



# **Accelerated Database Recovery – A Deep Dive Behind the Magic**

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February 15th, 2023

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Certified IT professionals to help achieve IT goals

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Help save on costs while improving IT reliability and solving  
challenges



# AGENDA

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01

**What is  
ADR?**

02

**Old-school**

03

**New  
Hottness**

04

**DEMO**

05

**Questions  
& Answers**





Why do I  
even care?





**STILL WAITING FOR ROLLBACK TO FINISH**

# Some Light Reading

Constant Time Recovery in  
Azure SQL Database

<http://bit.ly/SQLADRExplained>



# Accelerated Database Recovery

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Provides enhanced database availability in the presence of long running transactions.

Faster and consistent database recovery

Almost instantaneous transaction rollback



# Accelerated Database Recovery

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Aggressive log truncation

Available in Standard Edition

Default in Azure SQL Database/Managed Instance

Cannot disable it in Azure SQL Database/Managed Instance

# Azure SQL DB



```
1  
2 DECLARE @version NVARCHAR(124)  
3 SELECT @version = @@VERSION  
4 PRINT @version;  
5 go  
6 ALTER DATABASE Demo1 SET ACCELERATED_DATABASE_RECOVERY = OFF;
```

70 %

Messages

Microsoft SQL Azure (RTM) - 12.0.2000.8  
Sep 18 2021 19:01:34  
Copyright (C) 2019 Microsoft Corporation

Msg 40517, Level 16, State 1, Line 6

Keyword or statement option 'accelerated\_database\_recovery' is not supported in this version of SQL Server.

Completion time: 2021-12-10T21:43:18.4331296-05:00

# Microsoft's Official Guidance

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Workloads with long running transactions.

Active transactions are causing the transaction log to grow significantly.

Long running recovery (such as crash recovery or manual rollback).





# New Components

# ADR New Components

sLog

Persisted Version Store

Logical Revert

Aborted Transaction Map

Cleaner



**YAY FOR ADR!!!**



In-memory object

Contained non-versioned operations

Checkpoints persist contents to disk

Provides aggressive log truncation



# Persisted Version Store

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Same version store when using RCSI

Retains off-row versions

Availability Group aware

# Logical Revert

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Asynchronous in nature

Facilitates the “undo” at the row-level

Keeps track of all aborted transactions

Releases all locks immediately after abort

# Aborted Transaction Map

Not that ATM →

Tracks all aborted transactions

Implemented as a hash table

Rows are linked to PVS





# Cleaner

Asynchronous process

2019 - Single threaded / 2022 - Multi-threaded

Removes versions that are not needed

Cannot disable

Force clean up via  
`sp_persistent_version_cleanup` (synchronous)



# Cleaner Configurations

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Select \* from sys.configurations where name like 'ADR%';

ADR cleaner retry timeout

ADR Preallocation Factor\*

# How to Enable ADR

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Requires exclusive access to the database

Can specify specific/different filegroup

```
ALTER DATABASE [db_name]
```

```
SET ACCELERATED_DATABASE_RECOVERY = ON
```

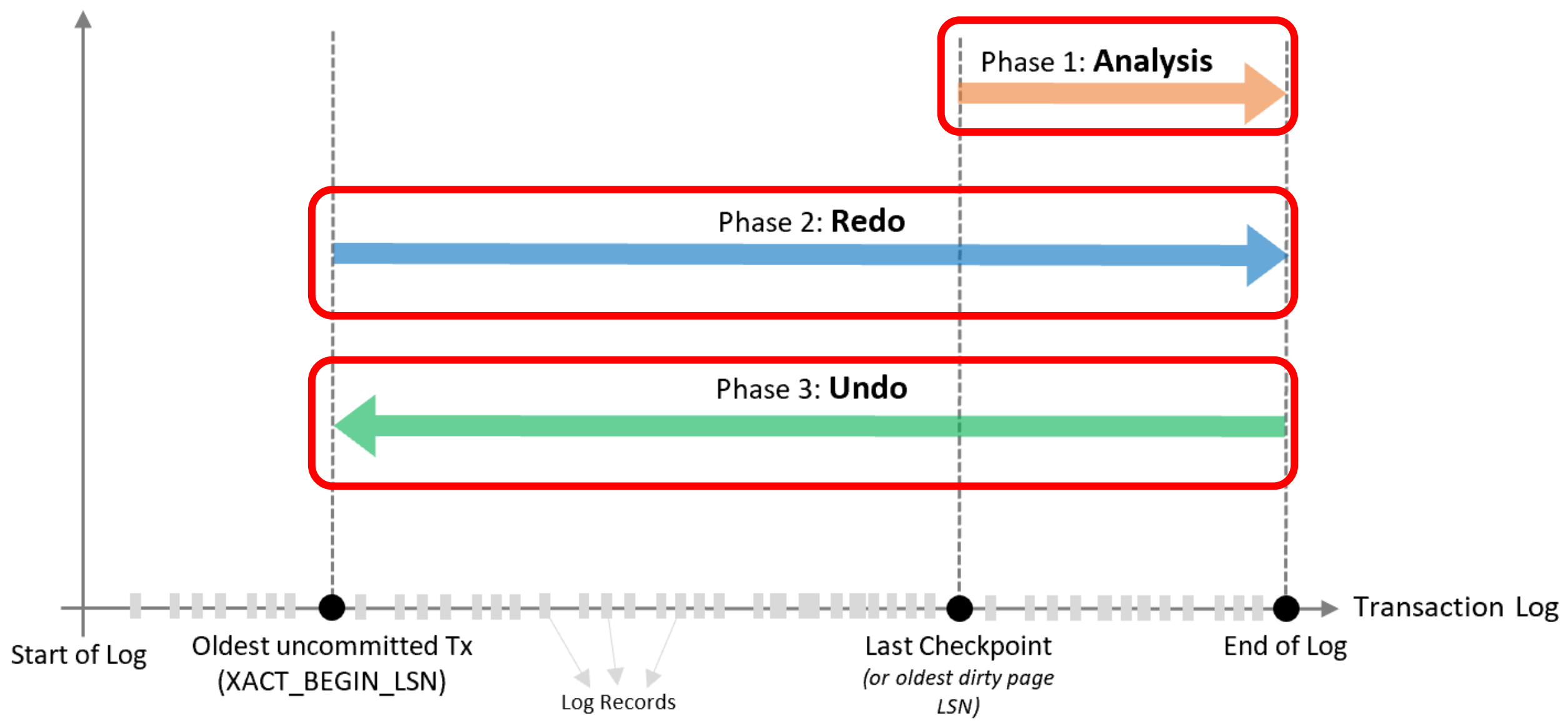
```
(PERSISTENT_VERSION_STORE_FILEGROUP =  
[SomeOtherFG])
```



# Old School vs New Hottness



# Recovery Phase / Transaction Log (without ADR)



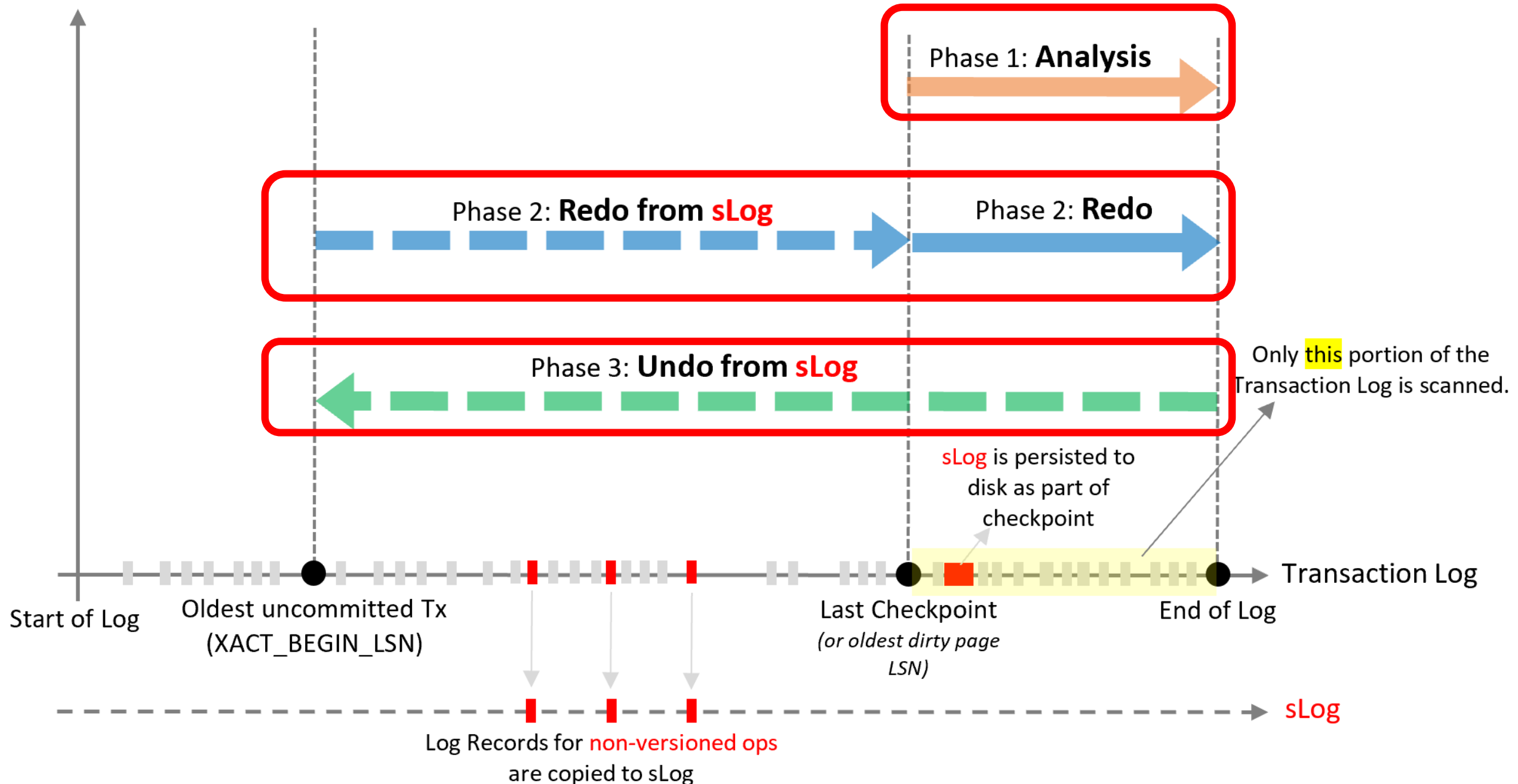


**Rollin',  
rollin',  
rollin'**

**Rawhide!**

**Rollback is  
proportional to  
longest running  
transaction**

# Recovery Phase / Transaction Log / sLog (with ADR)





# DEMO





**DANGER!! DANGER!!**

**DO NOT ATTACH  
DEBUGGER TO A  
PRODUCTION  
SQL INSTANCE!!**

**DISCLAIMER: I AM NOT HELD RESPONSIBLE IF YOU DO**

# When Not to Deploy ADR

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Extremely highly transactional

High volume of data modifications

Most likely edge case

Monitor PVS Store for issues

# Summary

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Faster rollbacks

Faster crash recovery upon startup/failover

Aggressive log truncation

Enable for majority of use cases

Simple to enable

# Resources

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SQLCallStackResolver – <http://aka.ms/sqlstack>

Article - <https://www.red-gate.com/simple-talk/databases/sql-server/database-administration-sql-server/how-does-accelerated-database-recovery-work/>

Whitepaper - <http://bit.ly/SQLADRExplained>



**Questions?**  
**Answers!**

**Got  
Questions?**

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