z/OS SMF Logstream Mode: Update and User Experience

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An Unmetered Ode to SMF

- **System Management Facility**
- **A powerful function unique to z/OS**
- **Framework for collecting and manipulating structured data produced by system or user components**
- **Header data (type, date/time) prescribed for all types**
- **Remainder documented for each IBM record type**
- **User records defined at will by owner/installation**
- **No action required by applications or subsystems**
- **No allocations, no opening/closing of log/trace**
- **All we have to do is collect, massage, and archive**

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Your Daddy's SMF

- **For more or less ever, SMF recording was to VSAM**
- **Multiple MANx clusters sucked up records AFAP**
- **Periodically each MANx file would be dumped by IFASMFDP immediately or ultimately to tape**
- **Triggered by indication of MANx data set full**
- **IEE391A SMF ENTER DUMP FOR DATA SET ON VOLSER SMFC02, DSN=SYS1.MAN2.$SYSC0**
- **IEE388I SMF NOW RECORDING ON VOLSER SMFC01, DSN=SYS1.MAN1.$SYSC0 TIME=**
- **Data set emptied (ZEROed) after dumping**
- **Switched to next available MANx data set round robin**

Daddy's SMF Headaches

- **Lots of problems**
- **MANx data sets filled up fast on a busy system**
- **Out of control tasks could swamp all MANx data sets**
- **Problems with tape could prevent normal dump/clear**
- **Even with emergency buffering, SMF data could be lost**
- **No prioritization of record types possible**
- **Records processed FIFO without regard to customer's needs**
- **If any data lost, all data lost**

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System Logger Rides to the Rescue

- **Solution in z/OS R9 was SMF Logger**
- **MANx replaced by system log stream**
- **Either supported by CF structure or DASD-only**
- **We use CF supported logstreams only (so far)**
- **Logstream solves many chronic problems**
- **Much faster than writing to MANx VSAM**
- **Less chance of losing data due to high rate**
- **Data directed to multiple log streams by SMF type**
- **But data must be managed somewhat differently**

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Managing SMF Data Gangnam Style

- **New management program IFASMF<u>DL</u>**
- **Original design required start/end dates**
- **Now IFASMFDL provides ARCHIVE with no DATE parameter**
- **Simply dumps all records not previously ARCHIVEd**
- **Starts with oldest non-ARCHIVEd records**
- **Marks dumped records as 'ARCHIVEd'**
- **Stops at current time plus…**
- **Includes 'SMART' keywords for moving end time**
- **Also adds diagnostic information for debugging**

Gangnam Style - 2

- **Management of data now similar to old MANx style**
- **But you still get logger speed and flexibility**
- **I recommend…**
- **One day retention (minimum allowed) in log stream definition**
- **Multiple ARCHIVE jobs per day (at least two)**
- **In sum: management of MANx data sets is driven by data**
- **Management of Logger data is driven by time**
- **Current implementation similar to old IFASMFDP**

Gangnam Style - 3

- **We run two dump jobs daily, midnight and noon**
- **Midnight job performs traditional SMF data processing**
- **Combines data from multiple systems, creates multiple outputs**
- **Produces reports for various subsystems, stakeholders**
- **Midday job just archives for next midnight job**
- **Purpose: make sure data is not deleted after extended outage**
- **Data marked as archived by SMF dump job**
- **Data retained/deleted by system logger**

D SMF Old School Style

- **IEE974I 15.22.16 SMF DATA SETS**
- **P-SYS1.MAN1.$SYSX0   SMFX01   67500   84 ACTIVE**
- **S-SYS1.MAN2.$SYSX0   SMFX02   67500   0 ALTERNATE**

- **Similar lines for each MANx data set**
- **Status changes as each one fills up or gets emptied**

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SMF Logstream Status

- **IFA714I 15.22.48 SMF STATUS**
- **LOGSTREAM NAME   BUFFERS   STATUS**
- **A-IFASMF.DEFAULT   21524   CONNECTED**

- **ISPF 3.4 for LOGR.IFASMF shows all offload data sets**
- **LOGR.IFASMF.DEFAULT.A0096197   *VSAM***
- **LOGR.IFASMF.DEFAULT.A0096197.DATA   ASMF01+**

- **Each data set is 2,745 tracks (183 cylinders)**
- **Size determined by logstream definitions**
- **Count rises and falls throughout the day**

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Set Recording Mode in PARMLIB

- **PARMLIB SMFPRMxx**
- **ACTIVE**
- **DSNAME(SYS1.MAN1.$SYS&SYSCLONE,**
- **SYS1.MAN2.$SYS&SYSCLONE,**
- **SYS1.MAN3.$SYS&SYSCLONE)**
- **RECORDING(LOGSTREAM)**
- **/* RECORDING(DATASET) /***
- **DEFAULTLSNAME(IFASMF.DEFAULT)**

- **Note: SMFPRMxx members cannot be concatenated**

Defining SMF Logstream - 1

- **//LOGRSMF EXEC PGM=IXCMIAPU**
- **//SYSPRINT DD SYSOUT=***
- **//SYSIN   DD ***
- **DATA TYPE(LOGR)**
- **DEFINE STRUCTURE**
- **NAME(IFASMF_DEFAULT)**
- **LOGSNUM(5)**
- **AVGBUFSIZE(32767)**
- **MAXBUFSIZE(65532)**

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Defining SMF Logstream - 2

- DEFINE LOGSTREAM
- NAME(IFASMF.DEFAULT)
- HLQ(LOGR)
- STRUCTNAME(IFASMF_DEFAULT)
- **LS_SIZE(32768)** ← Determines size of offload data set
- LS_DATACLAS(SMFLOG)
- STG_DATACLAS(SMFLOG)
- STG_DUPLEX(YES)
- DUPLEXMODE(UNCOND)
- AUTODELETE(YES)
- **RETPD(1)** ← Determines number of offload data sets

Logstream Archive Job

- **//ARCHLOGR EXEC PGM=IFASMFDL**
- **//OUTSMF   DD DSN=LOGR.SMFDATA(+1),**
- **//   DISP=(CATLG,DELETE),UNIT=TAPE,**
- **//   LRECL=32760,RECFM=VBS,BLKSIZE=4096,**
- **//SYSPRINT DD SYSOUT=***
- **//SYSIN   DD ***
- **LSNAME(IFASMF.DEFAULT,OPTIONS(ARCHIVE))**
- **OUTDD(OUTSMF,TYPE(0:255))**
- **SMARTENDPOINT /* R13 AND UP */**
- **SMARTEPOVER(0100) /* TWICE THE VALUE OF MAXDORM */**
- **//PROCSMF EXEC … Process LOGR.SMFDATA() as before**

Whither Offload Data Sets?

- **Location of offload data sets determined by SMS rules**
- **1. <u>Restricted</u>: go only to defined pool (one or more specific volumes)**
- **2. <u>Contained</u>: go to defined pool but allow overflow elsewhere**
- **3. <u>Free range</u>: go to any available volume, i.e. SYSALLDA**
- **With (1), you risk losing data (see below)**
- **With (3), you risk flooding the whole DASD farm**
- **I recommend option (2) unless space problems occur**
- **When you're all done, you get back most of the old MANx space**
- **Keep a few smallish MANx guys for emergency fallback to DS**
- **If you do have to fall back temporarily, be sure to dump MANx**

What Could Possibly Go Wrong?

- **Early on, IFASMFDL would choke on 'bad data'**
- **Especially invalid time stamp, other errors possible**
- **IFASMFDL would end badly with no diagnostics**
- **SMF data continued to accumulate in offload data sets**
- **Eventually DASD would fill up, causing buffering**
- **Finally SMF disconnected from log stream ;-(((**
- **IFA714I 15.22.48 SMF STATUS**
- **LOGSTREAM NAME   BUFFERS   STATUS**
- **   A-IFASMF.DEFAULT   9999999   DISCONNECTED**
- **Try switching to MANx, then back to logstream**
- **SMF Logstream has been very reliable for some time**

Questions?

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