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
  - 26th Biggest Company by Revenue in the U.S. (2018) - Fortune

- **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

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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