Software Requirements Specification (SRS)

CareAfrica Platform

Prepared by Telesphore Uwabera

African Leadership University

On 30/01/2024

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1. Introduction

1.1 Purpose

1.1 Product Identification

The software requirements specified in this document pertain to the CareAfrica Platform. This document addresses the initial version, Revision 1.0, and subsequent releases. The CareAfrica Platform is a comprehensive web application designed to facilitate wildlife conservation in Rwanda.

1.1.2 Scope

The scope of this Software Requirements Specification (SRS) document covers the development and functionality of the CareAfrica Platform. This platform aims to address challenges related to wildlife conservation in Rwanda by fostering community engagement, enabling real-time wildlife monitoring, and supporting strategic interventions for sustainable coexistence between humans and wildlife. The SRS outlines the initial system requirements for the entire platform, emphasizing key features and functionalities.

1.1.3 System Overview

The CareAfrica Platform will be developed using an Agile methodology, allowing for iterative development and adaptability to evolving conservation needs. This web-based application will provide a user-friendly interface for community members, wildlife experts, and conservation authorities. The system primarily focuses on habitat monitoring, wildlife incident reporting, and community education to contribute to the broader goal of preserving biodiversity in Rwanda.

1.2 Document Conventions

1.2.1 Font and Styling

This document follows standard business writing conventions, utilizing a readable font and occasionally employing bold or italicized text for emphasis or clarity. Key terms or requirements may be highlighted to draw attention.

1.2.2 Priority Assignment

Each requirement statement is assigned a priority level based on its significance. Priorities are denoted using standard terms such as "High," "Medium," or "Low." Unless explicitly stated otherwise, higher-level requirements' priorities are assumed to be inherited by detailed requirements. This priority scheme ensures a clear understanding of the relative importance of each requirement.

1.2.3 Version Control

The document includes a revision history section to track changes made over time. A version number and a brief description of the modifications identify each revision. This helps maintain document integrity and provides transparency regarding updates.

1.3 Intended Audience and Reading Suggestions

1.3.1 Intended Audience

This document is intended for various stakeholders involved in the development and implementation of the CareAfrica Platform. The primary audience includes:

Developers: To gain a comprehensive understanding of the technical requirements and functionalities.

Project Managers: To oversee the project's progress, aligning it with organizational goals and priorities.

Marketing Staff: To comprehend the platform's features for effective communication with potential users and stakeholders.

Users: To understand the expected functionalities and features of the CareAfrica Platform.

Testers: To develop test cases and ensure the platform meets specified requirements.

Documentation Writers: To use the information provided to create user manuals and other supporting documentation.

1.3.2 Reading Suggestions

For an optimal understanding of the document, readers are suggested to follow this sequence:

Overview Sections: Begin with Chapter 1 for an introduction to the project, including its purpose, scope, and system overview.

Functional Requirements: Developers and testers should delve into this chapter to understand the specific functionalities and features of the CareAfrica Platform.

Non-Functional Requirements: Project managers, marketing staff, and documentation writers can focus on this chapter to comprehend the system's performance, usability, and other non-functional aspects.

1.4 Product Scope

1.4.1 Software Description and Purpose

The CareAfrica Platform is a sophisticated web application designed to serve as a pivotal tool in Rwanda's wildlife conservation realm. The platform's primary purpose is to foster community engagement, empower wildlife experts, and facilitate real-time monitoring of wildlife activities. By enabling efficient incident reporting and community education, the platform aims to support strategic interventions for the sustainable coexistence of humans and wildlife.

1.4.2 Relevant Benefits, Objectives, and Goals

Community Engagement: Empower local communities to actively participate in wildlife conservation efforts, fostering a sense of ownership and responsibility.

Real-time Monitoring: Provide conservation authorities and experts with a dynamic platform for monitoring wildlife activities, aiding in timely response to emerging threats.

Incident Reporting: Enable users to report wildlife incidents promptly, facilitating swift intervention and protection of endangered species.

Community Education: Disseminate knowledge on wildlife conservation practices, promoting awareness and understanding among community members.

1.4.3 Relating to Corporate Goals or Business Strategies

The CareAfrica Platform aligns with corporate goals and business strategies by contributing to the broader mission of sustainable biodiversity conservation. The platform supports environmental stewardship, community involvement, and responsible business practices, reflecting positively on the organization's social and ecological responsibility commitment.

1.4.4 Reference to Vision and Scope Document

This SRS serves as a detailed specification document, and for overarching vision and scope details, readers are referred to the separate Vision and Scope document if available.

1.5 References

1. Vision and Scope Document

Source: https://orangesoft.co/blog/how-to-write-a-vision-and-scope-document

2. User Interface Style Guide

Source:
https://www.toptal.com/designers/ui/ui-styleguide-better-ux#:~:text=UI%20Style%20Guides%20are%20a,color%2C%20navigation%20menus%2C%20etc.

3. Environmental Conservation Standards

Source:
https://rema.gov.rw/fileadmin/templates/Documents/rema_doc/Policies/Rwanda%20Environmental%20Policy_English.pdf

4. Security Policy and Guidelines

Source:
https://www.varonis.com/blog/what-is-a-security-policy#:~:text=A%20security%20policy%20(also%20called,and%20availability%20of%20its%20data.

5. Mpact Network Access Guidelines

Source:
https://www.cyber.gov.au/resources-business-and-government/essential-cyber-security/ism/cyber-security-guidelines/guidelines-networking

2. Overall Description

2.1 Product Perspective

2.1.1 Context and Origin

The CareAfrica Platform is conceived as a standalone product, originating from the need to integrate technology into wildlife conservation efforts in Rwanda. Unlike existing systems, the CareAfrica Platform is not a replacement but a pioneering initiative, introducing a digital interface to enhance community

engagement, real-time monitoring, and incident reporting. This product is developed as a self-contained solution intended to synergize with existing wildlife conservation initiatives and contribute to the broader mission of preserving biodiversity.

2.1.2 System Context

The system context of the CareAfrica Platform is illustrated through a high-level diagram depicting the major components and their interconnections. The platform interfaces with external systems and technologies, establishing a comprehensive ecosystem for wildlife conservation. Key elements of the system context include:

Web Interface: The primary interface for community members, wildlife experts, and conservation authorities to interact with the CareAfrica Platform.

Geographic Information Systems (GIS): Integration with GIS for mapping and spatial analysis of wildlife habitats and movements.

IoT Devices: Potential integration with IoT devices to collect real-time data on wildlife activities and environmental conditions.

External Databases: Access to external databases for additional data on wildlife populations, habitat conditions, and historical trends.

By presenting the system context, stakeholders understand how the CareAfrica Platform fits into the broader landscape of wildlife conservation initiatives, fostering collaboration and data exchange.

2.2 Product Functions

The CareAfrica Platform is designed to perform the following primary functions, catering to the diverse needs of community members, wildlife experts, and conservation authorities:

2.2.1 Community Engagement

Educational Content: Provide a repository of educational materials, articles, and multimedia content to engage and inform community members about wildlife conservation.

Interactive Features: Facilitate community participation through forums, discussions, and interactive sessions, fostering a sense of ownership and responsibility.

2.2.2 Real-time Monitoring

Habitat Monitoring: Enable wildlife experts to monitor and analyze the condition of habitats in real-time, identifying changes and potential threats.

Wildlife Tracking: Track the movements and behaviors of wildlife species, supporting research and conservation strategies.

2.2.3 Incident Reporting

User Reporting: Allow community members to report wildlife incidents, such as poaching, habitat destruction, or injured animals, through a user-friendly interface.

Swift Intervention: Provide a mechanism for conservation authorities to receive and respond promptly to reported incidents, ensuring swift intervention and protection of endangered species.

These functions are organized to address the specific needs of each user class and contribute to the overarching goal of wildlife conservation in Rwanda. For a visual representation of how these functions relate, a top-level data flow diagram will be provided in Section 3, facilitating a clearer understanding of the system's functional architecture.

2.3 User Classes and Characteristics

The CareAfrica Platform anticipates the involvement of various user classes, each with distinct characteristics and roles in contributing to the success of the platform:

2.3.1 Community Members

Frequency of Use: Regular users engage with educational content, participate in discussions, and report incidents as needed.

Subset of Product Functions: Primarily engaged with community engagement features and incident reporting.

Technical Expertise: Varied technical expertise, ranging from basic to moderate.

Security or Privilege Levels: Standard user privileges, with access to educational content and community engagement features.

Educational Level: Diverse educational levels within the community, accommodating various backgrounds.

Experience: May have limited experience in wildlife conservation, relying on the platform for knowledge and interaction.

2.3.2 Wildlife Experts

Frequency of Use: Regular users monitor wildlife activities, analyze data, and contribute to conservation strategies.

Subset of Product Functions: Engaged with habitat monitoring, wildlife tracking, and research-related features.

Technical Expertise: High technical expertise in wildlife conservation and data analysis.

Security or Privilege Levels: Elevated privileges for data access and analysis, contributing to strategic decision-making.

Educational Level: Specialized knowledge in wildlife conservation and related fields.

Experience: Extensive experience in wildlife monitoring and conservation efforts.

2.3.3 Conservation Authorities

Frequency of Use: Frequent users oversee and coordinate conservation efforts, relying on real-time data for decision-making.

The subset of Product Functions: Primarily engaged with incident reporting, swift intervention, and strategic planning features.

Technical Expertise: Moderate to high technical expertise in wildlife conservation and management.

Security or Privilege Levels: The highest level of privileges for data access, intervention, and coordination.

Educational Level: Advanced education in environmental science, wildlife management, or related disciplines.

Experience: Extensive experience in leading wildlife conservation initiatives and crisis response.

2.3.4 Distinguishing Importance

This product's most crucial user class is the **Community Members**, as they form the foundation of the platform's engagement and reporting mechanisms. However, each user class is crucial to the platform's success, contributing unique perspectives and expertise to Rwanda's overarching goal of wildlife conservation.

2.4 Operating Environment

2.4.1 Hardware Platform

The CareAfrica Platform is designed to operate seamlessly on various hardware platforms, ensuring accessibility for a diverse user base. The supported hardware includes:

Desktops: Windows, macOS, Linux

Laptops: Windows, macOS, Linux

Tablets: iOS, Android

Smartphones: iOS, Android

Cellphones

By supporting a broad range of devices, the platform maximizes accessibility for community members, wildlife experts, and conservation authorities.

2.4.2 Operating System

The CareAfrica Platform is platform-agnostic, ensuring compatibility with major operating systems. Users can access the platform regardless of their preferred operating system, including:

Windows: Versions 7, 8, 10, and 11

macOS: Versions High Sierra, Mojave, Catalina

Linux: Ubuntu, Fedora, Debian

This flexibility allows users to engage with the platform using their preferred operating environment.

2.4.3 Software Components

The CareAfrica Platform coexists with standard web technologies, utilizing the following software components:

Web Browsers: Google Chrome, Mozilla Firefox, Microsoft Edge, Safari

Web Technologies: HTML5, CSS3, JavaScript

The platform may interface with external components, such as:

Geographic Information Systems (GIS): For mapping and spatial analysis.

IoT Devices: For real-time data collection on wildlife activities.

These software components enhance the platform's functionality and contribute to its role in wildlife conservation.

2.4.4 Peaceful Coexistence

The CareAfrica Platform is designed to coexist peacefully with other software applications and components. It ensures compatibility with standard web browsers and integrates smoothly with external systems, fostering a collaborative environment within the broader landscape of wildlife conservation initiatives.

2.5 Design and Implementation Constraints

The development of the CareAfrica Platform is subject to various constraints that shape the options available to the developers. These constraints are essential considerations for a successful implementation:

2.5.1 Regulatory Policies

Conservation Regulations: The development must adhere to local and international wildlife conservation regulations in Rwanda. Compliance with these regulations is critical to ensure ethical and legal practices.

2.5.2 Hardware Limitations

Widespread Accessibility: The platform should operate within common hardware constraints to ensure widespread accessibility. This includes considerations for varying device capabilities, screen sizes, and processing power.

2.5.3 Interfaces to Other Applications

GIS Integration: The CareAfrica Platform interfaces with Geographic Information Systems (GIS) for mapping and spatial analysis. The development must align with GIS standards and protocols for seamless integration.

IoT Device Integration: Potential integration with IoT devices requires adherence to standard communication protocols and data formats to facilitate real-time data collection.

2.5.4 Technologies, Tools, and Databases

Web Technologies: The platform is developed using standard web technologies, including HTML5, CSS3, and JavaScript. Compatibility with modern web browsers is a key consideration.

Database: The choice of database technology is a constraint, with preferences for scalability, reliability, and ease of integration.

2.5.5 Language Requirements

Multilingual Support: The user interface should support multiple languages to accommodate the diverse linguistic backgrounds of the user base. This includes considerations for translations and localization.

2.5.6 Security Considerations

Data Security: Adherence to robust security measures is imperative to protect user data, especially incident reports and real-time monitoring data. Encryption protocols and secure data storage practices must be implemented.

2.5.7 Design Conventions and Programming Standards

Consistent User Experience: Design conventions and programming standards should be followed to ensure a consistent and intuitive user experience across the platform. This includes considerations for user interface design, navigation, and information architecture.

2.5.8 Maintenance Responsibility

Customer's Organization: The customer's organization will maintain the delivered software. This imposes considerations for documentation, training, and providing a smooth transition for ongoing maintenance and support.

These design and implementation constraints are critical factors that guide the development process, ensuring the CareAfrica Platform aligns with ethical, technical, and regulatory standards.

2.6 User Documentation

The CareAfrica Platform is committed to delivering comprehensive user documentation to ensure a seamless user experience. The following user documentation components will be provided along with the software:

2.6.1 User Manuals

User manuals will be crafted to offer step-by-step guidance on utilizing the various features and functionalities of the CareAfrica Platform. These manuals will be tailored to cater to different user classes, providing context-specific instructions for community members, wildlife experts, and conservation authorities.

2.6.2 On-line Help

Online help features will be embedded within the platform, offering contextual assistance to users as they navigate through different sections. This includes tooltips, inline guides, and quick-reference information to enhance user understanding and engagement.

2.6.3 Tutorials

Tutorials will be developed to provide interactive and hands-on guidance for users who prefer a more immersive learning experience. These tutorials will cover key aspects of the platform, such as incident reporting, real-time monitoring, and community engagement.

2.6.4 Delivery Formats and Standards

User documentation will be delivered digitally to accommodate modern user preferences and environmental sustainability. The following delivery formats and standards will be adhered to:

PDF Documents: Comprehensive user manuals will be provided in PDF format, offering downloadable and printable resources for offline reference.

Online Documentation: User manuals, online help, and tutorials will be accessible through an online documentation portal. This ensures real-time updates and easy access for users from different devices.

Interactive Multimedia: Tutorials may include interactive multimedia elements, such as video demonstrations and interactive simulations, to enhance the learning experience.

Localization: User documentation will be designed with localization in mind, allowing for translation into multiple languages to cater to a diverse user base.

The user documentation components aim to empower users with the knowledge and skills needed to maximize the benefits of the CareAfrica Platform. Regular updates and feedback mechanisms will be implemented to improve the effectiveness of the documentation continuously.

2.7 Assumptions and Dependencies

2.7.1 Assumptions

Third-Party Components: It is assumed that third-party components, such as Geographic Information Systems (GIS) services and potential IoT devices for real-time data collection, will be available and compatible with the CareAfrica Platform. Any unavailability or incompatibility of these components could impact the platform's functionality.

Community Engagement: The platform's success assumes active community engagement. Community members are expected to actively participate in educational initiatives, discussions, and incident reporting. The platform's effectiveness relies on the willingness of the community to contribute.

2.7.2 Dependencies

External Data Sources: The CareAfrica Platform depends on external data sources for real-time monitoring and mapping. These sources may include wildlife databases, environmental data feeds, and satellite imagery. Changes or disruptions in these data sources could affect the accuracy and timeliness of the platform's information.

GIS Integration: The platform relies on Geographic Information Systems (GIS) for mapping and spatial analysis. The development is dependent on the availability and compatibility of GIS services. Any changes or disruptions in GIS services could impact the platform's mapping functionality.

IoT Device Integration: Potential integration with IoT devices for real-time data collection is a dependency. The success of this integration relies on the availability of compatible IoT devices and adherence to standard communication protocols.

Regulatory Compliance: The development assumes compliance with local and international wildlife conservation regulations. Regulation changes or unforeseen legal challenges could impact the platform's deployment and operation.

Community Support: The platform's success depends on the support and endorsement of local communities, wildlife experts, and conservation authorities. Building and maintaining positive relationships with these stakeholders is crucial for the project's ongoing success.

Maintenance Responsibility: The customer's organization will maintain the delivered software. The success of ongoing maintenance and support depends on the customer's commitment to allocating resources and following established maintenance protocols.

These assumptions and dependencies highlight critical factors that could influence the requirements and success of the CareAfrica Platform. Continuous communication and stakeholder collaboration are essential to mitigate risks associated with these assumptions and dependencies.

3. External Interface Requirements

3.1 User Interfaces

The CareAfrica Platform is designed with intuitive user interfaces to cater to the diverse needs of community members, wildlife experts, and conservation authorities. The logical characteristics of each interface between the software product and users are as follows:

3.1.1 Community Member Interface

Educational Content Dashboard: A visually engaging dashboard providing access to educational content, articles, and multimedia resources. It follows a card-based layout for easy navigation.

Community Engagement Hub: An interactive space with forums, discussions, and community updates. Users can contribute to discussions and engage with fellow community members.

Incident Reporting Interface: A user-friendly form for reporting wildlife incidents. It includes fields for incident details, location, and supporting media uploads.

3.1.2 Wildlife Expert Interface

Real-time Monitoring Dashboard: A comprehensive dashboard displaying real-time data on habitat conditions, wildlife movements, and research insights. It includes interactive maps and charts for data analysis.

Research and Analysis Tools: These are dedicated tools for wildlife experts to conduct in-depth analysis, track specific species, and contribute to conservation research.

3.1.3 Conservation Authority Interface

Incident Management Console: An interface for authorities to receive and manage reported incidents. It includes features for prioritization, intervention planning, and collaboration with field teams.

Decision Support System: A tool providing decision support based on real-time data. It includes alerts, notifications, and insights for strategic planning.

3.1.4 General Interface Characteristics

Responsive Design: All interfaces have a responsive layout to ensure a seamless experience across various devices, including desktops, laptops, tablets, and smartphones.

Consistent Navigation: Standardized navigation elements, such as menus and search functionality, are consistent across interfaces for ease of use.

Multilingual Support: Interfaces support multiple languages, allowing users to choose their preferred language for content and interactions.

Accessibility Features: Interfaces adhere to accessibility standards to accommodate users with diverse abilities. This includes considerations for screen readers and keyboard navigation.

Help and Support Features: Standardized buttons for accessing help and support features are available on every screen, providing users with assistance and guidance.

Error Message Display Standards: Clear and user-friendly error messages are implemented, following standardized formats for consistency and ease of understanding.

3.1.5 Future Interface Design

While the logical characteristics are outlined here, detailed user interface design specifications will be documented in a separate User Interface Specification. This document will include wireframes, mockups, and clear guidelines for each interface's visual and interactive aspects.

3.2 Hardware Interfaces

The CareAfrica Platform is designed to seamlessly interface with various hardware components, ensuring compatibility and effective data exchange. The following details outline the logical and physical characteristics of each interface between the software product and the hardware components of the system:

3.2.1 Supported Device Types

The CareAfrica Platform supports a diverse range of device types to maximize user accessibility. The platform is optimized for the following devices:

Desktops: Including Windows, macOS, and Linux operating systems.

Laptops: Compatible with various operating systems, including Windows, macOS, and Linux.

Tablets: Designed for both iOS and Android platforms.

Smartphones: Optimized for iOS and Android platforms.

The platform's responsive design ensures a consistent and user-friendly experience across these device types.

3.2.2 Data and Control Interactions

Real-time Data Interaction: The platform interfaces with hardware components, such as Geographic Information Systems (GIS) and potential IoT devices, for real-time data collection on wildlife activities and environmental conditions.

Mapping and Spatial Analysis: Interaction with GIS involves exchanging data for mapping and spatial analysis, allowing users to visualize wildlife habitats and movements.

IoT Device Integration: Potential integration with IoT devices requires bidirectional communication for collecting real-time data on wildlife activities. Communication protocols will be defined to facilitate seamless interaction.

3.2.3 Communication Protocols

The CareAfrica Platform employs standardized communication protocols to ensure efficient and secure interactions with hardware components. The following communication protocols are utilized:

RESTful APIs: Used for data exchange with external systems, including GIS services and IoT devices.

HTTP/HTTPS: Standard protocols for secure communication between the platform and external servers, ensuring data integrity and confidentiality.

IoT Protocols: Specific protocols, such as MQTT or CoAP, will be defined based on the compatibility of IoT devices chosen for integration.

3.2.4 Physical Characteristics

Device Compatibility: The platform is designed to operate within the physical characteristics of supported devices, including screen sizes, resolutions, and processing capabilities.

Input Methods: The user interfaces are optimized for various input methods, including touchscreens, keyboards, and mice, to accommodate the diverse hardware capabilities of supported devices.

These logical and physical characteristics define the hardware interfaces of the CareAfrica Platform, ensuring a robust and versatile system that can be accessed and interacted with across a wide range of devices and environmental conditions.

3.3 Software Interfaces

The CareAfrica Platform interfaces with various software components to ensure seamless data exchange and collaboration. The following details describe the connections between the CareAfrica Platform and other specific software components:

3.3.1 Geographic Information Systems (GIS)

Component Name: GIS Services (e.g., ArcGIS Online)

Version: Dependent on the specific GIS service provider's version.

Data Items Inbound:

Spatial Data: Inbound spatial data for mapping and visualizing wildlife habitats and movements.

Environmental Data: Environmental data for real-time monitoring and analysis.

Data Items Outbound:

Analyzed Data: Processed wildlife and habitat data for further analysis and presentation within the GIS.

3.3.2 IoT Device Integration

Component Name: IoT Devices (Specific devices chosen for integration)

Version: Variable based on the selected IoT devices.

Data Items Inbound:

Real-time Wildlife Data: Inbound data on wildlife activities collected by IoT devices.

Environmental Conditions: Data on habitat conditions is contained in real-time.

Data Items Outbound:

Command Signals: Outbound signals to control IoT devices and adjust monitoring parameters.

3.3.3 Database Management System (DBMS)

Component Name: Database Server (e.g., MongoDB)

Version: The latest stable version of the selected DBMS.

Data Items Inbound:

User Profiles: Inbound user data for authentication and personalization.

Incident Reports: Inbound reports of wildlife incidents for storage and analysis.

Data Items Outbound:

Educational Content: Outbound content for display on user interfaces.

Monitoring Data: Outbound data for real-time monitoring and analysis.

3.3.4 External Web Services

Component Name: External Web Services (e.g., Weather API)

Version: Dependent on the specific web service provider's version.

Data Items Inbound:

Environmental Data: Inbound data on weather conditions and environmental factors.

Real-time Alerts: Inbound alerts on external events impacting wildlife conservation.

Data Items Outbound:

Platform Updates: Outbound notifications to external services on platform updates.

3.3.5 Communication Protocols

HTTP/HTTPS: Standard protocols for communication with external servers and web services.

RESTful APIs: Utilized for exchanging data with GIS services and external databases.

WebSockets: Used for real-time communication with IoT devices and to update user interfaces.

3.3.6 Shared Data

User Authentication: Shared across various components to ensure secure access to the platform.

Incident Reports: Shared with the Database Management System for storage and analysis.

Educational Content: Shared with user interfaces for display to community members.

The nature of communications involves real-time data exchange, analysis, and presentation, enhancing the platform's wildlife monitoring and conservation capabilities.

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Environmental Conditions: Data on habitat conditions is collected in real time.

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4. Requirement Specification

4.0 Functional Requirements

Req ID	Requirements	Description
FR 4.1	**Incident Reporting**	
FR 4.1.1	Capture Incident Details	- Allow users to capture detailed information about wildlife incidents, including location, description, and severity.
FR 4.1.2	Photo Attachment	- Provide the capability for users to attach photos related to the reported wildlife incidents for visual documentation.

Req ID	Requirements	Description
FR 4.2	**Real-time Monitoring**	
FR 4.2.1	Display Real-time Monitoring Dashboard	- Display a real-time monitoring dashboard showing live updates on reported incidents, their locations, and severity levels.
FR 4.2.2	Filter and Search	- Allow users to filter and search for specific incidents based on criteria such as location, date, or severity.
FR 4.3	**Community Forum**	
FR 4.3.1	Participate in Discussions	- Enable users to participate in community discussions, share insights, and engage in conversations related to wildlife conservation.
FR 4.3.2	Report Violations	- Allow users to report forum posts that violate community guidelines for moderation.
FR 4.4	**Incident Resolution**	
FR 4.4.1	Assign and Manage Incidents	- Provide administrators with the ability to assign and manage the resolution of reported incidents.
FR 4.4.2	Resolution Status Updates	- Notify users about the status of their reported incidents, including resolution progress and outcomes.
FR 4.5	**User Authentication**	
FR 4.5.1	User Registration	- Allow users to register accounts on the platform, providing necessary information and agreeing to terms.
FR 4.5.2	Login Credentials	- Implement a secure login system, capturing user credentials such as username and password.
FR 4.6	**User Roles**	
FR 4.6.1	Role-Based Access Control (RBAC)	- Implement RBAC to define user roles (Community Member, Conservationist, Administrator) and their corresponding access levels.
FR 4.6.2	Administrator Functions	- Provide administrators with functions for user management, incident resolution, and community forum moderation.

5. Other Nonfunctional Requirements

5.0 Non-Functional Requirements

Requirement Type	Req ID	Description
Security	**NFR 1**	
User Authentication	NFR 1.1	- Users must authenticate using a secure Active Directory (AD) login system.
Data Encryption	NFR 1.2	- Ensure all sensitive user data and incident information is encrypted during transmission and storage.
Performance	**NFR 2**	
Scalability	NFR 2.1	- The system must be scalable to handle a minimum of 1000 simultaneous users without significant degradation in performance.
Response Time	NFR 2.2	- The system must provide real-time updates with a response time of no more than 3 seconds for incident reporting and monitoring.
Usability	**NFR 3**	
Language Support	NFR 3.1	- The platform must communicate with users in English.
Accessibility	NFR 3.2	- Ensure the platform is designed with user-friendly interfaces and intuitive navigation to enhance overall usability.
Auditability	**NFR 4**	

Requirement Type	Req ID	Description
Logging and Reporting	NFR 4.1	- The system must be auditable, allowing administrators to generate reports on user activities, incident resolutions, and forum interactions.
Cross-Browser Support	**NFR 5**	
Browser Compatibility	NFR 5.1	- The system must be accessible across multiple web browsers, including Google Chrome and Microsoft Edge.
Technology	**NFR 6**	
Platform Accessibility	NFR 6.1	- The platform must be accessible on PC and Android devices.
Mobile Application Accessibility	NFR 6.2	- The mobile application must be accessible only on the Mpact network to ensure secure access.

5.1 Performance Requirements

The CareAfrica Platform is designed to meet specific performance criteria to ensure a responsive, reliable, and efficient user experience. The following performance requirements outline the expectations under various circumstances, providing clarity for developers and guiding design choices:

5.1.1 Response Time

Educational Content Retrieval: The platform should respond to requests for educational content retrieval within 2 seconds to maintain user engagement and provide a seamless learning experience.

Real-time Data Updates: Real-time monitoring data and wildlife incident reports should be updated and reflected on user interfaces within 5 seconds of being reported or collected.

5.1.2 Throughput

Incident Reporting: The platform should support a throughput of at least 100 incident reports per minute, ensuring efficient processing and storage of reported wildlife incidents.

Community Forum Participation: Concurrent participation of at least 500 community members in the forum should be supported to encourage active engagement and discussions.

5.1.3 Scalability

User Base Scalability: The platform should gracefully handle a user base scaling up to 100,000 registered users, maintaining consistent response time and throughput performance.

Data Volume Scalability: As the volume of real-time monitoring data increases, the platform should scale horizontally to accommodate larger datasets without degradation in performance.

5.1.4 Availability

Platform Availability: The platform should achieve at least 99.9% uptime, allowing for scheduled maintenance windows. Users should be notified in advance of any planned downtime.

Real-time Monitoring: Real-time monitoring services should be available 24/7 to ensure continuous data collection and timely response to wildlife activities.

5.1.5 Reliability

Data Integrity: The platform should maintain data integrity, with a maximum allowable data loss rate of 0.1%, to ensure the accuracy and reliability of wildlife monitoring data.

Incident Reporting Reliability: The incident reporting feature should be available and reliable with a minimum success rate of 98%, promoting trust in the reporting process.

5.1.6 Security

Data Encryption: All data transmissions should be encrypted using industry-standard protocols (e.g., TLS/SSL) to ensure the confidentiality and security of user data.

Authentication Reliability: User authentication processes should have a reliability rate of 99.5%, minimizing the risk of unauthorized access.

5.1.7 Load Testing

Performance Testing: Regular load testing should validate the platform's performance under simulated heavy traffic conditions, ensuring it can handle peak loads without degradation.

These performance requirements guarantee a high-quality user experience, maintain data integrity, and foster trust in the platform's capabilities. Developers should consider these criteria when designing to meet the specified performance standards.

5.2 Safety Requirements

The CareAfrica Platform is committed to ensuring the safety of users, wildlife, and the environment. The following safety requirements outline measures to mitigate potential risks and ensure responsible use of the platform:

5.2.1 Data Privacy and Security

User Data Protection: The platform must comply with relevant data protection regulations (e.g., GDPR) to safeguard user privacy. Personal information should be encrypted during transmission and storage.

Incident Reporting Anonymity: The platform must provide users with the option for anonymous incident reporting to protect the identity of individuals involved in reporting wildlife incidents.

5.2.2 Wildlife Conservation Ethics

No Harmful Practices: The platform should not promote or endorse harmful practices that could endanger wildlife or their habitats. Educational content should adhere to ethical standards in wildlife conservation.

Accurate Information: Information provided on the platform should be accurate and verified to prevent the dissemination of misinformation that could harm wildlife or misguide conservation efforts.

5.2.3 User Education and Guidelines

Educational Content Guidelines: Educational content should include responsible wildlife observation and interaction guidelines. Users should be educated on ethical practices to minimize negative impacts on wildlife.

Community Code of Conduct: The platform should enforce a community code of conduct that discourages harmful or disruptive behavior. Code violations should result in appropriate actions, including warnings, suspensions, or bans.

5.2.4 Emergency Response

Incident Priority Handling: The platform should implement a priority handling system for reported incidents, ensuring that critical incidents threatening human safety or wildlife receive immediate attention.

Emergency Alerts: Conservation authorities and relevant stakeholders should be able to send emergency alerts to the community in urgent situations, such as natural disasters or wildlife emergencies.

5.2.5 Compliance with Conservation Laws

Regulatory Compliance: The platform must comply with local and international wildlife conservation laws and regulations. Any features or activities that violate these laws should be prevented or appropriately managed.

Certification: Obtain necessary certifications or endorsements from relevant conservation organizations and authorities to validate the platform's commitment to ethical wildlife conservation practices.

These safety requirements are integral to the platform's responsible use and aim to minimize potential risks associated with wildlife conservation efforts. Developers should adhere to these guidelines to promote a safe and ethical user experience.

5.3 Security Requirements

Security is paramount for the CareAfrica Platform to protect user data, ensure privacy, and maintain system integrity. The following security requirements outline measures to address security and privacy issues:

5.3.1 User Authentication

Secure User Authentication: User access to the platform must be secured through robust authentication mechanisms. Passwords must adhere to solid complexity requirements, and multi-factor authentication should be supported.

User Account Lockout: Implement an account lockout mechanism after a specified number of failed login attempts to prevent unauthorized access.

5.3.2 Data Encryption

Data Transmission Encryption: To ensure data confidentiality, data transmissions between users and the platform and external services must be encrypted using industry-standard protocols such as TLS/SSL.

Data Storage Encryption: Personally identifiable information (PII) and sensitive data stored in databases must be encrypted to protect against unauthorized access.

5.3.3 Access Control

Role-Based Access Control (RBAC): Implement RBAC to restrict access to specific features and data based on user roles, ensuring that users only have access to information relevant to their responsibilities.

Data Segregation: Enforce strict data segregation to prevent unauthorized access to sensitive information. Users should only have access to explicitly allowed data for their role.

5.3.4 Incident Reporting Anonymity

Anonymous Reporting: Provide users with the option to submit wildlife incident reports anonymously, protecting the identity of individuals involved and encouraging open reporting.

Confidentiality of Reports: Ensure that incident reports, even when not submitted anonymously, are treated with utmost confidentiality, and access to this information is restricted to authorized personnel.

5.3.5 Compliance with Privacy Laws

Data Protection Compliance: The platform must adhere to relevant protection laws and regulations, including GDPR and other regional or international privacy standards.

Privacy Policy: Maintain a clear and comprehensive privacy policy outlining how user data is collected, processed, and stored. Users should be informed of their rights regarding their personal information.

5.3.6 Security Certifications

ISO 27001 Certification: Aim to obtain ISO 27001 certification to demonstrate the platform's commitment to information security best practices.

Privacy Shield Certification: If applicable, obtain Privacy Shield certification to facilitate the secure transfer of personal data between the platform and entities outside the European Economic Area.

These security requirements establish a robust framework to safeguard user data, ensure privacy, and protect the integrity of the CareAfrica Platform. Developers should adhere to these security measures to create a secure and trustworthy platform for wildlife conservation.

5.4 Software Quality Attributes

The CareAfrica Platform is designed to focus on various quality attributes to ensure high performance, reliability, and user satisfaction. The following attributes are essential for both customers and developers:

5.4.1 Usability

Ease of Use: The platform should have an intuitive and user-friendly interface, with an average System Usability Scale (SUS) score of at least 80, ensuring users can easily navigate and utilize platform features.

Accessibility: The platform should comply with accessibility standards (e.g., WCAG) to cater to users with diverse abilities, providing an inclusive user experience.

5.4.2 Reliability

Availability: The platform should maintain at least 99.5% availability, minimizing downtime and ensuring users have continuous access to educational content and real-time monitoring features.

Data Integrity: Data stored on the platform should have a low error rate, with a maximum allowable data loss rate of 0.1%, maintaining the integrity and accuracy of wildlife monitoring data.

5.4.3 Maintainability

Modularity: The platform should be designed with a modular architecture to facilitate easy updates and enhancements. Modules should be independent, allowing for targeted maintenance and improvements.

Documentation: Maintain comprehensive and up-to-date documentation for developers, ensuring that future enhancements and modifications can be executed efficiently.

5.4.4 Performance Efficiency

Response Time: Ensure that the platform responds to user requests within 2 seconds for educational content retrieval and within 5 seconds for real-time data updates.

Throughput: Support a throughput of at least 100 incident reports per minute to ensure efficient processing and storage of reported wildlife incidents.

5.4.5 Security

User Authentication Security: Implement secure user authentication mechanisms, including strong password requirements and multi-factor authentication, to protect user accounts from unauthorized access.

Incident Reporting Confidentiality: Maintain the confidentiality of incident reports, ensuring that only authorized personnel have access to sensitive information.

5.4.6 Interoperability

External Integrations: Design the platform to be interoperable with external systems, such as GIS services and IoT devices, through standard communication protocols (e.g., RESTful APIs).

Compatibility: Ensure compatibility with various devices and operating systems, including desktops, laptops, tablets, and smartphones, providing a seamless experience across different platforms.

5.4.7 Testability

Test Coverage: Achieve a test coverage of at least 90% to ensure thorough testing of platform functionalities and identify and rectify potential issues before deployment.

Automated Testing: Implement automated testing processes to enhance the efficiency of testing activities and support continuous integration practices.

These software quality attributes are crucial for meeting customer expectations and ensuring a robust and reliable CareAfrica Platform. Developers should prioritize these attributes throughout the development lifecycle to deliver a high-quality product.

5.5 Business Rules

The CareAfrica Platform operates based on defined business rules to govern user interactions, data handling, and overall system behavior. These rules help maintain consistency, compliance, and ethical standards. The following business rules are integral to the operation of the platform:

5.5.1 User Roles and Permissions

Role-Based Access Control (RBAC): Users are assigned specific roles (e.g., Community Member, Conservationist, Administrator) defining their level of access and responsibilities within the platform.

Incident Reporting: Only registered users can submit wildlife incident reports. Community Members can report incidents anonymously, while Conservationists and Administrators can access detailed incident information for analysis and response.

5.5.2 Content Moderation

Educational Content Approval: Educational content submitted by users undergo a moderation process. Only approved content is published to ensure accuracy, relevance, and compliance with ethical standards.

Community Forum Guidelines: Users must adhere to community forum guidelines, and moderators can remove content that violates these guidelines to maintain a positive and respectful online environment.

5.5.3 Incident Prioritization

Priority Handling: Incidents reported as emergencies or those posing an immediate threat to human safety or wildlife receive priority attention in analysis and response, ensuring swift and appropriate action.

Conservation Authorities' Decision Authority: Conservation authorities have the final decision authority on the action taken in response to reported incidents, aligning with established wildlife conservation protocols.

5.5.4 User Engagement

Community Participation: Users are encouraged to actively participate in the community forum, share knowledge, and engage in discussions on wildlife conservation.

Incentive Programs: Implement incentive programs (e.g., badges, rewards) to recognize and reward users for their positive contributions to wildlife conservation and community engagement.

5.5.5 Data Privacy

Anonymity Options: Users can report wildlife incidents anonymously to protect their identity. However, anonymous reporting may limit the ability to follow up on specific incidents.

Data Sharing Consent: Users must provide explicit consent for sharing their data (e.g., location data for real-time monitoring) for wildlife conservation purposes.

These business rules guide the platform's operation, ensuring a structured and ethical approach to wildlife conservation and community engagement. Developers should implement functionalities and features by these rules to uphold the platform's principles.

6. Appendix

This section encompasses miscellaneous requirements that don't fit neatly into the preceding categories but are crucial for the overall success and functionality of the CareAfrica Platform.

6.1 Geographic Information System (GIS) Integration

- The platform must support integration with Geographic Information System (GIS) services to visualize and analyze spatial data related to wildlife incidents and conservation efforts.

6.2 Multilingual Support

- The platform should offer multilingual support to cater to a diverse user base. Users should be able to choose their preferred language for platform interactions.

6.3 Notifications and Alerts

- Users should receive timely notifications and alerts regarding wildlife incidents, community discussions, and platform updates. Notifications may include in-app alerts, emails, or SMS messages.

6.4 Platform Scalability

- The platform architecture should be scalable to accommodate future growth in user base, data volume, and feature enhancements without significant performance degradation.

6.5 User Feedback Mechanism

- Implement a user feedback mechanism to collect community insights, suggestions, and concerns. This can include surveys, feedback forms, or a dedicated feedback channel.

6.6 Legal and Ethical Compliance

- Ensure the platform complies with all relevant legal and ethical standards governing wildlife conservation, data protection, and online community interactions.

6.7 Offline Mode Functionality

- Provide offline mode functionality for users in areas with limited internet connectivity. Users should be able to access certain features, such as educational content, even offline.

6.8 Continuous Monitoring and Improvement

- Establish a system for continuously monitoring platform performance, user satisfaction, and wildlife conservation impact. Use collected data to inform iterative improvements and updates.

6.9 Disaster Recovery and Backup

- Implement a robust disaster recovery and backup system to safeguard user data and ensure rapid recovery during system failures, data loss, or unforeseen disasters.

6.10 Integration with Social Media

- Allow users to share wildlife conservation achievements, educational content, and notable discussions on social media platforms to increase platform visibility and community engagement.

6.11 Sustainable Technology Practices

- Adopt sustainable platform development and maintenance technology practices, including energy-efficient server infrastructure, minimizing carbon footprint, and eco-friendly design principles.

These miscellaneous requirements contribute to the holistic functionality, user experience, and ethical considerations of the CareAfrica Platform. Developers should consider and implement these requirements to ensure the platform's success and positive impact on wildlife conservation efforts.

Appendix A: Glossary

The following glossary provides definitions for terms and acronyms used throughout the CareAfrica Platform Software Requirements Specification (SRS):

- GIS: Geographic Information System

- RBAC: Role-Based Access Control

- SRS: Software Requirements Specification

- SUS: System Usability Scale

- IoT: Internet of Things

- GDPR: General Data Protection Regulation

- WCAG: Web Content Accessibility Guidelines

- PII: Personally Identifiable Information

- ISO: International Organization for Standardization

- SMS: Short Message Service

User Roles:

- Community Member: A registered user with access to educational content, the community forum, and the ability to report wildlife incidents.

- Conservationist: A user with additional privileges, including access to detailed incident information, analysis tools, and participation in conservation decision-making.

- Administrator: A user with complete control over platform settings, user management, and overall system administration.

Platform Features:

- Real-time Monitoring: The feature updates wildlife activities and incidents.

- Incident Reporting: The functionality allows users to report wildlife incidents, contributing to the platform's conservation efforts.

- Community Forum: A space for users to engage in discussions, share knowledge, and collaborate on wildlife conservation.

Quality Attributes:

- RBAC: Role-Based Access Control ensures users access features based on their assigned roles.

- Throughput: The rate at which the platform processes incident reports.

- SUS: System Usability Scale measures the usability of the platform.

Business Rules:

- Incident Priority Handling: The rule prioritizing incident response based on urgency and threat levels.

- Data Sharing Consent: Users' explicit agreement to share specific data for wildlife conservation purposes.

Other Requirements:

- Geographic Information System (GIS): Integration with GIS services for spatial data visualization.

- Multilingual Support: The platform's ability to support multiple languages.

- Notifications and Alerts: Timely alerts to users about wildlife incidents and platform updates.

This glossary aims to facilitate a common understanding of terms and concepts within the SRS for the CareAfrica Platform.

Appendix B: Analysis Models

1. Data Flow Diagram (DFD):

A Data Flow Diagram illustrates the data flow within the CareAfrica Platform, identifying processes, data sources, data destinations, and data storage. The diagram visually represents how information moves through the system, including submitting incident reports, real-time monitoring updates, and interactions within the community forum.

2. Class Diagram:

The Class Diagram provides a static view of the system's structure, depicting classes, their attributes, and their relationships. It includes classes such as User, Incident, CommunityPost, CommunityMember, Conservationist, and Administrator roles. The diagram outlines how these entities interact and collaborate within the platform.

3. State-Transition Diagram:

The State-Transition Diagram models the various states and transition entities, such as incident reports or user accounts, that can be undertaken within the CareAfrica Platform. It captures the lifecycle of an incident report, from submission to resolution, and the different states a user account can be in, including active, suspended, or banned.

4. Entity-Relationship Diagram (ERD):

The Entity-Relationship Diagram visualizes the relationships between different entities in the database. It illustrates how entities such as Users, Incidents, and CommunityPosts are related, depicting the cardinality and nature of these relationships. For instance, the relationship between Users and Incidents signifies which user is associated with which incident.

These analysis models contribute to a comprehensive understanding of the CareAfrica Platform's structure, functionality, and data flow. For a more detailed and visually appealing representation, it is recommended to use appropriate diagramming tools to create the mentioned models.