

Controlling OLAP Applications End to End

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ABSTRACT

In SAS[®] 9.2, there are several new features that help administrators to secure and control the use of OLAP Cubes in a reporting environment. This paper highlights the following new and existing features:

- ability to include or exclude members from aggregated values (parent values)
- member Level Security user interface
- subsetting report data using Information Map Filters
- roles controlling report functionality

OVERVIEW OF SAS 9.1 OLAP SECURITY

Many of the core security features that were available in SAS 9.1 are still valid for SAS 9.2. OLAP component inheritance of permissions, permissions required for cube-based activities, and member level security are highlighted in this section.

INHERITENCE OF OLAP COMPONENTS

It is essential when applying permissions to different OLAP components (including cube, dimension, hierarchy, level, or measure) to understand how permissions are inherited. The *SAS Intelligence Platform: Security Administration Guide* best depicts this relationship.

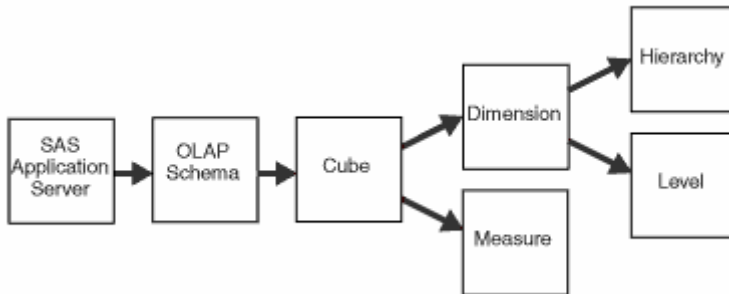


Figure 1: OLAP Components Permission Inheritance

SUMMARY OF PERMISSIONS

Following is a table that shows the permissions for basic functions involving cube usage and administration.

Task	Repository	Application Server	OLAP Schema	Parent Folder	Cube	Source Data Sets
Register a cube	RM, WM	RM	RM, WM	RM, WMM	-	RM, R ^{MLE}
Delete a cube	RM	RM	RM, WM	RM, WMM	RM, WM	-
Rebuild a cube	RM	RM	RM	RM	WM	RM, R ^{MLE}
Refresh a cube	RM	RM	RM	RM	RM, R	RM, R ^{MLE}
Set cube permissions	RM	-	RM	RM	RM, WM	-
Access cube data	RM	RM	RM	RM	RM, R	-
Register a schema	RM, WM	RM, WM	-	RM, WMM	-	-
Use the OLAP Server Monitor	RM	A	-	-	-	-

MEMBER LEVEL SECURITY

Member level security was available in 9.1. To apply member level security several steps are needed:

1. Select a dimension, and then in the **Authorization** tab, select a user.
2. Explicitly grant read permission to that user (background color will be white, as shown in Figure 2).
3. The **Member Authorization Properties** button will become active.
4. Click the button and type in the relevant MDX expression.

MDX expressions were manually entered with no validation process. Members could be “hidden,” which means, users were denied access to viewing secured members directly. The parent member, however, would still include the secured member in the summarized value.

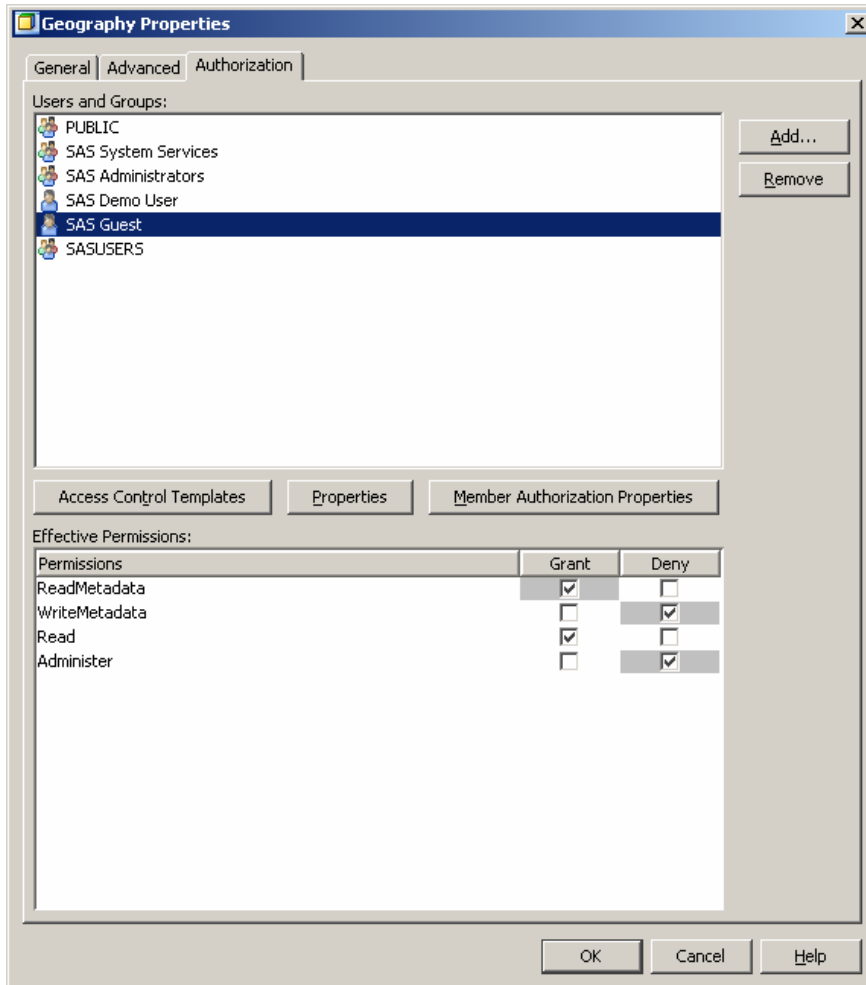


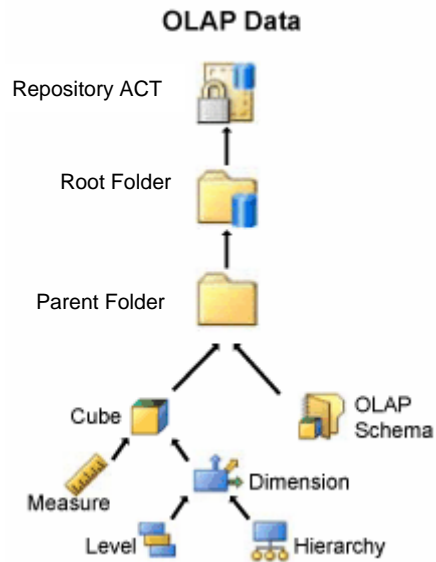
Figure 2: Grant explicit read permission to activate the member authorization properties button

SECURING OLAP DATA IN SAS 9.2

This section will describe the new features or changes to the existing options in SAS 9.2 that have been added to help further control OLAP data.

INHERITANCE OF OLAP COMPONENTS

The inheritance of OLAP components has altered in SAS 9.2, as a cube is now inheriting its permissions from the folder in which it resides. This is depicted in the following diagram:



SUMMARIZED VALUE OF PARENT MEMBERS

In SAS 8.2, SAS/MDDDB[®] Server users had the ability to drop or hide values using Access Control Levels (ACLs), therefore, controlling how parent values were summarized. In SAS 9.1, member level security only provided the option to “hide” members—therefore, the secured members were always included in the parent values. In SAS 9.2, when designing a cube users can decide to include (“hide”) or exclude (“drop”) members from a summarized value of their parent members by selecting or deselecting, respectively, the check box in the General window in the Cube Designer Wizard, shown in Figure 3, or using the option `SECURITY_SUBSET=No/Yes`, respectively. By default, the check box is selected when building a cube (the same as setting `SECURITY_SUBSET=No`), which gives the same result as in SAS 9.1.

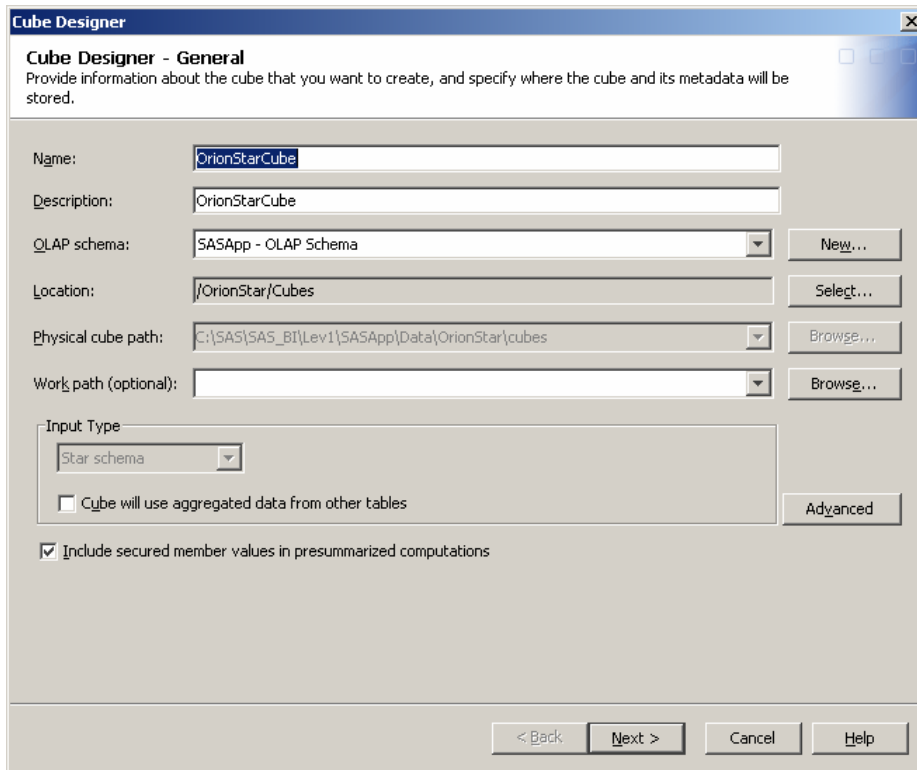


Figure 3: Check box to either include or exclude secured member values in presummarized computations (parent values)

MEMBER LEVEL SECURITY

The initial steps of applying member level security are still required. See member level security for the SAS 9.1 Overview section previously described on page 2. . The changes to member level security in SAS 9.2 are:

- As with the other features, member level security can now be applied in both SAS® Management Console and SAS® OLAP Cube Studio.
- When selecting the **Member Authorization Properties** button, a point-and-click user interface is now available to grant and deny access to a member and its descendants (Figure 4).
- An advanced expression window is also available to guide writing their own MDX expressions, which can now be validated before saving the expression.
- In the advanced expression window, member properties and identity properties are also available to use in the MDX expression.

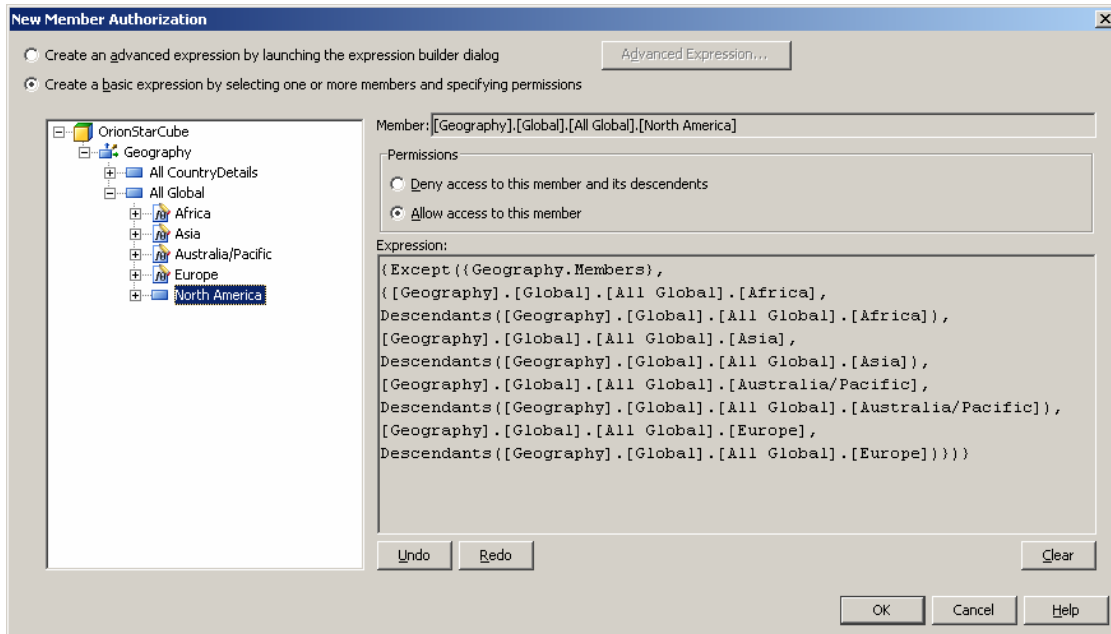


Figure 4: Point-and-click member level security user interface (the user interface is expected to change before software release)

INFORMATION MAP OLAP FILTERS AND PROMPTS

New with SAS[®] Information Map Studio 4.2, users have the ability to create filters and prompts that can be applied to specific reports, again controlling the data a report user will see. The use of information maps will limit the data and stop users from navigating to data outside the filter or prompt selection.

Additionally, the applied filter will alter the parent values summarization where only the selected values are included in any visible parent value. For example, in Figure 5, a filter has been created to include only North America and the United States (and descendants). The summarized value of North America will only include the United States, removing Canada from the summarized computation.

Prompts based on information, as mentioned, also limit the data a user can see. Figure 6 shows the definition of the prompt. The report user will be presented a hierarchy tree-based prompt and be asked to select a single member, which will ultimately restrict navigation to that member and its descendants. In order to see a new view, the user must refresh the data and make a new selection when prompted.

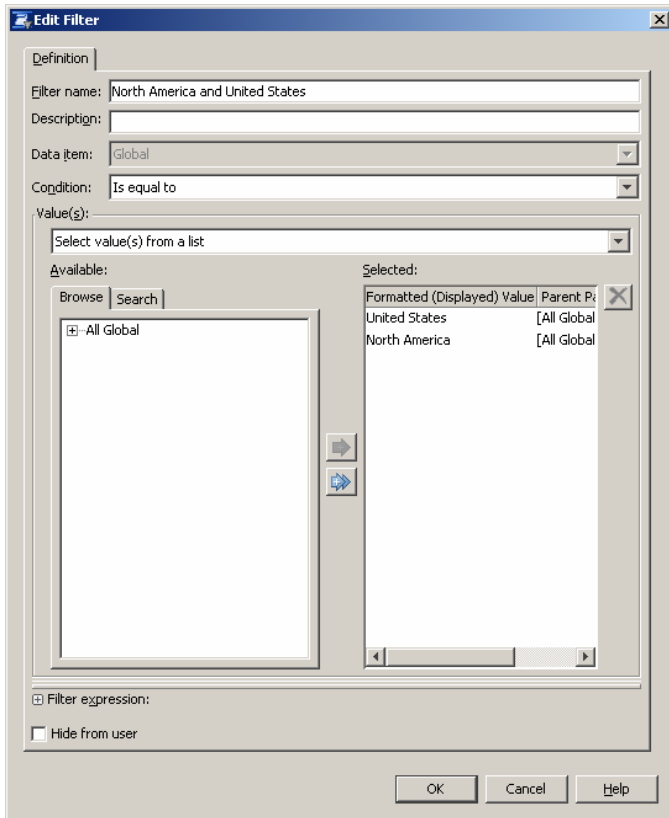


Figure 5: An OLAP information Map filter that can be used when creating a report in SAS® Web Report Studio.

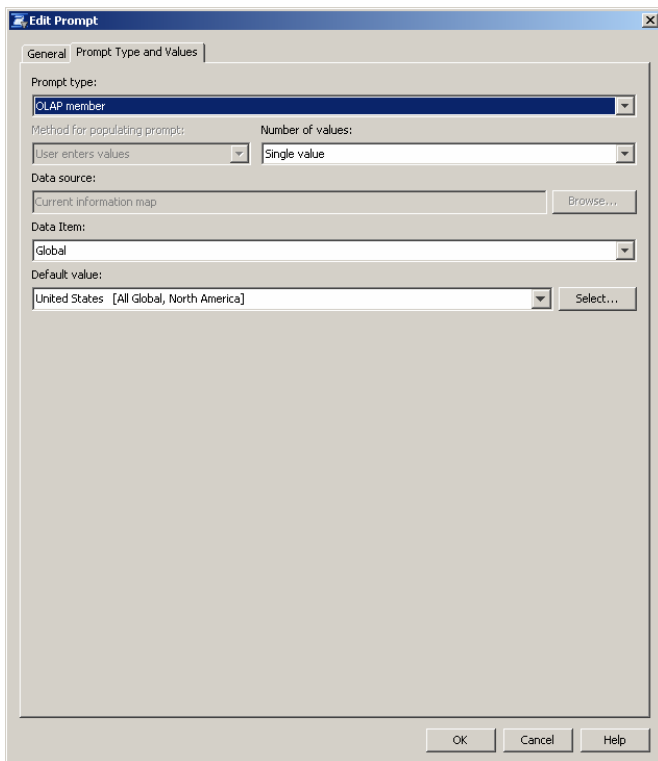


Figure 6: Creating an OLAP information Map prompt that users will see surfaced in SAS Web Report Studio.

SCENARIOS

Four scenarios are used to illustrate the new functionality mentioned in the previous section. Each scenario gives the actions and conditions the cube designer or administrator will apply to control OLAP data across the SAS Intelligence Platform. *Sasquest user* is the person who has been restricted in each of the scenarios. The OLAP tables from SAS Web Report Studio are included to clarify the results represented to *sasquest*.

SCENARIO 1

This first scenario, shown in Figure 7, shows the inclusion of secured members in parent (pre-summarized). This is the default result that users will see when building a cube in SAS 9.2, remaining consistent with SAS 9.1.

Action	Condition	Result
Summarized value		Parent values will include secured members (Default option), where <i>All Geography = SUM(Africa, Asia, Australia/Pacific, Europe, North America)</i>
Member level security	<code>((Except({Geography.Members}, { [Geography].[Global].[All Global].[Africa], Descendants([Geography].[Global].[All Global].[Africa]), [Geography].[Global].[All Global].[Asia], Descendants([Geography].[Global].[All Global].[Asia]), [Geography].[Global].[All Global].[Australia/Pacific], Descendants([Geography].[Global].[All Global].[Australia/Pacific]), [Geography].[Global].[All Global].[Europe], Descendants([Geography].[Global].[All Global].[Europe])}))</code>	Users will see the actual members and values hidden when navigating to the level the members are assigned to <i>Sasquest user will see at the continent level: North America</i>

Year		+ 1998	+ 1999	+ 2000	+ 2001	+ 2002
		Sum Of Quantity	Sum Of Quantity	Sum Of Quantity	Sum Of Quantity	Sum Of Quantity
All Global	Continent Name					
All Global	+ North America	66476	76880	97081	74813	84570
+ All Global		261159	302511	362969	308584	362094

Figure 7: Results showing inclusion of secured members in parent (pre-summarized) values, as they also appear in SAS 9.1.3

SCENARIO 2

Figure 8 illustrates the new feature of excluding secured members from the parent values which is achieved by using the option "SECURITY_SUBSET=YES". *Sasquest user* has been restricted to only seeing North America and its descendants.

Action	Condition	Result
Summarized value	SECURITY_SUBSET=YES	Parent Values will exclude secured member where <i>All Geography = North America</i>
Member level security	{ {Except ({Geography.Members} , { [Geography].[Global].[All Global].[Africa], Descendants ([Geography].[Global].[All Global].[Africa] , [Geography].[Global].[All Global].[Asia] , Descendants ([Geography].[Global].[All Global].[Asia]) , [Geography].[Global].[All Global].[Australia/Pacific] , Descendants ([Geography].[Global].[All Global].[Australia/Pacific]) , [Geography].[Global].[All Global].[Europe] , Descendants ([Geography].[Global].[All Global].[Europe]) }) } }	Users will see the actual members and values dropped from the parent value and will be removed when navigating to the level the members are assigned to. <i>Sasquest user will see at the continent level: North America</i>

Year		+ 1998	+ 1999	+ 2000	+ 2001	+ 2002
		Sum Of Quantity	Sum Of Quantity	Sum Of Quantity	Sum Of Quantity	Sum Of Quantity
All Global	Continent Name					
All Global	+ North America	66476	76880	97081	74813	84570
+ All Global		66476	76880	97081	74813	84570

Figure 8: Results showing exclusion of secured members from parent (pre-summarized) values

SCENARIO 3

In this scenario, an Information map OLAP filter was additionally applied to the report that restricted *sasquest* to only seeing North America and the United States (and descendants), eliminating Canada member from the view. Notice the summarized value of North America dropped Canada as well from its total (Figure 9).

Action	Condition	Result
Summarized value	SECURITY_SUBSET=YES	Parent Values will exclude secured member where <i>All Geography = North America</i>
Member level security	{ {Except ({Geography.Members} , { [Geography]. [Global]. [All Global]. [Africa], Descendants ([Geography]. [Global]. [All Global]. [Africa]) , [Geography]. [Global]. [All Global]. [Asia], Descendants ([Geography]. [Global]. [All Global]. [Asia]) , [Geography]. [Global]. [All Global]. [Australia/Pacific], Descendants ([Geography]. [Global]. [All Global]. [Australia/Pacific]) , [Geography]. [Global]. [All Global]. [Europe], Descendants ([Geography]. [Global]. [All Global]. [Europe]) }) }	Users will see the actual members and values dropped from the parent value and will be removed when navigating to the level the members are assigned to. <i>Sasquest user will see at the continent level: North America</i>
OLAP Information Map Filter	[Global]. [All Global]. [North America] [Global]. [All Global]. [North America]. [United States]	A pre-defined IMS filter has been created and use to limit the report data directly. <i>Sasquest user sees the report with the filtered values, only displaying:</i> North America United States

[Global](#) > North America

Year		+ 1998	+ 1999	+ 2000	+ 2001	+ 2002
		Sum Of Quantity	Sum Of Quantity	Sum Of Quantity	Sum Of Quantity	Sum Of Quantity
Continent Name	Country Abbreviation					
North America	+ United States	65108	75544	95785	73579	83334
North America		65108	75544	95785	73579	83334

Figure 9: Results after Information Map Filters were applied to the report.

SCENARIO 4

Information maps also support OLAP prompts. This scenario uses an information map OLAP prompt, in addition to excluding secured members from parent summarized vales. The sasquest user selects a single member to view, in this case the United States (Figure 10). The results, as seen in Figure 11, show that the data represented is restricted to the United States and its descendants; sasquest will need to refresh data to see other members.

Action	Condition	Result
Summarized value	SECURITY_SUBSET=YES	Parent Values will exclude secured member where <i>All Geography = North America</i>
Member level security	{ {Except ({Geography.Members} , { [Geography]. [Global]. [All Global]. [Africa], Descendants ([Geography]. [Global]. [All Global]. [Africa] , [Geography]. [Global]. [All Global]. [Asia] , Descendants ([Geography]. [Global]. [All Global]. [Asia]) , [Geography]. [Global]. [All Global]. [Australia/Pacific] , Descendants ([Geography]. [Global]. [All Global]. [Australia/Pacific]) , [Geography]. [Global]. [All Global]. [Europe] , Descendants ([Geography]. [Global]. [All Global]. [Europe]) }) } }	Users will see the actual members and values dropped from the parent value and will be removed when navigating to the level the members are assigned to. <i>Sasguest user will see at the continent level: North America</i>
OLAP Information Map Filter Prompt	[Global]. [All Global]. [North America]. [United States]	User will select which country they want to see. The data will be subsetted based on this filter and will need to refresh the report to view other data. <i>Sasguest user has selected United States from the prompt</i>

Please answer the prompts below and click the View Report button to continue.

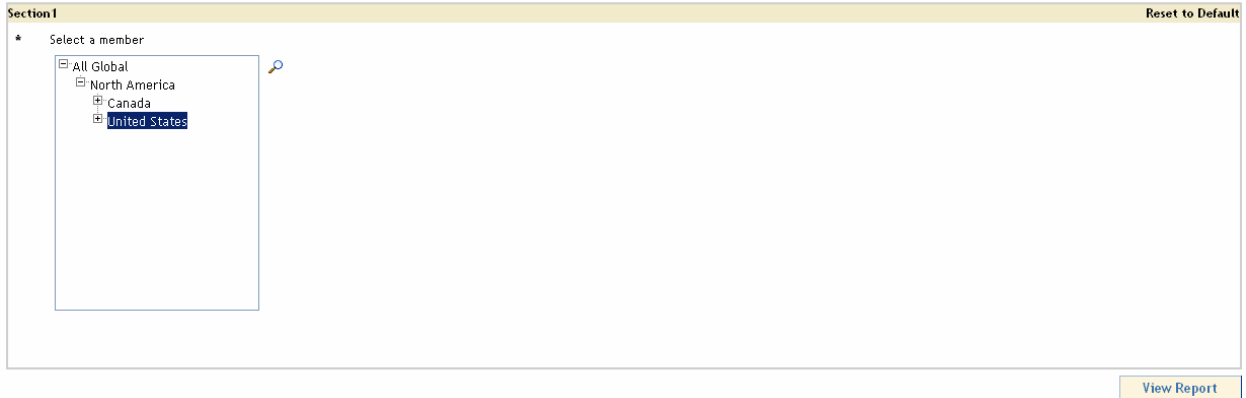


Figure 10: Sasguest user selects the United States from the OLAP information map prompt

Year	+ 1998	+ 1999	+ 2000	+ 2001	+ 2002
	Sum Of Quantity	Sum Of Quantity	Sum Of Quantity	Sum Of Quantity	Sum Of Quantity
Country Abbreviation					
+ United States	65108	75544	95785	73579	83334

Figure 11: Results after OLAP prompt selection from Figure 10.

RECOMMENDATIONS

With the changes that have been made in SAS 9.2, it is strongly recommended that member level security expressions **DO NOT** exclude any members that would cause a break in navigation. Previously in SAS 9.1.3, the following MDX expression was valid to ensure that users were not seeing the inclusion of secured members in the presummarized value of a parent:

```
{[Geography].[All Geography].[North America].[United States],
descendants([Geography].[All Geography].[North America].[United States])}
```

Note that the All member **[All Geography]** and the North America member have been excluded. In place of this elimination, it is recommended that users now use `Security_Subset=yes` to exclude the inclusion of secured members in the parent value. The `Security_Subset` option will provide better performance and will allow all totals and subtotal calculations (both visual totals and parent values—excluding the secured members) to be visible to the end user if set on the report.

RESTRICTING OLAP FUNCTIONALITY IN SAS WEB REPORT STUDIO

In SAS Management Console for 9.2, function-based roles are available that allow administrators to control the functionality that is available to SAS Web Report Studio users. For OLAP, administrators can control at the application level whether a user can navigate a cube or drill through to detailed data (Figure 12).

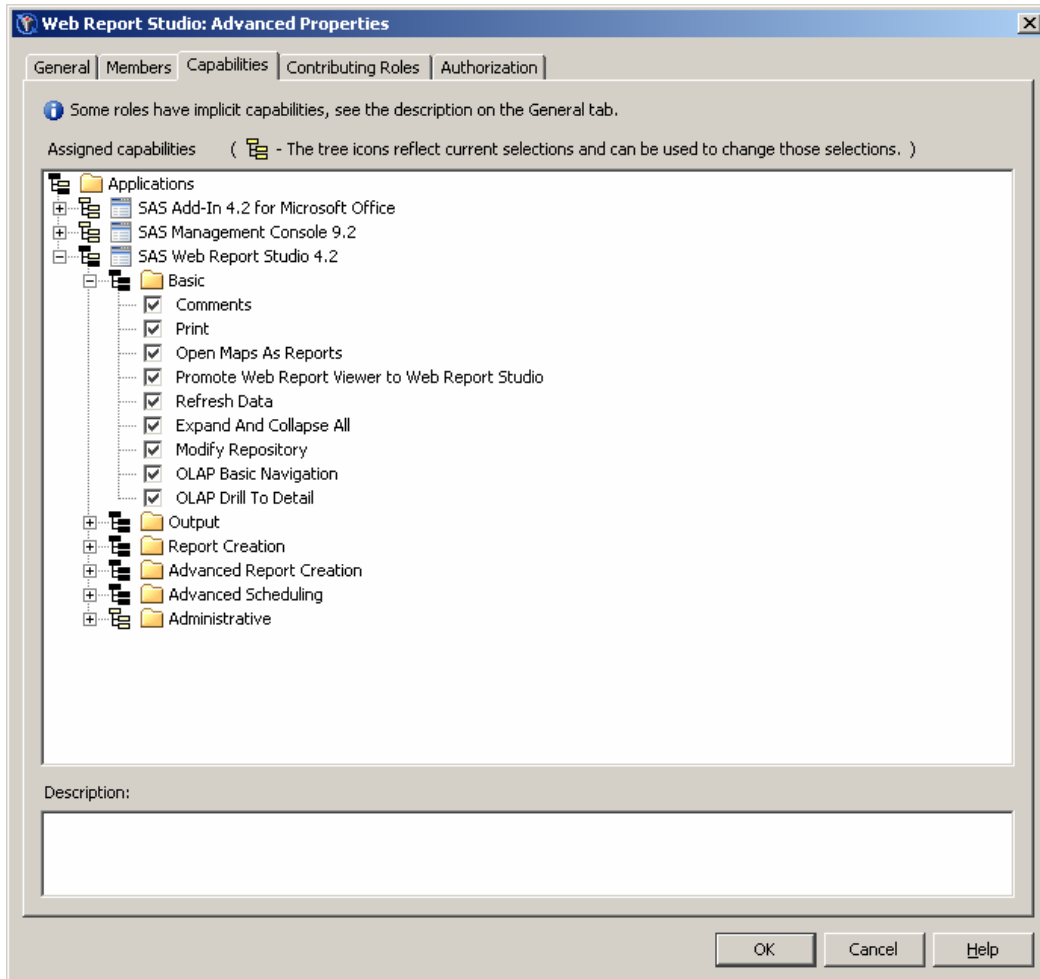


Figure 12: Advanced SAS Web Report Studio role that controls the basic functionality of users or groups.

CONCLUSION

With these new features, administrators can now control OLAP data at various levels of the SAS Intelligence Platform — at a cube level, information map level, and application level, allowing for a more flexible implementation.

RECOMMENDED READING

SAS® 9.2 Intelligence Platform: Security Administration Guide.

CONTACT INFORMATION

Your comments and questions are valued and encouraged. Contact the author at:

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