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CMMI

November 13<sup>th</sup> 2012

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# Objective of the presentation

The aim of the presentation is to introduce Capability Maturity Model Integrated (CMMI) and People Capability Maturity Model (P-CMM) process improvements approach to students of Software Project Management course at Faculty of Informatics and Information Technologies at Slovak University of Technology

The presentation will describe at high level what is CMMI and P-CMM about, and two case studies will be presented, where one is describing the preparation to CMMI appraisal and appraisal process itself in a software house company, and another use case introduces preparation to P-CMMI as a process improvement approach in a non-IT functions of a company.



# Introduction of Accenture – Presenter



**Vladimír Šatura**  
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Slovakia

## **Graduate at Slovenská Vysoká Škola Technická**

- Elektrotechnická Fakulta

## **14 years in Národná banka Slovenska**

- Establishment of new Computing Centre, development of payment system, lead of applications maintenance team

## **5 years Accenture Technology Solutions**

- Project processes and methodology, CMMI / P-CMM, Business Continuity and Information Security



# Agenda

## **Introduction to CMMI**

Use Case 1: CMMI certification

Introduction to P-CMM

Use Case 2: P-CMM implementation samples

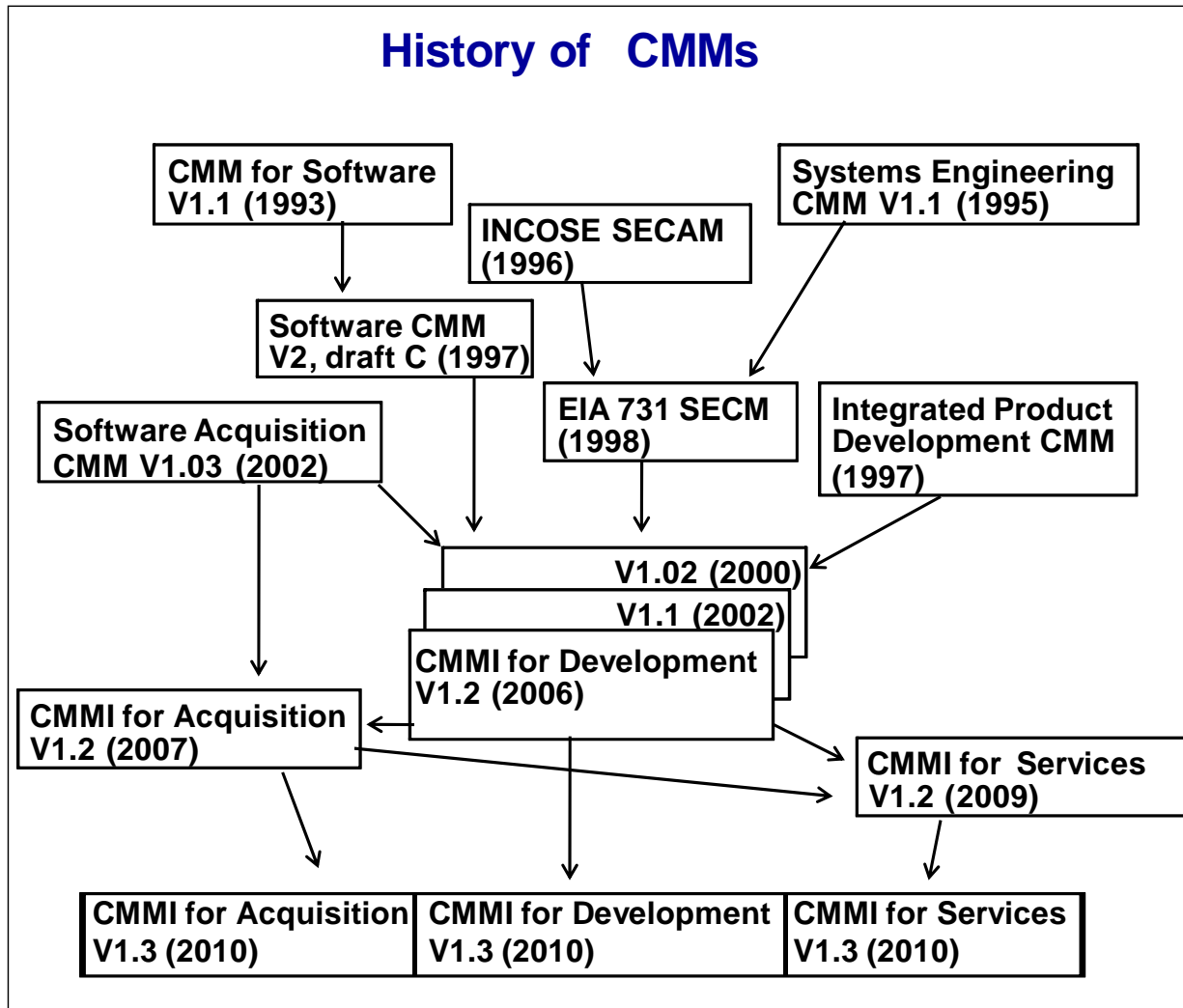


## Introduction of CMMI – 1/3

Capability Maturity Model Integrated (CMMI) is a framework for mature processes

- was developed by Carnegie Mellon University – Software Engineering Institute
- provides 5 levels of maturity
- is based on actual practices
- outlines best practices
- is used for a software process improvement program

# Introduction of CMMI – 2/3

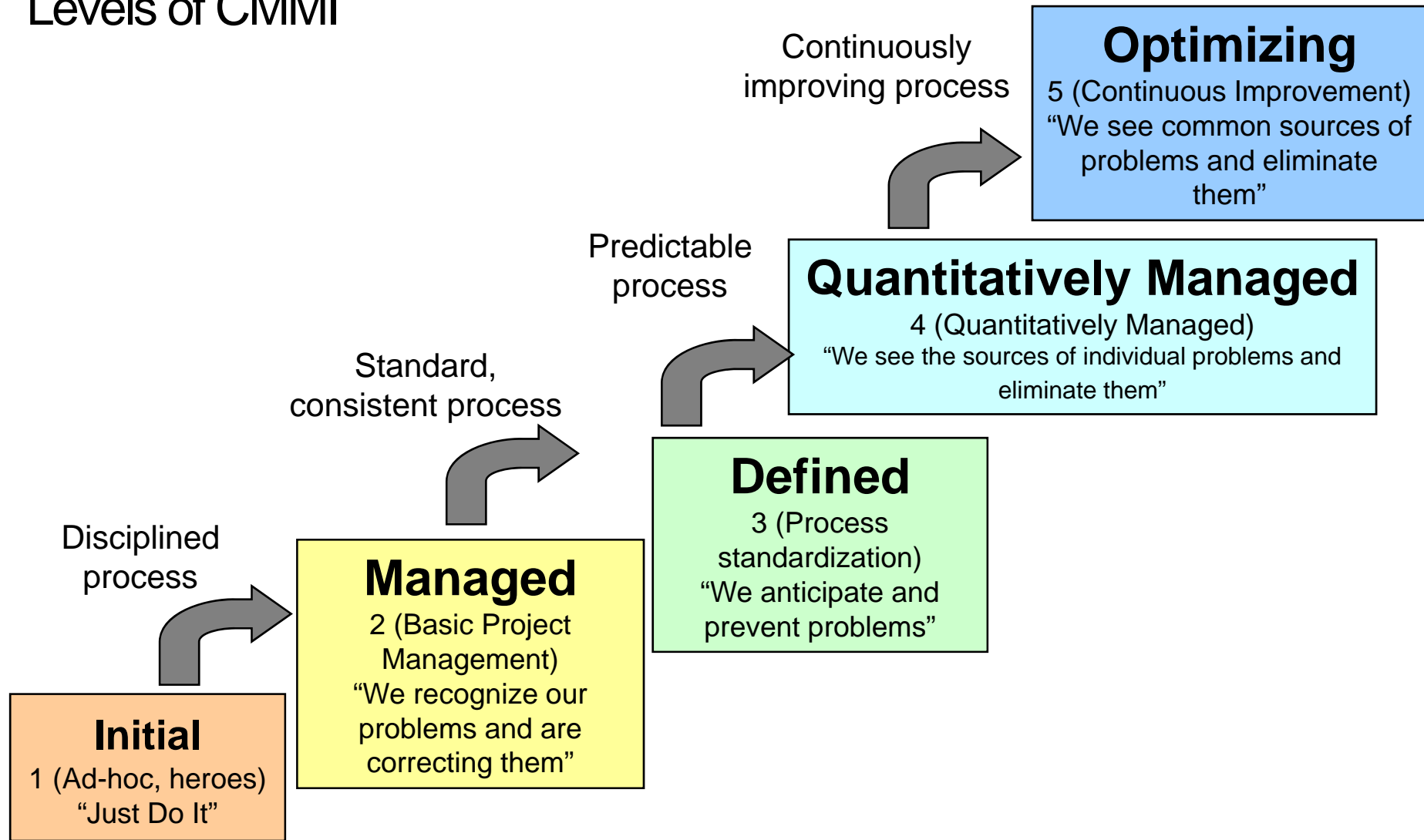


## Introduction of CMMI – 3/3

- Mature Organization
  - Processes are **defined** and **documented**
  - **Roles and responsibilities** are clear
  - Management **plans, monitors and communicates**
  - Product and process are **measured**
  - Quality, cost and schedule are **predictable**
  - Products **meet** user **expectations**
  - Management is committed to **continuous improvement**
  - Technology is used **effectively** within defined process



# Levels of CMMI





# Process Areas of CMMI for Development

## Capability Maturity Model – Integrated

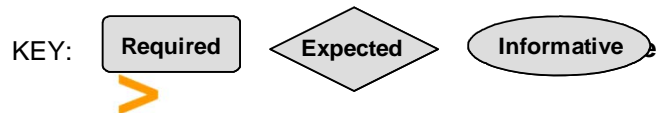
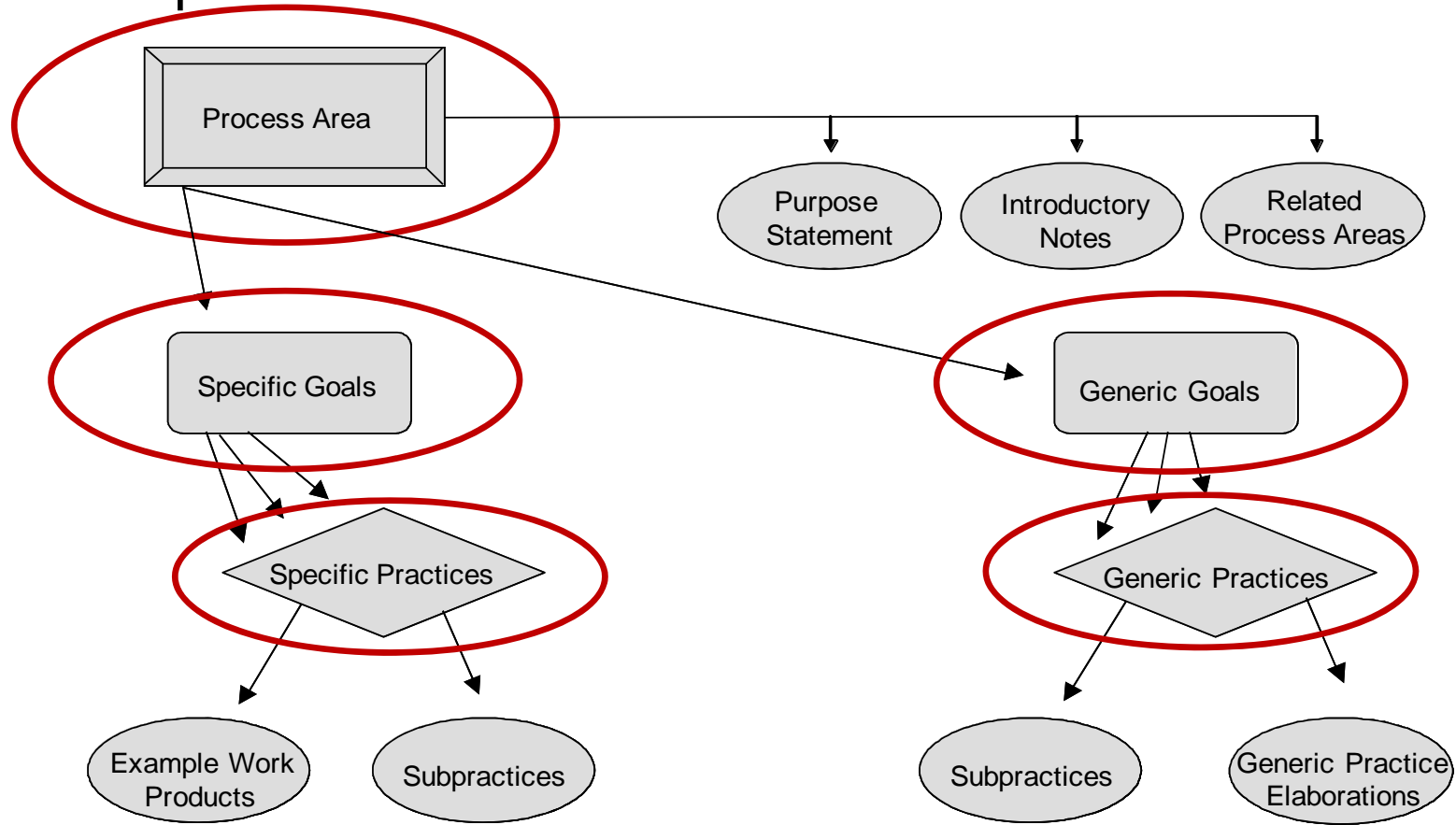
Level	Focus	Process Areas	Result
<b>5 Optimizing</b>	<b><i>Continuous process improvement</i></b>	Organizational Innovation & Deployment Causal Analysis and Resolution	<b>Productivity &amp; Quality</b>
<b>4 Quantitatively Managed</b>	<b><i>Quantitative management</i></b>	Organizational Process Performance Quantitative Project Management	
<b>3 Defined</b>	<b><i>Process standardization</i></b>	Requirements Development Technical Solution Product Integration Verification Validation Organizational Process Focus Organizational Process Definition Organizational Training Integrated Project Management Risk Management Decision Analysis and Resolution	
<b>2 Managed</b>	<b><i>Basic project management</i></b>	Requirements Management Project Planning Project Monitoring & Control Supplier Agreement Management Measurement and Analysis Process & Product Quality Assurance Configuration Management	
<b>1 Initial</b>	<b><i>Competent people and heroics</i></b>		

 **Software Engineering Institute**



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# CMMI Components



# Specific Goals and Practices

Specific Goals and Practices for **Technical Solution** Process Area  
in CMM for Development

<b>SG 1</b>	<b>Select Product Component Solutions</b>
SP 1.1	Develop Alternative Solutions and Selection Criteria
SP 1.2	Select Product Component Solutions
<b>SG 2</b>	<b>Develop the Design</b>
SP 2.1	Design the Product or Product Component
SP 2.2	Establish a Technical Data Package
SP 2.3	Design Interfaces Using Criteria
SP 2.4	Perform Make, Buy, or Reuse Analyses
<b>SG 3</b>	<b>Implement the Product Design</b>
SP 3.1	Implement the Design
SP 3.2	Develop Product Support Documentation

## Generic Goals and Practices of CMMI

<b>GG1</b>	<b>Achieve Specific Goals</b>
<b>GP1</b>	<b>Perform Specific Practices</b>
<b>GG 2</b>	<b>Institutionalize a managed process</b>
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	Control work products
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
<b>GG 3</b>	<b>Institutionalize a defined process</b>
GP 3.1	Establish a defined process
GP 3.2	Collect process related experience

# CMMI Appraisal - SCAMPI

Organization Organizational Unit	Team Leader Sponsor	Appraisal End Date	Model (Representation): Maturity Level
Accenture ANZ_ASEAN_Korea H&PS and Resources	Sanjay Gopal Su Sian Hon		
Accenture Accenture Bratislava Delivery Center	Sylvain Demuyter Claus Hintermeier	03/04/2011	CMMI-DEV v1.2(Staged):Maturity Level 3
Accenture (UK) Limited ACCENTURE UK DELIVERY CENTER	Rajiv Nag Andris Nestors Paul Billing	09/29/2011	CMMI-DEV v1.3(Staged):Maturity Level 3
Accenture Brazil Brazil Delivery Centre (BRDC)	Renato Vasques Marcelo Gerardi Zambrana Cicero Mazzaferro	07/23/2009	CMMI-DEV v1.2(Staged):Maturity Level 5
Accenture Inc Accenture Delivery Centers in the Philippines	Rajiv Nag ANNBEL TIERRO	08/06/2010	CMMI-DEV v1.2(Staged):Maturity Level 5
Accenture Inc Philippines Delivery Center - Solutions Workforce	Sankararaman Dhandapani GEORGE SON KENG PO	05/06/2011	People CMM v2.0(Staged):Maturity Level 5
Accenture LLP Accenture Products EALA Operating Unit	John Voss Jack Ramsay	06/16/2009	CMMI-DEV v1.2(Staged):Maturity Level 3
Accenture Services Pvt. Ltd. Accenture Delivery Center (DC) for Technology in India, Application Development (AD) Projects	Gururaj Managuli Bhaskar Ghosh	07/15/2011	CMMI-DEV v1.3(Staged):Maturity Level 5
Accenture Technology Solutions Coritel Spain Delivery Center	Giuseppe Magnani Antonio Moncada	07/15/2011	CMMI-DEV v1.3(Staged):Maturity Level 5
Accenture Technology Solutions Nantes Delivery Centre	Fernando Mandelli Alain Drouet	07/30/2009	CMMI-DEV v1.2(Staged):Maturity Level 3
Accenture Technology Solutions China Delivery Centre	Dan He Chi-Wei Wang	08/02/2010	CMMI-DEV v1.2(Staged):Maturity Level 5
Accenture Technology Solutions RIGA Delivery Center	Fernando Mandelli Maksims Jegorovs	03/25/2010	CMMI-DEV v1.2(Staged):Maturity Level 3
Accenture Technology Solutions Netherlands Delivery Centre - Managed Delivery Application Outsourcing	Vinay Gulati Mark van Dorp	07/01/2010	CMMI-SVC+SSD v1.2(Staged):Maturity Level 3

Appraisal Results may be published at

<http://www.sei.cmu.edu/cmmi/solutions/appraisals/pars.cfm>



# Agenda

Introduction to CMMI

**Use Case 1: CMMI certification**

Introduction to P-CMM

Use Case 2: P-CMM implementation samples



# Audience composition

What type of work you incline to?

- Be developer expert (coding, programming, testing)
- Prefere analyse requests and communication with clients
- Perform user support
- Manage people / team
- No idea



# Use case 1: CMMI on organization level

## Continuous Improvement

- Define organization processes standards
- Enhance processes based on internal and external requests
- Improve processes standards based on lesson learned

## Appraisal preparation

- Collect documentation
- Prepare Process Improvement Identification Document (PIID)



# Use case 1: CMMI on projects level

## Continuous improvement

- Manage projects using organization standards
- Check projects against these standards (Software Quality Reviews)
- Improve project processes and workproducts

## Appraisal preparation

- Collect project documentation (work plans, development samples, metrics, reports, ...)

## Use case 1: CMMI Appraisal (1)

### Define Appraisal Goals

- Assess organization processes against the CMMI Model Maturity Level 3
- Improve standardization of Software Production in order to better predict effort, improve customer satisfaction.

### Select projects and Support groups

- 4 Delivery projects
- Software Engineering Process Group, Training Coordinators, Metrics group

### Define Appraisal Team

- Appraisal Team Lead, Appraisal Team members – 4 internal + 2 external
- Appraisal Team spent round 450 hours



## Use case 1: CMMI Appraisal (2)

### Review documentation

- Appraisal team reviewed all collected documentation (639 files)

### Plan and Conduct Interviews

- Perform interview sessions for Higher Management, Project Managers, Practitioners, each support group (20 people in 11 sessions)
- Rules – Confidentiality

### Identify and Validate preliminary finding

- Present and validate potential findings to all participants
- Rules – Non-Attribution

### Present final findings with Appraisal rating

- Present strengths, recommendations and weaknesses to each process areas
- Present rating – Fully, Largely, Partially, Not Implemented Practices
- Present Maturity level



# Use case 1: CMMI Appraisal – Interview for Practitioners

Interview for Practitioners – Designers, Developers, Testers

Please describe

1. How were the requirements of project understood and commitment obtained?
2. How are interface requirements identified?
3. How you consider alternate solutions?
4. How product is assembled, integrated?
5. How you were trained for your role?
6. What are standards, checklist and tools you use?

# Use case 1: CMMI Appraisal – Interview for Project Managers

Interview for Practitioners – project managers, team leaders

Please describe

1. How do you plan your project?
2. How you defined project work environment?
3. How you contribute to organization data?
4. What are activities for which effort is tracking?
5. How you monitor quality of your work?



# Use case 1: CMMI Appraisal – Findings

## Technical Solution / Project Planning

### Strength

Documentation of requirements and design is made with high level of detail by **all** projects. [TS SP 2.1]

**Some** projects are using the Competency Framework to track proficiency levels (Beginner, Trained, Expert) for the project specific skills needs. [PP SP 2.5]

### Weakness

Challenges in getting all required inputs on time from the client makes it difficult for **some** projects to estimate, plan and monitor technical design at detailed level. [TS GP 2.8]

On **few** projects expertise developed during usage of new tools does not always result in contribution been made to organization assets libraries. [PP GP 3.2]



# Use case 1: CMMI Appraisal – Rating

Maturity

	PA	SG1	SG2	SG3	GG2	GG3
<b>Level 5</b> Causal Analysis and Resolution Organizational Innovation and Deployment						
<b>Level 4</b> Quantitative Project Management Organizational Process Performance						
Decision Analysis and Resolution	●	●				●
Risk Management	●	●	●	●		●
Integrated Project Management + IPPD	●	●	●			●
Organizational Training	●	●	●			●
Organizational Process Definition + IPPD	●	●				●
Organizational Process Focus	●	●	●	●		●
Validation	●	●	●			●
Verification	●	●	●	●		●
Product Integration	●	●	●	●		●
Technical Solution	●	●	●	●		●
<b>Level 3</b> Requirements Development	●	●	●	●		●
Configuration Management	●	●	●	●	●	●
Process and Product Quality Assurance	●	●	●		●	●
Measurement and Analysis	●	●	●		●	●
Supplier Agreement Management	●	●	●		●	●
Project Monitoring and Control	●	●	●		●	●
Project Planning	●	●	●	●	●	●
<b>Level 2</b> Requirements Management	●	●			●	●

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- PA : - Satisfied
- PA : - Not Satisfied
- PA : - Not Rated
- PA : - Not Applicable
- GOAL : - Satisfied
- GOAL : - Not Satisfied
- GOAL : - Not Rated
- GOAL : - Not Applicable

3



# Agenda

Introduction to CMMI

Use Case 1: CMMI certification

**Introduction to P-CMM**

Use Case 2: P-CMM implementation samples





# Introduction to P-CMM

CMMI contains practices that contribute directly to the business performance of an organization.

## People CMM

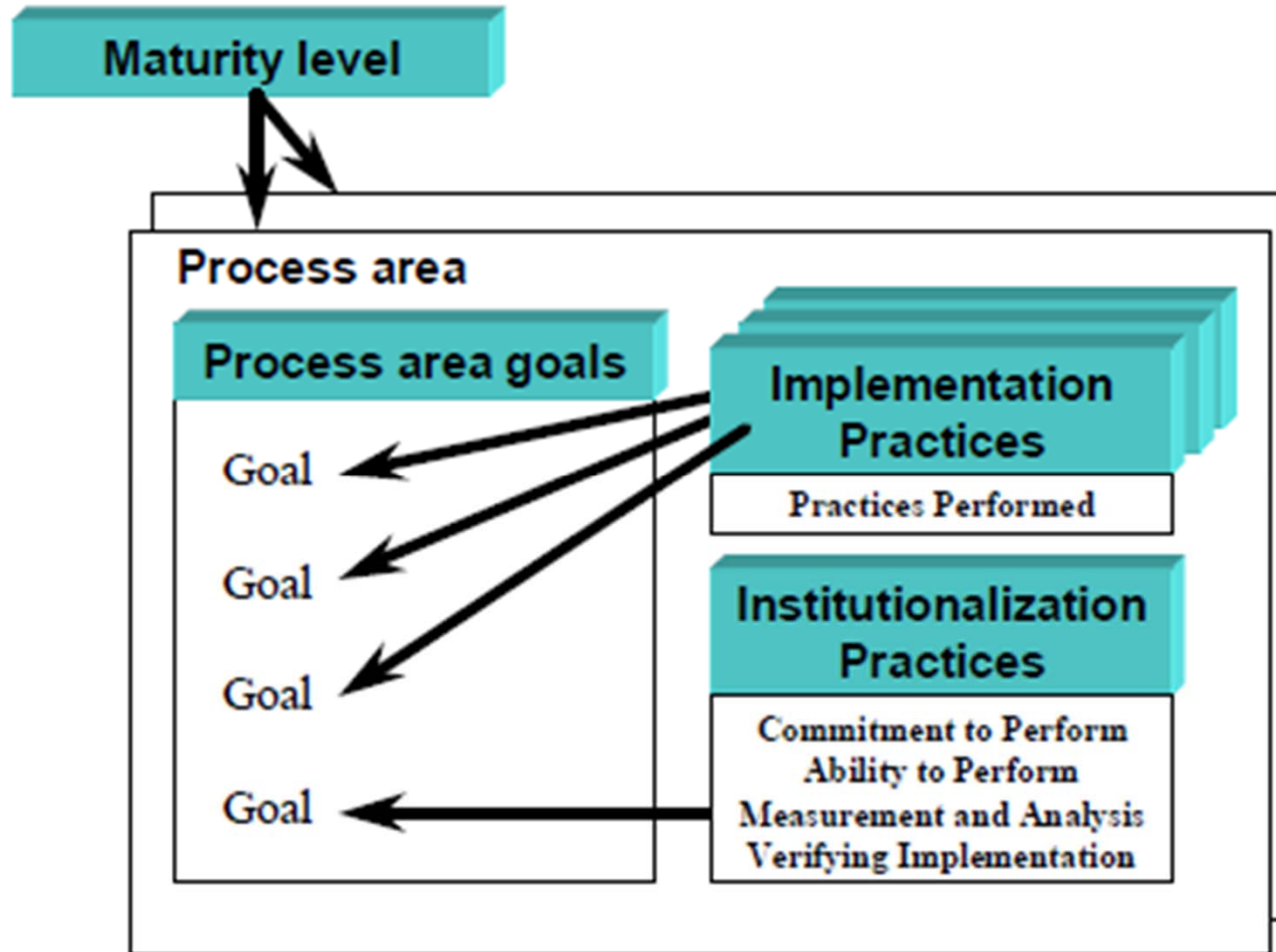
- defines capability as the levels of knowledge, skills, and process abilities available within each workforce competency of the organization to build its products or deliver its services.
- is a process model that address the people management

P-CMM Workforce definition:

The people an organization needs to perform its business activities.



# Introduction to P-CMM - Components



# P-CMM – Maturity Levels and Process Areas

Levels	People CMM Threads			
	Developing competency	Building workgroups & culture	Motivating & managing performance	Shaping the workforce
5 Optimizing	Continuous Capability Improvement		Organizational Performance Alignment	Continuous Workforce Innovation
4 Predictable	Competency Based Assets Mentoring	Competency Integration Empowered Workgroups	Quantitative Performance Management	Organizational Capability Management
3 Defined	Competency Development Competency Analysis	Workgroup Development Participatory Culture	Competency Based Practices Career Development	Workforce Planning
2 Managed	Training and Development	Communication & Coordination	Compensation Performance Management Work Environment	Staffing



# P-CMM Implementation Practices

## Performance Management

Goal		Practice	Practice Description
G1	Unit and individual performance objectives related to committed work are documented.  The performance of committed work is regularly discussed to identify actions that can improve it.	P01	Measurable performance objectives based on committed work are established for each unit.
G1		P02	The unit's performance objectives are periodically reviewed as business conditions or work commitments change, and, if necessary, they are revised.
G2		P06	Those responsible for performance management maintain ongoing communication about the performance of committed work with those whose performance they manage
G2		P07	Those responsible for managing performance of other maintain an awareness of accomplishments against performance objectives for each of the individuals whose performance they manage
G2		P08	Potential improvements in process, tools, or resources, which could enhance an individual's performance of committed work are identified, and actions are taken to provide them
G3	Performance problems are managed.	P10	If performance problems occur, they are discussed with the appropriate individual(s).
G4	Outstanding performance is recognized or rewarded.	P13	Guidelines for recognizing or rewarding outstanding performance are developed and communicated.
G5	Performance Management practices are institutionalized to ensure they are performed as managed processes.	CO1	The organization establishes and maintains a documented policy for conducting its performance management activities.
G5		AB1	Within each unit, an individual(s) is assigned responsibility and authority for ensuring that performance management activities are performed.
G5		ME1	Measurements are made and used to determine the status and performance of performance management activities.
G5		VE1	A responsible individual(s) verifies that the performance management activities are conducted according to the organization's documented policies, practices, procedures, and, where appropriate, plans; and addresses noncompliance.



# P-CMM Institutionalization Practices

## Performance Management

Goal		Practice	Practice Description
G5	Performance Management practices are institutionalized to ensure they are performed as managed processes.	CO1	The organization establishes and maintains a documented policy for conducting its performance management activities.
G5		AB1	Within each unit, an individual(s) is assigned responsibility and authority for ensuring that performance management activities are performed.
G5		ME1	Measurements are made and used to determine the status and performance of performance management activities.
G5		VE1	A responsible individual(s) verifies that the performance management activities are conducted according to the organization's documented policies, practices, procedures, and, where appropriate, plans; and addresses noncompliance.

## P-CMM Value and Benefits

- Better Employee engagement
- Lower „unmanage“ attrition
- Better hiring fitment
- Faster ramp up for projects
- Skills available Just-In-Time
- Faster and more focused learning
- Contribution to HR processes measured and visible
- Strong partnership between HR and operational management
- Higher productivity and better quality output

# Agenda

Introduction to CMMI

Use Case 1: CMMI certification

Introduction to P-CMM

**Use Case 2: P-CMM implementation samples**



# Use Case 2: P-CMM implementation Performance Management (1)

1

## Set Objectives

Identify and document specific objectives by Leadership Contribution Area

*Iterative & ongoing*

G1 Objectives are documented

The four phases

2

## Feedback

Provide structured feedback on what results were achieved and how results were achieved (Results by Leadership Contribution Area / Performance Factors)

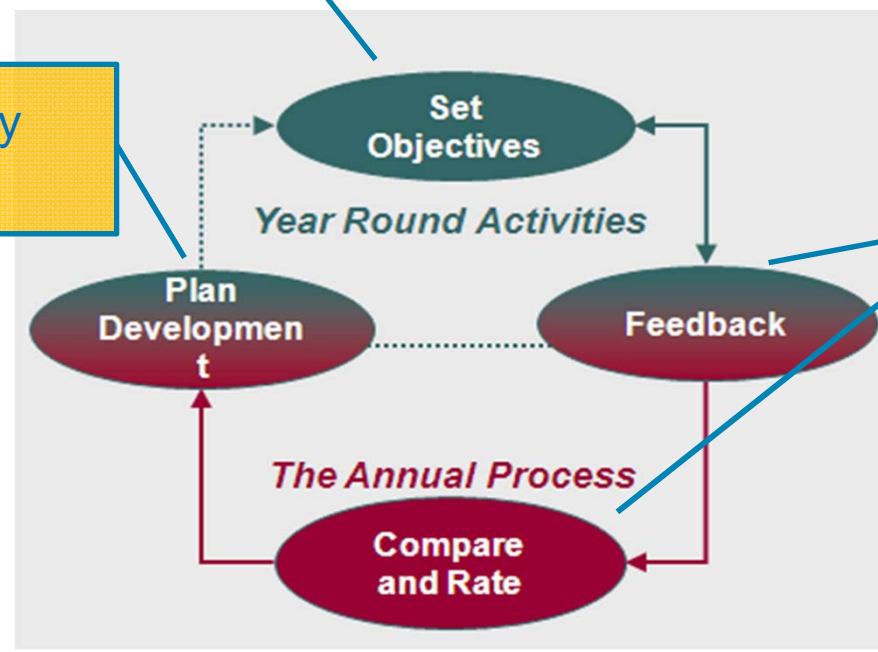
4

G2 Identify actions

## Plan Development

(covered within Career Development Process): Create focused plan for performance enhancement, performance improvement, and career development

*Iterative & ongoing*



3

G2 Performance is discussed

## Compare and Rate

Compare an individual's performance (based on outputs of Feedbacks) relative to peer group.

A final annual rating is determined & communicated





## Use Case 2: P-CMM implementation Performance Management (2)

G3 Performance  
problems are  
managed

Performance Improvement Plan (PIP)  
Individual plan how to improve performance  
Specific actions and due dates

G4 Outstanding  
performance is  
recognized

Performance recognition program  
Performance bonuses  
Recognition (celebration points, ecards, awards)

## Use Case 2: P-CMM implementation Performance Management (3)

### Comitment to Perform

- Performance Management Process defined
- Personal Improvement Process defined
- Celebration process defined

### Ability to Perform

- Organization roles defined (Organization Lead, Project Lead, Career counselor, HR Representative)

### Measurements and Analysis

- Set objectives completion target 90%
- Feedback completion rool-off target 90%

### Verification

- Internal Quality Assurance Review process

G5 practices are  
institutionalized



# Performance Management exercise

Please explain how

- G1 – you define and document your objectives
- G2 – your performance is discussed and actions defined
- G3 – your performance problems are managed
- G4 – your outstanding performance is recognized
- Get final degree
- Pass exams
- Participate in a team project
- Team projects are completed
- Better prepare for failed Tests
- Discuss with lecture / profesor what to improve
- Possibility to repeat tests / exams
- Red diploma
- Motivation bonuses

# Summarization

