Oracle Comprehensive Database Health Check

Client: Sample Report

Date: Sept 21st, 2017

Database: PROD1

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Content

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Audience

This document is intended for reference material to Centric's Oracle database client. This document will provide technical information about their Oracle database environment. Therefore, the consumer of this document should have a technical database background.

Background

Centric EAS National Practice has helped dozens of Oracle database clients over the years. During that time, we have identified a need to be able to do a comprehensive database health check assessment. This tool provides value to our clients by ensuring that their mission critical databases are operating at peak performance and identifying areas of improvement.

Centric brings years of Oracle DBA experience and a proven track record of Oracle implementation successes. Part of that is Centric' commitment to ensuring that our clients have a stable database to build from.

This document will cover key areas of focus within an Oracle database. In addition, it will highlight areas of concern, and areas where immediate remediation action should be taken.

This document will not provide the necessary steps for correcting deficiencies that are identified, but will highlight the suspected causes of issues that are identified.

Health Check Target Area

No specific area is showing an issue. The client is looking for an overall health check.

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Scorecard

This section give a recap and scoring of the database that was analyzed.
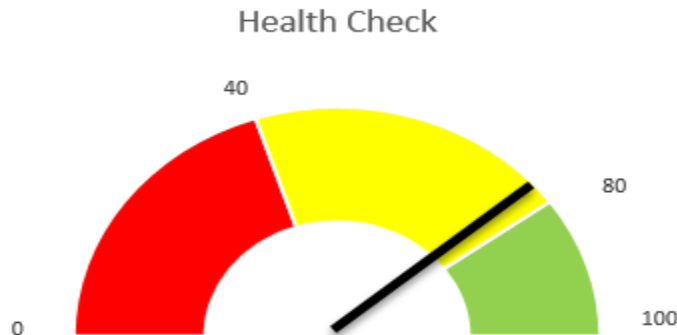
Section	Score	Max Score	Grade
Location of Binaries	3	5	🟨
Parameter File	4	5	🟩
Analysis of Control Files	3	5	🟨
Analysis of Redo Logs	1	5	🟥
Analysis of Log File Switches	5	5	🟩
Archiving of Redo Logs	5	5	🟩
Autoextensible Data Files	5	5	🟩
Location of Data Files	5	5	🟩
Non-System Owned Object in SYSTEM Tablespace	5	5	🟩
Locally vs Dictionary Owned Tablespaces	5	5	🟩
Temporary Tablespaces	5	5	🟩
Users Assigned to Temporary Tablespaces	5	5	🟩
Tablespace Fragmentation	5	5	🟩
Number of Extents Analysis	4	5	🟩
Ability To Extend Data Files	5	5	🟩
AUTO vs MANUAL UNDO Management	5	5	🟩
UNDO Tablespace Sizes	5	5	🟩
Memory Management	5	5	🟩
PGA Advice	5	5	🟩
SGA Advice	-	-	
Review of Database Alert Logs	1	5	🟥
Review of Database Incidents	1	5	🟥
Review of System Logs	3	5	🟨
Review of OS System Resources	1	5	🟥
AWR / ADDM Analysis	1	5	🟥
TOTAL SCORE	**92**	**120**	**77%**

Assessment

This part begins the detailed analysis of your system.

HOSTNAME: ddb1525.centricoracle.com

IP Address: 172.16.104.25

OS: Linux 4.1.12-37.4.1.el6uek_x86_64

CPUs: 4 Intel Xeon(R) E5-2620 v3 @ 2.40 GHz

Physical / Virtual: Virtual running OVM

Database: REPDB

Single Instance or RAC: Single Instance

Container DB/Pluggable: No

SGA Size: 4.9 GB

PGA Target Size: 974 MB

Location of Oracle Binaries
The location of the Oracle binaries is:
/home/oracle/app/oracle/product/12.2.0/dbhome_1

Normally, we would like to see these binaries under their own file system and not under the Oracle home path. We would recommend installing the Oracle binaries in a mount point like the following to be in line with "Best Practices"

/u01/app/oracle/product/12.2.0/dbhome_1

The /home mount point currently has 55% free space or around 232 GBs free. This appears to be adequate space for this mount point.

Parameter File
The database REPDB is currently utilizing the spfile spfileREPDB.ora which is located at the following directory path:

/home/oracle/app/oracle/product/12.2.0/dbhome_1/dbs

The current is not utilizing ASM or a clustered file system since this is not a RAC environment.

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No pfile existed is this directory. We normally like to have a copy of the pfile always available for review, but creation of a pfile from an spfile is a minor issue.

No in-depth analysis of the init parameters used have been analyzed at this time.

Analysis of Control Files

The database REPDB is currently utilizing the duplication of control files, which is an industry "Best Practice". However, both copies of the control files are currently located on the same disk and directory paths.

It is highly recommended that these duplicated control files be located on separate physical disks to ensure if a disk path should fail, you still have access to your at least one control file.

The current location of the control files are:

/home/oracle/app/oracle/oradata/REPDB

Analysis of Redo Logs

Best practices for an Oracle database, are to have at least two redo members per group. Each redo member should be on a different physical disk to ensure at least one is available in case of a disk failure.

You should have enough redo groups that you are never waiting on a redo group being archived to disk, if running in ARCHIVELOG mode.

Database REPDB currently has three redo groups, but only a single redo log member in each group. Should the physical disk fail that is hosting these redo logs, the database may become unrecoverable or data may be lost.

It is highly recommended that a second disk be mounted to this host and an additional redo log member be created for each redo group, writing to that new disk location.

Analysis of Log File Switches

An Oracle database should not be switching redo logs, ideally, more than once every 10 mins. This of course varies by the amount of workload hitting the system at any given time, and the current CPU and memory utilization.

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In reviewing REPDP, the redo logs are only switching an average of twice every hour. This means that once every 30 minutes. This indicates that the size and number of redo logs should be sufficient for the current workload of this database.

Archiving of Redo Logs
REPDB is currently in NO ARCHIVE LOG MODE, meaning that no archive logs are being generated. Therefore, this is no need for analysis of this setting.

This means that the database cannot be recovered to a Point-In-Time, and the possibility of data loss if almost ensured if the database has to be restored and recovered.

Autoextensible Data Files
This is an OEM repository database and thus does not have much in the way of custom application data files. The application data files that do exist are setup to be auto extendible.

Location of Data Files
The location of the data files are currently in a mounted file system that has 55% free space or about 231 GBs available. This seems to be sufficient space for future growth of the extendible data files and should allow to non-interrupted use.

Non-SYSTEM Owned Objects in SYSTEM Tablespace
Having non-System owned objects in the SYSTEM or SYSAUX can result in these tablespaces filling up and causing database interruptions. We have verified that only Oracle created owners have objects in these tablespaces.

Locally vs Dictionary Managed Tablespaces
Since Oracle 9i, local managed tablespaces have been the default tablespace setting and are the preferred method for setting up tablespaces. I review of the REPDB database shows that all tablespaces are currently setup to use local managed tablespaces (LMT).

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Temporary Tablespaces

All temporary tablespaces should be set at CONTENTS=TEMPORARY. A review of the REPDB database shows that the TEMP tablespaces is setup correctly.

Temporary tablespaces reuse their storage as needed. If the users are running out of temp tablespace, then you might want to re-size the temporary tablespace data files to increase the size of these tablespaces.

A review of the existing TEMP tablespaces shows the size to be 10 GBs and the "high water" mark is only 460 MBs. Therefore, at present, the temporary tablespace is sufficiently sized.   In fact, it could probably be significantly reduced.

Users Assigned to Temporary Tablespaces

Ensure that all users are assigned to a correctly setup temporary tablespace. A review of the REPDB database shows that all users are assigned to a correctly setup temporary tablespaces.

Tablespace Fragmentation

This metric has less merit in a SAN based RAID technology era. Now that bytes are swiped across numerous disks, almost all tablespaces will be fragmented over time as data is used within a SAN array. However, with the quick retrieval of data, is normally isn't an issue anymore.

Number of Extents Analysis

Having a large number of extents can impact performance if many objects have numerous extents. If an object has a large number of extents, recreating that object with a larger extent size may improve performance. At this time, only two objects has over 200 extents. Therefore, at this point the number of extents should not be a performance issue.

Ability to Extent Data Files

This analysis ensures that all data files within a tablespace have the ability to fully extend the next extent. If a tablespace cannot grow the next extent, then the object being extended will fail. A review of REPDB shows that all tablespaces can extent if needed.

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AUTO vs MANUAL UNDO Management

Starting in Oracle 9i, UNDO management can now be managed automatically. If the UNDO_MANAGEMENT init parameter is set to 'AUTO' then the database will automatically management undo segments. Best practices are to use AUTO undo management. REPDB is currently utilizing AUTO.

UNDO Tablespace Sizes

If the undo tablespaces is undersized, then performance issues could occur or ORA errors could occur, disrupting SQL performances.

A review of REPDB shows that the undo tablespace has used 2 GBs of space and can grow up to 32 GBs of space. Therefore, the undo tablespace is currently adequately sized.

Memory Management

Automatic Shared Memory Management (ASMM) was introduced in Oracle 10g. If the SGA_TARGET init parameter is set, then ASMM is currently being utilized. Automatic Memory Management (AMM) was introduced in Oracle 11g. If the MEMORY_MAX_TARGET and MEMORY_TARGET init parameters are set, then AMM is being utilized.

A review of the REPDB shows that ASMM is currently being utilized.

PGA Advice

Reviewing the DBA_HIST_PGA_TARGET_ADVICE view helps to determine if the PGA is adequately sized for the existing workload.

REPDB shows little significant improvement by increasing the PGA_AGGREGATE_TARGET init parameter at this time.

SGA Advice

Reviewing the DBA_HIST_SGA_TARGET_ADVICE view helps to determine if the SGA is adequately sized for the existing workload.

REPDB shows wide variations in executed DB Time used and number of physical rows returned by changing the SGA_TARGET value. I believe this is primarily due to the swapping issue. I would suggest resolving this first, before making any SGA changes at this time.

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Review of Database Alert Logs

To ensure a healthy database, a detailed review of the database alert logs are essential. The database writes key information about the health and activities of the database into the alert log.

In reviewing the alert log for the REPDB database, we have found several issues:

1. ORA-00700 errors have been posted to the alert log. These indicate an issue with excessive swapping is occurring on the host.
    a. This is an indication that potentially not enough memory is available for the workload on this host
2. NI cryptographic checksum mismatch error: 12599
    a. A search of Oracle support seems to indicate this might be a bug where a work-around would be to apply the following to the SQLNET.ORA file: SQLNET.ENCRYPTION_TYPES_SERVER= (3DES168)
    b. This may eliminate the numerous entries that are occurring in the alert log daily.

Review of Database Incidents

Database incidents are created whenever a significant enough error is detected within the Oracle database. Internal processes, then create a separate incident directory and the associated trace files are written so that this information can be easily uploaded to Oracle support.

A review of the incidents associated with the REPDB database indicated numerous incidents are being created daily. In looking at these incidents they are almost all related to the ORA-00700 swapping issue identified in the alert log.

Review of SYSTEM Logs

In addition to the database alert logs, incidents, and core dump directories, the system logs should also be reviewed. On a Linux based system, these would be located in /var/log directory.

Reviewing the messages files, we see few messages being written. However, on Sept 20th, 2017 the system recorded that the host would OUT OF MEMORY and a process had to be killed to free up memory. This should be reviewed and most likely is another indication that this host does not have sufficient memory allocated.

Review of OS System Resources

To ensure the system is adequately sized, the host resources should be reviewed to ensure they aren't hitting capacity limits. These would include CPU utilization, memory utilization, and system swapping.

As already discussed above, the database alert log has notated that swapping is occurring on this host. In addition, an Out Of Memory condition was detected in the system logs. Therefore, it seems to indicate that this host is at capacity on memory.

A review of CPU seems to indicate that they system generally runs at around 60% utilized and not significant periods of high CPU utilization have been notated.

AWR / ADDM Analysis

If the client currently is licensed to use the DIAGNOSTICS tools, then running an AWR and ADDM report over timeframes of noted issues and quiet periods can give added perspective to what is running during periods where performance is suspect.

This process will also high the key wait events for the database and any suggestions that Oracle might have to resolve them.

After running the AWR report for the previous week, the top wait events shows that 53.6% of DB Time was spent waiting on cursor: pin X. In addition, kksfbc child completion and latch: shared pool consumed another 14.4%. Therefore, 68% of the DB Time over the past week was being consumed by these three wait events. This is not normal behavior and I would suspect that the swapping and memory issues are contributing to these wait events.

After running the ADDM report for the past 48 hours, the report similar findings as what was detailed from the AWR report. In addition, a small percentage performance increase may be found by increased the init parameter "Session_cached_cursors" from the current value of 50 to something larger.

Summary

The REPDB is a database that is currently running on Centric's internal lab environment hosted on an OVM client. That client only has a single hard

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drive and limited CPU / RAM. During this analysis, it revealed that this OVM is being memory starved and should have additional memory added. In addition, there are risks by not having multiple disk drives available. However, since this is a lab environment, there is some accepted inherent risk that will be tolerated.

About Centric Consulting

Centric at a Glance

Centric is a management and technology consulting company. We have over 700 consultants with extensive experience delivering high-profile projects for clients of all shapes and sizes, including Fortune 500 companies.

· Highly capable consultants
· Passion for delivering results
· Long term relationship focused
· Easy to work with

Please visit our web site for a complete description of our ERP offerings. www.centricconsulting.com

100% of Centric's Clients are willing to reference our work. A sampling of our Clients includes:
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Ohio National Financial
Vitamix

EAS Practice Overview

Successful deployment and support of an ERP solution requires synergy between the business and IT. Our holistic solutions combine deep industry knowledge with business process and technology expertise to create unmatched value and customer experiences. We are transparent, flexible and easy to work with. We help businesses connect with the global economy and enable "game changer" capabilities.

Whether it is a first-time implementation, managed services, application or database upgrade, Centric can help. Clients consistently compliment us on our ability to adapt our approach and style to their culture, working directly with their team in a collaborative partnership. We are able to accomplish this through our "do the right thing" approach to client engagements.

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