Process and Tools for Mitigating Risks to Improve Maturity Level of CMM and Migrate to CMMI

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LUXOFT
Member of the IBS Group

Topics

- Luxoft Overview
- CMMI implementation. Problem statement
- Proposed solution
- Tool description
- View of Appraiser

LUXOFT Overview

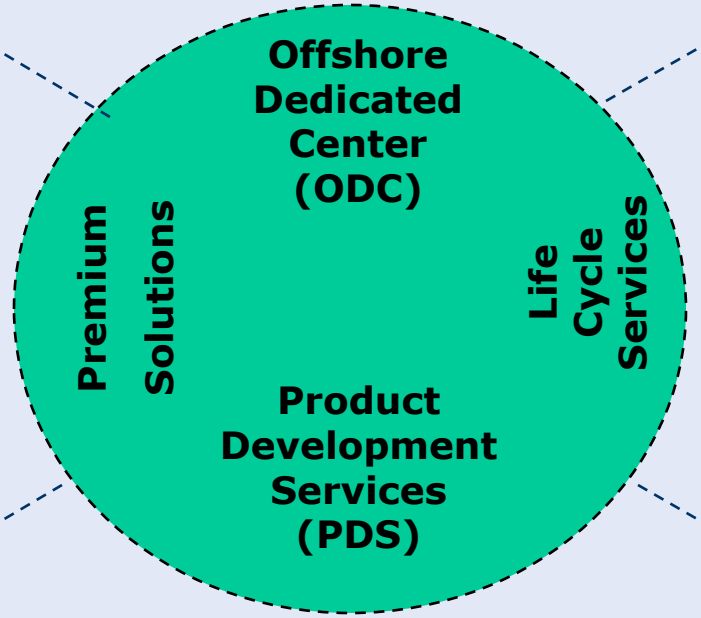
LUXOFT: Services

Seamless Integration with Customer

Effective knowledge transfer

Dedicated, Secure, Cost Effective Development Center

- Security and Risk Assessment Solutions
- Advanced Testing Utility
- Business Process Modeling and Optimization Solutions
- Adaptive and Autonomous Computing Solutions



- Requirements Analysis & Consulting
- New Applications Development
- Enterprise Application Integration Services
- Reengineering and Customization Services
- Maintenance
- Testing

Co-development of licensable software products and solutions

Luxoft Services Architecture

Premium Solutions

Security and Risk Assessment
Advanced Testing Utility
Business Process Modeling and Optimization
Adaptive and Autonomous Computing

Core Offerings

Life Cycle Services

Legacy Reengineering
EAI

Custom Software
Development
Testing & Maintenance

Russia
Dedicated
Center

Foundation

R&D

Technologies | Skills | Quality | Methodology

Luxoft Serv

Dedicated Development Centers created, staffed and operated by Luxoft for Individual Customers to serve as a seamless extension of their IT/Development staff; With the objective of:

- **Allow Customers to focus on core competencies**
- **Manage Cost**
- **Provide access to specialized skills**

Premium Solutions

Security and R
Advanced Tes
Business Proc
Adaptive and A

Core Offerings

Life Cycle Services

Legacy Reengineering
EAI

Custom Software Development
Testing & Maintenance

Russia Dedicated Center

Foundation

R&D

Technologies | Skills | Quality | Methodology

Luxoft Services Arc

Premium Solutions

Security and Risk Assessment
Advanced Testing Utility
Business Process Modeling an
Adaptive and Autonomous Co

Core Offerings

Life Cycle Services

Legacy Reengineering
EAI

Custom Software Development
Testing & Maintenance

Russia
Dedicated
Center

Foundation

R&D

Technologies | Skills | Quality | Methodology

Custom Application Development outsourcing services covering entire life-cycle:

- **Requirements Analysis & Consulting**
- **Design & Prototyping**
- **Coding and Testing**
- **Implementation**

Performed:On-shore & Off-shore

LUXOFT: Technical Expertise

Platforms

- Windows / Windows CE
- Unix
- AS/400
- Mainframes

Databases

- Oracle
- MS SQL Server
- Sybase
- IBM DB2
- Informix

Languages

- C / C++ / C#
- Java
- Visual Basic
- COBOL

Technologies

- J2EE
- Windows DNA / .NET
- HTML / DHTML / XHTML
- SGML / XML / XSL and PDF
- CORBA

Application Servers

- BEA Weblogic
- IBM Websphere
- Webmethods
- Microsoft BizTalk

and more...

CMMI Implementation Problem Statement

Understanding CMMI

- The model description is large and rather complex
- How to get structured view on the framework, how to navigate model easily?
- How to make this description easier for understanding by employees?
- How to apply CMM/CMMI most efficiently?

Labor-Intensiveness

- Mapping company's processes and artifacts to CMM key practices and CMMI PAs and TWPs is labor intensive
- Conducting internal process assessments is labor-intensive – hundreds of documents should be evaluated, results should be carefully analyzed
- Internal assessments may be conducted usually not more than once-twice a year
- Significant human resources involved into CMM/CMMI appraisal
- CMMI appraisal usually requires long time

CMMI Implementation Risks

- The mapping results are not correct
- Interpretation of Typical Work Products (TWPs) is simplified or not objective
- Key experts leave CMMI implementation project before the project completion
- Implementation results are not the ones you were expecting

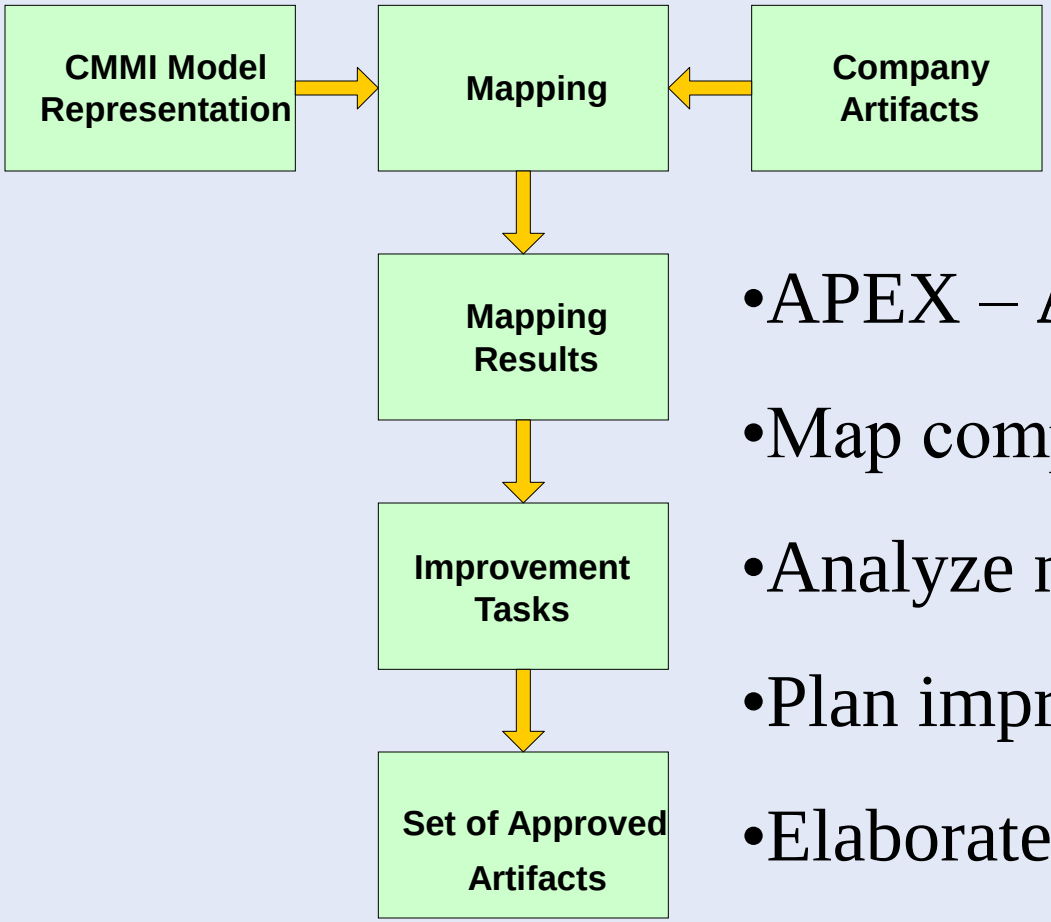
IMPACT – Fruitful features of the model are obscured and significant benefits are lost

Proposed Solution

Our Approach

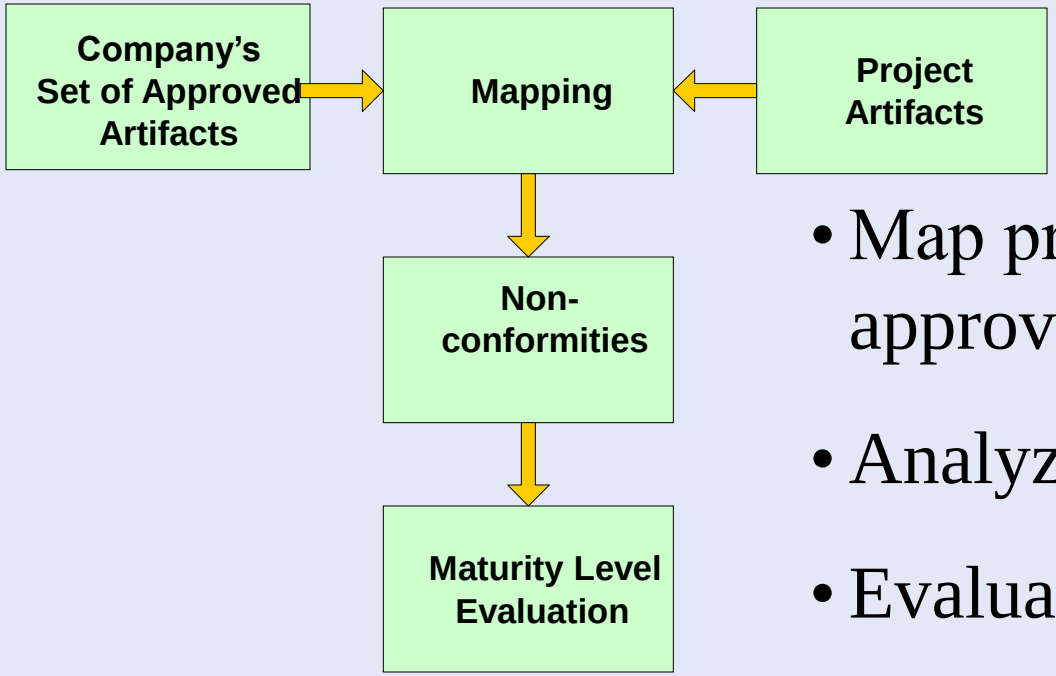
- To be based on PII matrices technology
- To define the structure and content of each required artifact to be compliant with CMMI (approved set of artifacts).
- To improve or refine processes
- To pilot these processes and develop typical project artifacts
- To compose projects' PII matrices
- Perform continuous internal mini-assessments (project QA audits) and to map real project's artifacts on approved set of artifacts
- To start new cycle

APEX Tool Concept



- APEX – **AP**praisal **EX**amination
- Map company's artifacts to TWPs
- Analyze non-conformities
- Plan improvement
- Elaborate set of approved artifacts

Internal Mini-Assessment Concept



- Map project's artifacts to set of approved artifacts
- Analyze discrepancies
- Evaluate maturity level

APEX Tool -Functional Overview

- Provides structured representation of CMMI model
- Allows adding comments to model elements
- Supports describing company's and project's set of artifacts
- Contains the shortcut to each artifact
- Documents the results of mapping between company artifacts and TWPs
- Allows defining degree of company's processes and artifacts compliance with model

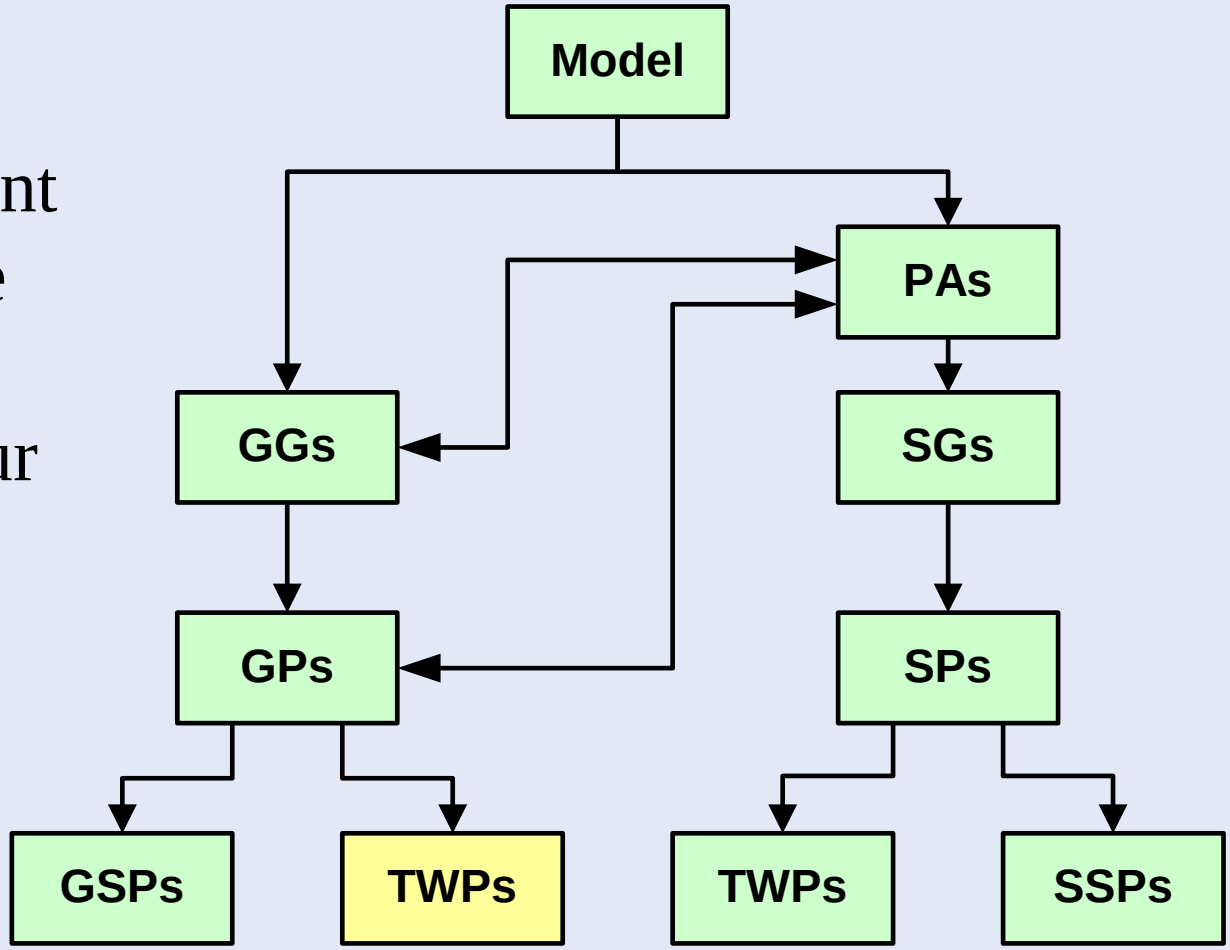
Functional Overview #2

- Contains information about all projects
- Generates variety of reports, including PII matrices
- Stores appraisal results
- Allows to record tasks
- Allows to document the results of monitoring

APEX Tool Description

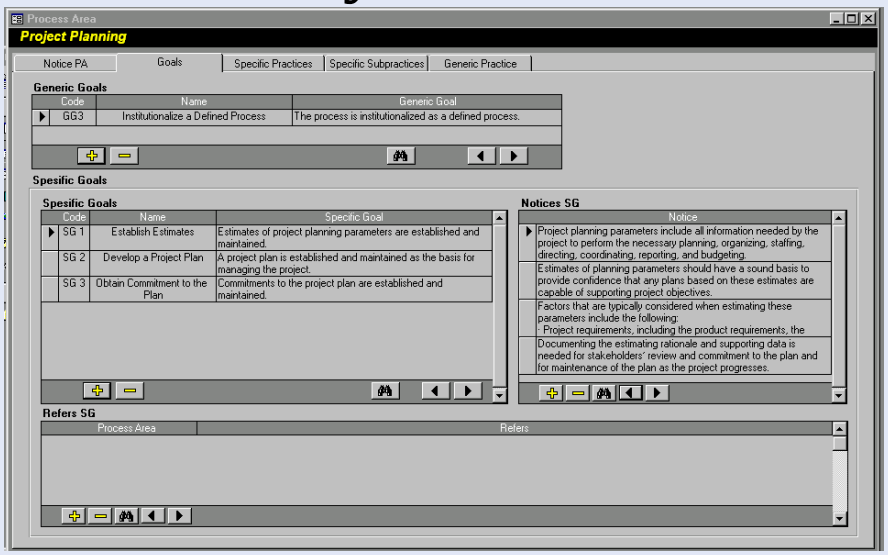
CMMI Model Representation

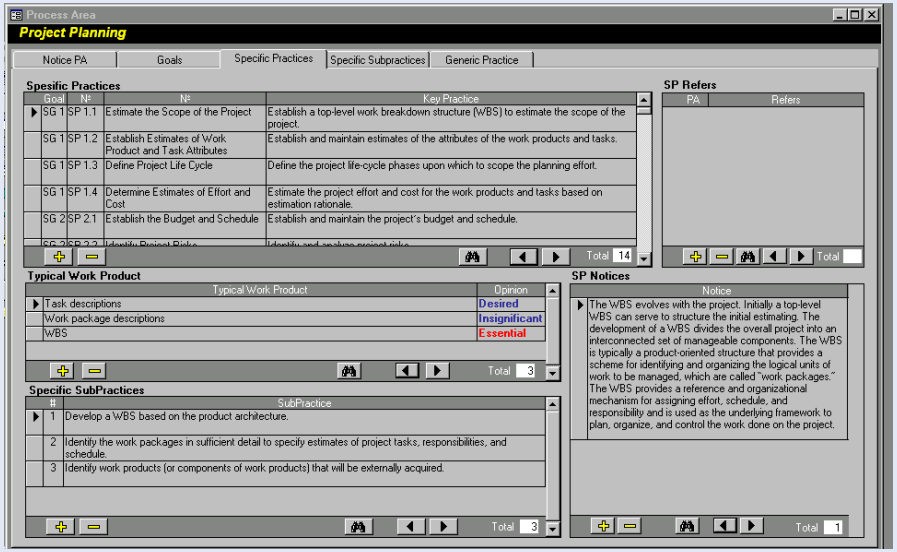
- Description of each model element is contained in the tool
- You may add your comments to each element
- **TWPs for GPs are added**



CMMI Model Navigation

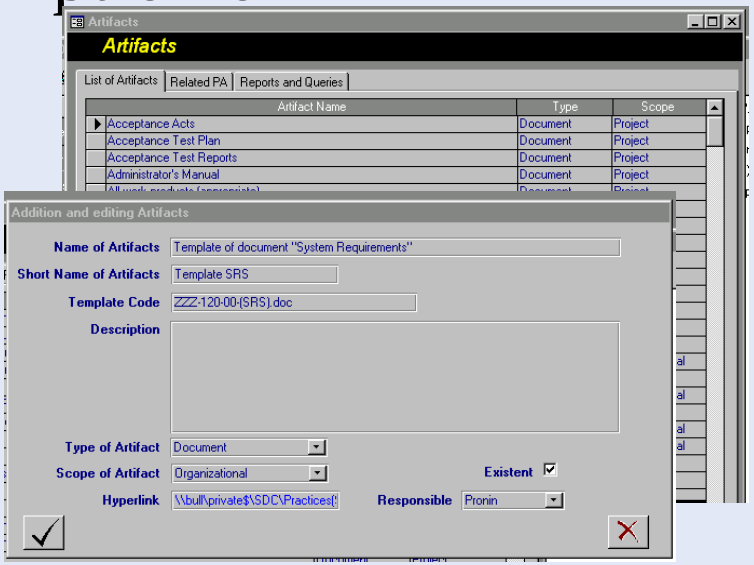
- Model navigation is based on three views: Process Areas view, Generic Goals and Practices view, and Specific Goals and Practices view
- It makes finding required model element convenient and easy





Artifact Description

Database contains the following description of each artifact:

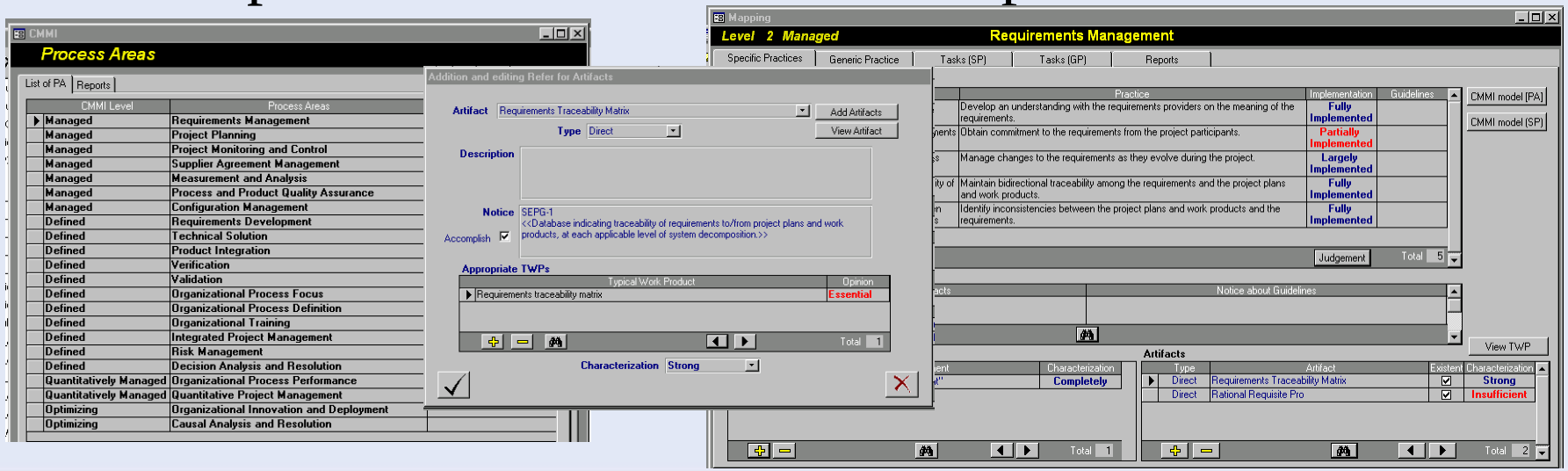


- Name
- Template code
- Free text information on artifact
- Type (document/software tool/procedure/equipment)
- Whether it is organizational or project level
- Location
- Responsible person (owner)
- Whether it exists (for on-going projects)

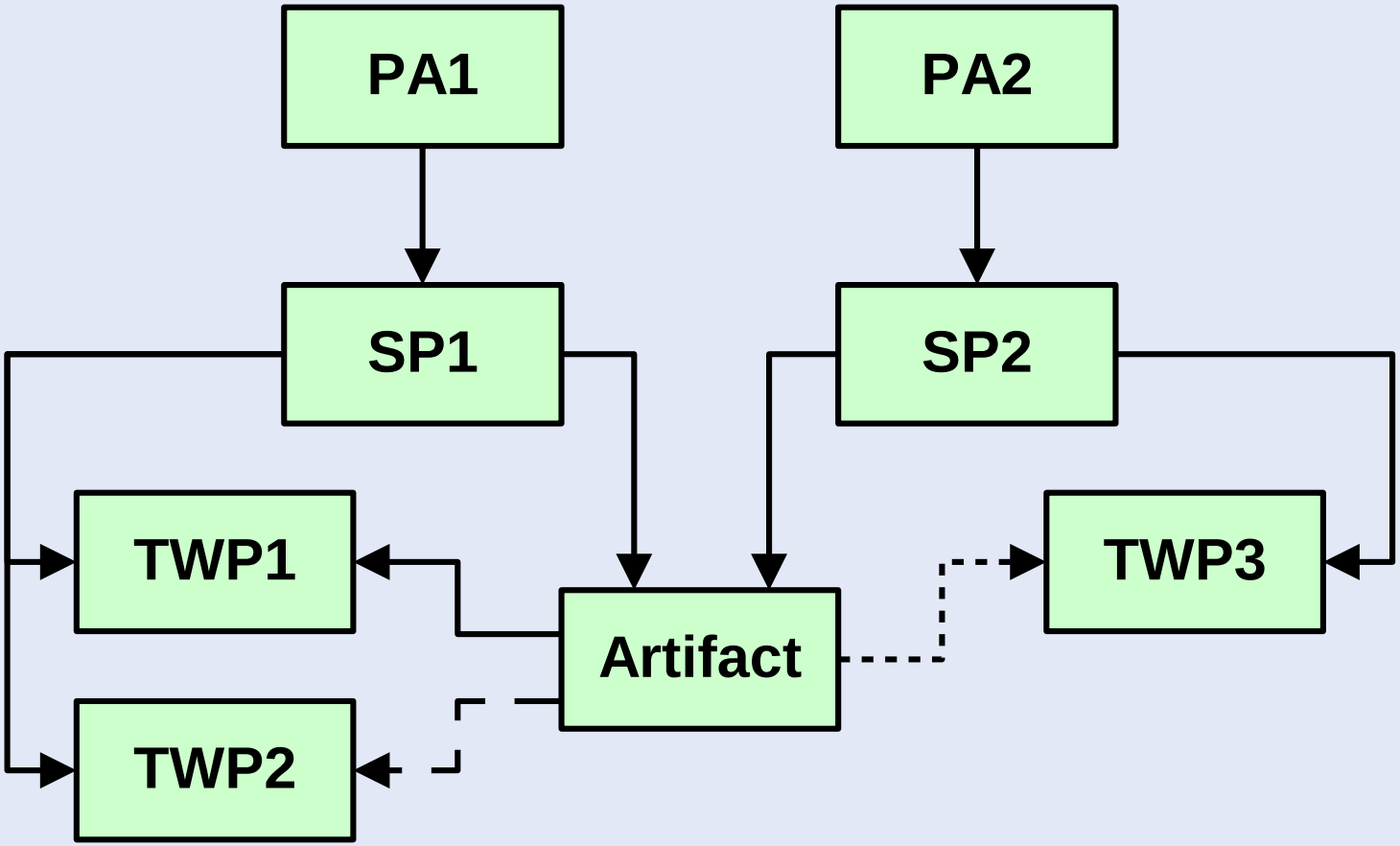
Defining Mapping

To do mapping using APEX Tool you should:

- Select Process Area
- Select relevant Generic or Specific Practice
- Add or edit artifacts related to selected practice
- Add or remove Typical Work Products, which correspond to artifact and selected practice



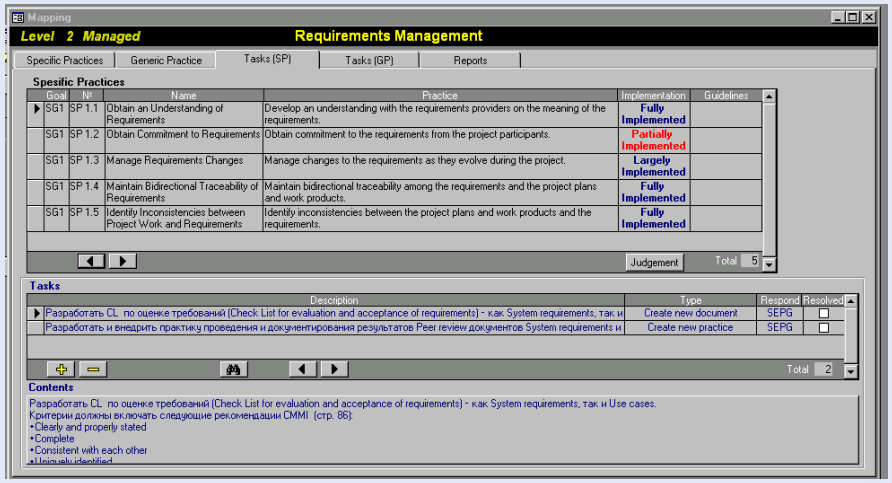
Defining Mapping #2



Analyzing Mapping Results

- Mapping results are the basis for improvement tasks
- Each task is related to specific GP or SP. For each task the following is specified:

- Task description and type (check, document creation/correction, practice creation/correction, discussion)
- Responsible person
- Degree of accomplishment
- List of related tasks and issues



Set of Approved Artifacts

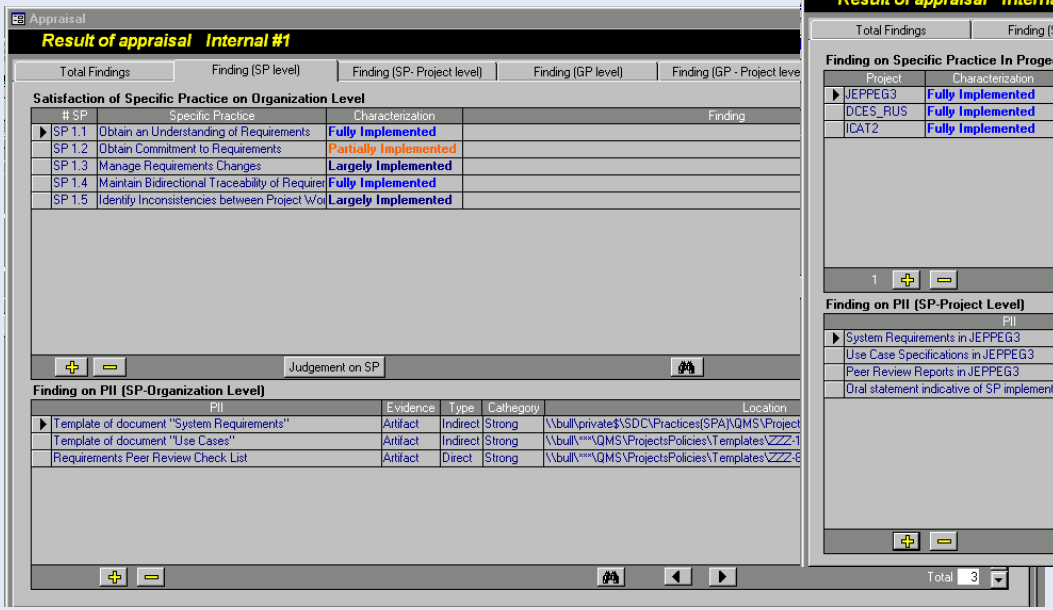
As a result of improvements, set of artifacts compliant with CMMI model is developed and approved internally .

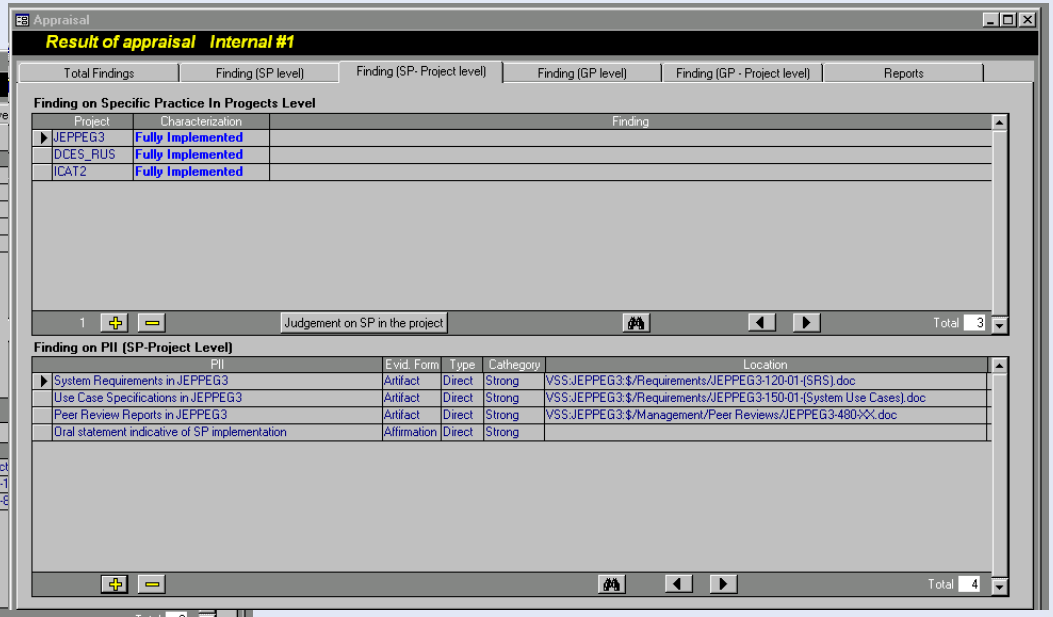
This set of artifacts is used as a reference for conducting internal project assessments.

Because all required data are stored in the APEX database, assessment productivity significantly increases.

Mini-Assessment Support #1

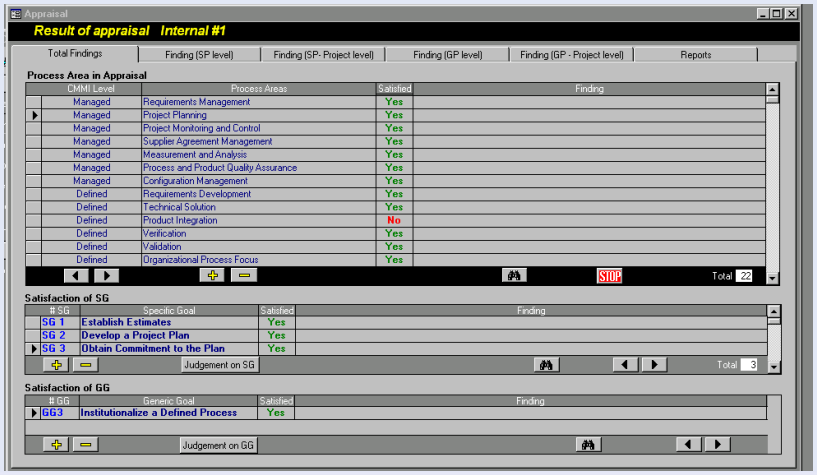
- APEX provides functionality for defining mini-assessments and documenting assessment results.
- Internal Assessor is responsible for entering findings into the APEX database.





Mini-Assessment Support#2

- APEX allows to document findings on several levels: GG and SG level, GP and SP, and on project level.
- Each mini-assessment has its own scope (set of projects, CMMI model coverage, etc.).
- By increasing productivity of internal mini-assessments the APEX allows **to perform such assessments continuously!**



APEX Reporting Capabilities

The APEX may generate a large number of reports, including:

- Reports on Practices coverage by artifacts
- Reports on improvement plan implementation
- Reports on mini-assessment findings
- Description of PAs, GGs, SGs, GPs and SPs
- Organization's and Project's PII matrices

Specific Goal ID	SG1 Manage Requirements	
Specific Practice ID	SP 1.1 Develop an understanding with the requirements providers on the meaning of the requirements.	
PII ID	Direct Artifacts	Indirect Artifacts
Artifacts Description	▪ Requirements Peer Review Check List *Evidence at organizational level* *- Requirements Peer Review Check List* *<\\bull****\QMS\Projects\Policies\Templates\ZZZ-811-01-(Requirements Check List).doc>* ▪ Peer Review Reports *Evidence at project level* *JEPPEG3* *- Peer Review Reports in JEPPEG3* *<VSS:JEPPEG3:$/Management/Peer Reviews/JEPPEG3-480-XX.doc>* *DCES_RUS* *- Peer Review Reports in DCES_RUS* *<VSS:DCES_RUS:$/Management/Peer Reviews/DCES_RUS-480-XX.doc>* *ICAT2* *- Peer Review Reports in ICAT2* *<RCC:ICAT2:$/Management/Peer Reviews/ICAT2-480-XX.doc>* ▪ Use Case Specifications *Evidence at project level* *JEPPEG3* *- Use Case Specifications in JEPPEG3* *<VSS:JEPPEG3:$/Requirements/JEPPEG3-150-01-(System Use Cases).doc>* *DCES_RUS* *- Use Case Specifications in DCES_RUS*	▪ Template of document "System Requirements" *Evidence at organizational level* *- Template of document "System Requirements"* *<\\bull\private$\SDC\Practices(SPA)\QMS\Projects\Policies\Templates\ZZZ-120-00-(SRS).doc>* ▪ Template of document "Use Cases" *Evidence at organizational level* *- Template of document "Use Cases"* *<\\bull****\QMS\Projects\Policies\Templates\ZZZ-150-00-(Use Cases Specification).doc>*

View of Appraiser

Advantages #1

- APEX emphasizes the main advantages of SCAMPI process which are: accuracy, reliability and repeatability of results
- PII matrices may be prepared in advance, it gives to appraiser opportunities to investigate evidences before on site appraisal and take GO/NO GO decision to perform the official SCAMPI.

Advantages #2

- All artifacts are available directly via APEX, which makes it much simpler to find and examine artifacts during mini appraisal & SCAMPI
- The documenting of appraisal's results requires significantly less time and more objective
- All assessment team members can investigate simultaneously different artifacts in the same network

Advantages #3

- Much simpler to interview – participants of interview have opportunity to demonstrate required artifacts via APEX.
- APEX significantly facilitates corrections in PII matrices resulted from assessment team consensus.
- The time to implement CMMI or to migrate from CMM to CMMI is significantly decreased.
- **Time for on site SCAMPI (5 levels) may be decreased from 20 days to 8 days**

Mapping Artifacts to Practices

Artifact relation to practice is described as follows:

•Does artifact directly or indirectly implements practice?

•Which TWPs are related to artifact?

•Degree of practice implementation in accordance with SCAMPI (Fully Implemented, Largely Implemented, Partially Implemented, Not Implemented)

Risk Mitigation

- PII matrices generated by APEX provide immediate information on current process maturity
- LUXOFT approach mitigated risks related to understanding, interpretation, and inter-relations of CMM and CMMI practices
- Knowledge base is maintained and accessible to all interested parties even if key participants are not available
- APEX mitigates the risk of different interpretation of model by external and internal assessors

Your questions/comments?