

COMPREHENSIVE DATABASE BACKUP STRATEGY FOR PAY AND ACCOUNTS OFFICES IMPLEMENTING COMPACT

Introduction

Disaster recovery is all-too-often ignored until it's too late. However, take a moment and consider what would be the result if an hour's worth of database changes were lost? A day's worth? What about a complete loss of the database? Answers to the above set of questions illustrate the need for a comprehensive disaster recovery plan. They'll also form the starting point for the development of a plan tailored to the unique needs for each PAO. Underlined below is a comprehensive contingency plan to cover unforeseen catastrophes that might threaten your COMPACT database in the future?

The first step in developing a solid disaster recovery plan is to develop an idea of what constitutes an acceptable loss for your PAO. First, consider the impact of losing data stored in your database. Would you be able to recover from the loss of an hour's worth of data? Chances are that you could deal with this situation by instructing your personnel to re-enter data entered during that period. Protection against these types of losses is provided by backups of the COMPACT database. Once you've determined the level of acceptable loss for your PAO, it's time to begin developing a strategy to minimize the impact of a catastrophic event on your database. Our first step is to develop a comprehensive backup strategy.

General Concepts

The backing up and restoring of the COMPACT database and transaction log is a way that SQL Server provides to protect from data loss. The backup utility (in the COMPACT application) creates a copy of the COMPACT database (Annexure-I). This copy can be used to restore the database if media failure occurs or if the database is somehow damaged (Annexure-II).

Simple Recovery Model

The Backup strategy adopted in COMPACT is the Simple Recovery Model. The Simple Recovery model allows the database to be recovered to the point of the last backup (to the most recent backup). With this recovery model, you cannot restore the database to the point of failure or to a specific point in time. Therefore, changes in the database made after the last backup will be lost.

The backup strategy for this recovery model consists of the full database backups only. To recover a database, you should restore the most recent full database backup. This recovery model takes less time to perform the backup and restore operation and requires less disk space, but does not provide the opportunity to restore the database to the point of failure or to a specific point in time.

For example, if you make a full database backup of the COMPACT database on a Monday at 5:30 PM, then suppose that the COMPACT database is damaged on Tuesday at 3 PM, you should restore the full database backup from Monday 5:30 PM. All changes since Monday 5:30 PM to Tuesday 3 PM will be lost.

Database Backups

The COMPACT application offers a full backup of the COMPACT database as and when the backup process is invoked (Annexure-I). The COMPACT backup process creates a Full-database backup i.e. it backs up the complete COMPACT database. The backup file size is proportional to the original database size. Full backups can be performed without taking the database offline, but they consume a large amount of system resources and may have a noticeable impact on database response times. So it is advisable to ensure that no users are connected to the COMPACT database at the time the backup process is invoked. An end of the day backup operation may be adopted in most Pay and Accounts Offices.

Suggested Secondary Media

When developing a disaster recovery plan you should also consider the storage of database backup media. COMPACT users can either opt for the DAT (Digital Audio Tape) format or the Compact Disk format as the secondary media to store their COMPACT databases as outlined below in order of preference:

- (i) 4mm DAT (Digital Audio Tape) which uses the DDS (Digital Data Storage) format.
- (ii) Compact Disk (Read/Re-writable) [CD-R/RW]

If you backup to tape/CDROM and then store the backup in the server room, they're not going to do you any good in the event of a fire that destroys the server room. It's best to keep a copy of the tapes in an accessible, secure offsite location. If you're located in an area prone to earthquakes, hurricanes or other natural disasters, you may also wish to consider sending a copy of your backups periodically to another location preferably to the Principal Accounts Office.

Creating a "Complete" Backup Solution

A typical COMPACT backup scenario creates a backup to the local hard disk of the Server. There are a couple of reasons for this. The backup is extremely fast. Also, disks are a much more convenient place to store a backup for later access than tape.

In the COMPACT system, the day-end backup (as suggested earlier) should be copied to tape / CD-R/RW as early as possible, not later than the next day.

Even so, you still run the risk that both your original and backup can be lost and inaccessible at the same time between the time the backup is made and until it's copied to tape. For example, if the OS crashes none of the information on any of the disks will be available until you resolve the OS error. The same goes for an electrical short circuit, lost network connectivity, or any one of a dozen scenarios one can think of.

It is also recommended to compress (zipping the file) the backup file and leave a copy on the server and if at any point a restore operation is required, of unzipping it before restoring it. This will save hard disk space if you are storing backups on the hard drive itself.

Move Your Backup Off the Original Machine As Soon As Possible.

PLANNING YOUR BACKUPS

Describes the steps to be followed to set up a comprehensive backup plan

One of the primary responsibilities is planning backups. This comprehensive backup plan has been compiled with a healthy dose of paranoia when planning how to protect your systems and information. Some basic steps for risk mitigation in general have also been factored in.

Determine how much downtime and data loss are acceptable to your PAO?

For a large PAO the backup frequency may be kept at 2 times a day whereas for a smaller PAO a day-end backup should suffice. Users are advised to use their own discretion to work out a backup interval best suited to their needs.

Recommended Backup Model ("Grandfather, Father, Son" principle)

This method is the most cost-effective, comprehensive and secure backup system of all. Covering 12 weeks, it requires ten Data Cartridge Tapes, allowing you to delete data

from your fixed disk and to retrieve it again upto three months later. It involves a simple, fast, daily routine. Here's how it is to be done:

First label your cartridges as follows:

MONDAY	TUESDAY	WEDNESDAY	THURSDAY
WEEK1 (1 st FRIDAY)	WEEK2 (2 nd FRIDAY)	WEEK3 (3 rd Friday)	WEEK4 (4 rd Friday)
MONTH1 (4 th Friday of Month1)	MONTH2 (4 th Friday of Month2)	MONTH3 (4 th Friday of Month3)	MONTH4 (4 th Friday of Month4)

Start the Cycle on a Friday evening and backup the COMPACT database onto the cartridge tape labelled **WEEK1**.

On Monday you backup the COMPACT database at the end of the day and copy it onto the cartridge tape labelled **MONDAY**. Repeat the process on **TUESDAY**, **WEDNESDAY** and **THURSDAY** using the corresponding cartridge tapes.

On the Friday, use **WEEK2** labelled tape to archive the COMPACT backup taken on Friday evening. Go through the next week similarly, but when it comes to Friday use the tape labelled **WEEK3** for the complete weekly backup.

Go through the following week similarly, but when it comes to Friday, use the tape labelled **MONTH1** to backup the COMPACT database.

For the next four week period repeat the cycle, but at the end of the fourth week use the cartridge tape labelled **MONTH2** for the COMPACT database backup.

For the next four week period repeat the cycle again, but at the end of the fourth week use **MONTH3** for the COMPACT database backup.

You now have a complete record of twelve weeks' data of COMPACT and the same rotation cycle can start again.

At the end of every financial year (31st March evening) a separate cartridge tape labelled "**FIN YEAR**" may be used to copy the following two backups of the COMPACT database.

- 1) Just before the pre-check financial year closing process is done on the COMPACT database.
- 2) After the completion of consolidation of the 2nd Supplementary period.