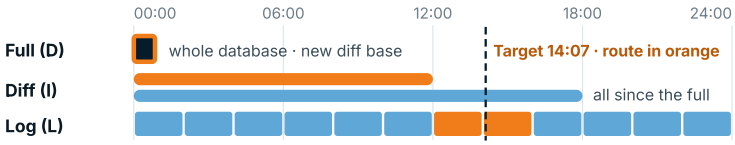
Restore commands for the day it matters

Your backups run. But can you get back from them – to the right point in time, and in time?

For DBAs & operations | Tested in the PSG lab: SQL Server 2022 and 2025 | As of November 2026

Caution: Always practise and verify under a **new database name**. `WITH REPLACE` overwrites an existing database. A tail-log backup with `NORECOVERY` takes the source offline. Paths, file names and logical names are examples.

1 Which route do you need?



GOAL	ROUTE
Latest state after a failure	Full → diff → logs → (tail-log) → `RECOVERY`
State before a user error	Full and diff *before* the target → logs with `STOPAT`
Copy for test or dev	`COPY_ONLY` full → restore under a new name
SIMPLE recovery model	Full and diff only; no point in time in between

Backup headers show whether files belong together – names and dates don't.

2 The commands, in order

1 Inventory: what is there? – backup history from msdb

```
SELECT TOP (50) bs.database_name, bs.type, bs.is_copy_only,
  bs.backup_start_date, bs.backup_finish_date,
  bs.first_lsn, bs.last_lsn, bs.differential_base_lsn,
  bmf.family_sequence_number, bmf.physical_device_name
FROM msdb.dbo.backupset AS bs
JOIN msdb.dbo.backupmediafamily AS bmf
  ON bmf.media_set_id = bs.media_set_id
WHERE bs.database_name = N'AppDB'
ORDER BY bs.backup_start_date DESC;
```

2 Get to know the file – checks the file, not the route

```
RESTORE HEADERONLY   FROM DISK = N'D:\Backup\AppDB_full.bak';
RESTORE FILELISTONLY FROM DISK = N'D:\Backup\AppDB_full.bak';
RESTORE VERIFYONLY   FROM DISK = N'D:\Backup\AppDB_full.bak'
  WITH CHECKSUM;
```

3 Restore the base, keep the chain open – names from FILELISTONLY

```
RESTORE DATABASE [AppDB_Test]
  FROM DISK = N'D:\Backup\AppDB_full.bak'
  WITH MOVE N'AppDB'     TO N'D:\Data\AppDB_Test.mdf',
       MOVE N'AppDB_log' TO N'D:\Log\AppDB_Test.ldf',
       NORECOVERY, CHECKSUM, STATS = 10;
```

4 Restore the diff – if any, and before the target

```
RESTORE DATABASE [AppDB_Test]
  FROM DISK = N'D:\Backup\AppDB_diff.bak'
  WITH NORECOVERY, CHECKSUM;
```

5 Logs in sequence – each with the same target time, in one batch

```
DECLARE @Target datetime = '2026-11-04T14:06:50';
RESTORE LOG [AppDB_Test] FROM DISK = N'D:\Backup\AppDB_log_01.trn'
  WITH NORECOVERY, CHECKSUM, STOPAT = @Target;
RESTORE LOG [AppDB_Test] FROM DISK = N'D:\Backup\AppDB_log_02.trn'
  WITH NORECOVERY, CHECKSUM, STOPAT = @Target;   -- and so on
```

6 Only now go online, then check – functionally, too: the right state?

```
RESTORE DATABASE [AppDB_Test] WITH RECOVERY;
DBCC CHECKDB ([AppDB_Test]) WITH NO_INFOMSGS;
```

Extra copy without moving the differential base

```
BACKUP DATABASE [AppDB] TO DISK = N'D:\Backup\AppDB_copy.bak'
  WITH COPY_ONLY, CHECKSUM, COMPRESSION;
```

3 When SQL Server says no

ERROR	MEANING	WHAT TO DO
3117	Already online via RECOVERY	Restart from the base
3136	Diff does not match the base	Find the matching full base
4305	Log starts too late	Find the missing log
3159	Target exists, tail not backed up	New name, or tail-log
3154	Backup of a different database	Choose a new name
3201	Backup file not reachable	Path and service rights
1834	Target files in use	`MOVE` for each logical file
3132	Stripe set incomplete	List all files of the set
4208	Log backup in SIMPLE recovery	Pick the model deliberately
3169	Backup from a newer version	Same or newer version only

Error 3013 usually follows and only reports the abort. The message before it is the one that matters.

Tail-log: back up the log tail, source goes offline – only in a planned recovery

```
BACKUP LOG [AppDB] TO DISK = N'D:\Backup\AppDB_tail.trn'
  WITH NORECOVERY, CHECKSUM;
```

4 Measured at PSG

- **VERIFYONLY says yes to a diff that cannot be restored on its own.** A file check is not a restore path.
- **A copy-only full is not a differential base.** Copy-only full plus a later diff: error 3136. With the regular full before it, the restore works.
- **The newest file does not close a gap.** Log 1 and log 3 without log 2: error 4305.
- **Stripes are parts, not copies.** With one of two files, even verification fails.

All ten errors above were triggered in the lab. Synthetic data, SQL Server 2022/2025 on Linux; not tested: AGs, encryption, object storage.

5 When to get help

- The oldest restore point you promised has never been restored.
- TDE or backup encryption – but no key test on a fresh instance.
- Backups on AG secondaries, or several tools backing up the same database.
- Your RTO only knows how long RESTORE runs, not the whole recovery.

PSG Health Check, area backup, restore & recovery: we review backup chains and restore times and, on request, accompany a restore test. Emergency: +49 40 39 88 28 75

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In depth, with lab evidence
psg.de/en/knowledge/sql-server-backup-restore-basics/

Discuss your restore scenario
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Please share it with your team.

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