Symantec NetBackup for Oracle Deduplication Best Practices Guide

Revision 2
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Available memory, disk space, and NIC information
Operating system
Version and patch level
Network topology
Router, gateway, and IP address information
Problem description:
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  Troubleshooting that was performed before contacting Symantec
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- Asia-Pacific and Japan: customercare_apac@symantec.com
- Europe, Middle-East, and Africa: semea@symantec.com
- North America and Latin America: supportsolutions@symantec.com
Deduplicating Oracle backups

This document includes the following topics:

- About deduplicating Oracle backups
- Prerequisites
- Optimizing and deduplicating stream-based and proxy copy Oracle backups
- For more information

About deduplicating Oracle backups

This topic explains how to use NetBackup to configure Oracle backups that are optimized for deduplication. You can configure either stream-based backups or proxy copy backups. The following topics explain how to optimize deduplicated Oracle backups:

- See “Prerequisites” on page 7.
- See “Optimizing and deduplicating stream-based and proxy copy Oracle backups” on page 8.
- See “For more information” on page 14.

Prerequisites

The optimized deduplication that this white paper describes requires the following software:

- NetBackup 6.5.5 or later.
(Conditional) One of the following emergency engineering binaries (EEBs) that enable deduplicated, optimized, proxy copy Oracle backups:

<table>
<thead>
<tr>
<th>EEBs</th>
<th>NetBackup release level</th>
</tr>
</thead>
<tbody>
<tr>
<td>2158524 and 2176416</td>
<td>NetBackup 7.0.1</td>
</tr>
<tr>
<td>2158522</td>
<td>NetBackup 7.0</td>
</tr>
<tr>
<td>2171243</td>
<td>NetBackup 6.5.6</td>
</tr>
<tr>
<td>2171228</td>
<td>NetBackup 6.5.5</td>
</tr>
</tbody>
</table>

Obtain the appropriate EEB(s) if you plan to perform proxy copy backups. You do not need to download additional EEBs if you want to perform stream-based backups.

Contact Symantec technical support to open a support case and to obtain a copy of the EEB that is appropriate for your NetBackup release level. Both the EEB and this technote are available for internal distribution only.

EEB 2176416, which is appropriate for NetBackup 7.0.1 platforms only, enables faster deduplicated backups for large files and is recommended for Oracle database backups.

Optimizing and deduplicating stream-based and proxy copy Oracle backups

NetBackup enables you to perform optimized deduplication of Oracle databases. You can perform either a stream-based backup or a proxy copy backup.

Symantec recommends that you perform a proxy copy when one or more of the following are true:

- The Oracle database that you want to back up is at the Oracle 10gR1 revision level or lower.
- The database consists of many small tablespaces.
- The database administrator or the backup administrator does not want to set FILESPERSET=1.

For stream-based backups, Symantec recommends that you specify FILESPERSET=1 for all Oracle database backups. When FILESPERSET=1 is specified, Oracle generates the backup set identically each time, with the same data from the same files in the same sequence each time the database is backed up. This uniformity ensures better deduplication. In addition, when FILESPERSET=1 is in effect, Oracle does not perform multiplexing, so Oracle includes only one file in each backup set. If
**FILESPERSET** is specified with a number other than 1, Oracle groups files together unpredictably and deduplication rates suffer.

Symantec recommends that you test your database backups by running both stream-based backups and proxy copy backups. Measure the deduplication rates and the backup times, and see which method fits best in your environment. The Oracle database files themselves benefit the most from deduplication. Typically, the archive logs and the control files are unique, so they benefit less from deduplication.

For information about the backup methods, see the following:

- See “Configuring a stream-based Oracle backup” on page 9.
- See “Configuring a proxy copy Oracle backup” on page 11.

### Configuring a stream-based Oracle backup

The NetBackup 7.0.1, 7.0, 6.5.6, and 6.5.5 releases contain code that enables you to perform a stream-based, optimized, deduplicated Oracle backup. Your system does not need any additional EEBs if you want to perform stream-based backups.

The following procedure explains how to reconfigure an existing Oracle RMAN specification to achieve a stream-based, optimized, deduplicated Oracle backup.

**To configure a stream-based Oracle backup**

1. On the client computer that hosts the Oracle database, open the RMAN backup script in a text editor, and make the following edits:

   - Add the **FILESPERSET=1** parameter to the part of the RMAN script that specifies how you want to back up the database. Do not add **FILESPERSET=1** to the section of the RMAN script that specifies how to back up the control files or archive logs. Typically, these other data objects are unique to each backup, so there is very little potential gain from optimizing the control file and archive log backups for deduplication.

   **Example RMAN script after editing:**

   ```
   BACKUP FILESPERSET=1 %BACKUP_TYPE% FORMAT 'bk_u%s_u_s%s_p%p_t%t' DATABASE;
   ```

   The addition of **FILESPERSET=1** suppresses Oracle multiplexing of more than one data file into a backup set. When you suppress Oracle
multiplexing, Oracle creates the backup set identically each time the backup runs. NetBackup can deduplicate these identical backup sets.

■ Specify parallel backup streams for the database backup.
   Specify appropriate \texttt{ALLOCATE CHANNEL} and \texttt{RELEASE CHANNEL} parameters in the backup script.

For an example that shows an edited backup script, see the following:

See “Example RMAN script for a stream-based backup” on page 14.

2 Disable Oracle’s optimization and encryption for the duration of the database backup.

By default, Oracle disables optimization and encryption. If optimization and encryption are enabled, run the following RMAN commands from the command line to disable optimization and encryption:

\begin{verbatim}
RMAN> CONFIGURE BACKUP OPTIMIZATION OFF;
RMAN> CONFIGURE ENCRYPTION FOR DATABASE OFF;
\end{verbatim}

If your site requires encryption, you can specify encryption in the NetBackup for Oracle backup policy.

3 Disable Oracle’s compression for the duration of the database backup.

By default, Oracle disables compression. If compression is enabled, Oracle compresses unused sections in streams, and the result is unpredictable deduplication rates. If compression is enabled, run the following RMAN command from the command line to disable compression:

\begin{verbatim}
RMAN> CONFIGURE DEVICE TYPE SBT_TAPE BACKUP TYPE TO BACKUPSET;
\end{verbatim}

If your site requires compression, you can specify compression in the NetBackup for Oracle backup policy.

4 Configure a NetBackup for Oracle policy.

If you want to compress or encrypt the backup, enable compression and encryption in the NetBackup \texttt{pd.conf} file.

Run a full database backup as soon as you can. The policy can perform incremental backups until the full backup can be run.

\textbf{Note:} Make sure that Oracle optimization, encryption, and compression are disabled for the entirety of the database backup. Make sure to check specifications outside of the RMAN backup script, too.
Configuring a proxy copy Oracle backup

In order to perform a proxy copy Oracle database backup that is optimized and deduplicated, you need to download and install an EEB on your system. The EEB that Symantec has created enables optimized, deduplicated Oracle proxy copy backups without a snapshot client. The following procedures explain how to install the EEB on a client and how to reconfigure RMAN to perform the optimized, deduplicated backup:

- See “Downloading and installing the NetBackup EEB” on page 11.
- See “Editing the RMAN script and configuring NetBackup for Oracle” on page 12.

Downloading and installing the NetBackup EEB

The following procedure explains how to download and install the EEB onto the client that hosts the Oracle database.

To download and install the NetBackup EEB

1. Contact the Symantec technical support group to open a support case and to obtain a copy of the EEB that is appropriate for the level of NetBackup that you have installed.

2. Download the EEB onto the client that hosts the Oracle database.
   The EEB contains an updated library file and an updated backup archiver.

3. Stop all NetBackup services.
   Type one of the following commands:
   - On Windows clients, type the following:
     > install_path\Veritas\NetBackup\bin\bpdown
   - On UNIX clients, type the following:
     # /usr/openv/netbackup/bin/bp.kill_all

4. Stop all Oracle instance processes and listener processes.
   See your Oracle documentation for information about how to perform this step.
5  (Conditional) Flush the library cache.
   Perform this step on AIX platforms.
   For example:
   ```bash
   $ slibclean
   ```
   See your Oracle documentation for more information about how to perform
   this step.

6  Run the EEB installer.
   Use the instructions in the EEB installation package. The following Web site
   contains general EEB installation instructions:
   http://www.symantec.com/business/support/index?page=content&id=TECH64620

7  Restart all Oracle instance processes and listener processes.
   See your Oracle documentation for information about how to perform this
   step.

8  Start NetBackup services.
   Type one of the following commands:
   - On Windows clients, type the following:
     ```bash
     > install_path\Veritas\NetBackup\bin\bpup
     ```
   - On UNIX clients, type the following:
     ```bash
     # /usr/openv/netbackup/bin/bp.start_all
     ```

9  (Conditional) Apply EEB 2176416.
   Perform this step in NetBackup 7.0.1 environments.

**Editing the RMAN script and configuring NetBackup for Oracle**

The following procedure explains how to edit the RMAN script on the client.

**To edit the RMAN script**

1  On the client computer that hosts the Oracle database, open the RMAN backup
   script in a text editor, and make the following edits:
   - Add `PROXY` to the list of commands that backs up the data files.
     Example RMAN script after editing:
     ```sql
     BACKUP
     FORMAT 'bk_u%u_s%s_p%p_t%t'
     ```
Specify the `NB_ORA_PC_STREAMS` parameter in the database backup script. For an example that shows an edited backup script, see the following:

See “Example RMAN script for a proxy copy backup” on page 15.

2 Disable Oracle's optimization and encryption for the duration of the database backup.

By default, Oracle disables optimization and encryption. If the optimization and encryption are enabled, run the following RMAN commands from the command line to disable optimization and encryption:

```
RMAN> CONFIGURE BACKUP OPTIMIZATION OFF;
RMAN> CONFIGURE ENCRYPTION FOR DATABASE OFF;
```

If your site requires encryption, you can specify encryption in the NetBackup for Oracle backup policy.

3 Disable Oracle's compression for the duration of the database backup.

By default, Oracle disables compression. If compression is enabled, Oracle compresses unused sections in streams, and the result is unpredictable deduplication rates. If compression is enabled, run the following RMAN command from the command line to disable compression:

```
RMAN> CONFIGURE DEVICE TYPE SBT_TAPE BACKUP TYPE TO BACKUPSET;
```

If your site requires compression, you can specify compression in the NetBackup for Oracle backup policy.

4 Configure a NetBackup for Oracle policy.

If you want to compress or encrypt the backup, enable compression and encryption in the NetBackup `pd.conf` file.

Run a full database backup as soon as you can. You can perform incremental backups until the full backup can be run.

**Note:** Make sure that Oracle optimization, encryption, and compression are disabled for the entirety of the database backup. Make sure to check specifications outside of the RMAN backup script, too.
For more information

For more information about NetBackup for Oracle, see one of the following:

- *NetBackup for Oracle Administrator's Guide for UNIX and Linux*
- *NetBackup for Oracle Administrator's Guide for Windows*
- The example RMAN backup scripts that NetBackup for Oracle wrote to your computer at the time the product was installed. Look in one of the following directories:
  - On Windows systems:
    ```
    install_path\NetBackup\dbext\Oracle\samples\rman
    ```
  - On UNIX systems:
    ```
    /usr/openv/netbackup/ext/db_ext/oracle/samples/rman
    ```
- The example scripts in the following topics:
  - See “Example RMAN script for a stream-based backup” on page 14.
  - See “Example RMAN script for a proxy copy backup” on page 15.

Example RMAN script for a stream-based backup

The following is an example fragment from an RMAN script that performs an optimized, deduplicated, stream-based backup of an Oracle database.

```plaintext
RUN {
    # Back up the database.
    # Use 4 channels as 4 parallel backup streams.

    ALLOCATE CHANNEL ch00 TYPE 'SBT_TAPE';
    ALLOCATE CHANNEL ch01 TYPE 'SBT_TAPE';
    ALLOCATE CHANNEL ch02 TYPE 'SBT_TAPE';
    ALLOCATE CHANNEL ch03 TYPE 'SBT_TAPE';
    SEND ' NB_ORA_SERV=$NB_ORA_SERV';

    BACKUP
    $BACKUP_TYPE
    SKIP INACCESSIBLE
    TAG hot_db_bk_level0
    # The following line sets FILESPERSET to 1 and facilitates database deduplication.
    FILESPERSET 1
}
```
DATABASE;
sql 'alter system archive log current';
RELEASE CHANNEL ch00;
RELEASE CHANNEL ch01;
RELEASE CHANNEL ch02;
RELEASE CHANNEL ch03;

# Back up the archive logs
# The FILES pervasive parameter setting depends on the number of archive logs you have.

ALLOCATE CHANNEL ch00 TYPE 'SBT_TAPE';
ALLOCATE CHANNEL ch01 TYPE 'SBT_TAPE';
SEND ' NB_ORA_SERV=$NB_ORA_SERV';
BACKUP
  FILES pervasive 20
  FORMAT 'al_%s_%p_%t'
  ARCHIVELOG ALL DELETE INPUT;
RELEASE CHANNEL ch00;
RELEASE CHANNEL ch01;
#
# Note: During the process of backing up the database, RMAN also backs up the
# control file. This version of the control file does not contain the
# information about the current backup because "nocatalog" has been specified.
# To include the information about the current backup, the control file should
# be backed up as the last step of the RMAN section. This step would not be
# necessary if we were using a recovery catalog or auto control file backups.
#
ALLOCATE CHANNEL ch00 TYPE 'SBT_TAPE';
SEND ' NB_ORA_SERV=$NB_ORA_SERV';
BACKUP
  FORMAT 'cntrl_%s_%p_%t'
  CURRENT CONTROLFILE;
RELEASE CHANNEL ch00;
}

Example RMAN script for a proxy copy backup

The following is an example of an RMAN script that performs an optimized, deduplicated, proxy copy backup of an Oracle database.
RUN {

# Back up the database.

ALLOCATE CHANNEL ch00 TYPE 'SBT_TAPE';

# Specify 2 streams, one stream per channel.

SEND 'NB_ORA_PC_STREAMS=2';

BACKUP
  PROXY
  SKIP INACCESSIBLE
  TAG hot_db_bk_proxy
  FORMAT 'bk_%s_%p_%t'
  DATABASE;
  sql 'alter system archive log current';
RELEASE CHANNEL ch00;

# Back up the archive logs.
# The FILESPERSET parameter setting depends on the number of archive logs you have.

ALLOCATE CHANNEL ch00 TYPE 'SBT_TAPE';
ALLOCATE CHANNEL ch01 TYPE 'SBT_TAPE';
SEND ' NB_ORA_SERV=$NB_ORA_SERV';
BACKUP
  FILESPERSET 20
  FORMAT 'al_%s_%p_%t'
  ARCHIVELOG ALL DELETE INPUT;
RELEASE CHANNEL ch00;
RELEASE CHANNEL ch01;

# Note: During the process of backing up the database, RMAN also backs up the
# control file. This version of the control file does not contain the
# information about the current backup because "nocatalog" has been specified.
# To include the information about the current backup, the control file should
# be backed up as the last step of the RMAN section. This step would not be
# necessary if we were using a recovery catalog or auto control file backups.

ALLOCATE CHANNEL ch00 TYPE 'SBT_TAPE';
SEND ' NB_ORA_SERV=$NB_ORA_SERV';
BACKUP
    FORMAT 'cntrl_%s_%p_%t'
    CURRENT CONTROLFILE;
RELEASE CHANNEL ch00;
}