software component in line with Component-Manager infrastructure.
- t2.2: Elaborate Settings-structure within the Component-Manager infrastructure.
- t2.3: Include tracking functionality.

Milestone 3

- t3.1: testing the component with a game
- t3.2: instructions and scripts for building and deploying

Graphical representation





Set up the Component

For the Competence-based Adaptation Component, there are two thing to do (additionally to creating the component) when setting it up:

- The Domain Model Component and the Competence Assessment Component need to be in place, supplying a domain model and a competence state.

Use the Component

The component recommends the next meaningful game situation in terms of learning.

- It is possible to request the next meaningful game situation, represented as an id string:

```
CompetenceBasedAdaptationAsset caa = CompetenceBasedAdaptationAsset.Instance;
String nextGameSituationID = caa.getNextGameSituationId();
```

- The current game situation can be requested:

```
String curGameSituationID = caa.getCurrentGameSituationId();
```

- A game situation can be completed successfully or not. This information can be returned to the component via the following method:

```
caa.setGameSituationUpdate(true);
```

Deployment

For the source code the following GitHub-link can be used https://github.com/RAGE-TUGraz/CompetenceBasedAssets - it contains the Visual Studio solution of the competence based component. Furthermore, the broken links to external component DLLs need to be fixed for each project and the Bridge code need to be adopted to the new environment, e.g. changing the IDataStorage path.

For integration into Unity, the resulting DLLs need to put into a folder in the Unity working-directory.

Unit test

For executing unit tests, the source code need to be open in visual studio and all links need to be fixed. In the test-explorer all tests can be executed.