

Preparing SAS Enterprise Miner for Use

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Overview of Preparing SAS Enterprise Miner for Use

SAS Enterprise Miner 5.1 is the first and only data mining solution that addresses the entire data mining process. Combined with SAS data warehousing and OLAP technologies, SAS Enterprise Miner helps companies reveal trends, explain known outcomes, predict future outcomes, and identify factors that can secure a desired effect.

There are two ways to deploy SAS Enterprise Miner:

- *Personal workstation.* In this deployment, Java files, configuration files, and documentation are stored locally on the client computer. The client communicates directly with the SAS Workspace Server and the SAS Metadata Server and must remain connected for the duration of a model training event. The personal workstation installation is appropriate for single-user configurations.
- *Enterprise client and shared platform server.* The SAS Enterprise Miner enterprise client installation includes only the Java files that are needed for display on the client computer. All other files are installed on a SAS Enterprise Miner shared platform server. Enterprise clients connect directly to the shared platform server process, which handles all communication with the SAS Metadata Server and the SAS Workspace Server. This installation facilitates multiple users working on projects collaboratively. Users can work in the same project, disconnect and reconnect to model training processes, and share mining results packages without experiencing resource conflicts.

As a best practice, you can deploy the SAS Enterprise Miner client by using Java Web Start, which enables you to deliver enterprise client files on demand from a link in a Web document. Java Web Start automatically downloads the most

recent versions of required files from an application server and stores the files on the client computer.

Note: For more information about how to deploy SAS Enterprise Miner, see the SAS Enterprise Miner Help, which is available from within the product. △

During a planned SAS installation, a SAS Metadata Server, an object spawner, and a SAS Workspace Server are defined and configured and are available for use by SAS Enterprise Miner. The deployment process also creates a foundation metadata repository and some initial users.

In addition, if this is not a personal workstation installation, you must perform these tasks:

- Create additional SAS Enterprise Miner users.
- Complete the SAS Enterprise Miner configuration wizard.
- Secure the metadata definitions for projects and models that are created by SAS Enterprise Miner users.

And, you might need to perform these tasks:

- Set extended attributes on the SAS Workspace Server.
- Add variables to the shell scripts that are used for non-Windows systems.
- Configure the Apache Tomcat HTTP Server for use with SAS Enterprise Miner.

Configuring SAS Enterprise Miner

When SAS Enterprise Miner 5.1 is delivered, it is preconfigured as a personal workstation, specifically to run on the same computer with the metadata server and workspace servers.

If you are using SAS Enterprise Miner on your computer as a personal workstation or as an enterprise (thin) client to connect to a SAS Enterprise Miner shared platform server, then you can skip the following sections—“Launching the SAS Enterprise Miner Configuration Wizard” and “Completing the SAS Enterprise Miner Configuration Wizard”—and proceed to “Completing the SAS Enterprise Miner Client.”

If the computer hosts the SAS Enterprise Miner shared platform server for multi-client access, you may need to adjust the configuration, as described in the following subsection.

Launching the SAS Enterprise Miner Configuration Wizard

To launch the SAS Enterprise Miner configuration wizard, complete the tasks that are applicable to your operating environment. See the following table.

Table 1.1 Tasks for Launching the SAS Enterprise Miner Configuration Wizard in Different Environments

Name of Operating Environment	Tasks to Perform
UNIX	Execute the emconfig script by entering [emroot]/emconfig .
Windows	Select Start ► Programs ► SAS ► Enterprise Miner EM 5.1 Advanced Configuration .

Completing the SAS Enterprise Miner Configuration Wizard

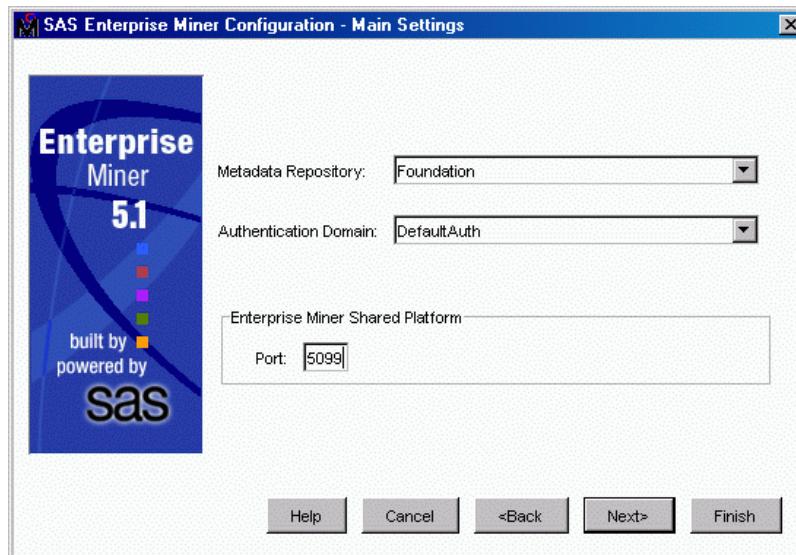
Here are the steps that you must follow to complete the SAS Enterprise Miner configuration wizard:

- 1 In the first wizard window, enter the login information for the SAS Metadata Server.

- a Enter the network address of the **Host** on which the SAS Metadata Server is running.
- b Enter the **Port** on the host. The default port is 8561.
- c Enter the name of the user of this installation of SAS Enterprise Miner. The user must have a login name for the specified SAS Metadata Server. For the Windows platform, if SAS Enterprise Miner is installed on a different computer than the SAS Metadata Server, then enter the fully qualified domain name. For example, enter **mydomain\myaccount**.
- d Enter the **Password** for the user name that you entered.
- e Select **Remember password** to save the user's password in encoded format along with the SAS Enterprise Miner login properties. If you do not select this check box, then the user will be prompted to supply a password each time a SAS Enterprise Miner Shared Platform Server or Personal Workstation is launched.

When you are finished, click **Next**.

- 2 Verify the repository name, authentication domain, and the shared platform server port.

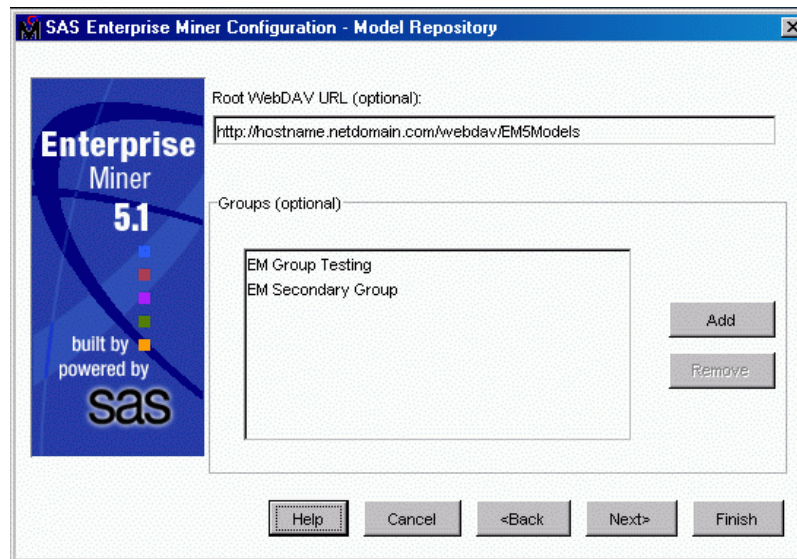


- a The name of the foundation repository is shown for verification. If multiple repositories are present, they might be displayed for additional verification.
- b Select the **Authentication Domain** that contains the user name that was specified in the first wizard window. Typically, all SAS Enterprise Miner users are assigned to the same authentication domain.
- c If you are configuring the SAS Enterprise Miner Shared Platform, you can enter the **Enterprise Miner Shared Platform** server port, which is the port on which the Remote Method Invocation (RMI) registry will be listening on this machine. This port is typically 5099, so it is generally safe to leave it at its default setting. If an RMI registry is already running on that port, the SAS Enterprise Miner Shared Platform Server will use it. Otherwise, the Enterprise Miner Shared Platform Server will launch an internal registry to use that port.

Note: RMI is a standard Java-based protocol provided by Sun Microsystems. It is used by SAS Enterprise Miner to manage communication between SAS Enterprise Miner clients and the SAS Enterprise Miner Shared Platform Server. △

When you are finished, click Next.

- 3 Enter optional model storage parameters.



- a Users can save model results for later examination by the SAS Enterprise Miner Model Viewer. To store the model, you write a package of data to a WebDAV area that is managed by an HTTP server. For more information, see the SAS Enterprise Miner 5.1 Help, which is available from within the product. The **Root WEBDAV URL (Optional)** field contains the URL of the WebDAV storage application. The URL should contain a port number when a number is applicable, such as **http://hostname.netdomain.com:8080/webdav/EM5Models**.
- b Users can group saved models for investigation and study purposes. To add a group, click **Add** and specify the name and description of the group. To delete a group, select it in the list and then click **Remove**.

When you are finished, click **Next**.

- 4 Verify the settings in the Summary window, then click **Finish**.
- 5 If the computer hosts the SAS Enterprise Miner Shared Platform Server for multi-client access, you must launch the server. The server's operation depends on the metadata server that was launched previously.

Table 1.2 Tasks for Launching the SAS Enterprise Miner Shared Platform Server in Different Operating Environments

Name of the Operating Environment	Tasks to Perform
UNIX	Execute the emserver script by entering [emroot]/emserver .
Windows	Execute the emserver script by entering [emroot]\emserver.bat .

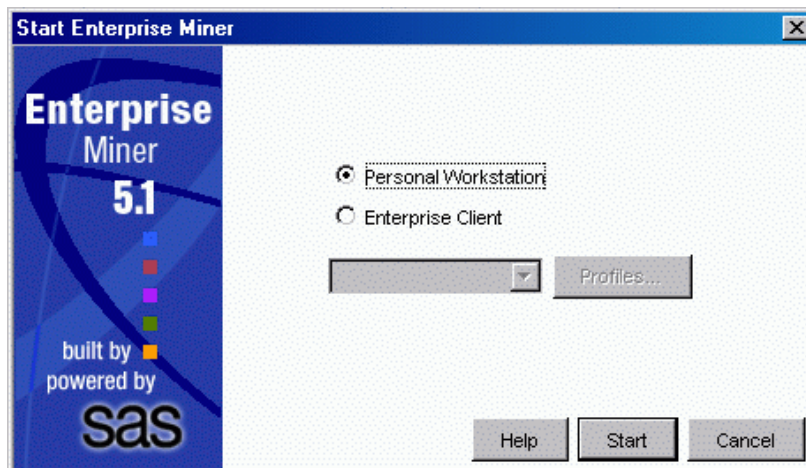
Configuring the SAS Enterprise Miner Client

To launch the SAS Enterprise Miner client, complete the tasks that are applicable to your operating environment.

Table 1.3 Tasks for Launching the SAS Enterprise Miner Client in Different Operating Environments

Name of the Operating Environment	Tasks to Perform
UNIX	Execute the em script by entering [emroot]/em .
Windows	Select Start ► Programs ► SAS ► Enterprise Miner EM 5.1 Client .

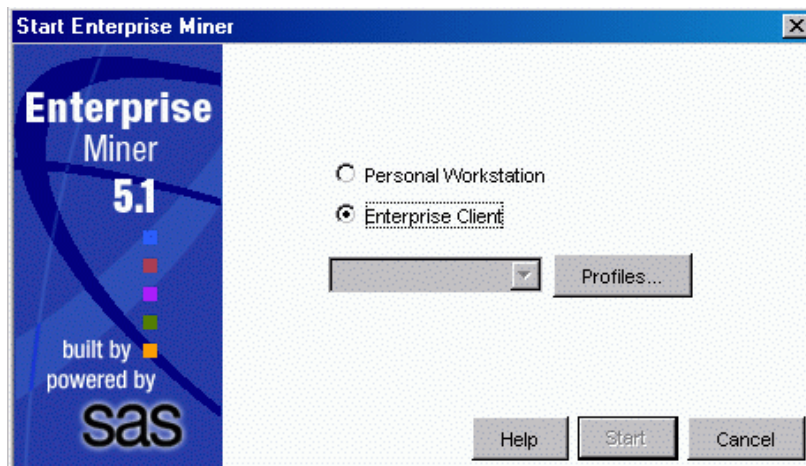
- 1 The client launcher appears.



This example shows the Personal Workstation selected. The launch window always begins with the most recent selection.

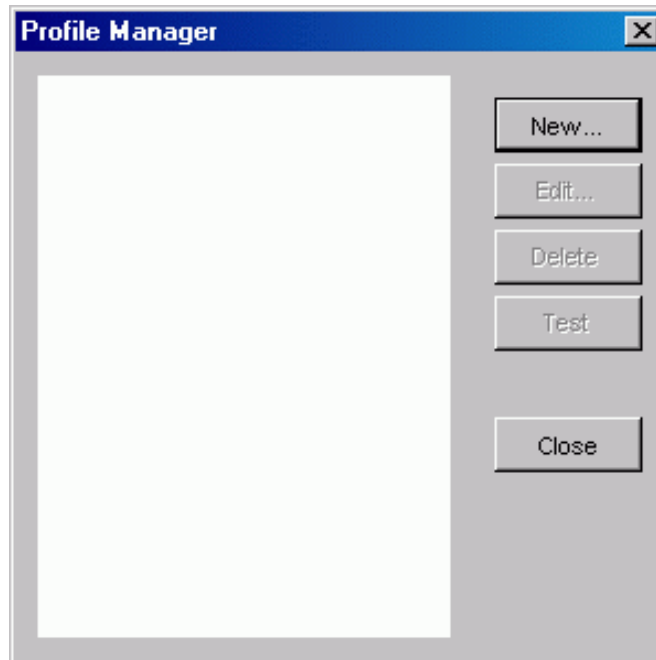
Note: If this is a personal workstation, click **Start** to launch SAS Enterprise Miner. You can skip this step for the personal workstation launch by adding the parameter **-noprompt** to the UNIX script or Windows shortcut. △

- 2 If you will be using this machine as a client to access one or more SAS Enterprise Miner Shared Platform Servers, select **Enterprise Client**.



- a This selection activates the **Profiles** button. If no enterprise clients have been defined, the **Start** button will be unavailable.

- b Click **Profiles** to add and manage profiles of enterprise clients.
- 3 When you click **Profiles**, the **Profile Manager** window appears.

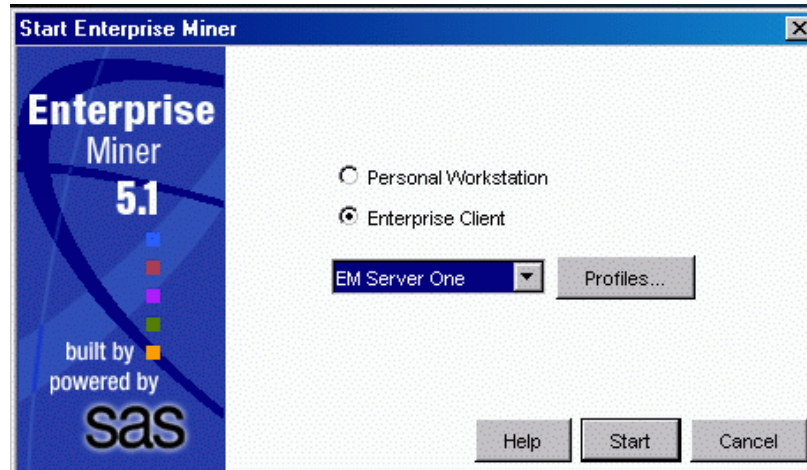


- a If the list of profiles is empty, only the **New** button will be active. If the list contains items, the **Edit** or **Delete** buttons will also be active.
 - b You can test whether a SAS Enterprise Miner Shared Platform Server is available by selecting the entry and clicking **Test**. A dialog box will appear that shows the condition of the server.
 - c Click **New** to add an enterprise client profile.
- 4 When you add or edit an enterprise client profile, the New Shared Platform Profile window appears.



- a Enter a convenient name for the shared platform server into the **Name** field.
- b Enter the host address of the shared platform server in the **Host** field. This might take the form of an IP address (for example, 123.123.123.123) or a domain name (for example, myserver.mynetdomain.com).

- c Enter the host port of the shared platform server's RMI registry in the **Port** field. This is typically **5099**.
 - d You can test whether a SAS Enterprise Miner Shared Platform Server is available by selecting the entry and clicking **Test**. A dialog box will appear that shows the condition of the server.
 - e Save the new or edited entry by clicking **OK**.
- 5 When enterprise client entries are present, they are selectable in the **Start** window.



- a Select the enterprise client that you would like to launch.
- b Click **Start** to launch the client and connect to the SAS Enterprise Miner Shared Platform Server.

Customizing SAS Workspace Server Settings

You can set extended attributes on each logical SAS Workspace Server that you are using at your site.

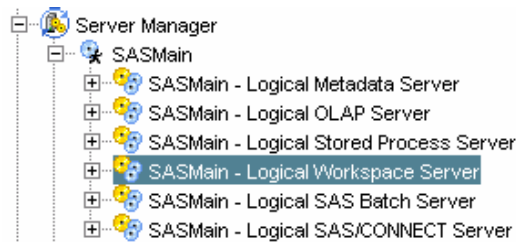
Table 1.4 Optional SAS Enterprise Miner Extended Attributes for the SAS Workspace Server

Extended Attribute	Description
EM_PROJECT_ROOT	The path on the server in which projects should be stored. The default is to let users specify any path when they create projects; however, in a production environment, the best practice is to specify the path.
EM_ENFORCE_PROJECT_LOCATION	Indicates whether to enforce the specified project root path. As a best practice in a production environment, set this attribute to Y to prevent users from changing the path.

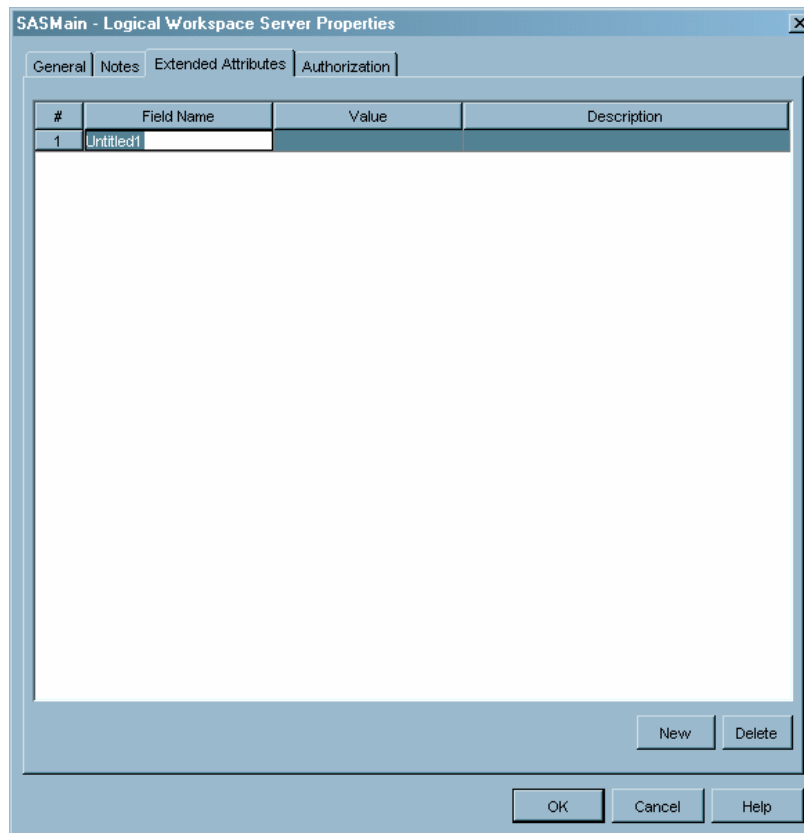
Extended Attribute	Description
EM_SERVER_INIT_CODE	The path on the server from which SAS Enterprise Miner retrieves SAS code to execute when a project is opened. For example, you might write code to force users to log their use into an audit trail.
EM_MAX_CPU	The number of CPUs to exercise during a process flow. The default is -1, which enables each project to use all available processors. To restrict the number of CPUs, enter an integer. For example, if you limit the number of CPUs that each project can use, then more projects can execute at the same time with less stress on the computer.
EM_SASCMD	The command that SAS Enterprise Miner uses to start a SAS MPConnect process to run a node. The default value is !sascmdv -noobjectserver -nosyntaxcheck -noasynchio

To add these attributes to a logical SAS Workspace Server, complete these steps in SAS Management Console:

- 1 Use your metadata profile to log on to the SAS Metadata Server that contains the SAS Metadata Repository connection that you want to use.
- 2 In the SAS Management Console navigation tree, select **Environment Management ► Server Manager**.
- 3 Select a SAS application server that contains a logical SAS Workspace Server.
- 4 Select the name of the logical SAS Workspace Server.



- 5 Select **File ► Properties**.
- 6 In the Properties dialog box, select the **Extended Attributes** tab.
- 7 Click the **New** button. The first line is highlighted and **Untitled1** appears in the **Field Name** field.



- 8 Enter the information for each attribute that you want to set. After you complete each line, click **New** to insert a new line.

Table 1.5 Sample Values for SAS Enterprise Miner Extended Attributes on the SAS Workspace Server

Field Name	Sample Value*	Description
EM_PROJECT_ROOT	<i>d:\my\project\path\</i>	Project tree storage path.
EM_ENFORCE_PROJECT_LOCATION		User cannot change the project storage path.
EM_SERVER_INIT_CODE	<i>d:\my\server\initialCode.sas</i>	Path to server initialization code.
EM_MAX_CPU	-1	Use all available processors.
EM_SASCMD	sas -config <i>e:\my\special\sasv9.cfg</i>	Use an alternate SAS configuration.

* User-specified values appear in italic.

- 9 When you are finished, click **OK** to save the attributes and close the dialog box.

Setting Required Variables in UNIX Shell Scripts

For UNIX systems, there are shell scripts that must contain variables that identify the default Java and SAS Enterprise Miner directory paths. The variables are EM_HOME and JAVA_HOME. Here are their default settings:

```
EM_HOME=/opt/SAS/SASEminer/5.1/EM51
JAVA_HOME=/opt/java1.4.1
```

If these variables are not already present, then add them to the following shell scripts.

Table 1.6 UNIX Shell Scripts

Shell Script	Description
\$EM_HOME/em	Java client script
\$EM_HOME/emhelp	Java client script
\$EM_HOME/emserver	Java application server (middle tier) script
\$EM_HOME/emconfigure	SAS Enterprise Miner configuration wizard script

Also, set the execute permission for each script file.

Customizing the Apache Tomcat HTTP Server

The HTTP server that is recommended for use with SAS Enterprise Miner 5.1 is the Apache Tomcat 4.1.18 server with integrated WebDAV support. To enable the model registration and storage functions of SAS Enterprise Miner, you must enable the Tomcat WebDAV write functionality and define the context path for the SAS Enterprise Miner Model Viewer application for Tomcat.

Note: Servers other than Tomcat 4.1.18 might have different instructions. △

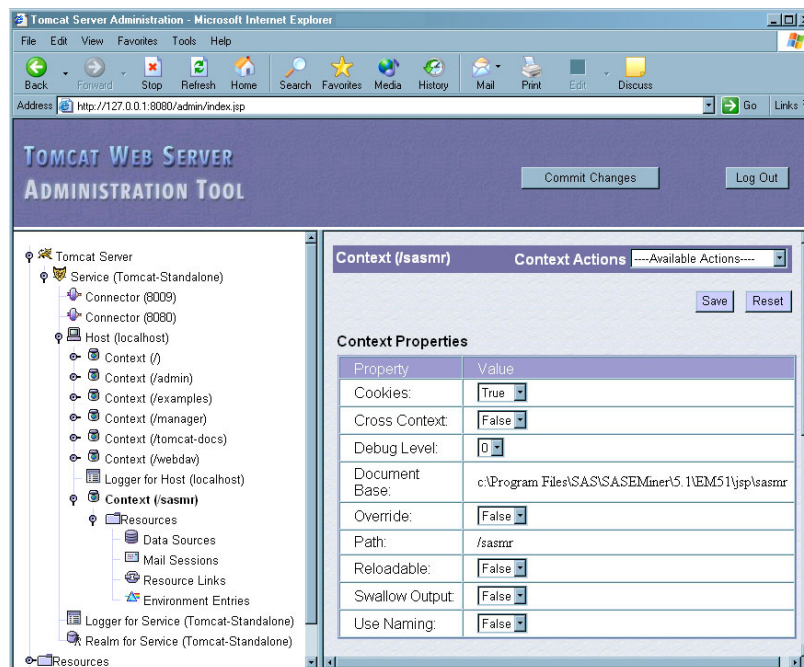
Note: These instructions assume that the default Windows and UNIX installation paths were used. The default path for Windows is **c:\Program Files\SAS\SASEminer\5.1\EM51**. The default path for UNIX is **/opt/SAS/SASEminer/5.1/EM51**. △

- 1 To enable the Tomcat write functions, remove the comment delineators from the following block of code in the WebDAV configuration XML file. For example, on Windows the file is typically found in **c:\Program Files\Apache Group\Tomcat 4.1\webapps\webdav\WEB-INF\web.xml**.

Note: If the comment delineators that are shown in the following code are not present, then the Tomcat WebDAV write functions are already enabled. △

```
<!--
  <init-param>
    <param-name>readonly</param-name>
    <param-value>>false</param-value>
  </init-param>
-->
```

- 2 As a best practice, use the Tomcat Web Server Administration Tool to define the SAS Enterprise Miner Model Viewer to Tomcat. On UNIX, you can launch the tool from the machine where Tomcat is installed by entering **http://localhost:8080/admin** into a Web browser (like Mozilla). (From a remote machine, enter the network address instead of **localhost**.) On Windows, you can launch the tool by selecting **Start ► Programs ► Apache Tomcat 4.1 ► Tomcat Administration**.
 - a In the navigation tree on the left, select **Tomcat Server ► Service ► Host**.
 - b In the display area to the right of the navigation tree, select **Create New Context** from the **Host Actions** drop-down list.
 - c In the **Document Base** field, enter the path to the viewer. Typically, the path is **c:\Program Files\SAS\SASEMiner\5.1\EM51\jsp\sasmr**.
 - d In the **Path** field, enter the context path. Typically, the path is **/sasmr**.
 - e Click the **Save** button. The context is added to the selected Host.



As an alternative to using the Tomcat Web Server Administration Tool, you can manually add the following context coding beneath the **<Host ...>** tag in the Tomcat server configuration XML file. The file is typically found in **c:\Program Files\Apache Tomcat 4.1\conf\server.xml**.

```
<!-- EM Model Viewer -->
<Context path="/sasmr"
  docBase="c:\Program Files\SAS\SASEMiner\5.1\EM51\jsp\sasmr"
  crossContext="false"
  debug="0"
  reloadable="false">
</Context>
```

Note: If the SAS Enterprise Miner installation path is other than that shown, change the location of the Document Base (**docBase=** value). △

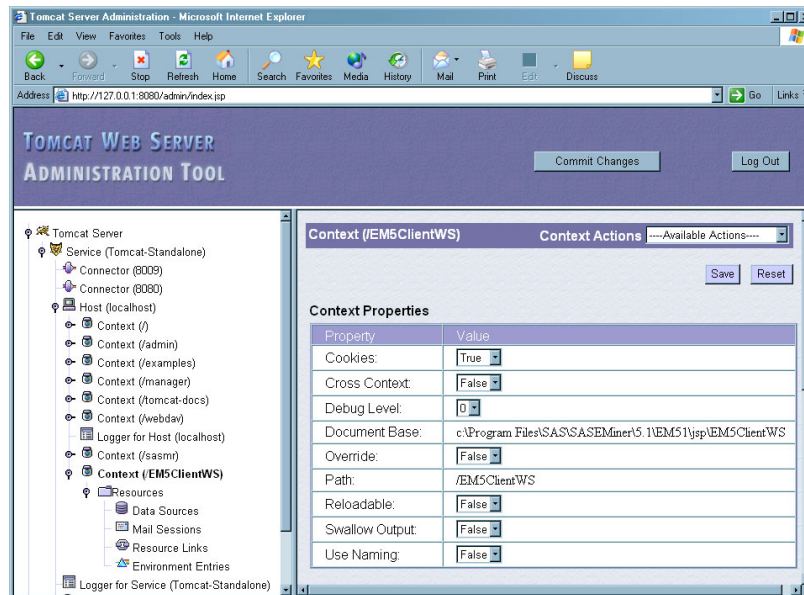
If the SAS Enterprise Miner Model Viewer is installed on a Tomcat server on which Tomcat security is enabled, the installer will need to grant permissions to Catalina for the model viewer. To accomplish this, you need to add the following item to the Catalina permissions file, typically located at **C:\Program**

Files\Apache Group\Tomcat 4.1\conf\catalina.policy or **C:\Tomcat 4.1\conf\catalina.policy**. Append these lines to the end of the module:

```
grant codeBase "file:C:/Program Files/SAS/SASEminer/5.1/EM51/jsp/sasmr/-"
{
    permission java.security.AllPermission;
};
```

where **C:/Program Files/SAS/SASEminer/5.1/EM51/jsp/sasmr/** (or its UNIX counterpart) is the docBase path to the **sasmr** application on the local disk, but with forward slashes even for Windows installations.

- 3 Use the Tomcat Web Server Administration Tool to define the SAS Enterprise Miner Java Web start client deployment to Tomcat.
 - a In the navigation tree on the left, select **Tomcat Server ► Service ► Host**.
 - b In the display area to the right of the navigation tree, select **Create New Context** from the **Host Actions** drop-down list.
 - c In the **Document Base** field, enter the path to the viewer. Typically, the path is **c:\Program Files\SAS\SASEminer\5.1\EM51\jsp\EM5ClientWS**.
 - d In the **Path** field, enter the context path. Typically, the path is **/EM5ClientWS**.
 - e Click the **Save** button. The context is added to the selected Host.



As an alternative to using the Tomcat Web Server Administration Tool, you can manually add the following context coding beneath the SAS Enterprise Miner Model Viewer in the Tomcat server configuration XML file:

```
<!-- EM Java Web Start Client -->
<Context path="/EM5ClientWS"
  docBase="c:\Program Files\SAS\SASEminer\5.1\EM51\jsp\EM5ClientWS"
  crossContext="false"
  debug="0"
  reloadable="false">
</Context>
```

Note: If the SAS Enterprise Miner installation path is other than that shown, change the location of the Document Base (**docBase=** value).

- 4 If you used the Tomcat Web Server Administration Tool, complete these tasks to exit the application:
 - a Click the **Commit Changes** button.

- b Click the `Log Out` button.
- 5 Customize the members `c:\Program Files\SAS\SASEMiner\5.1\EM51\jsp\EM5ClientWS*.jnlp` and change all occurrences of the example network address and HTTP server port from `mycomputer.mydomain.com:8080` to the proper network address and HTTP server port number of the computer on which the SAS Enterprise Miner Java application server is installed. There are two occurrences in `em5clientws.jnlp` and one occurrence each in `em5static.jnlp`, `em5un3rd.jnlp`, and `em5jhall.jnlp`.
- 6 Stop and restart the Tomcat HTTP server to apply the changes.
- 7 Access the SAS Enterprise Miner client that was deployed by using Java Web Start at `http://mycomputer.mydomain.com:8080/EM5ClientWS`.

Securing SAS Enterprise Miner Metadata

For thin-client installations, to secure access to the metadata objects that represent SAS Enterprise Miner projects, you grant or deny access to individual users or groups by using the **Authorization** tab for these metadata objects:

- ☐ the **SAS Enterprise Miner** folder
- ☐ the **Projects** folder
- ☐ individual projects
- ☐ the SAS application server that contains the logical SAS Workspace Server that is associated with the SAS Enterprise Miner projects.

Note: For stand-alone installations, there is no need to secure the metadata. △

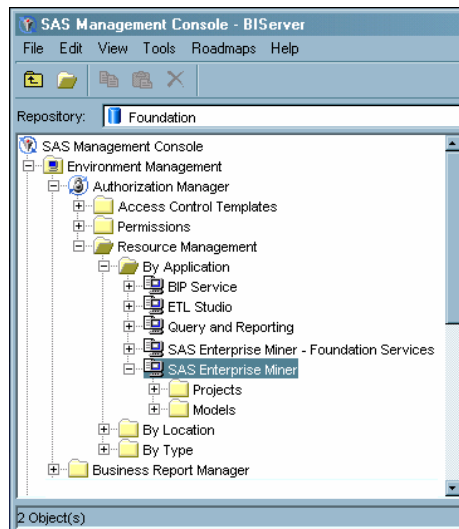
Note: Because all SAS Intelligence Platform applications use the metadata server when accessing resources, permissions that are enforced by the metadata server provide the strongest protections that are available in the metadata authorization layer. For more information, see . △

Note: Currently, you cannot secure SAS Enterprise Miner models. △

Securing Access at the SAS Enterprise Miner Folder Level

To access the **Authorization** tab for the **SAS Enterprise Miner** folder in the SAS Management Console navigation tree, complete these steps:

- 1 Use your metadata profile to log on to the SAS Metadata Server that contains the SAS Metadata Repository connection that you want to use.
- 2 Select **Environment Management ► Authorization Manager ► Resource Management ► By Application**.
- 3 Select the **SAS Enterprise Miner** folder.



4 Select **File ► Properties**.

5 Click the **Authorization** tab.

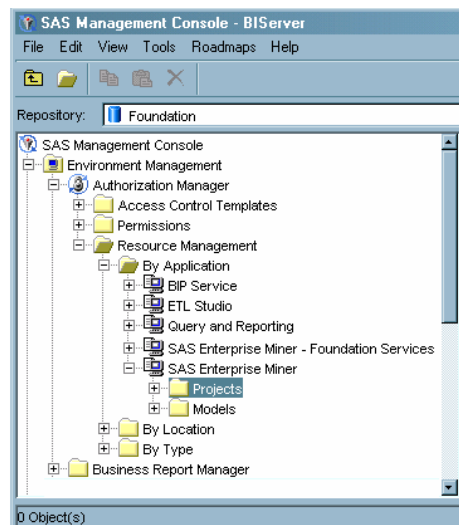
Note: For help on using the **Authorization** tab, click [Help](#). △

For example, if you deny ReadMetadata access to the **SAS Enterprise Miner** folder to UserA, then UserA will not be able to see any projects in SAS Enterprise Miner, unless you explicitly grant ReadMetadata permission to UserA on the **Projects** folder (see “Securing Access at the Projects Folder Level” on page 15).

Securing Access at the Projects Folder Level

To access the **Authorization** tab for the **Projects** folder in the SAS Management Console navigation tree, complete these steps:

- 1 Use your metadata profile to log on to the SAS Metadata Server that contains the SAS Metadata Repository connection that you want to use.
- 2 Select **Environment Management ► Authorization Manager ► Resource Management ► By Application ► SAS Enterprise Miner**.
- 3 Select the **Projects** folder.



- 4 Select **File ► Properties**.
- 5 Click the **Authorization** tab.

Note: For help on using the **Authorization** tab, click [Help](#). △

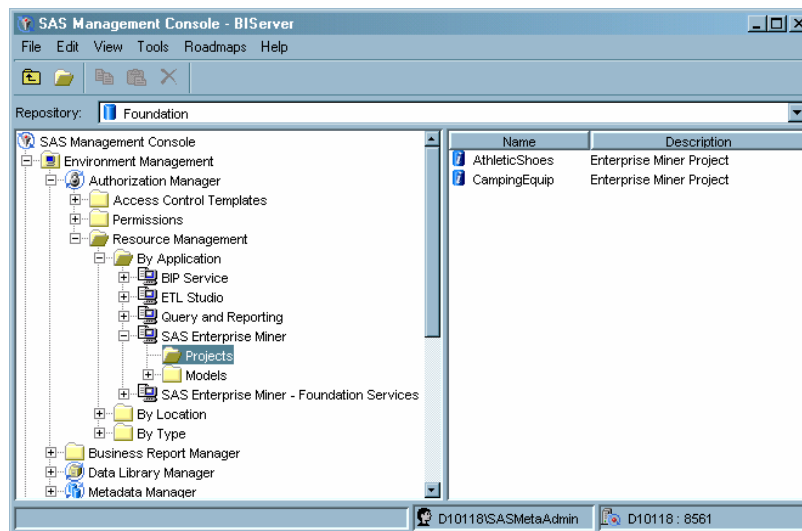
For example, if you deny ReadMetadata access to the **Projects** folder to UserA, then UserA will not be able to see any projects in SAS Enterprise Miner.

Permissions that you explicitly set on the **Projects** folder will override permissions set on the **SAS Enterprise Miner** folder.

Securing Access at the Individual Project Level

To access the **Authorization** tab for an individual project in the SAS Management Console navigation tree, complete these steps:

- 1 Use your metadata profile to log on to the SAS Metadata Server that contains the SAS Metadata Repository connection that you want to use.
- 2 Select **Environment Management ► Authorization Manager ► Resource Management ► By Application ► SAS Enterprise Miner**.
- 3 Select the **Projects** folder.
- 4 In the display area to the right of the navigation tree, select the project that you want to secure.



- 5 Select **File ► Properties**.
- 6 Click the **Authorization** tab.

Note: For help on using the **Authorization** tab, click [Help](#). △

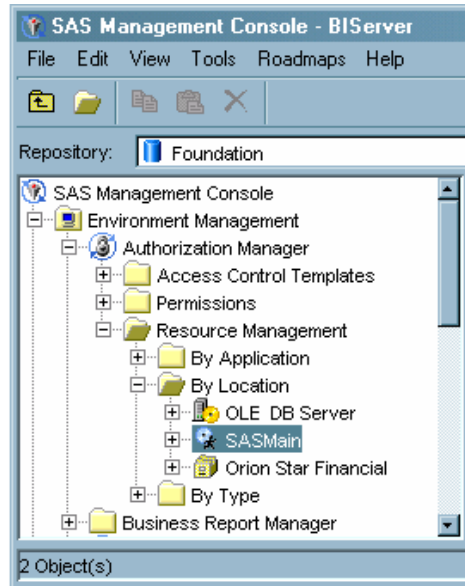
For example, if you deny ReadMetadata access to the **CampingEquip** project to UserA, then UserA will not be able to see the **CampingEquip** project in SAS Enterprise Miner. If you grant ReadMetadata but deny WriteMetadata, then UserA will be able to open the project but will not be able to save changes or delete it.

Note: If you have been denied ReadMetadata permission to the **Projects** folder that contains the project that you want to use, then you will not be able to physically navigate to the project even if you have been explicitly granted ReadMetadata permission to the project. △

Securing Access at the SAS Workspace Server Level

To access the **Authorization** tab for a SAS application server in the SAS Management Console navigation tree, complete these steps:

- 1 Use your metadata profile to log on to the SAS Metadata Server that contains the SAS Metadata Repository connection that you want to use.
- 2 Select **Environment Management ► Authorization Manager ► Resource Management ► By Location**.
- 3 Select the SAS application server that contains the SAS Workspace Server that is associated with your SAS Enterprise Miner projects.



- 4 Select **File ► Properties**.
- 5 Click the **Authorization** tab.

Note: For help on using the **Authorization** tab, click [Help](#). △

For example, if you deny ReadMetadata access to the **SASMain** application server to UserA, then UserA will not have access to any projects associated with that server.

