SPARX SYSTEMS

Enterprise Architect

User Guide Series

Requirement Modeling

Managing project requirements? Sparx Systems Enterprise Architect has many tools to help you develop and manage requirements, such as the Specification Manager for recording requirements as text, and the Traceability window to trace their development.

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CREATED WITH ENTERPRISE ARCHITECT

Table of Contents

Requirement Modeling

Manage all Aspects of Requirements from Elicitation to Validation and Reuse

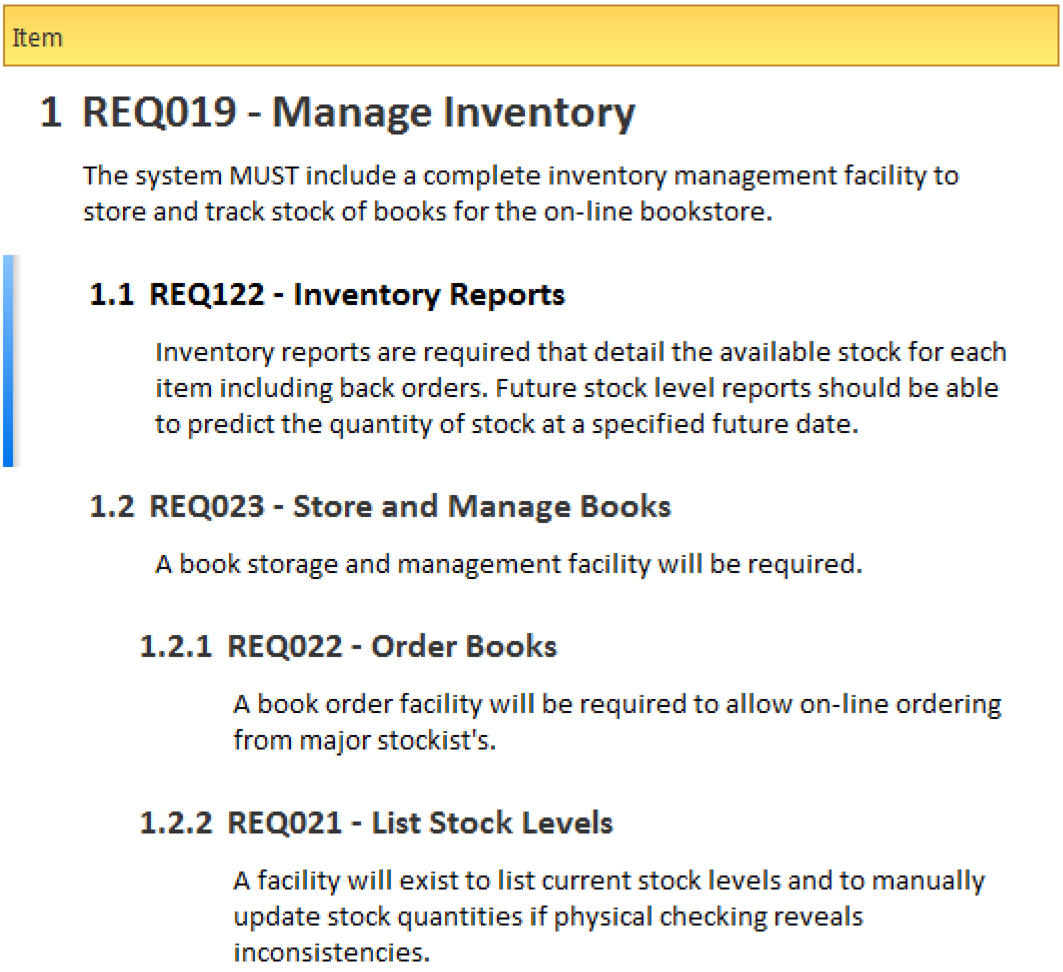
Requirement Engineering is one of the most important disciplines in the system lifecycle and has a documented impact on the success of projects.. Enterprise Architect is a sophisticated platform for developing and managing Requirements, and regardless of the domain, the size of the project or the method being followed, Enterprise Architect provides tools that make it easy to manage the largest of Requirement repositories in complex projects.

Analysts can work together via a collaborative platform with role based Security, **Discussions**, the **Library window**, **Model Mail** and a range of other tools to encourage best practice and productivity.

Requirement Development

Requirement Development consists of all the activities and tasks associated with discovering, evaluating, recording, documenting and validating the Requirements for a particular project. Requirements are discovered, analyzed, specified and verified. Enterprise Architect has a wide range of tools and features to assist the Analyst as they develop Requirements. The centerpiece for Requirement

Development is the **Specification Manager**, through which the Requirement Analyst can enter, view and manage Requirements in textual form as if in a spreadsheet. Requirement properties such as Status, Priority and Author can be edited in-line, and filters can be applied to restrict the display to particular requirements.



Item

1 REQ019 - Manage Inventory

The system MUST include a complete inventory management facility to store and track stock of books for the on-line bookstore.

1.1 REQ122 - Inventory Reports

Inventory reports are required that detail the available stock for each item including back orders. Future stock level reports should be able to predict the quantity of stock at a specified future date.

1.2 REQ023 - Store and Manage Books

A book storage and management facility will be required.

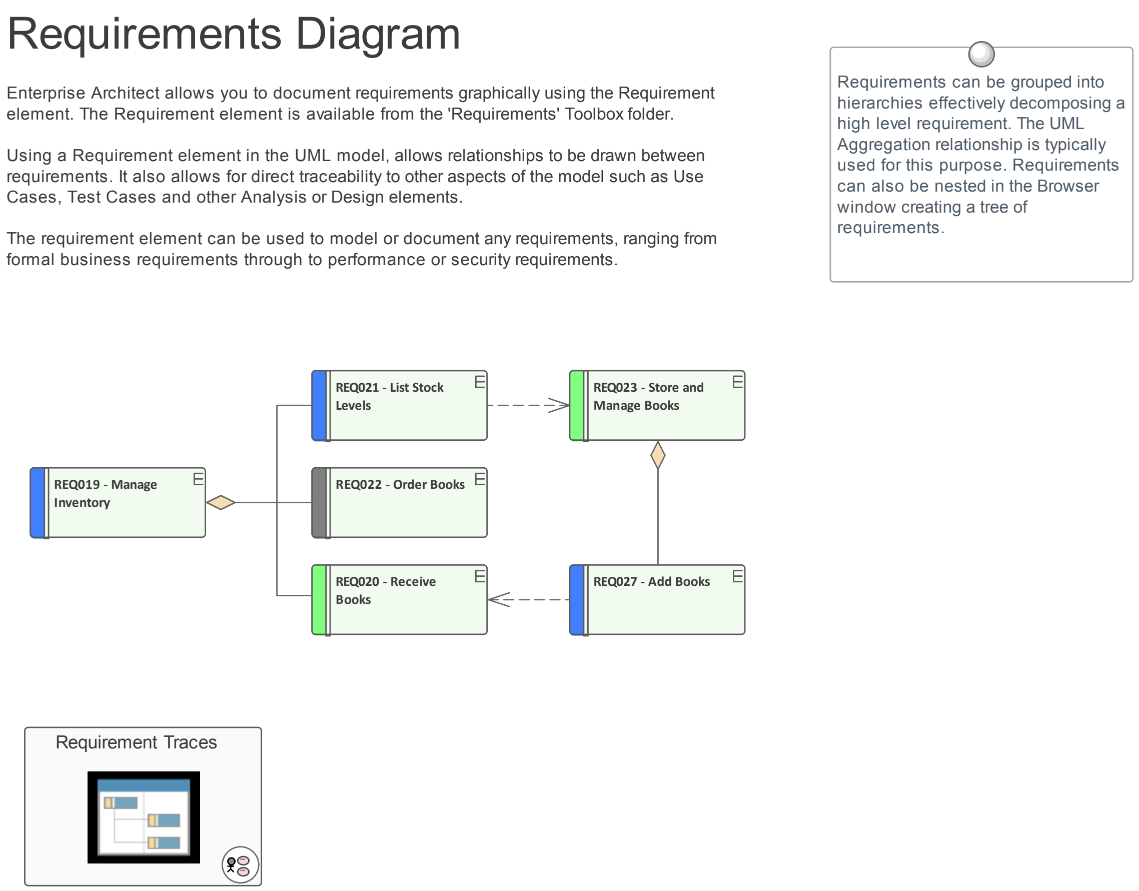
1.2.1 REQ022 - Order Books

A book order facility will be required to allow on-line ordering from major stockist's.

1.2.2 REQ021 - List Stock Levels

A facility will exist to list current stock levels and to manually update stock quantities if physical checking reveals inconsistencies.

The Specification Manager can be used in conjunction with a platform of other tools such as diagrams, the **Traceability window** and the **Discussions** facility.



Requirements Diagram

Enterprise Architect allows you to document requirements graphically using the Requirement element. The Requirement element is available from the 'Requirements' Toolbox folder.

Using a Requirement element in the UML model, allows relationships to be drawn between requirements. It also allows for direct traceability to other aspects of the model such as Use Cases, Test Cases and other Analysis or Design elements.

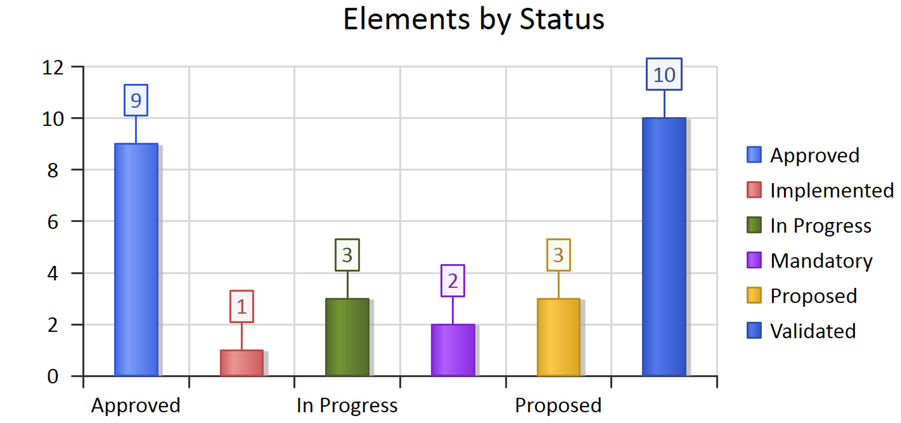
The requirement element can be used to model or document any requirements, ranging from formal business requirements through to performance or security requirements.

Requirements can be grouped into hierarchies effectively decomposing a high level requirement. The UML Aggregation relationship is typically used for this purpose. Requirements can also be nested in the Browser window creating a tree of requirements.

REQ021 - List Stock Levels
REQ023 - Store and Manage Books
REQ019 - Manage Inventory
REQ022 - Order Books
REQ020 - Receive Books
REQ027 - Add Books
Requirement Traces

Requirement Management

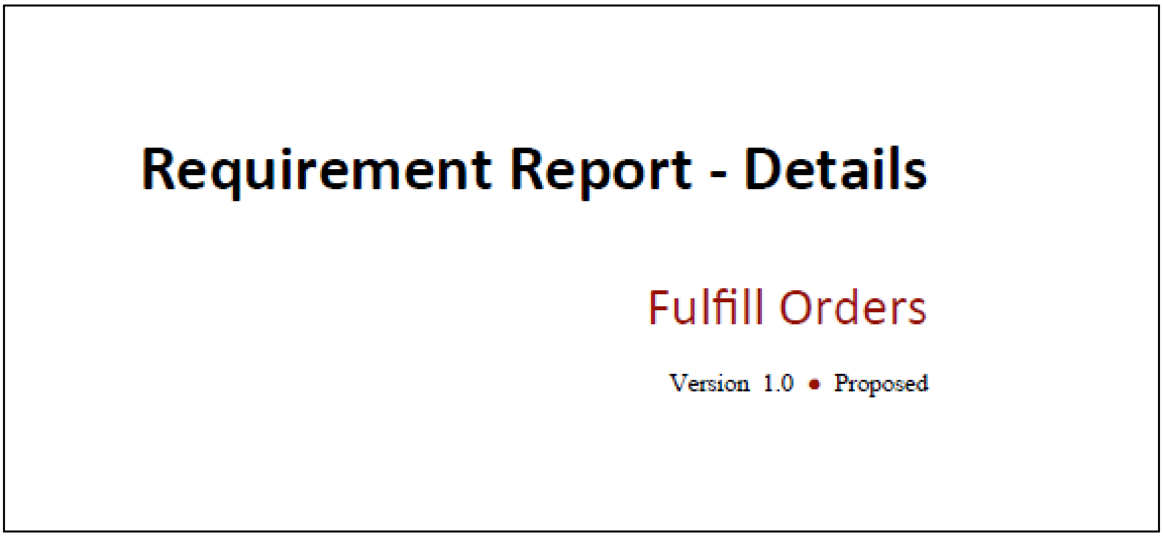
Requirement Management comprises the activities to maintain a set of Requirements that represent an accord or agreement between the project team and the customer. It also has a focus on ensuring that the Requirements are acceptable to the Design and Development Teams, and that they are sufficiently specific to be implemented into working business, software or hardware systems.



This diagram shows a Bar Chart element depicting element status for all the requirements in a selected package. It provides a useful summary for a Requirements Manager and is dynamically updated when the status changes and the diagram is reopened. There are a range of other pre-defined charts and user defined charts can also be added.

Requirement Documentation

A number of documents are commonly produced as part of the Requirement Engineering discipline, such as the Software (System) Requirements Specification and Use Case Reports, and these can be generated automatically from a Requirement Model using built-in templates. In addition a wide range of other documents can be produced using built-in or customized templates.



Requirement Report - Details

Fulfill Orders

Version 1.0 • Proposed

Requirement Processes and Standards

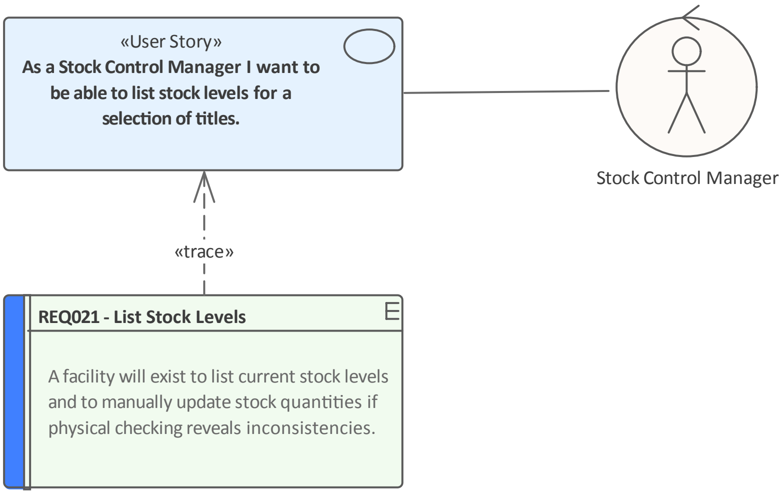
Enterprise Architect is an open platform that supports any Requirement engineering process. The tool has a rich feature set and is highly configurable, and its flexible design means that whatever method is being used you will find features to help. So whether the team is using Formal Requirements, Use Cases, User Stories or Story-Boards in any combination, Enterprise Architect can be used to develop, manage and document the Requirements. The implementation of the UML extension mechanisms means that any type of Requirement can be created and managed using built-in types or by using stereotyped elements and Tagged Values.

User Stories

User Stories are useful as an alternative way of describing user Requirements. They are typically used as part of an Agile development process, to provide a simple but clear description of what the user does or needs to do as part of the role they perform.

A User Story can be created using the stereotyped Artifact available from the Artifact Toolbox page, or as a stereotyped Use Case.

This diagram shows how a User Story can be modeled using a stereotyped Use Case. This allows the User Story to be described and to show the connection to a Persona.


«User Story»
As a Stock Control Manager I want to be able to list stock levels for a selection of titles.
Stock Control Manager
«trace»
REQ021 - List Stock Levels
A facility will exist to list current stock levels and to manually update stock quantities if physical checking reveals inconsistencies.

Introduction to Requirement Modeling

Requirement Engineering is one of the most important disciplines in the system lifecycle and, when done well, it will set the foundation for a successful project or program of work, ultimately ensuring that great value is delivered to the users and other stakeholders. Enterprise Architect is a sophisticated and intuitive platform for developing and managing Requirements gleaned from modeling stakeholder statements, business cases, business drivers and capabilities to define detailed Functional and Non-functional Requirements. Requirements can be prioritized, traced and tracked, and changes can be recorded, baselined, versioned and audited. Analysts can work together in a collaborative platform with role based Security, **Discussions**, the **Library window**, **Model Mail** and a range of other tools to encourage best practice and productivity, either directly on the local system or though Pro Cloud Services.

How it Will Help You

You will typically come to the topic of Requirement Engineering with some existing knowledge or experience, even if it is something that has been learnt in lectures or by on the job training, or perhaps by using a different tool. You will benefit by understanding the product features and the tools that are available to develop and manage Requirements in Enterprise Architect, and this will enable you to be more productive both when working alone and as a member of a team.

Who Will Benefit?

Anyone involved in the development or management of Requirements, whether at a strategic level, a business value level or a system development level, will benefit from reading this information. This includes a wide range of roles including Strategic Thinkers; Business and Requirement Analysts; Enterprise, Business, Technical and Solution Architects; Project and Program Managers; Developers, Test Designers and User Experience Designers.

What You Will Learn

This topic will teach you how to use the powerful features of Enterprise Architect to develop and manage Requirements, to create documentation and to work collaboratively as a member of a team using a formal or informal system life cycle process or standard.

Overview of the Documentation

Meet the Requirement Tools

Lists the key tools that are used for developing and managing Requirements, including a picture of each tool in action, where to find the tool, how to use it and how to become proficient in using the tool. There are a large number of additional useful tools that are described in the Help topic *Additional Requirement Tools*.

Requirements Overview

Puts Requirement Engineering in context by defining what Requirements are, the different levels of Requirement, characteristics of good Requirements and the business context of Requirements. The information also includes the concept of a Requirement diagram that readers coming from text based tools might not be familiar with, and how to create and view Requirements in Enterprise Architect.

Requirement Development

Discusses the activities and tasks associated with discovering, evaluating, recording, documenting and validating Requirements. The topic is conveniently divided into four sub-topics - Elicitation, Analysis, Specification and Validation - and identifies a wide range of features that can be used, from Mind Mapping diagrams for recording information in elicitation workshops, to the **Specification Manager** for creating Requirements, to Test Cases for validating them.

Requirement Management Describes the activities needed to maintain a set of Requirements that represent an accord or agreement between the project team and the customer. It includes composing hierarchies of Requirements, tracing other elements back to Requirements, and tracking the properties of Requirements including Status, Priority, and Difficulty. It also describes managing changing Requirements, Volatility and assessing the impact of changing Requirements.

Requirement Documentation Describes how formal and informal Requirement documentation can be generated directly from Enterprise Architect using a series of predefined and extensible templates. This includes Glossaries, Data Dictionaries, Use Case Reports and Documents such as a System Requirements Specification.

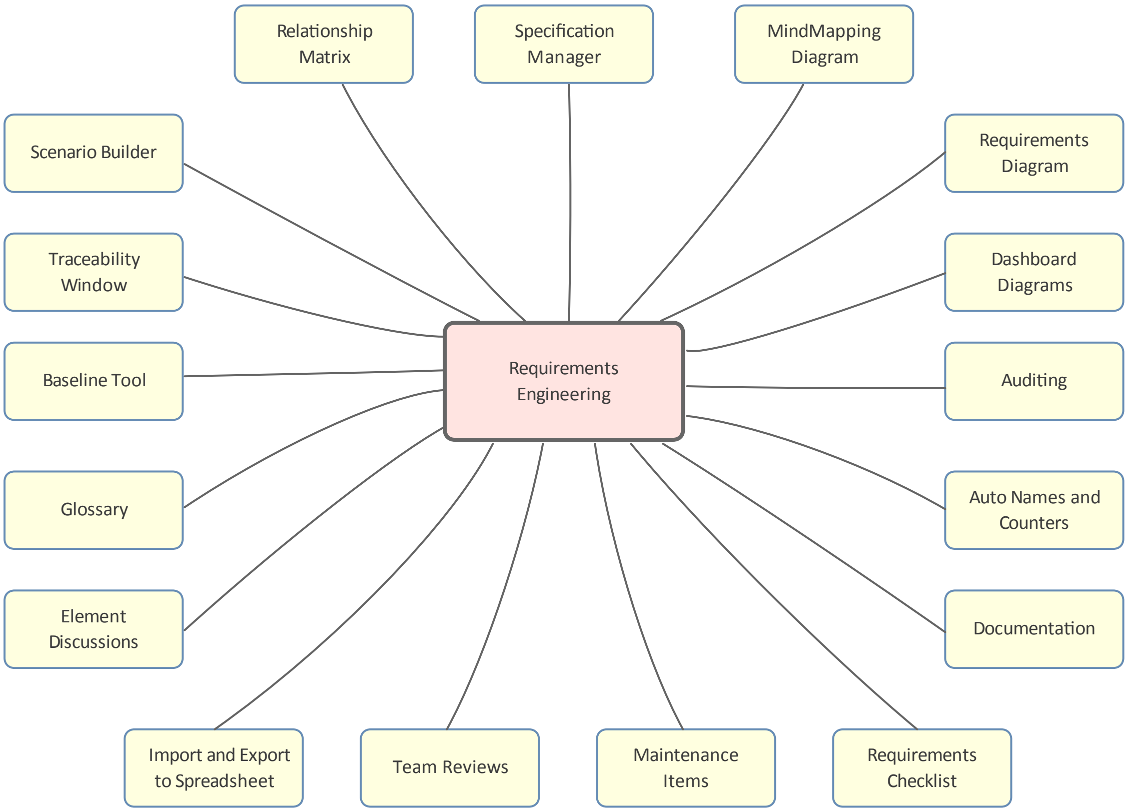
Requiremen Puts the usage of Enterprise Architect's

t Processes and Standards	Requirement tools in the context of System and Requirement processes and standards. The topic describes how flexible the tools are and how they can be used with any process or standard.
Additional Requirement Tools	Lists a series of additional tools that can be used for Requirement Engineering, including a picture of each tool in action, where to find the tool, how to use it and how to become proficient in using the tool. There are a number of key tools that are the most important tools for Requirement Engineering that are described in the first topic, entitled *Meet the Requirement Tools*.

Meet the Requirement Tools

Enterprise Architect is a sophisticated and flexible Requirement modeling tool that can be used across the Requirements' life cycle from planning through to product support. The tool can be used with any Requirement Management process, and there is a wide range of features that allow analysts to work using their preferred methods, such as word-processor views, spreadsheet views, diagrams, **Relationship Matrix** or several other core and extended features.

This Mind Map shows the landscape of the key Requirement tools that can be used to develop and manage Requirements. While these are the primary tools there is a series of other tools described in the Help topic *Additional Requirement Tools*.


Requirements Engineering
Relationship Matrix
Specification Manager
MindMapping Diagram
Scenario Builder
Requirements Diagram
Traceability Window
Dashboard Diagrams
Baseline Tool
Auditing
Glossary
Auto Names and Counters
Element Discussions
Documentation
Import and Export to Spreadsheet
Team Reviews
Maintenance Items
Requirements Checklist

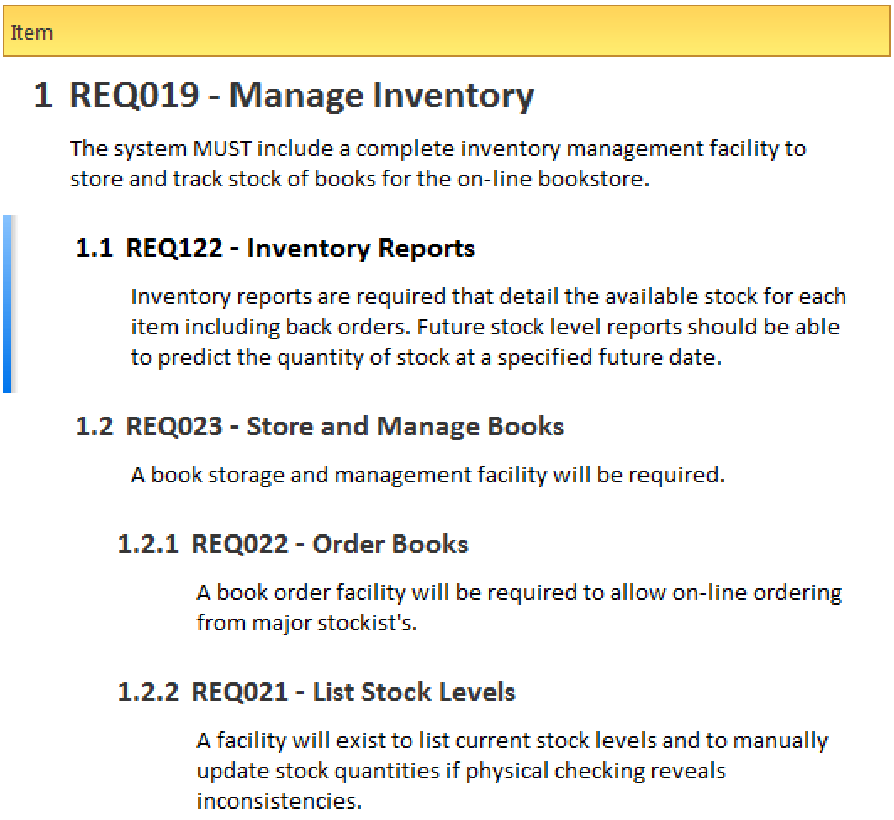
Specification Manager

Getting to Know the Specification Manager

Introducing the Specification Manager

The **Specification Manager** is the central tool for working with Requirements; it provides an interface resembling a Word Processor or Spreadsheet tool for entering, maintaining and viewing Requirements. New Requirements can be created with names and detailed descriptions and properties such as Status and Priority can be added from drop-down lists. Existing Requirements can be viewed and managed in a convenient view, and changing them in the Specification Manager will change them in all other places in the repository such as diagrams and windows. It is the perfect tool for those analysts more comfortable working with text rather than diagrams and who are accustomed to working in a Word Processor or Spreadsheet. It has the added advantage that the requirements are part of a model and can be traced to other elements, including Business

Drivers, Stakeholders and Solution Components.



Item

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A book order facility will be required to allow on-line ordering from major stockist's.

1.2.2 REQ021 - List Stock Levels

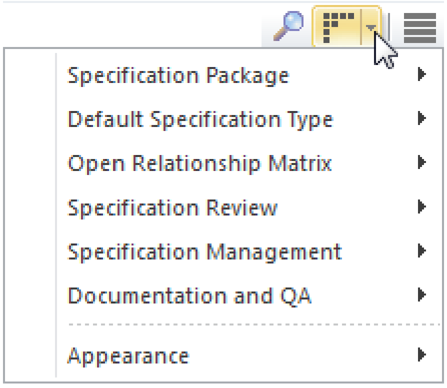
A facility will exist to list current stock levels and to manually update stock quantities if physical checking reveals inconsistencies.

Where to find the Specification Manager

Browser window | Right-click on Package | Open Package in | **Specification Manager**

Usage of the Specification Manager

To create, view and maintain Requirements in a text based tool that resembles working in a word processor or spreadsheet. Details can be added to the Requirements and Requirement properties can be added from drop-down lists. When the Requirements are changed in the **Specification Manager**

	the changes are conveniently reflected in the **Browser window** and all other windows.
Options for the Specification Manager	There are a wide range of options available from the options menu, to tailor the way you use the **Specification Manager**. These include Level (hierarchical) Numbering, Auto Naming, Spell Check, Documentation, Import and Export of Requirements, access to various related tools and more.  Specification Package Default Specification Type Open Relationship Matrix Specification Review Specification Management Documentation and QA Appearance
Learn more about the Specification Manager	The Specification Manager

The MDG Link for DOORS Add-In

The Model Driven Generator (MDG) Link™ for DOORS is an **Add-In** that provides support for linking an Enterprise Architect model to an IBM® Rational® DOORS® Requirements package. This tool is very useful when you need to perform your Requirements Management external to your Model Driven Development. Using this Add-In you can interchange Requirements defined within IBM DOORS with the traceable Requirements used within Enterprise Architect's Requirements Management features.

For all Enterprise Architect Editions other than Ultimate, you can purchase the MDG Link for DOORS separately and download the installer from the Sparx Systems website.

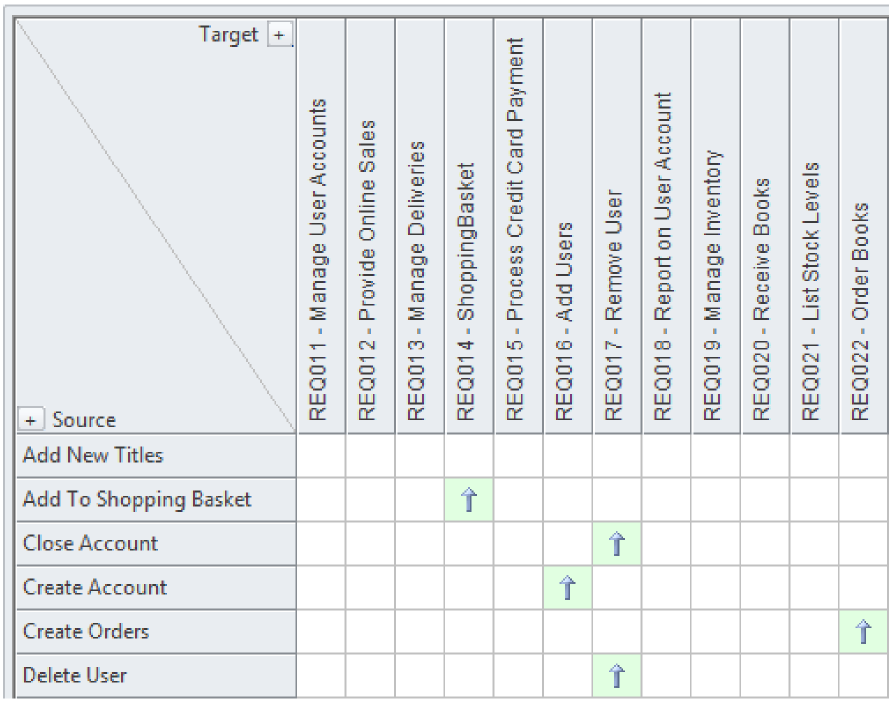
For full details concerning this Add-In, see the *MDG Link for DOORS* Help topic.

Relationship Matrix

Getting to Know the Relationship Matrix

Introducing the Relationship Matrix

The **Relationship Matrix** provides a visualizing compelling matrix-style view for a convenient analysis of the way that Requirements are related to each other and to other elements in the model. It can be used to view the relationships between Stakeholders and their Requirements, how Use Cases are related to Business Requirements or Functional Requirements, how Capabilities are related to Business Drivers, which Components implement a set of Requirements, and more. Any number of matrices can be defined quickly and then saved to be viewed in workshops, or included in documentation generated automatically from the model or exported to a spreadsheet file. When a matrix is created, connections can be viewed by placing the Requirements on one axis of the matrix and the connected elements on the other axis, then the cells of the matrix will indicate the direction of the relationship.



Target + + Source	REQ011 - Manage User Accounts	REQ012 - Provide Online Sales	REQ013 - Manage Deliveries	REQ014 - ShoppingBasket	REQ015 - Process Credit Card Payment	REQ016 - Add Users	REQ017 - Remove User	REQ018 - Report on User Account	REQ019 - Manage Inventory	REQ020 - Receive Books	REQ021 - List Stock Levels	REQ022 - Order Books
Add New Titles												
Add To Shopping Basket				↑								
Close Account							↑					
Create Account						↑						
Create Orders												↑
Delete User							↑					

Where to find the Relationship Matrix

In the **Browser window**, click on Package and select:

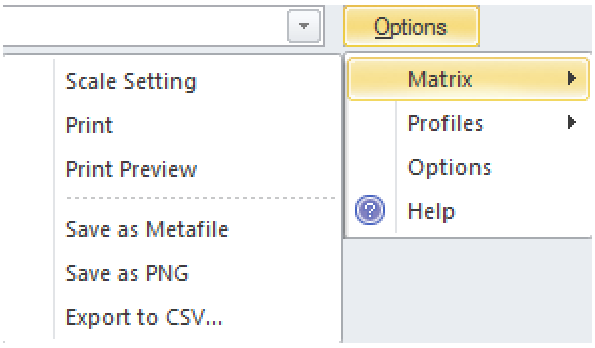
- The 'Resources' tab | Matrix Profiles | Right-click on a profile | Open Matrix Profile or
- The Start ribbon > Desktop > Design > Details > Matrix

Usage of the Relationship Matrix

To display the relationships that exist between elements - such as which Requirements are realized by which Use Cases - in two Packages in a visually compelling matrix. It is useful in analyzing missing elements or relationships; for example, to determine which Requirements are not realized by any Use Case, or which Components do not have corresponding Requirements or Use Cases. It is particularly useful in workshops with Business Stakeholders who might not be familiar with seeing Requirements in Trace diagrams.

Options for the Relationship Matrix

There is a range of options that can be set for the **Relationship Matrix**, including saving it to the 'Resources' tab of the **Browser window** or to a CSV format for opening in a spreadsheet. The appearance of the Relationship Matrix can also be altered by sorting the elements, showing an outline numbering view, and suppressing Package names. These items are available from the **Options button** on the Relationship Matrix.



Learn more about the Relationship Matrix

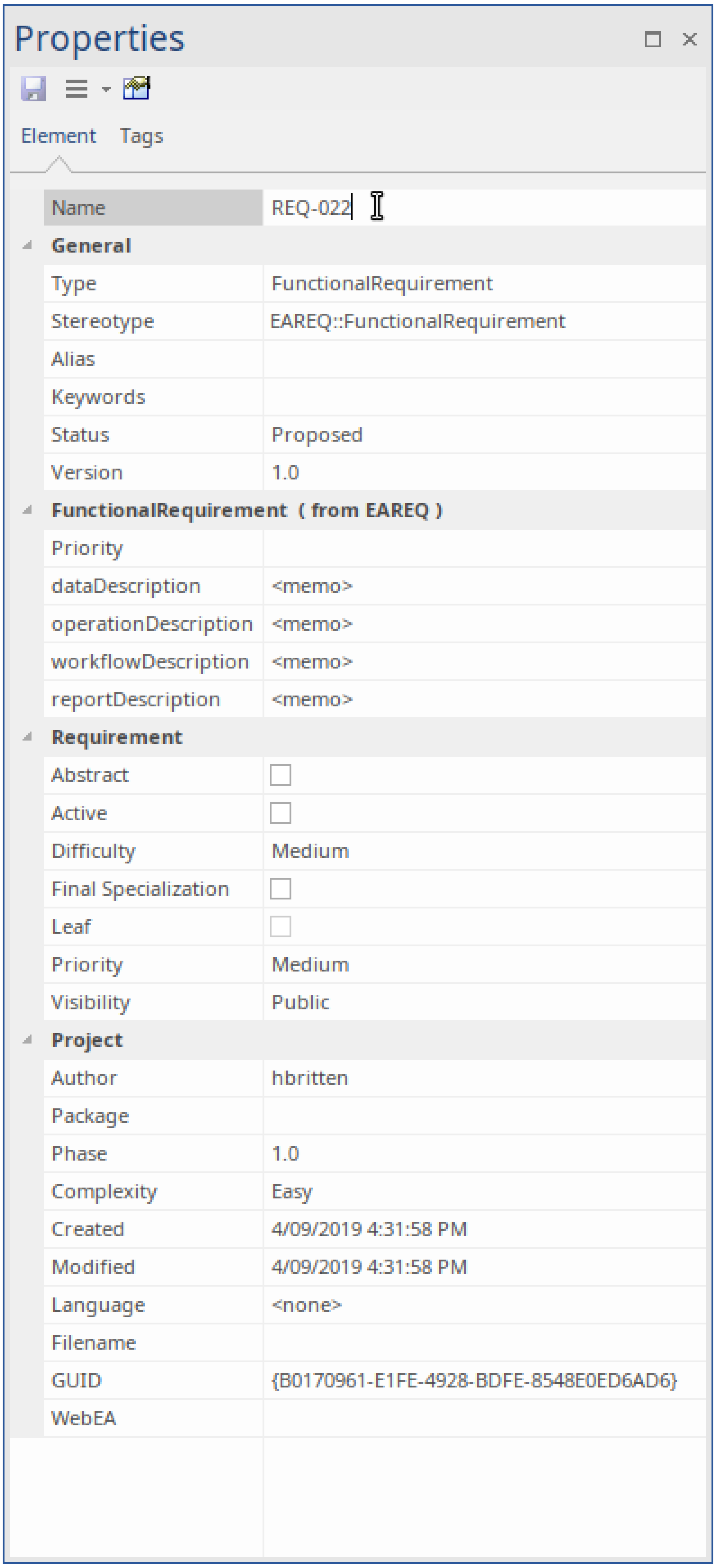
Relationship Matrix

Requirement Properties

Getting to Know the Requirement Properties

Introducing Requirement Properties

Requirement Properties define metadata about the Requirement that is useful for the management of Requirements for the purposes of prioritization and defining work Packages for the implementation teams. All Enterprise Architect elements have standard properties such as Status, Author and Phase, and the Requirement element has additional properties such as Difficulty and Priority. User-defined properties can also be created using Tagged Values.

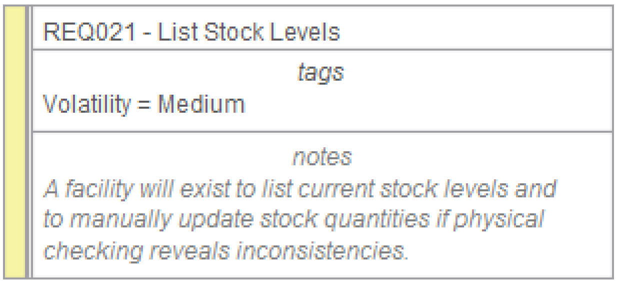


Properties

Name	REQ-022
General	
Type	FunctionalRequirement
Stereotype	EAREQ::FunctionalRequirement
Alias	
Keywords	
Status	Proposed
Version	1.0
FunctionalRequirement (from EAREQ)	
Priority	
dataDescription	<memo>
operationDescription	<memo>
workflowDescription	<memo>
reportDescription	<memo>
Requirement	
Abstract	□
Active	□
Difficulty	Medium
Final Specialization	□
Leaf	□
Priority	Medium
Visibility	Public
Project	
Author	hbritten
Package	
Phase	1.0
Complexity	Easy
Created	4/09/2019 4:31:58 PM
Modified	4/09/2019 4:31:58 PM
Language	<none>
Filename	
GUID	{B0170961-E1FE-4928-BDFE-8548E0ED6AD6}
WebEA	

Where to Ribbon: Design > Element > Editors >

find Requirement Properties	Properties Element Context Menu: Properties... | Properties... or **Browser window** Context Menu: Properties | Properties...
Usage of the Requirement Properties	The Properties define the important meta information about a Requirement, for the purposes of providing data to manage Requirements for prioritization, understanding which are the difficult Requirements, and managing the lifecycle by using Status to determine Requirements for implementation Packages.
Options for Requirement Properties	Enterprise Architect has a wide range of built-in properties for all elements, and a number of additional Requirement Properties. If other properties are needed by a modeler or team, such as the volatility (stability) of a Requirement, these can be added using the general-purpose UML extension mechanism of Tagged Values.



REQ021 - List Stock Levels

tags

Volatility = Medium

notes

A facility will exist to list current stock levels and to manually update stock quantities if physical checking reveals inconsistencies.

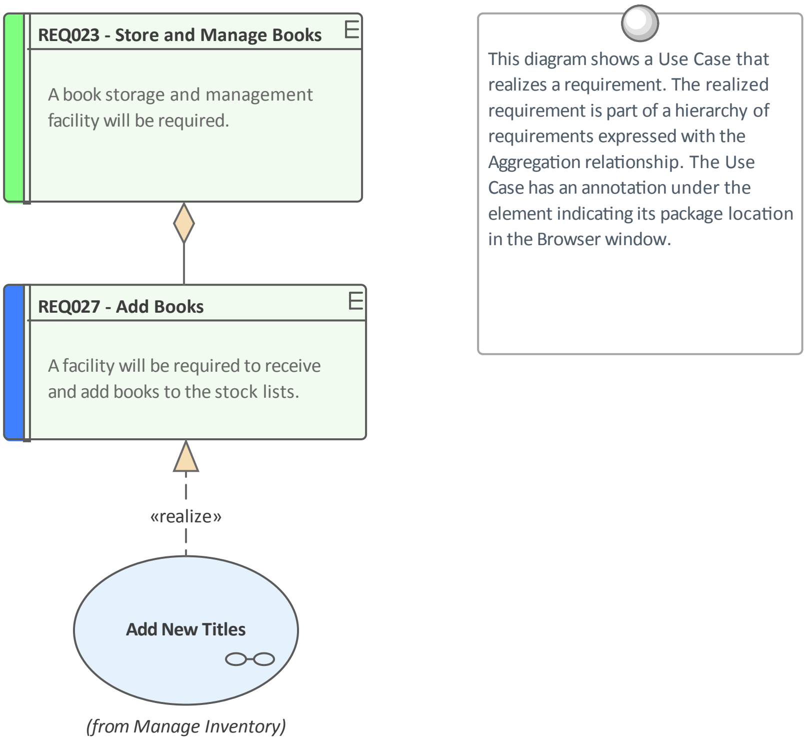
Learn more about Requirement Properties

Properties Dialog

Requirements Diagram

Getting to Know the Requirements Diagram

Introducing the Requirements Diagram	The Requirements diagram provides a visual representation of how Requirements are related to each other and to other elements in the model, including Business Drivers, Constraints, Business Rules, Use Cases, User Stories, design Components and more. The diagram is one of Enterprise Architect's extended diagram types. It provides an appealing graphical representation of Requirements, that will be a welcome change for Requirements Analysts who are accustomed to working with text based tools.


REQ023 - Store and Manage Books
A book storage and management facility will be required.
REQ027 - Add Books
A facility will be required to receive and add books to the stock lists.
«realize»
Add New Titles
(from Manage Inventory)
This diagram shows a Use Case that realizes a requirement. The realized requirement is part of a hierarchy of requirements expressed with the Aggregation relationship. The Use Case has an annotation under the element indicating its package location in the Browser window.

Where to find the Requirements Diagram

Browser window Context Menu : Add Diagram : ☰ | Manage | Show All **Perspectives** | Extended | Requirements

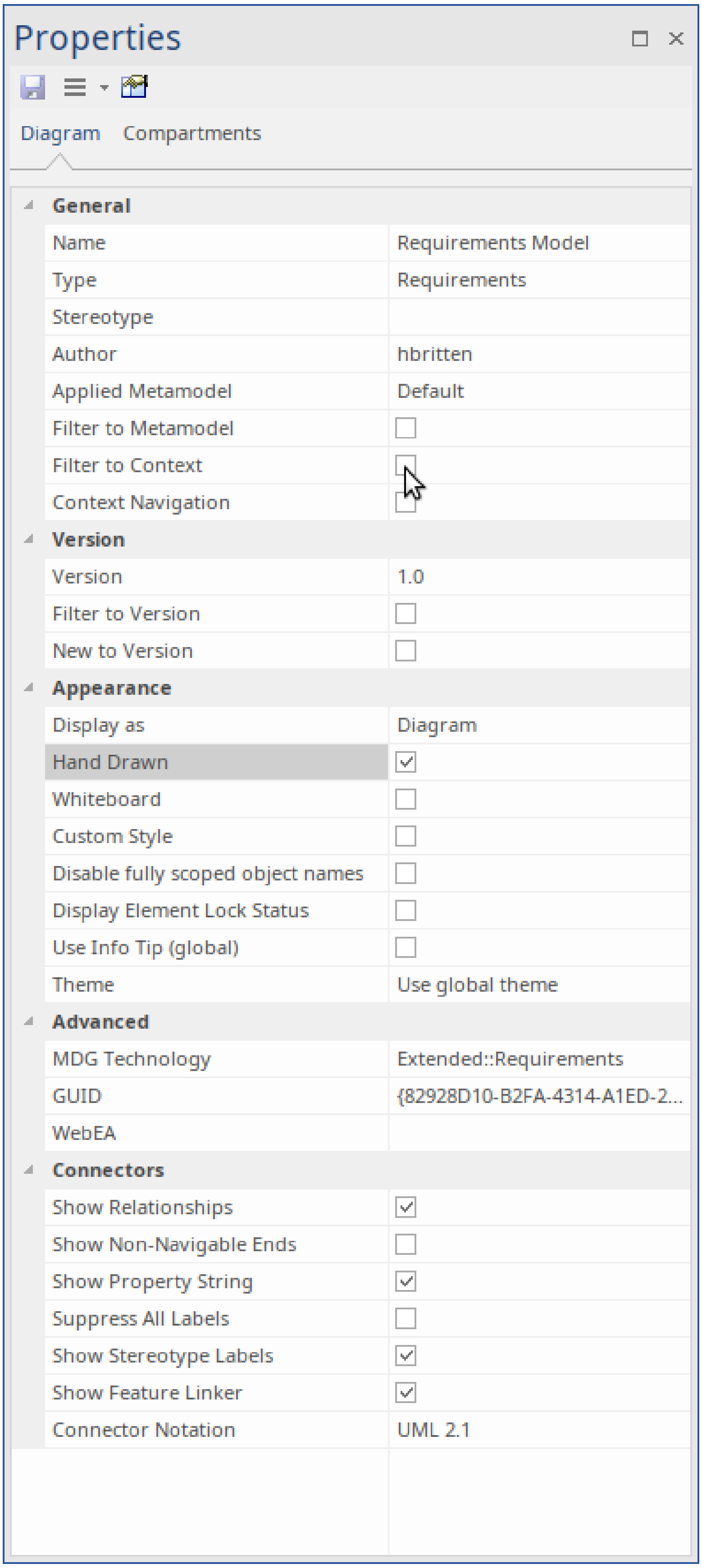
Usage of the Requirements Diagram

One usage is to show how Requirements are connected together in a hierarchy or, even more importantly, how Requirements are connected to other elements. The experienced modeler will define and manage the Requirements in the **Specification Manager** and then use the Requirements diagram to show how each Requirement is related to upstream process elements such as Business Drivers, and downstream process elements such as Use Cases, User

Stories, User Experience designs and solution Components.

Options for the Requirements Diagram

The appearance of a diagram can be changed to suit the audience, and details can be included, suppressed or altered to ensure the diagram meets its main objective of communication. There is a wide range of options, ranging from creating a Hand Drawn style of diagram to filtering diagram content.



General	
Name	Requirements Model
Type	Requirements
Stereotype	
Author	hbritten
Applied Metamodel	Default
Filter to Metamodel	□
Filter to Context	□
Context Navigation	□
Version	
Version	1.0
Filter to Version	□
New to Version	□
Appearance	
Display as	Diagram
Hand Drawn	☑
Whiteboard	□
Custom Style	□
Disable fully scoped object names	□
Display Element Lock Status	□
Use Info Tip (global)	□
Theme	Use global theme
Advanced	
MDG Technology	Extended::Requirements
GUID	{82928D10-B2FA-4314-A1ED-2...
WebEA	
Connectors	
Show Relationships	☑
Show Non-Navigable Ends	□
Show Property String	☑
Suppress All Labels	□
Show Stereotype Labels	☑
Show Feature Linker	☑
Connector Notation	UML 2.1

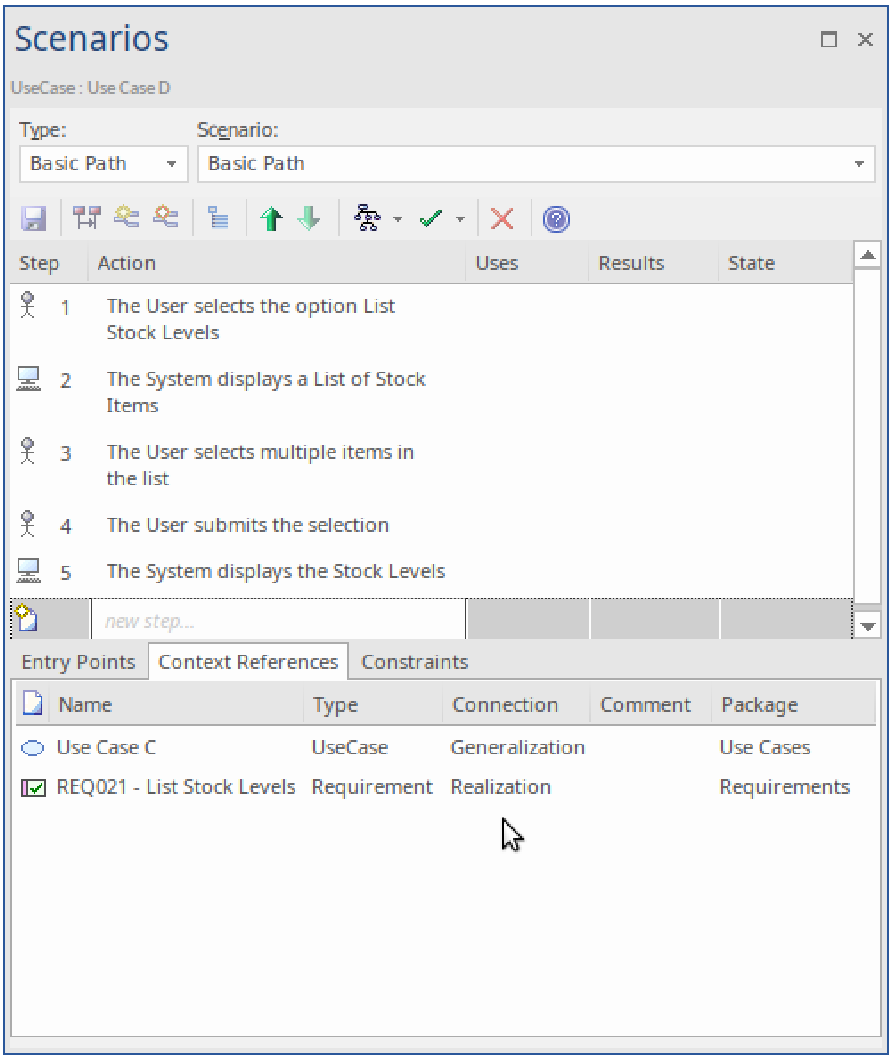
Learn more

about the Requirements Diagram	Working In Diagrams

Scenario Builder

Getting to Know the Scenario Builder

Introducing the Scenario Builder	The **Scenario Builder** is used to define the details of a Use Case including defining detailed descriptions, creating one or more Scenarios and defining pre-conditions, post-conditions and other constraints. The detailed steps of a Use Case can be recorded and linked to other elements in the model and these can then be generated out as a diagram providing a visual representation of the Use Case and its Scenarios. The diagram and the text can be synchronized and individual steps can then be traced to other elements such as Components that will realize the Requirement specified in the Use Case.



Scenarios

UseCase : Use Case D

Type: Basic Path

Scenario: Basic Path

Step	Action	Uses	Results	State
1	The User selects the option List Stock Levels			
2	The System displays a List of Stock Items			
3	The User selects multiple items in the list			
4	The User submits the selection			
5	The System displays the Stock Levels			
	new step...			

Name	Type	Connection	Comment	Package
Use Case C	UseCase	Generalization		Use Cases
REQ021 - List Stock Levels	Requirement	Realization		Requirements

Where to find the Scenario Builder

Start > Desktop > Design > Scenario Editor

Design > Element > Editors > Scenarios

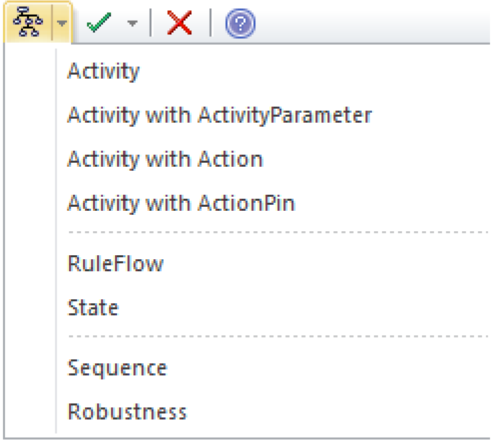
Element Context Menu: Properties | Responsibilities > Scenarios | right click | Add New : Structure Editor

Usage of the Scenario Builder

To define the details of a Use Case and its scenarios and constraints, which can be used to replace the traditional text-document based approach to defining Use Cases. This ensures that the Use Case diagram and the textual details of the Use Cases and its Scenarios and Constraints are all contained in the same model and can be traced. If the Use Cases are required in a document format for contractual or process reasons, a Use Case Report can be generated automatically from the models using the in-built documentation engine.

Options for the Scenario Builder

The **Scenario Builder** can be viewed as a tabbed or a docked window or in an element's **Properties window**. The steps of a Use Case including its Scenarios can be automatically generated into a number of different diagram types available from the Generate Diagram toolbar icon.



Learn more about the Scenario

Scenarios

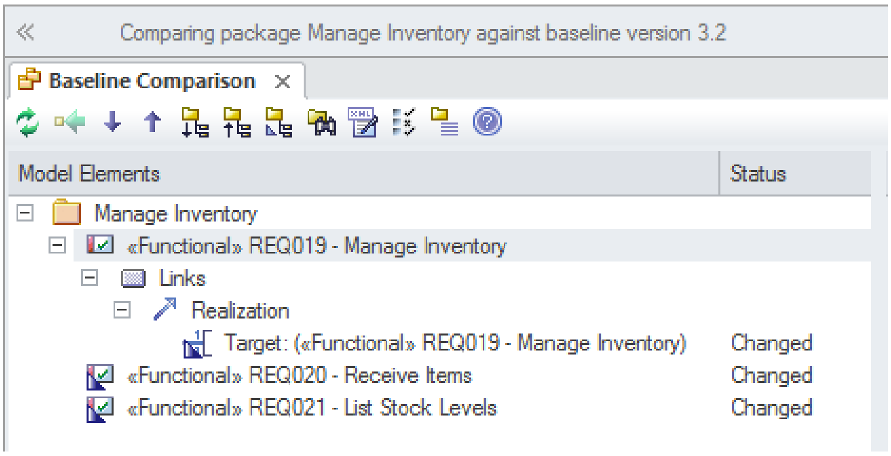
Builder

Baseline Tool

Getting to Know the Baseline Tool

Introducing the Baseline Tool

The Baseline Tool can capture a snapshot of the Requirements at a point in time and then, at a later time, the repository can be compared to this (or another baseline) for the purpose of determining what has changed. Any number of baselines can be created and labeled, and there is a baseline comparison tool that displays the differences between the baseline and the model and allows the modeler to revert a change in the model to a baseline at a granular level.



Comparing package Manage Inventory against baseline version 3.2

Baseline Comparison

Model Elements	Status
Manage Inventory	
«Functional» REQ019 - Manage Inventory	
Links	
Realization	
Target: («Functional» REQ019 - Manage Inventory)	Changed
«Functional» REQ020 - Receive Items	Changed
«Functional» REQ021 - List Stock Levels	Changed

Where to find the Baseline Tool

Ribbon: Design > Model > Manage > Manage **Baselines**

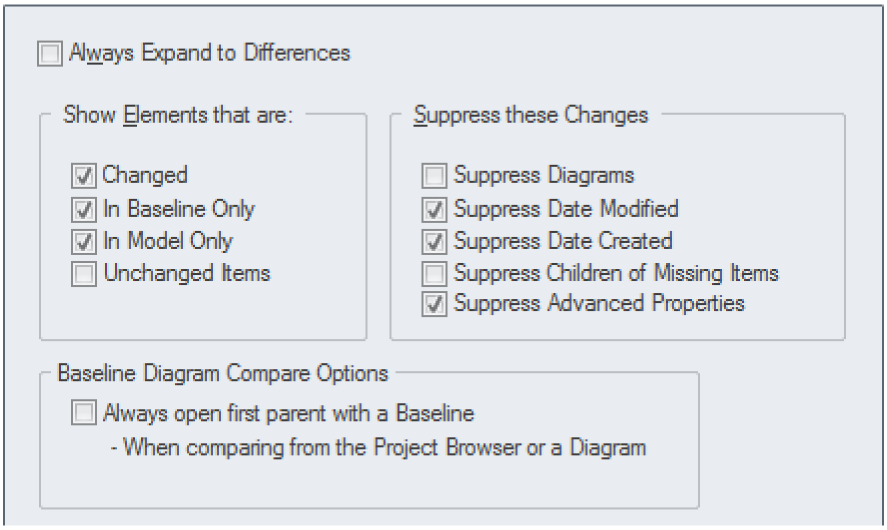
Keyboard: **Ctrl+Alt+B**

Usage of the Baseline Tool

Baselines are also useful when a formal requirements process is being followed or the Requirements form part of a contract, as the baseline can keep a snapshot of the requirements at important milestones such as contract signing or requirement phase sign off. This is also applicable to iterative and incremental processes such as Agile methods, as the requirements can be baselined before or even after a Sprint. When Requirements are still volatile and the Requirements' owners are still formulating their needs, a baseline can be created to take a snapshot at important points in the analysis phase, such as after an elicitation workshop.

Options for the Baseline Tool

There are several options that can be applied to configure the way the Baseline Compare tool presents information; these are available from the **Options button** on the **Baselines** window.



□ Always Expand to Differences

Show Elements that are:

☑ Changed
☑ In Baseline Only
☑ In Model Only
□ Unchanged Items

Suppress these Changes

□ Suppress Diagrams
☑ Suppress Date Modified
☑ Suppress Date Created
□ Suppress Children of Missing Items
☑ Suppress Advanced Properties

Baseline Diagram Compare Options

□ Always open first parent with a Baseline
- When comparing from the Project Browser or a Diagram

Learn more about the Baseline Tool

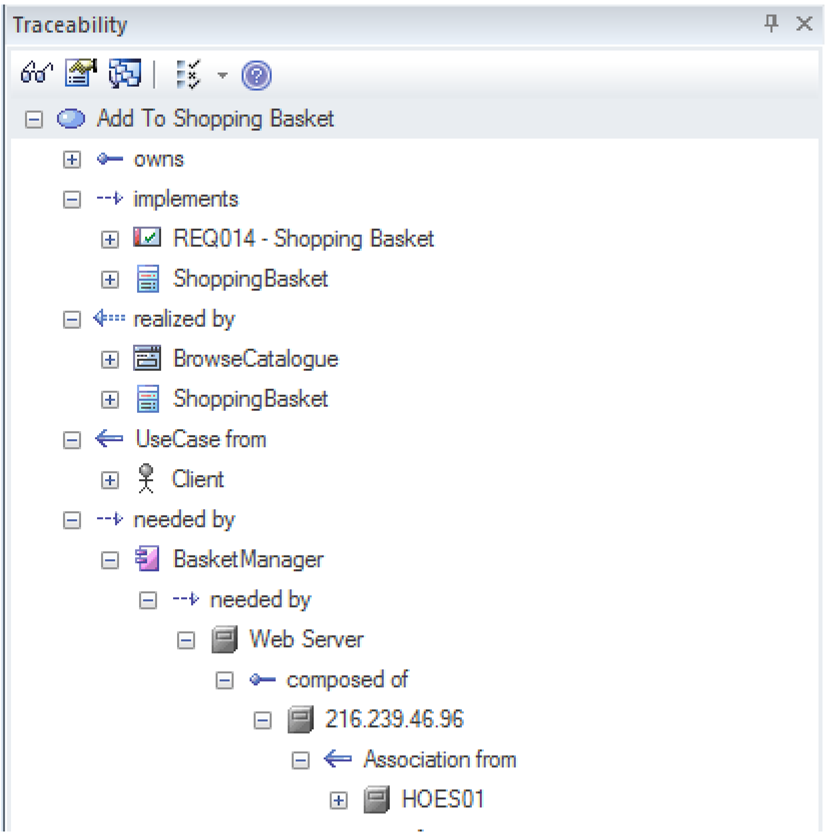
Baselines

Traceability Window

Getting to Know the Traceability Window

Introducing the Traceability Window

The **Traceability window** provides a hierarchical view of element connections, allowing traceability to be visualized and queried as elements are traversed in the model. This tool is particularly powerful because a modeler will often choose to hide diagram relationships, but by selecting an element in the diagram and viewing its connections in the Traceability window all its relationships will be revealed.



Traceability

- Add To Shopping Basket
  - owns
  - implements
    - REQ014 - Shopping Basket
    - ShoppingBasket
  - realized by
    - BrowseCatalogue
    - ShoppingBasket
  - UseCase from
    - Client
  - needed by
    - BasketManager
      - needed by
        - Web Server
          - composed of
            - 216.239.46.96
              - Association from
                - HOES01

Where to find the Traceability Window

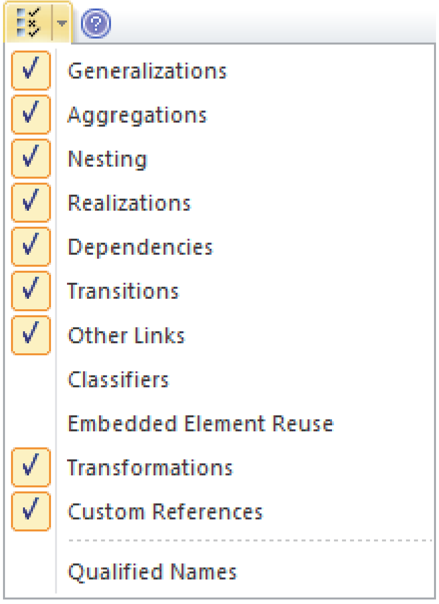
Start > Desktop > Design > Traceability

Usage of the Traceability Window

The **Traceability window** provides a hierarchical view of the way an element is connected to other elements in the repository, along with the type of each relationship. This window gives a complete list of all relationships that cannot be seen by viewing elements in the **Browser window** and that also might not appear in any diagrams. It is very useful for managing Requirements and tracing how a Requirement is related to upstream process elements such as Business Drivers and downstream process elements such as Components. It is a useful tool, enabling newcomers to a model to gain a quick understanding of which are the important and well connected elements. Before you delete an element in the model, you should use the Traceability window to ensure that you understand that element's existing relationships.

Options for the Traceability Window

There is a series of options that restrict traceability to specified connector types; these options can be set to alter what is displayed in the window. The options are available from the toolbar at the top of the window.

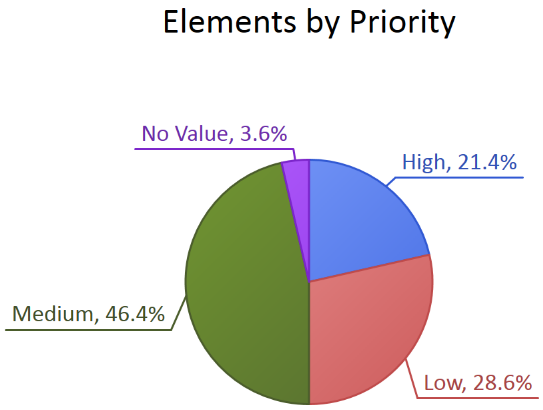


- ✓ Generalizations
- ✓ Aggregations
- ✓ Nesting
- ✓ Realizations
- ✓ Dependencies
- ✓ Transitions
- ✓ Other Links
- Classifiers
- Embedded Element Reuse
- ✓ Transformations
- ✓ Custom References
- Qualified Names

Learn more about the Traceability Window	The Traceability Window

Dashboard Diagrams

Dashboard diagrams allow you to create high quality Charts and graphs to display repository information in a visually compelling way. This diagram is an example of creating a Dashboard **diagram** in Sparx Systems Enterprise Architect; it illustrates the ratio of Requirement Priorities in a Pie Chart.



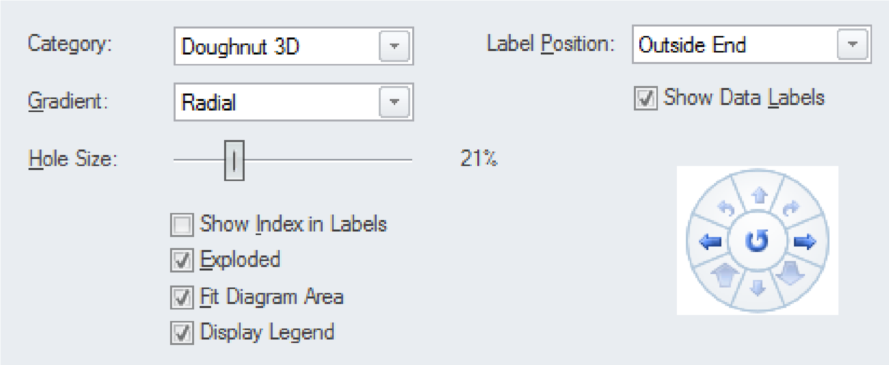
This diagram shows a Pie Chart element depicting element priorities for all the Requirements in a selected Package. It provides a useful summary for a Requirements Manager and is dynamically updated when the priority changes and the diagram is reopened. A range of other pre-defined Charts and user-defined Charts can also be added. A filter has been added to exclude all elements other than Requirements.

Enterprise Architect provides a Toolbox page of pre-configured Charts and graphs, but you are free to create and save any number of Charts, sourcing data from anywhere in the repository. The Charts and graphs provide valuable summary information that assists in the management of Requirements. High level reporting and project status can be easily tracked and documented using the numerous Charts and report elements available, which tightly link in with the model content and status.

Getting to Know Dashboard Diagrams

Where to find Dashboard Diagrams	**Browser window** | Right-click on Package | Add Diagram : ≡ | Manage | Show All **Perspectives** | Extended | Dashboard
Usage of Dashboard Diagrams	Dashboard diagrams present rich yet easily understood views of information - such as the status of Requirements in a particular release of the system - that can be opened inside the model or conveniently copied directly into management or project team presentations. They are useful for planning an iteration such as an Agile sprint to view how ready the Requirements are for the implementation team; for example, to view what percentage of the Requirements have been approved and are of high priority.
Options for Dashboard Diagrams	The standard Charts and graphs available from the Toolbox can be configured in a number of ways, including changing the source, applying filters or modifying the appearance of the Chart as indicated in this diagram, available from the Chart's

Properties window using the 'Appearance' section.



Category: Doughnut 3D

Gradient: Radial

Hole Size: 21%

□ Show Index in Labels

☑ Exploded

☑ Fit Diagram Area

☑ Display Legend

Label Position: Outside End

☑ Show Data Labels

Learn more about Dashboard Diagrams

- Standard Charts

MDG Link for DOORS

Welcome to the Model Driven Generator (MDG) Link™ for DOORS, which provides support for linking an Enterprise Architect model to an IBM® Rational® DOORS® Requirements package.

Features

The MDG Link for DOORS is useful when you need to perform the management of requirements external to your Model Driven Development. Using this **Add-In** you can interchange requirements defined within IBM DOORS with the traceable Requirements used within Enterprise Architect's Requirements Management features.

The MDG Link for DOORS supports:

Importing:

- Objects from IBM® Rational® DOORS®
- Object attributes from IBM® Rational® DOORS®
- Links between objects
- External links (attachments)
- **Discussions**

Exporting:

- Requirements and Use Cases
- Element properties and Tagged Values
- Connectors between elements

- Attachments

Synchronization:

- Of IBM® Rational® DOORS® requirements and Enterprise Architect elements through import and export (or vice-versa)

Obtaining the MDG Link for DOORS

For all Enterprise Architect Editions other than Ultimate, you can purchase the MDG Link for DOORS separately and download the installer from the Sparx Systems website. The product pages on the website provide:

- A product overview
- A video demonstration of the product
- Pricing and purchasing information
- System requirements for the product
- A trial edition of the product to explore for 30 days

When you purchase the product, you will receive download and installation instructions by email.

The Enterprise Architect Ultimate Edition includes a licence for the MDG Link for DOORS, although you download the Link installer from the Sparx Systems website and execute it separately.

Enable MDG Link for DOORS

When you have installed the MDG Link for DOORS, and before you can access its facilities, you must enable the product for use.

1. In Enterprise Architect, select the 'Specialize > **Add-Ins** > Manage-Addin' ribbon option.
2. Against the 'DoorsEASync' entry, select the 'Load on Startup' checkbox.
3. Click on the **OK button**.

Getting Started

After installing and enabling the MDG Link for DOORS, you can access the facilities of the technology in Enterprise Architect.

Access

Ribbon	Click on target Package, then: Specialize > **Add-Ins** > DOORS > [option]
Context Menu	**Browser window** | Right-click on target Package | Specialize | DOORS

Tasks

There are three principal tasks that you can perform through the MDG Link for DOORS.

Task	Description
Create a Module Link	On the 'DOORS' menu you can select the 'Add/Edit Module' option to create a link

	between Sparx Systems Enterprise Architect and an existing IBM® Rational® DOORS® module. You can also redirect a link to a different module. The link enables you to exchange requirements data between DOORS and Enterprise Architect, importing data from DOORS to Enterprise Architect, and exporting data from Enterprise Architect to DOORS.
Export Data To a DOORS Module	On the 'DOORS' menu you can select the 'Export to Doors' option to transfer requirements from a selected Enterprise Architect Package to a selected DOORS module. As part of this process you can create an export profile to define what the export should operate on.
Import Data From a DOORS Module	On the 'DOORS' menu you can select the 'Import from Doors' option to transfer requirements into a selected Enterprise Architect Package from a linked DOORS module. As part of this process you can create an import profile to define what the import should operate on.

Create a Link to a DOORS Module

In the MDG Link for DOORS you can create a link between Sparx Systems Enterprise Architect and an existing IBM® Rational® DOORS® module, which enables you to exchange requirements data between DOORS and Enterprise Architect. You can also redirect the link to a different module. Through this link you can import data from DOORS to Enterprise Architect, and export data from Enterprise Architect to DOORS.

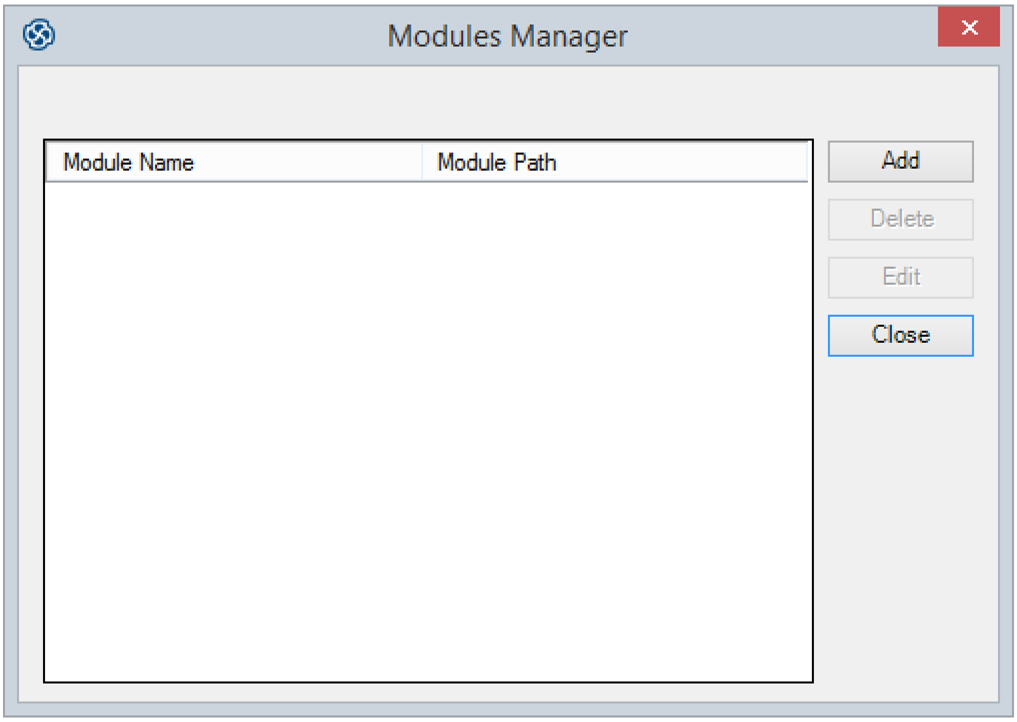
Access

Ribbon	Click on target Package, then: Specialize > **Add-Ins** > DOORS > Connect External Project
Context Menu	**Browser window** | Right-click on target Package | Specialize | DOORS | Add/Edit Module

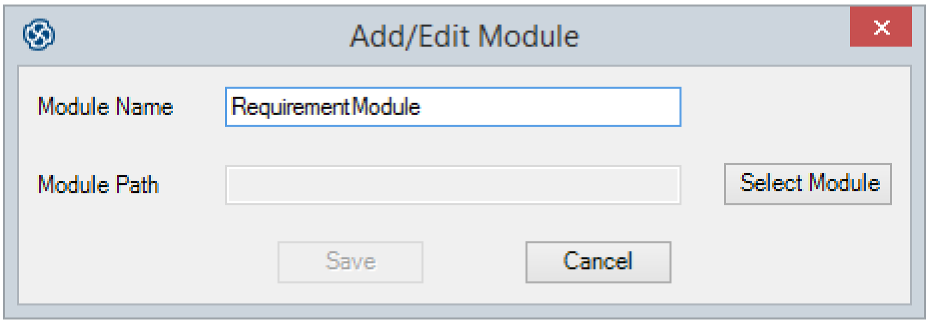
Modules Manager Dialog

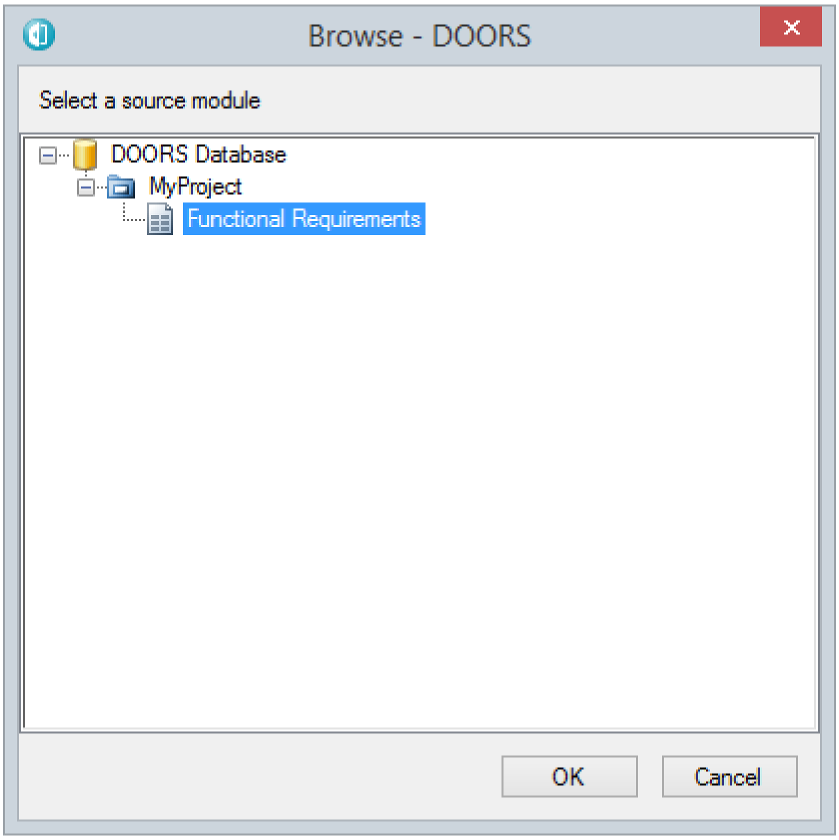
Use the 'Modules Manager' dialog to locate an existing

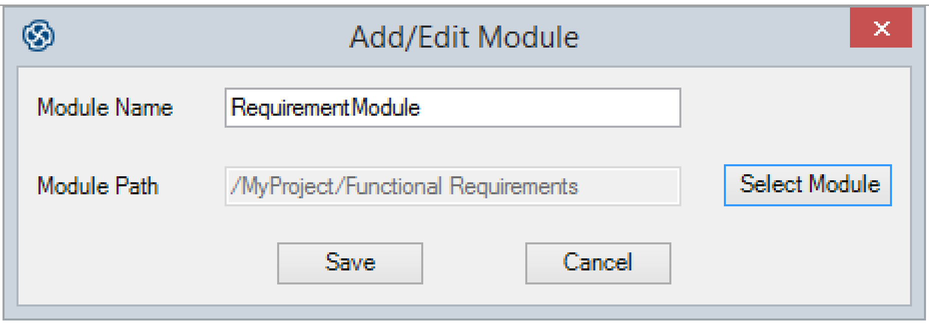
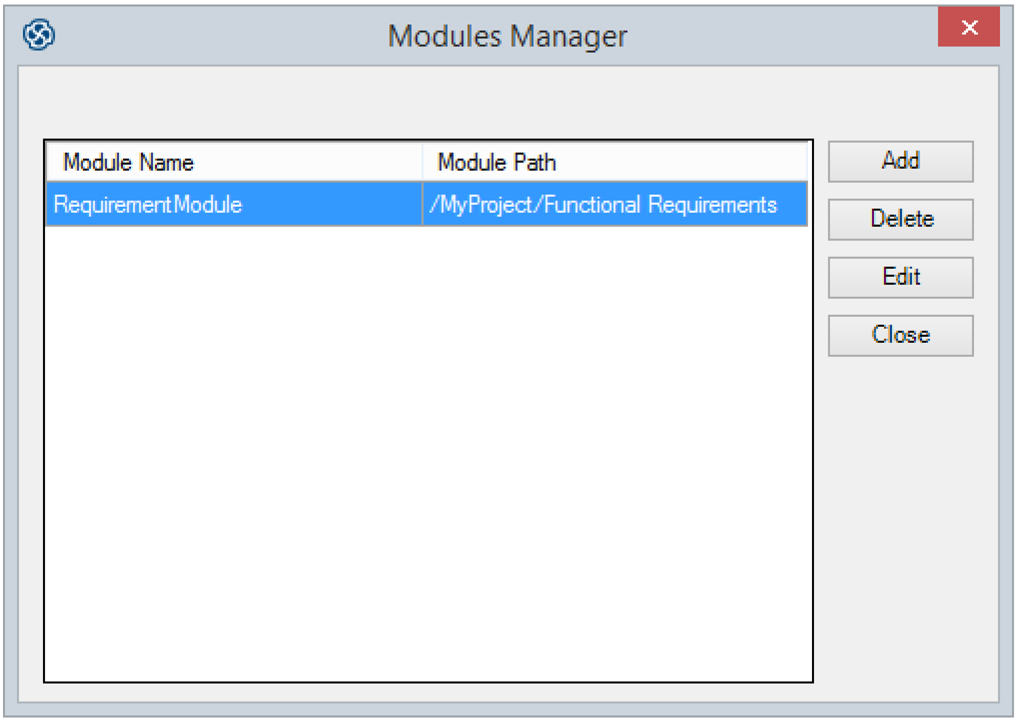
DOORS module and create a link to it.



Create a Link to a DOORS Module

Step	Action
1	On the 'Modules Manager' dialog, click on the **Add button**. The 'Add/Edit Module' dialog displays.  Add/Edit Module Module Path Select Module Save Cancel Module Name: RequirementModule The 'Module Name' field displays the name of the

	selected Module, to identify the link to the module. You cannot edit this name.
2	Click on the **Select Module button** to open the 'Browse - DOORS' dialog (in DOORS itself).  Browse - DOORS Select a source module DOORS Database MyProject Functional Requirements OK Cancel
3	Expand the module hierarchy as necessary to locate the required module, and click on it.
4	Click on the **OK button** to return to the 'Add/Edit Module' dialog, which now displays the module path and name in the 'Module Path' field.

	 Add/Edit Module Module Name: RequirementModule Module Path: /MyProject/Functional Requirements
6	Click on the **Save button**. The 'Module Manager' dialog redisplays, showing the newly-created module link. You can now use this link to exchange requirements data between Enterprise Architect and DOORS.  Modules Manager Module Name: RequirementModule — Module Path: /MyProject/Functional Requirements Click on the **Close button** to close the dialog.

Edit or Delete a Link to a DOORS Module

If the existing link to the DOORS module is not appropriate, you can delete or redirect it.

Step	Action
1	On the 'Modules Manager' dialog, click on the link to change. - To delete it, click on the **Delete button** and on the **Close button**; this ends the procedure - To redirect it, click on the **Edit button**; the 'Add/Edit Module' dialog redisplays
2	On the 'Add/Edit Module' dialog, click on the **Select Module button** to display the 'Browse - DOORS' dialog (in DOORS).
3	Expand the hierarchy as necessary on the 'Browse - DOORS' dialog, and click on the replacement module for the link.
4	Click on the **OK button** to return to the 'Add/Edit Module' dialog, which now shows the module path of the replacement module. Note that you cannot edit the link **name**.
5	Click on the **Save button**. The 'Module Manager' dialog redisplays, showing the edited module link. Click on the **Close button** to close the dialog.

Notes

- You can also create and edit links to DOORS modules through the 'Export to Doors' and 'Import from Doors' dialogs, using the **Module Manager button**

Export Requirements to DOORS

Using the Sparx Systems MDG Link for DOORS, you can transfer all the Requirement elements under the selected Enterprise Architect Package to a linked IBM® Rational® DOORS® module, as DOORS objects.

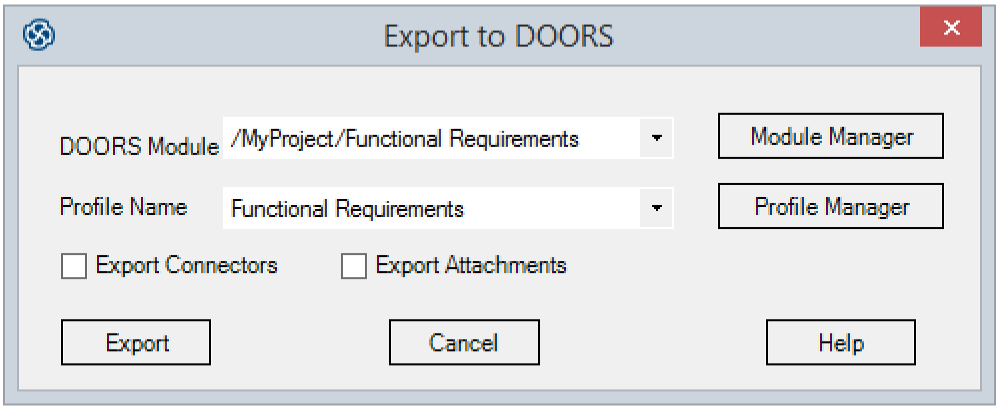
As part of this process you can create an export profile to define what the export should operate on. An export profile is a template in which you specify the Enterprise Architect element properties to be exported to the mapped fields in DOORS object properties.

Access

Ribbon	Click on target Package, then: Specialize > **Add-Ins** > DOORS > Export to Doors
Context Menu	**Browser window** | Right-click on target Package | Specialize | DOORS | Export to Doors

Export to DOORS Dialog

On the 'Export to DOORS' dialog you set the module you are exporting into, and specify which export profile to apply and whether to also export connectors and attachments.



DOORS Module: /MyProject/Functional Requirements

Profile Name: Functional Requirements

□ Export Connectors □ Export Attachments

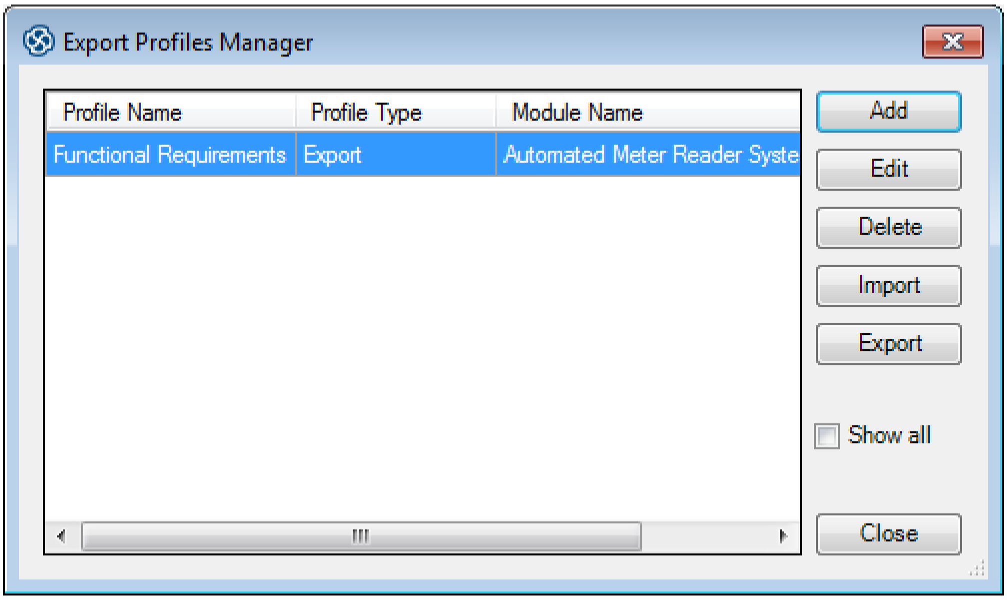
Export Options

Field/Button	Action
DOORS Module	Click on the **drop-down arrow** and select the linked DOORS module into which to export the Requirements.
Module Manager	If the required module is not listed, click on this button to display the 'Module Manager' dialog, and locate and link to the module.
Profile Name	Click on the **drop-down arrow** and select the appropriate export profile to

	use in this operation.
Profile Manager	If the export profiles listed are not appropriate, click on this button to display the 'Export Profiles Manager' dialog and create, edit or import the profile. (See the *Manage Export Profiles* table.)
Export Connectors	Select this checkbox to export any connectors between the Requirement elements.
Export Attachments	Select this checkbox to export any attachments that the Requirement elements might have.
Export	Click on this button to begin the export of Requirements from the selected Enterprise Architect Package to the specified DOORS module.
Cancel	Click on this button to close the 'Export to Doors' dialog without exporting any Requirements.
Help	Click on this button to display this Help topic.

Export Profiles Manager Dialog

When you click on the **Profile Manager button** on the 'Export to DOORS' dialog, the 'Export Profiles Manager' dialog displays. You use this dialog to create or import new profiles, edit or delete existing profiles, and export profiles to your preferred file system.



Profile Name	Profile Type	Module Name
Functional Requirements	Export	Automated Meter Reader Syste

Manage Export Profiles

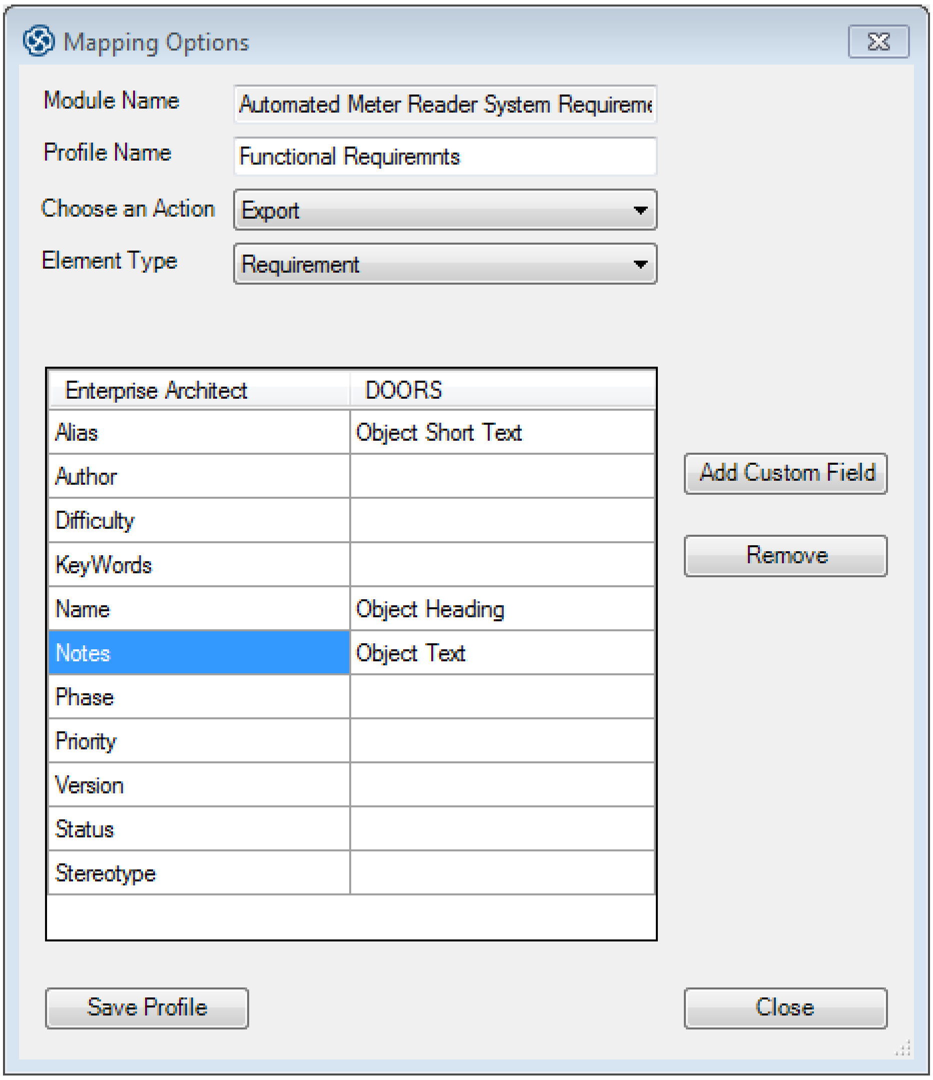
Field/Button	Action
Add	Click on this button to add a new export profile. The 'Mapping Options' dialog displays; see the *Create or Edit an Export*

	Profile table.
Edit	Click on an existing profile name and click on this button to edit the parameters of that profile. The 'Mapping Options' dialog displays, showing the current parameters of the profile; see the *Create or Edit an Export Profile* table.
Delete	Click on an existing profile name and click on this button to immediately remove that profile from the list.
Import	Click on this button to display the 'Import a Profile - Doors Extension' browser. Browse for the location of the required profile file (.eProfile), and click on the file name and on the **Open button**. A status message displays. Click on the **OK button**; if the operation was successful, the profile name displays on the 'Export Profiles Manager' dialog. If unsuccessful, the profile is not added to the list.
Export	Click on a profile name and click on this button to export that profile to a file system location as a .eProfile file. The 'Save As' browser displays. Browse to the

	required location and click on the **Save button**. A status message displays; click on the **OK button** to clear the message.
Show all	Turn on this option to display profiles which belong to all the linked modules.
Close	When you have finished using the 'Export Profiles Manager' dialog, click on this button to return to the 'Export to Doors' dialog.

Export Mapping Options Dialog

When you click on the **Add button** or **Edit button** on the 'Export Profiles Manager' dialog, the 'Mapping Options' dialog displays. This dialog maps Enterprise Architect element properties to IBM® Rational® DOORS® Object properties, and helps you to define which properties - including Tagged Values - to export. You can use the selected profile many times to update the DOORS module with changes in the Enterprise Architect Requirements.



Module Name: Automated Meter Reader System Requireme

Profile Name: Functional Requiremnts

Choose an Action: Export

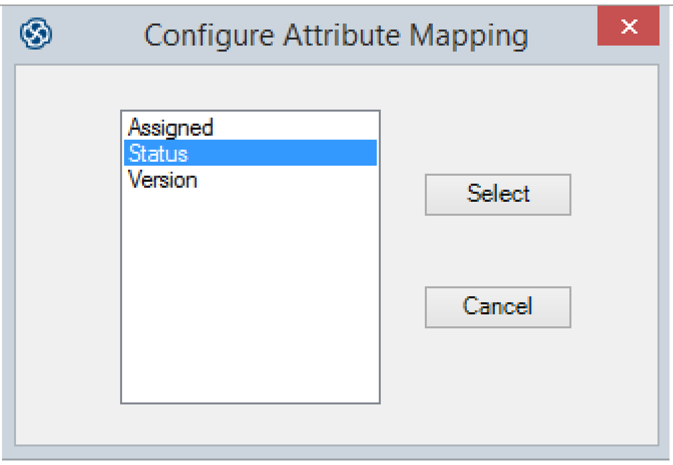
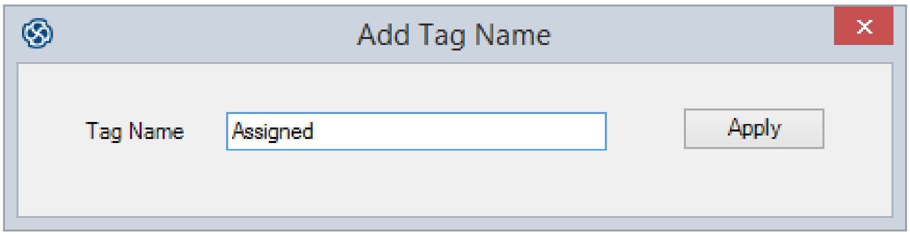
Element Type: Requirement

Enterprise Architect	DOORS
Alias	Object Short Text
Author	
Difficulty	
KeyWords	
Name	Object Heading
Notes	Object Text
Phase	
Priority	
Version	
Status	
Stereotype	

Create or Edit an Export Profile

Field/Button	Action
Profile Name	Type in an appropriate name for the profile (if editing an existing profile, the name of the selected profile displays here).

Choose an Action	Defaults to 'Export'. You can click on the **drop-down arrow** and change this action to 'Import' if you are switching the direction of the data exchange.
Element Type	Click on the **drop-down arrow** and select the type of Enterprise Architect element to export.
Requirement Type	This option will be available only if ‘Requirement’ is selected as Element Type. Click on the **drop-down arrow** and select the type of Requirement Type to filter for.
Enterprise Architect	Lists the Enterprise Architect element properties that could be exported.
DOORS	Lists the DOORS properties that can be exported to. Double-click on an empty property field to map that field to an Enterprise Architect property. If there are no available properties, an error message displays; otherwise, the 'Configure Attribute Mapping' dialog displays.

	 Configure Attribute Mapping Assigned Status Version Select Cancel
Add Custom Field	Click on this button to select an Enterprise Architect Tagged Value name to export. The 'Add Tag Name' dialog displays. 
Remove	Click on a DOORS property value and click on this button to clear the value mapped to the corresponding Enterprise Architect property.
Save Profile	Click on this button to save the Profile definition you have created, and close the 'Mapping Options' dialog and return to the 'Export Profiles Manager' dialog.
Close	Click on this button to close the 'Mapping Options' dialog.

Import Requirements from DOORS

Using the Sparx Systems MDG Link for DOORS, you can transfer all the objects in a linked IBM® Rational® DOORS® module into the selected Enterprise Architect Package, as the required types of Enterprise Architect element.

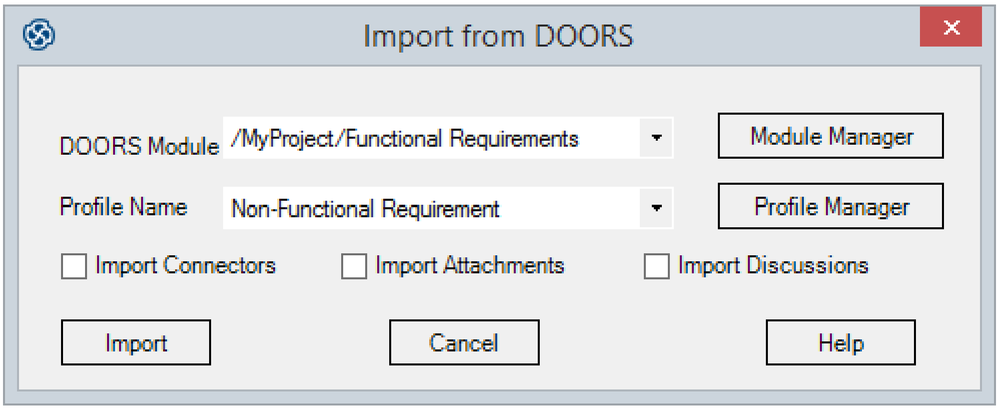
As part of this process you can create an import profile to define what the import should operate on. An import profile is a template in which you specify the DOORS object properties to be imported into mapped Enterprise Architect element properties.

Access

Ribbon	Click on target Package, then: Specialize > **Add-Ins** > DOORS > Import from Doors
Context Menu	**Browser window** | Right-click on target Package | Specialize | DOORS | Import from Doors

Import from DOORS Dialog

The 'Import from DOORS' dialog helps you to specify which module you are importing from, which import profile you are using, and whether to import connectors, attachments and **Discussions**.



Import from DOORS

DOORS Module: /MyProject/Functional Requirements

Profile Name: Non-Functional Requirement

□ Import Connectors □ Import Attachments □ Import Discussions

Import Options

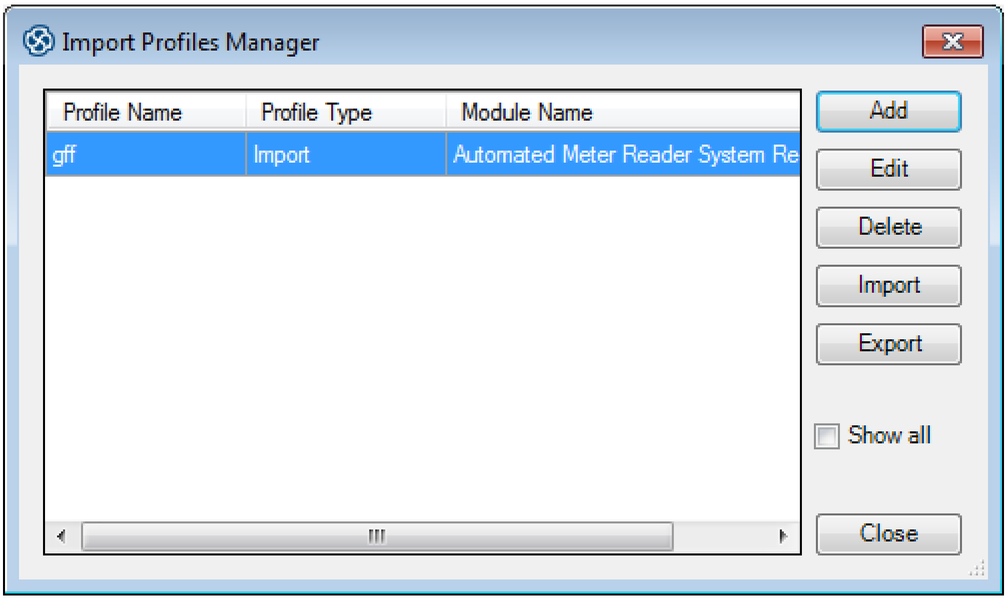
Field/Button	Action
Doors Module	Click on the **drop-down arrow** and select from the list of DOORS modules that are linked to this project.
Module Manager	If the module you want is not listed in the 'Doors Module' field, click on this button to display the 'Modules Manager' dialog and locate and link to the module you require.
	Click on the **drop-down arrow** and

Profile Name	select the Import profile to apply to this operation.
Profile Manager	If an appropriate profile to use is not listed in the 'Profile Name' field, click on this button to display the 'Import Profiles Manager' dialog (see the *Manage Import Profiles* table).
Import Connectors	Select this checkbox to import any connectors (relationships) between the already imported DOORS objects from various DOORS modules into different EA packages.
Import Attachments	Select this checkbox to import any attachments that the imported DOORS objects might have.
Import Discussions	Select this checkbox to import any **Discussions** associated with the imported DOORS objects.
Import	Click on this button to begin the import process.
Cancel	Click on this button to close the 'Import from Doors' dialog without performing the import.

Help	Click on this button to display this Help topic.

Import Profiles Manager Dialog

When you click on the **Profile Manager button** on the 'Import from Doors' dialog, the 'Import Profiles Manager' dialog displays. You use this dialog to create or import new profiles, edit or delete existing profiles, and export profiles to your preferred file system.



Profile Name	Profile Type	Module Name
gff	Import	Automated Meter Reader System Re

Manage Import Profiles

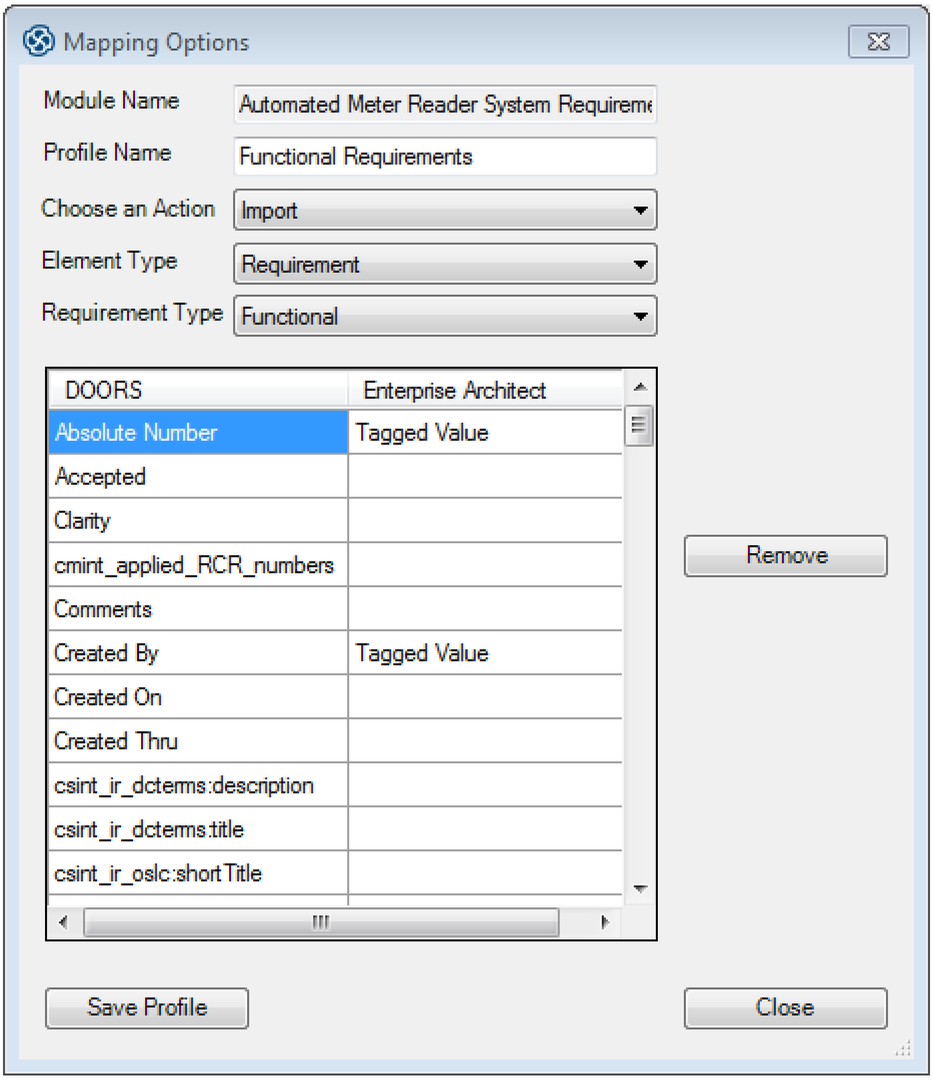
Field/Button	Action

Add	Click on this button to add a new Import profile. The 'Mapping Options' dialog displays; see the *Create or Edit an Import Profile* table.
Edit	Click on an existing profile name and click on this button to edit the parameters of the selected profile. The 'Mapping Options' dialog displays, showing the current parameters of the profile; see the *Create or Edit an Import Profile* table.
Delete	Click on an existing profile name and click on this button to immediately remove that profile from the list. There is no confirmatory prompt.
Import	Click on this button to display the 'Import a Profile - Doors Extension' browser. Browse for the location of the required profile file (.eProfile), and click on the file name and on the **Open button**. A status message displays. Click on the **OK button**; if the operation was successful, the profile name displays on the 'Import Profiles Manager' dialog. If unsuccessful, the profile is not added to the list.

Export	Click on a profile name and click on this button to export that profile to a file system location as a .eProfile file. The 'Save As' browser displays. Browse to the required location and click on the **Save button**. A status message displays; click on the **OK button** to clear the message.
Show All	Turn on this option to display profiles which belong to all the linked modules.
Close	When you have finished using the 'Import Profiles Manager' dialog, click on this button to return to the 'Import from Doors' dialog.

Import Mapping Options Dialog

When you click on the **Add button** or **Edit button** on the 'Import Profiles Manager' dialog, the 'Mapping Options' dialog displays. This dialog maps IBM® Rational® DOORS® Object properties to Enterprise Architect element properties, and helps you to define which properties to import. You can use the profile many times to update the Enterprise Architect Package with changes in the DOORS module objects.



Mapping Options

Module Name: Automated Meter Reader System Requireme

Profile Name: Functional Requirements

Choose an Action: Import

Element Type: Requirement

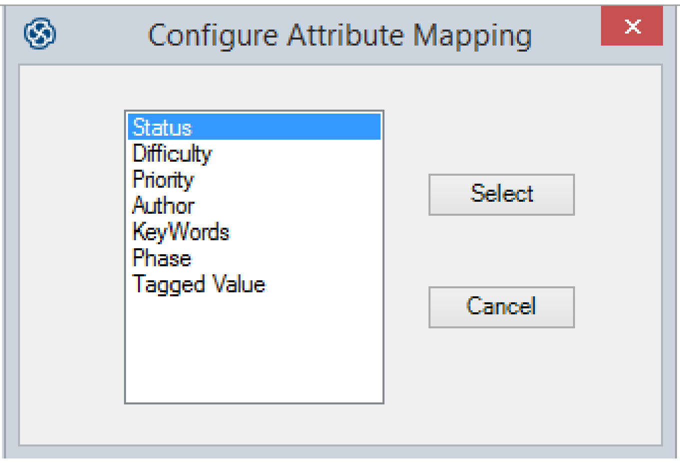
Requirement Type: Functional

DOORS	Enterprise Architect
Absolute Number	Tagged Value
Accepted	
Clarity	
cmint_applied_RCR_numbers	
Comments	
Created By	Tagged Value
Created On	
Created Thru	
csint_ir_dcterms:description	
csint_ir_dcterms:title	
csint_ir_oslc:shortTitle	

Create or Edit an Import Profile

Field/Button	Action
Profile Name	Type in an appropriate name for the import profile.
Choose an Action	Click on the **drop-down arrow** and select 'Import'. You can also reset the

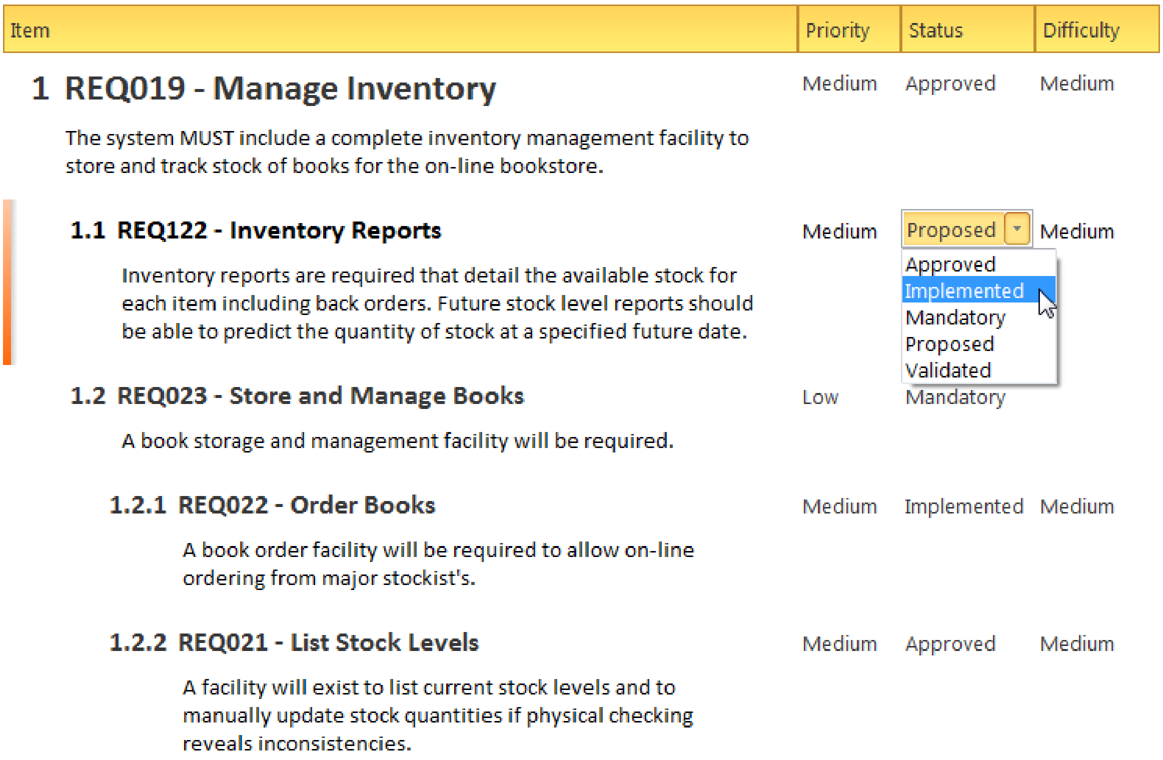
	profile to 'Export' to use it for exporting Requirements from the Enterprise Architect Package to the DOORS module.
Element Type	Click on the **drop-down arrow** and select the element type to create or overwrite with the DOORS data - either 'Requirement' or 'Use Case'.
Requirement Type	This option will be available only if ‘Requirement’ is selected as the Element Type. Click on the **drop-down arrow** and select any type you want to set on the Requirement elements resulting from the import.
DOORS	Lists the DOORS object properties available in the selected DOORS module.
Enterprise Architect	Lists the Enterprise Architect properties mapped to the DOORS properties. You can double-click on an empty property field to display the 'Configure Attribute Mapping' dialog, which provides a list of Enterprise Architect properties that can be mapped to the DOORS property.

	 Configure Attribute Mapping Status Difficulty Priority Author KeyWords Phase Tagged Value Select Cancel Click on a property and on the **Select button** to map it to the DOORS property.
Remove	If necessary, click on a mapped Enterprise Architect property field and click on this button to clear the field and unmap the property.
Save Profile	Click on this button to save the profile definition you have created and return to the 'Import Profiles Manager' dialog.
Close	Click on this button to close the 'Mapping Options' dialog.

Requirements Overview

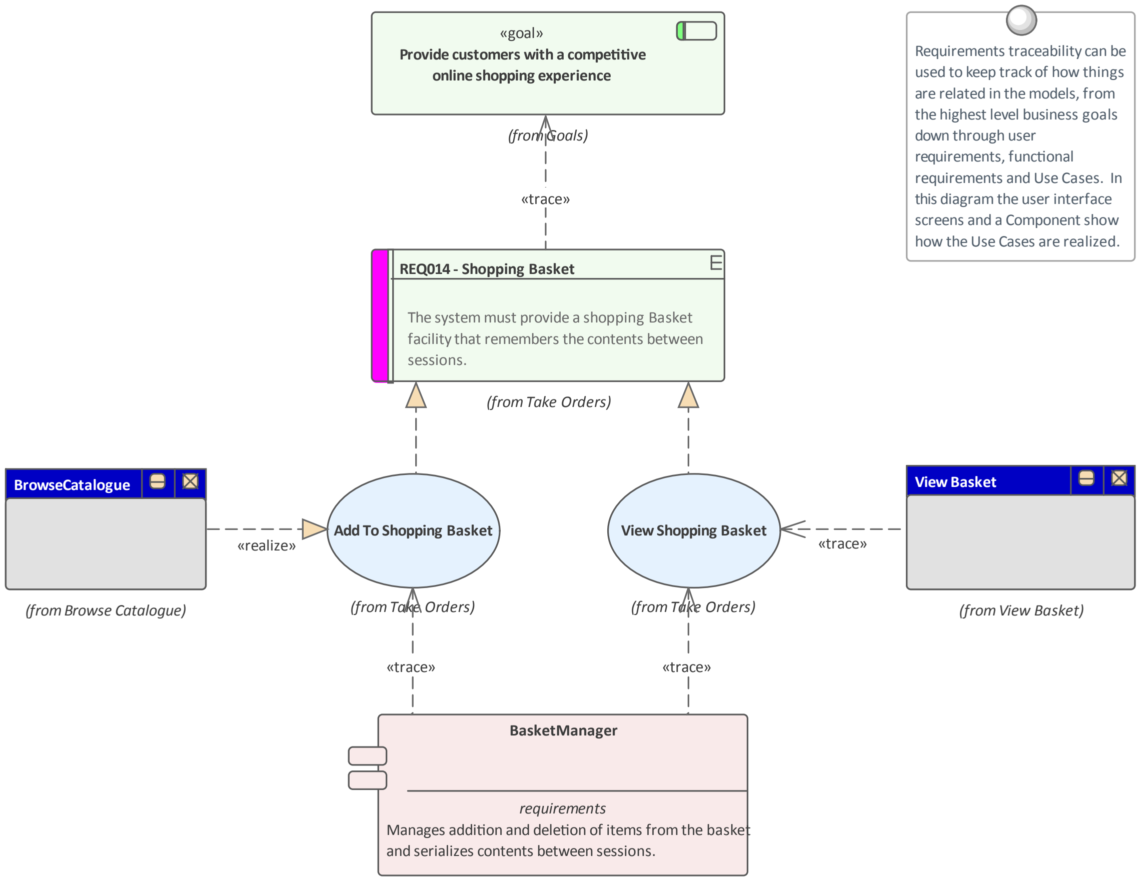
The discipline of Requirement Engineering is one of the most critical parts of any system development process. Whether it is an enterprise, business, engineering, real-time, software or hardware system, the definition and management of requirements is critical to the success of any endeavor. Clear and unambiguous articulation of requirements will ensure that the implementation team has the problem defined, giving the best chance of the correct solution being implemented. Enterprise Architect equips the Requirement Analyst and Manager with a formidable set of tools to take on this important challenge.

The powerful **Specification Manager** allows requirements to be entered, viewed and managed in a spreadsheet format, facilitating rapid input and editing of requirements. Requirement properties, including Tagged Values, can be edited in-line and values can be selected from drop-down lists.



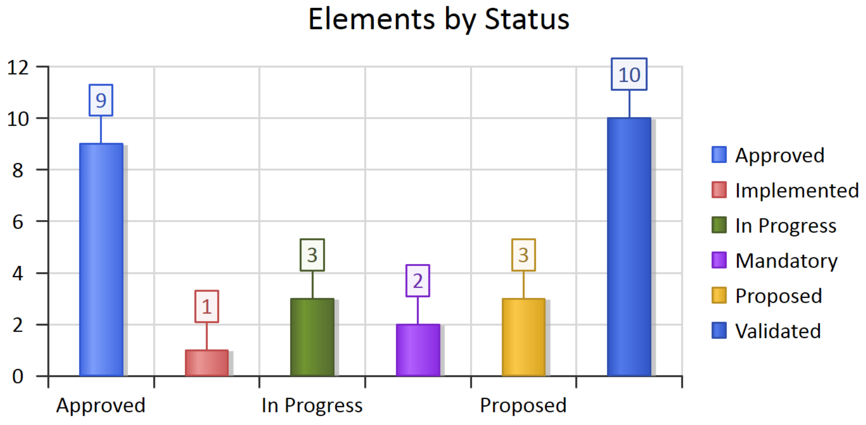
Item	Priority	Status	Difficulty
1 REQ019 - Manage Inventory The system MUST include a complete inventory management facility to store and track stock of books for the on-line bookstore.	Medium	Approved	Medium
1.1 REQ122 - Inventory Reports Inventory reports are required that detail the available stock for each item including back orders. Future stock level reports should be able to predict the quantity of stock at a specified future date.	Medium	Proposed	Medium
1.2 REQ023 - Store and Manage Books A book storage and management facility will be required.	Low	Mandatory	
1.2.1 REQ022 - Order Books A book order facility will be required to allow on-line ordering from major stockist's.	Medium	Implemented	Medium
1.2.2 REQ021 - List Stock Levels A facility will exist to list current stock levels and to manually update stock quantities if physical checking reveals inconsistencies.	Medium	Approved	Medium

Requirements can be viewed in diagrams and related to other model elements, creating compelling representations of traces between specifications and implementations.



Requirements traceability can be used to keep track of how things are related in the models, from the highest level business goals down through user requirements, functional requirements and Use Cases. In this diagram the user interface screens and a Component show how the Use Cases are realized.

Requirements can be managed in a variety of ways, from the use of the **Project Gantt Chart** to the Dashboard diagrams that show properties such as Status for a set of requirements.



This diagram shows a Bar Chart element depicting element status for all the requirements in a selected package. It provides a useful summary for a Requirements Manager and is dynamically updated when the status changes and the diagram is reopened. There are a range of other pre-defined charts and user defined charts can also be added.

These are just a few of the tools that are available to the Requirement Analyst and Managers.

What are Requirements

A requirement is a capability or condition that must be met to ensure that a solution meets the needs of its stakeholders. There is often robust debate about exactly what constitutes a requirement and some proponents will include notions such as Business Drivers and Policies and Business Rules while others will have a much more restrictive view of the requirements. Also a number of requirement methods are Use Case centric and only articulate requirements at a business level while others augment the Use Cases with detailed functional requirements required by the developers. The highly iterative methods such as Agile typically use User Stories and Requirements together but defer the elaboration of Requirements until an iteration (sprint) is being planned. Enterprise Architect provides generic tools to support any requirements method and any type of Requirement can be created and managed using built-in types or by using stereotyped elements and Tagged Values.

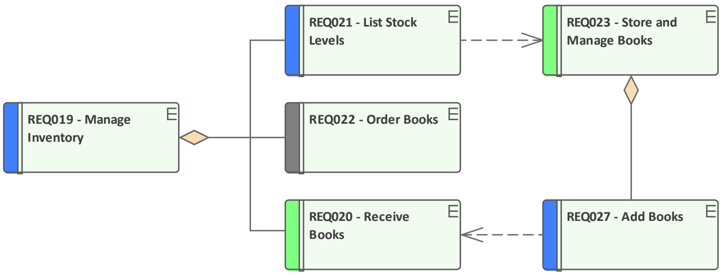
Requirements Diagram

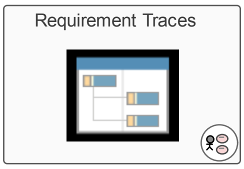
Enterprise Architect allows you to document requirements graphically using the Requirement element. The Requirement element is available from the 'Requirements' Toolbox folder.

Using a Requirement element in the UML model, allows relationships to be drawn between requirements. It also allows for direct traceability to other aspects of the model such as Use Cases, Test Cases and other Analysis or Design elements.

The requirement element can be used to model or document any requirements, ranging from formal business requirements through to performance or security requirements.

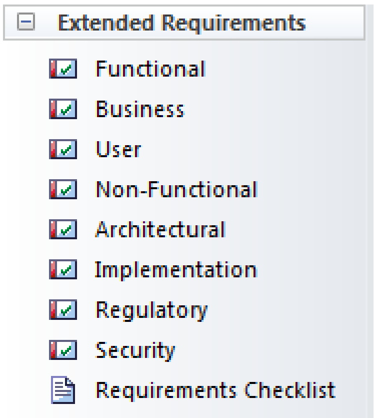
Requirements can be grouped into hierarchies effectively decomposing a high level requirement. The UML Aggregation relationship is typically used for this purpose. Requirements can also be nested in the Browser window creating a tree of requirements.


REQ021 - List Stock Levels
REQ023 - Store and Manage Books
REQ019 - Manage Inventory
REQ022 - Order Books
REQ020 - Receive Books
REQ027 - Add Books



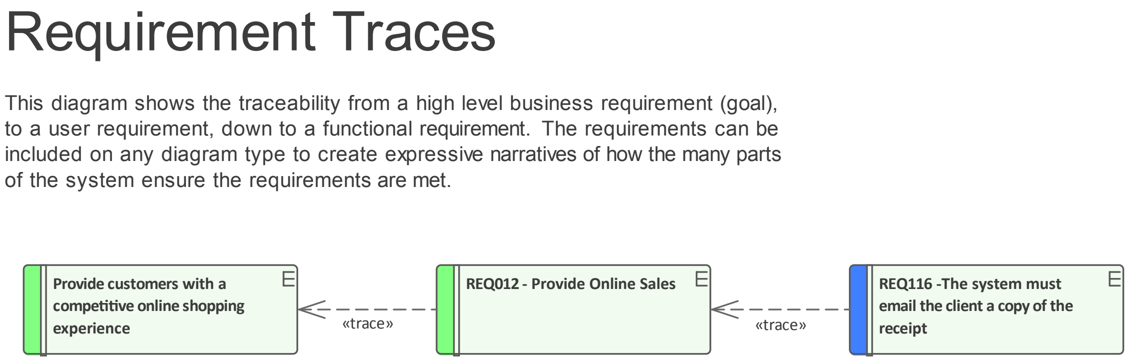
Levels and Types of Requirements

There are many different types of requirement, ranging from high level business requirements down to detailed technical requirements that specify an intricate part of a computer algorithm or hardware device. There are also types based on the source of the requirement - such as stakeholder requirements - or the location in the process - such as transition requirements. There is often confusion and debate about exactly what constitutes a requirement, so some teams will define Business Rules and Policies as requirements and others will view them as business specifications. Regardless of the method or the process that is being followed, Enterprise Architect allows the analyst to create sophisticated models of all requirement types.



Business Requirements

Business Requirements are high-level requirements that express the objectives and desired outcomes of an organization. They are often disregarded as being 'fluffy' by engineers who cannot see how they would be implemented, but if they are articulated well they can be broken down to measurable statements. They are typically defined in a business case or other statements by the product owner or sponsor, the marketing department or the customer. They attempt to articulate why the organization is spending money and resources on the project. Enterprise Architect has a Business Requirement element available from the 'Requirements' toolbox page for this purpose.



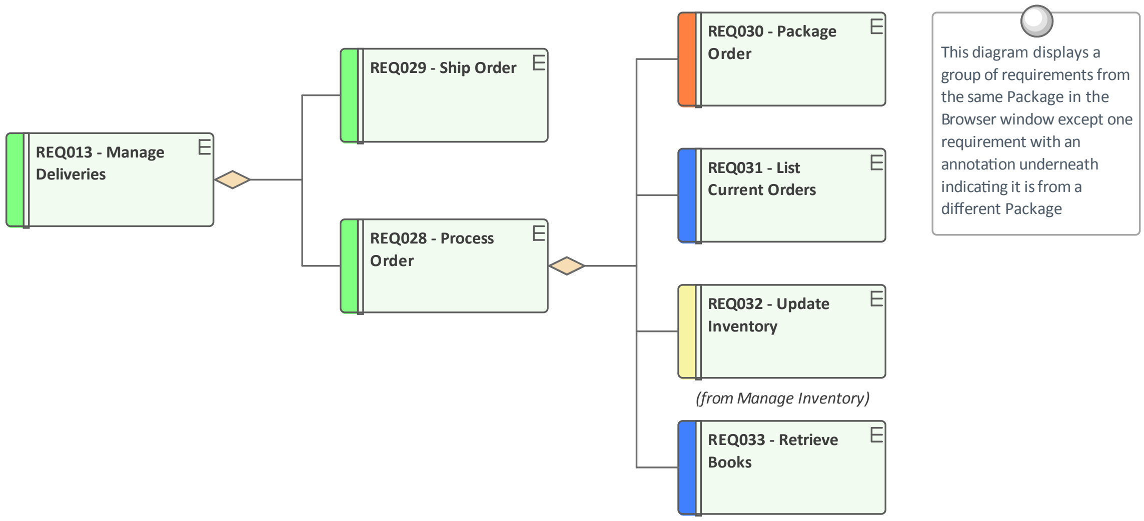
Requirement Traces

This diagram shows the traceability from a high level business requirement (goal), to a user requirement, down to a functional requirement. The requirements can be included on any diagram type to create expressive narratives of how the many parts of the system ensure the requirements are met.

Provide customers with a competitive online shopping experience
«trace»
REQ012 - Provide Online Sales
«trace»
REQ116 -The system must email the client a copy of the receipt

Functional Requirements

Functional Requirements are the bridge between the business and technical teams and provide the definition of what the system must do for its users that will in turn meet the business goals. Some methodologists believe that Functional Requirements can be described using only Use Cases or User Stories, but this appears to be a purist view and in practice there seems to be a need for detailed textual Requirements that describe what the architect must design and the developer must implement. Enterprise Architect has a Functional Requirement element available from the 'Requirements' toolbox page. There is also an Architectural Requirement available from the 'Extended Requirements' page of the Requirements toolbox. In addition there is powerful support for modeling Use Cases and Scenarios using the ingenious **Scenario Builder**.

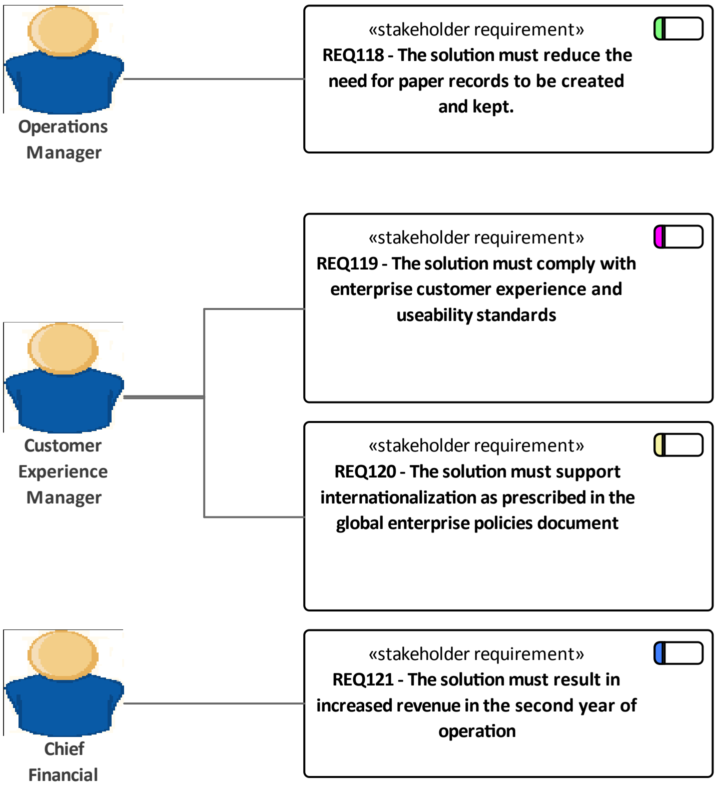

REQ013 - Manage Deliveries
REQ029 - Ship Order
REQ028 - Process Order
REQ030 - Package Order
REQ031 - List Current Orders
REQ032 - Update Inventory
(from Manage Inventory)
REQ033 - Retrieve Books
This diagram displays a group of requirements from the same Package in the Browser window except one requirement with an annotation underneath indicating it is from a different Package

Stakeholder Requirements

Stakeholder Requirements are statements of the stakeholders' needs and expectations and describe the features that must be met if the business requirements are to be fulfilled. Analysts tend to focus on the functional aspects of the needs but stakeholders' expectations might include performance and reliability and a variety of other non-functional needs. Both are critical and act as precursors to the definition of the functional and non functional requirements that will be consumed by the designers and implementers to create solutions that meet the customer's expectations. Enterprise Architect has a Requirement element that can be stereotyped to <<stakeholder requirement>> available from the 'Requirements' toolbox page for this purpose.

Stakeholder Requirements

This diagram shows a number of stakeholders and their needs (requirements).
A stereotype has been created for the stakeholders, that has an alternate image assigned to it.
The requirements are displayed using a rectangular presentation style, so as to display the stereotype <<stakeholder requirement>> in the diagram.



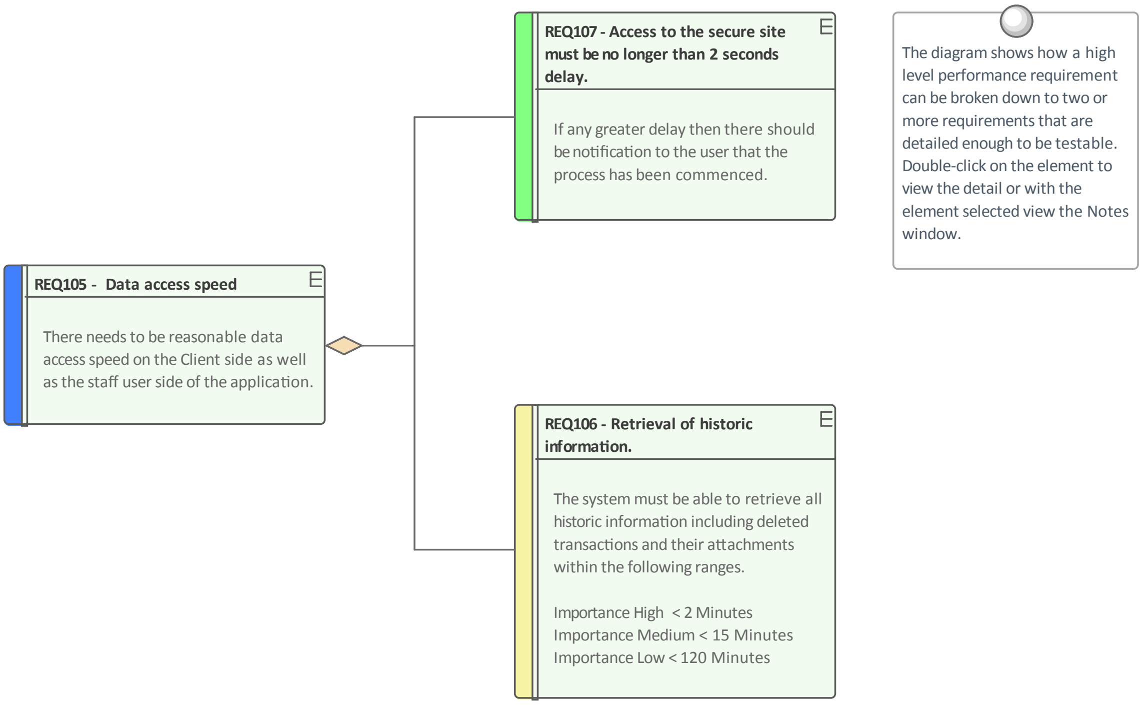
«stakeholder requirement»
REQ118 - The solution must reduce the need for paper records to be created and kept.

«stakeholder requirement»
REQ119 - The solution must comply with enterprise customer experience and useability standards

«stakeholder requirement»
REQ120 - The solution must support internationalization as prescribed in the global enterprise policies document

«stakeholder requirement»
REQ121 - The solution must result in increased revenue in the second year of operation

Non-Functional Requirements and Quality Attributes describe how well a system will perform when it is operating. These typically define or constrain how the system should be behave as a whole and include attributes such as how well it performs, how secure it is, how many times it develops a fault and how easily it can be extended.

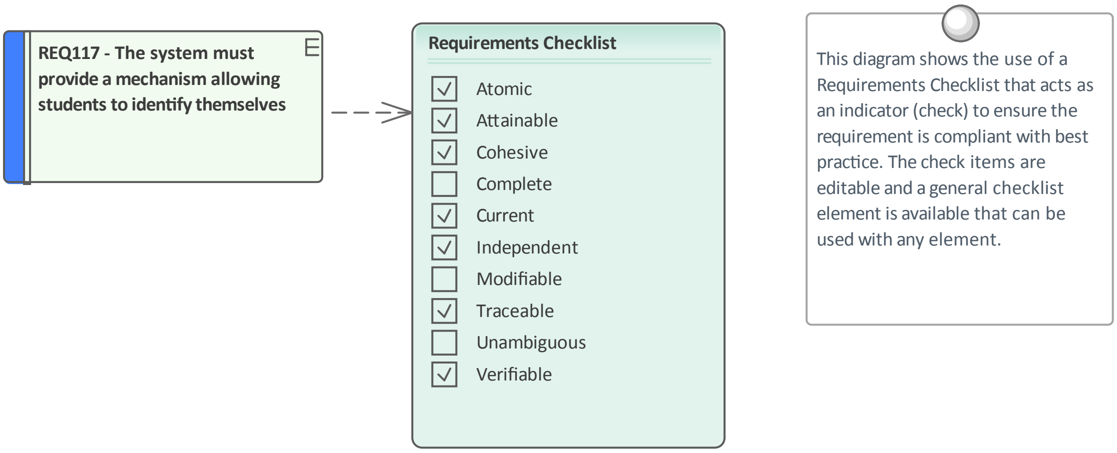

REQ107 - Access to the secure site must be no longer than 2 seconds delay.
If any greater delay then there should be notification to the user that the process has been commenced.
The diagram shows how a high level performance requirement can be broken down to two or more requirements that are detailed enough to be testable. Double-click on the element to view the detail or with the element selected view the Notes window.
REQ105 - Data access speed
There needs to be reasonable data access speed on the Client side as well as the staff user side of the application.
REQ106 - Retrieval of historic information.
The system must be able to retrieve all historic information including deleted transactions and their attachments within the following ranges.
Importance High < 2 Minutes
Importance Medium < 15 Minutes
Importance Low < 120 Minutes

Transition Requirements

Transition Requirements define what is needed to transform the business and systems from the current state to the future state. They define a transitory situation and once the system has been fully implemented the requirements and their implementation will not be visible. They define things such as training, conversion and reformatting of data and parallel runs of business and technology systems.

Characteristics of Good Requirements

More often than not errors and deficiencies in systems can be traced back to requirements engineering, and the literature frequently mentions the small cost of correcting a requirement compared to the large cost of correcting the system once it is built. Well articulated, managed and tested Requirements are therefore imperative to any system development process. Enterprise Architect has a convenient Requirements Checklist element available from the 'Extended Requirements' page of the Requirements Toolbox.



REQ117 - The system must provide a mechanism allowing students to identify themselves

Requirements Checklist

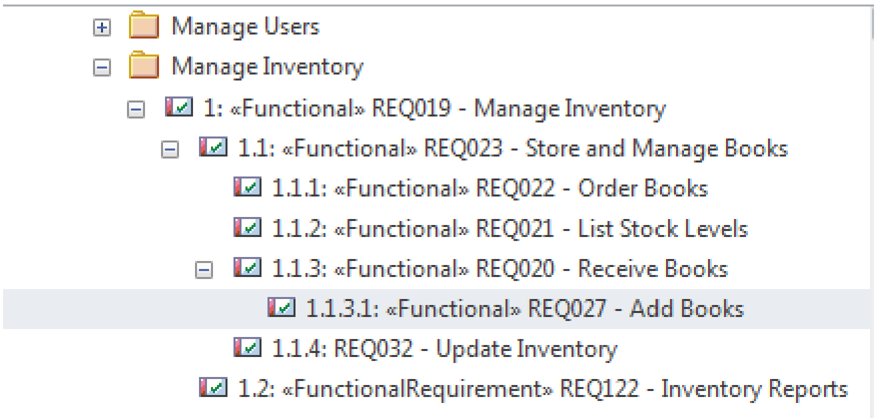
☑ Atomic
☑ Attainable
☑ Cohesive
□ Complete
☑ Current
☑ Independent
□ Modifiable
☑ Traceable
□ Unambiguous
☑ Verifiable

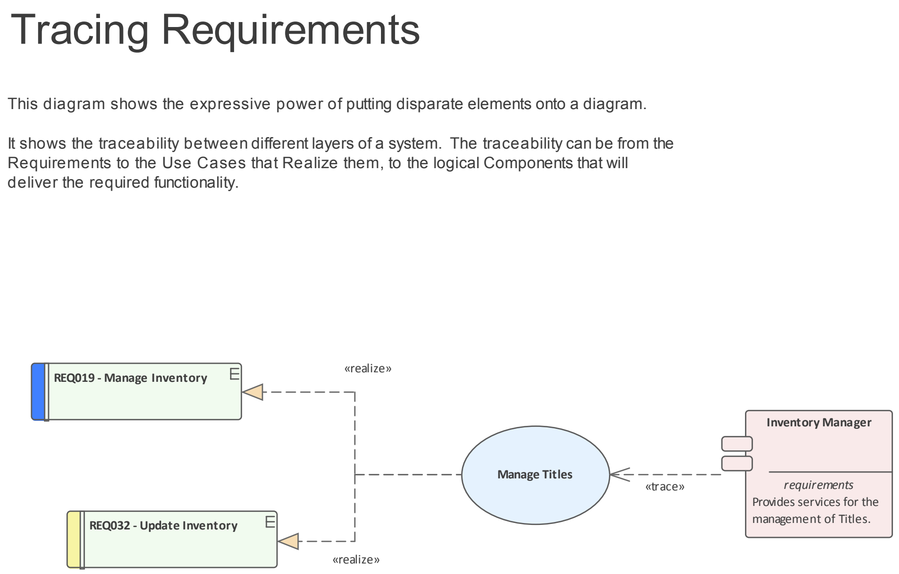
This diagram shows the use of a Requirements Checklist that acts as an indicator (check) to ensure the requirement is compliant with best practice. The check items are editable and a general checklist element is available that can be used with any element.

The Checklist can be used to indicate if a Requirement is ready for implementation.

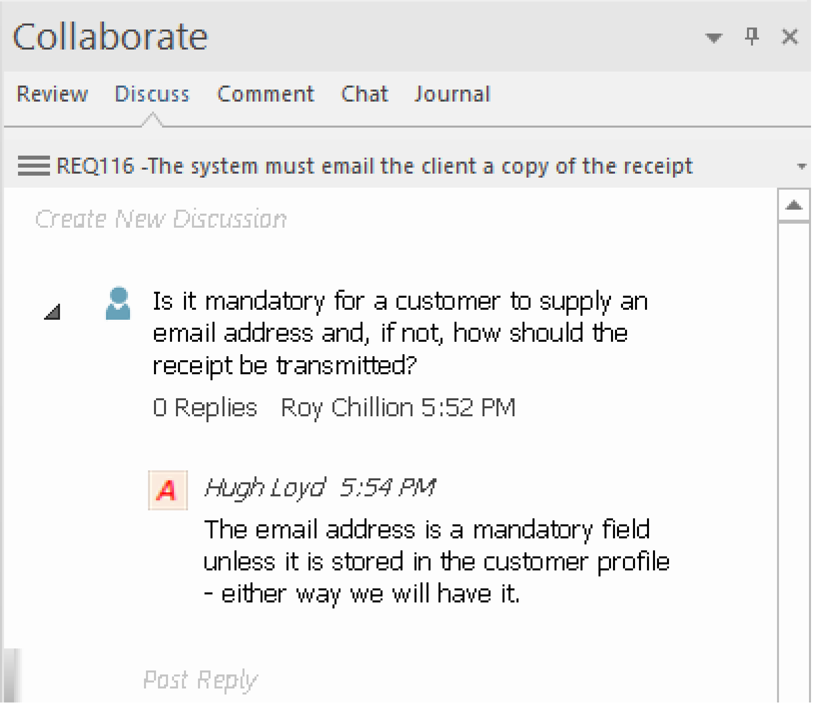
Qualities of Good Requirements

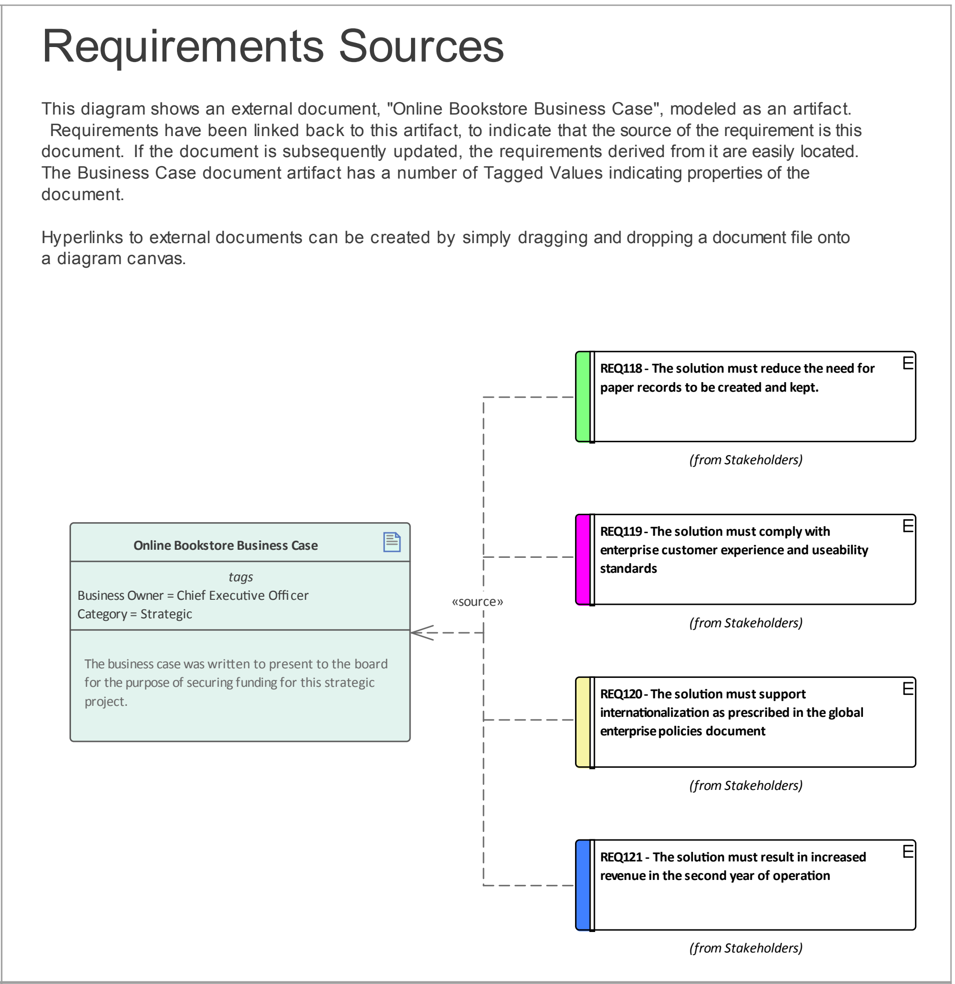
To be effective a set of Requirements must be complete and fully record the stakeholders' needs consistently, cohesively and unambiguously. Enterprise Architect provides an extensive set of features and tools for helping the analyst produce sets of Requirements that are of high quality.

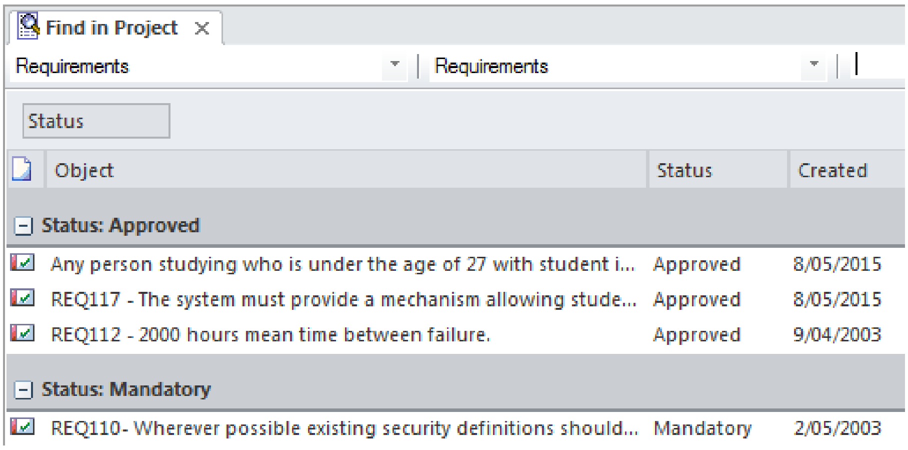
Quality	Description
Atomic	A requirement should articulate a single stakeholder need or a quality attribute. When a requirement contains multiple needs it is not possible to analyze the needs independently. Enterprise Architect can assist by allowing modelers to create hierarchies of requirements in the **Browser window**, which can be broken down to an atomic requirement.  Manage Users Manage Inventory 1: «Functional» REQ019 - Manage Inventory 1.1: «Functional» REQ023 - Store and Manage Books 1.1.1: «Functional» REQ022 - Order Books 1.1.2: «Functional» REQ021 - List Stock Levels 1.1.3: «Functional» REQ020 - Receive Books 1.1.3.1: «Functional» REQ027 - Add Books 1.1.4: REQ032 - Update Inventory 1.2: «FunctionalRequirement» REQ122 - Inventory Reports
Attainable	The need specified in the requirement must be achievable. If a requirement is not attainable the system will not be able to deliver the business value required by the stakeholders. Enterprise Architect can assist by allowing each requirement to be traced to an implementation element such as a Use Case or a Component. The **Relationship Matrix** can be used to

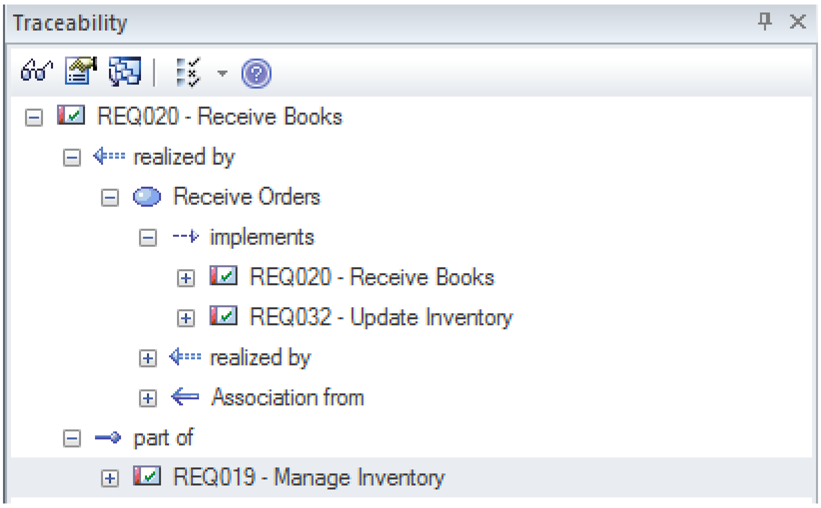
	quickly identify those requirements that are not traced to a lower level element.  Tracing Requirements This diagram shows the expressive power of putting disparate elements onto a diagram. It shows the traceability between different layers of a system. The traceability can be from the Requirements to the Use Cases that Realize them, to the logical Components that will deliver the required functionality. REQ019 - Manage Inventory «realize» Manage Titles «trace» Inventory Manager requirements Provides services for the management of Titles. REQ032 - Update Inventory «realize»
Cohesive	The requirements as a set must be consistent and cohesive and express the behavior of the system; any gaps must be determined and overlap between requirements must be resolved. Following a requirements process will assist greatly, and Enterprise Architect has a number of facilities that will make it easy to keep the requirements cohesive. Missing requirements can be identified using the **Relationship Matrix** where, for example, a matrix of stakeholders and their requirements would quickly identify stakeholders who didn't have requirements.
Complete	Each requirement must fully describe the

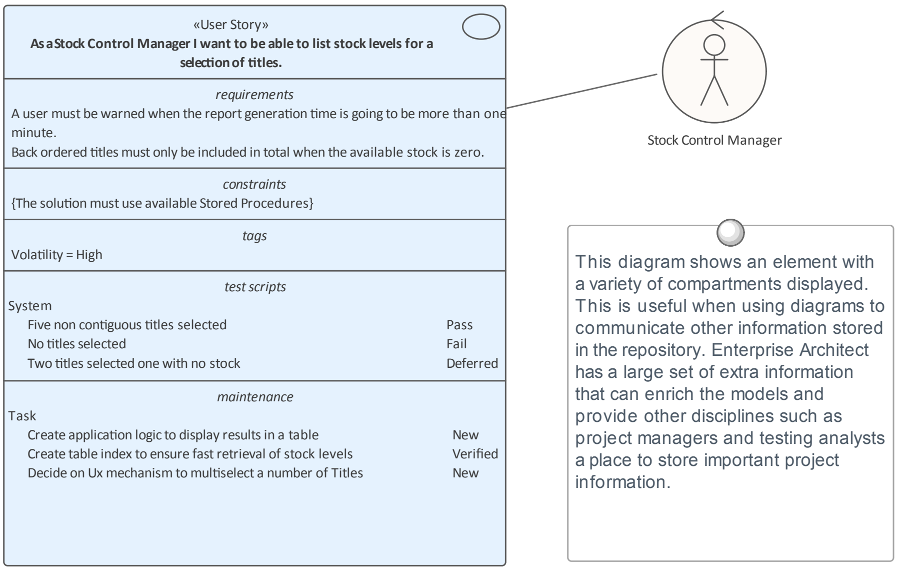
	necessary functionality or behavior that will result in the stakeholder's need being met. Enterprise Architect can help by team members using the **Team Library** facility or the **Collaborate window**. Some analysts prefer to mark requirements as needing to be completed, by appending the Requirement element with a tag such as 'TBC'. Enterprise Architect can assist by allowing the analyst to search across the requirements Packages for this tag and return a list of elements that require further work. A **Model View** could also be set up using this search to populate the view. The Collaborate window is also helpful because the information added is not part of the Requirement itself and does not contaminate the Requirement's notes with text that isn't part of the Requirements definition.

	 Collaborate Review Discuss Comment Chat Journal REQ116 -The system must email the client a copy of the receipt Create New Discussion Is it mandatory for a customer to supply an email address and, if not, how should the receipt be transmitted? 0 Replies Roy Chillion 5:52 PM Hugh Loyd 5:54 PM The email address is a mandatory field unless it is stored in the customer profile - either way we will have it. Post Reply
Current	A Requirement must be up-to-date and reflect the current knowledge and project status. Enterprise Architect can assist the analyst by allowing the sources of requirements to be modeled and the requirements themselves can be traced back to these artifacts so when the source is changed all the affected elements could be located.

	 Requirements Sources This diagram shows an external document, "Online Bookstore Business Case", modeled as an artifact. Requirements have been linked back to this artifact, to indicate that the source of the requirement is this document. If the document is subsequently updated, the requirements derived from it are easily located. The Business Case document artifact has a number of Tagged Values indicating properties of the document. Hyperlinks to external documents can be created by simply dragging and dropping a document file onto a diagram canvas. Online Bookstore Business Case tags Business Owner = Chief Executive Officer Category = Strategic The business case was written to present to the board for the purpose of securing funding for this strategic project. «source» REQ118 - The solution must reduce the need for paper records to be created and kept. (from Stakeholders) REQ119 - The solution must comply with enterprise customer experience and useability standards (from Stakeholders) REQ120 - The solution must support internationalization as prescribed in the global enterprise policies document (from Stakeholders) REQ121 - The solution must result in increased revenue in the second year of operation (from Stakeholders)
Independent	The requirements should be independent of each other, and not have overlapping statements that conflict with each other or restate the same need. A degree of analysis will be required as there will inevitably be some overlap, but this can be kept to a minimum by creating requirements in hierarchies and working systematically. Enterprise Architect has a number of features that can assist with this, including the **Relationship Matrix**, which will help to identify overlap. The powerful and flexible search function

	could also be used to identify overlapping or conflicting statements.  Find in Project Requirements ▾ | Requirements ▾ Status Object | Status | Created ⊟ Status: Approved Any person studying who is under the age of 27 with student i... | Approved | 8/05/2015 REQ117 - The system must provide a mechanism allowing stude... | Approved | 8/05/2015 REQ112 - 2000 hours mean time between failure. | Approved | 9/04/2003 ⊟ Status: Mandatory REQ110- Wherever possible existing security definitions should... | Mandatory | 2/05/2003
Modifiable	This means that a requirement can be changed without there being the need to modify other related requirements. It also applies to a Software (System) Requirements Specification and requires that it can be changed easily. Enterprise Architect can assist with both these issues; the Requirements themselves can easily be located through the search facility, and the text and properties changed easily. The System Requirements Specification is automatically generated from the model, so by simply changing one or more requirements and regenerating the document it will be updated.
Traceable	A Requirement is a specification of a characteristic or behavior, and does not

	exist in isolation but is typically related to up-process entities such as stakeholders, business drivers and goals, and down-process entities such as Use Cases and components. Enterprise Architect allows elements to be traced in any direction and provides a number of powerful tools to visualize the traces, including the **Relationship Matrix**, the Traceability Window and the Requirements diagram itself. The **Insert Related Elements** facility can be used to automatically construct a diagram of traces.  Traceability ⊟ REQ020 - Receive Books ⊟ realized by ⊟ Receive Orders ⊟ implements ⊞ REQ020 - Receive Books ⊞ REQ032 - Update Inventory ⊞ realized by ⊞ Association from ⊟ part of ⊞ REQ019 - Manage Inventory
Unambiguous	A Requirement should only be able to be interpreted in one way. Requirements that are ambiguous can lead to a project being delayed, over budget or having the wrong functionality or behavior. Enterprise Architect can assist with ambiguity by

	helping analysts to record comments about the requirements, using the Discussion facility.
Verifiable	A requirement is verifiable if the implemented system or product can be tested to ascertain that the requirement has been met. Key to being able to achieve this is knowing which test must be run to verify a particular requirement. Enterprise Architect can assist by allowing the modeler to trace Test Cases back to requirements and to visualize their relationship in a number of ways, including the use of the **Relationship Matrix**. Test results can also be recorded directly inside Enterprise Architect.  «User Story» As a Stock Control Manager I want to be able to list stock levels for a selection of titles. requirements A user must be warned when the report generation time is going to be more than one minute. Back ordered titles must only be included in total when the available stock is zero. constraints {The solution must use available Stored Procedures} tags Volatility = High test scripts System Five non contiguous titles selected Pass No titles selected Fail Two titles selected one with no stock Deferred maintenance Task Create application logic to display results in a table New Create table index to ensure fast retrieval of stock levels Verified Decide on Ux mechanism to multiselect a number of Titles New Stock Control Manager This diagram shows an element with a variety of compartments displayed. This is useful when using diagrams to communicate other information stored in the repository. Enterprise Architect has a large set of extra information that can enrich the models and provide other disciplines such as project managers and testing analysts a place to store important project information.
Necessary	Requirements should record a capability or behavior that is really needed or that

	specifies that the system or product should comply with constraints such as standards. Enterprise Architect can assist by allowing the modeler to relate each requirement back to its source and using the **Relationship Matrix**; requirements that have no source will be obviously identified as unnecessary or needing further investigation.
Feasible	A requirement that cannot be implemented will mean that the need of the stakeholder will not be met. It is best to identify these requirements as quickly as possible so as not to disappoint the owner of the requirement. Enterprise Architect can assist by allowing analysts, architects, designers and developers to discuss the requirement and determine its feasibility using the **Collaborate window**.

Business Context for Requirements

Requirements don't appear in isolation but are usually defined or discovered in the context of a business problem or opportunity that has been defined in one or more business documents. These documents and the information they contain can be included in the models and provide an important anchor point for Requirements.

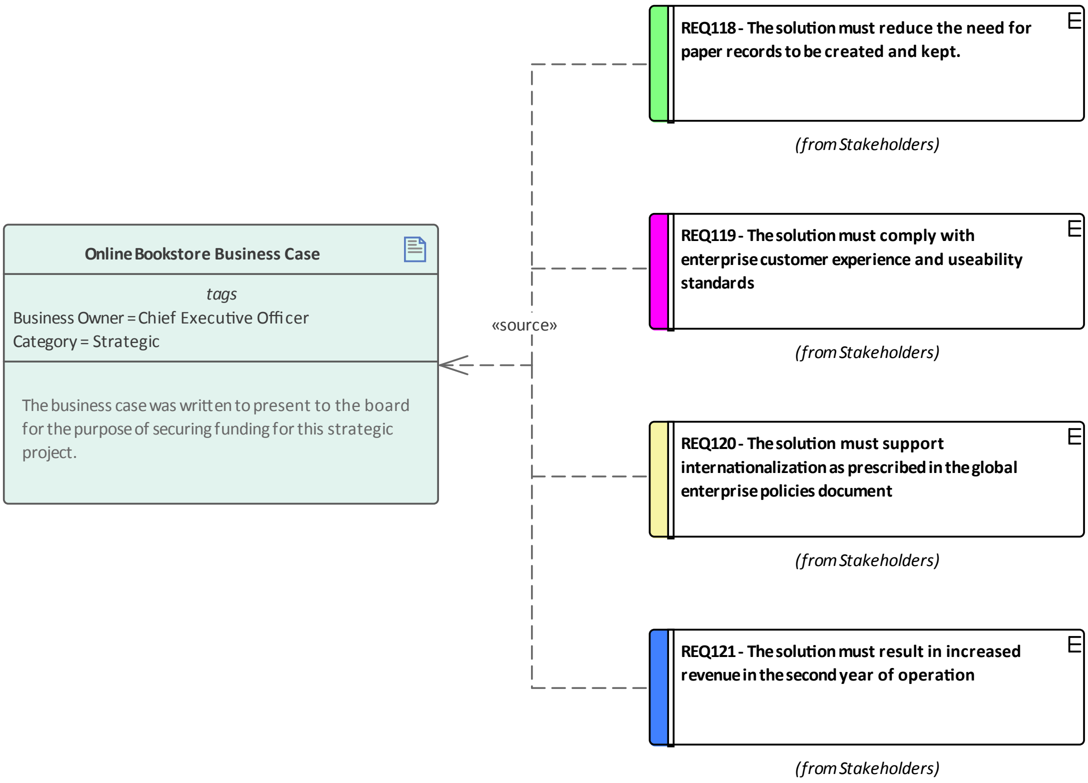
Business Case

The Business Case is a high level document or argument that attempts to articulate the reasons for initiating a project. It is an important artifact for the requirements analyst because it will typically contain information describing business value, drivers and business and technical risks. It places the endeavor in the context of other functions in the business and describes the solution options at a high level. It is an important source for requirements and should be included as an artifact in the model.

Requirements Sources

This diagram shows an external document, "Online Bookstore Business Case", modeled as an artifact. Requirements have been linked back to this artifact, to indicate that the source of the requirement is this document. If the document is subsequently updated, the requirements derived from it are easily located. The Business Case document artifact has a number of Tagged Values indicating properties of the document.

Hyperlinks to external documents can be created by simply dragging and dropping a document file onto a diagram canvas.


Online Bookstore Business Case
tags
Business Owner = Chief Executive Officer
Category = Strategic
The business case was written to present to the board for the purpose of securing funding for this strategic project.
«source»
REQ118 - The solution must reduce the need for paper records to be created and kept.
E
(from Stakeholders)
REQ119 - The solution must comply with enterprise customer experience and useability standards
E
(from Stakeholders)
REQ120 - The solution must support internationalization as prescribed in the global enterprise policies document
E
(from Stakeholders)
REQ121 - The solution must result in increased revenue in the second year of operation
E
(from Stakeholders)

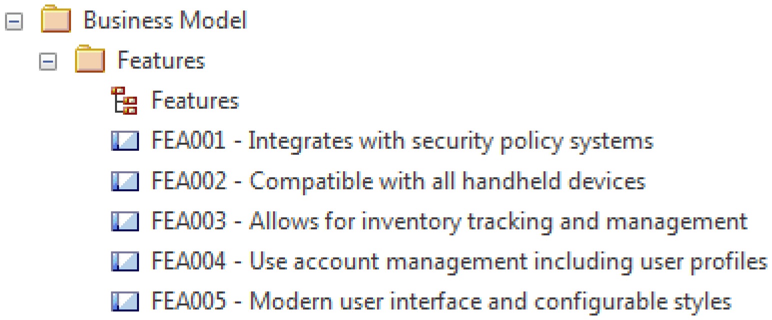
Drivers and Goals

Business Drivers and Goals are often documented by high level strategic thinkers, such as business or enterprise architects. Drivers define resources, processes or constraints that are vital to the operation of the organization, and Goals describe the position that the organization wants to attain.

They are typically enterprise level concerns and so should be modeled above the level of individual projects. They often exist in high level documentation, and even when they aren't clearly articulated at the organization level, an analyst can mine them from previous project documentation such as a Vision document, and model them in an enterprise Package above the project Packages in the repository.

Vision and Concept of Operation

While the Business Case describes the business reason for initiating the project, the Vision typically elaborates the opportunity or problem in more detail, describing the business context, the market position, key stakeholders and requirements, solution choices and constraints. The Vision is more often than not created prior to the team being assembled and can be a great source of requirements information. The required system functionality is often expressed using Features.


⊟ Business Model
⊟ Features
Features
FEA001 - Integrates with security policy systems
FEA002 - Compatible with all handheld devices
FEA003 - Allows for inventory tracking and management
FEA004 - Use account management including user profiles
FEA005 - Modern user interface and configurable styles

Enterprise Architect has a wide range of tools and element types that can be used to model the contents of the Vision document, including Users, Stakeholders, architecturally significant Use Cases and Requirements, Constraints and Deployment Environments.

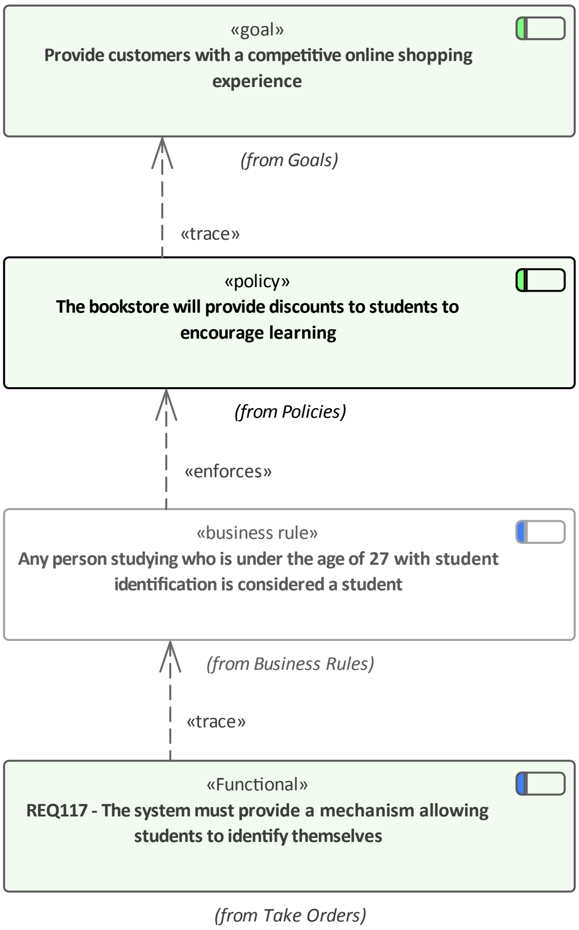
Policies and Business Rules

A Policy is a high level principle or statement of intent typically defined and managed by a governance body; a Business Rule is an implementation of the Policy. They are not strictly requirements and are often defined at the enterprise level rather than the project level, which facilitates their reuse across multiple projects. Policies and Business Rules can be modeled using stereotyped Requirement elements, and business and system requirements can be traced to them from individual projects. There is some overlap with regulatory and safety requirements, which some methods consider to be types of Business Rule. Enterprise Architect supports the modeling of Polices and Business Rules using stereotyped Requirements, but also has a powerful Business Rule Modeling capability that can create executable code for a variety of languages.

- Business Rule Modeling is available in the Unified and Ultimate Editions of Enterprise Architect

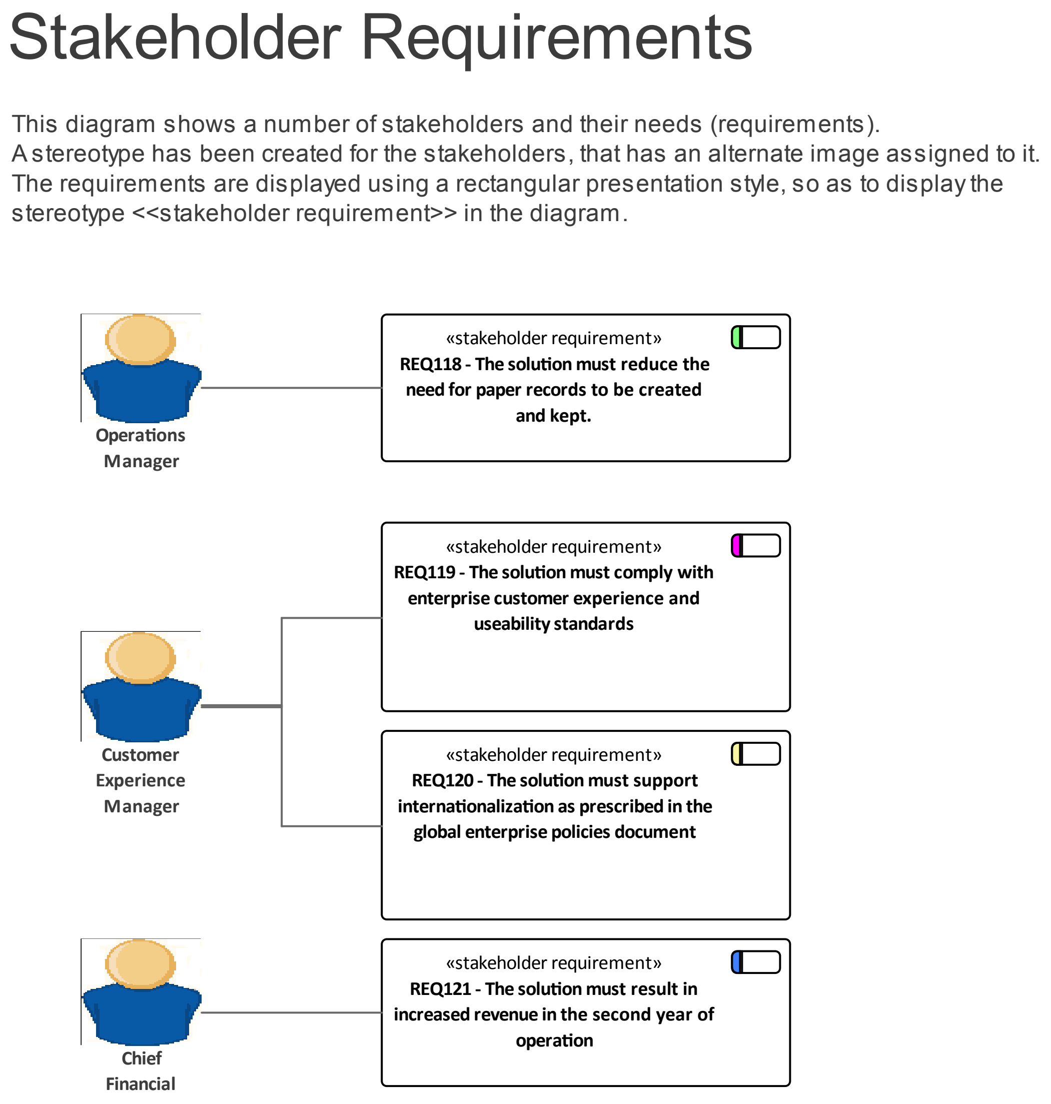
Business Rules and Policies

This diagram shows the way that goals, policies and business rules can be modeled using a stereotyped requirement element.
The policies express a guide that cannot be directly enforced while the business rules act to enforce the policy.


«goal»
Provide customers with a competitive online shopping experience
(from Goals)
«trace»
«policy»
The bookstore will provide discounts to students to encourage learning
(from Policies)
«enforces»
«business rule»
Any person studying who is under the age of 27 with student identification is considered a student
(from Business Rules)
«trace»
«Functional»
REQ117 - The system must provide a mechanism allowing students to identify themselves
(from Take Orders)

Stakeholders and Their Concerns

Stakeholders typically have the same set of concerns regardless of whether projects are running or not. A Security Manager will for example be concerned about the vulnerability of sensitive organizational data, a Customer Experience Manager will be concerned about speed of access and a Chief Financial Officer will be interested in return on investment. These concerns can be modeled at the enterprise level as they are generic and independent of individual projects. They will provide a source of understanding for project level requirements and will help identify gaps in the requirements landscape. Enterprise Architect can be used to model Stakeholders using a stereotyped **UML Class** and these high level concerns can be modeled using a requirement stereotyped as a Stakeholder Concern.



Stakeholder Requirements

This diagram shows a number of stakeholders and their needs (requirements).
A stereotype has been created for the stakeholders, that has an alternate image assigned to it.
The requirements are displayed using a rectangular presentation style, so as to display the stereotype <<stakeholder requirement>> in the diagram.

«stakeholder requirement»
REQ118 - The solution must reduce the need for paper records to be created and kept.

«stakeholder requirement»
REQ119 - The solution must comply with enterprise customer experience and useability standards

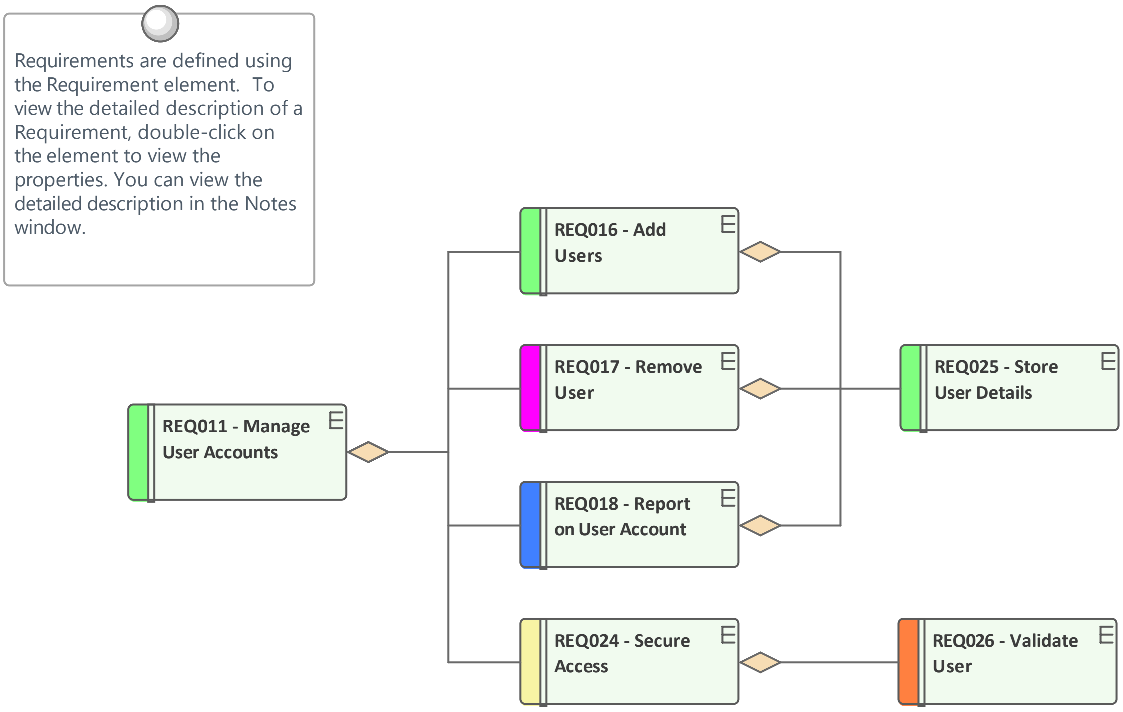
«stakeholder requirement»
REQ120 - The solution must support internationalization as prescribed in the global enterprise policies document

«stakeholder requirement»
REQ121 - The solution must result in increased revenue in the second year of operation

Requirements Diagram

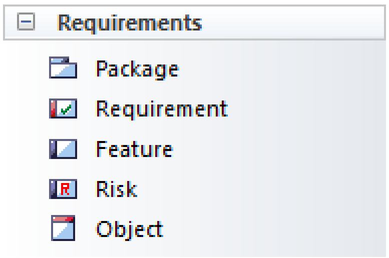
A Requirements diagram is one of Enterprise Architect's extended diagram types. It allows an analyst to model requirements visually, showing how requirements relate to each other and how they connect with other elements in the model such as Business Drivers, Constraints, Business Rules, Use Cases and design Components. The Requirement will be the main element seen on these diagrams; it has a name, a description and a series of properties (called attributes in some literature) such as status, complexity, difficulty and author. Enterprise Architect is designed to be a flexible tool and allows requirements to be created directly in the repository without the use of a diagram, but the diagram has proven to be a powerful tool to express the important role requirements play in the development process.

Example Diagram


Requirements are defined using the Requirement element. To view the detailed description of a Requirement, double-click on the element to view the properties. You can view the detailed description in the Notes window.
REQ016 - Add Users
REQ017 - Remove User
REQ011 - Manage User Accounts
REQ018 - Report on User Account
REQ024 - Secure Access
REQ025 - Store User Details
REQ026 - Validate User

Requirements Toolbox

You can create elements by dragging them from the 'Requirements' pages of the **Diagram Toolbox** onto the diagram canvas. Connectors can also be selected from the Toolbox and dragged between elements in the diagram or by using the Quick Linker. This table lists the elements available from the 'Requirements' toolbox but it is important to remember that other elements such as Use Cases and Components can be added to the diagram by opening other Toolbox pages - click on 🔍 to display the 'Find Toolbox Item' dialog and specify the element name.



Requirements

- Package
- Requirement
- Feature
- Risk
- Object

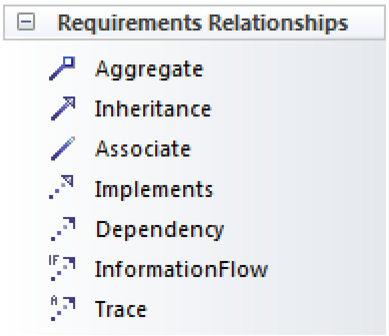
Requirements Toolbox Elements

Element	Usage
Package	Packages are container elements that can be used to group requirements and other elements into sets. They are not requirements themselves but act as a grouping mechanism; analysts should take care that the Package is not a high level requirement.
Requirement	The Requirement element is used for modeling a condition or capability that a system must have. The type of the requirement can be set but there are also a number of types of requirement such as Functional, User and Architectural requirements available from the 'Extended Requirements' page of the toolbox. They are useful for modeling a range of other entities, such as Rationales

	and Assumptions.
Feature	A Feature is a characteristic or property that the system must have to meet its business requirements. They are typically high level properties that represent a group of requirements.
Risk	A Risk is a condition that could cause the disruption, loss or compromise of a system. The element can be used to model both technical and business risks and can be connected to one or more elements.
Object	Objects are useful for modeling any of the entities that are discussed during a requirements elicitation workshop or while reading through project documentation. Formally they are Instances of Classes and when analysis is conducted a Domain Class can be derived from one or more objects.

Requirements Relationship Toolbox

You can create relationships by selecting the corresponding icon in the Toolbox and dragging between any two elements in the diagram canvas, or by using the Quick Linker. This table lists the relationships available from the 'Requirements Relationship' page of the Toolbox but it is important to remember that other relationships such as Composite can be added to the diagram by opening other Toolbox pages.



Requirements Relationships Toolbox

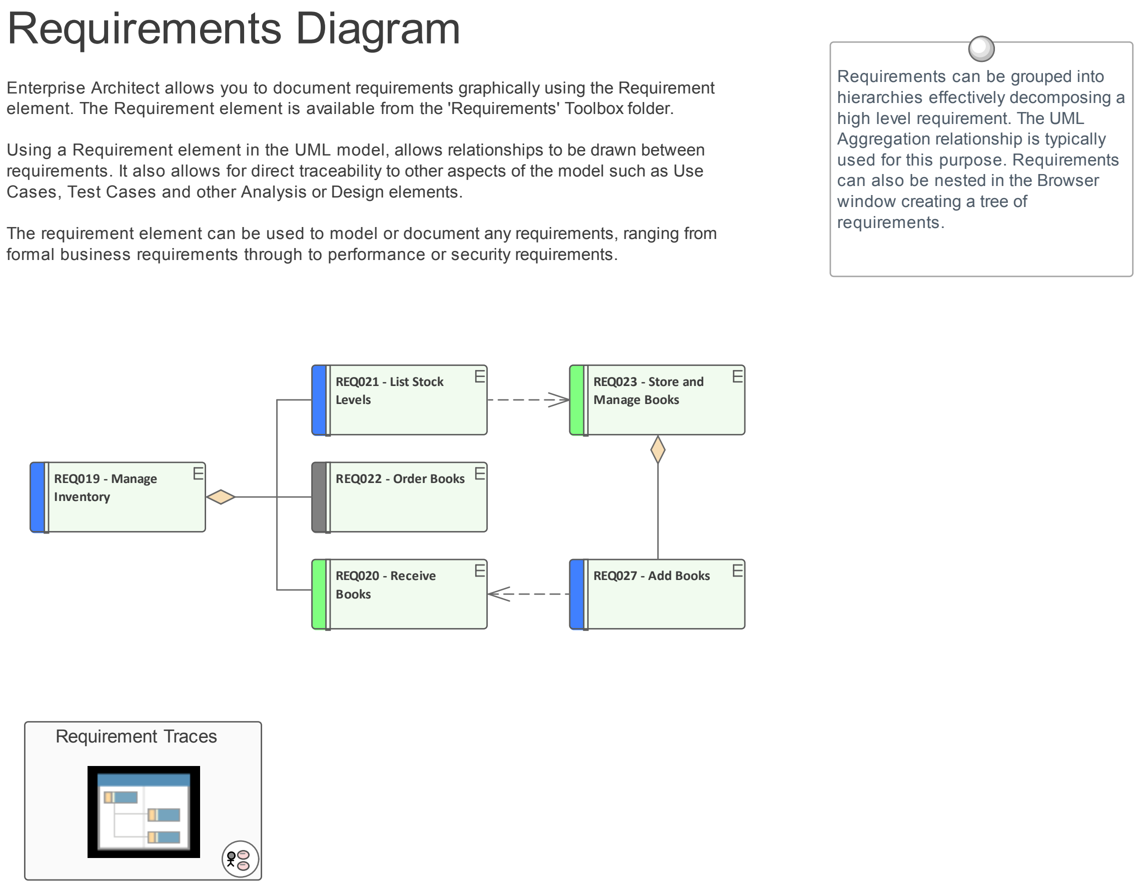
Connector	Use
Aggregate	Used to show that a requirement (diamond end) is made up of another requirement (tail end). This allows hierarchies of requirements to be created.
Inheritance	Used to show that an element (triangle end) is a more generalized version of another element (tail end). The relationship is used between Classifiers such as Use Cases, Classes, Artifacts and

	Components.
Associate	Used to show a semantic or structural relationship between two elements.
Implements	Used to show that a model element implements a Requirement. Typically it would be used by an architect or designer to indicate that the need expressed in the Requirement would be met by a particular module, Use Case or Component in the system.
Dependency	Used to show that a Requirement (tail end) relies upon another element (arrow end).
Information Flow	Used to show that data flows between two elements in a Repository. The type of data can be represented as Information Items that can be selected from any part of the model. They could be used to show the Requirement that information flows between the proposed system and a supplier's system or to represent a Constraint that two Components must communicate via a certain protocol.
Trace	Used to show that an element (tail end) is

	more elaborated in the model than the element at the arrow end. So a User Requirement could be traced to a Stakeholder Requirement or to a Business Goal,

Example Diagram - Hierarchies

This diagram shows how requirements can be connected into hierarchies thus allowing high level requirements to be broken down to verifiable requirements.



Requirements Diagram

Enterprise Architect allows you to document requirements graphically using the Requirement element. The Requirement element is available from the 'Requirements' Toolbox folder.

Using a Requirement element in the UML model, allows relationships to be drawn between requirements. It also allows for direct traceability to other aspects of the model such as Use Cases, Test Cases and other Analysis or Design elements.

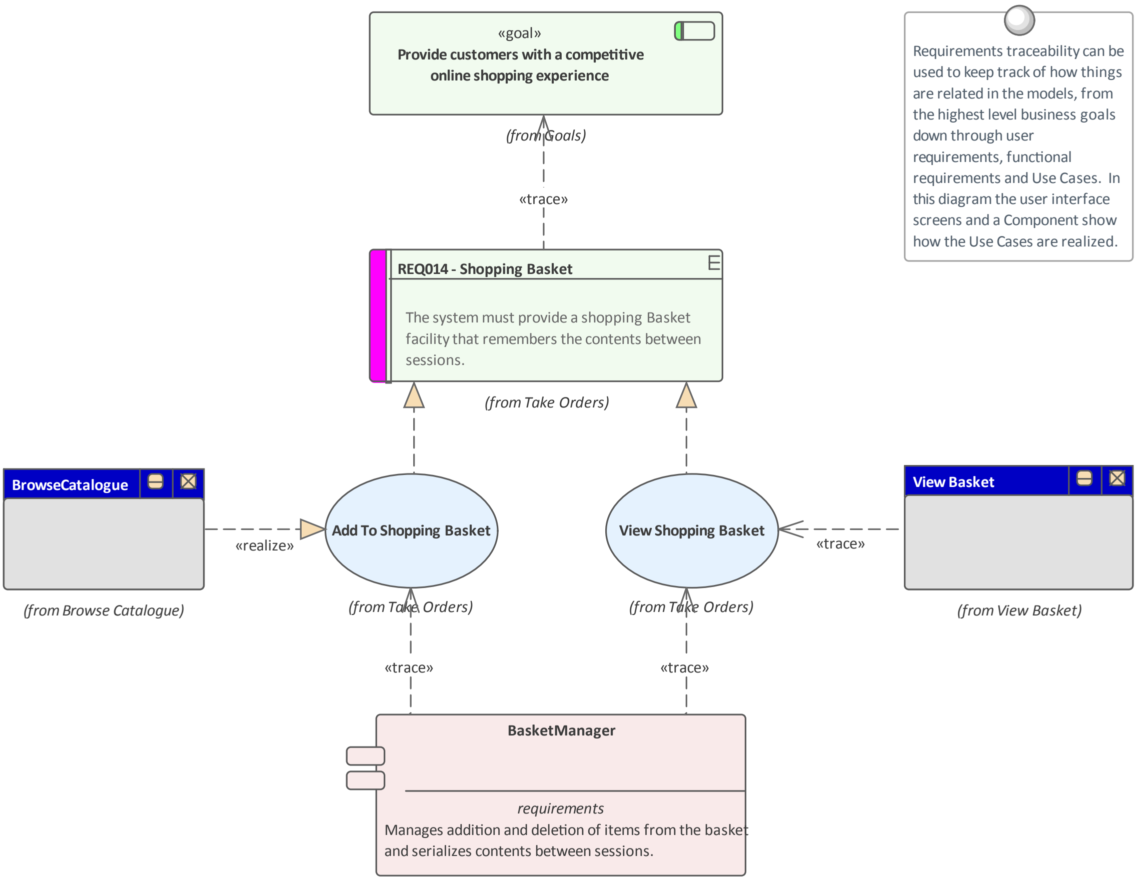
The requirement element can be used to model or document any requirements, ranging from formal business requirements through to performance or security requirements.

Requirements can be grouped into hierarchies effectively decomposing a high level requirement. The UML Aggregation relationship is typically used for this purpose. Requirements can also be nested in the Browser window creating a tree of requirements.

REQ019 - Manage Inventory
REQ021 - List Stock Levels
REQ022 - Order Books
REQ020 - Receive Books
REQ023 - Store and Manage Books
REQ027 - Add Books
Requirement Traces

Example Diagram - Traces

This diagram shows how Requirements can be connected to other elements in the model, displaying traceability.

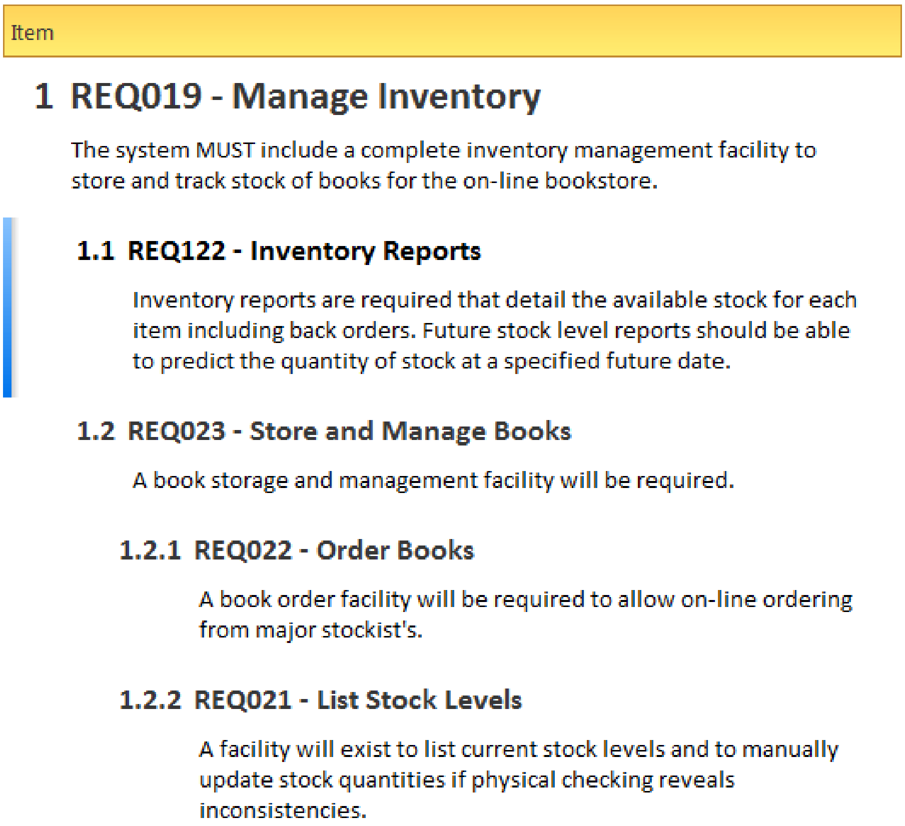
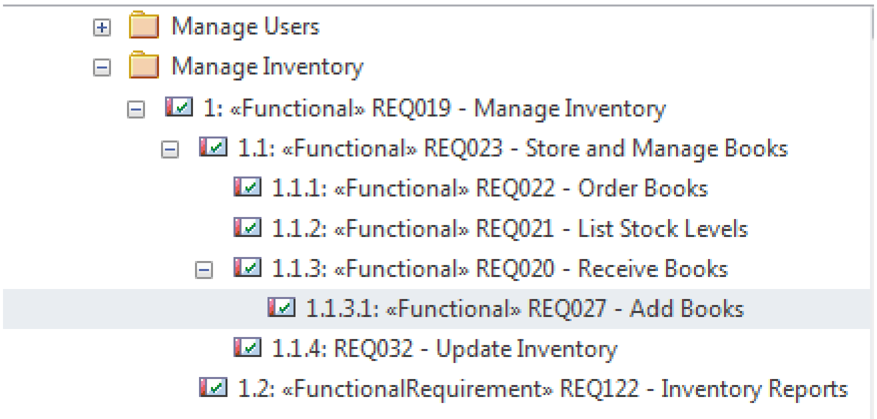

«goal»
Provide customers with a competitive online shopping experience
(from Goals)
«trace»
REQ014 - Shopping Basket
The system must provide a shopping Basket facility that remembers the contents between sessions.
(from Take Orders)
BrowseCatalogue
(from Browse Catalogue)
«realize»
Add To Shopping Basket
(from Take Orders)
View Shopping Basket
(from Take Orders)
«trace»
View Basket
(from View Basket)
«trace»
«trace»
BasketManager
requirements
Manages addition and deletion of items from the basket and serializes contents between sessions.
Requirements traceability can be used to keep track of how things are related in the models, from the highest level business goals down through user requirements, functional requirements and Use Cases. In this diagram the user interface screens and a Component show how the Use Cases are realized.

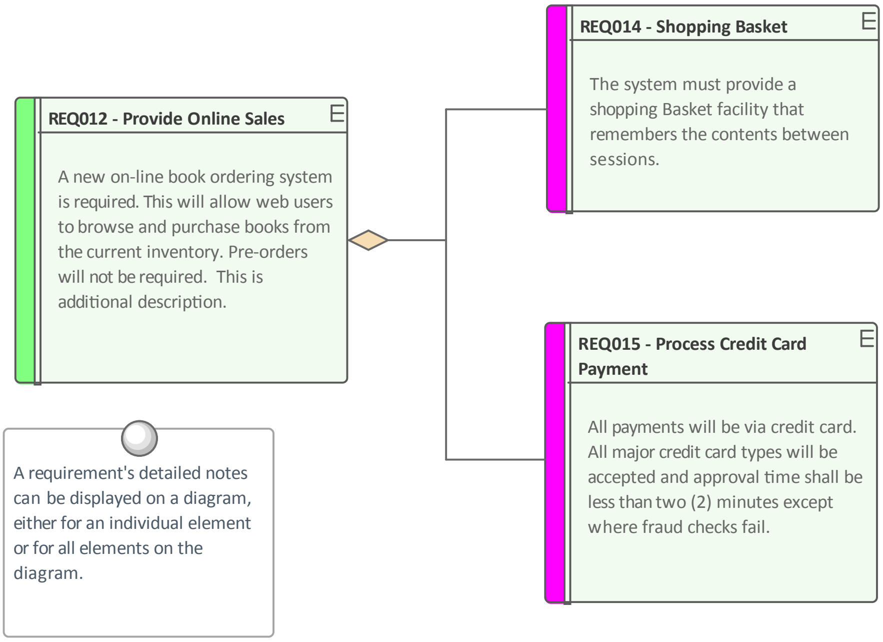
Creating and Viewing Requirements

Enterprise Architect is a sophisticated and flexible modeling platform and the tool offers a rich set of features for both the development and the management of requirements for any size project in any domain and using a variety of processes. Requirements can be created in a variety of ways and then visualized in a series of windows and dialogs that make it easy to develop and manage them and to communicate within the team and to the business customers.

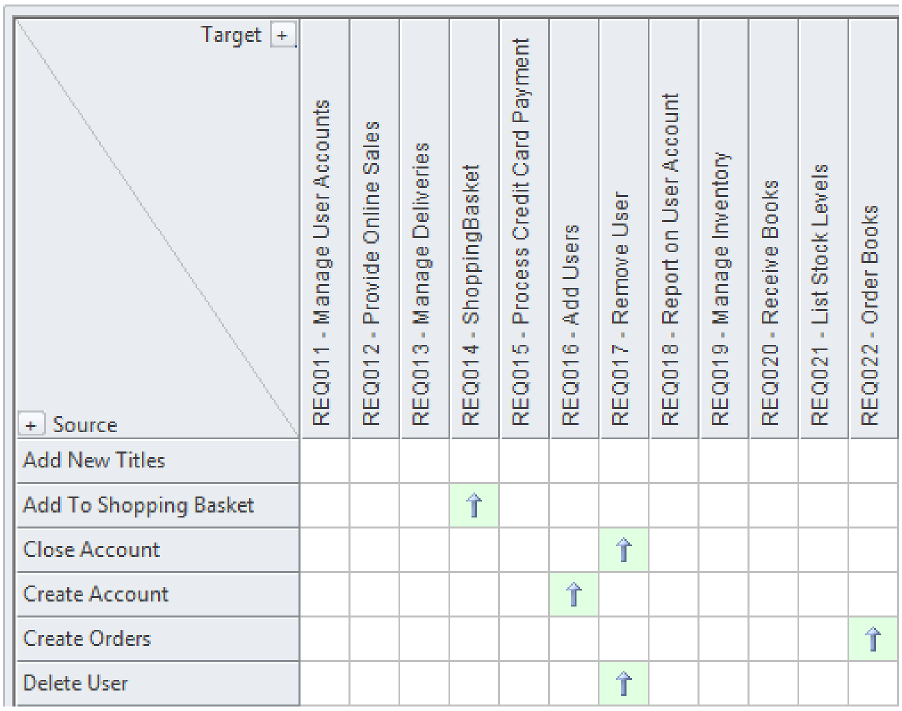
Viewing Requirements

Facility	Description
Specification Manager	Shows Requirements (and other element types) in a simple text format, and helps the modeler to create, edit and manage these elements. The **Specification Manager** will be the preferred tool for many Requirement Analysts as it allows the modeler to work in a familiar spreadsheet-like interface, to edit requirement properties such as Status, Priority and Difficulty using drop-down lists, and to add notes to the Requirements without needing to draw

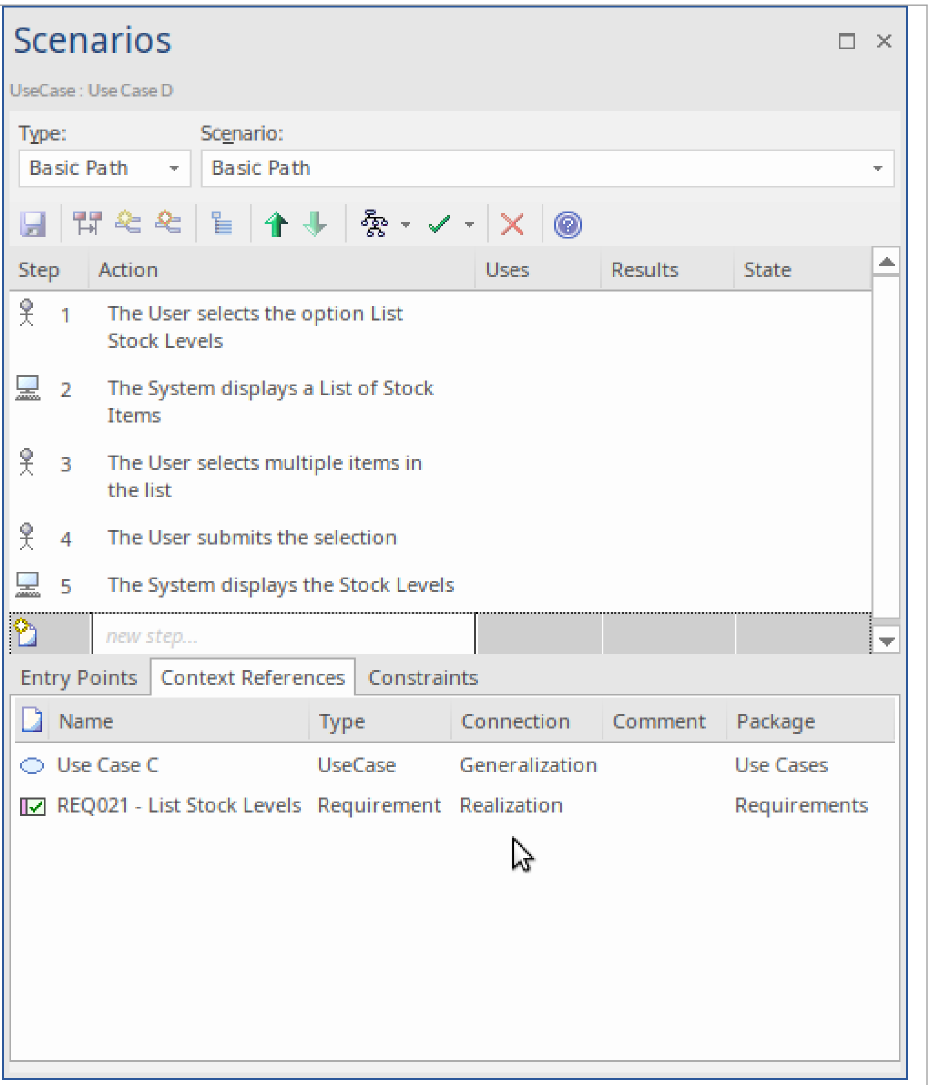
	diagrams.  Item 1 REQ019 - Manage Inventory The system MUST include a complete inventory management facility to store and track stock of books for the on-line bookstore. 1.1 REQ122 - Inventory Reports Inventory reports are required that detail the available stock for each item including back orders. Future stock level reports should be able to predict the quantity of stock at a specified future date. 1.2 REQ023 - Store and Manage Books A book storage and management facility will be required. 1.2.1 REQ022 - Order Books A book order facility will be required to allow on-line ordering from major stockist's. 1.2.2 REQ021 - List Stock Levels A facility will exist to list current stock levels and to manually update stock quantities if physical checking reveals inconsistencies.
Browser Window	Shows the content and structure of the repository and allows requirements to be viewed in a hierarchy of Packages, elements and diagrams.  Manage Users Manage Inventory 1: «Functional» REQ019 - Manage Inventory 1.1: «Functional» REQ023 - Store and Manage Books 1.1.1: «Functional» REQ022 - Order Books 1.1.2: «Functional» REQ021 - List Stock Levels 1.1.3: «Functional» REQ020 - Receive Books 1.1.3.1: «Functional» REQ027 - Add Books 1.1.4: REQ032 - Update Inventory 1.2: «FunctionalRequirement» REQ122 - Inventory Reports
Requirements Diagram	Shows the arrangement of a group of Requirements and other elements, and

	can show whether the elements are in the same Package or different Packages. It is a powerful way of presenting requirements information because connectors can be created to show how a Requirement relates to other elements in the Repository including other Requirements.  REQ014 - Shopping Basket The system must provide a shopping Basket facility that remembers the contents between sessions. REQ012 - Provide Online Sales A new on-line book ordering system is required. This will allow web users to browse and purchase books from the current inventory. Pre-orders will not be required. This is additional description. REQ015 - Process Credit Card Payment All payments will be via credit card. All major credit card types will be accepted and approval time shall be less than two (2) minutes except where fraud checks fail. A requirement's detailed notes can be displayed on a diagram, either for an individual element or for all elements on the diagram.
Relationship Matrix	Shows one group of elements on the horizontal axis and another group of elements on the vertical axis with markers indicating if they have a relationship and an arrow showing the direction of the connector. Relationships can be created directly in the matrix and these will be displayed on diagrams containing the source and target elements. The **Relationship Matrix** is a powerful

<table>
<tr><td></td><td>tool to quickly visualize gaps or missing requirements and is particularly useful for project managers and business stakeholders who might be less familiar with diagrammatic representations of Requirements and formal languages such as the UML.



<table>
<tr><th>Target +
+ Source</th><th>REQ011 - Manage User Accounts</th><th>REQ012 - Provide Online Sales</th><th>REQ013 - Manage Deliveries</th><th>REQ014 - ShoppingBasket</th><th>REQ015 - Process Credit Card Payment</th><th>REQ016 - Add Users</th><th>REQ017 - Remove User</th><th>REQ018 - Report on User Account</th><th>REQ019 - Manage Inventory</th><th>REQ020 - Receive Books</th><th>REQ021 - List Stock Levels</th><th>REQ022 - Order Books</th></tr>
<tr><td>Add New Titles</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Add To Shopping Basket</td><td></td><td></td><td></td><td>↑</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Close Account</td><td></td><td></td><td></td><td></td><td></td><td></td><td>↑</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Create Account</td><td></td><td></td><td></td><td></td><td></td><td>↑</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Create Orders</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>↑</td></tr>
<tr><td>Delete User</td><td></td><td></td><td></td><td></td><td></td><td></td><td>↑</td><td></td><td></td><td></td><td></td><td></td></tr>
</table>
</td></tr>
<tr><td>Scenario Builder</td><td>Used to create Scenarios, Constraints such as pre-conditions and post-conditions and to detail the steps of Use Case Scenarios. It can also be used to create behavior diagrams that allow the steps in a Scenario to be visualized and used as a target or source for connectors.</td></tr>
</table>

Scenarios

UseCase : Use Case D

Type: Basic Path

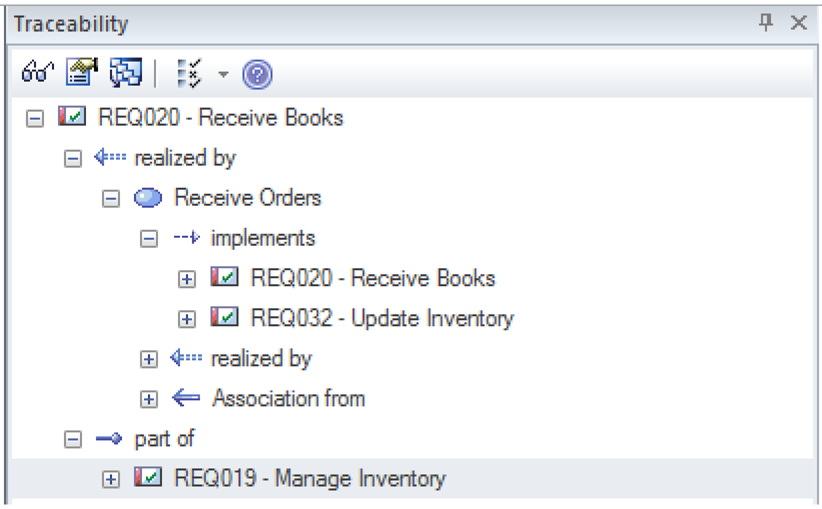
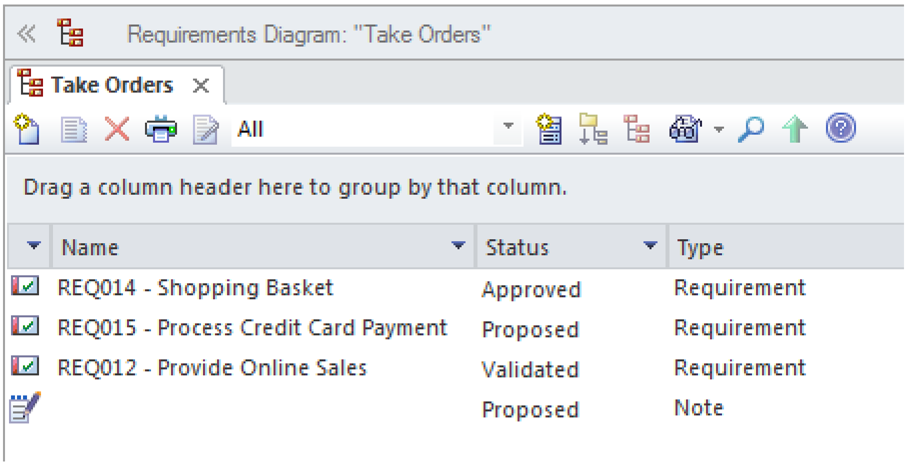
Scenario: Basic Path

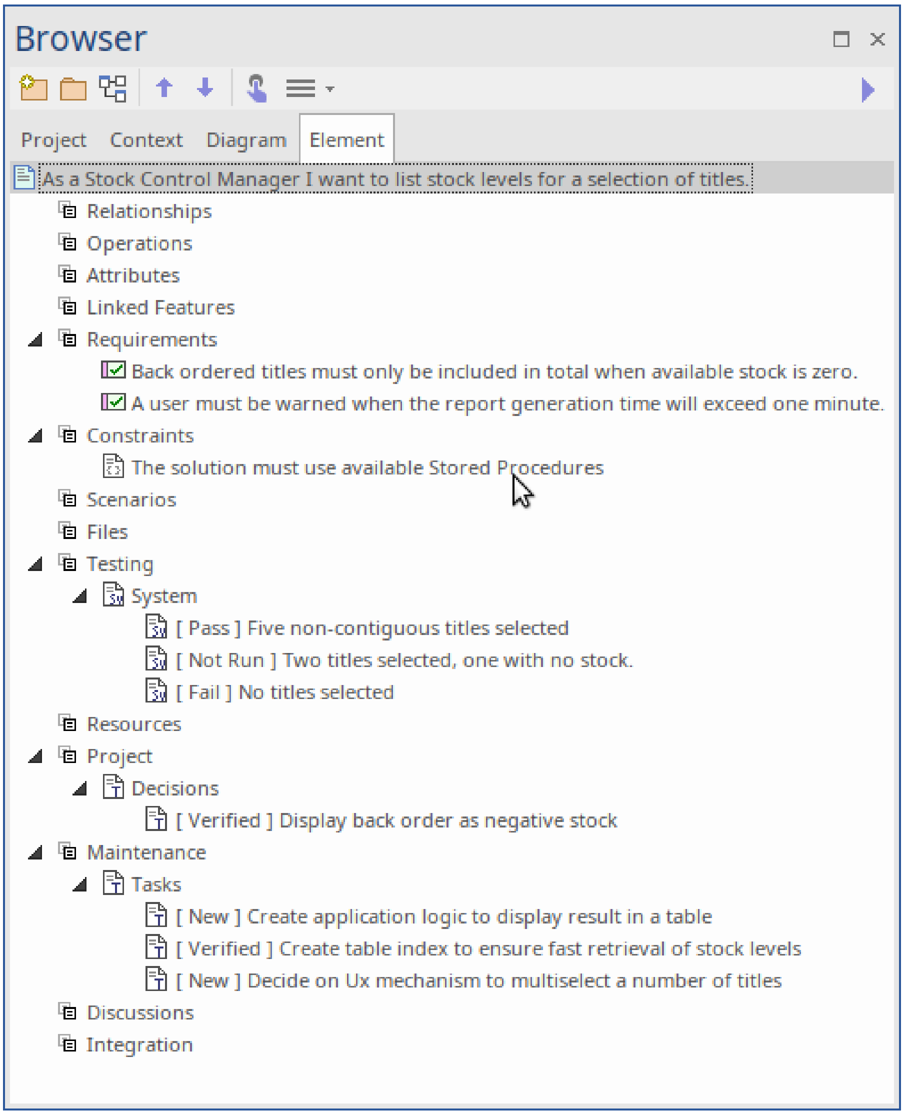
Step	Action	Uses	Results	State
1	The User selects the option List Stock Levels			
2	The System displays a List of Stock Items			
3	The User selects multiple items in the list			
4	The User submits the selection			
5	The System displays the Stock Levels			
	new step...			

Entry Points | Context References | Constraints

Name	Type	Connection	Comment	Package
Use Case C	UseCase	Generalization		Use Cases
REQ021 - List Stock Levels	Requirement	Realization		Requirements

Traceability Window	Used to display the hierarchy of elements based on their relationship to other elements. While the **Browser window** will give a structural view based on containment in a name space the **Traceability window** displays related elements regardless of their location in the repository.

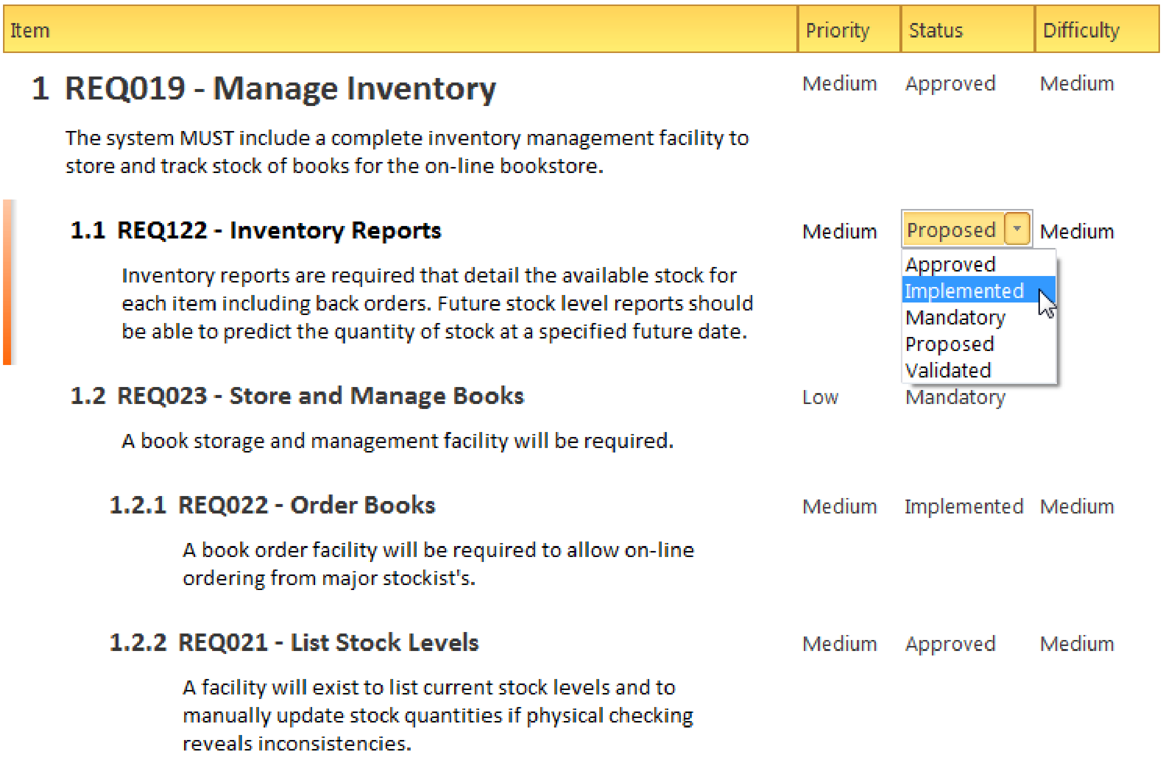
<table>
<tr><td></td><td>
Traceability
REQ020 - Receive Books
realized by
Receive Orders
implements
REQ020 - Receive Books
REQ032 - Update Inventory
realized by
Association from
part of
REQ019 - Manage Inventory</td></tr>
<tr><td>Diagram List</td><td>Lists the elements in a diagram, filtered and sorted according to the settings you define; shows all or selected default properties of each element. The properties can be edited in-line for each Requirement and new Requirements can be created in the diagram list.

Requirements Diagram: "Take Orders"
Take Orders
All
Drag a column header here to group by that column.<table>
<tr><th>Name</th><th>Status</th><th>Type</th></tr>
<tr><td>REQ014 - Shopping Basket</td><td>Approved</td><td>Requirement</td></tr>
<tr><td>REQ015 - Process Credit Card Payment</td><td>Proposed</td><td>Requirement</td></tr>
<tr><td>REQ012 - Provide Online Sales</td><td>Validated</td><td>Requirement</td></tr>
<tr><td></td><td>Proposed</td><td>Note</td></tr>
</table></td></tr>
<tr><td>Package Browser</td><td>Lists the elements in a Package, filtered and sorted according to the settings you define; shows all or selected default properties of each element.</td></tr>
<tr><td></td><td></td></tr>
</table>

Element tab of the Inspector window	Displays a selected element's Attributes, Tagged Values, Constraints, Internal Requirements, Relationships, Maintenance Items, Testing, Project Management items, Files, and more. It is a powerful way of displaying this information in one place without the need to open up other windows.  As a Stock Control Manager I want to list stock levels for a selection of titles. Relationships Operations Attributes Linked Features Requirements Back ordered titles must only be included in total when available stock is zero. A user must be warned when the report generation time will exceed one minute. Constraints The solution must use available Stored Procedures Scenarios Files Testing System [Pass] Five non-contiguous titles selected [Not Run] Two titles selected, one with no stock. [Fail] No titles selected Resources Project Decisions [Verified] Display back order as negative stock Maintenance Tasks [New] Create application logic to display result in a table [Verified] Create table index to ensure fast retrieval of stock levels [New] Decide on Ux mechanism to multiselect a number of titles Discussions Integration
Model Search	Enables you to locate Requirements in general in the model, or specific

	Requirement elements, according to the search criteria you use.
Model Views	Enables you to maintain links to commonly-used elements, and to rapidly show developments and changes in (Requirement) Package contents through either reports or slide shows of selected diagrams.

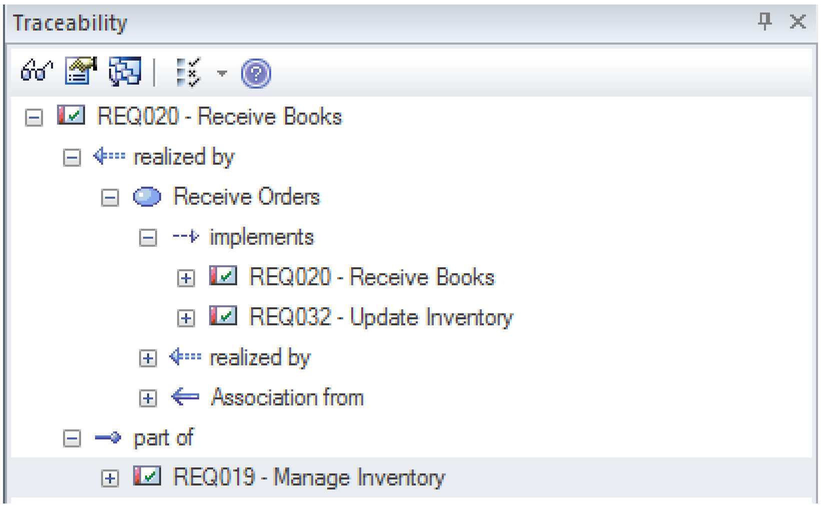
Requirement Development

Requirement development includes all the activities and tasks associated with discovering, evaluating, recording, documenting and validating the requirements for a particular project or program of work. Requirements are discovered, analyzed, specified and verified, and Enterprise Architect has a wide range of tools and features to assist the Requirement Analyst as they develop requirements. The centerpiece for requirement development is the **Specification Manager**, allowing the Analyst to enter, view and manage requirements in textual form in a spreadsheet format.



Item	Priority	Status	Difficulty
1 REQ019 - Manage Inventory The system MUST include a complete inventory management facility to store and track stock of books for the on-line bookstore.	Medium	Approved	Medium
1.1 REQ122 - Inventory Reports Inventory reports are required that detail the available stock for each item including back orders. Future stock level reports should be able to predict the quantity of stock at a specified future date.	Medium	Proposed	Medium
1.2 REQ023 - Store and Manage Books A book storage and management facility will be required.	Low	Mandatory	
1.2.1 REQ022 - Order Books A book order facility will be required to allow on-line ordering from major stockist's.	Medium	Implemented	Medium
1.2.2 REQ021 - List Stock Levels A facility will exist to list current stock levels and to manually update stock quantities if physical checking reveals inconsistencies.	Medium	Approved	Medium

The Specification Manager can be used in conjunction with a platform of other tools, such as diagrams, the **Traceability window** and the **Discussions** facility. These windows provide other views of the requirements, giving the modeler and the viewer a deep understanding of how a requirement relates to other parts of the repository, and providing detail not visible through the Specification Manager.



```
⊟ REQ020 - Receive Books
    ⊟ realized by
        ⊟ Receive Orders
            ⊟ implements
                ⊞ REQ020 - Receive Books
                ⊞ REQ032 - Update Inventory
            ⊞ realized by
            ⊞ Association from
    ⊟ part of
        ⊞ REQ019 - Manage Inventory
```

Elicitation

Elicitation is the process of information discovery, the information forming the precursors to requirements. The information will typically be raw and often heterogeneous, and it will not be until the requirements analysis phase is performed that true requirements will be able to be derived from it. Elicitation will take many forms, and all of the skills of the analyst will be needed to determine which documents, tools, people and processes to examine to discover the information. Some of these information source locations are listed in this table.

Location of requirements information

Requirements are not handed to the analyst on a plate but rather will be discovered in a variety of places including: by observing stakeholders performing their work, in business documents and a variety of other locations.

Source	Description
Observing Users	Observing users perform their work is a powerful way of gaining information about Requirements and often reveals details that would not be discovered by user interviews.

Business Documents	A number of business documents such as the Business Case, Vision or Concept of Operation will provide a source for Business Requirements and should be discovered and included as sources of Requirements.
Stakeholder Workshops	Getting all the important stakeholders into a workshop is a powerful and productive way to get information that will help with the Requirements definition. Typically there are fertile and robust discussions that provide the basis for deriving Requirements.
Current System Issues	There will often be documented information recording errors, faults and issues with the incumbent system that will provide the basis for Requirements for the replacement system. Care needs to be taken that any Requirements derived from these list are owned by a stakeholder and that there is a business need to include them in the new system.

User Observations

Observing users perform their work is a powerful and unobtrusive way of gaining an understanding of the tasks they carry out and how they use information and other software and hardware devices to achieve an outcome. Even if the processes that support the planned system will be different, the observations of the current processes will provide a useful context for discussions. It will also help the analyst empathize with the user and can result in a deeper understanding of the issues they face and provide the basis for the discovery of potential solutions. An analyst will often discover unmentioned documents, checklists and clue cards that can help illuminate the process. Equipped with a mobile phone or camera, it is also useful for the analyst to take photographs of the user working, which will help in the requirements analysis phase.

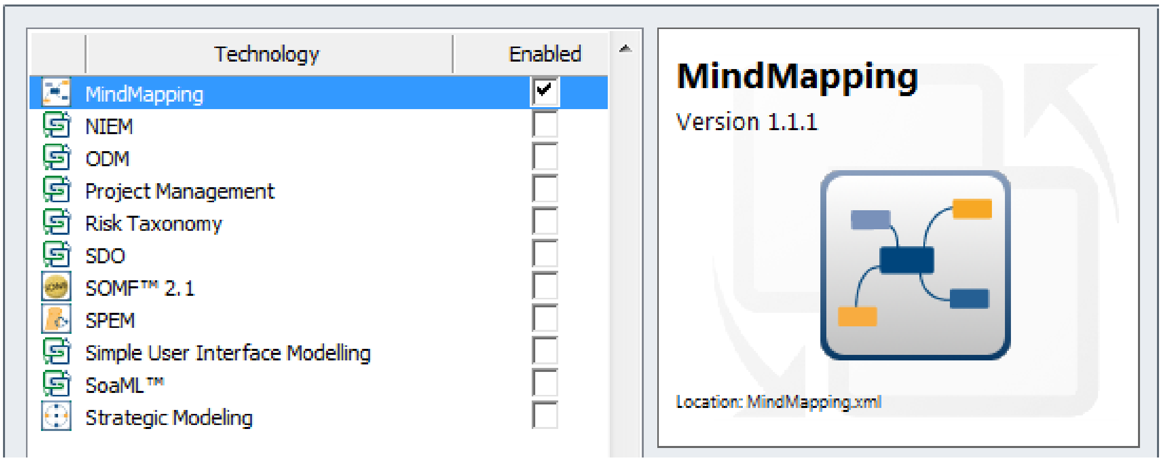
Enterprise Architect supports the modeler in representing files such as photos and scanned documents directly in the model, creating a rich and expressive representation of the user at work. There is the option to represent these as an Artifact (which, with a single key stroke (**F12**), will launch the file) or to use a hyperlink or even to include the image itself in a diagram.

Stakeholder Workshops

The requirements analyst or business analysis is charged with the difficult task of eliciting requirements, which necessitates excellent communication with the stakeholders, including the customer and the analysis team. One very successful way of facilitating the elicitation of the stakeholders' needs is to run a workshop with all the key stakeholders present. The analyst's skills as a communicator, diplomat and mediator are important to create a collaborative and respectful environment conducive to the exploration of the stakeholders' needs and concerns. It is imperative that the analyst uses terminology that the stakeholders understand and displays an understanding or a willingness to learn the elements that make up the domain.

There is sometimes a misconception that what will be articulated is a set of clearly defined requirements that can be entered into the tool as Stakeholder Requirements; this is far from the reality of what happens. Stakeholders will typically articulate a wide range of ideas, including Policies, Business Rules, Data definitions, Project Management Constraints, Functional Requirements, Business Requirements, existing system problems and even suggested solutions. Even when an external consultant is used to run these meetings the analyst will not have time to categorize all of these statements in the meetings. What is needed is a way for the scribe who is tasked with documenting the statements to get them into the tool without any concern for what type of information is being recorded. Having them recorded in the tool rather than scribbled in the analyst's notebook is best practice because it allows them to be displayed during the meeting and for stakeholders to see each others' comments.

Enterprise Architect has a number of facilities that can help with these workshops. One method that is very effective is to use the MindMapping diagram to record the stakeholders statements, which is very effective because it is a well known method and doesn't introduce any of the formality that comes with modeling languages such as UML.



Technology	Enabled
MindMapping	☑
NIEM	□
ODM	□
Project Management	□
Risk Taxonomy	□
SDO	□
SOMF™ 2.1	□
SPEM	□
Simple User Interface Modelling	□
SoaML™	□
Strategic Modeling	□

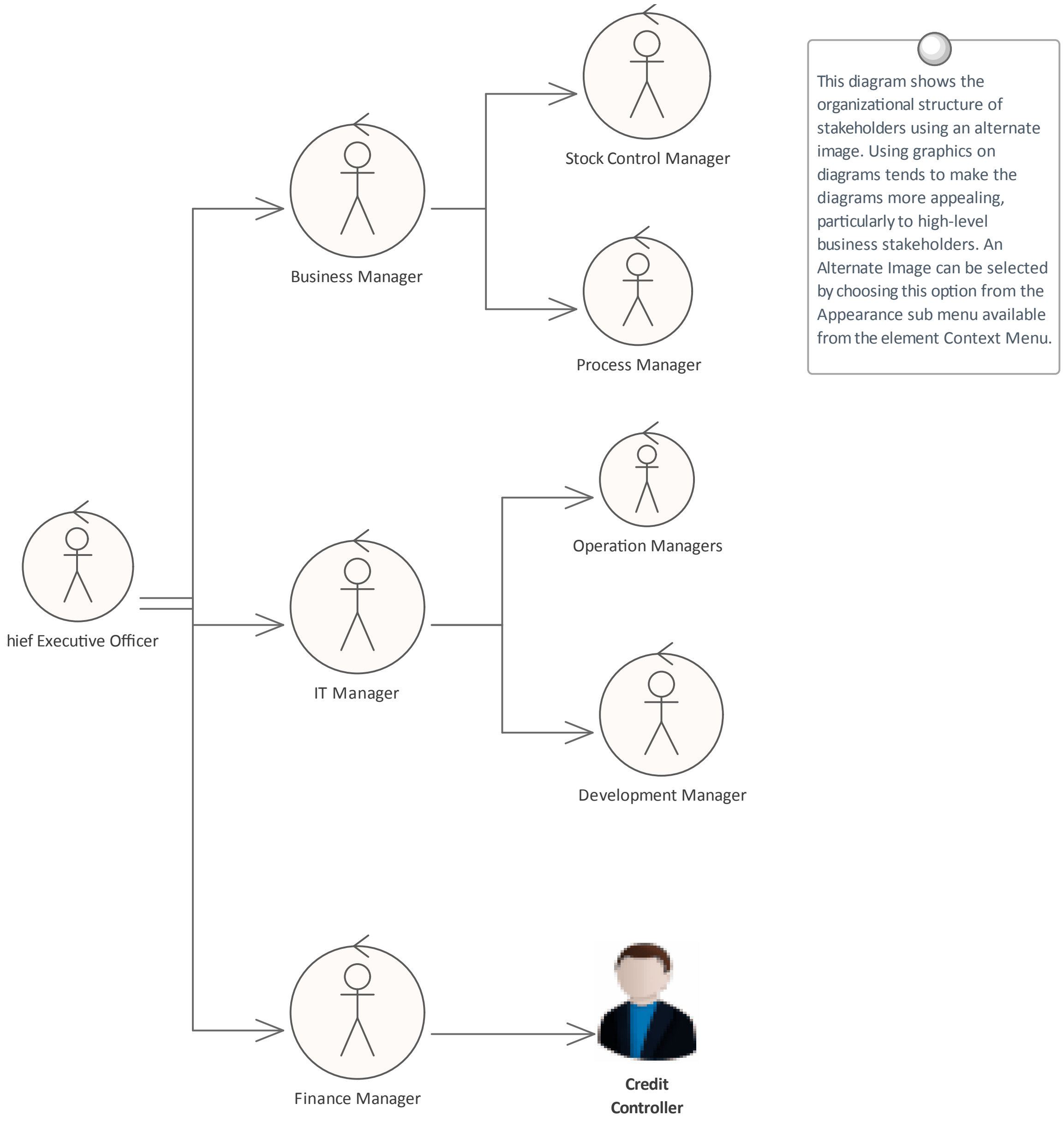
MindMapping

Version 1.1.1

Location: MindMapping.xml

As important terms are uncovered they could be entered into the **Project Glossary**, and even if there is not time to discuss and debate the agreed meaning, the words will act as an initial list of important entities in the domain. Alternatively, the terms could be created in a Domain Model and related to each other with connectors that describe the important relationships between the terms.

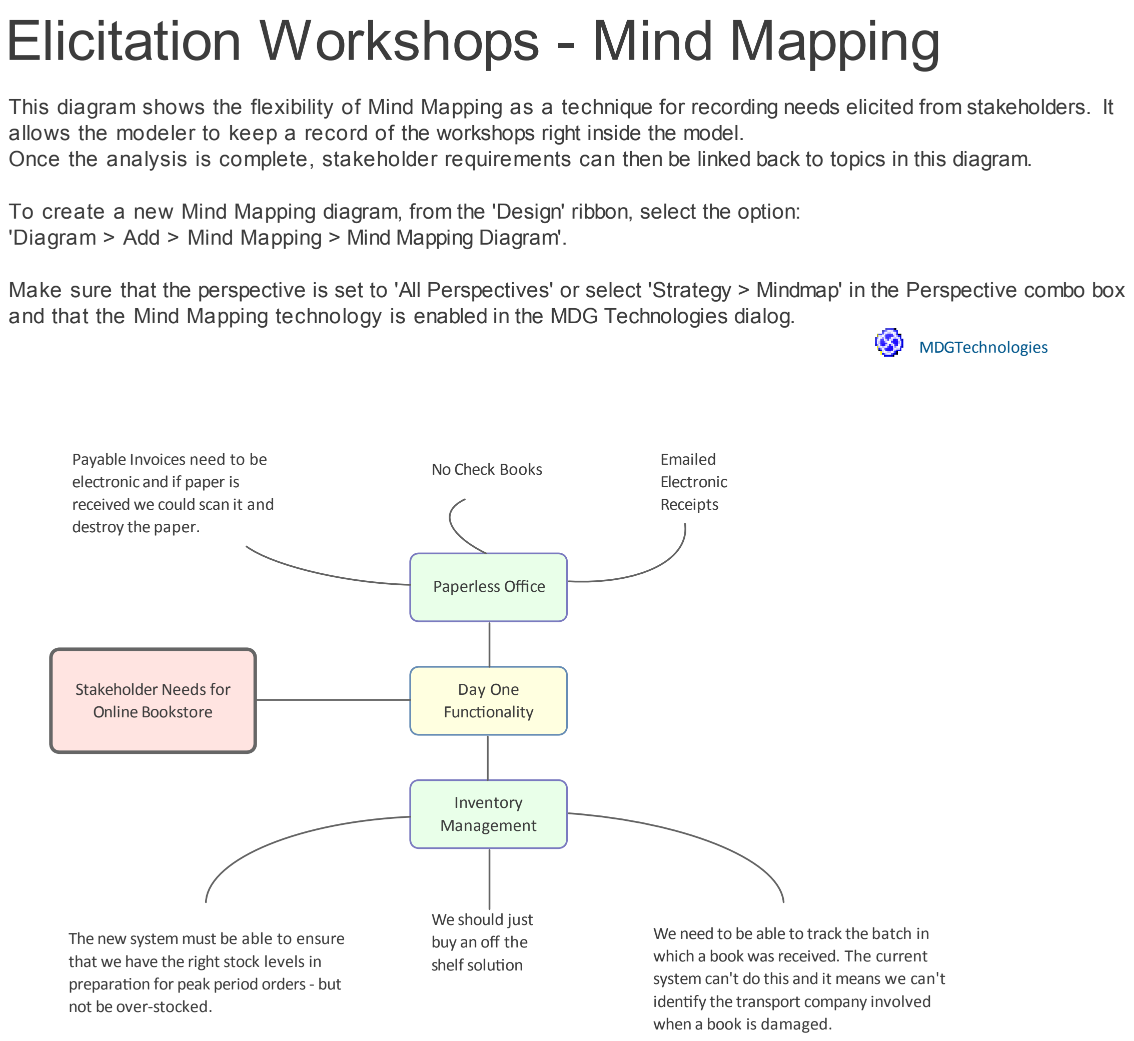
The stakeholders can also be modeled and their organizational relationship to each other can be described in a diagram. This is a useful technique that allows key stakeholders to locate themselves in the models, which creates buy-in.



This diagram shows the organizational structure of stakeholders using an alternate image. Using graphics on diagrams tends to make the diagrams more appealing, particularly to high-level business stakeholders. An Alternate Image can be selected by choosing this option from the Appearance sub menu available from the element Context Menu.

Mind Mapping Diagram

A Mind Mapping diagram can be used to record the stakeholder's statements during an elicitation workshop. The statements are not categorized but simply recorded and later during the analysis phase of Requirement's development they can be converted to the appropriate elements or retained and the Requirements can be traced back to the topics effectively creating a record of how the Requirement was derived. This is a powerful technique that shields the stakeholders from needing to know the modeling languages and allows them to concentrate on articulating their needs, it also frees the analyst up from concerns about which element to use to model the statements. This step is usually performed in the analysis phase of the Requirement's Development process.



Elicitation Workshops - Mind Mapping

This diagram shows the flexibility of Mind Mapping as a technique for recording needs elicited from stakeholders. It allows the modeler to keep a record of the workshops right inside the model.
Once the analysis is complete, stakeholder requirements can then be linked back to topics in this diagram.

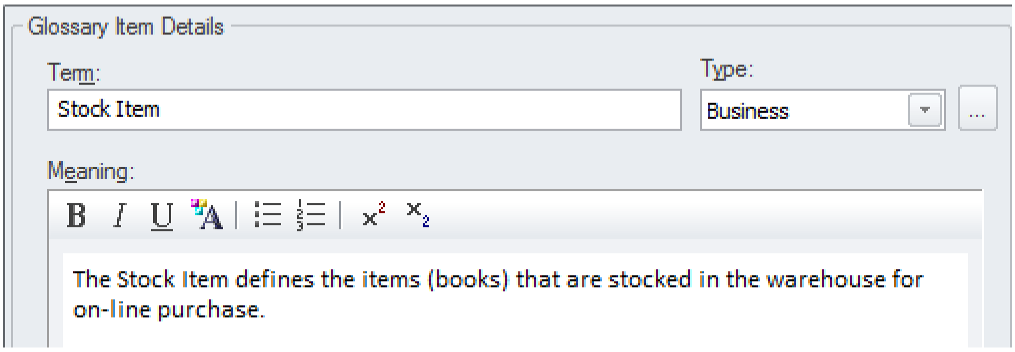
To create a new Mind Mapping diagram, from the 'Design' ribbon, select the option:
'Diagram > Add > Mind Mapping > Mind Mapping Diagram'.

Make sure that the perspective is set to 'All Perspectives' or select 'Strategy > Mindmap' in the Perspective combo box and that the Mind Mapping technology is enabled in the MDG Technologies dialog.

MDGTechnologies
Payable Invoices need to be electronic and if paper is received we could scan it and destroy the paper.
No Check Books
Emailed Electronic Receipts
Paperless Office
Stakeholder Needs for Online Bookstore
Day One Functionality
Inventory Management
The new system must be able to ensure that we have the right stock levels in preparation for peak period orders - but not be over-stocked.
We should just buy an off the shelf solution
We need to be able to track the batch in which a book was received. The current system can't do this and it means we can't identify the transport company involved when a book is damaged.

Glossary

Prior to a workshop an analyst can populate the **Project Glossary** with the existing terms and their meanings that have been gleaned from reading project documentation such as a Business Case or Vision Document. During the workshops, as new terms are uncovered they can be added to the Glossary and their definitions can be discussed and entered or deferred until later in the analysis phase.



Term: Stock Item

Type: Business

Meaning:

The Stock Item defines the items (books) that are stocked in the warehouse for on-line purchase.

Domain Model

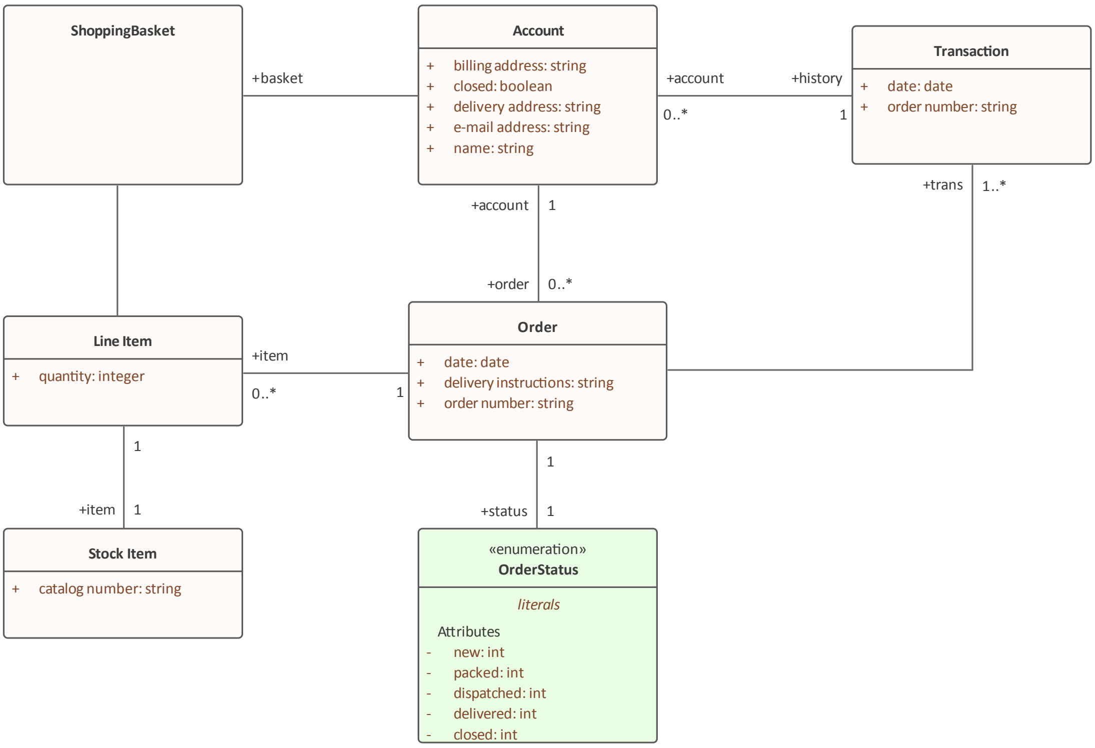
A domain model will act as a guiding model for discussions with many stakeholders and ideally a skeleton model should be created prior to the commencement of any workshops. The Domain Model should be kept simple and domain elements should be given a name and a description or a responsibility and initially only important connections should be made between elements. As the workshop progresses new elements will be uncovered and can be added directly to the model giving the stakeholders confidence that their needs and concerns are being addressed and managed well. Enterprise Architect allows domain models to be created using the **UML Class** diagram.

Domain Model

The Domain Model is a powerful mechanism for recording and defining business terms that are identified during Requirements analysis. It provides a single definition of the terms and their relationships, that can be referenced from anywhere within the model.

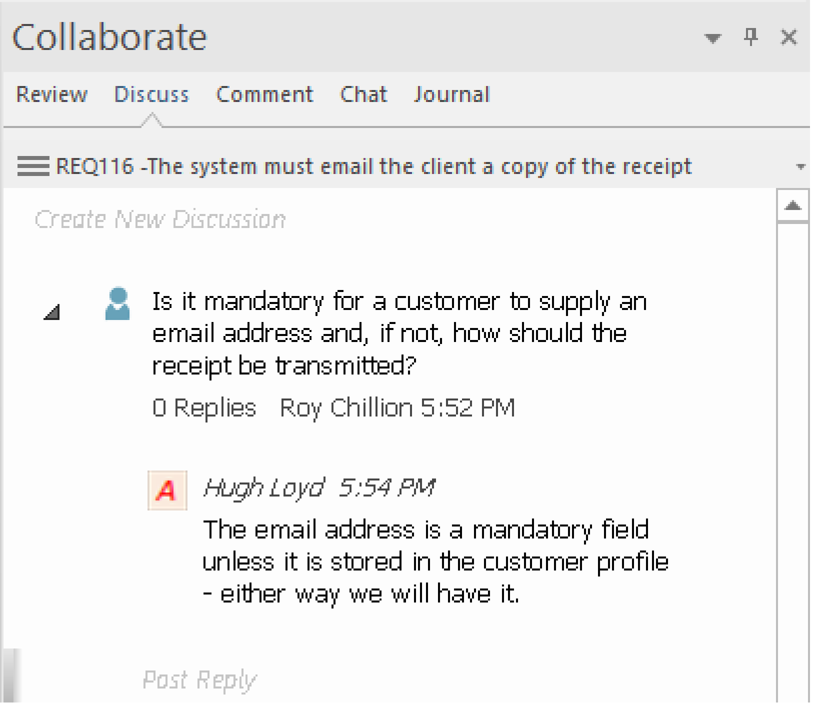
One of the advantages of using a domain model is that the terms are modeled as Class elements, allowing them to be linked to other elements within the domain model itself or to elements in other parts of the model. They can be used on any number of diagrams, and they can be displayed as a list, using the Package List window.

It is also possible to create hyperlinks within the Notes text of Requirements elements, that link directly to relevant domain elements.



Discussions

The **Collaborate window** is a convenient facility that allows commentary to be made on elements without contaminating the notes with discussions that ultimately don't contribute to the integrity of the model. Modelers often place notes on diagrams or write questions in the element Notes fields, and these are distracting and must be removed when formal documentation is generated from the model. The Collaborate window allows a modeler to initiate a discussion and others to reply. It is a perfect way to discuss requirements.



Is it mandatory for a customer to supply an email address and, if not, how should the receipt be transmitted?

0 Replies Roy Chillion 5:52 PM

Hugh Loyd 5:54 PM

The email address is a mandatory field unless it is stored in the customer profile - either way we will have it.

A **Discussions window** conveniently displays the **Discussions** for all elements in the repository.

Creating Requirements

Enterprise Architect has extensive support for developing Requirements, and provides a number of specialized tools for this purpose. As with all model content a modeler is encouraged to check whether the Requirements have been entered into the repository by someone else before embarking on the task of creating new Requirements. It is also possible that the Requirements have been defined in another tool such as a spreadsheet and could be imported into Enterprise Architect without the need to create each Requirement manually. Enterprise Architect has two locations for Requirements; they can be created in the model as an element that will appear in the **Browser window**, or they can be created inside another element as an Internal Requirement or Responsibility.

External and Internal Requirements

Enterprise Architect can support any type of Requirement process and allows Requirements to be defined as elements in the model. These are called External Requirements, but the tool also allows Requirements to be defined for a specific element, and these are called Internal Requirements. An Analyst who wants to define a user requirement such as the *The system must allow bus schedules to be updated*' would use an External Requirement. A modeler wanting to describe how a Component should behave would use an Internal Requirement for the Component, such as *The editor must support Unicode*. There is often contention between Analysts and Developers as to whether a Requirement should be internal or external, and Enterprise Architect provides a facility to move Internal Requirements to be external to the element. When they are moved they are still linked to the original element.

Creating External Requirements

Requirement analysts typically come from varied backgrounds and often have predilections about how they want to work so Enterprise Architect provides a wide range of ways of creating and managing requirements. External Requirements are Requirements that will appear in the **Browser window** and can be added to diagrams and viewed as separate elements with their own properties.

Methods for creating external requirements

Method	Description
Using the Specification Manager	Using the context menu and selecting 'Add New Element' will result in a new element being created in the grid ready for details to be added
Dragging a Toolbox item onto the current diagram	Dragging and dropping an item from a displayed toolbox page onto the current diagram will result in the element being added to the diagram.
Directly in the Browser window	In the **Browser window**, choose the location for the element to be inserted and select the 'New Element' toolbar option or 'Add Element' from the context menu.
Directly in a Package List	Display the context menu by right-clicking in the body of the window and select 'New Element'; the element will be added to the list.

Directly in a Diagram List	Display the context menu by right-clicking in the body of the widow and select 'New Element'; the element will be added to the list.
Importing from a variety of sources	Enterprise Architect supports a wide range of ways of importing requirements from external sources.
Moving an internal requirement external	Requirements that are defined inside an element can be moved external to a location specified by modeler thus creating a new element.

Notes

An Internal Requirement will not be displayed on a diagram by default; to ensure it is displayed you must set the compartment as visible either for the individual element or for all elements on the diagram.

Creating Internal Requirements

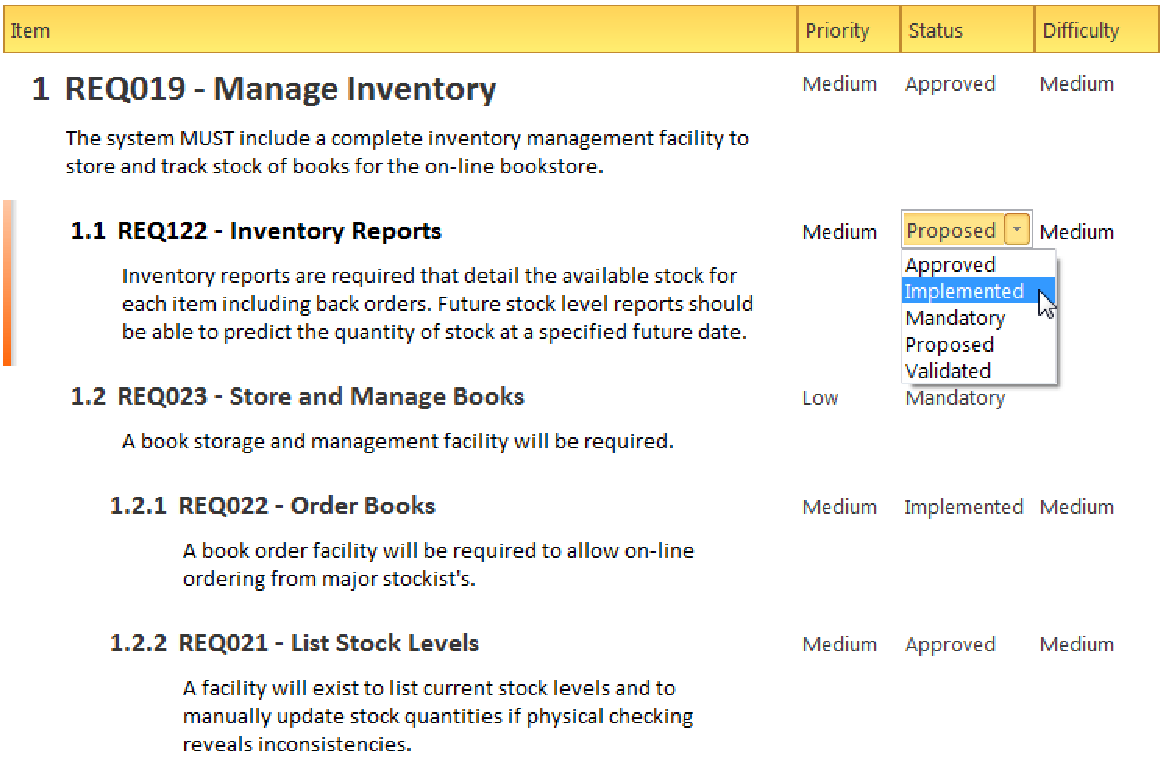
Internal Requirements can be created from an element's property sheet. This section describes how to do this.

Creating internal requirements

Step	Action
1	Select the element to house the Internal Requirement, and open the Responsibilties window for the element.
2	Select the Requirement section, the Requirement panel will be displayed.
3	Enter the name of the Requirement in the 'Requirement' field and any details into the notes field. Other properties such as Status and Priority can be added.
4	Select 'Save' to save the Requirement. The Requirement will be added to the element and will be displayed in the bottom section of the Window. Repeat the steps to enter another Requirement.

Using the Specification Manager

Enterprise Architect has a powerful and fully featured tool called the **Specification Manager** for creating, visualizing and managing specifications, which is particularly useful for working with requirements. Requirements analysts come from varied backgrounds and often have strong predilections about the way they work and the tools they prefer to use, so Enterprise Architect has functionality to suit a wide range of work styles. Some analysts prefer to work with elements and can use the diagramming interface; others prefer to work with hierarchies, so they can work in the **Browser window**; but for those who prefer to work with text through an interface such as tables and spreadsheets, the Specification Manager would be their tool of choice.



Item	Priority	Status	Difficulty
1 REQ019 - Manage Inventory The system MUST include a complete inventory management facility to store and track stock of books for the on-line bookstore.	Medium	Approved	Medium
1.1 REQ122 - Inventory Reports Inventory reports are required that detail the available stock for each item including back orders. Future stock level reports should be able to predict the quantity of stock at a specified future date.	Medium	Proposed	Medium
1.2 REQ023 - Store and Manage Books A book storage and management facility will be required.	Low	Mandatory	
1.2.1 REQ022 - Order Books A book order facility will be required to allow on-line ordering from major stockist's.	Medium	Implemented	Medium
1.2.2 REQ021 - List Stock Levels A facility will exist to list current stock levels and to manually update stock quantities if physical checking reveals inconsistencies.	Medium	Approved	Medium

When you create, delete or update elements in the

Specification Manager, they are automatically updated in the Browser window and any diagrams the element appears in.

Requirement Properties

Requirements development and management is critical to the success of any project and the properties of the requirements are important to the prioritization, and the way they will be elaborated and used within an implementation or development team. All Enterprise Architect elements have standard properties such as Status, Author and Phase but the requirement element has additional properties such as Difficulty and Priority. Some requirements processes will specify specific properties such as Owner and Volatility (Stability) and these can be configured by using Tagged Values that can be applied to each requirement. The 'Notes' field for a requirement has special significance as it often contains a formal and contractual description of how the system must behave or perform.

Access

On a diagram or in the **Browser window**, select an element and:

Ribbon	Design > Element > Editors > Properties
Context Menu	Right-click on element | Properties
Keyboard	

Shortcuts	**Alt+Enter**
Other	Double-click on element

Use to

- Document requirements
- Set requirement properties such as Type, Difficulty and Priority
- Set other element properties common to both Requirements and other model elements

Reference

Field	Action
Short Description	The name of the Requirement, which could include numbering, a natural language description, or some other formal specification. If you have set up **Auto Names and Counters** for Requirements and they are active, and you already have some text in this field, it would be over-written by the

	auto-counter text.
Alias	An alternative name (alias) to be used for this requirement. If you have set Alias autonaming and autonumbering, and you have already have some text in this field, it is over-written by the auto-counter text.
Status	The current status of this requirement.
Difficulty	An estimate of the difficulty in meeting this requirement; select from: • Low • Medium • High
Priority	The relative importance of meeting this requirement compared to other requirements; select from: • Low • Medium • High
Author	The modeler who created this requirement.
Key Words	A set of user-defined words that could be

	used to index or define the subject of this requirement.
Type	The type of this Requirement, typically used as a category for the Requirement. Possible values are defined on the 'Requirements' tab of the **General Types window**. This field displays a single value. You can click on the **drop-down arrow** and select a different value if necessary. However, be aware that you can define *multiple* values for this field, including stereotypes that you create or that are used in integrated or imported MDG technologies. You assign these multiple values using the **Properties window** for the selected Requirement element, in the 'Stereotype' field. This has two impacts on the 'Type' field: • The value displayed in the field might have been set on the Properties window, and might not be shown in the drop-down list (if it is a stereotype and not a General Type) • If you select a different value from the 'Type' drop-down list, you change only the first of the multiple values (the one displayed in the field); you do not

	change any of the other multiple values, which remain set
Phase	The project phase of this requirement.
Version	The version of this requirement.
Last Update	Read-only field specifying when this Requirement was last changed.
Created	Read-only field specifying when this Requirement was first created.
Notes	The description of this requirement, typically providing a more detailed explanation of the requirement. Some requirement processes prescribe that only a statement of the requirement be provided, and the 'Notes' field in these cases would remain blank. Novice modelers sometimes make the mistake of using this field for analyst discussions about the requirement; this commentary is best entered in the purpose-built **Collaborate window**.

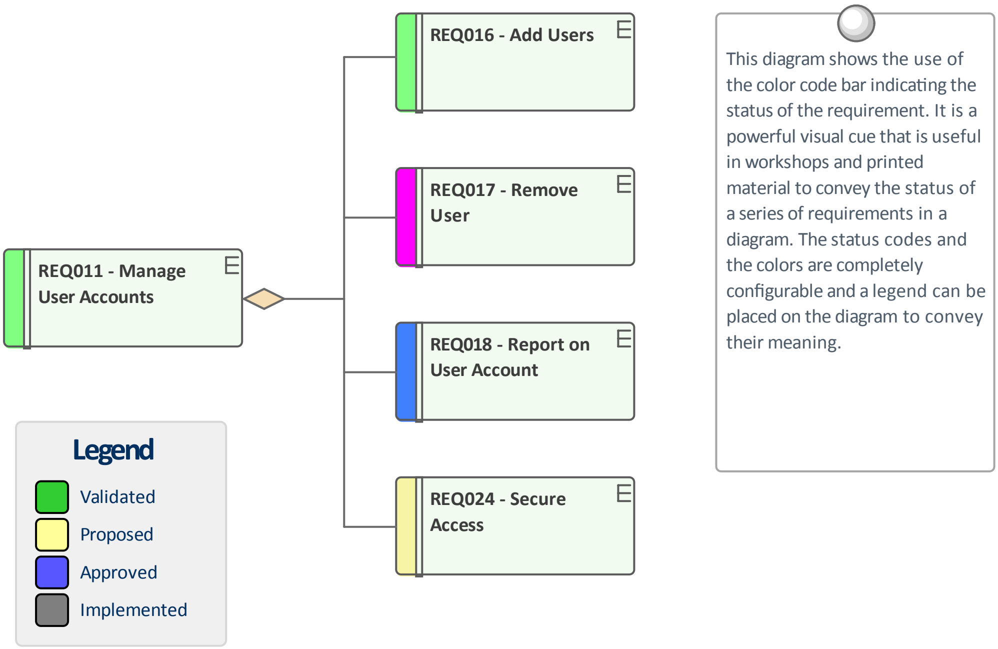
Notes

- In Requirement Management tools and texts, the characteristics of a requirement are commonly called 'Attributes'; however, in UML the term 'Attribute' refers to a different type of feature, and the Requirement characteristics are defined as properties - in this Enterprise Architect documentation, the term properties is used
- In a project, it might be necessary to define more information in a Requirement than is provided by the standard properties and Tagged Values can be used for this purpose

Color Coded Requirements Status

The status of a Requirement is an important property for project managers and other team members. Enterprise Architect provides a way to display the status of each Requirement as a color code in a diagram. The color codes act as a compelling visual cue, allowing team members and other stakeholders to get a quick view of the status of a set of Requirements. The color codes are pre-configured in Enterprise Architect but can be customized to suit any team, including deleting or adding additional codes and changing the color of existing ones. The default color codes are:

- Yellow for Proposed
- Blue for Approved
- Green for Validated
- Orange for Mandatory
- Black for Implemented



This diagram shows the use of the color code bar indicating the status of the requirement. It is a powerful visual cue that is useful in workshops and printed material to convey the status of a series of requirements in a diagram. The status codes and the colors are completely configurable and a legend can be placed on the diagram to convey their meaning.

A modeler can choose whether to display the status color codes on diagrams in a repository, by changing this setting in the 'Objects' page of the 'Preferences' dialog.

Access

Ribbon	Start > Desktop > Preferences > Preferences > Objects > Show status colors on diagrams

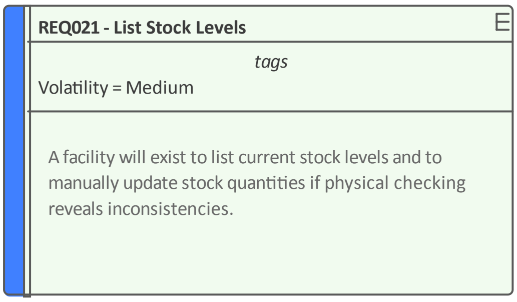
Enable color coded requirements

Step	Action
1	Select the 'Show status colors on diagrams' checkbox to enable the status of requirements to be represented by color coding in a diagram.

Displaying Properties on a Diagram

A diagram is a powerful means of communication. For many stakeholders it will be the preferred method of viewing the contents of a repository and each stakeholder will typically want to see different information. Enterprise Architect provides great flexibility, allowing the modeler to tailor what is shown in a diagram. This includes whether to display the detailed notes of a requirement, the extended properties represented by Tagged Values, constraints, testing details and more. This feature is not only available for requirements but can be used with any diagram object in a repository. The customization can occur at two levels:

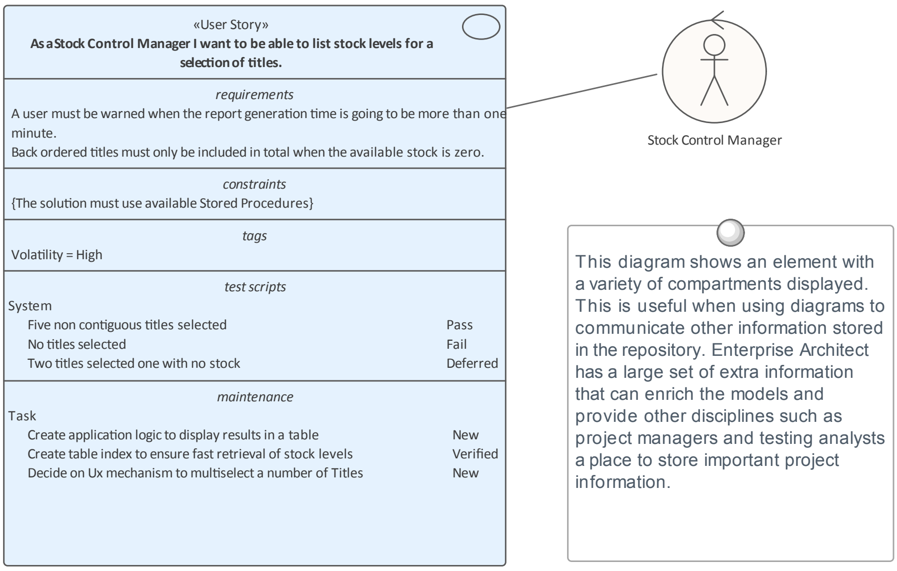
- Customize what is displayed for individual elements in a diagram
- Customize what is displayed for all elements in a diagram

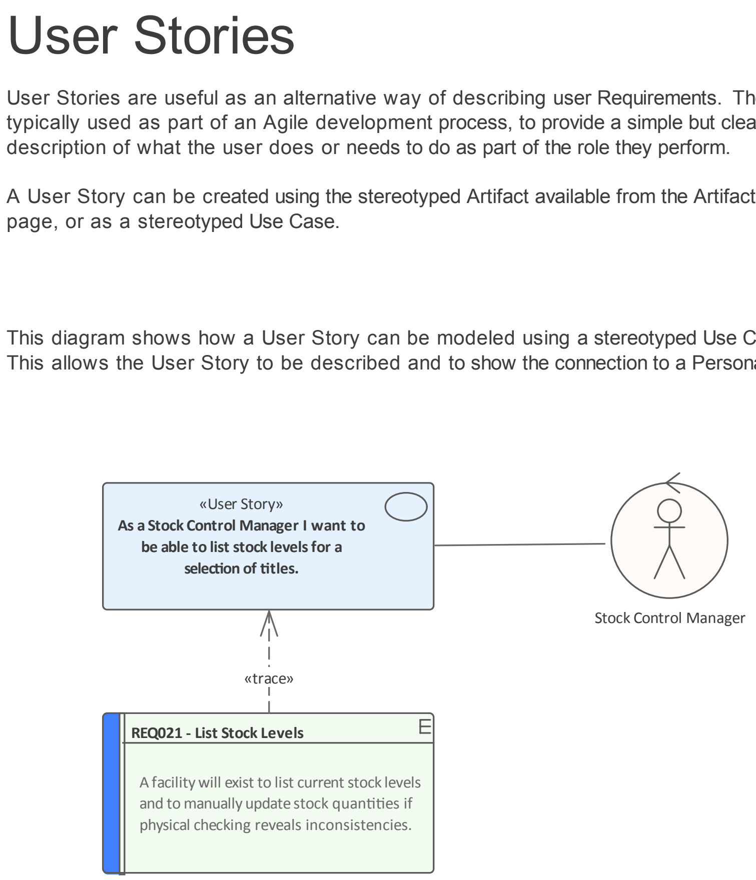

REQ021 - List Stock Levels
E
tags
Volatility = Medium
A facility will exist to list current stock levels and to manually update stock quantities if physical checking reveals inconsistencies.

Customize what is displayed in a diagram

Action	Description
Customize	By default, requirements' extended

visible compartments	properties, notes and other element information are not displayed in a diagram, but it can be useful to display this in the diagram elements, particularly when conducting requirement workshops or creating documentation. Enterprise Architect supports element compartments, and any number of compartments can be displayed in diagram elements, including Notes, Tagged Values (extended properties), Constraints, Tests and Maintenance items such as Features, Changes, Documents, Issues, Defects and Tasks. There are two options to do this: • To display the additional compartment on all elements in a diagram, double-click on the diagram background and select the 'Elements' tab of the 'Properties' dialog for the diagram; select the compartment checkbox for each compartment to display and click on the **OK button** • To display the additional compartment on a specific element in a diagram, from the element context menu select the 'Compartment Visibility' option; select the compartment checkbox for each compartment to display in the

	'Show Element Compartments' panel of the 'Compartment Visibility' dialog, or for notes in the 'Element Notes' panel and click on the OK button The additional compartments are then displayed in the Requirement element(s) on the diagram.  «User Story» **As a Stock Control Manager I want to be able to list stock levels for a selection of titles.** *requirements* A user must be warned when the report generation time is going to be more than one minute. Back ordered titles must only be included in total when the available stock is zero. *constraints* {The solution must use available Stored Procedures} *tags* Volatility = High *test scripts* System Five non contiguous titles selected Pass No titles selected Fail Two titles selected one with no stock Deferred *maintenance* Task Create application logic to display results in a table New Create table index to ensure fast retrieval of stock levels Verified Decide on Ux mechanism to multiselect a number of Titles New Stock Control Manager This diagram shows an element with a variety of compartments displayed. This is useful when using diagrams to communicate other information stored in the repository. Enterprise Architect has a large set of extra information that can enrich the models and provide other disciplines such as project managers and testing analysts a place to store important project information.
Displaying a stereotype in a diagram	By default requirement stereotypes are not displayed in a diagram. Enterprise Architect allows the modeler to display the element in a rectangular notation which displays the stereotype and an icon. They can be displayed for individual elements using the element context menu 'Advanced | Use Rectangle Notation' option. If the elements status colors were configured to be shown in diagrams the status color will be indicated in the

	requirements icon at the top right corner of the element.  User Stories User Stories are useful as an alternative way of describing user Requirements. They are typically used as part of an Agile development process, to provide a simple but clear description of what the user does or needs to do as part of the role they perform. A User Story can be created using the stereotyped Artifact available from the Artifact Toolbox page, or as a stereotyped Use Case. This diagram shows how a User Story can be modeled using a stereotyped Use Case. This allows the User Story to be described and to show the connection to a Persona. «User Story» As a Stock Control Manager I want to be able to list stock levels for a selection of titles. Stock Control Manager «trace» REQ021 - List Stock Levels E A facility will exist to list current stock levels and to manually update stock quantities if physical checking reveals inconsistencies.

Notes

- When the display is customized at the level of the diagram these settings will take precedence over the element level settings
- When the display is customized at the level of the requirement the length of the notes text displayed can be further tailored to a particular number of characters and formatting options can be set

Import Requirements

A requirements analyst has a busy schedule of work, from running stakeholder workshops to sifting through project documentation and updating project managers with the status of the requirement development, so any opportunity to save time and work more efficiently is usually welcomed. One of the most difficult tasks that the analyst faces is how to get a central repository of requirements when the source documents are often in a variety of formats and tools. Enterprise Architect has a range of mechanisms to import requirements from disparate sources, including:

- Enterprise Architect models using copy and paste
- A text based document such as a word processor file
- A CSV file that can be exported from a Spread Sheet or similar tool
- An XMI file that has been exported from another model
- The Rational Doors requirement management tool
- Any file source using a script to process the file
- A reusable asset server that has a register of requirements

Import Requirements by Copy and Paste from another Model

This method of creating Requirements allows you to copy them from another Enterprise Architect model by simply opening both models and copying the elements from one model to the other. You can copy a number of elements in the same Package or, if it is easier, you can copy an entire Package and all the elements it contains. When you copy elements they will be created as new elements in the target model and will be assigned new GUIDs.

Step	Action
1	Using the **Browser window** select an individual requirement or multi-select a number of requirements in the same Package and right-click to display the context menu.
2	Select: - For a single requirement, or a complete Package of requirements, the 'Copy/Paste | Copy to Clipboard | Full Structure for Duplication' option - For a selection of requirements, the 'Copy to Clipboard | Full Structure for Duplication' option Enterprise Architect copies the elements to the clipboard.
3	Select the target location in the **Browser window** and right-click to display the context menu.
4	Select 'Copy/Paste | Paste Element(s) from Clipboard' (or, if appropriate, 'Paste Package from

	Clipboard') from the context menu. Enterprise Architect creates the new elements in the target location, assigning new GUIDs to the elements.

Import Requirements from Text

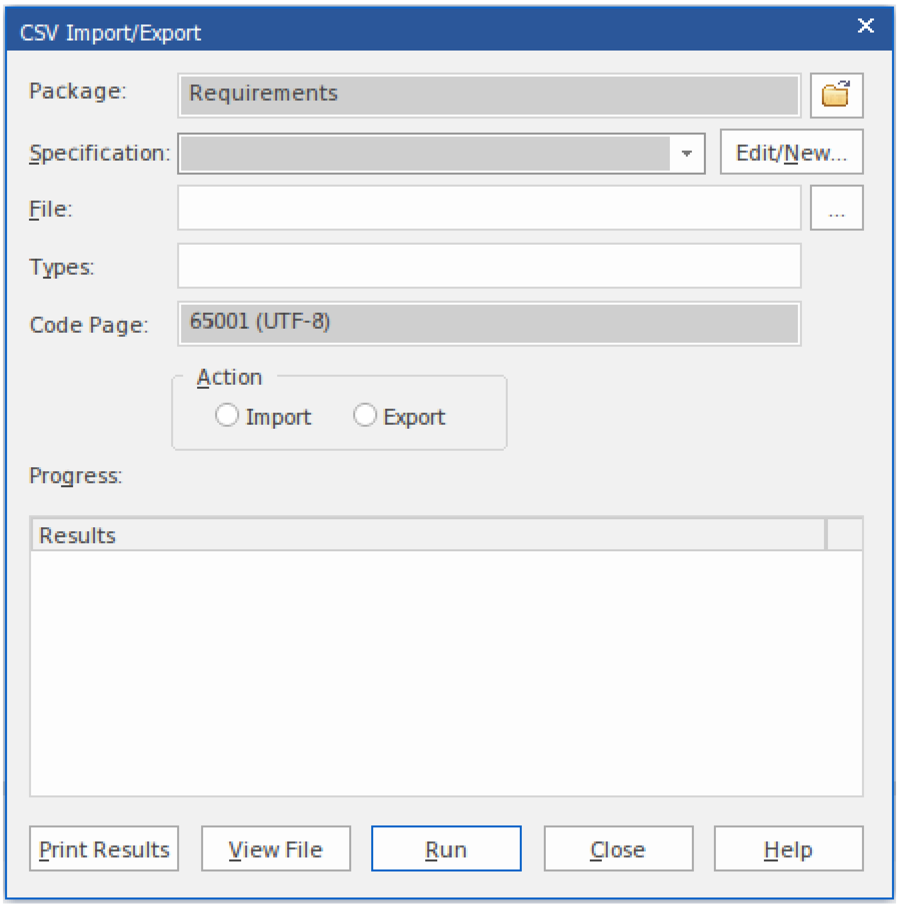
Word Processors and other text tools are commonly used to develop requirements when a team is not equipped with a purpose built requirements modeling platform such as Enterprise Architect. It is quite common to arrive at an elicitation workshop and find a customer or another stakeholder holding up a document saying that they have already started documenting their requirements. Fortunately Enterprise Architect has a convenient way of importing these requirements. This procedure creates a new element in Enterprise Architect by converting a text heading into an element's name and the text under the heading into the element's notes. You can use this method to generate any type of element; however, it is particularly useful for importing requirements from a requirements specification document. If there are a large number of requirements it might be more appropriate to use the **Scripting** method to import the requirements or, if they are in a table, to export them to a spreadsheet and use the CSV import mechanism.

Steps to Import Requirements from Text

Step	Action
1	Ensure you have a Requirements diagram open.
2	Open the document file containing the text you want to generate Requirement elements from (this can be opened in any common text editing tool).
3	Highlight the required heading and associated text and drag them from the text file into the diagram. The 'Toolbox Shortcut' menu displays.
4	Navigate through the menus and select the relevant element type, in this case Requirement. (If the diagram you are dragging onto is not a requirement diagram you will have to navigate to the requirement.)
5	Enterprise Architect creates a Requirement element in the diagram, and displays the 'Properties' dialog with the section heading in the 'Name' (or equivalent) field and the text in the 'Notes' field; the element is also added to the diagram's parent Package or element in the **Browser window**.

Import Requirements from a CSV file

Spreadsheets are often the default tool that analysts will use for Requirement Development, when they are not equipped with a more sophisticated tool such as Enterprise Architect. So it is quite common to find that a number of members of a team, including customers, have been entering requirements into a spreadsheet before Enterprise Architect has been installed. Fortunately, Enterprise Architect has a built-in facility to import such requirements so that they can be managed in a purpose-built requirements modeling platform, and the spreadsheets can be decommissioned. Columns in the spreadsheet will typically contain the name, description and additional properties of the requirements, which will need to be mapped to fields inside Enterprise Architect using a specification.



Package: Requirements

Code Page: 65001 (UTF-8)

Access

Ribbon	Publish > Model Exchange > CSV > **CSV Import/Export**

Steps to Import Requirements from a CSV file

Step	Action
1	The Package defaults to the one selected in the **Browser window** into which to import the Requirements. If you want to change this Package, use the 📂 icon to browse for the new Package.
2	In the 'Specification' field, click on the **drop-down arrow** and select the specification to use from the list. Alternatively, click on the **Edit/New button** to create a new one.
3	In the 'File' field, type in or browse for the source CSV file that contains the Requirements to be imported.
4	Click on the 'Import' radio button.
5	Click on the **Run button** to import the Requirements. The progress of the import is displayed in the 'Progress' panel.

Import Requirements from XMI

Enterprise Architect supports the XML Metadata

Interchange (XMI) exchange format which is governed by the Object Management Group (OMG) and provides a convenient way of exchanging models or model fragments. It is quite common for requirements that have been developed for one system to be applicable to another system; this is particularly true of non-functional requirements. Each project typically needs a unique set of requirements that have their own lifetime so these are best exported from one model and imported to another. XMI provides a suitable exchange format for this purpose and the XMI can be easily exported from one model and imported into another.

Access

Select your target Package in the **Browser window**, then:

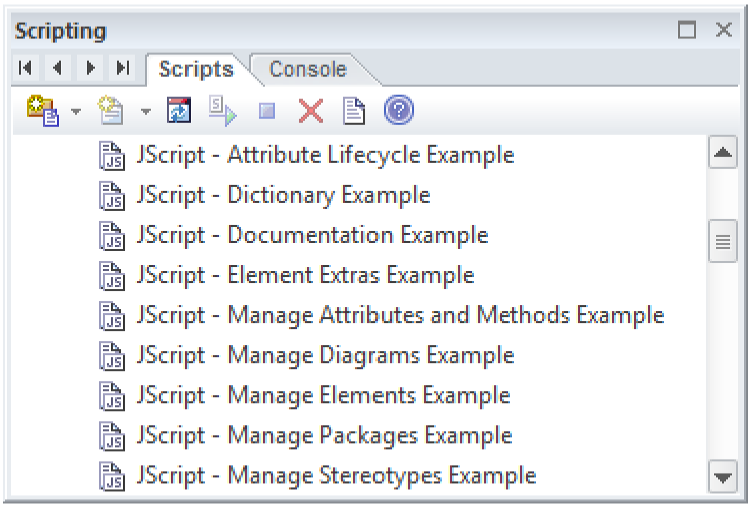
Ribbon	Publish > Model Exchange > Import XML > Import Package from XML
Keyboard Shortcuts	**Ctrl+Alt+I**

Import Requirements from XMI Steps

Step	Action
1	Select the location in the **Browser window** where you want the content inserted, and access the 'Import Package from XMI' dialog.
2	Select the filename of the XMI file to import, and select the appropriate options.
3	Click on the **Import button** to import the Package Enterprise Architect will prompt you to confirm the import; click on the **Yes button** to import the file. If there are unsaved diagrams you will be prompted to save diagrams before continuing. If any elements in the import file exist in the model you will be warned, and will not be able to import the file unless you select the 'Strip GUIDs' option.

Import Requirements from Any Format

Enterprise Architect can import requirements from a wide range of file formats, but on occasion the structure of the requirements in the source document, or the number of requirements, can make using one of these built-in mechanisms difficult. Fortunately the requirements can be imported from any file format using the powerful and flexible scripting facility - available in the core product - or by developing an **Add-In**.



JScript - Attribute Lifecycle Example
JScript - Dictionary Example
JScript - Documentation Example
JScript - Element Extras Example
JScript - Manage Attributes and Methods Example
JScript - Manage Diagrams Example
JScript - Manage Elements Example
JScript - Manage Packages Example
JScript - Manage Stereotypes Example

Import Requirements from Rational Doors

The Model Driven Generation (MDG) technology for Doors provides a lightweight bridge between Enterprise Architect and IBM Rational Software Architect (formerly Telelogic) DOORS. This allows the analyst to import the Requirements from Doors into an Enterprise Architect repository and to keep them synchronized with Doors. The entire hierarchy of Requirements will be imported and individual requirements can be linked to model elements such as Use Cases and Components. The Enterprise Architect model can be synchronized with Doors by re-importing the requirements. Any deleted items will be added to a 'Trash Can' Package but will not be deleted from the model or the diagrams.

Move Requirement External

Elements in Enterprise Architect can have internal requirements (responsibilities) that define what the element must accomplish. These can overlap or duplicate more formal requirements that the system in general must meet, so a modeler could decide to make an element's internal requirement into an external Requirement element. This is often done to allow a number of elements to implement the need expressed in the requirement. This can be achieved using the 'move external' function.

Access

On a diagram or in the **Browser window**, select an element and:

Ribbon	Design > Element > Responsibilities > Requirements
Context Menu	Right-click on element | Properties | Responsibilities > Requirements
Keyboard Shortcuts	**Alt+Enter** > Requirements **Shift+Alt+R**
Other	Double-click on element > Requirements

Change an element's internal requirement into an external requirement element

Step	Action
1	Right-click on the internal requirement to change to an external requirement. A short context menu displays.
2	Click on the 'Move External' menu option. The 'Find Package' dialog displays.
3	Locate and click on the Package to place the new Requirement element in.
4	Click on the **OK button**. A new Requirement element is created in the target Package, with a Realization connector from the current element to the Requirement. In the 'Properties' dialog, the Requirement is now marked with a 'Yes' in the 'External' column, and the dialog fields are disabled. To edit its details, double-click on the Requirement. The Requirement

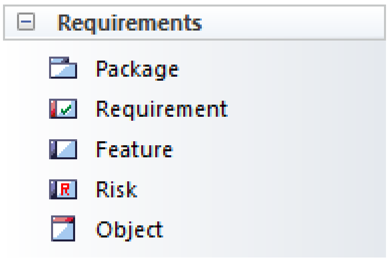
	element's own 'Properties' dialog displays.

Notes

- When an internal requirement is made into an external requirement element it is still viewable from within the element; any change to the external requirement will be reflected in the internal requirement and vice versa
- When an internal requirement is made into an external requirement element, the 'Stability' field and its value for the internal requirement are translated into the Stability Tagged Value in the external requirement

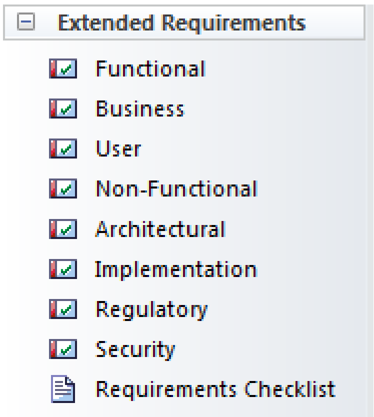
Recording Requirement Types

Enterprise Architect supports a wide range of element types and, in addition to the elements defined by the various standards, Enterprise Architect has added a series of extended elements that can be used for documenting a wide range of requirement types. When a Requirements diagram is created or opened, Enterprise Architect will display the Requirements Toolbox, which contains a number of standard and extended requirement elements. These elements can be dragged and dropped onto the diagram to create new elements, including a Package that acts as a container for Requirement elements and Feature, Risk and Object elements.



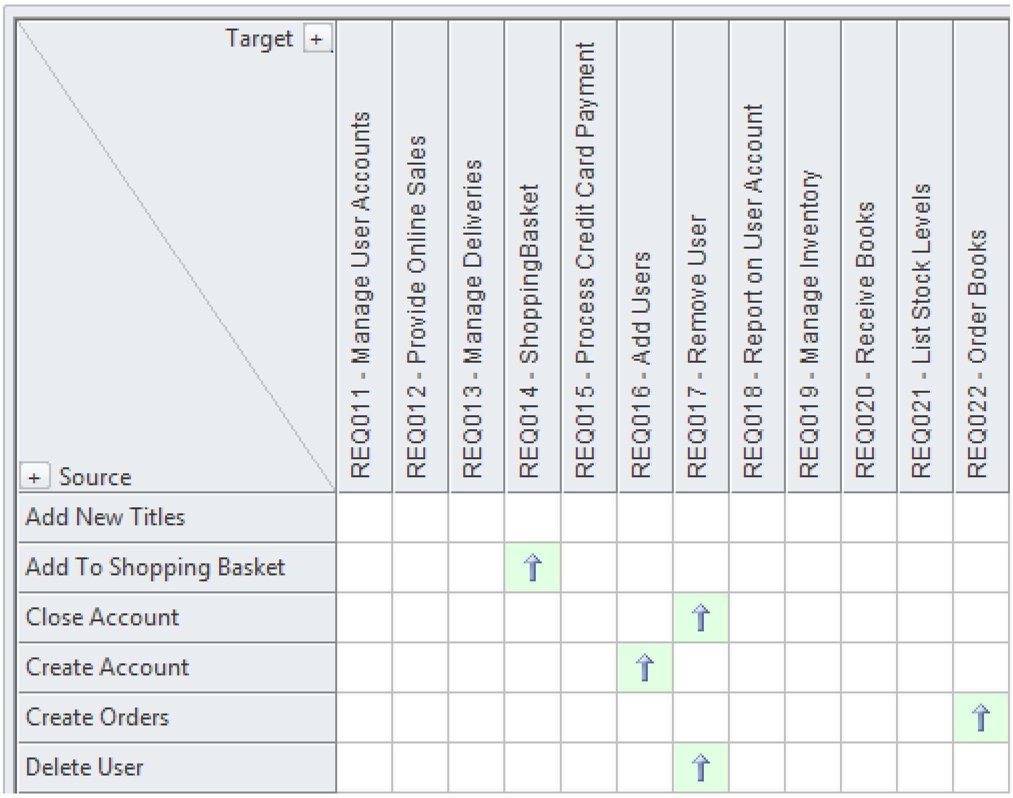
Extended Requirements

There is also a convenient set of extended requirements that can be used to model a variety of diagram types ranging from Functional, Business and User to Architectural and Non-Functional requirements. These come pre-configured with Tagged Values that allow you to specify additional properties of the requirements.



Analysis

The analysis phase of Requirements development ensures that the Requirements discovered in the Elicitation phase have been articulated correctly and have the correct format, level of detail and properties and form a cohesive and correct set. As a result of the disparate sources and methods of elicitation the Requirements recorded in the elicitation phase will need some massaging and balancing - it is quite common for example to find repeated or overlapping requirements or for an analyst to have omitted to record the concerns of one or more stakeholders. Tools such as the **Relationship Matrix** and the **Traceability window** will reveal omissions and issues with requirements. The **Collaborate window** - incorporating the **Model Mail** facility - also provides mechanisms for discussing the Requirements with other team members.



Target + + Source	REQ011 - Manage User Accounts	REQ012 - Provide Online Sales	REQ013 - Manage Deliveries	REQ014 - ShoppingBasket	REQ015 - Process Credit Card Payment	REQ016 - Add Users	REQ017 - Remove User	REQ018 - Report on User Account	REQ019 - Manage Inventory	REQ020 - Receive Books	REQ021 - List Stock Levels	REQ022 - Order Books
Add New Titles												
Add To Shopping Basket				↑								
Close Account							↑					
Create Account						↑						
Create Orders												↑
Delete User							↑					

Models Used to Document Requirements

One of the most important aspects of the requirements engineering discipline is to communicate knowledge and ensure that all stakeholders have a clear and unambiguous understanding of the problem and the proposed solution. This can be challenging because the stakeholders typically cross organizational boundaries and have a myriad of backgrounds spanning from senior business executives to low level engineers. This heterogeneous audience will need a variety of communication devices to ensure the various stakeholders are able to engage with the requirements and are able to understand them. Enterprise Architect is a modeling platform with a formidable range of tools and features that can be used to model requirements in almost any way. These include modeling stakeholders, requirements, user stories, user interfaces and a wide range of other models.

Requirements models

Model	Description
Textual Requirements	Textual requirements can be modeled using the Requirement element, and users can choose to work with the elements in a

	text tool such as the **Specification Manager**, directly in the **Browser window** in a hierarchy, or visually in a diagram. The Requirement element can be connected to other elements to describe a hierarchy of requirements, or to business goals or Use Cases and User Interface models. Through the Specification Manager Enterprise Architect allows the modeler to create, analyze and manage requirements in a text tool that resembles working in a spreadsheet but which is more powerful and gives the analyst access to other models, including the glossary and the domain models.
Stakeholders	Stakeholders can be modeled using UML Classes and descriptions can be added that describe the stakeholder. Stakeholders are possibly the most important entities in the requirements engineering discipline and creating elements to represent them in the model allows them to be used as the owner of requirements and business rules. They can be placed onto diagrams allowing them to be visible in elicitation and prioritization workshops.

Glossary	A Glossary can be created and managed using the **Project Glossary**, ensuring that important project and domain terms are accessible right inside the model. These terms can be inserted into the Notes fields of elements including Use Case and User Story descriptions.
Use Cases	Use Cases can be modeled in a Use Case diagram and can be connected to a range of other elements including user interface models, User Requirements and Components. The Use Cases can be kept light-weight by just completing the description or they can be fully-dressed using the powerful **Scenario Builder** Tool. Use Cases often present a problem for the requirements analyst because the diagrams are typically drawn in a diagramming tool and the text is written in a word processor, making it inaccessible to other model elements. Using Enterprise Architect's Scenario Builder the Use Case descriptions can be completed inside the Use Case itself inside the modeling tool. The tool can also produce behavior diagrams that represent the Use Case Scenarios automatically from the model.

User Stories	User Stories can be modeled using a stereotyped Use Case element and the text of the story can be completed in the description field. The Users and Personas can also be modeled and related to the story. Enterprise Architect allows the modeler to work with the stories in text form or in diagrams. Functional requirements can be added in preparation for handing to the development team for an iteration and these can be managed inside or outside the user story.
Domain Models	Domain models can be modeled using a **UML Class** diagram. The important entities in the business domain can be recorded, detailed and related to other elements. Creating domain models early in a project helps stakeholders make sense of all the important entities in a domain and the models can be used to generate a Data Dictionary. The domain elements can be created as links in textual statements of requirements, creating an articulated model that facilitates communication and understanding.
Process Models	Business processes are a useful way of recording the activities of a business including the events that trigger them to

	happen, the information that is produced or consumed, the outcomes and the roles that carry out the work. Enterprise Architect supports BPMN, UML and SysML Activity diagrams that can be used for this purpose.
Storyboards	Storyboards can be modeled using graphic elements in diagrams and a slide-show can be created to walk through the story.
Wireframes	Wireframes can be modeled using the powerful Wireframing diagram, which has built-in support for popular hand held devices such as Apple and Android phones and tablets, and also for modeling dialog windows and web pages. Using Enterprise Architect's Wireframing tool, an analyst can create powerful models of the arrangement of the application's content, describing interface elements and navigational mechanisms. Analysts and experienced designers have typically worked in isolation from other disciplines, but using Enterprise Architect the models can be created and maintained inside the same tool as the other requirement models, allowing traces to be created between other elements and the

	controls and content in the Wireframes.
User Profiles and Personas	User Profiles and Personas can be modeled using a stereotyped Actor element which allows descriptions and properties to be added that describe the persona.
System Events and Responses	A system will typically respond to a number of events and can also be responsible for creating events such as raising an alert or sending a data stream. These can be modeled in Enterprise Architect using BPMN or UML and SysML Activity diagrams.
System Interfaces	System Interfaces can be modeled using Provided and Required Interfaces and Ports on a Component diagram which describe how the software or hardware system interacts with other systems or how the internal Components of a system communicate. Enterprise Architect has rich support for modeling the interfaces and error codes and other behavior can be modeled. The interfaces can be linked to data definitions and Application Programmer Interface (API) specifications and a range of model

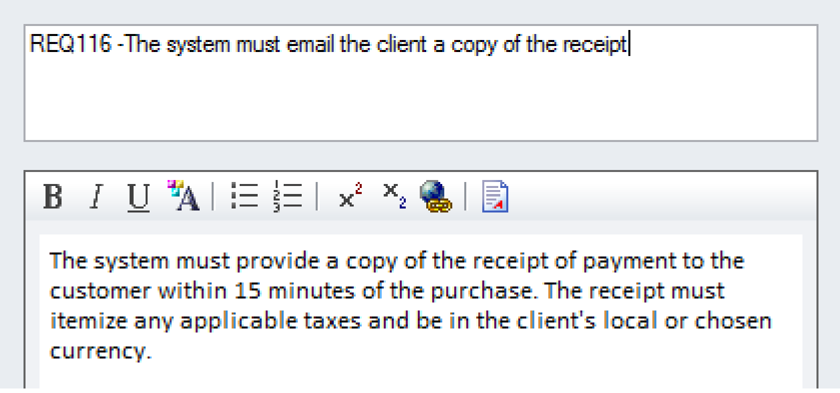
	elements including Use Cases and Requirements. The Interfaces can be added to documentation such as the System Requirements Specification and this document can be automatically generated from the model.

Requirements Naming and Numbering

Requirements are fundamental to the definition of a problem (or opportunity) and the solution must be traced back to this definition.

Requirement Names and Descriptions

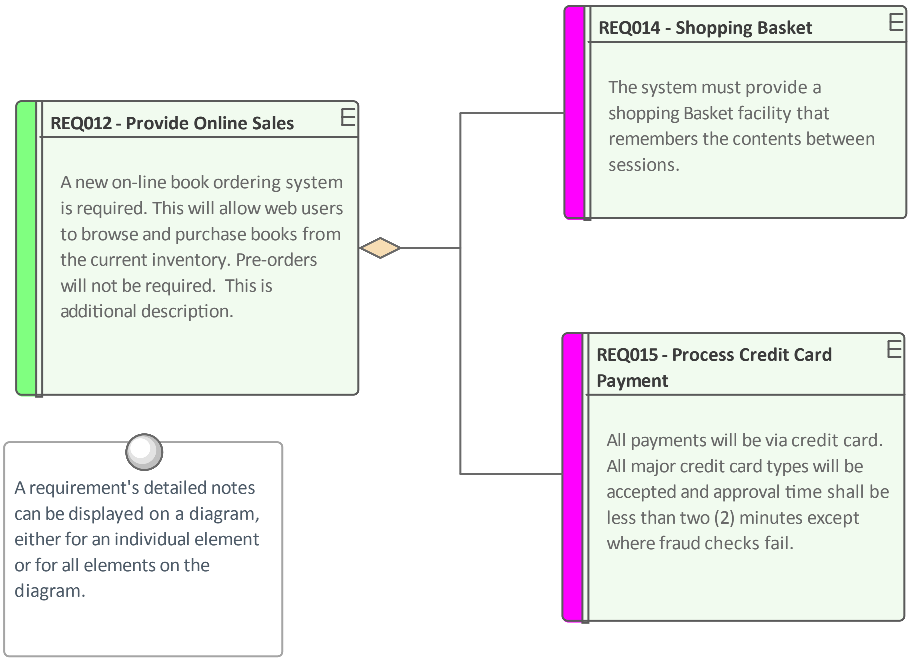
There are many schemes that are used to name requirements and Enterprise Architect is flexible enough to support any scheme that is used. There are two locations you can add textual information to a Requirement: the element name, which has a limit of 255 characters, and the 'Notes' field, which is effectively unlimited. Some schemes specify that a single definition of the requirement is entered and no notes are needed. Other schemes prescribe a short name and specify that the requirement is clarified with detailed text. If notes are not used it is common practice to use some type of numbering system so the Requirement can be referred to unambiguously.



REQ116 -The system must email the client a copy of the receipt

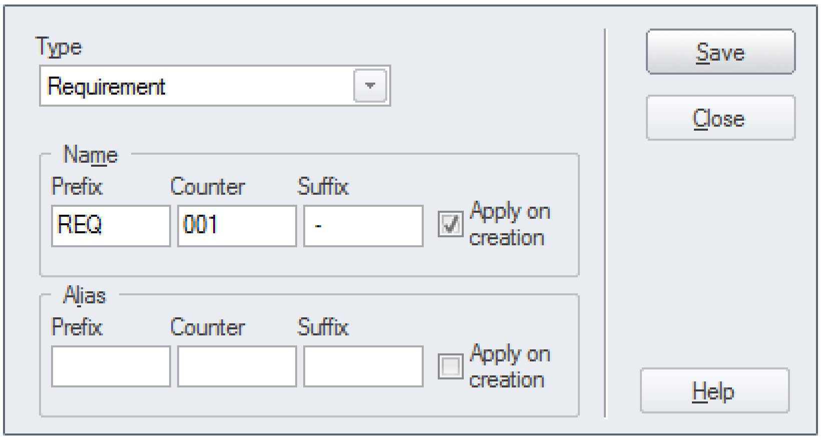
The system must provide a copy of the receipt of payment to the customer within 15 minutes of the purchase. The receipt must itemize any applicable taxes and be in the client's local or chosen currency.

When Requirements appear in diagrams the name will by default be displayed but a modeler can choose to display any one of a number of the requirement's compartments including the notes. This technique creates expressive diagrams that reveal the details of the requirement and help the reader or reviewer to understand the Requirement more fully.


REQ014 - Shopping Basket
The system must provide a shopping Basket facility that remembers the contents between sessions.
REQ012 - Provide Online Sales
A new on-line book ordering system is required. This will allow web users to browse and purchase books from the current inventory. Pre-orders will not be required. This is additional description.
REQ015 - Process Credit Card Payment
All payments will be via credit card. All major credit card types will be accepted and approval time shall be less than two (2) minutes except where fraud checks fail.
A requirement's detailed notes can be displayed on a diagram, either for an individual element or for all elements on the diagram.

Sequential Numbering

Good practice often recommends that Requirements are given a sequential number when they are created so they can be referred to in stakeholder workshops, change requests, conversations with System Integrators or implementation teams. Using a name in this situation is often unwieldy and subject to error so a sequential number is preferred. Enterprise Architect has a facility called **Auto Names and Counters** for this purpose that can be used to assign a sequential number to any element type including Requirements. It includes a prefix definition, a counter and a suffix definition allowing numbers such as: 'REQ007 - Manage Inventory' to be created. These can be further refined to numbering systems such as this architectural requirement: 'ARR134 - Payloads for internal component interfaces must use an XML format'.



Type: Requirement

Name

Prefix	Counter	Suffix	
REQ	001	-	☑ Apply on creation

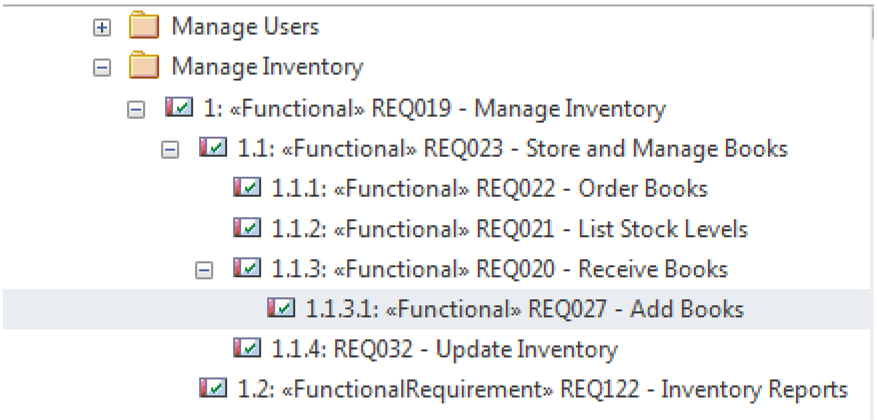
Alias

Prefix	Counter	Suffix	
			□ Apply on creation

The counter is added to the name and is displayed in all views of the repository including the **Browser window**, **Relationship Matrix**, search results and diagrams.

Numbered Hierarchies

When Requirements are written in word processors they typically use a numbering scheme called Outline Numbering, which assigns a number to the first level heading such as: '4 Inventory Requirements' and then a sub-heading is numbered by adding a period and a number such as '4.1 Stock Levels' and again down another level '4.1.1 List Stock Levels'. Enterprise Architect has a facility called Level Numbering that applies hierarchical numbering to the elements in a Package. This is a useful mechanism that is displayed in a number of locations, including the **Browser window**, the **Specification Manager**, **Diagram List** and Package List. It must be remembered, however, that if the order or the level of the elements in the Package is altered they will be assigned new numbers based on their new position; this makes this mechanism unsuitable if immutable numbers are needed.



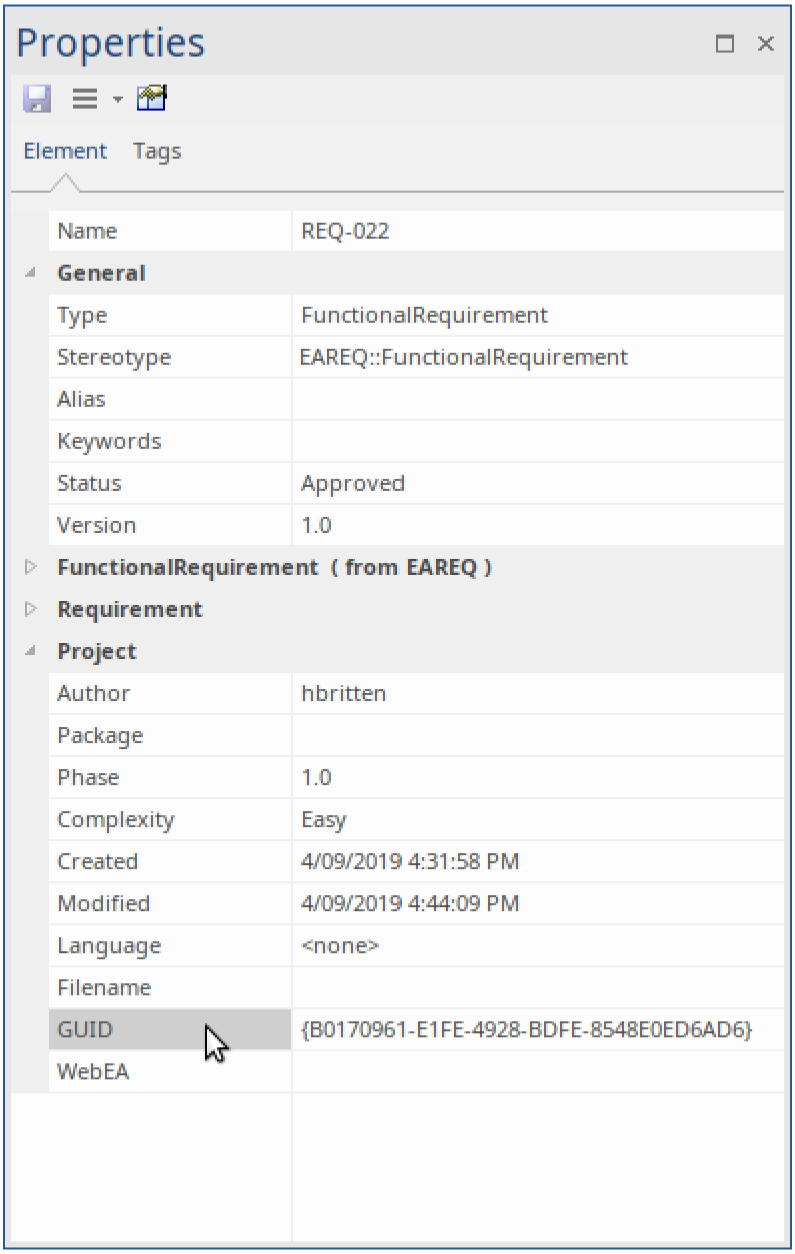
- Manage Users
- Manage Inventory
  - 1: «Functional» REQ019 - Manage Inventory
    - 1.1: «Functional» REQ023 - Store and Manage Books
      - 1.1.1: «Functional» REQ022 - Order Books
      - 1.1.2: «Functional» REQ021 - List Stock Levels
      - 1.1.3: «Functional» REQ020 - Receive Books
        - 1.1.3.1: «Functional» REQ027 - Add Books
      - 1.1.4: REQ032 - Update Inventory
    - 1.2: «FunctionalRequirement» REQ122 - Inventory Reports

Numbered Packages

This is a hybrid method where Packages are used to create a high level naming and numbering structure and the Requirements in each Package are numbered using the Package identifier and a number to identify them. So Requirements for the Fulfillment of Orders could be contained in a Package named '2.4 Fulfill Orders' and an individual requirement in this Package could be named 'FO-01 Process Credit Card Payments'. This would be manually maintained or a Script could be written to ensure that the numbers were correctly assigned.

Globally Unique Identifier

Every element, diagram and connector in an Enterprise Architect repository is given an immutable and unique reference in the form of a Globally Unique Identifier (GUID). The GUID is assigned to the element when it is created and is guaranteed to be unique across time and space. Thus requirements can ultimately be referred to by this unique identifier. While the GUID is a powerful and irrefutable way of referring to a Requirement it is not practical to use it in discussion with stakeholders because of its length and the fact that it is not memorable. The GUID's purpose is to be able to track and manage a Requirements provenance particularly when Enterprise Architect is used to generate Requirements to other tools. It is also used as the identifier in the XMI exchange format.



Name	REQ-022
General	
Type	FunctionalRequirement
Stereotype	EAREQ::FunctionalRequirement
Alias	
Keywords	
Status	Approved
Version	1.0
FunctionalRequirement (from EAREQ)	
Requirement	
Project	
Author	hbritten
Package	
Phase	1.0
Complexity	Easy
Created	4/09/2019 4:31:58 PM
Modified	4/09/2019 4:44:09 PM
Language	<none>
Filename	
GUID	{B0170961-E1FE-4928-BDFE-8548E0ED6AD6}
WebEA	

Proprietary Numbering Systems

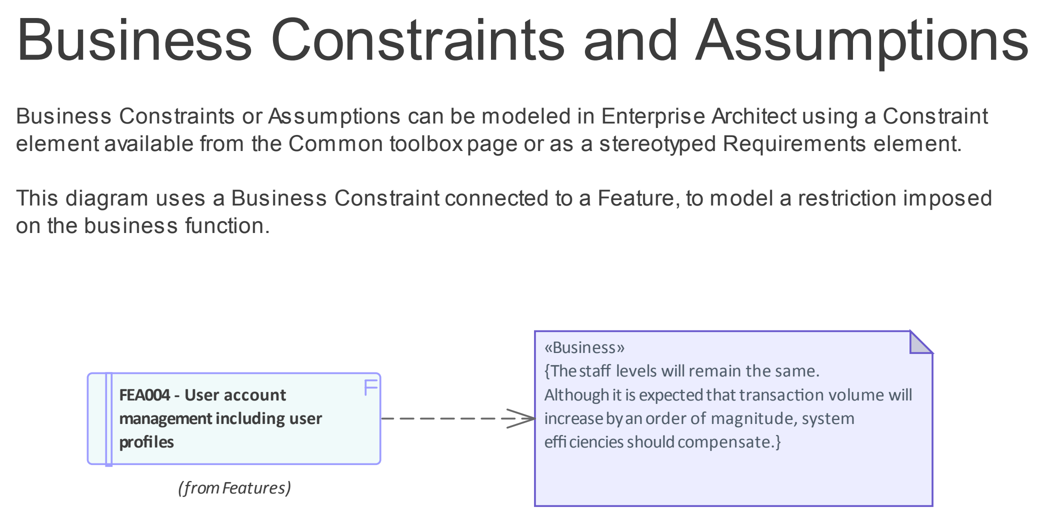
There might be projects or programs of work that will, for regulatory or commercial reasons, specify a proprietary numbering system that must be used with Requirements. For this reason one of Enterprise Architects in-built schemes might not suffice; in this situation the user can create their own numbering scheme using the **Scripting** facility in combination with Tagged Values.

Model Assumptions and Constraints

When an analyst is working through the information acquired from the elicitation process they will typically come across statements or conditions that are best described as Assumptions that have been made or Constraints that will restrict the solution is some way. These are not Requirements but have an important role in the requirements development process because they have the ability to affect the solution and must be understood.

Business Constraints

A Business Constraint is a business restriction or limitation imposed on the choices that can be made for the design, implementation or deployment of the solution. They are typically restrictions of budget, time and resources, but can be any type of limitation such as the context of the business deployment where the solution must not change the way that branch staff currently work. A Business Constraint might also limit the access or presentation of information such as 'Only the last four digits of a credit card number can be displayed in reports.' There is some overlap with business rules and the analyst should be careful to separate the two notions. Business Constraints can be modeled in Enterprise Architect using a Constraint element available from the Common toolbox page or a stereotyped Requirements element. They can be related to one or more model elements using a Dependency relationship. Constraints can also be created as a property of an element using the **Properties window**.



Business Constraints and Assumptions

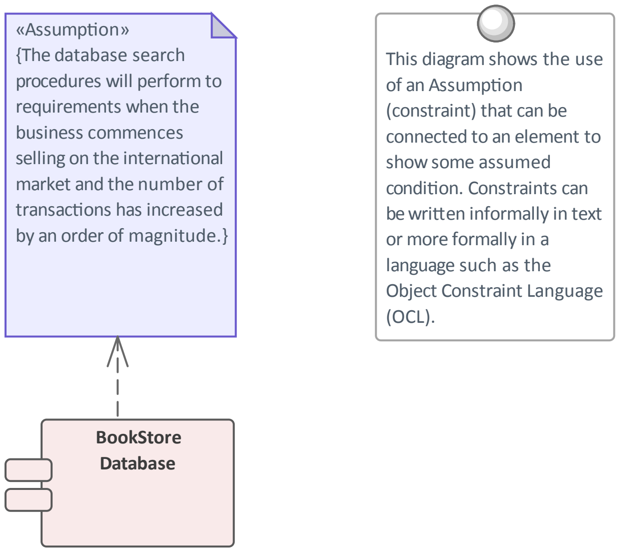
Business Constraints or Assumptions can be modeled in Enterprise Architect using a Constraint element available from the Common toolbox page or as a stereotyped Requirements element.

This diagram uses a Business Constraint connected to a Feature, to model a restriction imposed on the business function.

«Business»
{The staff levels will remain the same.
Although it is expected that transaction volume will increase by an order of magnitude, system efficiencies should compensate.}

Assumptions

An assumption is a statement that is believed to be true but that has not yet been verified. It is imperative that assumptions are modeled and attempts are made to verify them as they have the potential, if proved to be false, to significantly change in the definition of the problem and therefore the solution. They can be statements made about the way things are currently done or they could pertain to a future process or solution. Assumptions are similar to Risks, and good practice would prescribe them as being managed in a similar way to Risks. Attempts should be made to verify them as early as possible in the requirements development phase. An example of an assumption is: 'The User will know the meaning of toolbox icons as used in other Windows applications'. Based on this assumption the solution designer might plan not to implement tool-tips for the icons. Assumptions can be modeled in Enterprise Architect using a Constraint element, available from the 'Common' Toolbox page, or as a stereotyped Requirements element. They can be related to one or more model elements using a Dependency relationship.


«Assumption»
{The database search procedures will perform to requirements when the business commences selling on the international market and the number of transactions has increased by an order of magnitude.}
This diagram shows the use of an Assumption (constraint) that can be connected to an element to show some assumed condition. Constraints can be written informally in text or more formally in a language such as the Object Constraint Language (OCL).
BookStore Database

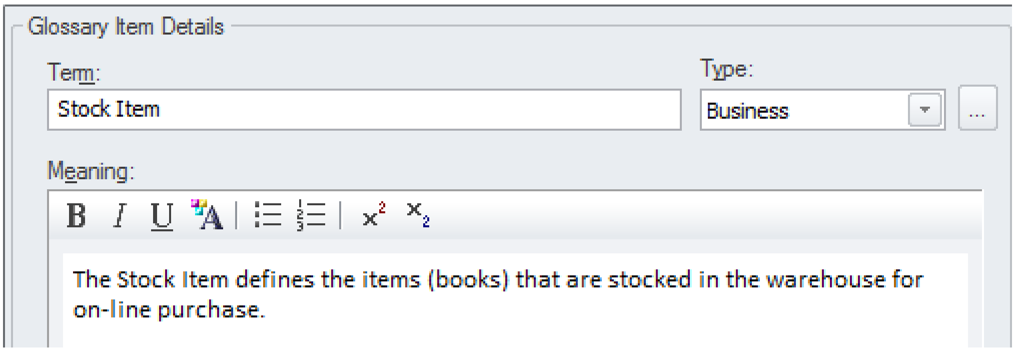
Technical Constraints

A technical constraint is any restriction on the choices that can be made for the architecture, design, implementation or deployment of the solution. They can start with principles defined in the enterprise architecture that restrict the types of platform, programming language and decision to buy or build part of the solution. They could also be restrictions on the type of protocol or standard that the solution must implement or comply with. Restrictions on file sizes and formats can also place limitations on the solution choices.

There is some overlap with non-functional requirements and the analyst should be careful to separate the two notions. Technical constraints can be modeled in Enterprise Architect using a Constraint element available from the 'Common' Toolbox page or as a stereotyped Requirements element. They can be related to one or more model elements using a Dependency relationship. Constraints can also be created as a property of an element using the **Properties window**.

Create a Glossary

One of the fundamental precepts of requirements engineering is to promote understanding and convergence of thought and to remove ambiguity. It is quite common for members on a project team to have quite disparate understanding of domain concepts. This can be easily rectified by creating a **Project Glossary** early in the project and ensuring the glossary is accessible to the project team. Enterprise Architect has a built in Glossary that allows the requirements analyst to define terms and meanings, and to create categories (types) of terms.



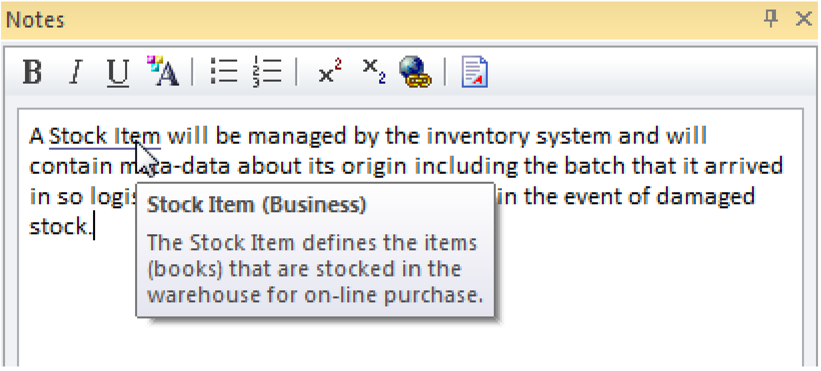
Term: Stock Item

Type: Business

Meaning:

The Stock Item defines the items (books) that are stocked in the warehouse for on-line purchase.

One of the features that makes the glossary powerful is the ability to link from text fields such as element notes to terms in the Glossary, and a rollover in the text displays the meaning.



A Stock Item will be managed by the inventory system and will contain m[...]a-data about its origin including the batch that it arrived in so logi[...] in the event of damaged stock.

Stock Item (Business)

The Stock Item defines the items (books) that are stocked in the warehouse for on-line purchase.

Notes

Experienced modelers tend to define the terms of a domain in a Domain Model and reserve the glossary for project and process terms and their definitions such as Use Case, Software Requirements Specification, Metric etc. This allows relationships between domain terms to be defined and data elements (Attributes) can be added including datatypes creating a more expressive representation than would be possible in the Glossary.

Create a Domain Model

Requirements analysis will reveal a number of business terms that must be defined if the requirements are to be understood and clarified. There are a number of options for recording these terms, including the **Project Glossary**, which is a purpose built lexicon through which you can list, define and categorize terms. The Domain Model (business object model) is another powerful mechanism for describing the important terms of the business, providing a single definition of the terms and their relationships that is accessible to all project staff, from high level business managers to low level engineers. One of the advantages of using a Domain Model is that the terms are modeled as elements, allowing them to be linked to other elements within the Domain Model itself or to elements in other parts of the models.

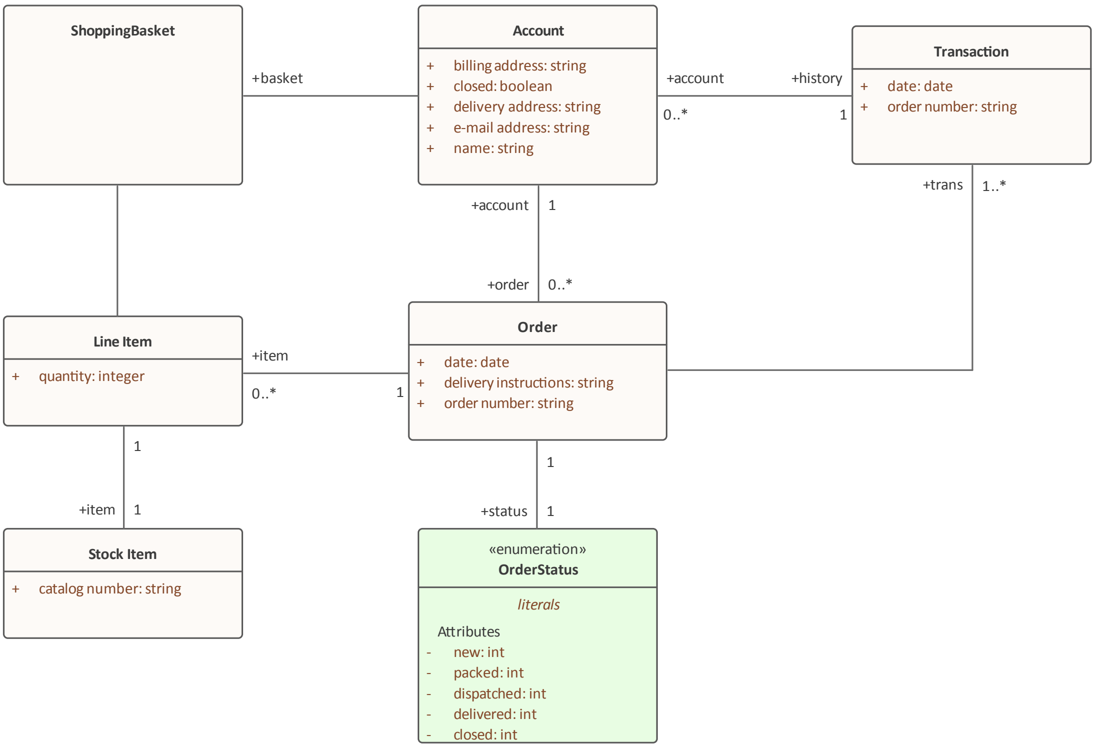
Enterprise Architect has extensive support for modeling a domain using a **UML Class** diagram, or the Classes can be created directly in the **Browser window** and displayed in a list using the **Package List window**.

Domain Model

The Domain Model is a powerful mechanism for recording and defining business terms that are identified during Requirements analysis. It provides a single definition of the terms and their relationships, that can be referenced from anywhere within the model.

One of the advantages of using a domain model is that the terms are modeled as Class elements, allowing them to be linked to other elements within the domain model itself or to elements in other parts of the model. They can be used on any number of diagrams, and they can be displayed as a list, using the Package List window.

It is also possible to create hyperlinks within the Notes text of Requirements elements, that link directly to relevant domain elements.



The Domain Model elements can be added to other diagrams to make them more expressive and to show important information, such as what data is being consumed or produced by a business process, or what data is being passed between application interfaces.

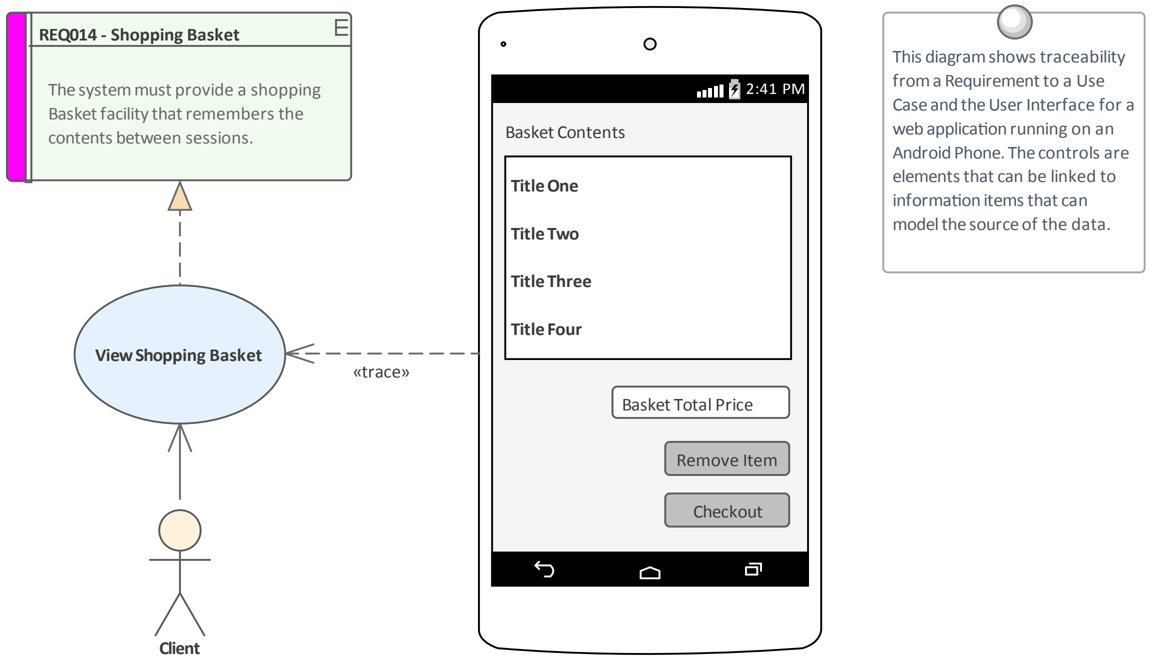
Enterprise Architect allows you to link to the domain elements (or any element) from the text of a requirement's notes. (This facility is available from any element.)

Notes

Experienced modelers tend to define the terms of a domain in a Domain Model and reserve the Glossary for project and process terms and their definitions such as Use Case, Software Requirements Specification, Metric etc.

Model the User Interface

The User Interface for a system can be modeled in a variety of ways depending on whether the interface is for the Web or for Win32 applications or for Web Applications targeting mobile devices.



This diagram shows traceability from a Requirement to a Use Case and the User Interface for a web application running on an Android Phone. The controls are elements that can be linked to information items that can model the source of the data.

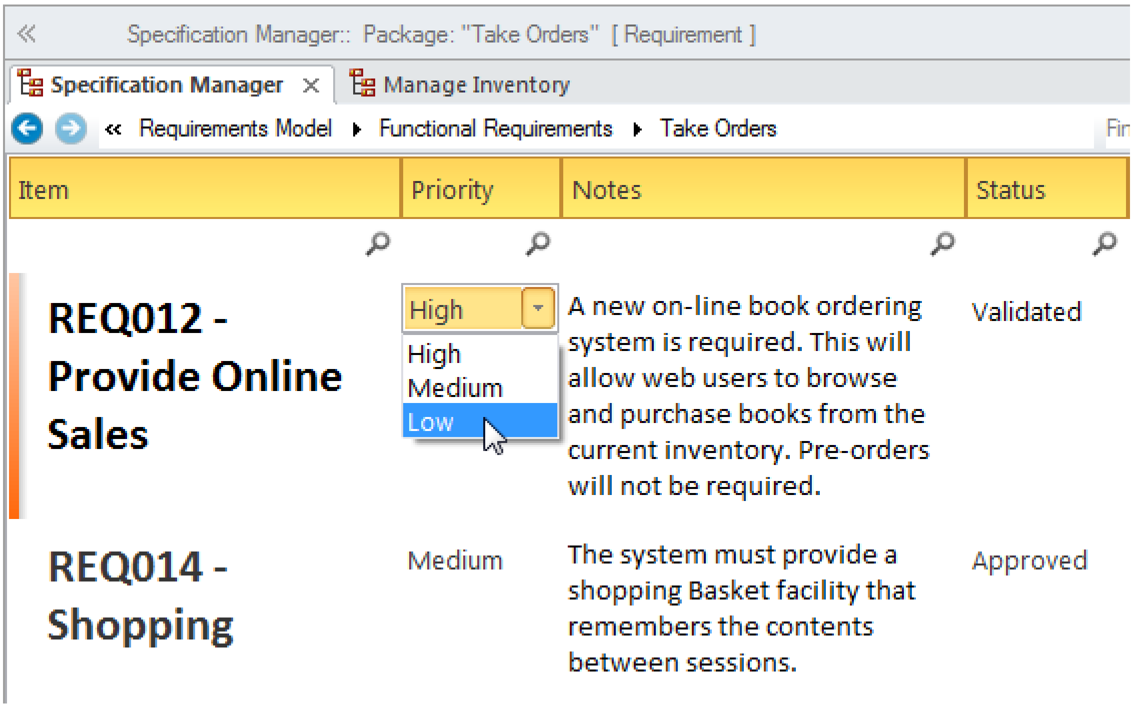
Prioritize the Requirements

Prioritization of requirements is imperative to the success of a project as it ensures that analysis, development, testing and implementation resources are focused on the most critical aspects of the system. Prioritization is a decision process that allocates a priority to the each requirement, the most common criteria for the categorization is business value. Business value is typically determined by the cost-benefit analysis of the value the implemented requirement will produce for the organization or its customers. Other factors might be policy or regulatory compliance, urgency, business or technical risk and the likelihood of success.

Changing the Priority Collaboratively

The process of selecting criteria and assigning priority is typically collaborative, and is often done in a workshop with stakeholders or their representatives debating the categorization. In previous eras this was a laborious and difficult process, but Enterprise Architect has some powerful features for working with requirement properties, including priority. There are a number of windows that support working with the requirements in a list and editing the priority in-line, automatically filtering or sorting the list of requirements based on the newly assigned priority, including the Package List and the **Diagram List**. The

Specification Manager is a useful tool for this purpose and provides a text based interface where the requirements and their notes can be viewed and priorities can be selected from a drop down list. The interface also displays a number of other useful properties that are typically useful for prioritization, such as Status and Complexity.

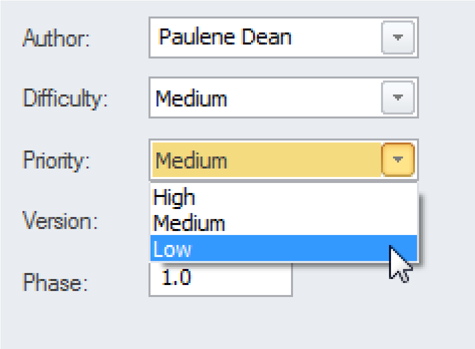


Specification Manager:: Package: "Take Orders" [Requirement]
Specification Manager
Manage Inventory
« Requirements Model ▸ Functional Requirements ▸ Take Orders
Fir
High
Medium
Low

Item	Priority	Notes	Status
REQ012 - Provide Online Sales	High	A new on-line book ordering system is required. This will allow web users to browse and purchase books from the current inventory. Pre-orders will not be required.	Validated
REQ014 - Shopping	Medium	The system must provide a shopping Basket facility that remembers the contents between sessions.	Approved

Requirement Priority Property

A wide range of criteria can be used for prioritization, and each organization and project will typically use some type of weighted average to determine the priority. Enterprise Architect has flexible and complete support for requirement prioritization, as each element has a built in 'Priority' property that can be set to indicate its priority, by selecting the appropriate value from a drop down list.



Author: Paulene Dean

Difficulty: Medium

Priority: Medium

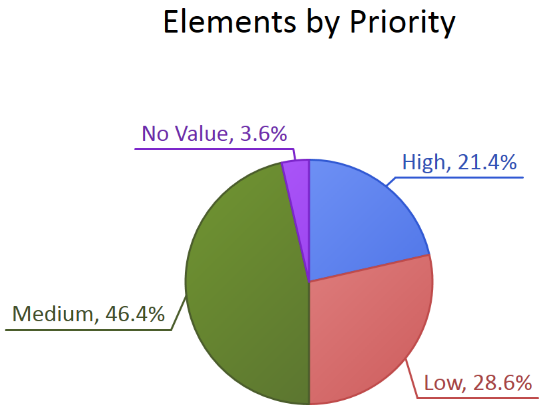
Version:

Phase: 1.0

The list of priorities is conveniently pre-loaded when you install Enterprise Architect, but these values can be edited or completely revised to suit your organization or project. They can even be imported as reference data from a previous project or, if the current project was created based on a template, the organization's priorities could be pre-loaded from the base model.

Dashboard Diagams

Enterprise Architect has a series of dashboard diagrams that can be used to create a compelling view of the Priority of requirements in a Package with the option to include sub-Packages. There are a number of pre-configured charts that can be used to display the ratio of Priority values for Requirements in a part of the model. Filters add another level of user configuration allowing a modeler to, for example, exclude requirements of a particular Status or ensure only requirements for the current phase are displayed.



This diagram shows a Pie Chart element depicting element priorities for all the Requirements in a selected Package. It provides a useful summary for a Requirements Manager and is dynamically updated when the priority changes and the diagram is reopened. A range of other pre-defined Charts and user-defined Charts can also be added. A filter has been added to exclude all elements other than Requirements.

Extension for Setting Priority

When there is a large number of Requirements and the basis for the prioritization has been well defined, a script or **Add-In** could be developed that could assign the Priority automatically based on a specified algorithm. Additional properties such as business value could be assigned using Tagged Values, and any Requirements that did not have the requisite properties set could be written to a log or presented as a search result list. The script or Add-In could be used on multiple project,s giving a consistent and unbiased result.

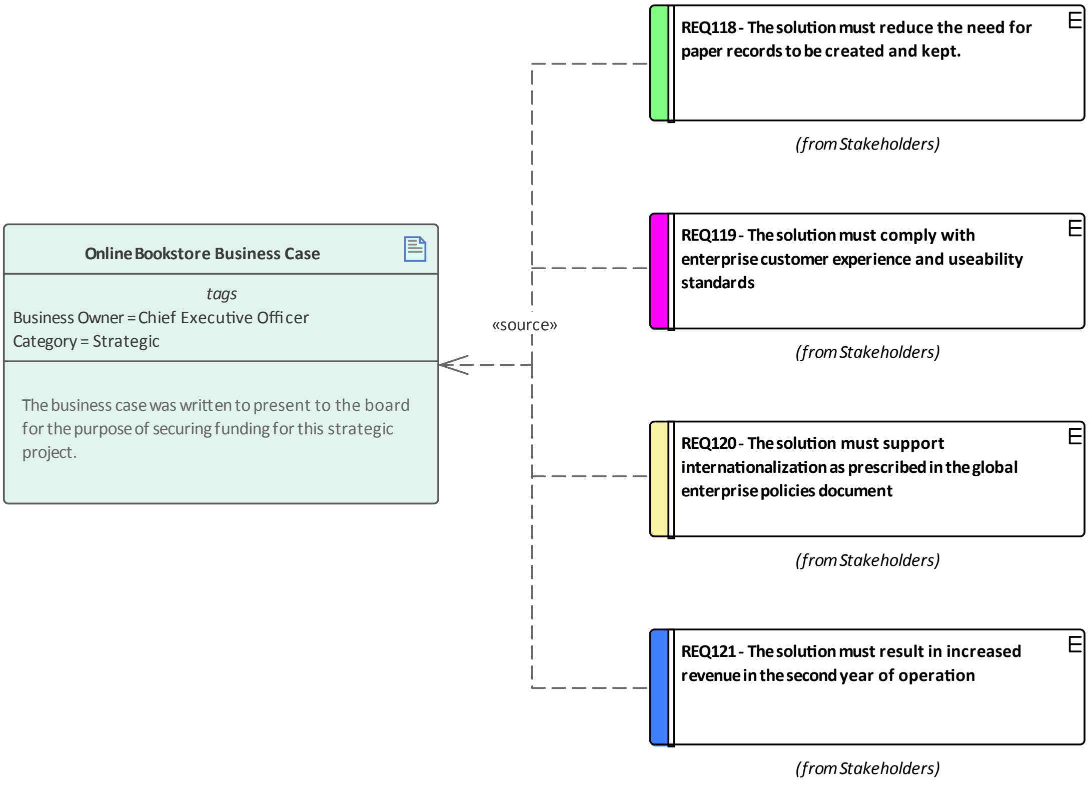
Specification

Requirements are typically derived from a wide range of sources, and there are often a number of requirements analysts working on a project. This will tend to make the Requirements disparate. Ensuring the Requirements are consistent and of high quality is critical to the success of a project.

Requirements Sources

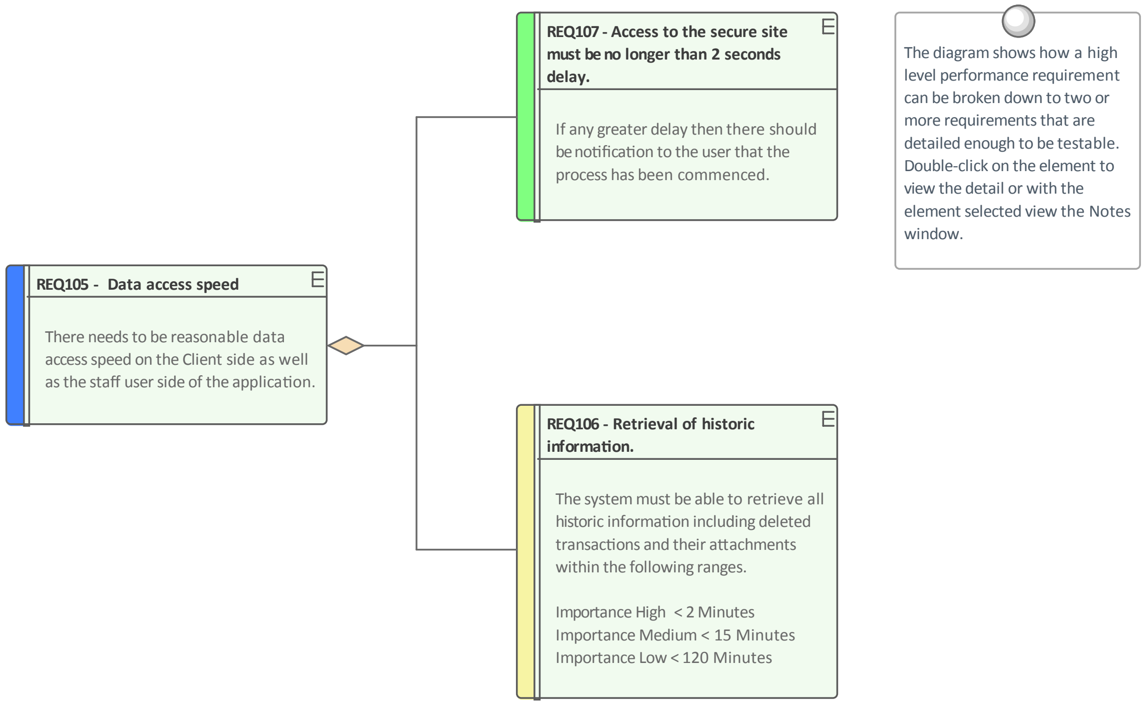
This diagram shows an external document, "Online Bookstore Business Case", modeled as an artifact. Requirements have been linked back to this artifact, to indicate that the source of the requirement is this document. If the document is subsequently updated, the requirements derived from it are easily located. The Business Case document artifact has a number of Tagged Values indicating properties of the document.

Hyperlinks to external documents can be created by simply dragging and dropping a document file onto a diagram canvas.


REQ118 - The solution must reduce the need for paper records to be created and kept.
E
(from Stakeholders)
REQ119 - The solution must comply with enterprise customer experience and useability standards
E
(from Stakeholders)
Online Bookstore Business Case
tags
Business Owner = Chief Executive Officer
Category = Strategic
The business case was written to present to the board for the purpose of securing funding for this strategic project.
«source»
REQ120 - The solution must support internationalization as prescribed in the global enterprise policies document
E
(from Stakeholders)
REQ121 - The solution must result in increased revenue in the second year of operation
E
(from Stakeholders)

Specify Quality Attributes

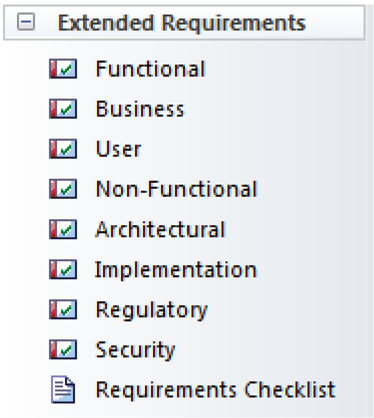
Non Functional Requirements and Quality Attributes are important inputs into the Architecture of a system and provide the criteria that define what the stakeholder's expectations are about how well the system will operate. Regardless of how well the Functional Requirements have been defined and implemented, if the Quality Attributes aren't built into the architecture and implemented the system is unlikely to be satisfactory to its stakeholders and users.


REQ107 - Access to the secure site must be no longer than 2 seconds delay.
If any greater delay then there should be notification to the user that the process has been commenced.
REQ105 - Data access speed
There needs to be reasonable data access speed on the Client side as well as the staff user side of the application.
REQ106 - Retrieval of historic information.
The system must be able to retrieve all historic information including deleted transactions and their attachments within the following ranges.
Importance High < 2 Minutes
Importance Medium < 15 Minutes
Importance Low < 120 Minutes

The diagram shows how a high level performance requirement can be broken down to two or more requirements that are detailed enough to be testable. Double-click on the element to view the detail or with the element selected view the Notes window.

Adding Non Functional Requirements

Enterprise Architect conveniently has a number of Requirements such as the Non Functional, Architecture, Implementation and Security Requirement types available from the 'Extended Requirements' page of the Requirements Toolbox. These can be dragged onto a diagram or created directly in the **Browser window** or **Specification Manager**.

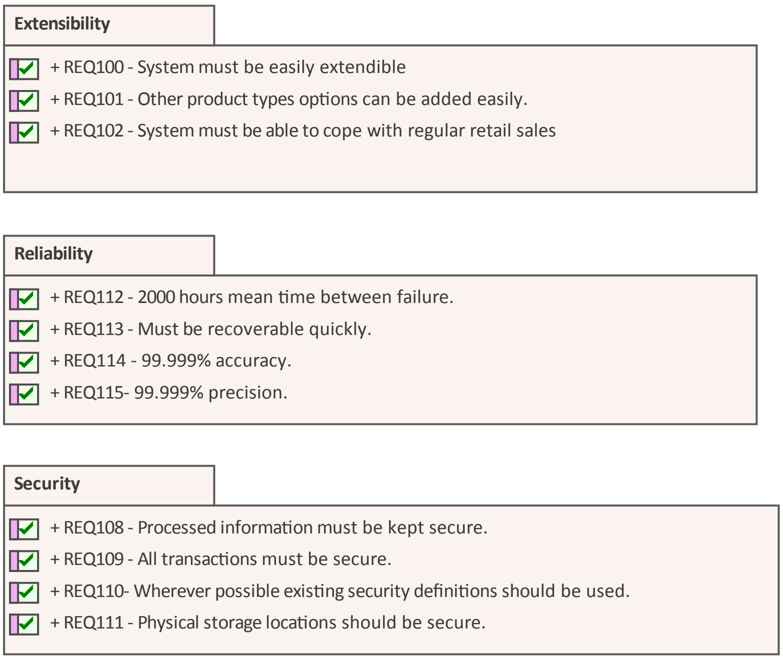


Requirements Packages

Quality Attributes are often grouped into sets, such as those pertaining to security or performance, or one of the '-ilities' such as Reliability. A requirements Package can be used to group these elements together which provides a convenient categorization for reporting. The Packages can be seen in the **Browser window** and can also be added to a diagram with the option to display the individual Requirements inside the Package.

Non-Functional Requirements

The Non Functional Requirements have been defined using a number of separate packages. The packages can then be displayed on a diagram, showing the Requirements they contain.



Extensibility

- ☑ + REQ100 - System must be easily extendible
- ☑ + REQ101 - Other product types options can be added easily.
- ☑ + REQ102 - System must be able to cope with regular retail sales

Reliability

- ☑ + REQ112 - 2000 hours mean time between failure.
- ☑ + REQ113 - Must be recoverable quickly.
- ☑ + REQ114 - 99.999% accuracy.
- ☑ + REQ115- 99.999% precision.

Security

- ☑ + REQ108 - Processed information must be kept secure.
- ☑ + REQ109 - All transactions must be secure.
- ☑ + REQ110- Wherever possible existing security definitions should be used.
- ☑ + REQ111 - Physical storage locations should be secure.

Requirement Sources

Much of the literature on requirements development talks of 'gathering' requirements, which implies that the analyst is walking through an orchard picking low hanging fruit. In practice the process is quite the opposite and the requirement analyst needs to have all the skills and tenacity of a detective to discover the sources of requirements. The requirement sources and the documents and artifacts that are discovered are first class citizens and can be modeled in Enterprise Architect to provide a register of the requirement sources. This is a list of common requirements sources:

- Interviews with users and other stakeholders
- Observations of users performing tasks
- Business Case or Proposal
- Concept of Operation or Vision document
- Procedure manuals and user task lists
- Enhancement Requests for the existing system
- Marketing material and product definitions
- Analysis of a market leader or competitor's products

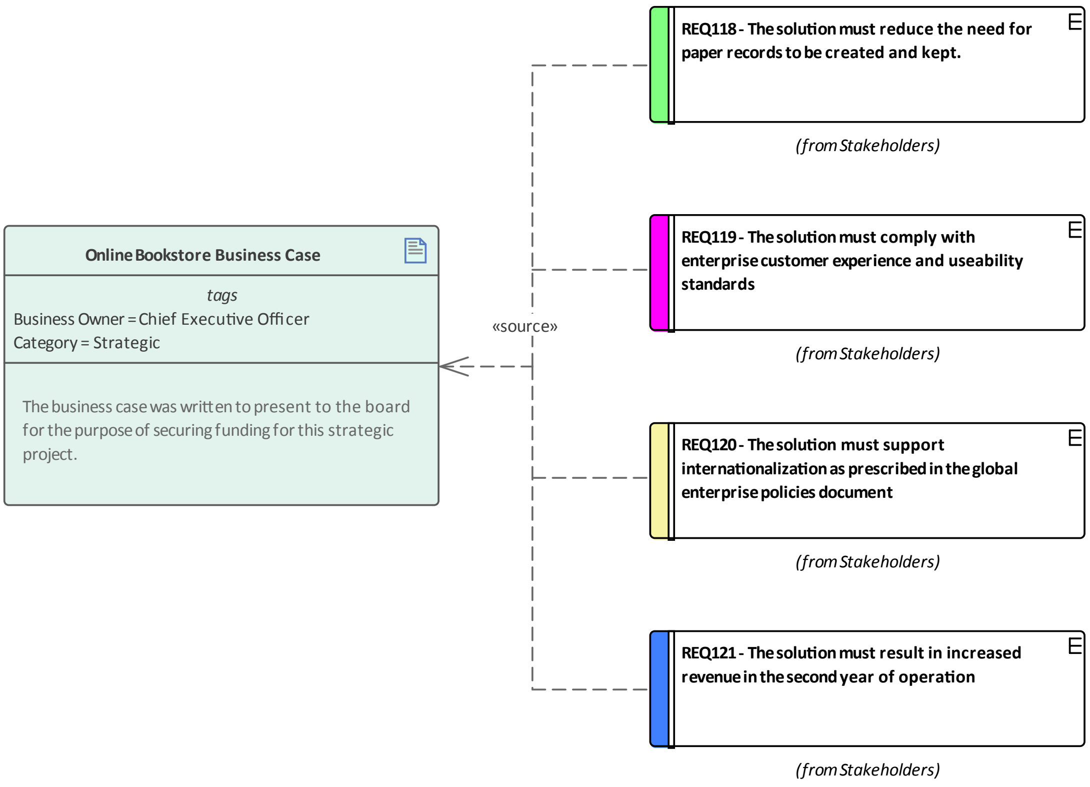
Modeling Requirement Sources

Requirement sources are typically documents or other file based artifacts and are best modeled as UML Artifacts using Tagged Values to add metadata to the element to record such information as its type, location, who it is governed by and any other relevant properties. The document and files will typically be stored in a variety of places across an organizations networks, but so long as there is a file path or a URL they can be opened from within Enterprise Architect by a single key stroke. The artifact will be opened either inside or outside Enterprise Architect using the appropriate editor for the file type.

Requirements Sources

This diagram shows an external document, "Online Bookstore Business Case", modeled as an artifact. Requirements have been linked back to this artifact, to indicate that the source of the requirement is this document. If the document is subsequently updated, the requirements derived from it are easily located. The Business Case document artifact has a number of Tagged Values indicating properties of the document.

Hyperlinks to external documents can be created by simply dragging and dropping a document file onto a diagram canvas.



Online Bookstore Business Case

tags
Business Owner = Chief Executive Officer
Category = Strategic

The business case was written to present to the board for the purpose of securing funding for this strategic project.

REQ118 - The solution must reduce the need for paper records to be created and kept.

(from Stakeholders)

REQ119 - The solution must comply with enterprise customer experience and useability standards

(from Stakeholders)

REQ120 - The solution must support internationalization as prescribed in the global enterprise policies document

(from Stakeholders)

REQ121 - The solution must result in increased revenue in the second year of operation

(from Stakeholders)

Creating artifacts to model requirement sources

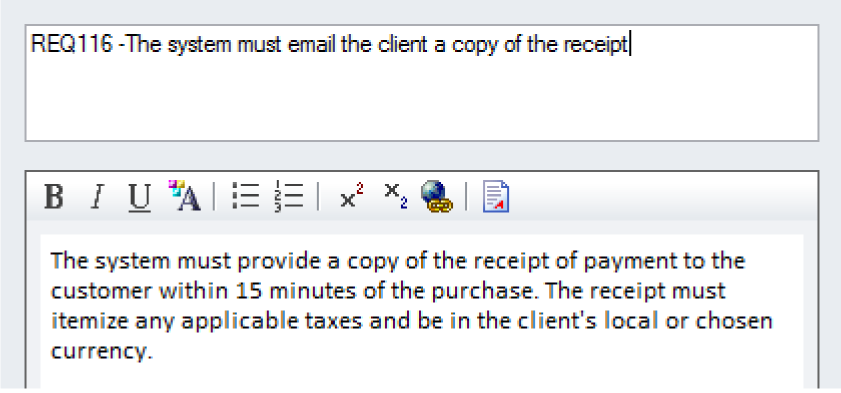
Step	Action
1	Ensure you have a diagram open that will be the canvas where you will create the elements. Open a file system browser such as MS Windows Explorer and drag-and-drop the file to the diagram canvas. A window will be displayed.
2	Select Artifact (External) from the window. Enterprise Architect will add a new Artifact to the diagram and prompt you to enter a name.
3	Enter an appropriate name for the requirement source or leave blank to use the file name for the element name.

Elaborate the Requirements

Once the information that acts as a precursor for the Requirements has been analyzed and the Requirements have been created in Enterprise Architect they must be elaborated with properties and additional information to make them meaningful to the stakeholders who own them and the implementation teams that will use them to design and build the required system.

Setting Requirement Properties

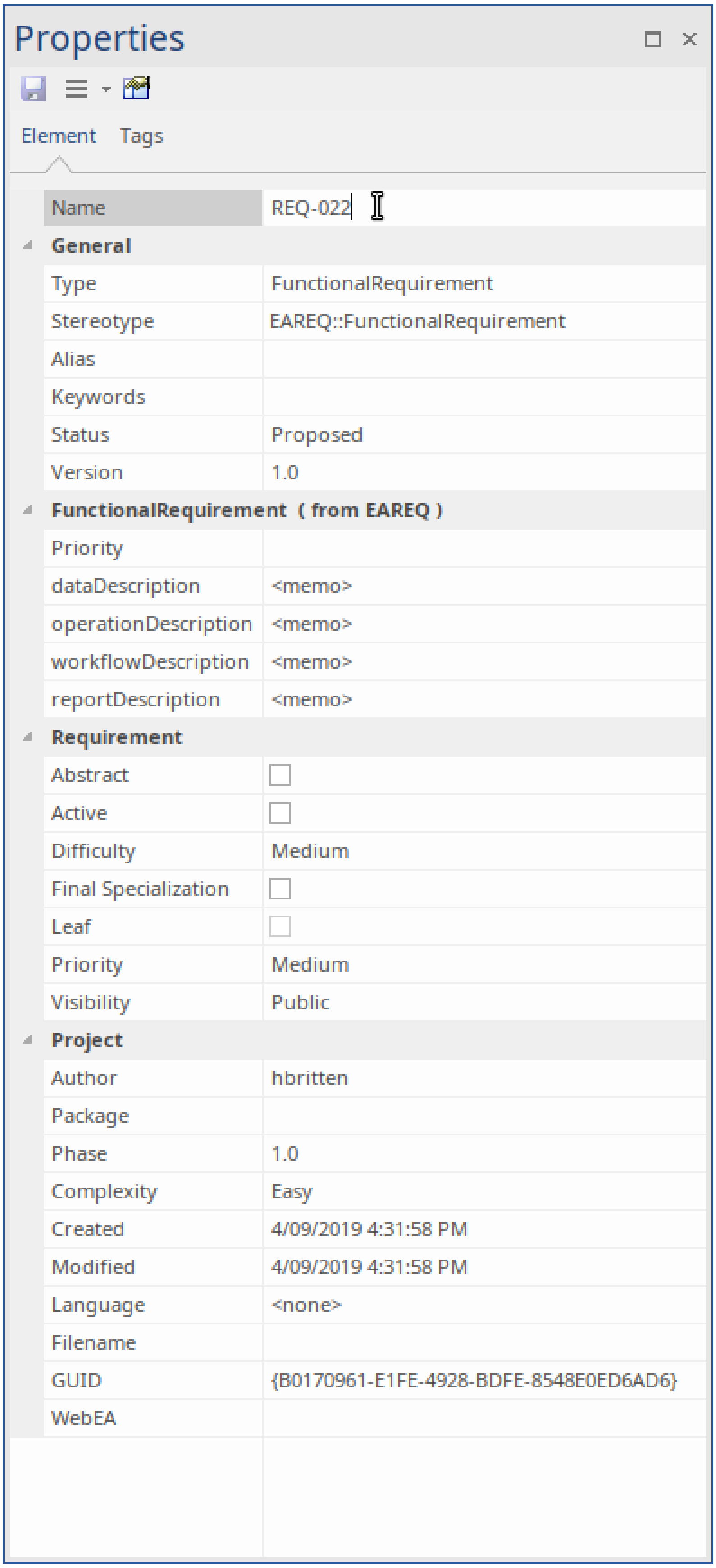
When Requirement elements are created they will be given a name, but will often benefit from having additional information recorded about the requirement that will add clarification and details needed by the Stakeholders or the implantation team. These details can be entered into the 'Notes' field for the element.



REQ116 -The system must email the client a copy of the receipt

The system must provide a copy of the receipt of payment to the customer within 15 minutes of the purchase. The receipt must itemize any applicable taxes and be in the client's local or chosen currency.

In addition there are a number of built-in properties that can be set for each Requirement, the most important of which are listed in this table; other user-defined properties can be added using Tagged Values.



Name	REQ-022
General	
Type	FunctionalRequirement
Stereotype	EAREQ::FunctionalRequirement
Alias	
Keywords	
Status	Proposed
Version	1.0
FunctionalRequirement (from EAREQ)	
Priority	
dataDescription	<memo>
operationDescription	<memo>
workflowDescription	<memo>
reportDescription	<memo>
Requirement	
Abstract	□
Active	□
Difficulty	Medium
Final Specialization	□
Leaf	□
Priority	Medium
Visibility	Public
Project	
Author	hbritten
Package	
Phase	1.0
Complexity	Easy
Created	4/09/2019 4:31:58 PM
Modified	4/09/2019 4:31:58 PM
Language	<none>
Filename	
GUID	{B0170961-E1FE-4928-BDFE-8548E0ED6AD6}
WebEA	

Important Requirement properties

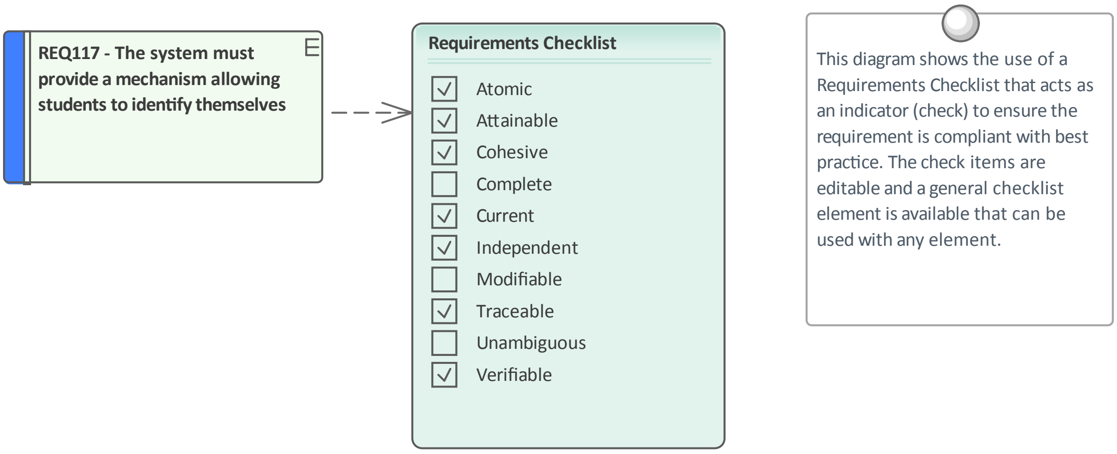
Property	Description
Status	The Status is used to record the condition of the Requirement; the modeler can select it from a drop-down list of predefined values. Setting the Status helps project managers and others involved in planning determine if a Requirement is ready to be included in a development Package of work or iteration.
Alias	The Alias can be used to record a sequence number or identifier for the Requirement. A modeler can choose to display the Alias in a number of locations including diagrams and reports.
Priority	The Priority is used to set the precedence or relative importance of a Requirement; the modeler can select it from a drop-down list of predefined values. Setting the Priority helps project managers and others involved in planning to determine those Requirements that

	should take precedence over others for implementation.
Difficulty	The Difficulty is a measure that attempts to describe the relative effort that would be required to realize the Requirement in a system implementation. The modeler can select a value from a drop-down list of predefined values. Setting the Difficulty helps project managers and others involved in planning determine the effort needed to implement the Requirement.
Phase	The Phase is a value that can be set to indicate the stage of development at which the Requirement will be implemented. The modeler can enter any value into this field. Setting the Phase helps project managers and others involved in planning determine which Package of work or iteration the Requirement should be included in.

Validation

Requirements validation is necessary to make sure the Requirements are of a high standard, suitably define the Customer's problem (or opportunity) and are sufficient for the implementation teams to design and implement the product. It is imperative that the requirements have the desired level of quality and are complete and necessary. There are a number of ways that Requirements can be validated, but probably the two most common ways are to perform team reviews and to assign test cases to the requirements.

The team reviews are typically conducted by team members or other analysts who have some familiarity with the domain, but were not themselves responsible for the requirements development or management. Enterprise Architect has a powerful tool to assist with this process, called the **Team Library**, which works across the entire model and allows reviewers to record their findings in discussion documents and to reference model elements. There is also a Requirements Checklist element available from the 'Extended Requirements' page of the Requirements Toolbox, which provides a useful mechanism for checking the quality of Requirements.



REQ117 - The system must provide a mechanism allowing students to identify themselves

Requirements Checklist

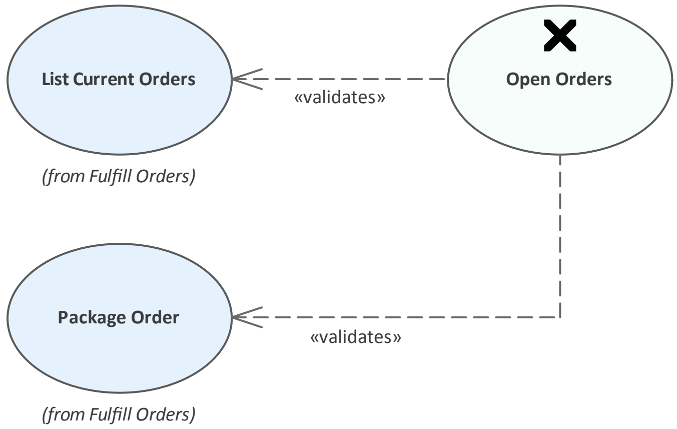
☑ Atomic
☑ Attainable
☑ Cohesive
☐ Complete
☑ Current
☑ Independent
☐ Modifiable
☑ Traceable
☐ Unambiguous
☑ Verifiable

This diagram shows the use of a Requirements Checklist that acts as an indicator (check) to ensure the requirement is compliant with best practice. The check items are editable and a general checklist element is available that can be used with any element.

Test Cases can be defined at a number of levels from User Acceptance tests down to Unit tests. Defining the test cases early in the requirements development process creates a double check on the Requirements, because when test cases are defined issues with the Requirements are often uncovered. Enterprise Architect has a number of facilities to define test cases and a modeler can select whichever is the most appropriate for the endeavor.

Derive Test Cases

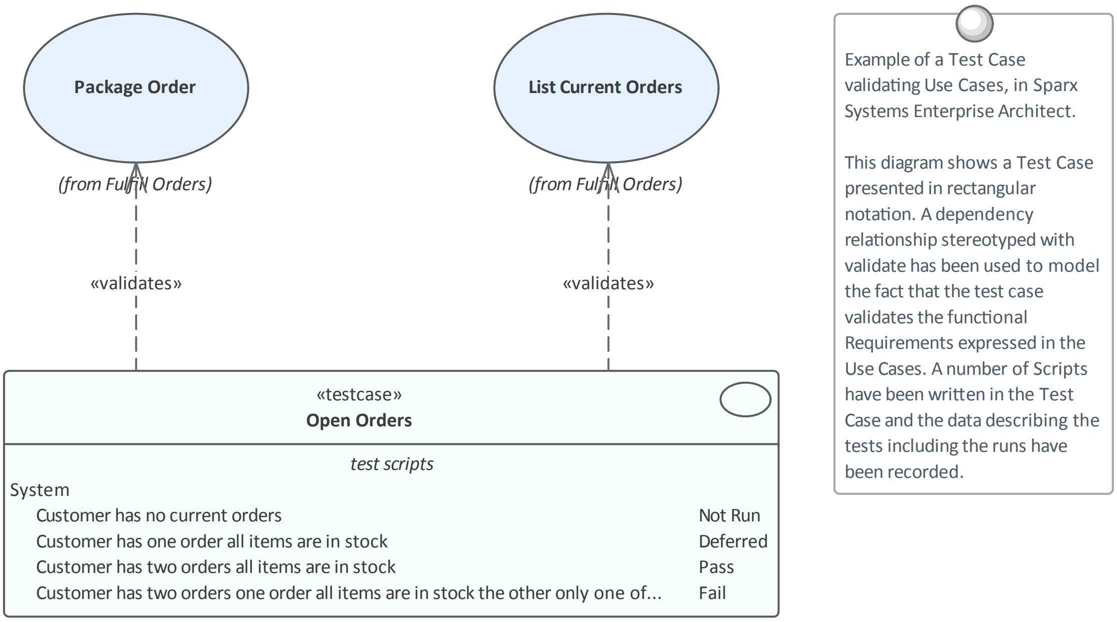
The definition of Test Cases acts as a double check on the quality of Requirements as test designer bring their own unique and often orthogonal view of the requirements. Best practice suggests that the testing team should be independent and isolated from the requirements team thus providing a fresh set of eyes on the Requirements. It is quite common for one Test Case to test a number of requirements or for a Requirement to be tested by one or more Test Cases. These relationships can be modeled in Enterprise Architect using the Test Case element which can have detailed test scripts defined.



Detailing the Test Cases

Any element in Enterprise Architect can have tests defined, which can be one of a number of types - such as Load, Regression or Standard - and from one of a number of classes of test - such as User Acceptance, System and Unit.

The details of the tests, including when they were run and the status of the test indicating whether it passed or failed, can be recorded.


Package Order
List Current Orders
(from Fulfill Orders)
(from Fulfill Orders)
«validates»
«validates»
«testcase»
Open Orders
test scripts
System
Customer has no current orders
Not Run
Customer has one order all items are in stock
Deferred
Customer has two orders all items are in stock
Pass
Customer has two orders one order all items are in stock the other only one of...
Fail

Example of a Test Case validating Use Cases, in Sparx Systems Enterprise Architect.

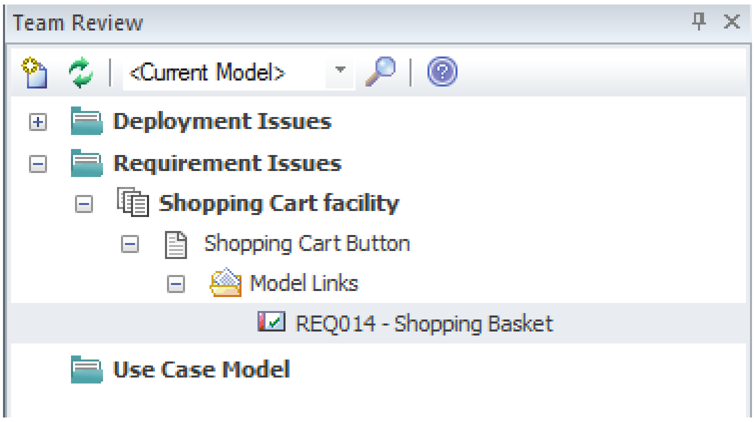
This diagram shows a Test Case presented in rectangular notation. A dependency relationship stereotyped with validate has been used to model the fact that the test case validates the functional Requirements expressed in the Use Cases. A number of Scripts have been written in the Test Case and the data describing the tests including the runs have been recorded.

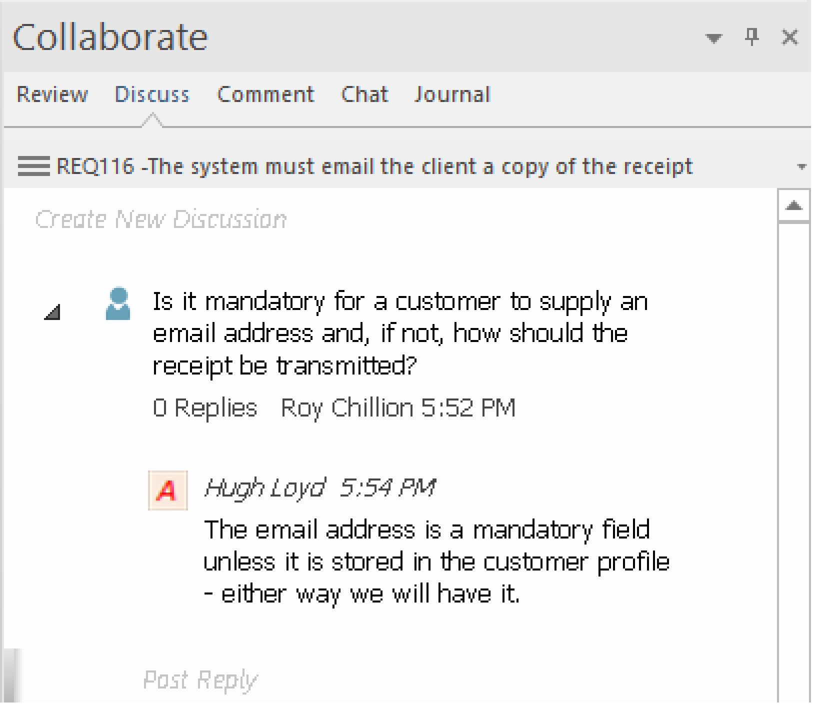
Review Requirements

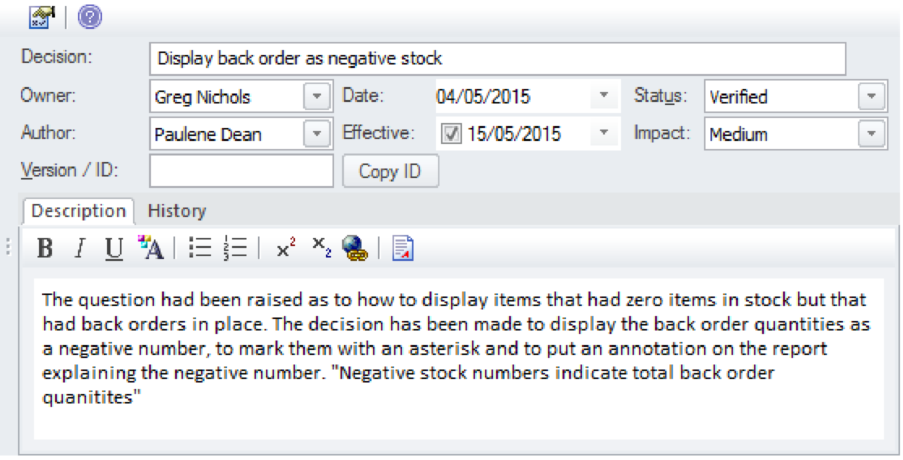
Requirements are typically discovered and written by a variety of team members, and are commonly sourced from a variety of documents and stakeholders at disparate times. All of these factors lead to a tendency for the Requirements to lack quality, be inconsistent and to contain issues. Best practice encourages early and continuous reviews of Requirements to detect and remove defects before the Requirements reach the design and implementation teams. Enterprise Architect provides sophisticated tools for reviewing Requirements including the **Team Library** tool, **Discussions**, and Maintenance items.

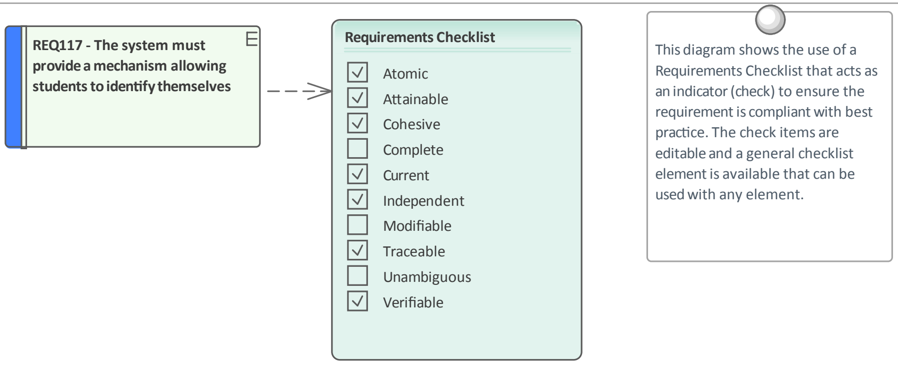
Requirement Review Tools

Review Tool	Description
Team Library	The **Team Library** is a powerful tool that allows team members to collaborate and review the contents of the repository. It is particularly useful with requirements validation as it allows a set of requirements to be discussed and reviewed. Each review could be set up as a category and then different types of review could be set up as topics, with posts being used to enter review items.

	Model elements can be added to a post, allowing - for example - a post to report two or more conflicting requirements. Team members would have the chance to post replies and view the linked elements. Statuses can be applied to indicate the progress through a workflow. The Team Library tool can be used in conjunction with the **Collaborate window** (where individual elements are managed) and the **Discussions window** (which contains a composite list of all element discussions in the repository).  Team Review <Current Model> Deployment Issues Requirement Issues Shopping Cart facility Shopping Cart Button Model Links REQ014 - Shopping Basket Use Case Model
Discussions	During the progress of a Requirements Review there will inevitably be ambiguities, issues and defects detected. Before these are entered against the Requirement as maintenance items, it is common for analysts conducting the review to want to discuss these items with team members or stakeholders. The **Collaborate window** is a useful place to

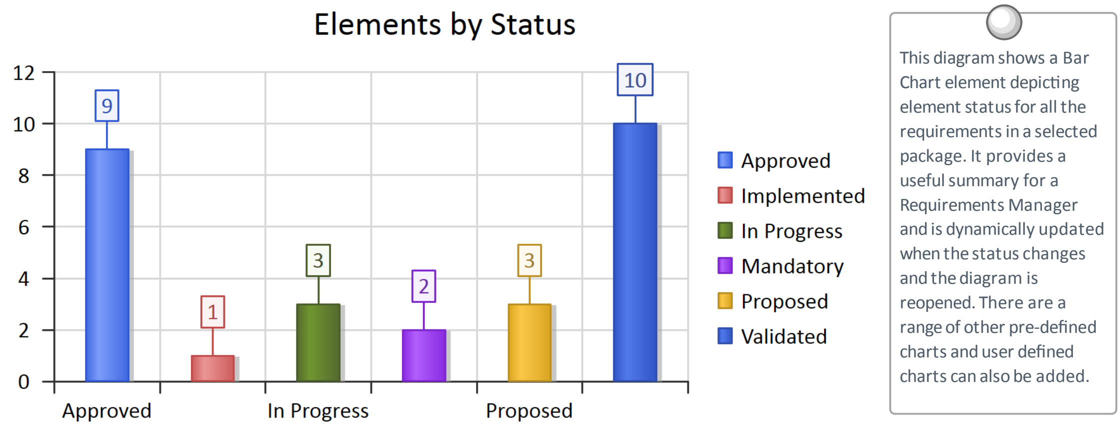
	record this information, allowing other team members to post replies. This is a particularly powerful facility because in many requirement tools these discussions are typically written in the text of the element, making it difficult to produce customer-ready documentation until they are all removed. It is quite common for modelers to enter discussions even outside a formal review and these will assist the reviewers to resolve Requirement defects or issues.  Collaborate Review Discuss Comment Chat Journal Create New Discussion Post Reply REQ116 -The system must email the client a copy of the receipt Is it mandatory for a customer to supply an email address and, if not, how should the receipt be transmitted? 0 Replies Roy Chillion 5:52 PM Hugh Loyd 5:54 PM The email address is a mandatory field unless it is stored in the customer profile - either way we will have it.
Element Maintenance Items	As Requirements are developed Changes will inevitable occur, Issues will be raised, Events will happen, Defects will be found, Tasks will need to be assigned and Decisions will need to be made.

	Enterprise Architect has a useful set of facilities to manage these items through the Project Maintenance facility. There is a window tab for each of these maintenance items where details of the item such as its Name, Description, Author, Completion Date and more can be assigned.  Decision: Display back order as negative stock Owner: Greg Nichols Date: 04/05/2015 Status: Verified Author: Paulene Dean Effective: ☑ 15/05/2015 Impact: Medium Version / ID: The question had been raised as to how to display items that had zero items in stock but that had back orders in place. The decision has been made to display the back order quantities as a negative number, to mark them with an asterisk and to put an annotation on the report explaining the negative number. "Negative stock numbers indicate total back order quanitites"
Requirement Checklist	Enterprise Architect has a convenient Requirements Checklist element available from the 'Extended Requirements' page of the Requirements Toolbox. This is a convenient way of recording visually whether a Requirement is of high quality and is a useful mechanism for team reviews.

	 REQ117 - The system must provide a mechanism allowing students to identify themselves **Requirements Checklist** ☑ Atomic ☑ Attainable ☑ Cohesive ☐ Complete ☑ Current ☑ Independent ☐ Modifiable ☑ Traceable ☐ Unambiguous ☑ Verifiable This diagram shows the use of a Requirements Checklist that acts as an indicator (check) to ensure the requirement is compliant with best practice. The check items are editable and a general checklist element is available that can be used with any element.

Requirement Management

This consists of the activities to maintain a set of requirements that represent an accord or agreement between the project team and the customer. It also involves ensuring that the requirements are acceptable to the design and implementation teams and that they are sufficient so that what they specify can be implemented into working business, software or hardware systems. Enterprise Architect is a sophisticated platform for managing requirements, and regardless of the domain, the size of the project or the method being followed, there are tools that will make it straightforward to manage even large repositories of requirements in complex projects.



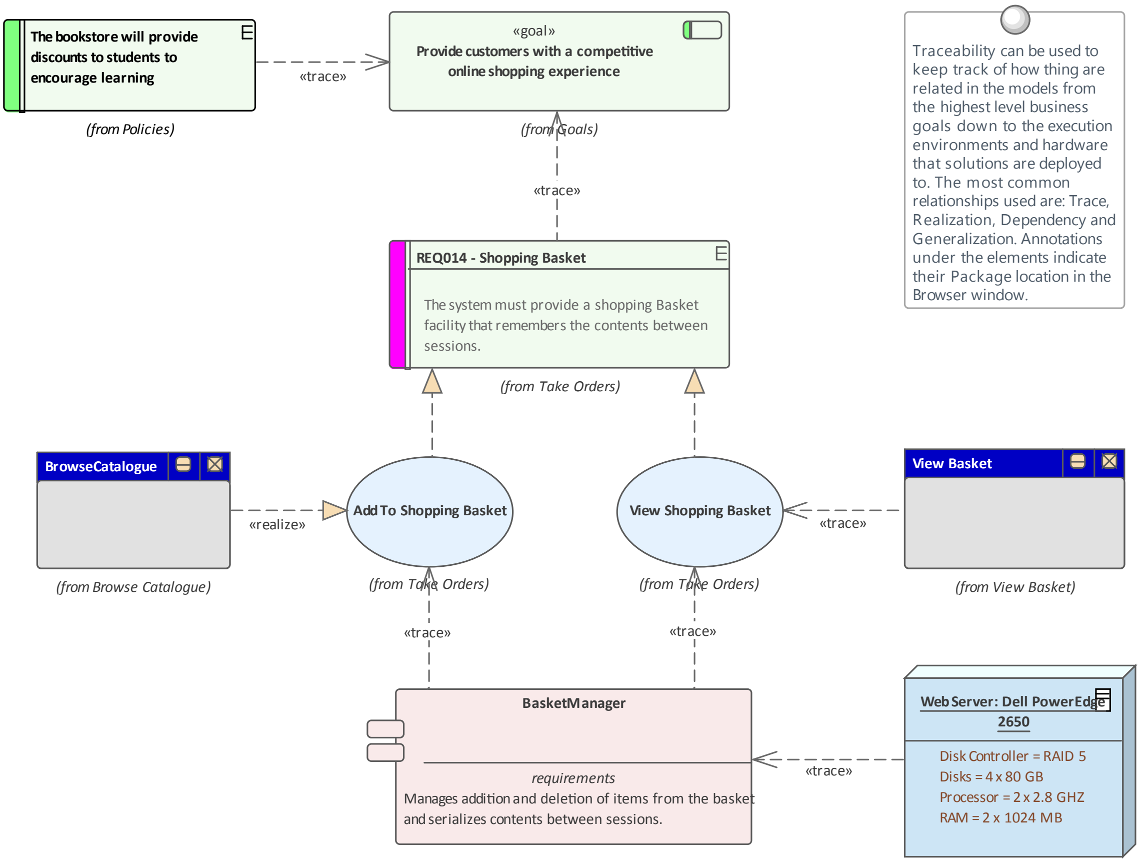
This diagram shows a Bar Chart element depicting element status for all the requirements in a selected package. It provides a useful summary for a Requirements Manager and is dynamically updated when the status changes and the diagram is reopened. There are a range of other pre-defined charts and user defined charts can also be added.

Tracing Requirements

Most Requirement processes mandate that Requirements are traced from high level concepts such as Business Drivers, Visions and Goals down to the parts of Components that implement them. For many projects this is an intractable problem because much of the information lives in a set of heterogeneous tools such as word processor documents, spreadsheets, diagram tools, corporate presentation tools and more. Some Project Managers attempt to solve the problem by creating a spreadsheet that acts as a register of all the disparate information but the management of this file takes up considerable project resources and the file is almost impossible to keep up to date. With Enterprise Architect there is the ability to model all of this project information in the one tool and to create easy-to-maintain and analyzable traces between all the elements, from the organization's mission statement right down to the level of programming code, if required.

Visualizing Traces in diagrams

Regardless of whether you have entered the project's Requirements using a diagram, using a text-based tool such as the **Specification Manager**, or by importing them from another tool, viewing the requirement traces in a diagram gives an easily understood view of their relationships. The diagrams can be created easily by dragging and dropping elements from the **Browser window**, or automatically by using the '**Insert Related Elements**' option. This function can be configured and used to draw a graph of elements to any depth, and can be restricted to selected types of element and connector. It is a powerful productivity tool in a team environment, and even modelers with deep knowledge of the domain and the repository are surprised at the connections that are displayed in the diagrams.



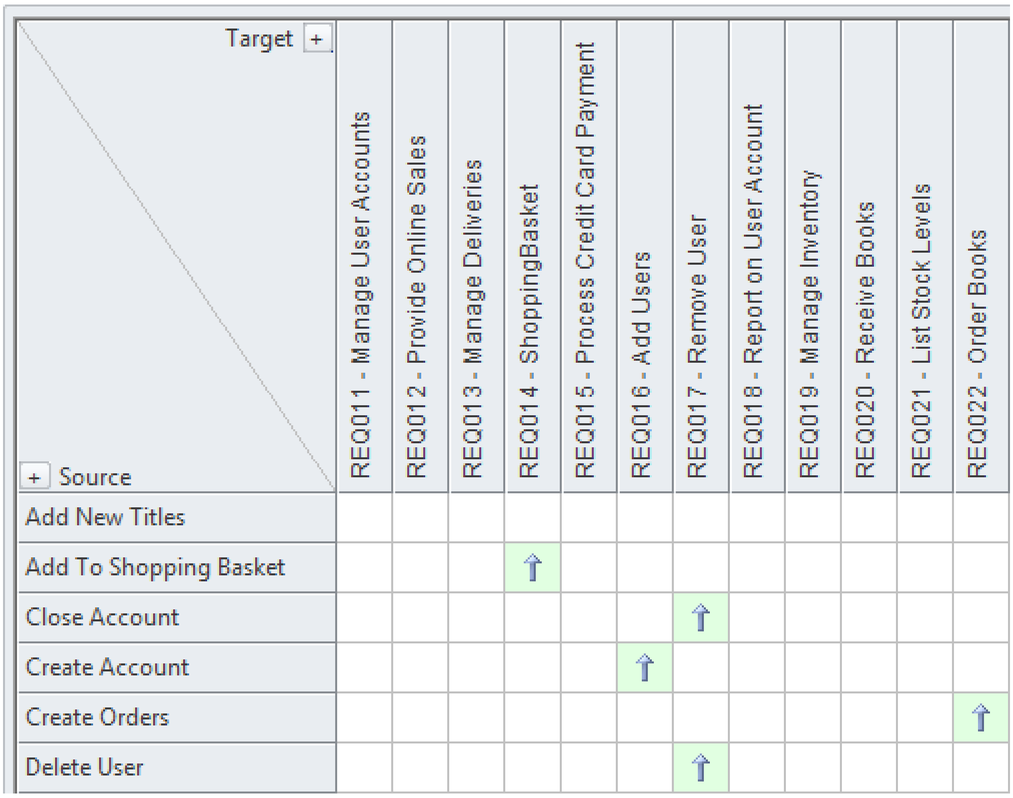
The system must provide a shopping Basket facility that remembers the contents between sessions.

Manages addition and deletion of items from the basket and serializes contents between sessions.

Traceability can be used to keep track of how thing are related in the models from the highest level business goals down to the execution environments and hardware that solutions are deployed to. The most common relationships used are: Trace, Realization, Dependency and Generalization. Annotations under the elements indicate their Package location in the Browser window.

Visualizing Traces using the Relationship Matrix

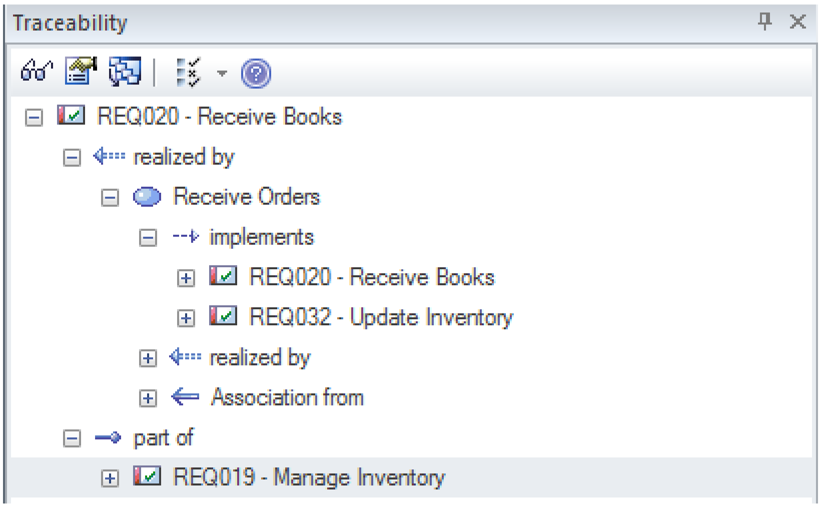
The **Relationship Matrix** is a powerful tool that provides an alternative way of visualizing the relationships between Requirements and other elements, or even between different levels or types of Requirement. It is quite common for some stakeholders to prefer a spreadsheet-like view of the Requirements and their relationships, and the Relationship Matrix provides an excellent way of presenting the relationships without resorting to a diagram. In Use Case driven requirements methods, Use Cases are said to realize one or more Requirements, and these relationships can be displayed visually in the Relationship Matrix. The list of Use Cases would appear on one axis of the matrix and the Requirements would be listed on the other axis. A marker in the intersection of a row and column would display if a relationship exists, indicating that a particular Use Case realizes a Requirement. Relationships between elements can be created or deleted using the Relationship Matrix, and the Matrix can be saved and reopened at any time or saved to a CSV file so it could be opened in a spreadsheet. Documentation can also be created that includes the Relationship Matrix, providing a powerful communication tool for people who do not have access to the model.



Target Source	REQ011 - Manage User Accounts	REQ012 - Provide Online Sales	REQ013 - Manage Deliveries	REQ014 - ShoppingBasket	REQ015 - Process Credit Card Payment	REQ016 - Add Users	REQ017 - Remove User	REQ018 - Report on User Account	REQ019 - Manage Inventory	REQ020 - Receive Books	REQ021 - List Stock Levels	REQ022 - Order Books
Add New Titles												
Add To Shopping Basket				↑								
Close Account							↑					
Create Account						↑						
Create Orders												↑
Delete User							↑					

Visualizing Traces using the Traceability Window

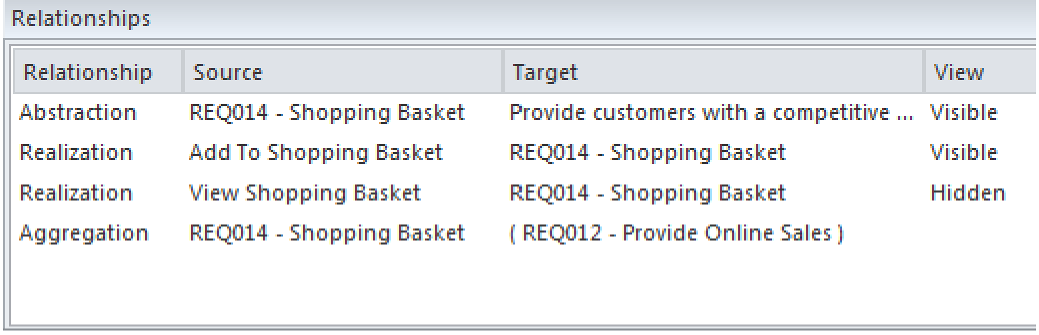
While diagrams and the **Relationship Matrix** allow modelers to view traces between requirement elements it is possible that the creators of these views of the repository have deliberately omitted elements from the view. For example a diagram does not need to show all the requirements owned by a particular stakeholder. The **Traceability window** will, however, present a complete and unabridged view of the relationships between elements. The element relationships will be displayed regardless of the location of the elements in the **Browser window**.



```
⊟ REQ020 - Receive Books
    ⊟ realized by
        ⊟ Receive Orders
            ⊟ implements
                ⊞ REQ020 - Receive Books
                ⊞ REQ032 - Update Inventory
            ⊞ realized by
            ⊞ Association from
    ⊟ part of
        ⊞ REQ019 - Manage Inventory
```

Visualizing Traces using the Relationships Window

Modelers often choose to hide one or more relationships on a diagram for the purpose of making the diagram simpler to understand or to hide detail. The Relationships window is a useful window to have open as it will display all the relationships that exist between the elements in the diagram indicating whether they are visible or hidden in the diagram.



Relationship	Source	Target	View
Abstraction	REQ014 - Shopping Basket	Provide customers with a competitive ...	Visible
Realization	Add To Shopping Basket	REQ014 - Shopping Basket	Visible
Realization	View Shopping Basket	REQ014 - Shopping Basket	Hidden
Aggregation	REQ014 - Shopping Basket	(REQ012 - Provide Online Sales)	

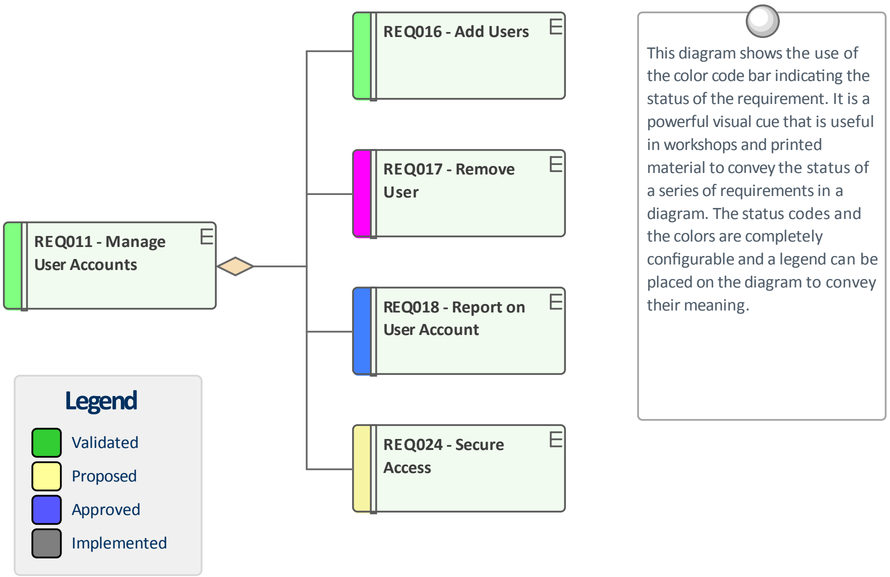
If relationships have been hidden in a diagram they can be made visible by selecting the 'Show Relationships' option on the 'Connectors' page of the 'Properties' dialog for the diagram.

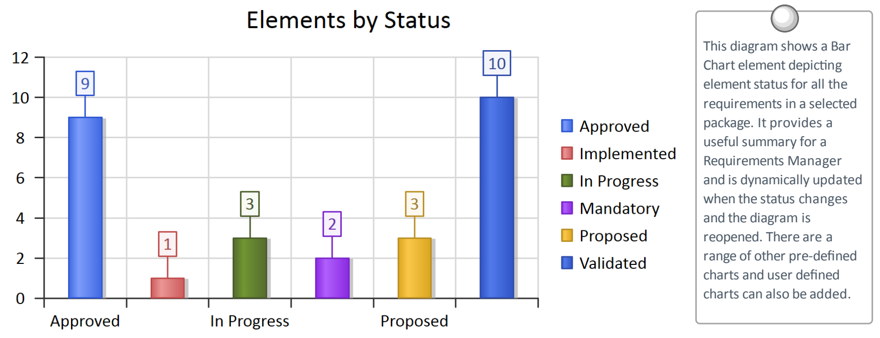
Tracking Requirements

The status of a requirement is a fundamental indicator of where it is positioned in the requirement's development process. For example requirements that have a status of 'Proposed' indicate that they are not yet ready and available for development work to begin. Enterprise Architect has a variety of tools to allow status to be tracked, analyzed and managed, starting with the fact that each requirement can be assigned a status and the list of status codes are completely configurable. The status is conveniently displayed in list views of the requirements including when using the **Specification Manager**. There are also a set of pre-defined and extensible dashboard charts and graphs that can be used to get a compelling visual representation of the status and other properties of requirements.

Tools for tracking requirements

Tool	Description
Status Codes	Status codes are a controlled list of statuses that can be applied to any element including Requirements. Enterprise Architect comes with a pre-defined list of codes but the list can be configured and codes in the list can be changed and deleted and new codes can

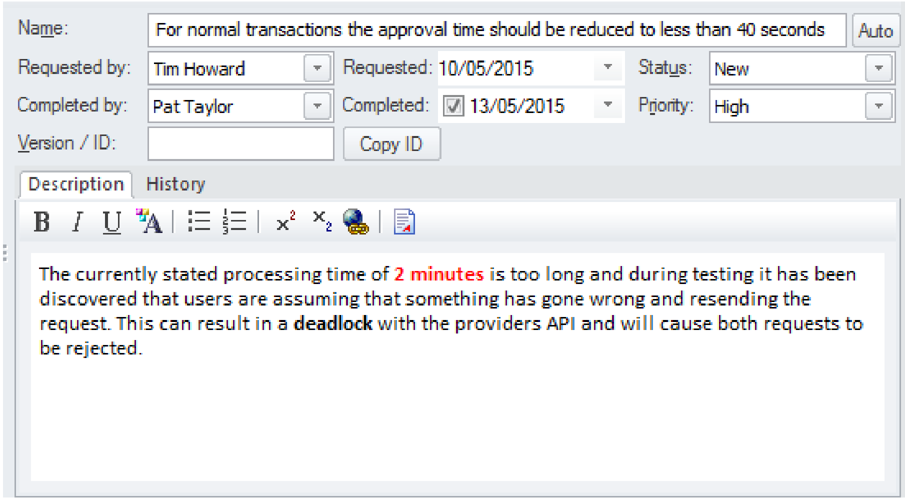
	be added. The status of Requirements can be displayed in a diagram as a color coded band on the side of the element.  REQ016 - Add Users REQ017 - Remove User REQ011 - Manage User Accounts REQ018 - Report on User Account REQ024 - Secure Access Legend Validated Proposed Approved Implemented This diagram shows the use of the color code bar indicating the status of the requirement. It is a powerful visual cue that is useful in workshops and printed material to convey the status of a series of requirements in a diagram. The status codes and the colors are completely configurable and a legend can be placed on the diagram to convey their meaning.
Dashboards charts and graphs	Dashboard diagrams are an extended diagram type and allow high quality charts and graphs to be created to display repository information in a visually compelling way. Any number of diagrams and charts can be created and the data can be sourced from any level in the repository Package hierarchy. Enterprise Architect comes with a toolbox page of pre-configured charts and graphs, but new charts can be created based on any information in the repository.

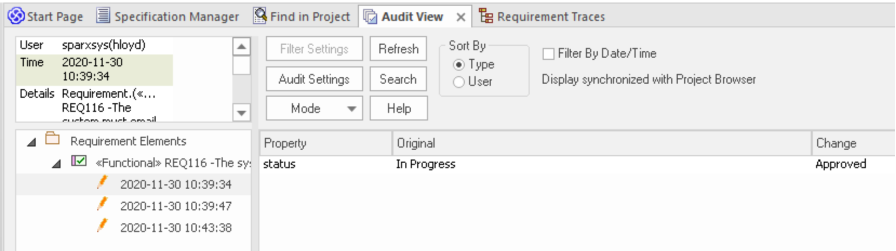
	 This diagram shows a Bar Chart element depicting element status for all the requirements in a selected package. It provides a useful summary for a Requirements Manager and is dynamically updated when the status changes and the diagram is reopened. There are a range of other pre-defined charts and user defined charts can also be added.

Managing Changing Requirements

It is inevitable that requirements will change during the specification and solution phases of a project, and most requirements management processes have some type of mechanisms for embracing these changes. Typically, a set of requirements will have been specified and groomed for the solution teams to implement; any subsequent changes are specified as Change Requests. Regardless of the rigor of the process being used, inadvertent changes will occur that need to be managed along with the Change Requests. Enterprise Architect is a sophisticated requirements management platform, with a range of tools to assist the requirements manager. Change Requests can be managed in the **Maintenance window**, which allows the requested change to be recorded and described, along with whoever requested it and when it was done and whoever completed the change. Inadvertent changes can be discovered and analyzed using a number of tool features, including **Auditing**, **Baselines** and **Version Control**; these tools have some overlapping features and can be used in isolation or together. The built-in Security system will also assist in preventing inadvertent changes to models, by allowing modelers to intentionally lock Packages and elements in the model.

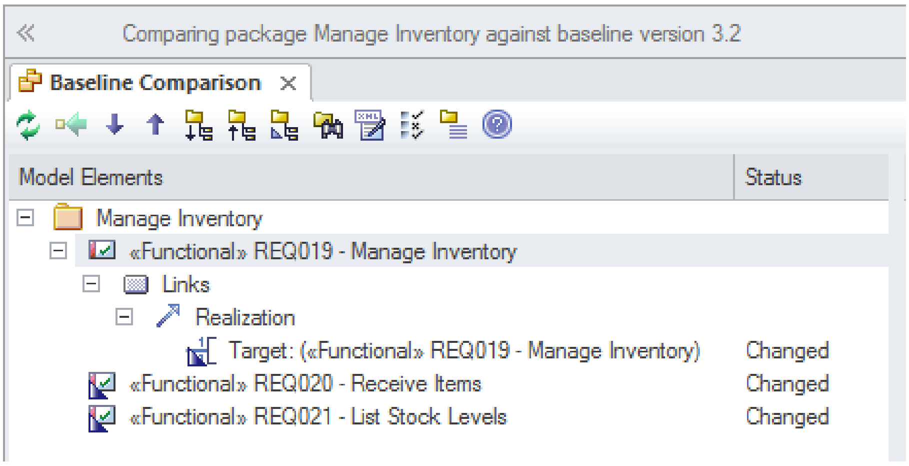
Mechanisms for managing changing requirements

Mechanism	Description
Element change task and effort items	Changes to requirements can happen inadvertently but it is more common for there to be an intentional change in response to a wide variety of factors such as Stakeholders revising their needs, the business changing or a problem being poorly understood. Inadvertent changes can be picked up using a number of tools but deliberate changes can be assigned using the Change item, which can be recorded against each element. Once the impact of the change has been analyzed Tasks can be created to specify what needs to be done to implement the change and Effort can be assigned using the Requirements Effort item.  Name: For normal transactions the approval time should be reduced to less than 40 seconds Requested by: Tim Howard Requested: 10/05/2015 Status: New Completed by: Pat Taylor Completed: ☑ 13/05/2015 Priority: High Version / ID: The currently stated processing time of 2 minutes is too long and during testing it has been discovered that users are assuming that something has gone wrong and resending the request. This can result in a **deadlock** with the providers API and will cause both requests to be rejected.
Auditing	**Auditing** is a built-in tool that, when

	enabled, automatically records changes to the repository. It has a number of different modes and views, and can be configured to assist in the management of Requirements. It can track what was changed in the model, who made the change and when it was made, showing the before and after views. So if the text of a Requirement was updated or its status was changed, this would be recorded. Auditing functionality overlaps with the Baseline tool, but unlike the Baseline tool the changes are being recorded automatically and every discreet change is recorded. In contrast, the Baseline tool will only compare the current model to a Baseline regardless of how many intervening changes had been made. Auditing will not assist with the impact of the changes but just what changes have occurred. Once the changes have been established, tools such as the **Relationship Matrix** can be used to determine the impact.  Start Page Specification Manager Find in Project Audit View Requirement Traces Filter Settings Refresh Audit Settings Search Mode Help User sparxsys(hloyd) Time 2020-11-30 10:39:34 Details Requirement.(«... REQ116 -The custom must email Sort By ● Type ○ User □ Filter By Date/Time Display synchronized with Project Browser Requirement Elements «Functional» REQ116 -The sy: 2020-11-30 10:39:34 2020-11-30 10:39:47 2020-11-30 10:43:38 Property / Original / Change status / In Progress / Approved

Version Control	**Version Control** can be implemented in Enterprise Architect to manage changes and revisions to any Package including Requirements Packages. Once implemented changes to Requirements will be recorded and a requirements analyst will be able to view previous version and roll back to these versions if required. There is some overlap between this tool feature and **Auditing** and **Baselines**. The difference between this facility and Auditing is that Auditing simply records the changes but does not allow you to revert to a previous version. The difference between Version Control and Baselines is that a modeler must intentionally create a baseline whereas with Version Control the changes are being recorded automatically in the background. Also with Baselines the intervening changes are not recorded, just the difference between the current requirement and the one captured in the Baseline.
Baselines	**Baselines** provide a powerful mechanism for managing changes to Requirements. Any number of baselines can be created and when requirements are changed these changed requirements can be compared

to one of the baselines. Baselines are typically created at important milestones in a project such as after a stakeholder meeting or before a development iteration is commenced. When differences are found and these changes were not intended or contravene project management practice the requirements from the baseline can be restored to the current model. Baselines will not help with assessing the impact of a change but once a change has been identified tools such as the **Relationship Matrix** and element traces can be used to determine the impact of a change.



Comparing package Manage Inventory against baseline version 3.2

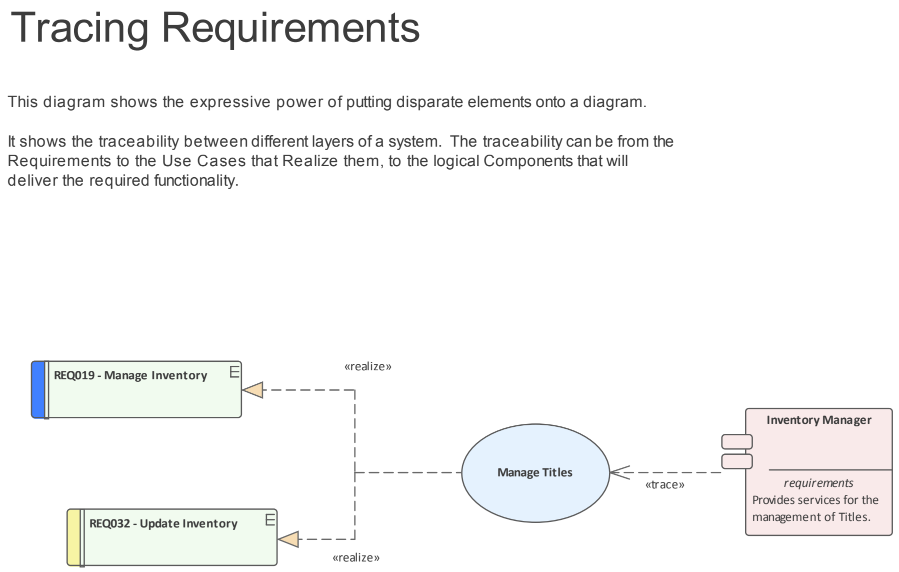
Model Elements	Status
Manage Inventory	
«Functional» REQ019 - Manage Inventory	
Links	
Realization	
Target: («Functional» REQ019 - Manage Inventory)	Changed
«Functional» REQ020 - Receive Items	Changed
«Functional» REQ021 - List Stock Levels	Changed

Impact Analysis of Changes

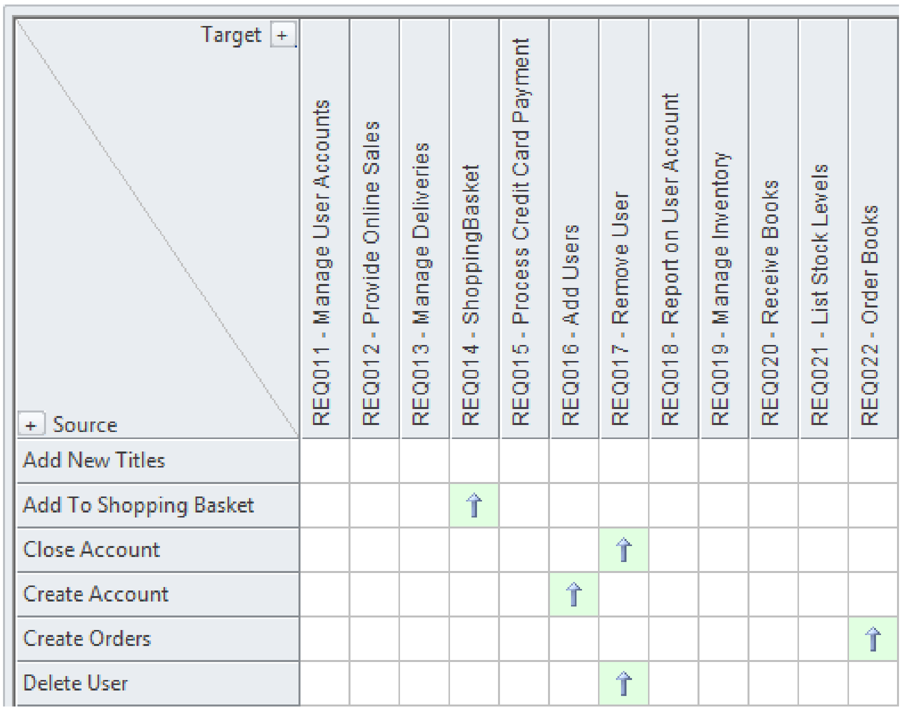
When the development of a system has started and requirements change there will be an impact of the change and the effect will need to be determined, understood and managed. Having traceability established both to up-process elements such as Stakeholders and Business Drivers and down-process elements such as Use Cases, Components, Test Cases and source code operations is critical to determining the impact of the change. Enterprise Architect has a number of facilities that can assist with this including the ability to visualize traces in diagrams, a powerful **Relationship Matrix**, a **Traceability window**, element Change, Task and Effort items that can be used to record impact and what is required to implement it.

Tools to record and analyze the impact of change

Tool	Description
Analysis using requirement traces	The ability to visualize requirements and the way they are connected to other elements is a powerful tool for analyzing the impact of change. Requirements often form a hierarchy and when one requirement is affected it typically has a

	ripple effect to the requirement's children and being able to visualize this in a diagram or in a hierarch is very useful. Requirements are also typically traced to up-process and down process elements and a diagram provides a way of viewing and analyzing these connections. The **Insert Related Elements** function can discover these connections and automatically draw and layout a diagram allowing the modeler to spend their time analyzing the impact.  Tracing Requirements This diagram shows the expressive power of putting disparate elements onto a diagram. It shows the traceability between different layers of a system. The traceability can be from the Requirements to the Use Cases that Realize them, to the logical Components that will deliver the required functionality. REQ019 - Manage Inventory «realize» Manage Titles «trace» Inventory Manager requirements Provides services for the management of Titles. REQ032 - Update Inventory «realize»
Analysis using a relationship matrix	The **Relationship Matrix** can be used to visualize the requirements and their connections by placing the Requirement on one axis of the matrix and the connected elements on the other. This method is very useful in workshops when working with people who might not be

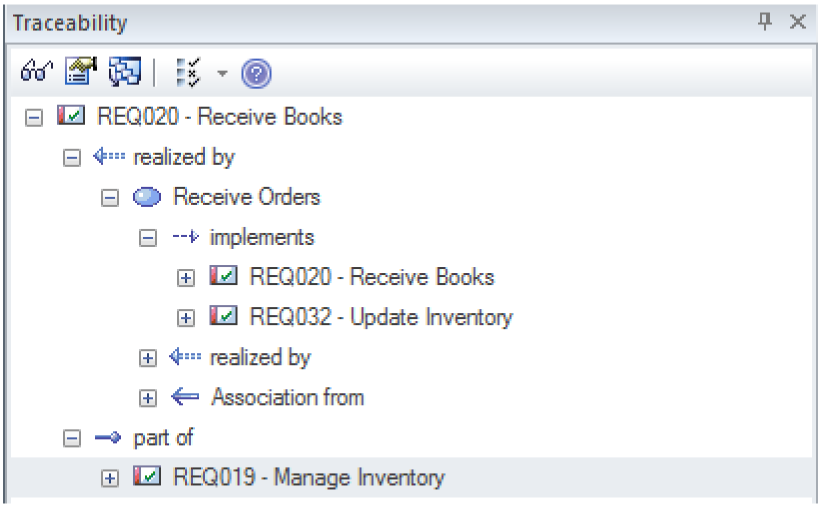
familiar with modeling languages such as UML or who work better with spreadsheet types of view. Any number of matrices can be created and their specification can be stored so they can easily be recalled.



Target + / + Source	REQ011 - Manage User Accounts	REQ012 - Provide Online Sales	REQ013 - Manage Deliveries	REQ014 - ShoppingBasket	REQ015 - Process Credit Card Payment	REQ016 - Add Users	REQ017 - Remove User	REQ018 - Report on User Account	REQ019 - Manage Inventory	REQ020 - Receive Books	REQ021 - List Stock Levels	REQ022 - Order Books
Add New Titles												
Add To Shopping Basket				↑								
Close Account							↑					
Create Account						↑						
Create Orders												↑
Delete User							↑					

Analysis using the traceability window

The **Traceability window** is a powerful window that shows the hierarchy of elements in the Repository. It is particularly useful because it unconditionally shows how elements are related to each other. Other views of the repository could be configured just to display particular elements for the purpose of communicating an idea whereas the Traceability window will display all relationship that an element

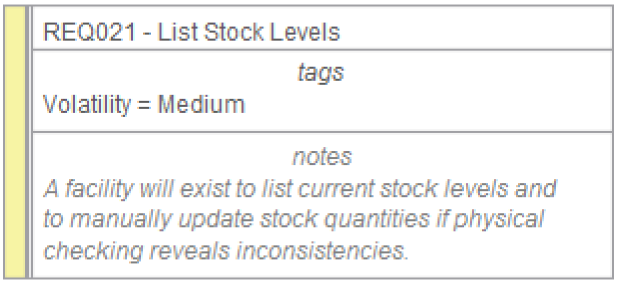
	participates in which makes it particularly useful for analyzing the impact of change.  Traceability REQ020 - Receive Books realized by Receive Orders implements REQ020 - Receive Books REQ032 - Update Inventory realized by Association from part of REQ019 - Manage Inventory

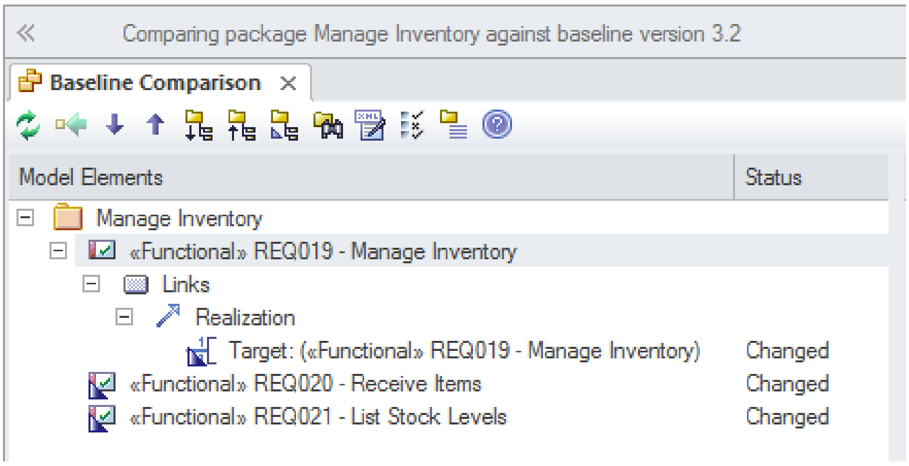
Requirement Volatility

There are ever increasing market place pressures to release products and systems as early as possible, putting stress on project teams to develop, test and deploy products in shorter and shorter periods of time. The requirements processes have changed significantly in recent years to ensure that stable, correct and well-articulated specifications are provided to architects, designers and developers when they need them. There has been a move to iterative and incremental processes and this necessitates providing a set of stable requirements for every iteration. The churning of requirements is often an indicator that a problem is not clearly understood, that stakeholders have not been compromised and there are unresolved political issues, the scope is not defined or the business itself is in fluctuation. Enterprise Architect has a number of mechanisms that can be used to assist with this problem. Enterprise Architect does not have a built-in property for requirement volatility (stability) but using the general purpose UML extension mechanism of Tagged Values a tag could be created to record this property.

Note: Internal requirements do have a stability property but external requirements do not.

Mechanisms for managing requirement volatitlity

Mechanism	Description
Volatility as a Tagged Value	Enterprise Architect provides a series of properties for Requirements, but additional properties can be created to record other properties such as a Requirement's volatility or the source of the Requirement. This is achieved using the UML Tagged Value mechanism, which allows any element including Requirements to have one or more tags applied, representing some property that can be assigned a value. Enterprise Architect has extended this mechanism and allows the modeler to create a list of values that can be chosen from a drop down list using the Predefined Structured Tagged Values. This allows a team to define their own list of volatility values, such as extreme, high, medium low, minimal.  REQ021 - List Stock Levels tags Volatility = Medium notes *A facility will exist to list current stock levels and to manually update stock quantities if physical checking reveals inconsistencies.*
Using	The Baseline facility is a powerful tool that enables a user to take a snapshot of a

Baselines	model or more typically a model fragment and then as the model is developed to compare the new version of the model to the baseline thus identifying anything that has changed since the baseline was taken. **Baselines** have general applicability but are particularly useful with requirements management where requirements are often said to be signed-off or frozen and any alterations to them must be registered as a change. The Baseline tool has a Compare utility that conveniently lists changes between the current model and the baseline.  Comparing package Manage Inventory against baseline version 3.2 Baseline Comparison Model Elements — Status Manage Inventory «Functional» REQ019 - Manage Inventory Links Realization Target: («Functional» REQ019 - Manage Inventory) — Changed «Functional» REQ020 - Receive Items — Changed «Functional» REQ021 - List Stock Levels — Changed
Searches for churning requirements	Enterprise Architect has a sophisticated search facility that allows a user to search across either a selected Package or the entire repository, to locate elements that meet fine-grained criteria. This can be used to locate requirements that have not changed by searching for a change in the

	modification date before a specified date, thus providing a list of stable requirements. Alternatively, if volatility has been set using a Tagged Value, all elements with a specified volatility could be located. The search facility returns a list of elements that can be located in the **Browser window**; the search can be used as the basis of a **Model View** to be used to view either volatile or non-volatile requirements.

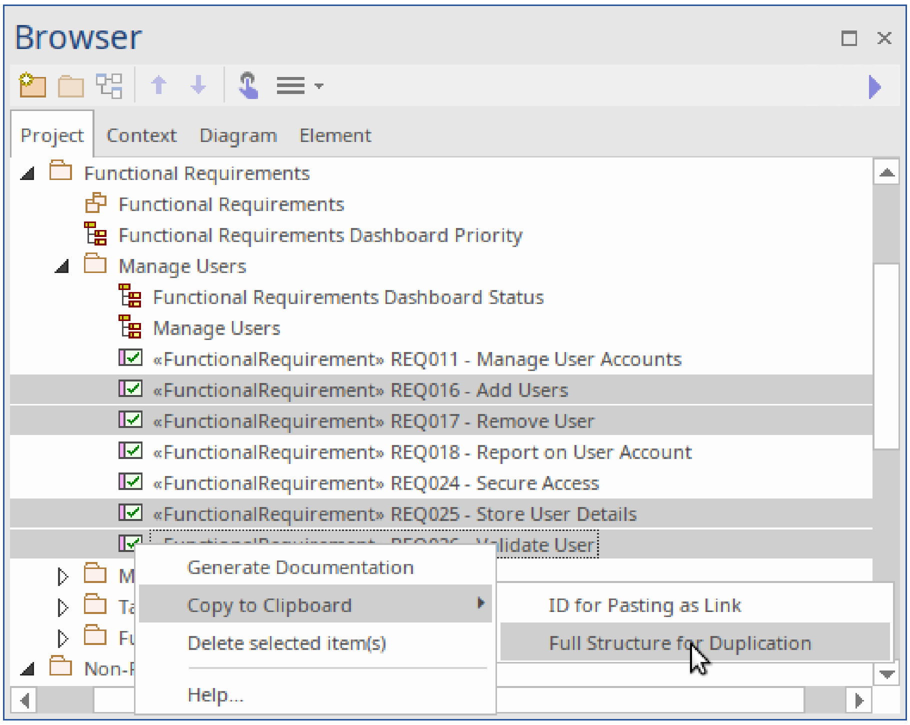
Requirement Reuse

The concept of reusing artifacts of a system development process has been written about in many papers and text books but has traditionally been confined to software components. In more recent years the notion of reusing specifications, including requirements, has started to get traction. The reuse is particularly important where organizations create a family of products with similar features, or where there is a community of users within an industry or domain. Other types of requirement such as security and regulatory requirements will typically apply to a number of projects. Business Rules and Stakeholders Concerns will also typically apply across many projects and are best catalogued outside individual project structures. Enterprise Architect provides a number of sophisticated mechanisms for managing the reuse of elements across projects, including structuring the repository for reuse, importing requirements from other sources, and a **Reusable Asset Service**.

Mechanism for requirements reuse

Mechanism	Description
Structuring the repository for	When you set up a repository, you have the choice of structuring it for a single project or for multiple projects, which in

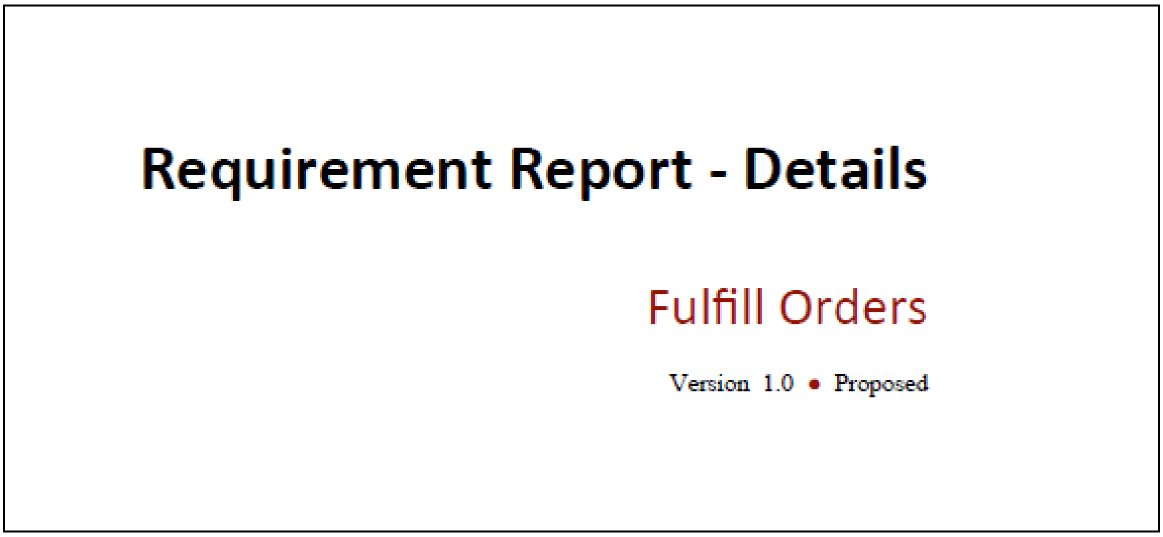
requirements reuse	turn could be organized by a number of programs of work. Enterprise Architect gives the modeler complete control on how the repository is structured, allowing Packages to be set up above the level of projects where some requirements such as Business, Regulatory and Architectural Requirements can be added.
Creating a base model	When you create a new repository in Enterprise Architect, you have the option of creating a blank model using the **Model Wizard** to help set up a repository structure, or you can use a base model as a template for the new model. The base model is a good place to store reusable assets such as Business, Regulatory and Architectural Requirements, and Policies and Business Rules. A base model can be created using the 'Save Project As...' option under the 'File Management' icon ( ).
Importing requirements from other models	It is quite common to have a number of Enterprise Architect Repositories in an organization and it is very easy to copy and reuse Requirements (or any other elements) from one model in another. This can be achieved by simply copying a selection of Requirements or an entire

	Package from one repository to another, or even from one project to another in the same repository. Enterprise Architect works in the same way as any other Windows program, simply copying the selection to the clipboard and then allowing it to be pasted in another location in the same model or in another open repository.  Browser Project Context Diagram Element Functional Requirements Functional Requirements Functional Requirements Dashboard Priority Manage Users Functional Requirements Dashboard Status Manage Users «FunctionalRequirement» REQ011 - Manage User Accounts «FunctionalRequirement» REQ016 - Add Users «FunctionalRequirement» REQ017 - Remove User «FunctionalRequirement» REQ018 - Report on User Account «FunctionalRequirement» REQ024 - Secure Access «FunctionalRequirement» REQ025 - Store User Details Validate User M Ta Fu Non-F Generate Documentation Copy to Clipboard Delete selected item(s) Help... ID for Pasting as Link Full Structure for Duplication
Using the Reusable Asset Service	The **Reusable Asset Service** (RAS) is particularly useful for distributed teams and provides a simple and convenient mechanism for modelers to distribute or download reusable model structures and elements such as Requirements through a shared repository, accessible via a Pro Cloud Server connection. Enterprise or

	organizational level Requirements could be stored in the RAS and different teams could incorporate them into their models, governance of the assets would typically be managed by the owner of the asset (register) at the Reusable Asset Service level.

Requirement Documentation

A number of documents are commonly produced as part of the Requirements Engineering discipline, such as the Software (System) Requirements Specification and Use Case Report. These can be generated automatically from a requirements model using built-in templates. In addition a wide range of other documents can be produced using built-in or customized templates. The documentation facility in Enterprise Architect is highly configurable and many reports can be produced using the template system, but for more complex reports there is a facility called **Virtual Documents** that allows a publisher to model the structure of the document and to cherry pick content from anywhere in the repository, applying different templates to each section of the document. There is also a wide variety of options that can be applied at the template or document generation level, and the **Scripting** engine can be used to inject content into a document or to produce the entire report.



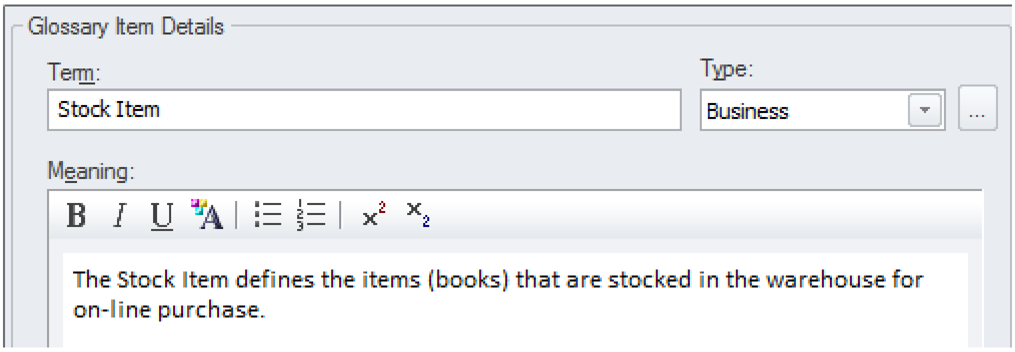
Requirement Report - Details

Fulfill Orders

Version 1.0 • Proposed

Project Glossary

A **Project Glossary** lists and defines the terms that are important for a project or program of work. The Project Glossary can be generated as an isolated document, or it can be included as a section in one or more other documents. It provides a single point of truth for the important project terms and their meanings; when new documentation is generated the terms will automatically be updated. The Glossary can be generated to a Docx or PDF format, or to HTML that could be included in a project or organization level web site. The Glossary allows the modeler to categorize the terms into user defined Types, and these can have styles applied when they are generated in documentation.



Glossary Item Details

Term: Stock Item

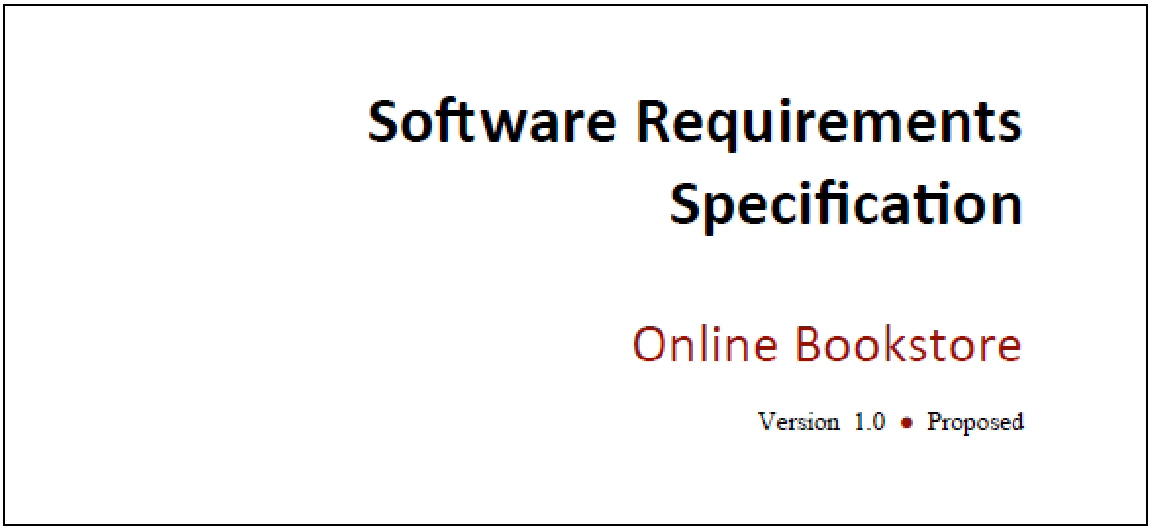
Type: Business

Meaning:

The Stock Item defines the items (books) that are stocked in the warehouse for on-line purchase.

Software Requirement Specification

This document describes the Requirements of the system, its behavior under defined conditions, and the constraints that it must operate under; it will typically be read by a variety of stakeholders. There is a built-in Requirements template that can be used to generate the document, although the modeler is free to create a new template that could be either based on this or created from a blank template. When the document has content from a variety of locations in the **Browser window**, it would be most expedient to use the **Virtual Documents** facility, which allows the user to create a model of the document (similar to a Master document in a Word Processor) that has a number of sections called Model Documents. These can have content picked from anywhere in the Browser window.


Software Requirements Specification

Online Bookstore

Version 1.0 ● Proposed

Use Case Report

The creation of Use Case documentation has traditionally been a manual process and with the documents in many projects running into hundreds of pages their production consumes valuable project resources. These hand-crafted documents become difficult to maintain and remain isolated from other parts of the project such as Requirements, Business Rules and solution Components. Enterprise Architect has a powerful tool called the **Scenario Builder** that allows the modeler to specify Use Cases and Scenarios inside the model and these can be automatically generated to high quality documentation using built-in templates. There are two built-in templates that can be used for generating a Use Case report: one documents the Use Case at a summary level and the other at a detailed level.

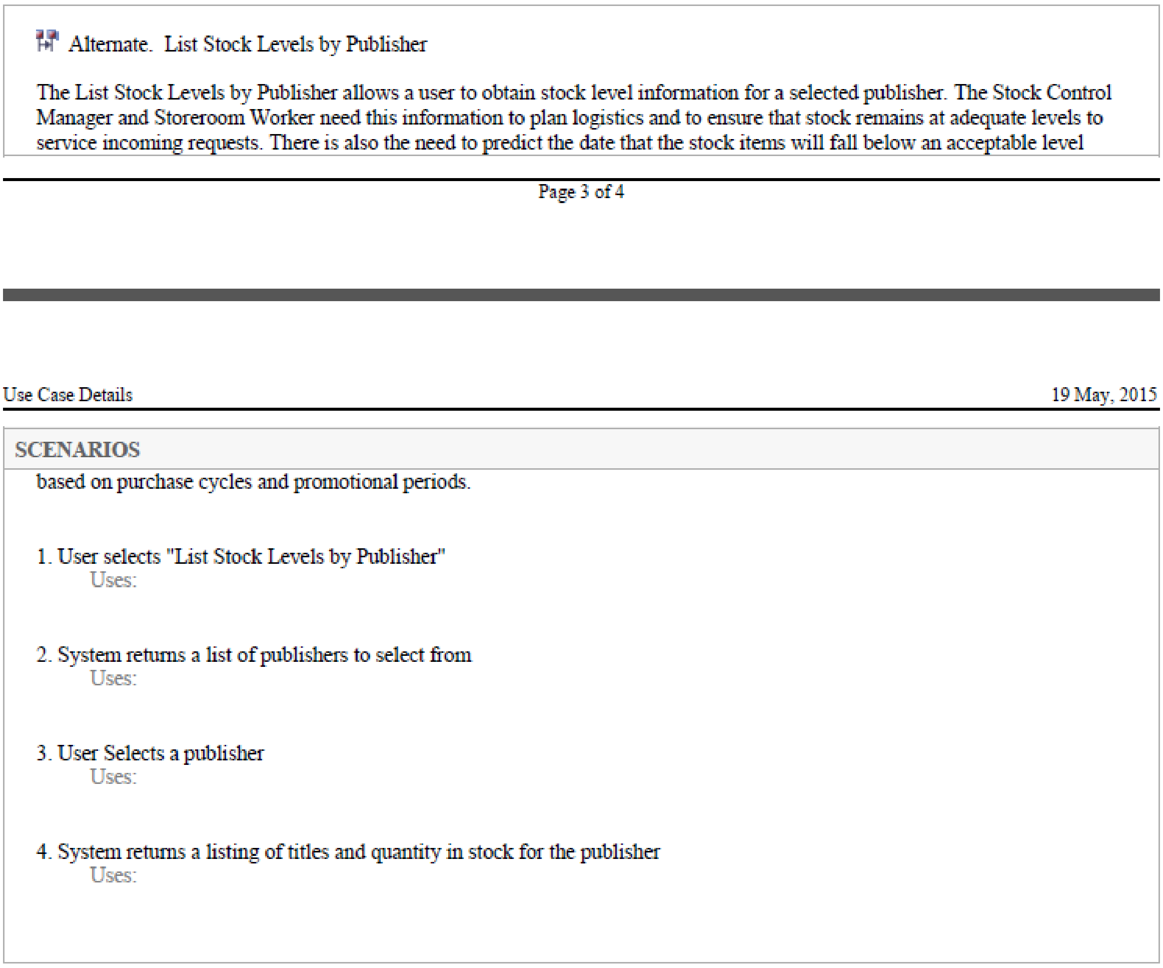
Use Case Details

List Stock Levels

Version 1.0 ● Proposed

Example content from a Use Case Report

The detailed Use Case report will list all the details of the Use Case and the detailed steps, including Basic Paths, Alternate and Exception Scenarios. Other information, including Internal Requirements, Pre and Post Conditions and other Constraints will also be included in the report. If a Behavioral diagram such as an Activity diagram has been automatically created, this diagram will also be displayed in the report.



Alternate. List Stock Levels by Publisher

The List Stock Levels by Publisher allows a user to obtain stock level information for a selected publisher. The Stock Control Manager and Storeroom Worker need this information to plan logistics and to ensure that stock remains at adequate levels to service incoming requests. There is also the need to predict the date that the stock items will fall below an acceptable level

Page 3 of 4

Use Case Details 19 May, 2015

SCENARIOS

based on purchase cycles and promotional periods.

1. User selects "List Stock Levels by Publisher"
   Uses:

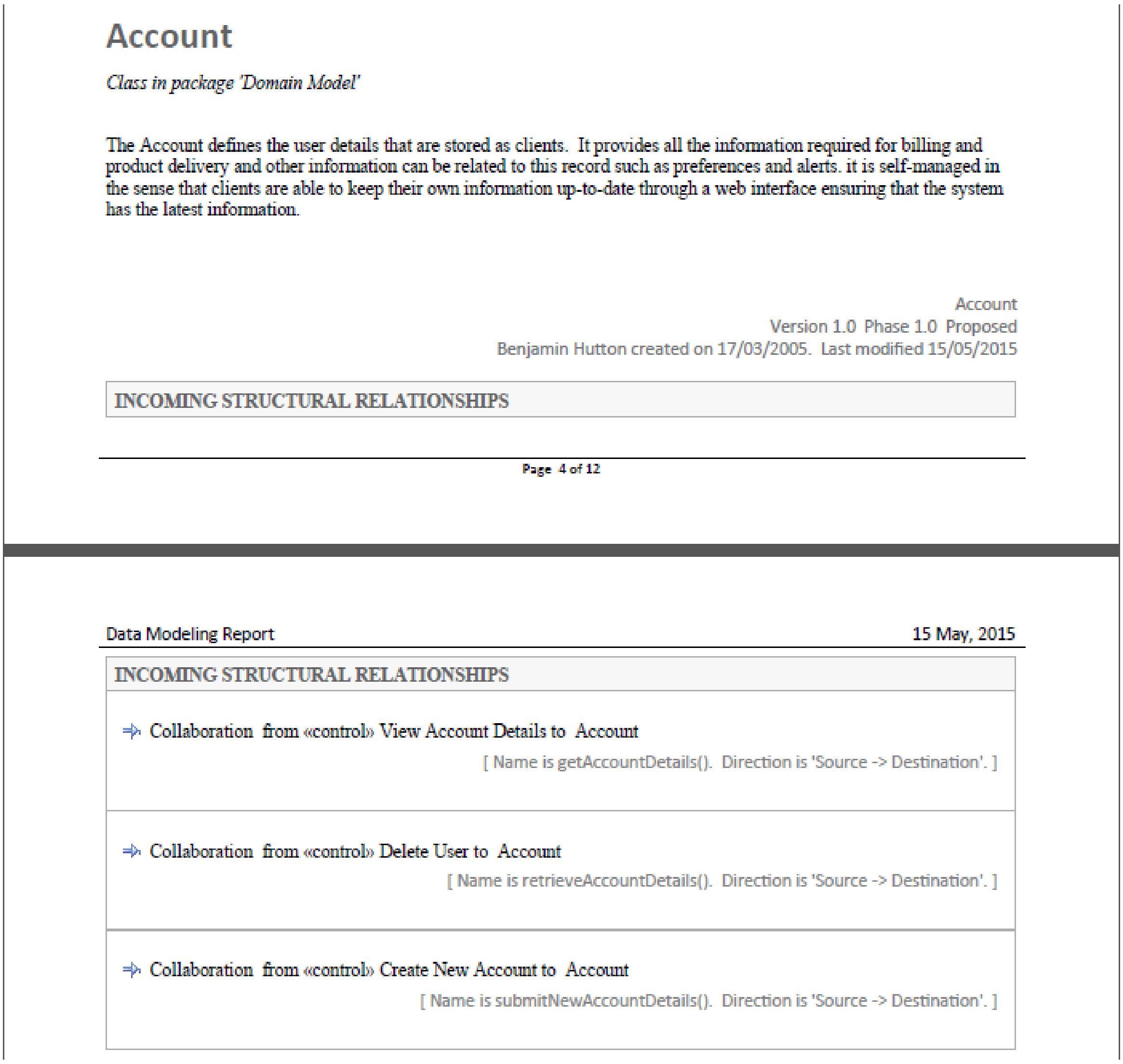
2. System returns a list of publishers to select from
   Uses:

3. User Selects a publisher
   Uses:

4. System returns a listing of titles and quantity in stock for the publisher
   Uses:

Data Dictionary

Many processes specify the creation of a Data Dictionary that acts as a reference for all the information that will be consumed, stored or created by the system. The Data Dictionary can be created in Enterprise Architect using the **UML Class** diagram and Classes can be defined to represent the important elements of the domain including Attributes and Data Types. Enterprise Architect can generate high quality documentation from the Class diagram and data items and their descriptions can be listed and the Attributes of these Classes can also be detailed with Data Types and Multiplicities. Enterprise Architect provides built-in templates that allow the Data Dictionary to be created automatically and these templates can be edited or new ones created.



Account

Class in package 'Domain Model'

The Account defines the user details that are stored as clients. It provides all the information required for billing and product delivery and other information can be related to this record such as preferences and alerts. it is self-managed in the sense that clients are able to keep their own information up-to-date through a web interface ensuring that the system has the latest information.

Account
Version 1.0 Phase 1.0 Proposed
Benjamin Hutton created on 17/03/2005. Last modified 15/05/2015

INCOMING STRUCTURAL RELATIONSHIPS

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Data Modeling Report 15 May, 2015

INCOMING STRUCTURAL RELATIONSHIPS

- Collaboration from «control» View Account Details to Account
  [Name is getAccountDetails(). Direction is 'Source -> Destination'.]
- Collaboration from «control» Delete User to Account
  [Name is retrieveAccountDetails(). Direction is 'Source -> Destination'.]
- Collaboration from «control» Create New Account to Account
  [Name is submitNewAccountDetails(). Direction is 'Source -> Destination'.]

Requirement Processes and Standards

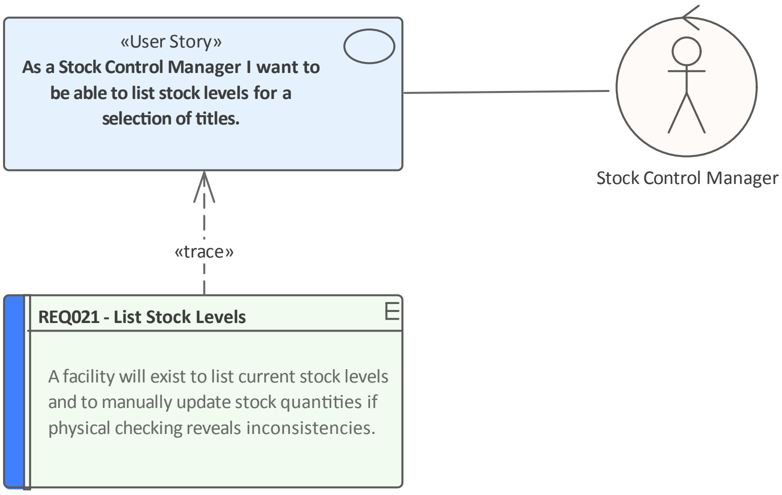
Enterprise Architect is an open platform that supports any Requirement Engineering process. The tool has a rich feature set and is highly configurable, and its flexible design means that whatever method is being used, the modeler will find features to help. So whether the team is using Formal Requirements, Use Cases, User Stories or Story-Boards in any combination, Enterprise Architect can be used to develop, manage and document the requirements. The implementation of the UML extension mechanisms means that any type of requirement can be created and managed using built-in types or by using Stereotyped elements and Tagged Values.

User Stories

User Stories are useful as an alternative way of describing user Requirements. They are typically used as part of an Agile development process, to provide a simple but clear description of what the user does or needs to do as part of the role they perform.

A User Story can be created using the stereotyped Artifact available from the Artifact Toolbox page, or as a stereotyped Use Case.

This diagram shows how a User Story can be modeled using a stereotyped Use Case. This allows the User Story to be described and to show the connection to a Persona.

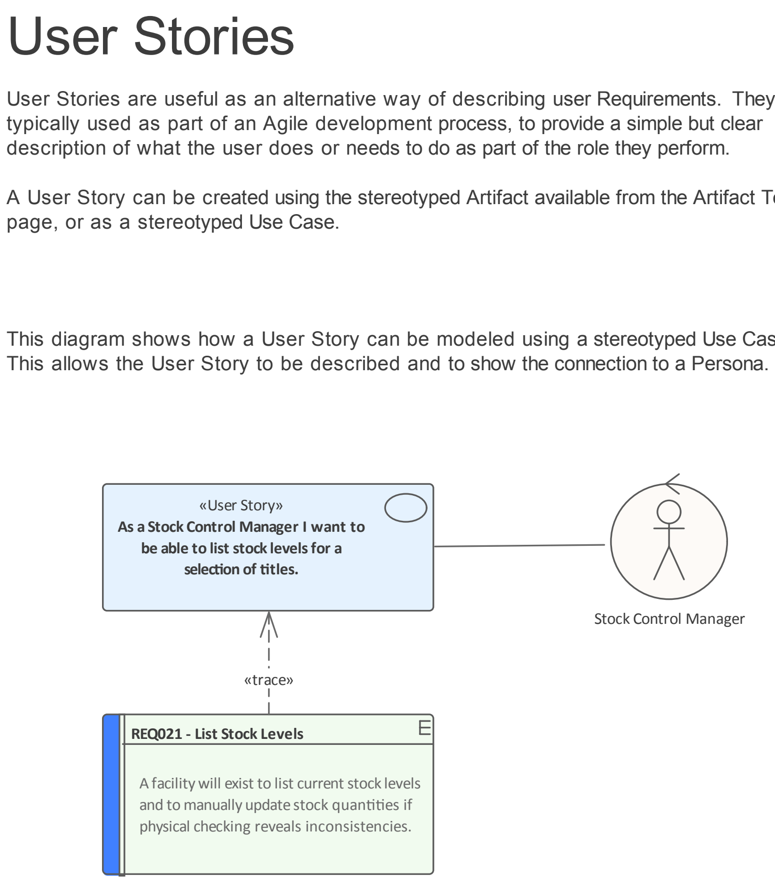

«User Story»
As a Stock Control Manager I want to be able to list stock levels for a selection of titles.
Stock Control Manager
«trace»
REQ021 - List Stock Levels
A facility will exist to list current stock levels and to manually update stock quantities if physical checking reveals inconsistencies.

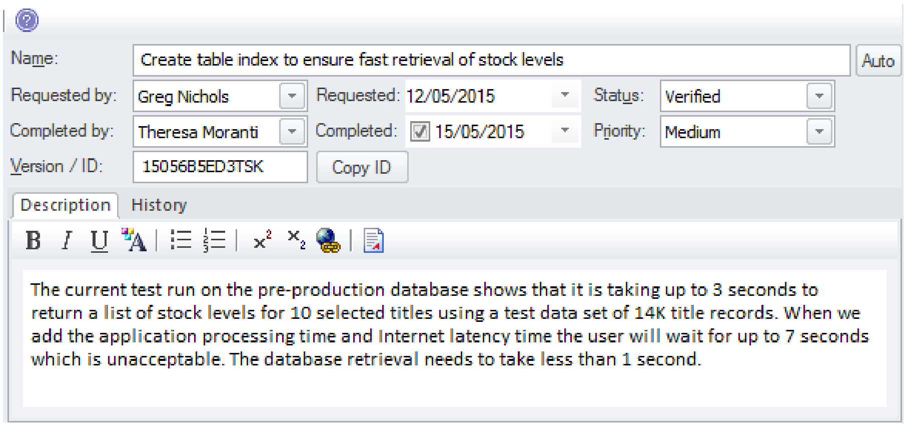
Agile Requirements Processes

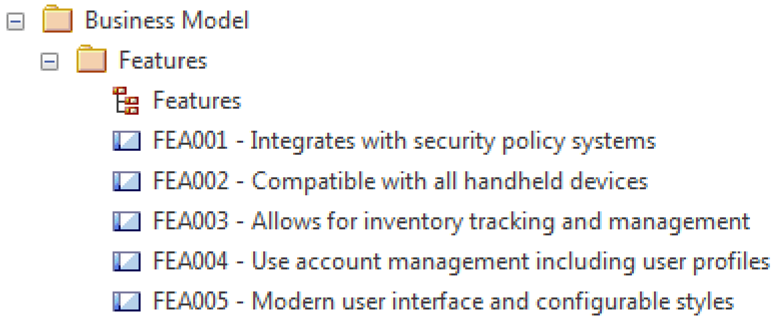
There are various Agile methods that have become prevalent for developing particular types of system, and the term 'Agile' has come to encompass a group of software development methods that are iterative and that focus on early development and delivery using customer and developer collaboration. Enterprise Architect has been built from the ground up as a flexible modeling platform that supports any software development methodology, and it has a wide range of tools and features that support Agile processes.

Support for Agile Methods

Method	Support
Scrum	'Scrum' is a project management approach for managing Agile projects; it is typically used in conjunction with other agile methods such as XP. The goal of Scrum is to deliver software releases in iterations, which provide the highest demonstrable business value. Enterprise Architect supports User Stories, textual requirements and product releases. Sprint backlogs can be managed using Tagged Values and **Model Views**. Estimates of

	effort can be recorded for Requirements in each of the backlogs, and refined as the items are promoted towards the sprint using the element Effort item. A built-in Gantt chart will automatically display the schedule for sprints, and a series of built-in and customizable dashboards can show the progress of a sprint. The Product Owner, Scrum Master and Team Member roles can all be supported. The tool provides a cohesive platform for collaboration and requirements management.  User Stories User Stories are useful as an alternative way of describing user Requirements. They are typically used as part of an Agile development process, to provide a simple but clear description of what the user does or needs to do as part of the role they perform. A User Story can be created using the stereotyped Artifact available from the Artifact Toolbox page, or as a stereotyped Use Case. This diagram shows how a User Story can be modeled using a stereotyped Use Case. This allows the User Story to be described and to show the connection to a Persona. «User Story» As a Stock Control Manager I want to be able to list stock levels for a selection of titles. Stock Control Manager «trace» REQ021 - List Stock Levels A facility will exist to list current stock levels and to manually update stock quantities if physical checking reveals inconsistencies.
Extreme	Extreme Programming relies on the User

Programming (XP)	Story (User Card) to express Requirements and develops plans for iterations and releases. Enterprise Architect supports XP by allowing User Stories to be modeled using a stereotyped Use Cases. Iterations are supported by the Phase property built into every element, and a Gantt chart can be used to automatically display scheduled iterations and releases. There is support for developer tasks that can be created as element maintenance tasks for each User Story; these can include status, priority, requested and completion dates, history and more. The Customer, Coach, Programmer and Tracker roles can all be supported and the tool provides a cohesive platform for collaboration, including visual inspections of code and design and automatic documentation generation.  Name: Create table index to ensure fast retrieval of stock levels Requested by: Greg Nichols Requested: 12/05/2015 Status: Verified Completed by: Theresa Moranti Completed: ☑ 15/05/2015 Priority: Medium Version / ID: 15056B5ED3TSK The current test run on the pre-production database shows that it is taking up to 3 seconds to return a list of stock levels for 10 selected titles using a test data set of 14K title records. When we add the application processing time and Internet latency time the user will wait for up to 7 seconds which is unacceptable. The database retrieval needs to take less than 1 second.

Feature Driven Development (FDD)	Feature-driven development (FDD) is an iterative and incremental process that uses a feature to drive iterations and development. Domain models are created early in collaboration with subject matter experts, subject areas are defined and these are broken down into Feature Sets and these in turn into atomic features. A Feature is a piece of system functionality that is valued by the client and is used to drive design, development and implementation. During design a Feature or small Feature Set are assigned to Classes and to programmers and the Features are used to monitor progress within an iteration. Enterprise Architect has support for this method with the Feature element that is part of the Requirements Toolbox, Subject Areas and Feature Sets can be modeled as Packages, allowing a hierarchy to be created that can be displayed as a diagram, list, using the **Relationship Matrix** or in the **Traceability window**.  Business Model Features Features FEA001 - Integrates with security policy systems FEA002 - Compatible with all handheld devices FEA003 - Allows for inventory tracking and management FEA004 - Use account management including user profiles FEA005 - Modern user interface and configurable styles

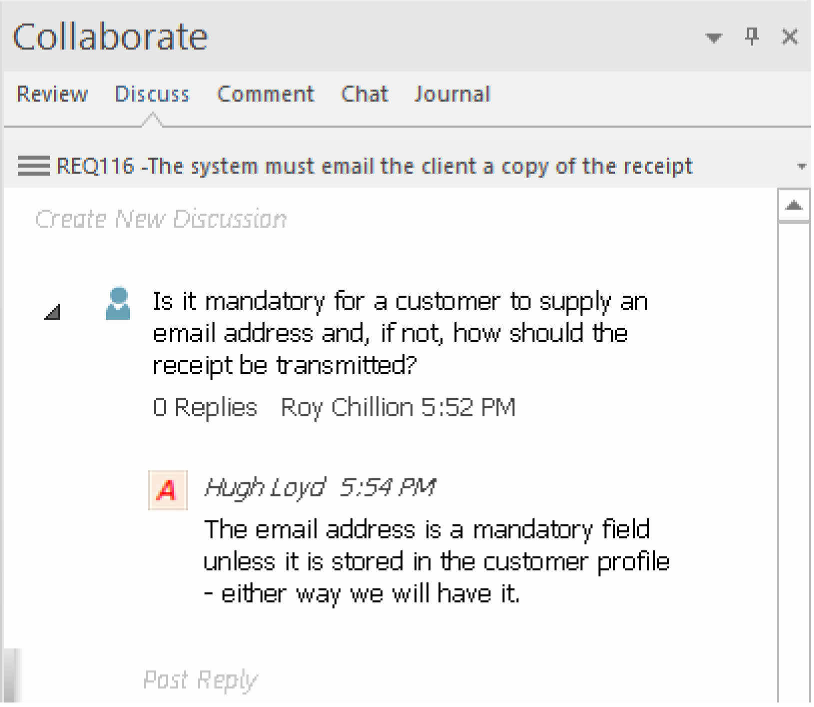
Business Analysis Body of Knowledge (BABOK)

The International Institute of Business Analysis publishes the Business Analysis Body of Knowledge (BABOK) Guide, which contains descriptive and prescriptive information on how to perform the activities and tasks of a business analyst in a number of areas of knowledge. The guide is produced and reviewed by a large number of people around the world and acts as a guide for business analysis, including requirements engineering. The guide defines a number of types of requirement, and these can all be implemented in Enterprise Architect by defining the types in the 'Requirements' section of the 'General Types' dialog.

Support for BABOK Knowledge Areas

Knowledge Area	Description
Business Analysis Planning and Monitoring	The Business Analysis Planning and Monitoring knowledge area is concerned with planning the approach to the analysis effort, the engagement with stakeholder, the governance of the activities and the how the Requirements and other information discovered during

	the process is managed and maintained. Enterprise Architect allows a team of analysts to define the approach that will be taken in the tool by defining processes, stakeholders and the governance mechanisms that will be used including the information that is collected.
Elicitation and Collaboration	The Elicitation and Collaboration knowledge area is concerned with the discovery and conformation of information obtained from stakeholders and a variety of other sources. The collaboration with stakeholders during the entire requirements life cycle is critical to the success of the change or endeavor. Enterprise Architect has a number of tools that can assist with planning the elicitation, including a Project Calendar, Gantt chart and a number of team collaboration tools such as **Model Mail**, **Discussions** and Slide Shows.



REQ116 -The system must email the client a copy of the receipt

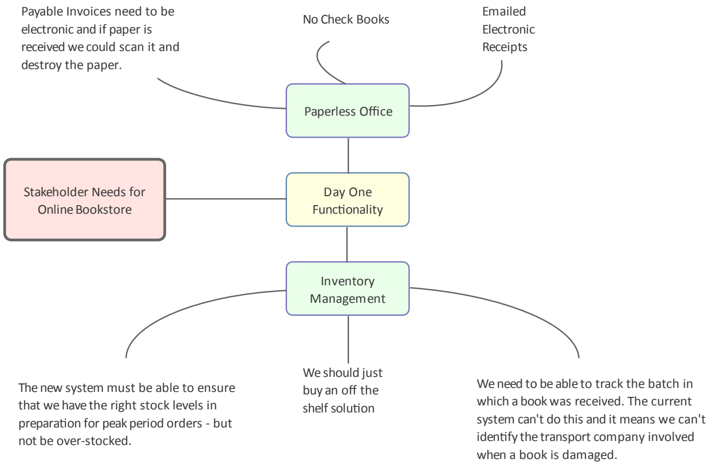
Is it mandatory for a customer to supply an email address and, if not, how should the receipt be transmitted?

0 Replies Roy Chillion 5:52 PM

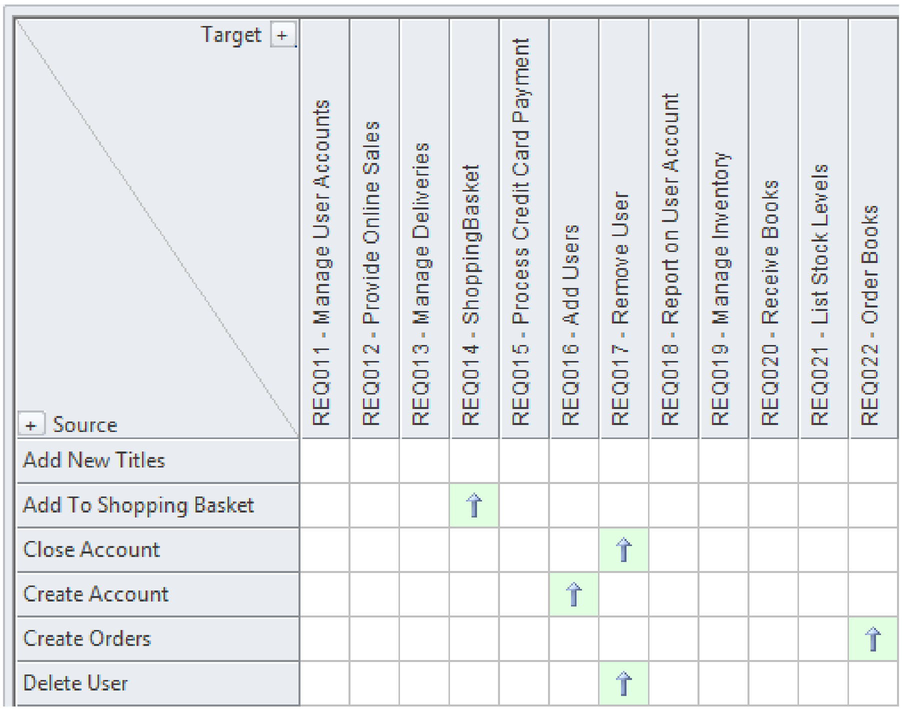
Hugh Loyd 5:54 PM

The email address is a mandatory field unless it is stored in the customer profile - either way we will have it.

Information elicited during stakeholder workshops can be recorded using a Mind Mapping diagram and, once it has been analyzed, reports can be generated to a variety of formats for confirmation with stakeholders. Photos taken during user observations can be included in diagrams, creating a rich visual presentation.

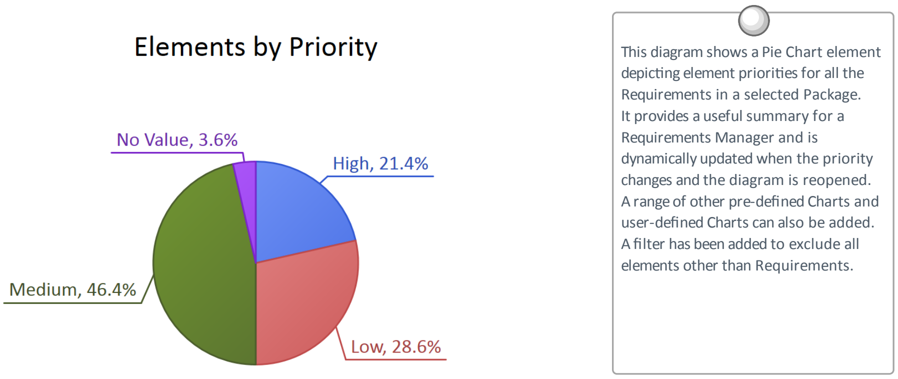
	Elicitation Workshops - Mind Mapping This diagram shows the flexibility of Mind Mapping as a technique for recording needs elicited from stakeholders. It allows the modeler to keep a record of the workshops right inside the model. Once the analysis is complete, stakeholder requirements can then be linked back to topics in this diagram. To create a new Mind Mapping diagram, from the 'Design' ribbon, select the option: 'Diagram > Add > Mind Mapping > Mind Mapping Diagram'. Make sure that the perspective is set to 'All Perspectives' or select 'Strategy > Mindmap' in the Perspective combo box and that the Mind Mapping technology is enabled in the MDG Technologies dialog. MDGTechnologies  Payable Invoices need to be electronic and if paper is received we could scan it and destroy the paper. No Check Books Emailed Electronic Receipts Paperless Office Stakeholder Needs for Online Bookstore Day One Functionality Inventory Management The new system must be able to ensure that we have the right stock levels in preparation for peak period orders - but not be over-stocked. We should just buy an off the shelf solution We need to be able to track the batch in which a book was received. The current system can't do this and it means we can't identify the transport company involved when a book is damaged.
Requirements Life Cycle Management	The Requirements Life Cycle Management knowledge area is concerned with the management of requirements and ensuring that the requirements can be related to the solution designs and, ultimately, to the solution components during the entire life cycle of the solution, from inception through to retirement. The management of requirements involves requirements governance, tracing the requirements, maintaining and prioritizing them, and managing change and assessment. Enterprise Architect has sophisticated tools that enable requirements to be

	traced, maintained and prioritized. These include the Relationships Matrix, which can be configured to display sets of traces between source and target Packages; the **Traceability window**, which shows how elements are connected in the repository; and the Relationships window, which displays the relationships between elements in a diagram. The diagram is a powerful way to demonstrate and make visual underlying relationships, including the connection between stakeholders and the elicited information.

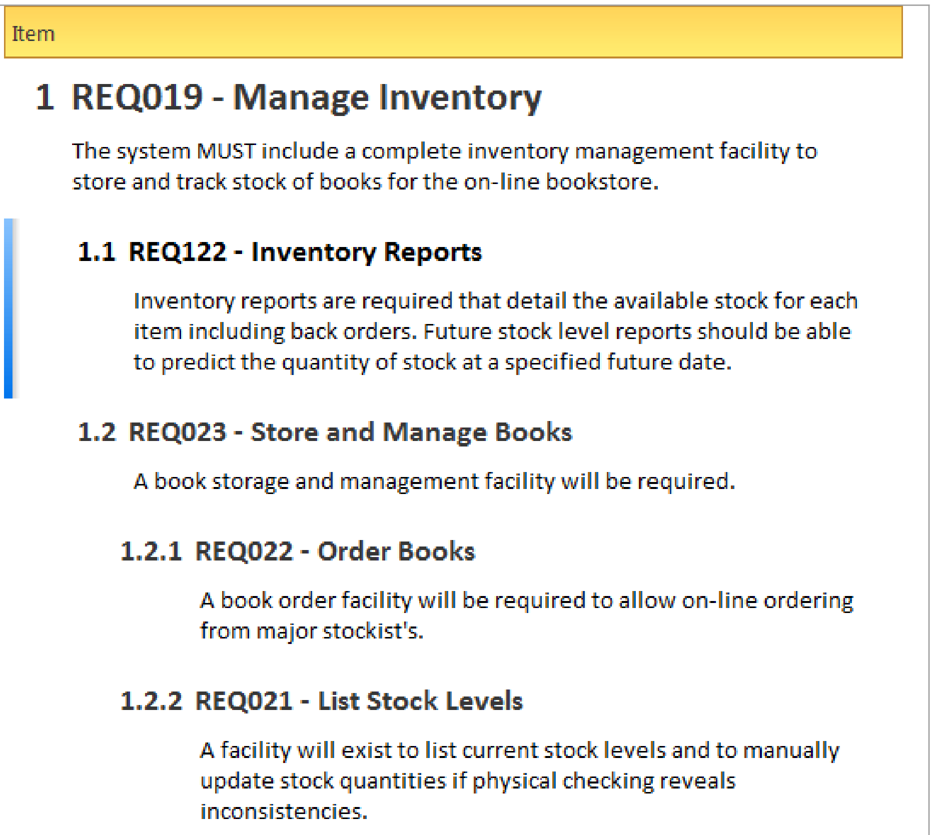


Target + + Source	REQ011 - Manage User Accounts	REQ012 - Provide Online Sales	REQ013 - Manage Deliveries	REQ014 - ShoppingBasket	REQ015 - Process Credit Card Payment	REQ016 - Add Users	REQ017 - Remove User	REQ018 - Report on User Account	REQ019 - Manage Inventory	REQ020 - Receive Books	REQ021 - List Stock Levels	REQ022 - Order Books
Add New Titles												
Add To Shopping Basket				↑								
Close Account							↑					
Create Account						↑						
Create Orders												↑
Delete User							↑					

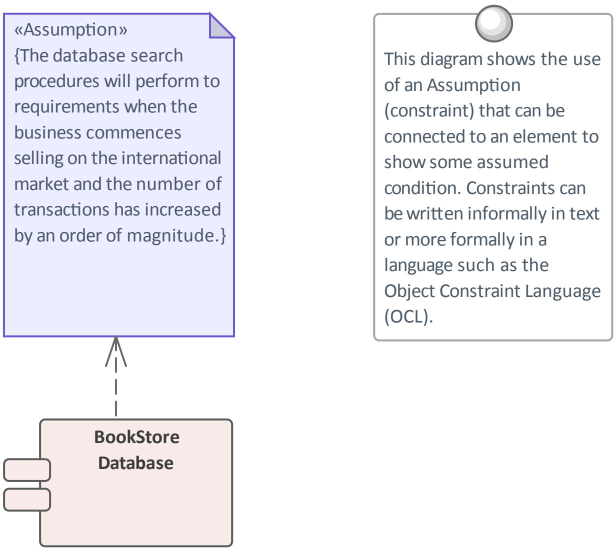
The requirements governance process could also be modeled using UML Activity diagrams or BPMN diagrams, and this process could be reused across a range of projects and changes. There is

	also a Dashboard diagram that allows Requirements properties to be categorized and displayed in a series of charts and graphs that assist in the collaboration and management of properties such as Status and Priority, and to communicate this information to stakeholders.  This diagram shows a Pie Chart element depicting element priorities for all the Requirements in a selected Package. It provides a useful summary for a Requirements Manager and is dynamically updated when the priority changes and the diagram is reopened. A range of other pre-defined Charts and user-defined Charts can also be added. A filter has been added to exclude all elements other than Requirements.
Strategy Analysis	The Strategy Analysis knowledge area is concerned with the discovery and articulation of a business need and the description of the future state and various transition (intermediate) states that will be used to move from the current state to the defined future state. It involves strategic thinking and the determination of a number of possible solutions that will create value for the organization and its stakeholders. Enterprise Architect has tools to describe the possible solutions and the value and outcomes they will

	produce and to model the current and future states and what is needed to transition from one state to another.
Requirements Analysis and Design Definition	The Requirements Analysis and Design Definition knowledge area is concerned with how to organize and structure the information that is discovered during elicitation and how to record these as a set of coherent Requirements. It is also concerned with the prioritization of the requirements and finding solution options that can be evaluated against the potential benefit they will bring to the business. The articulation and evaluation of solution options is done in conjunction with the implementation teams but ultimately it is the business analyst that is responsible for conveying the options and their business value and recommending a solution to the stakeholders. Enterprise Architect is a fully featured requirements management tool and allows requirements to be created, maintained and prioritized. The **Specification Manager** can be used to input, maintain and visualize requirements in a view that resembles working in a word processor or spreadsheet.

	 Item 1 REQ019 - Manage Inventory The system MUST include a complete inventory management facility to store and track stock of books for the on-line bookstore. 1.1 REQ122 - Inventory Reports Inventory reports are required that detail the available stock for each item including back orders. Future stock level reports should be able to predict the quantity of stock at a specified future date. 1.2 REQ023 - Store and Manage Books A book storage and management facility will be required. 1.2.1 REQ022 - Order Books A book order facility will be required to allow on-line ordering from major stockist's. 1.2.2 REQ021 - List Stock Levels A facility will exist to list current stock levels and to manually update stock quantities if physical checking reveals inconsistencies.
Solution Evaluation	The Solution Evaluation knowledge area is concerned with the evaluation of an implemented solution and the assessment of whether it meets the business needs. The implementation is typically a partial solution or proof of concept and the analyst must work to determine if there are obstacles or removable constraints that are limiting the value that can be delivered by the solution. Enterprise Architect is a full life cycle tool that not only is a requirements management platform but also allows the modeler to describe the solution in detail including constraints and design decisions and

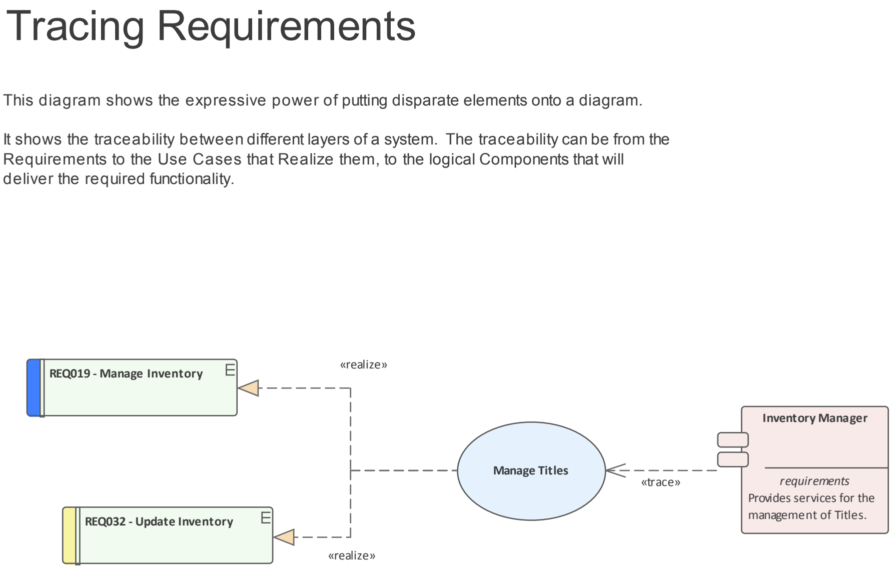
rationales.



{The database search procedures will perform to requirements when the business commences selling on the international market and the number of transactions has increased by an order of magnitude.}

This diagram shows the use of an Assumption (constraint) that can be connected to an element to show some assumed condition. Constraints can be written informally in text or more formally in a language such as the Object Constraint Language (OCL).

The solution components can be traced back to the functional, stakeholder and ultimately business requirements allowing the analyst to visualize the solution in the context of the problem and to record issues and decisions that will help inform how to proceed with a change.


Tracing Requirements

This diagram shows the expressive power of putting disparate elements onto a diagram.

It shows the traceability between different layers of a system. The traceability can be from the Requirements to the Use Cases that Realize them, to the logical Components that will deliver the required functionality.

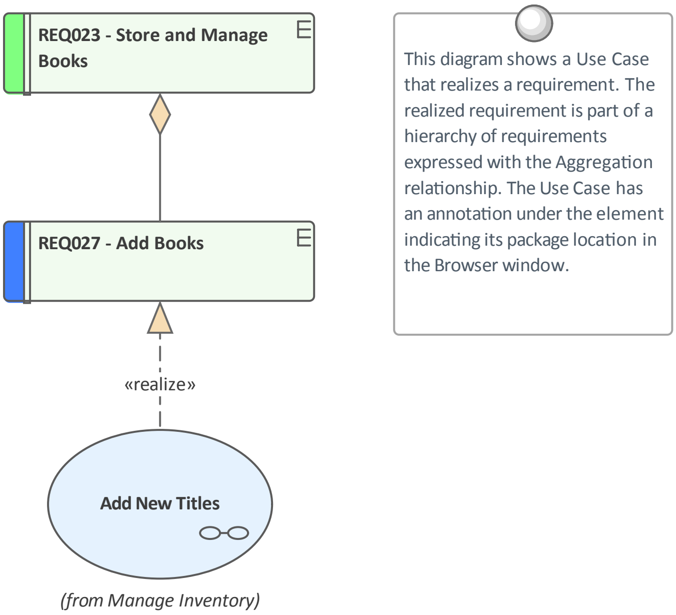
REQ019 - Manage Inventory
«realize»
Manage Titles
«trace»
Inventory Manager
requirements
Provides services for the management of Titles.
REQ032 - Update Inventory
«realize»

Notes

- Support for BABOK in Enterprise Architect includes a BABOK-specific Glossary for the product

UML Requirements

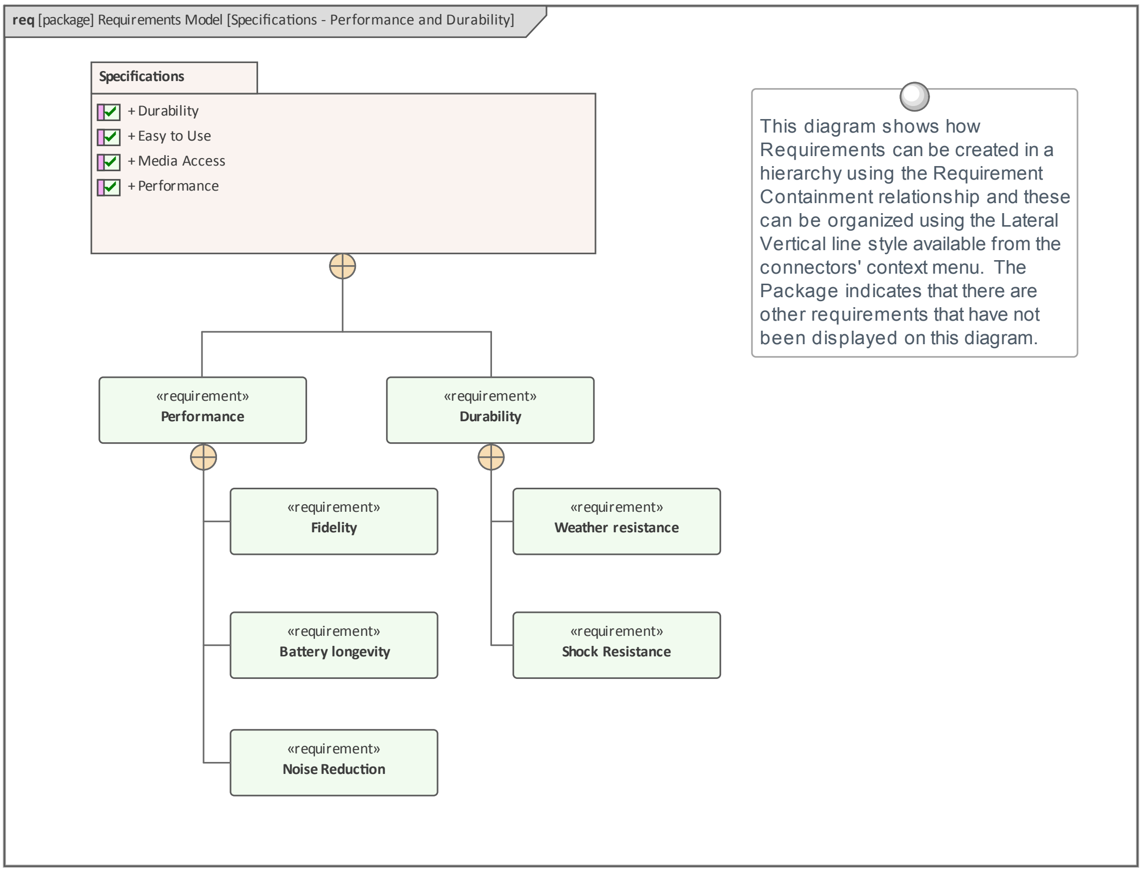
The Unified Modeling Language does not specify an element for modeling Requirements other than the Use Case, which it states can be used to describe system usages. In very early versions of UML a Requirement was defined as a stereotyped comment, but this was later made obsolete. Enterprise Architect has, since very early versions, filled this gap in the UML specification by extending the language to include a Requirement element that allows this important concept to be modeled textually and graphically in diagrams and other views. Enterprise Architect has rich support for modeling Use Cases in compliance with the specification but allows the requirements analyst to specify other Requirements using the flexible Requirements element. When used together the Requirement element and the Use Case equip the analyst with a powerful palette to describe the Requirements for any system at any level. The Requirement element can be used to describe Business Drivers, Business Goals and Stakeholder Requirements, and these can be linked to Use Cases with the Realize connector. The Use Cases can be augmented with detailed Functional, Architectural and Implementation Requirements suitable for the implementation teams.



This diagram shows a Use Case that realizes a requirement. The realized requirement is part of a hierarchy of requirements expressed with the Aggregation relationship. The Use Case has an annotation under the element indicating its package location in the Browser window.

SysML Requirements

The Systems Modeling Language (SysML) specifies a rich set of modeling constructs to represent text-based requirements as elements that can be related to other elements in a model. Model Based Engineering has become important in recent years, as the complexity of systems has increased and the engineering profession has recognized the need for more sophisticated mechanisms for describing and developing these complex systems. Enterprise Architect has full support for SysML and the modeling of Requirements, including support for a range of ways of presenting Requirements such as: Diagrams, Lists, Matrices, Hierarchies and documentation. There are even dashboard diagrams that present charts and graphs that summarize requirements' properties such as Status, Priority and Difficulty in a visually compelling way.


req [package] Requirements Model [Specifications - Performance and Durability]
Specifications
+ Durability
+ Easy to Use
+ Media Access
+ Performance
«requirement» Performance
«requirement» Durability
«requirement» Fidelity
«requirement» Battery longevity
«requirement» Noise Reduction
«requirement» Weather resistance
«requirement» Shock Resistance

This diagram shows how Requirements can be created in a hierarchy using the Requirement Containment relationship and these can be organized using the Lateral Vertical line style available from the connectors' context menu. The Package indicates that there are other requirements that have not been displayed on this diagram.

Additional Requirement Tools

In addition to the key tools listed in *Meet the Requirements Tools* there are a number of other tools that can be used for Requirement Development and Management and team collaboration in the Requirement Engineering discipline. These include the ability to assign sequential numbers to Requirements, importing Requirements from a spreadsheet file, creating Requirement documentation, and team collaboration features such as **Discussions**.

More Requirement Tools

Tool	Overview
Auto-Names and Counters	Use to assign a sequential number to a Requirement, including a prefix and suffix.
Requirements Checklist	Provides a graphical list of checks that can be applied to individual Requirements.
Import and Export Spreadsheets	A tool to import and export Requirements from spreadsheet files in the CSV format.
Documentati	

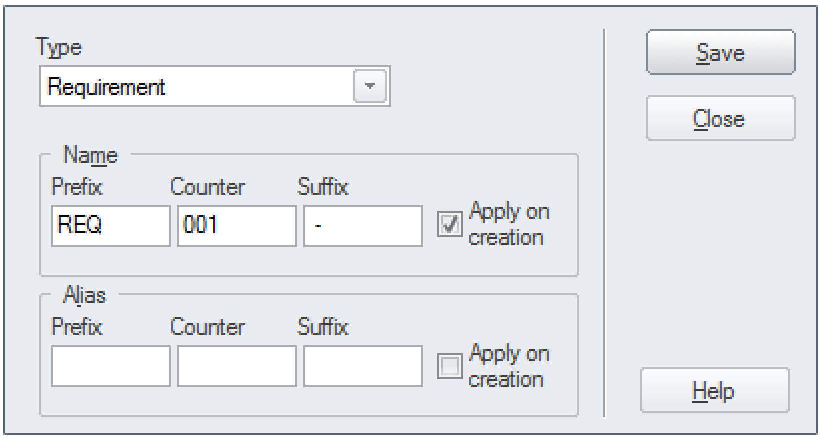
on	A powerful engine to automatically create high quality documentation directly from the model, using built-in or user-defined templates.
Glossary	A feature to create and maintain a lexicon of terms and their meaning that can grouped by type and styled when included in documentation.
Auditing	Used to keep a trail of what has changed in a repository, who it was changed by and when.
Discussions	A facility to allow modelers to create posts and replies to discuss model elements.
Maintenance Items	A series of Items that can be applied to Requirements to define such things as Changes, Issues, Defects and more.
Team Library	Allows reviews to be created for user defined categories and topics with links to model elements such as Requirements and Scenarios that can be referenced in the review.

Auto-Names and Counters

Getting to know Auto Names and Counters

Introducing Auto Names and Counters

To aid, regulate and enforce a naming standard, Enterprise Architect includes some capabilities to configure the default names assigned to new elements of a specific type. This is a useful feature when dealing with complex and large sets of requirements, but is also relevant when dealing with smaller data sets. **Auto Names and Counters** can be used to assign a sequential number to any element type including Requirements. It includes a prefix definition, a counter and a suffix definition allowing numbers such as: 'REQ007 - Manage Inventory' to be created.



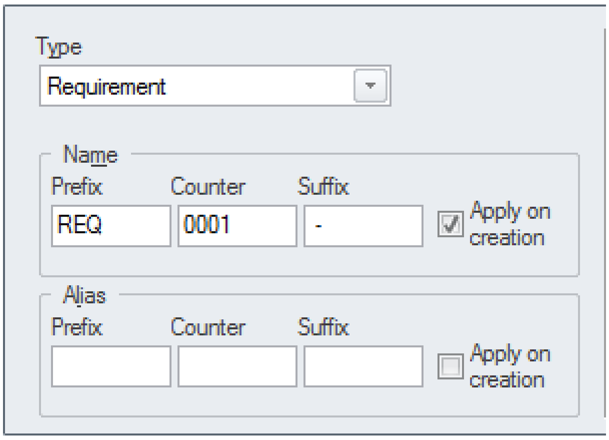
Type: Requirement

Name

Prefix	Counter	Suffix	
REQ	001	-	☑ Apply on creation

Alias

Prefix	Counter	Suffix	
			□ Apply on creation

Where to find Auto Names and Counters	Ribbon: Configure > Reference Data > Settings > **Auto Names and Counters**
Usage of Auto Names and Counters	Analysts and others can use the sequential number for communicating unambiguously about the requirements without having to use the often long requirement name. Select the 'Apply on Creation' option to start using the auto numbering feature; this can also be used to temporarily suspend auto naming, for example if other types of requirements are being entered that don't need to have sequential numbers assigned.
Options for Auto Names and Counters	There are options to define the prefix, counter and suffix for a requirement.  Type: Requirement Name — Prefix: REQ, Counter: 0001, Suffix: -, ☑ Apply on creation Alias — Prefix: , Counter: , Suffix: , □ Apply on creation
Learn more about Auto Names and	[Apply Auto Naming to Existing Elements]()

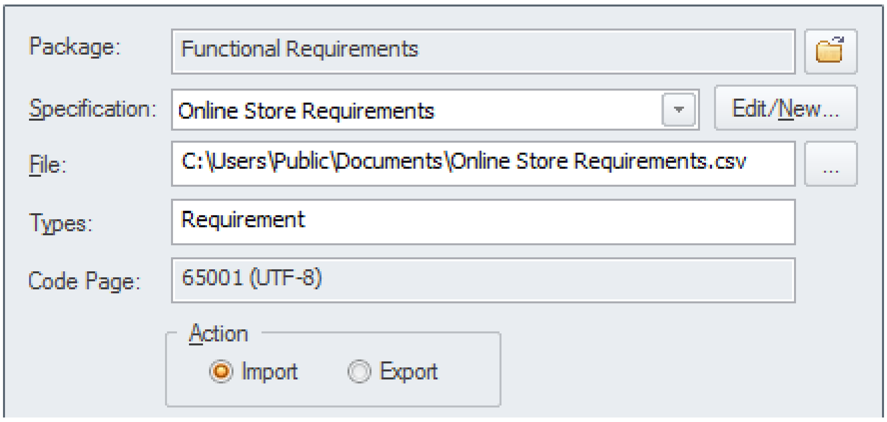
Counters

Import and Export Spreadsheets

Import and Export Spreadsheets

Introducing Import and Export Spreadsheets	This facility is a useful mechanism to import Requirements that have been defined in a Spreadsheet or a Word Processor table into Enterprise Architect. Once in Enterprise Architect the Requirements can be managed and traced to elements such as business drivers and Scenarios and Components. Alternatively Requirements in Enterprise Architect can be exported to a Spreadsheet for the purposes of providing them to a third party or for some type of numerical or statistical analysis. The mapping between fields in the Spreadsheet and the analogous properties in Enterprise Architect is completely configurable using a specification. For more detailed information exchange, the MDG Link for Microsoft Office (available from Sparx Systems) provides additional functionality and integration points useful when dealing with complex

Requirements.



Package: Functional Requirements

Specification: Online Store Requirements

File: C:\Users\Public\Documents\Online Store Requirements.csv

Types: Requirement

Code Page: 65001 (UTF-8)

Action: ● Import ○ Export

Where to find Import and Export Spreadsheets

Ribbon: Publish > Model Exchange > CSV

Use of Import and Export Spreadsheets

This feature can be used to import or export Requirements from a CSV file. Before a tool such as Enterprise Architect was installed, Analysts might have used a Spreadsheet or a table in their favorite word processor to record Requirements; these can conveniently be imported using the CSV import facility. Alternatively, Requirements sometimes have to be provided to a third party who will typically specify that they want them in a Spreadsheet file; this can be achieved using the export facility.

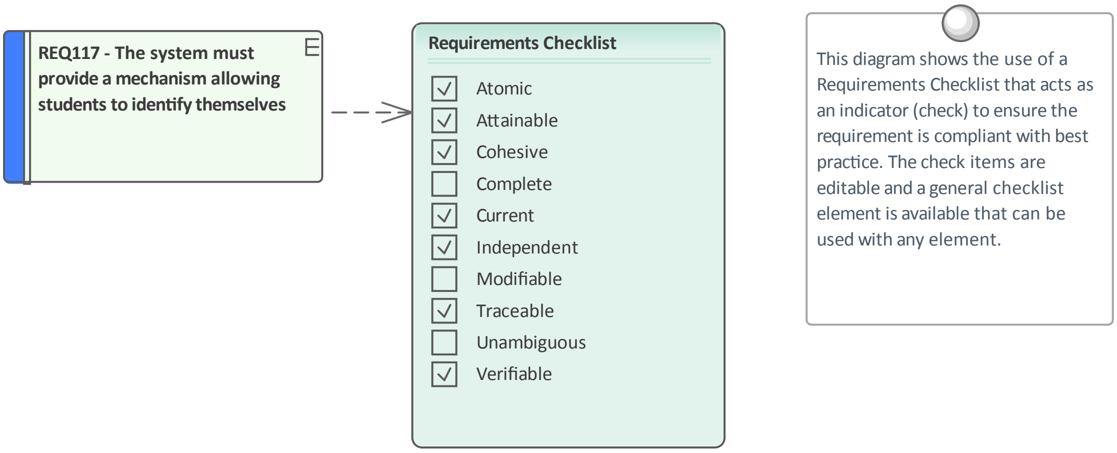
Options to Import and

The import and export facility is completely configurable and has a

Export Spreadsheets	user-defined specification to facilitate the mapping of Spreadsheet fields to Requirements properties in Enterprise Architect. This facility also includes the ability to import and export fields in Tagged Values of the Requirement.
Learn more about Import and Export Spreadsheets	CSV Import and Export

Requirements Checklist

The Requirement Checklist is a convenient element that acts as a tally to indicate whether a Requirement complies with a set of predefined measures such as whether the Requirement is Atomic, Cohesive, Traceable and Verifiable. It can be assigned to any Requirement and the measures can be updated directly in the diagram. When working with Requirements it is sometimes very useful to refer to a common set of 'best practices' and qualities that help define the nature of a well formed specification. The Requirement Checklist element is designed to meet this need.



REQ117 - The system must provide a mechanism allowing students to identify themselves

Requirements Checklist

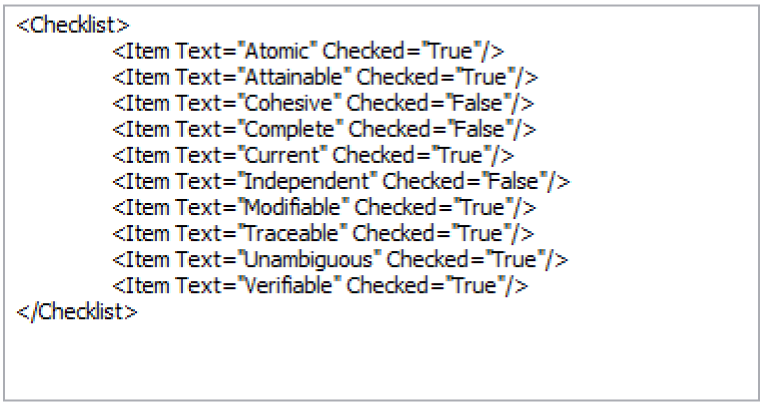
☑ Atomic
☑ Attainable
☑ Cohesive
□ Complete
☑ Current
☑ Independent
□ Modifiable
☑ Traceable
□ Unambiguous
☑ Verifiable

This diagram shows the use of a Requirements Checklist that acts as an indicator (check) to ensure the requirement is compliant with best practice. The check items are editable and a general checklist element is available that can be used with any element.

Getting to know the Requirements Checklist

Where to find the Requirements Checklist	Toolbox : 🔍 to display the 'Find Toolbox Item' dialog and specify 'Requirements Checklist'

Usage of the Requirements Checklist	Analysts and Requirements Managers can use the checklist to annotate whether one or more elements such as a Block or Activity or even a set of Requirements meet a set of predefined checks.
Options for the Requirements Checklist	The list of measures is completely configurable and items can be added or removed from the list for each individual checklist by using the Checklist Tagged Value notes.



```
<Checklist>
        <Item Text="Atomic" Checked="True"/>
        <Item Text="Attainable" Checked="True"/>
        <Item Text="Cohesive" Checked="False"/>
        <Item Text="Complete" Checked="False"/>
        <Item Text="Current" Checked="True"/>
        <Item Text="Independent" Checked="False"/>
        <Item Text="Modifiable" Checked="True"/>
        <Item Text="Traceable" Checked="True"/>
        <Item Text="Unambiguous" Checked="True"/>
        <Item Text="Verifiable" Checked="True"/>
</Checklist>
```

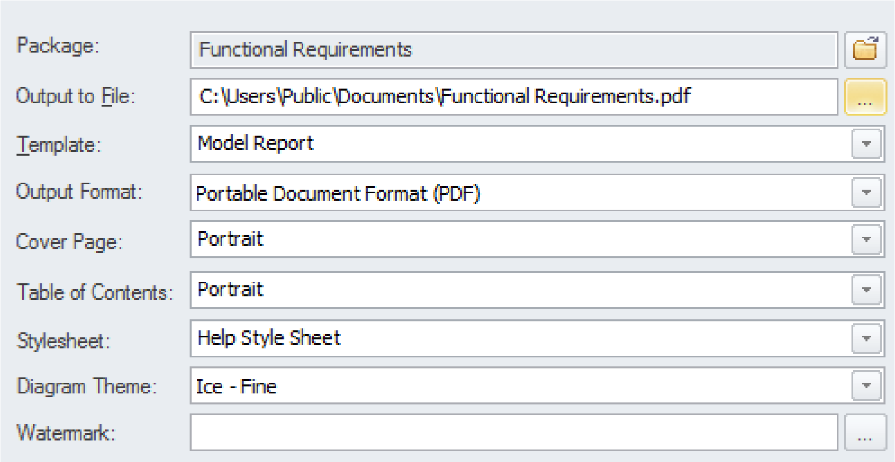
Learn more about the Requirements Checklist	Using the Checklist and Audited Checklist Artifacts

Documentation

Getting to know Documentation

Introducing Documentation

The Documentation features can be used to automatically generate a wide range of documentation directly from the models. These can be document-based such as PDF and Docx format or HTML-based. Flexible templates can be used to completely tailor the documents that are generated including company logos, tables of content, tables of element information and diagrams. Ad-hoc reports can also be created from a number of tools such as the Glossary and the Search Window.



Package:	Functional Requirements
Output to File:	C:\Users\Public\Documents\Functional Requirements.pdf
Template:	Model Report
Output Format:	Portable Document Format (PDF)
Cover Page:	Portrait
Table of Contents:	Portrait
Stylesheet:	Help Style Sheet
Diagram Theme:	Ice - Fine
Watermark:	

Where to

Ribbon: Publish > Model Reports >

find Documentation

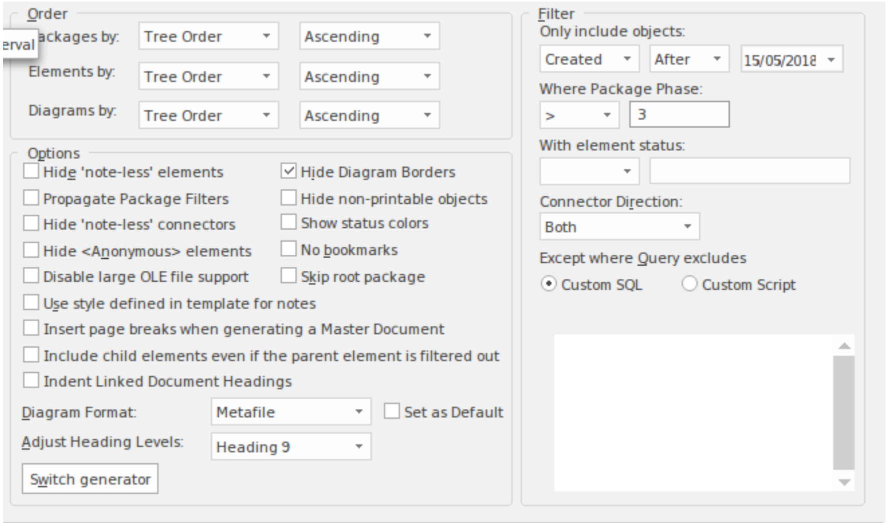
Report Builder

Use of Documentation

Modelers, Analysts, Architects, Project Managers and others can use the facility to produce a wide range of document-based publications and reports, such as a System Requirements Specification, Use Case Report, Data Dictionary, Solution Architecture Description and more. It can also be used for ad-hoc reporting to create reports such as a list of the most volatile requirements. HTML documentation can also be published to allow stakeholders who don't have access to Enterprise Architect to view the models from an Intranet site that can just be placed on a file system without the need for a Web Server.

Options for Documentation

There are several options that can be set to tailor the information that is included in a generated document, including the ordering of elements and diagrams and hiding certain elements. Filters and word substitutions and other options can also be applied.



Order

erval ackages by: Tree Order Ascending

Elements by: Tree Order Ascending

Diagrams by: Tree Order Ascending

Options

□ Hide 'note-less' elements ☑ Hide Diagram Borders

□ Propagate Package Filters □ Hide non-printable objects

□ Hide 'note-less' connectors □ Show status colors

□ Hide <Anonymous> elements □ No bookmarks

□ Disable large OLE file support □ Skip root package

□ Use style defined in template for notes

□ Insert page breaks when generating a Master Document

□ Include child elements even if the parent element is filtered out

□ Indent Linked Document Headings

Diagram Format: Metafile □ Set as Default

Adjust Heading Levels: Heading 9

Filter

Only include objects: Created After 15/05/2018

Where Package Phase: > 3

With element status:

Connector Direction: Both

Except where Query excludes

● Custom SQL ○ Custom Script

Learn more about Documentation

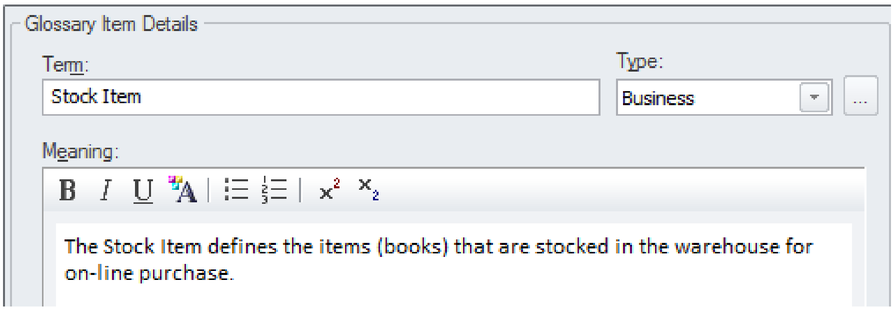
Model Publishing

Glossary

Getting to know the Glossary

Introducing the Glossary

The Glossary is a project level lexicon of the important terms and their meanings categorized by type. Any number of terms, their types and meanings can be defined and these can be referenced from the notes of model elements. The terms can be included in documentation or generated as a stand-alone report. When working with domain specific requirement specifications, architectures and other models it is essential that new terms and over-ridden meanings for common words or phrases are kept in a suitable dictionary format to ensure proper understanding of documentation and specifications.



Glossary Item Details

Term: Stock Item

Type: Business

Meaning:

The Stock Item defines the items (books) that are stocked in the warehouse for on-line purchase.

Where to find the Glossary

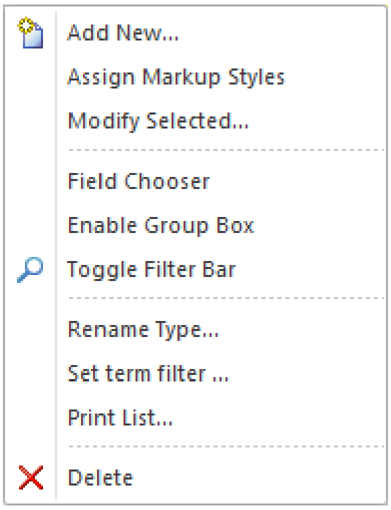
Ribbon: Publish > Dictionary > Glossary

Usage of the Glossary

The project Glossary can be used to record the important terms of a project or domain grouped by the type of term, allowing business, technical and domain specific types to be defined. A Glossary Report can be generated as a stand alone report or the glossary can be included as a section of another document.

Options for the Glossary

The Glossary has a number of options to determine the terms that are displayed in the list and to define the style that is used for types of terms in documentation.



Learn more about the Glossary

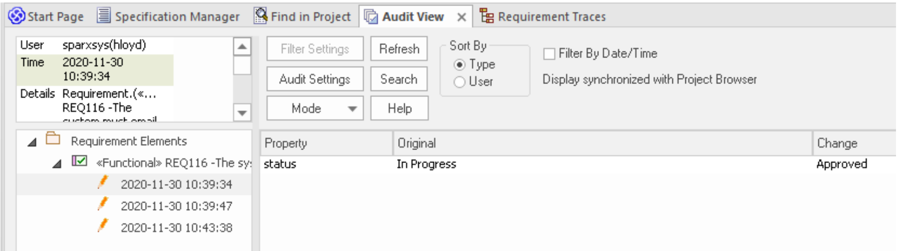
[Model Glossary]

Auditing

Getting to know Auditing

Introducing Auditing

The **Auditing** feature can keep track of the changes to Requirements including what was changed, when it was changed and by whom. Auditing is by default disabled and must be enabled before the changes to requirements will be recorded. Once enabled it is a passive tool that silently records the changes to elements. It does not replace **Version Control** or **Baselines** and in contrast to these tools it can not be used to return to a previous state of the model. Change management, governance and quality control are all aided by the use of Auditing.



User sparxsys(hloyd)
Time 2020-11-30 10:39:34
Details Requirement.(«... REQ116 -The

Sort By: ● Type ○ User

□ Filter By Date/Time

Display synchronized with Project Browser

Requirement Elements
- «Functional» REQ116 -The sy:
  - 2020-11-30 10:39:34
  - 2020-11-30 10:39:47
  - 2020-11-30 10:43:38

Property	Original	Change
status	In Progress	Approved

Where to find Auditing

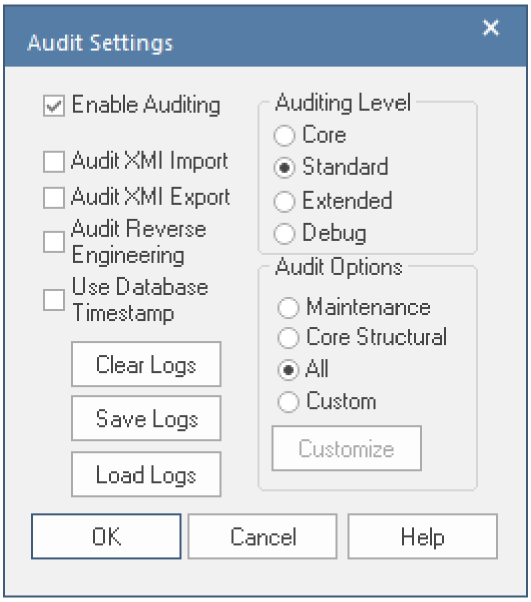
Ribbon: Configure > Model > **Auditing**

Use of Auditing

Auditing can be used to track what was changed in a model, who changed it and when. There are a number of modes and a repository administrator can use the settings to specify what is recorded in the audit. While a baseline can be used to show the difference between a model and a snapshot at a point in time, the Auditing tool records each individual change; it can not, however, be used to revert to a previous state.

Options for Auditing

There is a wide range of settings to configure auditing, starting with enabling or disabling the settings that determine which elements have an audit trail and the level of detail recorded. Audit logs can be exported from the repository to increase performance.



Audit Settings

☑ Enable Auditing

□ Audit XMI Import

□ Audit XMI Export

□ Audit Reverse Engineering

□ Use Database Timestamp

Auditing Level

○ Core

● Standard

○ Extended

○ Debug

Audit Options

○ Maintenance

○ Core Structural

● All

○ Custom

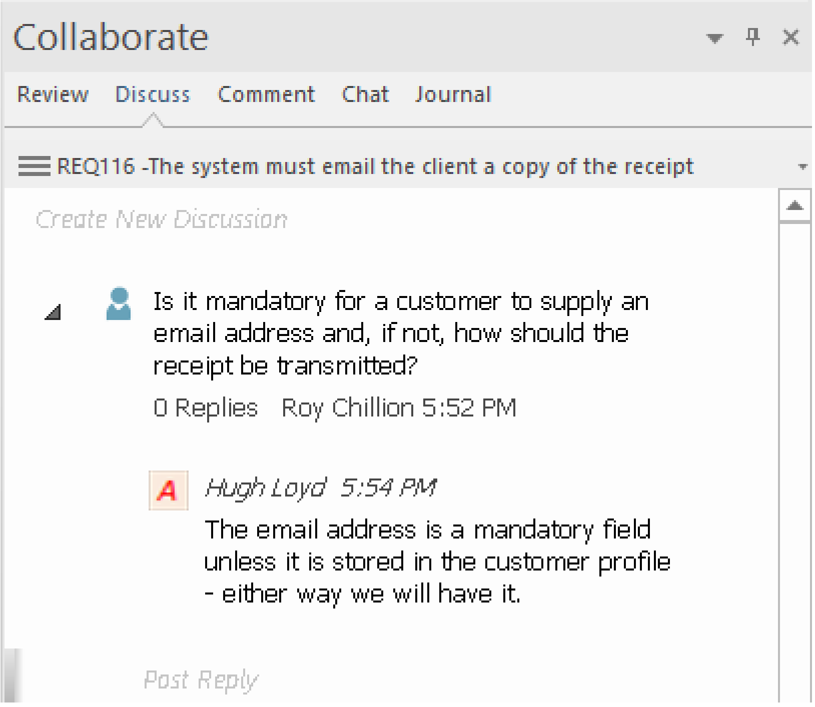
Learn more about Auditing	Auditing

Discussions

Getting to know Discussions

Introducing Discussions

The **Discussions** facility allows modelers to have conversations about elements, posting discussions and replying to existing posts. The Discussions for all elements in the model are conveniently listed in the Discussions Review window, allowing a modeler to see all the elements with posts.



Is it mandatory for a customer to supply an email address and, if not, how should the receipt be transmitted?

0 Replies Roy Chillion 5:52 PM

Hugh Loyd 5:54 PM

The email address is a mandatory field unless it is stored in the customer profile - either way we will have it.

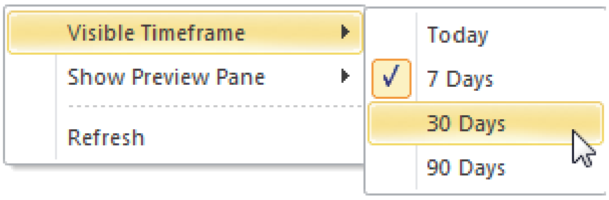
Where to find

To post or view an element's discussion

Ribbon: Start > Collaborate >

Discussions	**Discussions** > Discuss To view recently discussed elements Ribbon: Start > Collaborate > Discussions > Recently Discussed Elements To view all discussions in the repository Ribbon: Start > Collaborate > Discussions > Discussion History
Usage of Discussions	**Discussions** allow modelers to have conversations about elements without 'polluting' the element's notes with questions or modeling level comments such as 'Properties need to be added before the first release'. This feature brings the collaborative modeling platform alive, where modelers can add informal discussions about elements, emulating the discussions held in a physical workshop.
Options for Discussions	The **Discussion Review** window has a number of options to tailor the **Discussions** that are listed, including defining the timeframe to allow older and perhaps less relevant Discussions to

be hidden.



Learn more about Discussions

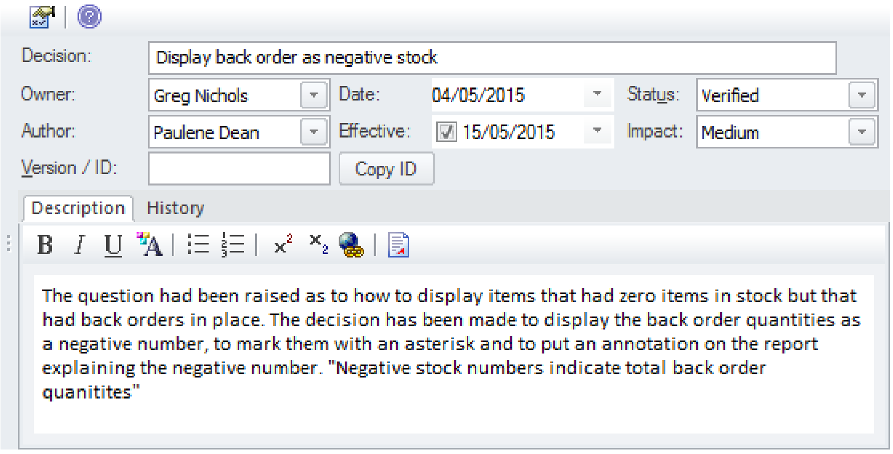
Discussions

Maintenance Items

Getting to know Maintenance Items

Introducing Maintenance Items

Element maintenance items can be used with any element, including Requirements, Components and Classes, to capture problems, changes, issues, tasks, events and decisions that affect the individual element. Several types of Maintenance Items can be used to track official changes, additions and deletions to sets of Requirements, Components, User Stories and other specifications, providing a sound basis for overall project governance and traceability.



Decision:	Display back order as negative stock				
Owner:	Greg Nichols	Date:	04/05/2015	Status:	Verified
Author:	Paulene Dean	Effective:	☑ 15/05/2015	Impact:	Medium
Version / ID:					

The question had been raised as to how to display items that had zero items in stock but that had back orders in place. The decision has been made to display the back order quantities as a negative number, to mark them with an asterisk and to put an annotation on the report explaining the negative number. "Negative stock numbers indicate total back order quanitites"

Where to find Maintenance

Ribbon: Construct > Change Management > Features / Changes /

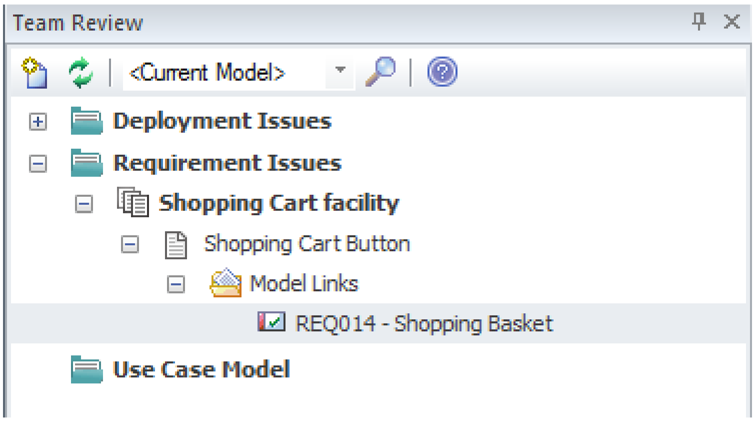
Items	Documents / Issues / Defects / Tasks
Usage of Maintenance Items	Element Maintenance Items can be used to record a wide range of information about elements including: changes, issues and tasks and more. These can be used to track the way an element is altered and maintained and can provide information about the Item including the rationale for the alteration, status and priority. While the Baseline and **Auditing** features record what has changed automatically the Maintenance Items provide the flexibility for a modeler to specify details manually.
Options for Maintenance Items	There are several types of maintenance item that can be used to add information to elements, including Features, Changes, Documents, Issues, Defects and Tasks. Items can present information such as who requested the item, who completed the item, and the status and priority of the item.
Learn more about Maintenance Items	Maintenance Items

Library

Getting to know The Library

Introducing The Library

The **Library window** provides an opportunity for developers, modelers, customers and stakeholders to comment and provide feedback on the work in progress or at the completion of a milestone or project.



Usage of The Library

The Library feature can be used to conduct model reviews from any number of perspectives, including walk-throughs, formal model reviews, or ad-hoc reviews.

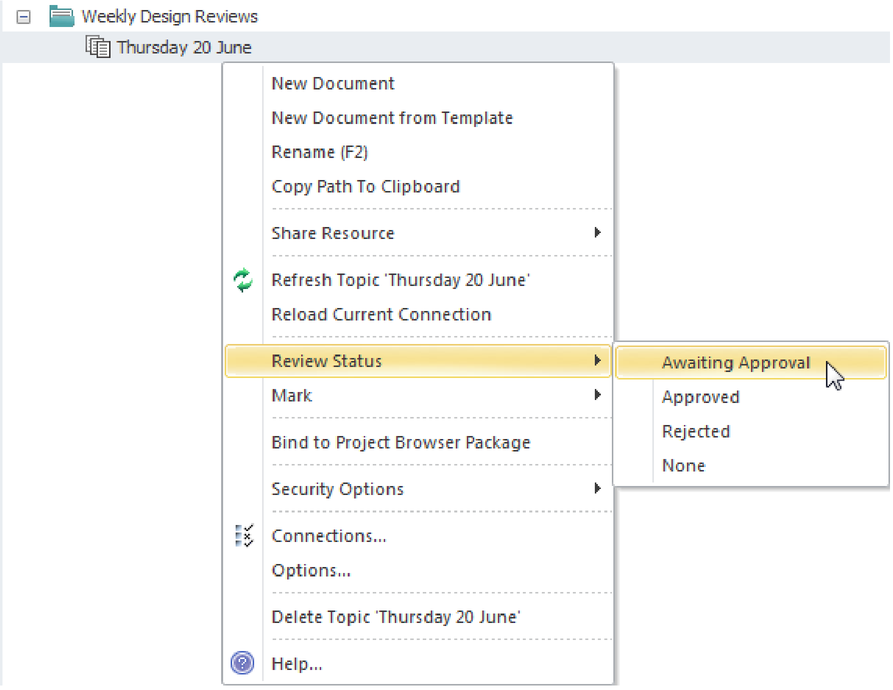
Where to find The Library

To post or view an element's discussion

Ribbon: Start > Desktop > Share > Library

Options for The Library

There is a wide range of settings available to configure the Library available from the Category and Topic context menus, including setting the status of the category or topic and other options. Diagrams, elements and element features can be conveniently dragged from the **Browser window** to create model links that can be used by team members to hyperlink directly from the **Library window** to these items in the Browser window.



Learn more about Team Library

[Library Window](#)