



*KNOW HOW ... NOW*

**SOLUTION DEPLOYMENT AFFILIATES**

# Experiences in Achieving Rational Process Management

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*Wm E. Riddle*  
*SEPG<sup>SM</sup> JAPAN 2004*  
*17 September 2004*

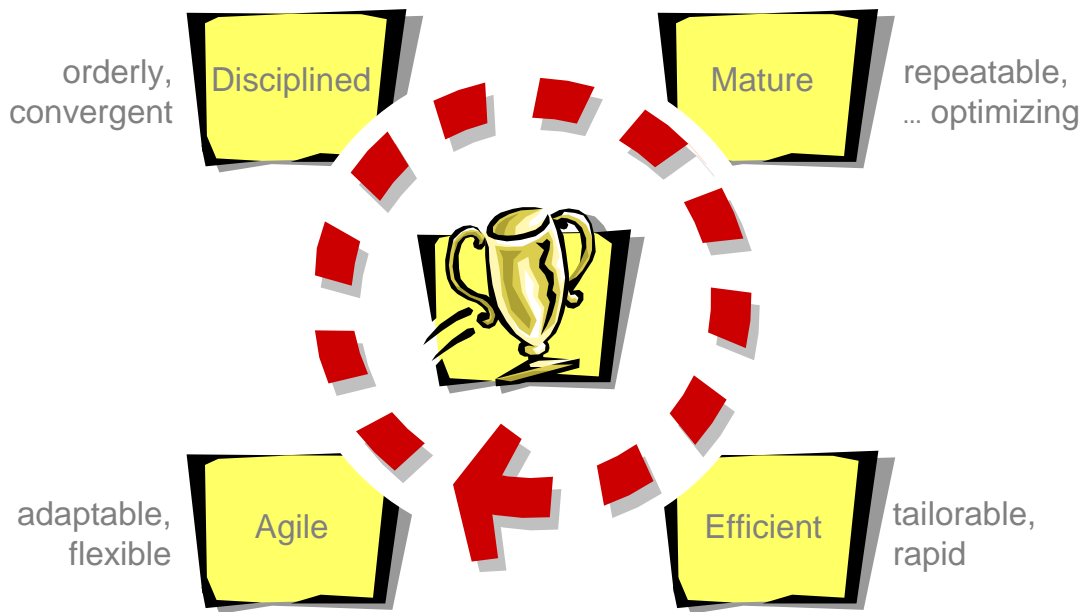
# Rational Process Management – 1

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*Gaining  
and  
Maintaining  
Control  
over  
Process  
Evolution*

# Target: Process Excellence

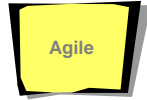


# Rational Process Management – 2

## PROCESS EXCELLENCE PROBLEMS



Wrong Processes



Out-of-Date Processes



Improper Process Performance



## PROCESS MANAGEMENT FOCUS

Documentation

Institutionalization

Description and Assessment

# Rational Process Management – 3

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## Overall Goals

- (operational) maintain consistency among processes and their descriptions as they evolve
- (organizational) maintain and – as possible – improve market-share, profitability, time-to-market, workforce capability and productivity

## Activities performed to:

- determine process needs, requirements, objectives, and constraints
- coordinate design and definition of inter-related processes
- install and institutionalize the processes
- support process analysis and improvement

From (with modifications): "Path to High Maturity Processes: Themes in the CMM® to Guide Process Improvement," Charles Weber, 20 January 2000

# Topics

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## **Documentation Capabilities**

developing effective process documentation

## **Process Management Process**

handling process evolution activities

## **Lessons Learned**

experiences from applications in industry

## **Summary**

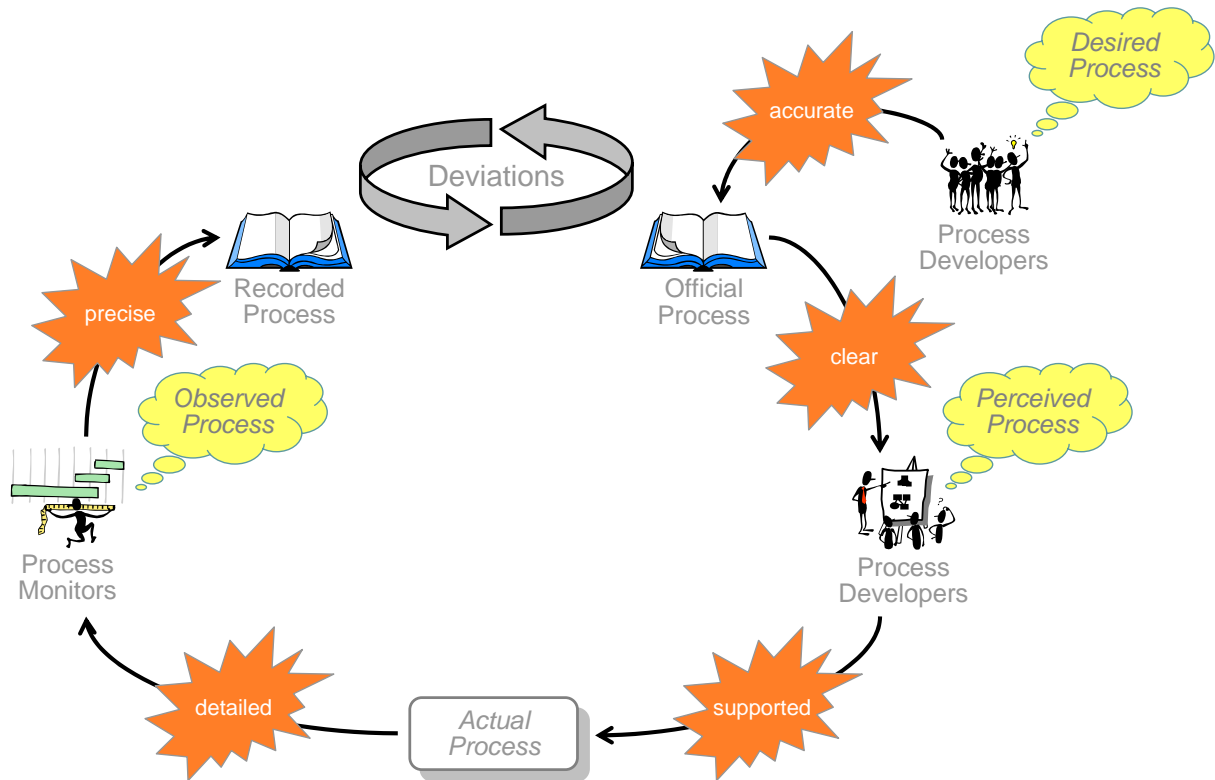
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# Documentation Capabilities

developing effective  
process documentation

# “Good” Process Documentation



*Desired Process*: what developers want to happen

*Official Process*: what developers say should happen

*Perceived Process*: what performers think should happen

*Actual Process*: what really happens

*Observed Process*: what an observer thinks has happened

*Recorded Process*: what an observer says has happened

*accurate*: captures what developers want to happen

*clear*: unambiguously specifies what should happen

*supported*: admits assistance for tedious or difficult activities

*detailed*: allows GQM factors to be defined

*precise*: allows “good vs. bad” metrics to be defined



# Valuable Process Documentation

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## Criteria:

1. Understandable
2. Contains needed information
3. Supports multiple views
4. Easy to “navigate”
5. Up-to-date

## Implications:

1. Accurate, clear, supported, detailed, and precise
2. Complete
3. Accessible from many different points-of-view
4. Extensively cross-referenced
5. New versions rapidly disseminated and easy to incorporate

# Process Documentation – Overview

4 Relationships also provide "navigation" popup windows.

2 Each entity's page shows its decomposition and other information about the entity.

3 Tables describe relationships (for example, the roles involved in an Activity's Tasks).

1 Manually-developed or generated graphics provide direct links to entities.

5 Pages listing all the entities of some category provide descriptions of and links to the entities.

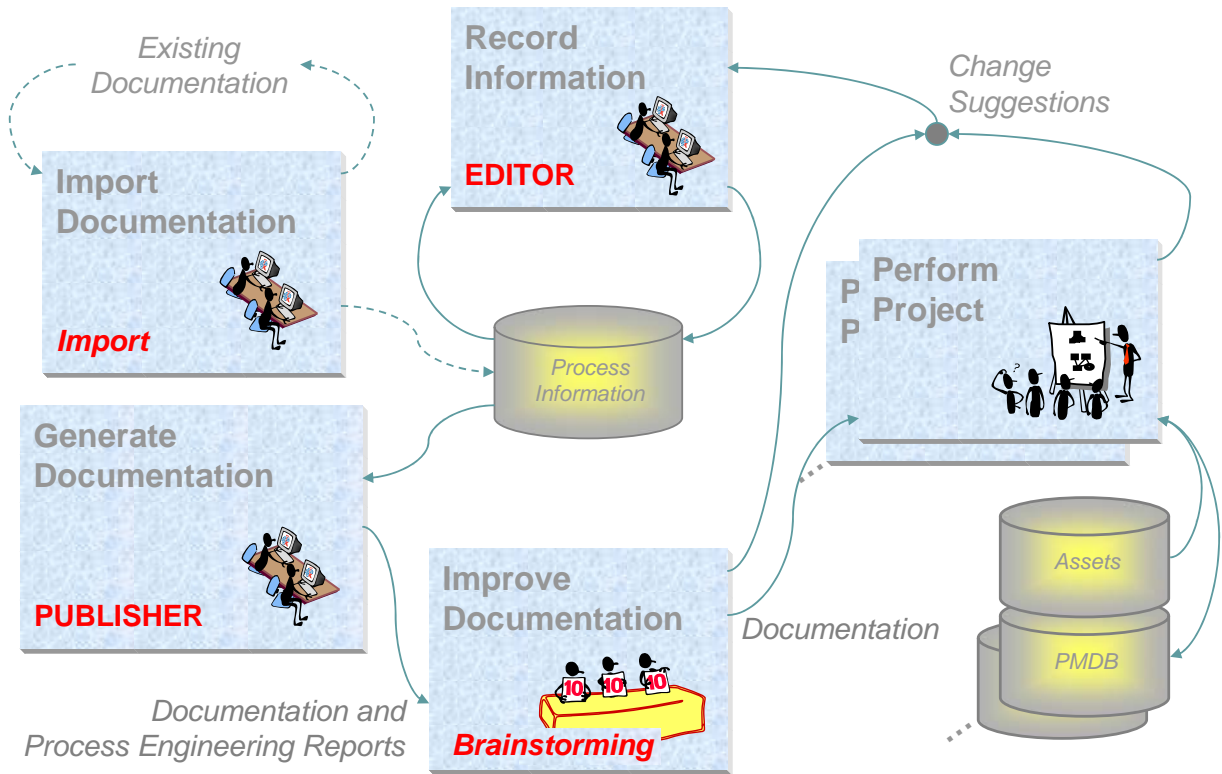
6 Citations to assets provide links for downloading the asset from a PAL.

7 A Glossary not only defines terms and acronyms but also allows entity access by name.



A variety of example WebGuides may be found at <[http://www.iese.fraunhofer.de/Products\\_Services/vincent/examples/](http://www.iese.fraunhofer.de/Products_Services/vincent/examples/)>.

# Process Documentation Process



# Process Information Editor



## Process Knowledge

- Reflects an organization for the information
- Maintains 'referential integrity'
- Supports non-redundant capture of information
- Allows entry of relationship information from either direction
- Minimally imposes constraints

The screenshot shows the TQ PM2 Tool interface. The main window displays a tree view of process information. A secondary window titled "Edit Activity [Identify Needs / Constraints]" is open, showing a table with columns for Name, Description, and Type. The table contains two rows of data. Below the table are buttons for Save, Close, New, and Delete.

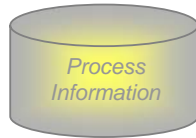
Name	Description	Type
N/C Doc drafted	A draft of the Needs and Constraints ...	
N/C Doc returned	Developing/Revising the requirement...	

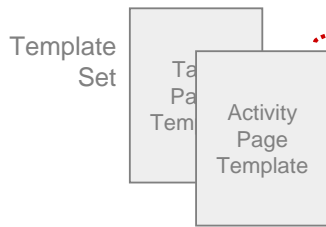
Name	Description	Type
N/C Doc delivered	A version of the Needs and Constraint...	
N/C Doc drafted	A draft of the Needs and Constraints ...	



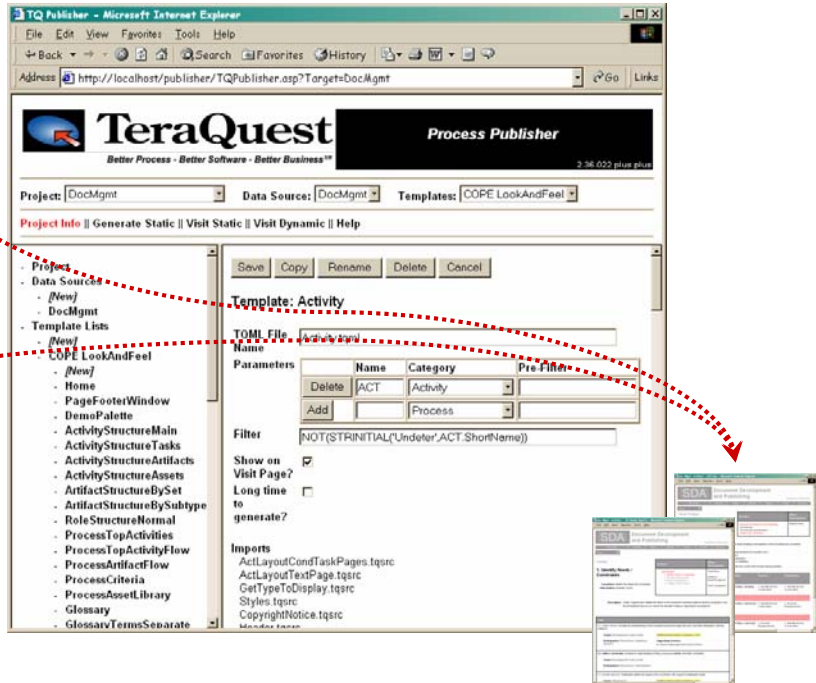
# Process Documentation Publisher



Holds information about the process entities. Provides content for the pages.

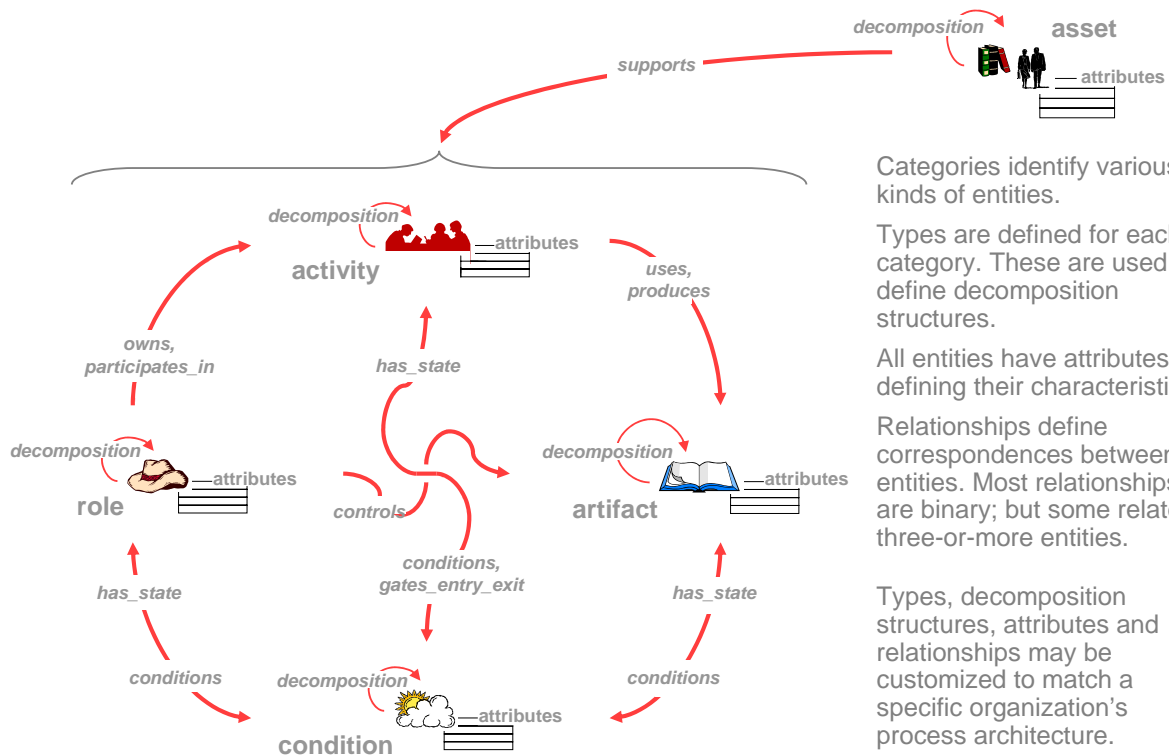


Defines the Website's Look-and-Feel in terms of templates, each describing some specific type of page.



Documentation Website

# COPE Process Architecture – Summary



Categories identify various kinds of entities.

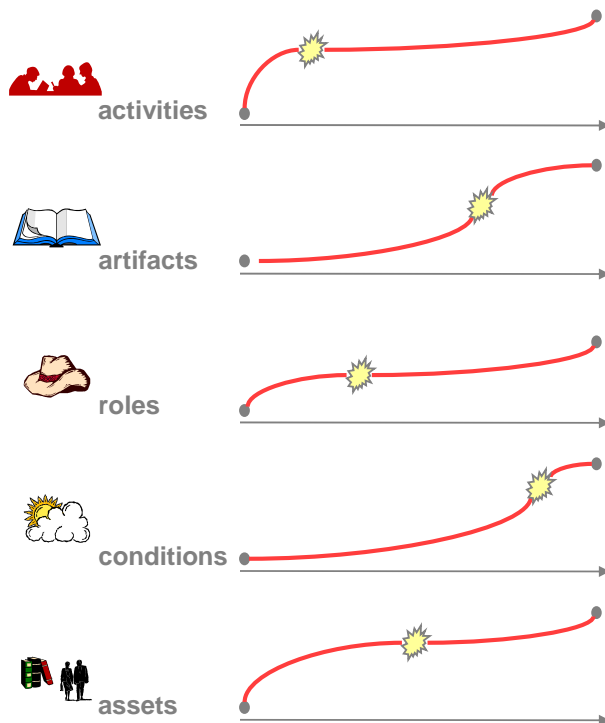
Types are defined for each category. These are used to define decomposition structures.

All entities have attributes defining their characteristics.

Relationships define correspondences between entities. Most relationships are binary; but some relate three-or-more entities.

Types, decomposition structures, attributes and relationships may be customized to match a specific organization's process architecture.

# Process Brainstorming – Summary



*Process Brainstorming*: elicitation of process information in a series of facilitated workshops.

Working groups focus on a Process and meet three times a week for about three hours with a final session to confirm their work.

Group's focus may proceed in many ways. A good, default, sequence (depicted at the left) is:

- 1<sup>st</sup> – activities
- 2<sup>nd</sup> – roles
- 3<sup>rd</sup> – assets
- 4<sup>th</sup> – artifacts
- 5<sup>th</sup> – conditions

Working group composition may lead to others sequences.

During each workshop, attention is given to minimizing unnecessary constraints and introducing necessary constraints.

Follow-up work used to homogenize work across groups, determine inter-process linkages, validate overall Process, etc.

# Process Brainstorming Support

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## Reports

- Process entity name, definition and relationship inconsistencies
- Violations of “good process engineering practices”
- Completeness of the process and its description
- Possible errors (anomalies) in the process
- Process changes (“as-is” vs. “to-be”)

Issue, TBD Lists, Meeting Agendas, etc. to help Process Development Teams carry out their work



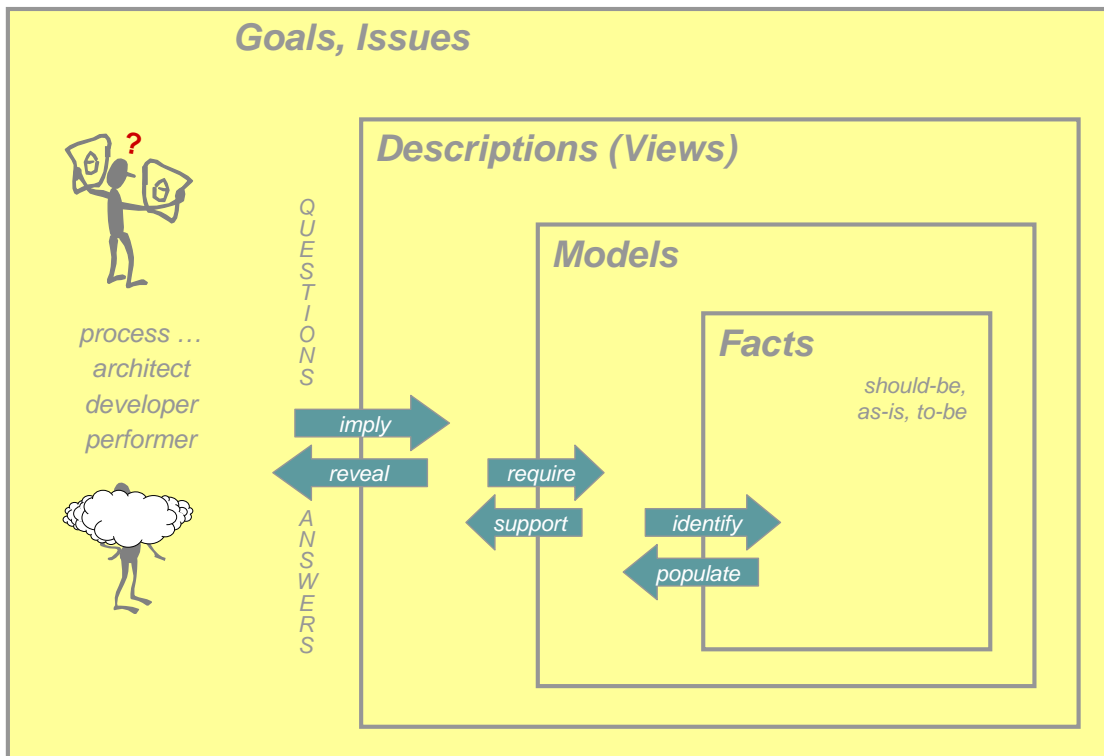
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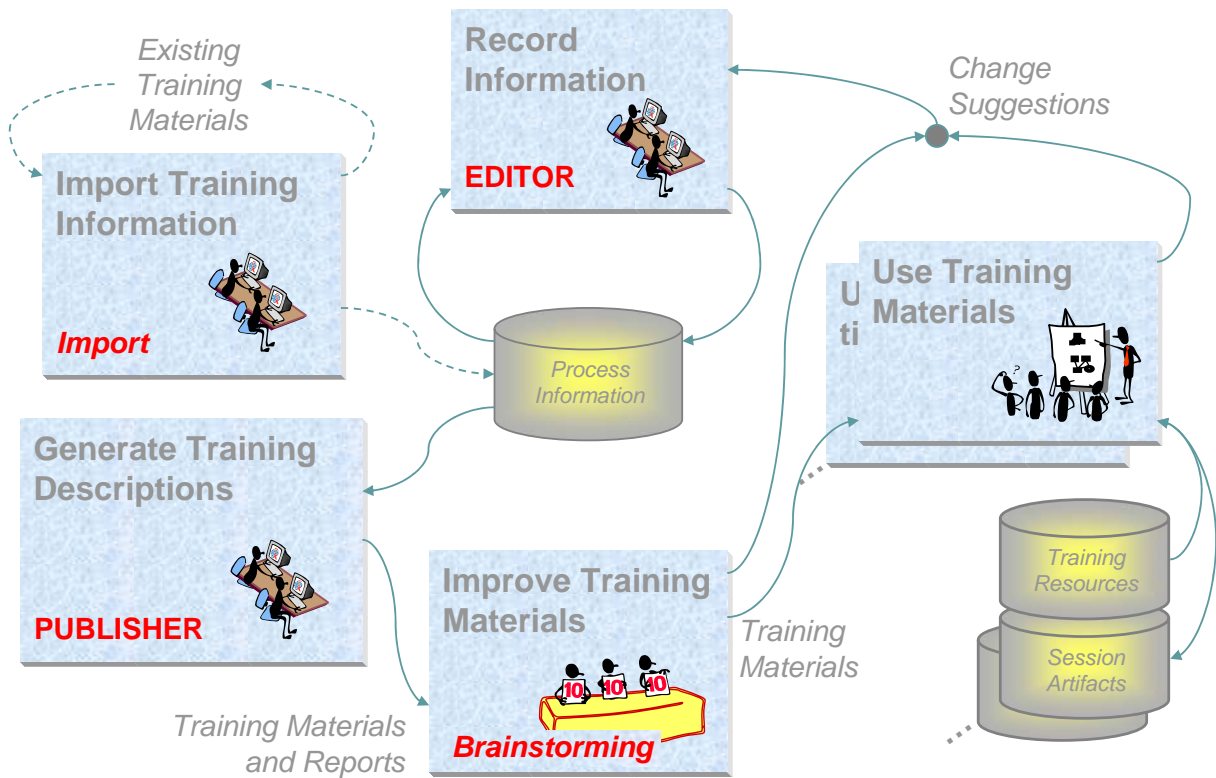
# Process Management Process

handling  
process evolution activities

# Question-Answering Paradigm



# Process Management Process – Training



# Process Training Support

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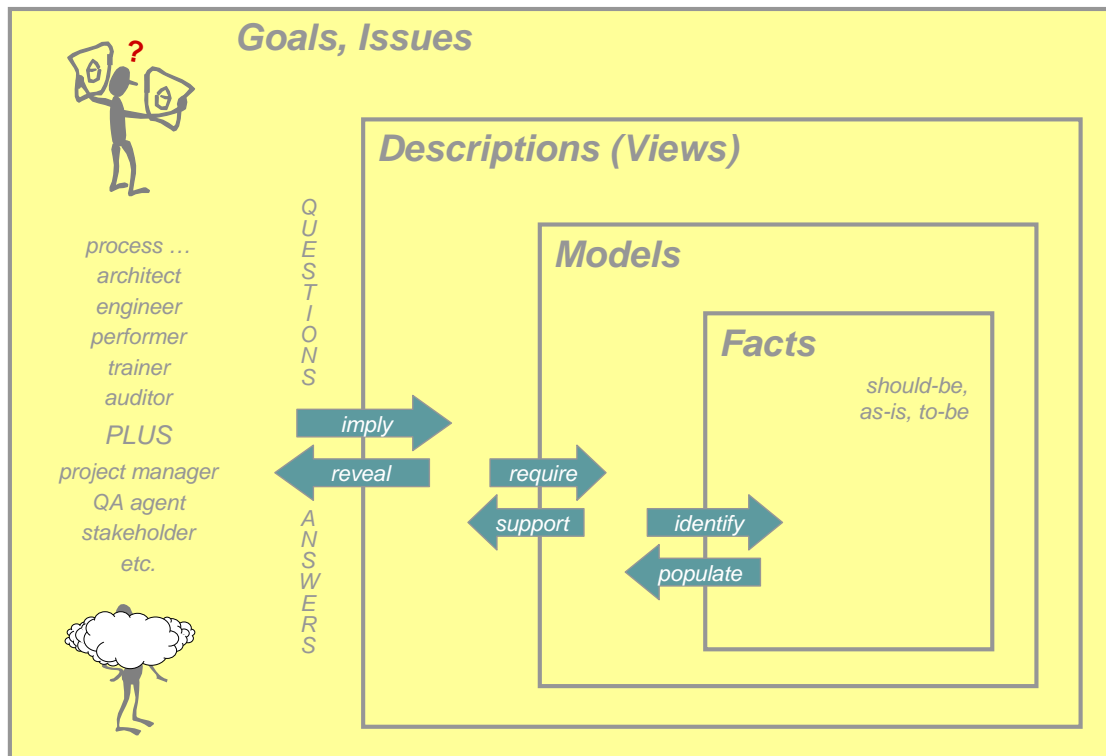
## Reports

- Topical (a.o.t. process entity) decomposition
- Dynamics
- Process changes (“as-is” vs. “to-be”)

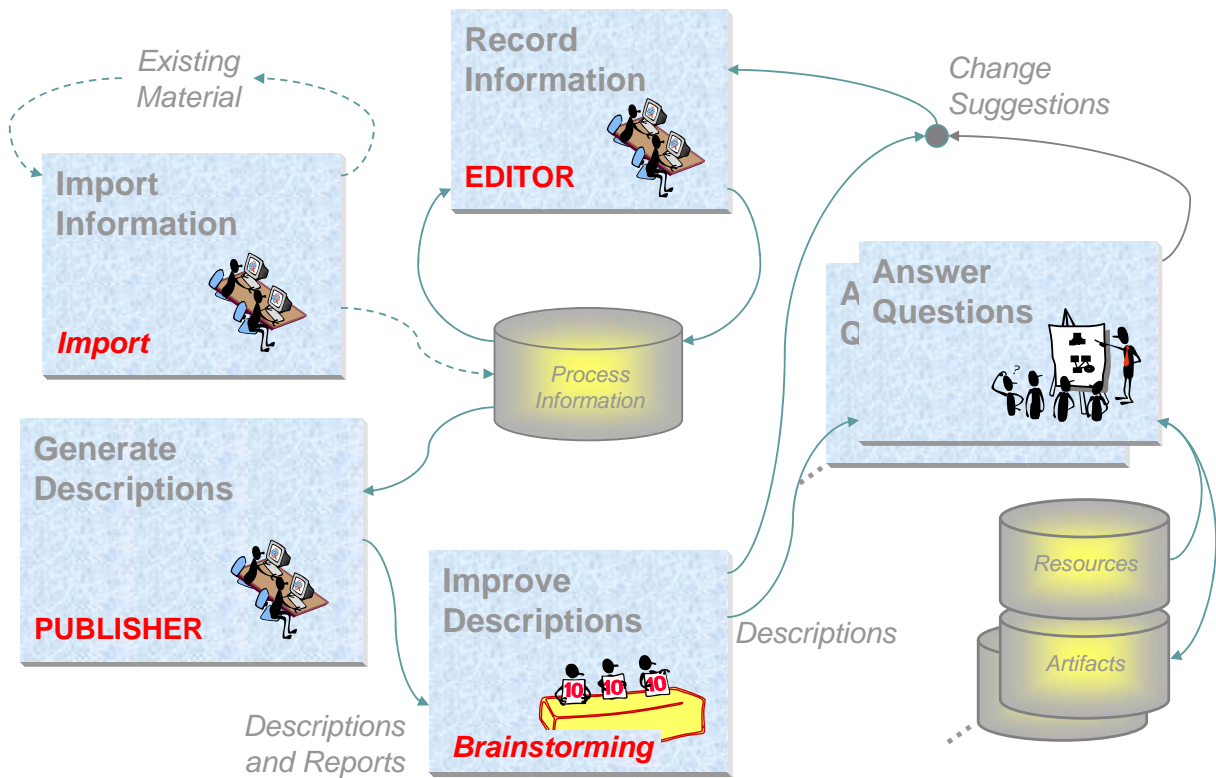
## Presentation Material

- Additional assets
- Annotated process entity descriptions
- Simulations

# Question Answering Paradigm – Generic

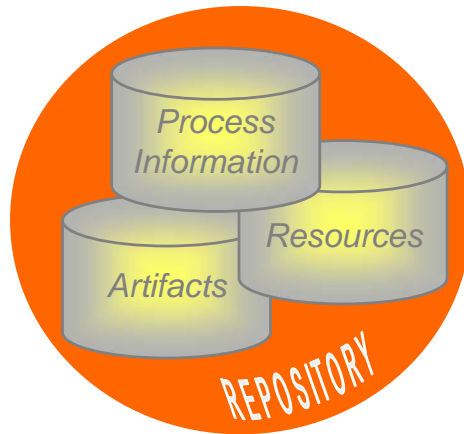


# Process Management Process



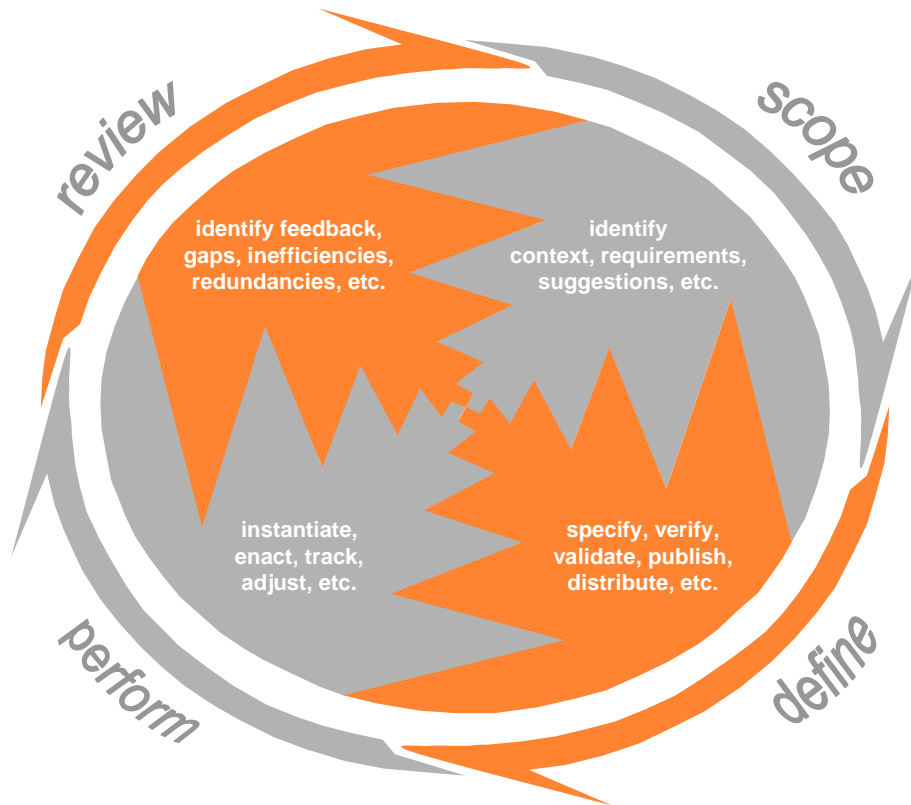
# Process Evolution Framework – Repository

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- **Process Information:** holds information about an organization’s “standard process” and variations used for specific projects
- **Resources Database:** holds assets supporting different processes and multiple performances of a process
- **Artifacts Database:** holds artifacts pertinent to use of the process for a specific project

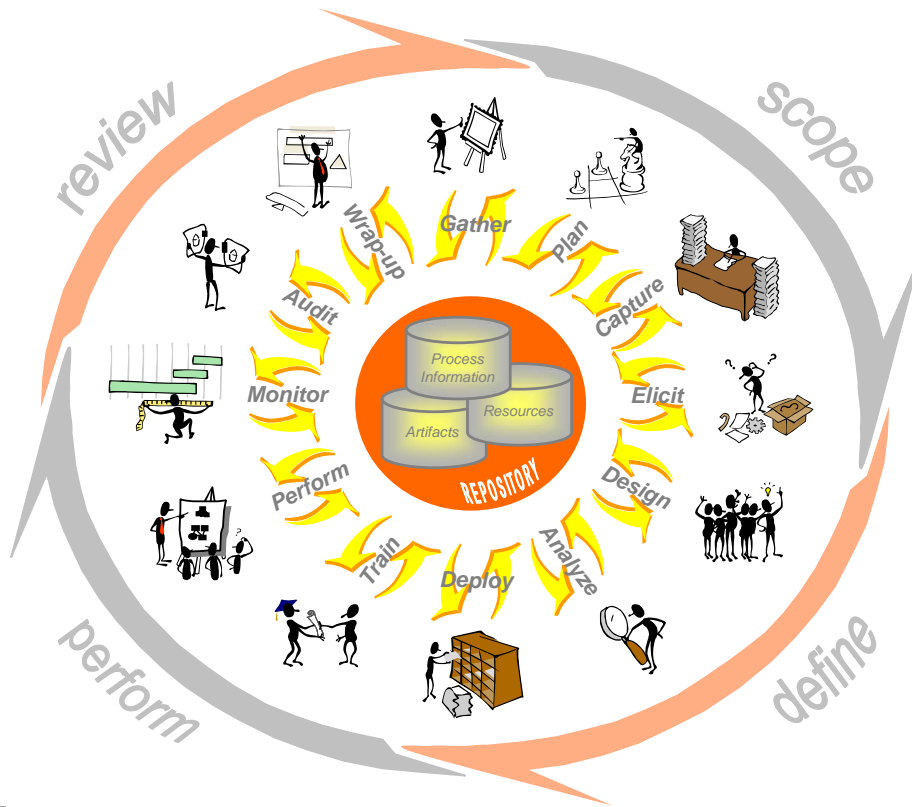
# Process Evolution Framework – Phases



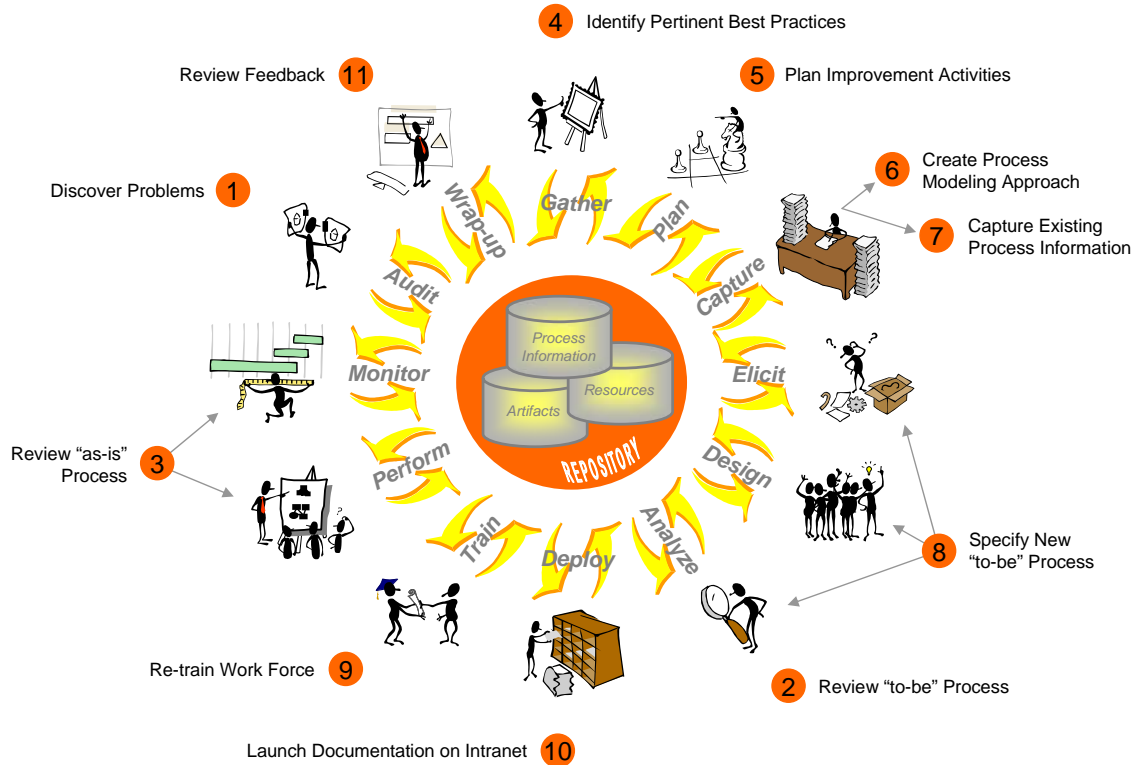
instantiate: prepare/train personnel, tailor process, couple to related processes, create project plan, re-plan project (as necessary)



# Process Evolution Framework – Activities



# Process Evolution Framework – Dynamics



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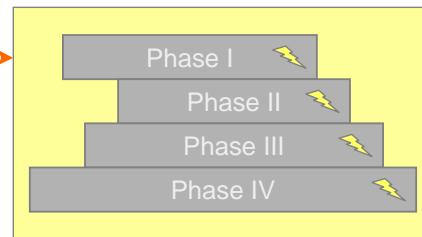
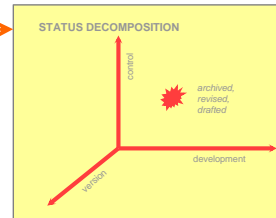
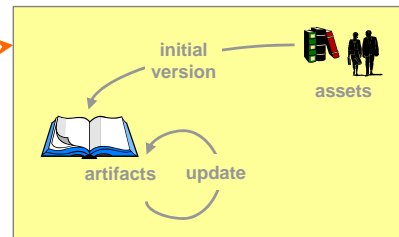
# Lessons Learned

experiences from  
applications in industry

# Lessons Learned – Basic Concepts

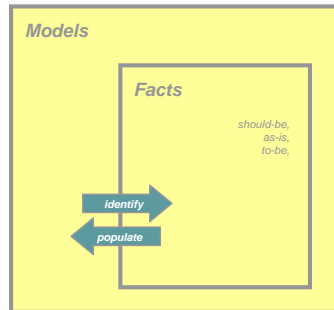
Process understanding requires realizing that:

- activities, roles and artifacts are all necessary; but, none is sufficient
- assets are also necessary (and different from artifacts)
- conditions are also necessary
- phases are not a decomposition (WBS) notion
- procedures/techniques  $\neq$  processes



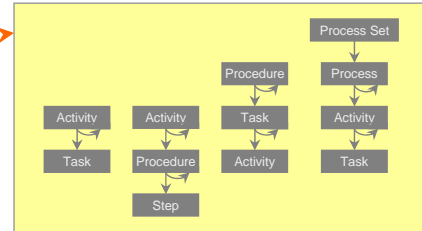
# Lessons Learned – Architecture

One architecture does not “fit all”



Multiple architectures (models) are needed to accommodate different ways of thinking about a process.

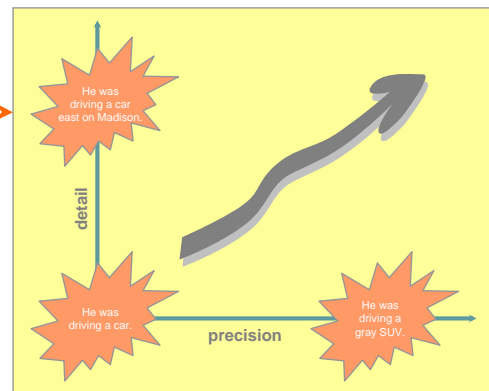
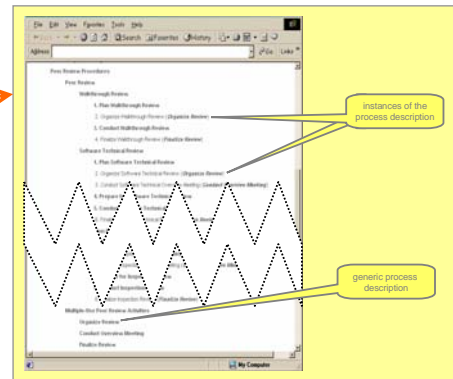
- Terminology Differences
- Decomposition Variations
- Composite Concepts
- Organization, Division and Project-specific Attributes and Relationships



# Lessons Learned – Modeling/Analysis

Process modeling/analysis requires support for:

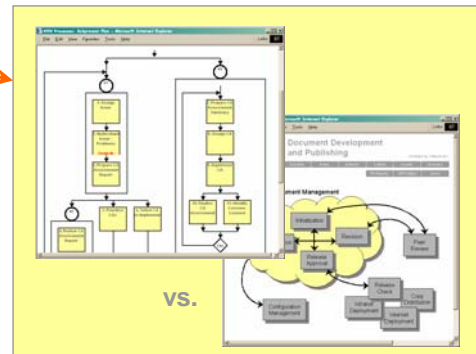
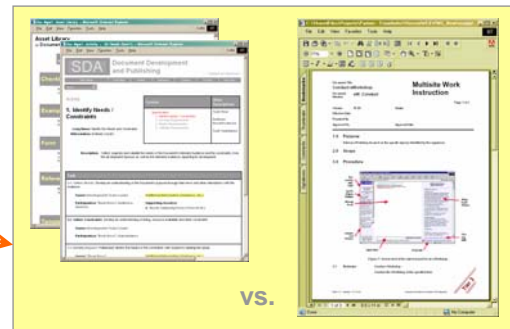
- composite concept definition
- reusable process modeling fragments
- “detail” versus “precision”
- support for tailoring and coupling is necessary



# Lessons Learned – Generation

Process rendering requires:

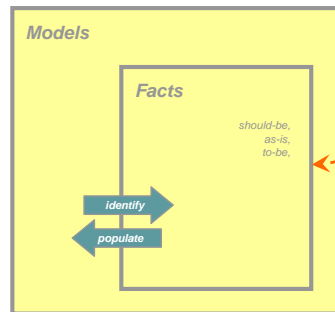
- automated generation of alternative renditions
- generating graphics as well as incorporating manually-developed graphics



# Lessons Learned – Database

One schema can “fit all”

- “Just the Facts”



The facts are the same no matter which architecture is used to organize them.

- Self-describe the Architecture
- But ... Question domains may require additional, domain-specific information



# Lessons Learned – Value Demonstration

Process management activities lead to relatively small cost savings.

Converting Manual to Online Documentation:

- cost: 50k US\$
- savings: 170k US\$
- ROI: 340% (per year)

However, they:

- amplify the return realized by other cost-reduction efforts, and
- should be evaluated on a cost-recovery basis.

Non-conformance Cost Reduction:

- cost: 1.10m US\$
- savings: 8.20m US\$
- ROI: 750% (per year)

Amplification By Cost Reduction:

- reduce by 25%: ROI 1000%
- reduce by 33%: ROI 1125%
- reduce by 50%: ROI 1500%

Cost-recovery:

- cost: 50k US\$
- return:
  - stay in business: ROI ∞%
  - satisfy customers: ROI ?%
  - increase efficiency: ROI ?%
  - etc.

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# Summary

# Process Excellence ... faster ... better!



Process  
Excellence

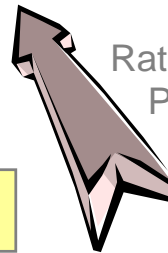
Process Definition

Process Excellence requires ...  
... continuous process  
improvement ...  
... facilitated by rapid evolution  
of consistent, high-quality  
documents supporting process  
evolution.

Consistent Descriptions

Rapid Process Change

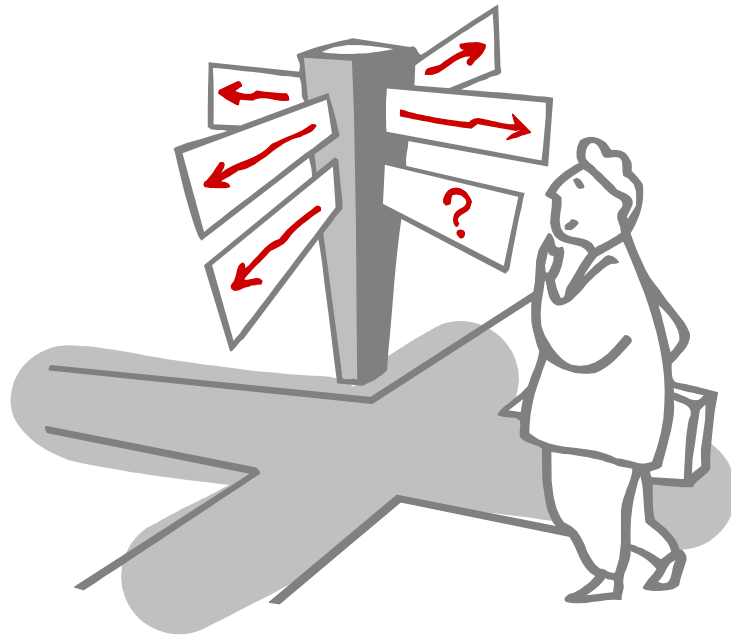
Coherent Process Architecture



Rational  
Process  
Management

# Questions?

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SDA

**SOLUTION DEPLOYMENT AFFILIATES**

*Know How... Now*

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**William E. Riddle** is a Senior Solution Architect at Solution Deployment Affiliates and a Senior Scientist at Fraunhofer IESE in Kaiserslautern, Germany. He helps organizations acquire and effectively apply process infrastructure technology in pursuit of high-value, high-quality (business and technical) processes that are continuously up-to-date and fit-for-purpose.

Previously, Bill was a Solution Architect at TeraQuest Metrics Inc. (where his activities included process management tool suite architecture, product line design, and training), a Senior Member of the Technical Staff at the Software Engineering Institute (where he established and led a group working on support for highly effective, efficient, flexible teams), President of Software Design & Analysis Inc. (a software engineering consultancy specializing in software processes, software engineering environments, and technology transfer), and Director of the Rocky Mountain Institute of Software Engineering (a non-profit organization he founded to assist in the transition of modern software engineering technology into widespread use). Bill was the first Chief Technical Officer at the Software Productivity Consortium where he established and led a software productivity improvement program oriented toward the needs of the Consortium's aerospace industry sponsors. He has also been a Manager of Software Engineering at Cray Laboratories and a Professor at the Universities of Michigan and Colorado.

Bill is a former ACM National Lecturer, former Chair of the ACM Special Interest Group on Software Engineering, an IEEE Fellow, and recipient of the Most Influential ICSE-8 Paper Award and the 1999 ACM SigSoft Distinguished Service Award. He is frequently involved in organizing workshops and conferences, and he chaired the 9th International Conference on Software Engineering. He received B.E.P., M.E.P. and M.S. degrees from Cornell University and his Ph.D. from Stanford University.