

Multiple Languages Surfaced via a Cube using SAS® 9.1 OLAP Server

INTRODUCTION

This paper explains the various steps needed to implement a cube so it can be displayed in a language specific to the users needs. There are 4 steps to implementation:

- Creating translated dimension tables
- Creating the cube
- Setting the system locale
- Displaying the cube

Each of these steps will be discussed in detail throughout this paper.

MULTIPLE LANGUAGE SUPPORT

Imagine you have 3 users - one in Paris, France, another in Tokyo, Japan and the last in New York, United States of America. How do you get the information out to these users so they will understand it – after all they all speak and read different languages?

This is where MLS (Multiple Language Support) becomes essential, enabling us to display information relevant to each user in their own language. MLS is available in 56 locales (System Locales) with English as the default. MLS can only be used for cubes that are loaded using a star schema (*SAS 9.1 OLAP Server Administrator's Guide*). A locale is set of data which is specific to language or culture. A locale based on your selection will provide Character sets for a language, sorting capabilities, numeric formatting, currency formatting, and date formatting.

ar_AE=Arabic (United Arab Emirates)	en_CB=English (Caribbean)	de_DE=German (Germany)	pt_BR=Portuguese (Brazil)
bg_BG=Bulgarian (Bulgaria)	En_IE=English (Ireland)	de_CH=German (Switzerland)	pt_PT=Portuguese (Portugal)
be_BY=Byelorussian (Belarus)	en_JM=English (Jamaica)	el_GR=Greek (Greece)	ro_RO=Romanian (Romania)
zh_CN=Chinese (China)	en_NZ=English (New Zealand)	he_IL=Hebrew (Israel)	ru_RU=Russian (Russia)
zh_HK=Chinese (HongKong)	en_ZA=English (South Africa)	hu_HU=Hungarian (Hungary)	sr_YU=Serbian (Yugoslavia)
zh_MO=Chinese (Macau)	en_GB=English (United Kingdom)	is_IS=Icelandic (Iceland)	sk_SK=Slovak (Slovakia)
zh_SG=Chinese (Singapore)	en_US=English (United States)	it_IT=Italian (Italy)	sl_SI=Slovenian (Slovenia)
zh_TW=Chinese (Taiwan)	et_EE=Estonian (Estonia)	it_CH=Italian (Switzerland)	es_MX=Spanish (Mexico)
hr_HR=Croatian (Crotia)	fi_FI=Finnish (Finland)	ja_JP=Japanese (Japan)	es_ES=Spanish (Spain)
cs_CZ=Czech (Czech Republic)	fr_BE=French (Belgium)	ko_KR=Korean (South Korea)	sv_SE=Swedish (Sweden)
da_DK=Danish (Denmark)	fr_CA=French (Canada)	lv_LV=Latvian (Lettish) (Latvia)	th_TH=Thai (Thailand)
nl_NL=Dutch (Netherlands)	fr_FR=French (France)	lt_LT=Lithuanian (Lithuania)	tr_TR=Turkish (Turkey)
en_AU=English (Australia)	fr_CH=French (Switzerland)	no_NO=Norwegian (Norway)	uk_UA=Ukrainian (Ukraine)
en_CA=English (Canada)	de_AT=German (Austria)	pl_PL=Polish (Poland)	vi_VN=Vietnamese (Vietnam)

Table 1: Language_Country Codes (*OLAP Server Administrator's Guide*)

DEMONSTRATION DATA

The data used to demonstrate the use of multiple languages is a fictitious automobile distributor, ABC Autos. ABC Autos collects various types of data:

- Automobile make and color
- Dealers and Destinations of the cars
- Dates of Distribution
- Sales and number of cars returned.

The data model (star schema) used for ABC Autos is represented in Figure 1. It has a centralized table, a fact table, that links together the other surrounding tables using dimension keys. The fact table also contains the measures that are available. The surrounding tables are the dimension tables which represent the structure of the Time, Car and Dealers dimensions. Each dimension contains a dimension key and several levels that are related to each other.

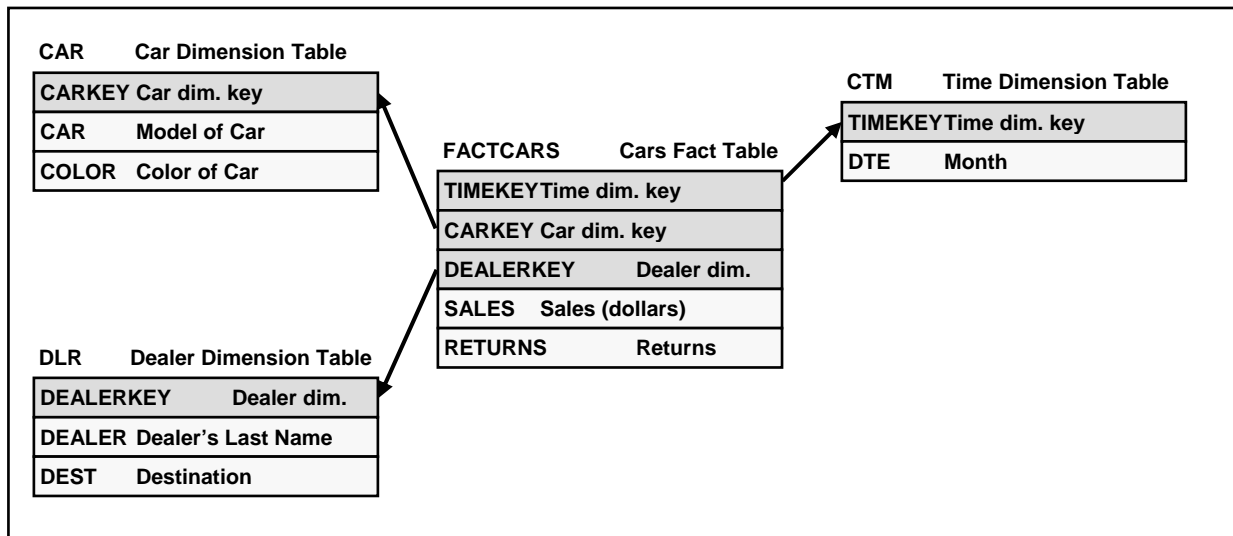


Figure 1: Diagrammatic Representation of the Data Model for ABC Autos

Please note, ABC Autos data is a simplified sample of data, however the concepts explained throughout this paper can be extrapolated to a real-life scenario.

TRANSLATED DIMENSION TABLES

To enable the use of multiple languages in a cube, you need to have translated dimension tables available for each language. The translated dimension tables (datasets) need to have the same name as the default dimension tables except the translated tables will have the identifying locale as a suffix (*OLAP Server Administrator's Guide*).

Locale	Dimension Tables		
English	CTM	CAR	DLR
French	CTMfr_FR	CARfr_FR	DLRfr_FR
Japanese	CTMja_JP	CARja_JP	DLRja_JP

Table 2: Locales and Associated Dataset Names

So for our example, you will need to have Dimension tables for English, French and Japanese. This can easily be achieved using DATA Steps. Below is an example that shows how to create the translated dimension tables for the car dimension.

French Car Dimension:

```
data cars.carfr_FR;
  set cars.car;
  if color = "Red" then color = "Rouge" ;
  if color = "Green" then color = "Verte" ;
  if color = "White" then color = "Blanche" ;
  if color = "Blue" then color = "Bleue" ;
  if color = "Black" then color = "Noire" ;
run;
```

Note the car make has not been translated as the names are the same in English and French.

Japanese Car Dimension:

```
data cars.carja_jp;
  set cars.car;

  if color = "Red" then color = "赤";
  if color = "Green" then color = "緑";
  if color = "White" then color = "白";
  if color = "Blue" then color = "青";
  if color = "Black" then color = "黒";

  if car = "Toyota" then car = "トヨタ";
  if car = "Chevy" then car = "シボレー";
  if car = "Chrysler" then car = "クライスラー";
  if car = "Ford" then car = "フォード";
run;
```

CUBE CREATION

There are two ways in which you can build a cube in SAS 9.1; either with the GUI interface, the Cube Designer Wizard which is available in SAS OLAP Cube Studio or SAS ETL Studio, or using the OLAP procedure. The translated dimension tables are read during build time and stored as locale-specific metadata which is used at query time (*OLAP Server Administrator's Guide*).

Cube Designer Wizard

If Star Schema has been selected as the input type in the "General" window, then you can select the "Advanced" button and one of the tab choices will be "Dimension Translation Tables". From the "Available Language/Locale" list box you can select the languages you require. The default language must be the first one in the list of selected languages (Figure 2).

If you are using SAS 9.1.2 or below, it is essential you check SAS Note 012323. For further steps on building a cube using the Cube Designer Wizard refer to *SAS 9.1 OLAP Server Administrator's Guide*.

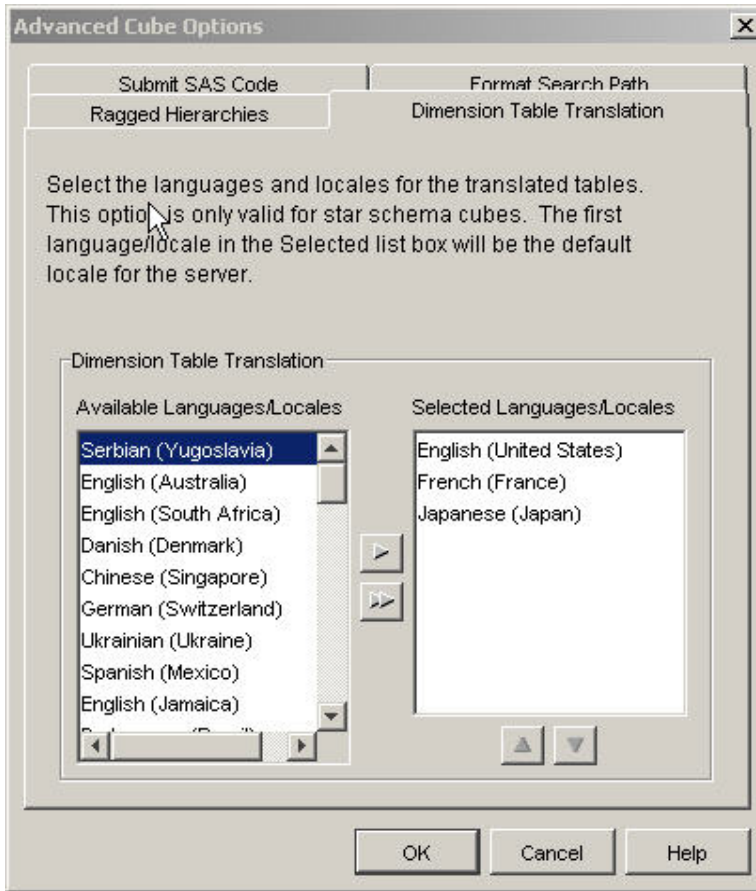


Figure 2: Dimension Table Translation Window

PROC OLAP

The locales are assigned in PROC OLAP using the USER_DEFINED_TRANSLATIONS (UDT) statement. The first locale that is listed in the statement is the default locale. If you use this statement the DIMTABLELIBREF and DIMTABLEMEMPREF options on the DIMENSION statement is also required.

An Example of PROC OLAP Syntax:

```
LIBNAME mls 'c:\sas\lev1\data\cars\data';

PROC OLAP data=mls.factcars cube=MLSCARS path=&cpath;
  METASRV host=&host port=&port protocol=&protocol userid=&userid
  pw=&pw repository=&repos olap_schema=&olap_schema;

  DIMENSION DATE hierarchies=(DATE) sort_order=ASCENDING
    dimtablelibref=mls
    dimtablemempref=ctm
    factkey=timekey
    dimkey=timekey;
  HIERARCHY DATE levels=(DTE);
  LEVEL dte;

  DIMENSION CARS hierarchies=(CARS) sort_order=ASCENDING
    dimtablelibref=mls
    dimtablemempref=car
    factkey=carkey
    dimkey=carkey;
  HIERARCHY CARS levels=(CAR COLOR);
```

```

LEVEL car;
LEVEL color;

DIMENSION DEALERS hierarchies=(DEALERS) sort_order=ASCENDING
    dimtablelibref=mls
    dimtablemempref=dlr
    factkey=dealerkey
    dimkey=dealerkey;
HIERARCHY DEALERS levels=(DEALER DEST);
LEVEL dealer;
LEVEL dest;

UDT en_US fr_FR ja_JP;

MEASURE SALES_SUM column=SALES stat=sum format=dollar15.2;
MEASURE SALES_N column=SALES stat=n format=12.0;
RUN;

```

When loading a cube into a client application, and depending on the system locale that client sends, the correct captions are displayed.

CHECKING LANGAUAGE ASSOCIATED WITH A CUBE

If you are unsure what languages are associated with a cube, you can check the underlying metadata. In the command line in, standard SAS session, issue the command METABROWSE. This will connect to the Metadata Server and display your metadata. You will need to navigate this tree structure to see the UDT tables associated with the cube by using the following path:

Cube→ Select Cube Name→ PropertySet →Languages→ SetProperties

Here will be the list of the UDT Metadata, displaying a table icon for each locale used.

SETTING THE SYSTEM LOCALE FOR CLIENT APPLICATION

The way of changing a system locale is dependent on the Operating System and the client application.

WINDOWS 2000

On Windows2000 you need to go to:

- Settings
- Control Panel
- Regional Options
- The General Tab
- Language Settings for the System (Lower Selection Box)
- Select your Groups of Languages (In our case this is Japanese and Western Europe and United States)
- Click on to the Set Default... button (Figure 2)
- Choose the Appropriate Locale (Figure 2)
- Click OK and YES to the Pop-up message boxes.

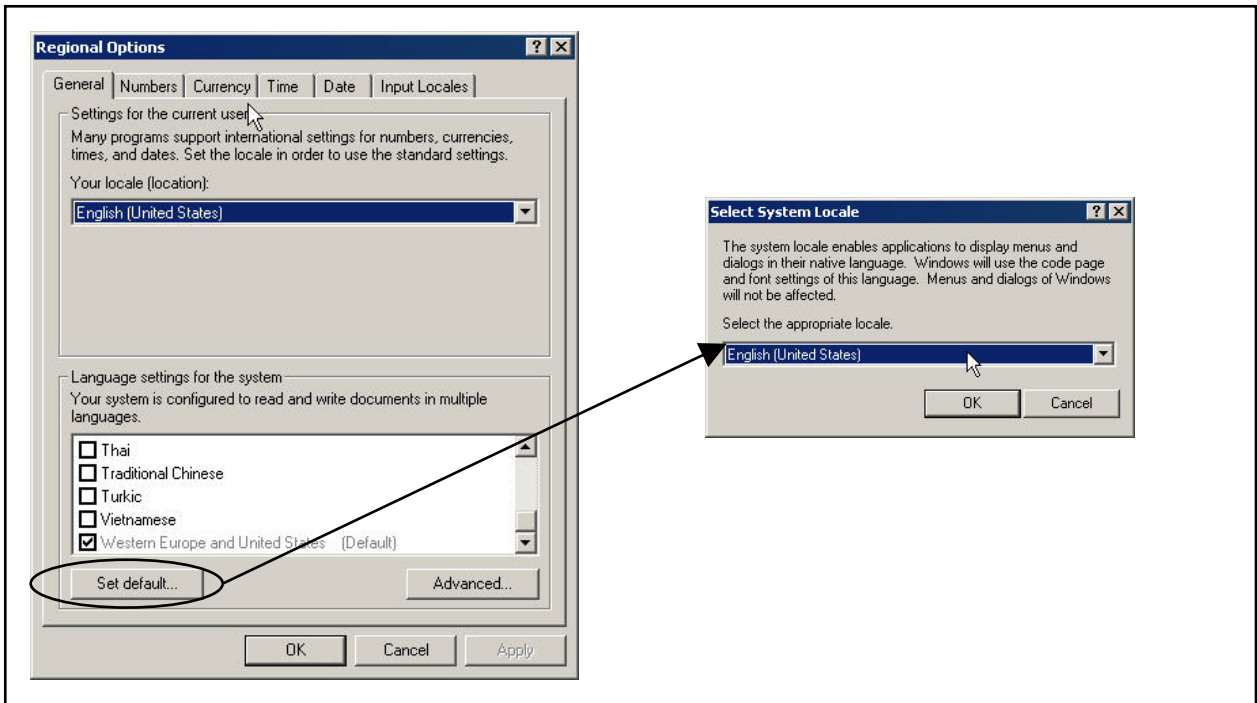


Figure 3: Setting the System Locale on Windows 2000

WINDOWS XP

On Windows XP the steps differ. They are as follows:

- Control Panel
- Regional and Language Options
- Select the Advanced Tab (Figure 4)
- Language for Non-Unicode programs
- Select a Language

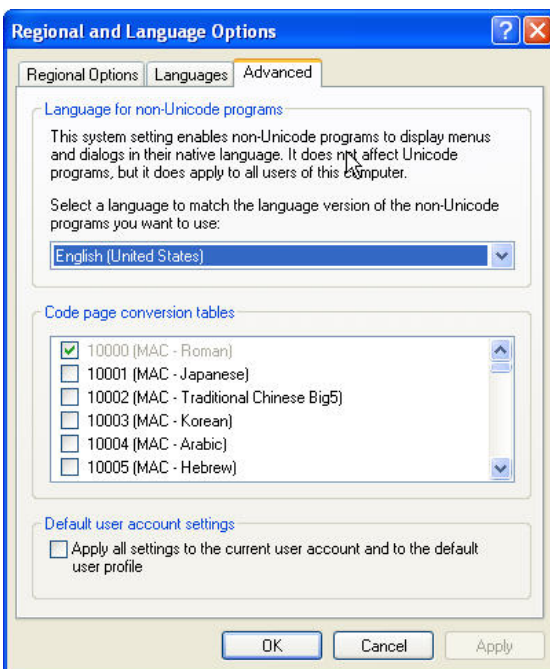


Figure 4: Setting the system locale in XP

A reboot of the computer will be required before the system local settings are correctly set.

WINDOWS-BASED APPLICATIONS

Generally Windows-based applications such as Excel and SAS® Enterprise Guide will require the locale to be changed as shown above and will require you to reboot your machine.

JAVA-BASED APPLICATIONS

For Java-based Applications such as SAS® Information Map Studio you can send another locale to the OLAP Server, overriding the system locale. This is achieved by using two system properties in the command line that starts the application. The system properties are:

-Duser.language=fr -Duser.country=FR

The advantage of Java-based applications and using these system properties is you do not have to reboot your machine.

VIEWING THE CUBE

Excel

The French locale is passed to the OLAP Server when Excel connects and once the cube is selected it is displayed in a pivot table (Figure 5).

Number of values for sales		dealer				Léorat Total *	Deschamps	Péchiné	Grand Total *
		dest							
		Alabama	Connecticut	Caroline du Nor	Caroline du Sud				
dte									
janvier				2		2	2	1	5
février			2			2	1	2	5
mars		1				1		3	4
avril					1	1		2	3
mai					1	1	2		3
Grand Total *		1	2	2	2	7	5	8	20

Figure 5: Pivot Table with French locale set

SAS® ENTERPRISE GUIDE

Enterprise Guide 3.0 (please contact your SAS representative about availability) views cubes in a GUI interface known as the OLAP Analyzer. Once the cube has been selected the locale is passed to the server, and returned is the translated table (Figure 6).

dealer	フィンチ				ジョーンズ	スミス
dest	AL	CT	NC	SC		
MeasuresLevel	salesN	salesN	salesN	salesN	salesN	salesN
dte						
1	2	.	.	2	.	1
2	2	.	2	.	1	2
3	1	1	.	.	.	3
4	1	.	.	1	.	2
5	1	.	.	1	2	.

Figure 6: OLAP table with Japanese locale set

SAS® INFORMATION MAP STUDIO

Information Map Studio 1.0 is a java-based application that creates a template for SAS® Web Report Studio and SAS® Visual Data Explorer to display. If you change the CommandLineArgs for Information Map Studio in the mapstudio.ini file to include the duser.language and the duser.country settings, the information map is

created in the language specified. This means the system locale is overridden without rebooting the computer. The disadvantage is that you will need to create an information map for each locale.

dealer	Léorat	Deschamps	Péchiné
	Number of values for sales	Number of values for sales	Number of values for sales
cte			
janvier	2	2	1
février	2	1	2
mars	1	.	3
avril	1	.	2
mai	1	2	.

Figure 7: Testing French Information Map in Information Map Studio 1.0

MDX (Multidimensional eXpressions)

MDX is a query language for multidimensional queries and a means of communication between OLE DB for OLAP providers (OLAP Server) and consumers (Clients). When using MDX in a query it looks very similar to SQL, however there are several significant differences. For some of these differences please refer to Spofford (2001) and Whitehorn et al (2003).

When the locale is set to English the MDX query that is passed to the OLAP Server by the client is:

```
SELECT {CROSSJOIN({[DEALERS].[All DEALERS].[Finch],
                  [DEALERS].[All DEALERS].[Finch].Children,
                  [DEALERS].[All DEALERS].[Jones],
                  [DEALERS].[All DEALERS].[Smith]},
                  {[Measures].[salesN]})} ON COLUMNS,
{[DATE].[All DATE].[January],
 [DATE].[All DATE].[February],
 [DATE].[All DATE].[March],
 [DATE].[All DATE].[April],
 [DATE].[All DATE].[May] } ON ROWS
FROM [mlscars]
```

For the French locale the MDX query that is passed to produce the report above for Excel is:

```
SELECT {CrossJoin({[DEALERS].[All DEALERS].[Léorat],
                  [DEALERS].[All DEALERS].[Léorat].Children,
                  [DEALERS].[All DEALERS].[Deschamps],
                  [DEALERS].[All DEALERS].[Péchiné]},
                  {[Measures].[salesN]})} ON COLUMNS,
{[DATE].[All DATE].[janvier],
 [DATE].[All DATE].[février],
 [DATE].[All DATE].[mars],
 [DATE].[All DATE].[avril],
 [DATE].[All DATE].[mai] } ON ROWS
FROM [mlscars]
```

The MDX for both locales are the same except that the member captions are the translated caption that relates to the specific system locale.

LOGGING OPTIONS

If for some reason you are do not see the correct language it is necessary to check that the correct locale is being passed to the server. To do this, the OLAP Server log requires a higher level of detail. In the OLAP Server configuration file add the parameter `iomlevel` to the `objectserverparms` statement.

```
-objectserverparms "server='SASMain - Logical OLAP Server' iomlevel=1"
```

In the OLAP Server log you need to find the line similar to the following, to identify the locale that is passed.

```
IOM CALL {compRef:6514898}->Server::CreateSession(): localeName=WLCID:1036
```

In this example, the French locale is being passed to the server. To check what codes relates to which locale refer to the following Microsoft web page:

<http://support.microsoft.com/default.aspx?scid=kb;en-us;221435>

REFERENCES

Microsoft Inc. (2001), *WD2000: Supported Language ID Reference Numbers (LCID)*,
<http://support.microsoft.com/default.aspx?scid=kb;en-us;221435>

SAS Institute Inc. (2003), *SAS 9.1 OLAP Server Administrations Guide*, CARY, NC: SAS Institute Inc.

George Spofford (2001), *MDX Solutions: With Microsoft SQL Server Analysis Services*, John Wiley and Sons

Mark Whitehorn, Mosha Pasumansky, Robert Zare (2003), *Fast Track to MDX*, Springer Verlag

RECOMMENDED READING

Matthias Ender (2004), *Taking your SAS/MDDB Applications to the Next Level, Proceedings of the twenty-ninth SAS Users Group International 029-29*

SAS Institute Inc. (2003), *SAS 9.1 MDX Users Guide*, CARY, NC: SAS Institute Inc.

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