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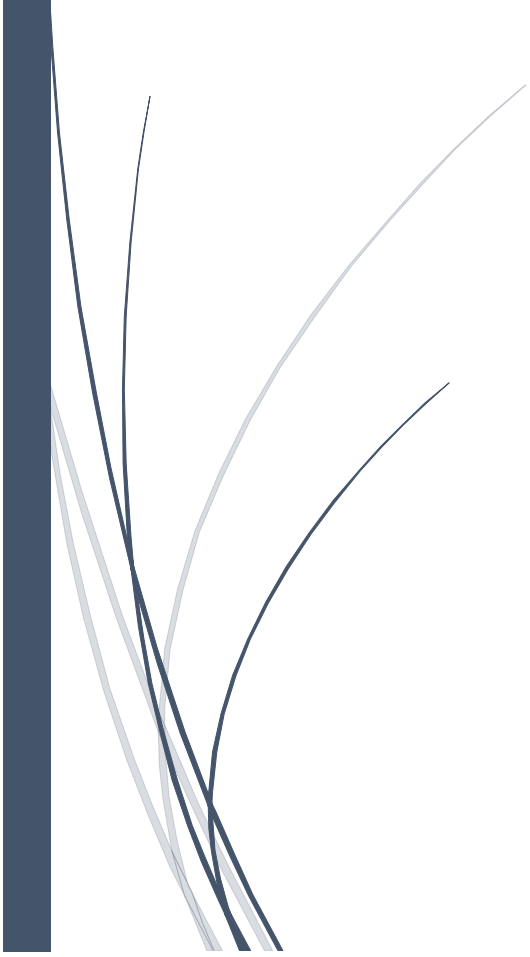
Crisis Management System

Software Requirements Specification Document - V3.0

DONTCRYSIS SOFTWARE SOLUTIONS



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Revision History

Name	Date	Description	Version
Mokshika Gaur	15th September	Included Introduction, Overall Descriptions and User classes, Glossary	V1.0
Patricio	26th September	Included use case diagram and data flow diagram.	V1.5
Shuvam Nandi	5th October	Added functional requirements	V1.6
Parth Satija	12th October	Updated functional requirements	V1.8
Madhavan Seshadri	13th October	Added User Interface Requirements and System Features and API	V2.5
Ankur Bansal	12th November	Made final modifications to SRS to make the Glossary terms consistent.	V3.0

1. Introduction

1.1 Purpose

The Ministry of Home Affairs (MHA) envisions to further increase the safety and security of Singapore by procuring a Crisis Management System (CMS) that allows seamless collaboration between government agencies during emergency times.

The purpose of this document is to list a complete set of requirements provided by the CMS with respect to public needs, the expected constraints as well as reactions to external stimuli. We will also predict how we hope this system will be used in order to develop a better understanding of the project and outline concepts and features, which may be implemented in future. A variety of model diagrams will be used to illustrate relevant concepts, interactions and data.

In summary, the objective of this document is to provide a detailed overview of the Crisis Management system. It describes how the respective clients, team and audience view the product and its functionality. This document is intended for all stakeholders, including (but not limited to) software developers, project managers, quality assurance personnel and customers.

1.2 Document Conventions

Titles as well as subtitles are in boldface and indentation is used to depict hierarchical relationship within the documentation. The document uses Times New Roman font, in size 12.

1.3 Intended Audience and Reading Suggestions

This document is intended for the listed audience:

- The product managers
- The internal software developers

- The testing team managers and engineers
- The maintenance managers and engineers
- The government IT department
- Users interested in CMS detailed information

1.4 Product Scope

CMS will function as the emergency news feed, which provides real-time status updates on a map of Singapore related to weather conditions and haze information on a web graphical user interface. CMS is monitored by the Prime Minister, cabinet ministers and government agencies, with reports containing all details of the crises sent to the PMO office at regular intervals. The public can report crises via CMS and request for assistance. CMS thus, is also the central point for displaying relevant information for emergencies.

The CMS serves as a command-and-control-platform for the call center operators to respond quickly to needs and dangerous situations, such as fires, gas leaks and hazardous air condition.

CMS thus provides real-time monitoring for the said incidents for the key decision makers and also contact the relevant agencies to respond to the situations. Moreover, each time the call operators input new incident/emergency data, the incident information is immediately updated on the map on the web page and SMS is dispatched to the relevant agencies by SMS.

2. Overall Description

2.1 Product Perspective

The purpose of CMS is to gather information of a crisis from the public along with data from various government websites. The goal of CMS is to serve as a central information centre to assist the different government agencies in the event of a crisis. Moreover, it also serves as a portal for

Ministers and members of the public to get a clear and consolidated understanding of the condition in Singapore. It allows CMS to works as a control centre by enabling the dissemination of useful information to the public through various media platforms like Facebook and SMS.

2.2 Product Functions

At the end of the project term, team Don't Crysis will deliver a web application as CMS. This system shall comprise of an authentication for call centre employees/ Government officials and agencies and a subscribe feature for members of the public. The system will include integration among several platforms, which includes the listed APIs:

a) Google Maps API
b) Twilio SMS API
c) Facebook API
d) Weather Channel API
e) National Environmental Agency(NEA) Haze monitoring API
f) Reportlab API

a) Google Map API

Google Map API is used to display the map with markers listing reported incidents, haze and weather conditions that are on-going in Singapore in real-time.

b) The Weather Channel API

The Weather Channel API (provided by weatherunderground.com) is integrated into the system to capture real-time weather information in Singapore. The information obtained is displayed on the Google Map for the audience to view the weather conditions.

c) National Environmental Agency (NEA) Haze monitoring API

The functionality of the Haze monitoring API is to enable the public and concerned authorities to monitor the haze index in Singapore. This data is processed and reflected on the Google Map as haze levels in different districts of Singapore.

d) Facebook API

The Call Centre employees can also share reported incidents, haze and weather conditions via Facebook.

e) Twilio SMS API

The Twilio SMS API is integrated into the system to facilitate dissemination of details of emergency situation via SMS to relevant departments and agencies. This ensures quick notification sending to the concerned agencies in the event of an emergency incident.

e) Reportlab API

The Reportlab API is integrated into the system which facilitates auto generation of pdf reports to be sent to PMO office.

The system will also include the following components:

1. **Map**

The main homepage of the Website displays a Google map. The crisis situations and weather/haze conditions are reflected on the map with the help of markers. Members of the public and authorised employees can view this map to find out the active conditions in Singapore.

2. **Incident Entry**

Public users can dial in to the CMS hotline to report any incident like fire, earthquake, medical emergency, industrial accidents etc. The authorized personnel then creates a new crisis by receiving the following details from the caller:

- Title of Event
- Name of the person
- Mobile Number
- Location & Postal Code of the crisis
- Type of crisis
- Description of the crisis
- Severity of the crisis

The created crisis is automatically stored in the database and the relevant agencies are notified of the emergency situations accordingly.

3. **Employee Dashboard**

Authorised personnel can use this page to monitor active events and even update their details. They can deactivate events which are no longer very severe or which have been resolved. They can also choose to share the crisis information on Facebook.

2.3 User Classes and Characteristics

Users belong to 3 types of categories:

1) **General Public Users:**

   This category represents members of the public. They can subscribe to the Crisis Management System to receive latest information on the crisis situations in Singapore via email. They can also get more information through Google Maps on the website, reflecting latest updates in Singapore. Moreover, they can also access Facebook to receive latest information from CMS.

2) **Authorized users:**

This category includes Call Centre employees as well as relevant agencies. Call Centre employees are the people working in the call centre department who can create or update crises. They can also share the crisis situation on Facebook and use SMS notification to inform relevant agencies about the crisis situation. They can then take necessary action to resolve the incident.

3) **Government Officers (PM):**

The Government officials including the PM receive an email in every 30 minutes interval, informing him about the situation of crises happening in Singapore.

2.4 Operating Environment

- Internet Browser (IE 8 and above), Chrome, Firefox, Safari

2.5 Constraints

- CMS is only able to update information when Internet connection is available.
- CMS is fully supported through IE 8.0 and above.
- CMS is only available in English language.
- CMS has limited features because of time constraints.

2.6 User Documentation

The documentations to be delivered along with the software include:

1) CMS User manual for Call Centre employee and relevant agencies
2) CMS User manual for Government Agencies
3) CMS User Help Information for General Public Users online

2.7 Assumptions and Dependencies

- The relevant agencies will receive SMS and deploy resources immediately to resolve the crisis upon receiving all necessary information.
- Facebook API will function properly and reflect all updates flawlessly.
- The email server will send reports to the Prime Minister successfully at regular intervals.
- Authorized users are trained properly.
- The Weather API and Haze API provide the latest information about weather conditions, updated at regular frequent intervals.

3. External Interface Requirements

3.1 User Interfaces

Our product is a web based application that supports a variety of web browsers, mainly but not limited to Google Chrome and Mozilla Firefox.

3.2 Hardware Interfaces

The web application can run on all laptops and tablets that support the web browsers, and the operating systems specified in this document.

3.3 Software Interfaces

- Operating System:

  The web application is supported on all the versions of Windows after Windows 7.
- Web Server:

  The web application is hosted on local Server.
- Database:

The database is implemented using MySQL and SQLServer.

- Software Framework

The web application was implemented using Python Django Framework, which is a slightly modified version of the MVC Framework.

3.4 Communications Interfaces

- As our product is a web application, HTTP protocol is used for communication with the client machines.
- All incidents are updated on a map on the homepage which is accessible to the entire public.
- Emails are sent out every half an hour interval or in the event of an emergency to the Prime Minister.
- SMSes are sent out to relevant agencies as soon as emergency situations are reported, using Twilio API.
- Updates on crisis situations are shared via SMS or Facebook by the Call Centre Operators.

4. System Features

4.1 User Subscription

4.1.1 Description and Priority

General public users can subscribe to the DontCrysis CMS and receive crisis alerts. They need to provide their details viz., Name, Mobile Number, NRIC, Address, Age, Postal Code and Email. Thereafter, they will receive the notifications of any crisis in their nearby location.

Priority: High

4.1.2 Stimulus/Response Sequences

4.1.2.1 The visitor on the website clicks Subscribe button

4.1.2.3 The visitor keys in all the details (Name, Mobile Number, NRIC, Address, Age, Postal Code, Email) into the form and presses Subscribe

4.1.2.4 The system gets the details from the form and verifies the details

4.1.2.5 If the details are missing or the format is incorrect, the system redirects the visitor to the same Subscribe page

4.1.2.6 If the details are correct and complete, the system stores the details into the database and creates a Subscriber successfully

4.1.3 Functional Requirements

REQ-1: The visitor must enter his/her name during subscription

REQ-2: The visitor must enter his/her mobile number during subscription

REQ-3: The visitor must enter his/her NRIC during subscription

REQ-4: The visitor must enter his/her address during subscription

REQ-5: The visitor must enter his/her age during subscription

REQ-6: The visitor must enter his/her postal code

REQ-7: The visitor must enter his/her email

4.2 Login for Call Centre Employees

4.2.1 Description and Priority

The Call Centre Employees are registered as users of the CMS. They need to login to the system to Create or Update any crisis. Only logged in users can go to the pages that require login such as Create Crisis and Update Crisis.

Priority: High

4.2.2 Stimulus/Response Sequences

4.2.2.1 The Call Centre Employee clicks on Login

4.2.2.2 The Call Centre Employee enters Username and Password

4.2.2.3 The Call Centre Employee clicks Login button

4.2.2.4 The system gets details from the form and authenticates the user's the details

4.2.2.5 If the user details are not valid, the system renders the invalid login page and gives a redirect link to the login page

4.2.2.6 If the user details are valid, the system redirects to the user dashboard.

4.2.3 Functional Requirements

REQ-1: The system must verify the user authentication

REQ-2: Only logged in users must be able to have access to privileged features and pages such as Create Event and Update Event page

4.3 Logout for Call Centre Employees

4.3.1 Description and Priority

Call Centre Employees logout from the system after they have keyed in or updated the crisis information into the system and their work for the day is done.

4.3.2 Stimulus/Response Sequences

4.3.2.1 The employee presses logout button

4.3.2.2 The system logs out the person and redirects to the homepage of CMS

4.3.3 Functional Requirements

REQ-1: After the call center employee presses logout, the system goes the home page automatically

4.4 Call Centre Employees Create Crisis

4.4.1 Description and Priority

The call centre employees create new crisis whenever someone from the public reports an incident to them. Only the employees have this privilege and hence they need to login before they can create event through the employee dashboard. The employee enters Title, Description, Postal Code, Type, Severity, Person Name and Person Phone (of the reporter of incident) to successfully create the event where all the fields are required.

4.4.2 Stimulus/Response Sequences

4.4.2.1 The Call Centre Employee clicks Create New event on his/her dashboard

4.4.2.2 The system redirects the Employee to the Create Crisis dashboard

4.4.2.3 The Call Centre Employee enters all the details required for creating an incident and the system gets the details

4.4.2.4 The system checks for the details, if the details are missing or in the invalid format, it prompts and stays on the same page

4.4.2.5 If the details are valid, the system creates an event and saves it into the database

4.4.3 Functional Requirements

REQ-1: The employee must enter title during creation of the crisis

REQ-2: The employee must enter description during creation of the crisis

REQ-3: The employee must enter postal code during creation of the crisis

REQ-4: The employee must enter type during creation of the crisis

REQ-5: The employee must enter severity during creation of the crisis

REQ-6: The employee must enter person (reporter's) name during creation of the crisis

REQ-7: The employee must enter person (reporter's) phone during creation of the crisis

4.5 Collect Information from Various APIs

4.5.1 Description and Priority

The CMS retrieves haze and weather information from National Environment Agency (NEA) website in the form of XML and The Weather Channel API in the form of JSON objects, respectively.

4.5.2 Stimulus/Response Sequences

4.5.2.1 Haze Manager keeps track of the PSI every three hours and weather information from the government website every one hour

4.5.2.2 Google Maps displays the dangerous PSI values of the regions

4.5.3 Functional Requirements

REQ-1: CMS must provide a Google map as visual aid to display PSI readings in various locations

REQ-2: CMS must provide access to the last 24 hour PSI information

REQ-3: CMS must provide weather forecast in real time

REQ-4: CMS must display the air quality description from good, moderate, unhealthy, very unhealthy and hazardous on the map

4.6 Notify Relevant Agencies via SMS

4.6.1 Description and Priority

When an incident is created by the employee, an SMS with the crisis and its key indicators will be sent to the related agency. SMS is concise and fast as compared to email, it saves time for related agencies to make decision and mitigate the crisis as soon as possible.

Priority: High.

4.6.2 Stimulus/Response Sequences

4.6.2.1 As soon as the event is created by the employee, the system triggers SMS functionality

4.6.2.2 It Generates text string with description and location of accident

4.6.2.3 Fetches all the number of related agency in database

4.6.2.4 Sends the text string to related agencies through SMS using API

4.6.3 Functional Requirements

REQ-1: System must be able to identify related agency with respect to incident, haze and weather

REQ-2: System must be able to identify description and location of the incident /haze/weather

REQ-3: System must be able to generate a text string with description and location

REQ-4: System must be able to send SMS to the relevant agencies within 10 seconds

4.7 Update the Crisis on Google Maps on Website

4.7.1 Description and Priority

Whenever there is a crisis created, it will be displayed on Google Map for visual aid for the users. Also, whenever any region crosses the threshold PSI index, a polygon displaying the affected region will appear on the Google Map. Dangerous weather conditions of Singapore will also appear on the Google Map via a marker. The idea behind the markers is that the members of the public as well as the government agencies can have a better idea of the location of crisis as to aid in relief of the crisis.

Priority: High

4.7.2 Stimulus/Response Sequences

4.7.2.1 When the Call Centre Employee creates an event, it is updated on the Google Map on homepage using markers for areas near the postal code entered

4.7.2.2 Haze PSI values are shaded on the map and updated every three hours automatically using backend process threading

4.7.3 Functional Requirements

REQ-1: System shall display a map marked with crisis/haze/weather affected area(s), when user clicks on “Map” tab

4.8 Notify the Subscribers via Email

4.8.1 Description and Priority

When an incident is created by the employee, all the subscribers affected by that incident (the area is figured out using the postal code) are sent an email notification regarding the crisis.

Priority: High

4.8.2 Stimulus/Response Sequences

4.8.2.1 The employee creates an incident which triggers the email sending feature of the system

4.8.2.2 System identifies the emergency situation and extracts data of the crisis and affected subscribers from database

4.8.2.3 System generates an email using the template

4.8.2.4 System emails the affected subscribers using external email sending API

4.8.3 Functional Requirements

REQ-1: System must initiate sending of notification emails in the background to the subscribers of the affected area with detailed information of the crisis, haze threshold being crossed or unsuitable weather conditions

4.9 Notify the Public via Facebook Posts

4.9.1 Description and Priority

Whenever one of the three emergency situations, i.e. crisis, haze and weather happen, a Facebook post listing detailed information of this emergency situation will be posted on CMS's Facebook page.

Priority: High

4.9.2 Stimulus/Response Sequences

4.9.2.1 The employee creates an incident which triggers the Facebook API feature of the system

4.9.2.2 System identifies the emergency situation

4.9.2.3 System extracts required information about the crisis from the database and generates a Facebook post using the template

4.9.2.4 System posts it to CMS's Facebook page using external API

4.9.3 Functional Requirements

REQ-1: The system shall identify the reported situation correctly.

REQ-2: The system shall extract all information needed in the corresponding template.

REQ-3: The system shall be able to allow the user to key in additional information.

REQ-4: The system shall be able to post a status on CMS's Facebook page.

4.10 Update PMO Every 30 minutes

4.7.1 Description and Priority

An email is sent to PM office automatically every 30 minutes. The email will include full report of current accident/haze/weather in the past 30 minutes. In the event of an emergency, an email will be sent manually to inform the PM.

Priority: Medium

4.7.2 Stimulus/Response Sequences

4.7.2.1 A report with key indicators and description of the accident/haze/weather to be generated automatically by the system

4.7.2.3 Updated data about the incident, haze and weather in the past 30 minutes is retrieved Send the updated report to PM office in 30 minutes interval

4.7.2.4 Send the updated report to PM office in 30 minutes interval

4.7.3 Functional Requirements

REQ-1: System must be able to generate a report with key indicators and description about the incident using database and haze and weather from real-time execution

REQ-2: System must be able to send an email to PM office with the auto generated report attached every 30 minutes

5. Other Non-Functional Requirements

5.1 Performance Requirements

5.1.1 Response Time

5.1.1.1 The system must upload the homepage in no longer than 30 seconds.

5.1.1.2 The system must send email to PMO office after every 30 minutes and the email must be received within 15 seconds.

5.1.1.3 The system sends SMS to relevant agencies on crisis reporting and it must be received by the agency in no longer than 10 seconds.

5.1.1.4 The system must be able to accept ten consecutive events reported by the user and update them in the database within 20 seconds.

5.1.2 Availability

5.1.2.1 The system must achieve an uptime ratio of 99 percent.

5.1.2.2 The system must operate fully in event of a power failure, for a minimum of 12 hours on a backup power supply.

5.1.2.2.1 The system must restore complete functionality within 3 minutes in event of a reboot.

5.1.2.3 The system must retain user data for at least 10 years.

5.2 Security Requirements

5.2.1 The information published to the public and report to the PMO must be validated by the call centre authorities.

5.2.2 System access for call centre employees and administrator must be controlled with usernames and password.

5.2.3 Only call centre employees and relevant authorised users are allowed to create incidents on CMS.

5.2.4 The system must adopt a database system with high security standards and ensure data privacy.

5.3 Software Quality Attributes

5.3.1 Usability

5.3.1.1 The system must be easy to learn and use.

5.3.1.1.1 The user must be able to use the system with minimal instructions.

5.3.1.1.2 The user must be able to retain system usage and functionality.

5.3.1.2 The system must have consistent design.

5.3.1.3 The system must offer simple error handling by implementing dropdowns, radio selections, etc. to minimize errors during user input.

5.3.2 Portability

5.3.2.1 The system must support a wide variety of operating systems.

5.3.2.2 The system must support a wide variety of database systems.

5.3.2.3 The system must be able to perform all its functionalities on different platforms.

5.3.3 Integrity

5.3.3.1 The system must only allow registered users to log into the system. This must be controlled by administrator. (Python Django Framework facilitates this)

5.3.3.2 The system must ensure data integrity and user privacy.

5.3.4 Flexibility

5.3.4.1 The system must facilitate easy and flexible addition of new features and functionalities.

5.3.4.2 The system must allow extension of symbols to be used for marker displays on map.

5.3.4.3 The system must allow addition of new crisis and flexible integration of those crisis.

5.3.4.4 The system must remove resolved crises or emergency situations from the map.

Appendix A: Glossary

CMS (Crisis Management System):
The system that provides information on prevailing crisis in the country using weather and haze information from government websites and publish emergency information to related parties (the public, related agencies, prime minister)

Call centre employees：

Staff at MHA that are in charge of managing incidents and informing relevant agencies by providing them with emergency information.

Public user:
Members of the public can obtain the information from the CMS via Facebook/Email or by visiting CMS webpage.

Facebook:
An online social networking site where people can post statuses and updates on various topics.

SMS (Short Message Service):
Service that enable the hand phone to send or receive short piece of message

Relevant agency:
The related group of people that deal with the emergency such as Fire Department, Rescue and Evacuation Teams, Ambulance etc.

Prime minister:
The most senior minister of cabinet in the executive branch of government in a parliamentary system

Database:

The general and internal database that stores the detail information of the incidents

Google Map:

A web based application provided by Google that offer location and mapping services

Haze:

An atmospheric phenomenon in which dust, particle and mist blur the sky

Appendix B: To Be Determined List

The following item are to be determined and realised during the further phases of SDLC:

1. Providing support for our web application on OSX and Linux platforms.

2. Creating a smartphone application supported on Android and iOS for our Crisis Management System.

3. The public must be able to select their preferred notification modes, either SMS, email or both, during subscription.

4. The web application must have a separate interface for the admin through which he can also register the call centre employees at the time of their induction.

5. Providing support for storing database in XML and also for using XPath to query the database.