Literature Survey and Comparison of Various SRS Formats

for

Airline Reservation System for Bon Voyage Airlines

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1. Introduction

1.1 Definition

The *System Requirements Specification* (SRS) document describes all data, functional and behavioral requirements of the software under production or development. This document covers the overall description of the system/software to be implemented, use cases and scenarios, data model, functional and non-functional requirements, interface and behavioral models, as well as restrictions and validation criteria to be used for the software. The appendices include business rules, glossary, traceability matrices and other necessary supplementary information that are specific to the system.

An SRS minimizes the time and effort required by developers to achieve desired goals and also minimizes the development cost. A good SRS defines how an application will interact with system hardware, other programs and human users in a wide variety of real-world situations. Parameters such as operating speed, response time, availability, portability, maintainability, footprint, security and speed of recovery from adverse events are evaluated. This is achieved and refined with detailed and continuous communications with the project team and customer till the software is complete.

1.2 Literature Survey

There is no single precise template for writing good Software Requirement Specifications. The contents of an SRS document depends on the software product being developed and also on the expertise of the people doing the requirement elicitation. Different business/technology domains in a company usually have their own customized version of SRS template. Still a good Software Requirement Specification (SRS) usually contains project scope section, functional requirements, requirement analysis models, external interface requirements and non functional requirements. If the project is for the development of a product, product vision defines the scope and the target user base of the product. The most well known formats include-

- *IEEE* SRS Format
- *TCS* SRS Format
- *IBM* SRS Format
- *Infosys* SRS Format
- *Wipro* SRS Format

2. *TCS* SRS Format

2.1 Format

1. Scope
2. Referenced Documents
3. Description of Software to be Developed
4. Development Sequence and Schedule
    - 4.1 Requirements Analysis
    - 4.2 Software Specification Review (PDR)
    - 4.3 Software Design
    - 4.4 Software Critical Design Review (CDR)
    - 4.5 Software Coding and Debug
    - 4.6 Module Testing
    - 4.7 Software Testing
    - 4.8 Integrated HW and SW Testing
    - 4.9 Subsystem Commissioning and Integration
    - 4.10 Software handover
5. Software Safety
    - 5.1 Safety certificate
    - 5.2 Communication Integrity
    - 5.3 Start-up and Shut-down Procedure
6. Generic Software Requirements
    - 6.1 Naming and Tagging Conventions
    - 6.2 Remote Initialization
    - 6.3 Data
    - 6.4 Software cyclic execution
    - 6.5 Data time stamping
    - 6.6 Modular Design
    - 6.7 Measuring Units
    - 6.8 Data resolution
    - 6.9 I/O Validation
    - 6.10 Synchronization
    - 6.11 Unused Code
    - 6.12 Software Comments
    - 6.13 Self-changing code
    - 6.14 Manual Operation
    - 6.15 Communication methods

7. Specific TCS Software Requirements
    - 7.1 Operating Systems
    - 7.2 Development Software
    - 7.3 Application Software
    - 7.4 Man-Machine Interfaces
8. Deliverables
9. Configuration Control

2.2 Comparison

The purpose of the *TCS* software is to coordinate the various subsystems to perform the required telescope functions, based on operator commands while providing feedback to the operator and maintaining system safety. It integrates information and control so that the operator and astronomer can concentrate on the observations being performed rather the operation of the telescope.

2.1.1. Pros

This format has a clear schedule and development sequence; adds to the quality of the document and is a very good improvement compared to the *IEEE* format. Software safety is another improvement. This is also an essential element missing in the *IEEE* format. All the requirements can be listed in the software requirement section and *TCS* requirement section. One advantage is that they have separated the two which makes the task of identifying the technologies required in the company easier.

2.1.2. Cons

In the *TCS* format, the purpose is missing and starts directly with scope. But, the content of purpose is relevant scope as well so these both can be merged together. Document conventions, Intended audience section are not elucidated in this format. This is a disadvantage as these come into the category of essential elements required to ease the reading of this document.

The overall description section is missing in case of *TCS* format. Though the description of software to be developed section serves the same purpose, it has been noted as a difference from *IEEE* Format. One major disadvantage is that there are no sections for use case diagrams, class diagrams, etc. which are very essential. Configuration Control is an additional in *IEEE* format which is missing in this format.

2.3 Conclusion

Overall, the *TCS* format is comparable to *IEEE* format. It has many features in addition to the ones in the *IEEE* format like specification for diagrams, software security and testing specification which are not elaborately elucidated in the *IEEE* format. It has a few disadvantages which cannot be overlooked.

3. *IBM* SRS Format

3.1 Format

1. Introduction
    - 1.1 Purpose
    - 1.2 Scope
    - 1.3 Definitions, Acronyms and Abbreviations
    - 1.4 References
    - 1.5 Technologies to be used
    - 1.6 Overview
2. Overall Description
    - 2.1 Use-Case Model Survey
    - 2.2 Architecture diagram and Database design
    - 2.3 Assumptions and Dependencies
3. Specific Requirements
    - 3.1 Use-Case Reports
    - 3.2 Supplementary Requirements
4. Supporting Information
5. Concerns/ Queries/ Doubts if any

3.2 Comparison

This SRS describes the general factors that affect the product and its requirements. It provides a background for those requirements and makes them easier to understand. Include items such as product perspective, product functions, user characteristics, constraints, assumptions and dependencies, and requirements subsets.

3.1.1. Pros

The *IBM* format is very similar to the *IEEE* format (add-ons). The *IBM* format has a separate section for various diagrams including use case diagrams like class, object, relational explicitly mentioned which is a good improvement when compared to the *IEEE* format. In the *IEEE* format the diagrams are confined to the appendix section, but not explicitly mentioned. Though it is up to the developer to include whatever diagrams he feels are important.

3.1.2. Cons

The *IBM* format includes technologies used in the project in the introduction section itself which increases the complexity of the document and makes it undesirable for reference. The *IBM* format does not include system features thus making it difficult for a developer going through the documentation as one would not know what are the conditions suitable for the deployment of the particular project.

It does not include the intended audience section in the introduction section which is a highly desirable. A major disadvantage of this format is that it does not have any section for non-functional requirements which is a essential part in the document. This SRS format doesn't depict any details regarding External interface requirements such as user interface, software interface, hardware interface and communication interface.

3.3 Conclusion

The *IBM* format is a concise version of *IEEE* format. It lacks in many aspects as compared to the *IEEE* format in aspects as listed above. Therefore *IEEE* format is proven to be a better format than the *IBM* format.

4. *Infosys* SRS Format

4.1 Format

1. Introduction
    - 1.1 Purpose
    - 1.2 Scope
    - 1.3 Definitions, Acronyms, and Abbreviations
    - 1.4 References
    - 1.5 Overview
2. The Overall Description
    - 2.1 Product Perspective
        - 2.1.1 System Interfaces
        - 2.1.2 Interfaces
        - 2.1.3 Hardware Interfaces
        - 2.1.4 Software Interfaces
        - 2.1.6 Memory Constraints
    - 2.2 Product Functions
    - 2.3 User Characteristics
    - 2.4 Constraints
    - 2.5 Assumptions and Dependencies
    - 2.6 Apportioning of Requirements
3. Specific Requirements
    - 3.1 External Interfaces
    - 3.2 Functions
    - 3.3 Performance Requirements
    - 3.4 Logical Database Requirements
    - 3.5 Design Constraints
        - 3.5.1 Standards Compliance
    - 3.6 Software System Attributes
        - 3.6.1 Reliability
        - 3.6.2 Availability
        - 3.6.3 Security
        - 3.6.4 Maintainability
        - 3.6.5 Portability
    - 3.7 Organizing the Specific Requirements
        - 3.7.1 Functional Hierarchy
4. Change Management Process

5. Document Approvals
6. Supporting Information

4.2 Comparison

The Software Requirements Specification document indicates all of the essential requirements given by the client for this project. The user and tester can utilize this document in testing and ensuring the requirements expected by the client are satisfied. All changes, including the reports and supplements, are tracked and logged for liabilities issues in this format.

The *Infosys* Format there is a section which describes the current and the proposed system. So the reader knows at what stage the system is currently in. *IEEE* format does not have anything regarding the current situation of the project. Business events such as external and temporal events are described in *Infosys* template. It defines the significant events that happen in a typical business environment. The prototype section present in *Infosys* helps in understanding the changes made to the initial version of the system. The given *SRS* doesn't provide any sort of document conventions, appendices to understand the conventions and terms used in the *SRS*; one may find it difficult to understand the terminologies used in the *SRS*.

4.3 Conclusion

The *Infosys* format is an expanded version of the *IEEE* format. It lacks in many aspects as compared to the *IEEE* format in aspects as listed above. Therefore *IEEE* format is proven to be a better format than the *Infosys* format.

5. *Wipro* SRS Format

4.1 Comparison

The *Wipro* format includes minute details including the minutes of the meeting held regarding the project, audit reports are included in the *SRS* of *Wipro*. It helps the reader visualize the development of the project. The *Wipro* format has a section that describes how exactly the project (or) the system is developed. It shows just the final details of the project. The *Wipro* format has a section included i.e. *out of scope* section that states the functions which will not be implemented in the system therefore giving the outer scope for further development.