Are Snapshots Backups?

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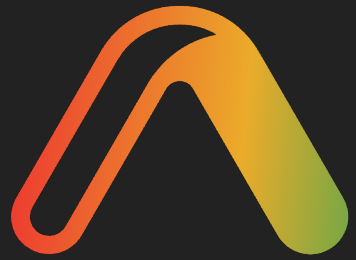

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Agenda

- Anatomy of a full backup
- Anatomy of a T-SQL snapshot
- Use cases
- Is this a backup?
- Best practices for snapshot backups

Bob...
How did we get here?

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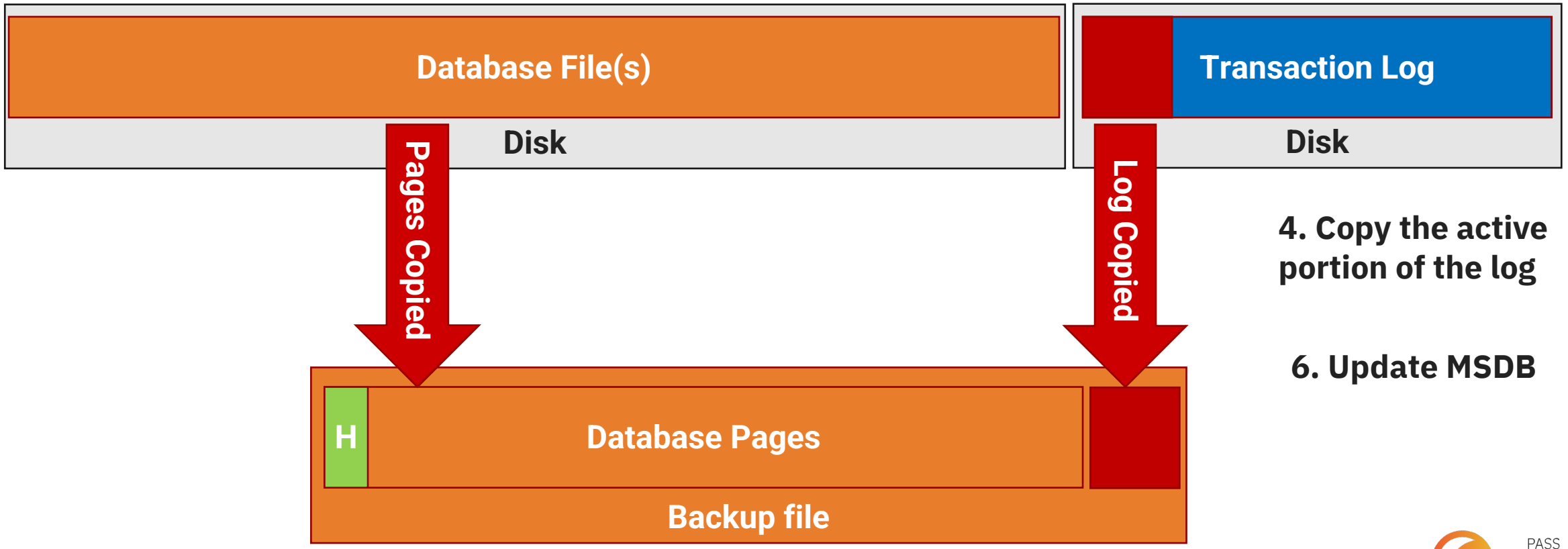
Anatomy of a full database backup

1. Checkpoint

2. Mark that the backup started

3. Database files read sequentially

5. Mark that the backup finished



4. Copy the active portion of the log

6. Update MSDB

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Challenges with full backups

- Size of data operation
- Takes time
- Pressure on resources CPU/Network/Disk
- Impact your workload
- Costs
- Recovery Time Objective (RTO)

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Let’s talk about snapshots

- Full, read only representation of the disk or volume
  - **Azure** – point in time, read only copy of a virtual hard disk (VHD)
  - **Storage** devices – point in time, read only representation of a volume
- Reverted to a previous point in time
- Copied / Cloned to provide others access to the data
- Experiment using Trace Flag 3661

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But I've used snapshots before 😬

Slow to execute and long IO stuns			Granularity of restore
Required Third Party Tools	No Point in Time Recovery	Performance Challenges due to Copy on Write	Consistency Issues
Operating System Specific (VSS)	If write ahead logging is followed, you always get a recoverable DB	No Portability	Infrastructure Specific Azure / VMware
Application Consistent	**Crash Consistent**	**Database Snapshots**	**Vendor Specific Implementation**

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Introducing T-SQL Snapshot Backup

- Ability to quiesce the database with no external tools
- SQL Server aware and in complete control
- Snapshot at the storage or service tier
- Unlocks **point in time recovery**
- Instantaneous restore for a FULL database, group or server
- Building and Seeding Availability Groups and Log Shipping
- Enables cross platform scenarios – Windows and Linux
- Its FAST!!! (Especially when compared with VSS)

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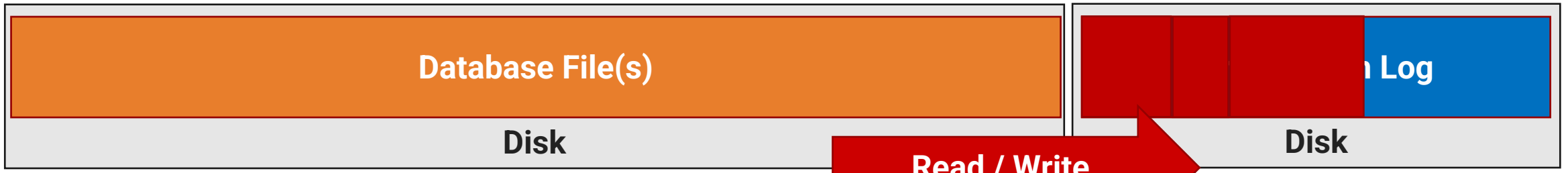
Anatomy of a snapshot backup - database

1. Checkpoint

3. Freeze the database and log

2. Mark that the backup started



6. Thaw the database and log

7. Mark that the backup finished

8. Update MSDB

4. Perform a snapshot at the storage layer

5. Write a metadata file

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Snapshot backup - TSQL

Suspend

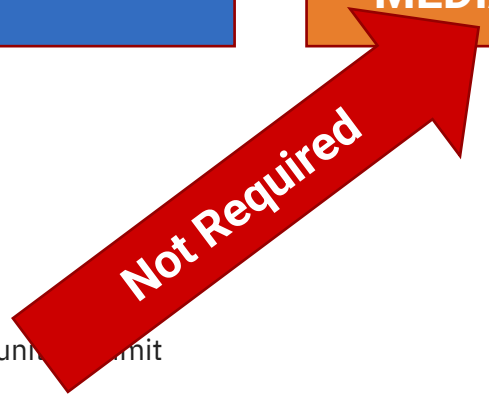
```
ALTER DATABASE DB1
SET SUSPEND_FOR_SNAPSHOT_BACKUP = ON
```

Snapshot

Take the storage snapshot – Azure, Storage Array, Hypervisor

Backup

```
BACKUP DATABASE DB1
   TO DISK=DB1.bkm
   WITH METADATA_ONLY,
   MEDIADESCRIPTION='SNAPSHOT_NAME|SNAPSHOT_LOCATION'
```



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The backup metadata file

- Describes what's in the backup
- You must protect it…
  - You do this anyway with your backups
  - If you're using enterprise backup same as protecting your backup catalog
- You can online the databases without it, but you'll lose point in time recovery
- Use the media description to locate your snapshot and name

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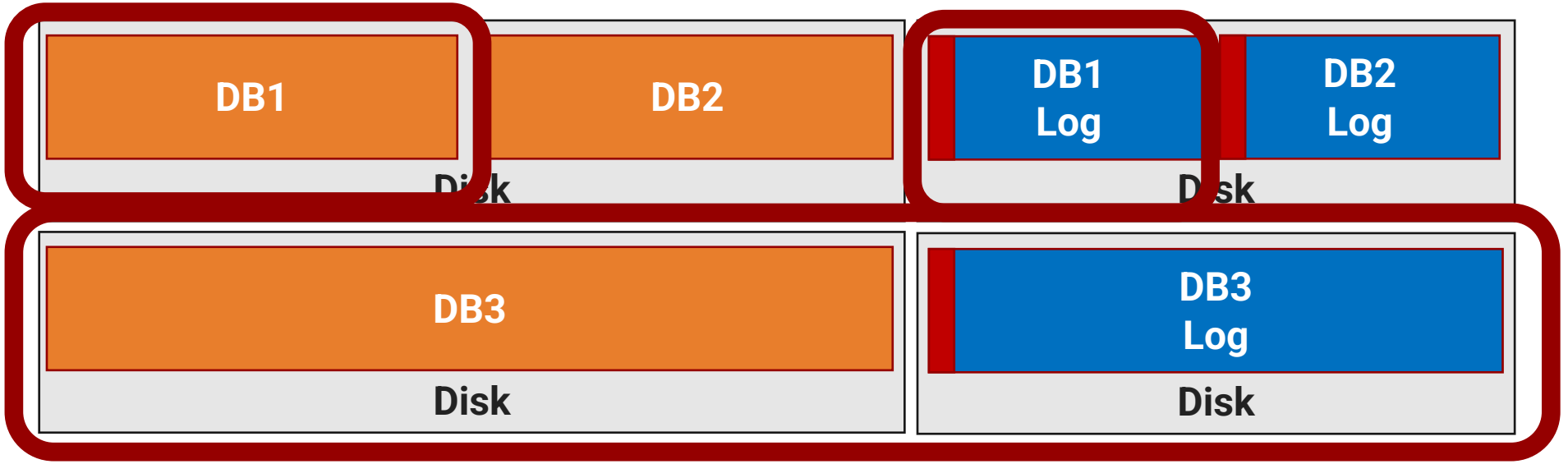
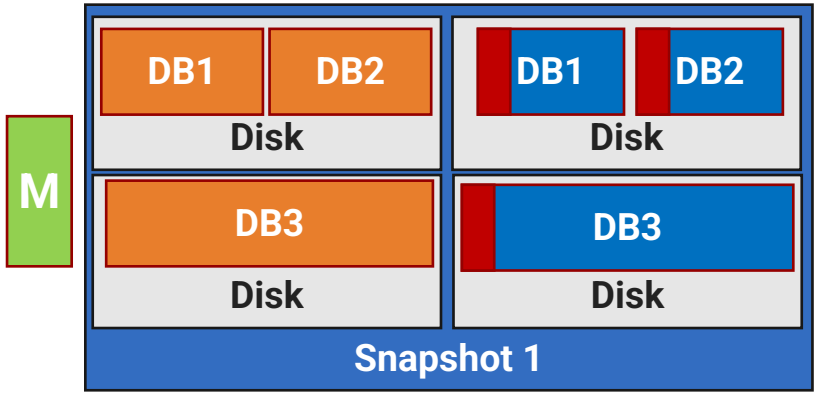
Anatomy of a snapshot backup - Group





What about DB2??

- **No IO Stun**
- **Allows granularity of freeze, rather than just volume**

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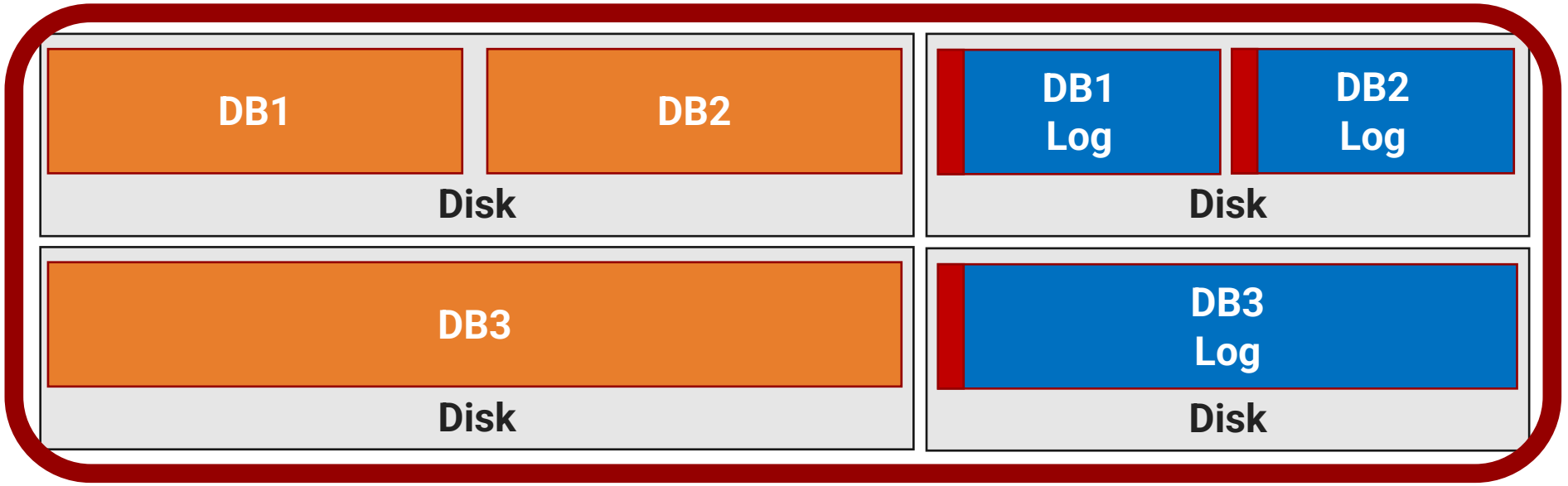
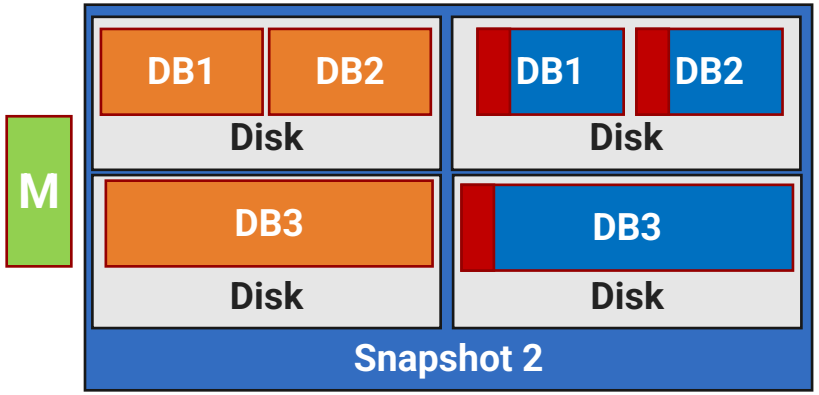
Anatomy of a snapshot backup - Server





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Anatomy of a snapshot backup – Restore!

RESTORE DB1 FROM DISK = ‘db1.bkm’ WITH METADATA_ONLY, NO_RECOVERY

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Let’s do a demo

Snapshot backup and Point and Time Recovery

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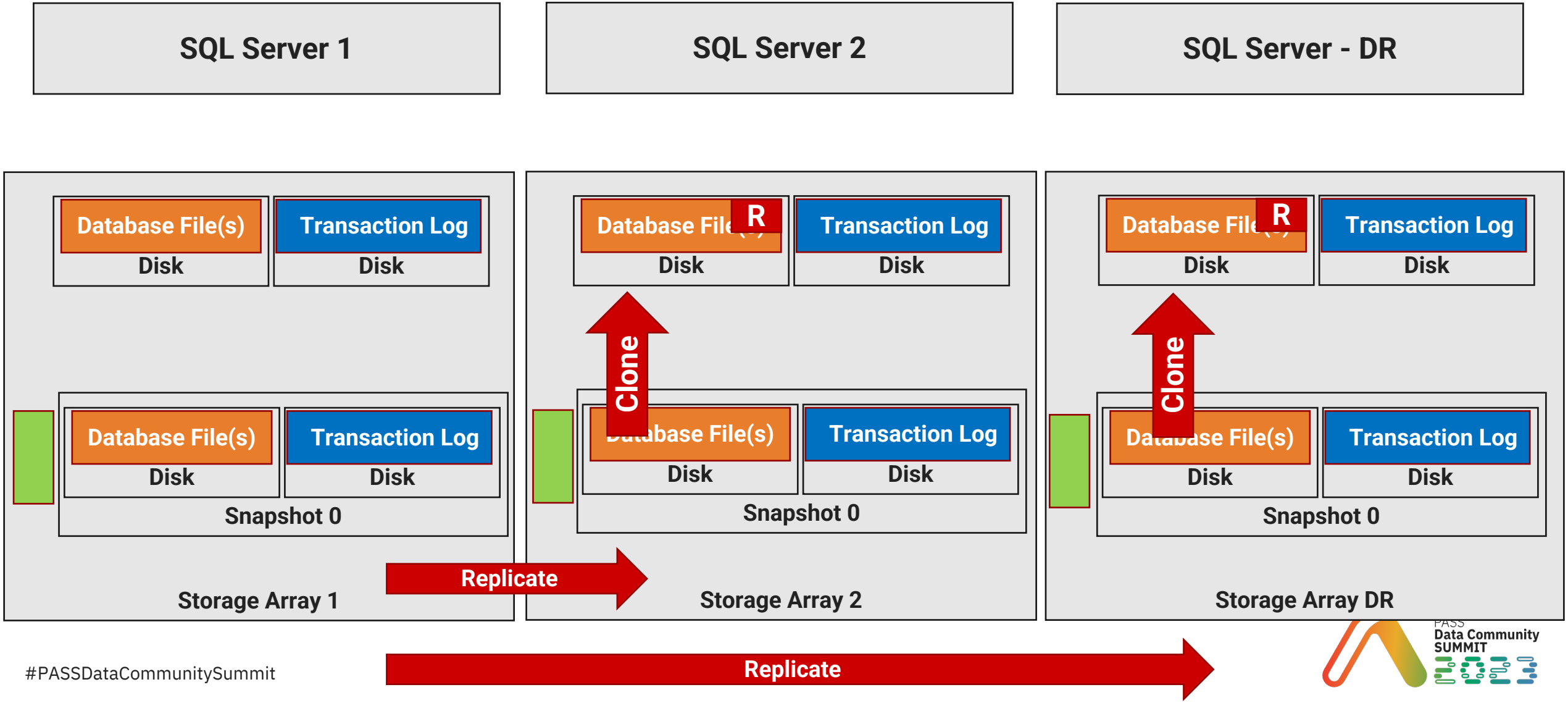
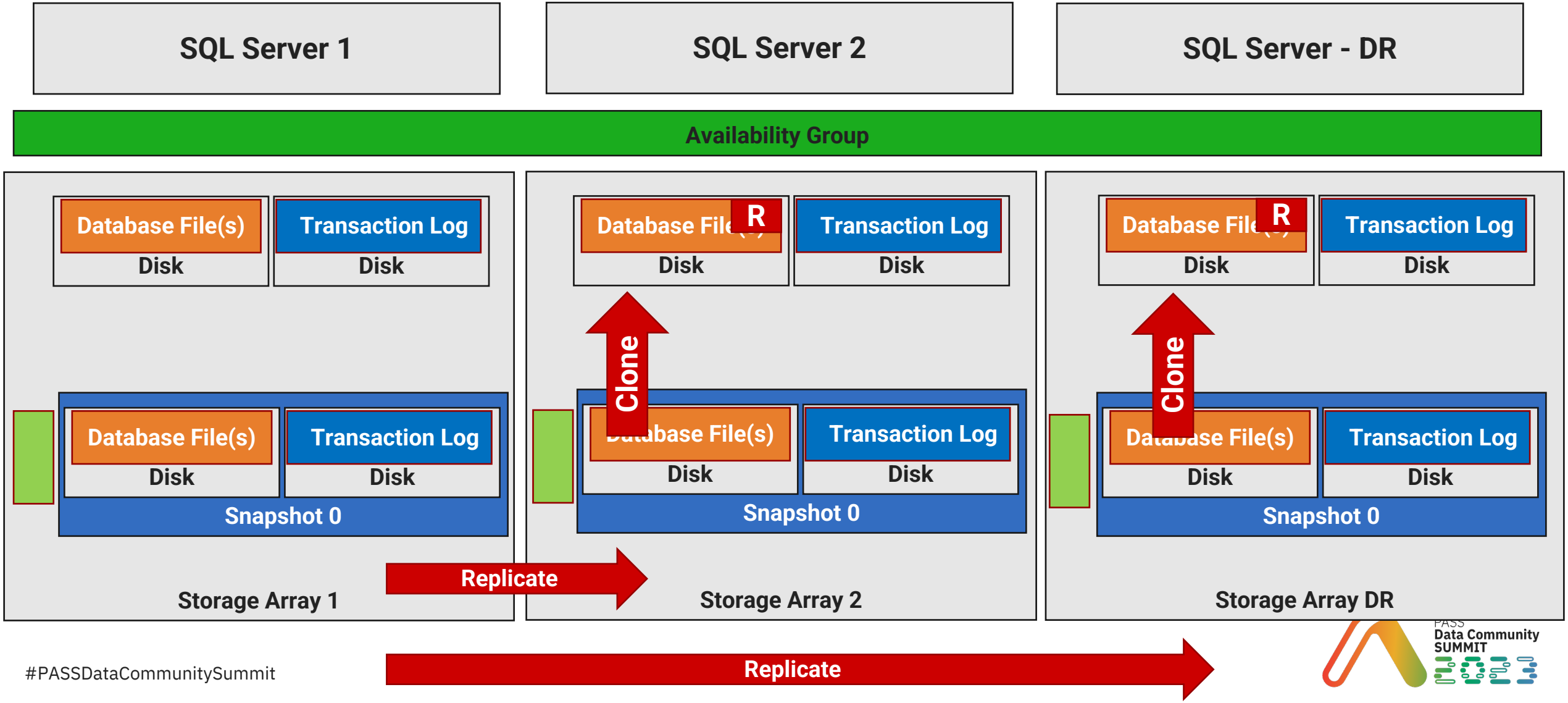
Is this backup?



Seeding an Availability Group



Let’s do a demo

Seeding an Availability Group using Snapshot Backup

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Let’s talk best practices

- Don’t like that IO stun…perform the snapshot during your normal backup window
- Protect your metadata files
- Replicate snapshots to other physical systems, locations and media types
- Consider using Accelerated Data Recovery
- Snapshot retention = costs
- Data file layout on storage
- User and system databases
- Snapshot only Primary AG replicas

Are T-SQL-based snapshots backups?

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Review

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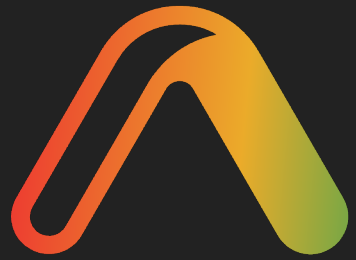

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Thank you

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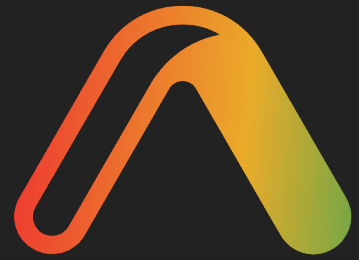

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