SAS Technical Support Top-Five Lists for SAS® Environment Manager on SAS® Viya®

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ABSTRACT

SAS® Environment Manager is a powerful web application that enables administrators to monitor and administer their entire SAS® Viya® platform. There are many tips and tricks to using this application to its fullest potential. Because SAS Technical Support Engineers support a wide variety of customer deployments, they have unique insight. This paper shares some of this insight into SAS Environment Manager through the following top-five lists: administration tips, lesser-known features, and documentation resources.

INTRODUCTION

Over time, SAS Technical Support has gathered a collection of administration tips, lesser-known features, and references given to customers who use SAS Environment Manager to manage their SAS Viya environments. This paper aims to help administrators use SAS Environment Manager on SAS Viya more effectively by sharing the top-five items from each of these categories; it does not cover basic usage information about the application. Here is an overview of what is covered in each category:

Top-five administration tips:

- Auditing
- LDAP and identities
- Dashboard resources
- Domains
- Reports

Top-five lesser-known features:

- Memory usage tile
- Custom groups
- Notifications
- Performance
- SAS Environment Manager URI

Top-five useful documentation links:

- Using the Dashboard
- SAS Environment Manager Functions
- Monitoring: How to (SAS Environment Manager)
- Identity Management: How To (SAS Environment Manager)
- Auditing: How To

This paper enables administrators to get the most out of SAS Environment Manager on SAS Viya.

TOP-FIVE ADMINISTRATION TIPS

This section provides a description of the affected feature, details about the issue, and a solution.

AUDITING

For auditing, the software captures failures associated with create, read, update, and delete operations. The audit microservice reads incoming events from the Application Exchange in the SAS Message Broker (RabbitMQ). The audit microservice captures and persists the events in the SAS® Web Infrastructure Platform Database. Every two hours, the sas-ops-agentsrv service on the CAS controller runs the genAudit task, which extracts auditing events from the SAS Web Infrastructure Platform Database. The genAudit task and the command-line interface (CLI) write the events to a CSV file and load that CSV file to the AUDIT table in SAS® Cloud Analytic Services (CAS), which populates the User Activity report. The default reporting time frame for user activity is seven days.

The User Activity report snapshot on the SAS Environment Manager Dashboard shows a bar chart of the most active users in the SAS environment. If you want more information about this bar chart, open the report to be taken to the Report Viewer to view this detailed audit information. If you want detailed information about each tab in the User Activity report, refer to the "View Auditing Report and Tables" section in *SAS® Viya® 3.4 Administration: Auditing*.

Issue: You might encounter an issue in which the User Activity report does not display data in SAS Environment Manager as shown below in Display 1:
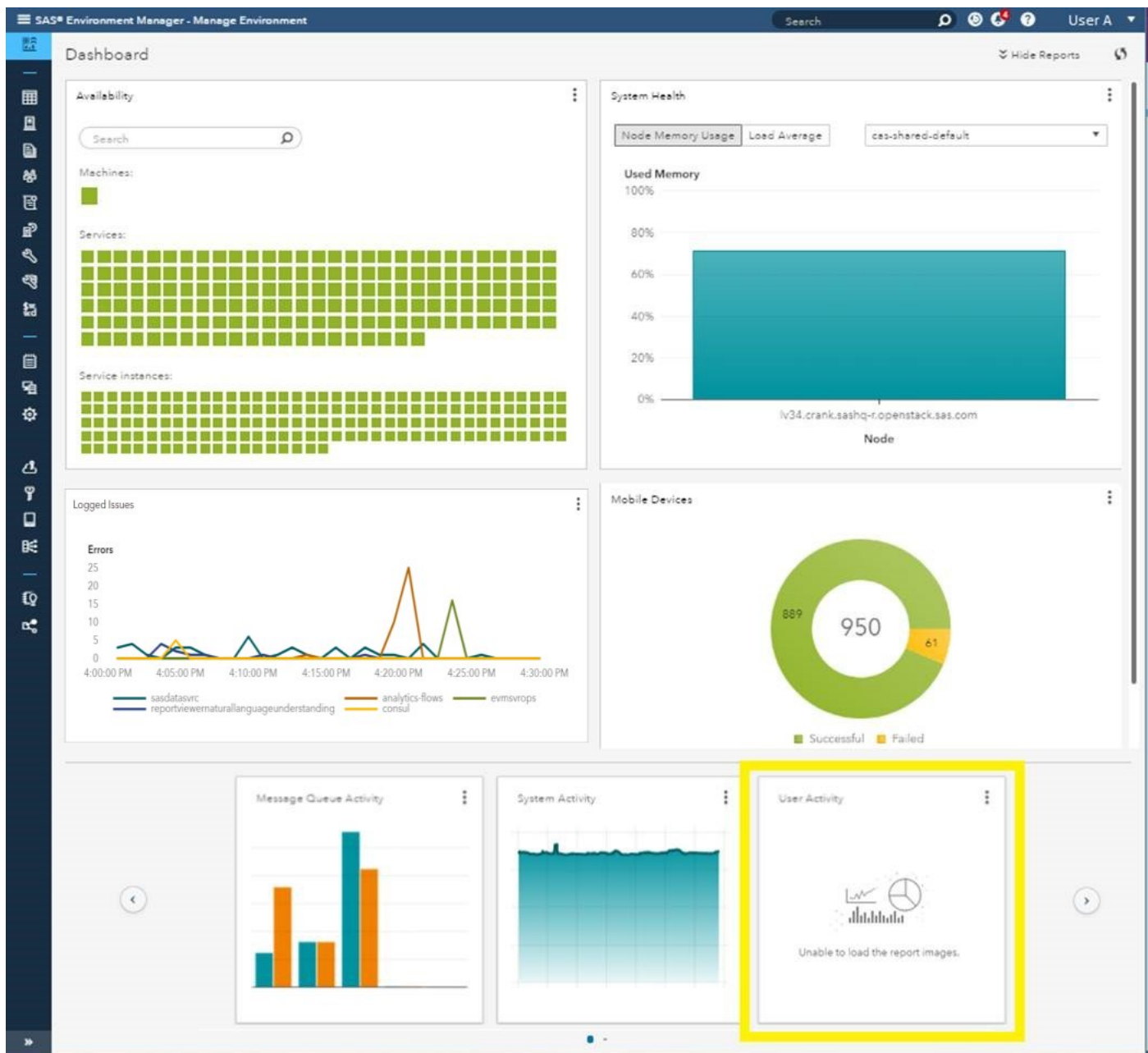
Display 1. The User Activity Report Displays "Unable to load the report images"

To work around the issue, you need to go through each of the following solutions in order. The first solution might address the problem. If not, continue on with the next two solutions until your issue is solved. If you go through all three solutions and the issue persists, contact SAS Technical Support.

Solution 1

Ensure that the CAS CLI and the audit CLI both exist on the same machine:

1. Change directory to the default path where the CAS CLI and the audit CLI exist. The default path is **/opt/sas/viya/home/libexec/admin-plugins**.

2. List the contents of this directory. The output should be as follows:

```
[sas@viya admin-plugins] $ ls *cas*
sas-cas-cli
[sas@viya admin-plugins] $ ls *audit*
sas-audit-cli
```

3. The sas-cas-cli and the sas-audit-cli must exist on the same machine, which must contain the OPERATIONS parameter. If these CLIs are not installed on the same machine, you must modify the inventory file, which is used to deploy the SAS Viya system and to redeploy SAS Viya. See the SAS® Viya® 3.3 for Linux: Deployment Guide for instructions about how to modify the inventory file correctly. In order for the operations infrastructure to manage audit records, include the machine in the [cas-server-primary] host group for the provider or single tenant. Also, include the machine in the [cas-server-secondary] host group.

As a side note: Before you run the **audit cli** command, you must set the profile as documented in SAS® Viya™ 3.3 Administration: Command-Line Interfaces. To set the profile, run the following command: **./sas-admin profile init**

Solution 2

Ensure that all the required files are in the **auditcli** directory.

1. To check, change directory to the **auditcli** directory path and list the files:

```
cd /opt/sas/viya/config/var/cache/auditcli
prompt> ls -l
```

The directory should contain five files and an audit.csv file as shown in Display 2:

```
[sas@viya bin]$ cd /opt/sas/viya/config/var/cache/auditcli
[sas@viya auditcli]$ ls -l
total 7020
-rw-r--r--. 1 sas sas       25 Dec  5 18:05 audit_casAccessManagement.fromDate
-rw-r--r--. 1 sas sas       25 Dec  5 18:05 audit_casManagement.fromDate
-rw-r--r--. 1 sas sas 7166110 Dec  5 19:28 audit.csv
-rw-r--r--. 1 sas sas       25 Jun  8 21:28 audit_dataPlans.fromDate
-rw-rw-r--. 1 sas sas       25 May  1 2018 audit_folders.fromDate
-rw-r--r--. 1 sas sas       25 May  9 2018 audit_reports.fromDate
```
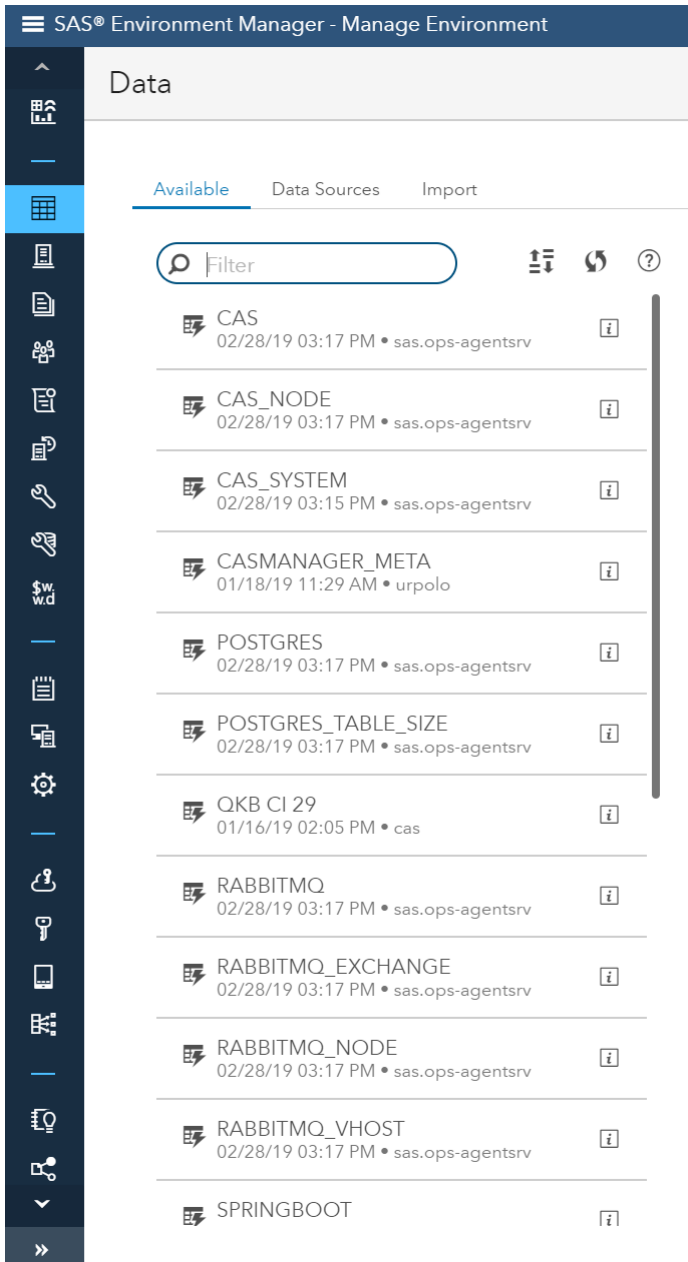
Display 2. Listing of Files in the auditcli Directory

2. If the files are missing, follow the instructions in the Workaround section below.

Solution 3

Ensure that the SystemData library contains the AUDIT table in SAS Environment Manager.

1. To check, in SAS Environment Manager, navigate to the **Data** page in the left navigation. Tables are listed on the **Available** tab as shown in Display 3:

Display 3. The AUDIT Table Is Missing from the SystemData Library

2. If the files are missing, follow the instructions in the Workaround section below.

Workaround

If the files from the `auditcli` directory (Solution 2) or the AUDIT table (Solution 3) are missing, do the following:

1. Make a backup of the `/opt/sas/viya/config/var/cache/auditcli` directory.

2. Delete all the contents of the `auditcli` directory.

3. Because the auditing extraction service runs every two hours, the results could take some time to surface.

LDAP AND IDENTITIES

In SAS Viya, SAS Environment Manager uses the identities microservice to connect to LDAP, which is used to authenticate users and groups. You can view your LDAP users and groups and create custom SAS Viya groups from the **Users** page in SAS Environment Manager. The SAS Logon Manager microservice searches the `LDAP` directory for the account that matches the user name, obtains the distinguished name (DN) for the account, and then attempts to bind to the LDAP server with that DN and the supplied password. The basic flow of the identities is outlined in SAS Note 61882, which is linked in this section.

Issues: Here are two issues that you might encounter with LDAP and identities. They both have the same solution.

- You see the message, "`No users were found`," in SAS Environment Manager after clicking the Users or Groups listing.

- The users or groups that you expect to load are not loaded.

Solution: If you encounter these issues, you might need to update the configuration within the LDAP properties. This update entails making changes to the sas.identities.providers.ldap.user and sas.identities.providers.ldap.group property values to name valid attributes for your site's LDAP provider. For helpful troubleshooting techniques such as generating a listing of identity configuration property values and enabling debug and trace-level logging for this issue, see SAS Note 61882, "Troubleshooting identities and the identities service in SAS® Viya®."

DASHBOARD RESOURCES

The SAS Environment Manager Dashboard is a quick view into the SAS Viya environment. It displays information about the health of the server and services, the memory usage of CAS, logged issues, reports, and mobile devices. This page provides a snapshot into the health of your environment.

The sas-peek and sas-watch components of the SAS Viya operations infrastructure are used by the monitoring microservice to populate this page by checking system and application measurements for threshold metrics on the host machines. The sas-peek component gathers those system metrics. The sas-watch component is persistent, and it monitors the state of resources. To learn more about the SAS Viya operations infrastructure, see SAS® Viya® 3.3 Administration: Operations Infrastructure.

Issue: On the SAS Environment Manager Dashboard, you might sometimes see a server displayed with yellow availability although its underlying services show as both green and red. In Display 4, the Launcher server shows three underlying launcher-server service instances: one shows as green, and the other two show as red.

Display 4. The Launcher Server Service Is Displayed in Yellow While the Three Services Instances Are Displayed in Red and Green

Solution: This issue happens when the service has registered itself, but it does not shut down properly. In this scenario, the service instance terminates but does not deregister itself. Then, when it restarts, a new service instance is created on a new port. This behavior means that some of the service instances are not running, but they are still registered, which is why they are still showing in SAS Environment Manager.

To work around this issue, run the following command, which shows every service that is listed:

```
/opt/sas/viya/home/bin/sas-bootstrap-config agent service list
```

The output shows the address, service name, ID, and port associated with each service. You can run `lsof` or `netstat` to find service instances associated with each Launcher server port. When you find ports that are included in the service list but that are not in use, you can safely deregister these services by using the following command:

```
/opt/sas/viya/home/bin/sas-bootstrap-config agent service deregister
<service-ID>
```

DOMAINS

You can use the **Domains** page to manage and/or add domains that are used for authentication, connection, and encryption. You can also store credentials for these domains using the Credentials view here or on the **My Credentials** page. Domains make calls to the credentials microservice, which is used to manage an identity (a user or a group). Credentials are organized by domains and provide access to the authentication provider.

Issue: You might encounter an issue in which all of your configured domain identities are not displayed when you select two or more identities. You encounter this issue when you perform steps similar to the following in SAS Environment Manager 3.2:

7

1. In SAS Environment Manager 3.2, go to **Domains** using the left navigation.
2. Click the new domain (⌗) icon.
3. Select the add (+) icon beside Identities.
4. After you move two or more identities to the right to the Selected Identities box, click **OK**.

When you perform these steps, sometimes only one of the identities is added.

In SAS Environment Manager 3.3, you encounter this issue when you perform steps similar to the following:
1. In SAS Environment Manager 3.3, go to Domains using the left navigation.
2. Click the new domain (⌗) icon.
3. Select the choose identities (♟) icon.
4. After you move two or more identities to the right to the Selected Identities box, click **OK**.

Solution: The Domain dialog box enables you to select a group or multiple groups in the Identities list. When you perform this action, you expect that two credentials will be created, one for each identity. In some cases, one or more of those credentials is not created. This issue occurs because the selected groups contain leading and/or trailing spaces in the display name in LDAP, which affects the processing of the credentials being created. The groups that you selected but that are missing from the list are the ones that contain the leading and/or trailing spaces. The solution is to correct the groups in LDAP that contain the leading space.
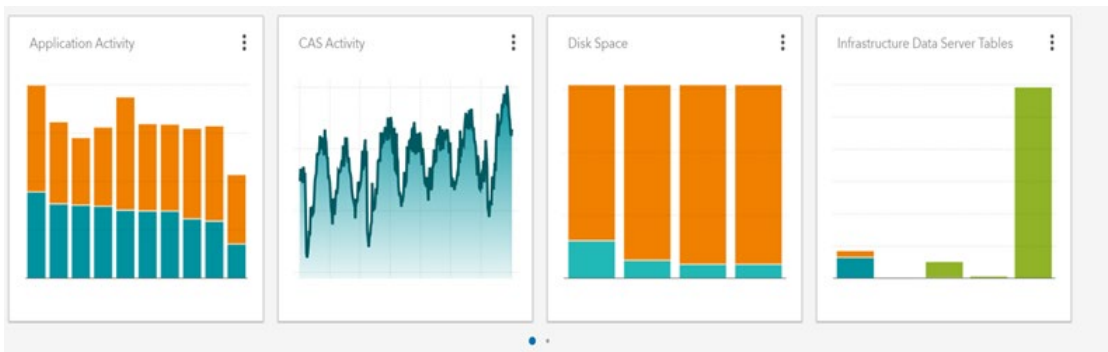
REPORTS

This section provides an overview of the reports that appear on the Dashboard by default. A description of an issue with two possible solutions follows the Overview section.

Overview

There are several microservices involved with reports. SAS Environment Manager uses SAS® Visual Analytics reports to create its reports. These reports are deployed during the installation of SAS Viya. If you want to customize these reports, click the three vertical dots at the top right of the report to open them in the Report Viewer.

Here are a few details about each snapshot report shown at the bottom of the Dashboard page and information about what to look for in each report. Display 5 shows the first set of reports on the SAS Environment Manager Dashboard:

Display 5. View of Reports on the Environment Manager Dashboard

In the Application Activity report, the bars represent different applications and their memory usage. Orange represents non-heap used memory and blue represents heap used memory. The *heap* is the portion of memory where dynamically allocated memory resides (Stack Overflow). If one bar in the chart is much higher than the rest of the bars, you can click it to open the chart in order to investigate further.

The CAS Activity report snapshot shows the memory that is used over a period of three days. Check the report for high peaks in the chart to see what time the memory usage spiked. Click the report for additional details.

The Disk Space report shows the top filesystems on machines that are running SAS Viya that have the least amount of free space. The orange bar represents free space whereas the blue bar represents used space. If your bar is primarily blue or contains only a little orange, you need to try to allocate more disk space to the system.

The Infrastructure Data Server Tables report on the Dashboard is a bar chart that shows the five largest tables in the SAS® Infrastructure Data Server. In the report, the blue, orange, and green colors represent table size, index size, and toast size maximums of the tables respectively. Here is an excerpt from the "SAS Infrastructure Data Server" section of *SAS® Viya® 3.4 Administration: Infrastructure Servers* that provides more detail about this server:

> "The SAS Infrastructure Data Server is based on PostgreSQL version 9 and is configured specifically to support SAS software. SAS Infrastructure Data Server stores user content, such as reports, custom groups, comments, authorization rules, selected source definitions, attachments, audit records, and user preferences."

See Display 6 for the second set of reports that are displayed to the left of the first set:
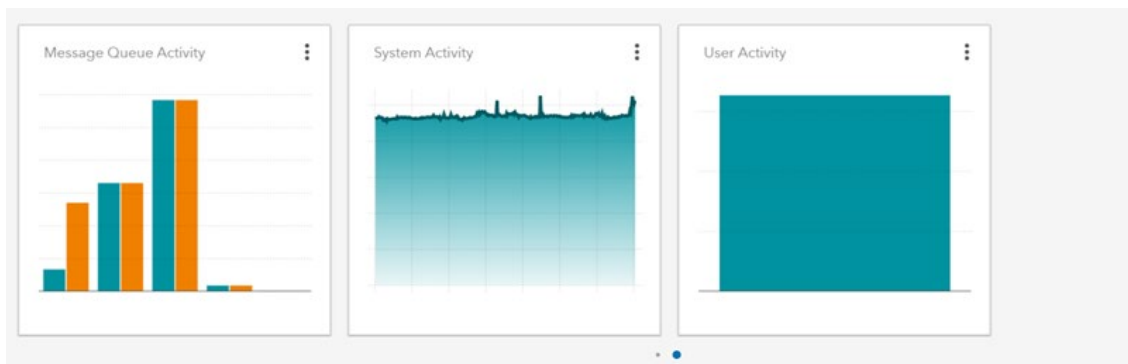
Display 6. View of Additional Reports from the SAS Environment Manager Dashboard

The Message Queue Activity report shows the amount of data that is published to and from each RabbitMQ message queue. Orange represents the data that is going from the RabbitMQ exchange (called Publish Out Count) and blue represents the data coming in (called Publish In Count).

The System Activity snapshot report on the Dashboard shows memory usage on the system over a period of three days. A steady and horizontal line is good because it indicates that you do not have much variability in the system. If the line has peaks, you should check them to determine their cause.

The User Activity report on the Dashboard shows the frequency with which the top five users log on to the environment. Click the report to see detailed auditing activity.

You can always unpin these reports from the Dashboard if you do not want them on the page. If you need to add them later, you can find them in the Content section, under **Products ▶ SAS Environment Manager ▶ Dashboard Items**.

Issue and Solutions

Issue: If reports are missing from the SAS Environment Manager Dashboard, there are two possible solutions for the problem. You should first follow the steps in Solution 1. If that does not address the issue, continue on to Solution 2. If you complete the steps in both solutions and the issue still persists, contact SAS Technical Support.

Solution 1

One reason that the reports might be missing is that the corresponding tables are not present in CAS.

1. Use Table 1 to find the name of the CAS table that populates the missing report.

Report Name	CAS Tables That Populate the Corresponding Report
Application Activity	Springboot
CAS Activity	CAS, CAS_NODE, CAS_SYSTEM
Disk Space	System_filesystem
Infrastructure Data Server Tables	Postgres_table_size
Message Queue Activity	Rabbitmq, rabbitmq_exchange, rabbitmq_node
System Activity	System, System_filesystem, system_filesystem_interface
User Activity	Audit

Table 1. Table of CAS Tables and Report Names

2. Go to the SAS Environment Manager **Data** page and access the Loaded tables view as shown in Display 7:
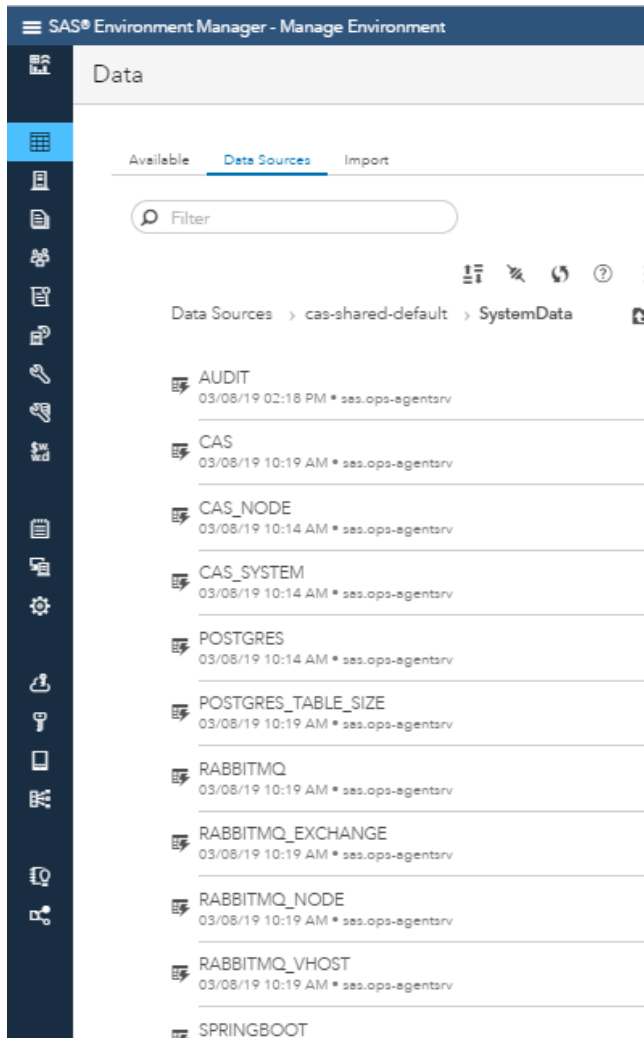
Display 7. Tables listed in the SystemData Library

3. If a table is missing, validate the deployment using the following command:

```
/opt/sas/viya/home/bin/sas-ops validate --level 3
```

4. If there are errors in the output, contact SAS Technical Support.

Solution 2

To recover the missing reports, complete these steps:

1. Log on to a machine where the CLI is deployed.
2. Navigate to the **bin** directory:
   ```
   cd /opt/sas/viya/home/bin
   ```

   Note: You might need to perform additional steps for steps 3 and 4. Refer to SAS® Viya™ 3.3 Administration: Command-Line Interfaces for assistance.

3. Source the sas-admin profile:
   `./sas-admin profile init`

4. To authenticate, run the following command using an administrator LDAP account:
   `./sas-admin auth login`

5. This command lists the report ID, the name of the report, the type, the CreatedBy information, the creation timestamp, and the TransferObjectCount information. Find the report that you are missing using the following command:
   `./sas-admin transfer list packages`

6. Run the following command to import the missing report into SAS Environment Manager:
   `./sas-admin transfer import --id <package-ID>`

   For example, the import call for the CAS Activity report would be as follows:

   `./sas-admin transfer import --id d572d911-0a53-4a41-a6cd-b6b7ed9a9b32`

   In this command, the *<package-ID>* was found from running step 5.

   Step 6 produces the output shown in Display 8:

**Display 8. Output from Running the Import Command**

   As you can see in Display 8, the import was successful. Seeing the task details for the import is optional. Complete step 6 for the all of the missing reports.

TOP-FIVE LESSER-KNOWN FEATURES

This section provides an overview of lesser-known features that are helpful to users of SAS Environment Manager on SAS Viya.

MEMORY USAGE TILE

Feature: In SAS Viya 3.4, the SAS Environment Manager Dashboard contains a memory usage tile as shown in Display 9. Many people assume that this tile refers to the use of the system's memory. However, the tile shows the usage of CAS memory.
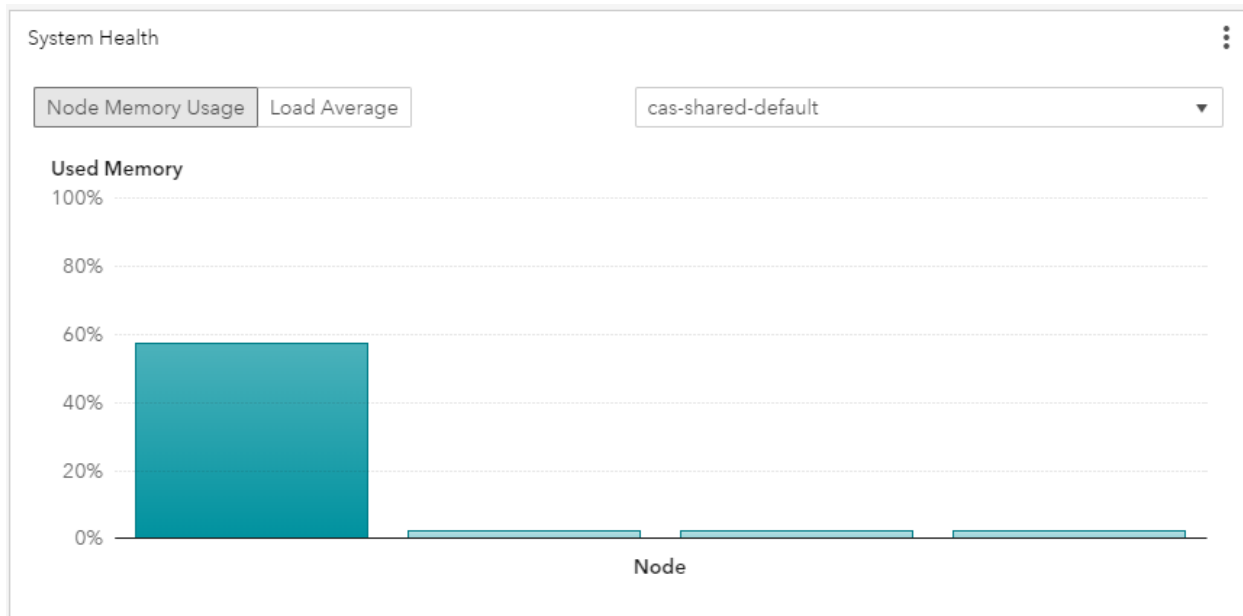
Display 9. Memory Usage Tile for All the Nodes in the CAS Environment

This tile is intended to let you monitor the state of your CAS memory, which is in-memory data. The information in Display 9 is distributed across all the nodes in the environment.

Implementation: One way to determine the CAS in-memory data usage is to look at the tables in the SAS Environment Manager data view of Available tables. Tables with the lightning-bolt icon have a *true* load state, which means that they are available for in-memory operations.
Note: A table that has a true load state is not necessarily 100% loaded in memory. Rather, it is available for in-memory operation.

Running new and large actions or queries causes memory to be consumed, at least temporarily, by CAS. Repetitive queries and actions performed in SAS Visual Analytics can draw results from a middle-tier cache for a quicker response and might not trigger CAS memory usage.

Here is an example that would show the memory usage rise on the memory usage tile. If you use a table by opening it in an application such as SAS Visual Analytics and run **Measure Details**, CAS counts the rows and calculates other metrics on all rows of data in a table. During this operation, you might see the physical memory usage rise while the operation is being performed on a large table.

CUSTOM GROUPS

Feature: In SAS Viya, custom groups are a useful feature for when you need to prevent some users from having access to certain pages in SAS Environment Manager.

Example: Here is an example of a situation in which a practical custom group is useful. In LDAP, you created two business units, most likely end users or data administrators. You want only one group, Data Administrators, to have access to the **Jobs** page in SAS Environment Manager. Both business units can access the **Data** and **Content** pages.

Display 10 shows how the left-navigation pane looks to a general SAS user (non-admin) user who can access the **Data** and **Content** pages.
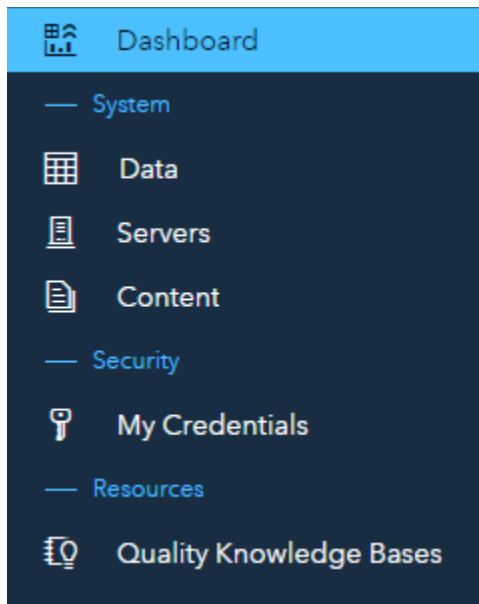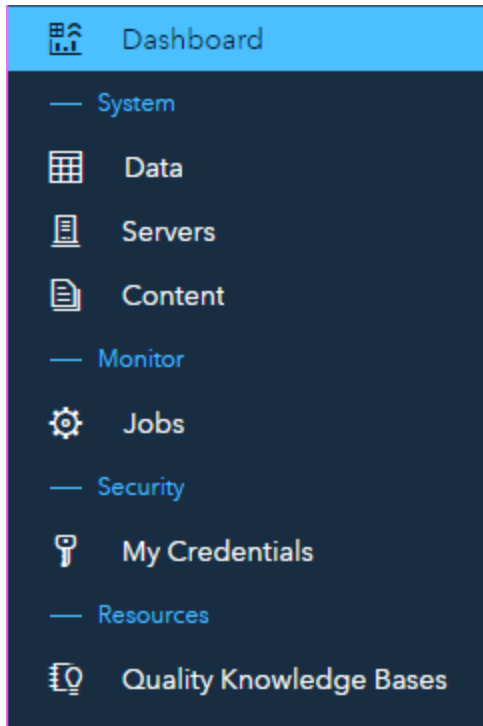

Display 10. View of Left Navigation for a General SAS User (Non-Admin User)

This example is a perfect situation in which to use custom groups to control which pages the user has access to.

Implementation: In order to grant a custom group of users access to a left-hand navigation page in SAS Environment Manager (in this example, the **Jobs** page), complete these steps:

1. Go to **Users**, select the Custom groups view, click the new ( ) icon, and name the group.

2. Go to the **Members** tab in the middle of the page and click the edit ( ) icon.
3. Add the business units or individuals that you want to grant access to the **Jobs** page and click **OK**.
4. Then, go to the **Rules** page in the left-navigation pane and find the /SASEnvironmentManager/jobs rule.
5. Change the **Principal** type from Authenticated Users to `Group` and click the user ( ) icon to the right of the **Principal** field.
6. A pop-up window lets you filter by custom groups and find your group easier.
7. Keep `Grant` as the **Rule Type** and click **Save**.

Display 11 shows the difference in the left-navigation pane after you make this change:

Display 11. View of Left Navigation When the Jobs Page Is Granted for an Admin User

Tip: If you are trying to find a rule that you created, you can use the filters on the page to show a listing of rules that have been edited or changed. You can either choose the Modified By filter or the Date Modified filter to display a list of rules that fit into the filter values.

NOTIFICATIONS

Feature: Notifications is a new feature in SAS Environment Manager on SAS Viya 3.3. The notifications microservice is responsible for notifications. The notifications microservice processes only events that are published by the following participating services and applications: backup, search index, EDA system events, SAS Activity Share, and SAS Visual Analytics (to some extent). Notifications are surfaced in the HTML commons banner component of the Dashboard, and they surface when an application creates subscriptions.

Implementation: When there is a notification, you see a bell ( ) icon on the SAS Environment Manager Dashboard. To read the notification, click the icon. If you want to disable the opt-in notifications, see SAS® Viya® 3.4 Administration.

PERFORMANCE

Feature: Performance is always a feature that people are interested in. You might be wondering which browser you should run SAS Environment Manager in to give you better performance for SAS Viya. SAS Technical Support tested three browsers to determine which browser loaded the SAS Environment Manager Dashboard the fastest. Table 2 shows the results of the test:

Browser	Seconds to Load
Google Chrome	12 – 14 seconds
Mozilla Firefox	17 - 18 seconds
Microsoft Internet Explorer	22 - 23 seconds

Table 2. SAS Environment Manager's Load Time on Different Browsers

Implementation: As you can see from Table 2, Google Chrome had the fastest load time. So, to maximize performance, you should run SAS Environment Manager in Chrome.

Performance can also be affected by the resources consumed by the microservices included with SAS Viya. Here are some of the microservices that affect performance the most: Monitoring service, searchIndex, licenses, identities, preferences, casProxy, casManagement, themes (htmlcommons), and authorization (oauth).

SAS ENVIRONMENT MANAGER URI

Feature: Each resource in SAS Viya is identified by a URI and can be either content (objects) or functions surfaced by applications and services. When you want to find content to view, modify, or update, you can refer to the URI to determine that you are looking at the correct item.

Implementation: You can use the URI to define authorization rules that govern the privileges that users have within the SAS Viya system. In addition, you must often have the URI when using the CLI or a REST API to identify unique resources. To learn more about the URI, see SAS® Viya® 3.3 Administration: Identity Management.

TOP-FIVE DOCUMENTATION RESOURCES AND HOW TO USE THEM

This section provides links to documentation resources that can help administrators get the most out of SAS Viya Environment Manager.

THE "USING THE DASHBOARD" SECTION

Refer to the "Using the Dashboard" section in *SAS® Viya® 3.4 Administration* to get helpful insight into how to maximize your use of this resource. The Dashboard is a great place to look if you need a quick snapshot of the environment and its health. The Availability tile is the first place to see the status of machines and services and whether they are fully available. The Logged Issues tile reports the top-five sources of ERROR and FATAL messages in the logs.

THE "SAS ENVIRONMENT MANAGER FUNCTIONS" SECTION

The "SAS Environment Manager Functions" section in *SAS® Viya® 3.4 Administration* provides a great overview of the various functions that help you manage and administer the SAS Viya environment through SAS Environment Manager. Here are the functions that are found on the left-navigation side of SAS Environment Manager for SAS Viya:

- **Data**: Use the **Data** page to check available caslibs, connect to a database server or remote file system, and import data.
- **Servers**: Use the **Servers** page to see which servers are available, display configuration information, view active and past sessions, and check environment variables that have been set.
- **Content**: The **Content** page is most useful for authorizations.
- **Users**: The **Users** page has three views: Users, groups, and custom groups. Both the users and groups views show you only information from LDAP or your directory service; these views are also read only. You can create custom groups that you can use to manage permissions from this page.
- **Licensed Products**: Use the **Licensed Products** page to check which products might be expiring soon.
- **Backup and Restore**: Use the **Backup and Restore** page to create backups of your environment. You can also restore the environment on this page.
- **Configuration**: Use the **Configuration** page to edit SAS Viya microservice configurations. You can also create configuration instances by clicking the microservice and then clicking **New Configuration** on the top-right side of the page. This action can be helpful if you need to configure a new logging.level for a service in order to troubleshoot an issue. For example, you might need to set the logging.level to `TRACE`.
- **Contexts**: Use the **Contexts** page to add environment variables and edit the port range for the different launcher contexts, if needed.
- **User-Defined Formats**: Use the **User-Defined Formats** page to add and import new formats. You can also edit, copy, and delete existing formats on this page.
- **Logs**: Use the **Logs** page to troubleshoot any issues in the environment.
- **Machines**: Use the **Machines** page to check machine health and monitor the machine properties. The following useful icons are located on the right side of the page:
  - Properties ( )
  - System Metrics ( )
  - SAS Packages ( ) that have been installed on the machine
  - System Limits ( )

- **Jobs**: Use the **Jobs** page to schedule and monitor jobs.
- **Domains**: Use the **Domains** page to manage and/or add domains used for authentication, connection, and encryption.
- **Mobile Devices**: Use the **Mobile Devices** page to whitelist or blacklist mobile devices to control their access to reports.
- **Rules**: The **Rules** page is very useful for administrators, because rules are created to limit or provide access to everything in SAS Environment Manager on SAS Viya.

THE "MONITORING: HOW TO (SAS ENVIRONMENT MANAGER)" SECTION

The "Monitoring: How to (SAS Environment Manager)" section in *SAS® Viya® 3.4 Administration* helps you understand SAS Viya reports in depth. Although the report snapshot exists only on the Dashboard, you can click a report to see a much more thorough report. This section of the documentation helps explain the meaning of the data behind the charts on each page of the reports.

THE "IDENTITY MANAGEMENT: HOW TO (SAS ENVIRONMENT MANAGER)" SECTION

Use the "Identity Management: How To (SAS Environment Manager)" section in *SAS® Viya® 3.4 Administration* to learn more about identities and how to manage resources. One aspect of identity management is the use of custom groups, which was one of the top five in the Lesser-Known Features section of this paper. However, you can do many more useful things using identity management. Be sure to read this section of the documentation to learn about the possibilities.

THE "AUDITING: HOW TO" SECTION

Use the "Auditing: How To" section in *SAS® Viya® 3.4 Administration* to help you get the same information from the CLI that you would get from the audit reports. The `sas-admin audit list` command contains several options that help you locate and sort through the audit records that you want to show. You can also use a command to view a detailed audit record for additional description.

Extra Tip: Visit the SAS Viya board in the SAS Support Communities to post questions or to find answers to questions that have already been asked.

CONCLUSION

SAS Environment Manager is a robust administration tool that provides SAS administrators better insight into monitoring and administering their entire SAS Viya platform. This paper was written by SAS Technical Support Engineers who wanted to share tips and tricks about how to use SAS Environment Manager to its fullest potential. The paper covered the authors' top-five administration tips, top-five lesser-known features, and top-five documentation resources that will help you understand your system and manage your SAS Viya environments.

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