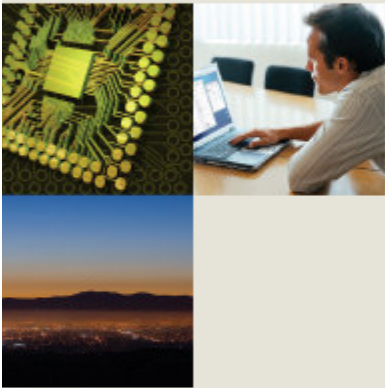


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Testing and Debugging Your Installation's ACS Routines

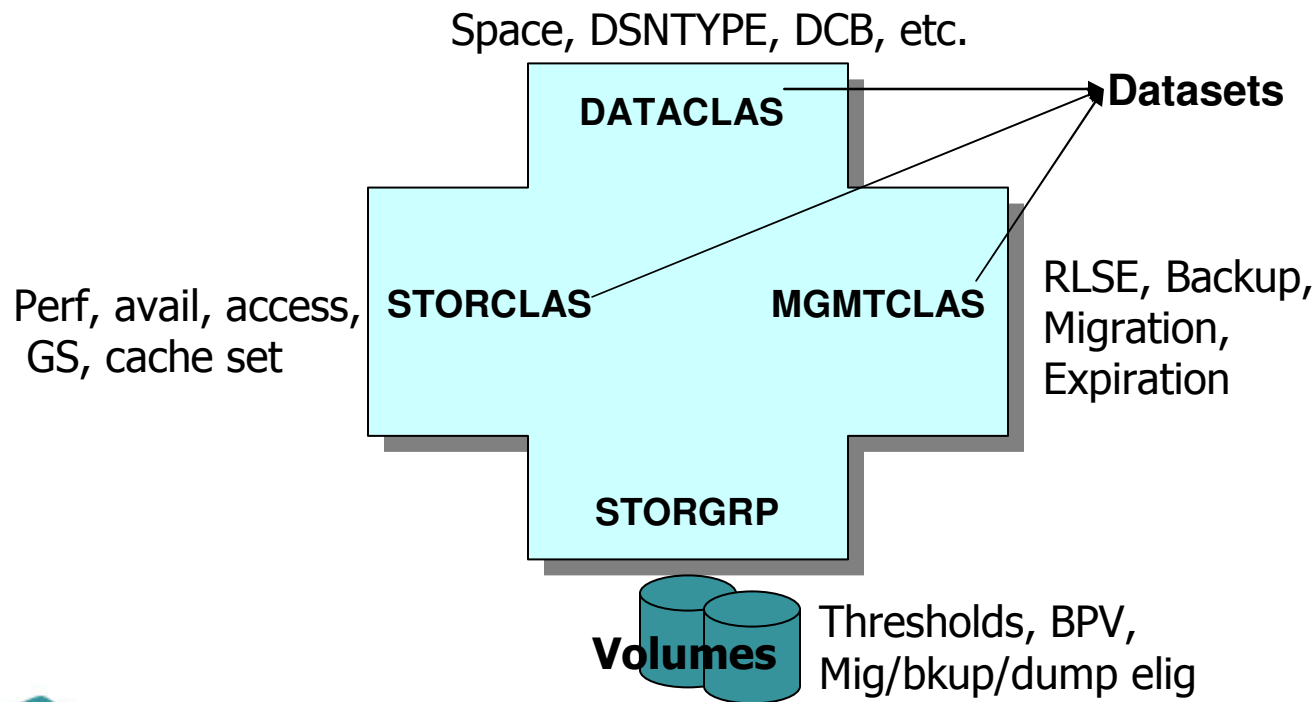
Session 7731

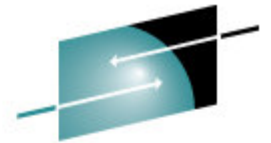
Steve Pryor
DTS Software, Inc.

770-922-2444

Automatic Class Selection is Important

- Implement storage management policy
- Executed for all new dataset allocations
 - SMS and non-SMS, all types of media



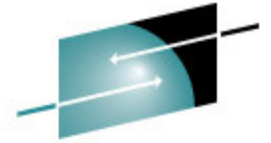


ACS Variables

&ACCT_JOB	&DEF_STORCLAS	&JOB	&MSPARM	&SIZE
&ACCT_STEP	&DSN	&LABEL	&MSPOLICY	&SPACE_TYPE
&ACSENVIR	&DSNTYPE	&LIBNAME	&MSPOOL	&SYSNAME
&ALLVOL	&DSORG	&LLQ	&NQVAL	&SYSPLEX
&ANYVOL	&DSOWNER	&MAXSIZE	&NVOL	&UNIT
&APPLIC	&DSTYPE	&MEMHLQ	&PGM	&USER
&BLKSIZE	&EXPDT	&MEMLLQ	&RECOORG	&XMODE
&DD	&FILENUM	&MEMN	&RETPD	
&DEF_DATACLAS	&GROUP	&MEMNQVAL	&SECLABL	
&DEF_MGMTCLAS	&HLQ	&MSPDEST	&SECOND_QTY	

&DATACLAS	&STORCLAS	&MGMTCLAS	&STORGRP
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ACS Routine Failures

- Coding Errors
 - Incorrect use of FILTLISTs or masks
 - Incorrect use of quotes
 - Incorrect use of GDG or special names
- Logic Errors
 - Using inappropriate R/O variables
 - Missing or early EXIT
 - Failure to SET R/W variable appropriately

Unable to allocate

Poor performance

Wrong volume selected

Missing backup, dataset deleted

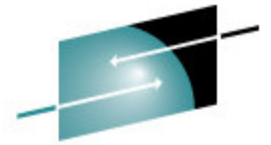


Problem Variables

- **&ALLVOL, &ANYVOL**
 - Volume reference values = 'REF=SD | ST | NS'
 - Recall or Recover and VOLCOUNT(ANY) = null
- **&DSN**
 - GDG = base name only, PDS = dataset name only
- **Data Class assignment may change R/O variables**
 - &RECORG, &NVOL, &DSNTYPE, &SIZE / MAXSIZE

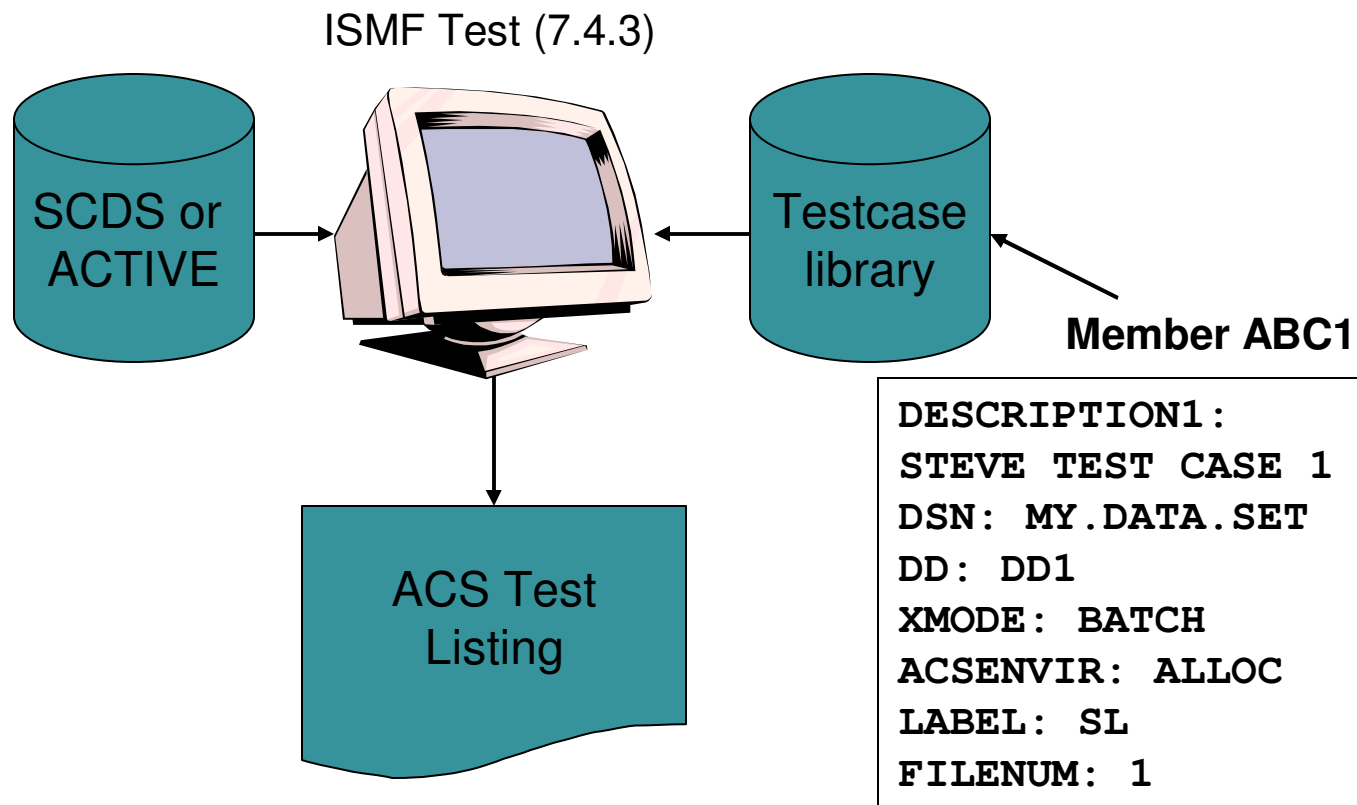
Problem Variables

- **&SIZE / &MAXSIZE**
 - ACS test case must specify KB, ACS routine can compare KB or MB
 - z/OS 1.11 introduces &SPACE_TYPE and &SECOND_QTY
 - &SIZE / &MAXSIZE *recalculated* after DATACLAS routine runs
 - But this is not accounted for in ISMF test
 - For non-VSAM
 - &SIZE = Primary + directory
 - &MAXSIZE = Primary + directory + 15 secondaries
 - For VSAM (based on cluster, then data, then index)
 - &SIZE = Primary
 - &MAXSIZE = Primary + 122 secondaries * volcount
 - *May be different if ECR and/or Add'l Volume Amount = 'S'*



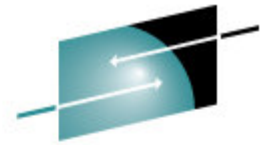
Native ISMF Test

- Test cases are flatfile PDS members



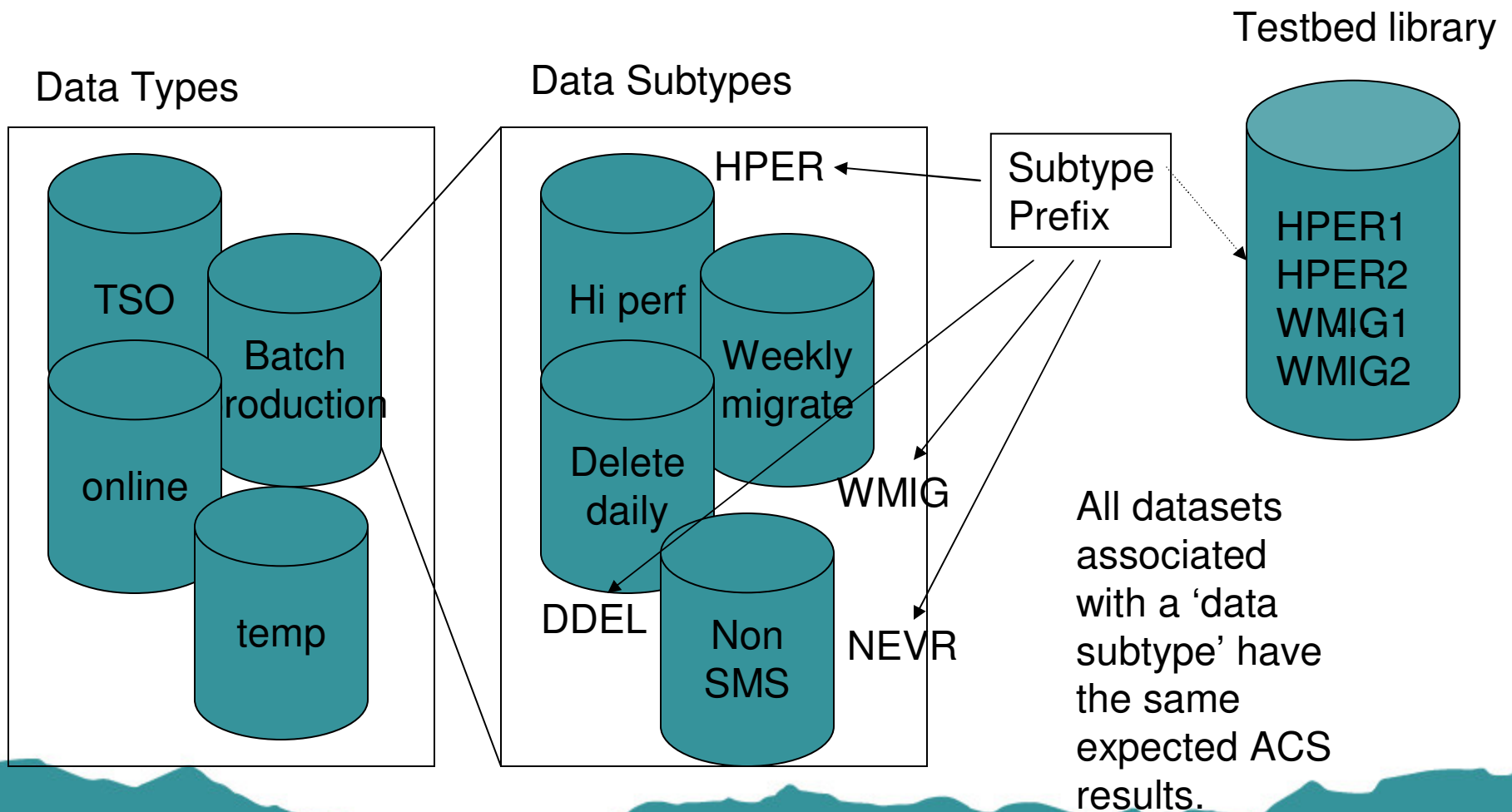
Create an ISMF Test Case

- Manually Define or Alter or Execute
 - via ISMF Test (7.4.1, 7.4.2, 7.4.3)
- Naviquest
 - Saved ISMF list
 - SMF data created by ACS routine exit
 - DCOLLECT, VMA extract
- Data source may need to be cleaned up before testcase generation
 - SYS1.VTOC, SYS1.VVDS eliminated
 - duplicates eliminated



Navigest Terminology

Data Classification



Saved ISMF List

- Create list via ISMF Dataset application (option 1)
 - Easy to create
- Build Test Cases via Naviquest (option 11.1)
- Easy to create
 - But does not always create valid test cases
 - Any invalid data in the testcase results unable-to-ALTER, unable-to-execute testcase, or worse
 - *Saved list uses SPACETYPE instead of SPACE_TYPE*
 - *Saved list uses 'K' or 'M' in SIZE variable (unable to ALTER but testcase executes, incorrectly)*
 - Non-dataset variables must be manually entered
 - JOB, XMODE, ACCT, DD, etc.
 - can be entered at Naviquest testcase generation time
 - Doesn't work for VSAM
 - Data/Index cases created but not CLUSTER

DCOLLECT Data

- Run DCOLLECT for dataset info
 - ISMF option C or batch job
- Generate test cases
 - Navquest (ISMF 11.2)
- Easy to create lots of test cases
 - Navquest testcase generation filters out SYS1.VVDS, etc.
 - Non-dataset variables must be manually entered after testcase generation
 - JOB, XMODE, ACCT, DD, etc.

SMF Records from IGDACSSC

- **STORCLAS** exit supplied in **SYS1.SACBCNTL**
 - source code accesses ACERO, ACERW, ACSPM
 - must be reassembled for each new DFSMS release
 - writes 'exit entered message'
 - write ACS R/O variables to SMF type 127
 - optionally write ACS R/O variables to job log if ACCT=DEBUG
- Program ACBTST
 - creates testcases from SMF type 127 records - one PDS member each
- Can create many test cases
 - includes all variables - JOB, STEP, DD, PGM, USER, etc.
 - Customize exit to select only desired jobs/applications
 - PDS member names Tnnnnnnn may need to be made meaningful

Naviquest

- Enhanced ACS Management – ISMF Option 11
 - Test Case Generation
 - Test Case Listings Comparison
 - Test Case Update
- Batch or ISPF
 - batch jobs invoke ISMF / ISPF via REXX
 - most ISPF functions can be performed in batch

Naviquest Regression Testing

- Test Case Execution
 - Execute Test Cases vs. SCDS 1 – save listing
 - Execute Test Cases vs. SCDS 2 – save listing
- Test Case Listing Comparison
 - Compare listing 1 vs. listing 2
 - Outputs:
 - Summary of exceptions listing
 - Exception Test Case PDS – test case library for test cases with different results
- Test Case Update
 - Update Test Case Library from Exception Library + Exception Listing
 - Replace DESCRIPTION2
 - DC=, SC=, MC=, SG= (limited to 80 chars)

WRITE Statements

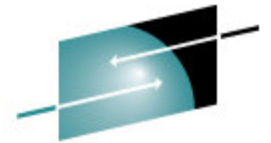
- Use to display values of variables
 - Up to 110 characters
- Problems
 - TSO – displays only if allocation fails
 - Only first SG name displayed
 - Only first volume displayed for &ALLVOL / &ANYVOL
 - Maximum of 5 messages per ACS routine

Using 'Trigger' Values

- Testing vs. ACTIVE
 - Run test jobs, e.g., PGM=IEFBR14
 - Examine JESMSGs
- Testing vs. SCDS
 - Use ISMF Test
 - Examine Testcase Listing
- Select on special values
 - Special JOBNAME, DD, etc.

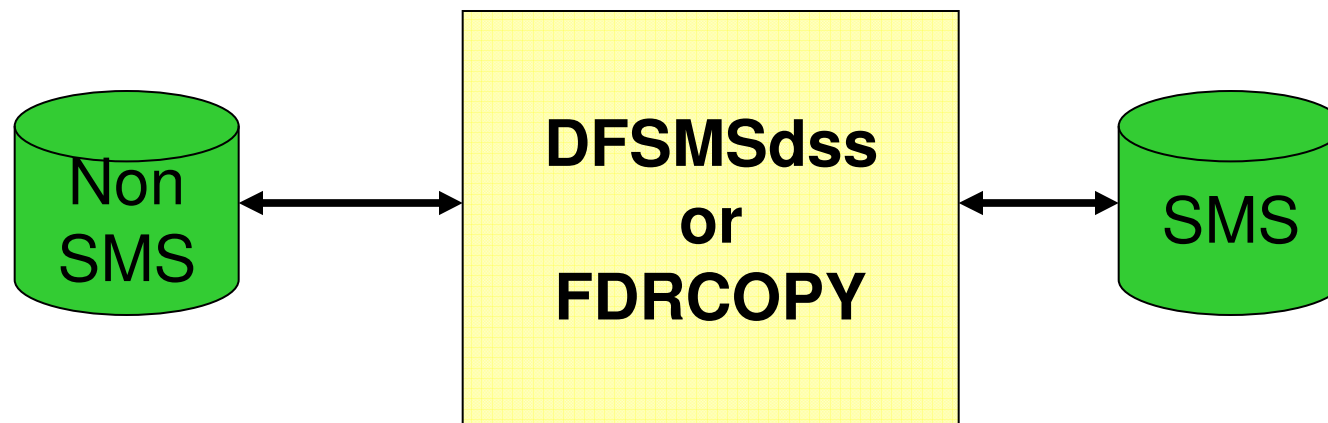
```
IF &DD = 'PI314159' THEN WRITE 'SIZE='&SIZE  
IF &JOBNAME = TESTX* THEN DO  
  WRITE 'SIZE='&SIZE  
  IF &XMODE = TSO THEN EXIT CODE(99)  
END
```
 - Nonexistent SMS class, e.g.,

```
IF &STORCLAS = 'NULL' THEN SET &STORCLAS = "  
IF &ACSENVIR = 'ALLOCTST' (vendor use)
```



CONVERTVOL

- Use SMS Conversion-in-Place (SIM) to execute ACS routines



```
// EXEC PGM=FDRCONVT
//SYSIN DD *
SIMULATE STATUS=SMS,
VOL=PROD04,
REDETERMINE=YES
```

ACS
Routines


```
// EXEC PGM=ADDRSSU
//SYSIN DD *
CONVERTV SMS TEST -
DYNAM (PROD04) -
RETDETERMINE
```

What ACS Testing Can't Do

- Expose ACS routine logic errors directly
- Use of LIKE= parameter in JCL
 - No &DSNTYPE, &DSORG, &SIZE/&MAXSIZE, RECORG
- Find Dataset Separation Profile errors
- Determine which volume will be selected for allocation
 - Use VOLSELMSG option in IGDSMSxx

IGDSMSxx Values

- Values affecting ACS Routines
 - ACSDEFAULTS(YES | NO)
 - BREAKPOINTVALUE(nnnnn)
 - DSNTYPE(LIBRARY | PDS | HFS)
 - REVERIFY(YES | NO)
 - USE_RESOWNER(YES | NO)

 - Values affecting Allocation and Volume Selection
 - FAST_VOLSEL(ON | OFF)
 - GDS_RECLAIM(YES | NO)
 - OVRD_EXPDT(YES | NO)
 - USEEAV(YES | NO)
 - VOLSELMSG
- 

ACS Testing and Debugging

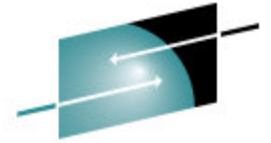
- Keys to Success
 - Limit the size and complexity of the ACS routines
 - Log all updates to ACS and prepare a fallback
 - Use SETSMS with SAVEACDS
 - Use WRITE statements to show ACS variable values
 - Include easily-accessible ‘testing’ code in ACS routines
 - Perhaps duplicate the production ACS routines as ‘test’ segments in the test LPARs
 - Create and Maintain a Testcase Library and regression testing regimen



Documentation

- *DFSMSdfp Storage Administration*
Document Number: SC26-7402-13
 - Defining SMS Constructs
 - ACS Routine Language and Syntax
 - Naviquest
- *DFSMS Using ISMF*
Document Number: SC26-7411-06
- *DFSMS Implementing System-Managed Storage*
Document Number: SC26-7407-06
 - Implementing SMS management
- *DFSMS Using the New Functions*
Document Number: SC26-7473-06
 - What's new in DFSMS (incl HSM, DFDSS, IDCAMS, et. al.)





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Questions???

