Oracle Exadata Interview Questions & Answers

Short
Simple
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Dedication

This book is dedicated to courage and knowledge,

the two qualities most needed

to succeed in any human challenge,

especially a job search.

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Book Title: Oracle Exadata Interview Questions and Answers

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About Author

This book has not been written by individual but group of experts who are working in Oracle and different technologies have given their valuable inputs and suggestions to complete this book. We are working in Oracle and multiple other domains across various industries which helped us to share wealth of knowledge and real time experience.

Many of our experts are working on Exadata since its inception (from Exadata version V1, V2), initially Oracle has kept this material under lock and key so, there were very limited materials available in market to educate ourselves for Database Machine. This was the case for interviewer too, they didn't know from where they should start to ask the questions because of the lack of exadata knowledge. We have also faced this ups and down and that's why we thought to publish this book which can help both interviewee and interviewer.

This book is unique because today you will not get any book, website or quality materials which we are providing here. We have tried our best to cover each and every topic which can be asked in interview, also it can help you to firm your concept of Oracle Exadata. We hope this book will help you to shape your career in Oracle technology and improve your employability scale at various levels.

We wish you best of luck and wonderful journey ahead..!!!

Introduction

This book was born from our personal experiences with managing, configuring, consolidating and migrating databases to Exadata platform and based on experience as an interviewer and interviewee. Our goal for writing this book is to provide experiences of Oracle Exadata and related technology to take on Exadata. We are sure this will help you to improve your knowledge and sharpen your skills while appearing into the interview.

Oracle has long been setting the standard in database technology, and to stay competitive administrators need to have a current understanding of Oracle's newest improvements, as technology changes faster than you can spell it. Oracle Engineered System is possibly the future for enterprise information systems. Corporations, both large and small, are looking for resources who know their job in depth.

Exadata has been a game changer with respect to database performance, driving and enabling business transformation, increased profitability, unrivalled customer satisfaction and improved availability and performance service levels.

Oracle Exadata Interview Questions and Answers contained likely be asked questions which are a perfect companion to stand ahead above the rest in today's competitive job market. Rather than going through comprehensive, textbook-sized reference guides, this book includes only the information required immediately for job search to build a career as an Oracle Exadata Professional.

We have prepared this book based on the Oracle exadata topics which will help you to prepare better. Using this guide to prepare for a job interview or to brush up on the newest trends in Oracle will aid any DBA in acquiring new skills. More than just Oracle documentation and sales pitches, this guide explains Oracle Exadata from the perspective of the DBA. If you think this book just covers important topics, then you are mistaken! It covers questions those are based on project knowledge and experience gained on successful high-profile Oracle Exadata implementers and administrators.

This book puts the interviewee in the driver's seat and helps them steer their way to impress the interviewer. If you are an interviewer, this book will help you to ask right questions to your potential employee. Rather than burying you in architectural and design details, this book is for those who need to get interview done using short and effective answering the questions. This book will help to Oracle DBA/DMA, Oracle Developer and Unix/Storage Administrator.

Includes

- Covered topic wise questions and answers
- 400+ Oracle Exadata Questions & Answers with examples wherever required
- 50+ diagrams to get better understanding of the concept
- List of important Oracle Document ID for Oracle Exadata
- Links for reference Exadata materials to firm your concept

Exadata Database Machine Overview

1. What is Exadata?

Exadata is preconfigured combination of hardware and software which provides a platform to run the Oracle Database. It includes server, storage, network switch, PDU, KVM, storage software, Oracle software and InfiniBand switches to connect the storage with server in single box.

In short it contained everything in single box. Only we have to provide power and network from outside.

2. What is the main objective of Exadata?

Common bottleneck of every business is inability to fetch data from the database in sufficient time which is addressed by exadata by eliminating unnecessary data transfer from storage to database server and executing SQL query on storage layer itself.

Only required data will be moved to database server which helps to reduce the utilization of memory and cups of database server and improve the overall performance of database.

3. What is SAGE?

It stands for Storage Appliance for Grid Environment which was the code name of Exadata project.

4. What are the challenges for IT systems to manage database?

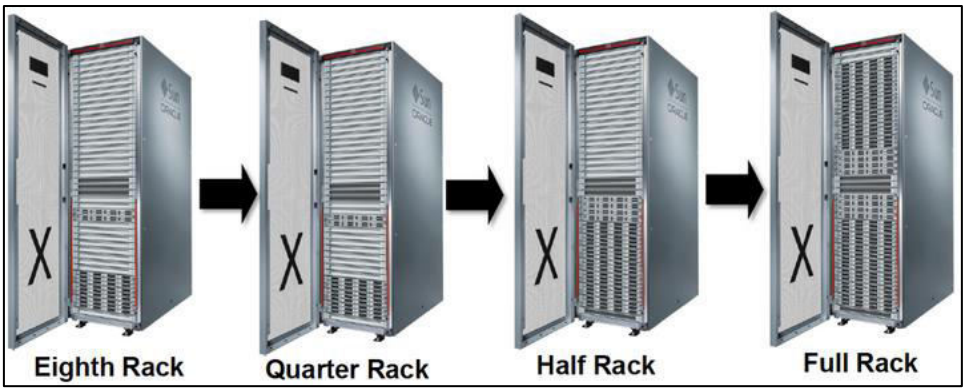
- High Availability
- Increasing Storage Requirement
- Security
- Multiple Vendors
- Complex Systems
- Sustaining growth
- Server Consolidation
- Time Constraints

5. Which types of Exadata configurations are available?

- $1/8^{th}$ Rack

- Quarter Rack
- Half Rack
- Full Rack

Below diagram shows the available Exadata configuration



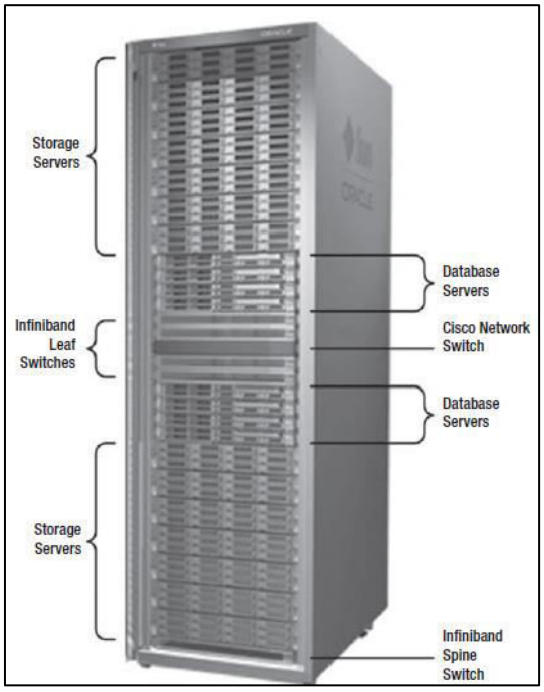
6. What are the benefits of Exadata machine on business level?

- Pre-configuration Rack
- High Availability at each level
- Required few resources to manage so TCO would be reduced
- Scalability
- Standard configuration across the glob
- High performance
- Applicable for OLTP, DW and hybrid environment
- Quick Deployment

7. What are the key components of Exadata machine?

- Compute Server (DB Server)
- Cell Server (Storage Server)
- Infiniband Switch
- CISCO Switch
- PDUs

Below diagram shows the components are contained by Exadata.



8. How to check best practice on Exadata?

Exacheck is the utility which we can execute on database machine; it generates a report containing the best practice recommendation and verification.

Exadata Machine Architecture and Configuration

9. Which tool is used to generate initial configuration files based on customer's data?

OEDA (Oracle Exadata Deployment Assistance)

10. Which are the unique features of Exadata?

- Smart Scan (Cell Offload)
- Flash cache
- EHCC (Exadata Hybrid Columnar Compression)
- IORM (IO Resource Manager)
- Storage Index

11. What are the two types of disks can be chosen for X5-2 database machine?

EF (Extreme Flash)

HC (High Capacity)

12. What is cellcli?

Cellcli is cell command line utility. It is used manage cell storage with the use of cellcli utility. We can say it's utility to administer cell storage.

13. What is the primary goal of Exadata?

- Reduce the volume of data transferred from disk systems to the database servers
- Reduce CPU usage on database servers
- Reduce disk access times at the storage layer

14. Which all networks available in Exadata?

- Infiniband Network
- ILOM and Management Network
- Client/Public Network

15. How many Infiniband switches contained in full exadata machine?

3 (THREE)

16. What is the use of Infiniband network?

Infiniband network is used for storage connectivity between cell server and compute nodes. It is also used as interconnect between RAC nodes.

17. What is the purpose of ILOM and management network?

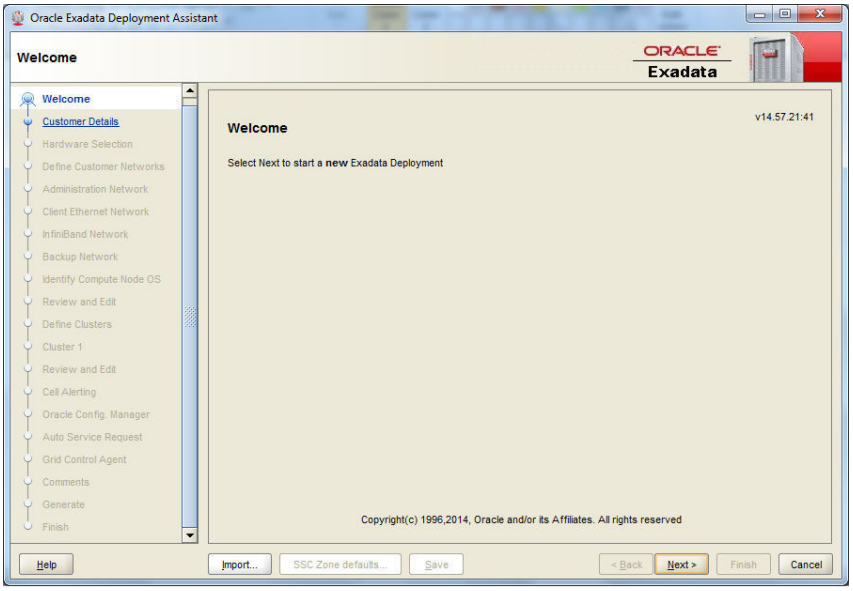
This network is used to manage the exadata components. All the administration activities could be done on this network.

18. What is client or public network in exadata?

Client or public network is used to established connectivity between database and application.

19. What is OEDA ?

OEDA stands for Oracle Exadata Deployment Assistance which is used to provide initial exadata configuration information to Oracle ACS team. i.e. IPs, Hostname, ASM disk group details, User & group etc…



20. What are the steps involved for initial Exadata configuration?

- Initial network preparation
- Configure Exadata servers
- Configure Exadata software
- Configure database hosts to use Exadata
- Configure ASM and database instances
- Configure ASM disk group for Exadata

21. What is onecommand?

Onecommand utility is used to configure the Exadata machine based on given information through OEDA by customer

22. Which steps are performed by onecommand utility?

Step 0: Validate the environment.
Step 1: Create work directory
Step 2: Unzip files
Step 3: Setup SSH for the root user
Step 4: Update the /etc/hosts file
Step 5: Create the cellip.ora and cellinit.ora files
Step 6: Validate the InfiniBand network
Step 7: Update the cell software
Step 8: Validate the cells
Step 9: Check RDS using the ping command
Step 10: Run CALLIBRATE on the cells
Step 11: Create the user accounts for celladmin and cellmonitor
Step 12: Set up SSH for the user accounts
Step 13: Create the grid disks.
Step 14: Install the grid software
Step 15: Patch the grid home software
Step 16: Relink Reliable Data Socket RDS) for Grid Infrastructure
Step 17: Run the grid root scripts
Step 18: Install the Oracle Database software
Step 19: Patch the database software
Step 20: Create the Oracle ASM disk groups
Step 21: Run Oracle Database Configuration Assistant
Step 22: Unlock Oracle Grid Infrastructure.
Step 23: Relink RDS for Oracle Database
Step 24: Lock Oracle Grid Infrastructure.
Step 25: Apply any security fixes

Step 26: Configure ASR.

Step 27: Set up storage server alerts

Step 28: Secure Oracle Exadata

23. Location of onecommand configuration files on Exadata box.

#/opt/oracle.SupportTools/onecommand

24. Which command is used to execute onecommand ?

#./deploy112.sh –i

25. What is ASM AU?

AU stands for Allocation Unit. The AU size governs how much data Oracle/ASM will write on one disk before going to the next disk in the ASM disk group that contains the object.

26. What is ASM AU recommended on Exadata?

4MB

27. What is default ASM AU size?

1MB

28. Which protocol is responsible to communicate between cell servers and compute node?

iDB protocol

29. What is iDB protocol?

iDB stands for intelligent database protocol. It is a network based protocol which is responsible to communicate between storage cell and database server.

30. Which protocol is used by iDB protocol?

RDS (Reliable Datagram Socket Protocol)

31. What is storage cell software?

It is software which manages exadata storage.

32. Which processes are used by storage software?

- Cellsrv - Cell Server
- MS- management server
- RS – Restart Server

33. What are the functions of storage server processes?

Cell server (cellsrv) is used to handle all the communication between cell storage and database server.

Management Server (MS) is used to provide cell interface to manage the cell storage server.

Restart server (RS) is set of services which is responsible for monitoring the other process and it restarts it if require.

34. What is the use of DISKMON process?

DISKMON is monitoring process which checks whether cells are alive or not. It is also responsible for propagating DBRM (Database Resource Manager) plan to storage cell.

Each instance has its own DISKMON process as well one master process for each DB node which is responsible to communicate between ASM and Database server.

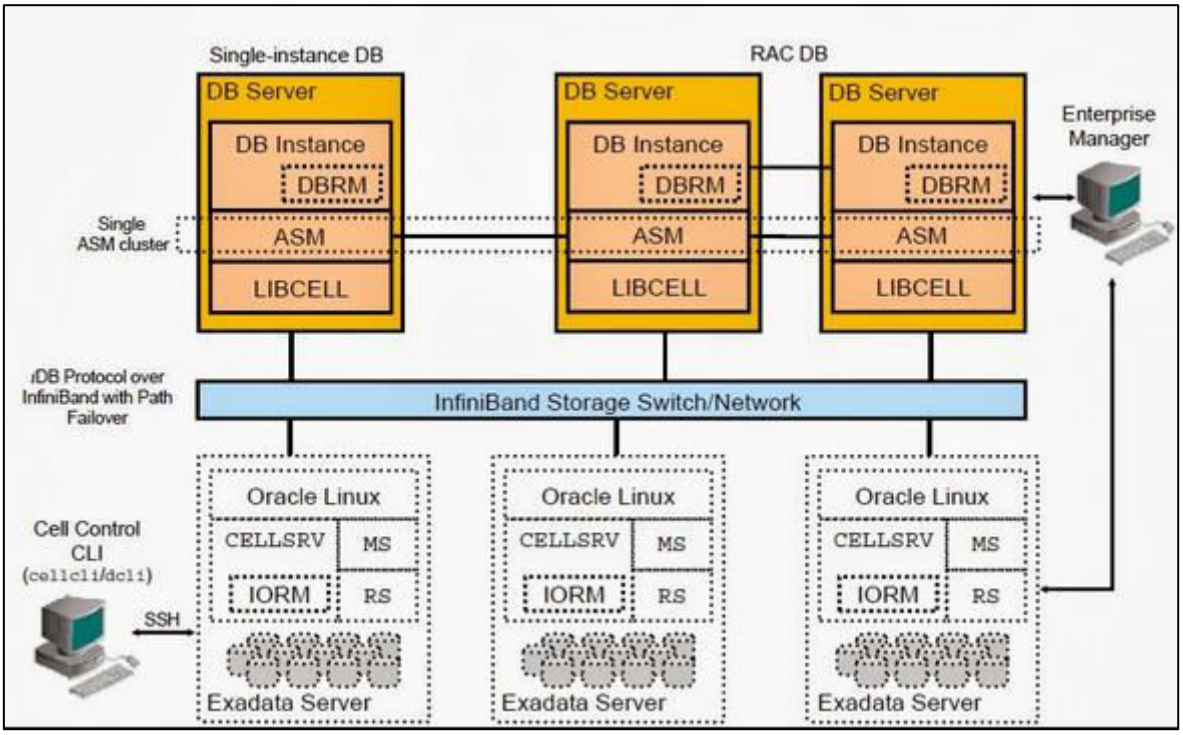
35. What is LIBCELL?

Libcell stands for Library Cell which is linked with Oracle kernel. It allow oracle kernel to talk with the storage server via network based instead of operating system reads and writes.

36. Components of storage software architecture.

- CELLSRV
- IORM
- DBRM
- RS
- MS
- iDB Protocol
- LIBCELL
- DISKMON

Reference Diagram:



37. What is cellcli?

Cellcli is Cell Command Line interface which is used to administer storage server.

38. What is DCLI?

DCLI is Distributed Command Line utility which is used to replicate command on multiple cell. DCLI utility can be used from Database server also.

39. Which operating system supports for Exadata database server?

Linux and Solaris

40. Which operating system supports for Storage cell?

Linux only

41. What is checkip and what the use of it?

Checkip is the OS level script which contains IP address and hostname which will be used by Exadata in configuration phase. It checks network readiness like proper DNS configuration, it also checks there is no IP duplication in the network by pinging it which not supposed to ping initially.

42. What are the major steps to configure Exadata?

- Generate parameter and deployment files by providing configuration details into OEDA
- Upload generated files to Exadata
- Run checkip script to verify network readiness
- Configure network using first boot
- Stage grid infrastructure and database software
- Execute onecommand

43. What does configurator worksheet contained?

- Exadata configuration parameters (ASM DG name, storage allocation, system type, time zone etc…)
- Oracle environment parameters (User & group ID/name, Oracle Home, DB related params)
- Exadata network settings (Public, private and ILOM IP address/hostname, NTP Server)
- Cell alert notification parameters (SMTP Server Details)
- EM12c related parameters (EM Server related params)

44. How many DB and storage server are contained in each exadata configuration rack?

Exadata Configuration	No. of DB Server	No. of Cell Server
1/8th Rack	2	3
Quarter Rack	2	3
Half Rack	4	7
Full Rack	8	14

45. Where we can get latest available patch information release details?

On oracle support, Doc ID – 888828.1

46. Which protocol is used by LIBCELL to communicate with storage server?

iDB (Intelligent Database Protocol)

47. What is the sequence to shut down and start-up the Exadata machine?

Power off Sequence

- Shut down Database
- Stop CRS on all nodes
- Shut down Database server
- Shut down cell storage
- Power off network devices
- Remove power cables from PDUs

Power on Sequence

- Plug the power to PDUs
- Start network devices
- Start cell servers
- Start Database servers
- Start CRS and Database if automatic start-up is disabled

48. How to take backup of cell storage software?

Backup of cell storage software happens automatically. Exadata uses external USB drive called the cellboot flash drive to take a backup of storage software.

49. Which script is required to check network readiness as a part of pre requisite of Exadata configuration?

Checkip.sh

50. Which script is used to reclaim the disk space of unused operating system?

For Linux: reclaimdisks.sh

For Solaris: reclaimdisks.pl

51. How to find exadata serial number?

From any DB or storage server we can execute below command to get the serial number of Exadata box.

ipmitool sunoem cli "show /SP system_identifier"

52. In which direction the air flows in the rack?

Front to back

53. How many rack we can linked by adding only infiniband cables?

8 Racks

Exadata Database and Storage Server Architecture

54. How many DB servers are contained in full rack database machine?

8

55. How many Storage servers are contained in full rack database machine?

14

56. Is it possible to execute cellcli from database server?

No

57. Where I can execute dcli utility?

On storage server as well as on DB server

58. What is NTP?

NTP is network time protocol which is used to sync time with central NTP server.

59. Which are operating system options available in database server?

Linux and Solaris

60. What should be ASM space allocation if backup performed internally?

40% storage space allocation for DATA disk group

60% storage space allocation for RECO disk group

61. What should be ASM space allocation if backup performed externally?

80% storage space allocation for DATA disk group

20% storage space allocation for RECO disk group

62. How many CPU sockets are contained in DB server?

2 Sockets

63. Which two disk in storage server contained Linux operating system files and what is the size of it?

First two disk of each storage server contained Linux operating system files. The size of it is 32 GB.

64. Which command is used to check active image on storage and database server?

#imageinfo

65. Write down the command which can give the cell status from database server.

 # dcli -g cellgroup -l root 'cellcli -e list cell'

66. How database server communicates to storage cell?

Database server communicates with storage cell through infiniband network.

67. Which two protocols can be configured for cell alert?

SMTP and SNMP

68. Which command gives the list of active and inactive images on storage cell server?

#imageinfo –all

69. How many IPs are required to configure database server?

- 1 for ILOM
- 1 for administration
- 2 for Client for connectivity (VIP and Physical)
- 1 for private connectivity

Total 5 IPs are required to configure database server.

70. How many IPs are required to configure storage server?

- 1 for ILOM
- 1 for administration
- 1 for private connectivity

Total 3 IPs are required to configure storage server.

71. What is the purpose of cellinit.ora file ?

Cellinit.ora file contains private storage network IP range.

72. What is in cellip.ora file?

Cellip.ora file contained IP addresses of all cells which are accessed by particular database server.

73. Which command is used to administrator cell storage?

Cellcli

74. How many users are available in cell storage?

- Root
- Celladmin
- Cellmonitor

75. What is the difference between celladmin and cellmonitor users?

Celladmin user can do all the administrative stuffs where as cellmonitor user can only monitor the cell.

Cellmonitor user don't have rights to change any configuration which can be done by either root or celladmin user.

76. Which process is responsible to provide interface for managing cell server?

MS process (Management Server)

77. What pre-requisites need be fulfilled to use dcli utility?

SSH equivalence should be configured between database server and storage cell to use dcli utility.

78. What is CALIBRATE?

CALIBRATE is used to test performance of storage server disks in terms of IOPS and MPBS.

79. What option we have to use to calibrate disk if cell server processes are running?

Cellcli>CALIBRATE FORCE

80. Which command we can use to restart the cell services?

Cellcli>alter cell restart services all

81. How many storage disk contained in one storage cell?

12

82. Which RAID level is used by Database server local hard disks?

RAID 5

83. What is the relationship between physical and grid disk?

Each physical disk mapped to the LUN

LUN mapped to CELLDISK

CELLDISK further divided into multiple GRIDDISK

GRIDDISKS will be visible to ASM as an ASM Disk to form a ASM disk group

84. What is LUN?

LUN is the lowest level of storage visible to Exadata software.

85. What is cell disk?

It is higher level abstraction for the data storage area on physical disk.

86. What is grid disk?

Grid disk is a potentially non-contiguous partition of cell disk that is directly exposed to ASM to be used for ASM disk group creation.

87. What is the disk size of system area in cell server?

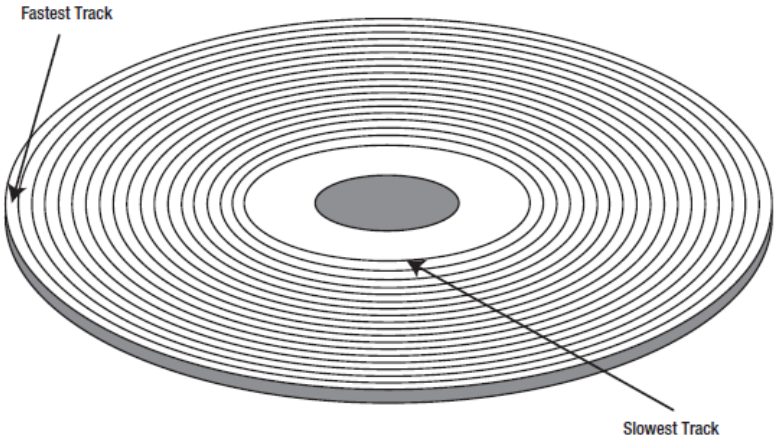
29 GB from first two disks on each cell storage

88. Can I have multiple celldisk for one grid disk?

No. Celldisk can have multiple griddisk but griddisk cannot have multiple celldisk

89. On which part of storage disk we can get highest performance?

Going from inner to outer track of storage disk we can get highest level of performance



Above figure shows the fastest and slowest track of disk

90. What should be the best practice to manage data on outer and inner sector of storage hard disk?

We can use outer sector to place data files, redo log files and control files to get highest performance while archives, backups or flash logs can be placed in inner sector.

In short High priority data should go to outer sector and low priority should go to inner sector of disk.

91. Which utility is used to patch Exadata database server?

Dbnodeupdate.sh utility is used to patch OS level patching on exadata while Opatch utility is used to patch RDBMS and GRID patching.

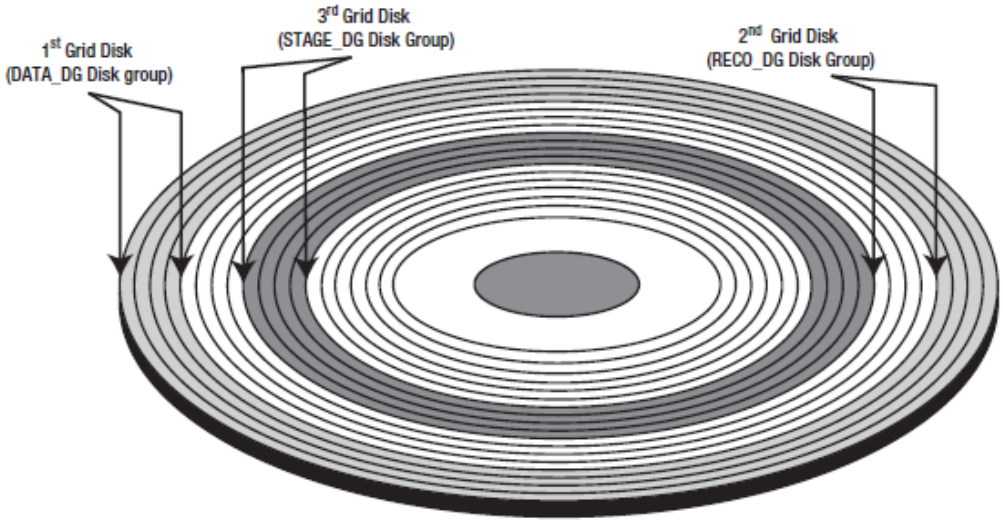
92. What is patch manager (patchmgr) utility in exadata storage server?

Patch manager utility is used to patch exadata storage server patching

93. What is disk allocation policy while creating griddisk?

The default policy simply allocates space starting with the fastest available tracks first, moving inward as space is consumed.

Using this policy, the first grid disk created on each cell disk will be given the fastest storage, while the last grid disk created will be relegated to the slower, inner tracks of the disk surface.



Above figure shows how Grid disk starts to utilize storage disk

94. What is interleaving?

Interleaving is one of the policies to create a grid disk in an alternate fashion between slower and faster tracks of the disks.

This can be done by splitting cell into two regions, one is outer region and second one is inner region.

95. What is system area in cell storage?

When cell disk created, it reserves small portion of the storage to store information about the LUNs, celldisk and griddisk.

96. How to check cell services status from cellcli utility?

By executing *cellcli>list cell detail* we can check the status of all three cell server services

```
cellsrvStatus:          running
msStatus:               running
rsStatus:               running
```

97. How to invoke cellcli from storage OS prompt?

 # cellcli –e list cell ---By using option –e we can invoke cellcli utility from OS prompt

98. What celladmin user can do?

Celladmin can do all the administration tasks like creating, altering and deleting cell objects.

99. Which command is used to execute script on cellcli prompt?

Cellcli>start script_name

100. Which operations are block to cellmonitor user?

Any operations which can change the cell configuration are block for cellmonitor user. Like Create, Alter or Delete cell objects.

101. Which user can CALIBRATE storage server disks?

Only root user can CALIBRATE the storage server disks.

102. What is the command to create cell disk?

Cellcli>create celldisk all

103. What is the command to create griddisk with prefix data and size 200GB?

Cellci> create griddisk all prefix=data , size=200G

104. What security options are available for griddisk?

- Open security
- ASM scoped security
- Database scoped security

105. How to check charging condition of battery of flash card for proactive battery replacement?

#/opt/MegaRAID/MegaCli/MegaCli64 -AdpBbuCmd -a0 | grep "Full Charge" -A5 | sort | grep Full -A1

```
[root@           ~]# /opt/MegaRAID/MegaCli/MegaCli64 -AdpBbuCmd -a0 | grep "Full Charge" -A5 | sort | grep Full -A1
  Full Charge Capacity: 1342 mAh
  Run time to empty: Battery is not being charged.
```

106. What is ASM scoped security?

ASM scoped security mode we can set when to make available particular griddisk to specific ASM cluster only which would be accessed by all databases which will be created on that ASM cluster.

107. What is Database scoped security?

This security mode allows setting access control on a griddisk and making it available to specific database cluster.

To use this this security mode ASM scope security is mandatory.

108. Which command is used to check the status of IB ports on cell server?

CellCLI> LIST IBPORT detail

109. What are the three functions of CELLSRV?

CELLSRV is responsible for collect statistics, servers smart scan request and implement IORM.

110. Which command is used to view cell alert history?

Cellcli>list alerthistory

111. Which part of storage disk has lowest performance?

Innermost track of storage disk has lowest performance.

112. How many IB ports are contained in each DB and Cell server?

Each storage and cell server contained 2 IB ports.

113. How many power distribution units contained in each exadata rack?

Two

114. How many management IPs are required for full rack x4-2 exadata machine?

Each component required one IP so total 28 management IPs are required for a full rack X4-2 Exadata machine.

115. How to verify hardware and software configuration on database server?

By executing CheckHWnFWProfile script

Location: /opt/oracle.SupportTools

116. How to validate cell server configuration?

Cellcli>alter cell validate configuration

```
CellCLI> alter cell validate configuration
Cell bticceladm01 successfully altered
```

117. How to configure email alert on storage server?

ALTER CELL smtpServer='mailserver.maildomain.com', -
smtpFromAddr='firstname.lastname@maildomain.com', -
smtpToAddr='firstname.lastname@maildomain.com', -
smtpFrom='Exadata cell', -
smtpPort='<port for mail server>', -

smtpUseSSL='TRUE', -
notificationPolicy='critical,warning,clear', -
notificationMethod='mail';

118. How to validate email configuration send alert from storage cell?

Cellcli>alter cell validate mail

If it sends mail to defined mail address than it is working fine.

119. How many Exadata wait events contained in 11.2.0.3 release?

There are 53 wait events are exadata specific events.

120. Is it possible to move all the storage disks from one cell to another cell?

Yes

121. Which files need to back up before moving storage disks from one cell to another cell?

- /etc/sysconfig/network
- /etc/sysconfig/network-scripts
- /etc/modprobe.conf
- /etc/hosts

122. Which disk group is used to keep OCR files on Exadata?

+DBFS_DG

123. How much time is required to replace hard drive in Exadata?

Approximate 60 minutes is required. It is completely dependent on how much time required for re-balancing.

124. What are the steps to replace hard failure storage disk on Exadata machine?

- Check the status of the LED on disk , it should be amber LED which means service action is required

- Check the status of disk from cellcli utility on specific cell server
- Confirm the location of HDD which need to be replaced based on LED flashing on that disk
- Remove faulty disk
- Wait for three minutes for MS daemon to recognize removal of hard drive
- Slide new drive into drive slot
- Verify the LED, it should be green
- Wait for three minutes for MS service to rebuild the drive
- Check the disk status from cellcli utility
- Execute '*alter cell validate configuration*' to validate the configuration of cell
- Check Lun and grid disks associated with that hard disk. It should create automatically.

125. What is the use of local disks in database server?

Local disk are used for operating system, grid and RDBMS binaries staging.

126. Which process generates the alert if any storage disk gets failed?

MS process (Management Server)

127. What are types of disk failure?

- Dead Disk
- Disk/Media problem
- Poor performance

Exadata Database Machine Features

Smart Flash Cache

128. What is smart flash cache?

Flash cache is the PCIe (Peripheral Components Interconnect Express) card which is plugged into the back end of the storage cell.

Flash Card

129. What can be cached?

- Frequently accessed data
- Index Block
- File header reads and writes
- Control file reads and writes
- DBA can set the caching priority

130. What cannot be cached?

- Backup related I/O
- Database pump I/O
- Data file formatting
- I/O to mirror copies
- Table scan don't control the cache

131. Who manage smart flash cache?

Oracle database software

132. Which device in Exadata contained flash cache card?

Storage cell

133. How many flash card are contained in each storage cell?

Each storage cell contained 4 flash cards

134. How many FMods available on each flash card?

Four FMods (Flash Modules) are available on each flash card.

135. How many flash cards are enclosed in X4-2 full rack Exadata machine?

56 Flash cards.

Each exadata cell contains 4 and each full rack Exadata contains 14 cell storages.

136. What is the storage capacity of flash cache in X4-2 full rack exadata machine?

44.8 TB raw space

137. How to check flash modules availability on storage cell?

#cellcli -e list lun where disktype=flashdisk

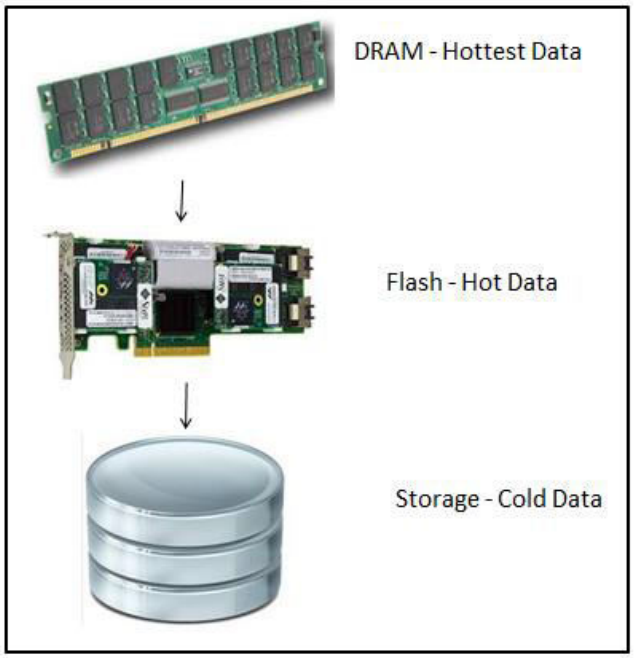
```
CellCLI> list lun where disktype=flashdisk
         1_0     1_0     normal
         1_1     1_1     normal
         1_2     1_2     normal
         1_3     1_3     normal
         2_0     2_0     normal
         2_1     2_1     normal
         2_2     2_2     normal
         2_3     2_3     normal
         4_0     4_0     normal
         4_1     4_1     normal
         4_2     4_2     normal
         4_3     4_3     normal
         5_0     5_0     normal
         5_1     5_1     normal
         5_2     5_2     normal
         5_3     5_3     normal
```

138. What is the primary task of flash cache?

Primary task of smart flash cache is to hold frequently accessed data in flash cache.

139. What is the main benefit of flash cache?

Primary task of smart flash cache is to hold frequently accessed data in flash cache so next time if same data required than physical read can be avoided by reading the data from flash cache as reading/writing data is faster in flash cache than the hard disk.



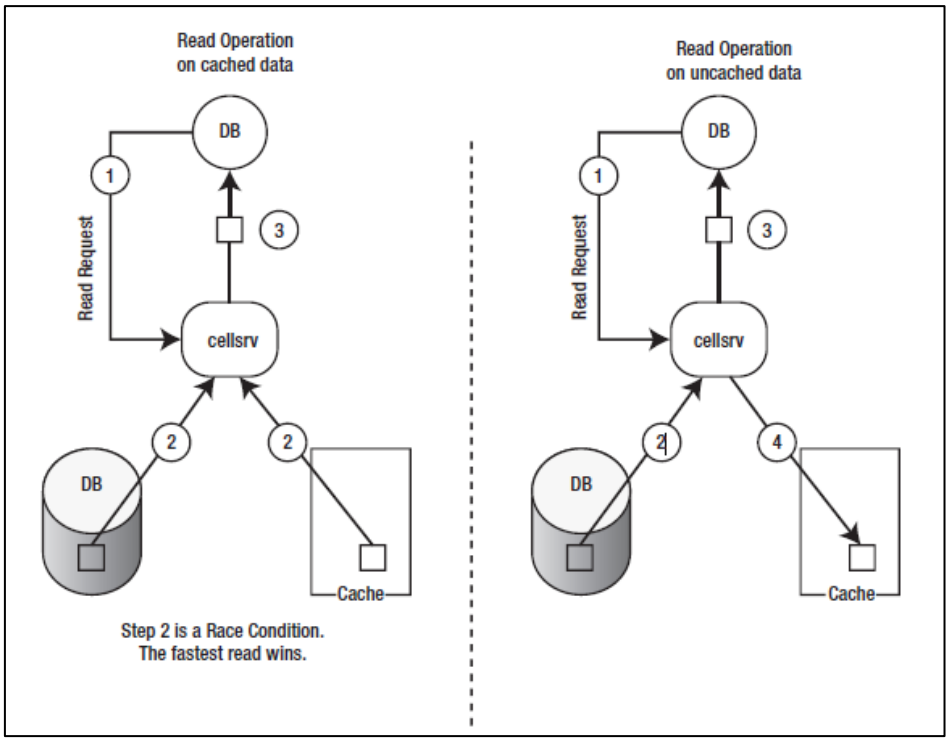
Above diagram shows how data request fulfil by Exadata.

140. How flash cache works?

Whenever any read request comes, the I/O subsystem will check if that data is available in flash cache. If it finds data into flash than it would give it from there else it would go to the storage hard disk and fetch the required data.

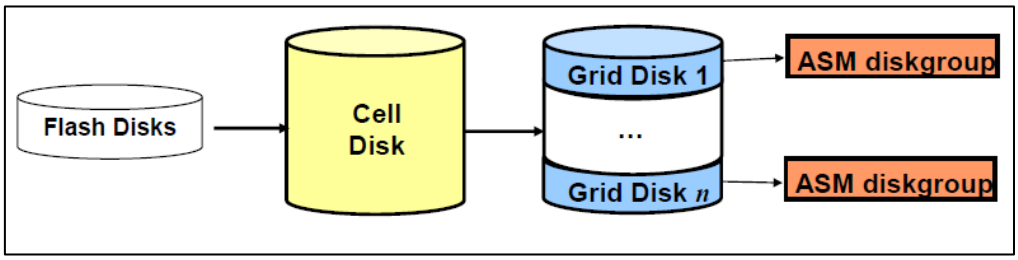
When it goes to storage disk to read data, the un-cached data it will put on flash cache post providing the requested data to the user which will ensure that system doesn't goes to slow down while writing data to the flash cache.

Whenever next request comes for the same data, it will fulfil this request by providing data from flash cache rather than going to storage disk.



141. How to create flash cache based ASM disk group?

- First create flash cell disk from flash cache disks
- Create grid disk from flash cell disks
- Assign flash grid disk to ASM disk group



142. Which are the two options are available in flash cache?

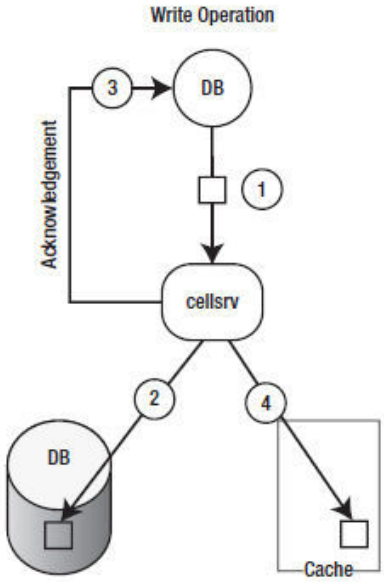
Writeback and writethrough

143. What is writethrough flash cache?

Writetrough mode of flash cache is only allowed to read data from flash cache, it will not allow writing data into the flash device.

144. What is writeback flash cache?

Writeback flash cache allows reading as well writing into the flash cache.



145. How to check whether flash cache configure writeback or writethrough?

It can be checked through cellcli utility with below command.

CELLCLI> list cell attributes flashcachemode

```
CellCLI> list cell attributes flashcachemode
         WriteBack
```

146. How we can manually influence any object for flash cache?

There are three options to configure smart flash cache on specific objects.

KEEP – It will permenttly pin table data into flash cache

DEFAULT- If default mode used for any object than automatic caching mechanism will be used

NONE – No data would pinned into flash if any object configured with this option

147. What is the command to keep object in flash cache with KEEP option?

Sql>alter table table_name storage (cell_flash_cache keep);

148. Command to create flashcache.

CellCLI> create flashcache all

149. Command to check flash cache details in cell storage.

CellCLI> list flashcache detail

150. How to enable flash cache compression?

Cellcli>ALTER CELL flashCacheCompress=true

151. While creating ASM disk group which parameter is used to enable flash cache on that disk group?

cell.smart_scan_capable=TRUE

152. What is the command to drop flashcache?

Cellcli>drop flashcache

153. How to determine which object is cached in flash cache on entire storage stack?

By executing below command

dcli -g ./cell_group cellcli -e list flashcachecontent > attributes dbUniqueName, hitCount, missCount, cachedSize, objectNumber

154. Which statistic can be used to check flash hit ration on database level?

cell flash cache read hits

155. List the steps for replacing the damaged physical flash disk.

- Identify damaged flash disk
- Power off the cell
- Replace flash card
- Power on the cell
- Verify and confirm new flash card

156. What is the maximum percentage of flash cache can be consumed by keep objects?

80%

157. How we can disable caching policy?

CELLCLI>ALTER GRIDDISK grid_disk_name CACHINGPOLICY="none"

158. What are the steps to change flashcache mode from writethrough to writaback?

It can be done in rolling as well non-rolling fashion. For rolling fashion we have to perform below steps in each cell server one by one.

Step 1. Drop the flash cache on that cell

#cellcli –e drop flashcache

Step 2. Check the status of ASM if the grid disks go OFFLINE. The following command should return 'Yes' for the grid disks being listed:

 # cellcli -e list griddisk attributes name,asmmodestatus,asmdeactivationoutcome

Step 3. Inactivate the griddisk on the cell

 # cellcli –e alter griddisk all inactive

Step 4. Shut down cellsrv service

 # cellcli -e alter cell shutdown services cellsrv

Step 5. Set the cell flashcache mode to writeback

 # cellcli -e "alter cell flashCacheMode=writeback"

Step 6. Restart the cellsrv service

 # cellcli -e alter cell startup services cellsrv

Step 7. Reactivate the griddisks on the cell

 # cellcli –e alter griddisk all active

Step 8. Verify all grid disks have been successfully put online using the following command:

 # cellcli -e list griddisk attributes name, asmmodestatus

Step 9. Recreate the flash cache

 # cellcli -e create flashcache all

Step 10. Check the status of the cell to confirm that it's now in WriteBack mode

 # cellcli -e list cell detail | grep flashCacheMode

Step 11. Repeat these same steps again on the next cell to the FINAL cell. However, before taking another storage server offline, execute the following making sure 'asmdeactivationoutcome' displays YES

 # cellcli -e list griddisk attributes name,asmmodestatus,asmdeactivationoutcome

159. What is the data flow for writeback flash cache?

For write request:

Write to flash or disk
Persist
Acknowledge

For read request:

Read from disk or cache
Populate
Persist

160. What is the command to enable flash cache on Exadata?

 # cellcli -e ALTER CELL flashcachecompress=true

161. What are the steps to enable flash cache compression?

- Drop flashcache
- Drop flashlog
- Enable compression
- Create flashcache
- Create flashlog

Smart Flash Log

162. What is smart flash log?

Smart flash log is a temporary storage area on Exadata smart flash cache to store redoes log data.

163. What is the default size of smart flash log?

By default it will be 32 MB on each flash module and 512 MB on each storage server.

Each storage server contained 4 flash cards, each flash cards contains 4 flash modules so it is 4*4*32=512 MB for each storage cell.

164. What is the benefit of smart flash log?

Oracle Exadata Smart Flash Log performs redo writes simultaneously to both flash memory and the disk controller cache, and completes the write when the first of the two completes.

This improves the user transaction response time, and increases overall database throughput for I/O intensive workloads. Oracle Exadata Smart Flash Log takes advantage of flash memory in Exadata Storage Server to accelerate log writes.

165. What can be maximum size of smart flash log in each flash module?

It must be less than 4GB

166. What are the steps need to perform to resize smart flash log?

Drop flashlog

Create flashlog with new size

167. Command to create smart flash log

Cellcli>create flashlog all --Default Size

Or

Celllci>create flashlog all size=1G –with size

168. How to display smart flash cache attributes?

Cellcli>describe flashlog

```
CellCLI> describe flashlog
         name
         cellDisk
         creationTime
         degradedCelldisks
         effectiveSize
         efficiency
         id
         size
         status
```

169. Command to drop smart flash log

Cellcli>drop flashlog

170. Which command is used to fetch the size of smart flash log of cell storage?

CellCLI> list flashlog attributes size detail

```
CellCLI> list flashlog  attributes size detail
         size:                     512M
```

Smart scan/ Offloading

171. What is smart scan offloading?

Offloading and Smart Scan are two terms that are used somewhat interchangeably. Exadata Smart Scan offloads processing of queries from the database server to the storage server.

Processors on the Exadata Storage Server process the data on behalf of the database SQL query. Only the data requested in the query is returned to the database server.

172. What is the main goal of smart scan?

- Reduce the volume of data transferred from disk systems to the database servers
- Reduce CPU usage on database servers
- Reduce disk access times at the storage layer

173. How smart scan works?

- If any query executes on database server than database server sends the extents and metadata to the storage cell.
- Smart scan will scan data blocks to identify relevant rows and columns.
- Once data identified by smart scan, it will return to database with only appropriate rows and columns.
- Once DB server gets the data, it will assemble returned data into result set.
- This operation will save the bandwidth as well CPUs and memory cost on database server as whole sql processing happens on storage server.

174. What are the requirement smart scans?

- Smart scan is possible for only full table and index scan
- Smart scan can only be used for direct path reads
- Smart scan must be enabled in the database
- Segments must be stored on appropriate configured disk group which has smart scan attribute set on DG level

175. In which scenario smart scan cannot be used?

- Scan on index organized table
- Scan on clustered table
- If the table has row level dependency tracking enabled
- More than 255 columns are referenced in the query
- LOB and LONG column is selected or queired
- Data are encrypted and cell based decryption is disabled

176. How to disable smart scan on session level on database?

Sql>alter system set cell_offload_processing=false;

177. Which parameter is used to enable/disable smart scan on ASM disk group level?

cell.smart_scan_capable

178. Which parameter we can use to measure whether smart scan is working or not for any query?

IO_CELL_OFFLOAD_ELIGIBLE_BYTES

179. Which parameter is used to enable and disable the smart scan?

cell_offload_processing

180. How to create ASM disk group with cell offload enabled?

CREATE DISKGROUP DATA_DG NORMAL REDUNDANCY

FAILGROUP CELL01 DISK 'o/192.168.12.3/DATA_DG_CD_05_cell01'

FAILGROUP CELL02 DISK 'o/192.168.12.4/DATA_DG_CD_05_cell02'

FAILGROUP CELL03 DISK 'o/192.168.12.5/DATA_DG_CD_05_cell03'

attribute 'compatible.rdbms'='11.2.0',

'compatible.asm' ='11.2.0',

'au_size'='4M','cell.smart_scan_capable'='true';

181. How to disable cell offload on ASM disk group?

alter diskgroup DATA_DG set attribute 'cell.smart_scan_capable' = 'FALSE';

182. Which statistics can be used to monitor smart scan for individual SQL statement?

- IO_CELL_OFFLOAD_ELIGIBLE_BYTES
- IO_CELL_OFFLOAD_RETURNED_BYTES
- OPTIMIZED_PHY_READ_BYTES

183. When we should consider to removing index?

We can consider to removing index if smart scan delivers acceptable performance.

184. What are the benefits of removing indexes which are not required?

- Improves DML performance
- Saves storage space

185. What is the command to invisible index?

SQL>ALTER INDEX index_name INVISIBLE;

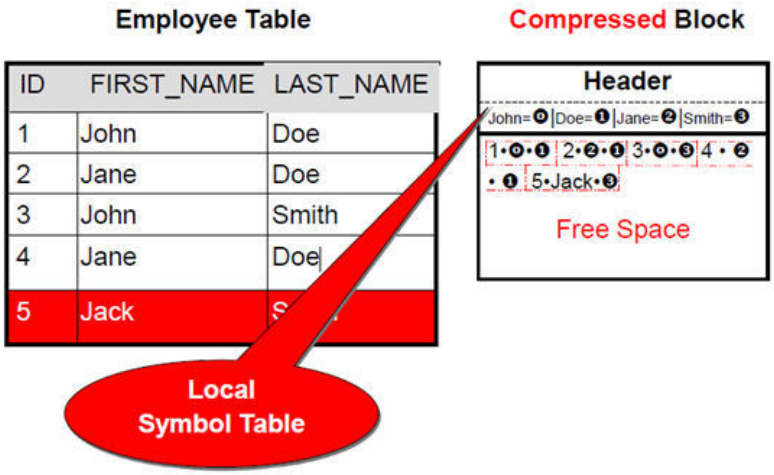
Hybrid Columnar Compression

186. What is EHCC stands for?

EHCC stands for Exadata Hybrid Columnar Compression

187. What is HCC ?

Hybrid Columnar Compression (EHCC) is a technique where tables are organized based on similar columns and then compressed. The key is organizing data based on column values; this keeps similar data together resulting in greater compression factors.



Above figure shows how data stores in compressed format

188. What are the different modes of compression in Exadata?

Query and Archive which further divide into Query low/high and Archive low/high

189. As per Oracle what is the compression factor as per Oracle for Query mode?

As per Oracle reports compression factor for Query mode is 10X. Again it's totally depends upon the type of data.

190. As per Oracle what is the compression factor for Archive mode?

As per Oracle reports compression factor for Archive mode is 15X to 50X. It is also dependent on the data type in the database.

191. Where decompression of data happens?

Decompression of data executes on storage level instead of database server to enhance performance.

192. Can we use HCC on non-exadata environment?

No, HCC is only available data stored on Exadata storage server.

193. Which compression algorithm uses by Query low and high compression?

Query low uses LZO compression algorithm while Query high uses ZLIB compression algorithm.

194. Which compression algorithm uses by Archive low and high compression?

Archive low uses ZLIB compression algorithm which is higher than Query high compression and Archive High compression uses Bzip2 compression.

195. What is CU?

Oracle blocks are combined into logical structure called compression unit (CU).

196. Which utility is used to find out estimated compression ratio of an object?

Compression Advisor is used to find out the estimated compression ratio of object.

197. Which packaged is used by compression advisor utility?

DBMS_COMPRESSION package

198. Is it possible to use compression advisor on non exadata setup?

Yes

199. How to create HCC table compressed for query high using CTAS?

*SQL>create table tbl_queryhigh nologging tablespace test_tbps compress for query high as select * from tbl_noncompress;*

200. How to specify compression attribute at tablespace level?

SQL>create bigfile tablespace comp_tblspc datafile '+DATA' size 2g autoextend on next 1m extent management local autoallocate segment space management auto default compress for query low;

201. How we can use compression attributes while creating compressed table?

SQL> CREATE TABLE ... COMPRESS FOR [QUERY LOW|QUERY HIGH|ARCHIVE LOW|ARCHIVE HIGH];

202. How to compress existing table to archive low compression?

SQL>alter table table_name move compress for archive low;

203. How to use compression with partition?

SQL>ALTER TABLE table_name MOVE PARATITION partition_name COMPRESS FOR [QUERY LOW|QUERY HIGH|ARCHIVE LOW|ARCHIVE HIGH];

204. How to un-compress table?

SQL>alter table table_name move nocompress;

205. When we should use which compression mode in database?

Generally for frequently accessed data we can use query low and high compression mode while archived data or data which are accessed and updated rarely, we can use archive low or high compression.

206. What is average storage can be saved if we use compression mode?

Storage saving can vary from 2X to 200X. It is totally dependent on data.

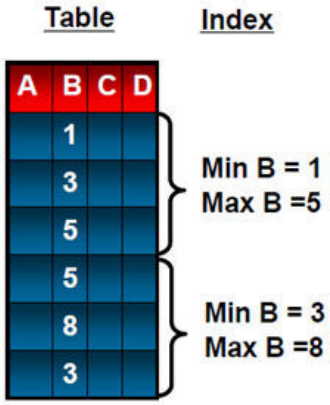
207. For higher storage saving, which compression mode is the best?

Archive High

Storage Index

208. What is storage index?

The storage index keeps track of minimum and maximum values of columns per storage region for tables stored on that cell.



209. What storage index does?

Storage index filter out data from the consideration.

210. How many maximum columns can be contained by storage index?

Up to eight columns per table

211. Where storage index resides?

Storage indexes are stored into the memory on cell storage.

212. What will happen to storage index if we restart the cell server?

As storage index stored into the memory so when we shut down the storage it will remove the indexes and it would be rebuild automatically once storage server comes up.

213. How much region covered by one storage index?

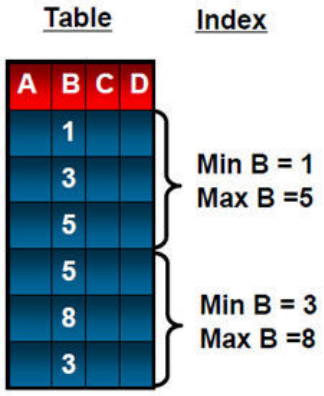
1 MB

214. How we can tune storage index?

Storage index managed automatically and transparent, there is no scope of doing any tuning or managing the storage index.

215. How storage index works?

Let me explain it by giving below example.



If we execute select query on above table

SQL> select * from TABLE where b>7;

In this case first query will go to the storage index and it will check min and max number for rows of first set but 7 is not fitting in Min and Max for rows of first set so, it will eliminate to check the chunk of data and it will move to second set of rows.

On second set of rows it will check min and max , here it finds max is 8 so, it will go inside and read the rows and give the appropriate output for the query.

Here it has eliminated reading of 3 rows which are not matching with the query which help to boost the database performance.

216. Which database statistic can be used to monitor storage index?

'Cell physical IO bytes saved by storage index' is used to monitor storage index.

217. Which parameter is used to enable or disable the storage index on database level?

"_kcfis_storageidx_disabled"

218. How to disable storage index on session level?

SQL>alter session set "_kcfis_storageidx_disabled"=true;

219. What is the primary goal of storage index?

Storage indexes are a feature unique to the Exadata Database Machine whose primary goal is to reduce the amount of I/O required to service I/O requests for Exadata Smart Scan.

220. What is region index?

Each storage region has a small memory structure associated with it that is used to store a region index, which is another name for a storage index.

221. Which parameter is used to trace the storage index?

"_kcfis_storageidx_diag_mode"

222. How to enable storage index tracing?

SQL>alter session set "_kcfis_storageidx_diag_mode"=2;

223. Where trace file will be stored of storage index tracing?

On storage cell

224. In which condition storage index is applicable for sql query?

- During direct path read operation
- With smart scan
- When query contain predicates and do not contains wildcards

IO Resource Manager

225. What is IORM?

IO Resource manager allows workloads and databases to share I/O resources automatically according to user defined policies. To manage workload across the databases we can define IORM plans.

226. What is DBRM?

DBRM stands for Database Resource Manager, which is used to manage resources within the database. It is also known as intradatabase resource manager.

227. What is interdatabase resource manager?

IORM also known as interdatabase resource manager which is used to manage workload across multiple databases.

228. What is consumer group in IORM?

Consumer group represents collection of users within database.

229. What is a category in IORM?

Category represents collection of consumer groups across all databases.

230. What are the two ways to distributes I/O resources?

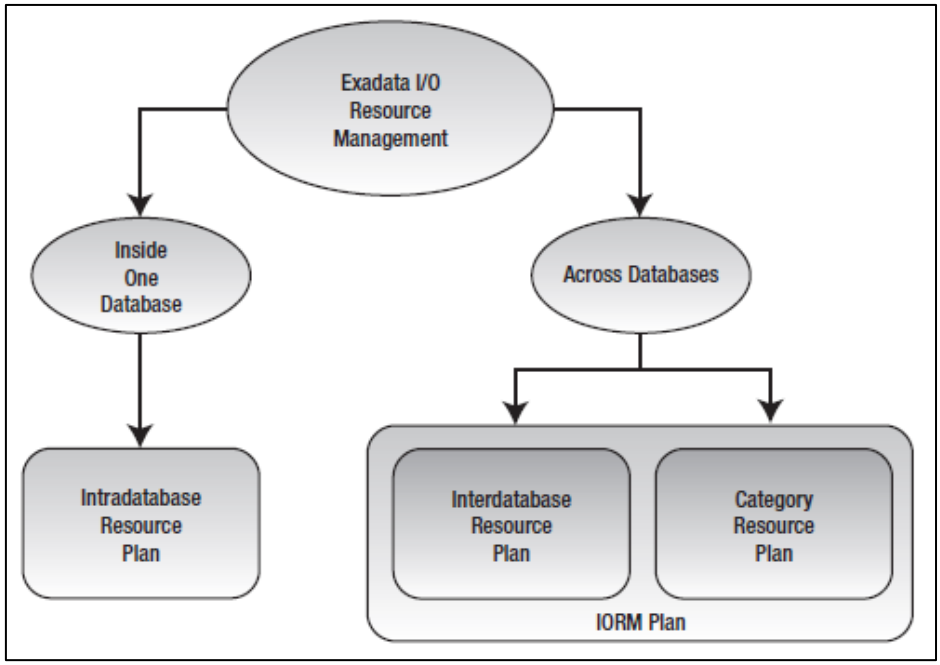
IORM plan directives offer two ways to distributes I/O resources.

DBPLAN - Database Plan

CATPLAN – Category Plan

231. Which three methods we can use for IO resource management?

- Interdatabase resource management
- Intradatabase resource management
- Category based resource management



Above figure shows type of IORM configuration

232. What is DBPLAN?

It specifies how to distribute IO workloads between different databases.

233. What is CATPLAN?

It specifies how to distribute IO workloads between different I/O categories.

234. What will happen if we don't specify DBPLAN?

If no database plan specified then I/O resource are divided equally between all incoming database requests.

235. How to disable smart flash cache feature in IORM plan?

To disable smart flash cache, we have to set value of flashcache directive to off.

236. How to disable flash log feature in IORM plan?

We can disable flashlog by setting the flashlog value to off.

Example for flashcache and flashlog usage in IORM.

```
ALTER IORMPLAN -
  dbplan=(
    (name=other,  level=1, allocation=96, limit=100  ,flashCache=on, flashLog=off),
    (name=test1,   level=1, allocation=3,  limit=5  ,flashCache=on, flashLog=off),
    (name=test2, level=1, allocation=1,  limit=5  ,flashCache=on, flashLog=on)
  )
```

237. What is the default value of flashcache and flashlog in IORM plan?

By default both would be enabled

238. How to check the status of IORM plan on cell server?

CELLCLI>list iormplan detail

Example:

CellCLI> list iormplan detail

name: cell01_IORMPLAN

catPlan:

dbPlan:

objective: basic

status: active

239. How to activate IORM plan?

CELLCLI>alter iormplan active

240. How many IORM plan can be active at one time?

Only one IORM plan

241. What if we don't use IORM plan in exadata?

All databases will get equal priority if IORM plan is not set

242. How to create category?

We can create category by using CREATE_CATAGORY procedure

243. What are the components contained in the DBRM?

DBRM contained three main components.

- Consumer Groups
- Plan Directives
- Resource Plan

244. Which instance parameter is used to activate resource plan?

"RESOURCE_MANAGER_PLAN"

Example:

SQL> alter system set resource_manager_plan='plan1';

245. What is the OTHER_GROUP in IORM?

It is default consumer group, any session that is not defined in resource plan will be assigned to the OTHER_GROUP consumer group to make sure that all session get assigned to the consumer group.

246. What is a plan directive?

Plan directives consist of one consumer group and one or more management attributes.

247. What is resource plan?

It is collection of plan directives that determines how database resources are to be allocated.

248. What is pending area?

Resource plans in the database cannot be directly modified; nor can you directly define new plan directives or resource groups.

Oracle provides a work space called the pending area for creating and modifying all the elements of a resource plan.

Example:

```
BEGIN

DBMS_RESOURCE_MANAGER.CREATE_PENDING_AREA();    ----Create the pending area

DBMS_RESOURCE_MANAGER.VALIDATE_PENDING_AREA();  ----Validate your work

DBMS_RESOURCE_MANAGER.SUBMIT_PENDING_AREA();    ----Install your work into DBRM

END;
```

249. How to deactivate resource plan on database level?

SQL>alter system set resource_manager_plan='';

250. What is instance caging?

Instance caging is used to provision of CPUs on instance level.

251. How cage instance to 2 CPUs?

SQL>alter system set cpu_count=2';

252. Which IORM objective should be used for OLTP workload?

Low_latency

253. Which IORM objective should be used for DW workload?

High_throughput

254. Which IORM objective should be used for mixed workload?

Balanced

255. How to check large IO load for database?

CELLCLI> LIST METRICCURRENT where name=DB_IO_RQ_LG

256. How to check small IO load for database?

CELLCLI> LIST METRICCURRENT where name=DB_IO_RQ_SM

DBFS

257. What is DBFS?

DBFS stands for Database File system which can be built on ASM disk group using database tablespace.

258. What is the use of DBFS?

DBFS can be used as a generalized shared file system on database machine which can be used to store data files, scripts, reports or any other application related data. Also it uses as staging area for bulk database loading.

259. What are the major steps to create DBFS?

- Database creation
- Tablespace creation
- User creation with required rights
- Create DBFS file system using dbfs_create_filesystem_advanced.sql
- Create OS level directory to mount DBFS file system with required rights
- Mount dbfs file system using dbfs_client

260. Which client is used to mount DBFS?

dbfs_client

261. What is the location pf dbfs_create_filesystem_advanced.sql?

$ORACLE_HOME/rdbms/admin

262. How to access DBFS?

DBFS can be accessed through OS mount point

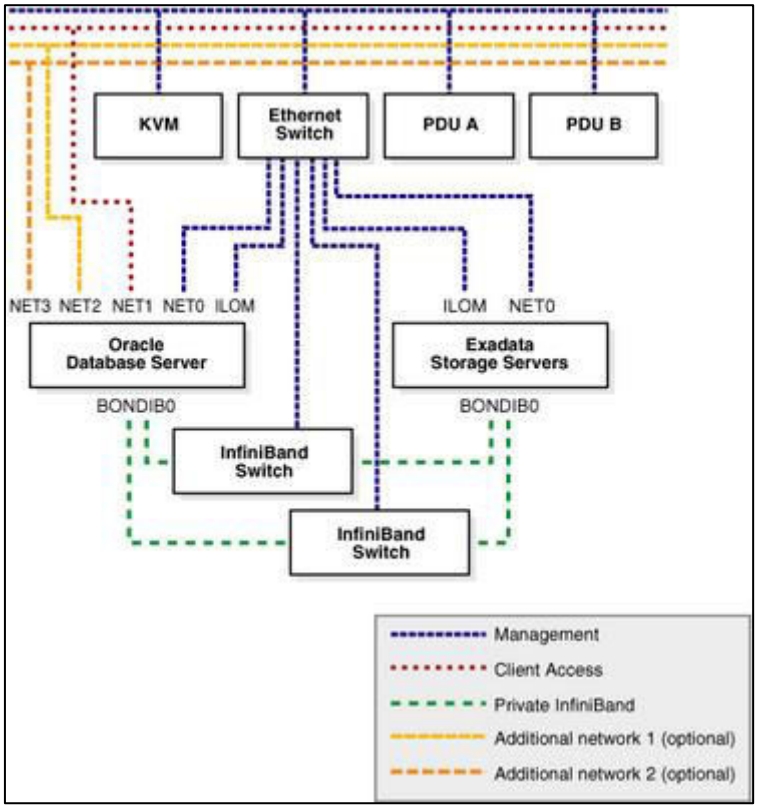
263. What can be redundancy level of DBFS?

Redundancy level of DBFS depends upon the ASM disk group which is associated with database on which DBFS is created.

Exadata Networking

264. How many networks are required in Exadata machine?

- Management/ILOM Network
- Private Netwrok
- Client/Public Network



Network Connectivity Diagram of Exadata Machine

265. What is the use of management/ILOM network?

This is Ethernet network which is used to manage the hardware components of Exadata machine. Using this network administrator can access the hardware through KVM or ssh to monitor the hardware components.

Servers and storage contains ILOM also which is used to monitor the components remotely. All the devices contain management networks including infiniband and PDUs.

266. What is the use of infiniband network?

This is high speed storage network between cell storage and database servers. This is also used as cluster interconnects. We can also configure high speed backup with the use of infiniband network.

Each database server and cell storage connected to infiniband network with the use of bonded infiniband network to maintain redundancy. This is the private network which does not required any network connection from client switch.

267. What is the purpose of Client/public network?

Client/public network is used to provide database connectivity to application.

268. What is NIC bonding?

The Linux bonding driver provides a method for aggregating multiple network interfaces into a single logical "bonded" interface.

The behaviour of the bonded interfaces depends upon the mode; generally speaking, modes provide either hot standby or load balancing services. Here we use bonding for high availability of NIC.

If any fault occurs on one NIC than accessibility of database or component would not be affected as other NIC will take care the existing connection.

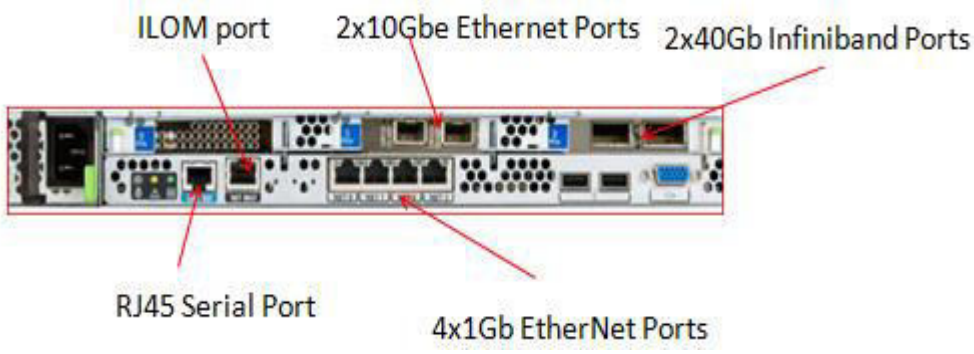
269. What is the capacity of infiniband port?

40 Gbps

270. How many network ports are contained in Database server?

- 2 ethernet ports with 1 Gbps speed
- 2 ethernet ports with 10 Gbps speed

- 2 Infiniband ports with 40 Gbps speed
- 1 Management port
- 1 ILOM port
- 1 port will be free



271. What is the purpose of infiniband spine switch?

Spine switch is used to connect multiple exadata database machines.

272. Which rack configuration contained spine switch?

Only half rack and full rack configuration contained spine switch

Monitoring Exadata Machine

273. Which components of Exadata machine required monitoring?

All the below mentioned components required monitoring.

Software Components:

Operating System

Storage Software

ASM

Database

Hardware Components:

Database Server

Storage Server

Storage and database server hard disks

Infiniband and cisco switches

PDUs

274. What all monitoring technologies we can used to monitor Exadata machine?

- OSwatcher
- Enterprise Manager Grid Control
- ASR
- SNMP
- ILOM
- ADR
- IPMI
- Exacheck

SNMP

275. What is SNMP?

SNMP is Standard Network Management Protocol which is used manage devices over the network.

IPMI

276. What is IPMI?

IPMI is Intelligent Platform Management Interface which is used to manages servers over the network.

277. What all the management includes in IPMI?

It includes field replaceable unit inventory reporting, logging of system events and system recovery which includes system power on/off/reset.

ILOM

278. What is ILOM?

ILOM stands for integrated Light Out Manager

279. What is the use of ILOM?

- Provide hardware errors and fault occurs
- Remotely we can control the power state of the server
- View graphical as well non graphical console of the server
- View status of indicators and sensors on the system
- Determine the hardware configuration of the system
- Receive important notifications and message

280. What is threshold?

Thresholds are definitions that allow administrators to define metrics levels, which if crossed automatically generate an alert notification.

ADR

281. What is ADR?

ADR is Automatic Diagnostics Repository which is a file based repository for diagnostic data such as trace, dumps, alert log, health monitor reports etc...

282. Where ADR stores the files?

Each instance of each product stores diagnostic data under its own home directory within the ADR.

283. How to get cell metric history in cell server?

CELLCLI>list metrichistory detail

284. How to get current metric detail in cell server?

CELLCLI>list metriccurrent detail

285. How to check health status of infiniband switch?

#showunhealthy

286. What is the command to check power status in infiniband switch?

#checkpower

287. How to check infiniband switch status?

#ibstatus

288. What to monitor in infiniband switch?

- Switch monitoring
- Port monitoring
- Infiniband fabric monitoring

289. How to check infiniband topology?

We can verify infiniband switch topology by executing verify-topology script from one of our database server.

290. How to monitor PDU of exadata machine?

We can monitor PDUs by physical check, OEM or ILOM.

Exacheck

291. What is exacheck?

Exacheck is designed to audit configuration of Oracle Exadata Machine which includes DB Server, Cell Storage, Infiniband switch, Software, Database, and Ethernet Network. Based on collected data it provides report of current configuration with Oracle best practice suggestion. It is not continuous monitoring tool.

292. When we should execute Exacheck utility?

Exachek report should be fetched after the initial Oracle Exadata Database Machine deployment, as a part of the routine maintenance schedule (at least monthly), before and after any system configuration change and patching activity.

293. What are the major phases in Exacheck report?

- Minimal input
- Data collection
- Analysis of existing configuration
- HTML report generation with existing details and best practice suggestion

OSWatcher

294. What is OSWatcher?

OSWatcher is a collection of Unix scripts designed to collect and archive operating system and network metrics to aid in diagnosing performance issues.

295. What is the time interval to collect data by OSWatcher?

15 Seconds

296. What is the default installation location of OSWatcher?

/opt/oracle.oswatcher/osw

ASR

297. What is ASR?

ASR stands for Automatic Service Request

298. What is the function of ASR?

ASR resolves problems faster by automatically creating Service Requests when specific hardware faults occur on qualified server, storage and Exadata products.

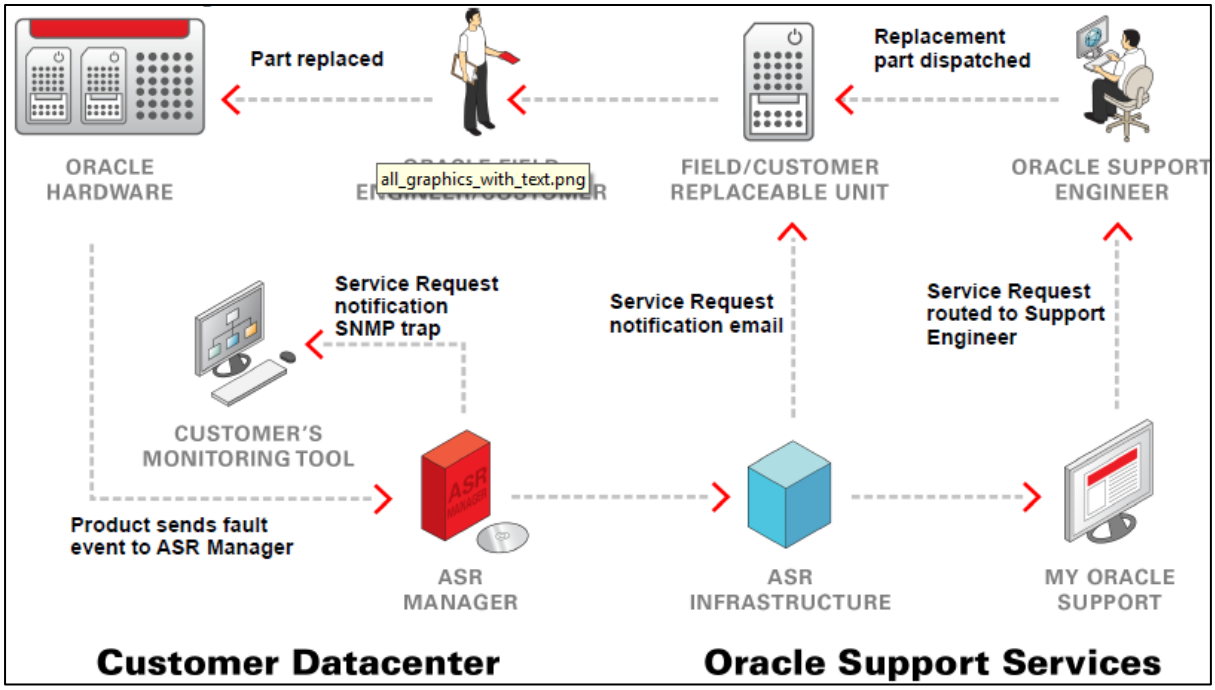
299. What are the pre-requisites to configure ASR?

- Access to My Oracle Support
- Internet connectivity using HTTPS
- Network connectivity from ASR server to Exadata components

300. How does ASR work?

- If any fault occurs in Exadata Machine hardware, it will automatically raise an SR with Oracle support team
- Once SR will be raised by ASR, it will send notification mail to the customer
- Create SR will be routed to support engineer
- Support engineer dispatch the faulty part to the customer location based on the identified issue
- Part will be replaced either by customer or Oracle engineer if machine is under warranty

Below diagram will give you more clarity that how ASR works.



301. What is not covered in ASR?

- CPU utilization
- File system full or un-mounted
- Proactive recommendation of firmware patch
- Operating system or any software failure

302. What is covered in ASR?

Any fault occurrence for any hardware of entire stack is covered in ASR

303. How to register ASR with Oracle?

We can register ASR by executing below command on ASR manager server.

#asr register

304. What is the default location of ASR installation?

/opt

305. How to activate exadata database server in ASR manager?

#asr activate_exadata -i management_ip -h server_hostname -l ilom_ip

After activating server in ASR manager, it is required to activate from My Oracle Support.

306. How to check the list of assets which registerd in ASR manager?

#asr list_asset

307. How to test ASR?

#asr send_test -i asset_ip

It will send test mail to registered mail ID.

308. Which components are included in fault coverage for Exadata machine?

- CPU
- PCIe
- Memory
- System Board
- Power supply
- Fans
- Disks
- Flash Disks

309. Which components are not included in fault coverage for Exadata machine?

- InfiniBand Switches
- Cisco Switch
- KMM / KVM
- Batteries

310. How to check ASR registration status?

#asr show_reg_status

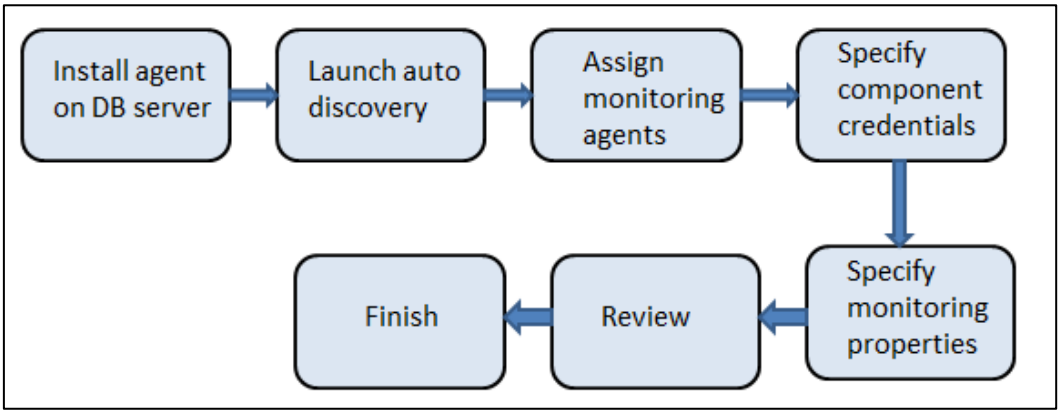
OEM

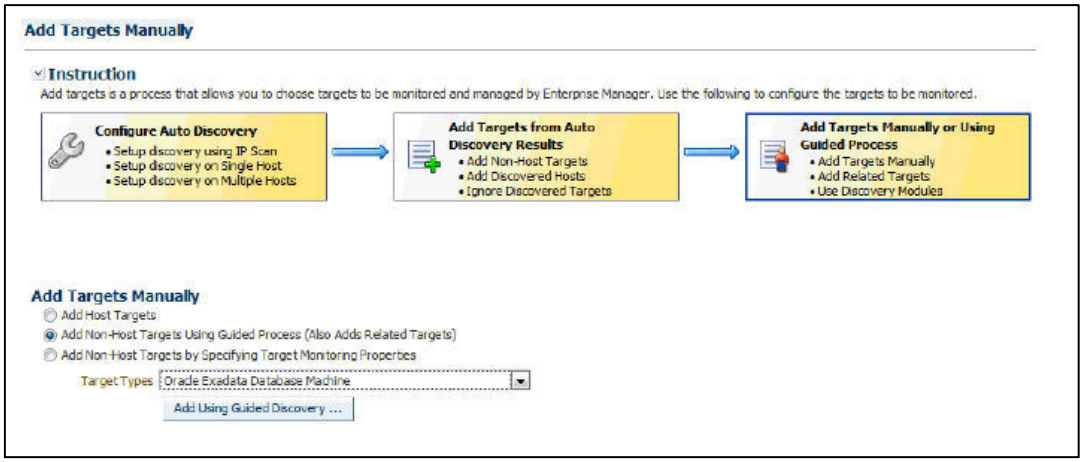
311. What is OEM?

OEM is Oracle Enterprise Manager which is centralized tool to monitor and administer systems as well software.

312. How to configure Exadata machine with OEM 12c?

Below are the steps which need to perform to discover the Exadata components to OEM 12c.





Above figure shows initial screen while we add target into EM12c

313. What checks will be done by discovery prerequisites?

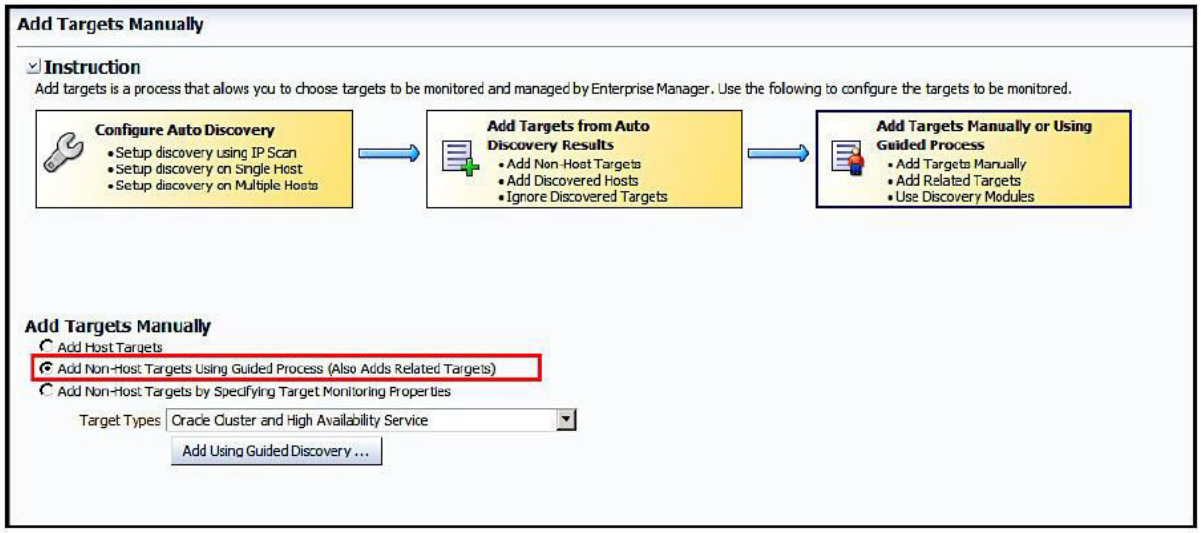
- Checks for critical configuration requirement
- Check to ensure databasemachine.xml and catalog.xml files are exists and readable
- Check to ensure that required discovery software (KFOD) is available
- Prevent discovered targets to be rediscovered again
- Verify that management server and cell server is up and running
- Verify credentials
- Verify component version
- Verify permissions

314. Where databasemachine.xml resides?

It will be available on "/opt/oracle.SupportTools/onecommand" location in compute node

315. What are the steps to discover cluster in OEM 12c?

- From the Setup menu, select Add Targets, then Add Targets Manually.
- In the Add Targets manually page, select Add Non-Host Targets Using Guided Process (Also Adds Related Targets) and Target Type as Oracle Cluster and High Availability Services.
- Click Add Using Guided Discovery and follow the wizard.
- On the Add Cluster Target: Specify Host page, select the first database node and click Continue.
- The cluster home details are displayed. Ensure that all database nodes are shown in Selected Hosts section.
- Click Add.



316. How to get a list of current snmp subscribers in storage cell?

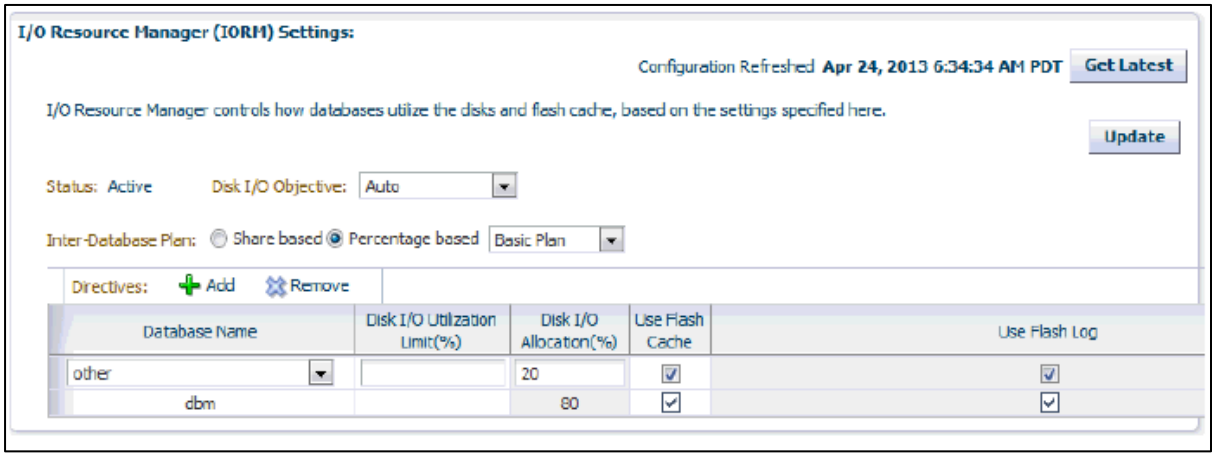
#cellcli -e list cell attributes snmpSubscriber

317. How to get notification method on cell storage?

#cellcli -e list cell attributes notificationMethod

318. From where we can manage IORM in OEM 12c?

Once you have selected an Exadata Storage Server cell, click the Exadata Storage Server menu, select Administration, and then Manage IO Resource.



319. How to check whether storage cell discovered with proper ip address?

Execute below command from one of the DB node.

$ORACLE_HOME/bin/kfod op=cellconfig

320. Which service is responsible to communicate between cell storage and EM12c?

MS (Management Server) Process

Database Consolidation and Migration

321. What are the reasons for consolidation? Why it's required?

- Minimize idle resources
- Maximize efficiency
- Lower costs

322. What are the types of consolidation?

Application Consolidation – It is the process of hosting multiple application schemas inside single database

Database Consolidation – It is the process of hosting multiple databases on a single platform

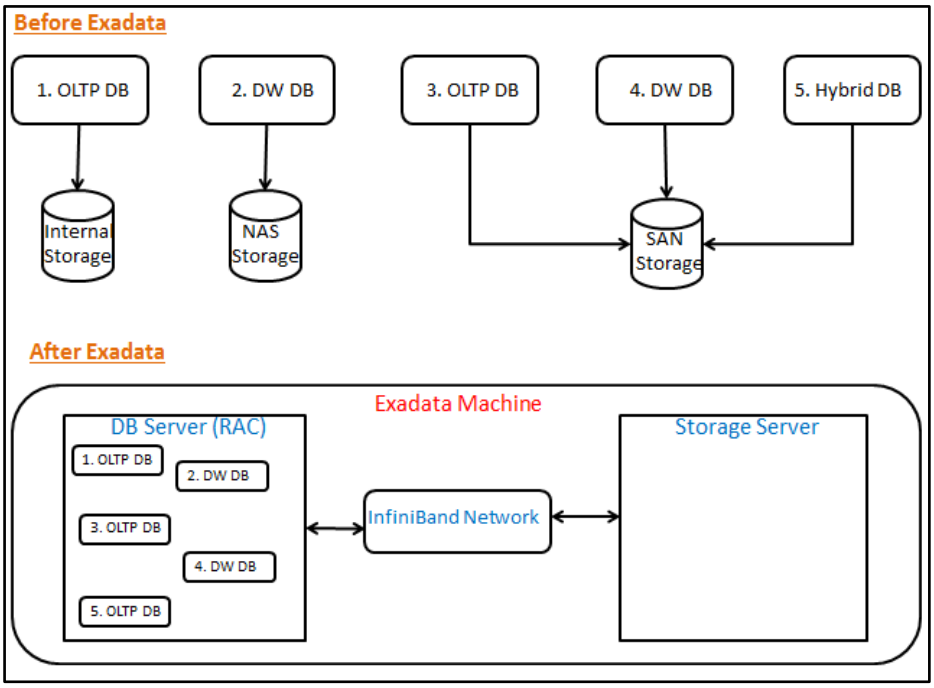
323. What should be recommended storage configuration for database consolidation?

- Recommended disk group like DATA for data files, RECO for flash recovery area and DBFS_DG for clusterware files and DBFS
- High redundancy for DATA disk group
- Stripe disk groups across all cell and all disks
- Use IORM to manage and allocate IO resources
- Set compitable.rdbms disk group attribute to the minimum database software version being used

324. What are the benefits of database consolidation on Exadata machine?

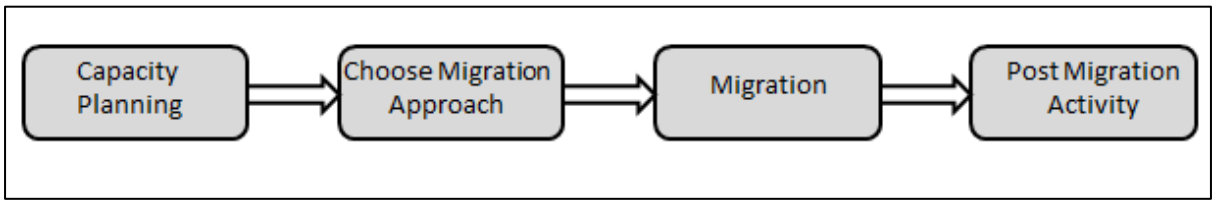
- Standard configuration for the database which is easier to manage
- Balanced configuration
- High availability and performance
- Consistent software and hardware
- Optimized configuration
- Support for OLTP, DW and mixed workload
- Easy and quick implementation
- Scalable infrastructure
- pre-implemented security

Below diagram shows the database setup before and after the database consolidation on Exadata.



325. What are the major steps to migrate database to Exadata database machine?

- Capacity planning
- Choose migration approach
- Migration
- Post migration tasks



326. Which factors we have to consider before migrating the database to exadata machine?

- Nature of application
- Application specific requirements
- EHCC , during or after migration
- Source platform and version

- Database size
- Downtime requirement
- Any other business requirement

327. What is the advantage of logical database migration?

Logical database migration allows you to change database extent size and alter physical characteristics of database like database character set.

328. What is physical database migration?

Physical migration will not allow changing any physical database characteristics.

329. Which migration approach we can use to migrate database to exadata?

- Logical/Physical standby database
- Datapump
- Streams
- Golden gate
- RMAN
- ASM online migration
- Transportable database
- Transportable tablespace
- Using database links

330. What are the typical requirements for migration from business perspective?

- Lower costs
- Quick implementation time
- Low manual intervention
- Minimal downtime for the application during database migration

331. Which migration approach can be applicable if we migrate database from low endian operating system architecture to exadata machine?

- Datapump
- Golden Gate
- Transportable tablespace
- Streams

332. Which migration approach can be the best for OLTP database?

Physical database migration approach

333. Which migration approach can be the best for DW database?

Logical database migration approach

334. Which method we can use to get near zero downtime to migrate database for heterogeneous environment?

Golden Gate

335. How to check that which platforms are supported by database?

SQL> select platform_name, endian_format from v$transportable_platform;

Backup and Recovery

336. What is offload block filtering?

Exadata storage server filters out the blocks that are not required for the incremental backup in progress so only the blocks that are required for the backup are sent to the database.

337. How offload processing helps to improve backup?

During offload processing only required block are sent for backup which helps to improve backup performance by reducing the time required for backup.

338. How HCC can help to improve database backup on exadata?

Exadata storage server filters out the blocks that are not required for the incremental backup in progress so only the blocks that are required for the backup are sent to the database.

339. What are the general recommendations to take rman backup on database machine?

- Use rman incremental backup with block change tracking
- Use an external rman recovery catalog repository
- Set proper size for DBA_RECOVERY_FILE_DEST_SIZE

340. What is CELLBOOT USB flash drive?

Exadata storage server takes backup automatically on USB flash drive which is known as CELLBOOT USB flash drive.

341. Which script is used to create bootable rescue image of storage cell server?

make_cellboot_usb

342. What is block change tracking (BCT)?

Block change tracking records the modified blocks since last backup and stores this logs in block change tracking file

343. What are the benefits of block change tracking?

BCT improves RMAN backup performance as it would not require to scan whole data files to detect changed blocks. It will only see the changed block through block change tracking files and take the backup that clock.

344. How to check the status of BCT?

select status from v$block_change_tracking;

by default BCT feature is disabled.

345. How to enable BCT?

SQL>alter database enable block change tracking;

OR

SQL>alter database enable block change tracking USING FILE '/u01/app/oracle/bct/rman_bct.f' reuse;"

The "USING FILE os_file_name" syntax allows you to define the location of the change tracking file on the OS, or you can omit this clause by enabling OMF.

346. Which command is used to monitor BCT?

SQL>select filename,status, bytes from v$block_change_tracking;

347. How BCT works?

- Whenever data blocks change, the Change Tracking Writer (CTWR) background process tracks the changed blocks in a private area of memory.
- When a commit is issued against the data block, the block change tracking information is copied to a shared area in Large Pool called the CTWR buffer.
- During the checkpoint, the CTWR process writes the information from the CTWR RAM buffer to the block change-tracking file.

348. Which two exadata specifics events triggered by backup and recovery operation on exadata?

- Cell smart incremental backup
- Cell smart restore from backup

349. Where storage cell server maintain copies of last good configuration backup?

/opt/oracle.cellos/iso/lastGoodConfig

350. How to display contents of CELLBOOT USB flash drive?

Mount USB by executing *#mount /dev/sdm1 /mnt/usb*

#cd /mnt/usb

#ls –l

Database Machine Maintenance

351. What are the common administrative tasks to manage Exadata database machine?

- Slow performance
- Patching
- Upgrades
- System outage or failure
- Suspected network issues
- Backup and recovery
- Failed hardware replacement

352. How we can power on the exadata components remotely?

We can use ILOM to power on the exadata component remotely.

353. How to power on database server with hostname db01-ilom?

By executing below command on ILOM CLI or by ILOM web console.

 # ipmitool -H db01-ilom -U root chassis power on

354. What is the sequence to power off Exadata machine?

- Database servers
- Storage servers
- Switches
- Rack

355. What are the steps to power off database servers?

- Stop clusterware - #crsctl stop cluster

- Shutdown database server - #shutdown –h –y now

356. What need to take care before powering off more than one storage server?

All database and Oracle Clusterware processes should be shut down prior to shutting down more than one Exadata Storage Server.

357. Which utility we can use to shut down multiple servers as a time?

DCLI utility

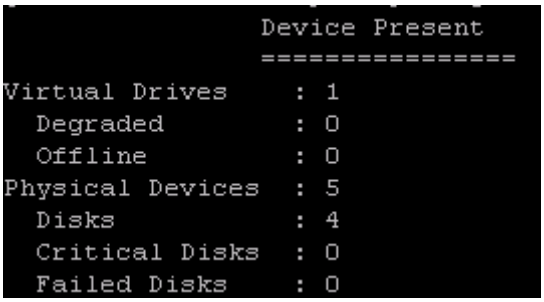
358. How to add memory into database server?

- Power off database server
- Add memory expansion into server
- Power on the server

359. Which command is used to verify database server disk controller?

#/opt/MegaRAID/MegaCli/MegaCli64 -AdpAllInfo -a0 | grep "Device Present" -A 8

It will give below output in X3-2 rack.



360. How to update database server while local repository is not able to connect ULN?

- Download ISO file for database server (Information available in Oracle note 888828.1)

- Create the directory to use as a mount point
- Mount the ISO file using created directory structure
- Modify yum configuration file by editing URL
- Clean yum cache
- List yum repository
- Perform full backup of system partition
- Shutdown oracle software
- Apply the update using yum utility
- Relink oracle software
- Start oracle software
- Reboot the database server for the changes to take effect

361. How to check battery status of flash card?

Execute *#/opt/MegaRAID/MegaCli/MegaCli64 -AdpBbuCmd -GetBbuStatus -a0* on storage cell.

Output:

```
BBU status for Adapter: 0

BatteryType: iBBU08
Voltage: 3827 mV
Current: 0 mA
Temperature: 33 C
Battery State: Optimal
Design Mode  : 48+ Hrs retention with a non-transparent learn cycle and moderate service life.

BBU Firmware Status:

  Charging Status              : None
  Voltage                                 : OK
  Temperature                             : OK
  Learn Cycle Requested                   : No
  Learn Cycle Active                      : No
  Learn Cycle Status                      : OK
  Learn Cycle Timeout                     : No
  I2c Errors Detected                     : No
  Battery Pack Missing                    : No
  Battery Replacement required            : No
  Remaining Capacity Low                  : No
  Periodic Learn Required                 : No
  Transparent Learn                       : No
  No space to cache offload               : No
  Pack is about to fail & should be replaced : No
  Cache Offload premium feature required  : No
  Module microcode update required        : No

BBU GasGauge Status: 0x0180
  Relative State of Charge: 58 %
  Charger System State: 1
  Charger System Ctrl: 0
  Charging current: 0 mA
  Absolute state of charge: 51 %
  Max Error: 0 %

Exit Code: 0x00
```

362. Procedure to drop storage server.

- Drop ASM disks
- Remove IP entry from cellip.ora on each database server which is accessing storage server which we need to drop
- Drop grid disks and cell disks on that server
- Shutdown all the services
- Power down the cell

363. Which command is used to show the status of physical disks on storage cell?

CELLCLI>list physicaldisk

364. How to replace disk due to disk failure?

- Determine failed disk with command
  #CELLCLI> LIST PHYSICALDISK WHERE diskType=HardDisk AND status=critical DETAIL
- Replace failed disk and wait for three minutes. Physical disk is hot pluggable so it can be done online.
- Confirm the online disk
  #CELLCLI> LIST PHYSICALDISK
- Verify firmware version
  CELLCLI>alter cell validate configuration

365. How to start LED to identify specific disk?

CELLCLI>alter physicaldisk disk_name serviceled on

366. How to move all drives from one storage cell to another?

- Take backup of following directories
  /etc/hosts
  /etc/modprobe.conf
  /etc/sysconfig/network
  /etc/sysconfig/network-scripts
- Shutdown storage cell
- Move all the drive to another cell
- Power on new storage cell

- Check the above four directories , if they are corrupted than restore it with backup
- Get hardware address by executing *#ifconfig* for each Ethernet port
- Edit Ethernet configuration files with H/W address (ifcfg-eth0,eth1,eth2,eth3)
- Restart cell server
- Active grid disk, *CELLCLI>alter griddisk all active*
- Validate configuration *CELLCLI>alter cell validate configuration*

367. What will happen if someone has removed wrong storage disk?

If someone has accidentally removed the wrong physical disk, then put the disk back. It will automatically be added back in the Oracle ASM disk group, and its data will be resynchronized.

368. How to identify failed flash disk?

Execute following command on cell server to identify failed flash disk.

CELLCLI> LIST PHYSICALDISK WHERE DISKTYPE=flashdisk AND STATUS=critical DETAIL

369. How flash disk outages affect the performance?

A flash disk outage can cause reduction in performance and data redundancy

370. What are the steps to follow for replacing flash disk?

- Inactivate all grid disks on the cell.
- Shut down the cell.
- Replace the failed flash disk based on the PCI number and FDOM number.
- Power up the cell. The cell services are started automatically.
- Bring all grid disks online using the following command:
  CELLCLI> ALTER GRIDDISK ALL ACTIVE
- Verify that all grid disks have been successfully put online using the following command:
  CELLCLI> LIST GRIDDISK ATTRIBUTES asmmodestatus

371. What will happen to flash griddisks which are the part of ASM disk group after replacing the flash disk?

If the flash disk is used for grid disks, then the grid disks will be re-created on the new flash disk.

If those grid disks were part of an Oracle ASM disk group, then they will be added back to the disk group and the data will be rebalanced on them based on the disk group redundancy and ASM_POWER_LIMIT parameter.

372. How to reset ILOM?

- Login to ILOM remote console
- Select Reset SP from maintenance tab
- Click on Reset SP

373. Why it's required to reset ILOM?

If ILOM becomes unresponsive than manual intervention is required to reset the ILOM.

374. What are the ways to reset ILOM?

- Using IPMItool
- SSH
- Remote console connectivity
- Unplugging the ILOM power supply
- Physically pressing SP reset pin on storage or database server

375. How to replace infiniband switch?

- Disconnect the cables from the switch. All InfiniBand cables should have labels at both ends indicating their locations. If there are any cables that do not have labels, then label them.
- Power off both power supplies on the switch by removing the power plugs
- Remove the switch from the rack
- Install the new switch in the rack
- Restore the switch settings using the backup
- Disable the Subnet Manager using the disablesm command
- Connect the cables to the new switch. Make sure to connect each cable to the correct port
- Run the following command on any of the servers:
  /opt/oracle.SupportTools/ibdiagtools/verify-topology
- Run the following command on any host to verify that there are no errors on any of the links in the fabric:
  ibdiagnet -c 1000 –r
- Enable the Subnet Manager using the enablesm command

376. How to verify InfiniBand topology?

 # /opt/oracle.SupportTools/ibdiagtools/verify-topology

377. What checks are handled by verify topology in InfiniBand?

- Missing InfiniBand cable
- Missing InfiniBand connection
- Incorrectly-seated cable
- Cable connected to the wrong endpoint

378. Which information is required prior replacement of database server?

- Name servers
- Time zone, such as Americas/Chicago
- NTP servers
- IP address information for the management network
- IP address information for the client access network
- IP address information for the InfiniBand network
- Canonical host name
- Default gateway

379. How to change database or storage server password?

#passwd user_name

380. How to change ILOM password?

- Log in to ILOM using ssh
- Use the following command to change the password
  set /SP/users/user_name password

381. How to get model of server or storage cell?

 # dmidecode -s system-product-name

382. How to monitor temperature of database and cell server?

#dcli -g /opt/oracle.SupportTools/onecommand/all_group -l root \ 'ipmitool sunoem cli "show /SYS/T_AMB" | grep value'

Here file all_group contains IPs of all storage and db servers.

383. What is the use of resourcecontrol utility?

It is used to manage CPU core. We can enable or disable CPU core as per requirement or based on capacity on demand.

Database Machine Patching

384. Which MOS ID I should refer for latest patch update?

MOS 888828.1

385. What information would be available on MOS id 888828.1?

- Patch news
- New patching method
- Latest patch updates
- Link or doc id notes for other products

386. What is QFSDP?

- It is Quarterly Full Stack Download Patch
- It contains patches for all the components of Exadata box
- Oracle release it quarterly

387. Which components need to be patched in Exadata?

- Infiniband Switch
- Storage Server
- Database Server
- Grid and RDBMS stack
- PDUs

388. What is the meaning of storage server version 11.2.3.2.1?

- **11 –** DB major release
- **2 -** DB minor release
- **3 -** Cell major release
- **2 -** Cell minor release
- **1 -** Maintenance release

389. What should be the patching order?

Patching order is not fixed but it is recommended as per below order to mitigate risks.

- Infiniband Switch
- Storage Cell
- Database Server
- GRID and RDBMS
- PDUs

390. What are the benefits and consideration if we have to apply patch in rolling fashion on cell server?

Benefits:

- No downtime
- If patch fails, only one cell is affected

Considerations:

- Patch apply time is longer
- Between 1.5 and 3 hours per cell for patch apply
- Reduced redundancy during patch apply process

391. What are the benefits and consideration if we have to apply patch in non-rolling fashion on cell server?

Benefits:

- Patch apply time is lesser than rolling fashion
- Between 1.5 and 3 hours for entire process

Considerations:

- Full downtime while applying patches
- If patch fails, all cells can be affected

392. What are the steps to apply patch on Exadata?

- Finalize bundle patch version
- Download & Extract
- Confirm patching method (rolling/non-rolling)
- Prepare
- Pre-requisites
- Apply Patch

- Post tasks
- Verify

393. Which utility is used to patch the storage cell?

Patchmgr utility is used for storage cell patching.

394. What all upgrade includes in storage cell patching?

- Operating system Upgrade
- Firmware Upgrade
- Storage Software Upgrade

395. Which utility is used to patch database server?

dbnodeupdate.sh is used to patch database server.

396. What steps will be executed by dbnodeupdate.sh utility?

Dbnodeupdate.sh utility is responsible to patch database server. It will perform all the pre-requisites checks, Upgrade and post upgrade steps. Following are the major steps which will be performed by dbnodeupdate.sh utility.

- Execute pre-requisite check
- Stop OSWatcher
- Perform file system backup
- Mount yum ISO image and configure yum
- Apply OS update using yum utility
- Reboot system
- Collect system configuration details
- Upgrade validation
- Start ExaWatcher
- Unlock GI home
- Relink all oracle homes for RDs protocol
- Lock GI home and enable CRS upon host restart

397. What is the command to rollback database server patch to previous version?

dbnodeupdate.sh –r

398. Which utility is used to patch InfiniBand switch?

Patchmgr

399. How we can minimize risk of patching?

- Create concise plan
- Read all the readme thoroughly multiple times
- Patch non production system first
- Apply patch on standby first if standby setup is available

400. What steps are performed in rolling patching for GRID and RDBMS on database server ?

- Stop Oracle Home
- Patch Oracle Home
- Stop CRS
- Unlock Grid Home
- Patch Grid Home
- Start CRS
- Lock Grid Home
- Start Oracle Home

401. What are the ways to update database server operating system?

- Mount ISO file containing RPMs
- Update directly from ULN
- Configure local yum repository

402. Which utility is used to patch GRID and RDBMS?

- OPatch
- OPlan

403. How we can mitigate patching if we have dataguard in place?

We can apply patch first on dataguard before applying on primary setup. If it goes smoothly than we can go for production.

404. What are the steps involved if first we have to patch dataguard before production setup?

- Apply patch to standby server
- Test patch
- Switchover to standby
- Apply patch to primary database
- Switchover back to original primary
- Run post-patch install scripts

405. How much time required for storage cell patching?

Approximate 2 hours per cell server in rolling fashion and approximate total 2 hours for all storage cells in non-rolling fashion.

406. How to determine whether Oracle patch is rolling or not?

Execute following command to check whether patch is applicable for rolling update or not.

$opatch query -is_rolling_patch [unzipped patch location]

407. What all steps are performed by patchmgr while patching cell server?

Entire patching activity done by patchmgr utility automatically.

- To ensure good backup exists, USB recovery media is recreated
- Check cells have ssh equivalence for root user
- Initialize files, check space and state of cell services
- Copy, extract prerequisite check archive to cells
- Check prerequisites on cell
- Copy the patch to cell
- Execute plug-in check for Patch Check Prerequisites
- Initiate patch on cell
- Reboot the cell
- Execute plug-in check for Patching
- Finalize patch
- Reboot the cell
- Check the state of patch
- Execute plug-in check for Post Patch

408. What are the major steps involved for cell server patching?

- Check and note down existing configuration of cell
- Clean up any previous patchmgr utility
- Verify that the cells meet prerequisite checks
- Patch cell server using patchmgr
- Validation updated cell

409. What are the steps to rollback patch on cell server?

- Disable writeback flashcache
- Check rollback pre-requisites
- Perform the rollback
- Clean up all the temporary patch or rollback files on the cells

Location of log files in database server

- **Database alert.log**

$ORACLE_BASE/diag/rdbms/{DBNAME}/{sid}/trace/alert_{sid}.log

Ex: /u01/app/oracle/diag/rdbms/dbfs/DBFS2/trace/alert_DBFS2.log

- **ASM alert.log**

$ORACLE_BASE/diag/asm/+asm/+ASM{instance number}/trace/ alert_+ASM {instance number}.log

Ex: /u01/app/oracle/diag/asm/+asm/+ASM2/trace/alert_+ASM2.log

- **Clusterware CRS alert.log**

$GRID_HOME/log/{node name}/alert{node name}.log

Ex: /u01/app/11.2.0/grid/log/dmorldb02/alertdmorldb02.log

- **Diskmon logfiles**

$GRID_HOME/log/{node name}/diskmon/diskmon.lo*

Ex: /u01/app/11.2.0/grid/log/dmorldb02/diskmon/diskmon.log

- **OS Watcher output files**

/opt/oracle.oswatcher/osw/archive/

To get OS watcher data of specific date :

#cd /opt/oracle.oswatcher/osw/archive

#find . -name '*12.01.13*' -print -exec zip /tmp/osw_`hostname`.zip {} ;

where 12- year 01- Month 13-day

- **OS message logfile**

/var/log/messages

- **VM Core files for Linux**

/u01/crashfiles

More details can be found in the following note:Where / How to find OS crashcore file in Exadata Systems [Linux] (Doc ID 1389225.1)

- **Disk controller firmware logs:**

/opt/MegaRAID/MegaCli/Megacli64 -fwtermlog -dsply -a0

Location of log files in cell server

- **Cell alert.log file**

/opt/oracle/cell/log/diag/asm/cell/{node name}/trace/alert.logorif the CELLTRACE parameter is set just do cd $CELLTRACE

- **MS logfile**

/opt/oracle/cell/log/diag/asm/cell/{node name}/trace/ms-odl.log.

orif the CELLTRACE parameter is set just do cd $CELLTRACE

- **OS watcher output data**

/opt/oracle.oswatcher/osw/archive/

To get OS watcher data of specific date :

#cd /opt/oracle.oswatcher/osw/archive

#find . -name '*12.01.13*' -print -exec zip /tmp/osw_`hostname`.zip {} ;

where 12- year 01- Month 13-day

- **OS message logfile**

/var/log/messages

- **VM Core files**

/var/log/oracle/crashfiles

More details can be found in the following note:

Where / How to find OS crashcore file in Exadata Systems [Linux] (Doc ID 1389225.1)

- **SunDiag output files.**

/tmp/sundiag_.tar.bz2

- **Cell patching issues related logfiles:**

/var/log/cellos

The major logfile of patch application output you will find in the db node from where you are patching in the location /tmp/<cell version>/patchmgr.stdout and patchmgr.err

- **Disk controller firmware logs:**

/opt/MegaRAID/MegaCli/Megacli64 -fwtermlog -dsply -a0

Useful Oracle document ID for Exadata

Document ID	Document Description
888828.1	Exadata Database Machine and Exadata Storage Server Supported Versions
1270094.1	Exadata Critical Issues
1353073.1	Exadata Diagnostics Collection Guide
1187674.1	Master Note for Oracle Exadata Database Machine and Oracle Exadata Storage Server
1483344.1	Exadata Platinum Customer Outage Classifications and Restoration Action Plans
1571965.1	Maximizing Availability with Engineered Systems – Exadata
1262380.1	Exadata Testing Practices and Patching Explained
1306814.1	Oracle Software Patching with OPLAN
1110675.1	Oracle Exadata Database Machine Monitoring
1094934.1	Best Practices for Data Warehousing on the Database Machine
1269706.1	Best Practices for OLTP Applications on the Database Machine
1071221.1	Oracle Sun Database Machine Backup and Recovery Best Practices
1054431.1	Configuring DBFS on Oracle Exadata Database Machine
1084360.1	Bare Metal Restore Procedure for Compute Nodes on an Exadata Environment (Linux)
1339769.1	Master Note for Oracle Database Resource Manager
960510.1	Data Guard Transport Considerations on Oracle Database Machine
401749.1	Shell Script to Calculate Values Recommended Linux HugePages / HugeTLB Configuration
1009715.1	Integrated Lights Out Manager (ILOM) CLI Quick Reference
1070954.1	Oracle Exadata Database Machine exachk or HealthCheck
1317159.1	Changing IP addresses on Exadata Database Machine
1244344.1	Exadata Starter Kit
1537407.1	Requirements and restrictions when using Oracle Database 12c on Exadata Database Machine
1551288.1	Understanding ASM Capacity and Reservation of Free Space in Exadata
1459611.1	How to Calculate Usable_FILE_MB / REQUIRED_MIRROR_FREE_MB
361468.1	HugePages on Oracle Linux 64-bit
761868.1	Oracle Exadata Diagnostic Information required for Disk Failures and some other Hardware issues

10386736	Documentation for Exadata 11.2 & 12.1
1085687.1	Heterogeneous Data Guard Support
1110675.1	Monitoring Best Practice
11911441	Configuring Database for DBFS on Oracle Database Machine
367445.1	ASM Diskgroup Imbalance Check

Useful link to learn more about Exadata machine

Exadata certification question bank

Why Exadata for Oracle databases?

Exadata Documentation

Useful command list of cell server

How to configure user equivalence?

What Exacheck does?

Oracle DMA job description

Things to do before applying patch on Exadata machine

How to install VNC server on Exadata

Exadata vs SAP HANA

How to calculate IOPS?

Exadata patching strategy

Exadata monitoring commands

1Z0-027 study guide

1Z0-485 study guide

OEDA Steps

Configure flash disk as a grid disk

Default password for Exadata

Oracle Exadata vs IBM power systems

DMA roles and responsibilities

Storage Index - Demo

DBFS creation

EHCC - Demo

X2-2 datasheet

X3-2 datasheet

X4-2 datasheet

X5-2 datasheet

---------- *Thank you and Good Luck*----------