Handling SAS@ Formats Catalogs across Versions

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Introduction

This poster discusses the problems and solutions of migrating SAS catalogs across versions. It starts with SAS v 6.12 and cover SAS v.8.1 + 8.2 and the new release SAS v 9.1. It also describes the problems with moving from a 32 bit to a 64 bit system. A summary of the enhancements in catalogs from one version to the next is displayed in chart form.

The poster describes in graphical form which catalogs can be opened and/or created with newer versions. It also describes the constraints to moving catalogs to other platforms with CPORT and CIMPORT.

Solutions are offered to the catalog dilemma. I.e. limit length of labels to the minimum backwards-compatible versions, create datasets out of format catalogs to store with the data.

The Problem

In the course of SAS upgrades, catalogs have not always kept up. Although the newer releases of SAS version 8 and up claim platform independence, there are some things to keep in mind when working with the associated catalogs.

The promise of platform independence has been met in most instances, as v8+datasets created on one platform can be accessed from another. CEDA (cross-environment data access) datasets do not need to be converted in order to be accessed. They can be transported in some instances using the Windows functionality of "click and drag" with a mouse. In general however, CPORT and CIMPORT are still the more robust methods to manipulate data files across platforms. In addition for SAS 9 there is a new MIGRATE procedure available.

In the case of format catalogs however, portability is still an issue. SAS 6.12 is of different architecture than 8 and above, and the catalogs are therefore read-only access. 64 bit systems cannot read 32 bit catalogs, and vise-versa, without some sort of conversion. This is especially confusing as SAS 8 and SAS 9 catalogs in 32 and 64 bits share the same extension naming convention. SAS institute provides a sample utility program on their website to identify the version, platform and whether the file is 32 or 64 bit. Or you can use the Unix file command against the main SAS executable !SASROOT.sas to determine type of installation.[1]

The table below demonstrates read-write access issues between SAS versions of the format catalogs. These issues do have work-arounds as described in the solutions section.

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[1] SN-004421

Catalog to open	SAS CATALOG READABILITY BETWEEN VERSIONS				
	SAS 6.12	SAS 8.1	SAS 8.2 32 bit	SAS 8.2 64 bit	SAS 9.1 64 bit
SAS 6.12	Read, Write, CPORT, CIMPORT	Read only	Read, Write using PROC FORMAT only	No access	MIGRATE
SAS 8.1		Read, Write, CPORT, CIMPORT	Read, Write, CPORT, CIMPORT	No access	MIGRATE
SAS 8.2 32 bit			Read, Write, CPORT, IMPORT	No access	MIGRATE
SAS 8.2 64 bit				Read, Write, CPORT, CIMPORT	Read, Write, CPORT, CIMPORT, MIGRATE
SAS 9.1 64 bit					Read, Write, CPORT, CIMPORT MIGRATE

	Highlights of New Features from Previous Versions
SAS 6.12	Format names max 8 for numeric, 7 for character Character format length max is 40
SAS 8.1	Fixed CPORT issue with version 8.0 Increased variable label length to max 256 char New DTDATE*w.* format produces the same output as DATE*w.*, but accepts a datetime value as input. Character format length max is 32,767
SAS 8.2	Fix to writing formats to legacy 6.12 version, use PROC FORMAT.
SAS 9.1	New Words22. format converts numeric values to their equivalent in words i.e. 692 = six hundred ninety-two New PROC MIGRATE procedure to streamline process of moving data from prior versions directly to SAS 9.1, 8.2 and between 32 bit and 64 bit operating systems (2 step process for the latter) Longer Format names, 31 char for Character, 32 for Numeric formats

The solution

In most instances, transport files are forward compatible with later versions of SAS. Therefore one solution is to use CPORT/CIMPORT to move files. SAS 6.12 catalogs and earlier offer special problems, as they can only be placed into transport files using SAS v 6 engine. Therefore if you no longer have a SAS v6 license you will have trouble moving these catalogs. They can still be accessed seamlessly using SAS 8.1 and above, they are read-only. Possible solutions are:

- Create transport files using SAS v6 engine and keep with the data
- Update the datasets to SAS 8 and above using CPORT/CIMPORT
- Create datasets out of the SAS catalogs and store with the data
- Migrate the data to the latest SAS version using PROC MIGRATE

The first solution requires keeping transport files in legacy versions of the data for v 6 and earlier. Should changes need to be made to the catalog, these cannot be packed up again in transport files with later SAS versions. New formats can be added by using creating new catalogs and using the FMTSEARCH option as a work-around.

The second solution between v 6, v 8 and between newer versions can be programmed as follows:

```
LIBNAME libref v6 'some_v6_library' ;
FILENAME fileref 'some_transp_file_name';
PROC CPORT CATALOG = libref.catalog_name FILE=fileref;
RUN;
```

Then:

```
PROC CIMPORT CATALOG = libref.catalog_name  INFILE = fileref ;
RUN;
```

Note that catalog_name is usually FORMATS.

The third solution is a very viable and good practice. By transforming the formats catalog into a dataset, you can now experience the same issues and solutions that you would with the associated datasets. Below is the code for this conversion:
        Note that catalog_name is usually FORMATS.

```
      /* creates dataset named formats from format catalog long  */
      PROC FORMAT  LIBRARY =data.long  CNTLOUT = library.formats_data;
      RUN;
```

```
NOTE: The data set LIBRARY.FORMATS_DATA has 146 observations and 21 variables.
```

```
      /* creates library named formats from dataset */
      PROC FORMAT CNTLIN =library.formats_data  LIBRARY = library.formats;
      RUN;
```

```
NOTE: Format LABID has been written to LIBRARY.FORMATS.
NOTE: Format $AEACTIP has been written to LIBRARY.FORMATS.
NOTE: Format $AEINT has been written to LIBRARY.FORMATS. ⊤..

NOTE: There were 146 observations read from the data set LIBRARY.FORMATS_DATA.
```

The fourth solution is a new procedure, PROC MIGRATE, introduced in SAS version 9 .
This procedure migrates the data from one operating system to another. Complete libnames
need to be defined with platform specific details. The procedure is new in SAS 9.1 and
migrates entire libraries from older versions directly to SAS 9.1 It also migrates data from
32 bit to 64 bit systems. Note that it only migrates entire libraries, not individual datasets or
files. Migration needs only to be done once per SAS upgrade. SAS has a website to help
with this process by offering a MIGRATION CALCULATOR at:
http://support.sas.com/rnd/migration/planning/files/migratecalc/
And http://support.sas.com/rnd/migration/resources/procmigrate/index.html

The basic syntax is as follows [2]:

```
      PROC MIGRATE IN= source_libref  OUT= target_libref
      <BUFSIZE=bufsize >
      <MOVE> <KEEPNODUPKEY>
      <SLIBREF=remote-libref-for32-bit migration>;
      RUN;
```

And for 32 to 64 bit conversion first you need access to a version 8 32 bit server and RLS
from SAS/SHARE or SAS/CONNECT. Your target server must be running SAS 9 in 64-
bit version.
Define the libname mycats server to the version 8 32 bit server below, and use option
SLIBREF:

```
      LIBNAME mycats SERVER=share1;
      PROC MIGRATE IN=source  OUT=TARGET
        SLIBREF=mycats;
      RUN;
```

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[2] Paper 288-8.3

Conclusion

In summary, do not assume that FORMAT catalogs will have the same portability as the associated datasets. Due to new architecture of the catalogs across versions, issues need to be resolved to keep legacy data in usable form. This author recommends always creating datasets out of the format catalogs and storing them with the data in the same library. In addition, when migrating to SAS 9.1 directly, use the functionality of the new procedure PROC MIGRATE whenever possible.

References

SAS® Institute Notes on line at http://support.sas.com/techsup/intro.html

SN-003323 Version 6 and Version 8 format catalog compatibility
SN-004350 The V6 LIBNAME does not exist in 64-bit 8.2 SAS
SN-004421 How to determine if a UNIX SAS install is 32-bit or 64-bit
TS-660 "I have the 64 bit Implementation of the SAS system, Release 8.2
        Installed , what do I need to know?"
Paper 288-28.3 Proc Migrate: How to Migrate Your Data and Know You've
        Done It Right!, Olson, Diane and Wiehle, David, SAS Institute, Cary ,
        NC

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