The Rap on RUP™ : An Introduction to the Rational Unified Process™

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Survey

- Does your organization have a well defined methodology/process?
- Does your organization use OOA/OOD?
- Does your organization use UML?

Agenda

- What is RUP?
- RUP Fundamentals
- Phases
- Product “features”
- Caveats
- Summary
- Questions

Process/Methodology Product Presentation

- Minimal UML bashing
- No rhyming
- No comparison with other methodologies
- RUP appears to be in flux since Rational's acquisition by IBM

Why RUP™ at SPIN?

- *The (RUP™) Knowledge base allows development teams to gain the full benefits of the industry standard UML*
- RUP™ covers all UML models
- RUP™ is hot; the latest silver bullet...

What is RUP™?

- A “software engineering process” (methodology)
- A knowledge base “process product”
  - CD to create web site
- UML model focused, not “paper documents” (but…)

What is RUP™?

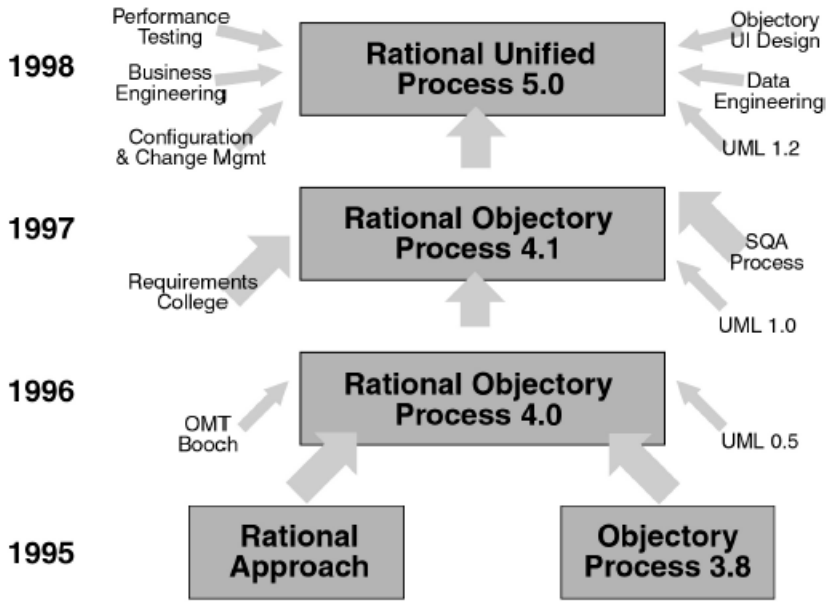
- Configurable process/product
  - Recognizes and supports variety of different project types
  - Support for tailoring and configuring project web sites
- Project oriented

3 Flavors of RUP

- Generic - not dependant on specific technology
- Microsoft Web Solution Technology
  - Additional templates, guidelines etc
- IBM Websphere™ Technology

History

- Methodology by Merger & Acquisition
- Objectory Process created in ‘80s
- Rational Approach created in ‘80s
- Acquisition of RequisitePro
- IBM acquires Rational



Genealogy of the Rational Unified Process

Why Should You Care About RUP™?

- Your organization is at SEI/CMM Level 1 "Ad Hoc"
  - Provides an excellent path to CMM Levels 2 and 3
- You need to add OOA/OOD to your current process/methodology
- Management wants to know when you're going to use the latest silver bullet

RUP™ Fundamentals

- RUP is object and process oriented
  - Data takes a back seat
- Architecture is “key to success”
  - Emphasizes need for prototyping of core functionality, not just UI
- Iterative development
- Use Cases are (were?) primary requirements specification technique

4 Phases

- Inception
- Elaboration
- Construction
- Transition

Inception

- Establish business case and business models
- Establishes initial “vision”, high level requirements via “business” use cases
- Create stakeholder “buy in”
- Evaluate risks and return

Elaboration

- Detailed requirements
- Architecture and prototype
- Design

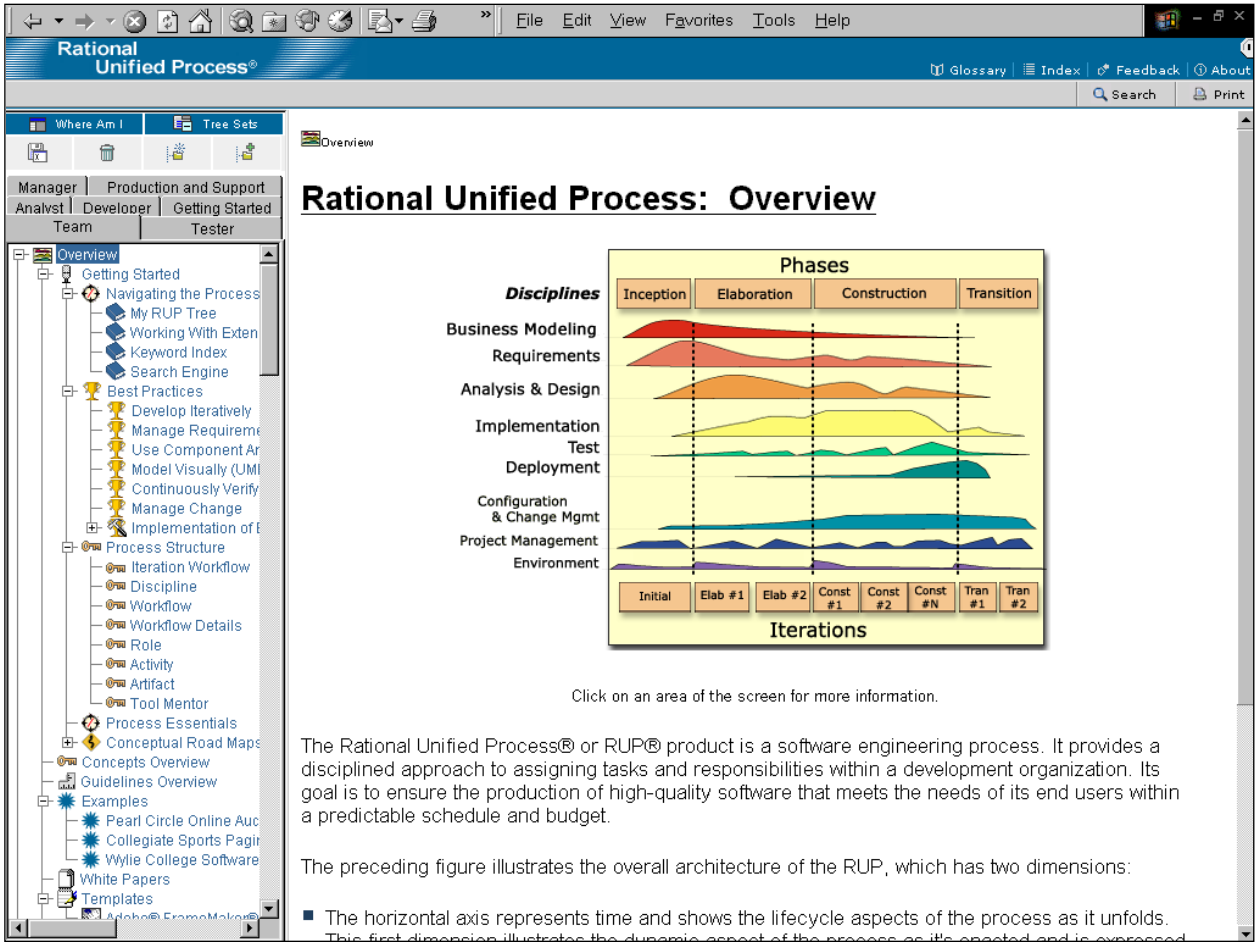
Construction

- Coding and testing

Transition

- Putting the product in the user's hands
- Highly variable, depending on product
  - Data migration
  - Training
  - Parallel Operations
  - Beta testing
  - Etc.

Overview of RUP™ (Organization)



Best Practices

- Develop software iteratively
- Manage requirements
- Use component-based architectures
- Model visually
- Continuously verify quality
- Control changes

Key Concepts of RUP™

- Organized by *discipline*
- *Workflow* - model of process for a discipline
- *Workflow Details* - 2nd level detail of workflow, detailing activities, roles and artifacts
- *Role* - who performs an activity
- *Activity* - defined piece of work that results in an artifact

More Key Concepts

- *Artifact* - a deliverable, may be document, model, code, etc
  - Templates and examples for many artifacts
- *Tool Mentor* - guide on using Rational Tools for RUP™

Analyst Roles

- Business-Model Reviewer
- Business Designer
- Business-Process Analyst
- System Analyst
- Requirements Specifier
- Test Analyst
- User-Interface Designer

Developer Roles

- Capsule Designer
- Code Reviewer
- Database Designer
- Implementer
- Integrator

More Roles

- Testers
- Managers
- Process Engineer
- Project Manager
- Change Control Manager
- Configuration Manager
- Deployment Manager
- Project Reviewer
- Test Manager

Disciplines

- A collection of related activities that are related to a major 'area of concern' within the overall project
- Disciplines span phases

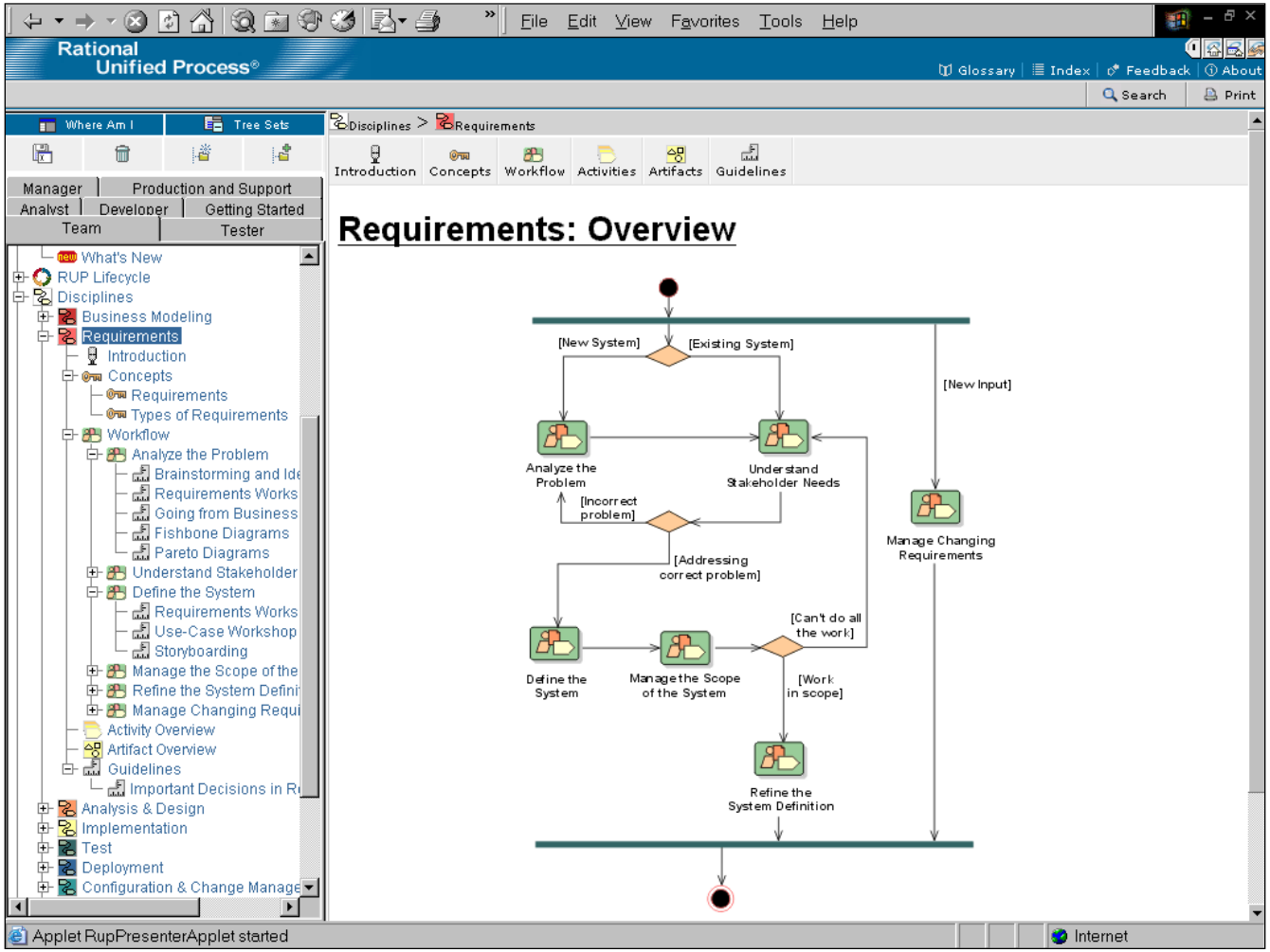
RUP™'s Disciplines

- Business Modeling
- Requirements
- Analysis and Design (Analysis <> Requirements, not performed by "analyst" role)
- Implementation
- Test
- Deployment
- Configuration and Change Management
- Project Management
- Environment

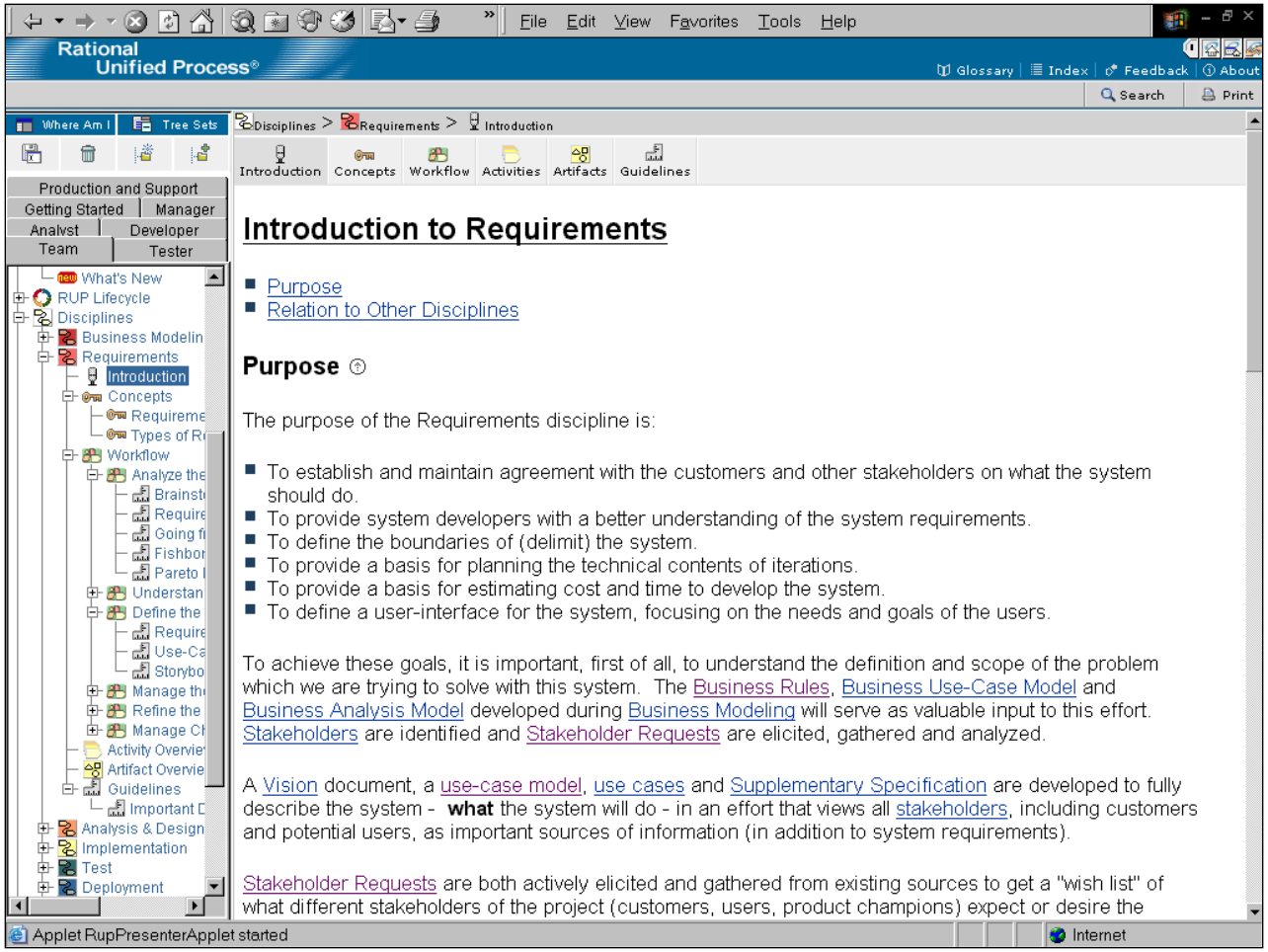
Each Discipline is Composed of:

- Overview
- Introduction
- Concepts
- Workflow - the high level activity diagram (process flow)
- Workflow detail - second level process
- Activities - actions performed by roles
- Artifacts - deliverables
- Guidelines - tutorials, checklists, etc

Discipline Overview

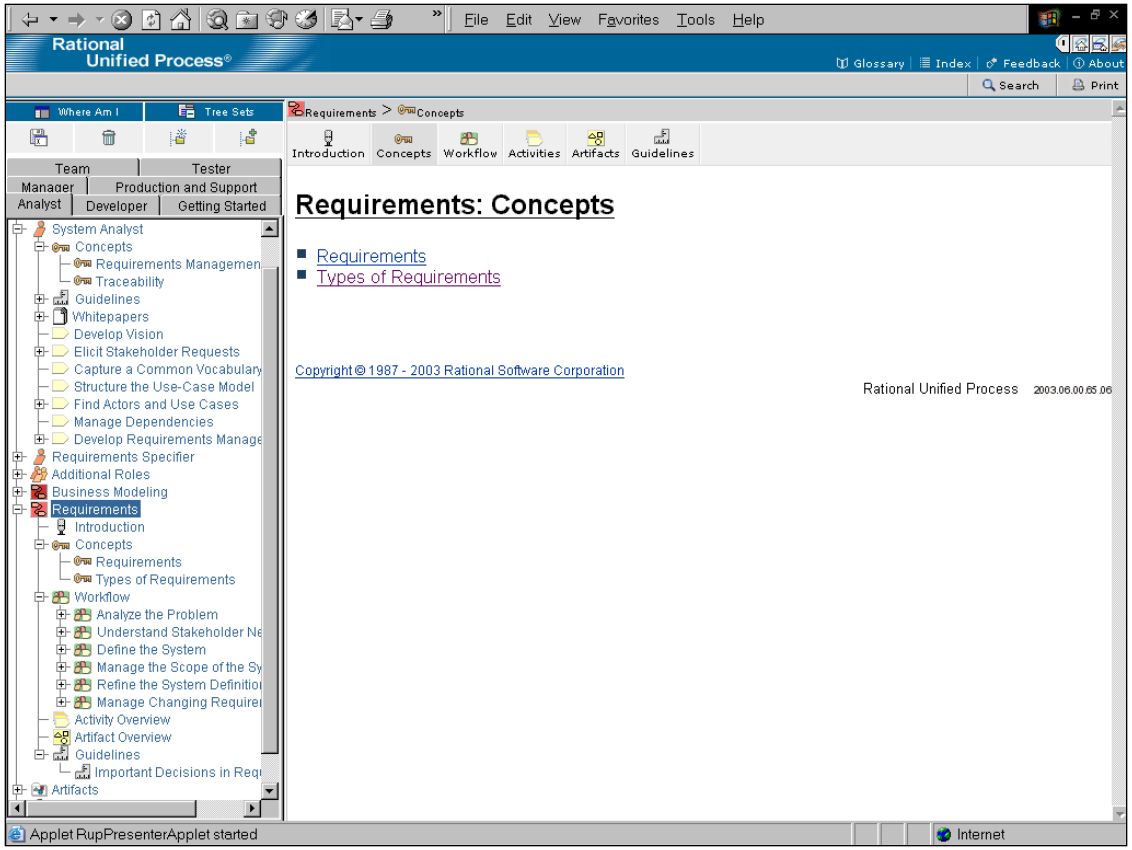


Introduction



Concepts

- Fundamentals of discipline/role



Concept Example

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Where Am I | Tree Sets

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Analyst | Developer | Getting Started

- System Analyst
  - Concepts
    - Requirements Managemen
    - Traceability
  - Guidelines
  - Whitepapers
  - Develop Vision
  - Elicit Stakeholder Requests
  - Capture a Common Vocabulary
  - Structure the Use-Case Model
  - Find Actors and Use Cases
  - Manage Dependencies
  - Develop Requirements Manage
- Requirements Specifier
- Additional Roles
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    - Types of Requirements
  - Workflow
    - Analyze the Problem
    - Understand Stakeholder Ne
    - Define the System
    - Manage the Scope of the Sy
    - Refine the System Definitio
    - Manage Changing Require
  - Activity Overview
  - Artifact Overview
  - Guidelines
    - Important Decisions in Req
- Artifacts

Requirements > Concepts > Requirements

Concepts: Requirements

A **requirement** is defined as "a condition or capability to which a system must conform".

There are many different kinds of requirements. One way of categorizing them is described as the **FURPS+** model [GRA92], using the acronym FURPS to describe the major categories of requirements with subcategories as shown below.

- Functionality
- Usability
- Reliability
- Performance
- Supportability

The "+" in FURPS+ reminds you to include such requirements as:

- design constraints
- implementation requirements
- interface requirements
- physical requirements.

(See also [IEEE Std 610.12.1990].)

Functional requirements specify actions that a system must be able to perform, without taking physical constraints into consideration. These are often best described in a use-case model and in use cases. Functional requirements thus specify the input and output behavior of a system.

Requirements that are not functional, such as the ones listed below, are sometimes called **non-functional requirements**. Many requirements are non-functional, and describe only attributes

http://www.rational.com/eval/rup/process/workflow/requirem/co_req.htm#Interface Requirement | Internet

Everything is Use-Case Driven

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      - Examples
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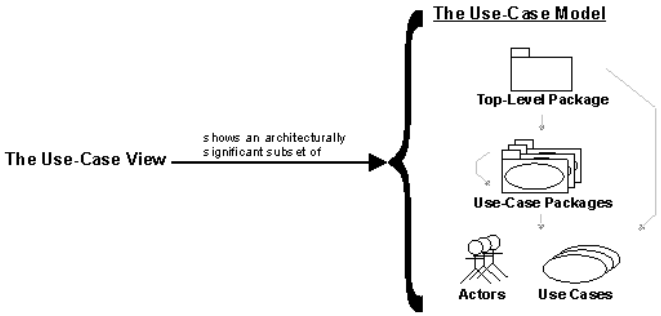
    - Requirements Attributes
  - Business Modeling Artifact Set
  - Change Request
  - Review Record
- Tool Mentors
- Additional Resources

Artifacts > Requirements Artifact Set > Use-Case Model > Use-Case View

Concepts: Use-Case View

To provide a basis for planning the technical contents of iterations, an architectural view called the **use-case view** is used in the Requirements discipline. There is only one use-case view of the system, which illustrates the use cases and scenarios that encompass architecturally significant behavior, classes, or technical risks. The use-case view is refined and considered initially in each iteration.



The use-case view shows an architecturally significant subset of the use-case model, a subset of the use cases and actors.

The analysis, design, and implementation activities subsequent to requirements are centered on the notion of an **architecture**. The production and validation of that architecture is the main focus of the early iterations, especially during the Elaboration phase. Architecture is represented by a number of different architectural views, which in their essence are extracts illustrating the "architecturally significant" elements of the models.

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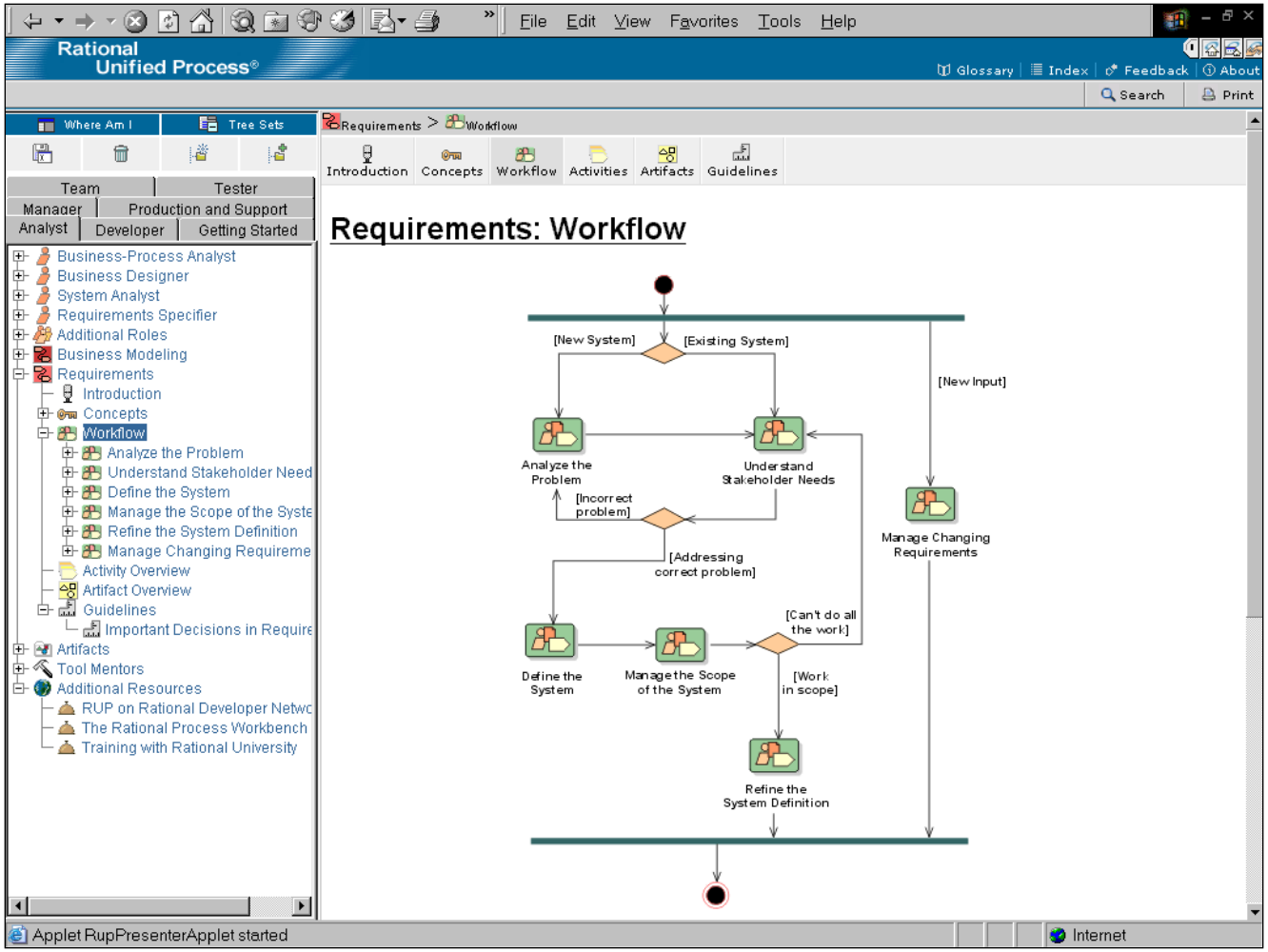
Workflow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Understand Stakeholder Need
Define the System
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Training with Rational University
Requirements: Workflow
[New System]
[Existing System]
[New Input]
Analyze the Problem
Understand Stakeholder Needs
[Incorrect problem]
[Addressing correct problem]
Manage Changing Requirements
[Can't do all the work]
Define the System
Manage the Scope of the System
[Work in scope]
Refine the System Definition
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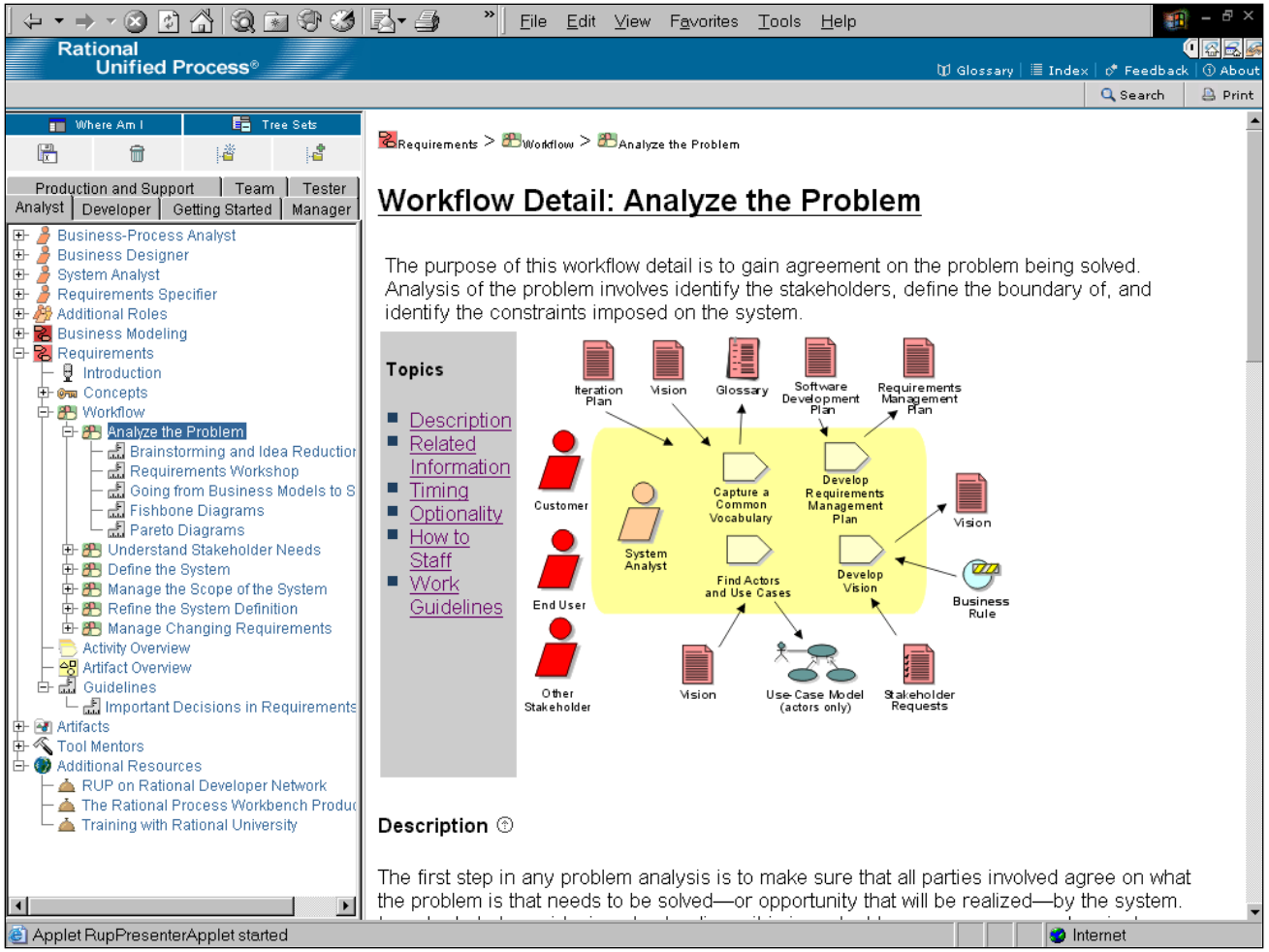
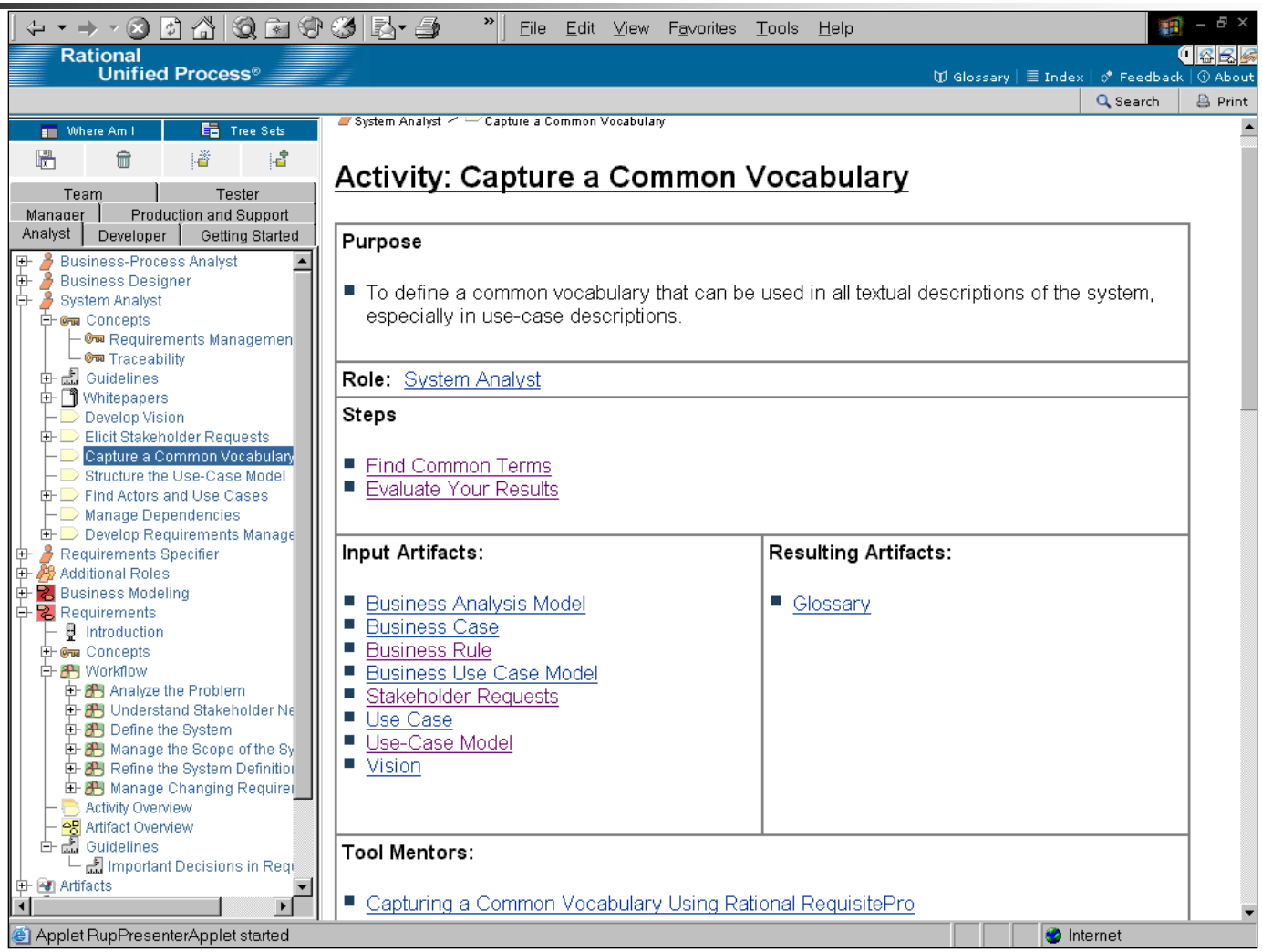
Workflow Detail



Activity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System Analyst / Capture a Common Vocabulary
Activity: Capture a Common Vocabulary
Purpose
To define a common vocabulary that can be used in all textual descriptions of the system, especially in use-case descriptions.
Role: System Analyst
Steps
Find Common Terms
Evaluate Your Results
Input Artifacts:
Business Analysis Model
Business Case
Business Rule
Business Use Case Model
Stakeholder Requests
Use Case
Use-Case Model
Vision
Resulting Artifacts:
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Tool Mentors:
Capturing a Common Vocabulary Using Rational RequisitePro
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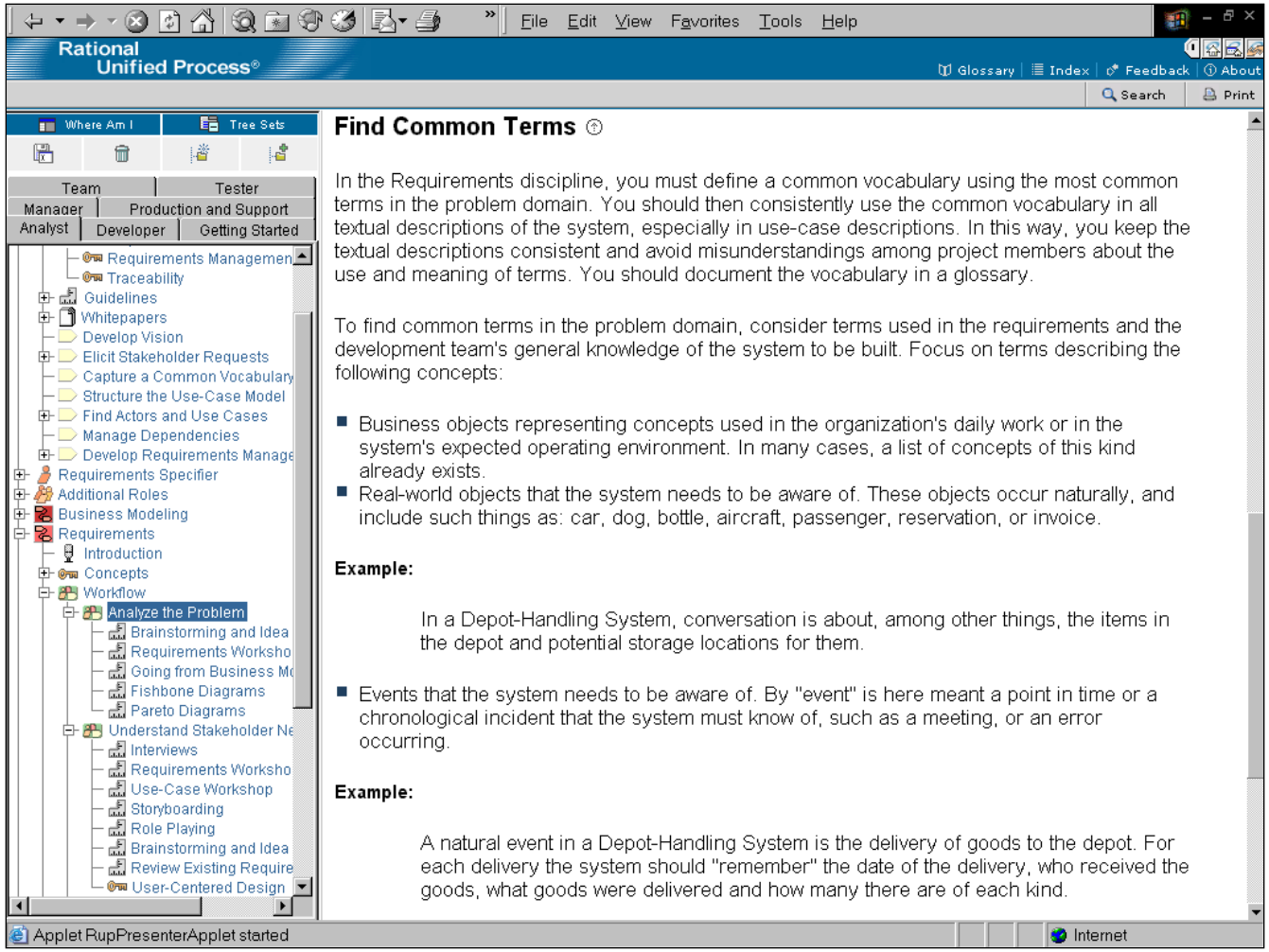
Activity Step



Artifacts May Be Documents, Models, Code, Etc.

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  - Business Vision
  - Business Glossary
  - Target-Organization Assess
  - Business Goal
  - Business Rule
  - Business Use-Case Model
  - Supplementary Business S
  - Business Analysis Model
  - Business Architecture Docu

	The Glossary defines important terms used by the project.
Role:	System Analyst
Optionality/Occurrence:	Primary artifact used to capture information about the project's business domain. Inception and Elaboration phases.
Templates and Reports:	■ Template: Glossary
Examples:	■ CREG Glossary - Elaboration Phase ■ CREG Glossary - Inception Phase ■ CSPS Glossary V1.0 ■ CSPS Glossary V2.0
UML Representation:	Not applicable.
More Information:	■ Checklist: Glossary

- **Purpose**
- **Timing**
- **Responsibility**
- **Tailoring**

Input to Activities:

- Architectural Analysis
- Assess Viability of Architectural Proof-of-Concept
- Detail a Use Case
- Detail the Software Requirements
- Find Actors and Use Cases

Output from Activities:

- Capture a Common Vocabulary

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Document Templates

- Templates for document artifacts available in a variety of formats
  - Microsoft Word
  - HTML
  - Framemaker
  - Rational SODA
- Business Glossary Template

Guidelines

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  - Training with Rational University

Guidelines: Important Decisions in Requirements

Topics

- Decide How to Perform the Workflow
- Decide How to Use Artifacts
- Decide Which Reports to Use
- Decide How to Maintain "Input Requirements"
- Decide How to Approve Use Cases

Decide How to Perform the Workflow

The following decisions should be made regarding the Requirements discipline's workflow:

- Decide how to perform the workflow by looking at the Requirements: Workflow. Study the diagram with its *guard conditions*. Decide which workflow details to perform and in which order.
- Decide what parts of the Requirements workflow details to perform. The table below shows some parts that can be introduced relatively independently from each other.
- Decide when, during the project lifecycle, to introduce each part of the workflow. As a general rule, the Requirements discipline should be introduced early in the project.

Part of workflow	Comments
Use-Cases	Some projects do not employ use-cases, which means that the project will not develop artifacts such as a Use-Case Model, Use-Case Package and Use Case. Instead use the Software Requirements Specification.
Workflow Detail: Manage Changing Requirements	This can be introduced after a few iterations in the project when there is a stable baseline.

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Guideline Example

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        - Templates
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      - Use-Case Model Survey
      - Examples
    - Requirements Managemen
    - Requirements Attributes
  - Analysis & Design Artifact Set
  - Implementation Artifact Set
  - Test Artifact Set

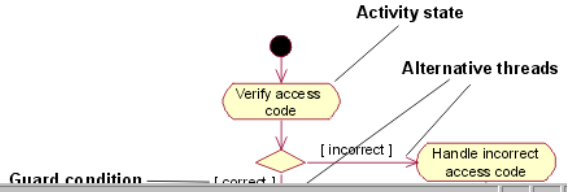
Artifacts > Requirements Artifact Set > Use-Case Model > Use Case > guidelines > Activity Diagram in the Use-Case Model

Guidelines: Activity Diagram in the Use-Case Model

The flow of events of a use case describes what needs to be done by the system to provide value to an actor. It consists of a sequence of activities that together produce something for the actor. The flow of events consists of a basic flow, and one or several alternative flows.

The flow of events of a use case can be described graphically with the help of an activity diagram. Such a diagram shows:

- **Activity states**, which represent the performance of an activity or step within the flow of events.
- **Transitions** that show what activity state follows after another. This type of transition is sometimes referred to as a completion transition, since it differs from a transition in that it does not require an explicit trigger event, it is triggered by the completion of the activity the activity state represents.
- **Decisions** for which a set of **guard conditions** are defined. These guard conditions control which transition (of a set of alternative transitions) follows once the activity has been completed. Decisions and guard conditions allow you to show **alternative threads** in the flow of events of a use case.
- **Synchronization bars** which you can use to show parallel subflows. Synchronization bars allow you to show **concurrent threads** in the flow of events of a use case.



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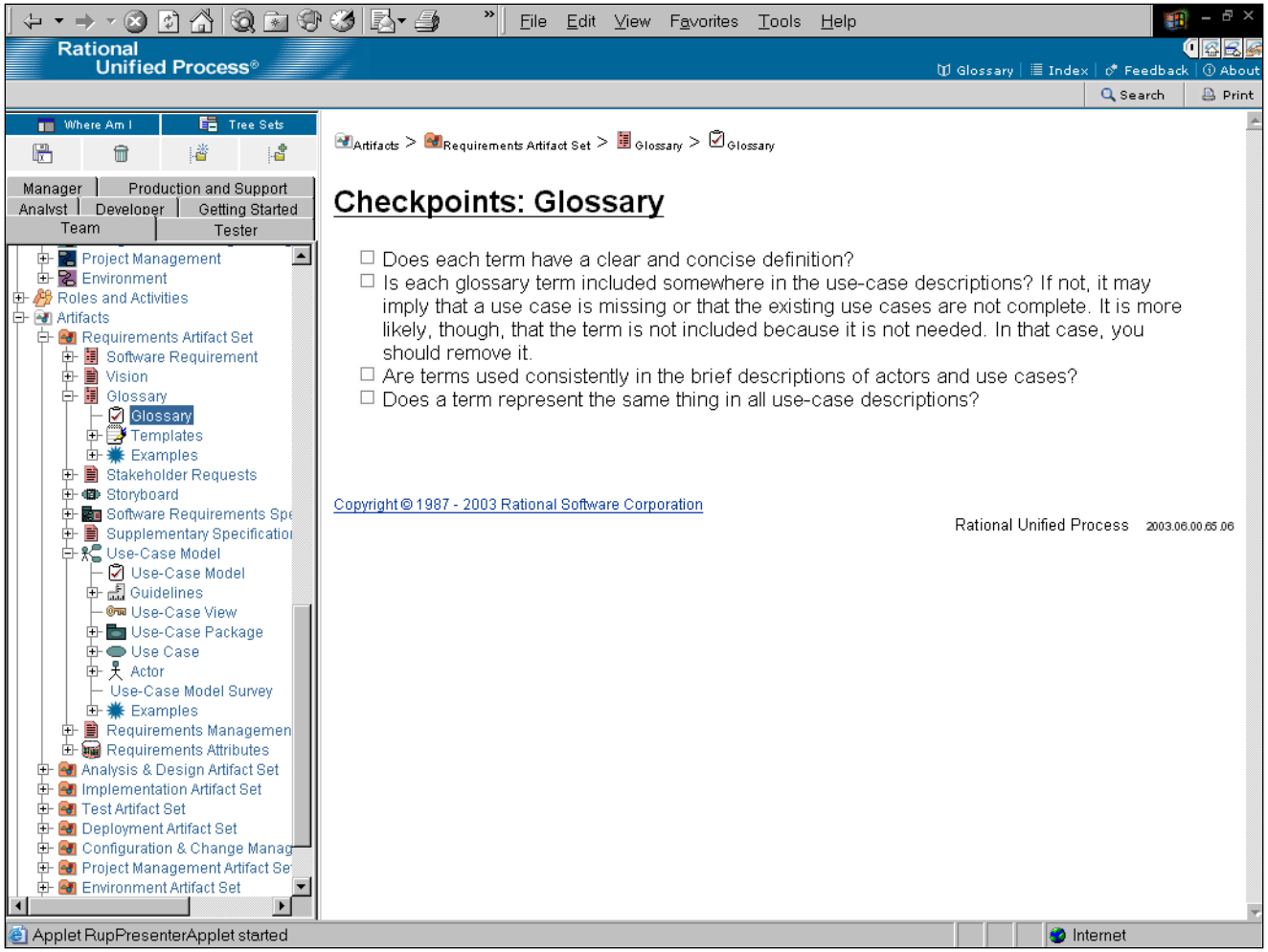
Checkpoints for Quality Reviews



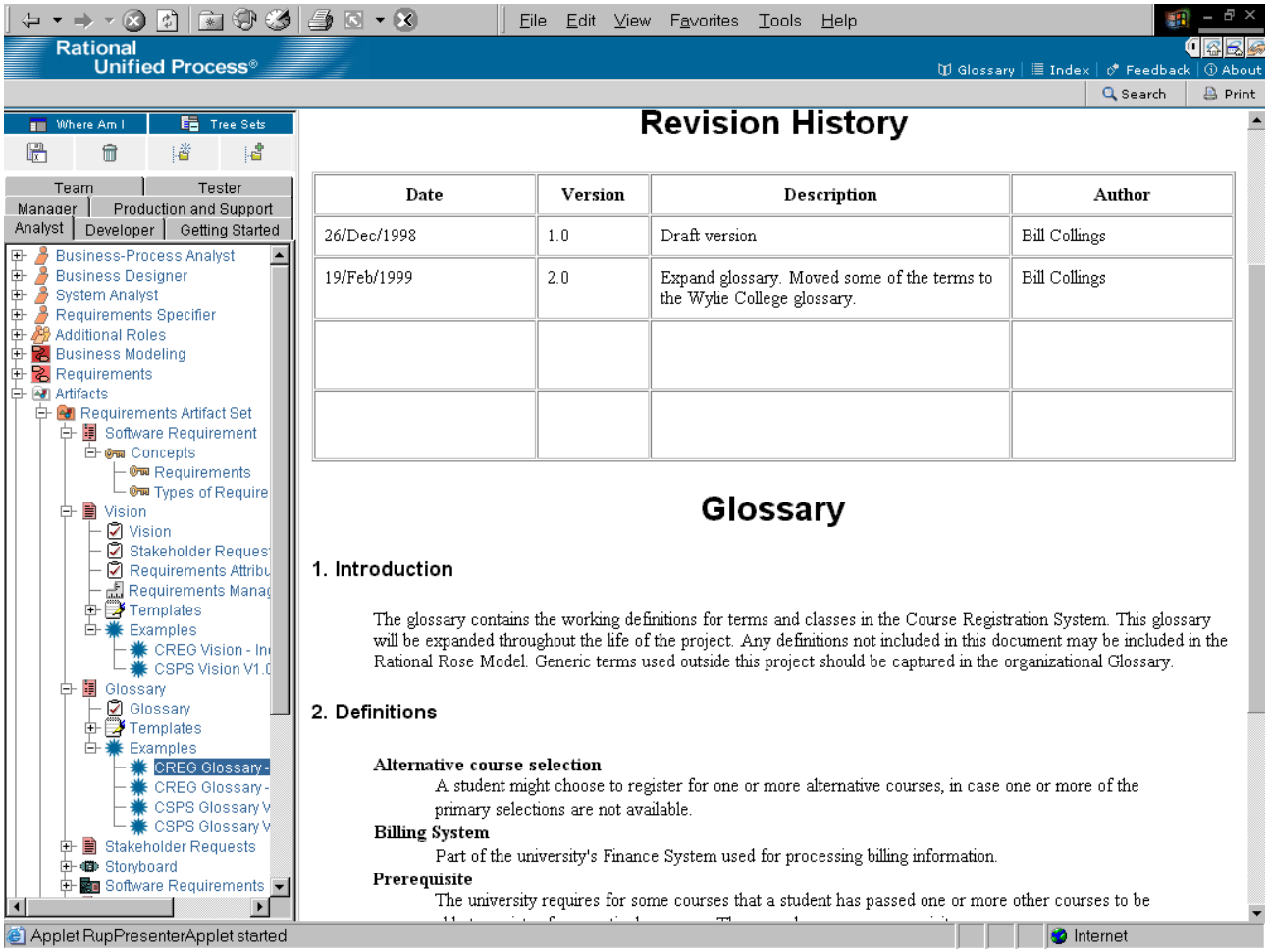
More Stuff

- Sample Projects
- Project Management Templates
- Tool Mentors

Sample Projects

- Examples of many artifacts for two projects
  - Course Registration System
  - Collegiate Sports Paging Systems

Glossary Example



Revision History

Date	Version	Description	Author
26/Dec/1998	1.0	Draft version	Bill Collings
19/Feb/1999	2.0	Expand glossary. Moved some of the terms to the Wylie College glossary.	Bill Collings

Glossary

1. Introduction

The glossary contains the working definitions for terms and classes in the Course Registration System. This glossary will be expanded throughout the life of the project. Any definitions not included in this document may be included in the Rational Rose Model. Generic terms used outside this project should be captured in the organizational Glossary.

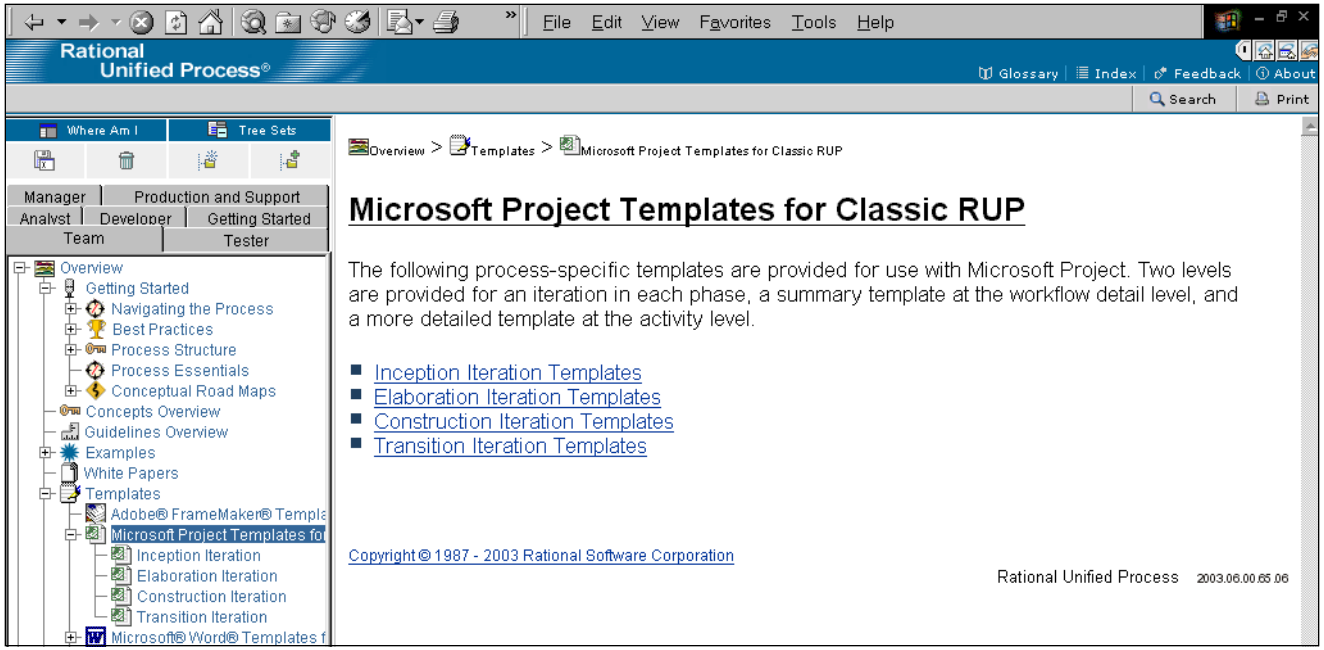
2. Definitions

Alternative course selection
A student might choose to register for one or more alternative courses, in case one or more of the primary selections are not available.

Billing System
Part of the university's Finance System used for processing billing information.

Prerequisite
The university requires for some courses that a student has passed one or more other courses to be

Project Management Templates



- Summary MS Project Example
- Detail MS Project Example

Tool Mentors - How to Use Rational Tools in RUP™

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  - Rational PurifyPlus
  - Rational QualityArchitect
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    - Change Management
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      - Creating a Baseline of a
      - Archiving Requirements
      - Viewing Requirement H
      - Adding Templates to Your R
      - Setting Up Rational Requisi
  - Rational Robot
  - Rational Rose
  - Rational Rose RealTime
  - Rational SoDA
  - Rational TestManager
  - Rational Test RealTime

Tool Mentor: Adding Templates to Your Rational RequisitePro Project

Purpose

This tool mentor describes how to use Microsoft® Word documents as templates for documents in your Rational RequisitePro® projects. The templates are referred to as document "outlines" within RequisitePro.

This section provides links to additional information related to this tool mentor.

- Develop Requirements Management Plan
- Support Development
- Prepare Templates for the Project

Activity: Set Up Tools.

Overview

Every new document in RequisitePro is based on a document type. The document type includes a default file extension, a default requirement type, and default text and formatting (regarding fonts, tabs, and so on) and is controlled by an associated outline. RequisitePro provides the following outlines for requirements and use-case development:

- Product Requirements Document
- Software Requirements Specification
- Modern Software Requirements Specification
- Multiple Use-Case Specification

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Caveats

- RUP™ is far from complete
  - Focused on software development
  - Series of books on *Unified Process … Phase* by Scott Ambler and Larry Constantine provide "missing" coverage
- Project oriented
- Lack of comprehensive "book" makes learning difficult

More Caveats

- IBM influence is creating some confusion and inconsistencies
- Use Cases are insufficient for good requirements, IMHO
- Fails to adequately address “data intensive” applications
  - Only addresses database design, no place for “data requirements”
- Viewed as “silver bullet” by many

Summary

- Forms solid basis for improving software development process, particularly for ad-hoc, Level 1 organizations
- Provides basis for incorporating OOA/OOD/UML into current software development process
- Provides basis for development using IBM, Rational and Microsoft technologies
- 30 day on-line evaluation available, http://www.rational.com

Questions