I.3. System Design Document

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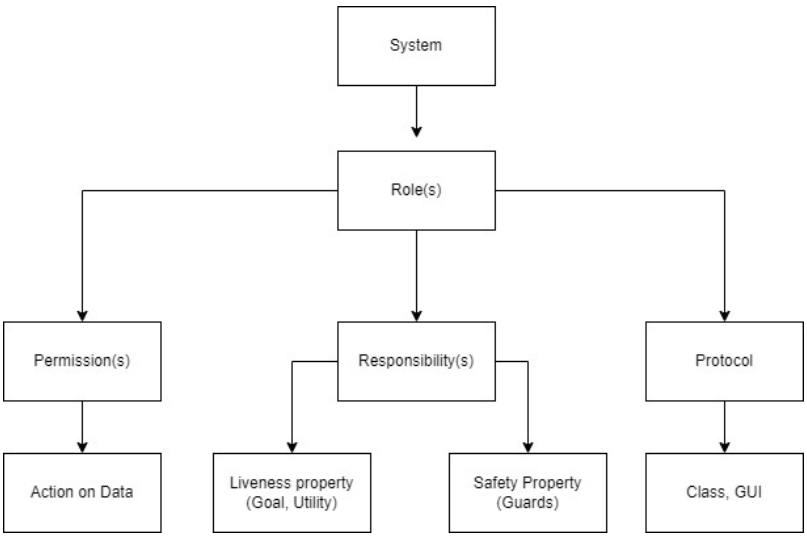
3. System Design Document

In the **system design document**, we are going to speak about the six pieces of information by following an agent-based development methodology (i.e., GAIA), and create the analysis and design documents specified by the GAIA methodology.This section includes: Goal Hierarchy, Agent System Architecture, Role Identification, Agent Description, Agent Internal Architecture, and finally Technology Overview.

3-1. Goal Hierarchy

Using GAIA, we think of each agent as having the resources of a computational process. It is presumable that the objective is to create a system that maximizes a particular global quality metric. From the perspective of the system's constituent parts, nevertheless, this structure might not be ideal.

The GAIA approach encourages developers to see creating software systems as an organizational design process with software agents serving as its building blocks. Therefore, in our analysis phase, first we focus on identifying roles and their properties as shown in the following figure.



Role detection process

3-2. System Architecture

3-3. Roles Identification

Here is a table that demonstrates the detected roles.

👉	**Role**	**By means of?**	**What?**	**What?**	**How?**
Row#	Role Name	Permissions	Liveness Property	Safety Property	Protocols
1	Sign Up	Read and Write users data	Handles the process of sign up for Providers and Clients	Checks validity of user data.	Registration
2	Sign In	Read users data, Authenticate user, Create Session	Handles the process of authentication. If user exists then creates a session. Also, create guest session for Guests.	Checks for active users, and apply SQL injection guards	Authenticator
3	Search Engine	Read providers data	Apply a query on Keywords column of providers table	Deliver a list of providers based on the data that user allowed to access.	SearchEngine
4	Bid Handler	Read and write on bids data	Handles the process of creating, accepting, or rejecting a bid	Checks if Clients have any waiting bid or not. Only one bid per Provider is allowed.	Bid

👉	Role	By means of?	What?	What?	How?
5	Contract Creation	Read and Write contracts data	Handles the process of creating contracts and sends the contract to both sides after Provider accepts the bid.	Checks if there is no contracts waiting for acceptance for these 2 parties.	CreateContract
6	Project Creation	Read and Write projects data, Read contracts data	Handles the process of creating the project based on the Client request after accepting contracts by both side.	Checks both Provider and Client have been accepted the contract and there is no project in database.	CreateProject
7	Payment Handler	Reads and write payment data	Handles the process of Payments	Checks if payments has not yet been done, Checks if payment is equal to what we have in Contract.	TransferMoney
8	Project Tracker	Reads and write projects progress data	Handles the process of tracking project progress, deadline and estimations	Checks if project is still active.	TrackProject
9	Project Change Handler	Read and write projects data	Handles the process of changing a project, upon the Client request. Delivers the changed requirement/contract to Provider.	Checks if there is no change request in database.	ChangeProject
10	Message Handler	Read and write messages data	Handles the process of sending messages between Provider and Client in a specific chatroom	Checks if user belongs to a chatroom	Message

👉	Role	By means of?	What?	What?	How?
11	Feedback Handler	Read and write feedback data	Handles the comments and ratings of projects	Checks if user has worked with feedback receiver via a contract in the past. Checks if user has not yet deliver a feedback related to an experience.	Feedback

3-4. Agents Description

3-5. Agents Internal Architecture

3-6. Technology Overview