

Team CSC

CSC's Software Engineering Framework



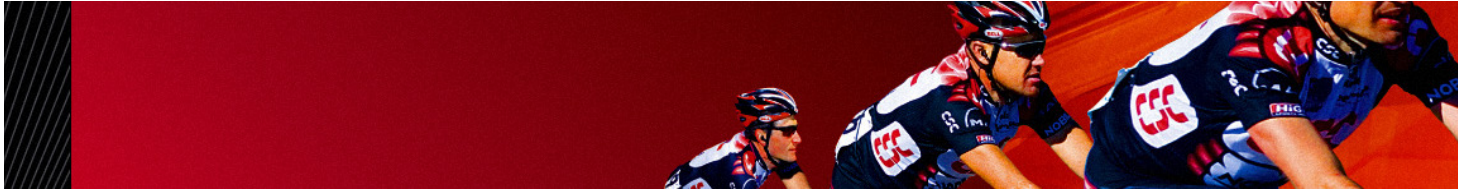
Bob Patterson
SEI Authorized SCAMPISM Lead

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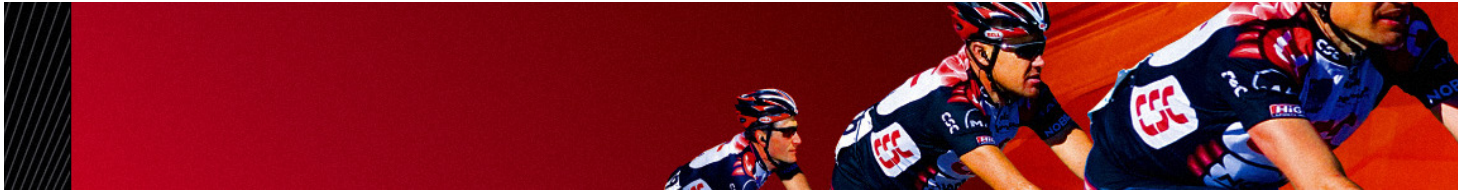
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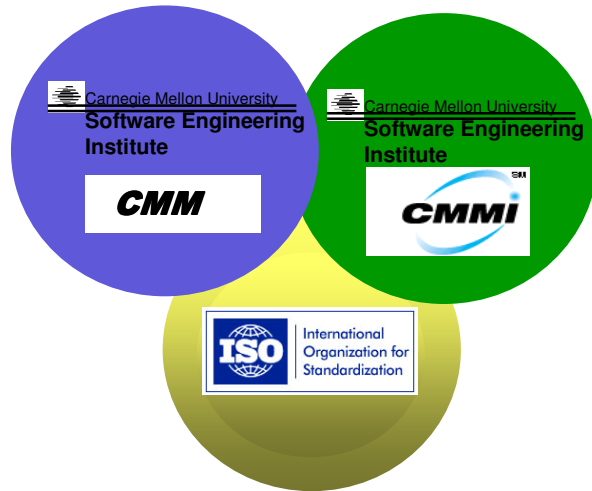
Agenda

- **Drivers**
- **SEI CMMI**
- **CMMI Process Areas**
- **Appraisal Method**



Drivers for an Engineering Framework

Industry Standards



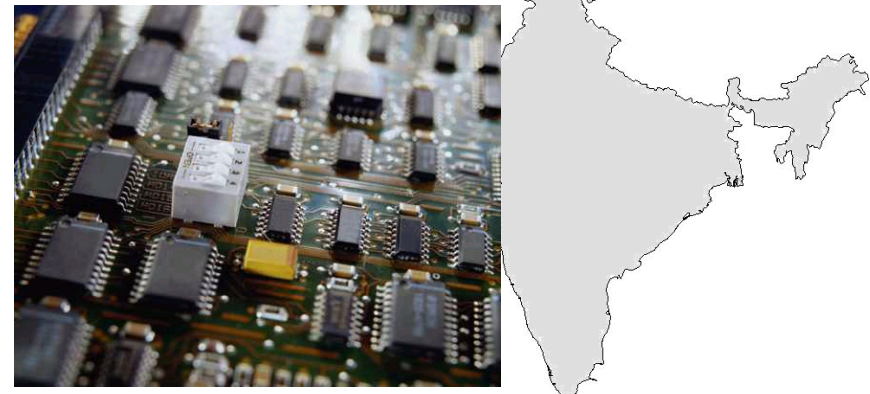
Measurements and Assessments

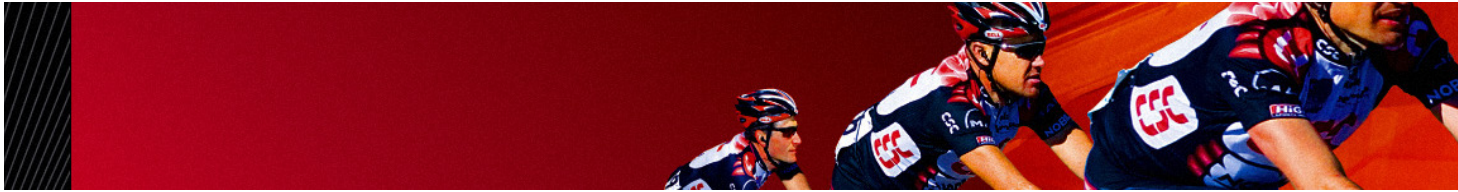


Knowledge Sharing



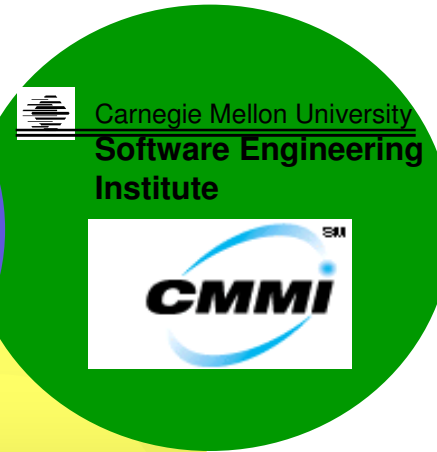
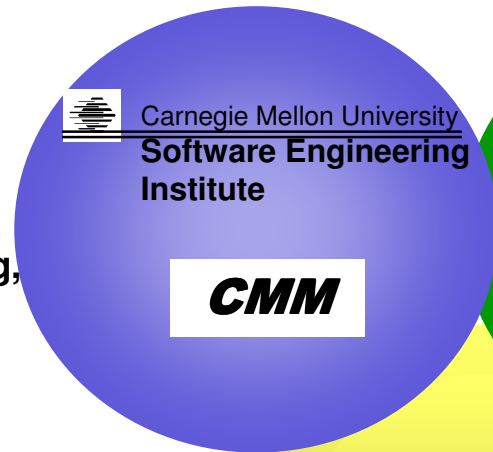
Business and Technology Drivers





Framework Built Upon Industry Standards

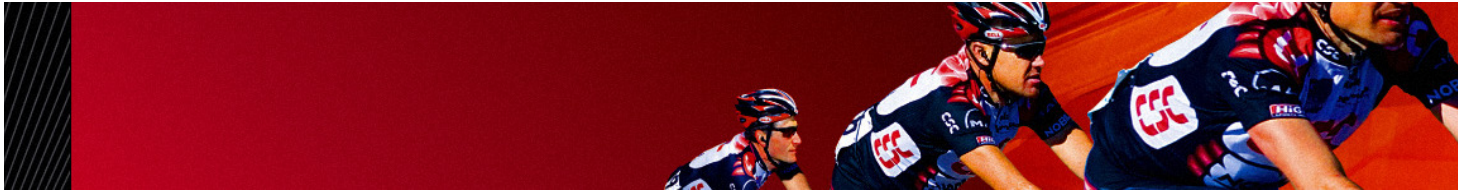
- **CMM (Capability Maturity Model)** provided requirements for creating, measuring, and improving processes



- **CMMI (Capability Maturity Model Integration)** updated the requirements for creating and measuring processes



- **ISO ensures conformity of products and services to International Standards providing assurance about their quality, safety, and reliability**

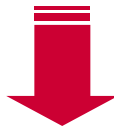


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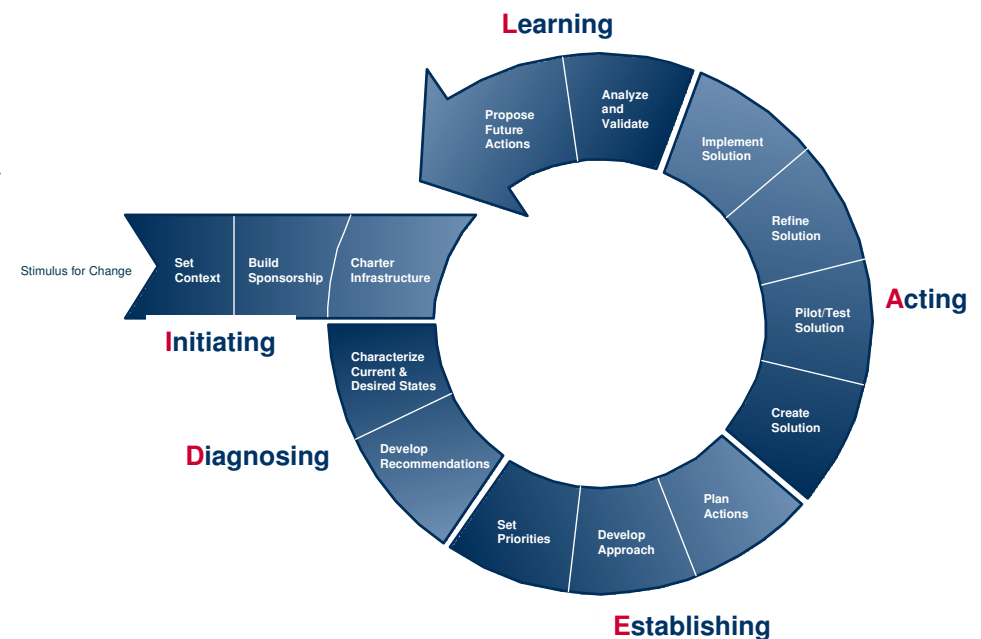
What is the SEI?

- Software Engineering Institute (SEI) – Federally funded research and development center with broad charter to improve the transition of software/system engineering technology
- Capability Maturity Model (CMM) – Designed to improve software development by identifying Key Process Areas that if improved increases an organizational software process capability

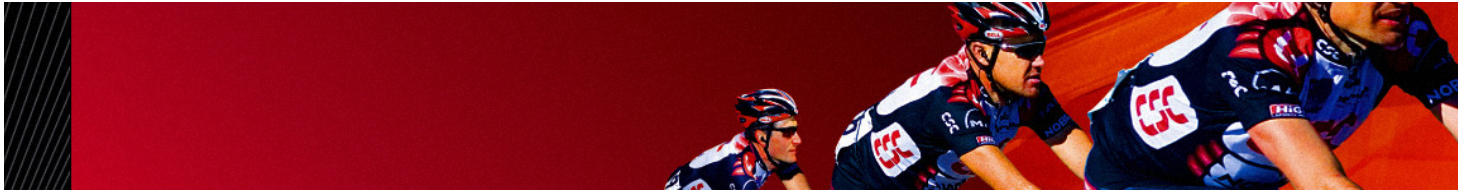
Transition



- Capability Maturity Model Integration (CMMI) developed to integrate existing CMMs for Software, System Engineering, Supplier Sourcing and Integrated Product and Process Teams



CSC follows the SEI IDEAL model to drive change



CMMI Performance Results Summary

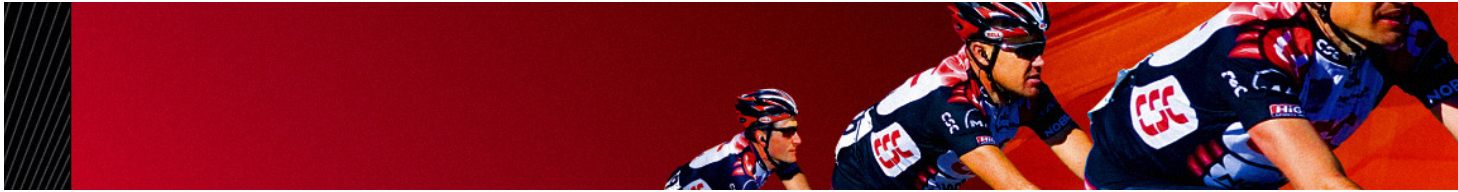
Improvements	Median	# of data points	Low	High
Cost	34%	29	3%	87%
Schedule	50%	22	2%	95%
Productivity	61%	20	11%	329%
Quality	48%	34	2%	132%
Customer Satisfaction	14%	7	-4%	55%
Return on Investment	4.0 : 1	22	1.7 : 1	27.7 : 1

- N = 35, as of August 2006, SEI TR-004
- Organizations with results expressed as change over time

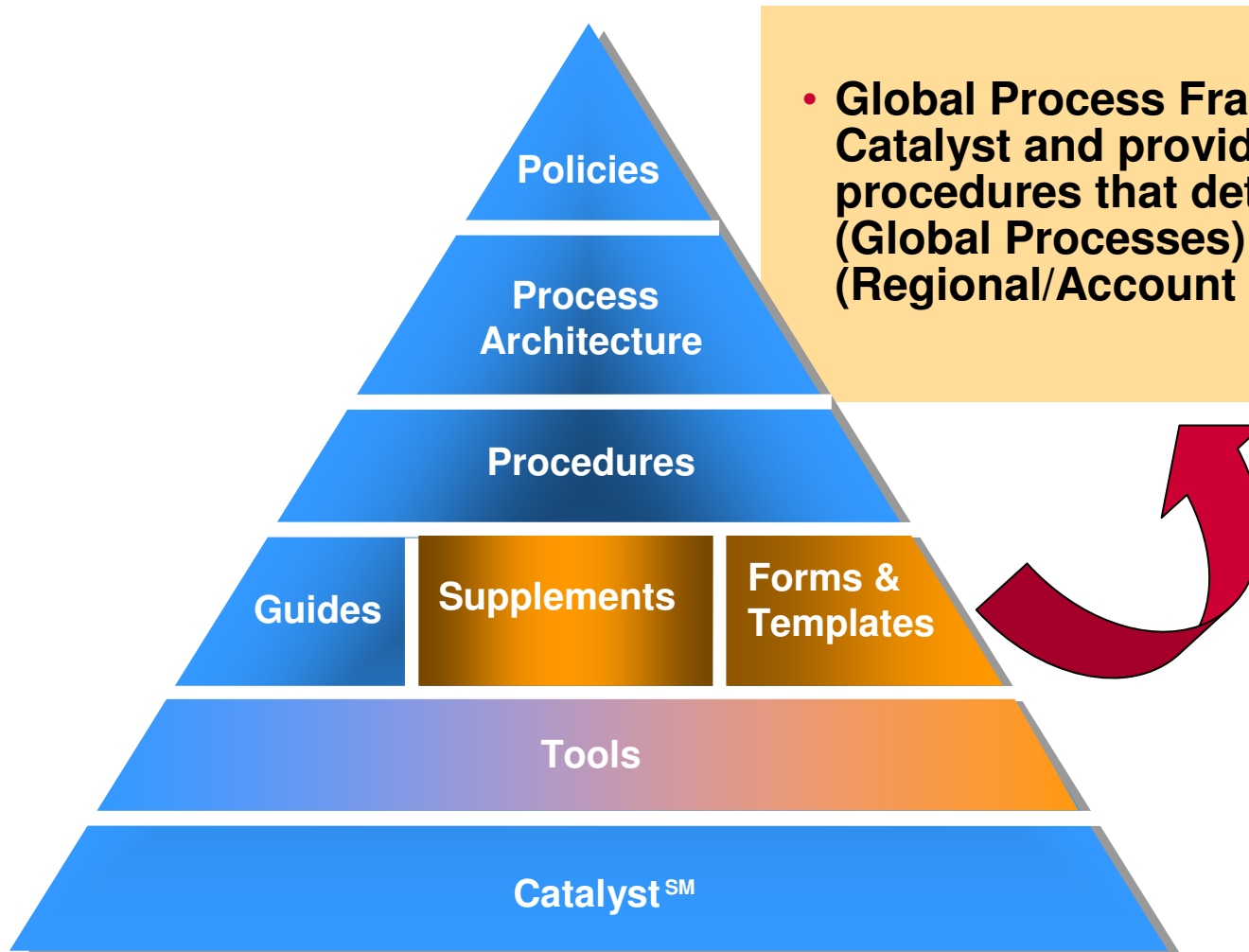
CSC's Global Process Framework (GPF)

- **Global application excellence requires a comprehensive, integrated framework to**
 - Provide a consistent view of progress and results across the global enterprise
 - Prescribe best practices, standards, methods, and tools
 - Clearly define roles, responsibilities, and management activities





Framework Structure Allows for Flexibility



- **Global Process Framework is built upon Catalyst and provides a common set of procedures that determines standardization (Global Processes) and customization (Regional/Account Processes)**

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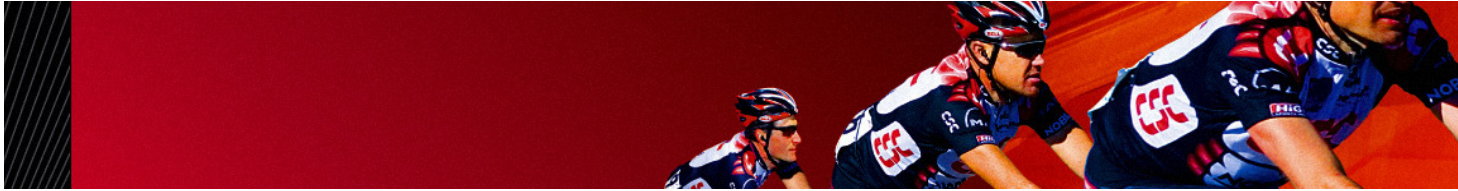
Framework for the GPF is the SEI
CMMI-DEV

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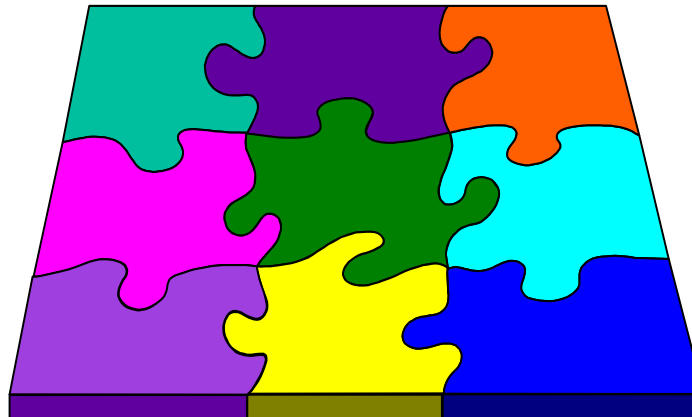


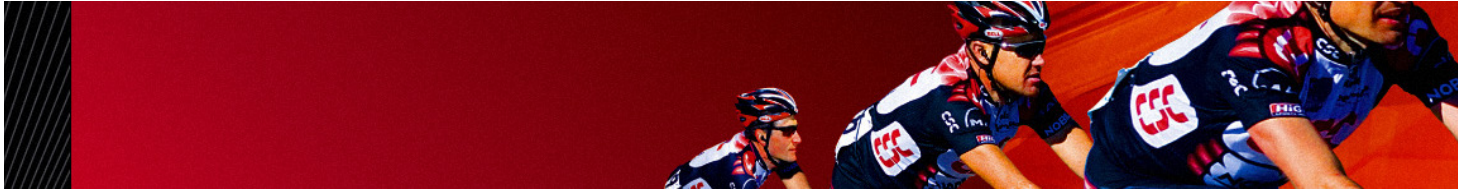
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CMMI Model Representations

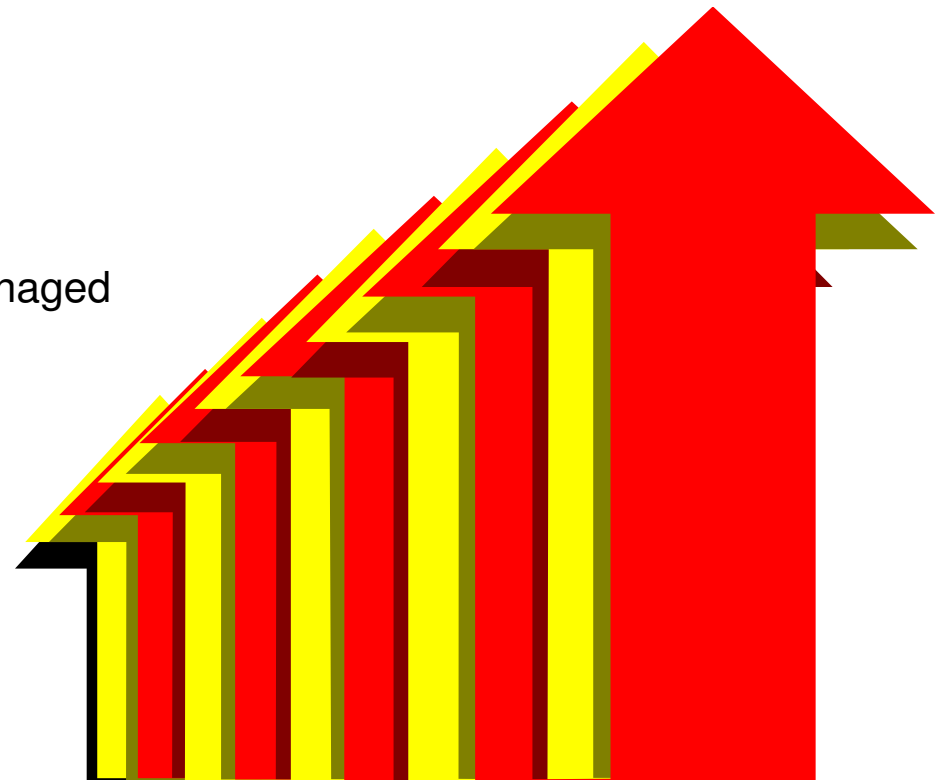
- An organization may choose to approach process improvement from either the
 - process capability approach, or the
 - organizational maturity approach
- CMMI models support each approach with a representation
 - Continuous representation - process capability approach
 - Staged representation - organizational maturity approach

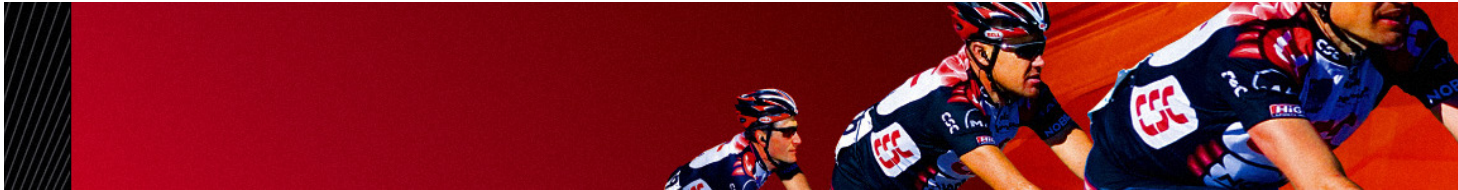




Continuous Representation

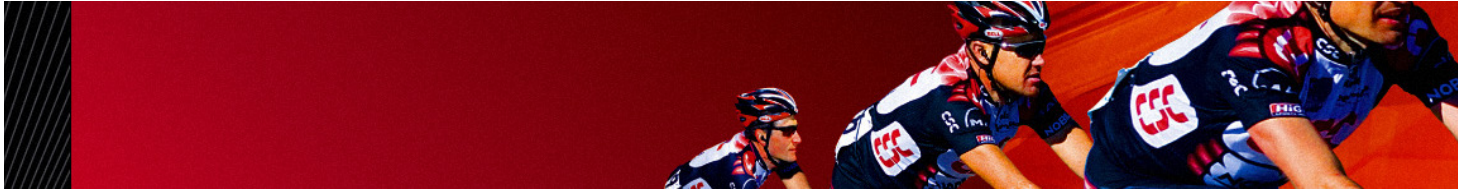
- Provides maximum flexibility for organizations to choose which processes to emphasize for improvement
 - Capability Levels for each Process Area
 - Level 0 - Incomplete
 - Level 1 - Performed
 - Level 2 - Managed
 - Level 3 - Defined
 - Level 4 - Quantitatively Managed
 - Level 5 - Optimizing





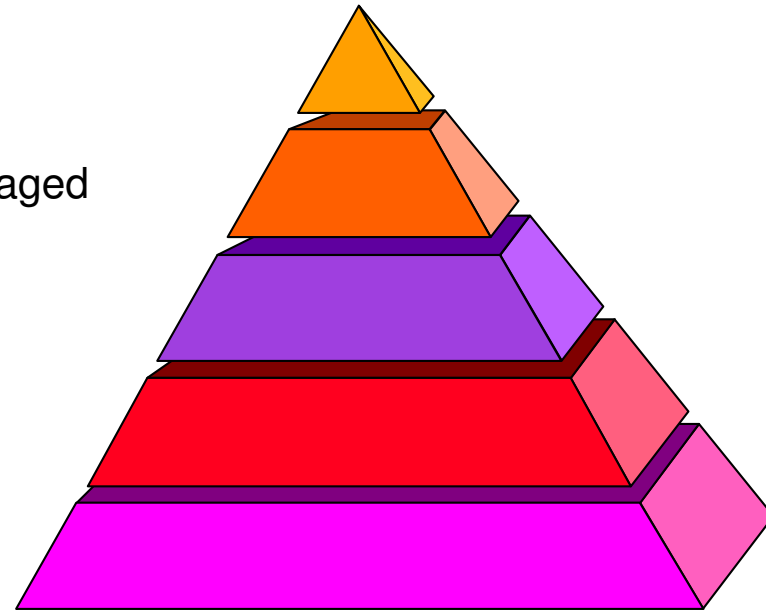
Continuous Representation of SEI CMMI-DEV V1.2

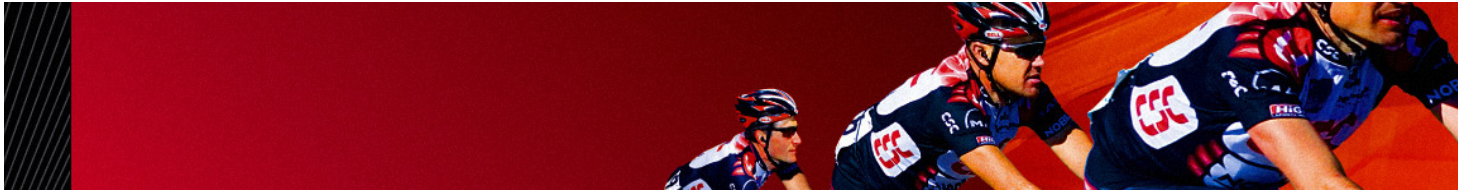
Category	Process Areas
Process Management	<ul style="list-style-type: none"> Organizational Process Focus Organizational Process Definition +IPPD Organizational Training Organizational Process Performance Organizational Innovation and Deployment
Project Management	<ul style="list-style-type: none"> Project Planning Project Monitoring and Control Supplier Agreement Management Integrated Project Management +IPPD Risk Management Quantitative Project Management
Engineering	<ul style="list-style-type: none"> Requirements Management Requirements Development Technical Solution Product Integration Verification Validation
Support	<ul style="list-style-type: none"> Configuration Management Process and Product Quality Assurance Measurement and Analysis Decision Analysis and Resolution Causal Analysis and Resolution



Staged Representation

- Provides a pre-defined roadmap for organizational improvement based on proven grouping and ordering of process and associated organizational relationships
 - Maturity Levels for each grouping of Process Areas
 - Level 1 Initial
 - Level 2 Managed
 - Level 3 Defined
 - Level 4 Quantitatively Managed
 - Level 5 Optimizing



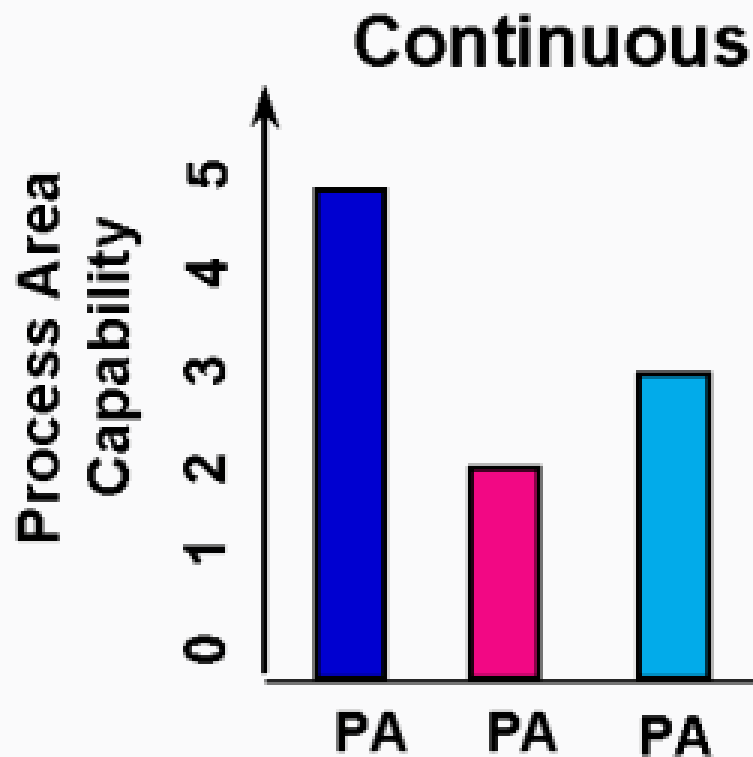


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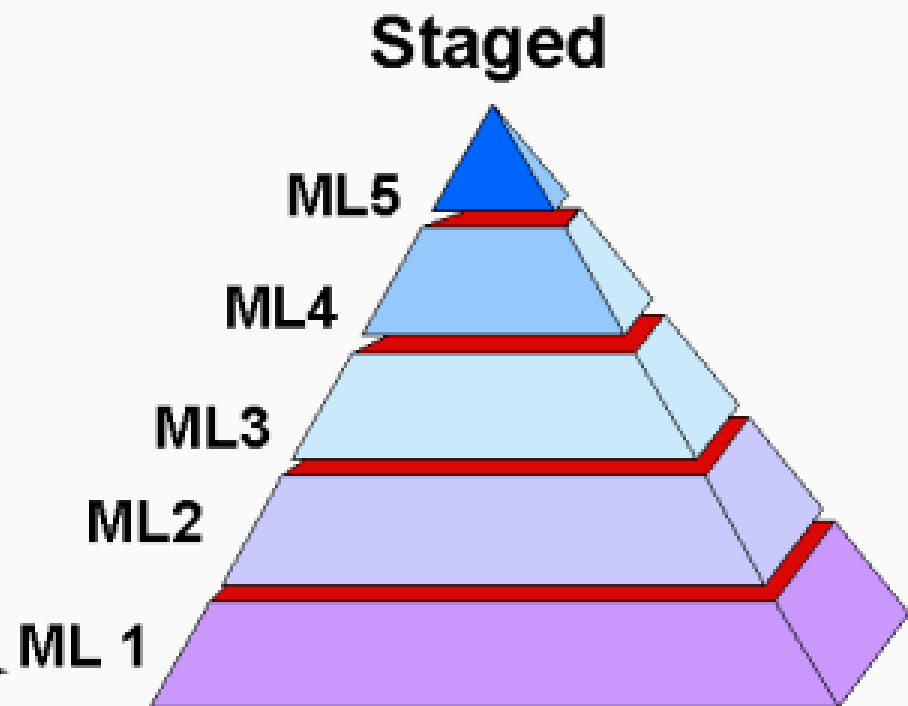
Staged Representation of SEI CMMI –DEV V1.2

Level	Focus	Process Areas	Quality Productivity
5 Optimizing	<i>Continuous Process Improvement</i>	Organizational Innovation and Deployment Causal Analysis and Resolution	
4 Quantitatively Managed	<i>Quantitative Management</i>	Organizational Process Performance Quantitative Project Management	
3 Defined	<i>Process Standardization</i>	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	<i>Basic Project Management</i>	Requirements Management Project Planning Project Monitoring and Control Supplier Agreement Management Measurement and Analysis Process and Product Quality Assurance Configuration Management	
1 Initial			
			Risk Rework

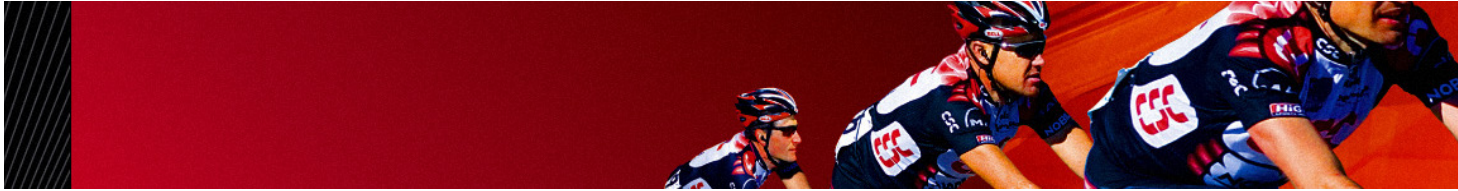
Comparing Model Representations



...for a single process area or a set of process areas



...for an established set of process areas across an organization



Model Components

- Process Areas (PA) - Cluster of related practices
 - Requirements Management (REQM)
- Specific Goals (SG) - Unique characteristics of a PA
 - Manage Requirements (SG 1)
- Specific Practices (SP) - Activity related to a SG
 - Obtain an understanding of requirements (SP 1.1)
- Generic Goals (GG) - Generic characteristics that indicate institutionalization
 - Institutionalize a Managed Process (GG2)
- Generic Practices (GP) - Practices that provide institutionalization
 - Establish an organizational policy (GP2.1)

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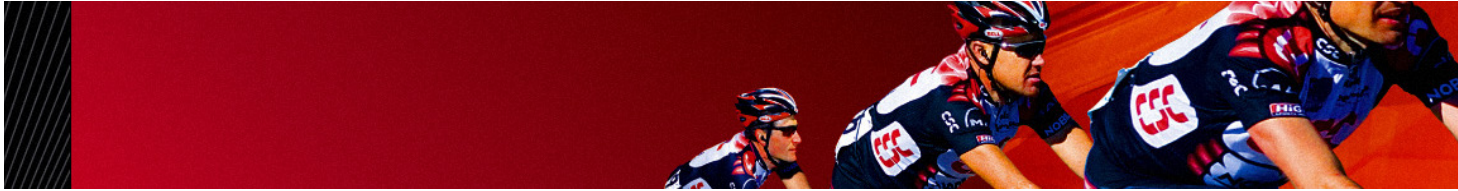
CMMI-DEV Process Areas

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CMMI Process Definitions - Maturity Level 2: Managed

Requirements Management

The purpose of Requirements Management is to manage the requirements of the project's products and product components and to identify inconsistencies between those requirements and the project's plans and work products.

Project Planning

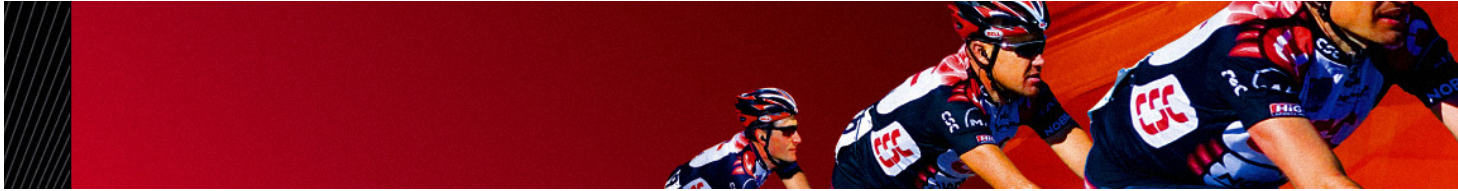
The purpose of Project Planning is to establish and maintain plans that define project activities.

Project Monitoring and Control

The purpose of Project Monitoring and Control is to provide an understanding of the project's progress so that appropriate corrective actions can be taken when the project's performance deviates significantly from the plan.

Supplier Agreement Management

The purpose of Supplier Agreement Management is to manage the acquisition of products from suppliers for which there exists a formal agreement.



CMMI Process Definitions - Maturity Level 2: Managed

Measurement and Analysis

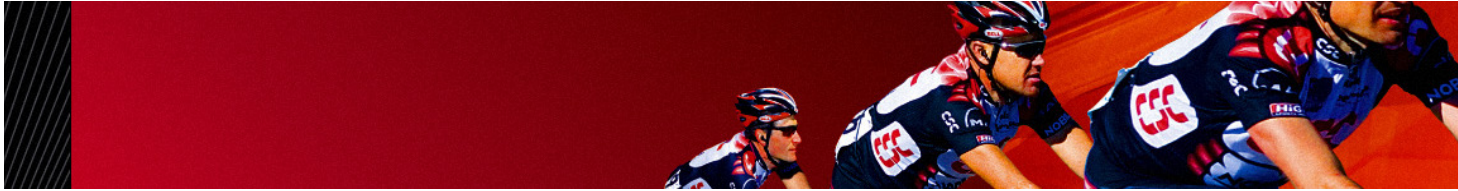
The purpose of Measurement and Analysis is to develop and sustain a measurement capability that is used to support management information needs.

Process and Product Quality Assurance

The purpose of Process and Product Quality Assurance is to provide staff and management with objective insight into processes and associated work products.

Configuration Management

The purpose of Configuration Management is to establish and maintain the integrity of work products using configuration identification, configuration control, configuration status accounting, and configuration audits.



CMMI Process Definitions - Maturity Level 3: Defined

Requirements Development

The purpose of Requirements Development is to produce and analyze customer, product, and product-component requirements.

Technical Solution

The purpose of Technical Solution is to design, develop, and implement solutions to requirements. Solutions, designs, and implementations encompass products, product components, and product-related life-cycle processes either singly or in combinations as appropriate.

Product Integration

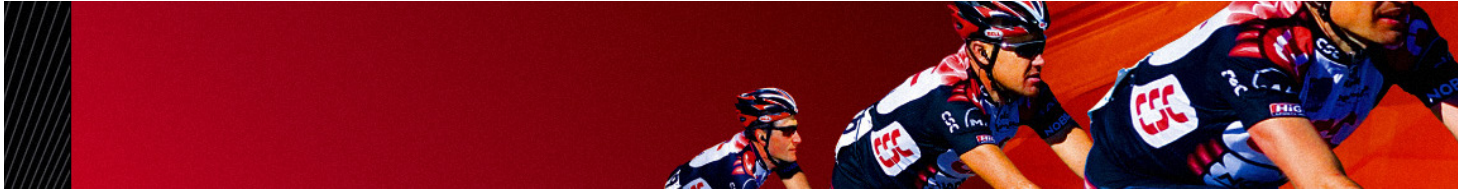
The purpose of Product Integration is to assemble the product from the product components, ensure that the product, as integrated, functions properly, and deliver the product.

Verification

The purpose of Verification is to ensure that selected work products meet their specified requirements. (Did you build the product right?)

Validation

The purpose of Validation is to demonstrate that a product or product component fulfills its intended use when placed in its intended environment. (Did you build the right product?)



CMMI Process Definitions - Maturity Level 3: Defined

Organizational Process Focus

The purpose of Organizational Process Focus is to plan and implement organizational process improvement based on a thorough understanding of the current strengths and weaknesses of the organization's processes and process assets.

Organizational Process Definition

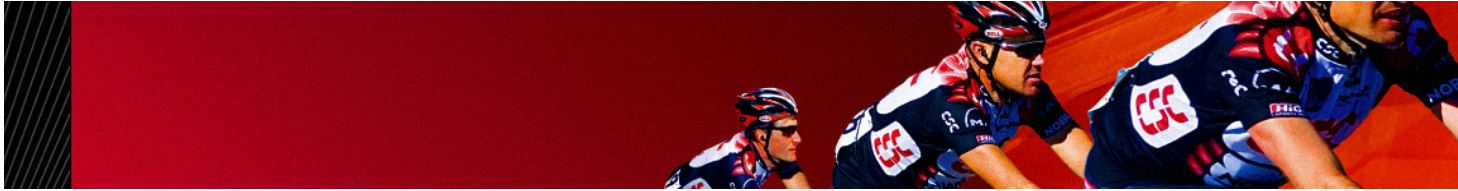
The purpose of Organizational Process Definition is to establish and maintain a usable set of organizational process assets.

Organizational Training

The purpose of Organizational Training is to develop the skills and knowledge of people so they can perform their roles effectively and efficiently.

Integrated Project Management

The purpose of Integrated Project Management is to establish and manage the project and the involvement of the relevant stakeholders according to an integrated and defined process that is tailored from the organization's set of standard



CMMI Process Definitions - Maturity Level 3 Defined

Risk Management

The purpose of Risk Management is to identify potential problems before they occur, so that risk-handling activities may be planned and invoked as needed across the life of the product or project to mitigate adverse impacts on achieving objectives.

Decision Analysis and Resolution

The purpose of Decision Analysis and Resolution is to analyze possible decisions using a formal evaluation process that evaluates identified alternatives against established criteria.

Requirements Management

SG 1 Manage Requirements

- SP 1.1 Obtain an Understanding of Requirements
- SP 1.2 Obtain Commitment to Requirements
- SP 1.3 Manage Requirements Changes
- SP 1.4 Maintain Bi-directional Traceability of Requirements
- SP 1.5 Identify Inconsistencies between Project Work and RQMTs

GG 2 Institutionalize a Managed Process (The same in each Process Area)

- GP 2.1 (CO 1) Establish an Organizational Policy
- GP 2.2 (AB 1) Plan the Process
- GP 2.3 (AB 2) Provide Resources
- GP 2.4 (AB 3) Assign Responsibility
- GP 2.5 (AB 4) Train People
- GP 2.6 (DI 1) Manage Configurations
- GP 2.7 (DI 2) Identify and Involve Relevant Stakeholders
- GP 2.8 (DI 3) Monitor and Control the Process
- GP 2.9 (VE 1) Objectively Evaluate Adherence
- GP 2.10 (VE 2) Review Status with Higher Level Management

GG 3 Institutionalize a Defined Process

- GP 3.1 Establish a Defined Process
- GP 3.2 Collect Improvement Information

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SCAMPI

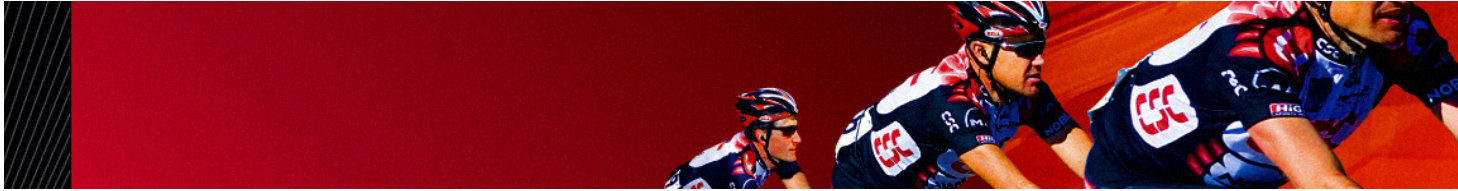
The appraisal method for CMMI

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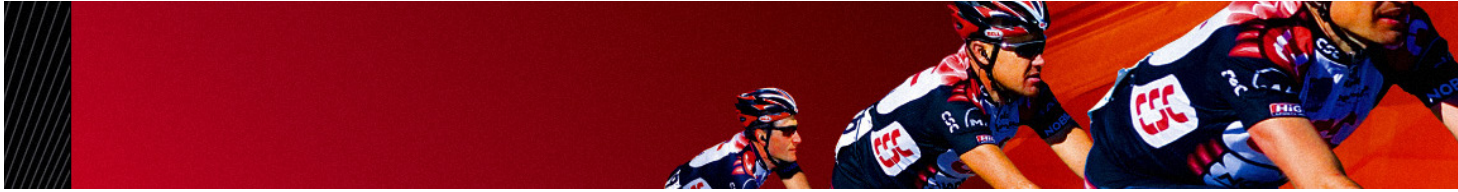


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Standard CMMI Appraisal Method for Process Improvement (SCAMPI)

- Must be used for all CMMI appraisals
- Has to be led by an authorized SCAMPI Lead Appraiser from a SEI Partner organization
- Focuses on verification of the organizations compliance instead of discovery of an organizations compliance
- Involves both interviews and documentation reviews of selected samples from the organizational unit



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Classes of Assessment Methods

Class A:

- Full comprehensive method
- Thorough model coverage
- Provides maturity level
- 6-8 team members

Final Appraisal

Benchmarking

Class B:

- Less comprehensive, less expensive
- Initial, partial, self-assessment
- Focus on areas needing attention
- No maturity level Rating
- 2-4 team members

Initial Appraisal

Mini-Appraisal

Class C:

- Quick look
- Checking for specific risk areas
- Inexpensive, little training Needed
- 1 or 2 team members

Process Verifications

Pulse Taking



Questions ?

Contact Info:

bpatters@csc.com

302-832-3183

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