THE POWER TO KNOW.

SAS® Environment Manager 2.1

User's Guide

Second Edition

SAS® Documentation

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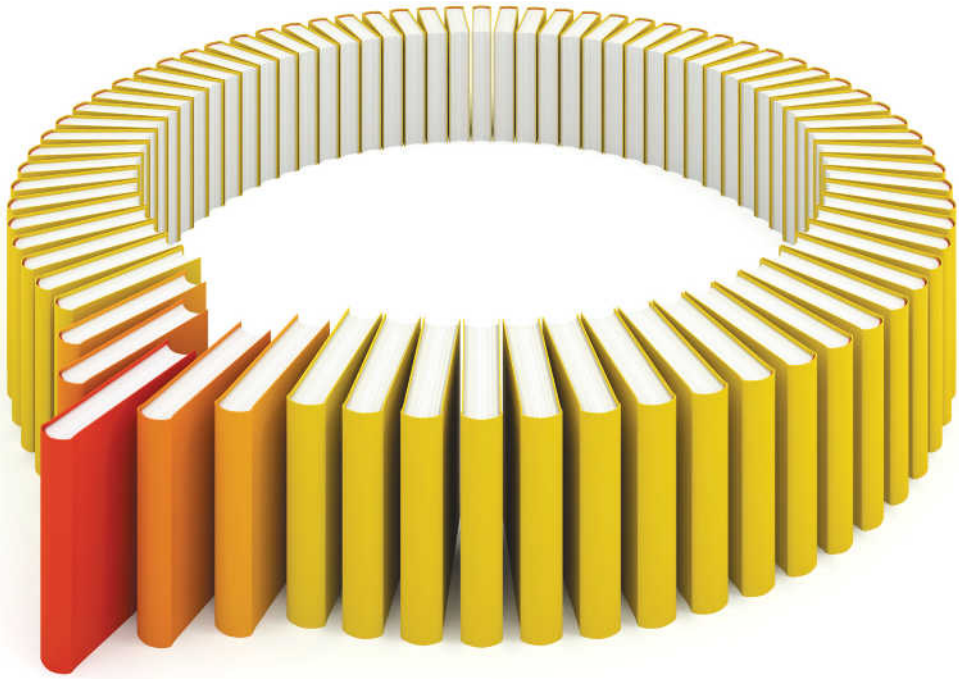

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What's New in SAS Environment Manager 2.1

Overview

SAS Environment Manager has the following new features and enhancements:

- Support for managing metadata access has been added.
- The user definition process has been simplified, with all users created in SAS metadata, rather than in SAS Environment Manager.
- Synchronization between users defined in certain groups in metadata and user definitions in SAS Environment Manager has been added.
- A new account for communication with the SAS Environment Manager agent has been added.
- Support for creating folders and editing the properties of metadata objects has been added.
- Support for metadata clusters has been added.

Managing Metadata Access

Selecting an object in the **Administration** tab enables you to manage metadata access for that object. The tasks that you can perform include the following:

- applying access control templates (ACTs) to metadata objects
- applying explicit controls to objects
- managing repository-level controls
- maintaining ACTs

Metadata User Synchronization

Users in SAS Environment Manager are now mapped to users created in SAS metadata. During installation, three user groups are created in SAS metadata to contain SAS Environment Manager users. Users that are members of these groups are mapped to user definitions in SAS Environment Manager with corresponding roles. A synchronization

function has also been added. When users are added to one of the supported groups in metadata, the synchronization function creates a corresponding user definition in SAS Environment and assigns the user to the correct role.

Agent Communication Account

A new user ID, sasevs@saspw, is now used to communicate with the SAS Environment Manager agent. The ID is created in metadata and in SAS Environment Manager during installation.

Metadata Object Management

In addition to viewing the properties of metadata objects, some of those properties can now be edited. Properties that can be edited include the following:

- Name
- Description
- Keywords
- Responsible parties
- Extended attributes

Folders to contain metadata objects can also be added, updated, or deleted.

Recommended Reading

Here is the recommended reading list for this title:

- The online Help for the SAS Environment Manager 2.1.
- *SAS Intelligence Platform: Middle-Tier Administration Guide*.
- *SAS Intelligence Platform: System Administration Guide*.

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Chapter 1

Introduction to SAS Environment Manager

What is SAS Environment Manager? **1**

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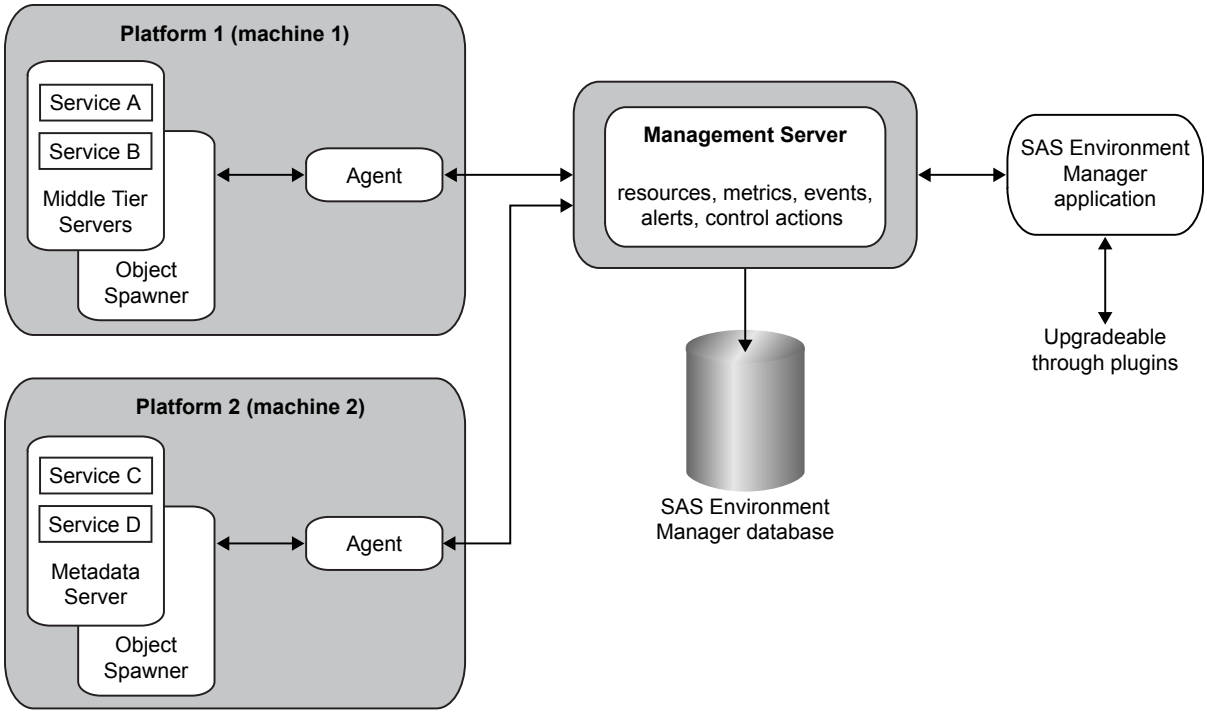
What is SAS Environment Manager?

SAS Environment Manager is a web-based administration solution for a SAS environment. The application can administer, monitor, and manage SAS resources, including administering the SAS Web Application Server and monitoring SAS foundation servers. The application collects and charts data on metrics for monitored resources, providing a comprehensive view of resource health and operation. It also provides functions such as auto-discovery of resources, monitoring of log events, and reporting of alerts. Over the lifecycle of SAS 9.4, functions will be added to extend SAS Environment Manager's capabilities as a centralized administration application for all SAS products.

SAS Environment Manager agents will run on all SAS platforms except for z/OS.

SAS Environment Manager is based on VMWare’s Hyperic product, with customizations and plugins to optimize the product specifically for a SAS environment. Some terms and concepts used in SAS Environment Manager are different than in other parts of SAS, but these are noted in this document.

The basic architecture of SAS Environment Manager consists of an agent process running on each platform in a SAS deployment that communicates to a central management server. Agents monitor detected resources and periodically report resource metrics back to the server. The server provides an interface for interacting with those agents, managing the data collected by the agents, distributing plugins, creating alerts and escalation procedures based on collected metrics, and graphing the metrics provided through the installed plugins.



There are five main components to SAS Environment Manager:

agent
: An agent is a software process that runs on each platform (middle-tier and server-tier machine) in a SAS deployment. The agent is responsible for tasks such as discovering software components on its platform, gathering metric and availability data for the platform and components, and performing resource control actions. The agents communicate with the management server. Plugins are used to provide the agents with the information needed to discover SAS resources installed on a platform.

management server
: The management server is responsible for communicating with the agents. It collects information about items such as discovered resources, metrics, and availability, and issues control actions received from the SAS Environment Manager application. Collected data is stored in the SAS Environment Manager database.

SAS Environment Manager database
: The database is a Postgres database that is a repository for all of the information about all of the resources known to SAS Environment Manager. It uses the SAS Web Infrastructure Platform Data Server, which is based on PostgreSQL. After resources are discovered and added to your inventory, the database stores data collected from the agents about the resources.

SAS Environment Manager application
: The application is the web-based interface to the SAS Environment Manager system. Resources discovered by the agents and added to the inventory are displayed and monitored. Metric and availability data collected by the agents and stored in the database is displayed and charted. Events and metric data are used to generate alerts. Control actions are sent back through the management server to the agents to control resources on the platforms. The application also includes a framework to add functions specific to SAS, such as server, library, and user administration.

plugins
: Plugins enable agents to discover and monitor resources in a SAS environment. Each plugin is associated with a specific resource, and provides the agents with the instructions needed to recognize the resource during auto-discovery and to monitor and collect metrics for the resource.

Resource Inventory Model

Overview

The SAS Environment resource inventory model contains three levels:

platform
: A container such as an operating system or a SAS server tier that holds servers and services

server
: Software product or process, such as a SAS Metadata Server, that runs on a platform

service
: A task-specific software component, such as a SAS logical server, that runs on a server or platform

Platforms

Platforms are the highest level of resource type in SAS Environment Manager. They are containers that host other software and services. There are three major categories of platforms:

- operating system platforms
- SAS Application Server Tier
- Virtual and network platforms

An operating system platform consists of a computer (physical or virtual) and the operating system that runs on it. The SAS Environment Manager uses the system plugin to teach the agent how to auto-discovers the operating system platform. You cannot manually add an operating system platform to inventory. SAS Environment Manager supports most of the operating systems on which SAS is supported.

The SAS Application Server Tier platform is an instantiation of a SAS deployment and a collective store of deployment-wide information such as license information and clustering. Resources in the SAS Application Server Tier platform include SAS Metadata Server and SAS Application Server and their logical servers (such as SAS Workspace Servers, SAS OLAP Servers, and SAS Stored Process Servers). The agent automatically discovers and creates the SAS Application Server through direct communication with the SAS metadata server as a platform resource.

Virtual and network platforms include a variety of platform types that do not map to an individual physical machine running a traditional operating system and are managed by an agent proxy. These include the following:

- resources that an agent monitors remotely over the network, such as network hosts and devices
- virtual resources such as VMware vSphere hosts and virtual machines

- distributed sets of resources, such as GemFire Distributed Systems

The agent does not automatically discover platforms other than the host operating system and the SAS Application Server Tier. You must manually create other platforms or supply resource properties data that enable the agent to manage them. Below are the virtual and network platform types that SAS Environment Manager supports:

- Cisco IOS
- GemFire Distributed System
- Network Device
- Network Host
- VMware vSphere Host
- VMware vSphere VM

Servers

In SAS Environment Manager, a server is commonly a software product or process that runs on a platform. Servers provide a communication interface and perform specific tasks upon request. The Monitoring Defaults page on the **Manage** tab lists all of the server types (along with platform and service types) that SAS Environment Manager supports.

Most server types are auto-discovered by a server type-specific SAS Environment Manager plugin. If the plugin that manages a server does not support auto-discovery, or if auto-discovery of a server fails, you might need to manually create a server. See "Manually Adding a Server" on page 23.

Examples of server types include the following:

- SAS Metadata Server
- SAS Object Spawner
- Postgres server
- SAS Home Directory Service

Services

In SAS Environment Manager, a service is a software component dedicated to a particular task that runs on a server or platform. A service that runs on a server is a service, and a service that runs on a platform is a platform service.

The resource plugin that discovers a platform or server also discovers key services, such as CPUs, network interfaces, and file systems that are running on the platform.

You can also configure a platform service that serves as a proxy for a resource that the SAS Environment Manager agent can monitor over the network. Examples include

- DNS service
- POP3 service
- Fileserver mount
- Windows service
- Network host storage

For more information, see "Manually Configuring a Service" on page 23.

Services that run on a server can be either an internal component of the server or a deployed item. Logical SAS servers are considered to be services that run on SAS server resources. Examples of services that run on servers include the following:

- PostgreSQL database
- SAS Object Spawner SAS Logical Workspace Server
- SpringSource tc Runtime Cache

The Monitoring Defaults page on the **Manage** tab lists the supported platform service types (along with platform types and server types) provided by the installed plugins.

Chapter 2

Finding Your Way Around

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Finding Your Way Around

The SAS Environment Manager interface is organized around five main areas, as illustrated in this figure:

The following table describes the main functional areas of SAS Environment Manager:

Main Page	Contents
Dashboard	Configurable collections of portlets; this is the initial view when starting SAS Environment Manager.
Resources	Resource-level monitoring and management.
Analyze	Deployment-wide views of events and alerts.
Administration	Metadata folders, basic properties of metadata objects, security and access controls

Main Page	Contents
Manage	Native users, roles, permissions, plugins.

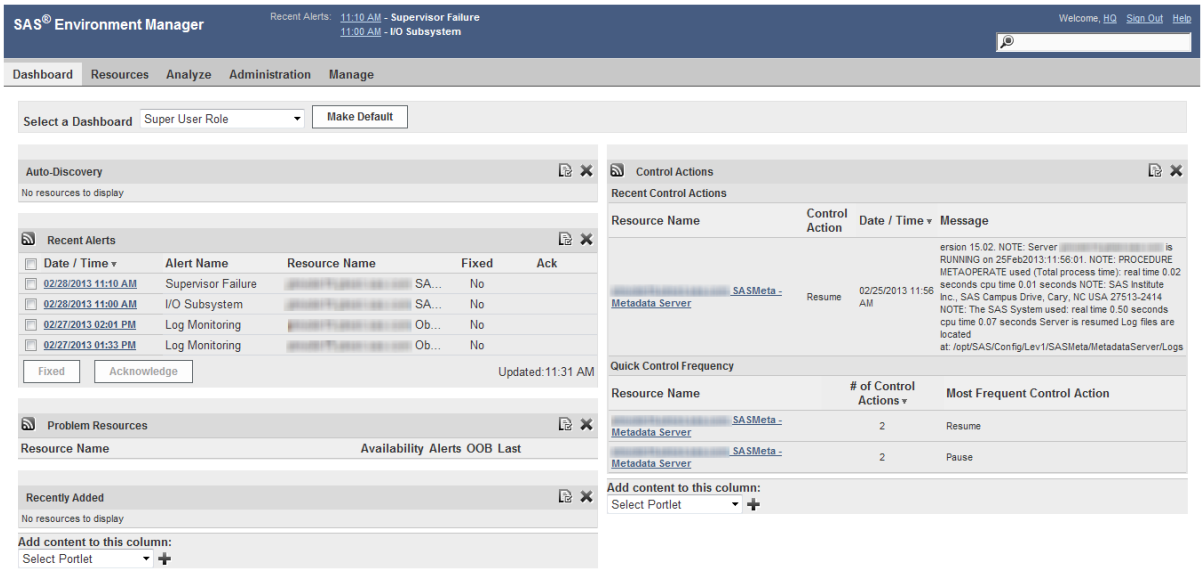
Viewing Important Information at a Glance: the Dashboard

The Dashboard is the starting point when you log on to SAS Environment Manager. The page consists of a collection of views (called portlets) of resources and metrics that are the most important to your environment. The Dashboard is customizable, so you can specify how many portlets are displayed, which metrics and functions they present, and which resources they cover. For example, your Dashboard could contain a portlet to display recently auto-discovered resources, a portlet to display recent alerts, or a portlet to display the availability of a group of selected servers. Selecting an entry (such as a resource or an alert) in a portlet takes you to detailed information about the entry.

Each user can access their own personal Dashboard as well as a Dashboard for each of the native roles of which the user is a member. Each Dashboard can be customized to meet the needs of the user or role.

An example Dashboard page is displayed in this figure.

Figure 2.1 *Example Dashboard*



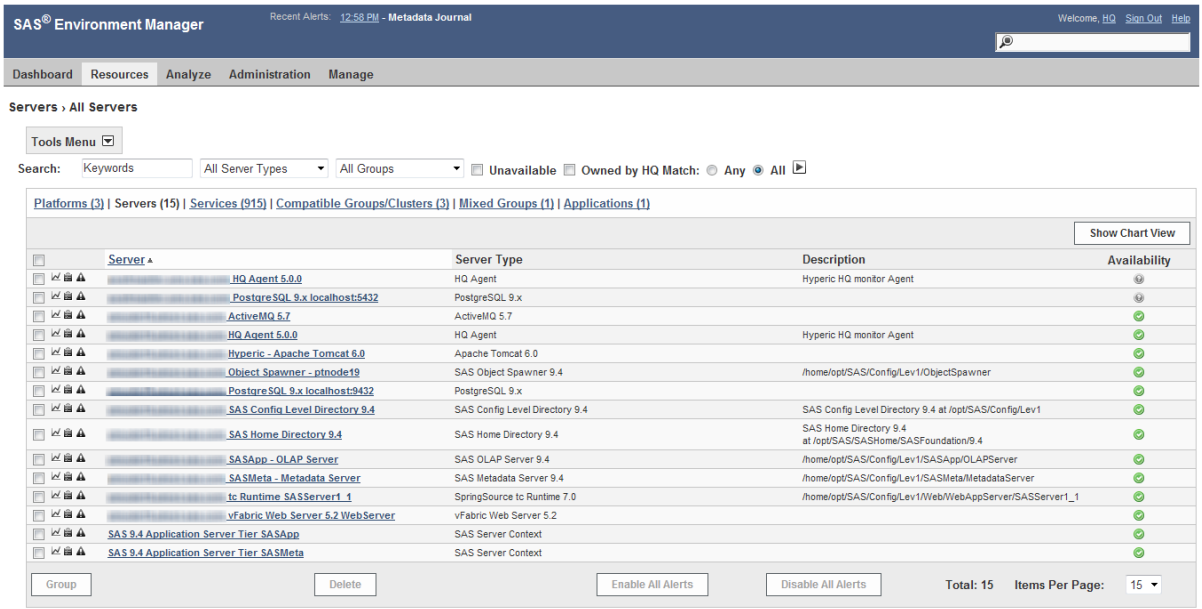
Monitoring Platforms, Servers, and Services: the Resources Pages

Use the **Resources** pages to monitor, configure, and manage inventory resources. The main Resources page lists the inventory of resources, organized by type:

- Platforms
- Servers
- Services
- Compatible Groups/Clusters
- Mixed Groups
- Applications

Other selections under Resources enable you to view only resources that are currently down or to select from recently viewed resources. This figure shows a server resource list.

Figure 2.2 *Resource List*



The icons on the left of the resource name enable you to quickly jump to the Monitor, Inventory, or Alerts page for the resource. Selecting the resource name displays the Monitor page for the resource. A lock icon indicates that, because of your permissions, a particular feature is not available for a particular resource.

Use these strategies to locate resources on the **Resources** page:

- Only one inventory type is displayed at a time. To access resources of a different inventory type, click a link in the table header.

Platforms (3) | Servers (15) | Services (1177) | Compatible Groups/Clusters (3) | Mixed Groups (1) | Applications (1)

- To further limit the display, you can specify criteria in the **Search** row and then click ▶ (at the end of the **Search** row). Not all criteria are supported for all inventory types.
- To include only resources that you own, select the **Owned by** check box.
- There might be multiple pages of resources in the list. Use the controls below the list to navigate.
- You can use **Resources** ⇨ **Recently Viewed** ⇨ ***the page name*** to quickly return to a page that you recently viewed.
- As an alternative to browsing and filtering on the **Resources** page, you can use the search field (on the right side of the application banner) to quickly locate a resource by its name.
- To view a list of resources that are not currently available, select **Resources** ⇨ **Currently Down**.
- You can initiate resource management tasks from the **Resources** page.

Monitoring Resource Events and Alerts: the Analyze Pages

Overview

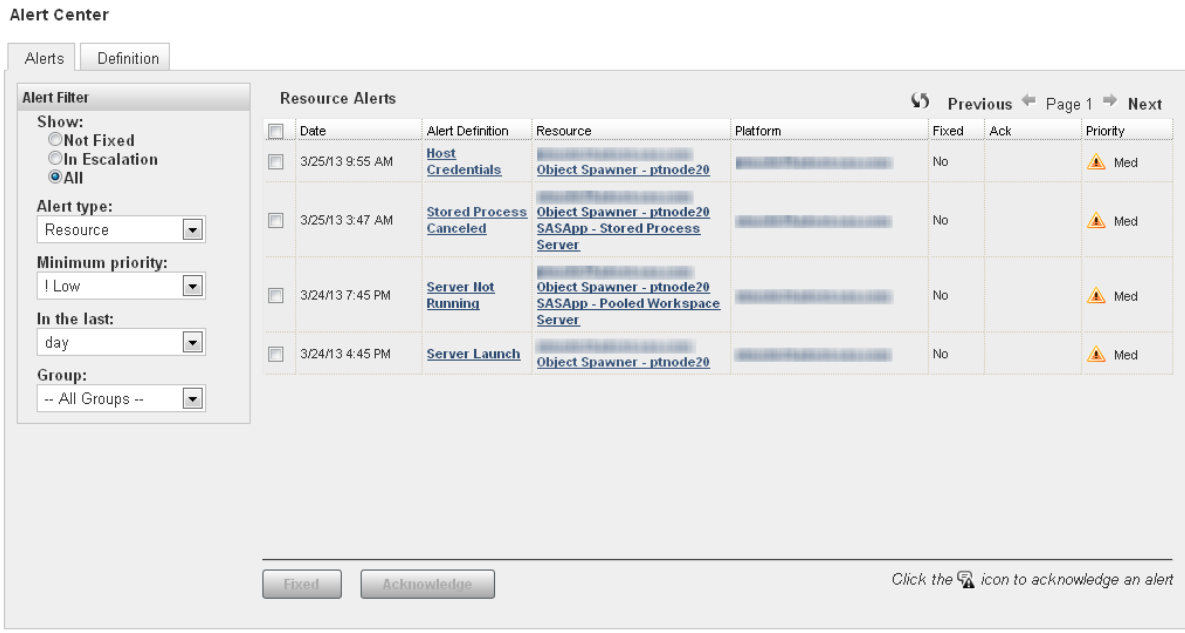
The **Analyze** pages contain the Alert Center, the Event Center, and the Operations Center. These pages enable you to quickly view and work with alerts and events throughout your system.

An event is any sort of activity in a resource that you are monitoring. Alerts are a user-defined type of event that acknowledges a critical condition in a selected resource. You can configure SAS Environment Manager to also log events for log messages and resource configuration changes.

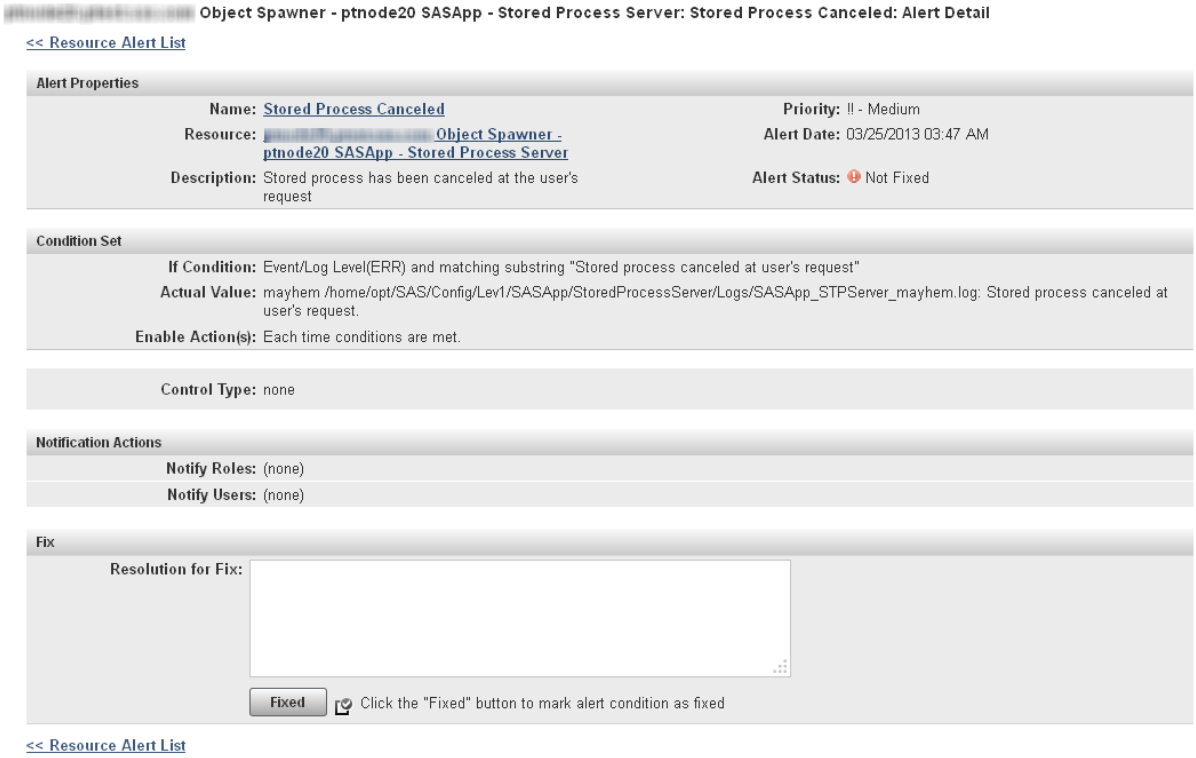
Alert Center

The Alert Center page provides a deployment-wide view of alerts and alert definitions.

The default view of the Alert Center is the **Alerts** tab, which displays a table with information about currently active alerts. You can use the filter controls to filter by criteria such as status, type, and priority. Clicking on an entry in the **Alert Definition** column in the table displays detailed information about the alert.



Although you can select the check box next to an alert and click **Fixed** to identify the problem as having been corrected, the Detail page for the alert enables you to not only mark the alert as fixed, but also to enter information about the resolution of the alert.



The **Definition** tab in the Alert Center contains a table listing all of the defined alerts. Clicking on an alert takes you to the definition page for the alert, where you can view more detailed information or edit the alert.

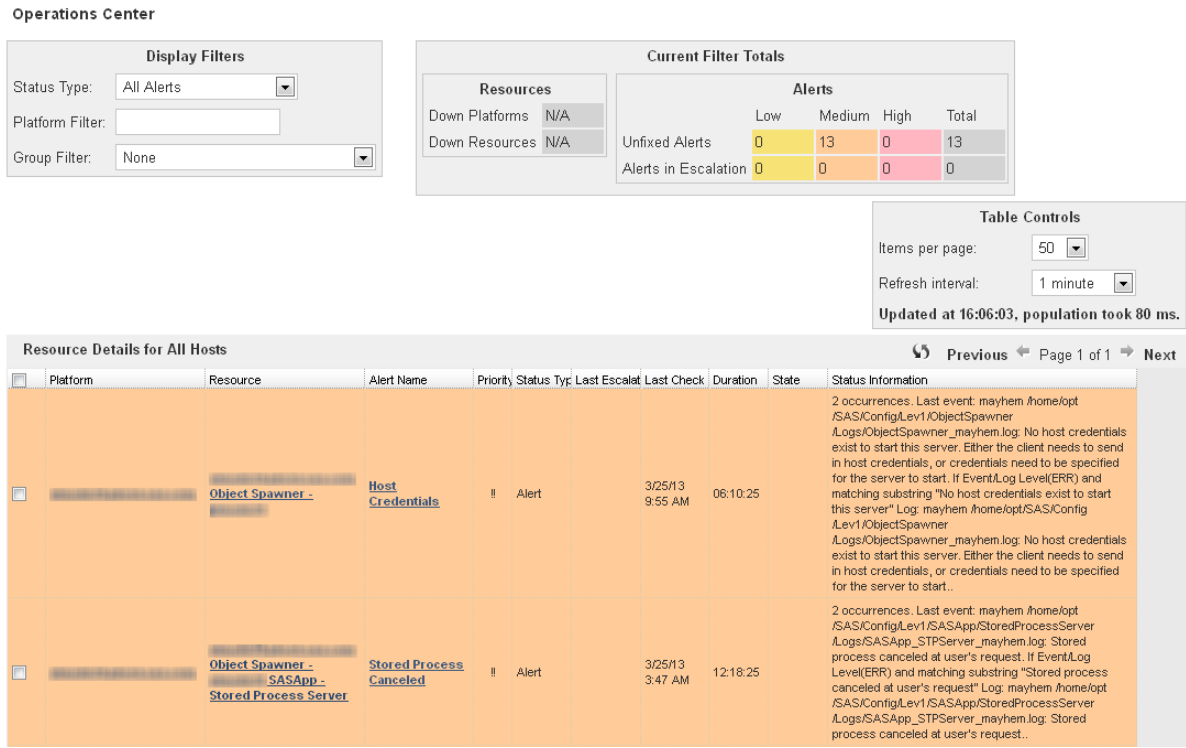
Event Center

The Event Center page provides a deployment-wide view of all events that have been logged for resources. Alerts are automatically logged as events. You can configure SAS Environment Manager to also log events for log messages, resource configuration changes, and resource metric triggers.

To access the event center, select **Analyze** ⇨ **Event Center**.

Operations Center

The Operations Center lists resources that are down or have unfixed alerts. You can use filters to find resources and problem types of interest. This concise view displays the current number of unavailable resources and unfixed alerts, and a one line problem summary for each resource.



Performing SAS Tasks: the Administration Page

The Administration page enables you to access and manage folders and folder contents in the SAS Metadata server. After you select a folder or an object contained in a folder, you can perform these tasks:

- view details about the folder or object's metadata
- modify the name, description, keywords, responsible parties, and extended attributes for folders and objects
- manage metadata access (such as access control templates and permissions)

- create, update, and delete folders

Configuring SAS Environment Manager: the Manage Page

Overview

Use the pages under Manage to control how the SAS Environment Manager application works.

Authentication/Authorization

The **Authentication/Authorization** area enables you to manage SAS Environment Manager users and user roles. These users and roles are not the same as the users and roles in SAS metadata that control access to SAS metadata objects, although SAS Environment Manager users are synchronized with users that are defined in metadata and added to specific groups. Use the **Administration** tab to control authorization for metadata objects.

In order to distinguish between the SAS Environment Manager access features and those in SAS metadata, this document and the SAS Environment Manager online Help refers to features internal to SAS Environment Manager as native features (such as native users or native roles). However, the SAS Environment Manager interface does not use the native terminology.

Server Settings

The **Server Settings** area enable you to change the settings for the SAS Environment Manager server, the defaults for monitoring, the configuration of escalation schemes, and the SAS Environment Manager plugins.

Server Settings
contains settings for the SAS Environment Manager server, including global alert properties, e-mail configuration, and notification properties

Monitoring Defaults
contains default monitoring and alerting definitions for all types of platforms, platform services, and servers supported by SAS Environment Manager.

Escalation Schemes Configuration
enables you to define notification or logging actions that are taken for alerts.

Plugin Manager
lists all currently loaded plugins and enables you to delete and update existing plugins, and load new ones. Deleting or updating a plugin cannot be reversed. Always save a copy before deleting or updating a plugin. You can find additional plugins for SAS Environment Manager at the Enterprise Management Integration area of SAS Customer Support on the web (`support.sas.com/rnd/emi`).

Plugins

The **Plugins** area contains functions that are added to the base functionality of SAS Environment Manager to perform a specific action. Plugins include the following:

- Network and Host Dependency Manager
- Groovy Console
- HQ Health
- HQ Web Services API
- tc Server Command-line Interface

License Usage Status

The **Licenses Usage Status** area displays the number of licenses in use on the platform as well as the total number of licenses allowed.

Chapter 3

Viewing Information at a Glance: Using the Dashboard

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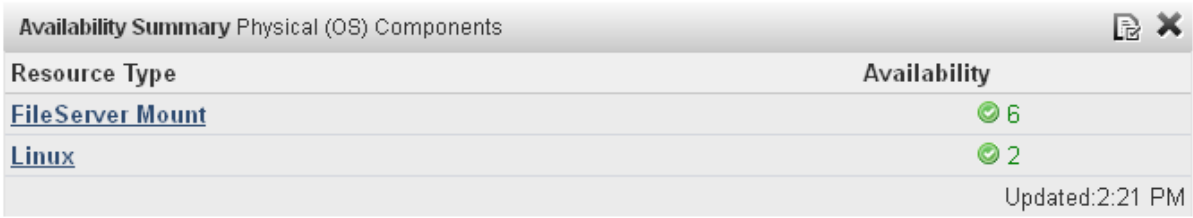
Reading the Dashboard

The Dashboard is your first view every time you start SAS Environment Manager. It is an at-a-glance view of the things that are most important to you when administering your environment, such as favorite resources, recent alerts, and resources that are currently experiencing problems.

The page contains a collection of portlets that provide information at a glance for a measure or a type of resource. You can select which portlets appear on the Dashboard, so the Dashboard shows you the information you most need to see. Selecting an entry in a portlet takes you to more detailed information about the entry. For example, selecting an entry in the **Recent Alerts** portlet takes you to the Alert Detail page for that alert. The following figure illustrates a sample Dashboard portlet.

Figure 3.1 *Sample Portlet*



The Dashboard is divided into two columns, and the portlets that can appear differ between the left and the right column. Some portlets can appear only once on a Dashboard, whereas other portlets can appear more than once. The portlets that can appear more than once are ones that display information about a selected group of resources. Each instance of the portlet displays information about different resources. The portlets that can appear only once display information for the entire environment.

This table lists the portlets that you can choose to appear on a Dashboard, as well as where they can appear and how many instances are allowed.

Table 3.1 *Portlets*

Name	Description	Location	Instances
Auto-Discovery	Lists new and changed resources and enables you to add them to the inventory. Check this portlet after you install a plugin to accept the newly discovered resources into the inventory.	Right	One
Availability Summary	Indicates the availability of selected resources, grouped by resource type. This portlet refreshes every minute.	Left	Multiple
Control Actions	Lists recently performed actions on managed resources and upcoming scheduled actions. Also indicates which quick control actions are most frequently performed.	Right	One
Favorite Resources	Lists selected resources.	Right	One
Saved Charts	Displays selected charts as a slide show.	Left	One
Recent Alerts	Lists the most recently triggered alerts for selected resources. This portlet refreshes every minute.	Right	Multiple
Recently Added	Lists platforms that have been recently added to inventory.	Left	One
Search Resources	Enables you to search for resources. The search supports case-insensitive, partial-term queries for a specified inventory type.	Left	One
Summary Counts	Displays a count of managed resources by inventory type. Only those resources that you are allowed to access are displayed.	Left	One
Group Alerts Summary	Displays traffic light indicators for resource alerts and group alerts for selected groups. To view a list of alerts that have fired for a group, click that group's traffic light. To view a group page, click that group's name.	Right	One
Metric Viewer	Displays selected metrics for selected resources. This portlet refreshes every minute.	Right	Multiple

Name	Description	Location	Instances
Problem Resources	Lists all resources that have problem metrics and provides details, including availability status, number of alerts per resource, number of times the metric has been out of bounds, and the most recent time that the out-of-bounds metric was collected.	Right	One

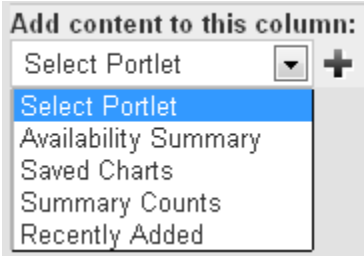
Because the Dashboard page can be customized, each user has access to multiple Dashboards, with each one modified according to different needs. Each user has access to a personal Dashboard, which contains portlets selected by the user. In addition, each user can also access a Dashboard for each of the native roles of which the user is a member. Each of those Dashboards is customized with the portlets that are most useful for that role. To choose a different Dashboard, select the one that you want to use from the **Select a Dashboard** field.

A new Dashboard type is automatically created whenever you create a new native role.

Customizing Your Dashboard

You can customize any Dashboard to which you have access by selecting portlets to appear on your Dashboard and by selecting the information that is displayed in each portlet.

To add a portlet to your Dashboard, use the **Add content to this column** menu to select from the available portlets and then click the Add icon , which is beside the field. The portlets displayed in the list depend on whether you are adding a portlet to the right or left column and which portlets have already been added to the Dashboard.



After the portlet is placed on your Dashboard, you can click and drag the portlet header to move it to a different location. However, you cannot move a portlet from one column to another.

To change the information that a portlet displays, click on the configuration icon in the portlet's header. Use the Portlet Configuration page to select options that narrow the focus of the information displayed in the portlet. The options available are unique to each portlet. Examples include the following:

- how many of the most recent control actions are displayed (**Control Actions** portlet)
- the number and type of alerts issued for selected resources (**Alerts** portlet)
- specified resources (**Availability Summary** portlet)

You can use groups (compatible groups, mixed groups, and application groups) to make your Dashboard portlets more useful. Groups enable you to organize resources by type or function within your organization. You can then configure portlets to display information about resources in particular groups, so your Dashboard contains information about the resources that are most vital to you.

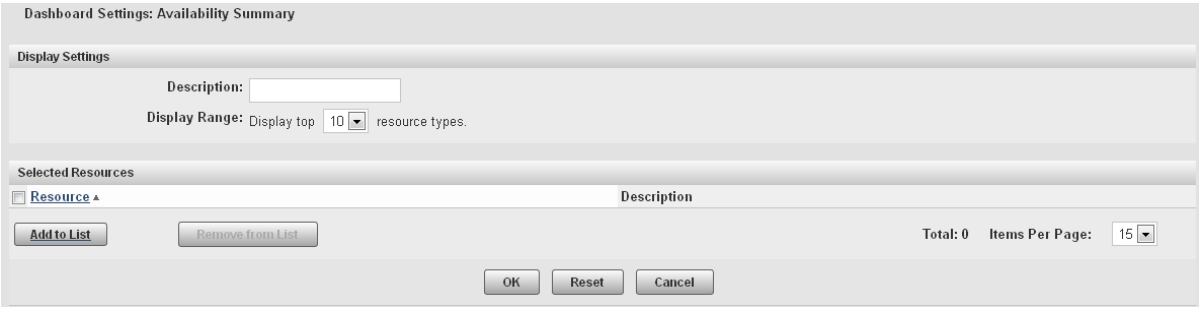
To remove a portlet from the Dashboard, click on the delete icon for the portlet.

Example: Adding an Availability Summary Portlet

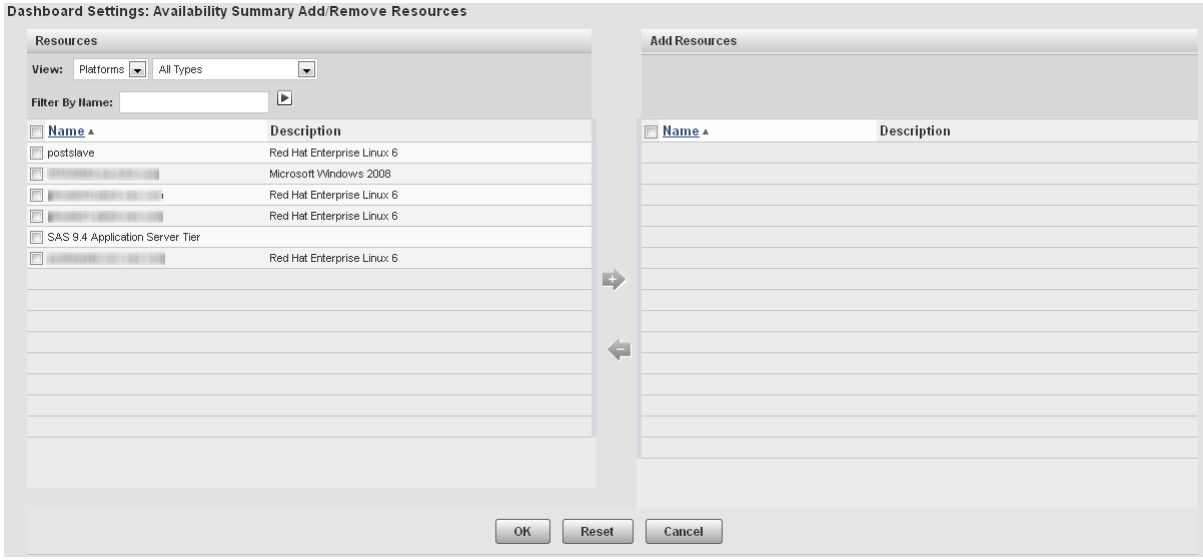
This example explains how to add a portlet to your Dashboard page that will monitor the availability of SAS Workspace Servers that are running under a SAS Object Spawner.

1. On the left side of the Dashboard page, select **Availability Summary** in the **Add Content to this column** field and click the Add icon . A blank **Availability Summary** portlet is added to your Dashboard.

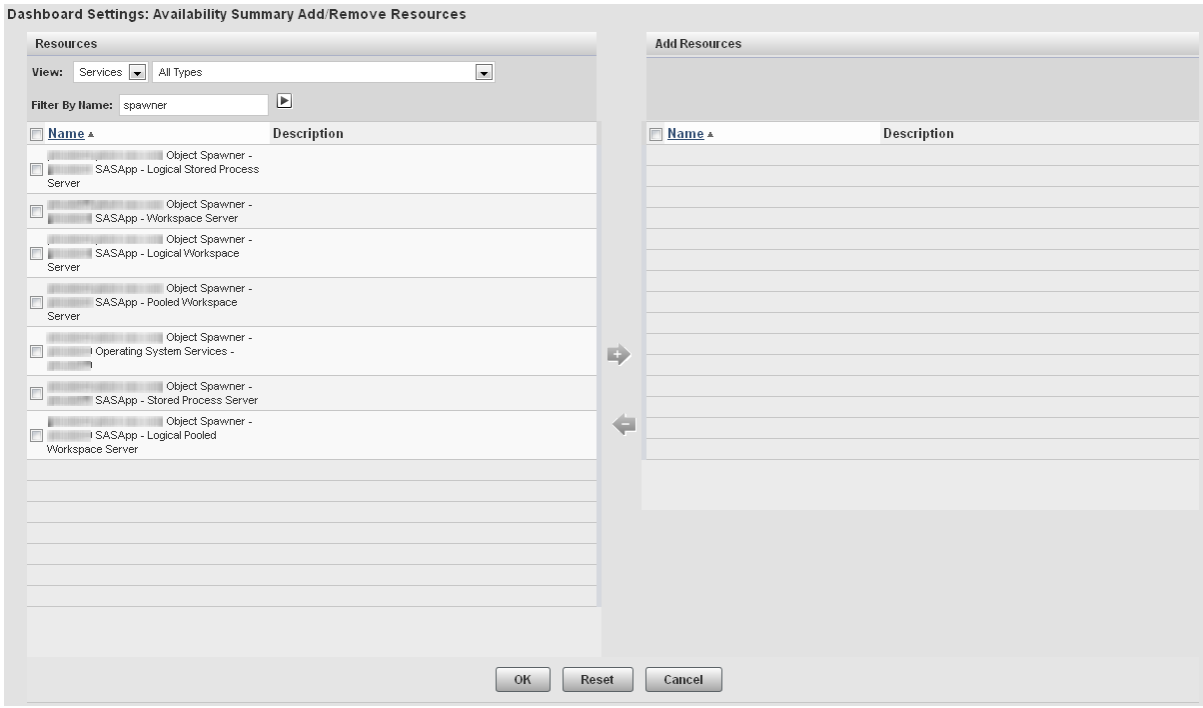
2. Click the Configuration icon to display the Dashboard Settings page for the portlet.



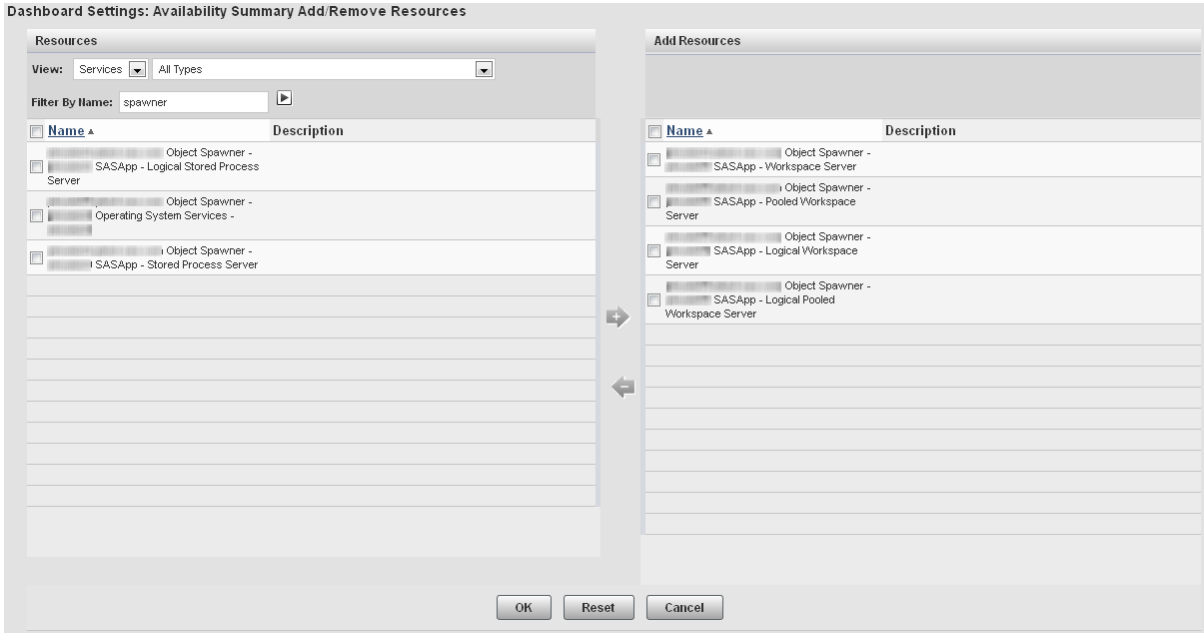
3. In the **Selected Resources** area, click **Add to List** to display the Add/Remove Resources page.



4. In the **View** field, select **Services**. Logical SAS servers are listed as services in SAS Environment Manager.
5. In the **Filter By Name** field, enter **`spawner`** and click ▶. The **Resources** list displays the services running under the SAS Object Spawner.



6. Select the check boxes beside the **Workspace Server** and **Pooled Workspace Server** entries and click ➕ to move the resources to the **Add Resources** list.



7. Click **OK** to return to the Dashboard Settings page, and click **OK** again to return to the Dashboard page. The portlet displays the availability information for the selected resources.

Chapter 4

Finding Resources in Your System

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Automatically Discovering and Adding SAS Resources

When the SAS Deployment Wizard installs SAS applications, it creates a file called auto-approved.properties. This file is located in the `<agenthome>/conf` directory. This file lists the SAS servers and services that are installed. When you run SAS Environment Manager for the first time, the application auto-discovers and auto-accepts the resources listed in the auto-approved.properties file. All of the resources in your initial SAS installation are automatically in your inventory when you start using SAS Environment Manager.

Using the Auto-Discovery Portlet

The Auto-Discovery portlet displays a list of servers and platform services that are auto-discovered. Resources that are listed on the portlet are known but are not yet being monitored. After the resources from the initial SAS installation have been discovered and added to the inventory, the Auto-Discovery portlet lists new resources that have been added to the monitored platforms.

To discover and add resources, follow these steps:

1. On the Dashboard, check the **Auto-Discovery** portlet to see whether new resources are listed.
2. Select the check box beside the resources that you want to monitor and select **Add to Inventory**.

3. Go to the Resources page. The resources you just added are listed in the appropriate table, together with any resources that are already being monitored. However, an Unknown icon ( ) is displayed in the **Availability** column for the new resources, because SAS Environment Manager has not begun to collect monitoring data. SAS Environment Manager collects data at intervals rather than continuously, so you must wait for the next data-collection cycle.
4. After approximately five minutes, data should be collected for the new resources and the **Availability** column reflects the status of the resources.

If the status of a new resource is displayed as Unknown even after a period of waiting, then the resource might not be completely configured for data collection. To configure the resource, follow these steps:

1. In the Resource page, locate the resource whose status is unknown and click on the entry in the Resources table. The Monitor page for the selected resource is displayed.
2. A message is displayed if the resource needs to be configured. If you need to perform additional configuration steps, select **Inventory** to display configuration details for the resource.
3. Scroll to the **Configuration Properties** area of the page and verify that the properties are correct. Click **Edit** to make changes to the properties.

Performing an Auto-Discovery Scan

If you know that resources have been added on a platform that you are monitoring, you can run an auto-discovery scan on the platform to locate the resources. Once the resources have been discovered, you can add them to your inventory for monitoring.

To perform an auto-discovery scan of a platform, follow these steps.

1. Using the **Resources** tab, go to the Detail page for the platform that you want to scan.
2. Select **Tools Menu** ⇨ **New Auto-Discovery**
3. If you want to scan for all servers and system processes on the platform, click **OK**.
4. If you want to scan for specific server types, select the check boxes for the server types that you want to scan for. You can also select attributes such as directories to include or exclude from the scan and the depth at which to scan. When you have specified the scanning criteria, click **OK** to start the scan.

Rediscovering Resources

After resources have been auto-discovered, there might be some resources that cannot be added to the inventory for some reason. If this happens, you can clear the contents of the auto-discovery queue and try discovering them again. After the resources are removed from the queue, and you restart the agent, the agent will rediscover the resources.

To clear the auto-discovery queue follow these steps:,

1. Select **Manage** ⇨ **HQ Health** to display the HQ Health page.

2. On the HQ Health page, select the **Database** tab.
3. In the **Action** field, select **Purge AIQ Data** and click ▶.

You can also manually delete any server resources from the Resources page. The servers are then rediscovered when you run an auto-discovery scan.

Manually Adding a Server

There might be some instances where you need to monitor a server that is not auto-discovered by the SAS Environment Manager agent. To manually add a server, follow these steps:

1. Navigate to the Resource Detail page for the platform on which the server runs.
2. Select **Tools Menu** ⇨ **New Server** to display the New Server page.
3. On the New Server page, specify the server name.
4. Use the **Server Type** menu to select the type of server. If the server type that you want to add is not listed, it is not supported by SAS Environment Manager and cannot be added.
5. In the **Install Path** field, specify the full pathname to the server software.
6. Click **OK** to complete the server definition.

Note: Because the agent does not update data continuously, it might take several minutes before metric data begins appearing for the new server.

Manually Configuring a Service

There might be some instances where you need to monitor a service that is not auto-discovered by the SAS Environment Manager agent. To manually add a service, follow these steps:

1. In the Resources view, select the platform that contains the service that you want to monitor.
2. In the Detail view for the selected platform, select **Tools Menu** ⇨ **New Platform Service**.
3. Specify a name for the service and select the service type. Common selections include **HTTP**, **Fileserver File**, and **TCP**.
4. Click **OK** to create the service and display the service details. Select the **Configuration Properties** link on the page.
5. Use the instructions on the Configuration Properties page to specify the options needed to monitor the service.

Chapter 5

Monitoring and Controlling Resources

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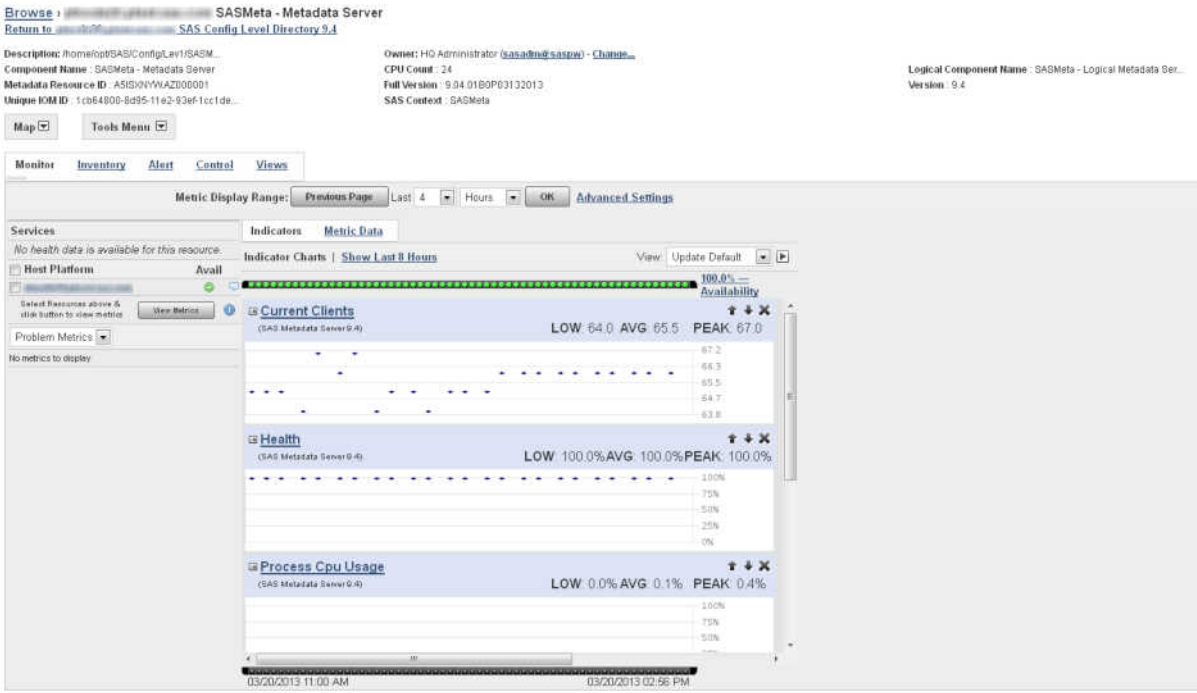
Monitoring Resources

A central capability of SAS Environment Manager is the ability to monitor resources. Monitoring enables you to track a resource's availability and overall health. A variety of metric data is displayed, both in numeric and graphic format, to enable you to examine detailed information about the resource's operation.

To view the monitoring information for a resource, select a resource from the table on the Resources page.



The fastest way to check the status of the selected resource is to use the availability bar, which is above the indicator charts. The availability bar displays a color-coded dot that represents the availability during a time slice. The length of each time slice depends on the display range that you select (for example, if you display the past eight hours of data, each dot corresponds to approximately eight minutes). The percentage of time that the resource was available is displayed at the end of the availability bar.

The dots are color-coded using the following format:

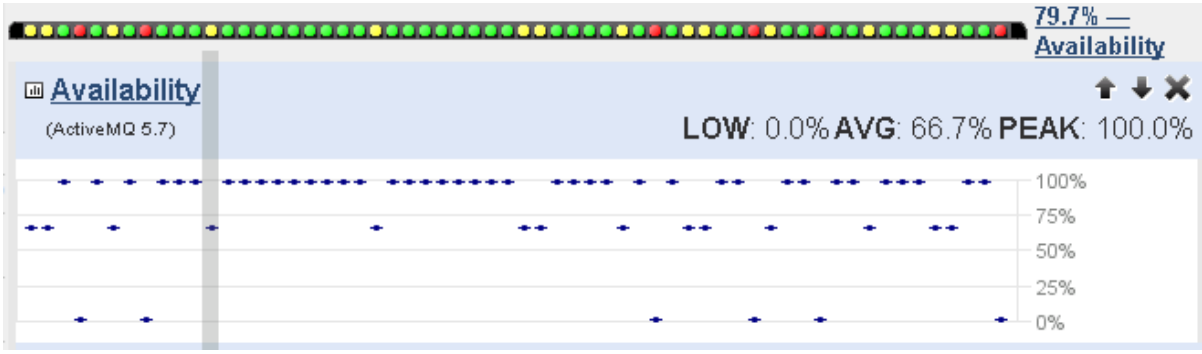
Green
: 100% availability

Yellow
: Partial availability; between 0% and 100%

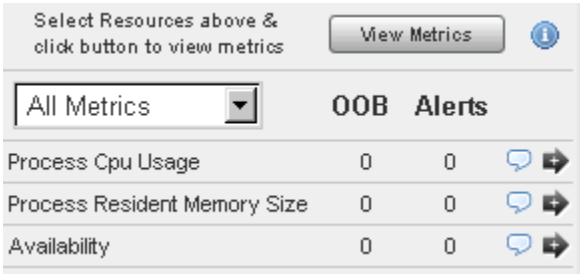
Red
: 0% availability

An availability bar such as the one in the following figure shows that the resource fluctuated between being available, partially available, and unavailable over the most recent time slices.

To help determine the cause of availability problems, click on the dot for a particular time slice. The selected time slice is highlighted on the indicator charts below the availability bar. This function helps you quickly check the charts for data that might correspond to the availability problem.



To change the metrics that are displayed in the metric charts, use the menu on the left side of the page to select either **All Metrics** or **Problem Metrics**, and then click **View Metrics** to display a lit of available metrics. Click the arrow beside a metric to add the chart to those displayed on the page.



The events bar is displayed below the indicator charts. It is similar to the availability bar, with dots representing time slices. The bar displays only a red dot if an event occurs during a time slice. If no event occurs, the bar remains black.

Managing SAS Resources

SAS Server Names

Because SAS Environment Manager is based on VMWare's Hyperic, some server names in SAS Environment Manager do not match the names that are used in a SAS deployment. Use this table to determine the name of the server that you are interested in.

SAS Server Name	Server Name Displayed in SAS Environment Manager
SAS Environment Manager	Apache Tomcat 5.5, 6.0, 7.0
SAS Environment Manager Agent	HQ Agent
SAS Web Server	vFabric Web Server 5.1, 5.2

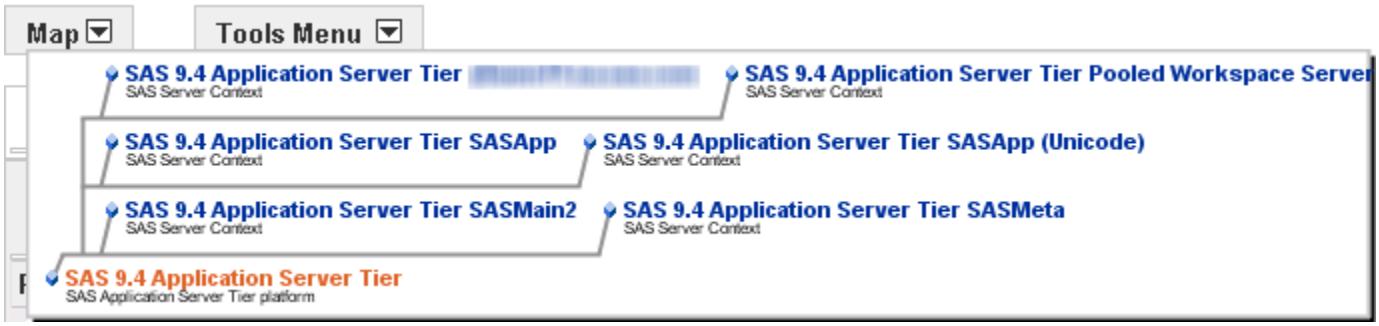
SAS Web Application Server	SpringSource tc Runtime 7.0
SAS Web Infrastructure Platform Data Server	PostgreSQL 9.x
SAS JMS Broker	Active MQ 4.0, 5.0, 5.1, 5.2, 5.3, 5.4, 5.7

Using the Map Control

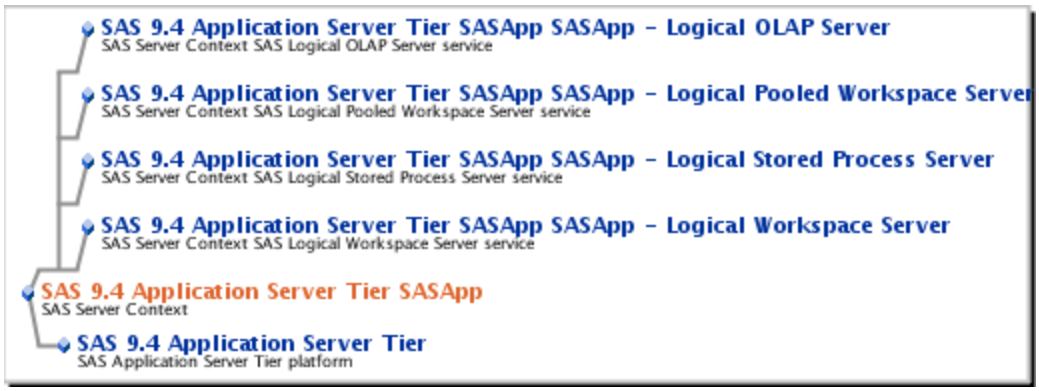
The **Map** control provides a visual representation of resources and the next level of parent and child resources. You can click on any of the resources listed on the map to go to the Monitor page for that resource. The **Map** control is available on the Monitor page for a resource.

The map for a platform displays the servers under the platform, and the map for a server displays the services under the server. You can use the map to better understand how a SAS environment is presented in SAS Environment Manager.

In SAS Environment Manager, the SAS Application Server Tier is considered to be a platform. The map for the platform illustrates the SAS servers that are part of the server tier.



Logical SAS servers, such as logical workspace servers or logical stored process servers, are treated in SAS Environment Manager as services, so they are displayed as children under the SASApp server.



For a SAS Object Spawner, the services listed in the map are the servers that are spawned by the spawner.

Making Resources Easier to Locate

Organizing Resources into Groups

In SAS Environment Manager, resources are organized into groups to make them easier to locate and manage. There are six different types of groups:

- platform resource groups
- server resource groups
- service resource groups
- compatible groups
- mixed groups
- applications

resource groups
: These groups are automatically created. When resources are discovered and then added to the inventory of monitored resources, they are added to the appropriate resource group. The three resource groups that are automatically created in SAS Environment Manager are platforms, servers, and services. It is important to note how SAS resources map to the resource hierarchy. For example, logical SAS servers are added to the services group.

compatible groups
: These groups contain selected instances of a single type of resource (for example, SAS Object Spawners). Creating a compatible group enables you to view aggregate metrics for a resource type. Compatible groups also make it easier for you to locate resources that you need to monitor. For example, you can create a group containing several servers of critical importance, which prevents you from having to search for those servers among the large numbers that might be on your site. After you create a

compatible group, you can add resources to the group if they match the selected group type.

mixed groups
: These groups are user-created groups that can contain multiple types of resources. Mixed groups can contain other groups, platforms, servers, and services, or applications. Availability is the only metric that is available for a mixed group. This type of group is useful for functions such as checking the availability of a SAS Object Spawner and all of the spawned services or for viewing the collective availability of a group of resources.

application
: These groups are a set of selected services, usually running in different servers on multiple platforms, that together fulfill a single business purpose. Creating application groups enables you to manage your infrastructure from an application perspective, as opposed to a hardware perspective.

Creating a Group

To create and populate a group, follow these steps:

1. In the Resources page, select **Tools Menu** ⇨ **New Group**.
2. In the New Group page, specify a name for the group.
3. Use the **Contains Resources** menu to select the type of group that you want to create.
4. Use the **Select Resource Type** menu to select the type of resource the group will contain.
5. Click **OK** to create the group.
6. In the Resources page, click on a resource that you want to add to the group.
7. In the Details page for the selected resource, select **Tools Menu** ⇨ **Add To Group**.
8. In the Group Manager page, select the group to which you want to add the resource. If the group that you want to add the resource to is not listed, the selected resource type is not the same as the resource types specified for the group.

Creating an Application

To create and populate an application, follow these steps:

1. In the Resources page, select **Tools Menu** ⇨ **New Application**
2. In the New Application page, specify a name for the application. Click **OK** to create the application.
3. The Configuration page for the application appears. In the **Services** area, click **Add to List** to select resources for the application.
4. In the **Services List**, select the services in the **Services** list that you want to add to the application and use the arrow button to move them to the **Add Services** list. Click **OK** when you finish selecting services, and then click **OK** again to create the application.

Controlling Resources Using Control Actions

What is a Control Action?

Control actions enable you to control certain types of servers and services from SAS Environment Manager. You can create control actions to perform operations such as starting, stopping, restarting, pausing, and resuming a server or starting, stopping and sending messages through a service. The specific actions available depend on the server or service type selected. You can define resource actions to run immediately, to run on a schedule, or to run in response to an alert.

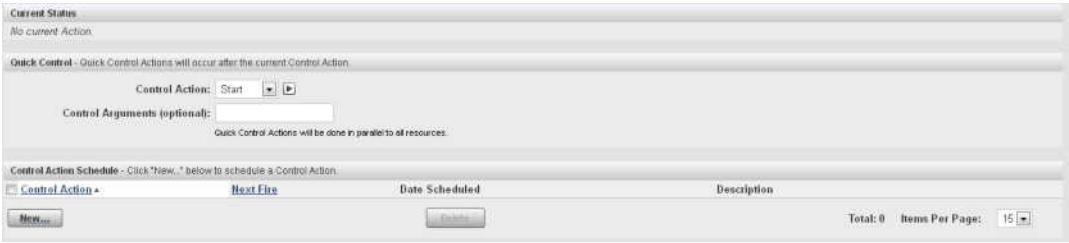
You can use control actions to control these types of servers:

- Postgre SQL SAS Web Infrastructure Platform Data Server (PostgreSQL 9.x)
- SAS Object Spawner
- SAS OLAP Server
- SAS Metadata Server
- SAS Web Application Server (SpringSource tc Runtime)

Performing Immediate Resource Control Actions

To use a control action to perform an immediate action on a resource, follow these steps:

1. In the Resource Details page for the selected server or service, click **Control**. If this menu item is not present, the resource does not support control actions. The Control Action page is displayed.



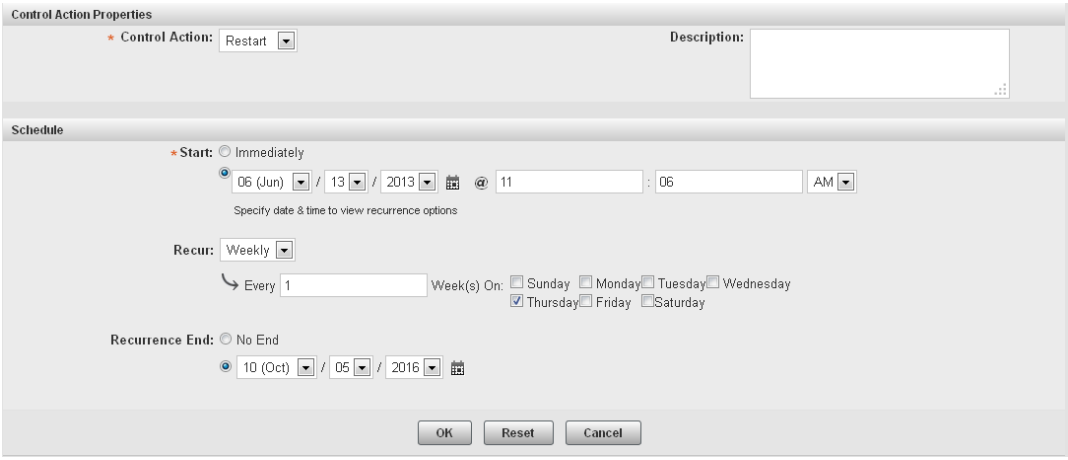
2. In the **Quick Control** area, select the type of action that you want to perform in the **Control Action** field.
3. Specify any arguments for the action in the **Control Arguments** field.
4. Click ▶ to perform the action.

Scheduling Resource Control Actions

To create a scheduled resource control action, follow these steps:

1. In the Resource Details page for the selected resource, click **Control**. If this menu item is not present, the resource does not support control actions. The Control Action page is displayed.

2. In the **Control Action Schedule** area, click **New**. The Scheduled Control Action page is displayed.
3. Select the action that you want to perform in the **Control Action** field.
4. In the **Schedule** area, select the radio button next to the date and specify the date and time that the scheduled action should take place.
5. Specify how often the action should recur and when the scheduled recurrence should end.



6. Click **OK** to save the scheduled control action.

To view the list of scheduled control actions for the resource, click **Control** in the Resource Details page for the selected resource. All scheduled control actions are listed in the **Control Action Schedule** area.

Performing Server Actions in Response to an Alert

To define a control action to occur in response to an alert, follow these steps:

1. Create or edit an alert definition. See "Defining an Alert" on page 41 for more information. On the Alert Definition page, click **Control Action**, the click **Edit**. The Add Control Action page is displayed
2. Use the **Resource Type** field to select the type of server or service for which you want to create the control action.
3. After you select the resource type, the **Resource Name** field is populated with all instances of the selected resource type. Select the instance for which you want to create the control action.
4. Select the type of action to be performed in the **Control Type** field. The field contains only actions that are supported on the selected resource type.
5. Click **OK** to define the control action. The defined action will now take place whenever the associated alert occurs.

Chapter 6

Monitoring Server Logs

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Setting Up Log and Configuration File Tracking

SAS Environment Manager enables you to monitor log files for events and configuration files for changes. When entries appear in these files, they are presented in SAS Environment Manager as events. You can also define alerts that are issued when selected types of messages appear in the log or when a selected configuration file is changed. See "Working with Resource Alerts" on page 40 for more information. In order for you to track log files and configuration files for a resource, you must turn on log file and configuration file tracking. If you do not configure log file or configuration file tracking, a warning message and a link to the Configuration page appears on the Detail page for the resource

To enable and configure log file and configuration file tracking for a resource, follow these steps:

1. Locate the resource for which you want to configure log tracking. Select **Resources** ⇨ **Browse** to view a list of all monitored resources.
2. Click on the resource name to display the Monitor page for the resource. Click **Inventory**.
3. In the **Configuration Properties** section of the page, click **Edit**.
4. On the Configuration Properties page, select the **server.log_track enable** check box.
5. Specify a comma-delimited list of the logs that should be monitored in the **server.log_track.files** field.
6. If you also want to track configuration changes, select the **server.config_track.enable** check box. Not every resource provides the ability to track configuration changes.

7. Specify a comma-delimited list of the configuration files that should be monitored in the **server.config_track.files** field.

Logging for SAS Servers

Logging Specific Types of Messages

SAS Environment Manager monitors SAS server log files and creates events for all error messages found in the log. The types of servers supported by this function are:

- SAS Metadata Server
- OLAP server
- Object spawner
- Stored process server
- CONNECT spawner
- Workspace server
- Pooled workspace server

You can change the configuration to look for specific types of log entries other than errors. The entry type that you specify will then produce an event in SAS Environment Manager. To configure logging to track specific messages, follow these steps:

1. Edit the file **<*server_config_directory*>/sev_logtracker_plugin.properties** (for example, /opt/SAS//Lev1/SASApp/OLAPServer/ sev_logtracker_plugin.properties)
2. Add a line for the message that you want to track. The format is

   ```
   level.[level_of_message].[sequential_number]=[regular_expression]
   ```

   For example, this entry looks for an INFO message containing the phrase "AUTOEXEC processing beginning":

   ```
   level.info.1=.*AUTOEXEC processing beginning.*
   ```

   .
3. If you add multiple expressions to look for of the same log level, simply increment the number:

   ```
   level.info.2=.*Message text here.*
   ```
4. Save the file. SAS Environment Manager will automatically use the revised file.

Setting Up Logging for SAS Servers

SAS Environment Manager can create events based on log monitoring for SAS servers such as SAS Metadata Server, SAS Object Spawner, and SAS OLAP Server. However, you must first specify a FixedFilename logfile in the logconfig.xml or logconfig.apm.xml file. To set up log monitoring for SAS servers, perform these tasks:

- Create a fixed name logfile appender. See "Time-Based Appender Example " on page 35 for a rolling file appender with a time-based policy. See "Fixed Window

Size Appender Example ” on page 35 for a rolling file appender with a fixed window policy based on log size.

- Add the appender to the logconfig.xml file for the server, or to the logconfig.apm.xml file if you are using the Audit, Measurement, and Performance package.
- In the Server Configuration page in SAS Environment Manager, enable logging and specify the logconfig.xml or logconfig.apm.xml file in the **server.log_track.files** field.
- Update the root logger to refer to the new appender

Time-Based Appender Example

This appender creates a fixed filename “HQ_<*SAS_servername*>.log” as a fixed name and rolls each day to an HQ_<*SAS_servername*>_*Date_Hostname*.log.

```
<appender class="RollingFileAppender" name="FixedFilename_Appender">
   <param name="File" value="/opt/sasinside/SASConfig/metadata/Lev1/SASMeta/MetadataServer/Logs/HQ_MetadataServer.log"/>
   <param name="Append" value="true"/>
   <param name="Unique" value="false"/>
   <param name="ImmediateFlush" value="true"/>
   <rollingPolicy class="TimeBasedRollingPolicy">
       <param name="FileNamePattern" value="/opt/sasinside/SASConfig/metadata/Lev1
/SASMeta/MetadataServer/Logs/HQ_MetadataServer_%d_%S{hostname}.log"/>
   </rollingPolicy>
   <layout>
       <param name="HeaderPattern" value="Host: '%S{hostname}', OS: '%S{os_family}', Release: '%S{os_release}', SAS Version: '%S{sup_ver_long2}',
Command: '%S{startup_cmd}'"/>
       <param name="ConversionPattern" value="%d %-5p [%t] %X{Client.ID}:%u - %m"/>
   </layout>
</appender>
```

This code updates the root logger to refer to the new appender.

```
<root>
   <level value="Error"/>
   <appender-ref ref="TimeBasedRollingFile"/>
   <appender-ref ref="FixedFilename_Appender"/>    <<<<<<<<<<<<<<<  Add this line
   <appender-ref ref="IOMServer"/>
</root>
```

Fixed Window Size Appender Example

This appender creates a fixed filename “HQ_<*servername*>_*hostname*_1.log” as a fixed name and rolls to a second HQ_<*servername*>_*hostname*_2.log. When the second file reaches a size of 100MB, it is deleted and HQ_<*servername*>_*hostname*_1 is renamed to HQ_<*servername*>_*hostname*_2, re-creating _1.

```
<appender class="RollingFileAppender" name="RFA">
    <param name="ImmediateFlush" value="true"/>
    <param name="Append" value="true"/>
    <filter class=”LevelMatchFilter”>
          <param name=”LevelToMatch” value=”INFO”/>
          <param name=”AcceptOnMatch” value=”TRUE”/>
    </filter>
    <rollingPolicy class="FixedWindowRollingPolicy">
```

```
            <param name="fileNamePattern" value="/opt/sasinside/SASConfig/metadata/Lev1
/SASMeta/MetadataServer/Logs/HQ_MetadataServer_%S{hostname}_%i.log"/>
            <param name="minIndex" value="1"/>
            <param name="maxIndex" value="2"/>
    </rollingPolicy>
    <triggeringPolicy class="SizeBasedTriggeringPolicy">
            <param name="MaxFileSize" value="100MB"/>
    </triggeringPolicy>
    <layout>
            <param name="HeaderPattern" value="Host: '%S{hostname}', OS: '%S{os_family}', Release: '%S{os_release}', SAS Version: '%S{sup_ver_long2}',
Command: '%S{startup_cmd}'"/>
            <param name="ConversionPattern" value="%d %-5p [%t] %X{Client.ID}:%u - %m"/>
    </layout>
</appender>
```

This code updates the root logger to refer to the new appender.

```
<root>
   <level value="Error"/>
   <appender-ref ref="TimeBasedRollingFile"/>
   <appender-ref ref="IOMServer"/>
   <appender-ref ref="RFA"/>                    <<<<<<<<<<< add this line
</root>
```

Monitoring Generic Log Files

You can use SAS Environment Manager to monitor generic log files. It can monitor the log file's metrics (such as size, permissions, and owner) and can also produce user-defined alerts for the file.

To monitor a log file, follow these steps:

1. In the SAS Environment Manager, select **Resources** ⇨ **Browse** ⇨ **Platforms**. Click on the platform that is running the server whose log you want to monitor.
2. From the Monitor page for the platform, select **Tools** ⇨ **New Platform Service**.
3. Specify a name for the service. In the **Service Type** field, select **FileServer File**. Click **OK**.
4. The Service Inventory page for the new service appears. A message is displayed at the top of the page indicating that the resource has not been configured. Select the **Configuration Properties** link in the message.
5. Specify the location of the log file that you want to monitor in the **path** field. Click **OK**.

You have now created a service that monitors the specified log file. To view the inventory page for the service, select **Resources** ⇨ **Browse** ⇨ **Services**. Specify the service name in the **Search** field to locate the service in the table.

After the service is created, you might want to create alerts to send a notification of certain conditions are met. For example, you could create an alert for a log monitoring service that would send a notification if the word ERROR appears in the log. See “Working with Resource Alerts” on page 40 for information about creating alerts..

Monitoring Syslogd and Other Privileged Logs

The SAS Environment Manager agent and server process are configured to run with the credentials of the user that was specified in the SAS Deployment Wizard. However, if you need to integrate SAS Environment Manager into your operating system's services, you might need to run the SAS Environment Manager Agent server as root in order to provide the appropriate Read access permissions. For example, syslog log messages are usually configured to allow only root access.

Perform these changes to run the agent process as root:

1. Log on as root and start a terminal session.
2. Navigate to HQ_AGENT_HOME and stop the agent using the command **`bin/hq-agent.sh stop`**.
3. Start the agent as root using the command **`bin/hq-agent.sh start`**.

After you start the agent process as root, you can create a service to monitor the log.

When the agent is running as root, it uses **`su`** to execute tasks. If **`/bin/su`** does not exist, create a link to it. For example, if **`su`** is in **`/sbin`** but not **`/bin`**, create a link as follows: **`$ sudo ln -s /sbin/su /bin/su`**

Chapter 7

Working with Events and Alerts

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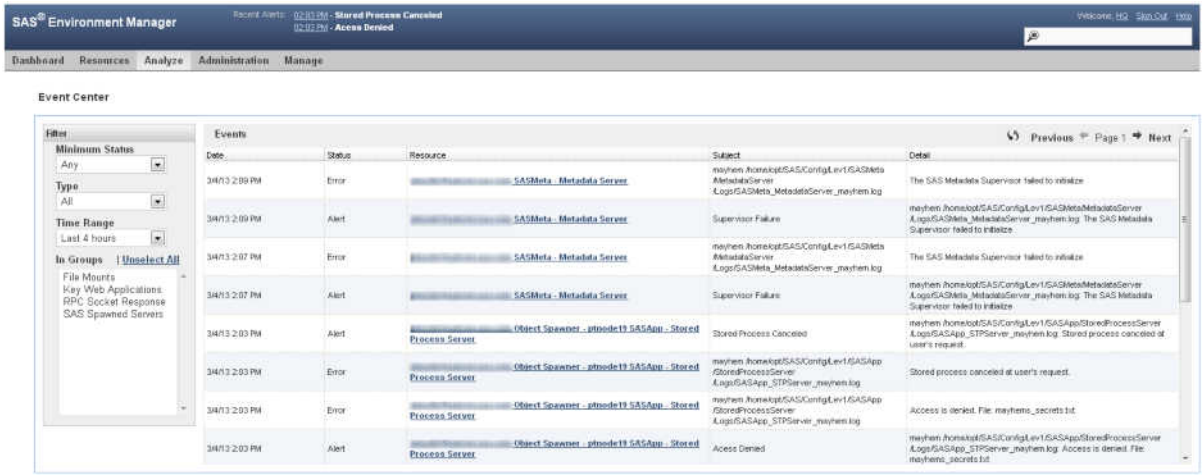
Monitoring Resource Events

SAS Environment Manager provides the capability to monitor metrics, scan log files, manage configuration changes, and monitor availability. When there is a change in a resource's threshold value for one of these items, an event is recorded in SAS Environment Manager's event message system. Alerts are a type of event. All events throughout the entire deployment are displayed in the Event Center. To access the Event Center, select **Analyze** ⇨ **Event Center**.

Figure 7.1 *Event Center*



The table shows information about recently recorded events, including the status, the resource involved, and information about what caused the event to be triggered. You can

subset the table to locate events more quickly. For example, you can show only the events that have at least Error status, or only the ones that affect resources in a specified group.

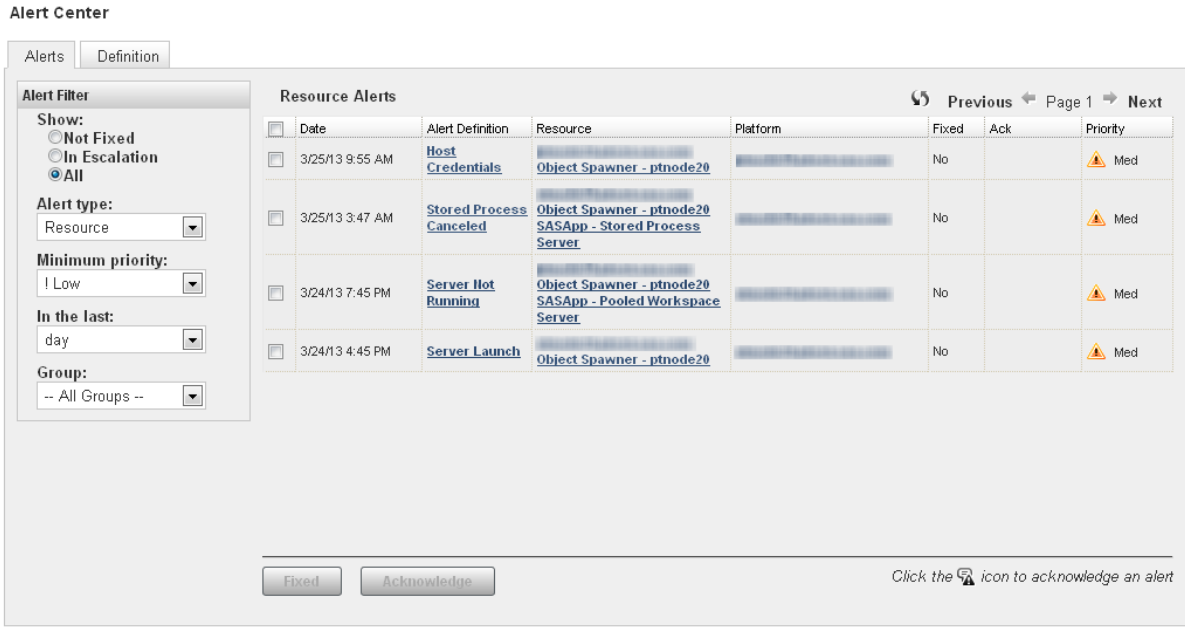
Clicking on the name of the resource in the event table takes you to the resource's Detail page.

Working with Resource Alerts

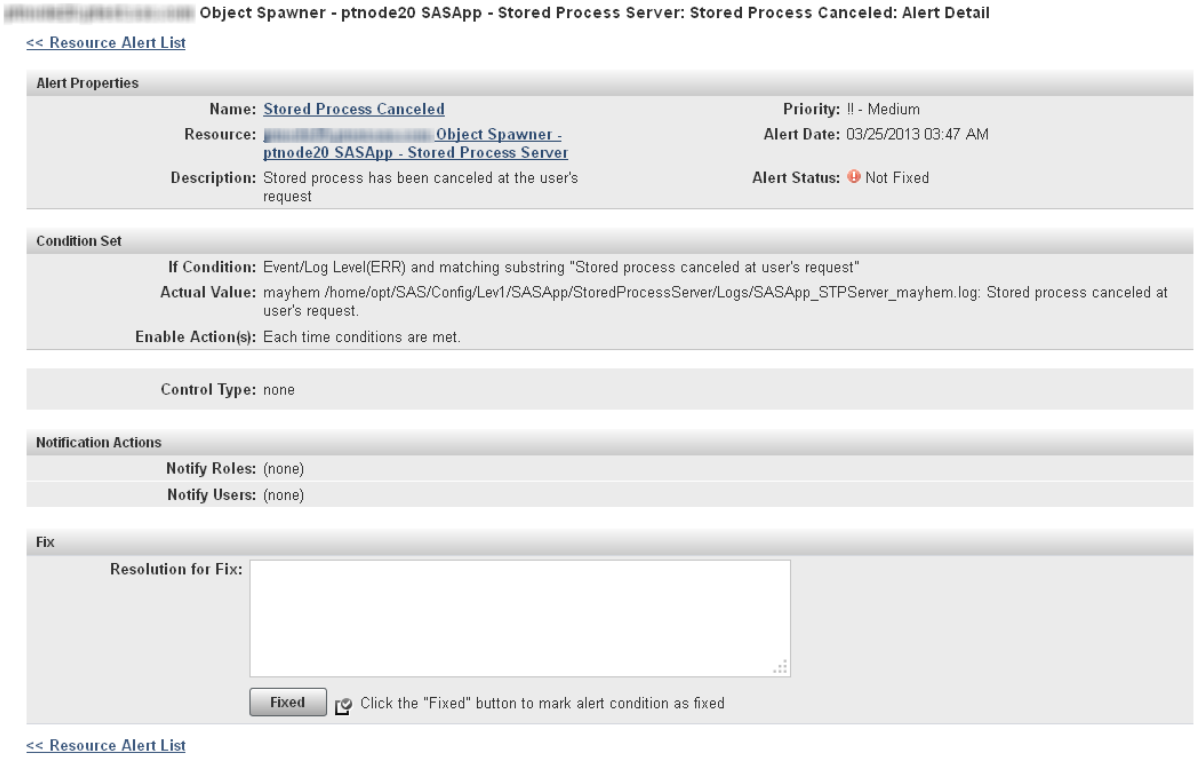
Overview of Alerts

Alerts are a user-defined type of event that indicates a critical condition in a selected resource. When an alert occurs, it must be acknowledged, and alerts are listed until they are marked as being fixed. You can define escalation schemes to identify the actions that happen if an alert is not fixed within a specified time.

Alerts are logged by the agents and all events throughout the entire deployment are displayed in the Alert Center. To access the Alert Center, select **Analyze** ⇨ **Event Center**.



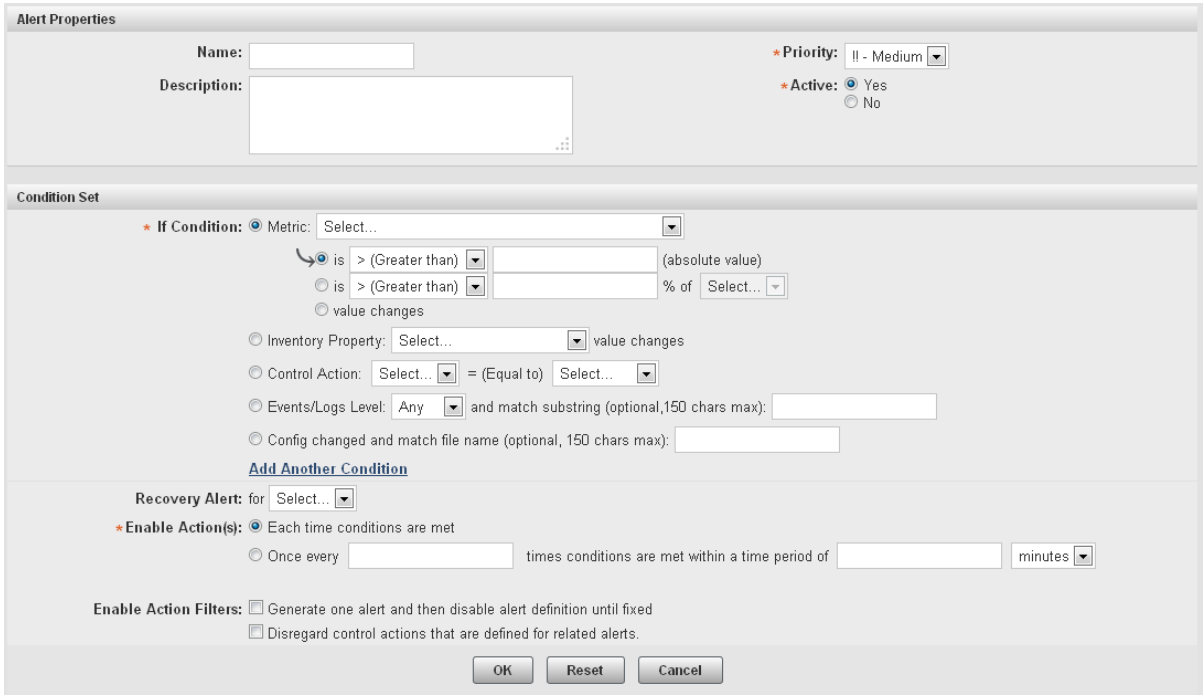
You can filter the alerts, for example, so that only the most recent ones or the ones of a specified type are displayed. Click the icon to acknowledge an alert. Select the check box next to an alert, and then click **Fixed** to fix the alert. You can also click on the entry in the **Alert Definition** column to display the Alert Details page, where you can view details about the alert and mark the alert as fixed (with comments).



Defining an Alert

To define an alert, follow these steps:

1. Select **Resources** ⇨ **Browse** or use a dashboard portlet to locate the resource for which you want to create an alert. Click on the resource name to view the Detail page for the resource.
2. On the Resource Detail page, select **Alerts** to view the alerts for the resource.
3. Click **Configure** to view the Alert Configuration page for the resource. Click **New** to display the New Alert page.



4. In the **Alert Properties** area, specify the name and priority for the alert and whether it is active.

5. In the **Condition Set** area, specify the conditions that must be met in order for the alert to be triggered. You can specify up to three conditions for each alert. Use these fields to specify the condition that triggers the alert

   Metric
   specifies that the alert is triggered based on the value of a metric that is monitored for the resource. You can specify that the condition is based on comparison to a fixed value, a percentage of a value, or a change in value. If you want to create an alert for a metric that is not listed, you must first enable collection of that metric.

   Update the metric collection settings for the resource type (choose **Monitoring Defaults** from the Manage page) or for the specific resource (click **Metrics** on the resource's Monitor page).

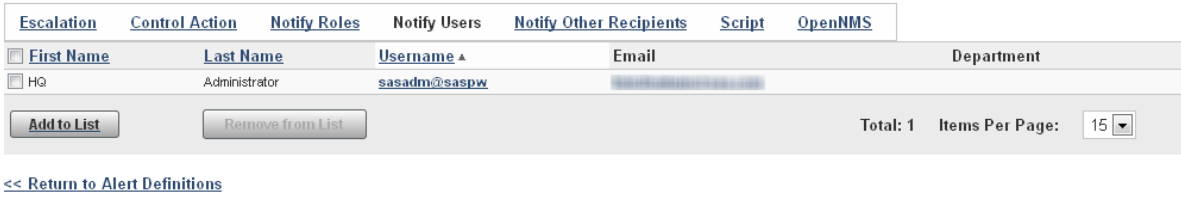
   Inventory Property
   specifies that the alert is triggered based on a change in the value of a resource property (such as version number). This condition is available only for certain types of resources (such as platforms and SAS Metadata Servers).

   Control Action
   specifies that the alert is triggered when an action meets a specified condition (such as the action of stopping a failed server). This condition is available only for servers that can be controlled through control actions. See "Controlling Resources Using Control Actions" on page 31 for more information.

   Events/Logs Level
   specifies that the alert is triggered when a selected string (such as Error) appears in the log.

   Config changed
   specifies that the alert is triggered when a configuration file changes (you can choose to specify the name of the configuration file).

6. In the **Enable Action** field, specify whether the alert is triggered only once, or periodically as long as the alert condition persists.
7. Click **OK** to define the alert and display the Alert Configuration page.



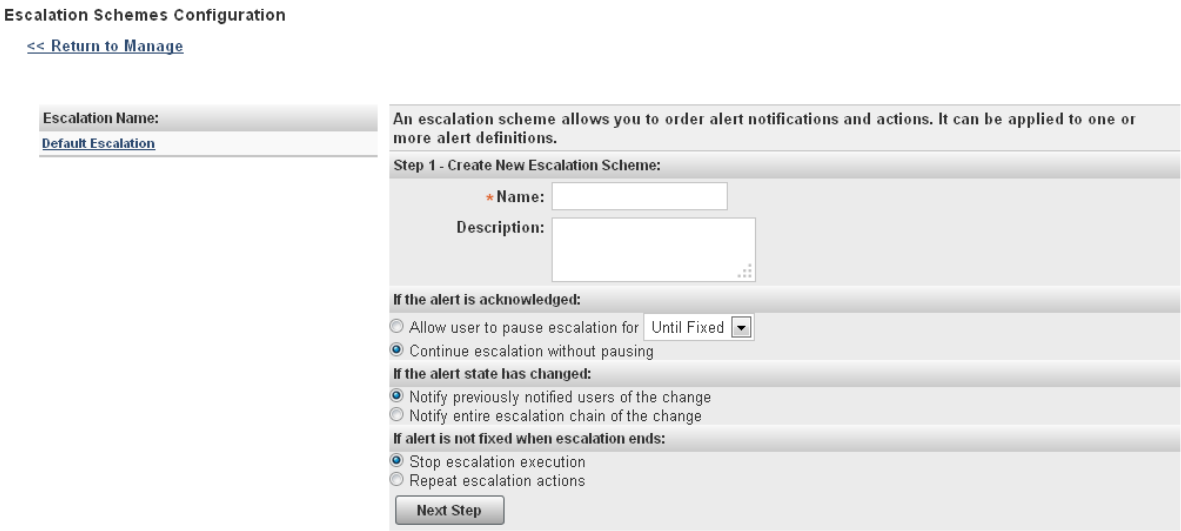
8. On the Alert Configuration page, you can specify an escalation scheme and identify the users and roles that should be notified when the alert occurs. To create an escalation scheme, see "Defining an Escalation Scheme" on page 43.
9. Click **Return to Alert Definitions** when you are finished.

Defining an Escalation Scheme

An escalation scheme is a series of actions that take place when an alert is not acknowledged or fixed within a certain period of time. An escalation scheme can be applied to multiple alerts. You can define an escalation scheme to perform any of these actions:

- send an e-mail or SMS message
- make an entry in a system log
- issue an SNMP notification

To define an escalation scheme, select **Manage** ⇨ **Escalation Schemes Configuration** (in the **Server Settings** area).



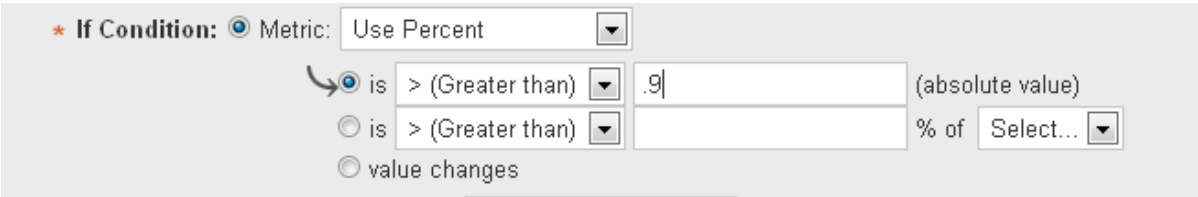
For information about the information required when defining an escalation scheme, refer to the Help for the page.

Example: Defining an Alert for SAS Work Directory Space

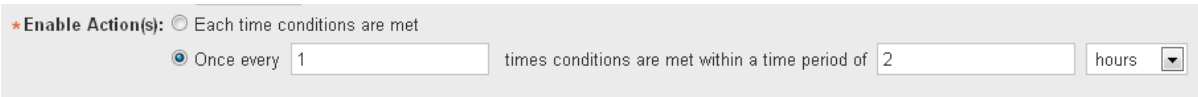
This example provides information for setting up an alert to be triggered whenever the SAS Work directory reaches 90% of its capacity. The alert should be issued once every two hours until the condition is cleared. When the alert is triggered, users with the Operations role should be notified.

1. Locate the service **SAS Home Directory 9.4 SAS work directory**. The service is under the **SAS Home Directory 9.4** server.
2. Navigate to the Resource Detail page for the service. On the Detail page, select **Alert** ⇨ **Configure** to display the Alert Configuration page. Click **New** to display the New Alert Configuration page.
3. Name the alert, select the priority, and specify that the alert should be active.

4. In the **If Condition** area, select the **Metric** radio button, then select **Use Percent** in the **Metric** field.
5. To specify 90% capacity, enter .9 in the **absolute value** field. To specify that the alert is triggered whenever the used capacity exceeds 90%, specify and select **> (Greater than)** from the comparison menu.



6. In the **Enable Action(s)** field, specify **1** for the number of times the alert is issued, **2** for the timer period, and select **hours** for the time period units. These values specify that the alert is issued one time every two hours while the alert conditions are met.



7. Click **OK** to define the alert and display the Configuration page for the new alert.
8. Select **Notify Roles**, and then select **Add to List**.
9. Select the check box beside **Operations** in the **Roles** list and use the arrow control to move the role to the **Add Role Notification** list.
10. Click **OK** to close the Role Selection page and then **Return to Alert Definitions** to complete the process of defining the alert.

Example: Defining an Alert for a Log File

This example provides information for setting up an alert to be triggered whenever an I/O Subsystem error appears in the log of the SAS Metadata Server. The alert should be issued every time an error appears in the log.

1. Locate the server **SASMeta – SAS Metadata Server** in the Resource page.
2. Navigate to the Resource Detail page for the server. On the Detail page, select **Alert** ⇨ **Configure** to display the Alert Configuration page. Click **New** to display the New Alert Configuration page
3. Name the alert, select the priority, and specify that the alert should be active.

4. In the **If Condition** area, select the **Event/Logs Level** radio button, then select **Error** in the **Event/Logs Level** field.

   In the **match substring** field, enter **I/O Subsystem**. These values specify that an alert is issued whenever the string "I/O Subsystem" appears in an error message in the log

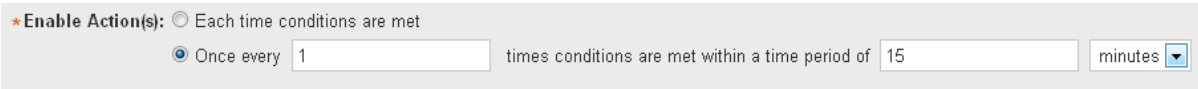
5. In the **Enable Action(s)** area, select the **Each time conditions are met** radio button. This specifies that the alert is triggered each time an I/O Subsystem error appears in the log.
6. Click **OK** to define the alert.

Example: Defining an Alert for Available Memory

This example provides information for setting up an alert to be triggered whenever the free memory on a SAS Web Application Server falls below 90% of 1.3 GB. The alert should be issued once every fifteen minutes until the condition is cleared.

1. Locate the server in the Resource page. The Resources page lists SAS Web Application Server using the server type SpringSource tc Runtime.
2. Navigate to the Resource Detail page for the server. On the Detail page, select **Alert** ⇨ **Configure** to display the Alert Configuration page. Click **New** to display the New Alert Configuration page
3. Name the alert, select the priority, and specify that the alert should be active.
4. In the **If Condition** area, select the **Metric** radio button, then select **Heap Memory Free** in the **Metric** field.
5. To specify the memory condition for the alert, enter 90 in the **%** field and then select **1.3 GB (Min Value)**. Select **< (Less than)** from the comparison menu.

6. In the **Enable Action(s)** field, specify **1** for the number of times the alert is issued, **15** for the timer period, and select **minutes** for the time period units. These values specify that the alert is issued one time every 15 minutes while the alert condition is met.



7. Click **OK** to define the alert.

Chapter 8

Managing Metadata Access

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Access Management

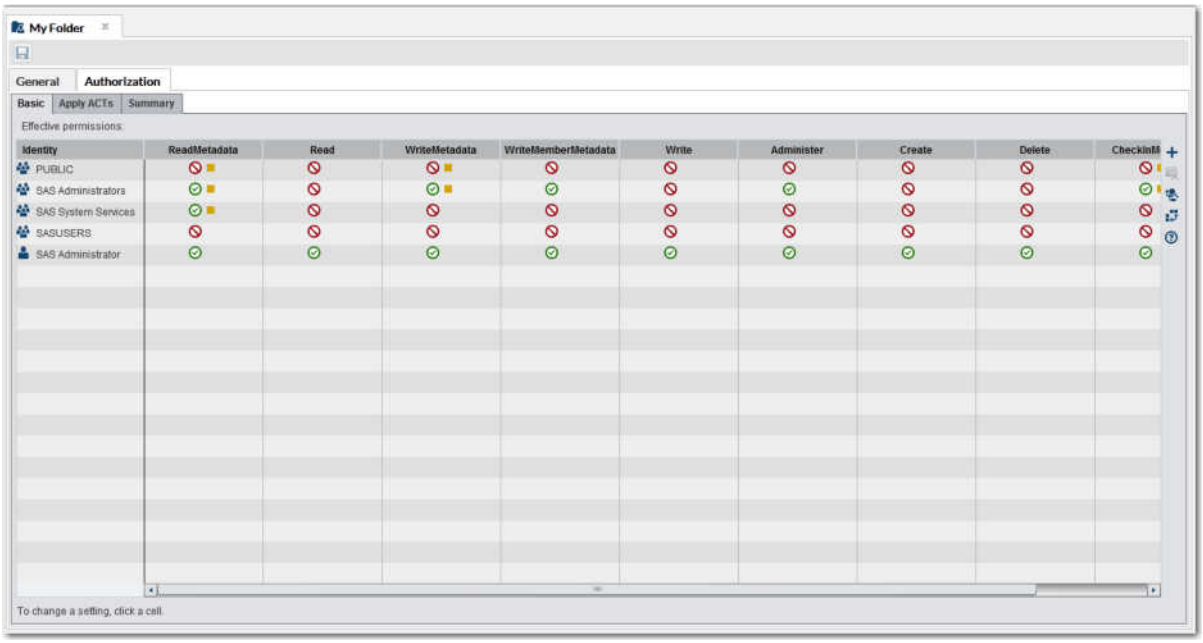
You can use SAS Environment Manager to manage access in the metadata authorization layer. The access control tasks that are provided by SAS Environment Manager include:

- application of ACTs to objects
- maintenance of access control templates (ACTs)
- application of explicit controls to objects
- management of repository-level controls

Over the lifecycle of SAS 9.4, functions will be added to extend SAS Environment Manager's capabilities as a centralized administration application for all SAS products. SAS Environment Manager is not currently a replacement for SAS Management Console, and no functionality has been removed from SAS Management Console.

To manage access to metadata objects in SAS Environment Manager, follow these steps:

1. Select the **Administration** page.
2. Right-click on an object in the **Folders** pane, and select **Open**. The tab corresponding to the object that you selected is displayed. For example, if you right-clicked **My Folder**, the **My Folder** tab will be displayed.
3. Select the **Authorization** tab. A window similar to the following is displayed:



Using an ACT

Why Use ACTs?

Use ACTs to avoid having to repeatedly add the same explicit controls for the same identities on multiple objects. When you apply an ACT to an object, the pattern settings in an ACT are added to the direct controls of an object.

TIP Settings in the pattern of an ACT affect access to all of the objects to which the ACT is applied. Settings on the **Authorization** tab for an ACT affect who can access that ACT.

Instructions

1. Open the object to which you will apply the ACT. On the **Authorization** ⇨ **Apply ACTs** tab for an object, select the check box for the appropriate ACT.

   TIP The repository ACT (which is usually named Default ACT) should not be directly applied to any object. Instead, the repository ACT participates through inheritance, serving as an access control parent of last resort.

2. On the **Authorization** ⇨ **Basic** tab for an object, notice that the identities that participate in the pattern of an ACT are listed. Verify that the revised settings are as you expect.

3. In the toolbar at the top of the tab, click .

Updating an ACT

CAUTION:
One ACT can protect thousands of objects. Changes that you make to an ACT's pattern affect every object that ACT is applied to.

To update an ACT, follow these steps:

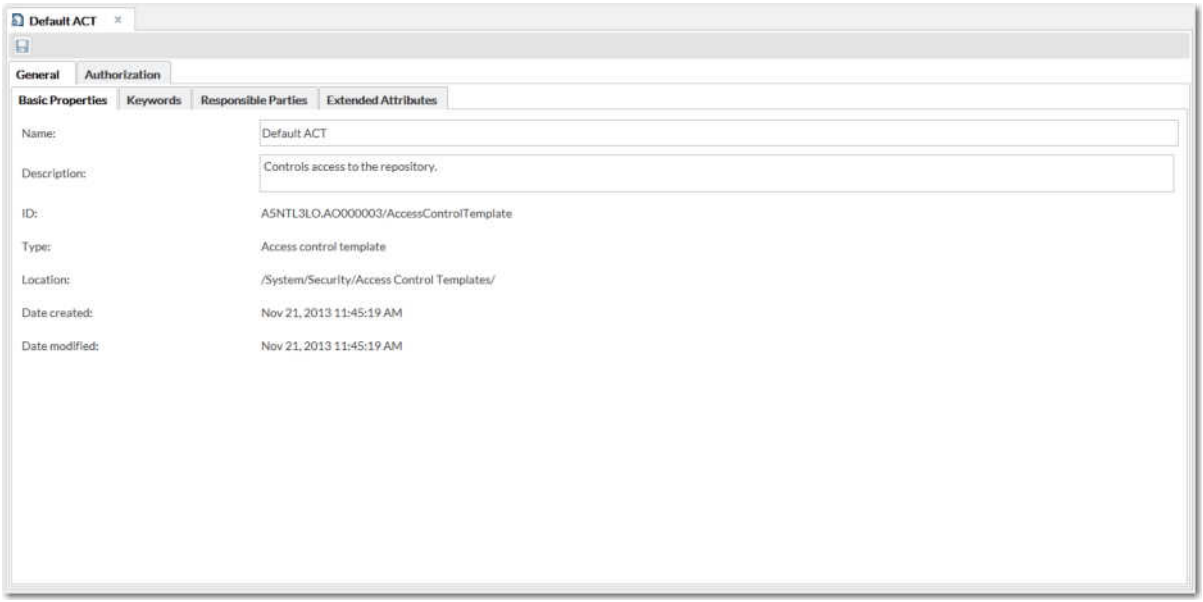
Locating an ACT

1. Access the **Administration** page.
2. From the **Folders** pane, navigate to **SAS Folders** ⇨ **System** ⇨ **Security** ⇨ **Access Control Templates**.

   Note: To locate ACTs that are in custom repositories, your navigation path will vary slight. For example, **SAS Folders** ⇨ ***custom-repository*** ⇨ **System** ⇨ **Security** ⇨ **Access Control Templates**.
3. Find the ACT that you want to update.

Modifying an ACT

4. Right-click the ACT and select **Open**. A window similar to the following is displayed:



5. To understand the potential impact of your intended changes, examine the ACT's **Usage** tab.
6. To modify the ACT's pattern:
   a. Adjust settings on the **Pattern** ⇨ **Basic** tab.
   b. In the toolbar at the top of the tab, click .
3. (Optional) Navigate to an object that uses the ACT and verify that the revised settings are as you expect.

Note: To create a custom ACT or delete an existing ACT, use SAS Management Console. For more information, see Chapter 4, "Access Management Tasks," in *SAS Management Console: Guide to Users and Permissions*.

Reviewing or Adjusting Repository-Level Controls

Which ACT is the Repository ACT?

If your site has multiple metadata repositories, you have multiple repository ACTs. Each repository has its own repository ACT, which is usually named Default ACT.

As an alternative to opening each ACT to determine which repository it belongs to, navigate to the ACT from within the **Folders** view.

- ACTs for the foundation repository are located in the **SAS Folders** ⇨ **System** ⇨ **Security** ⇨ **Access Control Templates** folder.
- ACTs for a custom repository are located in the **SAS Folders** ⇨ ***custom-repository*** ⇨ **System** ⇨ **Security** ⇨ **Access Control Templates** folder.

Note: The repository ACT indictor is located at the bottom of the ***access-control-template*** ⇨ **Authorization** ⇨ **Usage** tab.

Why Adjust the Repository-Level Controls?

CAUTION:
Altering the repository-level controls for service identities can prevent necessary access. We recommend that you do not change these settings.

Here are some key points about working with repository-level controls for a foundation repository:

- If you want some or all users to have default Read access to all data, grant the Read permission at the repository level.
- If you want to experiment with changing repository-level access, we recommend that you create a new ACT and designate that ACT as the repository ACT (instead of modifying the original repository ACT).
- All users need ReadMetadata and WriteMetadata access to the foundation repository. It is appropriate for the SASUSERS group to be granted these permissions in the pattern of the repository ACT.

Adding an Explicit Grant or Denial

1. Open the object that you want to protect or make available.
2. On the **Authorization** ⇨ **Basic** tab, locate the user or group that you want to assign an explicit control to. If the user or group is not listed, click to open the Add Identities window.

Note: An explicit grant of the ReadMetadata permission is automatically set for each identity that you add.

3. Click a cell and make a selection from the drop-down list.

   Note: If the selected identity is unrestricted, all permissions are granted and you cannot make changes.

   Note: When you click outside the cell, the yellow diamond that indicates an explicit control is displayed in the cell that you updated.

4. If you changed the access for a group, review the impact on all of the listed identities.

   Note: This is important because controls that you add for a group can affect access for all members of that group. For example, an explicit denial that you add for the PUBLIC group blocks access for all restricted users, unless there are also explicit (or direct ACT) grants. You must offset a broad explicit denial with explicit (or direct ACT) grants for any restricted identities whose access you want to preserve.

5. In the toolbar at the top of the tab, click .

TIP It is easy to add explicit grants and denials on each object that you want to protect or make available. However, adding a large number of individual access controls can make access control management unnecessarily cumbersome.

Add a Row-Level Permission Condition

What is a Permission Condition?

A permission condition limits an explicit grant of the Read permission so that different users access different subsets of data.

Instructions

To limit Read access to rows in a LASR table:

1. Access the **Authorization** ⇨ **Basic** tab for a LASR table.
2. In the **Read** column, click the cell for the identity that you want to assign the condition to.

   Note: If the identity is not already listed, click at the right edge of the table.

3. From the cell's drop-down list, select **Conditional grant**.

   Note: If **Conditional grant** is already selected, a condition already exists (and selecting **Conditional grant** enables you to view or update the condition).

4. In the New Permission Condition window, create a condition that specifies which rows the identity can see
5. Click **OK**. Notice that the cell contains the conditional grant icon with an explicit control indicator .
6. If you set a permission for a group, review the impact on the other listed identities. Constraints that you add for a group can affect access for all members of that group.

7. In the toolbar at the top of the tab, click .

Chapter 9

Controlling Access to SAS Environment Manager

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Controlling Access to SAS Environment Manager

About Native Roles and Users

SAS Environment Manager controls access and permissions within the application with its own registry of users and its own system of roles and permissions. In order to distinguish between the SAS Environment Manager access features and those in SAS metadata, this document and the SAS Environment Manager online Help refers to features internal to SAS Environment Manager as native features (such as native users or native roles). However, the SAS Environment Manager interface does not use the native terminology.

Although native user definitions are internal to SAS Environment Manager, they are mapped to user definitions created in SAS metadata. Native users are created by first creating the user definition in metadata and then synchronizing the user information with SAS Environment Manager. You cannot create native user definitions in SAS Environment Manager directly.

Native roles enable you to grant capabilities and permissions for actions in SAS Environment Manager to selected users. For example, an administrator role could be granted full permissions for all resource types and the ability to acknowledge and fix alerts, and a guest role could be denied the ability to fix or acknowledge alerts and have only Read permission for resources. Assigning a native role to a native user determines the actions that the user can perform in SAS Environment Manager.

Each native role also has its own unique Dashboard page, which you can customize to match the native role’s tasks. Each user has access to their own personal Dashboard page and the Dashboard pages of all native roles of which they are a member.

SAS Environment Manager and SAS Metadata Users

Users in SAS Environment Manager are mapped to users created in SAS metadata. During installation, three user groups are created in SAS metadata to contain SAS Environment Manager users. Users that are members of these groups are mapped to user definitions in SAS Environment Manager with corresponding roles. The user groups and their corresponding roles are as follows:

Group name in SAS metadata	Role in SAS Environment Manager
SAS_EV_Super_User	Super User Role
SAS_EV_Guest	Guest Role
SAS_EV_AppServer_Tier	SAS App Tier Role

For example, users added to the group SAS_EV_Guest are added as users in SAS Environment Manager under the Guest role when the users are synchronized.

When you install SAS Environment Manager 2.1, all existing SAS Environment Manager user definitions are automatically added to the SAS_EV_Guest group in metadata. After the existing users have been added to the SAS_EV_Guest group, use SAS Management Console to modify the user definitions or assign the users to other SAS_EV groups in metadata.

After you have defined new users in SAS metadata, sign on to SAS Environment Manager, and select **Manage** ⇨ **Synchronize Users**. User definitions are created for all users that are defined in the three SAS_EV groups in metadata. Any SAS Environment Manager users that are not associated with user definitions in metadata are deleted.

If you sign on to SAS Environment Manager using a user ID that is defined in metadata, is a member of one of the SAS_EV groups, but is not defined in SAS Environment Manager, then a user definition is automatically created in SAS Environment Manager and assigned to the correct role.

To create a new SAS Environment Manager user, use an application such as SAS Management Console to define the user and assign it to the appropriate SAS_EV user group, and then select **Manage** ⇨ **Synchronize Users** to create the user in SAS Environment Manager and assign the user to the proper role.

An internal account, sasevs (sasevs@saspw), is also created during installation. This account is assigned to the SAS_EV_Guest group. The account is used for communications between the SAS Environment Manager agent and server and enables plugins to access the SAS Metadata Server. The internal account sasadm@saspw is the default account for signing on to SAS Environment Manager.

The SAS Logon Manager is used to control the process of logging on to SAS Environment Manager. The application uses the same authentication process and authentication provider as the other SAS web applications.

Creating a Native Role

To create a native role, follow these steps:

1. On the Manage page, select **New Role**.
2. On the New Role page, specify a name for the role and select the native permissions and capabilities for each resource type. If you grant the **Read Only** permission for a resource type, you can also select the native capabilities for the resource type. For all

other permissions, the capabilities are automatically selected or disabled and cannot be changed.

3. Use these guidelines to determine the native permissions to set:

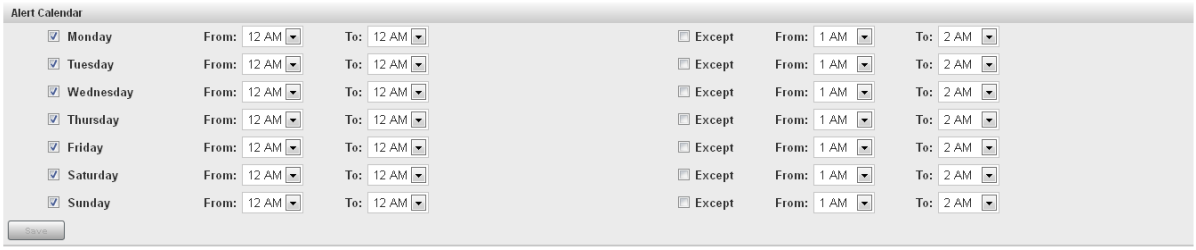
   Adding resource to the inventory and creating alert definitions
   : Select **Full** or **Read / Write** permissions. Users can also respond to alerts and control resources.

   Monitoring resources, responding to alerts, controlling resources
   : Select the **Read Only** permission and grant the capability to acknowledge and fix alerts and to control resources. Users can respond to alerts and control resources but cannot create or modify alerts or resources.

   Monitoring resources
   : Select the **Read Only** permission, but do not grant capabilities for alerts resource control. Users can view and monitor only resources.

4. When you click **OK**, the role and associated Dashboard page are created, and the Role Properties page is displayed. Use this page to select native users and resource groups that should be associated with the role and to create an alert calendar.

5. To create an alert calendar, select the days and times during which the roles' users will be notified of alerts. Make sure that at least one role is available during every time period.



Creating SAS Middle-Tier Administrator IDs

Administrators for SAS middle-tier servers must be defined in SAS metadata as well as in SAS Environment Manager. To create a middle-tier administrator user ID, follow these steps:

1. Use the User Manager plug-in in SAS Management Console to create a user definition for a middle-tier administrator.
2. Assign the user to the SAS_EV_AppServer_Tier user group. This group is created during the installation and configuration process.
3. Log on to SAS Environment Manager using the sasevs@saspw credentials, which is the default administrative identity.
4. Click **Manage** ⇨ **Synchronize Users** to synchronize the SAS Environment Manager users with the SAS metadata users..
5. Click **List Users** to view the list of all users.
6. Locate the entry in the user table for the new user and click the user name entry to display the Properties page.

7. In the Roles Assigned To section, verify that the user is assigned to the **SAS App Tier** role.

Appendix 1

Troubleshooting

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Resolving Problems with SAS Environment Manager

Cannot Add Discovered Resources into Inventory

When you add auto-discovered resources into the inventory, you might see the following error message

```
Unable to import platform :
org.hyperic.hq.common.SystemException:
org.hibernate.ObjectNotFoundException:No row the the given
identifier exists: [org.hyperic.hq.autoinventory.Allp#10001]
```

Purge the AIQ data in the SAS Environment Monitor database. Follow these steps:

1. Select **Administration** ⇨ **HQ Health** ⇨ **Database tab**
2. Select **Purge AIQ Data** from the **Action** menu.

   These messages appear:

   - DELETE FROM EAM_AIQ_IP: 0 rows
   - DELETE FROM EAM_AIQ_SERVICE: 0 rows
   - DELETE FROM EAM_AIQ_SERVER: 0 rows
   - DELETE FROM EAM_AIQ_PLATFORM: 0 rows
3. Restart the agents.

Resource in Availability Portlet with No Availability Information

If you add a resource that has been discovered but does not have any availability information to an Availability Summary portlet, the portlet will never display any information for the resource. The server log contains these messages:

1. On the **Resources** tab, delete the platform that contains the resource.

2. Stop the agent.
3. Delete the tokendata, keystore, and keyvals files from the directory **<*SAS-configuration-directory*>/Lev2/Web/SASEnvironmentManager/agent-5.0.0-EE/data**.
4. Issue the command **hq-agnet.bat/sh restart** from the command console.

Resolving Problems with SAS Environment Manager Agents

Agent Fails to Start

When you try to configure the SAS Environment Manager Agent, it does not start and you receive the error message `No token file found, waiting for Agent to initialize`

1. Stop the SAS Environment Manager agent.
2. Verify that the agent wrapper processes and the agent Java processes have stopped.
3. On the W6X platform, verify that the directory **%SystemRoot%\TEMP** exists. Remove the file **%SystemRoot%\TEMP\agent.encrypt.lock**.

   On all other UNIX platforms, search for the java.io.tmpdir environment variable in the agent wrapper process and the agent Java process. By default, the value of the variable will be set to the **\tmp** or **\var\tmp** directory. If the variable exists, remove the file **agent.encrypt.lock** under the specified directory.

Agent Receives the Error "OutOfMemory GC Overhead Limit Exceeded"

The agent.log file contains the message `java.lang.OutOfMemoryError: GC overhead limit exceeded`

Include these JVM options in the startup script for each agent:

```
-XX:NewRatio=8
 -XX:+CMSClassUnloadingEnabled
 -XX:+UseTLAB
 -XX:+UseCompressedOops
```

Modify the file **SAS-configuration_directory/LevX/Web/SASEnvironmentManager/agent-5.0.0-EE/bundles/agent-5.0.0/bin/hq-agent.sh** or **hq-agent.bat** and add these JVM options to the CLIENT_CMD variable:

```
CLIENT_CMD="${HQ_JAVA} \
   -D${AGENT_INSTALL_HOME_PROP}=${AGENT_INSTALL_HOME} \
   -D${AGENT_BUNDLE_HOME_PROP}=${AGENT_BUNDLE_HOME} \
   -XX:NewRatio=8 \
   -XX:+CMSClassUnloadingEnabled \
   -XX:+UseTLAB \
   -XX:+UseCompressedOops \
   -cp ${CLIENT_CLASSPATH} ${CLIENT_CLASS}"
```

EncryptionOperationNotPossibleException Error Message

After the agent successfully starts, some agent properties might get encrypted. If the agent cannot read the agent.scu file (which contains the encryption keys), it cannot decrypt the properties. The agent will not start and the `agent.log` or the `wrapper.log` file contains the error `org.jasypt.exceptions.EncryptionOperationNotPossibleException`.

1. Stop the SAS Environment Manager agent.
2. In the directory **`SAS-configuration/Lev2/Web/SASEnvironmentManager/agent-5.0.0-EE`** , delete the **`/data`** directory.
3. In the directory **`SAS-configuration/Lev2/Web/SASEnvironmentManager/agent-5.0.0-EE/conf`**, delete the **`agent.scu`** file.
4. Modify the encrypted property to a plain text value. In the file **`SAS-configuration/Lev2/Web/SASEnvironmentManager/agent-5.0.0-EE/agent.properties`**, set the property agent.setup.camPword to a plain text value (if it is encrypted, it will appear as ENC(XXXXXXXXXX)).
5. In the file **`SAS-configuration/Lev2/Web/SASEnvironmentManager/agent-5.0.0-EE/auto-approve.properties`**, change all values to True.
6. Restart the agent.

Cannot Stop EAgent Service Using Windows Services

On Windows, if you use Windows Services to stop the Hyperic Agent service, you will receive the error message `Windows could not stop the SAS[SAS94-Lev1] SAS Environment Manager Agent on Local Computer`. Clicking OK in the error message dialog box seems to stop the service, but the System Event Log contains the error `The SAS [SAS94-Lev1] SAS Environment Manager Agent service terminated with service-specific error Incorrect function.`.

Use the command line, rather than Windows Services, to stop the agent. The command to stop the agent is **`<sas_configuration_directory>/Lev2/Web/SASEnvironmentManager/agent-5.0.0-EE/bin/hq-agent.bat stop`**.

Resolving Problems with SAS Environment Manager Plugins

PostgreSQL Resources Not Configured Properly

After a PostgreSQL server is added into inventory, the Dashboard page indicates that the resource is not configured properly

On the Configuration Properties page for the server, specify this information:

postgresql.user
: specify the Web Infrastructure Platform Data Server database user name. The default value is dbmsowner

postgresql.pass
specify the password for the user name

postgresql.program
specify the path to the postgres.bat or postgres.sh file (on UNIX); or postgres.exe or postgres.bat (on Windows). On UNIX, the path is **/opt/sas/Lev1/SASWebInfrastructurePlatformDataServer/webinfdsvrc.sh**. On W6X, the path is **<*SAS_Configuration_Directory*>\Lev1\SASWebInfrastructurePlatformDataServer\webinfdsvrc.bat**.

Tomcat Resources Not Configured Properly

On the AIX platform, the Apache Tomcat 6.0 server Resource page displays the error `This resource is turned off or has not been configured properly. The problem is: Invalid configuration: Error contacting resource: Can't connect to MBeanServer url.`

1. Open the file **SAS_configuration_directory/Lev1/Web/SASEnvironmentManager/server-5.0.0-EE/hq-engine/hq-server/conf/hq-catalina.properties** and find the jmx.url port number. The default value is 1099.
2. On the Configuration Properties page for the server, specify the following property:

   jmx.url
   service:jmx.rmi:///jndi/rmi/://localhost:*port_number*

Cannot Discover tcServer Instances

On the H6I platform, no tcServer instances can be discovered.

HPUX has a limit of 1020 characters on command line queries. The parameters that the tcServer plugin uses to identify the tcServer process are not seen by the agent because they fall after the 1020 character limit has been reached. Edit the startup script so that the parameters that the plugin needs are seen before the 1020 character limit.

Edit the catalina.sh script. Change this section of the script:

```
eval \"$_RUNJAVA\" \"$LOGGING_CONFIG\" $JAVA_OPTS $CATALINA_OPTS \
    -Djava.endorsed.dirs=\"$JAVA_ENDORSED_DIRS\" -classpath \"$CLASSPATH\" \
    -Dcatalina.base=\"$CATALINA_BASE\" \
    -Dcatalina.home=\"$CATALINA_HOME\" \
    -Djava.io.tmpdir=\"$CATALINA_TMPDIR\" \
    org.apache.catalina.startup.Bootstrap "$@" start \
    >> "$CATALINA_OUT" 2>&1 "&"
```

Change the script to this:

```
eval \"$_RUNJAVA\" \"$LOGGING_CONFIG\" \
    -Dcatalina.base=\"$CATALINA_BASE\" \
    -Dcatalina.home=\"$CATALINA_HOME\" \
    $JAVA_OPTS \
    $CATALINA_OPTS \
    -Djava.endorsed.dirs=\"$JAVA_ENDORSED_DIRS\" -classpath \"$CLASSPATH\" \
    -Djava.io.tmpdir=\"$CATALINA_TMPDIR\" \
    org.apache.catalina.startup.Bootstrap "$@" start \
    >> "$CATALINA_OUT" 2>&1 "&"
```

SAS Environment Manager Agent Will Not Start

Cannot start the SAS Environment Manager Agent by using the start script `$SAS-configuration _directory/LevX/Web/SASEnvironmentManager/agent-5.0.0-EE/bin/hq-agent.sh start`.

The console displays this message:

```
Starting HQ Agent......Removed stale pid file:
/local/install/cfgsas1/config/Lev1/Web/SASEnvironmentManager/agent-5.0.0-EE/wrapper/sbin/.
WARNING: HQ Agent may have failed to start.
```

Use the unset command to remove the COLUMNS environment variable.

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