

# BSAS Macro

---

TRUE BATCH PROCESSING FROM SAS EG USING LOAD SHARING FACILITY (LSF)

ADAM HENDRICKS, SR. PRINCIPAL SYSTEMS ANALYST, GENERAL DYNAMICS FEDERAL CIVILIAN HEALTH

DEREK GRITTMANN, SR. PRINCIPAL SYSTEMS ANALYST, GENERAL DYNAMICS FEDERAL CIVILIAN HEALTH

healthAPT

# CCW Overview

---

The Centers for Medicare & Medicaid Services (CMS) launched the Chronic Conditions Data Warehouse (CCW), a research database, in response to the Medicare Modernization Act of 2003 (MMA).

Section 723 of the MMA outlined a plan to improve the quality of care and reduce the cost of care for chronically ill Medicare beneficiaries. In addition to chronic conditions, the CCW supports health policy analysis and other CMS initiatives.

Managed by HealthAPT (joint venture between NewWave Technologies and General DynamicsInformation Technology), the CMS Virtual Research Data Center (VRDC) within the CCW is an alternative solution that provides timelier access to Medicare and Medicaid program data in a more efficient and cost effective manner.

The CCW VRDC provides federal agencies, health policy analysts, and researchers with Medicare, Medicaid, assessment, and Part D data linked by beneficiary enabling longitudinal analysis across the continuum of care. With over 30 data sources, the CCW VRDC has SAN capacity of 4 PBs and contains over 322 billion records (1 billion records added monthly) for 115+ million beneficiaries.

# General Dynamics Overview

---

As a trusted health solutions organization for more than 30 years, General Dynamics Federal Civilian Health, part of General Dynamics Information Technology, provides end-to-end solutions and professional services to health organizations in the defense, federal civilian government, state and local government, commercial and international sectors.

Healthcare management services include:

- Database architecture
- Data access and dissemination
- Applications
- Security
- Data science services

# Differences Between True Batch Job vs SAS EG on LSF

What is a “True Batch Job”	SAS EG on LSF
➤ Not interactive.	❖ Interactive front end.
➤ Not child process of interactive process that launched it.	❖ Uses only one server grid as exec host by default.
➤ Completely independent of interactive process that launched it.	❖ Has background processes that are child processes of interactive session.
➤ I/O environment same as that of interactive process that launched it.	❖ Can leverage multiple servers on grid but only with complex SAS wrapper code. These are still not independent batch sessions. If the interactive parent session ends; so do the multiple grid job child sessions.

# SAS EG True Batch Job on LSF

---

- SAS code is saved under file system available to EG.
- Batch job uses full Load Sharing Facility (LSF) grid capabilities.
- Batch job is completely independent of SAS EG session.
- Results of batch job are available in same directory as SAS program launched in batch.
- Depending on how EG environment is set up, no change in SAS code may be necessary to run job in batch.
- **Note: Any macro or script for true batch in EG will work identically on the command line.**

# Grid Configuration for True Batch

---

Second grid metadata server with XCMD turned on or sasgrid & WorkspacesServer.sh script edited to give XCMD capability to users approved for true batch processing.

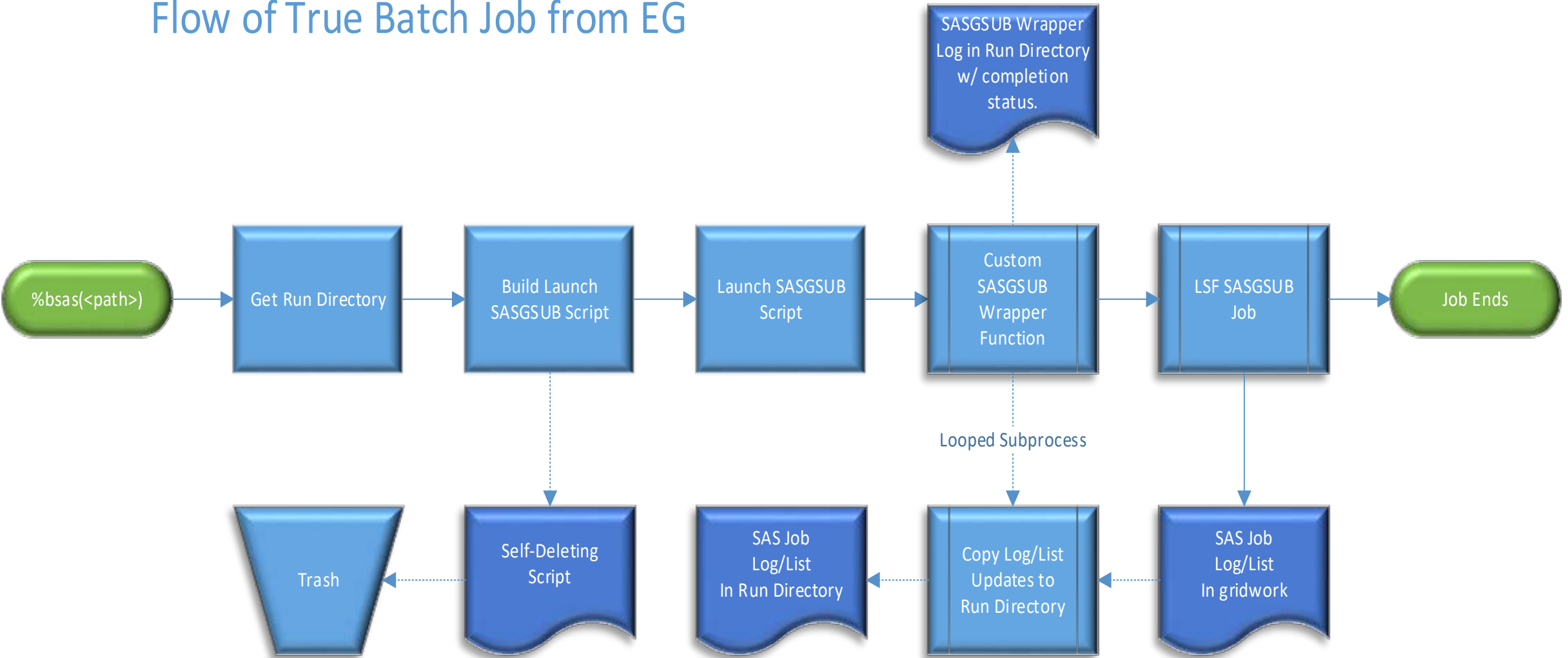
Example of WorkspaceServer.sh modification:

```
cmd="$SAS_COMMAND $USERMODS_OPTIONS"
arg='-noxcmd'
batch_group_found=`/usr/bin/groups $USER | grep 'sas_batch' | wc -l`

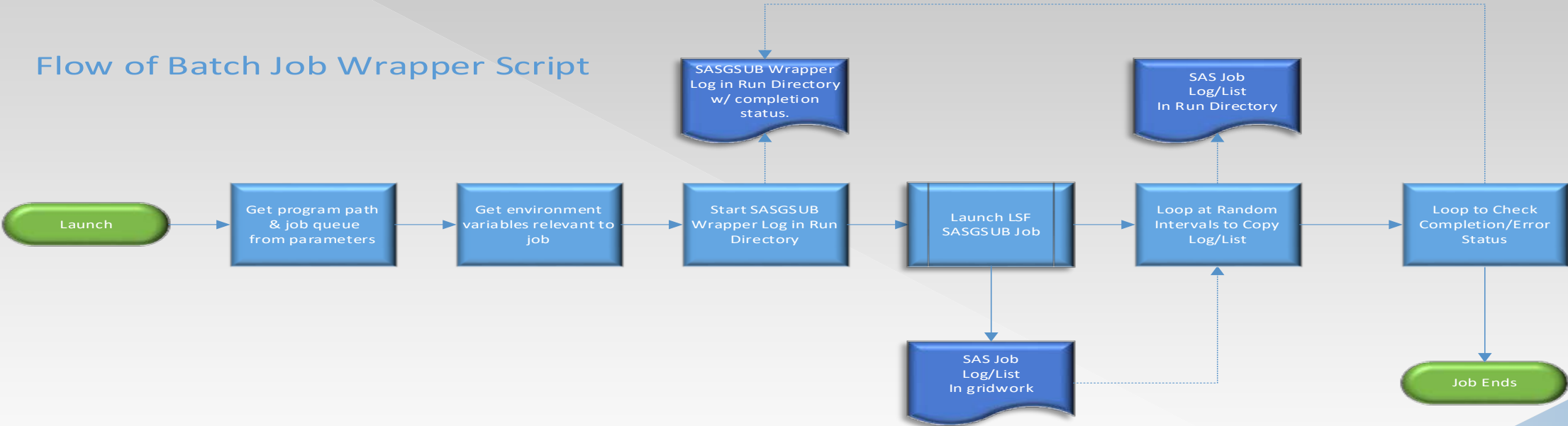
if [[ $batch_group_found -ne 0 ]]
then
    arg="-xcmd"
fi

cmd="$cmd $arg"
```

# Flow of True Batch Job from EG



# Flow of Batch Job Wrapper Script





BSASTestProject - SAS Enterprise Guide

File Edit View Tasks Favorites Program Tools Help

Process Flow

Project Tree

- Process Flow
  - Programs
    - bsas1
    - bsaslook

Servers

Refresh Disconnect Stop

- bsas
  - data
  - macros
  - pgms
    - test
      - bsas1.sas
      - bsaslook.sas
      - BSASTestProject.egp
      - oratest.sas
      - test.sas
  - bsasgsub
  - ckr084\_20111101

Process Flow

Run Stop Export Schedule Project Log Properties

bsas1

bsaslook

The screenshot displays the SAS Enterprise Guide interface for a project named 'BSASTestProject'. The top menu bar includes 'File', 'Edit', 'View', 'Tasks', 'Favorites', 'Program', 'Tools', and 'Help'. Below the menu is a toolbar with icons for file operations and a 'Process Flow' dropdown. The 'Project Tree' pane on the left shows a hierarchy: 'Process Flow' contains a 'Programs' folder, which in turn contains two program icons labeled 'bsas1' and 'bsaslook'. The 'Servers' pane below it shows a tree structure for a server named 'bsas', with subfolders 'data', 'macros', and 'pgms'. The 'pgms' folder is expanded to show a 'test' subfolder containing 'bsas1.sas', 'bsaslook.sas', 'BSASTestProject.egp', 'oratest.sas', and 'test.sas'. Other folders like 'bsasgsub' and 'ckr084\_20111101' are also visible. The main workspace on the right is titled 'Process Flow' and contains a toolbar with 'Run', 'Stop', 'Export', 'Schedule', 'Project Log', and 'Properties'. Below the toolbar, two program icons are arranged vertically on a grid background, labeled 'bsas1' and 'bsaslook'.

```
bsas1 ▾
Program Log
Save ▾ Run ▾ Stop Selected Server: sasCCW (Connected) ▾ Analyze Program ▾ Export ▾ Send To ▾ Create ▾ Changes Commit History Properties
* CCW SAS Program
*
*       File: bsas1.sas
*
*       Date: Tue Jun  2 17:03:56 EDT 2015
*
* Programmer: ██████████, Adam Hendricks, adam.hendricks@gdit.com
*
* Description:
*
*   Launches LSF batch jobs from two externally stored SAS programs.
*
* ;

options ps=999 missing=' ' nocenter nodate nonumber errorabend mprint;

* Start *;

%bsas(bsas/pgms/test.sas)

x 'sleep 30';

%bsas(bsas/pgms/oratest.sas)

* End of Program *;
```

```
bsaslook ▾
Program
Save ▾ Run ▾ Stop | Selected Server: sasCCW (Connected) ▾ | Analyze Program ▾ | Export ▾ Send To ▾ Create ▾ | Ch
* CCW SAS Program
*
*       File: bsaslook.sas
*
*       Date: Tue Jun  2 17:03:56 EDT 2015
*
* Programmer: ██████, Adam Hendricks, adam.hendricks@gdit.com
*
* Description:
*
* Lists LSF batch jobs currently running.
*
* ;

options ps=999 missing=' ' nocenter nodate nonumber errorabend mprint;

* Start *;

%bsaslook

* End of Program *;
```

BSASTestProject - SAS Enterprise Guide

File Edit View Tasks Favorites Program Tools Help

Process Flow

Project Tree

- Process Flow
  - Programs
    - bsas1
    - bsaslook

Servers

Refresh Disconnect Stop

- bsas
  - data
  - macros
  - pgms
    - test
      - bsas1.sas
      - bsaslook.sas
      - BSASTestProject.egp
      - oratest.log
      - oratest.lst
      - oratest.sas
      - oratest\_20181109\_153300\_sasgsub.log
      - test.log
      - test.lst
      - test.sas
      - test\_20181109\_153230\_sasgsub.log
  - bsasgsub
  - ckr084\_2011101

Process Flow

Run Stop Export Schedule Project Log Properties

bsas1

bsaslook → Listing - bsaslook

bsaslook

Program Log Results

Refresh Export Send To Publish Properties

User Batch Jobs - 09NOV18:14:07

Grid Job ID	Job Owner	Job Status	Job Queue	From Host	Execute Host	Job Name	Job Submitted Date	Job Submitted Time	Job Last Polled Date	Job Last Polled Time
272868		RUN	interactive_pgp			SAS			09NOV2018	12:58
272919		RUN	normal			test01	09NOV2018	15:52	09NOV2018	12:58
272920		RUN	normal			test02	09NOV2018	15:52	09NOV2018	12:58
272921		RUN	extract			test03	09NOV2018	15:52	09NOV2018	12:58
272922		RUN	priority-extract			test04	09NOV2018	15:52	09NOV2018	12:58
272923		RUN	normal			test05	09NOV2018	15:52	09NOV2018	12:58
272924		RUN	normal			test06	09NOV2018	15:53	09NOV2018	12:58
272925		RUN	extract			test07	09NOV2018	15:53	09NOV2018	12:58
272926		RUN	priority-extract			test08	09NOV2018	15:53	09NOV2018	12:58
272927		RUN	normal			test09	09NOV2018	15:53	09NOV2018	12:58
272928		RUN	normal			test10	09NOV2018	15:53	09NOV2018	12:58
272929		RUN	extract			test11	09NOV2018	15:53	09NOV2018	12:58
272930		RUN	priority-extract			test12	09NOV2018	15:53	09NOV2018	12:58
272931		RUN	normal			test13	09NOV2018	15:53	09NOV2018	12:58
272932		RUN	normal			test14	09NOV2018	15:53	09NOV2018	12:58
272933		RUN	extract			test15	09NOV2018	15:53	09NOV2018	12:58
272934		RUN	priority-extract			test16	09NOV2018	15:53	09NOV2018	12:58
272935		RUN	normal			test17	09NOV2018	15:53	09NOV2018	12:58
272936		RUN	normal			test18	09NOV2018	15:54	09NOV2018	12:58
272938		RUN	extract			test19	09NOV2018	15:54	09NOV2018	12:58
272939		RUN	priority-extract			test20	09NOV2018	15:54	09NOV2018	12:58
272940		RUN	normal			test21	09NOV2018	15:54	09NOV2018	12:58
272941		RUN	normal			test22	09NOV2018	15:54	09NOV2018	12:58
272942		RUN	extract			test23	09NOV2018	15:54	09NOV2018	12:58
272943		RUN	priority-extract			test24	09NOV2018	15:54	09NOV2018	12:58
272945		PEND	normal			test25	09NOV2018	15:54	09NOV2018	12:58

N = 26

# Questions?

---

Adam Hendricks, Sr. Principal Systems Analyst, General Dynamics Federal Civilian Health

- [Adam.Hendricks@gdit.com](mailto:Adam.Hendricks@gdit.com)

Derek Grittmann, Sr. Principal Systems Analyst, General Dynamics Federal Civilian Health

- [Derek.Grittmann@gdit.com](mailto:Derek.Grittmann@gdit.com)