

CHAPTER 3

SYSTEM ARCHITECTURE

3.1 OVERALL SYSTEM ARCHITECTURE

The proposed Heterogeneous Offer Agreement Generation (HOAG) is designed to improve the customer penetrating time and also provides the offered services to the customers. Figure.3.1 represents the proposed overall system architecture of HOAG, where the system designed with three layers called Analyzer Security Originator, Classified Filter and Fuzzy Based Offer Agreement Generator. Each layer technique has a specific processing and provides different functionality. Layer 1 technique accepts the incoming requests and executes the secured generation of the information. Layer 2 technique receives the secure generated information from layer 1 as input. Here the bulk amount of information gets reduced with the classification algorithm. Finally, the classified information from layer 2 moves to layer 3, where it evaluates and executes the agreement based on the customer requirements.

The three layer execution is the heart functionality of the proposed HOAG system. Multiple numbers of customers can access the offer based services with the certain amount of time. Figure 3.1 displays the core functionalities of the three layers with their internal components. Internal components are explained in detailed manner in the following descriptive sections.

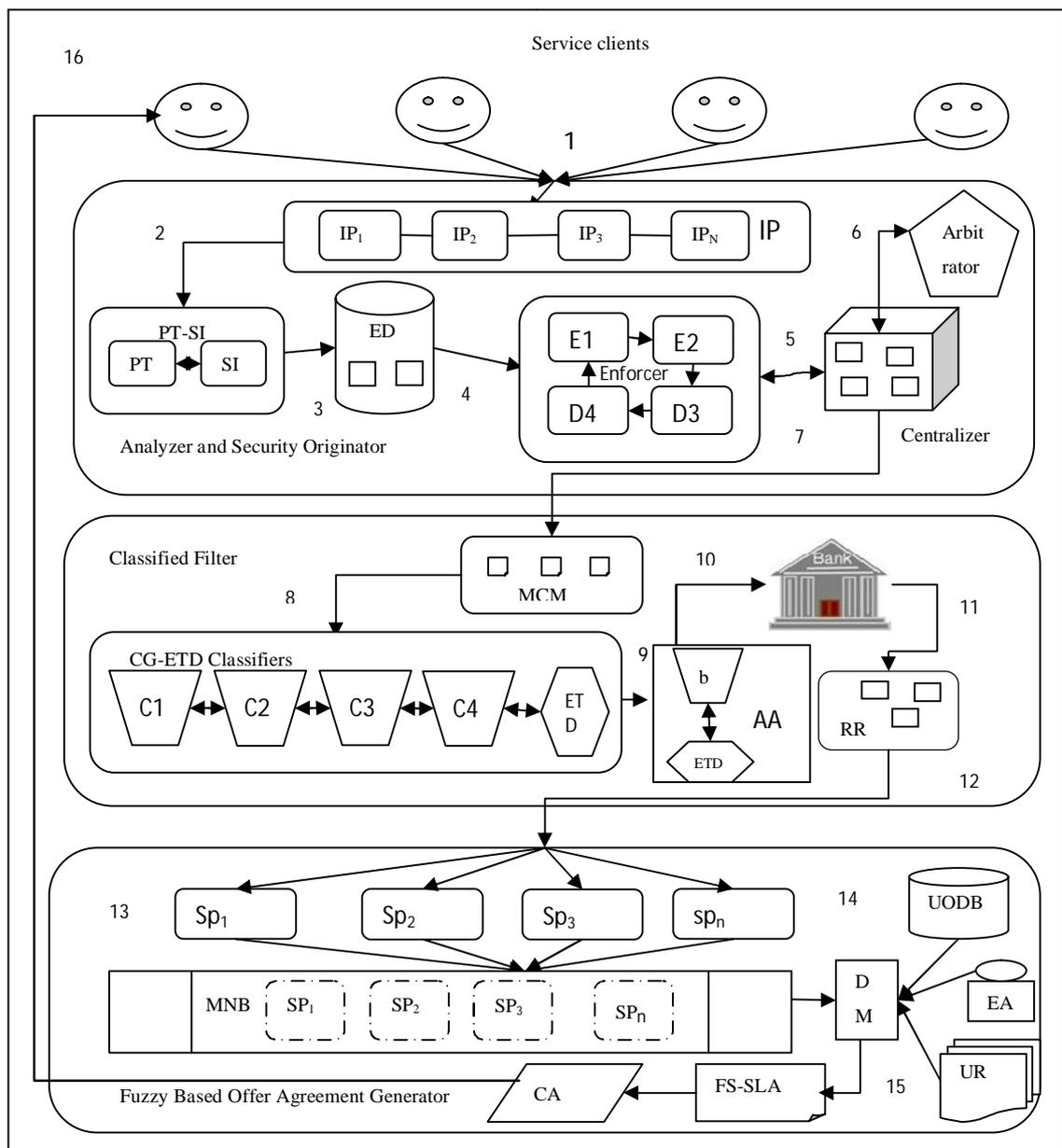


Figure 3.1 Heterogeneous Offer Agreement Generation (HOAG) system

3.2 ANALYZER AND SECURITY ORIGINATOR

This is the first active component of the proposed system, where all the input requirements are received from the users and also the credential information is filtered and secure evaluation is executed with the Enforcer algorithm. The functional components of layer 1 technique are Information

Packages, Password Transaction- Service Identity (PT-SI) records, Extracted Database, Enforcer generation, Arbitrator and centralizer.

3.2.1 Information Packages

Information packages are shortly known as IP. The functionality is to collect the user offered requirements from the customers. Service providers may offer different services to the customers, from those customers can preferably select their required services. Initially the customers can define their stated requirements through this package. This package has the customer opted requirements that is to be get matched in third layer of Fuzzy Based Offer Agreement Generator. Requirements like password, shop code, transaction Id and price value are retrieved in this package.

3.2.2 Password Transaction – Service Identity

The collection of information from IP package is further filtered in Password Transaction- Service Identity (PT-SI) records. All the requirements collected are filtered and categorized into two packages. First package is represented as Password Transaction (PT) and second package is represented as Service Identity (SI), collectively it known as PT-SI records. First package will filter the password and transaction Id from customer requirements. Second package will filter the service transaction Id from customer requirements. Once when the customer has a valid account with the purchasing service provider, then they can buy the favored products. If insufficient account balances are verified by provider then the customer requirements are discarded. Only the sufficient account details stated by the customer requirements are selected and filtered.

3.2.3 Extracted Database

Customer's purchasing details are collected and stored in a database called Extracted Database. The database consists of registered user profile and account details. Registered customer details are matched with the filtered requirements of PT-SI records. If unmatched requirements are found, then they are resent to the customers. So that, extracted database consists of collection of registered customer details that are to be rechecked before passing to the Enforcer component. This component only receives the filtered information with cross verification from the Extracted Database.

3.2.4 Enforcer Generation

This is the main part of secure execution of filtered information. The proposed Enforcer algorithm has four major execution processing known as Enforcer Encryption E1, Enforcer Encryption E2, Enforcer Decryption D3 and Enforcer Decryption D4. The basic reason behind the execution of these two encryptions and decryptions is to reduce hacking and also the hackers cannot judge or analyze the executed keys. Enforcer Encryption E1 performs with password and transaction Id. Enforcer Encryption E2 performs the second encryption with cipher text of Enforcer E1 and user login time. The decryption process starts with Enforcer Decryption D3 where, it decrypts with cipher text and token labeling date. Enforcer Decryption D4 performs with the preferred service provider Id and the decrypted output from Enforcer D3. With the secured generation, the keys next pass on to the Centralizer.

3.2.5 Centralizer

Centralizer is a repository component that temporarily stores the encryption and decryption keys from the Enforcer component. The purpose of designing this component is that, it will act as a temporary storage to prevent

fault occurrences or to reduce the vulnerabilities caused by the third party. The enforcer keys are passed from Enforcer components to Centralizer component in one life cycle generation. It means that, the keys are stored in the Centralizer only for a temporary time period and are demolished after the next arrival.

3.2.6 Arbitrator

This component has collection of chosen service provider Id, which is used in the decryption of Enforcer D4. The customer preferences of choosing services are noted and their service identities are collected with this component. So that, arbitrator has up to date collection of service identities based on the customer predilection.

3.3 CLASSIFIED FILTER

This is the second layer of HOAG framework, which reduces the bulk arrival of requests from layer 1. The proposed ETD algorithm is compared with the CG algorithm to measure the accuracy and the accurate data is next passed to the bank progression.

3.3.1 Multi Classifier Mixture

The secured information processed from layer 1 next input to layer 2 component of Classified Filter. The filter has multiple components. Among that Multi Classifier Mixture will receive the authenticated requirements that are evaluated using Enforcer algorithm. As it receives the authenticated information from the layer 1, the individual packages are created to collect the group of filtered data.

3.3.2 Collective Group – Efficient Trim Down classifiers

CG-ETD classifier stands for (Collective Group Classifiers) – (Efficient Trim Down classifier). The collective group denotes the collection of existing classifiers called J48, Random Tree, Random Forest and AD Tree. In this component a selected group of existing classifiers are collected and its accuracy is compared with the proposed classifier of Efficient Trim Down (ETD) classifier algorithm.

The basics behind comparison of proposed ETD algorithm with the existing classification is to check the accuracy of authenticated filtered requirements and to reduce the bulk arrival of requests. Considering the existing classifier algorithm the proposed ETD will measure the authenticated information risk analysis and complexity and evaluate the Empirical Estimation. In the experimental testing Collective Group classifiers namely (J48, Random Tree, Random Forest and AD Tree classifiers) are experimented and compared with Efficient Trim Down classifier. In figure 3.1, it is represented as C1 (J48), C2 (Random Tree), C3 (Random Forest) and C4 (AD Tree) and ETD for (Efficient Trim Down).

3.3.3 Accuracy Analyzer

This Analyzer measures the accuracy of received requirements from the CG-ETD classifiers. It also checks the accuracy measured by each classifier. The best accuracy was measured among the (J48, Random Tree, Random Forest and AD Tree) Collective Group of classifiers, and the best accuracy classifier is then compared with the proposed Efficient Trim Down (ETD) classifier. Finally, from the two comparisons the accurate results are sent for bank progressing.

3.3.4 Banking and Request Recognizer

Generated accurate results are received for the bank progressing and it executes the transactions based on the existence of user account details either in nationalized or internationalized bank. From the accurate user details verification, the user preferred requirements are further moved to Request Recognizer (RR). It is the sub part evaluation, which makes the queue execution of data transmission to the provider. Design of this Recognizer will formulate or make a queue arrangement and transmit the accurate requirements to the service provider services.

3.4 FUZZY BASED OFFER AGREEMENT GENERATOR

This is the third and final layer of execution in HOAG system, which is embedded with Multi Negotiation Broker, Decision Manager, User Oriented Database, Expert Advice and User Requirements components. From the finalized agreement, if the customer accepts they can buy the service.

3.4.1 Multi Negotiation Broker

The received accurate data are matched with multiple service provider services and the matched services are collected in the storehouse named as Multi Negotiation Broker. The broker has the possible collections of all service provider services that are utilized by the Decision Manager, and also it can update the currently available service provider service in the repository.

3.4.2 Decision Manager

The Decision Manager is the deciding authority to make decisions regarding customer requirements. The manager will be a knowledgeable person in the relevant field to make the final decisions to prepare the fuzzy

based SLA agreements. Decision Manager plays the major role to finalize the agreement generation, based on the conclusion of User Oriented Database, Expert Advice and User Requirements.

3.4.2.1 User-Oriented Database

User-Oriented Database (UO-DB) has existing dataset which consists of collection of users frequently using the service provider services. The user's accessing and rating ratio of services are collected and stored in the database. The database can store more than 1000 services preferred by the users and it also frequently updates the valid user account details.

3.4.2.2 Expert Advice

Expert Advice (EA) is the expert person in the pertinent field, who gives valuable suggestions in the current and existing available services. The advisable person will give suggestions to the Decision Manager to make the corrections. Suggestions given by EA will be more considerable while framing service agreements. Persons with nearly 20 years of experience are preferably selected as Expert Advice.

3.4.2.3 User Requirements

It represents the user oriented requirements that are collected from the customers. A user requirement varies with user needs based on the service availability, quality and duration. Customers have various options for choosing services, that may vary with the range of 'high', 'medium' and 'low', with respect to the parameters of availability, quality and duration. Such different combination of services are collected and stored in the user requirements, which serves as also one of the conclusion factor in the decision making of agreement.

3.4.3 Fuzzy Support-Service Level Agreement

Final decisions from the Decision Manager are finally written as an agreement that represents all possible options to choose the services. Fuzzy rule based language is used to frame the agreement. Framing of fuzzy rule based agreement will improve the user stated logic easily while compared to other logics.

3.4.4 Customer Approval

Agreements generated are finally mapped as a report and sent for Customer Approval. Customers can analyse the agreement note and check for the availability status of services that matches with their requirements. If match is found, an acknowledgement report is sent to the service provider. The provider will recheck the acknowledgement and supply their listed services to the customers. If the customer is satisfied with the agreement report, they can make a service agreement to buy the services.

3.5 ARCHITECTURAL CONTRIBUTIONS

The proposed Heterogeneous Offer Agreement Generation (HOAG) system is designed with the three layers: Analyzer Security Originator, Classified Filter and Fuzzy Offer Based Agreement Generator. With the combination of these three layers multiple customers can access the system at the same time it reduces the search time for their preferred services. The implementation of each layer results in major contributions like security, classification and agreement generation.

Secured transaction occurs with layer 1. In this layer the received information is secured with the proposed algorithm called Enforcer. This algorithm is generated with two sets of Enforcer Encryptions (E1, E2) and

two sets of Enforcer Decryptions (D3, D4). Arbitrator and Centralizer are used to store the service identity and security keys generated in Enforcer component.

Layer 2 provides the classification of authenticated information from layer 1. It reduces the bulk arrival of requests with the proposed classifier algorithm called Efficient Trim Down (ETD). Finally, Layer 3 generates Fuzzy Rule Based Agreement with the matched services. Here, the agreement is generated with the fuzzy rule based approach. The major contribution of this proposed HOAG work is to minimize the time taken to search for the suitable service provider services and to provide multiple offer based services.