Raytheon

Customer Success Is Our Mission

Objective Evidence For Appraisals

or 3782 easy steps to a successful SCAMPI℠

Kent McClurg

November 17-20, 2003

–Copyright © 2003 Raytheon Company. All rights reserved.

Agenda

- Introduction
- Where to start?
- The target
- The Problem with OE
- The Solution
- The Strategy

Introduction

- Where is OE described?
- What is Objective Evidence?
- Why do we need Objective Evidence?
- How much OE do we need?
- What kinds of OE are there?

Where is the OE described?

Raytheon
Intelligence and
Information Systems

- SCAMPI℠ MDD describes the types of objective evidence
  - Part I – Overview
  - Part II – Process Definitions
    - 1.4 Obtain and Analyze Initial Objective Evidence
    - 1.5 Prepare for Collection of Objective Evidence
    - 2.1 Examine Objective Evidence
    - 2.3 Document Objective Evidence

What is Objective Evidence?

Raytheon
Intelligence and
Information Systems

- "Objective evidence consists of qualitative or quantitative information, records, or statements of fact pertaining to the characteristics of an item or service or to the existence and implementation of a process element. It is based on observation, measurement, or test, and can be verified."
- "In SCAMPI℠, sources of objective evidence include instruments, presentations, documents, and interviews."

Standard CMMI℠ Appraisal Method for Process Improvement (SCAMPI℠), Version 1.1: Method Definition Document *December 2001*, Page I-11 & Glossary

Understand what OE is before you start collecting

Why do we need OE?

- *The aggregate of objective evidence provided is used as the basis for determining practice implementation.*
  - To make reasonable judgments regarding an organization's implemented processes relative to the CMMI models, appraisal teams base their judgments on the collection of objective evidence for each specific and generic practice applicable to process area goals within the appraisal scope. (**SCAMPI^{SM} MDD Page I-21**)

How much OE do we need? - 1

- *Practice implementation at the organizational unit level is a function of the degree of practice implementation at the instantiation level (e.g., projects).*
  - The extent of this can be determined only by considering the extent to which those practices are implemented by instantiations of the process
  - This necessitates the consideration of objective evidence for each instantiation, for each model practice within the appraisal scope

How much OE do we need? - 2

Raytheon
Intelligence and
Information Systems

- *Appraisal teams are obligated to seek and consider objective evidence of multiple types in determining practice implementation and goal satisfaction.*
  - The SCAMPI^{SM} method is data oriented, in that
    - Decisions on practice implementation and rating are made based upon the aggregate of objective evidence
    - Multiple types of objective evidence must be considered.
    - Artifacts indicative of practice implementation are a requirement of the SCAMPI^{SM} method.

What kinds of OE are there?

- The fundamental idea … is that the conduct of an activity or the implementation of a practice results in “footprints”—evidence that provides a basis for verification of the activity or practice.
- In SCAMPI^{SM}, Practice Implementation Indicators are the necessary consequence of implementing CMMI model practices.
  - Direct Objective Evidence
  - Indirect Objective Evidence
  - Instruments

Why Worry about all of this?

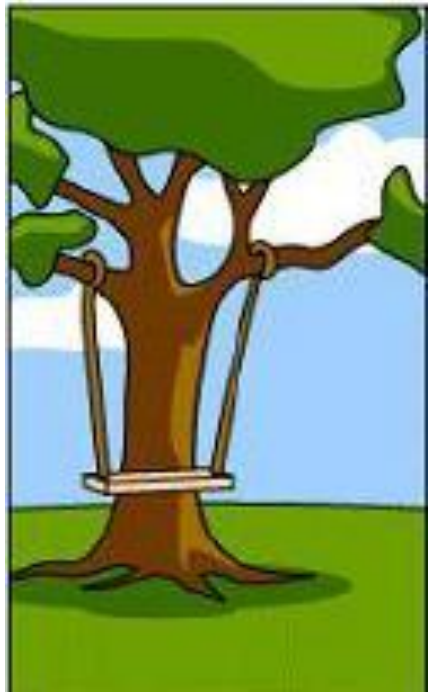
Because, when you are trying to get ready for a SCAMPI^{SM} **…**

The Short History of OE

Raytheon
Intelligence and
Information Systems

What the site heard when the CMMI guys explained it

What the site coordinator envisioned



How the Project Leaders understood it

Be clear, or beware

The Short History of OE

Raytheon
Intelligence and
Information Systems

How the Team Leaders saw it

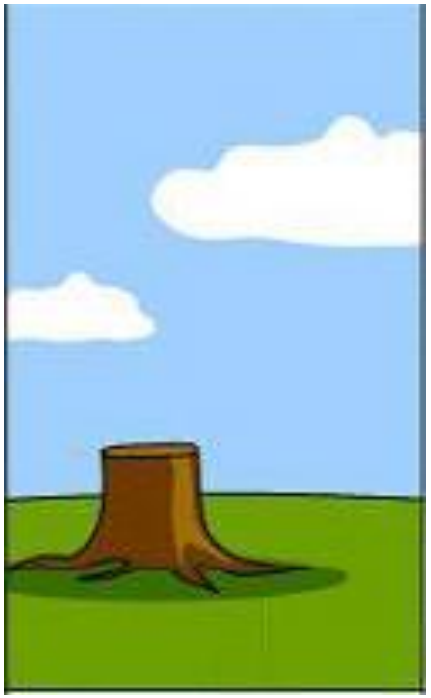
What SW looked for

What the SE's looked for

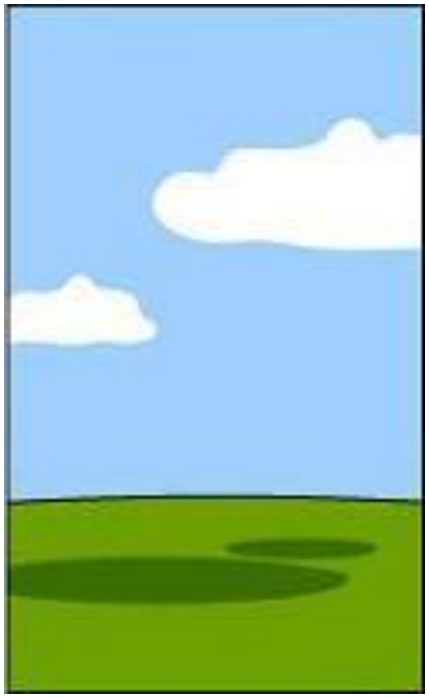
No good effort goes unpunished!

The Short History of OE

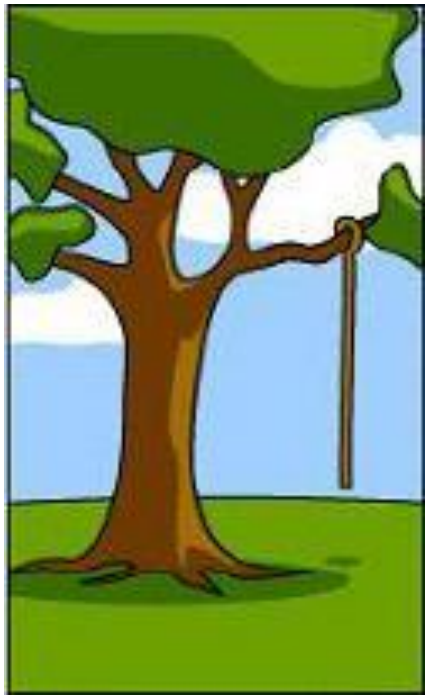
Raytheon
Intelligence and
Information Systems



What SE/SW actually provided



What the Class "B" appraisal saw



What the re-plan called for

Be careful what you ask for - - -

The Short History of OE

What the SCAMPI℠ team really needed

You might get it!

Where to start?

- Need to meet the practices by providing objective evidence that is
  - Sufficient – is there enough evidence?
  - Necessary – is it really essential evidence?
  - Accurate – does it reflect what is really done?
- The evidence should be presented in some coherent fashion
  - Threads
  - Discrete evidence (not applicable for a thread)

Threads or not threads – Sew many choices

Raytheon
Intelligence and Information Systems

- Make a decision on how to present the OE based on the practices
  - Do they lead you from point A to point B?
    - Thread candidates do this
    - Example: Technical Solution
  - Do they list independent (discrete) activities?
    - Non-thread candidates do this
    - Example: Process and Product Quality Assurance

Threads or not threads – Sew many choices

Raytheon
Intelligence and Information Systems

Thread Example: Technical Solution - Goals

SG 1 Select Product-Component Solutions

SP 1.1 Develop Detailed Alternative Solutions and Selection Criteria
SP 1.2 Evolve Operational Concepts and Scenarios
SP 1.3 Select Product-Component Solutions

SG 2 Develop the Design

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

SG 3 Implement the Product Design

SP 3.1 Implement the Design
SP 3.2 Develop Product Support Documentation

Note how these goals relate to each other. Solution →Design→Implement

Threads or not threads – Sew many choices

Raytheon
Intelligence and Information Systems

Thread Example: Technical Solution - Practices

SG 1 Select Product-Component Solutions

- SP 1.1 Develop Detailed Alternative Solutions and Selection Criteria
- SP 1.2 Evolve Operational Concepts and Scenarios
- SP 1.3 Select Product-Component Solutions

SG 2 Develop the Design

- 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

SG 3 Implement the Product Design

- SP 3.1 Implement the Design
- SP 3.2 Develop Product Support Documentation

Note how these practices relate to each other.

Solution→ Design → Implement

Threads or not threads – Sew many choices

Raytheon
Intelligence and Information Systems

Non-Thread Example: PPQA - Goals

SG 1 Objectively Evaluate Processes and Work Products

SP 1.1 Objectively Evaluate Processes
SP 1.2 Objectively Evaluate Work Products and Services

SG 2 Provide Objective Insight

SP 2.1 Communicate and Ensure Resolution of Noncompliance Issues
SP 2.2 Establish Records

Note how these goals are (somewhat) independent of each other. Objective evaluations may or may not provide the necessary objective insight. There are alternative ways of gaining objective insight other than objective evaluations.

Threads or not threads – Sew many choices

Raytheon
Intelligence and Information Systems

Non-Thread Example: PPQA - Practices

SG 1 Objectively Evaluate Processes and Work Products

SP 1.1 Objectively Evaluate Processes

SP 1.2 Objectively Evaluate Work Products and Services

These practices are discrete actions.

SG 2 Provide Objective Insight

SP 2.1 Communicate and Ensure Resolution of Noncompliance Issues

SP 2.2 Establish Records

Think about the best way to meet the appraisal needs when collecting and organizing the objective evidence

So, who gets to collect the OE?

How We View the Artifacts

- The project people see the artifacts as the result of executing the project as it moves through its life cycle
- The appraisers see the artifacts as the result of executing the project with respect to the Process Areas of the CMMI®

Who gets to Collect the OE? - 1

- Non-project OE collectors often don't know what to collect
  - Don't know where certain artifacts are stored
  - Not aware of what artifacts might be called
  - May not be aware of project sensitive information (not classification)
- Project OE collectors often don't know what to collect
  - Not aware of what will satisfy a practice since they are not familiar with the CMMI® (this is to be expected)
  - No experience dealing with OE
  - Don't need another job!
- It appears that neither group is entirely the right group

The Collection Solution?

- Train all of the necessary **project** people collecting the OE to understand all of the issues
  - Model content
  - SCAMPI requirements

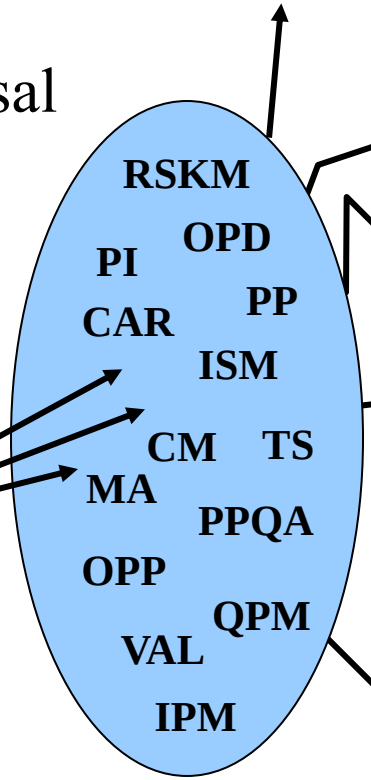
  OR
- Train **people from outside** the projects everything they need to know about the project in order to collect the OE

– neither of these seem to be the answer

Another "View" of the Problem

Raytheon
Intelligence and
Information Systems

The "mystical" appraisal team reviews the collected evidence through "CMMI" filter



The "filter" may prevent the team from seeing your big picture as you see it.

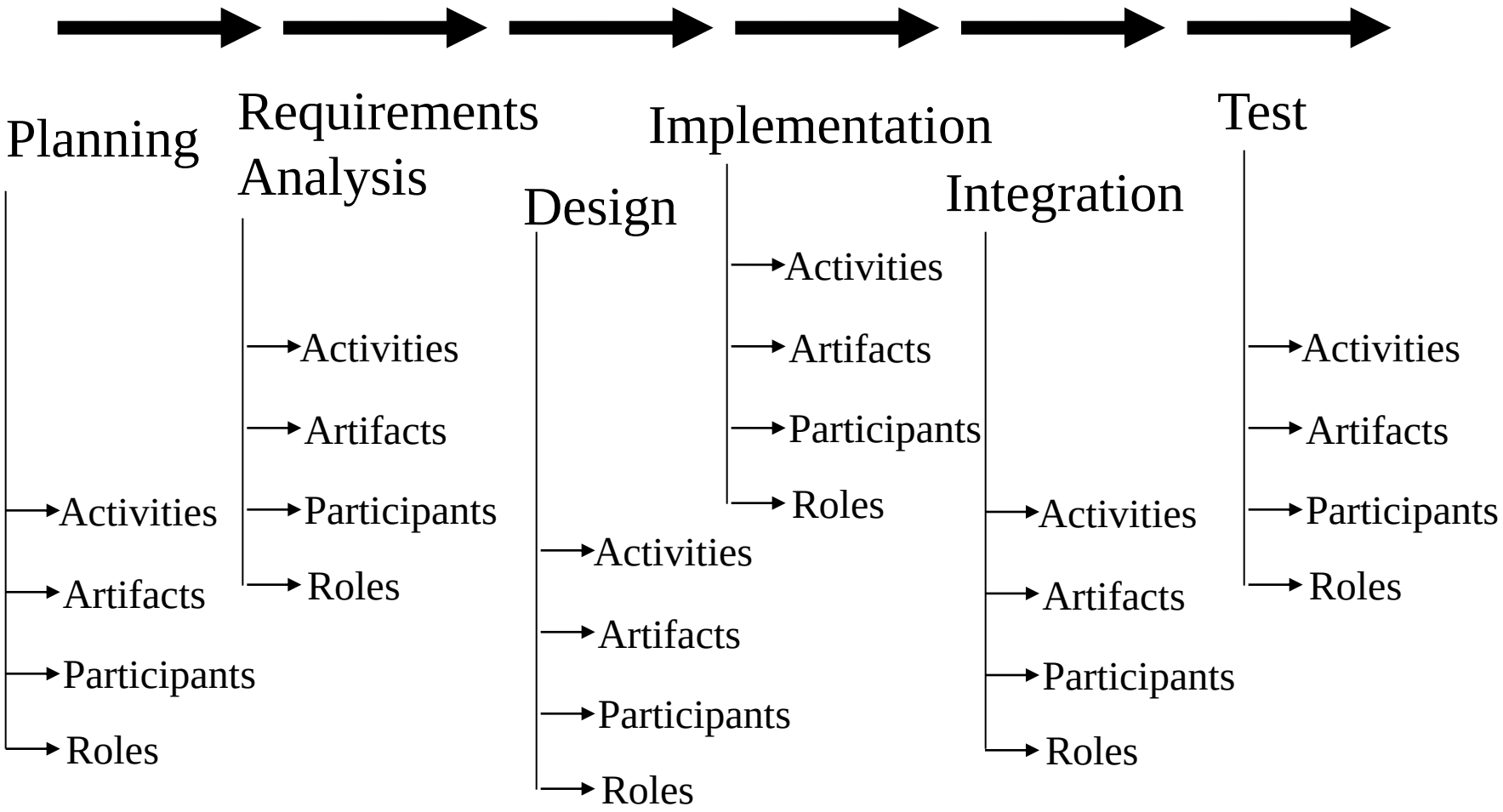
The CMMI filter does not reflect the life cycle of the projects, does not reflect sequencing. It groups evidence into specific process areas.

One Possible Solution

- Follow the project life cycle
  - Describe the activities performed on the project
  - Identify the artifacts associated with each activity (no need to mention the CMMI℠)
    - Direct artifacts – intended work product
    - Indirect artifacts – by-products of performing the activity
  - Provide the list of artifacts needed for each phase and activity of the project

The Solution: the Projects View

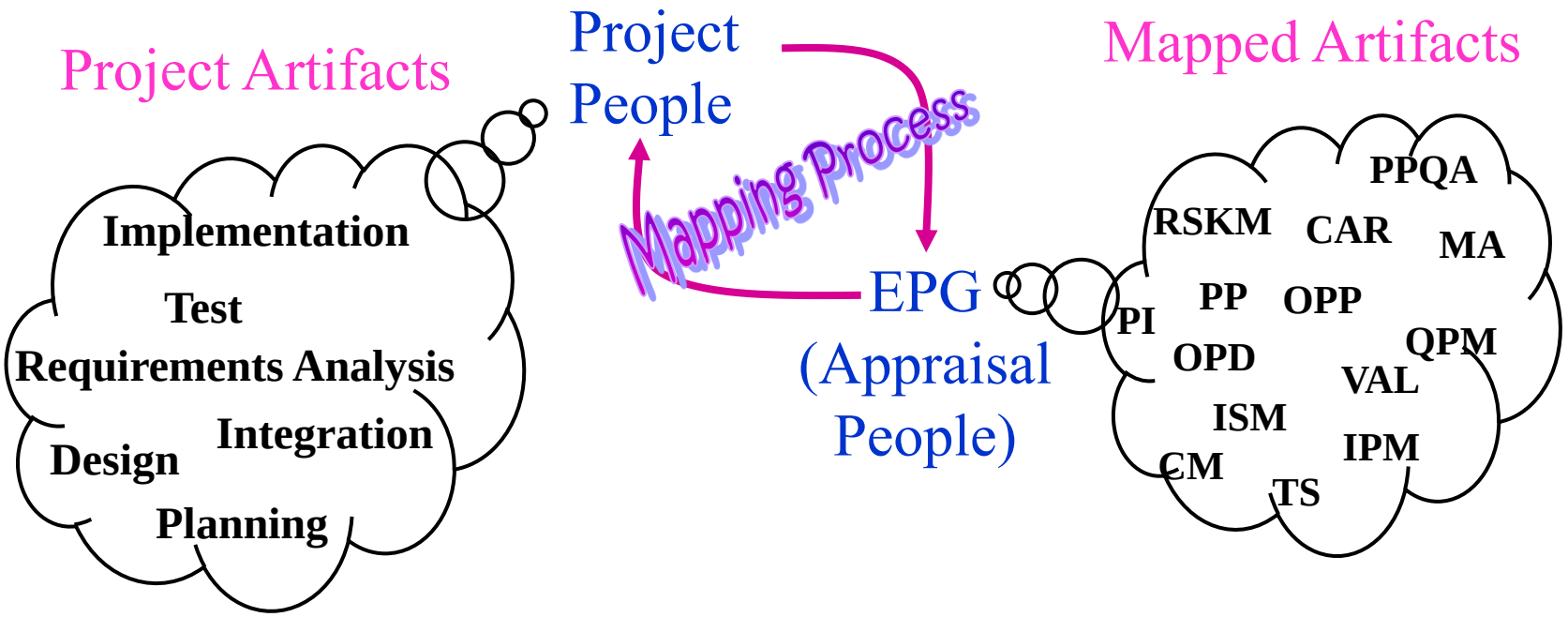
Raytheon
Intelligence and Information Systems



The Translation

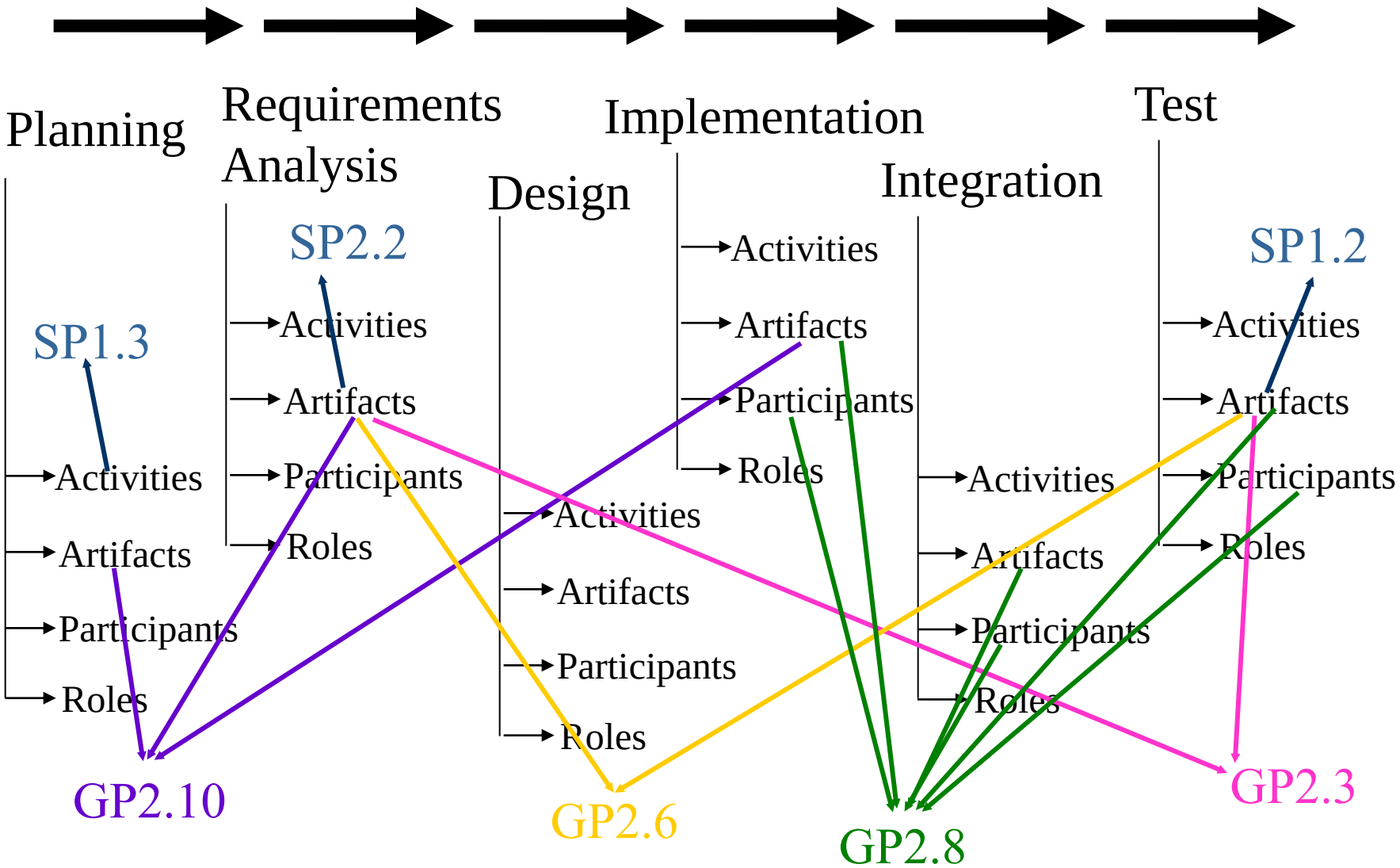
Raytheon
Intelligence and
Information Systems

- The OE identified and collected for for each defined Life Cycle phase is then mapped to the appropriate practices



The Solution for the Appraisers

Raytheon
Intelligence and
Information Systems



Example Mapping

Raytheon
Intelligence and
Information Systems

What the project provided	Where the EPG mapped it	OE Type
Project plan	PP SP2.7 Establish Project Plan	Direct
Project plan review checklist	PP SP3.1 Review Plans VER SP2.2 Conduct Peer Reviews	Direct
Minutes from project plan review	PP SP3.1 Review Plans VER SP2.2 Conduct Peer Reviews	Indirect
Project plan update	PP SP2.7 Establish Project Plan	Direct
Hours spent on plan change	PP SP2.7 Estab Proj Plan MA SP2.1 Collect Measurement Data	Indirect Direct

How is the OE Made Available?

- Some decision must be made concerning the basic approach to the OE.
  - Hardcopy or Softcopy or Both
  - Weigh the benefits and deficiencies of both.

Hardcopy Pro's and Con's

- Hardcopy Pro's
  - Collected OE is stable
  - Easy to mark the applicable sections
  - Sometimes easier for reviewers to use
- Hardcopy Con's
  - No automated search capability
  - Requires a new copy for each reference
  - Cannot support discovery mode
  - Not always possible to provide the entire artifact (size issue)
  - Can become "out of date"

Softcopy Pro's and Con's

- Softcopy Pro's
  - Can point to the source of the OE (folder) to aid in determining institutionalization
  - Easy to include multiple examples
  - Can include the entire artifact, not just pertinent pages
  - Easy to update to new artifacts or new versions
  - Automated search capability
  - Can support discovery mode
- Softcopy Con's
  - Hyperlinks can be broken
  - Not always easy to indicate the relevant parts
  - Versions can be moved or removed without anyone knowing

Keep Your Eye on the Target

Raytheon
Intelligence and
Information Systems

- Look to the end of the path – what is our goal with respect to the OE?
  - Characterize the practices of a goal
    - Do they define a thread?
    - Are they discrete activities?
  - Satisfy the goals of the process area
    - Does the OE support the goal?
    - Is it sufficient and correct?
  - Meet the process area for a maturity level or capability levels as planned
    - Make sure it all works together to establish the big picture that you want
- Know where we want to end up and how to get there!

Questions?