Using CMMI[SM]/SS to Manage COTS & MOTS Software

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Objectives

Present some supplier acquisition management problems from industry.

Briefly present the CMMI[SM] Supplier Sourcing model (i.e., SAM and ISM).

Present the IEEE Software Acquisition Management process.

Describe some real examples from industry, and describe how an organization can mature their Supplier Sourcing process using CMMI[SM].

Answer any of your questions.

Agenda

Why Manage Suppliers?

CMMI[SM] Supplier Sourcing Overview

IEEE Software Acquisition Management

Some Real Examples from Industry

Maturing Your Supplier Sourcing Process

Questions and Answers

Why Manage Suppliers?

The quality of a product can be severely compromised by a poor quality acquired product component.

If requirements are not defined and managed, how do you know what you are going to acquire?

How do you know if you have selected the most capable supplier?

The industry average schedule and cost over-runs for software are about 200%. How are you going to manage that?

Weaknesses in the SW-CMM®

Commercial off-the-shelf (COTS) software and modified off-the-shelf (MOTS) software are usually cheaper and faster than writing software from scratch, so COTS and MOTS software have been growing rapidly.

COTS products and MOTS products are not explicitly addressed in Software Subcontract Management (SSM) key process area in the SW-CMM®.

SSM does not address meeting the project's requirements very effectively.

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CMMI[SM] Supplier Sourcing (SS)

Supplier Sourcing is considered a discipline, and is only available in the CMMI[SM] models with "SS" (e.g., CMMI-SE/SW/IPPD/SS).

In CMMI[SM], Supplier Sourcing consists of Supplier Agreement Management (SAM), Integrated Supplier Management (ISM), and consists of discipline amplifications in other process areas.

SAM exists at Level 2 in the CMMI[SM] Staged Model, and in the Project Management process area category in the CMMI[SM] Continuous Model.

ISM exists at Level 3 in the CMMI[SM] Staged Model, and in the Project Management process area category in the CMMI[SM] Continuous Model.

- Adapted from "Capability Maturity Model® Integration (CMMI[SM]), Version 1.1", CMU/SEI-2002-TR-011, March 2002

CMMI[SM] SS Scope

SS applies to the acquisition of products and product components that are delivered to the project's customer.

To minimize risks, SS may be applied to acquisition of product components that are not delivered to the project's customer (optional).

SS does not cover arrangements where the supplier is integrated into the project team (i.e., contractors that follow your processes).

CMMI[SM] directly addresses COTS (commercial off the shelf), but does not directly address MOTS (modified off the shelf). However, SS applies to MOTS as addressed above.

• Adapted from "Capability Maturity Model® Integration (CMMI[SM]), Version 1.1", CMU/SEI-2002-TR-011, March 2002

Where are Products Acquired?

Products or product components may be acquired by the project from different sources, including:

- **Acquired as COTS or MOTS products**
- **Acquired from an external supplier**
- **Acquired from another part of the business**
- **Acquired from the project's customer**

Supplier Agreement Management

Purpose: Manage the acquisition of products from suppliers.

Specific Goal 1: Establish Supplier Agreements

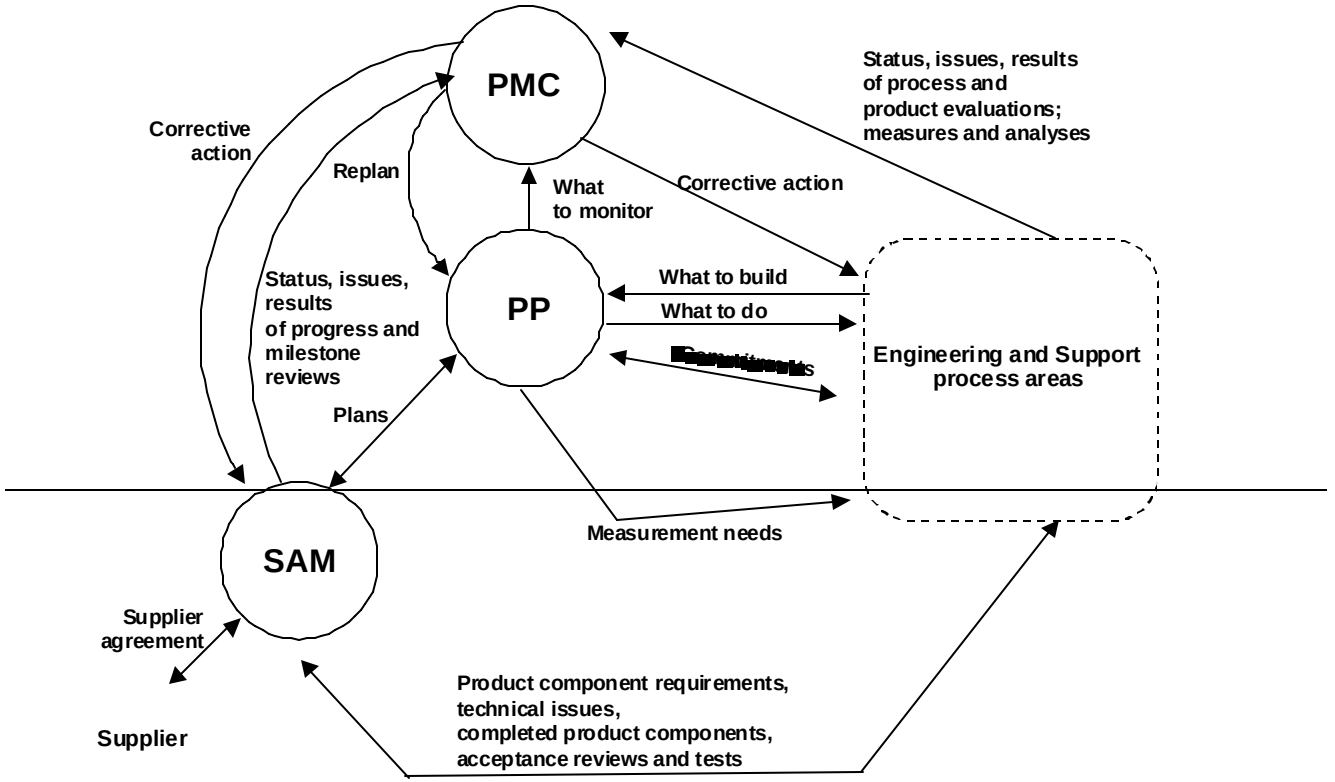
- **SP 1.1-1 Determine Acquisition Type**
- **SP 1.2-1 Select Suppliers**
- **SP 1.3-1 Establish Supplier Agreements**

Specific Goal 2: Satisfy Supplier Agreements

- **SP 2.1-1 Review COTS Products**
- **SP 2.2-1 Execute the Supplier Agreement**
- **SP 2.3-1 Accept the Acquired Product**
- **SP 2.4-1 Transition Products**

• Reference: "Capability Maturity Model® Integration (CMMI℠), Version 1.1", CMU/SEI-2002-TR-011, March 2002

Basic Project Management PAs



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Integrated Supplier Management

Purpose: Proactively identify sources of products that may be used to satisfy the project's requirements and to manage selected suppliers while maintaining a cooperative project-supplier relationship.

SG 1: Analyze and Select Sources of Products

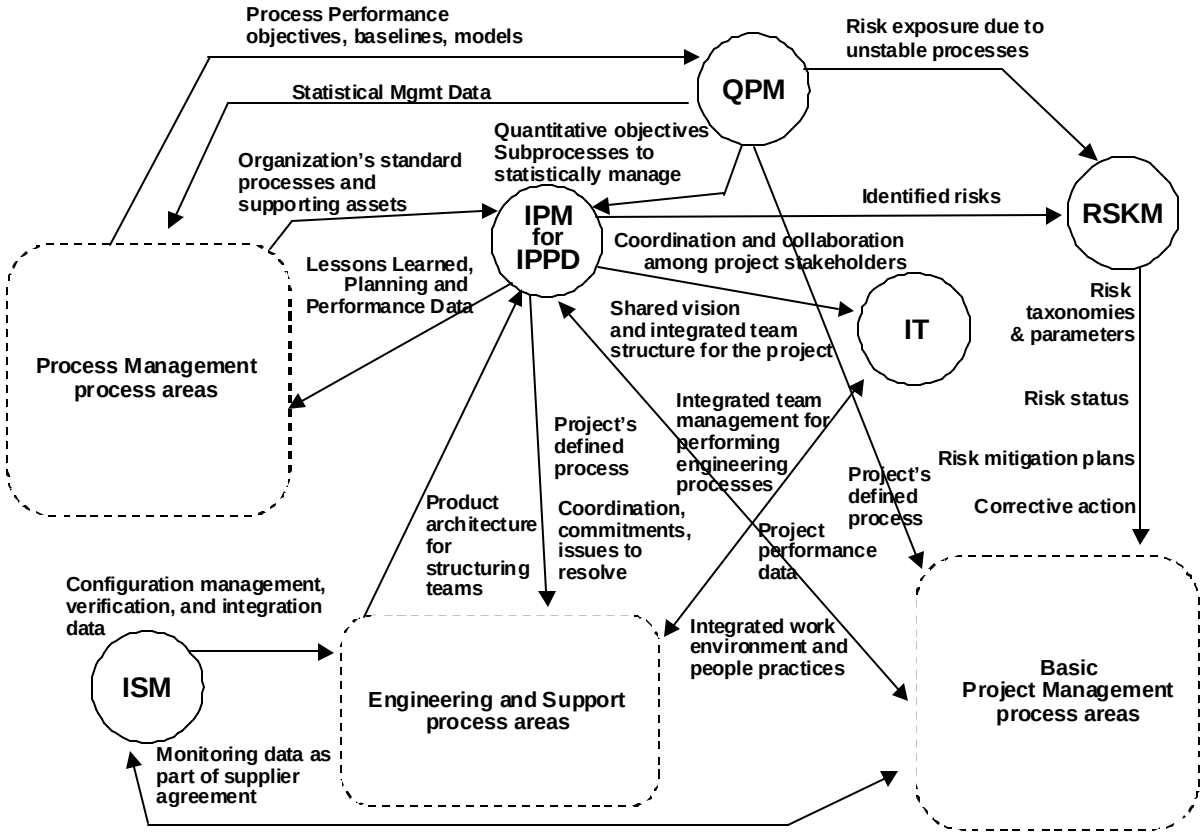
- **SP 1.1-1 Analyze Potential Sources of Products**
- **SP 1.2-1 Evaluate & Determine Sources of Products**

SG 2: Coordinate Work with Suppliers

- **SP 2.1-1 Monitor Selected Supplier Processes**
- **SP 2.2-1 Evaluate Selected Supplier Work Products**

• Reference: "Capability Maturity Model® Integration (CMMI℠), Version 1.1", CMU/SEI-2002-TR-011, March 2002

Advanced Project Management PAs



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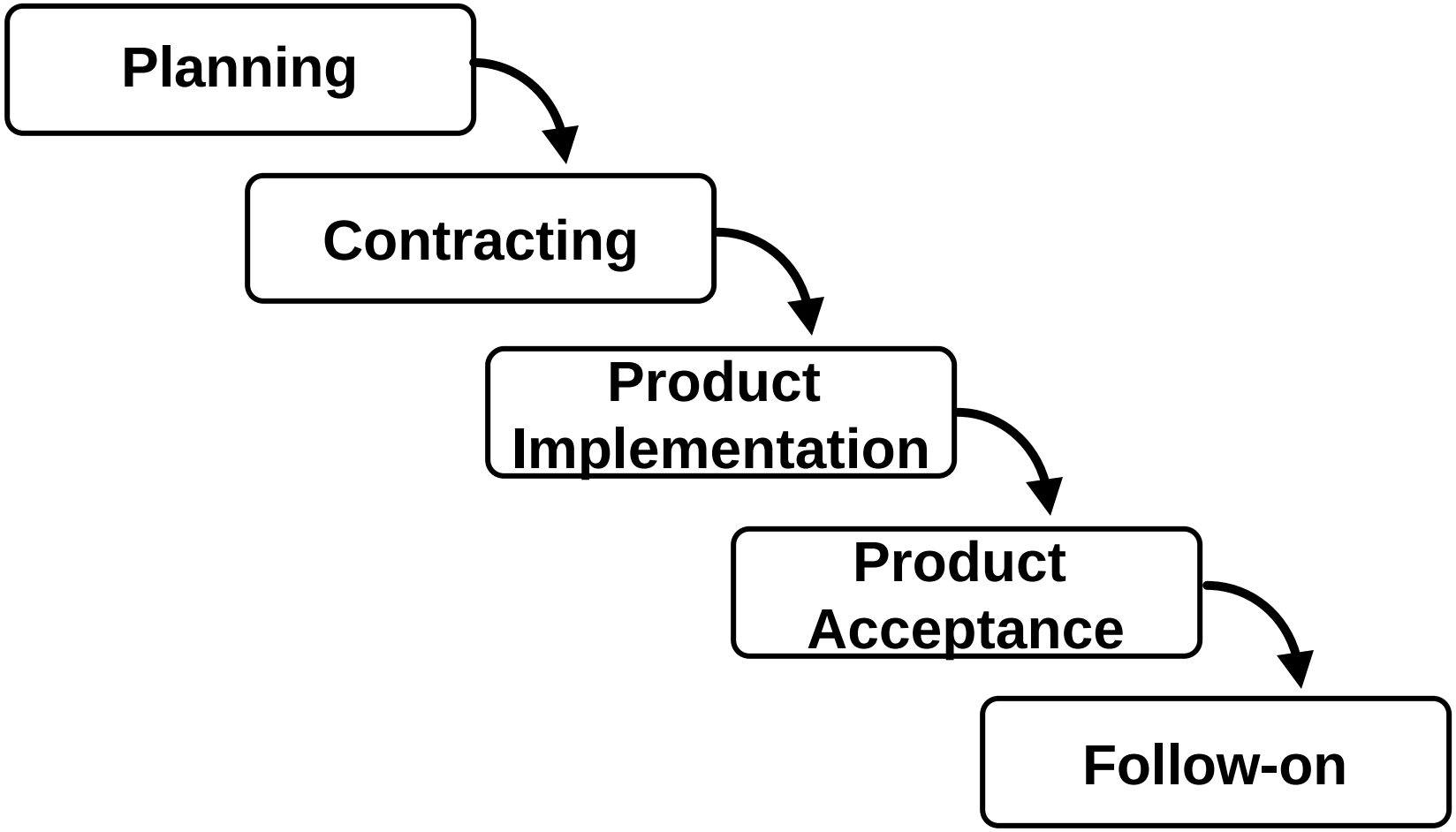
IEEE SAM Phases



• Adapted From: "IEEE Recommended Practice for Software Acquisition", IEEE Std 1062-1993

IEEE SAM Phases

Planning Phase: Develop the idea, plan the acquisition, determine requirements, and release proposal (e.g., request for proposal or RFP).

Contracting Phase: Identify suppliers, evaluate proposals, select supplier, and establish contract.

Product Implementation Phase: Manage supplier relationship and performance.

Product Acceptance Phase: Accepting delivery of acquired software that address project's needs.

Follow-On Phase: Use, maintain, and support the acquired software.

- Reference: "IEEE Recommended Practice for Software Acquisition", IEEE Std 1062-1993

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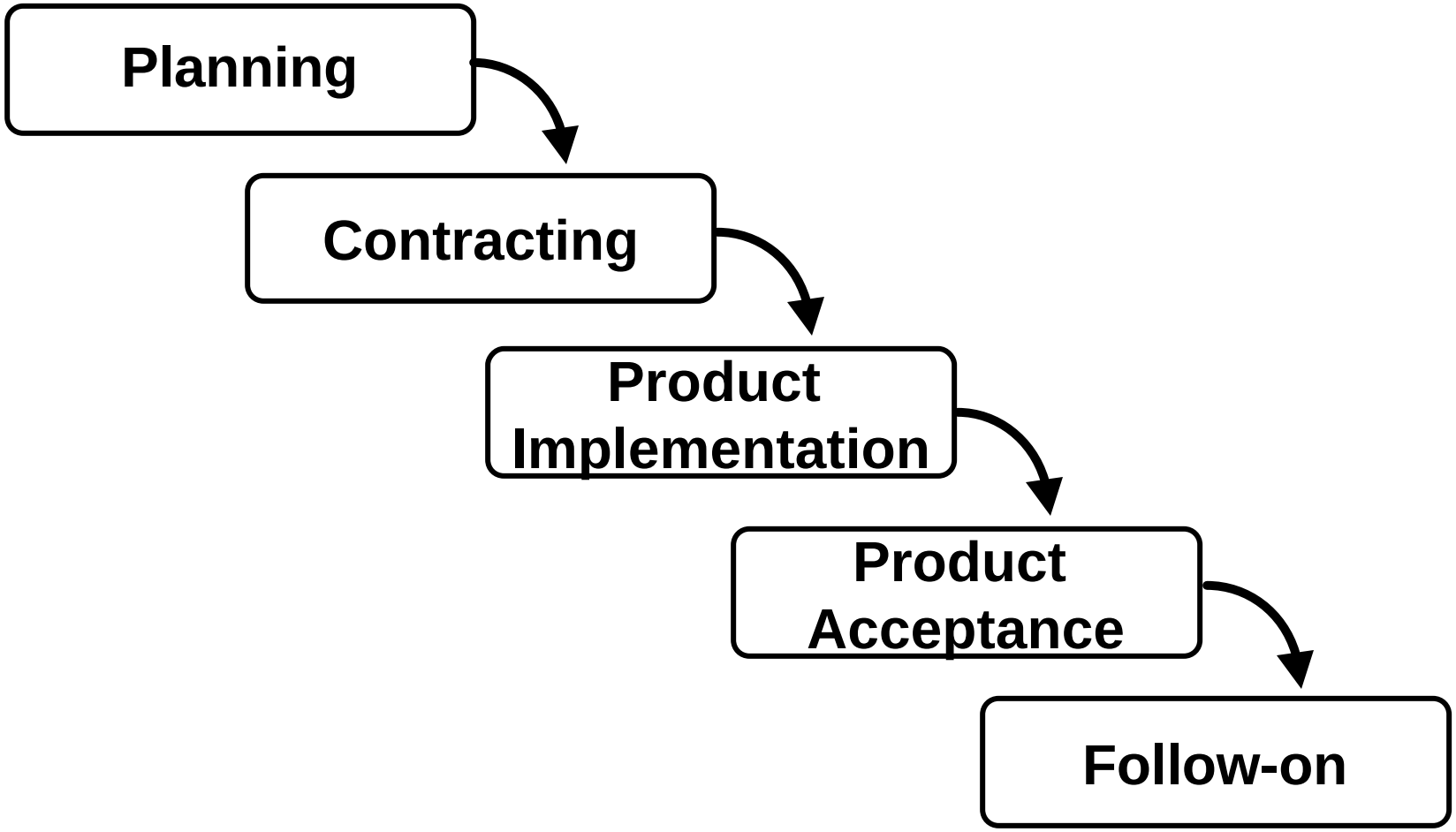
Real Industry Examples

Organizations have combined industry best practices (e.g., IEEE, SW-CMM, CMMI, SA-CMM, etc.) and defined their own supplier sourcing processes.

For the following organizational examples, the IEEE SAM process was selected as the governing model (SW-CMM and CMMI were also inputs).

The SAM processes were used on COTS, MOTS, and fully developed systems and software.

IEEE SAM Phases



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Planning Phase

Are you managing your Suppliers or are they managing you?

The Planning Phase includes:

- **planning activities and resources for managing the acquisition**
- **identifying acquisition needs for the project (i.e., determining technical and non-technical requirements).**

Example Output: A SAM Plan based on risk

• Adapted From: "IEEE Recommended Practice for Software Acquisition", IEEE Std 1062-1993

Contracting Phase

Identify, Evaluate and Select Suppliers includes:

- produce a candidate supplier list
- create measurable selection criteria
- evaluate the list of candidate suppliers
- select the final supplier
- establish agreements with the supplier

• Adapted From: "IEEE Recommended Practice for Software Acquisition", IEEE Std 1062-1993

Measurable Selection Criteria

SUPLLIER RATING FORM

CRITERIA	Weight	SCALE	SUPPLIER 1	SUPPLIER 2	SUPPLIER 3	SUPPLIER N
		ENTER SCORES FOR SUPPLIERS →				
Supports Strategic Goals	25	5 = Most Supportive 1 = Least Supportive	5	4	5	1
Return on Investment (ROI)	20	5 = Most ROI 1 = Least ROI	2	3	4	2
Cost	15	5 = Least Expensive 1 = Least Expensive	5	1	4	5
Schedule	15	5 = Most Expensive 1 = Most Expensive	4	5	4	5
Measure of Potential Impact	8	5 = Most Impact 1 = Least Impact	4	4	3	1
Risk	7	5 = Least Risk 1 = Most Risk	3	1	3	5
Size	5	5 = Most Manageable 1 = Least Manageable	3	1	4	5
Change Management	5	5 = Least Resistance 1 = Most Resistance	1	1	4	5
		WEIGHTED TOTALS	74.6	59.8	82	61.6

Product Implementation

As an acquisition manager, do you have the visibility that you need into the contracts that you oversee?

Managing Supplier Performance includes:

- manage contract during execution
- monitor supplier progress
- manage an open line of communication with supplier

• Adapted From: "IEEE Recommended Practice for Software Acquisition", IEEE Std 1062-1993

Strengths of SW-CMM®

The strength of the SW-CMM® is during the Product Implementation Phase:

- Management monitors supplier management
- Periodic technical reviews
- Formal milestone reviews with supplier
- SQA audits supplier (e.g., supplier SQA)
- SCM manages supplier SCM

Product Acceptance Phase

Before accepting the supplier product or product component, the following activities should be accomplished:

- **evaluate and perform acceptance testing according to a test plan**
- **maintain control over the test**
- **establish an acceptance process and ensure all acceptance criteria has been satisfied**

• Adapted From: "IEEE Recommended Practice for Software Acquisition", IEEE Std 1062-1993

Follow-On Phase

The Follow-On Phase not only includes using the product or product component, but also:

- **evaluating user satisfaction with the product**
- **evaluating the SAM process for areas of improvement**
- **recording maintenance work when the product is being used**
- **evaluating supplier performance and maintaining supplier performance data**

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Maturing Your SS Process

The purpose of SS is to effectively manage the acquisition of products and product components from sources external to the project.

SS should address COTS, MOTS, and fully developed product components that are delivered to the customer, and other high risk product components.

Use best practices from industry including CMMI SS (e.g., ISM), IEEE SAM, SW-CMM, SA-CMM, quality, etc., to define and improve your SS process.

Work with your suppliers to improve quality!!!

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