

LESSON 5.2

98-364 Database Administration Fundamentals

Understand Database Backups and Restore

Lesson Overview

In this lesson, you will learn about:

- The basics of backup and restore of a database
- Backup types:
 - Full backup
 - Incremental backup
 - Differential backup
- Replicated services

Basics of Backup and Restore of a Database

- Backup is a process of saving all needed items so that you could recreate the database in useful form in a relatively short time frame, if necessary.

Backup types:

- Full backup—all files are copied or backed up.
 - Incremental backup—only files that have been changed since the last backup are copied.
 - Differential backup—only files that have been changed since the last *full* backup are copied.
- Software and physical media are always issues when dealing with backups.
 - Backup software must be able to work with locked records.
 - Backup media must be able to hold the entire backup.

Restoring a Database

- Restore is the process of retrieving all needed items to bring the database back to its useful form.
- The restore process should be basic and straightforward.
- Restore should be a function of the backup system.
- The majority of all planning needs to be spent on the backup side so that when you need to restore, the process has already been planned.

Full Backups

- There are two types of full backup for a database system:
 - The first type copies all items of the database, including open items, such as files that are open at the time of the backup.
 - The second type copies all items of the database and all items on the server. It copies server files that the database is on in addition to the database itself, such as user security Network Address Translation (NAT).
- **Advantages of full backups**
 - You have complete copies of all files in one location, and the restore process is relatively easy.
- **Disadvantages of full backups**
 - Very time-consuming.
 - Can be very expensive.
 - Media storage cost.
 - Your system may be out of service during a full backup process.

Incremental Backups

- An incremental backup backs up only those files that have changed since the last backup.
 - Only the changes are written to the backup media.
 - If there has not been any changes, then no backup is made.
 - Incremental backups should be made every day since the last full backup.
- **Advantages of incremental backups**
 - — This backup is the fastest of the three types.
 - — The cost of an incremental backup is less than a full backup.
 - — The restore process can be faster if you have lost only certain files.
- **Disadvantages of incremental backups**
 - — The restore process can be much harder than for a full backup.
 - — Often need a full backup in addition to incremental backup(s) to restore the database.

Differential Backups

A differential backup will back up only those files that have changed since the last full backup.

— The difference between a differential backup and an incremental backup is that it is based upon the backup status of the last full backup, not the change of data.

— Backups should be made every day since the last full backup.

- **Advantages of differential backups**

— This backup is a faster process than a full backup.

— The cost of a differential backup is less than a full backup.

— The restore process can be faster if you have lost only certain files.

— Best balance between time to restore and cost.

- **Disadvantages of differential backups**

— Basic function restore relative quickly and full restore in a reasonable time frame

— May need full backup in addition to the incremental backups to restore the database.

Problems with Classic Backup Methods

- All backups require database and server resources that will reduce the ability of the database and/or the server where it is located.
- You need offsite backup in case of physical damage to the location hosting the database. If the building is destroyed, you still need the database to be working.
- Time delays for backups because the backup media that you need for the restore has already been moved offsite.
- Large areas can be used to store the onsite and offsite backups.

Replication Services

Replication services with real-time mirroring:

- Replication services are used to replicate and synchronize a database on two or more servers.
- The replication is a full or incremental reproduction of the database.
- You can even replicate the server environment the database is located on.
 - This can be done locally or across large networks while the database is actively being used.

Replication Services (continued)

- **Advantages of replication services:**
 - The backup can be set to an auto-write method.
 - All active files are written to both servers or groups of servers.
 - The database is never unavailable.
 - One server may be off the cluster or group of servers, but the database is still available.
 - The restore process can happen on one server while others work.
- **Disadvantages of replication services:**
 - The cost is very high compared to single-server backup methods.
 - The hardware cost of having multiple physical servers.
 - The networking cost of having the physical network equipment, additional servers, and the bandwidth for the servers to talk to each of them.
 - Still need to make physical backup as protection against system wide corruption.
 - Possible virus issues across the network or cluster.

Lesson Review

1. Describe a small-scale version of replicated services.
2. What are the three main types of backups?
3. What is the fastest backup method?
4. What is the fastest restore method?