Why Do You Need a Maturity Level 5 Supplier?

Kasse Initiatives

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Welcome

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Agenda

◆ Myths

◆ Characteristics of ML2 – ML5 Organizations

◆ Buyer's Responsibility for Defining the System Up Front

◆ Buyer's Responsibility for Managing the Supplier

◆ Supplier Relationship

◆ Supplier Selection Criteria

◆ Continuous Representation, Capability Levels and Supplier Capability Evaluation

Myths

Myths

◆ You must "trust" your supplier or you should not choose them

◆ You must never allow your supplier to suggest a change to the requirements or to the contract

◆ If you do not have so much expertise, it is quite OK to have your Supplier to define your requirements for you and the Acceptance Testing criteria

  ◇ It is also acceptable for the Supplier to conduct the Acceptance Testing for you

◆ Using a Supplier is always cheaper than developing a product or product component in-house

Myths - 2

◆ If you choose a Maturity Level 5 Supplier, it greatly reduces the work for the Project, because the Supplier will "manage itself"

◆ If you need multiple suppliers, ML 5 Suppliers will be more willing to cooperate to support your business objectives

◆ ML 5 Suppliers are able to demonstrate expected performance regardless of the application domain

◆ ML 5 Suppliers are able to support the culture of any Buyer they are supporting

Characteristics of
ML 2 – ML5 Organizations

Maturity Level 2 Characteristics

◆ Projects of the organization have ensured that processes are planned and executed in accordance with policy

◆ Projects employ skilled people

◆ Adequate resources are made available to the project team members

◆ Controlled outputs are produced

◆ Relevant stakeholders are involved, monitored, controlled, and reviewed and are evaluated for adherence to their process descriptions

◆ Status of the work products and the delivery of services are visible to management at defined points

◆ Work products are appropriately controlled

Maturity Level 3 Characteristics

◆ Processes are well characterized and understood, and are described in standards, procedures, tools, and methods

   ◇ These standard processes are used to establish consistency across the organization

   ◇ The standards, process descriptions, and procedures for a project are tailored from the organization's set of standard processes to suit a particular project or organizational unit and therefore are more consistent

◆ Processes are managed more proactively using an understanding of the interrelationships of the process activities and detailed measures of the process, its work products, and its services

Maturity Level 4 Characteristics

◆ The organization and projects establish quantitative objectives for quality and process performance and use them as criteria in managing processes

◆ Quantitative objectives are based on the needs of the customer, end users, organization, and process implementers

◆ Quality and process performance is understood in statistical terms and is managed throughout the life of the processes

Maturity Level 4 Characteristics - 2

◆ For selected subprocesses, detailed measures of process performance are collected and statistically analyzed

◆ Special causes of process variation are identified and, where appropriate, the sources of special causes are corrected to prevent future occurrences

◆ At maturity level 4, the performance of processes is controlled using statistical and other quantitative techniques, and is quantitatively predictable

Maturity Level 5 Characteristics

◆ At maturity level 5, an organization continually improves its processes based on a quantitative understanding of the common causes of variation inherent in processes

◆ Quantitative process improvement objectives for the organization are established, continually revised to reflect changing business objectives, and used as criteria in managing process improvement

◆ Both the defined processes and the organization's set of standard processes are targets of measurable improvement activities

Deciding To Use A Supplier

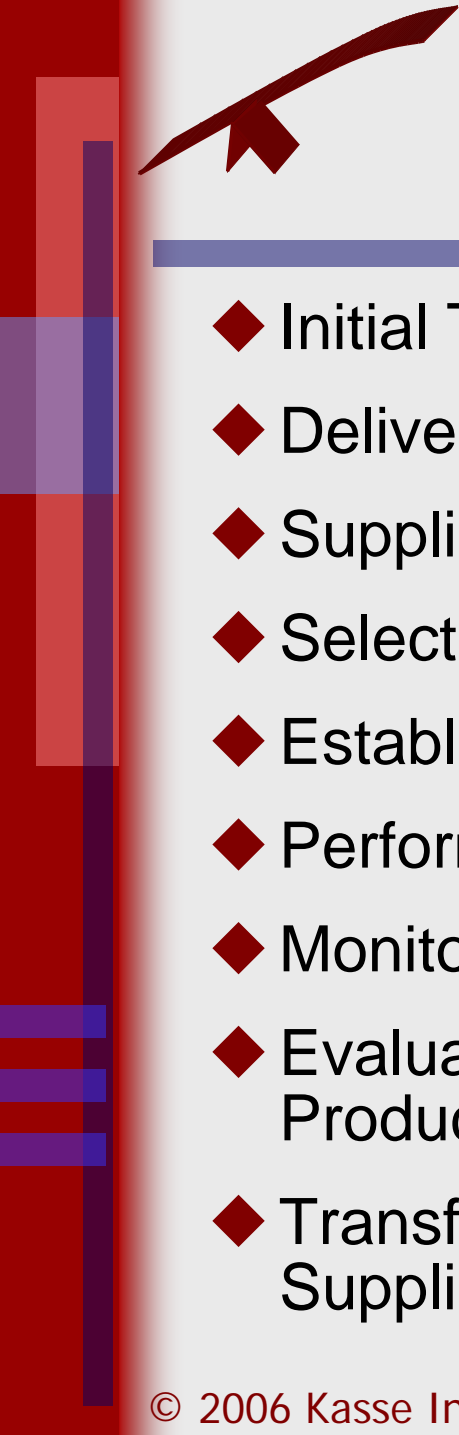# Buyer's Responsibility for Defining the System Up Front

◆ Requirements

  ◈ Business

  ◈ Technical

  ◈ Performance

  ◈ Quality

  ◈ Competition

  ◈ Competence

  ◈ Acceptance Criteria

◆ WBS → SOW

◆ Initial Planning

◆ Critical Path

◆ Initial Risk Identification

Buyer's Responsibility for Defining the System Up Front - 2

◆ Initial Technical Solution

◆ Deliverables

◆ Supplier Relationship

◆ Selecting the Supplier

◆ Establishing the Supplier Agreement

◆ Performing a Kick-Off with the Supplier's Project Team

◆ Monitoring the Supplier's Performance

◆ Evaluating Selected Supplier Processes and Work Products

◆ Transferring the Product or Product Component from Supplier to Buyer environment

Requirements

Deciding to Use a Supplier Requirements

◆ Understand the "customer's" requirements

⬥ Must be at a low enough level to be able to decide which of its customer requirements the Buyer wants the Supplier to be responsible to implement

Deciding to Use a Supplier Requirements - 2

◆ Categories of questions for consideration

　◈ How are those requirements related to the Buyer's organizational business requirements?

　◈ What is the Buyer's relationship with the Supplier?

　◈ What technical ability must the Supplier have?

　◈ What technical performance is required and is the supplier capable?

　　✦ What other projects can the Supplier discuss and show the actual performance delivered?

　◈ What quality factors is the Buyer seeking for the Supplier to deliver?

　　✦ Reliability

　　✦ Maintainability and Expandability

　　✦ Interoperability

◆ See Template for Deciding to Use a Supplier
　➔ Template to Help Decide to Use a Supplier.doc

Identify System Requirements

◆ Determine goal and scope of the effort

⬥ Review customer input

◆ Gather high-level Requirements

⬥ Identify the goals and requirements of project

⬥ Describe current state or system

⬥ Describe change to system or new system

⬥ Document justification for system change or new system

⬥ Identify security requirements

⬥ Identify computer resource requirements

⬥ Identify internal and external interfaces

Review Customer Input

◆ Overview

◆ Objectives

◆ Assumptions and Constraints

◆ Requirements

　◈ Functional requirements

　　◆ what the system should do, not how

　◈ Non-functional requirements

　　◆ constraints on the system

Describe System Objectives

◆ Reason for the system

 ◈ Why is it being built?

 • for Research and Development

 • for a specific customer

 • to meet existing/anticipated market needs/requirements

 • to upgrade an existing system to newer technology

◆ Reason for the system

◈ What is the problem it is trying to solve?

- ◆ a known problem

- ◆ an anticipated problem (e.g., loss of maintenance/production support for existing technology)

Develop System Overview

◆ The overview describes the interactions between the system and its operational environment

  ◈ Other systems with which it must interface

  ◈ Protocols it must use to interface with them

  ◈ Who the users are and in what manner they will use it

  ◈ Expected change in its environment over its lifetime

Document Your Assumptions

◆ All assumptions should be documented

　　◈ Captures thinking at the time

　　◈ Easier to find where wrong assumptions were made weeks and months later

　　◈ Reduces the risk of finger pointing about who made the right or wrong assumption

　　◈ Necessary for backup or someone who may take over the role of the person who worked on the decision to use a Supplier
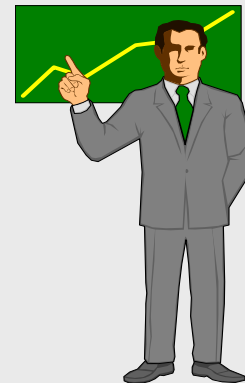
List System Constraints

Functional Constraints

- Performance
- Efficiency
- Response times
- Capacities
- Safety
- Security
- Quality issues
  - Maintainability
  - Portability
  - Reliability

Design Constraints

- Development standards
- Libraries
- Operating Environment:
  - System compatibility
  - Interaction with existing systems (hardware and/or software)
 - Hardware
  - Operating system

Acceptance Criteria

◆ Acceptance Criteria (the criteria that a product or product component must satisfy to be accepted by a user, customer or authorized entity) should be part of the requirements capture and specification process

◈ Who will perform the acceptance testing?

◈ What environment or portion of the user's environment must be exercised to satisfy the acceptance criteria?

◈ How much simulation will be allowed?

◈ What process will be followed if errors are found?

♦ What classification of errors must be fixed before the system will be accepted?

♦ What classification of errors may allow the system to be accepted in the event that workarounds can be provided?

Work Breakdown Structure

Determine Resources Needed

◆ Develop initial high-level work breakdown structure (WBS) PP-SAM-Starterkit-WBSExampleContentsv2.0.doc

◆ Make initial high-level rough estimates

- ◈ Size & Complexity

- ◈ Effort

- ◈ Critical computer resources

◆ Identify all participant roles
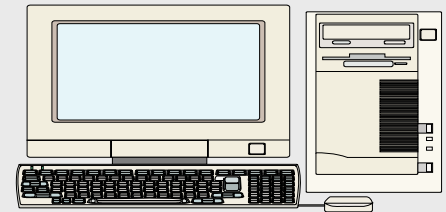
Determine Resources Needed - 2

◆ Develop high-level staffing profile including need for contracting support

◆ Determine training needs

◆ Identify the QA activities to be performed and the required support

◆ Determine CM activities and support

◆ Determine the Test activities and support

◆ Identify groups external to the project for inter-group coordination

◆ Develop preliminary schedule

Initial Planning

Initial Estimation

◆ Provide initial estimates for the following

- ◈ Size

- ◈ Effort

- ◈ Cost

- ◈ Schedule

- ◈ Risks

- ◈ Computer Resources

- ◈ Facilities and Test Environment

Resources Required

What must one have to get this project done?

◆ Staff

◆ Tools
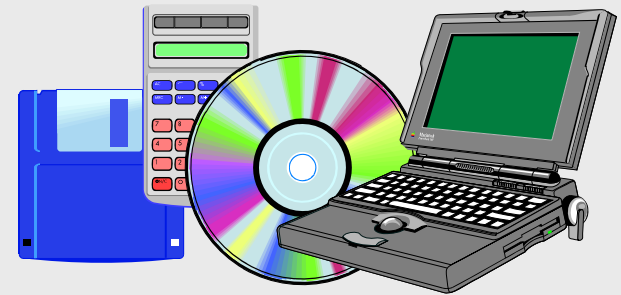
  ◈ Analysis

  ◈ Design

  ◈ Project Tracking

  ◈ CM

  ◈ Testing

◆ Facilities

◆ Systems

◆ Training

Staff Requirements

◆ Project Manager

◆ Detailed definition of skills and experience needed

◆ Detailed definition of time-frame needed

◆ Staff Requirements for planning and implementation phases of the project

Resource Planning

Staff Loading Curves

**Alternative Staffing Strategies
to Accelerate the Schedule**

People

2   4   6   8   10   12   14

"Impossible Region"

**Maximum Schedule
Acceleration ± 25%**
(shorten or extend by 25%)
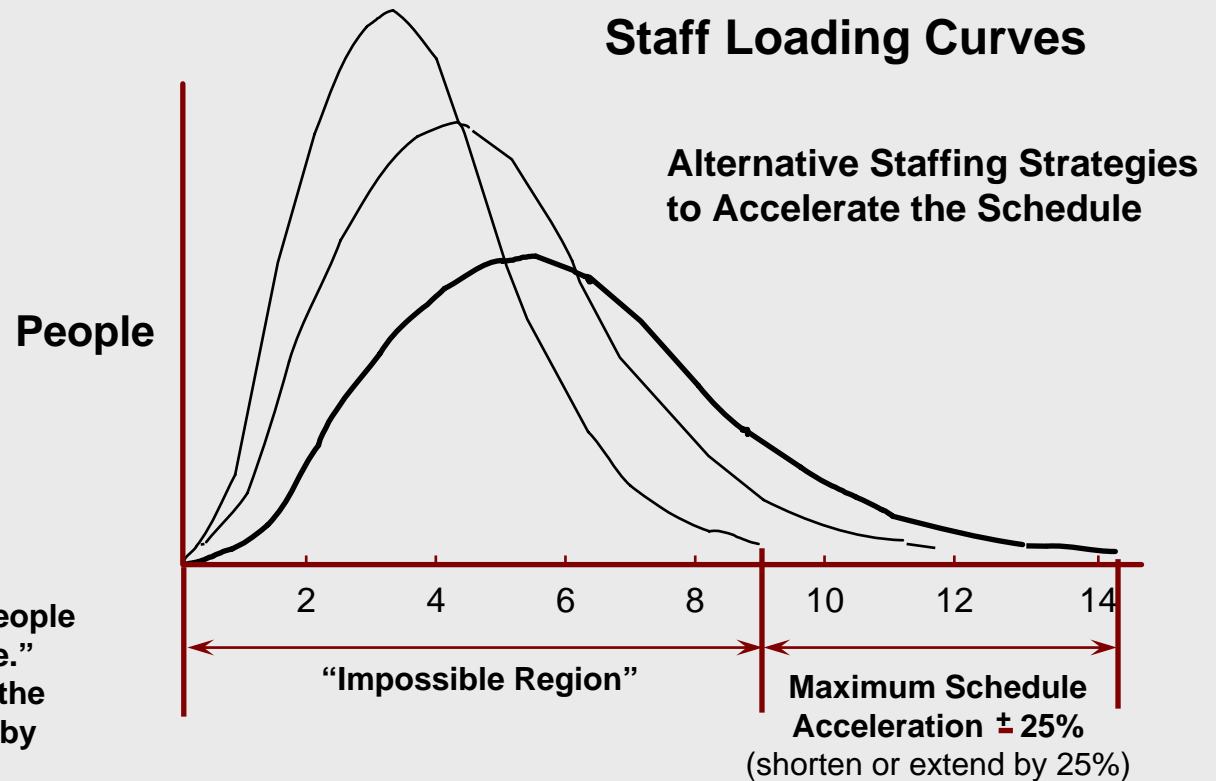
**"Person months and people
are not interchangeable."
"You cannot complete the
project in half the time by
doubling the people."**

Frederick Brooks
The Mythical Man-Month
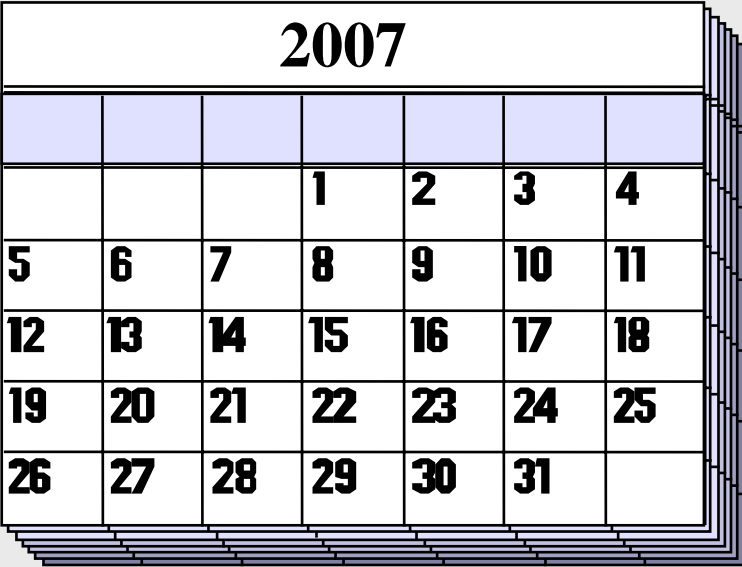
Barry Boehm
Software Engineering Economics

Critical Path

Create an Initial Schedule

2007						
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

Critical Path

◆ Determine Tasks Dependencies

◆ Calculate the Critical Path (CPM) schedule

◆ Integrate Resources into schedule
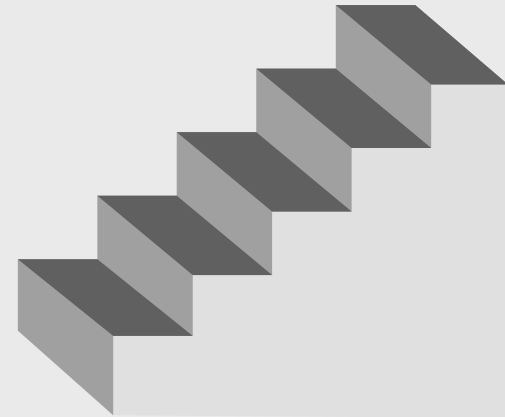
Microsoft Project Gantt Chart

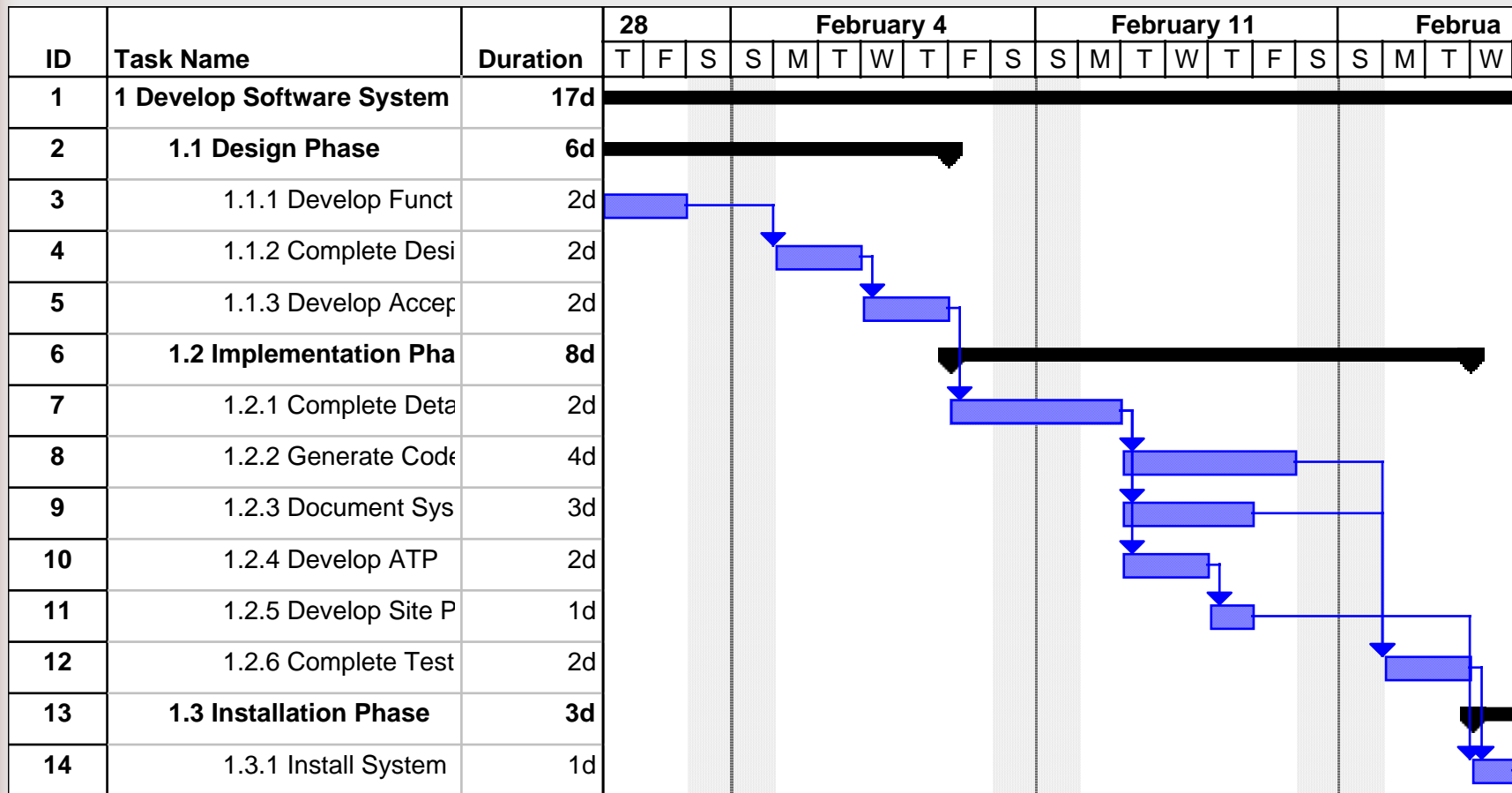| ID	Task Name	Duration	28			February 4						February 11						Februa
			T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W
1	1 Develop Software System	17d																
2	1.1 Design Phase	6d																
3	1.1.1 Develop Funct	2d																
4	1.1.2 Complete Desi	2d																
5	1.1.3 Develop Accep	2d																
6	1.2 Implementation Pha	8d																
7	1.2.1 Complete Deta	2d																
8	1.2.2 Generate Code	4d																
9	1.2.3 Document Sys	3d																
10	1.2.4 Develop ATP	2d																
11	1.2.5 Develop Site P	1d																
12	1.2.6 Complete Test	2d																
13	1.3 Installation Phase	3d																
14	1.3.1 Install System	1d																

Risks

Risk Definition

◆Any event that could impact project results

- ◈ Effort and Cost

- ◈ Schedule

- ◈ Functionality

- ◈ Performance

- ◈ Quality

Technical Solution

Recommend Strategy Tasks

◆ Develop high-level development strategy

◆ Develop high-level system architecture

◆ Identify proposed language/development environment

◈ Identify potential use of tools

◈ Identify potential use of COTS

Recommend Strategy Tasks - 2

◆ Describe potential alternative solutions

◆ Describe advantages and disadvantages of each potential solution in order to be in the best position to evaluate the Supplier's recommendations

Deliverables

Review Preliminary Project Plan

◆ Prepare preliminary project plan

◆ Ensure that all deliverables are clearly specified;

- ◈ Product components in software and hardware integrated into a system

- ◈ Architecture Specification

- ◈ Design Specifications

- ◈ Installation Manual

- ◈ Operator's Manual

- ◈ User's Manual

- ◈ Functional Configuration Audit Report

- ◈ Physical Configuration Audit Report

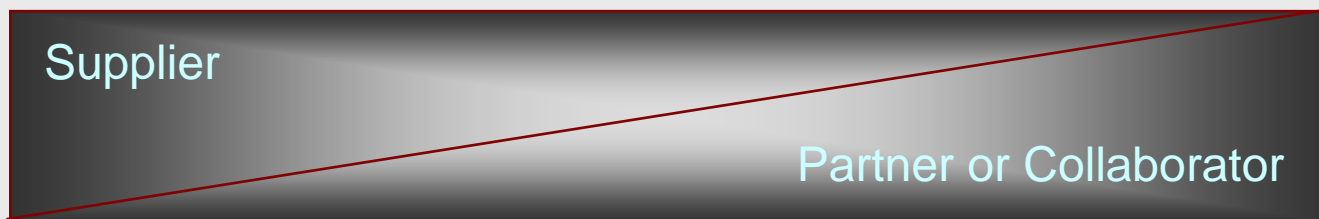- ◈ Version Description Document

- ◈ ……………

Supplier Relationship

Supplier Relationship

Requirements   **Trust**

Supplier

Partner or Collaborator

Supplier is given a small set of requirements

Supplier has proven its ability to perform within the agreed upon time and budget

Supplier as proven performance track record and is willing to share the entrepreneurial risk

Supplier Selection Criteria

Supplier Evaluation Criteria

◆ Suppliers are selected based on their ability to perform the work according to predefined evaluation criteria

  ◈ Prior documented performance in similar applications

  ◈ Geographic location

  ◈ System Engineering capabilities

  ◈ Software Engineering capabilities

  ◈ Knowledge, skills, and numbers of staff available to perform the work

  ◈ Available resources (facilities, hardware, software, training)

  ◈ Capability evaluation (Appraisal Results)

  ◈ KI Supplier Evaluation Checklist →Consolidated Supplier Evaluation Criteria - v2.7 Categories.rtf

Establish the Supplier Agreement

Establish the Supplier Agreement

◆ Establishing and maintaining the supplier agreement provides the supplier with the project needs, expectations, and measures of effectiveness

◆ The supplier agreement typically includes:

◈ Statement of work

◈ Terms and conditions

◈ List of deliverables, schedule, and budget

◈ Defined acceptance process including acceptance criteria

Establish the
Supplier Agreement - 2

◈ Identification of project and supplier representatives responsible and authorized to agree to changes to the supplier agreement

◈ Identifying the process for handling requirements change requests from either side

◈ Identifying processes, procedures, guidelines, methods, templates, etc., that will be followed

◈ Identifying critical dependencies between the project and the supplier

◈ Identifying the form, frequency, and depth of project oversight the supplier can expect from the project

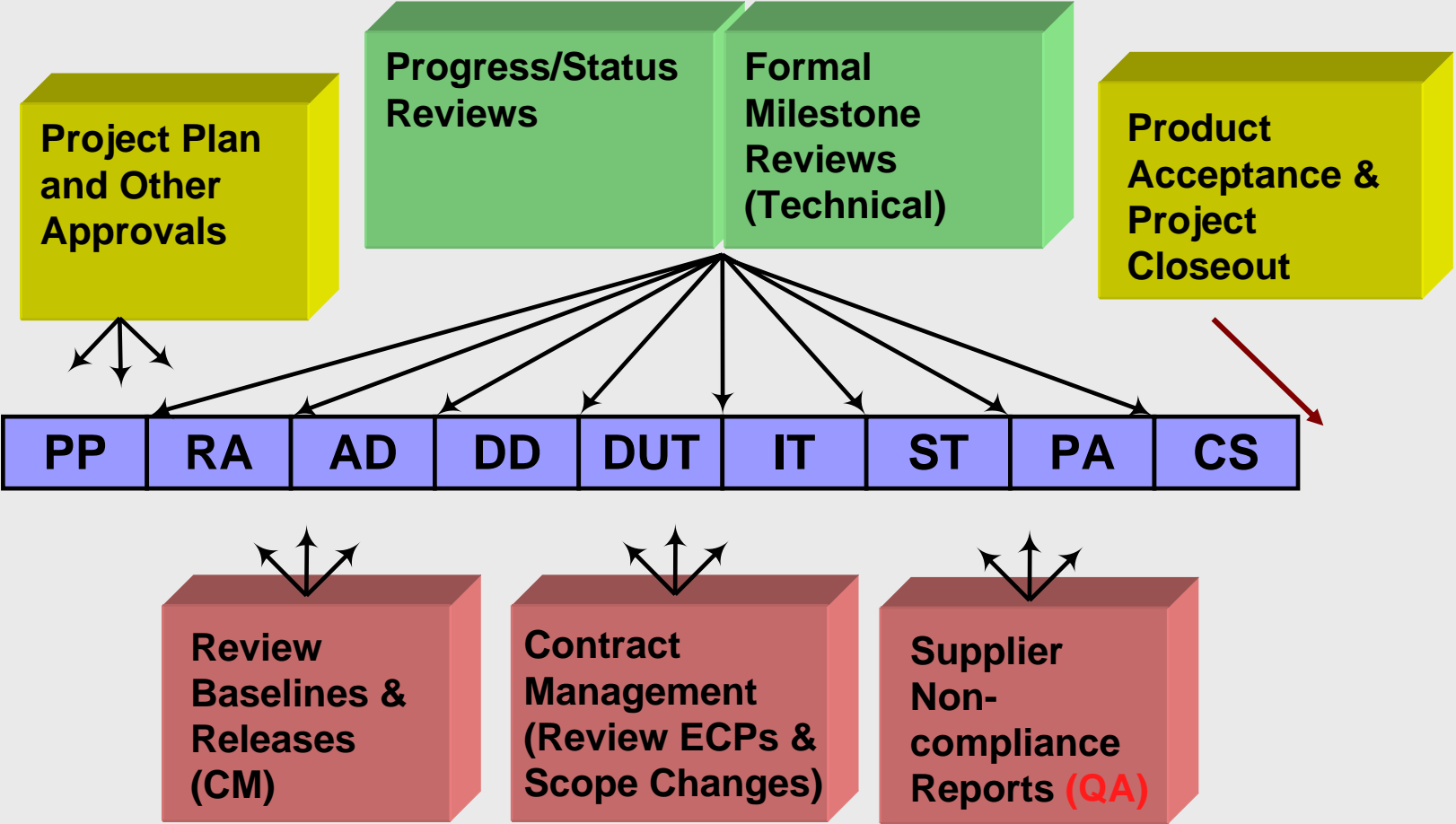 ◆ includes evaluation criteria to be used in monitoring the supplier's performance

Establish the Supplier Agreement - 3

◈ Identifying the supplier's responsibilities for ongoing maintenance and support of the acquired products

◈ Identifying warranty, ownership, and usage rights for the acquired products

Monitor the Supplier's Performance

Monitoring Performance Activities

Project Plan and Other Approvals

Progress/Status Reviews

Formal Milestone Reviews (Technical)

Product Acceptance & Project Closeout

PP	RA	AD	DD	DUT	IT	ST	PA	CS

Review Baselines & Releases (CM)

Contract Management (Review ECPs & Scope Changes)

Supplier Non-compliance Reports (QA)

Monitoring Concerns

Development Progress and Schedule

Computer Resource Utilization

Cost/Schedule Deviation

Quality Assurance

Configuration Management

Project Staffing

Issues and Action Items

Risk Items and Mitigation

Supplier Quality Assurance Monitoring

◆ The project's Quality Assurance representative monitors the supplier's quality assurance activities

 ◈ The supplier's plans, resources, procedures, and standards, for quality assurance are periodically reviewed to ensure they are adequate to monitor the supplier's own performance

Supplier Configuration Management Monitoring

◆ The project's Configuration Management representatives monitor the supplier's configuration management activities

◇ The project and the supplier coordinate their activities on matters relating to configuration management to ensure that the supplier's products can be readily integrated or incorporated into the project environment

Monitoring Selected Processes and Evaluating Selected Work Products

Monitor Selected Supplier Processes

◆ In situations where there must be tight alignment between some of the processes implemented by the supplier and those of the project, monitoring these processes will help prevent interface problems

◆ The selection must consider the impact of the supplier's processes on the project.

  ◈ On larger projects with significant subcontracts for development of critical components, monitoring of key processes is expected

  ◈ On smaller, less critical components, the selection process may determine that monitoring is not appropriate

  ◈ The overall risk should be considered in selecting processes to be monitored between these extremes

Monitor Selected Supplier Processes - 2

◆ The processes selected for monitoring should include:

 ◈ Engineering

 ◈ Project management

 ◈ Support processes critical to successful project performance such as quality assurance and configuration management

◆ There should be sufficient monitoring to detect issues, as early as possible, that may affect the supplier's ability to satisfy the requirements of the supplier agreement

◆ Analyzing selected processes involves taking the data obtained from monitoring selected supplier processes and analyzing it to determine whether there are serious issues

Measurement and Analysis Monitoring

◆ Measurement and analysis of the product components provided by suppliers is essential for effective management of the quality and costs of the project

◆ It is possible, with careful management of supplier agreements, to provide insight into the data that support supplier-performance analysis

Evaluate Selected Supplier Work Products

◆ The scope of this specific practice is limited to suppliers providing the project with custom-made products

◈ Custom-made products that present some risk to the program due to complexity or criticality should be examined as potential candidates

◆ Selected work products produced by the supplier should be evaluated to help detect issues as early as possible that may affect the supplier's ability to satisfy the requirements of the agreement

◆ The work products selected for evaluation should include critical products, product components, and work products that provide insight into quality issues as early as possible

Evaluate Selected Supplier Work Products - 2

◆ Work products are evaluated to ensure the following:

⬥ Derived requirements are traceable to higher level requirements

⬥ The architecture is feasible and will satisfy future product growth and reuse needs

⬥ Documentation that will be used to operate and to support the product is adequate

⬥ Work products are consistent with one another

⬥ Products and product components (e.g., custom-made, off-the-shelf, and customer-supplied products) can be integrated

Transitioning from the Supplier's Environment to the Buyer's Environment

Transitioning the Acquired Product From the Supplier to the Project

◆ Monitor the transition of the acquired products from the supplier to the project

- ◈ Ensure that the appropriate facilities to receive, store, use, and maintain the acquired products are available

- ◈ Ensure that the appropriate training is provided to assist in the transition

- ◈ Ensure that the storing, distributing, and use of the acquired products is performed according to the terms and conditions specified in the supplier agreement

- ◈ Transitioning from Supplier to Buyer
 → Transitioning from Supplier to Buyer v2.2.rtf

Supplier Capability Evaluation

CMMI Overview

Level	Process Characteristics	Process Areas	
Optimizing 5	**Focus is on quantitative continuous process improvement**	Causal Analysis and Resolution Organizational Innovation and Deployment	
Quantitatively Managed 4	**Process is measured and controlled**	Quantitative Project Management Organizational Process Performance	
Defined 3	**Process is characterized for the organization and is proactive**	Requirements Development Technical Solution Product Integration Verification Validation Decision Analysis & Resolution	Organizational Process Focus Organization Process Definition Organizational Training Integrated Project Management Risk Management
Managed 2	**Process is characterized for projects and is often reactive**	Requirements Management Project Planning Project Monitoring and Control Supplier Agreement Management	Product and Process Quality Assurance Configuration Management Measurement & Analysis
Initial 1	**Process is unpredictable, poorly controlled, and reactive**		

Capability Levels

5 Optimizing

4 Quantitatively Managed

3 Defined

2 Managed

1 Performed

0 Incomplete
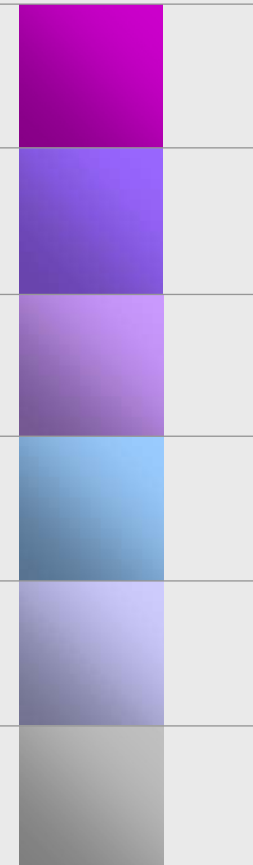
Supplier Capability Evaluation

◆ Capability Level 0 deals with Incomplete processes

◆ An incomplete process is a process that is either not performed or only performed partially

  ◈ One or more *Specific Goals* of the process are not performed

◆ Capability Level 1 deals with Performed processes

◆ **A performed process is a process that accomplishes the work necessary to produce work products**

◆ Capability Level 2 deals with Managed processes

◆ A managed process is a performed (capability level 1) process that has the basic infrastructure in place to support the process with the following characteristics:

◈ It is planned and executed in accordance with policy

◈ Employs skilled people who have adequate resources to produce controlled outputs

◈ Involves relevant stakeholders

◈ Is monitored, controlled, and reviewed

◈ Is evaluated for adherence to its process description

- ◆ GP 2.1 Establish an Organizational Policy

- ◆ GP 2.2 Plan the Process

- ◆ GP 2.3 Provide Resources

- ◆ GP 2.4 Assign Responsibility

- ◆ GP 2.5 Train People

- ◆ GP 2.6 Manage Configurations

- ◆ GP 2.7 Identify and Involve Relevant Stakeholders

- ◆ GP 2.8 - Monitor and Control the Process

- ◆ GP 2.9 - Objectively Evaluate Adherence

- ◆ GP 2.10 Review Status with Higher-Level Management

Supplier Capability Evaluation - 4

◆ GP 3.1 - Establish a Defined Process

◆ GP 3.2 Collect Improvement Information

◆ GP 4.1 Establish Quantitative Objectives for the Process

◆ GP 4.2 Stabilize Subprocess Performance

◆ GP 5.1 Ensure Process Improvement Objectives

◆ GP 5.2 Correct Root Causes of Problems

Summary - Why Do You Need an ML5 Supplier?

◆ Deciding to use a supplier requires:

- ◈ Understanding of the requirements to a low enough level

- ◈ Developing the initial project planning

- ◈ Defining the expectations, resources, and constraints for a project that will make use of one or more suppliers

- ◈ Determining the relationship the Buyer wants with the Supplier

- ◈ Developing the Statement of Work

- ◈ Developing the RFP

- ◈ Establishing the Evaluation Criteria

Summary - Why Do You Need an ML5 Supplier? - 2

◈ Evaluating the supplier's organizational process capability against the requirements and constraints

◈ Evaluating the supplier's quality and configuration management process capability

◈ Evaluating the supplier's management and engineering capability for the desired tasks

◈ Validating the supplier's past project performance on projects of similar size, complexity, functionality, cost, schedule, quality, risk, and customer satisfaction

Thank You

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