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ARCHITECTURAL REQUIREMENTS

Mobile Monitoring App

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The 5 Concurrent Nodes

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1 Introduction

This document contains the software (application) architectural requirements specification which is the infrastructure upon which the application will be developed.

The following requirements will be addressed:

- Quality requirements
- Technologies

2 Architectural Requirements

2.1 Critical Quality Requirements

2.1.1 Auditability

Description

Auditability refers to the ability to account for a system's usage by the user and be able to monitor events and create logs on what are the user's actions within the system.

Justification

The Mobile Monitoring Application main functionality is to monitor the user's device activities and report all logs within a particular device.

Mechanism

1. Strategy:

Auditability can be achieved by:

- Resource Monitoring: A tactic that registers all the events and resources that the application uses and creates logs for the resources usage.

2. Architectural Pattern(s):

- To monitor the application events and resources a design pattern such as the observer pattern can be implemented by the application that can register all events and resources usage.

2.1.2 Security

Description

Security is a critical aspect of any system that deals with critical and confidential data, the strategies used for security provides mechanisms to protect data from unauthorized access and modification. For the Mobile Monitoring Application this means the following:

- No one (person or program) should be able to delete the data collected on device.
- When the data is transferred over the network, data should be protected from being intercepted and hacked.

Justification

Security is a critical for any system that deals with critical and confidential data as in the Mobile Monitoring Application. User collected data need to be protected from being tampered with and accessed by unauthorized individuals to keep data reliable and confidential.

Mechanism

1. Strategy:

Security can be achieved by:

- Authentication: The strategy is used to identify and confirm a user's identity.
- Encryption: Data is converted to a secure format that cannot be easily read by unauthorized individuals.

2. Architectural Pattern(s):

- Layering: This pattern decouples the system by dividing it into components (layers) that communicate with each other through message requests and responses, this control the access of the user level layer from directly make request to lower layers that provides critical data.

2.2 Important Quality Requirements

2.2.1 Maintainability

Description

A modular system design is used for this system so that components can be easily added and removed.

Justification

A modular design decouples a system into components that are easy to maintain and makes the system more adaptable. Decoupling the system will also ensure that it is easy to do unit testing and integration testing.

Mechanism

1. Strategy:

Maintainability can be achieved by:

- Decoupling: This strategy breaks the system into manageable components to achieve a proper structure and maintainable system.

2. Architectural Patterns(s):

- Microkernel: The microkernel pattern improves maintainability because it separates high level services from low level services that is, it divides the systems into components that are maintainable and also allow for components to be easily removed or added to the system.

2.2.2 Performance

Description

Performance is a measure of a system responsiveness when executing some action.

Justification

The Mobile Monitoring Application need use the devices resources efficiently to increase the performance of the application which is an important quality requirement that will also make the system more reliable and increase throughput of the application.

Mechanism

1. Strategy:

Performance can be achieved by:

- Dynamic code optimization: This strategy focuses on the code design, quality and efficiency to improve performance on the system.

2. Architectural Patterns(s):

- The best way to achieve performance is manages the system's resources efficiently and use design patterns to optimize code and improve efficiency.

2.3 Nice-To-Have Quality Requirements

2.3.1 Testability

Description

Testability is a measure of how well a system allow one to test if a certain criteria is met by the system. This allows fault detection in the system easy and also the faults can be isolated in a timely manner.

Justification

It is vital the every component that is deployed on the system can be tested using unit testing and also integration testing so that faults can be detected as soon as possible and be fixed.

Mechanism

1. Strategy:
 - White-box: This tactic is mainly used for unit testing and require the knowledge of the the application internal structure to create test cases for the application components.
 - Black-box: This tactic is mainly used for integration testing, it examines the functionality of the application against the specification and simplifies system components testing when plugged in a modular system.
2. Architectural Patterns(s):
 - Model View Controller: This pattern promotes separation of concern in a system by decoupling the system into components that can be tested independently.

3 Technologies

3.1 Platform and IDE

- Android
- Android Studio

3.2 Programming Languages

- Java

3.3 Frameworks

- JUnit

3.4 Others

- AJAX
- JSON