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Performance and Tuning of Oracle RAC databases-1

What is LMS process in Oracle RAC databases?

LMS process called as Lock Manager Server Process, also called the GCS (Global Cache Services) process. Main work of this process is to transport blocks across to the nodes of Oracle RAC for “cache fusion” supportation. If any consistent read request found from another connected node then LMS process makes consistent read image of block and transport it to across the nodes for full feelling client’s consistent read request. This images transports using High Speed Interconnect process to and from remote nodes.

If we are using 8K block size then transporting consistent read images across to remote node using HSI using interconnect protocol becomes more busy and high CPU utilization. Which we can check from AWR reports, Statspack reports or Wait event called “global Cache Services” wait event. If this wait event consumes more CPU utilization and simultaneously found performance degradation of Oracle Database causes “cache fusion” and consistent read request transportation across to RAC nodes.

How to avoid this kind of performance degradation of Oracle RAC?

In Oracle Real Application Clusters, the cluster interconnect is a dedicated or stand alone network. This interconnect network is used to communicate the connected nodes across the clustering of RAC.

Ethernet is used in networking of Cluster interconnect protocol. Ethernet’s default frame size of 45-1500 bytes is the transferring unit between the all participant of nodes and hosts. If request of transferring data is larger than 1500 bytes then it will be split into smaller units and send multiple packets across to nodes using interconnect because lower range is 45 to 46 and upper limit of data is 1500 (maximum transfer unit) bytes.

Deployment of Jumbo Frames is very best option to such drastic situation of performance bottleneck. Jumbo Frames allows Ethernet packets to be sent in a larger size rather than default size.



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Generally Ethernet frames use a 1500 bytes size. Jumbo Frames allows this to be extended to 9000 bytes frame. This 9000 byte frame actually allow to send or transport 8k or larger block size data into single request of packets across to remote nodes instead of multiple frames which size default is 1500 bytes. This scenario is improving performance of RAC nodes specially “global Cache Services” wait event because it directly connected with consistent read request block image transporting across to remote nodes using interconnet protocol.

Multi block read request (called full table scan) is also affecting with same scenaro while we are using lower bound limit or default bound limit of MTU (maximum transfer unit) of interconnet of RAC. It is also stripping data in smaller units and send across to RAC connected nodes for “cache fusion” or “cr global cache request”. It is most targeting for deployment of same Jumbo Frames.

If small data is being transported then Jumbo Frames are not efficient and not recommended. But in some cases we can take advantages of same feature as follows.

- ✓ *Oracle RAC interconnect, where “global Cache services” or heavy waiting related global cache.*
- ✓ *NAS is involving in storage part of database.*
- ✓ *NAS is involving in backup part of database.*

Generally it is advisable to deploy for large amount of CR image transfer (cache fusion) using LMS process (means Global Cache Services) and your data block size is 8k or larger. But it is not advisable to impliment in general IP address of Ethernet card of server otherwise it may be degrade performance while small packet request is processing.