Software analysis and design

Module 1: Best practices of Software Engineering

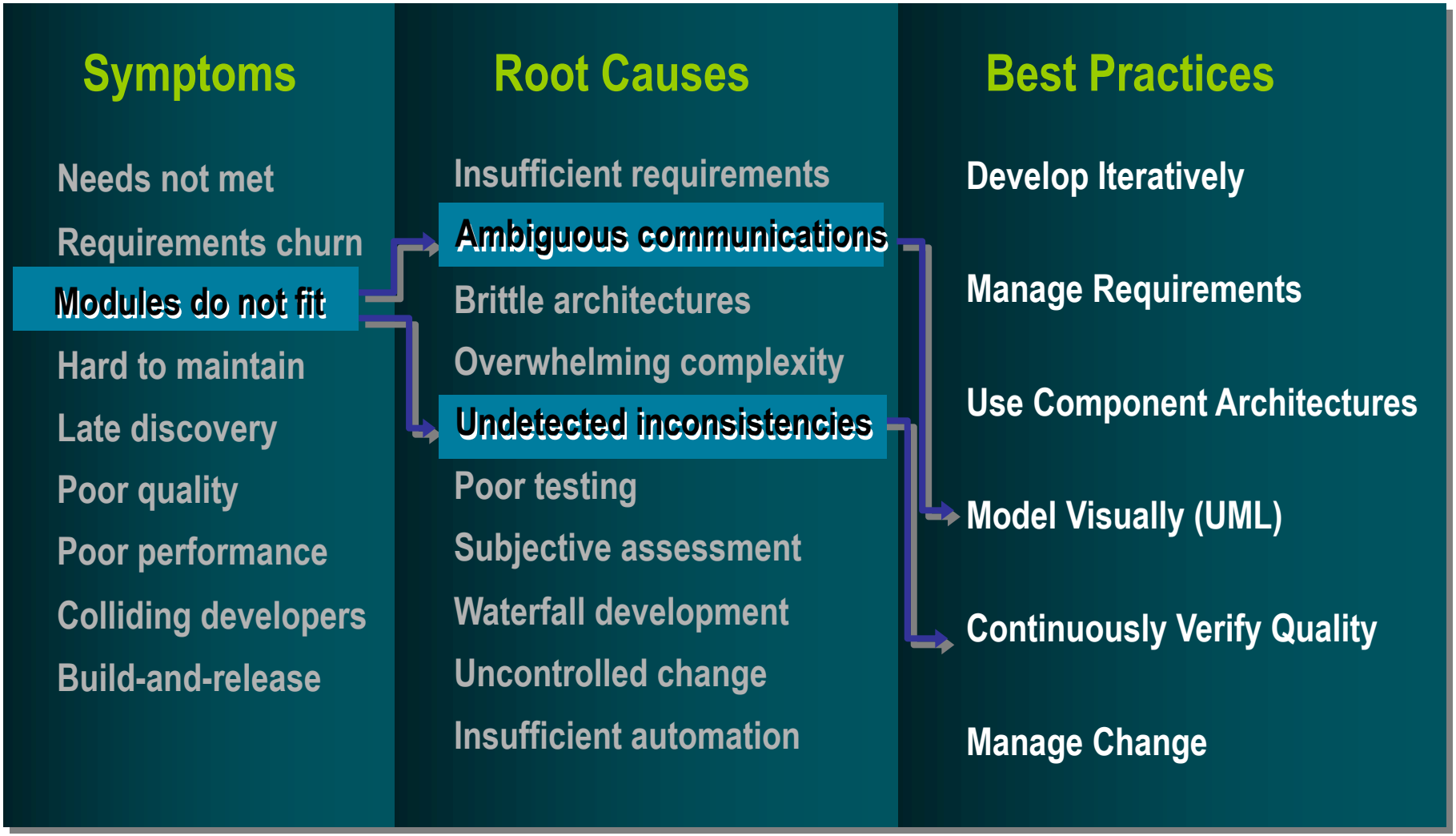
Objectives: Best Practices

- Identify symptoms of software development problems
- Explain the Best Practices
- Present the Rational Unified Process (RUP) within the context of the Best Practices.

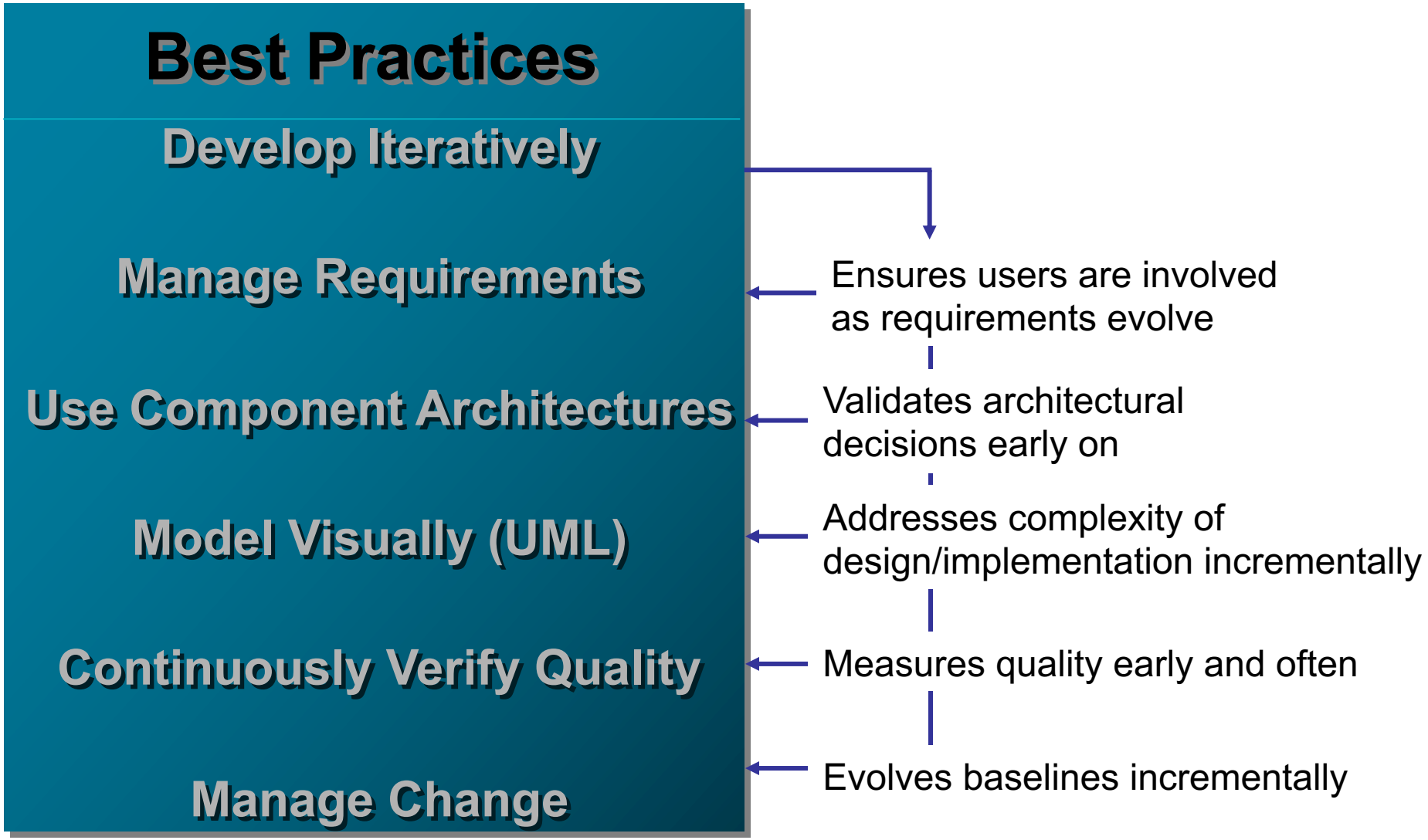
Symptoms of Software Development Problems

- ✓ User or business needs not met
- ✓ Requirements not addressed
- ✓ Modules not integrating
- ✓ Difficulties with maintenance
- ✓ Late discovery of flaws
- ✓ Poor quality of end-user experience
- ✓ Poor performance under load
- ✓ No coordinated team effort
- ✓ Build-and-release issues

Trace Symptoms to Root Causes

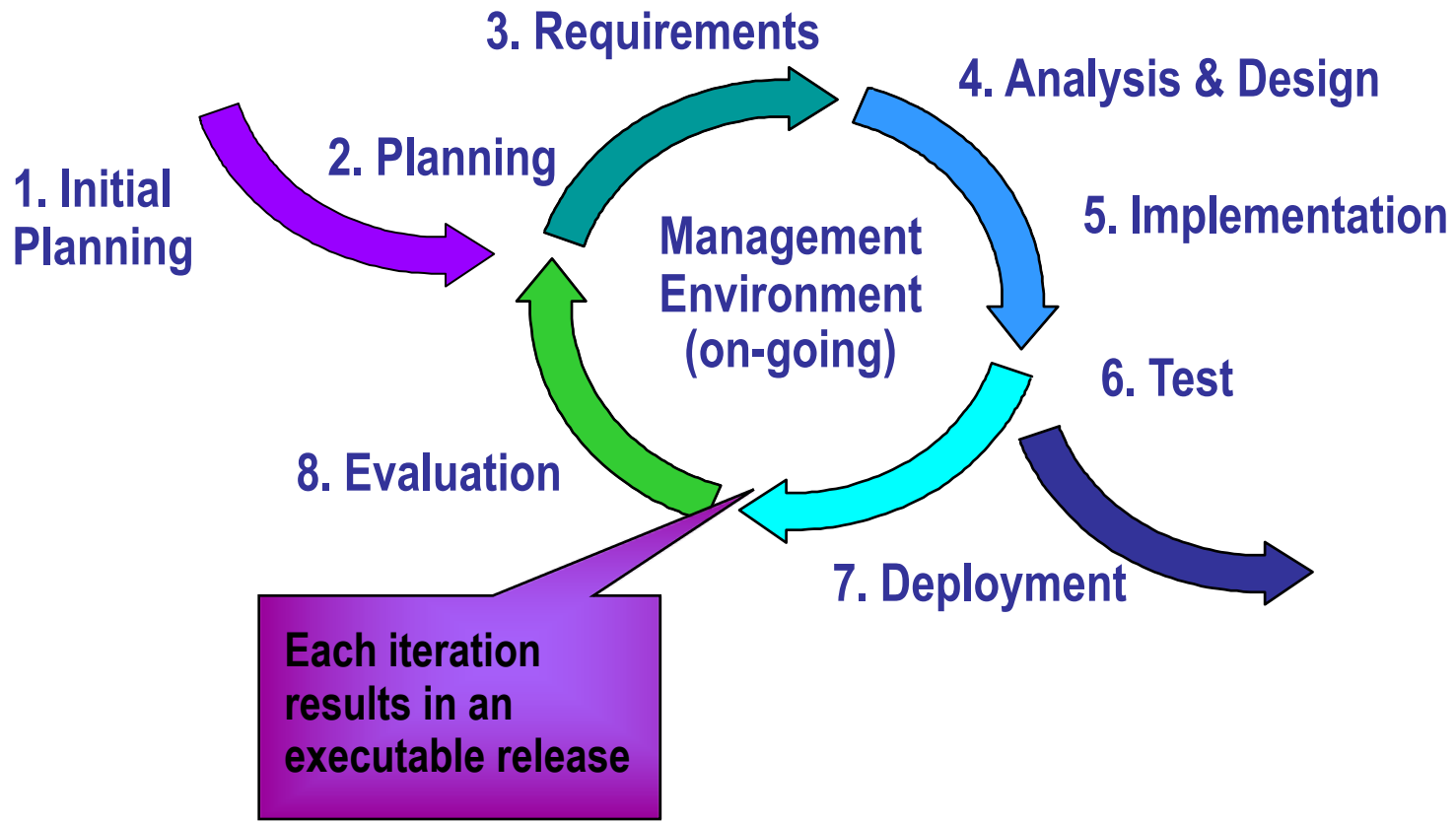


Best Practices Reinforce Each Other



Develop Iteratively

- Iterative development produces an executable



Managing Requirements

Ensures that you

- solve the right problem
- build the right system

by taking a systematic approach to

- eliciting
- organizing
- documenting
- managing

the changing requirements of a software application.

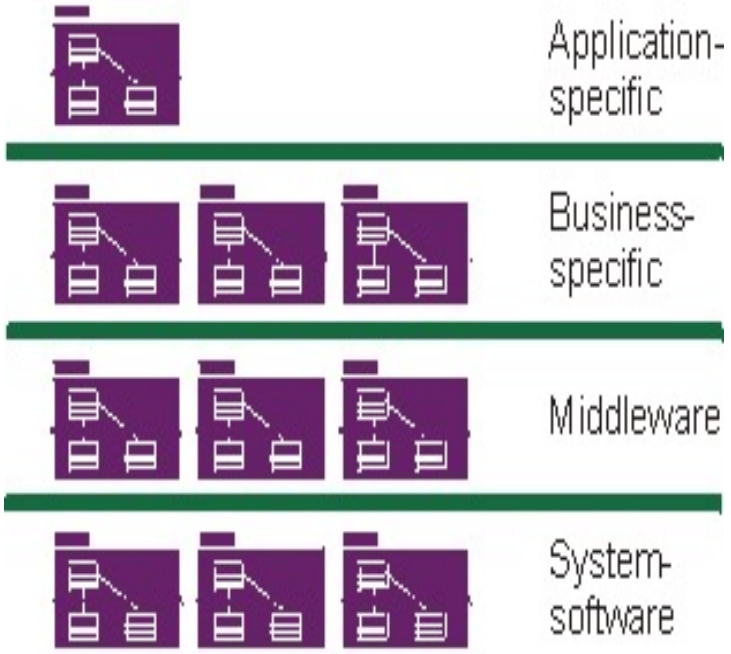
Use Component Architectures

- Software architecture needs to be:

Component-based	Resilient
– Reuse or customize components – Select from commercially available components – Evolve existing software incrementally	– Meets current and future requirements – Improves extensibility – Enables reuse – Encapsulates system dependencies

Purpose of a Component-Based Architecture

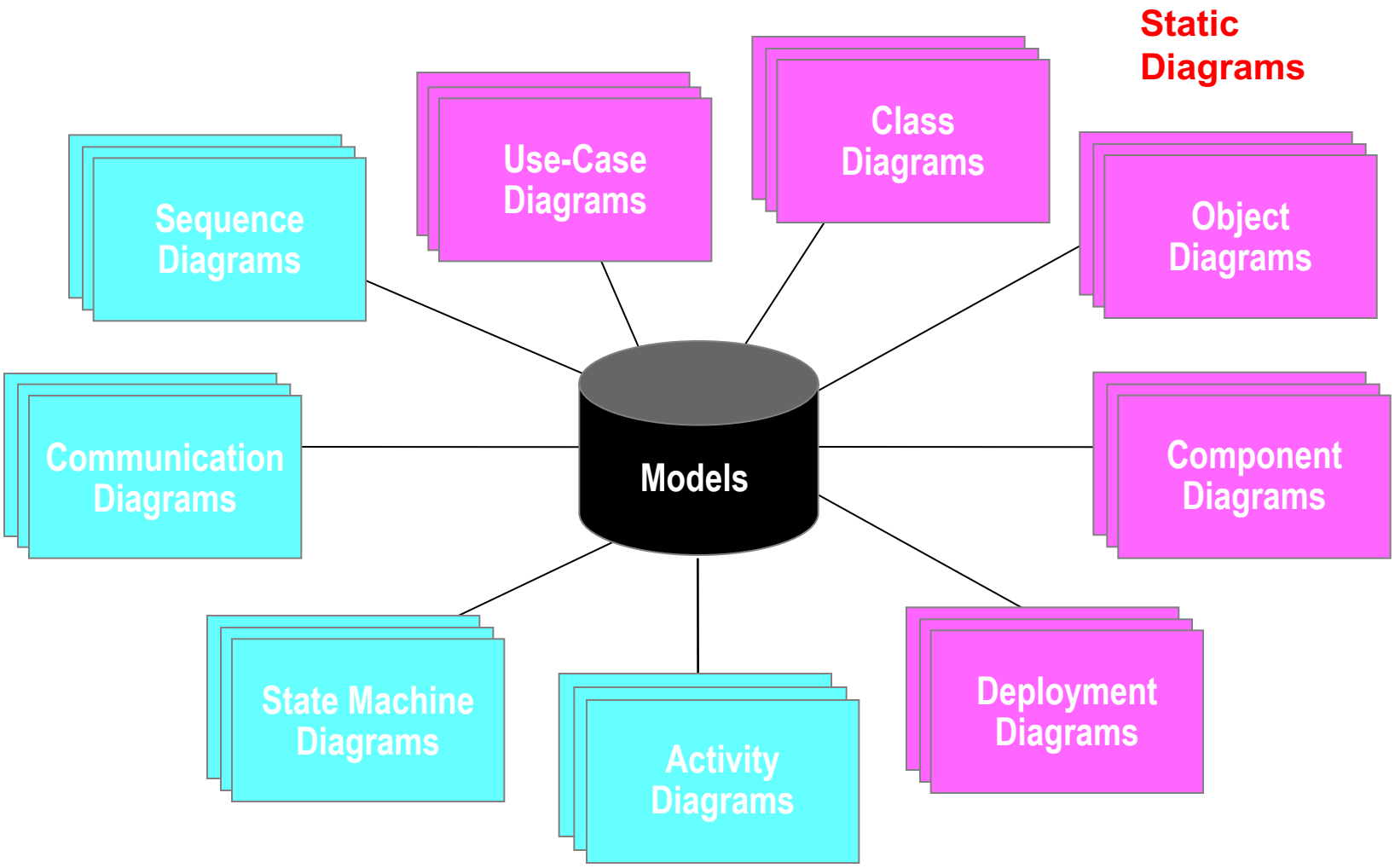
- Basis for reuse
  - Component reuse
  - Architecture reuse
- Basis for project management
  - Planning
  - Staffing
  - Delivery
- Intellectual control
  - Manage complexity
  - Maintain integrity



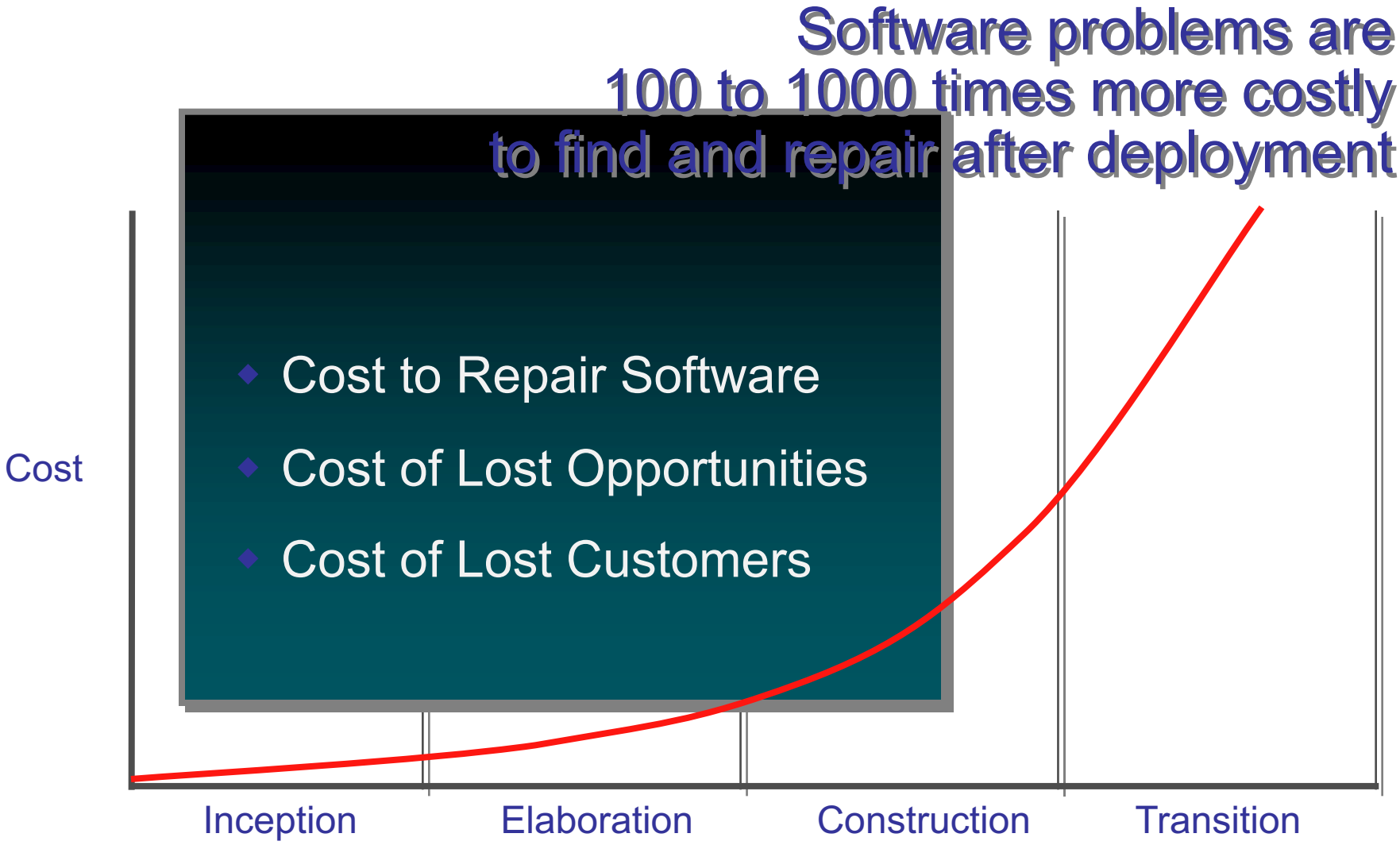
Model Visually (UML)

- Captures structure and behavior
- Shows how system elements fit together
- Keeps design and implementation consistent
- Hides or exposes details as appropriate
- Promotes unambiguous communication
  - The UML provides one language for all practitioners.

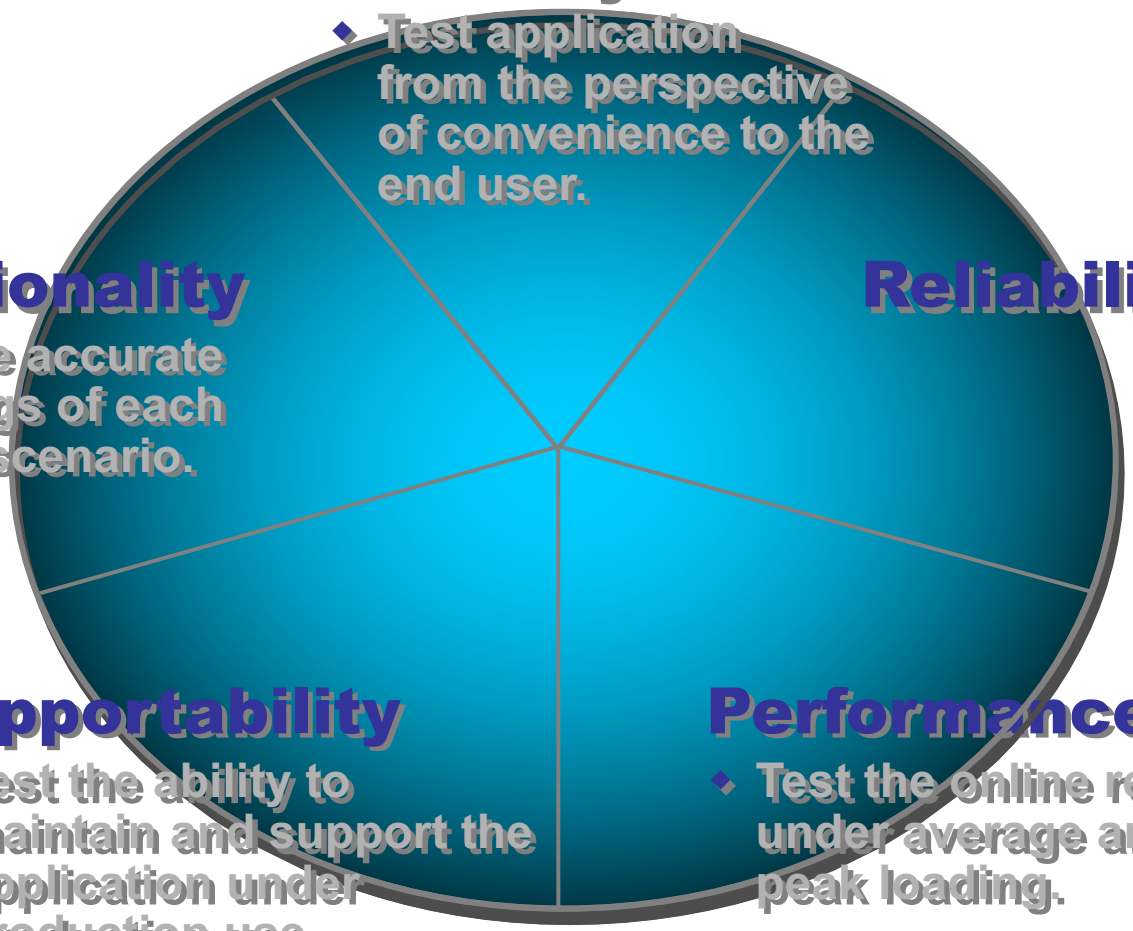
Visual Modeling with the Unified Modeling Language



Continuously Verify Quality



Testing Dimensions of Quality



Usability

- Test application from the perspective of convenience to the end user.

Functionality

- Test the accurate workings of each usage scenario.

Reliability

Supportability

- Test the ability to maintain and support the application under production use.

Performance

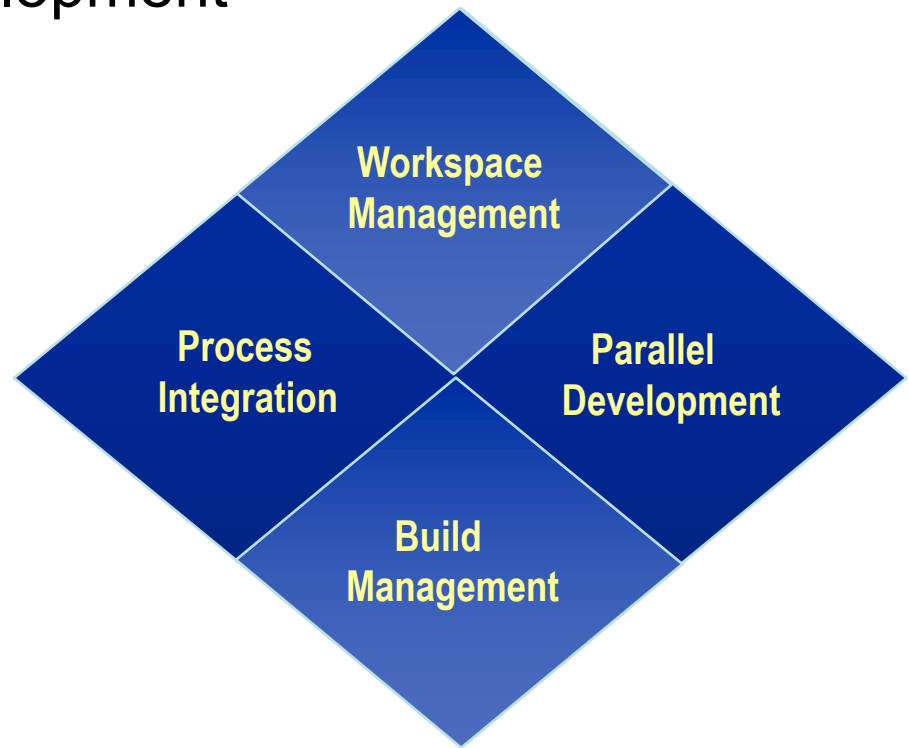
test hiệu năng

- Test the online response under average and peak loading.

phản hồi online và thời gian phản hồi/load

Manage Change

- To avoid confusion, have:
  - Secure workspaces for each developer
  - Automated integration/build management
  - Parallel development



Manage Change (continued)

- Unified Change Management (UCM) involves:
  - Management across the lifecycle
    - System
    - Project management
  - Activity-based management
    - Tasks
    - Defects
    - Enhancements
  - Progress tracking
    - Charts
    - Reports

Rational Unified Process Implements Best Practices

Best Practices
Process Made Practical

Develop Iteratively

Manage Requirements

Use Component Architectures

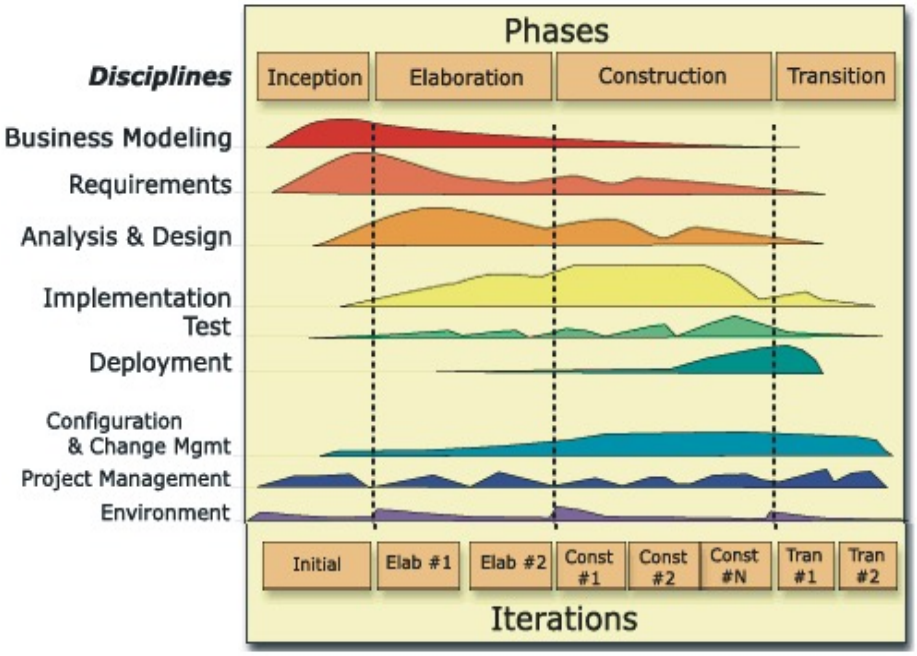
Model Visually (UML)

Continuously Verify Quality

Manage Change

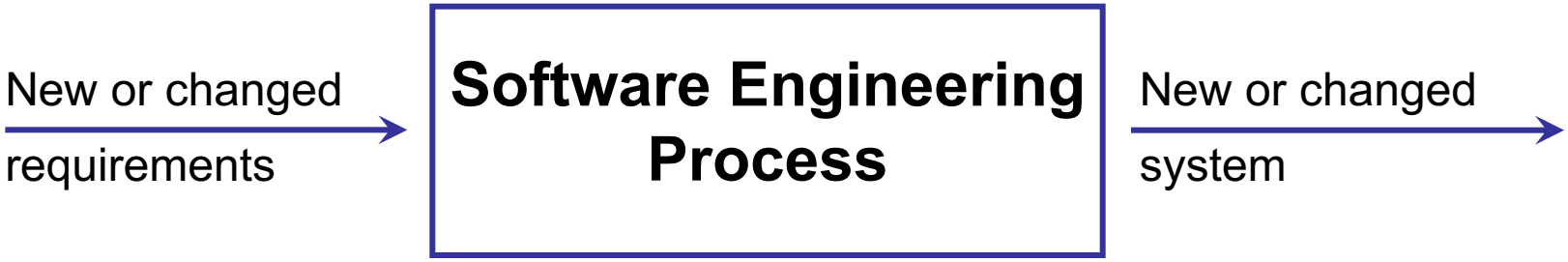
Achieving Best Practices

- Iterative approach
- Guidance for activities and artifacts
- Process focus on architecture
- Use cases that drive design and implementation
- Models that abstract the system



A Team-Based Definition of Process

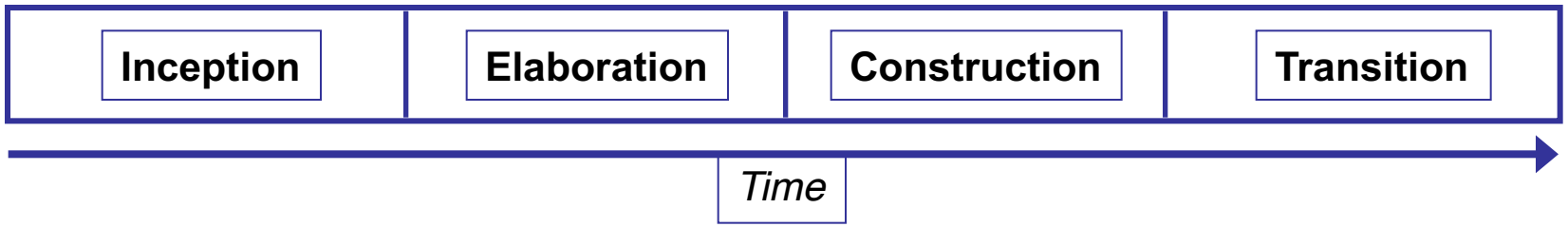
A process defines **Who** is doing **What**, **When**, and **How**, in order to reach a certain goal.



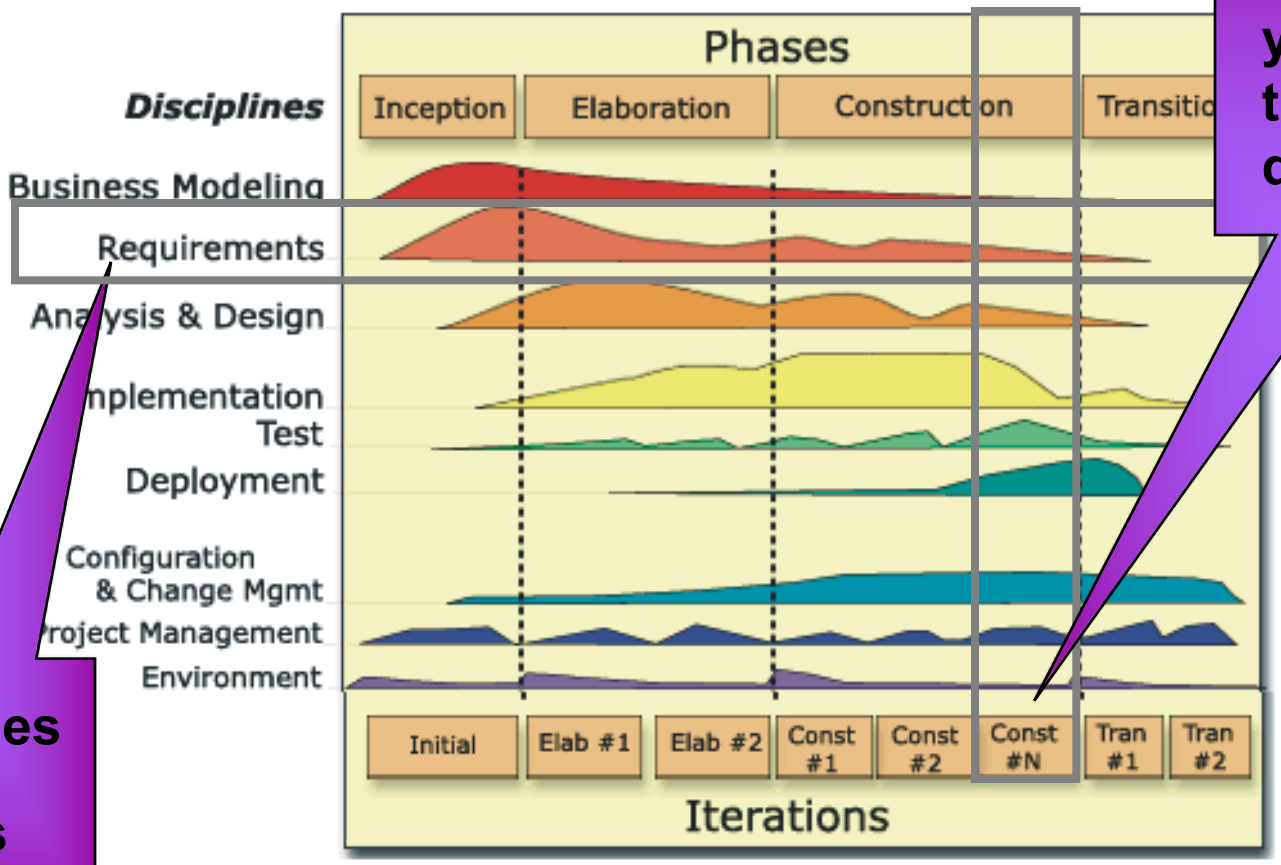
Process Structure - Lifecycle Phases

The Rational Unified Process has four phases:

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



Bringing It All Together: The Iterative Approach



In an iteration, you walk through all disciplines.

Disciplines group activities logically.

Summary

- Best Practices guide software engineering by addressing root causes.
- Best Practices reinforce each other.
- Process guides a team on who does what, when, and how.
- The Rational Unified Process is a means of achieving Best Practices.