

Share the Wealth of Information in SAS® Environment Manager Logs

Jackie Iverson and Marty Flis, SAS Institute Inc.

ABSTRACT

As a SAS administrator, have you ever wanted to look at data in SAS® Environment Manager that spans a longer length of time? Has your management asked for access to this data so that they can use it to spot trends and make predictions? This paper shows you how to share the wealth of information found in SAS Environment Manager log data and explains how to save and store this data for use in SAS® Visual Analytics. You will find tips on structuring data for easy analysis and examples of using the data to make business decisions.

INTRODUCTION

The purpose of this paper is to show how easy it is to obtain log information from your SAS environment to use in your own reports. The audience for this paper is SAS administrators and SAS users that have access to the SAS Environment Manager Service Architecture framework and its underlying data mart.

In this paper, we will detail this framework, which is just one component of SAS Environment Manager. It was introduced in SAS Environment Manager 2.4, which came with the SAS®9.4M2 platform.

SAS® ENVIRONMENT MANAGER SERVICE ARCHITECTURE FRAMEWORK

The SAS Environment Manager Service Architecture framework consists of several components that extend the functions of SAS Environment Manager, as follows:

- SAS Environment Manager Extended Monitoring allows administrators to adjust the collection of metrics and alerts to enhance monitoring and reporting capabilities.
- The SAS Environment Manager Data Mart is a data repository of collected data. We will look at this in detail in the next section.
- The SAS Environment Manager Report Center provides a collection of out-of-the-box reports, as well as the ability to create custom reports.

The framework can be turned on or off, as needed. In order to use these capabilities, you will need to enable extended monitoring, which is installed with SAS Environment Manager but is not automatically activated (Figures 1 - 3 show activation steps).

Windows Server	Linux Server
Open a command window.	
Navigate to the directory location of the EMI framework. <code>cd D:\SAS\Config\Lev1\Web\SASEnvironmentManager\emi-framework\bin</code>	Navigate to the directory location of the EMI framework. <code>cd /opt/sas/config/Lev1/Web/SASEnvironmentManager/emi-framework/bin</code>
Validate Framework <code>validate.bat --level 2</code>	Validate Framework <code>./validate.sh --level 2</code>
Initialize Framework <code>emi_init.bat -i</code>	Initialize Framework <code>./emi_init.sh -i</code>
Restart Object Spawner <code>D:\SAS\Config\Lev1\ObjectSpawner\ObjectSpawner.bat restart</code>	Restart Object Spawner <code>/opt/sas/config/Lev1/ObjectSpawner/ObjectSpawner.sh restart</code>

Windows Server	Linux Server
Validate Framework validate.bat --level 3	Validate Framework ./validate.sh --level 3

Figure 1. SAS® Environment Manager Service Architecture Framework Validation

Windows Server	Linux Server
Initialize ACM ETL Process emi_init.bat --enable ACM	Initialize ACM ETL Process ./emi_init.sh --enable ACM
Validate Framework validate.bat --level 3	Validate Framework ./validate.sh --level 3

Figure 2. SAS® Enable ACM ETL Process

Windows Server	Linux Server
Verify that the metadata server is running. D:\SAS\Config\Lev1\SASMeta\MetadataServer\Met adataServer.bat status	Verify that the metadata server is running. /opt/sas/config/Lev1/SASMeta/MetadataServer/Met adataServer.sh status
Initialize APM ETL apm_init.bat	Initialize APM ETL ./apm_init.sh
Restart SAS Application Servers Click the Services icon on the server machine taskbar. Find SAS[Config-Lev1] SASMeta - Metadata Server and select Restart .	Restart SAS Application Servers /opt/sas/config/Lev1/SASMeta/MetadataServer/Met adataServer.sh restart /opt/sas/config/Lev1/ObjectSpawner/ObjectSpawne r.sh restart /opt/sas/config/Lev1/ConnectSpawner/ConnectSpa wner.sh restart /opt/sas/config/Lev1/SASApp/OLAPServer/OLAPS erver.sh restart
Validate SAS Servers In SAS Management Console, log on as sasadm@saspw. On the Plug-ins tab, expand Server Manager ⇒ SASApp . Validate the following servers: <ul style="list-style-type: none"> - Logical OLAP Server - Logical Pooled Workspace Server - Logical Stored Process Server - Logical Workspace Server 	Validate SAS Servers In SAS Management Console, log on as sasadm@saspw. On the Plug-ins tab, expand Server Manager ⇒ SASApp . Validate the following servers: <ul style="list-style-type: none"> - Logical OLAP Server - Logical Pooled Workspace Server - Logical Stored Process Server - Logical Workspace Server
Enable APM ETL emi_init.bat --enable APM	Enable APM ETL ./emi_init.sh --enable APM
Validate Framework validate.bat --level 3	Validate Framework ./validate.sh --level 3
Using SAS Management Console, back up the SAS Metadata Repository.	Using SAS Management Console, back up the SAS Metadata Repository.

Figure 3. SAS® Enable APM ETL Process

The Report Center (Figure 4) provides many pre-written reports and the ability to create your own reports using data collected in the data mart.

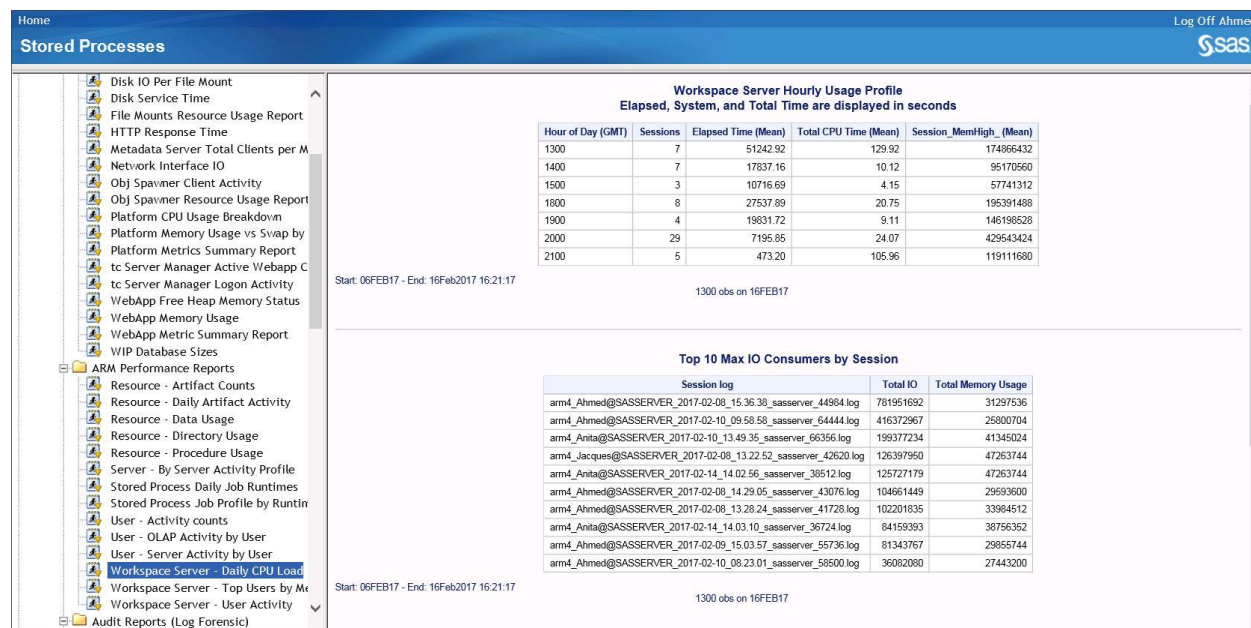


Figure 4. SAS® Environment Manager Report Center

This paper will focus on expanding the use of data mart data outside of the Report Center.

SAS® ENVIRONMENT MANAGER DATA MART

The SAS Environment Manager Data Mart is a collection of SAS data tables. SAS Environment Manager log data is collected using ETL processes and is stored in a standard format, thus making it easy to run reports and perform analysis. The data mart contains the following three main libraries:

- Audit, Performance, and Measurement (APM) artifact library
- Agent-Collected Metrics (ACM) artifact library
- KITS library

Each library has a separate ETL process that gathers data and stores it in the appropriate data table. The APM ETL process extracts performance metrics from log files. The ACM ETL process extracts metric data collected by SAS Environment Manager agents. SAS solutions can provide a solution kit with log parsers and an ETL framework in order to extract data for the KITS library.

The ETL processes are all independent. Administrators can activate all or some of them, depending on their needs. SAS Environment Manager manages the schedule for the ETL processes. Administrators can modify the schedule on the *Resources* ► *Browse* ► *Servers* ► *SAS Environment Manager Data Mart 9.4* tab.

A nightly data feed can be enabled to automatically copy data from the data mart to SAS Visual Analytics. Data in the data mart is, by default, available for 60 days. This is much longer than the 11 days that data is available in the SAS Environment Manager web application.

Figure 2 shows the flow of data into the data mart. Complete information about additional components of the SAS Environment Manager Service Architecture framework that are not included in this paper can be found in the “Understanding SAS Environment Manager Service Architecture” section of SAS®

Environment Manager 2.5: User's Guide, Third Edition. (Figure 5 is also sourced from that documentation.)

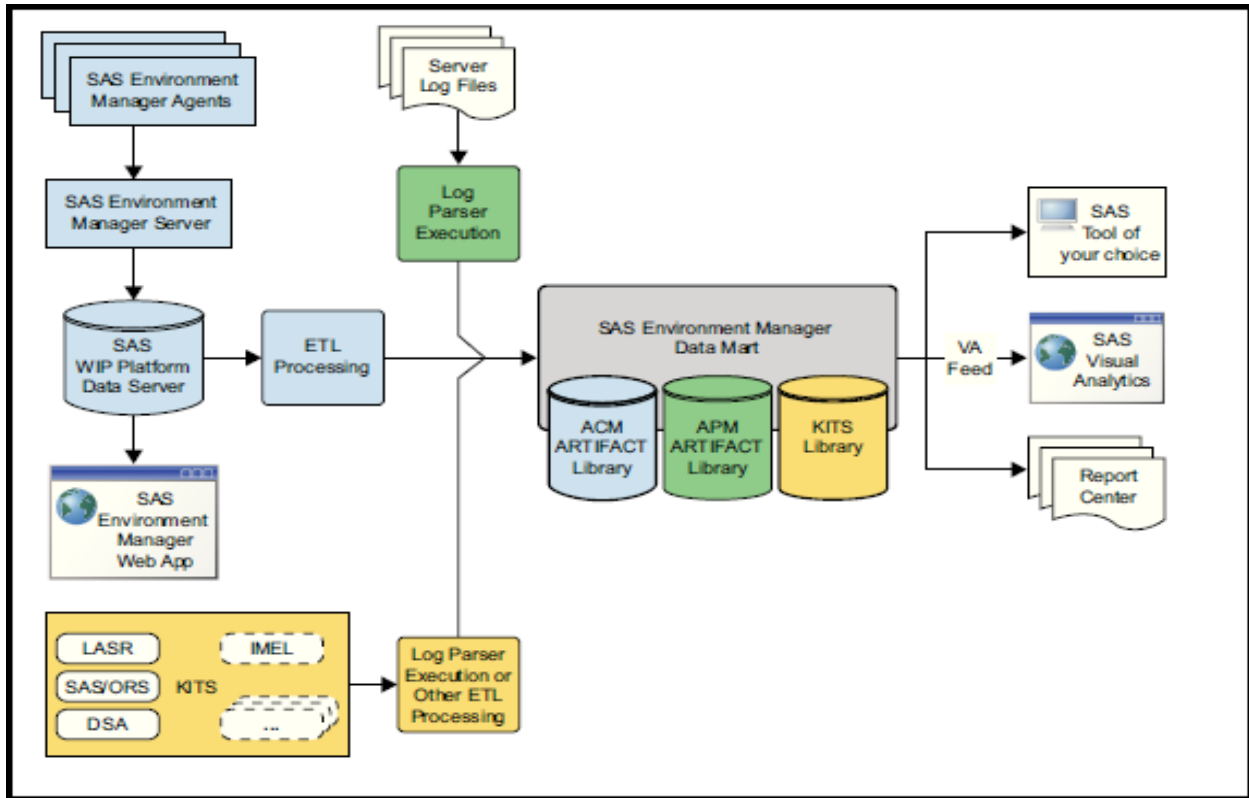


Figure 5. SAS® Environment Manager Data Mart Data Flow

The 60-day retention period for data in the data mart can be changed in the SAS® Management Console Configuration Manager plug-in (Figure 6).

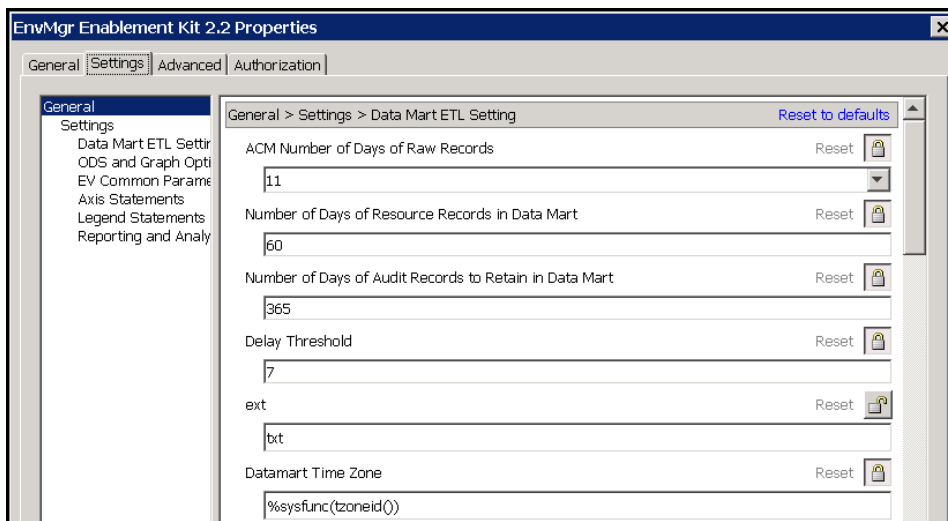


Figure 6. SAS® Environment Manager Enablement Kit Properties

ACM DATA

ACM data is collected by SAS Environment Manager agents and is used in the SAS Environment Manager web application. When the ACM data is stored in the SAS Environment Manager Data Mart, it is

restructured for easier reporting and analysis. The ACM library in the data mart is used in the SAS Environment Manager Report Center.

You can add events in SAS Environment Manager to monitor additional logs and create events based on text that is written to the log. New events are displayed in the Event Center and are fed to the ACM.EVENTS table. The ACM library location is as follows: [SAS-Configuration-Directory]/Levn/Web/SASEnvironmentManager/emi-framework/Datamart/acm/. Table 1 provides details about the ACM library.

ACM Library Tables	Contents
AVAILABILITY	Name of server and availability
EVENTS	Events logged by SAS® Environment Manager
FILEMOUNTS	Usage data for file mounts in SAS software environment
GROUPINVENTORY	Data about resource groups defined in SAS® Environment Manager
HOSTPLATFORMS	SAS® Environment Manager agent metrics for platforms
HTTPCHECKS	Metric data for HTTP checks of web services
IOMSERVERS	No longer in use
MEASUREINVENTORY	Data about measurements being performed
METADATASVRS	Metric data for SAS® Metadata Servers in environment
NETWORKINTERFACE	Network performance for environment
RESOURCEINVENTORY	Information about resources in SAS® Environment Manager inventory
SASAPPSERVERS	Metric data for SAS Application Server resources
SASLOGICALSERVERS	Metric data for SAS logical server resources
TCSSERVERMGRS	Metric data for tcServers in system
WEBAPPSERVER	Metric data for SAS Web Application Servers
WIPDATADB	Metric data for SAS® Web Infrastructure Platform Database

Table 1. ACM Library Details

APM DATA

APM data was extracted from various SAS server log files. These tables contain information about resource consumption, usage of SAS artifacts, and metadata activity. SAS artifacts include servers, programs, and reports. This functionality was previously available as a stand-alone download known as SAS® Audit, Performance, and Measurement Package. The APM library location is as follows: [SAS-Configuration-Directory]/Levn/Web/SASEnvironmentManager/emi-framework/Datamart/artifacts/. Table 2 provides details about the APM library.

APM Library Tables	Contents
ARTIFACTS	Information about artifacts (for example, libraries, directories, and stored processes) in environment
ARTIFACTSPHYSICALLOCATION	Information about physical location of artifacts
ARTIFACTUSAGEDETAILS	Usage information about artifacts
ARTIFACTUSAGESESSIONS	Usage information about artifacts in sessions
AUDIT_ACCESSC	Audit records for object access events
AUDIT_ADMUSER	Audit information for administrative user activities
AUDIT_GROUP	Audit information for identity groups
AUDIT_TRANSACTIONS	Audit information for transactions

APM Library Tables	Contents
AUDITACCESSCONTROLDETAIL	Detailed audit information about access requests
AUDITIM	Audit information recorded by time
DTINFOALL	Information about log file access
LIBRARIES	Information about the libraries in environment
RELATIONSHIPS	Contains information about relationships between artifacts defined in other tables
SERVERTYPEBYUSER	No longer in use
SERVERUSAGEBYUSER	No longer in use

Table 2. APM Library Details

KITS DATA

The solution kit framework can extend the capabilities of SAS Environment Manager to support specific solutions or applications. This framework includes support for collecting and storing operation information about solutions in SAS Environment Manager Data Mart tables (KIT tables).

The KITS library location is as follows: [SAS-Configuration-Directory]/Levn/Web/SASEnvironmentManager/emi-framework/Datamart/kits/. Table 3 provides details about the KITS library.

KITS Library Tables	Contents
EMI_INFO	Metrics for SAS® Environment Manager ETL processes
HTTPACCESS	Metrics for SAS web server
SASJobs_INFO	Contains metrics for SAS jobs
VALASR_INFO	Metrics for SAS® LASR™ Analytic Server

Table 3. KITS Library Details

GOING BEYOND THE SAS® ENVIRONMENT MANAGER DATA MART AND THE SAS® ENVIRONMENT MANAGER REPORT CENTER

The SAS Environment Manager Report Center has many useful pre-written reports that access the SAS Environment Manager Data Mart. You can directly access data in the tables, which provides you with more flexibility, as follows:

- Store selected data for long-term trending
- Join data from other sources to obtain extra information about users and groups
- Provide access to report creators without granting them unfettered access to SAS Environment Manager

Pulling data out of the data mart is as simple as setting a LIBNAME statement, creating a SAS program to copy the data, and writing the data to a new location. That location can be a SAS Visual Analytics drop zone that would automatically make the data available for reporting and analysis.

Because metric and audit data can grow very quickly, you might want to consider filtering or even summarizing the data during the copy. Some things to consider are as follows:

- Can the data be summarized without losing value?
- Can any of the columns be dropped without losing value?
- Does all of the data need to be tracked?

EXAMPLE

We created a report (Figure 7) that shows which users and departments are using SAS software. The report uses data from the APM library combined with additional data to give details about departments.

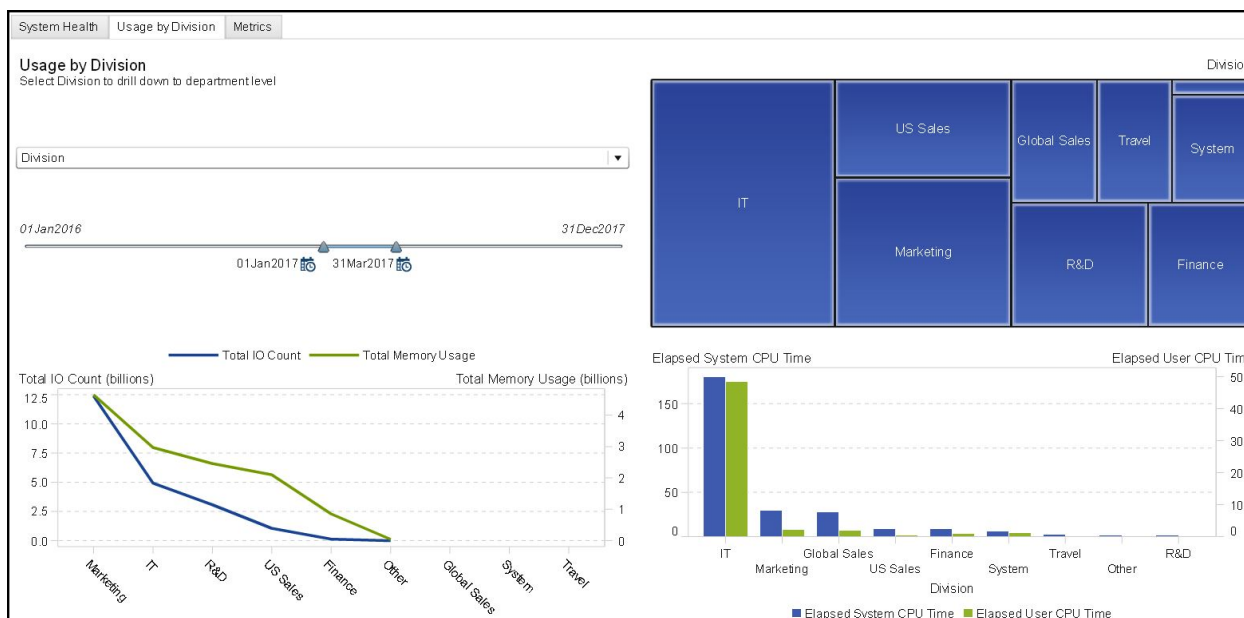


Figure 7. Usage by Department Report

To create the report, we used a simple SQL procedure to pull data from the ArtifactUsageDetails table and joined it with a table that contains more information about the users' departments. You might use a table from an IT or Human Resources system at your company. Because the ArtifactUsageDetails table contains data on more than one type of artifact, we selected only data where the type is "SERVER".

To enable the data feed from the data mart to SAS® Visual Analytics, follow these steps:

On the machine on which SAS Environment Manager is installed, change to the **<Levelroot>/Web/SASEnvironmentManager/emi-framework/bin** (UNIX) or **<Levelroot>/Web/SASEnvironmentManager\emi-framework\bin** (Windows) directory.

From a command line, issue the command **emi_init.sh -vafeed ON** (UNIX) or **emi_init.bat -vafeed ON** (Windows).

CONCLUSION

SAS Environment Manager provides a wealth of information to SAS administrators. You can use the dashboard to monitor the health of your server environment and generate customized alerts for monitored server events. The SAS Environment Manager Report Center provides multiple reports with detailed information about your SAS environment. You can easily share the data behind the reports with users and management. This empowers them to create the customized reports that your company needs in order to make decisions and successfully guide the direction of your organization.

ACKNOWLEDGMENTS

The authors would like to acknowledge Gilles Chrzaszcz and Doug Grossman for their feedback and review of this paper.

RECOMMENDED READING

- *SAS® Environment Manager 2.5: User's Guide, Third Edition*

CONTACT INFORMATION

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

Jackie Iverson

Jackie.Iverson@sas.com

Marty Flis

Marty.Flis@sas.com

SAS and all other SAS Institute Inc. product or service names are registered trademarks or trademarks of SAS Institute Inc. in the USA and other countries. ® indicates USA registration.

Other brand and product names are trademarks of their respective companies.