

Micro Focus<sup>®</sup>

# Modernization Workbench<sup>™</sup>

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Getting Started



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# Introducing Modernization Workbench

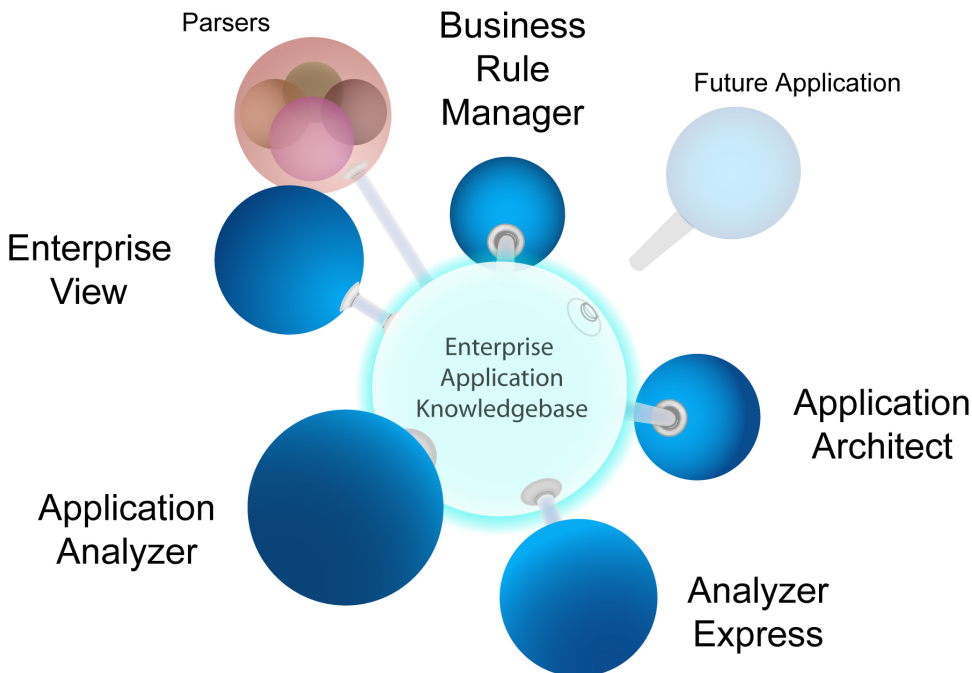
Micro Focus Modernization Workbench (MW) offers centralized storage and analysis of enterprise application portfolios:

- Language-specific parsers generate a common repository of application objects, in the industrial-strength DBMS of your choice.
- Sophisticated analysis tools give you convenient interactive access to the repository, in a multiuser environment that facilitates exchange of information and insight across the enterprise.

The result is a single easy-to-use interface in which you analyze assets written in modern languages like Java and C# alongside assets written in legacy languages like Cobol and PL/I. And in which you perform the analysis with industry-leading tools that offer deep, detailed, and comprehensive insight into complex modern distributed applications.

## Modernization Workbench Products

Modernization Workbench is a suite of PC-based software products for storing, analyzing, and re-architecting enterprise applications. The products are deployed in an integrated environment with access to a common repository of program objects. Language-specific parsers generate repository models that serve as the basis for a rich set of diagrams, reports, and other documentation. Each product is separately licensed.



# Application Analyzer

Application Analyzer is a robust set of non-invasive interactive tools that work with source code, system files, DDL, screen maps, and more. Use it for analyzing and documenting legacy systems at both the application and program levels.

Use Application Analyzer at the application level to:

- Create diagrams of applications.
- Perform change analysis across applications.
- Estimate application complexity and effort.

Use Application Analyzer at the program level to:

- Perform program analysis in stages.
- Perform impact analysis on a program.
- Model and search the repository.

# Enterprise View

Enterprise View (EV) is a Web server-based tool that offers IT executives "at-a-glance" application portfolio management (APM). EV charts and tables provide powerful graphical insight into APM trends and current status, on dashboards that make it easy to drill down from the "big picture" captured at the highest level to the lower-level details that support it.

With EV you can:

- Create, distribute, and gather responses to surveys about your organization's application portfolio and business processes.
- Mine application complexity metrics from the MW repository.
- Track survey and repository metrics in EV's rich variety of interactive charts, displayed on dashboards structured to show the rollup of data from lower to higher levels.

For users who need to drill down even deeper into an application portfolio, EV lets you search, filter, and analyze MW repository data. You can:

- Query the repository for information about application objects.
- Search, browse, and edit business rules and triggers.

# Business Rule Manager

Business rule mining encapsulates your application's business logic, making the application easier to understand, document, and test. It lowers the risk and cost of maintenance and enhancement, and ensures that all business logic is implemented in modernization efforts.

A *business rule* is a named container for program code that performs a discrete task in a business process. It identifies and documents the code segment that performs this task. A business rule named Calculate Date Difference, for example, might consist of this segment:

```
COMPUTE WS-DATE-VARIANCE = WS-C-CARD-DATE-CCYYMM - WS-TODAYS-DATE-CCYYMM.
```

Business Rule Manager (BRM) offers a powerful set of tools for autodetecting, and autodocumenting, business rules. You can batch edit rule attributes; create custom attributes suited to your particular needs;

match input/output data elements with the business names you've assigned to them in your project glossary; and much more.

## Application Architect

Application Architect offers a variety of advanced algorithms for *slicing* logic from program source: all the code you need for a computation, for example, or the code you need to "specialize" a program based on the value of a variable. You can create a self-contained program, called a *component*, from the sliced code or simply generate a list of sliced constructs for further analysis.

Both the component generation and list functions are supported in the full version of the Component Maker tool available to users of Application Architect. The list function only is supported in the restricted version of Component Maker, called Logic Analyzer, available to users of Application Analyzer.

## How Modernization Workbench Models Applications

Modernization Workbench is a model-based technology that generates information about legacy applications at two levels:

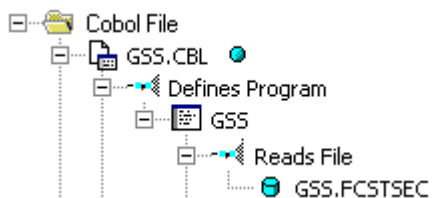
- Application-level information describes the relationships between the *objects* that comprise an application: its programs, copybooks, JCLs, BMS files, and so forth.
- Object-level information describes the relationships between the abstract syntactical *constructs* that comprise an object: its sections, paragraphs, statements, conditions, variables, and so forth.

At both levels, the models are conceived as *Entity Relationship Diagrams (ERDs)*. Each object or construct the parser generates is modeled as an entity in one of the diagrams. The models are represented in tree form to users.

## Understanding Application-Level Information

The *object model* for an application defines the relationships between the objects that comprise the application. These can be physical objects, like program source files or JCLs, or logical objects that identify abstract program elements: entry points, data stores, screens, jobs, and the like.

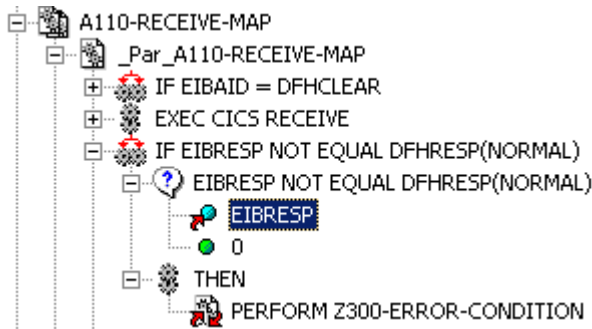
The *relationships* between objects describe the ways in which they interact. In the figure, the source file GSS.CBL *defines* the GSS program. The program, in turn, *reads* the data file GSS.FCSTSEC.



## Understanding Object-Level Information

The *construct model* for an object defines its syntax. It shows in abstract form how the syntactical constructs that comprise the object (its sections, paragraphs, statements, conditions, variables, and so forth) are related. A variable, for example, can be related in the construct model to its declaration, a dataport (if it is used in an I/O statement), or a condition (if the condition uses an expression of which the variable forms a part).

The figure shows a portion of the construct model for the GSS program. The model shows that the program executes a PERFORM statement if the value of the variable EIBRESP satisfies the condition EIBRESP NOT EQUAL DFHRESP(NORMAL).



If you are interested in investigating other uses of EIBRESP in the program, you can navigate to the declaration of the variable in the construct model, and from the declaration to each instance of the variable's use in the program.

## Workspaces and Projects

Modernization Workbench uses the familiar notions of workspace and project to help users organize application source files conveniently. A *workspace* is a named container for one or more applications. Every workspace has a corresponding database *repository* of model objects.

You can divide a workspace up into *projects* that represent different applications or different portions of an application. You might have a project for the batch portion of an application and another project for the online portion, for example. You can also use a project to collect items for discrete tasks: all the source files affected by a change request, for example.

When you set up a workspace in Modernization Workbench, the system creates a default project with the same name as the workspace. You can create new projects and move or copy entities between projects as needed.

A workspace can contain objects coded in different programming languages. You can create multiple workspaces on the same machine.

## Single-User versus Multiuser Environments

Modernization Workbench can be deployed in a single-user or multiuser environment:

- In a single-user environment, the workspace repository resides on the local machine, and can be accessed by the owner of the machine only. Limited facilities exist for sharing work with other users.
- In a multiuser environment, the workspace repository resides on a database server, and can be accessed by any user with appropriate database privileges.

Most installations deploy Modernization Workbench in a multiuser environment. Single-user mode typically is reserved for special needs.

The guidelines that follow for multiuser environments apply equally to single-user environments. For installation instructions, see the installation guide for your product.

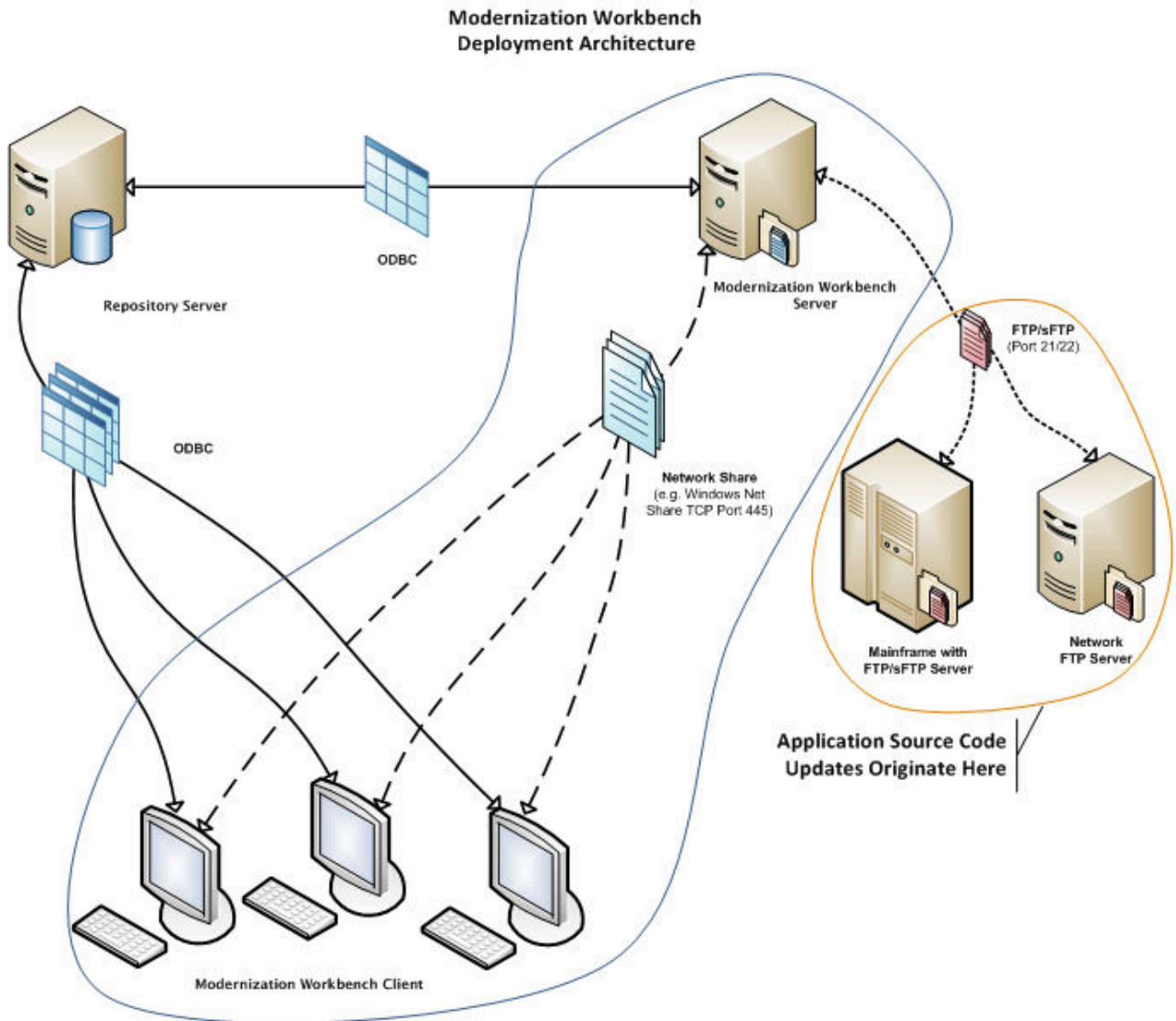


# Multuser Environment Basics

A multuser Modernization Workbench environment gives members of a development team common access to a workspace repository on a database server. Workspace setup is the responsibility of a master user, leaving team members free to focus on their tasks. Common access makes it easy to share insights across the team, and ensures that team members view the same source and work with the same option settings.

## Deployment Scenario

The figure below shows a standard deployment scenario for the Modernization Workbench multuser environment. The role each machine performs and its key relationships are described below. Keep in mind that the view is logical. Machine roles can be combined or separated as required.



## Mainframe and Network Server

The mainframe hosts the application to be modeled in Modernization Workbench. Application source files are downloaded from the mainframe (and, if necessary, a network server) to the Modernization Workbench server via FTP or SFTP.

## Modernization Workbench Server

The Modernization Workbench server hosts workspaces, workspace support files (including the copies of application source files the workbench creates at workspace loading), and workspace output. This server leverages multiple processes to enhance parsing performance in online or batch mode.

Parsed data is sent via ODBC to the database server. Some analysis output is stored on the workbench server as well.

## Database Server

The database server hosts the database for one or more multiuser repositories. This server provides centralized, network-accessible storage for parsed data and analysis output.

The workbench server, Enterprise View Web Server, and workbench clients access the database server via ODBC. For guidance on database setup, see the installation guide for your product.

## Modernization Workbench Client

Workbench clients host the *link files* that let team members connect to workspaces on the workbench server. These clients access repository data stored in the database server via ODBC.

## Enterprise View Web Server

The Enterprise View web server hosts services used by intranet and internet clients to display charts and to access web-based view of repositories.

## Enterprise View Web Client

Enterprise View web clients provide multiuser access to charts and workspace repository data via the Enterprise View web server.

## Workbench Privileges

Privileges in a multiuser environment work on two assumptions:

- Team members typically do not need to modify files until they have completed analysis and are ready to test a proposed change.
- The team lead is best situated to make the change and reverify the modified file.

For these reasons, the workbench multiuser environment has no need for file checkout and locking of the kind seen in conventional multiuser environments.

## Understanding Master Users

The user who creates a workspace on a Modernization Workbench server machine is referred to as its *owner*. Initially, only the owner has *master user* privileges for the workspace.

The master user can delete the workspace, upgrade the workspace configuration, register and verify source files, modify source, autoresolve decisions, perform restricted Clipper searches, create, assign, and delete tags, and so forth. The master user can also designate new master users for the workspace.

Ordinary users *connect* to the workspace from Modernization Workbench client machines. These users can perform any task not restricted to the master user: analyze programs, mine business rules, extract components, and so forth.

If you do not have master user privileges for a workspace, you will not see menu choices for privileged methods. The same team member can be a master user for one workspace and an ordinary user for another.

## Understanding Workspace Security Policies

When you create a workspace, you can choose from two workspace security policies:

- The *Simple Security Policy* recognizes two classes of users, master users and ordinary users.
- The *Three-Group Security Policy* recognizes a third class of users, *subject matter experts (SMEs)*, with special privileges to create, assign, and delete tags.

In each policy, the master user can create new master users.


## Using the Optional File Server

When you create a workspace, you can restrict Windows access to workspace source files to master users, while using the optional File Server to make the source files available *in the workbench only* to ordinary users. As long as you set up workspace folder privileges correctly, ordinary users can view and analyze sources in the workbench, but cannot access them otherwise. For file server installation instructions, see the installation guide for your product.

## Public and Private Visibility

In a multiuser environment, the user who creates a workspace resource (a project or a Clipper list, for example) is referred to as its *owner*. Only the owner can *share* the resource with other users.


A shared, or *public*, resource is visible to other members of your team. A *private* resource is not. If a public resource is *protected*, team members can view but not edit or delete the resource. A Clipper list, for example, is always protected.

You can turn sharing on and off in the tool you use to create the resource. Look for a symbol like this one for a shared project  to indicate that the resource is shared.

## Protecting Projects

By default, projects are *unprotected*: any user to whom the project is visible can delete the project, add source files, or remove source files.

The project owner or master user can designate a project as *protected*, in which case *no* user can delete or modify the project, including the project owner or master user: the project is read-only, until the project owner or master user turns protection off.

Turn on protection by selecting the project in the Repository pane and choosing **Project > Toggle Protection**. Choose **Project > Toggle Protection** again to turn it off. Look for a symbol like this one  to indicate that a project is protected.


## Dropping Indexes

If you are a master user with responsibility for verifying source files in a multiuser environment, you will almost always want to *drop database indexes* to improve verification performance. You will be prompted to drop indexes when you verify the application, or you can drop indexes at a time of your own choosing by selecting **Prepare > Drop Repository Indexes**.

When you drop indexes, you are prompted to restore the indexes when you analyze the files. If you want to restore indexes at a time of your own choosing, choose **Prepare > Restore Repository Indexes**.

## Computing Statistics

You typically need to *gather statistics* for your system before the optimizer for your RDBMS can determine the most efficient way to execute SQL statements. If you are a master user with responsibility for verifying source files in a multiuser environment, you will almost always want to gather system statistics after verification to improve performance of the Modernization Workbench analysis tools.

 **Note:** Check with your DBA before gathering system statistics. In Oracle, you must have GATHER\_SYSTEM\_STATISTICS privileges to execute this method. Make sure to restore indexes before gathering system statistics.


To gather system statistics, choose **Prepare > Compute Database Statistics**. You can view the generated statistics in your RDBMS.

# Modernization Workbench Basics

This section describes elementary workbench tasks: how to create a workspace and project, register and verify source files, use the browser and other workbench windows, set options, and export system diagrams and reports.

## Creating a Workspace in Oracle or DB/2

You create a workspace on the Modernization Workbench server machine. Other users *connect* to the workspace from Modernization Workbench client machines. The workspace repository resides on a database server, and can be accessed by any user with database privileges to the repository.

 **Note:** Do not modify the name of the workspace after you create it. Doing so will cause unpredictable results.

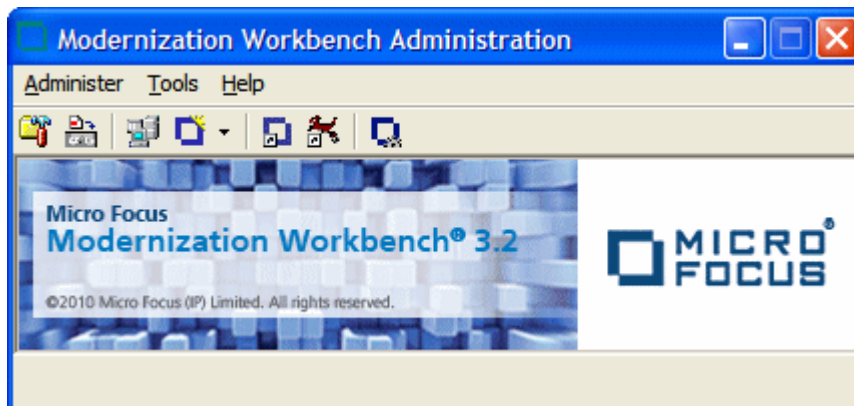
Before creating a workspace, you must configure an ODBC data source name (DSN) for the database that holds the workspace repository, as described in the installation guide for your product. You will need the following DSN configuration information to create the workspace:

- The data source name.
- The database schema name your DBA created for the repository.
- The database user name and password that give access to the schema.
- If required by your DBMS, the name of the tablespace your DBA created for the repository. If the DBA also created a tablespace for database indexes, you will need the name of that tablespace as well.

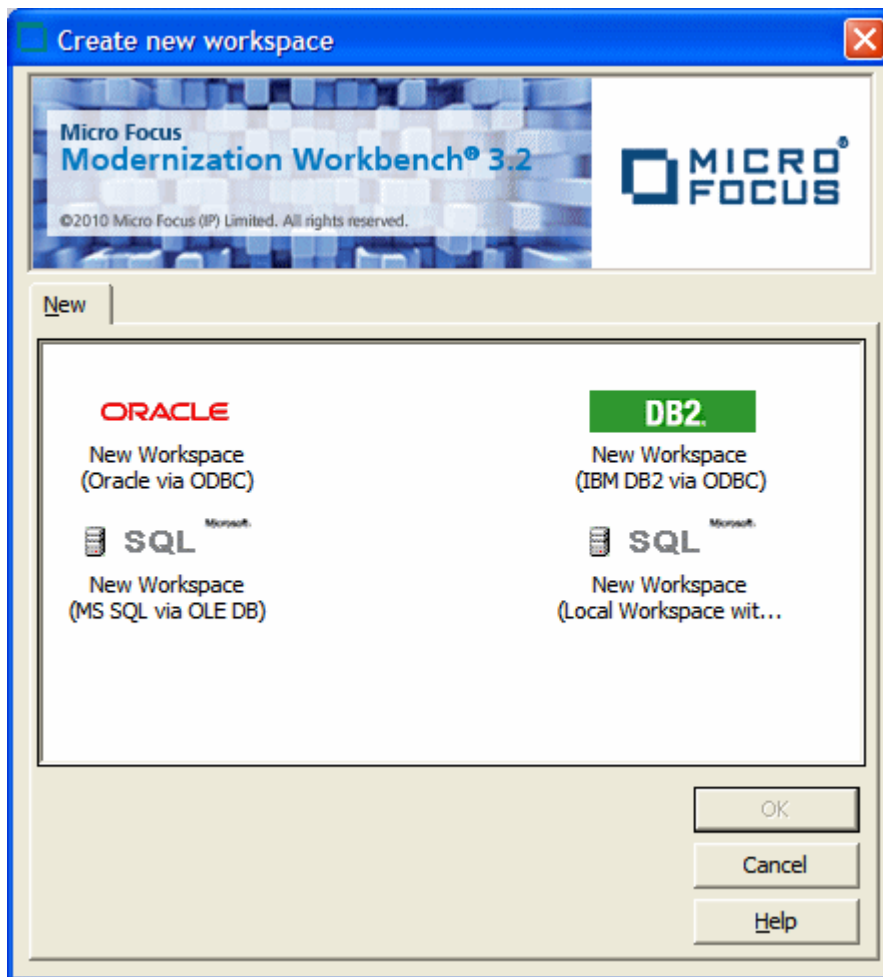
The folder in which you plan to create workspaces must be shared with team members. It's usually more convenient to share the folder before you create workspaces, but you can do it afterward if necessary, then refresh the workspace path.

It is the responsibility of the workspace creator to designate users for security policies. Perform this task as soon as you have finished creating the workspace, then periodically edit the list of users as required.

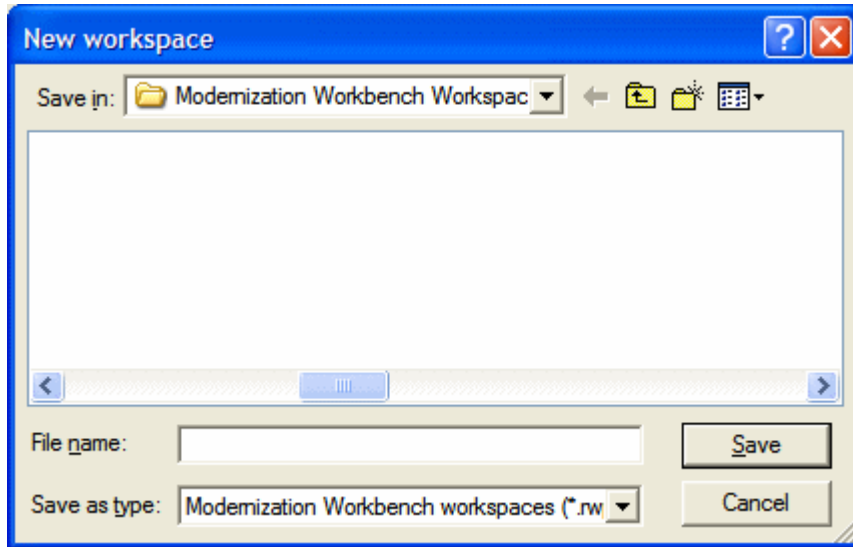
1. Choose **Start > Programs > Micro Focus > Modernization Workbench Administration**. The Administration window opens.



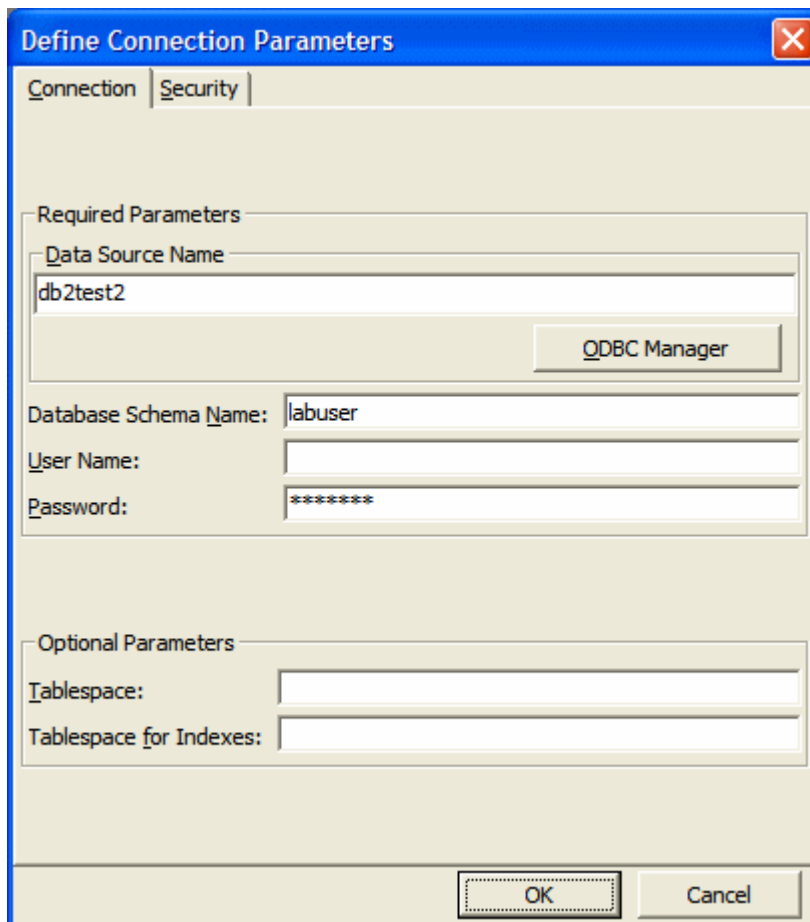
2. Choose **Administer > New Workspace**. The Create new workspace dialog opens.



3. In the Create new workspace dialog, double-click the **New Workspace** icon for the RDBMS in use at your site or select it and click **OK**. The New workspace dialog opens.



4. In the New workspace dialog, choose the location for the workspace in the **Save in** drop-down. In the **File name** field, enter the name of the workspace. Choose a name that describes the legacy application as closely as possible. Click **Save**. The Define Connection Parameters dialog opens.



5. In the Define Connection Parameters dialog, click the Connection tab. On the Connection tab, enter:

- The ODBC data source name you defined at ODBC data source configuration. If you have not defined a data source name, or want to use a different data source name, click **ODBC Manager** to open the data source name configuration dialog, then follow the instructions for ODBC data source configuration in the installation guide for your product.
  - The database schema name your DBA created for the workspace repository.
  - The database user name and password that give access to the schema.
  - If required by your DBMS, the name of the tablespace your DBA created for the repository. If your DBA also created a tablespace for database indexes, enter the name of that tablespace in the **Tablespace for Indexes** field. These fields are displayed only for DBMSs that require a tablespace name to be specified.
6. Click the Security tab. In the Policies list box, select:
- **Simple Security Policy** if you want to enforce a workspace security policy that recognizes two classes of users, master users and ordinary users.
  - **Three-Group Security Policy** if you want to enforce a workspace security policy that recognizes a third class of users, *subject matter experts (SMEs)*, with special privileges to create, assign, and delete tags.
7. In the Files access group box on the Security tab, select:
- **Direct sources access via Windows share** if your site does not restrict Windows access to workspace source files to the master user.
  - **Secure sources access via RMW file server** if your site restricts Windows access to workspace source files to the master user, while using the optional file server to make the source files available in the workbench to ordinary users. Make sure the values for the server name and port number fields are correct.



**Note:** For File Server installation and setup instructions, see the installation guide for your product.

8. Click **OK**.



**Note:** If you created the workspace in a non-shared folder, you are warned to that effect and prompted to share the folder. After you share the folder, make sure to refresh the workspace path.

You are notified that the workspace was created successfully. The workbench creates a workspace file (.rwp) and a folder with the same name in the specified location. The workspace folder contains support files and subfolders for workbench output. A project with the same name as the workspace is displayed in the Repository Browser.

## Creating a Workspace in SQL Server

You create a workspace on the Modernization Workbench server machine. Other users *connect* to the workspace from Modernization Workbench client machines. The workspace repository resides on a database server, and can be accessed by any user with database privileges to the repository.



**Note:** Do not modify the name of the workspace after you create it. Doing so will cause unpredictable results.


The folder in which you plan to create workspaces must be shared with team members. It's usually more convenient to share the folder before you create workspaces, but you can do it afterward if necessary, then refresh the workspace path.

It is the responsibility of the workspace creator to designate users for security policies. Perform this task as soon as you have finished creating the workspace, then periodically edit the list of users as required.

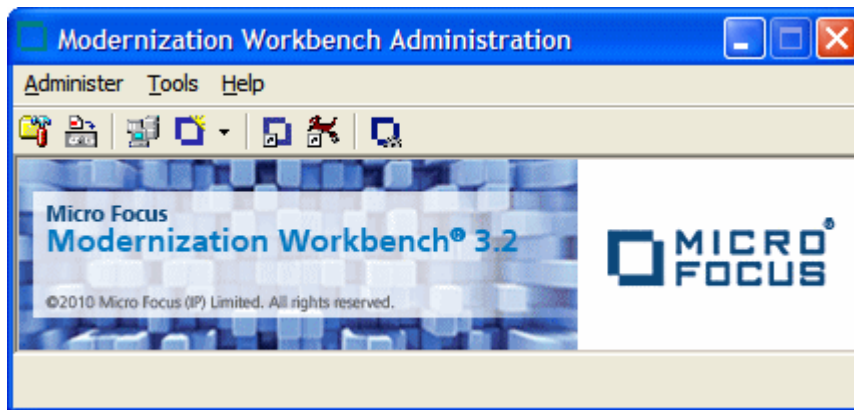
You can use Microsoft SQL Server Express to create a workspace on your local machine. Modernization Workbench creates a database for the workspace "on the fly," with no intervention on your part. If you do



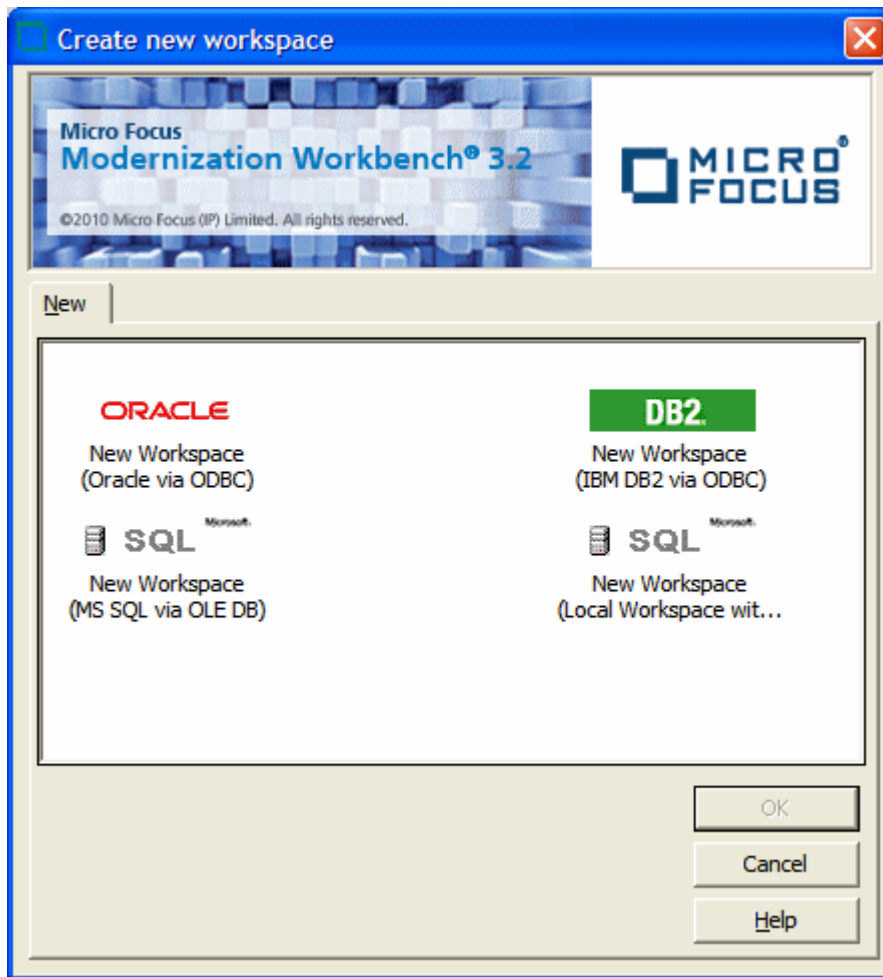
use SQL Server Express, keep in mind that the Windows user who creates the workspace must have been configured with appropriate permissions in SQL Server Express. The user who installed SQL Server Express will always have the appropriate permissions. See the SQL Server Express documentation for configuration instructions.

 **Note:** For Windows XP installations using the Italian locale, you must set the Time format in the Control Panel Regional Language Options to "HH:mm:ss" before attempting to verify an MW workspace with a SQL Server repository. Click **Settings > Control Panel > Regional and Language Options > Customize > Time** and choose "HH:mm:ss" from the **Time format** drop-down.

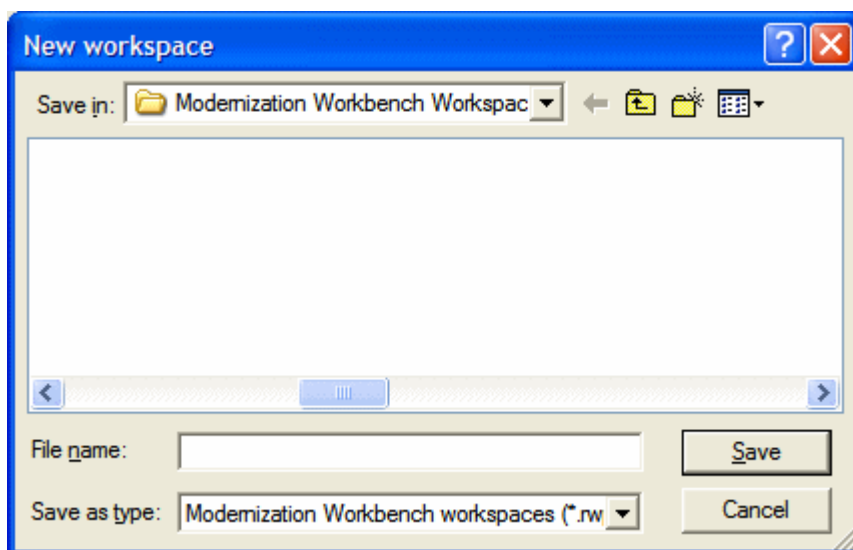
1. Choose **Start > Programs > Micro Focus > Modernization Workbench Administration**. The Administration window opens.




2. Choose **Administer > New Workspace**. The Create new workspace dialog opens.

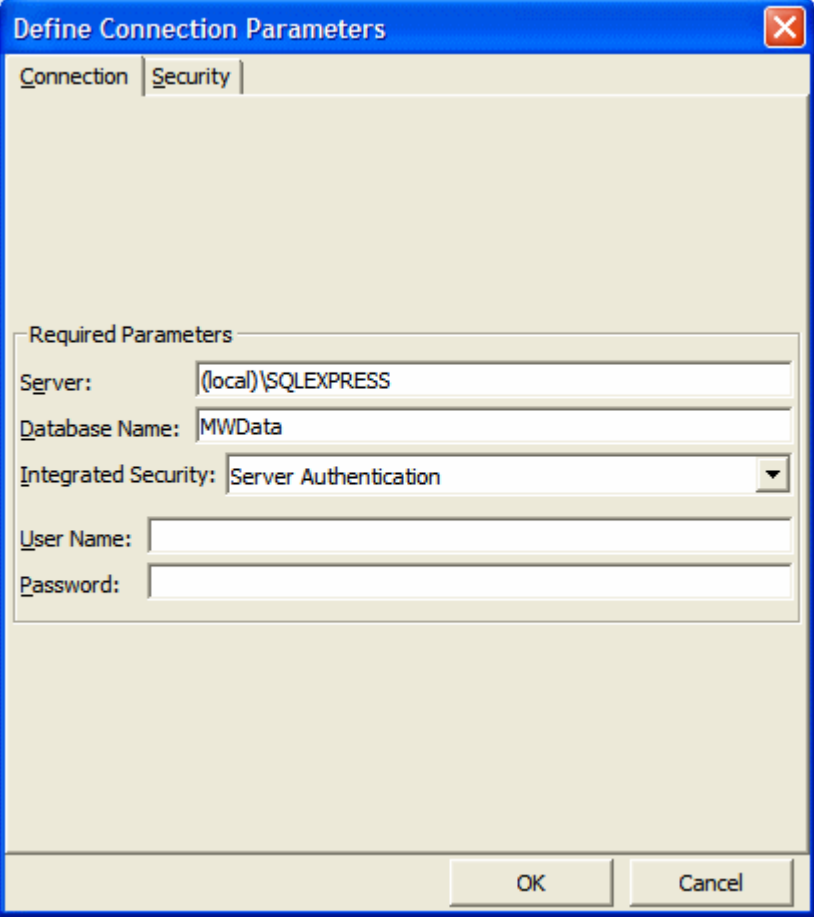


3. In the Create new workspace dialog, double-click the **New Workspace** icon for the RDBMS in use at your site or select it and click **OK**. The New workspace dialog opens.



4. In the New workspace dialog, choose the location for the workspace in the **Save in** drop-down. In the **File name** field, enter the name of the workspace. Choose a name that describes the legacy application as closely as possible. Click **Save**. The Define Connection Parameters dialog opens.

 **Note:** This dialog does not open for Microsoft SQL Server Express. The workbench starts creating the workspace immediately.



The screenshot shows the 'Define Connection Parameters' dialog box with the 'Security' tab active. The 'Required Parameters' section includes the following fields:

- Server:** (local)\SQLEXPRESS
- Database Name:** MWData
- Integrated Security:** Server Authentication
- User Name:** (empty)
- Password:** (empty)

Buttons for 'OK' and 'Cancel' are visible at the bottom of the dialog.

5. In the Define Connection Parameters dialog, click the Connection tab. Define the connection:
  - In the **Server** field, enter the server name. The server name must be of the form *<machine>\<SQL server>*.
  - In the **Database Name** field, enter the database name your DBA created for the workspace repository.
  - In the **Integrated Security** drop-down, select the integrated security provider interface in use at your site. Choose:
    - **Windows Authentication** if users connect to the workspace repository through a Windows user account.
    - **Server Authentication** if users connect to the workspace repository through an SQL Server login account.
  - If you chose **Server Authentication**, enter the database login name in the **User Name** field and the login password in the **Password** field.



**Note:** The database user name and login name are typically, but not always, the same. If you have trouble connecting, it may be because you are specifying the database user name rather than the login name.

6. Click the Security tab. In the Policies list box, select:

- **Simple Security Policy** if you want to enforce a workspace security policy that recognizes two classes of users, master users and ordinary users.
- **Three-Group Security Policy** if you want to enforce a workspace security policy that recognizes a third class of users, *subject matter experts (SMEs)*, with special privileges to create, assign, and delete tags.

7. In the Files access group box on the Security tab, select:

- **Direct sources access via Windows share** if your site does not restrict Windows access to workspace source files to the master user.
- **Secure sources access via RMW file server** if your site restricts Windows access to workspace source files to the master user, while using the optional file server to make the source files available in the workbench to ordinary users. Make sure the values for the server name and port number fields are correct.



**Note:** For File Server installation and setup instructions, see the installation guide for your product.

8. Click **OK**.



**Note:** If you created the workspace in a non-shared folder, you are warned to that effect and prompted to share the folder. After you share the folder, make sure to refresh the workspace path.

You are notified that the workspace was created successfully. The workbench creates a workspace file (.rwp) and a folder with the same name in the specified location. The workspace folder contains support files and subfolders for workbench output. A project with the same name as the workspace is displayed in the Repository Browser.

## Designating Users for Security Policies

When you create a workspace, you choose from two workspace security policies:

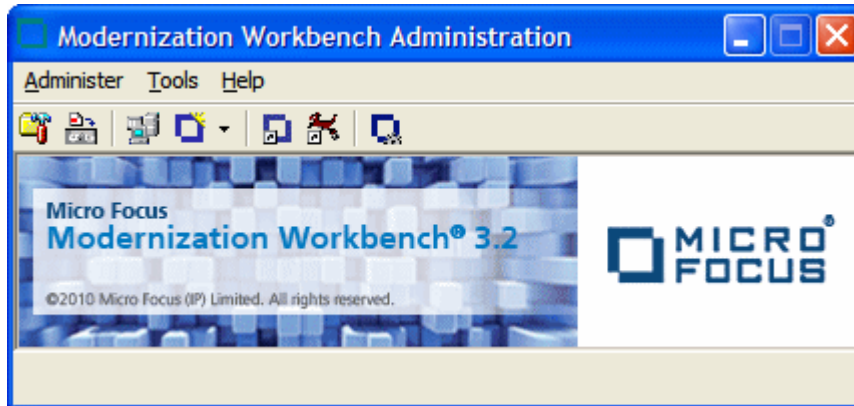
- The *Simple Security Policy* recognizes two classes of users, master users and ordinary users.
- The *Three-Group Security Policy* recognizes a third class of users, *subject matter experts (SMEs)*, with special privileges to create, assign, and delete tags.

In each policy, the master user can create new master users.

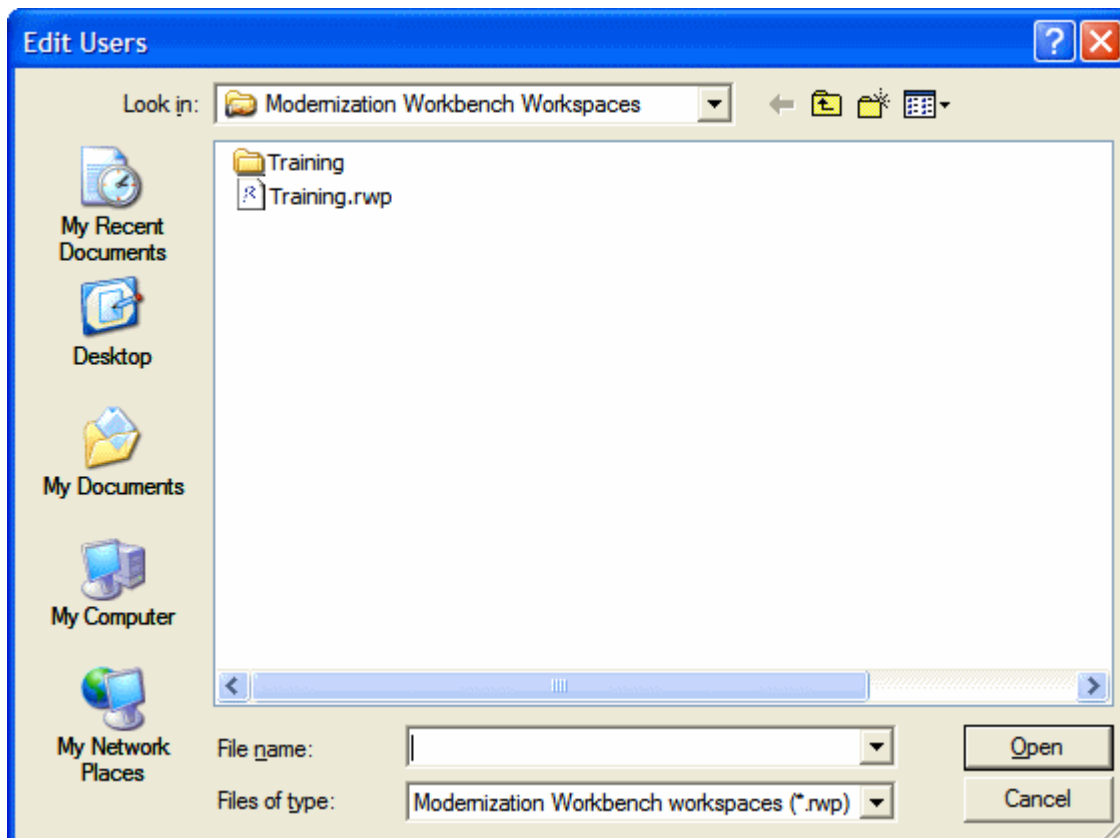
## Designating Users in a Simple Security Policy

A Simple Security Policy recognizes two classes of users, master users and ordinary users. Initially, only the workspace creator has master user privileges. The master user can designate new master users as described in this section.

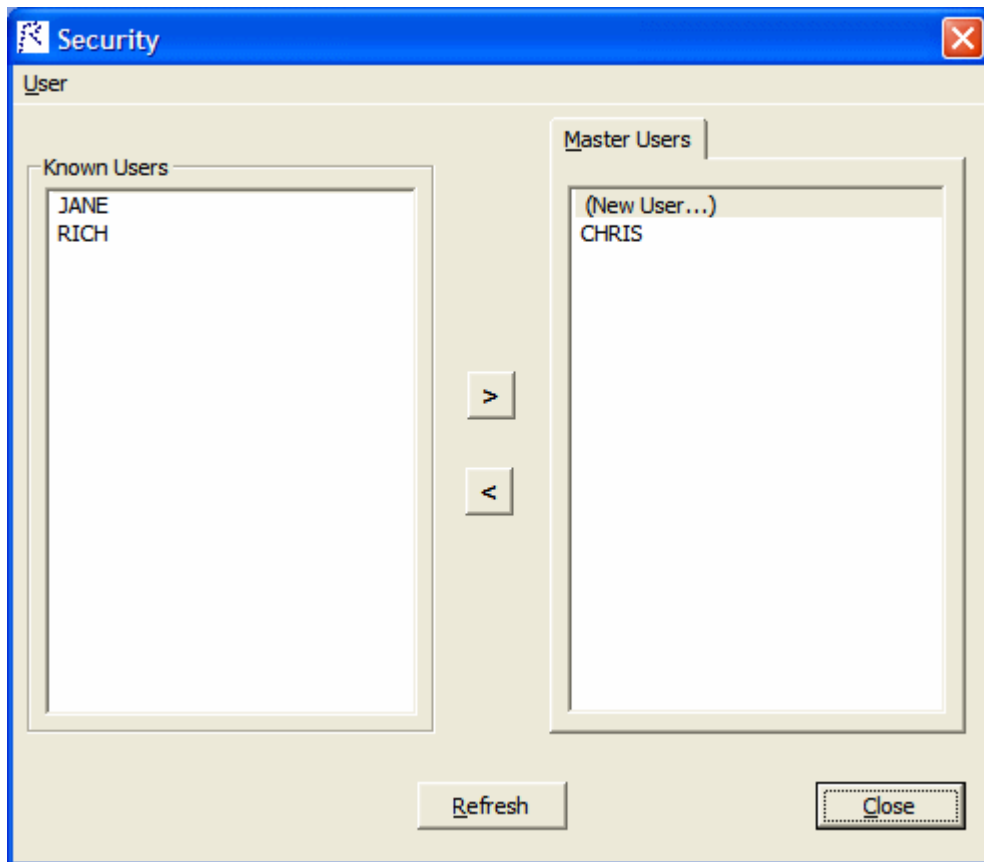
1. Choose **Start > Programs > Micro Focus > Modernization Workbench Administration**. The Administration window opens.




2. Choose **Administer > Edit Users**. The Edit Users dialog opens.



3. In the Edit Users dialog, select the workspace (.rwp file) for which you want to edit users and click **Open**. The Security dialog opens.



4. The Security dialog displays a list of users who have connected to the workspace in the Known Users list box and a list of master users in the Master Users list box. Select a known user and click the > button to move the known user into the list of master users. Select a master user and click the < button to move the master user into the list of known users.

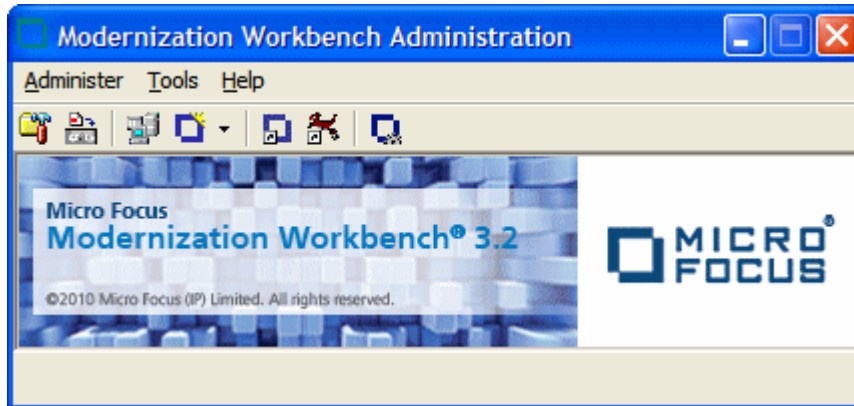
 **Note:** Click **Refresh** at any time to update the lists.

5. To create a new master user, click **(New User...)** in the Master User list box. A dialog opens prompting you to enter the name of the new master user. Enter the name and click **OK**.
6. When you are satisfied with your entries, click **Close**.

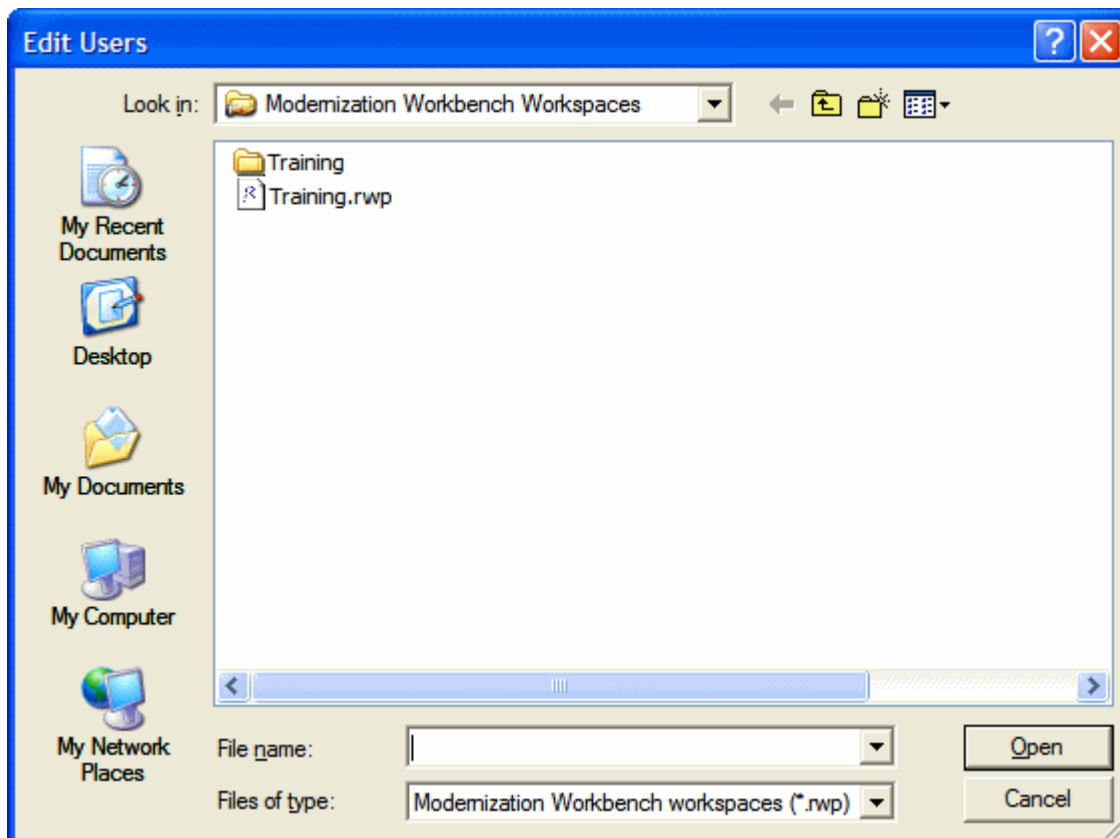
## Designating Users in a Three-Group Security Policy

A Three-Group Security Policy recognizes a third class of workspace users in addition to master users and ordinary users: *subject matter experts (SMEs)*, with special privileges to create, assign, and delete tags. Initially, only the workspace creator has master user privileges. The master user can designate SMEs and new master users as described in this section.

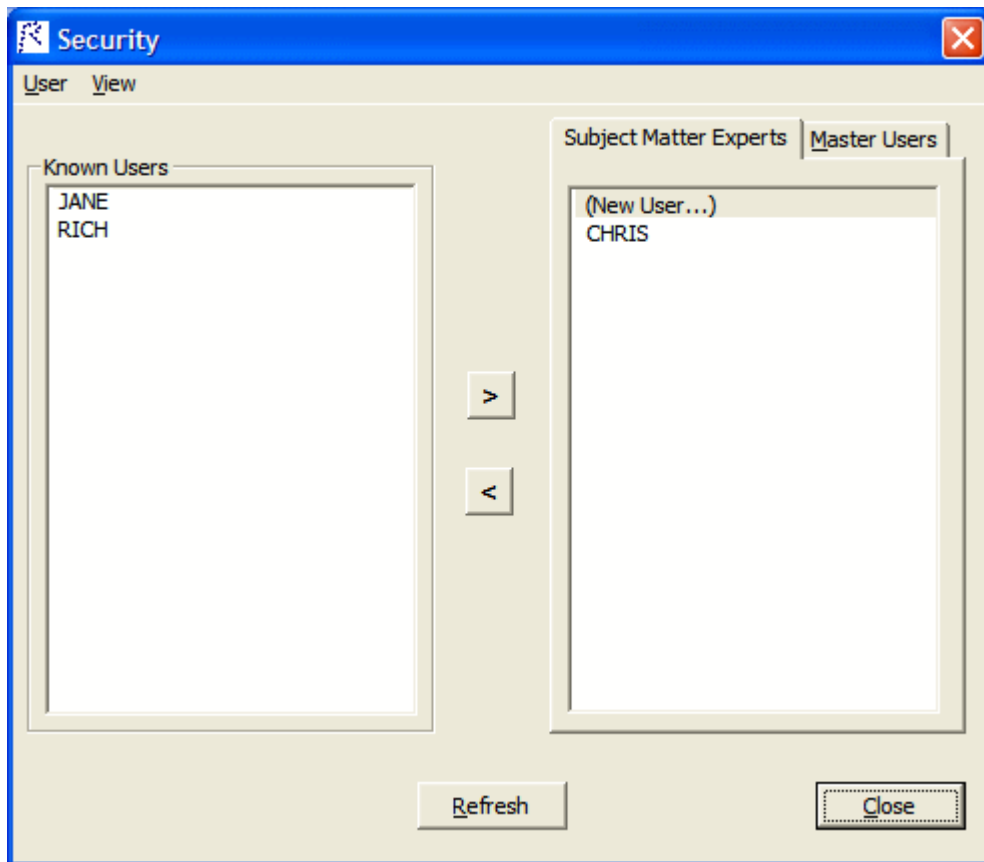
1. Choose **Start > Programs > Micro Focus > Modernization Workbench Administration**. The Administration window opens.




2. Choose **Administer > Edit Users**. The Edit Users dialog opens.



3. In the Edit Users dialog, select the workspace (.rwp file) for which you want to edit users and click **Open**. The Security dialog opens.



4. The Subject Matter Experts and Master Users tabs of the Security dialog display a list of users who have connected to the workspace in the Known Users list box and a list of subject matter experts and master users, respectively, in the opposite list box. Select a known user and click the > button to move the known user into the list of subject matter experts or master users. Select a master user and click the < button to move the subject matter expert or master user into the list of known users.

 **Note:** Click **Refresh** at any time to update the lists.

5. To create a new subject matter expert or master user, click **(New User...)** in the Subject Matter Experts or Master Users list box. A dialog opens prompting you to enter the name of the new subject matter expert or master user. Enter the name and click **OK**.
6. When you are satisfied with your entries, click **Close**.

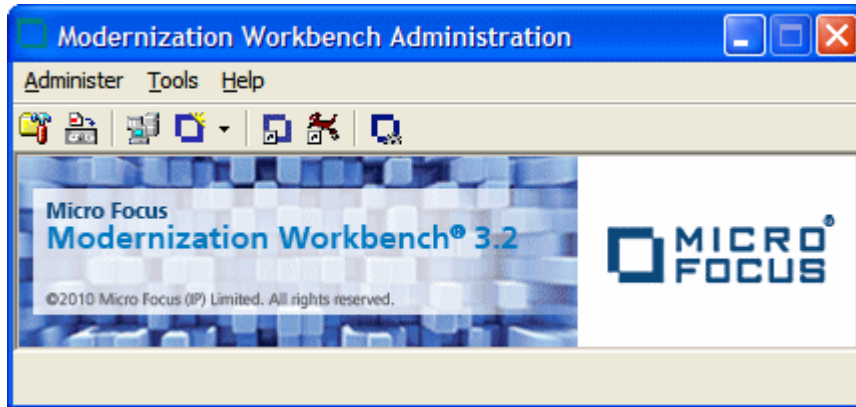
## Refreshing the Workspace Path

The folder in which you plan to create workspaces must be shared with team members. It's usually more convenient to share the folder before you create workspaces, but you can do it afterward if necessary, then refresh the workspace path as described below. You can also use the refresh path feature when you move a workspace.

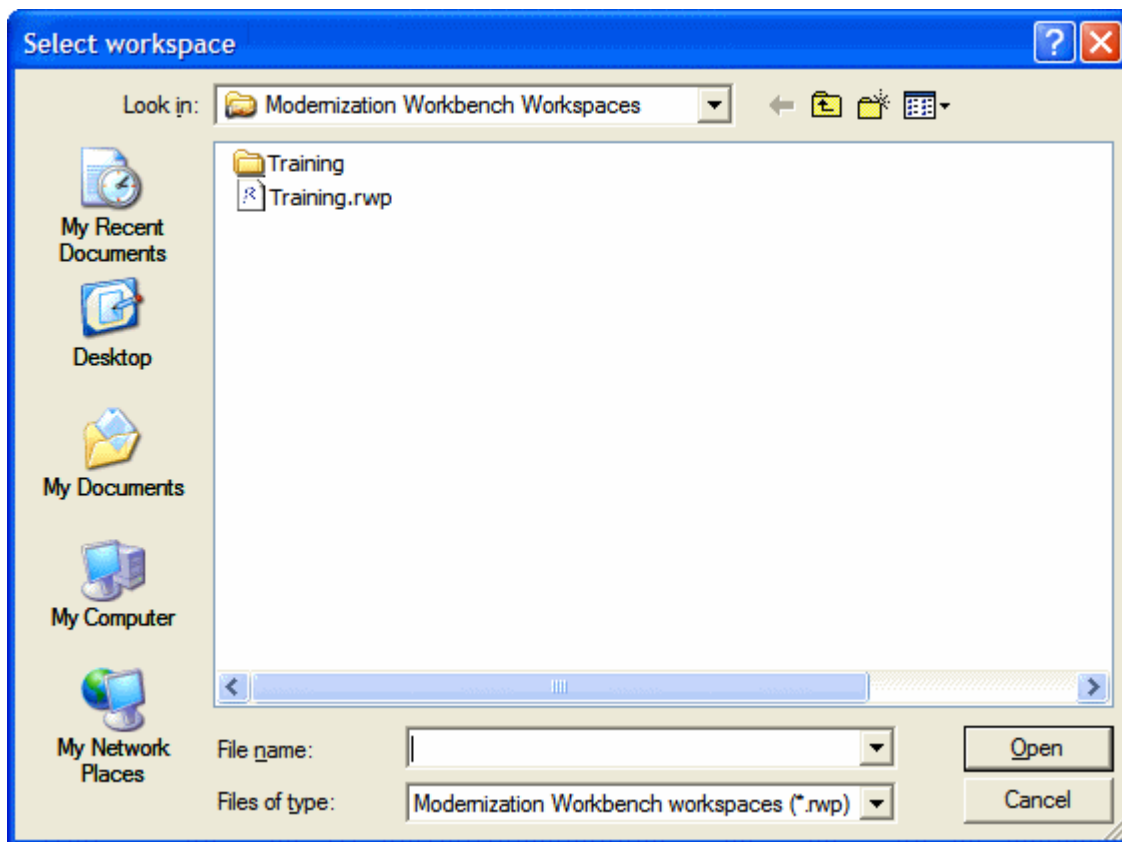
 **Note:** For instructions on how to share a workspace folder, see the installation guide for your product.



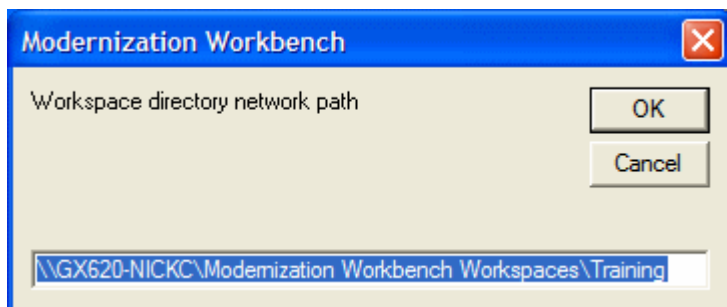
1. Choose **Start > Programs > Micro Focus> Modernization Workbench Administration**. The Administration window opens.




2. Choose **Administer > Refresh Workspace Path**. The Select workspace dialog opens.



3. In the Select workspace dialog, select the workspace (.rwp file) whose path you want to refresh and click **Open**. The Workspace directory network path dialog opens.



4. In the Workspace directory network path dialog, enter the path of the workspace in the text field. The path must be of the form `\machine_name\share_name\workspace_folder_name`, where *machine\_name* is the name of the machine where the shared folder resides, *share\_name* is the value of the Share name field on the Sharing tab of the Properties dialog for the shared folder, and *workspace\_folder\_name* is the name of the folder for the workspace.

 **Note:** The shared folder is the folder that contains the .rwp file for the workspace, *not* the workspace folder. The workspace folder (containing support files and subfolders for workbench output) resides on the same level as the .rwp file.

5. When you are satisfied with your entry, click **OK**.

## Connecting to a Workspace in Oracle or DB/2

Once a workspace has been created on the Modernization Workbench server machine, other users can *connect* to the workspace from workbench clients. When you connect to a workspace, you create a *link file* with connection information that points to the workspace. Because the connection information is already stored in the file, you don't have to enter it again when you reopen the workspace connection. Like a workspace file, a link file has a .rwp extension.

Before connecting to a workspace, you must configure an ODBC data source name (DSN) for the database that holds the workspace repository you want to link to, as described in the installation guide for your product. You will need the following DSN configuration information to connect to the workspace:

- The data source name.
  - The database schema name your DBA created for the repository you want to link to.
  - The database user name and password that give access to the schema.
1. Choose **Start > Programs > Micro Focus > Modernization Workbench**. The Open Existing workspace dialog opens above the Modernization Workbench main window. Click **Cancel** to dismiss the dialog.
  2. Choose **File > Build New Connection**. The Define Server Workspace Connection dialog opens.

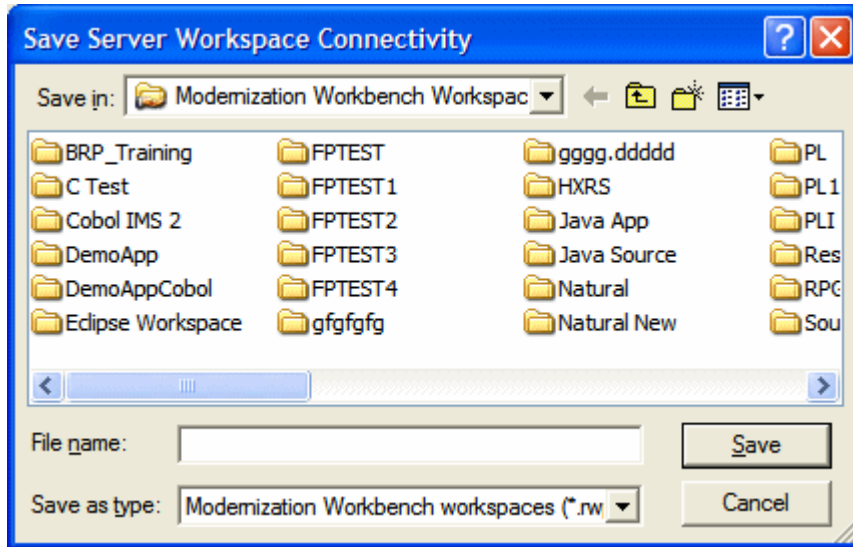
The screenshot shows the 'Define Server Workspace Connection' dialog box. The 'Database Provider' is set to 'IBM DB2 via ODBC'. In the 'Required Parameters' section, the 'Data Source Name' is 'db2test2', the 'Database Schema Name' is 'labuser', the 'User Name' is empty, and the 'Password' is masked with asterisks. An 'ODBC Manager' button is located below the 'Data Source Name' field. In the 'Optional Parameters' section, both 'Tablespace' and 'Tablespace for Indexes' are empty. The 'Save Link As (\*.rwp)' field is empty, with a 'Browse' button to its right. At the bottom, there are 'OK' and 'Cancel' buttons.

3. In the Define Server Workspace Connection dialog, select the ODBC driver for the RDBMS in use at your site in the **Database Provider** drop-down. In the Required Parameters group box, enter:
  - The ODBC data source name you defined at ODBC data source configuration. If you have not defined a data source name, or want to use a different data source name, click **ODBC Manager** to open the data source name configuration dialog, then follow the instructions for ODBC data source configuration in the installation guide for your product.
  - The database schema name your DBA created for the workspace repository.
  - The database user name and password that give access to the schema.



**Note:** The **Tablespace** and **Tablespace for Indexes** fields are for future use.

4. When you are satisfied with your entries in the Define Server Workspace Connection dialog, click the **Browse** button for the **Save Link As (.rwp)** field. The Save Server Workspace Connectivity dialog opens.




5. In the Save Server Workspace Connectivity dialog, choose the location for the workspace link in the **Save in** drop-down. In the **File name** field, enter the name of the link. Click **Save**.  
The linked workspace opens in the Modernization Workbench main window. The workbench creates a link file (.rwp) in the specified location.

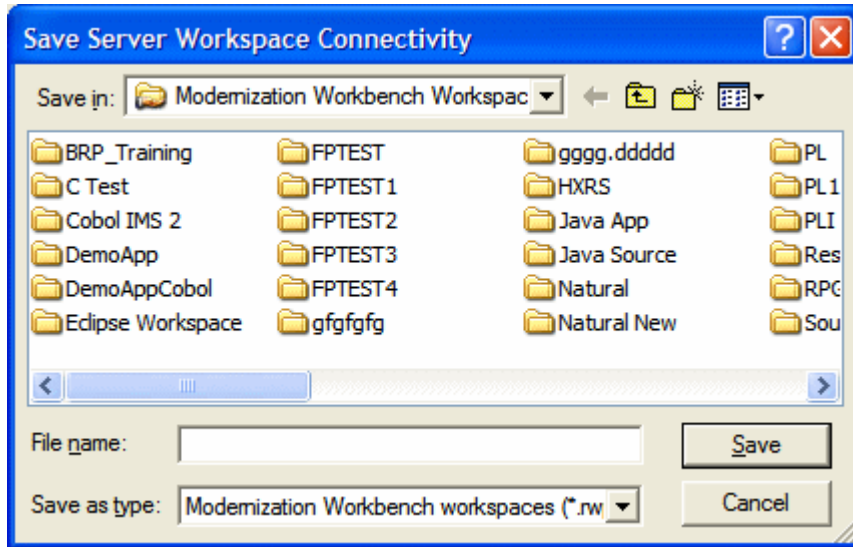
## Connecting to a Workspace in SQL Server

Once a workspace has been created on the Modernization Workbench server machine, other users can *connect* to the workspace from workbench clients. When you connect to a workspace, you create a *link file* with connection information that points to the workspace. Because the connection information is already stored in the file, you don't have to enter it again when you reopen the workspace connection. Like a workspace file, a link file has a .rwp extension.

1. Choose **Start > Programs > Micro Focus > Modernization Workbench**. The Open Existing workspace dialog opens above the Modernization Workbench main window. Click **Cancel** to dismiss the dialog.
2. Choose **File > Build New Connection**. The Define Server Workspace Connection dialog opens.

3. In the Define Server Workspace Connection dialog, click the Connection tab. Define the connection:
  - In the **Server** field, enter the server name. The server name must be of the form *<machine><SQL server>*.
  - In the **Database Name** field, enter the database name your DBA created for the workspace repository.
  - In the **Integrated Security** drop-down, select the integrated security provider interface in use at your site. Choose:
    - **Windows Authentication** if you connect to the workspace repository through a Windows user account.
    - **Server Authentication** if you connect to the workspace repository through an SQL Server login account.
  - If you chose **Server Authentication**, enter the database login name in the **User Name** field and the login password in the **Password** field.

 **Note:** The database user name and login name are typically, but not always, the same. If you have trouble connecting, it may be because you are specifying the database user name rather than the login name.
4. When you are satisfied with your entries in the Define Server Workspace Connection dialog, click the **Browse** button for the **Save Link As (.rwp)** field. The Save Server Workspace Connectivity dialog opens.




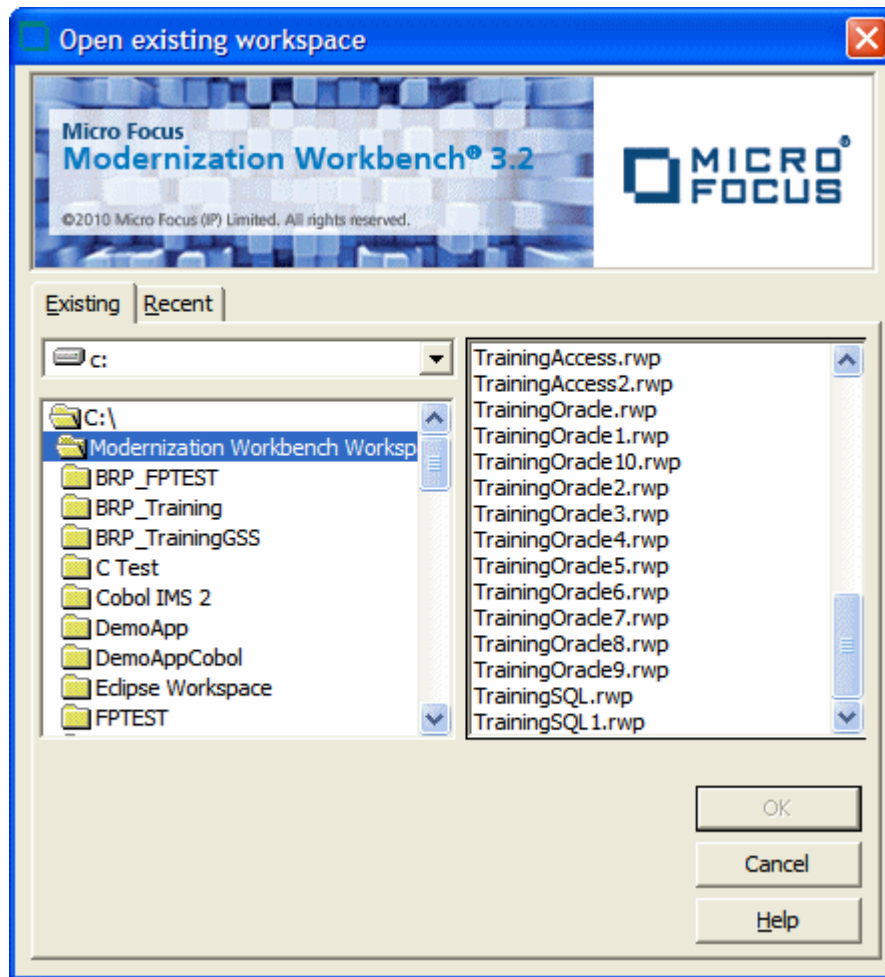
5. In the Save Server Workspace Connectivity dialog, choose the location for the workspace link in the **Save in** drop-down. In the **File name** field, enter the name of the link. Click **Save**.  
The linked workspace opens in the Modernization Workbench main window. The workbench creates a link file (.rwp) in the specified location.

## Opening a Workspace

The procedure for opening a workspace is the same whether you created the workspace or simply connected to it. You can also open a workspace by double-clicking it in the file system. You don't have to close a workspace before opening another workspace.


1. Choose **Start > Programs > Micro Focus > Modernization Workbench**. The Open Existing workspace dialog opens above the Modernization Workbench main window.

 **Note:** If Modernization Workbench is already open, choose **File > Open Workspace**.



2. Click the tab you want to work in:


- In the Existing tab, choose the drive and folder for the workspace you want to open. A list of workspaces in the selected folder is displayed in the righthand pane. Double-click the workspace you want to open, or select it and click **OK**.
- In the Recent tab, double-click the recently opened workspace you want to open, or select it and click **OK**.

 **Note:** If you created the workspace in a previous release of Modernization Workbench, the system prompts you to upgrade the workspace to the new release. Click **Yes**.

The workspace is displayed in the Modernization Workbench window. If a workspace was already open in the window, the selected workspace replaces it.

## Registering Source Files

Before you can analyze application source files in Modernization Workbench, you need to load, or *register*, the source files in a workspace.


 **Note:** In a multiuser environment, only a master user can register source files.

The workbench creates copies of the registered files on the server machine (or locally in a single-user environment) in the Sources folder for the workspace. These are the files you view and edit in the workbench tools. You can restore a file to its original state, update it to its current state, or export it as necessary.

Source files must have recognized DOS file extensions before they can be registered. You can view and add to the recognized extensions in the Workspace Registration options window. Files without extensions are checked for content, and if the content is recognized, the files are registered with appropriate extensions appended.


The workbench assumes that input source files are ASCII files in DOS format. Occasionally, files may be converted incorrectly from other formats to DOS-based ASCII with an extra special character (like “M”) at the end of each line. While Modernization Workbench accepts these files as input, some workbench tools may not work correctly with them. Make sure all source files are in valid ASCII format.

You can register source files in compressed formats (ZIP or RAR), as well as uncompressed formats. Modernization Workbench automatically unpacks the compressed file and registers its contents.

 **Note:** The workbench extracts compressed source files using the command line syntax for archiver versions most widely in use. If you use newer archiver versions, specify the command line syntax in the Archivers tab of the User Preferences window.

Workspace Registration options determine registration behavior. The default values for these options are preset based on your configuration and should be appropriate for most installations.


1. In the Repository Browser, create a project for the source files you want to register, or use the default project. To create a project, choose **Project > New Project**. The Create Project dialog opens. Enter the name of the new project and click **OK**. The new project is displayed in the Repository Browser.
2. Select the project in the Repository Browser, then drag-and-drop the file or folder for the source files you want to register onto the Repository Browser. You are notified that you have registered the files successfully and are prompted to verify the files. Click **Close**. The Repository Browser displays the contents of the new workspace, organized by file type.

 **Note:** In the notification dialog, select **Never ask again** if you do not want to be prompted to verify files. On the Environment tab of the User Preferences window, select **Ask user about verification** if you want to be prompted again.

## Verifying Source Files

Parsing, or *verifying*, an application source file generates the object model for the file. Only a master user can verify source files.

You can verify a single file, a group of files, all the files in a folder, or all the files in a project. It's usually best to verify an entire project. Modernization Workbench parses the files in appropriate order, taking account of likely dependencies between file types.

 **Note:** You need not verify copybooks. Copybooks are parsed when the including source file is verified. If your RPG or AS/400 Cobol application uses copy statements that reference Database Description or Device Description files, or if your MCP Cobol application uses copy statements that reference DMSII DASDL files, you need to generate copybooks for the application before you verify program files.

Workspace and Project Verification options determine verification behavior. The default values for these options are preset based on your configuration and should be appropriate for most installations.






1. In the Repository Browser, select the project, folder, or files you want to verify and choose **Prepare > Verify**.
2. You are prompted to drop repository indexes to improve verification performance. Click **Yes**. You will be prompted to restore the indexes when you analyze the files.

The parser builds an object model for each successfully verified file. For an unsuccessfully verified file, the parser builds an object model for as much of the file as it understands.

## How Verification Results Are Indicated

If you have not verified a workspace file, the file is displayed in the Repository pane in **bold** type. Since the system has not generated an object model of the file's contents, only the file itself is displayed.

A verified file shows all the objects in the model generated for the file. Verification results are denoted as follows:


- A blue dot  means that the parser has verified the file successfully.
- A red dot  means that the parser has encountered an error in the file.
- A yellow dot  means that the parser has encountered an error in the file, but that the file has been successfully verified under the relaxed parsing option.



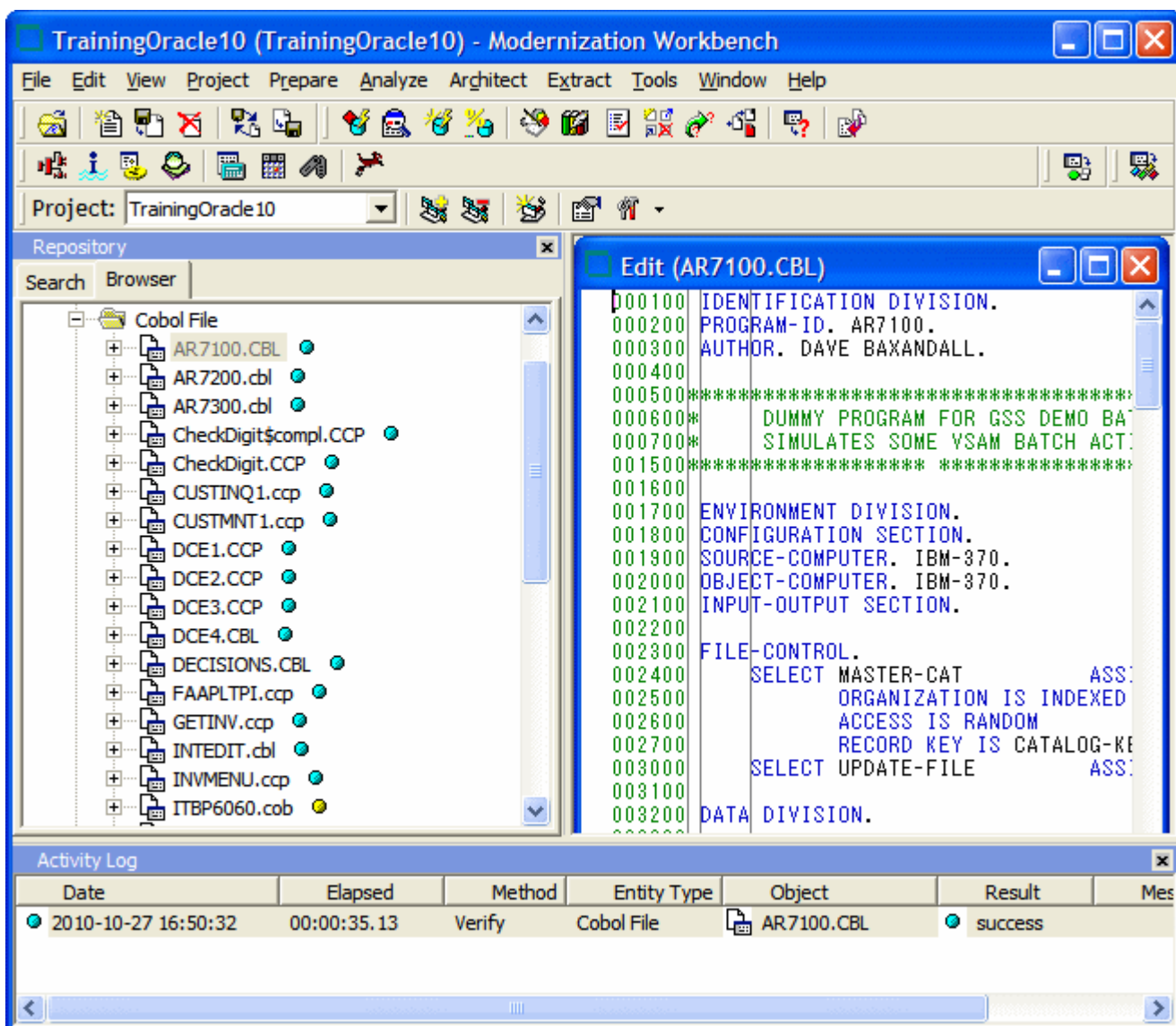
**Note:** When you edit a file, the modified file and any dependent files are *invalidated*, and need to be verified again. You can learn more about how objects are invalidated and how the system refreshes the repository in *Preparing Projects* in the workbench documentation set.

## Using the Modernization Workbench Main Window

The Modernization Workbench main window lets you view and edit projects, set workbench options, and open workbench tools. The window's state is saved across sessions.


Open a pane in the main window by selecting the appropriate choice in the **View** menu. Resize a pane by using the mouse to grab its border with another pane, called a *splitter*, and dragging it to a new location. Close a pane by clicking the  button in the upper righthand corner.

The figure shows the Modernization Workbench main window in a typical configuration.



## Menus

Modernization Workbench menus let you access workbench tools and other workbench functionality. Menus are displayed only for the products you have enabled in the Configuration Manager. The table below shows the relationship between products and menus.

 **Note:** The screens shown in the workbench documentation set display the menu bar with all products installed.


Most workbench menu choices have equivalent choices in the right-click menu. Menu selections for panes in the main window are available only if the pane has the focus.

| Product              | Menu    |
|----------------------|---------|
| Application Analyzer | Analyze |
|                      |         |

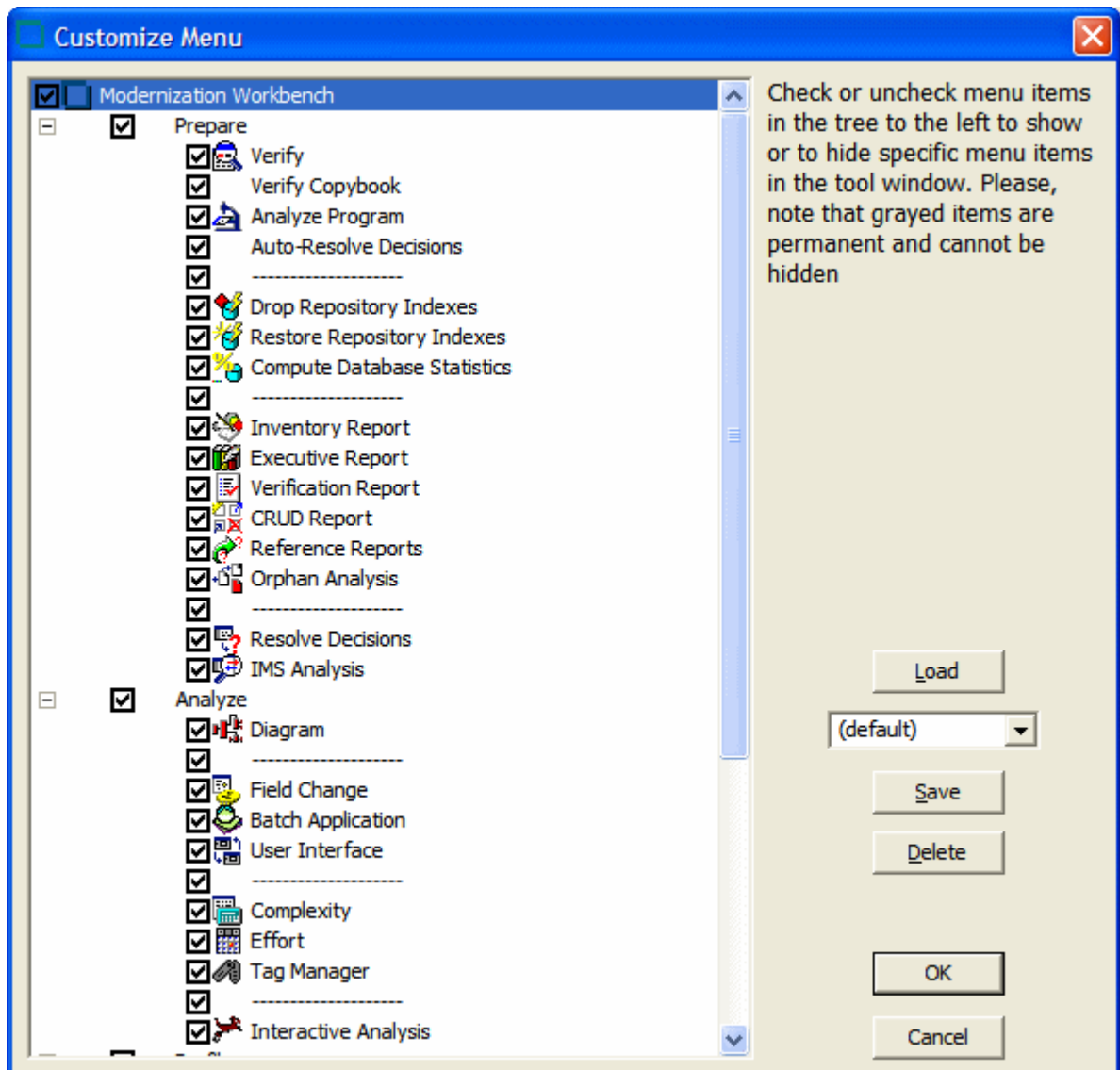
| Product               | Menu      |
|-----------------------|-----------|
| Enterprise View       | Profile   |
| Application Architect | Architect |
| Business Rule Manager | Extract   |

## Customizing Menus

Modernization Workbench-specific menus are fully customizable. You control which menus, choices, and tool bars the system displays. You can save a menu bar configuration and restore it with a single mouse click.

 **Note:** You cannot customize the Windows standard menus (**File**, **Edit**, **View**, and so forth).

1. Choose **Tools > Customize Menu**. If the Editor pane is open, you are prompted to close it. Click **OK**. The Customize Menu window opens.



2. In the Customize Menu window, deselect the menus and/or menu choices you want to hide. Select the menus and/or choices you want to show.
3. Enter a name for the specified menu configuration in the drop-down list below the **Load** button.
4. Click **Save** to save the configuration without dismissing the window. Click **OK** to save the configuration and dismiss the window.

The new configuration is applied in the Modernization Workbench main window.

To restore a menu configuration, select its name in the drop-down list and click **Load**. To restore the default configuration, select (default) in the drop-down list and click **Load**.

## Toolbars

You can access a Modernization Workbench menu function by clicking its tool bar icon. The tool tip for an icon tells you what it does. Place your cursor over the icon for a moment. The tool tip will display.

A tool bar is displayed only if its corresponding menu is displayed. You can change the position of a tool bar by grabbing the delimiter at the left of the tool bar and dragging it to a new location.

## Using the Repository Pane

The Repository pane displays the contents of the repository for the current workspace in three tabs. Use:

- The Search tab to find key relationships and available methods for an object.
- The Browser tab to view the object model for the workspace.
- The Legacy Search tab to narrow search results using a search filter.



**Note:** Choose **View > Search** to show the Search tab.

If more than one tab is open, click the tabs to switch between them. In the Browser and Legacy Search tabs, place your cursor over an object for a moment to display a tool tip that describes the object in more detail.

Hide a tab by selecting it and choosing **Hide** in the right-click menu. To restore the tab, select the appropriate choice in the **View** menu.

## Using the Search Tab

The Search pane displays a sorted list of workspace objects returned by a search of the repository. Use the list to find key relationships and available methods for an object.

1. Enter the text for the search in the **Item to search for** field. Modernization Workbench locates text matches as you type.
2. Select an object in the results list to see the relationship types and methods available for it in the Available functions pane.
3. In the Available functions pane, double-click:
  - A method to launch the relevant process.
  - A relationship type to view the relationships of that type for the object. A results pane opens over the Editor/Viewer. From the results pane, you can launch further queries by selecting objects in the right-hand column and choosing **Query Repository > <Relationship>** in the right-click menu.

## Using the Browser Tab

The Browser tab displays the object model for the workspace, organized in tree form by project, object type, and object relationship. The Browser tab is commonly called the Repository Browser.

### Selecting Objects

Select an object in the Browser tab by clicking it with the left mouse button. You can select all, select multiple, or type-ahead select.

Use the **Select** choices in the **Edit** menu to select objects based on their verification status. The choices operate on the entire list in the Search tab and on the objects under the selected workspace, project, or folder in the Browser tab.



**Note:** If you use the **Select** choices in the **Edit** menu to select objects in the Browser tab based on their verification status, and all the objects have not been fetched, the results are returned in the Search tab.

The **Project** drop-down displays the current project. You can navigate quickly to another project in the Browser tab by clicking the project name in the drop-down.

### Selecting All


To select all the objects in the tree or all the objects in the selected node, choose **Edit > Select All**. To deselect the objects, choose **Edit > Unselect All**.




### Selecting Multiple

To select a range of objects, hold down the Shift key, click the first object in the range, then click the last object in the range. To select objects that are not in a range, hold down the Control key, then click each object you want to select.



### Using the Type-Ahead Select Functions



Use the *simple type-ahead select function* to select displayed objects as you type. To use the simple function, make sure the Browser tab is current, then type the characters you want to match.

 **Note:** You cannot use the simple type-ahead select function in the Search tab.


Use the *advanced type ahead select function* to select objects in the Browser or Search tab whether or not they are currently displayed. To use the advanced function, click an object that has the same type as the object you want to select, then click the  button next to the  button at the bottom of the Repository pane (or if the filter subtree function is enabled, next to the  button). From the drop-down menu, choose:

- **Select** to match text explicitly.
- **Wildcard Select** to match text using wildcard patterns.



Enter the text you want to match in the field next to the  button. The tool selects matched objects as you type, as long as they are in the same subtree. Click the  button to repeat the select with the same criterion.

To select multiple objects, enter the text you want to match in the field next to the  button, then click the adjacent  button. From the drop-down menu, choose:

- **Select All** to select multiple objects that match text explicitly.
- **Wildcard Select All** to select multiple objects that match text using wildcard patterns.

The tool selects matched objects as long as they are in the same subtree. Click the  button to repeat the select with the same criterion.

### Expanding Subtrees




Click the  symbol next to an item to expand its subtree one level. Click the  symbol to collapse the subtree one level.


In the Repository Browser, select an item and choose **Expand Subtree** in the right-click menu to expand all its subtree levels in a single step. Select an item and choose **Save Subtree** in the right-click menu to export the label text for expanded subtree levels to a text file.



**Note:** For subtrees with a great many objects, you can improve browser display performance by filtering the subtree and/or by lowering the fetch buffer size in the General tab of the Workspace Options window.

## Filtering Subtrees

For a subtree with a great many objects, you can improve browser display performance by showing only objects of interest in the subtree. To filter out objects from a subtree, select the subtree, then enter the text you want to match in the field next to the  button at the bottom of the Repository pane (or if the type-ahead select function is enabled, next to the  button). Click the adjacent  button and choose **Filter** from the drop-down menu.

The tool filters out unmatched objects from the subtree, and places a  symbol next to the subtree in the browser display. The filter and filter text are persistent for the subtree across sessions. To remove the filter and its text, enter an empty string in the text field and choose **Filter** again.

## Refreshing the Browser

In a multiuser environment, you need to *refresh the browser* after another user adds, deletes, or modifies a workspace file. Choose **View > Refresh Browser** to refresh the browser.

## Viewing the Entire Workspace

By default, the Browser tab displays repository trees for projects only. These trees show only objects you can act on in the browser. To view all the objects in the workspace, choose **View > Entire Workspace**, or select (**none**) in the **Project** drop-down. Choose **View > Entire Workspace** again, or select a project in the **Project** drop-down, to display the project only.

## Using the Legacy Search Tab

The Legacy Search tab displays a sorted list of workspace objects returned by a search filter. Select objects in the Legacy Search tab the same way you do in the Browser tab.

To execute an existing search filter, choose **Edit > Search Criteria**. In the **Filter Name** drop-down, choose the filter for the search, then click **Find**. The results are returned in the Search tab.

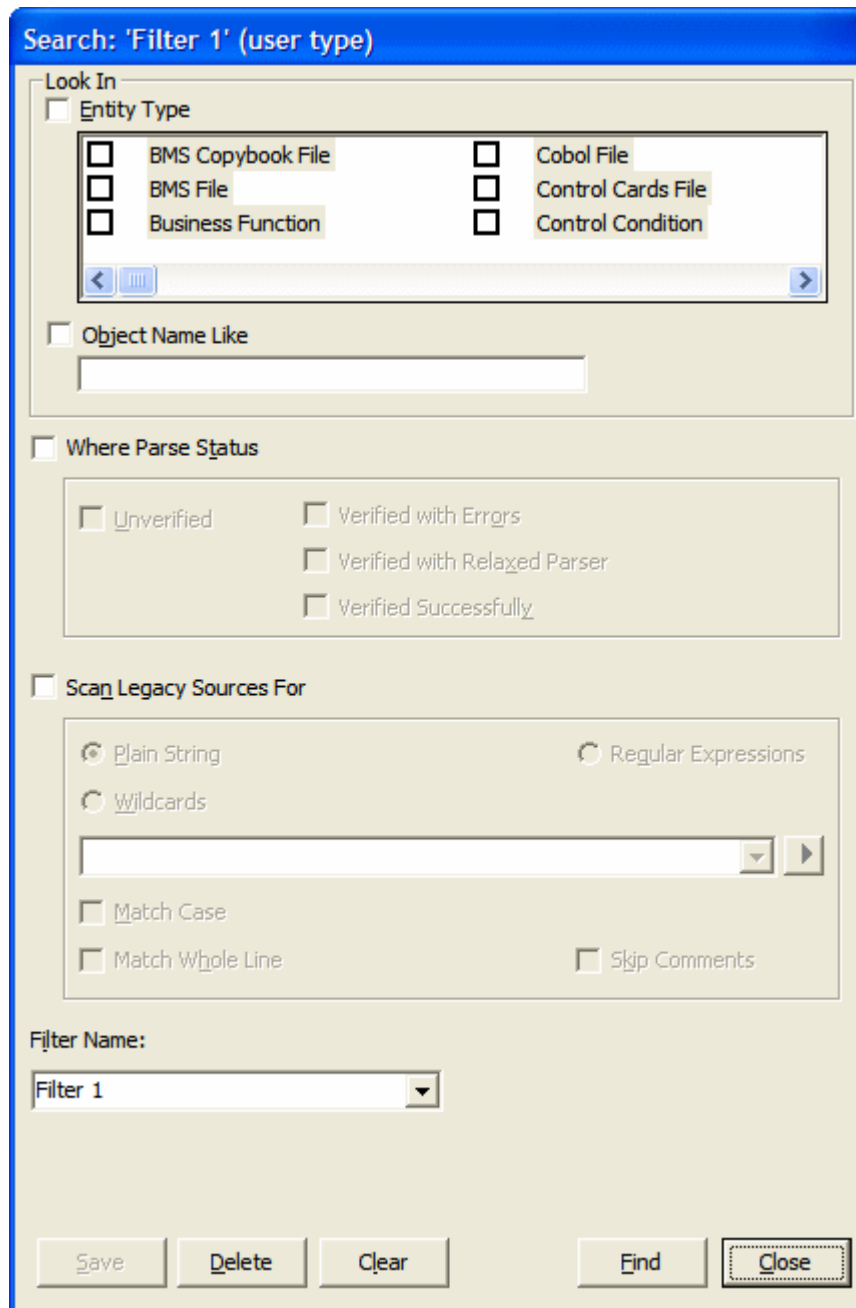


**Note:** By default, the results list shows two attributes of an object: its name and file type. Use the General tab of the Workspace Options window to display additional attributes.

## Creating a Search Filter

You can use predefined filters to search for objects in the Repository pane or create your own filters. You cannot modify a predefined filter.

1. Choose **Edit > New Criteria**. The Search dialog opens.



2. Choose any allowed combination of the following:

- To filter on object type, select the **Entity Type** check box and choose the entity type in the pane below.
- To filter on object name, select the **Object Name Like** check box and enter a matching pattern for the name in the accompanying field. You can use wildcard patterns allowed in LIKE statements by Visual Basic for Applications (VBA).
- To filter on verification status, select the **Where Parse Status** check box and choose the status in the group box below.
- To filter on a text string in the source, select the **Scan Legacy Sources For** check box, then specify the search criterion. Select the check boxes below the drop-down if you want the search to match case, skip comments, and/or match whole lines.




3. In the **Filter Name** drop-down, enter the name of the search filter and click **Save**.
4. To edit a search filter, select it in the **Filter Name** drop-down and follow the instructions for creating a filter. To delete a search filter, select it in the **Filter Name** drop-down and click **Delete**. To clear a search filter, select it in the **Filter Name** drop-down and click **Clear**.



**Note:** To execute a search directly from the Search dialog, select the search filter in the **Filter Name** drop-down and click **Find**. The results are returned in the Search tab.

### Specifying a Search Criterion

Follow these instructions to specify a search criterion in find and replace operations and in search filters.

1. Click the radio button for the type of pattern matching you want to use.
2. In the combo box:
  - Select the pattern for the text you want to match. The drop-down lists matching patterns from previous searches.
  - Enter a new matching pattern by typing in the combo box. You can enter plain character strings, Posix regular expressions, or wildcard patterns allowed in LIKE statements by Visual Basic for Applications (VBA). For regular expressions and wildcard patterns, click the  button next to the drop-down to display a pop-up menu of elements you can insert in the pattern. Click an element to insert it. The matching pattern is saved when you execute the search.

### Using Wildcard Patterns in Searches

In most searches you perform in the workbench tools, you can use wildcard patterns allowed in LIKE statements by Visual Basic for Applications (VBA). The table below shows the wildcard characters and what they match.

| Character   | Matches                               |
|-------------|---------------------------------------|
| ?           | Any single character.                 |
| *           | Zero or more characters.              |
| #           | Any single digit (0–9).               |
| [charlist]  | Any single character in charlist.     |
| [!charlist] | Any single character not in charlist. |



To match the special characters left bracket ([), question mark (?), number sign (#), and asterisk (\*), enclose them in brackets. The right bracket (]) cannot be used within a group to match itself, but it can be used outside a group as an individual character.

Specify a range of characters in a charlist by using a hyphen (–) to separate the upper and lower bounds of the range. [A-Z], for example, results in a match if the corresponding character position in a string contains any uppercase letters in the range A–Z. You can specify multiple ranges in brackets without delimiters.

## Finding and Replacing Text in Source Files

You can find and replace text in source files from the Browser or Search tab of the Repository pane. Use the Editor to replace text in a selection of source code.

1. In the Browser or Search tab, select the source files or the node that contains the source files you want to search and choose:


- **Edit > Find** if you simply want to search.
  - **Edit > Replace** if you want to search and replace.
2. The Find and Replace dialog opens. Click the tab for the operation you want to perform.
    -  **Note:** The find functionality in the Find tab is bidirectional. You can search up or down, and specify that the search wrap. The find functionality in the Replace tab is unidirectional. Otherwise, the find functionality is identical in each tab. The remaining steps assume that you want to both search and replace.
  3. In the **Find What** combo box, specify the search criterion. Select the check boxes below the drop-down if you want the search to match case and/or match whole words.
  4. In the **Replace With** combo box, select the replacement text. The drop-down lists text strings from previous replace operations. Enter new replacement text by typing in the combo box. If you used regular expressions for the find, click the  button next to the drop-down to display a list of elements you can insert in the replacement text field.
  5. Click **Find Next**. When the search finds a match, click **Replace**. You are prompted to confirm the replacement. Click **Yes**. Click **Find Next** again to find the next match, or click **Replace All** to replace all matching text.

## Using the Editor and Viewer

The Editor lets you view and edit the source code for a file. The Viewer lets you view renderings of logical objects like screens and transformation target models. Double-click a file in the Repository pane to view it in the Editor or Viewer. Choose **File > Recent Sources** to open a file from a list of recently opened files.

### Editing Source

Edit file source as you would text in a word processor (cut-and-paste, drag-and-drop, undo, and so forth). Click **File > Save** to save your changes. Edits are saved in the copy of the file maintained in the *\Workspace \Source* subfolder.

 **Note:** When you edit a file, the modified file and any dependent files are invalidated, and need to be verified again. Only a master user can edit and verify source in a multiuser environment.


### Finding and Replacing Source in a Selection

To find and replace source in a selection of text, select the text, then follow the instructions for the source file find and replace function.

### Viewing a List of Errors

For a source files with errors or warnings, right-click in the Editor and choose:

- **Errors > View Errors** from the popup menu to list the errors and warnings in a separate pane below the Editor. Choose **Edit > Errors > View Errors** again to hide the pane.
- **Errors > Next Error** from the popup menu to navigate to the offending source code for the next error in the list.
- **Errors > Previous Error** to navigate to the offending source code for the previous error in the list.
- **Errors > Severity Filter** from the popup menu to filter the list by severity.

 **Note:** You can set a severity filter for all your workspaces in the Editor User Preferences.

- **Errors > Copy Errors** in the pop-up menu to copy the list of errors and warnings to the clipboard.

To hide the Editor and show only the list of errors and warnings for the selected file, right-click in the Repository pane and choose **Show Errors** in the pop-up menu. Double-click the source file in the Repository pane to show the Editor again.

## Extracting and Expanding Copybooks (Cobol, MFS Only)

To extract source code as a copybook, select the code you want to extract, then choose **Edit > Extract Copybook**. A dialog box opens, where you can enter the name of the new copybook. Click **OK**. The new copybook is added to the repository and the extracted code is replaced by a COPY statement referencing the new copybook.

To expand COPY statements, choose **Edit > Expand Copy Statements**. The added lines of code are highlighted and a comment line is inserted to identify the source copybook.

## Commenting Out Source

To comment out a block of source, select the block and choose **Edit > Comment Block**. To uncomment the block, select it and choose **Edit > Uncomment Block**.

## Printing Source

To print the source for a file, choose **File > Print**.

## Restoring Line Numbers in Natural Source

To restore stripped line numbers in Natural source, choose **Edit > Restore Line Numbers in Natural Source**.

## Setting Editor User Preferences

Use the Editor tab of the User Preferences window to specify the display characteristics of the Editor.

1. Choose **Tools > User Preferences**. The User Preferences window opens. Click the Editor tab.
2. In the **Font** drop-down, select the display font for source code.
3. Select the **Colorize Text** check box if you want to use a color scheme to identify source elements, then specify the color of each source element.
4. In the Show Errors pane, select the check box for each type of error you want to show in the error list.

## Specifying the Color of Items

You use a standard Windows color control to specify a color scheme for source elements and other items. Use the Palette tab to select a color from the Windows palette. Use the System tab to match the color of a standard Windows element. Depending on the element, you can specify the foreground color, background color, and/or font color.

## Using the Object Information Pane

The Object Information pane displays comments you have entered for an object. Select an object in the Repository pane and choose **View > Object Information** to show the Object Information pane.

Enter comments for an object by selecting the object in the Repository pane and choosing **Properties** in the right-click menu. In the Description tab, enter your comment in the text area and click **OK**.



**Note:** You cannot use this method to enter comments for a workspace (that is, when an entire workspace is displayed in the Repository Browser). Use the General tab of the Workspace Options window to enter comments for a workspace.

## Viewing Object Properties

The *properties* of an object describe its characteristics: its language, complexity metrics, relationships, and the like. Select an object in the Repository pane and choose **View > Properties** to display a set of tabs with object properties. The table below describes the tabs in the Properties window.




**Note:** In other workbench tools, use the right-click menu or the **View** menu to display the properties of the selected object.

| Tab           | Description   |
|---------------|---|
| Description   | Displays comments you have entered for the object.  |
| General       | Displays the name and other general information for the object.   |
| Internal      | Displays verification option settings and other internal information for the object.  |
| System        | Displays system information for the object.   |
| Statistic     | Displays the complexity metrics for the object and their values.  |
| Relationships | Displays the relationships of the object. Select <b>Restricted to the current project</b> to restrict relationships to those in the current project. Select <b>Workspace wide</b> to show all the relationships of the object in the workspace. |
| Object Tags   | Displays the tags assigned to the object.   |

## Viewing Inventory Reports

Inventory Reports give high-level statistics for source file types in the current workspace: number of files of each type, whether verified, number of lines of source code (verified files only), and the like. To generate an Inventory Report, choose **Prepare > Inventory Report**. The table below describes the columns in the Inventory Report.

| Column       | Description   |
|--------------|---|
| Type         | The source file type.   |
| Source Lines | The number of lines of source code in verified files of the specified type.   |
| Quantity     | The number of source files of the specified type.   |
| Unverified   | The number of source files of the specified type for which verification was not attempted.<br> <b>Note:</b> Copybooks do not need to be verified. Copybooks are parsed when the including source file is verified. |
| Verified     | The number of successfully verified source files of the specified type.   |

| Column    | Description   |
|-----------|---|
| Erroneous | The number of unsuccessfully verified source files of the specified type.   |
| Relaxed   | The number of source files of the specified type that were verified despite errors, under the relaxed parsing option. |
| Missing   | The number of missing support files (copybooks, JCL procedures, and the like).  |

## Viewing Key Object Relationships with Query Repository

The Query Repository feature lets you home in on key relationships of an object: all the programs that call another program, or all the programs that update a data store, for example. From the results, you can launch further queries without having to return to the Repository Browser. You can create printable relationship reports and export them to a variety of standard formats.

1. In the Repository pane, select the workspace, project, folder, files, or objects you want to view relationships for and choose **Query Repository > <Relationship>** in the right-click menu. The Query Repository results pane opens over the Editor/Viewer.
2. To launch a query from the results, select one or more objects in the right-hand column and choose **Query Repository > <Relationship>** in the right-click menu.

## Using the Activity Log

The Activity Log is a chronological record of your activities in the current session. Choose **View > Activity Log** to show the Activity Log pane.

### Viewing Errors

If the parser generated errors or warnings for a file, double-click the Activity Log entry for the file or select the entry and choose **Expand** in the right-click menu to show a list of the errors and/or warnings. Double-click a message to navigate to the offending source in the Editor. Choose **Collapse** in the right-click menu to collapse the list.

### Viewing History

To view Activity Log entries across sessions, choose **History** in the right-click menu. Click a date to view the session log. To clear the session log, right-click in the log and choose **Clear Log** in the pop-up menu. To clear a log entry, select the entry and choose **Delete** in the right-click menu.

### Copying Records

To copy Activity Log records to the clipboard, select the records and choose **Copy** in the right-click menu.

### Generating Reports

To generate a report from the Activity Log, right-click in the log and choose **Report** in the pop-up menu.

## Clearing the Log

To clear the Activity Log, right-click in the log and choose **Clear Log** in the pop-up menu. To clear a log entry, select the entry and choose **Delete** in the right-click menu.

## Hiding a Column

To hide a column in the Activity Log, right-click in the log and deselect the column name in the **Columns** choice in the pop-up menu. Select the column name to show the column again.

## Creating a To Do List

A *to do list* is a record of tasks you need to perform before completing your project. You can create a to do list for a workspace, project, folder, source file, or extracted object.

1. In the Repository Browser, select a workspace, project, folder, source file, or generated object and choose **View > ToDo List**. The ToDo List window opens.
2. If you selected:
  - A workspace, project, or folder, choose **Edit > Add** to enter a task for the item and all the items it contains. Otherwise, choose **Add for Item** to enter a task for the workspace, project, or folder only.
  - A source file or generated object, choose **Edit > Add** to enter a task for the item.
3. The New Properties dialog opens. In the **Subject** field, enter the name of the task. In the **Content** field, enter a description of the task. Click **OK**. The task is listed in the ToDo List window.

## Viewing a To Do List

To view the to do list for an item, select the item in the Repository Browser and choose **View > ToDo List**. Use the options in the ToDo List window **Edit** menu to mark a task as done, delete a task, or view its properties. You can generate a report from a to do list by choosing **File > Report**.

## Using Tool Windows

When you open a Modernization Workbench tool, the window for the tool appears above the workbench main window. Simply move the tool window if you want to work in the main window again. A tool window's state is saved across sessions. Close a tool window by clicking the **✕** button in the upper righthand corner.

Tool windows are *modeless*: in principle, you can open as many tool windows as you want. In practice, the workbench will prompt you to close an “unprotected” tool window if the activity you want to perform could result in a repository change. An unprotected tool window cannot be updated to reflect a concurrent repository change.

In tool windows with lists, you can select all, select multiple, size columns, and sort by column.


## Resizing Panes

Resize a pane in a tool window by using the mouse to grab its border with another pane, called a *splitter*, and dragging the border to a new location. To control how panes are resized when you resize the window, select the splitter and choose one of the following in the right-click menu:

- For a vertical splitter, **Keep First** preserves the size of the panes to the left of the splitter. For a horizontal splitter, **Keep First** preserves the size of the panes above the splitter.
- For a vertical splitter, **Keep Second** preserves the size of the panes to the right of the splitter. For a horizontal splitter, **Keep Second** preserves the size of the panes below the splitter.
- **Keep Proportion** preserves the length and width ratio of the panes on either side of the splitter.

## Moving Panes

Move a pane in the window by grabbing its title bar to show the “virtual rectangle” for the pane. The virtual rectangle is a dotted color frame that you can drag to the position in the window at which you want the pane to appear. When you are satisfied with the new position, release the mouse button. The other panes in the window are adjusted as necessary.

 **Note:** You may have to drag the virtual rectangle beyond the edge of the tool window to achieve the effect you want.


To swap the positions of the panes on either side of a splitter, select the splitter and choose **Swap** in the right-click menu. To change the color of the splitter when it is selected (and of its virtual rectangle), select the splitter and choose **Color** in the right-click menu. Use the standard Windows color control to specify the color.

## Setting Options

Modernization Workbench options control the look and feel of the workbench tools and how they perform their tasks. The **Tools** menu gives you access to three sets of options:

- **Workspace Options** control the appearance and behavior of workbench tools for the current workspace.
- **Project Options** control the appearance and behavior of workbench tools for the current project.
- **User Preferences** control the appearance and behavior of the Editor, HyperView, and Change Analyzer across workspaces, and miscellaneous other tasks.

Each tool has an **Options** choice in the **View** menu that lets you set the options for that tool.

 **Note:** Many options are preset based on your choices in the Modernization Workbench Configuration Manager. For more information, see the installation guide for your product.

Tool options are described in detail in the relevant sections of the documentation set. This section shows you how to manage *option sets* and how to set general workbench and environment options


## Managing Option Sets


An *option set* is a particular configuration of settings for one of the option groupings. In a given Project Options set, for example, you might choose to show GO TO statements in the HyperView Callie tool, while in the other Project Options sets you would not.

Option sets let you switch back and forth between configurations in the same session, without having to change settings manually. You can also use them to ensure uniform results across your team by sharing customized settings with team members.

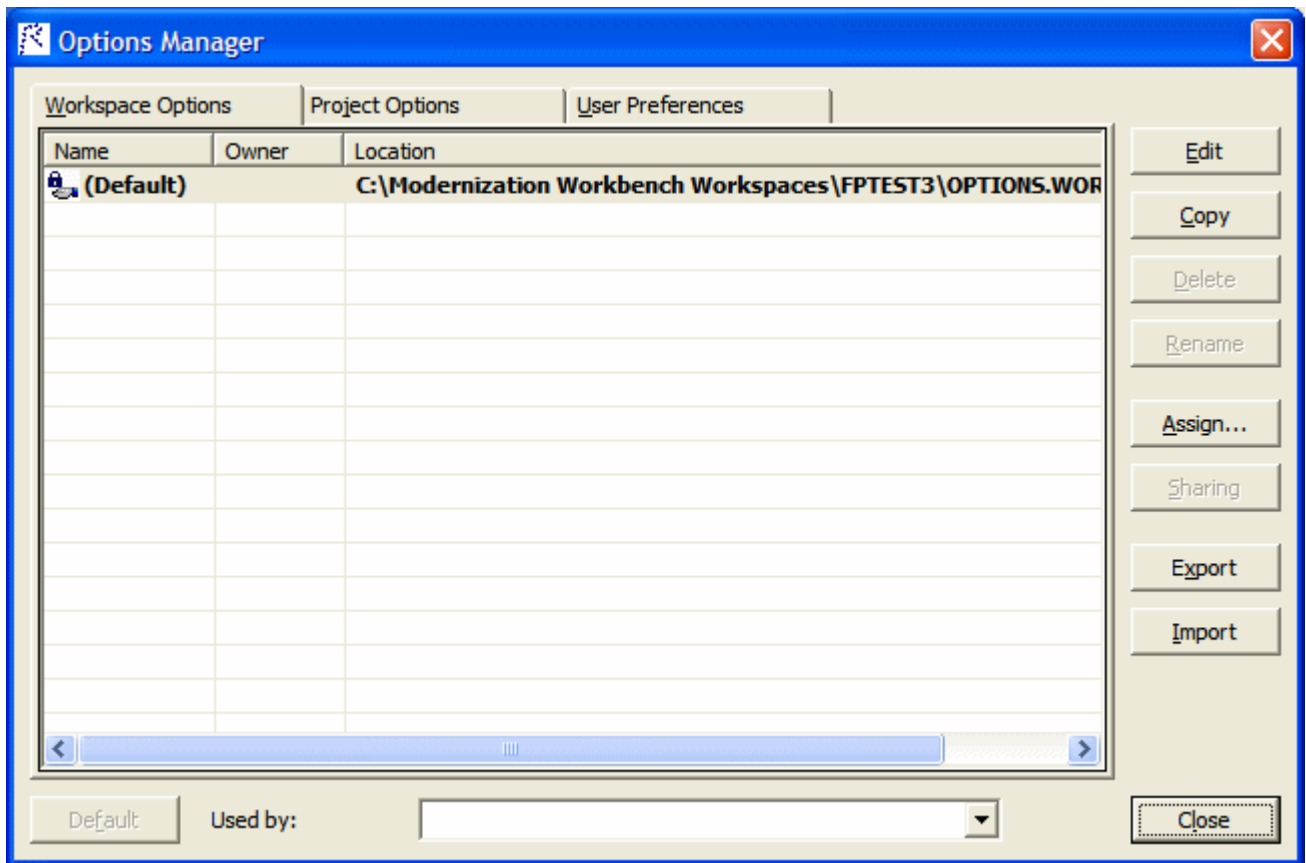
## Understanding the Options Manager Window

Use the Options Manager to define custom options sets. Choose **Tools > Options Manager** to open the Options Manager window.

The figure below shows the Options Manager window at startup, with the tab for the Workspace Options grouping selected. For each grouping, there is an initial read-only *default option set*, denoted by a  symbol, that reflects your current workbench configuration. The *active* option set is displayed in **bold** type in the Options Manager tab for the grouping. You make an option set active by *assigning* it. Assignments persist across workbench sessions.

The user who defines a custom option set is referred to as its *owner*. Only the owner can *share* a custom option set with other users, as indicated by a  symbol. A shared option set cannot be deleted or unshared if it is being used. The **Used By** drop-down at the bottom of the owner's Options Manager window lists the names of option set users. The owner's name appears in the Owner column in the Options Manager window displayed to other users (but not in the owner's Options Manager window).

The initial default option set is always shared with other users. An owner can designate another option set as the default, provided the option set is shared. The new default option set will automatically be assigned to every user who has not explicitly defined a custom option set. A default option set cannot be modified or deleted.





## Creating an Option Set

If there is only a “(Default)” option set for the grouping, select it and click **Edit**. Otherwise, select any option set and click **Edit**. Options Manager displays the available tabs for the selected options grouping.

Modify the options displayed on each tab as necessary and click **Apply**. When you are satisfied with your choices, click **OK**. The new option set is displayed in the Options Manager window with the name of the grouping.



**Note:** If a default option set already uses one of the grouping names, Options Manager prepends “Copy of” to the name.

## Renaming an Option Set

To rename an option set, select it and click **Rename**. The system displays the current name in an edit box. Enter the new name in the edit box and click outside the box.

## Editing an Option Set

To edit an option set, select it and click **Edit**, then follow the instructions for creating an option set. You cannot edit a default option set.

## Copying an Option Set

To copy an option set, select it and click **Copy**. Options Manager prepends “Copy of” to the name of the copied option set.

## Deleting an Option Set

To delete an option set, select it and click **Delete**. You cannot delete a default option set, or a shared option set that has been assigned by another user.

## Sharing an Option Set

To share an option set, select it and click **Sharing**. The button is a toggle. Select it again to revoke sharing. You cannot revoke sharing for an option set that has been assigned by another user.

## Making an Option Set the Default

To make a custom option set the default, share it first, then select it and click **Default**.




**Note:** In the Project Options tab, a dialog opens that prompts you to select or create a new project. Select the project and click **OK**.

The new default option set is automatically assigned to every user who has not explicitly defined a custom option set. A default option set cannot be modified or deleted.

## Assigning an Option Set

To make an option set active, select it and click **Assign**.

 **Note:** In the Project Options tab, a dialog opens that prompts you to select or create a new project. Select the project and click **OK**.

## Importing and Exporting Option Sets


To import an option set, click **Import**. A Load dialog opens, where you can specify the option set you want to import.

To export an option set, select it and click **Export**. A Save dialog opens, where you can specify the name and location of the option set.

## Setting General Options

Use the General tab of the Workspace Options window to specify the description of the workspace displayed in the Object Information pane, the attributes displayed in the Repository pane Search tab, and the browser fetch buffer size.

1. Choose **Tools > Workspace Options**. The Workspace Options window opens. Click the General tab.
2. In the **Workspace description** field, enter a description of your workspace. This description is shown in the Object Information pane.
3. In Repository Browser (Search), check the boxes for the object attributes that should be displayed in the Search tab of the Repository pane. Click **Select All** to check all the attributes.

 **Note:** Only attributes in the repository model for an object are displayed. That is, if you choose Cyclomatic Complexity, and only JCL files appear in the Search tab results list, the attribute will not be displayed in the list, because Cyclomatic Complexity is not an attribute of a JCL file.

4. In the **Browser Fetch Buffer Size** field, enter the size of the buffer the workbench uses to populate the repository tree. When you expand a node in the Repository Browser, the workbench populates the display from a buffer that contains the objects last fetched from the repository. For very large repositories, you may want to lower the buffer size so that you can work with objects in the Repository Browser while the workbench performs subsequent fetches.

## Setting Environment User Preferences

Use the Environment tab of the User Preferences window to specify whether you want to be prompted to verify source files after registering them and the scope of relationships shown in the Object Properties window.

1. Choose **Tools > User Preferences**. The User Preferences window opens. Click the Environment tab.
2. In After new files are registered, choose:
  - **Verify registered files** if you want the workbench to verify files after they have been registered.
  - **Ask user about verification** if you want to be prompted to verify files after they have been registered. Available whether or not **Verify registered files** is selected.
3. In Show relationships in the object properties view window, choose whether you want to restrict the relationships displayed in the Relationships tab of the Object Properties window:

- **Restricted to the current project** if you want to restrict the relationships of the object to those in the current project.
  - **Workspace wide** if you want to display all the relationships of the object in the current workspace.
4. For Java support, specify the path of the folder for the Java Runtime Environment (JRE) on your machine in the **Path to JRE Folder** field. If you do not enter a path, the current version specified in the Windows registry is used. You must use JRE version 1.5 or later.



**Note:** If your application was compiled with a previous version of the JRE, specify the path of the Java SE runtime library (rt.jar) used to compile the application in the **Enter classpath to JAR Files and/or path to external Java file root directories** field in Workspace Options > Verification > Settings.

## Setting Archivers User Preferences

The workbench registration process extracts compressed source files using the command line syntax for archiver versions most widely in use. Use the Archivers tab of the User Preferences window to specify the command line syntax for newer archiver versions.

1. Choose **Tools > User Preferences**. The User Preferences window opens. Click the Archivers tab.
2. In the **Command Line for Archiver** drop-down, choose the archiver whose command line syntax you want to specify.
3. In the **Unpack All** field, enter the command line syntax for the unpack all operation.
4. In the **Extract File** field, enter the command line syntax for the extract file operation.

## Setting Export Options

Use the Export Options tab of the Project Options window to specify where Modernization Workbench stores generated files. The default location is the `\<Workspace Home>\Output` folder.

1. Choose **Tools > Project Options**. The Project Options window opens. Click the Export Options tab.
2. In the **Target directory** field, enter the folder you want Modernization Workbench to store generated files in.
3. Deselect the **Move Files** check box if you want to copy generated files to both the default and the specified directories.

## Adding a Selectable Item

Many options windows allow you to add an item to a list of available items. In the Extensions tab of the Workspace Registration options, for example, you can add an extension to the list of recognized extensions.

Add an item by right-clicking in the selection pane and choosing **Add** in the pop-up menu. The workbench displays an empty text field next to a selected check box. Enter the name of the item in the text field and click outside the field.



**Note:** If you are entering a file extension, make sure to enter the dot (.).

Edit an item by selecting it and choosing **Edit** in the right-click menu. Delete an extension by selecting it and choosing **Delete** in the right-click menu.

## Working with Reports and Diagrams

When you generate a diagram or report in the Modernization Workbench, you typically have the option of saving it to a file or printing it. You can save to a wide variety of standard formats.



**Note:** Word must be installed to save reports to RTF and Word. Excel must be installed to save reports to Excel, CSV, and TXT. Visio 2002 must be installed to save a diagram to Visio. Visio 2002 is not required to save to Visio XML.

Click **Page Setup** in a report window to set up the page for a printed report. Click **Print** to print the report. The Print dialog opens, where you can set options for the print job. Click **OK**.

Click **Save** in a report window to export a report. A Save As dialog opens, where you can specify the name, location, and file type of the report.

## Using the Guide for a Tool

Many Modernization Workbench tools have guides that you can use to get started quickly in the tool. The guides are help-like systems with hyperlinks that you can use to access functions otherwise available only in menus and other program controls.

To open the guide for a tool, choose **View > Guide**. Use the table of contents in the **Page** drop-down to navigate quickly to a topic.

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