

About Wells Fargo



Our vision: "We want to satisfy all our customers' financial needs and help them succeed financially."

▪ Wells Fargo

- **3rd** Total Deposits (2017) - *FDIC data*
- **4th** Total Assets (2018) - *SNL Financial*
- **5th** Biggest Public Company in the World* (2017) *Forbes - Forbes*
- **26th** Biggest Company by Revenue in the U.S. (2018) - *Fortune*

Key Facts (Q2 2018)

Assets	\$1.9 trillion
Team members	More than 265,000
Customers	70 million

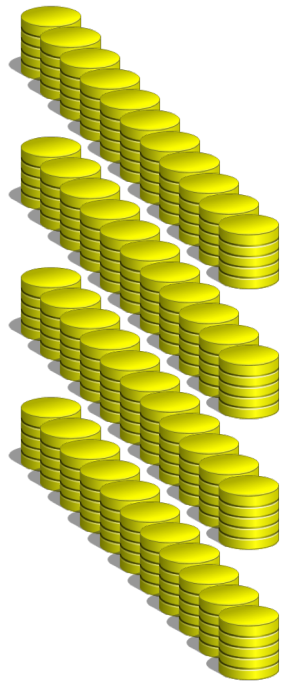
▪ Database Virtualization and Engineering (DVE)

- Centralized Technology Group Supporting Multiple Lines of Business
- Establishes standards for multiple database products
- Responsible for database product certifications
- Manages Oracle Exadata Engineered Systems

▪ My Background

- Oracle DBA for 22+ years, With WF for 10 years
- Primary Engineering focus on Database Cloning and Virtualization

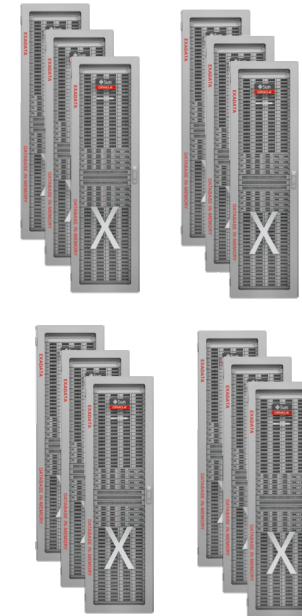
Oracle Consolidation and Re-platforming (OCR)



Consolidated and Standardize database to a common platform



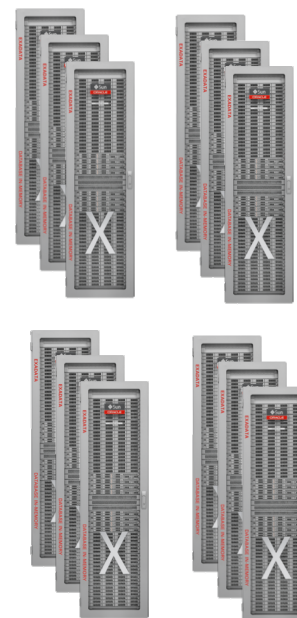
Providing more efficient use of data center capacity, administrative resources, and compute power



Why Exadata Sparse Clones



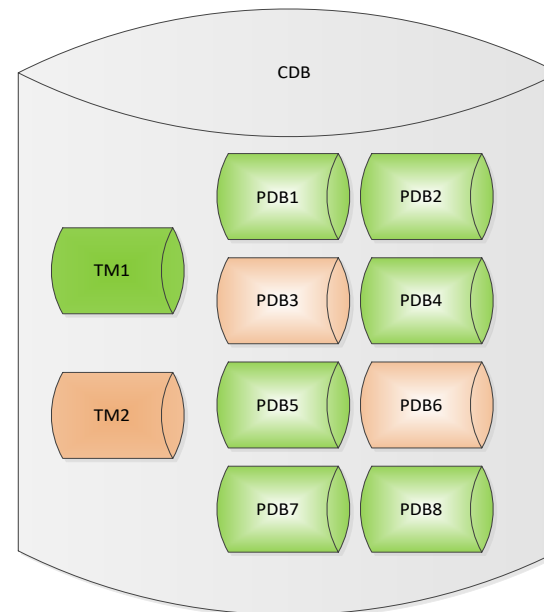
- Reduced storage needs
 - Including Backup storage
- Single Platform to Support
 - Native support on Exadata
 - Clone PDBs are managed just like Physical PDBs
- Exadata Caliber Performance
 - All Exadata Features supported
 - Smart Scan
 - Storage indexes
 - Smart Flash Cache
 - IORM



Our Deployment Model – Sparse Clones



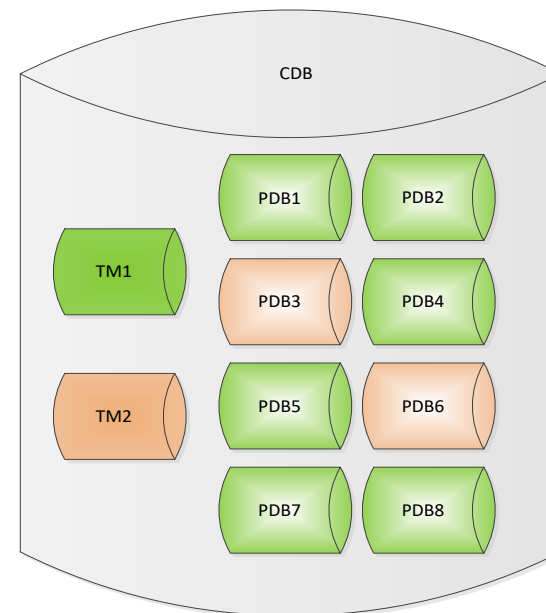
- Clone at the PDB Level
- Test Master PDB and Clone PDB share same CDB
 - Easy report and tracking Parent /Child dependencies
- Rotating Test Master PDB
 - Rotating Refresh (Weekly/Monthly)
 - Offline rebuilding of TM
 - Very quick refresh of clones
- Self Service Interface via APEX
 - Refresh
 - New Clone PDB
 - Drop Clone PDB



IORM usage in snapshots



- IORM manages Database I/O priority based on Tier
 - name=tier12,limit=50,share=5,flashcache=on,flashlog=on,type=profile
 - name=default,limit=25,share=1,flashcache=on,flashlog=on
- Define IORM profile at the PDB level via parameter DB_PERFORMANCE_PROFILE
- Allows Mix Mode of PDBs within Same CDB
 - UAT / Performance sensitive PDBs can be given higher priority
 - DEV / functional testing PDBs are given lower priority



Overall benefits of the solution



Today we have over 6000 database on 80+ Exadata Clusters

- **Reduce Risk and Complexity**
 - Common hardware platform
 - Consistent software stack
 - Simplified Automation

- **High Performance and Availability**
 - Low latency / High throughput
 - IORM providing QOS

- **Increase Agility / Time to Market**
 - Agile Development
 - Database Virtualization

