TROUBLESHOOTING YOUR SAS ENVIRONMENT
Host

Vanessa Porter
Presenter

Peter Hobart
• In Listen Mode

• Control bar opened with the white arrow in the orange box
9.4

Data Sources

- SAS Data Sets
- SAS OLAP Cubes
- SAS Scalable Performance Data (SPD) Engine Tables
- SAS Scalable Performance Data (SPD) Server
- SAS Web Infrastructure Platform Data Server
- Third-party Data Stores
- Enterprise Resource Planning (ERP) Systems

SAS Servers

- SAS Metadata Server
- SAS Workspace Server
- SAS Pooled Workspace Server
- SAS OLAP Server
- SAS Stored Process Server
- Running SAS processes for distributed clients

Middle Tier

- SAS Web Server
- SAS Web Application Server
- SAS Web Infrastructure Platform
- SAS Content Server
- Other infrastructure applications and services

Clients

Desktop clients:
- SAS Add-In for Microsoft Office
- SAS Data Integration Studio
- SAS Enterprise Guide
- SAS Enterprise Miner
- SAS Forecast Studio
- SAS Information Map Studio
- SAS Management Console
- SAS Model Manager
- SAS OLAP Cube Studio
- SAS Workflow Studio
- JMP
- Other SAS analytics and solutions

Web browser (to surface Web applications)

Mobile devices (to view some types of reports)
METADATA SERVER

- Handles initial connections
- Stores information about information e.g.
  - Server definitions
  - Library definitions
  - Users and groups
  - Security
MIDDLE TIER

- Processes requests from web clients
  - Static content is served by the SAS Web server (e.g. PDF & HTML files)
  - Dynamic content is served by the SAS Web Application Server e.g. stored processes
    - The web app server may forward the request to another server e.g. SAS workspace server or SAS stored process server
COMPUTE TIER

• Performs the heavy lifting of data
  • Makes connections to data via libraries
  • Runs SAS data step and SQL code
• Primary servers:
  • Workspace
  • Stored process
  • OLAP
WORKSPACE SERVER

- Standard workspace server runs under the requesting user's OS identity.
- Pooled workspace servers, Stored process servers and OLAP servers run under a system OS account e.g. `sassrv`
- OLAP server is only used to serve cubes. Cube creation is performed on a workspace server using proc OLAP.
- OLAP is being superseded by in-memory technologies: VA/VAAR/VS
CHECKING SERVER STATUS IN WINDOWS SERVICES
CHECKING SERVER STATUS IN SAS ENVIRONMENT MANAGER

<table>
<thead>
<tr>
<th>Platforms (2)</th>
<th>Servers (11)</th>
<th>Services (520)</th>
<th>Compatible Groups/Clusters (0)</th>
<th>Mixed Groups (0)</th>
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</thead>
<tbody>
<tr>
<td>Server</td>
<td>Server Type</td>
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<tr>
<td>SASERVER</td>
<td>ActiveMQ 5.7</td>
<td>ActiveMQ 5.7</td>
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<tr>
<td>HQ Agent</td>
<td>HQ Agent</td>
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<td>Hyperic -</td>
<td>Apache Tomcat 6.0</td>
<td>Apache Tomcat 6.0</td>
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<td>PostgreSQL</td>
<td>PostgreSQL 9.x</td>
<td>PostgreSQL 9.x</td>
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<tr>
<td>SAS Config Level Directory 9.4</td>
<td>SAS Config Level Directory 9.4</td>
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<td>SAS Home Directory 9.4</td>
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<td>SAS tc Runtime SASServer1 1</td>
<td>SpringSource tc Runtime 7.0</td>
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<td>SAS vFabric Web Server 5.2 Web Server</td>
<td>vFabric Web Server 5.2</td>
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<tr>
<td>SAS Object Spawner - sasserver</td>
<td>SAS Object Spawner 9.4</td>
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<tr>
<td>SAS OLAP Server</td>
<td>SAS OLAP Server 9.4</td>
<td></td>
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</tr>
<tr>
<td>SAS Metadata Server</td>
<td>SAS Metadata Server 9.4</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>
AN AUTHENTICATED USER CANNOT CONNECT TO METADATA

- Common cause is that the identity stored in metadata does not match the identity returned by authentication
- The user will be identified as xxxx as public
- The public group is normally denied entry to the system

- To diagnose this either
  - Temporarily grant Read Metadata to public to see if this enables the user to log in
  - (Better) verify what is returned by your authentication process
COMMON PROBLEMS
AN AUTHENTICATED USER CANNOT CONNECT TO METADATA
COMMON PROBLEMS

AN AUTHENTICATED USER CANNOT CONNECT TO METADATA

Select Users

Select this object type:

Users or Built-in security principals

From this location:

SUKPJH1

Enter the object names to select (examples):

SUKPJH1\Elvis

Advanced...

OK

Cancel
COMMON PROBLEMS

AN AUTHENTICATED USER CANNOT CONNECT TO METADATA
• Note that a simple text comparison is performed
• Even though SUKPJH1 and localhost both resolve to 127.0.0.1, to SAS metadata SUKPJH1\Elvis and localhost\Elvis are different
COMMON PROBLEMS

ODBC CONNECTIONS NO LONGER WORK

- SAS is available on 64 bit Windows as 32 or 64 bit
- 64 bit applications cannot use 32 bit ODBC drivers
- Solution is to add a SAS PC Files Server to bridge the bitness gap
- Free download from http://support.sas.com/downloads/
- You will need a sas.com profile

<table>
<thead>
<tr>
<th>Platform</th>
<th>Description</th>
<th>Request Download</th>
<th>Size</th>
<th>Uncompressed</th>
<th>Release Date</th>
<th>ReadME</th>
</tr>
</thead>
<tbody>
<tr>
<td>Microsoft® Windows® for x64</td>
<td>SAS PC Files Server</td>
<td>pcfilsrv_94160_wx6_en_web_1.zip</td>
<td>375MB</td>
<td>408MB</td>
<td>2014-08</td>
<td>pdf</td>
</tr>
<tr>
<td>Windows</td>
<td>SAS PC Files Server</td>
<td>pcfilsrv_94160_win_en_web_1.zip</td>
<td>479MB</td>
<td>512MB</td>
<td>2014-08</td>
<td>pdf</td>
</tr>
</tbody>
</table>
COMMON PROBLEMS

ODBC CONNECTIONS NO LONGER WORK

SAS 32 bit Windows

Microsoft Access

Microsoft Excel

Other ODBC Data

SAS

PC Files Server

Installed on same host as the PC files

SAS 64 bit Windows / UNIX / Linux

32 bit

64 bit

ODBC Manager

SAS

32 bit Windows

32 bit

44 bit

Installed on same host as the PC files
COMMON PROBLEMS

A SMALL CHANGE TO A SERVER CAUSES IT TO FAIL

• Even backing out the change does not resolve the problem
• This may not be due to the change you just made!
• If a server was not refreshed or restarted after a previous change, your reboot may have activated the previous change.
• Delete all mods in usermods autoexec and config files and reboot again
• Look for odd entries in autoexec.sas and sasv9.cfg files
• Look for previous versions in the server folders or on backups
COMMON PROBLEMS

RESTARTING THE OBJECT SPAWNER CAUSES MULTIPLE SERVERS TO FAIL OR THE SPAWNER TO FAIL

• Again this may be a "refresh issue"
• In the object spawner, move all servers to "Available"
• Move them back one by one to identify the problem server(s)
RESTARTING THE SERVERS
## RECOMMENDED START-UP ORDER

### SERVER TIER

<table>
<thead>
<tr>
<th>Start Order</th>
<th>Server or Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>SAS Web Infrastructure Platform Data Server</td>
</tr>
<tr>
<td>2</td>
<td>SAS Metadata Server</td>
</tr>
<tr>
<td>3</td>
<td>SAS OLAP Server</td>
</tr>
<tr>
<td>4</td>
<td>SAS Object Spawner</td>
</tr>
<tr>
<td>5</td>
<td>SAS/SHARE Server</td>
</tr>
<tr>
<td>6</td>
<td>SAS/CONNECT Spawner</td>
</tr>
<tr>
<td>7</td>
<td>SAS Deployment Tester Server</td>
</tr>
<tr>
<td>8</td>
<td>SAS Distributed In-Process Scheduler Job Runner</td>
</tr>
<tr>
<td>Start Order</td>
<td>Server or Service</td>
</tr>
<tr>
<td>------------</td>
<td>-----------------------------------</td>
</tr>
<tr>
<td>9</td>
<td>JMS Broker</td>
</tr>
<tr>
<td>10</td>
<td>Cache Locator</td>
</tr>
<tr>
<td>11</td>
<td>SAS Web Application Server</td>
</tr>
<tr>
<td>12</td>
<td>SAS Web Server</td>
</tr>
<tr>
<td>13</td>
<td>SAS Environment Manager Server</td>
</tr>
<tr>
<td>14</td>
<td>SAS Environment Manager Agent</td>
</tr>
<tr>
<td>15</td>
<td>SAS Deployment Agent</td>
</tr>
</tbody>
</table>
Look for logs, usually under

**Meta:** `/sas/config/Lev1/SASMeta/MetadataServer/Logs`
- Logging is on by default and rolls over to a new log at midnight.
- Periodically, old logs should be deleted or archived
- Search for "error" using any text editor

**Compute:** `/sas/config/Lev1/SASApp/<Server>/logs`
- "Traditional" SAS syntax logging for interactive sessions is not on by default as it could generate large amounts of text.
- Enable "traditional" logging by modifying either:
  - The startup script `-log` option
  - The `autoexec_usermods.sas` `-altlog` option
- Note the user may need additional OS permissions to write logs to the server file system
- Logconfig.xml turns on `event` logging framework
• Start-up parameters for SAS servers are stored in configuration files. These SAS system options take effect each time you invoke SAS.

If you want to specify different values for system options, or if you want to specify additional options, then enter your updates and additions in sasv9_usermods.cfg, which is located in the same directory as sasv9.cfg. You must restart the server in order for the changes to take effect.
The SAS servers and spawners generate messages as events occur. These messages can be of different severity levels from informational to severe. They can be directed to a number of different locations, including the following:

- log files
- operating system logs
- SAS Management Console
• Logging for each server is enabled by a system option and configured in an XML file.
  • The LOGCONFIGLOC= system option is specified in the server’s sasv9.cfg file and points to the logging configuration file.
  • The logging configuration file is an XML file that configures what messages are captured and where they are sent.

```
LOGCONFIGLOC="path to logconfig.xml"
```

sasv9.cfg

logconfig.xml
LOGGERS AND APPENDERS

- Loggers and appenders define what messages are captured and where they are sent.

**Loggers**
Use a hierarchical system to categorize log events. They can be configured to go to multiple appenders.

**Appenders**
Represent a specific output destination for messages, including fixed files, rolling files, operating system facilities, and client applications.
LOGGERS

- SAS server logger names begin with one of the following categories, which process the following types of events:

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Admin</td>
<td>Relevant to systems administrators and computer operators</td>
</tr>
<tr>
<td>App</td>
<td>Related to specific applications</td>
</tr>
<tr>
<td>Audit</td>
<td>Related to user authentication and security administration</td>
</tr>
<tr>
<td>IOM</td>
<td>For servers that use Integrated Object Model (IOM) workspace server interface</td>
</tr>
<tr>
<td>Perf</td>
<td>Related to performance</td>
</tr>
</tbody>
</table>

- Settings of the Root logger are inherited by all other loggers by default.
• Some sample loggers that are useful for monitoring the metadata server and metadata are listed below.
  • App.Meta – is the default category for general metadata informational, warning, and error messages
  • App. Meta.CM – logs change management events, including check-in and check-out
  • Audit.Meta.Security – contains all events that are triggered by metadata changes that can affect or change authorization decisions for objects
  • Audit.Meta.Updates – captures events that are performed on metadata objects
• Log events have an associated diagnostic level.

<table>
<thead>
<tr>
<th>Diagnostic Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACE</td>
<td>Fine-grained informational events intended for SAS Technical Support</td>
</tr>
<tr>
<td>DEBUG</td>
<td>Fine-grained informational events useful in debugging an application and intended for SAS Technical Support</td>
</tr>
<tr>
<td>INFO</td>
<td>Informational events that highlight the process of an application</td>
</tr>
<tr>
<td>WARN</td>
<td>Warning events or minor problems that are external to the application</td>
</tr>
<tr>
<td>ERROR</td>
<td>Error events that might still enable the application to continue running</td>
</tr>
<tr>
<td>FATAL</td>
<td>Very severe events that most likely cause the application to end</td>
</tr>
</tbody>
</table>
APPENDERS

- SAS has several appender classes for processing messages.
  - Appenders to log messages to an operating system (ConsoleAppender, ZOSWtoAppender)
  - An IOM server appender to log messages from any IOM server (IOMServerAppender)
  - File appenders for writing log messages to a file on disk (FileAppender, RollingFileAppender)
  - Appenders to write to Windows, UNIX, and z/OS operating system logs (UNIXFacilityAppender, WindowsEventAppender, ZOSFacilityAppender)
The IOM Server Appender writes log messages from IOM servers to a volatile run-time cache. The contents of the cache are available for display in SAS Management Console.

Use the Server Manager options to specify a message level or threshold filter level.
The option settings filter the events that are already generated, based on the server’s logging settings.

<table>
<thead>
<tr>
<th><strong>Message Level</strong></th>
<th>Specifies a specific level of messages to be displayed in SAS Management Console.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Threshold Level</strong></td>
<td>Specifies the lowest level of messages to be displayed in SAS Management Console.</td>
</tr>
</tbody>
</table>
**APPENDERS**

- Appender specifications can include additional parameters to specify the following:
  - filename (fileNamePattern)
  - file header information (HeaderPattern)
  - layout of messages in file (ConversionPattern)
- These parameters typically use conversion characters referenced with a preceding percent sign, including the following:

<table>
<thead>
<tr>
<th>Conversion Character</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>%d</td>
<td>Date of logging event</td>
</tr>
<tr>
<td>%t</td>
<td>Identifier for the thread that generated logging event</td>
</tr>
<tr>
<td>%m</td>
<td>Application-supplied message lines associated with the logging event</td>
</tr>
</tbody>
</table>
• The best practice is to use the initial logging configuration files created by the SAS Deployment Wizard.

• If necessary, you can use the following methods for modifying server logging configurations:
  • adjust logging levels dynamically using the Server Manager plug-in
  • use alternative logging configuration files provided for troubleshooting
  • modify the server’s logconfig.xml file
The dynamic changes affect all logging produced by the server in question, but do not modify the logconfig.xml file. The changes persist until changed dynamically or the server is restarted.
ALTERNATIVE LOGGING CONFIGURATION FILES

• To assist in troubleshooting, alternative logging configuration files are provided for some servers, including metadata servers, OLAP servers, pooled workspace servers, stored process servers, and workspace servers.
  • The files are named logconfig.trace.xml.
  • Messages are written to the server’s rolling log file.

⚠️ • Performance issues can result from using these files.

⚠️ Do not modify the logconfig.trace.xml logging configuration files unless you are requested to do so by SAS Technical Support.
USING ALTERNATIVE LOGGING CONFIGURATION FILES

• To use an alternative logging configuration file, follow these steps:
  1. Stop the server if it is running.
  2. Rename the server’s logconfig.xml file as logconfig_orig.xml.
  3. Rename the server’s logconfig.trace.xml file as logconfig.xml.
  4. Restart the server if necessary.
  5. When troubleshooting is complete, stop the server if it is running. Rename logconfig.xml as logconfig.trace.xml and logconfig_orig.xml as logconfig.xml. Restart the server if necessary.
MODIFYING LOGCONFIG.XML FILES

• The following are some examples of changes that you might want to make to a server’s log configuration file:
  • Configure the RollingFileAppender to use a different log filename or to store the files in a different location.
  • Configure a different message layout for an appender.

• If you elect to modify the server’s logconfig.xml file, make a backup copy first.
MIDDLE TIER LOGGING

• Usually located under /SAS/Config/Lev1/Web/Logs
• SAS middle tier is based on Apache / Tomcat
• Middle tier logging not covered today but here are a few pointers to typical questions and issues
<table>
<thead>
<tr>
<th>MID - TIER COMPONENT COMPARISON</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>9.3</strong></td>
</tr>
<tr>
<td>SAS BI Web Services for Java</td>
</tr>
<tr>
<td>SAS Content Server</td>
</tr>
<tr>
<td>SAS Logon Manager</td>
</tr>
<tr>
<td>SAS Preferences Manager</td>
</tr>
<tr>
<td>SAS Shared Web Assets</td>
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<tr>
<td>SAS Stored Process Web Application</td>
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<tr>
<td>SAS Web Administration Console</td>
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<tr>
<td>SAS Web Infrastructure Platform Services</td>
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<td>SAS Workflow</td>
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<td>SAS Foundation Services</td>
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<tr>
<td>SAS Remote Services</td>
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</tbody>
</table>
MULTICAST

• SAS 9.3 requires multicast for the mid-tier components to communicate.
• Multicast communication is no longer used to communicate among SAS 9.4 middle-tier applications in a single SAS deployment (the set of applications connected to the same SAS Metadata Server).
• In SAS 9.4 multicast is turned off by default but is available if any customer-created custom applications require it.
LOAD BALANCING

• The SAS 9.4 **Web Application servers** can be load-balanced by the SAS HTTP server, improving scalability and resilience.
  • Session affinity is handled by the SAS HTTP server
  • The HTTP server represents a "single point of failure"
• Load balancing the **SAS HTTP server** requires third-party components e.g. f5 BIG_IP

See more at
#n0axzi2o0wubxan1cgaovjqqjfo.htm
WEB INFRASTRUCTURE PLATFORM DATABASE OPTIONS

- The SAS WIP Data Server and SAS Content Server in 9.4 use a database as a persistent store
  - PostgreSQL 9.1.9. (supplied by default)
  - The WIP can be configured to use a third-party vendor database
    - Oracle
    - MySQL
    - DB2
    - SQL Server
    - PostgreSQL
SECURITY

• Passwords in configuration files and metadata are encrypted or encoded
• Passwords in transit to and from SAS servers are encrypted or encoded. You can choose to encrypt all such traffic, instead of encrypting only credentials.
• SAS HTTP server can be configured to use HTTPS/TLS (1-way SSL)
  • Automatically during installation
  • Manually post-installation
• SAS WAS can be manually configured to use HTTPS/TLS (2-way SSL)
SECURITY AND LOAD - BALANCING

• If HTTPS is to be used, certificates must be available for the installation to proceed.
• If a load-balancer is to be used with HTTPS then the termination point for HTTPS (and therefore the location of certificates) must be defined.
POSSIBLE CONFIGURATIONS IN DETAIL

Configurations 1 and 3 are preferred
THANK YOU FOR ATTENDING
MIDDLE TIER    STATUS

- http://<machine>:7980/server-status
- http://<machine>:7980/server-info
- http://<machine>:7980/balancer-manager
SAS PLATFORM ADMINISTRATION

FREE SAS TUTORIALS

Free SAS Tutorials

View SAS training "how to" videos, tutorials, and demos to learn tips and tricks for working with SAS software.

Creating a SAS Table from an Excel-Generated CSV File

Learn how to use the DATA step to read a comma-separated-value file and create a SAS table.

More information and sources of help
Latest Activity

<table>
<thead>
<tr>
<th>Featured Posts</th>
<th>Popular Posts</th>
<th>Unanswered Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Image" /></td>
<td><img src="image2" alt="Image" /></td>
<td><img src="image3" alt="Image" /></td>
</tr>
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<td><strong>Hypothesis testing with ASE?</strong></td>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td>In: SAS Data Mining</td>
<td>Latest post by: Benjamin8</td>
<td></td>
</tr>
<tr>
<td><strong>SAS High-Performance Analytics Tip #1: How it diff...</strong></td>
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<td>0</td>
</tr>
<tr>
<td>In: SAS Communities Library</td>
<td>Latest post by: RadhikaMyneni</td>
<td></td>
</tr>
<tr>
<td><strong>New releases for SAS Data Management products</strong></td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>In: SAS Communities Library</td>
<td>Latest post by: RonAgresta</td>
<td></td>
</tr>
<tr>
<td><strong>How to create a connection to SAS Data Sets in SAS...</strong></td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>In: SAS Communities Library</td>
<td>Latest post by: audrey</td>
<td></td>
</tr>
<tr>
<td><strong>How to call a SAS Data Management 2.6 Web Service ...</strong></td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>In: SAS Communities Library</td>
<td>Latest post by: StephenFonster</td>
<td></td>
</tr>
</tbody>
</table>
SAS Technical Support

SAS Technical Support Form

1. Basic Information
2. Problem Description
3. Review & Submit

Use this form to create a track with SAS Technical Support. Click here to update an existing track.

Before you proceed you should:

- Report critical problems by telephone
- Verify that any SPAM software on your machine will not block our e-mail responses

Shortly after you submit the form, you will receive an automatic e-mail that:

- Confirms that you have submitted the form successfully
- Provides a tracking number that has been assigned to your e-mail request

After you supply the basic information, click Next Page to proceed. Otherwise click Reset to start over.

Have a SAS profile? Log in to prefill the form or click here to create one.
WHERE TO GO FOR HELP

Knowledge Base
- Products & Solutions
- System Requirements
- Install Center
- Third-Party Software Reference
- Documentation
  - What’s New in SAS
  - Product Index A-Z
  - SAS 9.4
  - SAS Analytical Products 14.1
  - SAS Analytical Products 13.2
  - SAS Analytical Products 13.1
  - SAS 9.3
  - SAS Analytical Products 12.1
  - SAS 9.2
  - Earlier SAS Releases
- Papers
- Samples & SAS Notes
- Focus Areas

SAS 9.4 Product Documentation

Starting Points
- Product Index A-Z
- Programmer’s Bookshelf
- What’s New in SAS
- Documentation by Title

Syntax Shortcuts
- Syntax Lookup
- SAS Procedures by Name and Product
- SAS Language Elements by Name, Product, and Category

Search:

Enter search term

Product:

All Products

Display:
- All topics
- Examples only
- Syntax only
- What’s New topics

Submit
• www.sas.com/uk/usergroups

Platform Administration
23rd February 2016 – London
2nd March 2016 – Manchester
June 14th, 15th 16th