LECTURE 11

Software requirements Engineering

Requirement traceability with DOORS

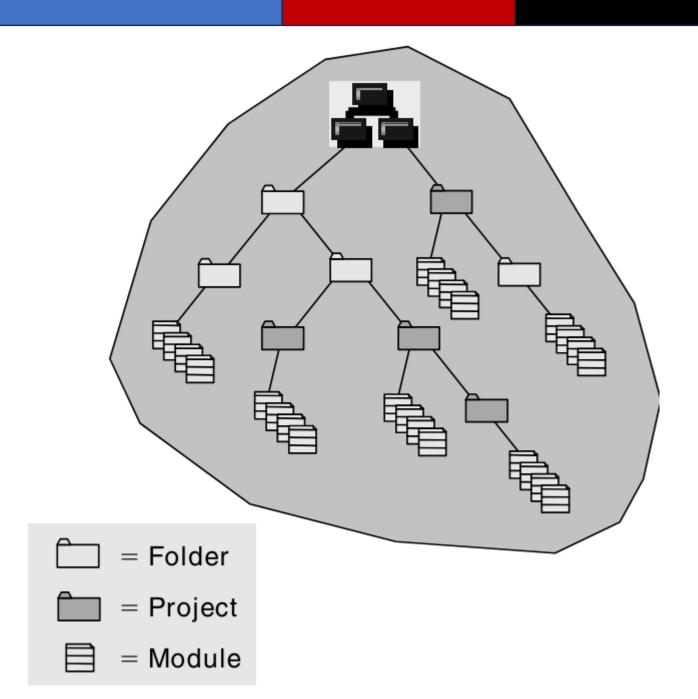
Instructor:

Dr. Natalia Chaudhry, Assistant Professor, PUCIT, University of the Punjab, Lahore. DOORS (Dynamic Object Oriented Requirements System) is a leading requirements management tool used by tens of thousands of engineers around the world.

DOORS Architecture

- Requirements and related information can be stored in a central database in DOORS.
- This database can be accessed in a variety of ways and exists throughout the lifetime of the application.
- The information in a DOORS database is stored in modules. Modules can be organized within the database by using folders and projects.
- A project is a special kind of folder that contains all the data for a particular project.
- DOORS folders are used to organize data and are just like folders in a computer file store.

- Folders may contain other folders, projects or modules.
- Folders are given a name and description and the ability for users to see or manipulate the data in a folder may be constrained using access controls.
- Projects are special folders that have additional functions associated with them.
- DOORS projects are used by a team of people to manage a collection of data relating to that team's work effort.
- The project provides the capability to manage users and their access to the data in the project, to back up the data and to distribute portions of the data to other DOORS databases.



DOORS modules are containers for data sets. Three classes of module exist:

Formal

- •Formal modules contain structured, well-defined requirements with attributes such as ID, name, description, priority, and status. They typically adhere to a specific requirement template.
- •Example: A "System Functional Requirements" module containing detailed functional requirements for a software system, each with attributes specifying its priority, status, and associated stakeholders.

descriptive

- •Descriptive modules contain unstructured or semi-structured textual information that provides context, background, or additional details about the project or its artifacts. They lack the formal structure and predefined attributes found in formal modules.
- •Example: A "Project Overview" module containing narrative descriptions of project goals, scope, stakeholders, and constraints, without the structured format of formal requirements.

link

- •Link modules establish and manage relationships (links) between artifacts in different modules. They don't contain standalone content but serve as connectors between requirements, tests, documents, and other project artifacts.
- •Example: A "Traceability Matrix" module showing traceability links between requirements in a formal requirements module and corresponding test cases in a test module.

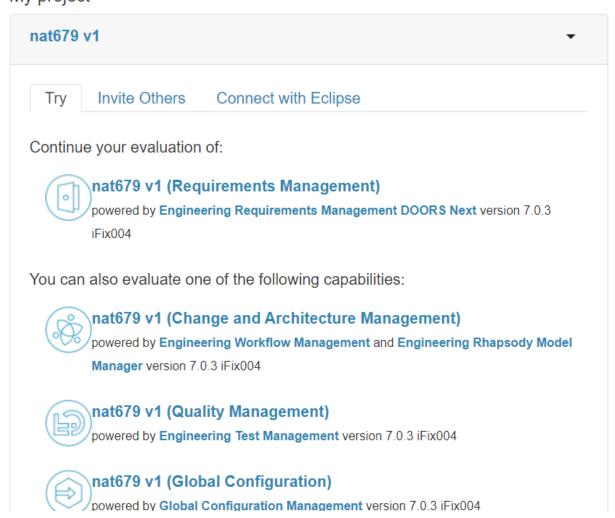
Projects, Modules and Objects

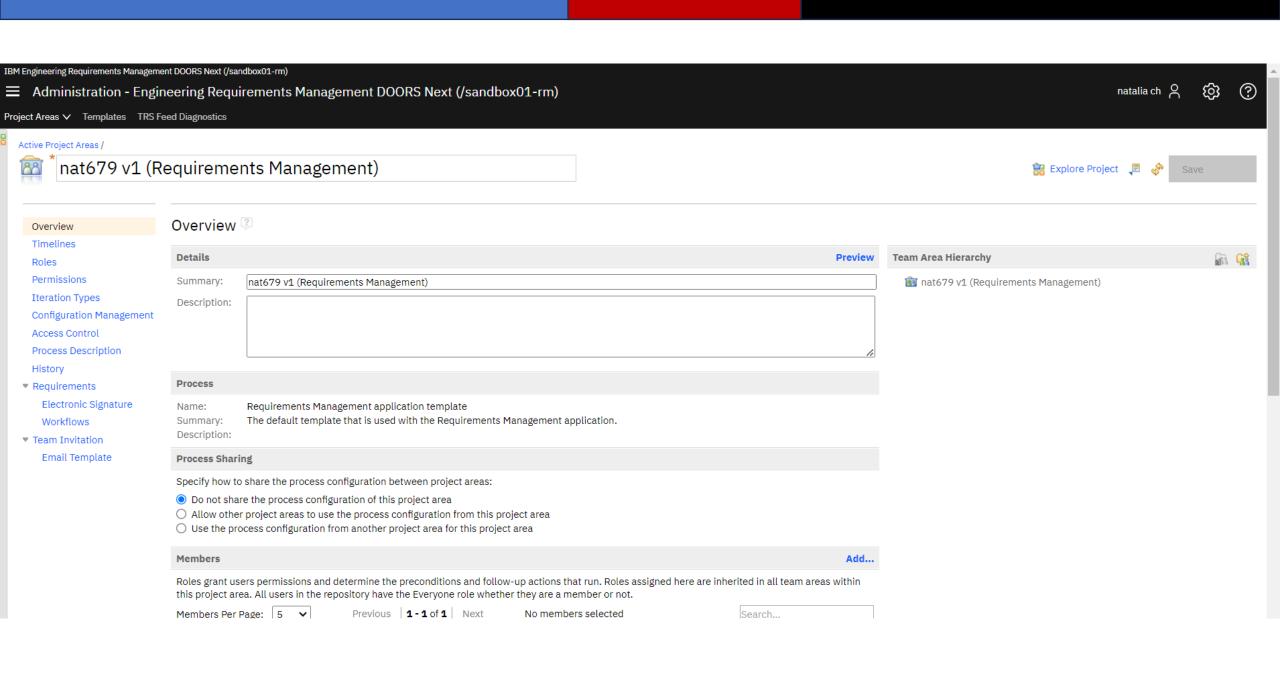
https://jazz.net/products/sandbox/?tag=rational-doors-next-generation

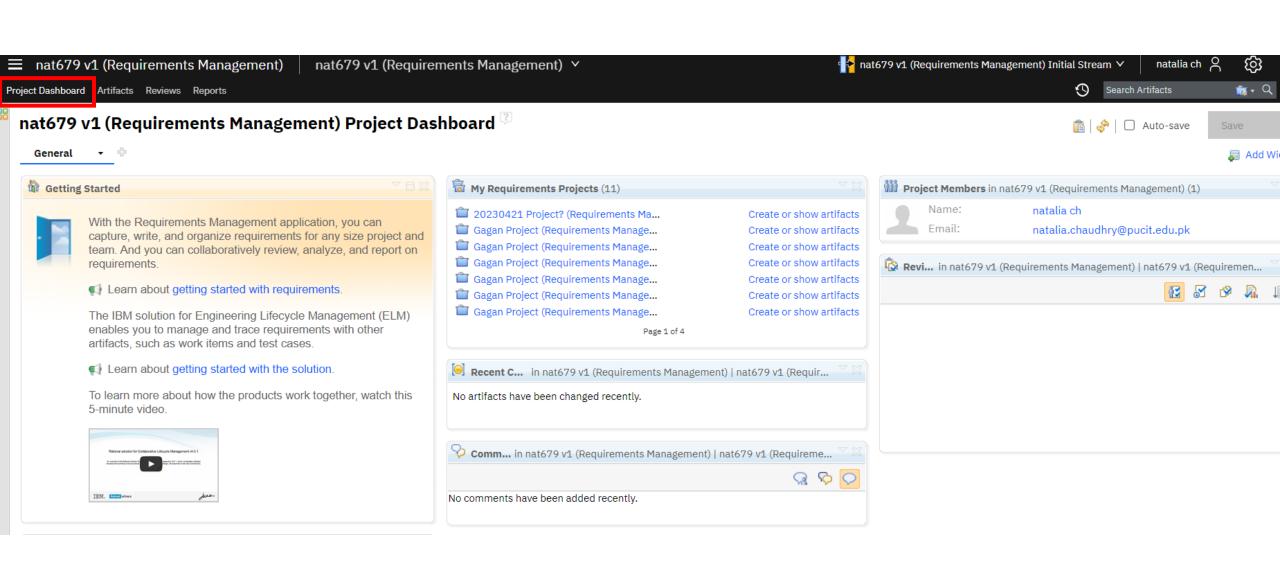
IBM Engineering Lifecycle Management Solution

This Cloud Trial System is now running ELM 7.0.3 iFix004.

My project



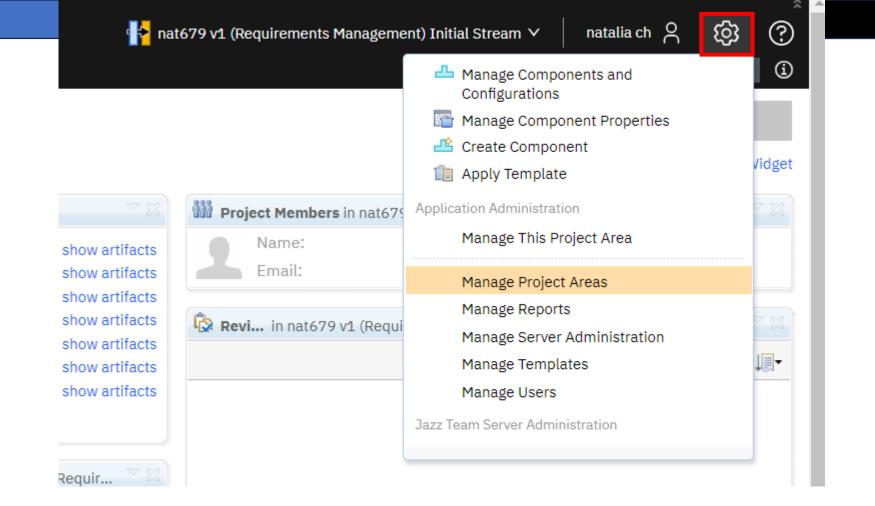




1: Setting up the project

The project manager or requirements analyst sets up a project by completing these tasks:

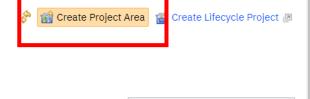
- Create a requirements project. Use a project template to establish a starting point for artifact types, attributes, link types, and folder structure.
- Customize artifact types, attributes, link types, folder structure, artifact queries (filters), and dashboards, as required.
- Work with project managers and team leaders to plan team organizations and roles, security, communications, and iteration and milestones schedules.
- Coordinate with project managers and team leaders to plan for associating requirements with development and test artifacts throughout the application lifecycle.



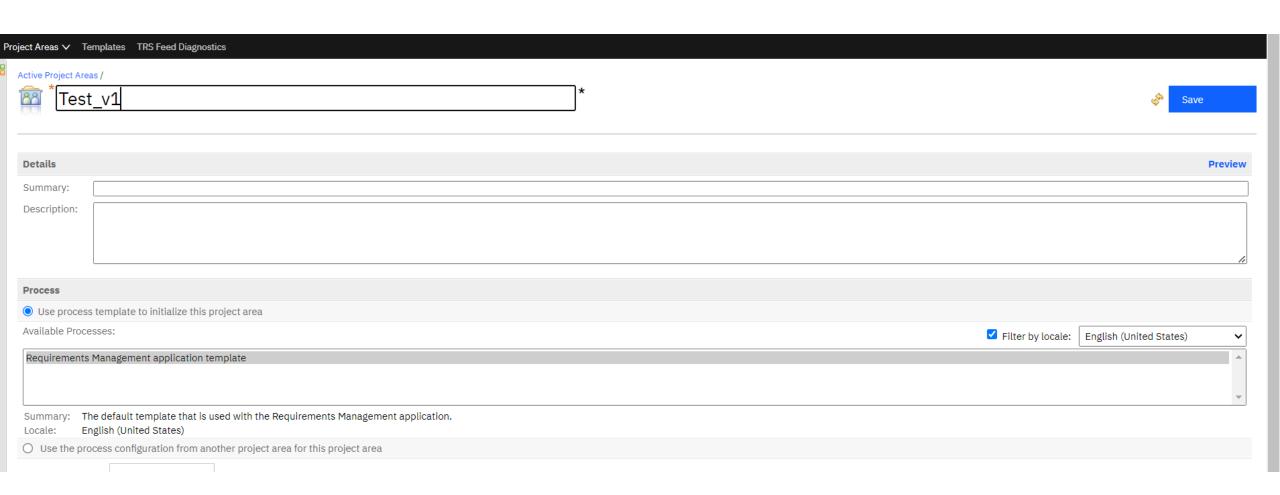
Active Project Areas

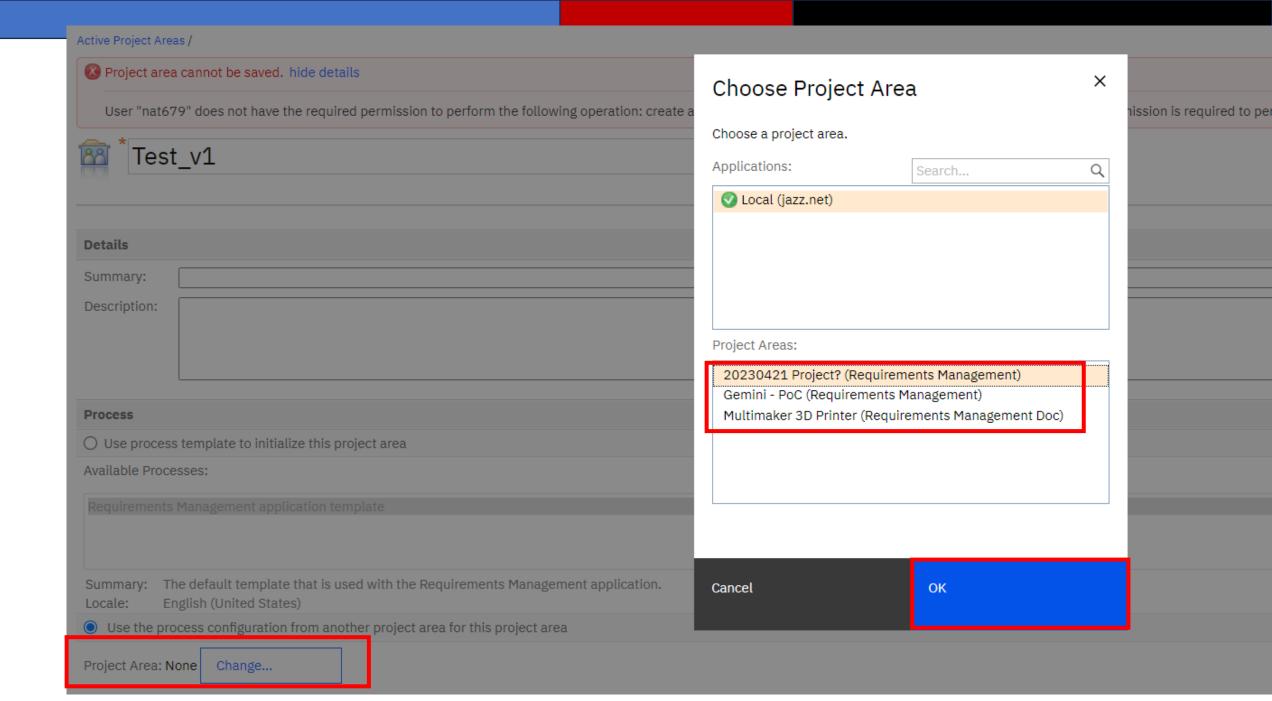
Use this interface to create and update project areas. To create a new project area, click the "Create Project Area" link. To edit an existing project area, click the project area's name in the table below.

▶ Did you want to create a Project Area or a Lifecycle Project?



Search...





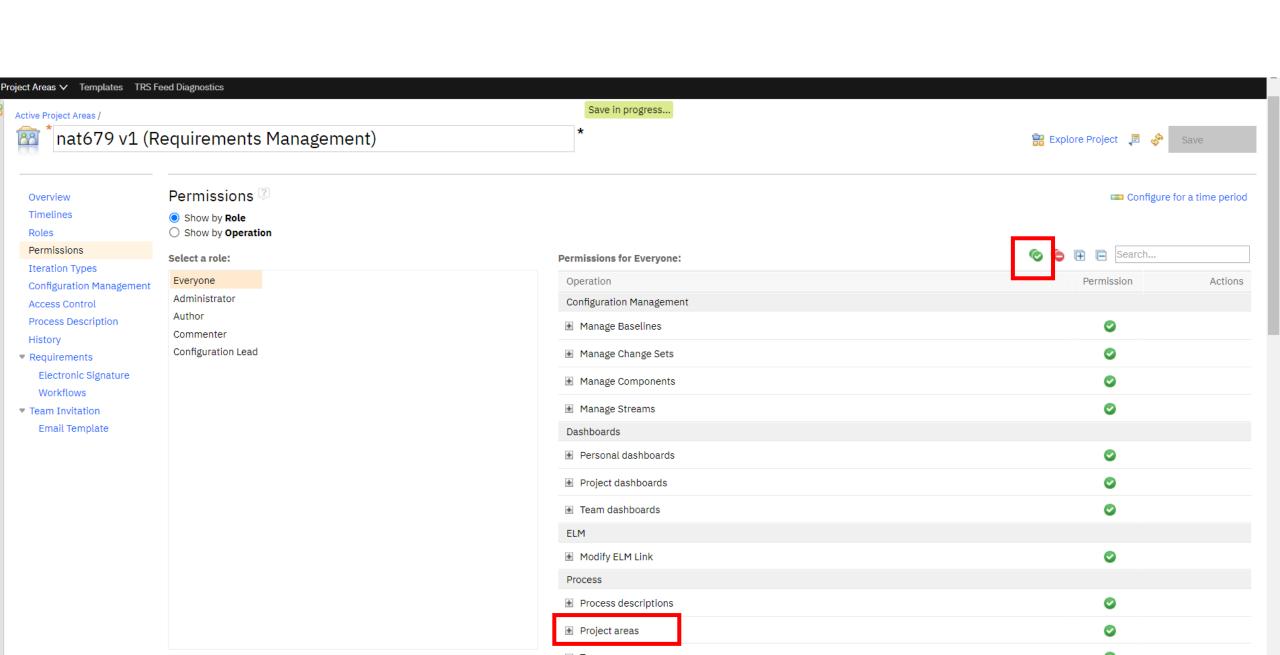
Might get an error "Project area cannot be saved"

Active Project Areas

Use this interface to create and update project areas. To create a new project area, click the "Create Project Area" link. To edit an existing project area, click the project area's name in the table below.

▶ Did you want to create a Project Area or a Lifecycle Project?

| | Previous 1 - 11 of 11 Next ▶ |
|---|---|
| Name | Description |
| 20230421 Project? (Requirements Management) | 20230421 Project? (Requirements Management) |
| Gagan Project (Requirements Management) | gagan980 Project (Requirements Management) |
| GE Training Project (Requirements Management) | GE Training Project (Requirements Management) |
| Gemini - PoC (Requirements Management) | Gemini - PoC (Requirements Management) |
| icefisher22 Project (Requirements Management) | icefisher22 Project (Requirements Management) |
| kikoos Project (Requirements Management) | kikoos Project (Requirements Management) |
| Multimaker 3D Printer (Requirements Management Doc) | Group assignment |
| | A requirement management documentation for group assignment in Requirement Engineering Requirement. |
| nat679 v1 (Requirements Management) | nat679 v1 (Requirements Management) |
| nehagrriet Project (Requirements Management) | nehagrriet Project (Requirements Management) |
| | test |
| Onboarding HEYA2 (Requirements Management) | Onboarding HEYA2 (Requirements Management) |
| rubensanchez1 Project (Requirements Management) | rubensanchez1 Project (Requirements Management) |





nat679 v1 (Requirements Management)

Members



mater in a nate in a nate

Add...









Roles

Permissions

Iteration Types

Configuration Management

Access Control

Process Description

History

▼ Requirements

Electronic Signature

Workflows

▼ Team Invitation

Email Template

Overview 🖓 Details Preview **Team Area Hierarchy** Summary: nat679 v1 (Requirements Management) Description: Process Requirements Management application template Name: The default template that is used with the Requirements Management application. Summary: Description: **Process Sharing** Specify how to share the process configuration between project areas: O Do not share the process configuration of this project area O Allow other project areas to use the process configuration from this project area Ouse the process configuration from another project area for this project area







Save

All Projects

(jazz.net)

My Projects

Show All Projects

nat679 v1 (Requirements Management)



Components

Create Component



nat679 v1 (Requirements Management)



A Show Artifacts A Show Modules

nat679 v1 (Requirements Management)



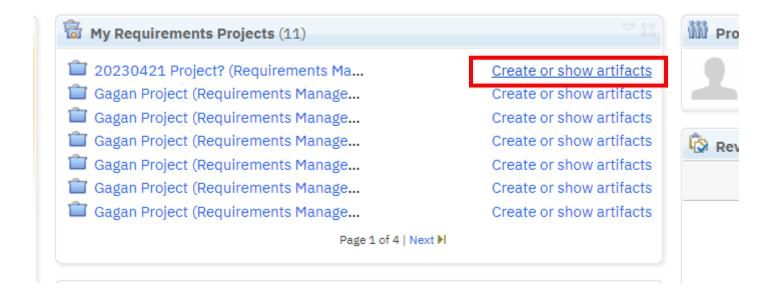
Components

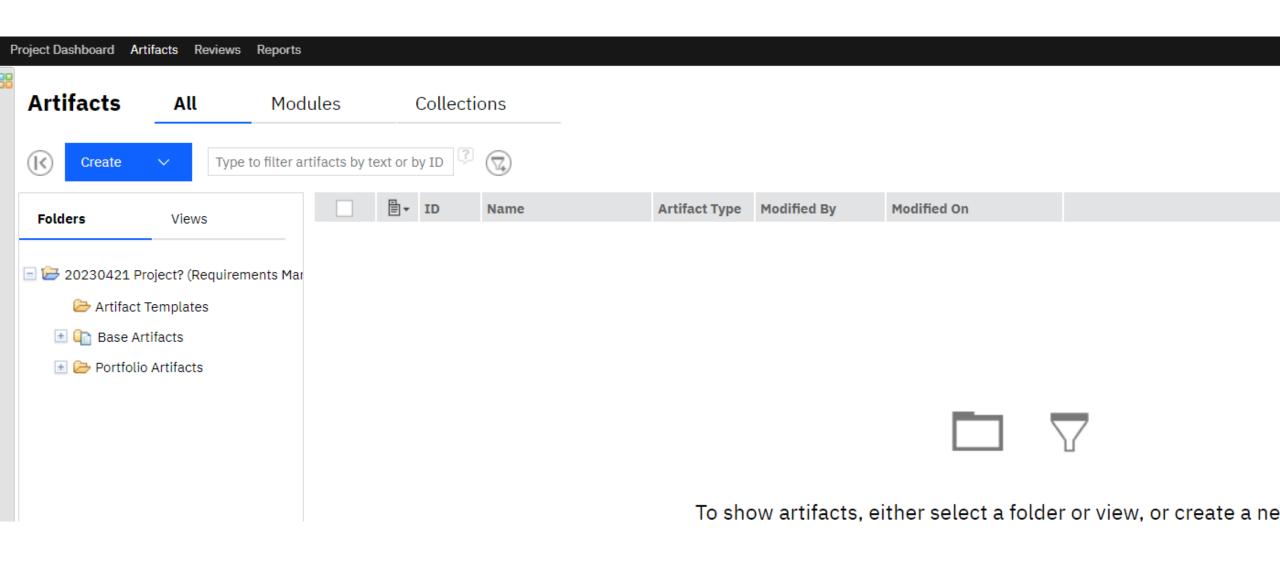
Explore Dashboard

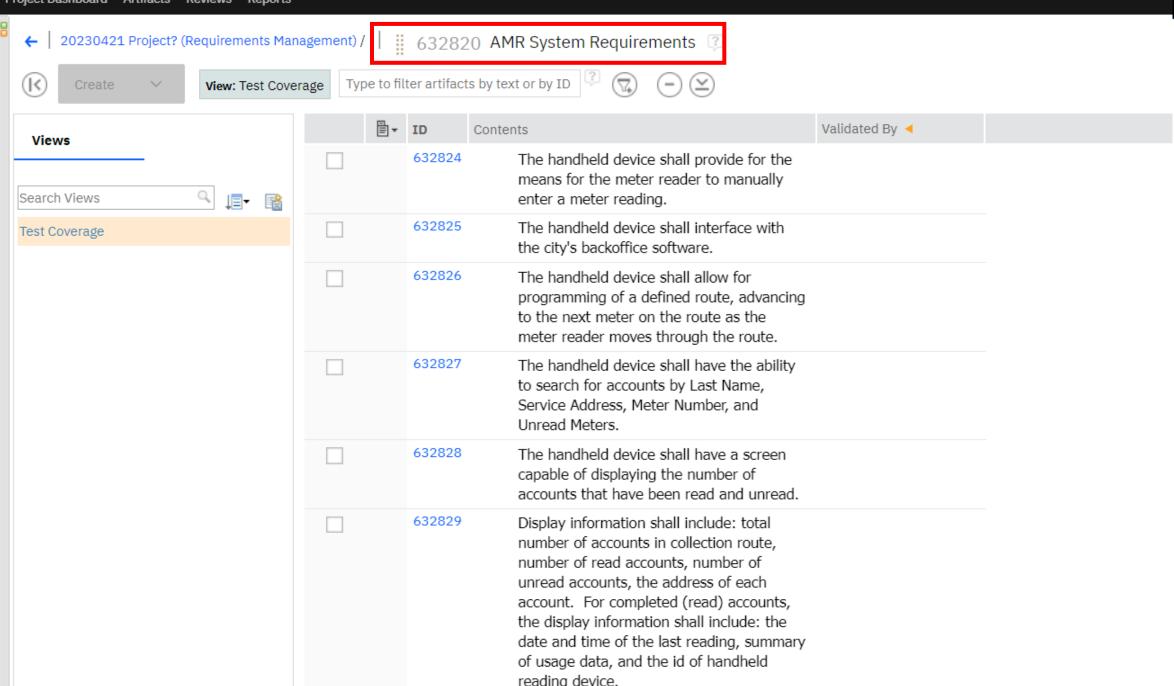
Create Component

nat679 v1 (Requirements Management)

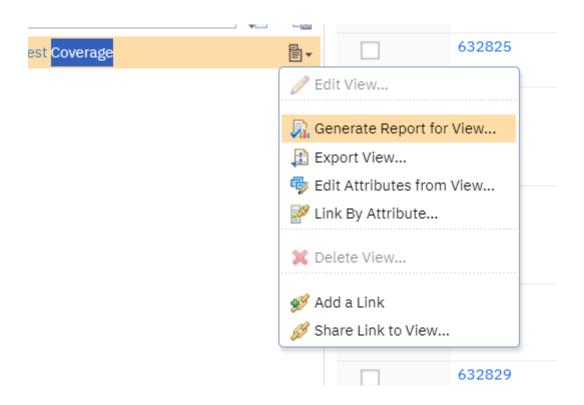
M Show Artifacts Show Modules







Showing 1.4 of 17 (20%)







Select the Report Type 2





Select the type of report to be generated

Available reports:

Audit History

Print Module Book

Print Module Table

Traceability Report



Create a Report

Select the Artifacts 3



Specify which artifacts will be included in this report

Number of artifacts included in the report: 14

632824: The handheld device shall provide for the means for the meter reac ▲ to manually enter a meter reading.

a 632825: The handheld device shall interface with the city's backoffice software.

🔒 632826: The handheld device shall allow for programming of a defined rout advancing to the next meter on the route a...

🔒 632827: The handheld device shall have the ability to search for accounts b Last Name, Service Address, Meter Number,...

a 632828: The handheld device shall have a screen capable of displaying the number of accounts that have been read and u...

a 632829: Display information shall include: total number of accounts in collection route, number of read accounts, numb...

a 632830: The handheld device shall allow the meter reader to enter information about meters relocated on a particular r...

🔒 632831: Info captured via the handheld device shall be downloadable via either cable hookup or wireless signal.

Add...

Create a Report

Select the Artifacts 3

Specify which artifacts will be included in this report

Number of artifacts included in the report: 15

632820: AMR System Requirements

🔒 632824: The handheld device shall provide for the means for the meter read to manually enter a meter reading.

🔒 632825: The handheld device shall interface with the city's backoffice software.

🔒 632826: The handheld device shall allow for programming of a defined rout advancing to the next meter on the route a...

🔒 632827: The handheld device shall have the ability to search for accounts b Last Name, Service Address, Meter Number,...

🔒 632828: The handheld device shall have a screen capable of displaying the number of accounts that have been read and u...

🔒 632829: Display information shall include: total number of accounts in collection route, number of read accounts, numb...

🔒 632830: The handheld device shall allow the meter reader to enter information about meters relocated on a particular r...

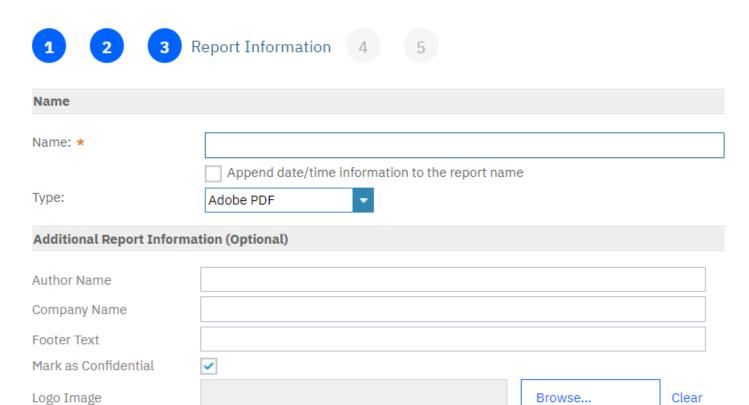
🔒 632831: Info captured via the handheld device shall be downloadable via 🦠

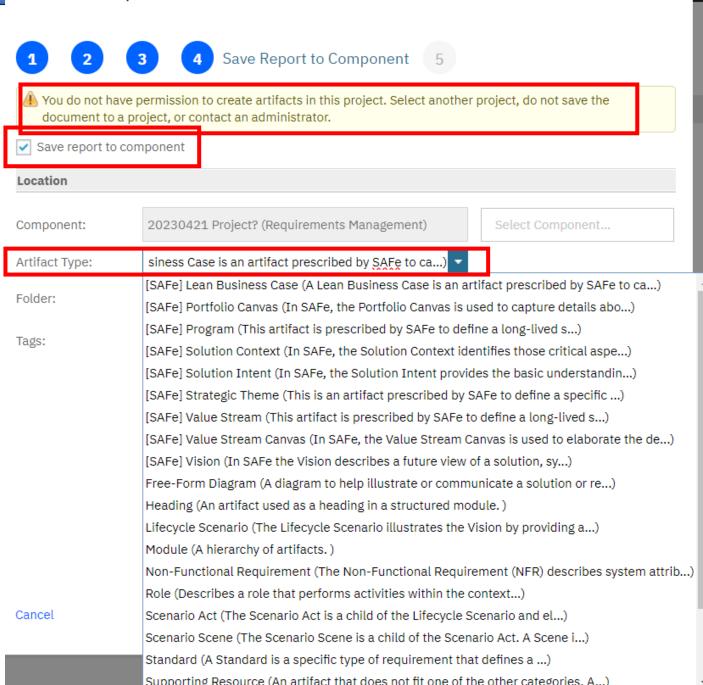
Add...

Remove

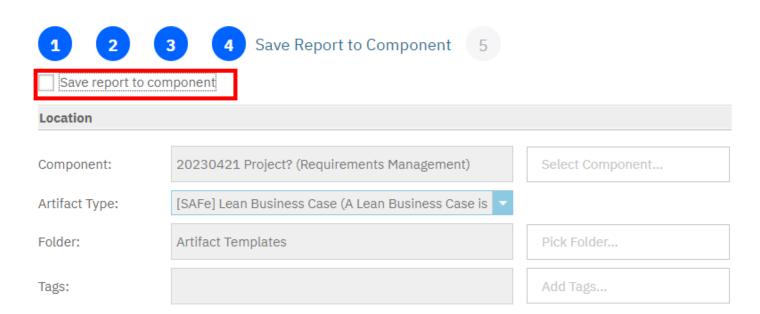
Cancel < Back Next > < Back Next > Cancel

Finish





X















Click Finish to generate the report.



Project Dashboard Artifacts Reviews Reports



1 The report was generated. Show the report. show details

Traceability Summary

Project 20230421 Project? (Requirements Management)

Prepared by natalia ch

May 12, 2024, 5:29:33 AM EDT

Configuration 20230421 Project? (Requirements Management) Initial Stream

Configuration Type Local Configuration

- "artifact" refers to any item or entity that is managed within the system.
 Artifacts can include requirements, test cases, design documents, meeting minutes, discussions, change requests, and any other project-related information that needs to be documented, organized, and tracked throughout the project lifecycle.
- Artifacts serve as the building blocks of the project and are typically stored within modules in DOORS.
- Each artifact represents a specific piece of information or a unit of work, and they are often interlinked to establish relationships and traceability between different project elements.

Key characteristics of artifacts in IBM Rational DOORS include:

- **1.Structured Information**: Artifacts can contain structured information with attributes such as ID, name, description, priority, status, owner, and other metadata.
- **2.Version Control**: DOORS allows for versioning of artifacts, enabling users to track changes over time and maintain a history of revisions.
- **3.Traceability**: Artifacts can be linked to each other to establish traceability relationships, showing how requirements are linked to design elements, test cases, and other project artifacts.
- **4.Collaboration**: DOORS supports collaboration among team members by providing features for commenting, discussing, and reviewing artifacts within the system. Overall, artifacts in IBM Rational DOORS are the fundamental entities that capture and represent project information, facilitating effective requirements management, documentation, and traceability throughout the project lifecycle.

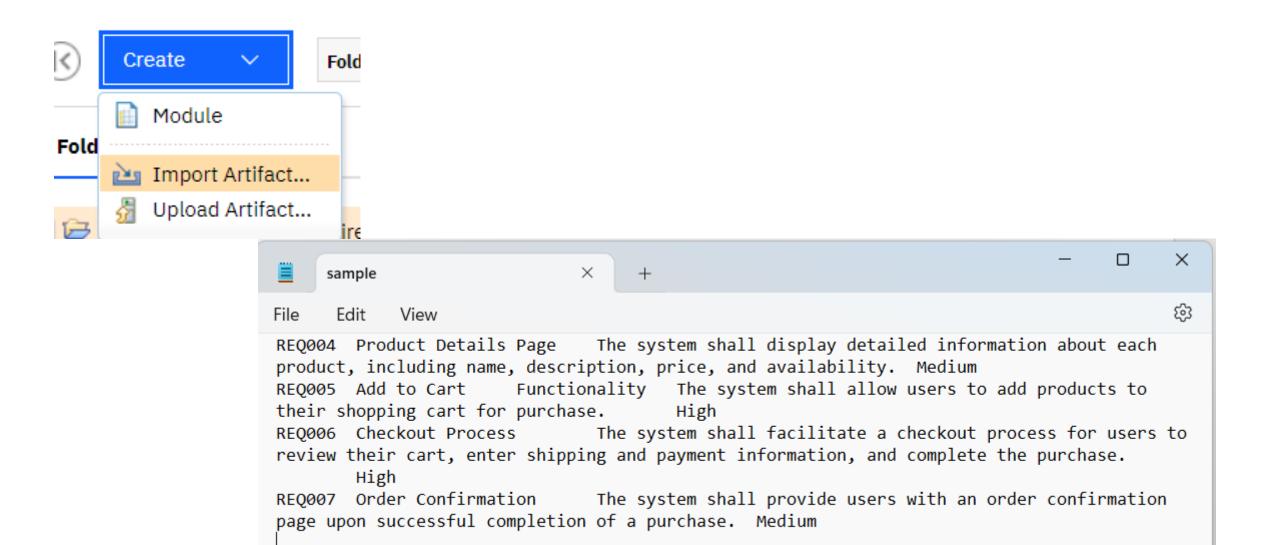
Importing requirements from a text document into IBM Rational DOOR

1. Prepare the Text Document:

1.Ensure that the text document containing the requirements is properly formatted. Each requirement should be listed on a separate line, and if there are multiple fields (e.g., ID, name, description, priority), they should be separated by a delimiter such as a tab or comma.

2. Open IBM Rational DOORS:

1. Launch IBM Rational DOORS and open the module where you want to import the requirements.



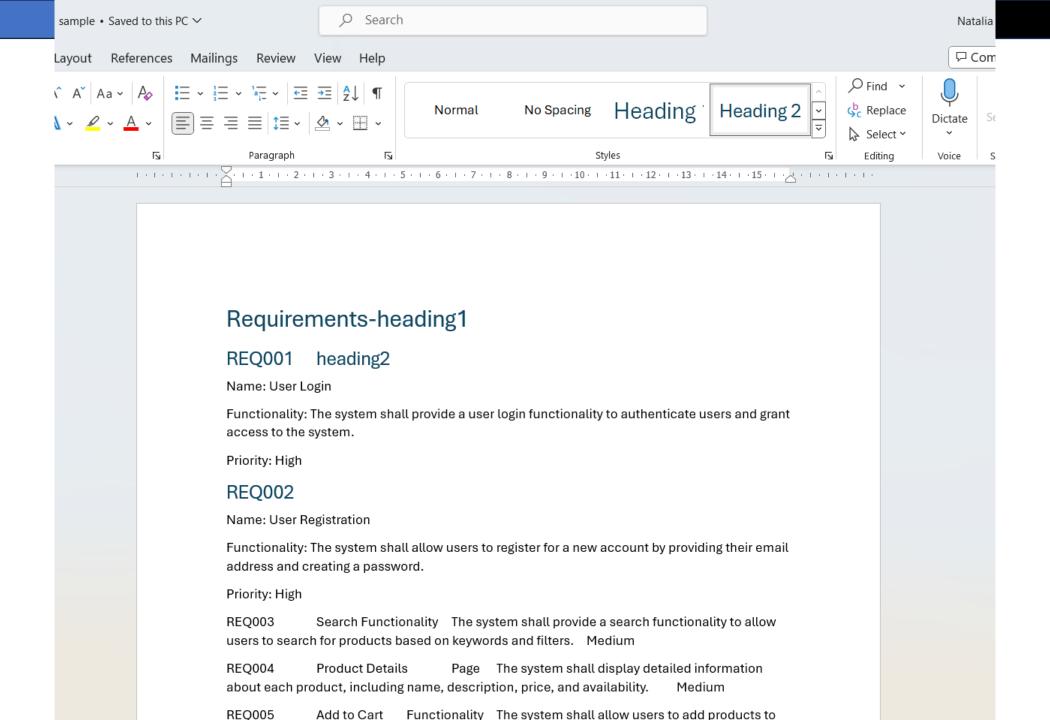
100%

Windows (CRLF)

UTF-8

1,073 characters

Ln 9, Col 1



Import



1 Import 2 3 4

Select what to import

Import requirements from within a text document

Identifies and extracts requirements within the document (Word, Open Office, rich text document). You can also convert the document into a module.

Import requirements from a CSV file or spreadsheet

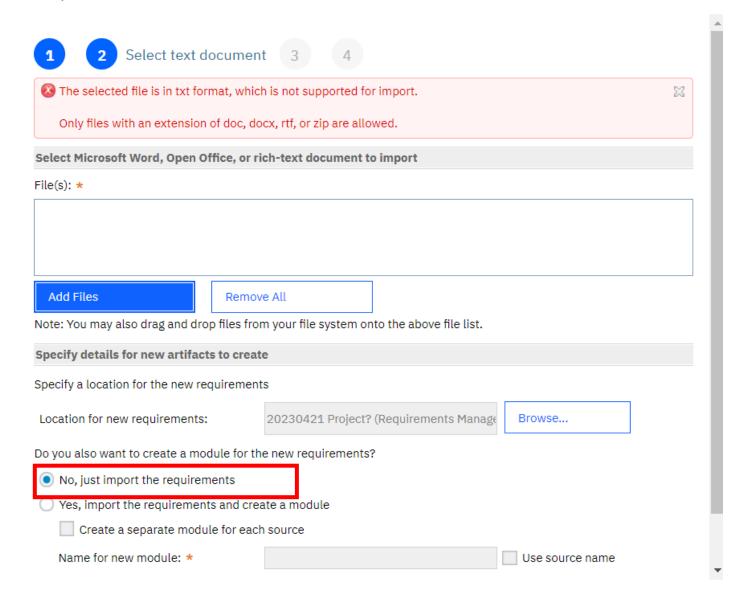
Extracts requirements from a CSV file or spreadsheet (Excel, Open Office).

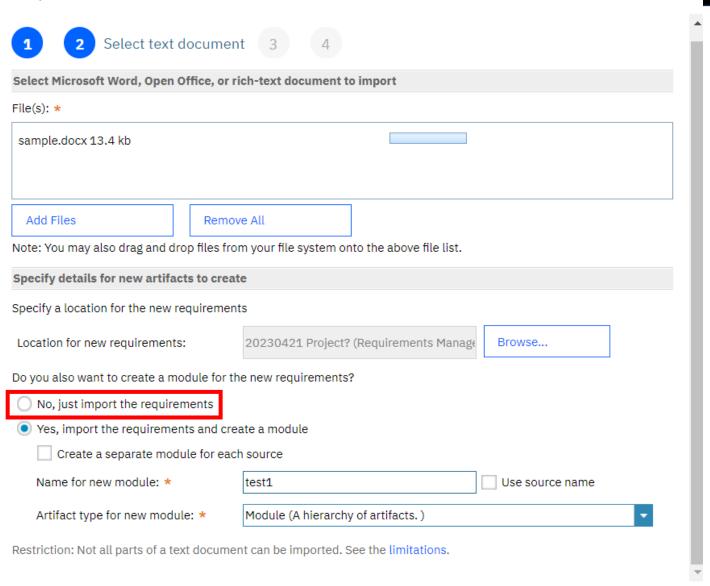
Import a text document and convert to a rich text artifact

Cancel



Finish





X

Cancel < Back Next > Finish





Extracting requirements...

0%

(i) Generating Preview

Source sample.docx: Loading...

Percent complete: 0%. Please wait...



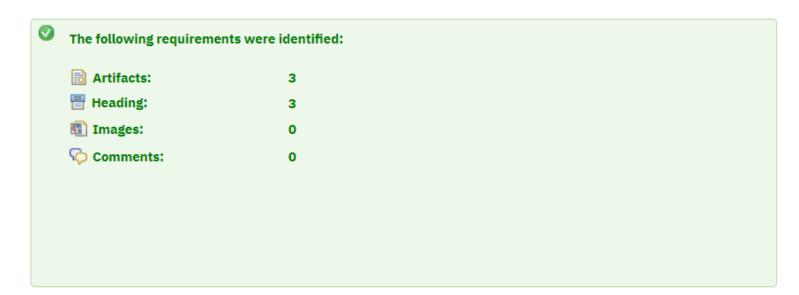




Import

1 2 3 4 Extract Requirements

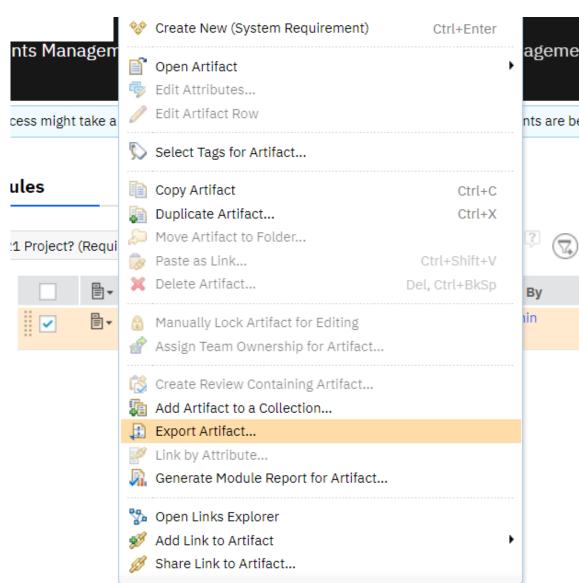
100%

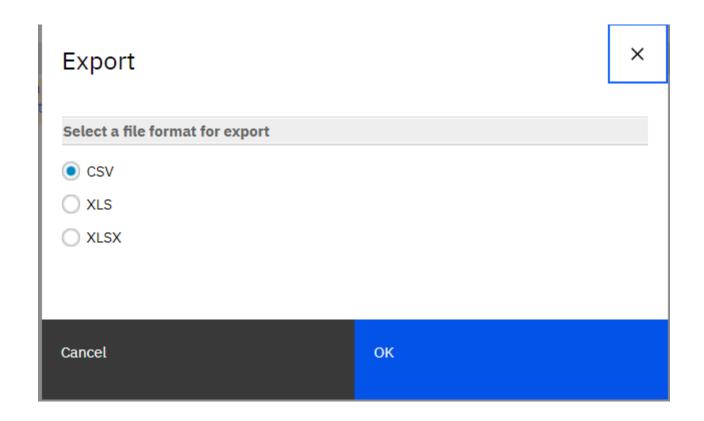


Click Finish to extract and import the requirements.



| | ₩ * | ID▼ | Name | Artifact Type | Modified By | Modified On | |
|---|-----|--------|-------------------------|-----------------------|-------------|------------------------------|--|
| ~ | - | 632820 | AMR System Requirements | System Requirement | Jazz Admin | Apr 21, 2023, 11:49:10 AM | |





You can refer to complete documentation for detailed exploration

https://www.ibm.com/docs/en/engineering-lifecycle-management-suite/lifecycle-management/7.0.3

Linking and traceability

- Use links to associate requirements with other requirements in IBM Engineering Requirements Management DOORS (DOORS), and with resources outside of DOORS.
- Standard links associate requirements in the same database with one another.
- External links associate requirements in a DOORS database with an entity or resource that is outside the current DOORS database.
- Collaboration links associate requirements with artifacts in the IBM Engineering Lifecycle Management (ELM) and other lifecycle applications.

Standard links

- Links give you traceability in both directions.
- You can check that your product or service satisfies all the user requirements, and check what features are being developed for each user requirement.
- You can use DOORS functions to trace the impact of a change at any stage in the development to a single requirement.
- For example, the engineering department tells you that they cannot deliver the solar-powered battery you were expecting. You can trace the links from the battery object back to the requirements that depend on it. You can trace the links forward to the other features that depend on having a solar-powered battery.

External links

- You use external links to create a link from a DOORS object to an entity or resource that is outside the current DOORS database.
- For example, you might create an external link to a website, or to a different DOORS database.
- External links can be marked as URLs.
- Where an external link is a URL, it is treated like a hyperlink and is opened by the default browser.

Collaboration links

You create collaboration links from a DOORS object to artifacts in workflow management, test management, requirements management, and architecture management applications in the ELM and other lifecycle applications.

- We can link objects with requirements and traverse these links
- We can answer questions like:

"Which system requirements do not have test cases associated with them?"

Types of Traceability Links:

Forward Traceability: Establishing links from requirements to downstream artifacts such as design documents, test cases, and code modules. For example, linking high-level requirements to detailed design documents.

Backward Traceability: Establishing links from downstream artifacts back to requirements to ensure coverage and alignment. For instance, linking test cases back to the requirements they verify.

Bi-directional Traceability: Establishing links that allow navigation between requirements and related artifacts in both forward and backward directions, ensuring comprehensive traceability.