Kaiser Permanente

SAS Business Intelligence Operations Guide

Northern California Revenue Cycle

Finance and Reporting
2/12/2014

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Folder conventions

Compute Server

SAS Administration set up the NCAL Revenue Cycle Folder on the Compute Server at:

/apps/sas/datasets/data26/NCREVCYC

From here, NCREVCYC sub-folders can be created. The current sub-folder structure is:

- code – all shared code is placed here
- data – all shared data are placed here
- fmtlib – all shared formats are to be placed here
- jobflow – all deployed jobs (i.e. batch jobs) are written here
- maclib – all shared macros are placed here
- templates – all shared templates are placed here

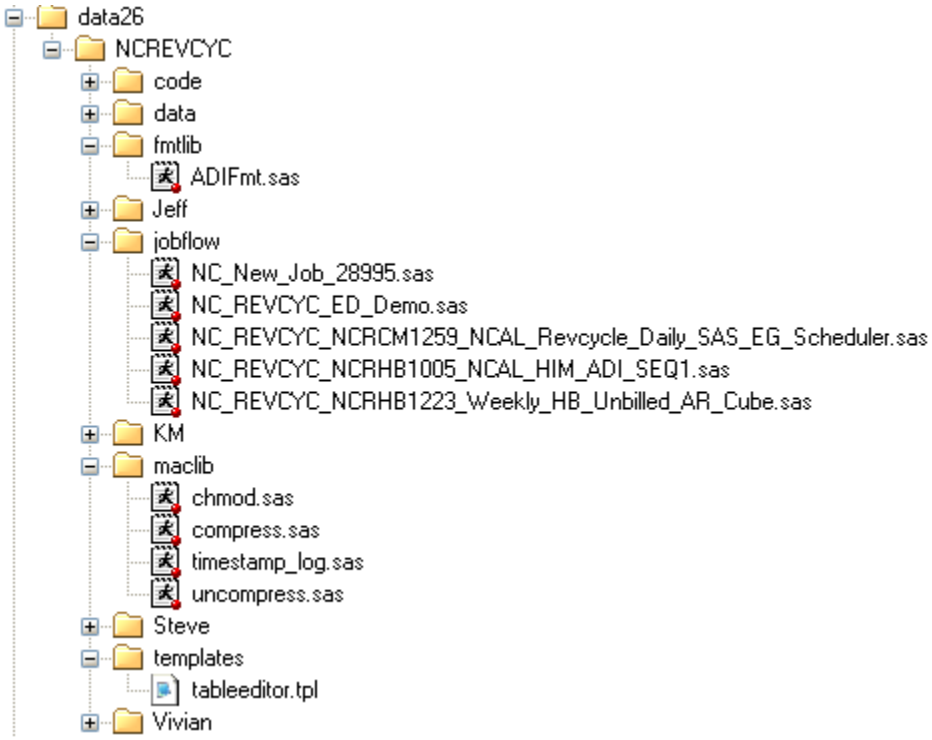


Figure 1: NCAL Revenue Cycle Folder Structure

In addition, user sub-folders exist for development work (e.g. Jeff, Vivian, KM, Steve)

The “code” subfolder is further divided into:

- NUID – to store password information (see section Passwords).
- Examples_Projects –example code, including:
    - Art_Carpenter_PROC_REPORT_Examples – all of the example code from Art Carpenter’s PROC REPORT book
    - Renu_Gehring_IM_WEB_Examples – all the example code from Renu Gehring’s book “SAS Business Intelligence for the Health Care Industry”
    - insert_into_ushare.egp – inserting rows into a ushare table
- Report_Requests – Any one-time work that is associated with a report request. For example:
    - 769 – All the code associated with the Unbilled AR Reconciliation work
- Report Products Folders – Here we make a distinction from the work in the “Report_Request” folder. This is for work that is wide in scope or is scheduled in batch. For example:
    - HIM_ADI – all the work involved in producing the HIM 1005 and 1118 reports
- StoredProcessCode – used for stored process code (TBD).

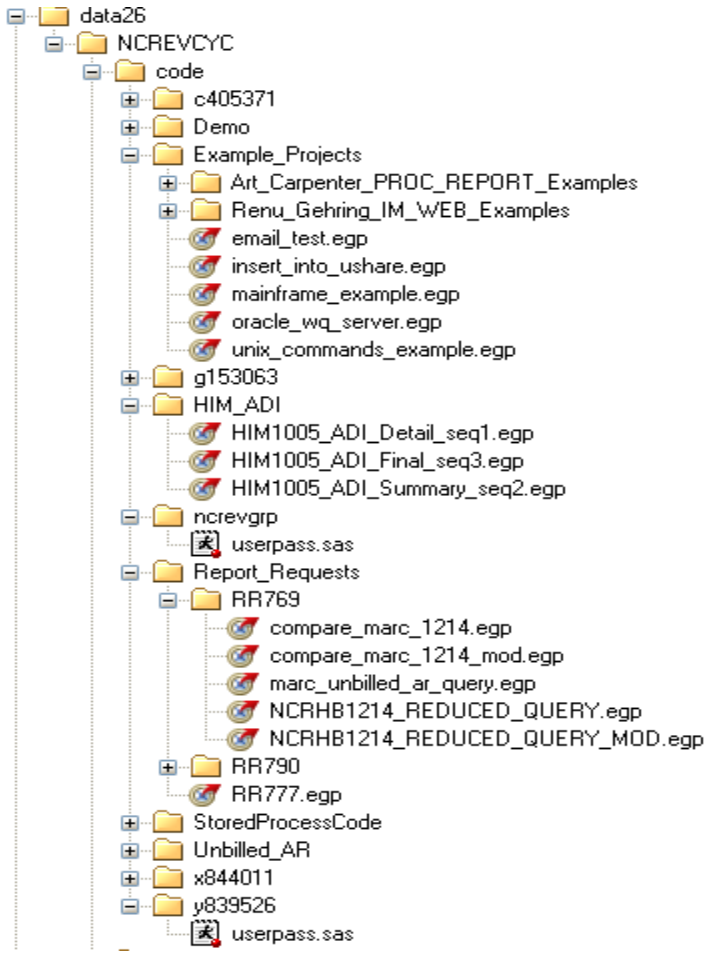


Figure 2: Code Subfolders.

When possible, the "data" sub-folder structure should match the "code" sub-folder structure. For example, "../data/Report_Requests/RR769" corresponds to "../code/Report_Requests/RR769".

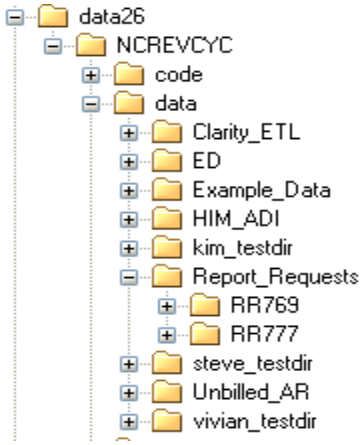


Figure 3: Data Subfolders.

Metadata Server

The folder structure on the Metadata Server is set up by SAS administration. The Metadata Server folders are accessible from user client applications: Data Integration Studio, Information Map Studio, Web Report Studio, and the SAS Add-In for Microsoft Office. Data from the Compute Server are not available by default and need to be mapped with a metadata library (see section SAS BI Application Data). The NCREVCYC folder structure on the Metadata Server is shown below:

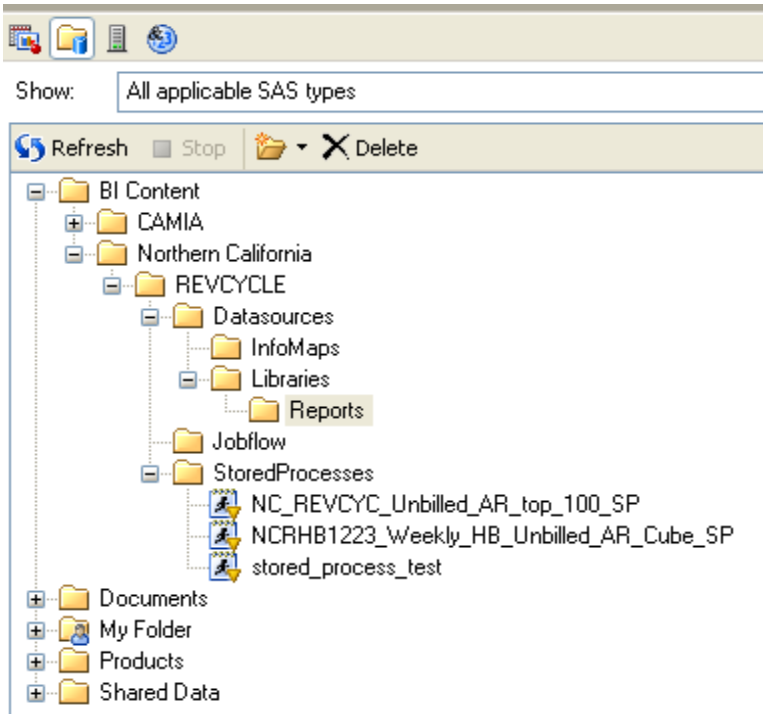


Figure 4: Metadata Server Folder Structure

File Permissions

Overview

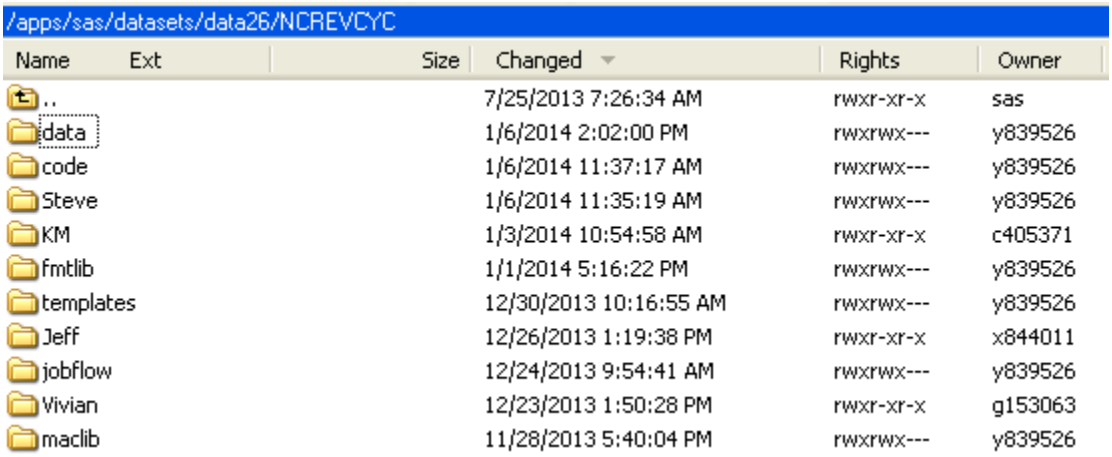
File creation on the Compute Server is subject to the Unix O/S file permissions model. There are three permissions for Unix files:

- Read
- Write
- Execute

These permissions are maintained for three classes of users:

- User – the owner (i.e. creator) of the file or folder/directory
- Group – an administered group of Unix users. For example, "ncrevcyc" is the group that includes the NCAL Revenue Cycle F&R report developers.
- World – any user account on the Compute Server

Examining the folders of "/app/sas/datasets/data26/NCREVCYC" (with WinSCP), the file permissions of the folders are shown under the "Rights" column.



Name	Ext	Size	Changed	Rights	Owner
..			7/25/2013 7:26:34 AM	rwxr-xr-x	sas
data			1/6/2014 2:02:00 PM	rwxrwx---	y839526
code			1/6/2014 11:37:17 AM	rwxrwx---	y839526
Steve			1/6/2014 11:35:19 AM	rwxrwx---	y839526
KM			1/3/2014 10:54:58 AM	rwxr-xr-x	c405371
fmtlib			1/1/2014 5:16:22 PM	rwxrwx---	y839526
templates			12/30/2013 10:16:55 AM	rwxrwx---	y839526
Jeff			12/26/2013 1:19:38 PM	rwxr-xr-x	x844011
jobflow			12/24/2013 9:54:41 AM	rwxrwx---	y839526
Vivian			12/23/2013 1:50:28 PM	rwxr-xr-x	g153063
maclib			11/28/2013 5:40:04 PM	rwxrwx---	y839526

Figure 5: File Permissions of NCREVCYC Folders.

The first through third characters are "rwx" indicating the owner/creator has read, write and execute permissions for the folder. The fourth through sixth characters are "rwx" indicating the group "ncrevcyc" has write, read, and execute permissions. The seventh through ninth characters are "---" indicating the world class of users does NOT have any permissions (note: "-" indicates the corresponding permission is missing).

As shown in Figure 6, the same information is presented differently when viewed from Putty. Here, there are 10 characters. The first character indicates whether this is a folder/directory "d", or a file "-". File permissions are displayed with the 2nd through the 10th characters. The fifth column displays the group.

```
$ ls -las
total 28
   4 drwxrwx---   12 sas      ncrevcyc       4096 Dec 30 08:30 .
   0 drwxr-xr-x    3 sas      sas             256 Jul 25 07:26 ..
   0 drwxr-xr-x    2 x844011  ncrevcyc        256 Dec 26 13:19 Jeff
   4 drwxr-xr-x    2 c405371  ncrevcyc       4096 Jan  3 10:54 KM
   4 drwxrwx---    3 y839526  ncrevcyc       4096 Jan  6 11:35 Steve
   4 drwxr-xr-x    3 g153063  ncrevcyc       4096 Dec 23 13:50 Vivian
   4 drwxrwx---   13 y839526  ncrevcyc       4096 Jan  6 11:37 code
   4 drwxrwx---   11 y839526  ncrevcyc       4096 Jan  6 14:02 data
   0 drwxrwx---    2 y839526  ncrevcyc        256 Jan  1 17:16 fmtlib
   4 drwxrwx---    2 y839526  ncrevcyc       4096 Dec 24 09:54 jobflow
   0 drwxrwx---    2 y839526  ncrevcyc        256 Nov 28 17:40 maclib
   0 drwxrwx---    2 y839526  ncrevcyc        256 Dec 30 10:16 templates
$
```

Figure 6: File permissions of NCREVCYC folders on O/S.

Folder Creation

When a folder is created, group write privileges are not given by default. For example, in Figure 6, the "Jeff" folder/directory was created by NUID x844011 and does not have write permissions for the group. This prevents other users within the group from writing files into the "Jeff" folder.

If files in a folder are to be edited among all users in the group, then group write permissions must be set after folder/file creation. This is especially necessary for scheduled jobs running under the ID "ncrevgrp". Scheduled jobs will fail if "ncrevgrp" cannot write to the folder/file. Permissions problems may result in the following log error:

```
ERROR: User does not have appropriate authorization level for library HIM_ADI.
```

Group write permissions can be set manually, from a Putty[1] prompt, with the command:

chmod g+w [folder/file name]

Alternatively, the "%chmod"[2] macro can be used within SAS code.

Although file creation from the SAS EG Windows Client can include spaces in names, Unix does not recognized spaces in file names. A space in a file name will cause failures when a SAS job is run in batch on Unix. As a general practice, do not include spaces in file names.

[1] See section Putty for information on the Putty application.
[2] See section Macro Library for information on the %chmod macro.

Permissions for World User Class

World user class permissions should be turned off for all folders/files. This will prevent users not in the "ncrevcyc" group from accessing information. These permissions can be turned off manually, from Putty, with:

chmod o-r *

chmod o-x *

A switch to the chmod command, "-R", can be used to recursively set permissions (i.e. apply to all sub-folders). E.g. chmod –R o-x. The %chmod macro can also be used within SAS code. Note:

- "o" refers to world.
- By default, write permissions are not given for the "world" class on file creation.

CHOWN

CHOWN is a Unix command for changing the owner of a file. This may be necessary when an employee leaves F&R. The root user (i.e. administrator) is required to execute the CHOWN command. Contact the SAS administrators if this is needed.

Passwords

Overview

A mechanism is needed to protect database access passwords within shared SAS code. For example, when accessing Clarity as a SAS dataset:

```
libname ushare teradata db=hcclnc_ushare tdpid=tdp1 user=y839526 password=xxxxxx;
```

Passwords should not be accessible by others in the group and should not appear in log files.

Setting up Password Files

Under "../NCREVCYC/code", NUID named folders are created for all users. For example, the folder for user y839526 would be "../NCREVCYC/code/y839526". Within that folder, the userpass.sas SAS file is created. Passwords are stored in userpass.sas, and the file should have permissions set to be readable only by the user (i.e. group read is taken away).

The file contains definitions for user ids and passwords.

```
/* NCAL Clarity Production */

%let CLR_NC_USERID = y839526;
%let CLR_NC_PW = xxxxxxxxx;

/* NCAL Mainframe Production */

%let MF_USERID = y839526;
%let MF_PW = xxxxxxxx;
```

Within shared SAS code, the password file is accessed with:

```
%include "/apps/sas/datasets/data26/NCREVCYC/code/&sysuserid/userpass.sas";
```

The macro variable &sysuserid resolves to the user id (NUID) of the user account running the shared code.

Password File for ncrevgrp

Executing scheduled batch jobs present a challenge for database access. A special user id, "ncrevgrp" (also a member of the "ncrevcyc" group) was created by SAS administration for batch jobs. Since "ncrevgrp" does not possess database accounts, a solution was require to allow database access in batch mode.

- The folder " ../NCREVCYC/code/ncrevgrp" was created for this special "batch" user.
- PROC PWENCODE was used to encode the password for g153063.
- The userpass.sas for g153063 was copied into the "../NCREVCYC/code/ncrevgrp" folder.

F&R is not allowed to have the Unix password for the "ncrevgrp" id. Therefore, any Unix command work (e.g. folder creation, setting permissions) that needs to be performed under the context of the "ncrevgrp" user account has to be done within a job running in batch mode. The flow,

NC_REVCYC_DAILY_ADMIN_JOBFLOW, which runs every night at 9PM is used for “ncrevgrp” administration (see section Scheduled Flows).

PROC PWENCODE

PROC PWENCODE allows the encoding of a password. For example:

```
proc pwencode in='xxxxxxxx' method=sas002; run;
```

where xxxxxxxx is the password to encode. The encoded password will appear in the log. The encoded password can be used in place of your database password. For example:

```
%let CLR_NC_USERID = y839526;
%let CLR_NC_PW = "{sas002}A8D5DB38101FD0D551B14E2A57B7CF66";
```

This is NOT encryption. Although the encoding hides the underlying password, the encoded password can be used by others for access within SAS. Make sure encoded passwords stay out of log files.

Scheduling

Batch Scheduling of SAS Jobs

Batch scheduling of SAS jobs in the SAS BI environment is performed with Data Integration Studio. SAS jobs are scheduled on the Compute Server.

New jobs are created under the “Jobflow” folder. Job names are required to start with “NC_REVCYC”.

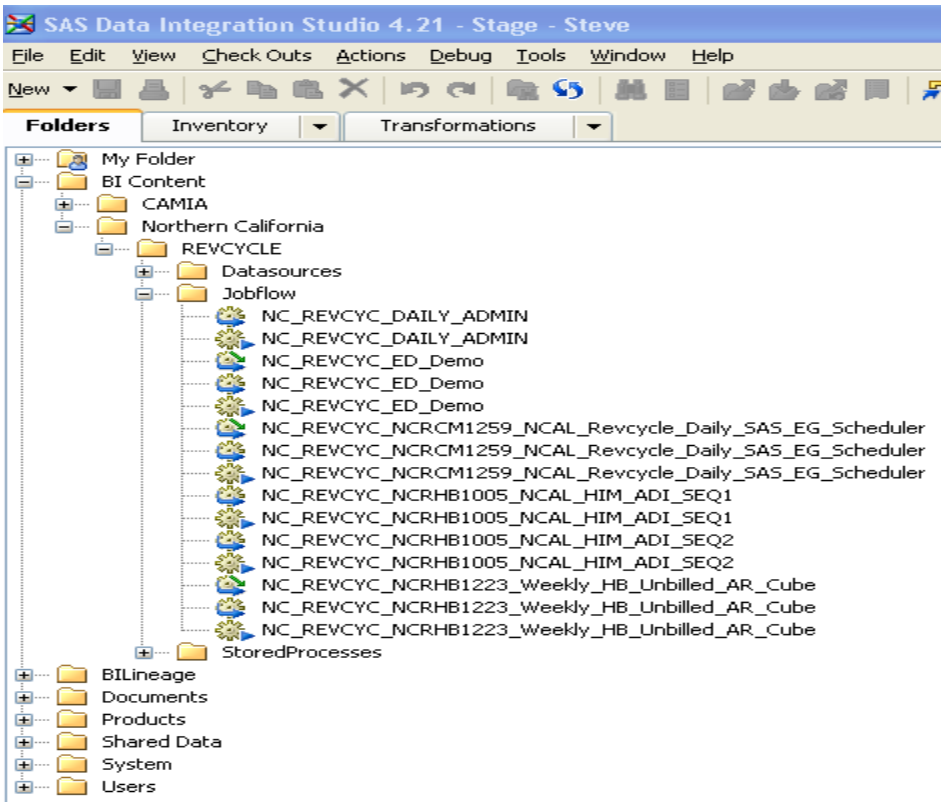


Figure 6: Data Integration Studio NCREVCYC Folder Structure.

Three types of items can be found under the Jobflow folder:

1. SAS job code
   This icon indicates SAS code. Documentation on creating jobs can be found on the shared drive (see section Northern California Revenue Cycle).

2. A deployed job
   This icon appears after a job is placed in the deployment directory. When deploying a job, a dialogue box will appear. Select "NC_REVCYC" as the "Deployment Directory." The remaining fields in the dialogue are filled in automatically by Data Integration Studio.

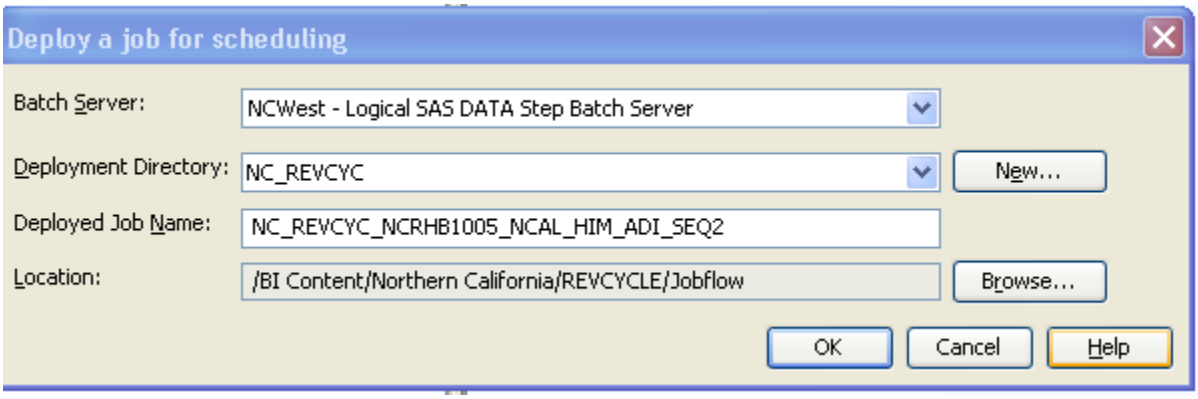


Figure 7: Deploying a NCREVCYC Job.

After a job has been deployed once, it may re-deployed after code changes are made. In this case, simply leave the field defaults and click "OK".

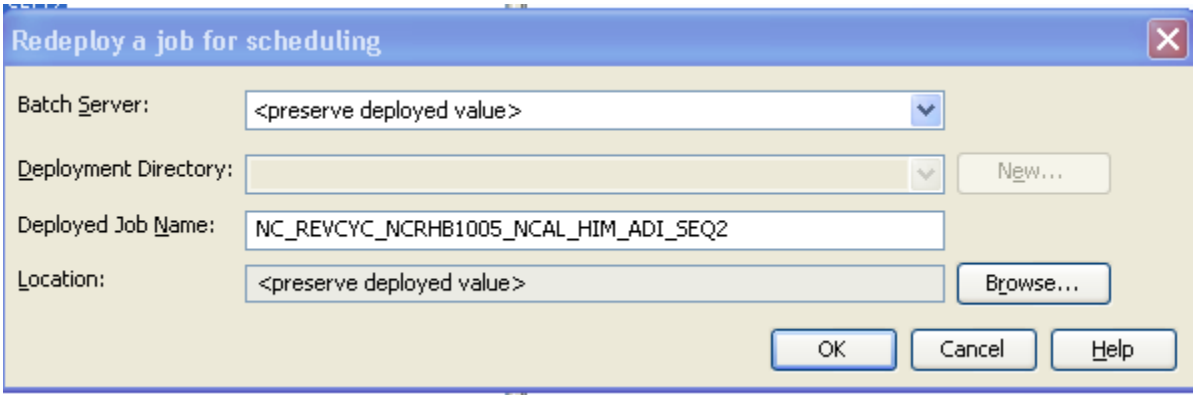


Figure 8: Redeploying a NCREVCYC Job.

When a job is deployed or re-deployed, code is written to the deployment directory on the Compute Server (shown below).

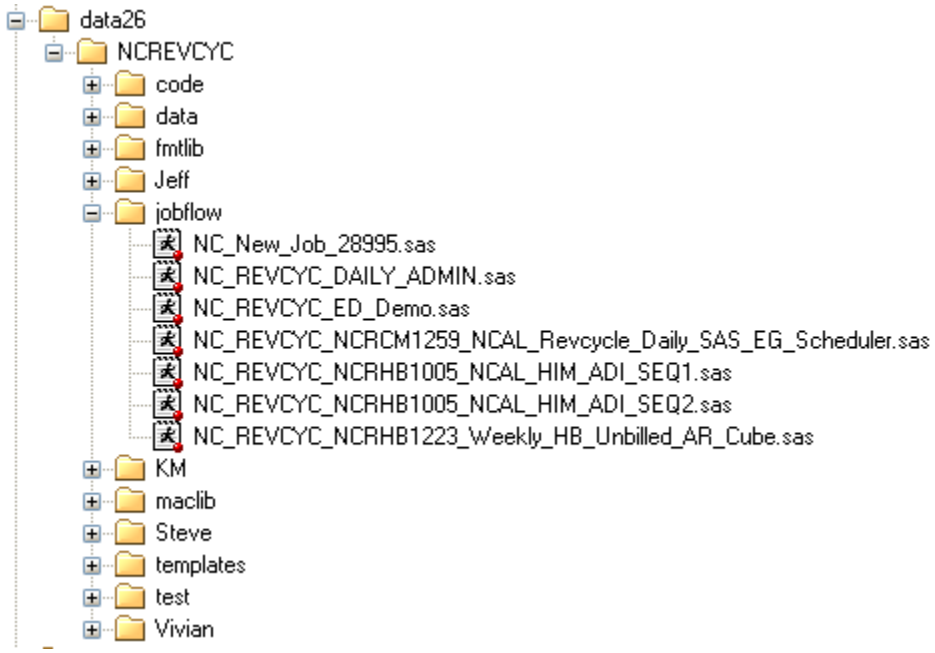


Figure 9: NCREVCYC Compute Server Deployment Directory.

Note: Once a job has been initially deployed, the file permissions of the SAS file in the jobflow folder will need to be modified to group writable. Otherwise, other users will receive a permissions violation when attempting to re-deploy the job.

3. A scheduled Flow 
   When a job(s) is deployed for the first time, a work order needs to be created to schedule the job(s). Scheduling (or any modifications to scheduling) needs to be performed by a SAS administrator. A work order is submitted to the self service desk.

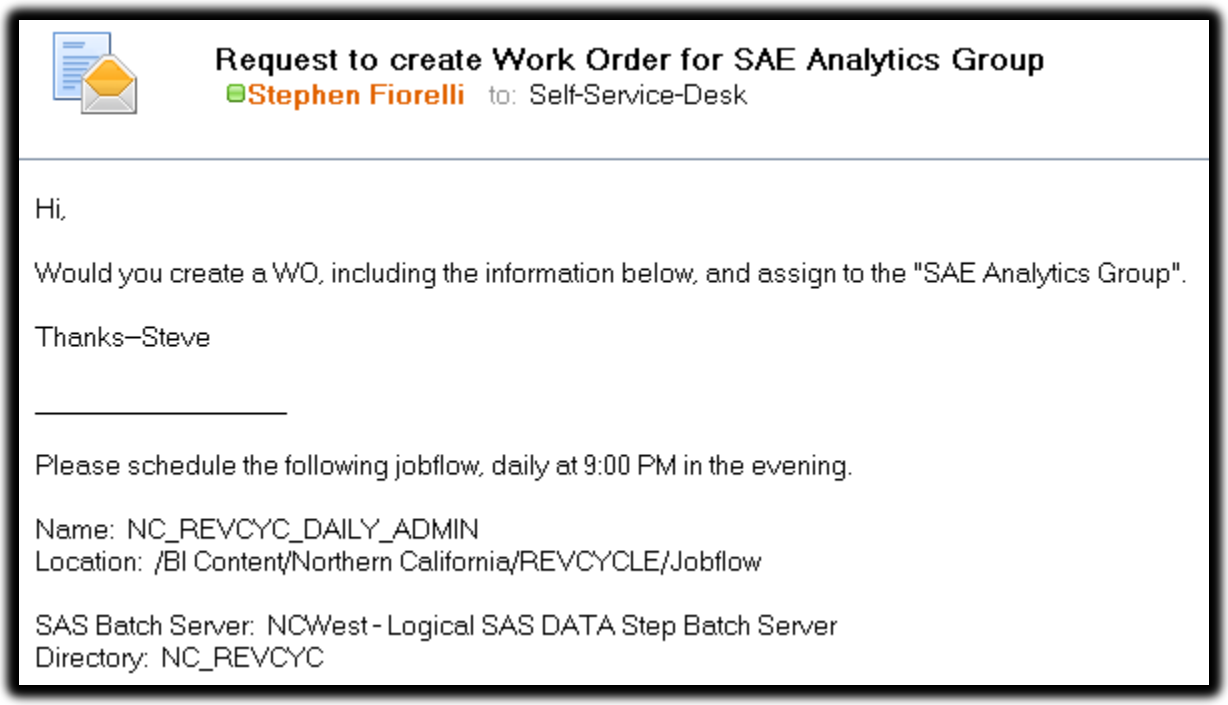


Figure 10: Scheduling Deployed Job with Work Order.

Subsequent re-deployments of the job do NOT require a work order. Simple re-deploy the job and any code changes will be picked up during the next job run.

A flow is a metadata structure that is schedulable and may contain one or more jobs and dependencies. Within Data Integration Studio, double-click on the Flow item to bring up the properties of the Flow. For example, the following shows a flow with multiple jobs and a dependency.

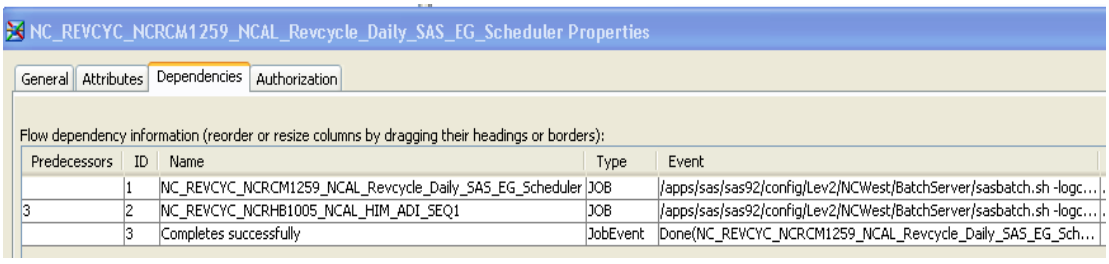


Figure 11: Flow with Multiple Jobs.

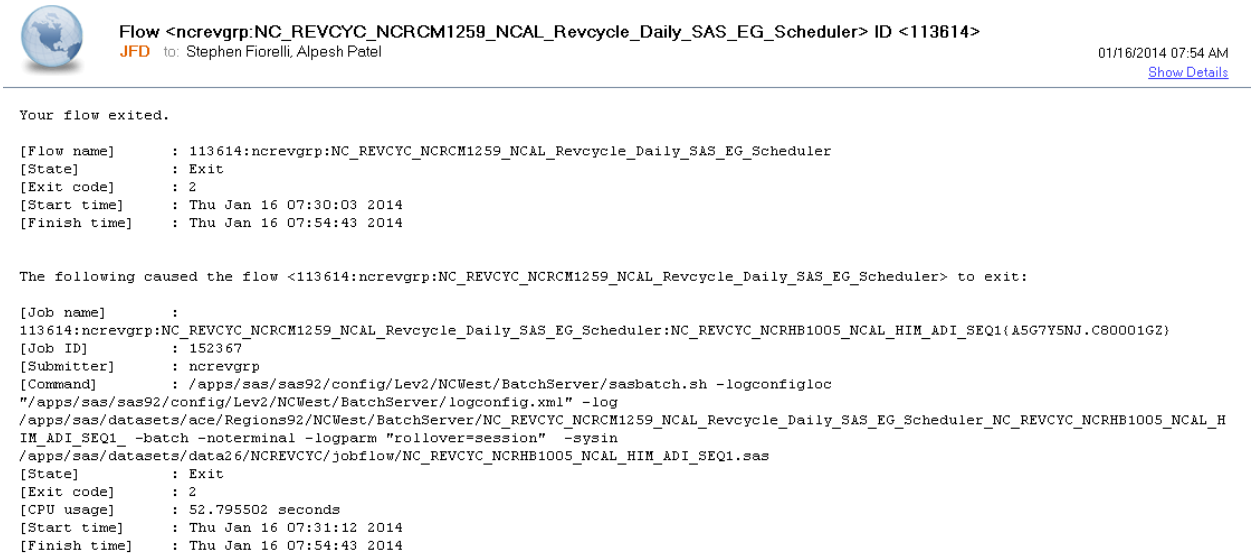
In Figure 11, we see that Flow NC_REVCYC_NCRCM1259_NCAL_Revcycle_Daily_SAS_EG_Scheduler contains two SAS jobs:

- NC_REVCYC_NCRCM_NCRCM1959_NCAL_Revcycle_Daily_SAS_EG_Scheduler
- NCR_REVCYC_NCRHB1005_NCAL_HIM_ADI_SEQ1

And NC_REVCYC_NCRHB1005_NCAL_HIM_ADI_SEQ1 will run only when NC_REVCYC_NCRCM_NCRCM1959_NCAL_Revcycle_Daily_SAS_EG_Scheduler completes successfully.

Job Completion

The SAS administrator will set up e-mail notification on job completion. For example:



Flow <ncrevgrp:NC_REVCYC_NCRCM1259_NCAL_Revcycle_Daily_SAS_EG_Scheduler> ID <113614>
JFD to: Stephen Fiorelli, Alpesh Patel
01/16/2014 07:54 AM
Show Details

```
Your flow exited.

[Flow name]      : 113614:ncrevgrp:NC_REVCYC_NCRCM1259_NCAL_Revcycle_Daily_SAS_EG_Scheduler
[State]          : Exit
[Exit code]      : 2
[Start time]     : Thu Jan 16 07:30:03 2014
[Finish time]    : Thu Jan 16 07:54:43 2014


The following caused the flow <113614:ncrevgrp:NC_REVCYC_NCRCM1259_NCAL_Revcycle_Daily_SAS_EG_Scheduler> to exit:

[Job name]       :
113614:ncrevgrp:NC_REVCYC_NCRCM1259_NCAL_Revcycle_Daily_SAS_EG_Scheduler:NC_REVCYC_NCRHB1005_NCAL_HIM_ADI_SEQ1(A5G7Y5NJ.C80001GZ)
[Job ID]         : 152367
[Submitter]      : ncrevgrp
[Command]        : /apps/sas/sas92/config/Lev2/NCWest/BatchServer/sasbatch.sh -logconfigloc
"/apps/sas/sas92/config/Lev2/NCWest/BatchServer/logconfig.xml" -log
/apps/sas/datasets/ace/Regions92/NCWest/BatchServer/NC_REVCYC_NCRCM1259_NCAL_Revcycle_Daily_SAS_EG_Scheduler_NC_REVCYC_NCRHB1005_NCAL_H
IM_ADI_SEQ1_ -batch -noterminal -logparm "rollover=session"  -sysin
/apps/sas/datasets/data26/NCREVCYC/jobflow/NC_REVCYC_NCRHB1005_NCAL_HIM_ADI_SEQ1.sas
[State]          : Exit
[Exit code]      : 2
[CPU usage]      : 52.795502 seconds
[Start time]     : Thu Jan 16 07:31:12 2014
[Finish time]    : Thu Jan 16 07:54:43 2014
```

Figure 12: e-mail Notification from SAS BI Scheduler.

The notification may not be an indication of a successful job execution. Log files should be checked and are maintained on the Compute Server for one month at:

/apps/sas/datasets/ace/Regions92/NCWest/BatchServer

Scheduled Flows

As of February 11th, 2014, there are 3 scheduled Flows:

1. Every Tuesday, a job that archives Unbilled AR data and produces a summary.
2. Every day starting at 9:00PM, a job that allows for administration under the “ncrevgrp” user account. Currently, this job performs the following functions:
    a. Removes world read permissions from log files.

b. Removes group write permissions from Unbilled AR detailed datasets that are archived on the Compute Server.

3. Every day starting at 7:30AM, running every hour until 11:30, and contains two jobs. The first job checks for Clarity ETL. The second job is triggered off the successful completion of the first job and produces the HIM ADI reports. Daily Clarity ETL triggering is described in more detail in the next section.

Flow	Schedule	Description
NC_REVCYC_NCRHB1223_Weekly_HB_Unbilled_AR_Cube	Tuesdays at 9:00 AM	Unbilled AR Archive and Summary
NC_REVCYC_DAILY_ADMIN_JOBFLOW	Every Day at 9 PM	ncrevgrp user administration
NC_REVCYC_NCRCM1259_NCAL_Revcycle_Daily_SAS_EG_Scheduler	Every Day, every hour, from 7:30 until 11:30	Daily Clarity ETL trigger and HIM Reports

Clarity ETL Scheduling Flow

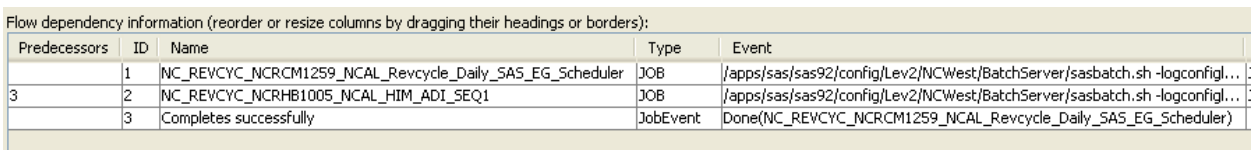
Kaiser's implementation of Infoview (Business Objects) has infrastructure for triggered scheduling off Clarity ETL. Similar infrastructure does not exist in the SAS BI environment. However, the features of the SAS BI scheduling mechanism allow for Clarity ETL triggering to be implemented:

- The same job can be run multiple times.
- Jobs can be triggered upon the successful completion of predecessor jobs.

Using the two features above, a simple Clarity ETL trigger mechanism was constructed.

The NC_REVCYC_NCRCM1259_NCAL_Revcycle_Daily_SAS_EG_Scheduler job makes use of the first feature. It is scheduled every hour beginning at 7:30 am until 11:30 and checks for Clarity ETL. The first time the job detects Clarity ETL occurred, success is returned. After Clarity ETL has been detected in a run of the job, subsequent runs during that day will abort. This prevents downstream jobs from being triggered multiple times.

With the second feature, a flow is constructed that allows for downstream jobs to be trigger off the successful completion of the NC_REVCYC_NCRCM1259_NCAL_Revcycle_Daily_SAS_EG_Scheduler job. This is shown in the flow NC_REVCYC_NCRCM1259_NCAL_Revcycle_Daily_SAS_EG_Scheduler (note: flow has same name as the job).


Flow dependency information (reorder or resize columns by dragging their headings or borders):

Predecessors	ID	Name	Type	Event
	1	NC_REVCYC_NCRCM1259_NCAL_Revcycle_Daily_SAS_EG_Scheduler	JOB	/apps/sas/sas92/config/Lev2/NCWest/BatchServer/sasbatch.sh -logconfigl...
3	2	NC_REVCYC_NCRHB1005_NCAL_HIM_ADI_SEQ1	JOB	/apps/sas/sas92/config/Lev2/NCWest/BatchServer/sasbatch.sh -logconfigl...
	3	Completes successfully	JobEvent	Done(NC_REVCYC_NCRCM1259_NCAL_Revcycle_Daily_SAS_EG_Scheduler)

Figure 13: Flow with job dependencies.

Currently, only the NC_REVCYC_NCRHB1005_HIM_ADI_SEQ1 job is dependent on successful completion of NC_REVCYC_NCRCM1259_NCAL_Revcycle_Daily_SAS_EG_Scheduler. However, multiple dependent jobs can be added to the flow and be triggered in parallel.

Key in implementing this mechanism is having the NC_REVCYC_NCRCM1259_NCAL_Revcycle_Daily_SAS_EG_Scheduler job return success once (at most) during the five scheduled runs. Otherwise, the NC_REVCYC_NCRHB1005_HIM_ADI_SEQ1 job may be triggered multiple times. A trigger dataset records the Clarity ETL detection for each day.

	jobid	clarity_service_status	clarity_service_trigger_date
1	1	Y	19734
2	1	Y	19735
3	1	Y	19736
4	1	Y	19737
5	1	Y	19738
6	1	Y	19739

Figure 14: Trigger dataset.

The first time the NC_REVCYC_NCRCM1259_NCAL_Revcycle_Daily_SAS_EG_Scheduler job detects Clarity ETL, an entry is made in the trigger dataset for that day. Subsequent runs of the job will check if an entry was made for the day. If so, the job is aborted. The flow chart below shows the process:

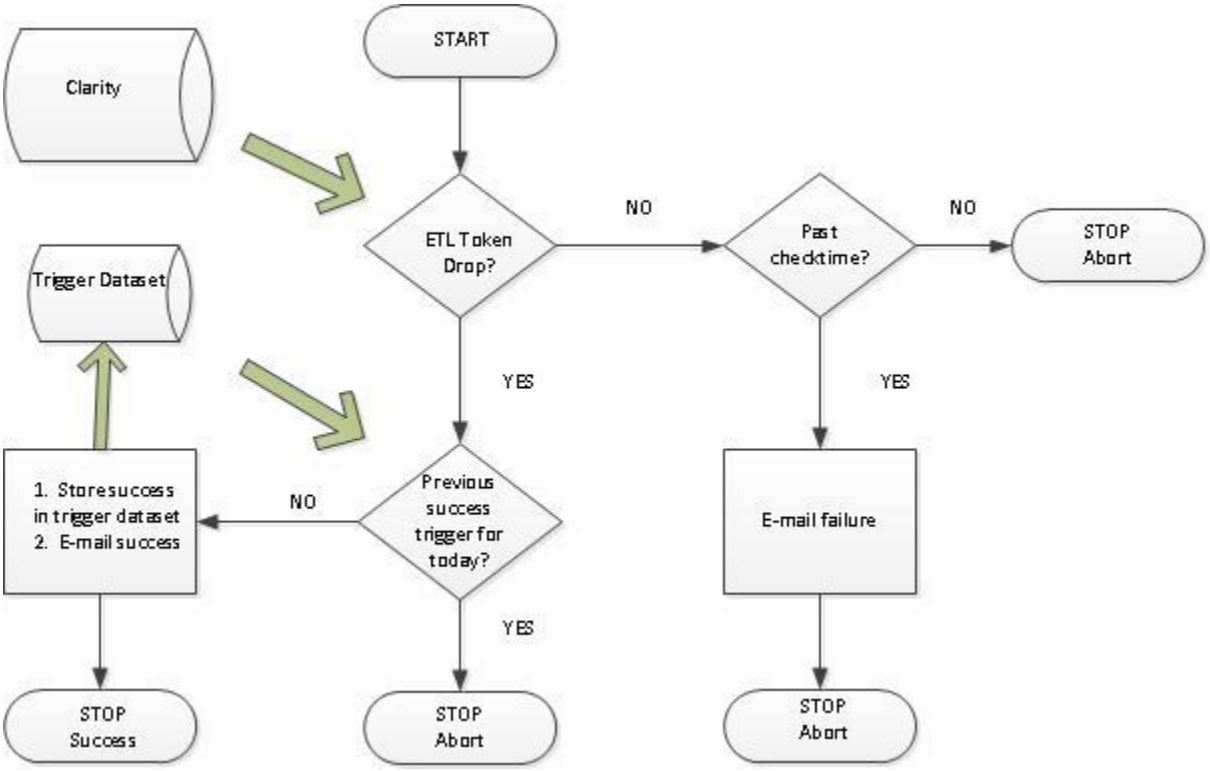


Figure 15: Clarity ETL Trigger Flowchart

The mechanism is implemented in the %Clarity_ETL macro and a unique job ID is used for each invocation of the macro. NC_REVCYC_NCRCM1259_NCAL_Revcycle_Daily_SAS_EG_Scheduler is the

main daily Clarity ETL trigger mechanism and uses a job ID of 1. **DO NOT** use jobid 1 for any other invocation of the macro.

Maintaining a job ID in the trigger dataset allows for multiple Clarity ETL trigger flows to be implemented.

The three scenarios below highlight the triggering mechanism for the HIM ADI job:

Scenario 1: Clarity ETL token drops at 5:00 AM.

Time of Scheduler Run	Has Clarity ETL Token Drop?	Return Status of Scheduler	Trigger Dependent HIM job?	E-Mail to F&R?
7:30 AM	Yes	Success	Yes	E-Mail Success
8:30 AM	Yes	Abort	No	No
9:30 AM	Yes	Abort	No	No
10:30 AM	Yes	Abort	No	No
11:30 Am	Yes	Abort	No	No

Scenario 2: Clarity ETL token drops at 8:00 AM.

Time of Scheduler Run	Has Clarity ETL Token Drop?	Return Status of Scheduler	Trigger Dependent HIM job?	E-Mail to F&R?
7:30 AM	No	Abort	No	No
8:30 AM	Yes	Success	Yes	E-Mail Success
9:30 AM	Yes	Abort	No	No
10:30 AM	Yes	Abort	No	No
11:30 AM	Yes	Abort	No	No

Scenario 3: Clarity ETL token drops at 1:00 PM (or doesn't drop all day).

Time of Scheduler Run	Has Clarity ETL Token Drop?	Return Status of Scheduler	Trigger Dependent HIM job?	E-Mail to F&R?
7:30 AM	No	Abort	No	No
8:30 AM	No	Abort	No	No
9:30 AM	No	Abort	No	No
10:30 AM	No	Abort	No	No
11:30 AM	No	Abort	No	E-Mail Failure

If the trigger file is accidentally deleted or corrupted, it can be recreated with:

/apps/sas/datasets/data26/NCREVCYC/code/Clarity_ETL/recreate_clarity_trigger_table.egp

Or, the backup file:

/apps/sas/datasets/data26/NCREVCYC/data/Clarity_ETL/clarity_job_trgr_backup.sas7bdat

Can be copied as:

/apps/sas/datasets/data26/NCREVCYC/data/Clarity_ETL/clarity_job_trgr.sas7bdat

Scheduled Job Failures

If a job fails, the job can be run manually within Data Integration Studio after addressing the issue. As a warning, you will have to consider file permissions[3]. Go to the job "jobflow" folder on the Metadata Server, open and execute the job.

[3] When running manually, you will be running under your NUID instead of under the "ncrevgrp" account.

Macro Library

/app/sas/datasets/data26/NCREVCYC/maclib contains common macros used.

- chmod – change file permissions for a file or folder/directory
- Timestamp_log – display current time in the log. Can be used to determine elapsed time of steps.
- Clarity_ETL – used to implement Clarity ETL triggering
- compress – used for Unix compression (TBD)
- uncompress – used for Unix un-compression (TBD)

These macros can be accessed with the sasautos option set in SAS code:

```
options sasautos=('/apps/sas/datasets/data26/NCREVCYC/maclib');
```

When creating a new common macro, save as a SAS program (as opposed to an Enterprise Guide Project). The SAS program and macro should have the same name with one exception: make sure the SAS program is all lower case.

SAS BI Application Data

The SAS BI applications:

- Data Integration Studio
- Information Map Studio
- SAS OLAP Cube Studio
- SAS Web Report Studio
- SAS Add-In for Microsoft Office

Cannot access Compute Server data directory directly. Metadata libraries need to be defined by SAS administration that map to a folder/directory on the Compute Server. Once the metadata library has been set up, SAS datasets can be moved into the corresponding Compute Server folder and be made available to SAS BI Applications. Currently, two metadata libraries have been created for NCAL Revenue Cycle.

Metadata Library	Compute Server Folder	Description
NC_REVCYC_MAP	data26/NCREVCYC/data/NC_REVCYC_MAP	Production Unbilled AR and HIM data
NC_REVCYC_EXAMPLES	data26/NCREVCYC/data/Example_Data	Example datasets from Renu Gehring's book

The metadata libraries contain metadata about the datasets. If datasets are moved in/out of the Compute Server folder, or attributes of the datasets change (i.e. new column), then the metadata needs to be updated. This can be done interactively within SAS EG or with the PROC METALIB procedure.

To update metadata interactively, within SAS EG, go to Tools->Update Library Metadata. A dialog box appears.

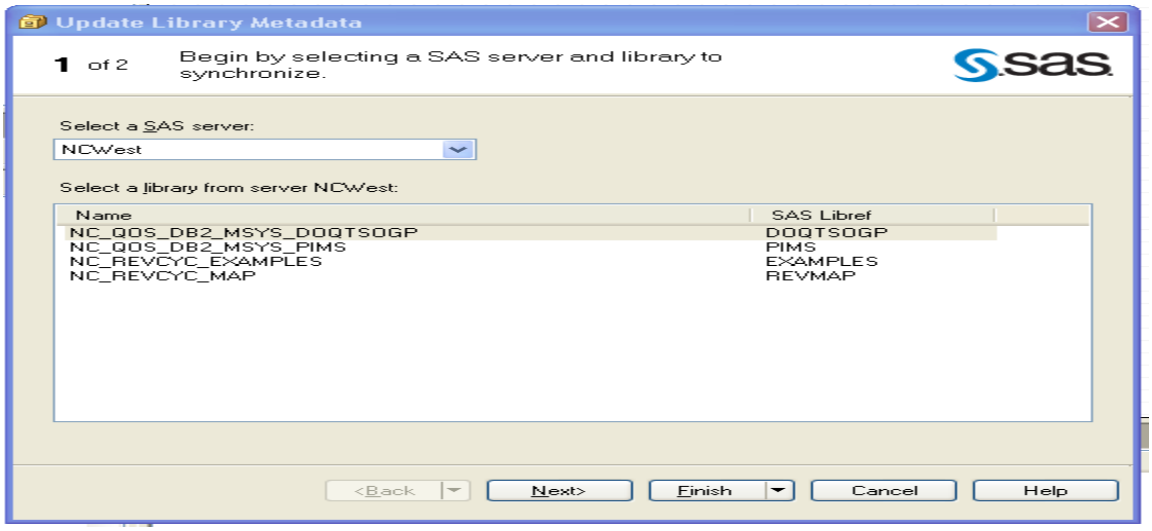


Figure 16: Metadata Library Update Dialog 1

Select the metadata library to be updated and click on "Next". This will bring up the following dialog:

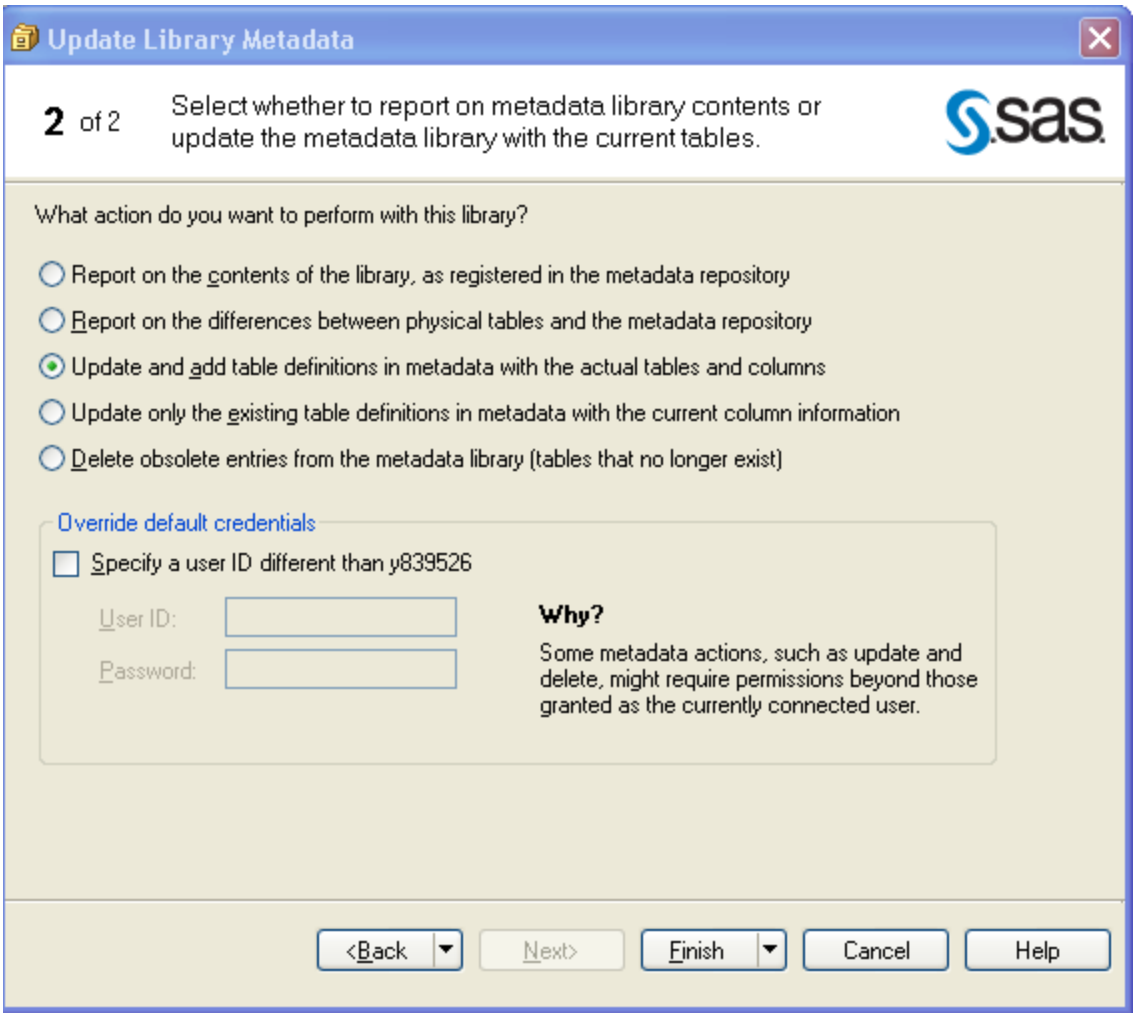


Figure 17: Metadata Library Update Dialog 2

Select the "Update and add table definitions in metadata with the actual tables and columns" radio button and click "Finish". Any updates, creations, and/or deletions will occur with results displayed in the Results window. For example:

The METALIB Procedure

Summary Report for Library NC_REVCYC_EXAMPLES

Repository Foundation

24JAN2014

Metadata Summary Statistics	
Total tables analyzed	24
Tables Updated	0
Tables Deleted	0
Tables Added	1
Tables matching data source	23
Tables not processed	0

Tables Added		
Metadata Name	**Metadata ID**	**SAS Name**
UNBILLED_AR_CUBE_CURRENT	A5G7Y5NJ.BE000LBP	UNBILLED_AR_CUBE_CURRENT

Compute Server data can be accessed by the SAS Add-in for Microsoft, Data Integration Studio, OLAP Cube Studio, or Information Map Studio once metadata has been updated. However, SAS Web Report Studio cannot access datasets directly. Information maps have to be created first.

Information Maps

Information Map Studio is used to create a logical view of the data. Once an Information map is created, it can be accessed by SAS Web Report Studio.

See Webex 8, in Reporting\SAS EG\Documentation\General\webex.txt for an example of creating an Information Map (using Unbilled AR non-Claim Edit data) and a report in Web Report Studio.

SAS Web Report Studio

The SAS Web Report Studio portal is accessed at (note: URL is case sensitive):

http://nzapwa14.nndc.kp.org:7070/SASWebReportStudio

Those with Unix credentials should use their Unix user id (i.e. NUID) and password to log in.

Those without Unix credentials (e.g. Business Analysts) can also access the portal with their Windows CS domain credentials. This requires a work order. Currently, all F&R analysts in addition to Bill Shelton, Nicole Gouldthread, and Rod Madamba have been set up to access the portal with Windows credentials.

See Webex 8, in Reporting\SAS EG\Documentation\General\webex.txt for an example of creating an Information Map (using Unbilled AR non-Claim Edit data) and a report in Web Report Studio.

SAS Add-in for Microsoft Office

Using the SAS Add-in for Microsoft Office requires Unix credentials for Metadata Server login. SAS administration discourages the use of the Add-in by business users as they may let their Unix accounts lapse.

SAS OLAP Cube Studio

No investigation of SAS OLAP Cube Studio has been performed to this point. An introduction to the component can be found at Reporting\SAS EG\Documentation\OLAP.

Stored Processes

No investigation of Stored Processes have been performed to this point. Documentation can be found at Z:\Reporting\SAS EG\Documentation\Stored Processes.

Programming Examples

Programming examples for various topics are provided on the Compute Server under the /apps/sas/datasets/data26/NCREVCYC/code/Example_Projects folder.

Ushare

insert_into_ushare.egp is an example of inserting data into a Clarity ushare table using SAS.

Unix

unix_command_examples.egp provides examples of executing Unix commands on the Compute Server.

e-mail

email.egp shows how to send an e-mail within SAS code. Other examples of e-mail delivery can be found in:

- data26/NCREVCYC/jobflow/ NC_REVCYC_NCRCM1259_NCAL_Revcycle_Daily_SAS_EG_Scheduler.sas
- data26/NCREVCYC/jobflow/ NC_REVCYC_NCRHB1005_NCAL_HIM_ADI_SEQ1.sas
- data26/NCREVCYC/jobflow/ NC_REVCYC_NCRHB1223_Weekly_HB_Unbilled_AR_Cube.sas

PROC REPORT

Art Carpenter is the author “Carpenter’s Guide to the SAS Report Procedure”. The PROC REPORT examples in that book can be found at:

data26/NCREVCYC/ code/Project_Examples/Art_Carpenter_PROC_REPORT_Examples

Excel

There are a number of means of producing Excel files outlined at the following link:

http://blogs.sas.com/content/sasdummy/2012/02/11/export-excel-methods/

Kaiser is on SAS 9.2. With this release, the XML based file formats introduced with MS Office 2007 are not supported. However, the ODS tagset ExcelXP can be used in 9.2 to produce XML files that can be opened with Excel 2007 and above.

Examples of producing csv files and XML files, with the ODS tagset ExcelXP, can be found on the Compute Server at:

data26/NCREVCYC/code/Example_Projects/DelGobbo_Excel_Examples

A paper related to these examples can be found on the shared drive at:

Z:\Reporting\SAS EG\Documentation\Excel\ DelGobbo 143-2013

An example of using the ODS ExcelXP tagset with PROC REPORT can be found at:

data26/NCREVCYC/code/HIM_ADI/NC_REVCYC_NCRHB1005_NCAL_HIM_ADI_SEQ1.SAS

Although not investigated to this point, an ODS tagset for producing pivot tables can be found at:

data26/NCREVCYC/templates/tableeditor.tpl

Example use can be found in the paper:

Reporting\SAS EG\Documentation\Excel and Pivot Tables\ pivot_table-003-2010.pdf

Associated Applications

Putty

Putty is a Windows terminal emulator client that can be used to open a command line window on either the Compute or Metadata Servers. The Putty application is found on the shared drive at:

Z:\Reporting\SAS EG\Misc

WinSCP

WinSCP is a Windows client that can be used for file browsing on the client and Compute/Metadata Servers. A left pane is used for client file browsing and a right pane for server file browsing. It can also be used for file transfer between the Windows client and Unix server. To transfer files, simply drag and drop a file from one pane to another. The drag and drop action will cause a copy dialog to pop-up as shown below.

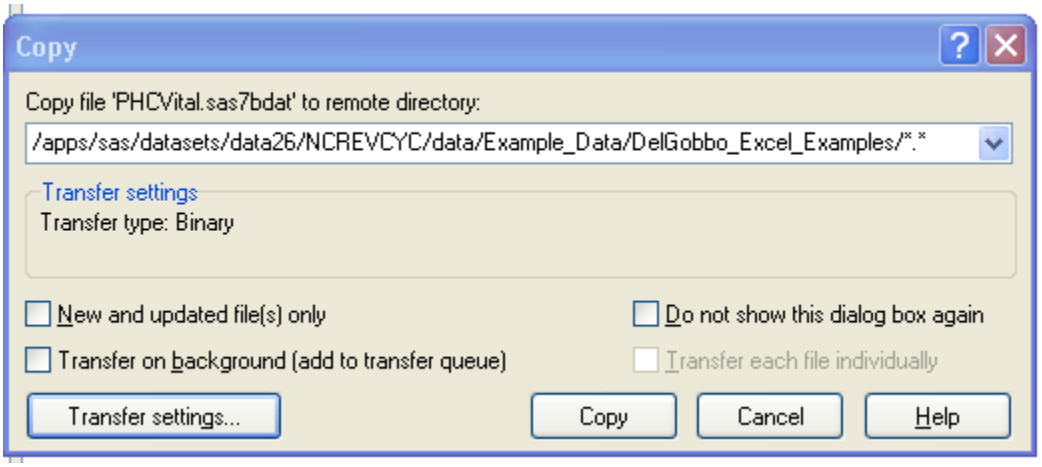


Figure 18: WinSCP File Transfer Dialog Box.

Teradata SQL Porting Issues

Porting Teradata SQL as a pass-thru query within SAS BI is fairly straight-forward. However, there are some issues to note:

1. The double dash, "- -", is used for a comment line in Teradata SQL. However, this will produce an error with a SAS pass-thru query. Use "/* */" for comments.

2. Some characters in Teradata variable names, such as "$" and "#", are not allowed as SAS variable names. To be safe, use characters, numbers, and the underscore in names. The following link provides SAS rules for variable names:

http://support.sas.com/documentation/cdl/en/lrcon/62955/HTML/default/viewer.htm#a000998953.htm

3. Missing ending parenthesis will cause SAS to run endlessly. For example, the following code:

```
proc sql;
connect to teradata as hcclnc(db=hcclnc tdpid=tdp1 user=&CLR_NC_USERID password=&CLR_NC_PW);
create table temp (compress=yes) as
select * from connection to hcclnc
(

select
current_date;

;
disconnect from hcclnc;
quit;
```

executes endlessly without warning or error. To fix, add the missing ")".

```
proc sql;
connect to teradata as hcclnc(db=hcclnc tdpid=tdp1 user=&CLR_NC_USERID password=&CLR_NC_PW);
create table temp (compress=yes) as
select * from connection to hcclnc
(

select
current_date;

);
disconnect from hcclnc;
quit;
```

4. Some Teradata functions will produce errors. For example, the following code:

```
proc sql;
connect to teradata as hcclnc(db=hcclnc tdpid=tdp1 user=&CLR_NC_USERID password=&CLR_NC_PW);
create table temp (compress=yes) as
select * from connection to hcclnc
(

select
dayofmonth(current_date);

);
disconnect from hcclnc;
quit;
```

Will produce the following error in the SAS log:

```
ERROR: Teradata prepare: Syntax error: expected something between '(' and the 'current_date' keyword. SQL statement was:
       select dayofmonth(current_date);
```

To correct the above, the extract function was used:

```
proc sql;
connect to teradata as hcclnc(db=hcclnc tdpid=tdp1 user=&CLR_NC_USERID password=&CLR_NC_PW);
create table temp (compress=yes) as
select * from connection to hcclnc
(

select
extract(day from current_date);

);
disconnect from hcclnc;
quit;
```

SAS BI Issues

Problem 1: Hard crash of system while in SAS EG. Subsequent attempts to edit programs would not work. Error shown below:

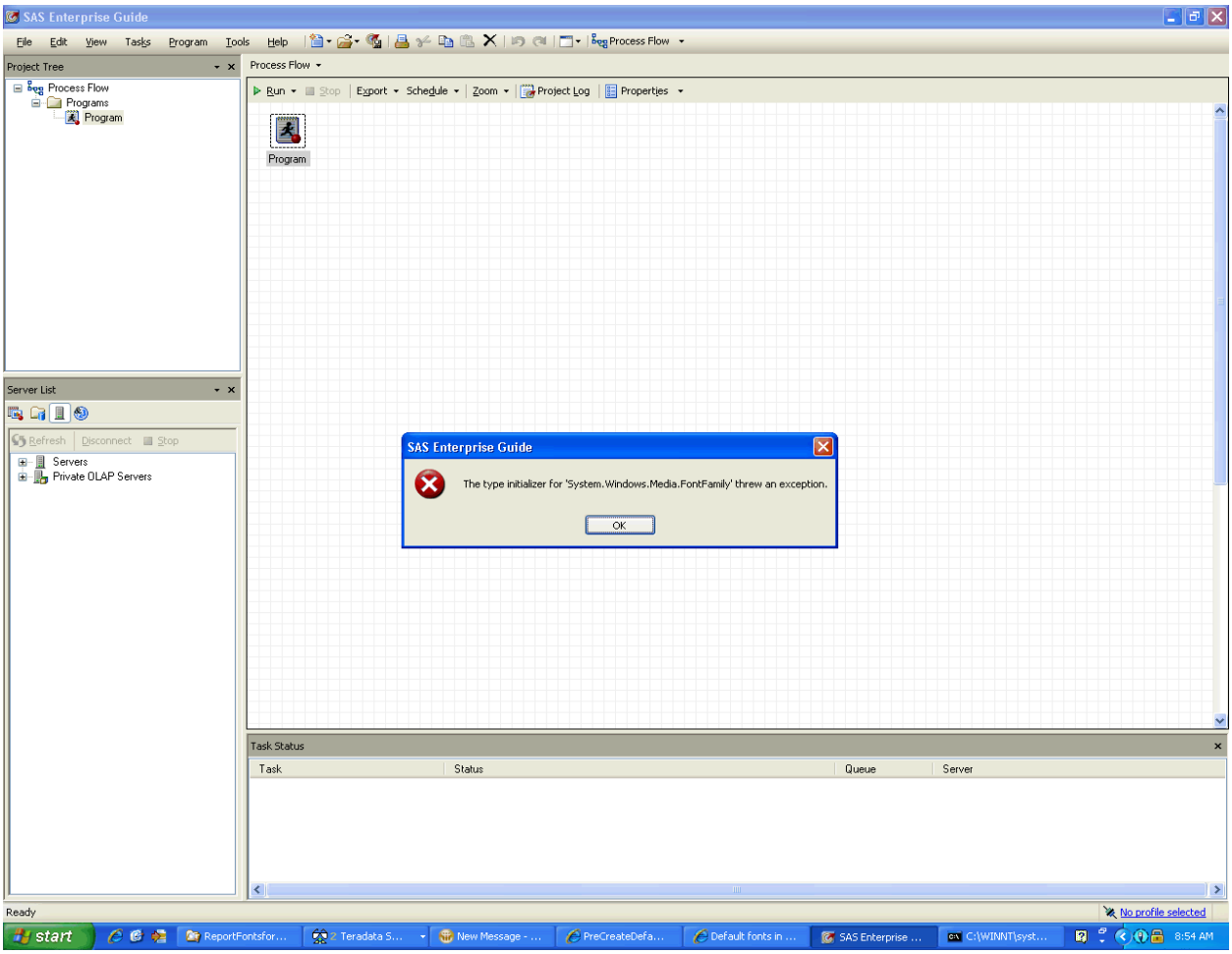


Figure 19: Problem - Unable to Edit within SAS EG.

Solution can be found at:

http://support.sas.com/kb/45/733.html

Requires admin privileges.

Problem 2: Java-based applications do not start (e.g. Data Integration Studio, Information Map Studio).

Check the file C:\Program Files\SAS92\sassw.config and look at the variable JREHOME:

JREHOME=C:\Program Files\Java\jre6\bin\java.exe

Check to see if java.exe exists in the path. If not, java based applications will not start.

Support

Northern California Revenue Cycle

A collection of documentation can be found on the shared drive at:

Z:\Reporting\SAS EG\Documentation

This guide can be found in the “General” folder.

Kaiser

General questions concerning SAS BI environment setup can be directed to the SAS Administrators at the following e-mail:

SA ANALYTICS SAS-IREG

The Kaiser SAS BI community can be engaged at the “SAS BI Information Sharing” Idea Book.

SAS

SAS Tech Support can be engaged with Questions/Problems after creating a profile at:

http://support.sas.com

SAS Community Wiki

A SAS Community Wiki has been set up by Art Carpenter which allows posting/editing of SAS content by the worldwide SAS community.