Requirement Analysis

Presented by : Sanvin Patil

Learning Objectives

- Understand Software Requirement Analysis and it's techniques.
- At the end of the session the attendee would be able to analyze the requirement and define Requirement understanding.

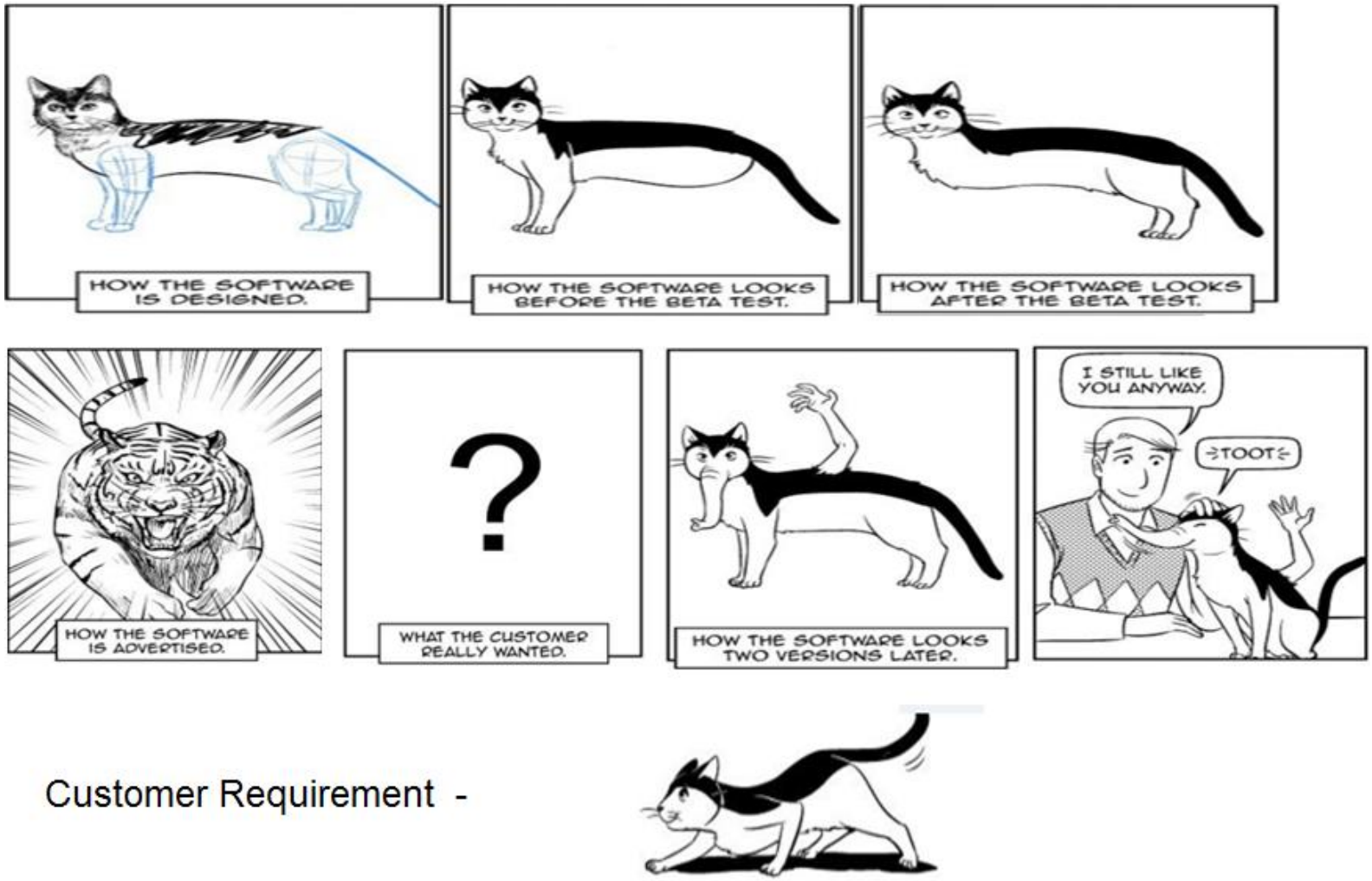
Cybage®
Delivering Value. Scientifically.

Agenda

- Requirement Analysis
- Techniques
- Types
- Requirement Validation
- Challenges
- Benefits
- QA Role

Cybage®
Delivering Value. Scientifically.

Impact of Lack in Requirement Analysis



Importance of Requirement Analysis

Analysts report that **71% of software projects failed** because of **poor requirements management**, making it the **single biggest reason for project failure** - bigger than bad technology, missed deadlines or change management failures.

Christopher Lindquist, Fixing the Requirements Mess, CIO Magazine

Top three causes of project failure were lack of user input, **incomplete requirements** or **changing requirements**.

The Standish CHAOS Report, which surveyed 9,236 IT projects

What is Requirement and Analysis?

Requirement:

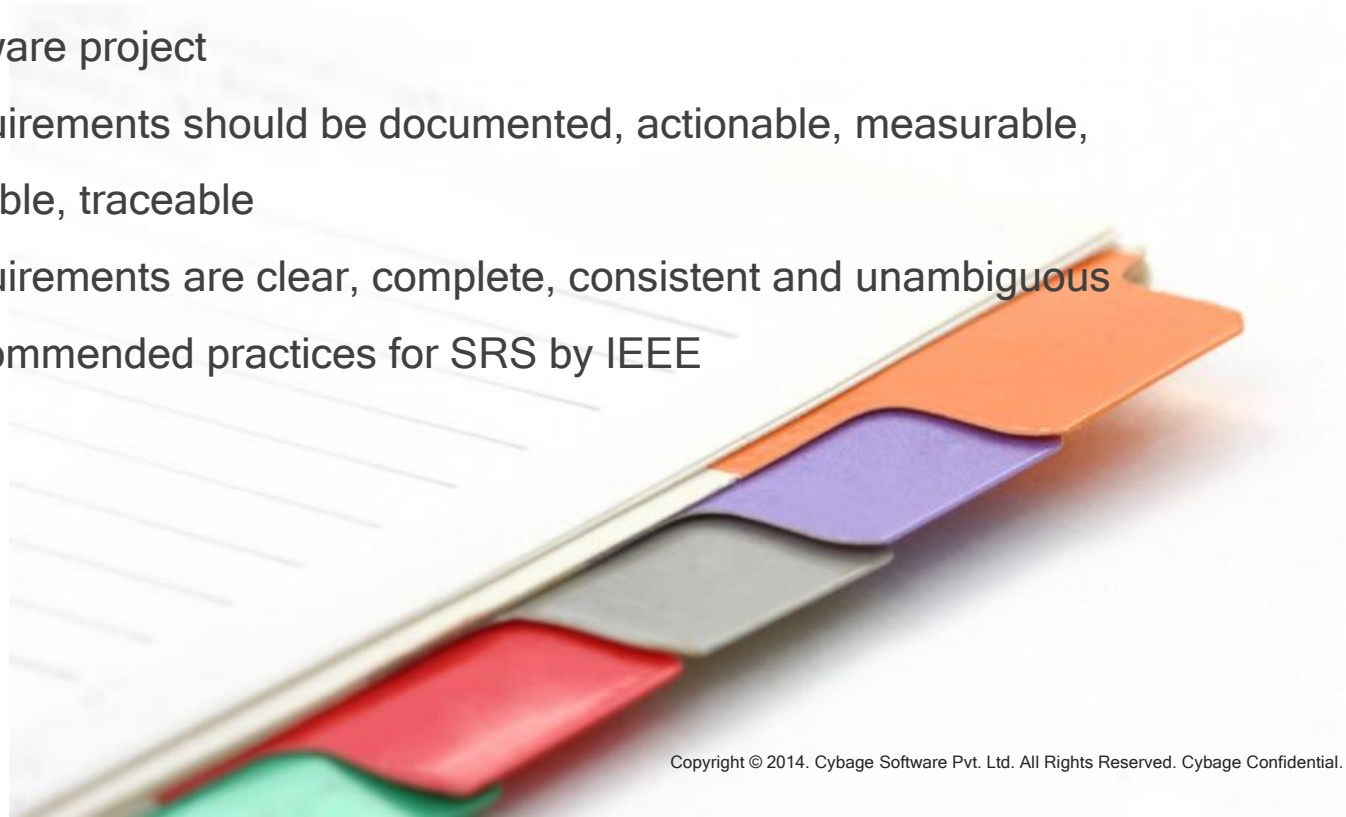
- Functional need of product/system
- Condition/capability to which a system must conform

Requirement Analysis:

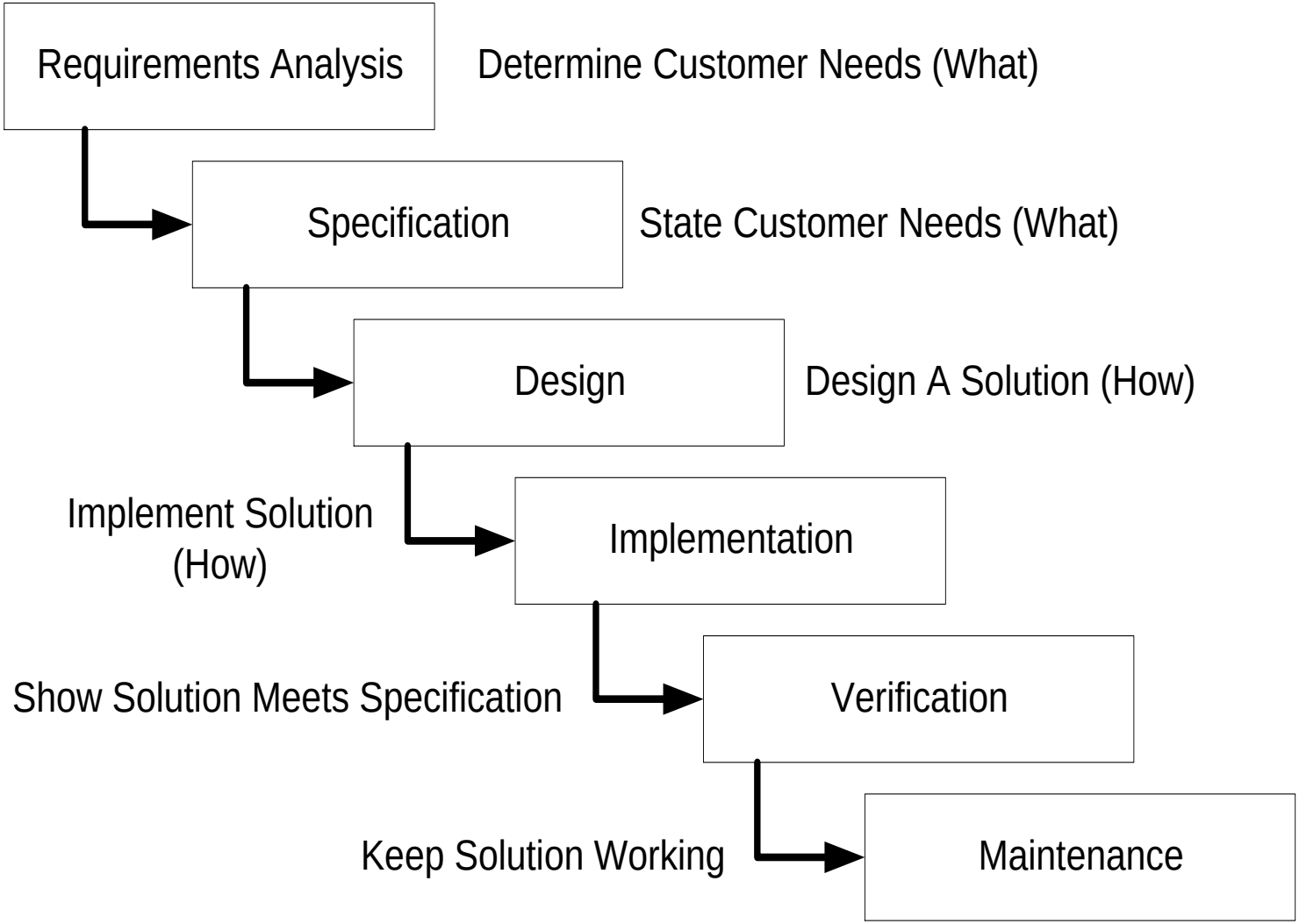
- Serves as a contract between the customer and the developer
- Serves to create Project test plan and cycles
- Clearly define the stated and unstated requirements
- Validation for complete, unambiguous and detailed requirement.

Continue..

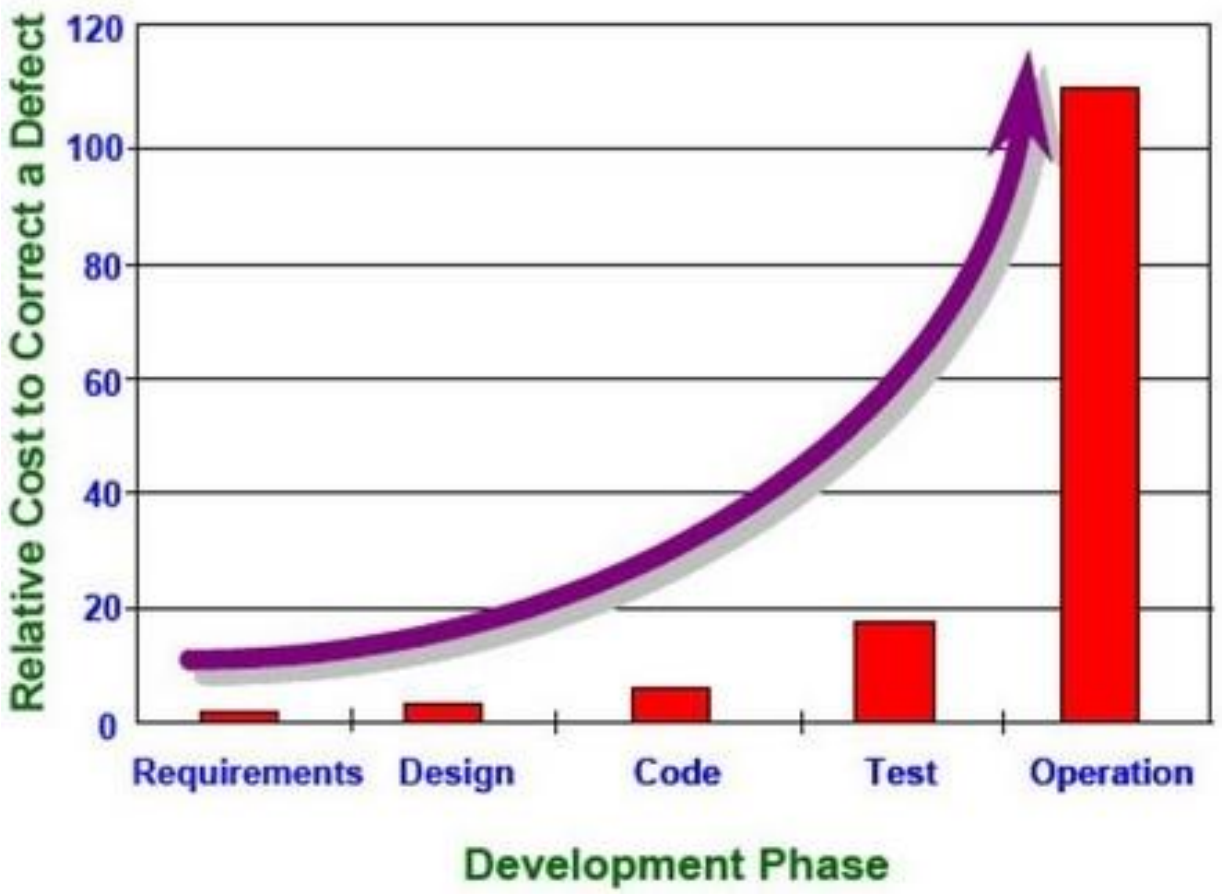
- Requirements analysis is the first important and fundamental stage
- It is performed by the Senior/Lead of the team with inputs from the customer
- Requirements analysis is critical to the success of a systems or software project
- Requirements should be documented, actionable, measurable, testable, traceable
- Requirements are clear, complete, consistent and unambiguous
- Recommended practices for SRS by IEEE



Software Development Life Cycle



Consequential Relative Cost of Errors



If a project spends least effort on analyzing requirements, it will lead to an uprise of errors/defects which are more costlier to fix.

Requirement Analysis Techniques

1. Unified Modeling Language (UML)
2. Data Flow Diagram (DFD)
3. Requirement Understanding Document (RUD)

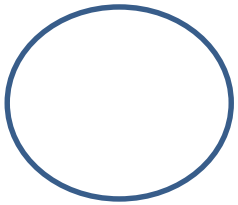
Unified Modeling Language (UML)

System Scope: This is used to define the boundary of the System. It represents with rectangular hollow box.

Use Case: Use to represent set of transaction, we can say this as user's task. It represents with ellipse shape.

Actor: Actor interacts with the use case. It represent with stick man.

Data Flow Diagram - DFD



Process: Work or Actions performed on the data

Data Store : Data storage representation

Source / Destination : External entity that is origin or destination of data

Data Flow: Arrow shows the movement of data

Requirement Understanding Document - RUD

Document covers details of Requirement understanding with points:

1. Assumptions
2. System Details
3. Logical System Requirements
4. System Entity
5. Hardware
6. Acceptance Criteria

- **QMS Document**: QMS/SDLC/Requirements Management Process/Template/S_RMP_RUD.doc
- **QMS Link**: http://cybintranet:8085/QMS%202.0/Documents/Process%20Manual/SDLC/Requirements%20Management%20Process/S_RMP_RUD.doc

Cybage®
Delivering Value. Scientifically.

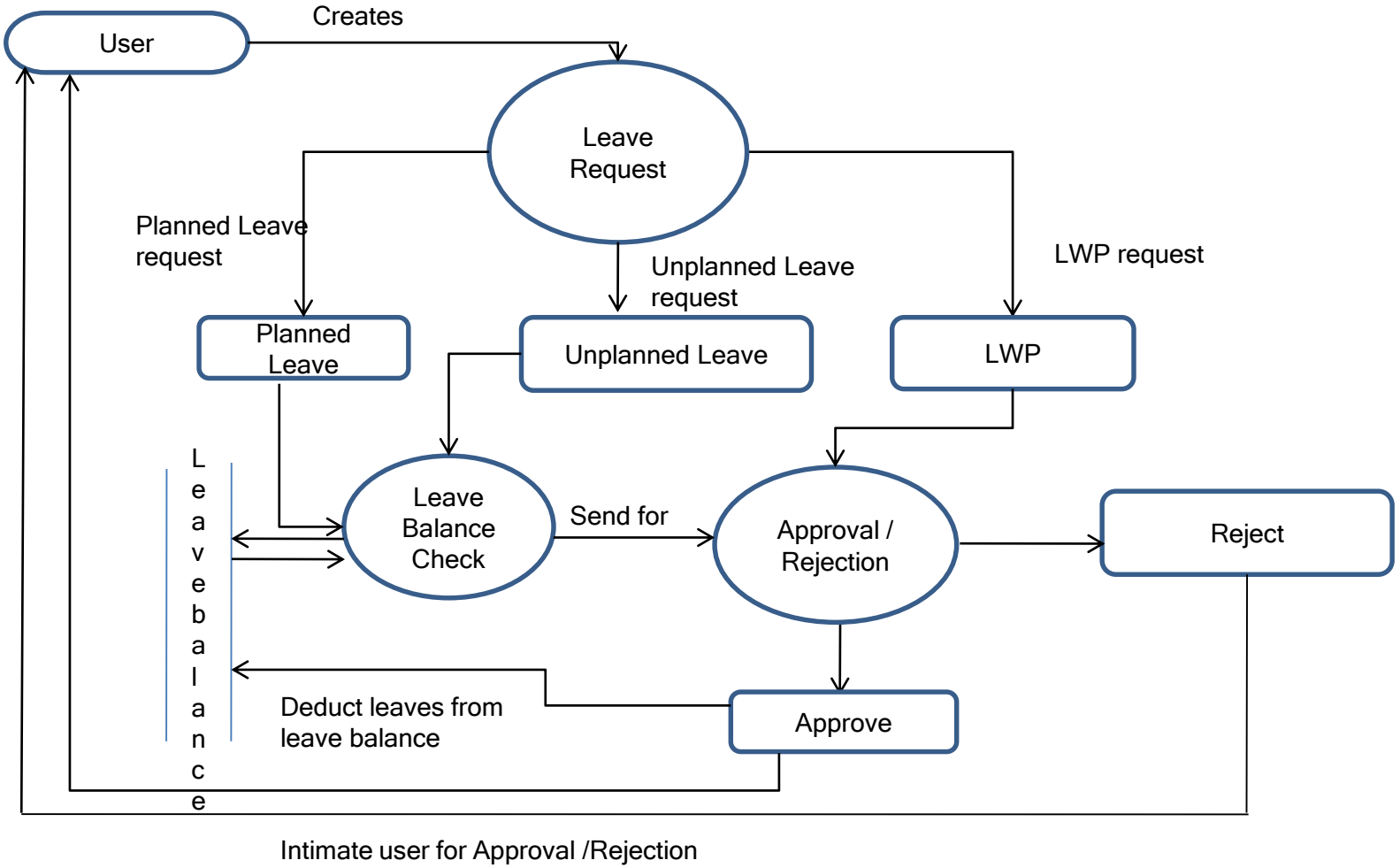
How to Analyze Requirements

- Find out what software has to do
- Identify Why, What, Who, How
- How complex application would be
- Which all things need to be tested
- Try to catch reading between the lines.

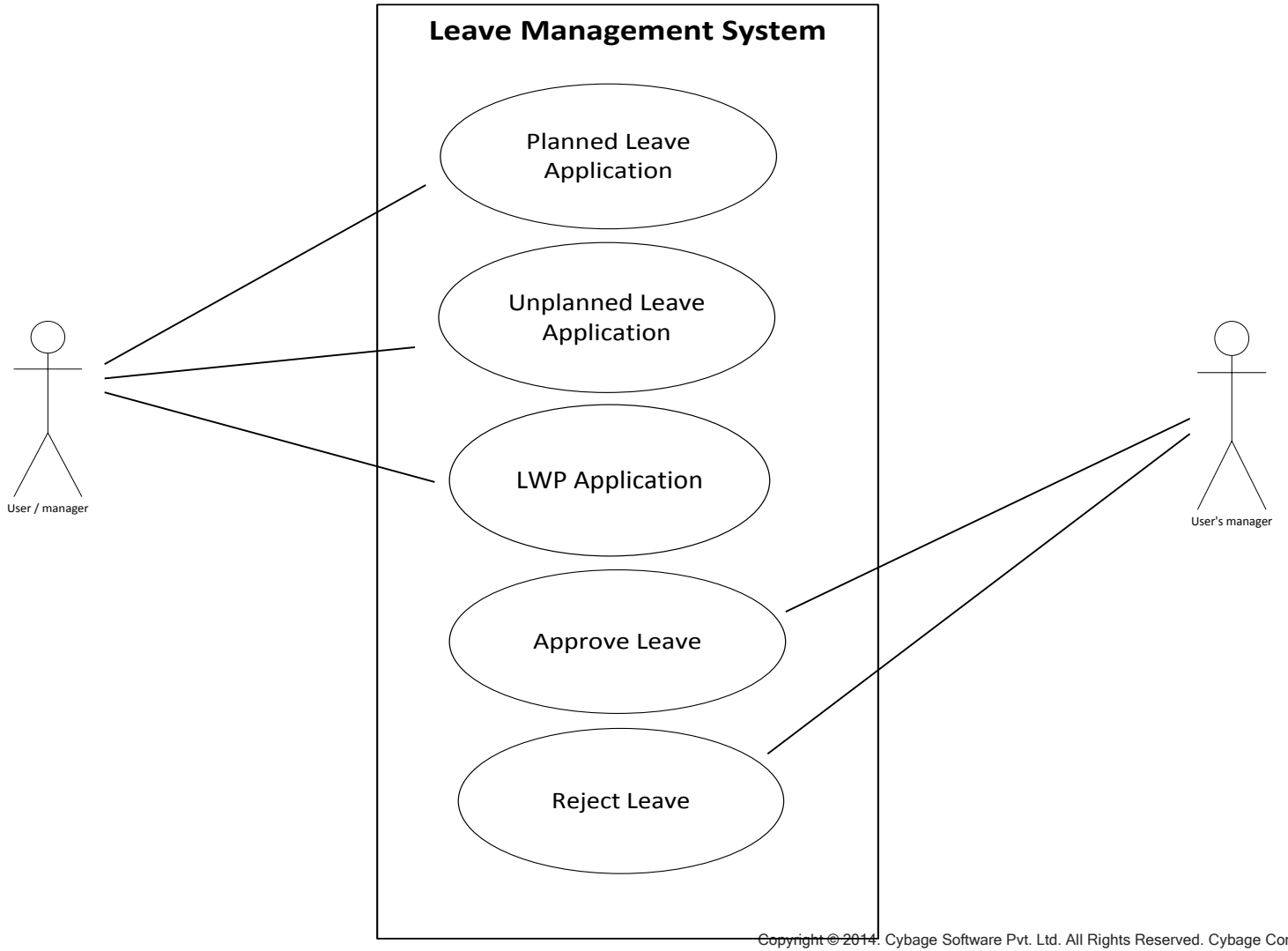
Example: Leave Management system

- Leave system must avail the facility for employee to apply for leave
- Leaves can be of type Planned, Unplanned, Leave without pay
- Employees have to apply all leaves in advance
- Once applied for the leave, employee must get mail to know that you have applies for how many days
- Deduction of leaves from leave balance must be done immediately after approval
- Leave addition also possible in leave balance
- When log record for the employee not found then LWP must get applied automatically
- UI needs to be sober
- System must support multiple users access at a time
- Authentication must supported
- Manager can reject leaves for various reasons.

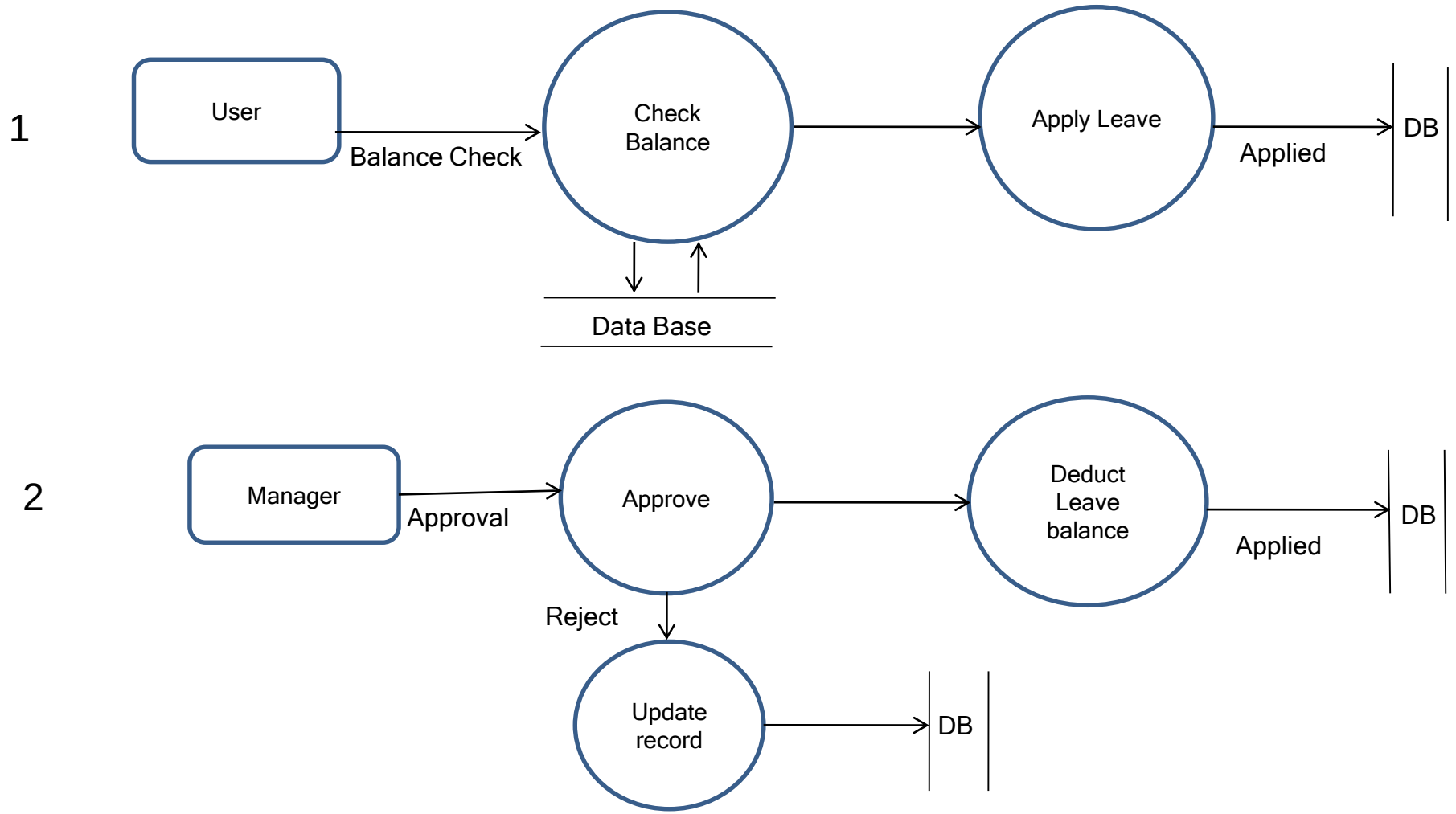
Leave Management system - Flow Diagram



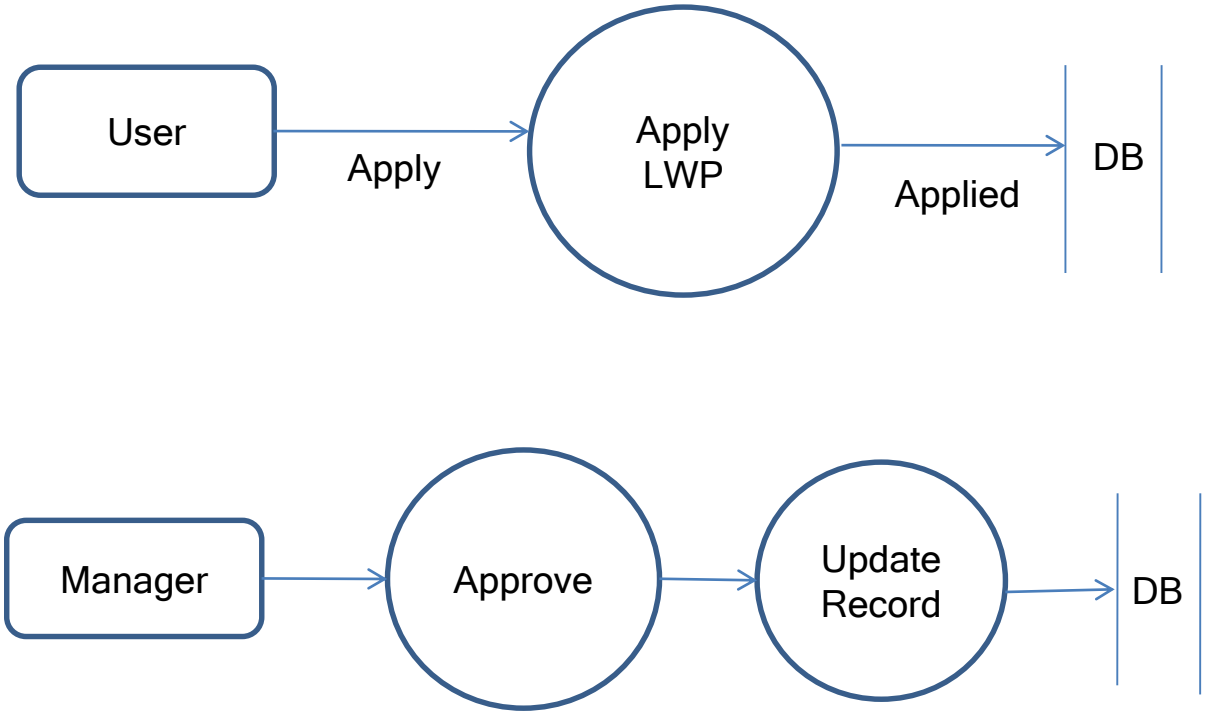
Leave Management system - UML



Leave Management system – DFD – PL/UL



Leave Management system – DFD - LWP



Leave Management -RUD

Below is the RUD for Leave management system.

Requirement Types

1. Functional Requirement
2. Non-Functional Requirement
3. Special Requirement

Functional Requirement

Related to application functionality and system Flow:

1. What a system is supposed to do
2. Describe functionality of System / services
3. High-level statements of what the system
4. System behavior for different Inputs
5. Task, action or activity.

Cybage®
Delivering Value. Scientifically.

Functional Requirement - Example

- Leave system must avail the facility for employee to apply for leave
- Leaves can be of type Planned, Unplanned, Leave without pay
- Employees have to apply all leaves in advance
- Once applied for the leave, employee must get mail to know that you have applies for how many days
- Deduction of leaves from leave balance must be done immediately after approval
- Leave addition also possible in leave balance
- When log record for the employee not found then LWP must get applied automatically
- UI needs to be sober
- System must support multiple users access at a time
- Authentication must supported
- Manager can reject leaves for various reasons.

Non-Functional Requirement

Related to application behavior/performance against defined criteria:

1. How a system is supposed to be
2. Constraints on the services / functions by the system (Performance time)
3. Constraints on the development process, standards (Coding Std.)
4. Define System properties and constraints (Usability)
5. Reliability, response time and storage requirement
6. Constraints: I/O device capability, system representation etc.
7. Physical Environment

Non-Functional Example

- Leave system must avail the facility for employee to apply for leave
- Leaves can be of type Planned, Unplanned, Leave without pay
- Employees have to apply all leaves in advance
- Once applied for the leave, employee must get mail to know that you have applies for how many days
- Deduction of leaves from leave balance must be done immediately after approval
- Leave addition also possible in leave balance
- When log record for the employee not found then LWP must get applied automatically
- UI needs to be sober
- System must support multiple users access at a time
- Authentication must supported
- Manager can reject leaves for various reasons.

Special Requirement

All other requirement not fall under functional and non-functional:

1. Specific testing for the system – Cloud, L10N, I18N
2. Additional support to the System - Compatibility
3. 3rd Party tool support – Analytics.

Special Requirement - Example

- Leave system must avail the facility for employee to apply for leave
- Leaves can be of type Planned, Unplanned, Leave without pay
- Employees have to apply all leaves in advance
- Once applied for the leave, employee must get mail to know that you have applies for how many days
- Deduction of leaves from leave balance must be done immediately after approval
- Leave addition also possible in leave balance
- When log record for the employee not found then LWP must get applied automatically
- UI needs to be sober
- System must support multiple users access at a time
- Authentication must supported
- Manager can reject leaves for any reason.

Requirement Analysis - Validation

1. Correctness – Incorrect statement
2. Completeness – Missing Requirement
3. Feasibility – Possible to Test
4. Testability – Testing Applicable
5. Ambiguity – Statement not clear due to multiple meaning
6. Consistency – Contradiction in 2 requirements.

Validation: Correctness

- Leave system must avail the facility for employee to apply for leave
- Leaves can be of type Planned, Unplanned, Leave without pay
- Employees have to apply all leaves in advance
- Once applied for the leave, employee must get mail to know that you have applies for how many days
- Deduction of leaves from leave balance must be done immediately after approval
- Leave addition also possible in leave balance
- When log record for the employee not found then LWP must get applied automatically
- UI needs to be sober
- System must support multiple users access at a time
- Authentication must supported
- Manager can reject leaves for various reasons.

Validation: Completeness

- Leave system must avail the facility for employee to apply for leave
- Leaves can be of type Planned, Unplanned, Leave without pay
- Employees have to apply all leaves in advance
- Once applied for the leave, employee must get mail to know that you have applies for how many days
- Deduction of leaves from leave balance must be done immediately after approval
- Leave addition also possible in leave balance
- When log record for the employee not found then LWP must get applied automatically
- UI needs to be sober
- System must support multiple users access at a time
- Authentication must supported
- Manager can reject leaves for various reasons.

Validation: Feasibility & Testability

- Leave system must avail the facility for employee to apply for leave
- Leaves can be of type Planned, Unplanned, Leave without pay
- Employees have to apply all leaves in advance
- Once applied for the leave, employee must get mail to know that you have applies for how many days
- Deduction of leaves from leave balance must be done immediately after approval
- Leave addition also possible in leave balance
- When log record for the employee not found then LWP must get applied automatically
- UI needs to be sober
- System must support multiple users access at a time
- Authentication must supported
- Manager can reject leaves for various reasons.

Validation: Ambiguity & Consistency

- Leave system must avail the facility for employee to apply for leave
- Leaves can be of type Planned, Unplanned, Leave without pay
- Employees have to apply all leaves in advance
- Once applied for the leave, employee must get mail to know that you have applies for how many days
- Deduction of leaves from leave balance must be done immediately after approval
- Leave addition also possible in leave balance
- When log record for the employee not found then LWP must get applied automatically
- UI needs to be sober
- System must support multiple users access at a time
- Authentication must supported
- Manager can reject leaves for various reasons.

Requirement Specification

- **System Requirements Specification Document Path :**

  QMS/SDLC/Requirements Management Process /Template

  /S_RMP_SRS.doc

  QMS Link :

  http://cybintranet:8085/QMS%202.0/Documents/Process%20Manual/SDLC/Requirements%20Management%20Process/S_RMP_SRS.doc

Challenges :

- Scope
- Ambiguous understanding of processes
- Communication
- Insufficient input from stakeholders
- Inconsistency within single process by multiple users
- Conflicting stakeholder interests
- Frequent new requirements

Requirement Analysis Benefits

- Application Understanding
- Gap Analysis
- Test Scenarios
- Reduce Rework
- On time Product Release
- Boost the team's productivity
- Maximum Product Test Coverage.

QA Role

- Analyze each and every requirement from FS
- Clarification queries and functionality
- Suggestions to implement the features or any logical issues
- Raise defect or clarification against the FS
- Track the defect or clarification raised against the FS
- Check whether it is updated in the base line document
- Check whether the updated functional specification is available for all stake holders with the latest version
- Check whether the version history is updated with change date and the author name who made changes in the document
- Create high level Test Scenarios
- Create Traceability Metrics
- Sign off from RA phase.

Any Questions?

Thank you!