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Oracle Exadata Case Studies: Drive Application Performance, Lower Business Costs

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GREAT-WEST FINANCIAL™ EMPOWER RETIREMENT™

Business Objective of Platform Upgrade

- Business Background
  - Serving customers for over 125 years
  - Rapidly growing organization
    - #3 insurer by total premium of bank-owned life insurance sold to U.S. banks
    - #2 Record Keeper of retirement plans
      - $400 billion in assets
      - $7 million participants

- Objective of Upgrade
  - Accommodate rapid growth
    - Need platform that can scale with us
  - Substantially increase performance from previous platform
    - Must make noticeable difference to business units
  - Minimal application changes to handle this growth
    - Application teams are taxed with developing software
  - Handle new security requirements
  - Be on a supportable platform
    - Heritage M8000 environment was reaching end of life

Why did we choose Exadata?

- Future “Proof” solution
  - Needed a solution that we could bet on for the next 5 years
- Platform faired best in reference and analyst calls
- Performance per “Oracle Core” highest of solutions tested
- Exadata achieved highest scores in our internal rating system
  - Extensive benchmarks performed
    - Benchmarks took place over 3 years on multiple platforms
  - Weighted scoring system (Oracle did not score highest on all fronts)
    - Performance (Response Time & Throughput)
    - Scalability
    - Cost (Acquisition Cost & Ongoing cost)
    - Vendor Relationship (Sales & Support)
- This was a growth positioning decision and not a consolidation exercise
  - Using more “Oracle Cores” after migration than before
  - Cost avoidance for making application changes to handle additional backend databases

Overview of Solution – Application Stack

- Proprietary Record Keeping Platform
  - External Web Stack
    - Angular
    - REST
    - JSON
    - Java Services Layer
  - Internal Customer Service Applications
    - Oracle Forms
    - J2EE stack
  - Batch Processes
    - Java
    - Oracle Pro*C

- Production Databases (3 x ¼ Rack HP)
  - 12 Total Record Keeping Databases
    - 4 OLTP RW
    - 4 Standbys
    - 4 Reporting
  - 6 Compliance Databases
  - 2 Job Scheduling Databases
  - 5 Third Party Application Databases
  - 2 “Common” databases
- Data Warehouse (1/8 Rack HC)
  - 1 Data Warehouse
  - Multiple Data Marts
- QA/UAT
  - 5 Full size copies of record keeping databases
  - 1 Job Scheduler
  - 2 Common Databases
- All production databases also have hot standbys in our secondary data center

Overview of Platform – Primary Data Center

3x ¼ Rack X4-2
Separated by Line of Business
High Performance Disk
Memory Expansion

1/8 Rack X4-2
Data Warehouse/Mart
High Capacity Disk
Memory Expansion

1 x 1/8 X4-2 HC -Development
1 x ¼ X4-2 HC QA/UAT

Overview of Platform – Secondary Data Center

3x 1/8th Rack X4-2
Separated by Line of Business
High Capacity Disk
Memory Expansion

1/8 Rack X4-2
Data Warehouse/Mart
High Capacity Disk
Memory Expansion

Before/After Technology Comparison

	Heritage	Exadata
Server Technology	SPARC (M8000, T5, 4900/6900)	x86
Oracle Database Version	11g Enterprise Edition	12c Enterprise Edition
Licensed Options	RAT Diag/Tuning Packs	RAT Diag/Tuning Packs Partitioning Storage Node (HCC) Advanced Compression Advanced Security (TDE) Golden Gate RAC
Hardware footprint	Production 5 x Oracle SPARC Servers 2 x Enterprise Class Storage Devices Failover 5 x Oracle SPARC Servers 2 x Enterprise Class Storage Devices Development/QA 2 x SunFire 4900	Production 3 x ¼ Rack X4 HP Disk 1 x 1/8 Rack X4 HC Disk Failover 4 x 1/8 Rack X4 HC Disk Development/QA ¼ Rack X4 HC Disk 1/8 Rack X4 HC Disk

Overview of Platform

- Total implementation is 10 Exadata Racks
- Exadata solution designed to support 70+ database instances
  - Production, Reporting, Local/Remote Standby, Development/QA/UAT
- Designed each rack to scale up as business scales up
  - Fully provisioned network to handle full rack for each rack installed
- We performed each migration from SPARC technology to Exadata during the maintenance window
  - Each line of business database migrated separately
  - Added compression, partitioning, encryption, golden date, 12c during upgrade
  - Highly skilled DBA team managed migration

Benefits

- On a non end of life platform with a known upgrade path
- Able to meet complex security requirements of clients
  - Encryption at rest did not show a not noticeable impact on performance or resource utilization
- Performance!
  - Saw an average of a 4x improvement with online transactions
  - Saw linear scalability in benchmarks
    - Only platform in our 20+ year history that has show this
    - Performance metrics hit in first 2 days of benchmarks with no-tuning on platform
  - Batch programs have shown a 2x-8x improvement throughput
  - Business users reached out to IT executive to thank them for this implementation
- Scalability
  - Our solution is designed to scale in each cabinet to accommodate future growth
  - Did not need to add additional databases to accommodate our growth
- Availability
  - We have had nodes reboot themselves during the day with little to no impact on the end users and batch processes
- Overall Tech Staff Happiness
  - Technical Teams get excited over new technology
  - It makes the long hours easier to tolerate when there is a clear technology vision

Key Takeaways

- Take the time in the beginning to setup them right
  - Make sure implementation team implements same versions across all racks
  - Dedicate someone to filling out the OEDA's and working to resolve issues
    - Person does not have to be a DB
- Be clear on plan to support the Exadata environment
  - Understand scope of Platinum support
  - 4 x ¼ Racks != 1 Rack
    - Each rack requires a basic level of support to maintain, fewer racks take less support
  - Worked with Storage, Networking and UNIX teams prior to implementation
  - Understand patching is a significant effort
- No vendor is perfect, expect bugs when going into uncharted territory
  - Combing 12c, platform shift, partitioning, encryption upgrade into one upgrade is sure to find at least one Oracle bug
  - Oracle did escalate case and had support on our critical issue
  - During the issue we did remain online for the duration of the bug fix
  - When critical incidents occur do not be afraid to escalate with Oracle
    - Oracle has a vested interest in your success
- Performance/Scalability will encourage application and business teams to work with you to make it work
  - If application development resources do not have to change their code to make it perform better they will advocate for the technology