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## **OSDI Status Update/Tips**

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Bug Diagnosis and Escalations

# Agenda

- OSDI version 1.2 release summary
- Virtual storage management
- Diagnostics improvements
- Alert log management
- Setting SQL\*Plus site-specific defaults
- Ask Phil



# OSDI 1.2 Release Summary



# OSDI Patch Releases

- OSDI 1.2 announced April 29<sup>th</sup> during SIG 2008
- 1.2.0 released May 16<sup>th</sup> under placeholder patch -
  - BUG 6138068 - PDS XMIT DISTRIBUTION OF LATEST OSDI MODULES
- Average 4-5 bug fixes/enhancements per patch release
- Patch release history -
  - 1.2.1.4 – 02/03/09
  - 1.2.1.3 – 12/09/08
  - 1.2.1.2 – 08/21/08
  - 1.2.1.1 – 07/11/08
  - 1.2.1.0 – 05/21/08

# OSDI Subsystem

- Subsystem rarely changes -
  - If the subsystem component in the patch is *newer* -
    - Update system link list and IPL
- SUBSYS last updated 04/18/2008 for OSDI 1.2 -
  - OSDI 1.2.1.4

Component	Version	Date
SUBSYS	1.2.0	04/18/2008
SVRREG	1.2.1.4	02/03/2009
NET	1.2.1.4	02/03/2009

- OSDI 1.2.0

Component	Version	Date
SUBSYS	1.2.0	04/18/2008
SVRREG	1.2.0	05/05/2008
NET	1.2.0	05/06/2008

# Bug Fix Summary

- z/OS upgrade/certification -
  - S0C4/ORACLE-3113 using XM DBLINK on z/OS 1.8+
  - S0E0-28 exposed by z/OS diagnostic trap IEAINITREGSTASK
- Network service -
  - S0C4 due to MINKID/MINKIDSR synchronization errors
  - S0C4/ORACLE-3135/ORACLE-3113 when data exceeds SDU size
  - No connections shown by DISPLAY TCP command
- Database service -
  - S0C4/ORACLE-29702 starting RAC instance
  - S0C4/hang due to bad dead process detection during initialization
- Gateway service -
  - S0F8-10 after POST failure
  - ORACLE-4101/ERRORID=1075 during 2PC recovery (RECO)

# Enhancement Request Summary

- Virtual Storage Management -
  - New command: DISPLAY MEMORY
  - New parameters: MIN\_SESSION\_MEM, AS1\_METRIC\_BIAS
- Diagnostics -
  - New Net message MIN0901W
    - Issued if SDUMPX fails
  - Changed Server Region message MIR0036W
    - Adds recovery routine name and ABEND code
  - Changed ABEND code for KILL and IDLE\_TIMEOUT
    - S222 (operator cancel) → U1023
    - TG4DB2 is now the same as the RDBMS

# Certification

- z/OS 1.10 certification -
  - TG4DB2 10.2.0.3 certification completed
  - Oracle 10.2.0.3 certification pending – no known issues at this time
  - Oracle 9.2.0.8 and 10.1.0.5 certification – not planned
- Previous upgrade issues -
  - Unexpected access register contents after calling a z/OS function
  - Control returned from LE in Primary ASC mode
- Preventative actions -
  - Run the Oracle kernel in Primary ASC mode
  - Switch to AR ASC mode only when required
  - Check for potential problems via z/OS diagnostic trap IEAINITREGSTASK (ABEND S0E0-28)

# OSDI Virtual Storage Management



# Server Region Memory Parameters

- Existing SVRREG parameters -
  - REGION\_MEM\_RESERVE
    - Limit total global/session memory per address space
  - MAX\_SESSION\_MEM
    - Limit memory for a single session
- New in OSDI 1.2.1.4 -
  - ER 7830901: MIN\_SESSION\_MEM
    - Reject new sessions if insufficient session memory
  - ER 7827748: AS1\_METRIC\_BIAS
    - Restrict # user sessions in control address space

# Server Region Memory Display

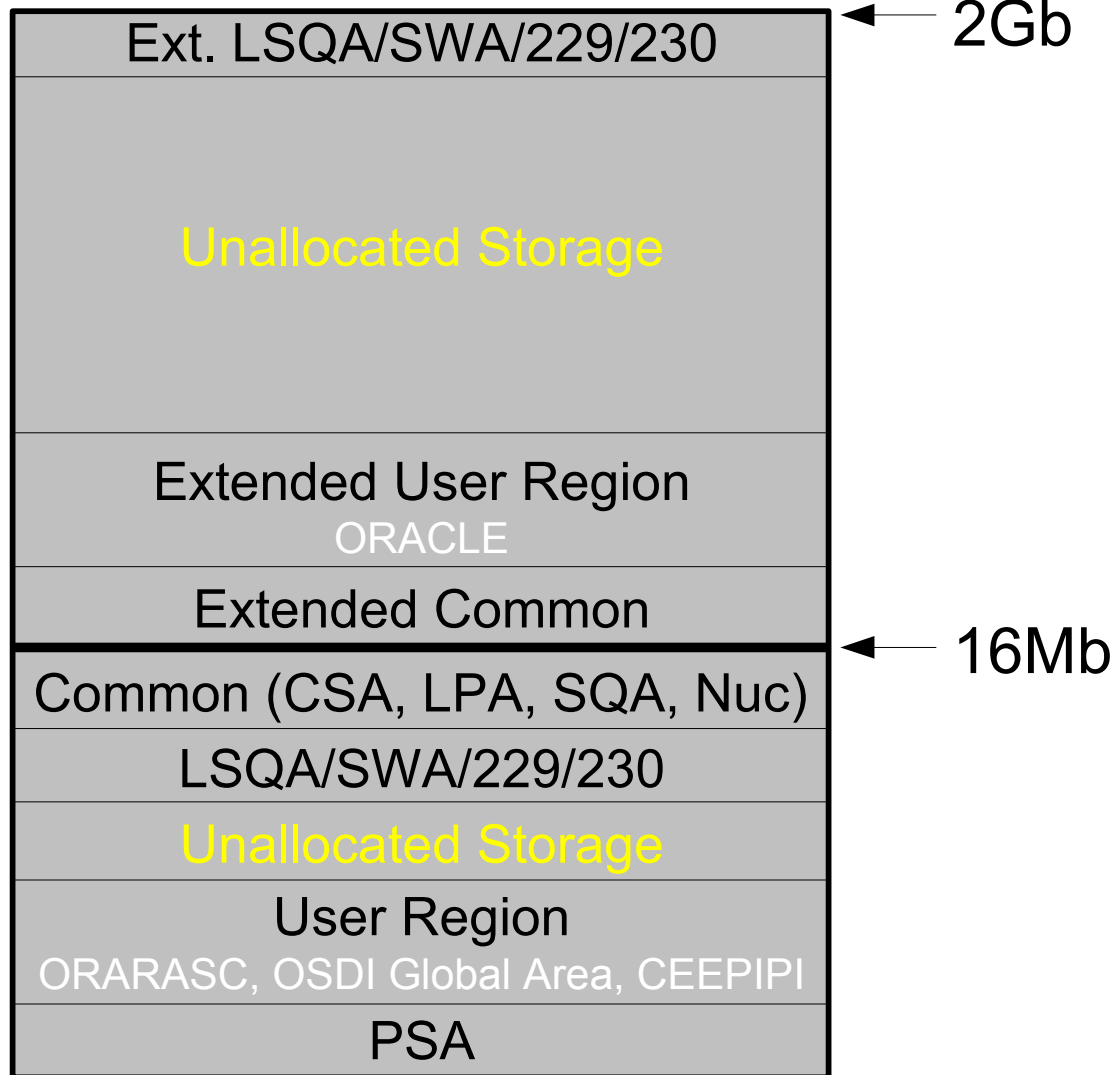
- ER 7830982 - MODIFY *<service>*,DISPLAY MEMORY

- Example -

```
F ECS5,DIS MEM
MIR0513I Server memory display
      Session   Session   Region Region
AS#   Current   High    Current Limit
001   33263K    34351K   392M  1351M
002      0K      0K     360M  1351M
003   12961K   15138K   373M  1351M
004      0K      0K     360M  1351M
MIR0500I Command processed
```

- Displays the following information per address space -
  - Total session memory (Kb)
  - Sum of session high water mark memory (Kb)
  - Region memory (Mb)
  - Region memory limit (Mb) or zero if REGION\_MEM\_RESERVE is not specified.

# Address Space After Initialization



# REGION\_MEM\_RESERVE

- Purpose -
  - Reserve virtual storage for OS functions (IDCAMS, SAF, RTM)
  - Avoid address space termination (usually ABEND S40D-10)
- Region limit calculated late during initialization -
  - $\text{Region Limit} = \text{SUM}(\text{UNALLOC}) - \text{REGION\_MEM\_RESERVE}$

```
F ECS5,DIS MEM
MIR0513I Server memory display
      Session  Session  Region Region
AS#   Current   High   Current Limit
001      0K      0K      0M   1351M
MIR0500I Command processed
```

- Service PROC needs REGION=0M (VSMLIST issue)
- Recommendation -
  - Set REGION\_MEM\_RESERVE to 100M – 150M
  - Default: 0 (no limit)

# MAX\_SESSION\_MEM

- Purpose -
  - Limit the amount of virtual storage that a single database session can allocate
  - Prevent “rogue” sessions from monopolizing memory
- Includes all session memory allocated by LE (heap and stack)
- Recommendation -
  - Application dependent -
    - CATALOG, CATPROC need MAX\_SESSION\_MEM(100M)
  - Default: 0 (no limit)
  - Contact Oracle Support if your applications need > 200M

# MIN\_SESSION\_MEM

- Enhancement Request -
  - BUG 7830901 - ENH: REJECT NEW CONNECTIONS WHEN SERVER REGION IS SHORT ON STORAGE
- Purpose -
  - Reserve virtual storage for existing sessions
- Effect -

ORA-12511: TNS:service handler found but it is not accepting connections

```
MIN0307E bind to service ECS5      failed, RC = 08, RSN = 0110, INFO = 0008001C
MIS0210E Connect to service failed
```

- Recommendation -
  - Application dependent – initial MIN\_SESSION\_MEM(10M)
  - Default: 0 (no minimum)
  - Note: Must set a region limit via REGION\_MEM\_RESERVE

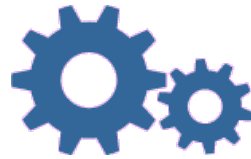
# AS1\_METRIC\_BIAS

- Enhancement Request -
    - BUG 7827748 - ENH: LIMIT ACCESS TO CONTROL ADDRESS SPACE IN A MAS CONFIGURATION
  - Purpose -
    - Reserve virtual storage for background tasks
  - Effect -
    - Bias user sessions towards auxiliary regions
- ```
EC01 DIS ECS5 LONG
MIS0308I Service ECS1      is ACTIVE  , 002 address spaces
          ASID 0077: ACTIVE    , 00000 binds, 65FFFFFFF metric
          ASID 008A: ACTIVE    , 00000 binds, 7FFFFFFC17 metric
```
- Recommendation -
    - Set AS1\_METRIC\_BIAS to 256M (some users) – 1024M (no users)
    - Default: 0 (no adjustment to memory availability metric)

# Setting MIN/MAX\_SESSION\_MEM

- SMF statistics records include session memory high
- Mapping macro in `<hlq>.SRCLIB(ORASMFO)` -
  - SMFHWST - HIGH-WATER MARK OF MAIN STORAGE USED
- Assembler code in `<hlq>.SRCLIB(ORAFMTO)` -
  - Sample Oracle OSDI SMF record formatting program
  - Reports SMFHWST as “HI STG”
- Enabled via SVRREG parameter -
  - SMF\_STAT\_RECNO(204)
- Note: PGA is a subset of session memory -
  - SMFHWST – 2923K
  - V\$SESSTAT session pga memory max – 1853K

# Diagnostics Improvements



# New/Changed Messages

- ER 8202577 - ENH: ISSUE A MESSAGE IF SDUMPX FAILS DURING ABEND RECOVERY

- Adds Net message MIN0901W

- Example -

```
MIN0901W Oracle network ECN4 TCP/IP HPNS driver (MINHPNSE) ECN4 ABEND S0C1 - SDUMPX  
RC=08, RSN=0B
```

- ER 8202532 - ENH: REPORT ABEND CODE IF SDUMPX FAILS

- Adds diagnostic information to Server Region message MIR0036W

- Example -

```
Old: MIR0036W Dump request for service ECS5 failed, Return code=08, Reason=04
```

```
New: MIR0036W Oracle server ECS5 server LE session (MIRREC) ECN4 ABEND U1113 - SDUMPX  
RC=08, RSN=04
```

# Changed ABEND Code

- ER 7332200 - CHANGE ABEND CODE TO U1023 FOR KILL & IDLE TIMEOUT OF DEDICATED TCBS
  - Change ABEND code for dedicated tasks (MIRCLNT)
  - S222 (operator cancel) → U1023 for TG4DB2
- No more blaming Operations staff 😊
- Consistent with use of U1023 for RDBMS sessions
- Note: Dedicated tasks are required by DB2 RRSF

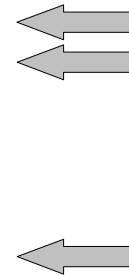
# Alert Log Management



# Alert Log to Spool

- Default: `ALERT_DSNAME(SYSOUT:*)` -

```
MIR0001I Starting control region for ECS5      service in subsystem EC01
MIR0009I Starting system subtasks
IEF237I JES2 ALLOCATED TO SYS00001
MIR0612I Alert log for service ECS5      allocated to SYS00001
MIR0002I ECS5      service address space ready. Version:1.2.1.4
MIR0011I Stop command received
MIR0003I Quiescing ECS5      service address spaces
MIR0010I Stopping system subtasks
IEF285I  ECS5.ECS5.STC00444.D0000101.?      SYSOUT
MIR0004I ECS5      service terminated
```



- Advantages -
  - Keep joblog and alert log together
  - Can view with SDSF etc. while instance is running
- Disadvantages -
  - Need spool archival utility?
  - STC output purged (dummy class)?

# Alert Log to Spool

- Override STC output class -

```
MIS0194I Service ECS5      Type ORA  (PVEAL RDBMS 10.2.0.3)
          SID=ECS5      MaxAS=010 Proc=ECS5      Jobname=ECS5
          JobAcct=(no accounting)
          JCLParm='MSGCLASS=Y' ←
          Parm=(no parameter)
```

```
1 //ECS5      JOB MSGCLASS=Y, ←
  // MSGLEVEL=1
2 //STARTING EXEC ECS5
```

- Advantages -

- Keep joblog and alert log together
- Can view log with SDSF etc. while instance is running
- Can be kept on spool after STC ends (timed purge?)

- Disadvantages -

- Need spool archival utility?

# Alert Log to Operator Console

- Server Region parameter: ALERT\_ROUTCDE(11) -

```
N 0000000 MVS09      09097 15:49:22.43 STC00460 00000090 IEF403I ECS5 - STARTED - TIME=15.49.22
N FFFFFFFF MVS09      09097 15:49:24.31 STC00460 00000090 MIR0001I Starting control region for ECS5
                                     service in subsystem EC01
N FFFFFFFF MVS09      09097 15:49:35.08 STC00460 00000090 MIR0009I Starting system subtasks
N FFFFFFFF MVS09      09097 15:49:35.10 STC00460 00000090 MIR0002I ECS5      service address space ready.
                                     Version:1.2.1.4
N FFFFFFFF MVS09      09097 15:49:35.11 STC00460 00000090 MIR0612I Alert log for service ECS5      allocated
                                     to SYS00001
N 0020000 MVS09      09097 15:50:08.44 STC00460 00000090 MIR0623I Starting ORACLE instance (normal)
N 0020000 MVS09      09097 15:50:08.51 STC00460 00000090 MIR0623I LICENSE_MAX_SESSION = 0
N 0020000 MVS09      09097 15:50:08.51 STC00460 00000090 MIR0623I LICENSE_SESSIONS_WARNING = 0
```

- Advantages -

- Monitoring via automated operations
- Independent of ALERT\_DSNAME
- View most (excluding IDCAMS) messages via SDSF etc.

- Disadvantages -

- Flood the console at database startup?

# Alert Log to Dataset

- Database service PROC -

```
//SYSPRINT DD DSN=EMEASUP.ECS5.ALERT.LOG,DISP=SHR
```

- Advantages -
  - Can view log while instance is running (shared enqueue)
- Disadvantages -
  - Some disk space wasted due to short blocks

# Alert Log to zFS File

- Database service PROC -

```
//SYSPRINT DD PATH='/support/EMEA/10g/V10203/rdbms/log/alert_ECS5.log',  
//          PATHOPTS=(OWRONLY,OCREAT,OAPPEND),  
//          PATHMODE=(SIRWXU,SIRWXG,SIROTH),  
//          PATHDISP=(KEEP,KEEP),  
//          FILEDATA=TEXT
```

- INITORA parameter (default) -

```
background_dump_dest = /support/EMEA/10g/V10203/rdbms/log
```

- Advantages -

- Monitoring via Enterprise Manager
- Can view log while instance is running

- Disadvantages -

- Needs periodic pruning

# Alert Log to Managed Datasets

- Server Region parameters -

```
ALERT_DSNAME(&ORAPREFD..&ORASRVN..ALERT.D&LYYMMDD..T&LHHMMSS.)  
ALERT_MAX(750K)  
ALERT_MIN(0)
```

- File management parameters (ORA\$FPS) -

```
* Alert log  
FILE_GROUP(DBAT)  
  DEFAULT_SPACE(2475 30)  
  UNIT(SYSDA)
```

- Advantages -

- Dataset names can include timestamps
- Doesn't keep growing until space/extents exceeded
- Recovery from write errors (e.g. disk full)

- Disadvantages -

- Can't view without switching (exclusive enqueue)
- Some disk space wasted due to short blocks

# Alert Log to Managed Datasets

- Example -

```
MIR0001I Starting control region for ECS5      service in subsystem EC01
MIR0009I Starting system subtasks
MIR0002I ECS5      service address space ready. Version:1.2.1.4
MIR0612I Alert log for service ECS5      allocated to SYS00001
MIR0618I DSN=EMEASUP.ECS5.ALERT.D090408.T102048
...
MIR0622I Service ECS5      alert log switching due to ALERT_MAX ←
MIR0612I Alert log for service ECS5      allocated to SYS00069
MIR0618I DSN=EMEASUP.ECS5.ALERT.D090408.T102622
```

- Alert log header -

```
Oracle service ECS5      alert log on system MVS09 DSN=EMEASUP.ECS5.ALERT.D090408.T102622
==> Date for following entries is 2009/04/08
```

- Manual log switch -

```
F ECS5,LOGSW
MIR0500I Command processed
MIR0612I Alert log for service ECS5      allocated to SYS00010
MIR0618I DSN=EMEASUP.ECS5.ALERT.D090408.T092517
```

# Alert Log to Managed Datasets

- Setting ALERT\_MAX -
  - Records periodically flushed to disk, so mostly unblocked
  - Figure on 10Kb per track (3390)
  - E.g. ALERT\_MAX(750K) – 5 cylinder limit
- Setting DEFAULT\_SPACE -
  - Allocated as AVBLOCK(1024) SPACE(<primary> <secondary>)
  - MVS uses AVBLOCK for *primary*, BLKSIZE for *secondary*
  - 3390: 33 \* 1024 byte blocks/track. 2 \* 27998 byte blocks/track.
  - E.g. DEFAULT\_SPACE(2475 30) – SPACE(5 1) CYLINDERS

# Setting Site-Specific Defaults For SQL\*Plus



# SQL\*Plus Profiles

- Example in the SQL\*Plus User's Guide and Reference -

```
-- login.sql
-- SQL*Plus user login startup file.
--
-- This script is automatically run after glogin.sql
--
-- To change the SQL*Plus prompt to display the current user,
-- connection identifier and current time.
-- First set the database date format to show the time.
ALTER SESSION SET nls_date_format = 'HH:MI:SS';
-- SET the SQLPROMPT to include the _USER, _CONNECT_IDENTIFIER
-- and _DATE variables.
SET SQLPROMPT "_USER'@'_CONNECT_IDENTIFIER _DATE> "
-- To set the number of lines to display in a report page to 24.
SET PAGESIZE 24
-- To set the number of characters to display on each report line to 78.
SET LINESIZE 78
-- To set the number format used in a report to $99,999.
SET NUMFORMAT $99,999
```

# SQL\*Plus Site Profile In Batch

- Enhancement Request -
  - BUG 6026963 - ENH: SITE PROFILE (GLOGIN.SQL) SUPPORT UNDER BATCH AND TSO (POSIX OFF)
    - Note: Available in CPUJul2007 (patch 6166424) and later
- How to -
  - Note 433102.1 - z/OS: Support for the GLOBAL Login File - glogin.sql
- Documentation -
  - Oracle Database System Administration Guide, 10g Release 2 (10.2) for IBM z/OS (B25398-01)
  - Oracle Database User's Guide, 10g Release 2 (10.2) for IBM z/OS (B25396-01)
  - SQL\*Plus User's Guide and Reference, Release 10.2 (B14357-01)

# SQL\*Plus Profiles

- For Unix (POSIX on) clients:
  - Site profile -
    - `$ORACLE_HOME/sqlplus/admin/glogin.sql`
  - User profile -
    - `login.sql`
- For native batch and TSO (POSIX off) clients:
  - Site profile default -
    - `//'SYS1.ORACLE.GLOGIN.SQL'`
  - Site profile environment variable -
    - `GLOGIN_SQL`
  - User profile -
    - `//DD:SQLLOGIN`

# Global Environment Variable File

- For batch and TSO (POSIX off) clients only
- Global environment variable file default -
  - `//'SYS1.ORACLE.ENV'`
- Local environment variable file -
  - `//DD:ORA$ENV`
- Advantages -
  - Dynamically allocated, so no JCL changes required
  - Maintained by System/Database Administrator
  - Provides site-specific global defaults, such as -
    - `NLS_LANG`
    - `GLOGIN_SQL`

# Global Environment Variable File

- Changing the filespec to comply with site standards -

```
//ASM EXEC PGM=ASMA90,REGION=6M,PARM=(OBJ,NODECK)
//SYSLIB DD DSN=SYS1.MACLIB,DISP=SHR
//SYSUT1 DD DSN=&&SYSUT1,UNIT=VIO,SPACE=(CYL,2)
//SYSPRINT DD SYSOUT=*
//SYSLIN DD DSN=&&SYSLIN,UNIT=VIO,DISP=(,PASS),SPACE=(CYL,2),
// DCB=BLKSIZE=3120
//SYSIN DD *
ORAENVGL RSECT
ORAENVGL RMODE ANY
* Filespec to open for Oracle client global environment
* variable settings (default //'SYS1.ORACLE.ENV')
      DC    C'//' 'ORACLE.GLOBAL.ENV' ''
      DC    X'00'           Required terminator byte
      END  ORAENVGL

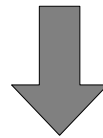
//*
//LKED EXEC PGM=LINKEDIT,REGION=6M,PARM='RENT,OL,MAP,LIST'
//SYSPRINT DD SYSOUT=*
//SYSUT1 DD DSN=&&SYSUT1,UNIT=VIO,SPACE=(CYL,2)
//SYSLMOD DD DSN=<hlq>.CMDLOAD,DISP=SHR
//SYSLIN DD DSN=&&SYSLIN,DISP=(OLD,DELETE)
//      DD *
      NAME ORAENVGL(R)
/*
```

# SQL\*Plus Site-Specific Defaults

- Putting it all together -

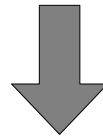
Module: ORAENVGL

```
//'ORACLE.GLOBAL.ENV'
```



DSN: ORACLE.GLOBAL.ENV

```
GLOGIN_SQL=//'ORACLE.GLOGIN.SQL'
```



DSN: ORACLE.GLOGIN.SQL

```
set sqlpluscompatibility 9.2.0
```

# Ask Phil





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