



Introduction to:

Project Requirements Definition & Management

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Welcome and Introductions

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Presentation Objectives

- **Help develop an understanding of:**
 - **How to develop and define Project requirements**
 - **What Requirements Management is all about**
 - **Specific emphasis on Requirements Traceability**
 - **Common problems and pitfalls encountered when developing and managing requirements**
 - **Impacts if Requirements Definition and Management is not done properly**



Agenda

- Requirements Definition
 - What is Requirements Definition
 - Requirements Alignment, 3-levels
 - General Process Flow
 - Quality Requirements
 - What's a GOOD Requirement **Break**
- Requirements Management
 - What is Requirements Management
 - Requirements Management Activities
 - Traceability
- Common Problems and Pitfalls
- Impact if Not Done Right

Overview

- Presentation purposely broken up into:
 - Requirements Definition is all about establishing a Requirements Baseline
 - Requirements Management is all about maintaining the Requirements Baseline
- Many sources combine Requirements Definition and Management
 - Recommend separating them due to timing and avoiding unnecessary constraints
 - Also aligns better with PAL process



Requirements Definition

This is NOT a PM Job!



What is Requirements Definition?

- The Set of Activities and Tasks that Identifies the Stakeholders, Elicitation techniques, and Collects, Analyzes, Documents, Approves, and Controls all of the requirements for a Project
 - Begins early, typically immediately after Project Concept/S1BA approval
 - Must be planned, scheduled, resourced, and managed to be successful
 - **THIS IS NOT AN AD HOC OR CASUAL EFFORT**
 - The results document the Project-level requirements, not just the RFP requirements



Requirements Alignment, 3-levels

■ First: Project Scope

- Scope: The sum of the products and services to be provided [by the] project, top level WBS
- All requirements must stem from the Project Scope

■ Second: Project Requirements

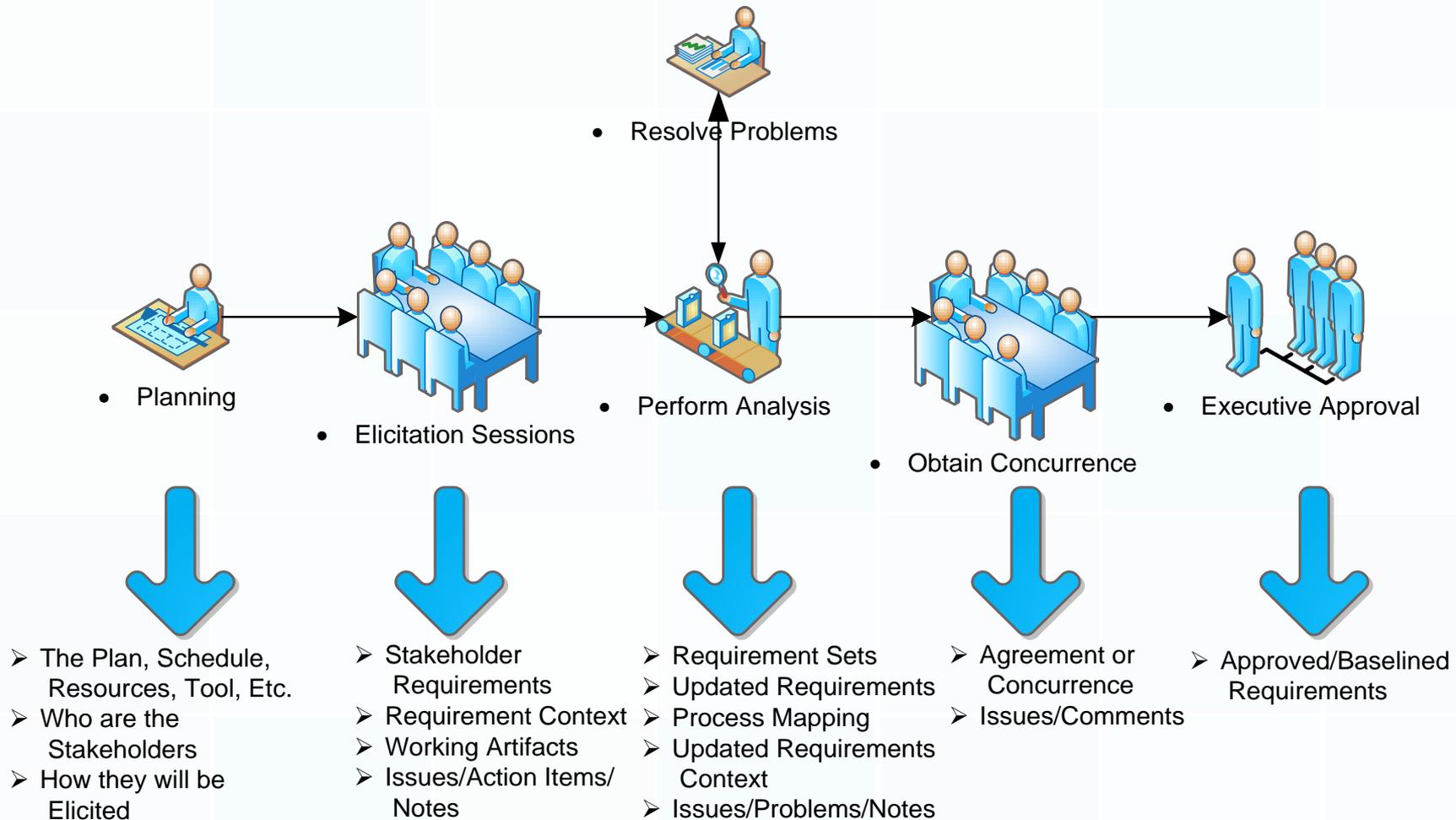
- Consist of mid and low level requirements
- Typically derived through a hierarchical decomposition process, aka elaborated WBS

■ Third: Allocate Requirements

- Assignment of Project Requirements to responsible entities



General Process Flow





General Process Flow

- **Key Predecessor for Performing Requirements Definition**
 - **Planning and scheduling of the activities and tasks**
 - **Identifying the resources, direct and indirect**
 - **Identifying Project resources relatively easy but estimates must be made for Stakeholders supporting the effort**
 - **Manage the effort**
 - **Activity tracking, progress reporting, status updates, management and artifact reviews, etc. should be performed to ensure the effort stays on track**
 - **This effort has a common tendency to slip and result in a poor requirements document**



General Process Flow

■ Elicit Stakeholder Requirements

- All Stakeholders must be identified
- An elicitation approach must be determined for each Stakeholder and Stakeholder Class/Group
 - Best way to elicit requirement from one Stakeholder may NOT be the same as another Stakeholder
- Schedule and conduct elicitation sessions
 - Document context of the requirements with the requirements
 - Capture all documentation, word, pictures, flow charts, etc.
 - Capture commonly missed areas: constraints, M&O scenarios, usability, etc.
- Do NOT attempt to perform analysis during elicitation



General Process Flow

- Analyze Stakeholder Requirements
 - Analyze the complete set of requirements
 - Analyze subsets defined around a common requirements context
 - Focus on subsets of related requirements and then individual requirements
 - Standard items such as **readability**, correctness, consistency, completeness, accuracy, testability, etc.
 - Verify scope and need for all requirements
 - Resolve problems with Stakeholders
 - Obtain concurrence that requirements and context is correct and complete



General Process Flow

- **Approve Stakeholder Requirements**
 - **Allocate** and obtain Project Executive Management approval of the requirements and the allocation
 - Establishes the Project Requirements Baseline
 - The commitment between the Project, Executive Management and the Stakeholders on what will be delivered and/or provided
 - Place the approved (Project Baseline) requirements under formal Configuration/Version Control
- **Project Requirement Definition is complete and Requirements Management begins**
 - Similar mini-efforts may be done for Change Requests per the Change Management Plan



Requirements Quality

- What are “Quality” Requirements?
 - 1. “Quality” Requirements implies that the documented requirements have a high degree of correctness, completeness, consistency, accuracy, etc.
 - 2. “Quality” Requirements **COMMUNICATE** the Stakeholders **needs** to potential vendors so that both the State and vendors have the same understanding of what is required
- Quality is Built-in, NOT Added-in
 - The process used and artifacts produced are the **Foundation** for understanding and communicating the Shared Vision/View of what is needed



Exercise and Break

■ Time TBD

What's a GOOD Requirement?

- **Two main perspectives**

- **If the goal is Project success then:**

- A GOOD requirement is any requirement that communicates the business needs to the contractor and the contractor understands these needs, aka the semantics/meaning of words

- **If the goal is enforceability of a contract, then:**

- A GOOD requirement is specific, properly worded, measureable, objective, etc., aka the syntax/structure of words

- **Both goals are not always achievable**

What's a GOOD Requirement?

- **Recommendation for GOOD Requirements**
 - When developing requirements, focus on the semantics to ensure the potential bidders understand what is required
 - Then, “tighten-up” your requirements to ensure they are enforceable, following a well defined syntax
 - Bridge the gap using narrative information to help bidders and a contractor understand what is required/needed

What's a Good Requirement?

■ The following is an example from an RFP

1. Training and Testing Specifications (TTS)

1A. Add New Learning Domain

This process allows the user to add a new Learning Domain (LD).

| ID | Category | Business Requirement | Mandatory Scored (MS) / Desirable (D) |
|------|-------------------------|--|---------------------------------------|
| 1A.1 | Add New Learning Domain | The system shall allow user to enter the LD number, LD title, Learning Need (LN), Learning Objectives (LO) and LO numbers when the user selects add new LD. | MS |
| 1A.2 | Add New Learning Domain | The system shall display the EO/LO and allow user to select the applicable courses for each EO/LO when the user selects link to courses (e.g. RBC, PC832, MOD III, MOD II, MOD I, SIBC, and Requal.) | MS |
| 1A.3 | Add New Learning Domain | The system shall require the user to enter the effective date and confirm that he/she wants to save the new LD when the user selects to save. | MS |
| 1A.4 | Add New Learning Domain | The system shall add the date created with the current date when the user selects save. | MS |
| 1A.5 | Add New Learning Domain | The system shall create a Learning Domain record after the date created is added. | MS |

What's a Good Requirement?

■ This is an improved version, not final

1. Training and Testing Specifications (TTS)

1A. Add New Learning Domain

This process allows the user to add a new Learning Domain (LD). In order to add a new learning domain, the users need to assign a unique number for the LD, give it a title, and associate learning needs and objectives for the new topic. For each learning objective (LO), the user needs to be able to associate and existing, active, and available course that will satisfy the LO; this will be used to identify all courses needed to complete the new learning domain. All LDs must have an effective date for when the new LD becomes effective. Once the user has created the new LD and explicitly saved the LD with all other required information, the system will create the new LD records.

| ID | Category | Business Requirement | Mandatory Scored (MS) / Desirable (D) |
|------|-------------------------|--|---------------------------------------|
| 1A.1 | Add New Learning Domain | The system shall allow user to enter the LD number, LD title, Learning Need (LN), Learning Objectives (LO) and LO numbers. | MS |
| 1A.2 | Add New Learning Domain | The system shall display the LO and allow user to select the applicable courses for each LO. | MS |
| 1A.3 | Add New Learning Domain | The system shall require the user to enter the effective date for the overall LD. | MS |
| 1A.4 | Add New Learning Domain | The system shall record the date when the user saves the LD. (Missing, what if not saved?) | MS |
| 1A.5 | Add New Learning Domain | The system shall create a Learning Domain record after the date created is added. | MS |

What's a Good Requirement?

■ Point is?

- Let context help you in explaining what is needed.
- Requirements themselves still need to be complete, testable, etc.
- Perform requirements analysis to identify holes and/or gaps in your requirements

■ Note that Use Cases are even more complete as context is buried throughout the Use Cases



Requirements Management

This is NOT a PM Job!



What's Requirements Management?

■ ISO/IEEE 29148 Standard Definition

- “[The] activities that ensure requirements are identified, documented, maintained, communicated and traced throughout the life cycle of a system, product, or service”
 - The recommended approach does not include the initial Requirements Identification/documentation as part of Requirements Management

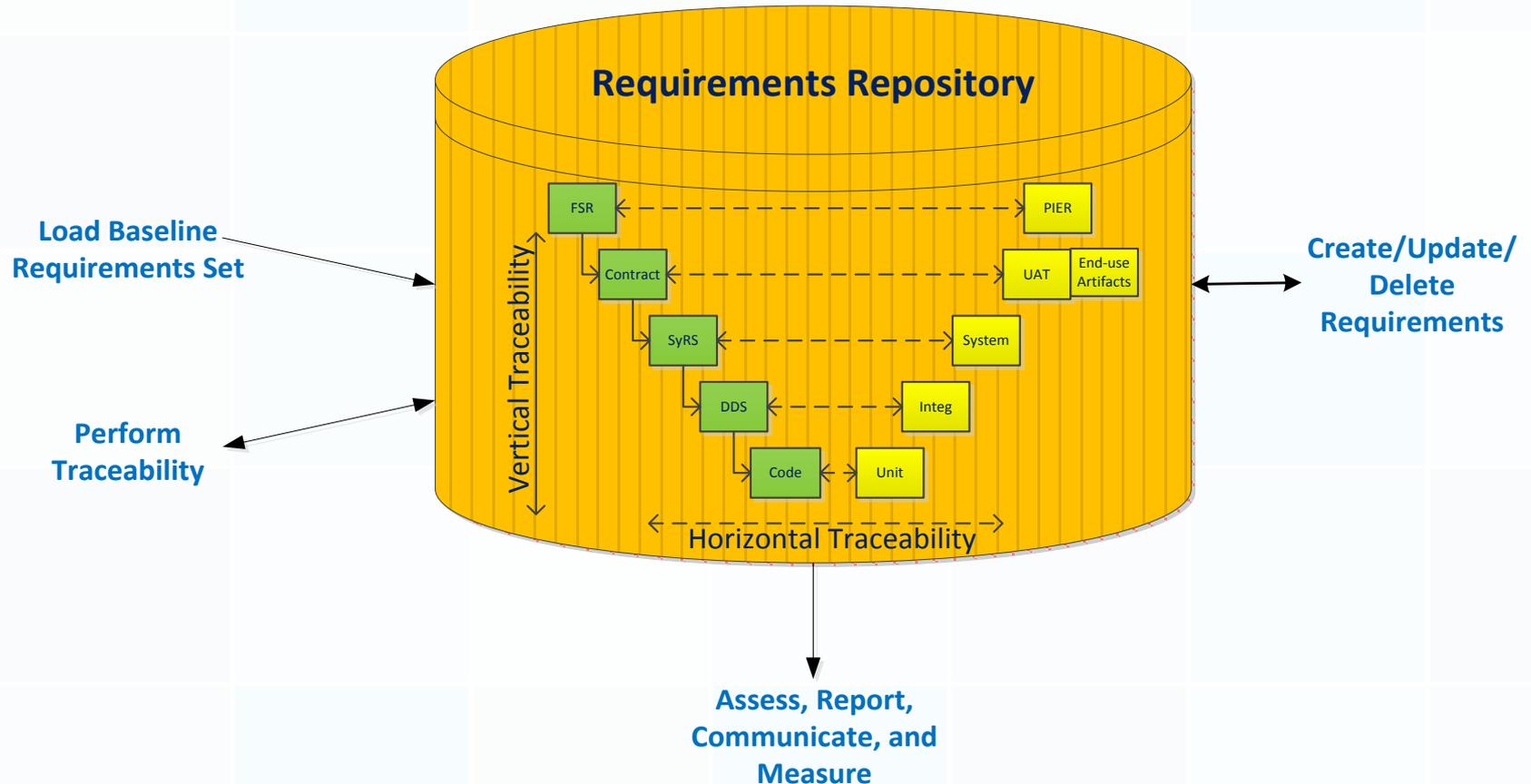
■ Requirements Management then deals with ...

- Capturing/Documenting, maintaining, communicating, and tracing requirements throughout the project life cycle



What's Requirements Management?

Requirements Management Process World





Requirements Management Activities

- Key Predecessors for Performing Requirements Management
 - Planning and scheduling the activities and tasks that will be Performed
 - Includes specifying the “**Level of Traceability**” and how Requirements Management will be performed and integrated into the other PM Processes
 - Identifying direct and indirect resources involved
 - Manage the Effort
 - Ensuring critical integration with Change Management
 - Turnaround times for Requirements Management tasks are often very short so as to not impact other efforts
 - Issues, such as traceability gaps, must be resolved quickly

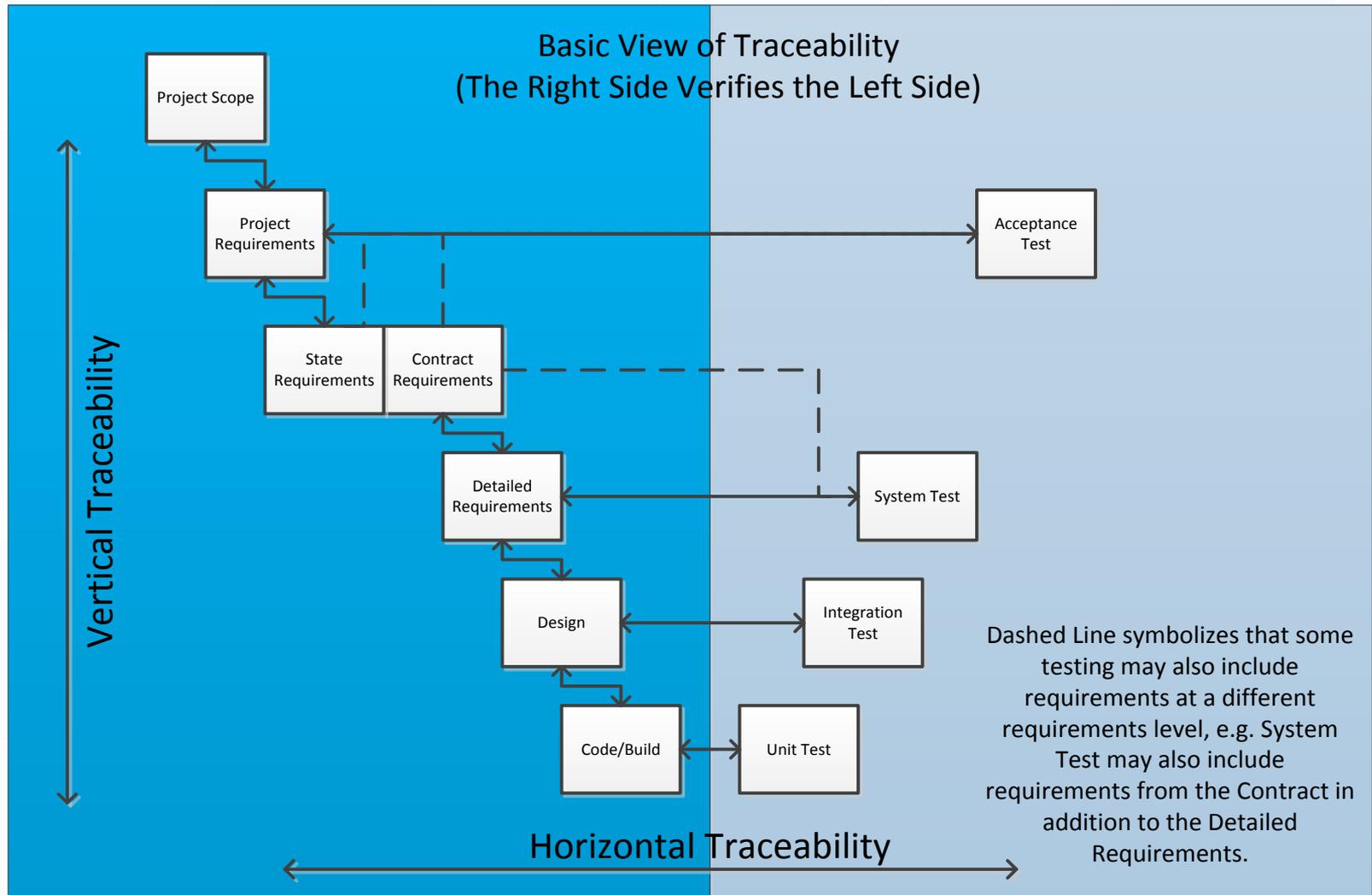


Requirements Management Activities

- **Establish Controlled Requirements Repository**
 - Includes both establishing the repository and creating the Project Requirements Baseline(s)
- **Performing Requirements Traceability & Analysis**
 - Performed incrementally as requirements are captured, both Vertical and Horizontal
 - Maybe, and often is, performed by multiple teams
- **Managing Requirements Changes**
 - Assessing impacts of proposed changes, capturing approved changes, and communicating the changes
- **Requirements Metrics and Reporting**



Requirements Traceability





Requirements Traceability

- Vertical Traceability performed incrementally as requirements are approved at each level
 - Mapping relationships between requirements at different levels
 - E.g., Project Requirements ↔ Contract ↔ Requirements Deliverable ↔ Design Deliverable
- Horizontal Traceability performed as soon as corresponding requirements level baselined
 - Mapping relationships between requirements and tests that verify the requirements
 - E.g., Project & Contract Requirements ↔ User Acceptance Test, Design ↔ Integration Test



Common Problems and Pitfalls

- **Lack of Planning**
 - Not identifying level of traceability to be performed
- **Insufficient Tools**
 - MS Excel is generally insufficient for traceability
- **Inexperienced Resources Performing RM**
 - Extremely Difficult to Learn On-the-Job
- **Identifying Requirements at too high of a Level**
 - Very common as it greatly simplifies traceability but loses all benefits of performing Requirements Management
- **Change Management bypasses RM**
 - Impacts of Proposed Changes Not Understood until After Approved
- **RM activities performed late or not at all**



Impacts if Not Done Right

- **Incorrect Expectations Between Stakeholders, Project, and Vendor(s)**
 - Failure to communicate
- **Failure to Identify and Deliver All Required by the Project Scope Statement**
 - Failure to identify and trace
- **Inability to Know when Items, Functionality, etc. is Dropped or Forgotten until the End of the Project**
 - Failure to trace and/or manage changes
- **Inability to Know if Everything was Tested or Verified and when Testing is Complete**



Impacts if Not Done Right

- Failure to First Identify Project Requirements Leads to unclear Liabilities for State
 - Liabilities appear during requirements allocation and must be addressed in RFP
- Poor RFP requirements results in an increased proposed cost due to risk
 - Think vague requirements beneficial - **WRONG**
 - Careful vendors typically protect themselves by incorporating assumptions or other statements in their proposal



Summary

- Write Requirements to **Communicate** the Stakeholders Needs
 - Plan your approach
 - ID Stakeholders and techniques, elicit, analyze, resolve, validate, and approve
 - Work top down from the Scope to Project Requirements and then allocate responsibilities
- Manage Requirements through the Lifecycle
 - Plan your approach
 - Integrate approach with PM processes
 - Let the Requirements Repository be the record-of-fact
 - Perform traceability as complete as possible



Questions



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CPD moving to the CA-PMO

■ Resources (Current location)

■ CPD's Home page

<http://www.cio.ca.gov/cpd/default.asp>

■ Consulting landing page

<http://www.cio.ca.gov/cpd/consulting.asp>

■ CPD Project Plans and Tools

<http://www.cio.ca.gov/cpd/plansandtools.asp>