Project Report

ISTM-624: Advanced System Analysis and Design

Team Invaders (603-1)

The Rescue911 Emergency Response Information System (ERIS): A Systems Development Project Case

- BY

Violin Mohandas

Divyesh Batra

Himanshi Khandelwal

Pooja Raj

Prashant Shishodia

Contents

1.1. Business Case 5
1.1.1. Problem Statement 5
1.1.2. Business Opportunity 5
1.1.3. Benefits, Goals and Measurement Criteria 5
1.1.4. Feasibility 6
1.1.5. Risks 6
1.2. Requirements 7
1.2.1. Functional Requirements 7
1.2.2. Nonfunctional requirements 7
1.2.3. Process-oriented Requirements 8
1.2.4. Information-oriented Requirements 8
1.3. Physical ERD: 9
1.4. Class Diagram: 10
1.5. Package Diagram: 11
1.6. Deployment Diagram: 12
1.7. Use Cases 13
1.7.1. Use Case 1: Log Emergency Call 13
1.7.2. Sequence Diagram 1: Log Emergency Call 14
1.7.3. Use Case 2: Dispatch Emergency Responses 15
1.7.4. Sequence Diagram 2: Dispatch Emergency Responses 16
1.7.5. Use Case 3: Record arrival and departure of Response Team 17
1.7.6. Sequence Diagram 3: Record arrival and departure of Response Team 18
1.7.7. Use Case 4: Record Response Team's Clock In and Clock Out Time 19
1.7.8. Sequence Diagram 4: Record Response Team's Clock In and Clock Out Time 20
1.7.9. Use Case 5: Generate Exception report 21
1.7.10. Sequence Diagram 5: Generate Exception report 22
1.7.11. Use Case 6: Generate Scheduled report 23
1.7.12. Sequence Diagram 6: Generate Scheduled report 24
1.7.13. Use Case 7: Generate Summary report 25
1.7.14. Sequence Diagram 7: Generate Summary report 26
1.7.15. Use Case 8: Cancellation of an Emergency 27

1.7.16. Sequence Diagram 8: Cancellation of an Emergency 28
1.7.17. Use Case 9: Record Billing services of patients 29
1.7.18. Sequence Diagram 9: Record Billing services of patients 30
1.7.19. Use Case 10: Adding new Rescue Personnel 31
1.7.20. Sequence Diagram 10: Adding new Rescue Personnel 32
1.7.21. Use Case 11: Deleting a Rescue Personnel 33
1.7.22. Sequence Diagram 11: Deleting a Rescue Personnel 34
1.7.23. Use Case 12: Temporarily add Rescue Personnel to Response Team 35
1.7.24. Sequence Diagram 12: Temporarily add Rescue Personnel to Response Team 36
1.7.25. Use Case 13: Request Response Team from External Emergency Service Company 37
1.7.26. Sequence Diagram 13: Request Response Team from External Emergency Company 38
1.7.27. Use Case 14: New Response Team Selection/Creation 39
1.7.28. Sequence Diagram 14: New Response Team Selection/Creation 40
1.7.29. Use Case 15: Log Emergency case service description 41
1.7.30. Sequence Diagram 15: Log Emergency case service description 42
1.8. Mockups 43
1.8.1. First Mockup is the general dashboard that staff member would see after logging in. 43
1.8.2. Log New Call request 43
1.8.3. List of Available Response Teams 44
1.8.4. Analytics depicting revenue 44
1.8.5. Subscription Reports and Incident Reports 45
1.8.6. Social Media Plugin and Live Feeds 45
1.8.7. New Messages Received 46
1.8.8. New Alerts Received 46
1.8.9. Add Response Personnel 47
1.8.10. Login Screen for Rescue Personnel 48
1.8.11. Home Screen 49
1.8.12. Log Case Details 51
1.8.13. Dispatch Response Teams 54
1.9. Test Plan: 55
1.9.1. Functional Requirements 55
1.9.2. Nonfunctional requirements 55
1.9.3. Process-oriented Requirements 56
1.10. Assumptions 63

1.1. Business Case

1.1.1. Problem Statement: Rescue 911 is an ambulance and emergency services company that operates a single 24-hour emergency operation call center to address emergencies that include: vehicle collision, heart attacks, strokes, stabbings, drowning etc. Trained dispatchers dispatch rescue teams on-site to address the situation. The assignment of response priorities and the coordination of the dispatch process are key offerings by Rescue 911 team.

However, due to a significant growth in operations in recent year, the services have degraded over time owing to manual intervention by the team, non-automated processes, no real-time logging of events and lack of proper documentation.

1.1.2. Business Opportunity: In order to reduce manual intervention by Rescue911's dispatchers and keep pace with their growth rate, a new information system must be introduced in the organization with an objective to maintain the infrastructural capacity to deliver emergency services solution. In other words, an intelligent automated system should be installed between dispatchers and the users, which can easily log calls and ensure accuracy of response team dispatching. Moreover, the new application can be efficiently enhanced to administer internal operational effectiveness by keeping a track of shift timings of the employees, along with generation of comprehensive reports for analysis by senior leadership in the organization. The Rescue911 mobile application is a one stop shop solution for the users and the employees to easily access the system anywhere anytime which uses a distributed system for easy availability and scalability.

1.1.3. Benefits, Goals and Measurement Criteria

Category	Benefit	Reason
Financial	● New revenue generated ● Upsurge in costs	The system is most likely to generate new revenue for Rescue 911 owing to process improvement and lower response time in addressing the situation. The automated process would be a highly intelligent system which can be fully integrated with other technology stacks prevalent in the organization. Lesser response time would lead to more incidents being handled by the organization, which would increase the revenue for the organization. However, the system would require timely upgradations owing to use of sophisticated technology.
Operational		The system would provide a platform to dispatchers to log new call information and would link it with available response teams on site. It would significantly save a lot of man-hours without excessive reliance on manual

		coordination. Moreover, as the new system would be well aware of grades of response team; the linkage of a response team to the severity of an incident would be accurate, thereby enhancing the quality of service.
Market	• Additional competitive advantage	Owing to reduction in product time to market and increased operation efficiency, a dispatcher would not have to contact external emergency services company in times of conflicting incidents. Robust system would lead to organized behavior and resource availability.
Customer	• Improved customer satisfaction • Increased customer retention • Greater customer loyalty	By logging caller's information, the system would ensure confirmation to callers whether a response has been dispatched or not. All customer related information would be saved and can be reused in case of future incidents.
Staff	• Increased staff satisfaction • Improved organizational culture • Longer staff retention	Logging of shift timings and generation of comprehensive reports would introduce the value of analytics in the organization leading to metrics for performance management and highly strategic decisions by senior leadership. Rescue911 mobile application would help the staff to easily access the system and perform their duties.

1.1.4. Feasibility: Since the process is digitalized; to ensure the feasibility of the process, system interaction can be categorized into: New Technology, New People (dispatchers) and New Processes. Each module should be examined by the staff with proper hands-on training on each section of the admin tool created. Then proper feasibility analysis should take place to see whether resultant benefits match those expected as per requirements.

Component	Rating (1-10)	Method Used to Determine Feasibility
New Technology	9	Rescue911 mobile application is a one stop shop solution. Simultaneously, the webpage can be used as the needs arises.
New People	8	A survey can be performed among dispatchers for basic knowledge of dashboards.
New Processes	6	Processes are digitalized and compared with competing organizations.

1.1.5. Risks: Since the assignment of response priorities and the coordination of the dispatch process are core to Rescue911's value offerings, any risk associated with aforementioned offerings would disrupt the whole process and severely impact organization's reputation.

Description	Likelihood	Impact	Mitigating Actions
Inability to recruit skilled resource	Low	Very High	Outsource project to an external emergency response organization with proven industry experience and appropriately skilled staff.
Technology solution is unable to deliver required results	Medium	High	Module-by-module analysis of the tool and make room for process enhancements. Ensure the services are always up and running with 24 X 7 IT support. Employ solution architects or subject matter experts to improve business processes.
Additional capital expenditure may be required in addition to that approved	Medium	Medium	Maintain strict cost management processes during the project

1.2. Requirements

1.2.1. Functional Requirements

Since ERIS will be implemented using the phased approach, the functional requirements will be met using the following functional requirements -

1.2.1.1. Computer aided dispatch subsystem (CAD) – Primary users: Operators and Supervisors

a. Log emergency calls received
b. Dispatch, track and manage emergency responses
c. Reporting and online querying
d. Response team records management

1.2.1.2 Mobile Application subsystem (MAS) – Primary users: Response Personnel and Managers

a. Rescue records management
d. Response Personnel shift logging (clocking in and out)
e. Reporting

1.2.1.3. Subscriber management subsystem (SMS) – Primary users: Managers

a. Direct and indirect subscriber records management

b. Reporting

1.2.1.4. Electronic patient care reporting subsystem (EPCR) – Primary users: Response Personnel
a. Capture patient care data
b. Reporting the dependencies between these sub-system

1.2.2. Nonfunctional requirements

1.2.2.1. Operational Requirements

a. The system should be compatible with any web browser.
b. The system can be run on any device ranging from handheld devices to desktops and laptops..

1.2.2.2. Performance Requirements

a. The system should be available 24/7
b. The average response time of the system should be less than 2 seconds.
c. Report generation should not exceed 20 seconds.
d. Current users – 2 million, current Rescue Personnel – 2000; System should be able to scale out efficiently from here onwards.
e. System should be able to handle traffic of minimum 125000 emergency entries per day
f. In the event of system failure, backup should kick in within 10 seconds.

1.2.2.3. Security Requirements

a. Antivirus and other required protection software should be installed in the system.
b. Only authenticated and authorized users should be able to access ERIS.

1.2.2.4. Cultural and political Requirements

a. Protection of personal information as per the Data Protection Act.

1.2.3. Process-oriented Requirements

1.2.3.1. The system allows operators to view patient historic records for 5 years.

1.2.3.2. The system must maintain real time information about Rescue Personnel, response teams and be accessible to the operator.

1.2.3.3. System should be able to use emergency location to lookup available response teams.

1.2.3.4. While assigning response teams, call center operators should be able to see and match emergency levels to response team grade.

1.2.3.5. System should be able to generate reports for schedules, exceptions etc.

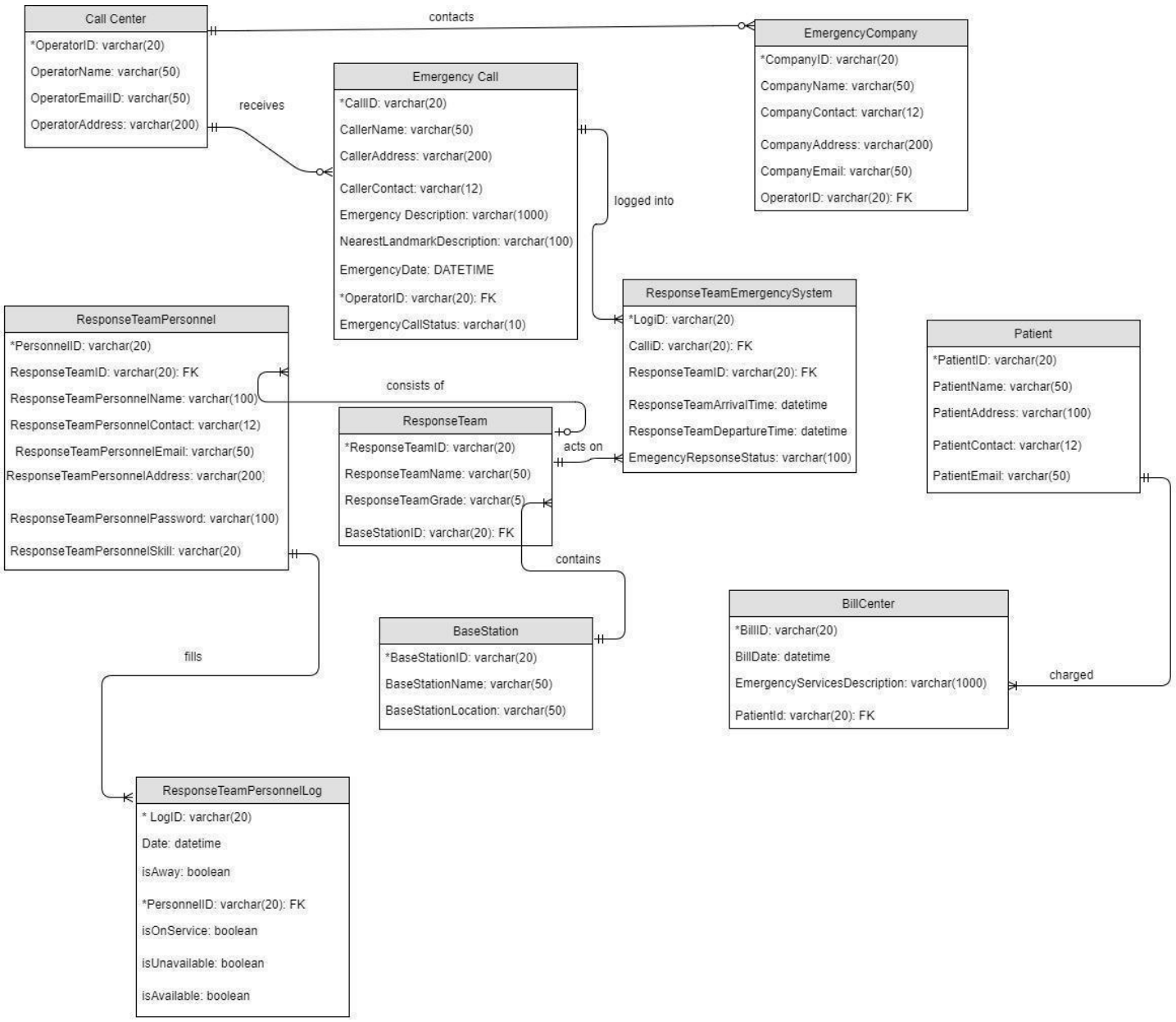
1.2.4. Information-oriented Requirements

1.2.4.1. The system maintains 5-year historic records per patient.

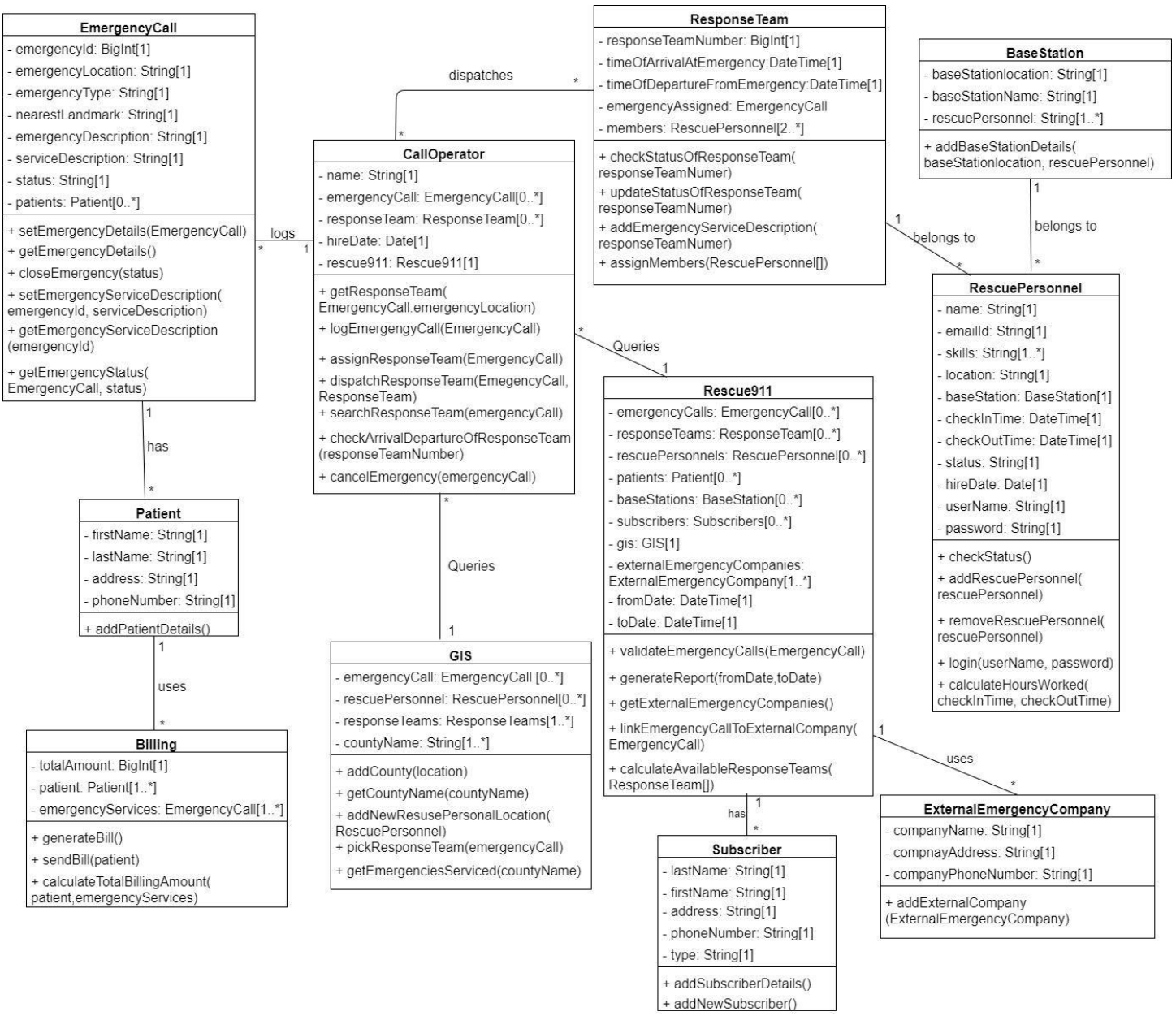
1.2.4.2. The system will log scheduling, exception etc. report details.

1.2.4.3. The system must include real time emergency information

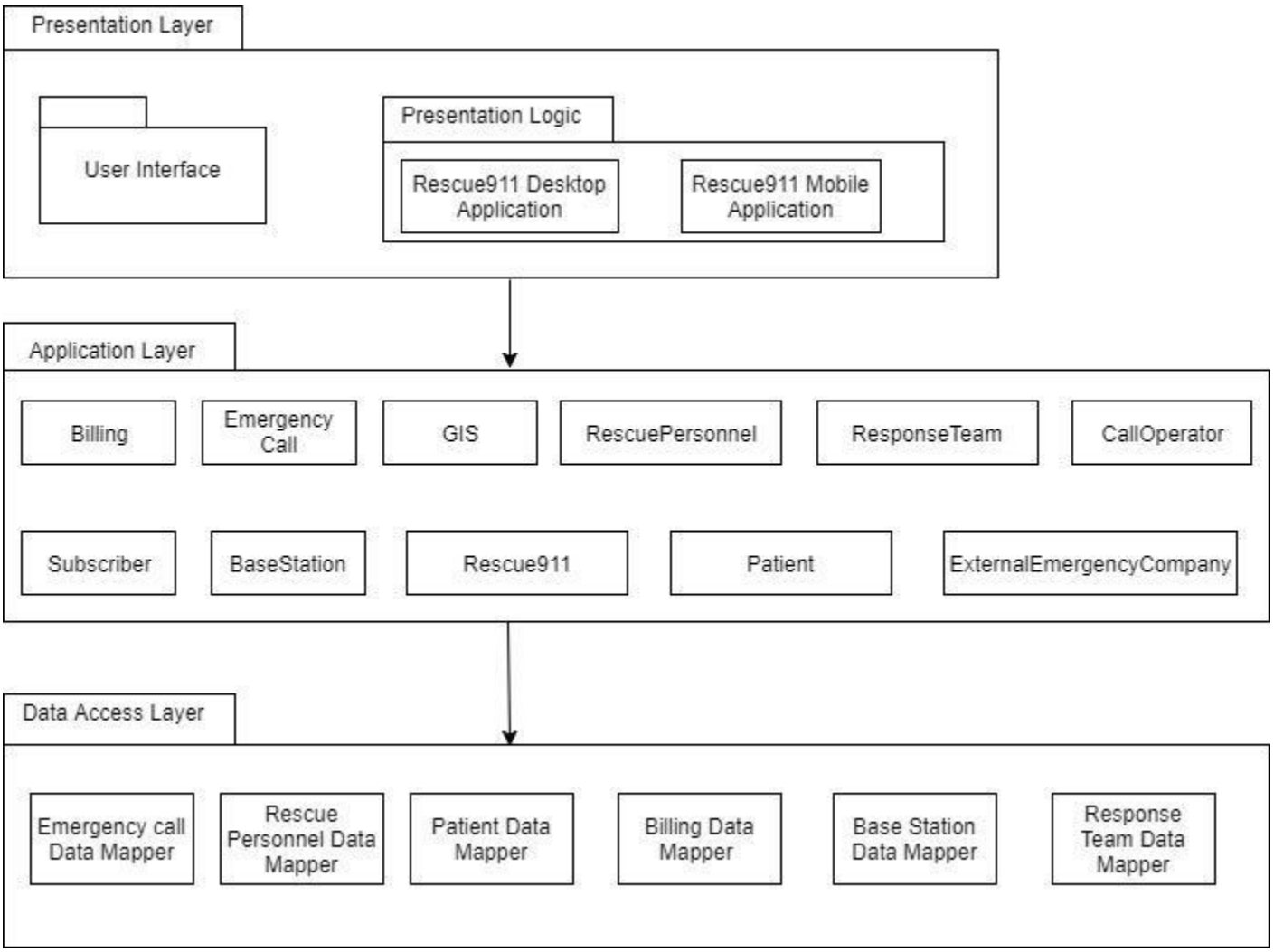
1.3. Physical ERD:



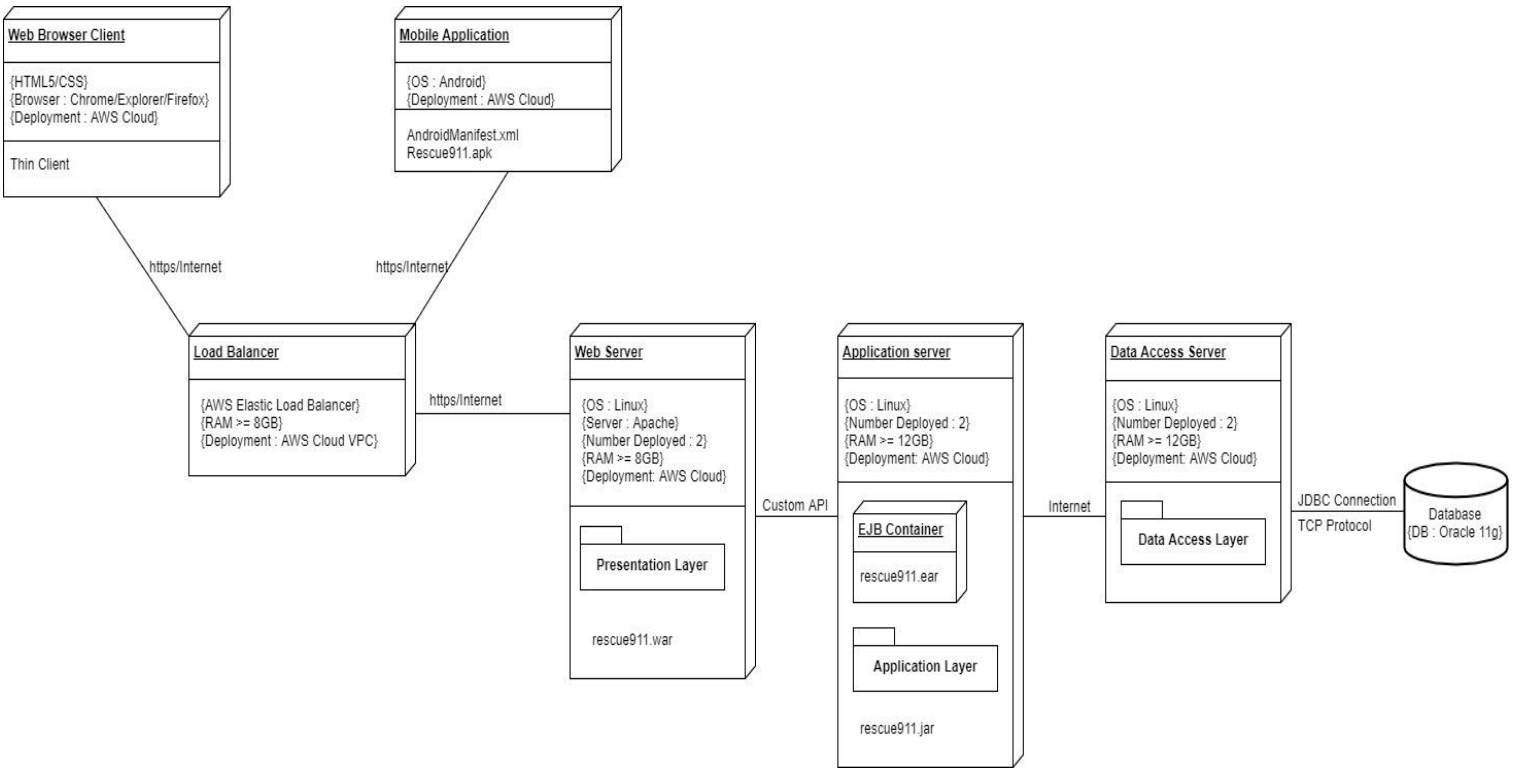
1.4. Class Diagram:



1.5. Package Diagram:


Presentation Layer
User Interface
Presentation Logic
Rescue911 Desktop Application
Rescue911 Mobile Application
Application Layer
Billing
Emergency Call
GIS
RescuePersonnel
ResponseTeam
CallOperator
Subscriber
BaseStation
Rescue911
Patient
ExternalEmergencyCompany
Data Access Layer
Emergency call Data Mapper
Rescue Personnel Data Mapper
Patient Data Mapper
Billing Data Mapper
Base Station Data Mapper
Response Team Data Mapper

1.6. Deployment Diagram:



1.7. Use Cases

1.7.1. Use Case 1: Log Emergency Call

<table>
<tr><td>Use Case Name: Log Emergency Call</td><td>UC1</td><td>Priority : High</td></tr>
<tr><td colspan="3">Actor : Call Operator</td></tr>
<tr><td colspan="3">Description: Call Operators capture the details like caller number, emergency type, caller name etc of the emergency call.</td></tr>
<tr><td colspan="3">Trigger : Rescue911 receives an emergency call
Type: ☑ External ☐ Temporal</td></tr>
<tr><td colspan="3">Preconditions:
1. The call is one of the emergency types that the system supports
2. Call Operator is authenticated as a valid Rescue911 user
3. Call Operator has the training to perform the job of emergency call logging</td></tr>
<tr><td colspan="2">Normal Course:
Call Operator initiates a new emergency call record creation when an emergency call is received
1. Call Operator enters the caller address
2. Call Operator enters nearest landmark of the emergency
3. Call Operator enters the caller phone number
4. Call Operator enters the caller’s name
5. Call Operator enters description of the emergency
6. Based on emergency call information system determines the status of the call
7. System determines that this is a new emergency call and the call is assigned a status of logged
8. The system checks for all emergency calls with the status of logged and triggers a Dispatch Emergency Response use case.</td><td>Information for Steps:

←Caller’s Address
←Nearest Landmark
←Caller Phone Number
←Callers Name

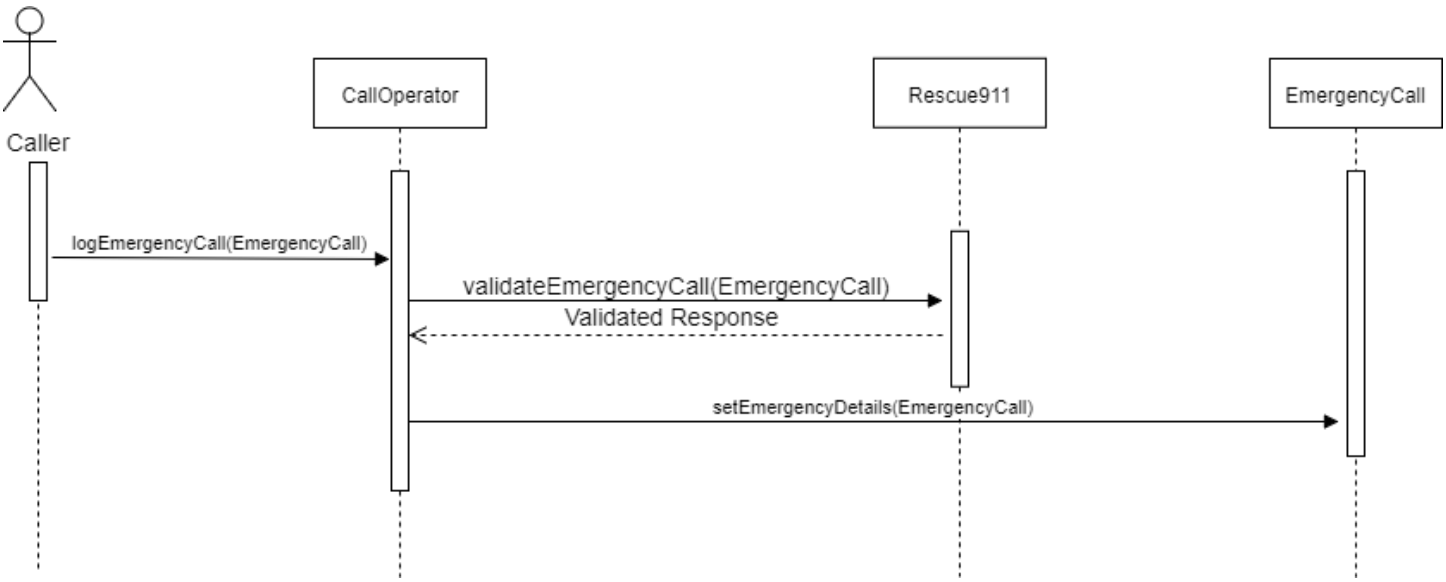
←Emergency Description

→Logged status of emergency call

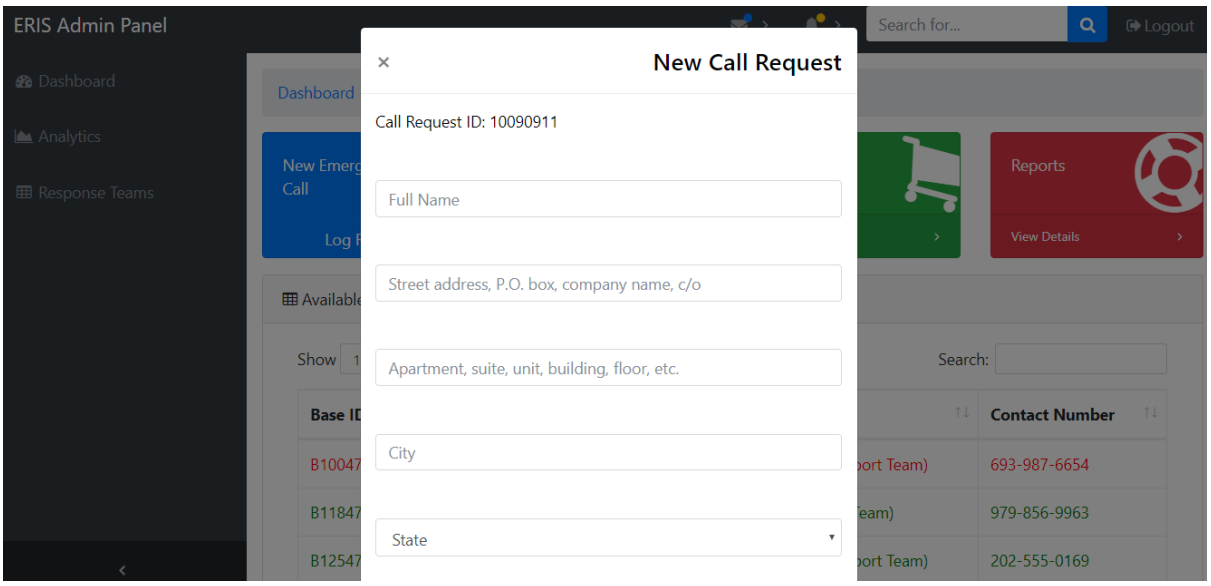
→Caller’s address
→Nearest Landmark
→Caller Phone Number
→Callers Name
→Emergency Description</td></tr>
<tr><td colspan="2">Alternative Course:
1.1 Rescue911 receives duplicate emergency call (branch at step 6)
1. If system determines that this emergency call is like another emergency call received within 30 mins prior to this call, the system assigns status of logged duplicated to the call – Call to another use case of Linking this call with another call</td><td>→Duplicate status of emergency call</td></tr>
</table>

Postconditions: 1. Emergency Call datastore is updated with the new emergency call record 2. Emergency Calls belonging to same incident are linked together for emergency responses 3. Emergency Response is triggered for each logged emergency call			
Summary Inputs	Source	Outputs	Destination
Caller Address Nearest Landmark Caller Phone Number Callers Name Emergency Description	Caller Caller Caller Caller Caller	Caller Address Emergency Call Status Nearest Landmark Caller Phone Number Callers Name Emergency Description	Emergency Call Datastore

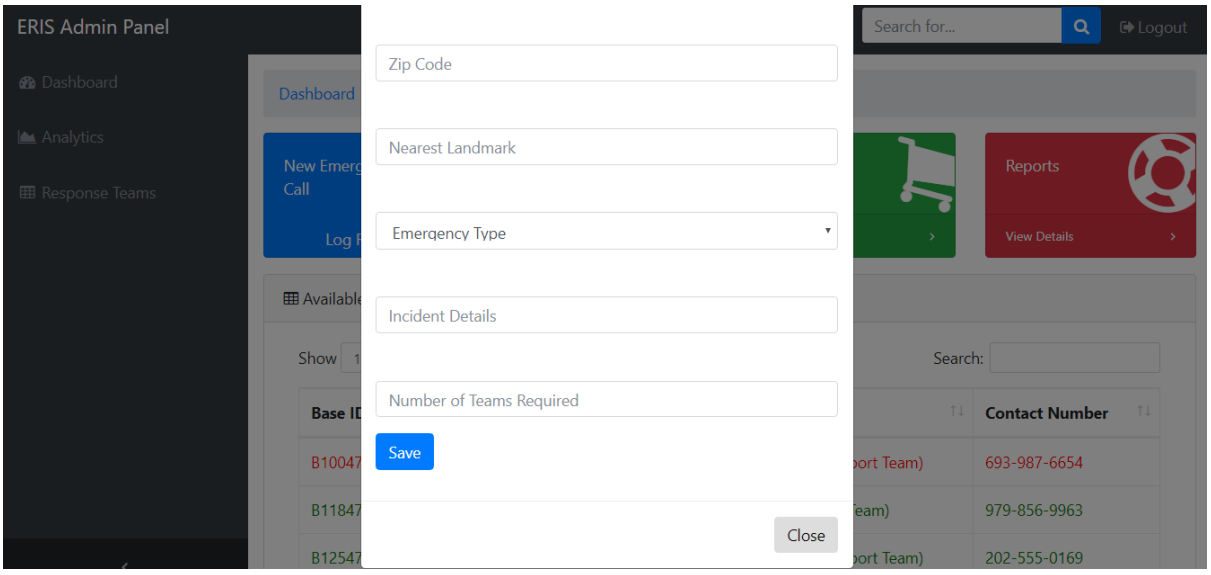
1.7.2. Sequence Diagram 1: Log Emergency Call



1.7.3. Mock-up 1: Log Emergency Call



1.7.4. Mock-up 2: Log Emergency Call

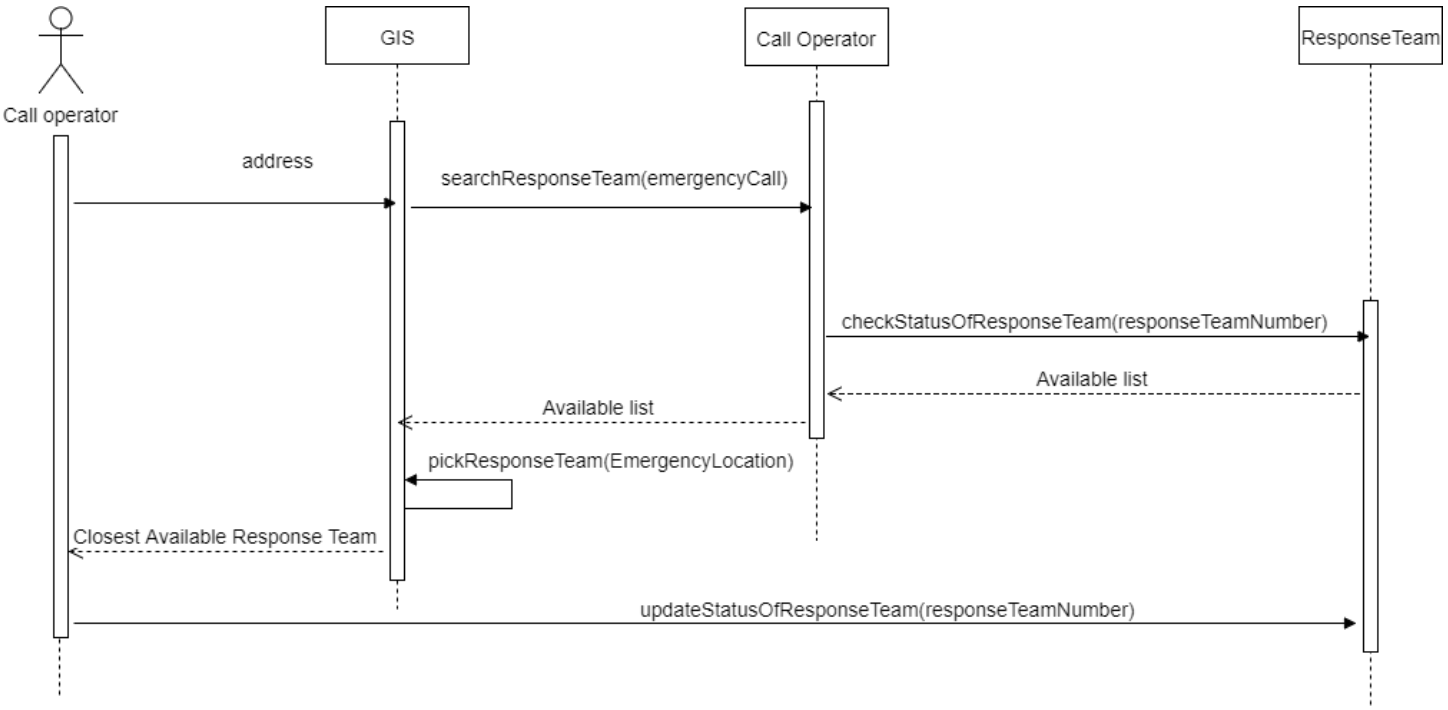


1.7.5. Use Case 2: Dispatch Emergency Responses

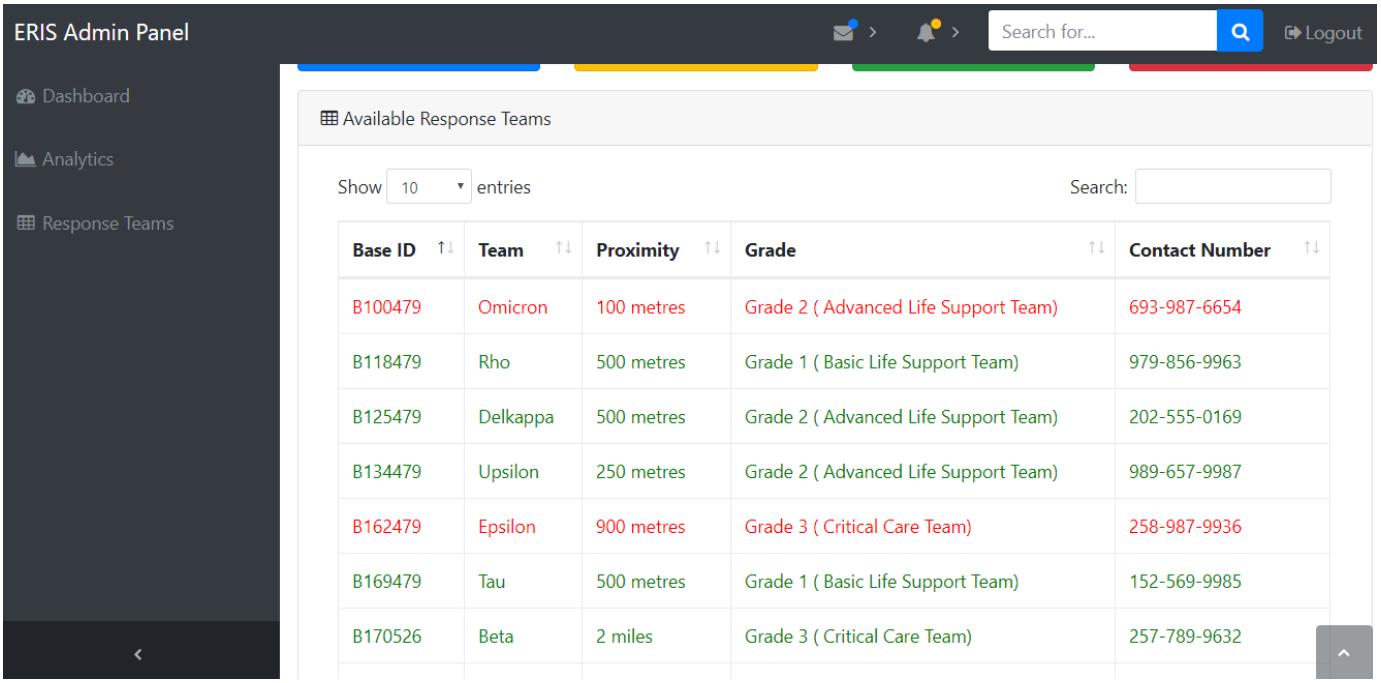
<table>
<tr><td colspan="2">Use Case Name: Dispatch emergency responses</td><td>UC2</td><td>Priority : High</td></tr>
<tr><td colspan="4">Actor : Call Operator</td></tr>
<tr><td colspan="4">Description : This use case describes the process of dispatching and tracking emergency responses through Rescue911</td></tr>
<tr><td colspan="4">Trigger : Rescue911 receives an emergency call
Type: ☑ External ☐ Temporal</td></tr>
<tr><td colspan="4">Preconditions:
1. Dispatchers should be able to evaluate the severity of the injury or illness
2. Dispatchers should be able to allocate the call to a priority category and ensure that they dispatch an appropriate response configuration
3. Operator should be logged into the system
4. Emergency call arrives</td></tr>
<tr><td colspan="3">Normal Course:
Emergency call arrives requesting for response team at certain location
1. Operator inputs callers address into internal GIS/GPS system
2. Internal GIS/GPS system shows list of nearest response teams filtered based on their availability
3. Operator uses above information to locate closest and most appropriate response team based on their skillset
4. Once an optimal response team has been located, the operator dispatches the team by radioing the relevant base station “Response Team XXX Proceed to Location XXXXXX. Over”
5. The operator must confirm that a response team has acknowledged the call and that they are proceeding to the scene
6. A record has been logged in the system of the above confirmation</td><td>Information for Steps:
←Caller’s Address
←Response teams
→ Record confirmation</td></tr>
<tr><td colspan="4">Postconditions:
1. Response team is successfully dispatched</td></tr>
<tr><td colspan="4">Summary
Inputs Source Outputs Destination</td></tr>
</table>

Caller Address List of Response teams	Call operator? Rescue911 Response Team	Record Confirmation	Internal GIS/GPS system Call operator? Emergency Call Datastore

1.7.6. Sequence Diagram 2: Dispatch Emergency Responses



1.7.7. Mock-up 3: Dispatch Emergency Responses



1.7.8. Use Case 3: Record arrival and departure of Response Team

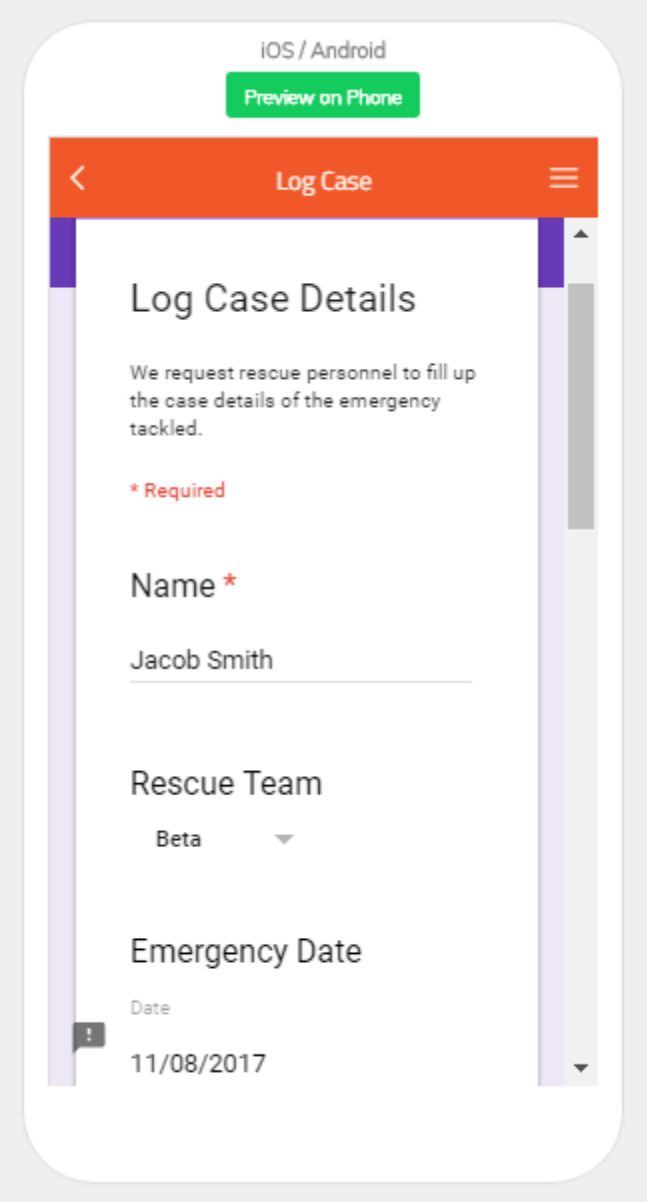
Use Case Name: Record arrival and departure of a response team	UC3	Priority : Medium
Actor : Rescue Personnel		
Description : This use case describes the process of recording arrival and departure of a response team		
Trigger : Rescue Personnel logs arrival and departure time on mobile application Type: ☑ External ☐ Temporal		
Preconditions: 1. A response team is already assigned an emergency 2. Rescue Personnel is authenticated to use the system 3. System is up and running		
Normal Course: Record entry of arrival and departure of a response team in the system 1. Rescue Personnel logs into the mobile application 2. Rescue personnel inputs time of arrival at emergency for the response team 3. After the emergency is serviced by the response team, rescue personnel inputs the time of departure for the response team 4. System notifies that the arrival and departure time of the response team has been updated 5. System marks the response team as available		Information for Steps: ← Rescue Personnel Username & Password ← Response team timeOfArrivalAtEmergency ← Response team timeOfDepartureFromEmergency → update status → Available status

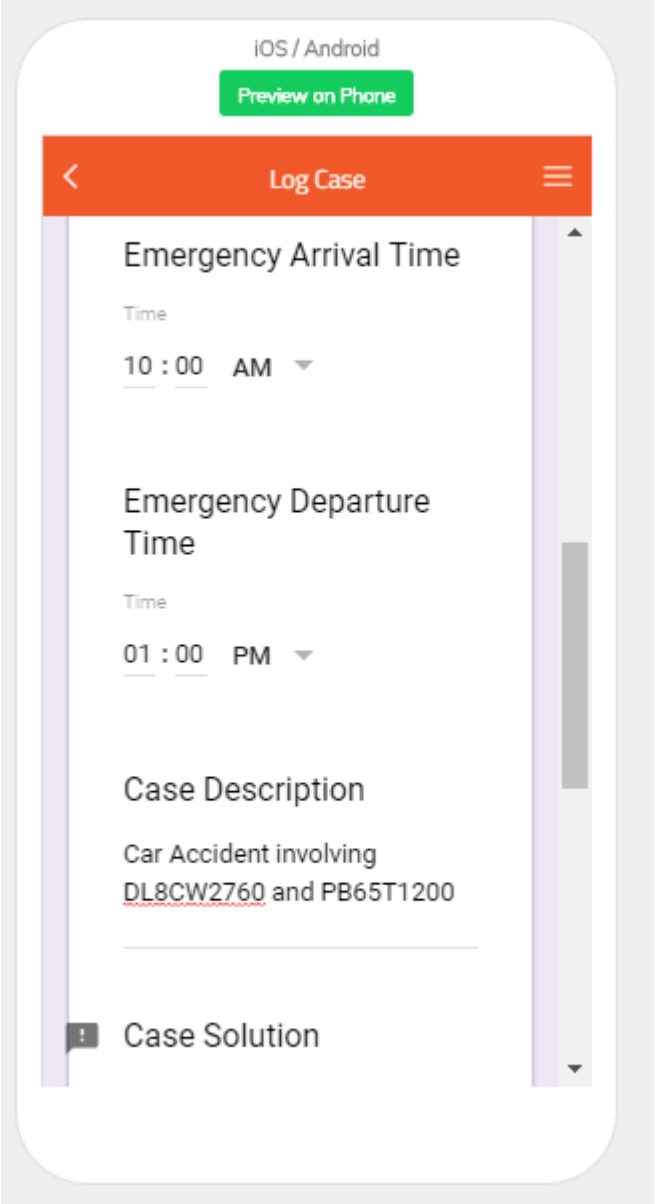
Alternative Courses: NA	
Postconditions: 1. System records the arrival and departure time of the response team successfully	
Exceptions: E1: Invalid arrival or departure time format (occurs at Normal Course step 2,3) 1. System displays message “Invalid time format” 2. System asks call center operator to re-enter time correctly	

Summary Inputs	Source	Outputs	Destination
Rescue Personnel Username & Password Response team timeOfArrivalAtEmergency Response team timeOfDepartureFromEmergency	Rescue Personnel	Update status Available status	Response Team Datastore

1.7.9. Sequence Diagram 3: Record arrival and departure of Response Team

1.7.10. Mock-up 4 : Record arrival and departure of Response Team





1.7.11. Use Case 4: Record Response Team's Clock In and Clock Out Time

<table>
<tr><td>Use Case Name: Record response team's clock in and clock out time</td><td>UC4</td><td>Priority : High</td></tr>
<tr><td colspan="3">Actor : Rescue Personnel</td></tr>
<tr><td colspan="3">Description : This use case describes the process of recording response team's clocking in and out of shift duty on mobile</td></tr>
<tr><td colspan="3">Trigger : Response team personnels arrives for duty
Type: ☑ External ☐ Temporal</td></tr>
<tr><td colspan="3">Preconditions:
1. Rescue911 Mobile application is working fine
2. Rescue Personnel is authenticated as a valid Rescue911 user
3. Each rescue personnel has a Rescue911 mobile application installed in his mobile phone
4. Each rescue personnel carries his mobile phone daily</td></tr>
<tr><td colspan="2">Normal Course:
Record clocking in and out of shift duty
1. Rescue personnel logs into the mobile application

2. Rescue personnel marks himself as available in the response team
3. Application increments number of available teams by 1

4. Rescue personnel marks his team as away if on lunch
5. Application decrements number of available teams by 1

6. Rescue personnel marks his team as on service while on an emergency
7. Application displays number of response team members in a team on service
8. Rescue personnel logs out of the mobile application after the shift duty</td><td>Information for Steps:
← Rescue Personnel username & password

→ Rescue Personnel Available status

→ Rescue Personnel Away status

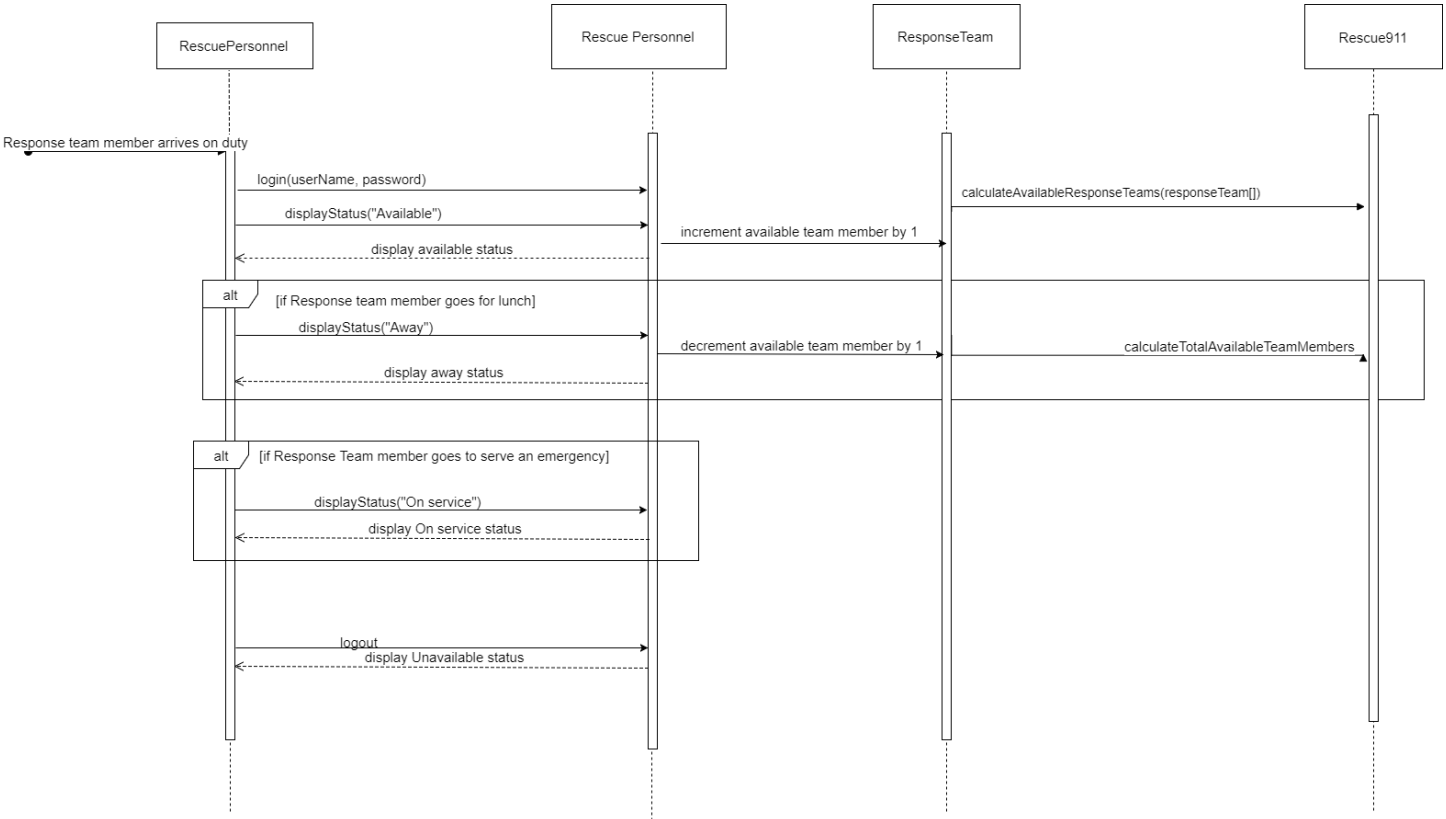
→Response Team On service status

←Rescue Personnel status

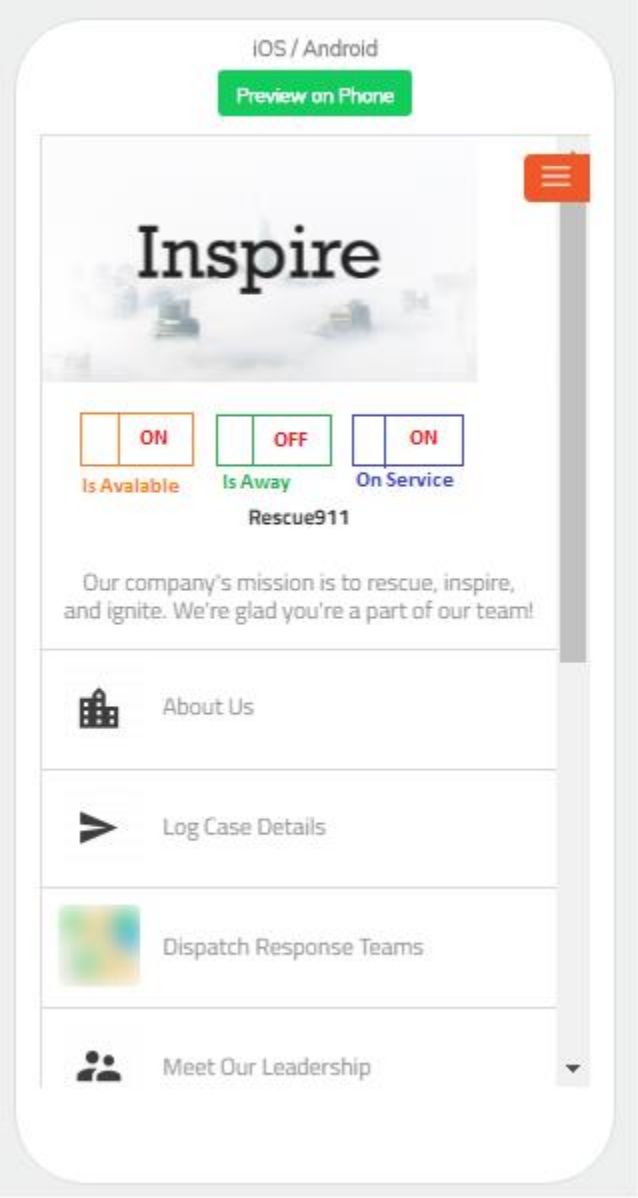
→Rescue Personnel Unavailable status</td></tr>
<tr><td colspan="2">Alternative Courses:
1.1 Number of response team member checked in is 1 (branch at step 4)
1. a)System marks that response team as unauthorized to attend any emergency case</td><td>→Unauthorized status</td></tr>
<tr><td colspan="3">Postconditions:
1. Response team member clocks in and out of shift duty period successfully</td></tr>
</table>

2. System displays accurate response team status			
Exceptions: E1: Username or password invalid(occurs at Normal Course step 1) 1. Application displays message “Invalid Username or password” 2. Application prompts the response team member to re-enter valid username and password			
Summary			
Inputs	Source	Outputs	Destination
Response team member username and password Response team member status	Response Team Datastore	Available Status Away Status On service status Unavailable status	Response Team Datastore

1.7.12. Sequence Diagram 4: Record Response Team’s Clock In and Clock Out Time



1.7.13. Mock-up 5 : Record Response Team's Clock In and Clock Out Time

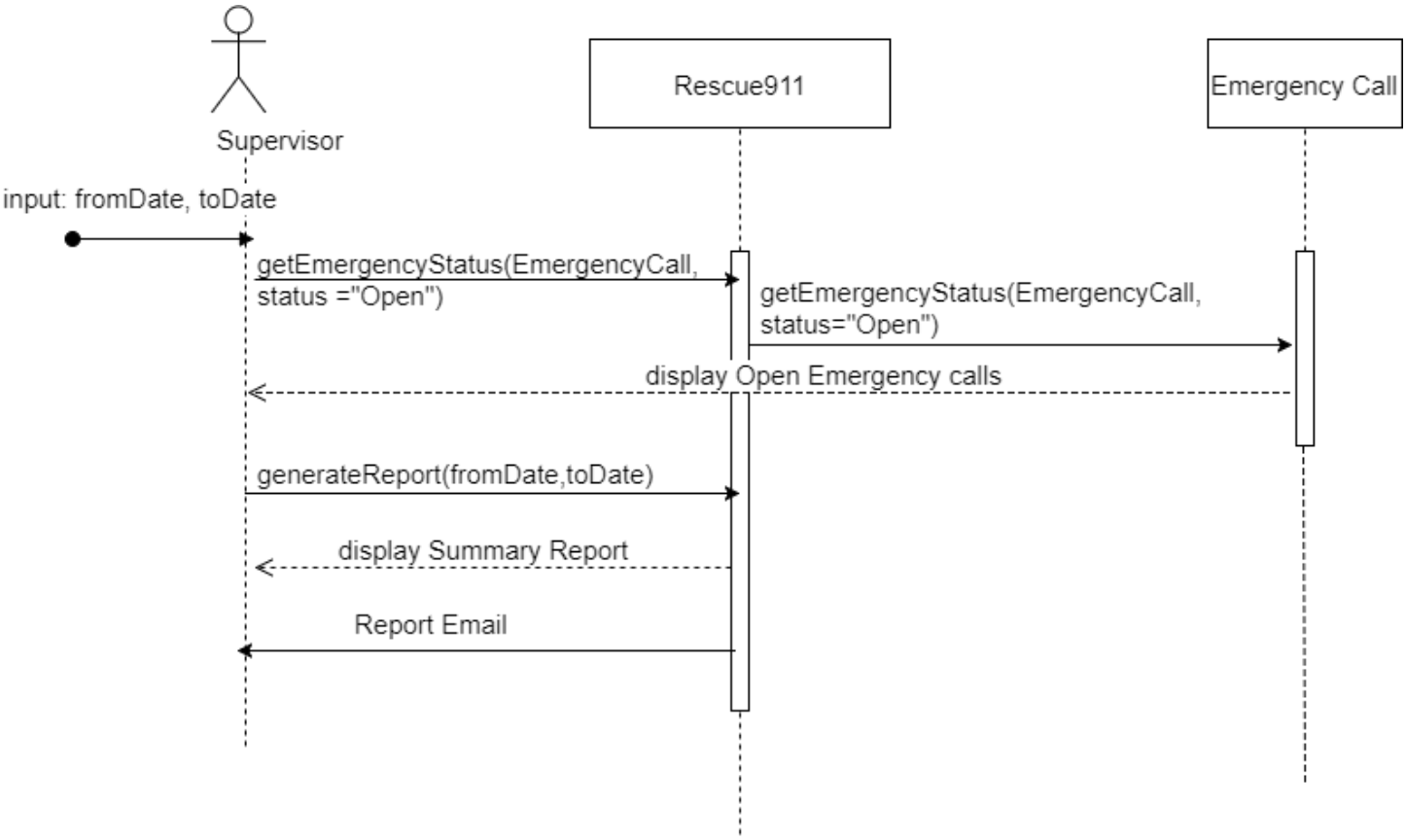


1.7.14. Use Case 5: Generate Exception report

Use Case Name: Generate Exception report	UC5	Priority : Low

Actor : Call Center Supervisor		
Description : This use case describes the process of generating exception reports that displays all the open emergency cases		
Trigger : Call center supervisor requests exception report Type: ☑ External ☐ Temporal		
Preconditions: 1. Call center supervisor is authenticated as a valid user 2. Rescue 911 mobile application is installed on the mobile phone 3. Supervisor clicks on report view and filters on type pf report		
Normal Course: Supervisor requests for exception report 1. Supervisor searches for emergency response not closed in the system 3. Supervisor clicks on generate exception report 4. System generates exception report 5. System emails exception report to the supervisor		Information for Steps: ← Emergency call status ← Emergency response and call details → Exception Report →Exception Report Email
Postconditions: 1. System generates exception report successfully		
Exceptions: E1: Error while click generate exception report (occurs on step 3) 1. System displays message “Error on generating exception report” 2. System prompts the supervisor to retry		
Summary Inputs	Source	Outputs
Emergency response status Emergency calls	Emergency calls Datastore	Exception Report Exception Report Email

1.7.15. Sequence Diagram 5: Generate Exception report

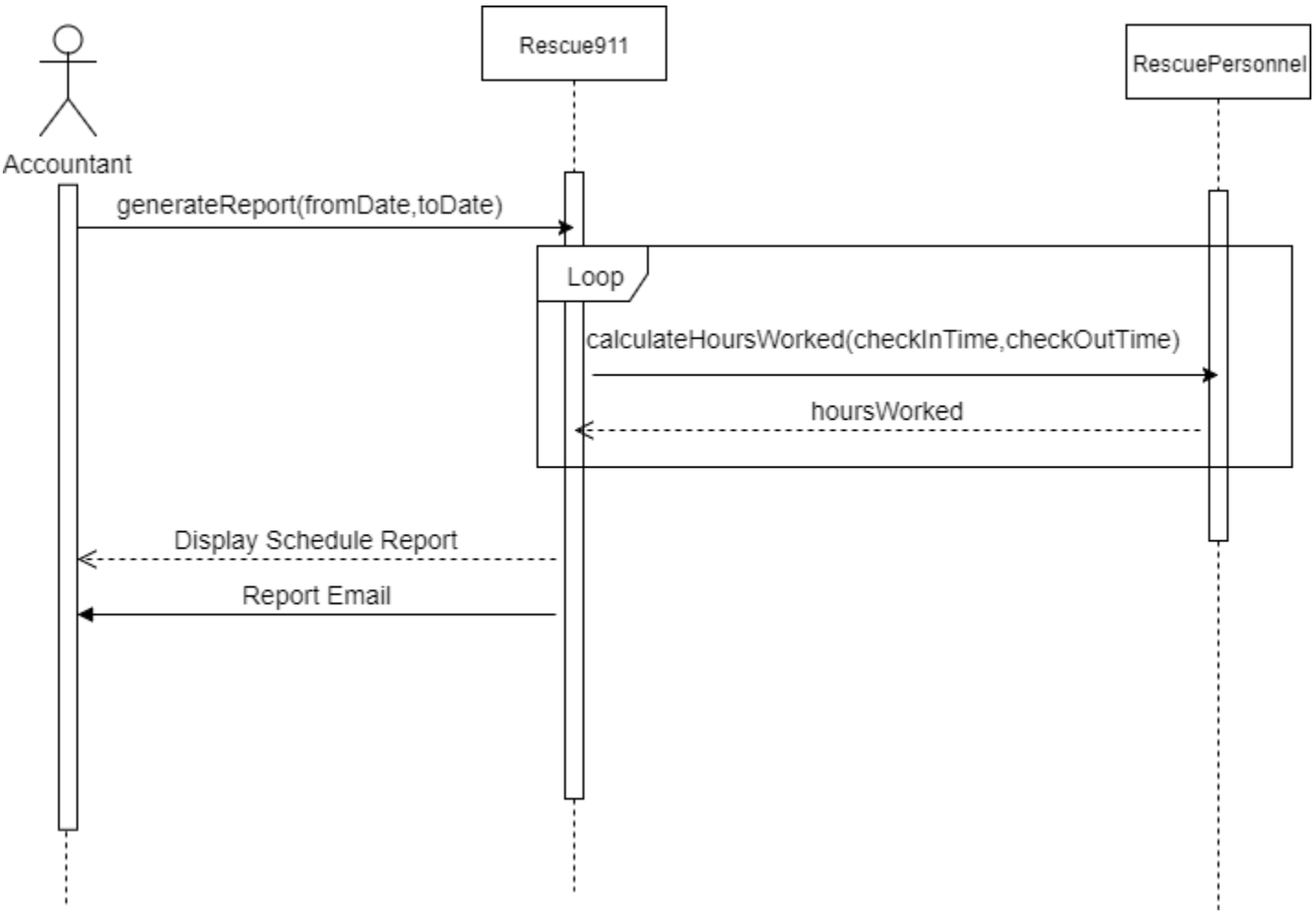


1.7.16. Use Case 6: Generate Scheduled report

Use Case Name: Generate Scheduled report	UC6	Priority : Low
Actor : Accountant		
Description : This use case describes the process of generating weekly scheduled reports to prepare weekly Response Personnel paychecks		
Trigger Weekly scheduled report time is triggered Type: ☐ External ☑ Temporal		
Preconditions: 1. Accountant is authenticated as a valid user 2. Rescue911 mobile application is up and running and is installed in his mobile phone 3. Email address of the accountant is already configured in the system 4. Accountant clicks on Reports view and filters on type of report		
Normal Course: Accountant requests for scheduled report 2. System requests for Response Personnel shift timings 3. System displays Response Personnel who performed duty on given search parameters 4. System generates scheduled report 5. System emails scheduled report to the accountant	Information for Steps: ← Response Personnel shift timings ← Response Personnel information → Scheduled Report → Scheduled Report Email	
Postconditions: 1. System generates scheduled report successfully		
Exceptions: E1: Error while generating scheduled report (occurs at step 4) 1. System displays message “Error on generating scheduled report” 2. System prompts the accountant to retry report generation manually E2: System does not display any Response Personnel based on search parameters (occurs at step 3) 1. System displays message “No search results found” 2. System prompts the accountant to enter valid search parameters if any		

Summary Inputs	Source	Outputs
Base Station ID Response Personnel shift timings Response Personnel information	Response Personnel datastore Base station datastore	Scheduled Report Scheduled Report Email

1.7.17. Sequence Diagram 6: Generate Scheduled report

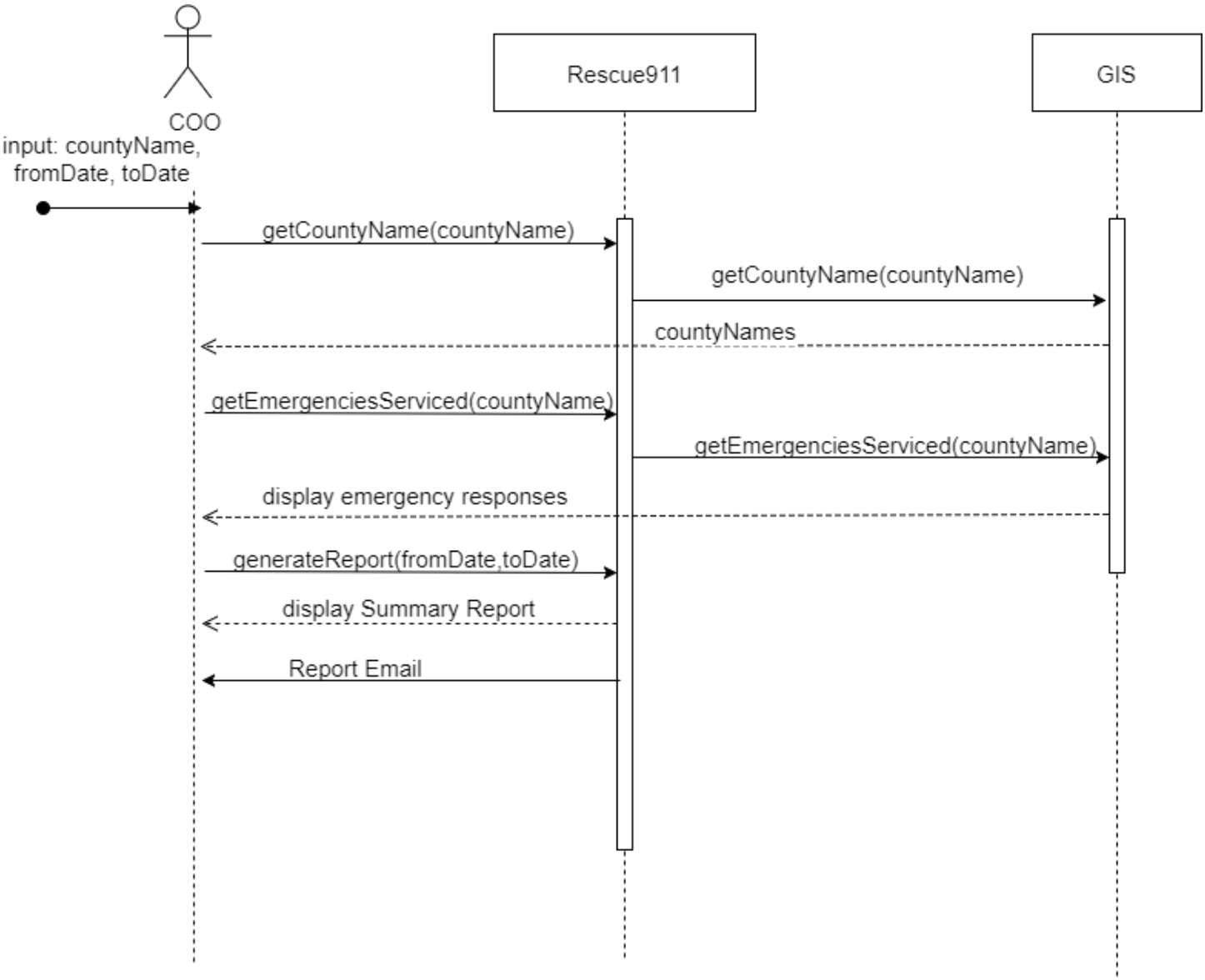


1.7.18. Use Case 7: Generate Summary report

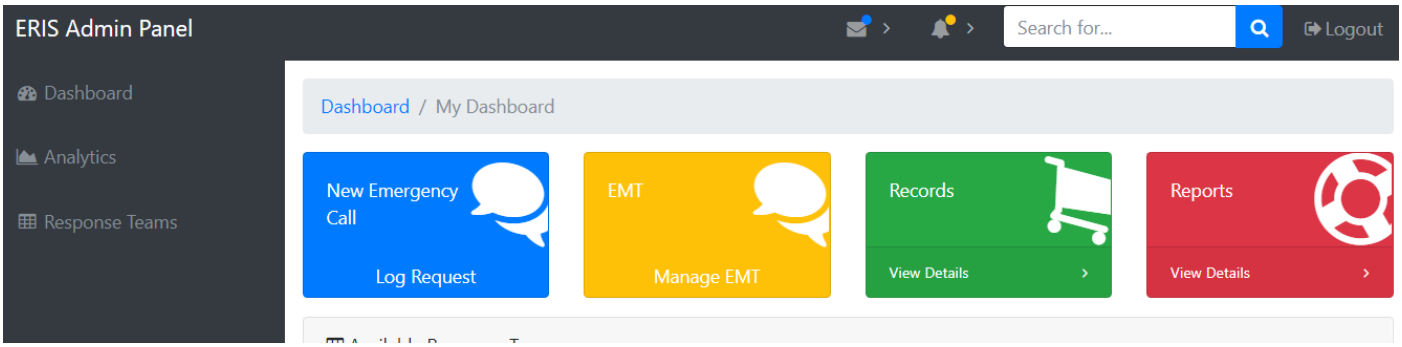
Use Case Name: Generate Summary report	UC7	Priority : Low
Actor : Chief operating officer(COO)		
Description : This use case describes the process of generating weekly summary reports for making important business decisions		
Trigger : COO requests for weekly summary report Type: ☑ External ☐ Temporal		
Preconditions: 1. COO is authenticated as a valid user 2. Rescue911 application is up and running 3. Email address of the COO is already configured in the system 4. COO clicks on reports view and filters on type of report		
Normal Course: COO requests for weekly summary report 1. System requests for county name 2. System requests for to and from date 2. System requests for emergencies serviced in a county 3. System generates summary report 4. System emails summary report to COO	Information for Steps: ← County name ← toDate and fromDate ←Emergency details → Summary Report → Summary Report Email	
Postconditions: 1. System generates summary report successfully		
Exceptions: E1: Error while generating summary report (occurs at step 3) 1. System displays message “Error on generating summary report” 2. System prompts the COO to retry report generation manually		

Summary Inputs	Source	Outputs
Base Station name Emergency details Todate fromDate	Rescue911 GIS	Summary Report Summary Report Email

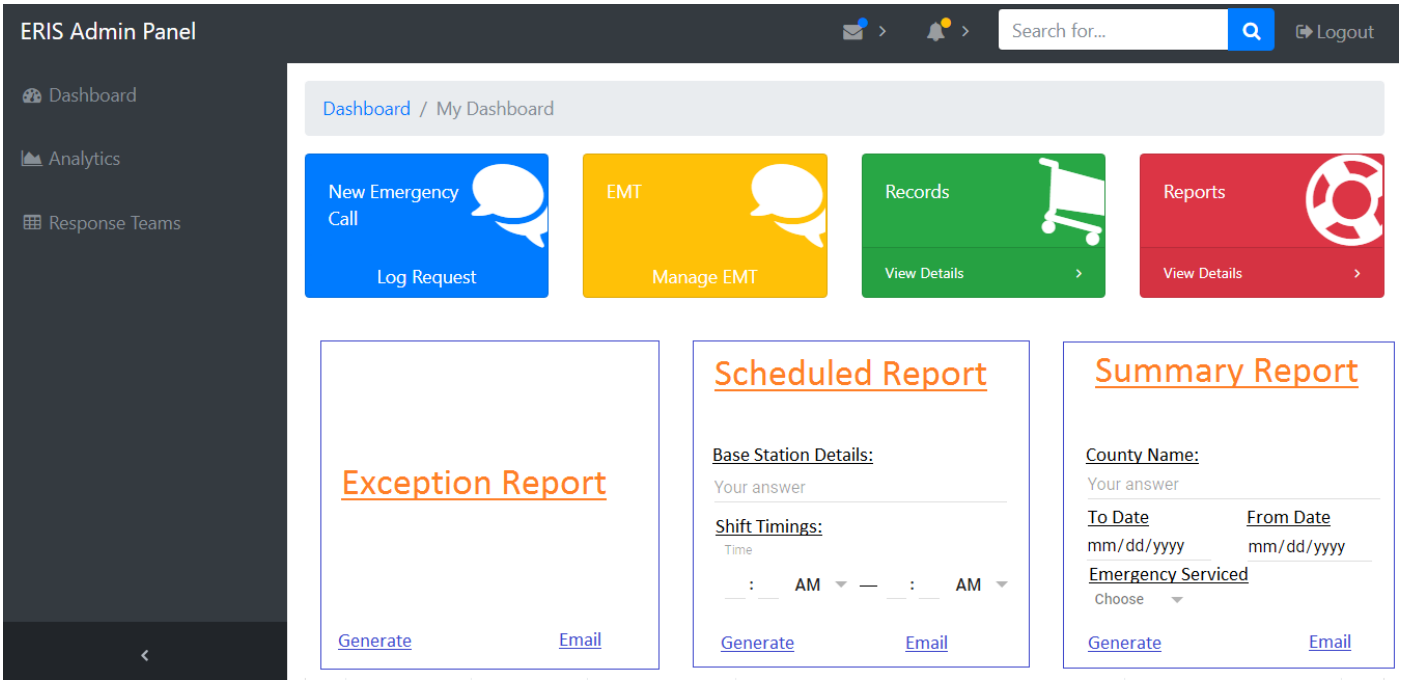
1.7.19. Sequence Diagram 7: Generate Summary report



1.7.20. Mock-up 7: Report generation



1.7.21. Mock-up 8: Report generation

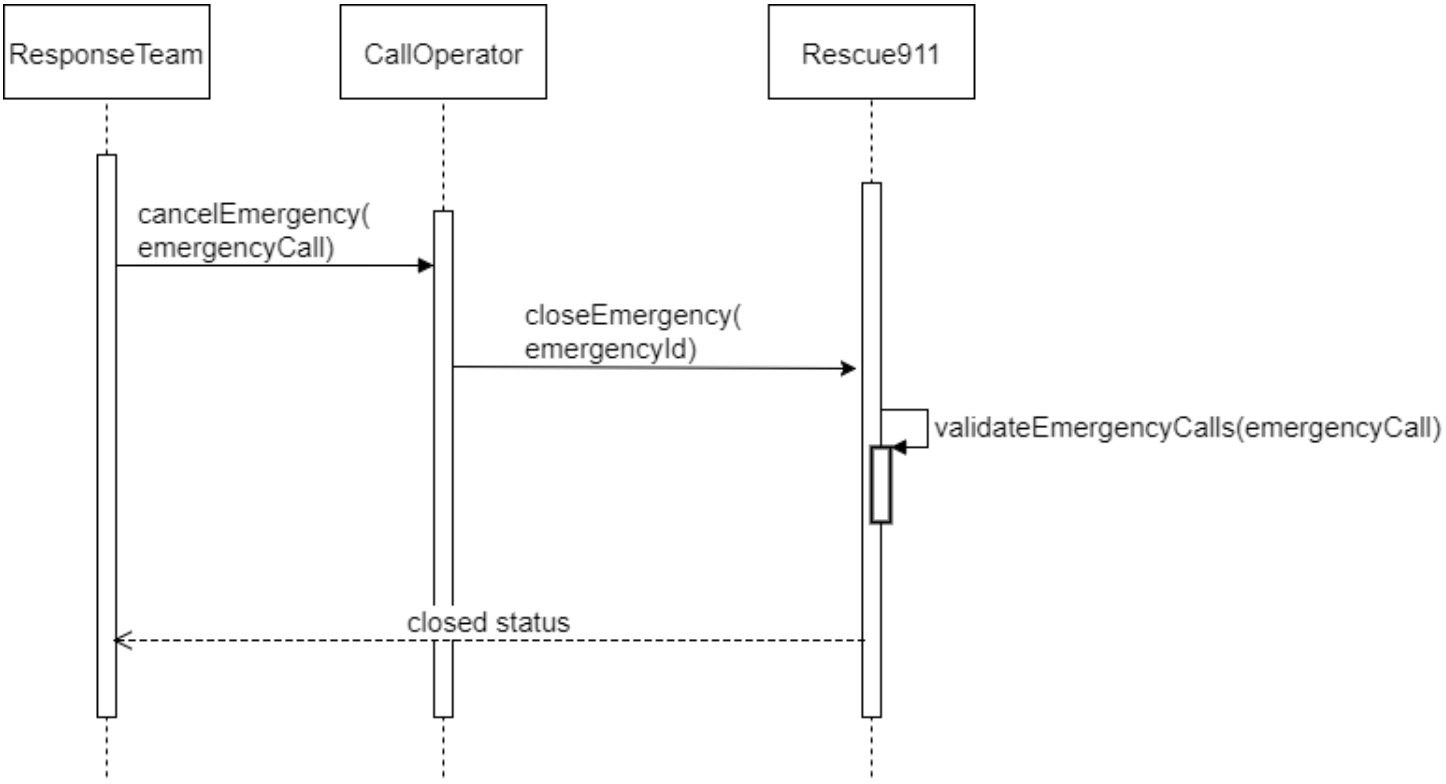


1.7.22. Use Case 8: Cancellation of an Emergency

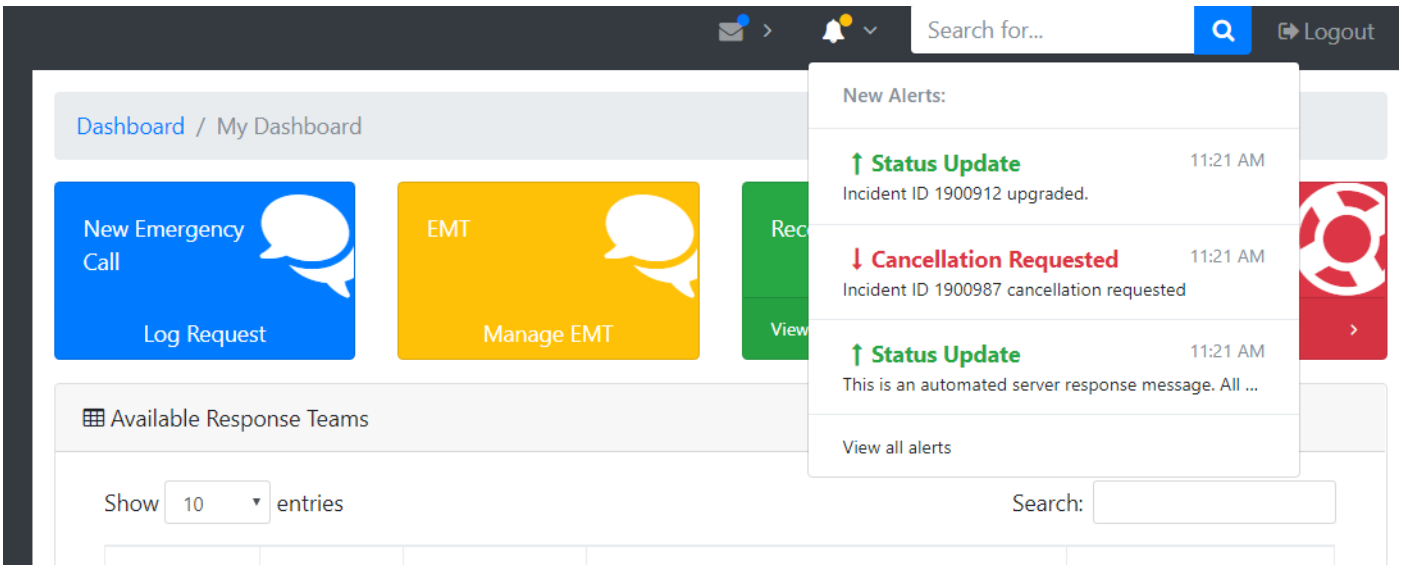
Use Case Name: Cancellation of an emergency	UC8	Priority : High
Actor : Call Operator		
Description : This use case describes the process of cancellation of an emergency		
Trigger : Response team requests for cancellation of an emergency through mobile interface Type: ☑ External ☐ Temporal		
Preconditions: 1. Call operator is authenticated to use the system 2. System is up and running		
Normal Course: Cancellation of an emergency due to prank call 1. System receives a notification of an emergency cancellation 2. Call operator clicks on view emergency details 3. Call operator validates the request manually 4. Call operator clicks on cancel emergency 5. System cancels the emergency 6. Systems displays the emergency status as closed		Information for Steps: ← Emergency Call details ← Emergency cancellation →Closed status
Alternative Courses: NA		
Postconditions: 1. System logs cancellation of emergency successfully		
Exceptions: NA		

Summary Inputs	Source	Outputs	Destination
Emergency call details Emergency cancellation	Emergency Call	Closed status	Emergency Call datastore

1.7.23. Sequence Diagram 8: Cancellation of an Emergency



1.7.24. Mock-up 9: Cancellation of an Emergency



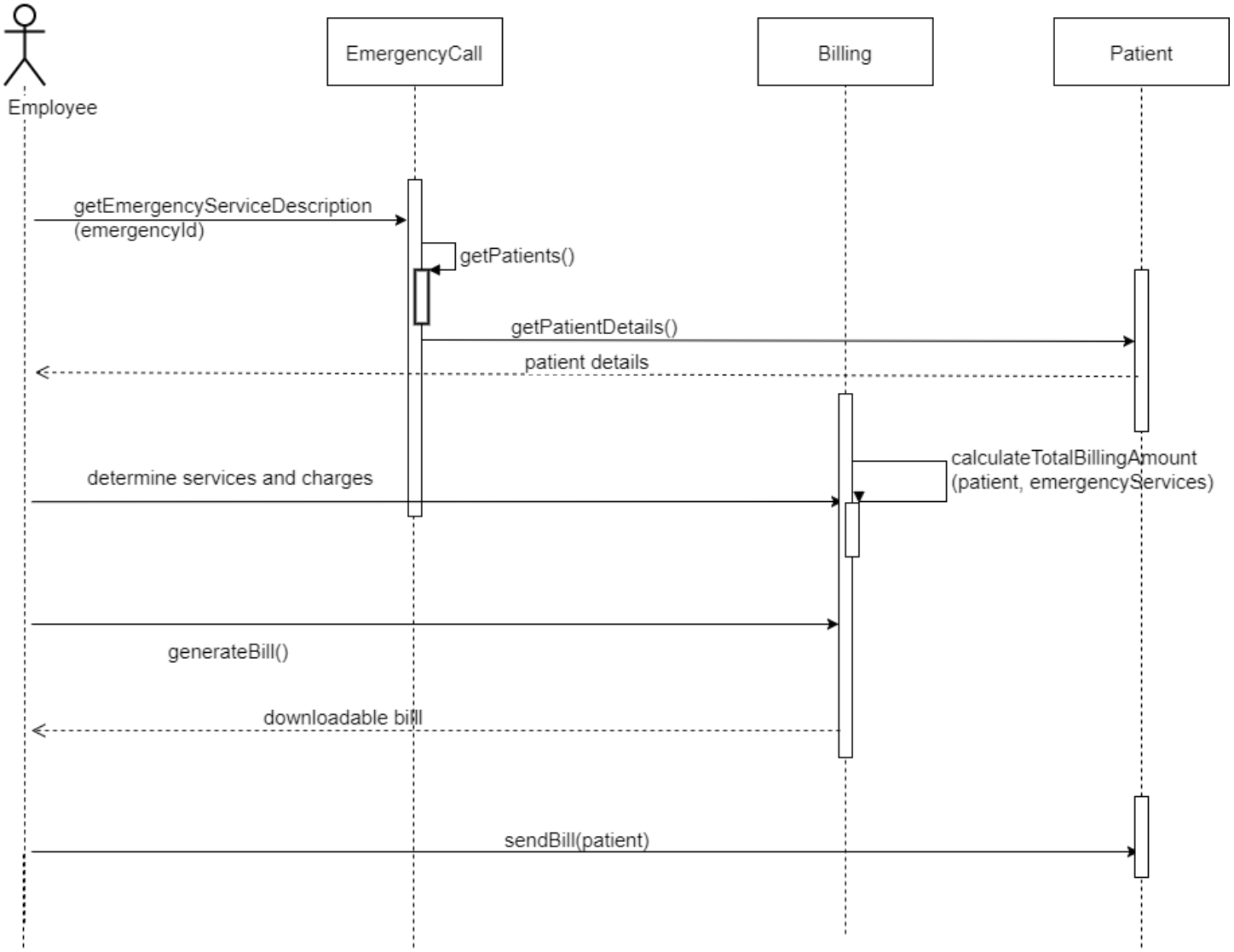
1.7.25. Use Case 9: Record Billing services of patients

Use Case Name: Record billing services of patients	UC9	Priority : High
Actor : Employee		
Description : This use case describes the process of billing patients for services offered by rescue911		
Trigger : Description of services offered for a patient in an emergency Type: ☑ External ☐ Temporal		
Preconditions: 1. Response team has provided a description of the services offered in an emergency 2. Employee is authorized to access the system 3. System is up and running 4. Patient details are retrieved from patient datastore		
Normal Course: Compute bill amount for a patient 1. Rescue911 employee fetches service description of one or more patients in an emergency 2. Employee gets emergency services from emergency service description 3. Employee clicks on generate bill 4. System generates a downloadable bill 5. Employee downloads the bill from the system 6. Employee clicks on send bill to patient		Information for Steps: ← Emergency Services description ←Emergency Services description →Billing ←Billing ←Billing ←Patient →Email, text message

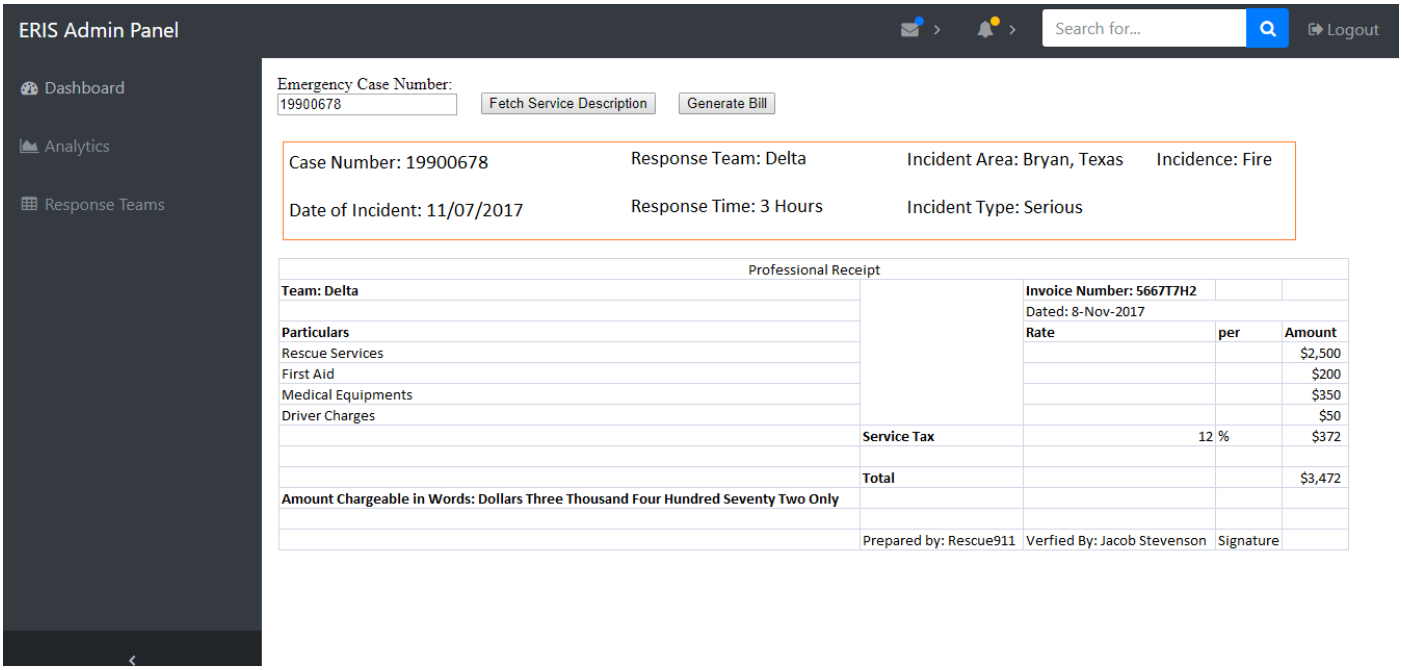
7. System notifies 'Email and text message sent'	
Alternative Courses: 1.1 Emergency did not require any service(branch at step 2) 1. a) System shows a popup 'No billable service' 1.2 Bill having no billable service(branch at step 4) 1. a) Bill generated contains all values of service as 0 and has a note 'No billable service' 1.3 If customer does not have an email ID 1.a) System will send an automated text message of bill amount 1.4 If customer does not provide a contact number 1.a) System will send an email of bill amount	→No billable service ←Billing →Text message →Email
Postconditions: 1. System generates bill successfully 2. User can download the bill successfully from the system	
Exceptions: E1: Invalid email id or contact number (occurs at Normal Course 7) 1. System displays message "Invalid email" or "Invalid contact number" 2. System asks call employee to re-enter correct details for patient contact information E2: System does not have patient contact information (occurs at Normal Course step 7) 1. System displays message "No contact information" 2. System asks employee to enter patient's contact information	

Summary Inputs	Source	Outputs	Destination
Emergency services description Billing Patient	Billing Datastore Patient Datastore	Billing Email Text Message No billable service message	Billing Data Store

1.7.26. Sequence Diagram 9: Record Billing services of patients


Employee
EmergencyCall
Billing
Patient
getEmergencyServiceDescription
(emergencyId)
getPatients()
getPatientDetails()
patient details
determine services and charges
calculateTotalBillingAmount
(patient, emergencyServices)
generateBill()
downloadable bill
sendBill(patient)

1.7.27. Mock-up 10: Record Billing services of patients

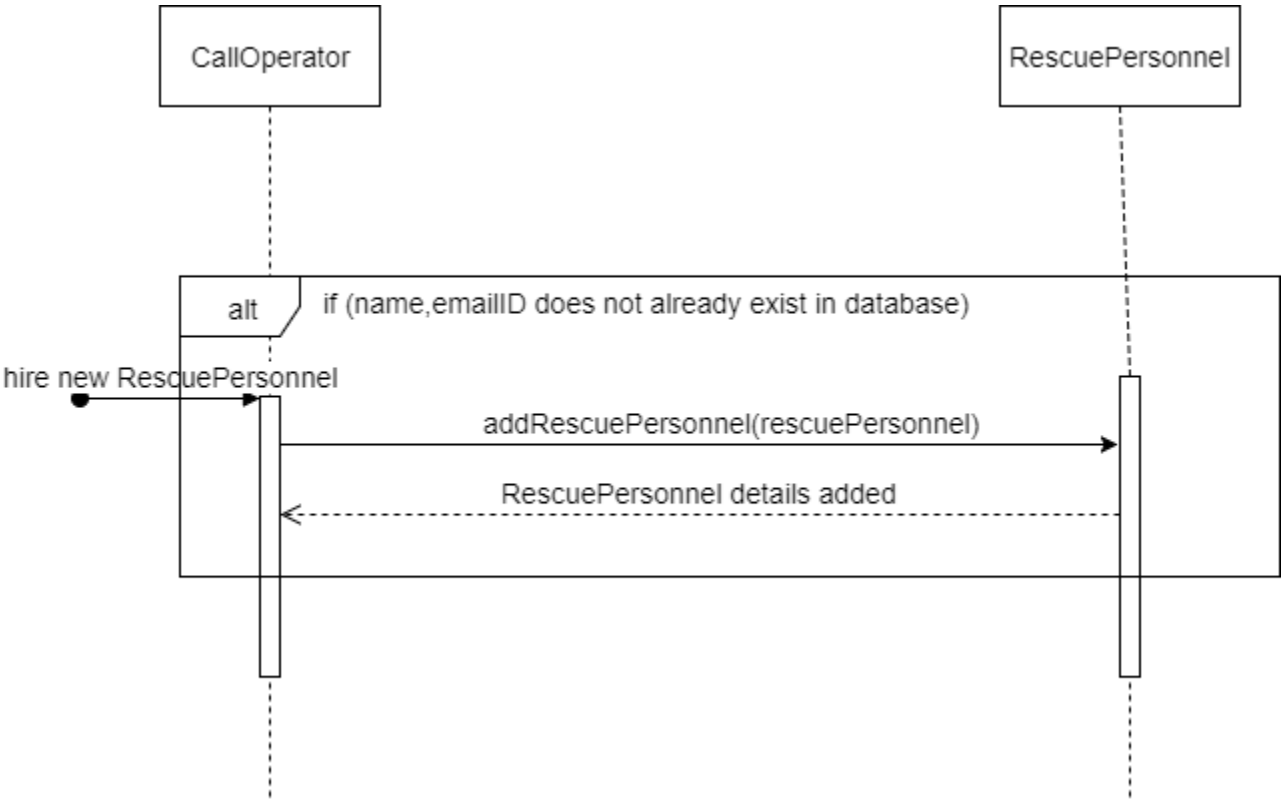


1.7.28. Use Case 10: Adding new Rescue Personnel

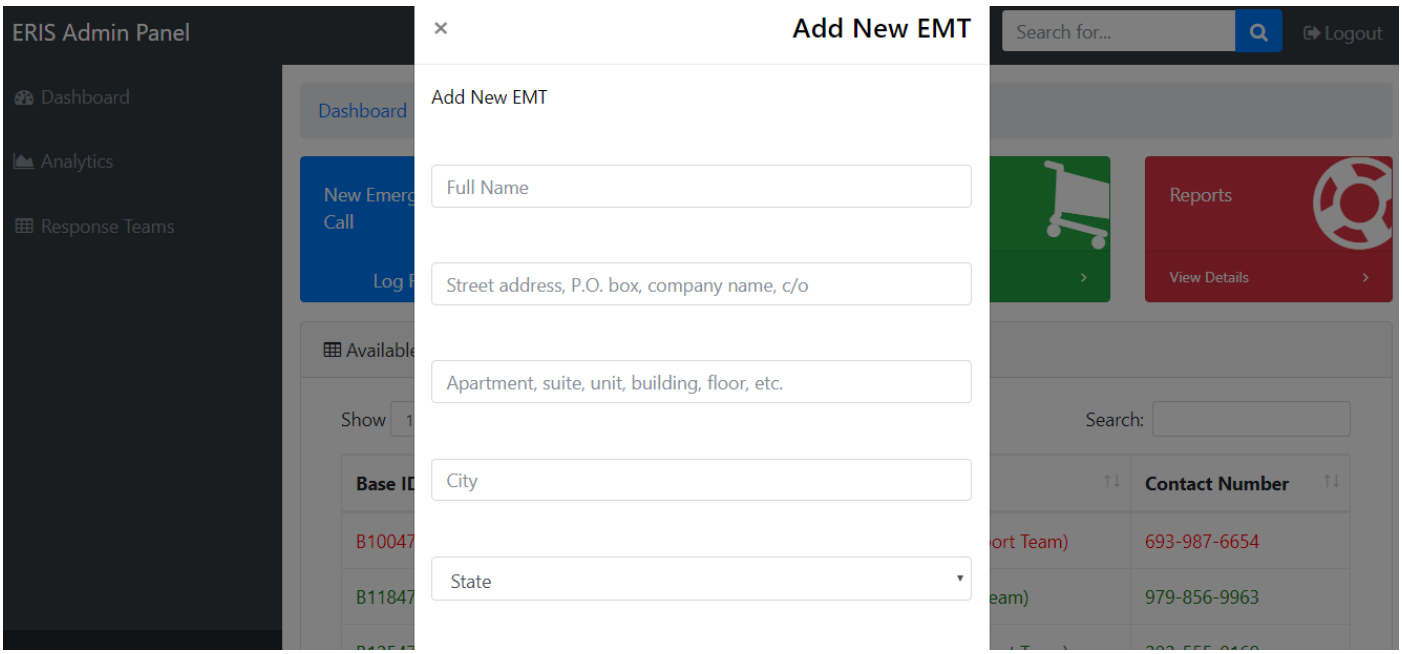
Use Case Name: Adding new Rescue Personnel	UC10	Priority : Low
Actor : Call Operator		
Description : This use case describes the process of adding an Rescue Personnel		
Trigger : A new Rescue Personnel is recruited Type: ☑ External ☐ Temporal		
Preconditions: 1. Call operator is authenticated to use the system 2. System is up and running		
Normal Course: Adding details of Rescue Personnel to the system 1. Call operator clicks on “Add Rescue Personnel” button 2. System prompts the operator to add details of the Response Personnel 3. Call center operator clicks on “save & submit” 4. System saves the details of the Rescue Personnel 5. System notifies the operator “Details added successfully”		Information for Steps: ← Rescue Personnel details → Rescue Personnel datastore → Success status
Alternative Courses: NA		
Postconditions: 1. System adds Response Personnel successfully		
Exceptions: E1: System displays an error message on save (occurs at Normal course 3) 1. System displays message “Details already present” 2. System asks call center operator to re-check details for the Rescue Personnel		

Summary Inputs	Source	Outputs	Destination
Rescue Personnel details		Success status	Rescue Personnel datastore

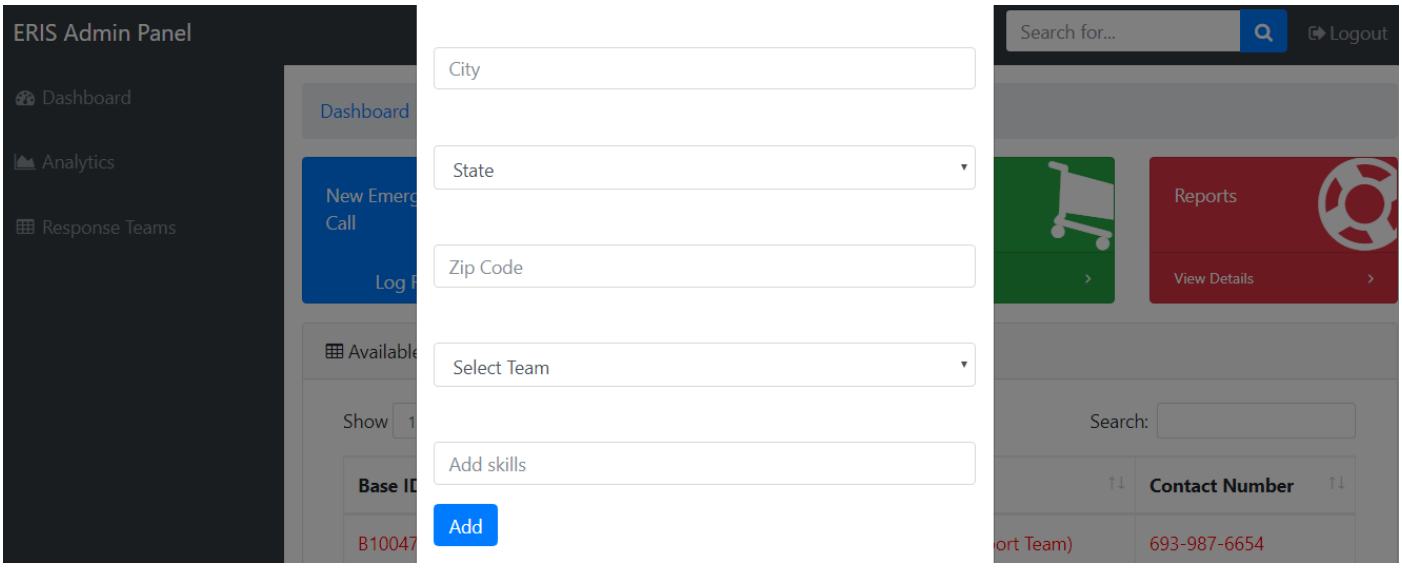
1.7.29. Sequence Diagram 10: Adding new Rescue Personnel



1.7.30. Mock-up 11: Adding new Rescue Personnel



1.7.31. Mock-up 12: Adding new Rescue Personnel

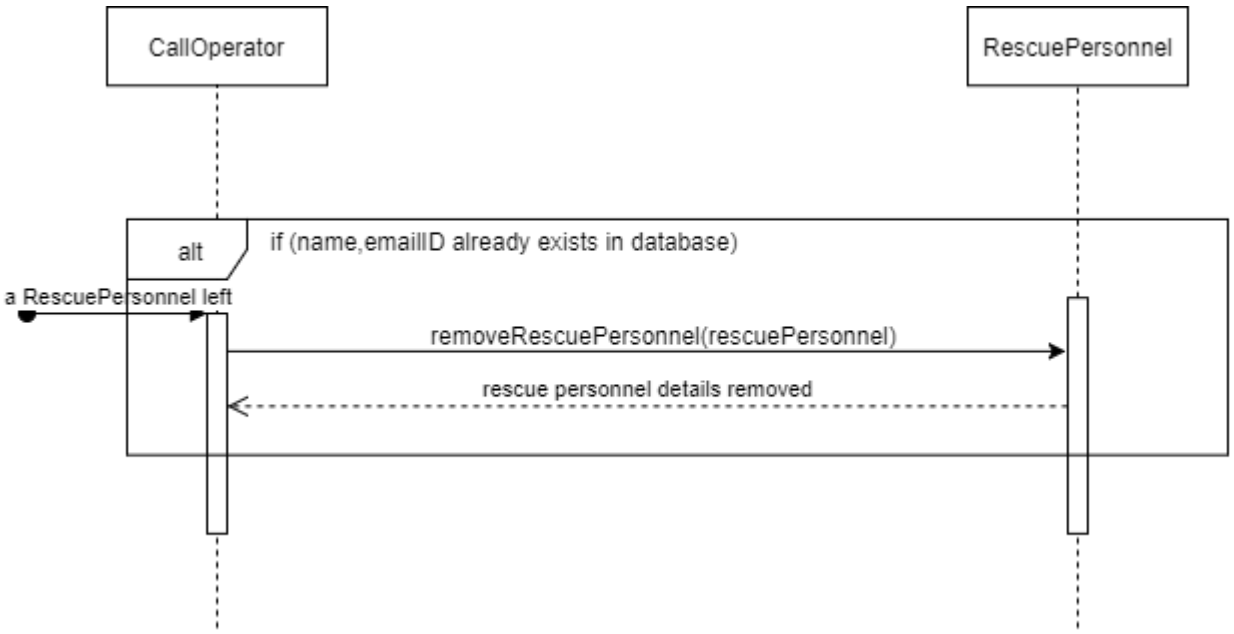


1.7.32. Use Case 11: Deleting a Rescue Personnel

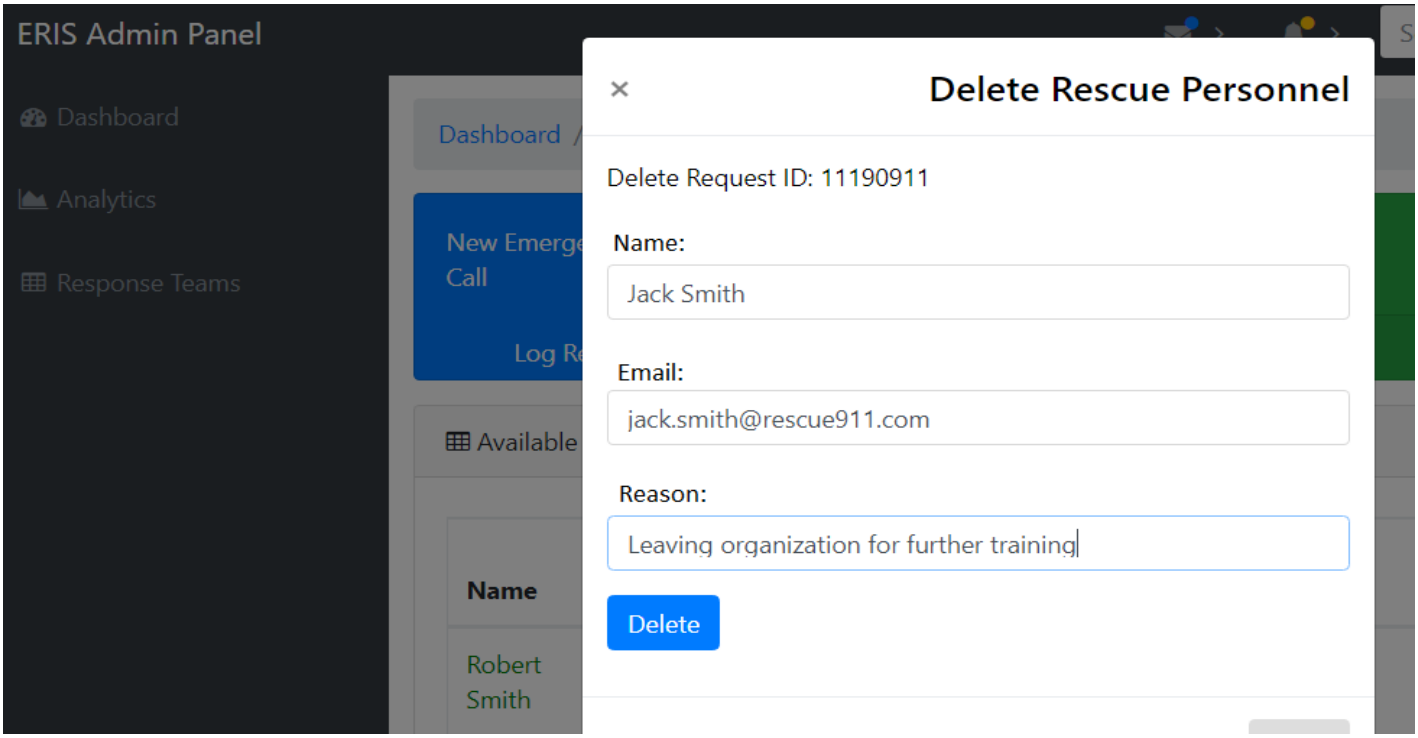
Use Case Name: Deleting a Rescue Personnel	UC11	Priority : Low
Actor : Call Operator		
Description : This use case describes the process of deleting an Rescue Personnel		
Trigger : An Rescue Personnel leaves the organization Type: ☑ External ☐ Temporal		
Preconditions: 1. Call operator is authenticated to use the system 2. System is up and running		
Normal Course: Deleting details of Rescue Personnel from the system 1. Call operator enters Rescue Personnel name, emailId 2. Call operator clicks on “Delete Rescue Personnel” button 3. System prompts for deletion of confirmation 4. Call operator clicks on “Ok” 5. System deletes details of the Rescue Personnel from the datastore 6. System notifies the operator “Details removed successfully”		Information for Steps: ← Rescue Personnel details → Rescue Personnel datastore → Success status
Alternative Courses: NA		
Postconditions: 1. System deletes Rescue Personnel successfully		
Exceptions: E1: System displays an error message on delete (occurs at Normal course 4) 1. System displays message “Employee account not present. Account already deleted” 2. System asks call operator to re-check details for the Rescue Personnel		
Summary Inputs Source Outputs Destination		

Rescue Personnel details	Rescue Personnel datastore	Success status	Rescue Personnel datastore

1.7.33. Sequence Diagram 11: Deleting a Rescue Personnel



1.7.34. Mock-up 12: Deleting a Rescue Personnel



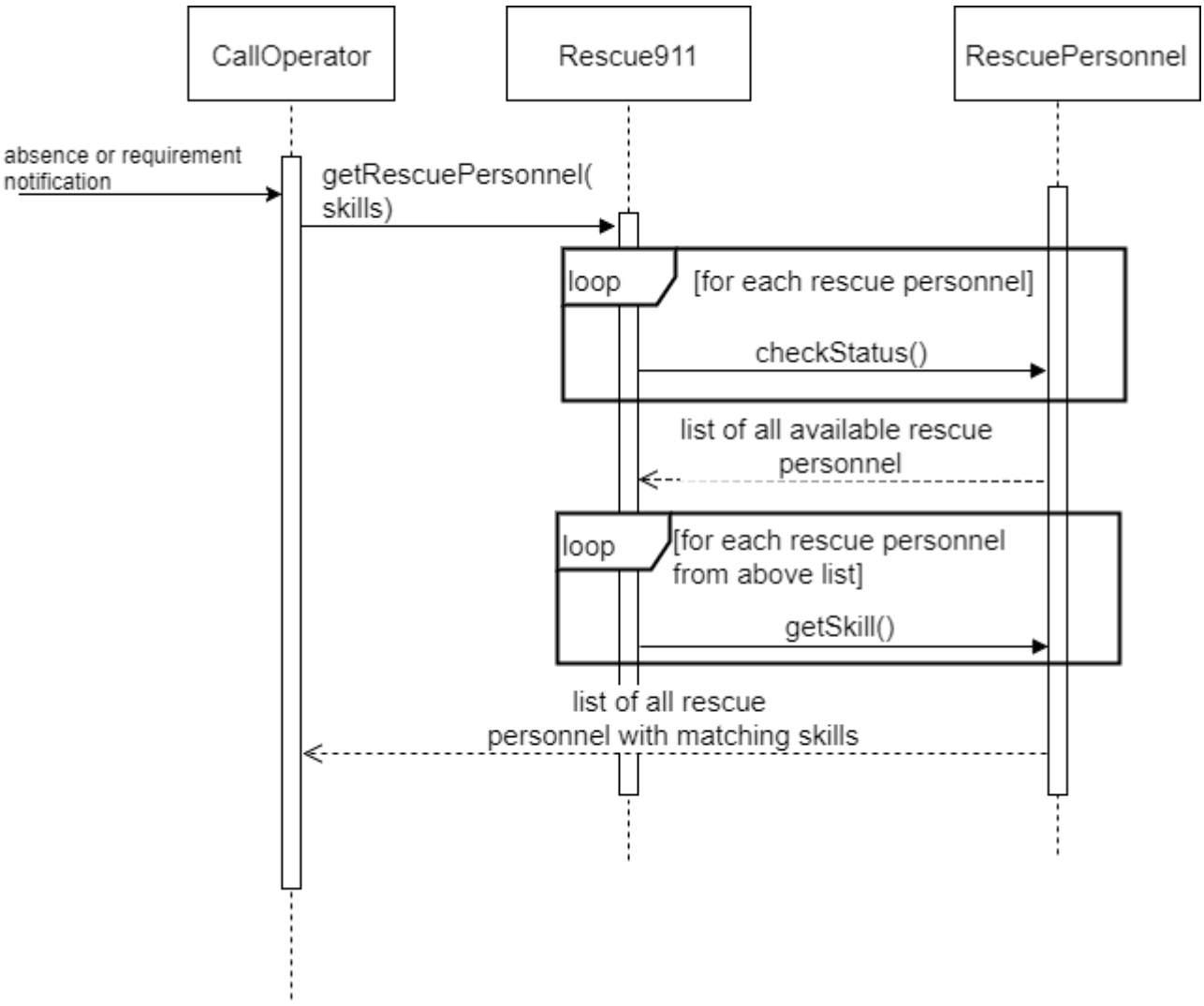
1.7.35. Use Case 12: Temporarily add Rescue Personnel to Response Team

Use Case Name: Temporarily add Rescue Personnel to response team	UC12	Priority : High
Actor : Call Operator		
Description : This use case describes the process of adding a Rescue Personnel to response team in case of absence or immediate requirement according to emergency situation		
Trigger : Absence of a Rescue Personnel or requirement from response team to call operator for an additional Rescue Personnel Type: ☑ External ☐ Temporal		
Preconditions: 1. Call operator is authenticated to use the system 2. System is up and running		
Normal Course: 1. Call operator receives notification of absence of a Response Personnel or trigger from response team at emergency location for requirement in system 2. Call operator looks for available rescue personnel 3. Call operator looks for available Rescue Personnel filtering them by skillset 4. Call operator assigns a Rescue Personnel to particular response team and update it in system		Information for Steps: ← Rescue Personnel status ← Rescue Personnel skill → Updated response team

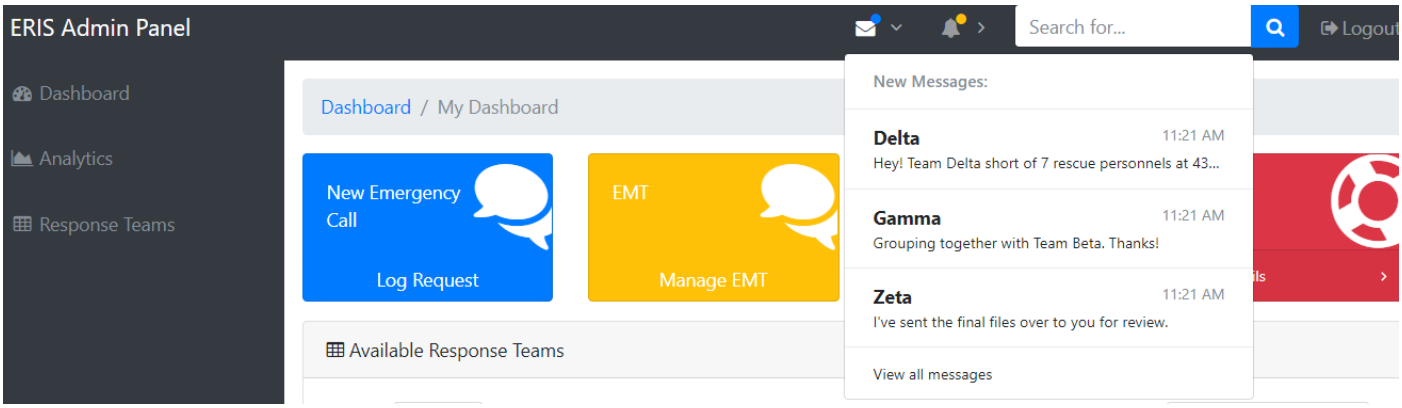
5. Assigned response team is dispatched to emergency location (in case of requirement).	→Response team status
Alternative Courses: 1.1 No Rescue Personnel available according to skillset (branch at normal course step 3) 1. Assign Rescue Personnel of nearest possible skillset to response team	→Updated response team
Post-conditions: 1. Rescue Personnel added to a particular response team	
Exceptions: NA	

Summary Inputs	Source	Outputs	Destination
Rescue Personnel status	Rescue911 Rescue Personnel Datastore	Updated response team	Response Team datastore

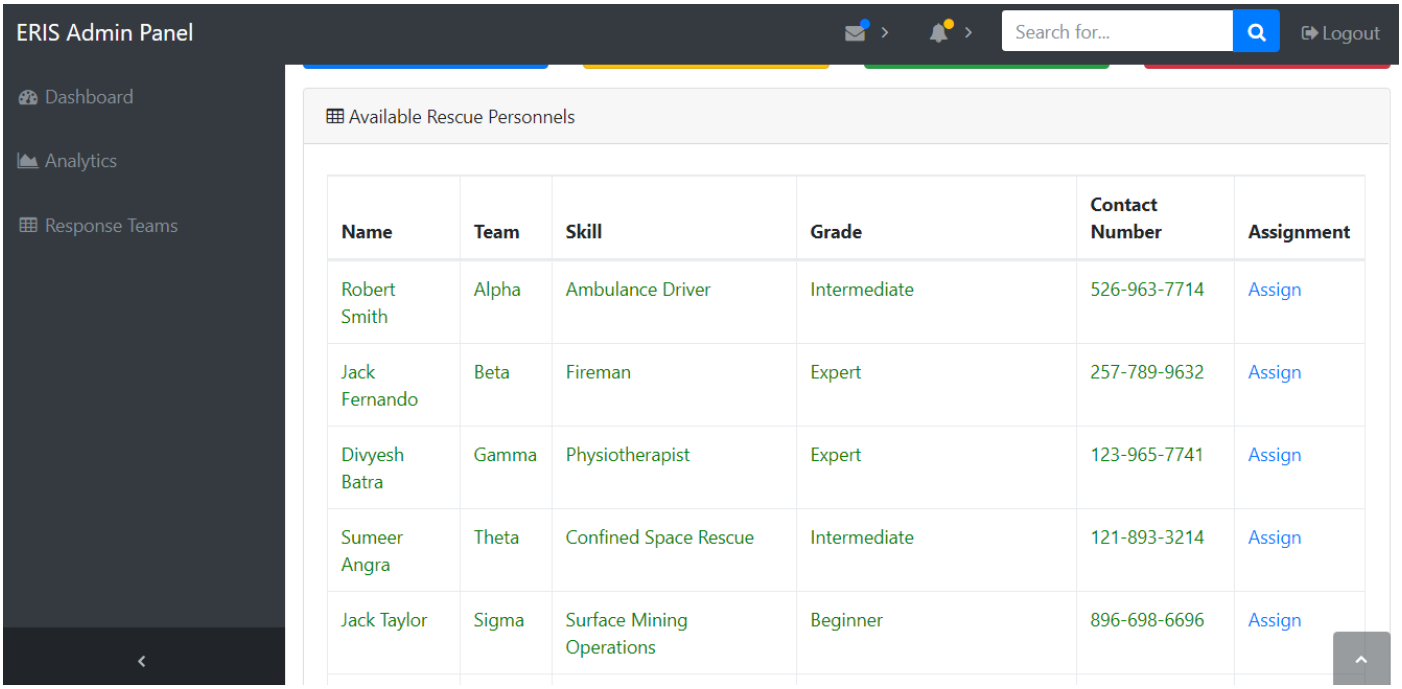
1.7.36. Sequence Diagram 12: Temporarily add Rescue Personnel to Response Team



1.7.37. Mock-up 13: Temporarily add Rescue Personnel to Response Team



1.7.38. Mock-up 14: Temporarily add Rescue Personnel to Response Team



1.7.39. Use Case 13: Request Response Team from External Emergency Service Company

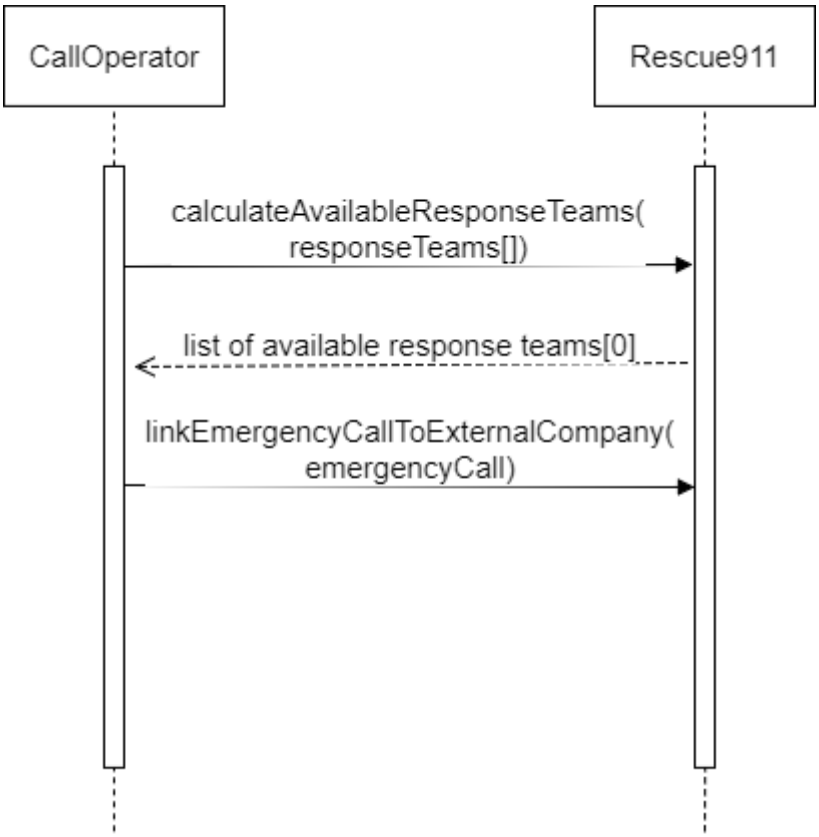
<table>
<tr><td>Use Case Name: Request for response team from another emergency services company</td><td>UC13</td><td colspan="2">Priority: Medium</td></tr>
<tr><td colspan="4">Actor: Call operator</td></tr>
<tr><td colspan="4">Description: This use case describes the request made by call operator for response team from another emergency services company</td></tr>
<tr><td colspan="4">Trigger: System gives notification mentioning all response teams assigned to emergency location
Type: ☑ External ☐ Temporal</td></tr>
<tr><td colspan="4">Preconditions:
1. Rescue911 call operator is authorized to access the system
2. System is up and running
3. All response teams are assigned to emergency location
4. New emergency call received or request for additional assistance from response teams</td></tr>
<tr><td colspan="2">Normal Course:
All response teams are assigned to emergency locations and additional response team is required for emergency situation
1. Call operator checks the dashboard for available response teams(but no team available).
2. Call operator checks the list of other emergency companies.
3. Call operator chooses and calls an emergency company, and confirms a team to be sent to particular emergency location.
4. Call operator links the chosen emergency company to that particular call.</td><td colspan="2">Information for Steps:

←External emergency company

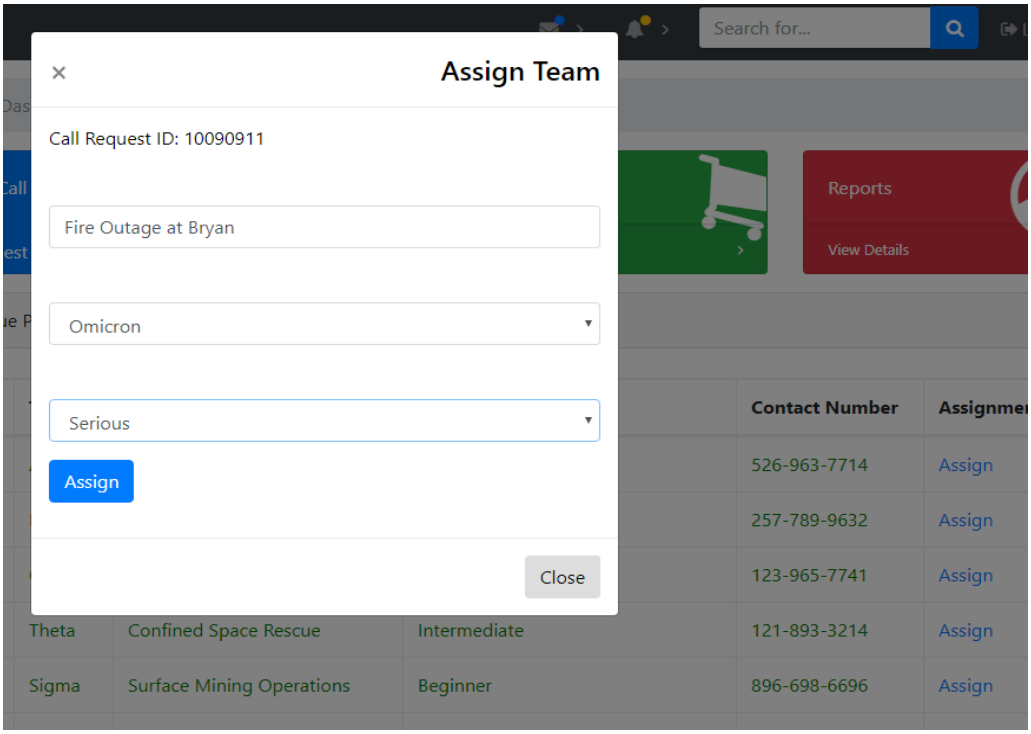
→ Emergency call status</td></tr>
<tr><td colspan="2">Alternative Courses:
1.1 If one emergency company doesn’t have response team ready for dispatch
1. Call operator calls another company. (Branch at step 3)</td><td colspan="2"></td></tr>
<tr><td colspan="4">Post-conditions:
1. Response team assigned successfully with help from another emergency services company.
2. Call operator can further login emergency calls.</td></tr>
<tr><td colspan="4">Exceptions:
E1: System does not have another emergency company contact information (occurs at Normal Course step 2)
1. System displays message “No contact information”
2. System asks employee to enter another emergency company’s information</td></tr>
<tr><td colspan="4">Summary
Inputs Source Outputs Destination</td></tr>
</table>

Emergency company data mapper	Emergency company data mapper	Emergency call status	Emergency call datastore

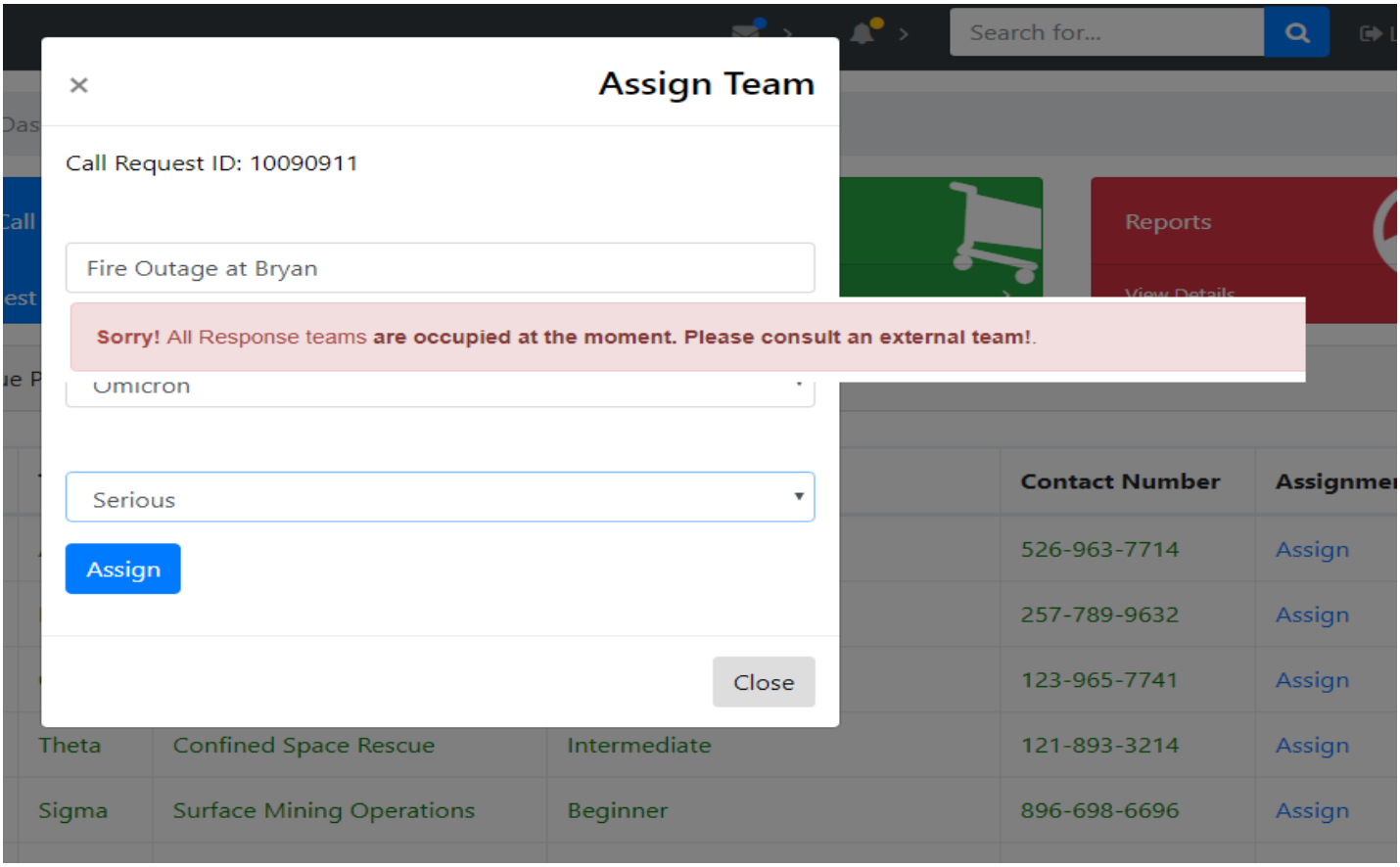
1.7.40. Sequence Diagram 13: Request Response Team from External Emergency Company



1.7.41. Mock-up 15: Request Response Team from External Emergency Company



1.7.42. Mock-up 16: Request Response Team from External Emergency Company



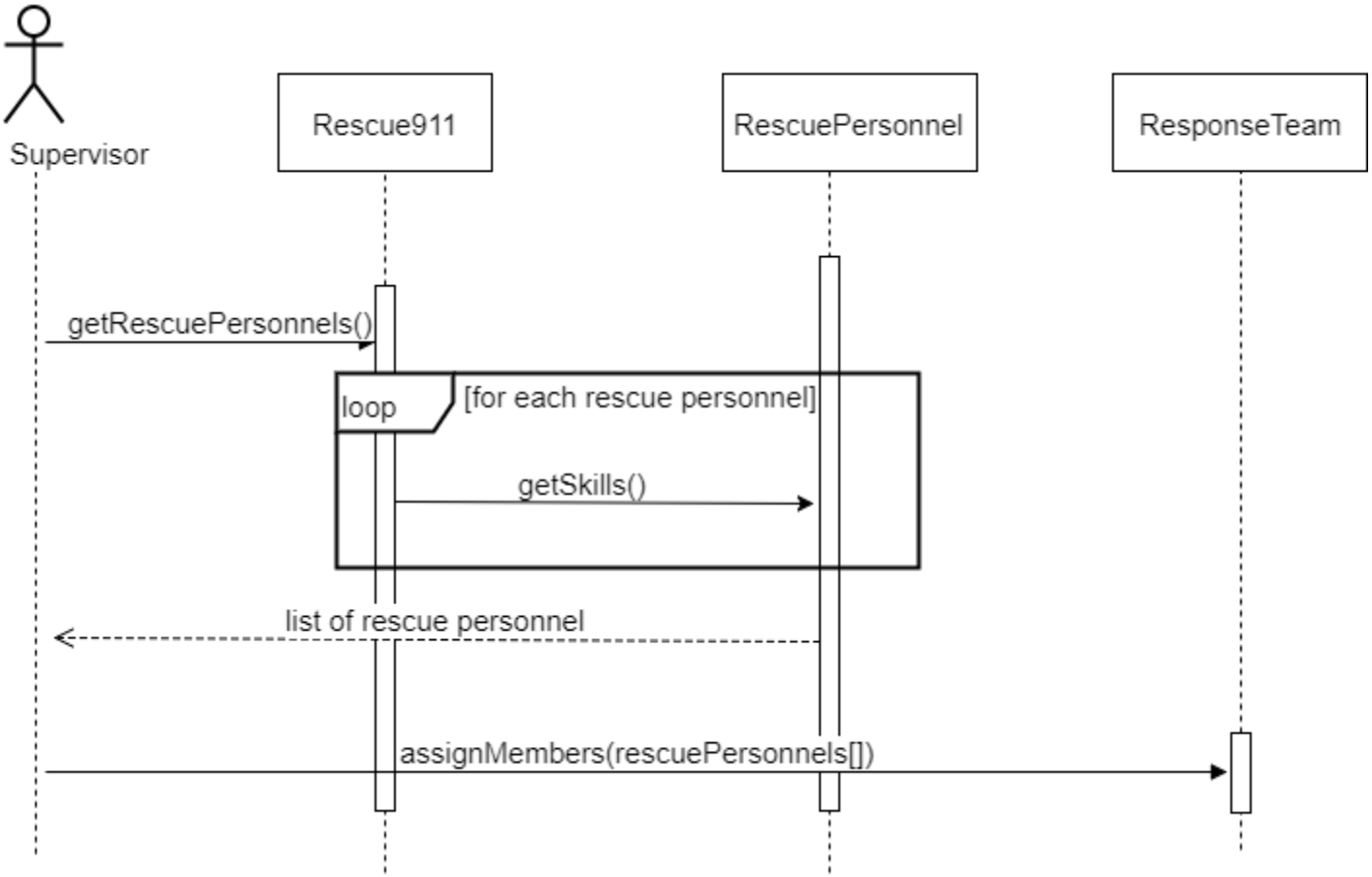
1.7.43. Use Case 14: New Response Team Selection/Creation

Use Case Name: New Response Team Selection/Creation	UC14	Priority : High
Actor : Supervisor		
Description : This use case describes the process of picking members that will form a response team		
Trigger : Must be done initially during setup or when new hires need to be placed Type: ☐ External ☑ Temporal		
Preconditions: 1. Rescue Personnel details along with tags forming their skills must be present in the employee database		
Normal Course: Rescue personnel need to be placed in appropriate response teams 1. Supervisor pulls up list of unplaced Rescue Personnel along with their skill tags from the employee database. 2. Based on their tags and requirement, supervisor places Rescue personnel in appropriate teams 3. The above newly formed list of teams is updated and		Information for Steps: ← List of Rescue personnel with tags → Updated list of response teams

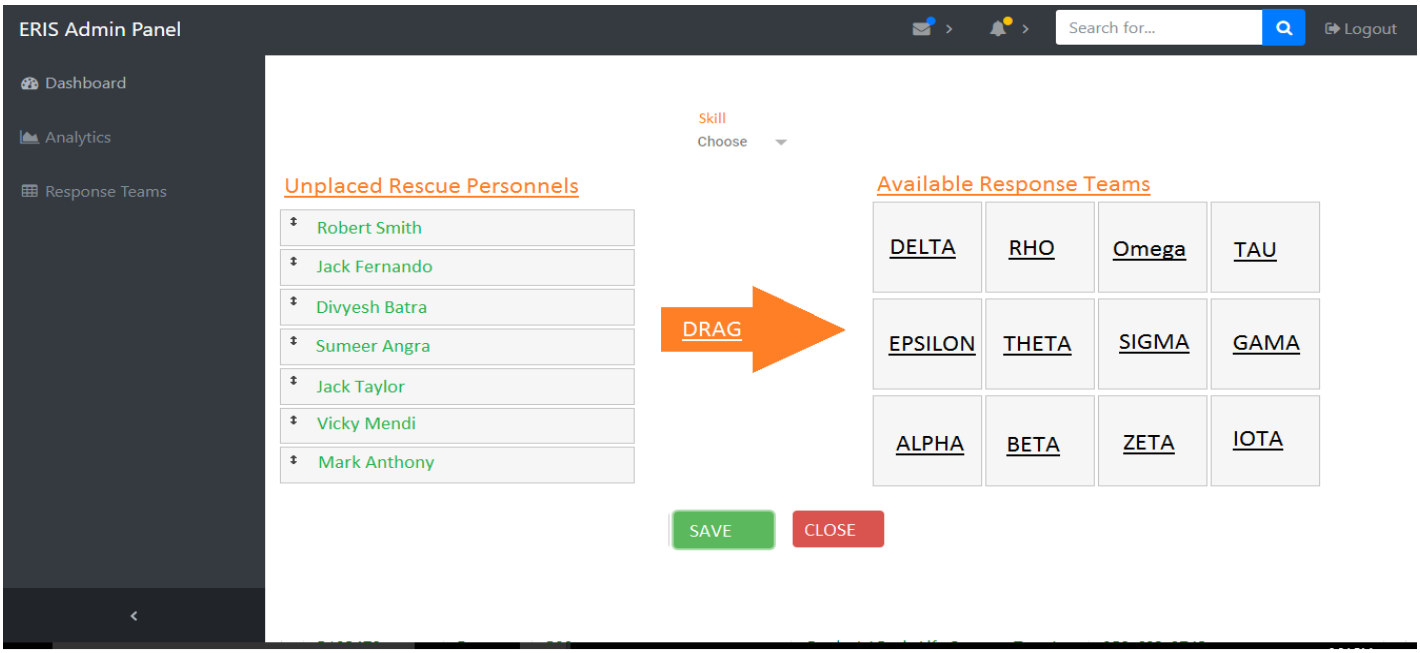
saved in the system	
Postconditions: 1. Response teams are successfully created	

Summary Inputs	Source	Outputs	Destination
List of Rescue personnel and their tags List of Response teams	Employee Datastore Supervisor	List of Rescue personnel and their tags List of Response teams	Supervisor Employee Datastore

1.7.44. Sequence Diagram 14: New Response Team Selection/Creation



1.7.45. Mock-up 17: New Response Team Selection/Creation

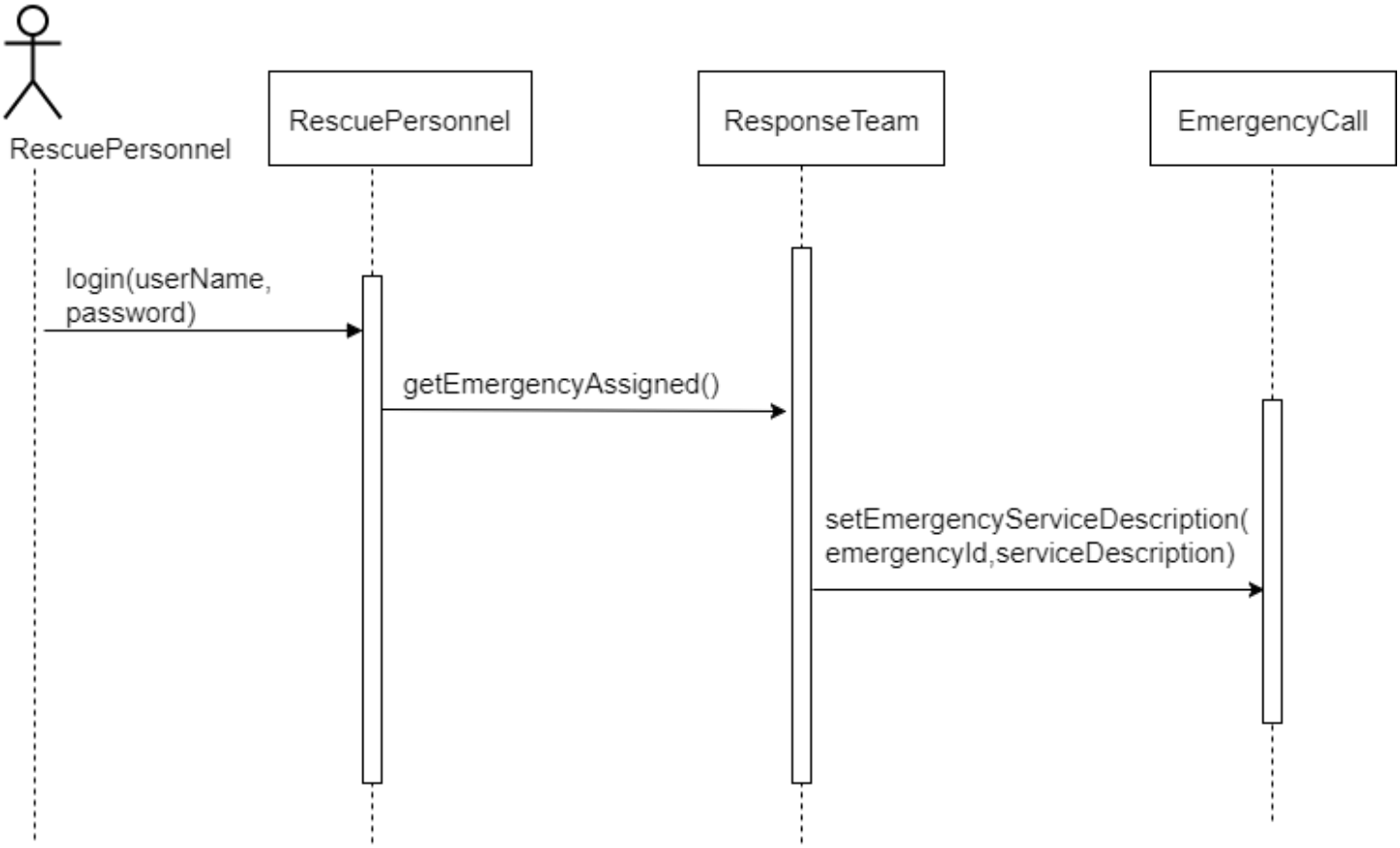


1.7.46. Use Case 15: Log Emergency case service description

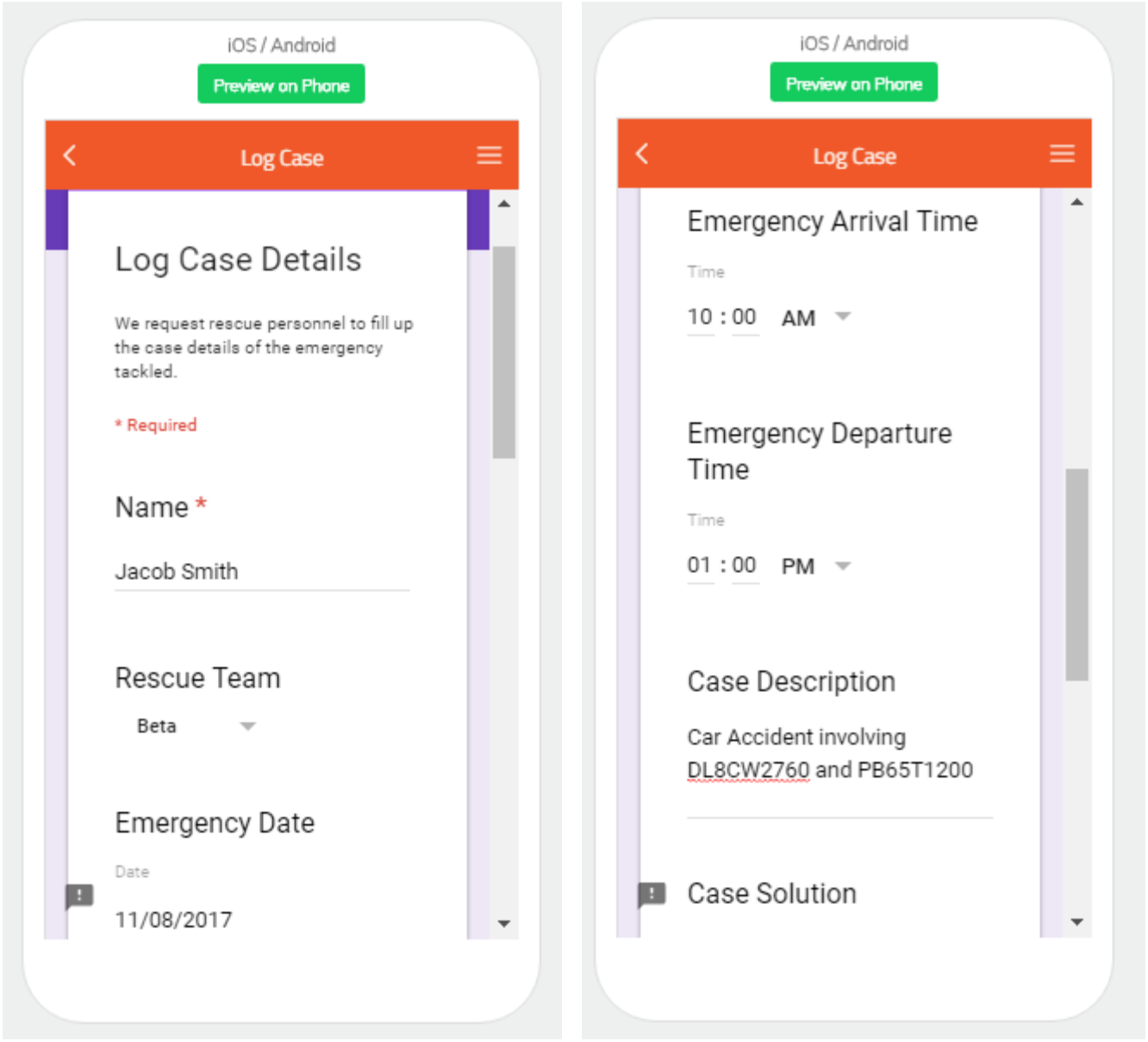
Use Case Name: Log Emergency case service description	UC15	Priority : High
Actor : Rescue Personnel		
Description : This use case describes the process of logging case description		
Trigger : Response team attends to a case Type: ☑ External ☐ Temporal		
Preconditions: 1. Response team should have completed attending to a case		
Normal Course: Rescue Personnel logs details of a case once it has been attended to 1. Rescue Personnel enters login details into the mobile application of ERIS 2. Rescue Personnel enters the case number, patient name and details of the case along with the solution 3. Rescue Personnel submits the above description which is later used for payment computation		Information for Steps: →Username and password →Case details
Postconditions: 1. Case is successfully logged into the system		

Summary Inputs	Source	Outputs	Destination
Username & Password Case Details	Rescue Personnel Rescue Personnel	Username & Password Case Details	Rescue Personnel Datastore

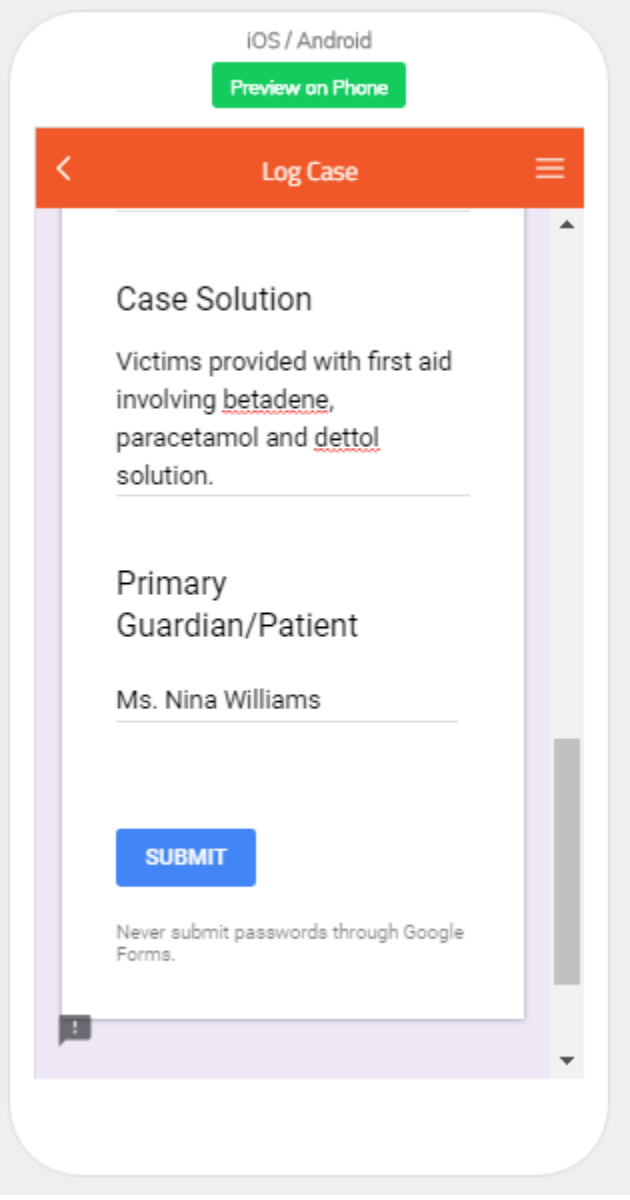
1.7.47. Sequence Diagram 15: Log Emergency case service description



1.7.48. Mock-up 18: Log Emergency case service description

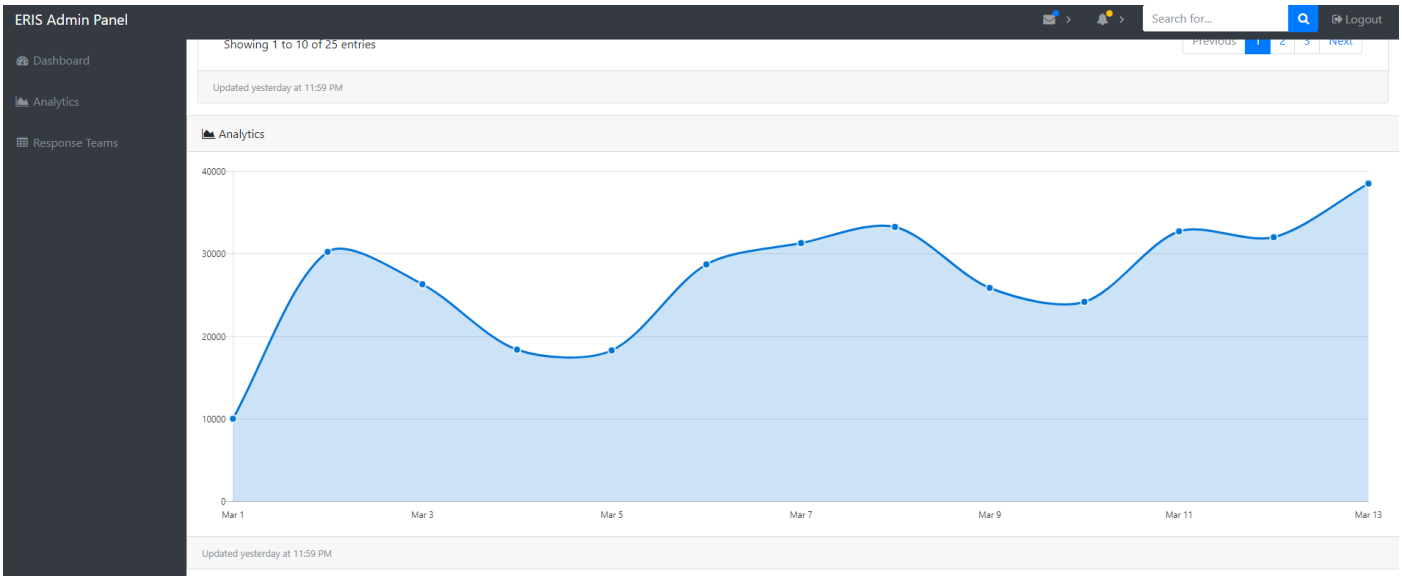


1.7.49. Mock-up 19: Log Emergency case service description

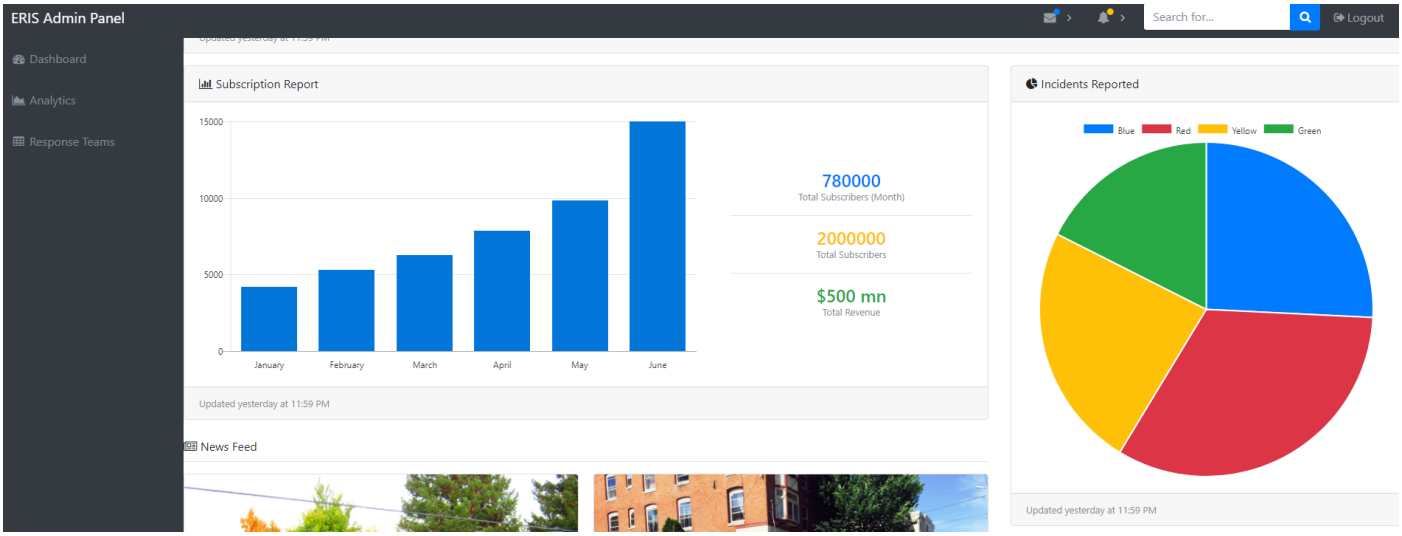


1.8. Miscellaneous Mockups

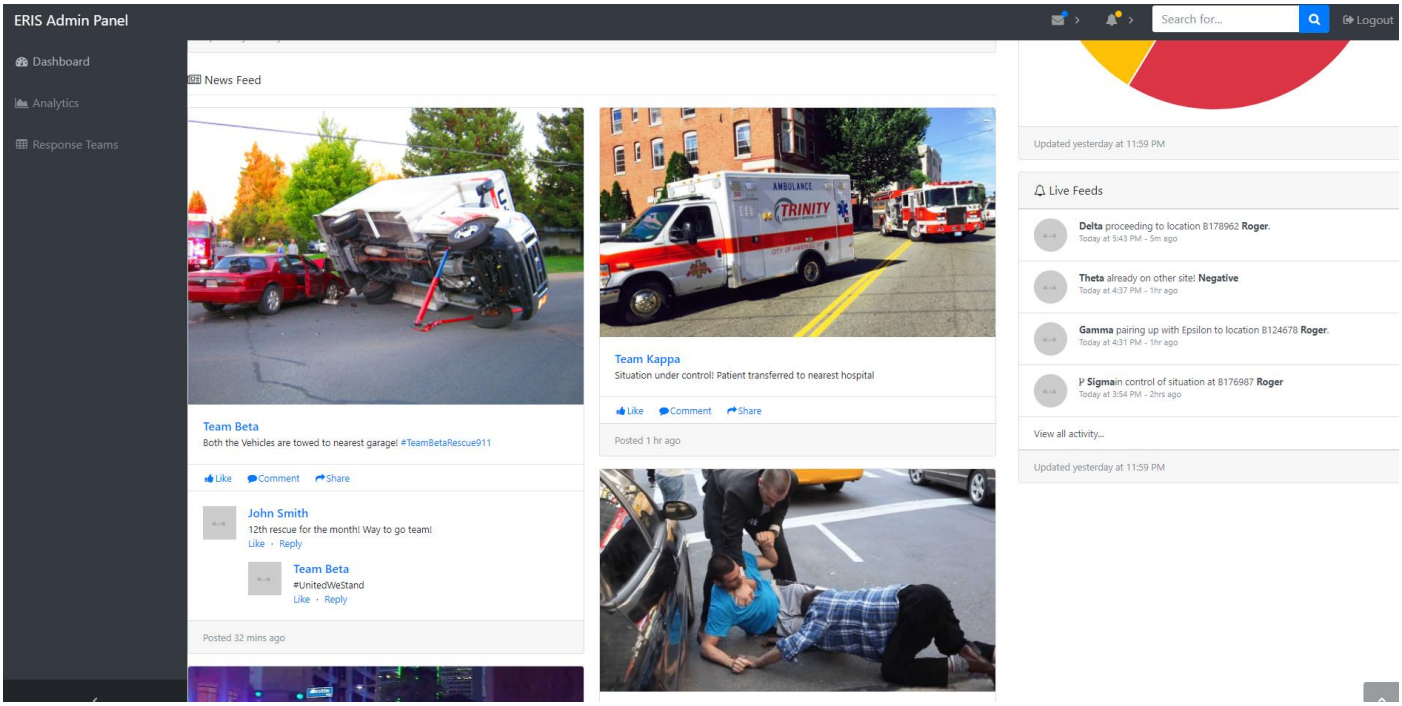
1.8.1. Mock-up 20: Analytics depicting revenue



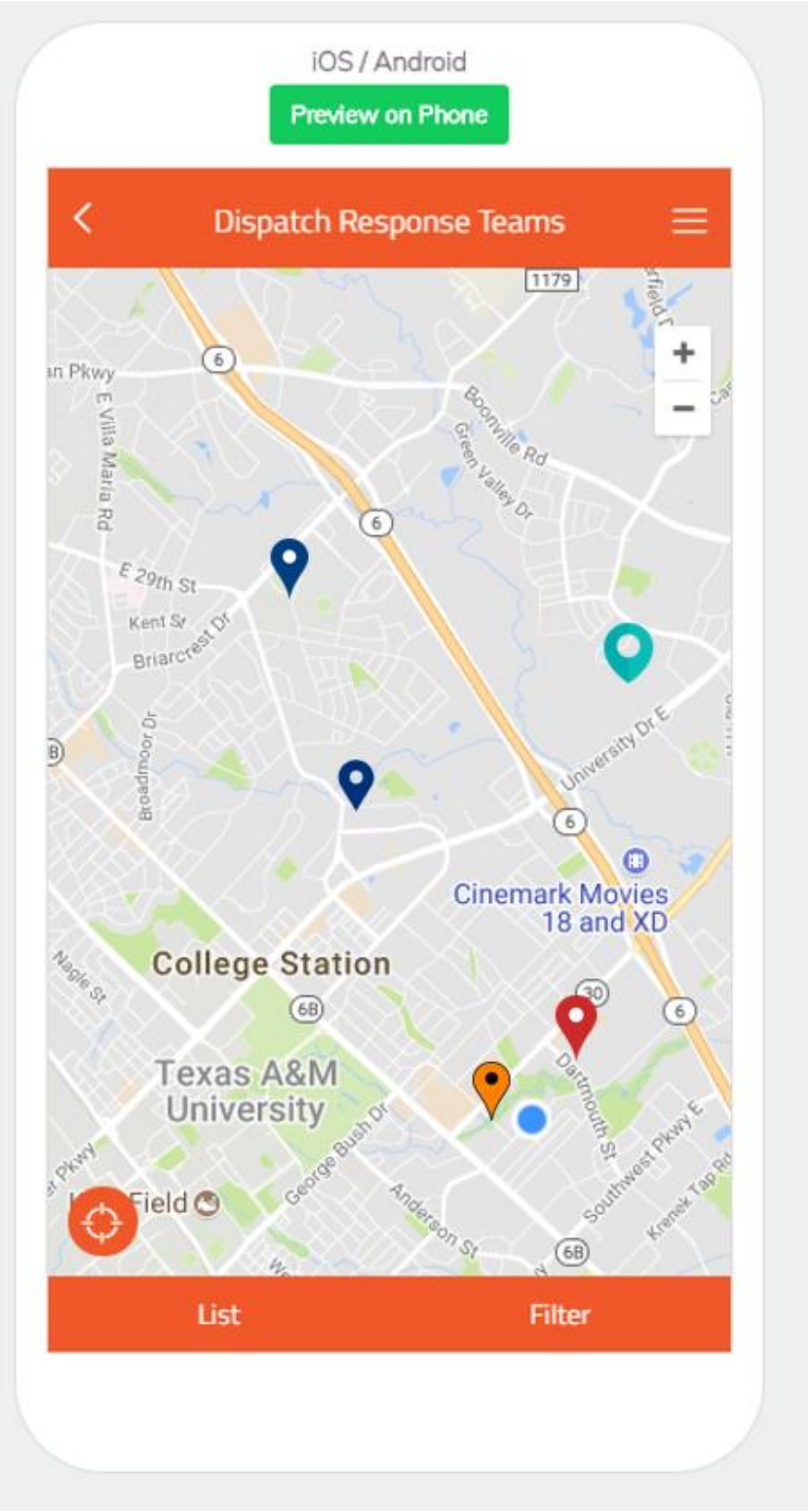
1.8.2. Mock-up 21: Subscribers and Incident reports dashboard



1.8.3. Mock-up 22: Social Media Plugin and Live Feed



1.8.4. Mock-up 23: Dispatch Response Team


iOS / Android
Preview on Phone
Dispatch Response Teams
1179
6
Boonville Rd
Green Valley Dr
E Villa Maria Rd
E 29th St
Kent St
Briarcrest Dr
Broadmoor Dr
University Dr E
Cinemark Movies
18 and XD
College Station
Texas A&M
University
George Bush Dr
Anderson St
Dartmouth St
Southwest Pkwy E
Kraenek Trap Rd
Nagle St
30
68
List
Filter

1.9. Test Plan:

S. No.	Requirements	Testing Methodology	Testing	Man-Hours
1.	**Functional Requirements** **Computer aided dispatch subsystem (CAD) – Primary users: Operators and Supervisors** a. Log emergency calls received: b. Dispatch, track and manage emergency responses: c. Reporting and online querying:	Black Box Testing Unit Testing Functional Testing Integration Testing System Testing	a) After initial design phase of Computer aided dispatch system, unit test will observe whether call center operator is able to log a new emergency call. He can input caller's name, phone, address, type of emergency situation and description of emergency situation. System provides status (logged, duplicate, complete, closed) to emergency calls. b) Testing will also verify whether available status of response team is correct, and these response teams are assigned emergency locations and dispatched to emergency locations in system. c)Reports generated and verified only for testing purposes once in a month.	40
2.	**Mobile Application subsystem (MAS) – Primary users: Response Personnel and Managers** a. Rescue records management: b. Response Personnel shift logging (clocking in and out):	Black Box Testing Unit Testing Functional Testing Acceptance Testing Integration Testing System Testing	a) Testing done to record virtual emergency calls, rescue team assigned and dispatched once in a week for first three months. b) Testing done to check whether response personnel shift logging in and out time is recorded and matches with manual entries in register.	32
3.	**Subscriber management subsystem (SMS) – Primary users: Managers** a. Direct and indirect subscriber records management:	Black Box Testing Unit Testing Functional Testing Integration Testing System Testing	Testing done to record different sets of virtual subscribers and then reports generated on these virtual data sets to check efficiency of subscriber records management.	24
4.	**Electronic patient care reporting**			16

	subsystem (EPCR) – Primary users: Response Personnel a. Capture patient care data:	Black Box Testing Unit Testing Functional Testing System Testing	Testing to run transactions to record and save patient care data and verify whether it is used by default through system if calls received by same patient by recording virtual emergency calls.	
5.	**Operational Requirements:** a.The system should be compatible with any web browser: b.The system can be run on any device ranging from handheld devices to desktops and laptops:	Functional Testing Usability Testing System Testing	a) Test run to check system software is running with several web browsers and results documented. b) Testing done to run CAD system on desktops and laptops and MAS system run on several mobile handsets and functionality efficiency results documented.	24
6.	**Performance Requirements:** a. The system should be available 24/7: b. The average response time of the system should be less than 2 seconds: c. Report generation should not exceed 20 seconds: d. System should be able to scale out efficiently from here onwards: e. System should be able to handle traffic of minimum 125000 emergency entries per day: f. In the event of system failure, backup should kick in within 10 seconds:	Performance Testing Functional Testing Load Testing Stress Testing System Testing	a) Test run every month to check whether system was unavailable at any time of month and for how long. b) Test run every month recording system response time. c) Test run every month to generate reports and generation time noted. d) Test run will be done to every 1st week of month to check number of current users in respect with current rescue personnel to determine system scalability. e) We are going to run a stress test of about 200000 emergency entries and check where it stops feeding entries. f) We will run a virtual case of system failure and record the time taken for a system backup.	48

7.	**Security Requirements** a. Only authenticated and authorized users should be able to access ERIS:	Functional Testing Acceptance Testing Integration Testing System Testing	Test runs to check only authenticated and authorized users should be able to log in ERIS, otherwise, system displays an error message of incorrect userID and password.	16
8.	**Process-oriented Requirements** a. The system must maintain real time information about Rescue Personnel, response teams and be accessible to the operator: b. System should be able to use emergency location to lookup available response teams: c. While assigning response teams, call center operators should be able to see and match emergency levels to response team grade:	Black Box Testing Unit Testing Functional Testing Acceptance Testing Integration Testing System Testing	a) Testing done to record virtual data sets of rescue personnel personal information and check whether all these data sets are available to operators for further use. b) Testing done to use emergency location data to see which response teams are available and then dispatch response teams to emergency locations to record and document results. c) All the skills set of response personnel is available in dropdown format and easily assigned to all response team personnel. Testing will also verify whether available status of response team is correct, and these response teams are assigned emergency locations and dispatched to emergency locations in system.	32

Note – After every iteration, Regression Testing will be performed to make sure that the system functionalities and “happy path flows” remain unchanged. To ensure that the system works as expected, the results of the regression test will be compared with a baseline of the system taken before applying the patches.

1.2. Tools

We will be using industry standard tools such as IBM Rational Tester, HPE Unified Functional Testing software for our testing. IBM Rational Tester is an automated functional testing and regression testing tool. We are

going to buy the licenses as required since these are paid applications. These tools will also provide us with defect testing and the required quality control testing tools.

1.3. Test Environment

New test servers are required for presentation, application and database layers. For integration, system, performance and UA, multiple test environments required.

1.4. Schedule

The initial schedule for testing is as given below:

Task	Start Date	End Date	Estimate Effort	Comments
Test Planning - Review - Requirements and RTM - Provide estimates	10/2/2017	10/10/2017	5 Man-hours	NA
Prepare Test Plan - Test plan to be approved by stakeholders	10/11/2017	10/15/2017	6 Man-hours	NA
Prepare Test Scenarios and Test Cases	10/16/2017	10/24/2017	8 Man-hours	NA
Execute Test - Prepare Test Result Document - Update RTM	10/25/2017	11/12/2017	10 Man-hours	NA
Report defects and Retest - Close defects	11/13/2017	11/30/2017	7 Man-hours	NA

1.5. Test Artifacts

Artifact Name	Created by	Used by
Test Plan	Test Designer	Project Manager, Test Manager, Tester, Deployment Manager
Test Result Document	Tester	Project Manager, Test Manager, Deployment Manager
Test Status Report	Tester	Entire Team
Defect Report	Tester	Project Manager, Test Manager, Tester, Deployment Manager
Requirements Traceability Matrix	Updated by Tester	Entire Team

UNIT TEST CASE - 1

Class: Rescue Personnel **Attribute Addressed:** name: String[1]

Tester: Alex **Date Designed:** 11/5/17 **Date Conducted:** 11/7/17

Results: Passed

Requirements Addressed: Rescue personnel's name is only in alphabet characters

Objective:
This test ensure that Rescue Personnel's name inputted only in alphabet characters. If it is inputted in alphanumeric format, system displays error.

Initial Conditions: Rescue911 service system is in active state, required system applications are running

Test Data:

	Name Entered	System message displayed
1)	John Smith	Name saved
2)	Jennifer Afron	Name saved
3)	David123	Error: Name not entered in required format

Test Flow:

1) Call operator input Rescue Personnel's name in system.
2) If name is in put only in alphabets, system displays name saved. Otherwise, system displays error.

Actual Results: Complies

Note: Call operator input name in the correct format (only alphabets).

UNIT TEST CASE – 2

Class: Rescue Personnel **Attribute Addressed:** checkinTime:DateTime[1]

Tester: Alex **Date Designed:** 13/5/17 **Date Conducted**: 13/7/17

Results: Passed

Requirements Addressed: Response Personnel shift logging (clock in time)

Objective:
This test ensures that every response personnel shift clocking in time is recorded correctly.

Initial Conditions: Rescue911 service system is in active state, required system applications are running

Test Data:

	Actual Clock-in Time	Clock-in Time in system
1)	7 am	7 am
2)	7:15 am	7:15 am
3)	7:10 am	7:10 am
4)	7:03 am	7:03 am

Test Flow:

1) Response team personnel swipe their ID card to record their shift clock in time.
2) The system not only records the time but in correct format.

Actual Results: Complies

Note: Response personnel shift clocking in time is recorded correctly.

UNIT TEST CASE - 3

Class: Rescue Personnel **Attribute Addressed:** checkOutTime:DateTime[1]

Tester: Alex **Date Designed:** 14/5/17 **Date Conducted**: 14/7/17

Results: Passed

Requirements Addressed: Response Personnel shift logging (clock-out time)

Objective:
This test ensures that every response personnel shift clocking out time is recorded correctly.

Initial Conditions: Rescue911 service system is in active state, required system applications are running

Test Data:

	Actual Clock-out Time	**Clock-out Time in system**
1)	5 pm	5 pm
2)	5:15 pm	5:15 pm
3)	5:10 pm	5:10 pm
4)	5:03 pm	5:03 pm

Test Flow:

1) Response team personnel swipe their ID card to record their shift clock out time.
2) The system not only records the time but in correct format.

Actual Results: Complies

Note: Response personnel shift clocking out time is recorded correctly.

UNIT TEST CASE - 4

Class: Rescue Personnel **Attribute Addressed:** hireDate:Date[1]

Tester: Steve **Date Designed:** 15/5/17 **Date Conducted:** 15/7/17

Results: Passed

Requirements Addressed: Personnel hire date is inputted in correct format

Objective:
This test ensure that rescue personnel hire date is inputted in correct format otherwise system displays error.

Initial Conditions: Rescue911 service system is in active state, required system applications are running

Test Data:

Date Entered	**System message displayed**
1) 07/11/2016	Date inputted
2) 10/15/2017	Date inputted
3) 15/12/2016	Error: Date not entered in required format

Test Flow:

1) Call center operator can log an emergency call in the system after receiving a call from patient.
2) Call center operator can input rescue personnel hire date in the format (mm/dd/yyyy).

Actual Results: Complies

Note: Call operators can input rescue personnel hire date only in required format otherwise system displays error message.

UNIT TEST CASE - 5

Class: Rescue Personnel **Attribute Addressed:** emailId: String[1]

Tester: Steve **Date Designed:** 18/5/17 **Date Conducted:** 18/7/17

Results: Passed

Requirements Addressed: Personnel's email is inputted in correct format

Objective:
This test ensure that rescue personnel email is inputted in correct format otherwise system displays error.

Initial Conditions: Rescue911 service system is in active state, required system applications are running

Test Data:

	Email Entered	System message displayed
1)	Abhay0404@rescue911.com	Email inputted
2)	Abhay0708yah.com	Error: Email not entered in required format

Test Flow:

1) Call center operator input rescue personnel email id.
2) If email ID is in put in required format, system displays name saved. Otherwise, system displays error.

Actual Results: Complies

Note: Call operators can input rescue personnel email id only in required format otherwise system displays error message.

UNIT TEST CASE - 6

Class: Rescue Personnel **Attribute Addressed:** skills: String[1..*]

Tester: Alex **Date Designed:** 18/5/17 **Date Conducted:** 18/7/17

Results: Passed

Requirements Addressed: Every Rescue Personnel is assigned a skill already listed in system by selecting from the choice of skills

Objective:
This test ensures that every rescue personnel is assigned a skill already listed in system.

Initial Conditions: Rescue911 service system is in active state, required system applications are running

Test Data:

Skills	**Skills displayed in the system**
1) John Davis	Ambulance Driver, Fireman
2) Joe Thomas	Physiotherapist
3) Rachel Ross	Surface mining operations

Test Flow:

1) Call operator assigns a skillset to rescue personnel.
2) Similarly, all rescue personnel are put under several skill categories in system.

Actual Results: Complies

Note: Call operators can put rescue personnel under several skill categories.

UNIT TEST CASE - 7

Class: Rescue Personnel **Attribute Addressed:** baseStation:BaseStation[1]

Tester: Alex **Date Designed:** 14/5/17 **Date Conducted:** 14/7/17

Results: Passed

Requirements Addressed: Every Personnel is assigned a base station

Objective:
This test ensures that every rescue personnel is assigned a base station as its workplace.

Initial Conditions: Rescue911 service system is in active state, required system applications are running

Test Data:

Rescue Personnel Name	**Base Station details**
1) John Davis	Name: Bryan base station Location: Bryan
2) Thomas Miller	Name: College Station base station Location: College Station

Test Flow:

1) Call center operator assigns rescue personnel a base station from listed base stations in system.

Actual Results: Complies

UNIT TEST CASE - 8

Class: Rescue Personnel **Attribute Addressed:** location: String[1]

Tester: Alex **Date Designed:** 20/5/17 **Date Conducted:** 22/7/17

Results: Passed

Requirements Addressed: Call operator checks Rescue Personnel's current location using GIS system

Objective:
This test ensures that call operator can check Rescue Personnel's current location using GIS system.

Initial Conditions: Rescue911 service system is in active state, required system applications are running

Test Data:

Personnel Name	**Location displayed**
1) John Davis	401 Anderson Street, College Station, TX
2) Ross Miller	156 Hop Street, College Station, TX

Test Flow:

1) Call operator input personnel's username on GIS system.
2) GIS system displays current location of the particular personnel.

Actual Results: Complies

UNIT TEST CASE - 9

Class: Rescue Personnel **Attribute Addressed:** status: String[1]

Tester: Steve **Date Designed:** 19/5/17 **Date Conducted:** 21/7/17

Results: Passed

Requirements Addressed: Rescue Personnel status is appropriately displayed in the system

Objective:
This test ensure that Rescue Personnel's status changes as and when the personnel is available or on service or is away for some work.

Initial Conditions: Rescue911 service system is in active state, required system applications are running

Test Data:

Personnel Name	**Status displayed on the system**
1) John Davis	On service
2) Ross Miller	Available
3) Rachel Joe	Away

Test Flow:

1) Call operator assigns an availability status to rescue personnel.
2) If response team is assigned an emergency call, response personnel status changes from available to on service.

Actual Results: Complies

UNIT TEST CASE - 10

Class: Rescue Personnel **Method Addressed:** login(userName,password)

Tester: Alex **Date Designed:** 17/5/17 **Date Conducted:** 23/7/17

Results: Passed

Requirements Addressed: Rescue Personnel able to login system through given username and password.

Objective:
This test ensure that Rescue Personnel can login to system through given username and password.

Initial Conditions: Rescue911 service system is in active state, required system applications are running

Test Data:

Username and Password Entered	**System message displayed**
1) John123, ********	Login successful
2) Hoberman345, *******	Login successful
3) Abcdd12334, *********	Error: Username or password is incorrect

Test Flow:

1) Rescue Personnel enters login username and password in system,
2) System allows login to happen.

Actual Results: Complies

UNIT TEST CASE - 11

Class: Rescue Personnel **Attribute Addressed:** userName:String[1]

Tester: Alex **Date Designed:** 18/5/17 **Date Conducted:** 23/7/17

Results: Passed

Requirements Addressed: Rescue personnel has a login username

Objective:
This test ensure that rescue personnel has a login username

Initial Conditions: Rescue911 service system is in active state, required system applications are running

Test Data:

Personnel Name	**Username**
1) John Davis	johndavis
2) Rachel Joe	rach1234

Test Flow:

1) Every rescue personnel has a username.
2) Username consists of alphanumeric characters.

Actual Results: Complies

UNIT TEST CASE - 12

Class: Rescue Personnel **Attribute Addressed:** password: String[1]

Tester: Steve **Date Designed:** 15/5/17 **Date Conducted:** 15/7/17

Results: Passed

Requirements Addressed: Rescue Personnel has a login password which is encrypted

Objective:
This test ensures that Rescue Personnel has an encrypted login password.

Initial Conditions: Rescue911 service system is in active state, required system applications are running

Test Data:

Rescue Personnel Name	**Password displayed in the system**
1) John Davis	**********
2) Rachel Joe	********

Test Flow:

1) Rescue personnel has a password.
2) Password consists of alphanumeric characters.

Actual Results: Complies

UNIT TEST CASE - 13

Class: Rescue Personnel **Method Addressed:** checkStatus()

Tester: Alex **Date Designed:** 23/5/17 **Date Conducted:** 25/7/17

Results: Passed

Requirements Addressed: Call operator checks personnel's status

Objective:
This test ensures that call operator is able to check personnel's status

Initial Conditions: Rescue911 service system is in active state, required system applications are running

Test Data:

Input Personnel's name	Availability Status
1) John Smith	Available
2) Cory Anderson	On service
3) Terry Lewis	Away

Test Flow:

1) Call operator input personnel's name to check his availability status.
2) System displays personnel's status.

Actual Results: Complies

UNIT TEST CASE - 14

Class: Rescue Personnel **Method Addressed:** addRescuePersonnel(rescuePersonnel)

Tester: Alex **Date Designed:** 20/5/17 **Date Conducted:** 20/7/17

Results: Passed

Requirements Addressed: Call operator adds rescue personnel to response team.

Objective:
This test ensures that call operator can add rescue personnel to response team.

Initial Conditions: Rescue911 service system is in active state, required system applications are running

Test Data:

Personnel username	Response Team No.	System message displayed
1) JohnSmith123	3	Personnel added to Response Team Alpha
2) JenniferAfron345	4	Personnel added to Response Team Beta

Test Flow:

1) Call operator is notified by the system about personnel's absence or sudden requirement from a particular response team.
2) Call operator remove a personnel username from a response team.
3) Call operator assign personnel's username to that particular response team which needs a personnel.

Actual Results: Complies

UNIT TEST CASE - 15

Class: Rescue Personnel **Method Addressed:**removeRescuePersonnel(rescuePersonnel)

Tester: Steve **Date Designed:** 23/5/17 **Date Conducted:** 25/7/17

Results: Passed

Requirements Addressed: Call operator remove a rescue personnel to response team.

Objective:
This test ensure that call operator is able to remove rescue personnel to response team.

Initial Conditions: Rescue911 service system is in active state, required system applications are running

Test Data:

	Personnel username	Response Team No.	System message displayed
1)	JohnSmith123	3	Personnel removed from Response Team 3
2)	JenniferAfron345	4	Personnel removed from Response Team 4

Test Flow:

1) Call operator is notified by the system about personnel's absence or sudden requirement from a particular response team.
2) Call operator remove personnel's username from a particular response team.

Actual Results: Complies

UNIT TEST CASE - 16

Class: Rescue Personnel **Method Addressed:** calculateHoursWorked(checkInTime,checkOutTime)

Tester: Alex **Date Designed:** 23/5/17 **Date Conducted:** 25/7/17

Results: Passed

Requirements Addressed: Personnel's working hours are calculated.

Objective: This test ensures that rescue personnel's working hours are calculated correctly.

Initial Conditions: Rescue911 service system is in active state, required system applications are running

Test Data:

Check-in Time	Check-out time	Working Hours displayed
1) 7:00 am	5:00 pm	10
2) 7:30 am	5:45 pm	10.25

Test Flow:

1) Call operator inputs personnel's name to check his check-in and check-out time.
2) System displays working hours.

Actual Results: Complies

Note: Call center operator input name in the correct format (only alphabets).

UNIT TEST CASE - 17

Class: Patient **Attributes Addressed:** firstName:String[1],lastName:String[1]

Tester: Steve **Date Designed:** 23/5/17 **Date Conducted:** 25/7/17

Results: Passed

Requirements Addressed: Patient's name is only in alphabet characters

Objective:
This test ensures that patient's name is inputted only in alphabet characters. If it is inputted in alphanumeric format, system displays error.

Initial Conditions: Rescue911 service system is in active state, required system applications are running

Test Data:

First and Last Name Entered	System message displayed
1) John Smith	Name saved
2) Jennifer Afron	Name saved
3) David123	Error: Name not entered in required format

Test Flow:
1) Call operator can log an emergency call in the system after receiving a call from patient.
2) Call operator inputs patient's name.
3) If name is in put only in alphabets, system displays name saved. Otherwise, system displays an error.

Actual Results: Complies

Note: Call operator inputs name in the correct format (only alphabets).

UNIT TEST CASE - 18

Class: Patient **Attribute Addressed:** address: String[1]

Tester: Alex **Date Designed:** 24/5/17 **Date Conducted:** 26/7/17

Results: Passed

Requirements Addressed: Patient address is in only alphanumeric characters

Objective:
This test ensure that patient's address inputted only in alphanumeric characters.

Initial Conditions: Rescue911 service system is in active state, required system applications are running

Test Data:

Address Entered	**System message displayed**
1) Apt. No.345, College Main Apt., Bryan, TX	Address saved
2) Apt. No. 16, Country Place Apt., Bryan, TX	Address saved
3) !Apt No 12, Country Plac*&., Bryan, TX	Error: Invalid text format

Test Flow:

1) Call operator inputs patient's address in system.
2) If address is in put only in alphanumeric characters, system displays address saved.

Actual Results: Complies

Note: Call operator inputs address in the correct format (only alphanumeric characters).

UNIT TEST CASE - 19

Class Name: Patient **Attribute Addressed:** phoneNumber:String[1]

Tester: Alex **Date Designed:** 25/5/17 **Date Conducted:** 25/7/17

Results: Passed

Requirements Addressed: Patient's phone number is saved in only numeric digits.

Objective:
This test ensures that patient's phone number is inputted only in numeric digits. If it is inputted in other format, system displays error.

Initial Conditions: Rescue911 service system is in active state, required system applications are running

Test Data:

Name Entered	System message displayed
1) 9873938889	Phone number saved
2) 7654447778	Phone number saved
3) 987654er99	Error: Number not entered in required format

Test Flow:

1) Call operator enters patient's phone number.
2) If number is only in numeric digits, system displays phone number saved. Otherwise, system displays error.

Actual Results: Complies

Note: Call operator inputs number in the correct format (only numeric digits).

UNIT TEST CASE - 20

Class Name: Patient **Method Addressed:** addPatientDetails()

Tester: Alex **Date Designed:** 20/5/17 **Date Conducted:** 25/7/17

Results: Passed

Requirements Addressed: Patient's details are saved in system as patient description in alphanumeric format and special characters such as (.,!&$%).

Objective:
This test ensures that patient's details are saved in alphanumeric characters.

Initial Conditions: Rescue911 service system is in active state, required system applications are running

Test Data:

Details Entered	**System message displayed**
1) Asthma patient from 3 years	Details saved
2) Major headache problems	Details saved
3) 70% burns	Details saved
4) Severe indigestion^	Error: Invalid text. Only (.,!&$%) are allowed

Test Flow:

1) Call operator enters patient's details.
2) If patient details are input in alphanumeric characters and specific special character format, system displays details saved.

Actual Results: Complies

Note: Call operator enters details in the correct format (alphanumeric characters and (.,!&$%) special charcters).

1.10. Assumptions

- No dynamic team formations will take place. Teams are only swapped in the event of some personnel not being available for the day which will be handled each morning before shifts are assigned.
- Rescue Personnel will be tracked based on their location that can be used to swap them if the need arises based on absentee personnel.
- Response teams do not have 1 specific location, but the location of the driver is tracked to identify a response team. It is assumed that the team members will be a maximum of 8 miles away from each other at all times.
- Bill amount for each patient in an emergency would be same