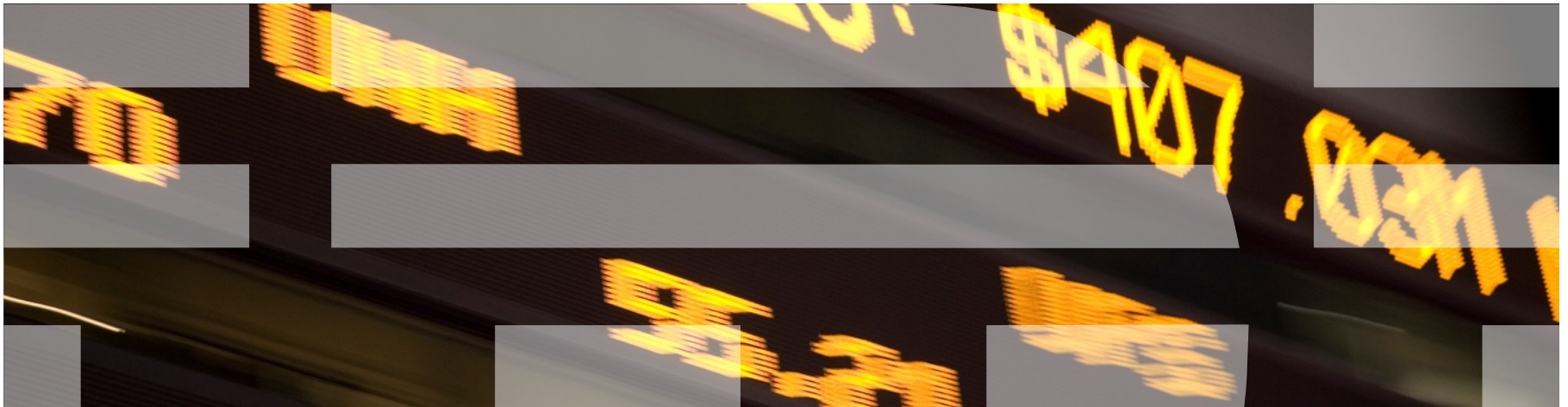# Application Modernization
Re-modeling for your Enterprise

SHARE Session 8655

Abstract

Application modernization. In order for businesses to ensure that their applications remain up-to-date, vibrant, relevant, and contributing to the financial success of the organization, application development teams need to pay attention to maintaining and enhancing the applications that keep the business running.

In this session, we will discuss the often over-looked topic of application modernization. We will cover aspects of application portfolio management, application analysis and assessment, identifying the applications which are most important to the organization, and application renovation.

Managing an application portfolio is an ongoing process. Just like maintenance and remodeling projects in non-IT environments. Come and learn how to focus your attention on the applications that are most critical to your business in order to maximize the effectiveness of your application modernization work.
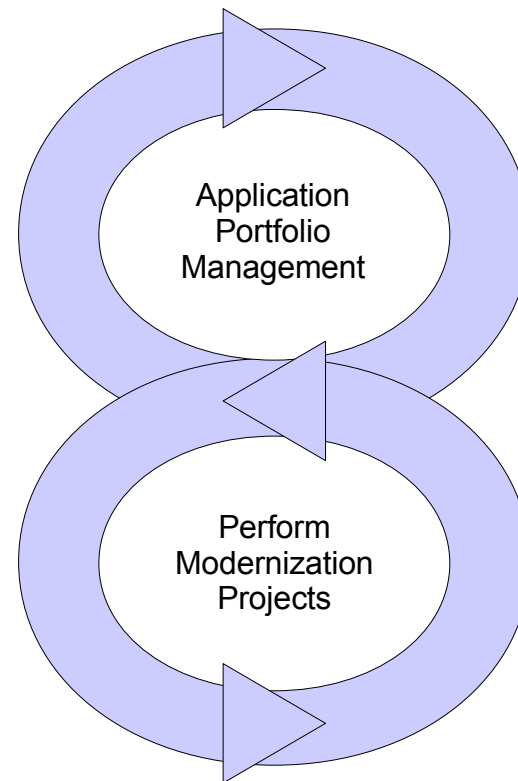
Agenda

- Application Modernization – what is it?
- Manage Applications as a Business
- Define Modernization Roadmap
- Technical Planning
- Application Renovation
- Summary
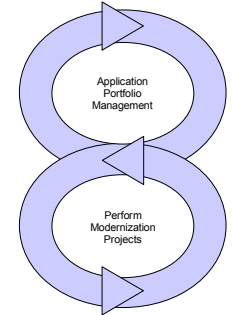
Agenda

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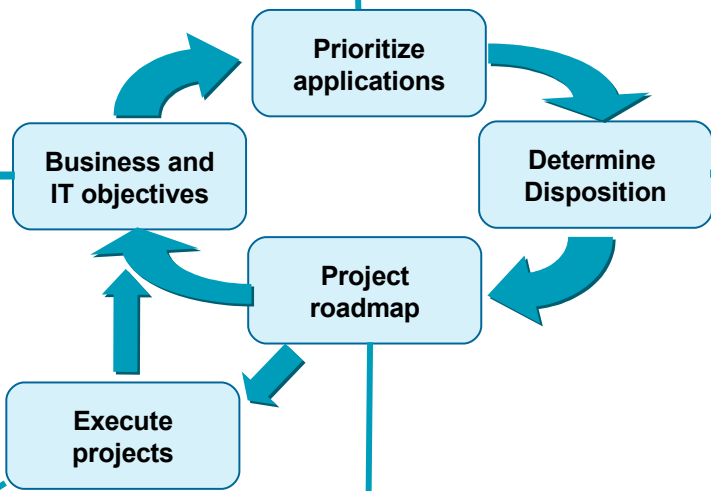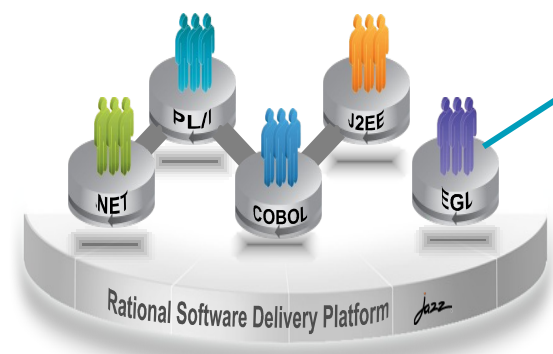

Application Portfolio Management
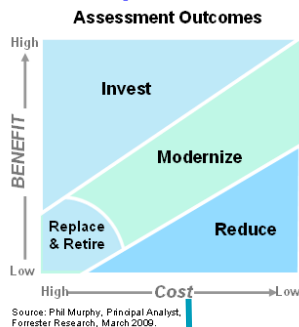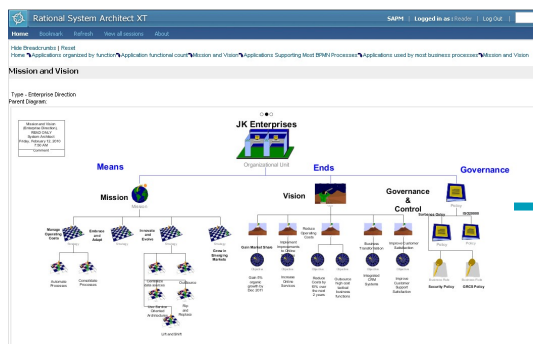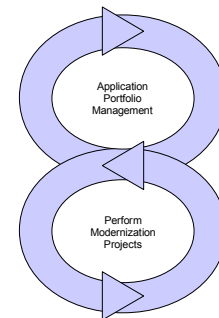
Perform Modernization Projects
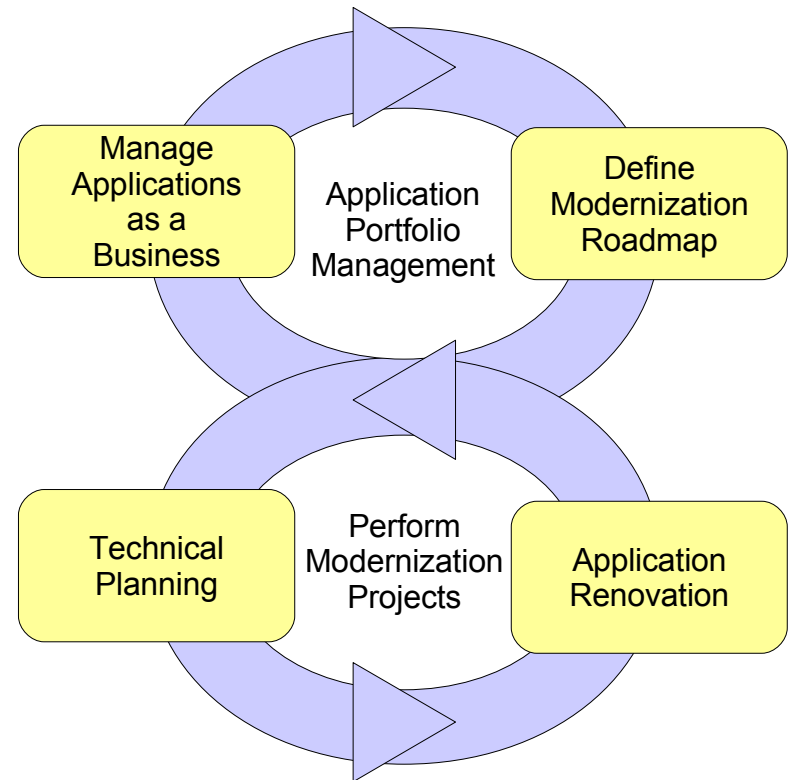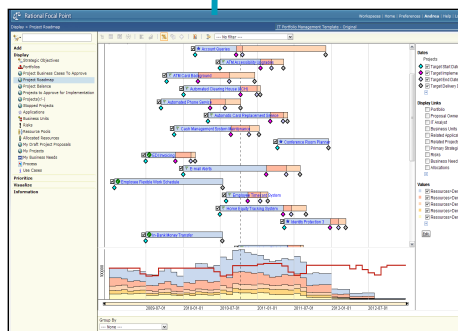
Application Modernization

- Manage Applications as a Business
  - Understand your inventory (assets and liabilities)
    - Software applications
    - Systems where that software runs
    - Dependencies between applications
  - Relationship of software to your business
- Define Modernization Roadmap
  - Determine which applications are most important to your business goals
  - Determine what direction to take for your applications
  - Estimate the costs of taking those directions
- Technical Planning
  - Understand existing applications in deep detail
  - Locate relationships between source code and data
  - Identify specific tasks for teams to accomplish
- Application renovation
  - Update, enhance, replace, retire, and so on

Application Modernization is a process for Portfolio Re-vitalization

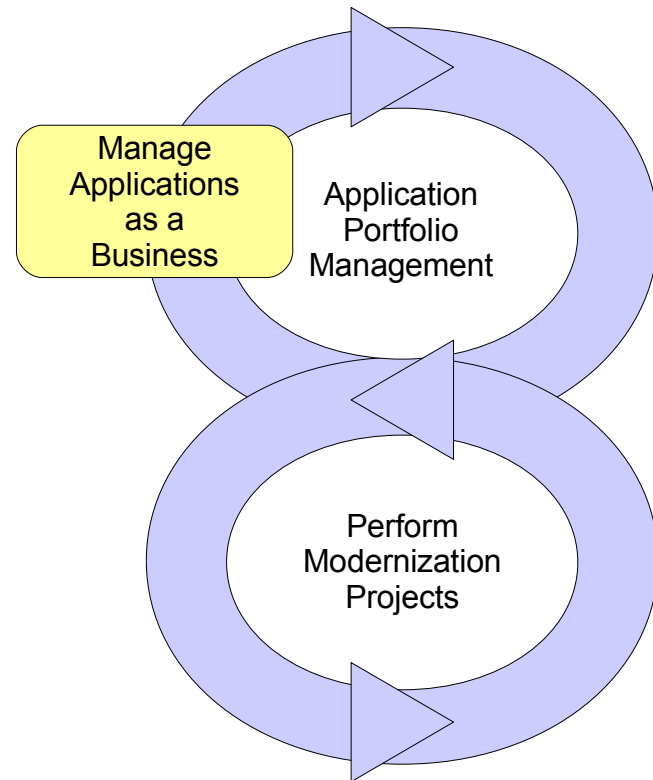*Business goals, technical and financial analyses drive the approach(es) recommended*

Assessment Outcomes

High — Invest — Modernize — Replace & Retire — Reduce — Low

BENEFIT

High — Cost — Low

Source: Phil Murphy, Principal Analyst, Forrester Research, March 2009.

Prioritize applications

Business and IT objectives

Determine Disposition

Project roadmap

Execute projects

Application Portfolio Management

Perform Modernization Projects

Retire
- Discontinue

Retain
- As-Is
- Consolidate
- Upgrade
- Rehost
- Wrap
- Convert
- Refactor
- Rewrite

Replace
- Purchase
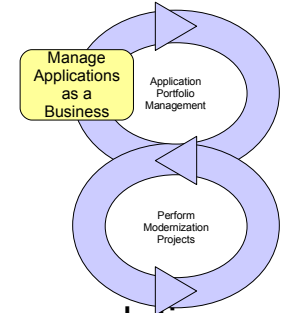- Lease

Rational Software Delivery Platform

Agenda

- Application Modernization – what is it?
- **Manage Applications as a Business**
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- Summary

Manage Applications as a Business

Application Portfolio Management

Perform Modernization Projects

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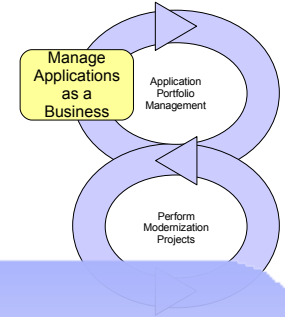
Manage Applications as a Business

- An Enterprise is built over time
    - Projects build upon one another
    - De-centralized teams and a plethora of technology options created many solutions
    - Subtle dependencies may exist between subsystems
    - Different initiatives result in different architectures existing across the IT environment
- Goals
    - Align application investments with current and future business goals
    - Don't over-invest in non-essential applications
    - Invest in important applications
- Tasks
    - Identify your business goals
    - Understand the inventory of applications in use
    - Understand the systems these applications depend upon
    - Understand the dependencies between applications
    - Evaluate the impact of these applications to your business goals
    - Determine which applications are of highest priority to act on (modernize, change investment level, retire, etc.)

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Decide on and communicate key objectives
Enable IT to become a value vs. cost center

Manage Applications as a Business

Application Portfolio Management

Perform Modernization Projects

Focus revitalization effort on key business objectives, such as

✓ Improved business agility

✓ Reduce operations and maintenance cost, to free money for investment in strategic initiatives

✓ Reduce compliance risk exposure

✓ Enable Cloud computing
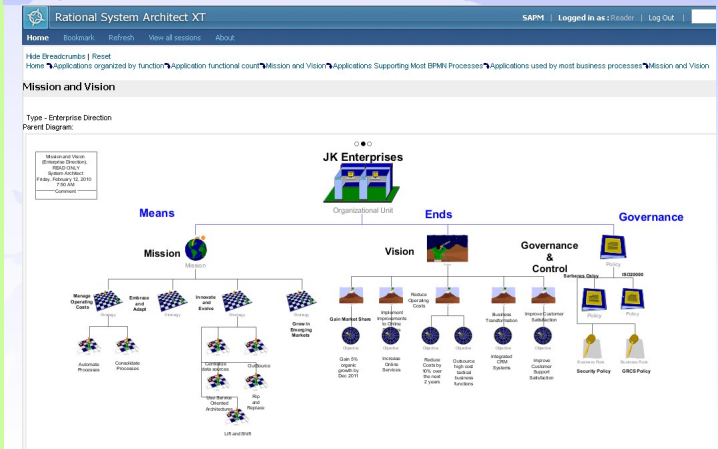
Benefits:
✓ Ability to model business objectives, strategies, organization, and processes in IBM Rational System Architect
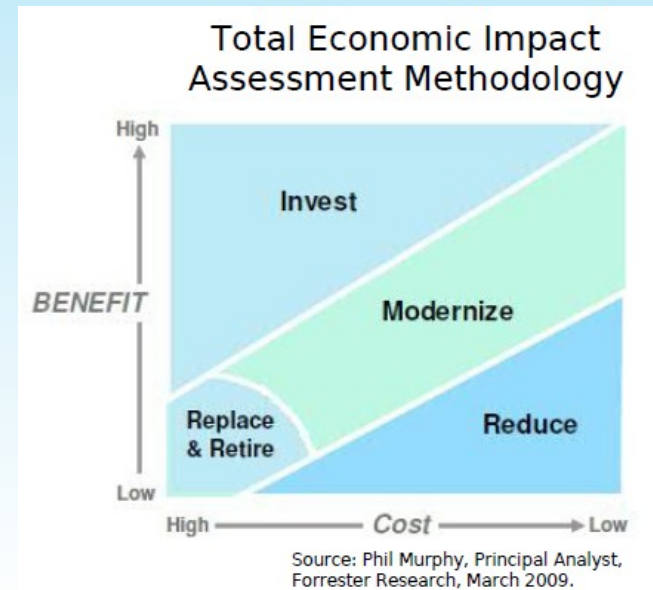✓ Collaborate on decisions related to organization priorities in IBM Rational Focal Point

IBM

Balance business value to cost and quality
Understand which applications are candidates for modernization

Manage Applications as a Business

Application Portfolio Management

Perform Modernization Projects
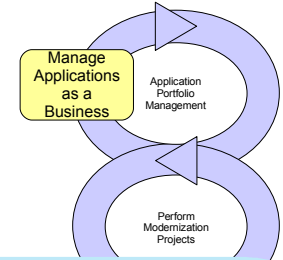
Which applications are

✓ the most valuable to the business?

✓ the most costly to maintain and operate?

✓ misaligned with target enterprise architecture?

✓ causing the most incidents?

Total Economic Impact Assessment Methodology

High — Invest

BENEFIT — Modernize

Replace & Retire — Reduce

Low

High ⟵ Cost ⟶ Low

Source: Phil Murphy, Principal Analyst, Forrester Research, March 2009.

Benefits:
✓ An application inventory with information about business and technical alignment (in Focal Point)
✓ A list of target applications most likely to benefit from revitalization (in Focal Point)
✓ Enterprise Architecture (in System Architect) linked to a decision engine (in Focal Point)

# Manage Applications as a Business
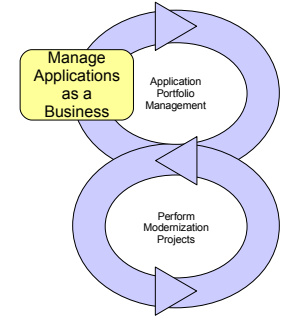
- Outcomes
    - An accurate inventory of applications, infrastructure, and dependencies
    - An understanding of the business goals of the organization and how they relate to the application inventory
    - A prioritized list of applications to further investigate, with a candidate type of high-level action (modernize, change investment level, retire, etc.)
- Next steps
    - Do deep dive analysis of prioritized applications to determine path to follow
        - Estimated costs of each approach
        - Estimated benefits of each approach
        - Dependencies for each approach
        - Which modernization strategy to implement

Agenda

- Application Modernization – what is it?
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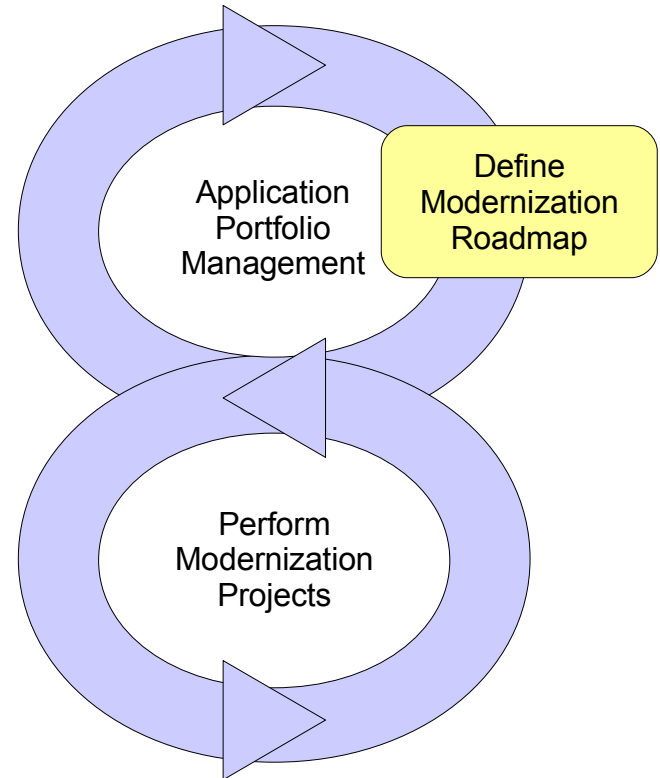
Define Modernization Roadmap

- Like any potential project, pros and cons must be considered
    - Is it worth working on the application?
    - What type of work should we do?
    - Will the work I perform pay off? When?
- Goals
    - Identify the relative importance of applications to business goals
    - Identify applications to renovate
    - Identify the appropriate approach to renovation (retain, retire, replace)
- Tasks
    - Perform static analysis of the applications to understand
        - Size
        - Complexity
        - Maintainability
        - Relationships
    - Outline modernization options with pros and cons
    - Compare the costs and expected benefits of different renovation methods
    - Determine the path to take for each renovation project

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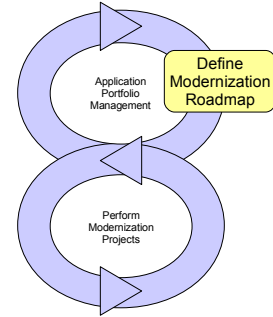
Business intelligence for applications
Determine modernization approach through technical and financial analysis to compare alternatives
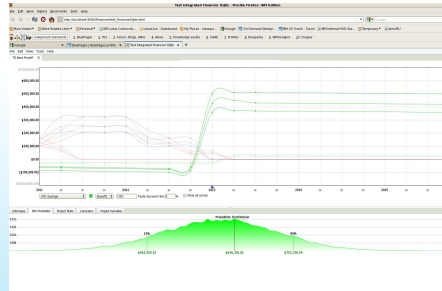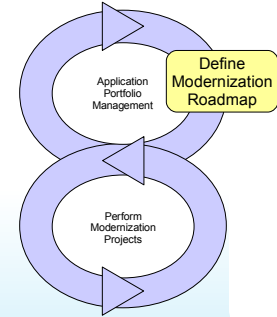
Financial Analysis

Enterprise Architecture

Decision Engine

Operational Data and Defects
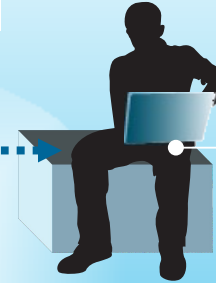
Application Intelligence

Application Artifacts
Mainframe   Distributed

Rational Asset Analyzer
Rational System Architect
Rational Focal Point
Rational Software Architect

Define Modernization Roadmap

Application Portfolio Management

Perform Modernization Projects

Benefits:
✓ Improved ROI by understanding technical quality to aid modernization decision, combined with financial option analysis, cognizant of the inherent uncertainty involved
✓ Reduced risk by quickly determining the full impact of proposed changes and lowered costs via dead code elimination, optimal planning, focused testing and faster development

Evaluate Different Opportunities and Solutions
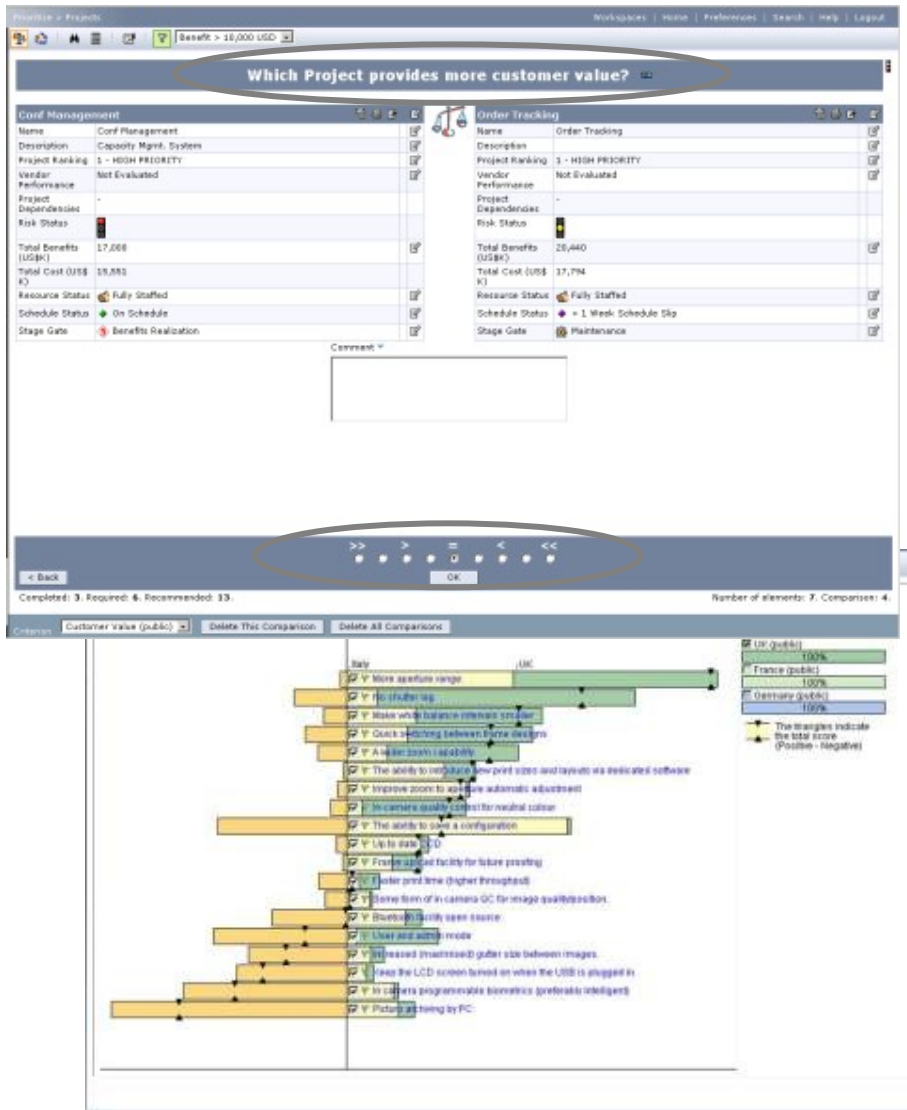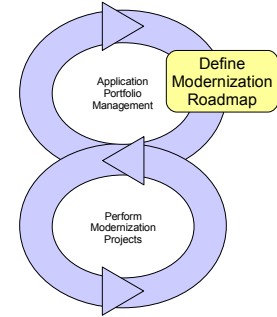
► Outline modernization options, considering among others cost, resources, benefits, and risk.

► Choose projects that achieve business objectives, with highest value, in the shortest time, with the least risk

"Everything that can be counted does not necessarily count; everything that counts cannot necessarily be counted"
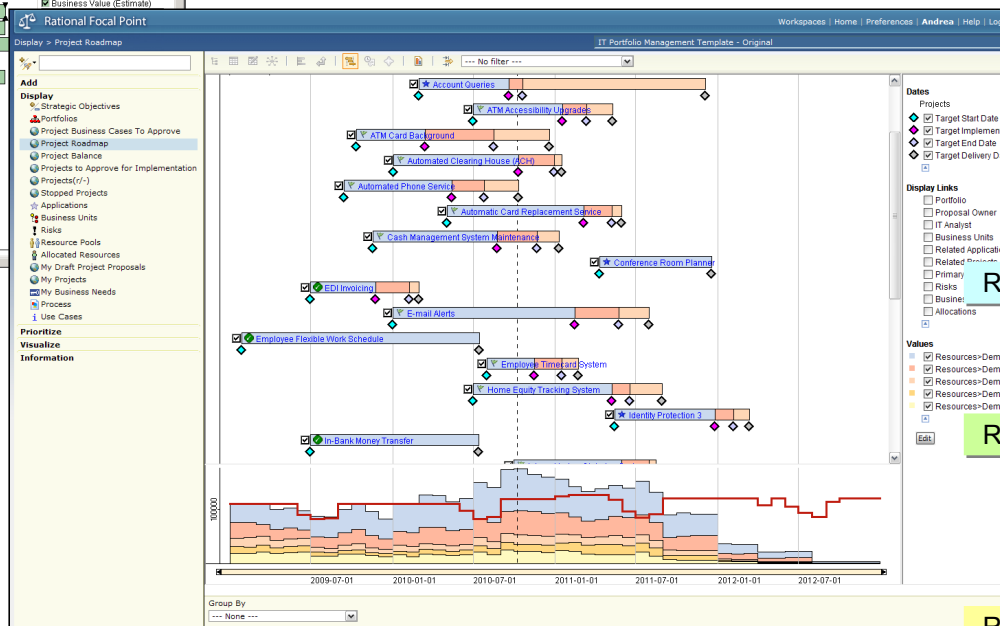
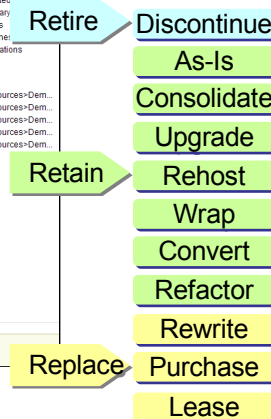- Albert Einstein

Produce Resource Roadmap
Weigh project priorities and stage project schedules
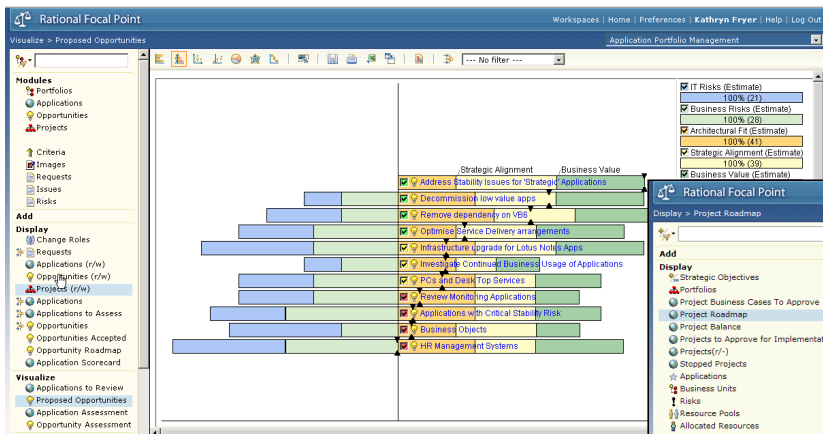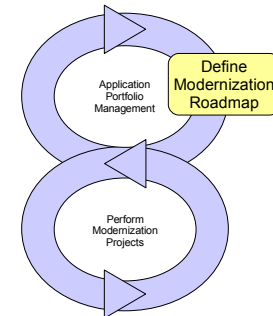
Trade-off between competing priorities

Macro-planning within resource demand and supply

Benefits:

✓ Effective utilization of available resources (people, skills, monetary funds) using Focal Point
✓ Informed trade-offs between potentially competing priorities in a resource constrained environment using Focal Point
✓ Hardwire strategy to execution through Focal Point and Rational Team Concert integration

Govern your modernization through role-based dashboards
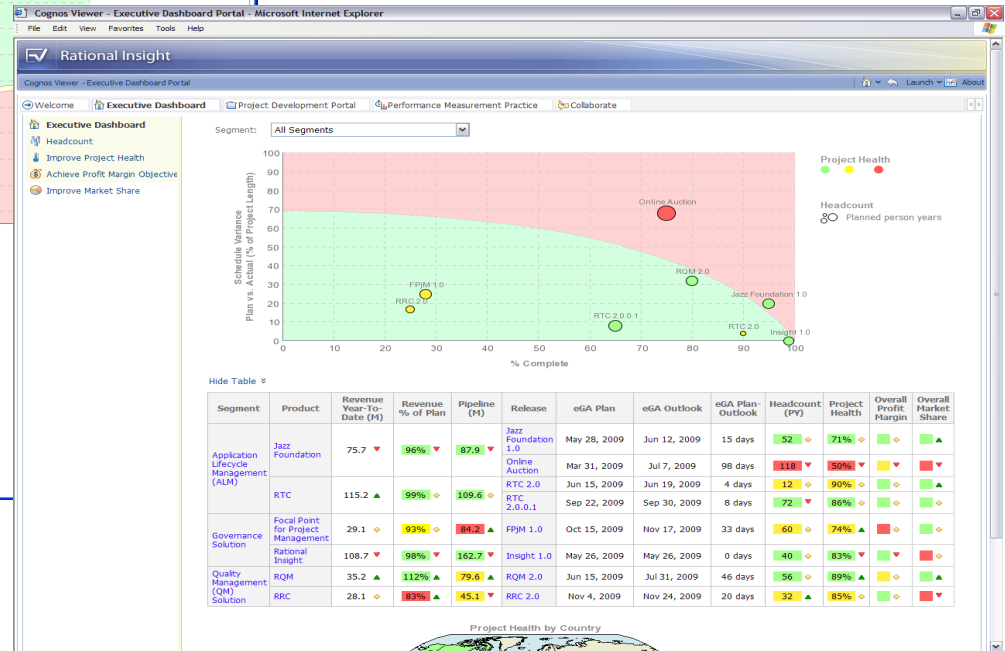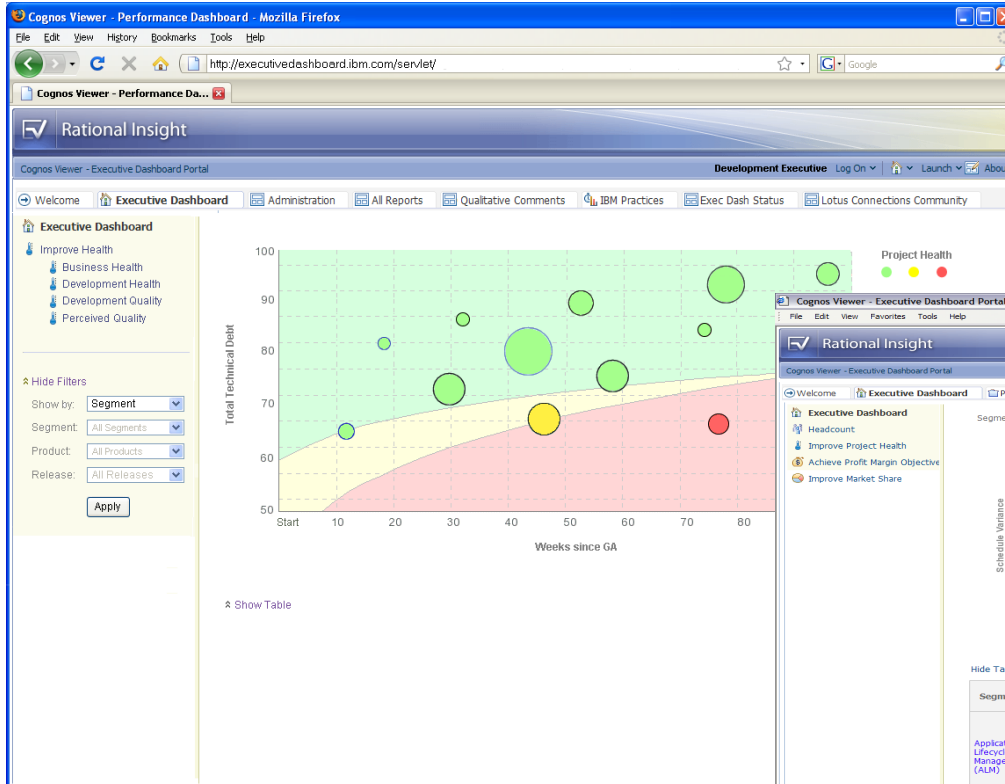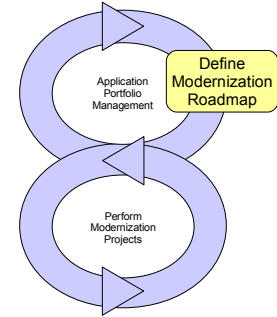
► Govern and manage to keep on track for objectives, budget and schedule

Define Modernization Roadmap
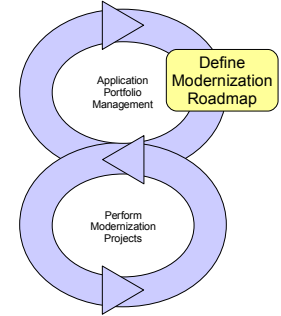
- Outcomes
    - An ordered list of application renovation projects – and approaches to take
    - Projects ordered by relevance and alignment to business goals
    - An estimate of the time, resources, and return on investment for each project
    - Define roadmap of which projects to do when, with consideration for resource supply constraints
- Next Steps
    - Allocate teams to work on the renovation projects
    - Perform more detailed application analysis during the renovation
    - Dispatch application renovation work projects

    - And begin the Application Portfolio Management cycle again!

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Application Portfolio Management

Technical Planning

Perform Modernization Projects

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Technical Planning

"Here be dragons."

"The devil is in the details."
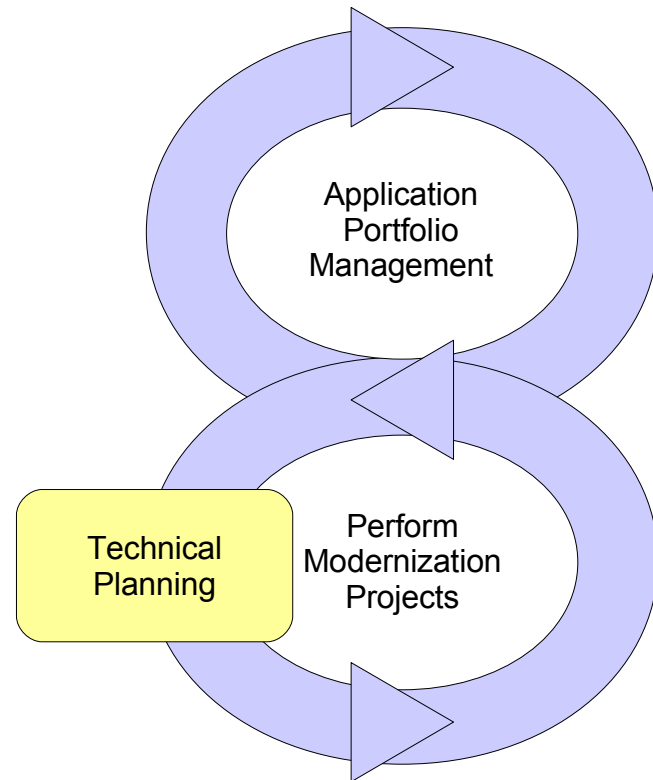
- This is where deep technical work starts
    - Any application renovation project requires program understanding
    - What modules do we need to update?
    - Which databases are affected, and how?
    - What impact will that have on the existing application source code?

- Goals
    - Understand the application's components and how they depend upon one another
    - Establish a detailed understanding of the application source code
    - Identify the specific areas of code and data that require modification

- Tasks
    - Ensure that the application source code is under change management
    - Analyze the application source code, database tables, and build environment
    - Analyze program flow and component diagrams to understand code structure
    - Plan the renovation project work tasks based on analyzing impact of required changes

Application Analysis – high level view of source code base
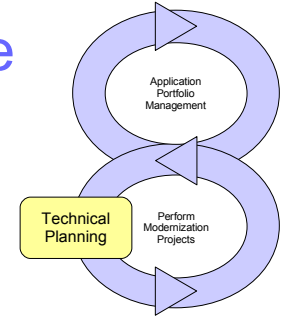
Explore MVS assets

Actions Select an Action ▾

Search MVS asset names: 🅰 [   ] Go ☐ Type mixed case Advanced search

Run time	Total
Batch job	57
CICS group	221
CICS online region	2
CICS transaction	938
DB2 system	5
IMS DBD	45
IMS subsystem	2
IMS transaction	50
Run unit ⑦	1317

Program	Total
BMS map definition	115
BMS map set definition	115
Concatenation set	16
DB2 stored procedure	215
Entry point	447
IMS PSB	104
Literal	19984
Program	456

Data	Total
Data element ⑦	158995
Data set	445
Data store	325
DB2 column	4889
DB2 table	541
DD name	1361
I/O record description	749

Application Portfolio Management

Technical Planning

Perform Modernization Projects

Inventory - lists – search-able summary for each type

Application Portfolio Management

Technical

Perform
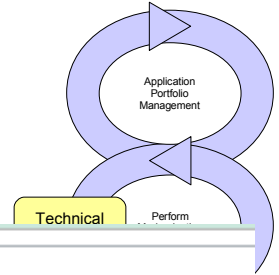
Program summary

Actions Select an Action

| Overview | Statistics | e-business information |

Search Program names: ᴵA QAD*   Go   ☐ Type mi

Optionally, specify any additional search criteria from the following:

Site	Application	Annotations ᴵA	Language	Analysis status	Program type
-- All -- ▾	-- All -- ▾		-- All -- ▾	-- All -- ▾	-- All --

Assign new language, Configure scanning options, Queue selected

☐	Program (12)	Language	Analysis status	Action	Number of lines in program	Source location
☐	QAD01	COB	Completed	delete, annotate	522	C:/Program Files/IBM/Rational Asset Analyzer/sampl
☐	QAD02	COB	Completed	delete, annotate	491	C:/Program Files/IBM/Rational Asset Analyzer/sampl
☐	QAD02	COB	Completed	delete, annotate	491	C:/Program Files/IBM/Rational Asset Analyzer/sampl
☐	QAD02A	COB	Completed	delete, annotate	498	C:/Program Files/IBM/Rational Asset Analyzer/sampl
☐	QAD03	PLI	Completed	delete, annotate	741	C:/Program Files/IBM/Rational Asset Analyzer/sampl
☐	QAD04	COB	Completed	delete, annotate	482	C:/Program Files/IBM/Rational Asset Analyzer/sampl
☐	QAD05	COB	Completed	delete, annotate	609	C:/Program Files/IBM/Rational Asset Analyzer/sampl
☐	QAD06	COB	Completed	delete, annotate	164	C:/Program Files/IBM/Rational Asset Analyzer/sampl
☐	QAD06	COB	Completed	delete, annotate	164	C:/Documents and Settings/Administrator/IBM/ration RaaI-Demo/sourceWextensions/DMHSRC19.cbl
☐	QAD07	COB	Completed	delete, annotate	337	C:/Program Files/IBM/Rational Asset Analyzer/sampl
☐	QAD08	COB	Completed	delete, annotate	179	C:/Program Files/IBM/Rational Asset Analyzer/sampl
☐	QAD09	COB	Completed	delete, annotate	269	C:/Program Files/IBM/Rational Asset Analyzer/sampl

Assign new language, Configure scanning options, Queue selected

Inventory – linked details about each source element
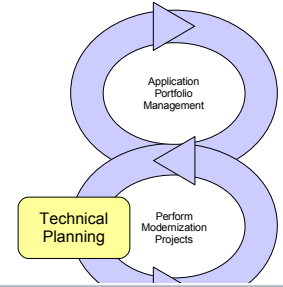
Program details

Actions Select an Action

Details	
File:	DMHSRC16
Program:	QAD02
Language/type:	COBOL / Program source
Scanning options - actual:	Proprietary scanner. Support any COBOL level. This is the most restrictive setting for reserved words.
Analysis status:	Completed
Metrics:	Blank lines: 53, Comment lines: 36, Noncomment lines: 309, Number of lines in file: 398, Number of lines in program: 491, Splitting nodes: 26
Site:	RAA
Container:	NTFS C:/Program Files/IBM/Rational Asset Analyzer/sample/source
Database updated:	2009/04/07 03:38:37 PM by DMHWSAA
Concatenation set assigned:	COBOL - DMH1

| Included files | Batch jobs | Control transfers | DB2 | Data sets | Data stores | Entry points | Run units | Transactions | User-related assets | Annotation |

Source files used by this program

File (2)	Language	Type	Analysis status	Action	Number of lines in file	Source location
DMHSRC06	COBOL	Included source	Completed	annotate	37	C:/Program Files/IBM/Rational Asset Analyzer/sample/source/DMHSR(
DMHSRC07	COBOL	Included source	Completed	annotate	19	C:/Program Files/IBM/Rational Asset Analyzer/sample/source/DMHSR(

End to End Impact Analysis
Understand change impact as part of planning
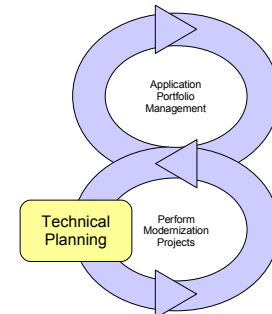
- Reduce time to determine **scope of change** whether for new enhancements, or even maintenance efforts

- View the metrics for impacted artifacts to determine the **risk of change** i.e. cyclomatic complexity, lines in file, etc.

- Traverse user-defined relationships to determine **impacts across platforms** i.e. follow dependencies from mainframe to J2EE and back.

- Create a "**bill of materials**" of impacted artifacts by evaluating the details page

| Overview | Summary | Details | Metrics - overview | Metrics - detailed | User-related assets |
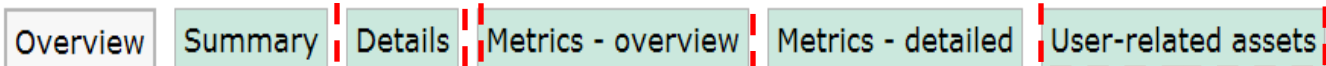
The following impact analysis overview diagram shows a subset of assets that this proposed code change directly and indirectly affects.

0 CICS transactions
0 IMS transactions

1 Batch jobs

0 CICS transactions
0 IMS transactions

7 Batch jobs

Direct Impacts

Indirect Impacts

Starting with 1 data elements in 1 programs

23 Data elements
0 Entry points
0 Other impacted programs

5 Data sets
4 Data stores
0 IMS segments
0 DB2 tables

15 Data elements
1 Programs
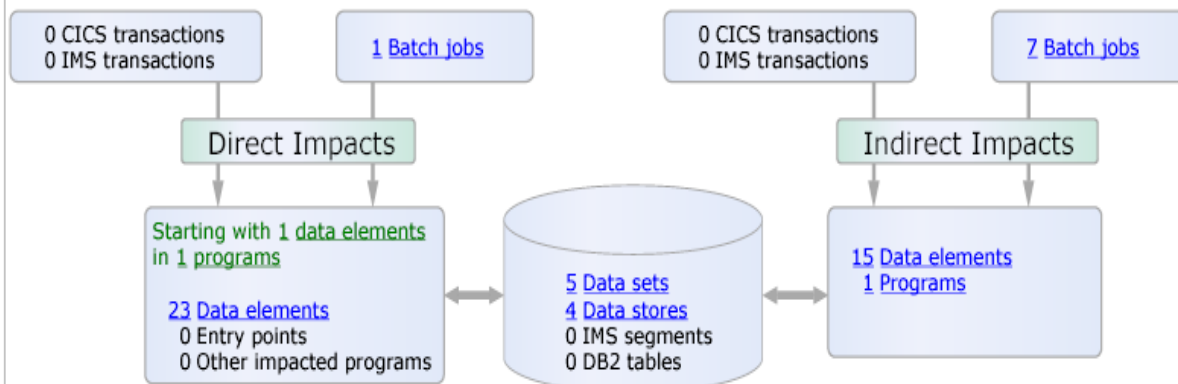
Impact Analysis Overview

Define work items and tasks

Subscribe to work items you're interested in

Predefined, custom and personal queries

Integrated discussion threads

Query results

Understands and persists work item's relationship to SCM and build artifacts

Plan work across team members

Understand how well you are progressing against your targets in real-time

Plan and execute iterations while managing team and individual load

Drag-and-drop work items to change owners/create child parent relationships

Technical Planning
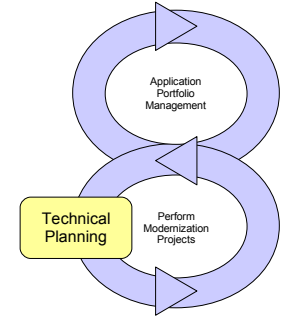
- ● Outcomes

    - – A plan, including assigned work items, for the renovation work project

    - – A detailed understanding of the affected pieces of the application

    - – A referrable information resource to help application development teams

    - – An automated, repeatable, build environment for building the application

- ● Next Steps

    - – Begin making changes to the application according to the work items and plan

    - – Unit, function, and system test the changes

    - – Reflect application information back into the application portfolio management system

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Application Portfolio Management

Perform Modernization Projects

Application Renovation
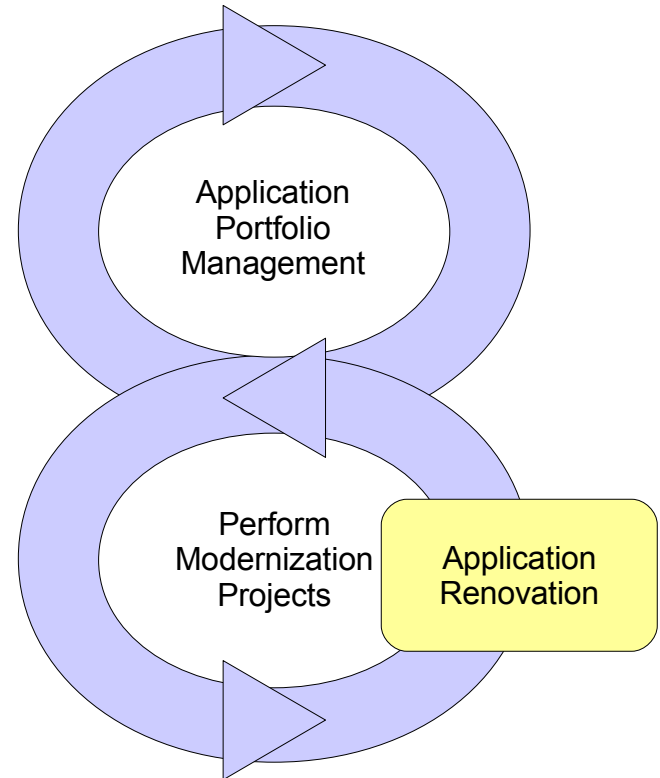
Application Renovation

- Each renovation project will take on different characteristics

    – Source code change

    – Database changes

    – Deployment platform and build modifications

    – Coordinated testing of the modified application

    – Staged deployment into production environments

- Goals

    – Successfully complete the required changes to the application

    – Ensure a smooth and efficient quality assurance phase

    – Deploy the renovated application into the production environment

- Tasks

    – Make changes to application source code and data designs

    – Test these changes in a local development environment

    – Collect changes made by multiple team members for consolidated build

    – Test and QA the combined set of changes

    – Plan and implement a staged deployment of the renovated application
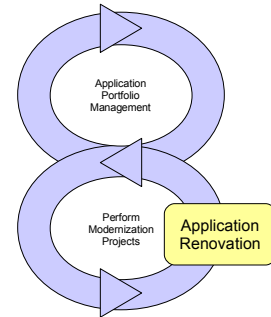
Collaborative Application Lifecycle Management
Deploy new, common team infrastructure to manage modernization projects

Application Portfolio Management

Perform Modernization Projects

Application Renovation

PL/I

J2EE

.NET

COBOL

EGL

Rational Software Delivery Platform

powered by Jazz
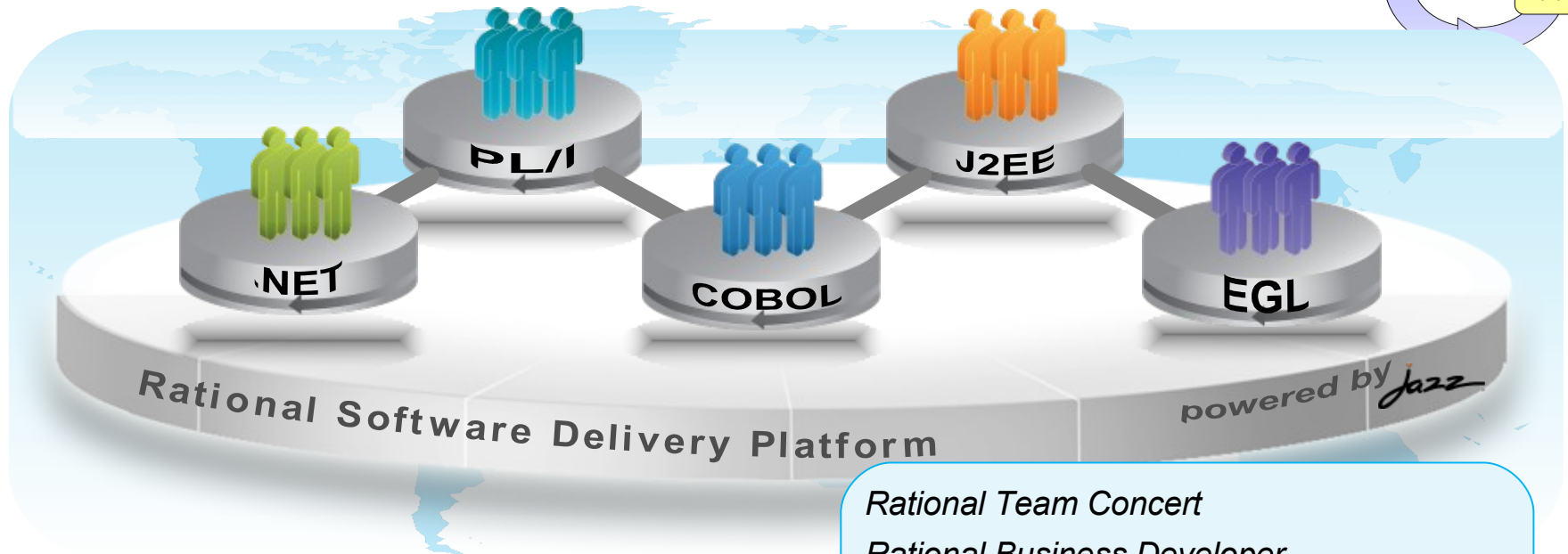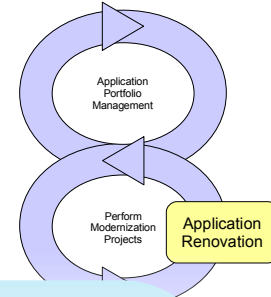
Rational Team Concert
Rational Business Developer
Rational Developer for zEnterprise
Rational Developer for System z / UT
Rational Asset Analyzer

Benefits

✔ Improved communication, higher quality, informed decision making, and more automated, transparent, and predictable software development

✔ Support for re-platforming, UI modernization, conversion, refactoring, and rewriting

Integrated Development Environments

Analyze applications using graphical diagrams

- Bring application analysis information into the IDE to aid in program development and understanding
  - ▶ Link code to data and runtime resources
  - ▶ Visualize code structure and flow

- Understand the effect of changes made in the IDE when deployed into production
  - ▶ Run impact analysis on code changes to determine effected production modules
  - ▶ Size testing efforts and create workspaces for changes
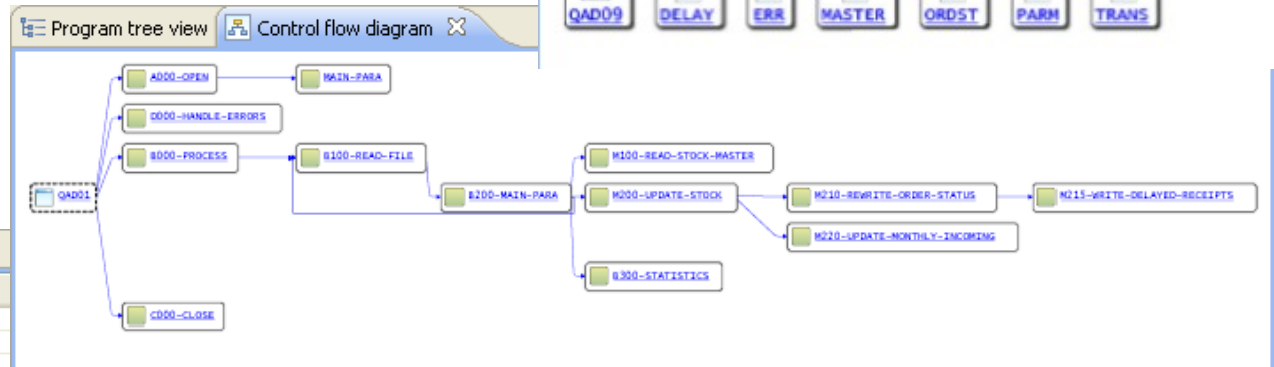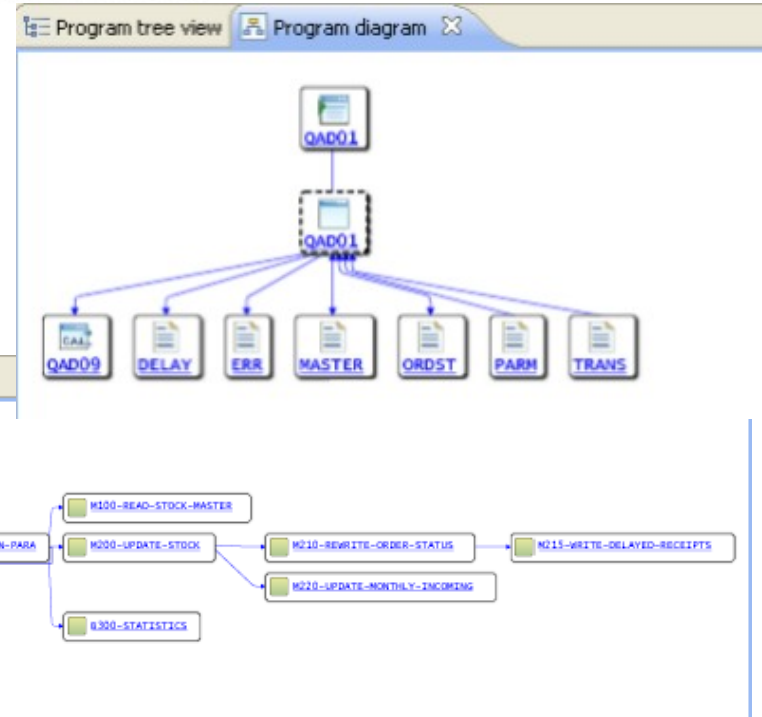
Interactive test of database queries

Use Case – Database Applications:

1. Copy/Paste your SQL Declare into a SQL Script and run it – verify results

2. Without doing any other navigation open a test table, and edit row values – or modify the statement (or both)

3. Re-run the SQL Script – verify results

4. Return to step 2 – repeat until satisfied with functionality

Application Renovation
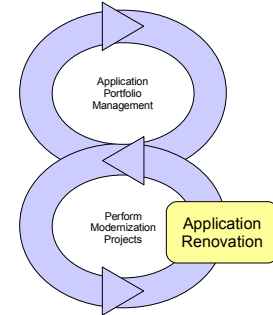
- Outcomes
  - Successful changes made to applications
  - Deployed into production environments
 - With measurable improvements to the business
- Next Steps
  - Reflect information learned back into Application Portfolio Management tools
  - Measure savings and benefits of the application renovation project
  - Compare measurements to forecasts for use in determining future estimates
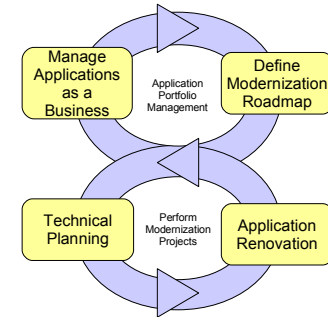
  - And start the next renovation project suggested by the Application Modernization Roadmap!

Agenda

- Application Modernization – what is it?
- Manage Applications as a Business
- Define Modernization Roadmap
- Technical Planning
- Application Renovation
- Summary
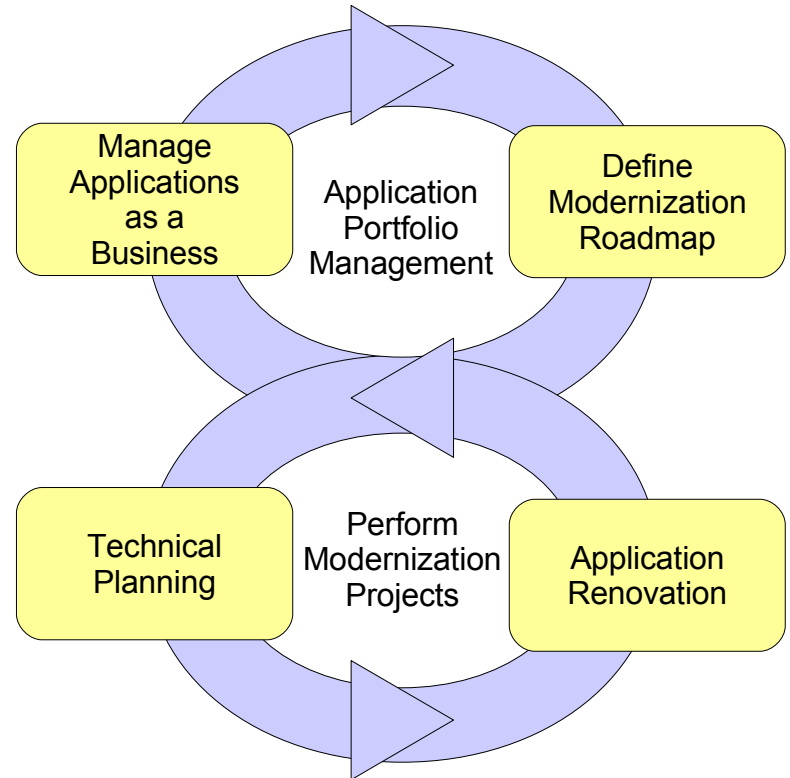
Summary

- Many companies spend more than 70% on keeping lights on, and that amount is increasing
- IT organizations have problems modifying applications at speed of business

- We provide a structured approach to incrementally modernize your portfolio based on business priorities

- Change without a plan is chaos
- A Plan without change is stagnation
- Business goals change
    – applications need to change to address them
- Continual renewal is required
    – tools help to guide, govern, drive, and accomplish this change

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Useful Links

- Rational System Architect
    - http://www.ibm.com/software/awdtools/systemarchitect/
- Rational Focal Point
    - http://www.ibm.com/software/awdtools/focalpoint/
- Rational Insight
    - http://www.ibm.com/software/rational/products/insight/
- Rational Team Concert Information:
    - http://www.ibm.com/software/rational/products/rtc/
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- Jazz Team Blog:
    - http://jazz.net/blog/
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    - email: hahnt@us.ibm.com
    - Blog: https://www.ibm.com/developerworks/mydeveloperworks/blogs/applicationmodernization

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