Lessons Learned Preparing Process Implementation Indicator Descriptions (PIIDs)

NDIA/SEI

CMMI® Technology Conference

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Agenda

- **The premise of this PIIDS session**

- **The problems**

- **Typical results in a first appraisal**

- **Some metrics (B, C and A)**

- **Recommendations**

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The Premise

The majority of early CMMI® presentations at previous conferences have been by organizations already familiar with the CMM and CMMI

- Many already at CMM of CMMI Maturity Level 3 or higher
- Many are Transition Partners with the SEI and have internal experts, appraisers, and instructors that are familiar with PIIDS

However other companies that do not have this experience reported on their experience transitioning to the CMMI and using PIIDS

- Effort to understand the new model
- Relative effort to convert their processes to be fully CMMI compliant using the PIIDs
- Effort to prepare for and undergo a SCAMPI^{SM} appraisal

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The Problem in the PIIDS Premise

These companies are starting from scratch

- They've have not paid the price to wrap up the learning curve on the model
- They do not know what it takes to succeed in an appraisal and prepare their PIID documentation and personnel carefully.

With the best of intentions they are seriously understating the effort it will take if you are starting from scratch to implement the CMMI

The Result

If you are small or just starting out in process improvement, you will likely have quantitatively different experiences than you expect

- **Effort to understand the CMMI model will be greater without the CMM experience as a basis. This is particularly true with organizations dealing with services (Help Desks, Training Service projects)**
- **Mapping your practices to the model and preparing the PIIDS will be incomplete because your early understanding of the model is incomplete**
- **Preparing for an appraisal will consume a lot of resources**
- **Many of the project personnel are not trained and do not understand the CMMI model**
- **Dealing with the results of the first appraisal can be catastrophic if you aren't prepared**

Problems Mapping Practices to the CMMI PIIDS

A typical first step in most process improvement efforts (after the Introduction to CMMI training) is to map your practices against the CMMI to determine your objective evidence (PIID) gaps

- **Most organizations haven't documented their current practices**
  - It can be hard to tell what you do
  - It's easy to assume just because you know of a process, it's widely used in the organization
- **Most Level 1 organizations that have documented processes don't follow them**
  - They are not widely communicated
  - They are not integrated into a whole project "system" with supporting training, templates, and management encouragement
  - They are abandoned at the first sign of trouble

Why use Practice Implementation Indicator Descriptions (PIIDs)?

Practice Implementation Indicator Descriptions (PIIDs)

- Practice implementation indicators are "footprints" which are evidence of the conduct or implementation of a practice.

- SCAMPI appraisals use practice implementation indicators as the focus to verify practice implementation.

- Verifying practice implementation is the review of Objective Evidence to determine whether a practice is implemented within a project and/or organization.

THE PROBLEM : "We really didn't understand the dynamics of the CMMI model until we tried to prepare the PIIDS for the appraisal."

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Practice Implementation Indicators and the Appraisal

PIIs include documents as well as information gathered from interviews with managers and practitioners.

Indicators provide a useful and reliable way of predicting that something is present or true.

Example: Automobile fuel gauge

Pros:
- can highly simplify repetitive and costly operations
- can be great time savers

Cons:
- can be misleading
- can be wrong

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Practice Implementation Indicator DescriptionTypes

Direct Artifacts

Indirect Artifacts

Affirmations

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Direct Artifacts

Tangible output(s) resulting directly from implementation of a specific or generic practice.

Integral part of verifying practice implementation.

May be explicitly stated or implied by the practice statement or associated informative material.

Examples:
- Typical work products listed in CMMI practices
- Target products of an "establish and maintain" specific practice
- Documents, deliverable products, training materials, etc.

Indirect Artifacts

Artifacts that are a consequence of performing a specific or generic practice or that substantiate its implementation, but which are not the purpose for which the practice is performed.

That is, an artifact exists but there is no indication of where it came from, who worked to develop it, or how it is used.

Examples:

Meeting minutes, review results, status reports, performance measures

Affirmations

Oral (interviews) or written statements confirming or supporting implementation of a specific or generic practice.

Usually provided by the practice implementers or other stakeholders.

May include interviews that are face-to-face, video conference or teleconference, or equivalent.

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Example – Indicators of Practice Implementation

PP SP1.1-1:

Establish a top-level work breakdown structure (WBS) to estimate the scope of the project.

Direct artifacts:
- top-level WBS
- task descriptions
- work package descriptions

Indirect artifacts:
- meeting minutes
- team charter
- WBS development notes

Affirmations:
- "We used the WBS to generate the estimates."

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Problems Preparing for the Appraisal – PIIDs (1/2)

CMMI appraisals are verification-based appraisals which rely on the organization identifying Process Implementation Indicator Descriptions (PIIDs) and collecting artifacts to prove the practices are implemented- not a discovery based effort (CBA-IPI or a SCE)

Immature organizations have trouble understanding how to fill out the PIIDs

- **Direct and Indirect Artifacts are confusing**
  - Object oriented practices vs. action oriented practices
  - One practice's direct artifact can be another practice's indirect artifact
- **A shotgun approach is used (list as many artifacts as you can think of)**
  - Usually none of the artifact(s) address the practice
- **Too general in terminology, not specific enough to show the practice is really implemented**
  - Meeting minutes, emails, action items
    - Actual examples of the above don't cover the practice in question

Problems Preparing for the Appraisal – PIIDs (2/2)

- **Appraisal teams will spend an inordinate amount of time separating the appropriate artifacts from the rest and "discovering" the real state of process implementation with immature organization**

Problems Preparing for the Appraisal/PIIDS - Politics

Organizations just starting out have a culture change problem to deal with

- **Managers don't want to air their dirty linen so they are reluctant to be appraised**
- **Project teams haven't really bought into the CMMI yet so they are reluctant to get involved**
- **Everybody is busy and the organization doesn't want to disturb the projects**
  - PIIDs will be filled out by a third party who's trained in the CMMI and in filling out PIIDs but without specific project knowledge, resulting in wasted effort trying to deal with the project team to get information

  or

  - PIIDs will be filled out by project team members that may not have been fully trained on what is needed, resulting in repeated requests for more/better information on the PIIDs by the appraisal team

> **Organizations, where we have performed appraisals, tend to fill out the PIIDs for PP and PMC with "Project Plan" listed as the Direct Artifact for each practice. The DAR Practice filled out the PIIDS with the DAR Plan for each specific practice.**
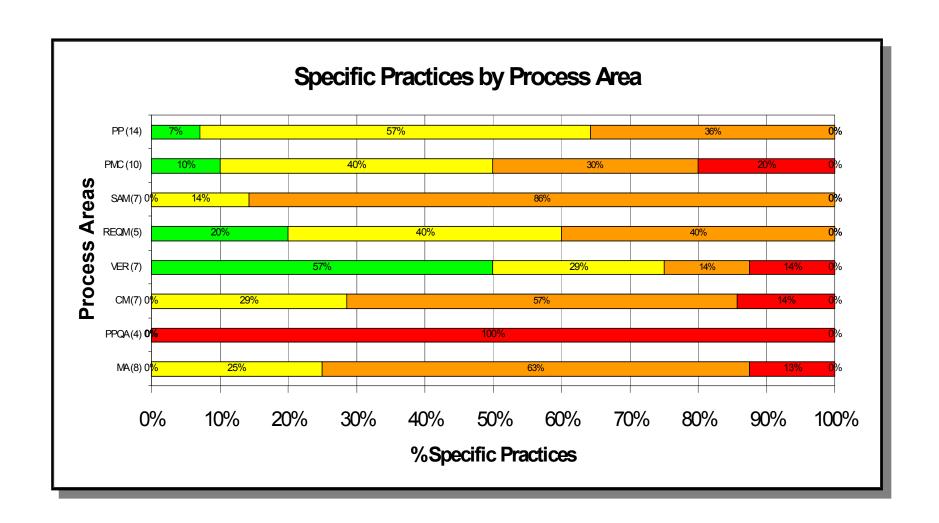
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Sample PIIDs Results

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Interpreting the Results

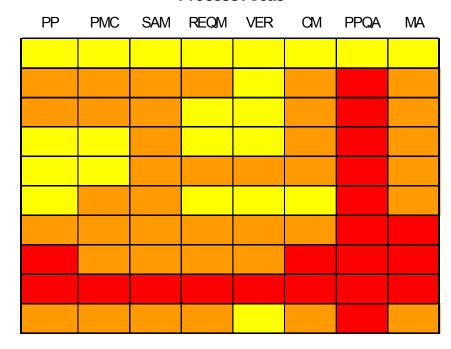|	
Fully Implemented (FI)	•**Direct artifacts present and appropriate** •**Supported by indirect artifact and/or affirmation** •**No substantial weaknesses noted**
Largely Implemented (LI)	•**Direct artifacts present and appropriate** •**Supported by indirect artifact and/or affirmation** •**One or more substantial weaknesses noted**
Partially Implemented (PI)	•**Direct artifacts absent or judged inadequate** •**Artifacts or affirmations indicate some aspects of the practice are implemented** •**One or more substantial weaknesses noted** *Projects that have not reached the point in the life cycle to have produced the necessary direct artifacts are rated PI and this would be accounted for when the instantiations are aggregated at the OU level practice rating.
Not Implemented (NI)	Any situation not covered by above

Typical First Appraisal (Class B w/6 projects)

Specific Practices by Process Area

Process Areas

Process Area				
PP (14)	7%	57%	36%	0%
PMC (10)	10%	40%	30%	20%	0%
SAM(7)	0% 14%	86%		0%
REQM(5)	20%	40%	40%	0%
VER (7)	57%	29%	14%	14%	0%
CM(7)	0% 29%	57%	14%	0%
PPQA(4)	0%	100%		0%
MA(8)	0% 25%	63%	13%	0%

%Specific Practices

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Typical First Appraisal (Class B w/6 projects)

Process Areas

Generic Practices	PP	PMC	SAM	REQM	VER	CM	PPQA	MA
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								

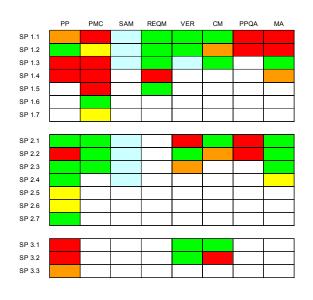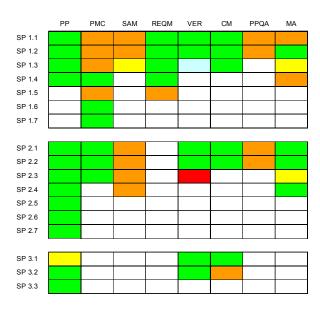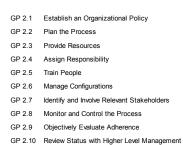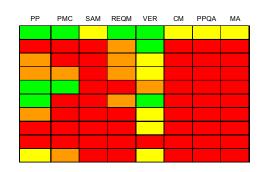# Different Views – Specific Practices

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Different Views – Generic Practices

	PP	PMC	SAM	REQM	VER	CM	PPQA	MA
GP 2.1 Establish an Organizational Policy								
GP 2.2 Plan the Process								
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SCAMPI Class A Level 3 SE/SW Goal Profile (3rd effort towards achieving a Maturity Level 3)

ORGANIZATIONAL UNIT CHARACTERIZATION AND GOAL/PA RATING MAP															
(actual Assignments)															
Practice >>			x.1	x.2	x.3	x.4	x.5	x.6	x.7	x.8	x9	x.10	x.11	x.12
Goal														
Process Area >>>>>>>>>>														
RD	SG1	S	FI	FI										
RD	SG2	S	FI	FI	FI									
RD	SG3	S	FI	FI	FI	FI	FI							
RD	GG3	S	FI	FI	FI	FI	FI	FI	FI	FI	FI	FI	FI	FI
TS	SG1	S	FI	FI	FI									
TS	SG2	S	FI	FI	FI	FI								
TS	SG3	S	FI	FI										
TS	GG3	S	FI	FI	FI	FI	FI	FI	FI	FI	FI	FI	FI	FI
PI	SG1	S	FI	FI	FI									
PI	SG2	S	FI	FI										
PI	SG3	S	FI	FI	FI	FI								
PI	GG3	S	FI	FI	FI	FI	FI	FI	FI	FI	FI	FI	FI	FI
VER	SG1	S	FI	FI	FI									
VER	SG2	S	FI	FI	LI									
VER	SG3	S	FI	FI										
VER	GG3	S	FI	FI	FI	FI	FI	FI	FI	FI	FI	FI	FI	FI
VAL	SG1	S	FI	FI	FI									
VAL	SG2	S	FI	FI										
VAL	GG3	S	FI	FI	FI	FI	FI	FI	FI	FI	FI	FI	FI	FI
OPF	SG1	S	FI	FI	FI									
OPF	SG2	S	FI	FI	FI	FI								
OPF	GG3	S	FI	FI	FI	FI	FI	FI	FI	FI	FI	FI	FI	FI
OPD	SG1	S	FI	FI	FI	LI	FI							
OPD	GG3	S	FI	FI	FI	FI	FI	FI	FI	FI	FI	FI	FI	FI
OT	SG1	S	FI	FI	FI	FI								
OT	SG2	S	FI	FI	FI									
OT	GG3	S	FI	FI	FI	FI	FI	FI	FI	FI	FI	FI	FI	FI
IPM	SG1	S	FI	LI	FI	FI	FI							
IPM	SG2	S	FI	FI	FI									
IPM	SG3	NA	NA	NA										
IPM	SG4	NA	NA	NA	NA									
IPM	GG3	S	FI	FI	FI	FI	FI	FI	FI	FI	FI	FI	FI	FI
RSKM	SG1	S	FI	FI	FI									
RSKM	SG2	S	FI	FI										
RSKM	SG3	S	FI	FI										
RSKM	GG3	S	FI	FI	FI	FI	FI	FI	FI	FI	FI	FI	FI	FI
IT	SG1	NA	n											
IT	SG2	NA												
IT	GG3	NA												
ISM	SG1	NA												
ISM	SG2	NA												
ISM	GG3	NA												
DAR	SG1	S	FI	FI	FI	FI	FI	FI						
DAR	GG3	S	FI	FI	FI	FI	FI	FI	FI	FI	FI	FI	FI	FI
OEI	SG1	NA	NA	NA	NA									
OEI	SG2	NA	NA	NA	NA									
OEI	GG3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

1 organization

Recommendations for preparing PIIDS from performing SCAMPI's with mature/inmature organizations

- **Mature organizations usually have employed one of the following techniques to resolve PIID issues:**
  - Provide a **"Process Improvement" Coach** to help the project teams resolve the direct vs indirect objective evidence problem
  - An **Organization Process Group** that provides direction through a series of workshops
  - **"TigerTeam"** approach with projects
  - BiMonthly reviews of PIIDS by PPQA
  - Organizational PPQA provides oversight

- **Most Immature organizations do not dedicate the resources to Process Improvement to effectively fill out the PIIDS**
  - Work allocation is in the range of 10-20% of time allocated to process improvement- the rest is billable/project work
  - No understanding of the model
  - The EPG has little experience in process improvement
  - Do not have the CMM background to fall back on in terms of what is involved in process improvement

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Any Questions or Comments?