



DEPARTMENT OF ELECTRICAL
AND COMPUTER ENGINEERING

SENG 696 Agent-Based Software Engineering
Software Acquisition Request System
Assignment 1B – Design Document

Group # 6

Desiree Leal - 30063471

(Greg) Amar Gadala - 10177584

Md. Shohug Hossain - 30162605

Rohit Yeast - 30067839

Background

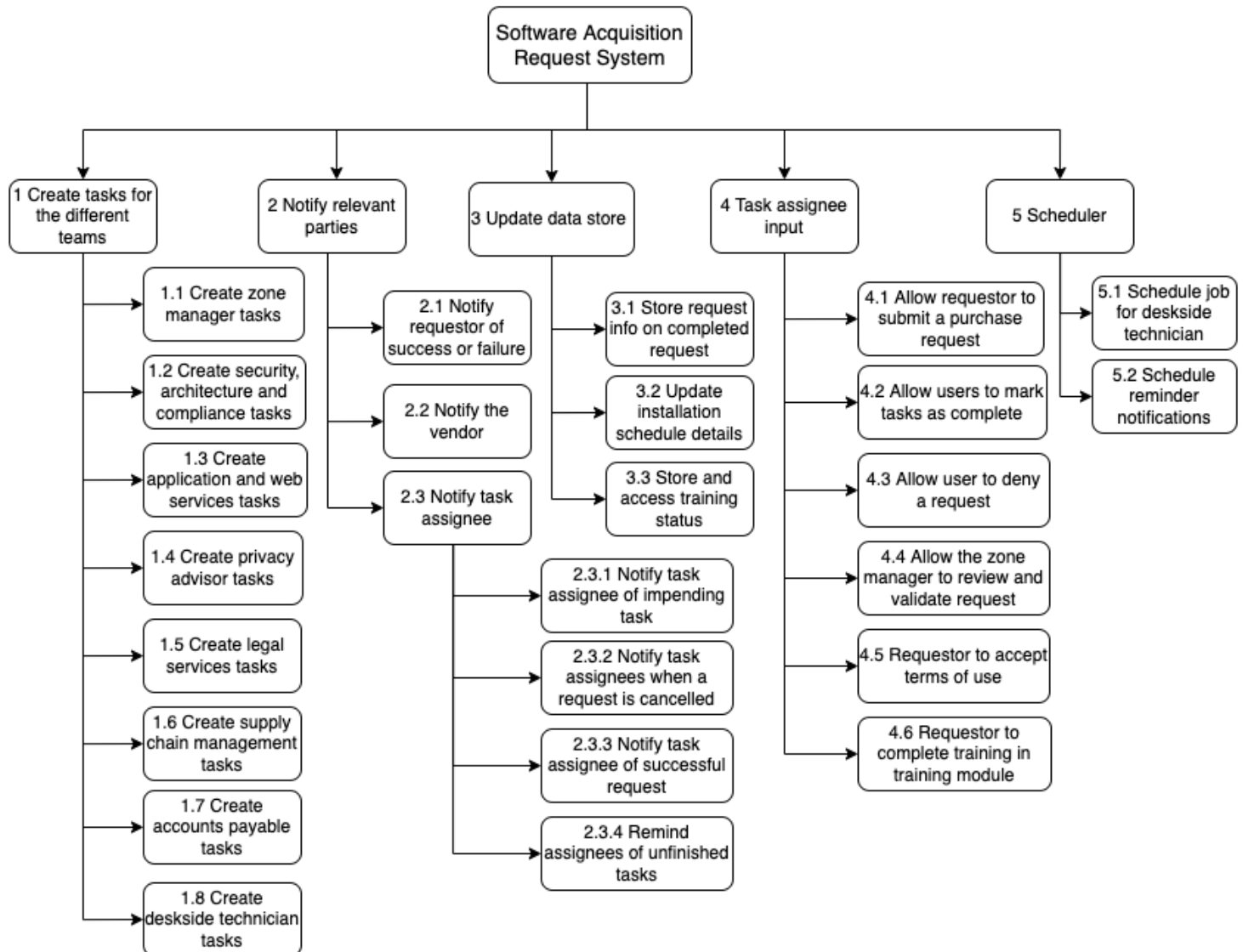
The Software Acquisition Request (hereinafter referred to as SAR) System allows customers/end users to put in a request in the system to acquire software. The process involves the collaboration of the following teams from the request of software, payment, and installation.

- Architecture & Security, Risk & Compliance
- Applications & Web Services
- Legal Services
- Privacy Office
- Supply Chain Management
- Accounts Payable
- Deskside Team

An agent-based system will be constructed to implement the system. The MaSE methodology is used to design the system.

Capturing Goals

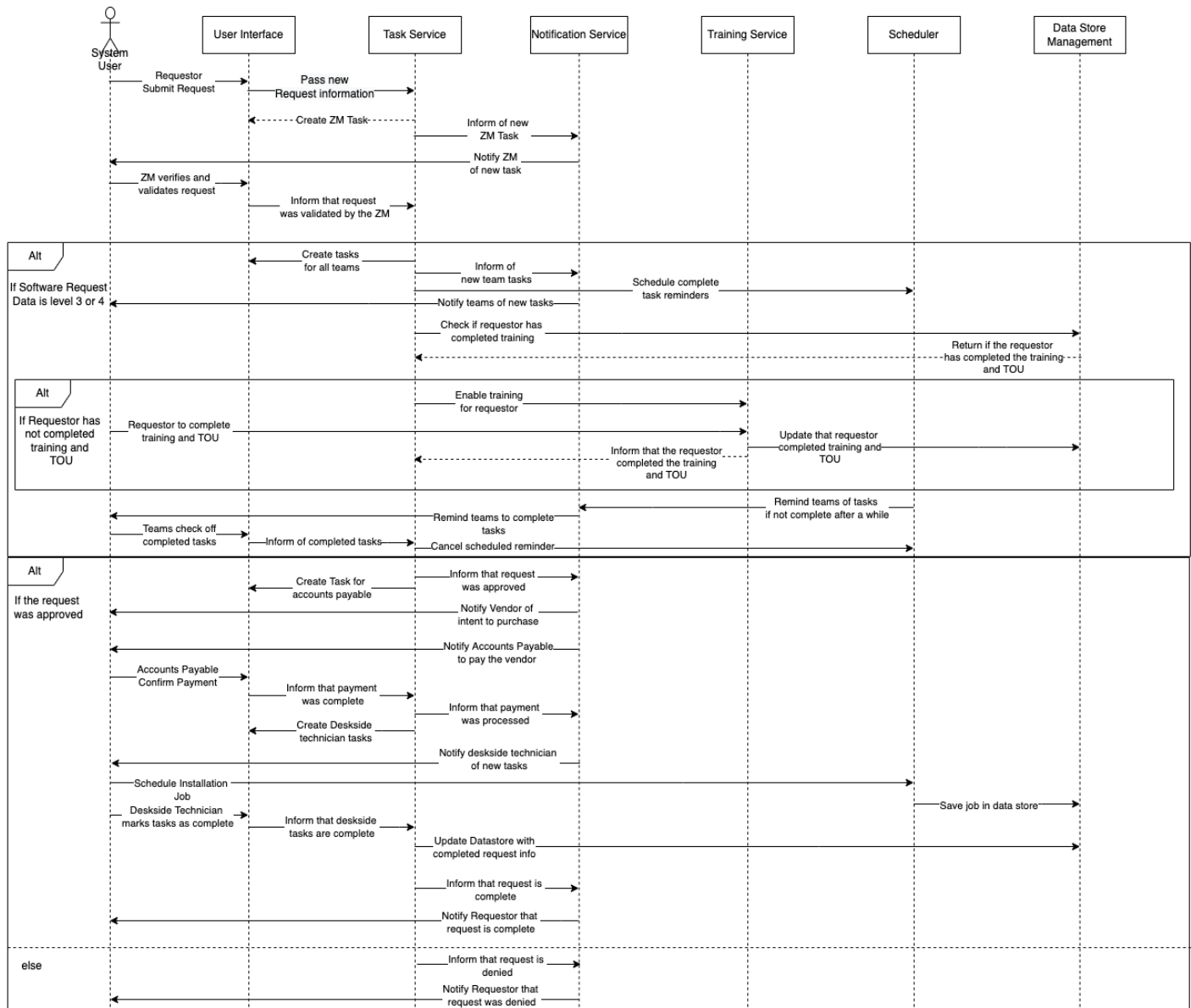
The goals of the system are converted from the requirements defined in the system specification document to a goal hierarchy diagram.



Applying Use Cases

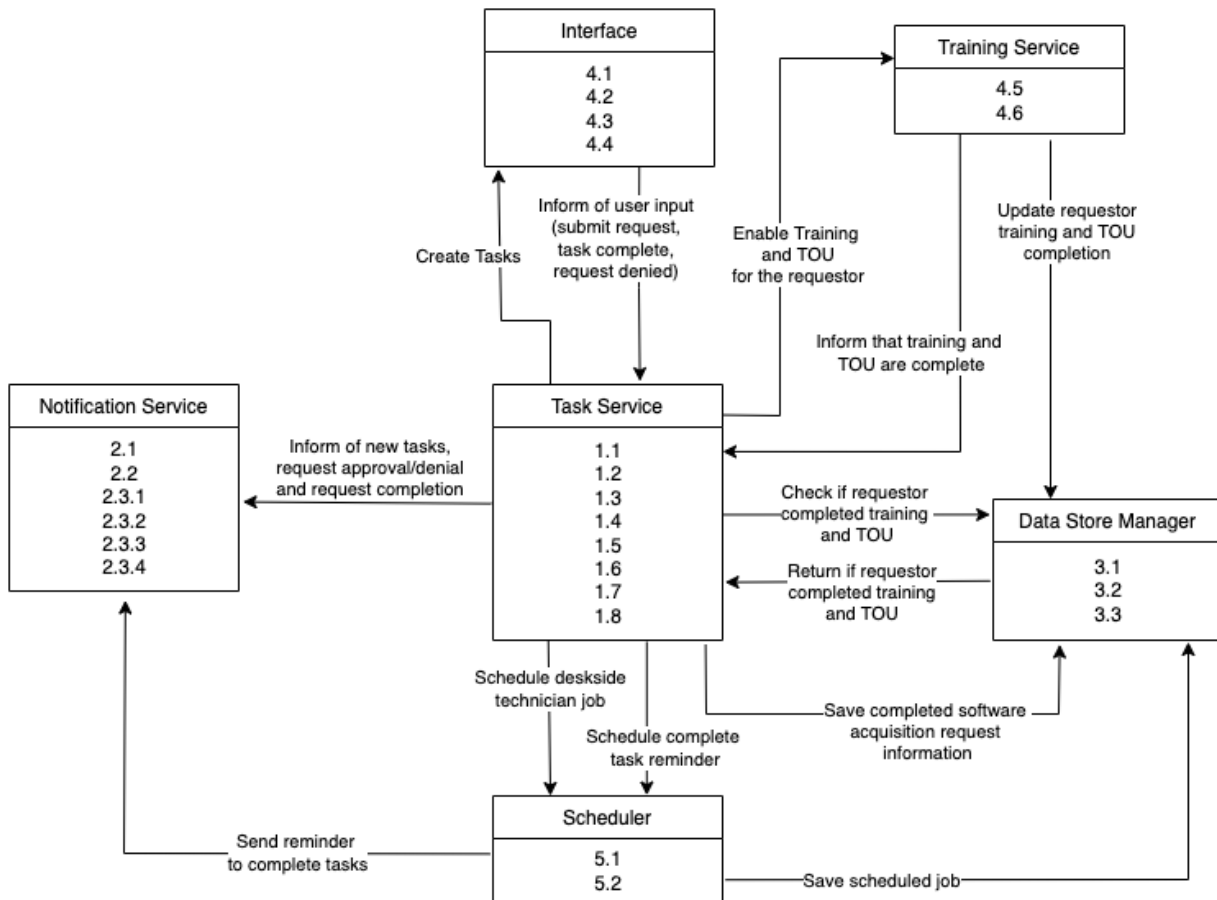
Use cases are applied in the following sequence diagram. Because there are so many actors on the system, only one was shown in the diagram. Interactions with the “System User” in the diagram always specify what user is using the system. Zone Manager was abbreviated to ZM, Terms of Use was abbreviated to TOU, and the following set teams are referred to as teams:

- Architecture and Security, Risk and Compliance
- Apps and Web Services
- Privacy Office
- Legal Services
- Supply Chain

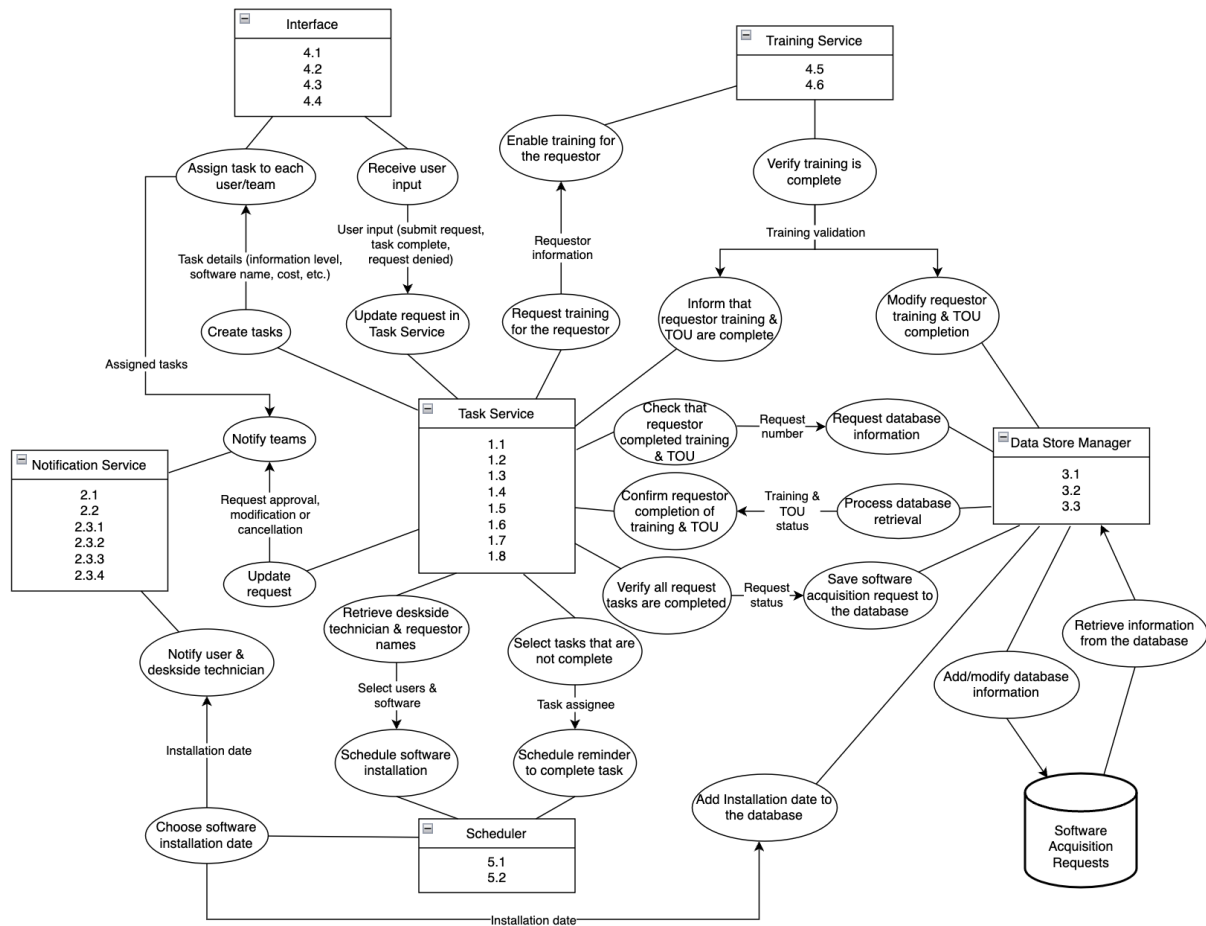


Refining Roles

The following role diagram was created using the goal hierarchy diagram and the sequence diagram. Goals identified by number in the goal hierarchy diagram are assigned to a role. The communications between the different roles were defined by analyzing the interactions in the sequence diagram.



From the role diagram above, a Concurrent Task diagram was used to clarify the task of each agent. The communications and activities of each task are defined to clearly represent the interactions between the agent roles. The Concurrent Task diagram for the Software Acquisition Request System is below.



Agent Description

There are six agents that will be used to implement the communication and data flow between the different components of the Software Acquisition Request system. The six agents defined in the Concurrent Task diagram have a more detailed description below.

User Interface Agent

- The User Interface Agent is used to submit a request for a software application to be purchased and installed. The user who submits a request is called the 'requestor'.
- The User Interface Agent communicates with the Task Service Agent. It will process the request information (software name, information level, requestor name) and send it to the Task Service Agent for further data analysis and communication.
- The User Interface Agent displays the tasks and request information sent by the Task Service Agent. These tasks and their required information are only visible to the users on the teams that they are assigned to.
- The User Interface Agent is used by the different users (Zone Manager, Legal team, Privacy Office, etc.) to view tasks, mark tasks as complete, or to cancel the request. These updates are then sent to the Task Service Agent to process.

Task Service Agent

- The Task Service Agent receives new requests from the Interface Agent about a SAR and creates a new request to track the status of the SAR. The requestor's information is processed to determine the Software Acquisition Process and the tasks required to complete it. The Task Service Agent will then assign tasks for each team to complete in the SAR process, and send those tasks to the Interface Agent to display to their assigned users. Once tasks are assigned for each team, the Task Service Agent waits to receive information from the User Interface Agent about an update on the assigned tasks.
- The Task Service Agent communicates with the Notification Agent to trigger a notification when users are assigned new tasks, the software payment is made, and the request is approved, denied, or completed.
- The Task Service Agent communicates with the Scheduler Agent to schedule reminders for task assignees if they have not marked their task as complete after a week (this is a nice-to-have feature). This process is following a happy path assuming that everything goes according to plan. Once a request has been approved, the Task Service Agent provides the Scheduler Agent with the Software name, Deskside Technician name and Requestor name, and triggers the Scheduler Agent to schedule a time for the Deskside Technician to install the software for the requestor.
- The Task Service Agent uses the Data Store Manager Agent to retrieve data from and upload data to the SAR database. When a request is completed, the Task Service Agent will notify the Data Store Manager and prompt it to create a new entry in the SAR database with the Request Number, Software Name, No. of Users, Information Type, etc. The Task Service Manager will send a request to the Data Store Manager to get the Training Status and TOU Status from the Training Status table, specific to the requestor's name.
- The Task Service Agent is responsible to request security training for the requestor through the Training Service Agent. The Task Service Agent will provide the Training Service Agent with the requestor's information for their training to be enabled. Once the requestor has completed their security training and TOU agreement with the Training Service Agent, the Training Service Agent will notify the Task Service Agent.

Notification Agent

- The Notification Agent is responsible for notifying the requestor and task assignees of newly assigned tasks, request cancellation or approval and request completion (purchase of software). The Task Service Management provides the Notification Agent with the contact and request information when a notification is to be sent out.
- The Notification Agent will also inform the requestor and deskside technician once the SAR is approved and Scheduler Agent has scheduled a date and time for the software installation.
- As a nice-to-have feature, the Notification Agent will remind users of their tasks if they have not been completed within a week of being assigned.

Scheduler Agent

- The Scheduler Agent communicates with the Task Service Agent. Once the requestor has submitted a SAR, and the Task Service Agent has assigned tasks, it talks to the Scheduler Agent to schedule reminders for each user to complete their task. If a user completed their task, the Task Service Agent will talk to the Scheduler to remove the reminder for that user.
- The Scheduler Agent organizes the installation date of the requested software once the Task Service Agent indicates that the software is purchased, and provides the names of the deskside technician and software requestor. The Scheduler Agent will select a date and time for the deskside technician to install the software for the requestor.
- As a nice-to-have feature, the Scheduler Agent will communicate with the Notification Agent when a user is to be reminded to complete an outstanding task or when a software installation has been scheduled and they are involved. The Scheduler Agent will send the Notification Agent the contact and reminder information for the notification.
- The Scheduler Agent sends requests to the Data Store Manager to update the SAR database after a software installation date has been scheduled.

Data Store Manager Agent

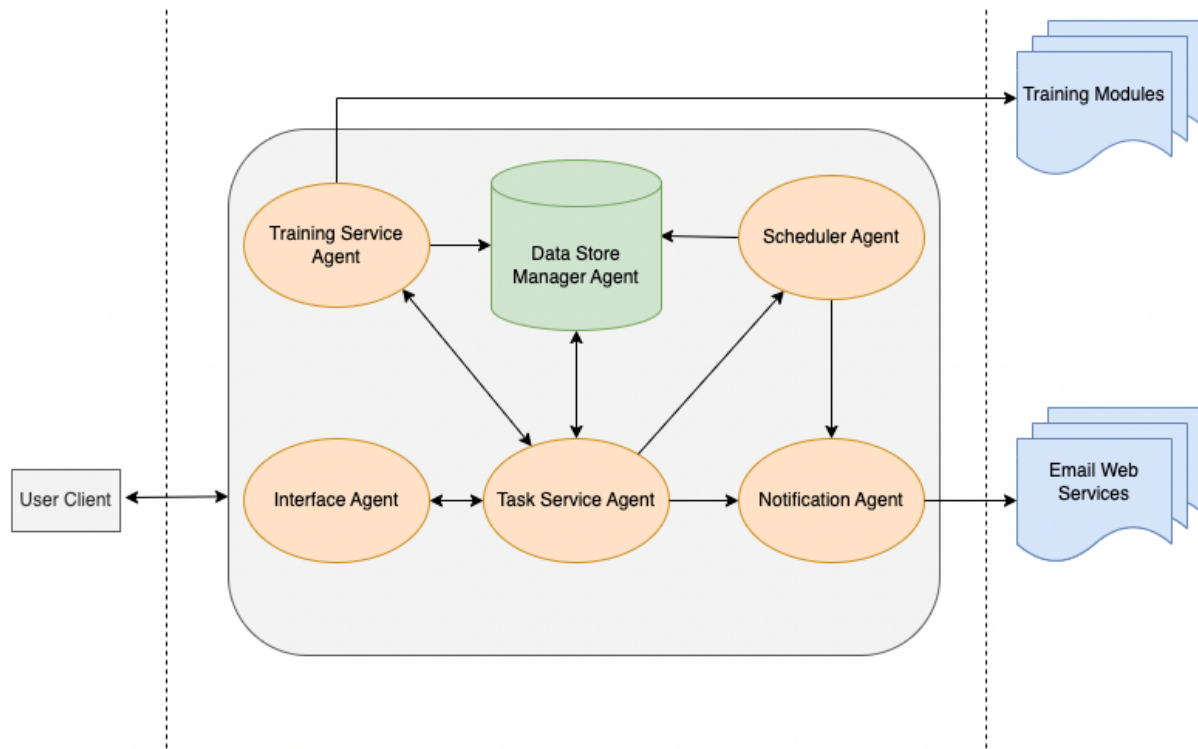
- The Data Store Manager Agent processes queries to and from the SAR database.
- The Data Store Manager Agent communicates with the Task Service Management Agent to return requested information, such as requestor training status; and to receive information to modify in the database, such as request status (approved or denied).
- The Data Store Manager receives requests to update the database from the Scheduler Agent when a software installation date is decided, and from the Training Service Agent when a requestor has completed their safety training and TOU.

Training Service Agent

- The Training Service Agent is responsible for delivering training modules for software requestors. The Task Service Agent will request security training and a TOU agreement that must be completed by a requestor before they can use the requested software. After receiving a request, the Training Service Agent will enable training modules for the requestor and verify that their training is complete.
- The Training Service Agent notifies the Task Service Agent and Data Store Manager Agent once a user has completed their training. The Data Store Manager is contacted to update the database with the completed status of the requestor's training.

Agent System Architecture

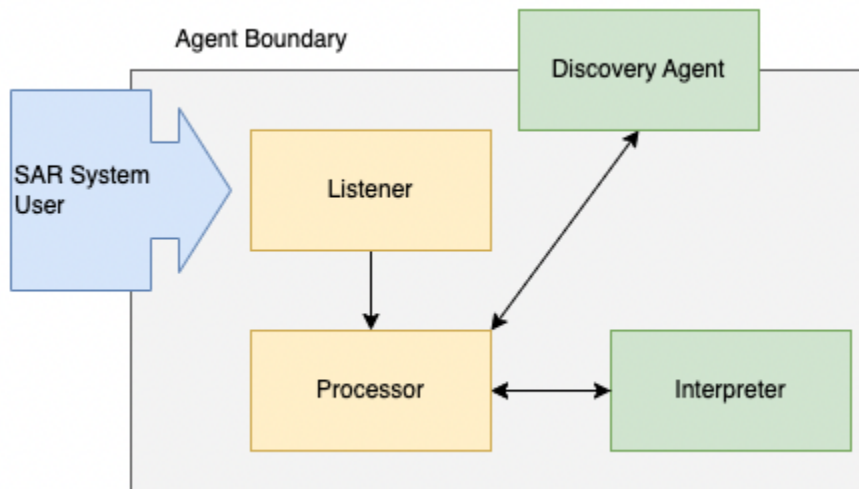
The SAR system is intended to work as a multi-agent system that integrates with the Training Module and utilizes an Email Web Service. The Training Module is an external service that returns the user's training status based on the completion of their assigned training modules. The Email Web Service is used to communicate notifications to users involved in the SAR process.



In the SAR system, users will submit a software acquisition request through the User Interface. The agents then process the request information to assign tasks to the different teams involved in approving/completing the request.

The multi-agent system uses the Email Web Services to notify users when they are assigned a task, or if they have not completed their assigned task within a week. The Email Web Services are also used to notify the requestor when the request has been approved or denied, and when the software installation is scheduled. In addition to the Email Web Services, the multi-agent system has to interact with the Training Modules to ensure software requestors are trained to handle sensitive information and have agreed to the terms of use.

Agent Internal Architecture



Listener

The Listener component will listen for any incoming messages from the SAR system.

Processor

The Processor will receive an XML document containing information from the incoming messages to the Listener. It will send the XML document to the Interpreter to parse and return the information, before calling the necessary functions to run a process.

Interpreter

The Interpreter will parse and interpret XML messages received from the Processor. An assumption can be made that all agents in the SAR agreed on a Document Type Definition.

Discovery Agent

The Discovery Agent provides the service discovery base for discovering agents in the SAR system.