

ORACLE CLOUD

Oracle Fusion Cloud Service Backup Practices

Apr. 2017





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Introduction

Backup and restoration practices provide protection against hardware and storage failures, data corruption, and human error.

Oracle Fusion Cloud Services support both online backup and offline backup. Online backup is the process of taking a backup when the systems and applications are running. Offline backup is the process of taking a backup when the systems and applications are down.

Environment Overview

The Oracle Fusion Cloud environment uses Exadata and Exalogic machines and related technologies.

Backup Artifacts

Data artifacts in each tier of the deployment architecture are backed up.

- **Web Tier** - The web tier is shared across multiple services and tenants. Each instance of the web tier is backed up separately. The scope of the web-tier backup is system wide.
- **Application Tier** – A backup of the application tier includes contents of the application configuration directory, managed server logs, and machine-specific Oracle instances.
- **Database Tier** – A backup of the database tier includes tenant-specific databases for Oracle Fusion Cloud services. It also includes databases used by Oracle Identity Management.
- **Identity Management Tier** – A backup of the Oracle Identity Management tier includes Oracle instances for Oracle Internet Directory, the directory service used in the cloud deployment.

Backup Process Workflow

- **Web artifacts** – Oracle HTTP Server in the Web Tier is replicated to an NFS storage appliance. A snapshot of this replica is backed-up to tape. Tape back is retained for 60 days.
- **Application artifacts** - Nightly snapshots of relevant volumes and shares are taken. Nightly replication is initiated to a backup NFS storage appliance. Initial replication is a full copy. Subsequent nightly copies are incremental updates only. The replicas are backed-up to tape. Tape backup is retained for 60 days.
- **Database artifacts** – Recovery Manager (RMAN) is used to take weekly backup of Oracle Databases. A backup of the full database is written to NFS storage appliance. Weekly snapshots are taken of data that has been copied to the storage appliances. Snapshot data is copied to backup tapes using the Oracle Secure Backup (OSB) software.
- **Database archive logs** - RMAN copies database archive logs continuously to the NFS storage appliance. An automated script runs periodically on the database hosts to create backup tapes of the archive logs to a centralized Oracle Secure Backup (OSB) server. A script deletes the archive logs after

the archive logs are written to the central server.

- **Oracle wallet and /etc/oracle** – Contents of /etc/wallets are copied to the network storage. The /etc/wallets/*wallet directory contents are copied to a secondary data center storage. The /etc/wallets/*wallet directory contents are copied to backup tapes daily.

Backup Retention

Backup Retention Schedule			
Source	Method	Frequency	Retention
Exalogic (middle tier)	ZFS snapshot	Nightly	5 days
Exalogic (middle tier)	ZFS replication	Nightly	5 days
Exalogic (tape backup)	Tape backup	Weekly	60 days
Exadata (database)	RMAN backup to NFS	Weekly	7 days
Exadata (database)	Tape backup	Weekly	60 days
Exadata (database archive logs)	NFS central storage	15 mins	7 days
Exadata (database archive logs)	Tape backup	Hourly	60 days
Exadata (database wallet and /etc)	NFS central storage	Weekly	7 days
Exadata (database wallet and /etc)	Tape backup	Weekly	60 days

Tape Media

Tapes are sent to an offsite location on a weekly basis. Tapes are retained according to the retention schedule above. Tapes are replaced if they reach any of the following thresholds:

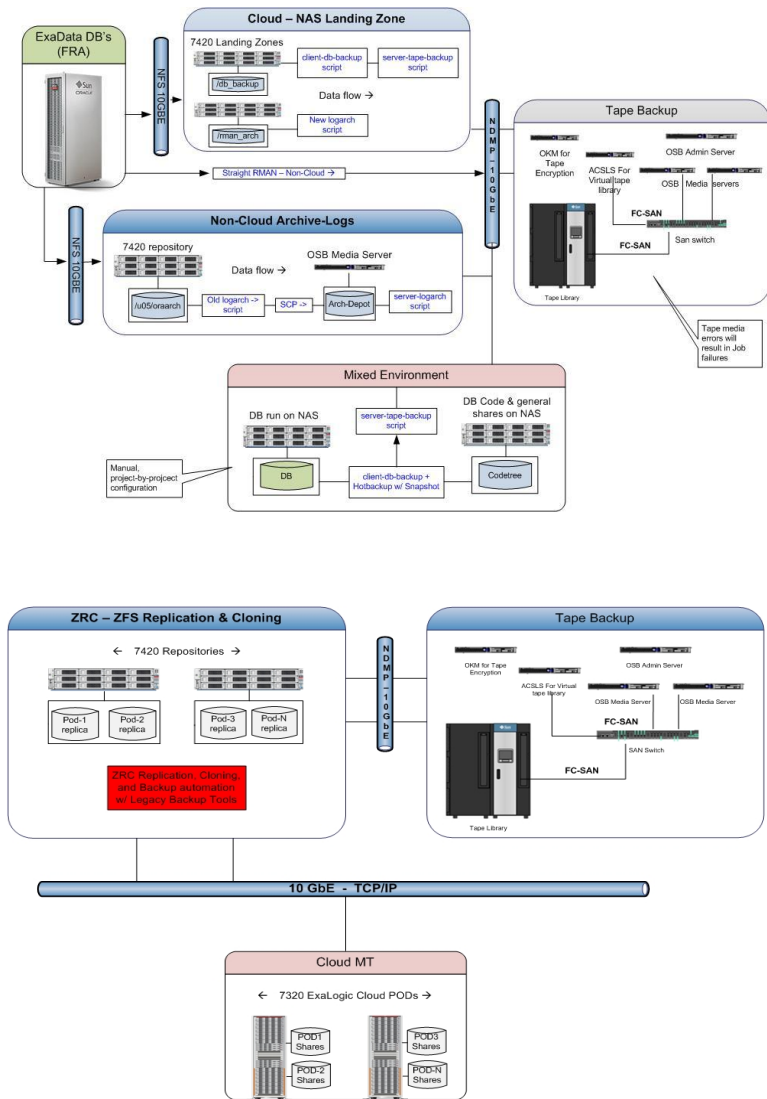
- Age of tape exceeds 4 years
- Tape mount or un-mount cycles exceed 10,000 cycles
- Tape read or write cycles exceed 5,000 cycles
- Number of vaults or shipments exceed 36

Backup Encryption

Oracle Cloud leverages the Oracle Key Management Appliance (KMA) for key management and the hardware encryption feature of the T10K tape drives to encrypt the data written to tape. Oracle KMA uses AES-256 bit encryption to secure the backups. The KMA cluster is replicated and kept in sync with off-site KMA cluster per standard practices.





Backup Architecture

The backup architecture diagram below shows the various methods employed for Fusion backups. NAS storage is used for near term backup storage and tapes are used for offsite and long term backup storage.





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Oracle Fusion Cloud Service Backup Standard And Practices
April 2017



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