Oracle Open World

Exadata Backups

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Turn here®

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Transition To Exadata – A Huge Success!

Challenges with traditional infrastructure

- 300TB of storage with over 60% annual growth rate
- Performance challenges
- Cost reduction pressures
- Need to make failover/recovery more robust

Benefits gained with Exadata

- 42x performance gains for reporting & 40% for OLTP
- Reduced storage by 30% using compression
- Consolidated physical servers from 10 to 4
- Reduced direct/indirect chargebacks by 30%
- Significantly improved failover, backup & recovery strategy

Exadata Architecture

Site 1

Production
Exadata X2-2 Half Rack
High Performance
OLTP Database 2TB
RTO: 0-4 Hours
RPO: Near Zero

Production
Exadata X2-2 Half Rack
High Performance
Data Warehouse 5TB
RTO: 8-24 Hours
RPO: Near Zero

Data Guard

Site 2

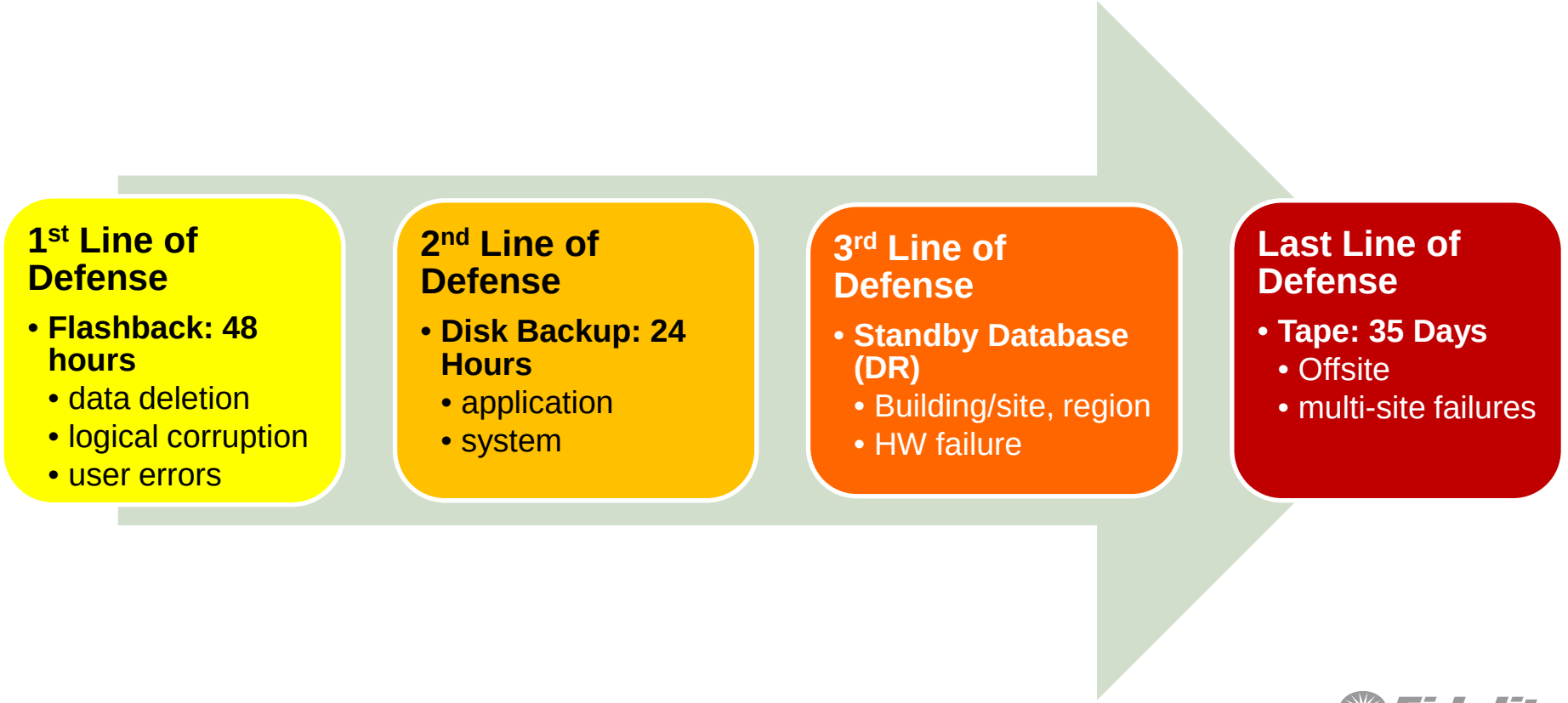
Standby (DR)
Exadata X2-2 Half Rack
High Performance
OLTP + Data Warehouse
RTO: 0-4 Hours
RPO: Near Zero

QA/Development
Exadata X2-2 Full Rack
High Capacity
+
ZFS Machine with
Virtualized Databases

Pre-Exadata Backup Challenges

- Over 60% annual data growth rate
- Business needs growing and becoming more complex
- Expensive software/hardware licenses
- Costly to keep backups on the disk
- Backups hurting database performance
- Complicated recovery with “no-logging”
- Concerns around non-logical DR software

Fundamental Data Protection Strategy



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Flashback

- Oracle Flashback Database
- Primary and Standby Sites

Retention Period:	48 Hours
Restore Time:	< 1 Hour
Space Used:	300GB

- Pros
  - Faster recovery
  - Data recovery from tables, schema, or entire database
  - Roll database back and forth repeatedly within the flashback window for complex data restore
- Cons
  - Same location as production
    - No protection from storage failure
  - No protection from physical corruption

Disk Backup

- Exadata Fast Recovery Area
- Incrementally Updated

Retention Period:	24 Hours
Backup Rate:	1.2 TB/hour
Restore Rate:	1 TB/hour
Type:	RMAN
	Online
	Daily
	Normal Redundancy

- Pros
  - Protect against physical/logical database corruption
  - Faster backup and restore
  - Minimal overhead to the production database
- Cons
  - Shorter protection window (24 hours)
  - Same location as production so no protection from DR or catastrophic storage failure

Standby Database

- Data Guard
- Asynchronous
- No Delay Apply
- 48 Hour Flashback Database setup
- 700 miles between Primary and Standby sites

- Pros
  - Great for any data recovery when combined with Flashback Database
  - Complete data protection if primary site is lost
  - Protection from physical corruption
  - Can be turned into snapshot standby database temporarily and used for QA/Dev database refreshes through RMAN
- Cons
  - Resources (another set of servers/storage)

Tape Backup

Retention Period:	35 Days (Offsite)
Channels:	2-4
Nodes:	1
Backup Rate:	1TB/hour (2 channels)
Restore Rate:	800GB/hour (2 channels)
RTO:	3 Days
Type:	RMAN
	CommVault
Archived Redo Logs Retention	3 Days on disk
Archived Redo Logs Backup	Every 30 minutes

- Pros
  - Longer term offsite retention than disk and standby
  - Media is relatively cheap
- Cons
  - Slower backup and restore than disk
  - Media is less reliable

Planning a Comprehensive Backup Strategy

Determine disk backup strategy	• Consider full backups once a week with daily incremental
Develop tape backup process	• Implement Oracle suggested RMAN backup strategy as it is great protection against data loss
Test different restore processes	• At least annually
Consolidate tape backup system	• Should be centrally managed

Implementation Recommendations

Optimal performance

- Configure Exadata backup over InfiniBand for better throughput
- Configure number of channels based on database size and SLAs
- Use one RMAN channel per tape drive for better throughput
- Enable block change tracking for fast RMAN incremental backups

Data protection and disaster recovery

- Backup Archived Log every 30 minutes for better data protection
- Encrypt the data before writing to tape for data security
- Set-up Flashback on both primary and standby databases
- Utilize Data Guard broker

Monitoring

- Use Oracle Enterprise Manager to monitor:
  - Disk backup
  - Tape backup
  - Data Guard
  - Flashback

Summary

- Have clear and well communicated recovery SLAs
- Build your strategy around the business needs
- Revisit a well-documented, multi-level strategy periodically
- Be conservative and prepare for the worst
- Test
- Practice