Improving Outcomes in Software Development

Martin Nally, CTO IBM Rational

Businesses Depend on their Ability to Innovate and Deliver Superior Systems and Software

More interconnected, more instrumented, more intelligent

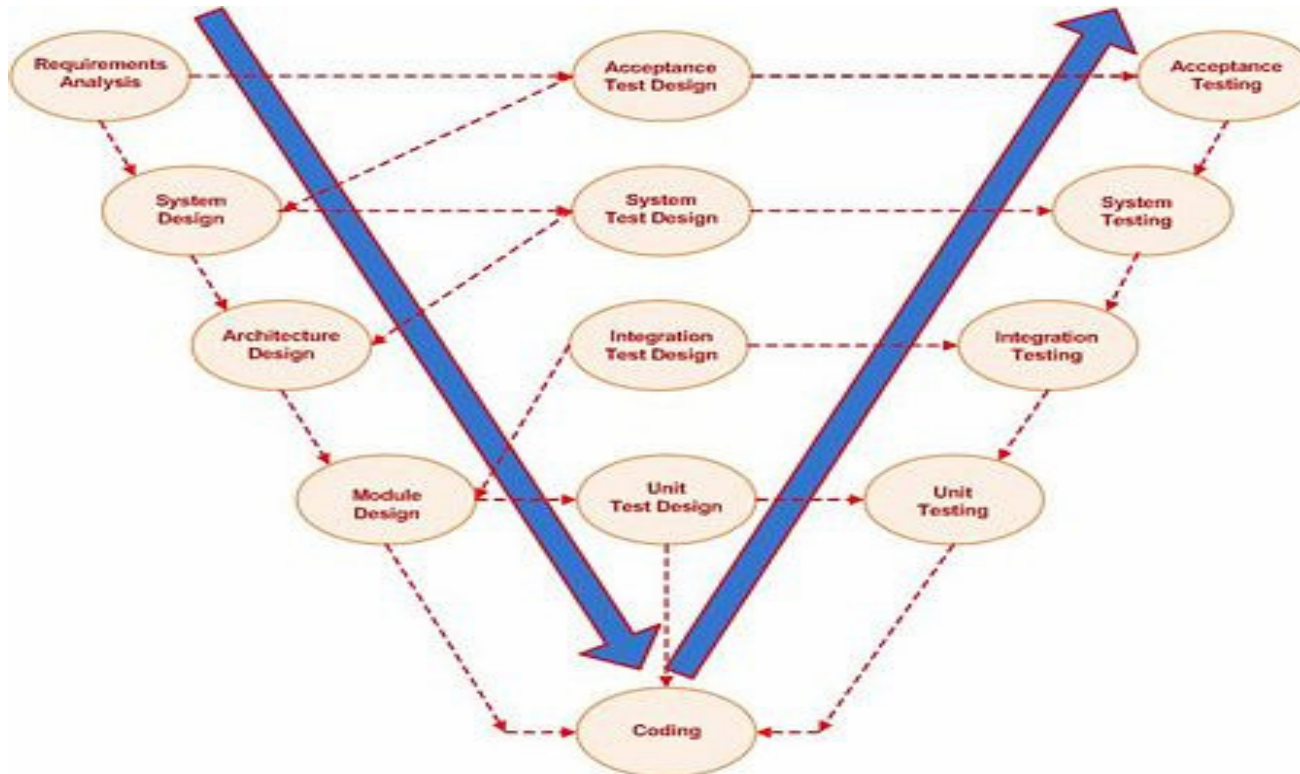**Software is the invisible thread enabling systems-of-systems**

Software & systems delivery has fiscal and societal impact
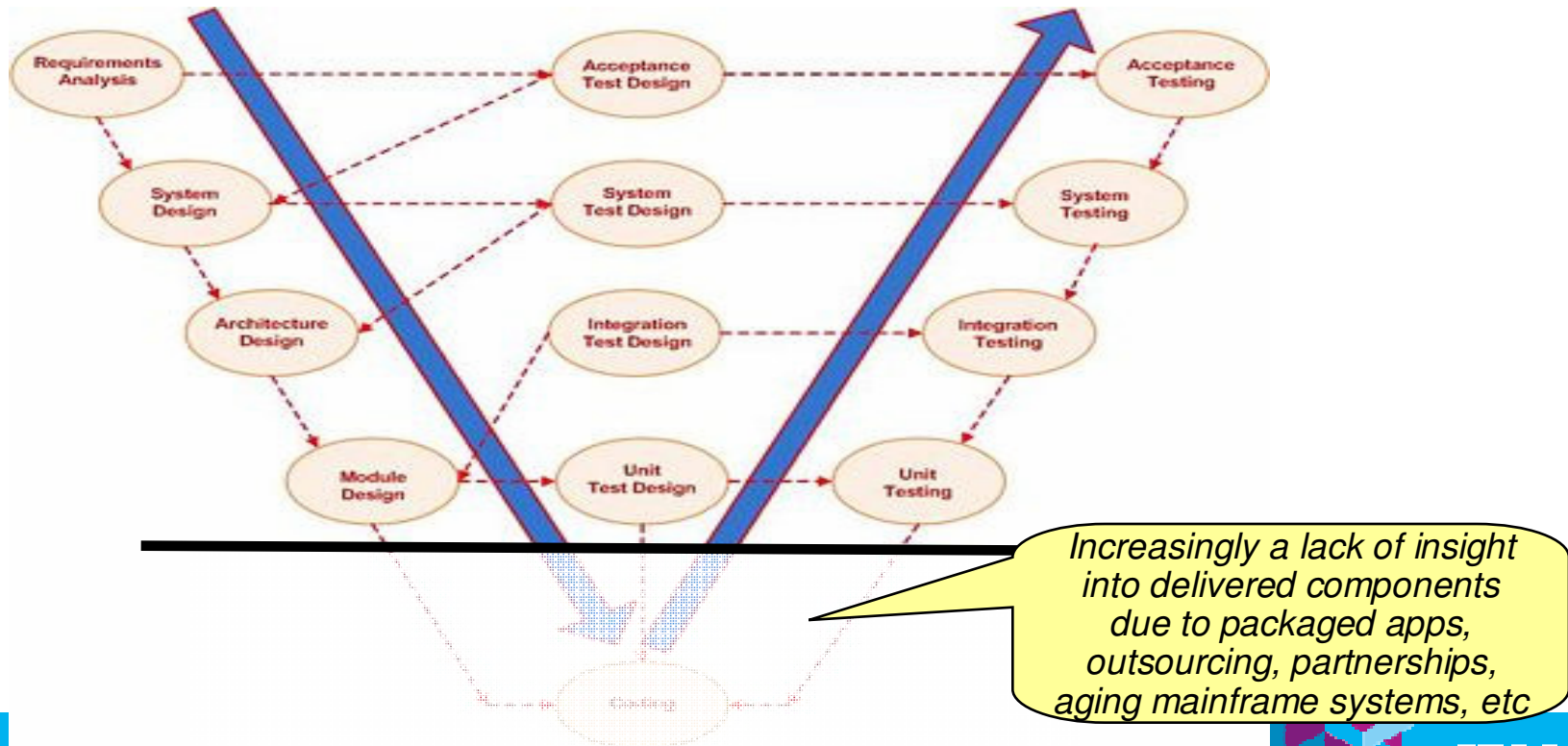
But......

▶ ……the world is changing……

▶ …… our core applications and

skills are aging ……

▶ ……our software practices are

not keeping pace……

Implications for Distributed Organizations -1

Implications for Distributed Organizations -2

> Increasingly a lack of insight into delivered components due to packaged apps, outsourcing, partnerships, aging mainframe systems, etc

Implications for Distributed Organizations -3

More and more of the detailed design is being assumed by the package vendors and outsourcers….increasing dependency on their solutions
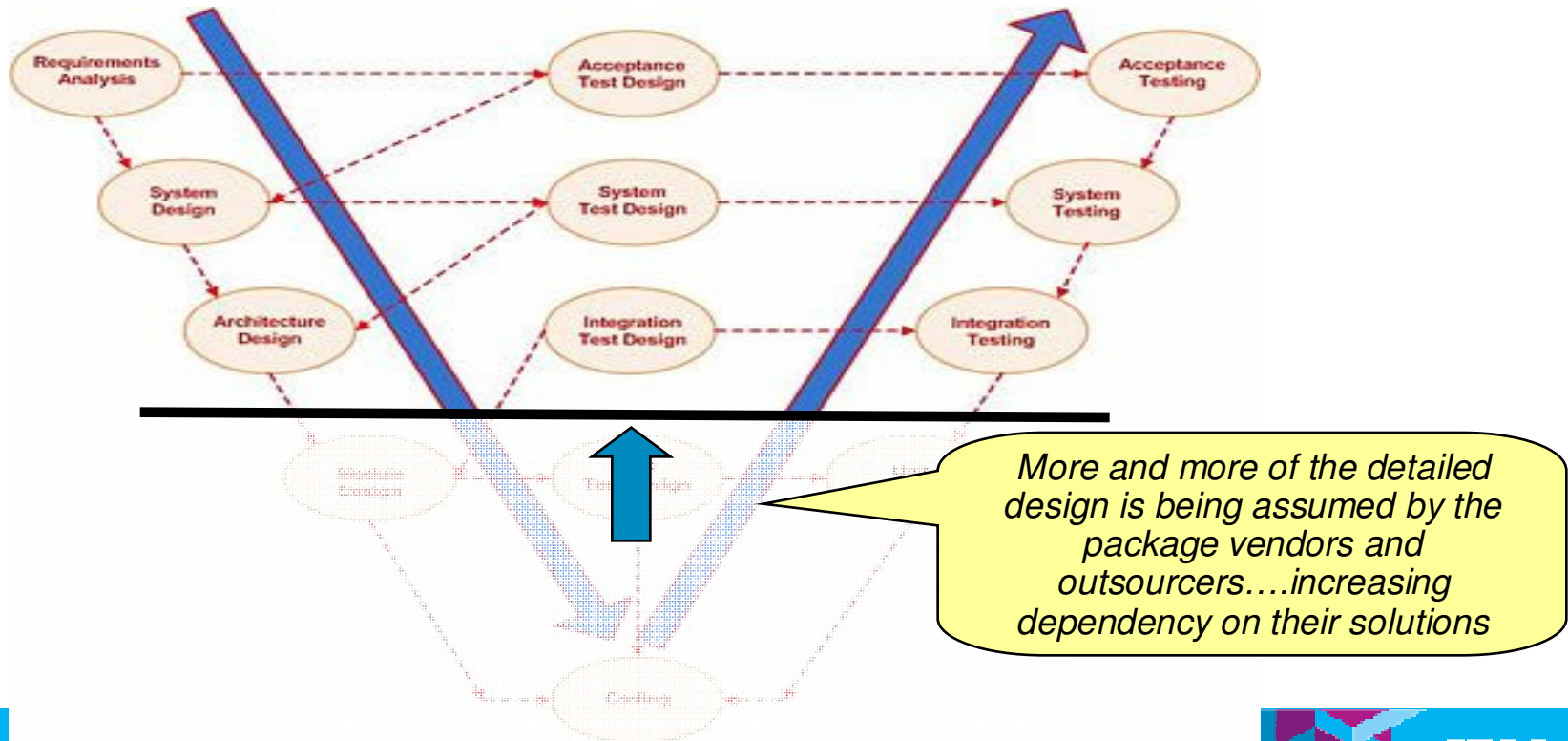
Implications for Distributed Organizations -4

Implications for Distributed Organizations -5

DOORS ReqPro RRC

Demand Management Center

Enterprise Architecture Center

SystemArchitect
FocalPoint

Quality Management Center

Rational Quality Manager
RFT   RPT
Watchfire

Collaborative ALM

RTC   CC/CQ   BuildForge

Delivery Center

RSM/RSA   RAD

Delivery Center

RAA HATS RDz

Delivery Center

Rhapsody
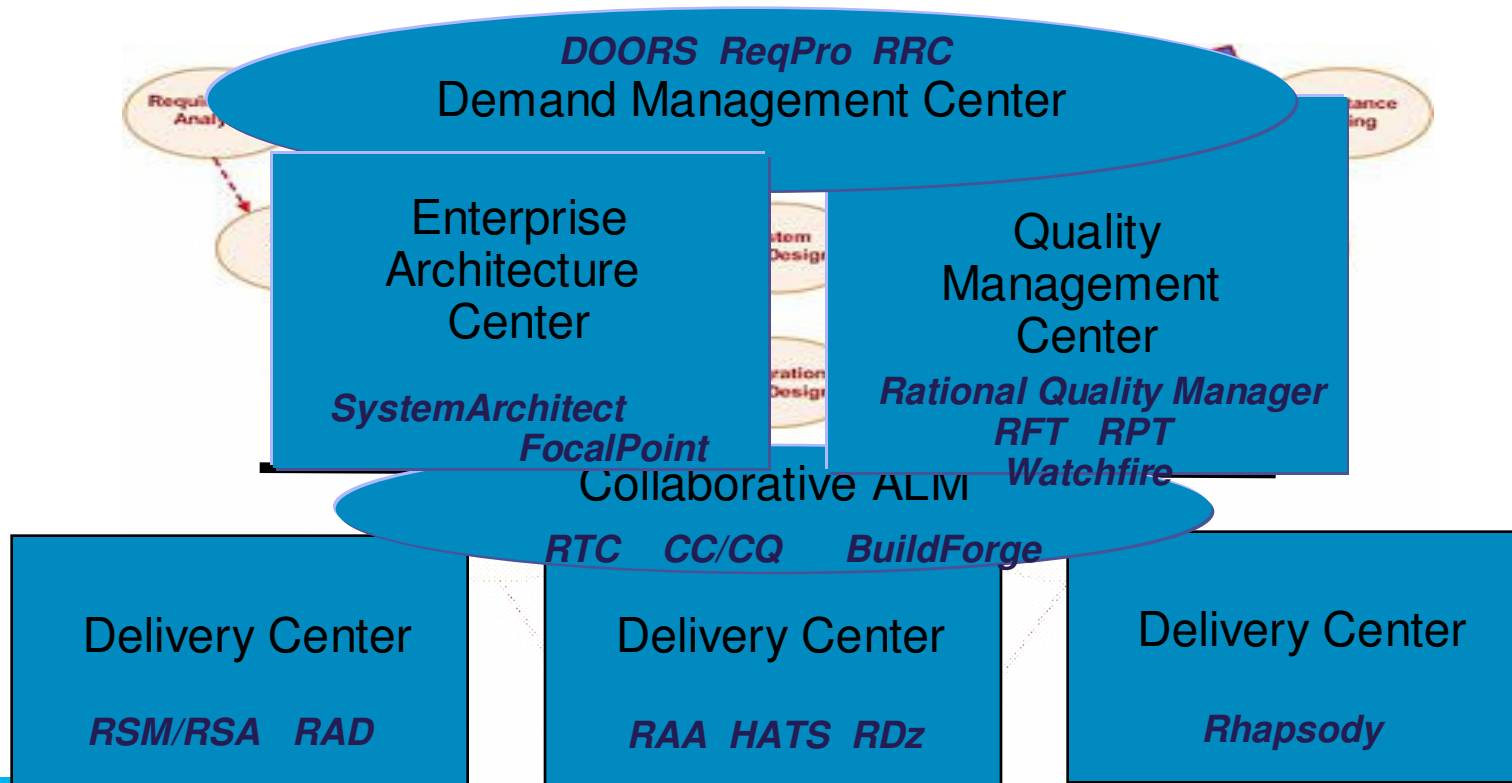
Successful outcomes depend on the integrations

Collaboration

– Integration of people and information

– Coordination of process

Automation

– Reduction of errors, labor

Reporting

– Measurement is key

Top 3 reasons ALM fails to deliver promise

Distracted by day-to-day delivery pressures – 78%

Tools don't integrate properly – 62%

Lack the necessary internal expertise – 56%

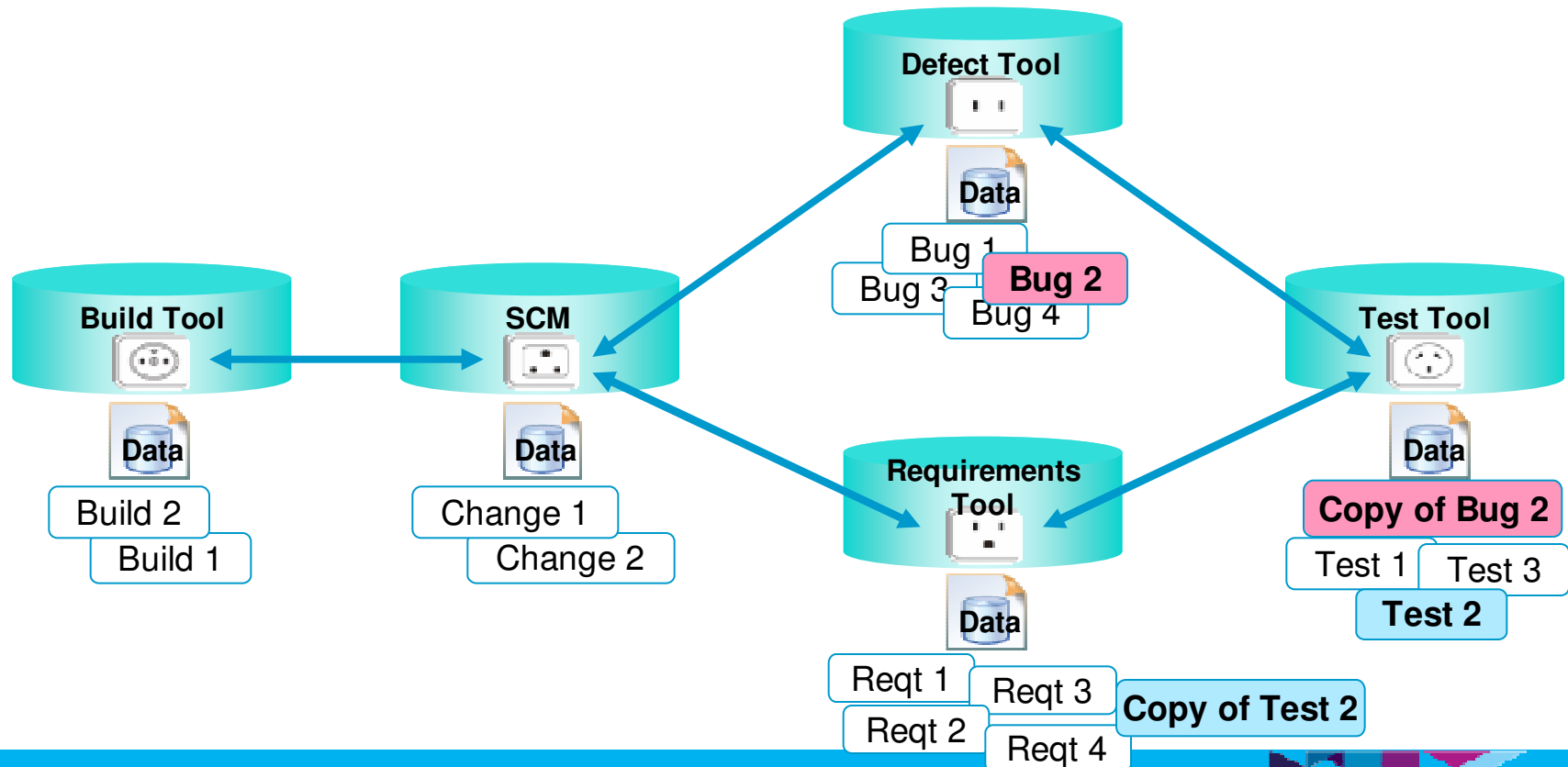Source: Forrester study commissioned by Wipro, 2008

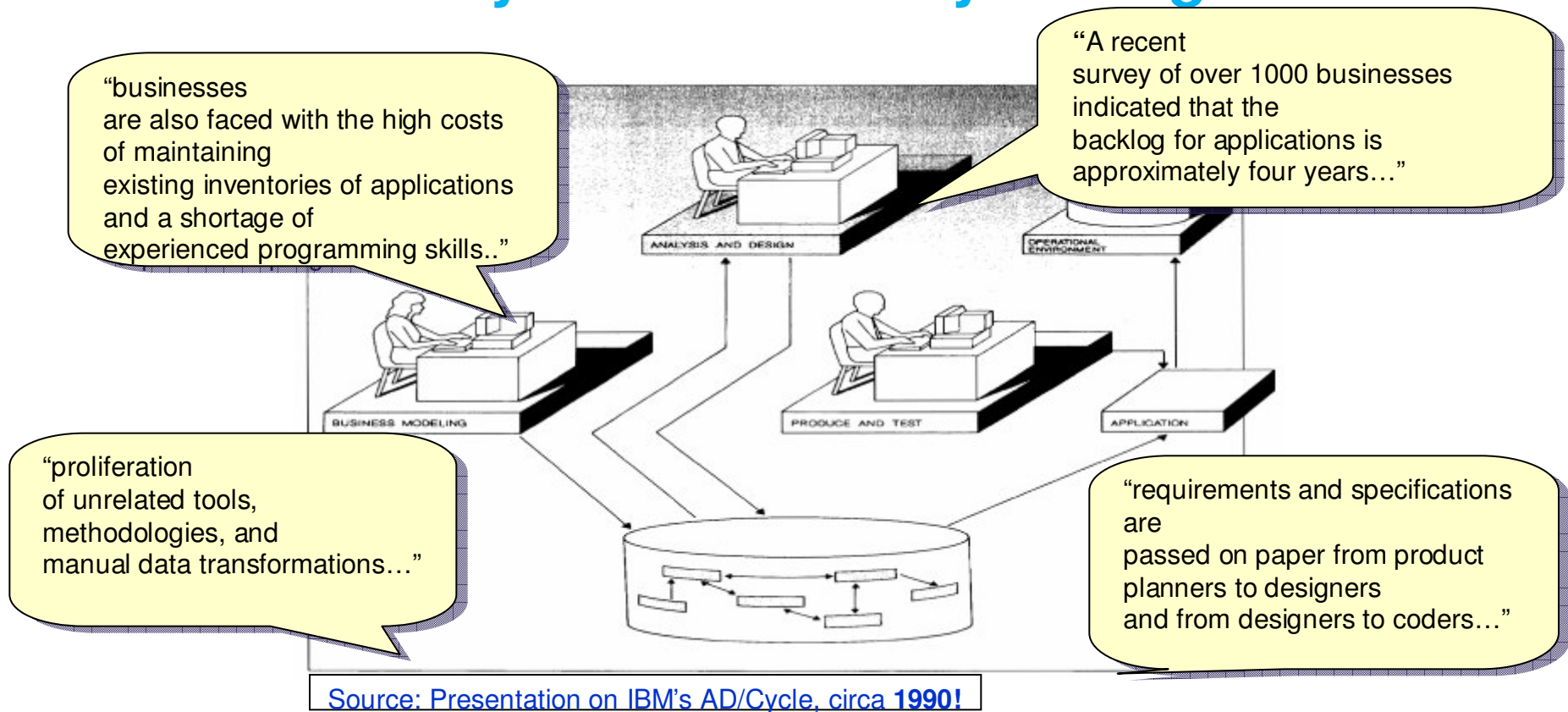Let's build a smarter planet.

IBM

How tools can help

- Easy to adopt and instantly productive

- Tools teach and support the process

- Seamless integration of tasks and data across all roles and tools

- Silent gathering of statistics and generation of reports

- Automation of repeatable processes

Let's build a smarter planet.

IBM

Tool integration today

Let's build a smarter planet.

IBM

What did we say about this 20 years ago?

"businesses
are also faced with the high costs of maintaining
existing inventories of applications and a shortage of
experienced programming skills.."

"A recent
survey of over 1000 businesses indicated that the
backlog for applications is approximately four years…"

"proliferation
of unrelated tools, methodologies, and
manual data transformations…"

"requirements and specifications are
passed on paper from product planners to designers
and from designers to coders…"

ANALYSIS AND DESIGN

OPERATIONAL ENVIRONMENT

BUSINESS MODELING

PRODUCE AND TEST

APPLICATION

Source: Presentation on IBM's AD/Cycle, circa **1990!**

What is the state-of-the-art today?

Most other vendors still trying to build AD/Cycle

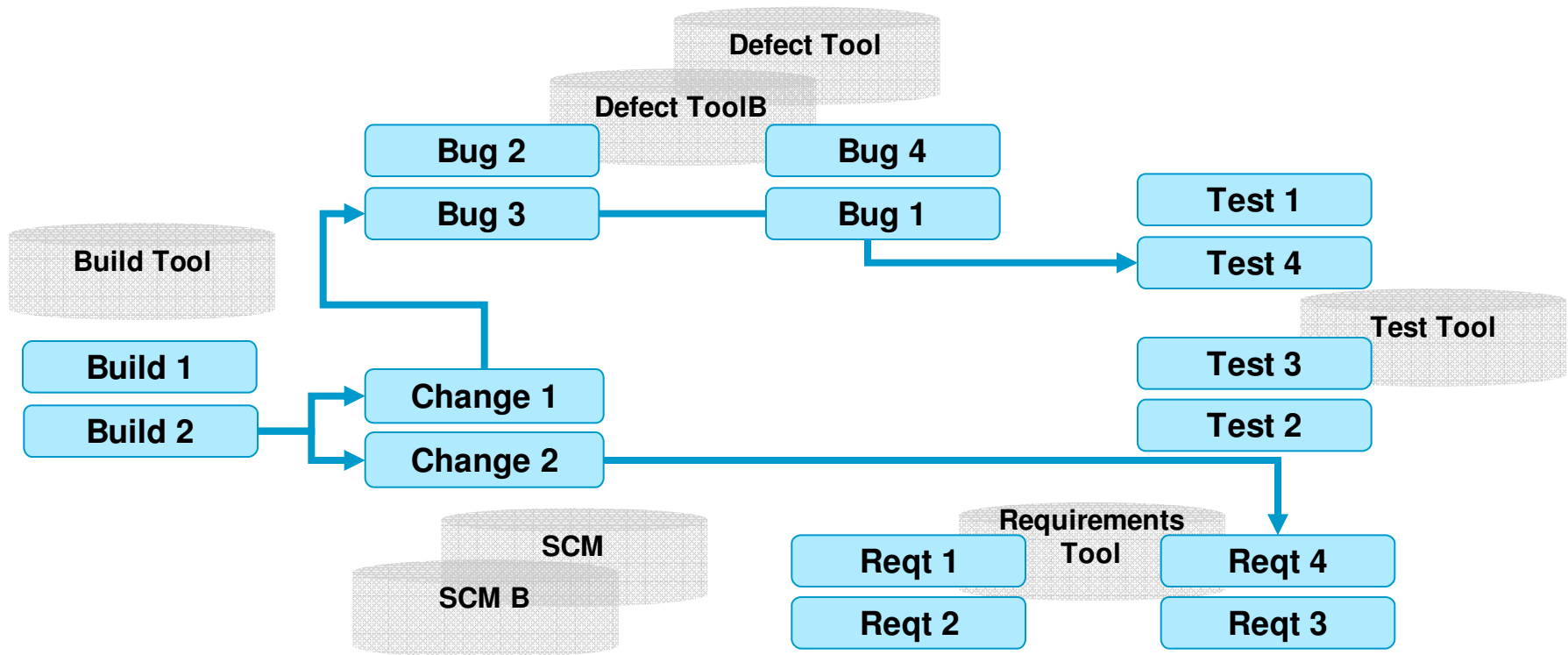Requires all tools to integrate around centralized repository

- – Data import (duplication) for foreign tools

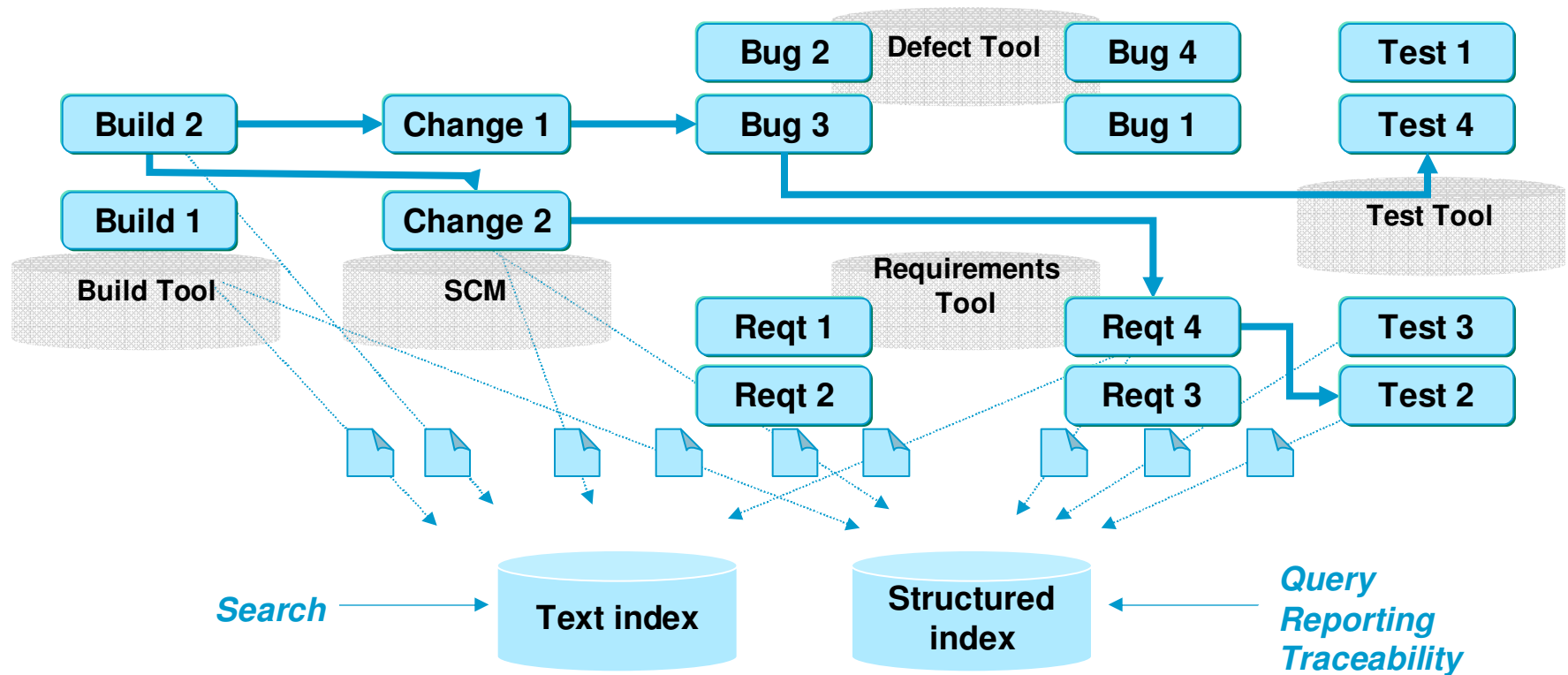Works as well as other centrally-planned economies have worked

- – Do your company's needs match a fixed, pre-planned solution, or is an open, integrated economy a better model?

Let's build a smarter planet.
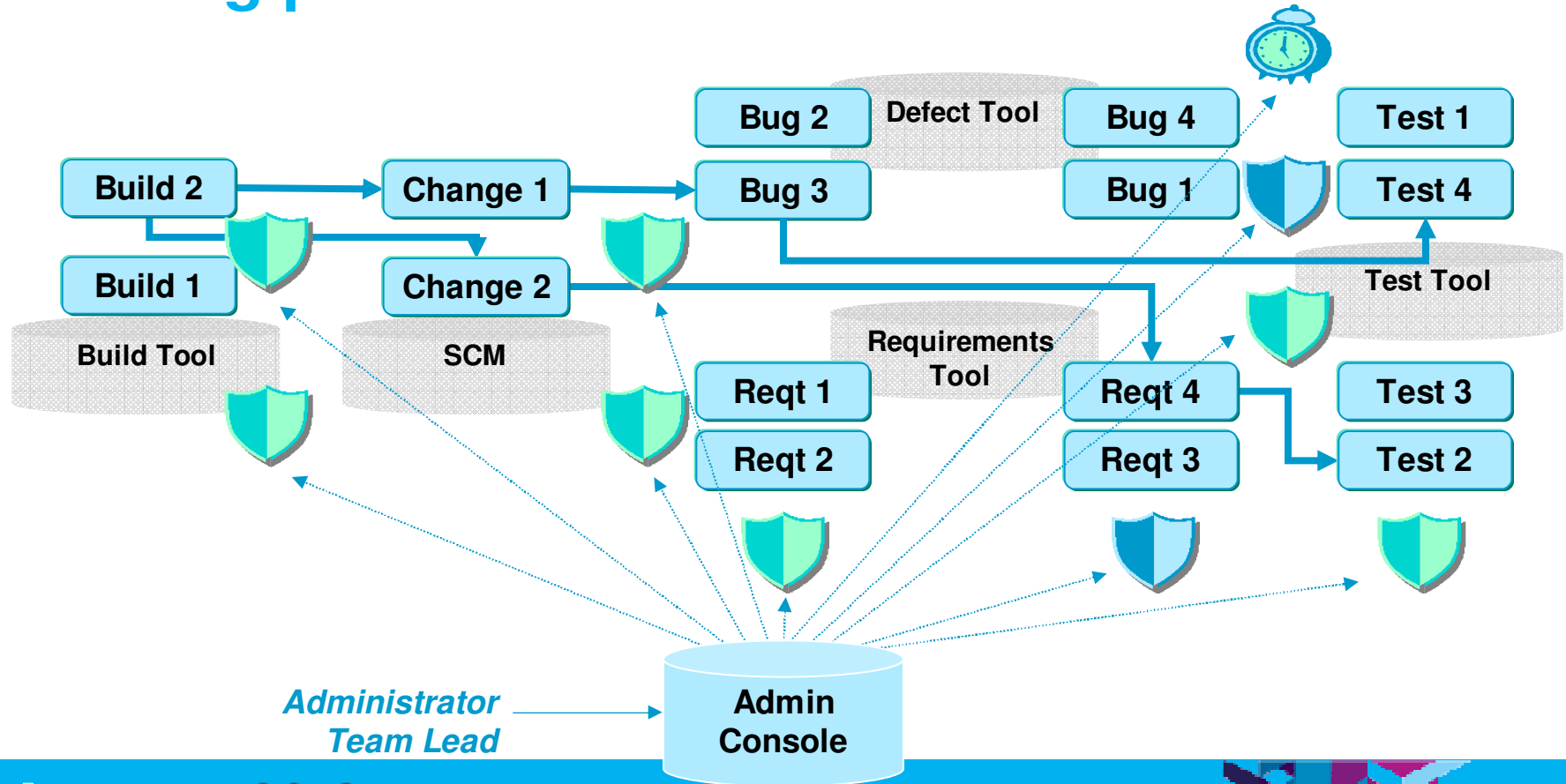
IBM

Another approach: Linked data

Finding and analyzing data

Build 2 → Change 1 → Bug 3

Bug 2 | Defect Tool | Bug 4

Bug 1

Build 1

Build Tool

Change 2

SCM

Test 1

Test 4

Test Tool

Requirements Tool

Reqt 1

Reqt 2

Reqt 4

Reqt 3

Test 3

Test 2

Search → Text index

Structured index ← Query Reporting Traceability

Defining process rules

Build 2 → Change 1 → Bug 3
Build 1
Change 2

Build Tool
SCM
Requirements Tool

Bug 2   **Defect Tool**   Bug 4   Test 1
                            Bug 1   Test 4

Test Tool

Reqt 1   Reqt 4   Test 3
Reqt 2   Reqt 3   Test 2

Administrator Team Lead → **Admin Console**

Let's build a smarter planet.

IBM

Why is this better?

A group of tools can work like one
- Seamless data integration
- Seamless process integration
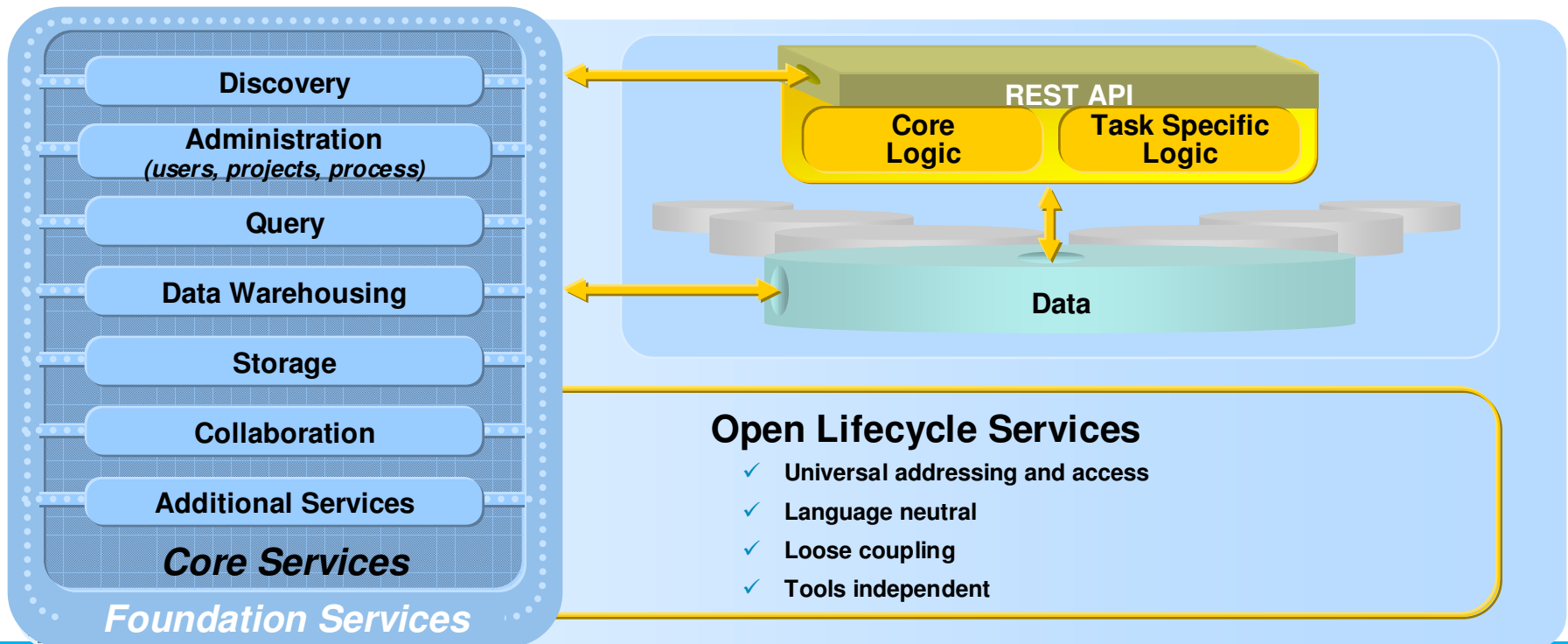- Seamless web user interface

Any tool can integrate this way
- New tools, Existing tools, Tools from multiple vendors

Eliminates import/export data duplication

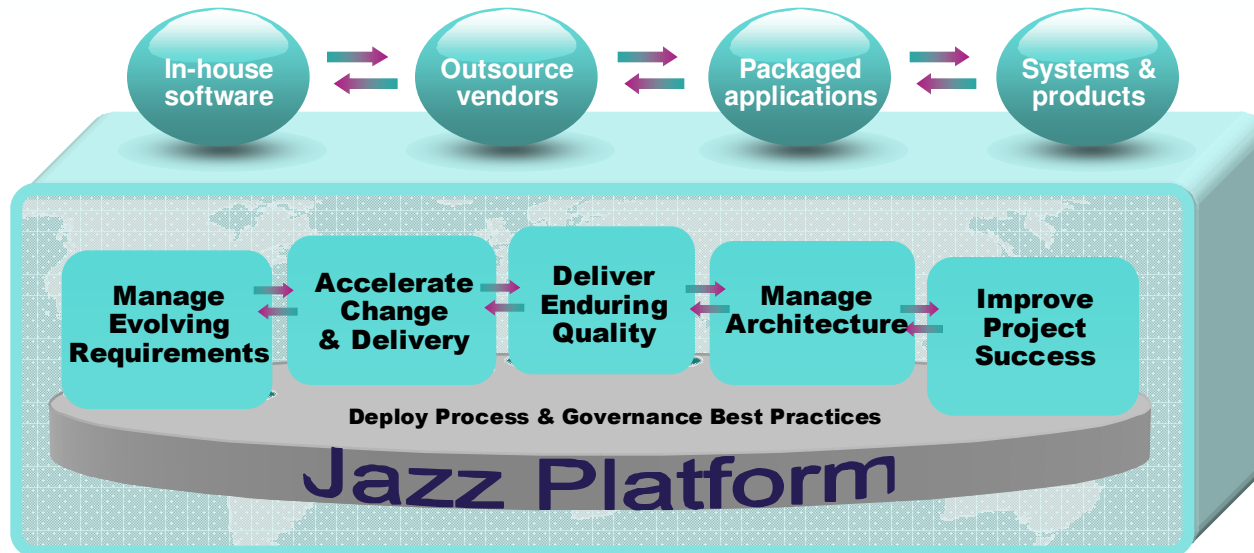Allows shared "capabilities" across tools

Jazz: Open, extensible, web-centric, integration platform

Discovery

Administration
(users, projects, process)

Query

Data Warehousing

Storage

Collaboration

Additional Services

Core Services

Foundation Services

REST API

| Core Logic | Task Specific Logic |

Data

Open Lifecycle Services

- ✓ Universal addressing and access
- ✓ Language neutral
- ✓ Loose coupling
- ✓ Tools independent

Let's build a smarter planet.

IBM

IBM Rational Software Delivery Platform

Rational software

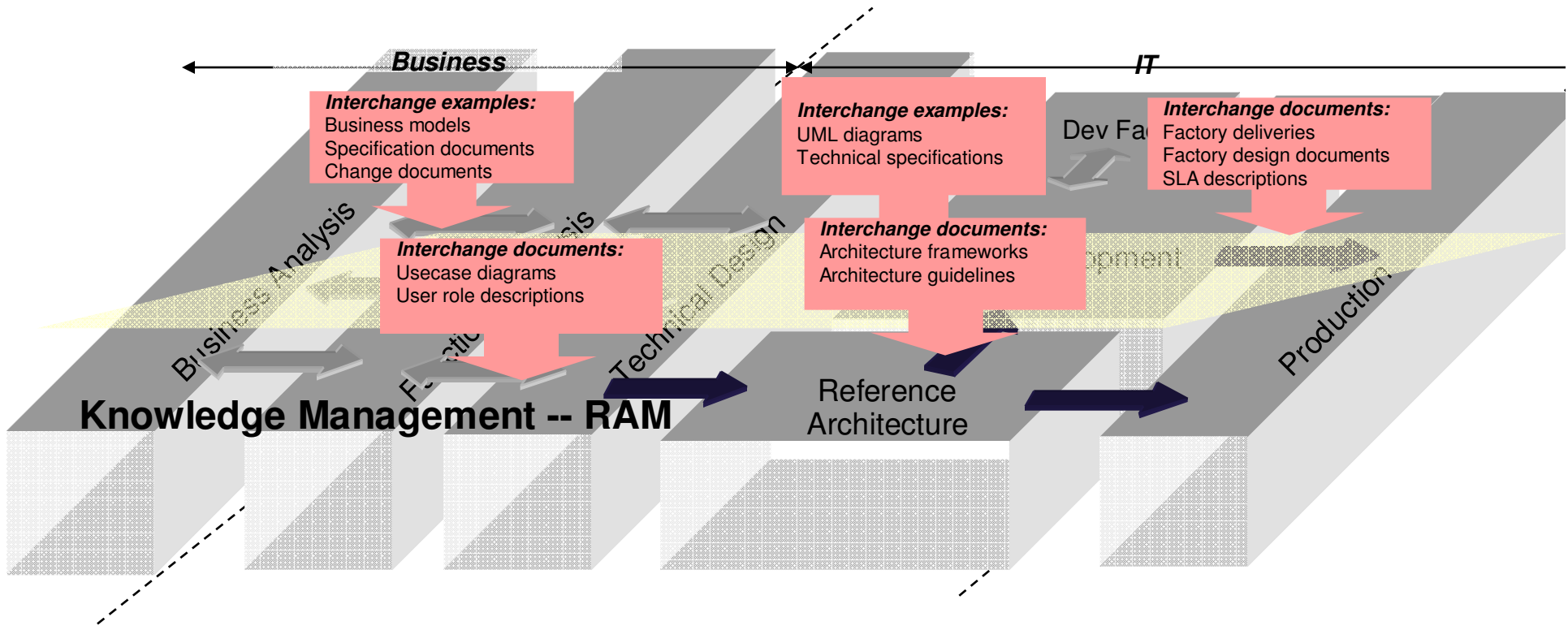**Solutions** to help customers achieve greater value and performance from their investments in delivering software

In-house software → Outsource vendors → Packaged applications → Systems & products

Manage Evolving Requirements → Accelerate Change & Delivery → Deliver Enduring Quality → Manage Architecture → Improve Project Success

Deploy Process & Governance Best Practices

Jazz Platform

- *Enterprise Modernization and Transformation*
- *Organizational Governance*
- *Skill Development and Community*
- *Implementation Services*

Let's build a smarter planet.

IBM

Layer 1 : Knowledge and Asset Management

Business

IT

Interchange examples:
Business models
Specification documents
Change documents

Interchange documents:
Usecase diagrams
User role descriptions

Interchange examples:
UML diagrams
Technical specifications

Interchange documents:
Architecture frameworks
Architecture guidelines

Interchange documents:
Factory deliveries
Factory design documents
SLA descriptions

Dev Fac

Business Analysis

Technical Design

Production

Knowledge Management -- RAM

Reference Architecture

Large Energy Company's IT organization

Objective

- Applications Management
  - Reduce time to find critical documents for supporting new release of a software products
  - Reduce time down time applications
  - Capture application knowledge from distributed support team workers (India, Brazil)

Solution

- IBM's Rational Asset Manager (RAM)
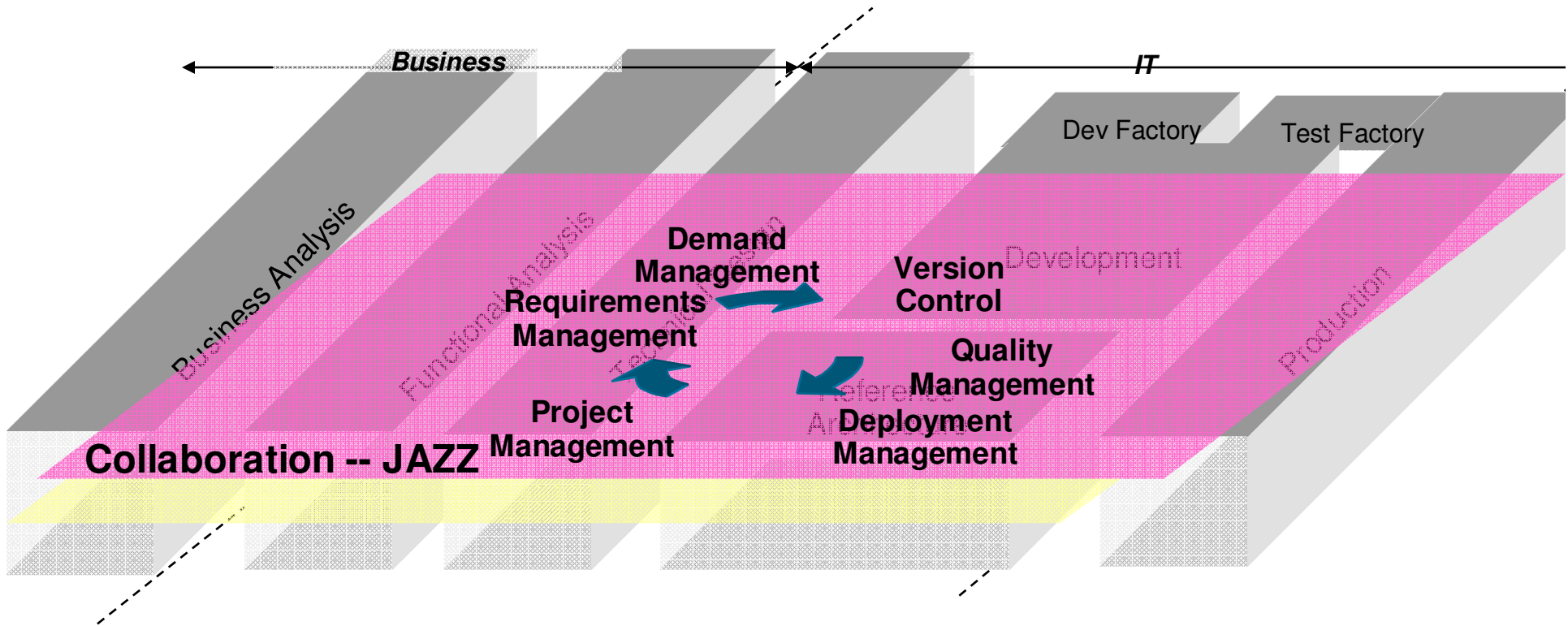- Integrations with HP Asset Center, HP Service Center, ClearCase, ClearQuest.

Benefits

- Reduce service down time as a result of better understanding which fine grained RAM development assets have been validated for new operational configurations proposed in Tivoli CCMDB like new versions of WebSphere Server or JVM.
- Faster searching and secure access to documents
- Understand and trace asset lifecycle from development to production.

Let's build a smarter planet.

IBM

Their vision and usage of RAM as the central portal for IT KMS

CRUD
Navigate, browse?

HP Asset Center

HP Service Center

…

CRUD

Navigate, browse

Navigate, browse

Rational Asset Manager

Navigate, browse

E-PIMS

SCM

Visual Studio

SCM

Telelogic System Architect

Let's build a smarter planet.

IBM
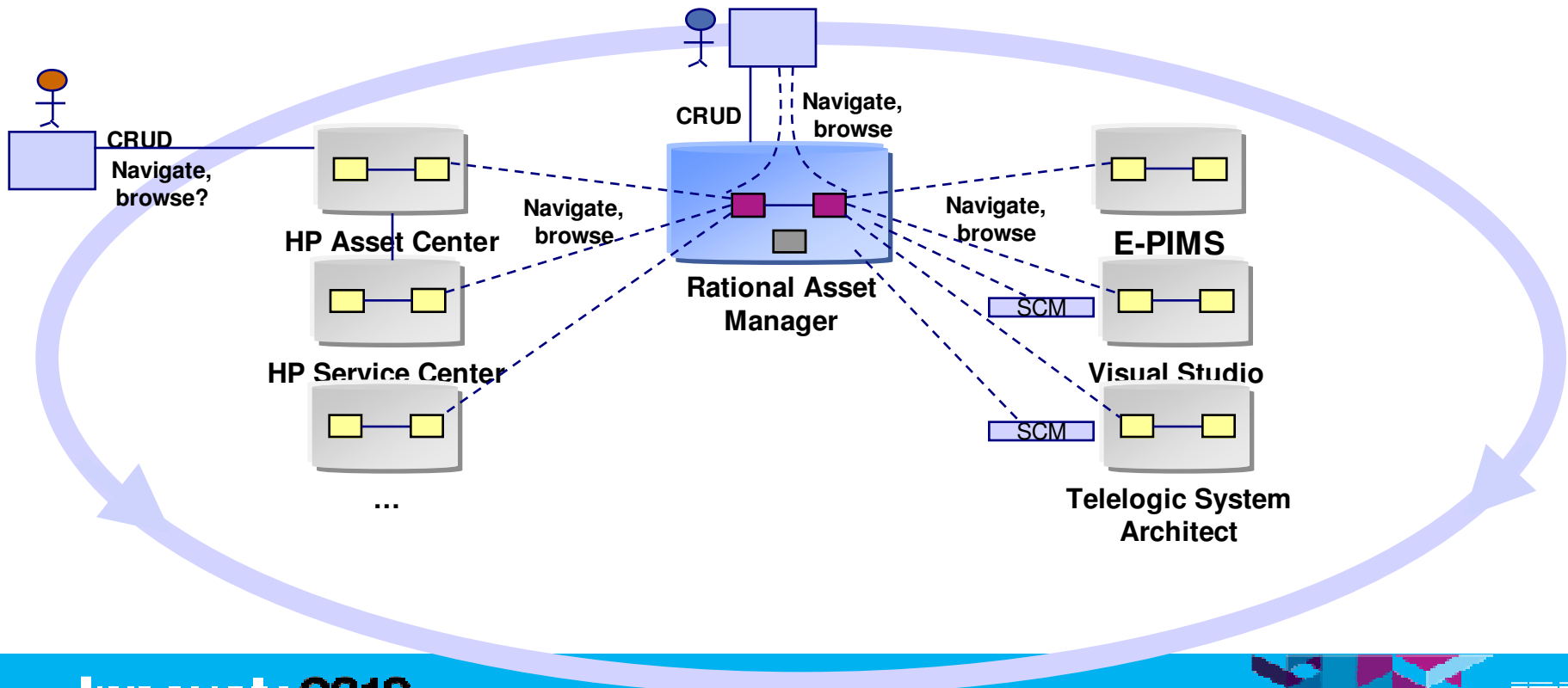
Layer 2: Collaborative Lifecycle Management

Business ← → IT

Business Analysis
Functional Analysis
Development
Production

Dev Factory
Test Factory

Demand Management
Requirements Management
Version Control
Project Management
Quality Management
Deployment Management

Collaboration -- JAZZ

Layer 3 : Governance : Rational Jazz Insight
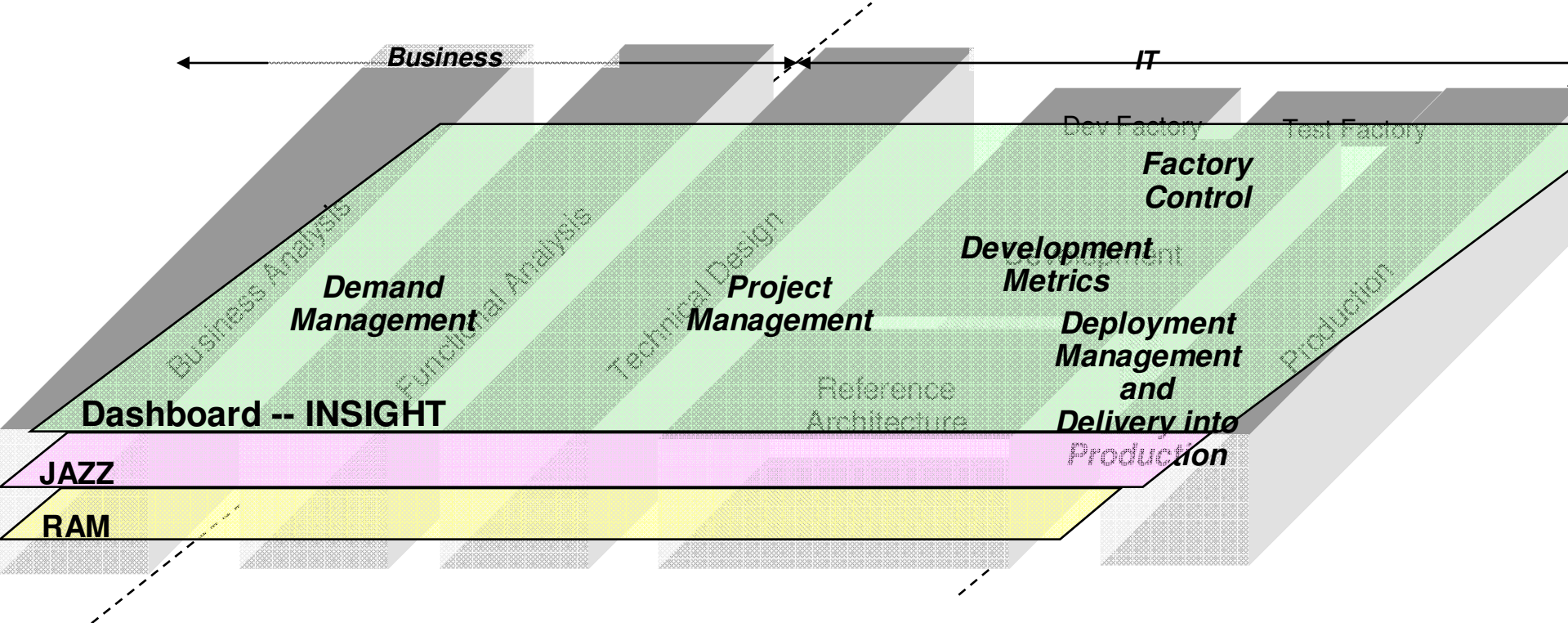
Executive Dashboard

Executive Dashboard

Development Health
- Build Health
- Project Velocity
- Staffing Variance
- Process Timeliness
- Iteration/Milestone Status
- Severity Analysis
- Security Vulnerabilities
- Static Code Analysis
- Requirements Met
- IPD Timeliness
- Transparency

Customer Quality
- Transactional Survey
- PMR / Call Rates
- Critical Situations
- Cost of Support
- Installability
- RFE SLAs
- Usability
- Consumability
- Scalability
- Integrations with other products
- User Experience / Doc
- Time to Resolution
- APAR:PMR ratio
- PostGA metrics

Development Quality
- Defect Backlog
- Test Escapes
- Functional Test Trends
- Critical Situations
- System Test Trends
- S-Curve Progress
- Automation Percentage
- Customer Testcases
- Consumability Scorecard
- Defect Latency
- Quality Plan Commitments
- Test Coverage
- Defect Density

Business Health
- Sales Plays
- Partner Enablement
- Support Enablement
- Technical Enablement
- Sales Enablement
- MCIF Index
- Alt Packaging
- OEMs
- XL hits
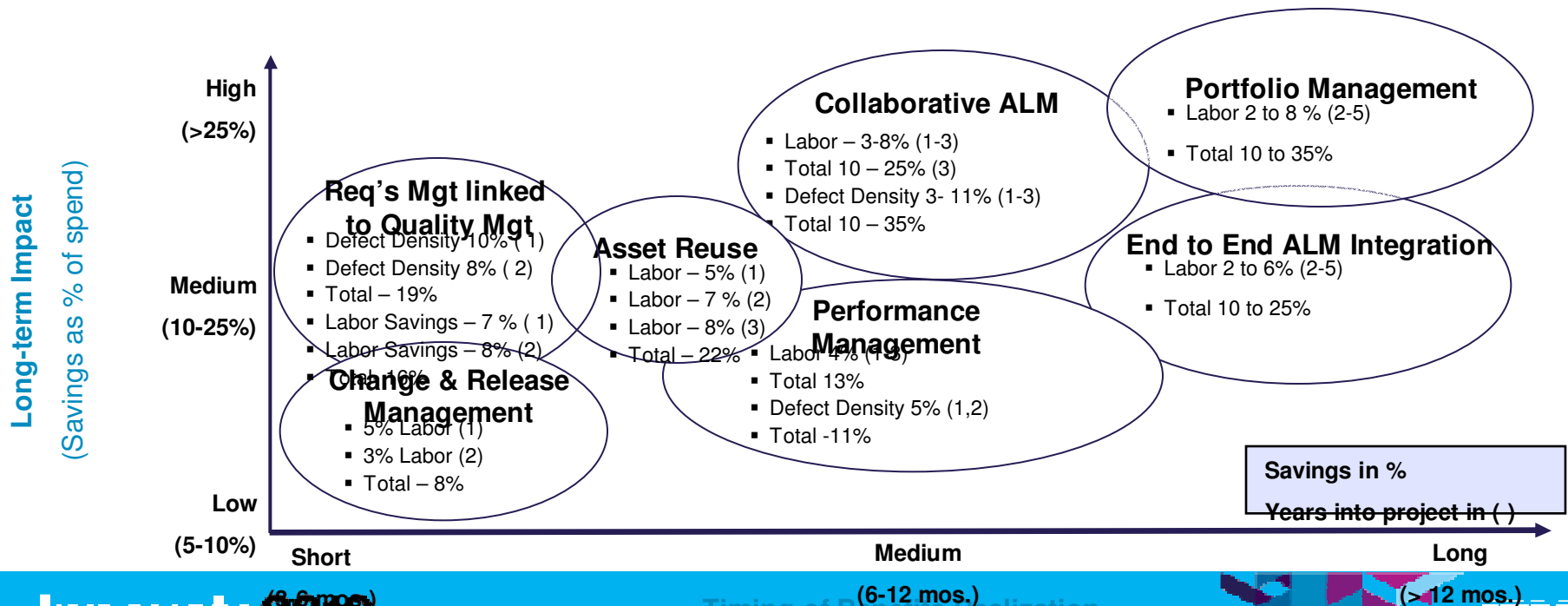- Tactics
- ROI
- Pipeline / Multiplier
- Revenue

Example of Software Practice and Metrics Analysis

Impact and Timing of Cost Savings Programs

Long-term Impact
(Savings as % of spend)

- High (>25%)
- Medium (10-25%)
- Low (5-10%)

Req's Mgt linked to Quality Mgt
- Audit-trails (compliancy)
- Bi-directional traceability
- Impact analysis
- Risk management

Asset Reuse
- Innovate
- Provision
- Distribute
- Consume

Change & Release Management
- Version control
- Configuration mgt
- Automated & integrated

Collaborative ALM
- Initially for key innovative projects
- Right-Size Governance
- Collaborate in Context
- Dynamic provisioning of projects and teams

Performance Management
- Across federated SW supply chain
- SLA execution / monitor KPI's
- Contractors / Sub-contractors
- Maintenance projects
- New development projects

Portfolio Management
- Link IT to business initiatives
- Application portfolio
- Prioritize investment decisions

End to End ALM Integration
- Deliver on top of the 3 foundational layers
- Cloud Development
- Transparency

Timing of Benefits Realization
- Short (3-6 mos.)
- Medium (6-12 mos.)
- Long (> 12 mos.)

Innovate2010

Let's build a smarter planet.

IBM

Example Programs with Possible Efficiencies and Savings

Impact and Timing of Cost Savings Programs

Long-term Impact (Savings as % of spend)

High (>25%)

Medium (10-25%)

Low (5-10%)

Collaborative ALM
- Labor – 3-8% (1-3)
- Total 10 – 25% (3)
- Defect Density 3- 11% (1-3)
- Total 10 – 35%

Portfolio Management
- Labor 2 to 8 % (2-5)
- Total 10 to 35%

Req's Mgt linked to Quality Mgt
- Defect Density 10% (1)
- Defect Density 8% (2)
- Total – 19%
- Labor Savings – 7 % (1)
- Labor Savings – 8% (2)
- Total 16%

Asset Reuse
- Labor – 5% (1)
- Labor – 7 % (2)
- Labor – 8% (3)
- Total – 22%

End to End ALM Integration
- Labor 2 to 6% (2-5)
- Total 10 to 25%

Performance Management
- Labor 4% (1,2)
- Total 13%
- Defect Density 5% (1,2)
- Total -11%

Change & Release Management
- 5% Labor (1)
- 3% Labor (2)
- Total – 8%

Savings in %

Years into project in ( )

Short (3-6 mos.)

Medium (6-12 mos.)

Long (>12 mos.)

Timing of Benefits Realization

Innovate 2010

Let's build a smarter planet.

Governance and Control of Software Delivery

Executive Dashboards

Smarter Planet ▸ Online Auction

Outstanding Work
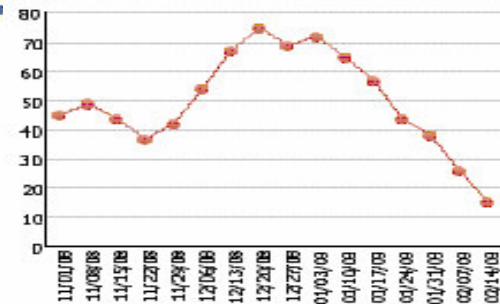
Iteration Velocity
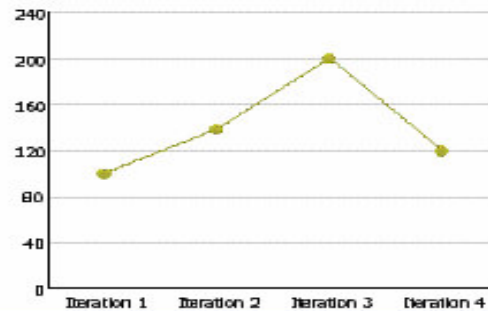
Build Health
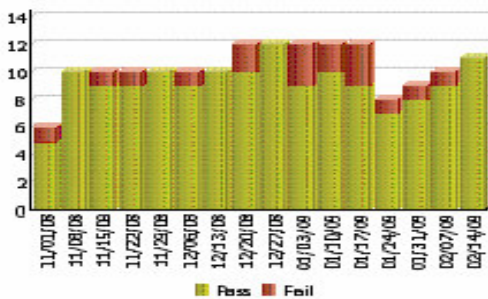
Enhancement Request Backlog
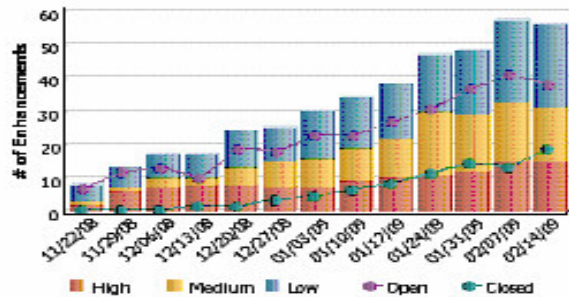
Actual Defect Trends
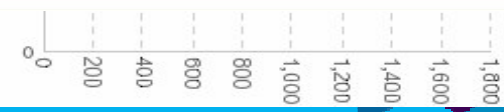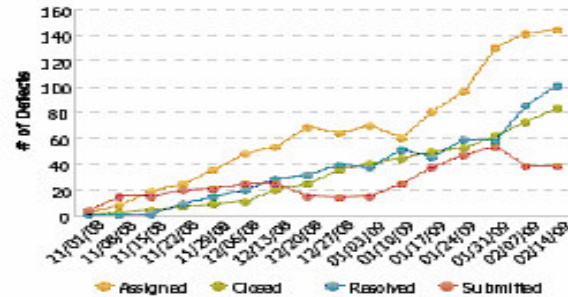
An Example: The RTCz Development Team

UA
San Jose, US

Mgt,Development
Raleigh, US

Development
Austin, US

Development
Pornichet, France

Development
Paris, France

Research
Haïfa, Israel

Development
Beijing, China

Work Items

SCM **Build**

Rational Team Concert

JAZZ TEAM SERVER

Development
Perth, Australia

Selfhosting Jazz server on z/OS
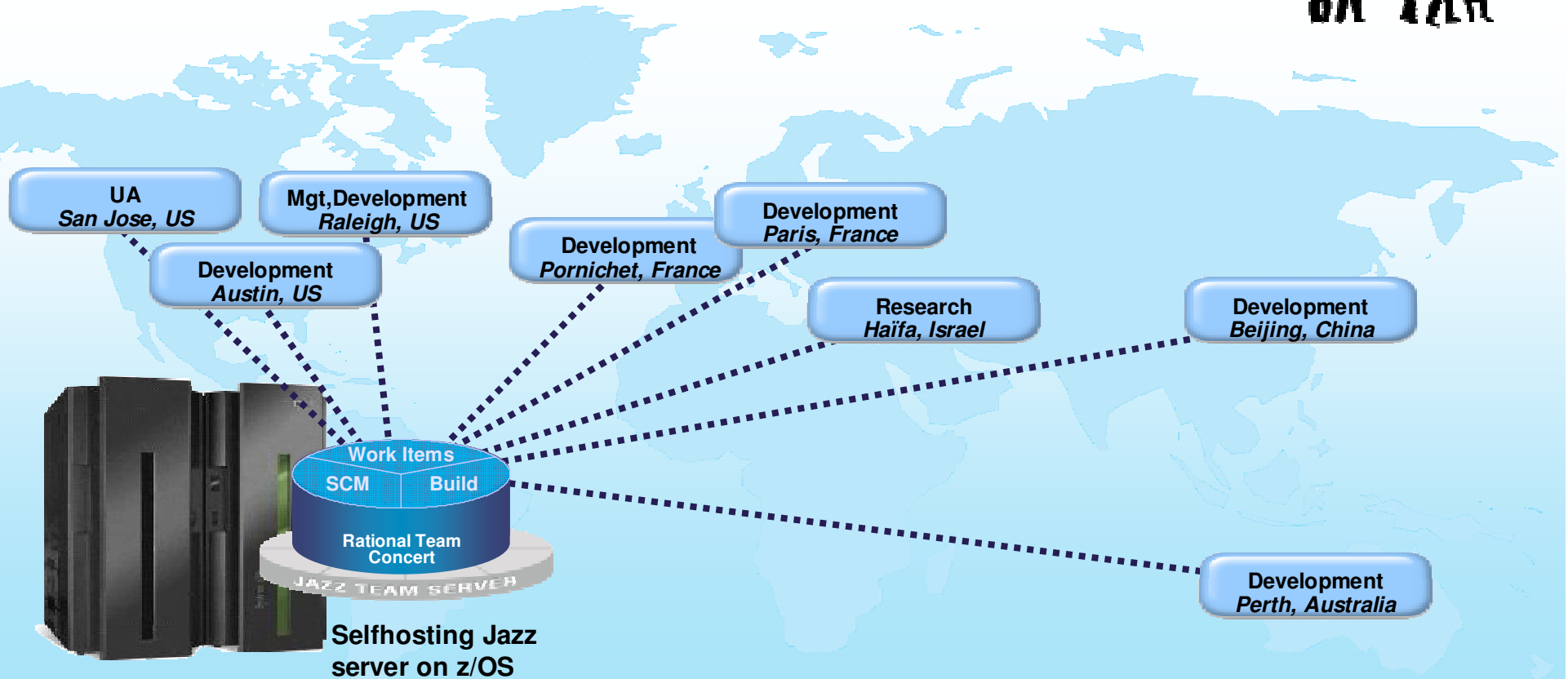
Tooling RTCz development using Team Concert

- **RTCz development project area**
  - Selfhosted on *System z*
    - *Access from Jazz.net*
  - 'RTCz for System z Project'
  - Based on the Scrum template

- **Geographically Distributed Development**
  - 3 main Scrum teams
    - FASL (France & Australia)
    - RTP (Raleigh, US)
    - BF (Austin, US)

- **2 parallel development lines**
  - Main development
    - Release v2.0
    - Post v2 development
  - IPD Product Delivery

Innovate2010
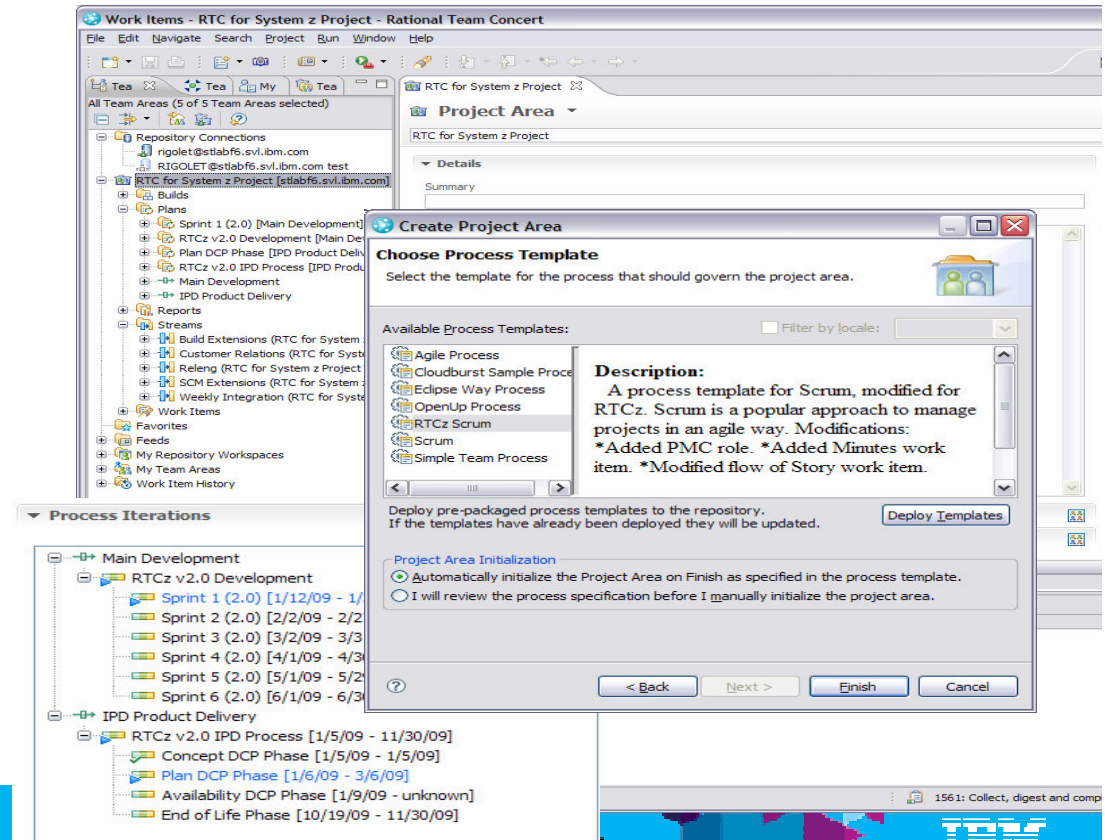
Tests coordinated using Rational Quality Manager

All defined in RQM

- FVT, SVT & Performance Test Plans

Defined by developers

- During the *Stabilization* phase

Executed by all members

- Developers, release engineer, ..., and managers included
- Test execution records

Creating & linking Defects on failure

Formal reviews

- Test cases approvals by Product Owner & ScrumMasters

Metrics & charts on quality presented at Sprint stakeholders meetings
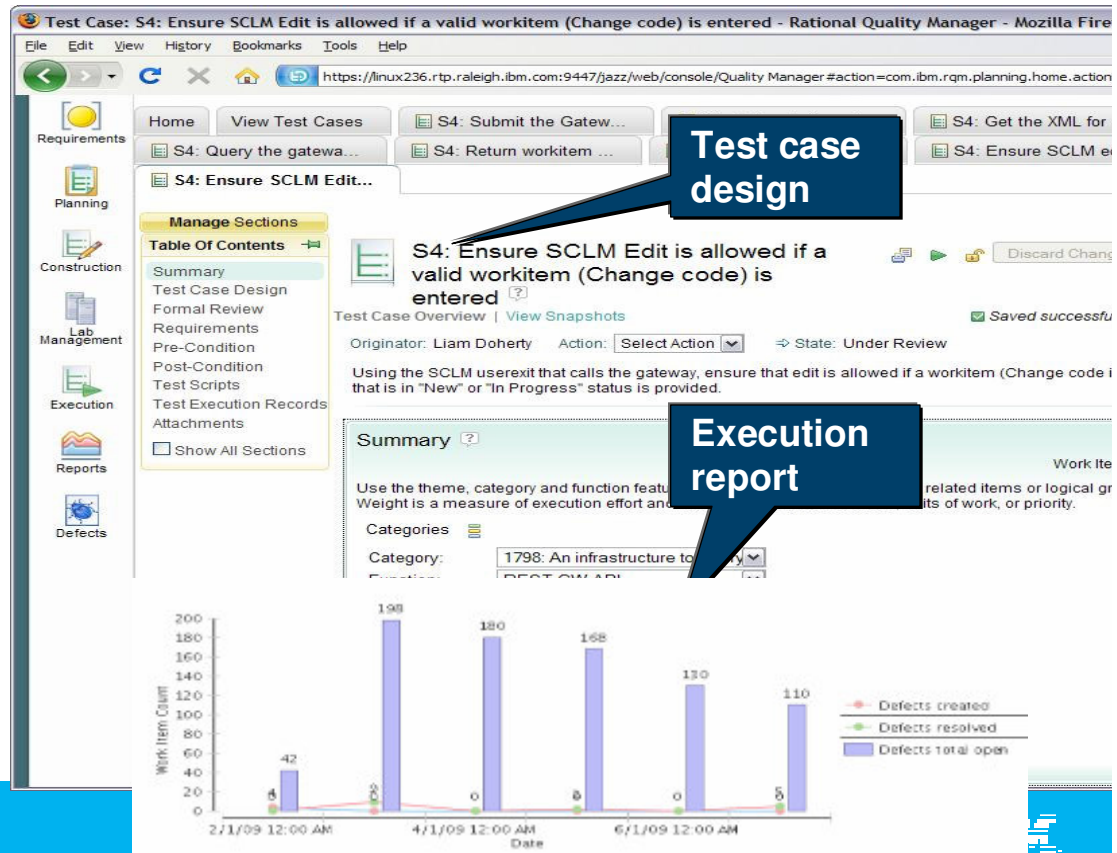
Collaborate using Workitems and Plans

Share & build source code using RTCz

Let's build a smarter planet.

Check the project status and health

Rational's Product Focus for 2010

Enterprise Modernization
- Collaborative development for z & i

Project & Process Management
- Integrated project management and reporting

Foundation
- Scalability
- Security
- Globalization
- Availability

Team Concert for i
Enabling enterprise modernization

Team Concert for z
Enabling enterprise modernization

Telelogic
Extending Jazz to the systems development marketplace

Project Management
Manage software projects across multiple sources

Insight
Meaningful metrics from multiple sources

Requirements Composer
Business Expert requirements collaboration

Team Concert
Revolutionary, collaborative development environment

Quality Manager
Collaborative, business-driven quality

Future IBM Capabilities

Manage Evolving Requirements

Manage Architecture

Ensure Security & Compliance

Accelerate Change & Delivery

Deliver Enduring Quality

Improve Project Success

3rd-Party Jazz Capabilities

Best Practices

Collaboration

Data Warehousing

Discovery

Query

Storage

Administration: *Users, projects, process*

JAZZ SERVICES

Innovate2010

Let's build a smarter planet.

IBM

Rational: The Road Ahead
Jazz-based offerings in 2010 and beyond

New!

Rational Insight
Gain insight based on real-time and historical trend information

New!

Rational Project Management
Manage global projects and resources

New and Enhanced!

Telelogic Portfolio
Extend the benefits of collaborative ALM to the systems market

Rational ClearQuest, Build Forge & RequisitePro
Realize the strengths of ALM through Jazz integrations

New and Enhanced!

Rational ClearCase
Extend collaboration capabilities

Future IBM Capabilities

Manage Evolving Requirements

Manage Architecture

Ensure Security & Compliance

Accelerate Change & Delivery

Deliver Enduring Quality

Improve Project Success

3rd-Party Jazz Capabilities

Best Practices

Collaboration

Administration: *Users, projects, process*

Data Warehousing

Discovery

Query

Storage

JAZZ SERVICES

Client Integrations
- Eclipse
- Visual Studio
- Microsoft Sharepoint
- Lotus Quickr

Powered by Jazz

More dynamic integration leveraging "Open Services for Lifecycle Collaboration"

Server Integrations
- Existing Rational offerings
- Business partner offerings
- Open source offerings
- Others to come...

Innovate2010

Let's build a smarter planet.

IBM

A Look to the Future: Rational Cloud-based Collaborative ALM
An evolution of *Jazz* **in the cloud**

Rational Team Concert

Rational Req Manager

Analyst

Developer

Tester

Rational Quality Manager

Developers link to requirements from work-items

Testers link to requirements from test plans and test cases

Analysts communicate requirements with links to development and test plans

Open | Hu... | Vision | Cal... | Cal... | Cal...

Calculate Mortgate UI ▾
<Enter Description>

Palette

Callouts
- Note
- Cursor

Basic Controls
- abc Label
- Paragraph
- Image Placeholder
- Text Field
- Text Area

Mortgage Calculator

Amount
Rate
Term   1 ▾

Calculate

Payement:

VIRTUALIZATION + STANDARDIZATION + AUTOMATION =

Cost   Flexibility

Enabling Agility@scale

innovate2010

Let's build a smarter planet.

IBM

Services _for_ the Cloud for SDS V1.0

Automation Enabling Services

Rational BuildForge Enterprise Edition V7.1.1

Features:
• Automating Services to deploy apps in the cloud
• Workflow automation of images, applications in the Cloud

Cloud Infrastructure Services

Service
Consumer

Service Provider

Cloud
Administrator

Deploys
images in the
cloud

Provides
services in the
cloud

Manages
Services in the
cloud

Image Services

• Image Capture Utility

• Image Promotion and Management

• Image Customization

• Image Deployment

Asset Management Services

• Assets Repository to store meta data
above images for image consumption

_Zephyr based Solution Modeling and composition, Virtual Image Design,
Resource and topology driven deployment workflow will be covered in future releases_

Innovate2010

Let's build a smarter planet.
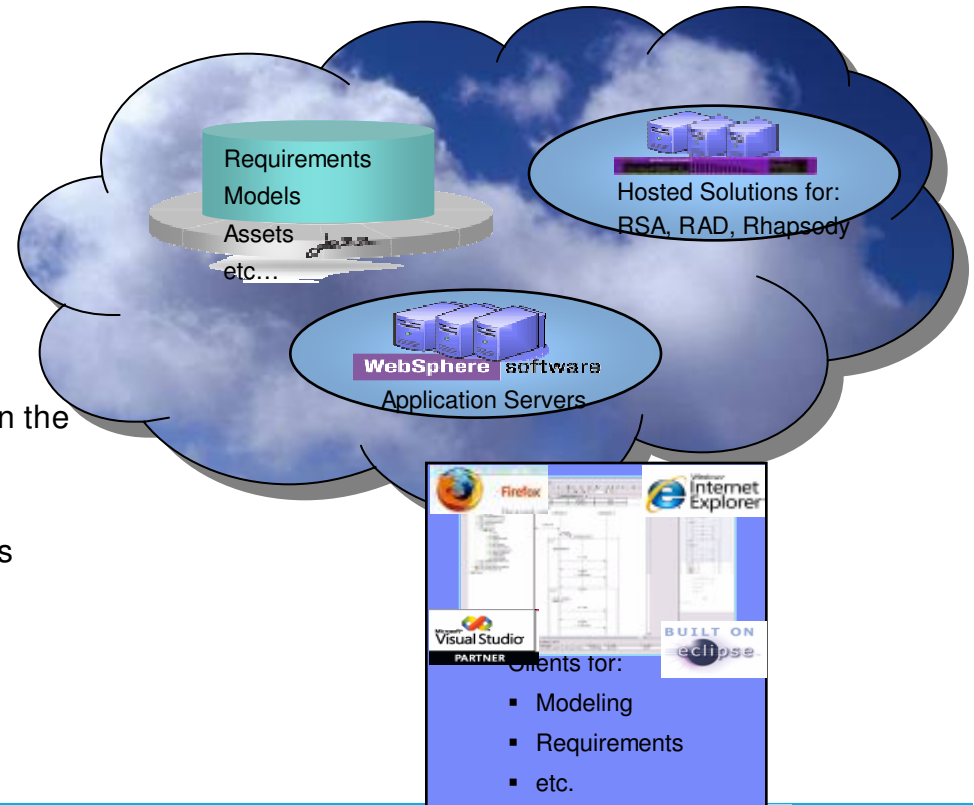
IBM

Tools for the Cloud

Desktop Products

- Rational Software Architect
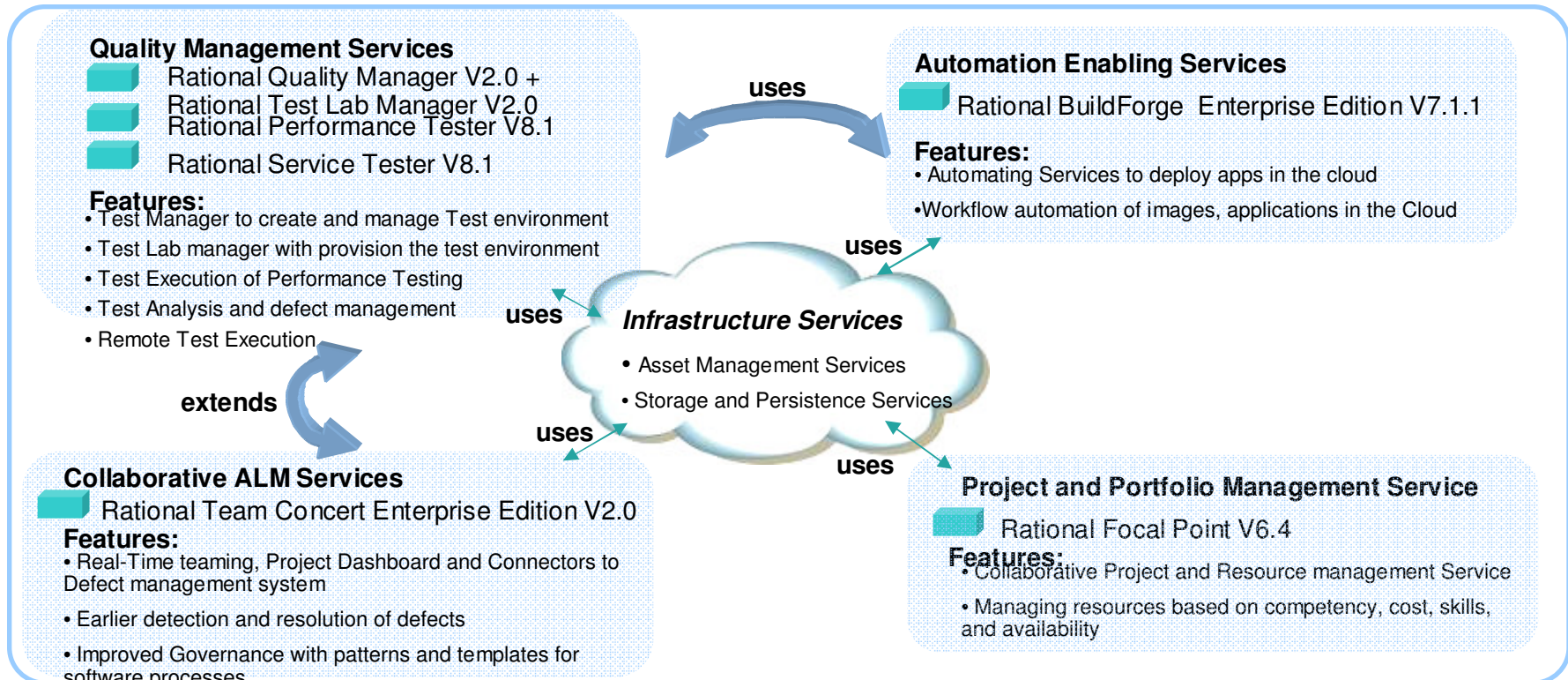- Rational Application Developer

Support for the Cloud

- Cloud Client
  - Connect, provision, and manage cloud requests
  - WebSphere Test Environment
  - Deploy and test to a WebSphere server running in the Cloud
- Cloud Topology Design
  - Create deployment topologies using cloud images from RAM
  - Zephyr topologies

Other

- Rational Build Forge

Requirements
Models
Assets
etc…

Hosted Solutions for:
RSA, RAD, Rhapsody

WebSphere software
Application Servers

Firefox

Internet Explorer

Visual Studio
PARTNER

BUILT ON
eclipse

Clients for:
- Modeling
- Requirements
- etc.

Innovate2010

Let's build a smarter planet.

IBM

Services *in* the Cloud for SDS V1.0

Quality Management Services
- Rational Quality Manager V2.0 +
- Rational Test Lab Manager V2.0
- Rational Performance Tester V8.1
- Rational Service Tester V8.1

Features:
- Test Manager to create and manage Test environment
- Test Lab manager with provision the test environment
- Test Execution of Performance Testing
- Test Analysis and defect management
- Remote Test Execution

extends

Collaborative ALM Services
- Rational Team Concert Enterprise Edition V2.0

Features:
- Real-Time teaming, Project Dashboard and Connectors to Defect management system
- Earlier detection and resolution of defects
- Improved Governance with patterns and templates for software processes

uses

Infrastructure Services
- Asset Management Services
- Storage and Persistence Services

uses

uses

uses

Automation Enabling Services
- Rational BuildForge Enterprise Edition V7.1.1

Features:
- Automating Services to deploy apps in the cloud
- Workflow automation of images, applications in the Cloud

Project and Portfolio Management Service
- Rational Focal Point V6.4

Features:
- Collaborative Project and Resource management Service
- Managing resources based on competency, cost, skills, and availability

Let's build a smarter planet.

IBM