

A low-angle, upward-looking photograph of the New York Stock Exchange building. The image shows the grand neoclassical facade with its prominent white marble columns and ornate pediment. Three American flags are visible on the building's facade. The sky is a clear, bright blue. The text is overlaid in white, bold, sans-serif font.

# HIGHEST LEVELS OF DATABASE PROTECTION WITH RECOVERY APPLIANCE

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NEW YORK STOCK EXCHANGE  
GLOBAL DATA SERVICES



## **ICE Facts**

**12 exchanges**

**6 clearing houses**

**12,000 + listed contracts and securities**

**Diverse markets span futures & options on interest rates, commodities, indexes and FX, as well as equities and equity options.**

**ICE Acquired NYSE in 2013**

# NYSE Facts

**\$27.3 trillion in Global Market Cap as of  
(6/30/2017)**

**We transact on average in <200  $\mu$ s**

**Data volume: ~70 billion transactions per  
day**

**Data size: ~ 20 TB of data per day**

**Global Data Services responsible for  
managing all the data on various data  
platforms including Exadata**

## **NYSE and Oracle**

**Oracle - primary transactional database platform supporting all NYSE businesses**

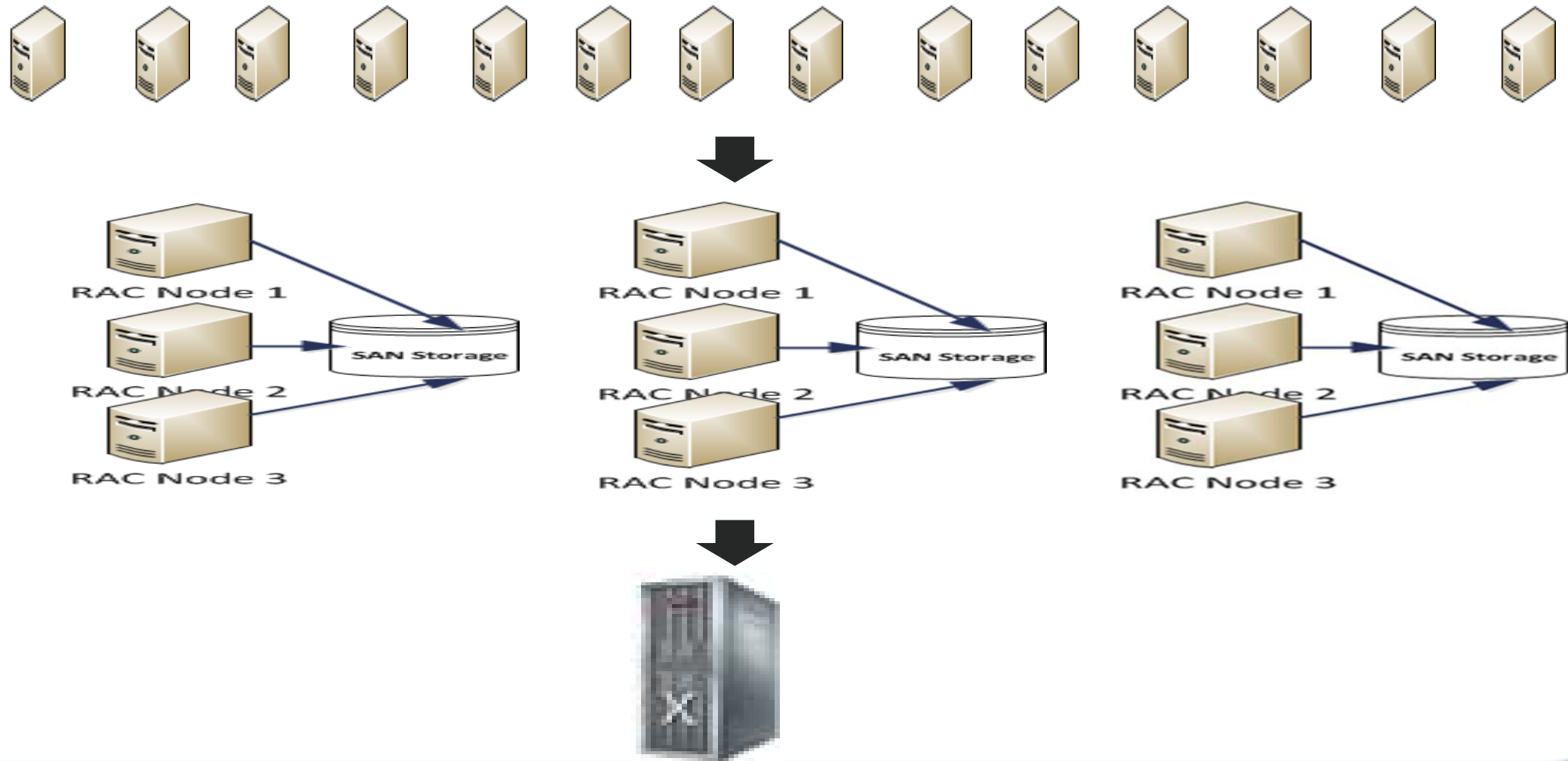
**OLTP and Data Mart environments - 250+ databases, RAC, Data Guard**

**Large transactional databases: ~20 TB each  
Each can produce ~900+ GB redo logs in a day**

**Large Data Mart: >400 TB**

**Total database size - 750+ TB**

# CONSOLIDATION TO EXADATA CAPACITY SOLUTION



# CAPACITY PROBLEMS

## LEGACY BACKUP ARCHITECTURE



An Example: X3-2 Full Rack, 8 DB Servers, 14 Storage Cells

Example of one database backup:

Backup Rate over network – 1.57 Gb/s  
(700 GB/hr)

Backup Size – 13.40 TB

Backup Time – 20 hours

There are 37 other databases running RMAN

Due to system consolidation, ever increasing size of the volume of business and velocity of changes occurring in the environment, keeping up with backup/restore always remains a challenge and we are constantly looking for ways to scale.

38 Databases

Total Size +90 T, some compressed (OLTP, HCC)

Growth +250 GB / Day



Media Server

# BACKUP / RESTORE REPLACEMENT OPTIONS

## Oracle Solution



RA X6 -5 cells (180 TB)

Backup Rate – 11.84 Gbs

Backup Size – 8.5 TB

Backup Time – 67 Min

Restore Rate – 9.33 Gbs

Restore Time – 124 Min

# of channels: 16

+ Stores Online redo in real time

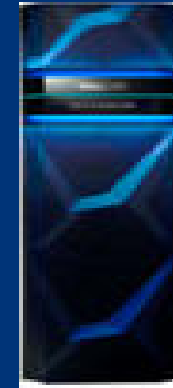
Recovery Appliance  
IS JUST FASTER



**3X Faster Backup**

**2X Faster Restore\***

## Storage Team Solution



Storage De-duplication Device

Backup Rate – 7.26 Gbs

Backup Size – 12.64 T

Backup Time – 237 Min

Restore Rate – 7.03 Gbs

Restore Time – 245 Min

# of channels: 48

**\* Doing level 0, incremental restore, redo apply/roll forward for a database dramatically increases the restore time on de-duplication device.**

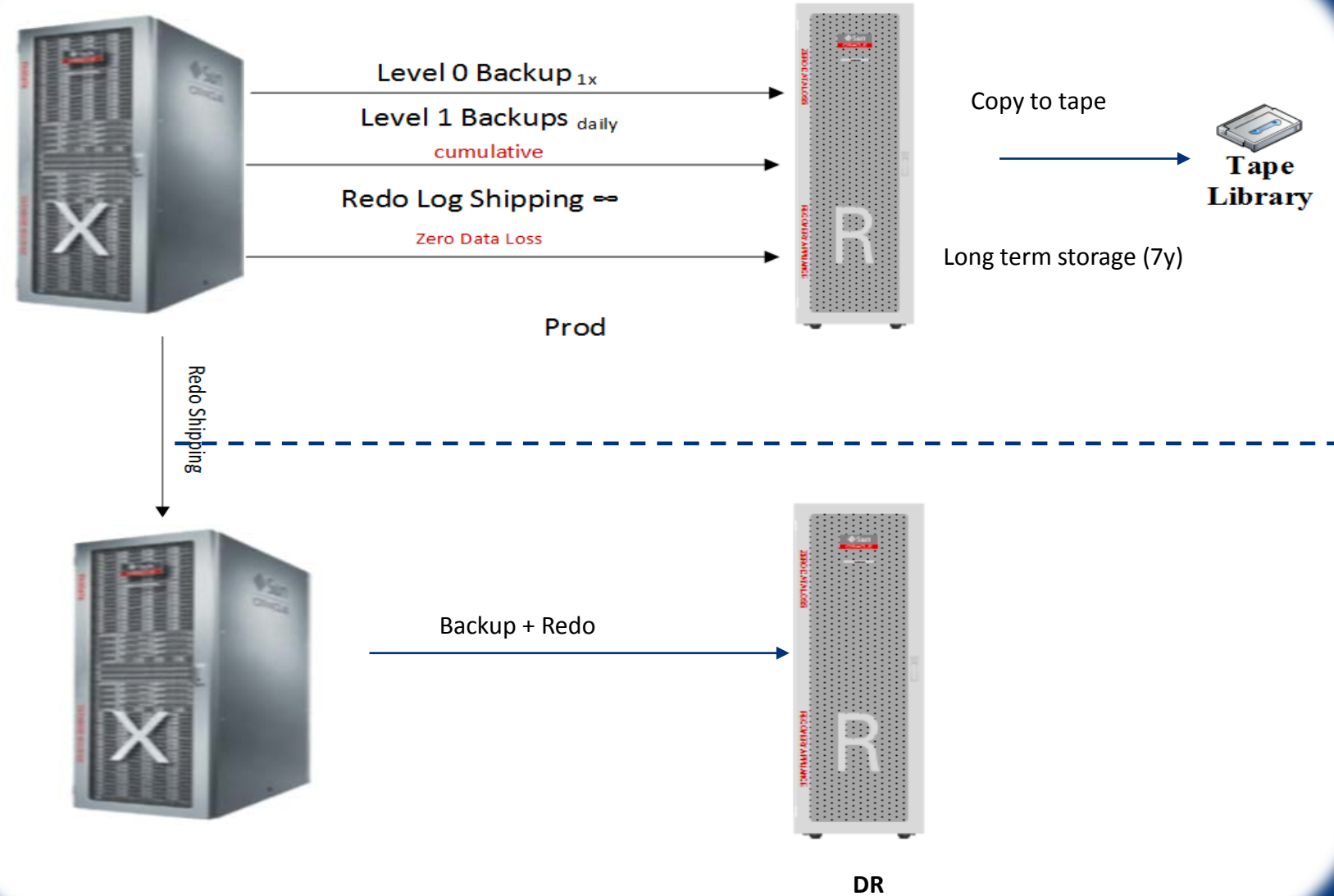
**Recovery Appliance makes it simpler and much faster to restore.**

# GOLD REFERENCE ARCHITECTURE

One Level 0 backup  
**EVER**

Minimal Database I/O  
+  
Minimal Network Load  
=  
CAPACITY

To Backup More Databases  
With Single Appliance  
With Zero Data Loss





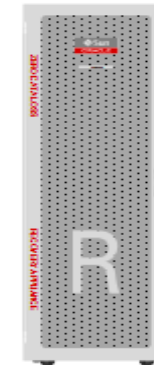
# KEY TAKEAWAYS



RESTORE

~~AND~~

~~RECOVER~~



Recovery Appliance allows us to quickly restore databases to any point-in-time of last 30 days **WITHOUT** spending time and added risk of dealing with incremental backups and roll-forward using archive logs.

Restore rate of 4.1 TB/h with Recovery Appliance represents 4X improvement over legacy approaches.

Incremental Forever / Virtual Full means we get 80X faster effective backup rates over legacy approaches.



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THANK YOU

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