

# **Software Requirements Specification**

**for**

## **IT INFRASTRUCTURE MANAGEMENT SOFTWARE**

**Version 1.1 approved**

**Prepared by**

**Harsha R PES1UG21CS222 | Hemanth S Reddy PES1UG21CS230  
Himanshi Gupta PES1UG21CS231 | Ishaan Mrug PES1UG21CS241**

**Peng**

**12.09.2023**

**Copyright © 1999 by Karl E. Wiegers. Permission is granted to use, modify, and distribute this document.**

# Table of Contents

Table of Contents.....	ii
Revision History.....	ii
1. Introduction.....	1
1.1 Purpose.....	1
1.2 Document Conventions.....	1
1.3 Intended Audience and Reading Suggestions.....	1
1.4 Product Scope.....	1
1.5 References.....	2
2. Overall Description.....	2
2.1 Product Perspective.....	2
2.2 Product Functions.....	3
2.3 User Classes and Characteristics.....	3
2.4 Operating Environment.....	4
2.5 Design and Implementation Constraints.....	4
2.6 User Documentation.....	5
2.7 Assumptions and Dependencies.....	5
3. External Interface Requirements.....	5
3.1 User Interfaces.....	5
3.2 Hardware Interfaces.....	6
3.3 Software Interfaces.....	6
3.4 Communications Interfaces.....	6

## Software Requirements Specification for IT INFRASTRUCTURE MANAGEMENT SOFTWARE

4. System Features.....	6
4.1 Data Log.....	6
4.2 Resource Request .....	8
4.3 Visualization and Finance .....	8
4.4 Alert Management .....	9
5. Other Nonfunctional Requirements.....	10
5.1 Performance Requirements.....	11
5.2 Safety Requirements.....	11
5.3 Security Requirements.....	11
5.4 Software Quality Attributes.....	12
5.5 Business Rules.....	12
6. Other Requirements.....	12
Appendix A: Glossary.....	12
Appendix B: Analysis Models.....	12
Appendix C: To Be Determined List.....	13

## Revision History

Name	Date	Reason For Changes	Version
	12.09.23	Initial draft	1.0
	20.10.23	Functionality addition -1 (Alerts)	1.1

# 1. Introduction

## 1.1 Purpose

The main objective of the product (IT INFRASTRUCTURE MANAGEMENT SOFTWARE version 1.0) is to monitor, summarize and on the whole keep track of all crucial resources for any enterprise. The software is capable of handling different types of data on any required resource and hence, provides a systematic approach for the utilization of capital.

## 1.2 Document Conventions

All the keywords have been embossed as well as key information has been denoted by their respective *report ID's(U1,CO1,OE1 etc)*. The document also provides more exclusive information to improve understanding for the reader, by adding more nuance. This nuance is denoted by the underlined segments.

## 1.3 Intended Audience and Reading Suggestions

The software mainly caters towards any enterprise that requires[IM1] an enhanced approach to supervise their resources. The main demographic for the document entails project managers, architects, employees and finally, the management board of the company. The content of the document has been oriented as modules, in accordance with their priority.

## 1.4 Product Scope

Inherently the aim of every enterprise is to maximize profits and a huge part of the expenses are derived from establishing servers and networks. Another aspect of expense, are the facilities provided for the employees and to fulfill their necessity of prerequisites, for their respective projects. The software efficiently logs in data regarding the availability and need for any resource in question i.e, Servers, Devices, Softwares etc. with this information, the company will have a better view of resources which are actively in use as well as ones on standby. Hence, provides insights to the enterprise, for them to make well informed decisions in terms of their finances. The software also tackles expansion of resources by yet again providing ample information to the enterprise to extract these resources efficiently i.e requirement of bigger servers to accommodate larger infrastructure, acquisition of workspaces for newly hired employees.

## 1.5 References

R1: IEEE Recommended Practice for Software Requirements Specifications:

<https://ieeexplore.ieee.org/document/88286>

R2: How to Write a Software Requirements Specification (SRS) Document:

<https://relevant.software/blog/software-requirements-specification-srs-document/>

R3: Writing a Software Requirements Specification Document:

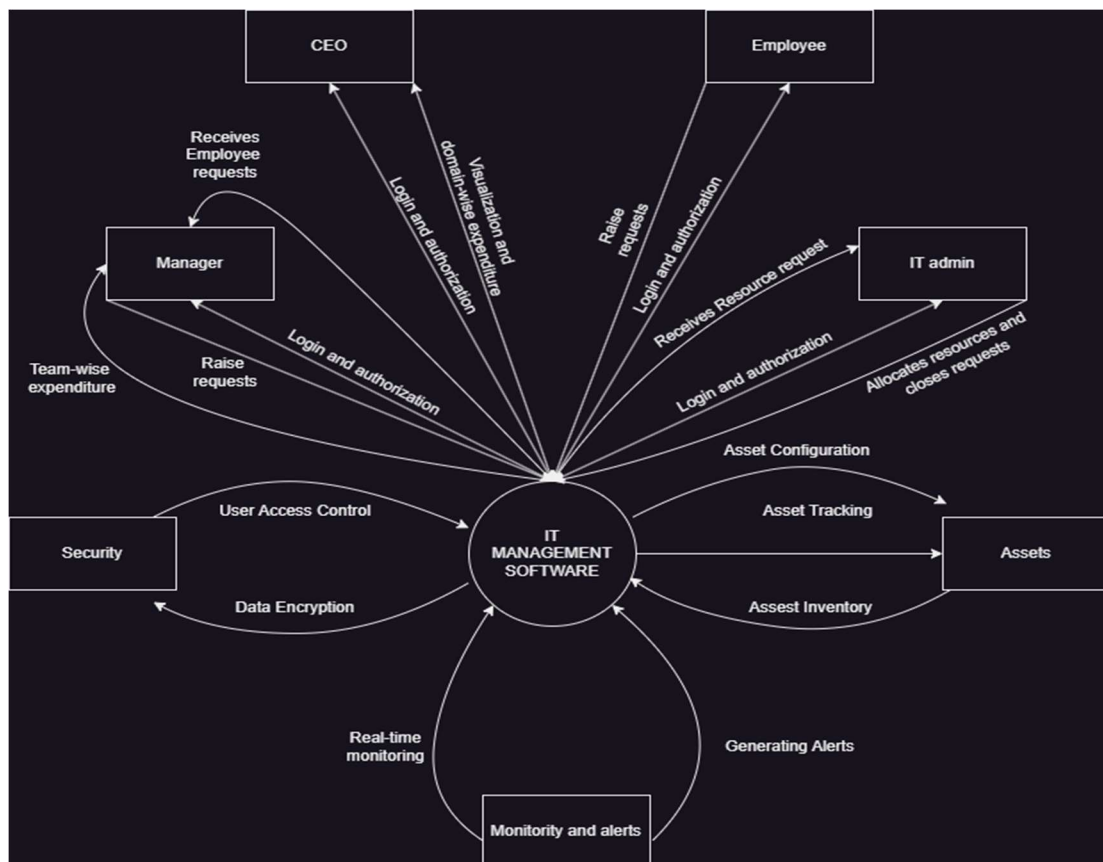
<https://enisananaj.medium.com/writing-a-software-requirements-specification-document-97d622805aef>

R4: What is SRS document as per IEEE standard?:

<https://www.studocu.com/in/document/galgotias-university/software-engineering-testing-methodologies/define-ieee-standards-for-srs/53729665>

## 2. Overall Description

### 2.1 Product Perspective



## 2.2 Product Functions

Functional Requirements:

- User Management
  - a. User Registration
  - b. User Authentication
  - c. User Roles & Permissions
- Asset Management
  - a. Asset Inventory
  - b. Asset Tracking
  - c. Asset Configuration
- Monitoring and Alerts
  - a. Real-time Monitoring
  - b. Alert Generation

## 2.3 User Classes and Characteristics

The users are classified on the basis of functions used and privileges.

IT admins - most important

Employees - least.

U1: Employees :

See their own data (present on their hardware and the projects they're working on). Can make requests to change.

U2: Manager :

See his own data as well as data pertaining to every employee managed by the manager. The manager analyzes the change requests, if feasible they forward it to the IT admins.

U3: CEO :

Have access to everyone's data, but the main focus is on overall performance of the hardware assets.

U4: IT Admins :

They have the rights to amend the data, information that is present across the data servers. They also review the change request, and implement it.

## **2.4 Operating Environment**

Our software is designed (have many releases) to work across different operating system platforms

Minimum System Requirements

OE1: Operating Systems : Windows 8 , Mac 10.10 , Linux 5.10

OE2: Hardware : Ryzen 3, Intel i3

OE3: Application : Microsoft Office, Libre Office

OE4: Server : 12.5 Gb per user (can be extended), 4Gb for requests.

## **2.5 Design and Implementation Constraints**

CO1: Corporate policies :

CO1.1: Time constraint: User data needs to be updated on a regular basis. Since most corporate decisions based on user resources or infrastructure depend on the database; failure of accurate data being represented timely may cause discrepancies.

CO1.2: Data security: Since the database logs information about users from every rung in the company's hierarchy and hence makes the data sensitive. This makes breach of data a big concern.

CO2: Hardware limitations :

CO2.1: Memory: The product heavily requires the support of a large and self-sufficient storage space. With a minimum data required for each user being 12.5 Gb and tentative space for requests is 4 Gb. The product also uses the concept of redundancy to provide better backup by trading-off memory space.

CO2.2: Operating Environment: Any environment that does not meet the specified requirements results in failure of the software.

CO3:Components :

CO3.1: The data is given out in two forms, firstly, minor visual representation for a bird's eye view, secondly, in the form of a .csv file. Hence, the software is contingent on a platform that supports the specified file format.

## **2.6 User Documentation**

Initially the software, provides a basic tutorial when the application is run for the first time. Apart from this, there is an online page to post any queries and look at the basic tutorial again.

## **2.7 Assumptions and Dependencies**

AS1: It is assumed that the users will have a stable internet connection for real time data and request access. In absence of this, we also have a timeout and a reconnection period.

DO1: Component : The data is given out in two forms, firstly, minor visual representation for a bird's eye view, secondly, in the form of a .csv file. Hence, the software is contingent on a platform that supports the specified file format.

# **3. External Interface Requirements**

## **3.1 User Interfaces**

UI1: CEO: This user is given a surface level perspective of the whole operation under the control of the software. They are not given direct access to the data from the database instead they get a visual representation as well as an in depth analysis of expenditure.

UI2: IT Admin: This user has complete access for viewing and editing all data in the database. They're also the recipient of all the request queries from the manager of the enterprise which are to be implemented by them.

UI3: Manager: This user has partial access for only viewing data for their team in the database. They forward request prompts if deemed necessary from their team over to the IT Admin.



UI4: Employee: This user is provided a holistic view of their own specifics with logs regarding their present as well as past projects.

Every user is provided with their unique login credentials and only the IT Admin has transparency over this information.

## 3.2 Hardware Interfaces

HI1: The software on the whole requires less interaction from other software components. The only major application used is to provide csv files.

Apart from this the product works standalone.

## 3.3 Software Interfaces

SI1: The software relies on a distributed storage system i.e a hadoop ecosystem. The minimum hadoop version is 3.3.3 and will also require the hive counterpart of the same.

SI2: Data manipulations are made using R or changes can also be made directly on the csv files. The product provides a two-fold mechanism to handle requests from users. One instance is of demand for allocation of resources for newly employed users or for a team assigned a new project. This demand constraint is sent by the manager to the IT Admin, who must fulfill the necessity in a timely manner. **The CEO is also notified of the same.** The Second instance is of demand created due to request prompts lodged by any user that has been approved by the respective authorities. **Finally, after allocation the IT Admin sends back a confirmatory message to the respective users to close the lodged requests.**

## 3.4 Communications Interfaces

CI1: The product uses FTP channel to ripple data across distances with minimal or no latency and error. This also relies on the strength of the servers set up by the enterprise. The product encrypts the data using AES algorithm which ensures data security.

# 4. System Features

## 4.1 Data Log

### 4.1.1 Description and Priority

The main function of the software is to collect and store data from the users, such as login details, user system configuration (hardware and software specifications), server configurations. The data stored physically will have multiple copies as well. This feature allows the IT Admin to get a microscopic view of any user/ team/ project. Hence this feature takes the highest priority in the software.

### 4.1.2 Stimulus/Response Sequences

Every time new resources are allocated, the software takes in input from the respective user and stores it in the database. On the alternative, users can also lodge requests to which resources are allocated and for these resources the metadata specifications will also be updated in the database.

### 4.1.3 Functional Requirements

#### User Management

##### 1.1 User Registration

Requirement ID: UR-001

Description: The system shall allow users to register by providing a valid email address and password.

Response to Error: If the email address is already registered, display an error message.

##### 1.2 User Authentication

Requirement ID: UA-001

Description: Users shall be able to log in by providing their registered email address and password.

Response to Error: If the password is incorrect, display an error message.

#### Asset Management

##### 2.1 Asset Inventory

Requirement ID: AM-001

Description: The software shall support the addition of new assets to the inventory, including details such as asset name, type, manufacturer, and purchase date.

Response to Error: If required fields are not filled, display an error message.

##### 2.2 Asset Tracking

Requirement ID: AM-002

Description: Users shall be able to search and retrieve information about specific assets in the inventory based on asset name, type, or other criteria.

Response to Error: If no matching assets are found, display a message indicating no results.

## 4.2 Resource Request

### 4.2.1 Description and Priority

The secondary function of the software is to lodge requests for resources from the engineers. This provides every user more flexibility and autonomy, regardless of hierarchy with their associated resources. This feature mainly caters to situations of urgent access and hence are also given high priority.

### 4.2.2 Stimulus/Response Sequences

Every time a user lodges in a request for new resources, the lodge is sent to the manager for approval. Once approved, the request is forwarded to the IT Admin who recognizes the need, accommodates resources for the request and finally sends a confirmatory message to complete the request. On the account of new hires/projects, requests can be directly lodged by the Manager to the IT Admin.

### 4.2.3 Functional Requirements

Login credentials are as specified in the previous feature (data log).

Requirement ID : CT-001

Description: Connection between the different user devices is required to communicate between the users, i.e Engineer, Manager, IT Admin,

Response to Error: On failed communication, the device will send requests through FTP (for 30 seconds) until it receives a confirmatory message saying that the request has been lodged.

## 4.3 Visualisation and Finance

### 4.1.1 Description and Priority

This feature provides selected users to view expenditure associated with their perspective in the enterprise. The CEO has a bird's eye view of the total expenditure at that instant, with an emphasis on the server expenditure. This provides a systematic approach to view the gross expenditure in various domains (Servers, Hardware and Software components etc) by the enterprise. The Manager has provision to view the total expenditure with respect to their team as well as their project. In turn, this perspective involves expense per user on a team and expense of shared resources per project. Engineers can only look at their own system configurations and components.

#### **4.1.2 Stimulus/Response Sequences**

Apart from the CEO, the users will have to request for the expenditure. For the CEO, the expenditure will always be displayed on the dashboard of the software.

#### **4.1.3 Functional Requirements**

User login credentials as described in the previous functions.

- CEO: This user isn't explicitly required to request for any information. The visual representation and financial reports will be predominantly present in their respective dashboard.
- Manager: This user has to explicitly request for information. Only a shallow analysis will be provided with respect to their project/team as a response.
- Engineer: This user has to explicitly request for information. Only their individual configuration and components.

## **4.4 Alert Management**

### **4.4.1 Introduction**

The Alert Management component is responsible for handling alert notifications within the IT Infrastructure Management Software (ITIMS). Alerts are generated in response to critical events or conditions within the IT infrastructure, providing users with timely information about potential issues that require their attention. This section outlines the functional requirements and features related to alert management.

### **4.4.2 Functional Requirements**

The Alert Management component shall include the following functionalities:

#### **4.4.2.1 Alert Generation**

The system shall be capable of generating alerts in response to predefined events or conditions that may impact the IT infrastructure. Alerts shall include relevant information about the event and its severity.

#### **4.4.2.2 Alert Notification**

Alerts shall be promptly delivered to the appropriate users or user groups based on predefined notification rules. Notification methods may include in-app notifications, email notifications, or SMS notifications.

#### **4.4.2.3 Alert Acknowledgment**

Users shall have the ability to acknowledge received alerts. Acknowledging an alert indicates that the user is aware of the alert and may take actions to address the issue.

#### **4.4.2.4 Alert Dismissal**

Users with appropriate permissions shall be able to dismiss alerts. Dismissing an alert indicates that the user has addressed the issue or determined that no further action is required.

#### **4.4.2.5 Alert History**

The system shall maintain a history of alerts, including their status (e.g., active, acknowledged, dismissed), event details, and timestamps. Users with the necessary permissions may review the alert history.

#### **4.4.2.6 Alert Configuration**

Administrators shall be able to configure alert rules, including the events or conditions that trigger alerts, the severity levels, and the recipients of alert notifications.

### **4.4.3 Nonfunctional Requirements**

#### **4.4.3.1 Performance Requirements**

The Alert Management component shall ensure that alert notifications are delivered in a timely manner to provide users with real-time information about critical events.

#### **4.4.3.2 Security Requirements**

Alerts containing sensitive information shall be transmitted and stored securely to protect the confidentiality and integrity of alert data.

## **5. Other Nonfunctional Requirements**

## 5.1 Performance Requirements

Not Applicable

## 5.2 Safety Requirements

### Data Backup and Recovery Safeguards

Safety Requirement SAR-001: The software shall implement automated and secure data backup mechanisms to prevent data loss.

Safeguards: Regularly backup critical data to multiple offsite locations and ensure data integrity during backup and recovery processes.

### High Availability and Fault Tolerance

Safety Requirement SAR-002: The software shall ensure high availability and fault tolerance to minimize system downtime.

Safeguards: Implement load balancing, failover mechanisms, and redundancy in critical components to prevent service disruptions.

### Change Control and Configuration Management

Safety Requirement SAR-003: The software shall enforce strict change control procedures to prevent unauthorized or accidental changes to critical system configurations.

Safeguards: Implement role-based access controls, approval workflows, and audit trails for all configuration changes.

## 5.3 Security Requirements

### Data Security and Encryption

Security Requirement SER-001: The software shall use strong encryption (e.g., AES-256) to protect data at rest and in transit.

Safeguards: Employ SSL/TLS for secure data transmission and encryption mechanisms to protect stored data.

### User Authentication and Authorization

## **Software Requirements Specification for IT INFRASTRUCTURE MANAGEMENT SOFTWARE**

Security Requirement SER-002: Users shall be required to authenticate using multi-factor authentication (MFA) for enhanced security.

Safeguards: Implement strict password policies and token-based authentication.

### **Compliance with Regulatory Standards**

Security Requirement SER-003: The software shall adhere to relevant data security and privacy regulations (e.g., GDPR, HIPAA).

Safeguards: Regularly audit and update the system to maintain compliance with regulatory standards.

### **Security Certifications**

Security Requirement SER-004: The software shall obtain and maintain industry-standard security certifications (e.g., ISO 27001, SOC 2).

Safeguards: Engage with third-party auditors for certification assessments and renewals.

## **5.4 Software Quality Attributes**

Not Applicable

## **5.5 Business Rules**

Not Applicable

# **6. Other Requirements**

Not Applicable

## **Appendix A: Glossary**

To be filled

## **Appendix B: Analysis Models**

To be filled

## **Appendix C: To Be Determined List**

To be filled