

Backup Rotation Schemes

What are they for?

A backup rotation scheme is a system for managing your backup storage media (tapes/DVDs/HDDs).

An effective backup scheme can provide various benefits such as:

- Prolonging the lifespan of your backup media
- Allowing efficient archiving of older backups
- Minimising the amount of backup space required for maximal restore point availability
- Minimise the impact of backup media failure or loss

Examples of commonly used schemes

1. **First In - First Out (FIFO)**

This is the simplest of the 3 backup schemes mentioned here. As the name implies, you backup to each different storage device in turn. Then when you fill your final device you go to the oldest (First In) device and use that for your next backup (First Out).

This backup scheme ensures even wear across all your backup devices. It is best used when archiving is unimportant and one of the schemes below is beyond the scope of requirements.

2. **Grandfather-Father-Son**

This is perhaps the most common / traditional system of backup rotation. With Grandfather-Father-Son (GFS) you have 3 tiers of backup that are cycled. Your oldest tier (Grandfather) backups are (usually) monthly full backups that you keep for, say, 12 months before rotating on a FIFO basis. In between your monthly backups you have weekly full backups (Father) that you could retain for 4-8 weeks before rotating. To save duplicating backups one Father backup per month is generally promoted to Grandfather status, rather than generating a new full backup. The Son backups would be daily backups which can be fulls but are frequently incremental backups that hang off the Father for that week. These can then be replaced / removed when the corresponding Father. The benefit of this method is that you get a long overall backup cycle (generally a full year) with relatively few backup devices as part of the rotation. You also get the greatest granularity for the most recent backups which is what you generally want for recovery purposes. Obviously the down side of this is that you lose granularity with the older generation backups. This backup scheme is very useful for archiving purposes.

3. **Tower of Hanoi**

This is an alternative system to GFS that uses storage media more efficiently but it is

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not quite as simple to understand and manage. It is based on the solution to the "Tower of Hanoi" puzzle involving transferring discs between poles.

Imagine you have **N** tapes that can each store a single backup. Using ToH you would use the first tape every other day (Day 1,3,5 etc.). Then you would use tape 2 on every fourth day starting on day 2 (So 2,6,10 etc.).

The general rule being: Use tape **N** every **2N** days starting on day **N-1**.

The advantages of this method are that you get a good backup cycle for the whole month from minimal tapes. A whole month can be done with 5 tapes. You will have backups available from 1, 2, 4, 8, ... , 2N days ago.

A significant disadvantage is that some of the tapes (tapes 1 and 2) are overwritten very frequently.

For a tutorial on setting up a Tower of Hanoi backup cycle see our tutorial found [here](#).

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