

Metadata reporting with SAS[®] software

Paul Homes
TekEds.com

Abstract

This presentation will provide a brief overview of metadata reporting using PROC METADATA including a discussion of practical business applications.

With a knowledge of this powerful procedure you can start answering questions such as

- “Which DI Studio jobs do I need to re-deploy for scheduling?”
- “Who has what checked-out at the moment?”
- “How do my development and test repositories differ and what jobs might I need to promote?”

Wrap these up in stored processes and publish via email or on the intranet.

What is metadata?

- “data about data”
- Information about your environment, data sources and processes
- Servers, Hosts, Ports, Directories, Files, Users, Email, Tables, Columns, Files, Jobs, Dimensions, Hierarchies, Schedules etc.
- Heart of the SAS Enterprise Intelligence Platform
- Metadata Server and client applications

“Tip of the Iceberg”

SAS Data Integration Studio

SAS Management Console

SAS OLAP Cube Studio

SAS Open Metadata Interface

SAS Metadata Server

SAS Metadata Model

“Hidden Depths”

Do you ever need to ...

- Find updated Jobs that need to be re-deployed for scheduling
- List all currently checked-out items and who has them locked
- View a chronological history of all check-ins and comments
- Compare Lev3 and Lev2 to see what Jobs need to be promoted
- Check for Jobs that have never been deployed
- Verify all deployed Jobs are in a Job Flow
- Report on Access Control Entries and objects
- Report on Access Control Templates and usage

Down to details ...

- SAS Metadata Model
- SAS Open Metadata Interface
- PROC METADATA
- XML
- SAS XML Libname Engine (SXLE)
- XPath

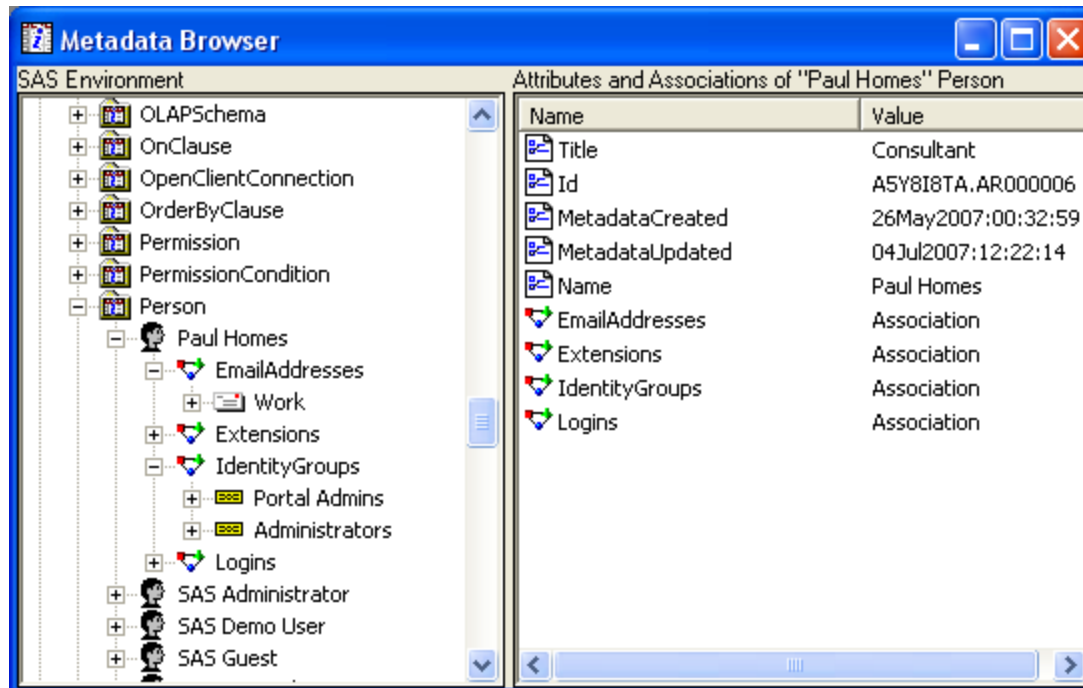
- ... a huge amount of documentation is available

SAS Metadata Model

- SAS OnlineDoc®: SAS Open Metadata Architecture, SAS Open Metadata Interface: Reference, SAS Metadata Model
- Object Types: e.g.
 - Person, IdentityGroup
 - SASLibrary, PhysicalTable, Column
 - Job, JFJob
- Object Attributes: e.g.
 - Id, Name, Desc, Libref,
- Object Associations: e.g.
 - EmailAddresses, IdentityGroups, Columns,

Metadata Browser

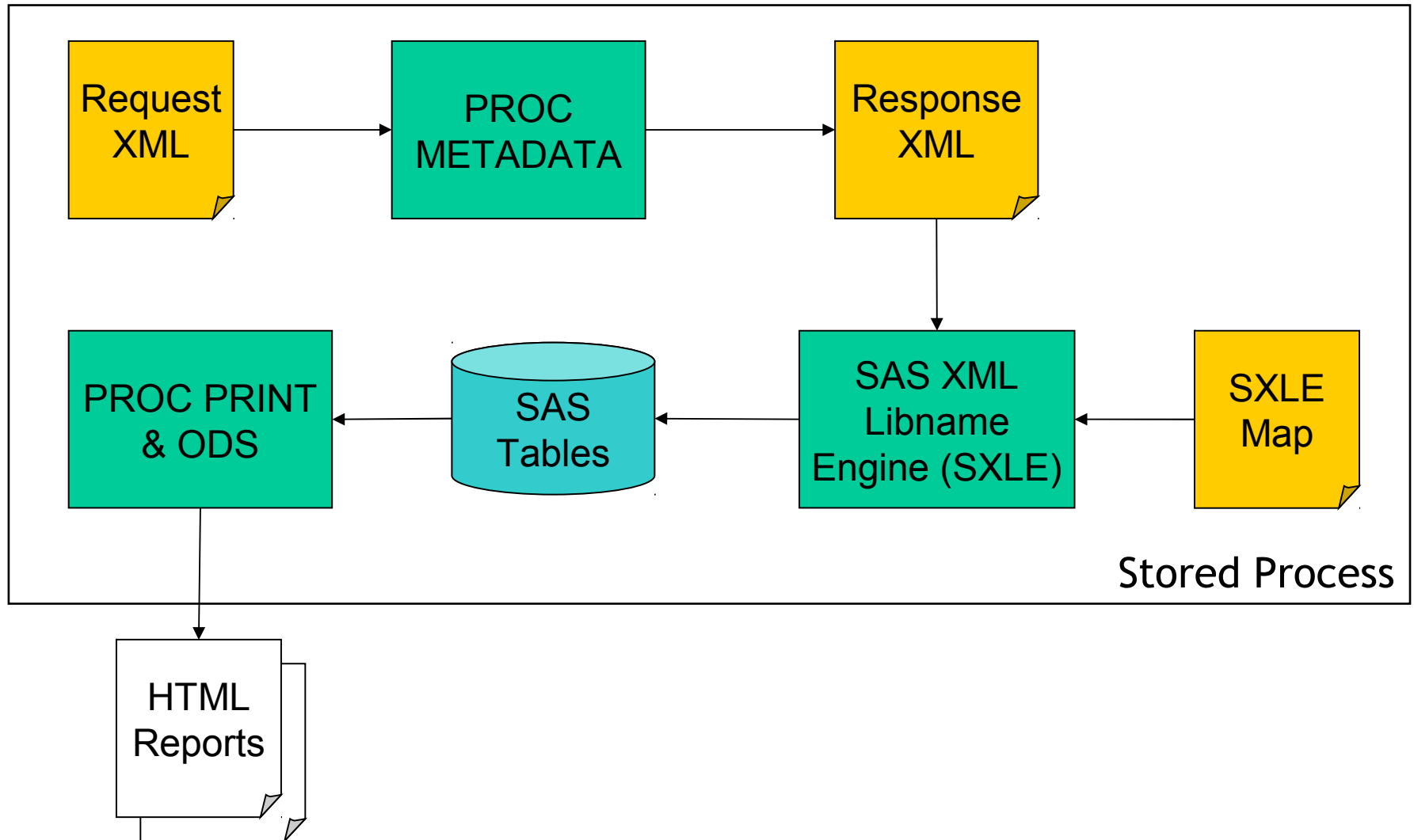
- An essential tool for metadata exploration ...



PROC METADATA

- Execute SAS Open Metadata Interface methods from Base SAS:
 - AddMetadata
 - DeleteMetadata
 - GetMetadata
 - GetMetadataObjects
 - GetRepositories
 - GetTypes
 - UpdateMetadata
- Avoid Add/Delete/Update

PROC METADATA



Metadata Connection Details

```
* set options for the metadata connection;
```

```
options
```

```
  metaserver="metadata-server-hostname"
```

```
  metaport=8561
```

```
  metauser="userid"
```

```
  metapass="password"
```

```
  metarepository="Foundation"
```

```
;
```

Build the XML Request

```
* use a temporary fileref to hold the request;
filename request temp;

* use a data step to create the XML request;
data _null_;
file request;
put '<GetMetadataObjects>';
put '    <Reposid>$METAREPOSITORY</Reposid>';
put '    <Type>Person</Type>';
put '    <Objects/>';
put '    <NS>SAS</NS>';
* Flags: + OMI_GET_METADATA(256) + OMI_XMLSELECT(128) +
OMI_TEMPLATE(4) = 388;
put '    <Flags>388</Flags>';
...
```

Build the XML Request (continued)

```
...
put '    <Options>';
put '        <XMLSelect search=""Person[@Name =: 'Paul']""/>";
put '    <Templates>';
put '        <Person Id="" Name="" Title="">';
put '            <EmailAddresses />';
put '        </Person>';
put '            <Email Address="" />';
put '        </Templates>';
put '    </Options>';
put '</GetMetadataObjects>';
run;
```

XML SELECT

- Like WHERE for PROC METADATA
- Examples...
 - Persons whose name starts with Paul:
 - Person[@Name =: 'Paul']
 - Groups with members whose name starts with SAS:
 - IdentityGroup[MemberIdentities/Person[@Name =: 'SAS']]

OMI Flags

- Request Options
 - OMI_GET_METADATA(256)
 - OMI_XMLSELECT(128)
 - OMI_TEMPLATE(4)
 - OMI_DEPENDENCY_USES(8192)

Execute PROC METADATA

```
* use a temporary fileref to hold the response;  
filename response temp;
```

```
proc metadata in=request out=response;  
run;
```

```
* release the temporary request;  
filename request;
```

```
* write the response to the log for debugging;  
data _null_;  
infile response lrecl=1048576;  
input;  
put _infile_;  
run;
```


Review XML Response

```
<GetMetadataObjects>
  <Reposid>A0000001.A5Y8I8TA</Reposid>
  <Type>Person</Type>
  <Objects>
    <Person Id="A5Y8I8TA.AR000006" Name="Paul Homes"
Title="Consultant">
      <EmailAddresses>
        <Email Id="A5Y8I8TA.BT000001" Address="paul@example.com"/>
      </EmailAddresses>
    </Person>
  </Objects>
  <!-- original request deleted -->
</GetMetadataObjects>
```

Build SXLE MAP

```
filename sxlemap temp;

data _null_;
file sxlemap;
put '<SXLEMAP version="1.2" name="Persons">';
put '<TABLE name="Persons">';
put '<TABLE-PATH syntax="XPath">//Objects/Person</TABLE-PATH>';
put '<COLUMN name="PersonId">';
put '<PATH syntax="XPath">//Objects/Person/@Id</PATH>';
...
put '<COLUMN name="PersonName">';
put '<PATH syntax="XPath">//Objects/Person/@Name</PATH>';
...
put '<COLUMN name="PersonTitle">';
put '<PATH syntax="XPath">//Objects/Person/@Title</PATH>';
...
put '<COLUMN name="PersonEmailAddress">';
put '<PATH syntax="XPath">
    //Objects/Person/EmailAddresses/Email@Address</PATH>';
...
```

Use SXLE to Generate Report

```
* assign the SXLE library using the XML response and the SXLE map;  
libname resplib xml xmlfileref=response xmlmap=sxlemap;
```

```
* generate a simple report;  
proc print data=resplib.Persons;  
run;
```

```
* clear the SXLE library;  
libname resplib;
```

```
* release the temporary SXLE map;  
filename sxlemap;
```

```
* release the temporary response;  
filename response;
```

SAS Output - Windows Internet Explorer

Metadata Objects that are currently Checked-Out / Locked

Obs	Object Type	Object Id	Object Name	Locked By Name
1	Job	A3S4PJCX.BV000Q8H	TestJob	Paul Homes
2	Property	A3S4PJCX.AI0030SQ	MACROS	Paul Homes
3	Property	A3S4PJCX.AI0030SR	ModifiedByProduct	Paul Homes
4	Property	A3S4PJCX.AI0030SS	DISVersion	Paul Homes
5	PropertySet	A3S4PJCX.AN001TL5	OPTIONS	Paul Homes
6	PropertySet	A3S4PJCX.AN001TL6	ModifiedByProductPropertySet	Paul Homes

SAS Output - Windows Internet Explorer

SAS Metadata Change Log

Obs	Date/Time	Person	Summary	Description
1	16SEP07:13:19:44	Paul Homes	Updated extract job to make use of new formats	
2	15SEP07:10:39:20	Paul Homes	Added new profit calculation rules	

SAS Output - Windows Internet Explorer

SAS Metadata Change Details

Obs	ObjectUpdated	PersonName	ObjectName	ObjectDesc
1	16SEP07:10:39:20	Paul Homes	Added new profit calculation rules	

Associated Jobs

Obs	Job Name
1	PROFIT_CALC

Associated Physical Tables

Obs	SAS Library Name	SAS Libref	SAS Table Name	SAS Table Name
1	Data Mart Library	DATAMART	PROFIT	PROFIT

SAS Output - Windows Internet Explorer

SAS DI Studio Jobs that need to be Redeployed

Obs	Deployed Job Name	Deployed Job Id	Associated Job Id	Associated Job Update Timestamp	Associated Source Code Update Timestamp	Checked Out To Person
1	TestJob	A3S4PJCX.AL0008HL	A3S4PJCX.BV000Q8H	15SEP07:16:05:37	15SEP07:16:04:56	
1	TestJob2	A3S4PJCX.AL0008GJ	A3S4PJCX.BV000Q9F	16SEP07:15:02:24	16SEP07:15:01:12	Paul Homes

SAS Output - Windows Internet Explorer

Promotable SAS DI Studio Jobs
 Source: Lev3 (9 Jobs)
 Target: Lev2 (9 Jobs)

Obs	Action	Job Path (Source)	Job Path (Target)	Job Updated (Source)	Job Updated (Target)	J
1	Source Job Deleted - Remove from Target		/Development/Deleted Test Job	.	04JUL07:09:56:51	
2	New Source Job - Promote to Target	/Development/New Test Job		04JUL07:09:55:24	.	A
3	Updated Source Job - Promote to Target	/Development/Updated Test Job (Source)	/Development/Updated Test Job (Source)	04JUL07:09:58:34	04JUL07:09:57:29	A
4	Updated Target Job - Investigate!	/Development/Updated Test Job (Target)	/Development/Updated Test Job (Target)	04JUL07:09:58:50	04JUL07:09:59:25	A
5	(No Change)	/Development/TestJobU	/Development/TestJobU	25APR07:12:28:16	25APR07:12:28:16	A
6	(No Change)	/Development/TestJobV	/Development/TestJobV	10MAY07:15:00:36	10MAY07:15:00:36	A
7	(No Change)	/Development/TestJobW	/Development/TestJobW	27APR07:16:27:11	27APR07:16:27:11	A
8	(No Change)	/Development/TestJobX	/Development/TestJobX	25APR07:12:28:16	25APR07:12:28:16	A
9	(No Change)	/Development/TestJobY	/Development/TestJobY	25APR07:12:28:16	25APR07:12:28:16	A
10	(No Change)	/Development/TestJobZ	/Development/TestJobZ	25APR07:12:28:16	25APR07:12:28:16	A

What else?

- METABROWSE
 - Unhide All
 - Find...
- SAS Management Console
 - Tools > Metadata Utility
- SAS Data Integration Studio
 - Advanced Tab
- Data step metadata_* functions

Summary

- SAS Metadata Model is rich with detail
 - a great deal of information is available
- SAS Metadata Server and APIs are open
 - Base SAS interfaces as well as Java etc.
- Custom metadata reporting
 - Take advantage of SAS information delivery platform you have
 - Add value to SAS client applications

Questions?