



IBM Software Group

# IBM Rational Systems Developer

基于MDD的团队协作开发

**Rational.** software

**IBM** 软件部 李卫锋



**ON** DEMAND BUSINESS™

# 议程

- 第二天上午
  - ▶ 系统开发面临的挑战
  - ▶ 团队开发
    - *团队开发: 过程向导*
    - *软件开发生命周期的集线器 (Hub)*
    - *团队开发: 需求工程*
    - *团队开发: 缺陷与变更管理*
    - *团队开发: 测试管理*
    - *团队开发: 配置管理*
  - ▶ 总结
  - ▶ DEMO
  - ▶ Q/A



# 挑战： 日益增加的系统开发的复杂性

⊗ 应该怎样管理系统级设计的成果？

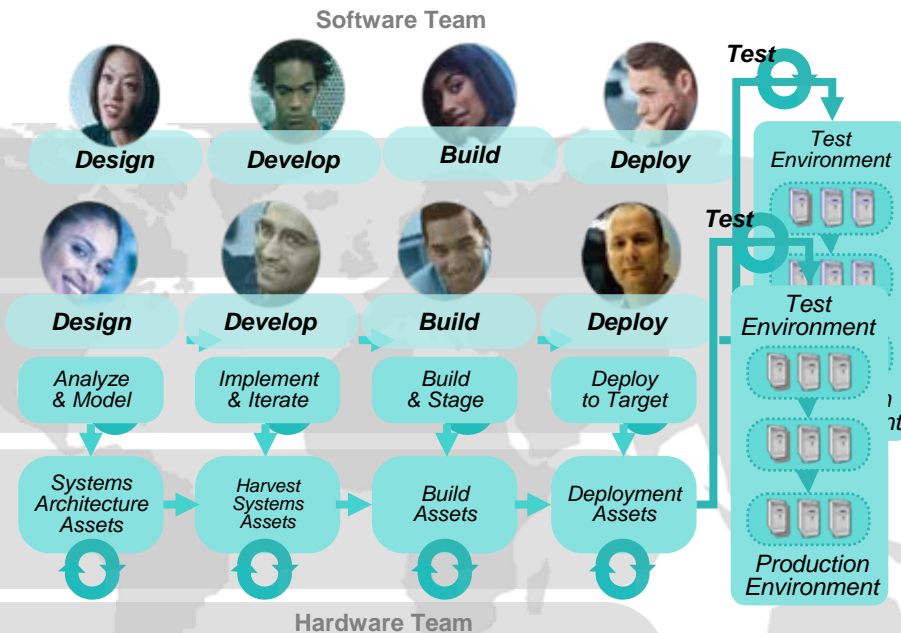
⊗ 系统构架是可靠的，但没有彻底的贯彻！

⊗ 应该规划软硬件的设计协同？

⊗ 应该如何协调软硬件团队？

⊗ 没有察觉设计中的混乱，直到项目的后期，——其实这些问题一开始就存在。

⊗ 应该如何保证项目的各个方面都符合相关工业标准的要求。



# 新的模型驱动的软件开发流程



需求分析员



架构师



开发人员

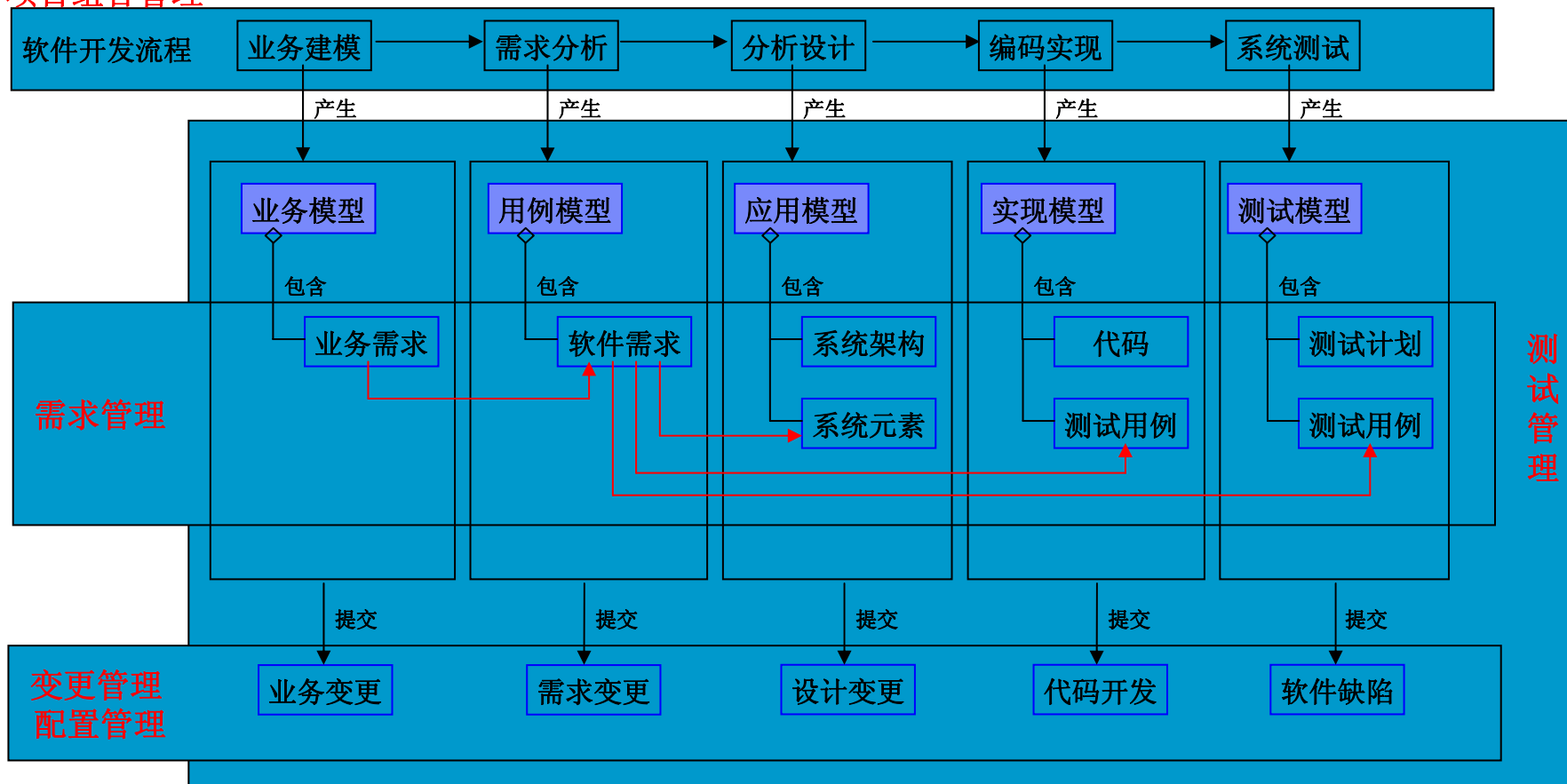


测试人员



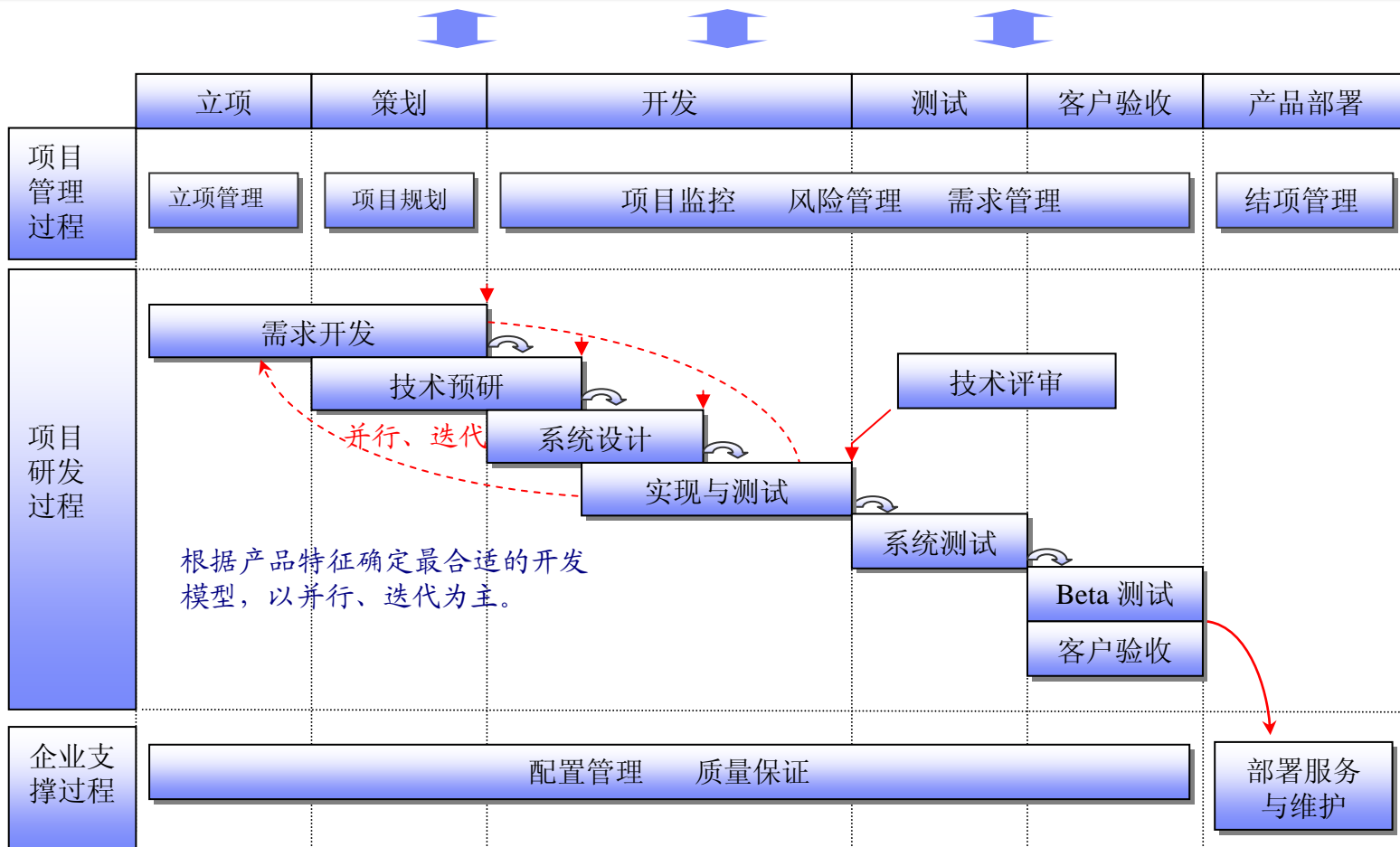
部署人员

项目组合管理



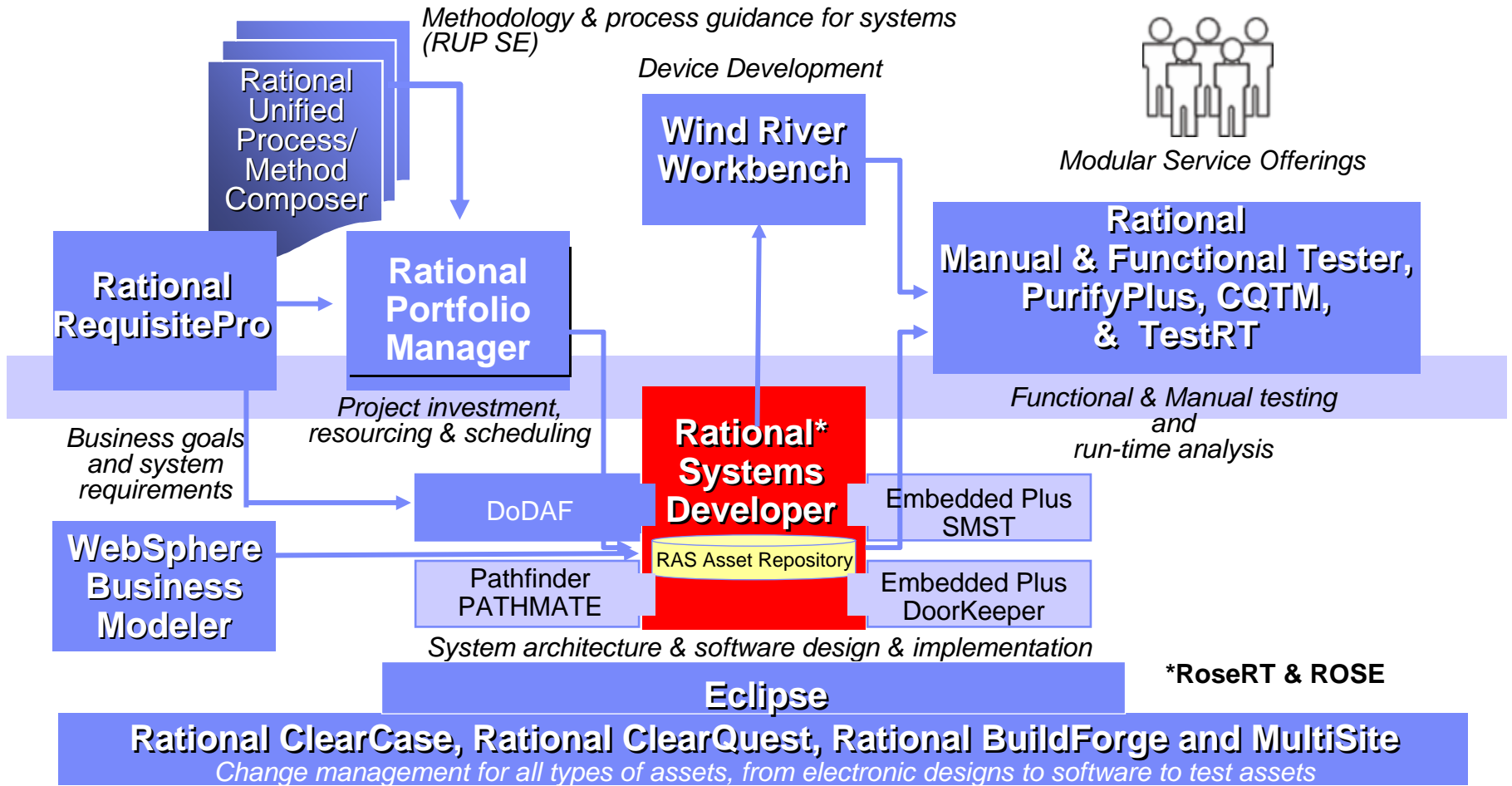
# 系统开发生命周期

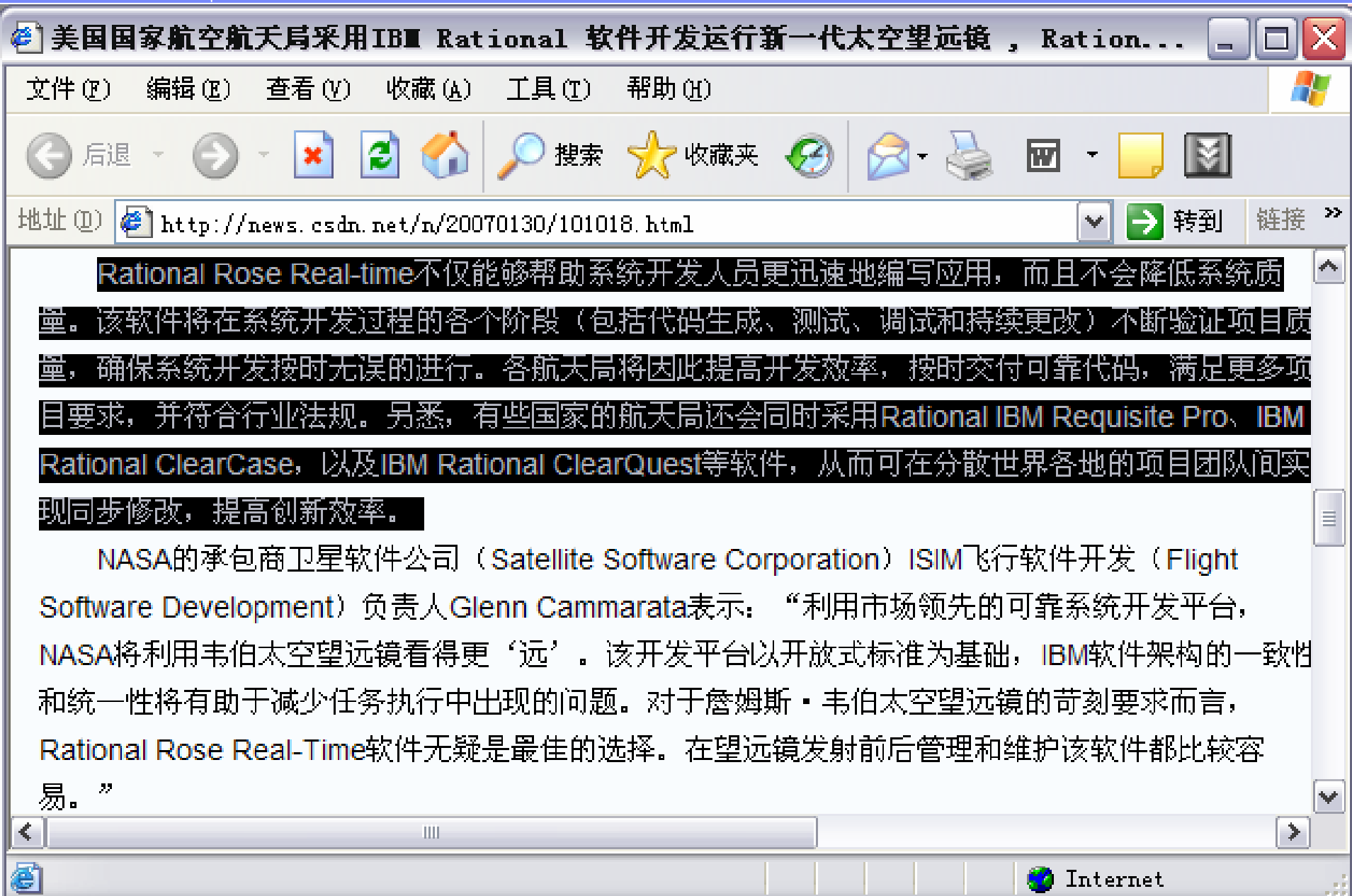
迭代化开发      以架构为中心      持续地质量验证      管理软件资产和变更



# 掌控系统构建的整个生命周期

## Rational Unified Process for Systems Engineering





美国国家航空航天局采用IBM Rational 软件开发运行新一代太空望远镜 , Ration...

文件(F) 编辑(E) 查看(V) 收藏(A) 工具(T) 帮助(H)

后退 前进 刷新 主页 搜索 收藏夹 打印 发送邮件 打印 打印 打印

地址(D) <http://news.csdn.net/n/20070130/101018.html> 转到 链接 >>

**Rational Rose Real-time**不仅能够帮助系统开发人员更迅速地编写应用,而且不会降低系统质量。该软件将在系统开发过程的各个阶段(包括代码生成、测试、调试和持续更改)不断验证项目质量,确保系统开发按时无误的进行。各航天局将因此提高开发效率,按时交付可靠代码,满足更多项目要求,并符合行业法规。另悉,有些国家的航天局还会同时采用Rational IBM Requisite Pro、IBM Rational ClearCase,以及IBM Rational ClearQuest等软件,从而可在分散世界各地的项目团队间实现同步修改,提高创新效率。

NASA的承包商卫星软件公司(Satellite Software Corporation) ISIM飞行软件开发(Flight Software Development)负责人Glenn Cammarata表示:“利用市场领先的可靠系统开发平台,NASA将利用韦伯太空望远镜看得更‘远’。该开发平台以开放式标准为基础,IBM软件架构的一致性和统一性将有助于减少任务执行中出现的问题。对于詹姆斯·韦伯太空望远镜的苛刻要求而言,Rational Rose Real-Time软件无疑是最佳的选择。在望远镜发射前后管理和维护该软件都比较容易。”

Internet



# 议程

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  - ▶ 团队开发
    - *团队开发: 过程向导*
    - *软件开发生命周期的集线器 (Hub)*
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  - ▶ 总结
  - ▶ DEMO
  - ▶ Q/A







Ease of Use

# 团队开发:过程向导

- Integration with Rational Unified Process for Systems Engineering (RUP-SE)
- Tool Mentors provide guidance for activities
- User customizable views with user defined content

**Improved navigation of RUP**

**Role: System Analyst**

The System Analyst role leads and coordinates requirements elicitation and use-case modeling by outlining the system's functionality and delimiting the system; for example, identifying what actors exist and what use cases they will require when interacting with the system.

**Topics**

- Description
- Related Information
- Staffing
- Further Reading

**Search**

Search query: use case actor

Advanced

Topics:

- Tool Mentors
- Artifacts
- Activities
- Roles
- Workflow Details
- General Content

Pages to include:

- Main description
- Concept pages
- Checkpoints
- Guidelines
- Templates
- Examples

Match whole

**RUP Advisor provides context sensitive guidance**

**RUP Advisor**

Tool Mentors (2)

- Tool Mentor: Working with Rational Architect
- Tool Mentor: Use Case Diagrams

Artifacts (2)

- Artifact: Actor
- Artifact: Use-Case Model

Checkpoints: Use Case

Guidelines: Use Case

Guidelines: Activity Diagram in the Use-Case Model

Report: Use Case <use-case name>

Use Case Specification: <Use-Case Name>

Activities (2)

- Activity: Review Requirements
- Activity: Detail the Software Requirements

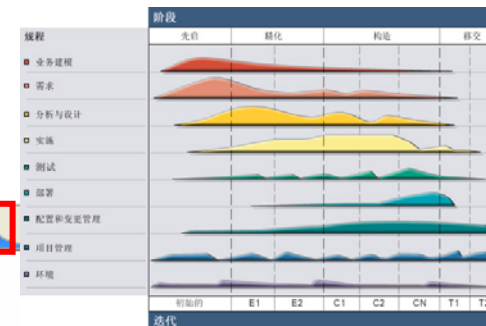
Properties RUP Advisor

**Search is integrated with Eclipse search**



# 接受流程指导

## Rational Rational Systems Developer and RUP-SE



Properties | **Tasks** | Console | Bookmarks | ClearQuest Query Results | Search | Requirement Trace | **Process Advisor**

Search scope: Tool Mentors, Artifacts, Activities  
Include: Main description, Concept pages, Guidelines, Main description

**Tool Mentors (9)**

- Tool Mentor: Detailing a Use Case Using Rational Software Architect
- Tool Mentor: Designing Use Cases Using Rational Software Architect
- Tool Mentor: Finding a Use Case Using Rational Software Architect
- Tool Mentor: Finding a Use Case Using Rational Software Architect
- Tool Mentor: Finding a Use Case Using Rational Software Architect
- Tool Mentor: Finding a Use Case Using Rational Software Architect
- Tool Mentor: Finding a Use Case Using Rational Software Architect
- Tool Mentor: Finding a Use Case Using Rational Software Architect
- Tool Mentor: Finding a Use Case Using Rational Software Architect

**Search Results**

Search scope: Tool Mentors, Artifacts, Activities  
Include: Concept pages, Guidelines, Main description

**Tool Mentors (6)**

- Tool Mentor: Detailing a Use Case Using Rational RequisitePro
- Tool Mentor: Detailing a Business Use Case Using Rational RequisitePro
- Tool Mentor: Setting Up Rational RequisitePro for a Project
- Tool Mentor: Adding Templates to Your Rational RequisitePro Project
- Tool Mentor: Capturing a Common Vocabulary Using Rational RequisitePro
- Tool Mentor: Developing a Vision Using Rational RequisitePro

**Artifacts (25)**

- Artifact: Use-Case Realization
- Artifact: Design Package
- Artifact: Service
- Artifact: Design Class
- Artifact: Analysis Class
- Artifact: Service Model
- Artifact: Design Model
- Artifact: Design Subsystem
- Artifact: Service Component
- Artifact: Analysis Model
- Artifact: Reference Architecture
- Artifact: Software Architecture Document
- Artifact: Interface
- Artifact: Business Use-Case Realization
- Artifact: Business Use Case
- Artifact: Business Actor
- Artifact: Business Worker
- Artifact: Test Design
- Artifact: Business Entity
- Artifact: Test Automation Architecture

**Rational Unified Process**

Analysis Model into a set of services with their own Implementation Models. The trading application design can now be modified to show the usage of these common services and the relationship between the trading application and service Java models is shown as well.

**Service Model Creation**

The Store Support Service Model was created according to the UML Profile for Software Services and a template model (included in Rational Software Architect), as described in the diagram below. The model was identified as a refinement of the Analysis Model, as shown above. As you can see the structure is presented in an overview diagram that demonstrates the dependencies between the views recommended by the template.

**Store Support Services Design**

```

    graph TD
        MV[Message View] --- SV[Service View]
        SV --- CV[Collaboration View]
    
```

The diagram links next to the view packages allow for quick navigation of the model and will be completed in the following sections.

For more information see the tool mentor [Creating a Service Model in RSA](#).

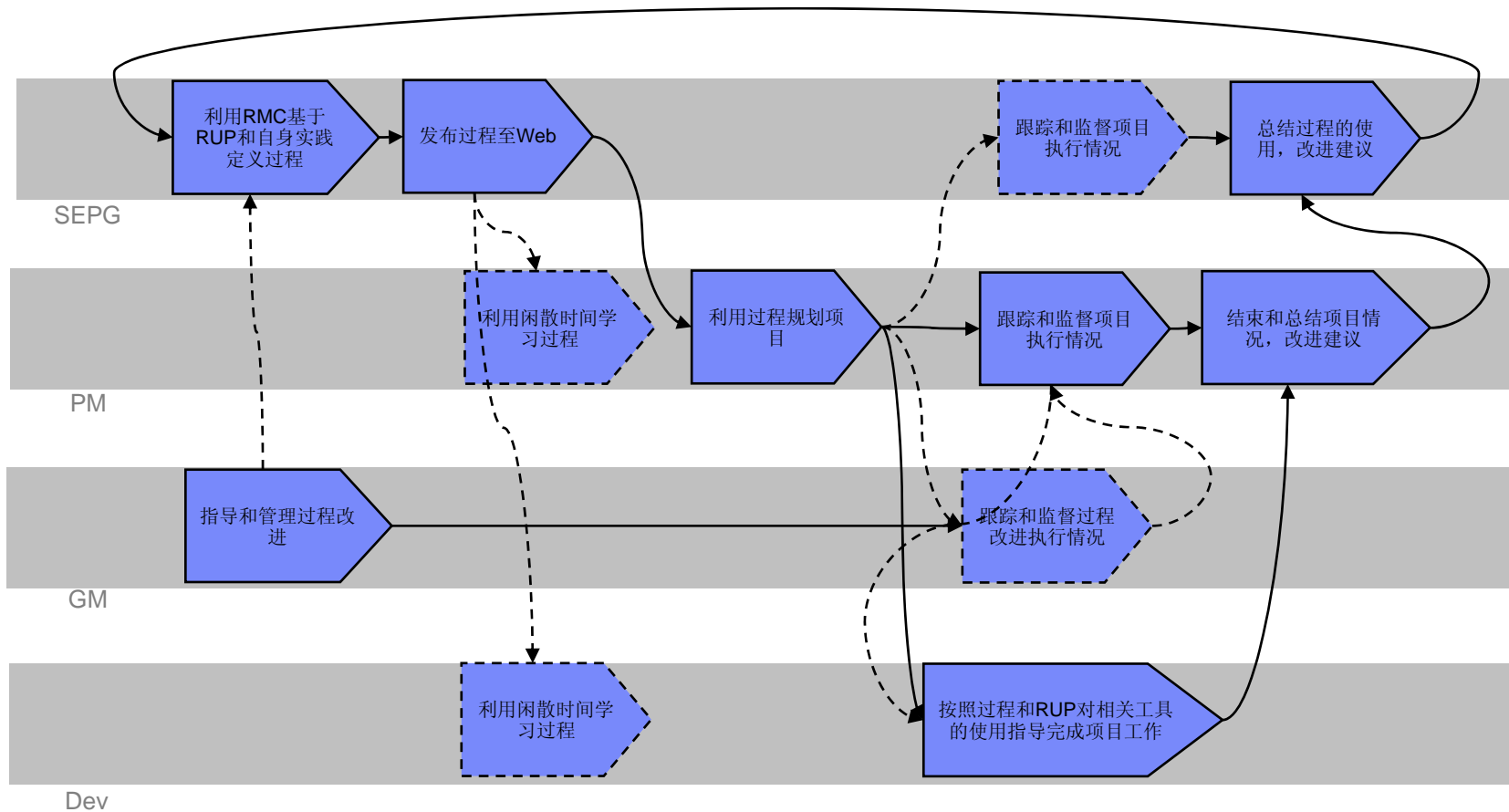
**Identify Service Partitions (Locality)**

It is clear from the description of the problem above that there are a number of ways we might look at partitioning the system, for example we might introduce partitions that represent inventory management, service/warranty management, point-of-sale operations (price lookup, customer, etc.) however these are

file:///C:/Program%20Files/IBM/Rational/SDP/6.0/RUP%20Configuration/soa/process/artifact/ar\_so...

RSD中上下文敏感的工具导师可以与RUP-SE中的流程指导内容相关联

# 团队开发:过程向导



# 议程

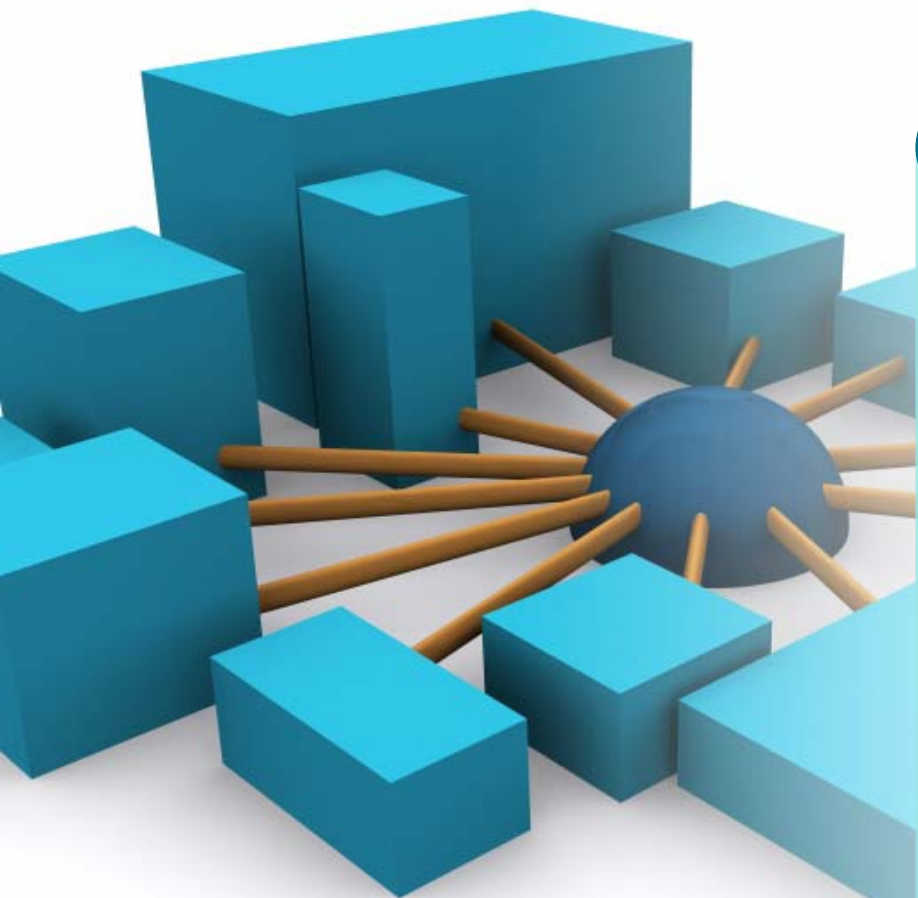
- 第二天上午
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# ClearQuest: 管理测试与开发

软件开发生命周期的集线器 (Hub)



## IBM Rational ClearQuest

测试 变更 缺陷

- 单一项目视图
- 跨地域的测试项目协作
- 可配置和强化过程
- 可扩展的测试系统

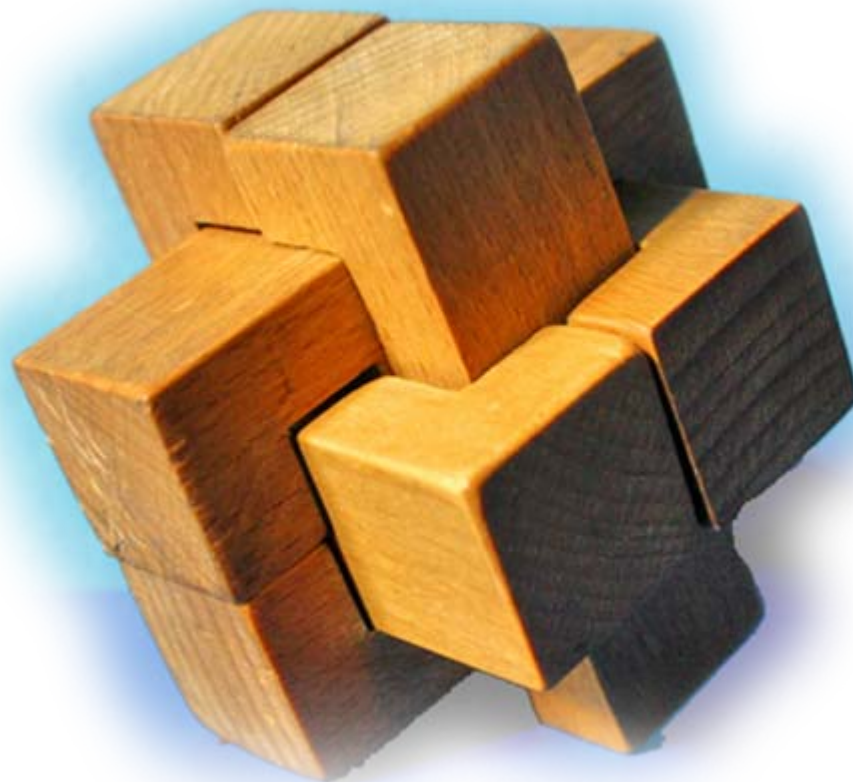


# 单一项目视图

管理测试、缺陷和变更的统一解决方案

## 带来的好处:

- 提供了集中查看整个项目状态的实时视图
- 记录了开发、测试和项目工件之间的可追踪、可审计的关系
  - ▶ 管理项目计划、测试结果、质量度量和缺陷
  - ▶ 集成了版本控制的集中存储库
  - ▶ 提供了广泛的度量报告



IBM Rational ClearQuest





# 生命周期的追踪关系

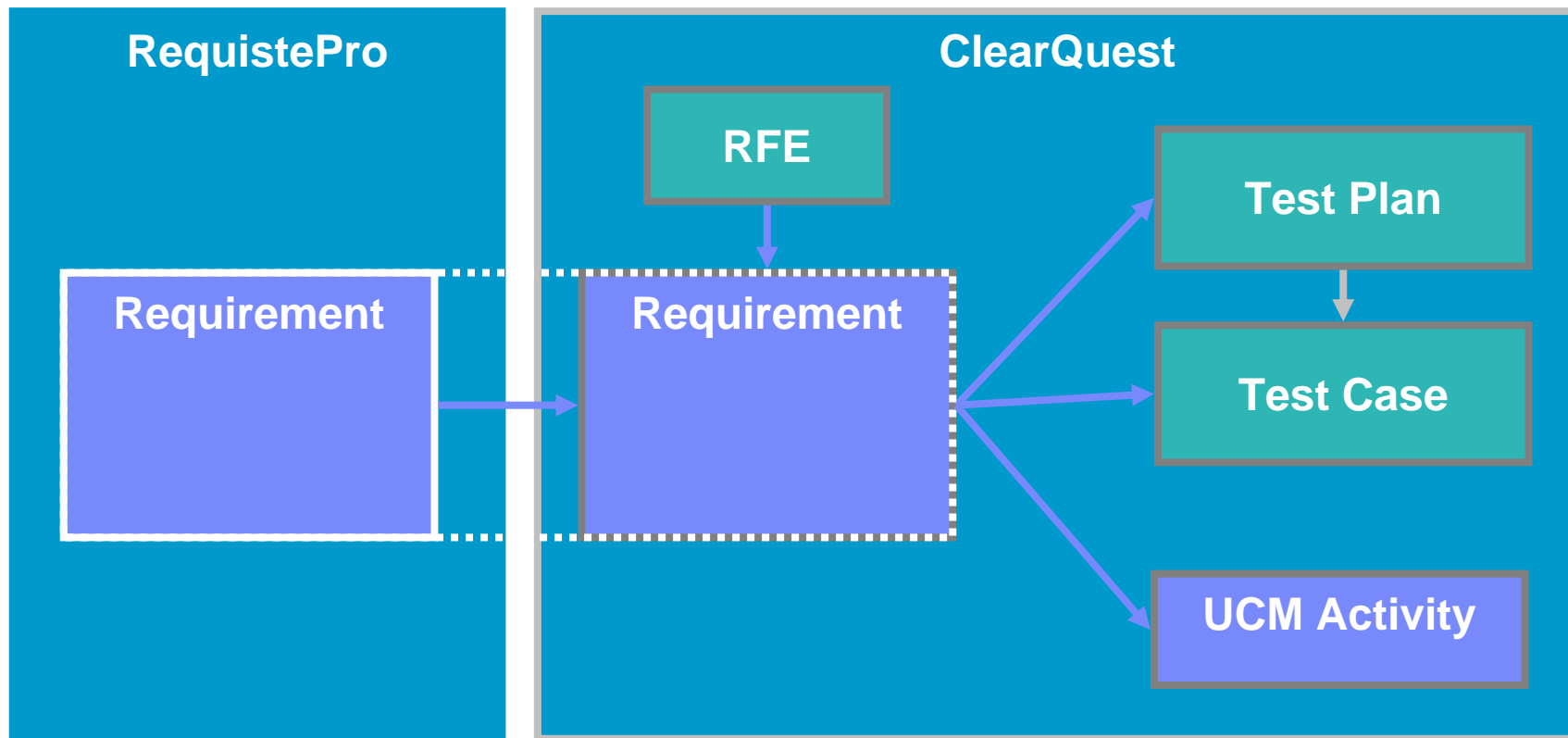
在一个地方可以查询到项目进展的所有方面



Tag	Requirement	Configured TC	Verdict	Defect Id	Defect Heading	Defect Priority	Defect State
+FEAT12	The Buyer should be able to cancel his/her own bid before the bid is accepted.	AUCT00000180	fail	AUCT00000191	Cancel bid function does not actually cancel build	1-Resolve Immediately	Submitted
+FEAT2	The Seller should be able to create an auction by describing an item or service	AUCT00000184	fail	AUCT00000200	Auction not accepting reserve bids	2-Give High Attention	Closed
+UC4.2	Register Basic Flow	AUCT00000168	fail	AUCT00000199	System lets you register multiple accounts with same login	1-Resolve Immediately	Submitted

- 通过查询可以获得：
  - ▶ 需求 <-> 测试用例
  - ▶ 缺陷 <-> 测试用例
  - ▶ 测试日志 <-> 需求
  - ▶ 缺陷 <-> 测试日志
- 建立需求到测试、缺陷的追踪关系，实现软件开发的闭环

# 生命周期的追踪关系



分析师

开发团队：  
项目经理，开发人员，测试人员

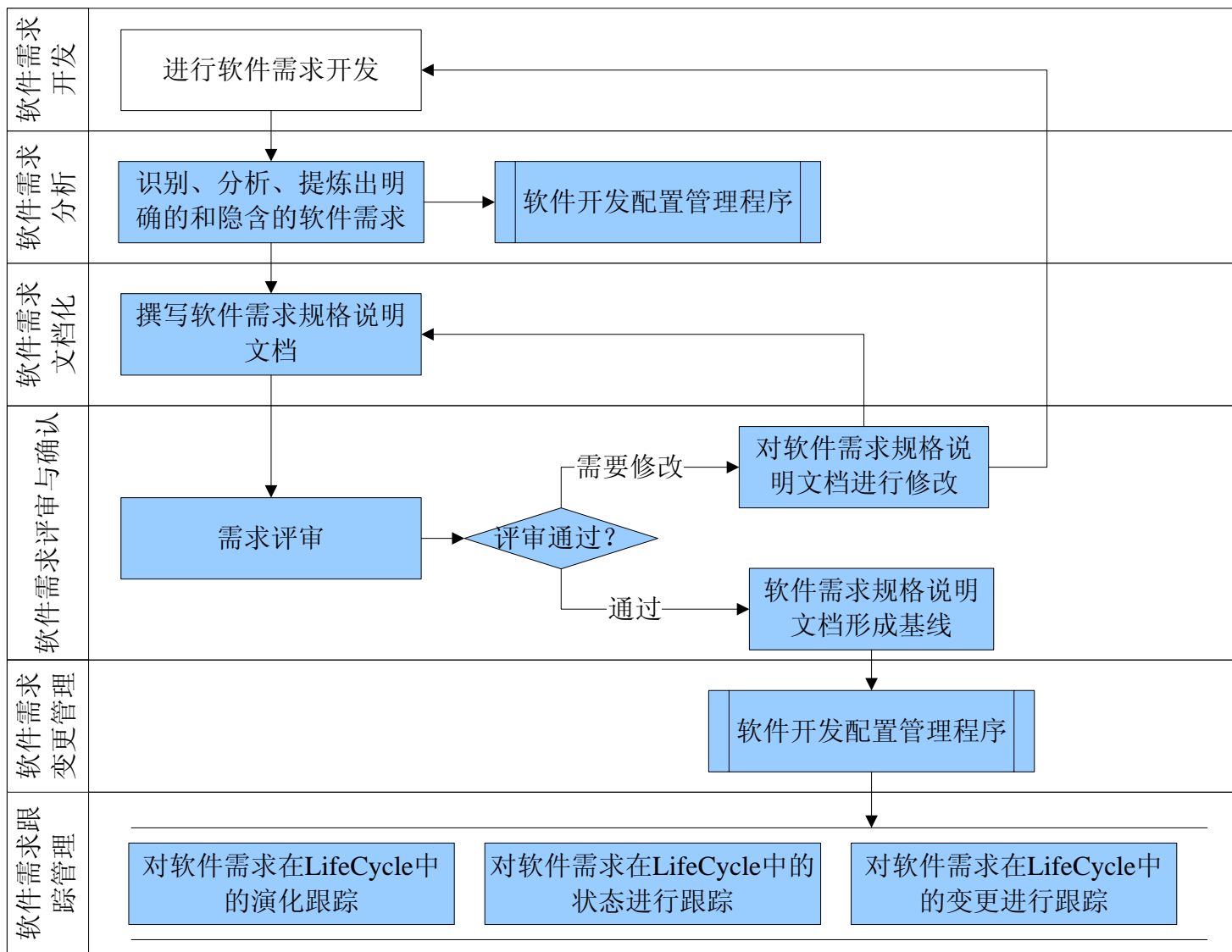


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# 团队开发:需求工程



# 团队开发：RSD与RequisitePro集成

- RequisitePro 可以管理以下追踪关系：
- 业务需求 -> 软件需求：保证没有业务需求会被遗漏
- 软件需求 -> 设计实现：保证所有的需求都被正确的实现
- 软件需求 -> 测试用例：保证测试的完备性，即测试应该覆盖所有的需求，RequisitePro中的需求可以作为CQTM中测试用例的测试输入，并且在CQTM中可以产生需求覆盖率报告来检查测试的完备性。

Requirements Explorer for viewing requirements in Eclipse.

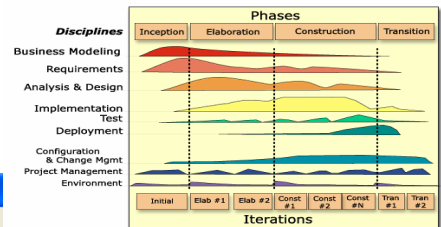
Associate requirements and model elements using Drag-and-Drop

View requirements traceability from the perspective of either "trace-to" or "trace-from"

The screenshot displays three windows from the Rational software interface. The top window, 'Requirement Explorer', shows a hierarchical tree of requirements including 'Coverage Analysis', 'Features and Vision', 'Glossary', 'Impact Analysis', 'Supplementary Requirements', 'Use Cases', 'Arrange Shipment', 'UC1 Arrange Shipment', 'UCS fff', 'Check Order Status', and 'Purchase CD'. A red arrow points from 'UC1 Arrange Shipment' to the 'UseCase1' element in the 'UML' diagram window on the right. The bottom-left window, 'Requirement Traceability', shows a list of classes (Class1 to Class6) with a 'FEAT11 Ability to check on customer orders' requirement. The bottom-right window, also 'Requirement Traceability', shows a list of requirements (FEAT12, FEAT13, FEAT11) with 'Class6' selected. A blue arrow points from 'Class6' to the 'FEAT11' requirement.



# 团队开发：RSD与RequisitePro集成



浏览需求跟踪关系和相关的用例，以评估影响

通过 RequisitePro 浏览 Microsoft Word 中的需求细节

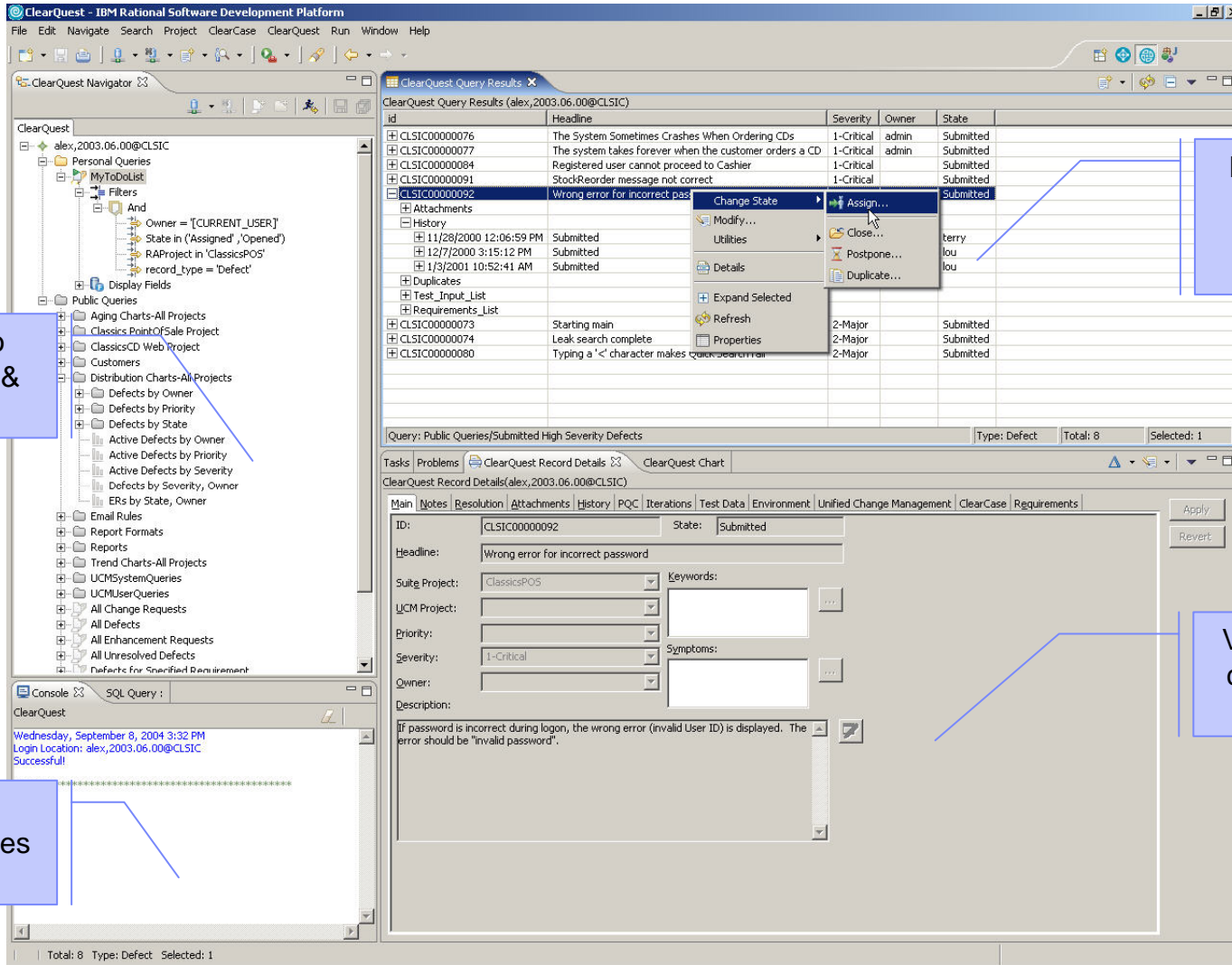


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# 团队开发：RSD与ClearQuest 集成



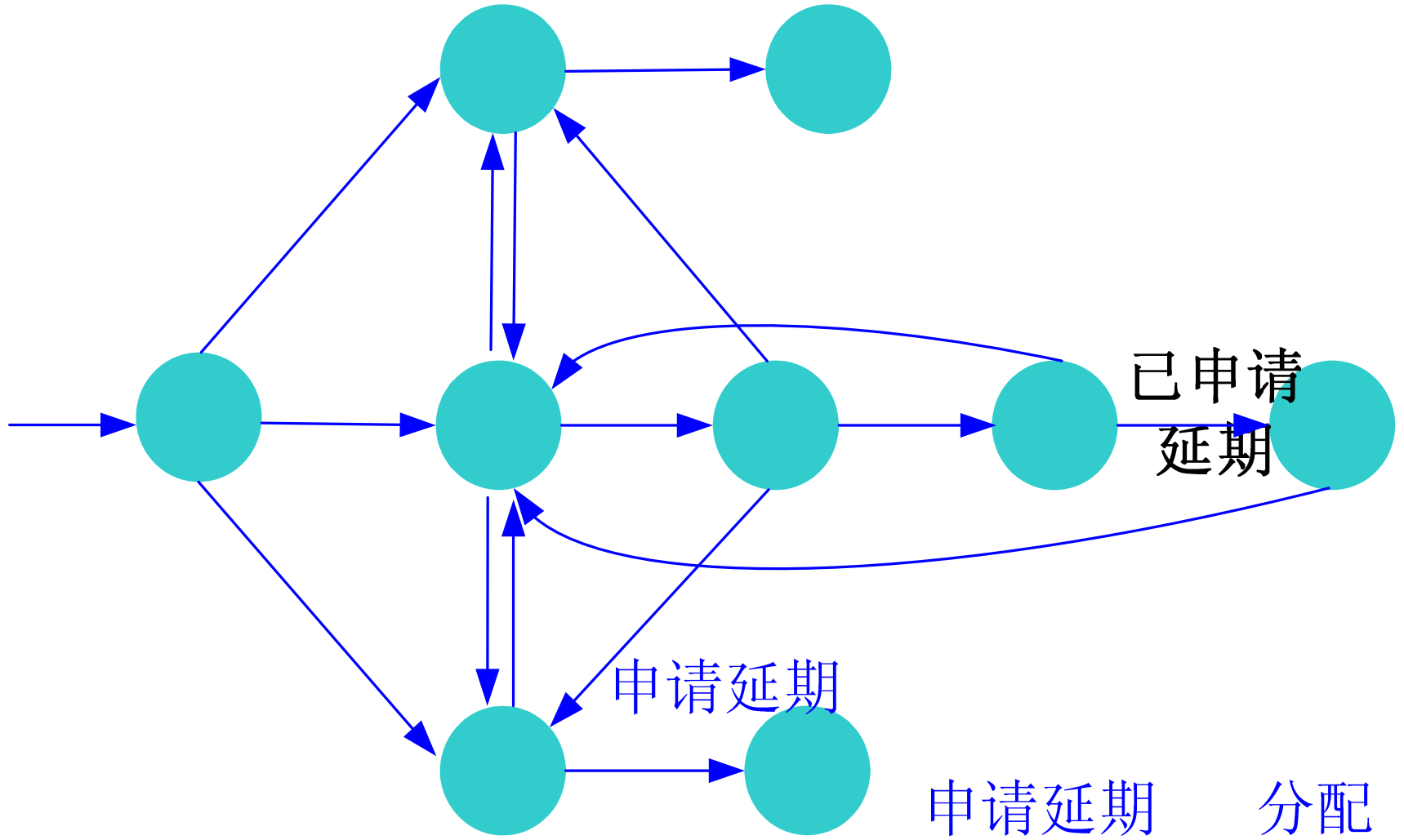
Hierarchical result set view shows parent-child relationships

Easy access to queries, charts, & reports

View record forms, charts and reports

Console, SQL Query & Properties views

# 解决方案：缺陷变更管理流程



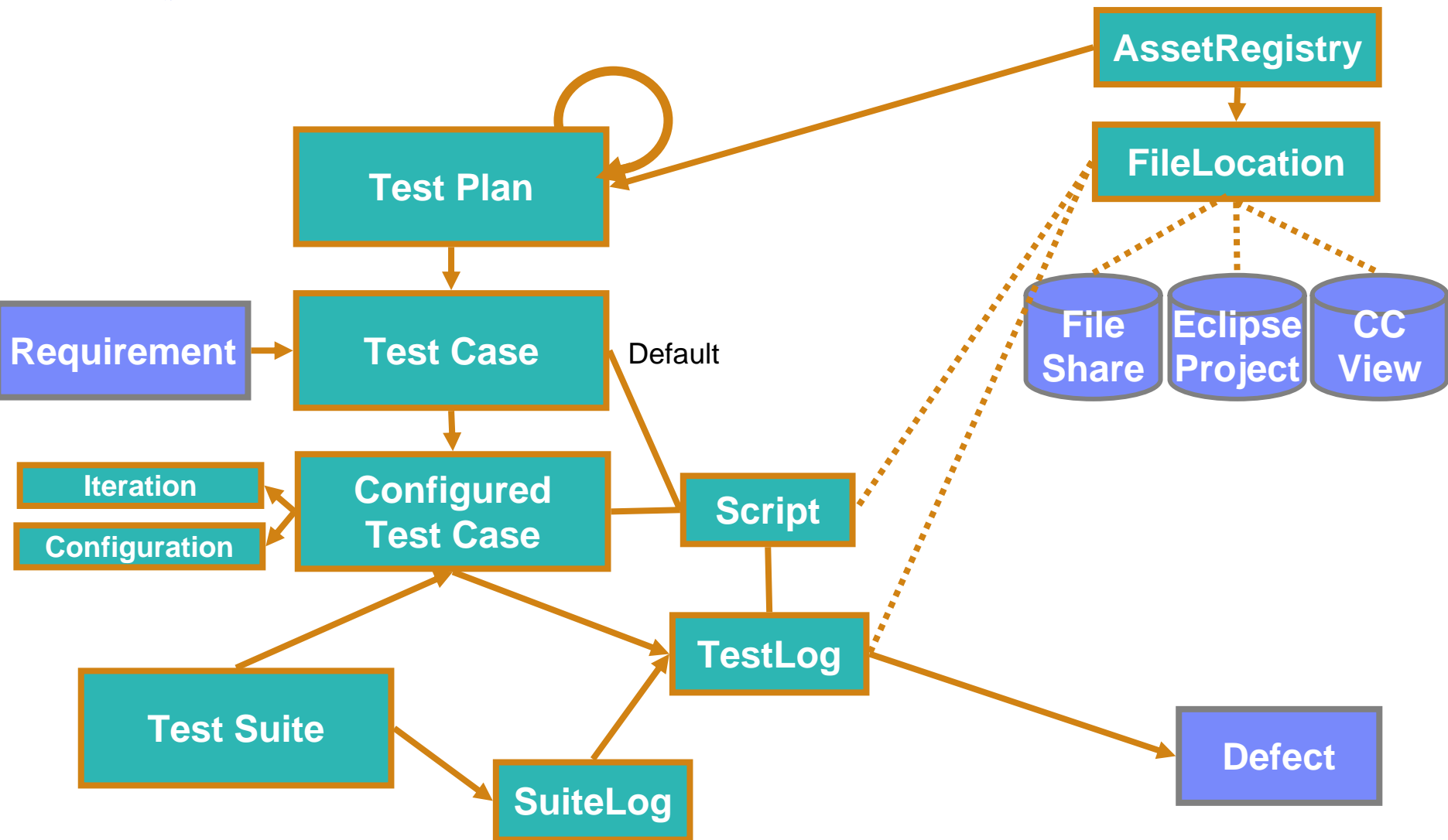
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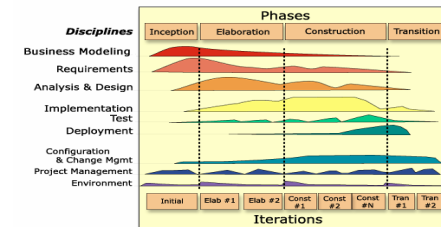


# 对象模型



# 为新的需求定义测试用例

## Test management on ClearQuest



测试人员

ClearQuest - IBM Rational Software Development Platform

File Edit Navigate Search Project Run ClearQuest Window Help

ClearQuest Navigator Test Manager - Planning

Test Plans - By State - ClearQuest Query Results

ClearQuest Query Results (dana,SDPDemo@AUCT)

id State Priority Owner Parent Plan

AUCT0000164 Account Ver

ChildPlans

ChildTestCases

AUCT0000166

Account Verification test plan

Test Plans

Test Suites

TestSuite1

Iterations

Iteration1

Iteration2

Iteration3

File Locations

Configurations

Default Config

Configuration Attributes

New Test Plan

New Test Case

Change State

Modify...

Utilities

Refresh

Rename

Open Test Motivator File...

Associate Test Motivator File...

Show record details

Associate Iterations

Properties

Create (TMTestCase) AUCT0000170

Main Test Motivator Execution History Notes Requirements

ID: AUCT0000170 State: Draft

Headline: Submit medium risk loan for less than \$10K

Priority: 2 - High Owner: dana

Test Plan:

id	Headline
AUCT0000164	Account Verification test plan

Iterations:

Name	Start...	EndD...	AssetRegi...
Iterati...	2005-...	2005-...	Registry1

Description: Tests the case where a medium risk applicant is applying for a loan less than \$10k. Should result in the loan being automatically approved

Template: Load

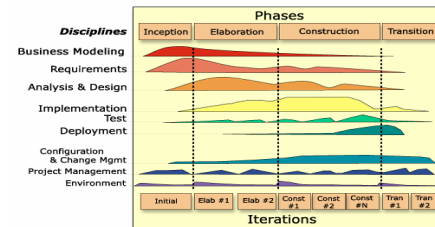
OK Cancel

测试人员创建与原有需求相关的测试用例



# 建立与需求之间的关联

## Test management on ClearQuest



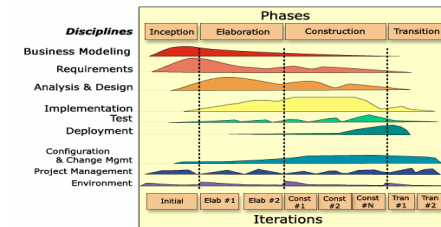
测试人员

测试人员将测试案例同  
**RequisitePro**中的需求相关联



# 与测试案例相关联的测试脚本

## Test Management on ClearQuest

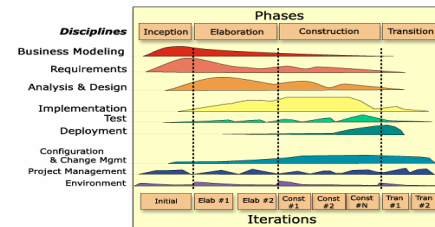


**Tester**

测试人员可以将来自下面测试工具的脚本与测试用例关联起来:

- Rational Functional Tester
- Rational Performance Tester
- other 来源

# 需求是经过测试和校验的 *Test Management on ClearQuest*



测试人员

ClearQuest - IBM Rational Software Development Platform

File Edit Navigate Search Project Run ClearQuest Window Help

ClearQuest Navigator Test Manager - Planning

Test Plans - By State - ClearQuest Query Results

ClearQuest Query Results (dana,SDPDemo@AUCT)

id	Headline	State	Priority	Owner	Parent Plan
AUCT00000164					
ChildPlans					
ChildTestCas					
AUCT000					
history					
Iterations					
PlanFile					

View TMConfiguredTestCase AUCT00000167 (dana,SDPDemo@AUCT)

Main Execution History Notes eSignature

Test Script :

URL

Open

rfile://BDDLabTest/LoanEligibilityTests%5CMediumRiskLoan1.tes...  
Browse

Copy from Test Case

Remove

Test Script Type :

Rational Functional Tester

Test Script Options :

Test Logs :

StartTime	EndTime	Build	Verdict	Iteration
2005-10-31 ...	2005-10-31 00:00:40	build	Pass	01-05

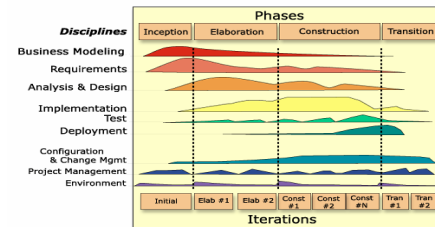
OK Cancel

经配置的测试用例可以从  
ClearQuest直接执行

测试日志示出测试PASS



# 需求是经过测试和校验的 *Test Management on ClearQuest*



在对测试用例进行校验时需要  
电子签名

The screenshot shows the ClearQuest application window titled "Verify AUCTION0000167 (dana,SDPDemo@AUCTION)". The interface includes a menu bar (File, Edit, Navigate, Search, Project, Diagram, Run, ClearQuest, Window, Help), a toolbar, and a navigation pane on the left. The main window has tabs for "Main", "Execution", "History", "Notes", and "eSignature". The "eSignature" tab is active, displaying a form with the following fields:

- Enter eSignature Here:
  - User Name: dana
  - \*Password: [Redacted]
- eSignature Log: [Empty list area]
- Signature is: [Empty text box]

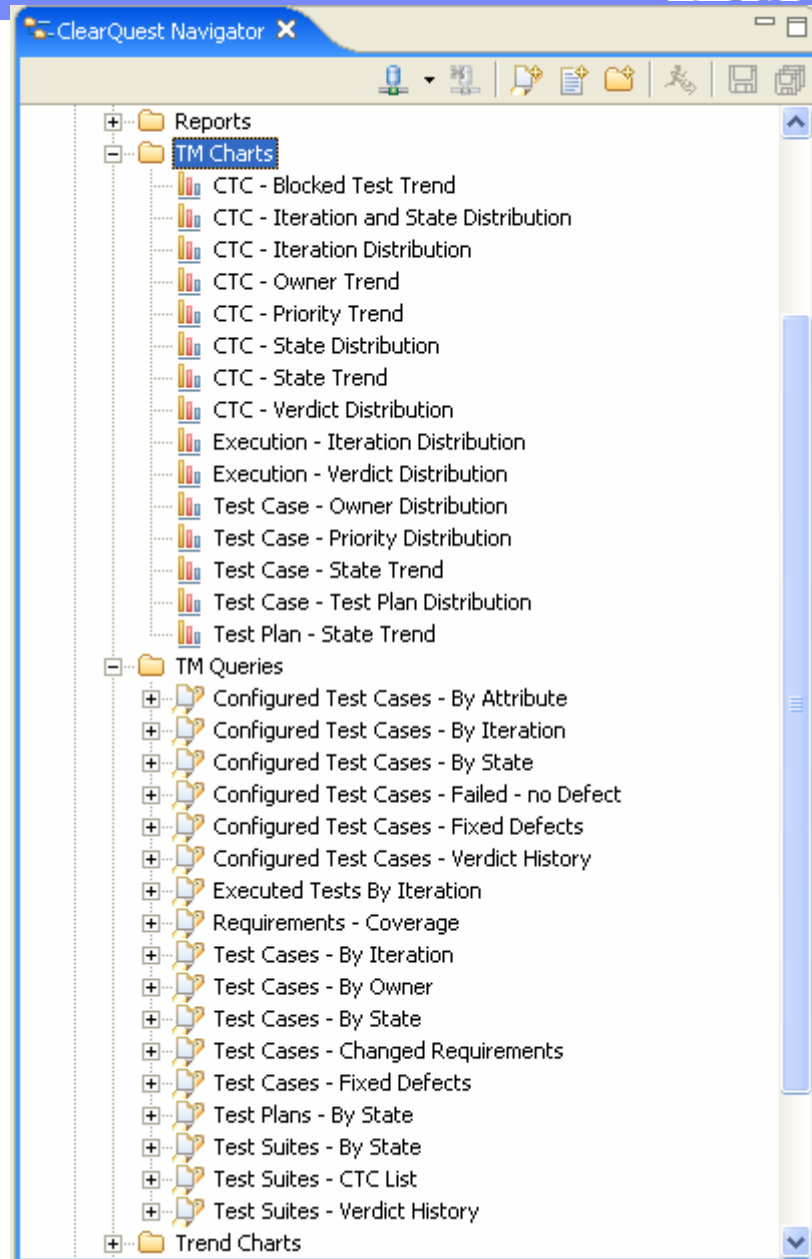
Buttons for "OK" and "Cancel" are located at the bottom right of the window. A red arrow points from the text box on the left to the "eSignature" tab.



# 测试报告与统计

## (Test Reporting and Metrics)

- 内置的查询、图标、报告：
  - ▶ 覆盖率和可疑度
    - 需求变化对测试用例的影响
    - 缺陷变化对测试用例的影响
  - ▶ 状态
    - 已计划 vs. 已实现
    - 成功 vs. 失败
    - 没有关联缺陷的失败的测试用例
    - 没有任何测试用例关联的需求
  - ▶ 趋势
    - 测试用例数量趋势
    - 失败 vs. 成功的测试用例数目
- 构建自己的查询图标报告
  - ▶ Crystal Reports
  - ▶ ProjectConsole
  - ▶ SoDA
- **Report Formats Beta 2**





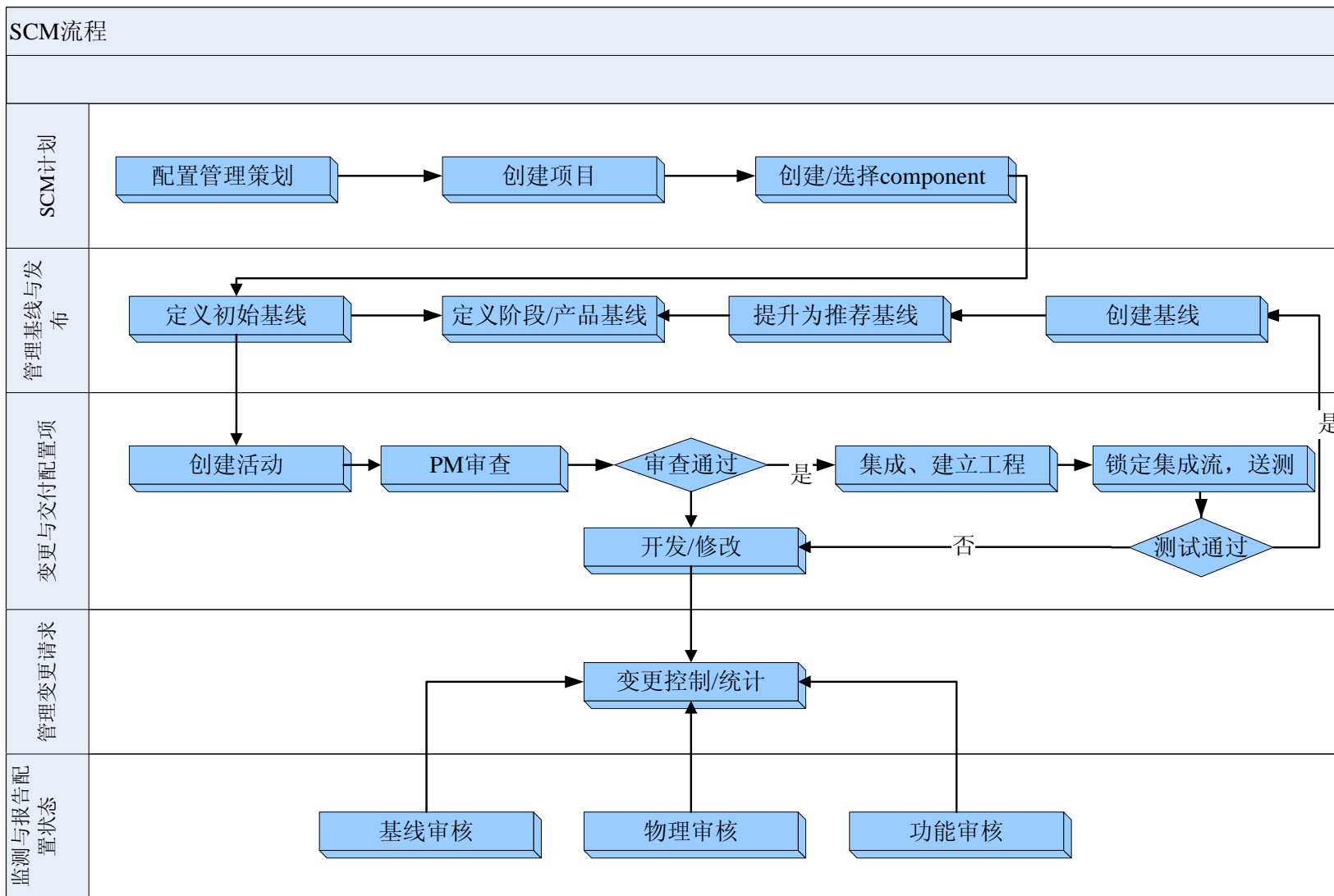
# 议程

- 第二天上午
  - ▶ 系统开发面临的挑战
  - ▶ 团队开发
    - *团队开发: 过程向导*
    - *软件开发生命周期的集线器 (Hub)*
    - *团队开发: 需求工程*
    - *团队开发: 缺陷与变更管理*
    - *团队开发: 测试管理*
    - *团队开发: 配置管理*
  - ▶ 总结
  - ▶ DEMO
  - ▶ Q/A





# 团队开发：配置管理

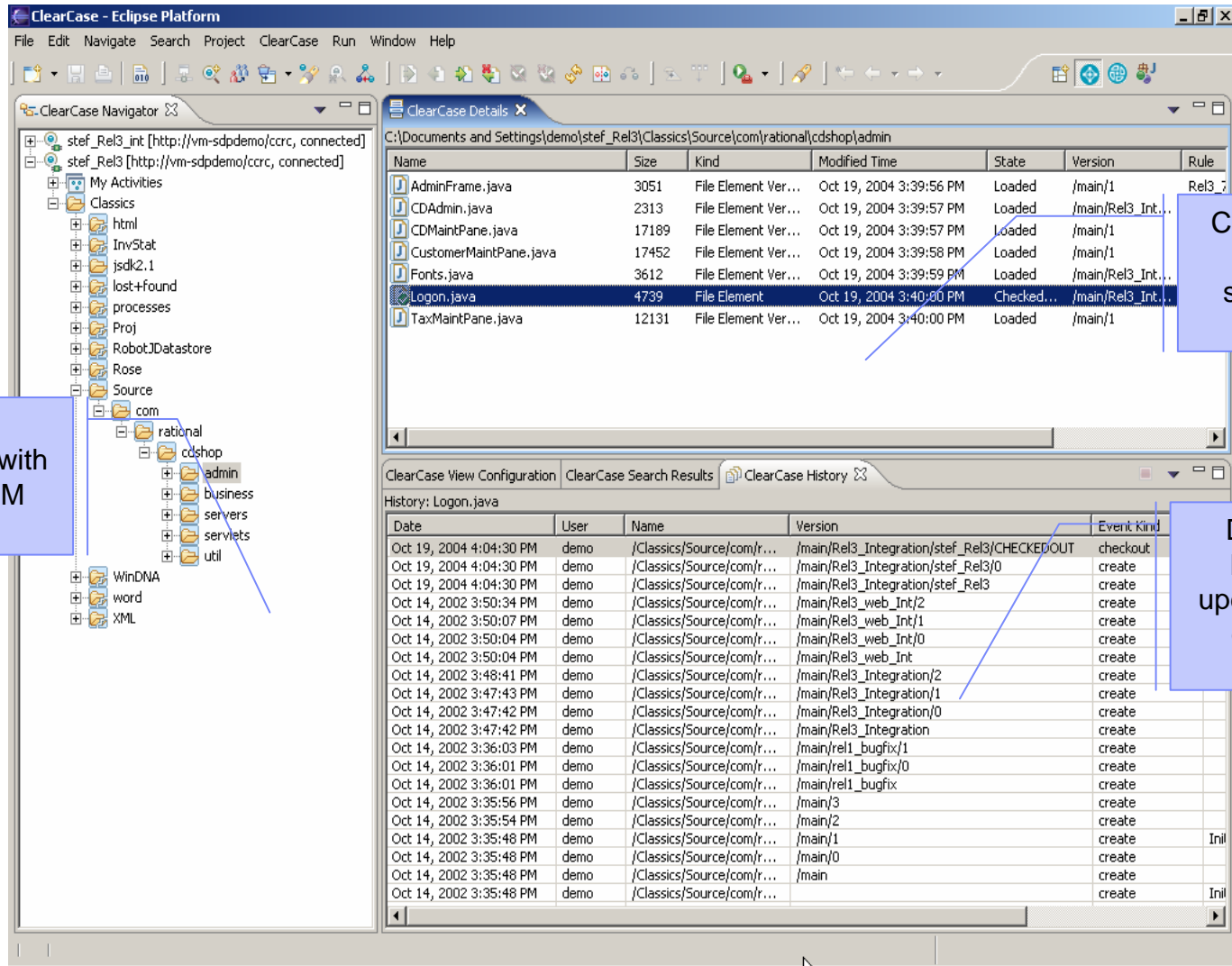


# 配置与变更管理实施

- 实施范围
  - ▶ 在相对大型化、复杂化的项目团队内部开始实施
- 实施内容
  - ▶ 建立统一的软件资产库
  - ▶ 通过建立有效的权限管理、共享机制支持全部开发团队的开发活动
  - ▶ 通过固化的流程管理开发团队的开发活动
  - ▶ 利用开发活动的管理有效管理产品配置与发布
  - ▶ 有效支持并控制并行开发，提高软件资产复用程度，缩短产品研发周期，提高客户满意度



# 团队开发：RSD与ClearCase 集成



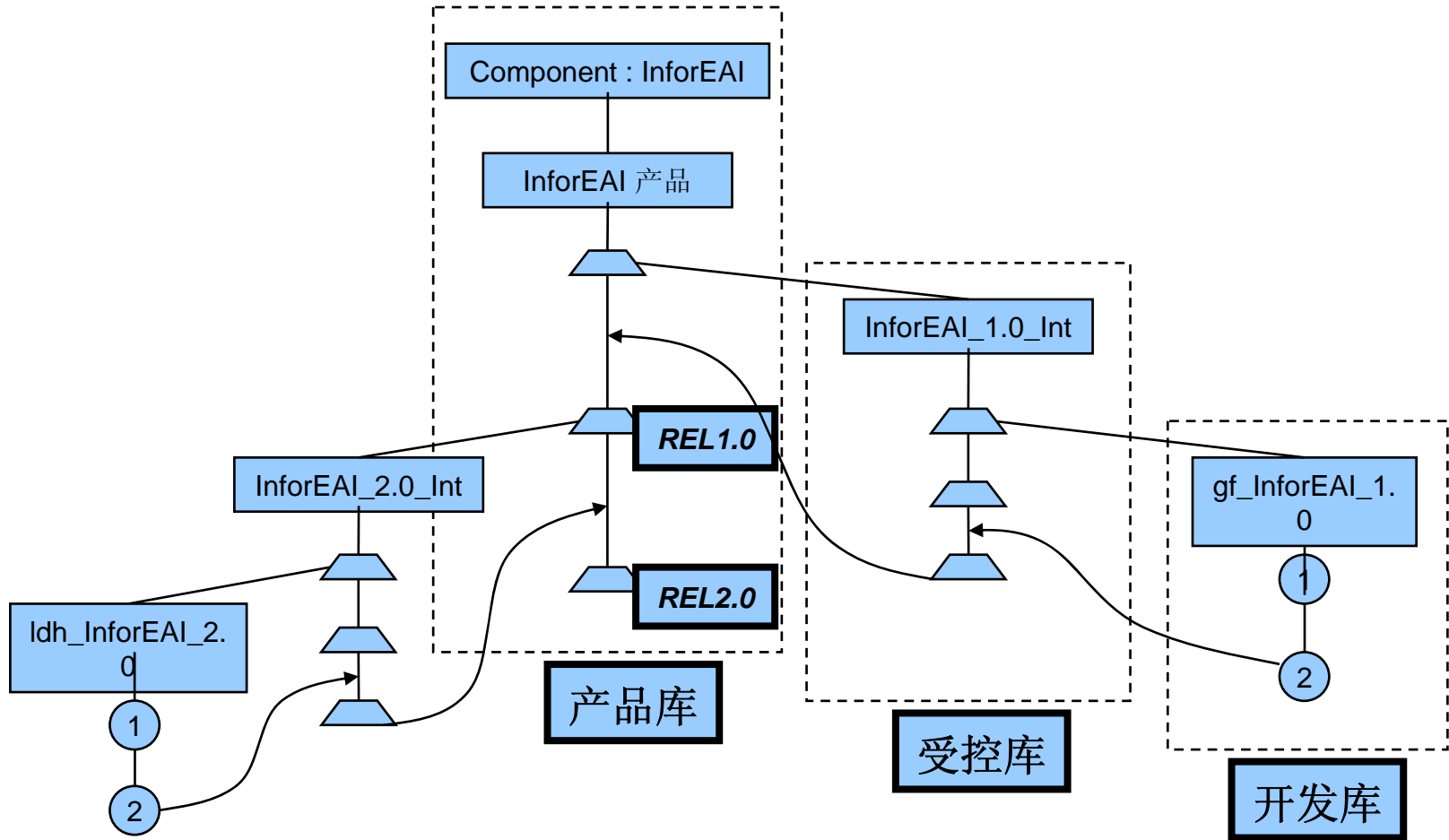
ClearCase Navigator view with integrated UCM activities

ClearCase Details view shows selected version information

Display version history, view & update config spec, display search results

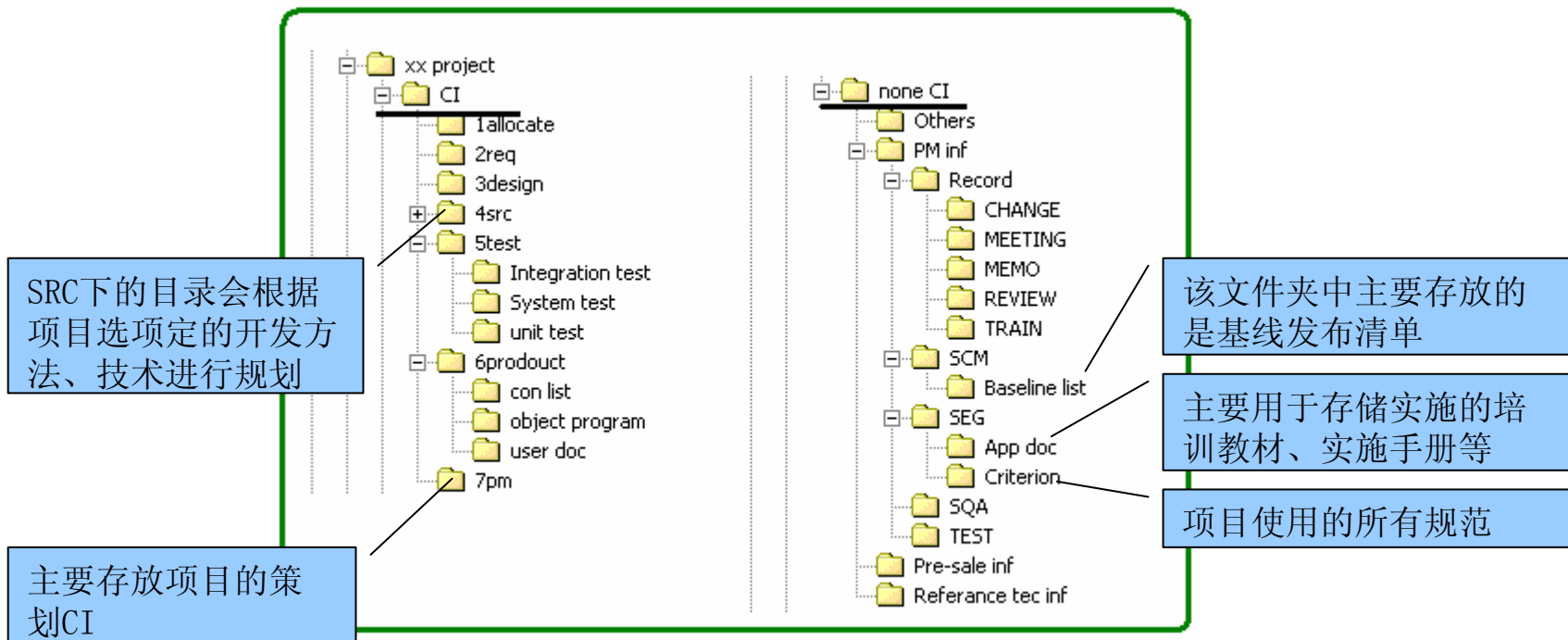


# 支持SCM的多个控制层次



# 支持SCM的多个控制层次

- 在生存周期的不同时间所需要的控制层次不同（例如，随着产品成熟要更加严密的控制）。
- 提供对配置项/单元的存储和检索功能。
- 在受影响的组之间和在库内部的控制层次之间提供配置项/单元的共享和传送。
- 有助于使用配置项/单元的产品标准。
- 对配置项/单元的归档版本提供存储和恢复功能。
- 确保按软件基线库正确生成产品。
- 对SCM记录提供存储、更新和检索功能。
- 支持SCM报告的编制。
- 提供对库结构和内容的维护。





# UCM workflow统一整个开发团队

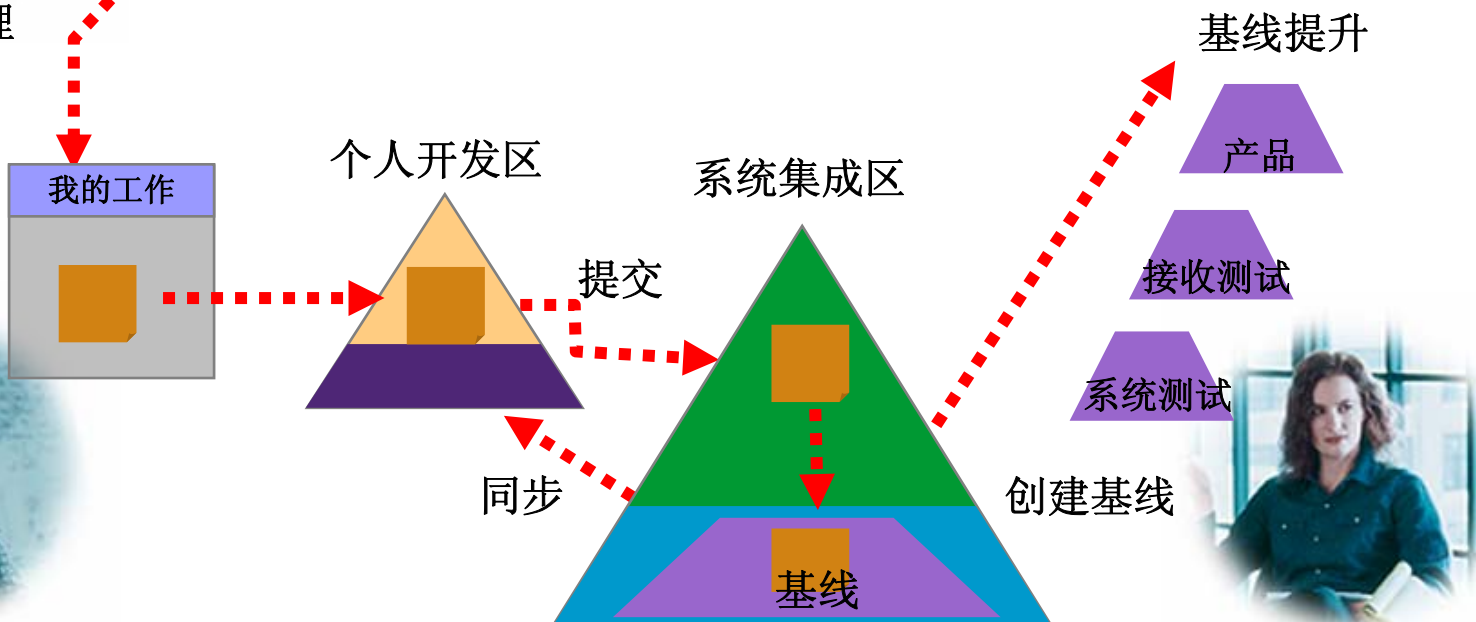


项目经理

开发活动			
开发活动	优先级	责任人	项目
登录网站中文化	1	Sam	CRSDC
欢迎界面没有小标题	3	Sandy	CRSDC
加入GUI 按钮	1	Kim	CRSDC



分析/设计/开发人员



集成人员



# UCM 以你工作的方式进行工作

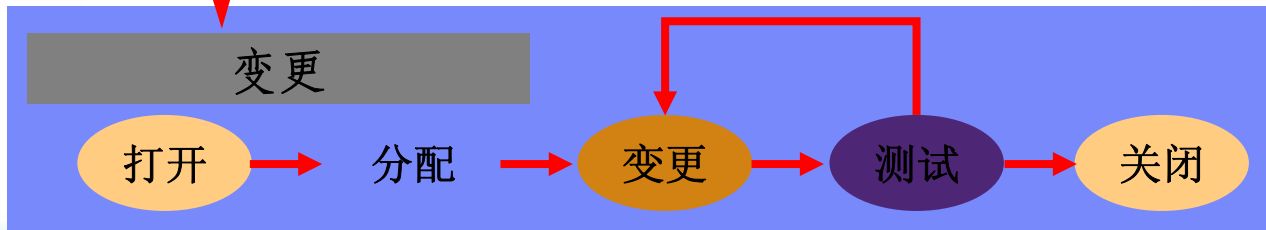
开发活动			
开发活动	优先级	责任人	项目
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加入GUI 按钮	1	Kim	CRSDC



开发人员



分析人员



项目经理  
/SCCB



集成人员



测试人员



# 总结



# DEMO



# QUESTIONS





THANK  
YOU

