Easier Platform Administration using SAS® v9.4 Grid Option Sets

Andrew Howell, ANJ Solutions Pty Ltd

ABSTRACT

For any SAS® Platform Administrator, the challenge is to ensure the right jobs run for the right users with the right resources at the right time.

Running on a SAS/Grid greatly assists this task, allowing prioritisation of processes to ensure an optimal mix of batch processing & interactive sessions, ensuring critical tasks have the resources to run, as well as ensuring one user or group does not dominate the resources which should be available to all.

In versions of SAS prior to v9.4, different user group requirements and/or different SAS application requirements necessitated multiple SAS Application Server Contexts (typically one per Business Unit), and often required complex nesting of SAS configuration files, each to suit particular resource requirements of a particular Logical SAS Server for a particular user group.

A major feature of SAS/Grid v9.4 is Grid Options Sets, meaning management of options, resources & queues is even easier, allowing different user groups to run SAS applications on a common shared SAS Application Server Context (such as SASApp), but still tailored to suit the requirements of each application and/or user group.

Much more than just queue selection; SAS v9.4 Grid Options Sets now allows SAS Platform Administrators to effectively have conditional queues, conditional configuration options and conditional resource requirements, all centrally located within in a single SAS Application Server Context managed by SAS Grid Options Sets.

This paper will examine the benefits of SAS/Grid processing, some of the issues encountered in previous version of SAS/Grid, and how these issues are managed much more effectively on a SAS v9.4 Platform thanks to SAS Grid Options Sets.

INTRODUCTION

The Platform Administrator's tasks include having to manage the many different ways SAS users intend to use the SAS platform; mainly through the regular execution of SAS jobs via batch processing or one of the SAS client tools (SAS Enterprise Guide, SAS Enterprise Miner, etc) or one of the SAS web applications (SAS Visual Analytics, etc).

However, there are often requirements beyond "regular usage" of the platform, such as:

- Applying different SAS configuration and/or queue options based on group membership;

- Applying different SAS configuration and/or queue options based on the SAS client;

- Being able to quickly execute emergency support jobs;

- Granting higher priority to senior business consumers who require prompt access to SAS reports;

- Allowing non-critical SAS users access to the SAS platform without impacting critical SAS users;

- Managing different business units, with allocation of server cores to be distributed according to each business unit's share of the licensing costs. *Note: SAS options such as* **CPUCOUNT** *will not fulfil this requirement, as SAS options are applied "per-session", not "per-group".*

There are also other support constraints to consider – different levels of support might be managed by or outsourced to different teams – for example, while a SAS Administrator may run the SAS Management Console client at will, they may not have the appropriate permissions to easily connect to the server to modify server-based configuration files (without having to first raise a support ticket, etc).

APPLYING SAS/GRID SETTINGS TO A SAS PLATFORM

Once grid queues are defined using Platform RTM for SAS (not covered in this paper), a default queue is configured in the SAS Logical Grid Server's properties in the Server Manager plug-in of SAS Management Console.

*Note: If no grid queue is set, the default setting is the pre-defined queue "**Normal**".*

In the figure below is a screenshot from a SAS Management Console v9.3. (The reason for using an older version will be explained later in this paper.)
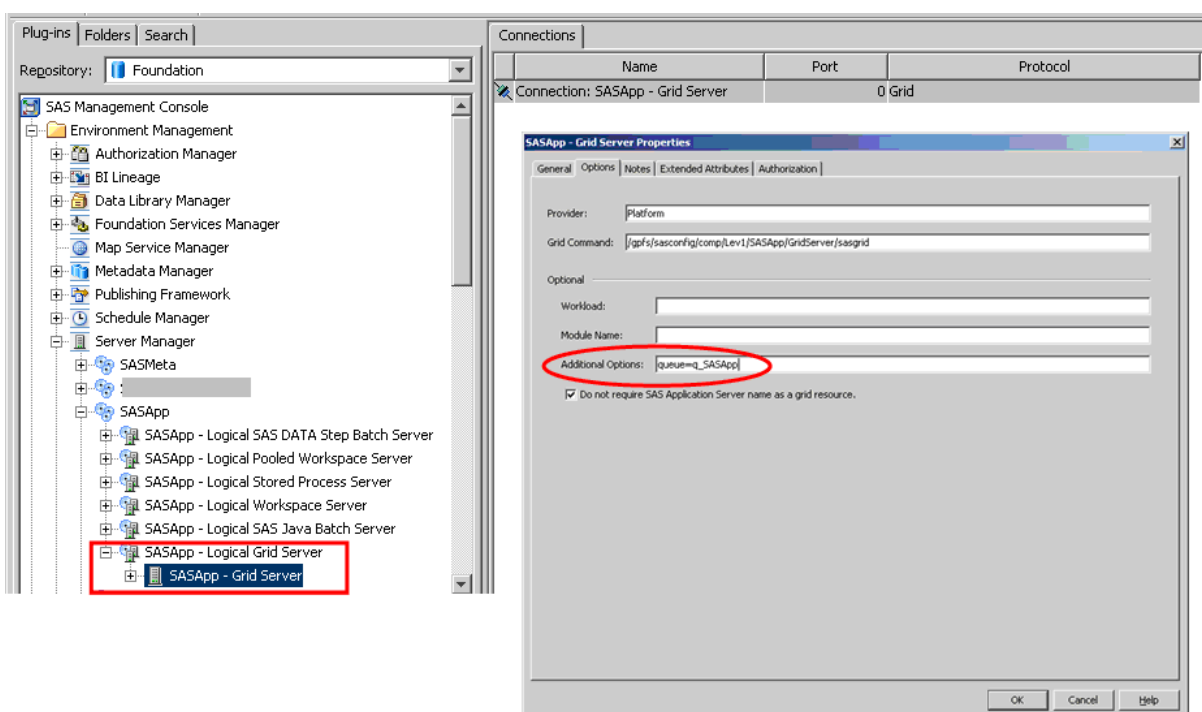

Figure 1 - Applying grid options in earlier versions of SAS Management Console

Once set, this now becomes the default queue for this SAS Application Server Context. By default, all jobs running in this Application Server Context's Logical SAS Servers will be submitted to this grid queue for execution.

Note: In some cases, it is possible to override the Logical Grid Server default settings. For example:

- By default, the SAS Data Step Batch Server calls **sasbatch.sh** to run SAS jobs;

- In a gridded environment, the SAS Data Step Batch Server is reconfigured to call a grid-specific **sasgsub.sh** which *(as its name suggests)* does not itself run the SAS job but instead submits the job to the SAS grid for execution. **sasgsub.sh** options can be configured to pass alternate grid options, such as "**queue=batch**".
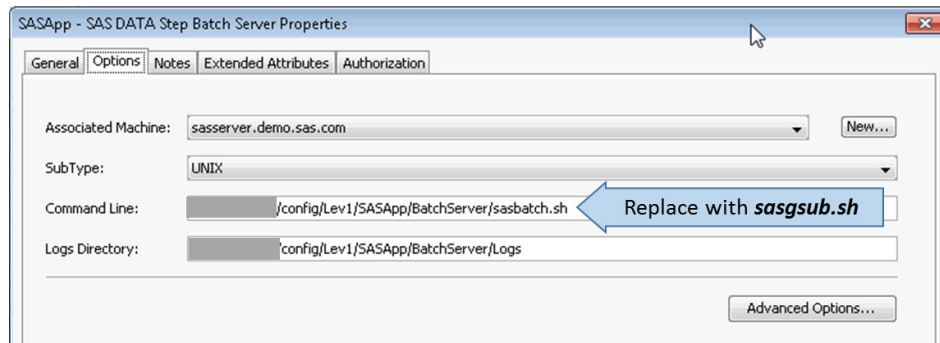
Figure 2 - SAS Data Step Batch Server options

SAS GRID CONFIGURATION PRIOR TO SAS V9.4

Prior to SAS v9.4, on a grid-enabled platform each SAS Application Server Context was essentially associated with a single queue (apart from examples such as the Data Step Batch Server discussed previously). **There was no way to apply multiple and/or conditional queue settings, and only limited ways to apply conditional SAS configuration settings**.

There was also no simple way within a single SAS Application Server Context to apply different configuration and/or queue settings based on which SAS client was connecting – Enterprise Guide, Enterprise Miner, Add In for Microsoft Office, etc.

As a result, it was not uncommon to see multiple business units / departments, each set up with a separate SAS Application Server Context, even though these different teams were effectively using SAS the same way, with the same tools; because they had different configuration and/or grid requirements, the simplest (but tedious) solution was set them up in separate SAS Application Server Contexts.

A hypothetical scenario, in the diagram below, represents the Logical Server definitions on a SAS v9.3 platform:

- The SASApp Logical Servers are primarily used by the installed SAS Solutions;

- The SASMktg Logical Servers are used by the Marketing Team (predominantly Enterprise Guide & Enterprise Miner users);

- The SASBIRpt Logical Servers are used by the BI & Reporting team (predominantly Add-In for Microsoft Office, and Enterprise Guide to a lesser extent).
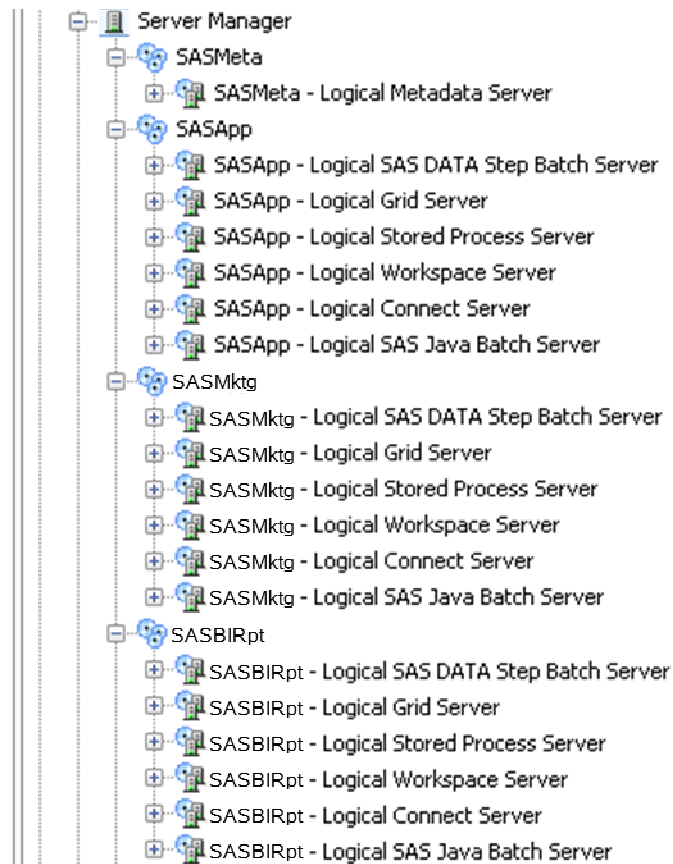
Figure 3 - Sample server configuration in SAS Management Console

Each Business Unit (BU) has its own SAS Application Server Context with BU-specific configuration & grid options, such as cores, batch windows, folder locations.

The end result is that there are multiple SAS Application Server Contexts defined, all with similar usage, but each must be managed separately.

Note: Depending on resource requirements, each Business Unit may run on a common queue, or run on separate BU-specific queues. If the latter, it is recommended that the separate queues have the same priority, so that one BU's jobs are not always held up by another BU's jobs.

SAS V9.4 GRID OPTIONS SETS

Whereas previously these challenges would have to be resolved by configuring multiple SAS Application Server Contexts *(or not dealt with at all)*, with the release of SAS v9.4 comes **SAS Grid Options Sets**, where default SAS options & Grid options can be defined in the SAS Logical Grid Server of a SAS Application Server Context, **but these options can be further tailored** to accommodate different metadata users/groups, and the SAS clients they are running.
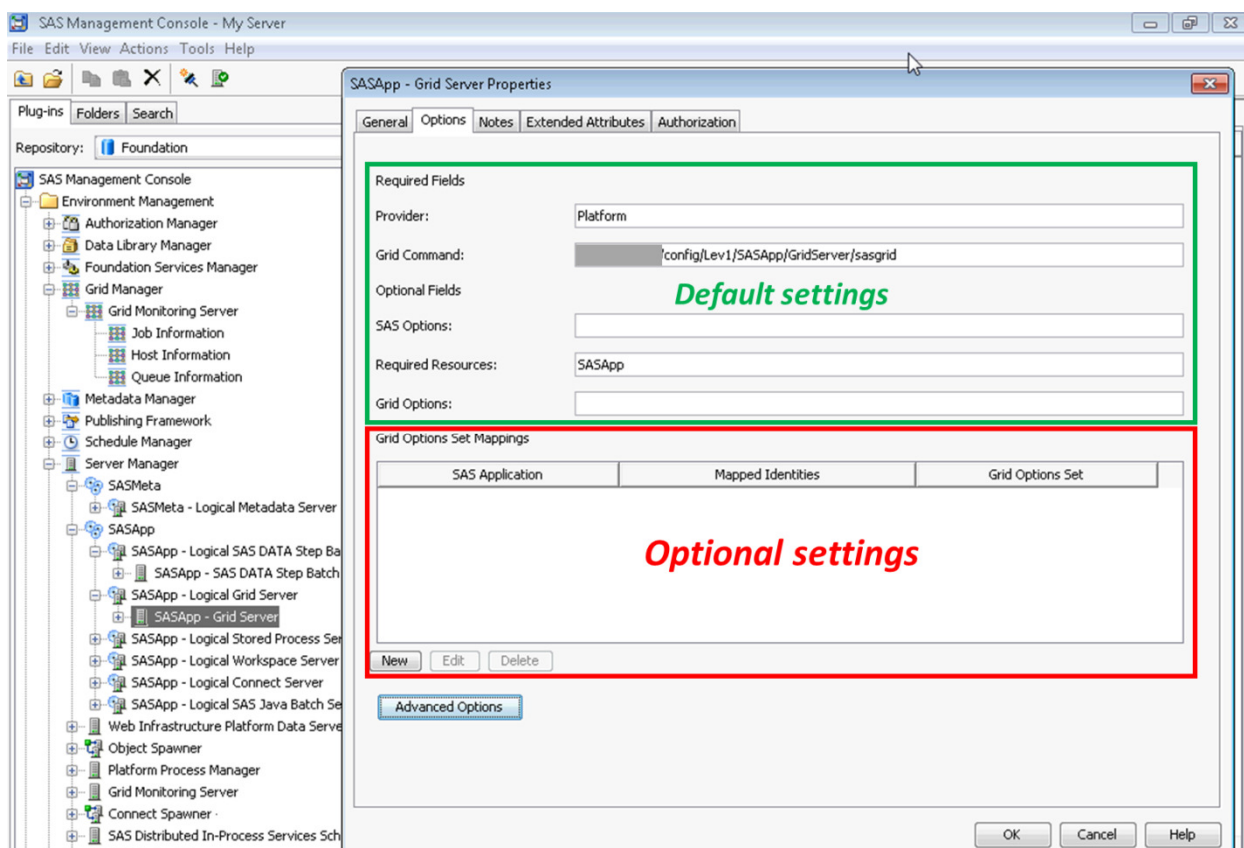

Figure 4 - SAS Management Console v9.4 Logical Server options

SUGGESTED APPLICATIONS OF SAS GRID OPTION SETS

One scenario I advocate is to give SAS Administrators higher priority (and possibly even pre-emptive capabilities) when running Enterprise Guide, should they need to urgently execute some support SAS code.

This priority / capability is defined in a queue created using Platform RTM for SAS, but the SAS Logical Servers must be configured for SAS Administrators to be able to run Enterprise Guide jobs on the high-priority queue.

To enable SAS Administrators to use this queue when running Enterprise Guide, a SAS Grid Options Set needs to be defined in the Options properties of the SAS Application Server Context's Logical Grid Server, as shown below:
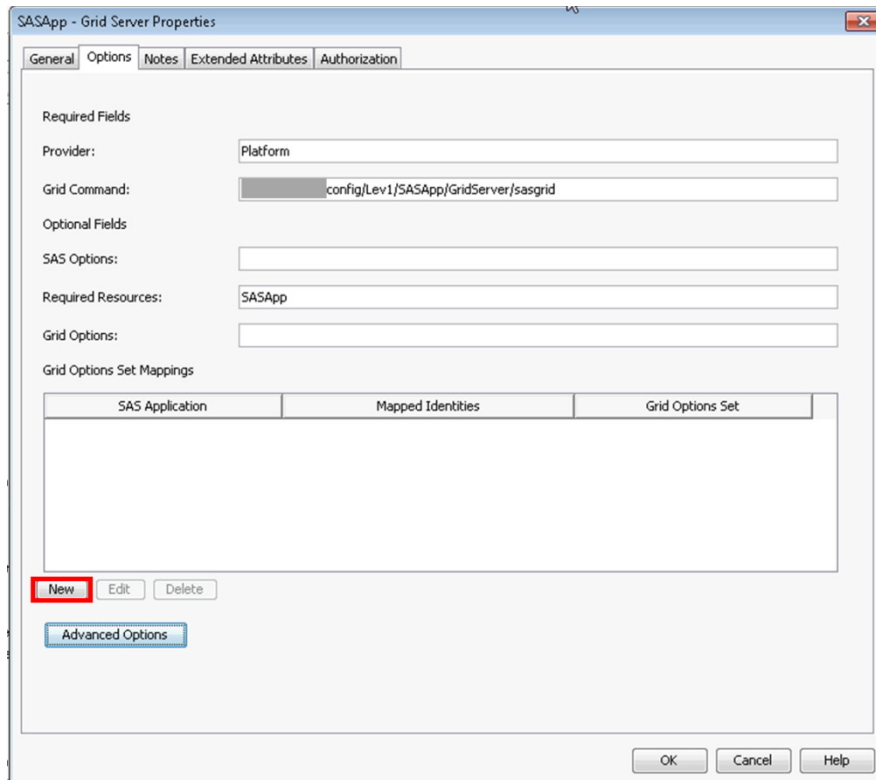
Figure 5 - Creating a new SAS Grid Option Set

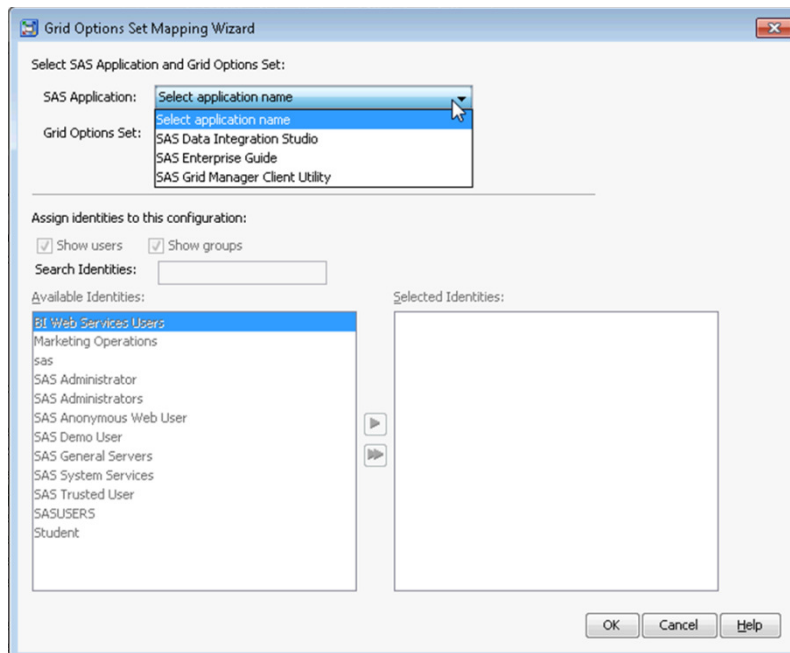Select the desired SAS client from the drop-down list:

Figure 6 - Selecting SAS client

Click "**New**" to create a new Grid Options Set, give the Grid Options Set an appropriate name, and then apply any SAS options, resource options, and/or Grid options for that particular Grid Option Set, then click "**OK**".
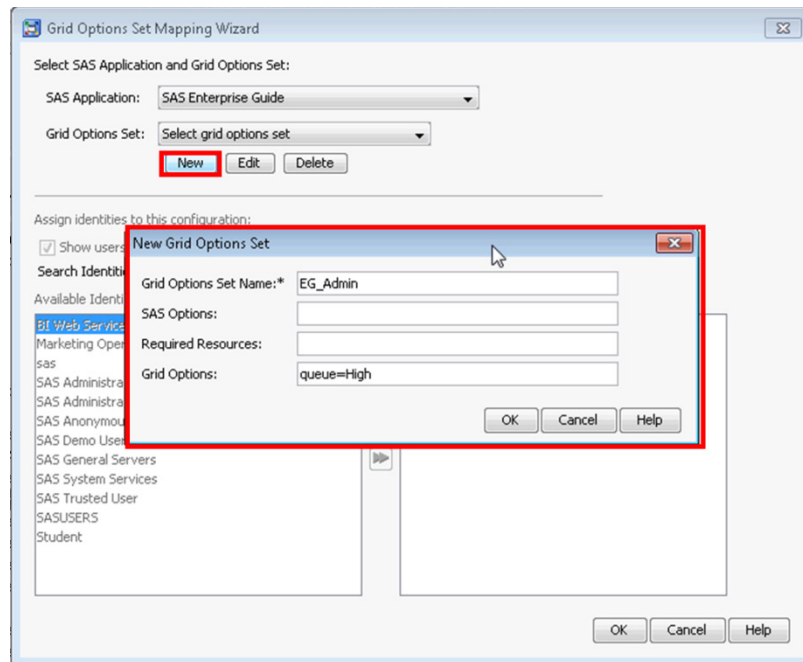

Figure 7 - Setting Grid Options Set options

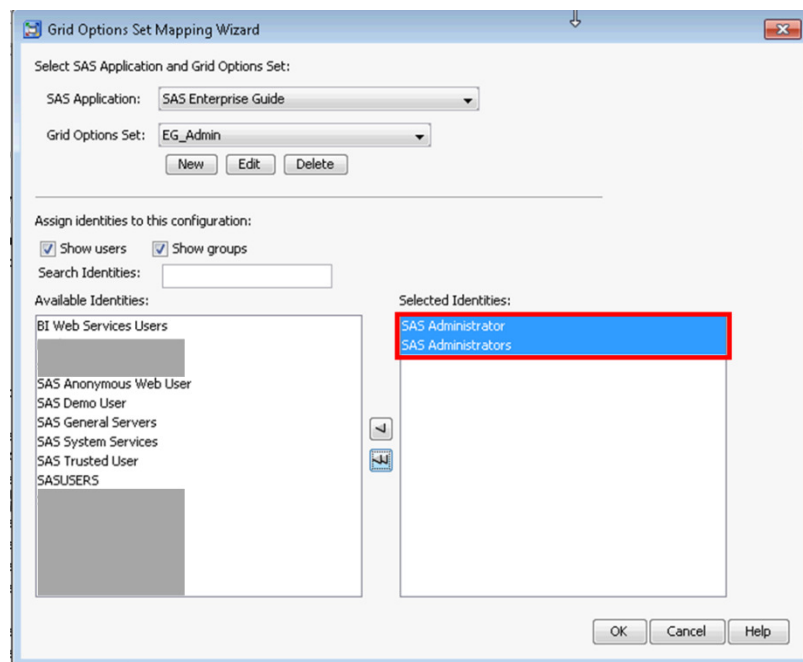Finally, select the metadata users and/or groups for this particular SAS Grid Option Set.

Figure 8 - Selecting SAS Grid Options Set users

The final result is a configuration which applies default settings to most users of a SAS Application Server Context, but allows SAS Administrators to run Enterprise Guide in the same SAS Application Server Context but with a higher priority.
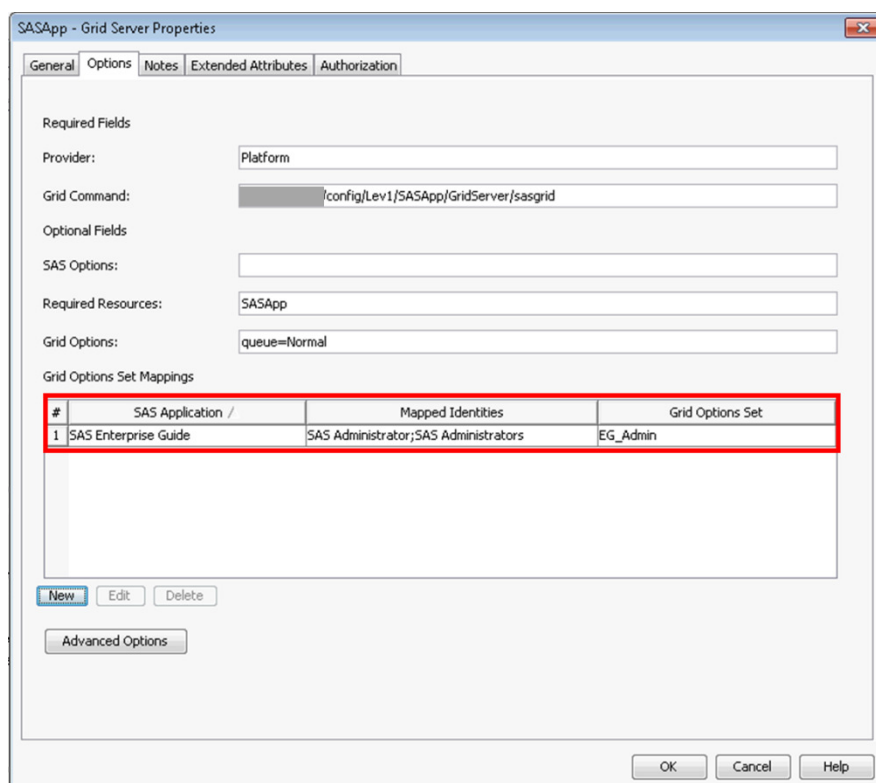

Figure 9 - Updated Logical Grid Server options

The same technique can be used to apply other conditional SAS configuration and/or grid options to resolve issues such as those mentioned in the introduction:

- Applying different SAS configuration and/or queue options based on group membership;

- Applying different SAS configuration and/or queue options based on the SAS client;

- Granting higher priority to senior business consumers who require prompt access to SAS reports;

- Allowing non-critical SAS users access to the SAS platform without impacting critical SAS users;

- Managing different business units, with allocation of server cores to be distributed according to each business unit's share of the licensing costs.

All of these scenarios can now be centrally managed (albeit with multiple queues) within a single SAS Application Server Context by using SAS Grid Options Sets.

CONCLUSION

Although not discussed in this paper, Platform RTM for SAS ensures simple creation & management of queue. SAS Management Console's ability to leverage those queues has now been greatly simplified in SAS v9.4 through the user of SAS Grid Options Sets.

My recommendations for SAS Application Server Context creation & management:

- Leave the SASApp Application Server Context for any installed SAS solutions, such Credit Risk, etc;

- Have a dedicated SAS Application Server Context (*nominally called **SASUsr***) for "regular" SAS usage - Enterprise Guide, Data Integration Studio, Enterprise Miner, Add In for Microsoft Office, etc;

- Minimise creation of additional SAS Application Server Contexts in favour of centalised management within a single SAS Application Server Context.

REFERENCES

SAS Training Course - SAS Grid Manager Administration (PCAD94)

Rabb. M. & Doninger, C. "Grid Computing and SAS".
http://support.sas.com/rnd/scalability/papers/101948_1204.pdf

Howell, A. 2014: Proceedings of SAS Global Forum, "Queues for Newbies - How to speak LSF in a SAS World", 1868-2014.

RECOMMENDED READING

- *SAS® Grid Computing for Dummies: Tim Bates, Tom Keefer & Steven Sober*

- *Grid Computing in SAS 9.4, Third Edition*

- *SAS/Connect Users Guide, Third Edition*

- *Other SAS/Grid presentations at SAS Global Forum 2016*

  - *Bosso, M.: SAS4240 - Creating a Strong Business Case for SAS® Grid Manager: Translating Grid Computing Benefits to Business Benefits*

  - *Parrish, S". SAS6365 - SAS® Grid Administration Made Simple*

  - *Markovic, N. & Nelson, G.: 11825 - Life in the Fast Lane: Optimization for Interactive and Batch Jobs*

  - *Bigalke, J. & Nelson, G.: 11562 - Beyond Best Practice: Grid Computing in the Modern World*

  - *Brown, T.: SAS6760 - Architecting Your SAS® Grid: Networking for Performance*

  - *Singh, P. & Gupta, T.: ePoster 7140 - Key Requirements For SAS® Grid Users*

ACKNOWLEDGMENTS

CONTACT INFORMATION

Your comments and questions are valued and encouraged. Please feel free to contact the author at:

Andrew Howell
ANJ Solutions Pty Ltd
PO Box 765, Macleod VIC 3085 AUSTRALIA
Phone: + 61 407 898 513
Email: info@anjsolutions.com.au
LinkedIn: http://au.linkedin.com/in/howellandrew/
Twitter: @AndrewAtANJ

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

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