REQUEL

A Collaborative Requirements Tool with Automated Assistance

User Guide

Version 1.0

Table of Contents

Table of Contents 2
Table of Figures 3
Acknowledgements and Disclaimers 5
Chapter 1 Introduction 8
Chapter 2 Getting Started 9
Chapter 3 Working with Requirements 12
    Creating a Project 12
    Project Navigation 13
    Creating and Editing Stakeholders 14
    Creating and Editing Goals 18
    Creating and Editing Stories 21
    Creating and Editing Actors 22
    Creating and Editing Scenarios 24
    Creating and Editing Use Cases 26
    Editing Scenario Steps 28
    Generating Documents 30
    Adding a Document Generator 31
    Working with Terms 32
Chapter 4 Discussing and Negotiating Requirements 35
    Adding Notes and Issues 35
    Working with Analysis Issues 39
Chapter 5 Requel Setup 41
    System Requirements 41
    Create a Database User 41
    Configuration 42
    Deploying to Apache Tomcat 44
    Completing the Setup 45
Chapter 6 User Administration 46
GNU Free Documentation License 48

Table of Figures

Figure 1: Login Screen ... 9
Figure 2: Main Screen ... 10
Figure 3: Projects Navigation Details ... 10
Figure 4: Edit User Screen ... 11
Figure 5: Edit User Screen with Errors ... 11
Figure 6: New Project Screen ... 12
Figure 7: Project Import File Selection ... 13
Figure 8: Project Navigation Tab ... 14
Figure 9: Stakeholder Navigator ... 14
Figure 10: Sorting Stakeholders ... 15
Figure 11: Edit Stakeholder Screen ... 15
Figure 12: Selecting a User for a Stakeholder ... 16
Figure 13: Stakeholder Permissions ... 16
Figure 14: Stakeholder Goals ... 17
Figure 15: Goal Selector ... 17
Figure 16: Goal Navigator Screen ... 18
Figure 17: New Goal Screen ... 19
Figure 18: Goal Referring Entities ... 19
Figure 19: Goal Relations ... 19
Figure 20: Goal Relation Editor Screen ... 20
Figure 21: Goal Relation "To Goal" Selection ... 20
Figure 22: Stories Navigation Screen ... 21
Figure 23: Story Editor Screen ... 21
Figure 24: Story Goals and Actors ... 22
Figure 25: Actors Navigator Screen ... 23
Figure 26: New Actor Screen ... 23
Figure 27: Referenced Goals ... 24
Figure 28: Scenarios Navigation Screen ... 25
Figure 29: New Scenario Screen ... 25
Figure 30: Scenario's Referring Scenarios ... 25
Figure 31: Use Case Navigation Screen ... 26
Figure 32: Use Case Edit Screen ... 27
Figure 33: Use Case Auxiliary Actors ... 27
Figure 34: Use Case Stories ... 27
Figure 35: Empty Scenario Step Editor ... 28
Figure 36: Empty Step Node ... 28
Figure 37: Select Scenario Screen ... 29
Figure 38: Scenario Steps Editor ... 29
Figure 39: Documents Navigator ... 30

Figure 40: Generating a Document 31
Figure 41: Requirements Document 31
Figure 42: Document Editor Screen 32
Figure 43: Terms Navigator 32
Figure 44: A Term with a Canonical Term 33
Figure 45: Term Editor 33
Figure 46: Canonical Term Selected 33
Figure 47: Replace Term 34
Figure 48: Annotations Section 35
Figure 49: New Note Editor 36
Figure 50: Shared Notes 36
Figure 51: New Issue Editor 37
Figure 52: Adding Positions 37
Figure 53: Position Editor 38
Figure 54: Argument Editor 38
Figure 55: Open Issues 39
Figure 56: Example Analysis Issue 39
Figure 57: Example Analysis Positions 39
Figure 58: Create the Database User 42
Figure 59: Extracting the db.properties file from the WAR File 43
Figure 60: Editing the Database Properties 43
Figure 61: Updating the WAR file 44
Figure 62: Apache Tomcat Manager 44
Figure 63: WAR File Deployment 45
Figure 64: Requel in the Tomcat Application Manager 45
Figure 65: Users Navigation Tab 46
Figure 66: User Editor 46
Figure 67: Username Already in Use 47
Figure 68: User Roles and Permissions 47

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Chapter 1 Introduction

This document describes how an administrator configures and installs the Requel system, and how users create and discuss requirements using the Requel system.

For administrators, the

Requel Setup chapter describes how to prepare and install the Requel system in a Web server.
The

User Administration chapter describes creating and editing users, and assigning roles and permissions.

For system users, the Requel system should already be installed on a Web server and your administrator should have given you a URL to access it. The Getting Started chapter defines Web browser requirements, how to connect to the system, and how to login. The Working with Requirements chapter describes how to create a project and add requirements elements to it. The

Discussing and Negotiating Requirements chapter describes adding notes and issues to requirements and negotiating resolutions to issues.

Chapter 2 Getting Started

To get started you need a Web browser, the URL to the Requel system, and a username and password. Mozilla Firefox version 3.0 or later is the only Web browser with which the system is certified to work correctly.

To connect to the system, enter the URL of the application in the address bar of the browser. The system returns the login screen as shown in Figure 1. Enter the username and password supplied by your administrator and click the “Login” button.

Figure 1: Login Screen

If your account is setup correctly you will see the main screen as shown in Figure 2. On the left hand side of the screen is a tab labeled “Projects” with a tree containing the projects that you are assigned. If you have project creation authorization you will also see a “New Project” button above the projects.

Figure 2: Main Screen

Figure 3 shows a close up of the project navigation tab.

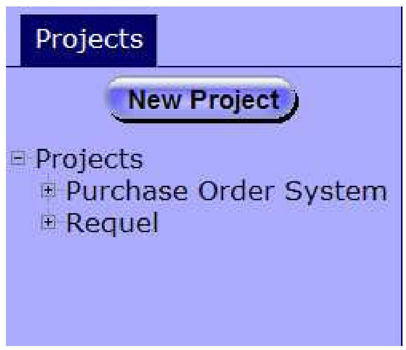


Figure 3: Projects Navigation Details

On the upper right hand of the screen, as shown in Figure 2, are a “Logout” button and “Edit Account” button. The logout button clears out your user session on the server and returns you to the login screen. The edit account button opens the “Edit User” screen for your system account as shown in Figure 4.

When you first login you should change the password assigned by the administrator to something more secure and fill in any missing personal data, such as your name, email address, and phone number. Unless you have system administrator privileges you will not be able to change your username.

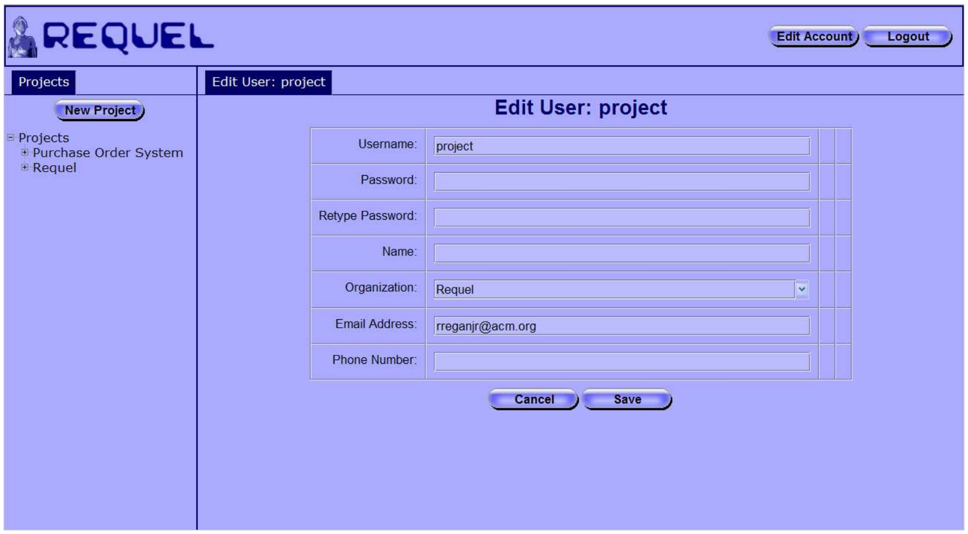


Figure 4: Edit User Screen

After making changes to your account you must click the "Save" button at the bottom to submit the changes to the system. If everything is valid the edit user panel will close and your changes will be saved. If there are any problems with your data, such as the password and retype password fields don't match, your email address is not formatted properly, or your phone number is not formatted properly, the system will display error messages next to the fields that need to be corrected as shown in Figure 5

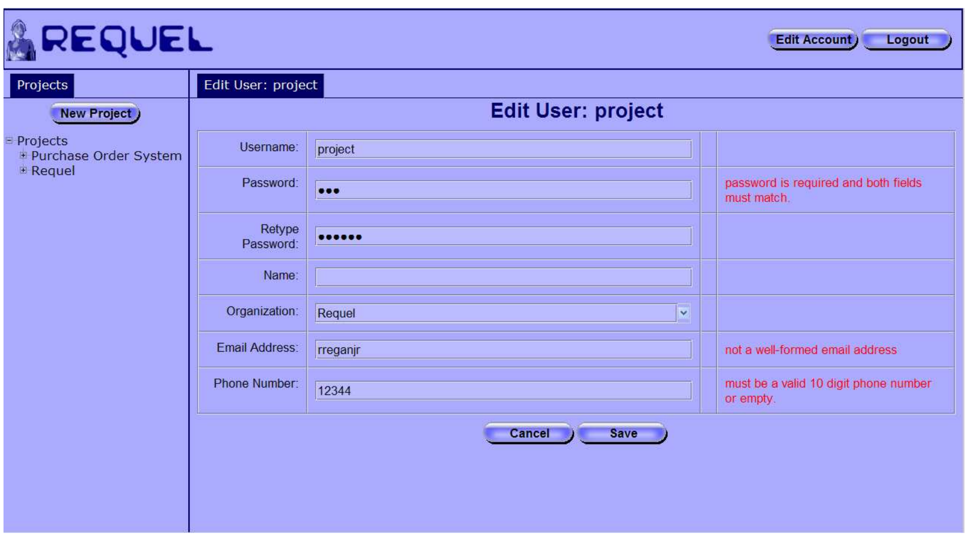


Figure 5: Edit User Screen with Errors

Chapter 3 Working with Requirements

This section shows you how to create a project and add requirements to it. Requel doesn't impose any particular process for creating requirements, which makes it flexible, but the flexibility may make it harder for you to get started if you don't have a process for gathering requirements in mind. If you don't have a process in mind, you may want to start with stories to describe the behavior of the system.

In any case, to start you will need to create a project and the stakeholders that will work on the requirements.

Creating a Project

Requel organizes requirements into projects. If you have project creation authorization the "New Project" button appears at the top of the project navigation tab as shown in Figure 3. Clicking the button opens the "New Project" screen show in Figure 6.

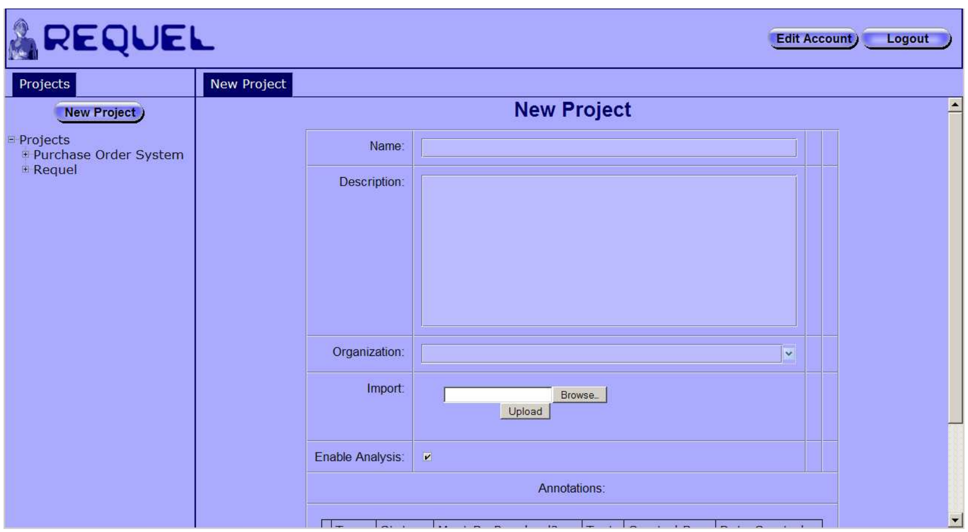


Figure 6: New Project Screen

The new project screen supports creating a project from scratch or importing a project stored in an XML file.

To create a new project from scratch enter a name, organization, optional description, and click the save button. The combination of project name and organization are required to be unique. The system verifies the values are valid, creates the project, and adds it to the project navigation tab. If there are validation problems the system puts a message to the right of the affected fields.

To import a project from an XML file, click the "Browse" button in the "Import" field and use the file upload dialog to navigate to the file to import as shown in Figure 7. If you are importing a project that already exists in Requel, you must change the name by entering a new name in the name field to meet the uniqueness requirement described earlier. Only the name can be changed when importing a project; values supplied in the description and organization fields are ignored.

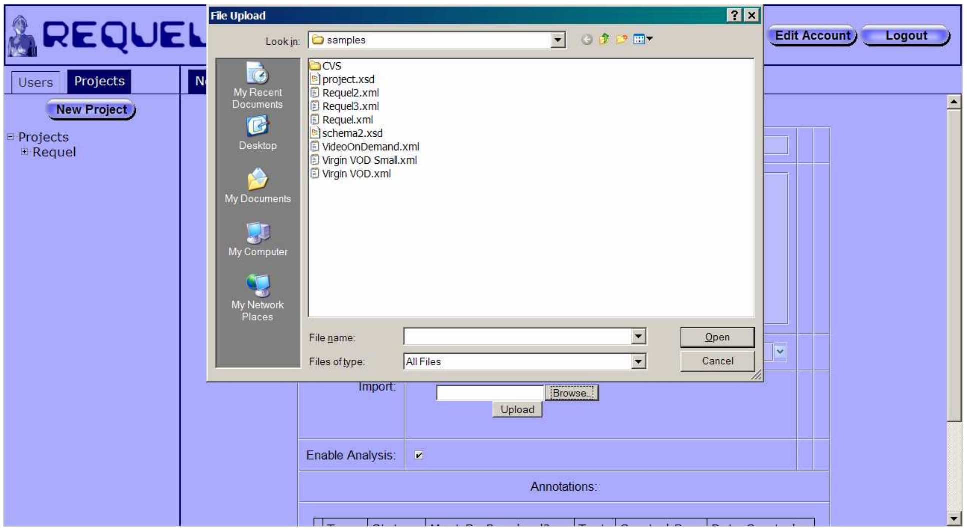


Figure 7: Project Import File Selection

When importing a project you have the option to turn off analysis using the "Enable Analysis" checkbox. This is useful for projects that were exported from the system and the elements have already been analyzed. Since the analysis uses a significant amount of processing power and can take a long time to complete. Projects created by hand or by another tool in the project XML format should have analysis enabled.

After selecting the file in the upload dialog, click the "Upload" button to upload the project file to the server. Then click the "Import" button at the bottom of the screen. The system creates a new project and adds it to the project navigation tab.

Project Navigation

Figure 8 shows a close up of the project navigation tab with the "Purchase Order System" project node in a closed state and the "Requel" project node in an open state. Clicking on the project name opens the "Project Overview" panel for editing the name, description and organization of the project, as well as adding issues and notes to the project. Clicking on the + next to a project name in the project navigation tab expands the project node to display the links to the requirements elements.

Figure 8: Project Navigation Tab

Creating and Editing Stakeholders

The first task to do after creating a new project is adding stakeholders for the users that will work on the project. Clicking on the "Stakeholders" link under a project in the navigation tab opens the stakeholder navigator, which lists all the stakeholders on the project, ordered by username as shown in Figure 9.

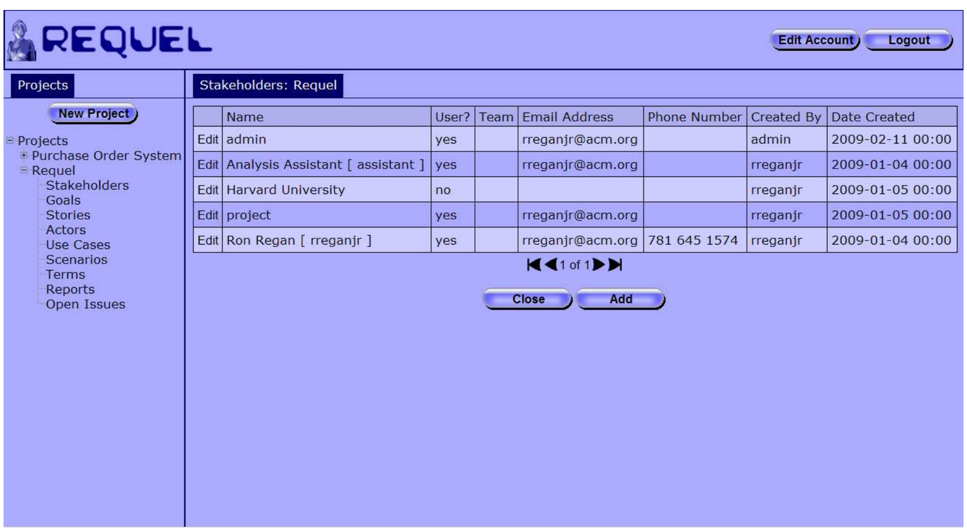


Figure 9: Stakeholder Navigator

Users authorized to edit stakeholders will see an "Edit" link in the first column of each stakeholder entry in the table and an "Add" button below the table. If you are not authorized to edit stakeholders the first column contains a "View" link that opens the stakeholder editor, but with read-only access. Clicking on the column titles sorts the stakeholders by that column. The first click sorts them in ascending order alphabetically as shown in Figure 10.

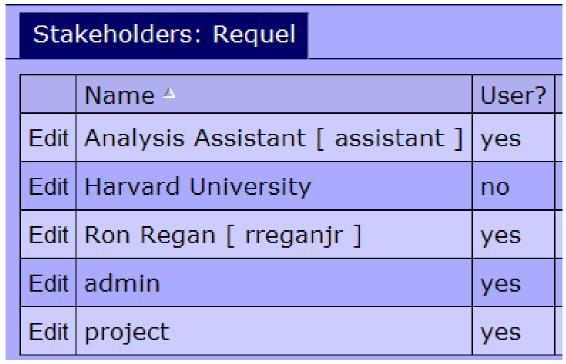


Figure 10: Sorting Stakeholders

The column indicates the sorting order with an arrow next to the column name. An arrow pointing up indicates ascending order and an arrow pointing down indicates descending order. Clicking on the column title, when it is sorted in ascending order, changes the sorting to descending order. Note: stakeholders without a name, for example the admin and project stakeholders in Figure 10, appear at the end of the results.

There will always be at least two stakeholders, the person that created the project and the "Analysis Assistant" that the system uses to indicate issues and notes created by the system.

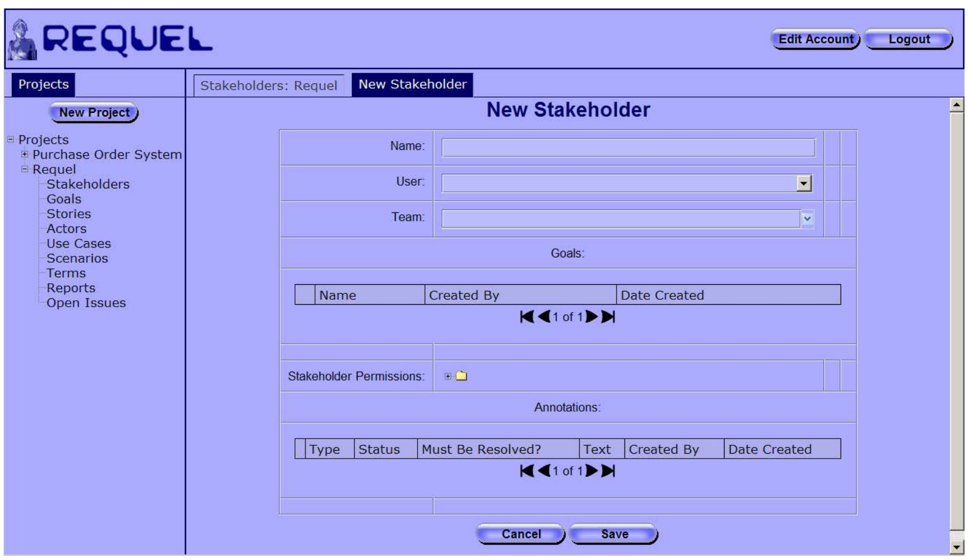


Figure 11: Edit Stakeholder Screen

Clicking the "Add" button on the stakeholder navigator screen opens the "New Stakeholder" screen shown in Figure 11. This screen is used for creating both user and non-user stakeholders for the project. To create a user stakeholder, leave the "Non-User Name" field empty and select a user from the "User" field, as shown in Figure 12.

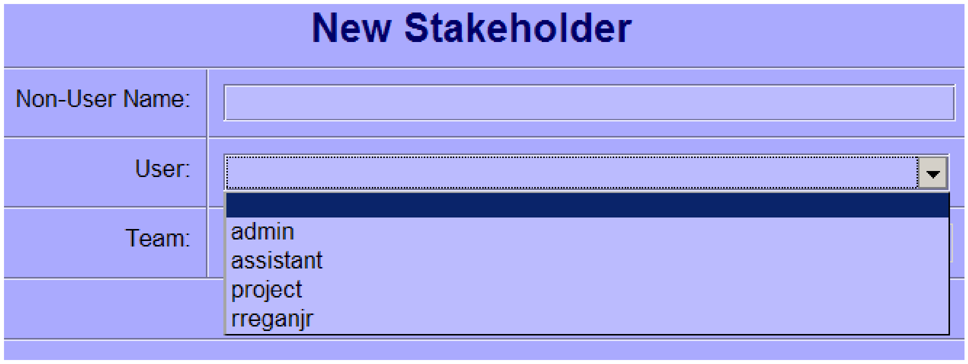


Figure 12: Selecting a User for a Stakeholder

Only administrators can create user accounts. If a person that you want to add to a project doesn't appear in the list they may not have a user account. You should ask the Requel administrator to add an account for that person, with the "Project User" role.

You may optionally enter or select a team name in the "Team" field. The team is for documentation purposes only. Customer and Supplier are examples of team names.

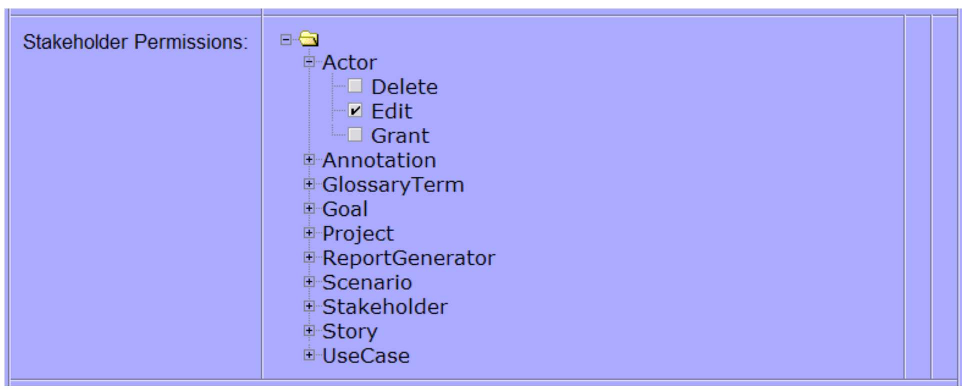


Figure 13: Stakeholder Permissions

User stakeholders can view all requirements elements on a project, but require explicit authorization to edit or delete requirements. The "Stakeholder Permissions" field contains a tree with nodes for each of the requirement element types. Each of the nodes has child nodes with permissions for actions such as "Delete", "Edit", and "Grant", and a checkbox as shown in Figure 13. Checking a box grants permission to the user to perform that action on that element type; unchecking the box revokes the permission. For example in Figure 13 the checkbox for "Edit" under "Actor" is checked indicating the user can create and edit actors.

The "Grant" action permission allows a user with stakeholder "Edit" permission to grant permissions for that element type to other users. For example, if stakeholder "A" has stakeholder edit permission and story grant permission, he or she can edit stakeholder "B" and grant or revoke "Delete", "Edit", and "Grant" permission for actors to stakeholder "B". If stakeholder "A" does not have grant permission for story elements, he or she can not grant or revoke permissions related to stories to stakeholder "B."

Figure 14: Stakeholder Goals

Non-user stakeholders represent organizations or regulatory bodies that don't have a user representative, but have interests or goals that the system must meet. Figure 14 shows a non-user stakeholder "Harvard University" with one goal named "Work is your own"; representing that projects submitted for homework are expected to be your own work. Non-user stakeholders are created using the same screen as user stakeholders, but instead of selecting a user, a name is entered in the "Non-User Name" field. Non-user stakeholders may have a team. Stakeholder permissions don't make sense for non-user stakeholders.

After creating a stakeholder, goals can be added to it. Both user and non-user stakeholders can have goals. A new goal can be added by clicking the "New" button, which opens the "New Goal" screen, or an existing goal can be added to the stakeholder by clicking the "Find" button and selecting a goal from the goal selector panel. Figure 15 shows the goal selector panel with the selected goal highlighted.

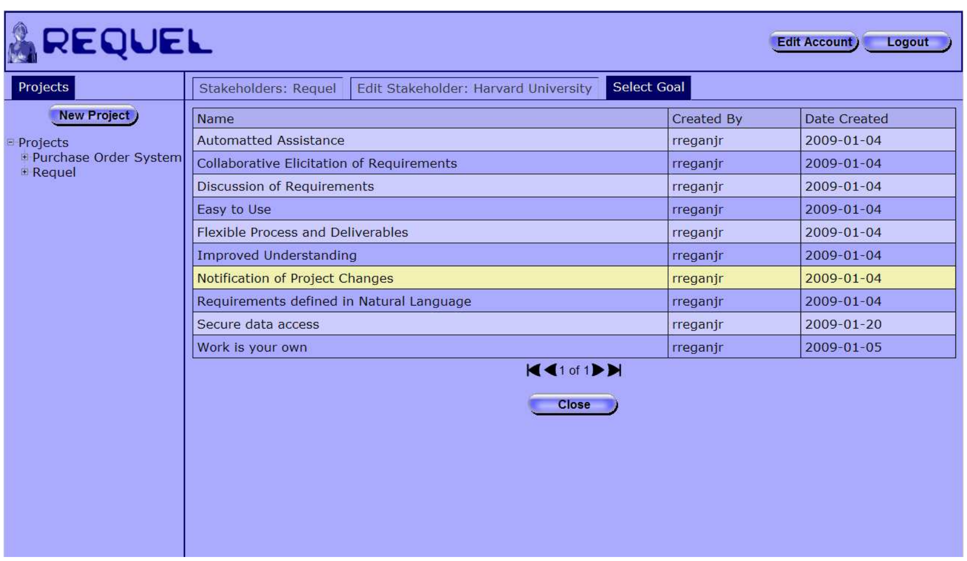


Figure 15: Goal Selector

The full goal can be viewed or edited by clicking on the “Edit” link in the first column of the goal table. The goal can be removed from the stakeholder by clicking the “Remove” link as shown in Figure 14. Removing a goal from a stakeholder does not delete it from the system.

Creating and Editing Goals

Goals are used to indicate desired properties, qualities, constraints, features and functions that the system must support. For example, “Easy to Use” is a high-level quality goal; “Must run on Linux” is a technology constraint; “Support an IBIS style of discussion” is a feature.

Clicking on the “Goals” link in the project navigation tab opens the goal navigator screen shown in Figure 16. The goal navigator has a table with the name of each goal, who created it, and when it was created. If you are authorized to edit goals the first column contains an “Edit” link and below the table is an “Add” button. If you are not authorized to edit goals the first column contains a “View” link that opens the goal editor for read-only viewing.

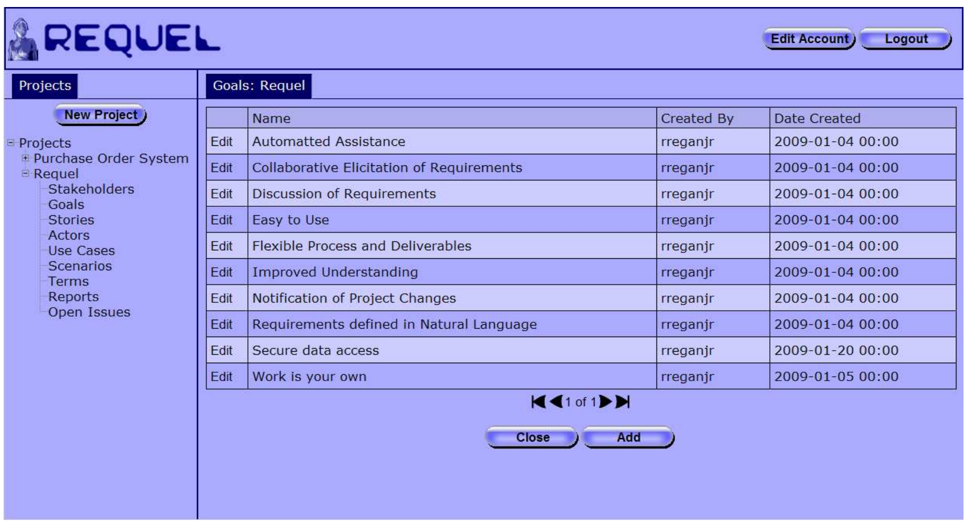


Figure 16: Goal Navigator Screen

Clicking the add button opens the “New Goal” screen shown in Figure 17. Goals have a name, which is a short one-line description, and a text body that is the full description of the goal. The goal name must be unique in a project. After entering a name and text body, click the save button at the bottom of the screen to create the goal. If the name is unique the system creates the goal and adds it to the goal navigator table.

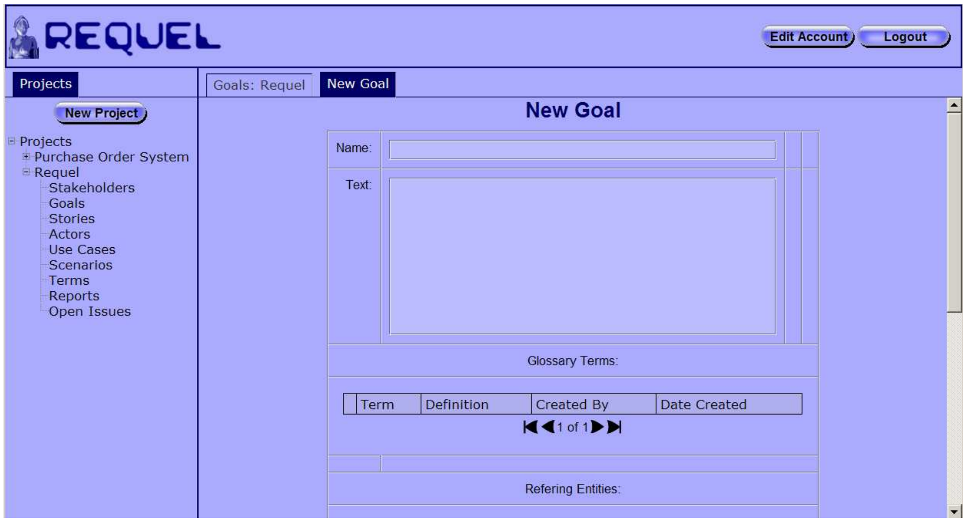


Figure 17: New Goal Screen

If the goal was created from another requirements element such as a stakeholder or use case, then the goal is also added to the goals field of that element. All the entities that refer to a goal are shown in the goal editor's "Referring Entities" table shown in Figure 18.

Referring Entities:

	Description	Created By	Date Created
Edit	Project: Requel	rreganjr	2009-01-04
Edit	Stakeholder: Harvard University	rreganjr	2009-01-05
Edit	UseCase: A user logs in to the system	rreganjr	2009-01-20

1 of 1

Figure 18: Goal Referring Entities

Upon saving the goal, the system initiates analysis of the goal as a background task referred to as the "Automated Assistant." The assistant adds notes and issues to the goal as it analyzes it. During analysis of a goal the assistant identifies unknown or misspelled words; potential "significant terms" to add to the glossary; potential actors that don't already exist in the project; and complex sentences that may be difficult to understand. You may work on any requirements elements as the assistant analyzes them; the assistant will not interfere with your work. See the Working with Analysis Issues section for more information about the analysis.

Relations To Other Goals:

	Relation Type	To Goal	Created By	Date Created
Edit	Supports	Improved Understanding	project	2009-03-23

1 of 1

Add

Figure 19: Goal Relations

Goals can have relationships with other goals listed in the goal editor's "Relations to Other Goals" field, as shown in Figure 19. The relationships can be used to add traceability of goals from high level soft goals to specific functional requirements and as an indication of how goals interact with each other. Goals may support or conflict with each other. Conflicts help to identify places where tradeoffs may be needed, and to document the rationale behind the decisions made. Goal relations are directional, for example if goal "A" supports goal "B" there is a relationship from goal "A" to goal "B", but not from goal "B" to goal "A".

Figure 20: Goal Relation Editor Screen

Clicking the "Add" button opens the "New Goal Relation" editor as shown in Figure 20. A goal relation has a "From Goal", a "To Goal", and the relation type. The editor defaults the "From Goal" selector to the goal in the editor where the add button was clicked. Both the "To" and "From" goal fields list all the goals in the project as possible options as shown in Figure 21. After selecting the "To Goal" and relation type, clicking save creates the relationship and adds it to the goal relations table of the original goal as shown in Figure 19.

Figure 21: Goal Relation "To Goal" Selection

Creating and Editing Stories

Stories are simple narratives of how a user interacts with the system. Stories can be used to describe how things work before the new system is in place, i.e. the current state of affairs, or how things will be when the new system is in place. Stories can describe negative cases, such as problems with the current system, or how the new system should behave in a bad situation.

Clicking the "Stories" link in the project navigator tab opens the stories navigation screen as shown in Figure 22.

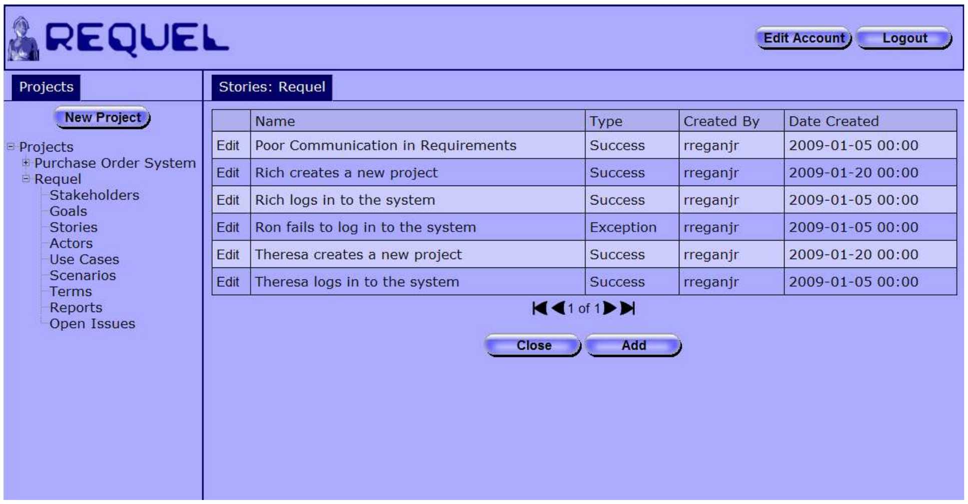


Figure 22: Stories Navigation Screen

The stories navigator has a table with the name, type, who created it, and when it was created. If you are authorized to edit stories the first column contains an "Edit" link and below the table is an "Add" button. If you are not authorized to edit stories the first column contains a "View" link that opens the story editor in read-only mode.

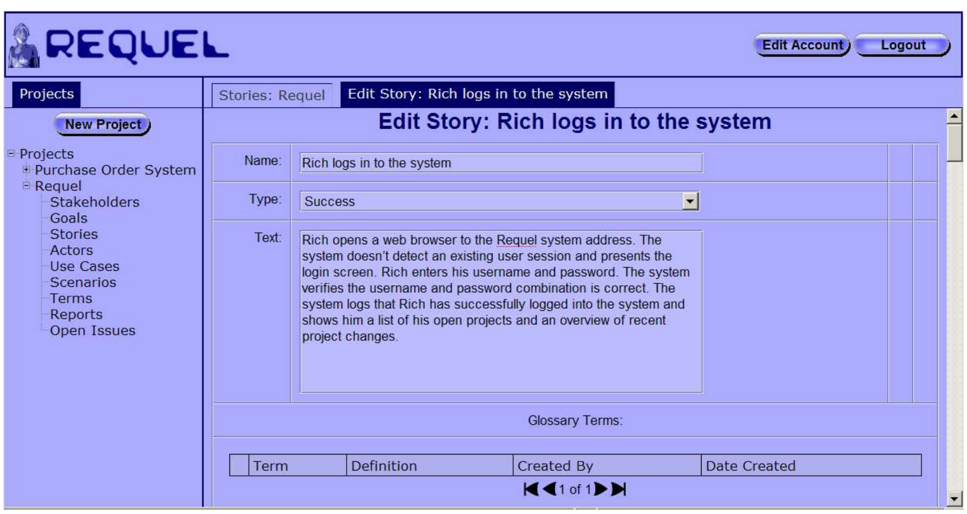


Figure 23: Story Editor Screen

Clicking the “Edit” button for an existing story opens the story editor screen shown in Figure 23. A story has a short one-line name, a type of “Success” or “Exception” and a text body. The story name must be unique in the project. Clicking the “Save” button, located at the bottom of the screen, validates and creates or updates the story and initiates analysis as a background task. See the Working with Analysis Issues section for more information about the analysis.

Optionally, stories can have goals and actors assigned. The actors add traceability to the types of users appropriate to the story. The goals can be used to indicate the goals supported by the story or derived from the story. For both goals and actors there are “New” and “Find” buttons as shown in Figure 24. The “New” button is used to open an editor for creating a new actor or goal that gets assigned to the story. The “Find” button is used to open a selector, like the one in Figure 15, to choose an existing goal or actor.

Figure 24: Story Goals and Actors

Creating and Editing Actors

Actors represent the types of users that will interact with the system. Actors may be human users or other systems. Clicking on the “Actors” link in the project navigation tab opens the actor navigator screen shown in Figure 25. The actor navigator contains a table of the actors with columns for the name, description, who created it, and when it was created. If you are authorized to edit actors the first column contains an “Edit” link and below the table is an “Add” button. If you are not authorized to edit actors the first column contains a “View” link that opens the actor editor for read-only viewing.

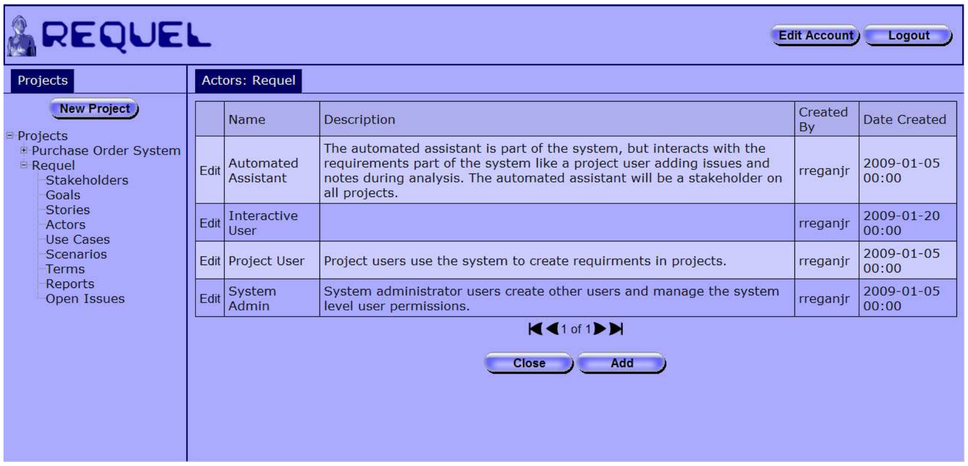


Figure 25: Actors Navigator Screen

Clicking the “Add” button opens the “New Actor” editor as shown in Figure 26.

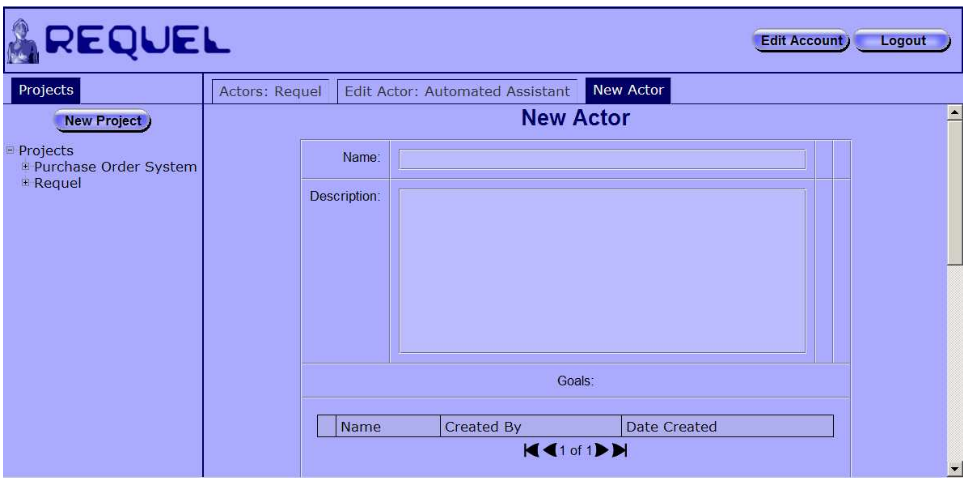
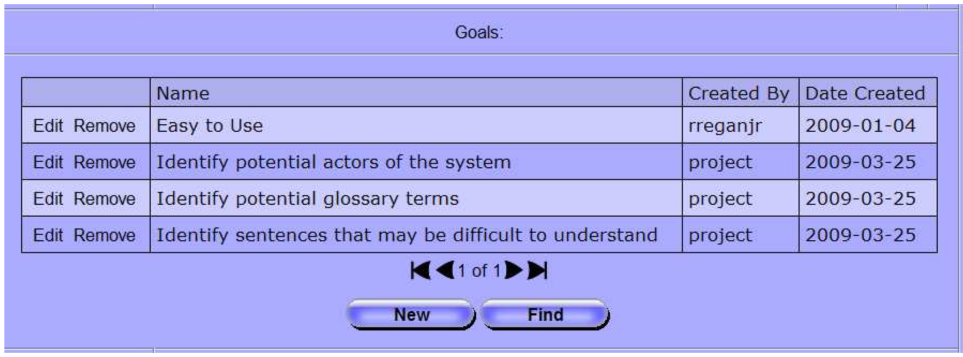


Figure 26: New Actor Screen

An actor has a name that must be unique in the project, and a description. The description can be used to describe the actor’s primary function or to describe an example “persona” for a person or system that typifies the actor. For example the following is a persona for a user of the Requel system:

> Theresa is an accountant for Bailey Pet Supply tasked with specifying the requirements for integrating the purchase order system with the accounting system using the system. Theresa has never used a requirements tool before and has no projects. Theresa will be an end-user of the resulting system.

Actors may have goals that identify the functions of the system relevant to the actor, or general interests that the actor has that the system must meet. Figure 27 shows the goal references of an actor in the Requel system.



Goals:

	Name	Created By	Date Created
Edit Remove	Easy to Use	rreganjr	2009-01-04
Edit Remove	Identify potential actors of the system	project	2009-03-25
Edit Remove	Identify potential glossary terms	project	2009-03-25
Edit Remove	Identify sentences that may be difficult to understand	project	2009-03-25

1 of 1

New Find

Figure 27: Referenced Goals

From the actor editor new goals can be added using the “New” button or existing goals can be added using the “Find” button. Goals attached to the actor can be removed by clicking the “Remove” link in the first column of the goals table. Goals that are removed from the actor are not deleted from the project.

Like other requirements element actors are analyzed when saved. See the Working with Analysis Issues section for more information about the analysis.

Creating and Editing Scenarios

Scenarios are semi-structured sequences of steps where the actor invokes an action on the system in one step, followed by a response by the system in the next step. Scenarios are composed of an ordered list of steps where a step may be a single action or a reference to another scenario with its own set of steps. Scenarios may be used as stand alone entities that describe an interaction more explicitly than a story, or in conjunction with a use case.

Clicking on the “Scenarios” link in the project navigator opens the scenarios navigator screen as shown in Figure 28. In addition to the standard name, created by, and date created columns, the scenario navigator has two additional columns: “Top Level” and “Type”. The top level column indicates if a scenario is used as a step in another scenario. Scenarios with a “Yes” value means the scenario is a top level scenario and not used in other scenarios. The type column indicates how the scenario is used, for example if it is used as an alternate, exceptional, or optional sequence of steps in another scenario.

If you are authorized to edit scenarios the first column contains an “Edit” link and below the table is an “Add” button. If you are not authorized to edit scenarios the first column contains a “View” link that opens the scenario editor for read-only viewing.

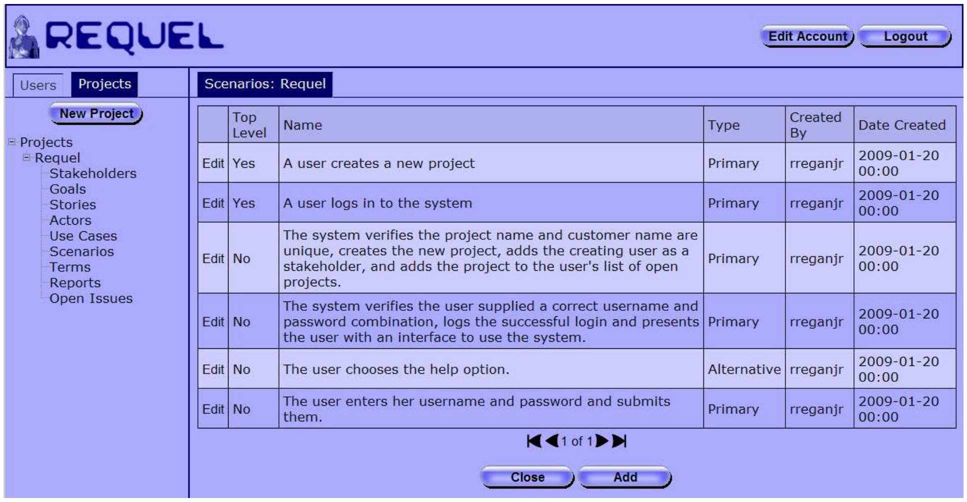


Figure 28: Scenarios Navigation Screen

Clicking the "Add" button opens the "New Scenario" editor as shown in Figure 29. A scenario has a name, type, optional descriptive text, and a sequence of steps. The scenario name must be unique in a project. The type of scenario is most relevant for scenarios that are steps in other scenarios and is described in the Editing Scenario Steps section, which gives a description of how to add and edit the steps of a scenario.

Figure 29: New Scenario Screen

The scenario editor lists the scenarios that use the scenario being edited in the "Referring Scenarios" table as shown in Figure 30. Clicking the edit link in the table opens the scenario editor for that scenario.

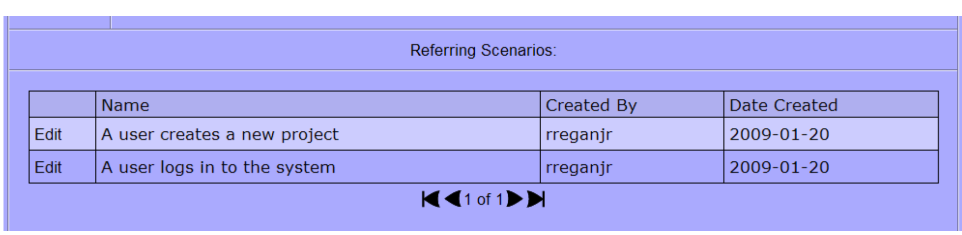


Figure 30: Scenario's Referring Scenarios

Creating and Editing Use Cases

Use cases represent functional requirements in terms of how a user interacts with the system. In the Requel system a use case is a confluence of stories, goals, and actors with a scenario to describe the behavior of a specific function of the system.

Clicking on the "Use Cases" link in the project navigator opens the use case navigator screen as shown in Figure 31. The navigator includes columns for the use case name, primary actor, created by username, and date created. If you are authorized to edit use cases the first column contains an "Edit" link and below the table is an "Add" button. If you are not authorized to edit use cases the first column contains a "View" link that opens the use case editor for read-only viewing.

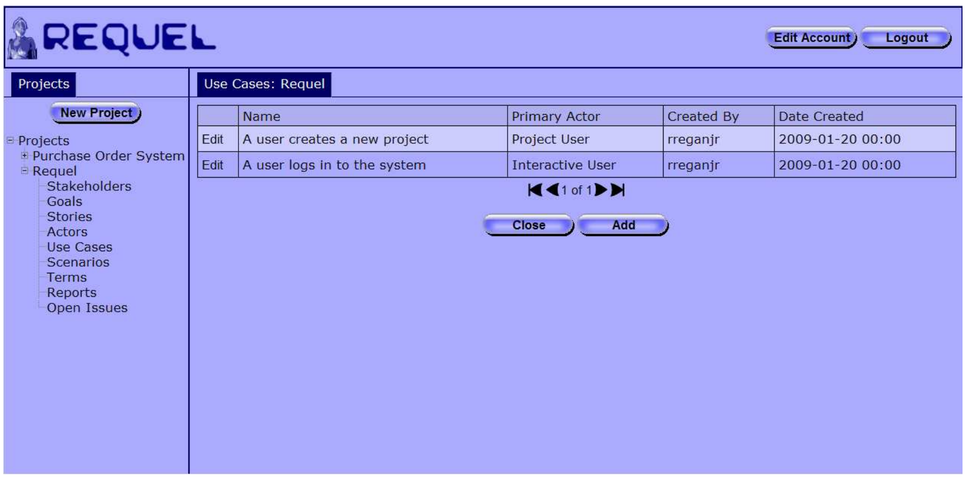


Figure 31: Use Case Navigation Screen

Clicking the "Add" button opens the "New Use Case" editor as shown in Figure 32. A use case has a name, which must be unique in a project, an optional description, and a primary actor. The primary actor input is a combo-box where the actor can be selected from the drop-down list, or a name can be entered. If a name is entered, when the use case is saved, a new actor is created, added to the project, and set as the primary actor. The description and other information of the actor can be edited later, by opening the actor editor through the actor navigation screen.

Figure 32: Use Case Edit Screen

A use case can contain a set of goals that represent what the primary actor is trying to accomplish with the use case. Goals are added and removed from use cases just like goals on other entities, such as on the actor editor screen as shown in Figure 27.

Most use cases only have a single primary actor, but in some cases additional actors are needed to show complex interactions where the system interacts with external services to support the user's actions. Auxiliary actors are displayed in a table as shown in Figure 33. Like goals, a new actor can be created and added, or an existing actor can be added to the auxiliary actors of the use case.

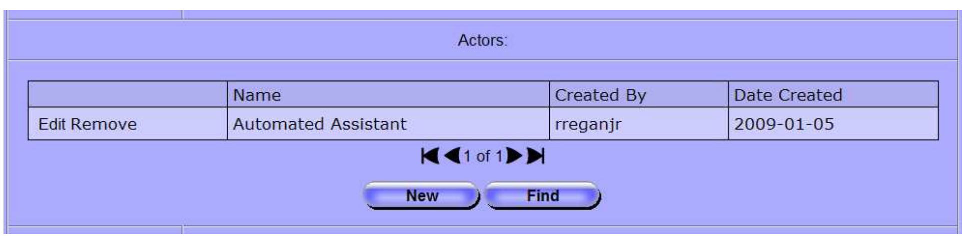


Figure 33: Use Case Auxiliary Actors

Use cases can reference multiple stories as example of successful and exceptional interactions with the system. Stories are useful as rationale for understanding the scenario of the use case. Stories are displayed in a table as shown in Figure 34 and can be added and removed just like actors and goals.

Figure 34: Use Case Stories

Editing the scenario of the use case is described in the Editing Scenario Steps section.

Editing Scenario Steps

The scenario step editor is used by both the scenario editor and use case editor screens. When creating a new scenario the steps editor appears with no steps and two buttons as shown in Figure 35.

Figure 35: Empty Scenario Step Editor

The "Add Step" button creates an empty step node as shown in Figure 36. New steps are added below any existing steps.

Figure 36: Empty Step Node

Each step has a box for editing the text, a drop down list for selecting the type, and a collection of buttons and icons for manipulating the step described in Table 1. The text of the step is limited to 255 characters. The types are pre-condition, primary, alternative, exception, and optional. A step with the pre-condition type isn't really a step, but indicates a condition that must be met for a scenario to start or continue. The primary type indicates the step is part of the primary flow of the scenario; alternative means the step is an alternative to the primary flow, but part of a successful interaction; exception indicates a problem or error condition; and optional means the step is a successful interaction, but one that is not required to take place.

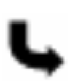
	The "slotted puzzle" icon is used to drag a step to a new location in the scenario by dropping it on the tabbed puzzle piece. A step can be dragged from and dropped to any sub-step level.
	The "tabbed puzzle" icon is the drop target for moving a step. Dropping a step on the target inserts that step in the location and moves the existing all subsequent steps down by one.
	The "X" button removes the step from the scenario and moves all subsequent steps up by one. If the step is a simple step with no sub-steps it is deleted from the project. If the step is a sub-scenario it is removed, but not deleted.
	The "sub-step" button adds a new sub-step to this step. If the step has other sub-steps the new one is added at the end of the sequence.

Table 1: Step Node Controls

The “Add Scenario” button shown in Figure 35 is used to add an existing scenario as a step in the current scenario. Clicking the button opens the “Select Scenario” screen as shown in Figure 37. Clicking on a scenario selects it and adds it as the last step in the scenario. Note: if the original scenario is a step or sub-step reachable through the selected scenario, then it would result in a cycle in the steps and it is not added.

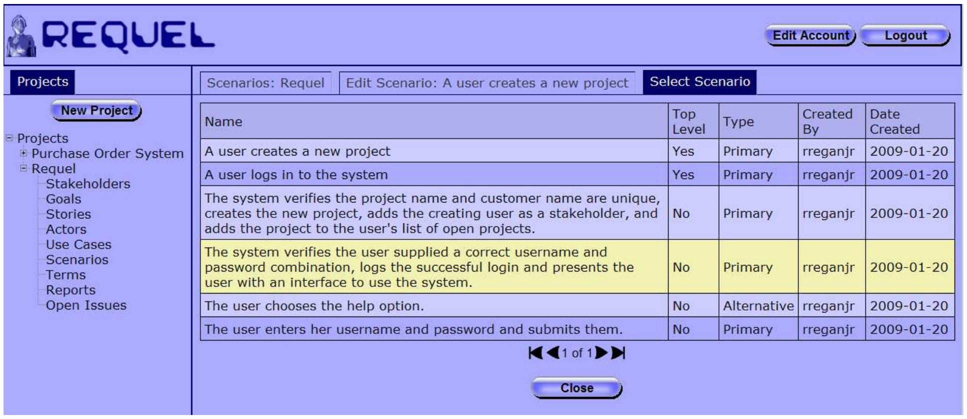


Figure 37: Select Scenario Screen

When editing a scenario with existing steps, the steps are ordered in the sequence they should occur, with sub-steps below and to the right of their parent step as shown at the bottom of Figure 38.

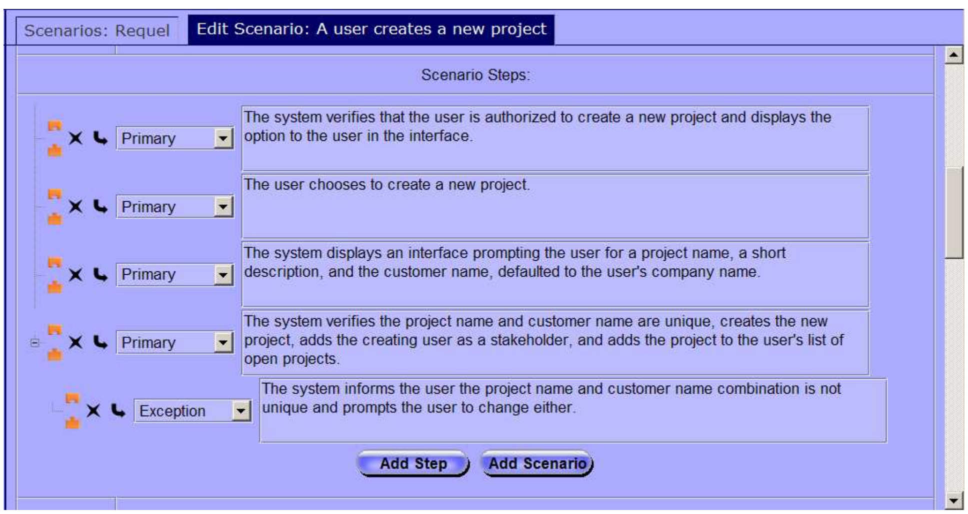


Figure 38: Scenario Steps Editor

Sub-steps can be nested to any level. Each step that contains sub-steps has a “-” button to the left of all other controls when the sub-steps are visible. Clicking it hides the sub-steps. When a step’s sub-steps are hidden the step has a “+” button, which exposes the sub-steps when clicked.

Generating Documents

Once the requirements are in Requel you will want to generate a specification document to provide to the developers to build the system. Just as there are many processes for acquiring requirements, there are many formats for specifying requirements. Requel supports creating custom documentation using the XML Stylesheet Language Transformations (XSLT) language to transform the requirements from an XML format into a specification document. XSLT is a powerful language that can transform XML into a variety of structured or unstructured document formats such as HTML, PDF, and Microsoft Office documents using the Office Open XML format.

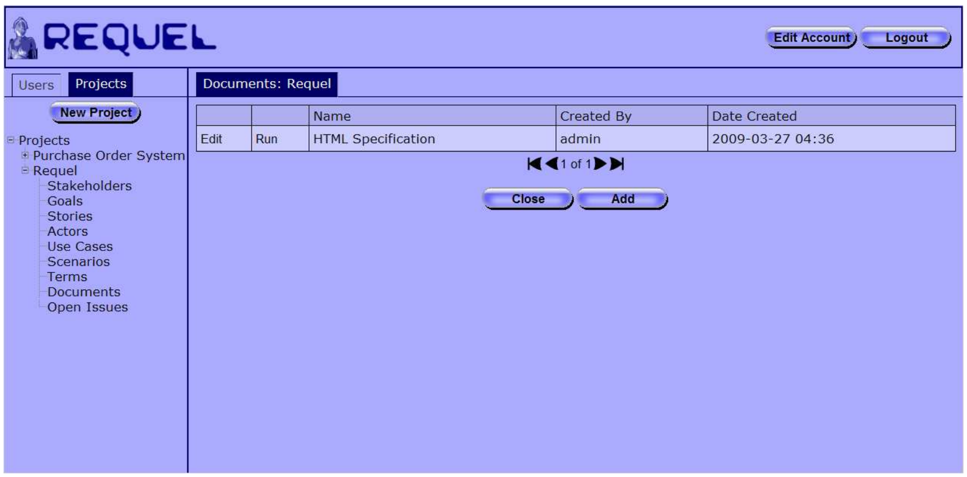


Figure 39: Documents Navigator

Clicking on the “Documents” link in the project navigation opens the documents navigator as shown in Figure 39. Each entry in the table represents an XSLT script for generating a document. If you are authorized to edit documents (in the stakeholder permissions it is labeled as ReportGenerator) the first column contains an “Edit” link and below the table is an “Add” button. If you are not authorized to edit documents the first column contains a “View” link that opens the document editor for read-only viewing.

The second column of the table holds a “Run” link that executes the XSLT script on the requirements to generate a document. The document is returned to the browser, which gives you the option to open it or save it as shown in Figure 40. The document will have the project’s name as the file name with an appropriate extension for the type of document as a suffix. For example, an HTML document for a project named “Requel” will be named “Requel.html”.

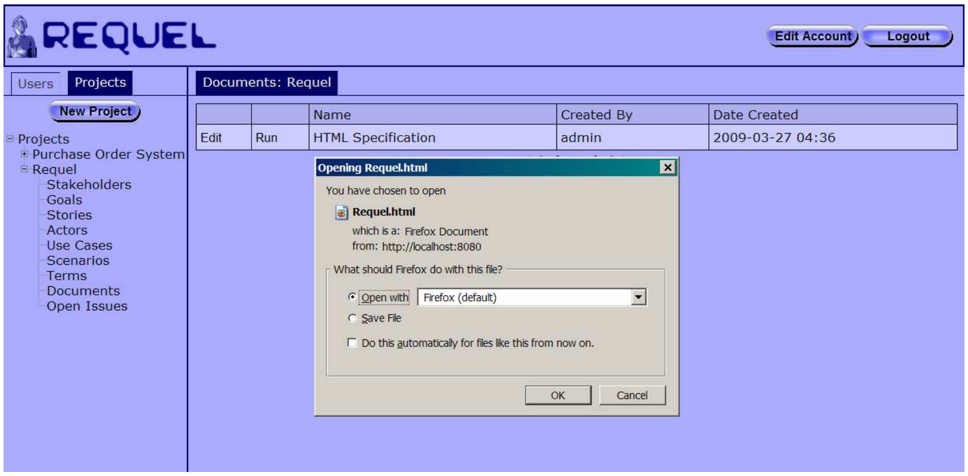


Figure 40: Generating a Document

The built-in "HTML Specification" document is added to all projects when they are created. It generates a simply formatted Web page with all requirements elements as shown in Figure 41. There is a section for each of the requirement element types: stakeholders, actors, goals, stories, use cases and scenarios. At the top of the document is a table of contents that links to each section and also to each element of the requirements.

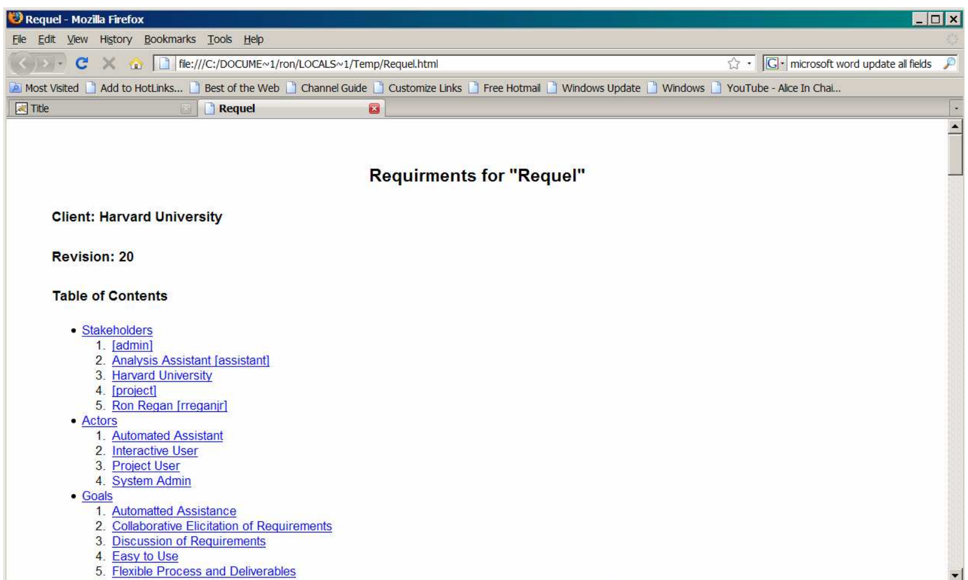


Figure 41: Requirements Document

Adding a Document Generator

Clicking the "Add" button opens the "New Document" editor as shown in Figure 42. A document has a name, which must be unique in the project, and the XSLT script text.

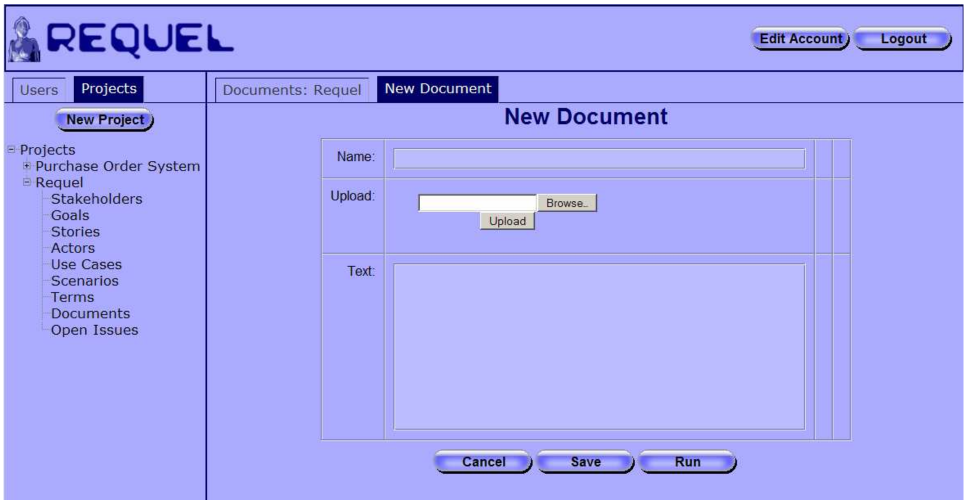


Figure 42: Document Editor Screen

An XSLT can be uploaded from your local system by clicking the "Browse" button, finding the file with the file upload dialog, and then clicking the "Upload" button. The contents of the XSLT will be loaded in the "Text" field. You can edit the XSLT in the text box, but it is not an effective tool for more than simple text changes.

Working with Terms

Each project has a glossary of terms. Using a glossary to explicitly define how words are used in a project can help improve understanding by using a consistent and explicitly defined set of terms. Clicking on the "Terms" link in the project navigator opens the terms navigator screen shown in Figure 43. If you are authorized to edit terms (in the stakeholder permissions it is labeled as GlossaryTerm) the first column contains an "Edit" link and below the table is an "Add" button. If you are not authorized to edit terms the first column contains a "View" link that opens the term editor for read-only viewing.

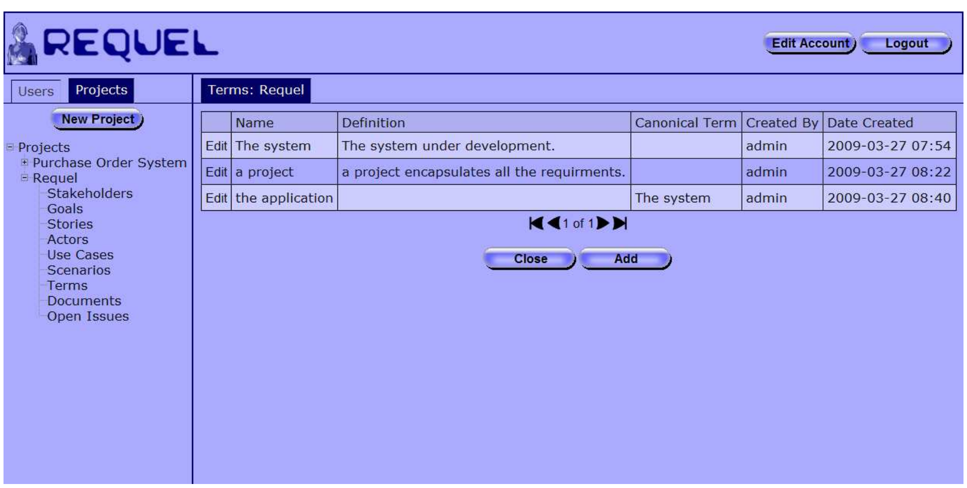


Figure 43: Terms Navigator

The terms navigator shows the text of the term in the "Name" column and the full text of the definition. The canonical term column contains the name of another term if the term is not the preferred term for the concept. For example the term "the application" in Figure 44 has the term "The system" as the canonical term. Ideally there should only be one term per concept and the system has a feature to solve this problem described below.

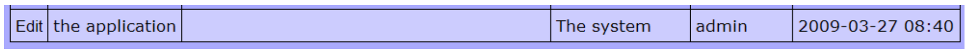


Figure 44: A Term with a Canonical Term

Clicking the "Edit" button on a term opens the term editor shown in Figure 45. The editor has text fields for the name and description and a selector button for choosing a canonical term.

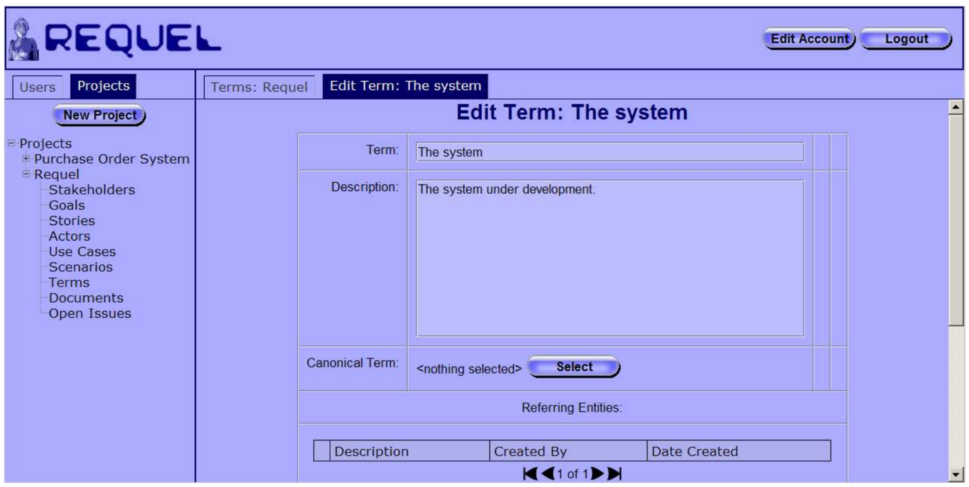


Figure 45: Term Editor

The selector button displays "<nothing selected>" when the term doesn't have a canonical term. Clicking the "Select" button opens a selector screen that looks like the navigator screen. When a canonical term is selected the name of the term shows up to the left of the button as shown in Figure 46. When creating a new term or changing the name of the term, the system scans all the requirements and adds cross references between the elements and the term.

Figure 46: Canonical Term Selected

As stated before, ideally there should only be one term per concept. In many cases different people use different terms to refer to the same thing when writing requirements individually. To solve the problem Requel has function that will replace all the occurrences of a term with its canonical term in all the requirement elements. First, all the terms need to be added to the glossary. The automated assistant will probably create issues identifying them as potential glossary terms; resolving these issues will create the terms and add references to all the requirement elements that use them. For all the terms that you want to replace, edit them and select the preferred term as the canonical term. At the bottom of the term editor is a "Replace

Term" button shown in Figure 47. Clicking the button causes the system to update all the occurrences of the term in the requirements elements with its canonical term.

Figure 47: Replace Term

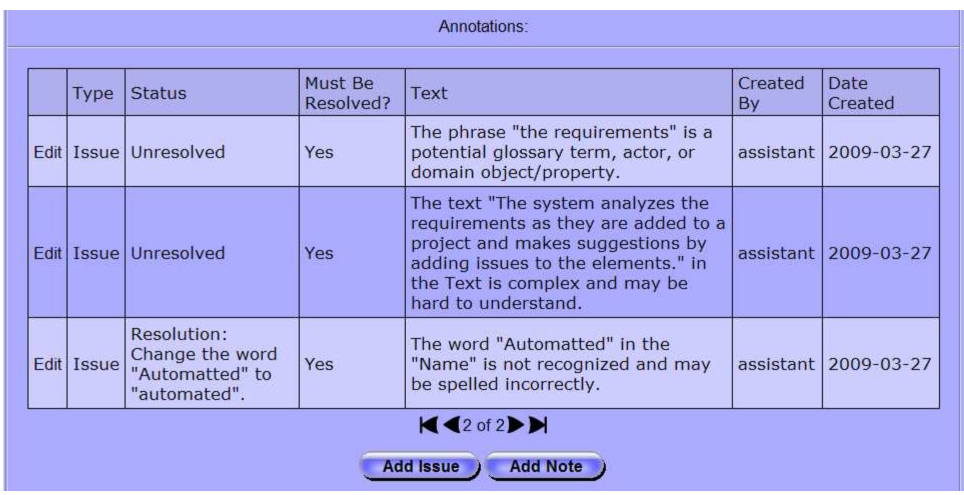
Chapter 4 Discussing and Negotiating Requirements

This section describes adding notes and issues to requirements, and negotiating resolutions to issues.

Discussion and negotiation are an important aspect of collaboration. For example a stakeholder adds an issue indicating a goal needs more details. Other stakeholders then propose solutions to the issue, and argue the merits of each with arguments supporting or conflicting with the potential solution. Once all the proposed solutions have been discussed, one can be chosen as the resolution.

Adding Notes and Issues

All the requirements elements support adding notes and issues. Each of the requirements editors has an “Annotations” table with the notes and issues as shown in Figure 48. If you are authorized to edit annotations the first column contains an “Edit” link and below the table are “Add Issue” and “Add Note” buttons. If you are not authorized to edit annotations the first column contains a “View” link that opens the note or issue editor for read-only viewing. Note: typically you will want all stakeholders to have “Edit” permission for annotations.



	Type	Status	Must Be Resolved?	Text	Created By	Date Created
Edit	Issue	Unresolved	Yes	The phrase "the requirements" is a potential glossary term, actor, or domain object/property.	assistant	2009-03-27
Edit	Issue	Unresolved	Yes	The text "The system analyzes the requirements as they are added to a project and makes suggestions by adding issues to the elements." in the Text is complex and may be hard to understand.	assistant	2009-03-27
Edit	Issue	Resolution: Change the word "Automatted" to "automated".	Yes	The word "Automatted" in the "Name" is not recognized and may be spelled incorrectly.	assistant	2009-03-27

Figure 48: Annotations Section

The type column in the table indicates if the annotation is a note or issue. The status column will always have the value “Informational” for notes and either “Unresolved” or “Resolution: …” for issues. When an issue is resolved the status will start with “Resolution:” followed by the text of the position that resolved the issue. The “Must be Resolved?” column will always have “No” for notes and either “Yes” or “No” for issues. The “Text” column contains the full text of the issue.

Clicking on the “Add Note” button opens the “New Note” editor as shown in Figure 49. A note only has the text of the note.

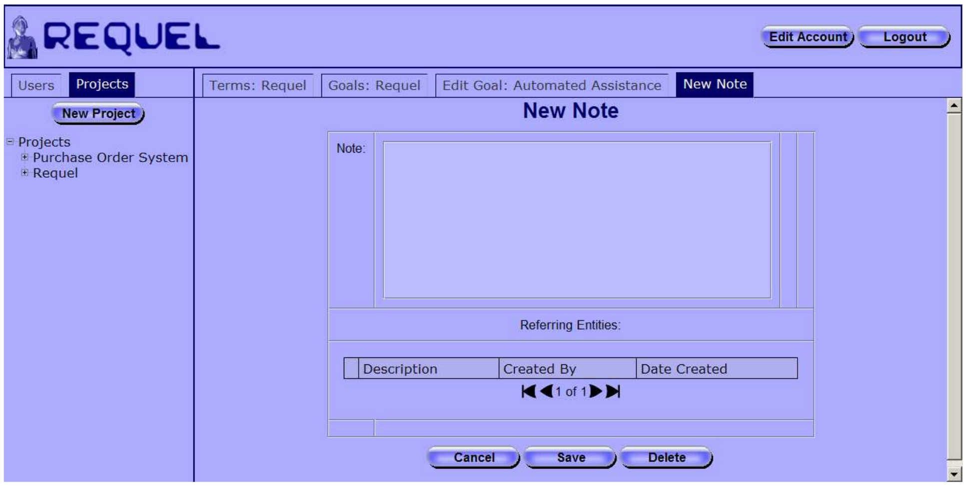


Figure 49: New Note Editor

There isn’t a way to find existing notes and add them to multiple requirement elements, but the system automatically detects adding notes with identical text and instead of creating a new note it will add the existing note to the requirement. Figure 50 shows a note shared by two goals, indicated in the “Referring Entities” table.

Figure 50: Shared Notes

Clicking on the “Add Issue” button opens the “New Issue” editor as shown in Figure 51. An issue has text, a must be resolved checkbox, and positions. The must be resolved property is only for documentation purposes.

Figure 51: New Issue Editor

After an issue is saved positions can be added by users authorized to edit issues by clicking the “Add” button below the positions table as shown in Figure 52.

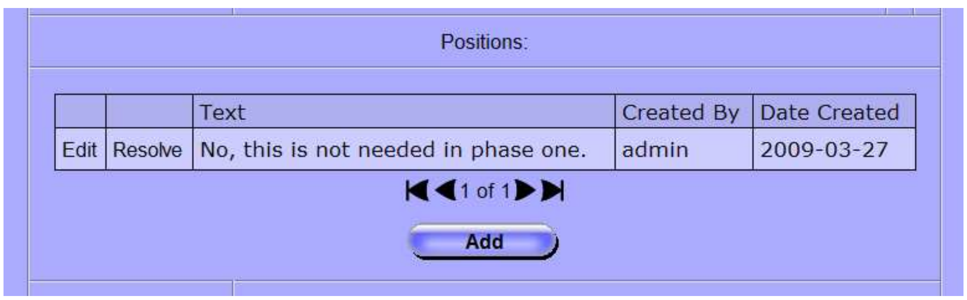


Figure 52: Adding Positions

Positions represent potential solutions to an issue. The position editor has a text field to enter the text of the position and a table of arguments that argue for or against the position as a solution to the issue, as shown in Figure 53. After a position is saved arguments can be added by users authorized to edit issues by clicking the “Add” button below the arguments table.

Figure 53: Position Editor

Arguments are the reasons why a particular position of an issue should or should not be chosen as the solution. Arguments have text description and a support level with values from "strongly against" to "strongly for." Clicking the add or edit button opens the argument editor shown in Figure 54. The argument editor has a field for entering the text of the argument and a drop down list with the support levels.

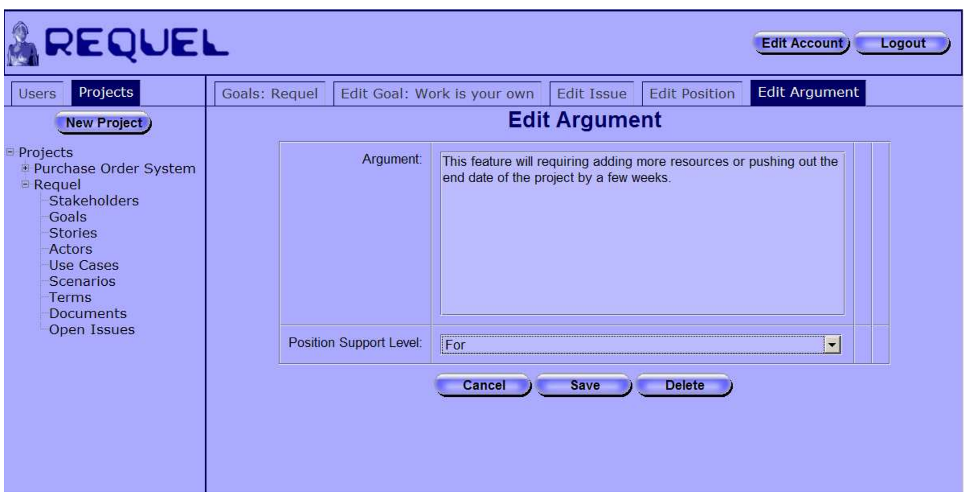


Figure 54: Argument Editor

All the open issues for all the elements of a project can be seen on the "Open Issues" screen as shown in Figure 55. The screen can be opened from the project navigator "Open Issues" link. The issues screen has a "View" link for each issue that opens the issue editor. The issues table has a column labeled "Annotatables" that lists out all of the requirements elements that are assigned to the issue.

Figure 55: Open Issues

Working with Analysis Issues

Every time a requirement element is saved the system's "Automated Assistant" analyses it and adds issues for potential problems or improvements. The issues will concern potential spelling errors or unfamiliar words, possible glossary terms and actors, complex sentences, and poorly structured scenario steps. Issues added during analysis will always have the "assistant" user as the creator as shown in the second column from the right in Figure 56.

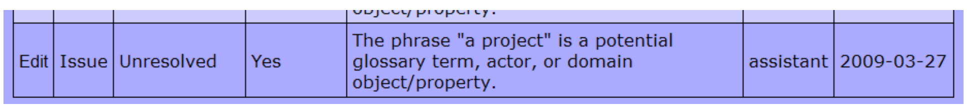


Figure 56: Example Analysis Issue

The issues added by the assistant have specialized positions that automate the task described in the position. Figure 57 shows the positions of the issue "The phrase 'a project' is a potential glossary term, actor, or domain object" from Figure 56. The position "Ignore this phrase" resolves the issue without taking any action. The position "Add 'a project' to the project glossary" adds the term "a project" to the glossary and a reference to all the project elements that are assigned to the issue, when used to resolve the issue.

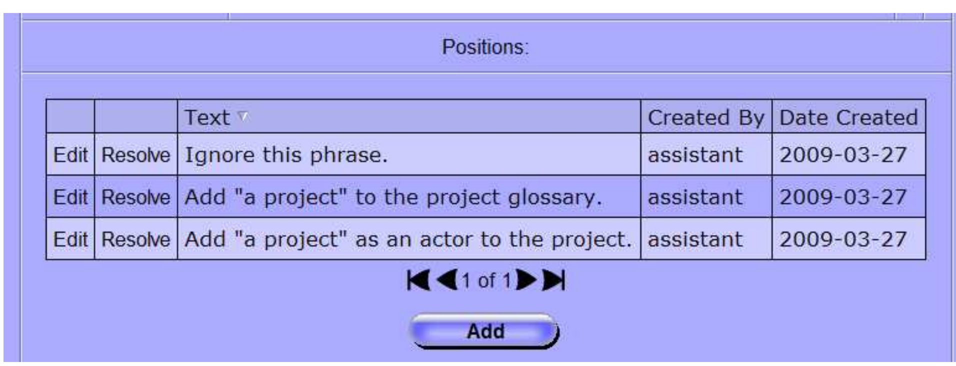


Figure 57: Example Analysis Positions

Table 2 lists the text of the special positions that invoke an automated task when used to resolve an issue.

Position Text	**Action taken when the position is used to resolve the issue.**
Add "…" to the project glossary.	Creates the term in the glossary and adds a reference to all the project elements that are assigned to the issue.
Add "…" as an actor to the project.	Creates a new actor in the project and adds a reference to all the project elements that are assigned to the issue.
Change the word "…" to "…".	Updates the name and text of all the requirement elements that are assigned to the issue to replace the original text with the new text.
Add "…" to the dictionary.	Adds the word to the systems global dictionary so that future occurrences of the word will not be identified as unknown.
Add the actor "…" to the use case.	Adds the actor to the auxiliary actors of the use case.
Change "…" to the primary actor.	Replaces the text in the scenario step with the name of the primary actor.

Table 2: Automated Task Positions

Chapter 5 Requel Setup

This section describes the setup of the Requel system. The system is distributed as a Java Web Archive File (WAR) and requires only minimal configuration to setup.

System Requirements

Requel is a Web application implemented in the Java language and based on the Java Enterprise Edition (JEE5) platform, intended to run in a standard Web container. Requel requires the standard Sun Microsystems Java runtime version 6 update 4 or later to operate properly. Requel has dependencies on Sun's virtual machine and will not work with a third-party virtual machine. Requel is known to work with versions 5.5 and 6.0 of the Apache Tomcat Web container.

Requel stores user and project data in a standard SQL database. It is known to work with MySQL Server version 5.0. The database initialization scripts may have MySQL specific syntax and commands, so using a different database my require converting the SQL syntax of the files.

Create a Database User

Before Requel can be installed a database user account must be created. Requel will use this account to create and initialize the database when first installed, and to update the requirements and user data during normal operation. It is important that the account has all privileges granted for the database that Requel will use.

The MySQL commands below create a user named 'requel' with the password 'password' and grants all privileges to that user for all objects in the database named 'requeldb'. The database does not need to be created ahead of time; Requel will create it on the first startup if it doesn't exist.

```
CREATE USER 'requel' IDENTIFIED BY 'password';
GRANT ALL PRIVILEGES ON requeldb.* TO requel;
FLUSH PRIVILEGES;
```

Figure 58 shows how to use the MySQL command line interface to login as the root user and create the Requel user. If the Web server and database server are on different physical servers, then in the create user and grant commands append the Web server hostname or IP address to the username. For example, requel@192.168.1.100.

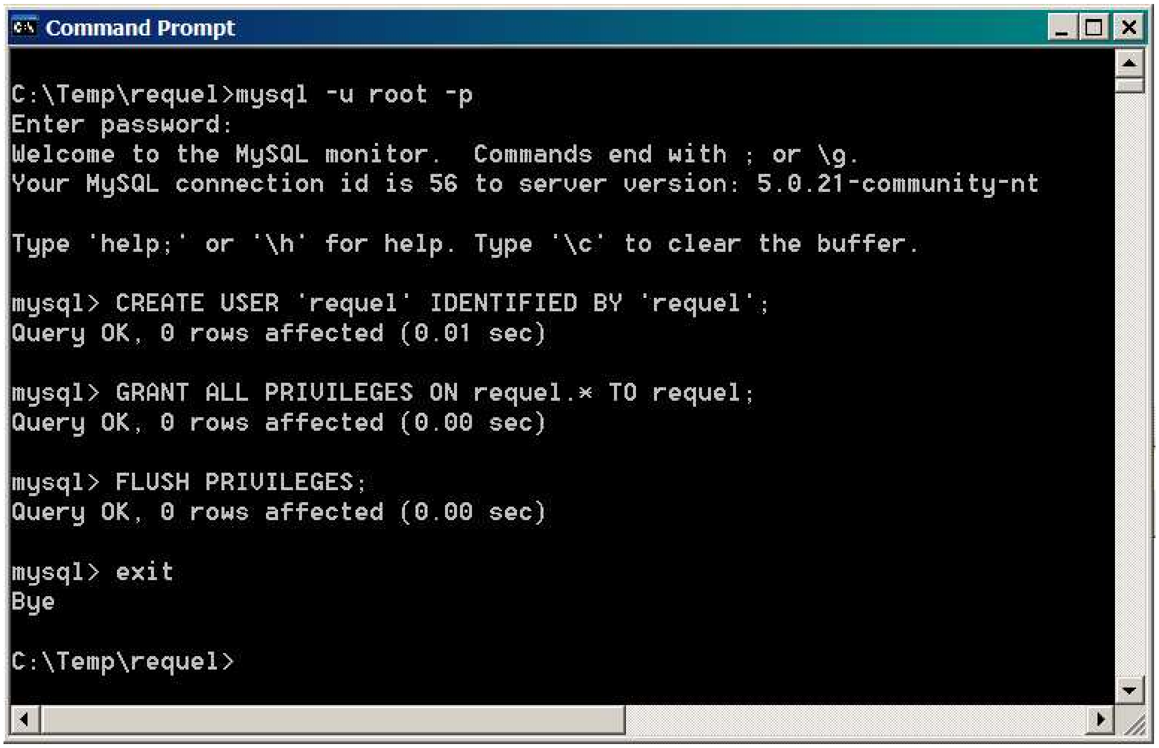


Figure 58: Create the Database User

Configuration

The Requel system requires minimal configuration to get running. The database settings are the only settings that must be configured before the system can be used and they should be configured before installing the WAR file in a Web server.

To configure the database settings the db.properties file must be unpacked from the WAR file. This can be done using the Java jar command as shown in Figure 59. Create a directory to hold the contents of the WAR file and copy the file into that directory. Use the jar command below to extract the file:

```
jar xvf requel.war WEB-INF\classes\db.properties
```

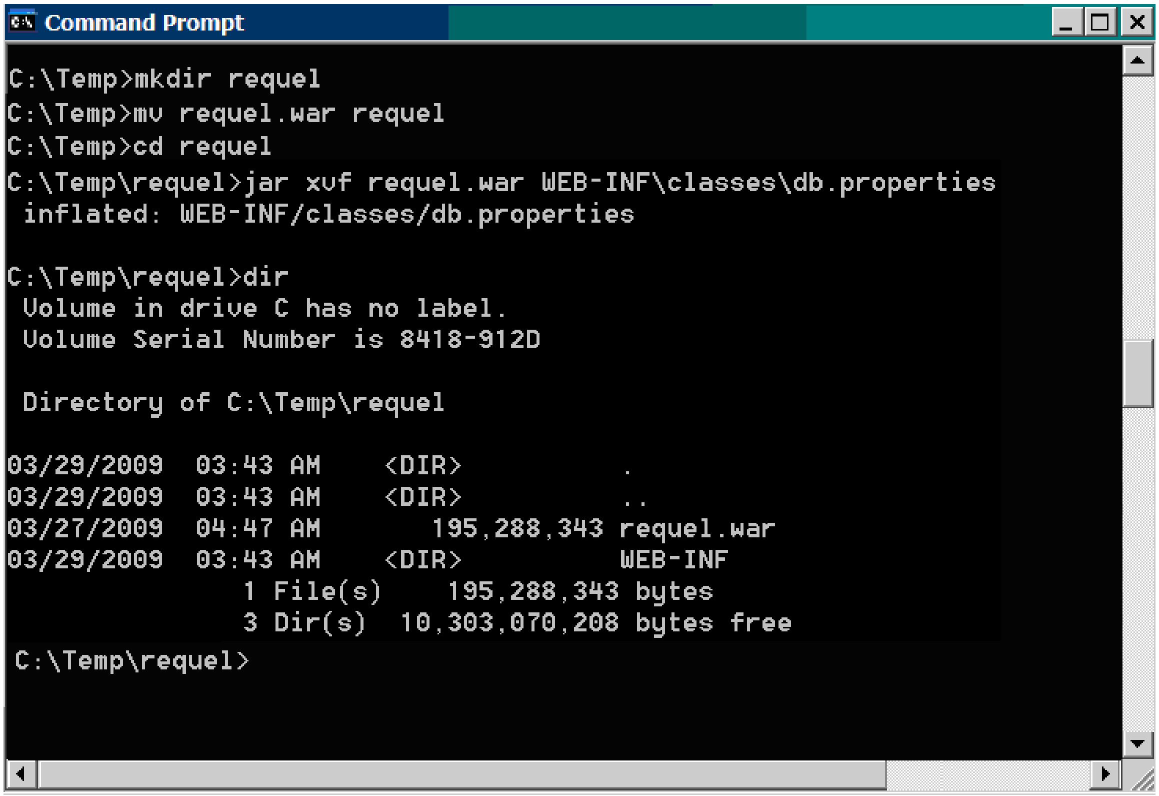


Figure 59: Extracting the db.properties file from the WAR File

When the jar command completes there will be a WEB-INF directory. Open the file WEB-INF\classes\db.properties in a text editor such as WordPad in Windows as shown in Figure 60. You will need to set the db.username, db.password, db.server, db.port, and db.name properties. Note: the Requel database user must have database creation permission if the database specified in the db.name property doesn't already exist.

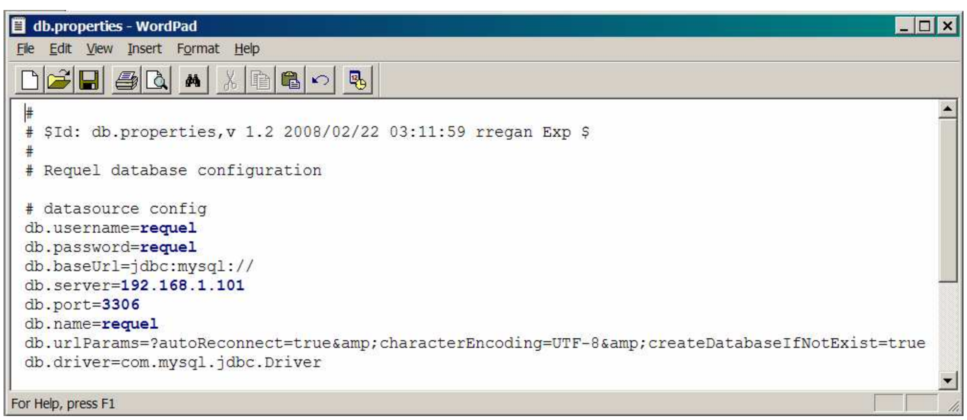


Figure 60: Editing the Database Properties

After saving the properties file, it must be added back to the WAR file. Use the jar command below to add the updated properties file to the war file as shown in Figure 61.

```
jar uvf requel.war WEB-INF\classes\db.properties
```

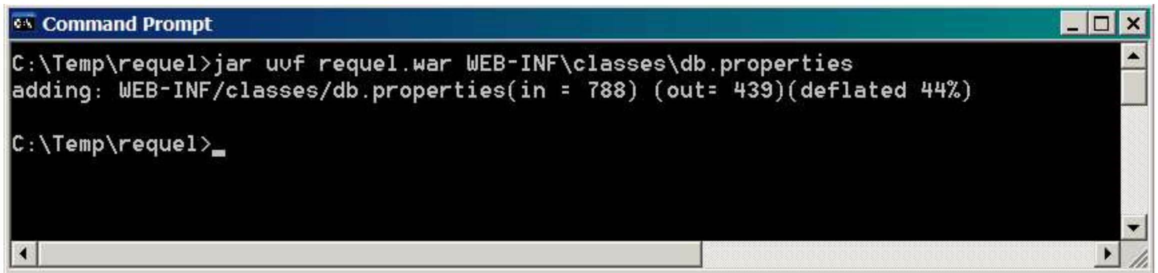


Figure 61: Updating the WAR file

The WAR file is now ready to be deployed to a Web server.

Deploying to Apache Tomcat

Apache Tomcat is a freely available open source JEE Web container. Use the Web application manger that comes with Tomcat to deploy the Requel WAR file. Open a Web browser to the manager page of the Tomcat server. The server prompts you for a username and password and then displays the manager page as shown in Figure 62.

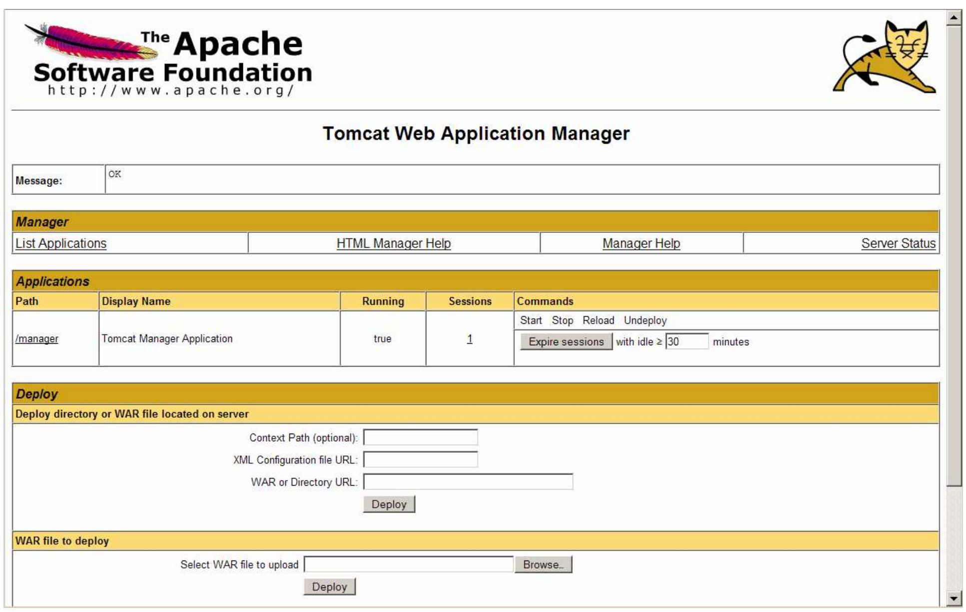


Figure 62: Apache Tomcat Manager

At the bottom of the page is the WAR file deployment form as shown in Figure 63. Use the browse button to locate the Requel WAR file with the updated database properties and then click the Deploy button to upload and install the application. It will typically take from between five and twenty minutes for Requel to create and initialize the database depending on the performance of the database server.

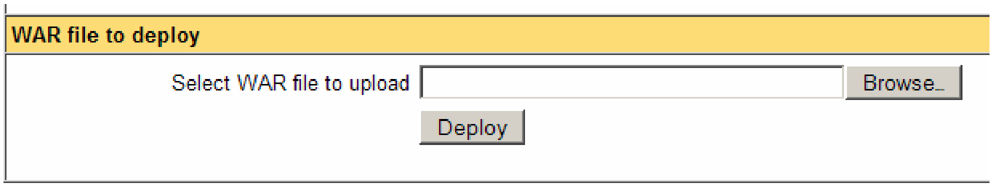


Figure 63: WAR File Deployment

When the deployment completes the application manager lists Requel in the applications section as shown in Figure 64. Clicking the "/requel" link in the "Path" column of the table connects to Requel and the login screen should appear as shown in Figure 1. You should record the URL from the address bar of the Web browser to send to users for accessing the system.

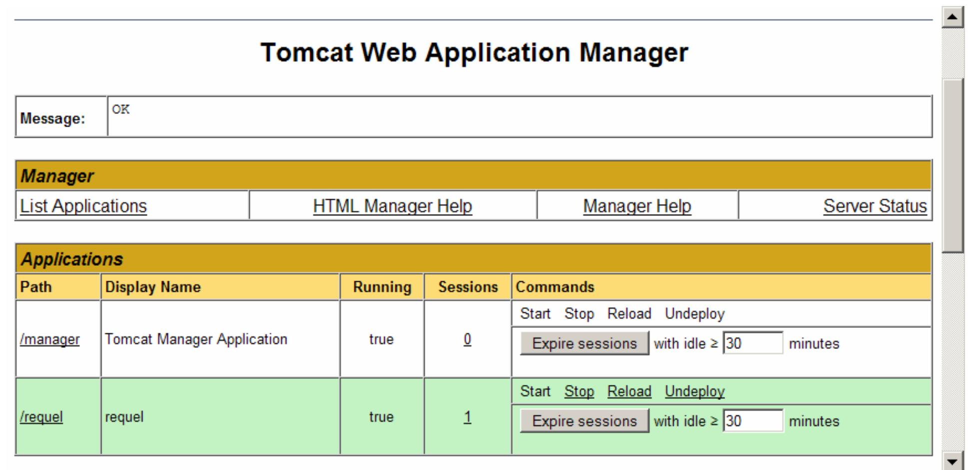


Figure 64: Requel in the Tomcat Application Manager

Completing the Setup

The first thing to do when the system is ready for access is to login using the built-in administrator account and change the password. The username and password are both set to 'admin' when the system is initialized. See the

User Administration section for instructions on changing the password. You should also change the password of the built-in project and assistant users.

The system is now ready to be used. The next step is creating accounts for the users to access the system. See the

User Administration section for instructions on creating users.

Chapter 6 User Administration

The primary task of system administrators is creating and managing users. System users with the system administrator role are authorized to edit user accounts for all users, and to add new users.

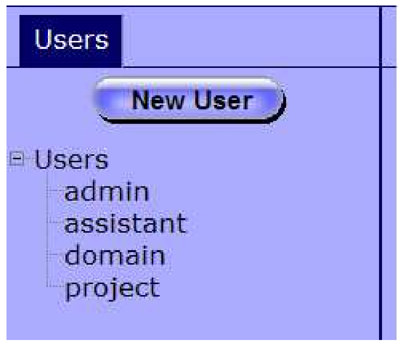


Figure 65: Users Navigation Tab

After logging in the left hand side of the screen will contain a tab labeled “Users” with a “New User” button for creating new users and tree containing all the users of the system as shown in Figure 65. Clicking the new user button opens the “New User” editor as shown in Figure 66. Clicking on a user name in the tree opens that user for editing. Each user must have a username, password, organization, email address, and at least one user role. The name and phone number are optional.

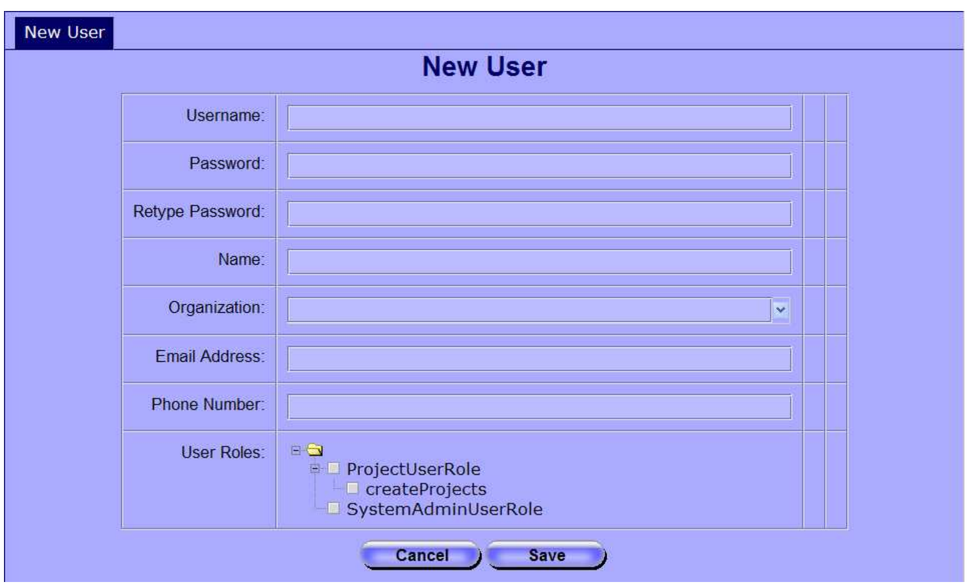


Figure 66: User Editor

The user name must be unique. If the chosen name is already in use by another user, the system reports an error message to the right of the username field as shown in Figure 67.

Figure 67: Username Already in Use

The user roles and permissions are used to authorize a user to access different features of the system. The “Project User Role” grants the user access to the project features of the system. The “Create Projects” permission under the project user role grants the user the ability to create new projects. The “System Admin User Role” grants the user access to the user administration function of the system. Figure 68 shows an example of a user with the project user role and permission to create new projects.

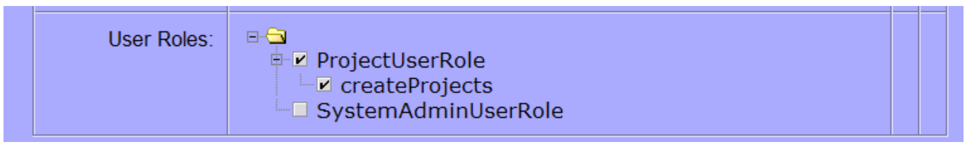


Figure 68: User Roles and Permissions

Roles and permissions can be changed after a user is created, but a user must always have at least one role. To disable a user’s access to the system the password should be reset.

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