ORACLE

ChevronTexaco: RMAN DUPLICATE -- DBA Time Saver to the Rescue

ChevronTexaco

"RMAN has greatly improved reliability of backups and database copies for our customers. We can now consistently deliver QA and development environments to our customers to meet their project needs. With automated database duplication, RMAN allows us to perform trouble free cloning."

-- Rich Bernat
Sr DBA/SAP Basis Administrator
ChevronTexaco

Corporate Profile: ChevronTexaco Corp.

- **Ranks among world's largest global energy companies**
- **Ranks among world's largest crude oil and natural gas producers**
- **Markets Chevron, Texaco, Caltex fuel products worldwide**
- **50,000 employees in 180+ countries**
- **$120 Billion in Annual Revenue**
- **http://www.chevrontexaco.com/**

OVERVIEW

ChevronTexaco relies on Oracle Recovery Manager (RMAN) for guaranteed backup and more importantly, recovery of its Oracle databases that underpin a comprehensive suite of SAP applications, servicing 25,000+ US-based employees. In addition, ChevronTexaco utilizes RMAN to automate the cloning of SAP databases for QA and development purposes, and to effectively restore all databases at a secondary site in the event the production data center suffers a complete disaster or outage.

INTRODUCTION

ChevronTexaco Corp. was formed by the merger of Chevron Corp. and Texaco Inc. It ranks among the world's largest and most competitive global energy companies, with a 125 year legacy tracing back to a seminal oil discovery in 1879 near Los Angeles, California. ChevronTexaco is active in more than 180 countries, and is engaged in every aspect of the oil and gas industry, including exploration and production; refining, marketing and transportation; chemicals manufacturing and sales. Its fuel products are marketed worldwide through the Chevron, Texaco and Caltex brands.

ChevronTexaco's U.S. SAP DBA group is responsible for six production databases, encompassing a total of 7.5 TB, accessed by over 20,000 self-service users, 3,000 named users, and 5,000 financials application users. These databases manage critical information for all of ChevronTexaco's SAP modules, including Financials, HR, Production Revenue Accounting, BW, and Sales & Distribution. The databases sustain high transaction rates, with approximately 3-5% of data changing on a daily basis, generating 20-50 GB of archived logs daily.

RMAN IMPROVES ABILITY TO CLONE DATABASES

Backup & Recovery Challenge

- Creation of QA and development databases not completing within set timeframes, impacting testing and development schedules

Backup & Recovery Solution

- Oracle Recovery Manager, Oracle 9.2.0.4
- 6 production SAP databases
  - 500GB to 2TB per database
  - 250 – 1400 datafiles per database
- 25,000+ named users
- Weekly incremental level 0 of production databases to tape
- Daily incremental level 1 backups
- 20 TB across 30+ databases for QA, development environments
- Monthly RMAN DUPLICATE to refresh QA instances
- Disaster recovery time objective of 72 hrs, for restoring production databases at remote site

System & Network Configuration

- (13) HP N-class & RP servers for production, QA, and development environments
  - 4-8 CPUs per server
  - 6-20 GB memory per server
  - HP-UX 64-bit
- Oracle9i Database, R 9.2.0.4
- 1-10 databases/server
- SAN attached StorageTek 9840A and 9980 tape drives, 1GB fibre
- HP OpenView Storage Data Protector 5.1

Subsets of the databases are regularly cloned (or, "refreshed") for QA and development environments -- in total, 20 TB across 30+ databases. Production cloning refreshes occur monthly and on-demand. On occasion, project database refreshes are requested to different points-in-time, to accommodate various project phases. In just one day, these refreshes can incur 6+ TB of data movement.

ChevronTexaco faced many challenges to support ongoing development projects. The SAP DBA group depended on a myriad of SQL and shell scripts to perform refreshes. As data volume steadily grew, refreshes were not completing within the required refresh window, which interfered with development schedules. These challenges, stemming from reliance on OS-level backup and restore procedures, included:

- Refresh could not be performed to the same host, and required a separate database server
- Renaming of Oracle datafiles and directories during restore
- Parsing SQL to rename datafiles and rebuilding controlfile during restore

Because of these challenges and the impact on internal applications responsible for sensitive data ranging from employee personal information to payroll statements, it became apparent that the SAP DBA group needed a simpler, more effective backup, recovery, and refresh method. After investigating several alternative tools and their associated costs, the IT group proceeded to standardize on RMAN for all SAP databases. RMAN has met those challenges head-on.

With RMAN, ChevronTexaco consolidated to a single set of RMAN scripts accessible by all databases. By using the RMAN DUPLICATE to clone a database, ChevronTexaco greatly simplified their scripts and expanded their level of automation.

RMAN enables ChevronTexaco to:

- Easily refresh an instance to the same or a different host, at a current or point-in-time, and automate renaming of datafiles
- Reduce tape consumption by 80% by utilizing incremental backups, which only backup changed blocks
- Detect physical block-level corruptions during backup and restore
- Validate block integrity of weekly full backups using RESTORE DATABASE VALIDATE
- Ensure that all files needed for restore are present
- Configure backup retention policy to easily obsolete backups that are no longer required
- Centralize backup and recovery management for 40+ databases

RMAN enables the DBAs at ChevronTexaco to meet their SLA:

- Recovery time objective (RTO) for complete restore of the production databases of 72 hours, from declaration of disaster. For restoring individual databases, an RTO of 1 hour for every 100 GB of data to be restored.
- Weekly full backup to tape completing in 5 hrs for a 2 TB production database, with average throughput of 110 MB/sec using 2 tape devices.
- Development-mandated refresh windows. For example, a 2 TB refresh to be completed in 9 hours.

CONCLUSION

ChevronTexaco uses Oracle Recovery Manager to provide simple and reliable backup, recovery, and database refreshes, while adding no additional license and integration cost to their existing environment.

The SAP DBA group reaped considerable cost savings and productivity benefits:

- Hardware savings through ability to refresh database to the same host, without requiring a separate server
- Tape storage savings using RMAN incremental backups
- No additional cost, as RMAN is integrated with the database
- Simplified scripts and greater levels of automation
- Easier delivery of development environment refreshes to customers, meeting their timeframes
- Automated and reliable solution to provide guaranteed data restoration

RMAN Benefits

- **Guaranteed, accurate backup and recovery**
- **Automatic block corruption detection and repair**
- **Performance-optimized, space-saving backup and restore operations**
- **Fine-granular data operations at tablespace, datafile, archive log, controlfile, and block level**
- **One-step database cloning**
- **Extensible to third party media managers**
- **No additional license cost – RMAN is an integrated feature of the Oracle Database Server**

For More Information

- Oracle9i Recovery Manager User's Guide
- RMAN on OTN

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