Paper 297-2012

Best Practices for Administering SAS® Enterprise Guide®

Casey Smith, SAS Institute Inc., Cary, NC

ABSTRACT

Customers and clients just want it to work. Management wants it to be secure and "intuitive" while sliding you a list of ten new unrelated "action items" needed, "when you aren't busy". You are in the middle, the grease between the cogs. When your phone rings, it isn't going to be someone gushing about how smooth everything is running. Sound familiar? If part of your work is administering and supporting people using SAS Enterprise Guide, then don't miss this talk. We cover deployment issues, environment customization, handling libraries, roles, SAS® Grid Manager support, migration, and project maintenance. Come learn about the SAS Enterprise Guide tools designed to make administrative life just a bit easier.

INTRODUCTION

This paper focuses on administration topics specific to SAS Enterprise Guide. The administration of the SAS Intelligence Platform is traditionally done through SAS Management Console, which allows the control of "metadata" used by various SAS components to locate and consume resources (libraries, folders, security settings, and so on). SAS Enterprise Guide is often offered with this platform as a way of extending its power and improving its approachability. SAS Enterprise Guide is a Microsoft Windows application giving users a familiar paradigm in which to work.

Understanding how SAS Enterprise Guide fits in your environment improves your ability to successfully administer it. SAS Enterprise Guide communicates with a SAS Metadata Server, which defines and controls access to resources in your organization. SAS Enterprise Guide also requires a local or remote SAS Workspace Server used to process SAS language code. The extensibility of SAS Enterprise Guide allows it to be leveraged by numerous SAS and third-party components. For example, with a SAS Stored Process Server, SAS Enterprise Guide can create and execute SAS Stored Processes. With a SAS OLAP Server or a third-party OLE DB-compatible OLAP provider, SAS Enterprise Guide can explore OLAP cubes. With SAS Web Infrastructure Platform services and SAS Content Server, SAS Enterprise Guide can save and access content in a central content repository. SAS Enterprise Guide can also leverage SAS Grid Manager, SAS[®] Forecast Server, SAS[®] Enterprise Miner ™, DBMS data servers, and more.

CUSTOMIZING YOUR DEPLOYMENT

One of the first goals of an administrator is planning how to get the appropriately configured software into the hands of your users. A standard deployment of SAS Enterprise Guide and some instruction will get your users up and going. However, if you want more control over your deployment and less instruction for your end users, you have the ability to customize your deployment. It is a good idea to consider whether you want to deploy SAS Enterprise Guide with a custom connection profile and/or custom options. A custom deployment allows you to preset options so that users have fewer configuration details to worry about; meaning you have fewer questions to (repeatedly) answer.

DEPLOYING WITH A CUSTOMIZED CONNECTION PROFILE

Since a SAS Metadata Server is the window through which SAS Enterprise Guide sees the rest of the SAS world, the first step in using SAS Enterprise Guide is configuring a profile to access it. A profile contains the information needed to make a connection to a SAS Metadata Server.

Best Practices for Administering SAS® Enterprise Guide®, continued

Display 1. Example Profile Settings

If your planned deployment includes a SAS Metadata Server, a profile called "My Server" will be created automatically for your SAS Enterprise Guide client installations, which points to this server. Your SAS Enterprise Guide users will be saved the step of manually creating this profile. SAS Enterprise Guide will automatically connect to your configured SAS Metadata Server when the application is started. Generally, an installation will use only a single SAS Metadata Server. However, certain advanced installations might wish to target different SAS Metadata Servers, or environmental changes might cause the connection information to change.

If your SAS Metadata Server connection information does change, your users will have to take manual steps to update their profiles to accommodate these changes. Updating profile information in SAS Enterprise Guide is very straightforward. However, it can be made even easier by storing a desired profile configuration in a shared location and directing your users to reference it.

To create a shared profiles configuration:

1.   From within SAS Enterprise Guide, select **Tools►SAS Enterprise Guide Explorer.**

2.   From within SAS Enterprise Guide Explorer, select **Tools►Profile Deployment Wizard.**

3.   On page 2 of the wizard, make any desired changes to your current local profiles as well as specifying the default active profile, if you have more than one. The profiles defined here, as well as the active profile, will be stored in the shared profiles configuration.

4.   On page 3 of the wizard, you can test each profile connection if desired.

Best Practices for Administering SAS® Enterprise Guide®, continued

5. On page 4 of the wizard, provide the shared network location where you plan to store the shared profiles configuration. It needs to be a location that the SAS Enterprise Guide client machines can access.

6. On page 5 of the wizard, specify a temporary location to save the SDSUpdate.xml and SDSControl.xml files, and then click **Next** and **Finish**.

7. Move or copy the SDSUpdate.xml file, which is the profiles configuration without user IDs and passwords, from the temporary location where you saved it to the shared network location you specified in the wizard, ensuring that the path is identical.
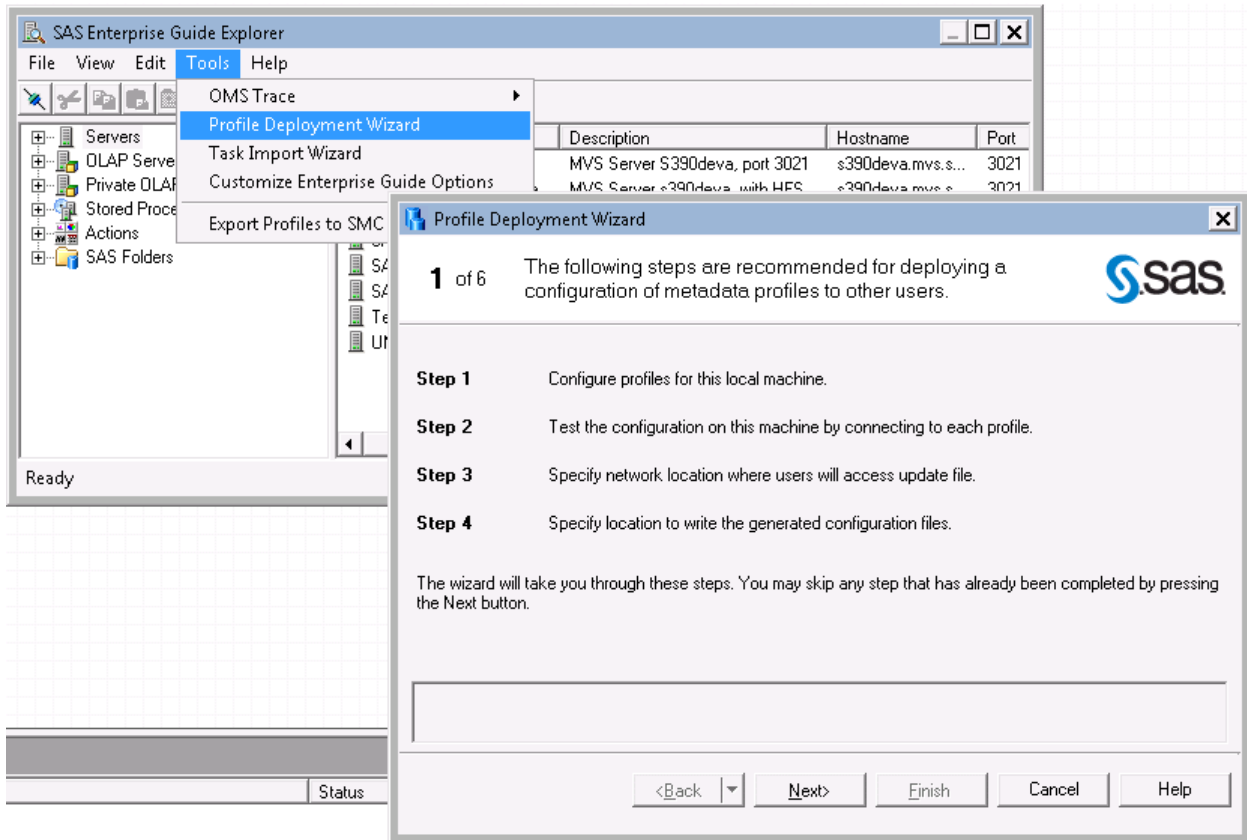
Display 2. Profile Deployment Wizard

Now that you have created a shared profile configuration, the SAS Enterprise Guide clients will have to be configured to reference it, which can be done by following these steps:

1. Click the connection link, which is on the right side of the status bar at the bottom of SAS Enterprise Guide (see Display 3), to bring up the Connections dialog box.
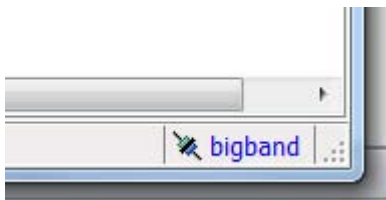
Display 3. Connected Profile Link

2. In the Connections dialog box, click the **Updates** tab.

3. Check the **Update configuration automatically** option and specify the path to the folder that contains the shared profiles configuration file, SDSUpdate.xml.

4. Optional. Click **Check for updates now** to immediately replace your personal profiles configuration with the shared profiles configuration.

Best Practices for Administering SAS® Enterprise Guide®, continued
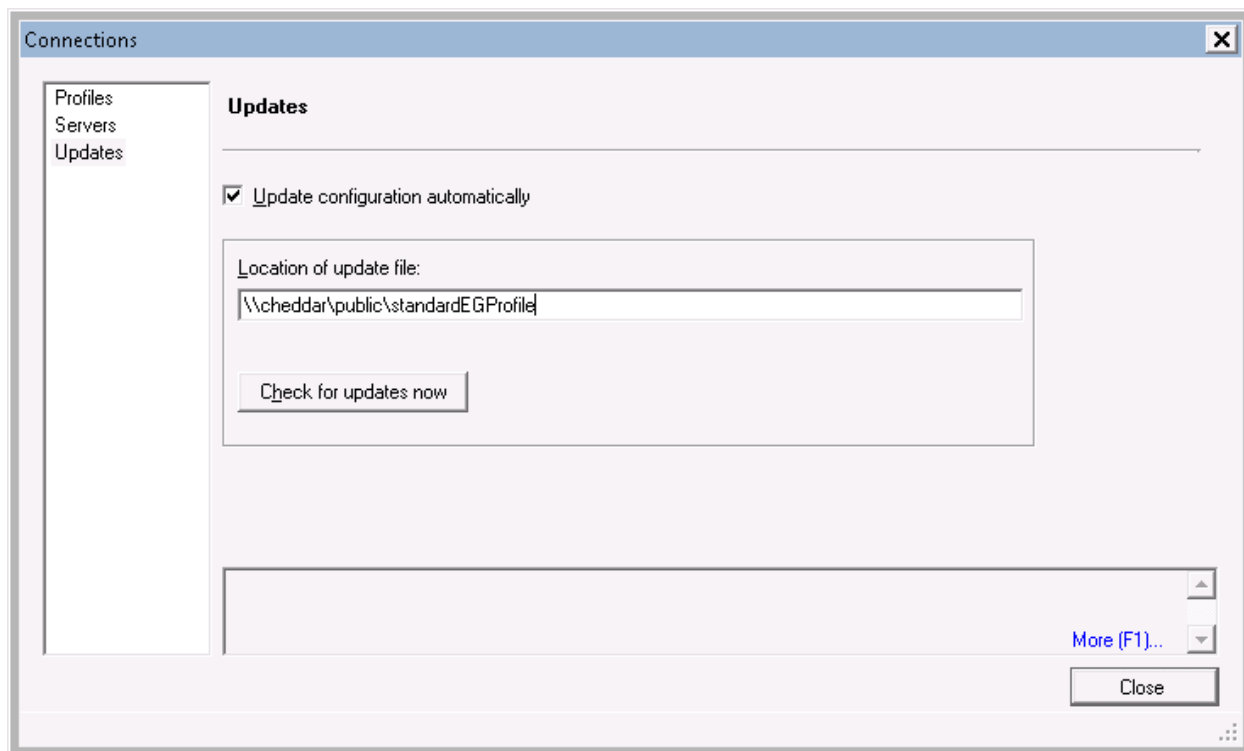
Display 4. Automatic Profiles Configuration Updates

When the **Update configuration automatically** option is set, the SAS Enterprise Guide client will check at start-up to see if the shared profiles configuration at the specified location has changed. If it has changed, the local profiles configuration will be replaced by the shared one, so any customizations your users have made will be lost! Make sure your users know to back up their profiles configuration if they make changes they do not want to lose when automatically updated.

If you have not already deployed SAS Enterprise Guide, or you are planning a new deployment, instead of instructing your users to manually reference the shared configuration file, you can do it for them. You have the ability to deploy the SAS Enterprise Guide clients pre-configured to use the shared profiles configuration, such that the clients will automatically pick up any updates made to the shared profiles configuration. To achieve this, copy the SDSControl.xml file you created earlier, which contains the automatic update instructions, to the SAS Enterprise Guide product directories in your SAS Software Depot.

Note: In a 9.3 SAS Software Depot, the SAS Enterprise Guide product directories should begin with `\SAS Software Depot\products\eguide__93`, with different folders for different languages and platforms. For example, `\SAS Software Depot\products\eguide__93130__win__en__sp0__1` is for English on a 32-bit Microsoft Windows platform. You will need to copy the SDSControl.xml file to all the SAS Enterprise Guide product directories you want automatically configured.

When the SAS Deployment Wizard installs your SAS Enterprise Guide clients, the SDSControl.xml file, if present in the appropriate SAS Enterprise Guide product directory, will also be deployed to the client machines. You can confirm that the SDSControl.xml file was properly deployed by ensuring the **Update configuration automatically** option and the **Location of update file** options discussed earlier are set appropriately after a fresh client installation. You can also make sure that the SDSControl.xml file exists on the client in the "all users" shared settings location (for example, %allusersprofile%\SAS\SharedSettings\5.1), which will cause it to be copied to the user application data location of each SAS Enterprise Guide user on the machine.

DEPLOYING WITH CUSTOMIZED OPTIONS

SAS Enterprise Guide surfaces lots of options from the **Tools►Options** menu that allow users to customize the behavior of the application. Many of these options are personal preferences while others have a direct impact on performance and server utilization. For example, a data source from a Base SAS engine library is locked when simply being viewed in the data grid. The **Close data grid after period of inactivity** option on the **Data►Performance**

4

Best Practices for Administering SAS® Enterprise Guide®, continued

panel, will close an inactive data grid after 30 minutes by default, releasing the lock on that data source. It is a very good idea to keep this option turned on and assigned a relatively short time period, so one of your users does not unintentionally prevent other individuals or processes from accessing the data. As an administrator, it is a good idea to be aware of these sorts of options and the impact they can have.
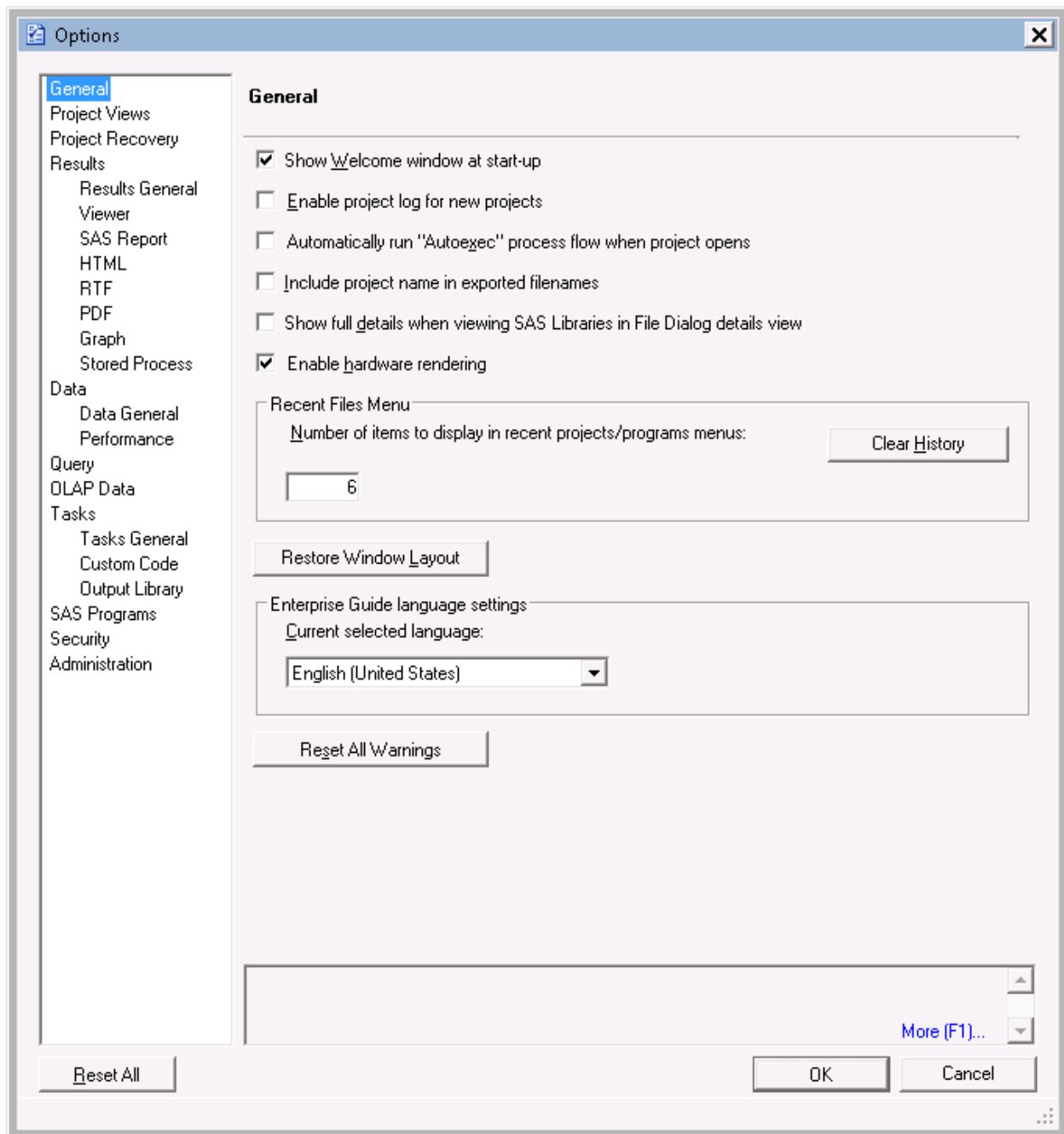
Display 5. SAS Enterprise Guide Options

Similar to deploying custom profiles, SAS Enterprise Guide provides the ability to deploy customized default options. Once you have familiarized yourself with the capabilities of the product, you might decide you want your users to start with a default set of options different from out-of-the box defaults. You can achieve this with the following steps:

1. From within SAS Enterprise Guide, select **Tools►SAS Enterprise Guide Explorer.**

2. From within SAS Enterprise Guide Explorer, select **Tools►Customize Enterprise Guide Options.**

Best Practices for Administering SAS® Enterprise Guide®, continued

3. You will be presented with the same options dialog box that appears when you select **Tools►Options** in SAS Enterprise Guide. Set the options as you desire.

4. Click **Save As** and save the EGOptions.xml file to a temporary location.

5. Copy the EGOptions.xml file to the SAS Enterprise Guide product directories in your SAS Software Depot that you want to be automatically configured.

When the SAS Deployment Wizard installs your SAS Enterprise Guide clients, if the EGOptions.xml file is present in the SAS Enterprise Guide product directory, it will be deployed to the client machines. You can confirm the EGOptions.xml file was properly deployed to the client by ensuring it exists in the SAS Enterprise Guide installation directory (for example, `C:\Program Files\SASHome\SASEnterpriseGuide\5.1`) and the customized options appear in **Tools►Options** in SAS Enterprise Guide. Clicking **Reset All** changes all the options back to your customized defaults.

If you are deploying both customized profiles and options, both the SDSControl.xml and EGOptions.xml files will need to be in the SAS Enterprise Guide product directories in your SAS Software Depot before your client installations.

AUTOMATING CLIENT INSTALLATIONS

SAS Enterprise Guide is installed using the SAS Deployment Wizard, which must be run on every client machine. However, the SAS Deployment Wizard offers a record and playback feature that enables you to automate your client installations. This feature is useful for deploying SAS Enterprise Guide to many machines and preventing your users from having to manually provide input during the installation. It requires you to record a response file that contains the desired responses to the SAS Deployment Wizard page options. You then run the SAS Deployment Wizard on each client with the response file as input. For more information, see the *SAS 9.3 Intelligence Platform: Installation and Configuration Guide*.

CUSTOMIZING THE INTERFACE WITH ROLES

SAS Enterprise Guide is a powerful tool and contains many features. As someone wise once said, "With great power comes great responsibility." As an administrator, you have the ability to relieve your users of some of that responsibility by controlling their access to certain features of the product through the use of roles.

Roles are defined in metadata and configured using the User Manager plug-in in SAS Management Console. When SAS Enterprise Guide Server Data is installed on the SAS Metadata Server, the SAS Enterprise Guide role metadata comes with four predefined roles:

Role Name	Role Description
Enterprise Guide: Advanced	Provides all capabilities in SAS Enterprise Guide.
Enterprise Guide: Analysis	Provides basic data analysis, reporting, and other capabilities.
Enterprise Guide: OLAP	Supports viewing OLAP cubes in the OLAP Analyzer and provides other capabilities.
Enterprise Guide: Programming	Provides SAS programming, stored process authoring, and other capabilities.

Table 1. Predefined SAS Enterprise Guide Roles

A role contains a collection of capabilities that define which specific features of the product are available to the members of that role. Roles allow you to customize the application interface for different individuals or groups, based on their responsibilities. Consider the responsibilities of your users and decide if it makes sense to subset the functionality they have access to.

By default, the PUBLIC group is a member of the Enterprise Guide: Advanced role, thus every user will have access to all the SAS Enterprise Guide features. If you decide to provide your users with targeted functionality, you will first need to remove PUBLIC from the Enterprise Guide: Advanced role. Then, you can either assign your users to one of the four predefined roles, or you can create new roles. I recommend creating new roles over altering one of the predefined roles, since there is no automatic way to revert the capability settings in the predefined roles to their defaults.

Best Practices for Administering SAS® Enterprise Guide®, continued
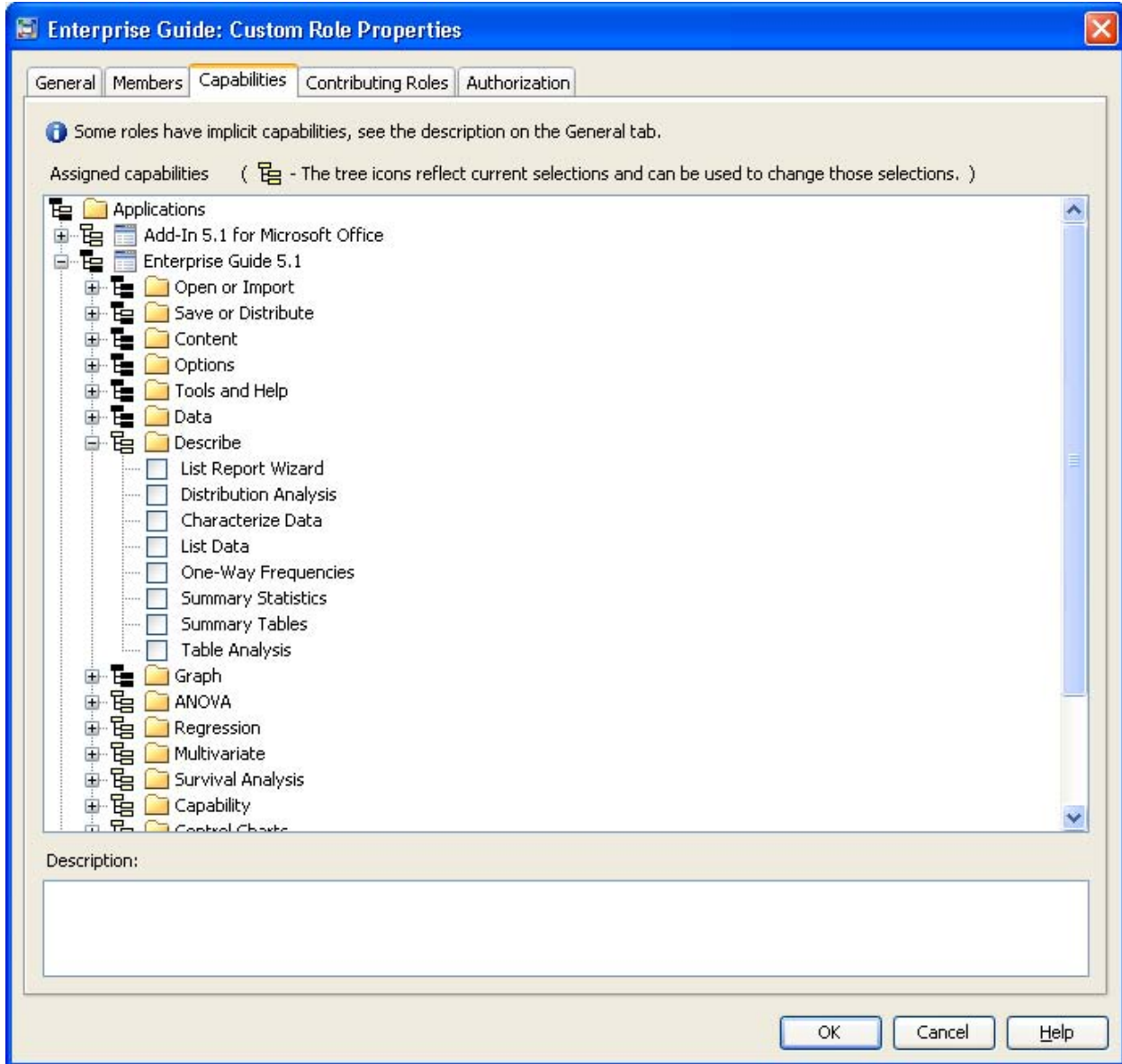
Display 6. Enabling or Disabling Role Capabilities in SAS Management Console

In Display 6, notice I created a custom role with all the Describe tasks disabled. I added a user as a member of the role, then when I log on to SAS Enterprise Guide as that user, the Functions: Restricted link appears on the status bar next to the active connection. The Functions: Restricted link appears only if you have one or more capabilities disabled.

**Display 7. Restricted Functions Link on Status Bar**

If you click the **Functions** hyperlink, it brings up the Function Settings dialog box, which lists the capabilities that you do and do not have access to.

Best Practices for Administering SAS® Enterprise Guide®, continued
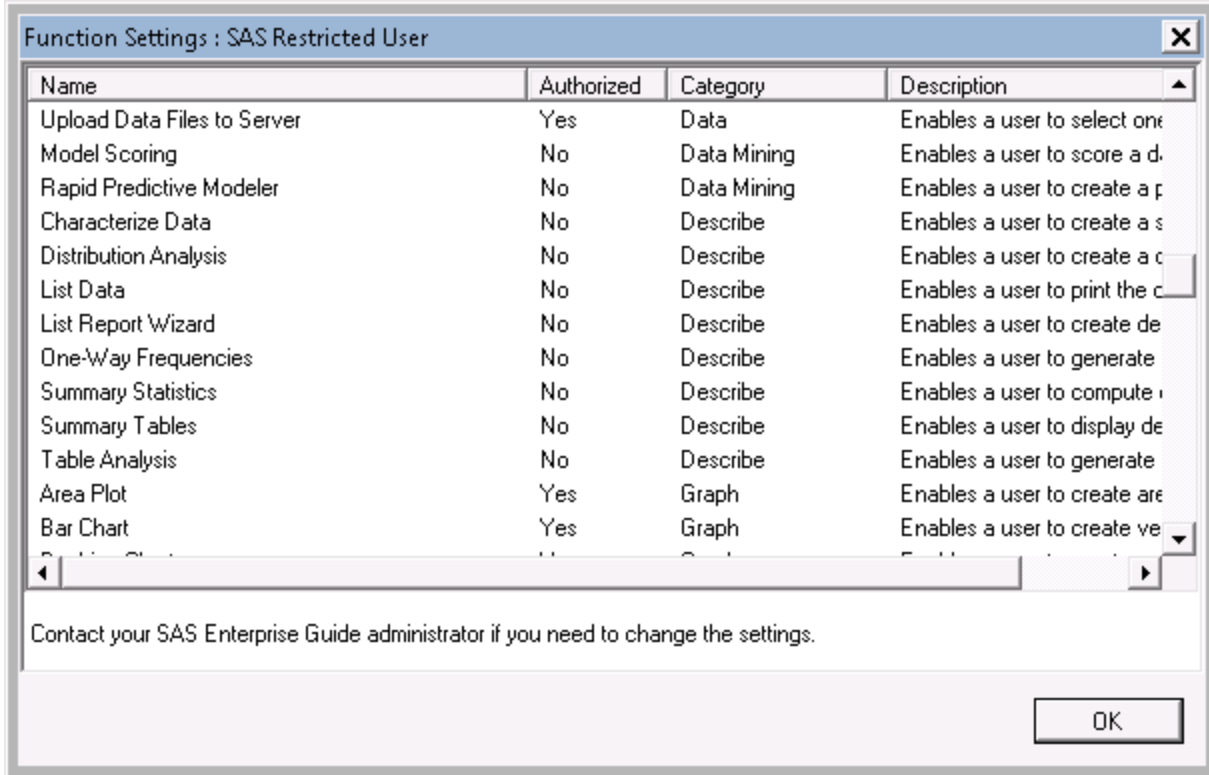
Display 8. Restricted Functions List in SAS Enterprise Guide

In Display 9, notice the Describe category and others do not appear on the Tasks menu on the left as a result of the disabled capabilities. When a capability is disabled, the associated feature is not displayed in the application.
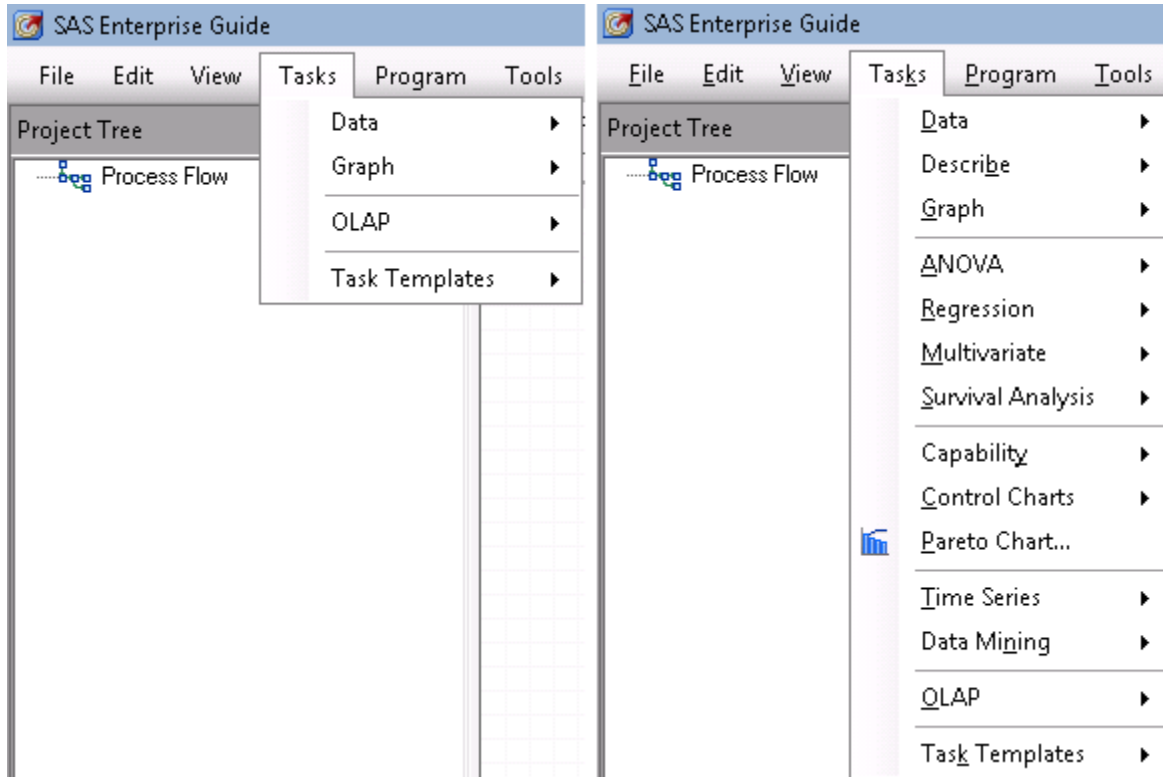
Best Practices for Administering SAS® Enterprise Guide®, continued

Display 9. Customized Interface from Disabled Capabilities

Custom tasks, which extend the functionality of SAS Enterprise Guide, can be registered in metadata and then enabled or disabled the same as built-in tasks. Use the Task Import Wizard on the **Tools** menu of the SAS Enterprise Guide Explorer tool to import custom tasks into metadata roles.

It is very important to note that disabling capabilities is not a substitute for security! Rather, roles simply provide a way to customize the application interface per user responsibilities. For example, if you disable the Modify All Options capability, a user will not be able to edit any of the options in the Options dialog box in SAS Enterprise Guide. However, this will not prevent them from directly editing the EGOptions.xml file to make changes.

MANUALLY IMPORTING ROLE METADATA

Role metadata is version specific and independent. You must have each version of the SAS Enterprise Guide Server Data installed to be able to configure roles for the corresponding client versions. For example, if you have SAS Enterprise Guide users on versions 5.1 and 4.3, you will need both SAS Enterprise Guide Server Data 5.1 and 4.3 installed on your SAS Metadata Server to control both. When multiple versions are installed, each version will appear in each role as a separate application and will need to be configured independently.

Getting multiple versions of SAS Enterprise Guide Server Data on a SAS Metadata Server can be tricky if not migrating your metadata, since software orders include only the version associated with the SAS Enterprise Guide version in the order. For example, suppose you want to upgrade your clients to a newer SAS Enterprise Guide version, but you don't want to upgrade your metadata server. If you want the new SAS Enterprise Guide clients to honor role capabilities, you'll have to put the new client role metadata on your existing metadata server. The ApplicationMetadataUtility tool (part of the SAS Platform Object Framework) will help you achieve this. Here are the steps for manually importing SAS Enterprise Guide Server Data 5.1 using a 9.3 software depot (the steps should be very similar for other versions) into a metadata server:

1. Make sure you have a good backup of your metadata repositories.

2. Copy the eguidedata_appSC.appxml.orig file from your 9.3 depot location **\SAS Software Depot \products\eguidedata__93130__prt__xx__sp0__1\eguidedata_gen.zip\Config\Deployment\Metadata** and save it as EG51.appxml in a temporary location. This file has an Application element at the top with values that we will need to manually substitute.

3. Open the eguidedata_default.properties file from your 9.3 depot location **\SAS Software Depot \product_data\eguidedata__93130__prt__xx__sp0__1\configure** to find the substitution values.

4. Open the eguidedata_config.xml file from your 9.3 depot location **\SAS Software Depot \products\eguidedata__93130__prt__xx__sp0__1\eguidedata_gen.zip\Config** and search for the "filterset" elements to see exactly how the substitution values are mapped.

5. Replace the keys in the Application element in EG5.1.appxml with the proper substitution values. Here is an example for 5.1:

```
<Application
       Name="Enterprise Guide 5.1"
       ProductName="Enterprise Guide 5.1"
       ClassIdentifier="eguidedata"
       Desc="Enterprise Guide 5.1"
       Major="5"
       Minor="1"
       SoftwareVersion="5.1"
       SpecVersion="5.1"
       Folder="/System/Applications/SAS Enterprise Guide/Enterprise Guide Srvr
Data 5.1"
       Platform=""
       ProductIdentifier=""
       SpecVendor=""
       Vendor=""
       VendorIdentifier=""
    >
```

6. If using the 9.2 ApplicationMetadataUtility with an appxml file from a 9.3 software depot, you'll need to remove the xmlns= attribute from the root ApplicationMetadata element at the top of the EG5.1.appxml file as well as comment out the Custom Tasks category element (search for CategoryName="eguide_CustomTasks") by

Best Practices for Administering SAS® Enterprise Guide®, continued

wrapping it with HTML-style commenting (<!-- and -->), since these are not valid in the 9.2 ApplicationMetadataUtility.

7.   From a machine with the SAS Platform Object Framework installed, run the ApplicationMetadataUtility (located in `C:\Program Files\SAS\SASPlatformObjectFramework\9.2` for 9.2 or `\SASHome\SASPlatformObjectFramework\9.3` for 9.3) from a command line with the following command:

   `ApplicationMetadataUtility.exe –host <hostname> -port <port> -user <userid> - password <password> <xmlFile>`

   Where <hostname> is your metadata server host name, <port> is your metadata server port, <userid> is the user id to login to the metadata server, <password> is the password to login to the metadata server for the specified userid, and <xmlFile> is your edited EG5.1.appxml file name.

After running the ApplicationMetadataUtility, you should see the new application and related capabilities on the Capabilities tab of each role in the User Manager plugin in SAS Management Console.

You can use similar steps to import older client role metadata into a newer metadata server. For example, if you have a 9.3 metadata server with SAS Enterprise Guide 5.1 role metadata only (no 4.3 role metadata), but you have SAS Enterprise Guide 4.3 clients, you can import 4.3 role metadata into your 9.3 metadata server using the ApplicationMetadataUtility.

Another way to achieve this is to export the desired role metadata from an existing metadata server and then import it into your target metadata server. Of course, it requires having access to a server that already contains the desired role metadata.

If you make a mistake or just want to start over, you can delete the imported role metadata by going to the Folders view in SAS Management Console, navigating to `\System\Applications`, expand SAS Enterprise Guide, right-click the desired version sub-folder, and then click Delete.

ADMINISTERING ACCESS TO DATA

After figuring out how to get the configured and customized software to your users, the most important next step is to figure out how to give them access to the appropriate data. After all, it is all about the data!

SAS accesses data through libraries and there are lots of ways to assign libraries. This is a larger topic than I can adequately cover here. I recommend reading the *SAS 9.3 Intelligence Platform: Data Administration Guide* to thoroughly explore the topic. Ultimately, you will define libraries in metadata to match your users to their appropriate level of data access. However, there are some unique library considerations for SAS Enterprise Guide.

SAS Enterprise Guide lists libraries that are defined in metadata as well as any libraries that are currently assigned on the server. Libraries denoted with a yellow icon are currently assigned, and libraries with an uncolored icon are defined in metadata, but not currently assigned. Therefore, a library with an initial yellow icon is a pre-assigned library (perhaps by a LIBNAME statement in an autoexec file or the pre-assigned option is checked in the library's metadata definition and the METAAUTOINIT option is turned on). SAS Enterprise Guide retrieves information about each library, so having many, especially pre-assigned, libraries can have a negative performance impact.

Best Practices for Administering SAS® Enterprise Guide®, continued
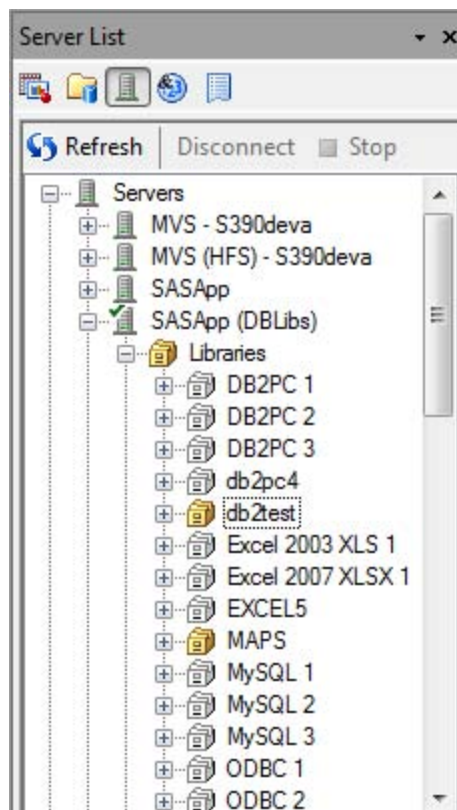
Display 10. Libraries in Server List

SAS Enterprise Guide provides an Assign Project Library wizard from the **Tools** menu. The Assign Project Library is a point-and-click way to create a repeatable library assignment as a step in a project. A SAS language LIBNAME statement is generated from the wizard settings and executed on the selected server, which means it is active only for the duration of the workspace session. It has the same behavior as a user submitting a LIBNAME statement in a program. Other users are unaffected.

By contrast, the SAS Enterprise Guide Explorer, accessed from the **Tools** menu in SAS Enterprise Guide, allows a user with appropriate permissions to define and configure libraries in metadata, similar to the way it is done in SAS Management Console. Since defined in metadata, configuring a library this way does impact other users and applications.

One of the most important things to understand related to data access and SAS Enterprise Guide is that SAS Enterprise Guide does not force users to work in a metadata-aware context. What this means is that a user with the ability to submit code can submit a LIBNAME statement (or use the Assign Project Library wizard, or any of a number of other ways) to get direct access to the physical data, bypassing any metadata layer permissions that might have been applied to defined libraries.

RESTRICTING USERS TO LIBRARIES DEFINED IN METADATA

As an administrator, it can be frustrating to realize that end users can subvert your efforts by bypassing the metadata layer permissions. All it takes is submitting a SAS LIBNAME statement to the physical location of the data. I recently saw an attempt to plug this hole by creating a statement-style macro called LIBNAME and putting it in a stored, compiled macro catalog:

```
libname mstore "C:\SAS\Config\Lev1\SASApp\SASEnvironment\SASMacro";
options implmac mstored sasmstore=mstore;
%macro libname(p1, p2, p3, p4, p5, p6, p7, p8) /stmt store des="Disable Libname";
%put ERROR: Use of the Libname statement is not allowed;
%mend;
```

Then, when users submit a LIBNAME statement they will get an error in the log with the message specified in the macro:

Best Practices for Administering SAS® Enterprise Guide®, continued

```
29         libname foo 'C:\temp';
ERROR: Use of the Libname statement is not allowed
```

First, enabling statement-style macros has performance overhead. Second, if users figure out it was just a macro, they could define their own macro named "LIBNAME" that would override it, and thus regain full access to the LIBNAME statement:

```
37         %macro libname;
38         %mend;
39         libname foo 'C:\temp';
NOTE: Libref FOO was successfully assigned as follows:
```

Third, this would do nothing to prevent users from directly reading the binary data stream and writing it back out to a location they have access to:

```
filename in "c:\tmp\secret.sas7bdat";
filename out "%sysfunc(getoption(work))\notsecret.sas7bdat";
data _null_;
  length fin 8 fout 8;
  r = '20'x;
  fin = fopen('in','I',1,'B');
  fout = fopen('out','O',1,'B');
  do while(fread(fin)= 0);
    rc = fget(fin,r,1);
    rc = fput(fout, r);
    rc =fwrite(fout);
  end;
  rc = fclose(fin);
  rc = fclose(fout);
run;
```

You could disable the Create or Modify SAS Program capability, which would completely remove their ability to submit code from the program editor. However, you would have to also disable the Add or Modify Custom Code to SAS Task and the Create or Modify SAS Stored Process capabilities, since they are both other places user-code could be executed to access the data. At this point, you are severely limiting the usefulness of the product, yet holes still remain. Users could still write a custom task or a simple application using IOM interfaces to submit their own code.

As long as users have the necessary host operating system permissions, they will be able to directly access and read a SAS table. So, what this boils down to is that any real data security must be put in place at the physical host operating system layer.

RESTRICTING ACCESS TO PHYSICAL DATA THROUGH INFORMATION MAPS

SAS Information Maps contain business metadata that is applied to data sources. They allow users to work with a more user-friendly representation of the data, instead of working directly with the raw data sources. It is not uncommon for administrators to want to force their users to be able to access data only through information maps, and not be able to access the source data. The query executed by the INFOMAPS engine is done on your behalf on a standard workspace server, using your credentials. Therefore, for the information map to be able to retrieve the data, you have to be able to retrieve the data, which means you cannot restrict access to the physical data in this default configuration. However, you can restrict access to the physical data by configuring server-side pooling. The SAS Pooled Workspace Server runs with the service account sassrv, so if you give sassrv host access to the data and deny host access to your users, the INFOMAPS engine will still be able to access the physical data through the SAS Pooled Workspace Server, but your end users will not be able to. Be aware this mediated access approach has a performance side effect, since the INFOMAPS engine will have to use remote access to access the data. When opening an information map in this configuration, an error in the log will indicate that direct access was not possible and that it is reverting to remote access, which should then access the information map data just fine, although potentially slower. So, don't be alarmed by the error.

INTEGRATING WITH SAS GRID MANAGER

SAS Grid Manager provides enterprise scheduling, workload management, and parallel workload management in a distributed grid environment. SAS Enterprise Guide can be configured for seamless submission to the SAS grid, leveraging the workload management capabilities of the grid. Prior to 5.1, each SAS Enterprise Guide client had to be

Best Practices for Administering SAS® Enterprise Guide®, continued

manually configured to use the SAS grid. (See http://support.sas.com/rnd/scalability/grid/download.html.) Integration with the SAS grid has been significantly improved with SAS Enterprise Guide 5.1.

SAS Enterprise Guide 5.1 automatically detects the presence of a grid by looking for a grid server definition in metadata. If it finds one, it is also automatically configured. It is no longer necessary to manually configure pre- and post-code for initializing and destructing the grid connection. The server list icons now indicate the presence of a grid with a pound (#) symbol, as well as the connected state of both the workspace server (green check mark) and the grid (green background on the pound symbol).
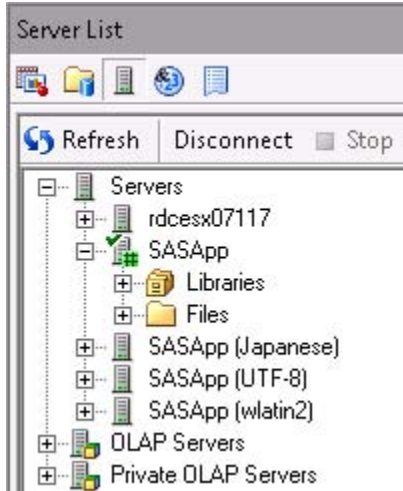
Display 11. Server Icon Indicates Presence and Connected State of Grid

## GETTING CONNECTED TO THE GRID

Use of the grid can be controlled by an administrator through metadata or left to the end users. You can force your end users to use the grid by adding an extended attribute named "EGGridPolicy" on the logical grid server with a value of Force.
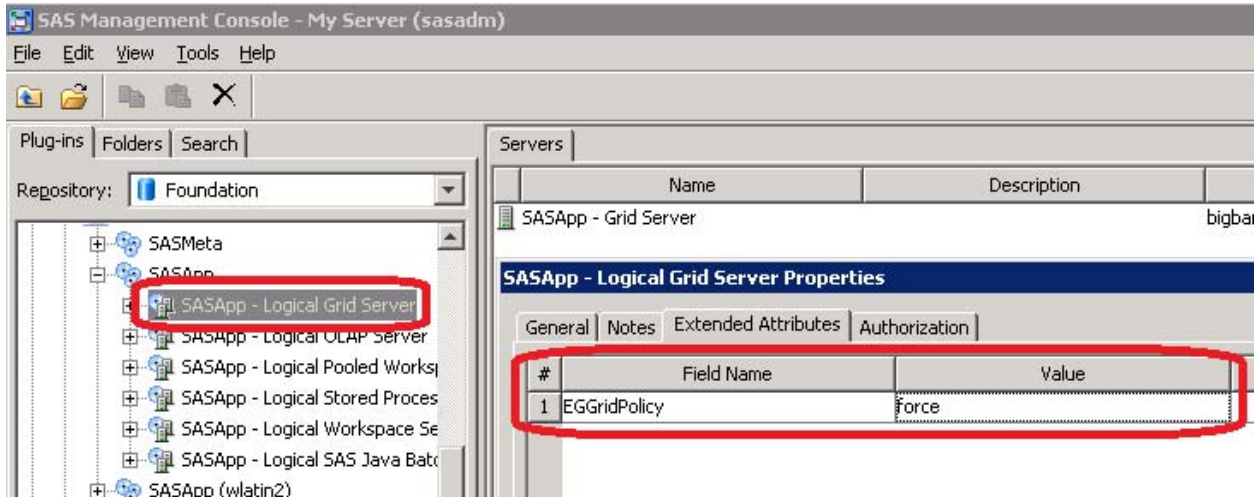
Display 12. Forcing Users to Use the Grid

If the grid policy is not forced in metadata, then users can control usage of the grid at the project level or individual task level. To enable the grid at a project level, select **File►Project Properties►Code Submission**, and then check **Use grid if available**.

Best Practices for Administering SAS® Enterprise Guide®, continued
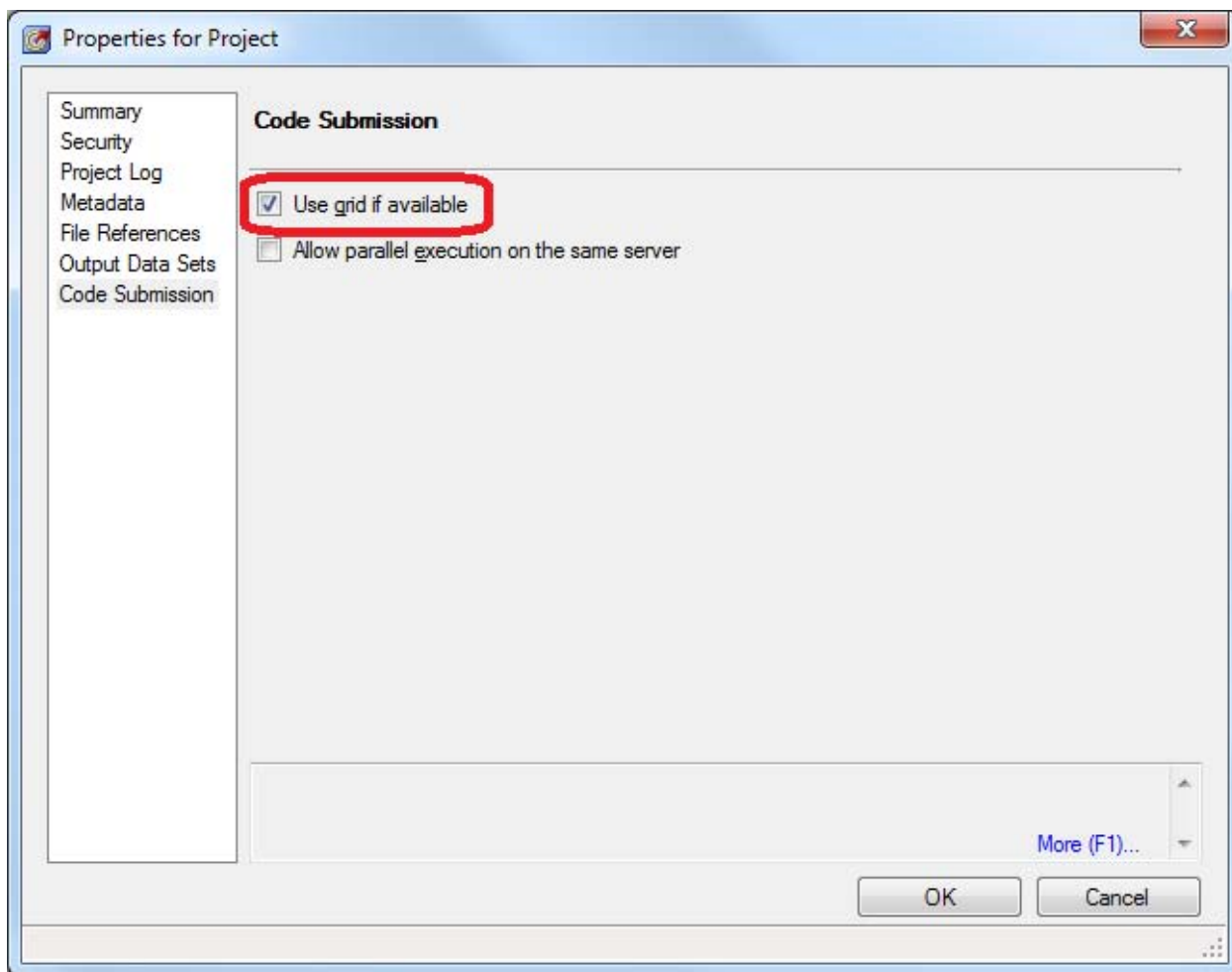
Display 13. Using the Grid at the Project Level

While the project grid setting applies to all project items by default, the usage of the grid can be overridden at the individual task level. You can access this override setting by right-clicking the item, clicking **Properties**, and then clicking the **Code Submission** page.

Best Practices for Administering SAS® Enterprise Guide®, continued
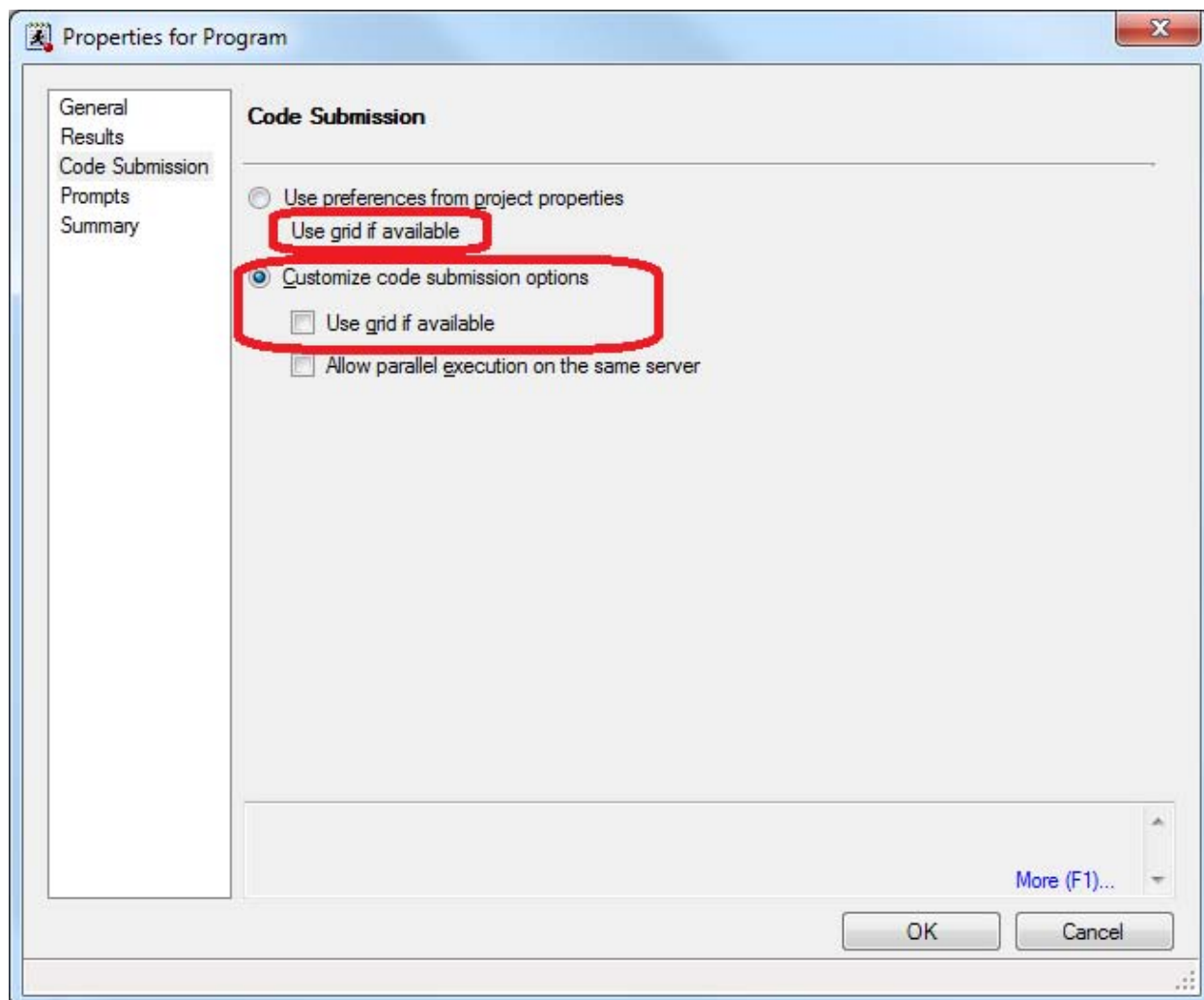
Display 14. Using the Grid at the Task Level

CONTROLLING WHEN THE GRID CONNECTION IS MADE

There are several considerations in deciding when to make a connection to the grid:

When Connection Is Made	Pros	Cons
Connect as soon as we connect to a workspace.	• Grid-specific libraries are available right away.	• There is extra overhead (in time) connecting to the grid. • If there is a problem connecting to the grid, it could prevent us from using the workspace server. • If we don't need the grid, we are taking up grid slots unnecessarily.
Defer connecting to the grid until we actually run a task on the grid.	• Don't pay the extra overhead until we know we need it. • If the workspace works, but the grid doesn't, we can still use the workspace.	• The first time you create a task, the grid-specific libraries are not available to use.

Best Practices for Administering SAS® Enterprise Guide®, continued

	We don't want to waste grid slots unnecessarily.	

Table 2. Pros and Cons of Different Grid Connection Timing

SAS Enterprise Guide allows users to control when they feel it is best to make a grid connection by selecting **Tools►Options►SAS Programs►Initialize grid (if available) when connecting to a workspace**. Connection to the grid is deferred by default. If the connection to the grid is deferred, the user has the ability to explicitly connect to the grid at any time by right-clicking the server in the server list and clicking **Connect to Grid**. Users might explicitly connect to the grid, so they get access to the Gridwork library, which is assigned as a result, from within tasks.

HOW TO KNOW IF A TASK IS RUNNING ON THE GRID

The task status view now has a Server Type column. If a task is running on the grid, it will show Grid. If it is running on a workspace server, it will show Workspace.

Task	Status	Queue	Server	Server Type
Program1	Connecting to server...		SASApp	Grid
Program2	Waiting on [Program1]...		SASApp	Workspace

Display 15. Server Type Displayed in Task Status View

With minimal configuration, accessing your grid environment in SAS Enterprise Guide 5.1 just works!

PROMOTING PARALLEL EXECUTION

Why do one thing at a time if you can do two? With minimal configuration, SAS Enterprise Guide can run independent jobs in parallel. Your users will certainly appreciate their jobs finishing faster.

One workspace session, which corresponds to one sas.exe process, is spawned when an instance of SAS Enterprise Guide connects to a SAS Workspace Server. The spawned workspace session is reused throughout the SAS Enterprise Guide session, unless explicitly disconnected. Therefore, when you run more than one job against the same SAS Workspace Server context (for example, SASApp), the jobs are run sequentially using the one sas.exe process. Each job has to wait its turn in line for execution on the server.

In Display 16, there are three independent programs in the process flow, yet only the first program is currently executing. Notice in the Task Status window that all three programs are associated with one workspace server (SASApp), and therefore, the other two programs are waiting. Program3 is waiting on Program2 to finish and Program2 is waiting on Program1 to finish. The example uses three independent programs for the sake of clarity; instead of individual programs, they could easily be long, complex process flow branches.

Best Practices for Administering SAS® Enterprise Guide®, continued
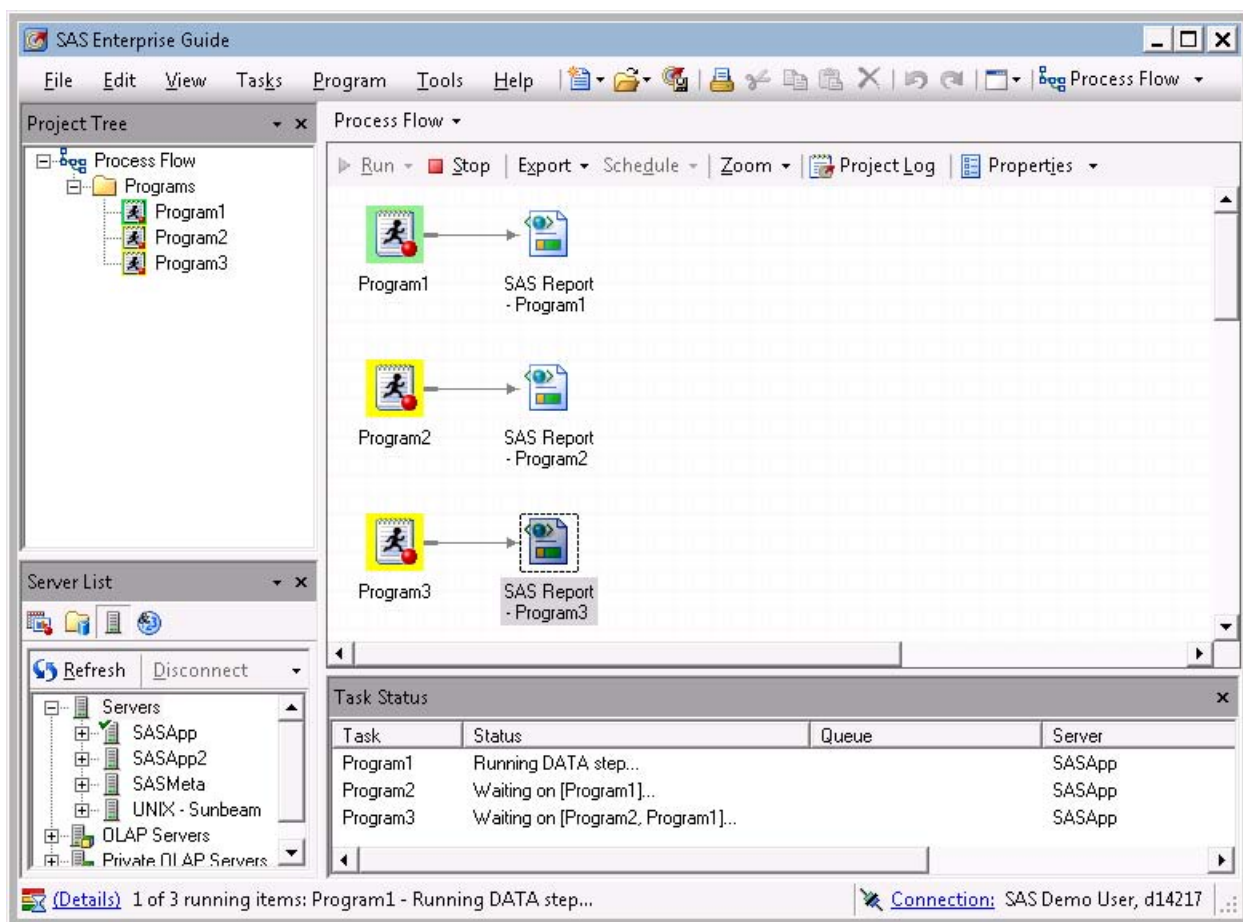
Display 16. Independent Programs Running Sequentially

By defining two or more logical SAS Workspace Servers (for example, SASApp2, SASApp3, and so on), you enable your users to run independent jobs in parallel by associating the jobs with different logical servers. Use the Server Manager plug-in in SAS Management Console to create additional server definitions, though we will not cover that here. To associate a program with a different server in SAS Enterprise Guide, right-click the program, click **Select Server**, and then click the desired server. This approach works even if the additional server contexts are defined against the same physical server. A workspace session will be spawned for each workspace server context, allowing multiple jobs to be run in parallel and leveraging the multiple cores on your server.

In Display 17, notice that Program1 and Program2 are executing simultaneously, while Program3 is waiting on Program1. Program1 and Program2 are able to run at the same time, because they are using separate workspace sessions as a result of running them on different logical servers (SASApp and SASApp2). Program3 is still associated with SASApp, and therefore, is waiting on Program1 to finish.

Best Practices for Administering SAS® Enterprise Guide®, continued
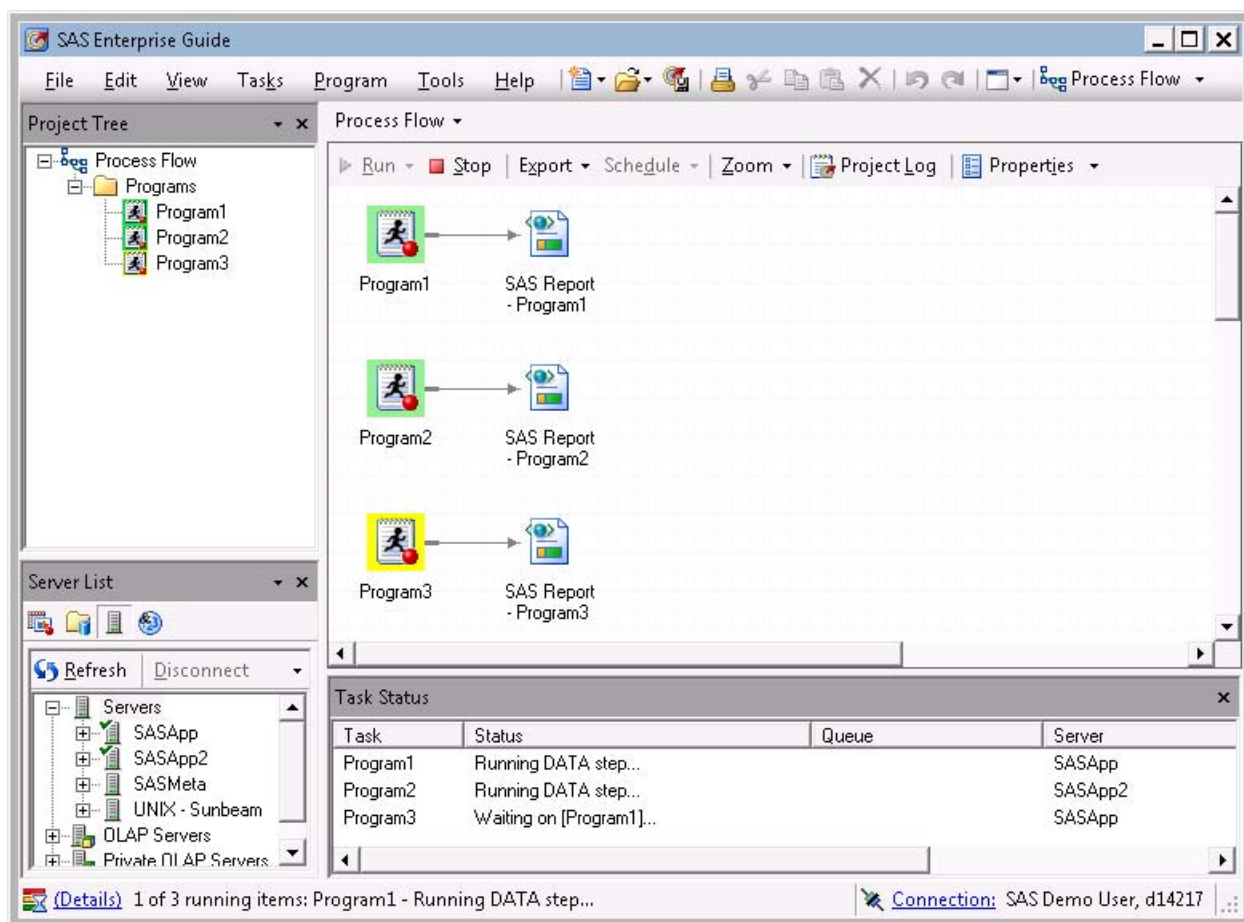
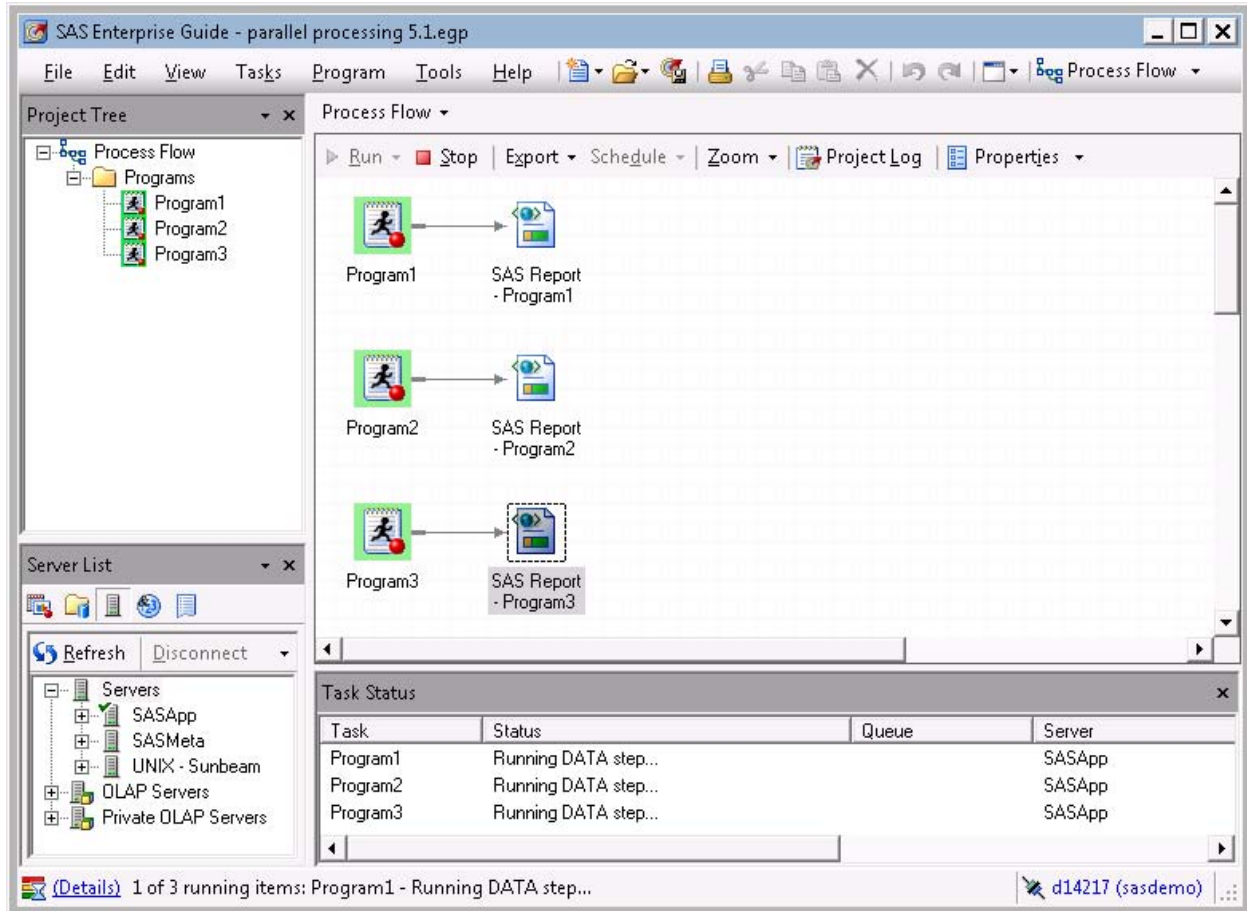**Display 17. Independent Programs Running Simultaneously on Different Logical Servers**

Having to create additional server contexts and keep them in sync is a drawback to this approach. Even without multiple logical servers, your users can leverage multiple workspace sessions by executing jobs from multiple instances of SAS Enterprise Guide. This alternative approach of working out of multiple SAS Enterprise Guide instances has its own obvious pain.

SAS Enterprise Guide, starting with 5.1, supports executing independent jobs in parallel on the same logical server. It achieves this by requesting additional workspace server sessions as needed, using the same server context. This feature (off by default) must be turned on one of two ways:

- From the **File** menu, select **Project Properties►Code Submission.** Then check **Allow parallel execution on the same server**. Setting the option here at the project level causes it to apply to everything in the project by default.

- Right-click a program, select **Properties►Code Submission**, and then click **Customize code submission options**. Check **Allow parallel execution on the same server**. Setting the option here at the element level causes it to apply only to the element.

When the **Allow parallel execution on the same server** option is enabled, if independent jobs are identified, additional workspace sessions will be requested to run them at the same time. Also, realize that since multiple workspaces sessions are being used, anything specific to the state of a workspace session will not exist in the other workspace sessions. Submitting a LIBNAME statement, setting an option, creating a macro variable or function, or creating data in the Work library are all examples of operations that affect workspace server state and would not be available in other workspace sessions.

Best Practices for Administering SAS® Enterprise Guide®, continued

**Display 18. Independent Programs Running Simultaneously on Same Logical Server**

Another point worth noting is that combining the **Allow parallel execution on the same server** option with the **Use grid if available** option will result in multiple workspace sessions, and therefore, multiple grid nodes running in parallel, which can be very powerful.

MIGRATING PROJECTS

Upgrading SAS Enterprise Guide client versions often does not require a platform upgrade. For example, 4.2, 4.3, and 5.1 are all compatible with 9.2 servers. Versions 4.3 and 5.1 are also compatible with 9.3 servers. However, a SAS Enterprise Guide project file is upgraded when opened in a more current client version and you cannot go backward. Therefore, it is important not to open and save (overwrite) your projects in a new version of the client unless you know you are not going to open it again in the previous version of the client. For example, suppose you have a side-by-side installation of SAS Enterprise Guide 4.3 and 5.1. Once you open and save your 4.3 projects in 5.1, you will no longer be able to open the projects again in 4.3. Likewise, if you send a project to someone, they will have to have the version of the client that the project was saved in or later. (This also applies to projects saved on metadata servers.)

When you do encounter platform or hardware changes, there are tools for batch updating your project references. The primary tool is the Migration wizard (MigrationWizard.exe), which can be found in the SAS Enterprise Guide installation directory. The Project Maintenance dialog box (which you open by selecting **Tools►Project Maintenance** serves a similar purpose but is for the currently open project, whereas the Migration wizard can handle lots of projects at a time. By following the steps in the wizards, you can map old resources (servers, libraries, and data sets) to new resources, thereby updating your projects' references appropriately.

Best Practices for Administering SAS® Enterprise Guide®, continued

Display 19. Mapping Old Resources to New Resources
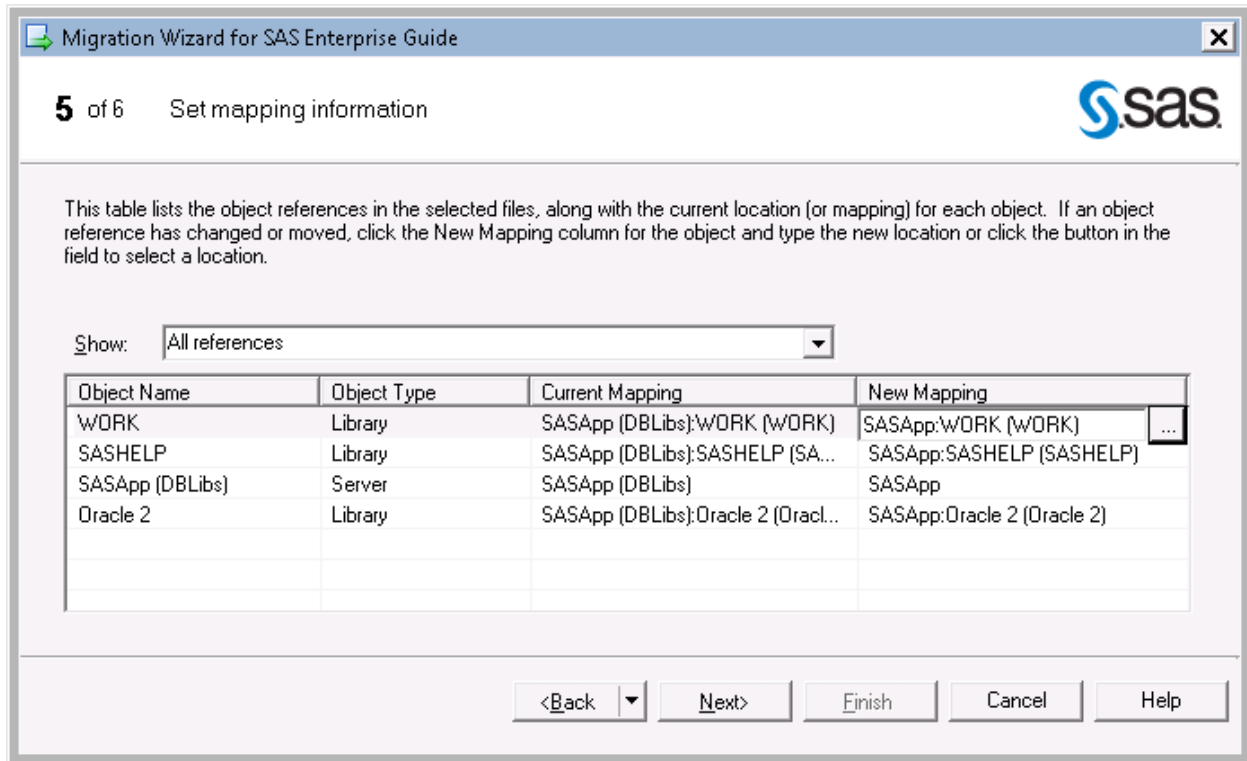
OTHER CONSIDERATIONS

JUST SAY NO TO SHELL ACCESS REQUESTS

The XCMD option (or ALLOWXCMD spawner option) would give your users the ability to execute shell commands on your server, which could result in potentially harmful operations such as file deletion. As a result of the security risks, it is very unlikely you want your users to be able to execute shell commands on your server. Fortunately, NOXCMD is the default. To avoid potential risk, it is a best practice to keep it that way.

```
x 'del *.*'; /* Oh no! ;
```

CONCLUSION

SAS Enterprise Guide has a number of features to help with customized deployments, data access management, grid computing, parallel processing, and project migration. Understanding and promoting these features will help your users get the most out of SAS Enterprise Guide.

REFERENCES

SAS Institute Inc. 2011. *SAS Intelligence Platform: Data Administration Guide*. Cary, NC: SAS Institute Inc. Available at http://support.sas.com/documentation/cdl/en/bidsag/62767/PDF/default/bidsag.pdf.

SAS Institute Inc. 2011. *SAS Intelligence Platform: Desktop Application Administration Guide*. Cary, NC: SAS Institute Inc. Available at http://support.sas.com/documentation/cdl/en/bidaag/63126/PDF/default/bidaag.pdf.

SAS Institute Inc. 2011. *SAS Intelligence Platform: Security Administration Guide*. Cary, NC: SAS Institute Inc. Available at http://support.sas.com/documentation/cdl/en/bisecag/63082/PDF/default/bisecag.pdf.

RECOMMENDED READING

- *SAS Intelligence Platform: Data Administration Guide*

Best Practices for Administering SAS® Enterprise Guide®, continued

- *SAS Intelligence Platform: Desktop Application Administration Guide*

- *SAS Intelligence Platform: Installation and Configuration Guide*

- *SAS Intelligence Platform: Security Administration Guide*

CONTACT INFORMATION

Your comments and questions are valued and encouraged. Contact the author:

Casey Smith
SAS Campus Drive
SAS Institute Inc.
E-mail: Casey.Smith@sas.com