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## Metadata Reporting Using the SAS® Configuration Troubleshooter: A Best Practice

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### ABSTRACT

Business intelligence (BI) platform administrators often struggle with gathering and examining necessary information when attempting to understand the current state of their systems, particularly when the information is not easily viewable such as repository metadata. Attendees in this session will see a demonstration of how the SAS® Configuration Troubleshooter can be used to easily produce a large variety of metadata reports that are readable, replicable, and printable.

### INTRODUCTION

Whether you are a manager or an administrator, operating any complex system involves exploring and monitoring the relationship of individual system pieces and understanding how those pieces interact with the larger picture of your system. The more granular the available detail, the more precise you can be when creating a view of the system.

Whether this system is a ship, a car, a spacecraft, or your new television, all systems have the ability to give the user information about the system's internal state. For example, a television has settings that control brightness, contrast, aspect ratio, input type, closed captioning, and so on.

Administering a BI platform has concepts that are very similar to managing a television. The SAS® Management Console provides a view of the system, although a view that is a bit more involved than the menus of a modern high-definition television. The view of metadata provided by the SAS Management Console enables you to adjust the system's operations to suit your needs. Yet, have you ever tinkered with a television setting and then decide the picture was better before the tinkering? Could you remember the exact settings before you began tinkering? Wouldn't it be nice if the television would tell you the previous settings?

The Metadata Exporting and Analysis (MEA) feature of the SAS Configuration Troubleshooter, gives you the ability to view metadata directly and begin asking new types of platform-management questions, such as the following:

- If I had a security audit, could I get the information that I need?
- Would there be any surprises?
- When adding new users, are the security groups too complicated for the help desk to know where to put the new users?
- Is inappropriate data being stored on the *wrong* servers?
- Are things being duplicated that are wasting space, time, and money?

You can even ask forecasting questions, such as, "Given our number of reports, data items, and users growing from month to month, when could we run into performance capacity problems?"

The Metadata Exporting and Analysis addition to the SAS Configuration Troubleshooter includes abilities designed to meet the following needs:

- creating portability

Various output options enable metadata exporting into formats that allow you to create printable reports. These output options are as simple as viewing and printing from a browser, but, more importantly, the report output can be read into SAS (via the SAS® XML Mapper or as CSV files) to produce a richly-featured analysis of the outputs. Examples of reports created with the output delivery system (ODS) are shown in the next two sections of this paper.

- comparing output

The XML output mentioned above gives you the ability to compare exported metadata across timeframes, or between systems. This new view enables you to determine what changed between points X and Y.

- using metadata to audit, forecast, and maintain your system

MEA provides a library of SAS jobs which enable you to import the results into SAS data sets. These data sets are available to be imported into the SAS BI Platform, or they can be analyzed via a stand-alone SAS® session. Having the metadata in data sets enables you to explore that metadata freely. You can ask new questions about your platform.

This variety of output options allows you to choose a preferred method of examining metadata and select the approach that is best suited to your current needs.

## CREATING PORTABILITY

Wouldn't it be nice if your new television could give you a printout of its settings? There would be no more scrolling to get to a menu option and then drilling into submenus to view the individual setting values. You could keep a copy of your favorite settings for each genre of movie you watch; maybe you could keep a copy of your grandparent's favorite settings for the next time they visit. The same concept applies to metadata. For example, with a printout you can compare an old system to a new one that is being deployed in a new business unit. Additionally, you can use a printout to verify that development servers are using the appropriate set of non-production resources. Certain metadata types lend themselves to easy printing. MEA gives you the convenience of portability.

For example, as a manager you might want to validate your BI content. With the ability to print metadata, you can divide and assign validation tasks in whatever method best suits your corporate data structure philosophy. If, for example, you decide to validate your content based on who can access which servers, then you can print the exported metadata and assign individuals to specific servers. You can use the same approach for libraries, groups, or whatever fits your businesses schema.

Sometimes it's just handy to have a hard copy like the one shown in Figure 1.

<b>People ( 32 )</b>		
<b>Administrator Persona</b>	<b>Description</b>	<b>Title</b>
Ahmed Zied	Description Shared Functions	Title IS Administrator III
<b>Analyst Persona</b>	<b>Description</b>	<b>Title</b>
Anthony Miller	Description Board of Directors	Title Chief Executive Officer
<b>Author Persona</b>	<b>Description</b>	<b>Title</b>
Chiorene Marion	Description Shared Functions	Title BI Architect II

Figure 1. Sample XML output (viewed in a browser) of printed metadata showing people in a repository, a description, and a title

## COMPARING OUTPUT

Time might be relative, but time matters to the state of information. For example, you really enjoy your fabulous new television, but there are channels you don't wish to see so you block those channels. How would you know later that you are missing out on great entertainment if a blocked channel changes its format? Just as channel formatting changes over time, system information changes over time, as well. People are added to organizations; new data sources are added to corporate IT structures; data promotions occur along the Development/Test/Production path. There are times where knowing what existed in the past can make your life easier in the present. If you have a power outage or get a television upgrade at some future date, having a copy of those television settings would make re-configuring our television an easy task.

This same concept applies easily to metadata if you need to reconfigure an environment or determine changes that occurred to an environment after initial testing and certification are completed.

For example, assume you are migrating or promoting a repository. Simple metadata comparisons can provide you with either a high-level view or a detailed view of your repository. In Figure 2, the left-hand pane shows the metadata before the migration process began. Before migration, there were 28 groups in our repository. The post-migration printout, in the right-hand pane, shows that only 27 groups were migrated. Our "Data Builders" group was omitted for some reason and now we know what needs to be fixed. We also could use this information in a different way, to see whether new groups were added over time.

Identity Groups (28)		Identity Groups (27)	
Data Analysts	Type IdentityGroup Members ( 2 ) Gloria Drew Jacques Villeneuve	Data Analysts	Type IdentityGroup Members ( 2 ) Gloria Drew Jacques Villeneuve
Data Builders	Type IdentityGroup Members ( 1 ) Tara O'Toole	Data Enablers	Type IdentityGroup Members ( 1 ) Marcel Dupree
Data Enablers	Type IdentityGroup Members ( 1 ) Marcel Dupree	ESRIGroup	Type IdentityGroup Members ( 13 ) Analyst Persona Anthony Miller Author Persona Christine Fletcher Consumer Persona Dennis Lansberry Harry Highpoint Henri Le Bleu Louis Favaron Manager Persona Reginald Steiber Renee Capachietti SAS Demo User
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Figure 2. An example of two reports viewed side by side (in a browser) for comparison purposes

Output comparisons are not limited to raw data. Figures 3 and 4 show examples of two reports that were generated via ODS and display hardware administration information.

Obs	ServerContext	LogicalServer	ServerComponent	Port	Hostname
1	Cypress	Cypress - Logical SAS/CONNECT Server	Cypress - Connect Server	8601	cypress.na.sas.com
2	Cypress	Cypress - Logical Workspace Server	SASApp - Workspace Server	8591	cypress.na.sas.com
3	Endapp20	Endapp20 - Logical Workspace Server	Endapp20 - Workspace Server	8591	endapp20.na.sas.com
4	solstice - chinese	solstice - chinese - Logical Workspace Server	solstice	3217	solstice

Figure 3. Sample ODS HTML output of server context data before promotion and migration

Obs	ServerContext	LogicalServer	ServerComponent	Port	Hostname
1	Cypress	Cypress - Logical SAS/CONNECT Server	Cypress - Connect Server	7551	poplar.na.sas.com
2	Cypress	Cypress - Logical Workspace Server	SASApp - Workspace Server	-1	poplar.na.sas.com
3	Endapp20	Endapp20 - Logical Workspace Server	Endapp20 - Workspace Server	8591	endapp20.na.sas.com
4	solstice - chinese	solstice - chinese - Logical Workspace Server	solstice	3217	solstice

**Figure 4. Sample ODS HTML output of server context data after promotion and migration**

As a further example, let's imagine that a site is upgrading to a new software release and is starting with new servers. As you can see by comparing Figure 3 and Figure 4, after migration the host name and port of the Server Components associated with the Server Context *Cypress* have changed. These values may be as intended, but having this output enables you to easily identify differences between the pre- and post-migration repositories.

## USING METADATA TO AUDIT, FORECAST, AND MAINTAIN YOUR SYSTEM

As you explore your new television you discover that you have hundreds of channels of information at your fingertips, and each channel is about a different subject. Some channels are boring while others can be quite interesting and informative. Just as your new television has a wide selection of viewing channels, the MEA export capacity, like different types of channels, enables you to explore a large cross section of metadata and choose the information that you wish to analyze. Imagine if you could see information about your television organized exactly like you wanted. During a time of major news events, you could search and locate all of the news channels. During times of severe weather, locating all of the weather information channels should be easy. More typically, you might want to find all of the action movies that are on television when you need to entertain a crowd that is looking for that type of entertainment. Navigating, drilling down, and searching through organized lists would be helpful.

The MEA enables easy navigation by including a library of SAS jobs which will import your metadata exports into SAS data sets. From there, you can use the power of SAS to ask your own questions about your metadata.

## AUDITING

Others might want to know particular information about your television, such as the model, the resolution, and so on. Alternatively, you might want to know about your television service, such as which channels are new or whether any pay channels currently offer free viewing. The same is true of metadata. As an IT manager or administrator, often you must answer questions about your repository for regulatory or management purposes. For example, imagine that you receive an audit request from an external audit source to provide a list of all SAS users that were added since January 1, 2005. The information should include the following:

- SAS user names
- When each user was made active
- Groups to which each user belongs
- Data libraries to which each user has access

MEA gives you the ability to extract the appropriate metadata, and then produce the reports for this audit request via whatever method you deem most appropriate. As shown in the example in Figure 5, ODS output is generated from the retrieved metadata. As with other types of information, Base SAS® and SAS® Business Intelligence software can easily provide reports with the necessary information based on this type of request.

## The SAS System

Obs	UserName	Group	User ID	Date Created	Accessible Data Libraries
1	Joe Adams	IT	jadams	10 Jan 2007	Technology, Technical Support
2	Steve Smith	Technical Support	ssmith	19 Aug 2008	Technical Support
3	Sandra Jones	Product Management	sjones	4 May 2007	Technical Support
4	Robert Gold	Publishing	rgold	28 Oct 2006	Published Documents, Marketing
5	Jill Cooper	Finance	jcoop	10 Jun 2005	Accounting

Figure 5. A sample auditing report created via ODS output

### FORECASTING

So far our new television has served us well, and as an analogy it does not fall short in the area of forecasting. Most television services offer a schedule that allows you to proactively plan your viewing. A day of idly surfing the channels can be an enjoyable way to pass time when the weather outside is not cooperating. Flipping endlessly through a channel loop is perfectly fine, when there are only 100 channels of “not much on television”. What happens if that number increases to 400 or 700? The number of channels continues to grow as technology expands and viewing options increase. You would either need to come up with a better surfing methodology or a favorites system. MEA provides a view of metadata that enables you to plan for future events.

### MAINTAINING YOUR SYSTEM

Like any system, sometimes maintenance is required. Situations change, and what worked with a given set of circumstances can be messy with other circumstances. Whether you are *avoiding messes* or *cleaning up defunct user information before the accumulation becomes a management problem*, these situations and the circumstances around them are purely subjective. There are no universal answers to accomplishing tasks that are unique to each business such as creating groups, assigning users to groups, applying security to metadata objects, and assigning servers to access specific libraries and specific data. MEA enables you to explore your metadata and begin asking *what if* questions about your metadata.

As a simple example, let's assume that your company is adding employees that will require access to report data. In the past new employees have been added to existing groups. MEA can help you explore your group metadata to determine what actions will be required to handle additional growth. The example report displayed in Figure 6 shows group names, the number of individual Access Control Entries (Aces) applied directly to each group, the number of members in each group, and the number of Aces applied to these individual members. The report gives you information that allows you to ask questions such as the following:

- Our Report Users group members have a lot of Aces applied directly to the members. Should we investigate this?
- The Report Users group has a lot of members and a lot of Aces. Should we consider breaking this group into subgroups?

## The SAS System

Obs	GroupName	Count of Aces applied to group	Member Count	Count of Aces applied to group members
1	Administrators	5	10	6
2	Report Users	55	210	400
3	Report Creators	12	8	6

Figure 6. Sample ODS output that enables an administrator to explore the size and complexity of individual groups

## CONCLUSION

While administering an enterprise-level BI platform is more complicated than tuning a television, many of the concepts are similar. As administrators and managers, one of the most important capabilities we need is the ability to gather and understand details about our repositories. The addition of the Metadata Exporting and Analysis feature to SAS Configuration Troubleshooter enables you to define the level of detail that you want to see, ask questions that are pertinent to your unique environment, and explore your metadata as you wish.

You will have access to basic XML information that can be saved and viewed for differences; you can generate BI-style reports for information that brings BI oversight into the management of the BI system itself; you can use information to help predict the future for storage growth or manageability challenges.

Data access is the first part of the capabilities added with MEA. Basic capabilities for exporting, reporting, and viewing differences make your information more useful. Finally, exposing the data to analytics such as data mining and forecasting, brings this formerly mundane, IT-centric information into the modern age. Just like the new television with its high-definition picture, we can have a detailed view of this information for viewing, studying, or planning purposes.

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## RECOMMENDED READING

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