Introduction

This technical white paper describes how to use the Sybase® Adaptive Server™ Enterprise (ASE) 12.5 or above enhanced quiesce database feature with Compellent Data Instant Replay in a UNIX environment. The quiesce database feature was first introduced in ASE 12.0 to leverage SAN vendors snapshot technologies to create a mirror of production volumes. However, ASE 12.5 provides an enhanced version of quiesce database command.

This paper focuses specifically on the following topics:
- Using the quiesce database feature to leverage Compellent Replay functionality to perform the following:
  - Database Clones

Audience

The primary target audience for this technical white paper is Sybase ASE database administrators, UNIX system administrators, SAN storage administrators, and architects who analyze, design, and maintain robust database and storage systems. Readers should be familiar with Sybase® Adaptive Server™ Enterprise, UNIX Operating System, and Compellent products.

CML Data Instant Replay Overview

Compellent provides unlimited space-efficient snapshots with instantaneous recovery to any server. Traditional solutions only provide a limited number of snapshots. Traditional snapshots consume a significant amount of space and can have a negative impact on performance. This is because typical snapshot implementations utilize a copy-on-write technology. As the volume changes, they need to make

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copies of that volume to reflect the incremental changes made to that volume. That consumes a lot of disk space and can be difficult to manage. In most complete systems, to recover a snapshot, an administrator must make a full volume clone of the volume.

Compellent’s solution is Data Instant Replay. Data Instant Replay offers an unlimited number of space-efficient snapshots, or Replays, based on any time interval. Automatic coalescence allows you to consolidate expired replays into less frequent intervals and recovers disk space. Because administrators don’t need to create a copy or clone of the original volume, recovering a Replay is extremely fast. Replays can be mapped to any server at any time in just a few seconds.

Sybase® ASE Quiesce Database Overview

In older version of Sybase® ASE, there was no quiesce database functionality. In order to create a mirror of production database volumes, the server has to be shut down. Starting with Sybase® ASE 12.0, the quiesce database functionality was introduced allowing customers to create a mirror of production database volumes without shutting down the server. However, an initial database dump is required before issuing the quiesce database command and another dump is required after a dump transaction with truncate-only. This is no longer the case with Sybase® ASE 12.0.0.1.

The Quiesce Database Feature

The quiesce database command, used with the hold keyword, suspends all updates to a user-specified list of one or more databases (8 databases is the maximum for one command). Transactions are then prevented from updating the persistent store of data in suspended databases, and background tasks such as the checkpoint and housekeeper processes will skip all databases that are in the suspended state. All writes to any databases the quiesce state are blocked within ASE until quiesce database is subsequently invoked with the release keyword. Updates then resume on databases that were previously suspended.

The benefit of this feature is to allow the production database server to be active and online while creating Data Instant Replays (i.e. snapshots). Any database that is not in the quiesce state continues write activity as usual. Any transactions blocked by the quiesce database hold command will resume and run to completion after the quiesce database release command is issued.

The syntax for the quiesce database hold command is:

```
quiesce database <tag_name> hold <dbname, dbname> for external dump
```

Where
- `<tag_name>` is the tag name.
- `<dbname>` is the name of your database(s).

Ex: `quiesce database userdb_tag hold master, user1db for external dump`

The syntax for the quiesce database release command is:

```
quiesce database <tag_name> release
```

Where
- `<tag_name>` is the tag name

Ex: `quiesce database userdb_tag release`
Cloning Sybase® ASE Database

The following example shows how you can utilize CML Data Instant Replay to clone a Sybase® ASE server.

Assumption: Server Bronco is the production server running Red Hat Linux with the following configuration. Server Stealth is the cloned host and has only boot volume.

- One volume was created for boot from SAN
- One volume was created for Sybase® ASE installation mounted under /opt/Sybase
- One volume was created for tomdb database mounted under /sybdev.
- The /sybdev mount point contains both data and logs for simplicity

```
[root@bronco ~]# df
Filesystem 1K-blocks  Used Available Use% Mounted on
/dev/sdc5 11935660 3425584 7893988 31% /
/dev/sdc1 124427 18442 99561 16% /boot
tmpfs 4088624 0 4088624 0% /dev/shm
/dev/sda5 20642396 1713628 17880196 9% /opt/sybase
/dev/sdb5 103210912 704772 97263332 1% /sybdev
```
Steps for Creating Clones of the whole Server

1. Quiesce the database with the hold keyword
   
isql –Usa –P –S hostname
   1> quiesce database tomdb_tag hold master, tomdb for external dump
   2> go
2. Create CML Replays
   
   Refer to CompCU user guide for how to create replays
3. Quiesce the database with the release keyword
   
isql –Usa –P –S hostname
   1> quiesce database tomdb_tag release
   2> go
4. Create CML views from the replays and map the views to Server Stealth
5. Once the views are mapped on Server Stealth, mount the views under the same mount point as server Bronco (/opt/sybase and /sybdev).
6. The following needs to be modified before starting Sybase® ASE on server Stealth
   
   - Rename /opt/sybase/ASE-15_0/BRONCO.cfg to STEALTH.cfg.
   - Rename /opt/sybase/ ASE-15_0/install/RUN_BRONCO to RUN_STEALTH and replace any BRONCO entry in this file to STEALTH.
   - Edit the /opt/sybase/interfaces file and replace any BRONCO or bronco entry in this file to STEALTH and stealth.
7. Start ASE on server Stealth
   
   /opt/sybase/ ASE-15_0/install/startserver –f /opt/sybase/ ASE-15_0/install/RUN_STEALHT

Steps for Creating Clones of a Single Database

Assumptions: Server Bronco is the production containing tomdb database. Server Stealth is a development with an ASE instance running but does not have tomdb database. The example shows how to clone tomdb database from server Bronco to server Stealth.

Note: tomdb database on server Bronco is self contained, meaning it resides on its own database device and not shared with other databases.

1. Quiesce the database with the hold keyword and generate manifest file
   
isql –Usa –P –S hostname
   1> quiesce database tomdb_tag hold tomdb for external dump to “/tmp/tomdb_manifest”
   2> go
2. Create CML Replays
   
   Refer to CompCU user guide for how to create replays
3. Quiesce the database with the release keyword

   \texttt{isql -Usa -P -S hostname}
   \texttt{1>quiesce database tomdb\_tag release}
   \texttt{2>go}

4. Copy /tmp/tomdb\_manifest to server Stealth

   \texttt{[root@bronco ~]# scp /tmp/tomdb\_manifest stealth:/tmp}

5. Create CML views from the replays and map the views to server Stealth

6. Once the views are mapped on server Stealth, query the new disk(s) and mount them under the same mount points as on production for tomdb.

7. Log into ASE on server Stealth and attach the tomdb database with the mount database command

   \texttt{isql -Usa -P -S STEALTH}
   \texttt{1> mount database all from "/tmp/tomdb\_manifest"}
   \texttt{2> go}

8. Bring tomdb database online

   \texttt{3> online database tomdb}
   \texttt{4> go}

\textbf{Conclusion}

With Compellent Data Instant Replay technology, you can create a clone of your production Sybase® Adaptive Server™ Enterprise in a matter of seconds regardless of database size. As you can see, the majority of the steps and time for cloning Sybase® ASE is from Sybase administration after the replays are created and mounted.