Spice Girls

Prevent, Mitigate, and Recover (PMR) Insight Collective Knowledge (PICK) Software Design Document

Version 2.0

March 4, 2020

Document Control

Approval

The Guidance Team and the customer shall approve this document.

Document Change Control

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Distribution List

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Change Summary

The following table details changes made between versions of this document

Version	Date	Modifier	Description

1.0	3/4/2020	Spice Girls	Creation of Document
1.1	3/31/2020	Spice Girls	Completion of Protocols
1.2	3/31/2020	Spice Girls	Collaboration Diagram Update
2.0	5/7/2020	Spice Girls	Code Alignment

Table of Contents

1. Introduction

1.1. Purpose and Intended Audience

The purpose of creating the software design document is to aid in the development of the design and structure of the system that the team will build. It gives guidance on the design. The SDD document shows how the system can be separated into components to simplify the implementation. The intended audience are the guidance team, the software engineering teams, and the clients: Mr. Vincent Fonseca, Mr. Baltazar Santaella, Ms. Herandy Vasquez, Ms. Florencia Larsen, Dr. Oscar Perez, and Mr. Erick De Nava.

1.2. Scope of Product

PICK shall be a tool used by the white team analysts in order to efficiently sort through documents pertaining to adversarial assessments. These include computer log files and screenshots. These documents are then used to piece together an attack log to analyze the way in which the blue team responds to the red team's attack. Without the tool, analysts are currently having to open up all the files that they wish to reference in their attack graphs. In addition, this system shall simplify the way in which data is filled for nodes in the attack graph. The ultimate goal of the system is to reduce the amount of time doing each analysis to approximately two weeks. LSH recognizes the complexity and the time it takes to
analyze the applicable logs, observation notes, and other artifacts gathered from an adversarial assessment from the red, blue, and white teams and generate a report that presents the events that took place during the adversarial assessment. They want a system that would aid their analysts in correlating red team's activities to blue team's responses and represent the events that took place during an adversarial assessment graphically. UTEP and LSH are collaborating to develop Prevent, Mitigate, and Recover (PMR) Insight Collective Knowledge System (PICK) that will provide the ability to correlate red team's activities to blue team's responses and graphically represent the events that took place during an
adversarial assessment.

1.3. References

[1] Tai Ramirez, Elsa, *Prevent, Mitigate, and Recover (PMR) Insight Collective Knowledge System (PICK)* [SRS] El Paso, TX: UTEP, 2020

1.4. Definitions, Acronyms, and Abbreviations

1.4.1. Definitions

Data Cleansing	Data cleansing is the removal of unwanted characters from uncleansed TMUX log file; removal of blank rows from uncleansed excel log file; and removal of blank lines from uncleansed log file.
Data Validation	Data validation is the process of inspecting data in the cleansed log files based on predefined data validation rules.
Log Entry	Splunk takes the validated log files and converts them into normalized data. The normalized data are called log entries. Users of the system can filter and edit log entries.
Significant Log Entry	A log entry selected by the user and associated with a vector. The attributes are the same as for a log entry. The system stores significant log entries. Splunk stores log entries in the normalized data files.
Timestamp	Denotes time in hours:minutes, date in month:date:year, and section in am/pm.
Significant log entry	Denotes a log entry that is associated to at least one vector.

1.4.2. Acronyms

UTEP	The University of Texas at El Paso
LSH	The Lethality, Survivability, and HSI Directorate
SDD	Software Design Document
PICK	Prevent, Mitigate, and Recover (PMR) Insight Collective Knowledge

1.4.3. Abbreviations

e.g	For example
i.e	That is

1.5. Overview

The document is divided into six sections. The first section gives a description of the overall system and how all the components relate to each-other. The following four sections are detailed descriptions of subsections of the system. Each of the detailed descriptions of subsystems gives the subsystem name, its general description and classes. It also goes into describing the subsystem's responsibilities and contracts. The database section shows the relational diagram of the database as well as the schema for the database.

2. Decomposition Description

2.1. System Collaboration Diagram

The PICK System will be divided as follows:

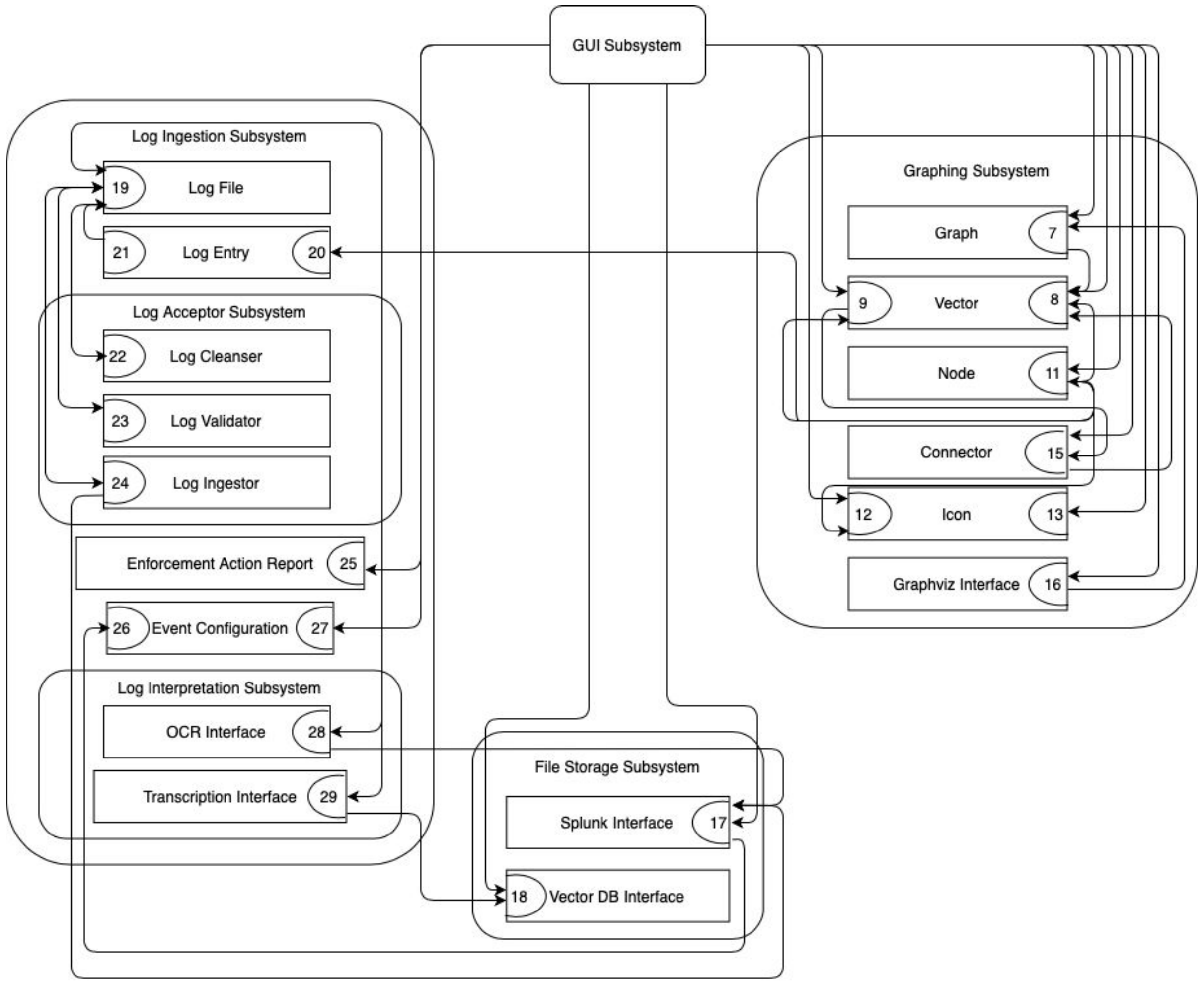


Figure 1: System Collaboration Diagram

2.2. Subsystem and Component Descriptions

The following section will describe the subsystems of the system and the classes they contain.

2.2.1. User Interface Subsystem

The GUI subsystem will handle any input and output of the system. It will allow the user to alter the system through prompts.

The classes of the subsystem are:

- Custom Icon Widget

- Enforcement Action Report Widget
- Export Configuration
- Filter Configuration
- Log File Configuration
- Graph Operations
- Pick Start Page
- Main Window
- Settings Window

The contracts of the subsystem include:

- Display Icon Creator
- Display Enforcement Action Report
- Display Export Configuration
- Display Filter Configuration
- Display Log File Configuration
- Generate Json
- Open Correct Window
- Display Main Window
- Display Settings Window

2.2.2. Graphing Subsystem

The classes of the subsystem include:

- Vector
- Node
- Icon
- Relationship

The contracts of the subsystem include:

- Know Vector Components
- Change Vector Components
- Know Node Details
- Change Node Details
- Know Icon Components
- Know Relationship Components
- Change Relationship Components

2.2.3. File Storage Subsystem

The file storage subsystem has interfaces to the vector database and to Splunk.

The classes for the subsystem include:

- Splunk Interface
- Vector DB Interface

The contracts of the subsystem include:

- Implement Splunk
- DB Interaction

2.2.4. Log Ingestion Subsystem

The log ingestion subsystem allows the user to create an event. It will allow the user to designate directories, access log files, interpret the log files, and split the log files into log entries.

The classes for the subsystem include:

- Log File
- Log Entry
- Log Acceptor Subsystem
    - Log Cleanser
    - Log Validator
- Interpretation Subsystem
    - Transcription
    - Audio Transcription Interface
    - ImageTranscription Interface

The contracts of the subsystem include:

- Know File Attributes
- Know Entry Attributes
- Create Entry
- Cleanse Logs
- Validate Logs
- Convert Audio Logs, Video Logs, and Image Logs to Text Logs

2.3. Dependencies

PICK is intended to run on Kali Linux and will be programmed in Python.

Log File will be dependent on an OCR and Transcription tool to convert visual and audio logs to text. It is also dependent on Splunk and a database that will function as file storage. Splunk will additionally aid in file filtering and searching.

The GUI will be using Graphviz to convert Graphs to attack graphs and timelines.

3. Detailed Description User Interaction Subsystem

3.1. Component Description

Component name: User Interaction Subsystem
Purpose: To allow the user to input information into the system and to view the state of the system.
Classes: User Interface

3.2. Class Description: Custom Icon Widget

Class: Custom Icon Widget	
Superclass:	
Subclasses:	
Private Responsibilities:	
Contract 1: Display Icon Creator	
Responsibilities	**Collaborations**
1. Display new icon widget 2. Set icon image 3. return icon image	2. Database Handler (xxxx) 3. Database Handler (xxxx)

initUI()
pre: none
post: displays the new icon widget

image()
pre: calling icon must be a valid icon object
post: returns the image pertaining to the icon object from which it is called

setImage(String value)
pre: calling icon must be a valid icon object, value must be a valid image
post: sets the icon's image to the new value

3.3. Class Description: Enforcement Action Report Widget

Class: Enforcement Action Report Widget
Superclass:
Subclasses:
Private Responsibilities:

1. Highlight line 2. Unhighlight 3. Highlight block 4. Update text changes	
Contract 2: Display Enforcement Action Report	
Responsibilities	**Collaborations**
1. Display enforcement action report 2. Accept updates to Splunk	2. Splunk handler (xxxx)

initUI()
pre: none
post: displays the enforcement action report widget and input is used to ingest proper log files to Splunk

3.4. Class Description: Export Configuration

Class: Export Configuration	
Superclass:	
Subclasses:	
Private Responsibilities:	
Contract 3: Display Export Configuration	
Responsibilities	**Collaborations**
1. Display export configuration GUI 2. Accept updates to export configuration	

initUI()
pre: none
post: displays the export configuration GUI and uses input to update export configuration which is stored on a local shelf

3.5. Class Description: Filter Configuration

Class: Filter Configuration
Superclass:
Subclasses:
Private Responsibilities:
Contract 4: Display Filter Configuration

Responsibilities	**Collaborations**
3. Display filter configuration GUI 4. Accept updates to filter configuration	

initUI()
pre: none
post: displays the filter configuration GUI and uses input to update filter configuration which is stored on a local shelf

3.6. Class Description: Log File Configuration

Class: Log File Configuration	
Superclass:	
Subclasses:	
Private Responsibilities:	
Contract 5: Display Log File Configuration	
Responsibilities	**Collaborations**
1. Display export configuration GUI 2. Accept updates to export configuration	

initUI()
pre: none
post: displays the log file configuration GUI and uses input to update log file configuration which is stored on a local shelf

3.7. Class Description: Graph Operations

Class: Graph Operations	
Superclass:	
Subclasses:	
Private Responsibilities:	
Contract 6: Generate Json	
Responsibilities	**Collaborations**
1. Parses vectors for Graphviz	1. Vector

graph_from_raw_vector(Vector vector)
pre: vector must be a valid vector
post: generates a Json for use by Graphviz

3.8. Class Description: Pick Start Page

Class: Pick Start Page	
Superclass:	
Subclasses:	
Private Responsibilities:	
Contract 27: Open Correct Window	
Responsibilities	**Collaborations**
1. Prompts user for what they want to do	1. Main Window (7), Settings Window (8)

pickStartPage()
pre: none
post: either settings view or main view is initialized depending on the user's selection

3.8. Class Description: Main Window

Class: Main Window GUI	
Superclass:	
Subclasses:	
Private Responsibilities: 1. Updates an entry from table 2. Determines what entry field is selected 3. Determines what node is selected 4. Determines what edge is selected 5. Determines what node is invoked 6. Determines what edge is invoked 7. Determines what node is removed 8. Determines what edge is removed	
Contract 7: Display Main Window	
Responsibilities	**Collaborations**
9. Display graph 10. Removes node 11. Saves graph	1. Graph Operations 2. Database Handler, Graph Operations 3. Graphviz

12. Loads graph	4. Graphviz
13. Creates new graph	5. Graph Operations
14. Adds node	6. Node
15. Deletes nodes	7. Node
16. Add edge	8. Relationships
17. Delete edte	9. Relationships
18. Updates views	10. Graph Operations
19. Opens filter configuration	11. Filter Configuration
20. Opens settings	12. Settings
21. Populates search table	13. Vector Database
22. Populates table	14. Database Handler
23. Populates graph	15. Database Handler
24. Generates models	16. Graph Operations\

save()
pre: none
post: saves a graph to a json wherever the user selects

new()
pre: none
post: generates a new graph the displays it

load()
pre: json file selected must be in the proper format
post: json file is displayed as a graph

save()
pre: none
post: saves a graph to a json wherever the user selects

addNode()
pre: none
post: blank node is made and added to the vector the graph in the main window represents

deleteNode()
pre: none
post: node is deleted and removed from the vector the graph in the main window represent

addEdge()
pre: none
post: blank edge is made and added to the vector the graph in the main window represents

deleteEdge()
pre: none
post: edge is deleted and removed from the vector the graph in the main window represent

updateViews(self)
pre: none
post: models generated, table, search table and graph populated

openExportConfig(self)
pre: none

post: opens export configuration

openFilterConfig(self)
pre: none
post: opens filter configuration

openSettings(self)
pre: none
post: opens settings

populateSearchTable(self)
pre: none
post: search table is populated with log entries

populateTable(self)
pre: none
post: table is populated with nodes and relationships

populateGraph(self)
pre: none
post: graph is populated with nodes and relationships

3.9. Class Description: Settings Window

Class: Settings Window GUI	
Superclass:	
Subclasses:	
Private Responsibilities:	
Contract 8: Display Settings Window	
Responsibilities	**Collaborations**
1. Display settings panel 2. Add project directory paths 3. Add project name and description 4. Add project start and end times 5. Add splunk credentials 6. Save project settings 7. Cleanse project files 8. Transcribe audio/image files 9. Validate project files 10. Ingest project files 11. Add icons 12. Edit Icons	1. Event Configuration 2. Event Configuration 3. Event Configuration 4. Splunk Handler 5. Log Cleanser 6. Transcription 7. Log Validator 8. Log Ingestor

13. Delete Icons 14. Open main window	

btn(int index)
pre: none
post: update the settings configuration stackview to the selected index

setDir(int index)
pre: none
post: opens a window to select a directory, then it fills the respective text input field (which is selected with the index parameter) with a selected directory

updateED()
pre: none
post: update event name and description on the settings database

updateDirLE()
pre: none
post: update directory path on the settings database

vaalidateTime()
pre: none
post: validate start and end time based on previous established criteria, if they are not valid, a dialog error message will pop-up and inform the user to fix them

validateRoot()
pre: the directory text input fields must contain non empty data
post: validate root directories based on previous established criteria, if they are not valid, a dialog error message will pop-up and inform the user to fix them

validateCredentials()
pre: the splunk text fields contain non empty data
post: validate credentials and establish a connection to local splunk server, if they are not valid, a dialog error message will pop-up and inform the user to fix them

startCleanse()
pre: files are present in the directories assigned
post: if files contain blank lines, or unreadable lines, those will be deleted and the file will be updated, nothing will occur to the files if they do not contain any of those

startAudioTranscription()
pre: audio files are present in the directories assigned
post: audio files will be transcribed to text, a copy with a different extension will be created

startImageTranscription()
pre: image files are present in the directories assigned
post: image files will be transcribed to text, a copy with a different extension will be created

startValidation()
pre: directories must be valid, and existing files must be present
post: generate enforcement action report for the files validated

organizeDirectories()
pre: directories must be configured accordingly
post: organize the raw files and copies in separate directories

startIngestion()
pre: directories must be configured accordingly
post: initialize the data ingestion process

startDataPopulation()
pre: none
post: redirects entries from splunk to the entry database document

openMain()
pre: none
post: open main window screen and close settings window

populateIcons()
pre: at least one icon file is present in collection
post: populates tables with the icon name, filepath, and an image of the icon

changeInIconTable()
pre: row must exist before it can be selected
post: point current selection to a specific file in the icon configuration table

showEditButtons()
pre: existing non-blank entry must be selected on the icon configuration table
post: displays and opens access to the edit and delete buttons

deleteIconConfigEdit()
pre: an existing icon must be selected
post: opens a dialog to ask for confirmation then proceeds to delete icon on collection

openIconConfigEdit()
pre: an existing icon must be selected
post: opens icon configuration window to configure fields of icon and update on icon collection

openIconConfigAdd()
pre: none
post: opens window configuration to add a new icon to icon collection

4. Detailed Description Graphing Subsystem

4.1. Component Description

Component Name: Graphing Subsystem
Purpose: Knows about the graph and its components
Classes: Vector, Node, Relationships, Icon

4.2. Class Description: Vector

Class: Vector	
Superclass:	
Subclasses:	
Private Responsibilities:	
Contract 9: Know Vector Components	
Responsibilities	**Collaborations**
1. Know vector name 2. Know vector time range 3. Know vector description 4. Know nodes belonging to vector 5. Know relationships belonging to vector	1. DB Handler 2. DB Handler 3. DB Handler 4. DB Handler 5. DB Handler
Contract 10: Change Vector Components	
Responsibilities	**Collaborations**
6. Change vector name 7. Change vector time range 8. Change vector description 9. Add nodes 10. Delete nodes 11. Add relationships 12. Delete relationships	1. DB Handler 2. DB Handler 3. DB Handler 4. DB Handler 5. DB Handler 6. DB Handler 7. DB Handler

changeVectorName(String name)
pre: none
post: if name does not belong to any other vector, vector name is changed to name; otherwise, no change occurs to vector

changeVectorTimeRange(Timestamp start, Timestamp end)
pre: none
post: vector time range is changed to that between start and end

changeVectorDescription(String description)
pre: none
post: vector description is changed to description

deleteNode(Node node)
pre: node must be within the vector
post: node is deleted to the vector; nothing else is changed

addRelationship(String name, Node source, Node destination)
pre: source, and destination must all be valid; source and destination are both within vector
post: a new relationship of called name will connect source and destination within vector

deleteRelationship(Relationship relationship)
pre: relationship and vector are valid; relationship is within vector
post: relationship is deleted and is no longer referenced by vector

4.3. Class Description: Nodes

Class: Nodes	
Superclass:	
Subclasses:	
Private Responsibilities: Knows the next node number in sequence, knows the node name, knows the node id, knows the node timestamp, knows the node's related file path (if any)	
Contract 11: Know Node Details	
Responsibilities	**Collaborations**
1. Knows node name 2. Knows node description 3. Knows node timestamp 4. Knows node icon 5. Knows related log file 6. Know node visibility 7. Know name visibility 8. Know id visibility 9. Know description visibility 10. Know log creator visibility 11. Know event type visibility 12. Know source visibility	1. DB Handler 2. DB Handler 3. DB Handler 4. DB Handler 5. DB Handler 6. DB Handler 7. DB Handler 8. DB Handler 9. DB Handler 10. DB Handler 11. DB Handler 12. DB Handler
Contract 11: Change Node Details	
Responsibilities	**Collaborations**

13. Create node	15. DB Handler
14. Change icons for nodes	16. DB Handler
15. Change name for nodes	17. DB Handler
16. Change description for nodes	18. DB Handler
17. Change node timestamp	19. DB Handler
18. Change node visibility	20. DB Handler
19. Change name for nodes	21. DB Handler
20. Change name visibility	22. DB Handler
21. Change id visibility	23. DB Handler
22. Change description visibility	24. DB Handler
23. Change log creator visibility	25. DB Handler
24. Change event type visibility	26. DB Handler
25. Change source visibility	27. DB Handler

Node(String name)
pre: none
post: log file created with node id being the next number in the sequence, timestamp being 00:00 00:00:0000, description left blank, and name as provided

Node(String name, LogFile file)
pre: log file must be valid
post: log file created with node id being the next number in the sequence, timestamp of log file, description of log file and name as provided

changeIcon(String name)
pre: name must be one of the names of icons already stored
post: the icon for the node changes to match the icon with the given name

changeName(String name)
pre: none
post: the name of the icon is changed to name

changeDescription(String name)
pre: none
post: the name of the icon is changed to name

changeTimestamp(Timestamp time)
pre: time must be a valid Timestamp
post: the time for the node changes to match the time provided

deleteNode()
pre: none
post: only given node deleted; node is deleted from the vector containing it

changeVisibility(boolean switch)
pre: none
post: the node becomes/stays visible if switch is true, the node becomes/stays invisible if switch is false

changeIDVisibility(boolean switch)
pre: none
post: the node id becomes/stays visible if switch is true, the node id becomes/stays invisible if switch is false

changeNameVisibility(boolean switch)
pre: none
post: the node name becomes/stays visible if switch is true, the node name becomes/stays invisible if switch is false

changeDescriptionVisibility(boolean switch)
pre: none
post: the node description becomes/stays visible if switch is true, the node description becomes/stays invisible if switch is false

changeLogEntryVisibility(boolean switch)
pre: none
post: the node log entry becomes/stays visible if switch is true, the node log entry becomes/stays invisible if switch is false

changeSourceVisibility(boolean switch)
pre: none
post: the node source becomes/stays visible if switch is true, the node source becomes/stays invisible if switch is false

changeLogCreatorVisibility(boolean switch)
pre: none
post: the node log creator becomes/stays visible if switch is true, the node log creator becomes/stays invisible if switch is false

changeEventTypeVisibility(boolean switch)
pre: none
post: the node event type becomes/stays visible if switch is true, the node event type becomes/stays invisible if switch is false

4.4. Class Description: Icon

Class: Icon	
Superclass:	
Subclasses:	
Private Responsibilities:	
Contract 12: Know Icon Components	
Responsibilities	**Collaborations**
1. Know icon name 2. Know icon path	1. DB Handler 2. DB Handler
Contract 13: Change Icon Components	
Responsibilities	**Collaborations**

3. Create icon 4. Delete icon 5. Change icon name 6. Change icon path	3. DB Handler 4. DB Handler 5. DB Handler 6. DB Handler

createIcon(String name, String filePath)
pre: filePath must lead to an image
post: icon called name and path filepath is created
deleteIcon()
pre: none
post: icon is deleted, it is removed from nodes containing it

changeIconName(String newName)
pre: none
post: icon's name is change to newName

changIconPath(String newPath)
pre: newPath must be contain an image file
post: icon's path is changed to newPath

4.5. Class Description: Relationship

Class: Relationship	
Superclass:	
Subclasses:	
Private Responsibilities:	
Contract 14: Know Relationship Components	
Responsibilities	**Collaborations**
1. Know relationship name 2. Know source node 3. Know destination node	1. DB Handler 2. DB Handler 3. DB Handler
Contract 15: Change Relationship Components	
Responsibilities	**Collaborations**
4. Create relationship 5. Change relationship name 6. Change source node 7. Change destination node 8. Delete relationship	6. DB Handler 7. DB Handler 8. DB Handler 9. DB Handler 10. DB Handler

createRelationship(Vector vector, String name, Node source, Node destination)
pre: none
post: relationship called name will connect source and destination within vector

changeRelationshipName(Relationship relationship, Name name)
pre: none
post: relationship name is changed to name

changeRelationshipSource(Vector vector, Relationship relationship, Node newSource)
pre: relationship and newSource must both be in vector
post: relationship's new source node is newSource

changeRelationshipDestination(Vector vector, Relationship relationship, Node newDestination)
pre: relationship and newDestination must both be in vector
post: relationship's new destination node is newDestination

deleteRelationship(Vector vector, Relationship relationship)
pre: none
post: relationship is deleted and removed from vector

5. Detailed Description File Storage Subsystem

5.1. Component Description

Component name: File Storage Subsystem
Purpose: Persistently stores changes made to vectors, nodes, relationships, icons and graphs.
Classes: Splunk Interface, Vector DB Interface

5.2. Class Description: Splunk Handler

Class: Splunk Handler	
Superclass:	
Subclasses:	
Private Responsibilities:	
Contract 16: Implement Splunk	
Responsibilities	**Collaborations**
1. get index from splunk 2. set index 3. upload files to splunk 4. add an index 5. delete an index 6. print users 7. print indexes 8. print jobs 9. create jobs 10. create a new user 11. add a directory 12. print inputs 13. download log entries from splunk 14. cleanse log files 15. Validate log files	1. Event Configuration (26)

get_index(string index) returns index
pre: access to Splunk must be valid and index exists
Post: Index returned

set_index(string name)
pre: access to Splunk must be valid
Post: index name is set

upload_file(string index, string path)
pre: access to Splunk must be valid
post: Files are now within splunk

add_index(string index)
pre: access to Splunk must be valid
Post: index is created

delete_index(string index)
pre: access to Splunk must be valid
Post: index is deleted

print_users() returns users
pre: access to Splunk must be valid
Post: users are printed

print_indexes() returns indexes
pre: access to Splunk must be valid
Post: indexes are printed

print_jobs() returns jobs
pre: access to Splunk must be valid
Post: jobs are printed

create_jobs()
pre: access to Splunk must be valid
Post: jobs are created

create_new_user(string username, string password, string role, string fullname)
pre: access to Splunk must be valid
Post: user is created

add_directory(string path)
pre: access to Splunk must be valid
Post: directory added

print_inputs() returns inputs
pre: access to Splunk must be valid
Post: inputs are printed

download_log_files()
pre: access to Splunk must be valid
Post: log files downloaded as log entries

cleanse(string file)
pre: access to Splunk must be valid
Post: file is cleansed. All empty rows are removed

validate(string file, string event_start, string event_end)
pre: access to Splunk must be valid
Post: files are validated

5.3. Class Description: DB Handler

Class: DB Handler

Superclass:	
Subclasses:	
Private Responsibilities:	
Contract 17: Log Entry Storage	
Responsibilities	**Collaborations**
1. Retrieve log entries 2. Create log entry 3. Delete log entry 4. Change log entry content 5. Change log entry timestamp 6. Change log entry host 7. Change log entry source 8. Change log entry source type	
Contract 18: Vector Storage	
Responsibilities	**Collaborations**
9. Create vector 10. Retrieve vector's name 11. Retrieve vector 12. Retrieve all vectors	

pushChanges(DBHandler database)
pre: database must be accessible
post: changes are pushed for approval

approveChanges(DBHandler database)
pre: database must be accessible and user must be a lead
post: changes are approved

pullChanges()
pre: database must be accessible
post: the system shall reflect changes on the main database

6. Detailed Description Log Ingestion Subsystem

6.1. Component Description

Component name: Log Ingestion Subsystem
Purpose: Deals with the initial input of files into the system
Classes: Log File, Log Entry, Log Cleanser, Log Validator, Log Ingestor, Enforcement Action Report, Evet Configuration, OCR Interface, Transcription Interface

6.2. Class Description: Log File

Class: Log File	
Superclass:	
Subclasses:	
Private Responsibilities:	
Contract 19: Know File Attributes	
Responsibilities	**Collaborations**
1. Know log file path 2. Know log file contents	

6.3. Class Description: Log Entry

Class: Log Entry	
Superclass:	
Subclasses:	
Private Responsibilities:	
Contract 20: Know Entry Attributes	
Responsibilities	**Collaborations**
1. Know log file path 2. Know timestamp 3. Know log entry content 4. Know source	
Contract 21: Create Entry	
Responsibilities	**Collaborations**

5. Create log entry	

6.4. Class Description: Cleanser

Class: Cleanser	
Superclass:	
Subclasses:	
Private Responsibilities:	
Contract 22: Cleanse Logs	
Responsibilities	**Collaborations**
1. Remove empty rows and columns 2.	

cleanse(File file)
pre: file must be a valid log file
post: file is cleansed by removing empty rows and columns

6.5. Class Description: Validator

Class: Log Validator	
Superclass:	
Subclasses:	
Private Responsibilities:	
Contract 23: Validate Logs	
Responsibilities	**Collaborations**
1. Check if log is in a given time range 2. Change validated status 3. Know validated status	1. Log File (19) 2. Log File (19) 3. Log File (19)

validate(LogFile file)
pre: file must be a valid log file which has been cleansed, validated status must be false
post: file is cleansed by checking if it si within a given time range and validated status becomes true

searchByPattern(Line line)
pre: file must be a valid log file which has been cleansed, validated status must be false
post: log file is assigned a group based on its timestamp

getEnforcementReport()
pre: instance of Validator class must be instantiated
post: report of the files not validated is returned

6.6. Class Description: Transcription

Class: Transcription	
Superclass:	
Subclasses:	
Private Responsibilities:	
Contract 29: Convert Audio Logs, Video Logs and Image Logs to Text Logs	
Responsibilities	**Collaborations**
1. Convert audio logs to text logs 2. Convert video logs to text logs 3. Convert image logs to text logs	1. Audio Transcription Interface 2. Audio Transcription Interface 3. Image Transcription Interface

transcribeAudio(String filePath, fileDirectory)
pre: filePath must lead to a valid audio file
post: creates a file in fileDirectory containing the text version of the audio file.

6.7. Class Description: Audio Transcription Interface

Class: Audio Transcription Interface	
Superclass:	
Subclasses:	
Private Responsibilities:	
Contract 29: Convert Audio Logs to Text Logs	
Responsibilities	**Collaborations**
1. Convert audio logs to text logs	

transcribeAudio(String filePath, fileDirectory)
pre: filePath must lead to a valid audio file
post: creates a file in fileDirectory containing the text version of the audio file.

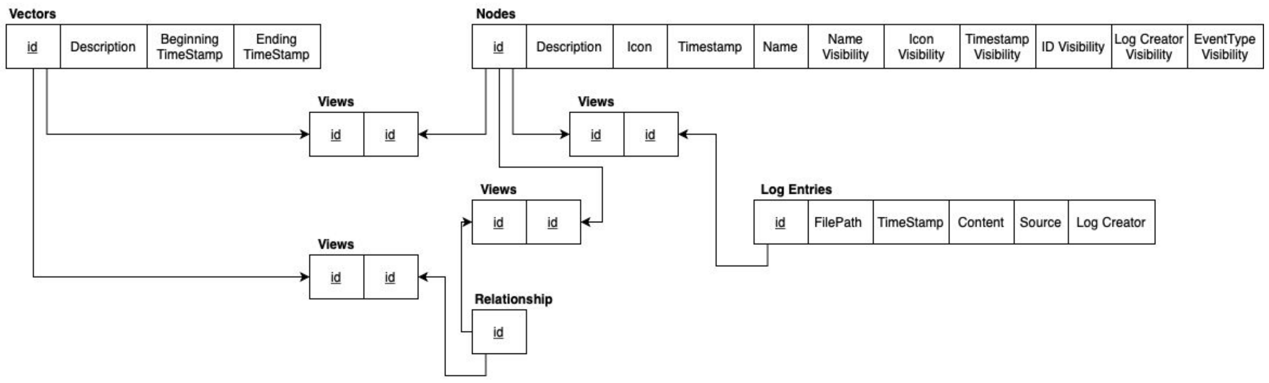
6.8. Class Description: Image Transcription Interface

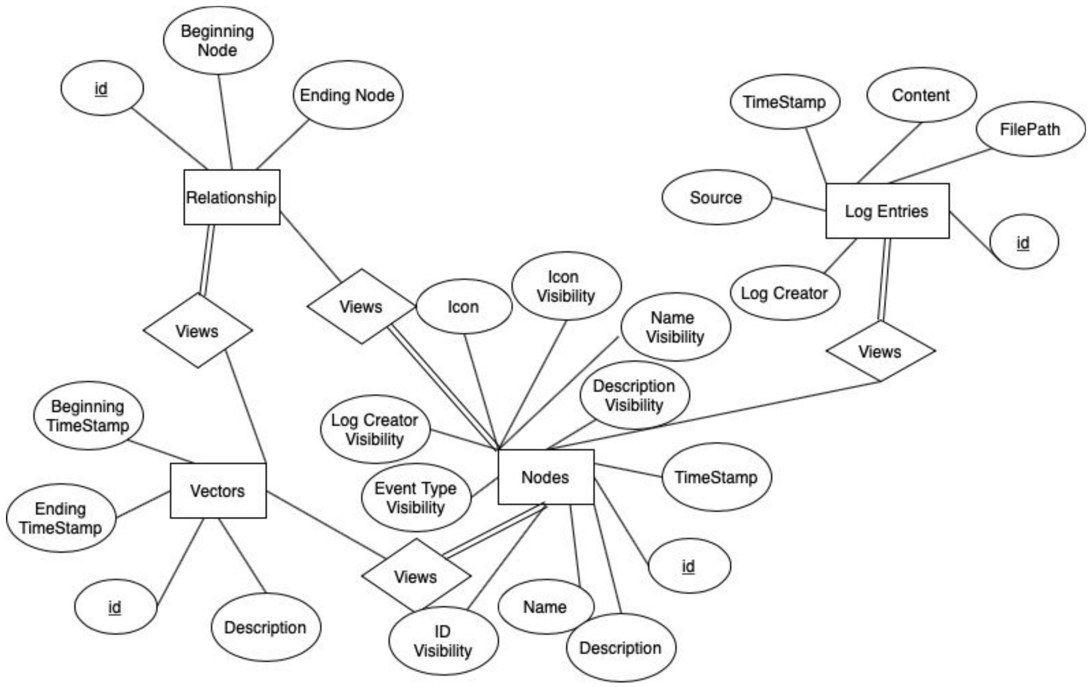
Class: Image Transcription Interface	
Superclass:	
Subclasses:	
Private Responsibilities:	
Contract 29: Convert Audio Logs to Text Logs	
Responsibilities	**Collaborations**
1. Convert image logs to text logs	

transcribeText(String filePath, fileDirectory)
pre: filePath must lead to a valid image file
post: creates a file in fileDirectory containing the text version of the image file.

7. Database

7.1. Database Schema





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