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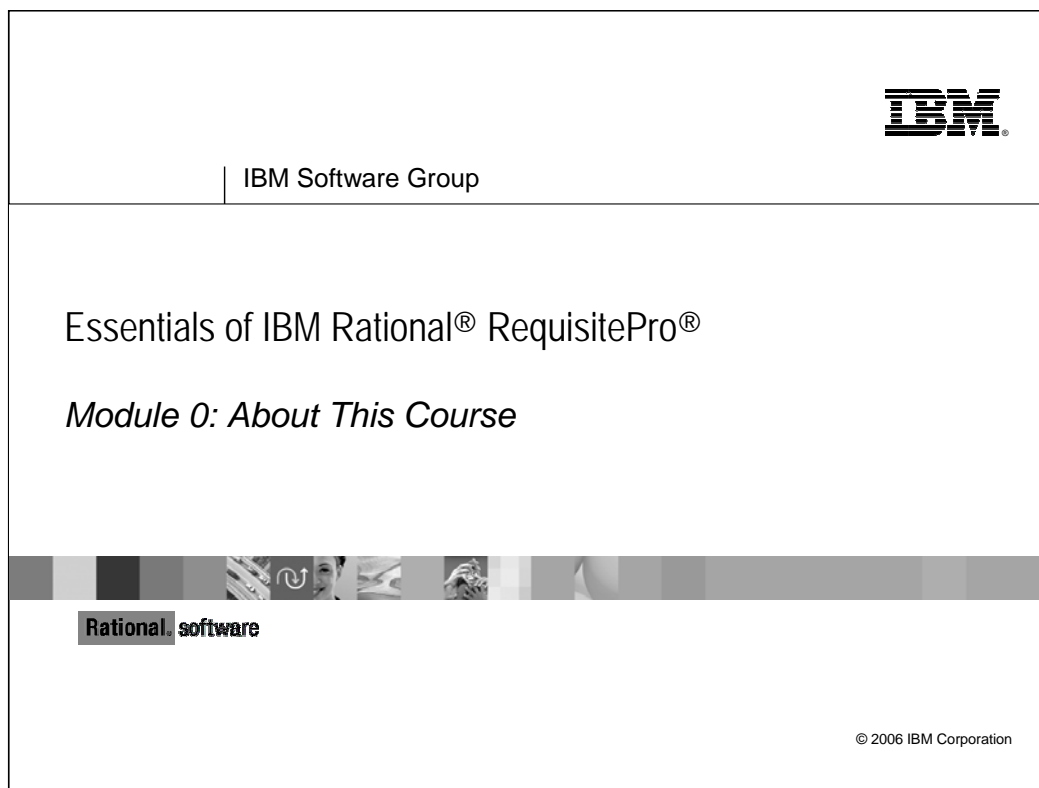
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## Course objectives

- Define the components and structure of a RequisitePro project.
- Connect to and work in a RequisitePro project.
  - Gather, organize, and document requirements.
  - Import and create requirements.
  - Create RequisitePro documents.
- Manage requirements.
  - Create packages.
  - Define traceability between requirements.
  - Open views, queries, and metrics.
- Communicate and manage changing requirements.
- Create and compare baselines using the RequisitePro Baseline Manager.

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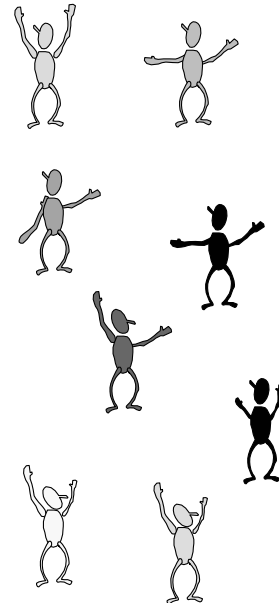


The student labs guide you through using Rational RequisitePro to manage a project according to the guidelines in the Requirements Management Plan. You gain an understanding of the development process using Rational RequisitePro as your requirements management tool.

- Gain skills and experience.
  - Transfer knowledge to your environment.
- Apply techniques demonstrated in class.
  - Use Rational RequisitePro features to complete your tasks and responsibilities.
- Communicate project information to the whole team.
- Manage changing requirements effectively.

## Intended audience

- **Analysts**
  - ▶ Business analysts
  - ▶ System analysts
- **Engineers**
  - ▶ Process engineers
  - ▶ Business engineers
- **QA team**
- **Tech writers**
- **Architects**



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The primary audience consists of business and requirements analysts. Additional audiences include any team member involved in requirements creation, specification, use, and management.

- Technical writers
- QA
- Documentation managers
- Project leads
- Application experts
- Testers
- Designer and other software developers

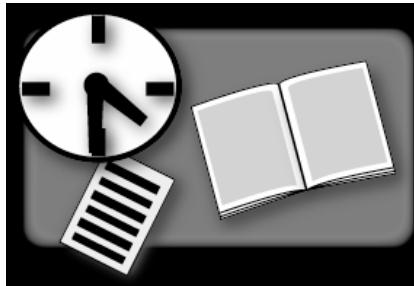
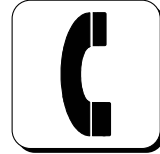
## Course agenda

- **Morning**
  - ▶ Module 0: About This Course
  - ▶ Module 1: Product Introduction
  - ▶ Module 2: Plan Your Project
  - ▶ Module 3: Gather, Organize, and Document Requirements
- **Lunch break**
- **Afternoon**
  - ▶ Module 4: Manage Your Requirements
  - ▶ Module 5: Communicate Your Requirements
  - ▶ Module 6: Summary and Tips

## Course materials

- *Essentials of IBM Rational RequisitePro* student manual
- *Essentials of IBM Rational RequisitePro* student workbook

## Logistics



### **Morning**

2 Fifteen-minute breaks

### **Lunch**

1 Hour

### **Afternoon**

2 Fifteen-minute breaks

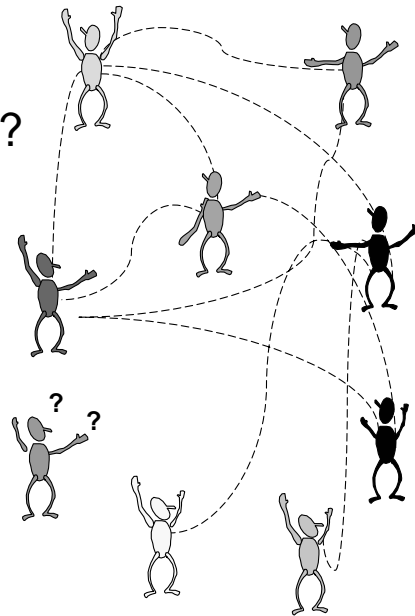


## Introductions

- Your organization
- Your role
- Your background and experience
  - ▶ Software development experience
  - ▶ IBM Rational tools experience
- Course expectations

## Your team communication

- Is there a centralized place for reviewing requirements and data?
- How are changes communicated?
- How do you monitor project progress and status?
- How do you manage change?



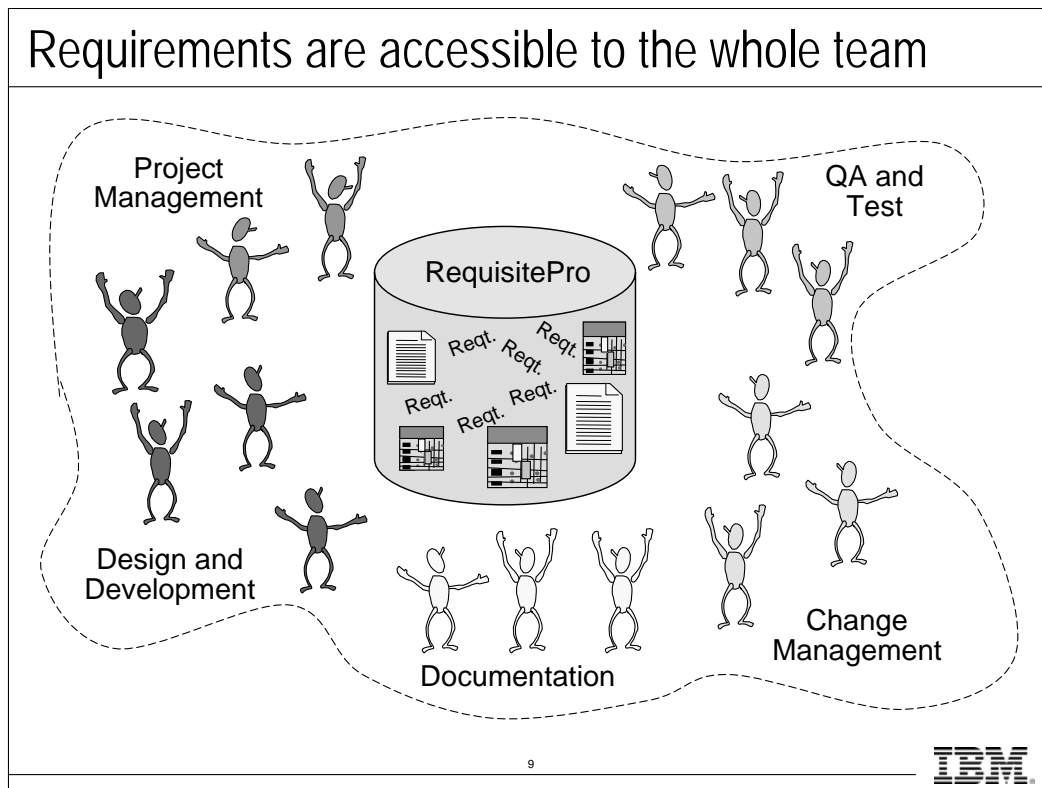
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How does your team currently communicate project requirements? Here is a list of some techniques that are common across many software projects:

- E-mail
- Memos
- Meetings
- Spreadsheets
- Printed documents
- White board

Depending upon the project size, any or all of these techniques may be entirely workable. The reality is that most software projects today are nontrivial and require a coordinated effort to effectively manage their requirements.



Effective requirements management requires you to organize your requirements so that they are available to the whole team. It also requires you to control change and ensure that your project does not spiral out of control as changes occur. When a change occurs, it must be communicated effectively, and the impact of the change must be fully understood.

## Key pain points

- There is no consistent way to organize user needs.
- Developers and testers receive poorly defined requirements.
- Requirement documents are difficult to write, review, and update.
- Applications miss customer expectations.
- Feature creep causes schedule delays and cost overruns.
- There is no easy way to review feature priorities and status.
- Requirement changes cannot be quickly traced.
- Requirements are not communicated to the entire team.

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Failing to manage requirements decreases the probability of meeting the project objectives.

Requirements management is the process of eliciting, organizing, and documenting requirements of the system. A requirements management process establishes and maintains agreement between the customer and team on changing requirements of the system.

It is a process that establishes and maintains agreement between the customer and team on changing requirements of the system.

Rational RequisitePro manages project requirements.

Communication is a key factor to a successful project.

## Benefits of IBM Rational RequisitePro

- Maintains documents with the requirements dynamically linked to a database.
  - ▶ Sort and query capabilities
- Identifies the impact of change with traceability features and impact analysis queries.
  - ▶ Scope management and resource allocation decisions
- Integrates requirements with other lifecycle artifacts and processes.
  - ▶ Clear communication across tools and teams

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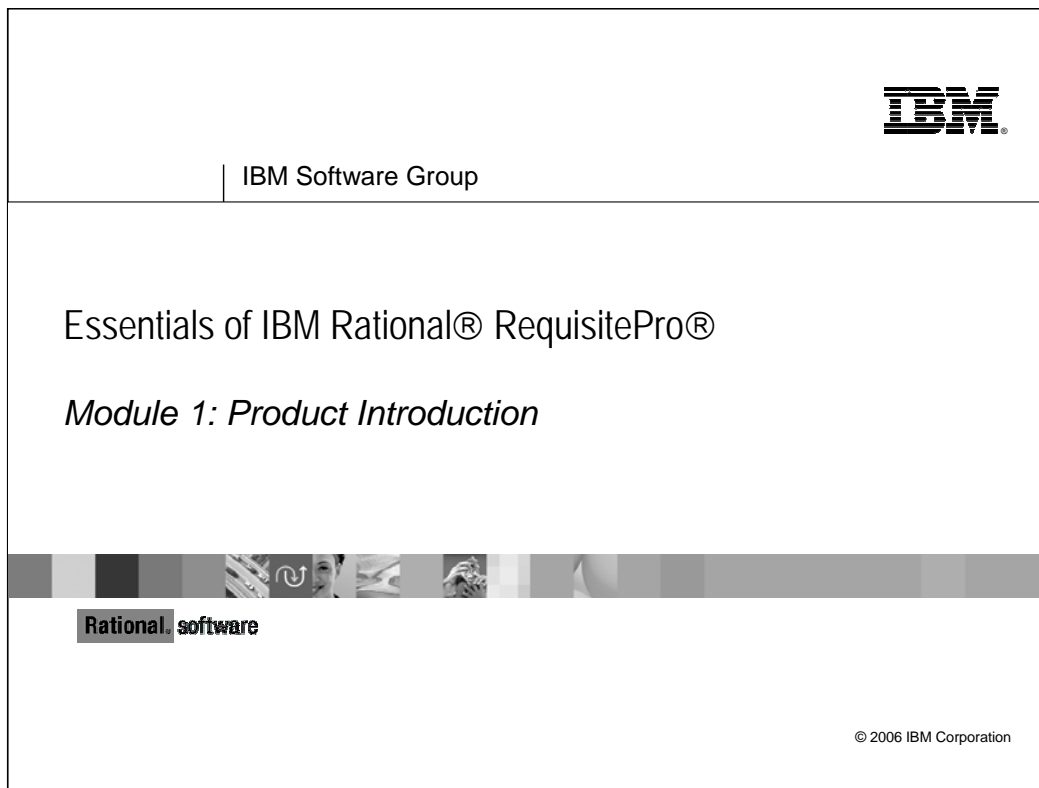


Rational RequisitePro provides you with the power of a database and the flexibility of a word processor. You work with your requirements in a flexible environment – Microsoft Word, while you are able to manage your requirements more effectively because they are actually stored in a centralized repository. This enables you to comprehensively manage change and facilitate collaboration and communication.

### Key Benefits:

- Dynamic integration between Word and a requirements database.
- Secure central requirements repository: The team is synchronized. Requirements have a version history capturing all changes to the requirements.
- User Security: Permission privileges are defined, LDAP (Lightweight Directory Access Protocol) for user authentication may be enabled.
- Use-defined project structure: Requirement types, requirements attributes, and document types are easier to understand and organize.
- Requirements traceability and coverage analysis: Set up and track relationships between requirements. Querying relationships provides coverage analysis to ensure completeness.
- Impact of requirement change: Traceability between related or dependent requirements.





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## Objectives: product introduction

- **Describe software development process.**
  - ▶ How and where Rational RequisitePro fits in the process.
- **Define Rational RequisitePro interface.**
  - ▶ Project structure and organization.
- **Navigate Rational RequisitePro.**

In this module, you will gain a basic understanding of all the parts of Rational RequisitePro and how they relate to each other. Furthermore, you will briefly review the Requirements Discipline from the Rational Unified Process in which Rational RequisitePro will assist in the project development lifecycle.



## RequisitePro

- Is a requirements management tool
- Enables you to track relationships between requirements
- Provides functionality to analyze the impact of changes to requirements
- RequisiteWeb is a Web client of RequisitePro that enables users to access RequisitePro project data using a browser



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RequisiteWeb uses a Web browser to provide platform-independent, thin-client access to RequisitePro project data. RequisiteWeb enables the following users to access RequisitePro requirement data:

- Distributed team members
- Teams that work in multiple-platform environments
- Linux browser users
- Reviewers

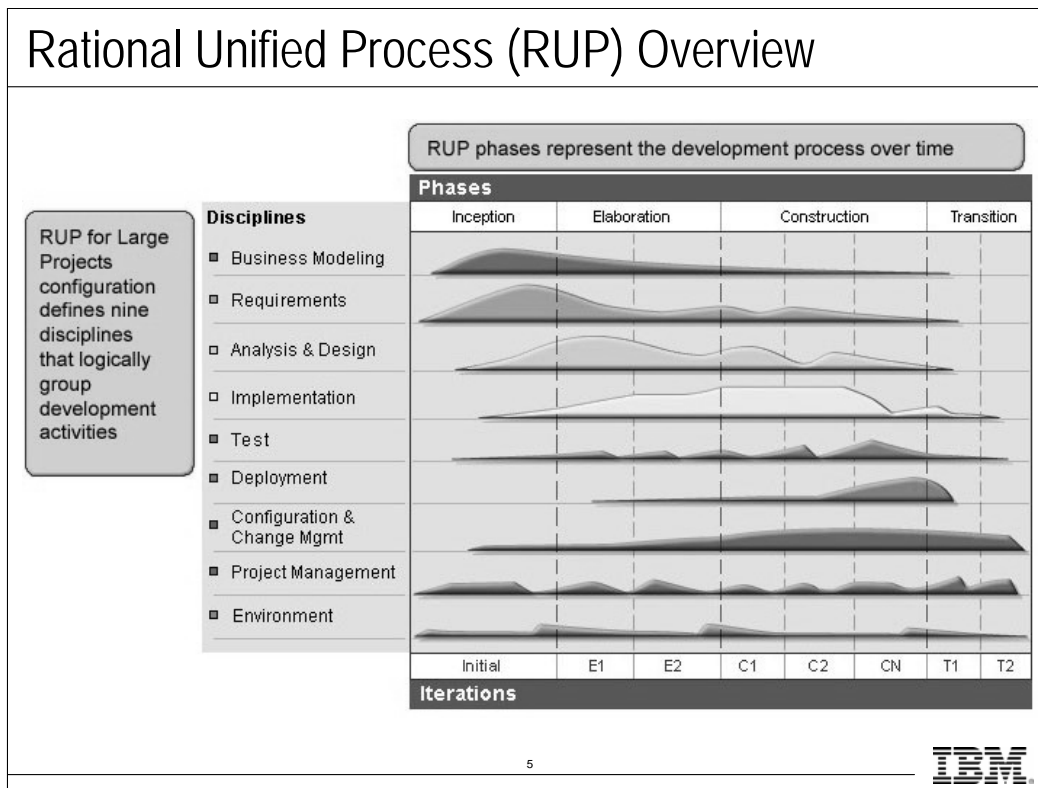
RequisiteWeb provides most of the capabilities of RequisitePro. It allows you to read, create, and modify RequisitePro project requirements and documents across a network and the Internet.

Supported browsers for RequisiteWeb are:

- Microsoft Internet Explorer®
- Firefox
- Mozilla

## RequisitePro (cont.)

- RequisitePro is integrated with Microsoft® Word for creating document-based requirements
- Team members use RequisitePro to:
  - ▶ Plan projects by creating and editing requirements and requirements documents
  - ▶ Gather, organize, and document requirements
  - ▶ Manage requirements
  - ▶ Communicate with team members and stakeholders
  - ▶ Perform project administrative tasks

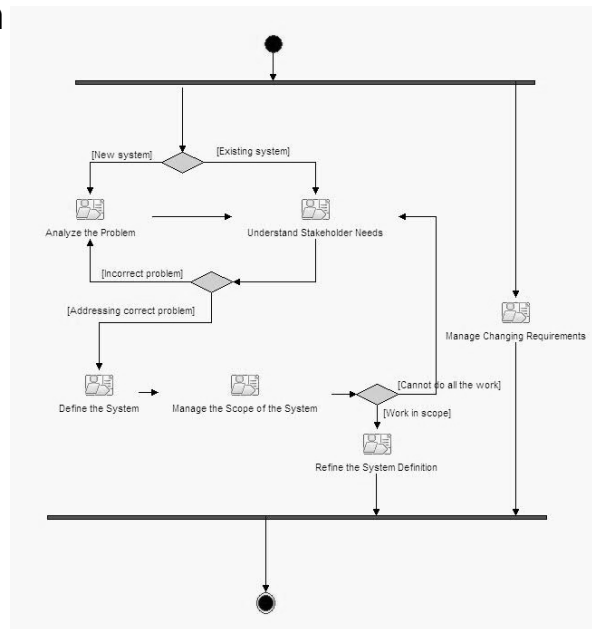


Rational RequisitePro is used throughout the development lifecycle. This *Essentials of Rational RequisitePro* course focuses on organizing a project, entering requirements, and managing those requirements.

With each discipline, the Rational Unified Process (RUP) defines activities to help manage and control your development process.

## RUP Requirements reference workflow

- Analyze the problem
- Understand stakeholder needs
- Define the system
- Manage the scope of the system
- Refine the system definition
- Manage changing requirements

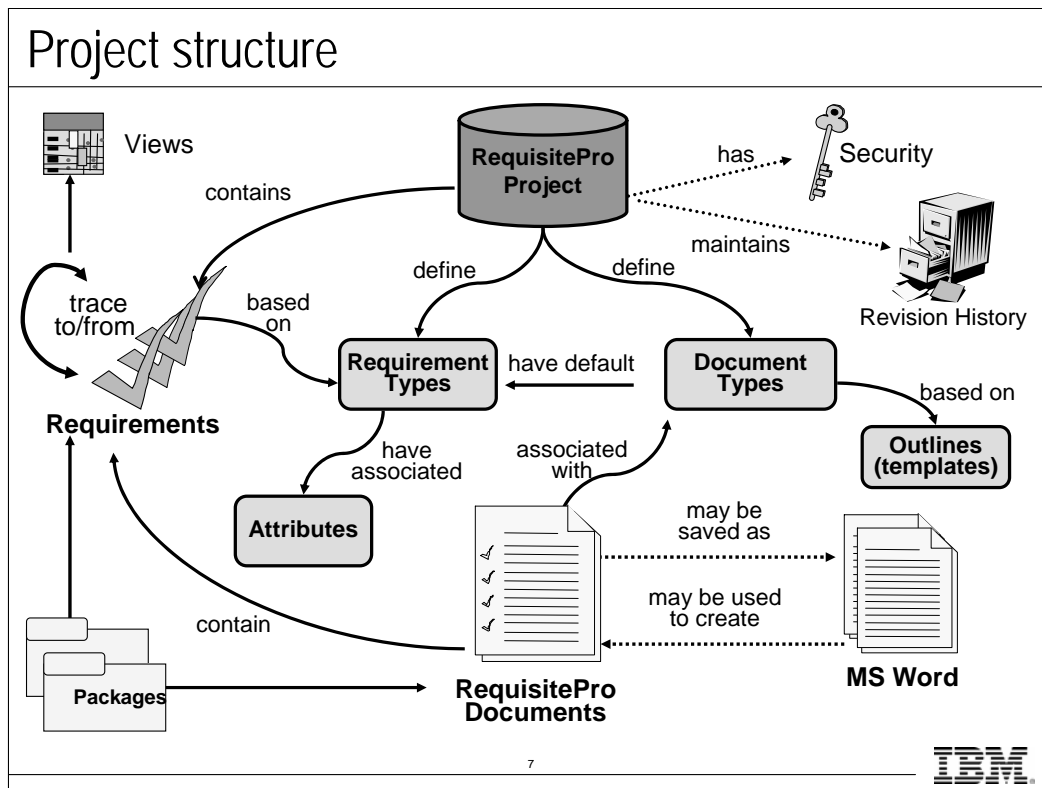


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Rational RequisitePro is used to manage the artifacts in each activity in the Requirements Discipline.

Rational RequisitePro provides a groundwork for organizing and efficiently managing requirements and project document information.



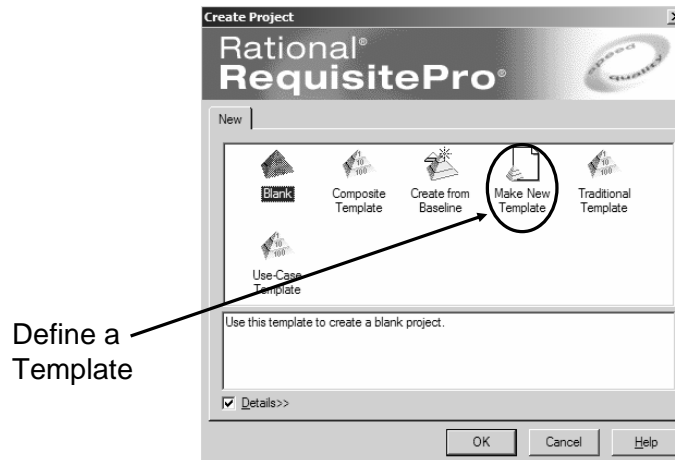
Your Requirements Management Plan dictates your project structure in RequisitePro. Your RM Plan specifies the types of requirements you want to capture, the relationships between the requirement types, and the attributes you want to capture with each requirement.

This slide shows a high-level overview of all the components in a RequisitePro project and how they relate to each other. Requirement types, attributes, and document types define RequisitePro project structure.

Every requirement is associated with a requirement type. All requirements are maintained in the project database but can be located in documents as well. Requirements may have relationships among or dependencies upon one another. They can be traced from one requirement to another.

## Project templates apply predefined project structure

- Templates include default:
  - ▶ Document Types based on outlines (Word templates) with default Requirement Types.
  - ▶ Requirement Types with associated attributes.



Templates can include artifacts, such as a Glossary.

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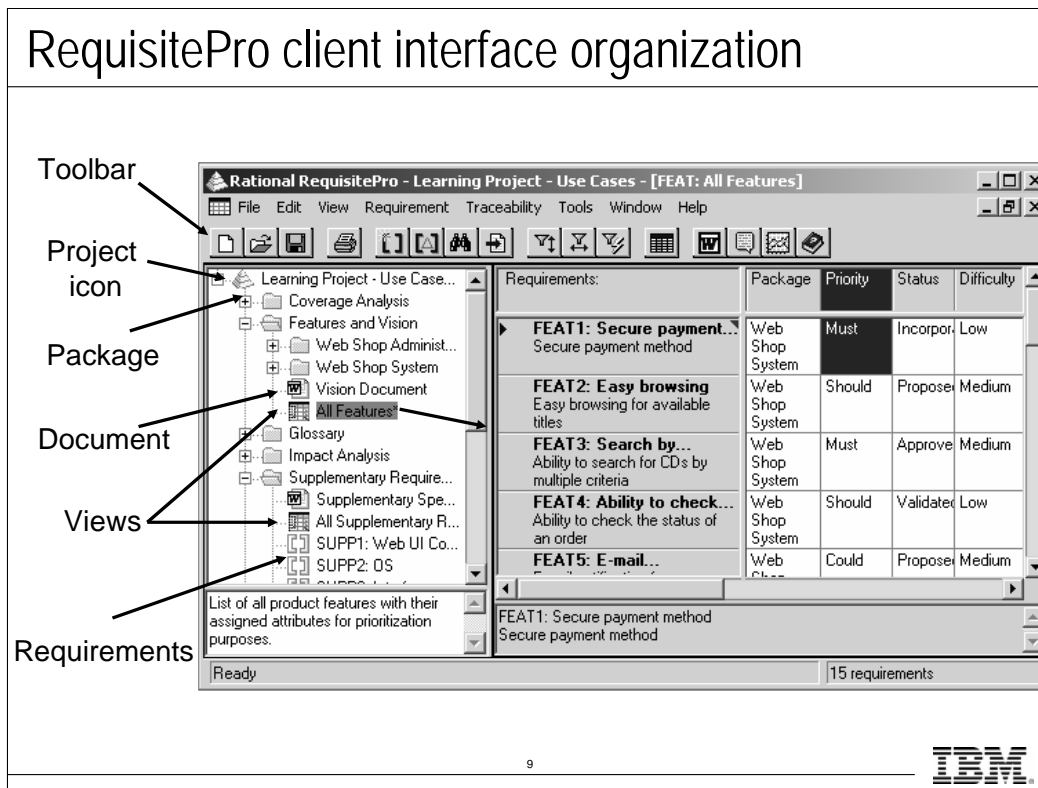


A new project is created from a project template. You can use one of the templates packaged with Rational RequisitePro that most closely resembles the structure you determine in your RM Plan, or you can make your own template. Templates include document types, requirement types, attributes, and security settings for a project.

Packaged project templates include:

- **Blank:** Empty project
- **Composite Template:** A combination of the Use-Case and Traditional templates
- **Traditional Template:** Traditional requirements capture strategy
- **Use-Case Template:** Uses a use-case methodology

You can also create a project using **Create from Baseline** that creates a new project using an existing project baseline.



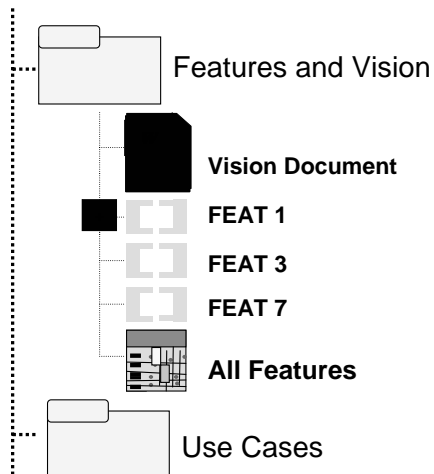
The left pane is called the Explorer. The right window is where all views are displayed. A “view” is your window into the project requirements database displayed as matrices.

Documents are opened in a separate Word window that includes the RequisitePro menu option.

You can toggle between the Word and Rational RequisitePro to organize and prioritize your requirements, trace relationships among them, and track requirement changes.

## Packages

- Visually organize your project in Explorer.
- Contain related requirements information.



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Packages provide a way for you to visually organize your requirements, requirements artifacts, and views into related groups.



## Views

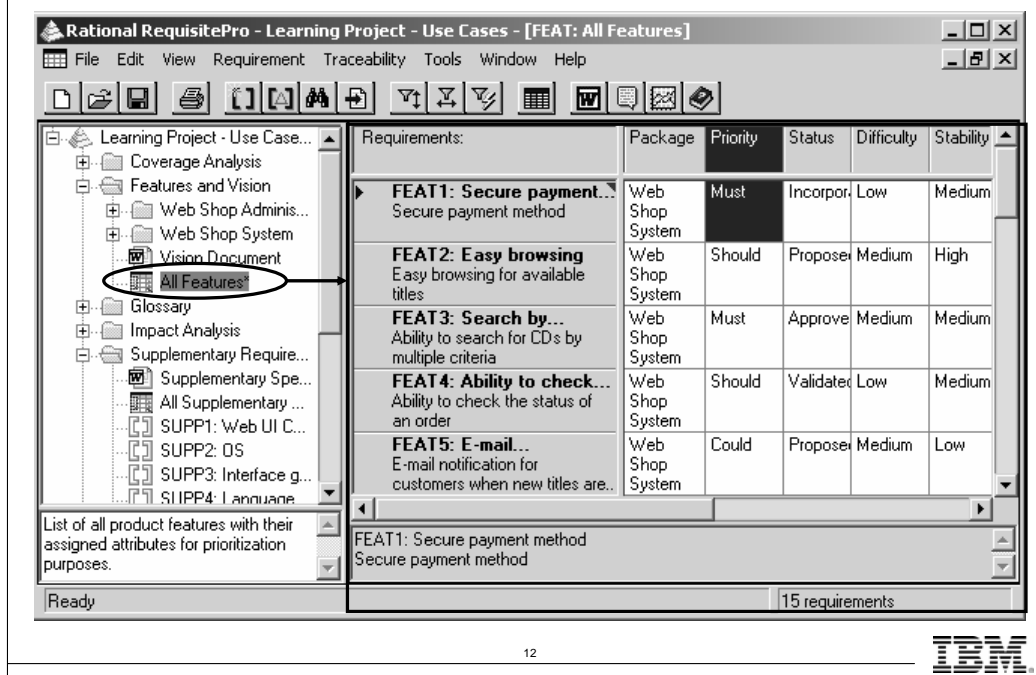
- Access database information by Requirement Type.
- Keep you organized and on track.
- Analyze data.
  - ▶ Control feature creep.
  - ▶ Provide Coverage and impact analysis.
- Display data in a matrix or tree.

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A view in Rational RequisitePro is an area where you create, analyze, and print requirements information. Views display and allow you to manage requirements in the database. The types of views are discussed in depth in Module 3.

## Working in a view

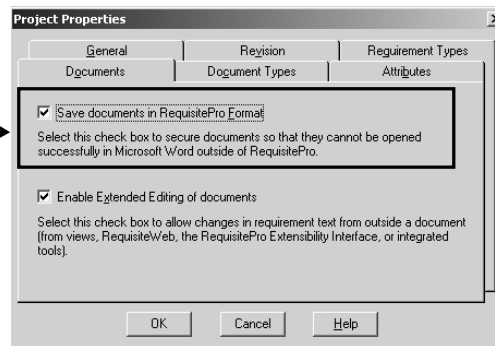


A view lets you work with the requirements directly in the database. You can modify requirement attributes, traceability, and text from within a view.

Views are created in the Explorer. You can open a view by double-clicking the view name. The view is opened in RequisitePro.

## RequisitePro documents

- Are part of the RequisitePro project.
  - ▶ Requirements are maintained in database.
- Are maintained using Word within RequisitePro.
- Saved in RequisitePro format.
  - ▶ Configurable.



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Documents are the natural format in which you capture requirements, providing context and supplementary information through a familiar Microsoft Word interface.

The costs for education and ramp-up time are significantly reduced when using Microsoft Word. Rational RequisitePro fits in your existing environment.

RequisitePro provides a robust architecture that maintains documents that “tell the story” of requirements in context. The documents are dynamically linked to a database for powerful sort and query capabilities and effective requirements management.

RequisitePro provides outlines of standard documents for you to use in your project. The outline templates provided in RequisitePro use the use-case approach and comply with the Rational Unified Process.

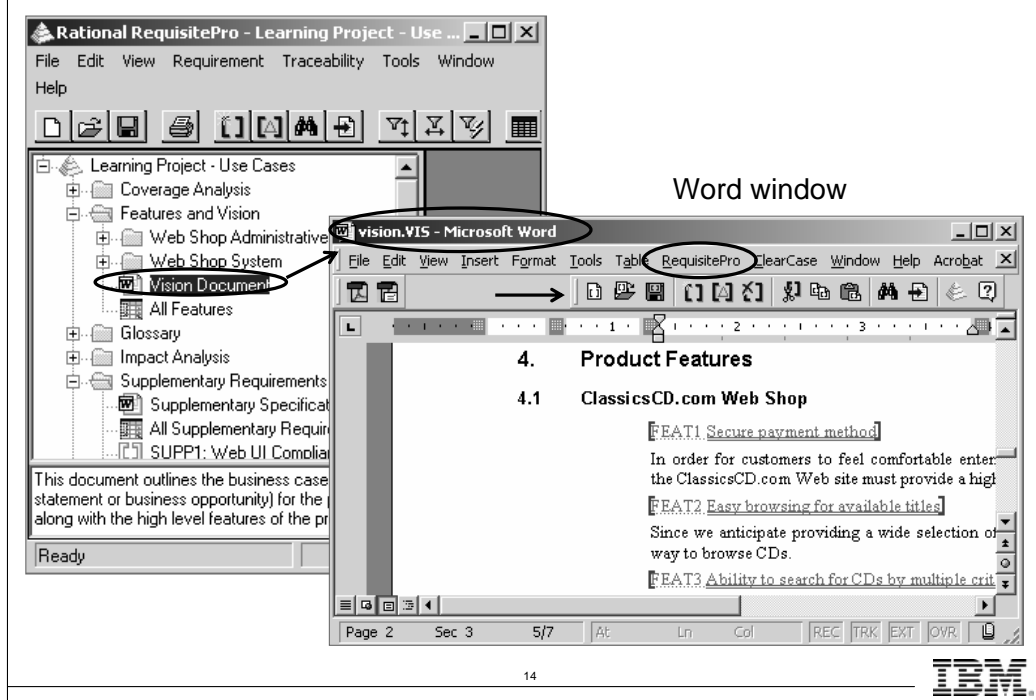
RequisitePro documents support industry standards, such as:

- IEEE - Institute Electrical and Electronics Engineering

- CMM - Capability Maturity Model

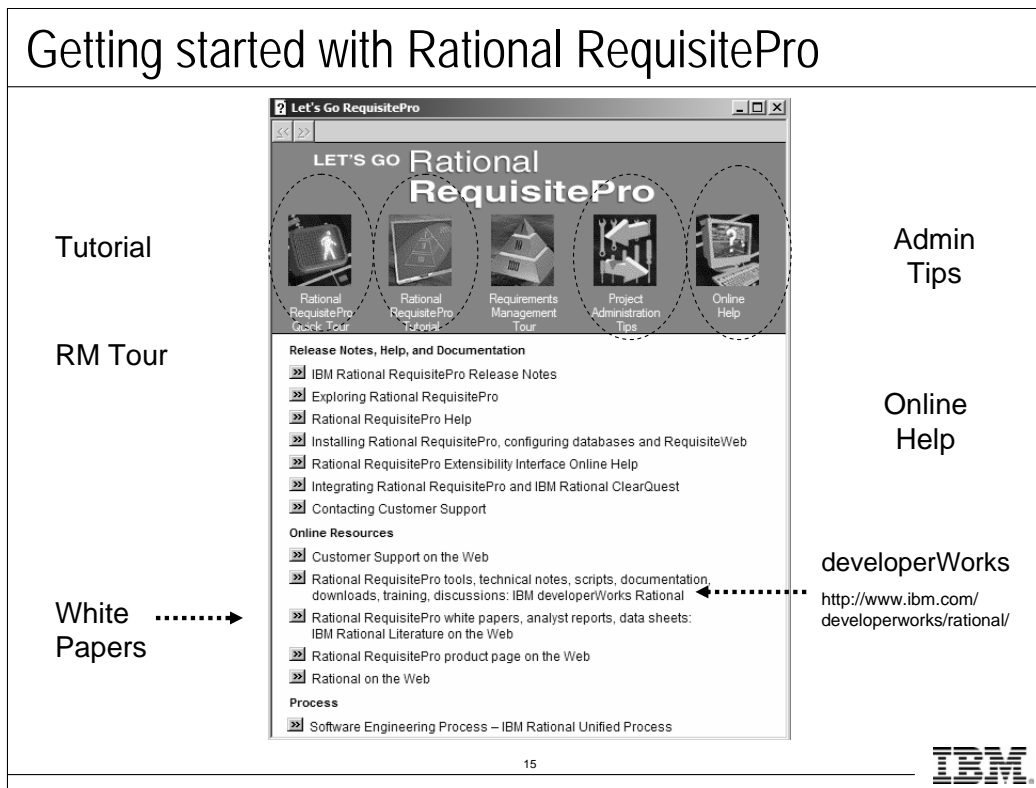
- ISO - International Standardization Organization

## Working in a RequisitePro document



You view, create, and modify requirements documents in Word. RequisitePro uses the Word functionality to provide powerful features for viewing, editing, and formatting documents.

The Word menu bar includes a RequisitePro menu for managing RequisitePro requirements and documents from within Word.



*Let's Go RequisitePro* is a Help interface launched at startup (when so configured in the **Options** dialog box). It is also accessible through the Help menu.

It provides links to Help, white papers, and external resources such as the developerWorks to help you in your development activities.

## Lab 1: Exploring Rational RequisitePro

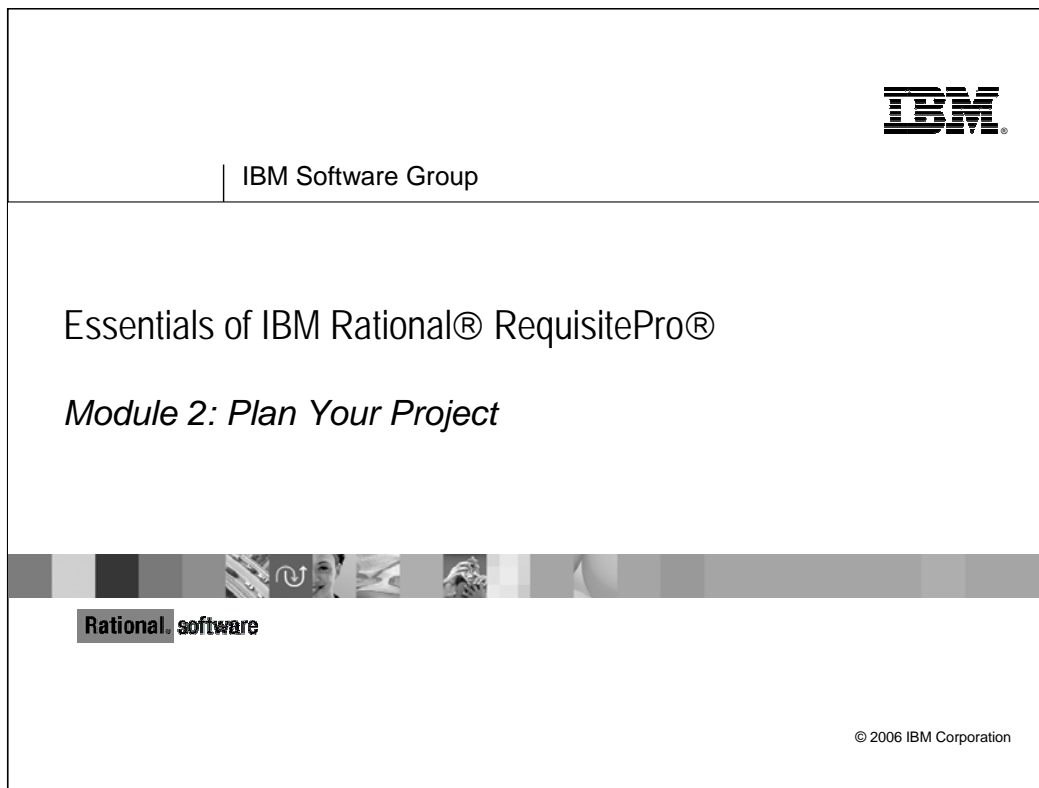
- Start Rational RequisitePro.
- Open an existing project.
  - ▶ The Learning Project – Use Cases.
- Browse project information.
- Explore Help.
- Set configuration options.



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**See Student Workbook Lab 1.**

**Goal:** Become familiar with Rational RequisitePro and its structure by navigating through a sample project.



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## Objectives: plan your project

- Define basic terms used in RequisitePro.
- Define your RM strategy.
  - ▶ Identify project artifacts that help you plan and define the project
- Describe components for project structure.
  - ▶ Document types
  - ▶ Requirement types
  - ▶ Attributes and their values
  - ▶ Traceability criteria

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When defining the problem, you start to plan the project.

In the Analyze the Problem activity you establish your requirements management plan. With this plan, you are then able to establish the RequisitePro project structure.

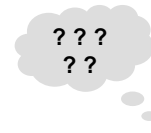
RequisitePro helps create and organize the basic artifacts necessary to start a project.



## RequisitePro requirement

- Any tracked item
  - ▶ Inputs and outputs to the system
  - ▶ Functions of the system
  - ▶ Attributes of the system and its environment
  - ▶ Features
  - ▶ Use Cases
  - ▶ Supplementary requirements
  - ▶ Stakeholder requests

What project requirements will you track?



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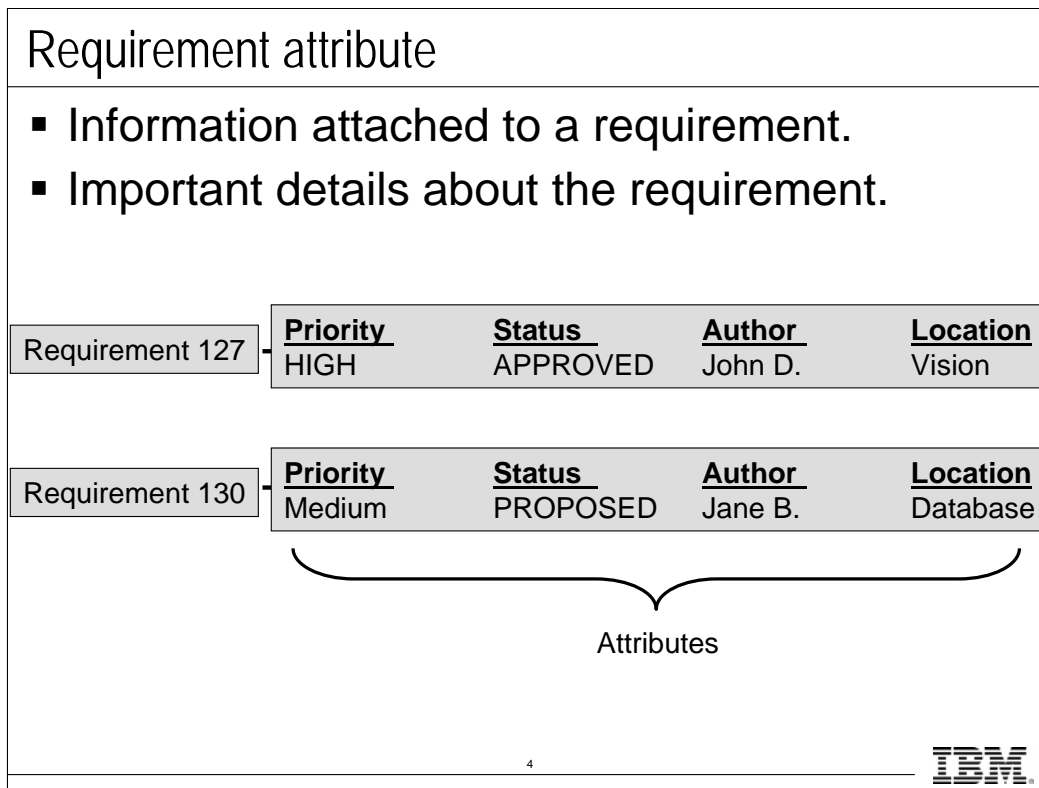


A requirement is defined as a condition or capability to which a system must conform; either derived directly from user needs, or stated in a contract, standard, specification, or other formally imposed document.

RequisitePro is flexible enough to allow you to define any item you need to track as a requirement.

Once a requirement is created in a RequisitePro project, you can do the following:

- Qualify the requirement by assigning attributes.
- Trace the requirement to and from other requirements.



Attributes are details about each requirement that are used to manage the requirements throughout the lifecycle of the project.

Attributes are defined per Requirement Type. Each attribute is assigned values.

RequisitePro has two types of attributes that are helpful to you.

1. **User-defined** attributes are defined by the user.

Examples: Priority, Status, Risk, Stability

Any of these attributes may be modified or deleted based upon the needs of your project.

2. **Read-only system** attributes are created and defined by RequisitePro.

Examples: Location, Author, Date, Revision Number

**Note:** Read-only system attributes cannot be modified or removed by users.

An attribute value is information assigned to a requirement. Attribute values can be text or numbers.

For example, the attribute Priority may be assigned the values of Low, Medium, or High.

## First steps in defining your RM strategy

- Name the project.
- Give a brief description of the project.
- Plan the project structure by drafting a Requirements Management Plan.

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To define the project, give it a name and a location. Determine a location for the project repository where all team members can access the data.

If you wish you can give the project a brief description for informational purposes.

The RequisitePro default database is Access.

RequisitePro is also compatible with IBM DB2 Universal Database, Oracle, and Microsoft SQL Server.

### **Choosing a database:**

Use the following criteria when deciding which database to use with RequisitePro:

Microsoft Access is recommended for use in small work groups, with fewer than ten concurrent users.

If your team is distributed across states or countries, use DB2, SQL Server, or Oracle. These enterprise databases provide socket-level access to remote network locations, which tend to perform better.

Use DB2, SQL Server, or Oracle if you anticipate having more than ten users logged on at one time. Tests have shown that the performance of Microsoft Access decreases after ten simultaneous logged-on users.

These numbers may vary with network bandwidth. Use DB2, SQL Server, or Oracle if you will be managing large numbers of requirements (tens of thousands).

## Requirements management plan

- Provides outline of project structure.
- Organizes your project and requirements.
  - ▶ Describes management strategy.



### RM Plan

- I. Introduction
- II. Requirements Management Organization
- III. Requirements Management Program
  - Requirements Identification
  - Traceability criteria
  - Attributes
- IV. Milestones
- V. Training and Resources

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A Requirements Management Plan records decisions about requirements and requirements management. A Requirements Management Plan is typically developed early in the project and refined throughout the project.

The decisions include structure and content of your requirements information, such as:

- The types of requirements
- The attributes associated with each Requirement Type

The management information includes:

- Information for measuring, reporting, and controlling changes to the product requirements
- Traceability criteria

The plan is organized for:

Managing requirements by type

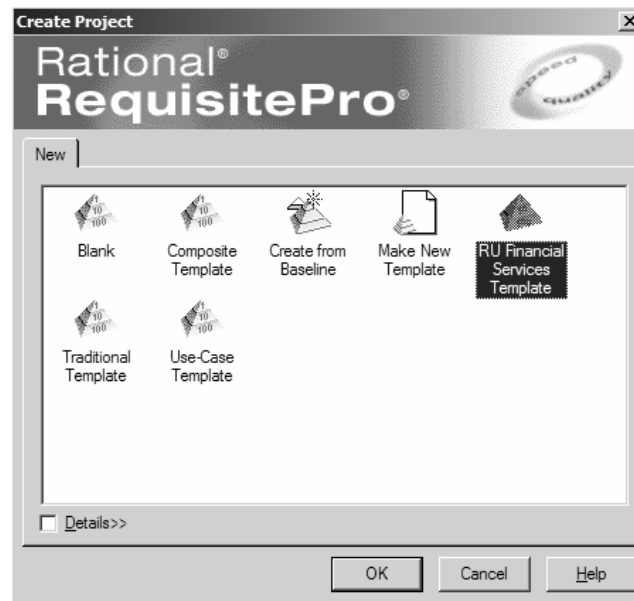
Querying project data by attribute values:

- Status
- Priorities

Viewing project requirements metrics and reports

Creating requirements traceability

## Create a new project



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A new project is created from a project template.

You may find that creating a company project template is useful. The example shows an RU Financial Services Template. Each new project created for the company should use the default structure from the RU Financial Services template and then be customized as necessary.

You can also create a new project from an existing project baseline. You create a RequisitePro baseline of a RequisitePro project, then use that baseline to create new RequisitePro projects. For example, you may want to base the next release of a project on a stable configuration of the previous release. You will learn more about RequisitePro baseline in Module 4 Manage Your Requirements.

## Organize your requirements by type

What types of requirements do you want to document and manage for the project?

? Features      Environmental      ? Use cases      Stakeholder Requests  
                          ?      Usability      ?      ?  
 Functional      ?      Stakeholder Needs  
                  Reliability      Supplementary      ?

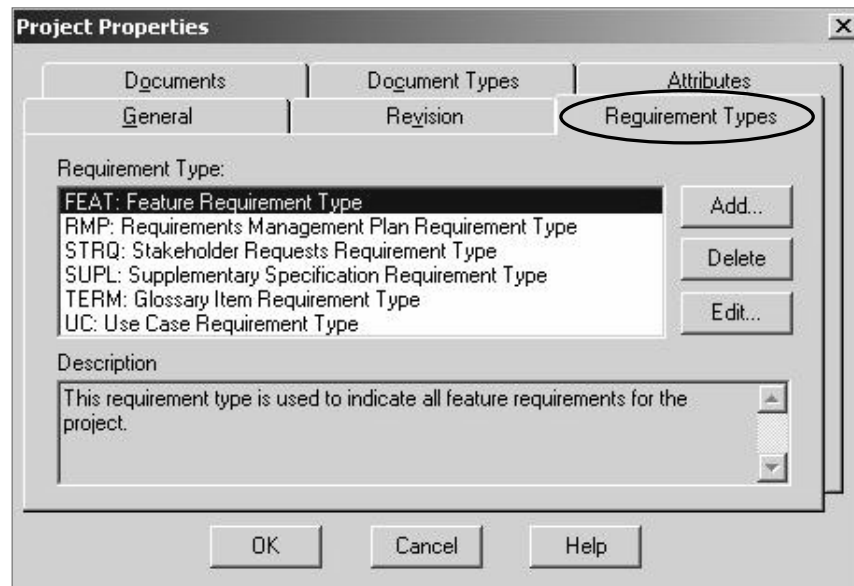
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What types of requirements do you want to document and manage in your project?  
 Depending upon the type of system you are developing, you will choose different  
 Requirement Types that you want to capture.

Each project has different needs. A project that involves the development of hardware and  
 software will probably want to capture both hardware and software requirements.

## Requirement Types



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### A Requirement Type:

- Is a set of descriptive and operational information associated with a requirement.
- Serves as a template for your requirement.
- Enables you to organize requirements by type at a higher level.

In defining requirements and their style, consider the following questions:

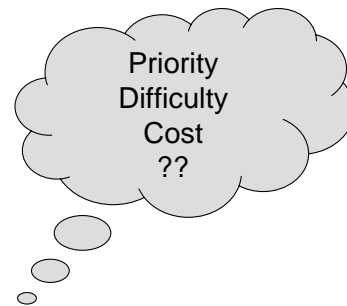
- Will they contain a specific word or format?
- How do you want your requirements identified?
- What types of requirements do you want to capture?

To set up Requirement Types select:

1. Click **File > Project Administration > Properties**.
2. Click the **Requirement Types** tab.

## Empower your project with requirement attributes

- Define attributes by Requirement Type.
  - ▶ What information do you want to track?
- Use requirement attributes to:
  - ▶ Assign resources
  - ▶ Assess status
  - ▶ Calculate software metrics
  - ▶ Manage project risk
  - ▶ Estimate costs and time
  - ▶ Manage project scope
  - ▶ Prioritize requirements



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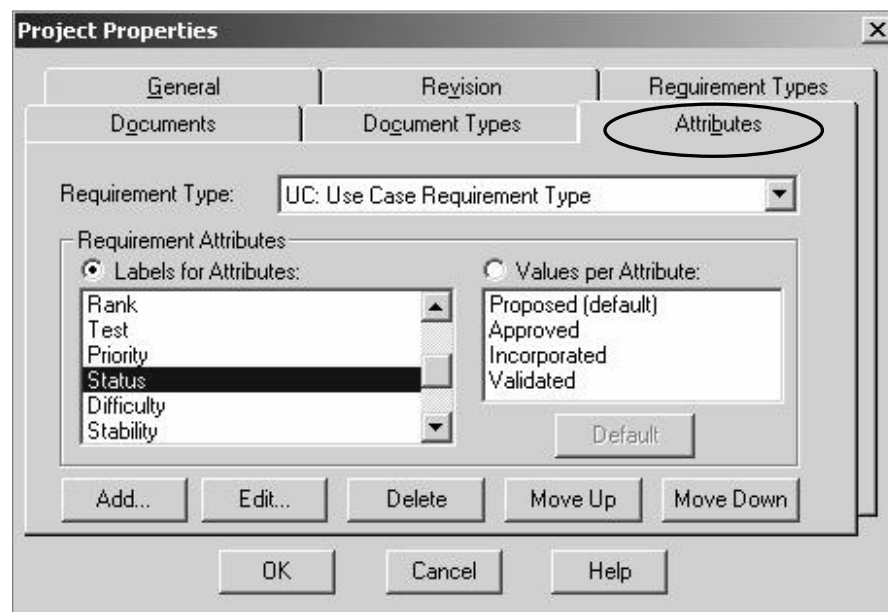
When setting up a RequisitePro project, you need to consider the attributes that you want to collect for each Requirement Type. Next you must document the attributes you want to collect in your Requirements Management Plan.

**Tip:** A minimalist approach is best. The more attributes you choose, the more work will be required to maintain them. As soon as your attributes lack maintenance and go out of date, all of your attributes become useless. That is because you have no way of determining which attribute values are correct and which are not.

Be sure to choose your attributes so that you are able to obtain useful information that will assist your project.



## Requirement attributes for each requirement type



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Once your Requirement Types have been identified, determine what management information about each requirement is needed. Store information as attributes about a particular type of requirement.

Attributes are either system attributes (defined by RequisitePro) or user-defined (defined by the project owner).

A requirement attribute:

- Provides information to manage a requirement.
- Helps a team plan, communicate, and monitor the project.

To configure attributes, click **File > Project Administration > Properties**, and then click the **Attributes** tab.

## Organize your project artifacts

- Define the types of documents you want to create:

Glossary

RM Plan

Vision

Supplementary Specification

Use Cases

- Identify which Requirement Type will be captured in each Document Type:

TERM → Glossary

RMP → RM Plan

FEAT → Vision

SUPL → Supl. Spec.

UC → Use Case

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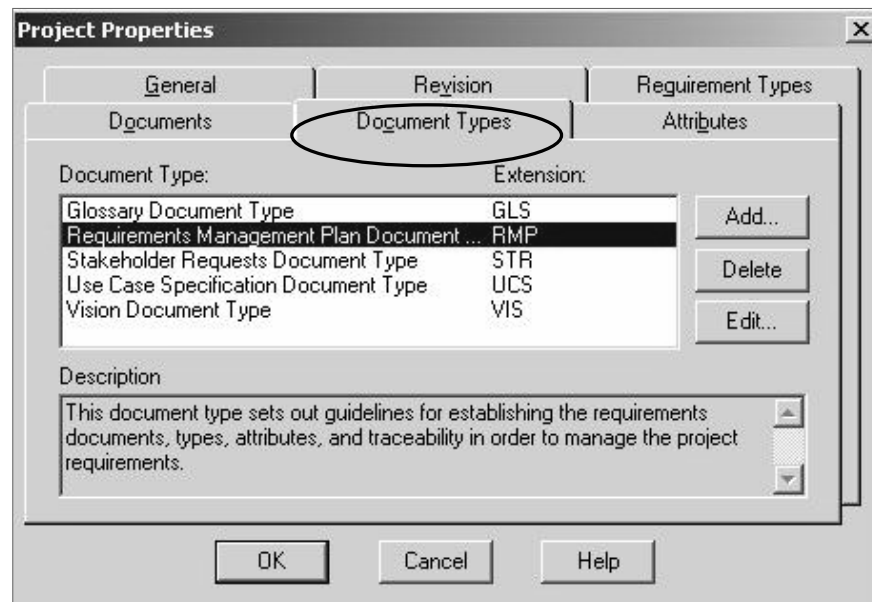


RequisitePro enables you to store all your documents in the project repository. This means that your stakeholders have a single place to go when they want to locate any document related to the project.

Part of establishing your RequisitePro project requires you to predetermine the types of documents you want to store in your project.

Each different Document Type is associated with a default Requirement Type.

## Document Types



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A Document Type is a definition for creating new documents. For example, a Use Case Specification Document Type is a definition of the document for specifying a use case. A document type has a standard format and predefined text.

A Document Type is based on an outline or document template. Document templates are created in Microsoft Word.

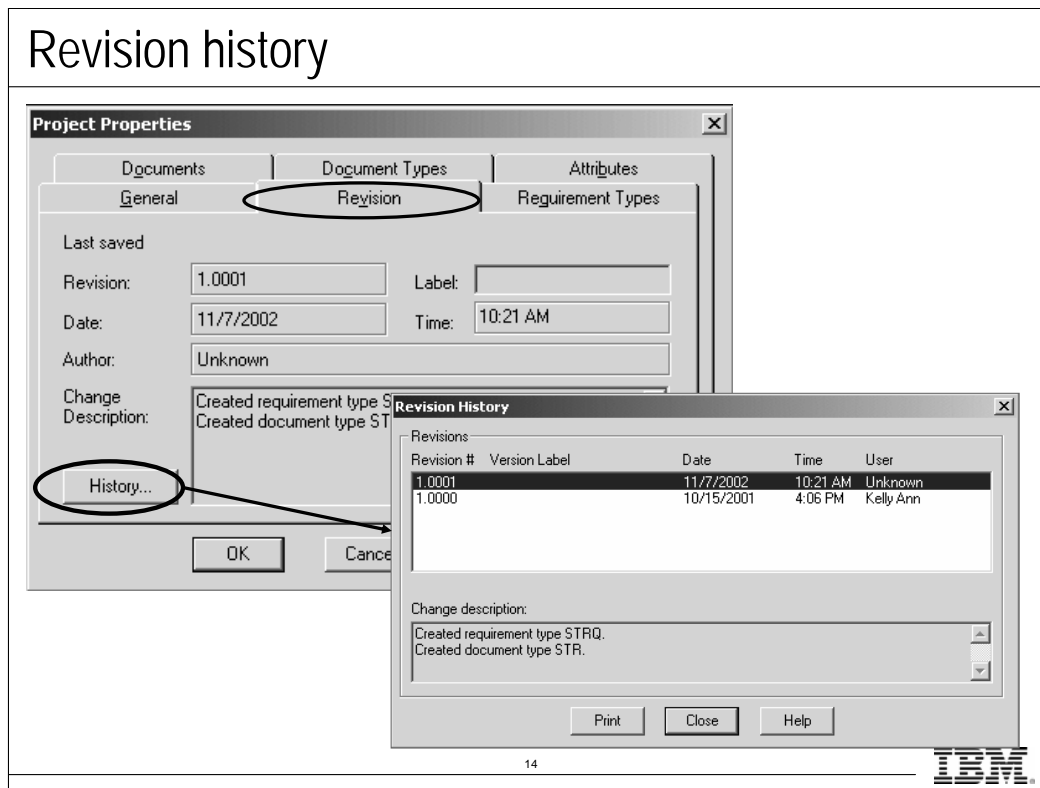
A Document Type also includes the selection of default requirement types. “Default” means that when a new requirement is created in a document, its type will be the default requirement type for that document type. A document can contain requirements of many different types. If no requirement type is chosen when a requirement is created, then each new requirement automatically becomes the “default” requirement type.

Benefits of standard document types include:

- They provide a good starting point.
- They apply consistent formatting to documents of the same type.

RequisitePro does not require the use of documents in a project. Requirements can be added directly into the database with no associated documentation. During project planning and assessment, the team must decide whether documents will be used in the project.

To configure document types, click **File > Project Administration > Properties**, and then click the **Document Types** tab.



RequisitePro supports change management using revision numbers and revision labels for the following: individual requirements and documents within projects, and RequisitePro projects.

If you change a requirement name, text, or attributes, RequisitePro increments the requirement revision number.

Also, when you modify a project or document, Rational RequisitePro creates new revision information.

You can view and print the revision history for the project, documents, or requirements.

Depending on the revision history you want to view, do one of the following:

#### **Projects**

Select the project in the Explorer, and click **File > Properties**.

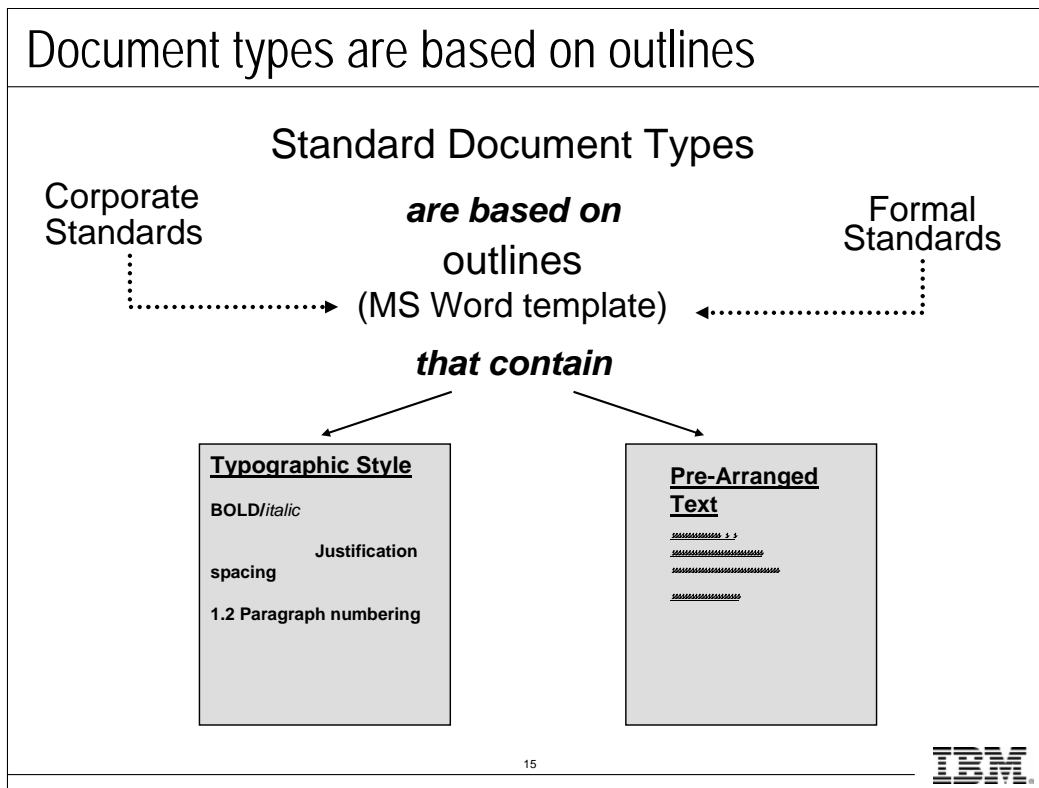
#### **Documents**

Select a document in the Explorer, and click **File > Properties** or

In Microsoft Word, click **RequisitePro > Document > Properties**.

#### **Requirements**

Select a requirement in the Explorer, and click **File > Properties**.



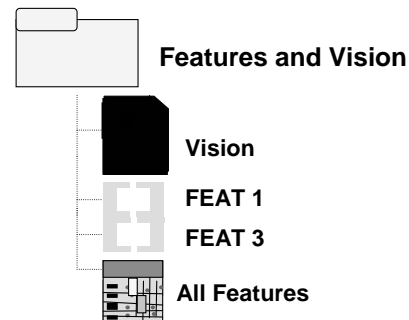
RequisitePro provides some basic document outlines to help your development process. RequisitePro includes outlines to support both the traditional or IEEE development methodology and the use-case development approach.

RequisitePro also provides the capability to capture your own corporate standard templates and use them to define RequisitePro documents.

Some companies have their own standard requirement templates that they choose to use when specifying requirements. These can easily be added to your collection of RequisitePro document templates. Packaged outlines are located in the outlines directory in RequisitePro.

## Package in RequisitePro

- Is a container that can include:
  - ▶ Requirements
  - ▶ Documents
  - ▶ Views
  - ▶ Other packages
- Organizes related artifacts visually.
- Is shared by all project users.



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Packages provide a simple and effective way to visually organize your requirements. Organizing your requirements using packages is similar to how you organize the files on your hard disk using directories.

Packages enable you to group requirements in a convenient way. For example, you could create a package for each use case. The requirements for each use case would be grouped in a single package, thereby enabling you to quickly locate them.

To create a package, click **File > New > Package**.

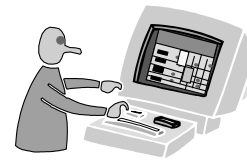
There are ways to move artifacts between packages:

- Drag and drop the artifact in the Explorer from one package to another.
- Modify the assigned package in the **Properties** dialog box.

To delete a package, make sure that it is empty, then select it and click **Edit > Delete**. The package is removed from the Explorer and the project database.

## Additional project logistics

- **User environment**
  - ▶ Multi-user? Stand alone? Web-based?
- **Establish the project repository.**
  - ▶ Choose a database:
    - Access, DB2, Oracle, SQL Server
    - Determine the server location
- **Security and Permissions**
  - ▶ Consider accessibility needs.
  - ▶ Determine the type of user authentication required for the project.
    - RequisitePro user authentication
    - Lightweight Directory Access Protocol (LDAP)



Project  
Administrator

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To ensure success in the project development stage, an assessment and some initial planning are necessary. Determination of the current status of the work environment is also needed. In this phase, it is helpful to determine goals, review existing components, and assess resources.

Consider the following when initially planning the project:

### **Development Method**

Does your project adhere to an overall governing standard such as a Use Case, IEEE, CMM, or ISO9000 standard?

### **User Environment**

How will the project be deployed in the user environment? Stand-alone? Networked? Distributed?

### **Requirements Capture Techniques**

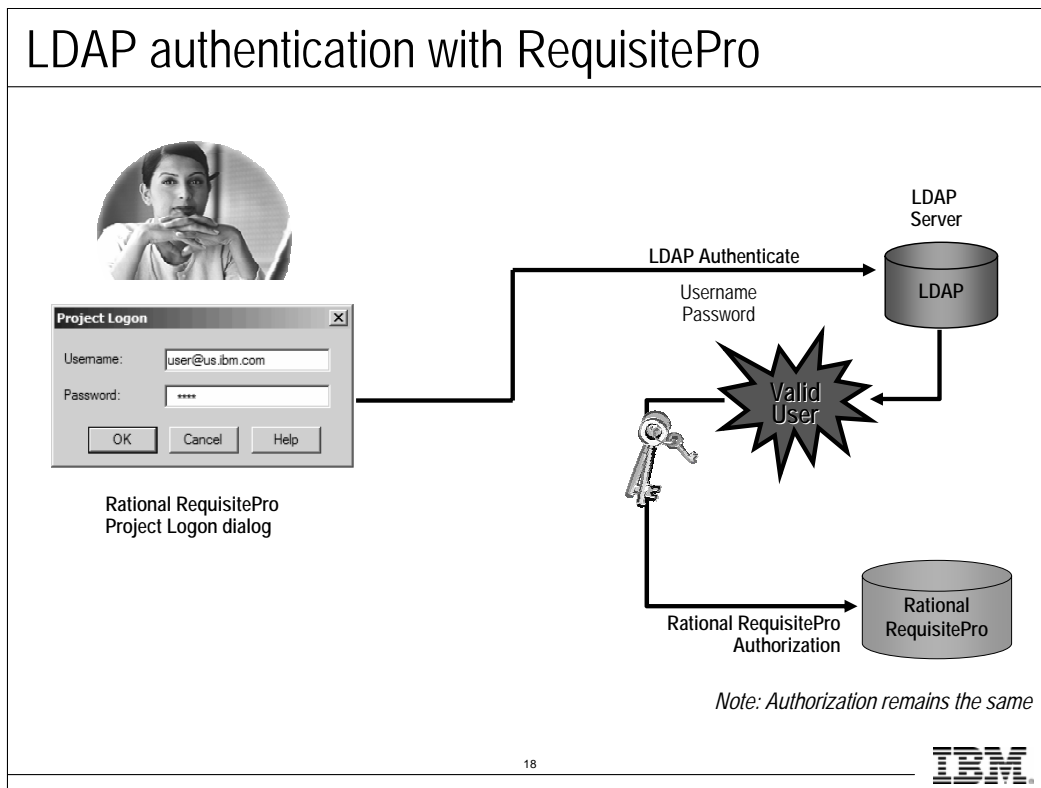
Will you capture your requirements in documents, in a database, or in both?

### **Security**

Determine specific permissions that define the kind of access users will have to the project. Security is crucial for projects with multiple users.

If security is not enabled for the project, any user can open the project. If security is enabled, you must decide whether to authenticate users using RequisitePro project user records only or using LDAP authentication.

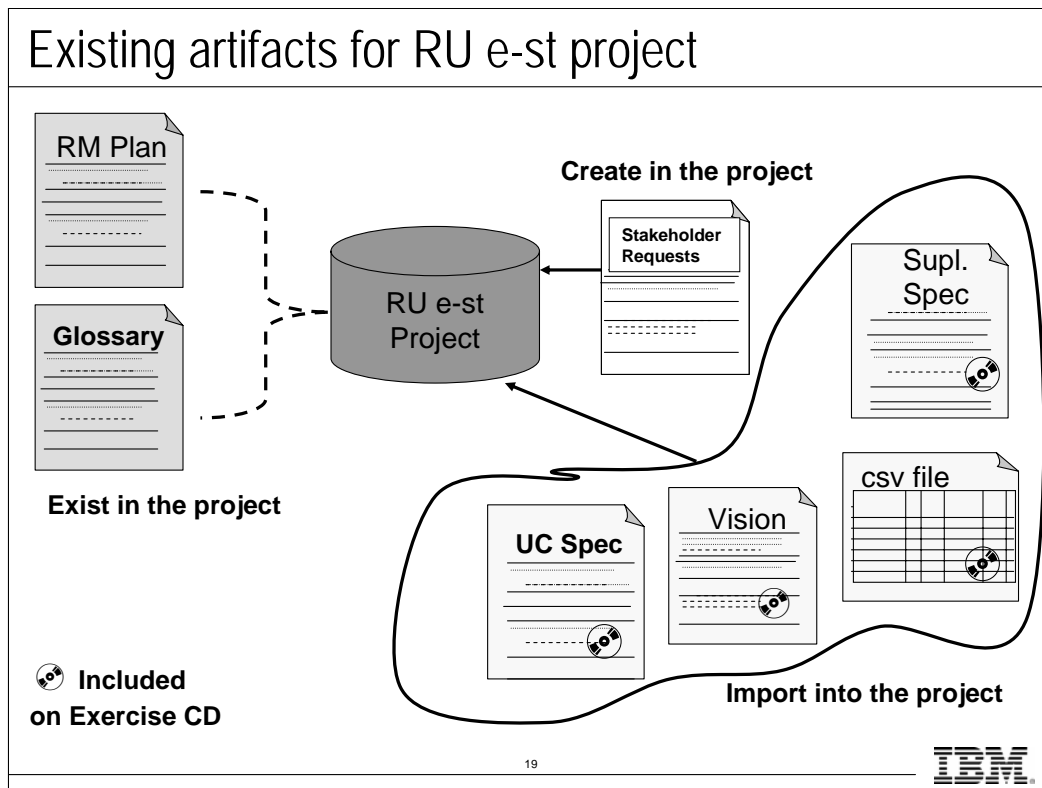
Using LDAP authentication decreases administrative costs by centralizing user records for multiple applications and reduces the number of passwords users must remember. It can also improve security by enforcing the password management policies implemented in the directory.



If you are using RequisitePro to authenticate users, the user enters a username and password. RequisitePro verifies that the is match a username and password stored in the RequisitePro project database.

If you are using LDAP authentication, RequisitePro user information is mapped to an LDAP directory. User passwords are not stored in RequisitePro. The user enters a username and password. RequisitePro checks an LDAP directory for a matching user record first. If LDAP authentication succeeds, then the user name and password are authenticated against the RequisitePro project database.





CD RU e-st project files on the exercise CD.

For the purpose of this class, you have been asked to build the software for an electronic stock trading system.

Each lab builds the system project as you gain more information and walk through the Requirements discipline as defined by the Rational Unified Process.

## Lab 2: Customize Project Structure

- Read Initial Requests document (optional).
- Open the RequisitePro project (from CD).
- Customize project structure.
- Modify project organization.
  - ▶ Create packages.



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**IBM**

**See Student Workbook Lab 2.**

**Goal:** Add the RU e-st project.

- Customize project structure.
  - Requirement Types
  - Attributes
  - Document Types
    - Outlines

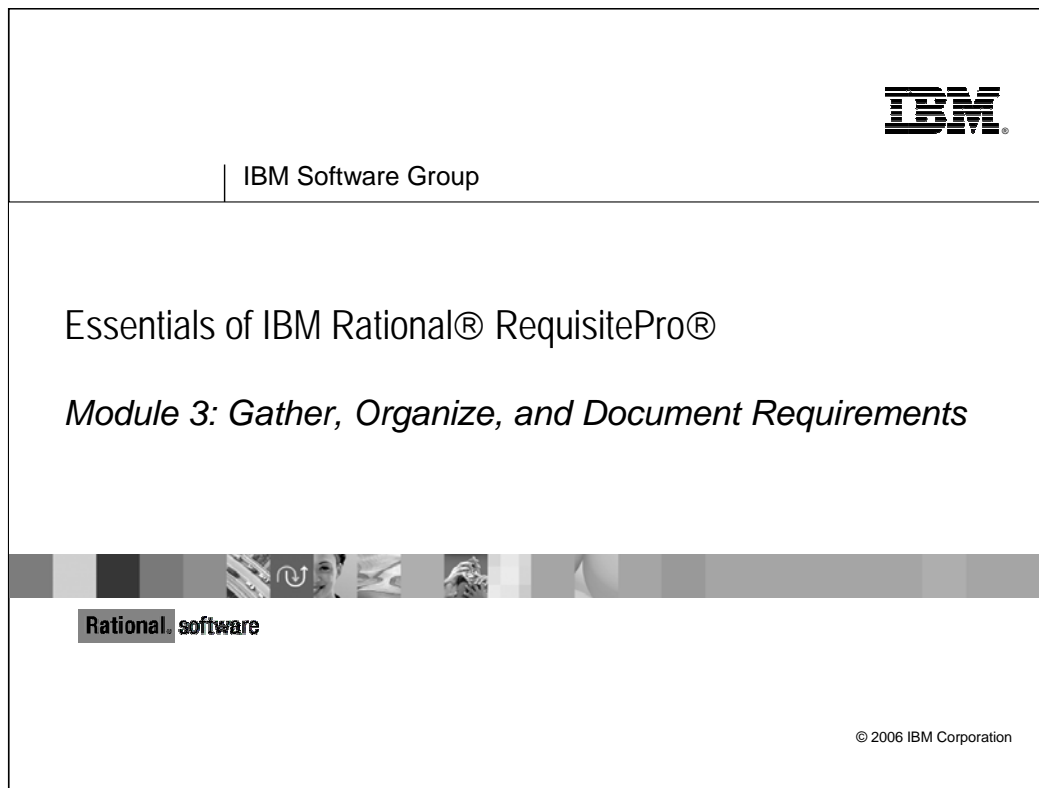
**Questions for planning your project:**

How do you want to manage the requirements?

What information is important to each team member?







## Contents

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## Objectives: gather, organize, and document requirements

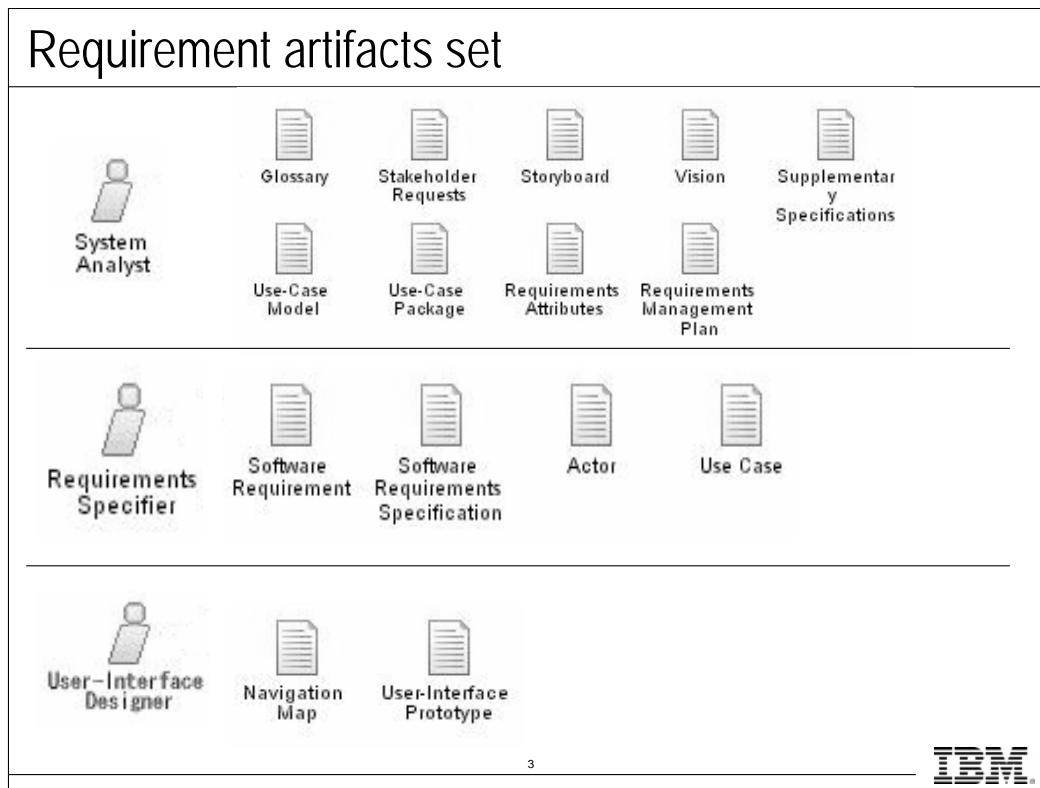
- Enter requirements directly into project.
- Import requirements.
- Edit and delete requirements.
- Assign attribute values.
- Recognize good requirement characteristics.
- Organize requirements.
  - ▶ Packages
  - ▶ Hierarchy

2



The first part of this module discusses requirements that reside only in the database, which are displayed and managed through views (matrices).

The second part of this module explores requirements located in documents using Word.



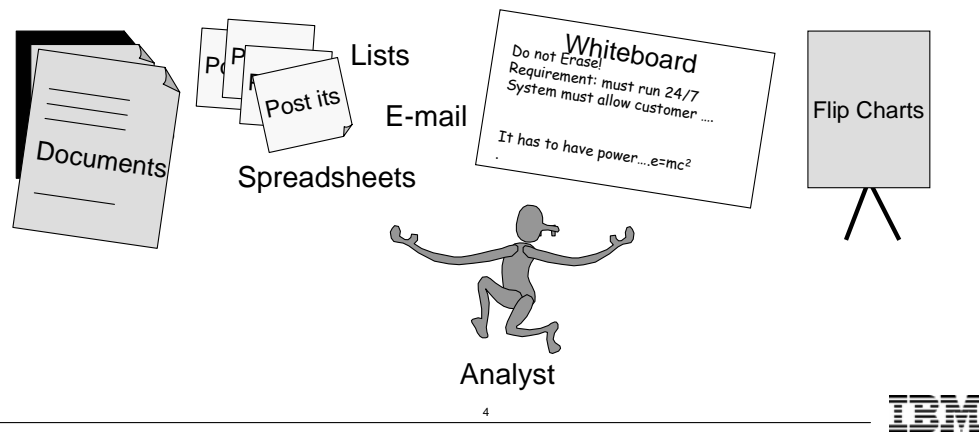
RequisitePro is used by many team members to manage project artifacts in a software development project.

Each project has a strategy for organizing and managing requirements. Here is one potential strategy for organizing requirements.

The examples above are from the Rational Unified Process (RUP).

## Where are your requirements now?

- Analyze the problem to be solved.
- Understand stakeholder needs.
- Organize initial requirements created from elicitation.



Is there existing data outside of RequisitePro that contains requirements? If some of your requirements already exist outside RequisitePro, import them into RequisitePro.

When you plan a project, the information is gathered through meetings, discussions, brainstorming, and e-mails. From the gathered information, you start defining the project and its structure. This usually happens through draft plans (RM Plan and Vision doc).

RequisitePro imports data into a project from files in Word format or Comma Separated Value format. CSV format is used by applications such as Microsoft Access and Microsoft Excel.

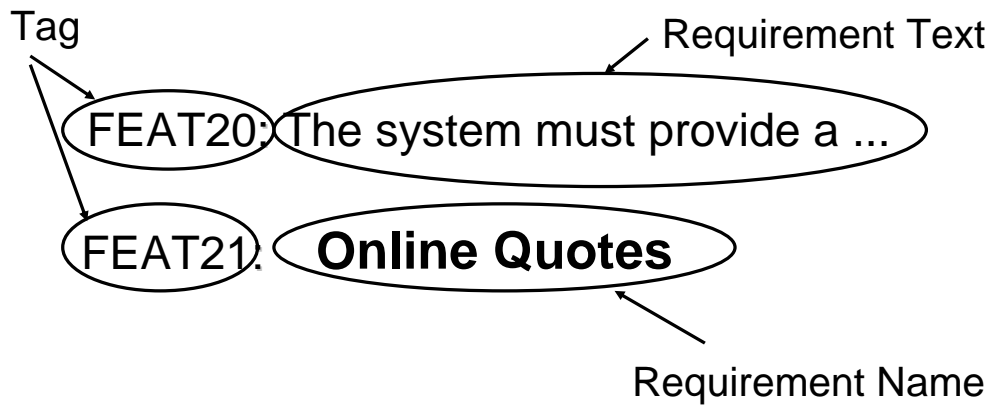
Where are your requirements captured?

- Post-its
- Documents
- Whiteboards
- Easel boards
- Spreadsheets
- E-mail threads
- Databases



## Requirements in RequisitePro

- Must have Text or Name.
- Are uniquely identified by a Tag.
- Are organized by Requirement Type.



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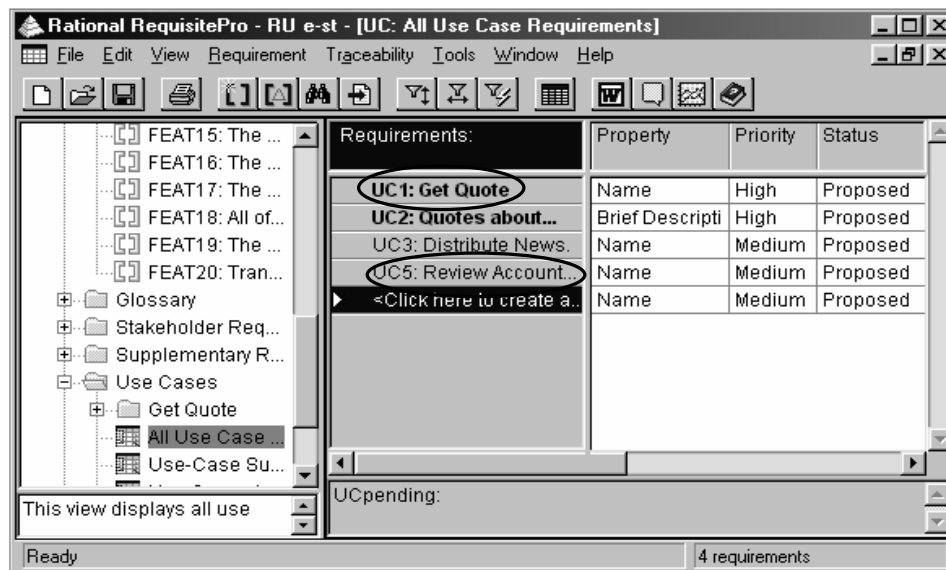


All requirements contain the **text** specification of a requirement and/or a short, descriptive requirement **name** (optional). Each requirement is uniquely identified by its requirement **tag**.

A requirement tag consists of the requirement type prefix and a unique number. For example, FEAT20 refers uniquely to the twentieth feature requirement.

A requirement name is a short descriptive name for a requirement. In a View and other locations where a requirement's tag is used as an identifier, RequisitePro will display its name. This allows users to refer to their requirements easily in conversations and find them easily in a View. If a requirement has a name, it will appear in the matrix view in **bold** type. Requirement names are optional, unlike the requirement text.

## Requirements in a view

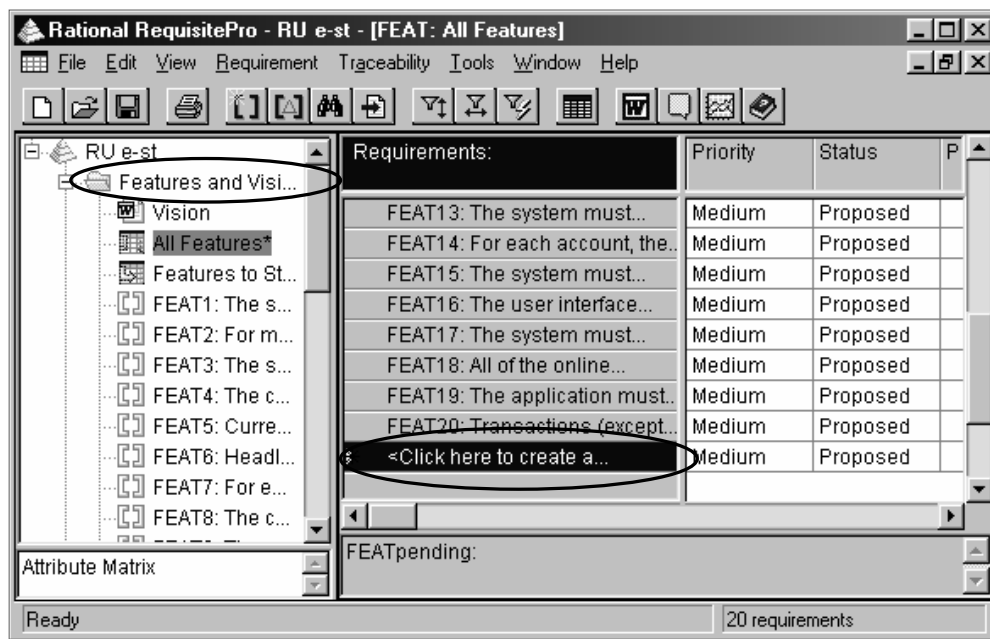


6



When working in a view, you can see the difference between a requirement text and a requirement name by the font. Requirement names are in bold. (The style is configurable.)

## Create a requirement in the Explorer or in a view



There are four ways to create a requirement in a RequisitePro:

- Click the New Requirement row in a view.
- Click **Requirement** > **New**.
- Right-click a package in the Explorer, and then click **New** > **Requirement**.
- Use Word (covered later).

A requirement added directly to the database bypasses the documentation process and resides only in the database. Any changes made to a database requirement are done in a view.

In a view, find the attribute labeled “Location” to determine where the requirement resides.

When working directly with the database, you access a view in RequisitePro. This is where you perform requirement management activities.

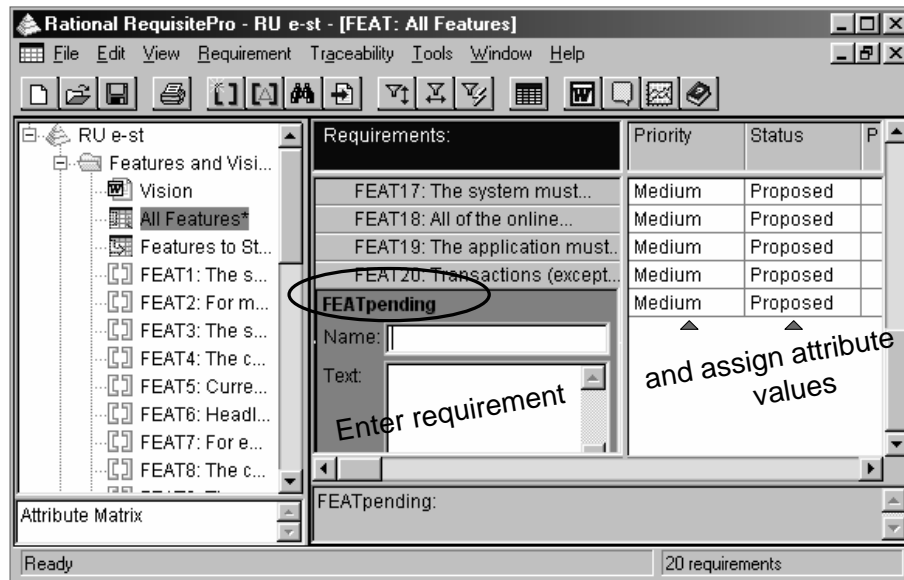
Views present information about requirements in a table (matrix) or in an outline tree.

RequisitePro has three view types:

- Attribute Matrix
- Traceability Matrix
- Traceability Trees

For now, the exploration is confined to the Attribute Matrix. This matrix displays all requirements of a selected requirement type, along with all associated attributes and values.

## A newly created requirement is pending



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The Attribute Matrix view allows you to enter a new requirement.

To create requirements in the Attribute Matrix:

1. Make sure that the **In-View requirements creation (without dialog box)** check box is selected. This check box is located at **Tools > Options**.
2. Click the last row near the statement **<Click here to create a requirement>**.
3. Click tab to modify or assign requirement attribute values.
4. Press ENTER to commit (save) the requirement. When the requirement is saved, it is assigned.

## Edit a requirement

- In a view:
  - ▶ Click the requirement.
  - or
  - ▶ Right-click and select **Properties**.
- In the Explorer:
  - ▶ Right-click and select **Properties**.
- From the RequisitePro menu:
  - ▶ Click **Requirement > Properties**.

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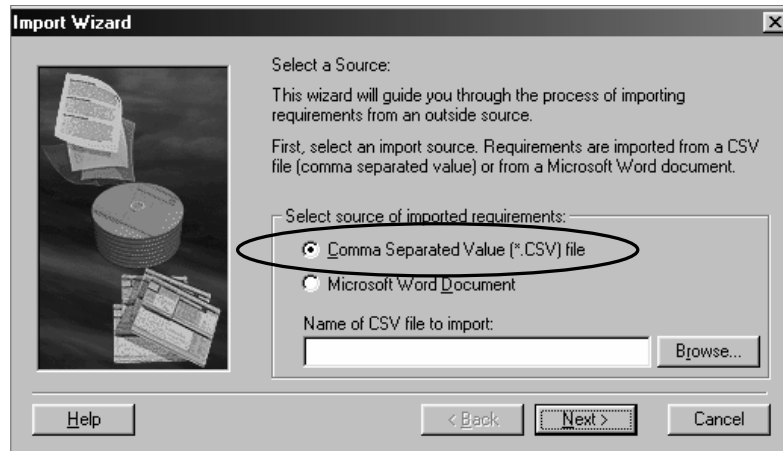


To modify a requirement in the database:

- If the **In-view requirement creation** option is enabled, click in the requirement. Edit the requirement directly in the matrix.
- Double-click the requirement. RequisitePro will take you to the location of the requirement to be modified.
- Click **Requirement > Properties** for the **Requirement Properties** dialog box.

## Import requirements from a CSV file

- Requirement and attribute data are imported directly into the project database.



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RequisitePro can import requirements and attributes into your project from any database that supports export of data in comma-separated value format, such as SQL Server, Oracle, Excel, or Access.

When a new requirement is added to the database, it is assigned a new root requirement number. If a requirement has a tag or a number in the external CSV file, that number is not preserved. RequisitePro recognizes a hierarchical numbering scheme and imports lower-level requirements as children of a higher-level requirement.

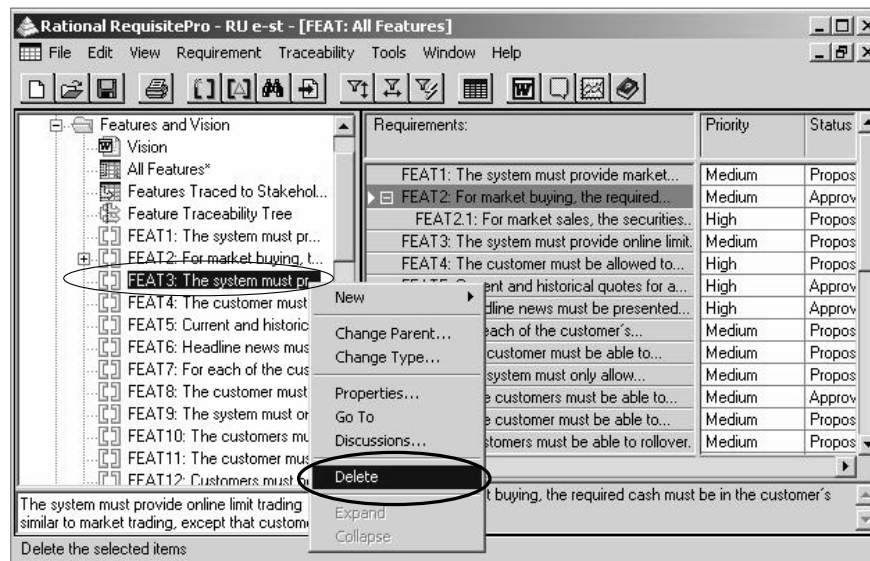
The CSV file and RequisitePro must be configured properly in order for you to import all information. Refer to RequisitePro Help for data formatting details.

To import a CSV file, click **File > Import** on the RequisitePro menu bar.

**Note:** The requirements are imported under the package you have selected in the Explorer.

## Delete a requirement in the Explorer

- Right-click the requirement, and then click **Delete**.



### Deleting a Requirement from the Database.

From the Explorer, right-click the requirement and select **Delete**.

A requirement that resides only in the database can be deleted from the Attribute Matrix in a view.

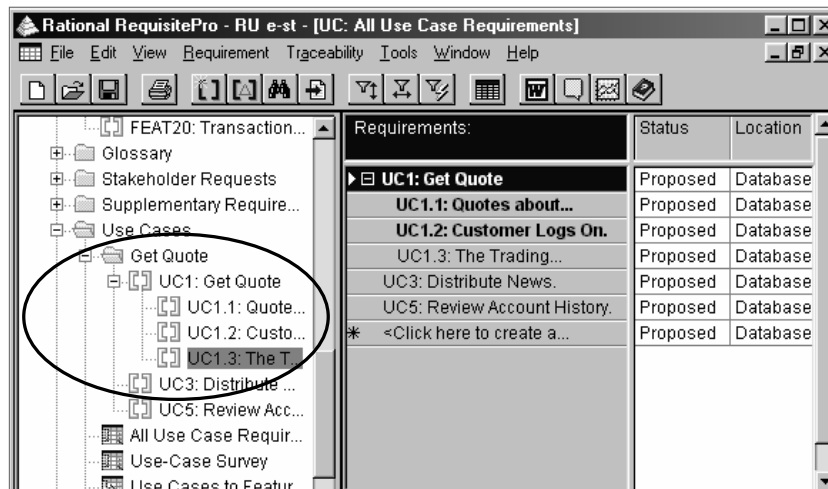
When a requirement is deleted, it is removed from the database, and its attributes, traceability relationships, and revision history are also deleted. There is no way to reverse a deletion.

Because there is no way to reverse a deletion, Rational recommends that you do not delete a requirement. Instead, assign the status attribute a value of Deleted. That way, if you ever want to reinstate it as a valid requirement, you still have its revision history and attributes in the database.

If the requirement is located in a Word document, you cannot delete it from the Explorer.

## Organize requirements with hierarchy

- Subdivide a general requirement into more specific requirements.



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Hierarchical requirements subdivide a general requirement into more specific requirements. In the example above, the requirement with the tag UC1 is a parent requirement. Its child requirements are numbered below it.

A leaf tag is found only in a hierarchical requirement and is defined as the digit(s) to the right of the final decimal point.

Hierarchical requirements can also be thought of as parent/child relationships. The hierarchical format follows a “top down” outline format. An outline contains headings and subpoints. All subpoints under the heading are assumed to be related to the heading. Because all children are subpoints of the parent, there is an implied relationship between the parent and all its children in the documentation.

Child requirements provide additional detail for their parent requirement.

It is important to understand a hierarchy in respect to cut/copy and paste. Hierarchical requirements can only be manipulated in this manner via the entire hierarchy. A child cannot be moved without its parent.



## Rules for hierarchical relationships

- **Parent and child: located together**
  - ▶ In a document OR only in database
- **Parent and child: same requirement type**
  - ▶ Same root tag
  - ▶ Same attributes defined
- **Parent (root) requirement may have**
  - ▶ Up to 24 levels of children
  - ▶ Unlimited children at any given level

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RequisitePro enforces certain rules when administering hierarchical requirements.

- Each hierarchy is considered to be a single unit by RequisitePro. The parent and child requirements must all be of the same requirement type.
- Hierarchies cannot exist separately from each other in RequisitePro. All cut/copy/paste operations must be performed on the entire hierarchy.
- Hierarchical requirements cannot span documents, nor can they span documents and database.
- A hierarchy is a one-to-many relationship. A child requirement can have only one parent, but a parent requirement can have an unlimited number of children. A hierarchy can contain up to 24 levels of children.
- When you delete a parent, you can choose to delete its children or assign them to another parent.
- If a parent requirement is changed, the relationships with its children becomes suspect. (Suspect links are discussed in Module 4.)

## Lab 3: Gather and Enter Requirements

- Import requirement data.
  - ▶ From a CSV file located on CD-ROM.
- Create requirements directly in a view.
  - ▶ Assign attribute values.
- Organize related requirements.
- Define hierarchy.

This lab focuses on entering and creating requirements directly in the project database.

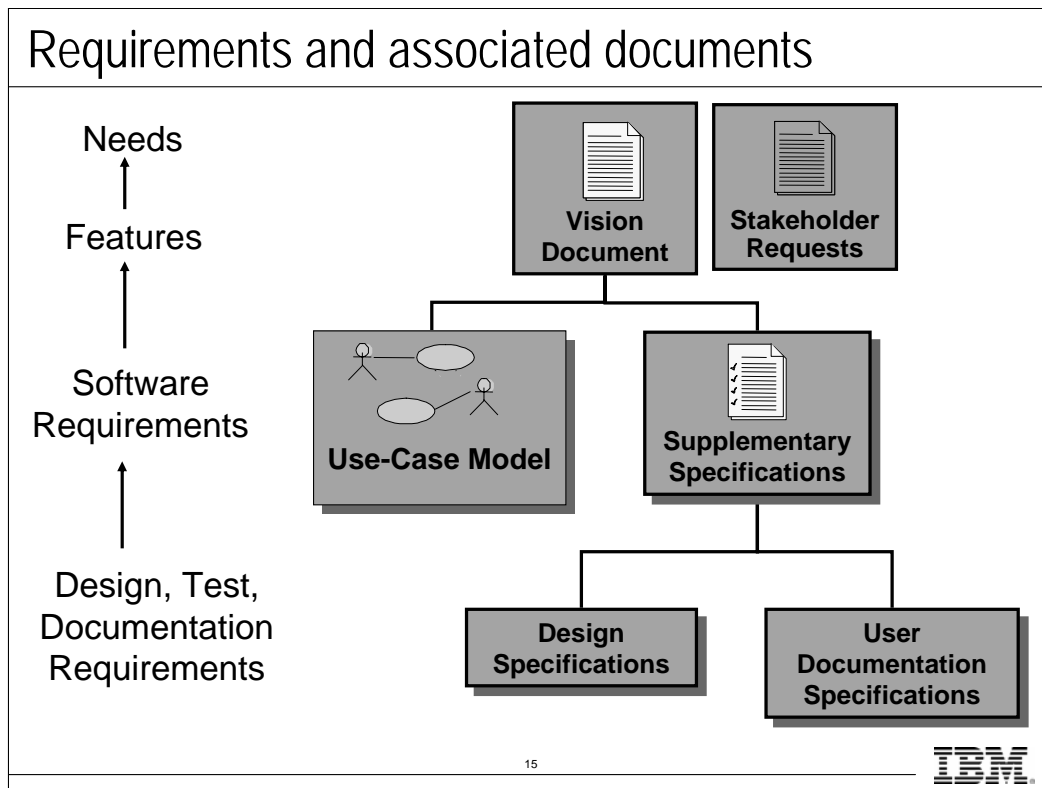


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**IBM**

### See Student Workbook Lab 3.

**Goal:** Begin populating your project with requirements located only in the database. Import requirements and attributes from a CSV file. Also, enter requirements directly in the project database through a view and create a hierarchical relationship.



This diagram offers a sample documentation structure with a use-case development approach. Here you can see the documents recommended in a use-case approach and the type of requirements that are associated with each document type.

Notice the Needs and Features are typically captured in the Vision document, while the Software Requirements are documented in the Use-Case Model and the Supplementary Specifications.

Test specifications, design specifications, and user documentation specifications can also be captured in RequisitePro documents.

## Use Word to write your requirements

- **Create RequisitePro documents.**
  - ▶ Create and edit requirements in RequisitePro documents using Word.
  - ▶ Delete requirements in documents.
  - ▶ Assign attribute values.
- **Import existing documents into the project.**

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The most powerful feature of RequisitePro is the ability to maintain your requirements using Microsoft Word. RequisitePro integrates with Word to add the requirements management capability. By using Word you have all the features of a flexible word processor at your fingertips, as well the power of a database to manage your requirements.

## A requirements document in RequisitePro

- Is a Word document.
  - ▶ Associated with a Document Type.
- Has a default Requirement Type.
- May be based on an outline:
  - Vision.VIS.
    - Is based on an outline.
    - Has a default Requirement Type: FEAT.
  - Execute Trade.UCS.
    - Is not based on a outline.
    - Has a default Requirement Type UC.

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Now it is time to explore the use of requirements documents in a RequisitePro project.

Each document is associated to a Document Type. Documents created in RequisitePro are assigned file name extensions that indicate the document type. If you assign a different file name extension, you make it impossible to open the document outside of RequisitePro.

An outline is a template. This means that when you create a new document, it will be based on a template that you specify.

Requirements located in a RequisitePro document are maintained in the project database. All requirements can be viewed from a view, regardless of where they are located.

## Create a requirements document in the project



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A requirements document is created within RequisitePro, so its requirements can be maintained and managed in the database.

When creating a document, RequisitePro adds a description of the new document to the project database. The document is stored in a file. The requirements created in the document are stored in the project database and in the document.

### Revision History

It is worth noting that revision history is kept at both the document level and the project level.

Revision may be kept at different levels (project, document, or requirement.) A revision is identified by a unique internal revision number, generated by Rational RequisitePro.

A document can be created in RequisitePro or Word. To create a document:

#### In RequisitePro:

Select a package, and then click **File > New > Document**.

Or

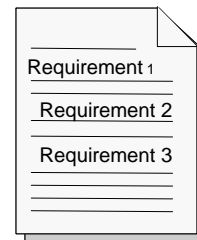
**Right-click** the package, and then click **New > Document**.

#### In Word:

Click **RequisitePro > Document > New**.

## Create requirements in a document

- Enter directly into the document.
- Create from existing text.
- Import from external files:
  - ▶ Word document
  - ▶ RequisitePro documents
- Cut/Paste from documents or database.



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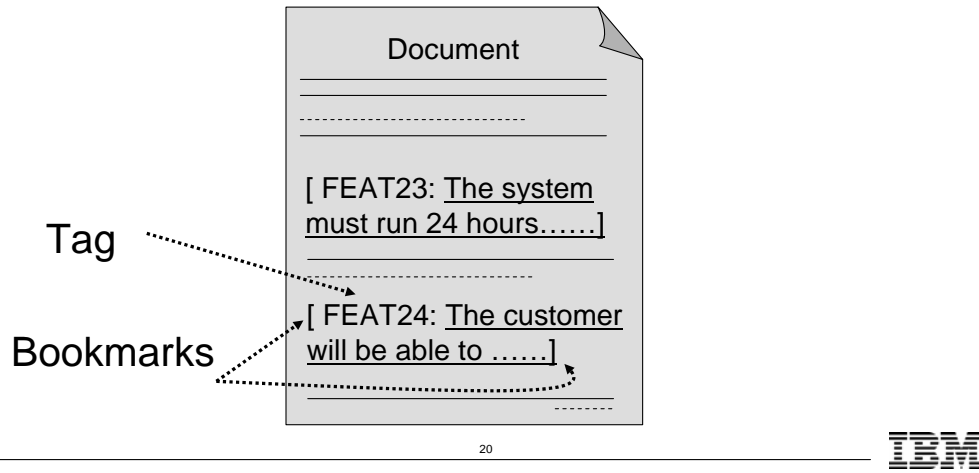
Once the document is created, begin to fill in the text and requirements within the document.

The following describes ways to create requirements in a document.

- Type them directly into the document within RequisitePro.
- Select some non-requirement text in the document and change it into a requirement.
- Cut a requirement from another location and paste it into the document at the desired location. Two cautions:
  - For requirements, use cut/paste on the RequisitePro toolbar instead of Word's cut and paste commands.
  - Paste soon after you cut a requirement. Requirements that are cut using RequisitePro's cut command are placed into a buffer only available to RequisitePro. If a requirement is in the buffer and another requirement is cut or copied, the original requirement is deleted from the database.
- Import requirements from existing Word documents and documents in other RequisitePro projects. The import feature increases reusability of previous requirement documents.

## Requirements located in a document

- Maintained in the database.
- Edited in the document or a view.
- Updated when document is saved.



A requirement created in a document is maintained in the database. A system-generated attribute titled Location shows the name of the document in which the requirement resides.

As mentioned in Module 2, tags are RequisitePro's indication of a requirement. Because they contain hidden text, it is recommended that you do not manipulate the hidden text in the document or in the tag.

Requirements are denoted in documents by Microsoft Word bookmarks. These are defined by RequisitePro. It is recommended that you avoid the manipulation of bookmarks through Word settings and that you avoid the use of other bookmarks in your RequisitePro document.

Requirements located in a document may be edited in the Views workplace if the **Enable Extended Editing of Documents** check box is selected in the **Options** dialog box.

### Word-Linked Files

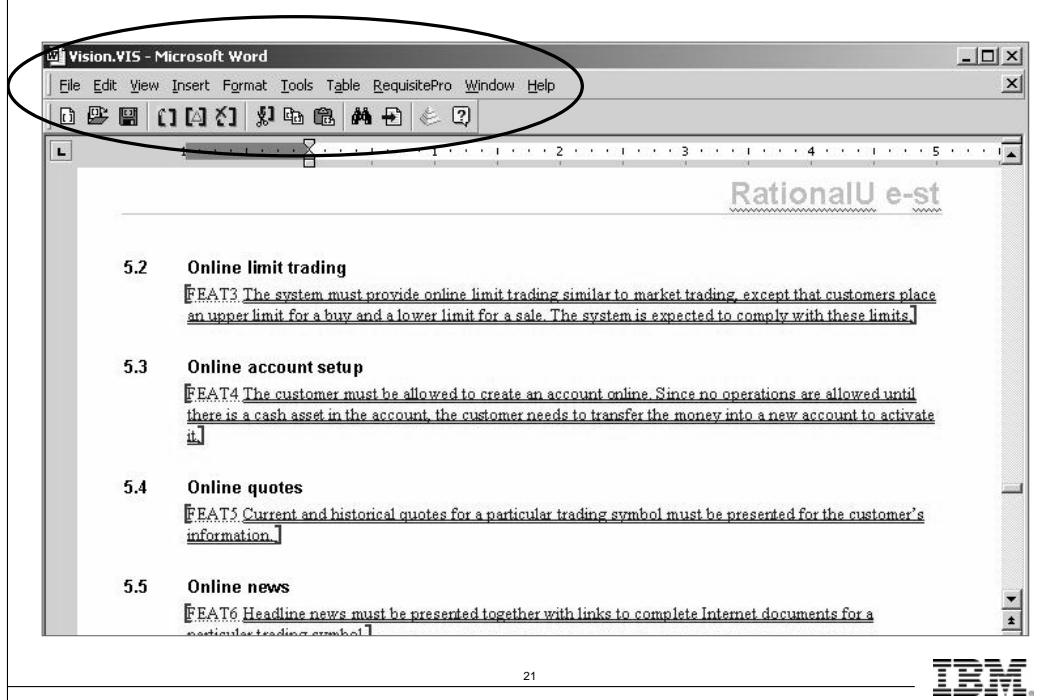
You may include Word-linked files as part of requirement text in a document. You can link to Microsoft PowerPoint files, Excel spreadsheets, bitmap files, and other types of files. However, do not link to other RequisitePro documents.

### Object Limits

A requirement can contain an object, such as a picture or spreadsheet. An object cannot be stored in the project database, so it can only be part of the requirement if that requirement is located in a document.



## Maintain requirements in documents



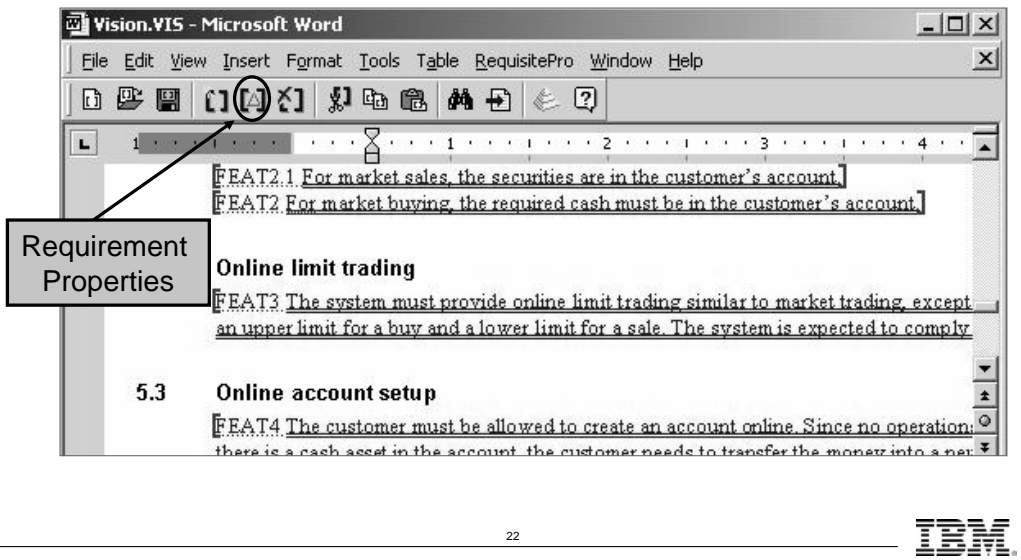
Now it is time to explore the use of requirements documents in a RequisitePro project. RequisitePro documents allow the user to add descriptive text to the requirements, print these documents and share them with Stakeholders, Project Managers, and team members.

The dynamic linking of the requirements in a document to a database keeps both environments up-to-date with the most current information. From the document, a simple right-click enables you to view or modify any of that particular requirement's attributes or traceability.

If you choose not to write documents to capture your requirements, you can maintain your requirements directly in the database via RequisitePro.

## Edit a requirement in a document

- On the RequisitePro toolbar.



You can edit a requirement in a document simply by entering the text between the bookmarks.

You are also able to edit a requirement located in a document from RequisitePro IF you have the option enabled. The option is enabled in the **Project Properties** dialog box.

You can update requirement text without having to open the document. This allows multiple people to simultaneously edit requirements within a single document. All changes are tracked in the database.

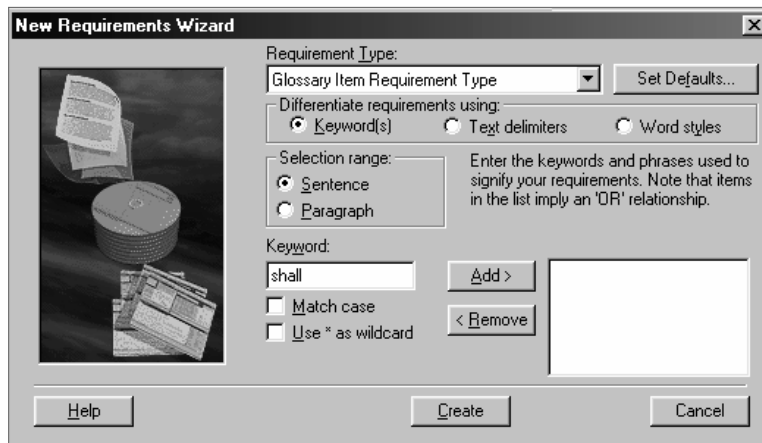
You can turn this option on and off at any time.

A requirement that has been updated in the project database will not be changed in the document until you open that document. If the document is open, the update is immediate. When you open the document after changes have been made in the database, you will receive notification of text updates.

You can modify a requirement's properties by placing the pointer somewhere between the requirement's bookmarks and clicking the **Requirement Properties** button.

## Import a document with the Import Wizard

- Create multiple requirements from selected document text.
- Support wildcard (\*) characters.



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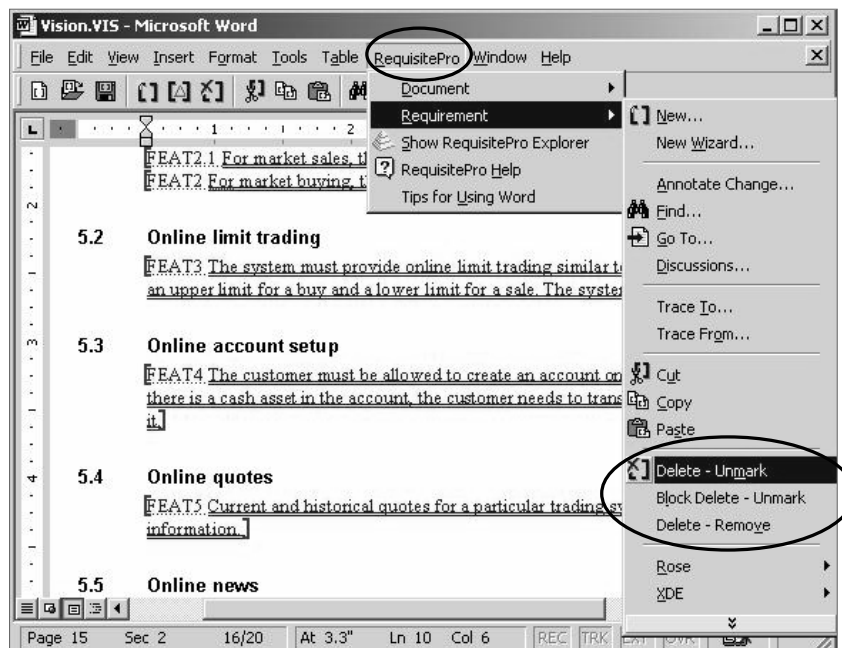
From Word, use the **Requirement > New Wizard** command to create multiple requirements from a block of selected text in a document. When you select this command, the Import wizard guides you through creating the requirements step-by-step. Specify the keywords to use for the requirements and indicate whether the requirements are in sentences or a paragraph.

RequisitePro uses three methods for distinguishing requirements in a highlighted block of text:

- Keywords such as: “must”, “shall”, “will be able”
- Text Delimiters: <>, {}, []
- Word Style: Heading 1 or Body Text

**Note:** When using wildcard characters, you cannot also match case. Word does not have this function/option.

## Delete a requirement in a document



When a requirement in a document is deleted, it is removed from the database, and its attributes, traceability relationships, and revision history are also deleted. There is no way to reverse a deletion.

There are two kinds of deletion methods for requirements that reside in a document. Both ways result in the requirement no longer being a requirement.

**Delete - Unmark** allows the text of the requirement to remain in the document. It becomes ordinary text and no longer a requirement.

Use **Delete - Unmark** or **Block Delete - Unmark** to delete requirements from the document where they reside and from the project database without disrupting the text of the document. **Block Delete - Unmark** is the same as **Delete - Unmark**, but it deletes all requirements in a selected section of a document.

**Delete - Remove** removes the entire text of the requirement from the document.

The commands to delete a requirement in the document are located on the RequisitePro toolbar.

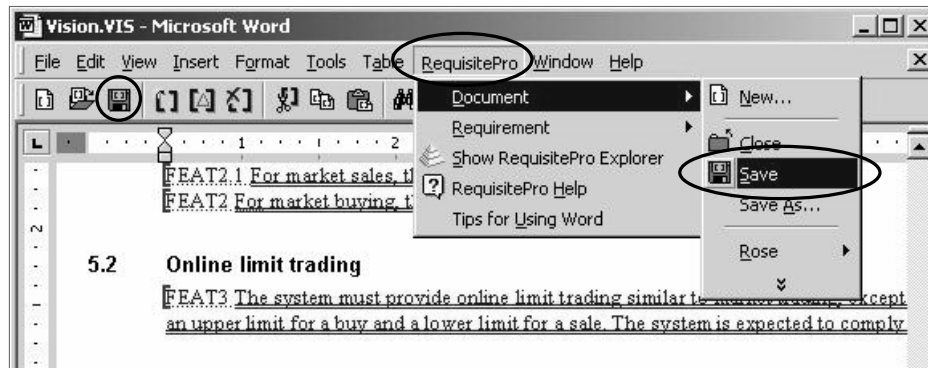
### Alternative Deletion Strategies

- Assign the Status attribute value Deleted.
- Place Deleted requirements in a document.

**Important:** Delete requirements only when necessary, since all the requirement information (history and traceability) is removed when you perform a deletion.

## Save a RequisitePro document

- From the RequisitePro toolbar.
- From the RequisitePro menu.
  - ▶ Document > Save.



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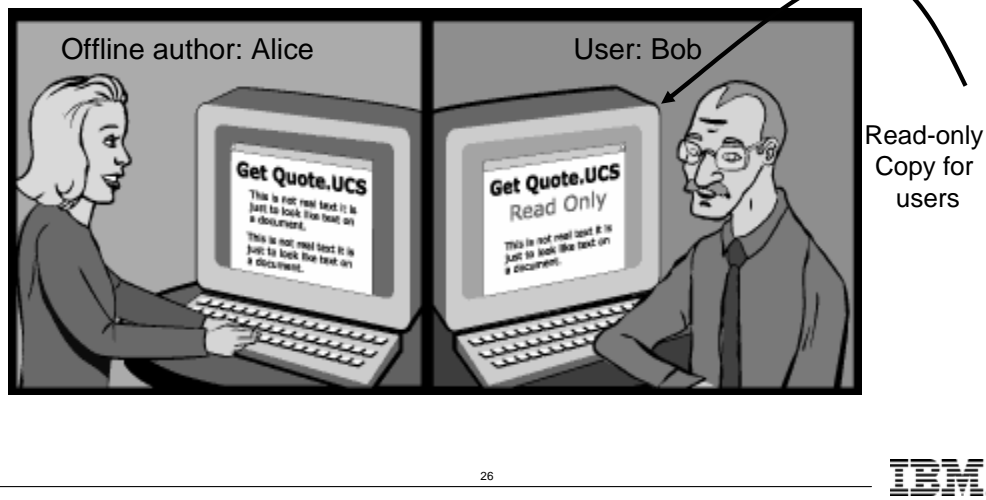


The **Save** command on the RequisitePro toolbar saves the active requirements document. This command is also available by clicking **RequisitePro > Document** in the Word workplace.

**Note:** Do not save a document in Microsoft Word by clicking **File > Save**. If you do so, the document will be saved, but requirements information will not be updated in the RequisitePro database until you close the document or click the RequisitePro **Save** command on the toolbar or menu.

## Offline authoring

- Provides support for distributed teams.
- Suits a world of portable computers.



Offline authoring makes it possible for portable computer users to keep an individual document on their computers instead of the whole project. While the user is traveling, the document can be taken offline and edited without tying up the entire project. Other team members can work in the project while the document is offline.

RequisitePro places no limit on the number of documents that can be offline at one time. This is a great benefit to distributed teams, because access to the RequisitePro database is not necessary to capture requirements in documents and modify existing requirement documents.

This feature is also helpful in the review process when customers or consultants need to view the document but do not have a copy of RequisitePro.

When the document is taken offline, the author is prompted by RequisitePro for information regarding it. This information enables team members to determine at any time who has a document offline and why.

There is a clear communication channel among the team members. Access to current data is critical. At the same time, you want to be sure that changes are tracked and integrated into the database while maintaining a level of version control. Offline authoring helps with these issues.

Use offline authoring in addition to the Merge and Revise function. At review time, the document is taken offline and distributed to team members. Reviewers turn on the Track Changes feature in Microsoft Word, edit the document, and return it to the team member who took the document offline. The reviewer merges all changes into the offline document and returns it to RequisitePro, where the database is updated.

## An offline authoring scenario

- **Take a document offline to update.**
  - ▶ Leaves a read-only copy behind for people to view.
  - ▶ Take document home to work on it.
- **Work on the document at home.**
  - ▶ Macros in the document allow you to add/modify/delete requirements.
- **Bring the document back online.**
  - ▶ Replaces the read-only copy.
  - ▶ Incorporates edits and updates database.

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Offline Authoring provides the ability for document authors to take a document out of the RequisitePro project, edit it in Microsoft Word outside of RequisitePro, and return the document to the project.

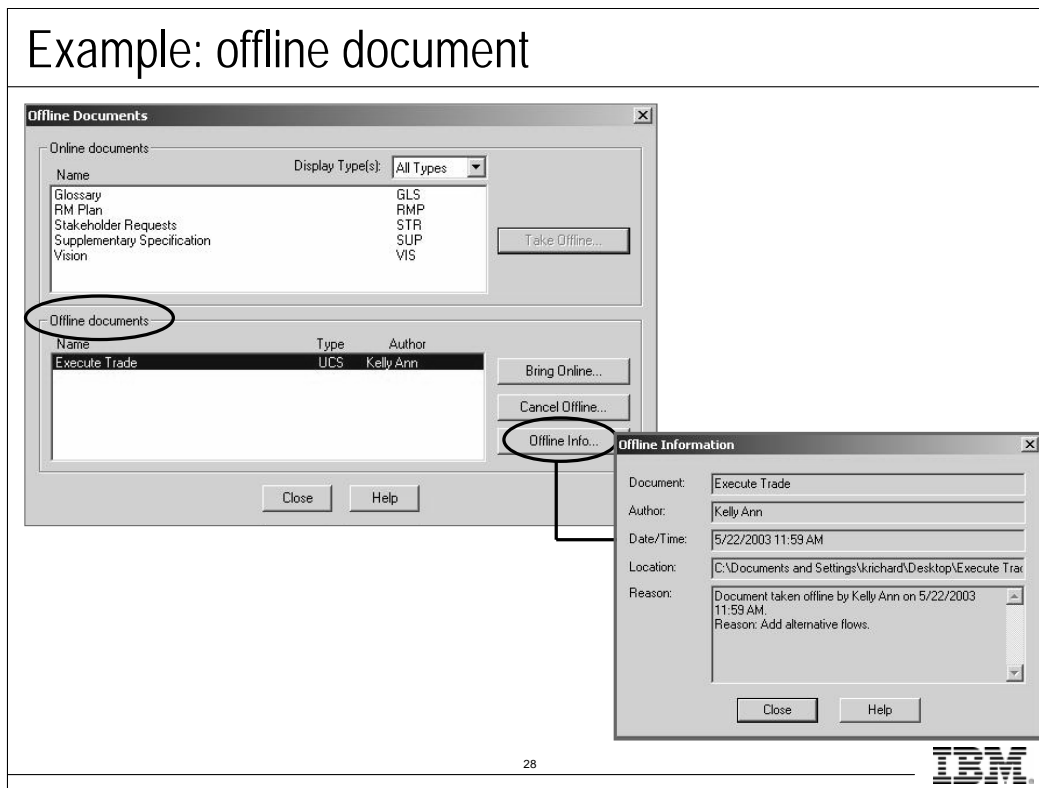
When you take a document offline, RequisitePro includes Microsoft Word macros in the document. These macros allow you to add and delete requirements in the offline document.

While the document is offline, the author can edit the textual content of the document, mark new requirements, and delete (unmark) existing requirements. A read-only copy of the document is left in the project for review by other team members during the offline process.

Upon return to the project, the offline changes are detected by RequisitePro and added to the project database.

Team members must have security privileges of Read/Write to manipulate a document or take it offline.

All changes are incorporated unless the document author cancels the offline operation. In this case, the original “read-only” copy is restored to the online project.



When you take a document offline, you can add and delete requirements in the document and edit document text. No one else can make changes to that document while it is offline.

Since only one person can have a RequisitePro document offline, offline authoring provides a level of control. The original is still stored in RequisitePro, but it is changed to a read-only document. Other users can view the document in RequisitePro, but they cannot edit it until the the author brings the offline copy back online.

#### Reminder:

The **Save As** command differs from offline authoring, because **Save As** saves a copy of a RequisitePro document as a .doc file. The Word document can be distributed to non-RequisitePro users to review the documents. Documents created with the **Save As** command contain information that was current at the time that the document was saved.

To take a document offline, do one of the following:

In RequisitePro:

Click **Tools > Offline Documents**.

In the Word workplace:

Click **RequisitePro > Documents > Offline Documents**.



## Lab 4: Create and Import RequisitePro Documents

- Create a RequisitePro document.
- Import documents and requirements into the project.
- Create and edit requirements in a RequisitePro document.
- Take a RequisitePro document offline to edit.

**This lab focuses on creating and modifying requirements in documents, importing documents, and creating documents in the project.**



**IBM**

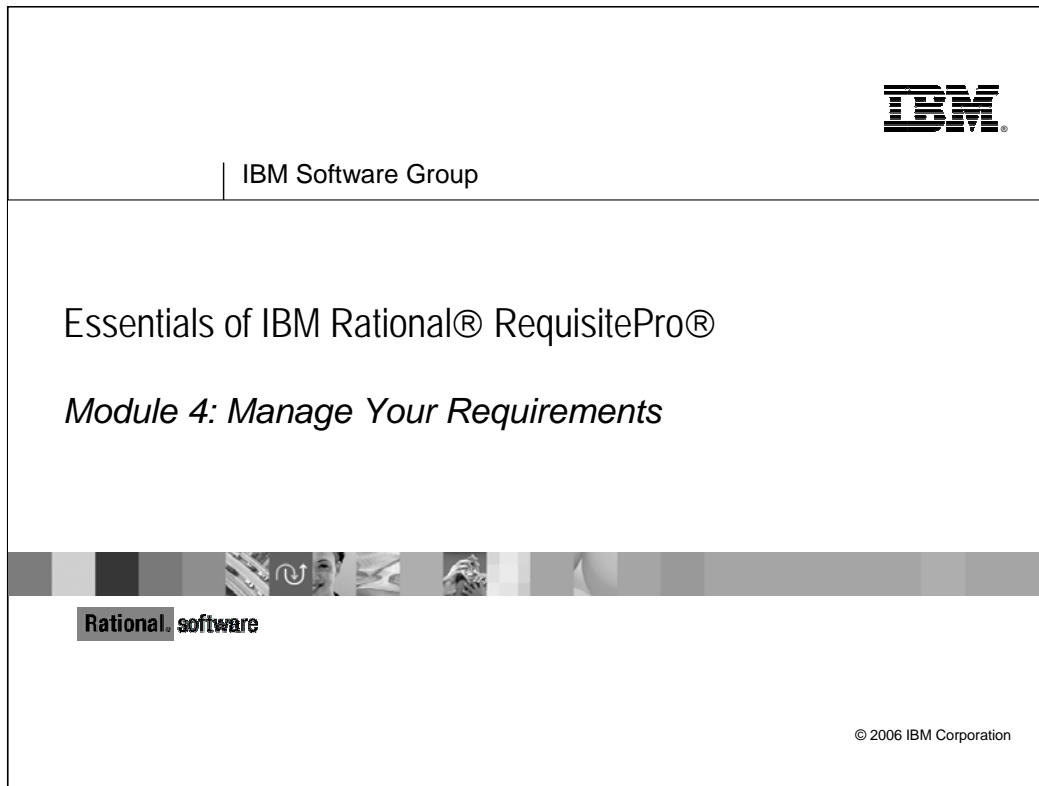
29

### See Student Workbook Lab 4.

**Goal:** Import and create documents into the RU e-st project.

- Import a Word document (Vision.doc) and create requirements using the Import Wizard.
- Import a RequisitePro document (Supplementary\_Specification.SUPL) that contains requirements already defined.
- Import a Word document (Execute\_Trade.doc) and manually create requirements from text in the document.
- Create a document from an outline (Stakeholder\_Requests.doc), insert text, and create requirements.
- Take a document offline. Edit the document offline and bring the document back into RequisitePro.





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## Objectives: manage your requirements

- Define traceability relationships.
- Query requirements data.
- Create requirement statistics (metrics).
- Recognize the functionality of the RequisitePro Baseline Manager.
- Create and compare baselines using the RequisitePro Baseline Manager.

2



This module shows you how Rational RequisitePro can help you manage your requirements. It concentrates on defining traceability and using traceability and attributes for managing queries.

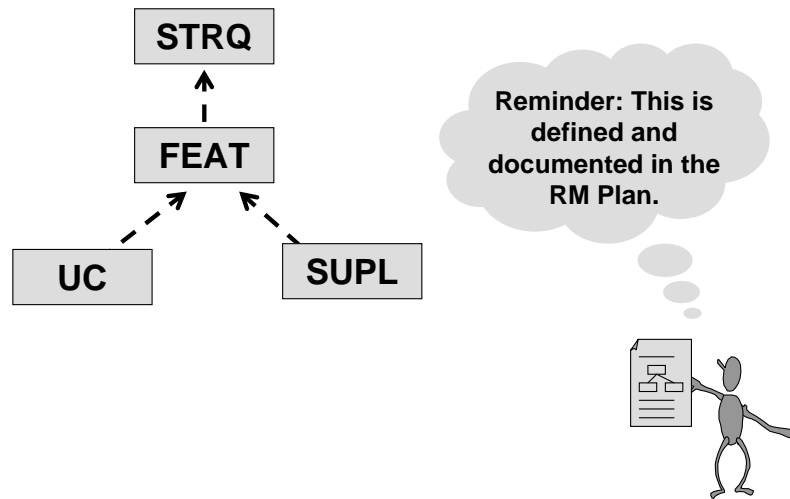
When you create traceability relationships between requirements, Rational RequisitePro visually indicates a dependency between two requirements. With this information you can perform real-time impact analysis and make informed decisions for project scope management and resource allocation, for example.

Rational RequisitePro helps you understand the impact of change with powerful traceability features that let you link related requirements. As change occurs, you are immediately aware of its impact within a project.

The RequisitePro Baseline Manager enables you to create and compare baselines of requirements contained in documents, Attribute Matrix views, and packages, or an entire RequisitePro project. Baselines can help you manage changing requirements, mitigate risks, and manage project scope more effectively.

## Requirements traceability

- A relationship between two requirements.



3

IBM

Traceability is a methodical approach to manage change by linking requirements that are related to each other.

Traceability provides a link between two associated requirements.

An example of a traceability strategy:

- Product features are directly traced to stakeholder requests.
- Use cases and supplementary requirements are traced to features.
- Use cases are indirectly traced to stakeholder requests because they trace to features, which in turn trace to stakeholder requests.

Traceability benefits for requirements management include:

- It is an efficient method of estimating the impact of a change to a requirement, because the requirements related to the changed requirement can be easily found.
- It is used to show that one requirement is derived from another or that one requirement is dependent on another.
- It helps ensure that customer needs are reflected in the final product, because the links can be followed from a customer need to the related features, to the related software requirements, to the design objects, and so on.

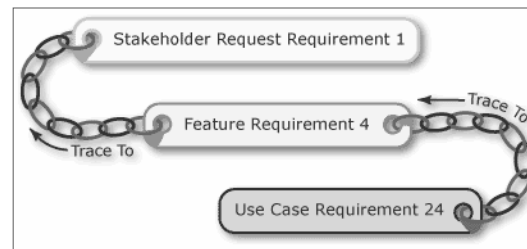
Rational recommends that you use only one direction of traceability and that you start with basic necessary traceability. Traceability is powerful and helpful, but it also takes a lot of work to maintain.

Rational RequisitePro prevents you from making circular relationships. For example, you cannot trace a use case to a feature to a stakeholder request, and the stakeholder request back to the use case.

## Traceability relationships

- Link two requirements to each other.
- Help manage change.
- Display in views:
  - ▶ Traceability Matrix
  - ▶ Traceability Tree

Views are  
created by  
Requirement  
Type.



4



Rational RequisitePro helps track changes in requirements throughout the development lifecycle. With traceability relationships, change is more visible because you can see that other requirements are related to a changed one.

There is only one traceability relationship between any two requirements. The difference between calling that relationship a “trace to” or “trace from” one is a matter of perspective.

For example, if FEAT2 is traced to UC6, both statements below are true:

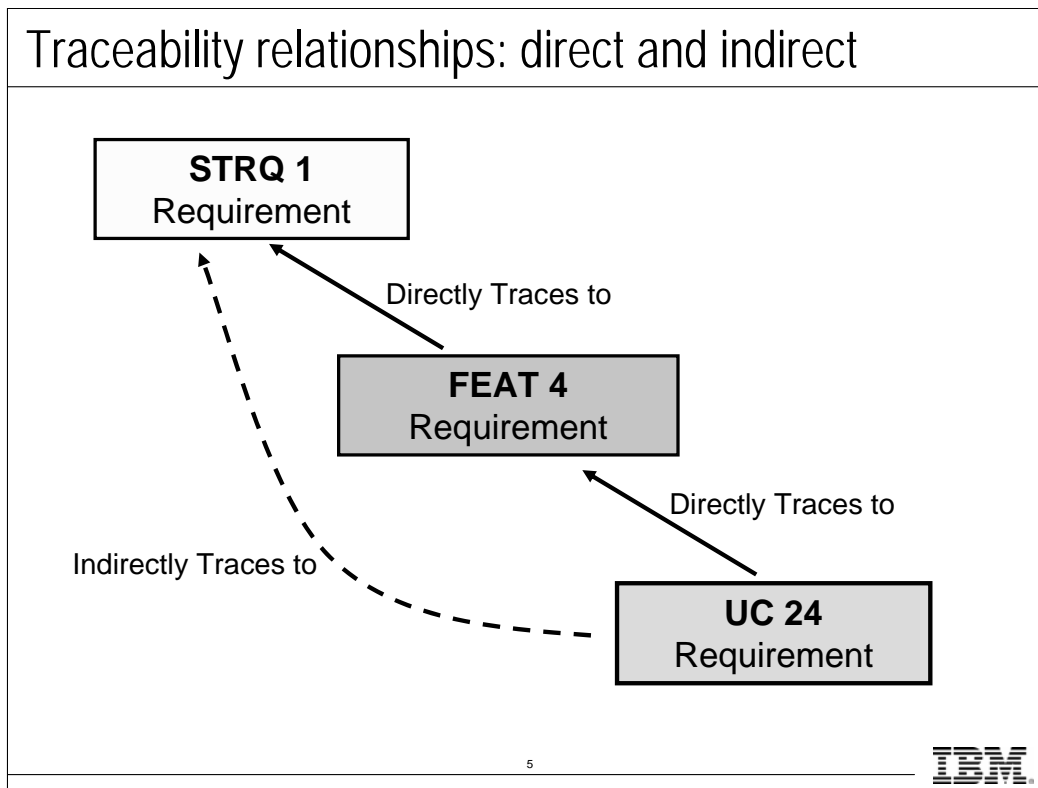
- Requirement FEAT2 is traced to UC6.
- Requirement UC6 is traced from Requirement FEAT2.

Rational recommends you use only one direction of traceability. For example, if you decide to trace *from* use cases *to* features, then consistently set all your links from a use case to a feature.

Traceability is displayed in the Views workplace in either a matrix or a tree view. The Traceability Matrix displays traceability relationships between two indicated Requirement Types. The two traceability trees (Traced out of.... Traced in to...) display the entire Traceability Tree relating to the specified root Requirement Type.

### Traceability Views tip:

- “Trace to” Row to Column: The requirements appearing in the rows trace to the requirements appearing in the columns.
- “Trace from” Column to Row: The requirements appearing in the columns are traced from the Requirement Type appearing in the rows.

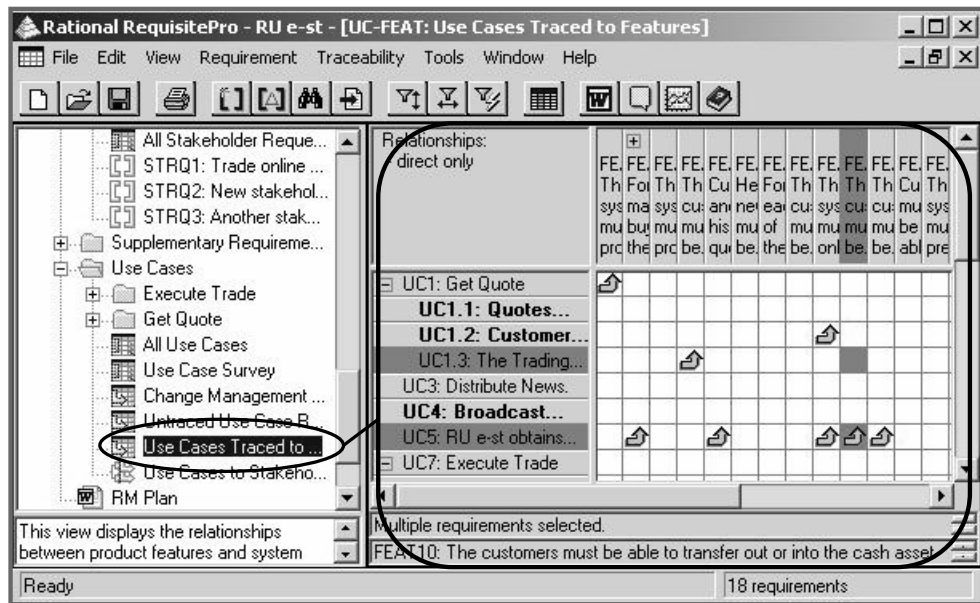


A traceability relationship is indirect if a requirement traces to an intermediate requirement (FEAT 4 Requirement), which in turn traces to a third requirement. For example, UC24 Requirement is indirectly traced to STRQ1 Requirement. The relationship between UC24 and STRQ1 is indirect.

Indirect traceability relationships are maintained by Rational RequisitePro; you cannot modify them. An arrow outlined by a dotted line, lighter in color than a direct relationship arrow, indicates an indirect traceability relationship in the Traceability Matrix and Traceability Tree views.

A Traceability Matrix always displays the direct traceability relationships. If you want indirect relationships also to be shown on a Traceability Matrix, click **View > Properties > Show Indirect**.

## Traceability Matrix



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This view helps you see the relationships between requirements and understand how a change affects other requirements and the overall project. With this information, you can make decisions about how to best manage change.

The Traceability Matrix displays the relationships between two types of requirements. The arrow indicates a relationship between two requirements. This matrix can be used to create, modify, and delete traceability relationships.

Direct traceability relationships are ones that are specified between two particular requirements. For example, in the matrix shown above, Requirement UC1.2 is directly linked to Requirement FEAT9.

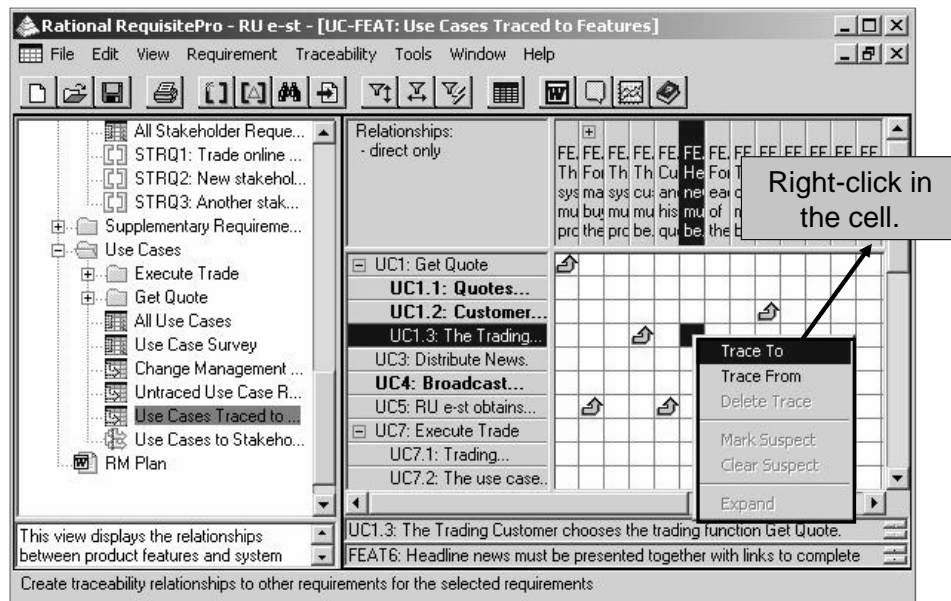
How will you use this information to manage the scope of the system?

The project requirements information that has been gathered and entered into the RU e-st project allows you to:

- See the relationships between requirements, which can determine how change impacts related requirements.
- Prioritize requirements to determine which requirements should be implemented for each iteration of development.
- Create queries based on requirement attributes to review project status and progress.
- Assure quality and verify that all implementation fulfills defined requirements.



## Set traceability links



You can easily set Traceability links within a Traceability Matrix by right-clicking the row and column you want to link.

Indirect links are created by Rational RequisitePro and are visible in the matrix if you have selected **Show Indirect** in the view's **Properties** dialog box.

To create a trace link:

From the Views workplace:

Right-click a cell, and then click **Trace To** or **Trace From**.

From the Word workplace:

Click **RequisitePro > Requirement > Trace To**.

From a requirement's **Properties** dialog box:

Click the **Traceability** tab, and select **Add** in the **To** or **From** list box. Next select the requirement to trace to or from and click **OK**.

To delete traceability links:

Right-click the link in the view, and then select **Delete Trace**.

## Traceability links: "Trace To" or "Trace From"

- Represent a bi-directional dependency relationship between two requirements.
  - ▶ "Trace from" relationships and "trace to" relationships help you understand how changing requirements can impact related requirements.
- Be consistent.
  - ▶ Use only one direction between two Requirement Types.

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When you create traceability relationships in Rational RequisitePro, you can "trace from" one requirement to another, or "trace to" one requirement from another. The difference between calling the "trace to" or "trace from" relationship is one of perspective.

The terms "trace to/trace from relationship," "traceability relationship," and "link" and are used interchangeably.

When using traceability in Rational RequisitePro, the links are automatically maintained, making it is easy to assess their impact of change. Traceability helps mitigate risk and manage the scope of the system.

For example, both of these statements are true:

**UC1 is traced to FEAT1; FEAT1 is traced from UC1.**

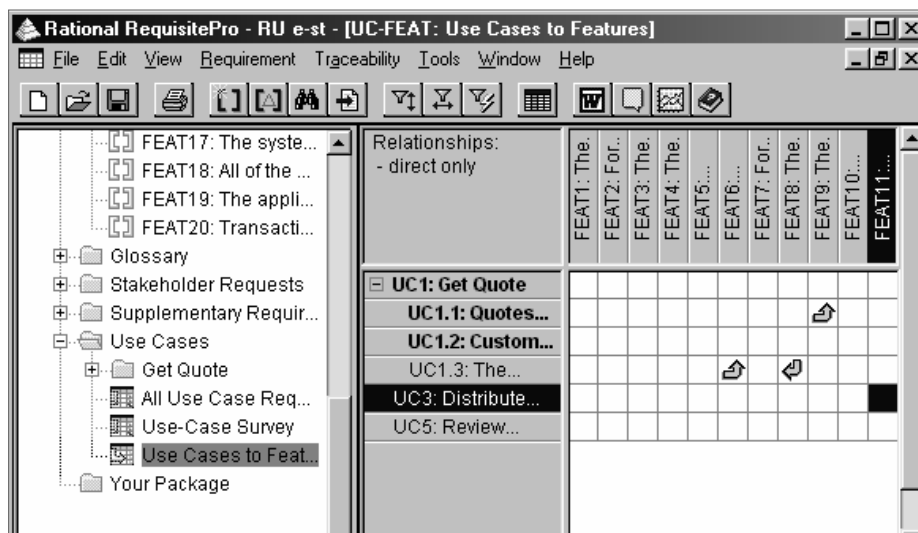
**STRQ2 is traced to FEAT2; FEAT2 is traced from STRQ2.**

Trace from relationships and Trace to relationships help you to understand how changing requirements can impact related requirements.

### **Important reminder:**

The traceability structure (directional flow and dependencies) should be decided before you start the project, defined in the RM Plan, and must be consistently used throughout the project lifecycle.

## Example of bad traceability



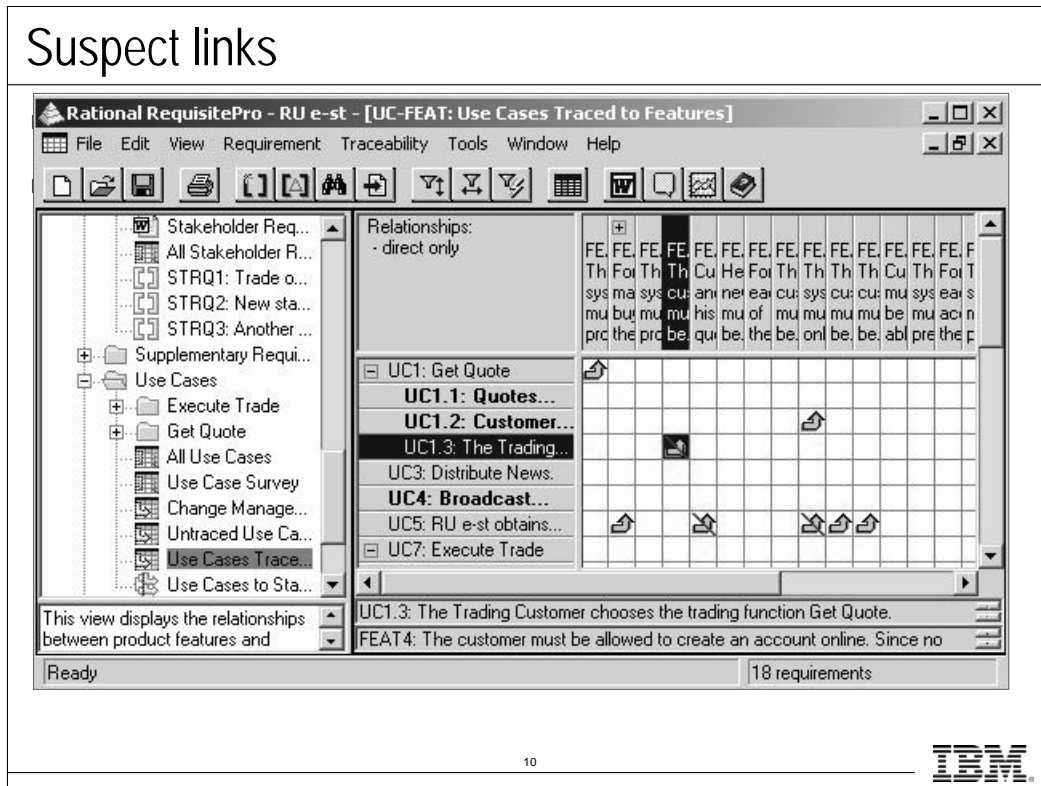
What's wrong with this picture?

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All of your traced relationships in the matrix should be in the same direction (have the same flow, bottom-up or top-down). If they are not in the same direction, then querying the database to obtain useful information becomes very difficult – if not impossible. The traced relationships should be based on the project's RM Plan.

## Suspect links



One of the exciting features of Rational RequisitePro is the ability to track suspect traceability links. When a change is made to a requirement, Rational RequisitePro automatically marks its relationships as suspect.

A visual indicator (a red diagonal line) is placed on all traceability links directly connected to the changed requirement. In addition, a link is marked as suspect if a change is made to an attribute value of a requirement (if that attribute has been defined to “affect suspect”).

A suspect link indicates a change to a requirement. Team members must review each such change.

Traceability views can be queried to display only those requirements that have links that are suspect. This is an easy way to find the requirements that need to be reviewed.

You may manually mark a link as suspect even if neither requirement has changed. You might do this to remind yourself that some aspect of the linked requirements must be reviewed.

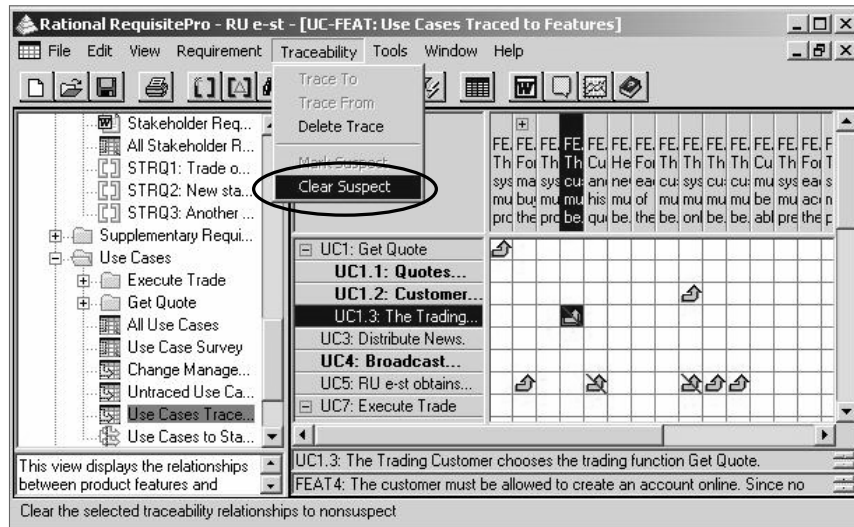
### Why do requirements change?

- The team did not ask the right people the right questions.
- There was a change in the business problem being solved.
- The users changed their minds or their perceptions.
- The external environment changed.
- The team failed to create a process to help manage change.
- The team’s understanding of the problem improved.

Rational RequisitePro marks related requirement links as suspect. When a link becomes suspect, the dependent requirements must be checked to determine if or how they are affected by the change.

## Suspect links (continued)

- Must be manually cleared.



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Since a suspect link indicates a change to a requirement, team members need to review that change.

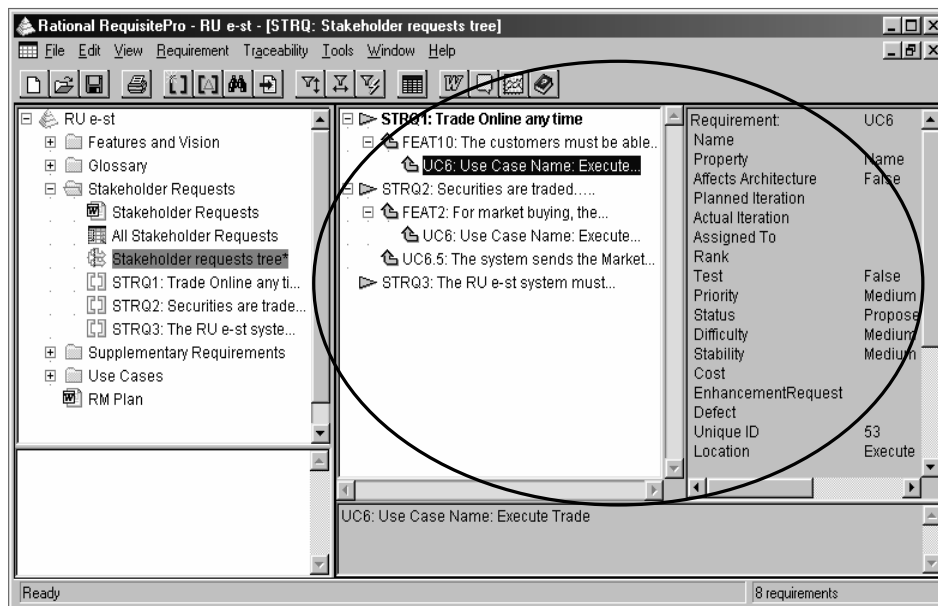
A team member determines if any updates must be made to the linked requirements. After the review of requirements in question, the suspect link must be “cleared” (erased) manually by a user.

You may manually mark a link as suspect, even if nothing has changed, as a reminder to review the link or as a reminder to review the link to ensure that the dependency relationship is valid.

You can turn off the **Auto Suspect** option—for example, during a spell check. If you do this, the option remains off until you turn it back on. So, if you turn **Auto Suspect** off for spell check, do not forget to turn it on again when the spell check is complete.

On the RequisitePro menu bar, click **Tools > Auto Suspect**.

## Traceability Tree view

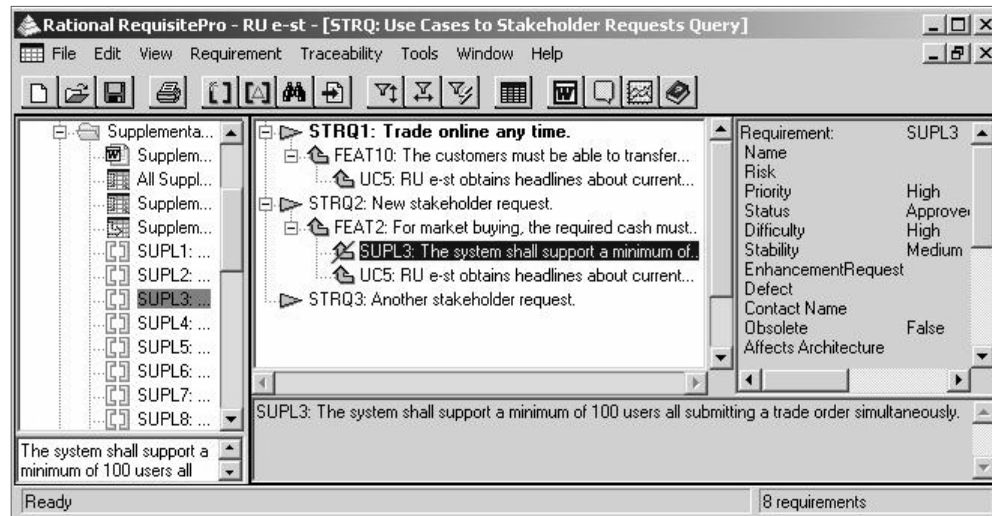


A Traceability Tree displays the entire chain of relationships based on a root requirement of one Requirement Type and all the traceability links and parent-child hierarchies associated with the root requirement. A root requirement is a requirement at the uppermost level of the requirements hierarchy.

A Traceability Tree is a view that displays all internal and external requirements traced to or from a requirement (depending on the direction of the tree).

Here is an example of a Traceability Tree with STRQ as the root requirement.

## Suspect links with hierarchical relationships



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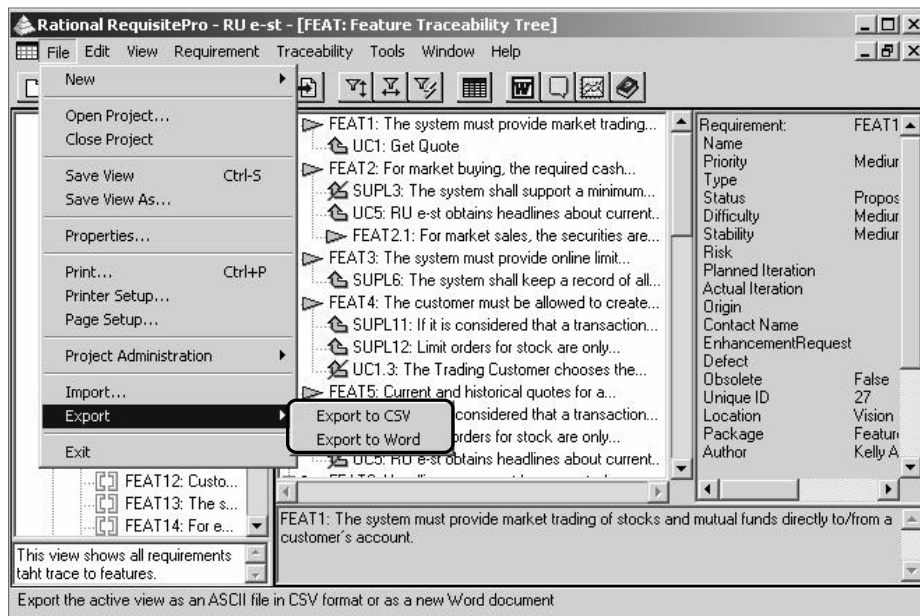
Rational RequisitePro marks suspect links between parent and child requirements. When you modify a parent requirement, Rational RequisitePro marks the relationship between the parent and all its immediate children as suspect. Changes include modifications to the requirement name, requirement text, Requirement Type, or attributes.

Suspect links on hierarchical requirements are usually viewed in Tree views. There is a special symbol for suspect links in a hierarchy: a triangle with a red line through it.

Hierarchical suspect links can also be seen in a Traceability Matrix from a Requirement Type to itself.

Hierarchical relationships are not the same as traceability relationships. Hierarchical relationships cannot be queried for suspect links. Queries are covered in the next section.

## Export a view to Word or CSV format



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Rational RequisitePro allows you to save the view results to an external file. This allows you to take the information away with you for analysis at a later time.

Views can be exported to non-RequisitePro users for review purposes. You can export a view to a CSV file or to Word format.

To export views:

Click **File > Export > Export to CSV**.

or

Click **File > Export > Export to Word**.



## Requirement queries

- Query on attribute value or traceability links.
- May be saved and rerun at any time.
  
- Questions
  - ▶ Which features are assigned to this iteration?
  - ▶ Which features are High customer priority?
  - ▶ Which use cases are completed?
  - ▶ Which use cases have been changed?

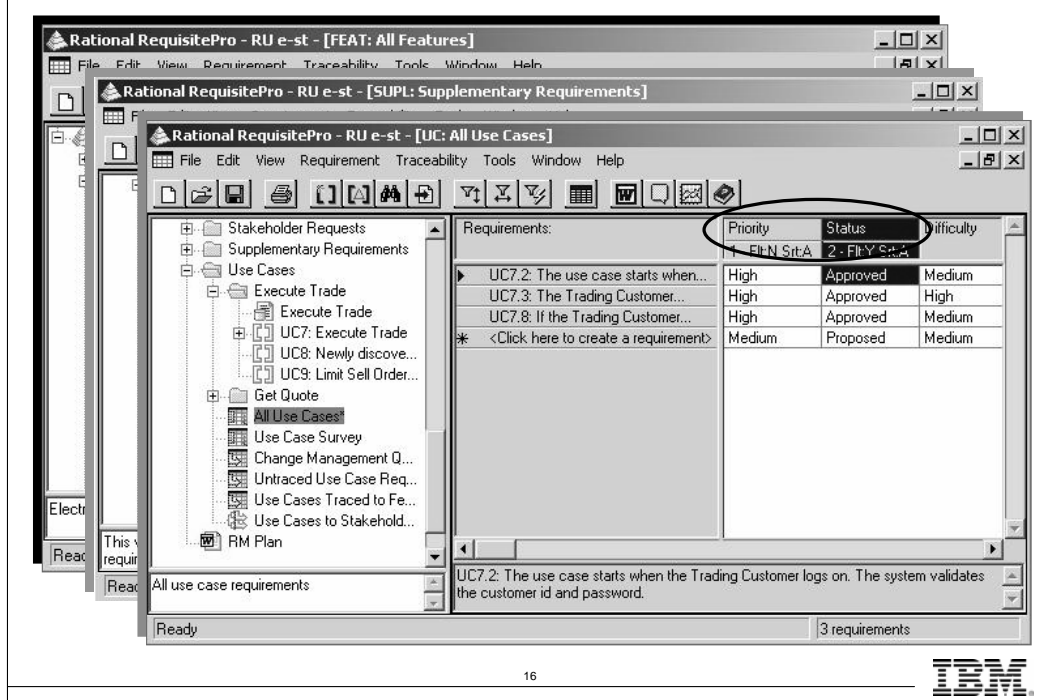
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In order to decide on the scope of the system to be built, a manager needs information about the status, cost, and difficulty of the requirements. Rational RequisitePro provides requirements management capabilities to obtain requirement information. For example, you can:

- Use attributes and traceability to manage project progress.
- Use queries to obtain answers to a variety of management questions.
- Query your requirements database to obtain answers to a wide variety of questions about the requirements.
- Save your queried views in RequisitePro as project-wide or personal views. You can rerun these saved views throughout the lifetime of the project.

## Query examples



Filter requirements in a view by limiting the value of one or more attributes or by limiting traceability.

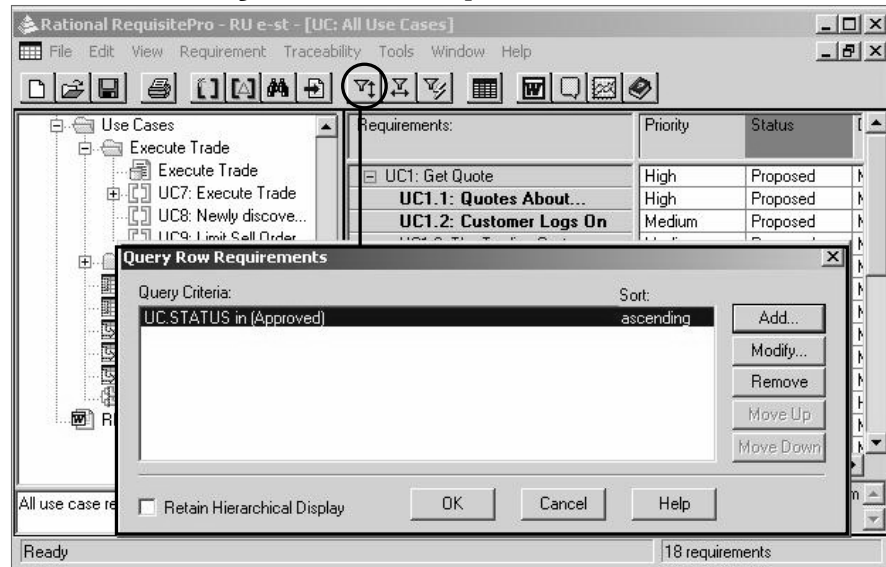
Filtering restricts the information being displayed.

Sorting determines the order in which information is displayed.

You can query row (Attribute and Traceability Matrices), column (Traceability Matrix), or root requirements.

## Define filter and sort criteria for query

- Click **Query Row Requirements** button.



Determine the filtering and sorting criteria you need to apply to generate the desired view. After you click **Query Row** or **Query Column**, Rational RequisitePro displays the dialog boxes in which you can determine your sort criteria.

For example, John needs to review all of the use case requirements with Priority value of High and Status value of Approved. To do this, he will create the Attribute Matrix, click **Query Row**, and select the criteria in the dialog box.

Once John submits his criteria, Rational RequisitePro creates the query results. The results show him the number of filters used to create the query and whether they are in ascending or descending order.

The results of John's query are static; that is, they reflect the point in time in the project at which the query was run. All query results can be saved as a view. If any changes are made to the database after John saves the view, he must update the view to see the latest information.

To update the view, click **View > Refresh** on the RequisitePro menu bar or click the **Refresh the View** button on the RequisitePro toolbar.

## Lab 5: Traceability and Requirement Queries

- Set traceability links.
- Create suspect links.
- Query requirements in a view.
- Export requirement views.



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**IBM**

### See Student Workbook Lab 5.

**Goal:** In this lab, you will create and modify traceability links, review suspect links, create traceability views, create and modify management queries, and export views.

## Manage requirements using metric reports

- **Scope management**
  - Resources and budget
  - Time
  - Priorities
- **Change management**
  - Impact analysis
- **Requirement relationships**
- **Project status**
  - Priorities
  - Tested
  - Progress

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The following queries are examples common to most projects. They can be helpful in managing requirements.

### **Scope Management (Attribute Matrix)**

- Query all requirements that are High Priority.
- Add Low Difficulty to a query.
- Query the Status value of Incorporated or Approved.
- Query use cases in the current iteration.

### **Project Status (Attribute Matrix, Traceability Trees)**

- Query all feature requirements that are Approved.
- Query all requirements of a type that do not have traceability links.

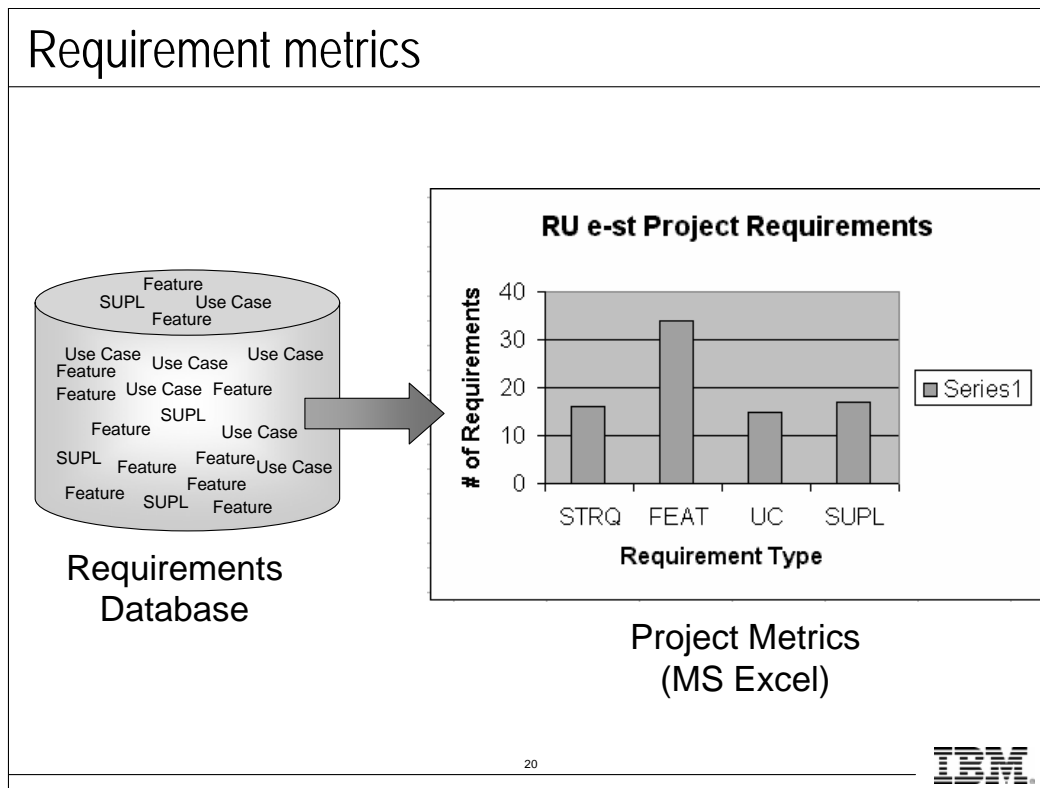
### **Requirement Relationships**

- Query use cases related to feature 1 (Traceability Matrix).
- Query all requirements of any type related to feature 1 (Traceability Tree).

### **Change Management (Traceability Matrix)**

- Query traceability links that are marked suspect.

The results of your queries can be printed out and distributed to team members for work assignments.



Now let's discuss RequisitePro metrics. Rational RequisitePro metrics provide you with reporting capabilities on the project data.

Use requirement metrics to retrieve information that is vital for evaluating the progress of project priorities, workloads, and deadlines. The reports are displayed in Excel.

Requirement metrics provide project managers and product analysts with statistics concerning project requirement attributes, relationships, and revisions.

## Requirement metrics reporting

- Provide statistical report capability.
- Apply filter(s) to requirement data.
  - Combine one or more filters to produce a query.
  - Apply one or more queries to produce a report.
  - Display reports in Microsoft Excel.



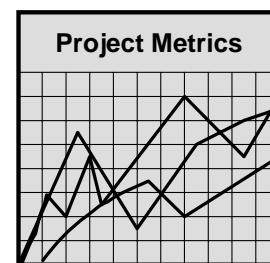
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The metrics feature is used for compiling statistics on requirement name, text, attributes, relationships, and revisions. These report results are displayed in Microsoft Excel and can be manipulated using Excel's charting capabilities.

## Metric report types

- **Static report.**
  - ▶ Uses basic filters.
  - ▶ Provides a “snapshot” view of project.
- **Trend analysis report.**
  - ▶ Uses time-sensitive filters.
  - ▶ Analyzes changes over time.



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A requirement metrics filter, query, or report is considered static if it retrieves information that provides a “snapshot” view of a project at the present time.

A trend analysis report shows how the project changes over time. Each column represents one filter in a query, and each row tallies the number of revisions that meet the criteria of the filter for the specified time period.

### **Benefits of Measuring your requirements data**

- Trend analyses
- Completeness and coverage reports
- Project status reports

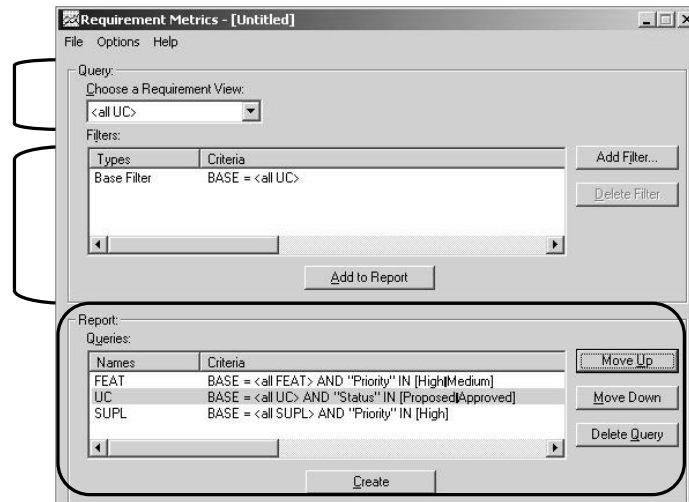
Project managers and system analysts extract information from a Rational RequisitePro project and use the output to convey project status, progress, and expected performance.

Meaningful data is dispersed to team members, management, and customers.



## Basic filters for query

- Create criteria for retrieving requirement data.



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Begin by creating one or more filters. A filter creates criteria for retrieving requirement information. For example, you would use an Attribute Count Filter to determine how many requirements in the project have a Priority value of High. You would then combine one or more filters to produce a query. A query combines the criteria from multiple filters to analyze requirements. The filters that compose a query are joined with the AND statement. Finally, you combine one or more queries to produce a report.

All data in the project that is available for creating a view is available for metrics analysis, including:

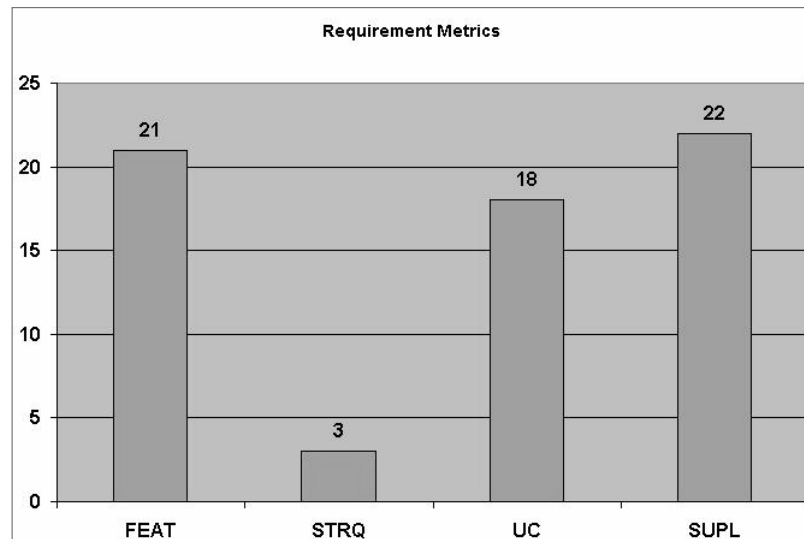
- Requirement text
- Attributes
- Traceability changes
- Hierarchical relationships
- Revision history

Once you have finished creating your filter, click the **Add to Report** button, and your filter becomes a query for the report. Multiple queries can be added until your statistical criteria are complete.

Finish by clicking **Create**. Your report is generated in Excel, which automatically opens on your desktop.

## View reports in Excel

- As a snapshot view of project statistics.



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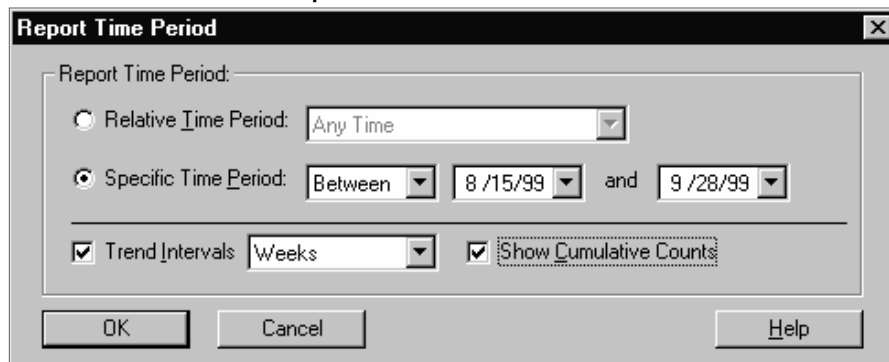
Once you have perfected your queries and filters for a report, the metric criteria can be saved and rerun throughout the project's lifecycle. You can edit the saved report at any time.

If a change is made to the requirement attributes it may make a saved report obsolete. Should this happen, Rational RequisitePro displays an error message when the report is requested.

When you save the report (metric criteria), it is saved with the file extension \*.rqm.

## Time-sensitive filters

- Analyze changes over time.
- Provide report time period options.
  - ▶ Capture data from a specified date range.
  - ▶ Provide trend intervals for days, weeks, months.
  - ▶ Accumulate requirements for each time interval.



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Time-sensitive filters are used for trend analysis reports. A report is configured by the user to capture data during a specific time frame of development. Additionally, the report data can display a variety of time intervals and return a cumulative number of requirements for each time interval selected.

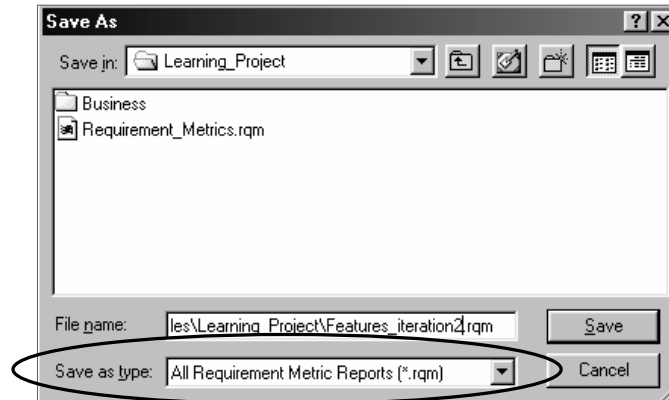
In addition to setting the **Report Time Period** options, you can request the output to detail the requirements. In this manner, you can have both the chart output of the queried report and the requirement text.

The Excel report is created in one worksheet. A summary detail worksheet is also created, which lists all requirements and text that apply to the query.

Trend analysis reports are very helpful in the management of project status. A trend analysis report is not created in the labs of this course because the class project is only one day old.

## Save reports for reuse

- Create a report, save, and rerun.
  - ▶ Save a report
    - Click **File > Save As**
      - Report, queries, and settings saved to \*.rqm file



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After you have perfected your filters and queries for a report, you can save and rerun them throughout the lifetime of the project.

To save a report, click **File > Save Report** in the **Requirements Metrics** dialog box.

Saved reports are edited and modified as easily as they are created. Be careful when editing a saved report. If any changes to the requirement types or attributes are made, the saved report may become obsolete. An error message appears if an obsolete report is requested.

## Lab 6: Metric Reports

- Create a static analysis report.
- Apply filters and queries.
- Format report output in Microsoft Excel.
- Create a Dynamic Query (Optional).



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**IBM**

**See Student Workbook Lab 6.**

**Goal:** Create some filtered queries to see project status, and show project data via Excel.

## RequisitePro baseline

- A RequisitePro baseline is a snapshot of project requirements at a particular point in the development lifecycle.
- Use baselines to:
  - ▶ Determine what has changed over time.
  - ▶ Generate reports about what has changed.
  - ▶ Create RequisitePro projects based on full project baselines.

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In a typical project, requirements often change. Baselines allow you to capture a snapshot of requirements at major project milestones.

The baseline captures information for artifacts up to the point in time in which the baseline was created. For a project baseline, historical references of all revisions up to the time the baseline is created are included in the baseline.

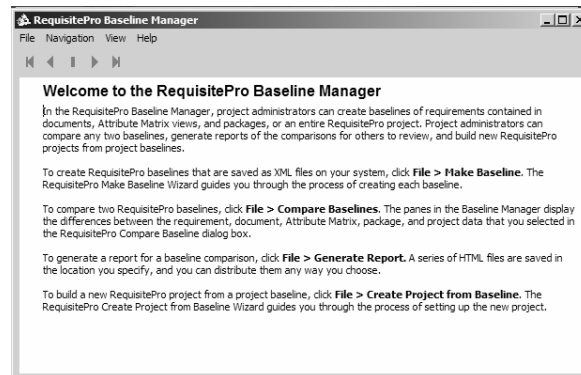
## RequisitePro Baseline Manager

- RequisitePro Baseline Manager is a tool in RequisitePro for project administrators to:

- ▶ Make baselines
- ▶ Compare baselines
- ▶ Generate reports
- ▶ Create a new RequisitePro project from an existing project baseline

- Launch the RequisitePro Baseline Manager from the:

- ▶ RequisitePro Tools menu
- ▶ Windows Start menu
- ▶ Command line



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There are three ways to launch the RequisitePro Baseline Manager:

1. In RequisitePro, click **Tools > RequisitePro Baseline Manager**.
2. In Windows, click **Start > Programs > Rational Software > Rational RequisitePro > RequisitePro Baseline Manager**.
3. From a Command Prompt window type:  
`<cmd-context> \Program Files\Rational\RequisitePro\bin\BaseComp.exe`

To learn more about the RequisitePro Baseline Manager, see *SCM315 Essentials of Using IBM Rational RequisitePro Baseline Manager* Web-based training.

## Types of baselines

Baseline type	Description
Project baseline	A snapshot of all the project data
Package baseline	A baseline of requirements, views, and documents in one or more packages
Document baseline	A baseline of the requirements in one or more documents
Attribute Matrix view baseline	A baseline of the requirements of the query results for one or more Attribute Matrix views

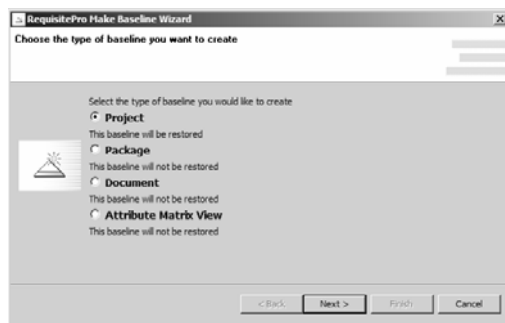
When you make a project baseline, the RequisitePro Baseline Manager:

- Converts a project's requirements data to XML files
- Saves requirement documents in a RequisitePro project (if any) with .DOC extension

After creating a RequisitePro baseline, you can add the baseline directory to a source control system, if desired.



## Making a baseline



Click **File > Make Baseline**

### ■ Use the RequisitePro Make Baseline Wizard to create a baseline.

- ▶ Select the type of baseline that you want to create and which project to use.
- ▶ Select the type of information to include in the baseline such as traceability, history, and discussions.
- ▶ XML files are created in a subdirectory named with the label you specify.

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Before making a baseline ensure that:

- You or the user who will make the baseline belongs to the administrator group.
- The RequisitePro project is closed. No one, including the person who is creating the baseline, can have the project open

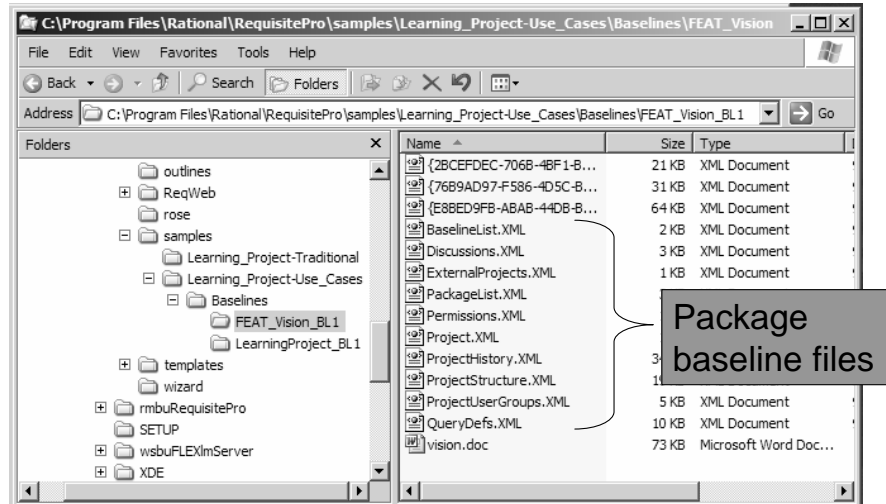
Consider making a baseline:

- After requirements are reviewed and approved
- At the end of each iteration
- When requirements are frozen going into a major product release
- When you want to create a new project based on an existing project baseline

Baseline options:

- Traceability  
This option is checked by default for project baselines. Include this option in other baseline types when you want to identify traceability changes between requirements.
- Cross-Project Traceability (CPT)  
Include this option when you want to compare changes in cross-project traceability. Cross-project traceability allows you to establish a relationship between two requirements that reside in different projects.
- History  
Include this option when you want to find out who has made a change, when, and why.
- Discussions  
Include this option when you want to find out if there are any new discussions or new replies to existing discussions.

## Example of baseline directories and files



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Before creating baselines, plan a baseline directory structure and labels that will help you organize the baselines and identify the contents of each subdirectory.

### Labels

Use baseline labels to:

- Name a directory for the XML files that are created when making a baseline.
- Identify baselines when comparing baselines.
- Identify which artifacts are included in the baseline.

Labels help you identify which baselines are older and which are newer. This information is important when comparing baselines.

Before making baselines, choose labels that clearly represent the information for that particular baseline. Apply consistent naming conventions for all your labels.

### Directory Structure

The default location for storing baseline files is

/<RequisitePro project location>/Baselines. Or, you can choose to store baseline files in another location, such as a shared drive. Example of a baseline directory structure:

```
c:/<RequisitePro project location>/Baselines
  /AttributeMatrixViewBaselines
    /AllFeaturesBaselines1
    /AllFeaturesBaselines2
  /DocumentBaselines
    /AllDocs03072006
    /AllDocs06092006
  /PackageBaselines
    /UseCasesPkgInceptionPhase
    /UseCasesPkgElaborationPhase
  /ProjectBaselines
    /LearningProjectIteration_1
    /LearningProjectIteration_2
```

## Comparing baselines

- It is important to communicate requirement changes to the appropriate stakeholders so that you can get their input on how the changes may affect the project.
- By comparing baselines, you avoid the risk of missing requirement changes.

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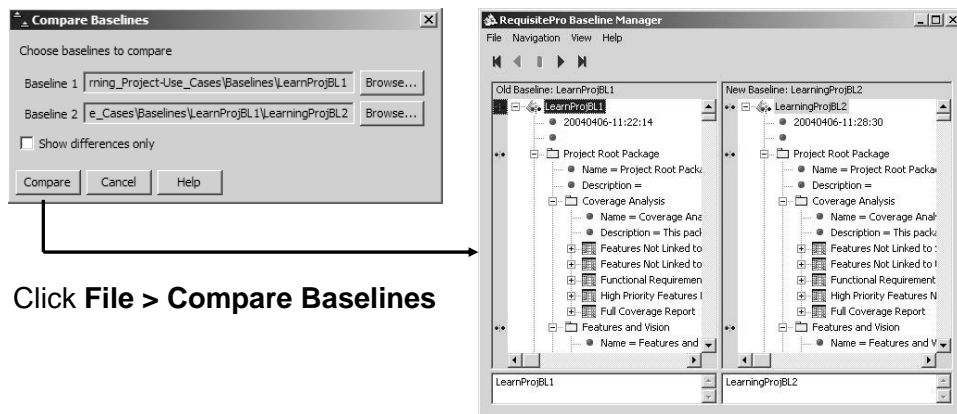
Requirements change. It is important to communicate changes to the appropriate stakeholders and get their input on how these changes may affect the project. Unmanaged changes may turn into project risks that can cause scope creep and jeopardize your project.

Comparing baselines identifies requirements changes made between two snapshots of your RequisitePro requirements documents in Word, Attribute Matrix views, packages, or projects. Comparing baselines helps you avoid the risk of missing requirement changes, which helps you:

- Effectively communicate changes to stakeholders
- Avoid project scope creep
- Mitigate project risks

## Comparing baselines (cont.)

- The two baselines you choose to compare must be:
  - From the same project
  - Of the same baseline type
- The Compare Baselines results display in side-by-side panes.



Click **File > Compare Baselines**

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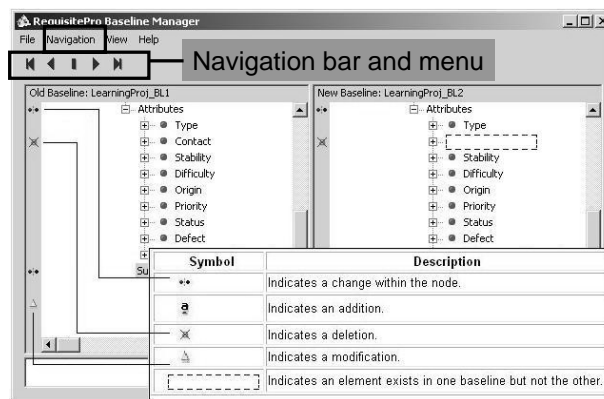
The two baselines you choose to compare must be from the same project and be of the same type, such as two document baselines, two project baselines, two package baselines, or two Attribute Matrix views baselines. You cannot compare baselines of different types. For example, you cannot compare a project baseline to a package baseline.

Project structure, History, and Discussions are compared automatically. Packages, views, and documents are compared when you expand them in the compare tree.

The Project Root Package is the container and the starting point for all user-defined packages. When you compare project baselines, Project Root Package is not compared automatically. You need to initiate the comparison of the Project Root Package by expanding the package.

## Icons in the compare panes

- Icons in the margins identify elements that have changed:
  - ▶ Additions
  - ▶ Deletions
  - ▶ Modifications
  - ▶ Moves (identified as a deletion in one location and an addition to another location)
- Use the Navigation bar or the Navigation menu to move to the differences identified by the icons.



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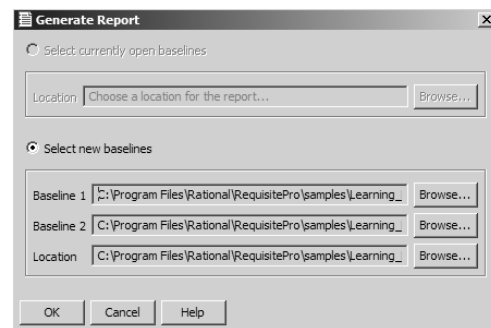
You can use the Navigation bar or the Navigation menu to move to the differences identified by Compare Baselines. The Navigation bar and Navigation menu are disabled until a difference between the two baselines is identified. You can also navigate manually through differences in the compare tree.

Actions of the Navigation bar buttons (from left to right):

- Jumps to the first difference (of what has been compared)
- Jumps to the closest difference preceding the selected node
- Scrolls to and expands the currently selected node
- Jumps to the closest difference following the selected node
- Jumps to the last difference

## Generating a baseline comparison report

- A baseline comparison report enables you to:
  - ▶ Keep a record of your baseline comparison results.
  - ▶ Share comparison results with stakeholders who may not have access to RequisitePro Baseline Manager.



Click **File > Generate Report**

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You can generate a comparison report by clicking **File > Generate Report** in the RequisitePro Baseline Manager. Reports can also be run in batch mode.

## Generating a baseline comparison report (cont.)

- The baselines that you select are compared.
- A series of HTML files are created; the files vary depending on the type of baselines are compared.
- The report identifies only requirement artifacts that have been modified.

ReqTag	Difference	Type	Name 1	Name 2	Baseline 1	Baseline 2
FEAT1	Modified	Requirement	Secure payment method	Secure payment method	Secure payment method	Secure payment method using SSL technology
FEAT16	Inserted	Requirement		Cancel orders		Shoppers should be able to cancel an order within 24 hours.
FEAT16	Inserted	List Value		Difficulty		Medium
FEAT16	Inserted	List Value		Origin		Help Desk
FEAT16	Inserted	List Value		Priority		Should

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When you generate a baseline comparison report, Baseline Manager creates a series of HTML files. The files generated vary depending on which baselines are compared.

In the report example above, notice the changes between baseline 1 and baseline 2. Existing requirements were modified and new requirements were added.

## Lab 7: Creating and Comparing Baselines

- Create baselines.
- Compare baselines.
  - ▶ After completing this lab you will review the differences that you find with your instructor.



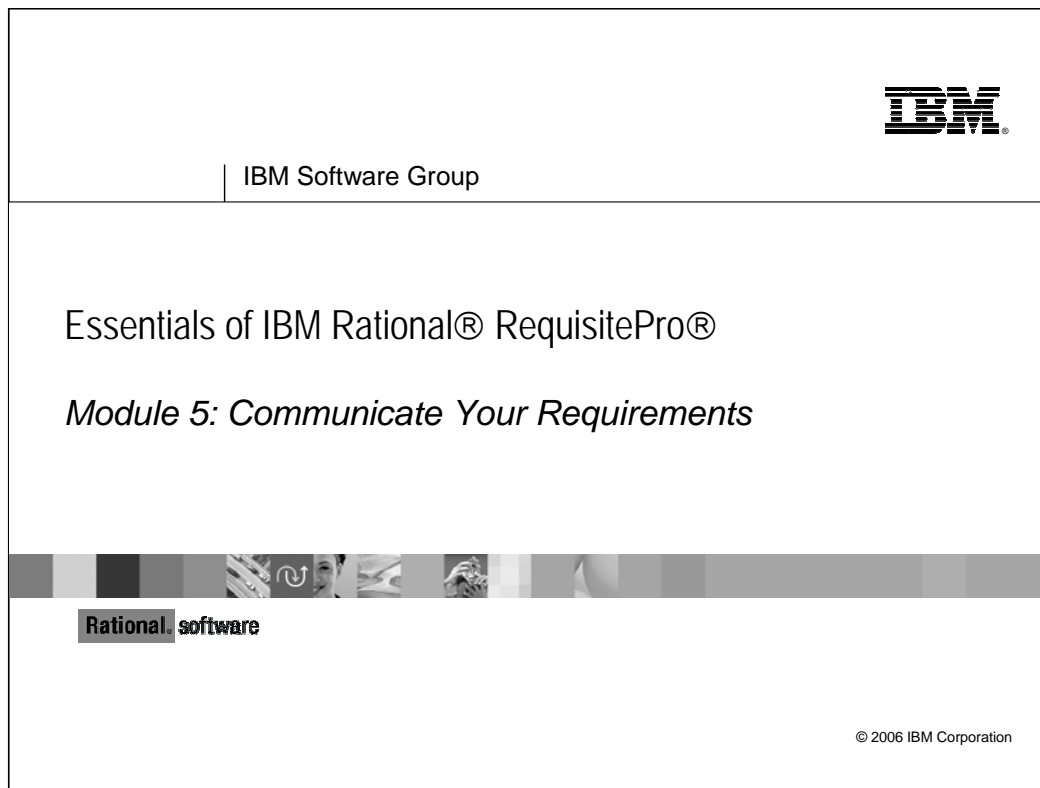
38

**IBM**

### See Student Workbook Lab 7.

**Goal:** Create project, package, attribute matrix view, and document baselines. You will make changes to the project and create new baselines. You will then use the Compare Baseline tool to identify the changes in the baselines.





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## Objectives: communicate your requirements

- Explain what revision notification is.
- Know how to register to a requirement and get revision notification in e-mail.
- Participate in discussion groups.

2



In this module, you will learn how to use features of RequisitePro to manage changing requirements and facilitate team communication. You will learn how to enable revision notification so that you can be alerted when requirements you are interested in change. You also will learn how to use the Discussion Groups feature to facilitate communication within the project team.

## Team communication

- As requirements define what the system must do, it is important that you involve different stakeholders in requirements management, and keep them informed of changes made to the project and requirements.
- RequisitePro mechanisms for communicating with team members and stakeholders:
  - ▶ Revision notification
  - ▶ Discussion groups

3



Keeping the project team and business stakeholders involved in requirements management can be a time consuming task. RequisitePro provides revision notification and discussion groups to aid team communication.

Revision notification allows users to subscribe requirements and receive e-mail notification when changes occur to them. Discussion groups let you address comments, issues, and questions to a group of discussion participants. Discussions can be associated with one or more specific requirements, or they can refer to the project in general.

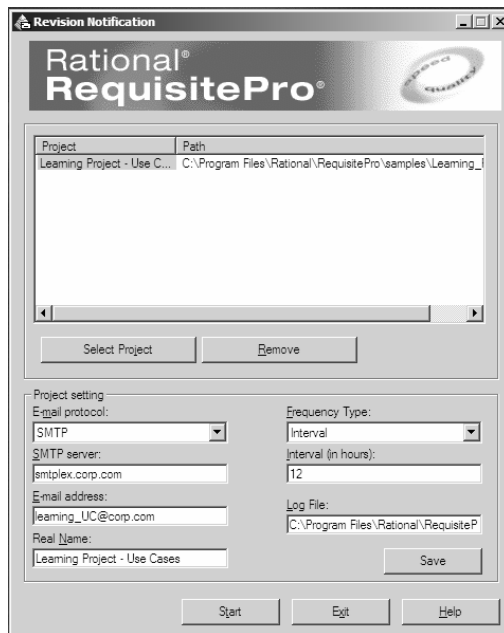
By understanding the impact of change, you are much better equipped to control changes that affect your project.

## Requirement revision notification

- RequisitePro provides e-mail notification when changes occur to the requirements you subscribe to
  - ▶ Project administrators enable revision notification
  - ▶ Users subscribe to requirements to receive change notifications by e-mail
  - ▶ RequisitePro monitors projects for revisions at specified times or intervals
  - ▶ When RequisitePro detects revisions that have occurred since the last notification, RequisitePro sends an e-mail message containing the change information to subscribed users of the requirements that have changed

## Enabling revision notification

- The project administrator sets up revision notification
  - ▶ Which projects RequisitePro should monitor for changes
  - ▶ E-mail protocol to be used
  - ▶ E-mail address for each project
  - ▶ E-mail alert frequency



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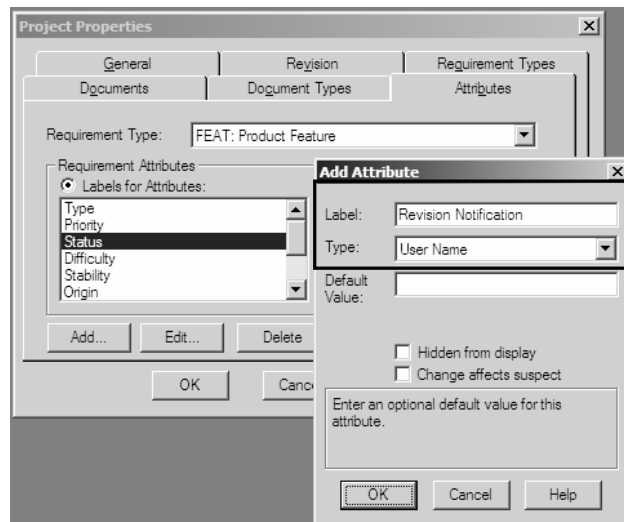
You can access this tool by double-clicking the Revision Notification executable file in the default location of:

C:\Program Files\Rational\RequisitePro\bin\RqReqEmailConfig.exe

For SMTP protocol, the administrator specifies an e-mail address to identify the sender of the e-mail notifications. The administrator can create an e-mail account for each RequisitePro project to indicate the project as the sender.

## Enabling revision notification (cont.)

- The project administrator adds an attribute of type User Name with a label of Revision Notification to each requirement type in a project



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This step is required to enable users to subscribe to a specific requirement for revision notification.

In a RequisitePro project, click **File > Project Administration > Properties > Attributes**.

## Subscribing to requirement revision notification

Requirement Properties: FEAT12: Maintain customer information

General | Revision | Attributes | Traceability | Hierarchy | Discussions

Attributes

Origin: Help Desk

Contact:

EnhancementRequest:

Defect:

Revision Notification: Kelly Ann

OK Cancel Help

You can subscribe to a requirement through its Requirement Properties dialog.

You can subscribe to multiple requirements in an Attribute Matrix view.

Requirements:	Stability	Origin	Revision Notification	Unique ID
FEAT1: Secure payment method	Medium	Partners		2
FEAT2: Easy browsing	High	Help Desk		3
FEAT3: Search by multiple criteria	Medium	Help Desk		308
FEAT4: Ability to check status of an order	Medium	Partners		5
FEAT5: E-mail notification of new titles of interest	Low	Help Desk		
FEAT6: Highly scalable	Medium	Customer visit		8
FEAT7: Ability to customize the Web site	High	Help Desk		9
FEAT8: User registration good for future purchases	Low	Customer visit		328
FEAT9: Shipping Status	Medium	Help Desk		10
FEAT10: Ability to add/remove offerings	High	Help Desk		11
FEAT11: Ability to check on customer orders	Medium	Partners		12
FEAT12: Maintain customer information	Low	Help Desk		13
FEAT13: Generate reports	Medium	Customer visit		295
FEAT14: Use Legacy System	Medium	Help Desk		14
FEAT15: Interactive guide to site through online...	High	Competitors		
* <Click here to create a requirement>	Medium	Help Desk		empty

Set Value

Set the value of the attribute "Revision Notification" to the value specified below for all requirements selected in the view.

Value: Kelly Ann

OK Cancel Help

Anyone who has an interest in a specific requirement should consider subscribing to it. The subscriber could be an architect, a designer, a developer, a tester, a project manager, a user, or a business stakeholder.

The user name you enter should be the name listed in the Security dialog,

**File > Project Administration > Security.**


Use the Properties box to subscribe to a single requirement. Subscribing in an Attribute Matrix view enables you to subscribe to multiple requirements at once.

Subscription is based on the user who is logged in at the time. If a stakeholder wants to add another account to the subscription list, the stakeholder types the user name of the person who needs to be subscribed. For multiple users, each user name must be separated by a comma.

## Sample revision notification e-mail message

<b>Subject: Requirement revision - Learning Project - Use Cases: SUPP1</b>	
SUPP1: Interface guidelines	
<b>Revision2</b>	Revision #: 1.0018 Version Label: Date Time: 2004-07-01 13:00:04 Author: Kelly Ann Change Description: Created trace relationship to FEAT11. Created trace relationship from FEAT3.
<b>Revision1</b>	Revision #: 1.0017 Version Label: Date Time: 2004-07-01 12:59:48 Author: Pat Change Description: DIFFICULTY: Medium - Low. Requirement Text Changed. REQTEXT: The system shall follow standard interface guidelines.
.....	
<b>Tag, Name</b>	SUPP1: Interface guidelines
<b>Text,</b>	Text: The system shall follow standard interface guidelines.
<b>Package,</b>	Package: Project Root Package\Supplementary Requirements
<b>Location</b>	Location: C:\Program Files\Rational\RequisitePro\samples\Learning_Project-Use_Cases\Supplementary Specification.SUP
<b>Attributes</b>	Priority: Status: Validated Difficulty: Low Stability: Low Revision Notification: Nabil, Mario
<b>Traceability</b>	Traces from: FEAT3 Traces to: FEAT11
<b>Hierarchy</b>	Parent: None Children: None

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Revision notification e-mail messages contain information such as:

- Project name and e-mail address
- Requirement tag
- Requirement name
- Revision number
- Version label
- Date and time of the changes
- Author who made the revision
- Change description
- Current values for all properties of the requirement

The top section of the e-mail message lists all new revisions for the requirement. The last revision is listed first.

The bottom section (below the dotted line in the example) lists requirement properties: General, Attributes, Traceability, and Hierarchy.



## Team communication using discussion groups

- Engages team in dialogs.
  - ▶ Related to:
    - One or more requirements
    - Whole project
  - ▶ Tree-like display of comments and replies
- Occurs within Rational RequisitePro or through e-mail.

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Tracking issues and questions related to requirements can be a difficult task. Discussion groups provide the ability to attach discussions to the project as a whole, or to one or more specific requirements. Once a discussion is defined, it is added to the project database and is graphically represented in Rational RequisitePro as a tree-like display. The discussion can then be viewed in Rational RequisitePro by all team members.

Additionally, all discussions can be queried to assist you in managing your discussions and isolating only those discussions meeting your defined query criterion.

## Communicate requirements

- **Support:**
  - ▶ Large teams
    - Simplify the gathering of information
    - Optimize the input process
  - ▶ Multi-user environments
  - ▶ Change proposal process



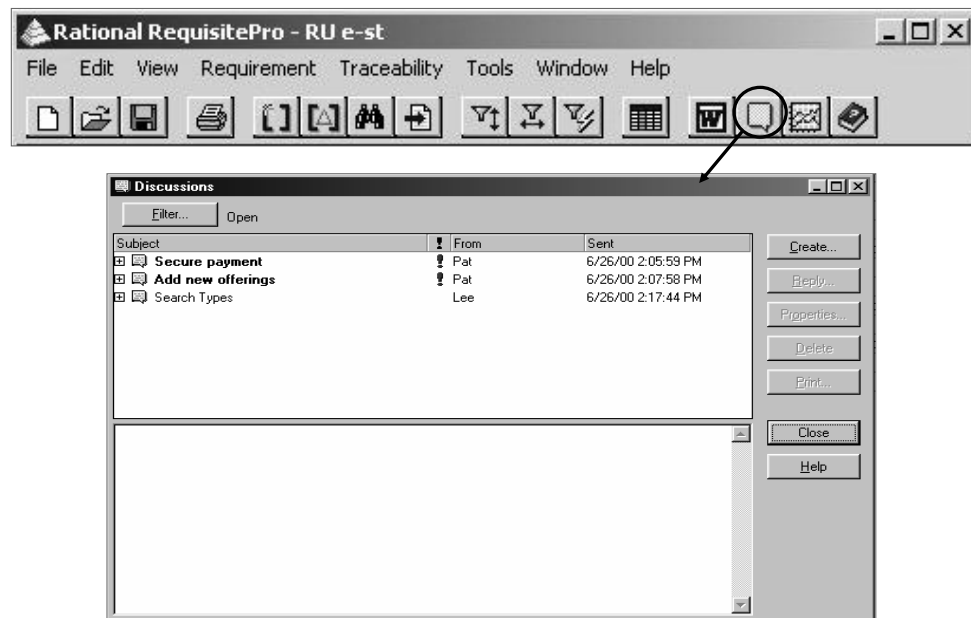
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Discussion groups allow the managed exchange of critical information or notification of proposed changes to a project or requirement.

With e-mail enabled, specified team members are informed of proposed changes or issues regardless of their access to Rational RequisitePro. This provides a solution for development teams in a distributed environment and also allows traveling team members to stay current on important facets of the project. Similarly, key customers who do not have a copy of Rational RequisitePro can be added to these discussion groups to ensure that the development stays on target with the stakeholder needs.

## Create discussions



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You can create a discussion by clicking **Show All Discussions > Create**.

The **Discussion Property** dialog box appears with fields in which you can type a discussion title and text. You can also assign priority, participants, and associate the requirements to the discussion.

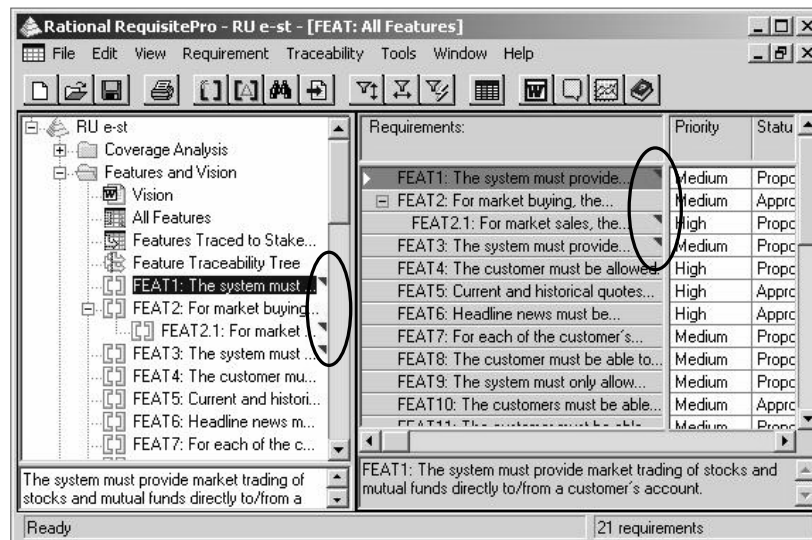
Participants may be assigned at a group level or to individual users.

A much faster way to create a discussion is to right-click a requirement in the Explorer, and then click **Discussions**.

This automatically associates the discussion with the requirement.

## Identifying discussions in Rational RequisitePro

### ■ Discussion indicators in views and Explorer.



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Discussions record ideas about anything in the project. A discussion can be centered around multiple requirements or no requirements at all. In the latter case, the discussion is associated with the entire project.

When a requirement is associated with a discussion, a red triangle is displayed in the Explorer or in any view type to the right of the requirement text.

Even though a requirement is associated with a discussion, it may be manipulated by other members of the development team. Team members may update the requirement, set or remove traceability, or perform any other necessary editing. Attaching a discussion to a requirement does not affect or prevent changes to it.

All participants can view and read discussion items in a Rational RequisitePro project.

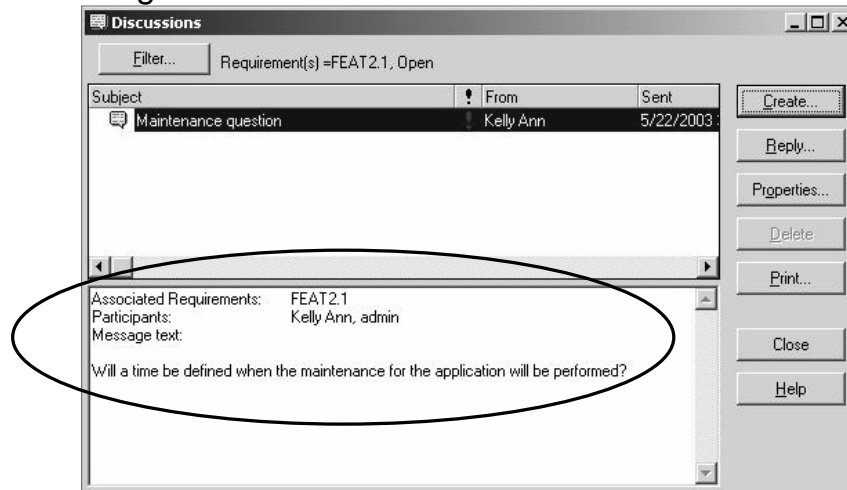
To access a discussion for a requirement, do one of the following:

- Click the small red triangle to open the **Discussions** dialog box.
- Right-click the requirement that has a discussion and select **Discussions**. You can do this from either the Explorer or the Views workplace.

This is a method of filtering the display of discussions, since you are presented with only those discussions that apply to that particular requirement.

## Viewing discussions

- Associated requirement
- Defined participants
- Message text



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Each discussion topic is listed in the **Discussions** dialog box, along with information regarding its origin. When a discussion topic is selected, the lower pane of the **Discussions** dialog box displays information regarding the topic.

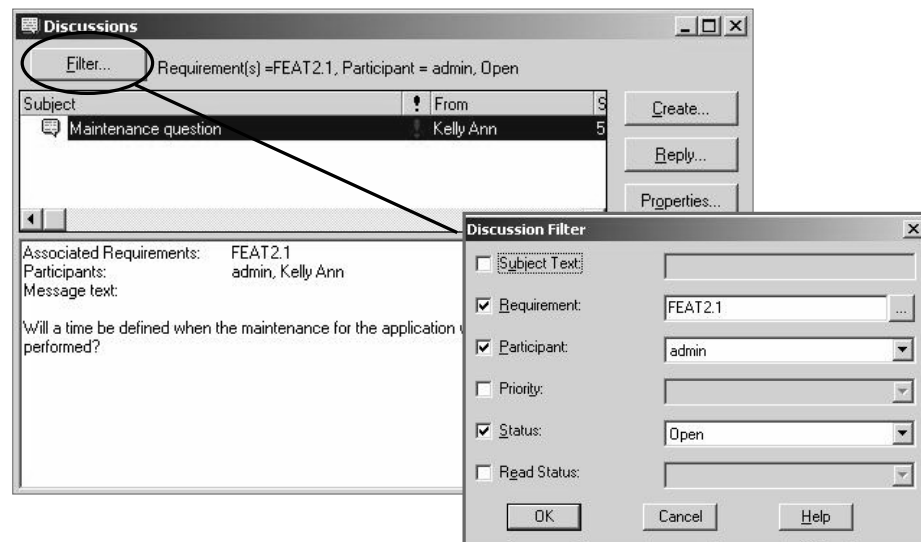
When a team member creates a new discussion, he or she has the opportunity to restrict the discussion to certain defined participants. If the discussion is restricted to participants, all team members may view the discussion item and responses, but only those who are participants can take an active part in the discussion.

Discussions can be e-mail-enabled. When e-mail is activated for a discussion, the participants must be defined in Rational RequisitePro before any e-mail can be sent.

All users can view and read discussion items in a project. Participants in discussion groups can create and reply to discussions in Rational RequisitePro.

## Querying discussions

- Flexible discussion query mechanism.



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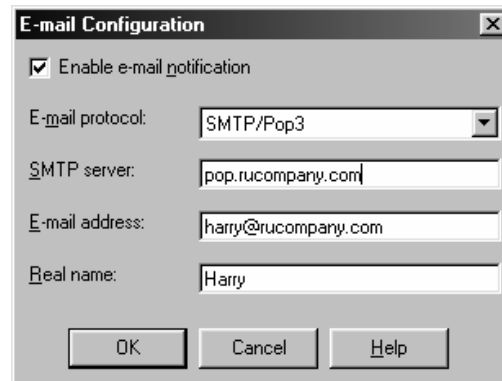


You can use filters to help you manage your discussions. Filters help you locate specific discussions by **subject, requirement, participants, priority, status** or **read status**.

By default a discussion that has been closed is not displayed when you open the **Discussions** window. To view closed discussions you must use a filter and select a status of **closed**.

## Discussion through e-mail

- Promotes team collaboration.
- Automatic distribution of discussions.



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Discussions can be set up so that participants are notified by e-mail when a discussion involves them. Participants are also able to reply to the e-mail and have their comments added to the discussion thread in Rational RequisitePro.

E-mail can be set up to use either SMTP/POP3 or MAPI mail servers. Consult your network administrator to find the name of your e-mail server.

To set up your e-mail properties, click **Tools > E-mail Setup**.

## Communicate requirements across the organization

- **Cross-Project Traceability.**
  - ▶ Trace any requirement that bridges multiple projects:
    - Corporate business rules
    - Legislative requirements

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Cross-project traceability allows you to establish traceability between requirements that reside in different projects. This is useful when you want to share requirements from one project to the next. Some examples of cross-project traceability are:

- Sharing business rules across multiple projects.
- Capturing regulatory requirements that impact all your projects.
- Sharing customer requirements across multiple projects. This usually is needed when you have a “system of systems.”

To use cross-project traceability, you first open each external project and mark the requirement types in the projects for external traceability. Then you open the primary project and connect the external projects to it. Once you make the connection, you can add traceability relationships for all requirements of the marked requirement types.

External requirements are identified with a prefix that you set in the **General** tab of each project's **Project Properties** dialog box.



## Lab 8: Group Discussions

- Create and reply to a discussion group within Rational RequisitePro.



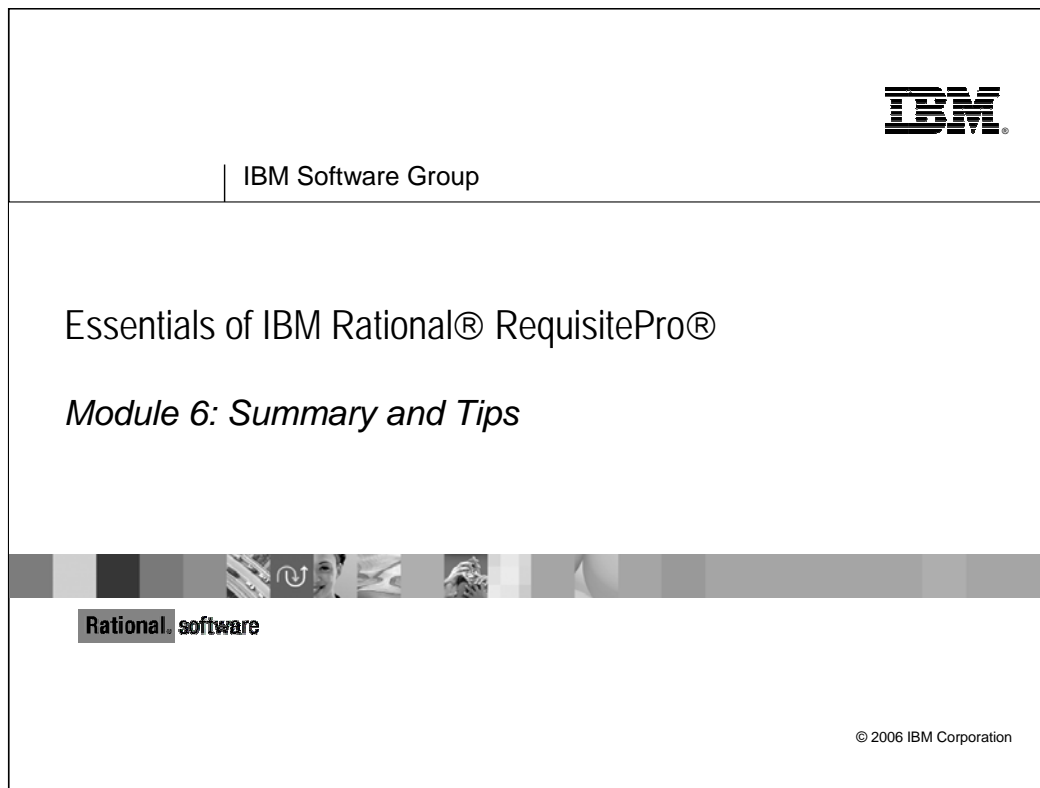
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**IBM**

**See Student Workbook Lab 8.**

**Goal:** Create a discussion.





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## Summary

- Connected to an existing project.
- Customized the project structure.
- Created, imported, modified, and deleted requirements.
- Defined traceability links, assigned attribute values, and created views.
- Imported, modified, and created documents.
- Queried requirements and produced metric reports.
- Communicated requirement information via group discussions.

2



This slide presents a high-level summary of the activities you performed today.

## Summary: plan your project

- **Requirements Management Plan.**
  - ▶ Document types
  - ▶ Requirement types
  - ▶ Attribute types and values
  - ▶ Traceability
- **Project Infrastructure.**
  - ▶ Security
    - Who needs write access to what?
    - What type of user authentication is required?
  - ▶ Database selection
    - Estimate Repository size

3



The Requirements Management plan is central to a coordinated approach to requirements management. In a nontrivial project, an unplanned RM process is a recipe for disaster.

The infrastructure you need to support your project is also important to consider. If you have a large number of requirements, choose an enterprise database such as DB2. Microsoft Access will not scale to large projects. Refer to the Rational RequisitePro Help for further details.

Rational RequisitePro also allows you to establish security to ensure that access and changes to your requirements is controlled. You can use the user authentication provided by RequisitePro or you can use LDAP authentication.

## Summary: gather, organize, and document

- Where are your requirements now?
  - ▶ What can you import vs. create manually?
- Support the management process.
  - ▶ Attributes, metrics
- Organize your requirements.
  - ▶ Packages, hierarchy

4



Getting your requirements into Rational RequisitePro is one of the first activities you must perform. Are they stored electronically? If so, Rational RequisitePro provides many features to facilitate the import process.

Always strive to write quality requirements. Can you validate that a requirement has been met? Is there only one interpretation for each requirement? Do any requirements contradict each other?

When determining the attributes to be assigned to each requirement, remember that someone has to maintain them. A simple approach is always best. You must also consider the types of information that management is going to require from the repository.

Having all your requirements in one giant bucket can make them difficult to manage. Packages and hierarchy can help you organize your requirements so that they are easy to locate and manage.

## Summary: manage your requirements

- **Traceability.**
  - ▶ Analyze the impact of change.
  - ▶ Control feature creep.
- **Metrics.**
  - ▶ Prioritize requirements.
  - ▶ Assess project status.
    - Static analysis using filters
    - Trend analysis using time-sensitive filters

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Managing the requirements that you have is important. Rational RequisitePro provides a number of different views that allow you to see your requirements from a different perspective.

A traceability matrix allows you to see a two-dimensional view of dependencies between requirements.

An attribute matrix allows you to view all of the requirements by the values that their attributes contain. Filtering this view allows you to see things like highest priority requirements, and so on.

A traceability tree shows you the dependencies between requirements at multiple levels.

Metrics can be obtained to show things such as the rate of changes to your requirements.

## Qualities of software requirements sets

- **Correct.**
  - ▶ Is a true statement of something the system must do.
- **Complete.**
  - ▶ Describes all significant requirements of concern to the user.
- **Consistent.**
  - ▶ Does not conflict other requirements.
- **Unambiguous.**
  - ▶ Is subject to one and only one interpretation.

ref – Leffingwell & Widrig (1999). IEEE 830-1993, § 4.3.2, 1994

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### **Correct**

- Does every requirement state something required of the system?  
“A set of requirements is correct if and only if every requirement stated therein represents something required of the system to be built.” *Davis (1993)*  
It is not possible to determine if a requirement is correct simply by reading the requirement. The correctness is verified by a subject matter expert during a review.

### **Complete**

- Does the set of requirements include all significant requirements, whether related to functionality, performance design constraints, attributes, or external interfaces?
- Have the expected ranges of input values in all possible scenarios been identified and addressed?
- Have responses been included to both valid and invalid input values?
- Do all figures, tables, and diagrams include full labels and references and definitions of all terms and units of measure?

### **Consistent**

- Is it internally consistent, with no subset of individual requirements described which are in conflict? (E.g. Vision document, the use-case model and the Supplementary Specifications)

### **Unambiguous**

- Does each requirement have one, and only one, interpretation?



## Qualities of software requirements sets (cont.)

- **Verifiable.**
  - Can be tested cost effectively.
- **Ranked for importance and stability.**
  - Can be sorted based on customer importance and stability of the requirement itself.
- **Modifiable.**
  - Changes do not affect the structure and style of the set.
- **Traceable.**
  - The origin of each requirement can be found.
- **Understandable.**
  - Comprehended by users and developers.

ref – Leffingwell & Widrig (1999). IEEE 830-1993, § 4.3.2, 1994

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### **Verifiable**

- Is every requirement stated verifiable?
- Is there some finite cost-effective process with which a person or machine can check that the software product meets the requirement?

### **Ability to Rank Requirements**

- Has each requirement been tagged with an identifier to indicate either the importance and stability of that particular requirement?

### **Modifiable**

- Are the structure and style of the requirements in the software requirements set (use cases, supplementary specification; or software requirements specification) such that any changes to the requirements can be made easily, completely, and consistently while retaining the structure and style?
- Has redundancy been identified, minimized, and cross-referenced?

### **Traceable**

- Does each requirement have a clear identifier?
- Is it distinguishable from non-essential statements in the requirements set?
- Is the origin of each requirement clear?
- Is backward traceability maintained by explicitly referencing earlier artifacts?
- Is a reasonable amount of forward traceability maintained to artifacts spawned by the requirements set? For example, test cases.

## Tips for writing good requirements

- Write sentences that are:
  - ▶ Complete.
  - ▶ Simple.
  - ▶ In the active voice.
- Ensure that the requirement is:
  - ▶ Non-conflicting.
  - ▶ Verifiable or testable.
- Write “what” shall be done and not “how” it will be done.

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**Non-conflicting:** Focusing on each requirement as if it were an independent entity can easily lead to conflicting requirements for a given system. Organizing your requirements based on the requirement types discussed earlier helps determine assumptions and find possible conflicting requirements.

**Complete sentences:** Keep in mind that clearly communicating requirements to all stakeholders is our primary goal. If the requirements are difficult to read, the possibility of misinterpretation is increased.

**Simple Sentences:** Grammatically, a simple sentence contains a subject and predicate. When a simple sentence is used in a software requirement, the subject should identify the person or system that is being discussed.

**Active voice:** In the active voice, the subject is the agent of the action denoted by the verb. In the passive voice, the subject is the object of the action denoted by the verb.

**Verifiable and testable:** A key principle for writing a good requirement is to write it such that it can be verified or tested. This means that the requirement, if tested, could yield a “success” or “failed” result. Whenever possible, include metrics (something that is measurable or quantifiable) in your requirement so that what is expected from the system is absolutely clear.

**“What,” not “How”:** Another key principle to writing a good software requirement is to always write “what” the system will do and NOT “how” the system will do a particular task. By focusing on the “how,” the author falls into the trap of designing the system through requirements.

## Signs of troublesome or “poor” requirements

- Undefined jargon is used.
- The word “use” is used.
- Conjunctions can be found.
- Exception statements are used.
- Graphical depictions are used in lieu of a detailed textual description.
- Generalizations are used.
- Relative terms are used.
- Suggestive terms are used.
- Clarifications are used.
- The word “not” is used.

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**Undefined “jargon”:** Plug-n-play, point-and-click, WYSIWYG.

**The word “use” is used:** Example (vague): The system uses the sensor to make forecasts.

Example (clear): The system reads the barometric pressure from the sensor and applies the value to the forecast formula.

**Conjunctions can be found:** Use of: and, or, also, with.

**Exception statements are used:** Use of: if, but, when, except, unless, although.

**Graphical depictions are used in lieu of a detailed textual description:** Graphical depictions should only be used to augment a detailed textual description.

**Generalization terms are used:** Examples: Generally, usually, often, normally, typically, “as possible”, approximately, paradigm.

**Relative terms are used:** Examples: User-friendly, fast, flexible, adaptive, intuitive.

**Suggestive terms are used:** Examples: Could, should, may, might, maybe, ought, perhaps, probably.

**Clarifications are used:** Examples: “That is”, “for example”, or “like”.

**The word “not” is used:** The problem with stating what is NOT allowed is that you haven’t said what IS allowed. If the list isn’t exhaustive you have created a hole in your requirements. It is usually much easier to state what is allowed rather than what is not allowed.

## Group Exercise: identify “good” requirements

- **Example 1:**
  - The system shall have a user-friendly interface to facilitate fast data-entry.
- **Example 2:**
  - The system shall not allow numbers in a user’s password.
- **Example 3:**
  - The user shall select Login and the system will display a dialog box allowing the user to type in a User ID and Password.
- **Example 4:**
  - The system shall generally be accessible 24X7, except for when the database is being updated.

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Read each requirement example and answer the following questions:

Is it a “good” or “bad” requirement example?

Why?

- Refer to previous slides for hints.

If it is a “poor” example, what could make it a “good” requirement?

If it is a “good” example, why?

## Summary: communicating requirements

- All requirements are maintained in a repository with centralized access.
- Familiar interface:
  - ▶ Microsoft Word
  - ▶ RequisitePro Explorer
- Revision notification
  - ▶ Informs team members and stakeholders of requirement changes that may affect their work
- Discussion groups:
  - ▶ Facilitate information transfer among team members.
  - ▶ Provide a simple facilitation mechanism.

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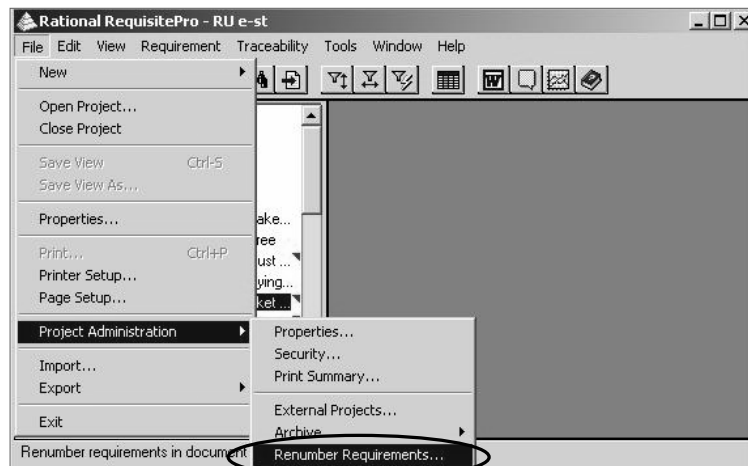
Knowing where your requirements are is at the heart of your ability to communicate them to stakeholders. Rational RequisitePro ensures that all your requirements are located in a central repository. Access to the repository is via a familiar browser and the industry standard word processor – Microsoft Word.

Revision notification allows users to subscribe requirements and receive e-mail notification when changes occur to them. RequisitePro monitors projects for revisions and sends an e-mail message containing the revision information to subscribed users of the requirements that have changed. Everyone with an interest in requirements can be informed of changes that may impact their work.

Discussion groups provide a simple, yet powerful mechanism to disseminate information related to one or more requirements. The information can be accessed through Rational RequisitePro or e-mail.

## RequisitePro tip: renumber requirements option

- Eliminates the "holes" in a numbering scheme.
- Requirements are renumbered in the order in which they appear in a document.



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The renumbering feature is useful for eliminating "holes" in a numbering scheme, which can result when you delete requirements.

To renumber requirements, you must open the project in exclusive mode.

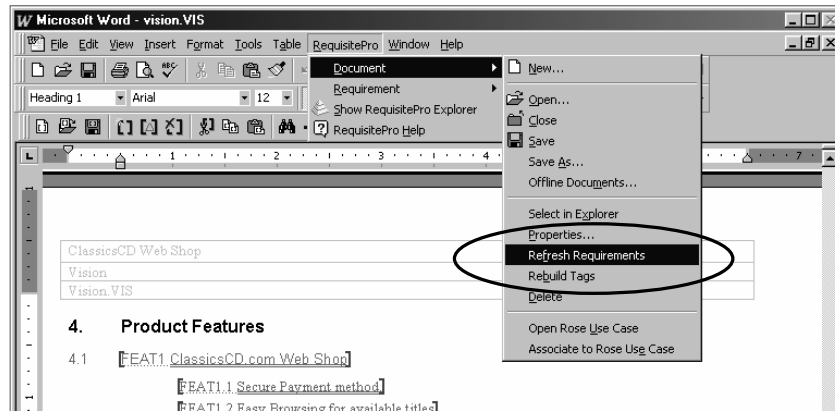
Renumbering requirements also renumbers all requirements of a given type in the entire project, not just requirements in a particular document.

To renumber requirements in documents, first open all documents that contain requirements of that type, and then click

**File > Project Administration > Renumber Requirements.**

## RequisitePro tip: capabilities for documents

- Refresh Requirements.
- Rebuild Tags.



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### Refresh Requirements

You might inadvertently overwrite the style of the requirements. A requirement's color and/or style may be overwritten with the settings attributed to another style in the document.

To restore the original requirement type style and color settings:

In the Word workplace, click **RequisitePro > Document > Refresh Requirements**.

Requirement tags can be accidentally corrupted or deleted while editing a document.

The **Rebuild Tags** command rebuilds a requirement tag that is partially or completely deleted or corrupted. Rational RequisitePro provides a list of rebuilt tags. To rebuild tags:

In the Word workplace, click **RequisitePro > Document > Rebuild Tags**.

To display/not display tags in a document, select or clear the **Show Tags** check box on the **Document General** tab in the **Properties** dialog box for the project.

## Other sources of information

- **Related courses**
  - ▶ *REQ480 Requirements Management with Use Cases*
  - ▶ *PRJ270 Essentials of Rational Unified Process*
  - ▶ *REQ270 Essentials of IBM Rational RequisiteWeb* (classroom training) or *REQ210 Essentials of IBM Rational RequisiteWeb* Web-based training
- **developerWorks Rational**
  - ▶ [www.ibm.com/developerworks/rational/](http://www.ibm.com/developerworks/rational/)
  - ▶ Product documentation, technical articles, online discussions, *the Rational edge* (e-zine), user groups, and more
- **Rational Web site**
  - ▶ [www.ibm.com/software/rational/](http://www.ibm.com/software/rational/)

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IBM® developerWorks® (Rational products) is an online community that provides information and a place to exchange of ideas and best practices. Content on the site has been edited for quality and relevance, and organized by technology and process. In addition to these resources are links to Web-based training. Use the site to:

- Learn about new tools and methodologies.
- Increase proficiency on existing solutions.
- Find tips on handling changes in project definition or technology.