IBM Software Group

Rational 솔루션이 어떻게 MDSE를 지원하는가?

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Innovation for a smarter planet

IBM Rational MDSE Solution

MDSE

(Model Driven Systems Engineering)

1 What is MDSE?

2 IBM Rational MDSE Solution

3 IBM Rational Harmony Process

4 고객사례 – Boeing

5 Q&A

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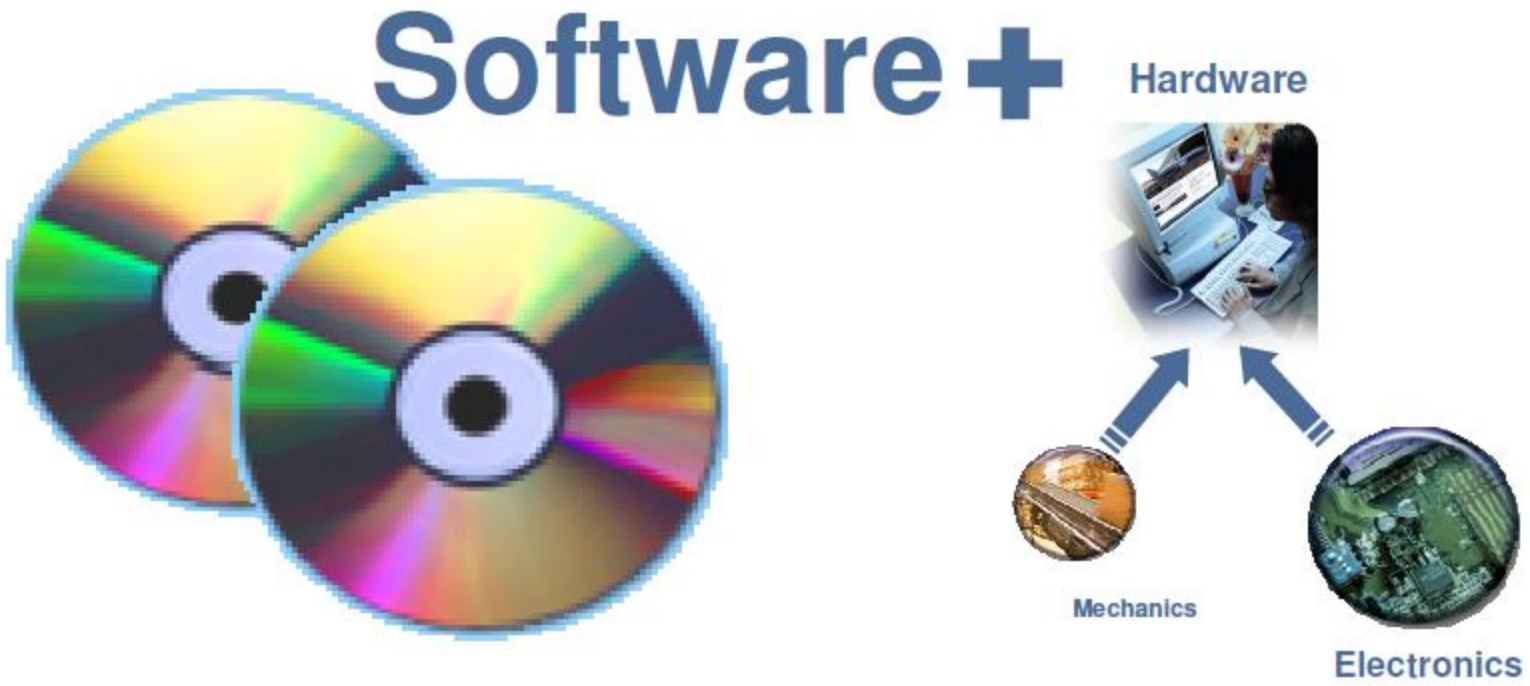
5 Q&A

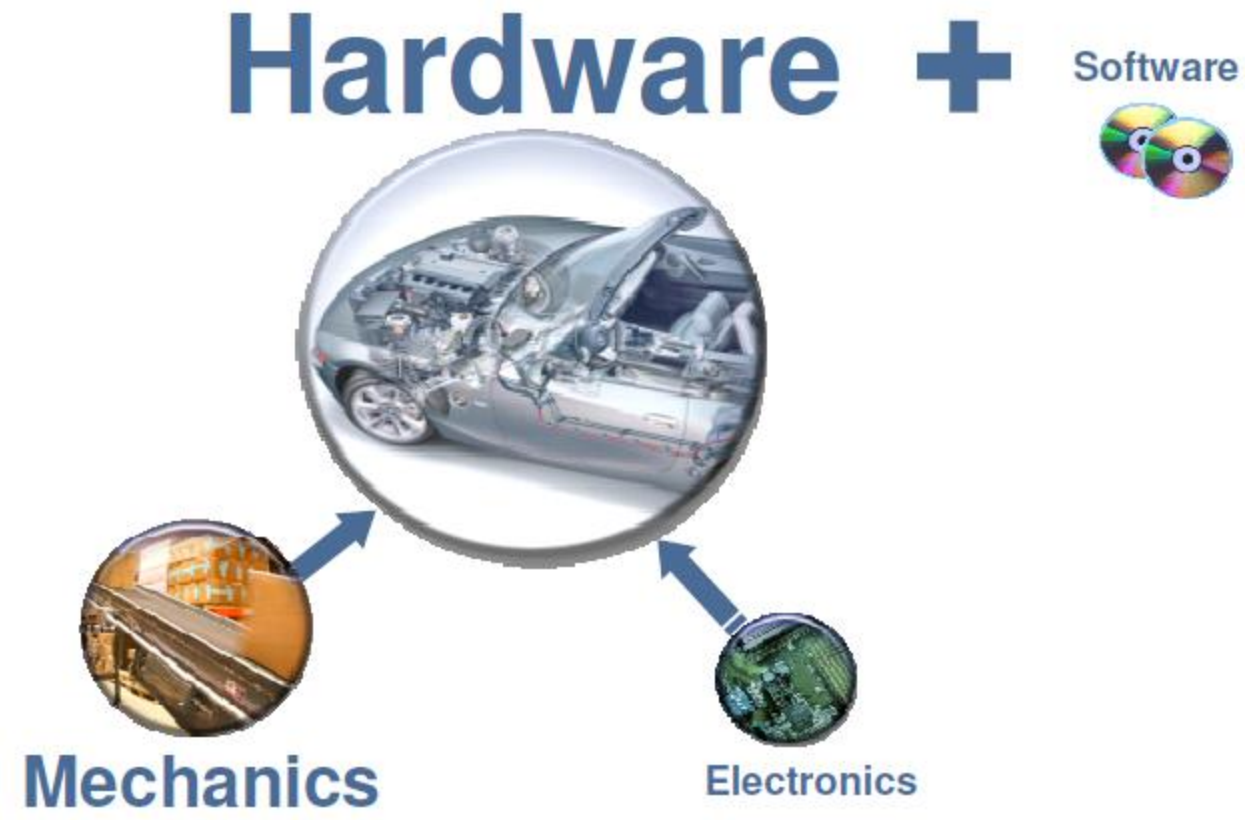
Let´s define what we mean by a “System” - Version A

From a Software Company Point of View

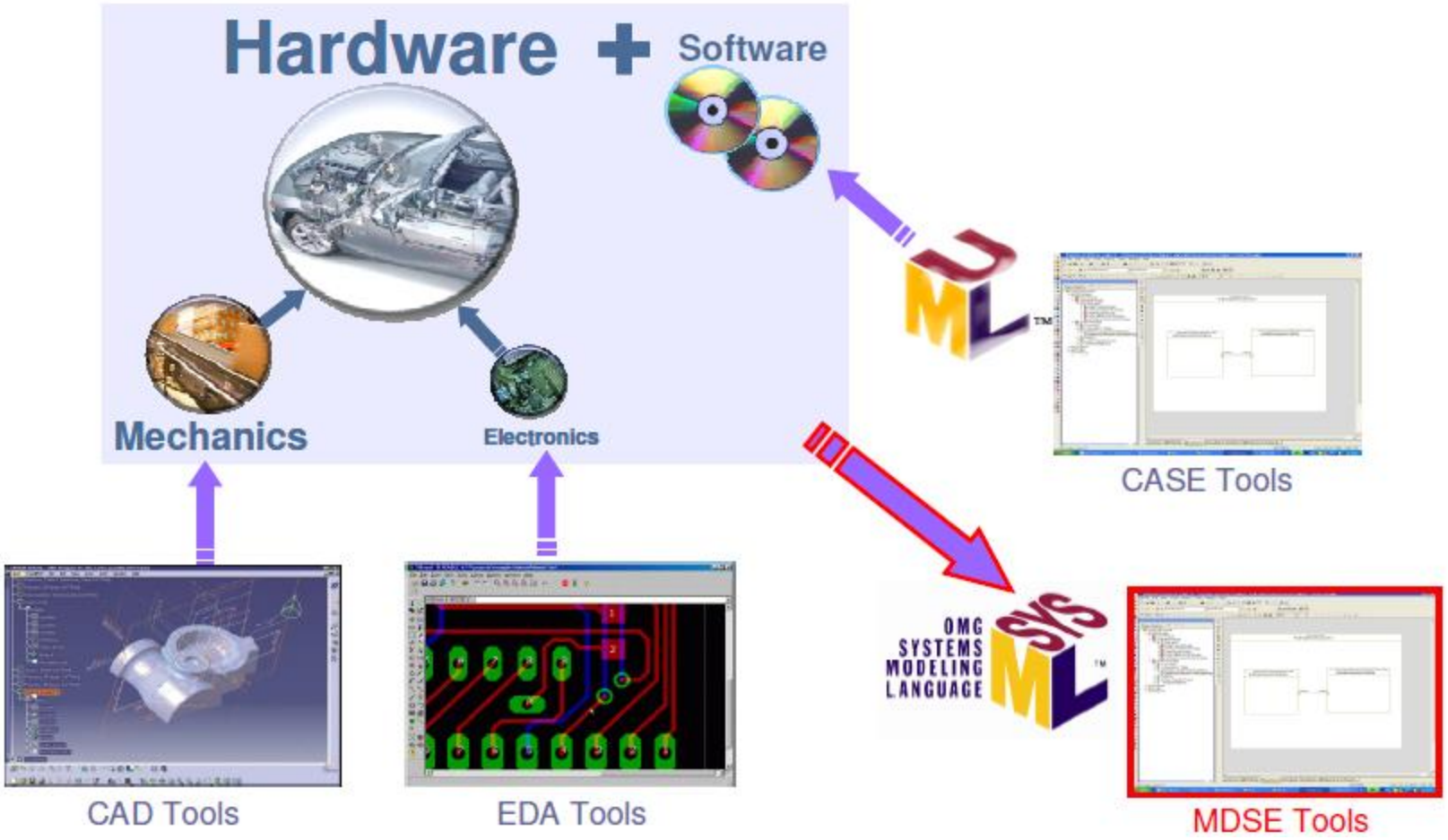


Let´s define what we mean by a “System” - Version B

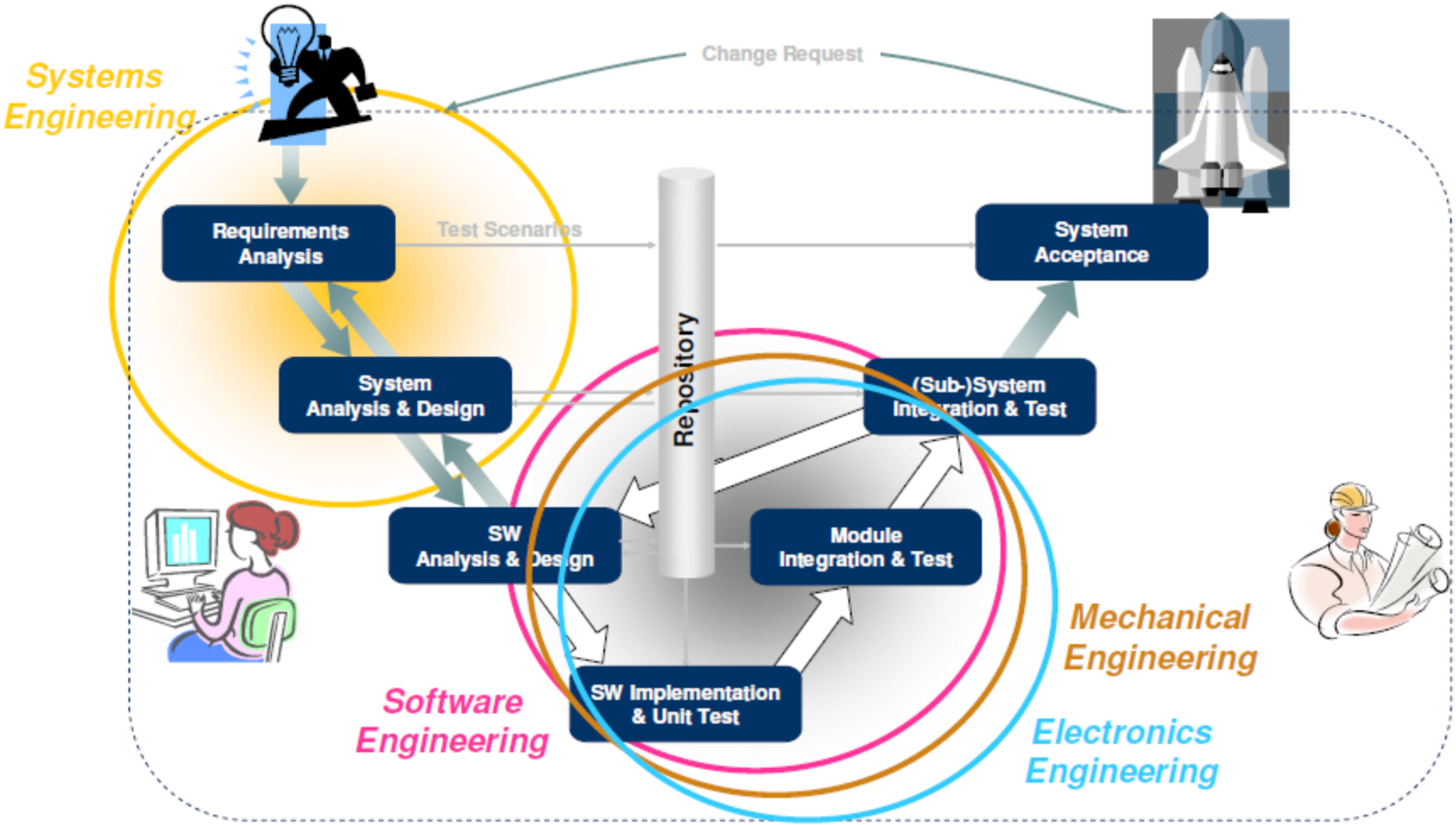
From a Systems Company Point of View



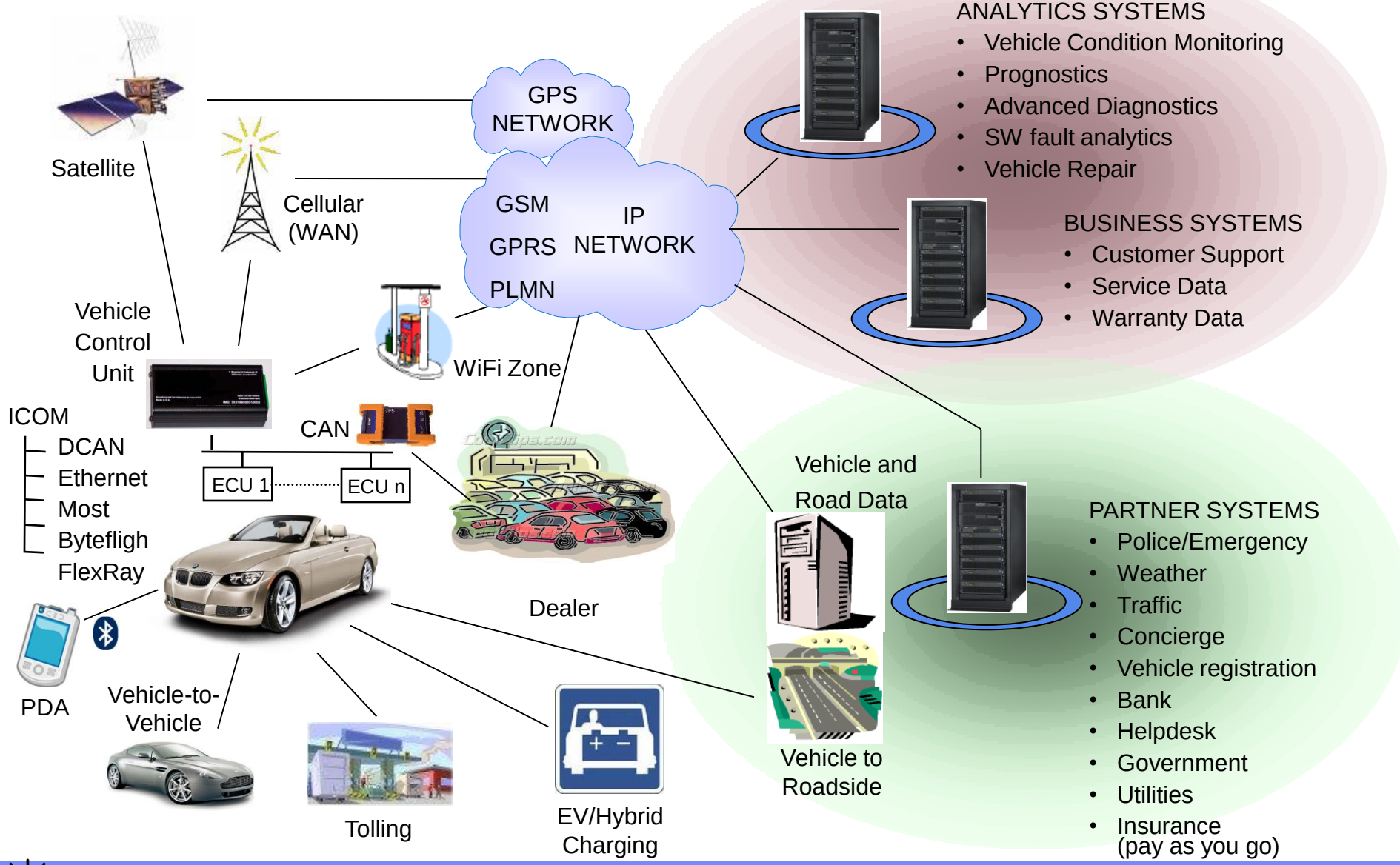
Model Driven Systems Engineering (MDSE) addresses these challenges!



Systems Development Process

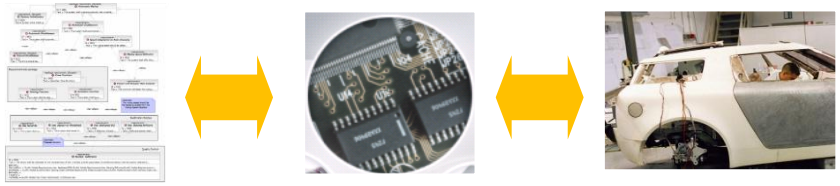


The Connected Vehicle – 'A System of systems'



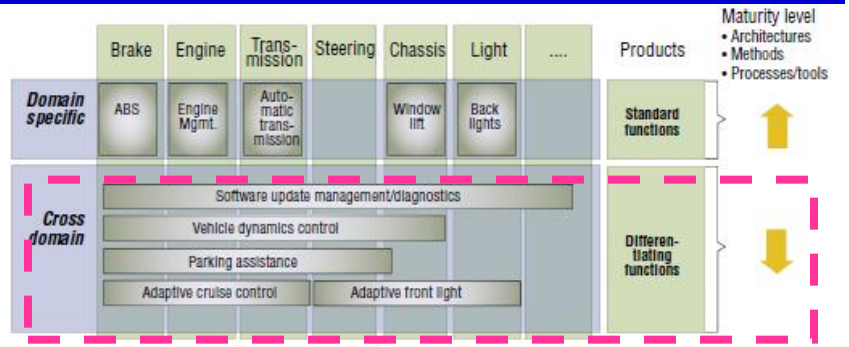
Increasing complexity of systems makes hard to maintain quality and cost (example of Auto industry)

Inter-relationship across software / electronics / mechanics



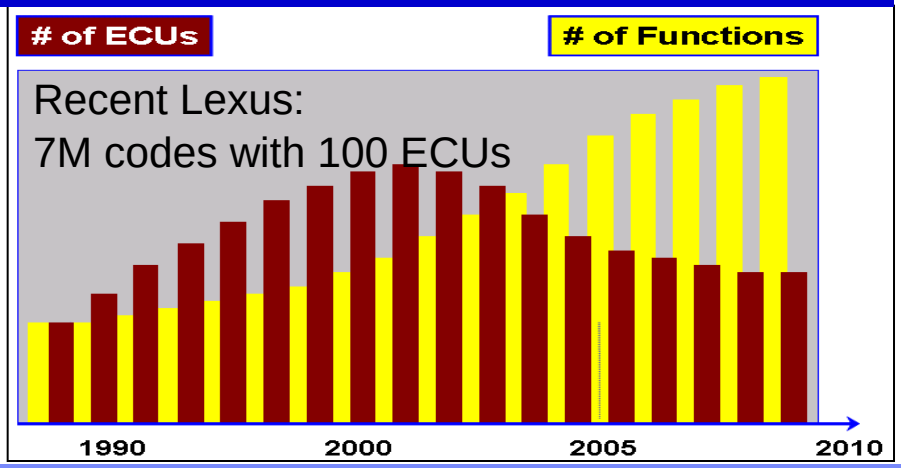
Software Electronics Mechanics

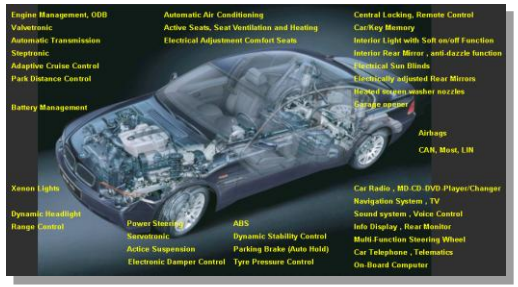
Cross-domain design functions for differentiation



Source: IBM Institute for Business Value.

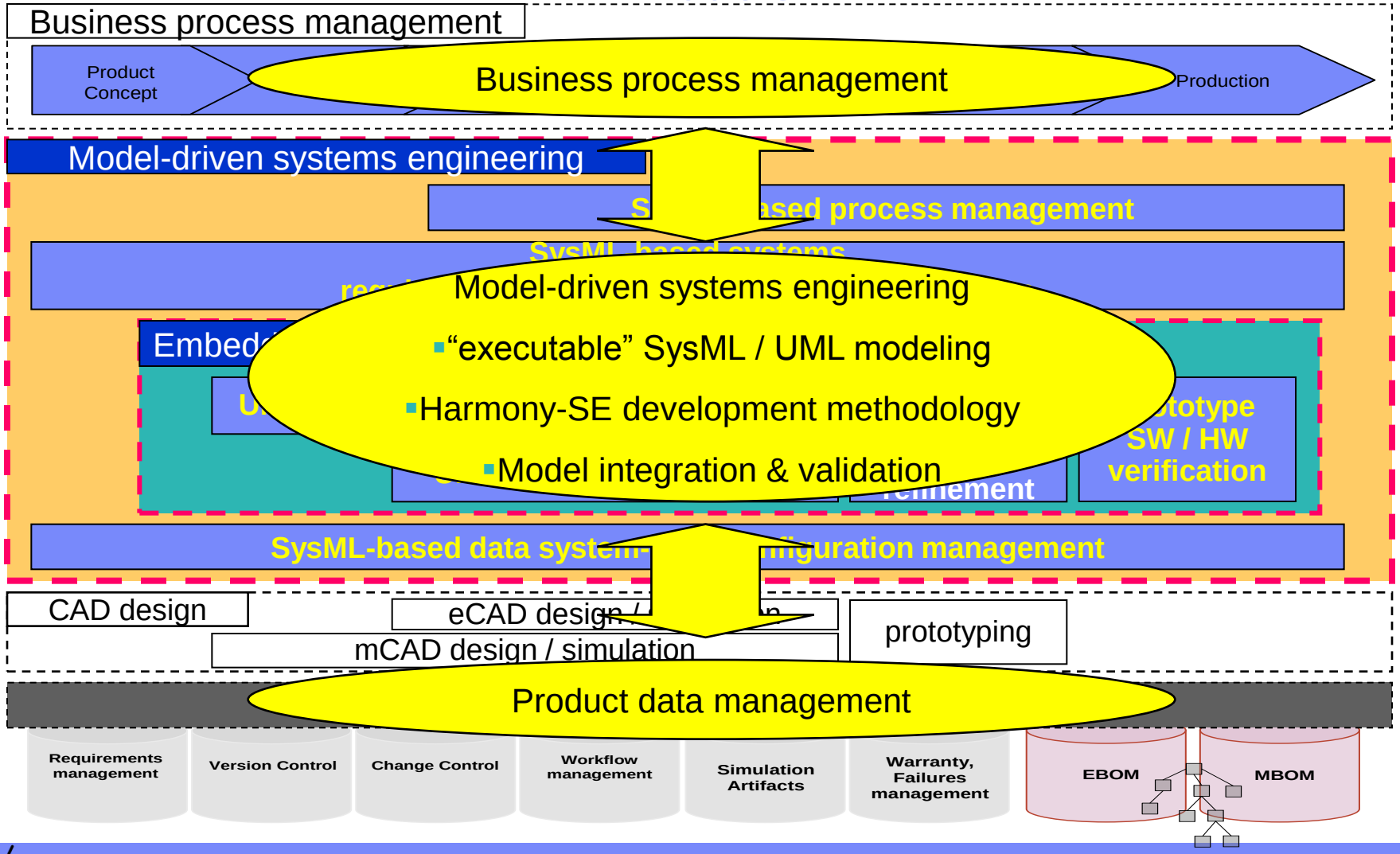
Rapid increase of SW on complicated electronics



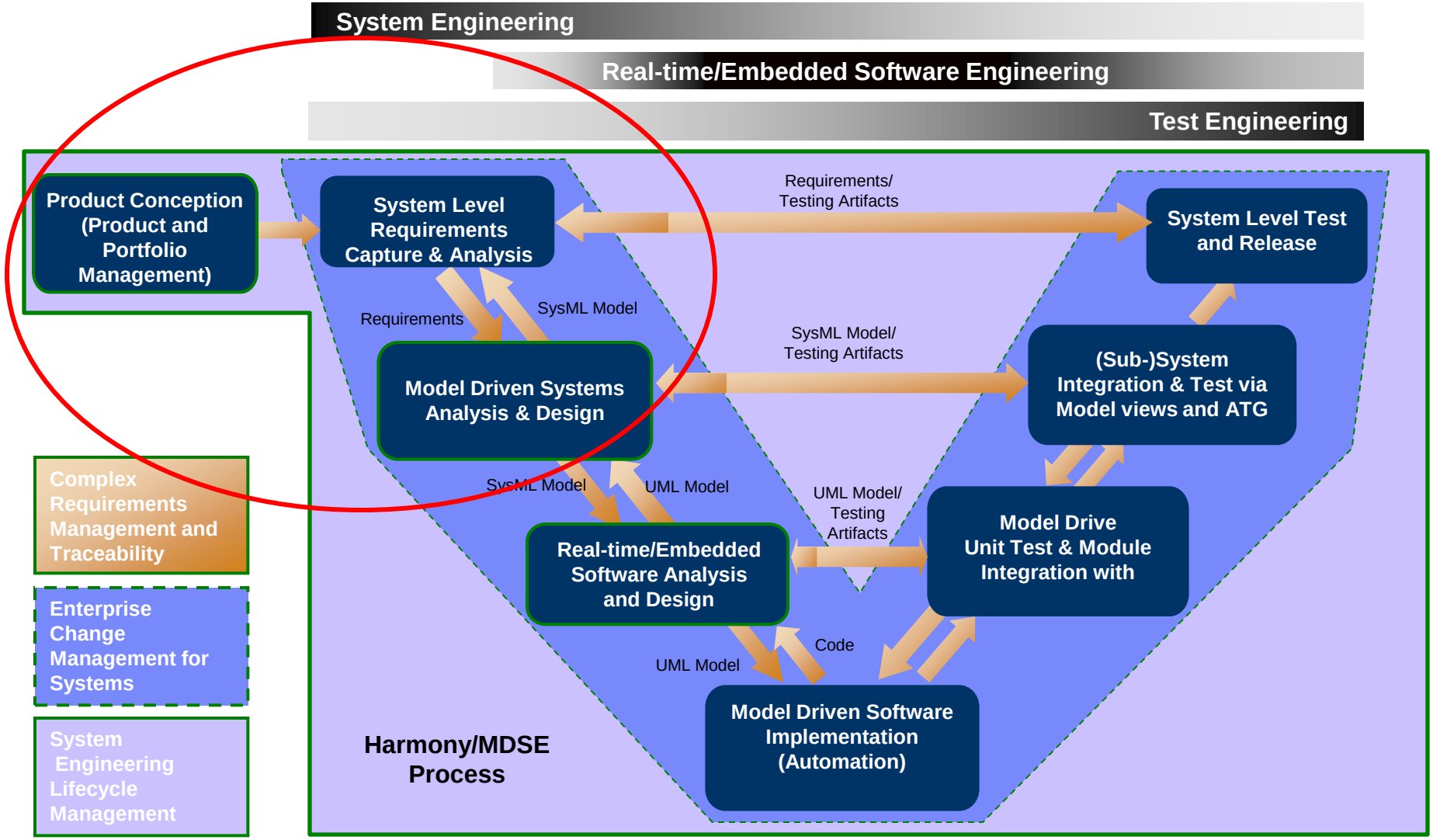


Increase of complexity for differentiation

MDSE will introduce new methods and tools to transform PLM by connecting business process and product data by "executable models".



Rational MDSE Solutions



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(Model Driven Systems Engineering)

1 What is MDSE?

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- 1) PPM(Product & Portfolio Management)
- 2) Way Jazz?
- 3) System Workbench
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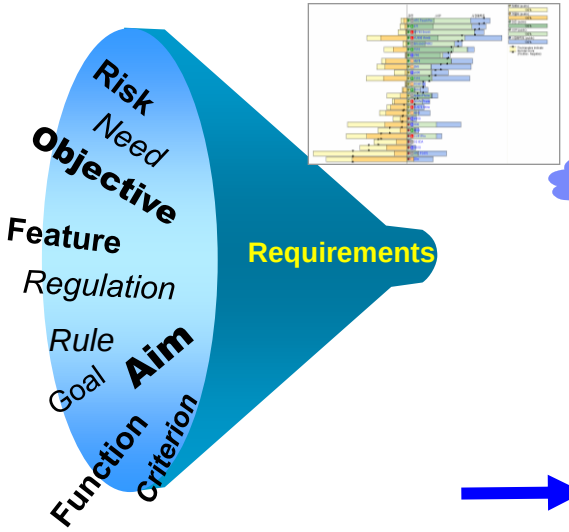
2.1

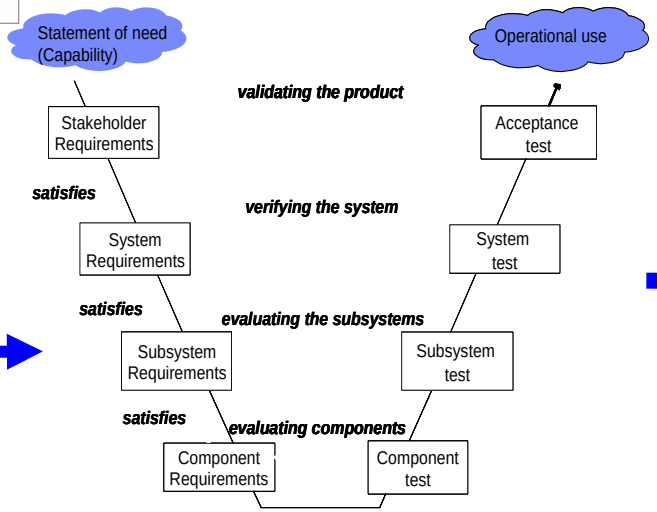
Visual development

- PPM 솔루션으로 고객의 Needs, 경쟁사 정보, 각종 분석을 통해 요구사항을 선택함
- RM 솔루션으로 체계적인 요구사항 관리(추가, 변경, 검증)
- PPM 솔루션으로 프로젝트의 진행사항을 실시간으로 파악함



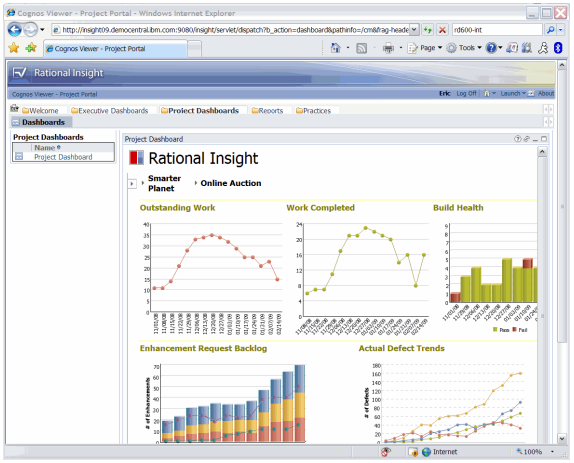
Value based decision

(Rational Focal Point)



MDSE

(Rational DOORS, Rhapsody, RTC, RQM, RPE)



Project Dashboard

(Rational Insight)

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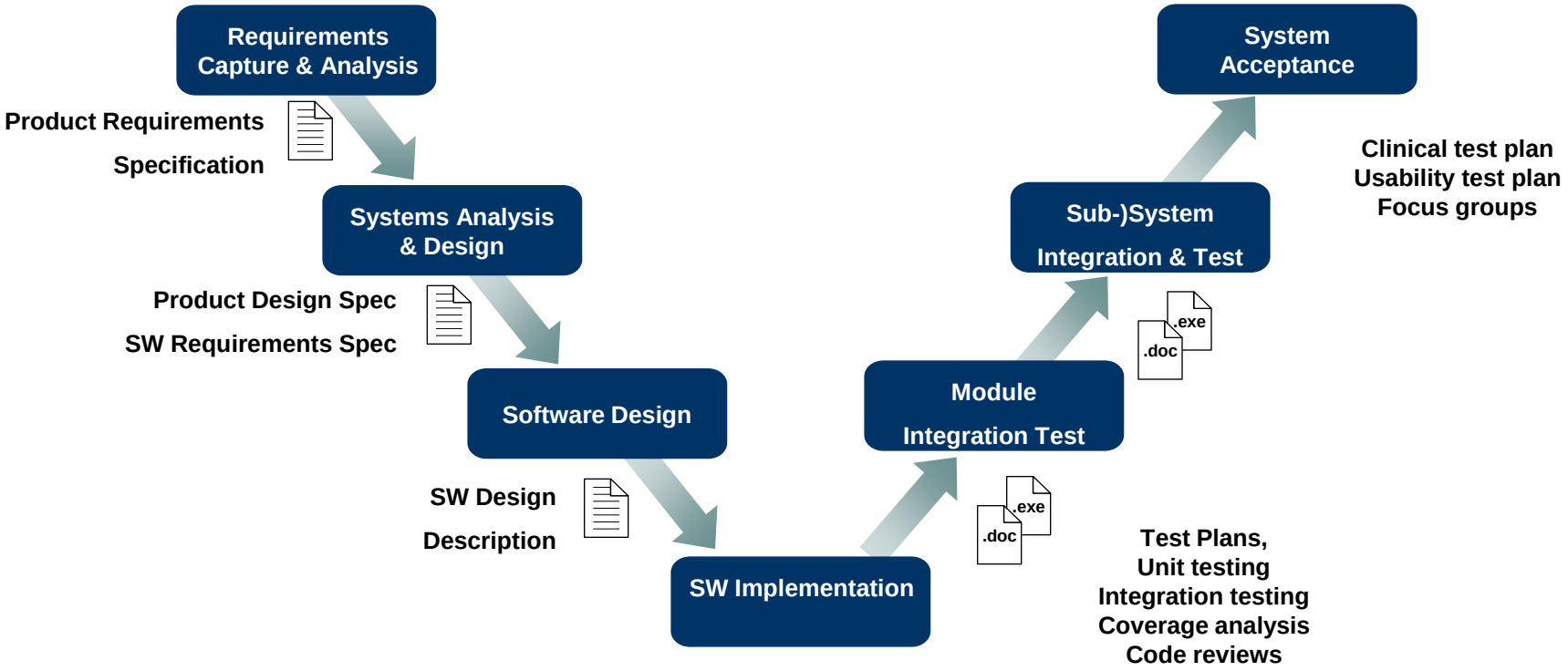
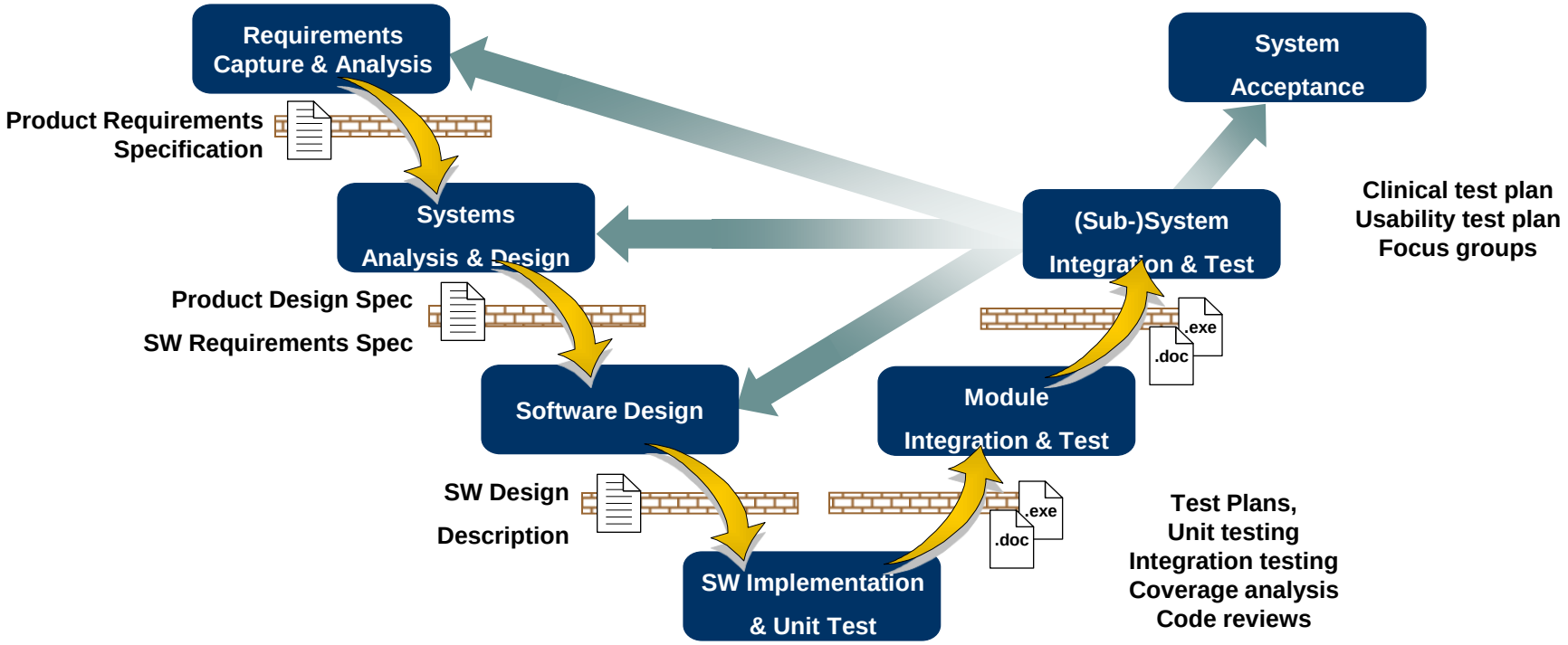
Traditional systems development - how it should work

- **Traditional development assumes design input is fully defined**
- **Design output is verified against design input iteratively**



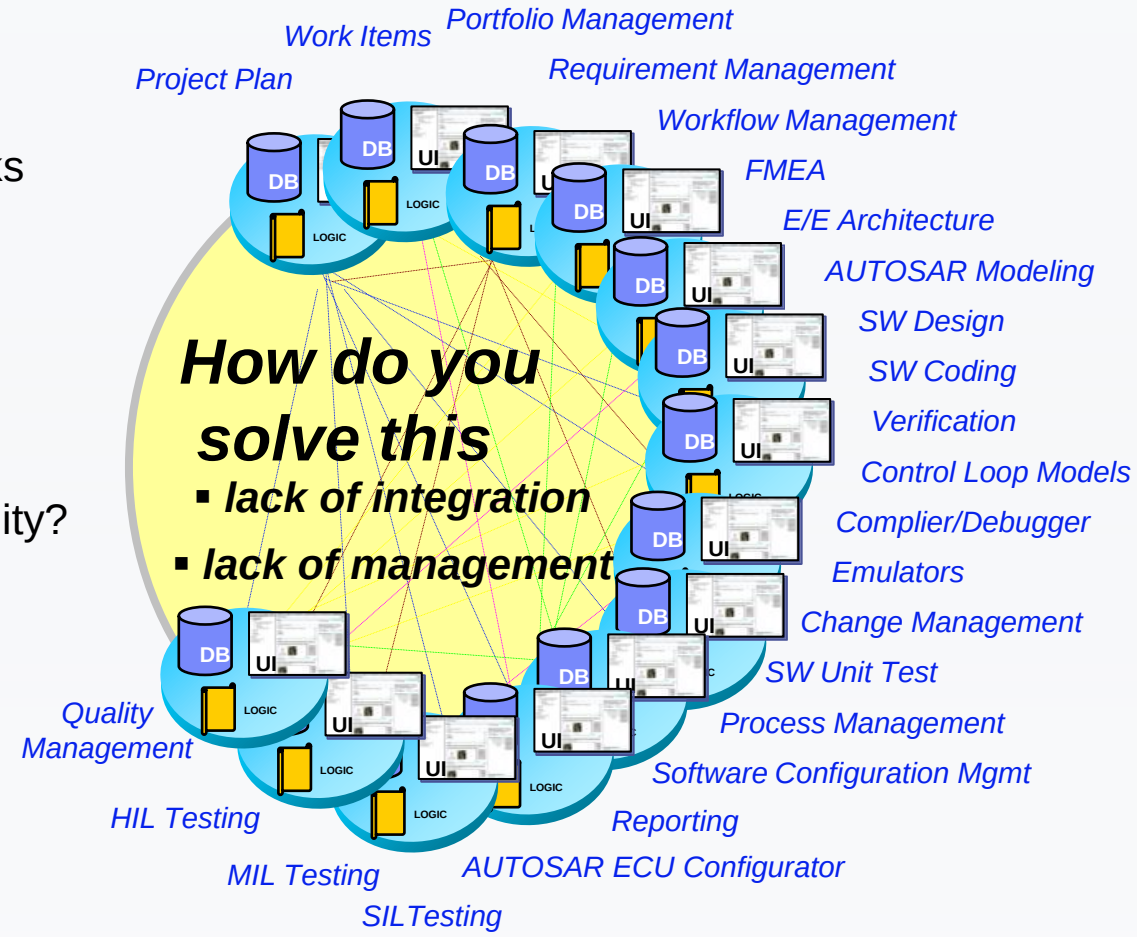
Traditional systems development - how it actually works

- In the traditional V, work is serial, and team members are disconnected and often waiting on the work of others, leading to delays
- Artifacts handed off from the previous process step are informal and not tested, leading to poor quality



Electric/Electronic/Software engineering environments are highly fragmented - *the challenge to connect them is increasing exponentially*

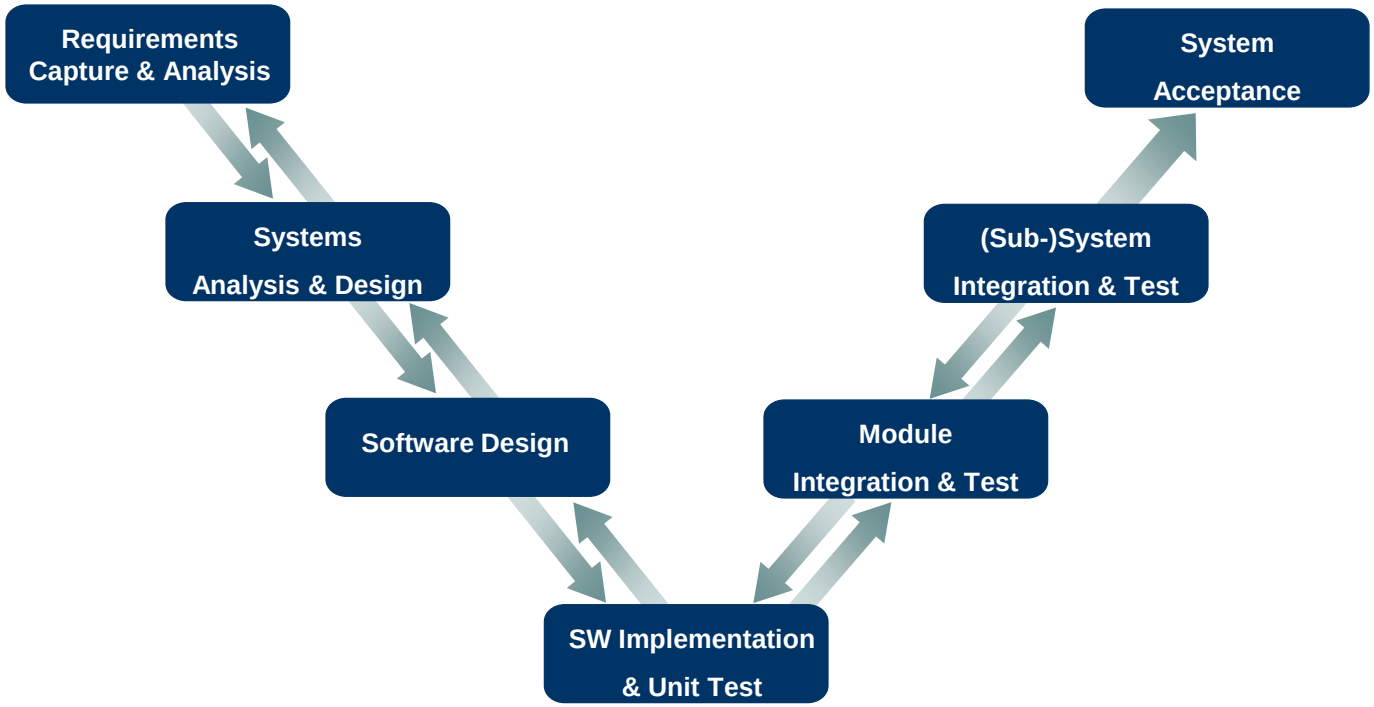
- **Traditionally, each tool came with its own**
  - **UI** - Web and desktop presentations of views and tasks
  - **Logic –** Workflow, process, search, query, scale, security and collaboration
  - **Storage** – individual files on workstation or servers: how to ensure availability and traceability?
- **Resulting in...**
  - Brittle integrations
  - Silos everywhere
  - High cost to maintain and administer
  - Low re-use



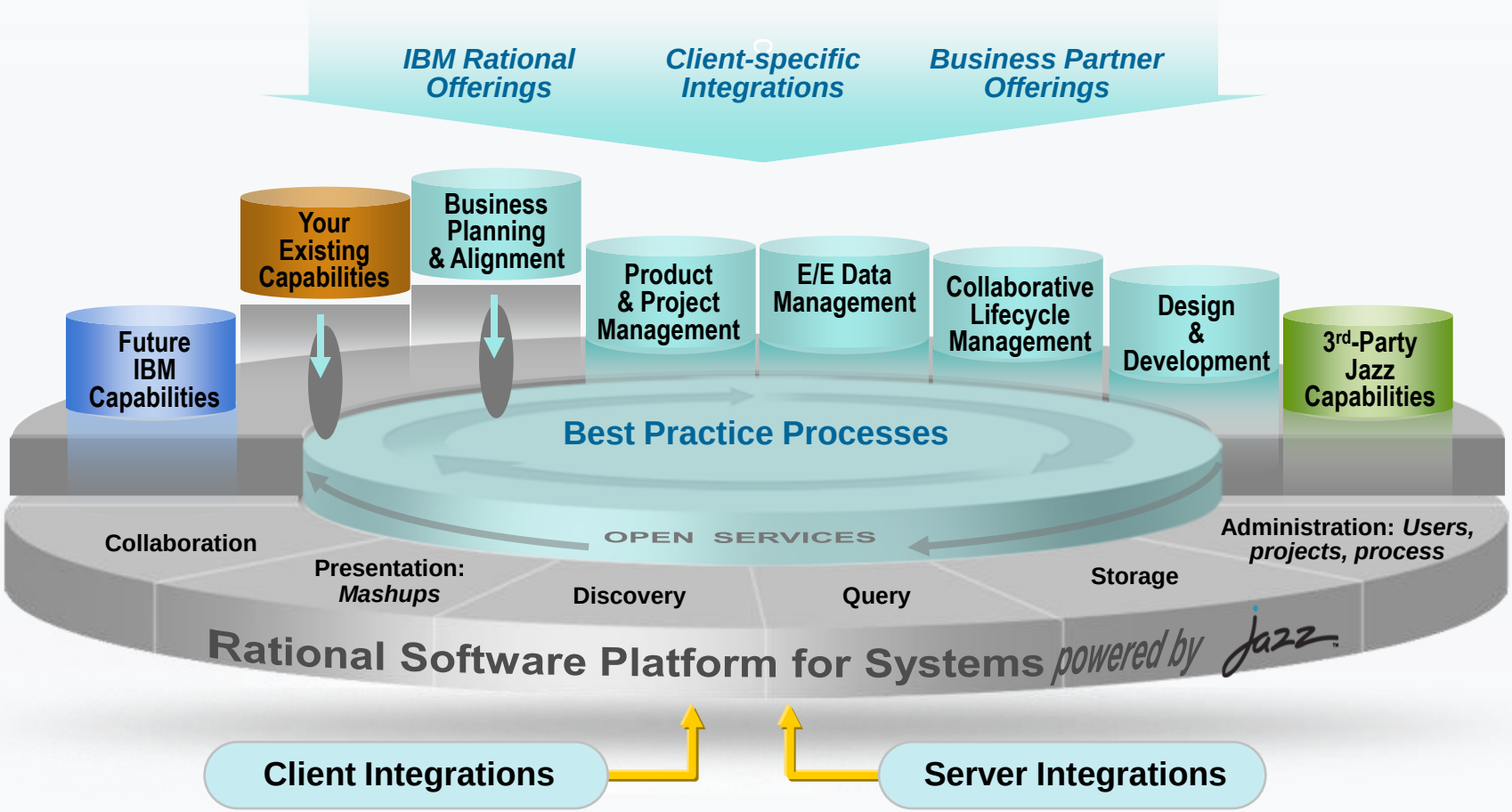
Delivering systems innovation

with agility, quality, and speed

- **Needed** – Removal of development barriers with transparent team collaboration and industry leading tool interoperability



Future E/E engineering capabilities will be seamlessly integrated *Based on standard and open technologies such as OSLC*



Rational Platform For Systems Advantages

- **Open architecture based on an open standard**
- **Allows any third party to integrate**
- **Allows freedom of choice to select the best capability rather than the one size fits all approach of some PLM vendors**
- **Allows cross domain visualization of data**
- **Eliminates “clone and own” approach to data sharing**

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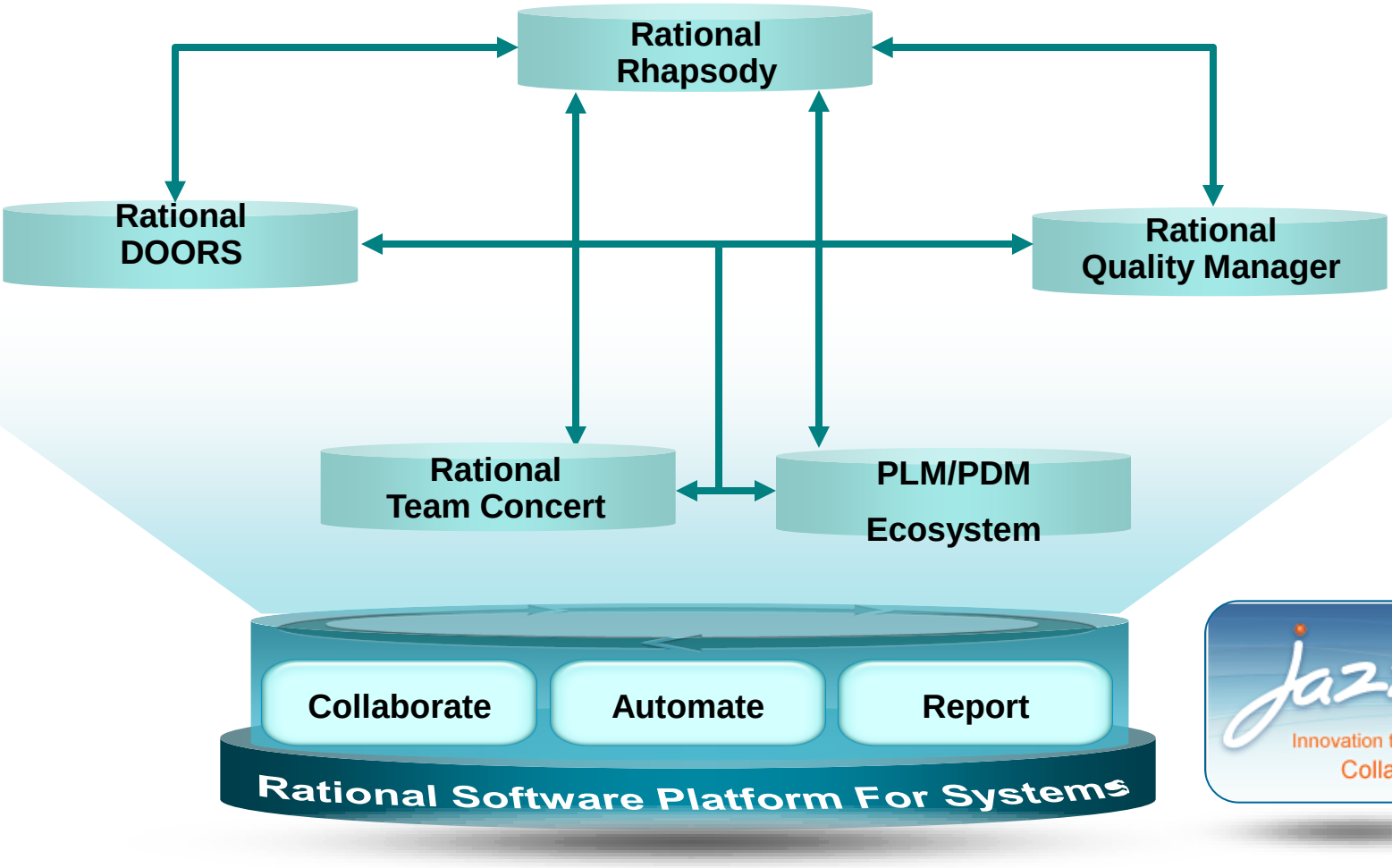
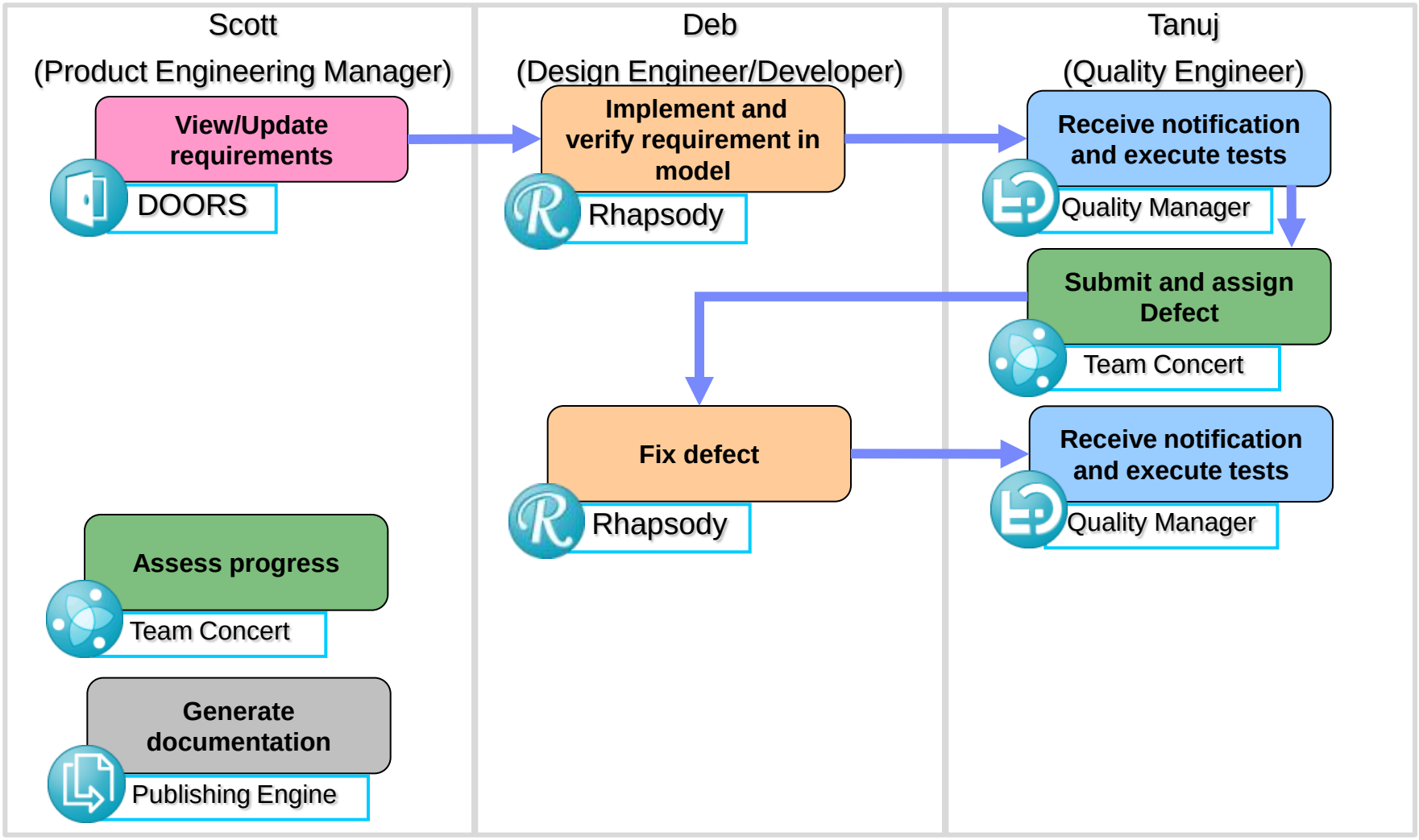
Rational Platform for Systems



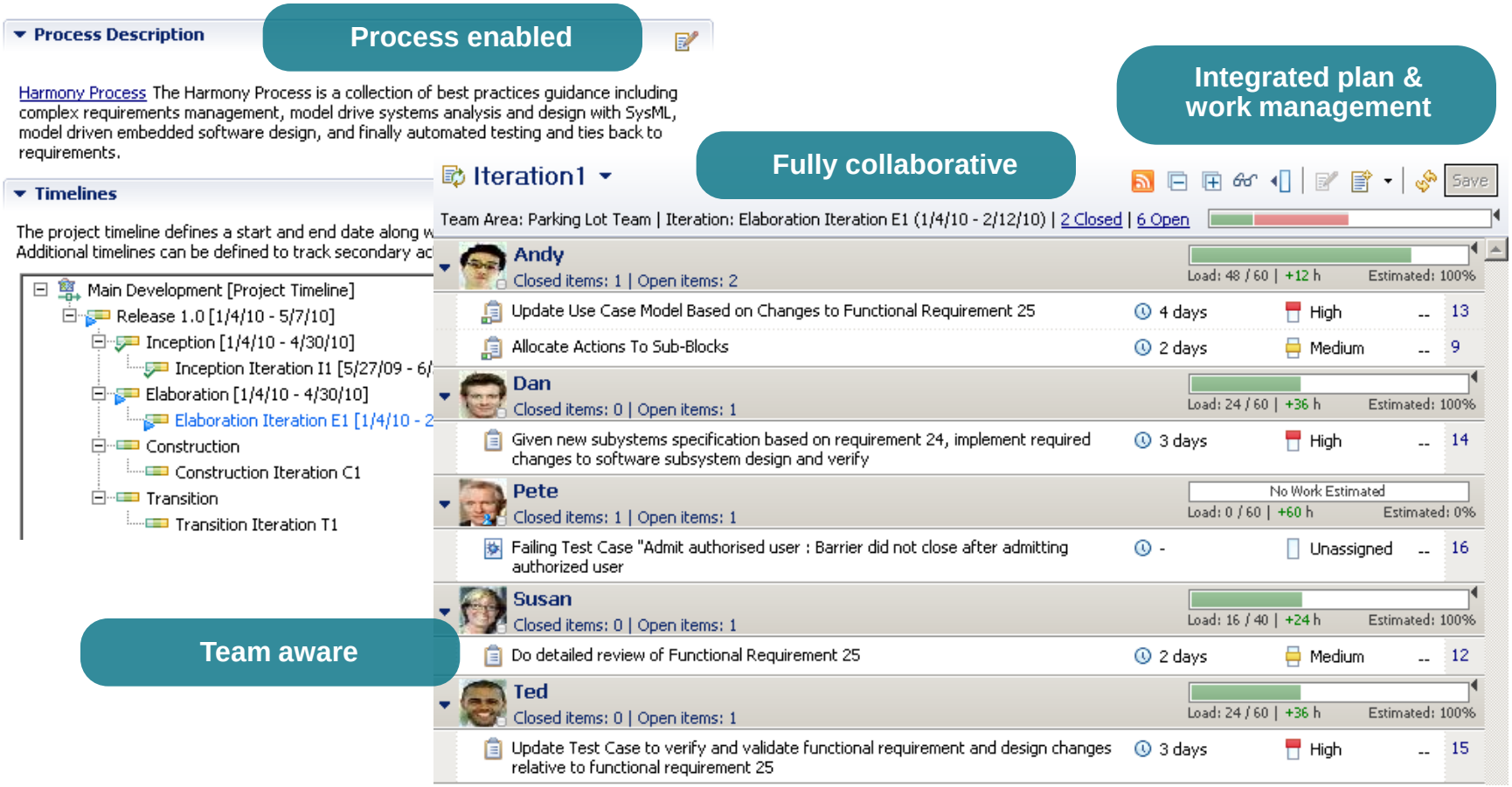
Example usage scenario



Rational Solution	DOORS	Rhapsody	Team Concert	Quality Manager	Publishing Engine

Systems delivery collaboration and management hub

using Rational Team Concert



Manage requirements across lifecycle and across disciplines

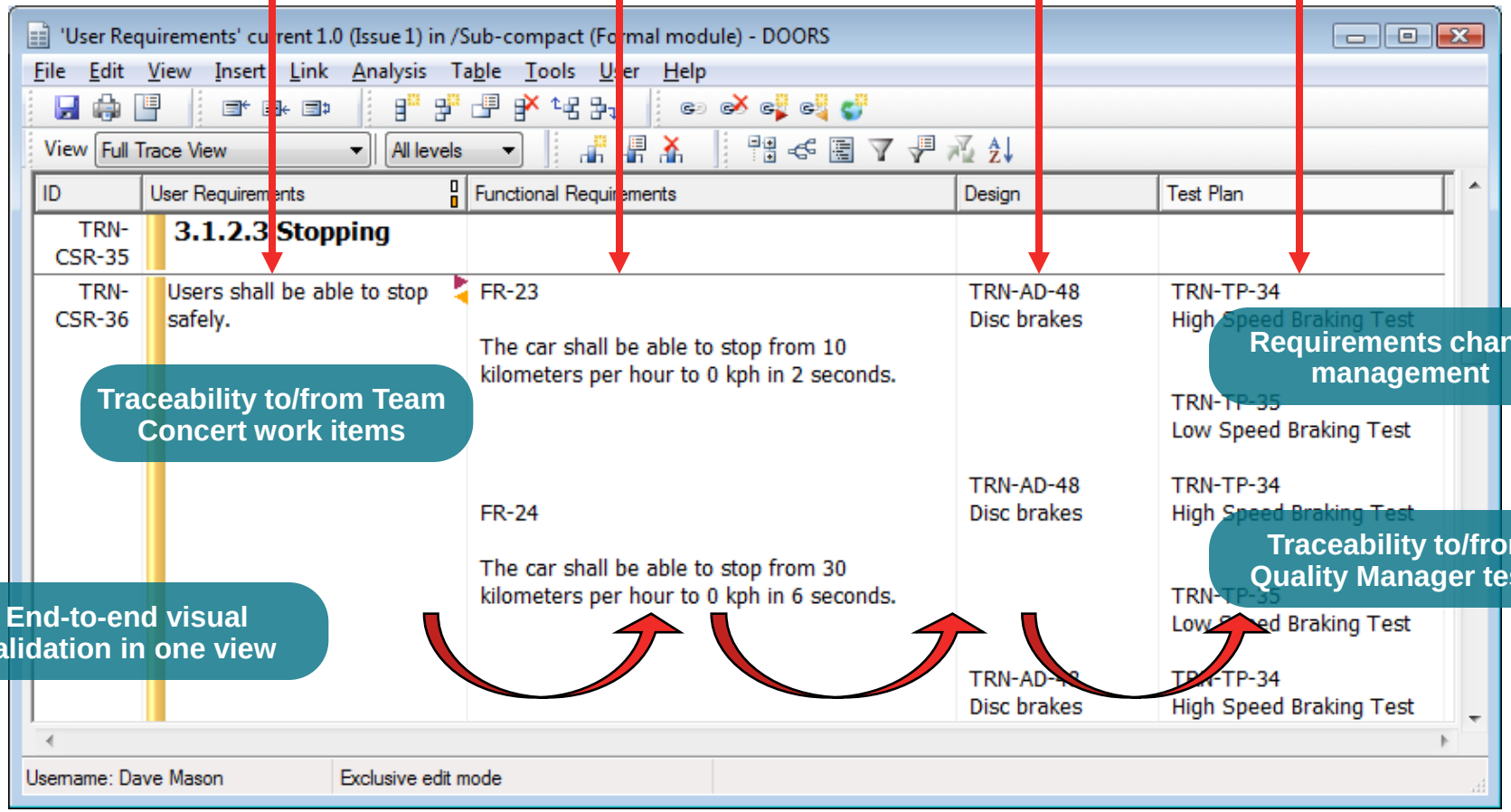
using Rational DOORS

User Requirements

Technical Requirements

Design

Test Cases



Traceability to/from Team Concert work items

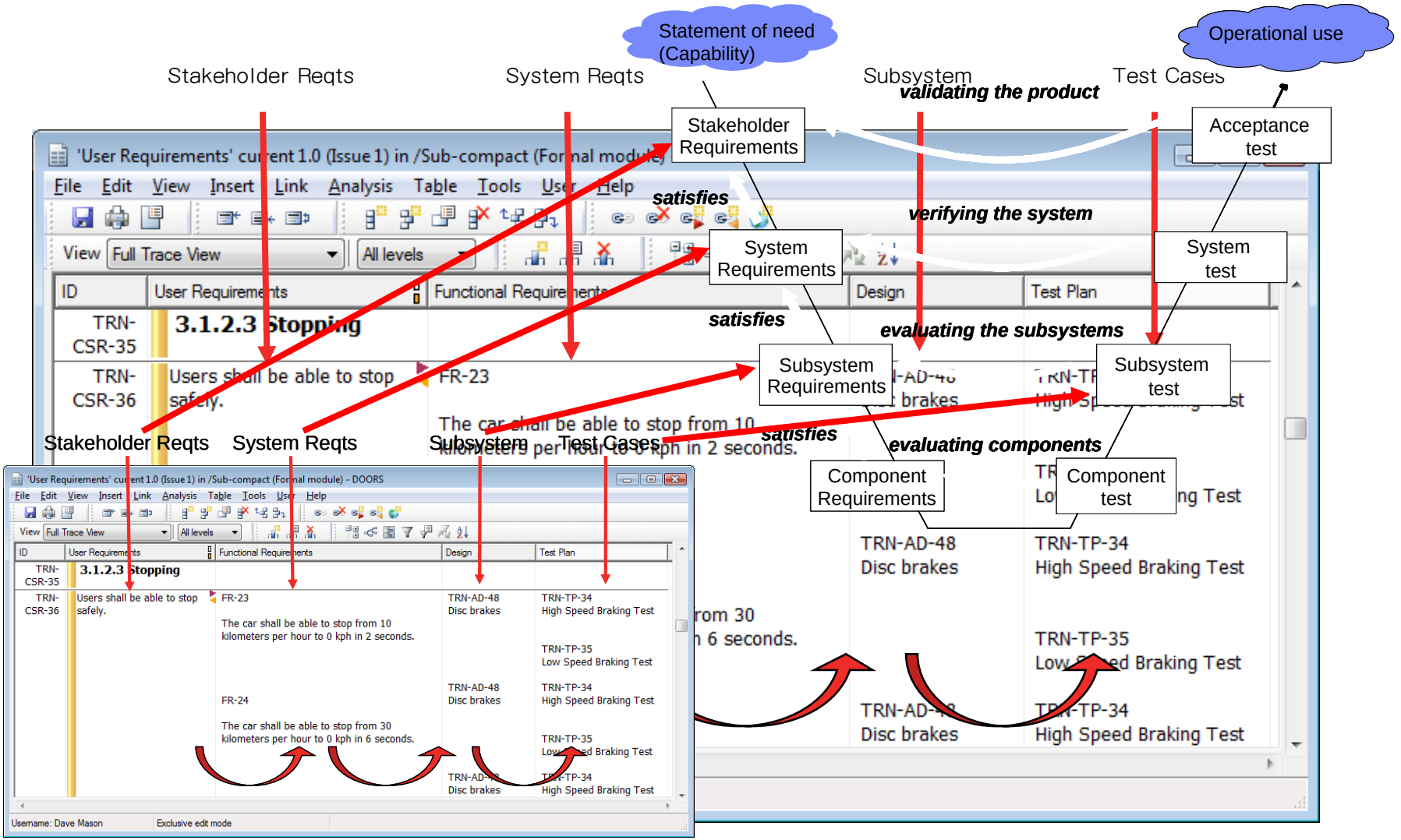
Requirements change management

Traceability to/from Quality Manager tests

End-to-end visual validation in one view

- Build the right product because the requirements are visible at all times

Process mapping with DOORS



"전체 수명주기의 산출물들간의 개별 요구사항 추적성 도구"

Modern approaches for describing systems are evolving

to better manage complexity and reduce time-to-market

Past

Specifications

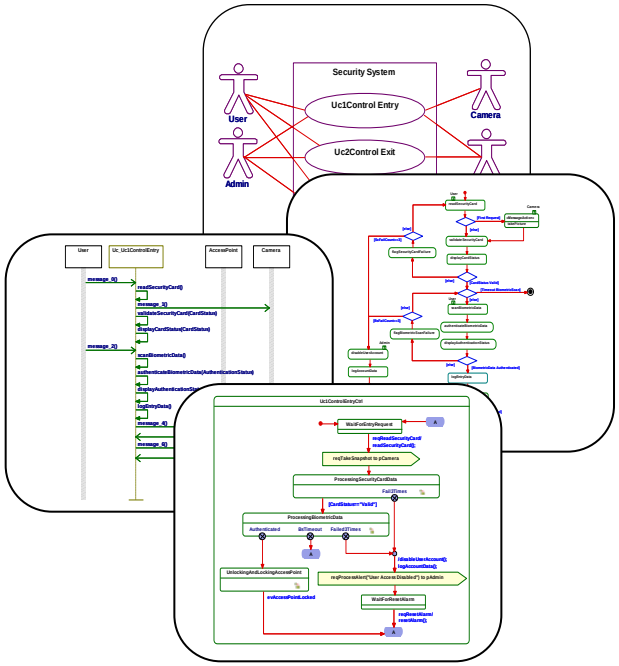
Interface requirements

System design

Analysis & trade-off

Test plans

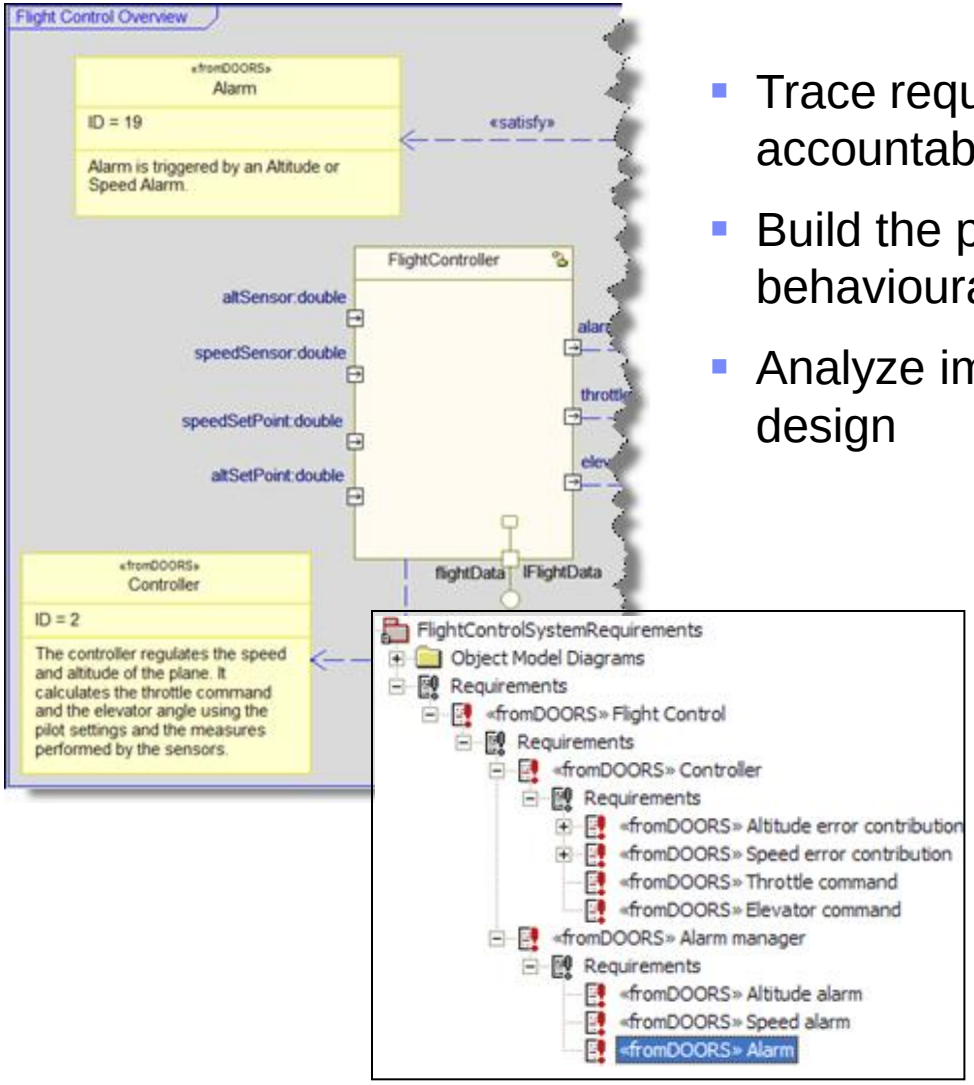
Future



Moving from manual methods to a model-driven approach

Model driven analysis and design for Systems Engineers

using Rational Rhapsody and Rational DOORS



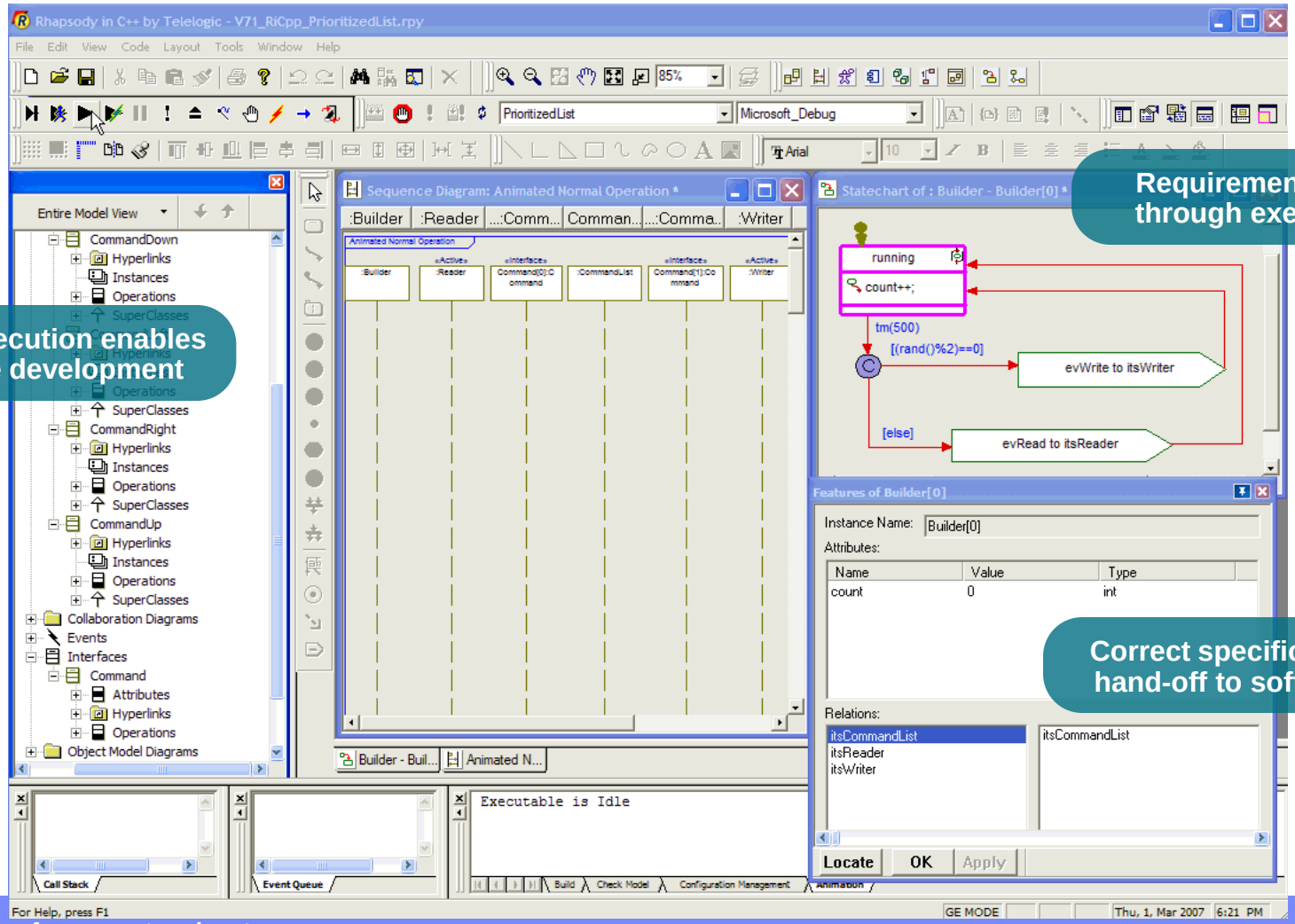
- Trace requirements in either direction for full accountability and understanding
- Build the product right with structural and behavioural analysis and design
- Analyze impact of changes in requirements or design

OMG SYSTEMS MODELING LANGUAGE™

Confirmation of analysis and design for Systems Engineers

using Rational Rhapsody

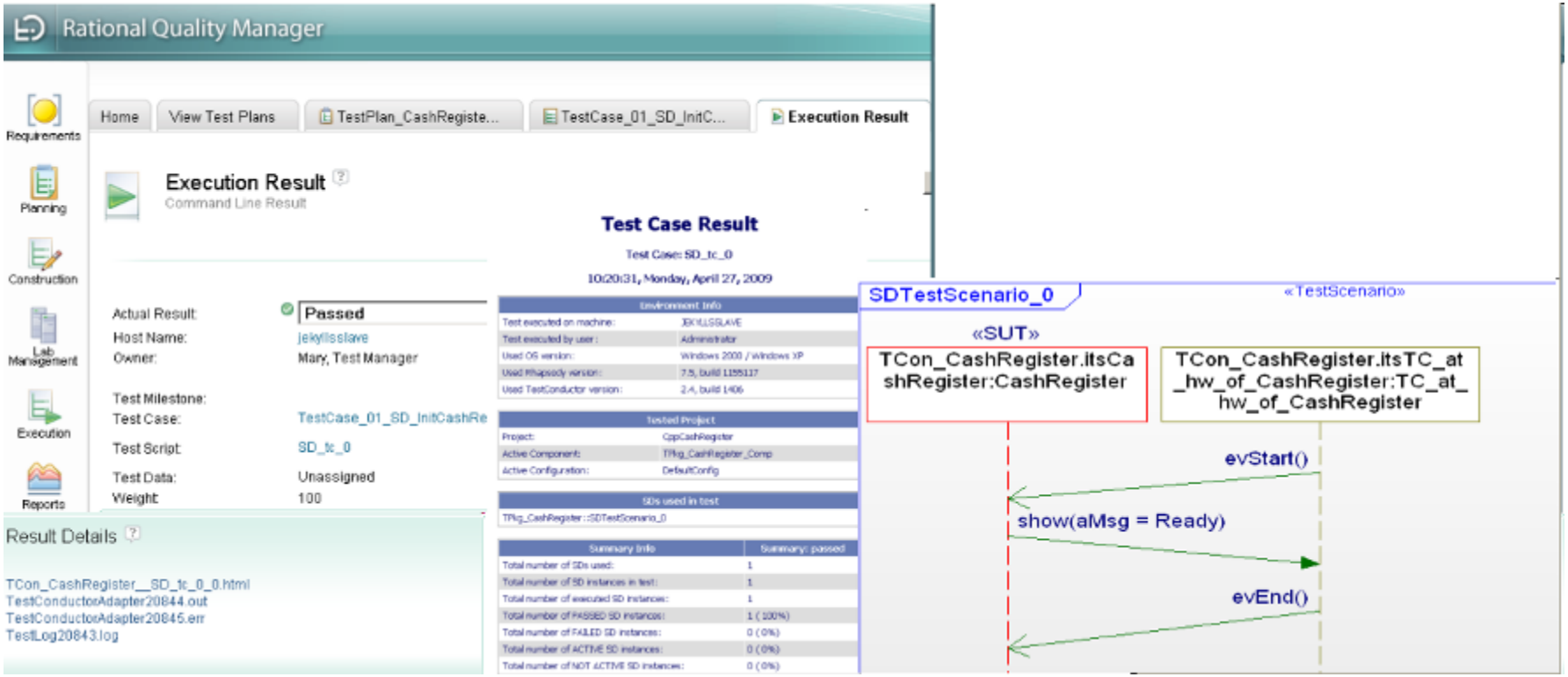
- Find errors early in the process with advanced model execution capabilities



Build in quality from concept to launch

using Rational Quality Manager

- **Execute often to validate functionality and verify correctness**
- **Automatically create and execute tests from the design model or target platform**
- **Manage test cases, while prioritizing the features and functions to be tested**



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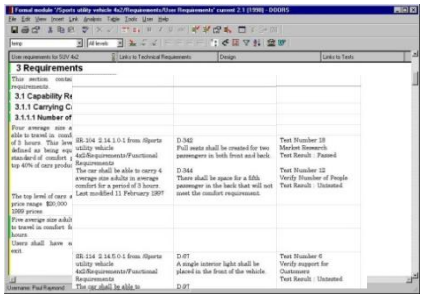
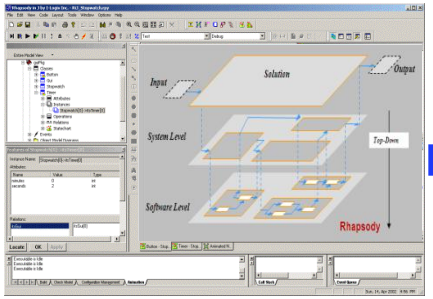
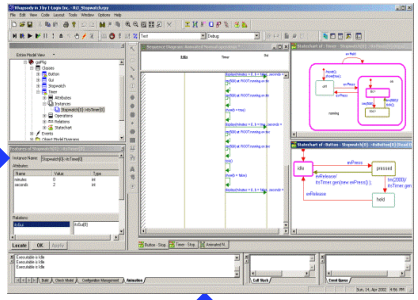
Requirements based development on CLM

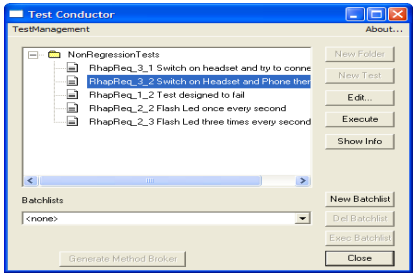


DOORS



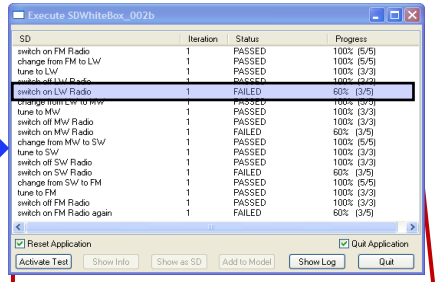


Rhapsody

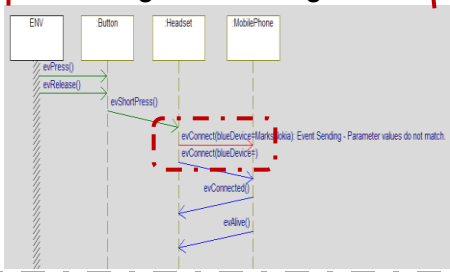


Test Conductor

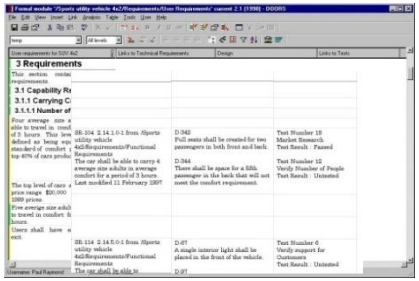
Test Conductor - Result



Finding & Correcting Errors



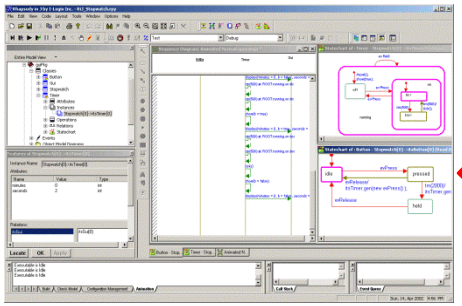
Requirements based test on CLM



DOORS

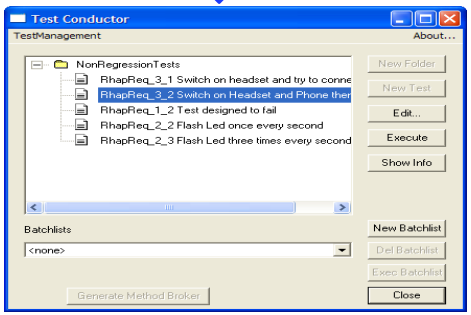
요구사항 내보내기

시험결과 반영

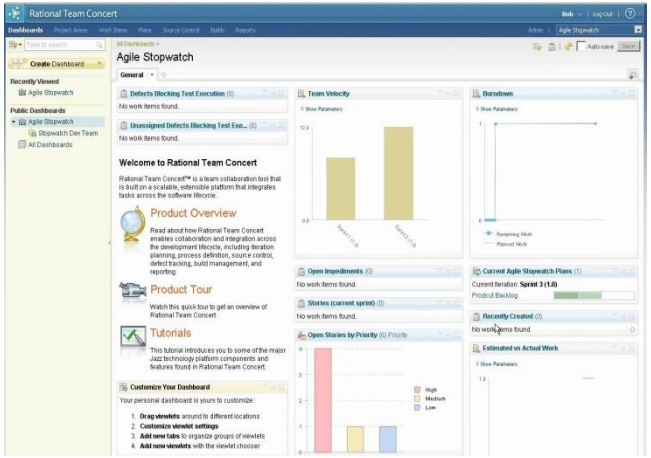


Task

Rhapsody



Test Conductor



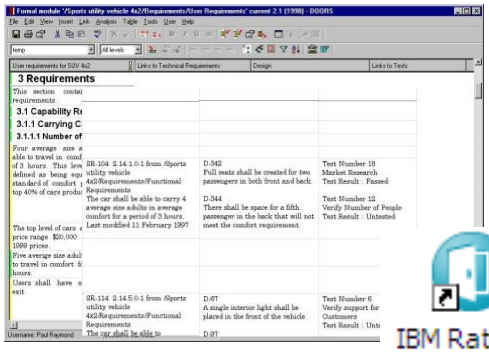
RTC

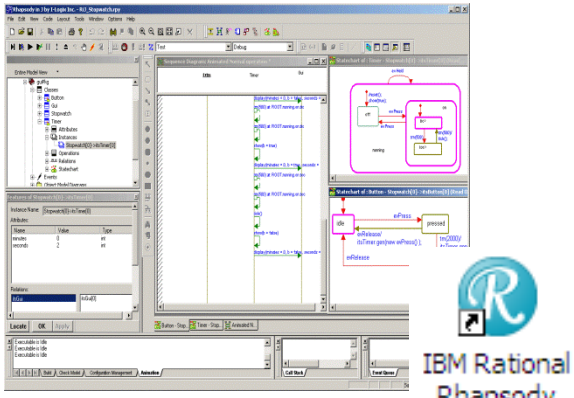
Assign Task

테스트 관리 **(Rational Quality Manager)**

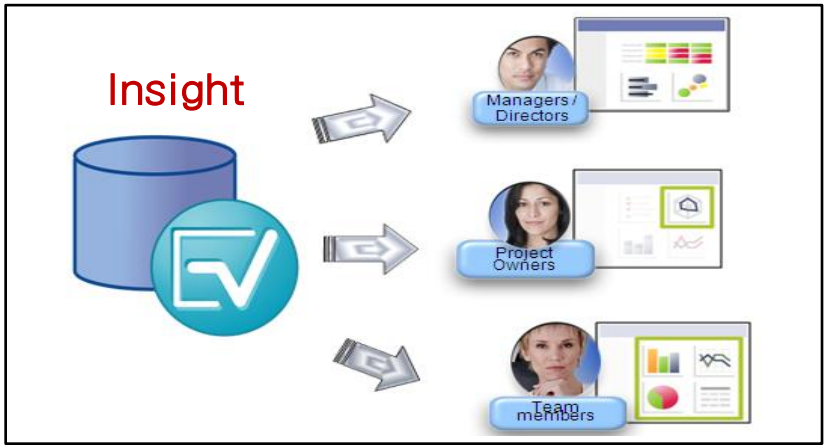
CLM Solution Artifacts

Data Source

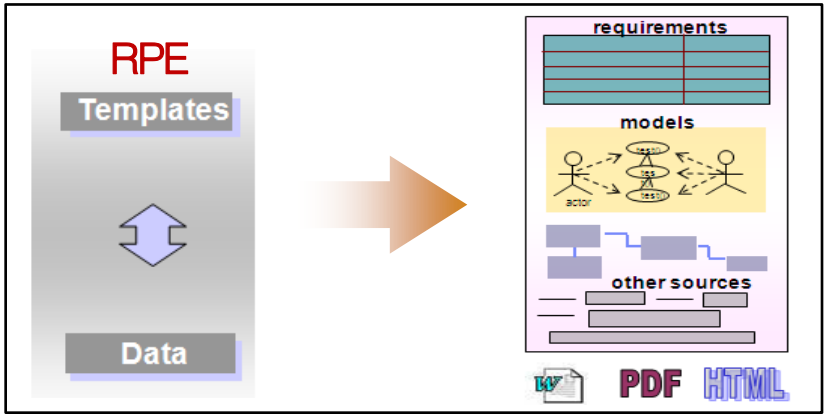




Dashboard



Automatic Report Generation



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Rational Harmony

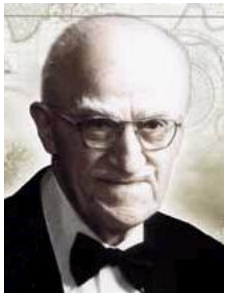
A family of domain-specific processes for building better software and systems

- **Harmony/SE**
  - Systems Engineering

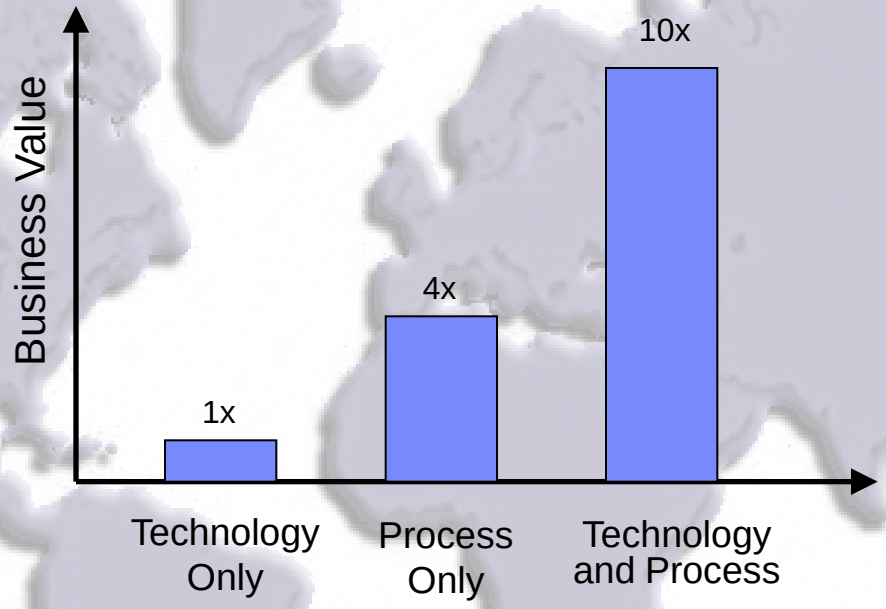
The Importance of Process & Best Practices

"…The quality of a product is largely determined by the quality of the process that is used to develop and maintain it …"

based on: Shewhart, Juran, Deming and Humphrey

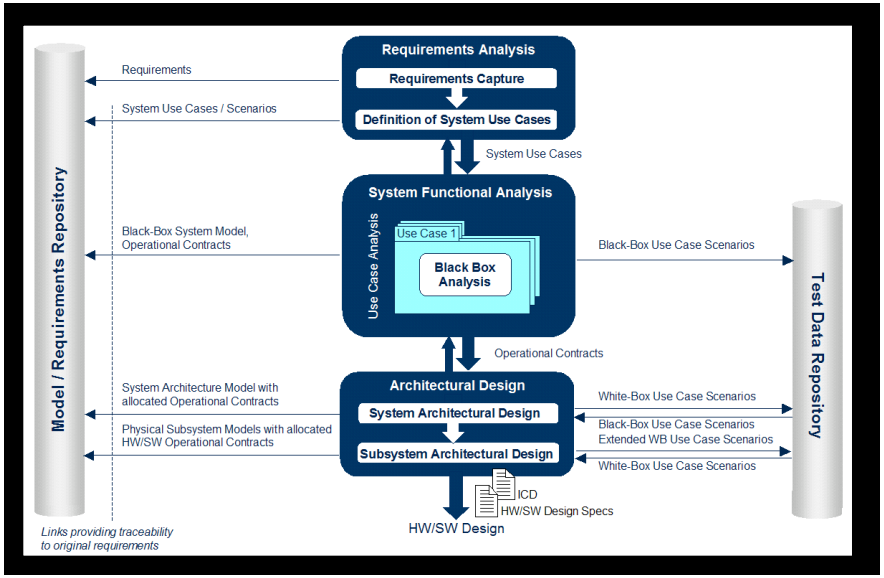
Combination of Technology and Process Results in 10x Business Value



Source: London School of Economics – McKinsey Survey

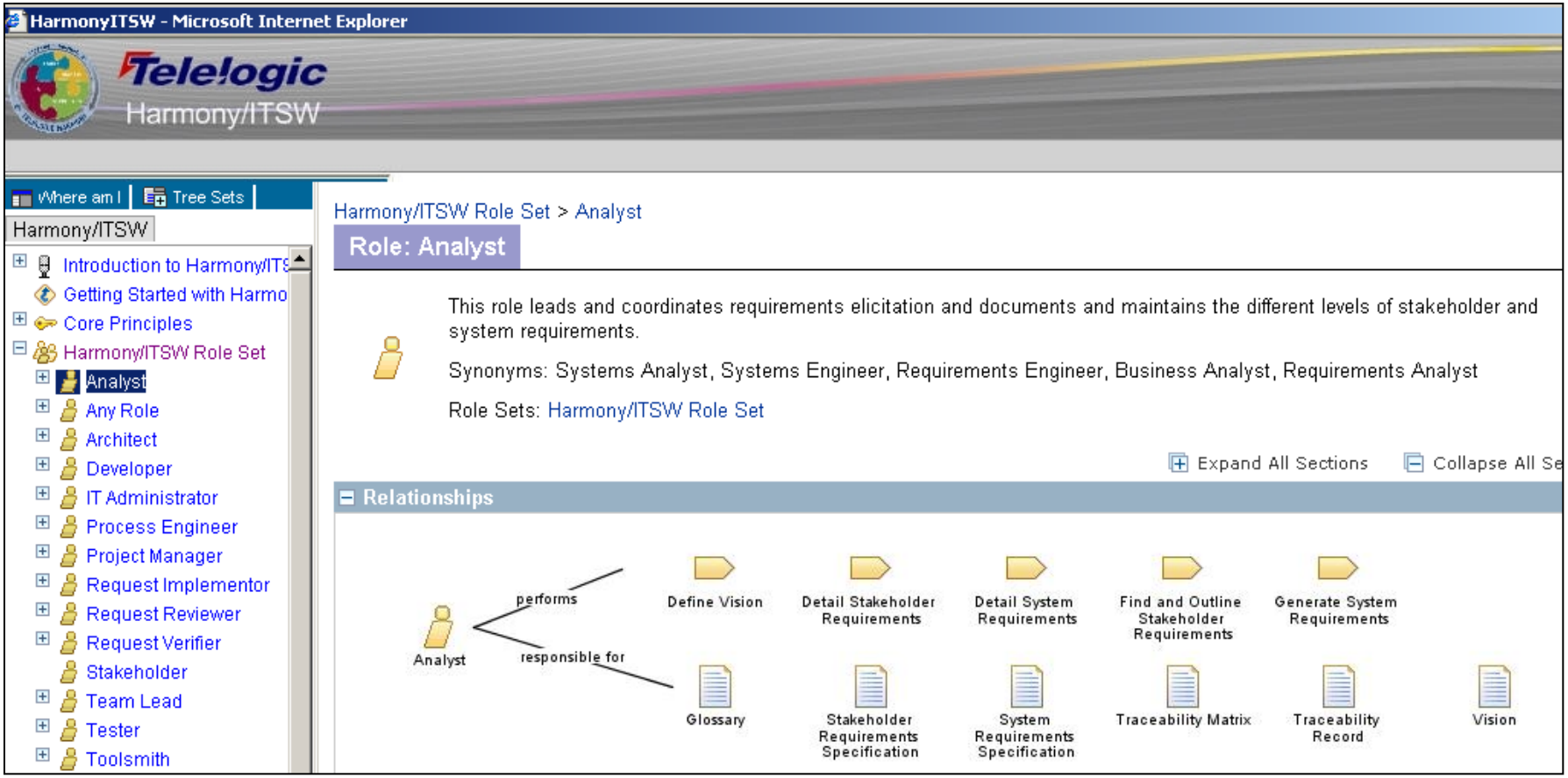
Systems Engineering
Harmony/SE

- **A model-based development process built upon the UML 2.1 and SysML languages**
- **Step-by-step guidance to evolve requirements into a solution**
- **Tool mentors specific to DOORS, Change, Synergy, and Rhapsody plus other Rational tooling**
- **Process Content/Methods may be tailored with EPF Composer or RMC**



Adoption Made Easy

Role-based Guidance Available as a Website



Example Guideline in Harmony

Example on Traceability

Guideline: Traceability

Traceability is a term used to describe the establishment and maintenance of relationships between artifacts such as a requirement and a design class or a requirement and a test case, so that one can analyze the completeness of work done and assess the impact of changes.

Expand All Sections | Collapse All Sections

Relationships

Related Elements

- Design the Solution
- Create Test Cases
- Create Individual Harmony/ITSW Documents in DOORS
- Requirements
- Detail Stakeholder Requirements
- Find and Outline Stakeholder Requirements

Back to top

Main Description

Introduction

Traceability (Concept: Traceability) needs to be implemented throughout any development. This must include vertical traceability, between levels of abstraction (for example, from a System Requirement to one or more Stakeholder Requirements) and horizontal traceability (for example from a Test Case to a System Requirement).

Uses of Traceability

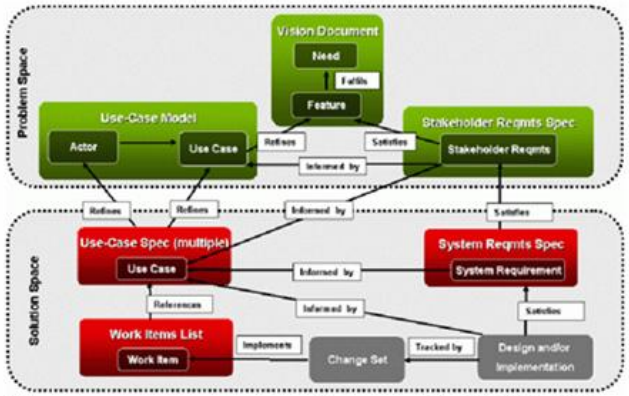
Traceability information is fundamental to impact analysis, particularly in assessing the impact of a proposed change.

It is also fundamental to coverage analysis, both in the sense of ensuring that all relevant items at one level of specification or development are adequately reflected at the next level, and also to assist in assessing test coverage.

For completeness, each requirement stated at one level of abstraction, must *satisfy* one or more requirements at the next higher level. Similarly, each requirement must be *tested* by at least one test.

Traceability Relationships

The following diagram shows the basic traceability relationships recommended.



What Harmony Can Do For Our Customers?

- **Communicate best practices across the organization**
- **Connect the dots… people, process, and tools**
- **Support continuous process improvement and compliance**
- **Increases ROI on IBM Rational and Rational tools**

Benefits of the MDSE and the Rational Harmony Processes

- ✓ **Help you build a world-class development organization**
- ✓ **Guidance from concept to delivered system**
- ✓ **Repeatable high quality software and systems development**
- ✓ **Bi-directional interface between the systems software groups**
- ✓ **Audit trail for regulatory agencies**
- ✓ **Continuous Process improvement**

Best Practices for Positioning MDSE and Harmony

- **Pitch Harmony along with a tool solution such as DOORS, Rhapsody, RQM, etc. (10x ROI, Tool Mentor Benefits)**

- and/or -

- **Position Harmony as an improvement to existing Best Practices for Systems Engineering and Embedded Software development**

- and/or -

- **Position Harmony as a tool & process training aid/accelerator**

- and/or -

- **Can also position as process/workflow tool…similar to RUP or RMC sale**

To help grease the skids, identify at least one Process Champion to work with during the sales cycle

IBM Rational MDSE Solution

MDSE

(Model Driven Systems Engineering)

1 What is MDSE?

2 IBM Rational MDSE Solution

3 IBM Rational Harmony Process

4 고객사례 – Boeing

5 Q&A

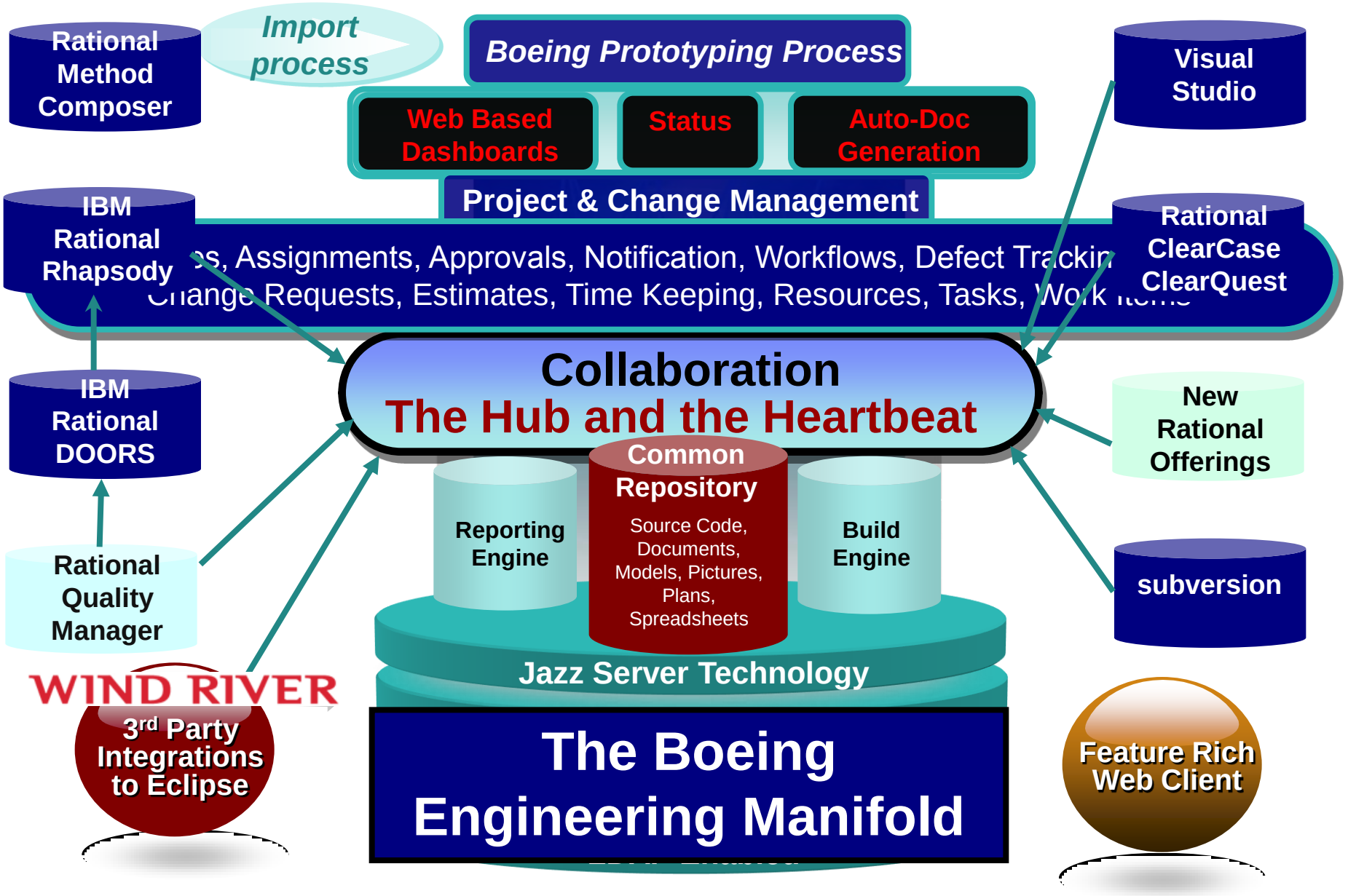
4

Leveraging the Boeing Engineering Manifold for System/Software Engineering

May 6, 2009

Boeing National Account Team - Jason Meshell (Rational), Bill Leep (GBS)

"RationalLogic" ***Technical Team –Rachel Huang, Gavin Arthurs, Mark Cesario, Ricardo Camacho, Kathy Culver, Ed Mayer, Doug Ishagaki***


Rational Method Composer
Import process
Boeing Prototyping Process
Visual Studio
Web Based Dashboards
Status
Auto-Doc Generation
Project & Change Management
IBM Rational Rhapsody
Rational ClearCase ClearQuest
Change Requests, Estimates, Time Keeping, Resources, Tasks,
Collaboration
The Hub and the Heartbeat
IBM Rational DOORS
New Rational Offerings
Common Repository
Source Code, Documents, Models, Pictures, Plans, Spreadsheets
Reporting Engine
Build Engine
Rational Quality Manager
subversion
WIND RIVER
3rd Party Integrations to Eclipse
Jazz Server Technology
The Boeing Engineering Manifold
Feature Rich Web Client

Whether You Are Building:

Business-Critical Applications

Mission-Critical Systems

New Products

– Rational Harmony –

Connecting People, Process, and Tools

Thank You

IBM Rational MDSE Solution

MDSE

(Model Driven Systems Engineering)

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