HOW TO SCOPE A PROJECT
HOW TO PLAN A PROJECT
PROJECT COST MANAGEMENT

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Overview

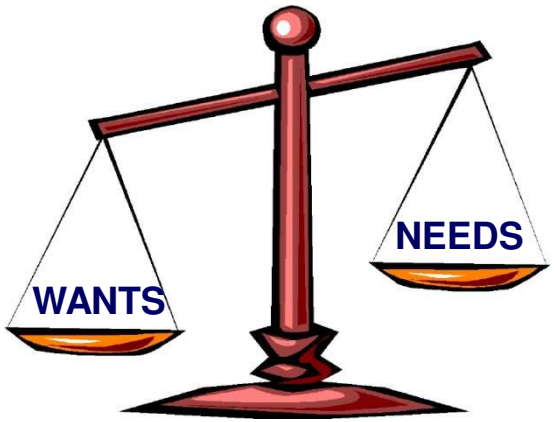
- Managing client expectations
- Gathering requirements
- Monitoring Scope Change
- Writing an effective Project Overview Statement (POS)
- Project planning considerations, activities, and deliverables
- Project Definition Statement
- The role of the client in the planning
- Work Breakdown Structure
- Estimating task duration
- Estimating resource requirements
- Estimating cost
- Writing an effective project proposal
- Challenges & Best Practices

Defining Project Boundaries

- Project scope is the delineation of what a project includes and what it doesn't.
  - Scope is the sum of the products, services, and results to be provided as a project.
- A scope statement describes a project's boundaries.
- Project scope can derive from the project objectives, deliverables, requirements, and specifications.

Client Wants vs. Client Needs Dilemma

- What your client wants may not be what your client needs.
- Project manager's job is to make sure that what they want is what they need and that what they need will be delivered.



- Following requirements gathering and documentation
  - Select the best-fit project management life cycle
  - Develop the Work Breakdown Structure (WBS) that defines the work to be done to deliver those requirements.

Management Lessons from Skipper – What the client wants

Who is Our Client?

Good Client

- Know what they want
- Know what it takes to deliver
- Work towards best solution
- Easy to work with
- Meaningfully involved

Not So Good Client

- Not sure of what they want
- Constantly change their mind
- Not interested in solving project problems
- Hard to satisfy
- Not very involved

Project manager & team must satisfy the needs of <u>both</u>.

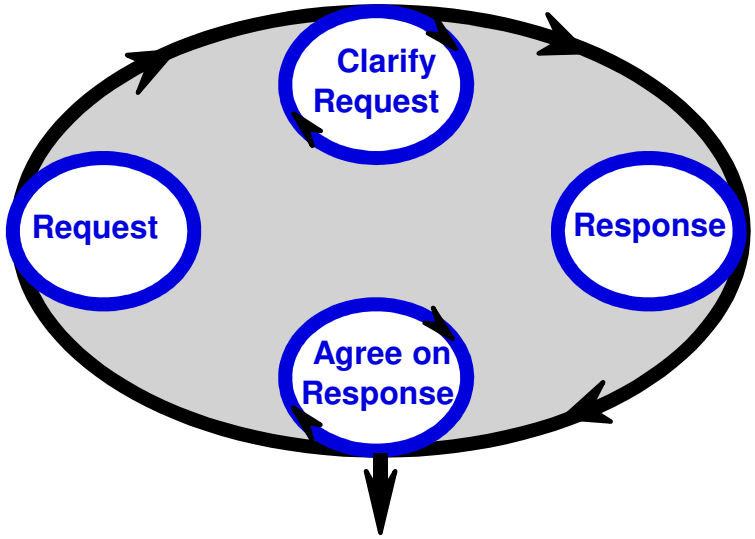
Tips to Managing Client Expectations During Scoping

- Make sure you understand what your client wants/needs/expects
- Make sure the client understands what you will do
- Assure yourself that what your client wants is what your client needs
- Actively include your client in scoping the project
- Put yourself in the shoes of your client
- Meaningfully involve your client wherever possible
- Keep your client informed of project status

Project Scoping

Typical topics to discuss on project scoping meeting:

- Description of current state
- Description of problem or business opportunity
- Description of end state
- Requirements definition and documentation
- Discussion of the gap between current and end state
- Choose best-fit project management approach to close the gap
- Draft and approve the Project Overview Statement (POS)
- Deliver Requirements Document



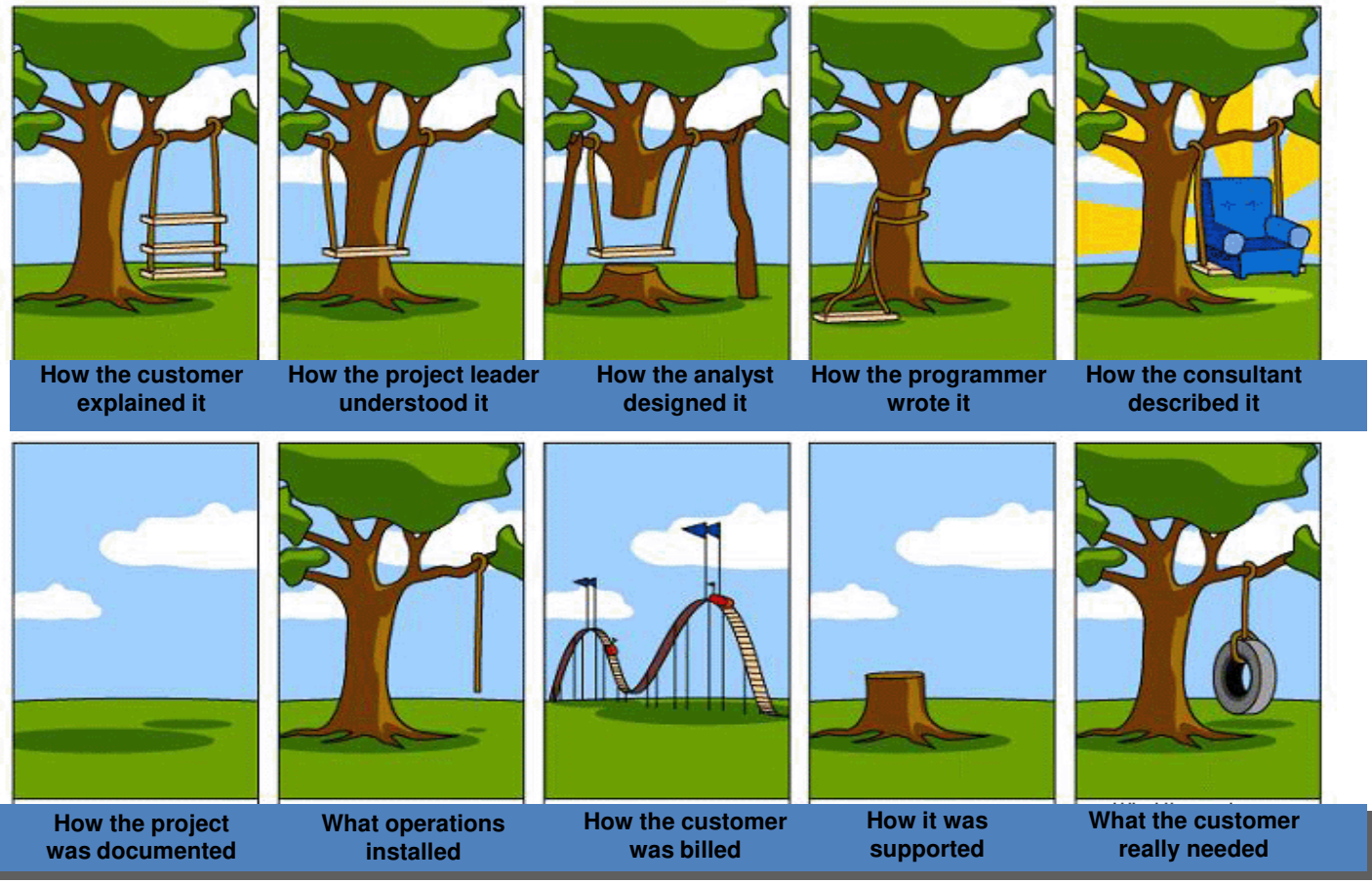
Scope Decomposition

- Scope can be elaborated by
  - using a scope statement to identify the major deliverables associated with the project and the acceptance criteria for each deliverable.
  - decomposing it into lower levels of detail using a work breakdown structure (WBS - later).
  - identifying the themes of the project in an agile charter, roadmap, or as part of the product hierarchy.

Exercise: Painting the House

What Are Requirements?

A requirement is something the product/project should do/produce or a quality that it must have.

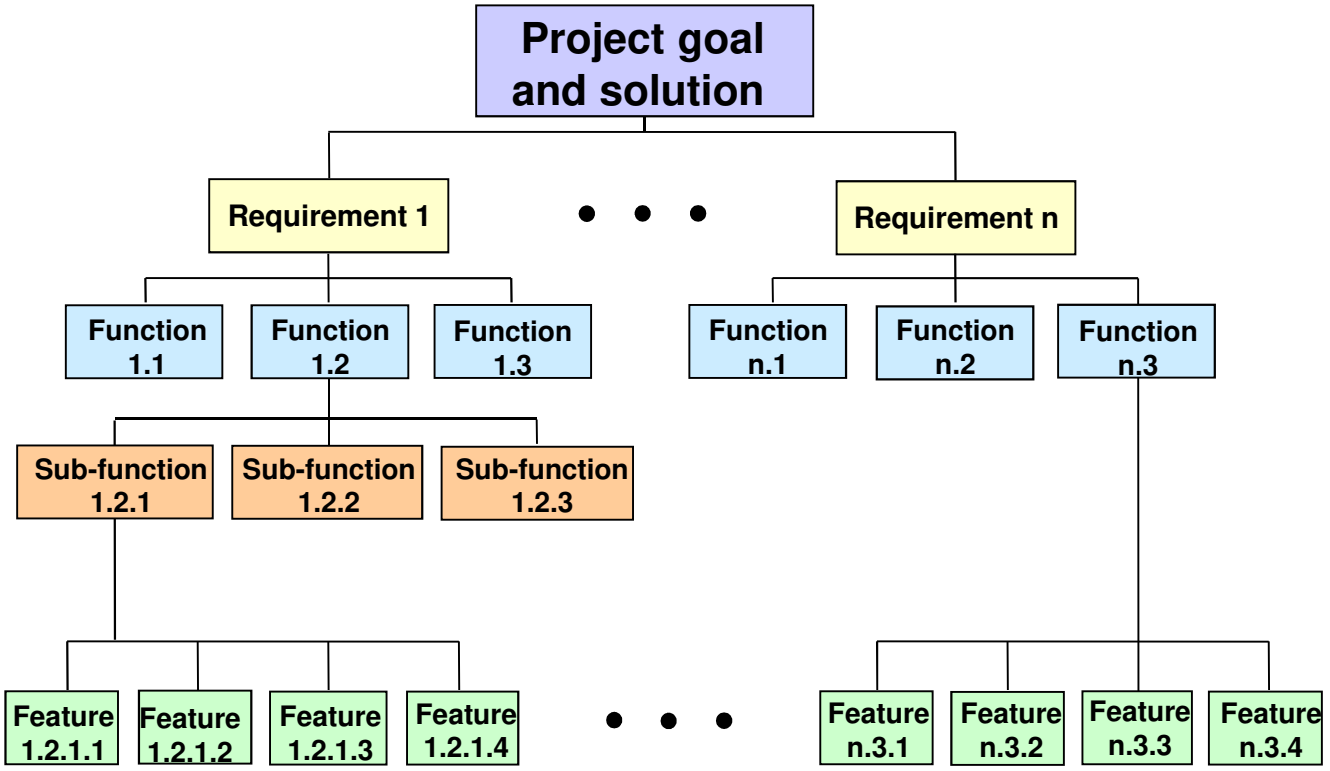


Types of Requirements

- Functional
  - What the product or service must do
- Non-functional
  - Characteristics or qualities that make the product or service attractive, usable, fast, or reliable
  - Are usually associated with performance criteria
- Global
  - Highest level of requirements within the system or product (general requirements)
- Product/project constraints
  - Requirements that, on the surface, resemble design constraints or project constraints

Building the Requirements Breakdown Structure

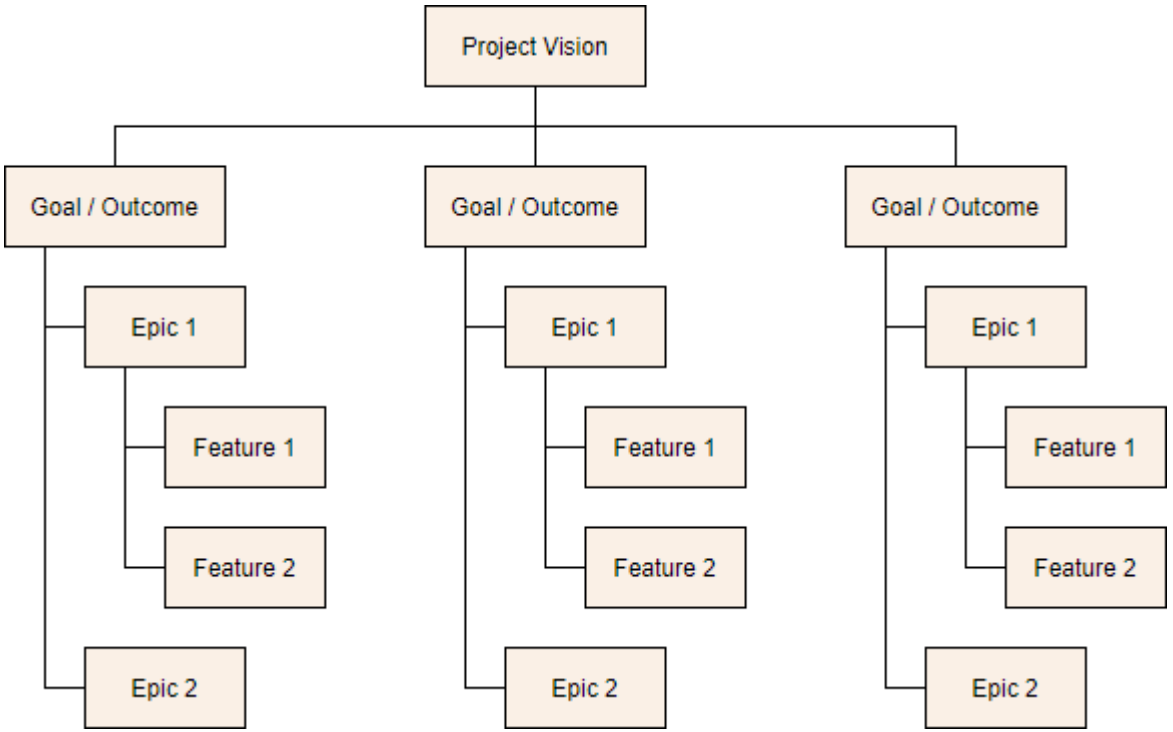
- Useful as an aid in helping decide which PMLC model is the best fit for the project.



Characteristics of the RBS

- **The RBS is intuitive and most meaningful to the client**
- The RBS is a deliverables based approach
- The RBS is consistent with the PMI PMBOK
- The RBS remains client facing as long as possible into the planning exercise
- Provides the input needed to choose the best fit PMLC Model

Example: Agile Requirements Breakdown Structure



Verifying Attributes

- Completeness
  - Are the requirements essentially complete or are some missing?
- Clarity
  - Are the requirements clear? Are they ambiguous or imprecise?
- Validity
  - Do the requirements reflect client intentions?
- Measurability
  - Does the requirement have a fit criterion (measurement)?
- Testability
  - Can the criterion be used to test whether the requirement provides the solution?
- Maintainability
  - Will the implementation be difficult or easy to understand or maintain?
- Reliability
  - Can the reliability and availability requirements be met?

Verifying Attributes (continued)

- Look and Feel
  - Have all human factors been met (GUI, ergonomics, etc.)?
- Feasibility
  - Can the requirements be implemented?
- Precedent
  - Has a requirement similar to this been implemented before?
- Scale
  - Are the requirements large and/or complex?
- Stability
  - How often and to what degree might the requirements change?
- Performance
  - Can the performance be met on a consistent basis?
- Safety
  - Can the safety requirements be fully demonstrated?
- Specifications
  - Is the documentation adequate to design, implement and test the system?

The Challenge of Requirements Management

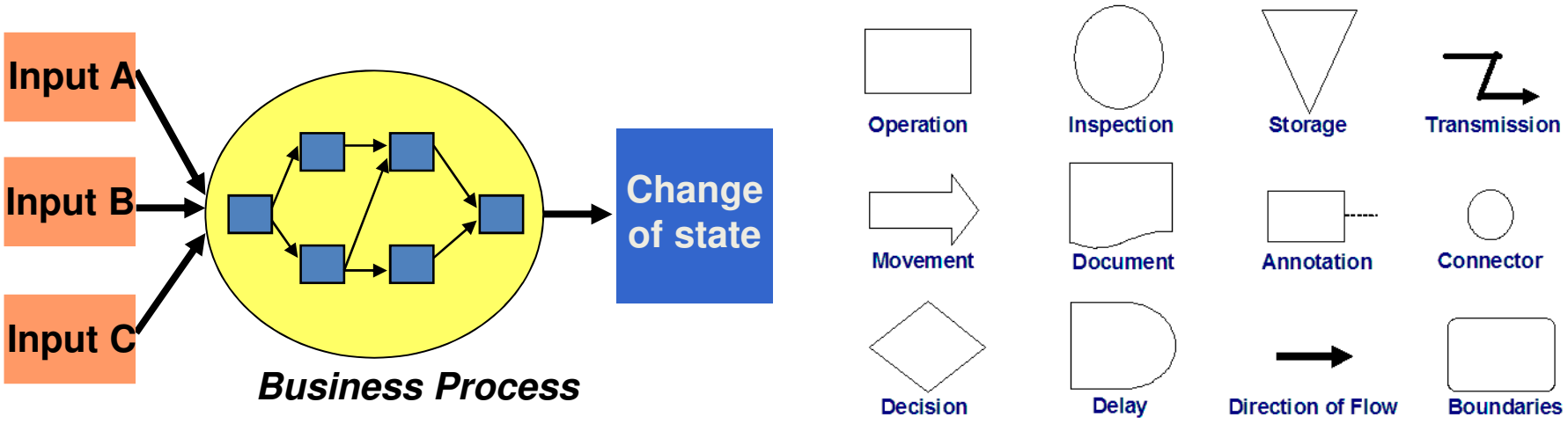
- Not always obvious
- Come from many sources
- Not always easy to express clearly in words
- Many different types of requirements at different levels of detail
- Number of requirements can become unmanageable if not controlled
- Requirements are not independent and may create conflict situations
- Many interested and responsible parties
- Change as a result of changing business conditions
- Can be time-sensitive

Approaches to Requirements Gathering

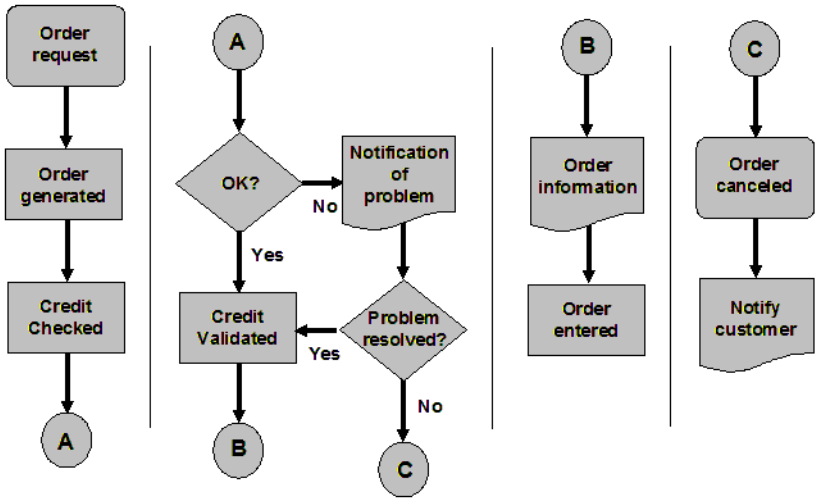
- Facilitated Group Session
- Interview
- Observation
- Requirements Reuse
- Business Process Diagramming
- Prototyping
- Use Cases

What is a Business Process?

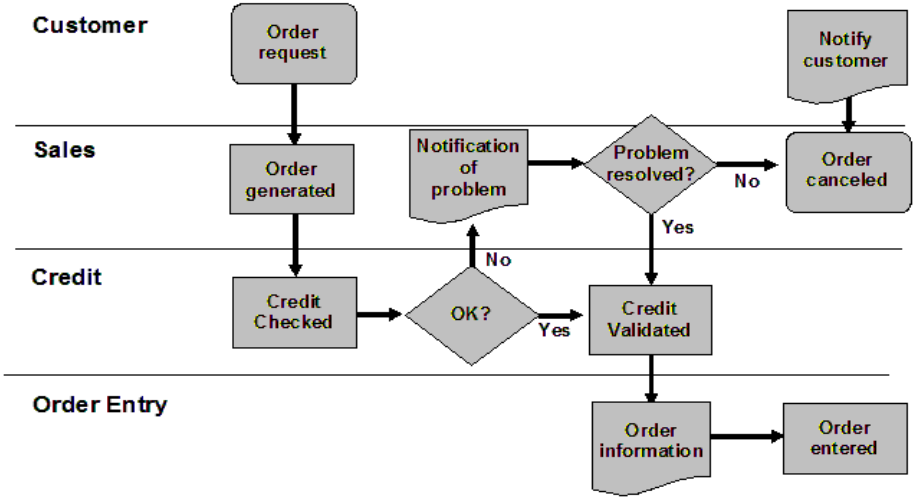
- A business process is a collection of activities that take one or more inputs from one or more different sources and produces a change of state that delivers business value.
- Standard flowchart symbols can be used.



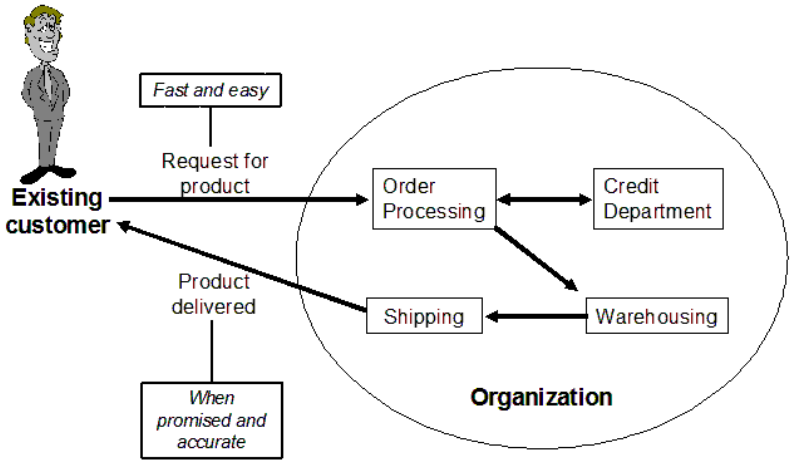
Business Process Diagram Formats



The top-down, left-to-right format



The swim lane Format



Context diagramming process

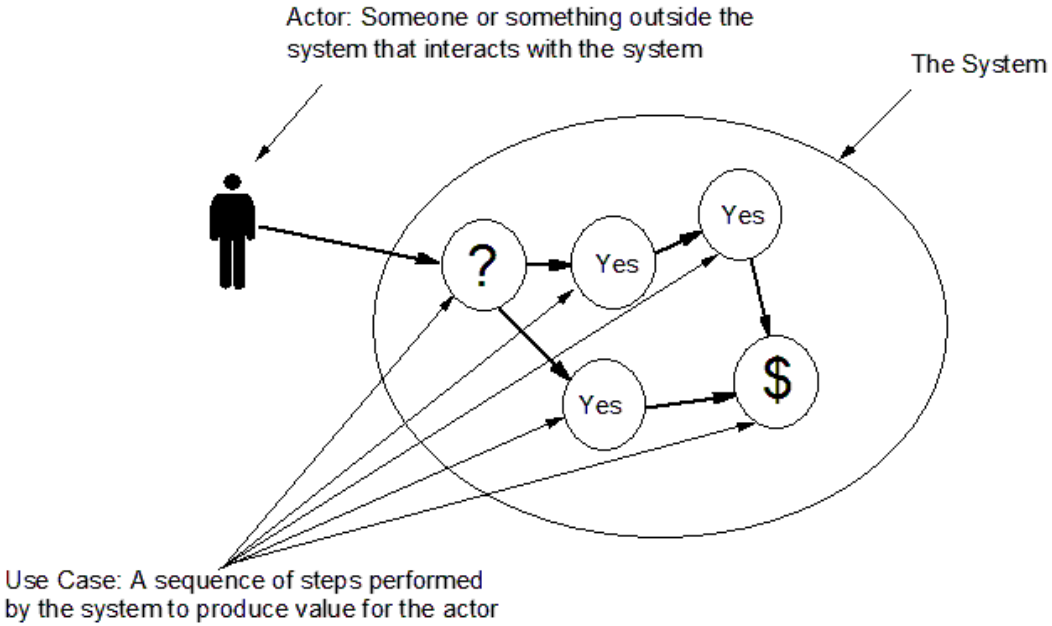
Prototyping

- It is usually hard to visualize from narrative description.

- Clients can comment on a mock-up of a solution and give the developers more insight into what constitutes an acceptable solution.
  - Storyboard versions
  - Production versions

Use Cases

- Tell the story of how the solution will operate in the mind of the client
- A use case diagram is a simple way to describe how an individual interacts with a business process.



Moving Targets of Completion

- In uncertain and rapidly changing environments projects face the situation that a “good enough for release” or “done” goal may be subject to change.
  - The definition of the project goal being delivered or “done” is constantly moving.
  - Project teams track the planned rate of project goal achievement relative to the rate of progress toward completion.
  - The longer the project takes to complete, the further the project goal of “done” is likely to move. This is sometimes referred to as “done drift.”

- In a more stable environment projects often face “scope creep” - additional scope or requirements are accepted without adjusting the corresponding schedule, budget, or resource needs.
  - Use a change control system where all changes are evaluated for the potential value they bring to the project and the potential resources, time, and budget needed to realize the potential value.
  - Then present the changes to the project governance body, product owner, or executive sponsor for formal approval.

Monitoring New Work and Changes

- Change is inevitable almost in any project!
  - In adaptive projects this is expected.
- The project manager works with the product owner to manage expectations around adding scope, the implications to the budget, and the availability of project team members.
- Scope changes can add to uncertainty; therefore, any change requests should be accompanied by an evaluation of any new risks that are introduced due to the addition to or change in scope.
- The changes are also communicated to the appropriate stakeholders.

Purpose of the Project Overview Statement

- A one-page description that is:
  - A general statement of the project
  - A reference for the planning team
  - A decision aid for the project
  - To get management approval to plan the project
  - A communications tool among the project manager, their development team, the customer, and the senior management
- Often known by other terms, like the Vision or Mission of the project
- Non-traditional POS Uses
  - Can help understand a project even if not starting from scratch
  - Inheriting a project from someone else
  - Using a POS as a suggestion to start an unsolicited project
  - Use a POS as a reference to guide your team during development

Example POS

- Problem/Opportunity
- Project Goal
- Project Objectives
- Success Criteria
- Assumptions/Risks/Obstacles

PROJECT OVERVIEW STATEMENT	Project Name	Project No.	Project Manager
	Office Supply Cost Reduction		PAUL BEARER

Problem/Opportunity

Our cost reduction task force reports that office supply expenses have exceeded budget by an average of 4% for each of the last three fiscal years. In addition an across the board budget cut of 2% has been announced and there is an inflation rate of 3% estimated for the year.

Goal

To implement a cost containment program that will result in office supply expenses being within budget by the end of the next fiscal year.

Objectives

1. Establish a departmental office supply budgeting and control system.
2. Implement a central stores for office and copying supplies.
3. Standardize the types and brands of office supplies used by the company.
4. Increase employee awareness of copying practices that can reduce the cost of meeting their copying needs.

Success Criteria

1. The total project cost is less than 4% of the current year office supply budget.
2. At least 98% of office supply requests are filled on demand.
3. At least 90% of the departments have office supply expenses within budget.
4. No department office supply expense exceeds budget by more than 4%.

Assumptions, Risks, Obstacles

1. Central stores can be operated at or below the breakeven point.
2. Users will be sensitive to and supportive of the cost containment initiatives.
3. Equitable office supply budgets can be established.
4. Management will be supportive and consistent.
5. The existing inventory control system can support the central stores operation.

Prepared By	Date	Approved By	Date
Olive Branch	9/2/04	Del E. Lama	9/3/04

Components of the Project Overview Statement - 1

- Problem/Opportunity
  - A problem needing resolution or an untapped business opportunity.
  - A statement of fact that everyone would agree to. It stands on its own.
  - This is the foundation on which the proposed project will be based.
- Project Goal
  - A one or two sentence statement of how you intend to address the stated problem/opportunity.
  - A scoping statement that bounds the project you are proposing.

Components of the Project Overview Statement - 2

- Project Objectives
  - 5 or 6 brief statements that further bound your project goal statement.
  - From these statements it is clear what is in and not in the proposed project.
  - These statements might identify major project deliverables.
  - These statements form a necessary and sufficient set of objectives.

- Project Success Criteria
  - Quantifiable and measurable, and, if possible, expressed in terms of business value
    - Increase Revenue
    - Avoid Costs
    - Improve Service

Components of the Project Overview Statement - 3

- Assumptions, Risks and Obstacles
  - Technological
    - New to the company
    - Obsolescence
  - Environmental
    - Management change
    - Staff turnover
  - Interpersonal
    - Working relationships
  - Cultural
    - Fit to the company
  - Causal Relationships
    - Will the solution solve the problem
- Attachments
  - Risk Analysis
  - Financial Analyses
    - Feasibility studies
    - Cost/benefit analysis
    - Breakeven analysis
    - Return on investment

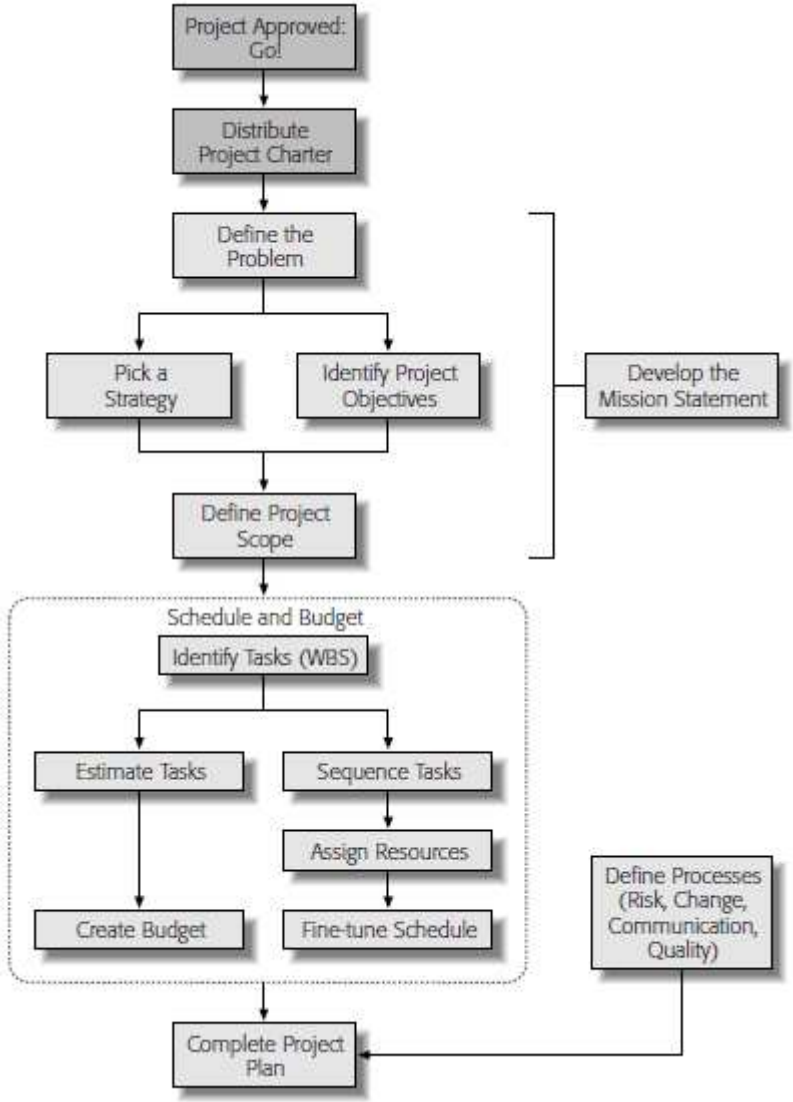
Gaining Approval to Plan the Project

Expected Review Questions from Management

- How important is the problem or opportunity to the organization?
- How is the project related to our critical success factors?
- Does the goal statement related directly to the problem or opportunity?
- Are the objectives clear representations of the goal statement?
- Is there sufficient business value as measured by the success criteria to warrant further expenditures on this project?
- Is the relationship between the project objectives and the success criteria clearly established?
- Are the risks too high and the business value too low?
- Can senior management mitigate the identified risks?

Project Planning

- A project plan acts as the road map to your destination.
  - Why you're doing the project
  - How you're going to do it.
- Project planning is a process, not a one-time deal.



Project Planning Considerations

- Cost estimating and budgeting
- Technology strategies scheduling
- Specification of deliverables
- Resource usage estimating
- Delineation of organizational structure
- Information and control system sign
- Risk Identification

- The importance of planning
  - Planning Reduces Uncertainty
  - Planning Increases Understanding
  - Planning Improves Efficiency

Project Planning Activities

- Validation & prioritization of requirements
- Review POS for clarity
- Overview of the project planning approach to be taken
- Create the complete Work Breakdown Structure
- Creation of the dependency diagram
- Estimate task duration and resource needs
- Identification of project risks and mitigation plans
- Construct project network diagram
- Determine critical path
- Revise and approve project completion date
- Finalize resource schedule
- Gain consensus on the project plan

Who's Involved in the Planning Process?

- Project manager
- Client
- Project team

Project Planning Deliverables

- Write the Project Overview Statement
- Project Definition Statement
- Work Breakdown Structure (WBS)
- Project Dependency Diagram
- Task duration estimates
- Resource Requirements
  - Resource availability
  - Resource assignments
- Initial Project Schedule
- Final Project Schedule
- Project plan
- Project Notebook - documentation
- Project proposal
  - Background
  - Objective
  - Overview of approach to be taken
  - Detailed statement of work
  - Time and cost summary
  - Appendices

Writing a Project Definition Statement

Project Definition Statement is a detailed project definition from the project team's point of view

- Same five parts as the POS
- A more detailed project definition from the team's perspective
- Several pages long
- To make sure the team has a common understanding of what the project is all about

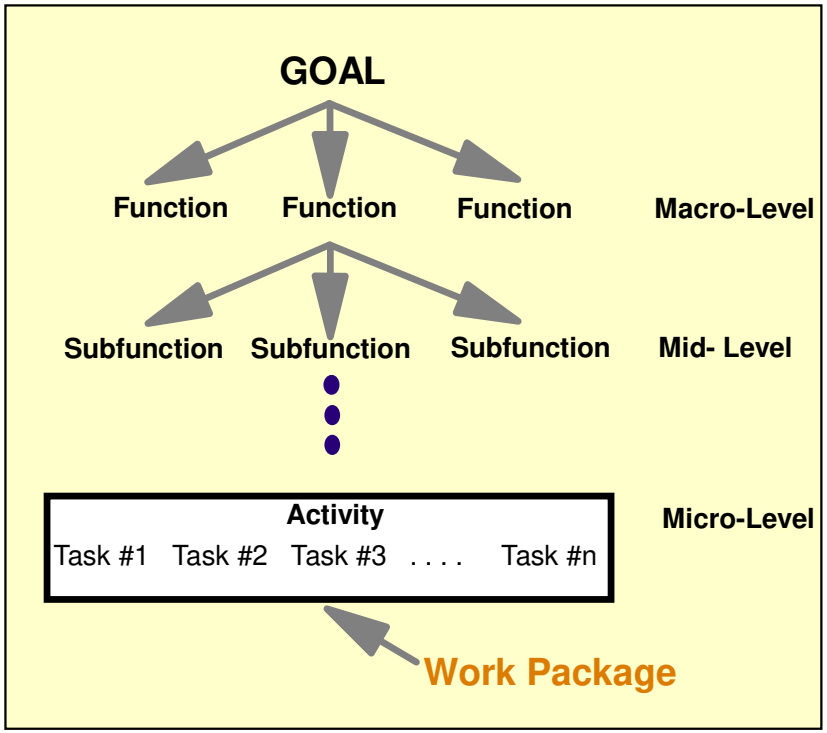
The Role of the Client in the Planning Meeting

- The client or their representative must be present.
- Validation of requirements and POS
- Prioritizing requirements (MoSCoW)
  - Must Haves
  - Should Haves
  - Could Haves
  - Wouldn't It Be Nice to Haves
- Generating and validating the WBS
- Commitment of resources from the client
- Agreement on the project plan
- Client must own the project plan
- Meaningful involvement by the client

Definition of the Work Breakdown Structure

- The Work Breakdown Structure (WBS) hierarchical decomposition of the total scope of work to be carried out by the project team to accomplish the project objectives and create the required deliverables.

- Why is the WBS Important?
  - Thought process tool
  - Architectural design tool
  - Planning tool
  - Project status reporting tool



How to Build a WBS

- Top-Down Approach
  - Begins at the goal level and partitions work down to lower levels
  - Team Approach
  - Sub-team Approach
- Bottom-Up Approach
  - More like a brainstorming session

- When
  - The client didn't participate in building the WBS like you expected.
  - You have an uncomfortable feeling
  - Scope change is likely to be a big part of the project

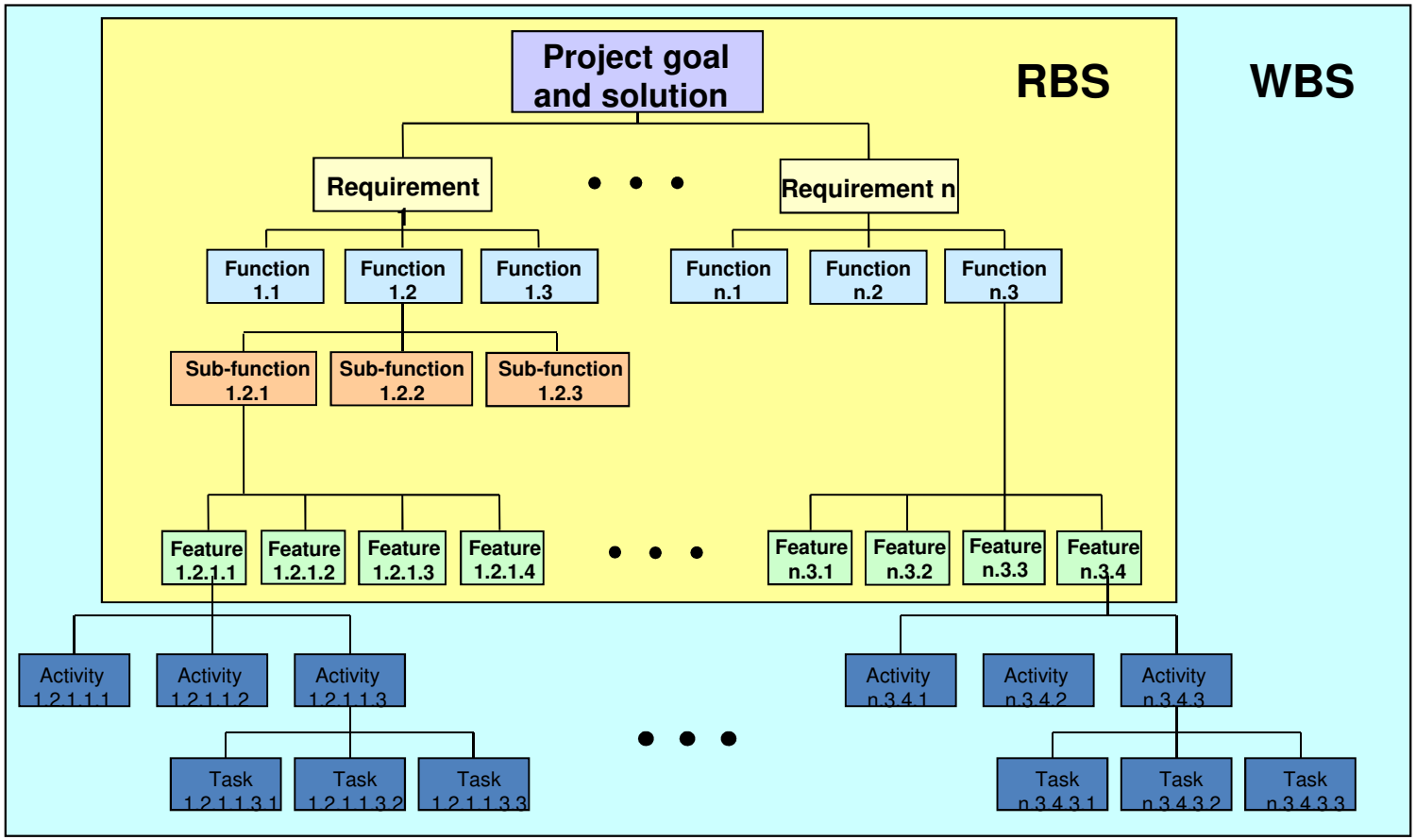
Choose a PMLC model that accommodates frequent change

WBS Completion Criteria

- Can I determine activity status at any point in time?
- Is there a defined start and end event?
- Does the activity have a deliverable?
- Can I easily estimate time and cost?
- Is the activity duration within acceptable limits?
- Can the activity work be done without interruption?

- Exceptions
  - Stopping Before Completion Criteria Are Met
  - Decomposing Beyond Completion of the Criteria
    - Short duration projects
    - High risk activities
    - Large duration variance

RBS is a subset of the WBS



Perspectives: RBS vs. WBS

RBS

- What?
- Customer's perspective
- An acceptable solution for a particular problem or product underdeveloped
- Can be prioritized into an implementation plan

WBS

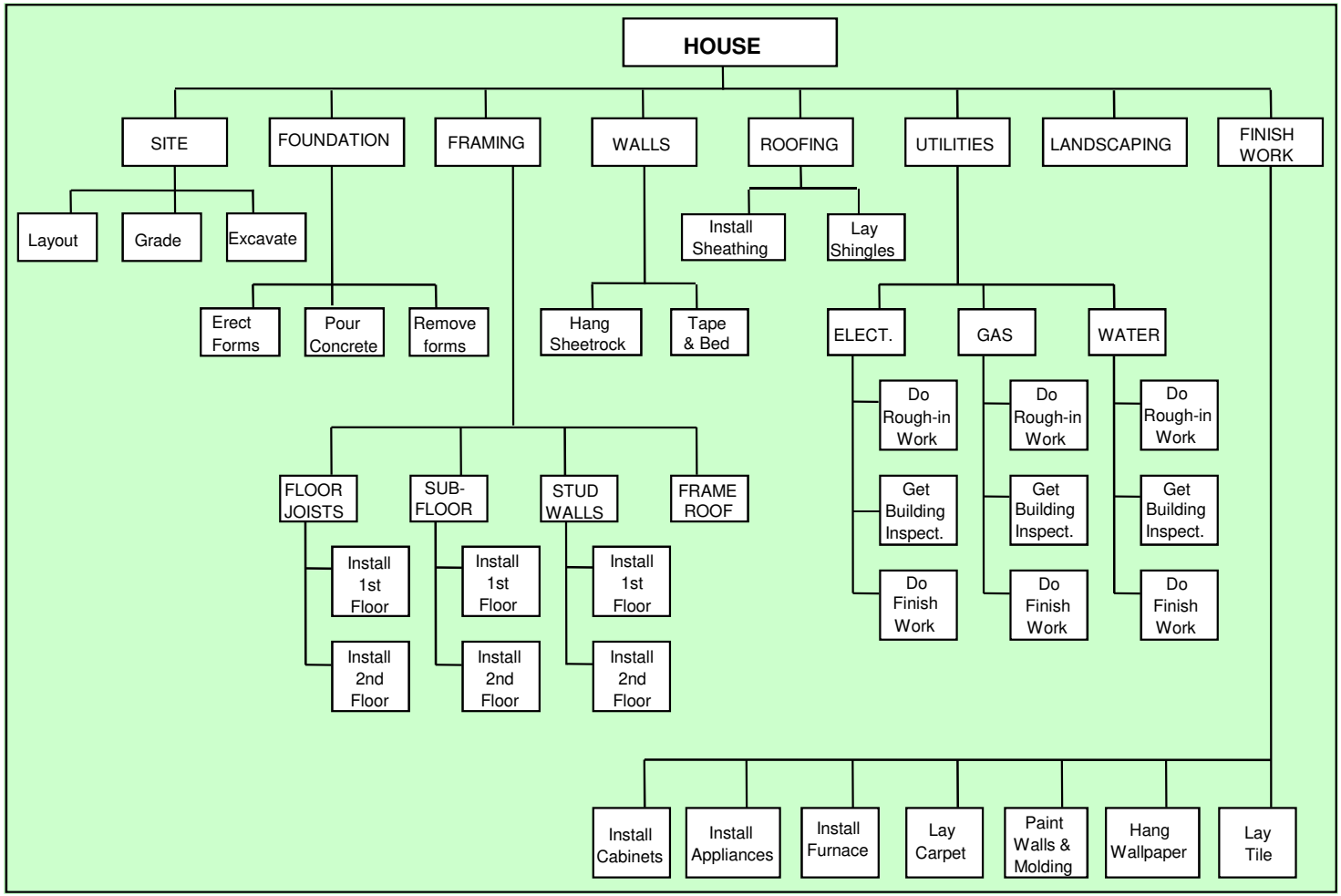
- How?
- Project team's perspective
- Deliverable-oriented
- All the work contained is to be identified, estimated, scheduled, and budgeted

Approaches to Building the WBS

- Deliverables-based structures
  - Physical decomposition
  - Functional decomposition
- Task-based structures
  - Design-Build-Test-Implement
  - Objectives
- Organizational structures
  - Geographic
  - Departmental
  - Business Function
- Using WBS templates
  - Saves planning time
  - Builds on prior experience
  - Standardizes the planning and management of projects
  - Provides a structure for collecting and using estimated/actual duration and cost data
  - Focuses process quality improvement efforts

WBS Example - 1

- Graphical WBS for Building a House



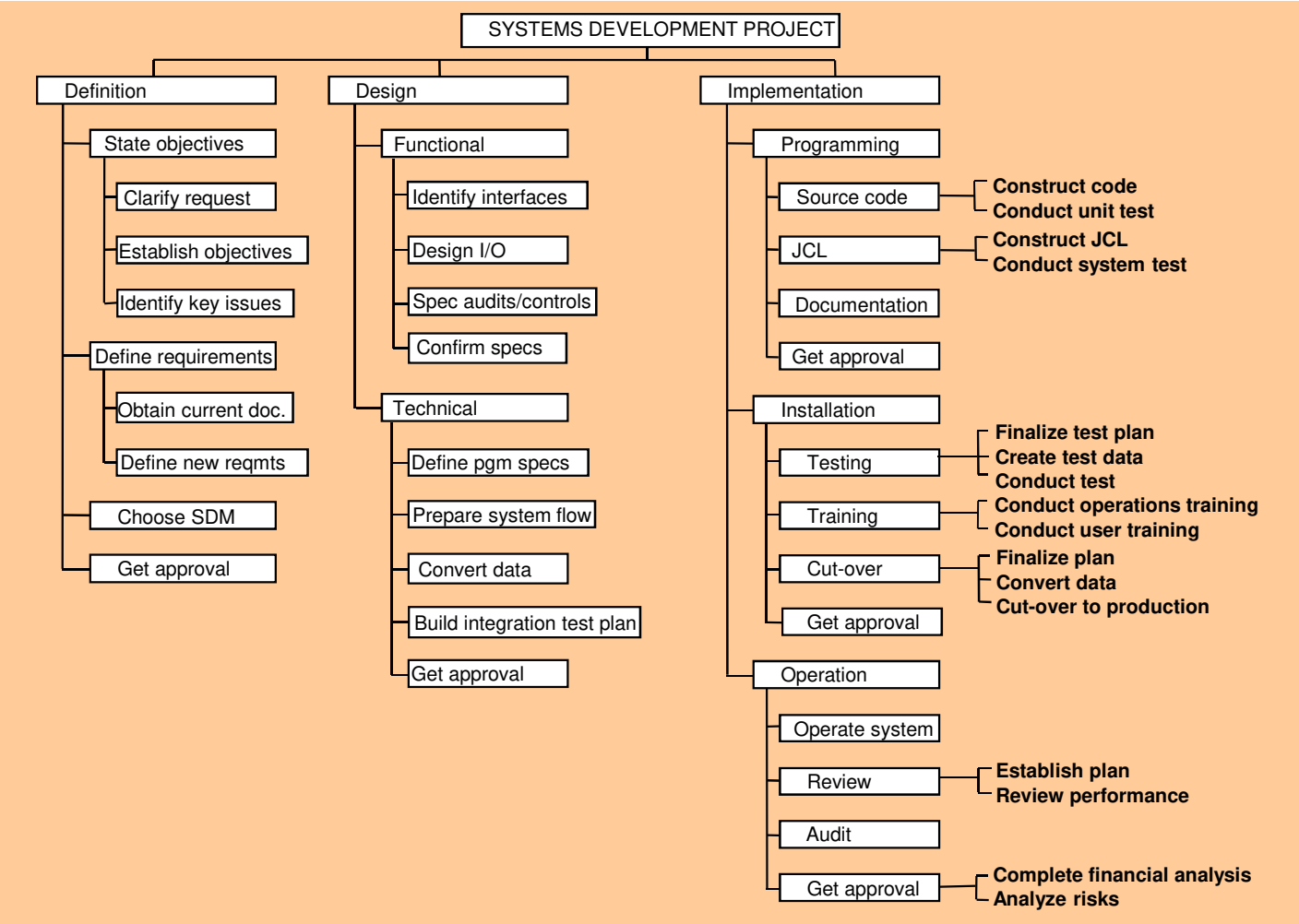
WBS Example - 2

- Indented Outline WBS for Building a House

1. **SITE PREPARATION**
   - 1.1. Layout
   - 1.2. Grading
   - 1.3. Excavation
2. **FOUNDATION**
   - 2.1. Erect Forms
   - 2.2. Pour Concrete
   - 2.3. Remove Forms
3. **FRAMING**
   - 3.1. Floor Joists
     - 3.1.1. Install first floor joists
     - 3.1.2. Install second floor joists
   - 3.2. Sub-flooring
     - 3.2.1. Install first floor sub-flooring
     - 3.2.2. Install second floor sub-flooring
   - 3.3. Stud Walls
     - 3.3.1. Erect first floor stud walls
     - 3.3.2. Erect second floor stud walls
   - 3.4. Frame the roof

WBS Example - 3

- WBS for a waterfall systems development methodology



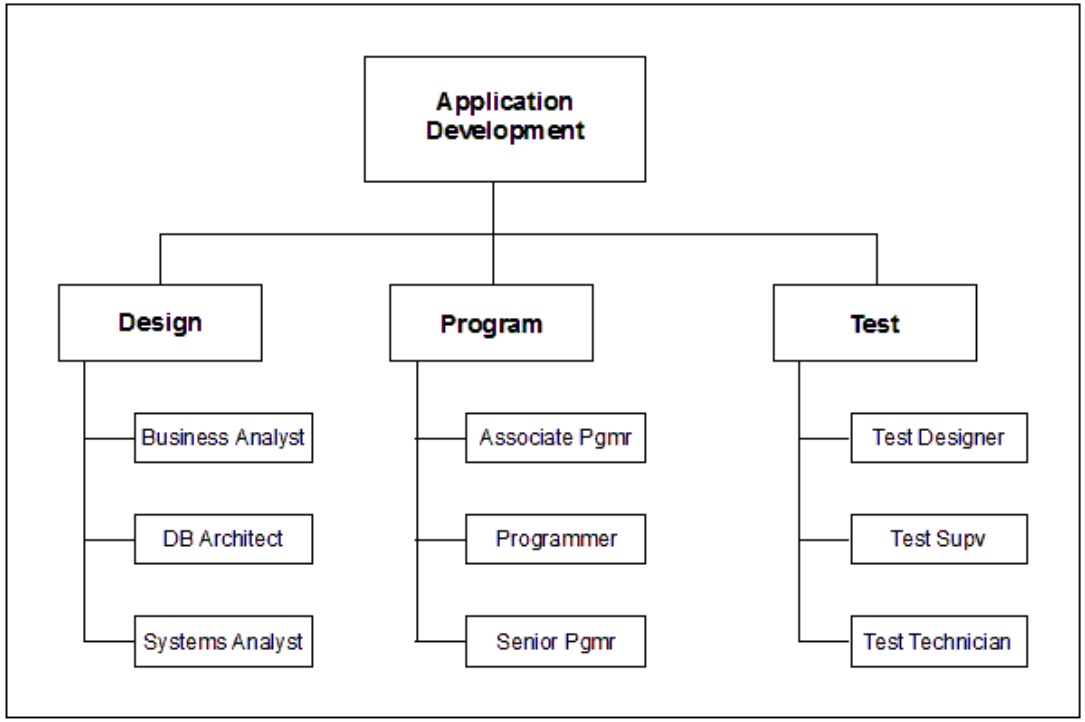
Agile example to scope and structure work

Estimating Task Duration

- Estimating is difficult because it is subjective.
  - A task's duration will vary simply because duration is a random variable.
- Better to have estimates from the team to have an average.
- Duration vs. Labor (effort)
  - Estimate duration to build the schedule and determine when the project will be completed
  - Estimate labor when you have to contain expenses within a budget
- Resource loading vs. Task duration

Estimating Resource Requirements

- People
  - Skill set
- Facilities
- Equipment
- Money
- Materials



- Resource Breakdown Structure is a subset of WBS
  - Determined by job families defined by HR

Estimating Cost

- Order of magnitude estimate
- Budget estimate
- Definitive estimate
- Cost Budgeting
- Cost Control
  - Weekly reports
  - Baseline versus actual

Let’s try again: Painting the House

Project Proposal

- The deliverable from all the planning activities is the project proposal.
  - States the complete business case for the project

- Contents
  - Executive Summary
  - Background
  - Objective
  - Overview of the approach to be taken
  - Detailed statement of work
  - Time and cost summary
  - Appendices

Gaining Approval to Launch the Project

- You may be asked to revise and resubmit your proposal for one or more of the following reasons
  - The cost/benefit is not in your favor
  - The risks of failure are too high
  - The total project cost exceeds available funding
  - There are other projects competing for the same resources

Example Project Proposal – TEYDEB (1501 AGY-100 Form)

A.3. Proje Özeti

A.4. Proje Kısa Tanıtımı

- Bu bölümde doğrudan projenin amacına, somut hedeflerine, Ar-Ge içeriğine, yenilikçi yönlerine, teknoloji düzeyine odaklanılmalıdır. Proje ekibi kurgusu, uygulanacak projeye özel yöntemler, kuruluşunuz özgün katkıları ve elde edilecek proje çıktısının sağlayacağı teknik / ekonomik yararları açık bir biçimde özetleyen metinler yazılmalıdır. Hazırlanan özetin, projenin ilgili olduğu temel teknolojik alanlarda uzmanlığı olan kişilere sunulacağı dikkate alınarak konu ile ilgili genel (kitabi) kavramlar tekrar edilmemeli, üzerinde çalışılacak teknik detaylara odaklanılmalıdır.

B. PROJENİN ENDÜSTRİYEL AR-GE İÇERİĞİ, TEKNOLOJİ DÜZEYİ VE YENİLİKÇİ YÖNÜ

- Proje Hedefleri
- Proje Hazırlık Çalışmaları
- Ar-Ge Sürecinde Kullanılacak Yöntemler

C. PROJE PLANI VE KURULUŞ ALTYAPISI

D. PROJENİN EKONOMİK YARARA VE ULUSAL KAZANIMA DÖNÜŞEBİLİRLİĞİ

E. PROJE BÜTÇESİ

Ref: http://www.tubitak.gov.tr/sites/default/files/agy100-04-170614.doc
http://www.tubitak.gov.tr/sites/default/files/1501-agy100-04_kilavuz-140514.doc

Challenges & Best Practices

- Challenges
  - Handling Large complex projects

- Best Practices
  - Proof of Concept before Actual Implementation
  - Phased Execution with user acceptance per phase
  - Separate environments for development, QA & Pre-Production
  - Plan for external system dependency
  - Joint Planning
  - Senior Management Checkpoint meetings
  - Separate testing and design teams for large projects
  - Core Team for Subject Matter expertise and guidance

Challenges & Best Practices

- Challenges
  - Handling Quick & dirty solutions

- Best Practices
  - Active Participation of client PM in finalizing requirements
  - Technical design for representative cases (with core team)
  - Use of available open source or cost effective third party tools
  - Extreme Programming / Pair Programming
  - Schedule activities in parallel

Challenges & Best Practices

- Transition - Challenges
  - Full Knowledge Coverage
  - Cooperation from existing teams
  - Availability of SMEs
  - Knowledge Management

- Transition - Best Practices
  - Audio-Video Recording
  - Knowledge Scorecard – Certification Process
  - Vendor shadowing client resources and vice versa
  - Involvement of the vendor in testing/documenting the system or application
  - Training of the vendor team on the application being out sourced
  - Linking severance package with knowledge transfer activities

Summary

- Don’t just understand, manage client expectations!
- Requirement is something the product/project should do/produce or a quality that it must have.
  - RBS is a hierarchical description of what the solution has to do in order to acceptably meet client needs.
- Gathering requirements
  - Business Process Diagramming
  - Prototyping
  - Use Cases
- Monitor and manage scope change
- Project Overview Statement (POS) is a general statement of the project and a reference for planning
- Project planning considerations, activities, and deliverables
- Project Definition Statement is a detailed project definition to make sure the team has a common understanding of what the project is all about
- The role of the client in the planning – validate, prioritize, commit resources
- Work Breakdown Structure
- Estimating task duration is difficult due to subjective nature – better to have team averages
- Estimating resource requirements
- Estimating cost
- Project proposal states the complete business case for the project.

References

- Understanding Storyboarding in the Software Design Process (http://www.iamwire.com/2017/05/storyboarding-software-design-process/153220)

- MoSCoW Prioritization (https://www.productplan.com/glossary/moscow-prioritization/)

- Epics, Stories, Themes, and Initiatives (https://www.atlassian.com/agile/project-management/epics-stories-themes)