

What's new in **BASE SAS 9.2**

Checkpoint/Restart

Rupinder Dhillon
Dhillon Consulting Inc.

What is Checkpoint/Restart?

- Using Checkpoint and restart modes together allows you to resubmit batch SAS programs that failed.
 - When resubmitted, the program will resume at the DATA or PROC step where the error occurred
 - DATA and PROC steps that completed successfully in the failed run will not be resubmitted.

Checkpoint/Restart Modes

- **Checkpoint Mode:**
 - SAS records info about the DATA and PROC steps in a Checkpoint library.
- **Restart Mode:**
 - SAS reads the checkpoint library to determine which steps completed successfully. The program resumes at the step where the failure occurred.
- **Note:** restart mode will always re-execute GLOBAL statements (ie. FILENAME, LIBNAME) and macros.
- **Why?** Because the checkpoint library only stores info about the steps that succeeded and failed. It does not store information about macro variables, macro definitions, SAS datasets or any other info that might have been processed in the step that failed.

What if a step should ALWAYS be re-run?

- Add the statement **CHECKPOINT EXECUTE_ALWAYS** immediately before the step.
- This statements tells SAS that this step should ignore checkpoint/restart commands and always execute.

Adding Checkpoint/Restart to your batch program:

- Add the **CHECKPOINT EXECUTE_ALWAYS** statement before any DATA and PROC steps that you want to execute each time the batch program is submitted.
- If your checkpoint-restart library is a user-defined library, you must add the **LIBNAME** statement that defines the checkpoint-restart libref as the first statement in the batch program.
 - If you use the **WORK** library as your checkpoint library, no LIBNAME statement is necessary.

Run your batch program using the following system options:

- **SYSIN**: names the batch program (if req'd in your operating environment)
- **STEPCHKPT**: enables checkpoint mode
- **STEPCHKPTLIB**: specifies the libref of the library where SAS saves the checkpoint restart data

Run your batch program using the following system options:

- *NOTE:* if you are not using a user defined library and using the WORK library instead then:
 - **NOWORKTERM:** saves the WORK library when SAS ends
 - **NOWORKINIT:** does not initialize the WORK library when SAS starts
- **ERRORCHECK STRICT:** puts SAS in syntax-check mode when an error occurs in the LIBNAME, FILENAME, %INCLUDE and LOCK statements
- **ERRORABEND** specifies whether SAS terminates for most errors

To resubmit a batch job in restart mode

- Add:
 - **STEPRESTART**: tells SAS to restart using checkpoint-restart data saved in checkpoint library (Work or usedefined)

SAS Commands in batch mode

- In a Windows Operating Environment:

```
sas -sysin `c:\mysas\myprogram.sas' -stepchkpt  
- stepchkptlib mylibref -errorcheck strict -errorabend
```

- Or:

```
sas -sysin `c:\mysas\myprogram.sas' -stepchkpt  
-noworkterm -noworkinit -errorcheck strict -errorabend
```

- Restarting:

```
sas -sysin `c:\sas\myprogram.sas' -stepchkpt -steprestart  
-stepchklib mylibref -errorcheck strict -errorabend
```

Display Manager Commands

- Keep in mind...
 - Since Checkpoint/Restart modes are meant for batch processing, if SAS comes across a DM command, checkpoint restart modes are turned off and the checkpoint library is deleted.

Checkpoint/Restart in LSF

- SAS is currently looking for ways to integrate Checkpoint/Restart into the LSF scheduler.
- Will work with Job rerun and Job requeue
- Latest word (from SAS Global Forum 2009), look for this functionality in 'an early 9.2 maintenance release'

For more info:

Checkpoint/Restart on Support.sas.com:

- <http://support.sas.com/documentation/cdl/en/lrcon/61722/HTML/default/a000993436.htm>

Other new features in Base 9.2:

- <http://support.sas.com/documentation/cdl/en/whatsnew/62435/HTML/default/baseovwhatsnew902.htm>

All SAS 9.2 Product Documentation:

- <http://support.sas.com/cdlsearch?ct=80000>