



SAS Grid Manager 9.4M6 - What Admins Should Know

Presenter: Edoardo Riva, Principal Technical Architect

#SASGF

SAS[®] GLOBAL FORUM 2019

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Kay Bailey Hutchison Convention Center

Admin Meet & Mingle



Sunday, April 28



3:30-5:00pm



Room D171 on Level1

Meet Other Admins | Ask Questions of SAS Admin Gurus

Determine Which Breakouts & Super Demos To Attend



SAS Grid Manager 9.4M6 - What Admins Should Know

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What's New in SAS Grid Manager for SAS 9.4M6

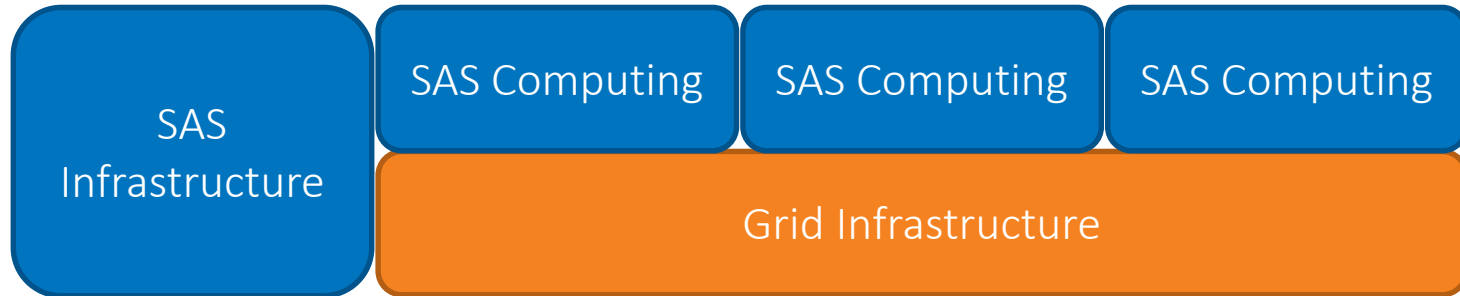
Agenda

- A new kid in town
- What are the new components?
- Provider comparison
- What has not changed
- About SAS Grid Manager for Platform



What is a SAS grid?

A SAS grid computing environment is one in which SAS computing tasks are distributed among multiple computers on a network, all under the control of SAS Grid Manager.



SAS Grid Manager

Providers



SAS Grid Manager for Platform

Platform Suite for SAS

- Load Sharing Facility
- Process Manager
- Platform Web Svcs

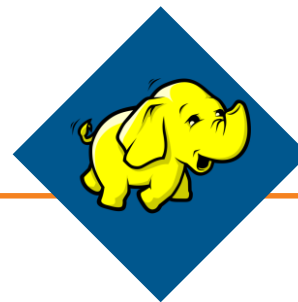
SAS Environment Manager
Platform RTM for SAS
SAS Management Console
Grid Manager plug-in



SAS Grid Manager

SAS Workload Orchestrator
SAS Job Flow Scheduler

SGM Web Interface
SGM Admin Utility (CLI)
SAS Environment Manager



SAS Grid Manager for Hadoop

YARN
Oozie

SASGRID policy file
Hadoop Resource Manager



SAS Grid Manager

Software Components

SAS Grid Manager Components

A New SAS Grid Provider

The SAS-built provider for SAS Grid Manager includes:

- **SAS Workload Orchestrator** (SWO)
- **SAS Job Flow Scheduler** (SASJFS)
- SAS Workload Orchestrator Web Interface
- SAS Workload Orchestrator Administration Utility

SAS Grid Manager Components

SAS Workload Orchestrator

The **SAS Workload Orchestrator** is your grid:

- dispatches jobs
- monitors hosts and spreads the load
- is installed and runs on all machines in the cluster
 - but is not required on dedicated Metadata or Middle tiers
- is a single daemon, with configuration stored in a single json text file.

SAS Grid Manager Components

SAS Job Flow Scheduler

SAS Job Flow Scheduler is the flow scheduler for the grid.

- passes commands to the SAS Workload Orchestrator at certain times or events
- flows are built in the SAS Management Console Schedule Manager plugin, using jobs from other applications such as SAS Data Integration Studio
 - can be used to run many tasks in parallel on the grid.
 - can be used to determine the sequence of events for multiple related jobs
- determines when jobs are submitted to the grid
 - but they may not run immediately if the right conditions are not met (hosts too busy, etc...)

SAS Grid Manager Components

SAS Job Flow Scheduler Components

SAS Job Flow Scheduler (SASJFS) consists of different components that cooperate to execute flows:

- **SASJFS service**
is the main running service that handles the requests to schedule a flow.
- **Launcher**
acts as a gateway between SASJFS and OS Trigger.
- **OS Trigger**
is a stand-alone program that updates the Operating System service to trigger the flow.
- **Job Flow Orchestrator**
is a stand-alone program that manages the flow orchestration.

SAS Grid Manager Components

Additional Components

SAS Grid Manager provides new additional components to **administer** SAS Workload Orchestrator:

- SAS Workload Orchestrator Web Interface
- SAS Workload Orchestrator Administration Utility

Both can

- **monitor** jobs, queues, hosts, services, and logs
- **configure** hosts, queues, services, user groups, and user resources.

SAS Grid Manager Components

SAS Workload Orchestrator Web Interface

The SAS Workload Orchestrator Web Interface

- Is a **web interface** hosted by the SAS Workload Orchestrator process on the **master** host
- Can be **proxied** by the SAS Web Server to always point to the current master in case of failover

SAS Grid Manager Components

SAS Workload Orchestrator Web Interface

The screenshot displays the SAS Workload Orchestrator Web Interface. The main page is titled "Grid Home" and is divided into three main sections: Information, Queue Status, and Host Status.

Information Section:

- General:**
 - Grid version: 9.46
 - License expiration date: Jan 24, 2019
 - Build date: Nov 6, 2018, 11:31:24 AM
 - GUI build date (version): Oct 25, 2018, 1:27:08 AM (1.0.0)
- Jobs:**
 - Total: 60
 - Pending: 0
 - Running: 60
 - Suspended: 0
- Queues:**
 - Total: 6
 - Open active: 6
 - Open inactive: 0
 - Closed: 0
- Hosts:**
 - Current master: n001
 - Total: 11
 - Active: 4
 - Inactive: 0
 - Closed: 3
 - Full: 4
 - Master candidates: n001, n026, n051

Queue Status Section:

Shows a grid of queue status cards:

- top Priority 10: OPEN-ACTIVE
- mini Priority 15: OPEN-ACTIVE
- bottom Priority 10: OPEN-ACTIVE
- nightly Priority 10: OPEN-ACTIVE
- priority Priority 20: OPEN-ACTIVE

Host Status Section:

Shows a grid of host status cards:

- n001 0% Utilized: OPEN-NO_SLOTS
- n002 0% Utilized: OPEN-OK
- n005 0% Utilized: OPEN-FULL
- n006 0% Utilized: OPEN-OK
- n009 0% Utilized: OPEN-OK
- n026 0% Utilized: OPEN-OK

Queues Pop-up Window:

Shows a table of queues with filters and advanced options.

Name	State	Priority	Jobs Pending	Jobs Running	Maximum Job
top	OPEN-ACTIVE	10	0	20	Undefined
mini	OPEN-ACTIVE	15	0	0	Undefined
bottom	OPEN-ACTIVE	10	0	0	Undefined
nightly	OPEN-ACTIVE	10	0	40	Undefined
priority	OPEN-ACTIVE	20	0	0	15

Hosts Pop-up Window:

Shows a table of hosts with filters and advanced options.

Name	State	Maximum Jobs Allowed	Jobs Running	Jobs Suspended	Operating System
n001	OPEN-NO_SLOTS	0	0	0	Linux
n002	OPEN-NO_SLOTS	0	0	0	Linux
n003	OPEN-NO_SLOTS	0	0	0	Linux
n004	OPEN-FULL	8	8	0	Linux
n005	OPEN-FULL	8	8	0	Linux
n006	OPEN-FULL	8	8	0	Linux
n007	OPEN-FULL	8	8	0	Linux
n008	OPEN-OK	8	6	0	Linux
n009	OPEN-OK	8	7	0	Linux

SAS Grid Manager Components

SAS Workload Orchestrator Administration Utility

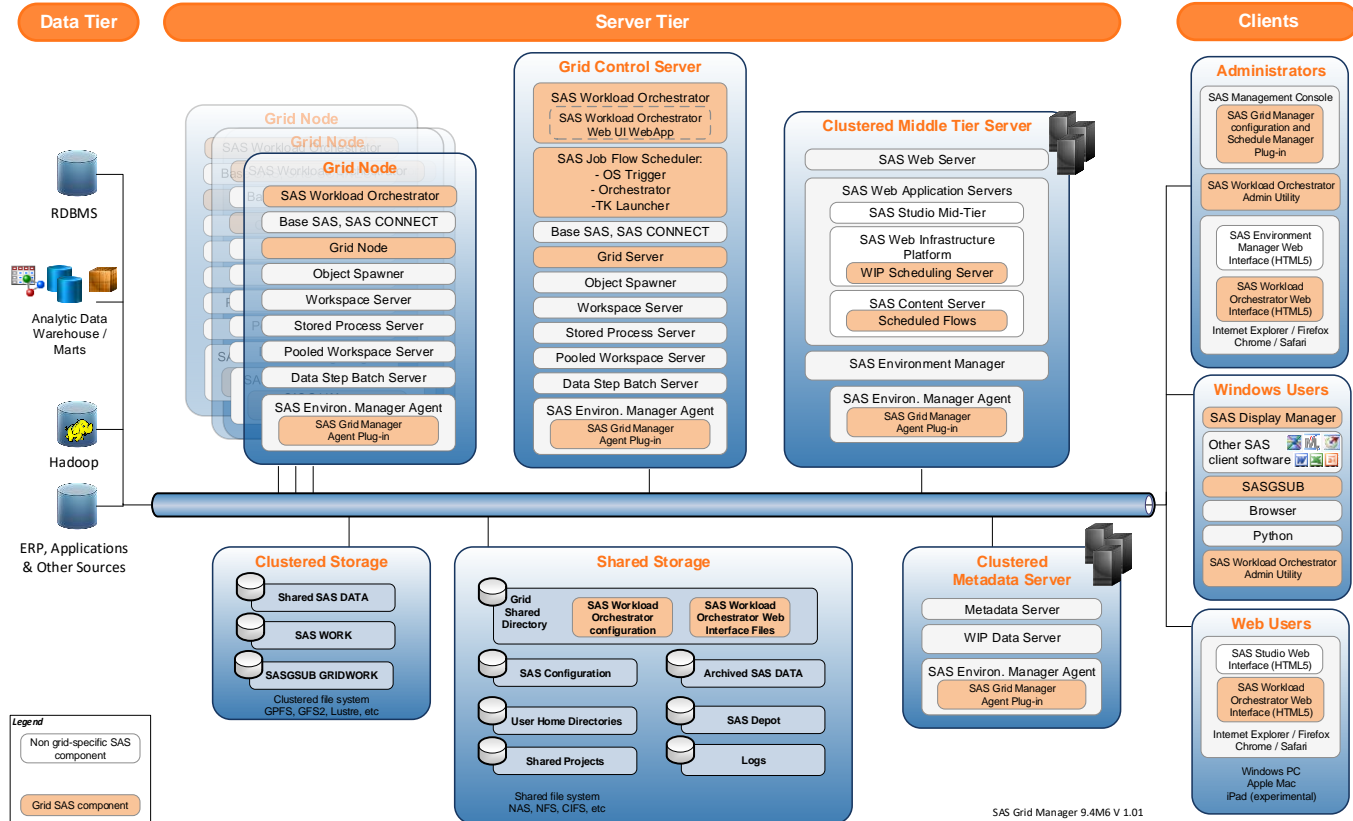
The SAS Workload Orchestrator Administration Utility

- Is an administration **command-line** interface
- Has a similar syntax to Viya CLIs
- Is located in the directory SASConfig/Lev1/Applications/GridAdminUtility
- Sample invocation:

```
sas-grid-cli show-jobs --state RUNNING
```


Sample Architecture Diagram

SAS Grid Manager 9.4M6



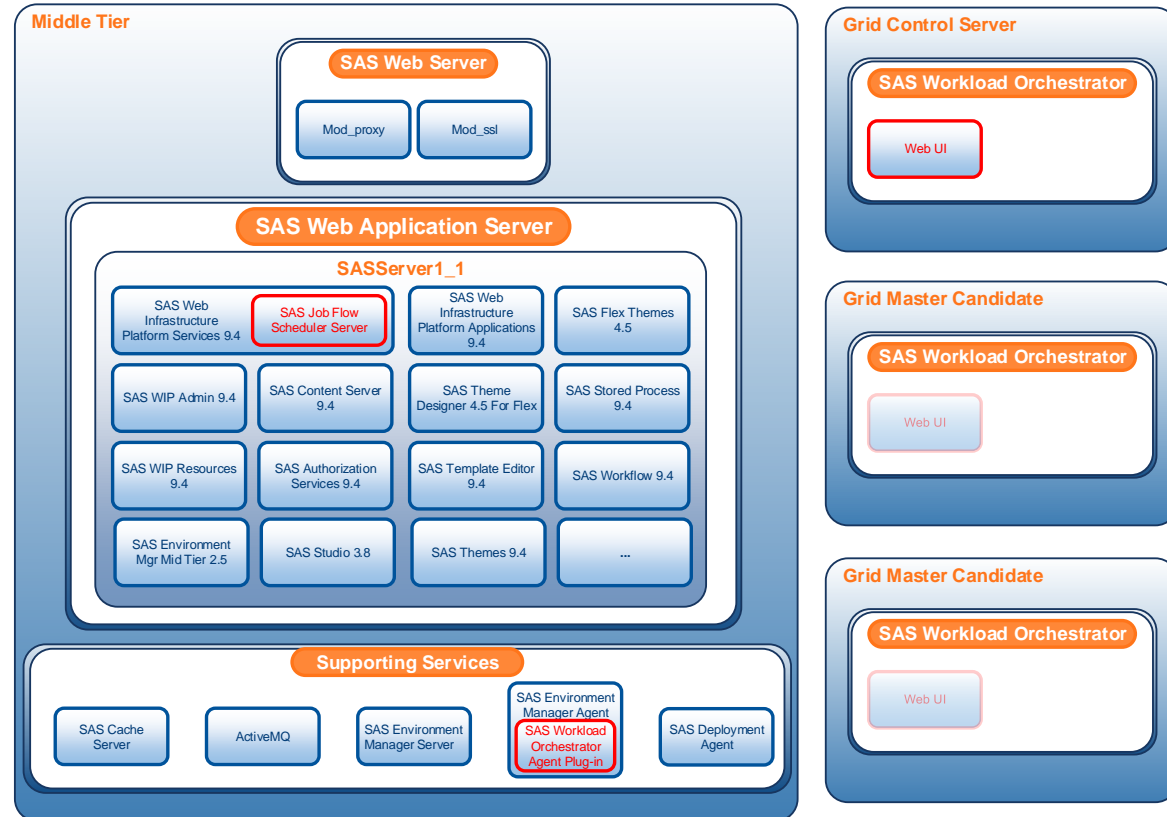
SAS Grid Manager 9.4M6 V.1.01

Sample Middle-Tier Diagram

Web Components Architecture View

SAS Grid Manager 9.4M6

Version: 1.0





Provider Comparison

Provider Comparison

SAS Grid Manager

- SAS-developed
 - SAS-controlled release schedule
- LAX, Windows (64-bit)
- SDW-installed
- Optimized for analytics workloads
- Management of any workload (including open source jobs)
- SAS Workload Orchestrator Web App
 - Auditing/logging benefit

SAS Grid Manager for Platform

- IBM-developed
- UNIX, LAX, Windows
- Standalone and SWD installer
- Optimized for HPC workloads
- Restricted to SAS-only workloads
- SAS Environment Manager (or Platform RTM) administration
- More scheduling options

Functional Differences

SAS Workload Orchestrator

- Dynamic reconfiguration
- Built-in GUI
- REST APIs
- End-to-end Kerberos support
- Secure communication
 - SSL – all
 - HMAC – inter-daemon
- Cron values for time-based config

Platform LSF

- Hostgroup/usergroup policies
- More robust queue definition
- Core/CPU limits
- Email notification
- Job pre/post-execution

Functional Similarities

SAS Grid Manager

SAS Grid Manager for Platform

- Queues, Jobs, Priorities, Resource Requirements
- High Availability
- All modes of submission
 - SAS/CONNECT
 - SASGSUB
 - Grid-launched Workspace Servers
 - Scheduling
- All integrated clients (SAS Enterprise Guide, SAS Studio, SAS Data Integration Studio, SAS Enterprise Miner, etc)

Which one is best for me?

SAS Grid Manager

- Potential candidate for
 - New customers
 - Open source workloads
 - New projects
 - Environments targeted to adopt SAS Viya

SAS Grid Manager for Platform

- Potential candidate for
 - Existing SAS Grid Manager customers that have already invested in Platform Suite for SAS technology
 - Upgrade of existing environments



SAS Grid Manager for Platform

Changes with SAS 9.4M6

SAS Grid Manager for Platform

Changes with SAS 9.4M6

- SAS Grid Manager Module for SAS Environment Manager re-design.
 - The user interface has been refreshed with a modern look
 - The provided functionality remains the same.
- Grid Management Services (GMS) is not supported with the latest release of LSF.
 - SAS Grid Manager plug-in for SAS Management Console is no longer supported.
 - Still included with SAS 9.4M6 if you want to upgrade an existing environment to SAS 9.4M6 without also upgrading Platform Suite for SAS.

SAS Grid Manager Module for SAS Environment Manager

SAS® Grid Manager for Platform SAS Grid Administrator

Home

- Monitor
- Jobs
- Queues
- Hosts
- Services
- Audit Logs
- Configure
- LSF Configuration
- HA Configuration
- Utilities

Cluster

Name	sasgrid
Status	ok
Administrators	sas sasrv sasdemo
Version	8.0.1
Master host	sasgrid03.unx.sas.com

Jobs

No items

Queues

priority	Open / Active
owners	Open / Inactive
night	Open / Inactive
chkpnt_rerun_queue	Closed / Active
short	Open / Active
license	Open / Active
hpc_linux	Open / Active
hpc_ibm	Closed / Active
normal	Open / Active

Hosts

sasgrid00.unx.sas.com	-
sasgrid05.unx.sas.com	ok
sasgrid03.unx.sas.com	ok
sasgrid04.unx.sas.com	ok

Services

sasmeta	STARTING
sasmeta2	ACTIVE
sasest	ACTIVE

Audit Logs

HA/stop	sas
HA/start	sas
QUEUE/close	sas
LSF_CONFIGURE/load	sas
LSF_CONFIGURE/save	sas
HA_CONFIGURE/save	sas

Configuration

Active LSF configuration	configuration_3
Active HA configuration	configuration_1
LSF configuration count	3
HA configuration count	1

For further info

You can find additional, comprehensive information in the official documentation:

- [What's New in SAS Grid Manager 9.4](#)
- Grid Computing for SAS Using SAS Grid Manager (Part 2) section of [Grid Computing in SAS 9.4](#)