

Project Management Best Practices

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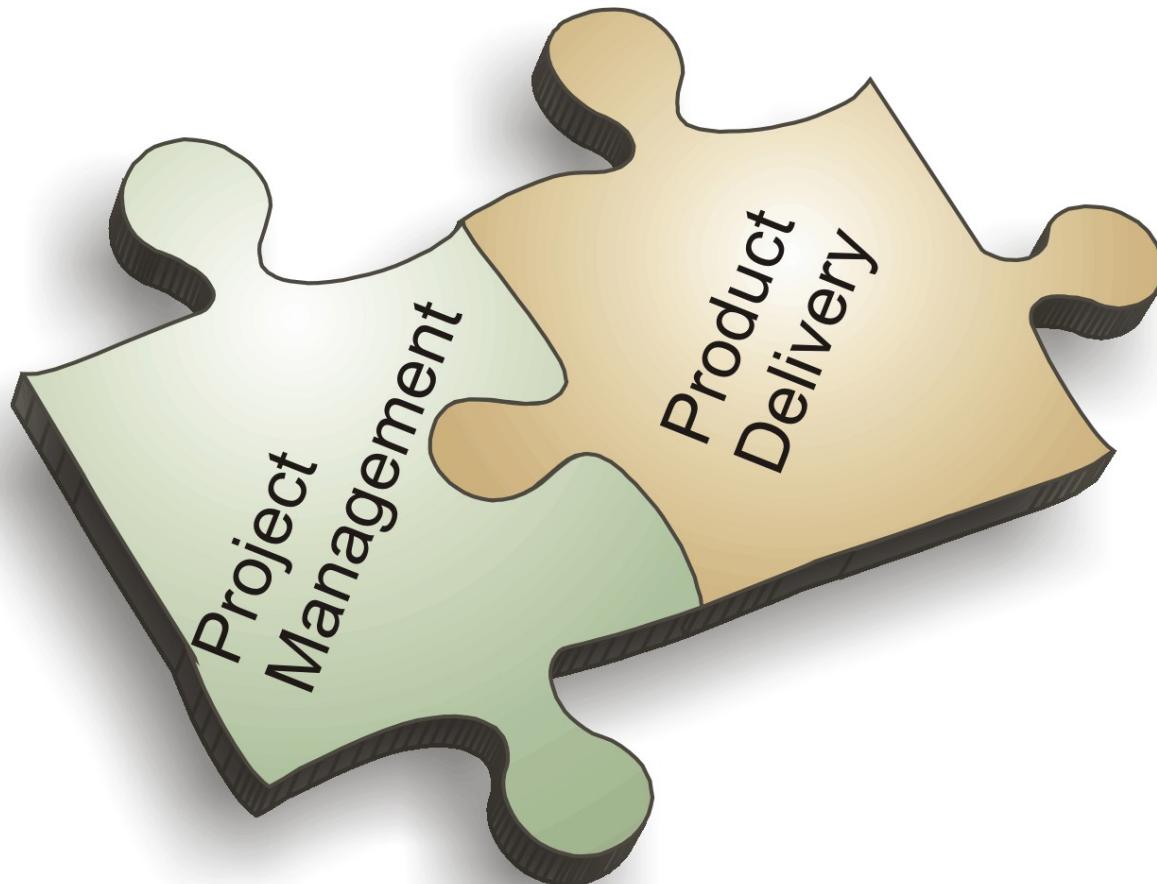


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Agenda

- Framework ←
- Project Integration
- Scope Management
- Time Management
- Cost Management
- Quality Management
- Risk Management
- Communication Management
- Stakeholder Management
- Human Resource Management
- Procurement Management
- Professional Responsibility & Ethics

Project Framework



Topics

- Project
- Project Management
- Program Management
- Portfolio Management
- Program Management Office
- Stakeholder
- Organization Types
- Project Manager Responsibilities
- Organization Process Assets (OPA)
- Enterprise Environmental Factors (EEF)
- Expert Judgment
- Project Documents
- Work Performance Data
- Work Performance Information
- Work Performance Reports

What is Project???

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What is Project?

Project – A temporary endeavor undertaken to create a unique product, service or result

How Temporary?

- Has a definite *beginning and end*, not an on-going effort
- Ceases when objectives have been attained
- Team is *disbanded* upon project completion

Unique?

- The product or service is *different* in some way from other product or services
- Product characteristics are *progressively elaborated*

Project has...

- Goal (measurable/verifiable) Oriented
- Finite duration with a beginning and end
- Uniqueness to a great extent and related uncertainties
- Coordinated undertaking of interrelated activities
- Performing the activities involve resources
- Resources cost money

“Projects” different from “operations”?

Projects

- Permanent Project Charter
- Catalyst for change
- Unique product or service
- Heterogeneous teams
- Start and end date
- Progressive elaboration

Operations

- Semi-permanent charter
- Maintains status quo
- Standard product or service
- Homogeneous teams
- Ongoing
- Predefined product

Project Constraints



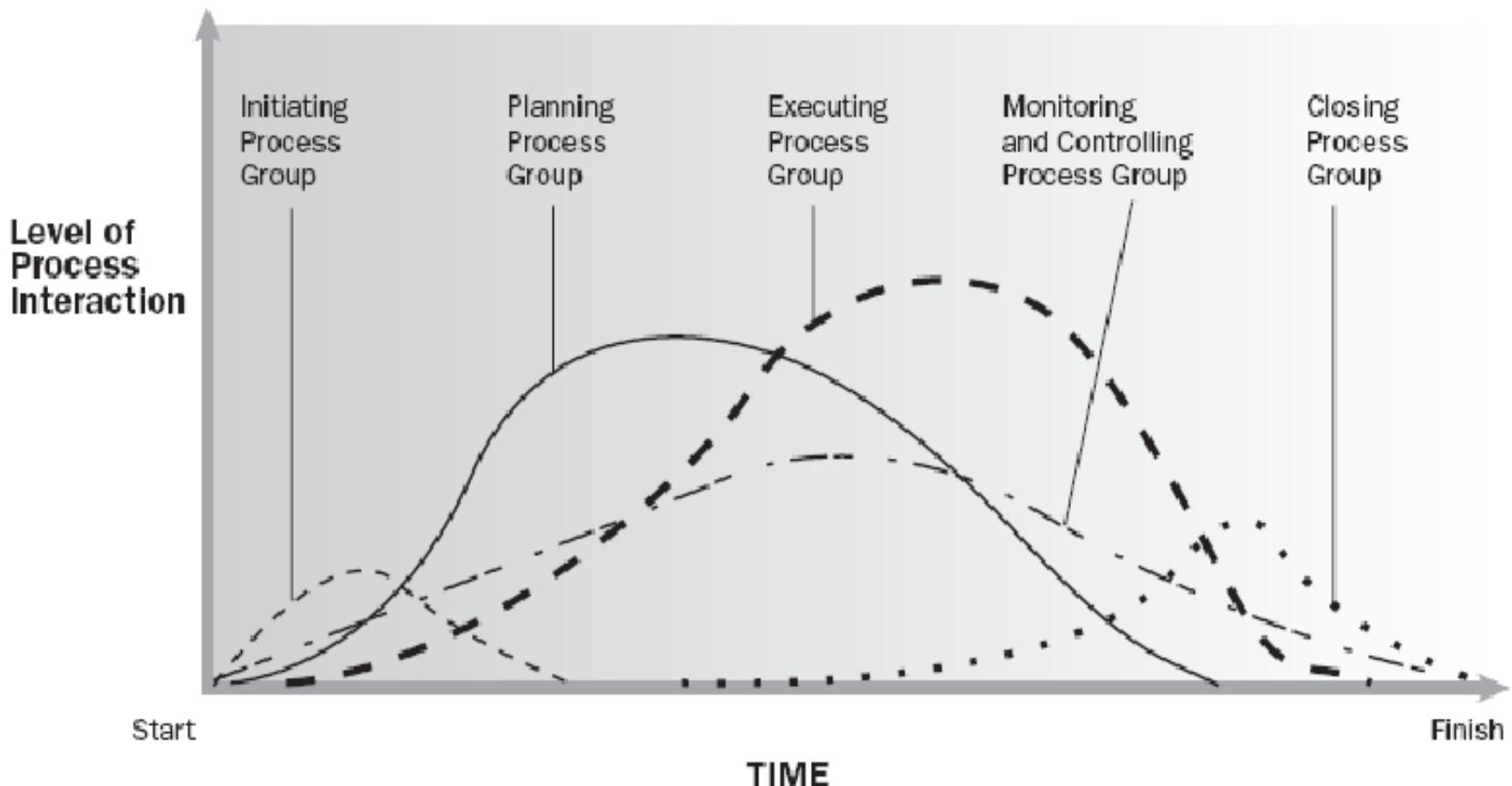
Project Management?

The application of **knowledge, skills, tools** and **techniques** to project activities in order to **meet** the **project requirements**

Project Phases

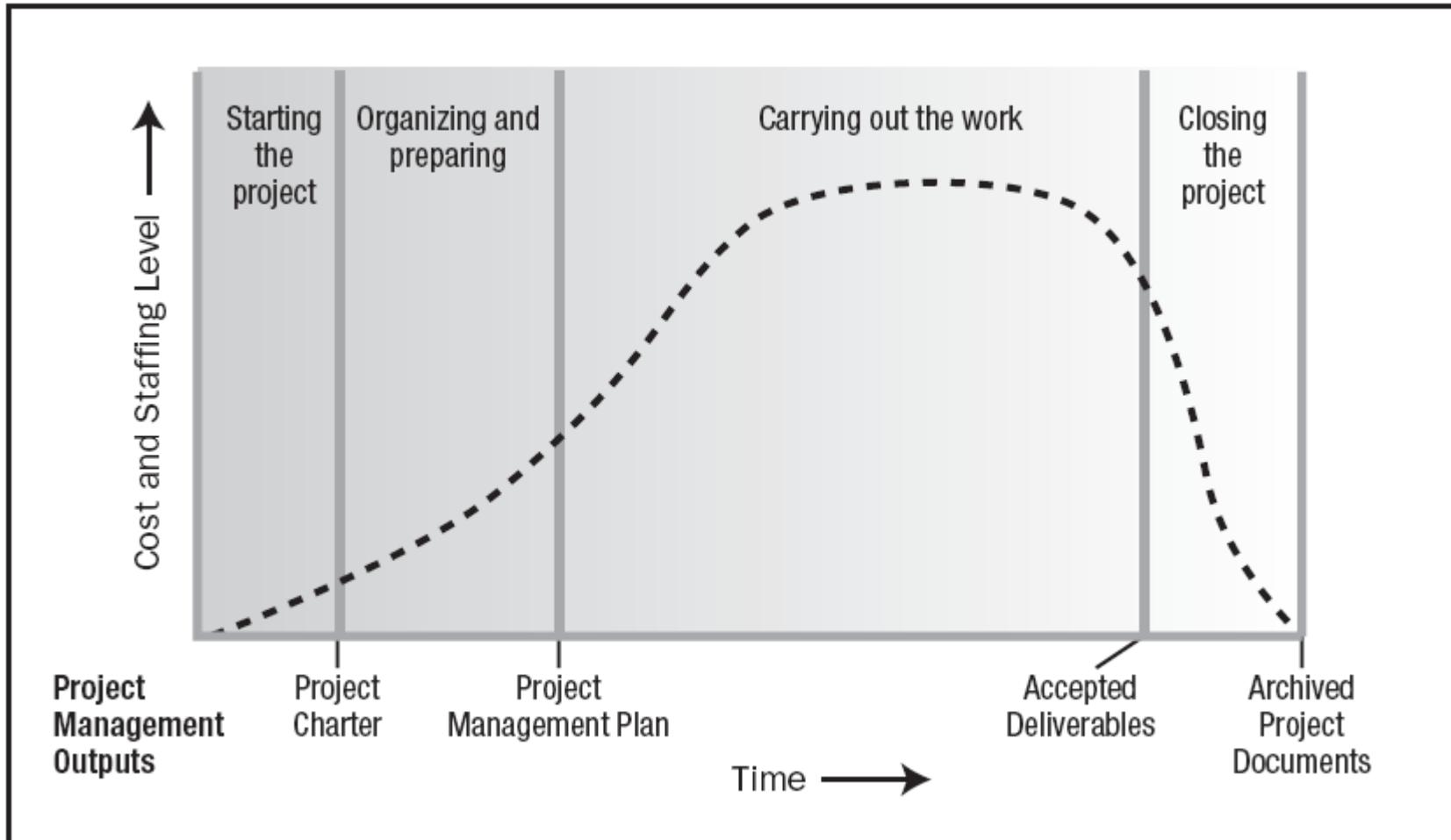
- ✓ Projects are divided into phases where extra control is required to effectively manage the completion of the major deliverables
- ✓ Collectively, the project phases put together is known as Project life cycle
- ✓ Each phase is marked by one or more tangible verification work product
- ✓ The conclusion of a project phase is generally marked by a review
- ✓ The phase end points are referred to as phase exits, milestones, phase gates, decision gates, stage gates or kill points
- ✓ Starting a phase before approval of deliverables of a previous phase is called Fast Tracking
- ✓ Your Project Must have Phases

Typical PLC & Level of Activities



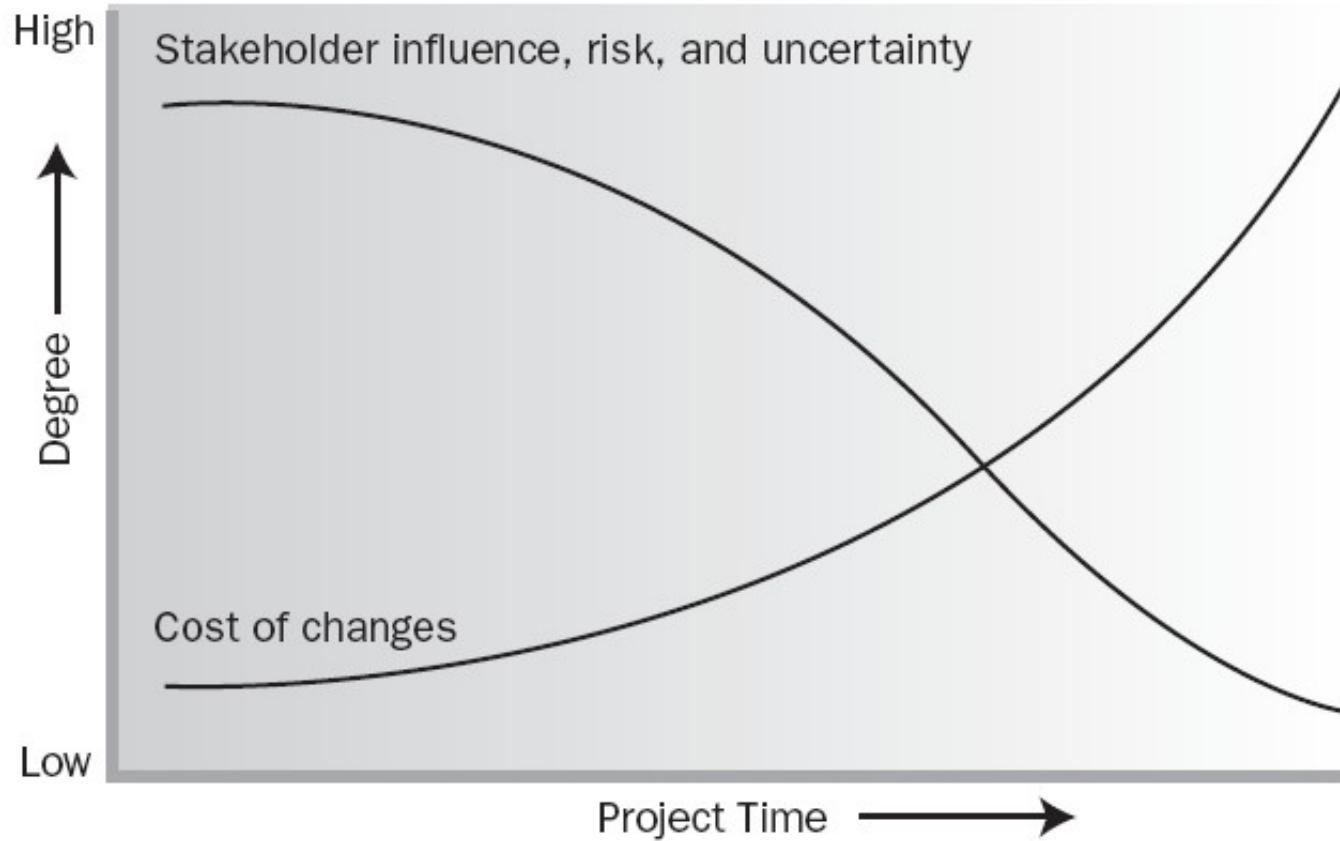
Source PMBOK Guide Version 5.0

Typical Costing & Staffing across PLC



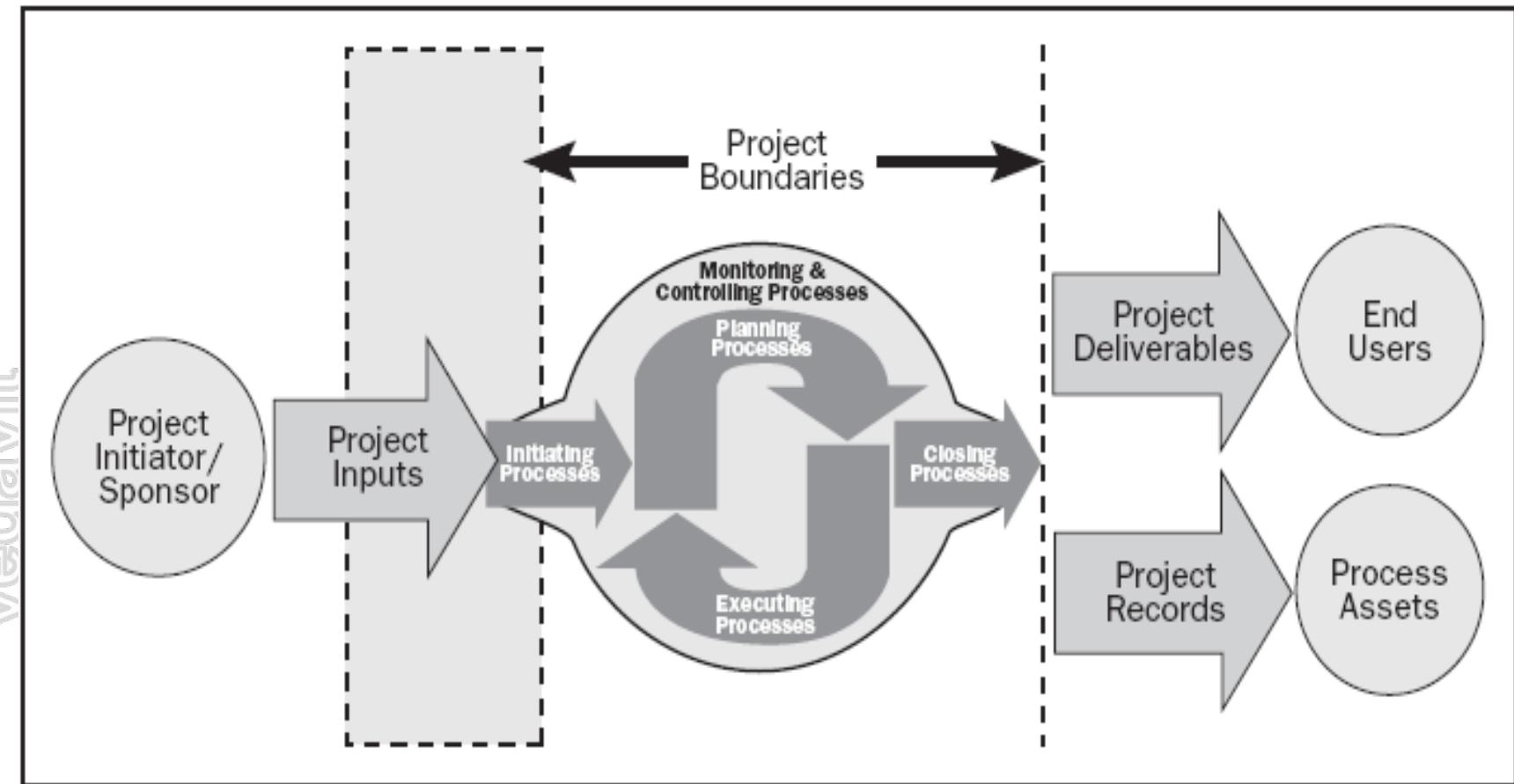
Source PMBOK Guide Version 5.0

Impact of Variables based on Time



Source PMBOK Guide Version 5.0

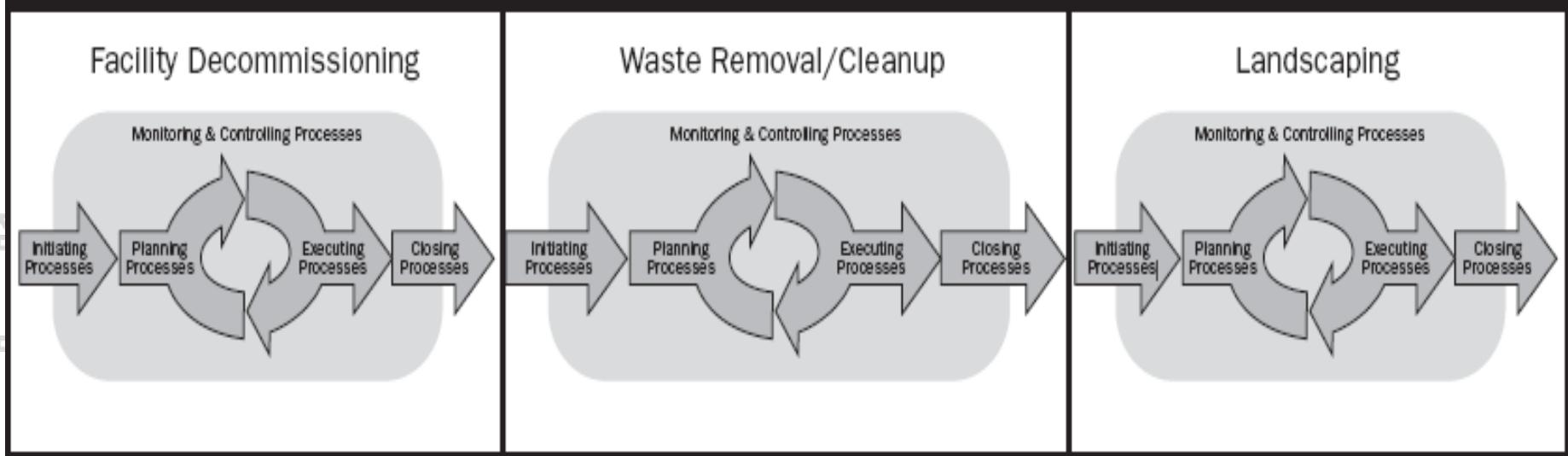
Project Boundaries are Important!



Source PMBOK Guide Version 5.0

Relationship between Process Group & Phases

One Approach to Cleaning Up a Hazardous Waste Site



Source PMBOK Guide Version 5.0

What is Program?

- Group of related projects managed in a coordinated way to obtain benefits and control not available from managing them individually
- To get the desired benefits a Program manager can initiate new project or kill existing project under his project.
- It is not necessary that all projects be successful to make a program successful
- Program also coordinate with operations to manage the benefits and last longer than projects

Project Portfolio Management

- Collection of projects or programs and other work that are grouped together to facilitate effective management of that work to meet strategic business objectives
- Portfolio manager selects or rejects new projects. Takes decision on further funding of already taken projects / programs
- Ensure funding for the projects or programs
- Portfolio exists in organizations based on the mission / vision or strategy of the organization

What is PMO?

- ✓ Managing shared resources across all project administered by PMO
- ✓ Identifying and developing project management methodology, best practices and standards
- ✓ Coaching, mentoring, training and oversight
- ✓ Monitoring compliance with project management standards, policies, procedures and templates via project audits
- ✓ Developing and managing project policies, procedures, templates and other shared documentation (organizational process assets), and
- ✓ Coordinating communication across projects
- ✓ Types of PMO
 - ✓ PMO may be supporting project managers in their day to day project management work without taking ownership
 - ✓ PMO may be auditing and taking reports from projects
 - ✓ PMO may be taking full control of project and project resources and managing them end to end

PMO Services

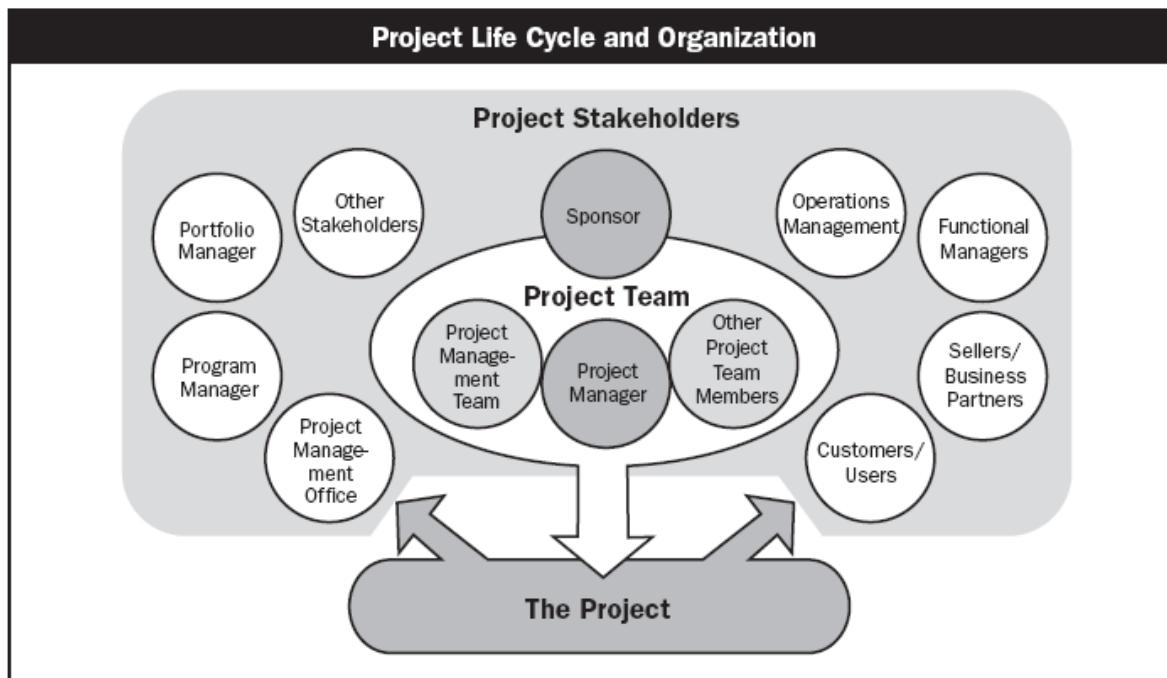


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Who are Stakeholders?

Persons or organizations who are actively *involved* in the project or whose interests maybe positively or negatively *affected* by the performance or completion of the project

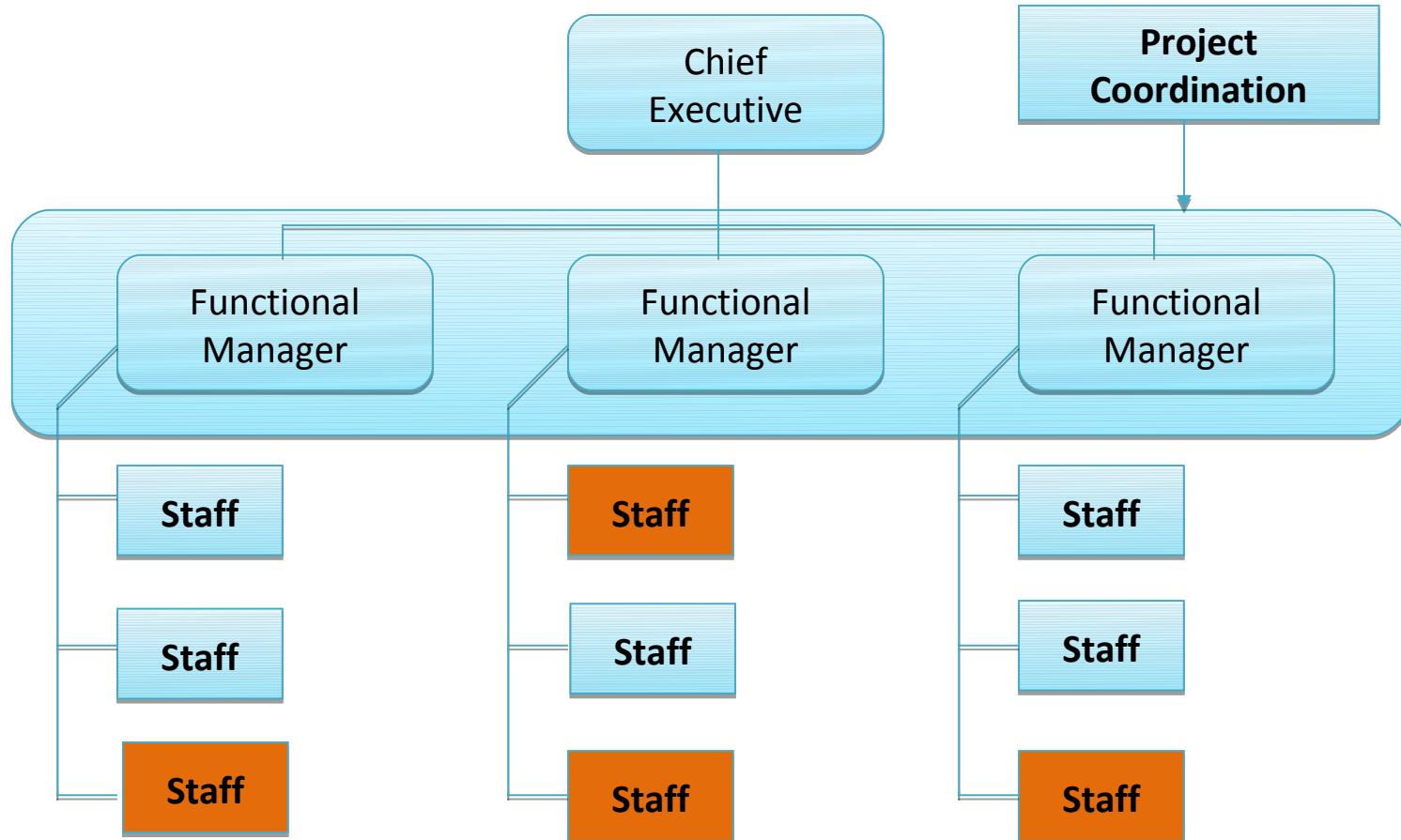


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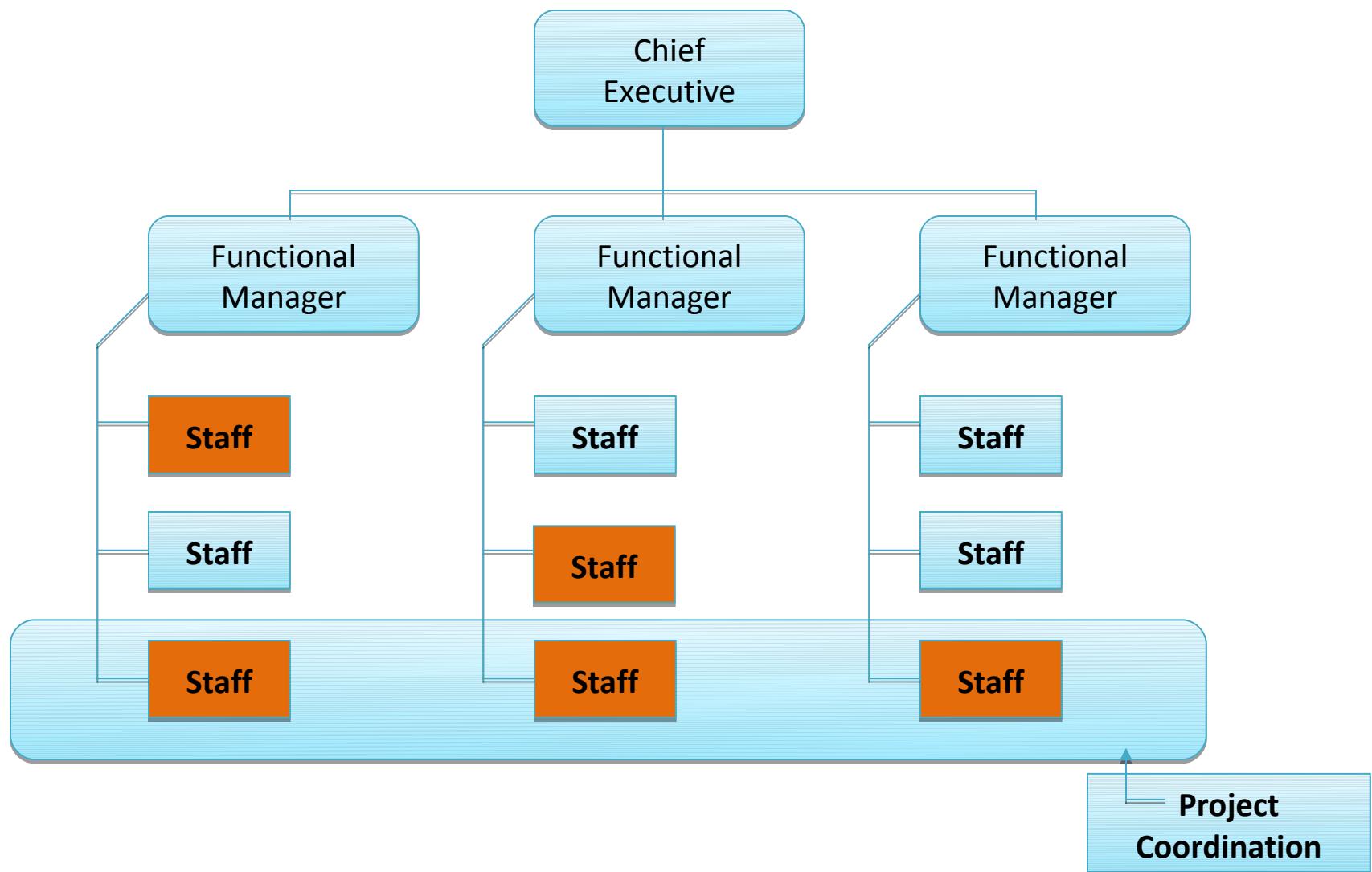
Organizational Types & Influence on Projects

- ✓ Functional
- ✓ Matrix
 - ✓ Weak Matrix
 - ✓ Balanced Matrix
 - ✓ Strong matrix
- ✓ Projectized

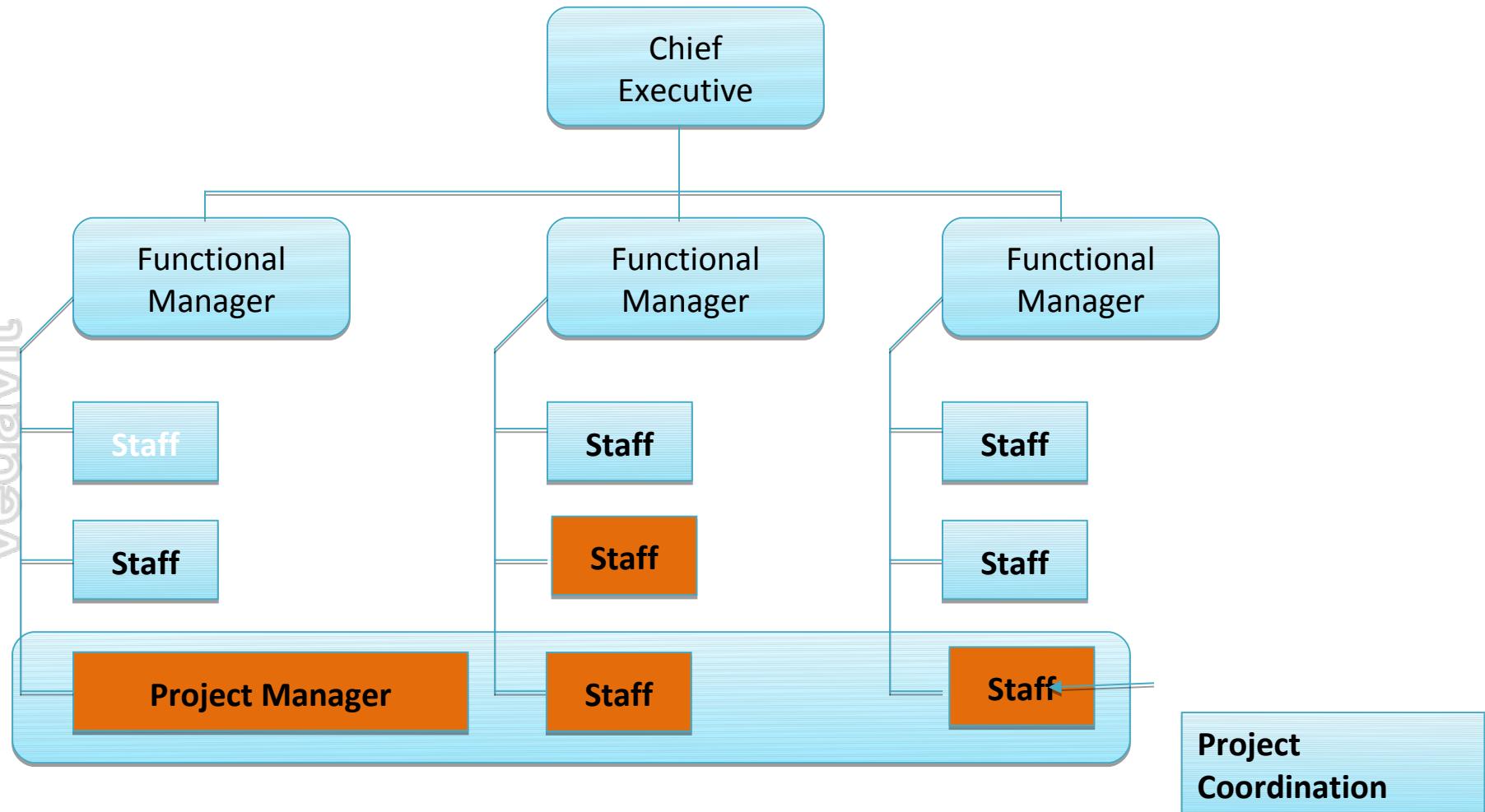
Functional



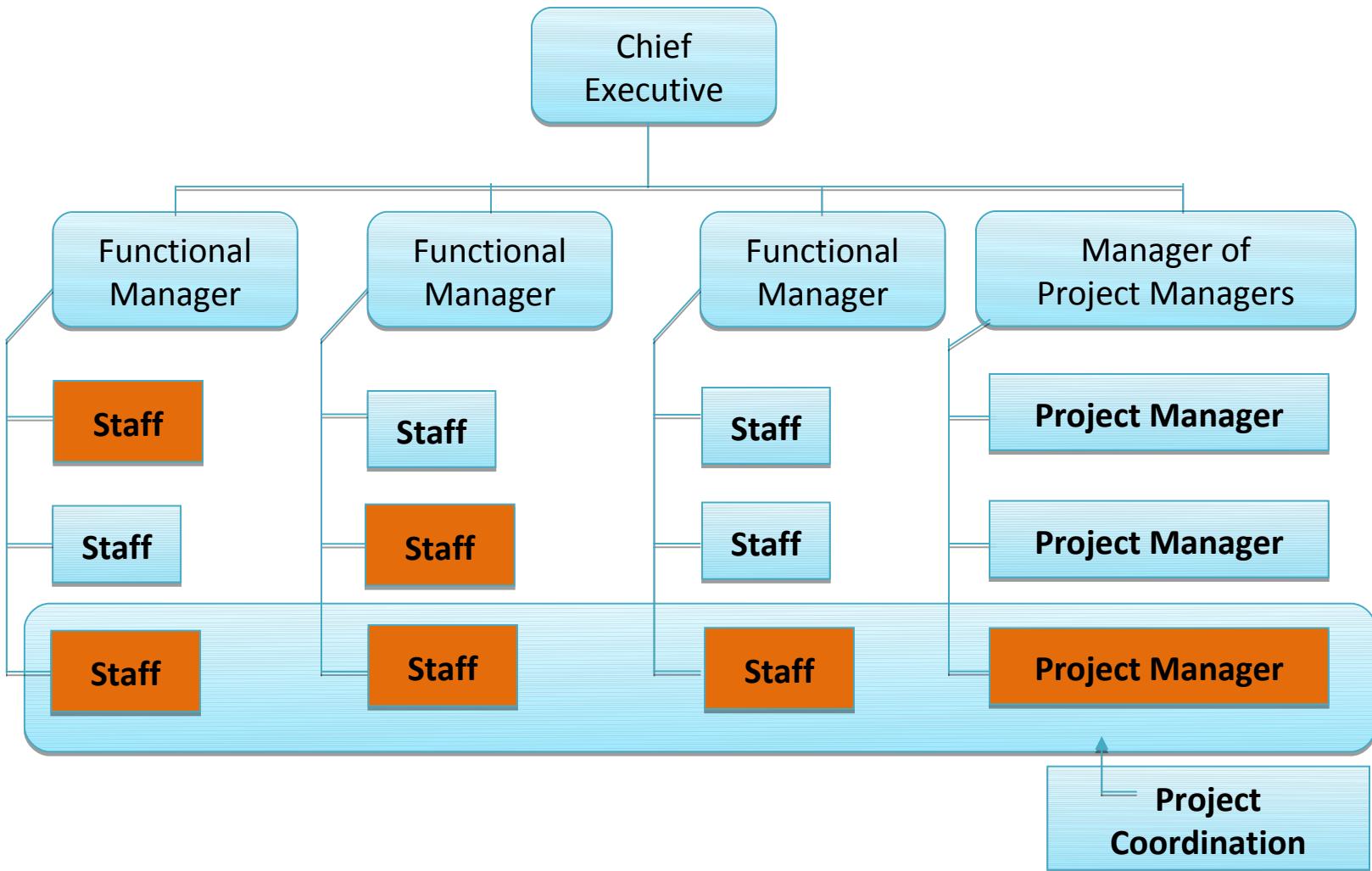
Weak Matrix



Balance Matrix

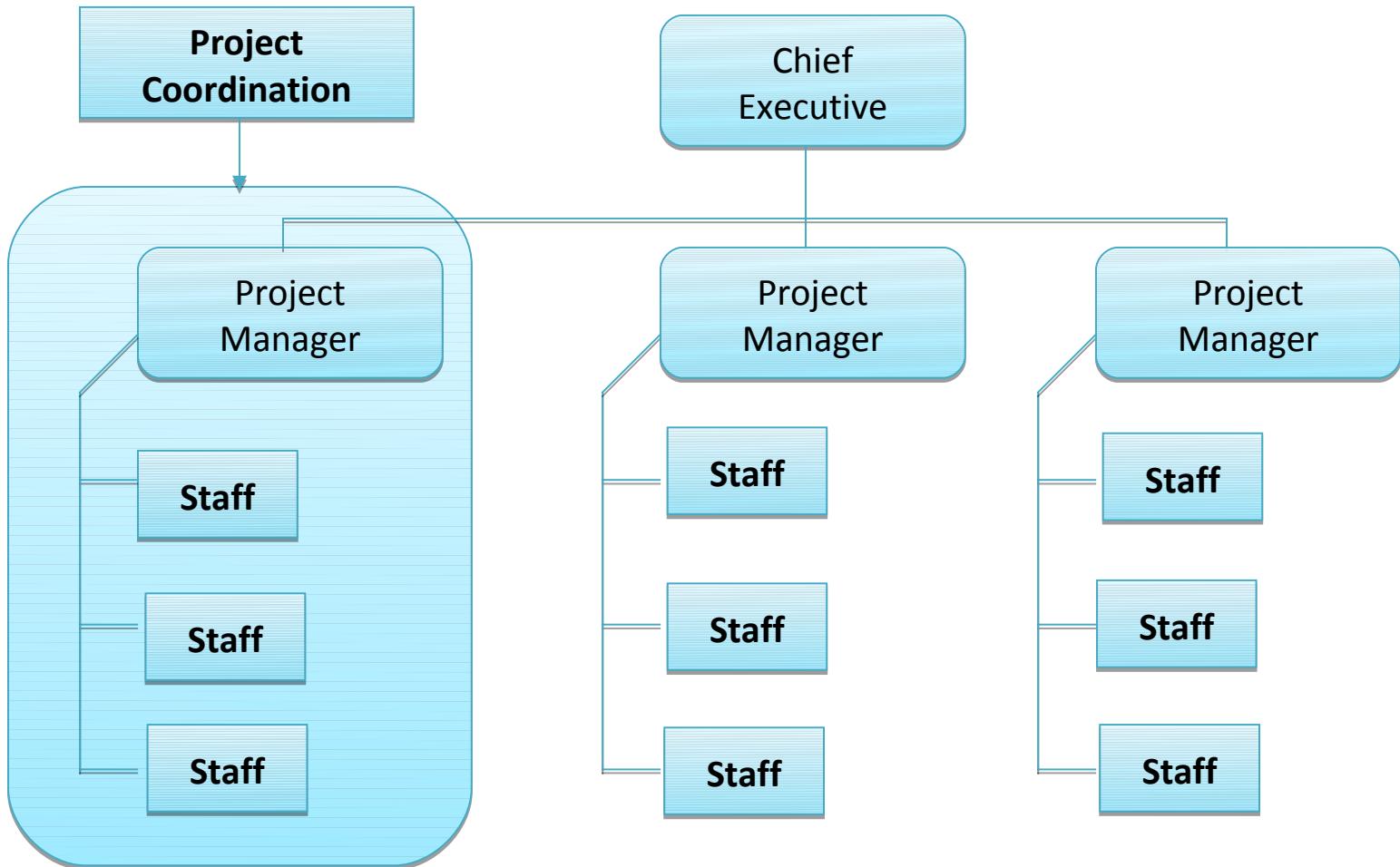


Strong Matrix



Projectized Matrix

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Organizational Influence

Project Characteristics	Organization Structure	<i>Functional</i>	<i>Matrix</i>			<i>Projectized</i>
			Weak Matrix	Balanced Matrix	Strong Matrix	
Project Manager's Authority	Little or None	Limited	Low to Moderate	Moderate to High	High to Almost Total	
Resource Availability	Little or None	Limited	Low to Moderate	Moderate to High	High to Almost Total	
Who controls the project budget	Functional Manager	Functional Manager	Mixed	Project Manager	Project Manager	
Project Manager's Role	Part-time	Part-time	Full-time	Full-time	Full-time	
Project Management Administrative Staff	Part-time	Part-time	Part-time	Full-time	Full-time	

Source PMBOK Guide Version 5.0

Project Manager Responsibilities

- **Initiating a Project**
 - Project aligned with org objectives & customer needs
 - High-level risks, assumptions and constraints are understood
 - Stakeholders identified and their need are understood
 - Project Charter approved
- **Planning a Project**
 - Project scope agreed
 - Project schedule approved
 - Cost budget approved
 - Project team identified with roles and responsibilities agreed
 - Communication activities agreed
 - Quality management process established
 - Risk response plan approved
 - Integrated change control processes defined
 - Procurement plan approved
 - Project Plan approved

Project Manager Responsibilities

- **Executing a Project**
 - Project scope achieved
 - Project stakeholders expectations managed
 - Human resource managed
 - Ensure processes are being followed as agreed
 - Material and equipment resources managed
 - Risk management strategies are implemented
- **Monitoring & Controlling a Project**
 - Project tracked and status communicated to stakeholders
 - Project change is managed
 - Quality is monitored and controlled
 - Risk is monitored and controlled
 - Project team managed
 - Contract administered
- **Closing a Project**
 - Project outcomes accepted
 - Project resources released
 - Stakeholder perceptions measured and analyzed
 - Project formally closed

Project Manager in Nutshell

Should

- Be a resourceful person who can get things done and keep all relevant stakeholders informed.
- Ensure work estimates in terms of size, efforts & schedule
- Ensure risk identification, analysis, prioritization, monitoring & control is done periodically
- Ensure right resource allocated for the work, resource backup and utilization
- Ensure team is motivated, career planning, training and development activities are being done
- Ensure scope and requirements are management
- Ensure stakeholders are sufficiently engaged, their expectations are managed they are being communicated proactively
- Ensure project objectives are met in terms of time, cost, scope and defect free product.
- Ensure all contractual obligations are fulfilled
- Ensure procurements are as per contract & proposal
- Ensure Configuration management, data backup
- Ensure lessons learned are documented and implemented
- Ensure cost is optimized
- Participate in presales & proposals

Project Manager Competencies

- Communication
- Leading
- Managing
- Cognitive Ability
- Effectiveness
- Professionalism

Organizational Process Assets (OPA)

- Lessons Learned
- Historical Data
- Organization Defined Standard Processes

Enterprise Environmental Factors (EEF)

- Factors which cannot be changed by project team and has negative or positive impact on the project objectives
- EEF should also be considered in risk identification process
- Regulatory policies, skills available in market, competitors, company policies, political problems, inflations etc.

Expert Judgment

- Industry specific relevant previous experience of an individual to perform project management activities
- Expert judgment can be used for initiating a project, estimating, planning, executing, monitoring & controlling & closing project activites.

Project Documents

- Documents which are prepared or modified by project team by following plan or processes
- Documents which are handed over by stakeholders for the reference purpose
- Change log, issue log, defect reports, design documents, requirement documentation, procurement documents etc.

Work Performance Data (WPD)

Raw observations and measurements identified during activities performed

- % of work physically complete
- Quality of technical performance measures
- Start and finish data of scheduled activities
- Number of change requests
- Number of defects
- Actual cost
- Actual Duration

Work Performance Information (WPI)

Performance data collected from Controlling processes is **analysed in context and integrated based on relationship across areas**

- Status of deliverables
- Implementation status of change request
- Forecasted estimates to complete

Work Performance Reports (WPR)

- Progress Reports
- Status Reports
- Forecast Reports
- Reports include
 - Risks and their possible impacts
 - Issues (safety, security, performance, moral) at hand
 - Cause of variance, corrective and preventive actions and their owners and due date

Recap – Project Management Framework

- Project
- Project Management
- Program Management
- Portfolio Management
- Program Management Office
- Stakeholder
- Organization Types
- Project Manager Responsibilities
- Organization Process Assets (OPA)
- Enterprise Environmental Factors (EEF)
- Expert Judgment
- Project Documents
- Work Performance Data
- Work Performance Information
- Work Performance Reports

Discussions !

Agenda

- ✓ Framework
- Project Integration ←
- Scope Management
- Time Management
- Cost Management
- Quality Management
- Risk Management
- Communication Management
- Stakeholder Management
- Human Resource Management
- Procurement Management
- Professional Responsibility & Ethics

Project Integration Management



Framework for Project Integration Management



Project Integration Management



Definition

Processes and activities needed to identify, define, combine, unify, and coordinate the various processes and project management activities within the Project Management Process Groups

Project Integration Management

- Develop Project Charter [INITIATING]
- Develop Project Management Plan [PLANNING]
- Direct and Manage Project Execution [EXECUTING]
- Monitor and Control Project Work [M&C]
- Perform Integrated Change Control [M&C]
- Close Project or Phase [CLOSING]

Develop Project Charter



Definition

Developing the project charter that formally authorizes a project or a project phase.



Develop Project Charter



1. Project Statement of work
2. Business case
3. Agreements
4. Enterprise Environmental Factors
5. Organization Process Assets

1. Expert Judgement
2. Facilitation Techniques

1. Project Charter

Project Charter Template

1. Project purpose or justification
2. Measurable project objectives and related success criteria
3. High – Level Requirements
4. High – Level Project description
5. High – Level Risks
6. Summary milestone schedule
7. Summary Budget
8. Project approval requirements
9. Assigned project manager, responsibility, and authority level
10. Name and authority of the sponsor or other person(s) authorizing the project charter

Develop Project Management Plan



Definition

Documenting the actions necessary to define, prepare, integrate, and coordinate all subsidiary plans into a project management plan.



Project Management Plan

- Project Management Methodology
- Project Phases & Life Cycle
- Tailored Processes
- Project Baselines
- All subsidiary plans required
 1. Configuration Management Plan
 2. Scope Management Plan
 3. Requirement Management Plan
 4. Schedule Management Plan
 5. Cost Management Plan
 6. Quality Management Plan
 7. Human Resource Management Plan
 8. Communication Management Plan
 9. Risk Management Plan
 10. Procurement Management Plan
 11. Stakeholder Management Plan

Each subsidiary plan includes resources (human, machine, material) and templates required to perform project management activities. Location, time and frequency of performing activities of those plans along with metrics and thresholds of those metrics are also part of every subsidiary plan

Configuration Management Plan

Configuration Management Plan includes

- List the items to be managed under configuration management system
- List of various categories of items to be managed under CMS
- Their naming & version convention
- Security & access permission to these configuration items
- Backup, archival, retrieval, restore strategies
- Tools required and training to use tools
- Resource required to perform CM activities
- Various scheduled activities like configuration audits

Plan Scope Management

- **Scope Management Plan includes**
 - Process for preparing project scope statement (PSS)
 - Process that enable creation of WBS from PSS
 - Process that specifies how formal acceptance be obtained
 - Process to control changes to details PSS
- **Requirement Management Plan includes**
 - Process of analyzing, documenting and managing requirements
 - Process of requirement prioritization
 - Product measurement metrics and their rationale
 - RTM structure
 - Configuration management activities related to product

Schedule Management Plan

Establishing the policies, procedures and documentation for planning, developing, managing, executing, and controlling the project schedule

It includes

- Scheduling tools to be used
- Level of accuracy
- Units of measure for each resource
- Organizational procedure links
- Process of updating the progress in schedule model
- Control thresholds
- Rules of performance measurement (baselines, %complete, fixed formula etc.)
- Define scheduling reporting format

Cost Management Plan

It includes

- Cost management tools to be used
- Level of accuracy (acceptable range +/- 5%)
- Level of precision (US\$ 100.01)
- Units of measure for each resource
- Organizational procedure links
- Process of updating the progress in schedule model
- Control thresholds (an allowed variation before some action need to be taken)
- Rules of performance measurement (baselines, %complete, fixed formula etc.)
- Project cost recording process
- Currency exchange rate fluctuation adjustment process
- Define scheduling reporting format

Develop Project Management Plan



- 1. Project Charter
- 2. Output from Other Processes
- 3. Enterprise Environmental Factors
- 4. Organization Process Assets

- 1. Expert Judgement
- 2. Facilitation Techniques

- 1. Project Management Plan

Direct & Manage Project Work



Definition

**Performing the work defined in the project
Management plan to achieve the project's
objectives.**



Direct and Manage Project Work



- 1. Project Management Plan
- 2. Approved Change Requests
- 3. Enterprise Environmental Factors
- 4. Organization Process Assets

- 1. Expert Judgement
- 2. Project Management Information System
- 3. Meetings

- 1. Deliverables
- 2. Work Performance Data
- 3. Change Requests
- 4. Project Management Plan Updates
- 5. Project Documents Updates

Monitor & Control Project Work



Definition

Tracking, reviewing and regulating the progress to meet the performance objectives defined in the project management plan.



Monitor and Control Project Work



1. Project Management Plan
2. Schedule forecasts
3. Cost forecasts
4. Validated Changes
5. Work Performance Information
6. Enterprise Environmental Factors
7. Organization Process Assets



1. Expert Judgement
2. Analytical techniques
3. Project Management Information Systems
4. Meetings



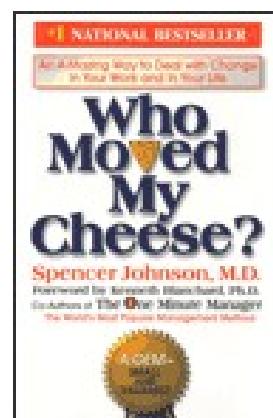
1. Change Requests
2. Work performance reports
3. Project Management Plan Updates
4. Project Documents Updates

Perform Integrated Change Control



Definition

Reviewing all change requests, approving changes and managing changes to the deliverables, organizational process assets, project documents and the project management plan.



Perform Integrated Change Control



1. Project Management Plan
2. Work Performance Report
3. Change Requests
4. Enterprise Environmental Factors
5. Organization Process Assets



1. Expert Judgement
2. Meetings
3. Change Control Meetings



1. Approved Change Requests
2. Change log
3. Project Management Plan Updates
4. Project Documents Updates

Close Project or Phase



Definition

Finalizing all activities across all of the project Management Process Groups to formally close the project or a project phase



Close Project or Phase



1. Project Management Plan
2. Accepted Deliverables
3. Organization Process Assets



1. Expert Judgement
2. Analytical techniques
3. Meetings

1. Final product, service or result transition
2. Organization Process Assets Updates

Recap - Integration Management

- ✓ Project Charter
 - ✓ Purpose
 - ✓ Information Required to make it
 - ✓ Its Content
- ✓ Project Management Plan
 - ✓ Purpose
 - ✓ Its Components
- ✓ Direct & Manage Project Execution
 - ✓ Purpose & Outputs
- ✓ Monitor & Control Project Work
 - ✓ Purpose & Outputs
- ✓ Integrated Change Control
 - ✓ Purpose & Outputs
- ✓ Close Project or Phase
 - ✓ Purpose & Outputs

Discussions !

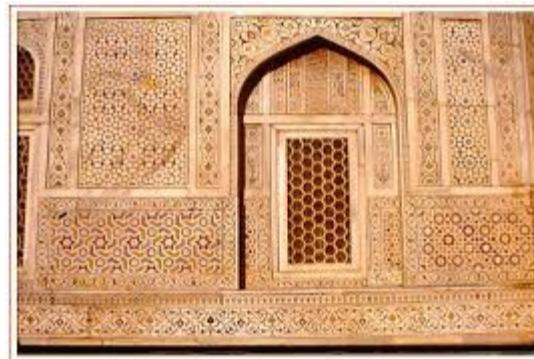
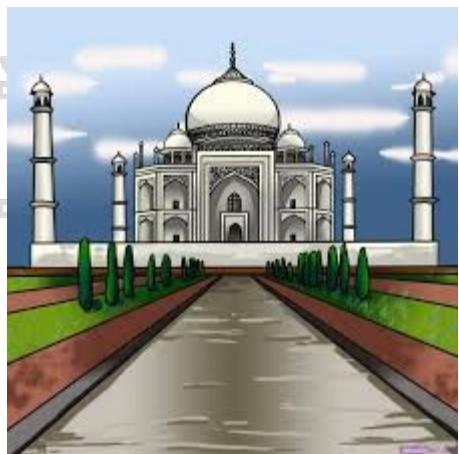
Agenda

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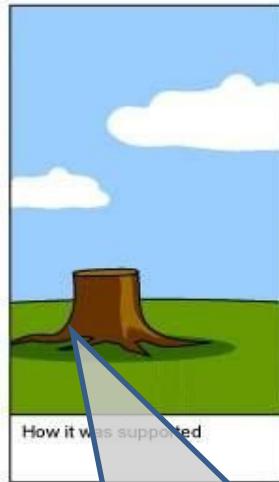
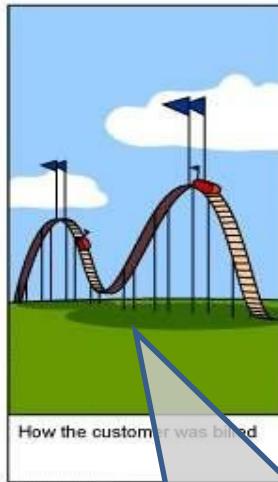
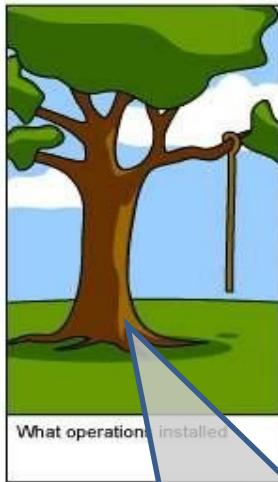
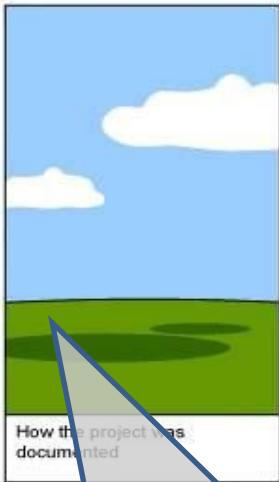
Project Scope Management



Level of Detailing in Product Scope



How the customer explained it How the Project Leader understood it How the Analyst designed it How the Programmer wrote it How the Business Consultant described it



How the project was documented

How operations were installed

How the customer was billed

What the customer really needed

Scope

- **Project Scope** "The work that needs to be accomplished to deliver a product, service, or result with the specified features and functions."
- **Product Scope** "The features and functions that characterize a product, service, or result."

Project Scope Management



Definition

Processes required to ensure that the project includes all the work required, and ONLY the work required to complete the project successfully

Project Scope Management

- Collect Requirements [PLANNING]
- Define Scope [PLANNING]
- Create WBS [PLANNING]
- Validate Scope [M&C]
- Control Scope [M&C]

8. Collect Requirements



Definition

Defining and documenting stakeholders' needs to meet the project objectives.



Collect Requirements



1. Scope Management Plan
2. Requirement Management Plan
3. Stakeholder Management Plan
4. Project Charter
5. Stakeholder Register



1. Interviews
2. Focus Groups
3. Facilitated Workshops
4. Group Creativity Technique
5. Group Decision Making Techniques
6. Questionnaires and Surveys
7. Observations
8. Prototypes
9. Benchmarking
10. Context diagrams
11. Document Analysis



1. Requirements Documentation
2. Requirement Traceability Matrix

Collect Requirements

Focus groups

Guided by moderator, group's final opinion is taken



Facilitated workshops

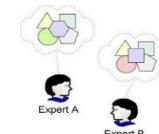
Cross functional stakeholders. Settle their differences like JAD with developers

Group creativity techniques

Brain storming



Nominal group techniques: Brainstorming only on most voted



Delphi Techniques: Only selected experts answers. Who answered what is not shared

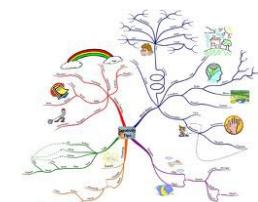
Idea Mapping techniques: Individuals ideas mapped on single map



Affinity diagrams: Grouping and sorting of ideas for discussion

Group decision making techniques

Majority, Unanimity, Plurality, Dictatorship



Requirement Traceability Matrix

- Tracing Requirements to
 - Business needs, opportunities, goals & objectives
 - Project objectives
 - Project scope/WBS deliverables
 - Product design
 - product development
 - Test strategy and test scenarios
- Traces high-level requirements to more detailed requirements.
- Attributes in RTM can be
 - Unique identifier
 - Textual description of requirement
 - Rationale for inclusion
 - Owner
 - Source
 - Priority
 - Version
 - Current Status (active, cancelled, differed, added, approved)
 - Date completed
 - Stability
 - Complexity
 - Acceptance Criteria

Requirement vs Scope

Scope and requirement are two different things.

- Requirements are only those, which are in scope!
- Requirements are driven from scope
- Boundaries are defined first (using SOW), requirements are collected next

Requirement must be measurable, testable, traceable, complete, consistent and acceptable to key stakeholders.

Requirement Documentation includes

- Business need or **opportunity to be seized**, describing the limitation of the current situation and why the project has been undertaken
- Business and project **objectives** for traceability
- **Functional requirements**, describing business process, information, and interaction with the product, as appropriate which can be documented textually in a requirements list, in models, or both
- **Non-functional requirements** like SLA, performance, safety, security, compliance, supportability, retention/purge
- **Quality requirements**
- **Acceptance criteria**
- **Business rules** stating the guiding principles
- **Impacts to other** organizational areas call centre, technology centre, sales force
- Impacts to other entities inside or outside the performing organization
- **Support and training** requirements
- Requirements **assumptions and constraints**

Define Scope



Definition

Developing a detailed description of the project and product.



Define Scope



1. Scope Management Plan
2. Project Charter
3. Requirements Documentation
4. Organization Process Assets



1. Expert Judgement
2. Product Analysis
3. Alternatives Identification
4. Facilitated Workshops

1. Project Scope Statement
2. Project Documents Updates

Define Scope

- Product Analysis
 - Product breakdown
 - System analysis
 - Requirement analysis
 - System engineering: Deals with multiple complex systems
 - Value engineering: Functions, value, cost
 - Retain the function & value and reduce the cost
 - Value analysis: Debate the function and its cost
 - Discuss the value of function vs the cost
- Alternative Identification
 - Alternative way of doing work

Scope Statement

Scope statement has following sections

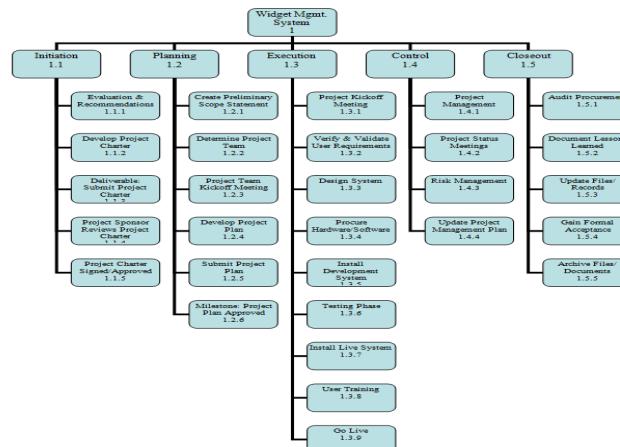
- Product Scope Description
- Product Acceptance Criteria
- Project Deliverables
- Project Exclusions
- Project Constraints (budget, imposed date, scheduled milestones, contractual provisions)
- Project Assumptions
- Organizational policies
- Available skilled resources

Create WBS



Definition

Subdividing project deliverables and project work into smaller, more manageable components.



Create WBS



1. Scope Management Plan
2. Project Scope Statement
3. Requirements Documentation
4. Enterprise Environmental Factors
5. Organization Process Assets



1. Expert Judgement
2. Decomposition



1. Scope Baseline
2. Project Documents Updates

Scope baseline

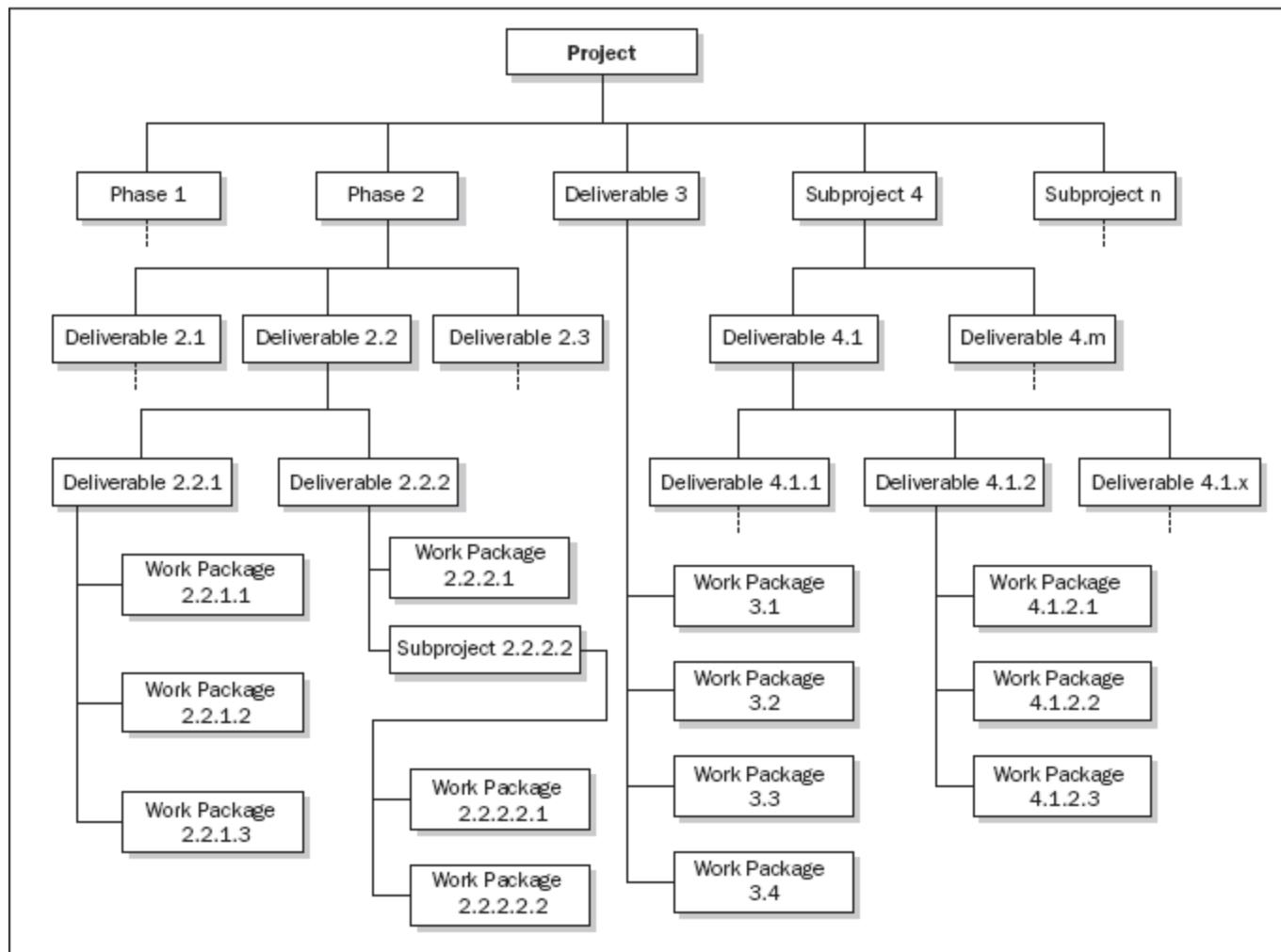
Scope baseline is part of PMP, Scope baseline includes

- Project Scope Statements
- WBS
- WBS Dictionary

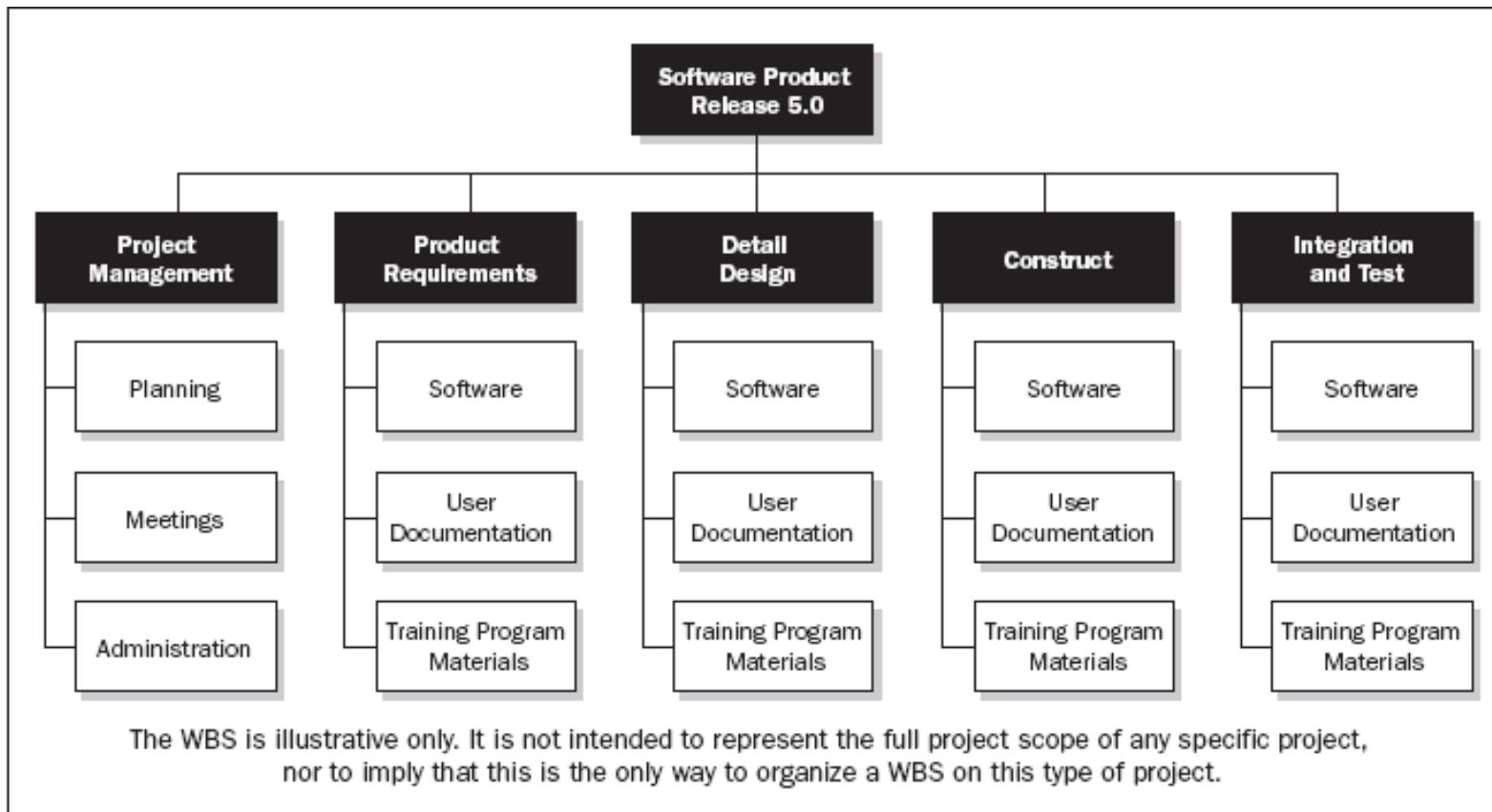
WBS Types

- Phase Driven
- Department Driven
- Milestone Driven
- Component Driven
- Location Driven
-

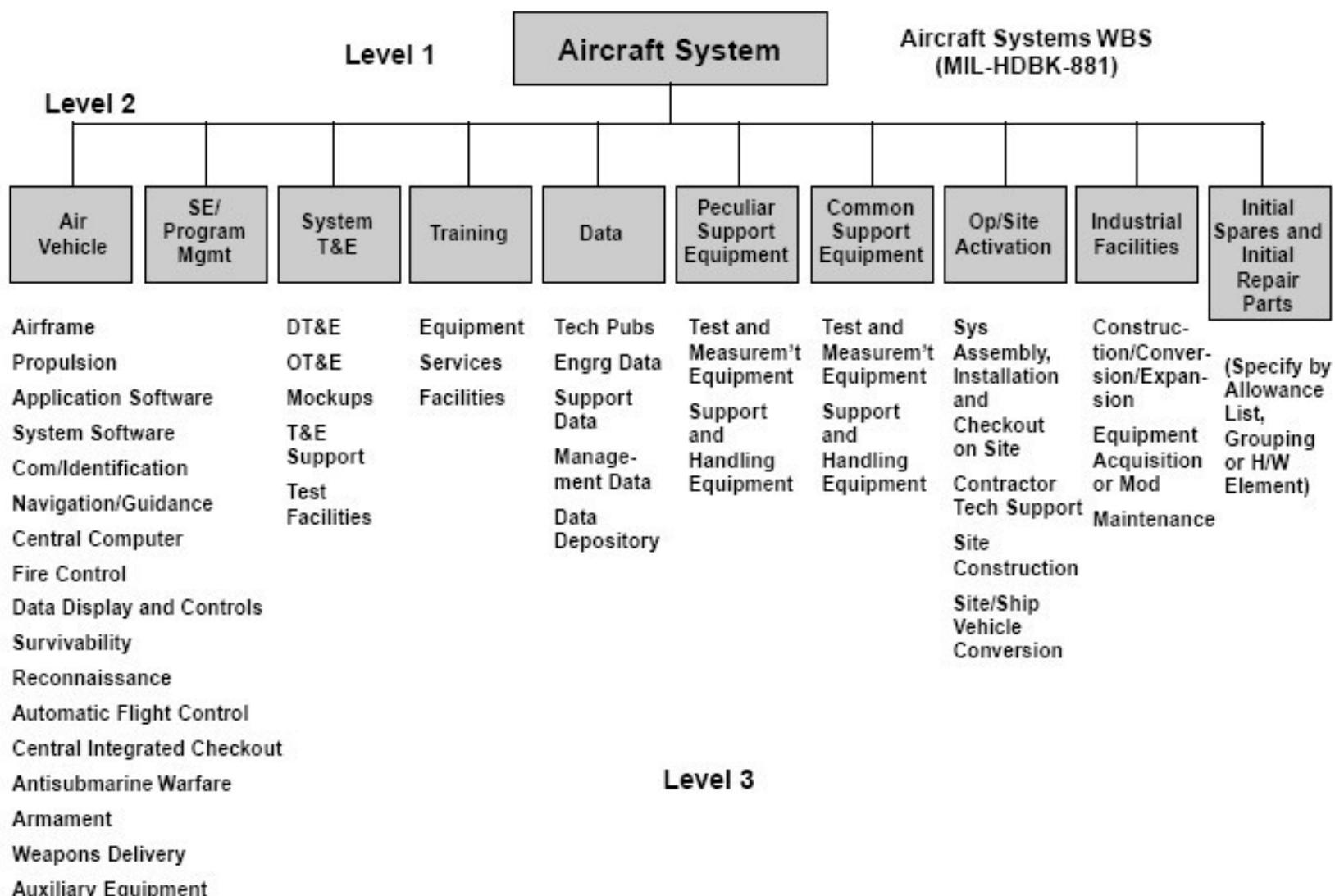
Phase oriented WBS



Department oriented WBS



Subproject Oriented WBS



Validate Scope



Definition

Formalizing acceptance of the completed project deliverables.



Validate Scope



1. Project Management Plan
2. Requirements Documentation
3. Requirement Traceability Matrix
4. Verified deliverables
5. Work Performance Data



1. Inspection
2. Group Decision Making Techniques



1. Accepted Deliverables
2. Change Requests
3. Work Performance Information
4. Project Documents Updates

Control Scope



Definition

Monitoring the status of the project and product scope and managing changes to the scope baseline.



Control Scope



1. Project Management Plan
2. Requirements Documentation
3. Requirement Traceability Matrix
4. Work Performance Data
5. Organization Process Assets



1. Variance Analysis

1. Work Performance Information
2. Change Requests
3. Project Management Plan Updates
4. Project Documents Updates
5. Organization Process Assets Updates

Recap – Scope Management

- ✓ Purpose of Scope Management
- ✓ Collect Requirement
 - ✓ Purpose, Tools & Output
- ✓ Define Scope
 - ✓ Purpose, Tools & Output
- ✓ Create WBS
 - ✓ Purpose, WBS Type
- ✓ Scope Baseline
 - ✓ Purpose & Component
- ✓ Validate Scope
 - ✓ Purpose, Tools & Output
- ✓ Control Scope
 - ✓ Purpose, Output

Discussions !

Agenda

- ✓ Framework
- ✓ Project Integration
- ✓ Scope Management
- Time Management ←
- Cost Management
- Quality Management
- Risk Management
- Communication Management
- Stakeholder Management
- Human Resource Management
- Procurement Management
- Professional Responsibility & Ethics

Project Schedule Management

Project Time Management

NewCo 1

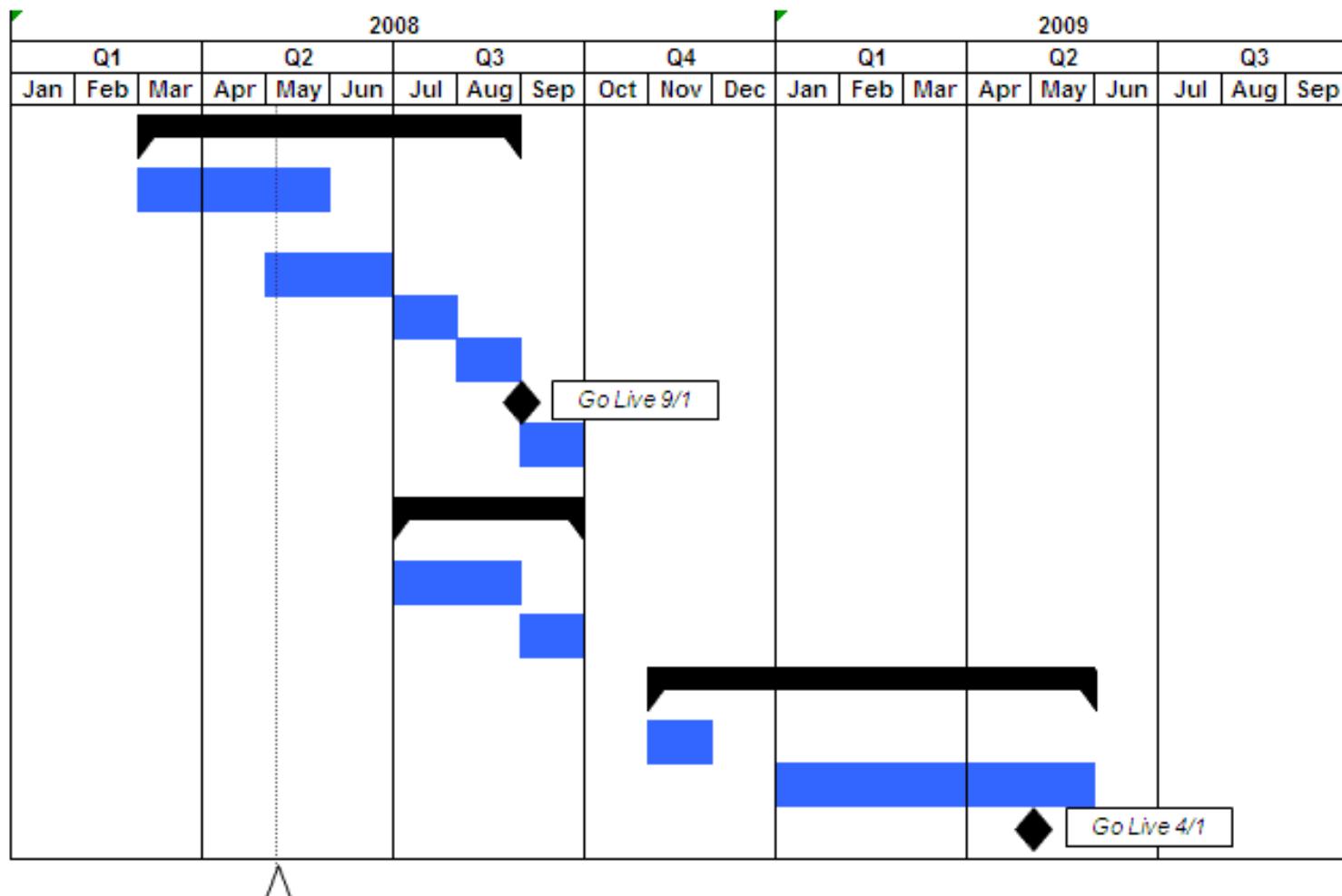
- Workplan & Budget
- Convert
- Design
- Development
- Implementation
- Go Live
- Operations

NewCo 2 Prep

- Workplan & Budget
- Design
- Implementation

NewCo 2

- Workplan & Budget
- Convert
- Go Live



Project Time Management

"Doing your project without a plan is like watching television with someone else holding the remote control"- Peter Turla

"The bad news is time flies. The good news is you're the pilot." - Michael Altshuler

"I made this letter longer than usual because I lack the time to make it shorter." – Pascal

"Time is a great teacher, but unfortunately it kills all its pupils." - Hector Louis Berlioz

Project Time Management



Definition

Processes required to manage timely completion of the project.



Project Time Management

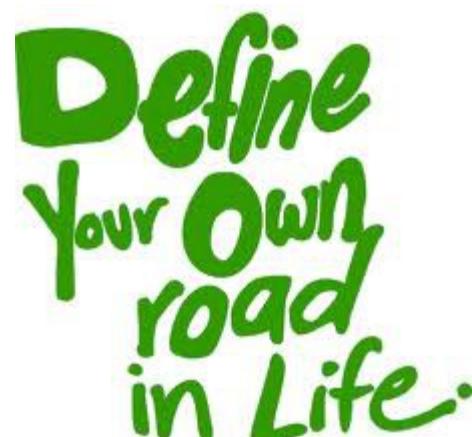
- Define Activities [PLANNING]
- Sequence Activities [PLANNING]
- Estimate Activity Resources [PLANNING]
- Estimate Activity Durations [PLANNING]
- Develop Schedule [PLANNING]
- Control Schedule [M&C]

Define Activities



Definition

Identifying the specific actions to be performed to produce the project deliverables



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Define Activities



1. Schedule Management Plan
2. Scope Baseline
3. Enterprise Environmental Factors
4. Organization Process Assets



1. Decomposition
2. Rolling Wave Planning
3. Expert Judgement



1. Activity List
2. Activity Attributes
3. Milestone List

Activity Attributes

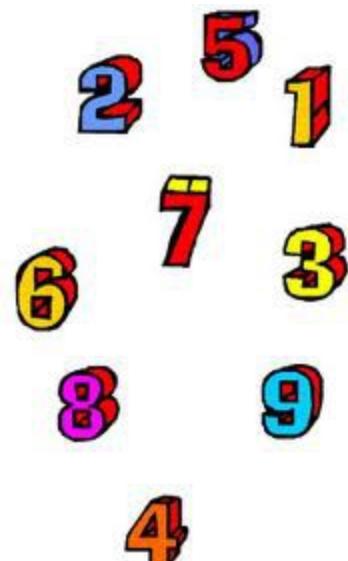
- Dependency
- Location of performance
- Type of dependency
- Level of efforts (work contour)
- Efforts required
- Related Deadline
- Related WBS account
- Critical activity
- Type of task (fixed duration, resources, work)
- Resource & skills required
- Duration
- Lead & Lag

Sequence Activities



Definition

Identifying and documenting relationships among the project activities.



Sequence Activities



1. Schedule Management Plan
2. Activity List
3. Activity Attributes
4. Milestone List
5. Project Scope Statement
6. Enterprise Environmental Factors
7. Organization Process Assets



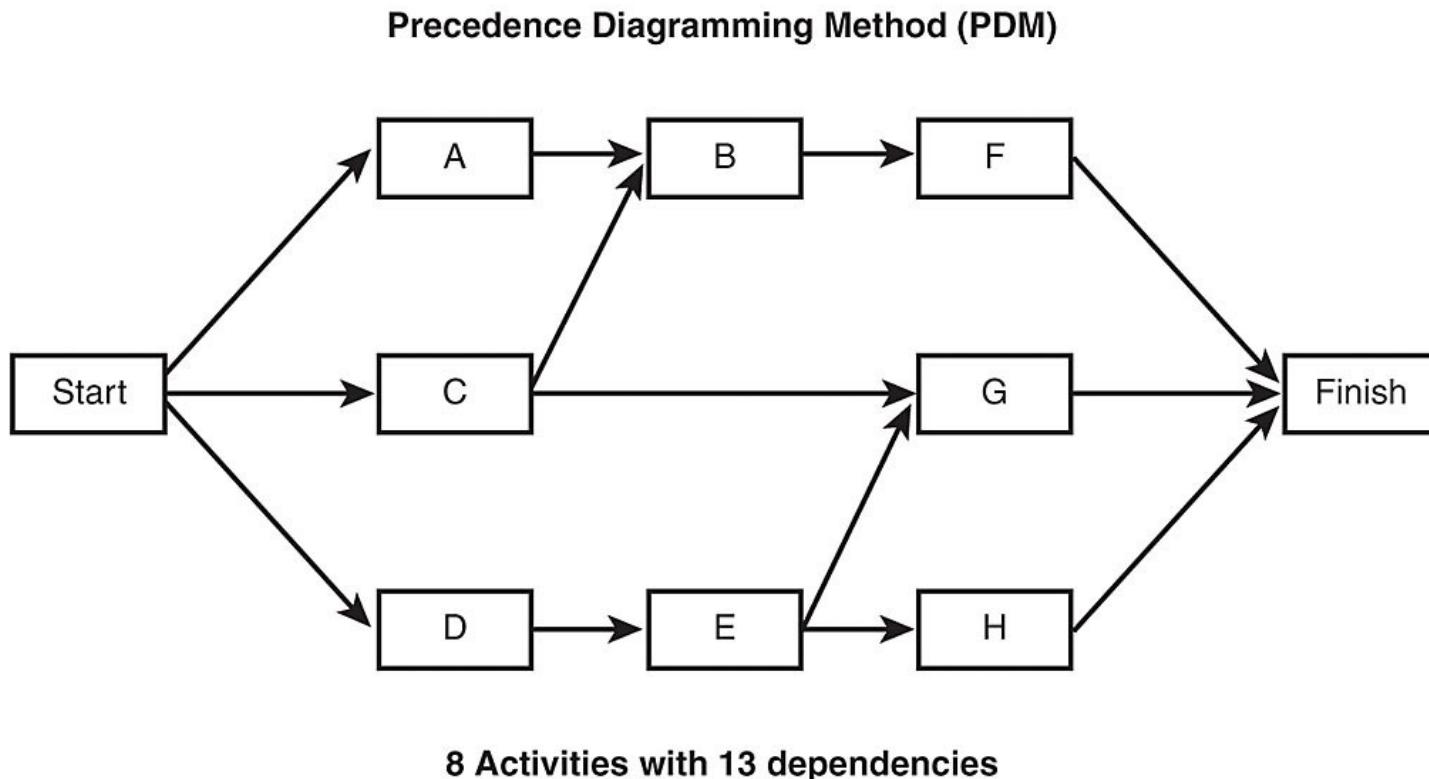
1. Precedence Diagramming Method
2. Dependency Determination
3. Leads and Lags

1. Project Schedule Network Diagrams
2. Project Documents Updates

Sequence Activities

- **Dependency Types**
 - Finish to Start (FS), Finish to Finish (FF), Start to Finish (SF), Start to Start (SS)
- **Constraints Type**
 - ASAP, ALAP, SNET, SNLT, FNET, FNLT, MSO, MFO
- **Lead & Lag**
- **Examples**
 - Switching electric current between normal to generator (FS)
 - Trainer and Student reach to training venue to start the training (FF)
 - Training delivery starts and making notes (SS)
 - Work assignment in project and people taking training (SF)
 - Send document to customer to review and wait for 5 days for approval (lag)
 - Before design approve you start digging foundation for building house (lead)

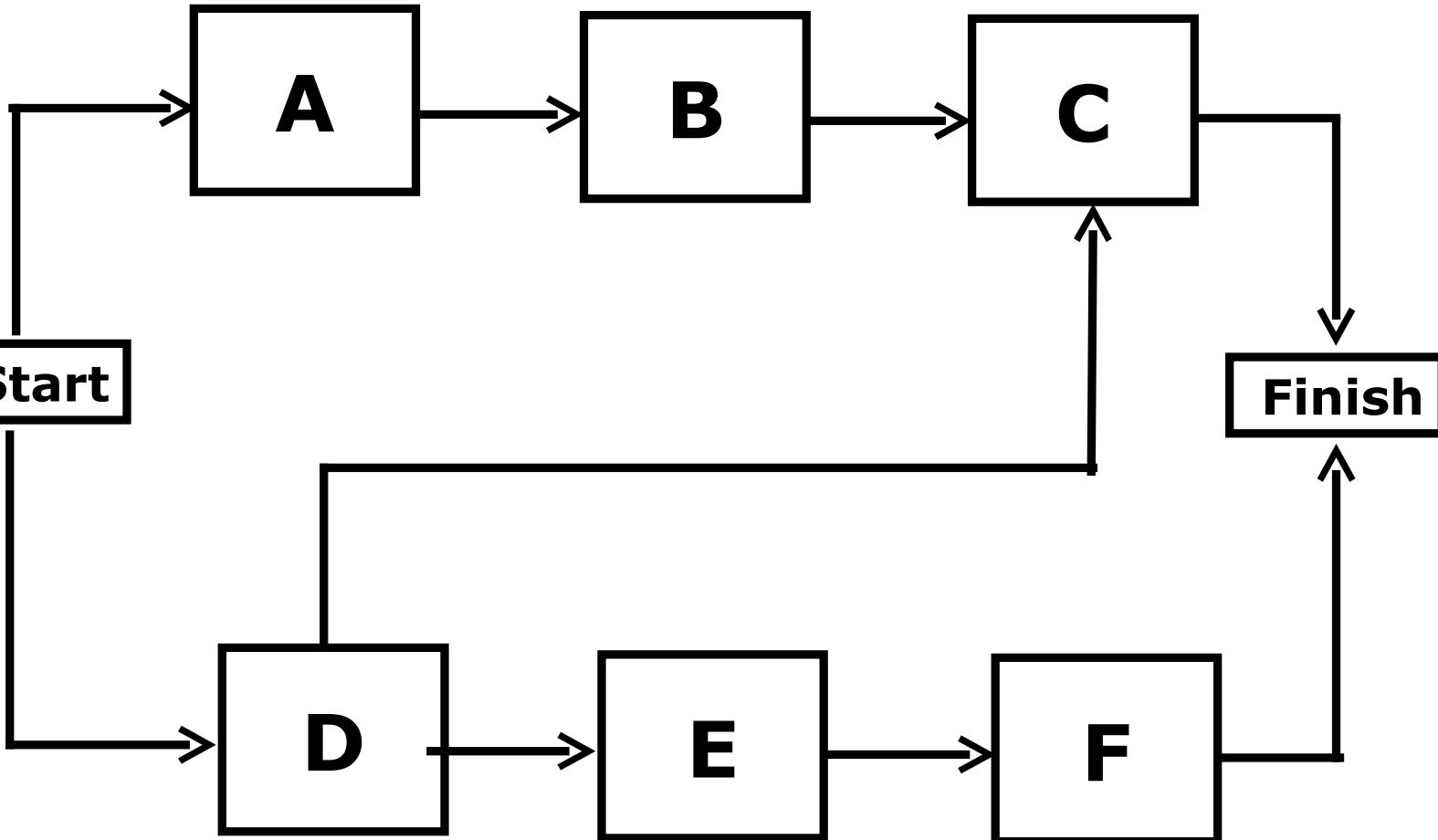
Precedence Diagramming Method (PDM)



Also known as Activity on Nodes (AON)

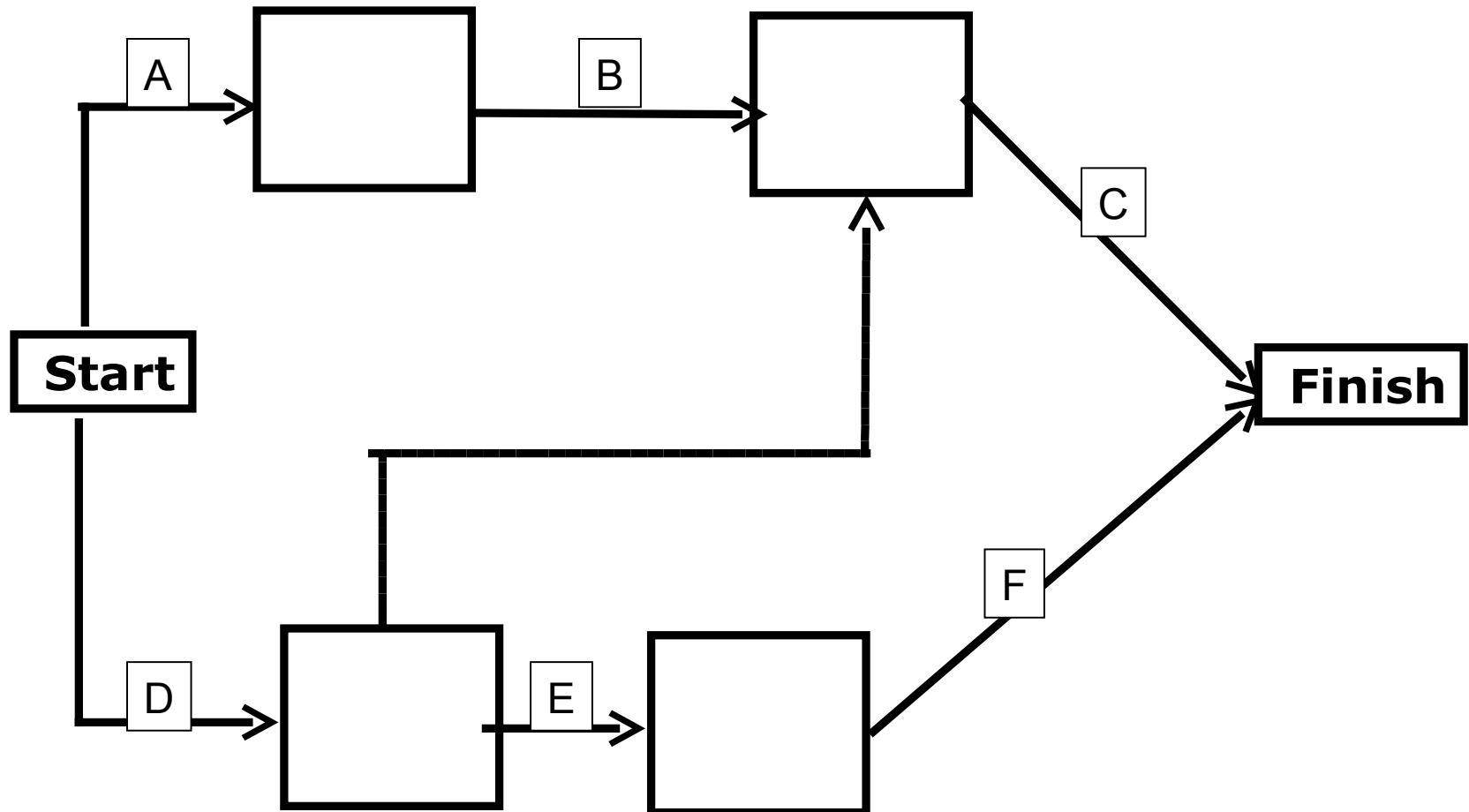
Network Development

Precedence Diagramming Method (AON)



Network Development

Precedence Diagramming Method (AOA)

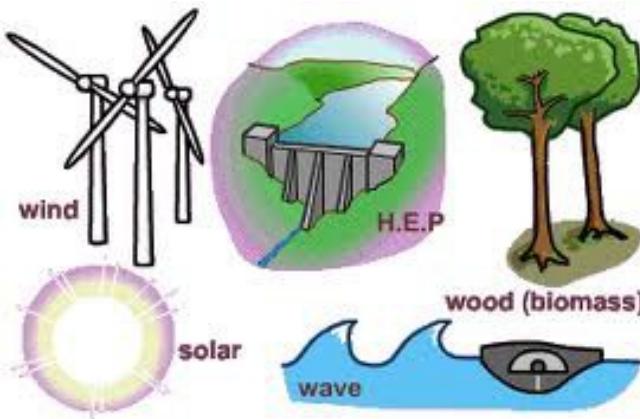


Estimate Activity Resources



Definition

Estimating the type and quantities of material, people, equipment or supplies required to perform each activity.



Estimate Activity Resources



1. Schedule Management Plan
2. Activity List
3. Activity Attributes
4. Resource Calendars
5. Risk Register
6. Activity Cost Estimates
7. Enterprise Environmental Factors
8. Organization Process Assets

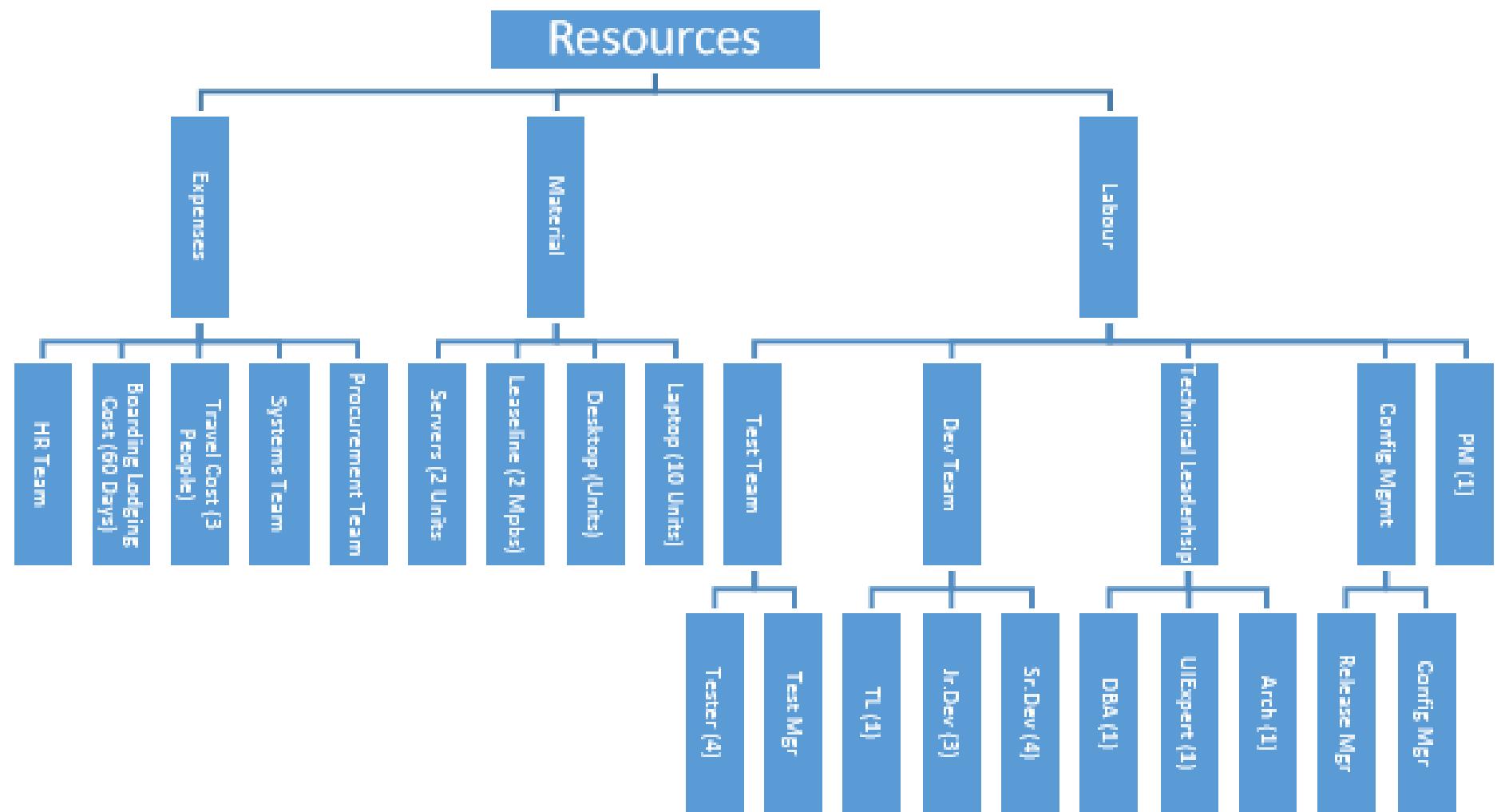


1. Expert Judgement
2. Alternatives Analysis
3. Published Estimated Data
4. Bottom-up estimating
5. Project Management Software



1. Activity Resource Requirements
2. Resource Breakdown Structure
3. Project Documents Updates

Resource Breakdown Structure



Estimate Activity Durations



Definition

Approximating the number of work periods needed to complete individual activities with estimated resources.



Estimate Activity Durations



1. Schedule Management Plan
2. Activity List
3. Activity Attributes
4. Activity Resource Requirements
5. Resource Calendars
6. Project Scope Statement
7. Risk Register
8. Resource Breakdown structure
9. Enterprise Environmental Factors
10. Organization Process Assets



1. Expert Judgement
2. Analogous Estimating
3. Parametric Estimating
4. Three-point estimates
5. Group Decision Making Techniques
6. Reserve Analysis

1. Activity Duration Estimates
2. Project Documents Updates

PERT – Program Evaluation and Review Technique

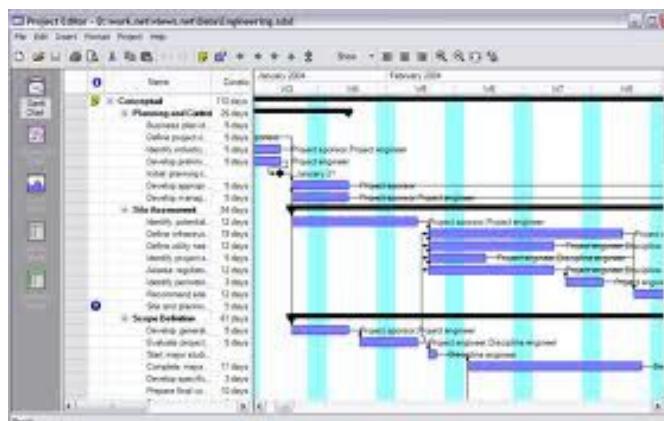
- PERT Estimate = $(\text{Optimistic} + 4 * \text{Most Likely} + \text{Pessimistic})/6$
- Standard Deviation (using PERT) = $(\text{Pessimistic} - \text{Optimistic})/6$
- Variance (using PERT) = $((\text{Pessimistic} - \text{Optimistic})/6)^2$

Develop Schedule



Definition

Analyzing activity sequences, durations, resource requirements and schedule constraints to create the project schedule.



Develop Schedule



- 1. Schedule Management Plan
- 2. Activity List
- 3. Activity Attributes
- 4. Project Schedule Network Diagrams
- 5. Activity Resource Requirements
- 6. Resource Calendars
- 7. Activity Duration Estimates
- 8. Project Scope Statement
- 9. Risk Register
- 10. Project staff assignment
- 11. Resource Breakdown structure
- 12. Enterprise Environmental Factors
- 13. Organization Process Assets

- 1. Schedule Network Analysis
- 2. Critical Path Method
- 3. Critical Chain Method
- 4. Resource Optimization techniques
- 5. Modeling Techniques
- 6. Leads and Lags
- 7. Schedule Compression
- 8. Scheduling Tool

- 1. Schedule baseline
- 2. Project Schedule
- 3. Schedule Data
- 4. Project Calendars
- 5. Project Management Plan Updates
- 6. Project Documents Updates

Control Schedule



Definition

Monitoring the status of the project to update project progress and manage changes to the schedule baseline



Control Schedule



1. Project Management Plan
2. Project Schedule
3. Work Performance Data
4. Project Calendars
5. Schedule Data
6. Organization Process Assets



1. Performance Reviews
2. Project Management Software
3. Resource Optimization Techniques
4. Modeling Techniques
5. Leads and Lags
6. Schedule Compression
7. Scheduling Tool



1. Work Performance Information
2. Schedule Forecasts
3. Change Requests
4. Project Management Plan Updates
5. Project Documents Updates
6. Organization Process Assets Updates

Big Concepts

Critical Path Method (CPM)

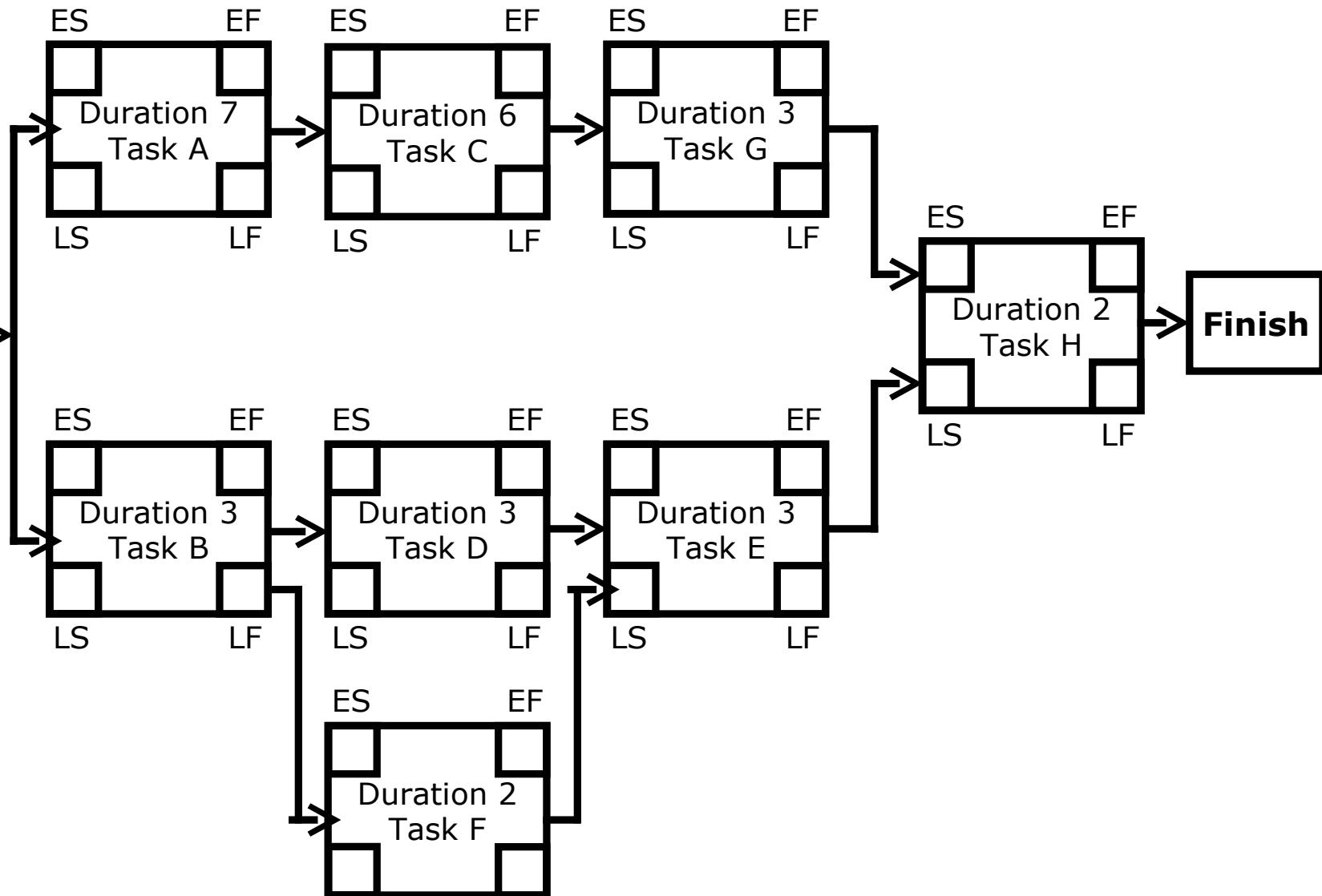
Critical Chain Method (CCM)

Critical Path Method (CPM)

Critical Path Method (CPM)

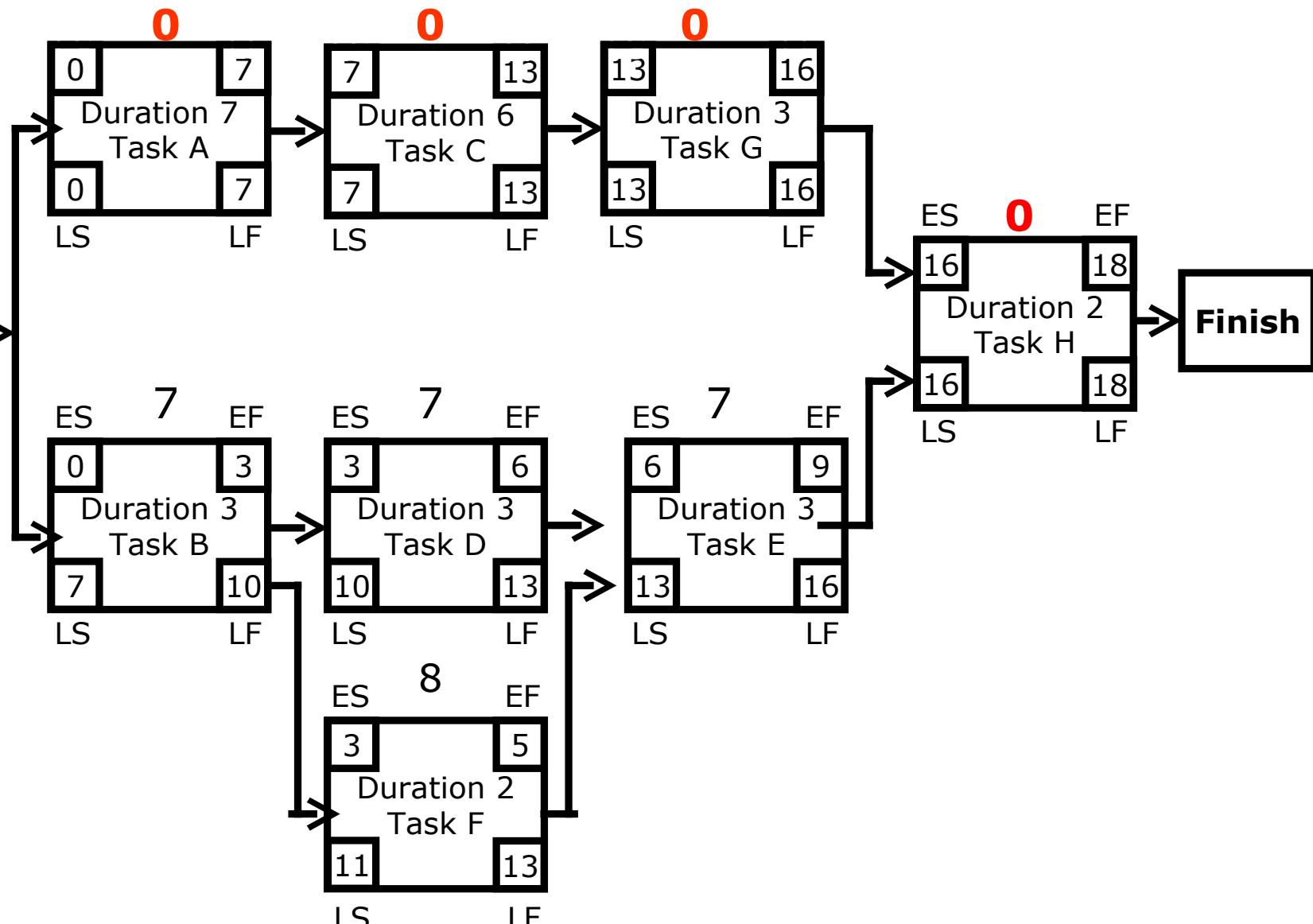
Critical Path method is a planning technique that is used to demonstrate and view the chronological activities of a program or project, and identifies any possible timing risks and can be used to establish the least amount of time to complete a project.

Critical Path

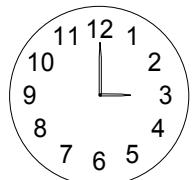


Critical Path – Longest Path, Zero Float

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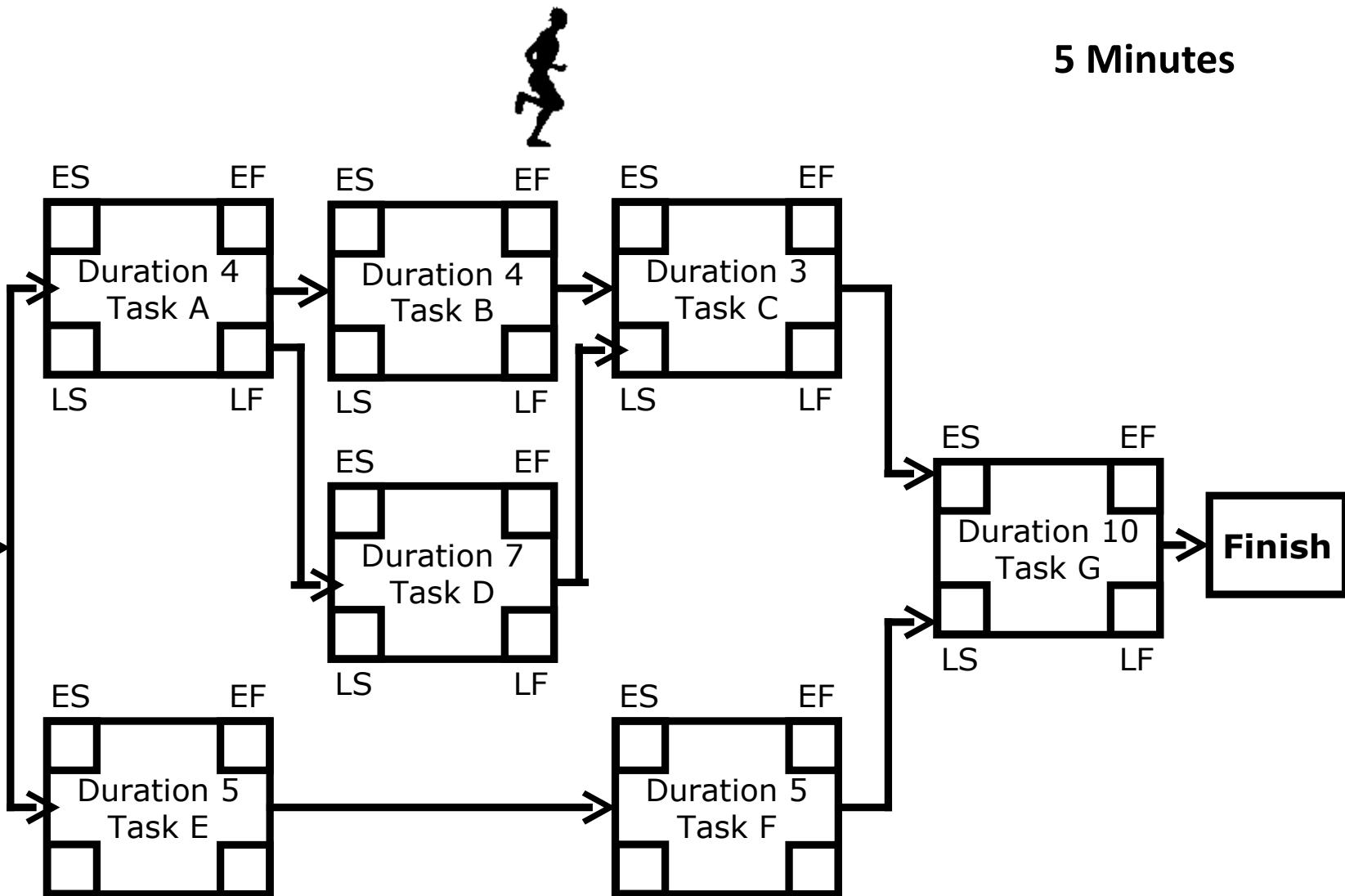


Discussion/Excercise-16



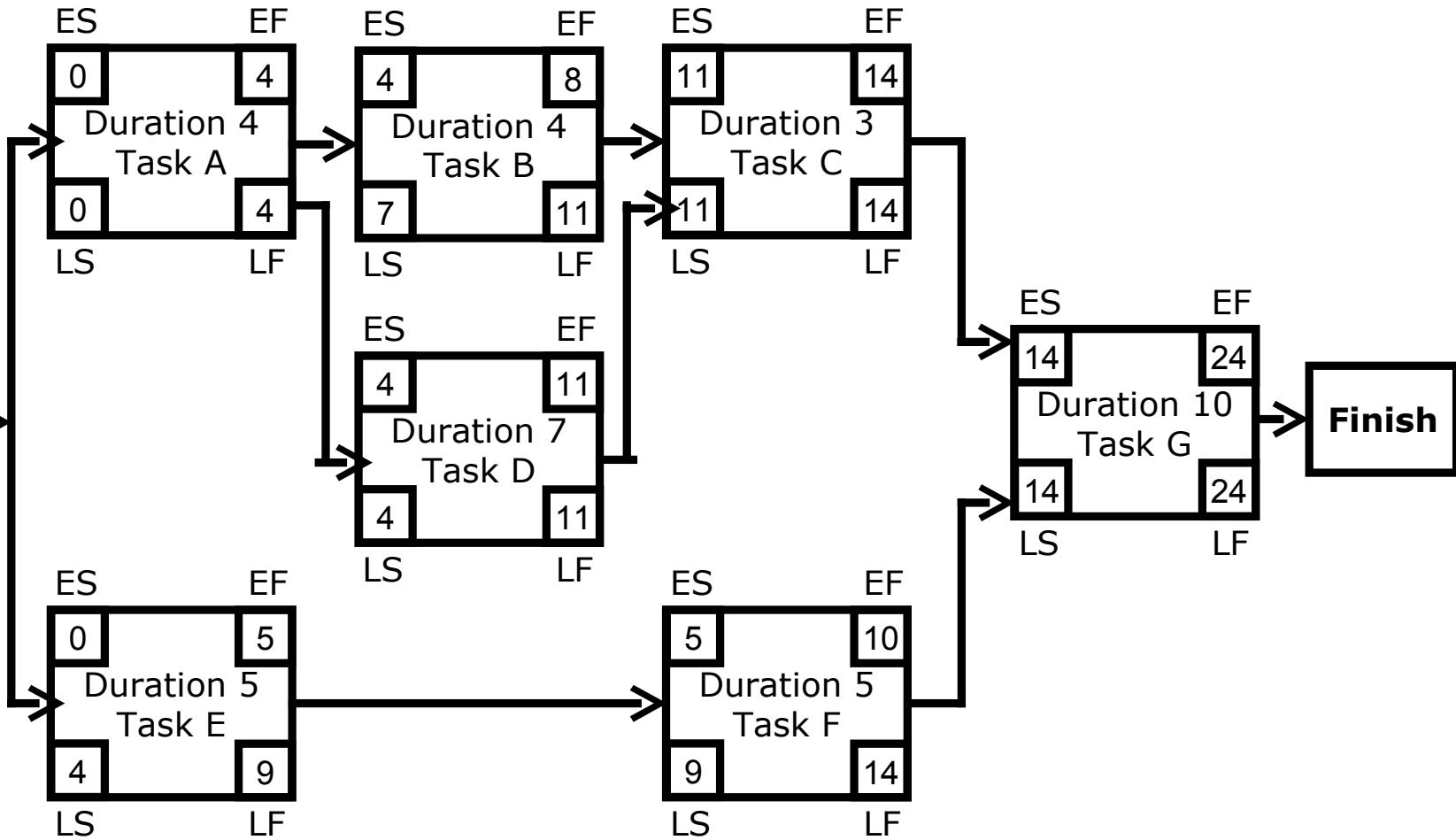
5 Minutes

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Network Exercise - solution

Critical Path : ADCG



Facts/Tips for Critical Path

- Total Float is the amount of time the task can delayed without delaying the project finish date.
- Free float is the amount of time a task can slip without delaying the early start of any task that immediately follows it
- It is possible that a zero float activity may not be on critical path
- Longest path & shortest time possible to complete the project
- A project can multiple critical paths
- Difference between late and early is float
- Positive float (the activity can wait to start even after previous activity finishes)
- Negative float (the activity must start before previous finishes)
- Zero float (the activity must immediately start after the finish of previous one)
- Crashing activities to short the overall duration of project
- Fast-tracking activities to short the overall duration of project
- Be cautious that non-critical activity is not being delayed than the allowed free float
- Take care of sub-critical path or non-critical path
- Manage critical path resources very closely
- Do not overload critical path activity resources
- Avoid multitasking for resources working on critical path activities

Benefits of PERT/CPM

It Provides following information

- Expected Project completion time
- Probability of completion before a specified date
- The critical path activities that directly impact the completion time
- The activities that have slack time and that can lend resources to critical path activities
- Activity start and end dates

Critical Chain Method (CCM)

Background

- Eliyahu Goldratt proposed CCM
- This is developed based on the TOC framework

Why CCM is needed?

- You have CPM available why CCM is needed?
 - You can manage the delays on non-critical path using buffers/floats. BUT
 - How do you manage the delays on critical path?

Principles Behind CCM

- **Delays accumulate; gains don't advantage**
 - Sequential Steps: Resources are not available to start early
 - Parallel Steps: Three activity each takes 5 days time start in parallel. If one activity takes 10 days and other finish on time, early activities will not be able to take advantage.
 - If above sequential and parallel activities are dependent then affect is magnified
- **Other Time Wasters**
 - Multitasking
 - Student Syndrome
 - Parkinson's Law

Critical Chain Method

- CPM is developed using the belief that book as many resource as in advance and they will be available when need because it has been promised
- CCM says that if a resource is over booked on any activity he will not be available to work on that activity therefore level the resource on the project activities. Thus resource constrained critical path is critical chain.
- CPM is about hoarding, greed. Therefore over-estimation and project management laws like Parkinson law, Murphy law, Student syndrome applies here.
- CCM is about believe and assumption that it will available when needed but we need to have proper alert system in place.

CCM Concepts

- **Resource Buffer:** Notify dependent task resources that when I will finish my work on regularly basis and final notification 1-2 days before. So that resource is available to start the work.
- **Safety or Project Buffer** should be added at the end of critical-chain as non-activity buffer
- **Feeding Buffer:** Add buffer where chain of non-critical activity joins the critical path. This way non critical task can be avoided being critical

How to estimate in CCM

- Resource will give t80, t90 estimate.
- Half them to get t50 estimate.
- Do not put the end date to task and let people finish the task as early as possible.
- No penalty for finish beyond t50.
- Project Buffer should be 50% of the buffer removed from activity.

How to manage CCM

- If activity finishes late time is borrowed from project buffer.
- If activity finishes early, gained time is added to project buffer

Discussions !

Recap – Time Management

- ✓ Define Activities
 - ✓ Purpose, Output
- ✓ Sequence Activities
 - ✓ Purpose, Tools, Dependency Type, Constraint Types, Lead & Lag
- ✓ Estimate Resources
 - ✓ Purpose, Techniques
- ✓ Estimate Duration
 - ✓ Purpose, Techniques
- ✓ Develop Schedule
 - ✓ Purpose, Techniques
- ✓ Schedule Baseline
- ✓ Critical Path Method
- ✓ Critical Chain Method
- ✓ Standard Deviation & Confidence Level

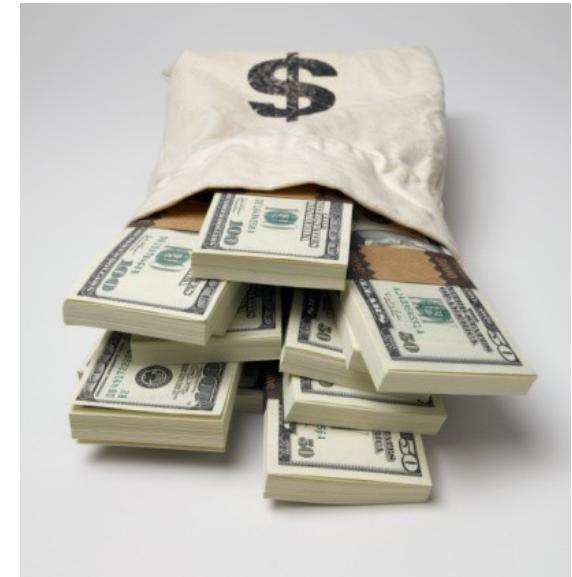
Agenda

- ✓ Framework
- ✓ Project Integration
- ✓ Scope Management
- ✓ Time Management
- Cost Management ←
- Quality Management
- Risk Management
- Communication Management
- Stakeholder Management
- Human Resource Management
- Procurement Management
- Professional Responsibility & Ethics

Project Cost Management

Project Cost Management

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Project Cost Management- A Thought

- ✓ If you don't plan, it doesn't work. If you do plan, it doesn't work either.
Why plan!
- ✓ The same work under the same conditions will be estimated differently by ten different estimators or by one estimator at ten different times. So why to estimate!
- ✓ Any project can be estimated accurately (once it's completed).
- ✓ Nothing is impossible for the person who doesn't have to do it.
- ✓ Right answers to wrong questions are just as wrong as wrong answers to right questions.

Project Cost Management



Definition

**Processes involved in estimating, budgeting,
and controlling costs so that the project can be
completed within the approved budget**

Project Cost Management

- Estimate Costs [PLANNING]
- Determine Budget [PLANNING]
- Control Costs [M&C]

Components of Contract Price

- Contract Price includes Material, Labor, Expenses, Overheads, Risk Management Budget, Profit Margins
- Cost baseline includes **contingency reserves**
- Project budget includes **management reserves**

Do you know?

- Who estimates Material cost for your project?
- Who estimates Human Resource cost for your project?
- Who estimates Expenses cost for your project?
- Who estimates Overhead cost for your project?
- How much is contingency reserve for your project?
- What are indirect costs to your project?
- When can you use contingency funds and who approves that?
- How much is profit margin on your project?
- What is the price?

Types of Cost

- ✓ Fixed Cost vs Variable Cost
- ✓ Direct vs Indirect Cost
- ✓ Material, Labour, Services
- ✓ Overhead Cost
- ✓ Sunk Cost
- ✓ Opportunity Cost

Types of Cost

- ✓ Direct cost: purchased, used, consumed in the project directly.
- ✓ Indirect cost: shared cost between project.

Types of Cost

- ✓ **Sunk Cost-** Retrospective cost/ that cannot be recovered/ Cost gone and very low value or zero value was taken out. Plant developed but not of any use now additional money is required but by that money some better work can be done, so not to invest and let already invested money sunk. Software developed but it is not of any use now due any reason.
- ✓ **Perspective Cost-** cost to be occurred in future
- ✓ **Allocated Cost-** Cost of security service is shared by all division/companies of the building. Spreading the cost among those that use it.

Types of Cost

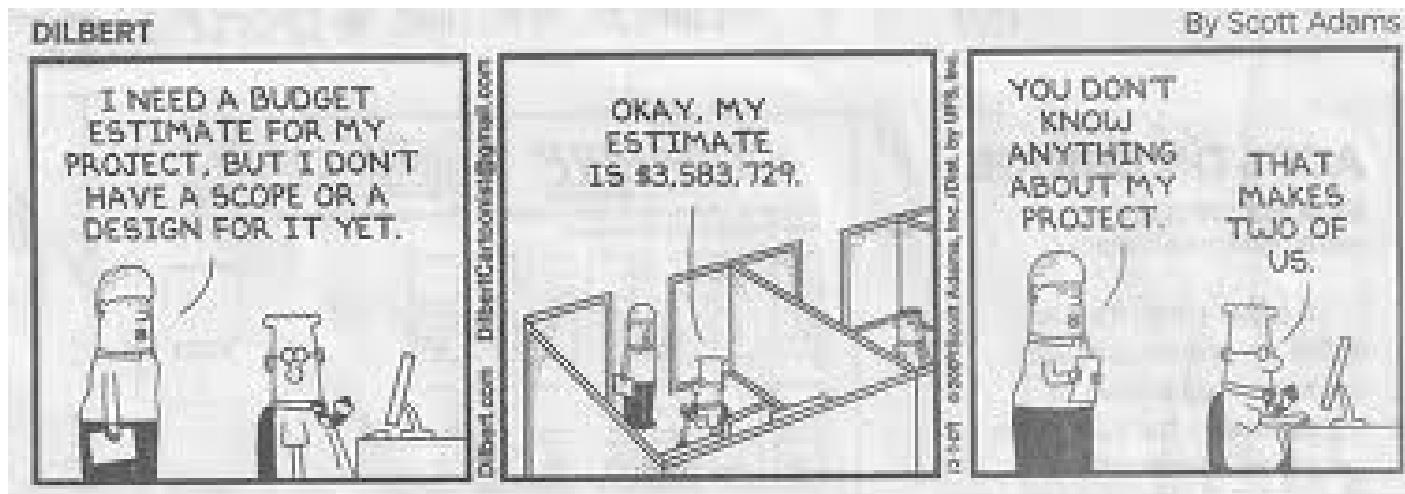
- ✓ **Apportioned Cost-** To find apportioned cost you should know % of each appraised value (land, building, machine)
- ✓ **Value Added Cost-** Sale price of a product and cost price of material is value add
- ✓ **Transfer Cost** -Cost of transfer or transaction between two entities
- ✓ **Opportunity cost-** Value lose because of exercising an option. It is just economic cost. Does not reflect in financial books

Estimate Costs



Definition

Developing an approximation of the costs of the resources needed to complete project activities.



Estimate Cost



1. Cost Management Plan
2. Human Resource Management Plan
3. Scope Baseline
4. Project Schedule
5. Risk Register
6. Enterprise Environmental Factors
7. Organization Process Assets



1. Expert Judgement
2. Analogous Estimating
3. Parametric Estimating
4. Bottom-up estimating
5. Three-point estimates
6. Reserve Analysis
7. Cost of Quality
8. Project Management Software
9. Vendor Bid Analysis
10. Group Decision Making Techniques



1. Activity Cost Estimates
2. Basis of estimates
3. Project Documents Updates

Project Cost Estimation Ranges

- Never ever commit one absolute number to your project sponsor. Always range.
- Cost estimation may include only Direct Cost or in combination of with Indirect Costs

Class Name	%	Range
Definitive	- 5 -> +5%	10%
Capital Cost	-15 -> +10%	25%
Appropriation	-25 -> +15%	40%
Budget Estimates	-10 -> +25%	35%
Feasibility	-35 -> +25%	60%
Order of Magnitude	-50 -> +50%	100%

Determine Budget



Definition

Aggregating the estimated costs of individual activities or work packages to establish an authorized cost baseline

Determine Budget



1. Cost Management Plan
2. Scope Baseline
3. Activity Cost Estimates
4. Basis of estimates
5. Project Schedule
6. Resource Calendars
7. Risk Register
8. Agreements
9. Organization Process Assets



1. Expert Judgement
2. Cost Aggregation
3. Reserve Analysis
4. Historical Relationships
5. Funding Limit Reconciliation



1. Cost Baseline
2. Project Funding requirements
3. Project Documents Updates

Estimation Traps

Customer: “How long will this project take?”

Project Manager: “What is the project about?”

Customer: “It is a systems upgrade project.”

Project Manager: “Can you tell me more about the project?”

Customer: “I don’t know, we will get into that later, but just tell me how long will it take.”

Five Ways to Avoid Estimation Traps

1. Provide a range instead of number.
 - Ranges reveals level of uncertainty in the scope. Customer will appreciate it if you tell him why that kind of range is given.
 - +/- 10 or +/- 50%. You can discuss cone of uncertainty with customer
2. Highlight underlying assumptions and constraints
 - Based on this (current information) assign confidence level or probability
3. Use objective estimation techniques like 3 Point or PERT
 - Don't play estimation games like padding estimates by doubling and then customer make it half. Next time you quadruple it. This unnecessarily creates cycle of mistrust.
4. Use a combination of techniques and solicit multiple perspectives
5. Track and compare actual results
 - Initially everybody fights for getting "accurate estimates" after that people forget about it

Next time you are asked to provide an accurate estimate, don't fall into the trap. Instead, use it as an opportunity to engage and educate your stakeholders about the reality of estimates.

Control Costs



Definition

Monitoring the status of the project to update the project budget and managing changes to the cost baseline



Control Cost



1. Project Management Plan
2. Project Funding requirements
3. Work Performance Data
4. Organization Process Assets



1. EVM
2. Forecasting
3. TCPI
4. Performance Reviews
5. Project Management Software
6. Reserve Analysis

1. Work Performance Information
2. Cost Forecasts
3. Change Requests
4. Project Management Plan Updates
5. Project Documents Updates
6. Organization Process Assets Updates

Big Concepts

Earn Value Management

Earned Value Management – Basic Concepts

Planned Value (PV)- BCWS

Authorized budget assigned to the work to be accomplished for an activity or work breakdown structure component.

Earned Value (EV)- BCWP

Value of work performed expressed in terms of the approved budget assigned to that work for an activity or work breakdown structure component.

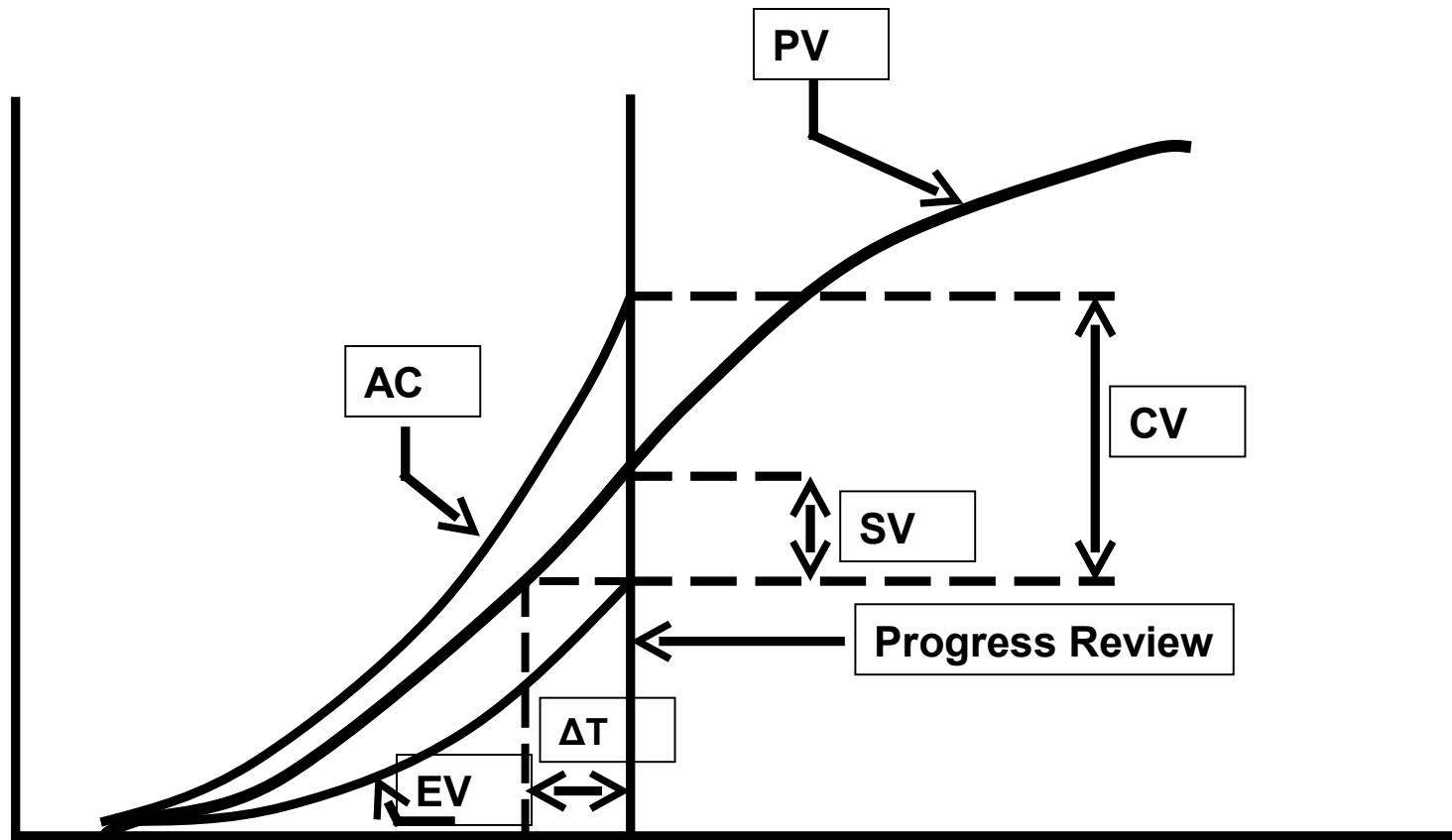
Actual Cost (AC)- ACWP

Total cost actually incurred and recorded in accomplishing work performed for an activity or work breakdown structure component.

Earned Value Rules

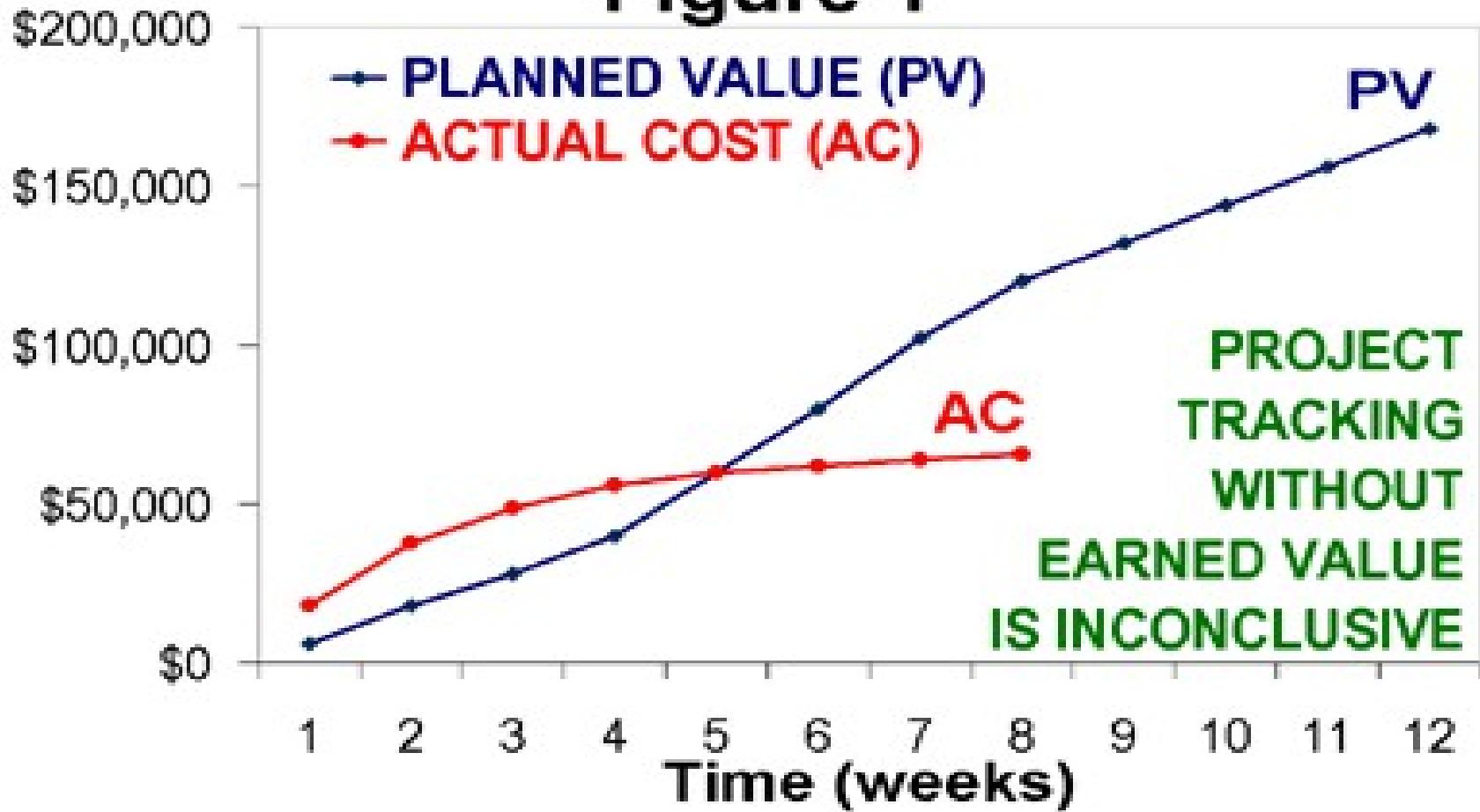
- 0% - 100%
- 50% - 50%
- 20% - 80%
- 25% - 75%

Earned Value Management – S Curve



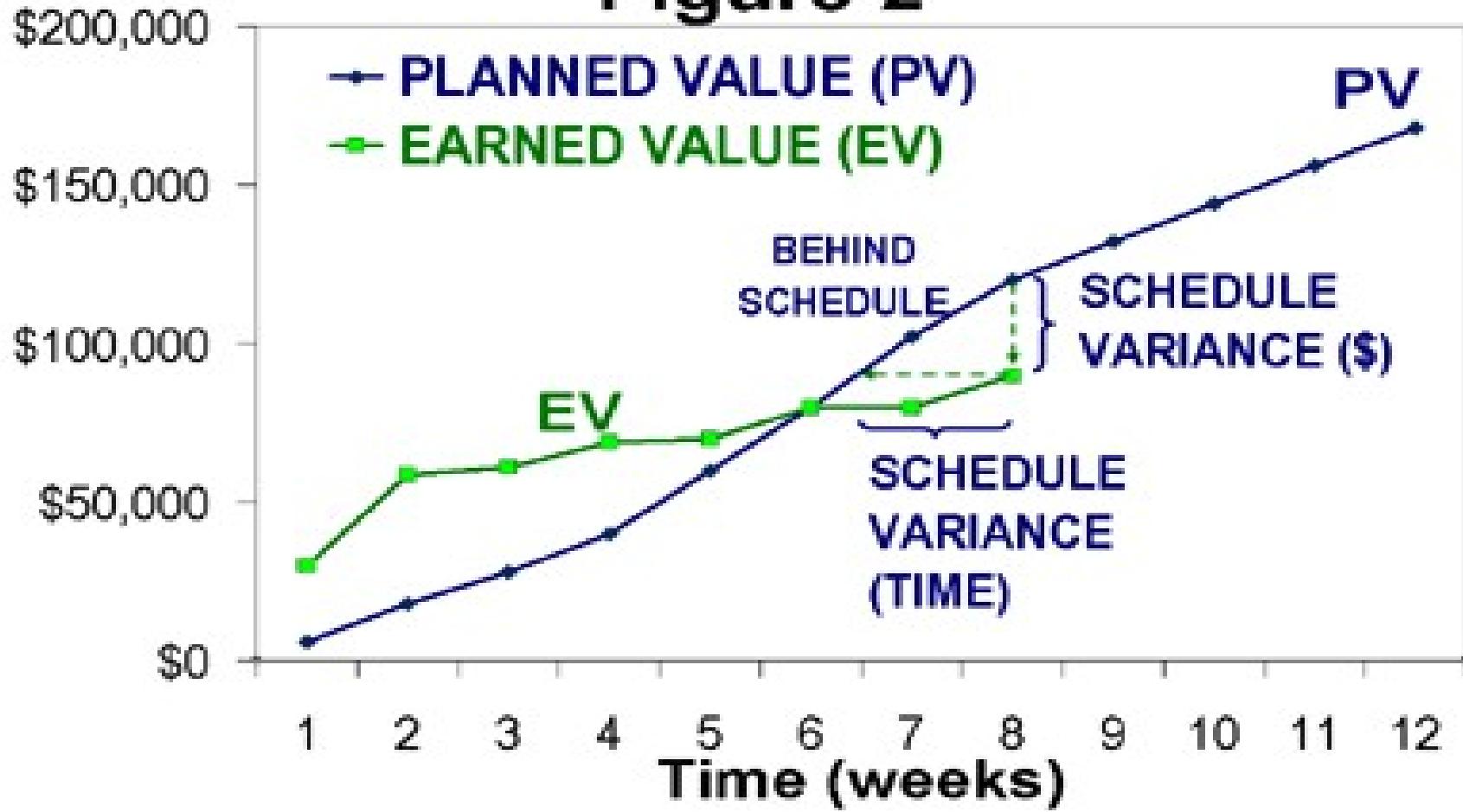
How is this Project?

Figure 1



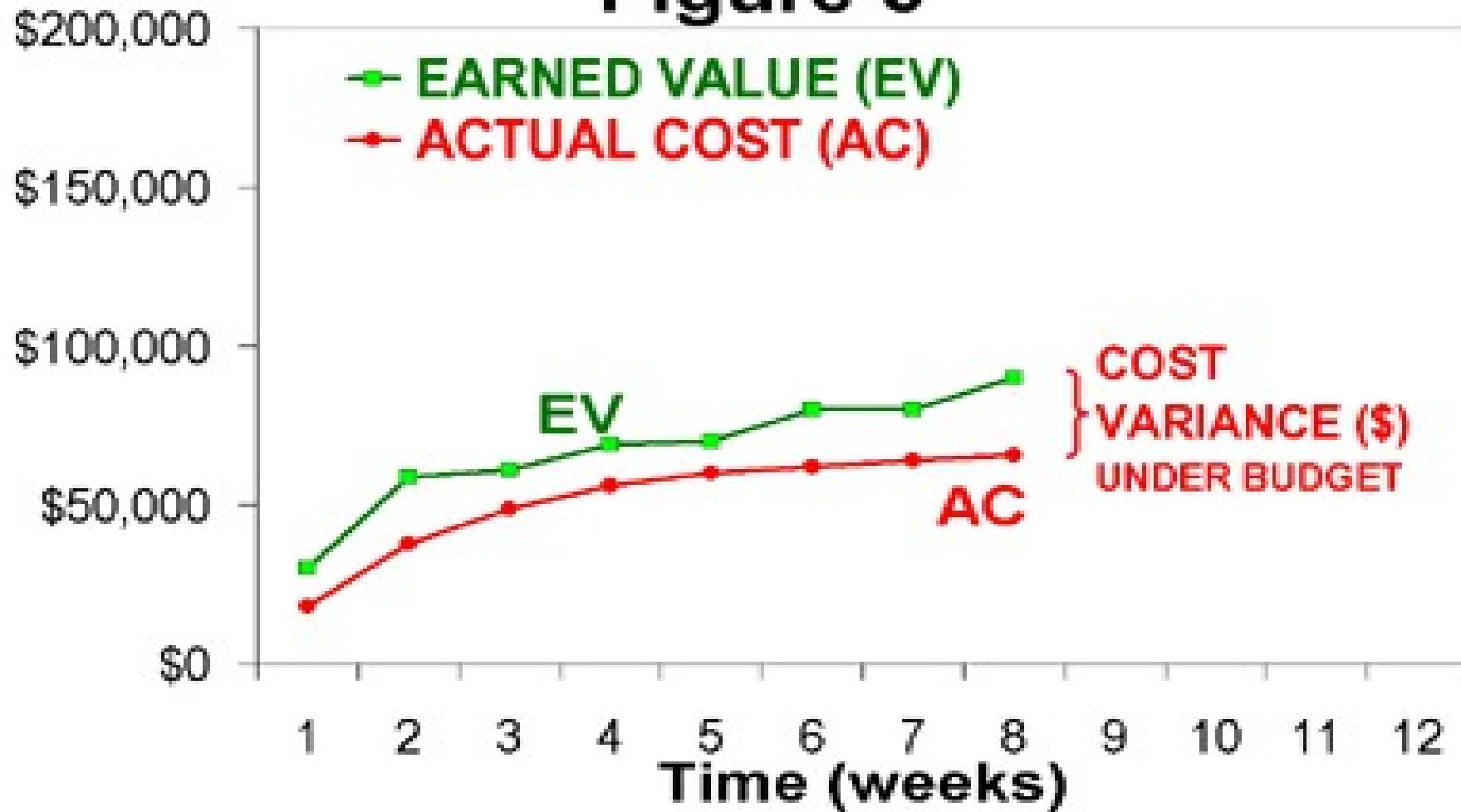
and How is this Project?

Figure 2



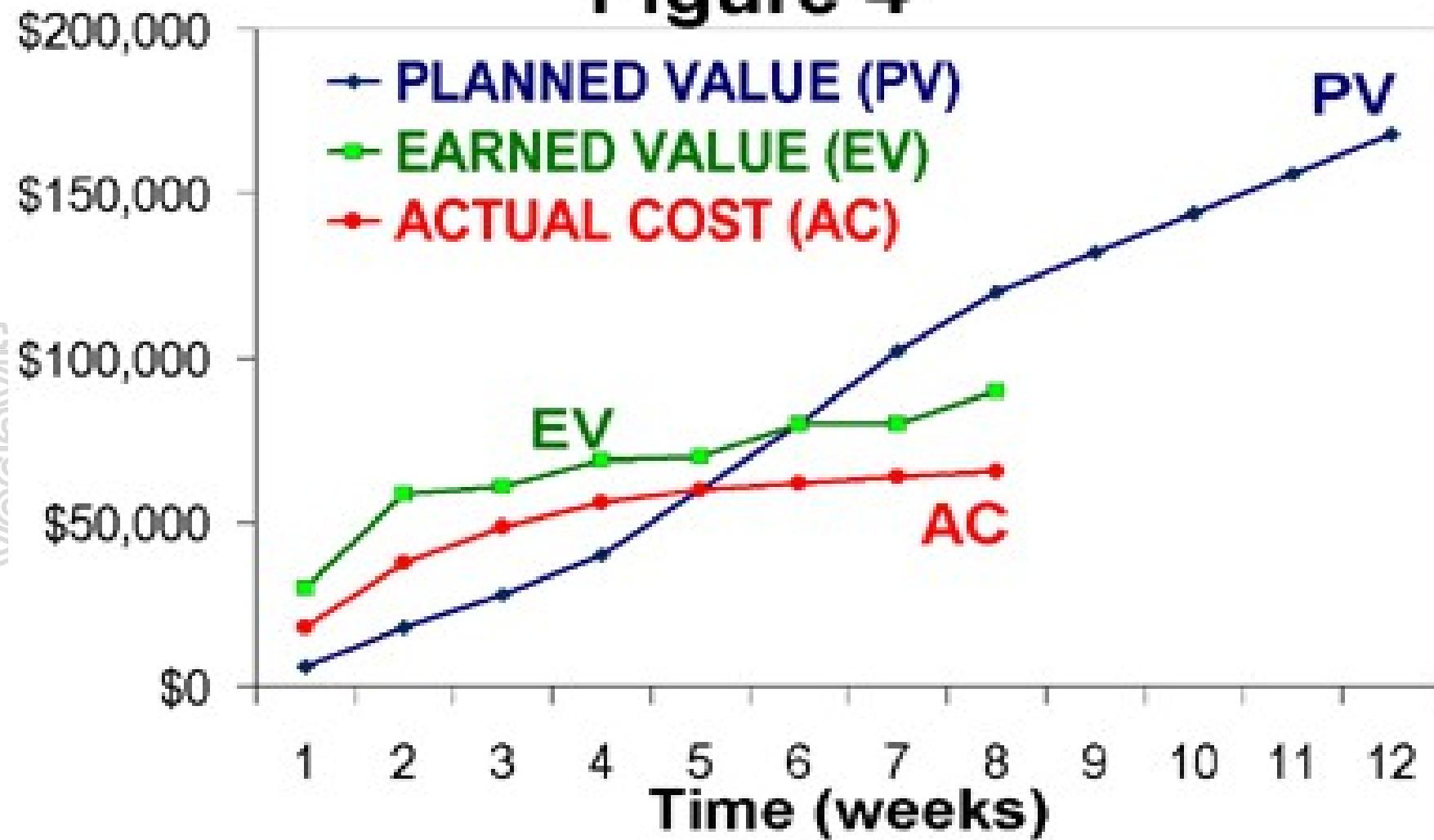
and How is this Project?

Figure 3



and What about this Project?

Figure 4



EVM-Variances

$$CV (\text{Cost Variance}) = EV - AC$$

$CV = 0 \Rightarrow$ the Project is proceeding as per plan on cost

$CV < 0 \Rightarrow$ the Project is over budget

$CV > 0 \Rightarrow$ the Project is under budget

$$SV (\text{Schedule Variance}) = EV - PV$$

$SV = 0 \Rightarrow$ the project is on plan, time-wise

$SV < 0 \Rightarrow$ the project is BEHIND schedule

$SV > 0 \Rightarrow$ the project is AHEAD of schedule

EVM- Indexes

CPI (Cost Performance Index) tells you how much worth of job you are getting for every \$ being spent.

$$CPI = EV/AC$$

CPI = 1 => the project is on plan, cost wise

CPI < 1 => the project is over budget or under performing

CPI > 1 => the project is under budget or over performing

SPI tells the PM how much worth of job has been completed against planned work

$$SPI = EV / PV$$

SPI = 1 => the project is on schedule

SPI < 1 => the project is BEHIND schedule

SPI > 1 => the project is AHEAD of schedule

EVM- Critical Ratio

CR tells the PM the overall shape of your project

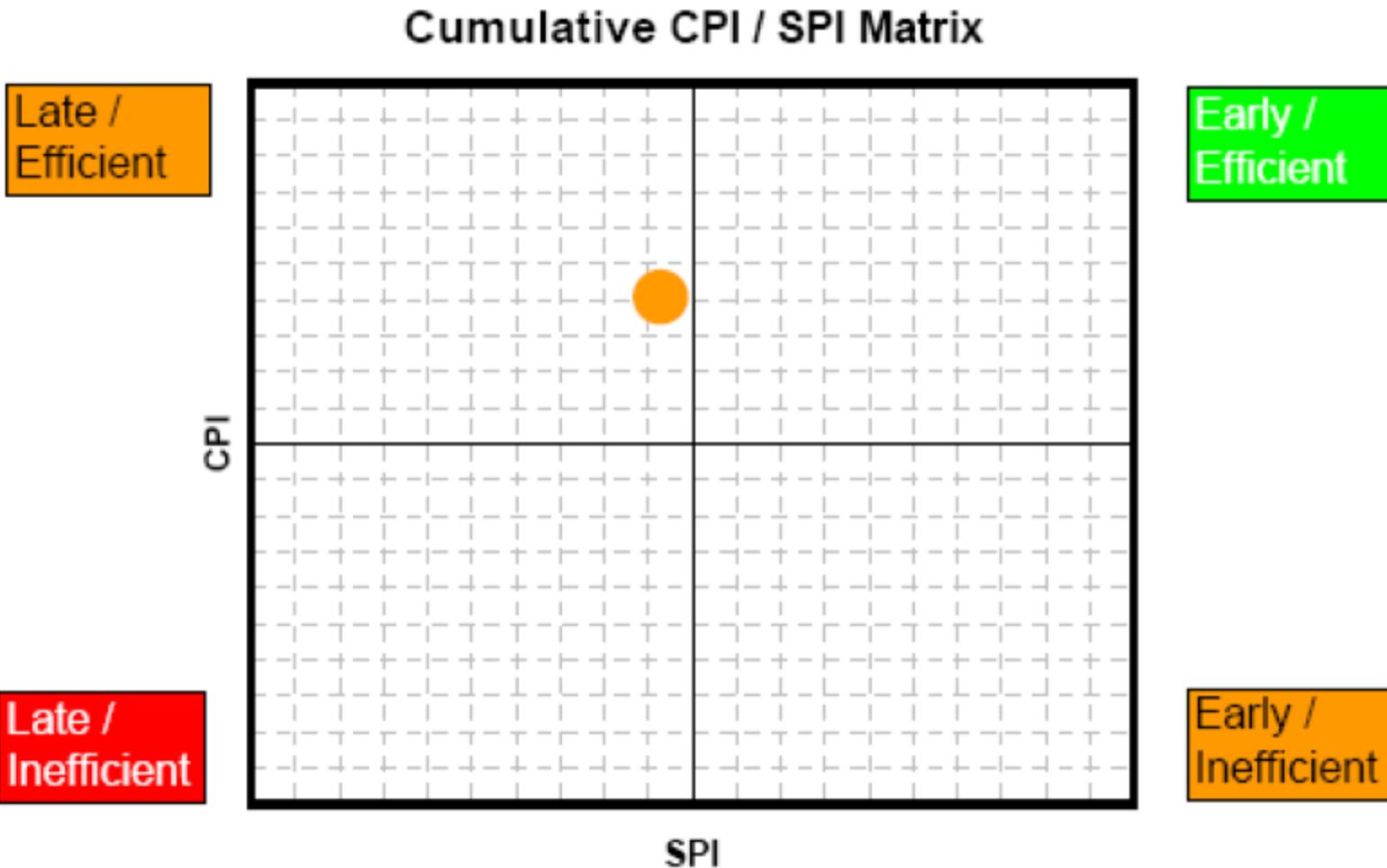
$$CR = CPI \times SPI$$

CR = 1 => the project is on schedule & within budget

CR < 1 => the project is BEHIND schedule or budget or both

CR > 1 => the project is AHEAD of schedule or budget or both

CPI & SPI Summary



Forecasting- ETC

- *Recalculate it, if original estimate are no longer valid now.*
- *Calculate it manually based on the progress, if original estimates are still valid*
 - $ETC = BAC - EV$

Forecasting- EAC

Estimate at Completion(EAC)

1. $EAC \text{ (atypical)} = AC + ETC \text{ (Re-estimated)}$

2. $EAC \text{ (atypical)} = AC + BAC - EV$ (*Estimated based on Progress*)

3. $EAC \text{ (typical considering CPI & SPI)} = AC + ETC / (CPI \times SPI)$

4. $EAC \text{ (typical)} = AC + ETC / CPI = BAC / CPI$

If you feel that you will be able to complete the project on time in spite of current delay then you can consider SPI as 1. In that case CR= SPI

Forecasting- Variance at Completion

- Variance at Completion (VAC)

$$VAC = BAC - EAC$$

- *Variance at Completion (%)*

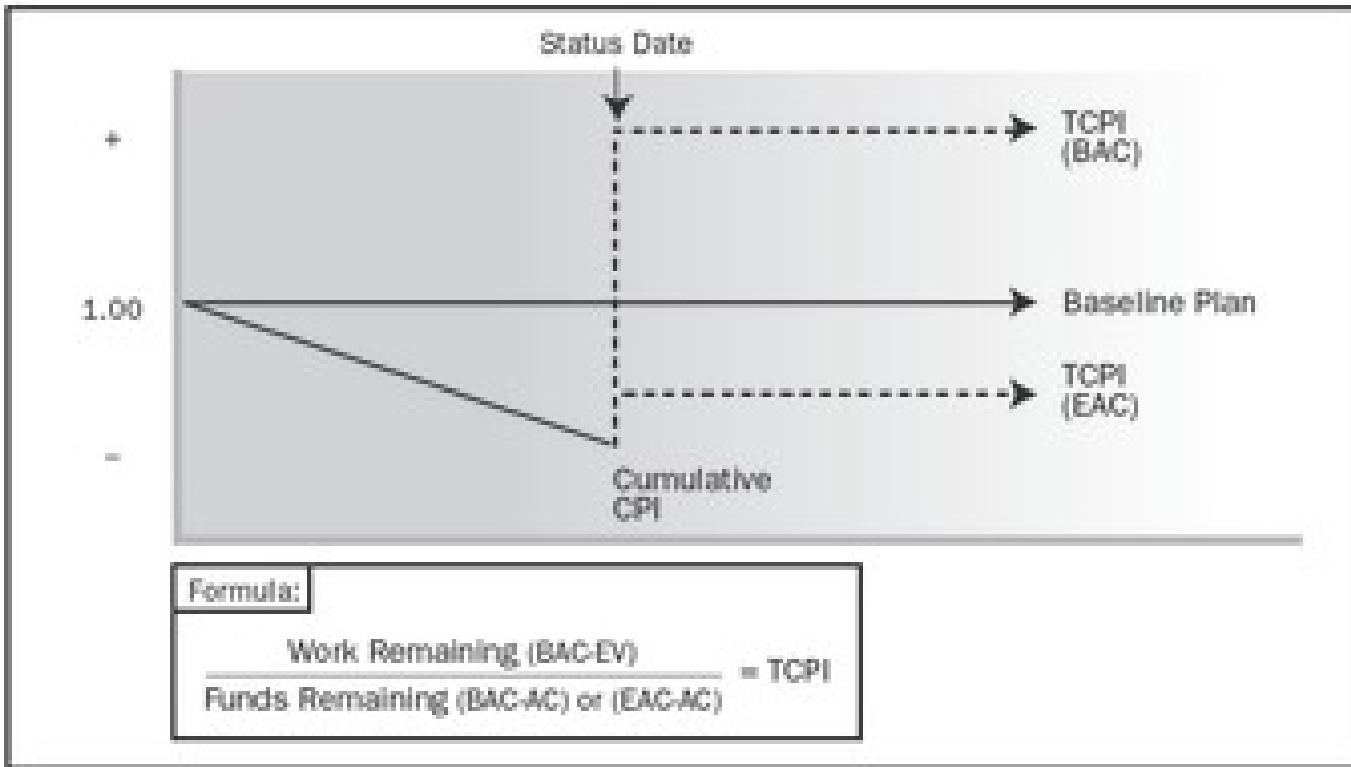
$$PVAC= (BAC-EAC)/BAC$$

Forecasting: TCPI

TCPI (To complete Performance Index) can be calculated using BAC or EAC

- TCPI using BAC = $(BAC-EV) / (BAC-AC)$
- TCPI using EAC = $(BAC-EV) / (EAC-AC)$

To Complete Performance Index



Source : PMI PMBOK® *Fourth Edition*

Case Study — Case 1

- PV = \$ 1000
- EV = \$ 1000
- AC = \$ 1000

This is the ideal situation where everything goes as per plan.

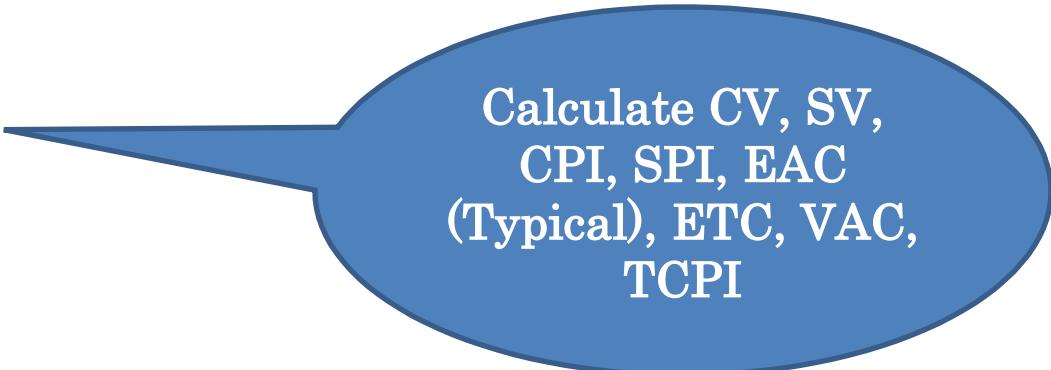


Case Study — Case 2

- PV = \$ 1,800
 - EV = \$ 1,500
 - AC = \$ 1,700
 - CV = EV – AC = - \$ 200
 - SV = EV – PV = - \$ 300
 - CPI = EV/AC = 0.88
 - SPI = EV/PV = 0.83
- PV = \$ 2,900
 - EV = \$ 2,700
 - AC = \$ 2,500
 - CV = 200
 - SV = -200
 - CPI = 1.08
 - SPI = 0.92

Calculate CV, SV,
SPI, SPI

EVM- Case 3

- PV = \$ 1,700
 - BAC = \$ 5000
 - EV = \$ 1,800
 - AC = \$ 1,600
- 
- CV = 200
 - SV = 100
 - CPI = 1.125
 - SPI = 1.058
- EAC = BAC/ CPI = \$4444
 - ETC =EAC-AC = \$2844
 - VAC = BAC – EAC= \$556
 - TCPI using BAC = $5000-1800/5000-1600 = 0.941$
 - TCPI using EAC = $5000-1800/4444-1600 = 1.125$

Recap – Cost Management

- ✓ Types of Costs
- ✓ Ranges of Costs
- ✓ Estimate Cost
 - ✓ Purpose, Techniques, Outputs
- ✓ Determine Budget
 - ✓ Purpose, Techniques
- ✓ Cost Baseline
- ✓ Control Cost
 - ✓ Purpose, Techniques
- ✓ Earned Value Management
- ✓ Budget Forecast

Discussions !

Agenda

- ✓ Framework
- ✓ Project Integration
- ✓ Scope Management
- ✓ Time Management
- ✓ Cost Management
- Quality Management ←
- Risk Management
- Communication Management
- Stakeholder Management
- Human Resource Management
- Procurement Management
- Professional Responsibility & Ethics

Project Quality Management

Project Quality Management



Quality Definitions from Quality Gurus

1. 'Quality is Predictability'- Deming
2. 'Conformance to requirements' - Crosby
3. 'Fitness for use' - Juran
4. 'Customer's opinion'- Feigenbaum
5. 'The totality of characteristics of an entity that bear on its ability to satisfy stated and implied need' - ISO 8402:1994
6. Conformance to "Valid Requirements".
7. Customers' perception of the value of the suppliers' work output.
8. A perceived degree of excellence with a minimum, usually set forth by the customer.
9. Best value for money.

Quality Gurus

1. **Philip B Corssby-** Popularized concept of Zero Defect. He eliminate defects complete not only reduce it to acceptable quality level
2. **Dr. Eliyahu M Goldratt-** Theory of Constraints. Focus on single element on process chain which can address 99% problems.
3. **Dr. Edward Deming-** Deming Cycle (85% Quality Problems are related to Management)
4. **Dr. Joseph M Juran-** Developed Quality Trilogy (Q-Planning, Q-Improvement, Q-Control)
5. **Dr. Walter Shewhart-** PDCA (Theory of process control or Shewart Transformation Process)
6. **Dr. Genichi Taguchi-** Taguchi Methodology or Designing in Quality (Making a design which is less sensitive to variation rather than control the manufacturing variation)
7. **Dr. Kaoru Ishikawa-** Philosophy of Total Quality, Ishikawa Diagram
8. **Shigeo Shingo-** Developed lean concepts, refined JIT (lean manufacturing)
9. **Taiichi Ohno-** Developed concept of Seven Wastes; this is used to identify non-value-added activity
10. **Armand V Feigenbaum:** Developed Idea of Total Quality Control

Project Quality Management



Definition

Processes and activities of the performing organization that determine quality policies, objectives, and responsibilities so that the project will satisfy the needs for which it was undertaken

Project Quality Management

- Plan Quality [PLANNING]
- Perform Quality Assurance [EXECUTING]
- Perform Quality Control [M&C]

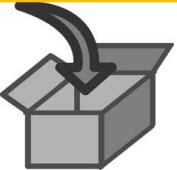
Plan Quality



Definition

Identifying quality requirements and/or standards for the project and product, and documenting how the project will demonstrate compliance.

Plan Quality



1. Project Management Plan
2. Stakeholder Register
3. Risk Register
4. Requirement Documentation
5. Enterprise Environmental Factors
6. Organization Process Assets



1. Cost-benefit analysis
2. Cost of Quality
3. Seven basic quality tools
4. Benchmarking
5. Design of experiments
6. Statistical sampling
7. Additional quality planning tools
8. Meetings



1. Quality Management Plan
2. Process Improvement Plan
3. Quality Metrics
4. Quality Checklist
5. Project Documents Updates

Cost of Quality

Cost of Conformance

Prevention Costs

(Build a quality product)

- Training
- Document processes
- Equipment
- Time to do it right

Appraisal Costs

(Assess the quality)

- Testing
- Destructive testing loss
- Inspections

Money spent during the project to avoid failures

Cost of Nonconformance

Internal Failure Costs

(Failures found by the project)

- Rework
- Scrap

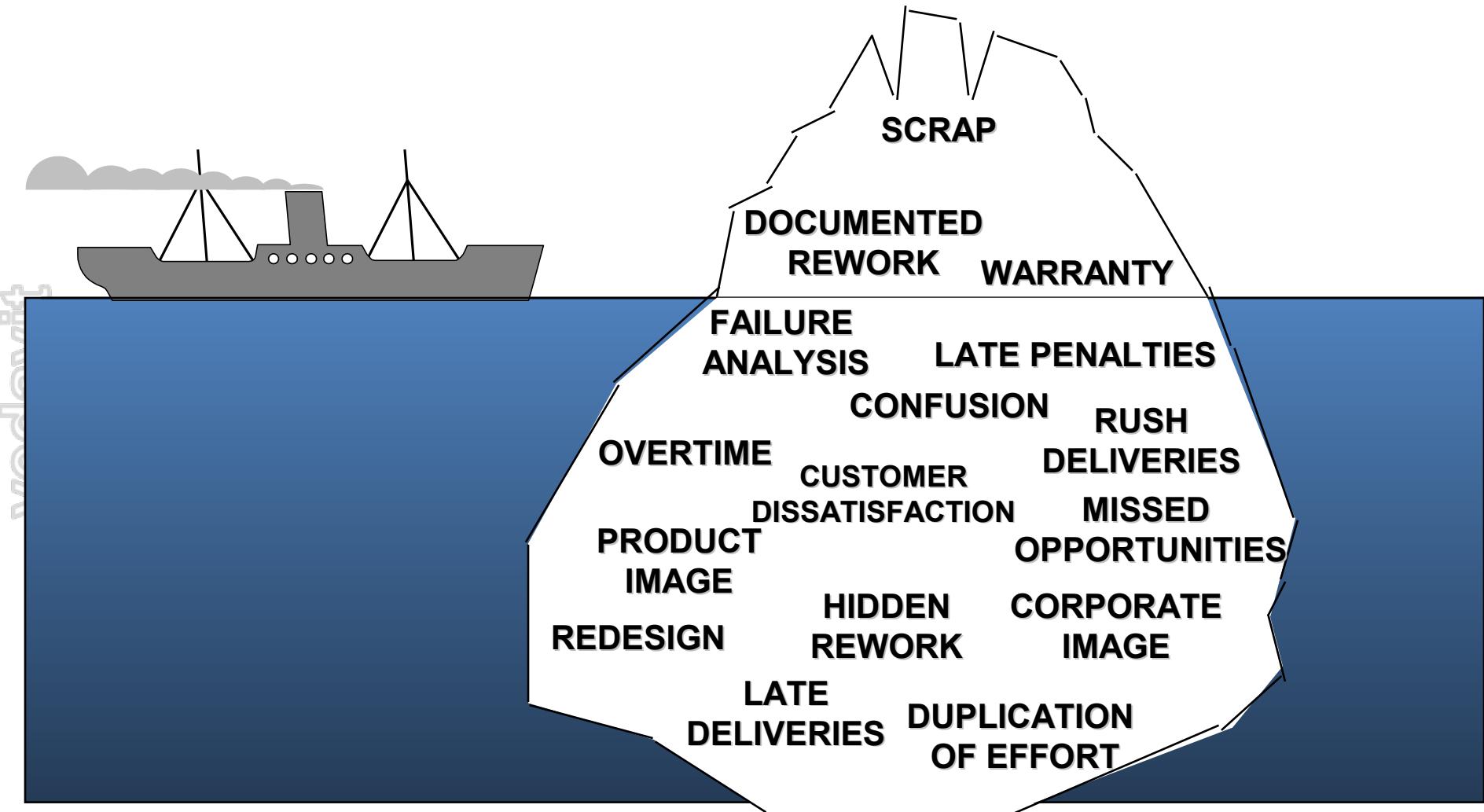
External Failure Costs

(Failures found by the customer)

- Liabilities
- Warranty work
- Lost business

Money spent during and after the project because of failures

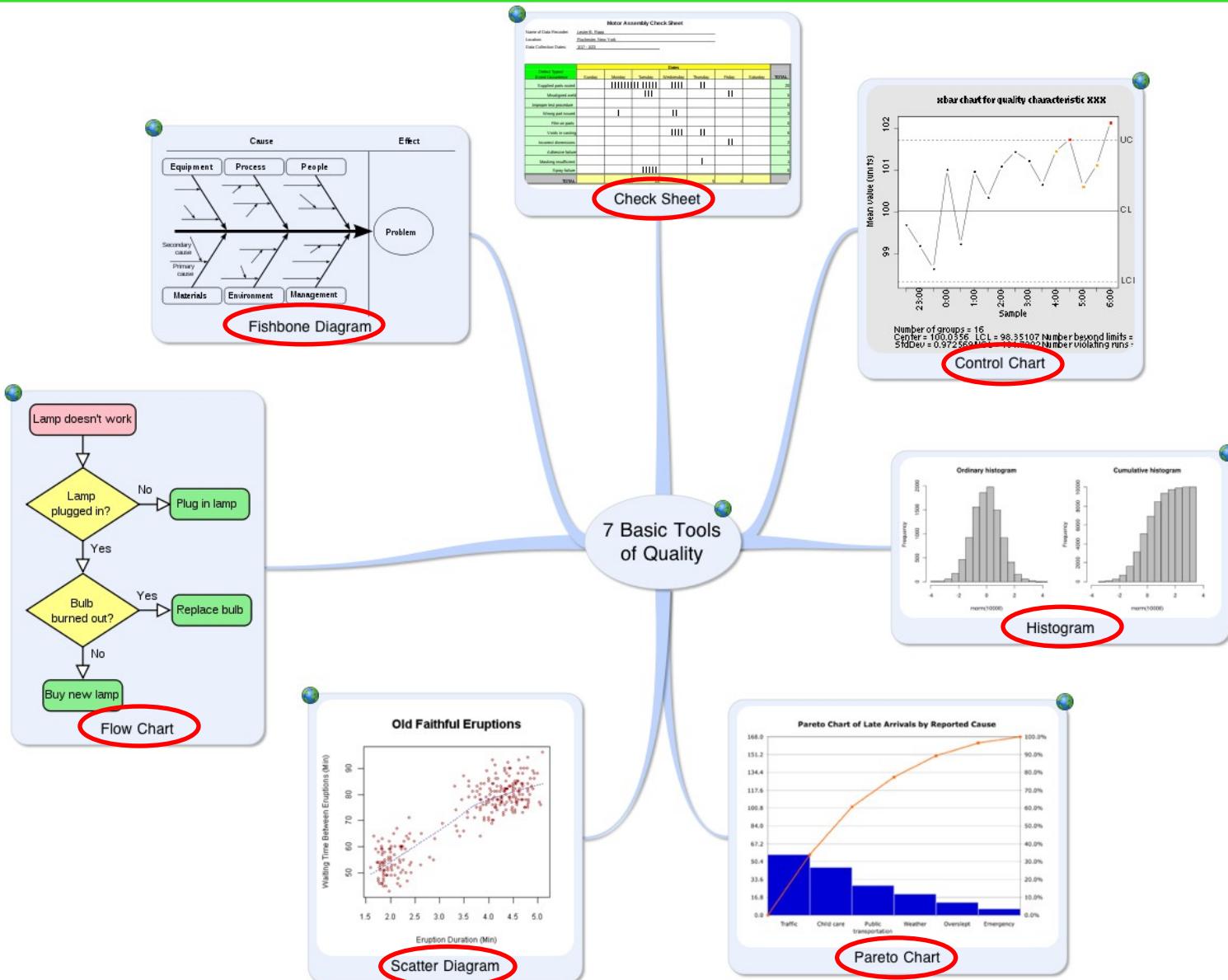
Cost of Nonconformance- Iceberg



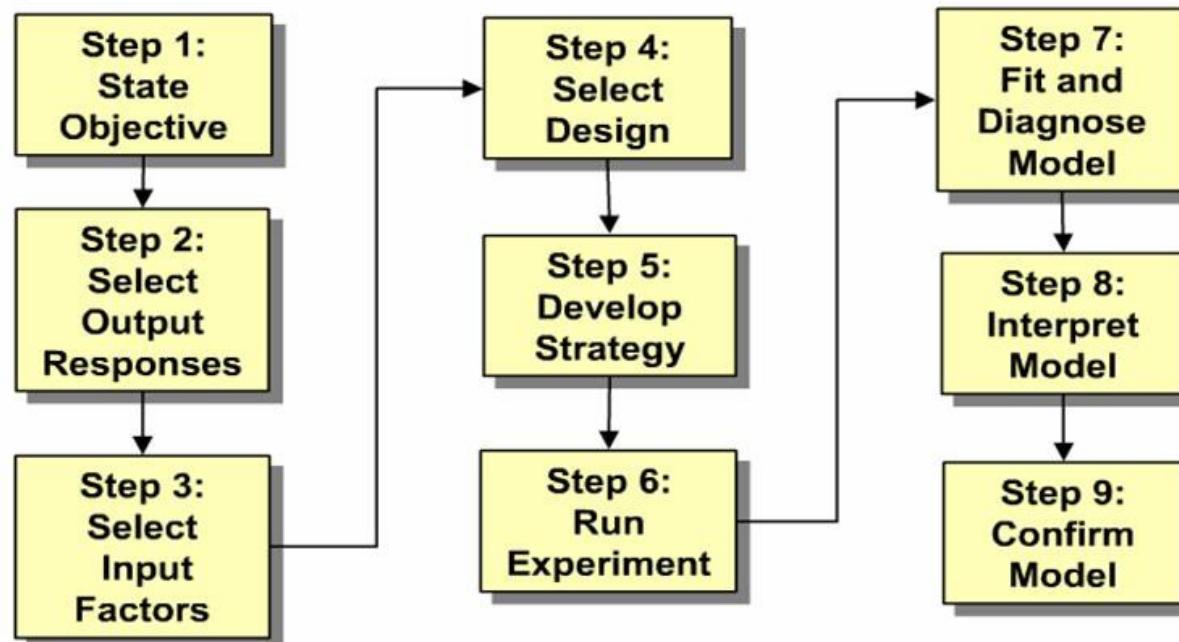
Quality flow from Top



7 Basic Tools of Quality



Design of Experiments (DOE)



Perform Quality Assurance



Definition

Auditing quality requirements and the results from quality control measurements to ensure appropriate quality standards and operational definitions are used.

Perform Quality Assurance



1. Quality Management Plan
2. Process Improvement Plan
3. Quality Metrics
4. Quality Control Measurements
5. Project Documents



1. Quality Management & Control Tools
2. Quality audits
3. Process analysis



1. Change Requests
2. Organization Process Assets Updates
3. Project Management Plan Updates
4. Project Documents Updates

Perform Quality Control



Definition

- **Monitoring and recording results of executing the quality activities to assess performance and recommend necessary changes.**

Quality Control



1. Project Management Plan
2. Quality Metrics
3. Quality Checklist
4. Work Performance Data
5. Approved Change Requests
6. Deliverables
7. Project documents
8. Organization Process Assets

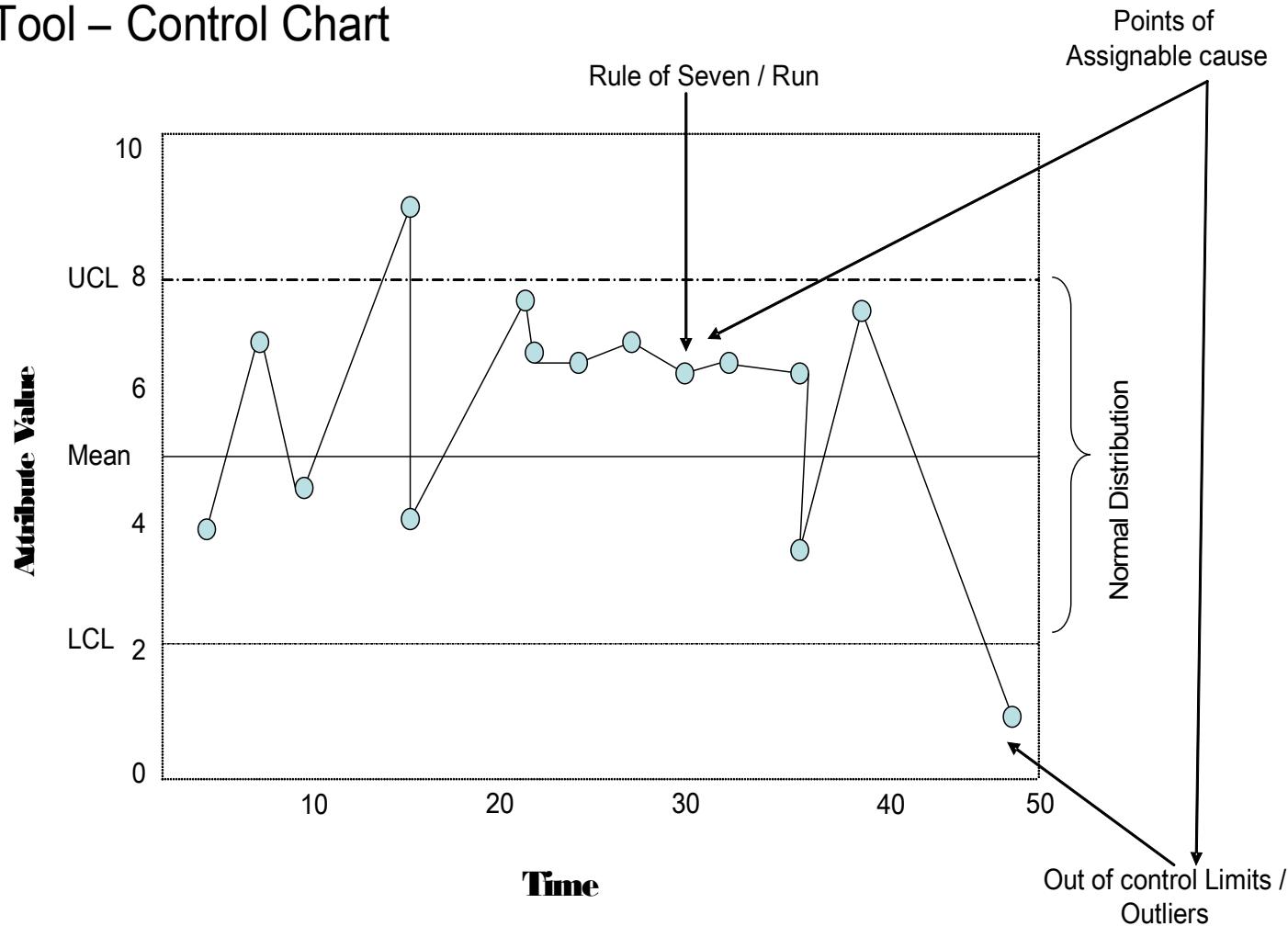


1. Seven basic quality tools
2. Statistical sampling
3. Inspection
4. Approved Change Request Review

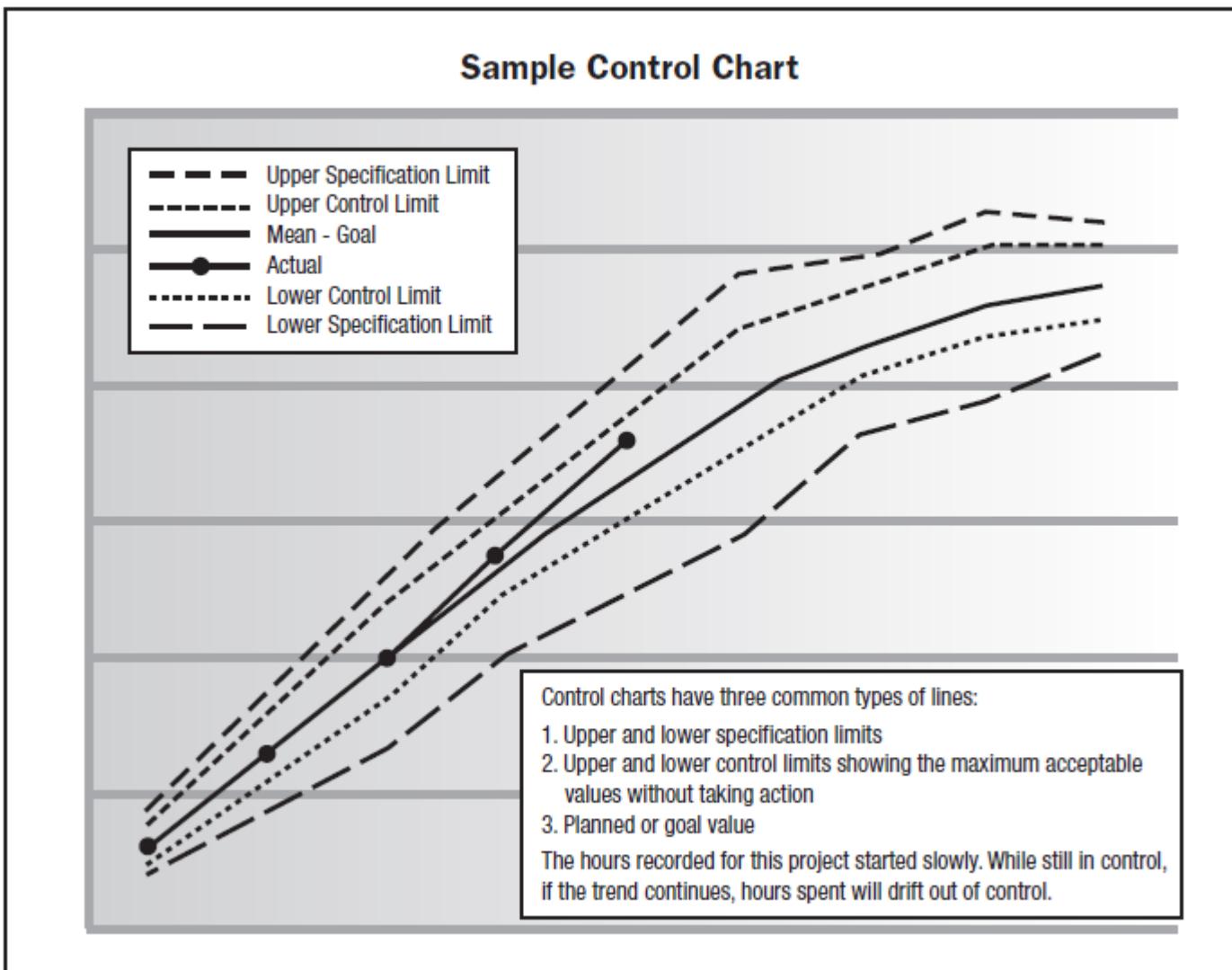
1. Quality Control Measurements
2. Validated Changes
3. Verified deliverables
4. Work Performance Information
5. Change Requests
6. Project Management Plan Updates
7. Project Documents Updates
8. Organization Process Assets Updates

Control Charts

Tool – Control Chart



Control Charts



Recap – Quality Management

- ✓ Quality Top-Down flow
- ✓ Meaning of Quality
- ✓ Component of Quality Management Plan
- ✓ Metrics
- ✓ Process Improvement Plan
- ✓ Quality Checklists
- ✓ Process Analysis
- ✓ Quality Audits
- ✓ Control Quality
 - ✓ Purpose, Tools, Output
- ✓ 7 Quality Tools

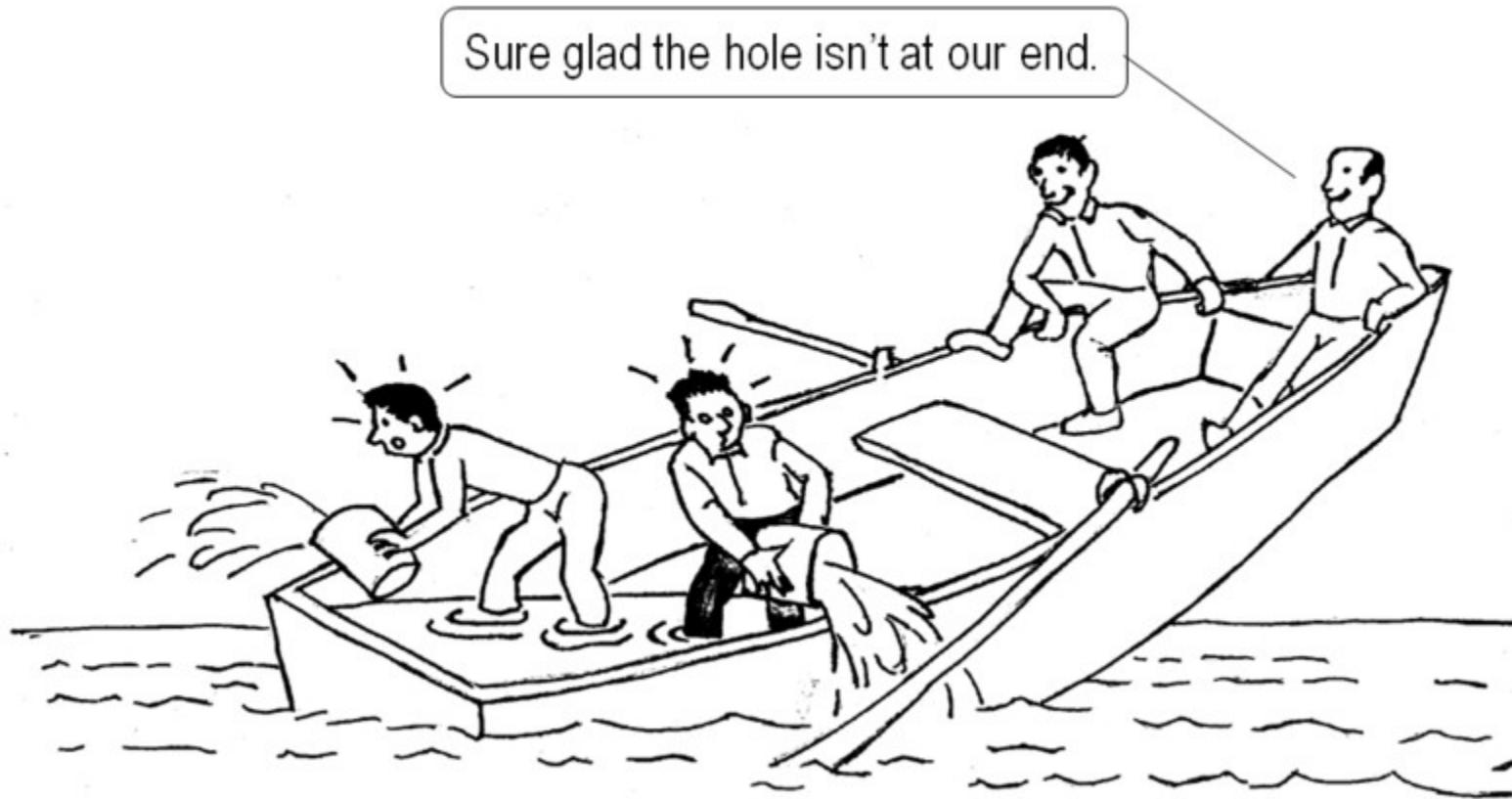
Discussions !

Agenda

- ✓ Framework
- ✓ Project Integration
- ✓ Scope Management
- ✓ Time Management
- ✓ Cost Management
- ✓ Quality Management
 - Risk Management ←
 - Communication Management
 - Stakeholder Management
 - Human Resource Management
 - Procurement Management
 - Professional Responsibility & Ethics

Project Risk Management







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Project Risk Management



Definition

Processes for conducting risk management planning, identification, analysis, response planning and monitoring and control on a project.

Project Risk Management

- Plan Risk Management [PLANNING]
- Identify Risks [PLANNING]
- Perform Qualitative Risk Analysis [PLANNING]
- Perform Quantitative Risk Analysis [PLANNING]
- Plan Risk Responses [PLANNING]
- Control Risks [M&C]

Personal Attitude to Risk

Individual stakeholder may fall into one of the three categories

- ❖ Risks Averse
- ❖ Risk Seeking
- ❖ Risk Neutral

Plan Risk Management



Definition

Defining how to conduct risk management activities for a project .

Plan Risk Management



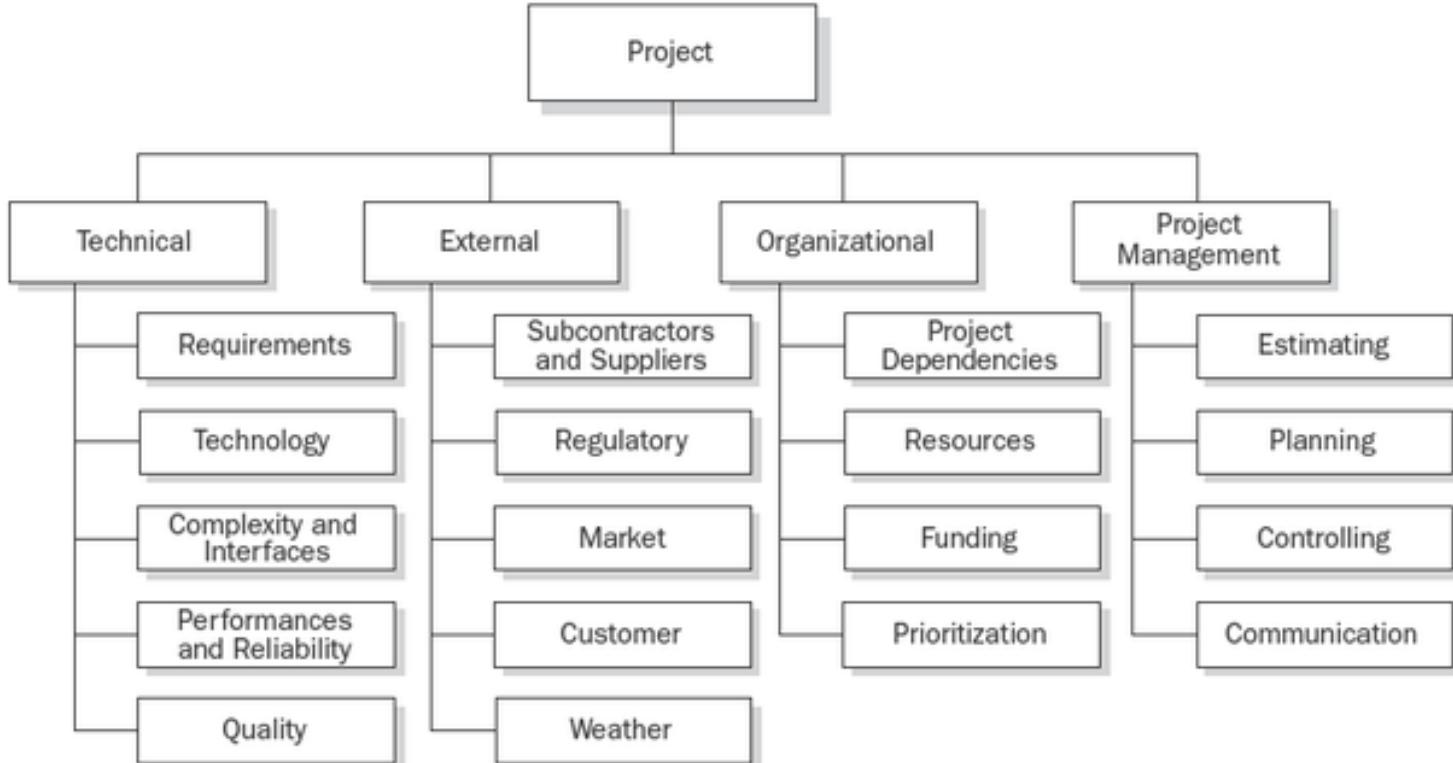
1. Project Management Plan
2. Project Charter
3. Stakeholder Register
4. Enterprise Environmental Factors
5. Organization Process Assets



1. Expert Judgement
2. Analytical techniques
3. Meetings

1. Risk Management Plan

Risk Breakdown Structure



The Risk Breakdown Structure (RBS) lists the categories and sub-categories within which risks may arise for a typical project. Different RBSs will be appropriate for different types of projects and different types of organizations. One benefit of this approach is to remind participants in a risk identification exercise of the many sources from which project risk may arise.

Source : PMI PMBOK® *Fourth Edition*

Definition of Impact

Defined Conditions for Impact Scales of a Risk on Major Project Objectives
(Examples are shown for negative impacts only)

Project Objective	Relative or numerical scales are shown				
	Very low /.05	Low /.10	Moderate /.20	High /.40	Very high /.80
Cost	Insignificant cost increase	<10% cost increase	10-20% cost increase	20-40% cost increase	>40% cost increase
Time	Insignificant time increase	<5% time increase	5-10% time increase	10-20% time increase	>20% time increase
Scope	Scope decrease barely noticeable	Minor areas of scope affected	Major areas of scope affected	Scope reduction unacceptable to sponsor	Project end item is effectively useless
Quality	Quality degradation barely noticeable	Only very demanding applications are affected	Quality reduction requires sponsor approval	Quality reduction unacceptable to sponsor	Project end item is effectively useless

This table presents examples of risk impact definitions for four different project objectives. They should be tailored in the Risk Management Planning process to the individual project and to the organization's risk thresholds. Impact definitions can be developed for opportunities in a similar way.

Source : PMI PMBOK® *Fourth Edition*

Identify Risks



Definition

Determining which risks may affect the project and documenting their characteristics

Identify Risks



1. Risk Management Plan
2. Cost Management Plan
3. Schedule Management Plan
4. Quality Management Plan
5. Human Resource Management Plan
6. Scope Baseline
7. Activity Cost Estimates
8. Activity Duration Estimates
9. Stakeholder Register
10. Project Documents
11. Procurement Documents
12. Enterprise Environmental Factors
13. Organization Process Assets



1. Expert Judgement
2. Documentation Reviews
3. Information Gathering Techniques
4. Checklist Analysis
5. Assumptions Analysis
6. Diagramming Techniques
7. SWOT Analysis

1. Risk Register

Diagramming Techniques

- Cause and effect diagrams
- System or process flow charts
- Influence Diagram

Perform Qualitative Risk Analysis



Definition

Prioritizing risks for further analysis or action by assessing and combining their probability of occurrence and impact.

Perform Qualitative Risk Analysis



1. Risk Management Plan
2. Scope Baseline
3. Risk Register
4. Enterprise Environmental Factors
5. Organization Process Assets



1. Expert Judgement
2. Risk Probability and impact assessment
3. Probability and impact matrix
4. Risk data quality assessment
5. Risk Categorization
6. Risk urgency assessment



1. Project Documents Updates

Probability Impact Matrix

Probability and Impact Matrix										
Probability	Threats					Opportunities				
0.90	0.05	0.09	0.18	0.36	0.72	0.72	0.36	0.18	0.09	0.05
0.70	0.04	0.07	0.14	0.28	0.56	0.56	0.28	0.14	0.07	0.04
0.50	0.03	0.05	0.10	0.20	0.40	0.40	0.20	0.10	0.05	0.03
0.30	0.02	0.03	0.06	0.12	0.24	0.24	0.12	0.06	0.03	0.02
0.10	0.01	0.01	0.02	0.04	0.08	0.08	0.04	0.02	0.01	0.01
	0.05	0.10	0.20	0.40	0.80	0.80	0.40	0.20	0.10	0.05

Impact (relative scale) on an objective (e.g., cost, time, scope or quality)

Each risk is rated on its probability of occurring and impact on an objective if it does occur. The organization's thresholds for low, moderate or high risks are shown in the matrix and determine whether the risk is scored as high, moderate or low for that objective.

Define Threshold

High risk ("red condition")

Medium risk ("yellow condition")

Low risk ("green condition")

Source : PMI PMBOK® *Fourth Edition*

Perform Quantitative Risk Analysis



Definition

Numerically analyzing the effect of identified risks on overall project objectives.

Perform Quantitative Risk Analysis



1. Risk Management Plan
2. Cost Management Plan
3. Schedule Management Plan
4. Risk Register
5. Enterprise Environmental Factors
6. Organization Process Assets



1. Expert Judgement
2. Data gathering and representation techniques
3. Quantitative Risk analysis and modelling techniques



1. Project Documents Updates

PQnRA- Tools & Techniques

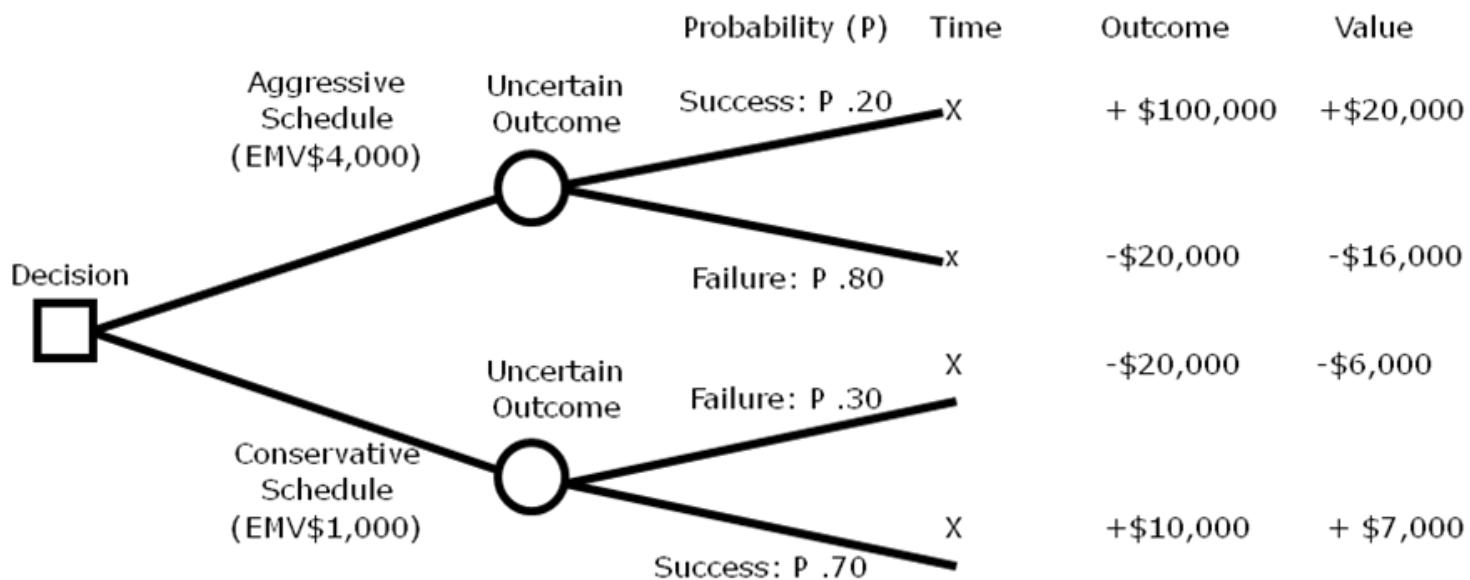
- ✓ Data Gathering & Representation Techniques
 - ✓ Interview
 - ✓ Probability Distribution (Normal, Beta, Triangular)
- ✓ Quantitative Risk Analysis Modeling Techniques
 - ✓ Sensitivity analysis- helps to determine which risks have the most potential impact- Tornado diagrams (compare relative importance and impact of variables of high degree of uncertainty)
 - ✓ Expected monetary value analysis (EMV)- Calculates average outcome of future scenarios that may or may not happen
 - ✓ Modeling & Simulation- Monte Carlo techniques

Formulae

- Probability = Number of Occurrences / Total Number occurrences
= Frequency of Related Events / Total Number of Events
- Probability = Frequency of Related Events /
Total Number of Possible Events
- Expected Monetary Value (EMV) = Risk Event Probability X
Risk Event Value
- The sum of their probabilities of occurrence is 1.0

Decision Tree

A decision tree is a diagram that describes a decision under consideration and the implications of choosing one or other available alternatives



- Expected monetary value (EMV) of result Outcome x Probability of that outcome
- Expected monetary value of a decision sum of EMVs of all Outcomes stemming from that decision
- Aggressive schedule has expected monetary value of \$4,000 and is "preferred" over conservative schedule with expected monetary value of \$1,000

Plan Risk Response



Definition

Developing options and actions to enhance opportunities and reduce threats to project objectives.

Plan Risk Response



1. Risk Management Plan
2. Risk Register



1. Expert Judgement
2. Strategies for Negative risk or threats
3. Strategies for Positive risks or opportunities
4. Contingent response strategies



1. Project Management Plan Updates
2. Project Documents Updates

Risk Response Strategies

Threats or Negative Risk

Positive Risk or Opportunities

- Avoid Exploit
- Transfer Share
- Mitigate Enhance
- Acceptance Acceptance

Negative Risk Responses

Avoid

Risk avoidance involves changing the project management plan to eliminate the threat posed by an adverse risk, to isolate the project objectives from the risk's impact or to relax the objective that is in jeopardy, such as extending the schedule or reducing scope.

Transfer

It requires shifting the negative impact of a threat, along with ownership of the response, to a third party.

Mitigate

It implies a reduction in the probability and / or impact of an adverse risk event to an acceptable threshold. Transference is a form of mitigation.

Positive Risk Responses

Exploit

It seeks to eliminate the uncertainty associated with a particular upside risk by making the opportunity definitely happen. It may be selected for opportunities where the organization wishes to ensure that it is realized.

Examples include assigning more talented resources to the project to reduce time to completion or to provide better quality than originally planned.

- It is analogous to 'avoidance'

Share

It involves allocating ownership to a third-party who is best able to capture the opportunity for the benefit of the project.

Examples include forming risk-sharing partnerships or joint ventures.

- It is analogous to 'transference'.

Positive Risk Responses

Enhance

It modifies the ‘size’ of an opportunity by Increasing probability and / or positive impacts and identifying and maximizing key drivers of positive- impact risks.

It seeks to facilitate or strengthen the cause of the opportunity and proactively target and reinforce it’s trigger conditions to increase the probability.

It is analogous to ‘mitigation’.

+/- Risk Responses

Accept

It is a strategy that is adopted because it is seldom possible to eliminate all risk from a project.

It indicates that the project team

1. Has decided not to change the project management plan to deal with risk or
2. Is unable to identify any other suitable response strategy.

- ***Active Acceptance*** most commonly involves establishing a '***contingency reserve***', including amounts of time, money or resources to handle known or unknown threats or opportunities.
- ***Passive Acceptance*** requires no action, leaving the project team to deal with threats or opportunities as they occur.

Understanding Reserves

Contingency reserves : Known – Unknown

- It is designed for use only if certain events occur or only under certain predefined conditions, provided there is sufficient warning to implement the response.
- Examples of events that may trigger the contingency response include missing intermediate milestones or gaining higher priority with a supplier.
- Events triggering the contingency response should be triggered and tracked.

Management reserves: Unknown – Unknown

It is defined for use only if ‘the events that occur or only under certain conditions’, where information about the event & its occurrence is absolutely NOT available.

Control Risks



Definition

Implementing risk response plans, tracking identified risks, monitoring residual risks, identifying new risks, and evaluating risk process effectiveness throughout the project.

Control Risks



1. Project Management Plan
2. Risk Register
3. Work Performance Data
4. Work Performance Report



1. Risk Reassessment
2. Risk Audits
3. Variance and trend analysis
4. Technical performance measurement
5. Reserve Analysis
6. Meetings



1. Work Performance Information
2. Change Requests
3. Project Management Plan Updates
4. Project Documents Updates
5. Organization Process Assets Updates

Risk Management Terms

- ✓ **Contingency Reserve**
 - ✓ A separately planned quantity used to allow for future situations which may be planned for only in part (sometimes called “Known-unknowns”)
 - ✓ Intended to reduce the impact of missing cost or schedule objectives
 - ✓ Normally included in the project costs
- ✓ **Management Reserves**
 - ✓ “A separately planned quantity used to allow for future situations which are impossible to predict (sometimes called “Unknown- unknowns”)
 - ✓ Intended to reduce the risk of missing cost or schedule objectives
 - ✓ Use of Management reserves requires a change to the project’s cost baseline
- ✓ **Residual Risks**
 - ✓ Residual risks are those that remain after response measures have been taken.
 - ✓ Include minor risks that have been accepted and addressed. E.g., By adding contingency amounts to the cost or by allowing time
- ✓ **Secondary risks**
 - ✓ Risks that arise as a result of implementing risk response
 - ✓ Should be identified and responses planned

Recap – Risk Management

- ✓ Component of Risk Management Plan
- ✓ Reserves Types
- ✓ Identify Risk
 - ✓ Tools
- ✓ Prioritization of risk
 - ✓ Perform Qualitative Risk Analysis
 - ✓ Perform Quantitative Risk Analysis
- ✓ Plan Risk Responses
 - ✓ 4 Responses for (+) Risks and 4 Responses of (-) Risks
- ✓ Control Risks
 - ✓ Work around,
 - ✓ Residual Risk
 - ✓ Secondary Risk

Discussions !

Agenda

- ✓ Framework
- ✓ Project Integration
- ✓ Scope Management
- ✓ Time Management
- ✓ Cost Management
- ✓ Quality Management
- ✓ Risk Management
- Communication Management ←
- Stakeholder Management
- Human Resource Management
- Procurement Management
- Professional Responsibility & Ethics

Project Communication Management

Project Communications Management

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Project Communication Management



Definition

**Processes required to ensure timely and
appropriate generation, collection, distribution,
storage, retrieval and ultimate disposition of
project information.**

Project Communications Management

- Plan Communications [PLANNING]
- Manage Communication[EXECUTING]
- Control Communications[M&C]

Plan Communications



Definition

Determining the project stakeholder information needs and defining a communication approach.

Plan Communication Management



1. Project Management Plan
2. Stakeholder Register
3. Enterprise Environmental Factors
4. Organization Process Assets



1. Communication Requirement Analysis
2. Communication Technology
3. Communication Models
4. Communication Methods
5. Meetings



1. Communication Management Plan
2. Project Documents Updates

Communication Requirements Analysis

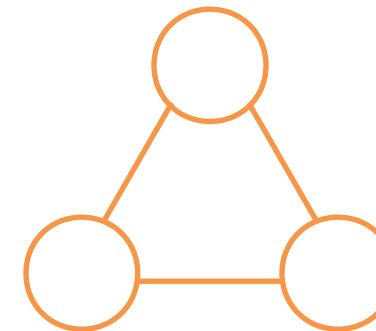
- ❖ Project resources should be expended only on communicating ***information that contributes to success*** or where a ***lack of communication can lead to failure.***
- ❖ Depends upon the responsibilities and relationship between performing organization and stakeholder.
- ❖ Depends upon disciplines, departments, and specialties involved in the project.
- ❖ Depends upon logistics of how many individuals will be involved with the project and at which locations.
- ❖ Depends upon internal and External communication needs

Number of Communication Channels

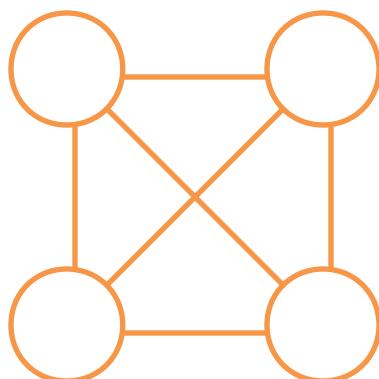
$$N(N-1)/2$$



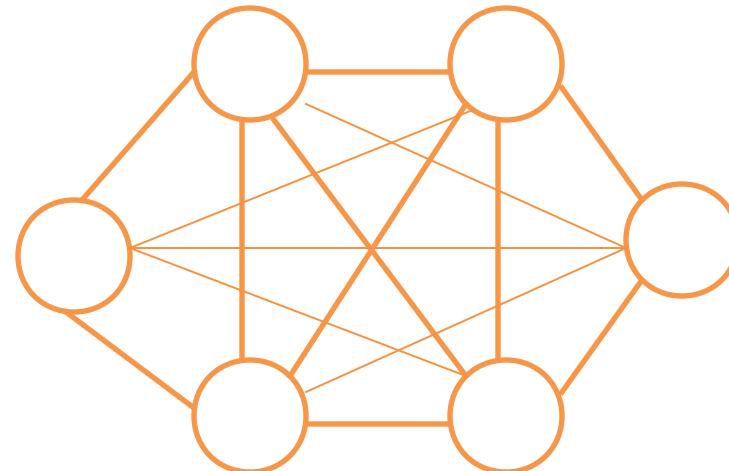
Two People, One Channel



Three People, Three Channel



Four People, Six Channel



Six People, Fifteen Channel

Communication Methods

Which communication technology should be used depends upon what communication method is the needed

Three Communication Methods

–Interactive Communication

Phone, audio/video conferences, moderator lead discussion, workshop

–Push Communication

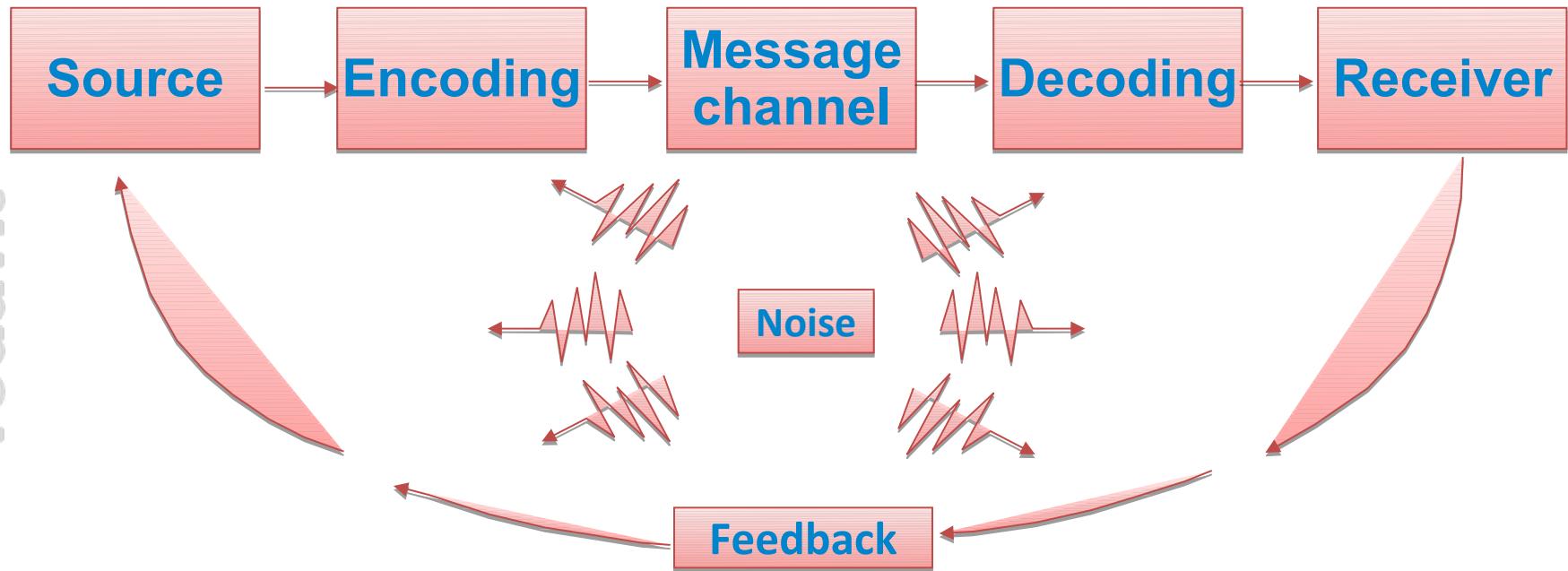
Letters, memos, reports, emails, faxes, voice mail, press releases

– Pull Communication

e-learning, knowledge repository, unknown people

Communication Model

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Communication Technologies



Example Communication Type

Situation	Communication Type
Updating the project plan	Formal Written
Presentations to management	Formal Verbal
Trying to solve a complex problem	Formal Written
Making notes regarding a telephone conversation	Informal Written
Making changes to a contact	Formal Written
Informing a team member of poor performance (first notice)	Informal Verbal
Informing a team member of poor performance (second notice)	Formal Written
Scheduling a meeting	Informal Written
Clarifying a work package	Formal Written
Requesting additional resources	Informal Verbal
Trying to discover the root cause of a problem	Informal Verbal
Sending an email to ask for clarification of an issue	Informal Written
Holding a milestone party	Informal Verbal
Conducting a bidder conference	Formal Verbal

Manage Communication



Definition

As per the communication management plan creating, collecting, distributing, storing, retrieving and ultimate disposition of project information

Manage Communications



1. Communication Management Plan
2. Work Performance Report
3. Enterprise Environmental Factors
4. Organization Process Assets



1. Communication Techniques
2. Communication Models
3. Communication Methods
4. Information Management Systems
5. Performance Reporting



1. Project Communications
2. Organization Process Assets Updates
3. Project Documents Updates
4. Project Management Plan Updates

Communication Methods

- Individual Meetings
- Group Meetings
- Audio & Video conferences
- Computer chats
- Remote communication methods

Information distribution tools

- Hardcopy distribution, manual filing systems, press released, shared access to electronic database
- Electronic communication & conferencing tool: email, fax, voice mail, telephone, video, web conferencing, websites and web publishing
- Electronic tools for project management web interfaces to scheduling and project management software, meeting and virtual office software, portals and collaborating work management tool

Control Communications



Definition

Monitoring and controlling communication throughout project life cycle to ensure the information needs of the project stakeholders are met

Control Communications



1. Project Management Plan
2. Project Communications
3. Issue Log
4. Work Performance Data
5. Organization Process Assets



1. Expert Judgement
2. Information Management Systems
3. Meetings

1. Work Performance Information
2. Change Requests
3. Project Management Plan Updates
4. Project Documents Updates
5. Organization Process Assets Updates

Communication Types

Informal	Meeting, Conversation	Email, Status Update, Memos
Formal	Speech, Presentation	Project Plan, Contract, Charter
	Verbal	Written

Dimensions of Communication

- Internal - External
- Formal - Informal
- Vertical - Horizontal
- Official - Unofficial
- Written - Oral
- Verbal - Non-verbal

Communication Management

- ✓ Filtering – A phenomenon that occurs when a large portion of the message is lost in vertical/horizontal communication
- ✓ Nonverbal communication carries 55% of the message
- ✓ Progress Reports generally show problems after they have occurred.
- ✓ A communication matrix is an excellent tool to identify the stakeholders and their requirements for communication.

Communication Management

Probable Factors

- ❖ Senders reputation
- ❖ Status within the organization
- ❖ Environmental Background
- ❖ Dysfunctional emotional behaviors
- ❖ Situational Consideration – Predefined Mindset
- ❖ Historical Consideration in message interpretation

Other Factors

- ❖ Ambiguity in language
- ❖ Culture
- ❖ Semantics
- ❖ Knowledge Base
- ❖ Message Content – hidden agendas

Cross Cultural Problems

Project may require inputs from individual and groups from different countries

Relevant concerns are -

- ❖ Differences in culture
- ❖ Differences in project environments.
- ❖ Attitude – perceiving others using one's own standards rather than other's.
- ❖ Stereotypes – sticking to a particular culture to apply in any situation
- ❖ Thought patterns – differing culture across geographical distances/organizations
- ❖ Time sense – differing sense of urgency

Recap – Communication Management

- ✓ Components of communication management plan
- ✓ Understanding number of communication channels
- ✓ Communication Technologies
- ✓ Communication Methods
- ✓ Barrier in Communication
- ✓ Dimensions of Communication
- ✓ Manage Communication
 - ✓ Purpose
- ✓ Control Communication
 - ✓ Purpose

Discussions !

Agenda

- ✓ Framework
- ✓ Project Integration
- ✓ Scope Management
- ✓ Time Management
- ✓ Cost Management
- ✓ Quality Management
- ✓ Risk Management
- ✓ Communication Management
 - Stakeholder Management ←
 - Human Resource Management
 - Procurement Management
 - Professional Responsibility & Ethics

Project Stakeholder Management

Project Communications Management

- Identify Stakeholders [INITIATING]
- Plan Stakeholder Management [PLANNING]
- Manage Stakeholder Expectations [EXECUTING]
- Control Stakeholder Engagements [M&C]

Identify Stakeholders



Definition

Identifying all people, group or organizations
that could be impacted by the project and
documenting relevant information regarding
their interests, involvement and impact on
project success.

Identify Stakeholders



1. Project Charter
2. Procurement Documents
3. Enterprise Environmental Factors
4. Organization Process Assets



1. Expert Judgement
2. Stakeholder Analysis
3. Meetings

1. Stakeholder Management Plan

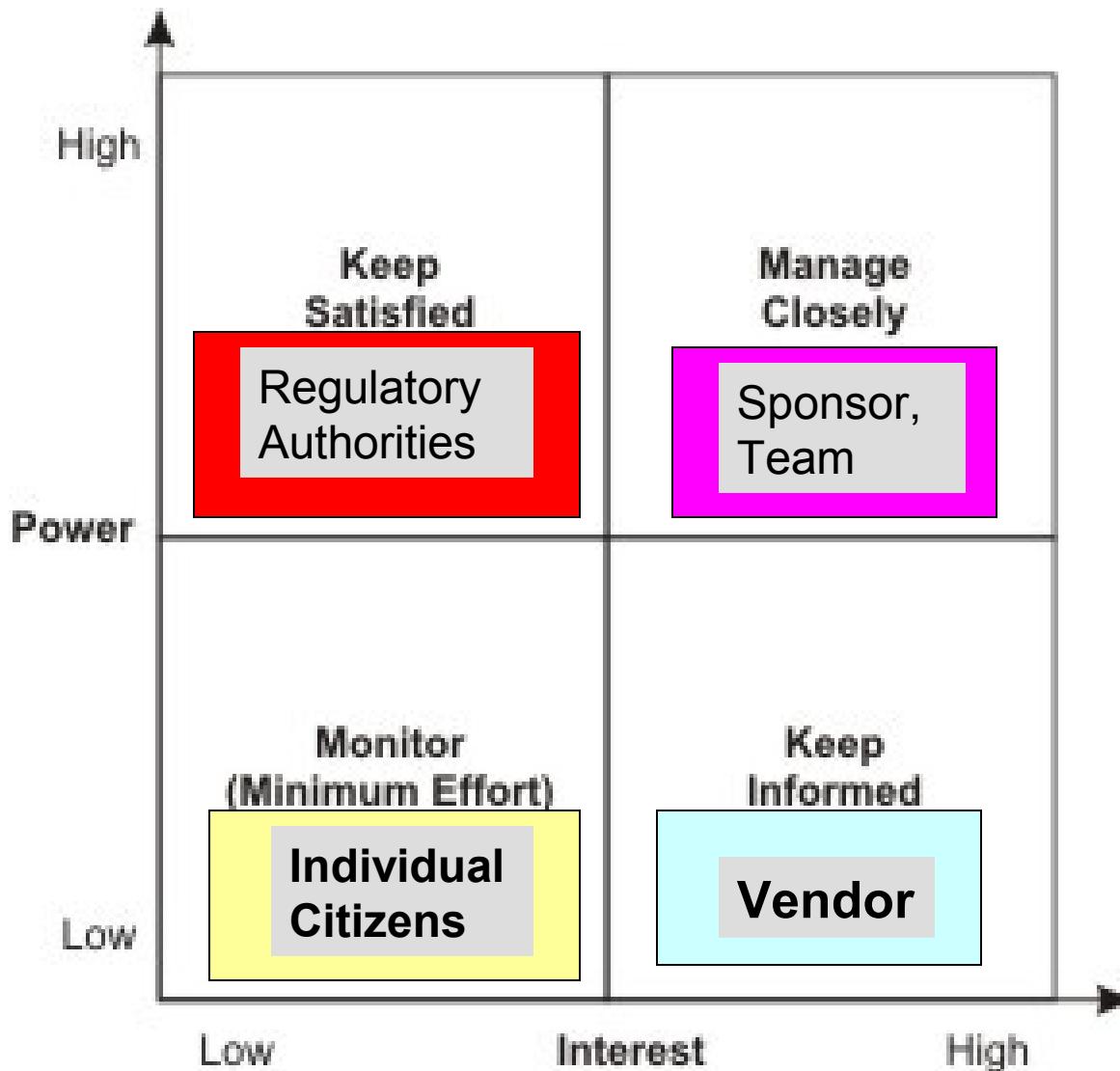
Sample Stakeholder Analysis Matrix

	Stakeholders				
	Ahmed	Susan	Erik	Mark	David
Organization	Internal Senior Management	Project team	Project Team	Hardware Vendor	Project manager for other internal project
Role on project	Sponsor of project and one of the company's founder	DBA sequencing expert	Lead Programmer	Supplies some instrument hardware	Competing for company resources
Unique Facts	Demanding, likes details, business focus, Stanford MBA	Very smart, Ph.D. in biology, easy to work with, has a toddler	Best Programmer I know, weird sense of humor	Start-up company, he knows we can make him rich if this works	Nice guy, one of oldest people at company, has 3 kids in college
Level of interest	Very high	Very high	High	Very high	Low to medium
Level of Influence	Very high, can call the shots	SME, critical to success	High; hard to replace	Low; other vendors available	Low to medium
Suggestions on managing relationship	Keep informed, let him lead conversations, do as he says and quickly	Make sure she reviews specifications and leads testing; can do some work from home	Keep him happy so he stays; emphasize stock options; likes Mexican food	Give him enough leads time to deliver hardware	He knows his project takes a back seat to this one, but can learn from him

Sample Stakeholder Analysis Matrix

Stakeholder	Stakeholder Interest(s) in the Project	Assessment of Impact	Potential Strategies for Gaining Support or Reducing Obstacles

Power/Interest Grid with stakeholders



Plan Stakeholder Management



Definition

Developing appropriate management strategies to effectively engage stakeholders throughout the project lifecycle

Plan Stakeholders Management



1. Project Management Plan
2. Stakeholder Register
3. Enterprise Environmental Factors
4. Organization Process Assets



1. Expert Judgement
2. Meetings
3. Analytical techniques

1. Stakeholder Management Plan
2. Project Documents Updates

Manage Stakeholder Expectations



Definition

Process of communicating and working with stakeholders to meet their needs and addressing issues as they occur.



Manage Stakeholders Expectations



1. Stakeholder Management Plan
2. Communication Management Plan
3. Change Log
4. Organization Process Assets



1. Communication Methods
2. Interpersonal Skills
3. Management Skills



1. Issue Log
2. Change Requests
3. Project Management Plan Updates
4. Project Documents Updates
5. Organization Process Assets Updates

Interpersonal Skills

A project manager works with team. He need to ensure that stakeholders are aligned with project. The skills which helps him in managing group of people...

1. Leadership
2. Team Building
3. Motivation
4. Communication
5. Influencing
6. Decision Making
7. Political & Cultural Awareness
8. Negotiation

Management Skills

1. Presentation Skills
2. Negotiating Skills
3. Writing Skills
4. Public Speaking Skills

Control Stakeholder Engagements



Definition

Monitoring overall project stakeholder relationships and adjusting strategies and plans to engage stakeholders.

Control Stakeholder Engagements



1. Project Management Plan
2. Issue Log
3. Work Performance Data
4. Project Documents



1. Expert Judgement
2. Information Management Systems
3. Meetings



1. Work Performance Information
2. Change Requests
3. Project Management Plan Updates
4. Project Documents Updates
5. Organization Process Assets Updates

Recap – Stakeholder Management

- ✓ Who are stakeholders?
- ✓ Component of stakeholder management plan
- ✓ Manage stakeholder engagement
 - ✓ Purpose
- ✓ Issue Log
 - ✓ Purpose
- ✓ Control stakeholder engagement
 - ✓ Purpose

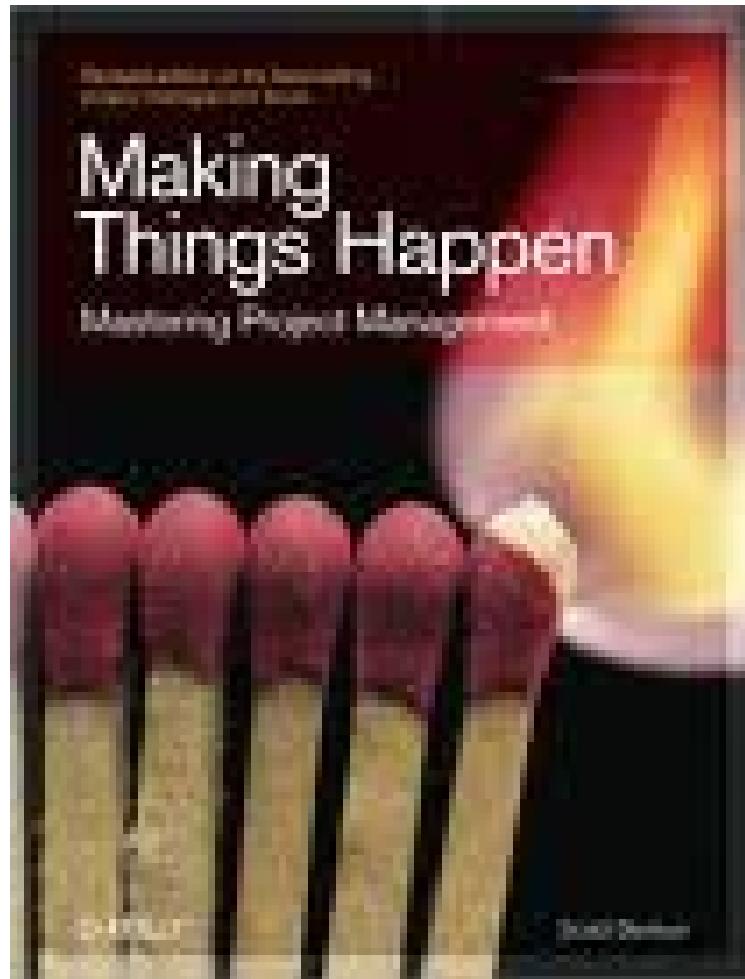
Discussions !

Agenda

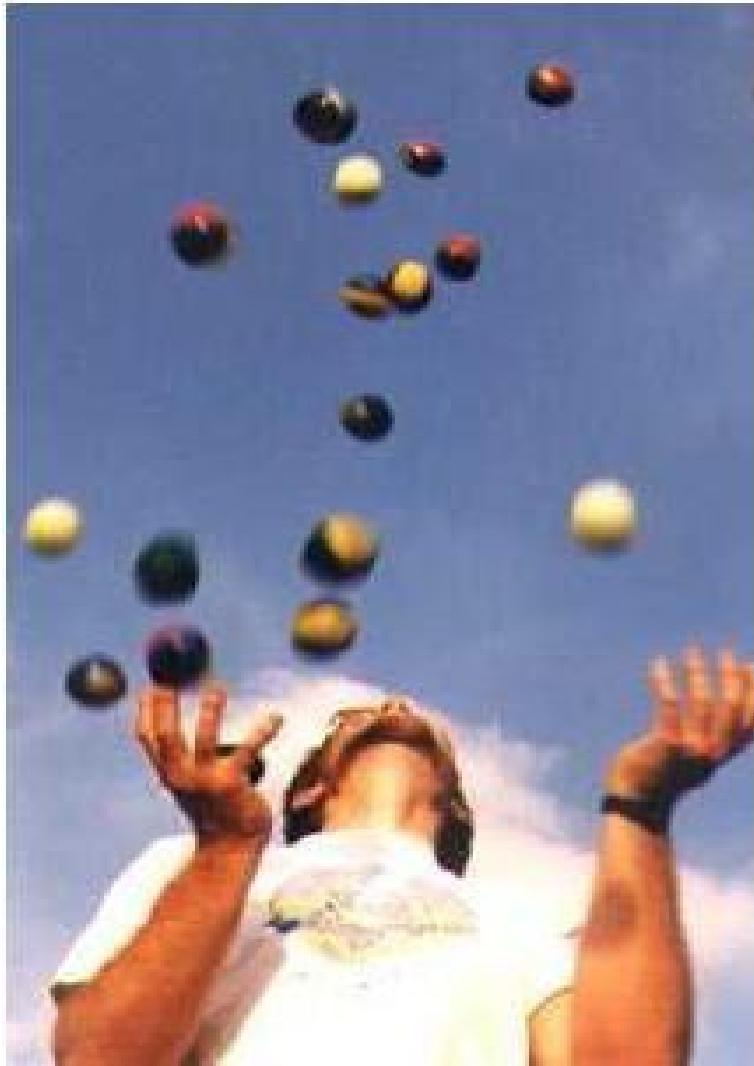
- ✓ Framework
- ✓ Project Integration
- ✓ Scope Management
- ✓ Time Management
- ✓ Cost Management
- ✓ Quality Management
- ✓ Risk Management
- ✓ Communication Management
- ✓ Stakeholder Management
- Human Resource Management ←
- Procurement Management
- Professional Responsibility & Ethics

Project Human Resource Management

Project HR Management- Make it Happen



Project HR Management- Balancing All



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Project Human Resource Management



Definition

Processes that organize, manage and lead the project team.

Project team is comprised of the people with assigned roles and responsibilities for completing the project.

Project HR Management

- Plan Human Resource Management [PLANNING]
- Acquire Project Team [EXECUTING]
- Develop Project Team [EXECUTING]
- Manage Project Team [EXECUTING]

Plan Human Resource Plan



Definition

**Identifying and documenting project roles,
responsibilities and required skills, reporting
relationships and creating a staffing
management plan.**

Plan Human Resource Plan



1. Project Management Plan
2. Activity Resource Requirements
3. Enterprise Environmental Factors
4. Organization Process Assets

1. Expert Judgement
2. Organization Charts and position descriptions
3. Networking
4. Organizational Theory
5. Meetings

1. Human Resource Management Plan

Human Resource Management Plan

- Roles & Responsibilities (Role, Authority, Responsibility, Competency)
- Project organization chart
- Staffing management plan
 - Staff acquisition plan: From where and when the people will come, at what location they will come to work, what are the cost associated with each expertise, what kind of assistance is required from HR and functional manager of the resource
 - Resource calendar: When the recruitment should start, resource availability (resource histogram),
 - Staff release plan: When and how to release resources for smooth transition, so that resource cost is not counted in the project
 - Training need
 - Recognition & rewards
 - Complying with union contracts, government regulation or other HR policies

Responsibility Assignment Matrix - RAM

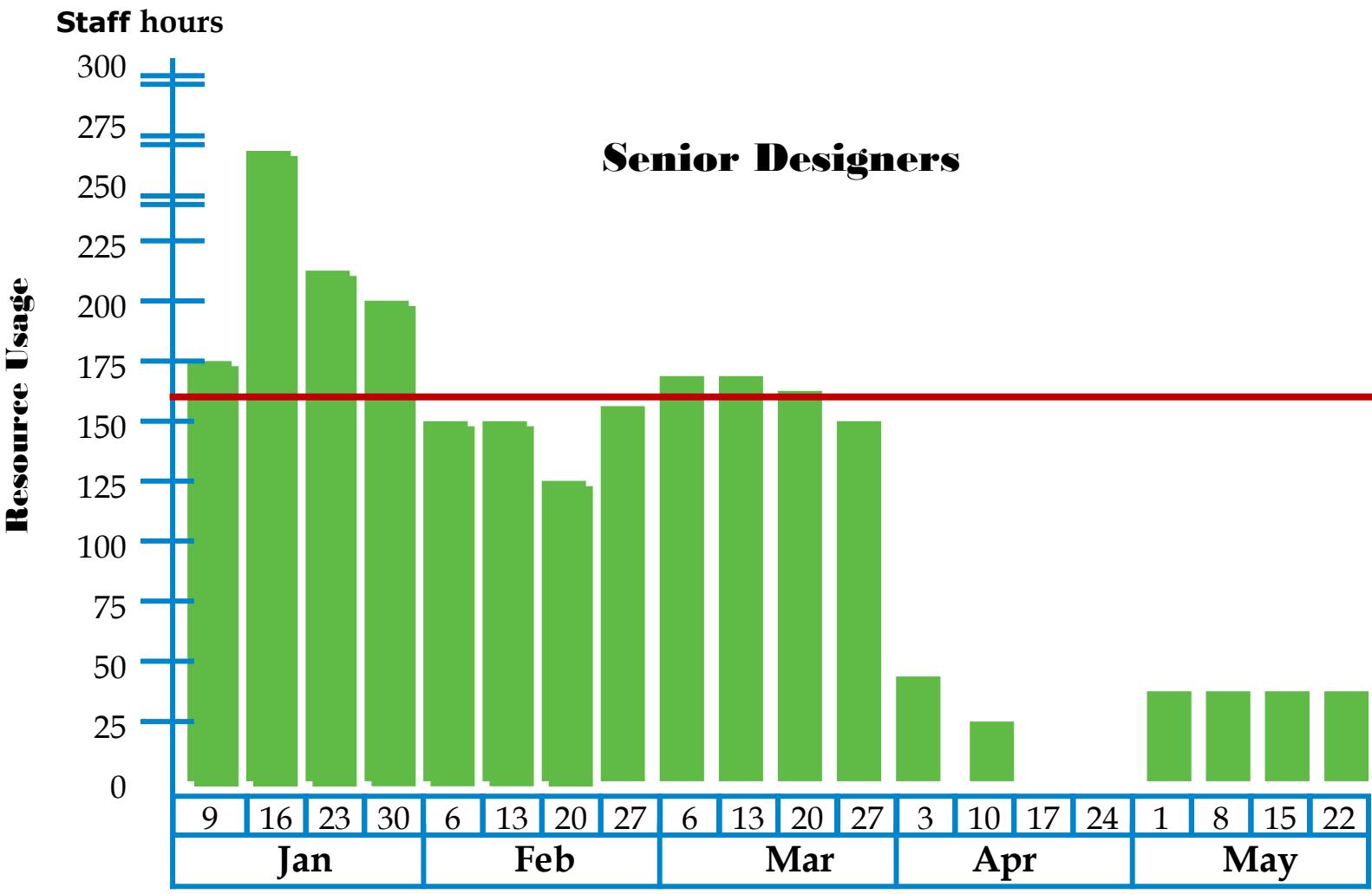
PHASE \ PERSON	Shiv	Ram	Jim	Karl	Rita	Mohan	...
Requirements	S	R	A	P	P		
Functional	S		A	P		P	
Design	S		R	A	I		P
Development		R	S	A		P	P
Testing			S	P	I	A	P

P = Participant A = Accountable R = Review required

I = input required S = Sign-off required

Resource Histogram

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Acquire Project Team



Definition

Confirming human resource availability and obtaining the team necessary to complete project assignments

Acquire Project Team



1. Human Resource Management Plan
2. Enterprise Environmental Factors
3. Organization Process Assets



1. Pre-assignment
2. Negotiation
3. Acquisition
4. Virtual Teams
5. Multi-criteria decision analysis



1. Project Staff Assignments
2. Resource Calendars
3. Project Management Plan Updates

Develop Project Team



Definition

Process of improving competencies, team interaction, and the overall team environment to enhance project performance.

Develop Project Team



1. Human Resource Management Plan
2. Project Staff Assignments
3. Resource Calendars



1. Interpersonal Skills
2. Training
3. Team-building activities
4. Ground Rules
5. Co-location
6. Recognition and Rewards
7. Personnel Assessment Tools

1. Team Performance Assessments
2. Enterprise Environmental Factors Updates

Team Performance Assessment..

- Skills acquired which increased productivity
- Reduced turnover rate
- Perform better within team
- Increased cohesiveness- sharing info/ openness

Manage Project Team



Definition

Tracking team member performance, providing feedback, resolving issues and managing changes to optimize project performance.

Manage Project Team



1. Human Resource Management Plan
2. Project Staff Assignments
3. Team Performance Assessments
4. Issue Log
5. Work Performance Report
6. Organization Process Assets



1. Observation & Conversation
2. Project Performance Appraisals
3. Conflict Management
4. Interpersonal Skills

1. Change Requests
2. Enterprise Environmental Factors Updates
3. Project Management Plan Updates
4. Project Documents Updates
5. Organization Process Assets Updates

Types of Power

- ✓ Formal – positional, granted by organizational/upper mgmt
- ✓ Expert – power earned through a recognized level of knowledge or skill in a specific area
- ✓ Reward – the power to give a positive consequences, like promotions, salary rise etc.
- ✓ Penalty – the power to provide negative consequences, like suspension, termination, reprimands
- ✓ Referent – power gained when team members admire, and willingly follow an individual as a role model

Team Development / Tuckman Model

✓ Five Stages of Team development

- ✓ **Forming** – Members of the group get to know each other and try to set up some ground rules about behavior
- ✓ **Storming** – Conflicts arise as various members of the group try to exert leadership and the methods of operation are being established
- ✓ **Norming** – Conflicts are largely settled and a feeling of group identity emerges
- ✓ **Performing** – Emphasis now is the task at hand
- ✓ **Adjourning** – The group disbands

Sequence is followed for each individual/group

Big Concepts

Conflict Resolution

Motivational Theories

Leadership Styles

Management Theories

Conflict Management

Conflicts - good or bad ???

Traditional view – Conflicts are bad, created by people and to be avoided

Current view – Conflicts are good and need to be confronted in order to bring out real issues and resolve them

Conflict Management

Sources of conflict

- ❖ Schedules
- ❖ Project Priorities
- ❖ Technical Issues
- ❖ Personality Conflict
- ❖ Cost
- ❖ Scarce resources
- ❖ Personal work styles
- ❖ Administrative Procedures

Conflict Management

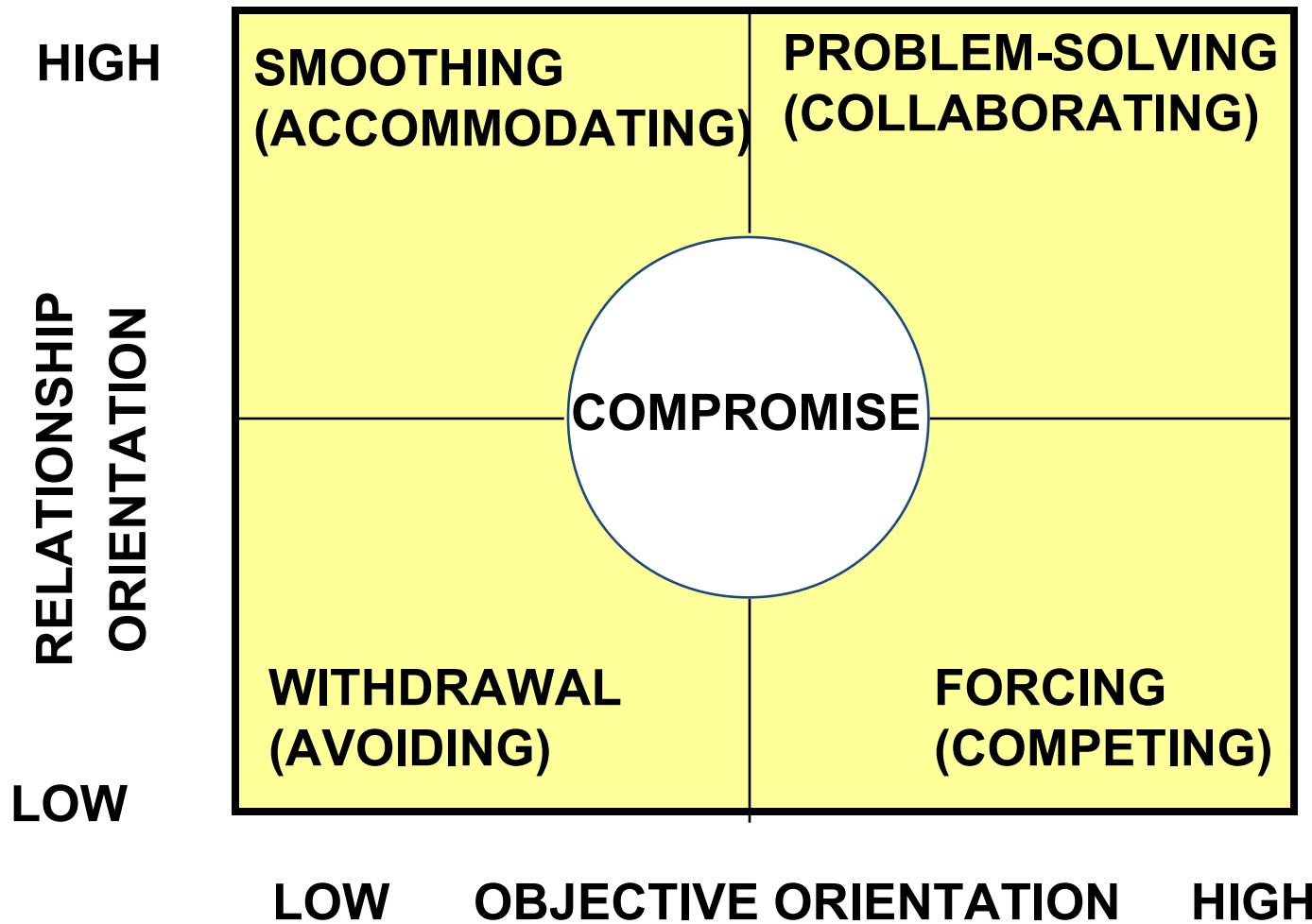
Characteristics of conflict

- ❖ Conflict is natural and forces a search for alternatives
- ❖ Conflict is team issue
- ❖ Openness resolves conflict
- ❖ Conflict resolution should focus on issues, not personalities
- ❖ Conflict resolution should focus on the present not on the past

Conflict Resolution

- ❖ Withdrawal – avoiding, giving up, stop gap, passive reaction, buying time, appropriate for “cooling off” time, no solution. Lose-lose outcome
- ❖ Smoothing – grudging agreement, avoids conflict, appeasing, friendly atmosphere. No lasting solution, lose outcome
- ❖ Compromising – bargaining, acceptable agreement, some satisfaction to each party, not ideal solution, trade off, a form of definitive solution. Lose outcome.
- ❖ Confronting/Problem Solving – approached as an issue to be solved by examining alternatives.
Give and take attitude, open dialog – direct approach, pinpoints problem, develops alternatives, objectively resolves issues, time consuming, ultimate solution, Win-Win outcome
- ❖ Collaborating – leading to consensus and commitment by incorporating multiple viewpoints and insights from differing perspectives.
- ❖ Forcing – Uses power, used as a last resort, ill feeling may result, Win-lose outcome. Win-Lose outcome

Conflict Resolution



Motivational Theories



Motivational Theories

1. Frederick Herzberg's Hygiene & Motivation Factors
2. Abraham Maslow's Hierarchy of Needs
3. Expectancy Theorem of Motivation by Victor Vroom
4. Job characteristics model of Oldham-Hackman
5. Theory X & Y of McGregor

Motivational Theories

Frederick Herzberg Hygiene Factors and Motivating Agents (1954)

Hygiene factors

- ✓ Supervision
- ✓ Company policy and administrator
- ✓ Positive working Condition
- ✓ Interpersonal relations
- ✓ Job Security
- ✓ Status
- ✓ Compensation
- ✓ Personal life



**Presence will not guarantee higher productivity
Absence will result in poor productivity**

Motivational Theories

Frederick Herzberg

Hygiene Factors and Motivating Agents (1954)

Motivating factors

- ✓ Achievements
- ✓ Recognitions
- ✓ Work Itself
- ✓ Responsibility
- ✓ Advancement
- ✓ Possibility for growth

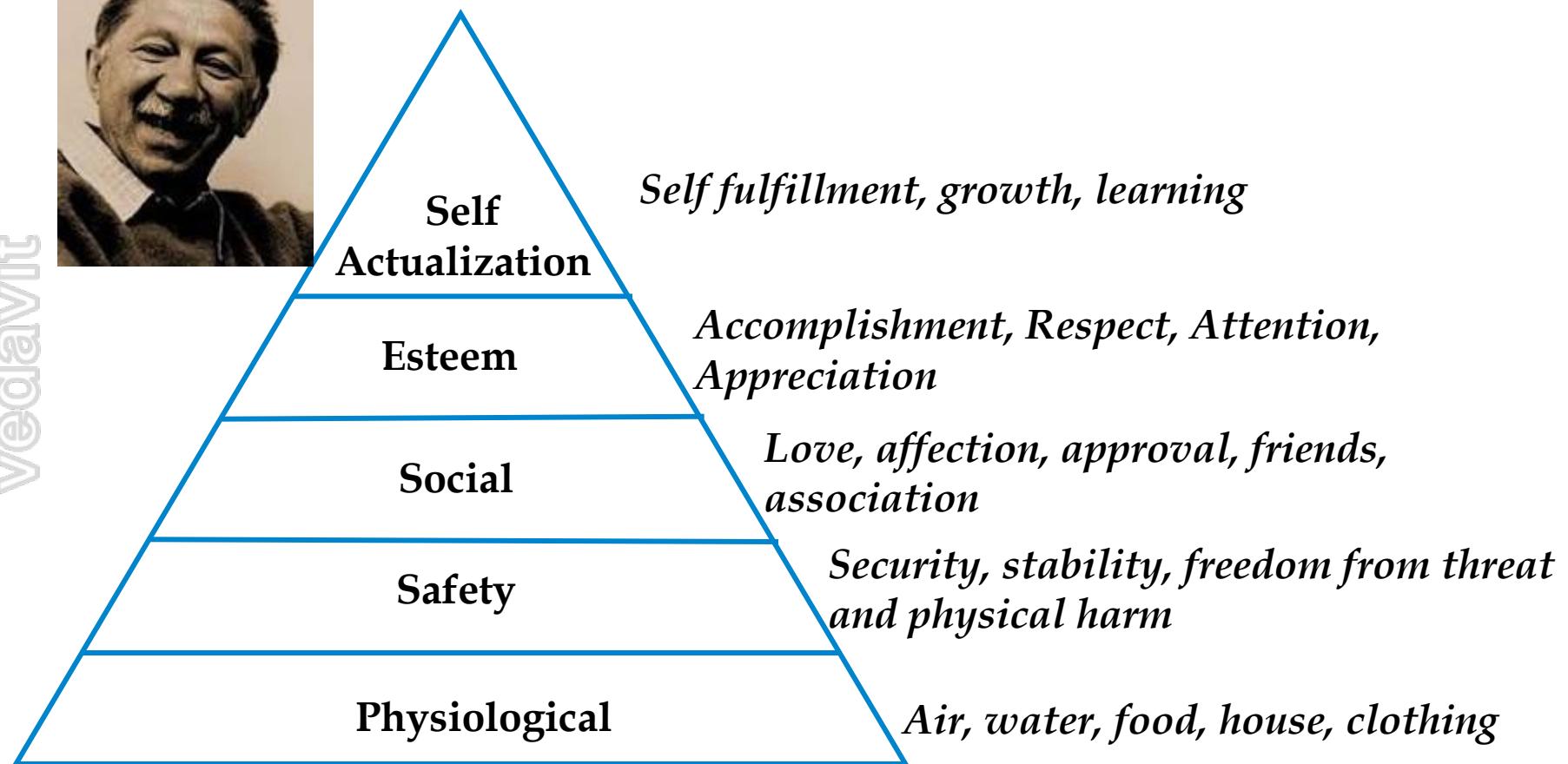
Motivation will not work without Hygiene.

Motivational Theories

Abraham Maslow's Hierarchy of Needs (1954)



(In order of priority)



Motivational Theories

Expectancy Theorem of Motivation by Victor Vroom

The extent to which an individual is motivated...

The level of expectation of their efforts will result in a desired outcome (effort performance linkage)

(Is the work important?)

The expectation that good work will be rewarded (Performance-reward linkage)

(Will I be rewarded?)

Attractiveness of the reward

(What is the value of the reward?)

Motivation will be high when all three factors are high



Motivational Theories



The Oldham-Hackman job characteristics model

- ✓ **Skill Variety** – the number of job skills that the job holder has the opportunity to exercise
- ✓ **Task Identity** – the degree to which your work and its result are identifiable as belonging to you
- ✓ **Task Significance** – the degree to which your job has an influence on others
- ✓ **Autonomy** – the discretion you have about the way that you do the job
- ✓ **Feedback** – the information that you get back about the result of your work

Motivational Theories

McGregor's Theory X

- ✓ The average worker is inherently lazy and needs supervisions
- ✓ The average worker dislikes work and avoids work whenever possible
- ✓ To induce adequate effort, the supervisor must threaten punishment and exercise careful supervision
- ✓ The average worker avoids increased responsibility and seeks to be directed

Theory X relies on Strict Rules, Performance incentives, Rewards, Threats to job security



Motivational Theories

McGregor's Theory Y

- ✓ Workers are willing to do the job without continuous supervision
- ✓ The average worker wants to be active and finds the physical and mental effort on the job satisfying
- ✓ Greatest results come from willing participation which will tend to produce self-direction towards goals without coercion and control
- ✓ The average worker seeks opportunity for personal improvement and self respect

Theory Y relies on worker participation in decisions, cordial manager-worker relationships, worker designed job methodology, worker individualism

Leadership Theories

Leadership Theories

- ✓ Theory Z of William Ouchi
- ✓ Contingency Theory of Fred Fiedler

Leadership Theories

Theory Z Proposed by William Ouchi

According to Theory Z, people who don't fit either Theory X or Theory Y are really a combination of the two.

People who develop a leadership style based on Theory Z, use different styles of leadership with different people, depending on the situation.



Leadership Theories

Contingency Theory of Fred Fiedler

- ✓ No theory is best theory. Because best depends upon individual manager and organization.
- ✓ Built on a combination of Theory Y behaviors and the Hygiene Theory
- ✓ People are motivated to achieve level competency and will continue to be motivated by this need even after competency is reached

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Leadership



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Leadership Style

How leaders lead the group

Leadership Style

1. Transactional Leadership

This style of leadership starts with the premise that team members agree to obey their leader totally when they take a job on.

The “transaction” is usually that the organization pays the team members, in return for their effort and compliance.

Leadership Style

2. Autocratic Leadership

Under the autocratic leadership styles, all decision-making powers are centralized in the leader as shown such leaders are dictators.

Autocratic leadership is an extreme form of transactional leadership, where a leader exerts high levels of power over his or her employees or team members.

Leadership Style

3. Transformational Leadership

Transformational leadership is a leadership style that is defined as leadership that creates valuable and positive change in the followers.

A person with this leadership style is a true leader who inspires his or her team with a shared vision of the future.

Transformational leaders are highly visible, and spend a lot of time communicating.

Leadership Style

4. Servant Leadership

When someone, at any level within an organization, leads simply by virtue of meeting the needs of his or her team, he or she is described as a “servant leader”.

Servant Leadership’s focus was on the leader as a servant, with his or her key role being in developing, enabling and supporting team members, helping them fully develop their potential and deliver their best.

Leadership Style

5. Charismatic Leadership

Charismatic leaders can tend to believe more in themselves than in their teams.

Transformational Leader has a basic focus of transforming the organization and, quite possibly, their followers, the Charismatic Leader may not want to change anything.

Leadership Style

6. Democratic or Participative Leadership

Although a democratic leader will make the final decision, he or she invites other members of the team to contribute to the decision-making process.

Leadership Style

7. Laissez-Faire Leadership

This French phrase means “leave it be”

It is one in which the manager provides little or no direction and gives employees as much freedom as possible.

Leadership Style

8. Bureaucratic Leadership

This is style of leadership that emphasizes procedures and historical methods regardless of their usefulness in changing environments.

Bureaucratic leaders attempt to solve problems by adding layers of control, and their power comes from controlling the flow of information.

Management Theories

The way managers manage their
work and people

Management Theories

Management styles are characteristic ways of making decisions and relating to subordinates

- ✓ Autocratic – traditional figure of a boss who makes binding decisions regardless of what subordinates think or desire
- ✓ Laissez-Fare – Other extreme of autocratic, the staff can pursue anything they wish, enhances free thinking
- ✓ Democratic – participative, decisions made jointly by management and staff
- ✓ MBWA- Management by Walking around

Key to Successful Team Management

- ✓ Listens to subordinates to diagnose or solve problems
- ✓ Sets goals and develops short- and long- range action plans
- ✓ Gives directions about who is to do which tasks to what standards
- ✓ Provides feedback on task performance
- ✓ Rewards or disciplines task performance and personal characteristics
- ✓ Develops subordinates

Key to Successful Team Management

- ✓ Understanding that team is an Integral Unit of Organization
- ✓ A team mission, objective, goals, strategy and role definition
- ✓ A leader and an organizational support system
- ✓ Managers responsive to needs of team members
- ✓ Encourage participation and effective communication
- ✓ Foster an atmosphere of trust among team members
- ✓ Provide feedback effectively
- ✓ A collective culture and style
- ✓ Motivate team members with challenges & rewards

Halo effect

The halo effect is the assumption that because the person is good at a technology they'd also be good at managing a project. (Which may be wrong assumption).

Recap – HR Management

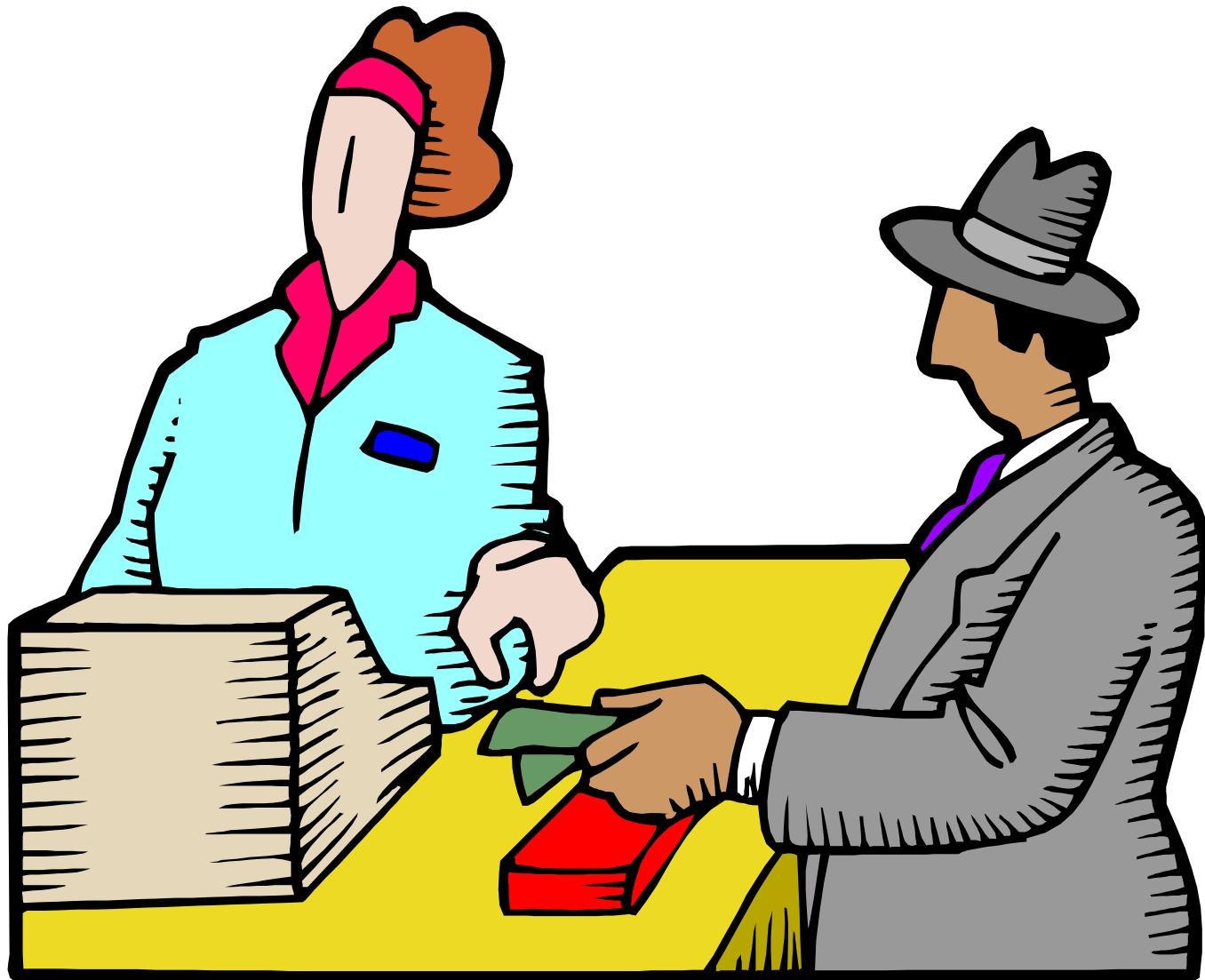
- ✓ Components of Human Resource Management Plan
- ✓ Resource Calendar, Organization Calendar & Work Calendar
- ✓ How to acquire human resources and form teams
- ✓ Team Development Activities
- ✓ Conflict Management Techniques
 - ✓ Withdrawal, Forcing, Compromise, Smoothing, Confrontation, Collaboration
- ✓ Motivation Theories
 - ✓ Abraham Maslow(need), Fredrick (Hygiene), Victor Vroom (expectancy), Oldham-Hackman (job), Theory X & Y (McGregor)
- ✓ Leadership Theories
- ✓ Manager & Leader
- ✓ Powers
- ✓ Team Development Model

Discussions !

Agenda

- ✓ Framework
- ✓ Project Integration
- ✓ Scope Management
- ✓ Time Management
- ✓ Cost Management
- ✓ Quality Management
- ✓ Risk Management
- ✓ Communication Management
- ✓ Stakeholder Management
- ✓ Human Resource Management
- Procurement Management ←
- Professional Responsibility & Ethics

Project Procurement Management



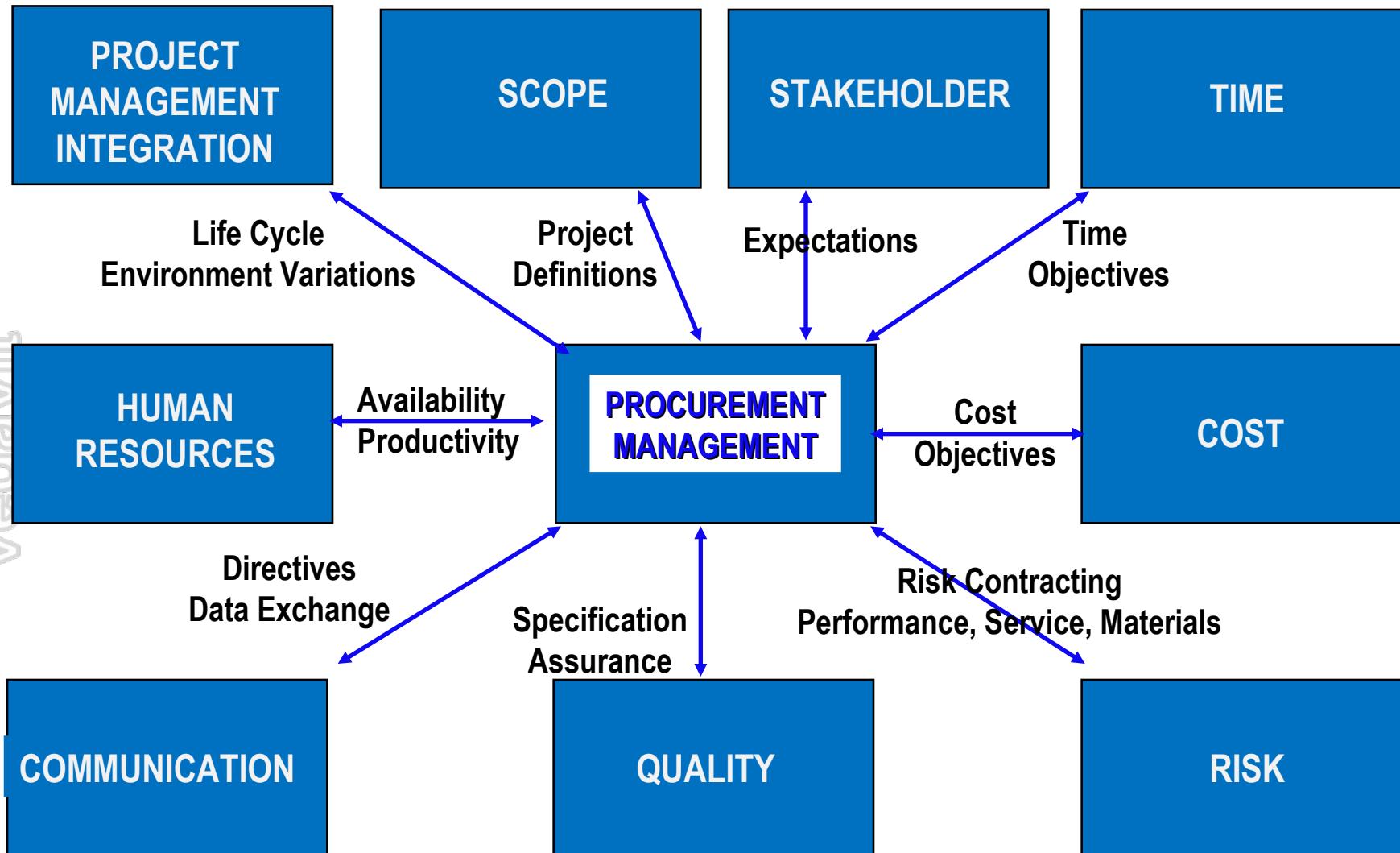
Project Procurement Management



Definition

Processes necessary to purchase or acquire products, services or results needed from outside the project team.

Another look @ Procurement Management



Project Procurement Management

- Plan Procurements [PLANNING]
- Conduct Procurements [EXECUTING]
- Administer Procurements [M&C]
- Close Procurements [CLOSING]

Project Manager's Role

- ✓ Identifying project procurement needs
- ✓ Determine contract types and potential providers
- ✓ Identify/select procurement source
- ✓ Assessing quality and completeness of contract
- ✓ Verify product/service acceptance
- ✓ Structured review of the procurement process

Plan Procurement



Definition

**Documenting project purchasing decisions,
specifying the approach and identifying
potential sellers.**

Plan Procurement



1. Project Management plan
2. Requirements Documentation
3. Risk Register
4. Activity Resource Requirements
5. Project Schedule
6. Activity Cost Estimates
7. Stakeholder Register
8. Enterprise Environmental Factors
9. Organization Process Assets

1. Expert Judgement
2. Make-or-buy analysis
3. Market Research
4. Meetings

1. Procurement Management Plan
2. Procurement Statements of work
3. Procurement Documents
4. Source selection criteria
5. Make-or-buy decisions
6. Change Requests
7. Project Documents Updates

Procurement Management Plan



Definition

Describes how the procurement processes will be managed

- ✓ Types of Contracts to be used
- ✓ Managing Multiple Providers
- ✓ Coordination with other project aspects

Source selection criteria

- Understanding of need
- Overall or life-cycle cost
- Technical capability
- Risk
- Management Approach
- Technical Approach
- Warranty
- Financial Capacity
- Production Capacity and interest
- Business size and type
- Past performance of sellers
- References
- Intellectual property rights
- Proprietary rights

Conduct Procurements



Definition

**Process involves obtaining seller responses,
selecting a seller and awarding a contract**

Conduct Procurement



1. Procurement Management Plan
2. Procurement Documents
3. Source selection criteria
4. Seller proposals
5. Project Documents
6. Make-or-buy decisions
7. Procurement Statement of work
8. Organization Process Assets

1. Expert Judgement
2. Bidder conferences
3. Proposal evaluation techniques
4. Independent estimates
5. Advertising
6. Analytical techniques
7. Procurement Negotiation

1. Selected Sellers
2. Agreements
3. Resource Calendars
4. Change Requests
5. Project Management Plan Updates
6. Project Documents Updates

Control Procurement



Definition

**Managing procurement relationships,
monitoring contract performance and making
changes and corrections as needed.**

Control Procurement



1. Project Management Plan
2. Procurement Documents
3. Agreements
4. Approved Change Requests
5. Work Performance Reports
6. Work Performance Data



1. Contract Change Control System
2. Procurement Performance Reviews
3. Inspections and Audits
4. Performance Reporting
5. Payment Systems
6. Claim Administration
7. Records Management Systems



1. Work Performance Information
2. Change Requests
3. Project Management Plan Updates
4. Procurement Documents Updates
5. Organization Process Assets Updates

Claim Administration

- Contested changes or potential constructive changes are those requested changes where buyer and seller cannot reach to an agreement for payment.
- Settle through negotiation
- Follow the ADR (alternative dispute resolution) method established in contract.

Close Procurement



Definition

Process of completing each project procurement .

Close Procurement



1. Procurement Management Plan
2. Procurement Documents



1. Procurement Audits
2. Procurement Negotiation
3. Records Management Systems

1. Closed Procurements
2. Organization Process Assets Updates

Big Concepts

- Components of a Contract
- Important Aspects of Contract
- Contract Types
- Important Terms of Procurement Management
- Contract Change Control

Components of a Contract

- ✓ SOW or Deliverables
- ✓ Schedule Baseline
- ✓ Performance Reporting
- ✓ Period of Performance
- ✓ Roles & Responsibilities
- ✓ Seller's Place of Performance
- ✓ Pricing
- ✓ Payment Terms
- ✓ Place of delivery
- ✓ Inspection and acceptance criteria

Components of a Contract

- ✓ Warranty
- ✓ Product Support
- ✓ Limitation of liability
- ✓ Fees and retainage
- ✓ Penalties
- ✓ Incentives
- ✓ Insurance and performance bonds
- ✓ Subordinate subcontractors approvals
- ✓ Change request handling
- ✓ Termination and alternative dispute resolution Mechanism

Important Aspects of Contract

- Look from buyer's perspective
- Seller is not supplying people to adjunct the buyer's team (seller remains external to the project team)
- All product and project management requirements should be specifically stated in the contract
- Contracts require formality
- If it is not in a contract, it can be done if a change is issued
- If it is in the contract, it must be done or a change order, signed by both parties issued
- Changes must be in writing

Important Aspects of Contract

- Contracts are legally binding
- Contracts should help diminish project risk
- Most governments back all contracts by providing a court system for dispute resolution
- In many parts of the world (including India), contracts are informal and relationships between parties is more important than the contract
- It is important to take a more formal approach to the procurement process when answering questions

Important Aspects of Contract

- Contract contains offer – clearly stated in a manner that can be understood by a reasonable person
- Contract must be between competent persons (mental state, age)
- Contract must have lawful objectives
- Acceptance by the buyer, based on genuine assent of both parties
- Consideration – Most important part of the contract. It means something of value is received by the seller in exchange for meeting the promise
- Follows all laws where the contract execution occurs

Contract Types



Definition

Different types of contracts are more or less appropriate for different types of purchases.

- ❖ Time and material contracts
- ❖ Unit Price contracts
- ❖ Fixed Price or lump sum contracts
- ❖ Cost reimbursable contracts

Contract Types

T & M – Time & Materials

The seller is paid for the amount of time it takes to accomplish the work & also reimbursed for the materials to complete the work. Profit is inbuilt.

Unit Price – Fixed Price

The seller is paid a fixed price for an agreed upon Unit of Supply. Profit is inbuilt.

Contract Types- Fix Price Plus

FFP – Firm Fixed Price

Lump sum/firm Fixed Price. Seller at most risk. Profit is inbuilt.

FPIF – Fixed Price Incentive Fee

Most difficult to administer. It contains a number of cost/profit schemes like, cost, target profit, target price, ceiling price and share ratio. If seller maximizes profits, an incentive is offered to improve efficiency.

FP-EPA— Fixed Price with Economic Price Adjustment

The seller is paid a fixed price. The contract is reviewed at pre-defined intervals in the project for adjustments to the contract price based on certain parameters

Contract Types- Cost Plus

CPFF— Cost Plus Fixed Fee

Not desirable from buyer's point of view.

The contractor is reimbursed its cost + a fixed fee

CPAF-Cost Plus Award Fee

Not desirable from buyer's point of view. The contractor is influenced to increase costs.

CPIF— Cost Plus Incentive Fee

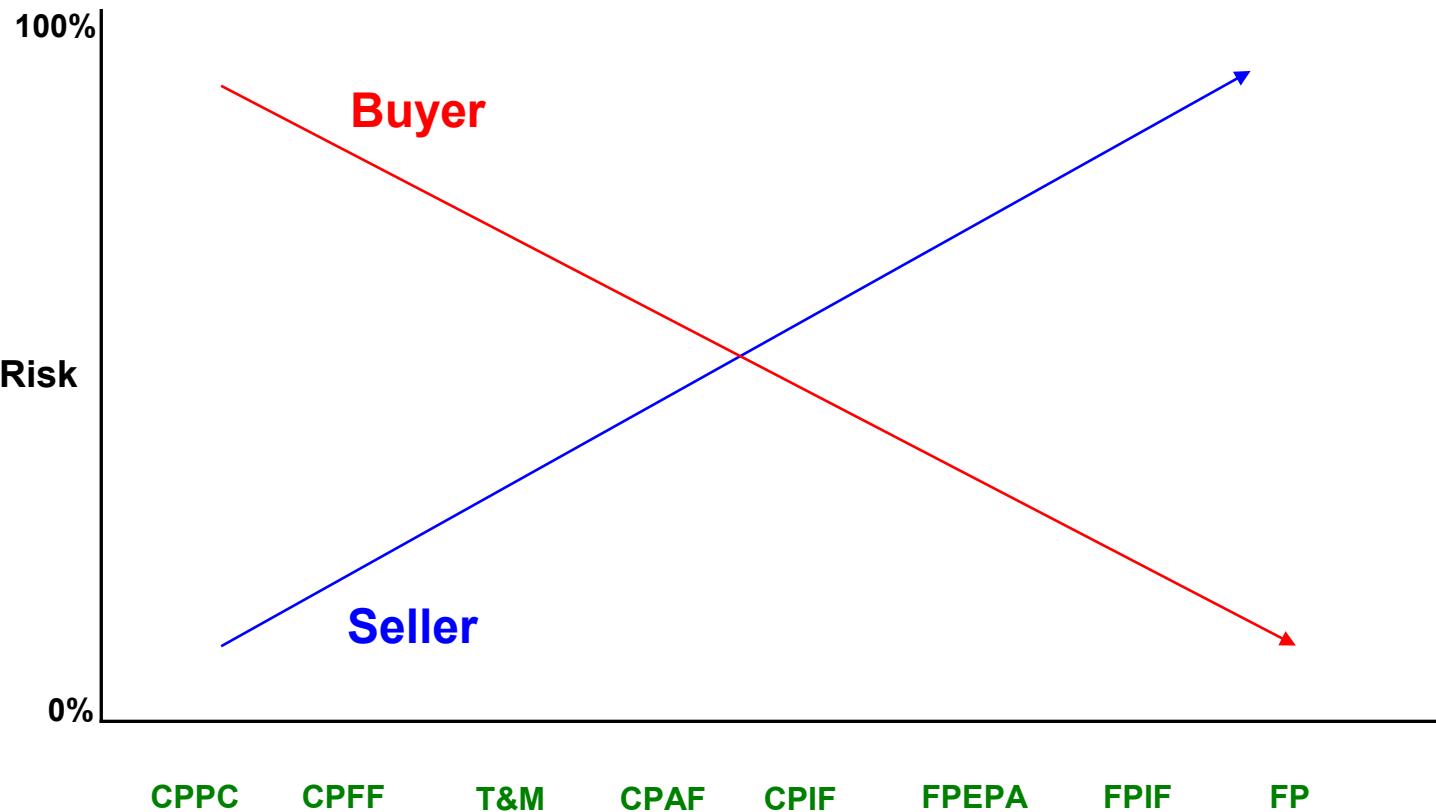
Seller is reimbursed for an agreed upon performance cost along with a pre established fee plus an incentive bonus. The buyer and seller share the uncertainty to a certain degree

CPPC— Cost Plus Percentage Fee

Along with cost incurred a seller is also paid for an agreed upon percentage of cost incurred in completing the project. Most unsuitable from buyer's perspective.

Contract Types & Risk

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Important Terms of Procurement Management

- Acronyms
 - IFB- Invitation for Bid,
 - RFB- Request for Bid,
 - LOI- Letter of Intent,
 - RFQ- Request for Quotation
- IFB or RFB/P :
 - Single Price,
 - High \$ Value
- RFQ used :
 - Per Item/Hour Price,
 - Lower \$ Value,
 - May be used to develop info in RFP.

Important Terms of Procurement Management

- ✓ T& M Used when you must begin work immediately without a procurement statement of work
- ✓ If seller need to do more work in cost plus fixed fee contract then he should negotiate to change in contract. Otherwise seller will not get more than fixed fee, no matter how much he works.
- ✓ An IFB is typically a request for a sealed document that lists the seller's firm price to complete the detailed work.
- ✓ A letter of intent is not binding in a court of law, it does make the seller feel more comfortable about expending funds before a contract is signed.

Contract Change Control System (CCCS)

- ✓ CCCS is a process for modifying the contract.
- ✓ Contract change control system (CCCS) is part of integrated change control system
- ✓ PM should focus on Buyer Seller relationship
- ✓ Following are part of CCCS
 1. Paperwork
 2. Tracking Systems
 3. Dispute resolution processes
 4. Approval Levels necessary for authorizing changes

Recap – Procurement Management

- ✓ What is the meaning of procurement in project management
- ✓ Things you should take care while planning procurement
- ✓ Source Selection Criteria
- ✓ Contract Types
- ✓ Conduct Procurements
- ✓ Contract Administration
- ✓ Close Procurements

Discussions !

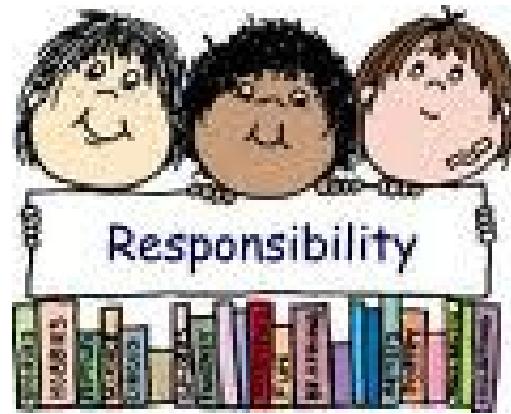
Agenda

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- ✓ Risk Management
- ✓ Communication Management
- ✓ Stakeholder Management
- ✓ Human Resource Management
- ✓ Procurement Management
- Professional Responsibility & Ethics ←

Professional Responsibility and Ethics

Balancing Everything





Honesty

Honesty is our duty to understand the truth and act in a Truthful manner both in our communication and in our conduct

1. We earnestly seek to understand the truth
2. We are truthful in our communications and conduct and provide in timely manner
3. We make commitments and promises in good faith (implied & explicit)
4. We do not engage on or condone behavior that is designated to deceive others
5. We do not engage in dishonest behavior with the intention of personal gain or at the expense of other.

Responsibility

Responsibility is our duty to take ownership for the decisions we make or fail to make, the actions we take or fail to take & the consequences that result

1. Make decisions and take actions based on the BEST interests of society, Public safety and the environment
2. We accept those assignments that are consistent with our background, experience, skills and qualifications
3. We inform ourselves and uphold the policies, rules and regulations and laws that govern our work, professional and volunteer activities
4. We report unethical or illegal conduct to appropriate management & if necessary to those affected by the conduct
5. We bring violations of this Code to the attention of the appropriate body for resolution. We only file ethics complaints when they are substantiated by facts.

Respect

Respect is our duty to show a high regard for ourselves, others and the resources entrusted to us

1. We inform ourselves about norms and customs of others and avoid engaging in behaviors they might consider disrespectful
2. We listen to others points of view , seeking to understand them
3. We approach directly those persons with whom we have conflict
4. We conduct ourselves in a professional manner
5. We negotiate in good faith, do not exercise the power of our expertise or position to influence decisions

Fairness

Fairness is our duty to make decisions and act impartially & Objectively. Our conduct must be free from competing self interest , Prejudice and favoritism.

- 1.We demonstrate transparency in decision making and constantly re-examine our impartiality .
- 2.We provide equal access to information to those authorized & equal opportunities to qualified candidates
- 3.We do not discriminate against others based on, but not limited to , Gender, Race, Age, Religion, Disability, Nationality or Sexual orientation.

Fairness

Conflict of Interest:

1. We proactively and fully disclose any real or potential conflicts of interest to the appropriate stakeholders.

2. When we realize that we have a real or potential conflict of interest :
 - We refrain from engaging in the decision making process or otherwise
 - attempting to influence outcomes, unless or until we have made full
 - disclosure to the affected stakeholders.

3. We do not hire or fire, reward or punish, or award or deny contracts based on personal considerations. Including but not limited to Favoritism, Nepotism, or Bribery.

Ethics Quick Test

Texas Instruments “Ethics Quick Test” for making ethical decisions

- ✓ Is the action legal?
- ✓ Does it comply with your understanding of company values?
- ✓ If you do it, will you feel bad?
- ✓ How will it look in the newspaper?
- ✓ If you know it is wrong, do not do it.
- ✓ If you are not sure, ask.
- ✓ Keep asking until you get an answer.

Project Manager's Oath of **Professional Responsibility**

Professional Responsibility

- ✓ Ensure individual integrity
- ✓ Adhere to legal requirements and ethical standards
- ✓ Protect Stakeholders
- ✓ Share lessons learned and other relevant information
- ✓ Build capabilities of colleagues
- ✓ Advance project management professionalism
- ✓ Improve competencies as project manager
- ✓ Balance stakeholder interests in project
- ✓ Respect cultural ethnic and personal differences
- ✓ Ensure collaborative project management environment
- ✓ Comply with all organizational rules and policies

Professional Responsibility

- ✓ Provide accurate and truthful representations in cost estimates
- ✓ Provide accurate and truthful representations in project reports
- ✓ Report violations of policies, procedures and code of ethics
- ✓ Strive for fair resolutions
- ✓ Satisfy competing needs and objectives
- ✓ Interact with others in a professional manner
- ✓ Be responsible for satisfying the complete scope and objectives of customer requirements
- ✓ Maintain and respect confidential information

Professional Responsibility

- ✓ Ensure that a conflict of interest does not interfere with professional judgment
- ✓ Disclose conflict of interest to customer
- ✓ Disclose circumstances that could be construed as conflicts of interest
- ✓ Refrain from offering or accepting inappropriate payments, gifts, or other forms of compensation
- ✓ Adhere to all applicable laws or customs of the country where services are being provided
- ✓ Respect intellectual property developed or owned by others
- ✓ Act in an accurate, truthful and competent manner

Discussions !



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