CMMI® Mini-Tutorial

SuZ Garcia
SEI

For AFRL Technology Maturity Workshop, Sep 2007

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Report Documentation Page

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Why are you here?

What are YOUR questions about CMMI?

…..your answers will help to “tune the soundtrack” to your needs

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Why am I here?

In my past:

- CMMs developer
- Technology Transition researcher
- CMMs applier in multiple organizational settings
  - Internal within small company
  - Internal within large company
  - Consultant to other companies

In my present:

- Co-Author (along with Richard Turner) of *CMMI Survival Guide: Just Enough Process Improvement*
- Project team member for IPSS: Improving Processes in Small Settings
- Author of "Will my System Play Nicely with Others? Using CMMI in Systems of Systems Settings"
- Continued interest in relevant use of CMMI

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Topics

Why do Organizations Look to CMMI?

What Is CMMI?

- General
- A Bit More about the Model

Who Is Using CMMI?

How Can CMMI Benefit People Evaluating Technology Maturity?

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Typical Issues Leading to CMMI Use

Plans are made, but not necessarily followed.

Work is not tracked against the plan; plans are not adjusted.

Requirements are not consistent; changes are not managed.

Estimates are way off; over-commitment is common.

When overruns become apparent, a crisis atmosphere develops.

Defects are discovered in test or, worse yet, by the customer.

Success depends on heroic efforts by competent individuals.

Repeatability is questionable.

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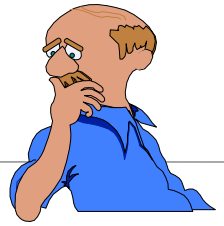
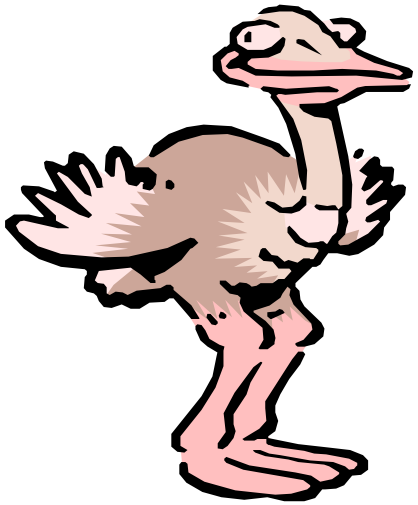
What do we do when problems arise?



Ignorance is bliss



Denial

AIIEEE

Not a good method for problem solving

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What Happens in a Crisis?

Common responses to crises are

- people work faster and longer
- people are moved from project to project
- projects cut requirements
- projects add more people
- everyone cuts corners
- a hero saves the day

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Process Supports Change Along Multiple Dimensions

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Why Focus on Process?

It complements a focus on *people:*

- The experience and training of your work force is not always enough.
- Working harder is not the answer.
- A well-defined process can provide the means to work smarter.
- Shifts the “blame” for problems from people to the process

It complements a focus on *technology:*

- Technology, by itself, will most likely not be used effectively.
- Technology, in the context of an appropriate process roadmap, can provide the most benefit.

It helps to mitigate some of the risks of the *environment:*

- Volatile business environments often use process as a stability point

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The Premise—and Promise—of Process

The quality of a system is highly influenced by the quality of the process used to acquire, develop, and maintain it.

- a long-established premise in manufacturing
- visible worldwide in quality movements in manufacturing and service industries (e.g., ISO standards).

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Common Fallacies

I don't need process, I have …

- Really good people
- Advanced technology
- An experienced manager

Process …

- Interferes with creativity
- Introduces bureaucracy and regimentation
- Isn't needed when building prototypes
- Is only useful on large projects
- Hinders agility in fast-moving markets
- Costs too much

There are counterexamples to all of these throughout the process improvement literature, BUT some of these can be problems if your adoption process isn't tuned to your *environment*

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What Is CMMI?

Capability Maturity Model Integration (CMMI) is a suite of products used for process improvement.

- Models
- Appraisal Methods
- Training Courses

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CMMI Models -1

A framework that describes key elements of effective process.

A guide to evolutionary improvement from ad hoc, immature activities to mature, disciplined processes.

A description of practices for planning, engineering, and managing business processes that can help you achieve business goals related to things such as:

- cost
- schedule
- functionality
- product/service quality

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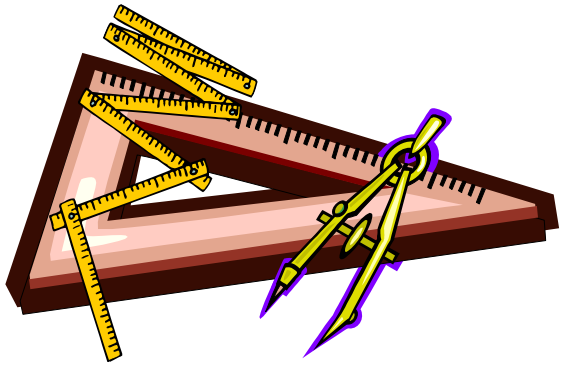
CMMI Models -2

A yardstick against which the maturity of an organization's product development, acquisition, and/or service-related processes can be measured and compared with industry state of the practice.

A basis for planning improvements to your business processes.

CMMI best practices tell you WHAT to do but neither HOW to do it nor WHO should do it.



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CMMI Best Practices Are Used for

The development, acquisition, maintenance and delivery of products and services

Software-intensive products and services

Product and service lifecycles from conception through delivery and maintenance

Benchmarking your organization against others in a variety of industries

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CMMI Appraisals (SCAMPI^{SM})

Measures an organization's processes using a CMMI model as a yardstick

Uses a formalized appraisal process

Involves senior management as an appraisal sponsor

Focuses the appraisal on the sponsor's business objectives

Observes strict confidentiality and non-attribution of data

Focuses on follow-on activities and decision making based on the appraisal results

Three appraisal Classes: A, B, and C

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SCAMPI Classes A, B, and C

Approach
SCAMPI C

Deployment
SCAMPI B

Institutionalization
SCAMPI A
(Maturity Levels)

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CMMI Adoption Is Not One-Size-Fits-All

Some adopt only CMMI

Some adopt CMMI with or in addition to other approaches, such as

- Six Sigma
- Agile Methods
- TSP/PSP
- ISO 9000/9001
- IEEE Standards
- RUP
- Balanced Scorecard

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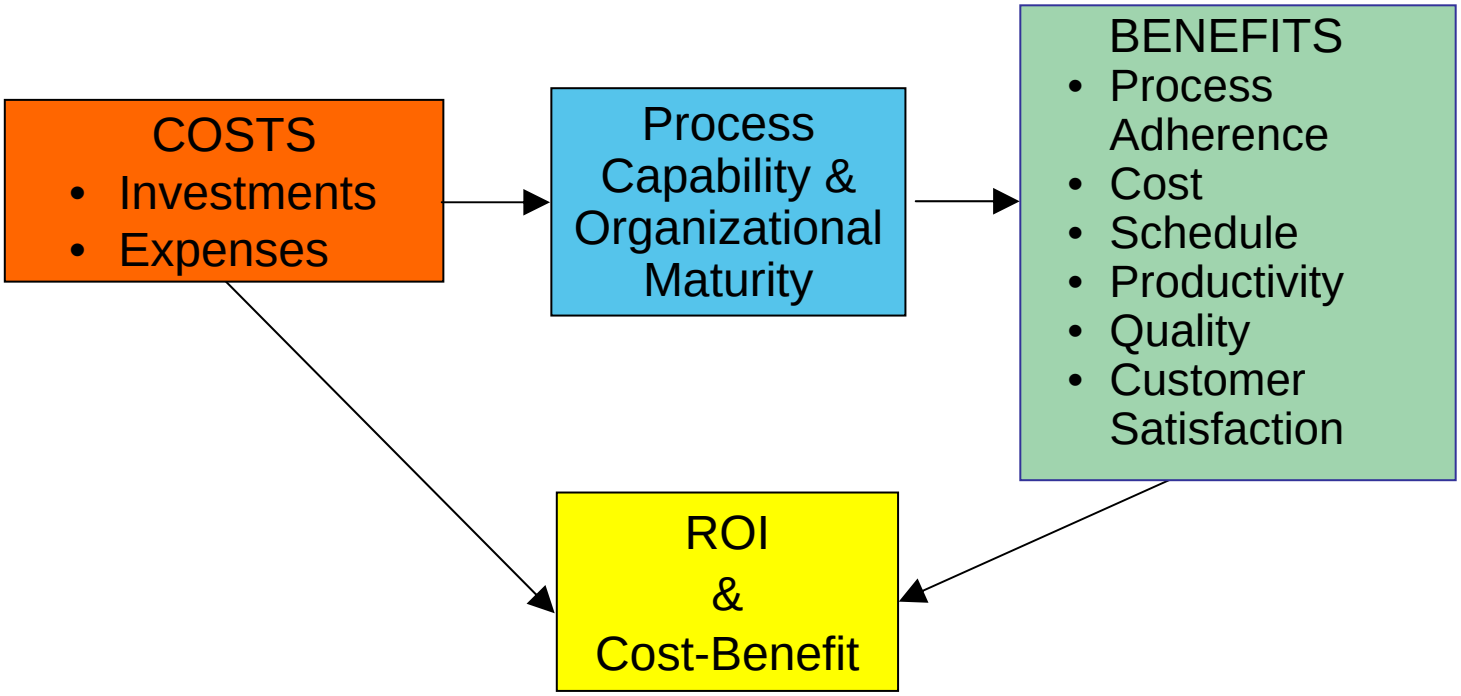
Costs and Benefits of CMMI



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Costs May Vary

The cost of CMMI adoption is highly variable depending on many factors, including organization

- size
- culture
- organization
- current processes

Regardless of the investment, we've found that organizations experience a respectable return on their investment.

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Published Benefits

For more detailed information about CMMI benefits, see the report, *Demonstrating the Impact and Benefits of CMMI: An Update and Preliminary Results*

- SEI special report released in October 2003
- Based on case studies, supplementary materials, and comprehensive literature review
- on the SEI Web site at http://www.sei.cmu.edu/publications/documents/03.reports/03sr009.html

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Topics

Why do Organizations Look to CMMI?

What Is CMMI?

- General
- A Bit More about CMMI-DEV v1.2

Who Is Using CMMI?

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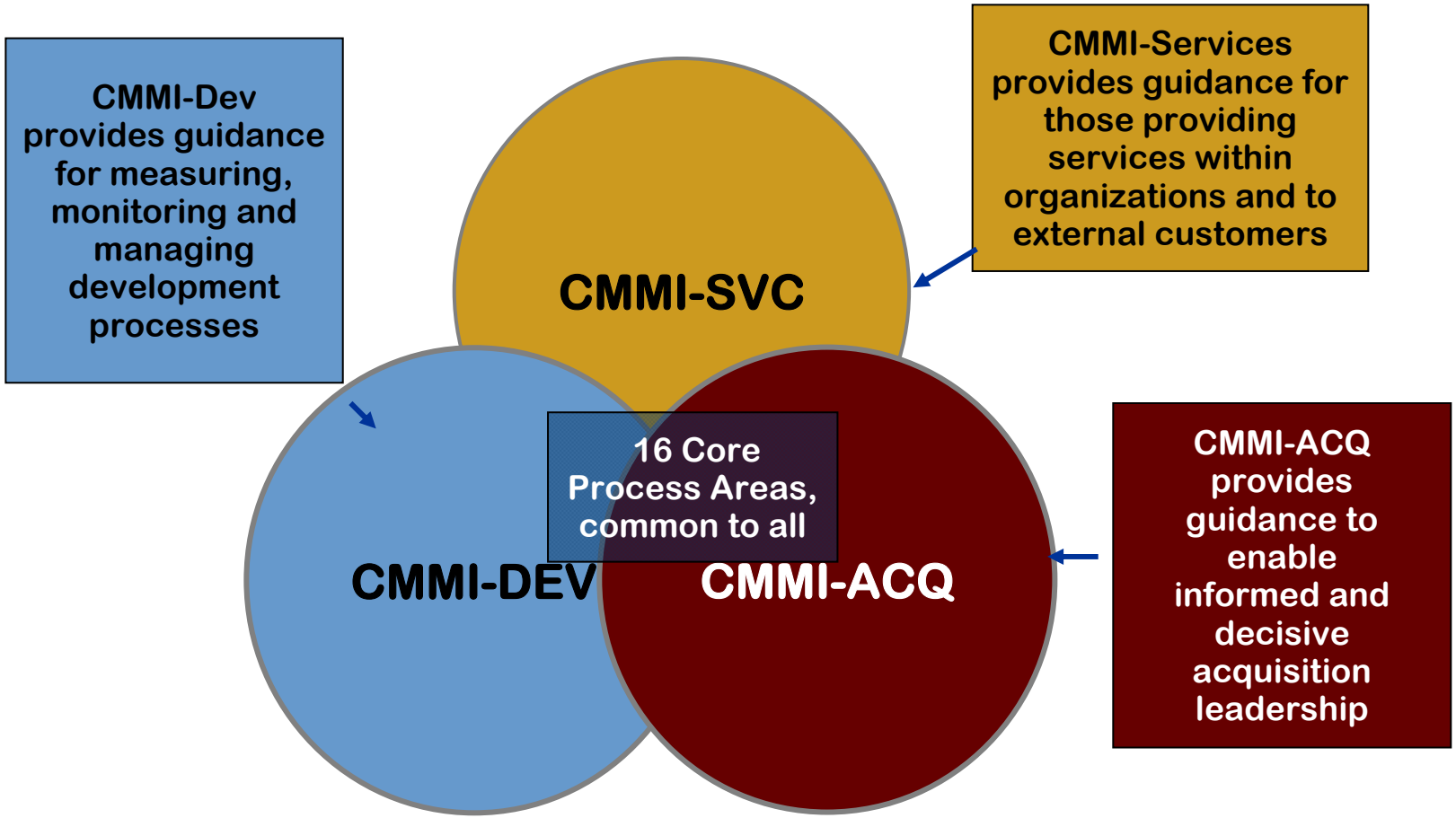
3 Complementary "Constellations"



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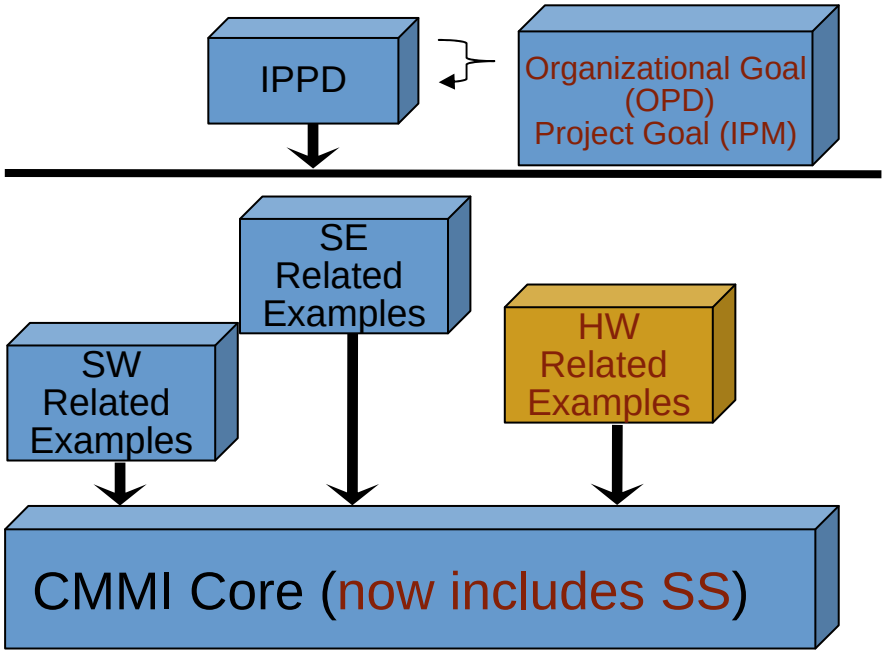
CMMI Model Combinations

CMMI-Dev v 1.2



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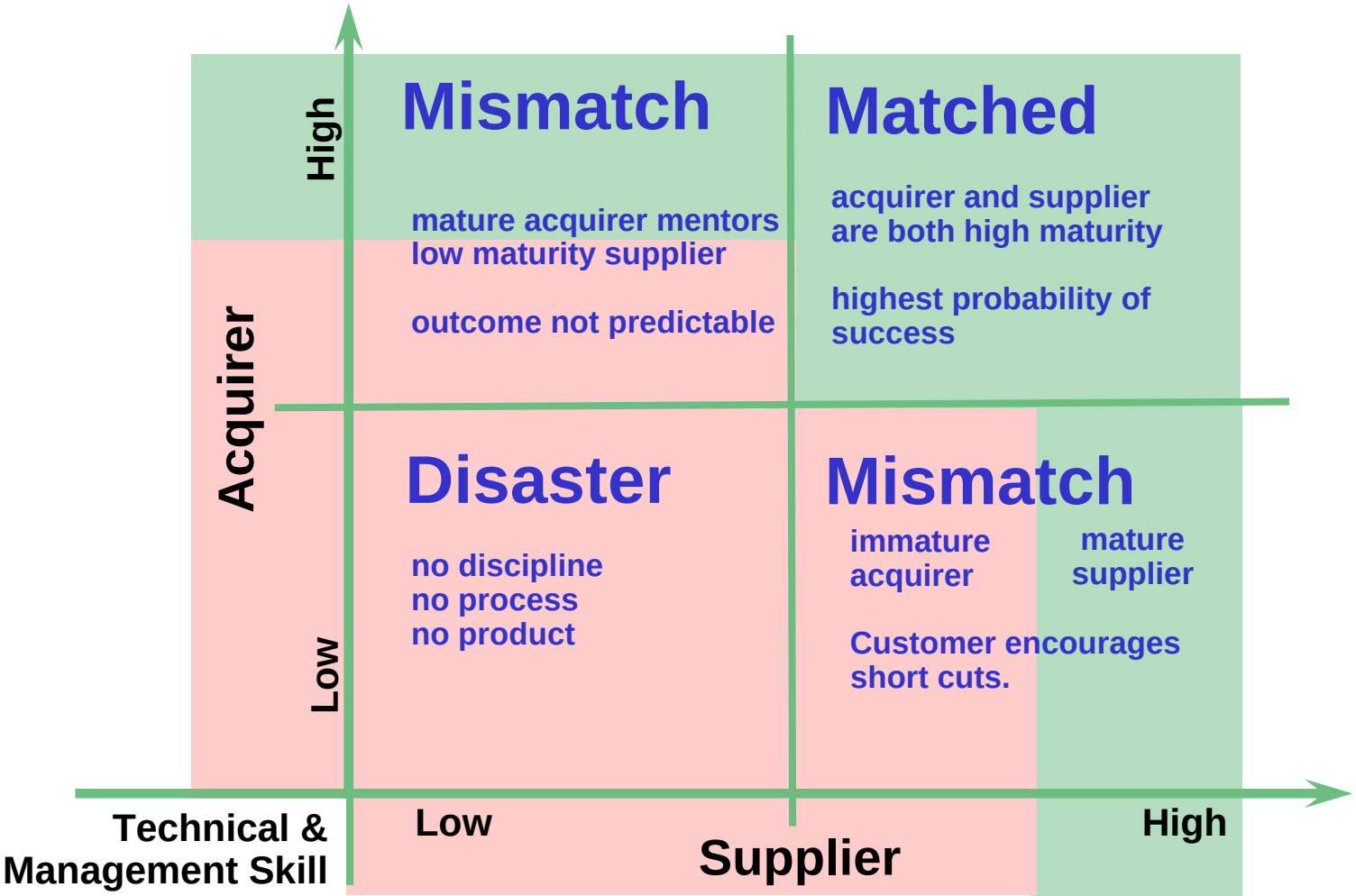
Acquirer/Supplier Mismatch Led to CMMI-ACQ



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Critical Distinctions Among Processes

performed vs. managed

the extent to which the process is planned; performance is managed against the plan; corrective actions are taken when needed

managed vs. defined

the scope of application of the process descriptions, standards, and procedures (i.e., project vs. organization)

defined vs. quantitatively managed

the predictability of process performance

quantitatively managed vs. optimizing

whether the process is continually improved by addressing common causes of process variation

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Selected Model Constructs

Maturity Levels

Capability Levels

Generic Goals

Generic Practices

Process Areas

Specific Goals

Specific Practices

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The Heart of a CMM: Generic Goals and Practices

Generic Goals	*Generic Practices*
GG1: Achieve Specific Goals	GP 1.1: Perform Specific Practices
GG2: Institutionalize a Managed Process	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
GG3: Institutionalize a Defined Process	GP 3.1: Establish a Defined Process GP 3.2: Collect Improvement Information
GG4: Institutionalize a Quantitatively Managed Process	GP 4.1: Establish Quantitative Objectives for the Process GP 4.2: Stabilize Subprocess Performance
GG5: Institutionalize an Optimizing Process	GP 5.1: Ensure Continuous Process Improvement GP 5.2: Correct Root Causes of Problems

Adapted from Cepeda Systems & Software Analysis, Inc.

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Understanding Levels

Levels are used in CMMI to describe an evolutionary path for an organization that wants to improve the processes it uses to develop and maintain its products and services.

CMMI supports two improvement paths:

- continuous - enabling an organization to incrementally improve processes corresponding to an individual process area (or set of process areas) selected by the organization
- staged - enabling the organization to improve a set of related processes by incrementally addressing successive predefined sets of process areas

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What Generic Goals Get Applied to (Continuous Representation): Process Areas by Categories

Category	Process Areas
Process Management	Organizational Process Focus Organizational Process Definition +IPPD Organizational Training Organizational Process Performance Organizational Innovation and Deployment
Project Management	Project Planning Project Monitoring and Control Supplier Agreement Management Integrated Project Management +IPPD Risk Management Quantitative Project Management
Engineering	Requirements Management Requirements Development Technical Solution Product Integration Verification Validation
Support	Configuration Management Process and Product Quality Assurance Measurement and Analysis Decision Analysis and Resolution Causal Analysis and Resolution

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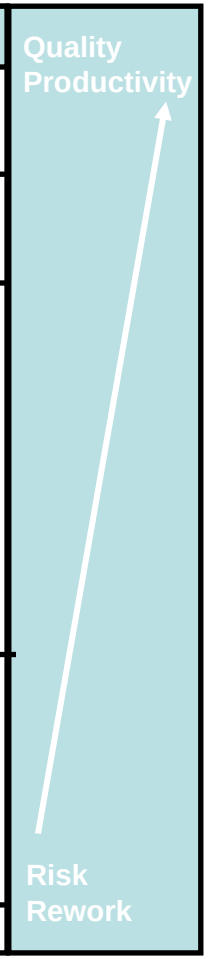
What Generic Goals Get Applied to (Staged Representation): Process Areas by Maturity Level

Level	Focus	Process Areas
5 Optimizing	*Continuous Process Improvement*	Organizational Innovation and Deployment Causal Analysis and Resolution
4 Quantitatively Managed	*Quantitative Management*	Organizational Process Performance Quantitative Project Management
3 Defined	*Process Standardization*	Requirements Development Technical Solution Product Integration Verification Validation Organizational Process Focus Organizational Process Definition +IPPD Organizational Training Integrated Project Management +IPPD Risk Management Decision Analysis and Resolution
2 Managed	*Basic Project Management*	Requirements Management Project Planning Project Monitoring and Control Supplier Agreement Management Measurement and Analysis Process and Product Quality Assurance Configuration Management
1 Initial		



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Achieving Capability Levels (CL) for a *Process Area*

GP1.1 through GP5.2 All SPs	CL5 Optimizing	Defect prevention, proactive improvement, innovative technology insertion and deployment
GP1.1 through GP4.2 All SPs	CL4 Quantitatively Managed	Measure process performance, stabilize process, control charts, deal with causes of special variations
GP1.1 through GP3.2 All SPs	CL3 Defined	Project's process is tailored from organization's standard processes; understand process qualitatively; process contributes to the organizations assets
GP1.1 through GP2.10 All SPs	CL2 Managed	Adhere to policy; follow documented plans and processes, apply adequate resources; assign responsibility and authority; train people, apply configuration management, monitor, control, and evaluate process; identify and involve stakeholders; review with management
GP1.1 All SPs	CL1 Performed	Perform the work
A few GPs or SPs may be implemented	CL0	Not performed, incomplete

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Achieving Maturity Levels for an *Organizational Unit*

GP2.1 through GP3.2 All ML2, ML3, ML4, and ML5 PAs	ML5 Optimizing	Prevent defects; proactively improve; insert and deploy innovative technology
GP2.1 through GP3.2 All ML2, ML3, and ML4 PAs	ML4 Quantitatively Managed	Measure process performance; stabilize process and control charts; deal with causes of special variations
GP2.1 through GP3.2 All ML2 and ML3 PAs	ML3 Defined	Tailor the project's process from organization's standard processes; understand processes qualitatively; ensure that projects contribute to organization assets
GP2.1 through GP2.10 All ML2 PAs	ML2 Managed	Adhere to policy; follow documented plans and processes; apply adequate resources; assign responsibility and authority; train people; apply CM; monitor, control, and evaluate process; identify and involve stakeholders; review with management
	ML1 Initial	Processes are ad hoc and chaotic

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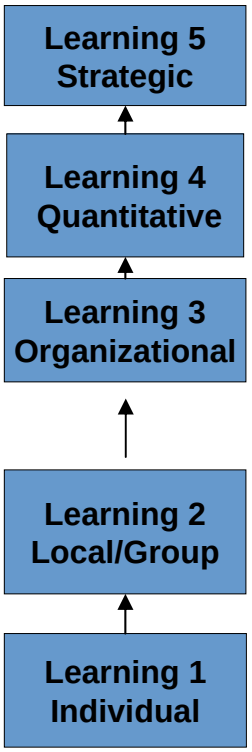
Ultimately the Levels are About Learning

This is why "skipping" levels doesn't work; the learning that takes place at each level feeds the one above it.



The operational insights available via the organizational quantitative learning permit the organization to focus on more strategic learning about its business environment.

Both local and organizational learning become more quantitative in nature where appropriate, as an addition to, not replacement of, other learning approaches

The organization makes explicit and sustained investments in gathering and filtering the learning from groups to make available and support learning across the organization. Much of this learning is qualitative in nature

Learning is shared within a local work group, which often leads to local standards (i.e. project standards) being adopted. Learning among groups is idiosyncratic.

Learning occurs within individuals. Sharing learning is idiosyncratic to the individual's preferences.

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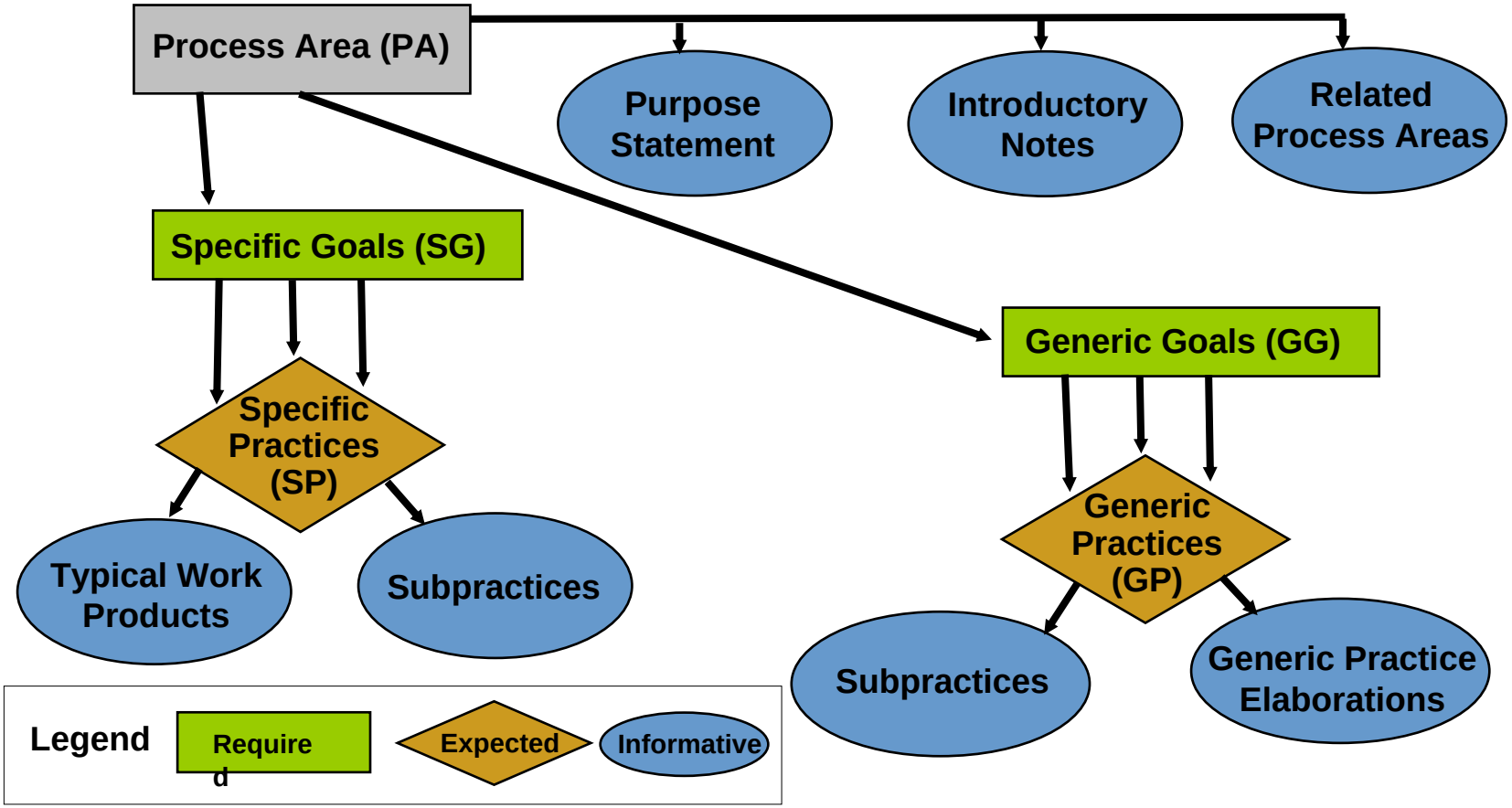
What's Inside a *Process Area*



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Topics

Why do Organizations Look to CMMI?

What Is CMMI?

- General
- A Bit More Detail on CMMI-Dev

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CMMI Transition Status
As reported to the SEI as of 6-30-07

Training

Introduction to CMMI – 70,791

Intermediate CMMI – 2,549

Introduction to CMMI Instructor – 504

SCAMPI A Lead Appraiser – 731

SCAMPI B&C-Only Team Lead – 33

Understanding CMMI High Maturity Practices –120

Authorized

Introduction to CMMI V1.2 Instructors – 400

SCAMPI V1.2 Lead Appraisers – 417

SCAMPI B&C V1.2Team Leads – 20

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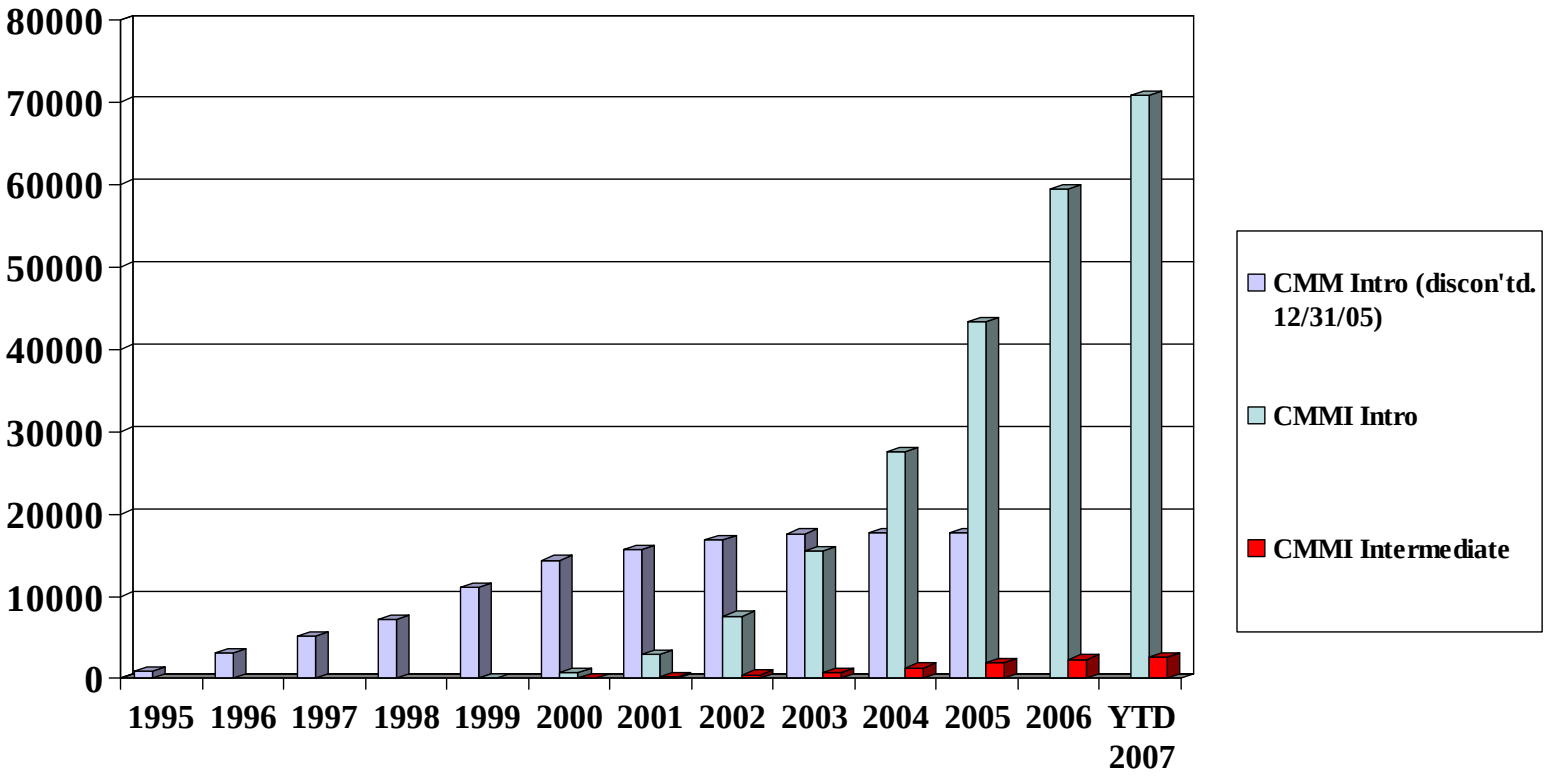
Intro to the CMM and CMMI Attendees (Cumulative)



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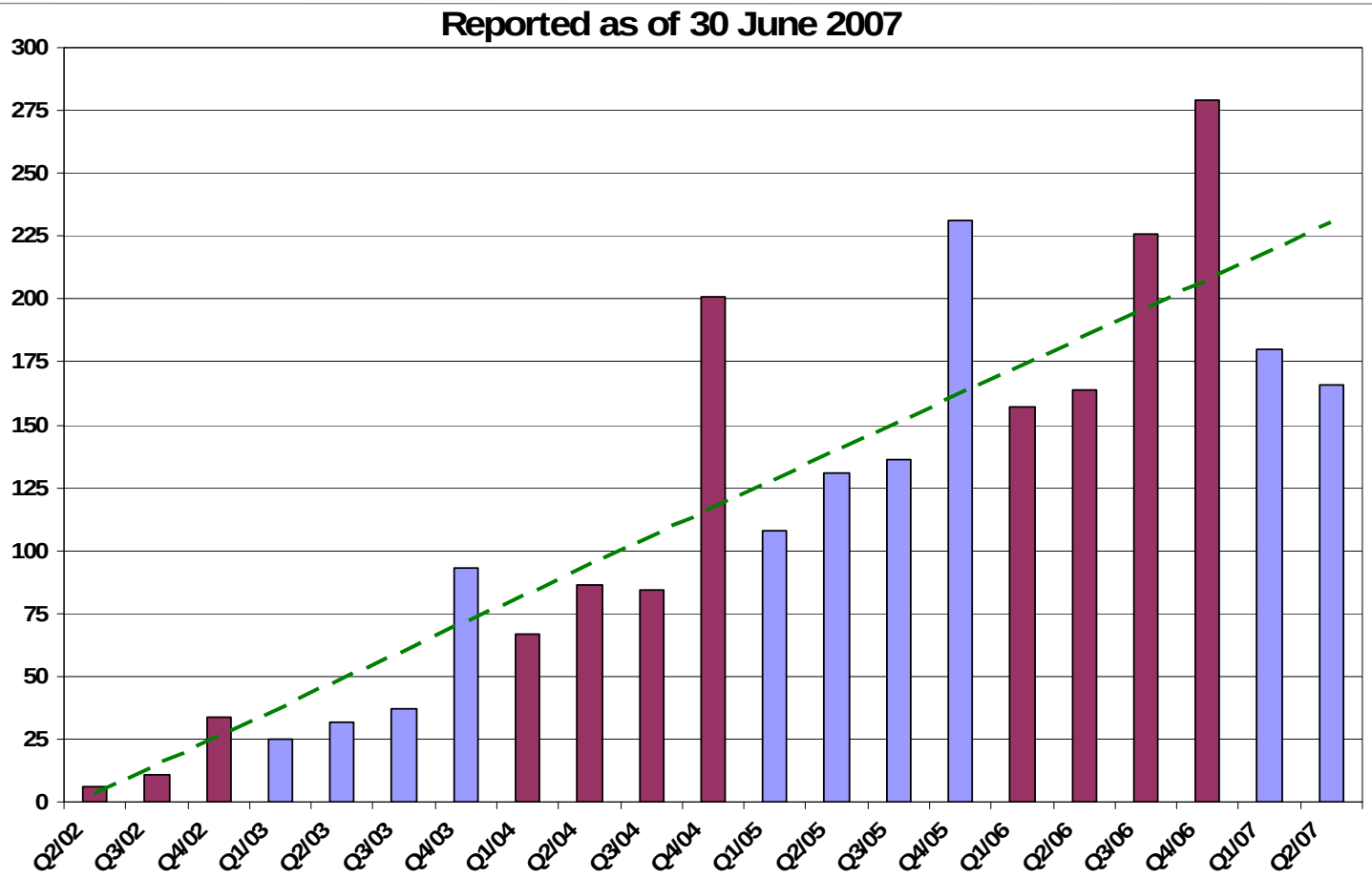
Number of SCAMPI v1.1/v1.2 Class A Appraisals (Conducted by Quarter)



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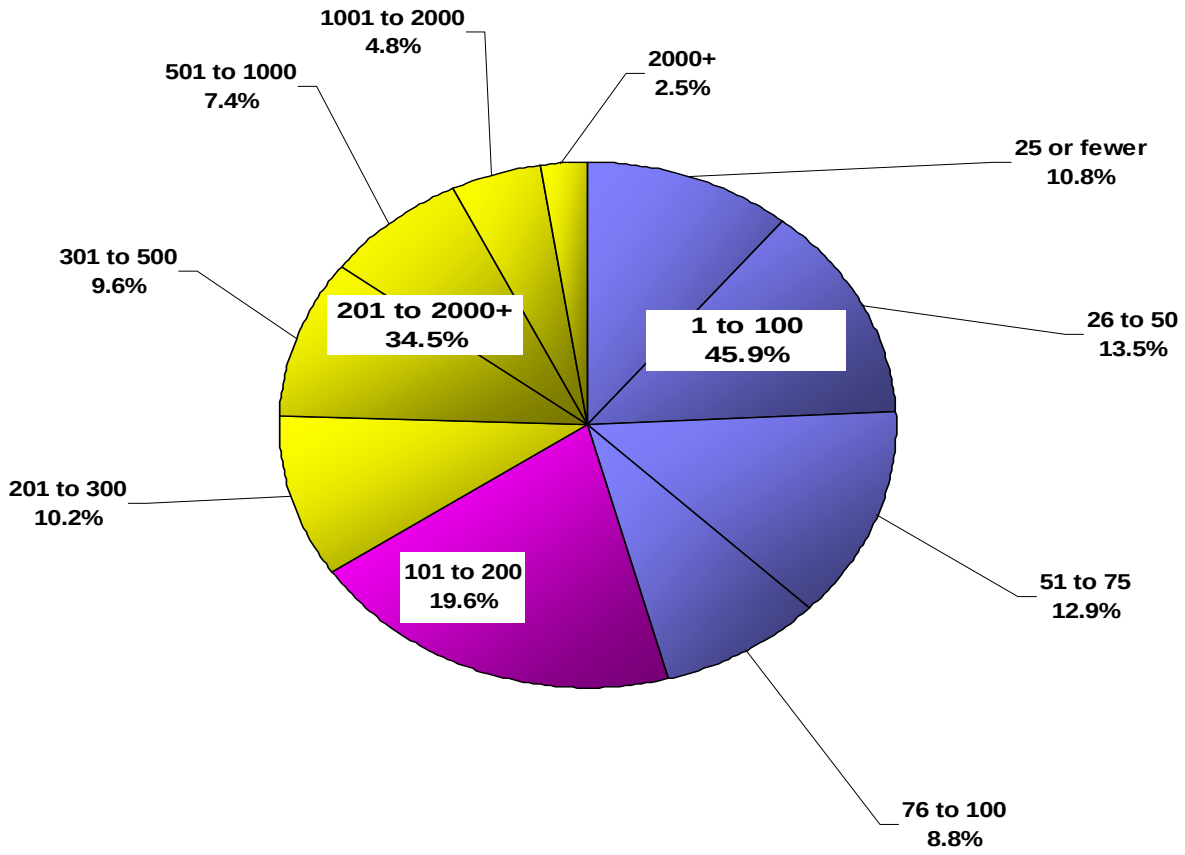
Organization Size

Based on the total number of employees within the area of the organization that was appraised



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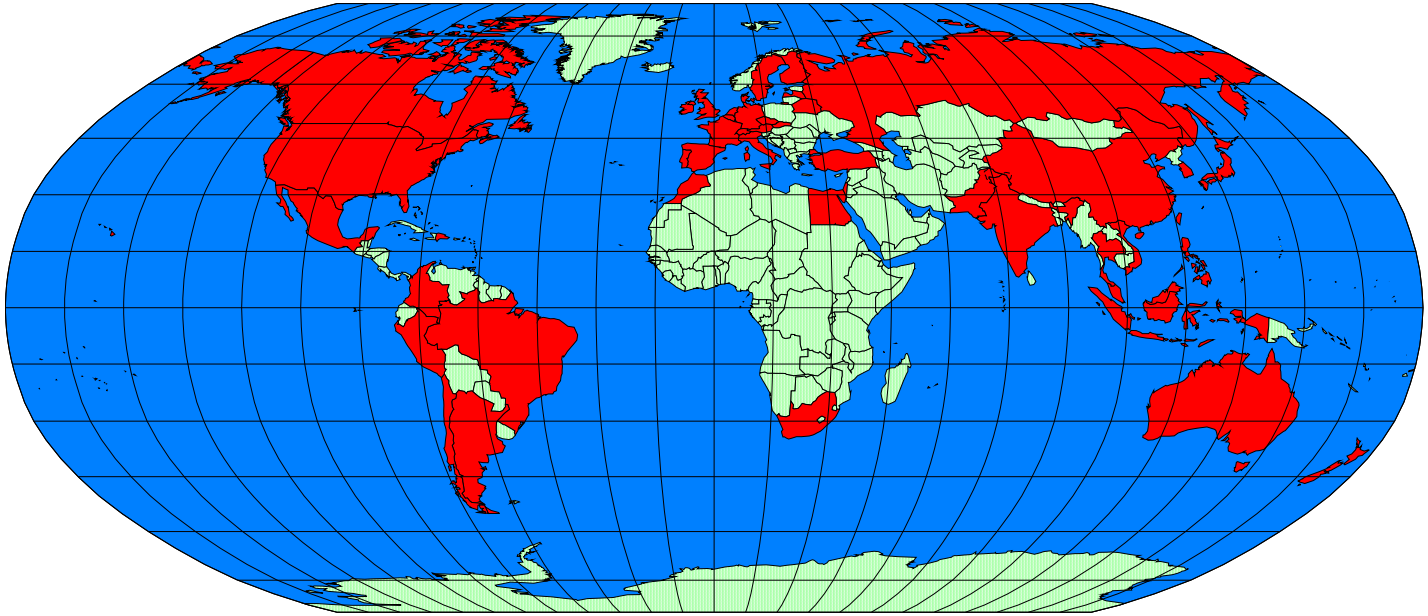
Countries where Appraisals have been Performed <u>and</u> Reported to the SEI



Argentina	Australia	Austria	Bahrain	Belarus	Belgium	Brazil	Canada
Chile	China	Colombia	Czech Republic	Denmark	Dominican Republic	Egypt	Finland
France	Germany	Hong Kong	India	Indonesia	Ireland	Israel	Italy
Japan	Korea, Republic of	Latvia	Malaysia	Mauritius	Mexico	Morocco	Netherlands
New Zealand	Pakistan	Peru	Philippines	Portugal	Russia	Singapore	Slovakia
South Africa	Spain	Sweden	Switzerland	Taiwan	Thailand	Turkey	United Kingdom
United States	Vietnam						

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Number of Appraisals and Maturity Levels Reported to the SEI by Country

Country	Number of Appraisals	Maturity Level 1 Reported	Maturity Level 2 Reported	Maturity Level 3 Reported	Maturity Level 4 Reported	Maturity Level 5 Reported	Country	Number of Appraisals	Maturity Level 1 Reported	Maturity Level 2 Reported	Maturity Level 3 Reported	Maturity Level 4 Reported	Maturity Level 5 Reported
Argentina	19	No	Yes	Yes	Yes	Yes	Korea, Republic Of	78	Yes	Yes	Yes	Yes	Yes
Australia	23	Yes	Yes	Yes	Yes	Yes	Latvia	10 or fewer					
Austria	10 or fewer						Malaysia	19	No	Yes	Yes	No	Yes
Bahrain	10 or fewer						Mauritius	10 or fewer					
Belarus	10 or fewer						Mexico	15	No	Yes	Yes	Yes	Yes
Belgium	10 or fewer						Morocco	10 or fewer					
Brazil	48	No	Yes	Yes	Yes	Yes	Netherlands	10 or fewer					
Canada	26	No	Yes	Yes	Yes	Yes	New Zealand	10 or fewer					
Chile	15	No	Yes	Yes	No	Yes	Pakistan	10 or fewer					
China	240	Yes	Yes	Yes	Yes	Yes	Peru	10 or fewer					
Colombia	10 or fewer						Philippines	16	No	Yes	Yes	No	Yes
Czech Republic	10 or fewer						Portugal	10 or fewer					
Denmark	10 or fewer						Russia	10 or fewer					
Dominican Republic	10 or fewer						Singapore	10 or fewer					
Egypt	17	No	Yes	Yes	Yes	Yes	Slovakia	10 or fewer					
Finland	10 or fewer						South Africa	10 or fewer					
France	75	Yes	Yes	Yes	Yes	Yes	Spain	31	No	Yes	Yes	No	Yes
Germany	35	Yes	Yes	Yes	Yes	Yes	Sweden	10 or fewer					
Hong Kong	10						Switzerland	10 or fewer					
India	204	No	Yes	Yes	Yes	Yes	Taiwan	46	No	Yes	Yes	No	Yes
Indonesia	10 or fewer						Thailand	10 or fewer					
Ireland	10 or fewer						Turkey	10 or fewer					
Israel	10						United Kingdom	48	Yes	Yes	Yes	Yes	No
Italy	10 or fewer						United States	718	Yes	Yes	Yes	Yes	Yes
Japan	172	Yes	Yes	Yes	Yes	Yes	Viet Nam	10 or fewer					

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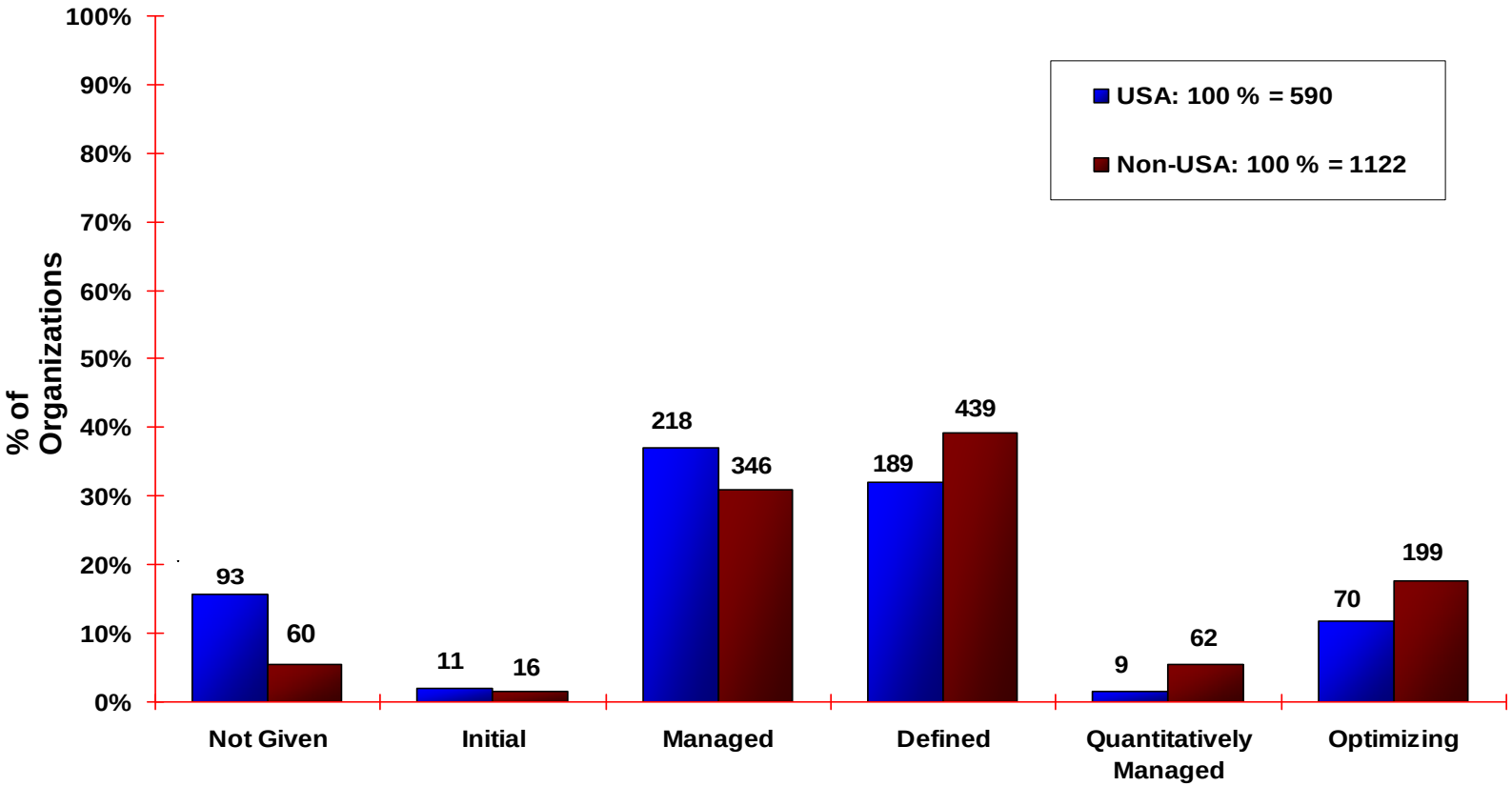
Maturity Profile by All Reporting USA and Non-USA Organizations



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Performance Results Summary

Improvements	Median	# of data points	Low	High
Cost	20%	21	3%	87%
Schedule	37%	19	2%	90%
Productivity	67%	16	11%	255%
Quality	50%	18	29%	132%
Customer Satisfaction	14%	6	-4%	55%
Return on Investment	4.8 : 1	14	2 : 1	27.7 : 1

- N = 25, as of 15 December 2005
- Organizations with results expressed as change over time

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CMMI Books…Including Mine!

A Guide to the CMMI: Second Edition

CMMI: A Framework…

CMMI Assessments

CMMI Distilled: Second Edition

CMMI SCAMPI Distilled

CMMI Survival Guide

CMMI: Un Itinéraire Fléché: Second Edition

De kleine CMMI

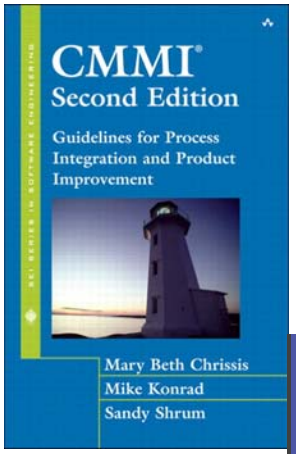
Interpreting the CMMI

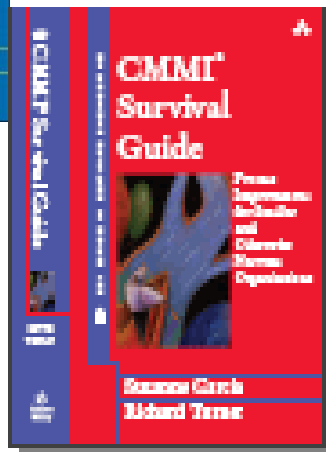
Making Process Improvement Work

Practical Insight into CMMI

Real Process Improvement Using the CMMI

Systematic Process Improvement Using ISO 9001:2000 and CMMI





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How About SEI Publications?

Technical notes and special reports:

- Interpreting CMMI:
  - for Operational Organizations
  - for COTS Based Systems
  - for Service Organizations
  - for Business Development
- Using CMMI with:
  - Team Software Process (TSP)
  - Earned Value Management
  - Product Line Practices
  - Six Sigma
- Supplementing CMMI for Safety Critical Development ("+Safe")
- Demonstrating the Impact and Benefits of CMMI (and Web pages – http://www.sei.cmu.edu/cmmi/results)
- Tutorial: *Will My System Play Nicely with Others? CMMI in a SoS Context*

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DoD Technology Readiness Levels

A scale from 1 to 9 used to assess technology maturity*

1. Basic principles observed and reported.
2. Technology concept and/or application formulated.
3. Analytical and experimental critical function and/or characteristic proof of concept.
4. Component and/or breadboard validation in laboratory environment.
5. Component and/or breadboard validation in relevant environment.
6. System/subsystem model or prototype demonstration in a relevant environment.
7. System prototype demonstration in an operational environment.
8. Actual system completed and qualified through test and demonstration.
9. Actual system proven through successful mission operations.

*DoD Interim Defense Acquisition Guidebook, October 30, 2002

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TRL Readiness Fundamentals in the Hardware/Systems Context

For hardware/systems, TRLs 1-9 depict the following general progression in readiness:

- The environment in which the technology can function becomes more representative of the final operational environment
  - from paper studies through laboratory setup, simulated environments, to mission operations
- The completeness of the technology increases
  - from basic properties through breadboard components, integrated components, prototype, to final form

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Technology Maturity ≠ Process Maturity

Technology maturity scales such as TRLs measure the progress of a technology towards a narrower and narrower production and operational context, culminating in use within a specific operating environment

Process maturity scales(within the process improvement community termed Capability Maturity, even though it really should be *Process* Capability Maturity) such as capability levels and maturity levels measure the progress of an environment (typically an organization) toward a more measurable project and organizational process context.

The process capabilities achieved can be applied in multiple relevant project contexts.

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TRL Stages Where *Process* Capability Maturity Might be Helpful

A scale from 1 to 9 used to assess technology maturity*

1. Basic principles observed and reported.
2. Technology concept and/or application formulated.
3. Analytical and experimental critical function and/or characteristic proof of concept.
4. Component and/or breadboard validation in laboratory environment.
5. Component and/or breadboard validation in relevant environment.
6. System/subsystem model or prototype demonstration in a relevant environment.
7. System prototype demonstration in an operational environment.
8. Actual system completed and qualified through test and demonstration.
9. Actual system proven through successful mission operations.

*DoD Interim Defense Acquisition Guidebook, October 30, 2002

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Useful Approaches to Using CMMI

1: Apply selected CMMI-DEV ideas to the processes that you use in managing the evolution of technology.

- Do you manage technology evolution projects? Could you use guidance in *Project Planning* and *Project Monitoring & Control*?
- Do you need to manage risks? Could you use guidance in *Risk Management*?
- Etc…

2: Encourage projects over which you have oversight to consider using CMMI-DEV as a guide for relevant processes at relevant points.

3: Use ideas from the soon-to-be-released CMMI-ACQ for guidance in processes used in overseeing other technology developers.

NOTE THERE IS NO MENTION OF MATURITY LEVELS IN ANY OF THE ABOVE STATEMENTS

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What I would NOT Recommend…

Please don't try to tie a particular *process* maturity level to a particular *technology* maturity level!

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Where to Start in Adopting CMMI into Your Organization

Ask someone you trust to learn more about CMMI and report back to you. Ways to learn more include the SEI Web site, *Introduction to CMMI* training, and written publications.

Talk to others who have adopted CMMI to see how they did it. Early adopters that have agreed to talk to potential adopters are listed on the SEI Web site.

Participate in Discussion Groups and Bulletin Boards or attend a conference to learn from others who have adopted CMMI. A list of a few such forums is at www.sei.cmu.edu/cmmi/adoption/knowledge-exchange.html

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For More Information About CMMI

Go to CMMI Web site:

http://www.sei.cmu.edu/cmmi

http://seir.sei.cmu.edu

Contact SEI Customer Relations:

Customer Relations
Software Engineering Institute
Carnegie Mellon University
Pittsburgh, PA 15213-3890
FAX: (412) 268-5800

customer-relations@sei.cmu.edu

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Backup Slides

Titles and Specific Goals for the CMMI-DEV 1.2 Process Areas

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Causal Analysis and Resolution Goals

SG 1: Determine Causes of Defects

Root causes of defects and other problems are systematically determined.

SG 2: Address Causes of Defects

Root causes of defects and other problems are systematically addressed to prevent their future occurrence.

The process area also has generic goals to support institutionalization.

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Configuration Management Goals

SG 1: Establish Baselines
Baselines of identified work products are established.

SG 2: Track and Control Changes
Changes to the work products under configuration management are tracked and controlled.

SG 3: Establish Integrity
Integrity of baselines is established and maintained.

The process area also has generic goals to support institutionalization.

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Decision Analysis and Resolution Goals

SG 1: Evaluate Alternatives

Decisions are based on an evaluation of alternatives using established criteria.

The process area also has generic goals to support institutionalization.

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IPM (+IPPD Addition)

SG 1: Use the Project's Defined Process
The project is conducted using a defined process that is tailored from the organization's set of standard processes.

SG 2: Coordinate and Collaborate with Relevant Stakeholders
Coordination and collaboration of the project with the relevant stakeholders is conducted.

IPPD Addition:

SG 3: Apply IPPD Principles
The project is managed using IPPD principles.

The process area also has generic goals to support institutionalization.

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Measurement and Analysis Goals

SG 1: Align Measurement and Analysis Activities
Measurement objectives and activities are aligned with identified information needs and objectives.

SG 2: Provide Measurement Results
Measurement results that address identified information needs and objectives are provided.

The process area also has generic goals to support institutionalization.

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Organizational Innovation and Deployment Goals

SG 1: Select Improvements

Process and technology improvements that contribute to meeting quality and process-performance objectives are selected.

SG 2: Deploy Improvements

Measurable improvements to the organization's processes and technologies are continually and systematically deployed.

The process area also has generic goals to support institutionalization.

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Organizational Process Definition + IPPD

SG 1: Establish Organizational Process Assets
A set of organizational process assets is established and maintained.

IPPD Addition:

SG 2: Enable IPPD Management
Organizational rules and guidelines, which govern the operation of integrated teams, are provided.

The process area also has generic goals to support institutionalization.

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Organizational Process Focus

SG 1: Determine Process Improvement Opportunities
Strengths, weaknesses, and improvement opportunities for the organization's processes are identified periodically and as needed.

SG 2: Plan and Implement Process Improvements
Process actions that address improvements to the organization's processes and process assets are planned and implemented.

SG 3: Deploy Organizational Process Assets and Incorporate Lessons Learned
The organizational process assets are deployed across the organization, and process-related experiences are incorporated into the organizational process assets.

The process area also has generic goals to support institutionalization.

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Organizational Process Performance Goals

SG 1: Establish Performance Baselines and Models

Baselines and models that characterize the expected process performance of the organization's set of standard processes are established and maintained.

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Organizational Training Goals

SG 1: Establish an Organizational Training Capability

A training capability that supports the organization's management and technical roles is established and maintained.

SG 2: Provide Necessary Training

Training necessary for individuals to perform their roles effectively is provided.

The process area also has generic goals to support institutionalization.

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Product Integration Goals

SG 1: Prepare for Product Integration
Preparation for product integration is conducted.

SG 2: Ensure Interface Compatibility
The product component interfaces, both internal and external, are compatible.

SG 3: Assemble Product Components and Deliver the Product
Verified product components are assembled and the integrated, verified, and validated product is delivered.

The process area also has generic goals to support institutionalization.

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Project Monitoring and Control Goals

SG 1: Monitor Project Against Plan

Actual performance and progress of the project are monitored against the project plan.

SG 2: Manage Corrective Action to Closure

Corrective actions are managed to closure when the project's performance or results deviate significantly from the plan.

The process area also has generic goals to support institutionalization.

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Project Planning Goals

SG 1: Establish Estimates
Estimates of project planning parameters are established and maintained.

SG 2: Develop a Project Plan
A project plan is established and maintained as the basis for managing the project.

SG 3: Obtain Commitment to the Plan
Commitments to the project plan are established and maintained.

The process area also has generic goals to support institutionalization.

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Process and Product Quality Assurance Goals

SG 1: Objectively Evaluate Processes and Work Products

Adherence of the performed process and associated work products and services to applicable process descriptions, standards, and procedures is objectively evaluated.

SG 2: Provide Objective Insight

Noncompliance issues are objectively tracked and communicated, and resolution is ensured.

The process area also has generic goals to support institutionalization.

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Quantitative Project Management Goals

SG 1: Quantitatively Manage the Project

The project is quantitatively managed using quality and process-performance objectives.

SG 2: Statistically Manage Subprocess Performance

The performance of selected subprocesses within the project's defined process is statistically managed.

The process area also has generic goals to support institutionalization.

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Requirements Development

SG 1: Develop Customer Requirements
Stakeholder needs, expectations, constraints, and interfaces are collected and translated into customer requirements.

SG 2: Develop Product Requirements
Customer requirements are refined and elaborated to develop product and product component requirements.

SG 3: Analyze and Validate Requirements
The requirements are analyzed and validated, and a definition of required functionality is developed.

The process area also has generic goals to support institutionalization.

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Requirements Management

SG 1: Manage Requirements

Requirements are managed and inconsistencies with project plans and work products are identified.

The process area also has generic goals to support institutionalization

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Risk Management Goals

SG 1: Prepare for Risk Management
Preparation for risk management is conducted.

SG 2: Identify and Analyze Risks
Risks are identified and analyzed to determine their relative importance.

SG 3: Mitigate Risks
Risks are handled and mitigated, where appropriate, to reduce adverse impacts on achieving objectives.

The process area also has generic goals to support institutionalization.

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Supplier Agreement Management

SG 1: Establish Supplier Agreements

Agreements with the suppliers are established and maintained.

SG 2: Satisfy Supplier Agreements

Agreements with the suppliers are satisfied by both the project and the supplier.

The process area also has generic goals to support institutionalization.

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Technical Solution

SG 1: Select Product Component Solutions
Product or product component solutions are selected from alternative solutions.

SG 2: Develop the Design
Product or product components designs are developed.

SG 3: Implement the Product Design
Product components, and associated support documentation, are implemented from their designs.

The process area also has generic goals to support institutionalization.

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Validation

SG 1: Prepare for Validation
Preparation for validation is conducted.

SG 2: Validate Product or Product Components
The product or product components are validated to ensure that they are suitable for use in their intended operating environment.

The process area also has generic goals to support institutionalization.

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Verification

SG 1: Prepare for Verification
Preparation for verification is conducted.

SG 2: Perform Peer Reviews
Peer reviews are performed on selected work products..

SG 3: Verify Selected Work Products
Selected work products are verified against their specified requirements.

The process area also has generic goals to support institutionalization.

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