Resolving ORA-29770 LMHB Terminates Instance (Doc ID 1946105.1)

APPLIES TO:

Gen 1 Exadata Cloud at Customer (Oracle Exadata Database Cloud Machine) - Version N/A and later
Oracle Cloud Infrastructure - Database Service - Version N/A and later
Oracle Database Cloud Service - Version N/A and later
Oracle Database - Enterprise Edition - Version 11.2.0.1 and later
Oracle Database Cloud Schema Service - Version N/A and later
Information in this document applies to any platform.

PURPOSE

The purpose of this document is to explain the meaning of the ORA-29770 error in the context of a RAC database instance and to provide guidance for further troubleshooting.

TROUBLESHOOTING STEPS

Background

In a RAC database the LMON, LMSn and LMD processes are responsible for managing global resources (locks, buffer cache requests, etc) that span multiple instances. Problems with these processes on one node can have a negative impact on all database instances which would result in performance degradation, database hangs, etc. The LMHB database process (Global Cache/Enqueue Service Heartbeat Monitor) is designed to proactively address such situations by monitoring LMON, LMSn and LMD and terminating the instance when a problem with these processes is detected. The overall goal of terminating the "problem" instance is to free locked resources allowing the "healthy" instances to continue processing.

If the LMHB process finds a problem then you will see something like this in the alert log:

```
LMON (ospid: 31216) waits for event 'control file sequential read' for 88 secs.
Errors in file <ORACLE_BASE>/diag/rdbms/<DBNAME>/<SID>/trace/<sid>_lmhb_31304.trc
(incident=2329):
ORA-29770: global enqueue process LMON (OSID 31216) is hung for more than 70 seconds
LMHB (ospid: 31304) is terminating the instance.

or


LMON (ospid: 8594) waits for event 'control file sequential read' for 118 secs.
ERROR: LMON is not healthy and has no heartbeat.
ERROR: LMHB (ospid: 8614) is terminating the instance.
```

In these cases it was LMON that was determined to have a problem but it could be any of LMON, LMSn or LMD that had problems. Once LMHB terminates the instance, any resources blocked by the instance will be cleared and a reconfiguration of surviving database instance(s) will be performed allowing the surviving instances to continue processing.

Troubleshoot Instructions

Although there are some bugs reported in this area (see Known Defect Section below) this error does not generally indicate a bug.

In the cases above we see that the wait event that predicated the LMHB instance termination was due to 'control file sequential read' waits. Other waits are possible and these might give an indication of the problem.

Also as the following example shows LMHB will often give additional information to help you with determining the cause. In the case below it is not LMON as above but an LMSn process having problems.

```
LMSB (ospid: 27702) has not called a wait for 92 secs.
<…>
ERROR: Some process(s) is not making progress.
LMHB (ospid: 27708) is terminating the instance.
Please check LMHB trace file for more details.
Please also check the CPU load, I/O load and other system properties for anomalous behavior
ERROR: Some process(s) is not making progress.
LMHB (ospid: 27708): terminating the instance due to error 29770
```

In this case the issue was with lack of swap space at the OS level which caused processing delays for LMSB . The OS system logs and OSWatcher data should be reviewed for any error conditions, warnings and overall OS performance problems.

In the cases where there are –no- Oracle wait events, such as the 'control file sequential read' wait above, we would recommend running the latest version of ORAcheck (Document:1268927.1 ORAchk - Health Checks for the Oracle Stack) and verifying that there are no OS warnings or errors – particularly with respect to system resource limits.

Known Defects

For the situation in which LMON encounters the 'control file sequential read' wait the following code defects have been reported:

<unpublished> Bug 8888434 has been fixed in 11.2.0.2+
Bug:11890804 has been fixed in 11.2.0.3+
Please refer Document:1197674.1, Document:8888434.8 and Document:11890804.8 for more details

If you are encountering this specific wait on a pre 11.2.0.3 verion then please consider applying the above fixes or upgrading/patching to a higher release. If you are encountering this particular case and are on 11.2.0.3+ where these bugs are fixed we recommend that you examine the Troubleshooting section above.

For a situation where an LMS process reports "ORA-29770: global enqueue process LMS1 (OSID xxx) is hung for more than <nn> seconds " and there is an enqueue or wait event involving CTWR then one of the following bugs may apply. These are duplicate bugs but have different symptoms.

BUG 22809871 (Internal) - ORA-04031- "LARGE POOL","CTWR DBA BUFFER" - INSTANCE CRASH/RESTARTED

BUG 23616730 (Internal) - GSIAP INSTANCES 2,3 & 4 CRASHED FOR EVENT 'ENQ: CT - CTWR PROCESS START/STOP' both fixed in 12.2.0.1.0

Another Bug 21913183 CTWR gets ORA-4031 for "ctwr dba buffer" then instance terminates with ORA-29770 fixed in 12.2.0.1.0

Diagnostic Collection

(This section describes the data we need and how to collect it)

What to Collect

Diagnostic	**Comment**
Database instance alert log, and all LMHB, LMON, LMSn and LMD trace files from the local database with the LMHB	Predominately to establish/verify the time line but also for further information on the wait type or other possible

termination.	cause of the LMHB termination **(TFA will collect this)**
Database instance alert log and all LMHB, LMON, LMSn and LMD trace files from the local ASM instance – even if the ASM instance is not the one reporting the LMHB instance termination.	To determine if there are any ASM instance conditions/messages that can shed light on the reported LMHB termination. Eg failed access to a control file disk etc **(TFA will collect this)**
OS messages logs from the home node of the relevant instance	OS messages indicating resource shortage, OOM killer etc **(TFA will collect this)**
OS Watcher data from the home node of the relevant instance	CPU load, memory utilization etc **(TFA will collect this)**

How to Collect

If TFA is installed (:)) simply run the following command:

```
$GI_HOME/tfa/bin/tfactl diagcollect -from "MMM/dd/yyyy hh:mm:ss" -to "MMM/dd/yyyy
hh:mm:ss"

Format example: "Jul/1/2014 21:00:00"
Specify the "from time" to be 4 hours before and the "to time" to be 4 hours after the
time of error.
```

If TFA is not installed (:():

```
Datatbase logs & trace files:

cd $(orabase)/diag/rdbms
tar cf - $(find . -name '*.trc' -exec egrep '<date_time_search_string>' {} \; grep -v bucket) |
gzip >  /tmp/database_trace_files.tar.gz


ASM logs & trace files:

cd $(orabase)/diag/asm/+asm/
tar cf - $(find . -name '*.trc' -exec egrep '<date_time_search_string>' {} \; grep -v bucket) |
gzip >  /tmp/asm_trace_files.tar.gz


OS logs:

/var/adm/messages* or /var/log/messages* or 'errpt -a' or Windows System Event Viewer log (saved
as .TXT file)
```