UNIT-II

- ❑ Rational Unified Process
- ❑ 4+1 View Architecture
- ❑ Use Case Overview.

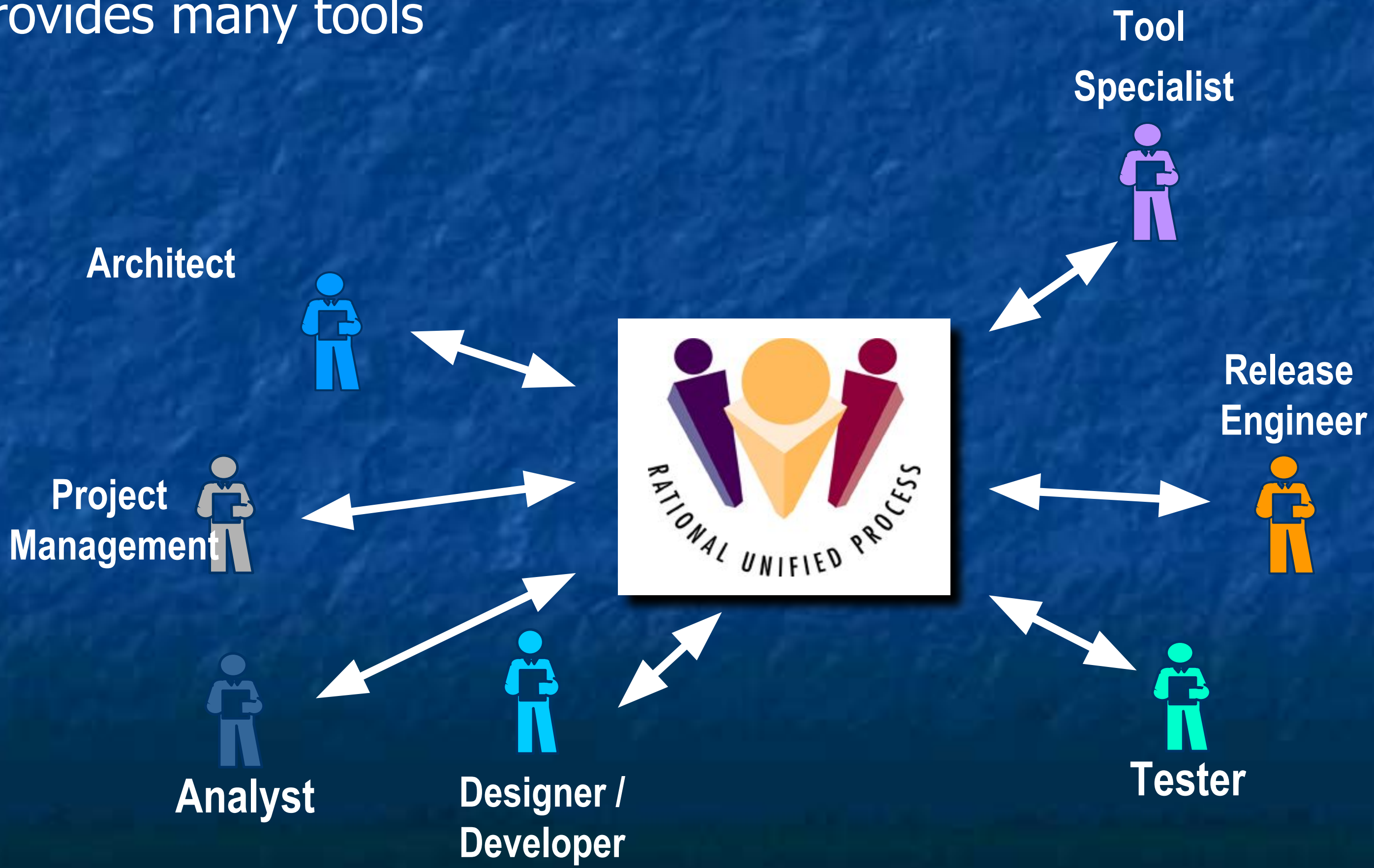
Rational Unified Process (RUP)

- Introduction
- Phases
- Core Workflows
- Best Practices
- Tools

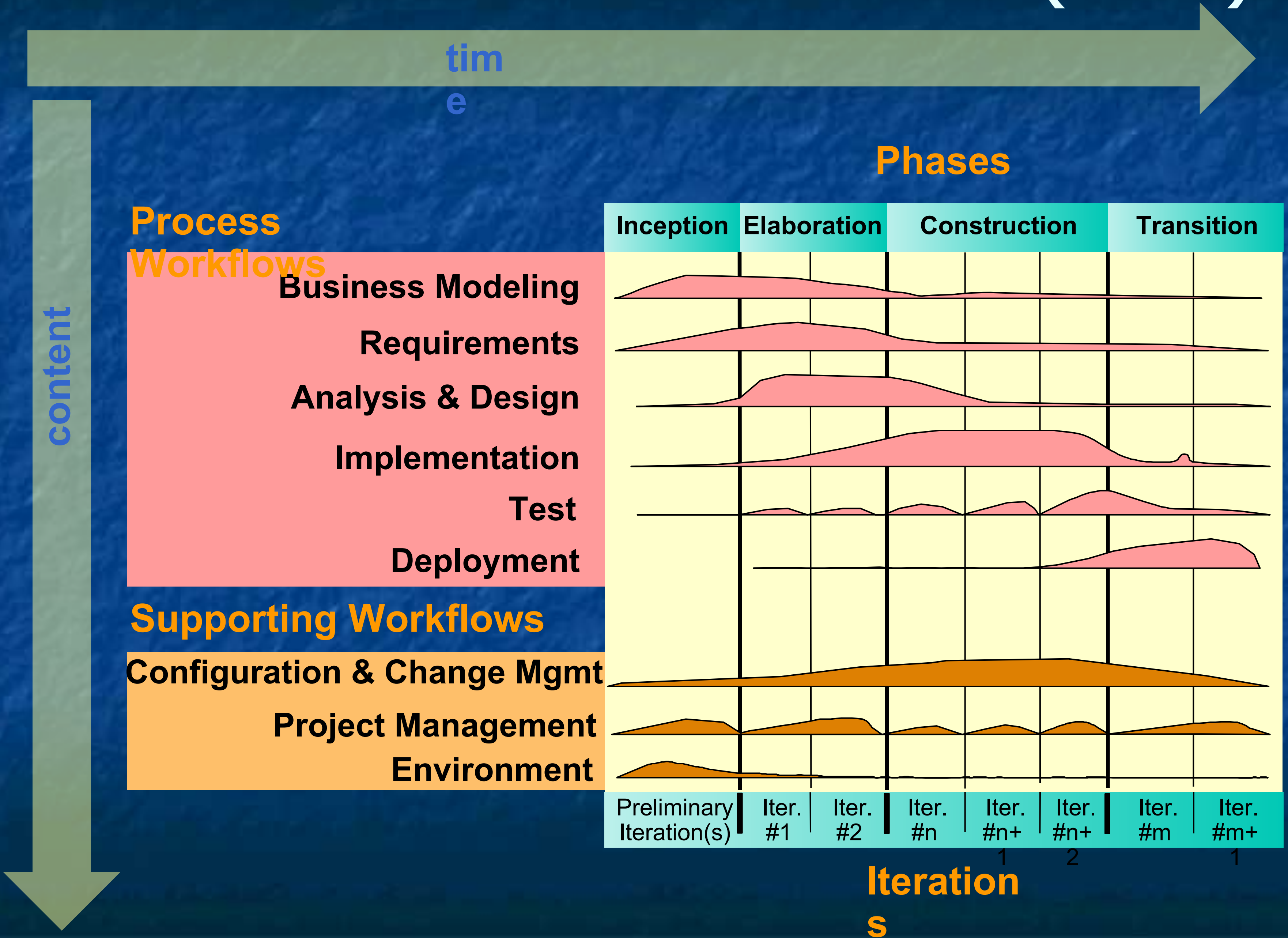
- **Team-Unifying Approach**

  The RUP unifies a software team by providing a common view of the development process and a shared vision of a common goal

- **Increased Team Productivity**
  - knowledge base of all processes
  - view of how to develop software
  - modeling language
  - Rational provides many tools



Rational Unified Process (RUP)



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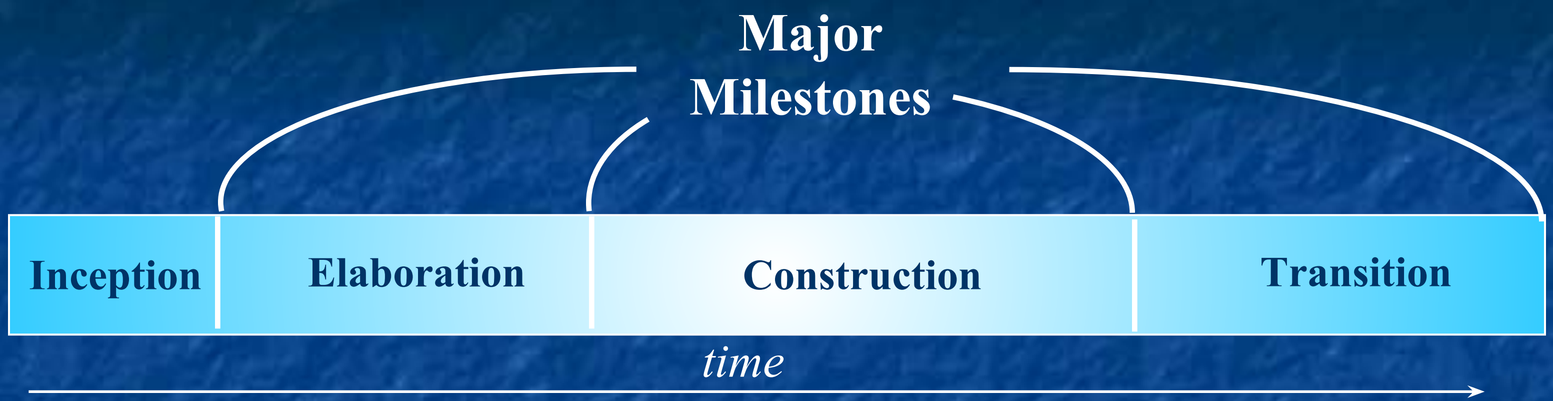
Phases in the Process



The Rational Unified Process has four phases:

- Inception - Define the scope of project
- Elaboration - Plan project, specify features, baseline architecture
- Construction - Build the product
- Transition - Transition the product into end user community

Inception phase

- Establishing the project's software scope and boundary conditions, including an operational vision, acceptance criteria.
- Discriminating the critical use cases of the system.
- Estimating the overall cost and schedule for the entire project (and more detailed estimates for the elaboration phase that will immediately follow).
- Estimating potential risks (the sources of unpredictability)
- Preparing the supporting environment for the project.

Elaboration phase

- **Defining, validating .**
- **Refining the Vision, based on new information obtained during the phase.**
- **Refining the development case and putting in place the development environment, including the process & tools.**
- **Refining the architecture and selecting components.**
- **The selected architectural components are integrated and assessed against the primary scenarios.**

Construction phase

- Resource management, control and process optimization.
- Complete component development and testing against the defined evaluation criteria.
- Assessment of product releases against acceptance criteria for the vision.

Transition phase

- Executing deployment plans.
- Finalizing end-user support material.
- Testing the deliverable product at the development site.
- Creating a product release.
- Getting user feedback.
- Fine-tuning the product based on feedback.
- Making the product available to end users.

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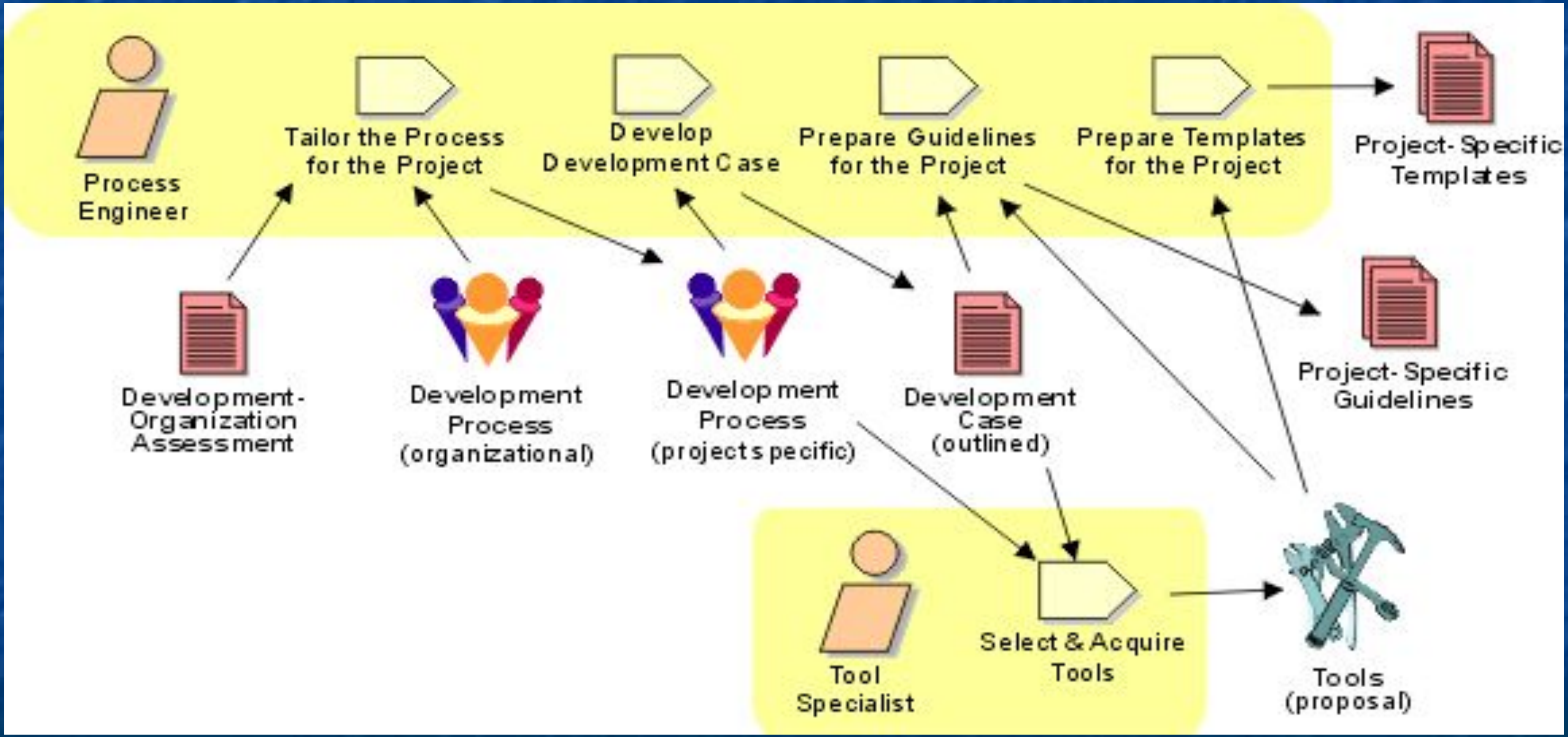
What is a workflow?

- A set of activities that is performed by the various roles in a project
- Describes a meaningful sequence of activities that produce a useful result (an artifact)
- Shows interaction between roles

Workflow Detail: Prepare Environment for Project


Process Engineer
Tailor the Process for the Project
Develop Development Case
Prepare Guidelines for the Project
Prepare Templates for the Project
Project-Specific Templates
Development-Organization Assessment
Development Process (organizational)
Development Process (project specific)
Development Case (outlined)
Project-Specific Guidelines
Tool Specialist
Select & Acquire Tools
Tools (proposal)

Workflows - 3 key elements

- Three key elements of each workflows:
  - Artifacts
  - Roles
  - Activities

Artifacts

A piece of information that:

- Is produced, modified, or used by a process
- Defines an area of responsibility
- Is subject to version control.

An artifact can be a *model*, a *model element*, or a *document*. A document can enclose other documents.

Roles

- Represent a role that an individual may play on the project
- Responsible for producing artifacts
- Distinct from actors

Activities

- Tasks performed by people representing particular roles in order to produce artifacts

Brief summary of process workflows

- Business Modelling
- Requirements
- Analysis & Design
- Implementation
- Test
- Deployment

Business Modelling

- Understand structure & dynamics of organization in which system is to be deployed
- Understand current problems in the target organization & identify improvement potential
- Ensure customers, end users & developers have common understanding of target organisation
- Derive system requirements to support target organisation

Analysis & Design

- Transform requirements into a design of the system
- Evolve a robust architecture for the system
- Adapt design to match the implementation environment, designing it for performance

Implementation

- Define organization of the code, in terms of implementation subsystems organized in layers
- Implement classes & objects in terms of components
- Test developed components as units
- Integrate results into an executable system

Test

- Verify interaction between objects
- Verify proper integration of all components of the software
- Verify that all requirements have been correctly implemented
- Identify & ensure defects are addressed prior to deployment

Deployment

- Provide custom installation
- Provide shrink wrap product offering
- Provide software over internet

Brief summary of supporting workflows

- Configuration & Change Management
- Project Management
- Environment

Configuration & Change Management

- Supports development methods
- Maintains product integrity
- Ensures completeness & correctness of configured product
- Provides stable environment within which to develop product
- Restricts changes to artifacts based on project policies
- Provides an audit trail on why, when & by whom any artifact was changed

Project Management

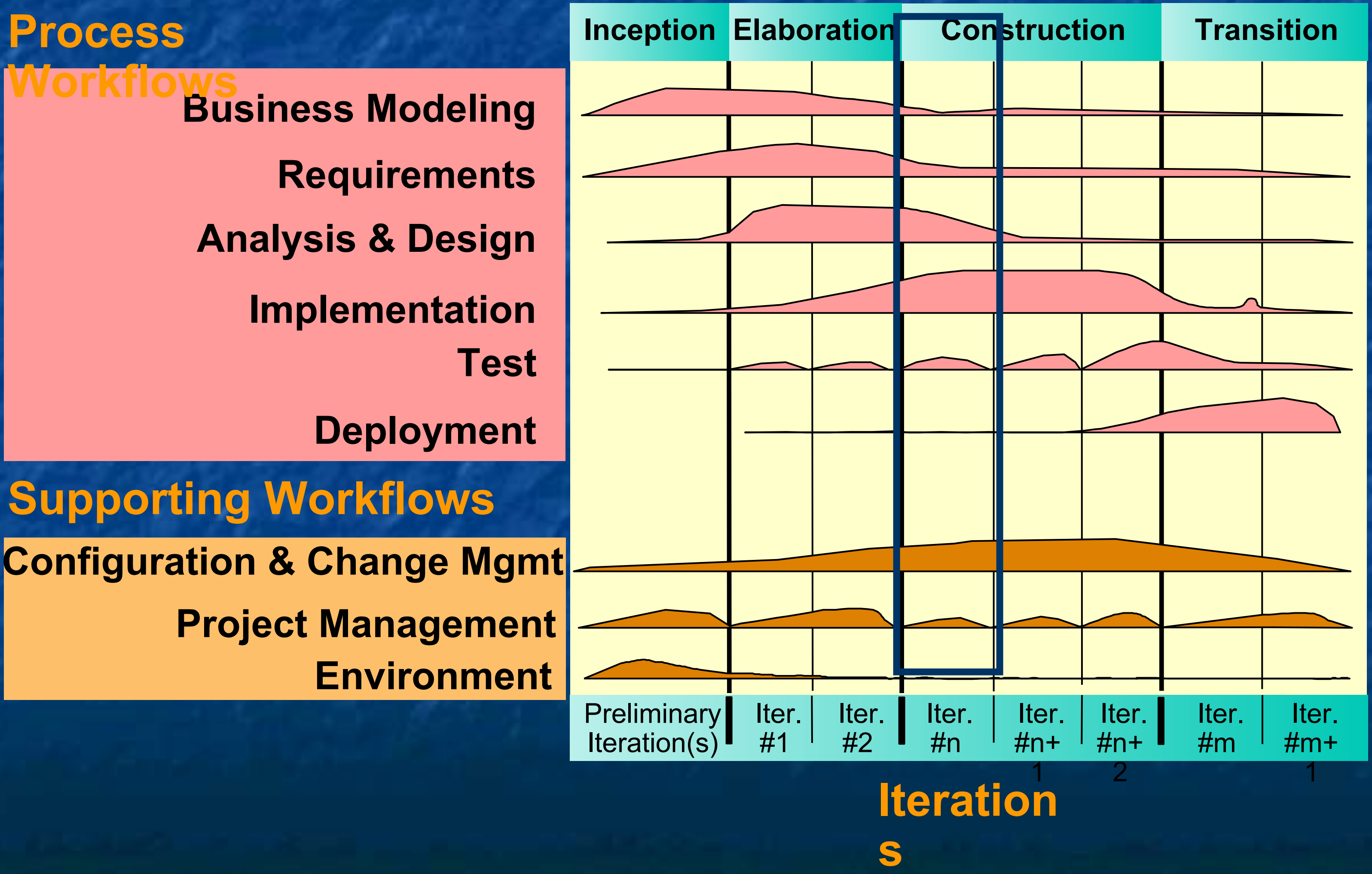
- A framework for managing software-intensive projects
- Practical guidelines for planning, staffing, executing & monitoring projects
- A framework for managing risk

Environment

- Design, implement and manage the project’s required technical environments
- Define the technical architectures for the development, system validation, testing & staging/release management environments
- When possible, standard architectural models for given types of platforms should be utilized when defining the production environment

Bringing It All Together...

In an iteration, you walk through all workflows



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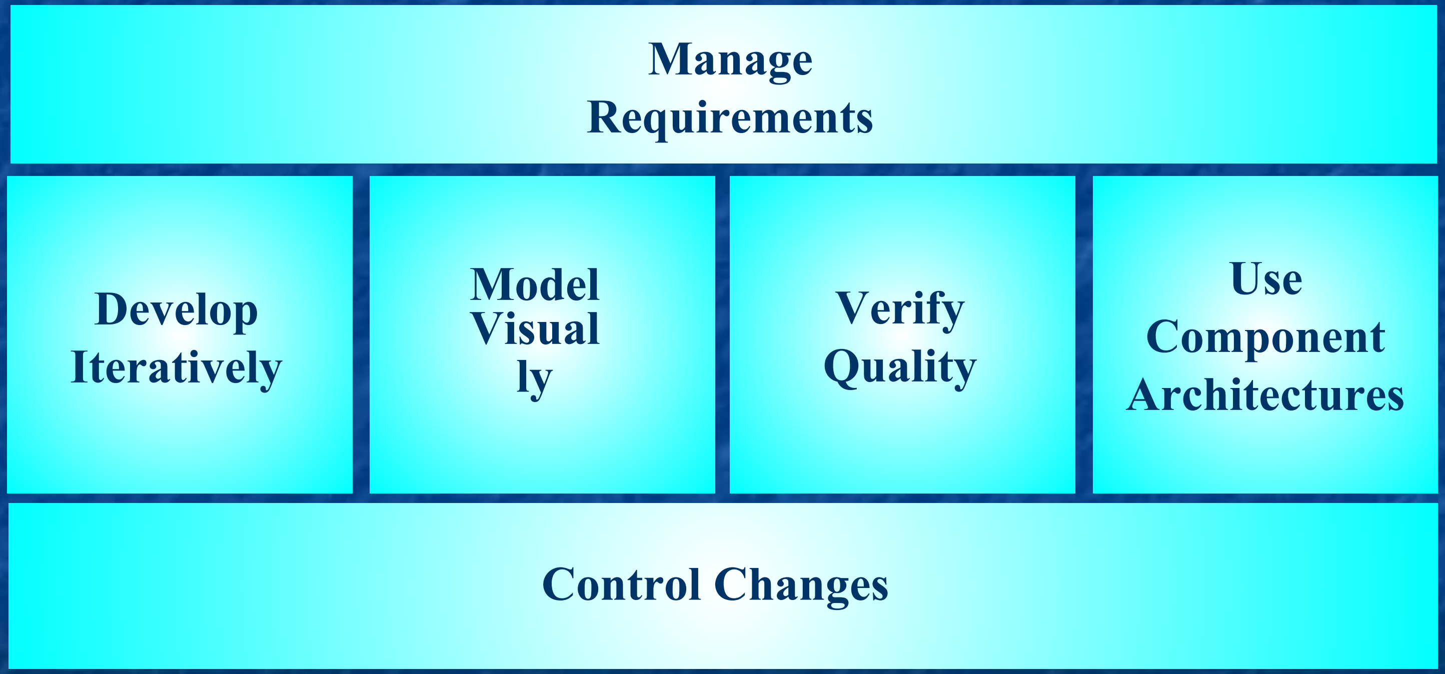
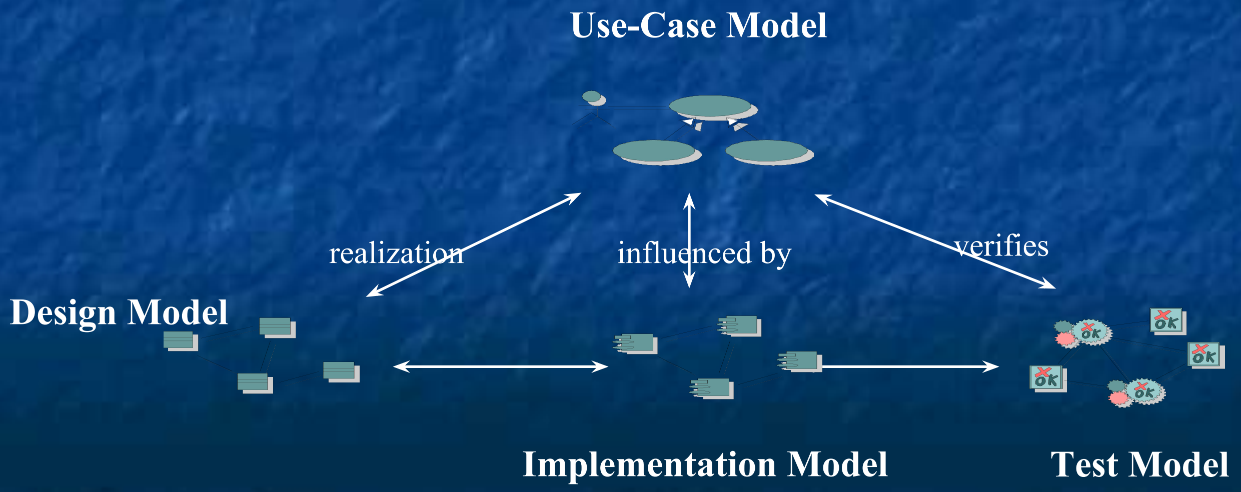
Rational Unified Process

Describes the effective implementation of key "Best Practices"



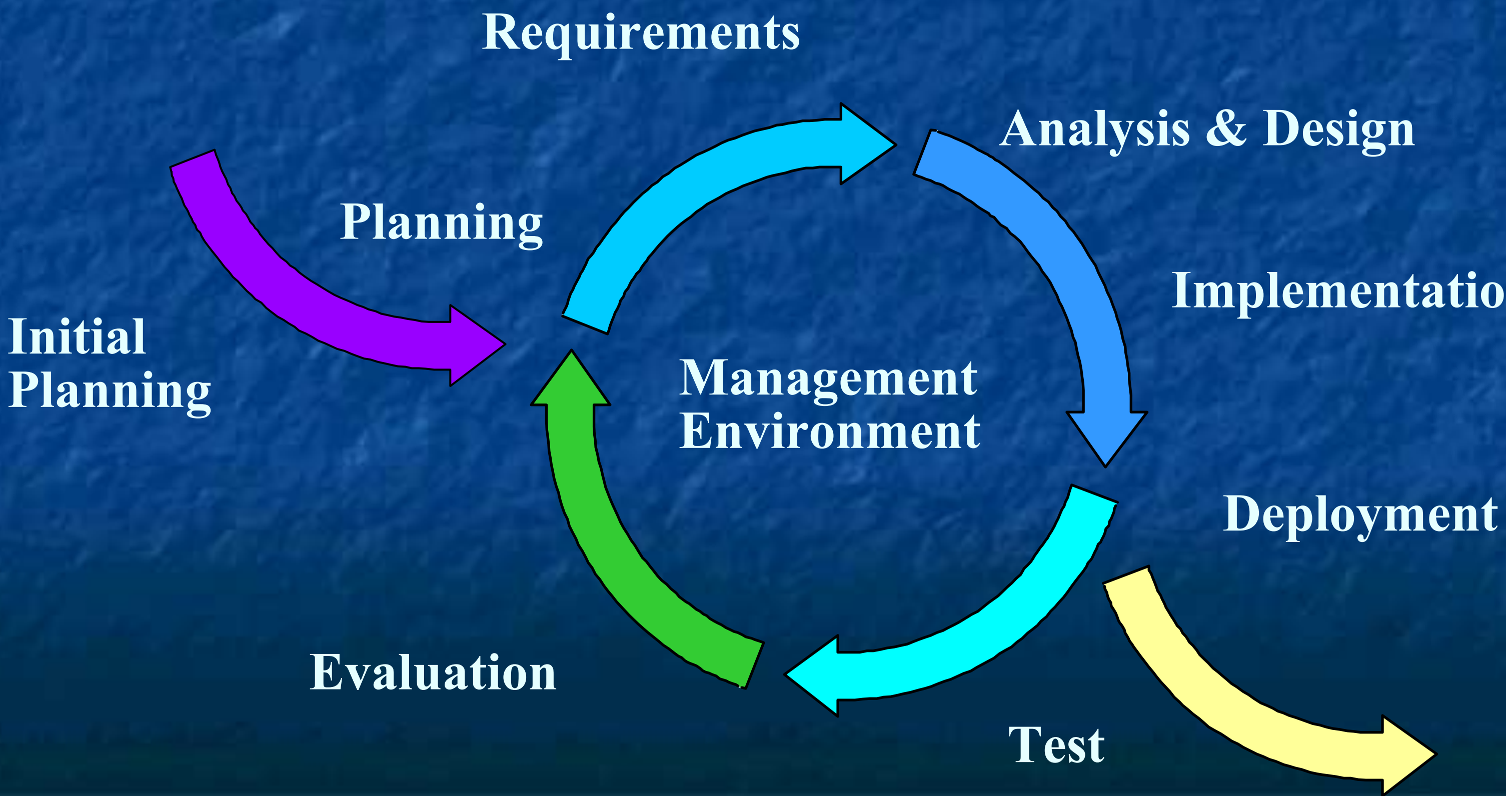
1. Manage Your Requirements

- Elicit, organize, and document required functionality and constraints
- Track and document tradeoffs and decisions
- Business requirements are easily captured and communicated through use cases
- Use cases are important planning instruments

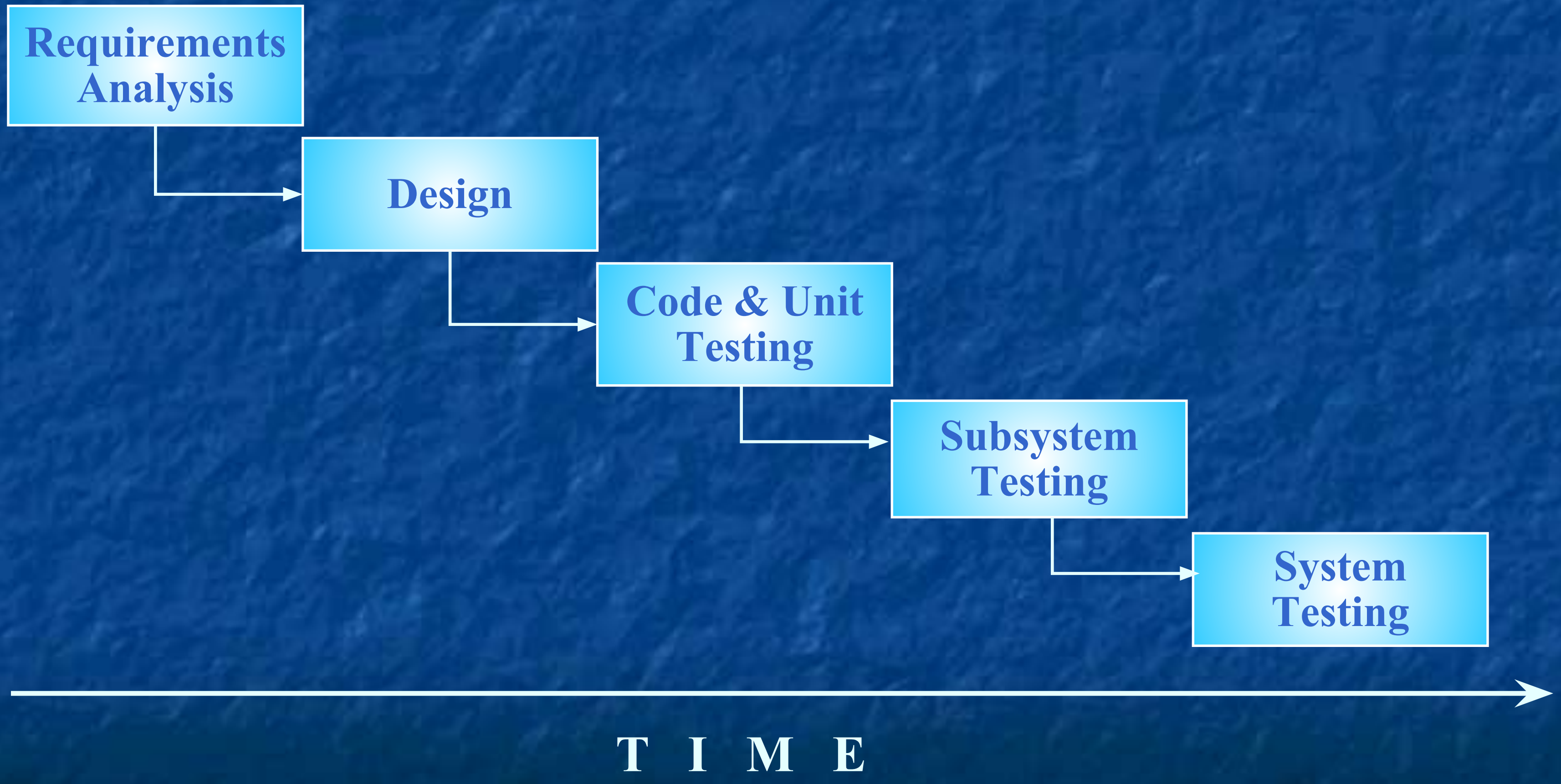


2. Develop Software Iteratively

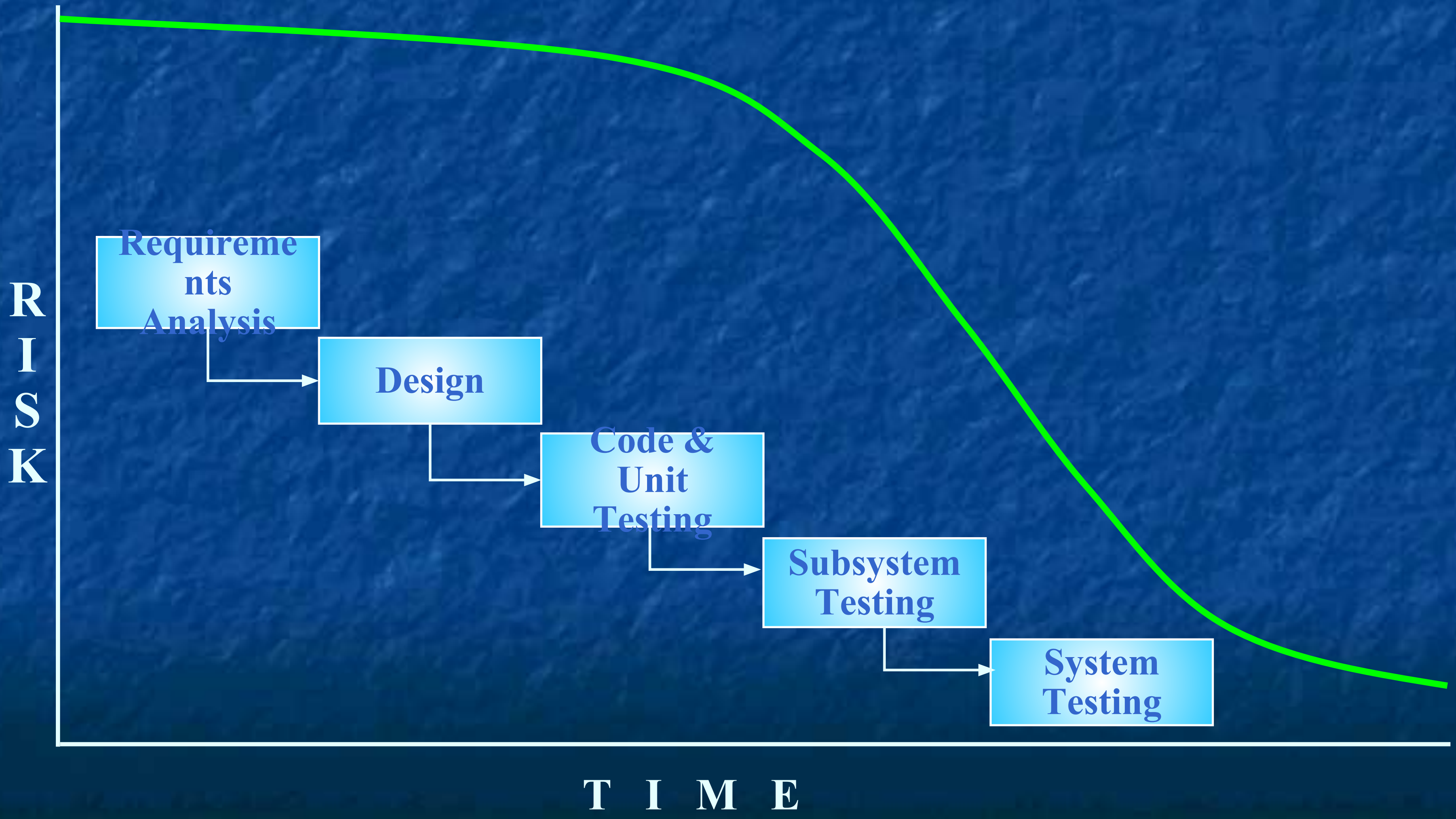
- An initial design will likely be flawed with respect to its key requirements
- Late-phase discovery of design defects results in costly over-runs and/or project cancellation



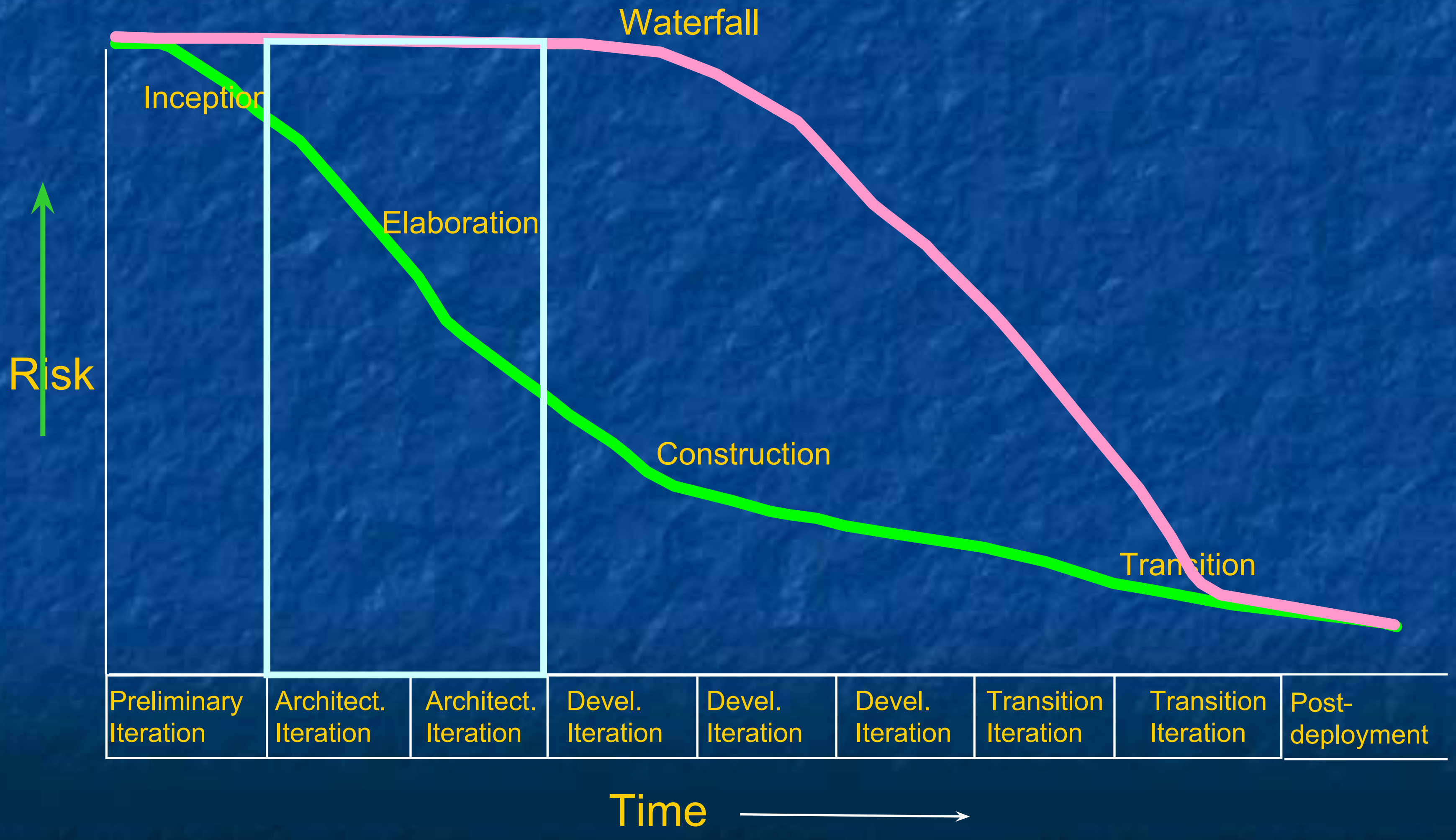
Waterfall Development



Waterfall Development: Risk vs. Time



Risk Profile of an Iterative Development



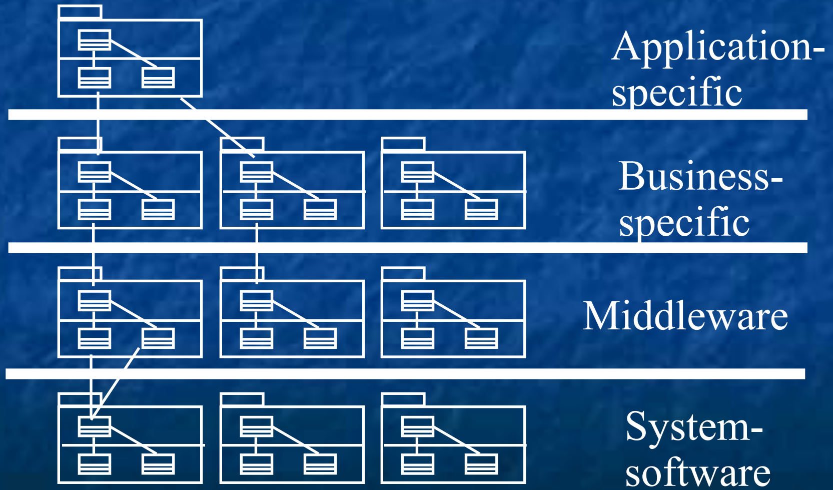
Iterative Development Characteristics

- Critical risks are resolved before making large investments
- Initial iterations enable early user feedback
- Testing and integration are continuous
- Objective milestones provide short-term focus
- Progress is measured by assessing implementations
- Partial implementations can be deployed

3. Employ Component-based Architecture

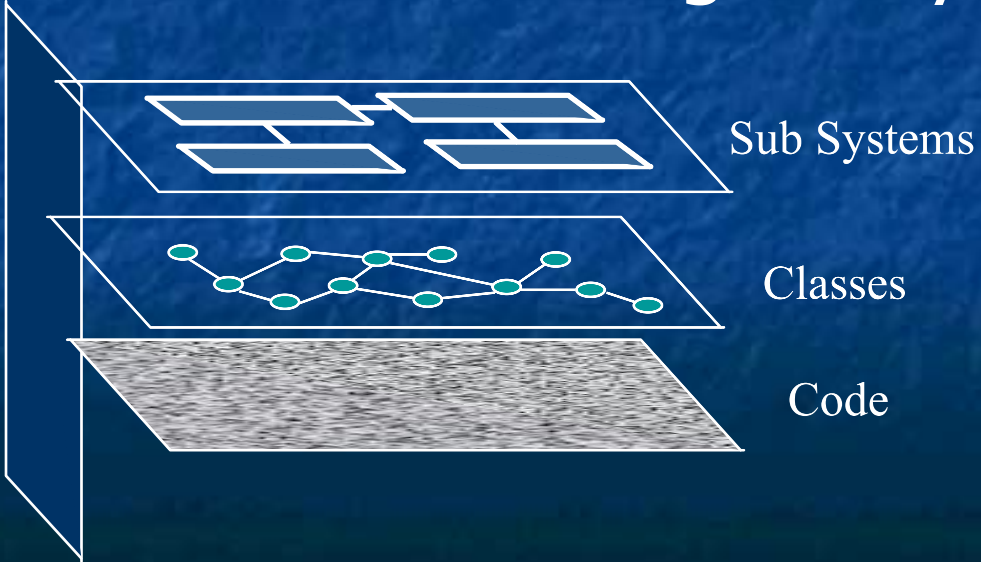
- Design, implement and test your architecture up-front!
- A systematic approach to define a "good" architecture
  - **Resilient to change by using well-defined interfaces**
  - **By using and reverse engineering components**
  - **Derived from top rank use cases**

Component-based Architecture with layers



4. Model Software Visually

- Aiding understanding of complex systems
- Exploring and comparing design alternatives at a low cost
- Forming a foundation for implementation
- Capturing requirements precisely
- Communicating decisions unambiguously

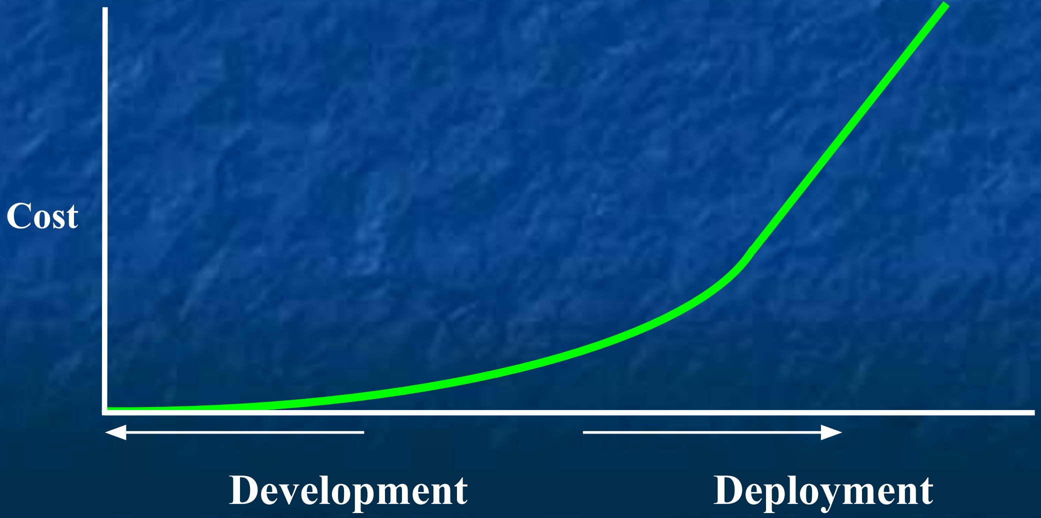


Visual Modeling raises the level of abstraction

5. Verify Software Quality

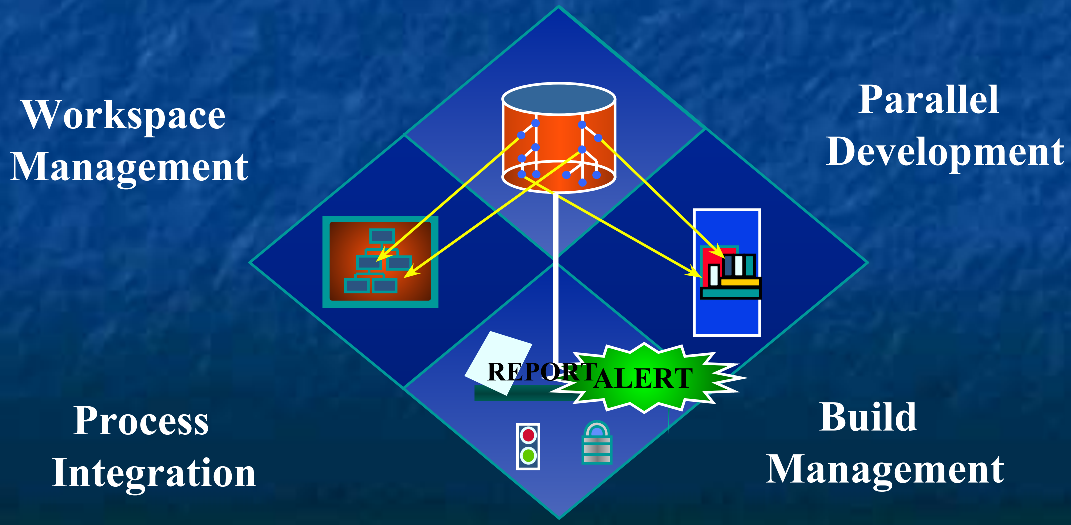
- Create tests for each key scenario to ensure that all requirements are properly implemented
- Unacceptable application performance hurts as much as unacceptable reliability
- Verify software reliability - memory leaks, bottle necks
- Test every iteration - automate test!

Software problems are 100 to 1000 times more costly to find and repair after deployment



6. Control Changes to Software

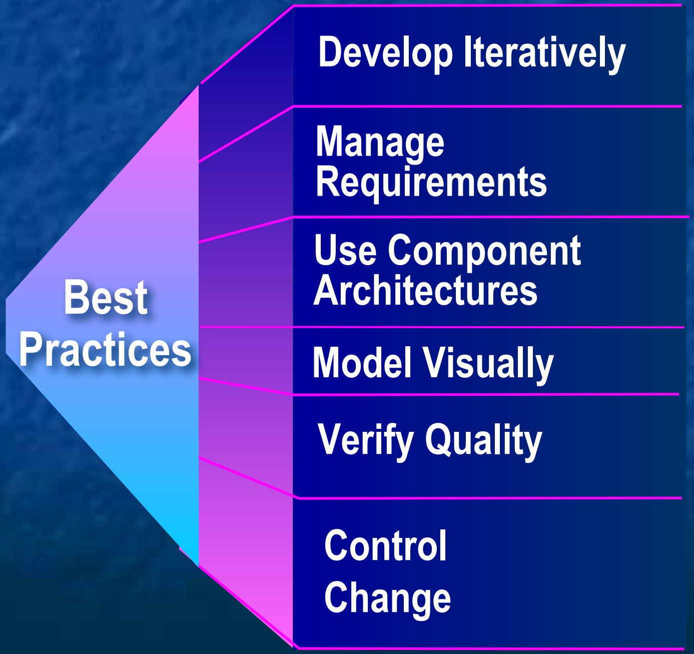
- Control, track and monitor changes to enable iterative development
- Establish secure workspaces for each developer
  - Provide isolation from changes made in other workspaces
  - Control all software artifacts - models, code, docs, etc.
- Automate integration and build management

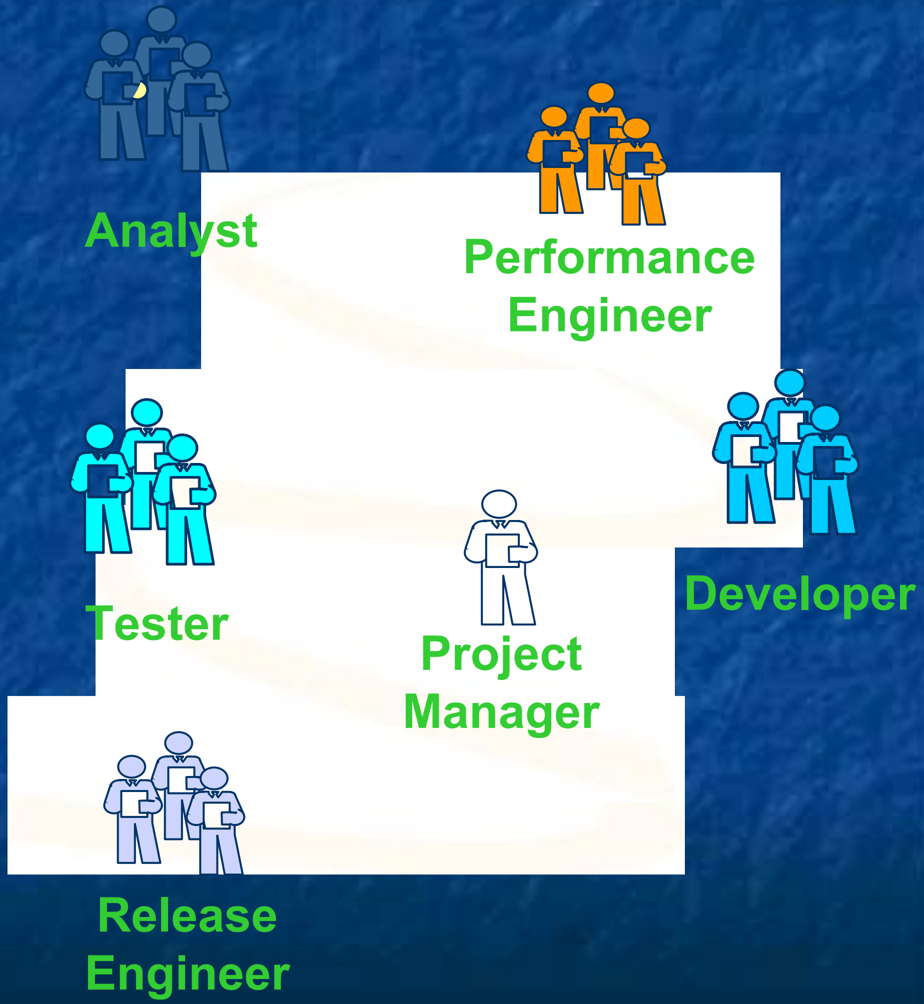


CM is more than just check-in and check-out

Summary: Best Practices of Software Engineering

- The result is software that is
  - On Time
  - On Budget
  - Meets Users Needs





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Tools

- The success of process adoption is significantly improved by the use of appropriate supporting tools.
- **Tool Mentors** provide detailed descriptions of how to perform specific process activities or steps, or produce a particular artifact or report, using one or more tools.

Tools

- Rational Unified Process
- RUP Builder
- Rational Process Workbench
- Rational Administrator
- Rational Suite AnalystStudio
- Rational ClearCase
- Rational ClearQuest
- Rational ProjectConsole
- Rational PurifyPlus
- Rational QualityArchitect

Tools

- Rational RequisitePro
- Rational Robot
- Rational Rose
- Rational Rose RealTime
- Rational SoDA
- Rational TestManager
- Rational Test RealTime
- Rational TestFactory
- Rational XDE Developer - Java Platform Edition
- Rational XDE Developer - .NET Edition