



EXADATA TO THE CLOUD

Zsolt Szaloki /
Siófok - 5/18/2022



ON-PREMISE UAT ENVIRONMENT

Exadata X6-2

- 2 Compute nodes: 2 x 22 core / 2 x 750 GB memory
- 7 High Capacity Storage servers 7 x 96 TB / 12.8 TB Flash
- 2 IB switch 40 Gbit/sec
- 5 Database (12.1)
- 40 TB data

OCI ENVIRONMENT

The screenshot shows the Oracle Cloud console interface for an Exadata Infrastructure resource. The top navigation bar includes the Oracle Cloud logo and a search bar. The breadcrumb trail indicates the path: Overview > Bare Metal, VM and Exadata > Exadata Infrastructure > Exadata Infrastructure Details. On the left, there is a green 'EXA' logo and a status indicator 'AVAILABLE'. The main content area is divided into two columns. The left column, titled 'Exadata Infrastructure Information', contains a 'General Information' section with fields for Compartment, OCID (with a 'Show Copy' link), Created date (17.24.04 UTC), Availability Domain (crAT), Exadata System Model (X8M-2), and Lifecycle State (Available). The right column, titled 'Exadata Resources', shows 'DB Servers: 2 (100 OCPUs)' and 'Storage Servers: 4 (199 TB)'. Below this is a 'Maintenance' section with links for 'Edit' on the schedule, 'View' on the next maintenance, and 'Manage' on customer contacts. A 'Resources' sidebar on the left lists 'Exadata VM Clusters' and 'Work Requests (0)'. The main section below the information is titled 'Exadata VM Clusters in [redacted] Compartment' and includes a 'Create Exadata VM Cluster' button. A table below shows one cluster with columns for Display Name, State (Available), Availability Domain (crAT), OCPUs (40), and Created date (19.51.50 UTC). The bottom right corner shows 'Showing 1 Item' and '1 of 1'.

ORACLE Cloud Search resources, services, and documentation

Overview > Bare Metal, VM and Exadata > Exadata Infrastructure > Exadata Infrastructure Details

EXA
AVAILABLE

Scale Infrastructure Update Display Name Move Resource Add Tags **Terminate**

Exadata Infrastructure Information Tags

General Information

Compartment: [redacted]
OCID: [redacted] [Show Copy](#)
Created: [redacted] 17.24.04 UTC
Availability Domain: crAT [redacted]
Exadata System Model: X8M-2
Lifecycle State: Available

Exadata Resources

DB Servers: 2 (100 OCPUs)
Storage Servers: 4 (199 TB)

Maintenance

Maintenance Schedule: Custom schedule [Edit](#)
Next Maintenance: System is up to date [View](#)
Customer Contacts: Configured [Manage](#)

Resources

Exadata VM Clusters
Work Requests (0)

List Scope
Compartment [redacted]

Exadata VM Clusters in [redacted] Compartment

The Exadata cloud VM cluster is a child resource of the cloud Exadata infrastructure. Cloud VM clusters contain the storage software and networking configuration required to run Exadata databases. [Learn more](#)

[Create Exadata VM Cluster](#)

Display Name	State	Availability Domain	OCPUs	Created
[redacted]	Available	crAT [redacted]	40	[redacted] 19.51.50 UTC

Showing 1 Item < 1 of 1

OCI BACKUP ON OBJECT STORAGE

Backup performance dropped due to encryption

- Number of channels
- Multi node backup
- Section size
- Compression algorithm → BASIC
- Increased CPU usage

MIGRATION CONCEPT

- Backup on-premise Exadata to on-premise ZFS
- Replicate on-premise ZFS to OCI ZFS
- Restore from OCI ZFS to OCI Exadata
- Setup Data Guard between on-premise Exadata to OCI Exadata
- Encrypt Standby databases
- Data Guard switchover
- MEK management

ON-PREMISE ZFS → VIRTUAL ZFS IN OCI → RESTORE TO OCI

On-premise 2 x 10 Gb connection to Exadata



2 x 1 Gb connection between DC and OCI

CONFIGURE DATA GUARD

- Set parameter `_tablespace_encryption_default_algorithm` to AES256 on primary (patch 30398099)
- Create MEK on primary in local wallet
- Restore databases from virtual ZFS to EXACS
- Copy local wallet from primary to standby
- Configure Data Guard broker
- Increase recovery size

ENCRYPTION ON OCI

Oracle white paper:

Converting to Transparent Data Encryption with Oracle Data Guard using Fast Offline Conversion

Verify that the Data Guard configuration is healthy and contains no gaps.

Create the encryption wallet, and set the master key.

Copy the wallet files to the standby database environment.

Place the standby in a mounted state with recovery stopped.

On the standby: Encrypt data files in-place and in parallel.

On the standby: Restart redo apply and catch up.

Execute a Data Guard switchover making the encrypted standby the new primary and the unencrypted primary the new standby.

On the NEW standby: Place the new standby database in a mounted state with recovery stopped.

On the NEW standby: Encrypt data files in-place and in parallel.

On the NEW standby: Restart redo apply and catch up.

Optionally execute a Data Guard switchover to reestablish the original configuration.

CUTOVER DATE

- Increase CPU during cutover
- IORM configuration
- Switchover
- Backup new primary
- CDC configuration
- Object move to new tablespace

RunBook for AGCS UAT Migration // 24-28.03

1	A	B	C	D	E	F	G	H
2	Phase	Step	Task	Date	From	To	Duration	
25	Prereq	22	Configure automatic backup (API)	2022.03.17			0:00	
26	Prereq	23	Start and monitor manual backup	2022.03.17			0:00	
27	Prereq	24	DEM: Double-check DB entries	2022.03.21			0:00	
28	Prereq	25	Verify correct encryption configuration (AES-256) for OWB DB (tablespace)	2022.03.17			0:00	
29	Prereq	26	Drop OWB all repositories	2022.03.17			0:00	
30	Prereq	27	Create empty account OWB_ & corresponding workspace	2022.03.17			0:00	
31	Prereq	28	Hand-Over to create them to create locations and mappings for OWB (TBD w/ about Service Name - just on Cut-Over WE with right Service Name?)	2022.03.18			0:00	
32	Prereq	29	Task for Stop all CDC tasks on dm25 (UAT CDC Servers (host names TBD)) (note: shall be done in advance e.g. evening before or in the morning)	2022.03.23	18:00	18:00	0:00	
33	Prereq	30	Cleanup OS filesystem (for not used DB-Homes e.g. DB13-TST etc.) / prepare for backup (as of now: tar config files etc. & save to Object Storage)	2022.03.23			0:00	
34	Prereq	31	Prepare image (for non-PROD AMS)	2022.03.22			0:00	
35	Prereq	32	check oracle homes on	2022.03.22			0:00	
36	Prereq	33	Increase recovery sizes for all DBs (compare with settings for the Clones e.g. PGA_ increased from 3 TB to 15 TB)	2022.03.22	14:00	15:00	1:00	
37			Note: as of 30.03.22 - confirmation from for Cut-Over start Thu 24.03.22				4:30	
38			Status meeting - open main WebEx session - send the invitation (TBD) / all applications (UAT) are shutdown	2022.03.24	9:30	9:30	0:30	
39	GoLive	34	Increase # of CPUs to 100 (note: VM rebooted - not supposed to happen [Online Op] - SR ongoing for RCA)	2022.03.24	9:00	9:15	0:15	
40	GoLive	35	Rescheck listener.ora configuration on and listener status	2022.03.24	9:00	9:50	0:50	
41	GoLive	36	Check job_queue_processes are 0 for all DBs on (DONE, Rest also done)	2022.03.24	9:00	9:50	0:50	
42	GoLive		OBSOLETE Check/configure services to primary on check services related logs (note: to be done per DB in Cutover)	2022.03.24			0:00	
43	GoLive		OBSOLETE Remove service names from App Testing DB clones (note: being done per DB in Cutover)	2022.03.24			0:00	
44	GoLive	37	Adjust IORM: clones get 1 share, 3 shares, 3 shares, 3 shares	2022.03.24	9:55	10:05	0:10	
45	GoLive	38	Final configuration & Verify BacCS backup for databases running on dm80 on Object-Storage (13:00 ongoing for all DBs)	2022.03.24	10:00	11:00	1:00	
46	GoLive	39	Verify OCI backup for local filesystem (15:00 ongoing) (note: engineering task for final solution as Jira task in Kanban)	2022.03.24	11:00	11:30	0:30	
47	GoLive	40	Verify cronjob (via Backup Tool / Backup API) for DB backups (15:00 ongoing for all DBs)	2022.03.24	11:30	11:40	0:10	
48	GoLive	41	Verify if all the backups and replications were finished successfully for all 5 DBs	2022.03.24	11:40	12:10	0:30	
49	GoLive	42	Start incl backup on all databases before the cutover incl. archive log backup	2022.03.24	12:10	12:40	0:30	
50							1:35	
51			Status meeting - open main WebEx session - send the invitation (TBD) / general status update	2022.03.24	13:20	13:30	0:10	
52	Cutover	43	intentionally blank					
53	Cutover	44	intentionally blank					
54	Cutover	45	& dm80: Blackout all databases on CC (CloudControl)	2022.03.24	13:00	13:20	0:20	
55	Cutover		Stop and disable listener on needs to be kept online! (note: not applicable for this kind of migration runbook)	2022.03.24			0:00	
56	Cutover		Restart (had experience in the past with bugs not allowing the switchover to complete) (note: not applicable for this kind of migration runbook)	2022.03.24			0:00	
57	Cutover	46	Run a final archiveLog backup on all databases running on — plan more time here, check the current backup timings !!!	2022.03.24	13:20	13:30	0:10	
58	Cutover	47	Switch backup mode to disabled on for all databases	2022.03.24	13:30	14:00	0:30	
59	Cutover	48	Shut down local UC4 on all compute nodes on —> skipped, instead: NOBACKUP lock enabled (to avoid ISM incidents)	2022.03.24	14:00	14:05	0:05	
60	Cutover		30 mins buffer	2022.03.24	14:05	14:35	0:30	
61			Status meeting	2022.03.24	14:30	15:30	1:00	
62	Cutover - BLOCK1		(AES-256) (note: see above steps #13-28 / some tasks here were already done in advance - in close alignment with)				5:15	
63	Cutover	49	OBSOLETE Set job_queue_processes parameters to 0 on for on				0:00	
64	Cutover	50	Remove 2 DB service names on Clone	2022.03.18			0:00	
65	Cutover	51	Create 2 DB service names on new primary	2022.03.18			0:00	
66	Cutover	52	OBSOLETE Complete health-check on primary and standby	2022.03.21	11:00	12:00	1:00	
67	Cutover	53	Shutdown DB	2022.03.24	15:00	15:15	0:15	
68	Cutover	54	Configure ORV (Moving MEK from local waiter to ORV) (#1 of 3 for 25.03.22)	2022.03.25	12:00	16:00	4:00	
69	Cutover		Buffer TBD	2022.03.24			0:00	
70	Cutover	55	Inform AGCS DBAs about finish with database (ready as of 24.03.22 15:00) - continuous status (email) & final confirmation 27.03.22 to B	2022.03.27	20:00	20:00	0:00	
71	Cutover - BLOCK1 END							
72	Cutover - BLOCK2		(AES-256)				9:04	

FURTHER STEPS

- Filesystem backup
- OWB → Oracle Data Integrator, ODI migration
- Database migration to 19c
- Further 5 Exadata migrations in this year
- Deployment with Terraform

QUESTIONS?

**THANK YOU FOR YOUR
ATTENTION!**