Spice Girls

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

Version 1.0

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

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 convert 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:

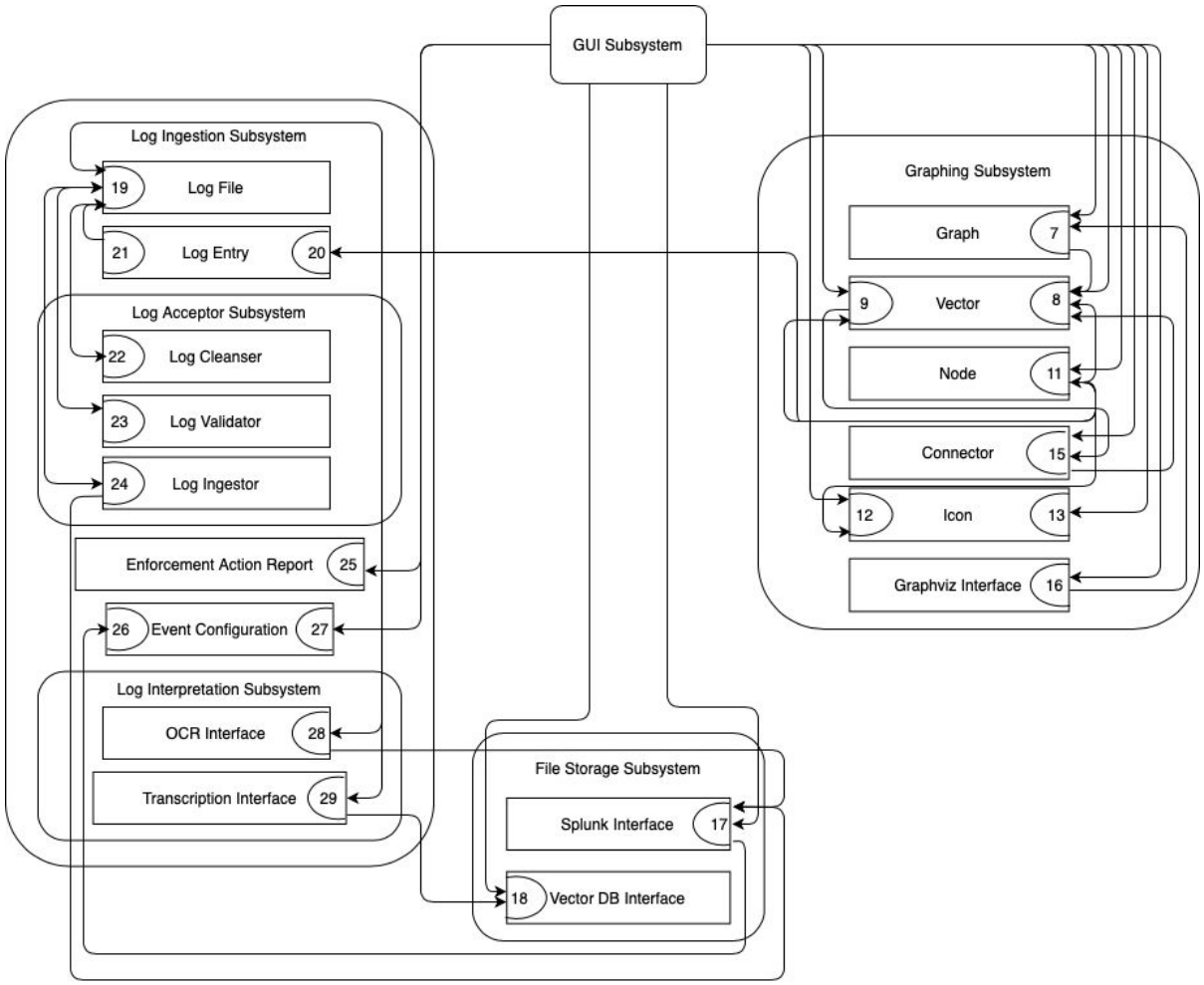


Figure 1: System Collaboration Diagram

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 class of the subsystem is:

- User Interface

The contracts of the subsystem include:

- Graph Interaction
- Vector Interaction
- Node Interaction
- Icon Interaction
- Event Creation
- Data Storage Interaction

2.2.2. Graphing Subsystem

The classes of the subsystem include:

- Graph
- Vector
- Node
- Icon
- Connector
- Graphviz Interface

The contracts of the subsystem include:

- Graph Settings
- Know Vector Components
- Change Vector Components
- Generate CSV
- Know Node Details
- Change Node Details
- Know Icon Components
- Know Connector Components
- Change Connector Components
- Implement Graphviz

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
    - Log Ingestor
- Enforcement Action Report
- Event Configuration
- Interpretation Subsystem
    - OCR Interface
    - Transcription Interface

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: User Interface

<table>
<tr><td colspan="2">Class: User Interface</td></tr>
<tr><td colspan="2">Superclass:</td></tr>
<tr><td colspan="2">Subclasses:</td></tr>
<tr><td colspan="2">Private Responsibilities:</td></tr>
<tr><td colspan="2">Contract 1: Graph Interaction</td></tr>
<tr><td>Responsibilities</td><td>Collaborations</td></tr>
<tr><td>1. Prompt to show/hide node
2. Prompt to change icon
3. Prompt to show/hide node name
4. Prompt to show/hide node id
5. Prompt to show/hide node description
6. Prompt to show/hide node timestamp
7. Prompt to show/hide log entry reference
8. Prompt to show/hide log creator
9. Prompt to show/hide event type
10. Prompt to show/hide source
11. Prompt to change orientation
12. Prompt to change interval units
13. Prompt to change interval
14. Display attack graph
15. Display timeline
16. Display table
17. Export CSV of the graph
18. Export PDF of the graph</td><td>

14. Graph (7) Graphviz Interface (16) Icon (12)
15. Graph (7) Graphviz Interface (16) Icon (12)
16. Graph (7) Graphviz Interface (16) Icon (12)
17. Vector (8, 30)
18. Graph (7) Graphviz Interface (16) Icon (12)</td></tr>
<tr><td colspan="2">Contract 2: Vector Interaction</td></tr>
<tr><td>Responsibilities</td><td>Collaborations</td></tr>
<tr><td>19. Prompt to delete node from vector
20. Prompt to filter through log entries
21. Prompt to search through log entries
22. Prompt to change vector name</td><td>19. Vector (9)
20. Splunk Interface (17)
21. Splunk Interface (17)
22. Vector (9)</td></tr>
</table>

23. Prompt to change vector description 24. Prompt to change vector time range 25. Prompt to delete vector 26. Prompt to change connector name 27. Prompt to change connector parent node 28. Prompt to change connector child node 29. Prompt to add connector 30. Prompt to delete connector	23. Vector (9) 24. Vector (9) 25. Vector (9) 26. Connector (15) 27. Vector (9) Connector (15) 28. Vector (9) Connector (15) 29. Vector (9) Connector (15) 30. Vector (9) Connector (15)
Contract 3: Node Interaction	
Responsibilities	**Collaborations**
31. Prompt user to create node from log file 32. Prompt user to create blank node 33. Prompt user to change node name 34. Prompt user to change node description 35. Prompt user to change node timestamp 36. Prompt user to change node source 37. Prompt user to delete node	32. Node (11) Log Entry (20) 33. Node (11) 34. Node (11) 35. Node (11) 36. Node (11) 37. Node (11) 38. Vector (8) Node (11)
Contract 4: Icon Interaction	
Responsibilities	**Collaborations**
39. Prompt user to create icon 40. Prompt user to delete icon 41. Prompt user to change icon name 42. Prompt user to change icon path	39. Icon (13) 40. Icon (13) 41. Icon (13) 42. Icon (13)
Contract 5: Event Creation	
Responsibilities	**Collaborations**
43. Prompt user to name event 44. Prompt user to add event description 45. Prompt user to select time range 46. Prompt user to select root directory 47. Prompt user to select blue team folder 48. Prompt user to select red team folder 49. Prompt user to select white team folder	43. Event Configuration (27) 44. Event Configuration (27) 45. Event Configuration (27) 46. Event Configuration (27) 47. Event Configuration (27) 48. Event Configuration (27) 49. Event Configuration (27)
Contract 6: Data Storage Interaction	
Responsibilities	**Collaborations**
50. Push changes to vector database 51. Pull changes from vector database 52. Approve changes to vector database	50. Vector DB Interface (18) 51. Vector DB Interface (18) 52. Vector DB Interface (18)

turnNodeVisibilityOn()
pre: nodeVisibility must be off

post: displays the node and applicable information (if turned on)

turnNodeVisibilityOff()
pre: nodeVisibility must be on
post: hides the entire node

changeIcon(String iconName)
pre: iconName must be a valid icon name
post: displays the changed node icon

turnNodeNameVisibilityOn()
pre: nodeNameVisibility must be off
post: displays the node with name

turnNodeNameVisibilityOff()
pre: nodeNameVisibility must be on
post: displays the node without name

turnNodeIDVisibilityOn()
pre: nodeNameVisibility must be off
post: displays the node with node id

turnNodeIDVisibilityOff()
pre: nodeIDVisibility must be on
post: displays the node without node id

turnNodeDescriptionVisibilityOn()
pre: nodeDescriptionVisibility must be off
post: displays the node with description

turnNodeDescriptionVisibilityOff()
pre: nodeDescriptionVisibility must be on
post: displays the node without description

turnNodeTimestampVisibilityOn()
pre: nodeTimestampVisibility must be off
post: displays the node with timestamp

turnNodeDTimestampVisibilityOff()
pre: nodeTimestampVisibility must be on
post: displays the node without timestamp

turnNodeLogEntryVisibilityOn()
pre: nodeLogEntryVisibility must be off
post: displays the node with log entry

turnNodeLogEntryVisibilityOff()
pre: nodeLogEntryVisibility must be on
post: displays the nod without log entry

turnNodeLogCreatorVisibilityOn()
pre: nodeLogCreatorVisibility must be off
post: displays the node with log creator

turnNodeLogCreatorVisibilityOff()
pre: nodeLogCreatorVisibility must be on
post:displays the node without log creator

turnNodeEventTypeVisibilityOn()
pre: nodeEventTypeVisibility must be off
post: displays the node with event type

turnNodeEventTypeVisibilityOff()
pre: nodeEventTypeVisibility must be on
post: displays the node without event type

turnNodeSourceVisibilityOn()
pre: nodeSourceVisibility must be off
post: displays the node with source

turnNodeSourceVisibilityOff()
pre: nodeSourceVisibility must be on
post: displays the node without source

turnLandscapeOrientation()
pre: orientation must be portrait
post: displays the change in orientation

turnPortraitOrientation()
pre: orientation must be landscape
post: displays the change in orientation

changeIntervalUnits(String unit)
pre: none
post: displays error if unit is not a valid unit; otherwise, displays the change in interval units

changeIntervals(int interval)
pre: none
post: requests new entry if interval is not positive; otherwise, displays the change in intervals

dispayAttackGraph(Graph graph)
pre: none
post: displays error if graph is invalid; otherwise, displays the graph that is returned

displayTimeline(Graph graph)
pre: none
post: displays error if graph is invalid; otherwise, displays the graph that is returned

displayTable(Graph graph)
pre: none
post: displays error if graph is invalid; otherwise, displays the graph that is returned

exportCSV(Vector vector)
pre: none
post: displays error if vector is invalid; otherwise, exports the String returned

exportPDF(Graph graph)
pre: none
post: error is displayed if graph is invalid; otherwise, exports the pdf file

deleteNode(Vector vector, Node node)
pre: node must be valid
post: the node is deleted, vector no longer references it and removes all connectors with it as a parent or child

filterLogEntries(Timestamp start, Timestamp stop)
pre: start must be before stop
post: the filtered results are displayed

filterLogEntries(String team)
pre: none
post: error is displayed if team is not “red”, “blue”, or “white”; otherwise, the filtered results are displayed

searchLogEntries(String keyword)
pre: none
post: the results fitting the description are displayed

changeVectorName(Vector vector, String name)
pre: none
post: error is displayed if vector is invalid; otherwise, the changed vector name is displayed

changeVectorDescription(Vector vector, String description)
pre: none
post: error is displayed if vector is invalid; otherwise, the vector description is changed

changeVectorTimeRange(Vector vector, Timestamp start, Timestamp end)
pre: none
post: error is displayed if vector, start and end are not valid and start is not before end; otherwise, the vector time range is changed to be between start and end

deleteVector(Vector vector)
pre: none
post: error is displayed if vector is invalid; otherwise, vector is deleted

changeConnectorName(Connector connector, Name name)
pre: none
post: error displayed if connector is not valid; otherwise, connector name is changed to name

changeConnectorParent(Vector vector, Connector connector, Node newParent)
pre: none
post: error is displayed if either vector, connector or newParent are invalid or if connector or newParent are not within vector; otherwise, connector’s new parent node is newParent

changeConnectorChild(Vector vector, Connector connector, Node newChild)
pre: none
post: error is displayed if either vector, connector, or newChild are invalid or connector or newChild are not within vector; otherwise, connector’s new child node is newChild

addConnector(Vector vector, String name, Node parent, Node child)
pre: none

post: error is displayed if either vector, parent, or child are invalid or if either parent or child do not exist within vector; otherwise, a new connector of called name will connect parent and child within vector

deleteConnection(Vector vector, Connector connector)
pre: none
post: error is displayed if either connector or vector are invalid or connector is not within vector; otherwise, connector is deleted and is no longer referenced by vector

createNode(String node)
pre: none
post: node called name and id as next number in sequence is created, all other fields are left blank; error is displayed if node does not exist

createNode(String name, LogFile file)
pre: none
post: node called name and id as next number in sequence is created, all other fields are decided according to the log file; error is displayed if log file does not exist

changeNodeName(Node node, String name)
pre: none
post: error is displayed if node does not exist; otherwise, node's name is changed to name; nothing else is changed about node

changeNodeDescription(Node node, String description)
pre: none
post: error is displayed if node does not exist; otherwise, node's description is changed to description; nothing else is changed about node

changeNodeTimestamp(Node node, Timestamp timestamp)
pre: none
post: error is displayed if node does not exist; otherwise, node's timestamp is changed to timestamp; nothing else is changed about node

changeNodeSource(Node node, String source)
pre: none
post: error is displayed if node does not exist; otherwise, node's source is changed to source; nothing else is changed about node

deleteNode(Node node)
pre: none
post: error is displayed if node does not exist; otherwise, node is deleted; it is removed from the vector containing it

createIcon(String name, String filePath)
pre: none
post: error is displayed if filePath does not lead to a valid image file; otherwise, icon called name with path filePath is created

deleteIcon(Icon icon)
pre: none
post: error is displayed if icon does not exist; otherwise, icon is deleted; nothing else changes

changeIconName(Icon icon, String newName)

pre: none
post: error is displayed if icon does not exist; otherwise, icon's name is changed to newName

changeIconPath(Icon icon, String newPath)
pre: none
post: error is displayed if icon does not exist or filePath is not the path to a valid image file; otherwise, icon's name is changed to newName

nameEvent(Event event, String name)
pre: none
post: error is displayed if event is invalid; otherwise, event name is set to name

eventDescription(Event event, String description)
pre: none
post: error is displayed if event is invalid; otherwise, event description is set to description

eventTimeRange(Event event, Timestamp start, Timestamp end)
pre: none
post: error is displayed if event, start, or end is invalid or start is not before end; otetherse, time range is set between start and finish

eventRootDirectory(Event event, String path)
pre: none
post: error is displayed if event or path is invalid; otherwise, root directory is set to path

eventBlueFolder(Event event, String path)
pre: none
post: error is displayed if event or path is invalid; otherwise, blue folder is set to path

eventWhiteFolder(Event event, String path)
pre: none
post: error is displayed if event or path is invalid; otherwise, white folder is set to path

eventRedFolder(Event event, String path)
pre: none
post: error is displayed if event or path is invalid; otherwise, red folder is set to path

pushChanges(VectorDBInterface database)
pre: none
post: error is displayed if database cannot be reached; otherwise, changes are pushed for approval

approveChanges(VectorDBInterface database)
pre: none
post: error is displayed if database cannot be reached or if user is not a lead; otherwise changes are approved

pullChanges(VectorDBInterface database)
pre: none
post: error is displayed if database cannot be reached; otherwise the system shall reflect changes on the main database

4. Detailed Description Graphing Subsystem

4.1. Component Description

Component Name: Graphing Subsystem
Purpose: Knows about the graph and its components
Classes: Graph, Graphviz Interface, Vector, Node, Connectors, Icon

4.2. Class Description: Graph

Class: Graph	
Superclass:	
Subclasses:	
Private Responsibilities:	
Contract 7: Graph Settings	
Responsibilities	**Collaborations**
1. Know related vector 2. Know node visibility 3. Know name visibility 4. Know id visibility 5. Know description visibility 6. Know node timestamp 7. Know orientation 8. Know interval units 9. Know interval 10. Know log entry visibility 11. Know log creator visibility 12. Know event type visibility 13. Know icon type visibility 14. Know source visibility 15. Change node visibility 16. Change name for nodes 17. Change id visibility 18. Change description visibility 19. Change node timestamp 20. Change orientation 21. Change interval units 22. Change interval 23. Change log entry visibility 24. Change log creator visibility 25. Change event type visibility 26. Change icon type visibility 27. Change source visibility	1. Vector (8)

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

changeName(String name)
pre: none
post: the name for the node changes to match the name provided

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

changeOrientation(String orientation)
pre: orientation must be “Portrait” or “Landscape”
post: the orientation becomes/stays in landscape if orientation is landscape, the orientation becomes/stays in portrait if orientation is portrait

changeIntervalUnits(String units)
pre: units must be a valid unit
post: interval units are changed

changeIntervals(int intervals)
pre: interval must be a positive number
post: interval size is changed

4.3. Class Description: Vector

Class: Vector	
Superclass:	
Subclasses:	
Private Responsibilities:	
Contract 8: 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 connectors belonging to vector	
Contract 9: Change Vector Components	
Responsibilities	**Collaborations**
6. Change vector name 7. Change vector time range 8. Change vector description 9. Delete nodes 10. Add connectors 11. Delete connectors	9. Node (11) 10. Connectors (15) 11. Connectors (15)
Contract 30: Generate CSV	
Responsibilities	**Collaborations**
12. Generate CSV	

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

addConnector(String name, Node parent, Node child)
pre: parent, and child must all be valid; parent and child are both within vector
post: a new connector of called name will connect parent and child within vector

deleteConnection(Connector connector)
pre: connector and vector are valid; connector is within vector
post: connector is deleted and is no longer referenced by vector

generateCSV() returns String CSV
pre: none
post: a CSV String is returned

4.4. 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 10: Know Node Details	
Responsibilities	**Collaborations**
1. Knows node name 2. Knows node description 3. Knows node timestamp 4. Knows related log file	
Contract 11: Change Node Details	
Responsibilities	**Collaborations**
5. Create node 6. Change icons for nodes 7. Change name for nodes 8. Change node timestamp 9. Delete node	5. Log Entry (20) 6. Icon (12) 9. Vector (8) Vector (9)

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

4.5. Class Description: Icon

Class: Icon	
Superclass:	
Subclasses:	
Private Responsibilities:	
Contract 12: Know Icon Components	
Responsibilities	**Collaborations**
1. Know icon name 2. Know icon path	
Contract 13: Change Icon Components	
Responsibilities	**Collaborations**
3. Create icon 4. Delete icon 5. Change icon name 6. Change icon path	

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

4.6. Class Description: Connector

Class: Connector	
Superclass:	
Subclasses:	
Private Responsibilities:	
Contract 14: Know Connector Components	
Responsibilities	**Collaborations**
1. Know connection name 2. Know parent node 3. Know child node	
Contract 15: Change Connector Components	
Responsibilities	**Collaborations**
4. Create connection 5. Change connection name 6. Change parent node 7. Change child node 8. Delete connection	4. Vector (8) 6. Vector (8) 7. Vector (8) 8. Vector (8)

createConnector(Vector vector, String name, Node parent, Node child)
pre: none
post: connector called name will connect parent and child within vector

changeConnectorName(Connector connector, Name name)
pre: none
post: connector name is changed to name

changeConnectorParent(Vector vector, Connector connector, Node newParent)
pre: connector and newParent must both be in vector

post: connector's new parent node is newParent

changeConnectorChild(Vector vector, Connector connector, Node newChild)
pre: connector and newChild must both be in vector
post: connector's new child node is newChild

deleteConnection(Vector vector, Connector connector)
pre: none
post: connector is deleted and removed from vector

4.7. Class Description: Graphviz Interface

Class: Graphviz Interface	
Superclass:	
Subclasses:	
Private Responsibilities:	
Contract 16: Implement Graphviz	
Responsibilities	**Collaborations**
1. Implement Graphviz 2. Export PDF	1. Graph (7) 2. Graph (7)

implementGraphviz(Graph graph, String type) returns int[][] Image
pre: graph must be valid, type must be either "Attack Graph", "Timeline", or "Table"
post: returns Image represents the vector with the conditions stored in graph in the format specified by type

exportPDF(Graph graph) returns a pdfImage
pre: graph must be valid
post: returns Image represents the vector with the conditions stored in graph

5. Detailed Description File Storage Subsystem

5.1. Component Description

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

5.2. Class Description: Splunk Interface

Class: Splunk Interface	
Superclass:	
Subclasses:	
Private Responsibilities:	
Contract 17: Implement Splunk	
Responsibilities	**Collaborations**
1. Pull log files from Splunk 2. Filter using Splunk	1. Event Configuration (26)

pullFiles()
pre: access to Splunk must be valid
post: Splunk files are now within the root directory

filterLogEntries(Timestamp start, Timestamp end) returns LogEntry[] list
pre: none
post: list contains the log entries in splunk reduced to those fitting within the timestamps

filterLogEntries(String team) returns LogEntry[] list
pre: none
post: list contains the log entries in splunk reduced to those originating from team

5.3. Class Description: Vector DB Interface

Class: Vector DB Interface
Superclass:
Subclasses:
Private Responsibilities:
Contract 18: DB Interaction

Responsibilities	**Collaborations**
1. Pull updates to vectors and components from DB 2. Push updates to vectors and components from DB 3. Approve updates to vectors and components from DB	

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

approveChanges(VectorDBInterface 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 3. Know cleansing status 4. Know validation status 5. Know ingestion status	2. Splunk Interface (17) OCR Interface (28) Transcription Interface (29) 3. Log Cleanser (22) 4. Log Validator (23) 5. Log Ingestor (24)

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. Divide log file	5. Log File (19)

divideLogFil(LogFile file)
pre: file must be a valid log file
post: one or many log entries is made from the log file

6.4. Class Description: Log Cleanser

Class: Log Cleanser	
Superclass:	
Subclasses:	
Private Responsibilities:	
Contract 22: Cleanse Logs	
Responsibilities	**Collaborations**
1. Remove empty rows and columns 2. Change cleansed status 3. Know cleansed status	

cleanseLog(LogFile file)
pre: file must be a valid log file, cleansed status must be false
post: file is cleansed by removing empty rows and columns and cleansed status becomes true

6.5. Class Description: Log 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)

validateLog(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

6.6. Class Description: Log Ingestor

Class: Log Ingestor	
Superclass:	
Subclasses:	
Private Responsibilities:	
Contract 24: Ingest Logs	
Responsibilities	**Collaborations**
1. Take files into the system 2. Change ingested status 3. Know ingested status	1. Log File (19) Splunk Interface (17) 2. Log File (19) 3. Log File (19)

ingestLog(LogFile file)
pre: file must be a valid log file that has been cleansed and validated but not ingested
post: file is ingested by copying it within the system, ingested status becomes true

6.7. Class Description: Enforcement Action Report

Class: Enforcement Action Report	
Superclass:	
Subclasses:	
Private Responsibilities:	
Contract 25: Know Failed Logs	
Responsibilities	**Collaborations**
1. Know logs that do pass the validation 2. Know logs that do not pass the validation	1. Log Validator (23) 2. Log Validator (23)

6.8. Class Description: Event Configuration

Class: Event Configuration
Superclass:
Subclasses:
Private Responsibilities:

Contract 26: Know Event Attributes	
Responsibilities	**Collaborations**
1. Know event name 2. Know event description 3. Know event time range 4. Know root directory 5. Know red team directory 6. Know blue team directory 7. Know white team directory	
Contract 27: Change Event Description	
Responsibilities	**Collaborations**
8. Change event name 9. Change event description 10. Change event time range 11. Change root directory 12. Change red team directory 13. Change blue team directory 14. Change white team directory	

nameEvent(String name)
pre: none
post: event name is set to name

eventDescription(String description)
pre: none
post: event description is set to description

eventTimeRange(Timestamp start, Timestamp end)
pre: start and end must be valid timestamps and start must be before end
post: time range is set between start and finish

eventRootDirectory(String path)
pre: path must be valid
post: root directory is set to path

eventBlueFolder(String path)
pre: path must be valid
post: blue folder is set to path

eventWhiteFolder(String path)
pre: path must be valid
post: white folder is set to path

eventRedFolder(String path)
pre: path must be valid
post: red folder is set to path

6.9. Class Description: OCR Interface

Class: OCR Interface	
Superclass:	
Subclasses:	
Private Responsibilities:	
Contract 28: Convert Visual Logs to Text Logs	
Responsibilities	**Collaborations**
1. Convert visual logs to text logs	1. Splunk Interface (17) Log File (19)

visualToText(ImageFile image) returns LogFile file
pre: image must be a valid image file
post: returns file which contains the content of image in a text format

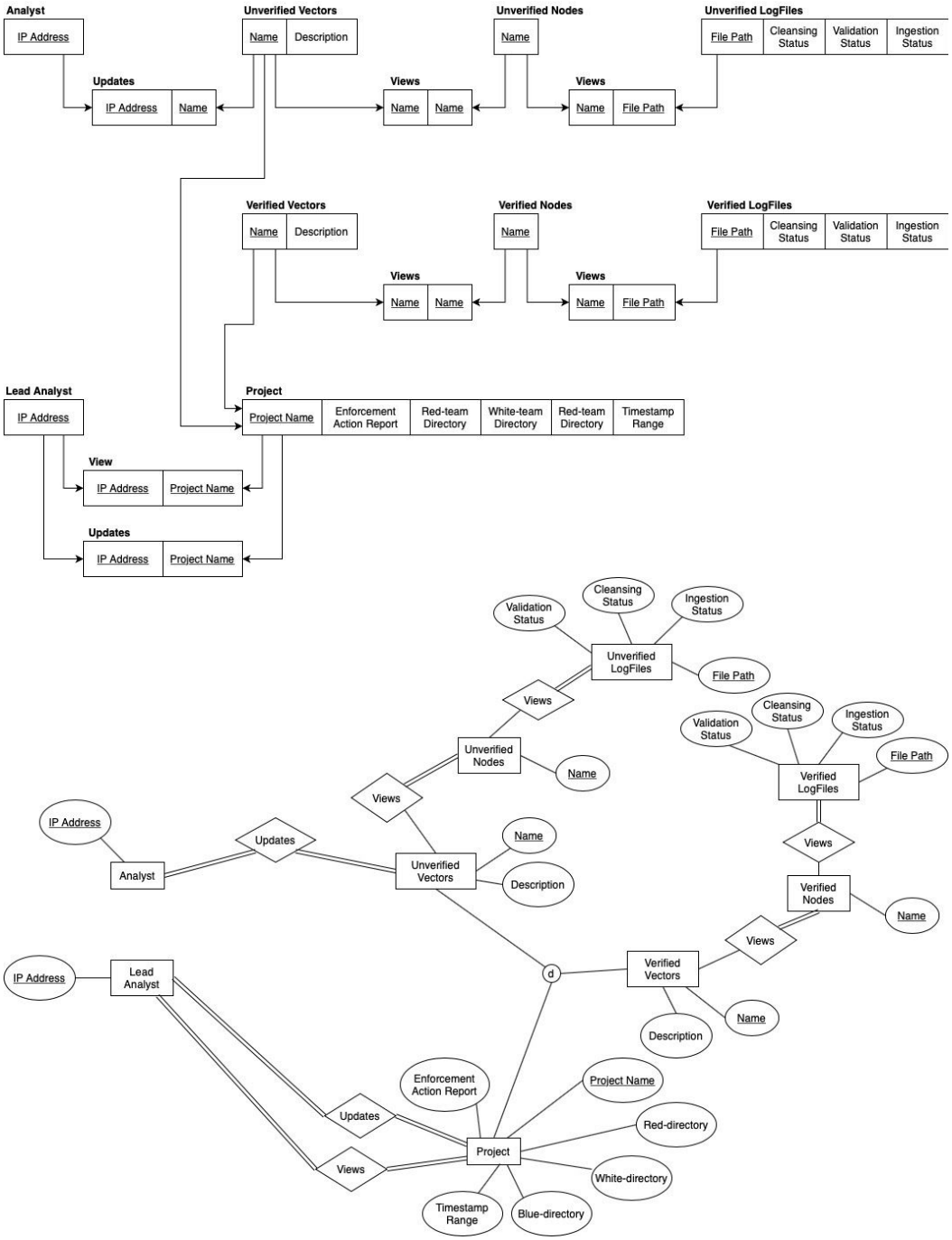
6.10. Class Description: Transcription Interface

Class: Transcription Interface	
Superclass:	
Subclasses:	
Private Responsibilities:	
Contract 29: Convert Audio Logs to Text Logs	
Responsibilities	**Collaborations**
1. Convert audio logs to text logs	1. Splunk Interface (17) Log File (19)

audioToText(AudioFile audio) returns LogFile file
pre: audio must be a valid audio or video file
post: returns file which contains the content of audio in a text format

7. Database

7.1. Database Schema



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