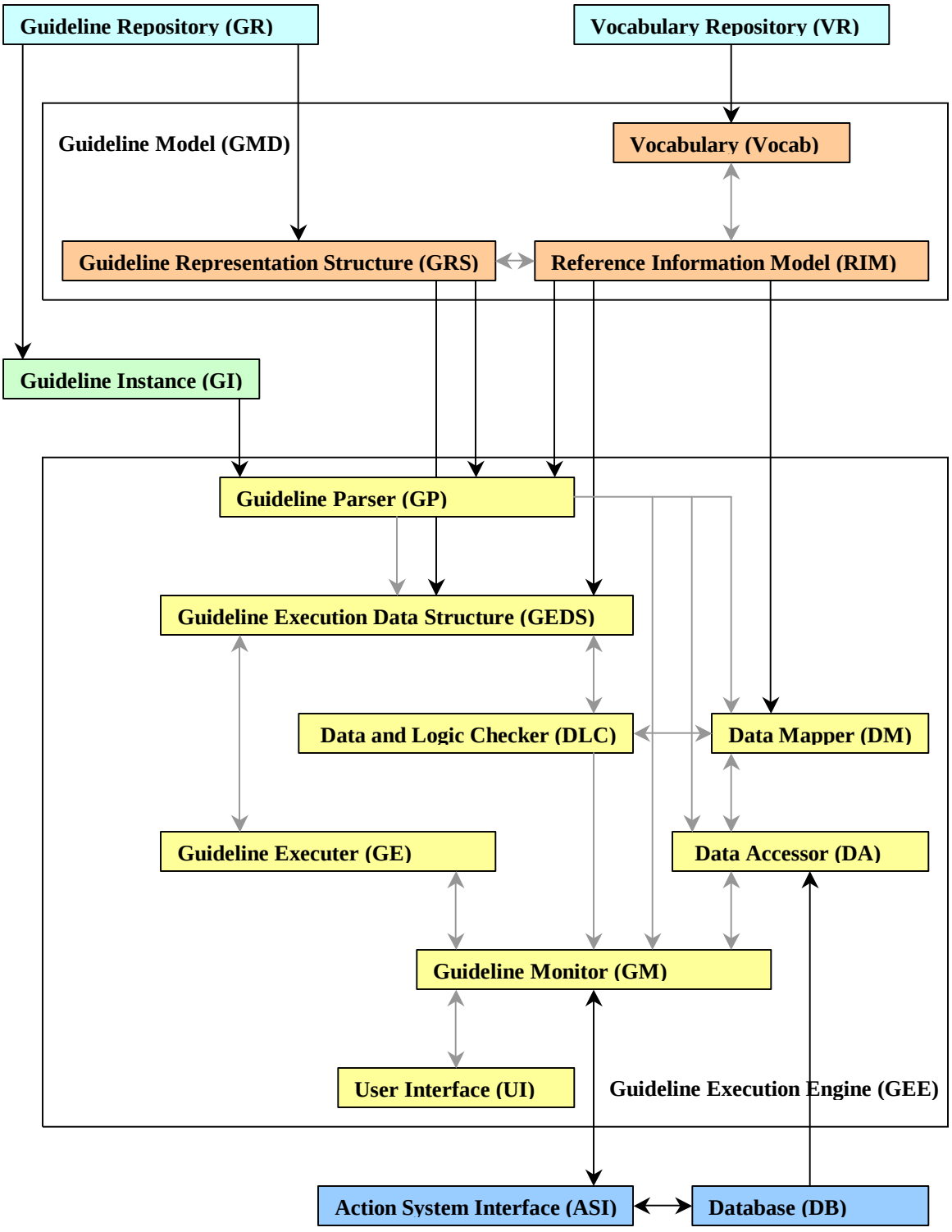
Specification for the Guideline Execution Engine (GEE)

System Architecture



Guideline Representation Assumptions

- Guidelines are represented in GLIF format.
- To facilitate development and revisions of GLIF specification, the GEE will process the GMD and the GI separately. For this purpose, the GR should provide both the GMD and the GI.
- Guideline execution should be based on categories of guideline steps. For the current version of GLIF specification, we should support execution for action steps, decision steps, patient state steps (It doesn't need explicit execution but only an internal state to facilitate other functions such as entry and exit point of guideline, logic completeness and consistency checking, etc.?), branch steps, and synchronization steps, including specializations (descendants) of these steps. Considering that we separate the GMD and the GI representation, we can support execution of guidelines even the representation model is changed, as long as we modify the correspondent definitions of the GEDS. This approach is based on knowledge engineering methodology that separates tasks, domain ontology and problem-solving methods.

System Design and Functional Requirement

Guideline Model (GMD)

- The GMD consists of the GRS, which we called core GLIF model in GLIF specification but in general can be any guideline representation model, the RIM and the Vocab.
- The GRS is retrieved from the GR for a specific GI. The Vocab is retrieved from the VR. The RIM is also based on some standards. (Can the RIM and the Vocab been combined in some standard vocabulary stored in the VR?)

Guideline Instance (GI)

- The GI is retrieved from the GR. The correspondent GRS, RIM and Vocab are also retrieved to form the GMD.

Guideline Execution Engine (GEE)

- The GEE consists of the GP, the GEDS, the DLC, the DM, the DA, the GE and the GM.
- The GP will parse the GI according to the correspondent GRS, RIM and Vocab. Based on this parsing, the GP will instantiate the GEDS, the DM and the DA. The state of the parsing will be feedback by the GM to the user through the UI.
- The GEDS is an internal structure that provides the workflow of the guideline, represents the data and other aspects of the guideline. It will be used by the DLC for data and logic checking and by the GE for guideline execution.
- The DM provides an internal representation of data based on the GRS, the RIM and the Vocab. It will be used by the DLC for data and logic checking and by the DA for data accessing.
- The DA provides an internal connection between the nominal data represented in the guideline and the real data stored in the local DB based on the data representation in the DM (for example, using ODBC/JDBC, RIM and Vocab to realize mapping to local DB?). It will be used by the GM for data accessing and by the DLC for data and logic checking.
- Before execution of the guideline, the DLC will perform data and logic checking, using the GEDS, the DM and the DA in the process of the checking. These checking include, 1) data type and range checking, and 2) logic completeness and consistency checking. The state of the checking will be feedback by the GM to the user through the UI.
- After data and logic checking, the GE will retrieve the guideline steps within the GEDS according to the flow of these steps, and execute guideline steps according to a set of predefined rules. For current version of GLIF, the following rules will apply, 1) one by one for those steps in a sequence (steps out of any paths between a branch step and a synchronization step), 2) simultaneously for those steps in parallel (steps within some path between a branch step and a synchronization step) (for implementation purpose may select a random sequence), and 3) let user select the order for those steps at any order (steps within some path between a branch step and a synchronization step). The state of the execution will be feedback by the GM to the user through the UI. When the

execution needs communication with local environment, the GE will send and get information to/from the GM, which will then communicate with the local environment through the DA (for data access), the UI (for direct communication with user) and the ASI (for other communications).

- The GM provides communication between the GEE and the local environment. Data access in the process of guideline execution is through the DA. Direct communication with user such as feedback of execution and direct data input (for example, confirming the completion of an action) is through the UI. Other communications between the GEE and the local environment is through the ASI.
- The UI provides direct communication between the GEE and the user, such as feedback of execution and direct data input (for example, confirming the completion of an action).

Action System Interface (ASI)

- The ASI is the interface between the GEE and the local environment for communications other than data access and direct user communication. It may communicate with the local DB.