I.3. System Design Document

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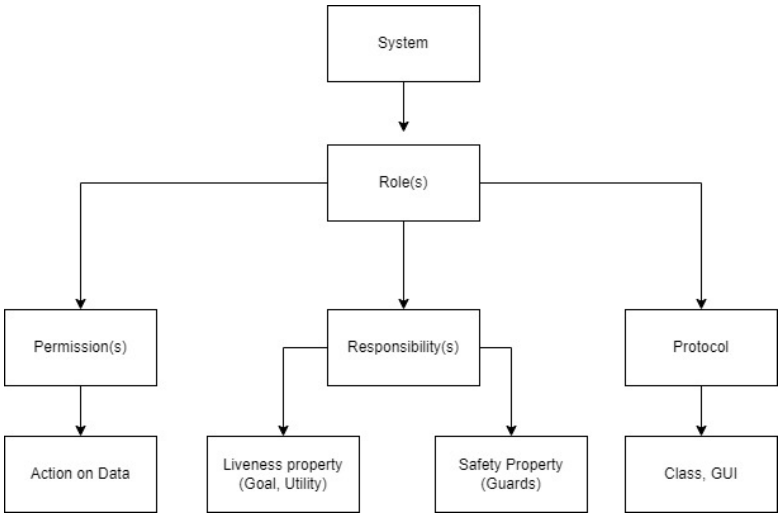
3. System Design Document

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**	**Why?**	**By means of?**	**What? (Responsibility)**		**How?**
Row#	Role Name	Description	Permissions	Liveness Property	Safety Property	Protocols
1	Registration	Handles the process of sign up for Providers and Clients	Read and Write user data	Register = (Request.register, Client)	Create a profile in the system	RegisterUser
2	Authentication	handling the process of authentication to find if the user is logged in or not, also it can detect whether the user is provider, client or guest	read user data, authenticate user	ReqeustAccess = (Request. Access, Client)	Grant system access	AuthenticateUser
3	Project Change Handler	handling the process of changing in projects	read project change data, write project change data	ReqeustChange = (Request. Change, project)	Deliver the changed project	ChangeProject
4	Provider Search	handling the process of searching provider by different Criteria	read provider data	RequestQuotes = (Request. Quotes, ProviderList)	Deliver a list of providers	SearchProviders

👉	Role	Why?	By means of?	What? (Responsibility)		How?
5	Project Creation	handling the process of creating the project based on the client request	write project data	RequestProject = (Request. Project, Project)	Generating a project	CreateProjects
6	Plan Checker	1) handling the process of begin registered in one of plans. 2) It proposes different plan options	1) write user's plan 2) read: user's plan 3) modify: user 's plan	RequestPlan = (Request.Plan, Plan)	Prcoess the requested plan	CheckPlans
7	Bid Handler	handling the process of creating, accepting, or rejecting a bid	write bid data, read bid data	RequestBid = (Request.Bid, Bid)	Process with the bid	HandleBids
8	Message Handler	handling the process of sending messages between users based on different events	write message data, read message data	RequestMessage = (Request. Message, MessageList)	Deliver a list of messages	DeliverMessages
9	Contract Handler	handling the process of creating contracts	write contract data, read contract data	RequestContract = (Request. Contract, Contract)	creating a contract	CreateProjects
10	Payment Handler	handling the process of Payments	write payment data, read payment data	RequestPayment = (Request. Payment, Transaction)	Process with the payment	TransferMoney

👉	Role	Why?	By means of?	What? (Responsibility)		How?
11	Project Tracker	handling the process of tracking project progress, deadline and estimations	read project tracking data, write project tracking data	RequestTracking = (Reqeust. Tracking, Progress)	Deliver the progress of projects	TrackProjects
12	Feedback Handler	handling the process of handling comments and ratings of projects estimations	read feedback data, write feedback data	RequestFeedback = (Request. Feedback, Feedback)	Generate the feedback	DeliverFeedbacks
13	GUI	handling interactions between users and multiple systems		ReqeustInteraction = (Request. Interaction,	Handle user interaction in the System	

3-4. Agents Description

3-5. Agents Internal Architecture

3-6. Technology Overview