Administering Rational ClearQuest

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Rational
unifying software teams

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Contents

1 Before you begin

This guide is for Rational ClearQuest administrators.
It assumes that you have read *Introducing Rational ClearQuest*, have experience with administering relational databases, and know how to write scripts in VBScript or Perl.

This guide provides the concepts and initial steps required to begin administering ClearQuest. For specific step-by-step instructions, see the ClearQuest Designer online Help. Select **Help > Contents and Index**. A good place to begin is with the ClearQuest Designer Tutorial; select **Rational ClearQuest Designer Tutorial** from the Start menu.

Other ClearQuest documentation

In addition to this guide, ClearQuest includes the following printed documentation:

- *Introducing Rational ClearQuest:* Provides an overview of how to use ClearQuest, and a brief example of how the ClearQuest administrator can customize ClearQuest to fit your workflow.
- *Installing Rational ClearQuest:* Explains how to install ClearQuest, ClearQuest Designer, vendor databases, and related tools.

and the following online documentation:

- Release notes
- *ClearQuest Help:* Online Help for ClearQuest.
- *ClearQuest Designer Help:* Online Help for ClearQuest Designer.
- *ClearQuest Designer Tutorial:* Introduces the key features of ClearQuest Designer.

- *ClearQuest API Reference Guide:* Online reference guide explaining the syntax for writing hooks and external applications.
- *ClearQuest Web Help:* Online Help for the ClearQuest web-based client.
- *ClearQuest Maintenance Tool Help:* Online Help for the ClearQuest Maintenance Tool.
- *ClearQuest Import Tool Help:* Online Help for the ClearQuest Import Tool.

Contacting Rational Software

If you have a technical problem and you cannot find the solution in this guide or in the online Help, contact Rational Software Technical Support. Select **Reference > Contacting Technical Support** in the ClearQuest Help for addresses and phone numbers of technical support centers.

Before contacting technical support, note the sequence of events that led to the problem and any program messages you see. If possible, have the product running on your computer when you call.

For technical information about ClearQuest, answers to common questions, and information about other Rational Software products, visit the Rational Software World Wide Web site at `http://www.rational.com`. To contact technical support directly, use `http://www.rational.com/support`.

2 Understanding ClearQuest administration

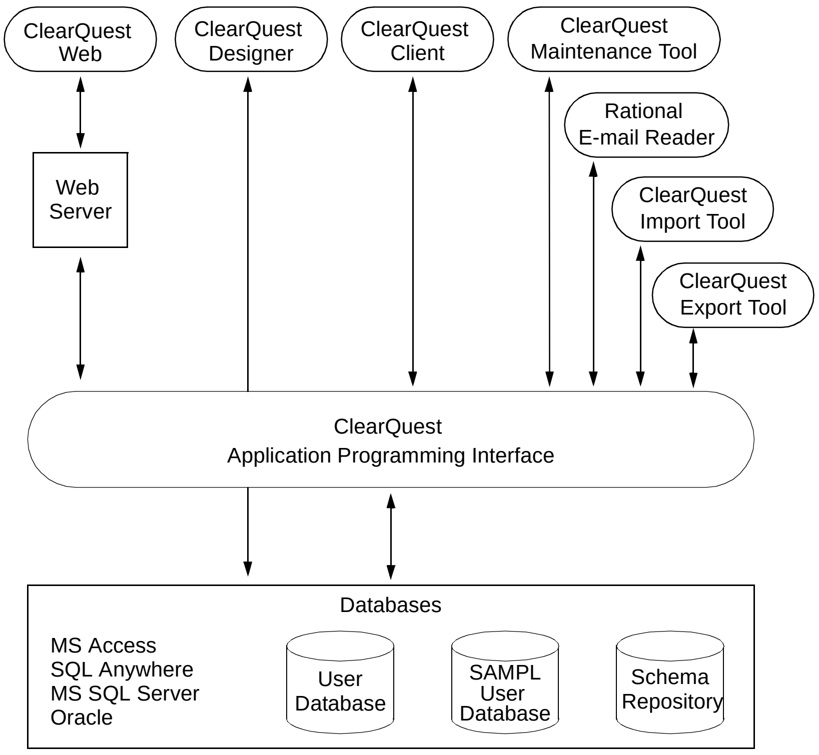
As the ClearQuest administrator, your job is to set up, customize, and maintain ClearQuest for your end users. This chapter provides essential ClearQuest concepts to help you understand your role and to use this guide effectively.

Topics covered include:

- Overview of ClearQuest architecture
- Overview of administrator tasks
- Understanding ClearQuest schemas and databases
- Defining your change request management process
- Basic tasks to get your ClearQuest users started

Overview of ClearQuest architecture

ClearQuest consists of several components that work together in a client-server environment. As the ClearQuest administrator, you will work with each of these components.

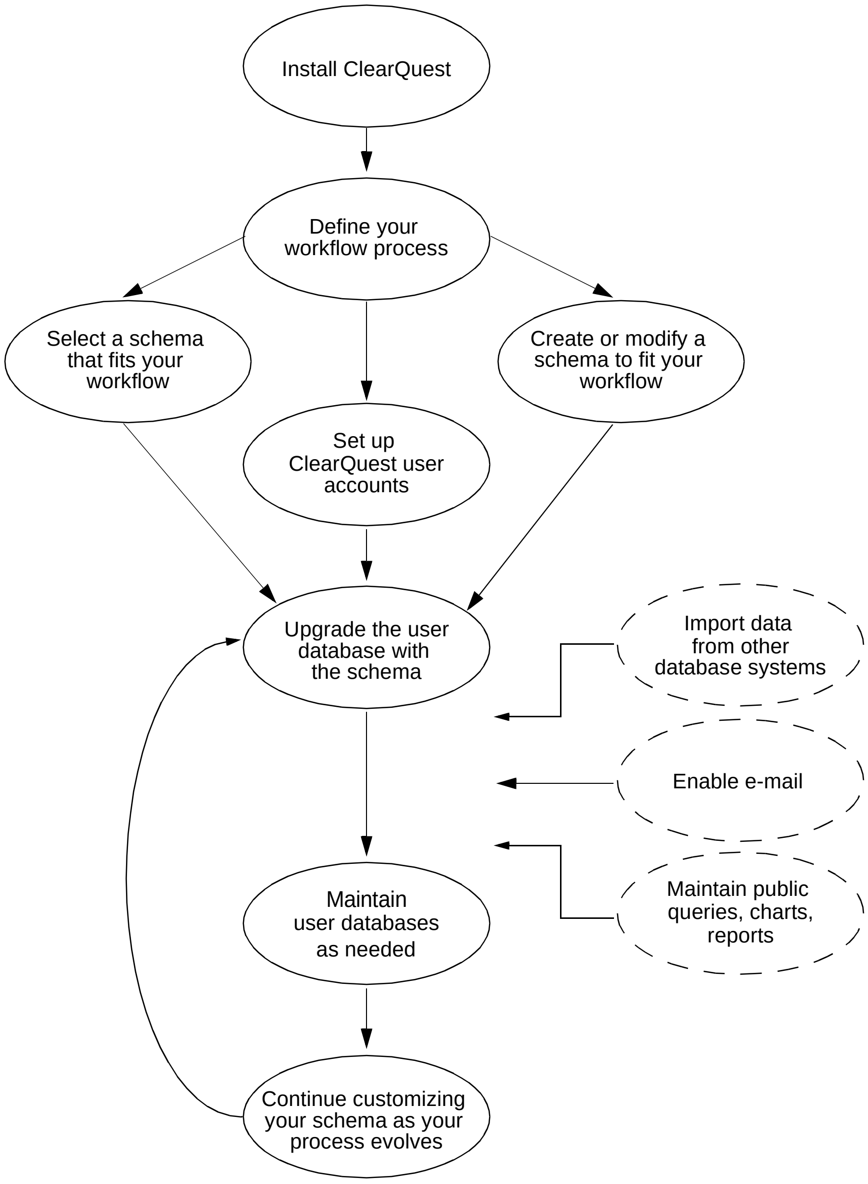


Here’s how you use ClearQuest components.

Component	Used by	Use to
ClearQuest	Everyone	Submit, modify, and track change requests, and to analyze project progress by running queries, charts, and reports.
ClearQuest Web	Everyone	Access ClearQuest across multiple platforms through Netscape Navigator® or Microsoft’s Internet Explorer.® You can submit change requests and run queries, charts, and reports.
ClearQuest Designer	ClearQuest Administrator	Customize ClearQuest, manage ClearQuest schemas and databases, and administer users and user groups.
ClearQuest Import Tool	ClearQuest Administrator	Import data including records, history, and attachments from other change request systems.
ClearQuest Export Tool	ClearQuest Administrator	Export ClearQuest data from one ClearQuest user database to another user database that uses a different schema.
ClearQuest Maintenance Tool	Everyone	Set up and connect to the schema repository during installation and when you upgrade to a new ClearQuest version.
Rational E-mail Reader	ClearQuest Administrator	Configure your e-mail settings to enable ClearQuest users to submit and modify records by e-mail. See Chapter 9, “Administering ClearQuest E-mail.”

Overview of administrator tasks

Below is an overview of the ClearQuest administrator tasks.


Install ClearQuest
Define your workflow process
Select a schema that fits your workflow
Set up ClearQuest user accounts
Create or modify a schema to fit your workflow
Upgrade the user database with the schema
Import data from other database systems
Enable e-mail
Maintain public queries, charts, reports
Maintain user databases as needed
Continue customizing your schema as your process evolves

Understanding ClearQuest schemas and databases

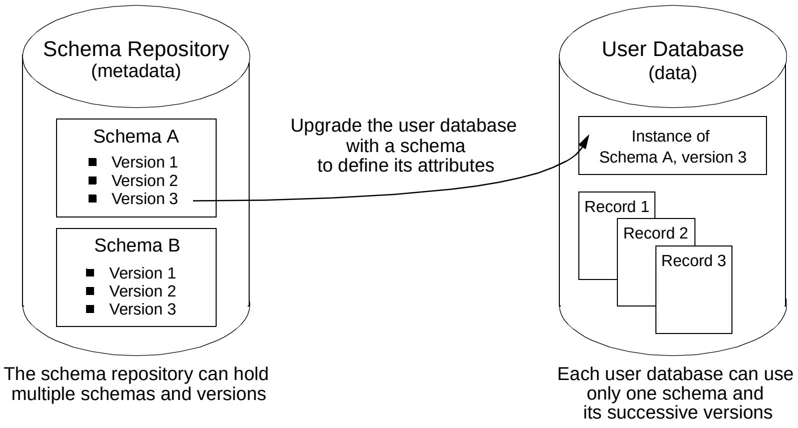
A ClearQuest schema contains the metadata that defines the process for working with records within ClearQuest. It includes record definitions, form and field definitions, record states, actions that you can perform on records, and hook scripts.

ClearQuest includes several predefined schemas that provide common workflow processes and support integration with various Rational Software products. For a description of ClearQuest schemas, see Appendix A, “ClearQuest schemas and packages.”

ClearQuest requires at least two databases:

- A schema repository (master database): This is where ClearQuest stores schemas.
- One or more user databases: A user database contains the data entered into the system by the users of ClearQuest and ClearQuest Web. You can have as many user databases as you need.

As the ClearQuest administrator, you select a schema that fits your process, then upgrade the user database with the schema. The schema defines the attributes of the user database.


Schema Repository
(metadata)
Schema A
Version 1
Version 2
Version 3
Schema B
Version 1
Version 2
Version 3
Upgrade the user database with a schema to define its attributes
User Database
(data)
Instance of Schema A, version 3
Record 1
Record 2
Record 3
The schema repository can hold multiple schemas and versions
Each user database can use only one schema and its successive versions

Defining your change request management process

Your most important task as the ClearQuest administrator is to define your process for working with records and then select the ClearQuest schema that best suits your process or customize a schema to fit your process.

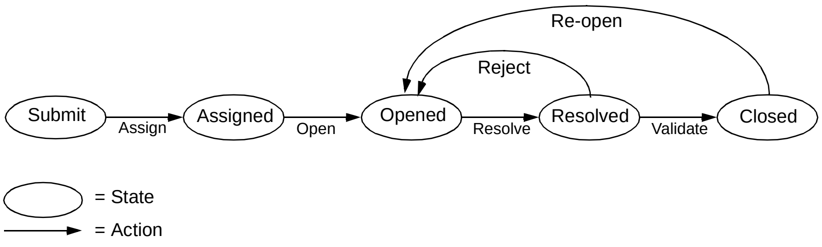
This section describes basic concepts that will help you understand how to define your process and to customize a ClearQuest schema to fit that process.

Record types, states, and actions

ClearQuest supports several types of records, such as defects and enhancement requests. You work with records by moving them through various stages, or “states,” usually beginning with when the record is submitted to the system and ending with when it is closed. Movement from state to state is initiated when a user performs an action such as Open or Close on the record.

State model

Each record type has a state model that defines how it can be used. Below is a typical state model showing how a change request record moves from state to state.



Refining your process

You can refine your state model by adding rules and permissions that support your workflow process. You do this by using the predefined hook code and controls that are included in ClearQuest. You can also use the ClearQuest application programming interface (API) to write your own hook code or to write external applications that reinforce your process. You can:

- Control the type of data you collect by customizing the fields you use and how they behave.
- Define access controls that determine who can perform actions and when those actions can be performed.
- Define what happens when an action is performed. Actions can trigger other events, such as sending automatic e-mail notifications when a specific action is performed.

For example, you can restrict actions to specific users or user groups. You might allow everyone on the team to resolve a change request, but allow only a quality assurance engineer to validate the resolution and close the record. You can also designate a person responsible for supplying data before the request can move to the next state.

Before you begin customizing

Before you begin customizing ClearQuest, be sure to read the following:

- Chapter 4, “Working with ClearQuest schemas,” to find out how to check schemas in and out of the schema repository, how to test your work, and how to upgrade a user database with a new schema version.
- “Planning your schema customizations” on page 58.
- Appendix A, “ClearQuest schemas and packages,” for a complete list of ClearQuest’s predefined schemas and schema packages.

Basic tasks to get your ClearQuest users started

Below is a list of tasks you must perform to get your ClearQuest users started.

Task	Do this	To find out how, see
Install ClearQuest and set up databases	Create a schema repository and one or more user databases	*Installing Rational ClearQuest*
Define your change request management process	Plan states and actions, create a state transition model, define record types, forms and fields, plan hook code	This chapter and Chapter 5, "Customizing a schema"
Select a predefined schema that fits your workflow		Appendix A, "ClearQuest schemas and packages"
Customize the selected schema, if necessary, or build a new schema from scratch	Begin by adding predefined packages to build the functionality you need	Appendix A, "ClearQuest schemas and packages"
	Customize the schema as needed	Chapter 4, "Working with ClearQuest schemas" and Chapter 5, "Customizing a schema"
	Write hook code to further refine your workflow (optional)	Chapter 7, "Using hooks to customize your workflow"
Upgrade your user database with the selected/customized schema		Chapter 4, "Working with ClearQuest schemas"
Import data from other database systems (optional)		Chapter 10, "Importing data into ClearQuest"
Create ClearQuest login accounts and user groups and define user access permissions	Add ClearQuest users, subscribe them to user database, create user groups, set permissions	Chapter 6, "Administering users"

Task	Do this	To find out how, see
Enable e-mail notification	Have each ClearQuest user enable e-mail notification in ClearQuest	ClearQuest Help
	Set up e-mail rules	Chapter 9, “Administering ClearQuest E-mail”
Enable ClearQuest Web (optional)		*Installing Rational ClearQuest*
		Chapter 8, “Administering ClearQuest Web”
Customize ClearQuest queries, charts, and reports (optional)	Customize ClearQuest queries, charts, and reports and save them in the ClearQuest Public Queries folder	ClearQuest Help
	Alternatively, give permissions to other users such as project managers to do this	Chapter 6, “Administering users”

3 Managing databases

This chapter describes the ClearQuest databases, their setup, and how to maintain them. Use this chapter to understand how ClearQuest uses databases, how to choose a vendor database, and how to perform various maintenance activities.

Topics covered include:

- Understanding ClearQuest databases
- Choosing a database vendor
- Creating new databases
- Understanding database maintenance
- Changing your database vendor
- Moving a database to a new location
- Moving a database to another schema
- Deleting user databases
- Undeleting a user database

Understanding ClearQuest databases

ClearQuest uses relational databases to store the data about your process and forms (metadata) and the actual information you plan to track (records). This section describes how ClearQuest stores data, where to keep the databases, and how to choose a supported vendor database.

Types of databases

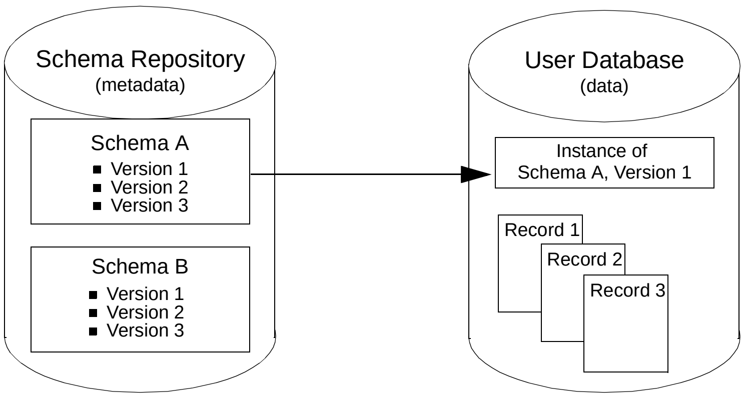
ClearQuest requires at least two databases:

- schema repository (master database)
- user database

A schema is a set of metadata that describes your process and customizations, such as field definitions, field behaviors, and state transitions. ClearQuest stores all schemas in the schema repository; therefore, you must have a schema repository. For more information on schemas, see Chapter 4, “Working with ClearQuest schemas.”

The other required database stores, in the form of records, the actual data you want to collect. This is known as the user database, because it contains the data entered by your end users. You must have at least one user database, but you can have as many as you need. For example, you can have different user databases for different projects or departments. We also recommend that you have a test user database to use for testing new schema customizations.

The two required databases are related. A user database is associated with a schema, so it reflects the process model and customizations you design in the schema.



The ClearQuest administrator manages and updates schemas using the ClearQuest Designer and applies them to user databases

ClearQuest users enter records using the ClearQuest client and web interfaces

Important: You must create your schema repository before you can begin customizing ClearQuest.

Where to keep ClearQuest databases

We recommend that you store the ClearQuest databases on a machine dedicated solely to that purpose. This should be a powerful machine with plenty of RAM and hard disk space. Exact requirements depend on the number of users at your site, the number of records in your database, and whether you include large attachments with your records. Check to see if your database vendor has specific requirements.

Choosing a database vendor

You must decide which database vendor you want to use to create the ClearQuest databases. ClearQuest supports the following databases:

Entry-level database

- Microsoft Access (supplied with ClearQuest)

Mid-level database

- Sybase SQL Anywhere (supplied with ClearQuest)

High-end databases

- Microsoft SQL Server
- Oracle (NT and UNIX)

For the specific versions that ClearQuest supports, see the Release Notes.

To decide which vendor best suits your needs, you must determine how many simultaneous users you expect to have. You can use the following general guidelines to help you:

- For initial testing and evaluation or for small groups (less than five users), you can use the entry-level database.
- For small to medium size groups (five to twenty users) you can use the mid-level database.
- For larger groups (over twenty users), large amounts of data, or to achieve better performance, use one of the high-end databases.

Note: You can use different database vendors for different ClearQuest databases. For example, your production database and schema repository may be high-end databases, while your test database is an entry- or mid-level database.

Creating new databases

Once you have selected a dedicated machine to use as the ClearQuest database server and determined the database vendor you want to use, you are ready to create the required ClearQuest databases (schema repository and user databases). Once the databases are set up, you can begin using and customizing ClearQuest.

For specific steps on creating new databases, see the *Installing Rational ClearQuest* guide. The steps for installing databases assume that the vendor software is already installed. When the databases are created, you can proceed to Chapter 4, “Working with ClearQuest schemas”.

Understanding database maintenance

This section describes how to maintain your ClearQuest databases and perform some special activities.

Understanding database integrity

ClearQuest stores data using relational database functionality. However, the methods for storing and locating information in tables and for joining that information for presentation in the interface are specific to ClearQuest.

Important: To preserve your data integrity, we strongly recommend that you do not use your database vendor tools to directly manipulate ClearQuest data or tables. If your data becomes corrupted, it will be extremely difficult to recover. For this reason, once you create the databases you should use only ClearQuest tools to manipulate data.

The following table lists various database activities and the ClearQuest tool or interface you should use to perform them. Specific activities are detailed later in this chapter.

Database Activity	Tool/Interface	Comments
Creating a new	Database vendor and ClearQuest Maintenance Tool and ClearQuest Designer	Use the vendor database of your choice to create empty databases. Use ClearQuest Maintenance Tool to connect and initialize the schema repository and sample database. Use the ClearQuest Designer to create new user databases. **Note**: Microsoft Access and SQL Anywhere databases are created from within ClearQuest
Backing up	Your preferred vendor database tool	Perform regular backups to preserve your data
Modifying data	ClearQuest client, web interface, ClearQuest Designer, ClearQuest API	Do not use your database vendor tools to directly modify ClearQuest data or tables.
Upgrading	ClearQuest Designer or ClearQuest Maintenance Tool	To upgrade a user database to a new schema version, use the ClearQuest Designer. To upgrade to a new version of ClearQuest, use the ClearQuest Maintenance Tool.
Moving/changing	ClearQuest Designer or ClearQuest Maintenance Tool	To move or switch a user database, use the ClearQuest Designer. To move a schema repository to a new location or to switch database vendors, use the ClearQuest Maintenance Tool.

Database Activity	Tool/Interface	Comments
Moving to a new schema	ClearQuest Export Tool and ClearQuest Import Tool	To switch to a different schema, export data from a user database with the ClearQuest Export Tool To import data into a user database associated with a new schema, use the ClearQuest Import Tool.
Deleting/undeleting a user database	ClearQuest Designer	The ClearQuest Designer removes the link between the schema repository and the database, but does not delete the physical database. To delete the physical database, use your database vendor tools.

Backing up your data

You never know when an equipment failure or software problems will occur that can cause data loss. Regular backups are the only way to ensure the safety of your ClearQuest data.

We recommend developing a strategy for performing regular database backups. Back up your user databases and your schema repository at the same time. This preserves both your data and customizations.

You can use whichever tool you choose for performing backups. Most high-end databases come with a tool you can use to establish regular backups.

Changing your database vendor

You can use ClearQuest to change (move) a database from one vendor to another. The following examples show how to move a sample schema repository using the ClearQuest Maintenance Tool, and a sample user database using the ClearQuest Designer.

These examples show how to move a database from Microsoft Access to Microsoft SQL Server, but the same steps apply for converting from any supported database to another.

Note: Your schema repository and user databases are stored in different databases, so you must convert them separately.

Moving a schema repository

This example shows how to move a schema repository (called “CQ master” in our example) to a new database vendor using the ClearQuest Maintenance Tool.

1 Install and configure the new vendor database software.

2 Create a new empty database with your vendor tool (exception: Microsoft Access and SQL Anywhere databases can be created from within ClearQuest).

Note: See the *Installing Rational ClearQuest* guide for information on creating new databases.

3 Notify all users to log off from ClearQuest.

ClearQuest prevents new users from accessing the databases during the process, but it cannot detect or log off users who are still logged in when the procedure begins.

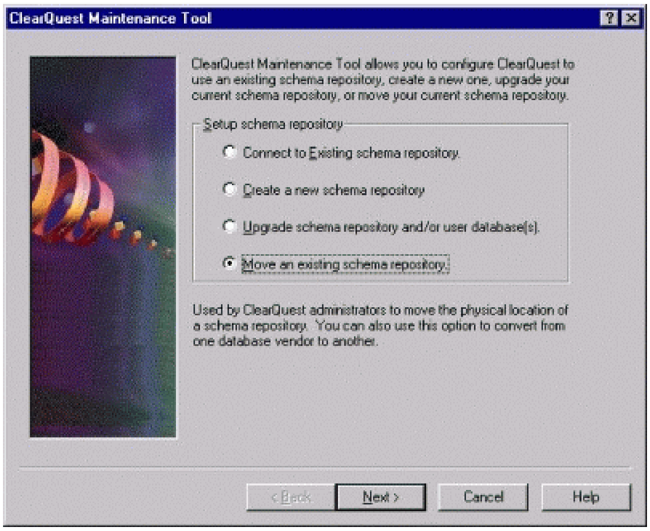
Note: Some high-end databases give the administrator a tool for logging users off from the database. Check your database vendor to see if it has such a tool.

4 Back up all your databases.

Warning: Always make a backup of your database before changing database vendors. The conversion process locks the original databases during conversion.

5 Run the ClearQuest Maintenance Tool from the Start menu.

6 Select **Move an existing schema repository** and click **Next**.


ClearQuest Maintenance Tool

ClearQuest Maintenance Tool allows you to configure ClearQuest to use an existing schema repository, create a new one, upgrade your current schema repository, or move your current schema repository.

Setup schema repository

( ) Connect to Existing schema repository.

( ) Create a new schema repository

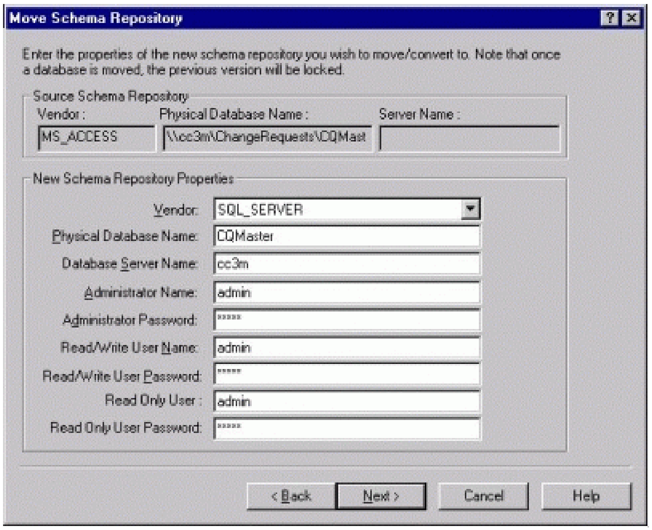
( ) Upgrade schema repository and/or user database(s).

[✓ Move an existing schema repository.]

Used by ClearQuest administrators to move the physical location of a schema repository. You can also use this option to convert from one database vendor to another.

7 Enter your ClearQuest administrator login name and password (you must have Super User privileges to perform this activity; see “Understanding database privileges” on page 97) and click **Next**.

8 Provide the new schema repository properties, then click **Next**.


Move Schema Repository

Enter the properties of the new schema repository you wish to move/convert to. Note that once a database is moved, the previous version will be locked.

Source Schema Repository

Vendor:	Physical Database Name:	Server Name:
MS_ACCESS	\\cc3m\ChangeRequests\CQMast	

New Schema Repository Properties

Vendor:	SQL_SERVER
Physical Database Name:	CQMaster
Database Server Name:	cc3m
Administrator Name:	admin
Administrator Password:	*****
Read/Write User Name:	admin
Read/Write User Password:	*****
Read Only User :	admin
Read Only User Password:	*****

9 When the conversion is complete, exit the ClearQuest Maintenance Tool.

10 Have all users run the ClearQuest Maintenance Tool to connect to the new schema repository. Be sure to provide them with the information they need to connect. See “Installing ClearQuest for end-users” in the *Installing Rational ClearQuest* guide for details on the information needed to connect.

Moving a user database

This example shows how to move a user database (called “SAMPL” in our example) to a new database vendor using the ClearQuest Designer.

1 Install and configure the new vendor database software.

2 Create a new empty database with your vendor tool (exception: Microsoft Access and SQL Anywhere databases can be created from within ClearQuest).

Note: See the *Installing Rational ClearQuest* guide for information on creating new databases.

3 Notify all users to log off from ClearQuest.

ClearQuest prevents new users from accessing the databases during the process, but it cannot detect or log off users who are still logged in when the procedure begins.

Note: Some high-end databases give the administrator a tool for logging users off from the database. Check your database vendor to see if it has such a tool.

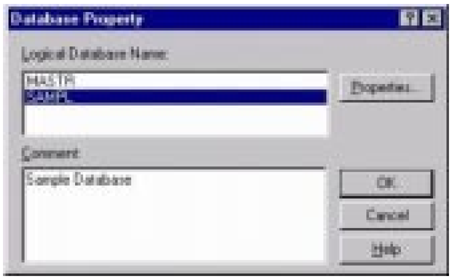
4 Back up your databases.

Warning: Always make a backup of your database before changing database vendors. The conversion process locks the original databases during the conversion process.

5 Run the ClearQuest Designer from the Start menu.

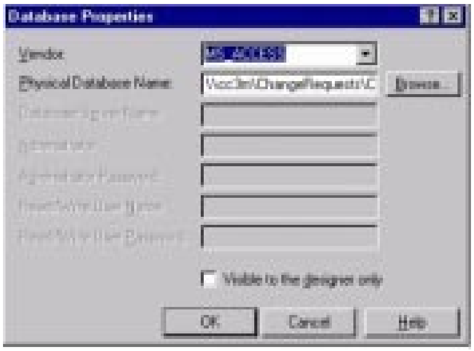
6 Select **Database > Database Properties**.

7 In the Database Property dialog box, select the user database and click **Properties**.



Sample Database

8 Change the vendor.

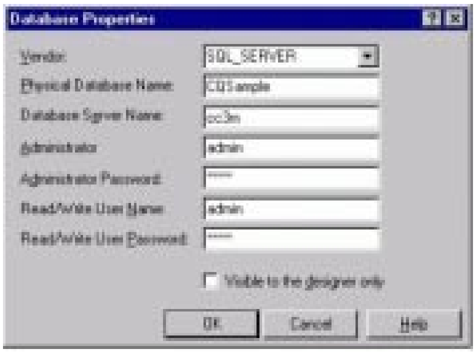


Database Properties

Vendor:	MS_ACCESS
Physical Database Name:	\\cc3m\ChangeRequests\C
Database Server Name:	
Administrator:	
Administrator Password:	
Read/Write User Name:	
Read/Write User Password:	

☐ Visible to the designer only

9 Provide the new database properties, then click **OK**.

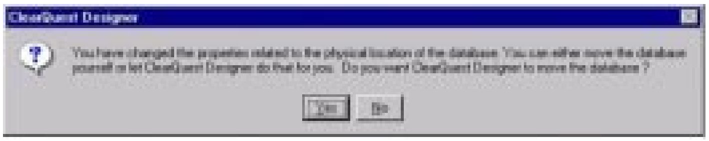


Database Properties

Vendor:	SQL_SERVER
Physical Database Name:	CQSample
Database Server Name:	cc3m
Administrator:	admin
Administrator Password:	*****
Read/Write User Name:	admin
Read/Write User Password:	*****

☐ Visible to the designer only

10 Click **Yes** to have ClearQuest convert the database for you.



ClearQuest Designer

You have changed the properties related to the physical location of the database. You can either move the database yourself or let ClearQuest Designer do that for you. Do you want ClearQuest Designer to move the database ?

11 When the conversion is complete, click **OK** to exit.

Moving a database to a new location

To move a database to a new location, follow the same procedure for switching database vendors, with the following exceptions:

- Since you are using the same database vendor, you do not need to reinstall any database software unless you are moving to a completely different machine.
- When entering database properties, enter the new location or server information (the vendor remains the same).

Moving a database to another schema

Once a user database is associated with a schema, you can upgrade that database with new versions of that schema, but you cannot apply an entirely different schema to the database.

For example, if you have a user database using version 1 of the Defect Tracking schema, you can upgrade that database to version 2 of the DefectTracking schema. If you want to start using the Enterprise schema instead, you cannot apply it to the database already associated to the DefectTracking schema.

The only way to switch to a new schema is to move the data out of the old user database into a new user database that is using the new schema. ClearQuest provides the tools you need to export and import the data.

Specifically, switching schemas involves the following tasks:

1. Create or modify the schema you want to start using.

   See Chapter 4, “Working with ClearQuest schemas” and Chapter 5, “Customizing a schema” for information on creating and modifying schemas.

2. Create a new user database based on the new schema.

   Use the ClearQuest Designer to create a new user database.

3. Export the data from your current user database.

   Use the ClearQuest Export Tool to export the data from your current user database. See “Using the ClearQuest Export Tool” on page 37.

4. Import the data into the new database.

   Use the ClearQuest Import Tool to import the data into your new database. See Chapter 10, “Importing data into ClearQuest” for information on using the Import Tool.

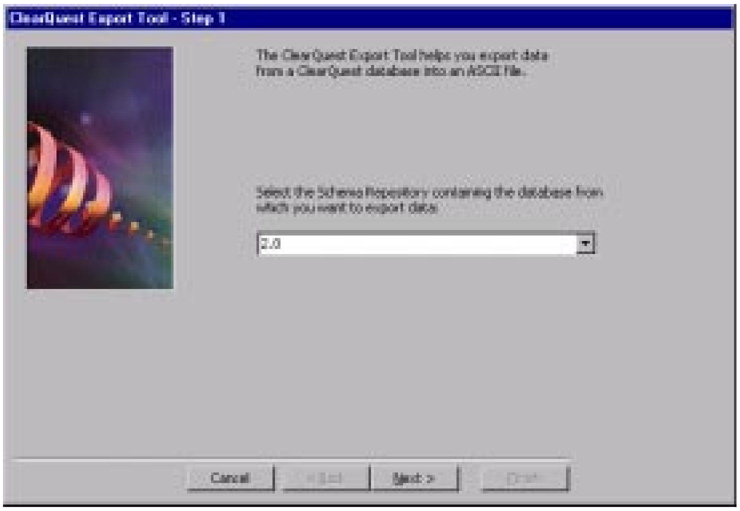
Consider the following issues when switching to a new schema:

- After creating a new schema, we recommend that you test it with a test database before upgrading your new user database. You can import a small subset of your data and test the schema to be sure all aspects of the process and workflow function correctly.
- If your new schema has dynamic lists, be sure to populate those lists before importing your data (see “Understanding choice lists” on page 110).
- If you have dependencies for reference or reference_list fields within your data, you should import your data in the proper order. For example, you may need to import your project record type first, then your main data record type, then attachments, and finally history.
- If you are not only switching schemas, but also schema repositories, you must import user information first. Use the ClearQuest Designer User Administration tool to export the user information and move it to the new schema repository before moving any data.
- If the new schema uses different state names from the old schema, you must edit the export file to correct the old state names. For example, suppose the old schema used the state name *submitted*, but the new schema calls that state *new*. After exporting your data, you must edit the export file and replace *submitted* with *new* before importing that data into the new schema.
- The ClearQuest Export Tool exports the record ID into the display_name field for history and attachments stateless record types; see “Working with record types” on page 61. Remember to map the display_name field to the original “old” ID field when importing data into the new schema.

Using the ClearQuest Export Tool

The ClearQuest Export Tool exports your data into an ASCII format optimized for the ClearQuest Import Tool. To run the Export Tool, do the following:

1 Launch the ClearQuest Export Tool from the Start menu.


ClearQuest Export Tool - Step 1

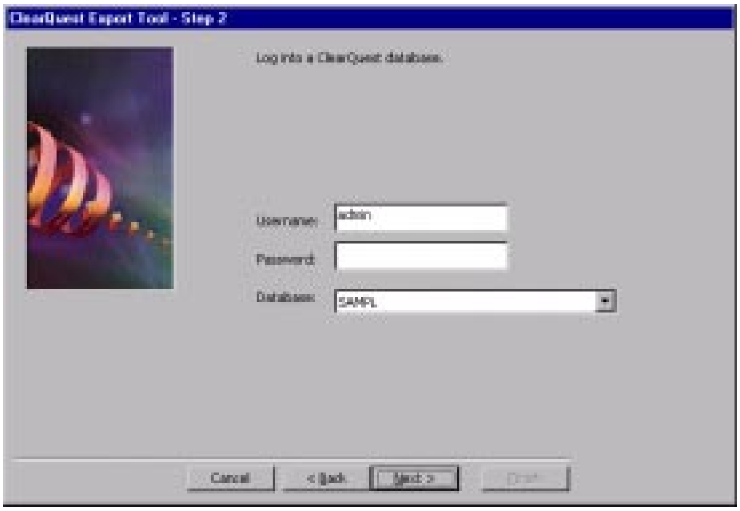
The ClearQuest Export Tool helps you export data from a ClearQuest database into an ASCII file.

Select the Schema Repository containing the database from which you want to export data:

2.0

2 Select the schema repository containing the database from which you want to export data. The default is the schema repository associated with the current version number of ClearQuest.

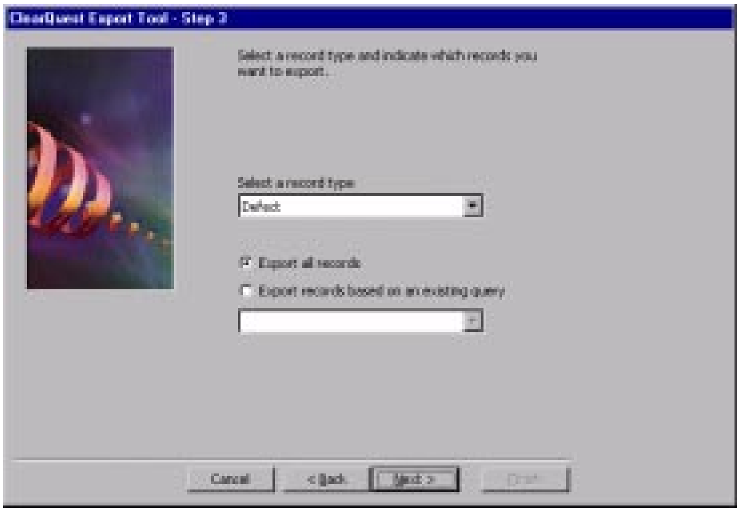
3 Log in and select the database you want to export.



Log into a ClearQuest database.

Username: admin
Password:
Database: SAMPL

4 Select a record type and indicate which records you want to export. You can export all records or select a ClearQuest query to export specific records.



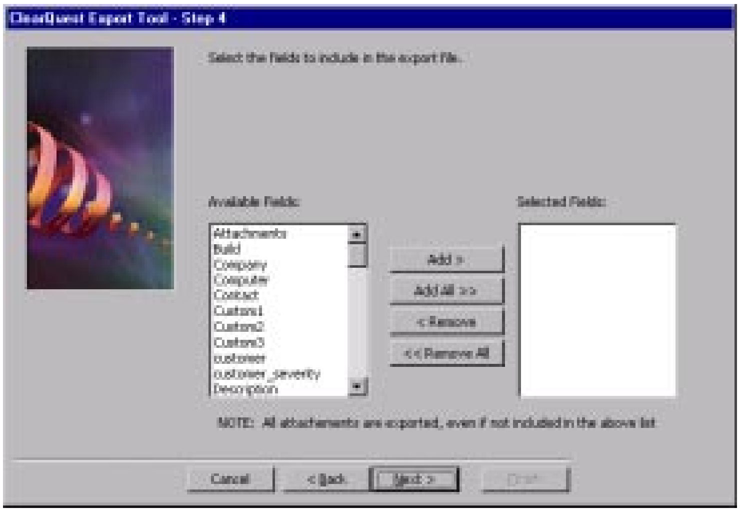
Select a record type and indicate which records you want to export.

Select a record type: Defect

[✓ Export all records]
Export records based on an existing query

The history, attachments, and duplicates data are automatically exported for the selected record type.

5 Select the fields to export.


ClearQuest Export Tool - Step 4

Select the fields to include in the export file.

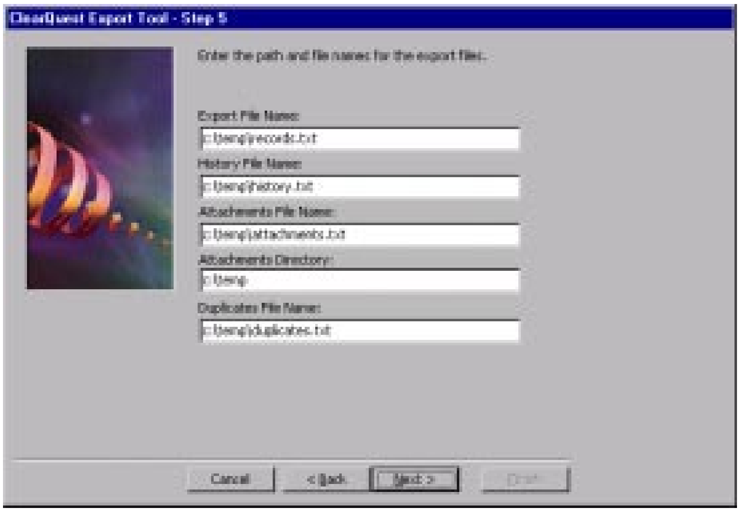
Available Fields:

- Attachments
- Build
- Company
- Computer
- Contact
- Custom1
- Custom2
- Custom3
- customer
- customer_severity
- Description

Selected Fields:

NOTE: All attachments are exported, even if not included in the above list

6 Enter names for the export files. ClearQuest creates separate files for records, history, attachments, and duplicates. These are the files required by the ClearQuest Import Tool.


ClearQuest Export Tool - Step 5

Enter the path and file names for the export files.

Export File Name: c:\temp\records.txt

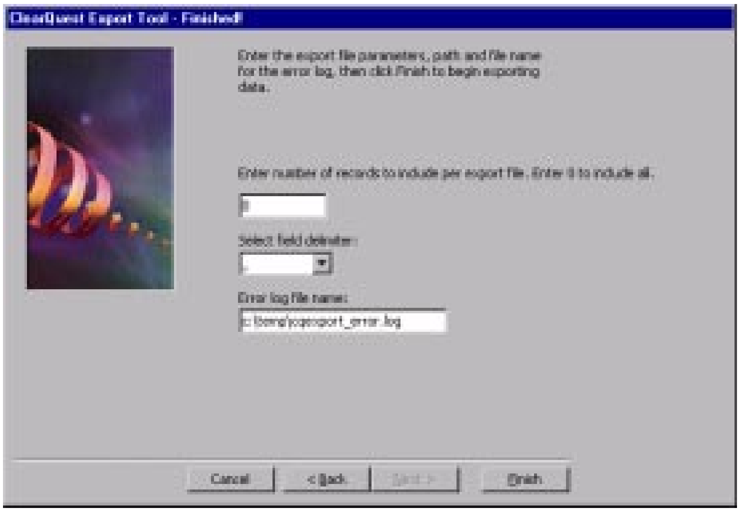
History File Name: c:\temp\history.txt

Attachments File Name: c:\temp\attachments.txt

Attachments Directory: c:\temp

Duplicates File Name: c:\temp\duplicates.txt

7 Enter the final export parameters.



ClearQuest Export Tool - Finished!

Enter the export file parameters, path and file name for the error log, then click Finish to begin exporting data.

Enter number of records to include per export file. Enter 0 to include all.

0

Select field delimiter:

,

Error log file name:

c:\temp\cqexport_error.log

- You can choose to include all records in one file or enter the number of records you want per file.
- Select the field delimiter for the export files. The most common format is comma-delimited, but you can also use colons, semi-colons, pipes, or tabs.
- Enter the path and name for the Error log.

8 Click Finish to begin the export. ClearQuest displays a dialog box when the export is complete and lists any detected errors.

Deleting user databases

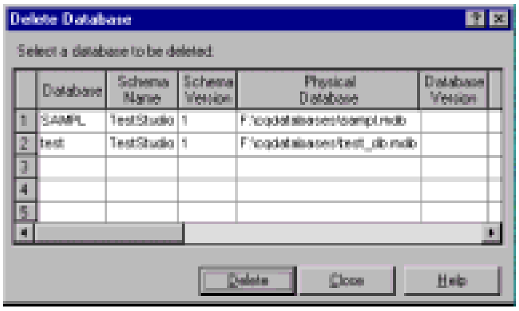
Deleting a user database removes the link between the schema repository and the database. It does not delete the physical database, nor does it delete the schema associated with that database.

Important: The link to deleted databases is permanently lost if you delete the schema version to which the database was associated, or if you upgrade to newer versions of ClearQuest.

To delete a database from ClearQuest, do the following:

1 Launch the ClearQuest Designer from the Start menu.

2 Choose **Database > Delete Database**. This opens the Delete Database dialog.



Select a database to be deleted.

	Database	Schema Name	Schema Version	Physical Database	Database Version
1	SAMPL	TestStudio	1	F:\cqdatabases\sampl.mdb	
2	test	TestStudio	1	F:\cqdatabases\test_db.mdb	
3					
4					
5					

3 Choose the database you want to delete.

4 Click **Delete**.

Note: This procedure is for deleting user databases. To delete a schema see, “Deleting a schema” on page 51.

If you want to physically delete an Oracle or SQL Server database, you must use your vendor’s tools to remove the user database after deleting the link. For Microsoft Access and SQL Anywhere databases, you can manually remove the database files.

Undeleting a user database

You can restore the link between a user database and the schema repository by undeleting the database. Recovering the link should be done soon after deletion, otherwise the link may be lost (for example, links are lost after upgrading ClearQuest to a newer version).

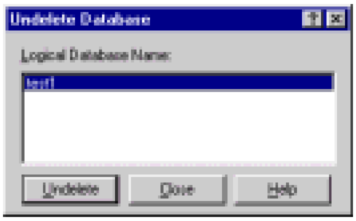
Note: ClearQuest does not physically delete the user database, only the link between it and the schema repository. If you use your database vendor's tools to delete the database, it will be physically removed and all data will be lost. Undeleting a database through ClearQuest (restoring the link) can happen only if the physical database still exists.

You must restore the link to the same schema version to which the user database was previously linked. The physical database must be in the same location that it was in when it was deleted.

To undelete a user database:

1. Launch the ClearQuest Designer from the Start menu.

2. Choose **Database > Undelete Database**. This opens the Undelete Database dialog.



test1

3. Choose a deleted database from the list.

4. Click **Undelete**.

4 Working with ClearQuest schemas

A ClearQuest schema contains the metadata (the record types, fields, forms, and so on) that define how you work with records in ClearQuest. ClearQuest includes several predefined schemas that provide common workflow models.

Predefined schemas are made up of schema packages that add specific functionality to the schema. A quick way to customize a schema is to start with a predefined schema and add various packages to get the functionality you need.

To work with schemas, you use the ClearQuest Designer. This chapter covers the basic procedures you need to use when working with all schemas, whether you are modifying an existing schema or creating a schema from scratch.

Topics covered include:

- Basic procedures for working with schemas
- Selecting a ClearQuest schema
- Adding packages

To work with schemas, you need Schema Designer or Super User privileges. For more information, see Chapter 6, "Administering users."

More information? For a complete list of predefined schemas and packages, see Appendix A, "ClearQuest schemas and packages." For information on how to customize an individual schema, see Chapter 5, "Customizing a schema."

Basic procedures for working with schemas

ClearQuest maintains schemas under version control in the schema repository. To customize a schema or to create a new schema, use the ClearQuest Designer and follow these basic procedures:

1. Create a test database to use to test your schema customizations. See “Setting up a test database” on page 45.
2. Check out a schema from the schema repository.

   If you are creating a schema from scratch, you can start with the predefined Blank schema.
3. Choose the scripting language to use for hook code. See “Choosing a scripting language” on page 47.
4. Associate the schema with the test database. Select **Database > Set Test Database**.
5. Customize the schema, validating often, especially if you are making complex changes to your schema. See “Validating schema changes” on page 47.
6. Save your work in progress. See “Saving work in progress” on page 48.

   You can save your work in progress and log off while a schema is checked out to you; you can resume work when you log back in.
7. Test your schema changes. Select **File > Test Work**. Testing upgrades the test database with your latest schema changes, providing a quick way for you to test your work in progress before you actually check in the schema. See “Testing a schema” on page 49.
8. Repeat steps 4 through 6 until you are satisfied with your schema changes.

9 Check the schema into the schema repository. ClearQuest creates a new version of the schema when you check it in. See “Checking in a schema” on page 49.

Note: Checking in a schema revision does not affect any databases, it just makes the new revision available so that you can use it to upgrade an existing database or to apply to a new database. ClearQuest keeps a history of each revision, so you can view a prior revision and use it in a new database. Checking in a schema also forces the validation of the schema.

10 Make sure that everyone is logged off the user database. Back up the user database and the schema repository.

11 Upgrade the user database to the new schema revision. Select **Database > Upgrade Database** and select the user database. See “Upgrading a user database” on page 51.

Setting up a test database

Before you check out a schema to customize, you should create a test database to use for testing your schema changes. Using a test database provides a quick way for you to test your work in progress without actually checking in the schema and updating the user database.

Try creating some sample records to test various aspects of your schema. You can use the ClearQuest Import Tool to import data to test complex schema customizations.

To set up a test database:

1 Create a test database by selecting **Database > New Database**.

2 Check out a schema to customize it and associate it with the test database. Select **Database > Set Test Database** and select the test database.

3 Test your work before you check in a schema by selecting **File > Test Work**.

More information? Look up *test databases, setting* in the ClearQuest Designer Help index.

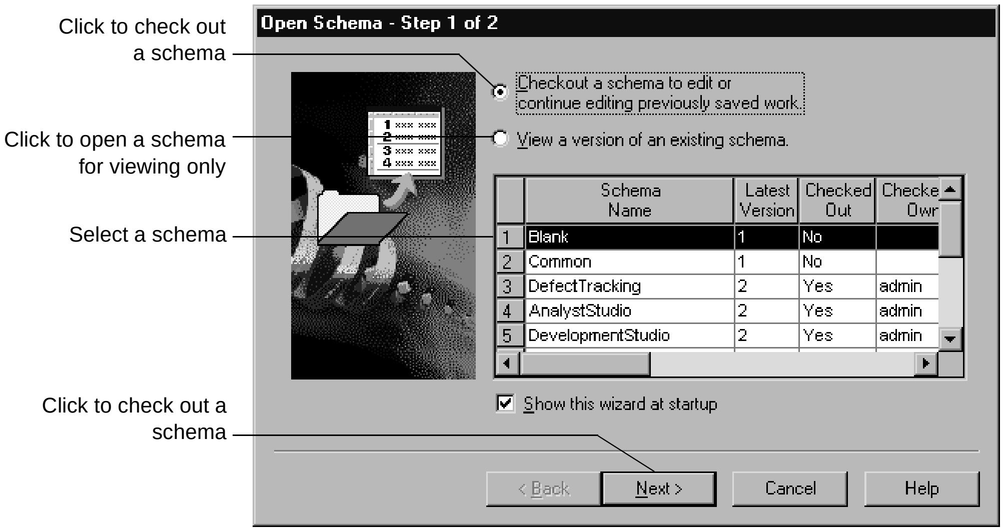
Checking out a schema

To customize a schema, you must first check out the schema from the schema repository. When you check out a schema, ClearQuest creates a new version of the schema for you to edit.

To check out a schema, select **File > Open Schema** in ClearQuest Designer to display a list of the *latest* versions of all existing schemas.

To create a new schema from scratch, select **File > New Schema** and select the Blank schema from the list of schemas. The Blank schema contains only system fields.

ClearQuest Designer displays the Open Schema dialog.


Click to check out a schema
Click to open a schema for viewing only
Select a schema
Click to check out a schema
Open Schema - Step 1 of 2
< Back
Next >
Cancel
Help

● Checkout a schema to edit or continue editing previously saved work.

○ View a version of an existing schema.

	Schema Name	Latest Version	Checked Out	Checke Owr
1	Blank	1	No	
2	Common	1	No	
3	DefectTracking	2	Yes	admin
4	AnalystStudio	2	Yes	admin
5	DevelopmentStudio	2	Yes	admin

☑ Show this wizard at startup

Note: If you open a schema for viewing only, you cannot customize the schema.

More information? Look up *schemas, checking out* in the ClearQuest Designer Help index.

Choosing a scripting language

Hooks are triggers for pieces of code that ClearQuest executes at specified times to more fully implement your process. You can write hooks in VBScript and/or Perl. For documentation on either language, see the following resources on the internet:

- http://msdn.microsoft.com/scripting/
- http://www.perl.com/

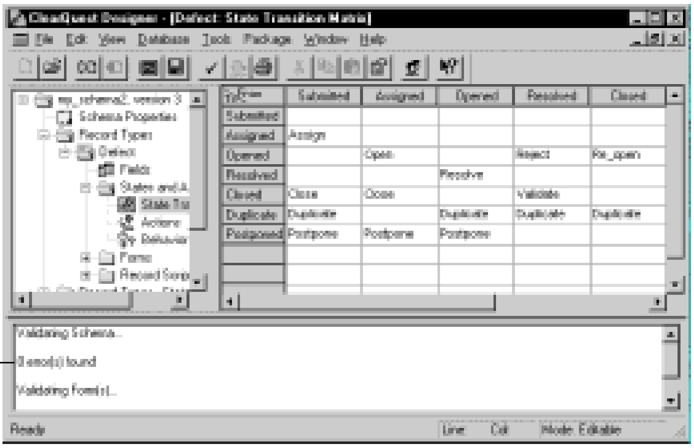
ClearQuest runs your hooks in VBScript or Perl, but not both at the same time. After checking out a schema, double-click **Schema Properties** in the Workspace to set the ClearQuest schema properties for the one scripting language that corresponds to the set of scripts that you currently want ClearQuest to run (look up *schemas, setting up* in the ClearQuest Designer Help index).

More information? See Chapter 7, “Using hooks to customize your workflow.”

Validating schema changes

When you attempt to check in a schema, ClearQuest automatically validates your schema to ensure that it does not contain any errors. If you are making a lot of changes to a schema, you can also check for errors by validating your schema manually as you go.

To validate a schema, select **File > Validate**. ClearQuest displays the validation results in the Validation window in the bottom pane of the Designer.


Right-click an error and select **What's This?** to get more information about the error
ClearQuest Designer - [Defect: State Transition Matrix]
File Edit View Database Tools Package Window Help
my_schema2, version 3
Schema Properties
Record Types
Defect
Fields
States and A
State Tra
Actions
Behavior
Forms
Record Scrip
Ready
Line Col Mode: Editable

To/From	Submitted	Assigned	Opened	Resolved	Closed
Submitted					
Assigned	Assign				
Opened		Open		Reject	Re_open
Resolved			Resolve		
Closed	Close	Close		Validate	
Duplicate	Duplicate		Duplicate	Duplicate	Duplicate
Postponed	Postpone	Postpone	Postpone		

```
Validating Schema...
3 error(s) found
Validating Form(s)...
```

Note: Review the validation results and make changes as needed. You cannot check in a schema if there are validation errors.

To get help about the cause of a validation error, select the validation error message and right-click to display a shortcut menu. Select **What's This?** from the shortcut menu to display diagnostic information about the error.

Validation does not guarantee that your schema will function as desired. In particular, hook code can introduce subtle errors at runtime if not written correctly. Be sure to test your schema before checking it in, and always make a backup copy of your user database before upgrading it.

More information? Look up *schemas, validation* in the ClearQuest Designer Help index.

Saving work in progress

To save work in progress without checking in the schema, select **File > Save Work**. ClearQuest does not create a new version of the schema until you check it in.

It's a good idea to validate and save often as you work. See "Validating schema changes" on page 47.

Testing a schema

You should test your work before you check in a schema to ensure that the test database remains up to date with the latest schema version (see "Setting up a test database" on page 45).

To test a schema, select **File > Test Work**. This automatically upgrades the test database with your current schema changes and starts the ClearQuest client so you can test your work.

ClearQuest also validates the schema and displays any validation errors in the Validation pane at the bottom of the ClearQuest Designer window.

Note: If you skip testing your work for a schema revision, you must create a new test database.

More information? See "Setting up a test database" on page 45. Look up *schemas, testing* in the ClearQuest Designer Help index.

Checking in a schema

Note: You cannot check in a schema if there are validation errors. See "Validating schema changes" on page 47.

When you finish editing a schema, you should check it in to save your changes. When you check in a schema, ClearQuest increments the version number of the schema in the schema repository.

You must check in a schema before you can use it with any of your user databases. Checking in a schema does not affect the user database until you upgrade the user database with the new schema version.

To check in a schema, select **File > Check In**. ClearQuest validates the schema. Any errors are displayed in the Validation pane on the bottom of the Workspace.

Review the validation results and change the schema as needed to correct any validation errors. For help on any of the validation messages, right-click an error message and choose **What's This?** from the shortcut menu.

If you cannot validate all of your schema changes, you can save your schema changes and continue editing at a later time. You can also undo your checkout and revert the schema to its previous version. See "Saving work in progress" on page 48.

Undoing a schema checkout

You can return a schema to its previous version, even if you have made changes and saved them. To revert to the last checked-in version of a schema, select **File > Undo Check Out**.

Undoing a checkout removes any changes made to the schema since it was checked out. This includes removing changes that may have been made over multiple sessions and saved without checking in the schema.

Note: If you tested your work by selecting **File > Test Work**, your test database was upgraded to your current work. Once you undo the schema checkout, the test database will no longer be valid. You must delete the test database and re-create it.

Upgrading a user database

After checking in a schema, you must upgrade the user database with the new schema version so that users have access to the latest changes. In ClearQuest Designer, select **Database > Upgrade Database.**

Keep in mind the following restrictions when you upgrade a user database:

- Once a user database is associated with a schema version, it can only be upgraded to newer versions of that schema. It cannot be upgraded to an earlier version or to a different schema.
- Before upgrading a user database, make sure that no users are connected to it. ClearQuest prevents new users from connecting to a database while you are upgrading it, but it does not disconnect users who are connected *before* you upgrade.

More information? Look up *databases, upgrading* in the ClearQuest Designer Help index. Also see Chapter 3, “Managing databases.”

Deleting a schema

Note: Schema deletions are final. You cannot retrieve a deleted schema.

You can delete a schema or a version of a schema if it has more than one version.

- To delete a version of a schema from the schema repository, select **File > Delete Schema Version** and select the schema version you want to delete.
- To delete *all* versions of a schema from the schema repository, select **File > Delete Schema** and select the schema you want to delete.

Selecting a ClearQuest schema

ClearQuest provides several predefined schemas that you can use as is or customize to suit your workflow. The Blank schema contains only ClearQuest system fields; you can use it as a starting point to create a schema.

ClearQuest schemas are made up of schema *packages*. A package is a piece of schema functionality. For example, the Email package adds the E_mail rules record type, which allows you to set up configurable e-mail rules. You can add individual packages to your own customized schema, or use them to enhance ClearQuest predefined schemas.

The following table describes the predefined schemas that are included in ClearQuest:

Schema	Description
AnalystStudio	Compatible with Rational AnalystStudio. Contains customization for use with Rational RequisitePro.
Blank	Contains only system fields. Use Blank to create a schema from scratch.
Common	Contains metadata that is common to all of the ClearQuest schemas.
DefectTracking	Contains the fields necessary to start using ClearQuest to track defects in a software development environment.
DevelopmentStudio	Compatible with Rational DevelopmentStudio. Contains fields and rules that work with Rational’s Purify, Quantify, and Pure Coverage.
Enterprise	For use with Rational EnterpriseStudio. Contains fields and hooks that work with all Rational products.
TestStudio	Compatible with Rational TestStudio. Contains fields and rules that work with Rational’s TeamTest, RequisitePro, Purify, Quantify, and Pure Coverage.
UnifiedChangeManagement	Supports the UCM process by providing integration with Rational ClearCase.

More information? See Appendix A, “Working with ClearQuest schemas,” for a complete description of ClearQuest schemas and packages.

To learn about the UnifiedChangeManagement schema and package, see *Enabling ClearQuest for Unified Change Management* on page 181.

Adding packages

ClearQuest's schema packages contain metadata, such as records, fields, and forms, that define specific functionality. Installing a package into a schema provides a way to quickly add that functionality to the schema.

A package might contain one or more new record types and might modify one or more record types that already exist in your schema. For example, the Email package provides functionality that allows the ClearQuest user to send an e-mail notification to a designated person. When installed into a schema, the Email package adds the new stateless Email_Rule record type to the schema and adds the Send_Email_Notif action to an existing record type in the schema.

For a complete list of packages and the record types and fields they modify, see "Packages included in ClearQuest schemas" on page 170.

Keep in mind the following when you add a package:

- You can add one or more packages to any schema.
- Your schema must *not* already contain the metadata that the package adds. For example, if you attempt to install a package containing a Project record type into a schema that already contains a Project record type, the installation fails.
- Packages replace the add-ins used in previous versions of ClearQuest. If you are upgrading from a previous version of ClearQuest and your schemas use add-ins, install the *upgrade version* of the package(s). Upgrade packages contain the word "upgrade" in their version string. Your schema *must* already contain metadata for the upgrade package to modify. For example, an attempt to install a package that modifies the Email_Rule record type only succeeds with a schema that already includes this record type.

Note: You cannot create your own packages to use with the Package Wizard. However, you can export schemas or schema versions and then import them to another schema repository using the CQLOAD command line utility. For more information, look up *cqload* in the ClearQuest Designer Help index.

There are four parts to adding a package to a schema:

1. Add the package.

   Select **Package > Package Wizard** and select a package to install. Packages that are already part of your current schema do not appear in the list of packages.

2. Enable record types.

   Some packages include modifications to record types that already exist in your schema. You decide whether or not the package should modify an existing record type. For details of each package, see “Packages included in ClearQuest schemas” on page 170.

   More information? Look up *record types, setting up for a package* in the ClearQuest Designer Help index.

3. Map the states in your schema to valid state types.

   When you add a package that uses state types, you are prompted to map each of your existing states to a state type for that package. You can map more than one state to a state type, but each state type requires at least one state.

   Just as your schema uses a state model, state types themselves also follow a specific model. State type models are listed in “State type models for packages” on page 178. To learn how to map state types, see “Mapping state types” on page 80.

   More information? Look up *state types, setting up for a package* in the ClearQuest Designer Help index. For step-by-step instructions on adding packages, look up *packages, installing*.

4 Create default actions if you are using the UCM package. See “Using default actions” on page 87.

5 Customizing a schema

This chapter describes how to use ClearQuest Designer to customize a schema. Topics covered include:

- Planning your schema customizations
- Working with record types
- Working with fields
- Defining your state model
- Working with record forms

ClearQuest includes several predefined schemas. If one of these schemas meets your business needs, you can use it without modification. For a complete list of ClearQuest predefined schemas and packages, see Appendix A, “Customizing a schema.”

Before you can customize a schema, you must check the schema out of the schema repository. For complete instructions on how to work with schemas, see Chapter 4, “Working with ClearQuest schemas.”

To customize a schema, you need Schema Designer or Super User privileges. For more information, see Chapter 6, “Administering users.”

Planning your schema customizations

Customizing a schema is a multi-step process involving these basic procedures:

1 Define your data.

To define the data you want to collect and manage in ClearQuest, you work with record types and fields. To define your data:

- Decide what type of records you need. You may want to define separate record types for hardware defects and software defects, each of which would define its own set of fields. See “Working with record types” on page 61.
- List the fields you need on each record form.
- You can further customize your record type through field *data types* and *hooks*.

Note: A quick way to add record types and fields to a schema is to add one or more ClearQuest predefined packages to your schema. Before you add packages to a schema, read “Adding packages” on page 54.

2 Define your state model.

See “Defining your state model” on page 77.

Each record type has its own state model. A state model consists of states, state types, actions, and field behaviors. To define your state model:

- List the record states that you need and the actions that can be performed on the record in each state.
- Draw a state model showing how records will move through your system. Define the possible states in which a record can exist. For example, a simple defect tracking system might define submitted, opened, fixed, and verified states.
- Create the actions you want to use to modify records and to move them from one state to the next.

- Group each field with a specific state. Define the legal values for each field, including whether to provide choice lists, and whether the field is required or optional. See “Working with fields” on page 65.
- You can further customize your process by adding action hooks. See “Adding action hooks” on page 85.
- You can also customize your schema by adding one or mode packages. Certain packages can involve your working with state types. A state type is a label some ClearQuest schema and packages use to define a state’s role in your state model. For example, the UnifiedChangeManagement package and the Resolution package require that each state in your state model be assigned or mapped to a specific state type. When you add a new state to a schema that uses state types, you must map the new state to a state type. For more information, see “Mapping state types” on page 80.

3. Build your forms. See “Working with record forms” on page 88.
   - Create the forms your users will use to submit new records and view existing records. Design the layout of your forms. Decide where to locate each field on the form.
   - For the web interface, decide how fields should be grouped and the order they should appear in on the web pages.

4. Add hooks.
   - Define the relationships between fields. Determine whether the value in one field affects the values in other fields. These relationships can help you decide where to add hooks and what types of hooks to add. See “Adding field hooks” on page 74.
   - Plan additional controls, hook code, or permissions that will enhance how your record form is used. For example, decide who should be notified when a record is submitted or changed, who can perform certain actions, and which fields are required in each state. See “Adding action hooks” on page 85.

For more information about hooks, see Chapter 7, “Using hooks to customize your workflow.”

More information? Select **Working with schemas, Creating a new schema** in the ClearQuest Designer Help.

Working with record types

A record type is a category of change requests to be managed by ClearQuest. A record type contains everything you need to define the data you want to collect and track: the states a record can be in, the actions that can be performed on the record, the fields, and the forms.

You can have one or more record types in a schema. For example, you can create a simple schema that has the single Defect record type, or you can create a complex schema that has multiple record types such as Hardware Defects, Software Defects, and Engineering Change Requests.

ClearQuest supports two types of records:

- State-based
- Stateless

State-based records

State-based records use states, such as Submitted, Assigned, and Resolved, to track their position in your project's life cycle. This type of record is always associated with a state. A record moves from one state to another through an *action*.

ClearQuest includes some predefined state-based record types. For a description of these record types, see Appendix A, "ClearQuest schemas and packages."

Stateless records

Stateless records are usually used for reference, such as a list of users, projects, or other information. Stateless record types do not move from state to state; the only actions you can perform on a stateless record are Submit, Modify, Delete, and Import.

ClearQuest includes some predefined stateless record types. See "Packages included in ClearQuest schemas" on page 170.

Record type families

You can group two or more state-based record types as a record type family to allow ClearQuest users to query across multiple record types.

To create a record type family, follow the instructions in “Adding and creating record types” below. Keep in mind the following:

- The record types in a family must have one or more common fields. These fields are also used to query the record type family.

  Open the Fields grid for each record type in the family and add the common field(s). Make sure the information in the Field Name and Type columns is the same for the record type family and for the individual record types. You can ignore the columns with hooks.
- Since record types and record type families appear in the same window when ClearQuest users select **Query > New Query**, make sure you use a naming convention that will help users distinguish individual record types from record type families.

Adding and creating record types

You can add new record types to your schema. You must create record types as either state-based or stateless; once you create the record type, you cannot change whether it is stateless or state-based.

To create a record type select **Edit > Add Record Type/Family** in ClearQuest Designer. Click **State**, **Stateless**, or **Family** and type a name for the record type or family.

Note: When you create a stateless record type, you must select one or more of its fields to be the unique key. ClearQuest uses the unique key to differentiate among stateless records of a given type. For more information, select **Defining record types > Assigning a unique key to a stateless record type** in the ClearQuest Designer Help.

More information? Select **Defining record types > Adding a record type** in the ClearQuest Designer Help.

Selecting the default record type

When you add new record types to a schema, you must choose which record type should be used as the default. Default record types can be state-based or stateless.

Each schema must have a default record type. ClearQuest uses the default record type to create a shortcut button in the ClearQuest client that can be used for submitting records of that type. ClearQuest also uses the default record type in situations where no other record type is explicitly specified.

To make a record type the default, right-click the record type in the Workspace and select **Default Record Type** from the shortcut menu.

Using ClearQuest packages to add record types

You can use ClearQuest predefined packages to add functionality to a schema. Packages can add record types or enhance existing record types by adding fields, hooks, forms, and states.

More information? See “Adding packages” on page 54.

Renaming a record type

To rename a record type or family, select **Edit > Rename Record Type/Family** and type a new name.

Note: When you change the name of a record type, you must edit any hooks in the record type to reflect the new name. If you do not edit your hooks, your scripts will not work.

More information? Select **Defining record types > Renaming record types** in the ClearQuest Designer Help.

Deleting a record type

To delete a record type, select **Edit > Delete Record Type/Family** and select a record type or family to delete.

The following restrictions apply to deleting record types:

- ClearQuest maintains four stateless system record types: History, Attachments, Groups, and Users. You cannot delete system record types.
- You cannot delete the default record type. You must first assign another record type to be the default.
- If you have explicitly referred to the name of a record type in a hook, you must modify your script code to remove any references to that name.
- Record types added by read-only packages cannot be deleted.

Working with fields

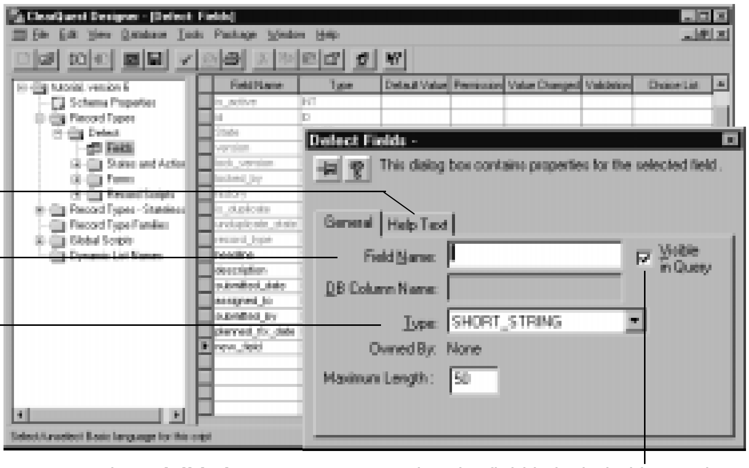
You work with fields to control the type of data that users can add to a user database. You can do the following with fields:

- Define field behavior
- Add help text to a field
- Link related records
- Add hooks to the field
- Create dynamic choice lists for fields

Adding and modifying fields

Each record type has a Fields grid that shows the fields associated with that record type. Each field is displayed in a row, and its properties are displayed in columns.

You can add fields to the record type or modify the properties of those fields. To add a new field to your schema, open the Fields grid and then select **Edit > Add Field**.


Use the Help Text tab to describe the field for your users
Type the name of the field
Select a data type
Select **Visible in Query** to ensure that the field is included in queries run in the ClearQuest client
Defect Fields -
General
Help Text

Field Name:
DB Column Name:
Type: SHORT_STRING
Owned By: None
Maximum Length: 50
[✓ Visible in Query]

Note: To make a new field available to users, you must add the field to the record form. See “Adding a field to a form” on page 91.

Selecting a field data type

When you add a field, you must choose a data type for the field. The data type defines the type of data that can be entered in the field.

ClearQuest supports the following field data types.

Data	Description/Comments
ATTACHMENT_LIST	Allows records to store files related to the record.
DATE_TIME	SQL date and time.
INT	SQL integer.
MULTILINE_STRING	A variable-length string of unlimited size.
REFERENCE	A reference to a unique key in a record type. For REFERENCE type fields, you must select a state-based or stateless record type to refer to. You can also enter an optional back-reference field to create a link from the referenced record back to this field's record.
REFERENCE_LIST	Multiple references to unique keys in record types. Reference list fields allow you to reference multiple records within a field. You can use reference list fields in conjunction with a parent/child control to link related records. For REFERENCE_LIST type fields, you must select a state-based or stateless record type to refer to. You can also enter an optional back-reference field to create a link from the referenced record back to this field's record.
SHORT_STRING	A variable-length character string with a 254-character maximum. You set the length in the Properties dialog box when defining the field. Enter a value between 0 and 254 in the Maximum Length field.

Note: You cannot modify the data type of a field after you check in the schema. To change the properties of a field, delete the existing field and then create a new field with the properties you want.

You can change the name you use to refer to a field. However, if you explicitly refer to the field by its name in a script, be sure to update your script to use the new name.

Adding Help text to the field

Use the Help Text tab to enter a description of the field. This is the help text your users will see when they ask for help about that field. The Help Text limit is 254 characters, approximately two-thirds of the space available on the Help Text tab.

More information? Look up *fields, overview* in the ClearQuest Designer Help index.

Deleting a field

To delete a field, open the Fields grid. Select the row that contains the field that you want to delete and then select **Edit > Delete Field**.

The following restrictions apply to deleting fields:

- To delete a field, you must also delete the field from the record form. See “Editing forms” on page 90.
- You cannot delete, rename, or modify a system field.

  Each ClearQuest record type includes system fields. These fields are required for every record of that type. System fields appear dimmed in the Fields grid.
- You cannot reuse the field name. A deleted field remains in the database, but is unavailable to users.
- If you have explicitly referred to the name of a field in script code, you need to remove any references to the field from your script.
- In the ClearQuest client, any queries that use this field will become invalid.

Defining field behavior

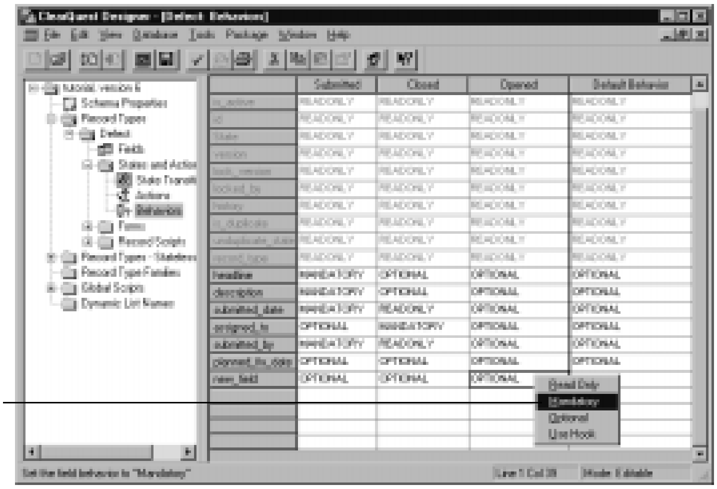
Each field has one or more behaviors associated with it. Fields in a state-based record type can have a different behavior for each possible state. For example, a field could be Optional in the Opened state and Mandatory in the Resolved state. Fields in a stateless record type have no states and therefore need only one behavior for each field.

ClearQuest supports the following field behaviors.

Behavior	Description
Mandatory	The user is required to put a value in this field before applying the changes to a record. Failure to do so will result in a runtime validation error.
Optional	The user can enter data into this field but is not required to do so. **Note:** Optional is the default setting for new fields.
Readonly	The user can view the contents of the field but cannot modify them. **Note:** Hooks can modify Readonly fields.
Use_hook	Use the field’s permission hook to determine the level of user access.

To set the behavior for a field, open the Behaviors grid. In the Workspace, select **Record Types > Defect > States and Actions > Behaviors**.

Right-click the cell you want to modify and select the new behavior from the shortcut menu



	Submitted	Closed	Opened	Default Behavior
is_active	READONLY	READONLY	READONLY	READONLY
id	READONLY	READONLY	READONLY	READONLY
State	READONLY	READONLY	READONLY	READONLY
version	READONLY	READONLY	READONLY	READONLY
lock_version	READONLY	READONLY	READONLY	READONLY
locked_by	READONLY	READONLY	READONLY	READONLY
history	READONLY	READONLY	READONLY	READONLY
is_duplicate	READONLY	READONLY	READONLY	READONLY
unduplicate_state	READONLY	READONLY	READONLY	READONLY
record_type	READONLY	READONLY	READONLY	READONLY
headline	MANDATORY	OPTIONAL	OPTIONAL	OPTIONAL
description	MANDATORY	OPTIONAL	OPTIONAL	OPTIONAL
submitted_date	MANDATORY	READONLY	OPTIONAL	OPTIONAL
assigned_to	OPTIONAL	MANDATORY	OPTIONAL	OPTIONAL
submitted_by	MANDATORY	READONLY	OPTIONAL	OPTIONAL
planned_fix_date	OPTIONAL	OPTIONAL	OPTIONAL	OPTIONAL
new_field	OPTIONAL	OPTIONAL	OPTIONAL	

Set the field behavior to "Mandatory" Line 1 Col 39 Mode: Editable

You can use the Default Behavior column to set a default behavior for a field. The default behavior applies to the field in every state. When you add a new state, the default behavior will automatically be applied to the field in the new state.

Note: You can also set the behavior of a field by using a hook. Hooks operate using Super User privileges and therefore can modify any field, even if the field behavior is Readonly.

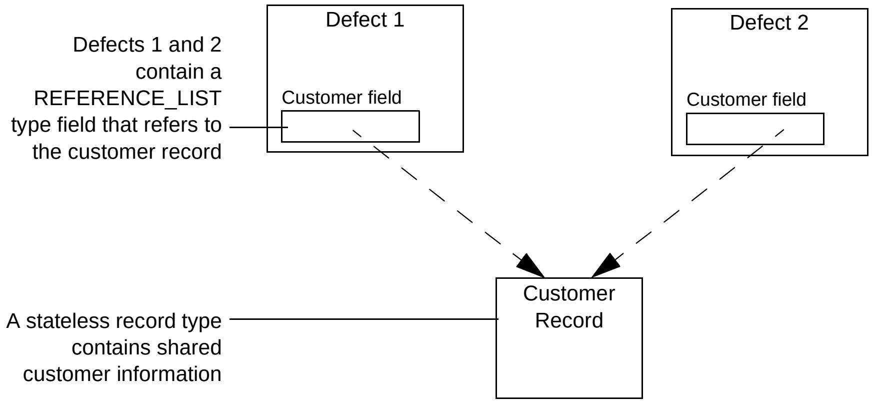
More information? Look up *fields, behaviors* in the ClearQuest Designer Help index.

Using fields to link records

You can use fields to establish links between records. The records can be of the same record type or of different record types.

Linking records to share common data

You can use REFERENCE or REFERENCE_LIST type fields to link records in order to share common data. For example, you might have the same customer data that must be entered for multiple records.

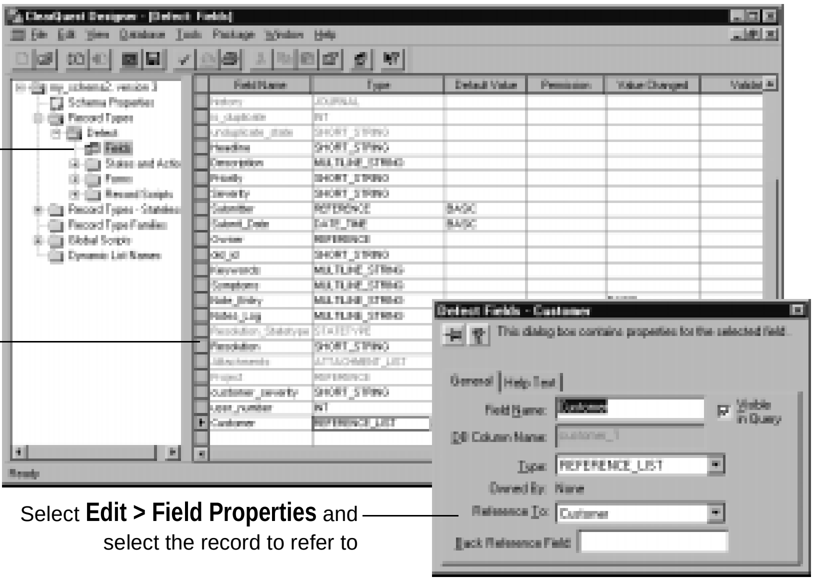


Defect 1
Defect 2
Customer field
Customer field
Defects 1 and 2 contain a REFERENCE_LIST type field that refers to the customer record
Customer Record
A stateless record type contains shared customer information

To link records, follow these guidelines:

1 Create a REFERENCE or REFERENCE_LIST type field in the record type. Select REFERENCE to link one record type; select REFERENCE_LIST to link multiple record types.

2 Select **Edit > Field Properties** and select the record type to refer to.


Double-click to open the Fields grid
Add a field and select REFERENCE_LIST as the type
Select **Edit > Field Properties** and select the record to refer to
ClearQuest Designer - [Defect: Fields]
File Edit View Database Tools Package Window Help
my_schema2: version 3
Schema Properties
Record Types
Defect
Fields
States and Actions
Forms
Record Scripts
Record Types - Stateless
Record Type Families
Global Scripts
Dynamic List Names
Ready

Field Name	Type	Default Value	Permission	Value Changed	Validation
History	JOURNAL				
is_duplicate	INT				
unduplicate_state	SHORT_STRING				
Headline	SHORT_STRING				
Description	MULTILINE_STRING				
Priority	SHORT_STRING				
Severity	SHORT_STRING				
Submitter	REFERENCE	BASIC			
Submit_Date	DATE_TIME	BASIC			
Owner	REFERENCE				
old_id	SHORT_STRING				
Keywords	MULTILINE_STRING				
Symptoms	MULTILINE_STRING				
Note_Entry	MULTILINE_STRING				
Notes_Log	MULTILINE_STRING				
Resolution_Statetype	STATETYPE				
Resolution	SHORT_STRING				
Attachments	ATTACHMENT_LIST				
Project	REFERENCE				
customer_severity	SHORT_STRING				
user_number	INT				
Customer	REFERENCE_LIST				

Defect Fields - Customer

This dialog box contains properties for the selected field.

General | Help Text

Field Name: Customer   [✓ Visible in Query]

DB Column Name: customer_1

Type: REFERENCE_LIST

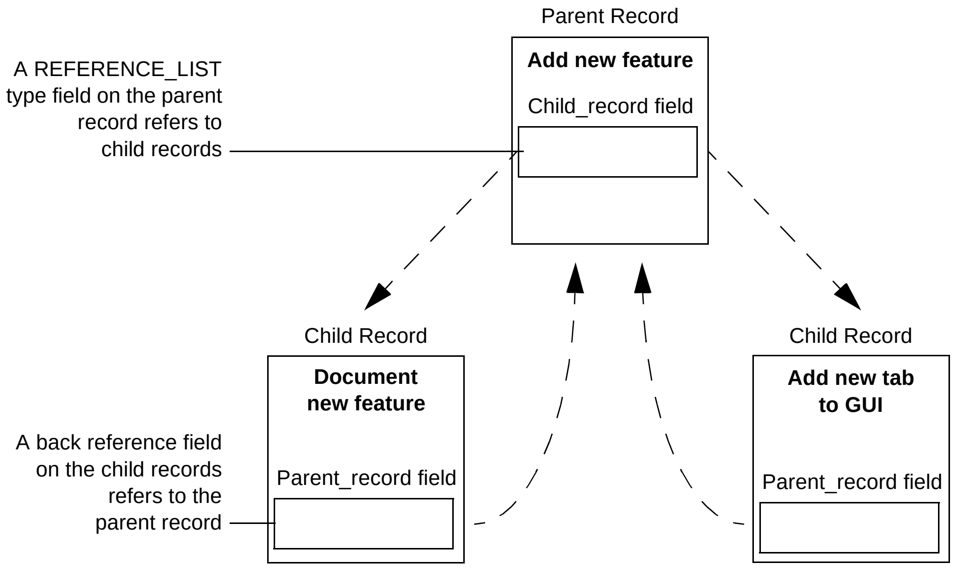
Owned By: None

Reference To: Customer

Back Reference Field:

Linking records to create a parent/child hierarchy

You can use REFERENCE or REFERENCE_LIST type fields to link records of the same type to create a parent/child hierarchy. For example, you can relate a parent record that requests the addition of a new feature to one or more child records that describe related tasks, such as documenting the new feature and adding a new tab to the interface.

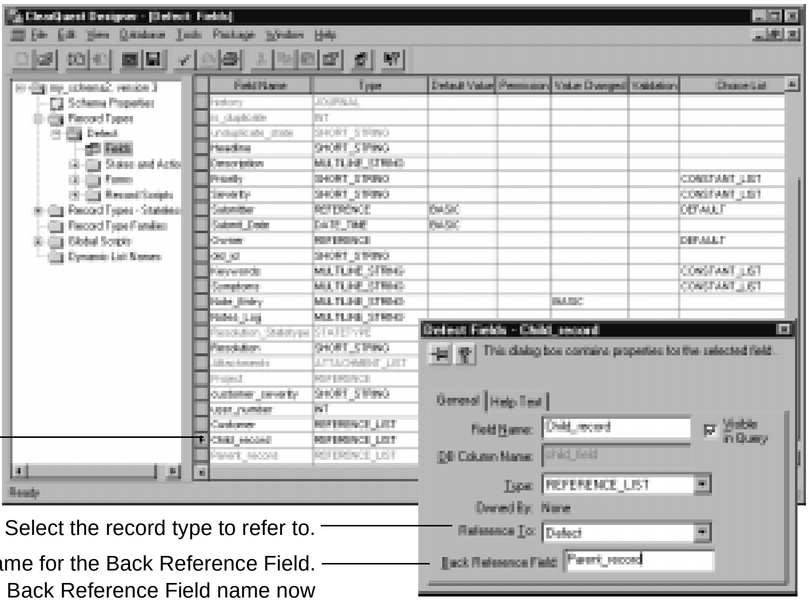


Follow these guidelines to create a parent/child hierarchy:

1 Add a REFERENCE_LIST or REFERENCE type field to the parent record.

2 Select the field and select **Edit > Field Properties**.

3 Optionally, you can enter a name for a Back Reference field. This allows you to view the link from the child record point of view. This field is automatically added to the fields of the child record.



Field Name	Type	Default Value	Permission	Value Changed	Validation	Choice List
history	JOURNAL					
is_duplicate	INT					
unduplicate_state	SHORT_STRING					
Headline	SHORT_STRING					
Description	MULTILINE_STRING					
Priority	SHORT_STRING					CONSTANT_LIST
Severity	SHORT_STRING					CONSTANT_LIST
Submitter	REFERENCE	BASIC				DEFAULT
Submit_Date	DATE_TIME	BASIC				
Owner	REFERENCE					DEFAULT
old_id	SHORT_STRING					
Keywords	MULTILINE_STRING					CONSTANT_LIST
Symptoms	MULTILINE_STRING					CONSTANT_LIST
Note_Entry	MULTILINE_STRING			BASIC		
Notes_Log	MULTILINE_STRING					
Resolution_Statetype	STATETYPE					
Resolution	SHORT_STRING					
Attachments	ATTACHMENT_LIST					
Project	REFERENCE					
customer_severity	SHORT_STRING					
open_number	INT					
Customer	REFERENCE_LIST					
Child_record	REFERENCE_LIST					
Parent_record	REFERENCE_LIST					

Field Name: Child_record
DB Column Name: child_field
Type: REFERENCE_LIST
Owned By: None
Reference To: Defect
Back Reference Field: Parent_record

Add a field and select REFERENCE_LIST as the type.

Select the record type to refer to.

Type a name for the Back Reference Field. Notice that the Back Reference Field name now appears grayed out in the Fields List.

4 Add the new fields to the forms as you normally would. You must use a parent/child control with a REFERENCE_LIST field type. See “Adding a field to a form” on page 91.

Note: Back reference fields are read only.

More information? Look up *records, linking related* and *data types, supported* in ClearQuest Designer Help index. See also “Action hook for setting the value of a parent record” on page 128.

Adding field hooks

ClearQuest allows you to customize your schema by adding hooks to your fields. ClearQuest triggers your hooks at predetermined times during the execution of an action. For example, you can customize the schema so that field default values are assigned whenever someone submits a new record.

ClearQuest includes the following predefined field hooks.

Field hook	Use/Comments
Choice List	Returns a list of valid field values. Use this hook with fields that are displayed using a list-type control, such as a list box or combo box.
Default Value	Sets the initial value of the field. This hook is called at the beginning of a Submit action.
Permission	Returns one of the BehaviorType constants indicating the user's access to the field. If you add a Permission hook to a field, you must modify the Behaviors grid so that at least one of the field's behaviors is set to USE_HOOK. Failure to do this will result in a validation error.
Value Changed	Validates the contents of the field. This hook is called immediately after the Value-Changed hook so that you can provide the user with immediate feedback regarding the validity of the field's contents. ClearQuest also calls it before committing the record to the database.
Validation	Responds to changes in the field's value. You can use this hook to trigger updates for other fields.

You can use the ClearQuest API to write custom field hooks. See Chapter 7, "Using hooks to customize your workflow," for information about field hooks and dependent fields.

More information? Look up *fields, hooks for* in the ClearQuest Designer Help index.

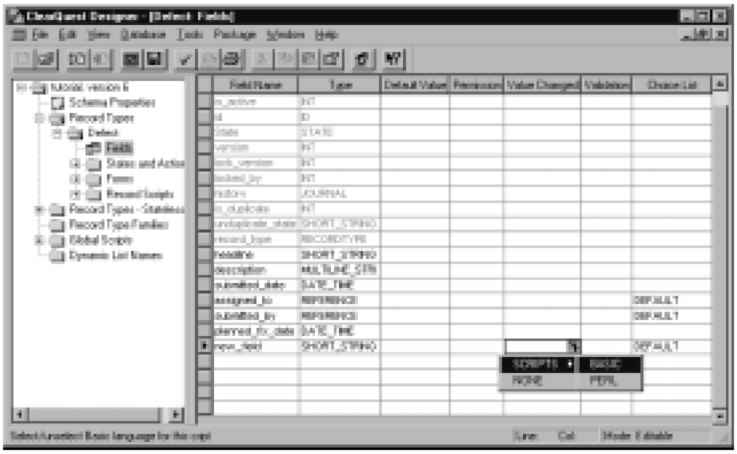
Creating dependent fields

ClearQuest allows you to create a dependency between two fields so that when the value of the parent field changes, the value of the child field (the dependent field) also changes.

Note: Consider field dependencies very carefully when planning your schema. Creating dependent fields requires the use of script hooks, which can introduce runtime errors if not written correctly. Be sure to test script hooks thoroughly before making them available to your users.

To create a dependency between two fields, you must add a VALUE_CHANGED hook to the parent field. Follow these steps:

1 Open the Fields grid.



Field Name	Type	Default Value	Permission	Value Changed	Validation	Choice List
is_active	INT					
id	ID					
State	STATE					
version	INT					
lock_version	INT					
locked_by	INT					
history	JOURNAL					
is_duplicate	INT					
unduplicate_state	SHORT_STRING					
record_type	RECORDTYPE					
headline	SHORT_STRING					
description	MULTILINE_STR					
submitted_date	DATE_TIME					
assigned_to	REFERENCE					DEFAULT
submitted_by	REFERENCE					DEFAULT
planned_fix_date	DATE_TIME					
new_field	SHORT_STRING					DEFAULT

2 In the Fields grid, click the Value Changed cell of the parent field and select BASIC or Perl from the drop-down list.

If Instant Edit Mode is enabled, ClearQuest Designer automatically opens the Script editor. To enable or disable instant editing, select **Edit > Instant Edit Mode**.

Double-click the cell to open the Script editor, if it does not automatically appear.

3 In the Script editor, write a script that gets the value of the parent field and uses it to set the value of the child field. When you finish editing your script, select **Hooks > Compile** to check the syntax of your script code (see “Action hook for setting the value of a parent record” on page 128).

Enabling dependent fields for ClearQuest Web

If you want dependent fields to be enabled in ClearQuest Web, you must also specify the field on which the dependency is based. You do this in the Web Dependent Fields tab of the Control Properties sheet.

Only three types of controls support web dependency:

- the pull-down list box
- the drop-down combo box
- the combo box

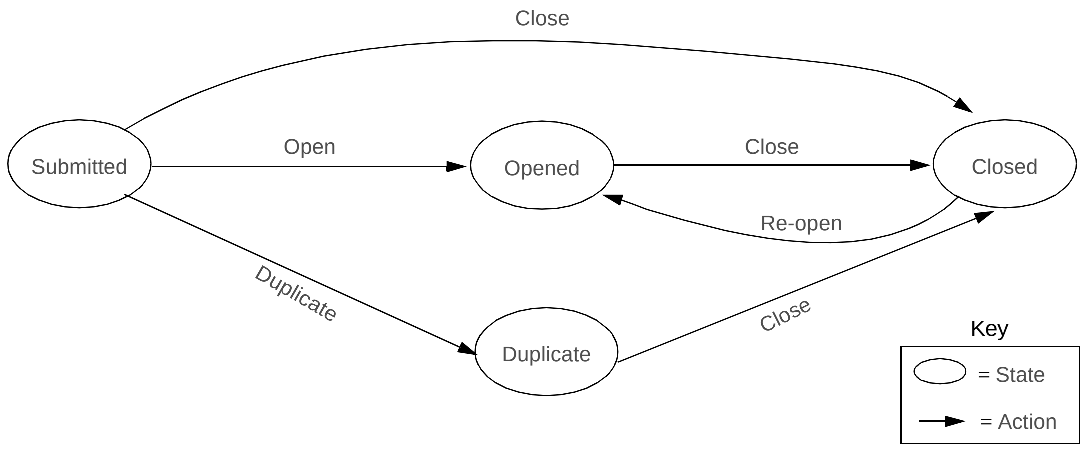
More information? See Chapter 8, “Administering ClearQuest Web.”

Defining your state model

Each record type has a *state model*, which shows the states a record can be in and the actions that can be performed on the record in each state.

A *state* identifies a record's status in your system's life cycle. Some default ClearQuest states are Opened, Resolved, and Closed. An *action* is a change, such as Submit, Modify, and Resolve, that takes place to a record.

The state model below shows how the EnhancementRequest record type (included in several predefined schemas) moves from one state to another as the result of an action.



You can also see this information in the EnhancementRequest record type's State Transition Matrix.

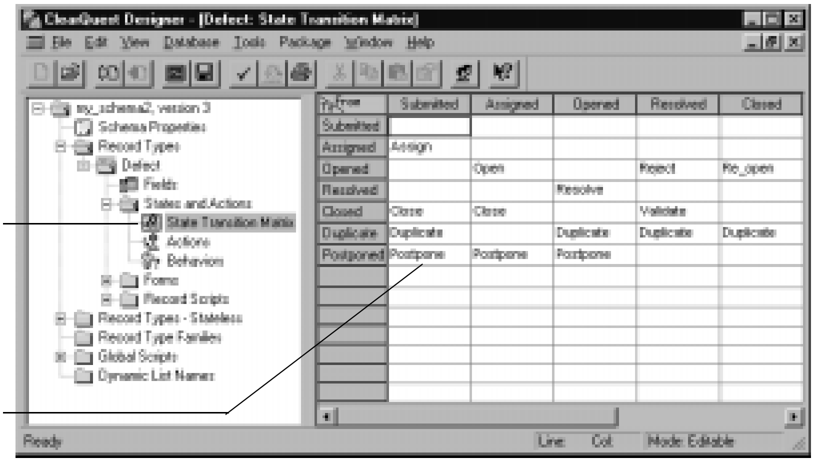
Using the State Transition Matrix

The movement of a record from one state to another is called a *state transition*. A state transition consists of a source state(s), a destination state, and the action necessary to complete the transition. A record's current state is the source state; the state it changes to is the destination state.

The State Transition Matrix is where you create, modify, and delete states and view the actions required to move a record between states.

In the State Transition Matrix, source states are listed in columns (From), and destination states are listed in rows (To)

The Postpone action moves the record from the Submitted state to the Postponed state



To/From	Submitted	Assigned	Opened	Resolved	Closed
Submitted					
Assigned	Assign				
Opened		Open		Reject	Re_open
Resolved			Resolve		
Closed	Close	Close		Validate	
Duplicate	Duplicate		Duplicate	Duplicate	Duplicate
Postponed	Postpone	Postpone	Postpone		

The action necessary to move from a particular source state to a destination state is listed at the intersecting cell. If there is no action listed in the cell, a state transition is not allowed.

Listing the states you need

Begin designing a state model by listing the states you want and describing them. For example, the following table describes the states for the EnhancementRequest record type, which is included in several ClearQuest predefined schemas.

State	Description
Submitted	First state of a new record.
Opened	Record is being worked on.
Closed	Record fix has been verified.
Duplicate	Record duplicates another record.

Adding a new state

To add a new state, use the State Transition Matrix. Select **Edit > Add State** and type the name of a new state in the dialog. ClearQuest automatically adds the new state to the row and column headers.

Now that you have created a new state, you can create a new CHANGE_STATE action to transition records from other states to this new state. Alternatively, you can modify an existing CHANGE_STATE action to transition records to and from the state.

Note: If you define a state in your schema, you must use that state. It is a validation error to define a state that cannot be reached by one or more actions. Each CHANGE_STATE action must specify source and destination states. If none are defined, ClearQuest reports an error during validation.

More information? Look up *states, adding to record type* in the ClearQuest Designer Help index.

Note: If your schema uses state types and you add a new state, you must map it to a state type. See “Mapping state types” on page 80.

Changing the name of a state

You can modify the name of a state at any time. When you change the name of a state, ClearQuest automatically updates state name information in any actions that refer to that state.

To rename a state, use the State Transition Matrix. Select the row of the state that you want to rename and then select **Edit > Rename State** to open the Rename State dialog.

Note: If a hook refers to the name of a state explicitly, you must manually update the script code with the new name of the state.

Mapping state types

Certain packages, such as the UnifiedChangeManagement (UCM) Package and the Resolution package, modify schema business rules by adding hooks. To enable these packages to identify the states in which to fire their hooks, you edit certain properties of the states in your schema.

Just as your schema has a state model for its states, so a package can have a state type model for its state types. State types are part of a state type model that enables the hooks of certain packages to work with your schema.

To ensure a package with state types works properly with your schema, you need to map each state in each record type to an appropriate package state type. You can map more than one state to a state type, but each state type requires at least one state.

Using State Transition Matrix properties to map state types

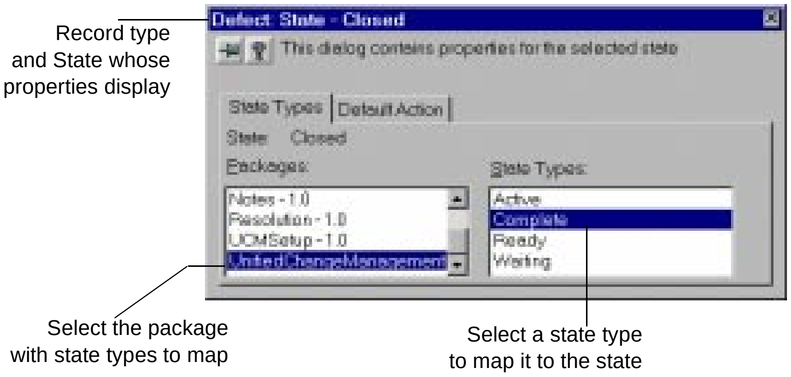
You can modify the mappings of states to state types.

1. In the ClearQuest Designer workspace, open the State Transition Matrix, then right-click on a state and click **Properties**.

   The properties dialog for that state displays the **State Types** tab.

2. To map the state type to the properties for that state, select from the **Packages** list the package that requires state type mapping, then select a state type.

The following image shows mapping the Closed state to the UnifiedChangeManagement package Complete state type.



Defect: State - Closed

This dialog contains properties for the selected state

State Types | Default Action

State Closed

Packages:
- Notes - 1.0
- Resolution - 1.0
- UCMSetup - 1.0
- UnifiedChangeManagement

State Types:
- Active
- Complete
- Ready
- Waiting

3 Select the next state in your state model and map it to one of the package state types.

4 Click the button in the top right corner to save your mappings and close the dialog box.

Note: If you are using the UCM schema or package, you must assign default actions for your states; see “Setting default actions for the UCM package” on page 184.

Working with actions and action types

After defining your states, determine the actions that move a record from one state to another. Actions are how you move records from state to state, modify or delete records, and submit new records to the database.

Actions can do the following:

- Create a new record and add it to the database.
- Modify the information in the record.
- Move a record from one state to another.

- Mark one record as a duplicate of another, or unmark a record that is currently a duplicate.
- Execute hooks. Different action hooks handle access control, initialization, validation, and notification.
- Delete a record from the database.
- Import data.

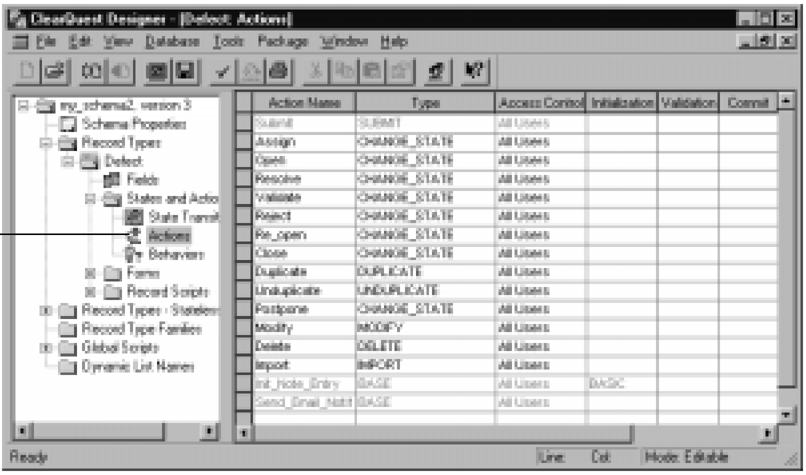
ClearQuest supports the following action types:

Action type	Description/Comments
Change_state	Moves a record from a source state to a destination state. A Change_state action can reference many source states, but only one destination state. (Not available for stateless record types.)
Submit	Enters a new record into the ClearQuest user database. For state-based records, Submit assigns a destination state, but does not require a source. Each record type can have only one action whose type is Submit.
Modify	Allows users to modify field values in a record without transitioning the record between states.
Delete	Allows users to delete a record from the database.
Base	A base action is a secondary action that you can specify to occur immediately after every action. For example, a base action can automatically send e-mail notification each time any user commits an action.
Duplicate	Links the record to another record that contains similar information. (Not available for stateless record types.)
Import	Allows ClearQuest to import records from another source. During Import, ClearQuest validates the contents of imported records. However, ClearQuest does not perform field type validation during Import. In addition, when a set of state-based records is imported, ClearQuest assigns them to a state specified in the data files without verifying whether they could have legally transitioned to that state.
Record_script_alias	Allows you to create an action and associate it with a record script.
Unduplicate	Removes the link between duplicate records. (Not available for stateless record types.)

Adding and modifying actions

Each record type has an Actions grid that defines the actions available for records of that type. Each action is displayed in a row, and its properties are displayed in columns.You can use the Actions grid to add, modify, rename, and delete actions. You must choose an *action type* for each action in your schema.

To display the Actions grid, open a record type in the Workspace, and select **States and Actions > Actions**. The Actions grid appears. Right-click an action to display its Properties dialog.



Action Name	Type	Access Control	Initialization	Validation	Commit
Submit	SUBMIT	All Users			
Assign	CHANGE_STATE	All Users			
Open	CHANGE_STATE	All Users			
Resolve	CHANGE_STATE	All Users			
Validate	CHANGE_STATE	All Users			
Reject	CHANGE_STATE	All Users			
Re_open	CHANGE_STATE	All Users			
Close	CHANGE_STATE	All Users			
Duplicate	DUPLICATE	All Users			
Unduplicate	UNDUPLICATE	All Users			
Postpone	CHANGE_STATE	All Users			
Modify	MODIFY	All Users			
Delete	DELETE	All Users			
Import	IMPORT	All Users			
Init_Note_Entry	BASE	All Users	BASIC		
Send_Email_Notif	BASE	All Users			

In the Actions grid, each action is displayed in a row, and its properties are displayed in columns

Creating a state transition

After defining a set of states, you use the Actions grid to set up the state transitions for the record type.

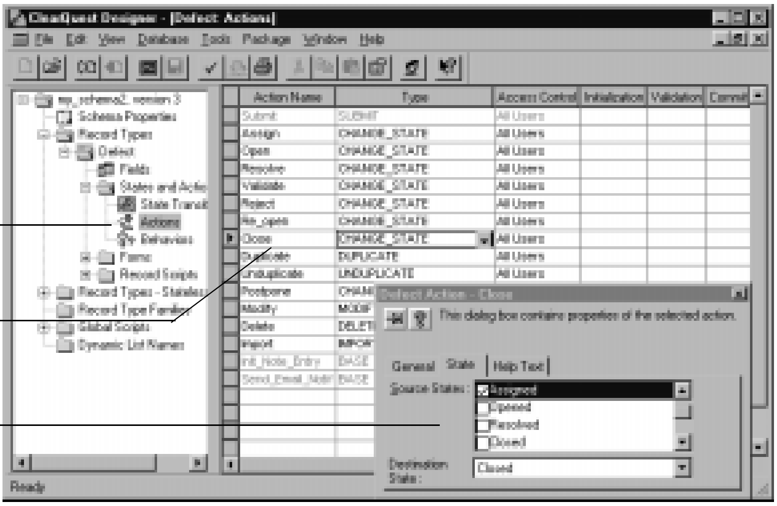
To create a state transition, you must define an action whose type is Change_state and then select a source state(s) and a destination state for the action.

Open the Actions grid, then select an action and select **Edit > Action Properties** to display the Properties dialog for the action.

Double-click to open the Actions grid

Select an action, and then select **Edit > Action Properties**

In the State tab, select a source state and a destination state



Action Name	Type	Access Control	Initialization	Validation	Commi
Submit	SUBMIT	All Users			
Assign	CHANGE_STATE	All Users			
Open	CHANGE_STATE	All Users			
Resolve	CHANGE_STATE	All Users			
Validate	CHANGE_STATE	All Users			
Reject	CHANGE_STATE	All Users			
Re_open	CHANGE_STATE	All Users			
Close	CHANGE_STATE	All Users			
Duplicate	DUPLICATE	All Users			
Unduplicate	UNDUPLICATE	All Users			
Postpone	CHANG				
Modify	MODIF				
Delete	DELETI				
Import	IMPOR				
Init_Note_Entry	BASE				
Send_Email_Notif	BASE				

Defect Action - Close

This dialog box contains properties of the selected action.

General | State | Help Text

Source States: [✓ Assigned] Opened Resolved Closed

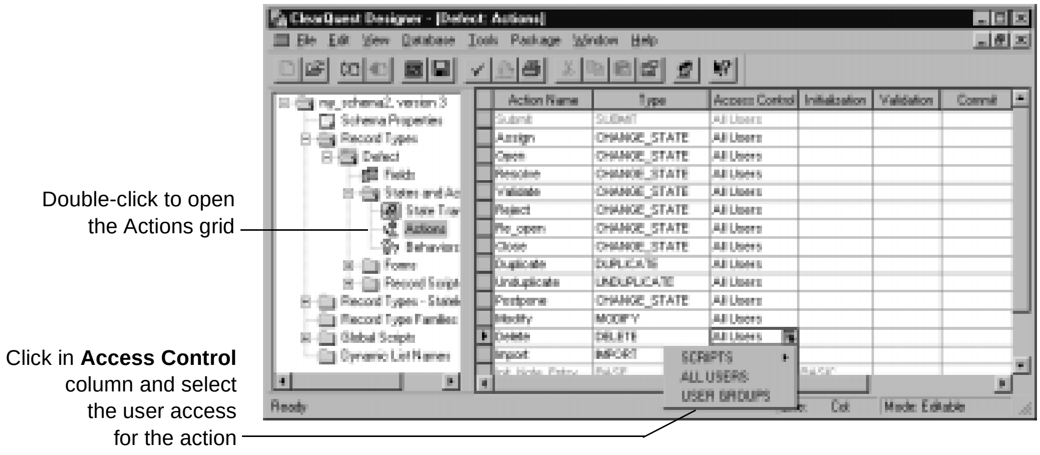
Destination State: Closed

After you create a state transition, check the State Transition Matrix to verify that ClearQuest applied the transitions to the states.

Adding action hooks

You can add action hooks that implement tasks at key points in a record's life.

For example, by default ClearQuest grants all users access to every action. You can limit the access to an action by using an access-control hook. To set an access-control hook for an action, open the Actions grid. Click in the Access Control column of the appropriate action and select the type of access control you want to associate with the action.



Action Name	Type	Access Control	Initialization	Validation	Commit
Submit	SUBMIT	All Users			
Assign	CHANGE_STATE	All Users			
Open	CHANGE_STATE	All Users			
Resolve	CHANGE_STATE	All Users			
Validate	CHANGE_STATE	All Users			
Reject	CHANGE_STATE	All Users			
Re_open	CHANGE_STATE	All Users			
Close	CHANGE_STATE	All Users			
Duplicate	DUPLICATE	All Users			
Unduplicate	UNDUPLICATE	All Users			
Postpone	CHANGE_STATE	All Users			
Modify	MODIFY	All Users			
Delete	DELETE	All Users			
Import	IMPORT				

You can also use the ClearQuest API to create your own custom hooks. See Chapter 7, "Using hooks to customize your workflow," for information about action hooks.

ClearQuest includes the following action hooks:

Action hook	Use/Comments
Access-Control	Returns a Boolean indicating whether the specified user may initiate the specified action on a record. This hook is called before the user performs the action. You can write an access-control hook as a VBScript or Perl subroutine. Alternatively, you can grant access to all users or to one or more groups of users.
Initialization	Allows complex initialization of a record. You can use this hook to set up field values before ClearQuest begins an action. This hook is called after the action has been initialized but before the contents of the record are displayed in a form. If you want to write an initialization hook, you must write it as a script subroutine.
Commit	Updates a set of external data sources so that they stay parallel with the database contents. This hook is called after changes are added to the database but before those changes are committed. You can write a commit hook as a VBScript or Perl subroutine.
Notification	Lets you trigger additional ClearQuest actions after a record has been committed to the database. For example, you could use this hook to send e-mail to a group of users. Notification hooks must use a script.
Validation	Validates the contents of a record. You can use this hook to check conditions that are difficult to verify inside the individual field validation hooks. For example, you can use this hook to verify information across a group of fields. ClearQuest executes this hook prior to committing any changes to the database. Validation hooks must use a script.

Using default actions

You can define default actions for states. A default action for a state appears in bold in the ClearQuest client Actions menu. Associating a state with a default action

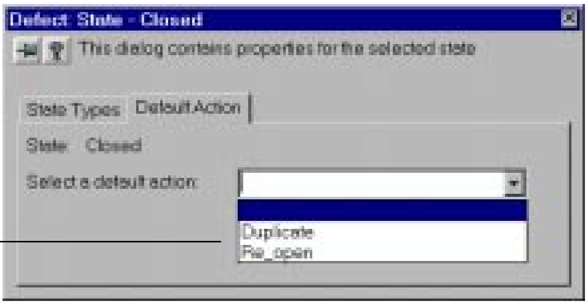
- highlights a path to guide your users through your state model
- provides something you can easily call in your hook code
- can be a requirement for certain schemas and packages, such as the UCM schema and package

Note: If you use the UCM schema or package, the default actions of your states must provide a valid path through the state type model. For more information, see "UnifiedChangeManagement package state type model" on page 179.

To set up a default action for a state,

1. Create a state transition upon which to apply the default action.
2. Open the State Transition Matrix for the record.
3. Right-click the state you want to edit and select **Properties** from the shortcut menu. A dialog box displays the properties for that state.
4. In the Default action tab of the State Properties dialog box, choose the action you want to designate as the default action.

Select an action to assign it as the default action for this state



Working with record forms

Each record type can have two forms associated with it: a submit form and a record form. When a ClearQuest client user creates a new record, ClearQuest displays the submit form. When the user views the record later, ClearQuest uses the record form.

Every record type must have a record form, but a submit form is not required. If you do not create a submit form, ClearQuest uses the record form for both viewing and submitting records.

You use controls to display fields on the form. ClearQuest provides controls for text boxes, list boxes, check boxes, option buttons, and so on. For example, you can associate a field containing a string with a text-box control. Not all controls work with all field types. For example, a list view control or a parent/child control must be used with a reference-list field.

In addition to displaying the contents of fields, you can use some controls to perform special tasks. Controls such as push buttons and list boxes can be associated with record scripts. For example, in the TestStudio schema, a push button is associated with the Build_Properties record script, which allows users to view the properties of the build they've selected.

Creating forms

You use ClearQuest Designer to create forms. You must define at least one record form for each record type in your schema. You can also define a submit form for a record type if you want users to use a different form to submit records of that type.

To create a new form:

1. In the Workspace, expand the record type you want to modify.
2. Right-click the Forms folder and select **Add** from the shortcut menu. ClearQuest displays a new empty form and highlights the name of the form in the Workspace so that you can change it.

3 In the Workspace, type a name for the new form.

4 Right-click on the form and choose either **Submit Form** or **Record Form** as appropriate for the type of form you want to create.

After creating a form, you can add controls to it. If the record that owns the form contains too many fields to display on one dialog tab, you can add additional dialog tabs as necessary. Every form must have at least one dialog tab.

ClearQuest automatically adds three controls to every form: an Apply button, a Revert button, and an Actions button. You cannot delete these buttons. ClearQuest uses them to initiate and manage actions.

Re-using forms

After creating a form, you can save time by reusing a form in other schemas. You can use it as is or modify it.

Right-click a form in the Forms folder and select **Export Form** from the popup menu. You can then import the form into other schemas.

You must import the form into a record type with a name identical to the record type that exported the form. Right-click a form in the Forms folder and select **Import Form**. You cannot export a form and then import it into a different record type within the same schema.

When importing a form, ClearQuest maps the fields associated with the form to the fields of the selected record type. ClearQuest maps fields based on their name and does not check to see if the fields have matching types. If a field in the form does not correspond to a field in the selected record type, you must reassign the corresponding control to a valid field (or delete the control altogether).

Deleting forms

If you no longer need a form, you can delete it. However, you must remember that every record type must have at least one form associated with it. If a record type has only one form left, that form must be a record form; ClearQuest will not let you delete the last form of a record type.

Editing forms

For step-by-step instructions on how to edit a form, select **Working with record forms > Editing forms** in the ClearQuest Designer Help. You can find out how to:

- Change the size of a form
- Add and delete dialog tabs
- Add tab-level access
- Add and delete controls

Adding a field to a form

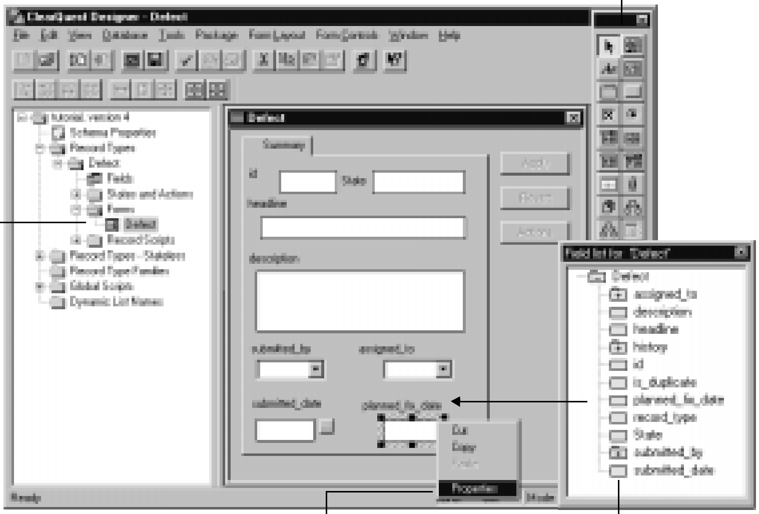
To add a field, you first create the field in the Fields grid (see "Adding and modifying fields" on page 65), and then you add the field to the form.

To add a field to a form, select **Record Types > Forms** in the Workspace and double-click a form to open it for editing.

In the Fields List window, select the field you want to add and drag it onto the form. This automatically installs the appropriate type of control along with the field.

Use the Controls Palette to add controls such as check boxes and option buttons to a form

Double-click a form to open it for editing.



To edit the field properties, right-click the field and select **Properties** from the pop-up menu.

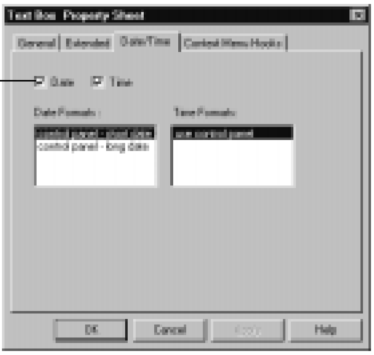
Select a field in the Fields List window and drag it onto the form. This adds the correct form control for the field.

ClearQuest supports the following form controls:

Form control	Description
Picture	Lets you display a static image on your form.
Static Text	Displays an uneditable text string.
Text Box	Displays a field's value as an editable text string.
Group Box	A control used to visually group one or more other controls.
Push Button	Initiates specific tasks related to the record. You can associate push buttons with record hooks or with list views.
Check Box	A two-value control you can use for Boolean values or any field that has only two values.
Option Button	Option button controls are used in groups to represent a set of mutually exclusive choices.
Drop-down List Box	Displays a list of possible values for a particular field.
List Box	Displays a list of possible values for a particular field.
Combo Box	Combines an editable text field with a list box.
Drop-down Combo Box	Combines an editable text field with a drop-down list box.
List View	Allows you to display the records associated with a field of the REFERENCE_LIST type.
Attachment	Displays a list of attached files and includes a set of controls that allow users to add, remove, or view attached files.
History	Displays the actions that have been applied to a record.
Duplicate Box	Displays the ID of the record of which this record is a duplicate.
Duplicate Dependent	Displays the IDs of any records that are duplicates of this record.
Parent/child	Allows you to set up a form to link associated records. Used with REFERENCE_LIST field type.
ActiveX	Incorporates any registered ActiveX control into a form.

Editing field properties

After adding the field to the form, right-click on the field and select Properties from the pop-up menu.



You can select or modify such items as the field's name and label, whether or not the field has horizontal or vertical scrolling, data formats, and context menu hooks. The options you are allowed to select depend on the type of field.

Creating forms for multiple platforms

The forms you create in ClearQuest Designer appear differently when viewed by the Windows and ClearQuest Web clients. For example, in Windows you click on a tab to display it, while in ClearQuest Web you can either click on a link or scroll to display various tabs. However, the same information is available no matter which client you use.

Also, hooks do not work the same in the ClearQuest Web client as they do on other clients. See Chapter 7, "Using hooks to customize your workflow," for information about using hooks on the Web client.

6 Administering users

All ClearQuest users must be set up in the ClearQuest schema repository. This chapter describes how to set up individual users and groups, assign permission levels to individuals, and subscribe (give access to) individuals and groups to databases.

Topics covered include:

- Planning
- Understanding database privileges
- Adding users
- Creating groups
- Transferring between schema repositories

Note: You must have Super User or User Administrator privileges to set up users and groups. See "Modifying user profiles" on page 99 for an explanation of these terms.

Planning

This section provides some guidelines to help you plan the setting up of users and groups in ClearQuest. Before adding a user you must decide how that person can access ClearQuest data. ClearQuest provides the following options to help you control data access:

- Users and groups can be assigned certain privileges. These privileges determine the tasks that users can perform, especially in ClearQuest Designer. See “Understanding database privileges” on page 97.
- You can control the data users have access to by subscribing them only to certain databases. See “Subscribing users to databases” on page 99.
- User access can be controlled by limiting the ClearQuest Actions a user can perform. See “Controlling user access to actions” on page 102.
- The actions a user can perform can also be controlled by adding a user to a group, then restricting the actions the group can perform. See “Creating groups” on page 101.

The order in which you add users and groups is:

1. Create (add) individual users and assign each user a database privilege(s).
2. Subscribe users to one or more databases.
3. Create groups.
4. Subscribe each group to one or more databases.
5. Choose which actions each group can perform. Restricting a group to certain Actions requires you to edit the Actions grid. See Chapter 5, “Customizing a schema,” for more information.

Understanding database privileges

Depending on how you create your schema, your users may require privileges to perform an action or enter a value into a specific field. You may also want to let some users modify the schema, build forms, and assign access to other users. When you create a user you can assign one of the following privileges:

- **Active User** is the most basic ClearQuest privilege. The Active User has permission to log in to subscribed databases and submit new records, modify existing records, and create, save, and modify personal queries, charts, and reports.

  A user with Active User permission can also log in to ClearQuest Designer, but cannot edit schemas.

  In addition to any other permissions granted, users must have this permission to log in to the database.
- **Schema Designer** has permission to create and modify schemas in ClearQuest Designer. A Schema Designer cannot perform User Administrator tasks unless that option is also selected.
- **User Administrator** has permission to create and modify user and group permissions using ClearQuest Designer. A User Administrator cannot perform the Schema Designer tasks unless that option is also selected.
- **Super User** is the only type of user that has permission to create, modify, and delete databases and schemas, and to set up users and groups.

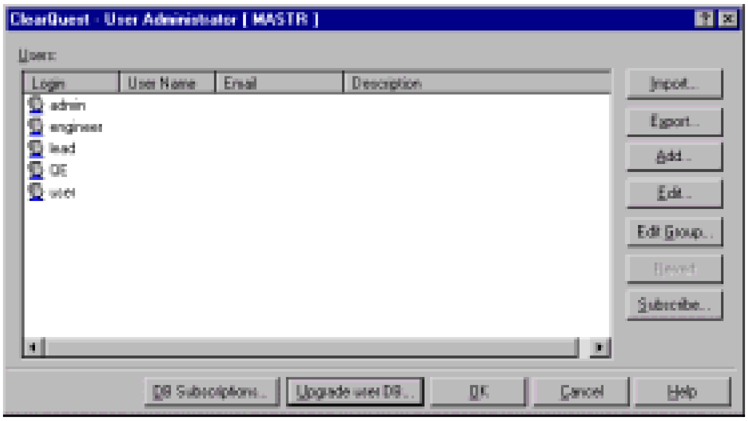
You assign a privileges when you add a new user. You can modify the privileges later if desired.

Note: The term *Administrator* used in this guide means any role with privileges above that of Active User.

More information? Look up *access, privileges* in the ClearQuest Designer Help index.

Adding users

To add users, open ClearQuest Designer and select **Tools > User Administration**. The User Administrator window appears, as shown below:



This window is your starting point for creating and modifying users and groups, and subscribing users and groups to the databases you designate. *Subscribing* users and groups to a database means that they have been given access to those databases.

In the User Administrator window, click **Add**. The **User Information** window appears. Complete the fields in the General box in the upper part of the window to create a user profile. User and group profiles are stored in the user database in the schema repository.

Note: Existing Windows administrative profiles, including a user ID and password, cannot be used within ClearQuest. Individual users and groups must be set up in ClearQuest.

More information? Look up *users, creating* or *users, editing* in the ClearQuest Designer Help index.

Modifying user profiles

You can change the user profile, including the privileges. In the User Information window, click **Edit** to make your changes.

Changing user information

Individual users can change some of the information in their profile, including the name, e-mail address, password, and telephone number, from either ClearQuest Designer or the ClearQuest client. In the ClearQuest client, select **View > Change user profile**. When a user makes changes, the profile in the user database in the schema repository is updated. The changes apply to all databases the user is subscribed to.

Note: A user cannot change his or her database privileges.

Subscribing users to databases

After you create a user and assign permissions, determine the databases to which the user can be subscribed.

By default, ClearQuest gives new users access to all databases. If you want to limit a user's access to only certain databases, click **Subscribe** in the User Administrator window and select the databases the user can access.

More information? Look up *users, subscribing to a database* in the ClearQuest Designer Help index.

Making users inactive

You cannot delete a user from ClearQuest because a user can be referenced in multiple record types. For example, a user is probably assigned to one or more defect reports.

However, you can make a user inactive, which means the user cannot log in to ClearQuest or be assigned any more defect records. To make a user inactive, select the user in the User

Administrator window, click **Subscribe**, and unsubscribe the user from all databases.

For historical information and data integrity, an inactive user's name is retained in the database to which the user was subscribed. The name will no longer appear on choice lists of users when modifying or submitting new records.

Creating groups

After you create users, you can create groups and subscribe them to databases.

In the **User Administrator** window, click **Edit Group**. In the User Group window, click **New Group**. Name the group and move users into the group from the list on the left. To remove users, double-click the group to display a list of its members, highlight a user, and click **Remove**.

More information? Look up *user groups, creating* in the ClearQuest Designer Help index.

Subscribing groups to databases

To subscribe a group to databases, click the group name in the right column, click Group Subscription at the bottom of the window, and make your selections.

By default, ClearQuest gives new groups access to all databases. If you want to limit a group's access to only certain databases, click **Group Subscription** in the User Group window and select the databases the group can access.

You can add and remove users from a group after it is created.

More information? Lookup *user groups, subscribing to a database* in the ClearQuest Designer Help index.

Making groups inactive

A new group is active by default. If you want to make a group inactive, open the User Group window, select a group, right-click, and deselect **Active** from the popup menu.

You can also make a group inactive by clicking **Group Subscription** in the User Group window, and unsubscribe the group from all databases.

Controlling user access to actions

You can further focus the responsibility of a user by limiting the types of actions the user can perform. For example, you can limit access to perform the Assign action to certain individuals.

To limit user access to an action, open the record type, then select **States and Actions > Actions**. In the Actions grid, left-click in the Access Control field of an Action, click the down arrow, and select **Scripts**, **All Users**, or **User Groups**.

- Select **Scripts** to create an access-control hook which will allow you to restrict access to this Action based on a specific set of criteria. For more information on access-control hooks see Chapter 7, “Using hooks to customize your workflow.”
- Select **All Users** to allow any ClearQuest user to access the Action. This is the default setting.
- Select **User Groups** to access a list of groups. Select the groups you want to have access to this Action.

More information? Look up *access, granting to users* in the ClearQuest Designer Help index.

Transferring between schema repositories

You can use the **Import** and **Export** buttons in the User Administrator window to transfer a list of users and groups from one schema repository to another. When you export the list of users and groups, ClearQuest creates a text file you can import into another schema repository. The text file contains the profiles of each user and group.

7 Using hooks to customize your workflow

You can adapt ClearQuest to serve the changing or advanced needs of your team by writing hooks (custom code) to be invoked from predefined points within ClearQuest, and writing external applications that run outside of ClearQuest. In both cases, you use the ClearQuest application programming interface (API) to access data.

Note: For more information on the ClearQuest API, select **Rational ClearQuest API Reference** from the Start menu. The *Rational ClearQuest API Reference* is an online reference guide for all ClearQuest API calls.

This chapter covers the following topics:

- Understanding hooks
- Understanding field and action hooks
- Execution order of field and action hooks
- Understanding record scripts
- Understanding global scripts
- Writing external applications
- Understanding the ClearQuest API
- Common API calls
- Examples of common hooks

Note: To learn about using hooks in the web environment, see Chapter 8, “Administering ClearQuest Web.”

Understanding hooks

Hooks are entry points, like triggers, for pieces of code that ClearQuest executes at specified times to more fully customize the product. Hooks are used in a variety of ways:

- Actions can have hooks for access control, initialization, notification, committal, and validation.
- Fields can have hooks for specifying default values, choice lists, and permissions, and for handling tasks associated with the field when it is validated or its value changes.
- Records can use record scripts that allow you to trigger actions that are specific to a record type.
- Global scripts allow you write a subroutine, such as an e-mail notification, that can be called from any hook in any record type.

Choosing a scripting language

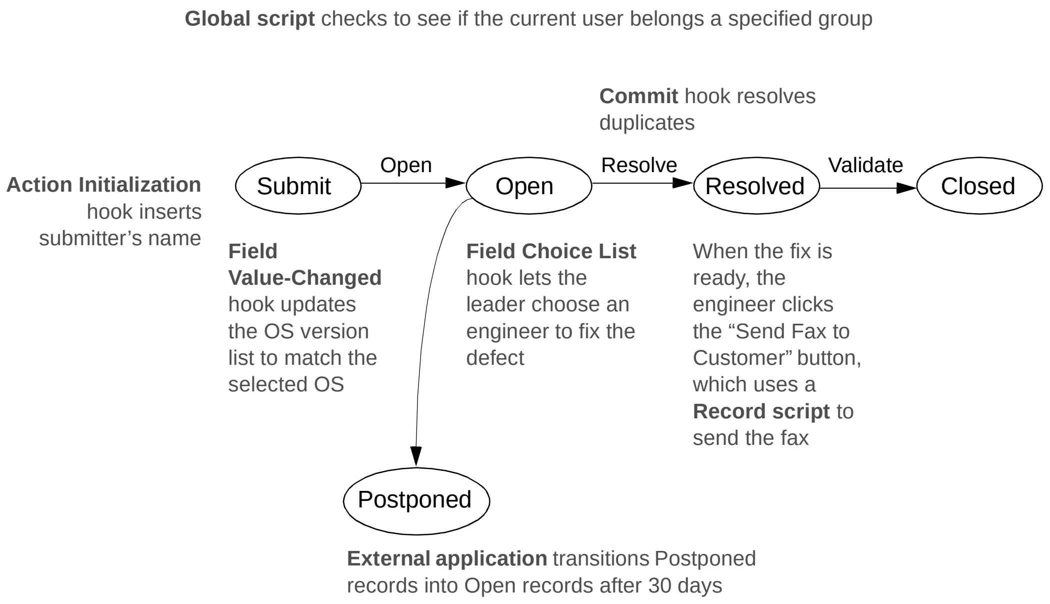
You can write hooks in VBScript and/or Perl. For documentation on either language, see the following resources on the internet:

- http://msdn.microsoft.com/scripting/
- http://www.perl.com/

ClearQuest runs your hooks in VBScript or Perl, but not both at the same time. You set the ClearQuest schema properties for the one scripting language that corresponds to the set of scripts that you currently want ClearQuest to run (look up *schemas, setting properties* in the ClearQuest Designer Help index).

Planning hooks for your process

Plan a set of hooks that work together to enforce your organization's process. For example, the following state transition model shows how you can refine your process by combining field and action hooks, a global script, and an external application.


Global script checks to see if the current user belongs a specified group
Commit hook resolves duplicates
Action Initialization hook inserts submitter's name
Submit
Open
Open
Resolve
Resolved
Validate
Closed
Field Value-Changed hook updates the OS version list to match the selected OS
Field Choice List hook lets the leader choose an engineer to fix the defect
When the fix is ready, the engineer clicks the "Send Fax to Customer" button, which uses a **Record script** to send the fax
Postponed
External application transitions Postponed records into Open records after 30 days

As you plan your set of hooks, consider the following.

- Be aware that hooks run with Super User privileges and are not subject to the usual access control or field behavior restrictions. This means you can use hooks to set and reset values in fields that are normally read-only. (You cannot reset ClearQuest system fields that are read-only, such as the History field.) Required fields remain required.
- Take advantage of outside code to extend capabilities. VBScript has access to COM objects (and Perl can gain access to COM objects through a third-party package). In addition, Perl can take advantage of many third-party packages. For example, a

hook could interact with the user through dialog boxes or read from and write to external files. You are responsible for ensuring that the proper third-party objects are installed on the client machine.

- Although it is possible to include SQL code in your scripts, we highly recommend that you use the ClearQuest API methods to run queries and retrieve data within script code. ClearQuest allows you to rename record types and fields, and this will be problematic in any SQL code that you include.
- Pick the appropriate hooks to use. For example, rather than write a script hook to control access to an action, you can limit use of the action to a particular user group. See "Controlling user access to actions" on page 102.
- If your users include web-based clients, take extra precautions to ensure that your hooks work in the web environment. See "Using hooks in ClearQuest Web" on page 137.
- Test and debug your hook code so that you do not write incorrect values into your database or cause the program to hang while processing an infinite loop or waiting for nonexistent input. To view debugging information (the output of the OutputDebugString method), you can use dbwin32.exe, which ships with ClearQuest.

Understanding field and action hooks

As part of customizing a schema, you can define various hooks for both fields and actions. Field hooks and action hooks work together to customize how ClearQuest enforces your workflow when a user runs an action against a record.

Field hooks

You use a field hook for an event that affects a particular field within the record. Your field hook can set the initial value, respond to events when a field value changes, enforce access permissions so only the user groups you specify can change field values, and validate the values your users provide.

The scope of a field hook is the current field within the current record.

Field hook	What it does	Comments
Choice-List	Returns a set of legal values.	You can also provide values without scripting by using a constant or a dynamic list.
Default Value	Sets the initial value of the field.	This hook is called at the beginning of a Submit action. You can also assign a constant value as the default value.
Permission	Customizes the behavior of a field.	Use to force workflow and/or security. (See the online *ClearQuest API Reference* for enumerated constants.)
Validation	Validates the contents of the field.	This hook is called when the value changes, so that you provide the user with immediate feedback regarding the validity of the field’s contents and before committing the record to the database.

Field hook	What it does	Comments
Value-Changed	Responds to changes in the value of a field.	You can use this hook to trigger updates for other fields (for example, dependent lists). After executing this hook, ClearQuest validates any field the script modified by calling the field's Validation hook (if any).

Note: To learn the sequence in which hooks run, see "Execution order of field and action hooks" on page 113.

Understanding choice lists

For default values and choice lists, you have the option of specifying a fixed constant (Constant-Value field hook) or a Constant-List field hook. For choice lists, there is also the option of using a dynamic list.

You can specify choice list behavior in four ways:

- **Default**, which is for reference and list of reference field types only. The system presents a choice of all the active records of the given type as a default choice list for these field types.
- **Hook scripts,** which supports a dependent list whose values change when the user selects a certain value in another form control (see "Creating a dependent list" on page 123).
- **Constant-List** field hook, which provides a set of values to a list.
- **Dynamic-List** field hook is similar to a Constant-List field hook, except that you *use the ClearQuest client instead of the ClearQuest Designer* to provide values to the list. Dynamic-List field hooks are convenient for lists that you update frequently because you add values without changing the schema.

  To create a Dynamic-List hook, use ClearQuest Designer to create a Dynamic-List name, then associate the list with a field that uses a choice list. Next, log into the client as the administrator to create the list under **Edit** > **Named Lists**.

Defining choice list behavior

You can prevent the user from entering values that are not in a choice list by choosing the **Limit to List** option. Any value not within the list fails validation. If you do not choose the Limit to List option, users can enter a value not in the choice list.

All three unscripted field hooks (Constant-Value, Constant-List, Dynamic-List) provide the **Recalculate Choice List** option. Choose this option to have ClearQuest reinitialize the list during runtime interaction if it depends on changes to another value. For a scripted choice list, this refresh operation might incur some performance overhead. If you do not choose the Recalculate Choice List option, ClearQuest only refreshes the values at the beginning of each action.

Action hooks

Action hooks can control who has permission to change record values and validate user entries before ClearQuest commits them to the database. Action hooks can also validate the entire record and send e-mail notification when the action is complete.

The scope of an action hook is the current record.

Action hook	What it does	When
Access-Control	Determines if the current user has permission to invoke the current action.	When the action is about to start.
Initialization	Sets initial field values (or any task you specify).	When the action starts.
Validation	Validates the field values you specify. If the user types invalid data, ClearQuest prompts the user for valid data.	When the user commits the action.

Action hook	What it does	When
Commit	Links an action on multiple records into a single transaction. Example: Resolve all duplicates of a change request if the original is resolved.	When ClearQuest commits the transaction to the database.
Notification	Launches a post-commit action, for example, the sending of e-mail notification, after the main action (see Chapter 9, “Administering ClearQuest E-mail”).	After ClearQuest commits the transaction.

Execution order of field and action hooks

ClearQuest executes field and action hooks at predetermined times and in a predetermined order. There are four hook execution points while a record is open.

- When an action begins
- When a field value is set
- When the record is validated
- When the record is committed

When an action begins

When a ClearQuest user initiates an action, ClearQuest executes hooks in the following order.

1. The **Action Access Control** hook stops processing of the action if the user is not allowed to initiate the action. If this is the case, the remaining hooks do not execute.

2. The **Field Permission** hook determines whether each field is mandatory, optional, or read-only.

3. The **Action Initialization** hook performs initialization tasks, such as setting up field values before ClearQuest begins an action.

4. The **Field Default Value** hook sets the value for each field (for Submit actions only).

5. The **Field Validation** hook validates the contents of each field. During import actions, however, no validation occurs.

   Field validation hooks cannot validate nonexistent values. For example, a field validation hook cannot validate a field if it is mandatory but the user has not yet entered a value, or if the user enters a value that is not a member of a choice list.

6 The **Field Choice List** hook runs if there is a field choice.

If a Field Value Changed hook calls SetFieldValue to change the value of another field, ClearQuest executes the other field's Field Value Changed and Validation hooks.

When a field's value is set

When your users edit a record, they set or change the value in one or more fields. During the editing of a record, ClearQuest executes hooks in the following order:

1 The **Field Value Changed** hook runs for each field that changed.

If the Limit to List option is set and the user enters an illegal value, ClearQuest marks the field as invalid. Only when the user enters an legal value does the next hook run.

Note: If a Field Value Changed hook calls SetFieldValue to change the value of another field, ClearQuest executes the other field's Field Value Changed hook immediately.

2 The **Field Validation** hook runs for each field.

3 The **Field Choice List** hook runs for each field that uses the Recalculate Choice List option.

If you use dependent fields with the Recalculate Choice List option, ClearQuest first runs the Field Validation hook and then the Field Choice List hook for each field, until all changed fields have been set and validated.

Note: In ClearQuest Web, field hooks run only when the user invokes the Submit action. See "Using hooks in ClearQuest Web" on page 137.

When the record is validated

Before ClearQuest commits to the database the changes a user has made to a record, ClearQuest validates the record by executing the following hooks in order.

1 The **Field Validation** hook runs for each field in the record.

2 The **Action Validation** hook runs for the action that was performed.

When the record is committed

The Commit hook executes after the database has been updated with changes to the current record, but before the update transaction has been *committed* to the database. This means that you cannot use a Commit hook to do further modifications to the current record; such modifications are not applied to the record. Use a Commit hook only for side-effect actions against other records that you want to be part of the same database transaction as the main action. (For example, resolving a duplicate defect if the parent defect is ready to be resolved.)

After ClearQuest validates a record, it commits the record to the database by executing the following hooks in order.

1 The **Action Commit** hook runs.

2 ClearQuest commits the transaction to the database.

3 The **Action Notification** hook runs. For example, ClearQuest might send an e-mail message to worker’s supervisor if you have established one or more e-mail rules.

Understanding record scripts

You can write a script that performs custom behavior in the context of a record. For example, a record script could send data about the current record to another system.

There are three ways to invoke a record script:

- Associate the record script with a form control, either a button or a (right-click) shortcut menu. A record script subroutine is specific to one record type.

  For example, within the TeamTest schema, the Build_Properties record script allows users to view the properties of the build they have selected. The script is associated with a push button which, when clicked, runs the script. The Build_Properties record script then retrieves the build information from the Rational Repository, and displays the information in a dialog box.
- Make an action that invokes the record script. Create a RECORD_SCRIPT_ALIAS action and associate it with your record script. When the user selects the action, the record script is invoked immediately. To update the current record from within such a script, begin an action in the script using the EditEntity API.
- Call the record script from within another script or hook by using the FireNamedHook API.

More information? Look up *record scripts* in the ClearQuest Designer Help index.

Understanding global scripts

You can use global scripts to define common functions that you can call from any hook in your schema. In this sense, global scripts resemble a library of subroutines. ClearQuest does not invoke global scripts directly.

Global scripts are convenient when you have multiple record types that call the same hook code. This centralizes hook code maintenance, and you do not have to copy the hook code into multiple places. For example, a global script can format text strings for all records, whether they are enhancement requests or defects. Another example is ClearQuest's Email package, which allows multiple actions to send notification by calling one global script.

More information? Look up *global scripts* in the ClearQuest Designer Help index.

Writing external applications

You can write an external application in VBScript or Perl to perform tasks against a ClearQuest database. For example:

- At midnight each day, execute a predefined set of queries and mail the results to your managers group
- Each Sunday, find all defects that have been open for more than a month and escalate their status

An external application must begin by creating a session object and logging in to a ClearQuest database. Among the tasks you can then perform are: create a query, execute a saved query, create new records, and perform actions on existing records.

Note: ClearQuest ships its own version of Perl (CQPerl.exe, CQPerl.dll). When creating external applications using Perl, make sure you use the CQPerlExt package. See “Using the ClearQuest API” in the online *ClearQuest API Reference*.

Understanding the ClearQuest API

The ClearQuest API enables you to take full advantage of the power of ClearQuest by writing custom solutions tailored to the development process of your organization. You can write hooks on your own, or you can customize the sample hooks this chapter provides.

More information? See the online *ClearQuest API Reference* for details of the objects, methods, properties, and constants you can use when you write hooks and/or external applications.

Working with sessions

The Session object represents the current database-access session and is the starting point of all operations. If you are writing hooks, ClearQuest provides access to the current Session object through the GetSession method of the Entity object. Because hooks always operate within the context of modifying a record (entity), you always have a corresponding Entity object from which to call GetSession.

If you are writing an external application to access ClearQuest's databases, you must create a Session object and log in to the database. To work with an entity, you must then call the API that returns the entity object.

More information? See "Working with sessions" in the online *ClearQuest API Reference*.

Working with queries

You can run queries to fetch data from the ClearQuest database based on a set of search criteria that you provide. First, you build a query (QueryDef) to specify what data you want. Second, you create a result set object to hold the data. Third, you execute the query, which fetches the data in a result set. Finally, you access the data.

More information? To learn how to build a query using objects, such as QueryDef and ResultSet, see “Working with Queries” in the online *ClearQuest API Reference*.

Working with records

When one of your users enters a change request, ClearQuest stores the data in a logical record called an entity. You can create, edit, and view a record’s data, as well as view data about the record’s entity type. The BuildEntity method enables you to create a new record; the EditEntity method enables you to edit an existing record. The ClearQuest API provides methods, as well, for you to validate your changes and commit the updated record to the database.

More information? See “Working with Records” in the online *ClearQuest API Reference*.

Common API calls

This section provides basic building blocks from which you can create hooks. Each API call appears first in VBScript, then in Perl, along with the purpose of the call. The syntax uses an `<object.><method>` format.

More information? See the online *ClearQuest API Reference*.

API Call (VBScript/Perl)	Function
[entity.]GetSession $entity->GetSession	Gets the session, which is necessary to invoke many other APIs.
[session.]OutputDebugString $session->OutputDebugString	Captures information that you can use for debugging your hook code or external application.
[session.]GetEntity $session->GetEntity	Fetches a record from the database.
[session.]EditEntity $session->EditEntity	Edits a record that ClearQuest has fetched from the database.
[entity.]SetFieldValue $entity->SetFieldValue	Assigns a value to a field.
[entity.]Validate $entity->Validate	Ensures that the data in a record are acceptable before ClearQuest attempts to save the record to the database.
[entity.]Commit $entity->Commit	Commits the record, including any edits, to the database.
[entity.]Revert $entity->Revert	Cancels the changes. A good method to use if validation fails and no commit occurs.
[entity.]GetFieldValue $entity->GetFieldValue	Fetches the field info object for the specified field.
[fieldinfo.]GetValue $fieldinfo->GetValue	Fetches the value(s) of a field.
[session.]BuildQuery $session->BuildQuery	Builds a query.
[querydef.]BuildField $QueryDef->BuildField	Includes a field in a query’s search results.

API Call (VBScript/Perl)	Function
[querydef,queryfilternode.]BuildFilterOperator $QueryDef->BuildFilterOperator $QueryFilterNode->BuildFilterOperator	Builds a filter operator for a query such as “equal to” or “greater than.”
[queryfilternode.]BuildFilter $QueryFilterNode->BuildFilter	Creates support for a complex query.
[session.]BuildResultSet $session->BuildResultSet	Creates the ResultSet object necessary to run a query.
[resultset.]Execute $resultset->Execute	Runs the query with the current ResultSet object.
[resultset.]MoveNext $resultset->MoveNext	Moves the cursor to the next record in the data set.
[resultset.]GetColumnValue $resultset->GetColumnValue	Fetches the value in the column you specify of the current row.
[session.]GetUserLoginName $session->GetUserLoginName	Gets the user’s login ID.
[*entity.*]Revert $*entity->*Revert	Discards any changes made to the Entity object. Do not use the Revert API to abort the current action from within a hook. This API is only for reverting an action that was explicitly started within a hook or script. If you need to abort the current action, use the exception mechanisms of the scripting language to throw an exception or cause the action-validation hook to return “false.”

Examples of common hooks

This section provides several hook examples that are commonly used by ClearQuest administrators. The examples include:

- "Creating a dependent list" on page 123.
- "Field choice list hook to display user information" on page 125.
- "Action initialization hook for a field value" on page 127.
- "Action hook for setting the value of a parent record" on page 128.

Note: ClearQuest Designer provides some hook code for you, but these examples do not duplicate the system-provided code.

Creating a dependent list

An unscripted constant list enables you to assign fixed values to a field. The simple example that follows assumes, however, that the values you want for the client operating system depend on the values your user selects for the server operating system.

1 On the server_os field, create a choice-list hook with the enumerated list of values set to Windows NT and Unix.

VBScript:

```
choices.AddItem("NT")
choices.AddItem("Unix")
```

Perl:

```
push(@choices,"NT","Unix");
return @choices; #ClearQuest Designer provides this line of code
```

2 To prevent your users from adding new members to the list, check the **Limit to List** property.

3 To clear the old value in client_os when a new value is selected in server_os, add the following to the server_os Value_Changed hook:

VBScript:

```
SetFieldValue "client_os", ""
```

Perl:

```
$entity->SetFieldValue("client_os", "");
```

4 On the client_os field, create a choice-list hook:

VBScript:

```
dim server_os_choice
set server_os_choice = GetFieldValue("server_os")
select case server_os_choice.GetValue()
case "NT"
      choices.AddItem ("Win95")
      choices.AddItem ("NT")
      choices.AddItem ("Web")
case "Unix"
      choices.AddItem ("Web")
end select
```

Perl:

```
$server_os_choice = $entity->GetFieldValue("server_os");
$svalue = $server_os_choice->GetValue();
if ($svalue eq "NT") {
  push(@choices, "Win95","NT","Web");
} elsif ($svalue eq "Unix") {
  push(@choices,"CQWeb");
}
return @choices; #ClearQuest Designer provides this line of code
```

5 In the properties for the for the client_os hook, check **Recalculate choice list**, so that whenever the server_os field changes, the values recalculate.

6 Add the client_os and server_os fields to your form using list box controls.

Field choice list hook to display user information

This hook provides values for the full name of users in a listview control you have created on your form.

VBScript:

```
Dim userList, userObj, newSession

set AdminSession = CreateObject("CLEARQUEST.AdminSession")
AdminSession.Logon = "ADMIN_LOGIN", "ADMIN_PWD", "");

’ Get the list of users
set userList = AdminSession.Users
n_users = userList.Count()
For i=0 to $n_users -1
  set userObj = userList.Item(i)
  userFullname = userObj.FullName

# If there is user information, get it
if userFullname <> ""
  Choices.AddItem(userFullname)
end if
Next
```

You can also fetch additional information:

- `userObj.Name` gives the login name entered in the user admin tool for the user
- `userObj.Phone` gives the phone number entered in the user admin tool for the user
- `userObj.EMail` gives the e-mail address entered in the user admin tool for the user
- `userObj.MiscInfo` gives the Description entered in the user admin tool for the user

Perl:

```
# Build an administrative session
$AdminSession = CQAdminSession::Build();
$AdminSession->Logon ("admin", "admin_password", "database");

# Get the list of users
$userList = $AdminSession->GetUsers();
$n_users = $userList->Count();
```

```
for ($i=0; $i < $n_users;$i++) {
  $userObj = $userList->Item($i);
  $userFullname = $userObj->GetFullName();

# If there is user information, get it
if ($userFullname ne "") {
  push(@choices, $userFullname);
  }
}
return @choices;
```

You can also fetch additional information:

- `userObj->GetName()` gives the login name entered in the user admin tool for the user
- `userObj->GetPhone()` gives the phone number entered in the user admin tool for the user
- `userObj->GetEMail()` gives the e-mail address entered in the user admin tool for the user
- `userObj->GetMiscInfo()` gives the Description entered in the user admin tool for the user

Action initialization hook for a field value

In this example, when the user invokes the SUBMIT action, the action hook initializes the problem_description field with the login name of the person who is submitting the record. That way, users know who created the original change request.

VBScript:

```
Dim session
Dim login_name

‘ Get the session
set session = GetSession

‘ Get the logon name
login_name = session.GetUserLoginName
SetFieldValue "problem_description", login_name
```

Perl:

```
# Get the session
$session = $entity -> GetSession();

# Get the logon name
$login_name = $session -> GetUserLoginName();
$entity -> SetFieldValue("problem_description",$login_name);
```

Action hook for setting the value of a parent record

Use the following action hook in conjunction with parent/child linking to create a state-based relationship between a parent record and its children. This hook allows you to automatically move the parent record to the next state if all the children are in that state (see “Using fields to link records” on page 70).

Note: This code assumes certain field names and record types. If you cut and paste, you will have to make some changes.

VBScript:

```
Dim parent_id   ‘Dimension variables that hold objects
Dim ParentObj
Dim ChildRefList
Dim ChildArray
Dim ChildID
Dim defectChildEntityObj
Dim StateStatus
Dim SameState
Dim CurrentState
Dim retvalue
Dim ActionJustPerformed

set sessionObj = GetSession
ThisID = GetDisplayName
ActionJustPerformed = GetActionName
sessionobj.outputdebugstring "action is: " & _
ActionJustPerformed & vbCrLf
StateStatus = ""
SameState = 0

sessionobj.outputdebugstring "current db id is: " & ThisID _
& vbCrLf

parent_id = GetFieldValue("parent").GetValue()
sessionobj.outputdebugstring "parent id is: " & parent_id _
& vbCrLf

if parent_id <> "" then
  set ParentObj=sessionobj.GetEntity("defect", parent_id)
  ChildRefList=ParentObj.GetFieldValue("parent").GetValue
  ChildArray=split (ChildRefList, vbLf)

For Each ChildID In ChildArray
  set defectChildEntityObj=sessionobj.GetEntity("Defect", _
  ChildID)
    CurrentState=defectChildEntityObj.GetFieldValue _
    ("State").GetValue

    sessionobj.outputdebugstring "StateStatus is: " & _
    StateStatus & vbCrLf

    sessionobj.outputdebugstring "CurrentState is: " & _
    CurrentState & vbCrLf

    sessionobj.outputdebugstring "SameState is: " & _
    SameState & vbCrLf

    if StateStatus = "" then
      StateStatus = CurrentState
      SameState = 1

    sessionobj.outputdebugstring "coming to statestatus _
    is null" & vbCrLf

    elseif StateStatus = CurrentState then
    sessionobj.outputdebugstring "coming to same state" & _
    vbCrLf
    SameState = 1

    else
   sessionobj.outputdebugstring "states are different" & vbCrLf
    SameState = 0

    end if

  Next

  if SameState = 1 then
    sessionobj.outputdebugstring "samestate = 1, setting _
    parent state" & vbCrLf
    sessionobj.EditEntity ParentObj, ActionJustPerformed
    status = ParentObj.Validate

    if (status <> "") then
     sessionobj.outputdebugstring "error when updating parent _
      state: " & status & vbCrLf
    exit sub
    end if

    ParentObj.Commit
  end if
end if
```

Perl:

```
$sessionObj=$entity->GetSession();
$ThisID=$entity->GetDisplayName();
$ActionJustPerformed->GetActionName();
$parent_id=$entity->GetFieldValue("parent1")->GetValue();
$StateStatus="";
$SameState=0;

# ClearQuest has a message monitor to display
# ClearQuest messages and your messages
$sessionObj->OutputDebugMessage ("perl current db id is:
$ThisID\n");
$sessionObj->OutputDebugMessage ("perl parent id is:
$parent_id\n");

if ($parent_id ne "")  {
    $ParentObj = $sessionObj->GetEntity("defect", $parent_id);
    $ChildRefList=$ParentObj->GetFieldValue
    ("children1")->GetValue();
    $sessionObj->OutputDebugMessage ("children are:
    $childreflist\n");
    @ChildArray = split (/\n/,$ChildRefList);

foreach $ChildID (@ChildArray) {

    $defectChildEntityObj = $sessionObj->GetEntity("defect",
    $ChildID);
    $CurrentState =$defectChildEntityObj->
    GetFieldValue("State")->GetValue();

    $sessionObj->OutputDebugMessage("perl StateStatus is:
    $StateStatus\n");

    $sessionObj->OutputDebugMessage("perl Current Status is:
    $CurrentStatus\n");

    $sessionObj->OutputDebugMessage("perl SameState is:
    $SameState\n");


    if ($StateStatus eq "") {

        $StateStatus = $CurrentState;
        $SameState = 1;

        $sessionObj->OutputDebugMessage("coming to
        statestatus is null\n");
    } elsif ($StateStatus eq $CurrentState)  {

        sessionObj->OutputDebugMessage ("coming to same
        state\n");
        $SameState = 1;

    } else   {
        $sessionObj->OutputDebugMessage("states are
        different\n");
        $SameState = 0;
    }    #nested if statements
} #End foreach Loop


if ($SameState == 1) {
    $sessionObj->OutputDebugMessage("samestate = 1, setting
    parent state\n");
    $sessionObj->EditEntity($ParentObj, $ActionJustPerformed);
    $status = $ParentObj->Validate();

    if ($status ne "")  {
        $sessionObj->OutputDebugMessage ("error when updating
        parent state: $status\n");
            return -1;  # Exit
    }

    $ParentObj->Commit();
}    #end if for ($SameState == 1)
}    #end if for ($parent_id ne "")
```

8 Administering ClearQuest Web

ClearQuest Web allows you to extend support to users through a web interface. With ClearQuest Web, users can access ClearQuest data from remote locations.

This chapter covers the following topics:

- Understanding ClearQuest Web customizations
- Configuring display settings
- Setting up limited access for users and groups
- Using hooks in ClearQuest Web

Note: To prepare and set up web support for your users, see the *Installing Rational ClearQuest* guide.

Understanding ClearQuest Web customizations

ClearQuest Web supports many of the same features as the native Windows ClearQuest client, with some exceptions. Some features require additional customizations to make them work correctly on the web.

ClearQuest Web feature differences

ClearQuest Web differs from the native client in the following ways.

- Users cannot drill down (query) on charts.
- Users can only use public charts and reports (they cannot create their own).
- ClearQuest Web generates reports in HTML format.
- Users should navigate with the ClearQuest Web buttons instead of the web browser's Back and Forward buttons.
- Instead of a form with tabs, a column displays fields in groups that correspond to the native ClearQuest tabs. See "Configuring display settings" on page 135.
- ClearQuest Web can be set up to limit access by certain users and user groups to submit records and run a single query only. See "Setting up limited access for users and groups" on page 136.
- Certain hooks must be modified to function correctly on the web, including those for creating dependent fields. See "Using hooks in ClearQuest Web" on page 137.

Configuring display settings

You can customize how ClearQuest Web displays, including font and color usage. To do this, select the **Edit Web Settings** operation in ClearQuest Web. For a complete list of the settings you can customize, select **Editing Web Settings** in the ClearQuest Web Help.

Note: Only users with Super User or Schema Designer privileges can edit web settings.

In addition, forms and reports display differently on the web:

- ClearQuest Web does not display forms in the same way as the native client. Instead of a form with tabs, a column displays fields in groups that correspond to the native ClearQuest tabs. You can control the order in which fields appear on the web by setting the field tab order when you create the form.
- ClearQuest Web generates reports in HTML format. When you design report formats with Crystal Reports, test the output to HTML and not just the default RTF format.

More information? Select **Working with record forms** in the ClearQuest Designer Help and **Working with reports** in the ClearQuest (client) Help.

Setting up limited access for users and groups

You can limit web access by restricting users or user groups to the following activities:

- Submit records
- Run a single query that you provide

This “web entry” version of ClearQuest Web provides another layer of user privileges.

For example, you can enable beta customers to provide feedback through a password-protected virtual “extranet.” First, you would create a ClearQuest user group (see “Administering users” on page 95) that consists of customers from which you want feedback, and then distribute the ClearQuest URL to that group. That group will only be able to submit records and query for the records you specify. The query results are read-only.

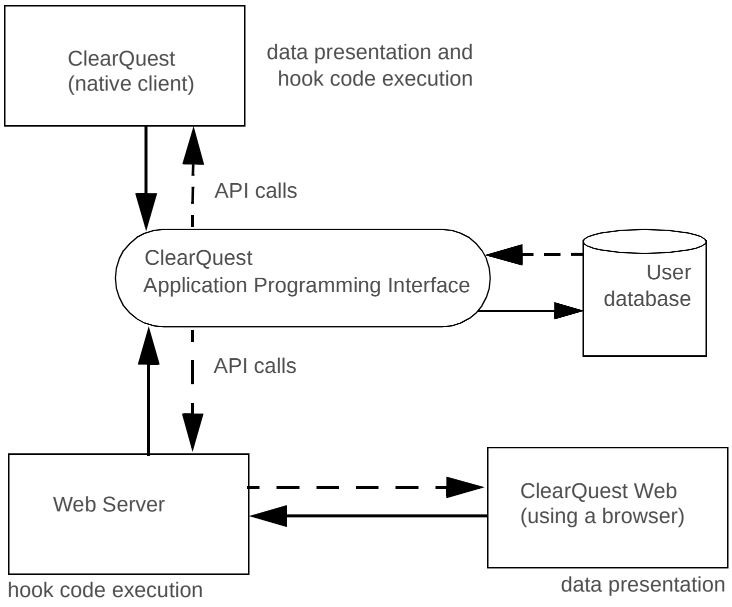
To configure ClearQuest Web to be a “web entry” client for a user or user group, you must have Schema Designer or Super User privileges. To do this, select the **Edit Web Settings** operation in ClearQuest Web.

More information? For more information, select **Editing Web Settings** in the ClearQuest Web Help.

Using hooks in ClearQuest Web

Any hooks you have created in your schema will run on the web server with ClearQuest Web, however certain hooks need modifications in order to work properly on the web. In particular, you must configure dependent fields, and you cannot use message boxes.

Note: Context-menu hooks are not available on ClearQuest Web.



Using dependent fields on ClearQuest Web

ClearQuest Web is not aware of dependencies that exist between fields. To enable support for dependent fields, you must use specific controls when designing your record form, and follow the steps below.

1. Create the dependent field relationship with a value-changed field hook.

   When running on ClearQuest Web, field hooks can set values of dependent fields, but they cannot reference field values other than their own.

2. Add the appropriate control. Both the field that creates the dependency and the dependent fields need to use one of the following controls. You can mix and match:

   - Drop-down list box
   - Combo box
   - Drop-down combo box

3. In the control's property sheet, use the Web Dependent Fields tab to specify the fields that depend on the respective field's value. Only the parent field of the dependency needs to be web-enabled.

   Note: In order to update the choice list associated with the dependent field, you'll need to mark **Recalculate List** when you create the choice list. This may decrease web performance.

Displaying messages on ClearQuest Web

Functions that call other Windows applications, such as a message box, cause the web client to freeze. For example, if a message box function runs on a web server, the message box pops up on the server's screen. Since the user cannot click OK on the server, the client is left waiting. This requires you to reboot the web server.

However, if record script hooks return a string value, that string is displayed to the user.

Adjusting functionality by detecting a web session

When writing hooks, you can use the ClearQuest API to detect whether a user is on a web browser rather than the native client. This allows you to take appropriate action if you have not adjusted your schema to match the functionality available on the web. For example, when you detect a web session in a function that creates a message box or a new window, you can call code modified for the web environment or exit the function.

Web session detection in VBScript

```
dim currDBSession   ’ Current Db session

set currDBSession = GetSession
    ’ Test for existence of the web session variable
   if currDBSession.HasValue ("_CG_WEB_SESSION") then
    ’ Either exit or do something else
   end if
```

Web session detection in Perl

```
 my $currDBSession;   # Current Db session

$currDBSession = $entity->GetSession();
     # Test for existence of the web session variable
    if ( $currDBSession->HasValue ("_CG_WEB_SESSION") {
     # Either exit or do something else
}
```

9 Administering ClearQuest E-mail

ClearQuest takes advantage of e-mail in two ways.

- ClearQuest can send e-mail notification to a user or a user group when a record meets the criteria you define. For example, you can send e-mail to your testing team as soon as a defect is fixed. To do this, you set up e-mail rules with ClearQuest.
- ClearQuest users can submit and modify records via e-mail. For example, users can respond to an e-mail notification with notes that can be appended to a record in the ClearQuest database. To set up e-mail submission capability, you use the Rational E-mail Reader.

This chapter covers the following topics:

- Configuring ClearQuest to send e-mail
- Setting up e-mail rules
- Submitting records via e-mail
- Understanding “roundtrip” e-mail

Setting up e-mail rules

E-mail rules are used to set up e-mail notification for ClearQuest users. For example, you can create an e-mail rule that sends e-mail to the quality assurance team when a defect has been resolved. You can set up the e-mail to include any of the fields of the resolved defect.

You create e-mail rules by submitting Email_Rule records from the ClearQuest client. To add or modify an e-mail rule, you must have Super User or Schema Designer privileges (see “Understanding database privileges” on page 97).

Use the Email_Rule record type to set up the parameters used to determine when e-mail is sent, under which conditions, to which users or user groups it is sent, and the content of the e-mail message.

Note: Most of ClearQuest’s predefined schemas include the E_mail rule record type. If the schema you are using does not, you can add this functionality by adding the Email package (see Appendix A, “ClearQuest schemas and packages”).

When you create an e-mail rule, you establish the criteria that triggers e-mail notification. You can send e-mail based on the following changes to a record:

- A field’s value changes.
- A specific action is taken.
- A record shows up in a specific query.

  If you want to send mail when a record meets multiple criteria, you can define a query and then send e-mail when the record meets that query’s criteria.

More information? When submitting an e-mail rule record, right-click a field and choose Help for more information. In addition, look up *e-mail* in ClearQuest Help index.

Configuring ClearQuest clients to send e-mail

In order to send notification e-mail messages, ClearQuest users must configure their e-mail settings and enable e-mail notification. This allows individual client machines to use the ClearQuest e-mail rules you set up. Users set up their e-mail by choosing **View > E-mail Options** in ClearQuest.

To configure ClearQuest Web to send e-mail, see “Installing ClearQuest Web” in the *Installing ClearQuest* guide.

More information? Look up *e-mail* in the ClearQuest Help index.

Sending records via e-mail

To enable your users to submit and modify records via e-mail, you must configure the Rational E-mail Reader. The E-mail Reader is an e-mail processing tool that parses e-mail submissions and commits new records or changes to the database.

The E-mail Reader (mailreader.exe) is automatically installed in the \Rational\common directory. You can drag a copy of the mailreader.exe to the desktop to create a shortcut to it. Follow the instructions in the online Help (located in \Rational\common\mailreader.hlp) on how to set up the E-mail Reader.

Keep in mind the following when configuring the E-mail Reader:

- The E-mail Reader requires a dedicated e-mail account that has been assigned for parsing records.
- You must designate one machine to run the E-mail Reader. To ensure that e-mail services are always available, run the E-mail Reader on the same machine as your database server.
- Any e-mail sent must be in the required format. See "Formatting e-mail for submission" on page 145.
- You should set up defaults to be used. This allows users to quickly respond to e-mail notification without taking into account the required format.
- Remember that field values submitted via e-mail overwrite the existing data. If you want to append existing data, you must specify a field that allows users to append data, such as the Notes Log (available in most predefined schemas).

Formatting e-mail for submission

Any e-mail sent must conform to the following format. If it does not conform to the following format, the e-mail submission will fail and the e-mail will be deleted.

Subject:<record type> <action> <record ID>

Body: <fieldname: legal value>
<fieldname: legal value>
{<multiline_fieldname: This is an example of a field value for a field whose data type is a multi-line text field. It requires curly braces>}

The Subject line follows these guidelines:

- The record type is always required and is listed first.
- The action name is listed after the record type. If you have set up defaults, you can omit the action (see the example below). Users can override the defaults by specifying a different action. If you do not provide an action, and defaults have not been set up, the submission will be rejected.
- The record ID is listed after the action, but is not necessary when submitting new records.

Note: You can configure the E-mail Reader to track errors and e-mail you when a record fails to be committed to the database.

The e-mail sender can be an external application.

E-mail format example

In this example, you have set up the default action as Modify and the default field to be Notes Log. The Subject line requires the record type and record ID, but because of the defaults, the action name is optional.

Subject: RE: defect SAMPL00000017

Body: {Today we posted a patch for this problem on the company intranet. Please download the patch to solve your customer's problem.}

Guidelines for using the e-mail format

Keep in mind that your schema rules, such as required fields and legal values, apply when users submit or modify records with e-mail. For example, if the user specifies the Submit action, but fails to include all the required fields for the Submit state, the e-mail is sent back to the sender with an error message.

If you want to know about any failed e-mail messages, you can configure the E-mail Reader to keep a log or send e-mail to you whenever a submission fails.

Use the following guidelines when sending e-mail:

- Use curly braces for a text field with multiple lines:

```
{description: my description here... multiple lines follow}
```

- If legal values are not used, the Rational E-mail Reader sends an error message to the submitter.
- E-mail submission does not support adding attachments.
- Fields can be included in any order.
- The e-mail must include values for any required fields.
- Include only fields that you want to overwrite. To avoid overwriting updates made by other users, use a field that appends text and preserves earlier entries.
- Do not supply a value for a read-only field (for example, defect ID), because ClearQuest does not change such fields.
- ClearQuest's own e-mail notification mail uses the required format automatically. Users can use this mail as a template for sending additional records or modifications via e-mail.

Using “roundtrip” e-mail

Your team can use e-mail notification along with e-mail submission to update records. This combination is called “roundtrip” e-mail.

Here’s an example of a typical sequence of events:

1 A user submits a record via e-mail with the required format. ClearQuest assigns the new defect ID number PROD0000137.

2 An e-mail rule you established notifies the lead engineer of this defect.

3 The lead engineer reads the e-mail entitled “PROD0000137”, then responds by e-mail, including remarks in the description field, using the required format.

   Important: The reply should only include fields you want to modify. Any field included in the message will overwrite existing data.

4 The Rational E-mail Reader processes the e-mail message and submits the modified record to the ClearQuest database.

10 Importing data into ClearQuest

This chapter describes how to import data from an existing change request management system into ClearQuest.

Topics covered include:

- Understanding the import process
- Ensuring a successful data import
- Exporting data
- Performing the import for records

Understanding the import process

In general, importing data into ClearQuest from another system involves the following steps:

1. Plan your requirements: Know what fields, choice lists, record types, forms, and actions you need to manage data in ClearQuest.
2. Create a schema that contains all the fields, actions, and state transitions necessary to support your imported data. Map the states and fields in your existing process to states and fields in the ClearQuest schema.
3. Create or modify ClearQuest forms so users can view and modify the imported data.
4. Create a database to hold your imported data using the new schema.
5. Test the customizations you made to the database.
6. Export a small sample of data from your current system to a text file that uses the ClearQuest import format.
7. Use the ClearQuest Import Tool to move the test data into ClearQuest.
8. Manipulate the test data in ClearQuest.
9. Make any additional schema changes based on your test.
10. Perform the real conversion by exporting all the data from your current system to a text file that uses the ClearQuest import file format.
11. Run the ClearQuest Import tool to move the data into ClearQuest.
12. Repeat the import process for your history, attachments, and duplicates if applicable.

These steps are described in detail in the following sections.

Ensuring a successful data import

Before you begin importing data, plan your conversion carefully by doing the following:

- Analyze your current data and workflow.
- Plan what you need to create in your ClearQuest database and forms. This includes all fields, choice lists, record types, forms, actions, e-mail rules, hooks, and in some cases, reports.
- Plan a test using a subset of the data from your old system. Run this test data through all the states of your workflow.

Analyzing your data

Before you begin customizing ClearQuest or importing data, you must understand your current process so that you can implement it in ClearQuest. Make sure all fields and states in your current system are accounted for and will have a corresponding field or state in the ClearQuest schema. Understand your current process workflow and make sure you translate that to the ClearQuest state transition model when you customize your schema. For an overview of the implementation process see, Chapter 2, “Understanding ClearQuest administration.”

Creating a schema

Once you understand your process and data requirements, you can begin building a schema. A schema is a set of metadata that describes your process and customizations, such as field definitions, field behaviors, and state transitions. In addition to defining fields and states, you must define e-mail rules, hooks, and reports before you import. You can then create the forms that will be used to collect and display the data. For details on how to create your schema, see Chapter 4, “Working with ClearQuest schemas” and Chapter 5, “Customizing a schema.”

It is important to map all fields and states in your current system to a field and state in ClearQuest. If you do not provide a mapping between an exported field and a ClearQuest field, the data for that field is not imported. If the state field is not mapped, ClearQuest defaults all records to the Submitted state. This makes your state model ineffective and prevents you from creating accurate metrics.

Original record ID

ClearQuest assigns a new record ID to each imported record, so be sure that your schema has a field for the original (old) record ID. ClearQuest uses the original record ID when importing duplicates, history, and attachments. It is also useful for finding records based on the original record ID.

Note: If you used the ClearQuest Export Tool to export data from another ClearQuest database, the ID field in the export file should be mapped to the original record ID field.

Creating a database

You must create a user database to hold the imported data or upgrade an existing user database. This database is associated with the schema you customized so that it reflects the process model and customizations you designed into the schema. For information on creating and maintaining ClearQuest databases see Chapter 3, “Managing databases.”

Testing the conversion

We recommend that you first import a few test records into a test database. Make sure you read the following sections on exporting data and performing the conversion, then try the process with a subset of your data. After moving these test records into ClearQuest, make sure you can manipulate them from within the ClearQuest user interface. When you are satisfied that everything is working properly, go ahead and import all of your records.

Note: Consider importing all of the records in your system, even those that have been resolved. By including all records, you are able to access historical information about your projects and immediately generate useful management reports.

Exporting data

You must use your current tool to export data into a delimited text file before you can import it into ClearQuest. You must create separate export files for records, history, and attachments.

Make sure you have a reliable way to export data from your old system. We recommend testing the export several times to be sure you get consistent results.

Understanding the record import file format

The import file format is a list of delimited, double-quoted strings ending with a newline character. The most common file format is comma-delimited, but you can also use colons, semi-colons, pipes, or tabs.

The first row of the import file contains a list of the field names being exported. Subsequent rows contain the field values for the individual records. A sample file would look like the following:

```
"id","state","submitdate","severity","priority","summary","description"
"1","Submitted","1/1/97 7:00.00","3-Workaround","3","The short cut for
    ""Printing is grayed out "" does not work","See summary --John"
"2","Opened","1/4/97 11:32.00","1-Crash","1","Can’t login to the
    system","I typed my login and the hour glass sign appears, but after
    15 minutes, I still can’t type in my password. There’s an infinite
    loop somewhere."
```

When exporting your data, keep the following file format issues in mind:

- If you are creating a comma-delimited data file, field values can contain embedded commas as long as they are enclosed within the quotes surrounding the field. For example:

  ```
  "I typed my login and the hour glass sign appears, but after 15 minutes,
  I still can’t type in my password. There’s an infinite loop somewhere."
  ```

- Look for embedded double quotes in field values. They must be enclosed within more double quotes, as in the following summary field example.

  ```
  "The short cut for ""Printing all"" does not work."
  ```

- If a field is empty, use “”, “<<None>>”, or “<<Unassigned>>”.
- Do not include spaces before or after the delimiter character.

- Before you can import reference fields, values for those referenced record types must be imported first. Whatever values the import file has for those fields must already exist in ClearQuest. This includes users.
- Items in a reference list must be comma-separated in the import file (for example “Ref1, Ref2, Ref3”).

Data types supported in ClearQuest

The values of the fields in the import file are interpreted according to the data type defined for the corresponding field in the ClearQuest schema. ClearQuest supports the following data types:

Data Type	Description	Behavior
SHORT_STRING	A variable-length character string with a maximum character length	Inserted as is
INT	SQL integer	Converted to an integer
DATE_TIME	SQL date and time	Converted to date/time
REFERENCE	A reference to a display name in a state-based or stateless record type	Interpreted as a key to a stateless record type
REFERENCE_LIST	Multiple references to display names in a state-based or stateless record type	Interpreted as a list of references
ATTACHMENT_LIST	A list of fields with type Attachment	Interpreted as a list of pathnames to attachments
MULTILINE_STRING	A variable-length character string of unlimited size	Inserted as is to the maximum length in the schema for this type
STATE	Reserved for system fields	CQ validates value of the field, but does not trigger actions required to reach the state

Note: ClearQuest maps unsupported data types as STRING. You map the data types and fields during the actual import process using the ClearQuest Import Tool (described later in this chapter).

Understanding the history import file format

The import file format for history requires that each history be its own row, and that each entry have an original ID number identifying the record to which the history belongs. The remaining fields contain information on the action that was performed, and should include the following fields:

- original record ID
- timestamp
- user name
- action performed
- old state
- new state

Note: If you used the ClearQuest Export Tool to export data from another ClearQuest database, the original record ID is stored in the “display_name” field.

An example import file looks like this:

```
"id","timestamp","user_name","action_name","old_state","new_state"
"1","Apr  6 1999 9:31AM","srahman","Fix_Log","verified","verified"
"2","Apr  6 1999 9:31AM","srahman","Fix_Log","verified","verified"
```

The date should always specify the full year regardless of the date format used. Acceptable date formats include:

- “6 April 1999”
- “April 6, 1999 8:30:00”
- “8:30:00 Apr 6 1999”
- “4/6/1999 8:30:00PM”

Understanding the attachment import file format

The import file format for attachments requires that each entry have an original ID number identifying the record to which the attachments belong. The remainder of each entry lists the attached files associated with each attachment field of the record.

The pathnames for the attached files of a single attachment data type field are grouped together inside one set of quotation marks and separated by delimiter characters.

The following example associates three attached files with a record whose original ID is 101. The schema contains two attachment fields, attfield1 and attfield2.

Note: If you used the ClearQuest Export Tool to export data from another ClearQuest database, the original record ID is stored in the display_name field.

The import file looks like the following:

```
"id","attfield1","attfield2"
"101","c:\temp\101_1.txt,c:\temp\101_2.txt","c:\temp\101_3.txt"
```

In this example, attfield1 has two attached files associated with it. A comma separates the pathnames for the files. ClearQuest stores the actual contents of the attachments, not just a reference to them, and uses the pathname to locate and read the file.

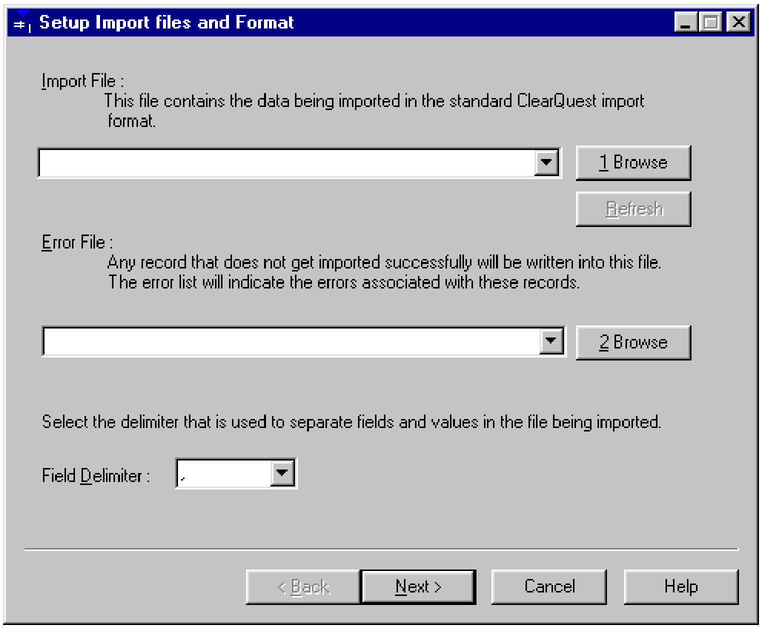
Performing the import for records

When you have set up a ClearQuest schema and database to receive your data, and exported your data from your current system, you are ready to perform the data transfer. Data is imported in three parts: records, history, and attachments.

Note: You can also import duplicate records separately. If you use the ClearQuest Export Tool to export data from another ClearQuest database, a separate export file for duplicate records is created automatically.

To perform the import for records:

1 Run the ClearQuest Import Tool from the Start menu, enter your user name and password, and select the database in which to import. The Setup Import files and Format dialog box appears:


Setup Import files and Format
Import File :
This file contains the data being imported in the standard ClearQuest import format.
1 Browse
Refresh
Error File :
Any record that does not get imported successfully will be written into this file.
The error list will indicate the errors associated with these records.
2 Browse
Select the delimiter that is used to separate fields and values in the file being imported.
Field Delimiter : ,
< Back
Next >
Cancel
Help

Note: Within the ClearQuest Import and Export tools, *Entity* refers to record type.

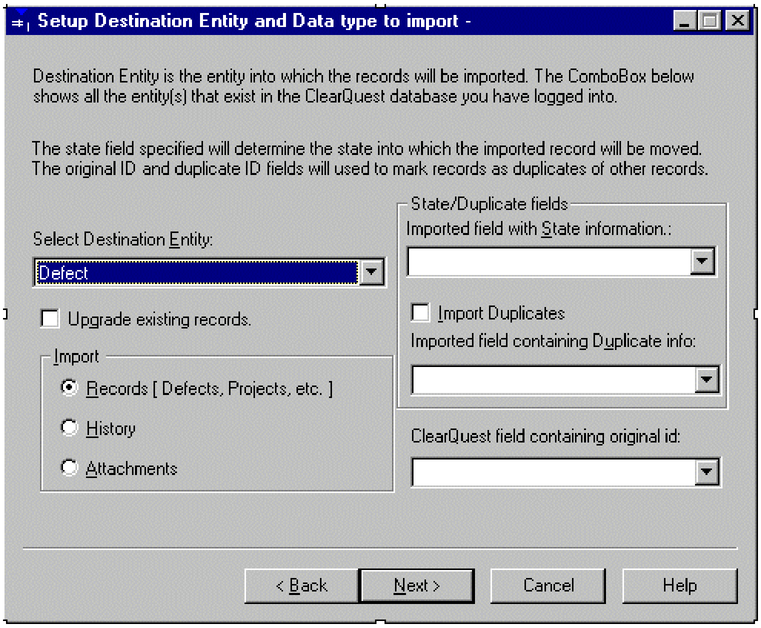
2 Fill in the information on the Setup import files and Format dialog box.

a Enter the path to the file containing your exported data in the Import File field. You can use the **Browse** button to locate the file.

b Enter the location and name to use for the Error File. If any record does not convert successfully, it is saved to the Error File, and you can use that file to fix problems and reimport the record later.

c Select the Field Delimiter used in your export file.

3 Click **Next**. The Setup Destination Entity and Data Type to Import dialog box appears.



Destination Entity is the entity into which the records will be imported. The ComboBox below shows all the entity(s) that exist in the ClearQuest database you have logged into.

The state field specified will determine the state into which the imported record will be moved. The original ID and duplicate ID fields will used to mark records as duplicates of other records.

Select Destination Entity: Defect

☐ Upgrade existing records.

Import

● Records [Defects, Projects, etc.]

○ History

○ Attachments

State/Duplicate fields

Imported field with State information.:

☐ Import Duplicates

Imported field containing Duplicate info:

ClearQuest field containing original id:

4 Select the entity and data type to import.

a Enter the Destination Entity. This is the record type into which the records are imported.

b Indicate the type of data you are importing: Records, History, or Attachments.

c If the entity has states, specify the exported field that maps to the state field you defined in your ClearQuest schema. The state field specified determines the state into which the record is imported. If this field is empty, ClearQuest defaults to the Submit state.

Note: The state names in your import file must match those you defined in your ClearQuest schema. If you want to use different state names, you must edit your import file to use the new names. For example, if your current application used the state name Submitted, but you called that state New in your ClearQuest template, you must edit your import file and replace Submitted with New.

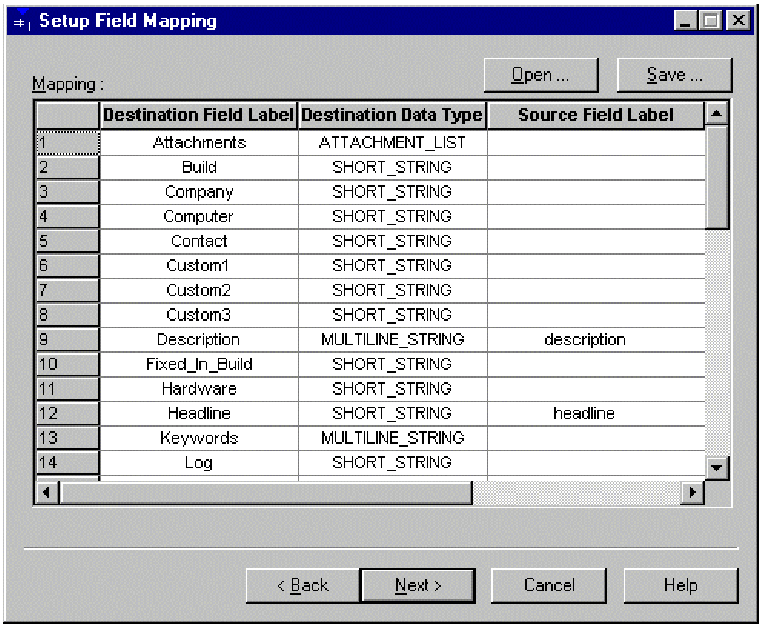
d Indicate whether the imported records contain duplicates. If they do, enter the exported field name that contains the duplicate information. For more information on importing duplicates, see “Importing duplicate records” on page 164.

e Enter the name of the ClearQuest field that will contain the original record ID of the exported data. This field is important for importing history, attachments, and duplicate records.

Note: ClearQuest allows you to update records that you previously imported. If you are upgrading previously imported records, history, or attachments, click **Upgrade existing records**.

If you used the ClearQuest Export Tool to export duplicate record information separately, click **Upgrade existing records** and **Import Duplicates**. This adds the duplicate information to the existing records. If you are importing duplicate records from another application, see “Importing duplicate records” on page 164.

5 Click **Next**. The Setup Field Mapping dialog box appears.



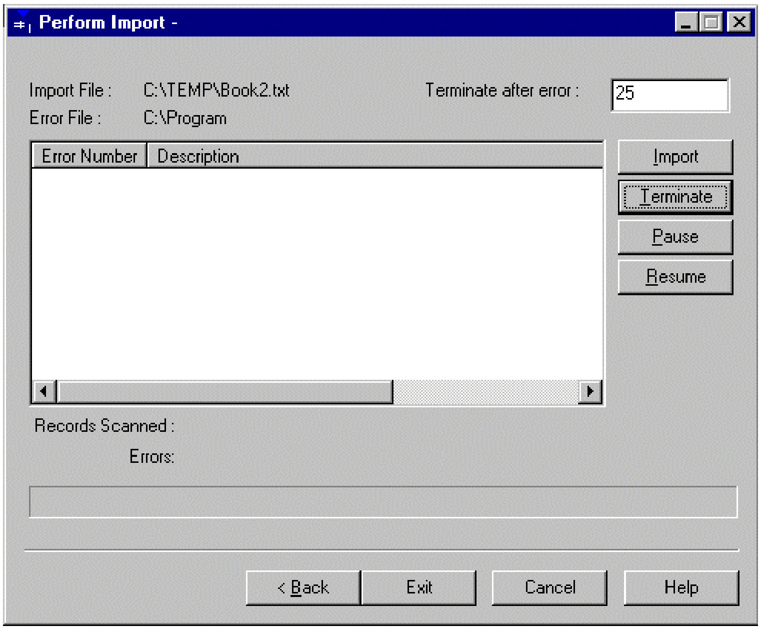
	Destination Field Label	Destination Data Type	Source Field Label
1	Attachments	ATTACHMENT_LIST	
2	Build	SHORT_STRING	
3	Company	SHORT_STRING	
4	Computer	SHORT_STRING	
5	Contact	SHORT_STRING	
6	Custom1	SHORT_STRING	
7	Custom2	SHORT_STRING	
8	Custom3	SHORT_STRING	
9	Description	MULTILINE_STRING	description
10	Fixed_In_Build	SHORT_STRING	
11	Hardware	SHORT_STRING	
12	Headline	SHORT_STRING	headline
13	Keywords	MULTILINE_STRING	
14	Log	SHORT_STRING	

6 Create a one-to-one mapping between the fields exported from your current system and the fields you created in the ClearQuest schema. The first column lists the field names of the ClearQuest fields, the second column lists the data type defined for the field in the ClearQuest schema, and the third column lists the original field names. If the exported field names are the same as the new ClearQuest field names, the mapping is done automatically.

- You cannot map a field from the exported data file to more than one field in the ClearQuest schema.
- If the time field is mapped to a date-time field in ClearQuest, today's date is appended to the time. Also, if the date field is mapped to a date-time field in ClearQuest, the current time is appended to the date.

7 When you have completed the mappings, click **Save** to save the current mappings to a text file. This allows you to re-open the mapping file if you need to repeat the import process.

8 Click **Next**. The Perform Import dialog box appears.



Import File : C:\TEMP\Book2.txt

Error File : C:\Program

Terminate after error : 25

Error Number	Description

Records Scanned :

Errors:

9 In the Terminate after error field, indicate how many errors can occur before the import process is terminated.

10 Click **Import** to begin the process. ClearQuest displays the number of errors and the number of records scanned during the import.

11 When the import is finished, click **Exit** to close the Import Tool.

Importing records from the Error file

If errors occur during the import, ClearQuest creates the following files:

- `error file`: ClearQuest saves the unimported records to the error file whose name and location you defined in step 2 above.
- `errlog.txt`: ClearQuest saves error messages to a text file in your system Temp directory.

To reimport these problem records:

1. Check the errlog.txt file and review the types of errors encountered.

2. Open the error file containing the unimported records.

3. Correct the errors in the records. Be sure the error file follows the import file format. See “Understanding the record import file format” on page 153.

4. Perform the import process again using the error file as the import file and specifying a new error file name.

Importing history

After importing your records, you are ready to import your history information. History information is important if you want historical and trend-analysis reports to work.

Before importing history information, be sure you have an import file containing the history fields. See “Understanding the history import file format” on page 155.

To import history, follow the procedure for “Performing the import for records” on page 157, with the following changes:

- In step 2, filling in the information on the Setup import files and Format dialog box:
  - Enter the path to the file containing your exported history data in the Import File field. You can use the **Browse** button to locate the file.
  - Enter the location and name to use for the Error File. If you have an error file from importing records, be sure to give the error file for History a different name.

- In step 4, selecting the entity and data type to import:
  - Indicate that History is the type of data you are importing.
  - Enter the name of the ClearQuest field that contains the original record ID of the exported data. ClearQuest must know the record to which the history information belongs.
- In step 6, creating a one-to-one mapping, map your history fields to the corresponding fields in your ClearQuest schema, and save the map file.

All other steps are the same.

Importing attachments

After importing your records, you are ready to import your attachments. Before importing attachments, be sure you have an import file containing the attachment information. See "Understanding the attachment import file format" on page 155.

To import attachments, follow the procedure for "Performing the import for records" on page 157, with the following changes:

- In step 2, filling in the information on the Setup import files and Format dialog box:
  - Enter the path to the file containing your exported attachment data in the Import File field. You can use the **Browse** button to locate the file.
  - Enter the location and name to use for the Error File. If you have an error file from importing records, be sure to give the error file for attachments a different name.
- In step 4, selecting the entity and data type to import:
  - Indicate that Attachments are the type of data you are importing.
  - Enter the name of the ClearQuest field that contains the original record ID of the exported data. ClearQuest must know the record to which the attachment belongs.

- In step 6, creating a one-to-one mapping, map your attachment fields to the corresponding fields in your ClearQuest schema, and save the map file.

All other steps are the same.

Importing duplicate records

You can import duplicate records when importing all of your records. To import duplicate records, considering the following requirements:

- Imported duplicates must have a pointer to their original ID.
- You must indicate which ClearQuest field maps to the original ID. ClearQuest uses the original record to locate the parent of the duplicate record.
- Within ClearQuest, duplicate records are handled using a Duplicate state and action. Be sure your schema includes both.

To import duplicate records:

1. Follow the steps for “Performing the import for records” on page 157.
2. In step 4, check **Import Duplicates** and enter the field name containing the duplicate information.
3. Run the import. Any duplicate that cannot reference its parent record (because it was imported before the parent) is saved to the Error file.
4. When the import is completed, use the Error file to import the duplicates that did not successfully import the first time.

Importing duplicate records separately

Another method for importing duplicate records is to create a separate export file for duplicate records, just as you do for history and attachments. You can then import all of your other records (excluding the child records), and import the duplicates later.

Upgrading existing records

You can also use the ClearQuest Import tool to update records that you previously imported. For example, if you modified records in your old system that have already been imported into ClearQuest, you can update the imported records with the new data.

Warning: Be sure you do not change the records in both locations. If you upgrade existing records that have already been modified in ClearQuest, you will lose your changes.

To upgrade existing records, follow the procedure for “Performing the import for records” on page 157. In step 4, “Selecting the entity and data type to import,” select **Upgrade existing records**. All other steps are the same.

A ClearQuest schemas and packages

ClearQuest ships with several predefined schemas. There's a schema to coincide with each of Rational's Windows suites. ClearQuest also comes with a "Blank" schema that contains only the minimally required system fields.

Each ClearQuest predefined schema consists of a number of schema packages. ClearQuest uses these packages to build a complete schema. A package consists of pieces of schema functionality. For example, the Email package adds the Email_rule record type, which allows administrators to set up configurable e-mail rules according to their process.

This appendix includes the following topics:

- ClearQuest predefined schemas
- Packages included in ClearQuest schemas
- State models used by predefined record types
- State type models for packages

More information? For information on how to customize a schema, see Chapter 5, "Customizing a schema."

ClearQuest predefined schemas

ClearQuest ships with several predefined schemas. There's a schema to coincide with each of Rational's Windows suites. ClearQuest also comes with a “Blank” schema that contains only the minimally required system fields.

Within ClearQuest schemas, each schema consists of a number of schema packages. ClearQuest uses these packages to build a complete schema. A package consists of pieces of schema functionality. For example, the Email package adds the Email_rule record type, which allows administrators to set up configurable e-mail rules according to their process.

Schema	Description	Included packages
Blank	Contains only system fields. Use Blank to create a schema from scratch.	None.
Common	Contains fields and record types that are common to all predefined schemas. Each ClearQuest schema is comprised of this schema and one or more packages.	None.
DefectTracking	Contains the fields necessary to start using ClearQuest to track defects in a software development environment.	Attachments, Customer, Email, History, Notes, Project, Resolution.
AnalystStudio	For use with Rational Analyst Studio. Contains fields and rules that work with Rational Rose and RequisitePro.	AnalystStudioSetup, Attachments, Email, Enhancement Request History, Notes, PQC, Repository, RequisitePro, Resolution.
DevelopmentStudio	For use with Rational DevelopmentStudio. Contains fields and rules that work with Rational Purify, Quantify, and Pure Coverage.	Attachments, Email, Enhancement Request, History, Notes, PQC, Repository, RequisitePro, Resolution.

Schema	Description	Included packages
TestStudio	For use with Rational TestStudio. Contains fields and rules that work with Rational TeamTest, RequisitePro, Purify, Quantify, and Pure Coverage.	Attachments, Email, Enhancement Request, History, Notes, PQC, Project, Repository, RequisitePro, Resolution, TeamTest.
Enterprise	For use with Rational EnterpriseStudio. Contains fields and hooks that work with most Rational Suite products.	Attachments, BaseCMActivity, Email, Enhancement Request, History, Notes, PQC, Resolution. Repository, RequisitePro, TeamTest, UCMPolicyScripts, UnifiedChangeManagement.
Unified Change Management (UCM)	Supports the UCM process by providing integration with Rational ClearCase.	Attachments, BaseCMActivity, Email, History, Notes, Resolution, UCMPolicyScripts, UnifiedChangeManagement.

Packages included in ClearQuest schemas

The following table lists the packages provided by ClearQuest. Some packages are read-only; their functionality cannot not be changed.

Package	Description	Record type(s) added/modified	Field(s)
Attachments (read-only)	Allows you to add and remove attachments related to a record.	Adds an "Attachment" tab to the enabled record type.	**Fields added to enabled record type:** Attachments
BaseCMActivity	Provides support for the BaseCMActivity record type. Included in the UCM schema and Enterprise schema as a lightweight activity record type. You can use this alternative to the defect record type as is, enable it for Unified Change Management (UCM), or develop it into a new record type. For more information, see *Managing Software Projects with ClearCase*.	Adds the BaseCMActivity record type.	**Fields added to BaseCMActivity record type:** Owner Description Headline
ClearCase (read-only)	Provides support for integration with Rational ClearCase. For UCM integration, see UnifiedChangeMan-.	Adds the cc_change set and cc_vob_object record types Adds the ClearCase tab to the enabled record type	**Fields in cc_change_set record type:** objects **Fields in cc_vob_object record type:** Name Object_oid Vob_Family_uuid **Fields added to enabled record type:** cc_change_set

Package	Description	Record type(s) added/modified	Field(s)
Customer	Supports the integration of customer data with your change request management system.	Adds a “customer” stateless record type that includes the following actions: Submit, Modify, Import and Delete. Also, adds reference fields to customer information to the record type you choose.	**Fields added to enabled record type:** Attachment CallTrackingID Company Description Email Fax Name Phone
Enhancement Request	Supports an additional record type for product enhancement requests.	Adds a “enhancement request” record type with the following actions: Submit, Modify, Delete, Close, Re_open, Open, Duplicate and Unduplicate.	**Fields in Enhancement record type:** Customer_Email Customer_Name Customer_Phone Customer_Priority Description Headline Keywords Owner Priority Product Product_Area Request_Type Submit_date Submitter Target_Release

Package	Description	Record type(s) added/modified	Field(s)
Email (read-only)	Supports automatic e-mail notification when records are modified.	Creates a stateless record type "email_rule". Adds a base action to the enabled record type. This base action runs the e-mail rule whenever any action is invoked.	**Email_rule record type fields:** Actions Action_Types CC_Actioner CC_Addr_fields CC_Additional CC_Groups CC_Users Change_fields Display_fields Entify_def (record type) From_Addr Include_Defect Is_Active_Rule Filter_Query Name Show_previous Source_states Subject_fields Target_states To_Additional To_Addr_Fields To_Groups To_Users
History (read-only)	Allows you to keep an historical account of all actions taken on a record.	Adds a "History" tab to the enabled record type.	**Fields added to enabled record type:** History
Notes	Allows you to keep an historical account of all notes that have been entered on a record, according to date and user.	Adds a "Notes" tab to the enabled record type.	**Fields added to enabled record type:** Note_Entry Notes_log

Package	Description	Record type(s) added/modified	Field(s)
PQC (read-only)	Provides support for integration with Rational Purify, Quantify, and Pure Coverage.	Adds a PQC tab to the form of the enabled record type.	**Fields added to enabled record type:** PQC_DiagnosticTool PQC_Executable PQC_TestCommand PQC_TestTool PQC_Stack PQC_StackID
Project	Allows you to track records according to project. (Note: No relation to the UCM package "Project" concept)	Creates a stateless record type "project". Adds the project field to the enabled record type.	**Project record type fields:** Name Description **Fields added to enabled record type:** Project
Repository (read-only)	Provides support needed for both Rational RequisitePro and Rational TeamTest.	Creates a stateless record type "repoproject" that allows you to use TeamTest or RequisitePro projects with ClearQuest.	**Fields included in the repoproject record type:** Name TT_Repo (Refers to the TeamTest Repository)
RequisitePro (read-only)	Provides support for integration with Rational RequisitePro.	Adds the Requirements stateless record type Adds the Requirements tab to the enabled record type.	**Fields in Requirements record type:** Req_ID Requirement **Fields added to enabled record type:** Requirements_List

Package	Description	Record type(s) added/modified	Field(s)
Resolution	Adds support to users track how a record was resolved. Requires you to map schema states to the following state types: Not_Resolved; Resolved	Adds a “Resolution” tab to the enabled record type.	**Fields added to enabled record type:** Resolution Resolution_statetype
TeamTest (read-only)	Provides support for integration with Rational TeamTest.	Adds Test Data and Environment tabs to the record type you specify.	**Fields added to enabled record type:** Build Company Computer Contact Custom1 (modifiable) Custom2 (modifiable) Custom3 (modifiable) Fixed_in_build Hardware Log Log_Folder Old_internal_ID Operating_system Other_Environment Resolution_Description Requirement Requirement_ID Test_Script Verification_Point
UCMPolicyScripts	Provides support for the UnifiedChangeManagement (UCM) package by adding three global scripts.	Does not add any record types.	

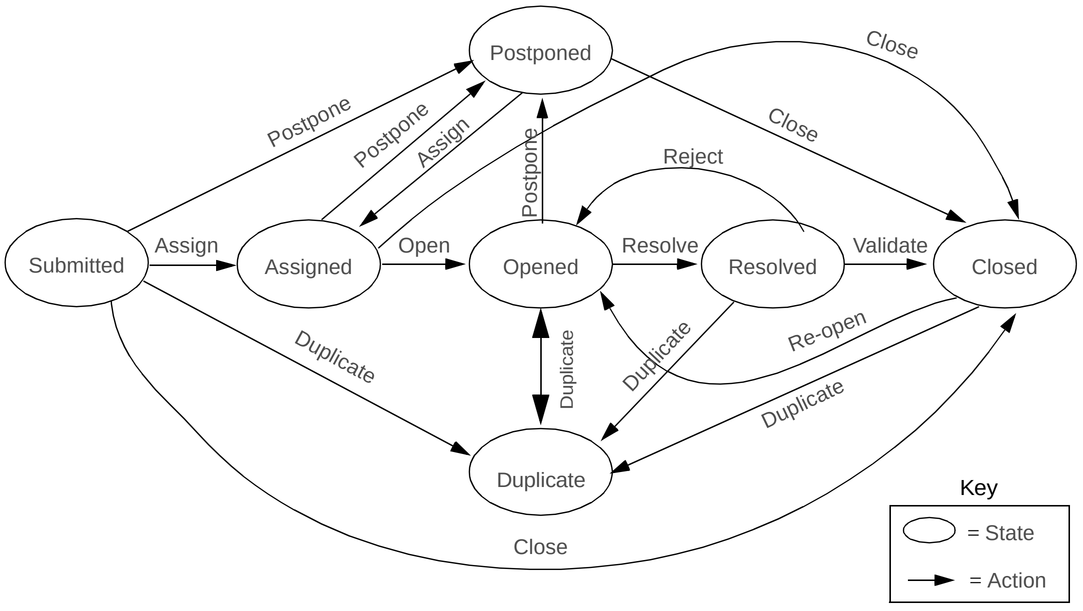
Package	Description	Record type(s) added/modified	Field(s)
UnifiedChangeMan-agment (UCM)	Provides supports for the UCM process by enabling integration with Rational ClearCase 4.0 and above; links a ClearCase Project VOB with a ClearQuest user database. Requires the UCMPocyScripts package. Can be used with the BaseCMActivity package. Requires you to map schema states to the following state types: Waiting; Active; Ready; Complete	Adds UCMUtilityActivity Adds UCM_Project stateless record type Also adds queries to the client workspace	**Fields added to enabled record type:** ucm_statetype ucm_vob_object ucm_stream_object ucm_stream ucm_view ucm_project
Visual SourceSafe (read-only)	Provides support for integration with Microsoft's VisualSourceSafe.	Adds SSObject and SCSnapObject stateless record types. Adds the VisualSourceSafe tab to the form of the enabled record type.	**Fields added to enabled record type:** VSSChangeSet **Fields added in SCObject record type:** CQDefects VSSCheckOutState VSSFileName VSSSpec VSSUser VSSVersion **Fields added in SCSnapObject record type:** CreatedBy CreatedOn Label SnapElements

State model for defect record type

The Defect record type contains the following states:

State	Description
Submitted	First state of a new defect.
Assigned	Assigned to a team member.
Opened	Being worked on.
Resolved	Has been fixed.
Closed	Has been verified.
Duplicate	Duplicates another defect.
Postponed	Postponed until another release or iteration.

The state model for the defect record type is the same for each predefined schema. You can also see this information in the Defect record type's State Transition Matrix.

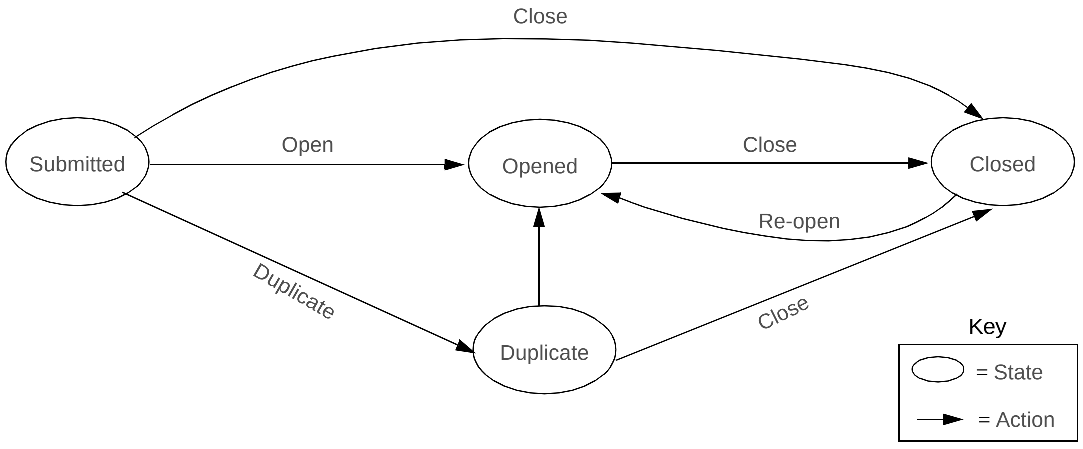


State model for Enhancement Request record type

The EnhancementRequest record type contains the following states.

State	Description
Submitted	First state of a new enhancement request.
Opened	Being worked on.
Closed	Has been verified.
Duplicate	Duplicates another enhancement request.

The following state model diagram shows how the EnhancementRequest record type moves from one state to another as the result of an action. You can also see this information in the EnhancementRequest record type's State Transition Matrix.



State type models for packages

A state type is a label that defines a state's role in your state model. Some ClearQuest schemas and packages require that each state in your state model be assigned or mapped to a specific state type. For example, the UnifiedChangeManagement schema and package use state types to invoke certain ClearCase triggers. ClearQuest's Resolution package uses state types to invoke certain ClearCase hooks when a record's state transitions to a state mapped to the "resolved" state type.

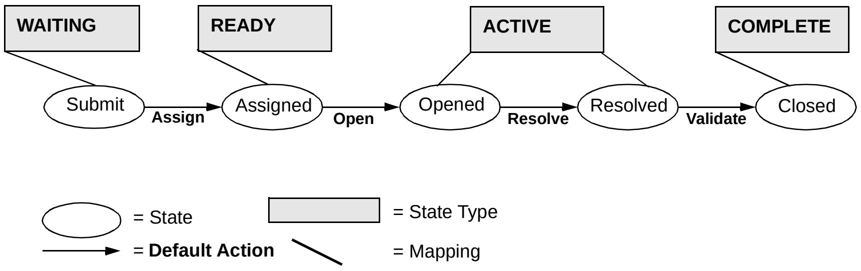
When you add a new state to a schema that uses state types, you must map the new state to a state type.

For an overview of the UCM-ClearQuest integration, see *Managing Software Projects with ClearCase*. To learn about the UnifiedChangeManagement schema and package, see *Enabling ClearQuest for Unified Change Management* on page 181.

UnifiedChangeManagement package state type model

The following table and diagram show the state types and a valid state mapping for the UCM package. The default actions of the states must provide a complete transition through the state type model.

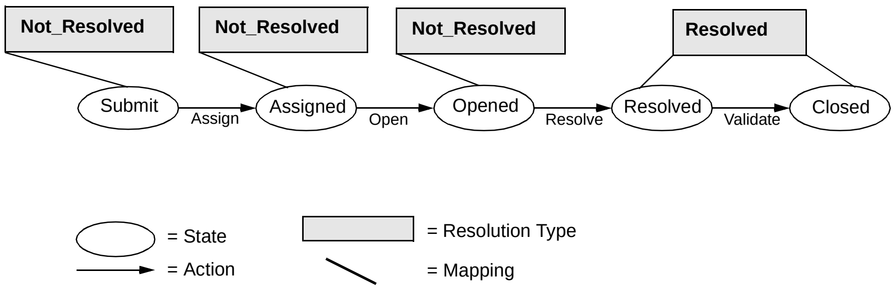
State Type	Description	Mapped state in UCM schema
Waiting	Record not yet assigned, triaged, or scheduled.	Submitted Postponed
Ready	Record appears in the assigned user's To Do List query.	Assigned
Active	User has started working on the record, which can now contain ClearCase element information.	Opened
Complete	User has completed work on the record, which is now associated with a ClearCase project and its ClearCase elements.	Resolved Closed Duplicate



Resolution package state type model

The following table and diagram show the state types and an example of a valid state mapping for the Resolution package.

State Type	Description
Not_resolved	The record is not resolved.
Resolved	The record is resolved.



B Enabling ClearQuest for Unified Change Management

The ClearQuest/Unified Change Management (UCM) integration links all ClearCase UCM project activities to ClearQuest records. The integration requires the following:

- A ClearQuest schema enabled for UCM
- ClearCase 4.x with a project enabled to work with ClearQuest

ClearQuest provides two predefined schemas that are UCM-enabled: the UnifiedChangeManagement and Enterprise schemas. The easiest way to implement UCM is to use one of the predefined schemas.

If you want to use the UCM integration with another schema, you need to add the following schema packages:

- UCMPolicyScripts
- UnifiedChangeManagement

The next section describes how to install the packages. See Appendix A, “ClearQuest schemas and packages,” for detailed information on the content of these packages.

Note: The information provided here describes how to enable ClearQuest for UCM. For complete information on setting up and using the UCM integration, and understanding the UCM process, see the *Managing Software Projects with ClearCase* guide provided with ClearCase.

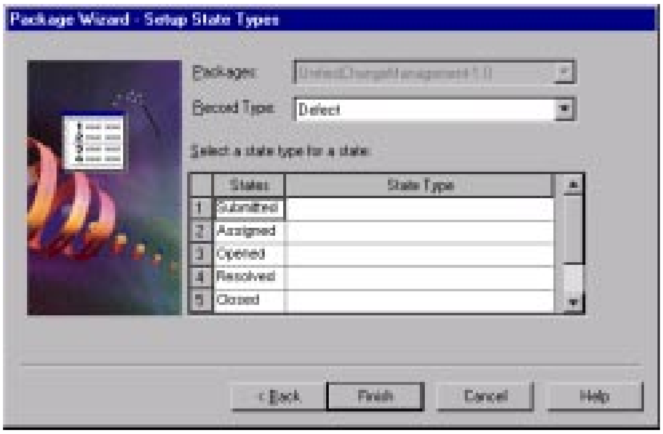
Adding UCM functionality to a schema

To add the UCM packages, state mappings and actions, do this:

1. Launch the ClearQuest Designer from the Start menu.
2. Select **Package > Package Wizard**. Click **More Packages** to locate the UCM packages.
3. Add the latest revision of the UCM packages in this order:
   - UCMPolicyScripts package
   - UnifiedChangeManagement package.

   Note: Each package is installed separately. Install the UCMPolicyScripts package first, check in your schema, then repeat the process for the UnifiedChangeManagement package.
4. Select the schema to apply the package to.
5. If you are applying the UCMPolicyScripts package, you are done and can click **Finish**.

   If you are applying the UnifiedChangeManagement package click **Next** to continue.
6. Select the record type(s) to enable for UCM and click **Next** to display the Setup State Types wizard.



Package Wizard - Setup State Types

Packages: UnifiedChangeManagement 1.0

Record Type: Defect

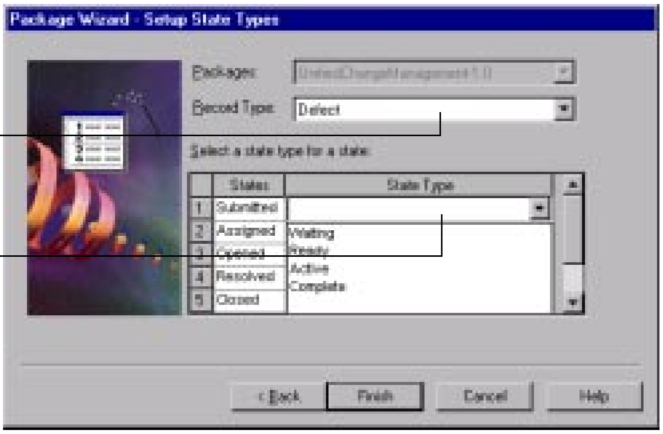
Select a state type for a state:

	States	State Type
1	Submitted	
2	Assigned	
3	Opened	
4	Resolved	
5	Closed	

7 Map states in your schema to the UCM state types. Click on the State Types field to display the list of available state types.

Map state types for each record type you enabled for UCM. Display different record types by make a selection here.

Click the State Types field to display the list of available state types.



Packages: UnifiedChangeManagement 1.0

Record Type: Defect

Select a state type for a state:

	States	State Type
1	Submitted	
2	Assigned	Waiting
3	Opened	Ready
4	Resolved	Active
5	Closed	Complete

8 Repeat the state type mapping for each record type you enabled in step 6. To display a new record type, make a selection from the **Record Type** field.

Note: For more information on the UCM state types, see the *Managing Software Projects with ClearCase* guide provided with ClearCase, or Appendix A, “ClearQuest schemas and packages.”

9 When you have completed mapping your states, click **Finish**.

You must now add default actions for each state of the record type you enable for UCM. The next section describes that process.

Setting default actions for the UCM package

The State Transition Matrix in your schema must provide at least one path through the entire state type model (Waiting to Ready to Active to Complete). In addition to mapping each state to a state type, you must also assign a default action for each state.

Assign a default action for each state until you complete the state type model. Once your default actions provide a complete path of mapped state type transitions, you are done with the mapping task. For example, if your schema has a Closed state, and it is mapped to the Complete state type, it does not need a default action.

For more information state types, the UCM package, and default actions, see “UnifiedChangeManagement package state type model” on page 179.

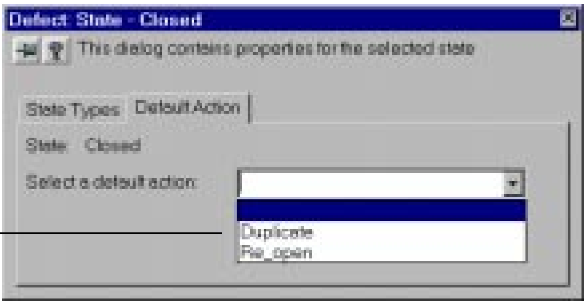
More information? Look up *actions, default* in the ClearQuest Designer Help index.

To assign default actions:

1 Open the State Transition Matrix for the record type you enabled for UCM.

2 Right-click on a state in the left column and select **Properties**.

3 In the properties dialog click the **Default Action** tab.



Select an action to assign it as the default action for this state

4. Select a default action from the list. The choices on the list depend on the actions you have created for your state transitions in the State Transition Matrix.

   For each state, select the action that brings the record to a state that is associated with the next state type in the model. For example, the Submitted state (Waiting) moves to the Assigned state (Ready) through the Assign default action. The Waiting to Ready to Active to Complete model must be traversed through the default actions. For an example of a complete model see, "UnifiedChangeManagement package state type model" on page 179.

   For more information on state types and default actions, see Chapter 5, "Customizing a schema." For complete information on setting up and using the UCM integration, and understanding the UCM process, see the *Managing Software Projects with ClearCase* guide provided with ClearCase.

Index