

DATA LEAKAGE DETECTION

[DLD]

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AGENDA

- PROBLEM DEFINITION
- PROBLEM SETUP AND MATHEMATICAL NOTATION
- SYSTEM ARCHITECTURE DESIGN
- SOFTWARE AND HARDWARE REQUIREMENT
- SCREEN SHOTS
- UML DIAGRAMS
- ADVANTAGES
- FUTURE SCOPES
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PROBLEM DEFINITION

- In the course of doing business, sometimes sensitive data must be handed over to supposedly trusted third parties.
- **Our goal** is to detect when the distributor's sensitive data has been leaked by agents, through probability calculation using number of download for a particular agent.

PROBLEM SETUP AND NOTATION

Mathematical model

Title:-

DATA LEAKAGE DETECTION.

Problem statement: -

To build a application that helps in **Detecting the data** which has been leaked. Also it helps in finding **Guilty Agent** from the given set of agents which has leaked the data using **Probability Distribution through number of Downloads.**

Problem description:

Let,

DLD is the system such that $DLD = \{A, D, T, U, R, S, U^*, C, M, F\}$.

1. $\{A\}$ is the Administrator who controls entire operation's performed in the Software
2. $\{D\}$ is the Distributor who will send data T to different agents U .
3. T is the set of data object that are supplied to agents.
 T can be of any type and size, e.g., they could be tuples in a relation, or relations in a database. $T = \{t_1, t_2, t_3, \dots, t_n\}$
4. U is the set of Agents who will receive the data from the distributor A
5. R is the record set of Data objects which is sent to agents
 $R = \{t_1, t_3, t_5, \dots, t_m\}$ **R is a Subset of T**

6. S is the record set of data objects which are leaked.

$S=\{t_1, t_3, t_5..t_m\}$ **S is a Subset of T**

7. U^* is the set of all agents which may have leaked the data

$U^*=\{u_1, u_3, \dots, u_m\}$ **U^* is a subset of U**

8. C is the set of conditions which will be given by the agents to the distributor.

$C=\{\text{cond}_1, \text{cond}_2, \text{cond}_3, \dots, \text{cond}_n\}$

9. M is set of data objects to be send in Sample Data Request algorithm

$M=\{m_1, m_2, m_3, \dots, m_n\}$

ACTIVITY:

SAMPLE is a function for a data allocation for any m_i subset of records from T . The transition can be shown as:

$$R_i = \text{SAMPLE}(T, m_i)$$

EXPLICIT is a function for a data allocation for which satisfies the condition.

$$R_i = \text{EXPLICIT}(T, \text{cond}_i)$$

SELECTAGENT is the function used in EXPLICIT algorithm for finding the agent .

$$\text{SELECTAGENT}(R_1, R_2, \dots, R_n)$$

SELECTOBJECT is the function used in SAMPLE algorithm for selecting the data Objects

$$\text{SELECTOBJECT}(i, R_i)$$

SIMPLE ENCRYPTO is the function used to ENCRYPT the file to be sent to the Agent

DATA STRUCTURES USED:

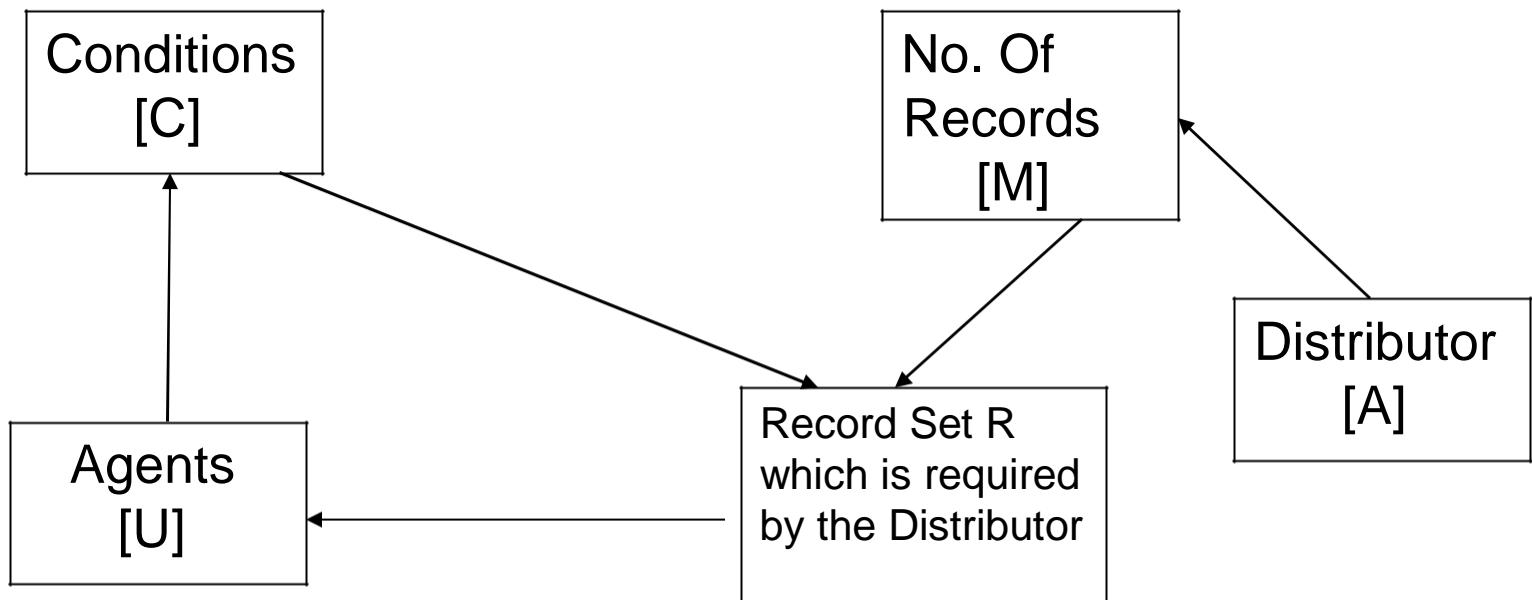
Array: To store the no of data objects T ,No of agents U , record set R and to display the particular output.

Execution of functions :

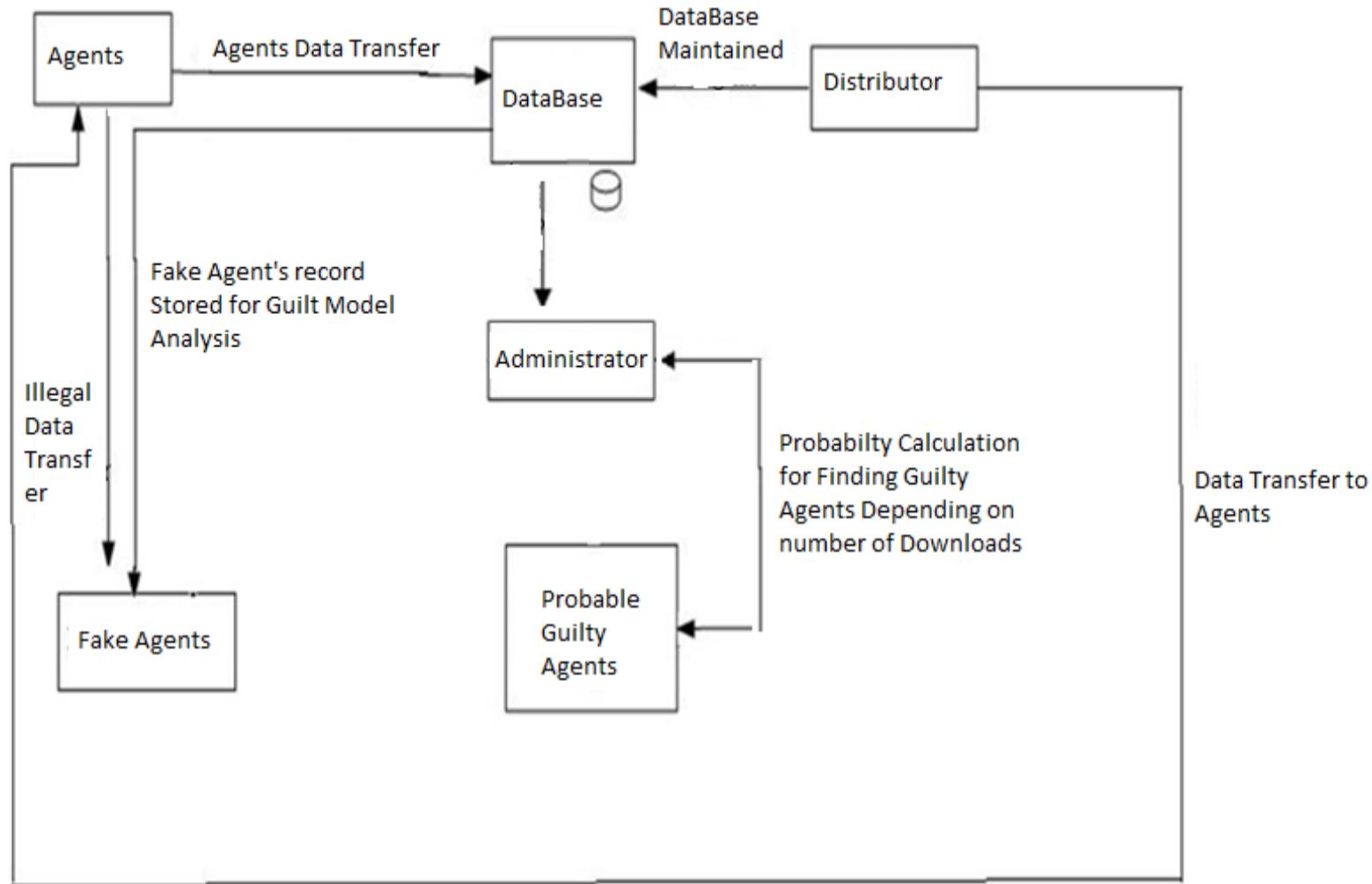
The functions will be executed on a daily basis for number of times whenever distributor wants to send the data to the agent and vice versa using C and M.

FUNCTIONAL DEPENDENCY DIAGRAM:

The functional dependency of the system depends upon the conditions which are given by the agent and no of records which distributor decides to send to the agents.



SYSTEM ARCHITECTURE DIAGRAM



SOFTWARE AND HARDWARE REQUIREMENT

Hardware Interfaces

- 2.4 GHZ, 80 GB HDD for installation.
- 512 MB memory.
- Users can use any PC based browser clients with IE 5.5 upwards.

Software Interfaces

- JDK 1.6
- Java Swing
- Net beans 6.5
- Socket programming
- Triple AES algorithm

SCREEN SHOTS

1. User Login



2. Agent Form(Request)

The screenshot shows a Windows application window titled "Data Leakage Detection". The menu bar includes "File", "Agent", "Change Password", and "Logout". The main title bar also says "Data Leakage Detection". The window contains a section titled "Sharing Details" with three input fields: "Data Request Descrip...", "Select Region" (set to "Pune"), and "Select Distributor" (set to "Raj1 Agrawal1"). A "Send Request" button is below the distributor field. At the bottom right of the window is a link "Data Leakage Detection".

Sharing Details

Data Request Descrip...

Select Region

Select Distributor

Data Leakage Detection

3. Agent Form(Download Form)

Data Leakage Detection

File Agent Change Password Logout

Files For Agent

| Sr. No. | Uploaded By | Email Id | Phone No | File Description | Size | Date |
|---------|----------------|----------------------|------------|------------------|------|---------------|
| 1 | Raj1 Agrawal1 | mail.rajesh.agraw... | 9860923474 | ronal tp | 6320 | 05-Jun-12 Tue |
| 2 | Raj1 Agrawal1 | mail.rajesh.agraw... | 9860923474 | tp | 6320 | 05-Jun-12 Tue |
| 3 | Raj1 Agrawal1 | mail.rajesh.agraw... | 9860923474 | co | 6320 | 05-Jun-12 Tue |
| 4 | rajesh agrawal | mail.rajesh.agraw... | 9860923474 | com | 6320 | 05-Jun-12 Tue |

Selected File Details

Upload... Data Leakage Detection

Shared...

Sharing Details

Encryption Key Go

File Content

4.Distributor(View shared files)

The screenshot shows a Windows application window titled "Data Leakage Detection". The menu bar includes "File", "Distributor", "Change Password", and "Logout". The main content area is titled "List of Folders to be Shared" and displays a table with three rows of data:

| Sr. No | Name | Folder Path | Size | Date |
|--------|------------------|------------------|------|---------------|
| 1 | Kaustubh bojewar | /133889212630... | 6320 | 05-Jun-12 Tue |
| 2 | Kaustubh bojewar | /133889060392... | 6320 | 05-Jun-12 Tue |
| 3 | Kaustubh bojewar | /133888769215... | 6320 | 05-Jun-12 Tue |

5.Distributor(Upload Files)

Screenshot of the Data Leakage Detection application interface:

The main window title is "Data Leakage Detection". The menu bar includes "File", "Distributor", "Change Password", and "Logout".

The "File To Be Shared" section contains a file input field, a "Browse" button, and an "Add" button.

The "List of Folders to be Shared" section displays a table with columns: Sr. No, Folder Path, Size, and Select. There are no entries in this table.

The "Sharing Details" section includes fields for "Agent Requests" (dropdown menu), "File Description" (text input), "Encryption Key" (text input containing "Kaustubh bojewar"), and "Share With" (text input).

A large green circular icon with a white downward-pointing arrow and the text "Data Leakage Detection" is displayed prominently.

The "Shared Files By You" section shows a table of shared files:

| Sr. No | Name | Folder Path | Size | Date |
|--------|------------------|-----------------------|------|---------------|
| 1 | Kaustubh bojewar | /1338892126306/Q1.dmp | 6320 | 05-Jun-12 Tue |
| 2 | Kaustubh bojewar | /1338890603922/Q1.dmp | 6320 | 05-Jun-12 Tue |
| 3 | Kaustubh bojewar | /1338887692155/Q1.dmp | 6320 | 05-Jun-12 Tue |

Page footer: DATA LEAKAGE DETECTION

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6. Administrator (Probability Calc)

Data Leakage Detection

File Distributor Agent Admin Change Password Logout

Data Leakage Detection

Guilty Agent Calculations

| Sr. No | Agent Name | No Of Downloads |
|--------|------------------|-----------------|
| 1 | Kaustubh bojewar | 18 |
| 2 | agent2 agent2 | 1 |

Probability Calculation On No Of Downloads

A pie chart titled "Probability Calculation On No Of Downloads". The chart is divided into two segments: a large red segment labeled "Kaustubh bojewar" and a small blue segment labeled "agent2 agent2". The chart is set against a grey background.

Legend: ● Kaustubh bojewar ● agent2 agent2

Guilty Agent Downloads From Other Machine

| Sr. No | Agent Name | File Name | File Description |
|--------|------------------|-----------|------------------|
| 1 | Kaustubh bojewar | Q1.txt | ronal tp |
| 2 | Kaustubh bojewar | Q1.txt | ronal tp |
| 3 | Kaustubh bojewar | Q1.txt | ronal tp |
| 4 | Kaustubh bojewar | Q1.txt | ronal tp |

7. Administrator (Manage Agents)

The screenshot shows a software application window titled "Data Leakage Detection". The menu bar includes "File", "Distributor", "Agent", "Admin", "Change Password", and "Logout". The main title bar also displays "Data Leakage Detection".

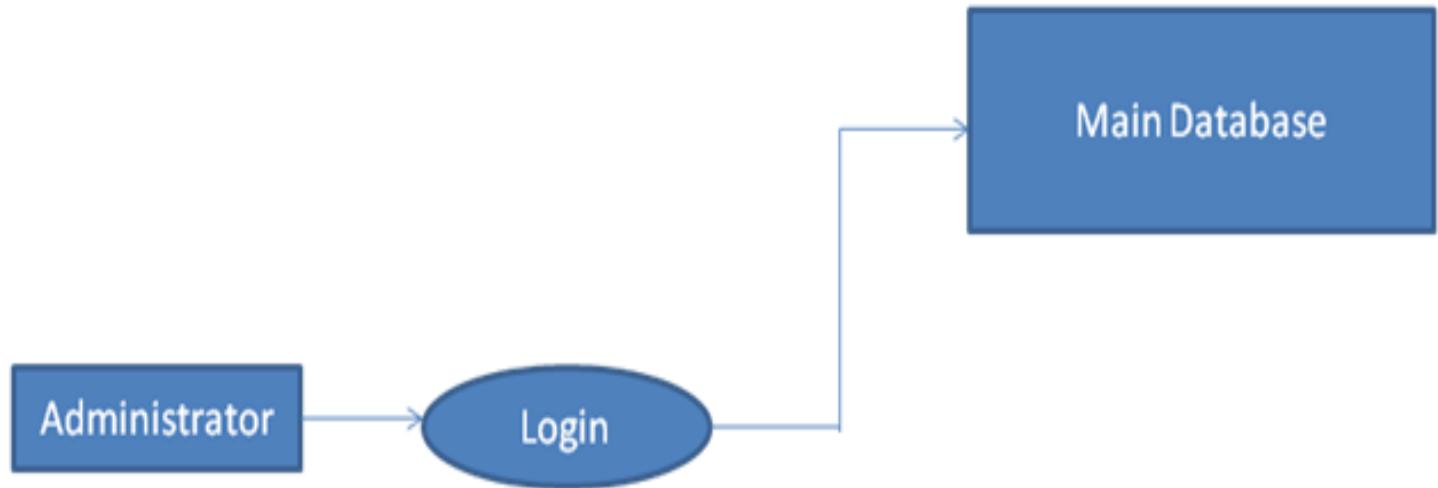
The interface is titled "Block Guilty Agent". It features a "Select Agent" dropdown menu currently set to "Kaustubh bojewar". Below it is a "Block Reason" input field, which is currently empty. At the bottom of the screen are two buttons: "Data Leakage Detection" and "Deactivate".

UML DIAGRAMS

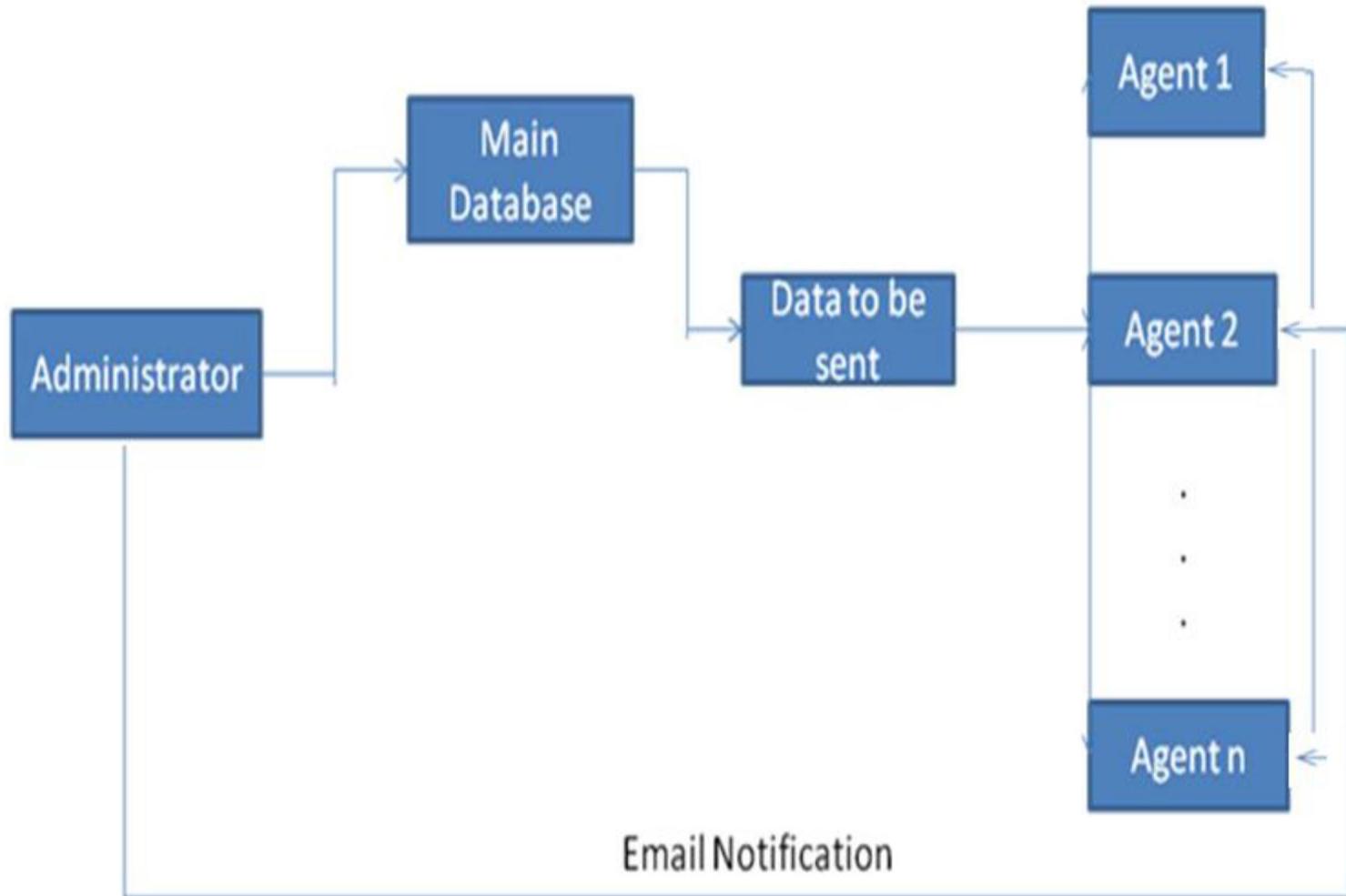
- Data Flow Diagram
- Use Case Diagram
- Class Diagram
- Sequence Diagram
- Activity Diagram

1. Data Flow Diagram

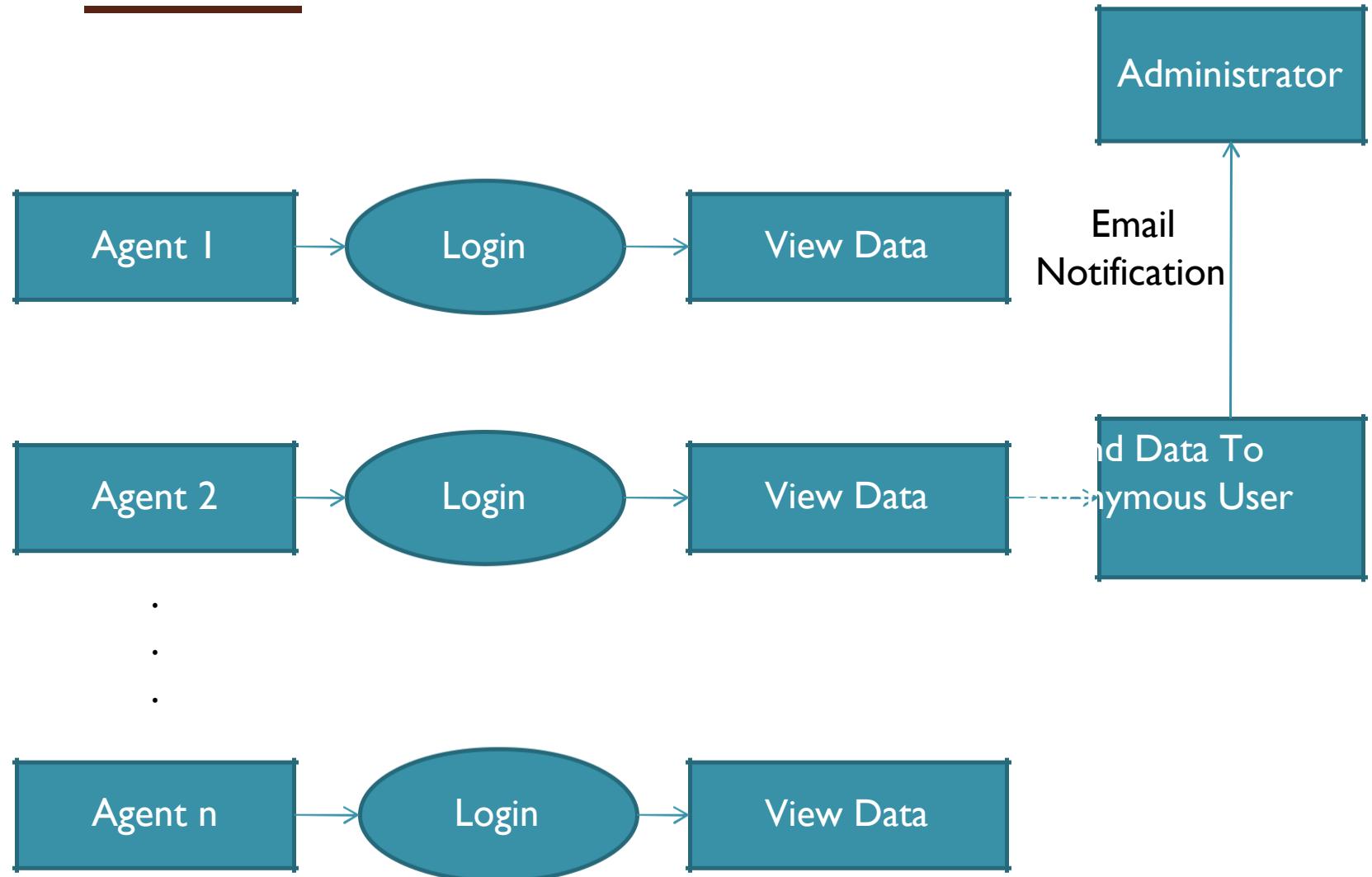
Level 0



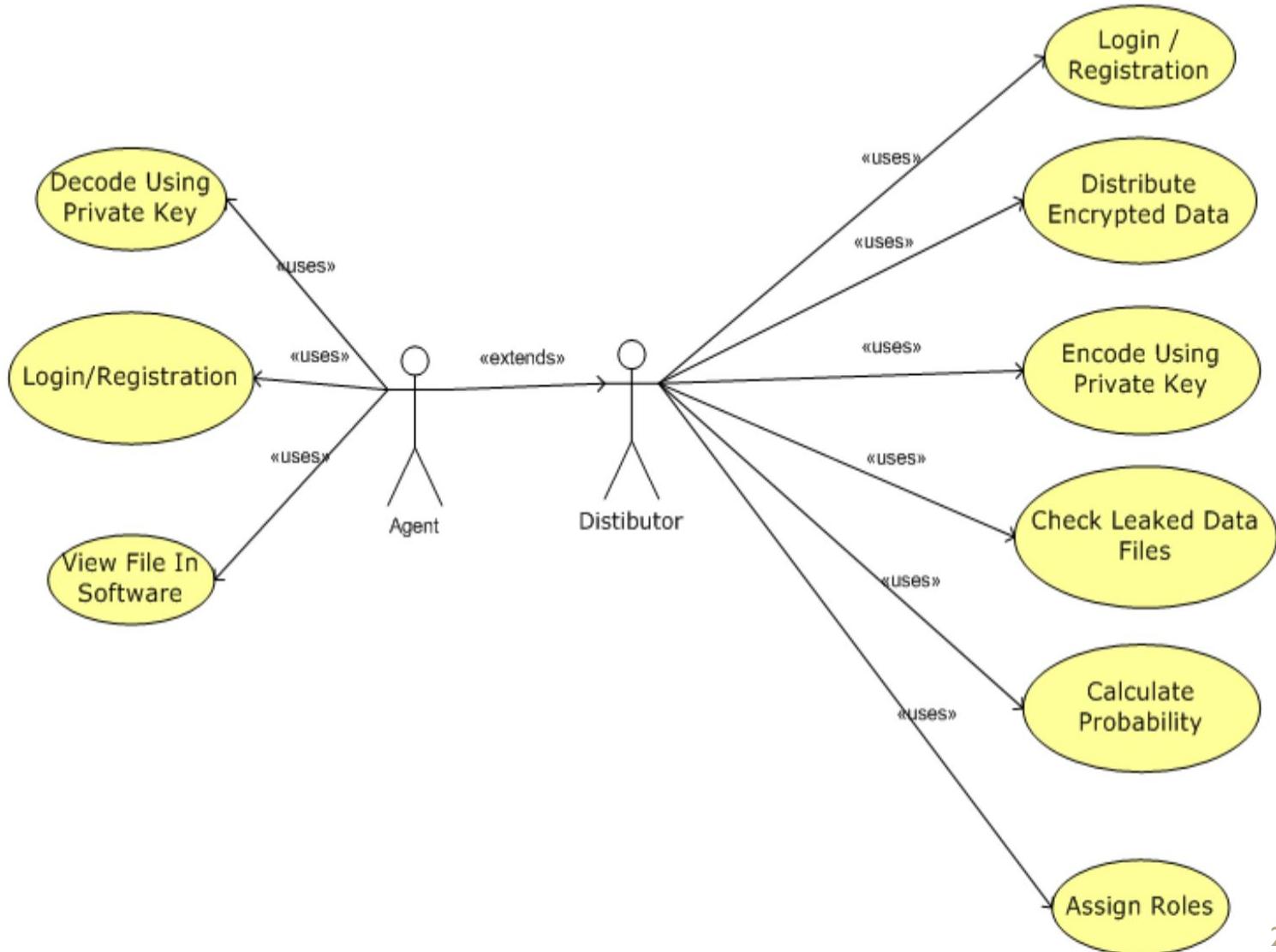
Level 1



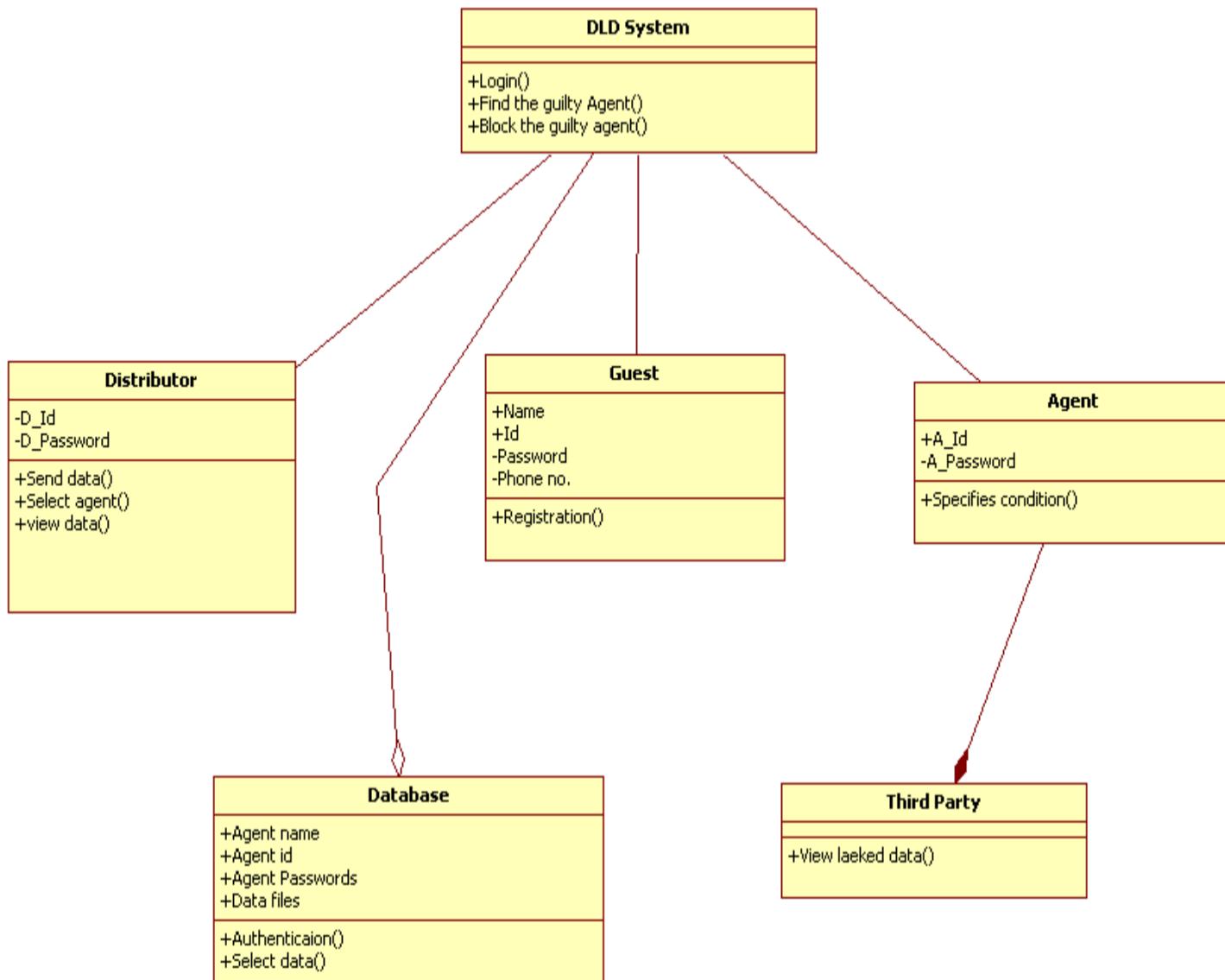
Level 2



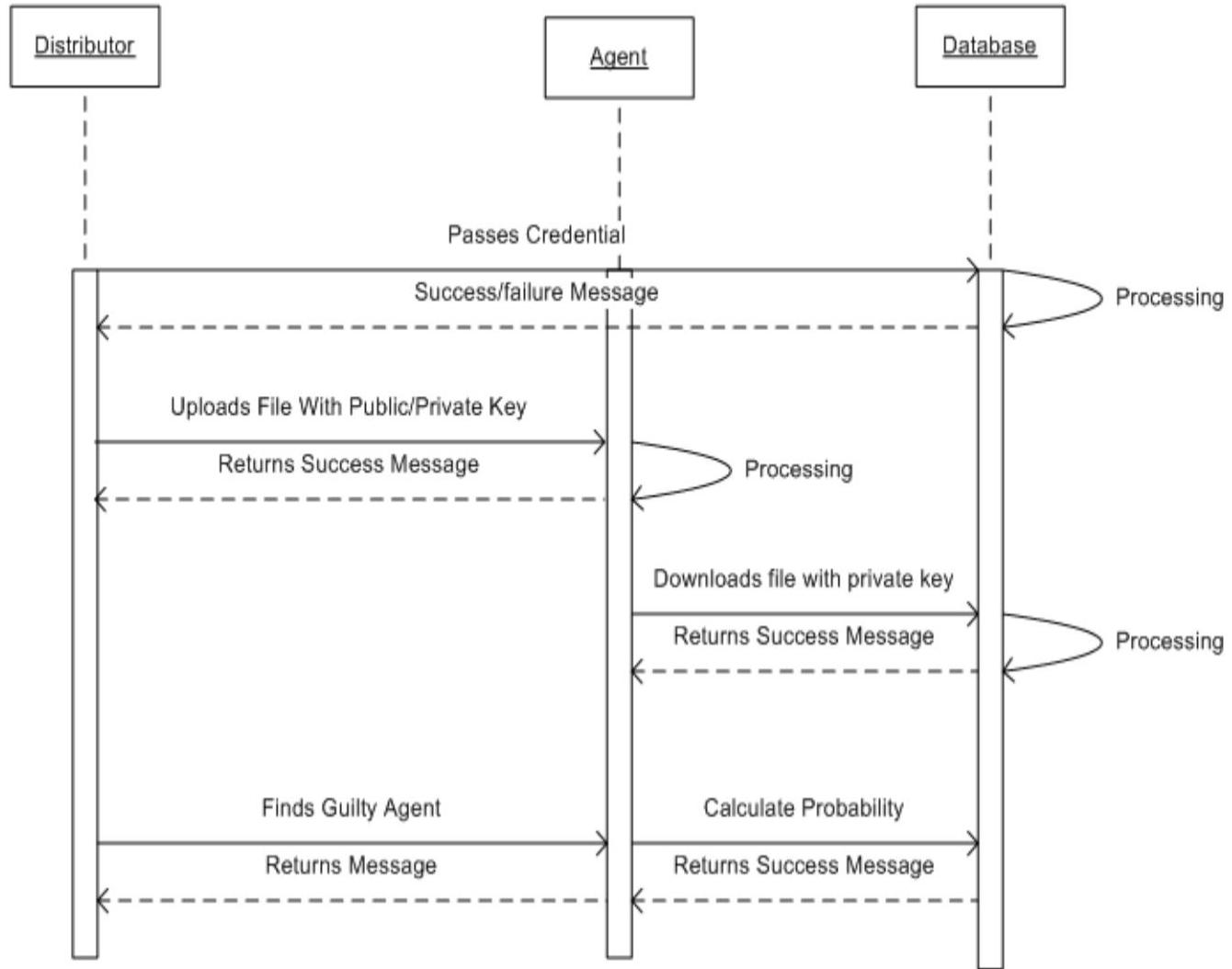
2. Use Case Diagram



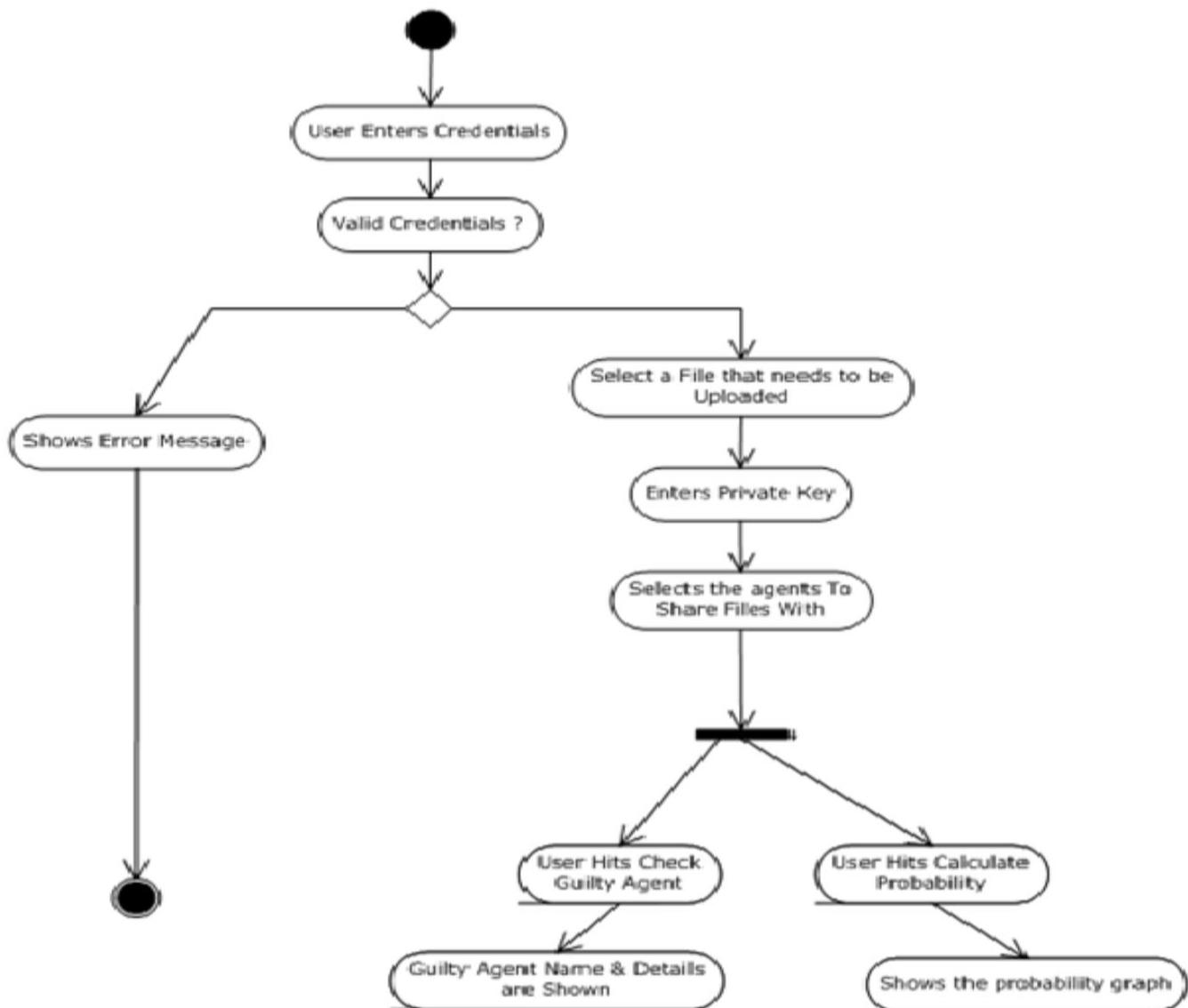
3. Class Diagram



4.Sequence Diagram



5. Activity Diagram



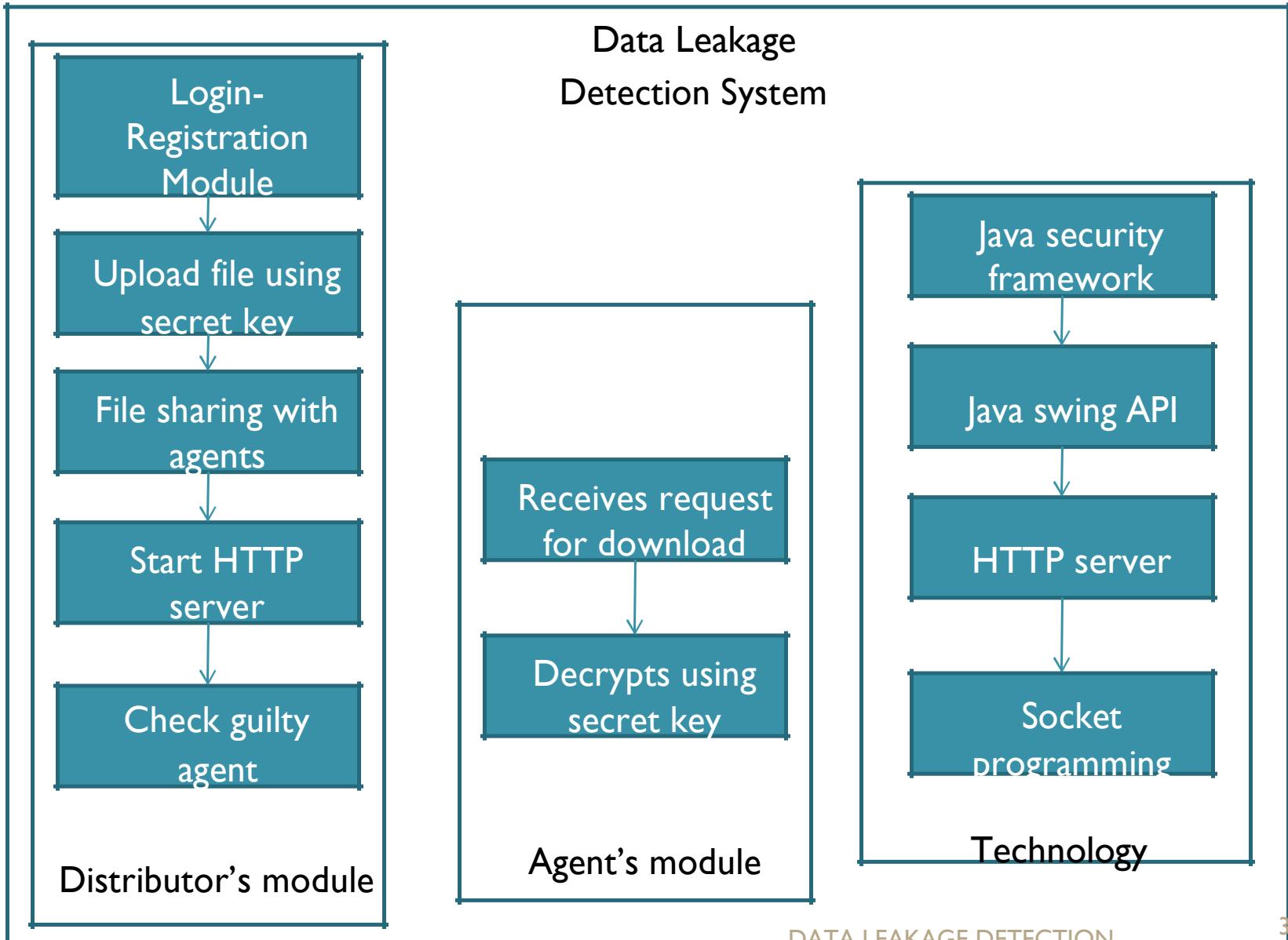
ADVANTAGES

- This system includes the *data hiding* along with the provisional software with which only the data can be accessed.
- This system gives *privileged access to the administrator (data distributor) as well as the agents* registered by the distributors. Only registered agents can access the system. The user accounts can be activated as well as cancelled.
- The exported file will be accessed only by the system. The agent has given only the permission to access the software and view the data. If the data is leaked by the agent's system the path and agent information will be sent to the distributor thereby the identity of the leaked user can be traced.

FUTURE SCOPE

- Currently, we are dealing with only text files in this project but in future we will try to deal with all types of files.
- Recent research papers say that it is not possible to find the exact guilty agent who has leaked the data. Instead, we are finding out the probability of the agent being guilty or who has leaked the data through calculation of number of downloads.
- For more security, we will also provide a verification code on the agent's mobile in future.

CONCLUSION



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THANK YOU...