Accelerated Database Recovery – A Deep Dive Behind the Magic

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Certified IT professionals to help achieve IT goals

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My Slides & Demos

https://bit.ly/mypresentationfiles

AGENDA

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

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

Faster and consistent database recovery

Almost instantaneous transaction rollback

Accelerated Database Recovery

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

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

sLog

In-memory object

Contained non-versioned operations

Checkpoints persist contents to disk

Provides aggressive log truncation

Persisted Version Store

Same version store when using RCSI

Retains off-row versions

Availability Group aware

Logical Revert

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

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

ADR cleaner retry timeout

ADR Preallocation Factor*

How to Enable ADR

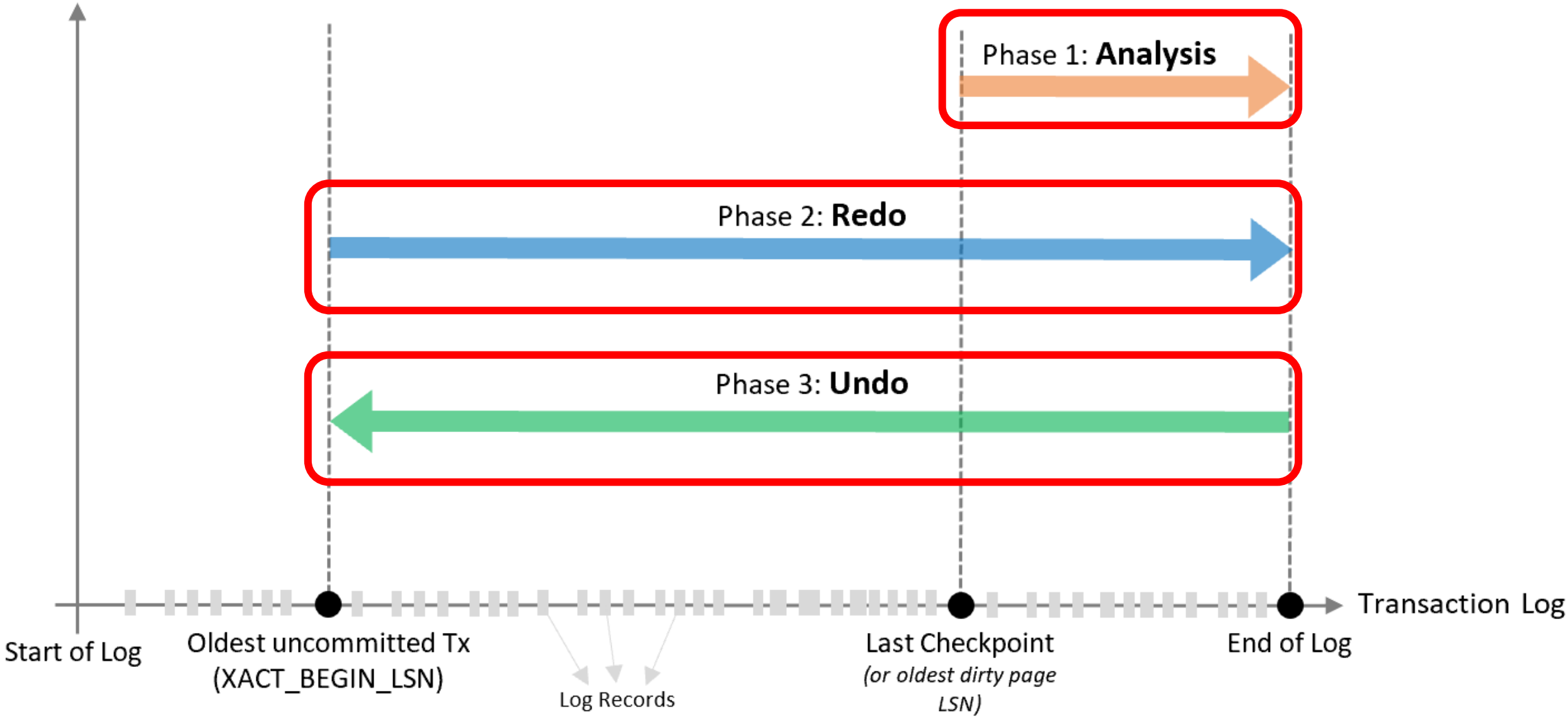
Requires exclusive access to the database

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)

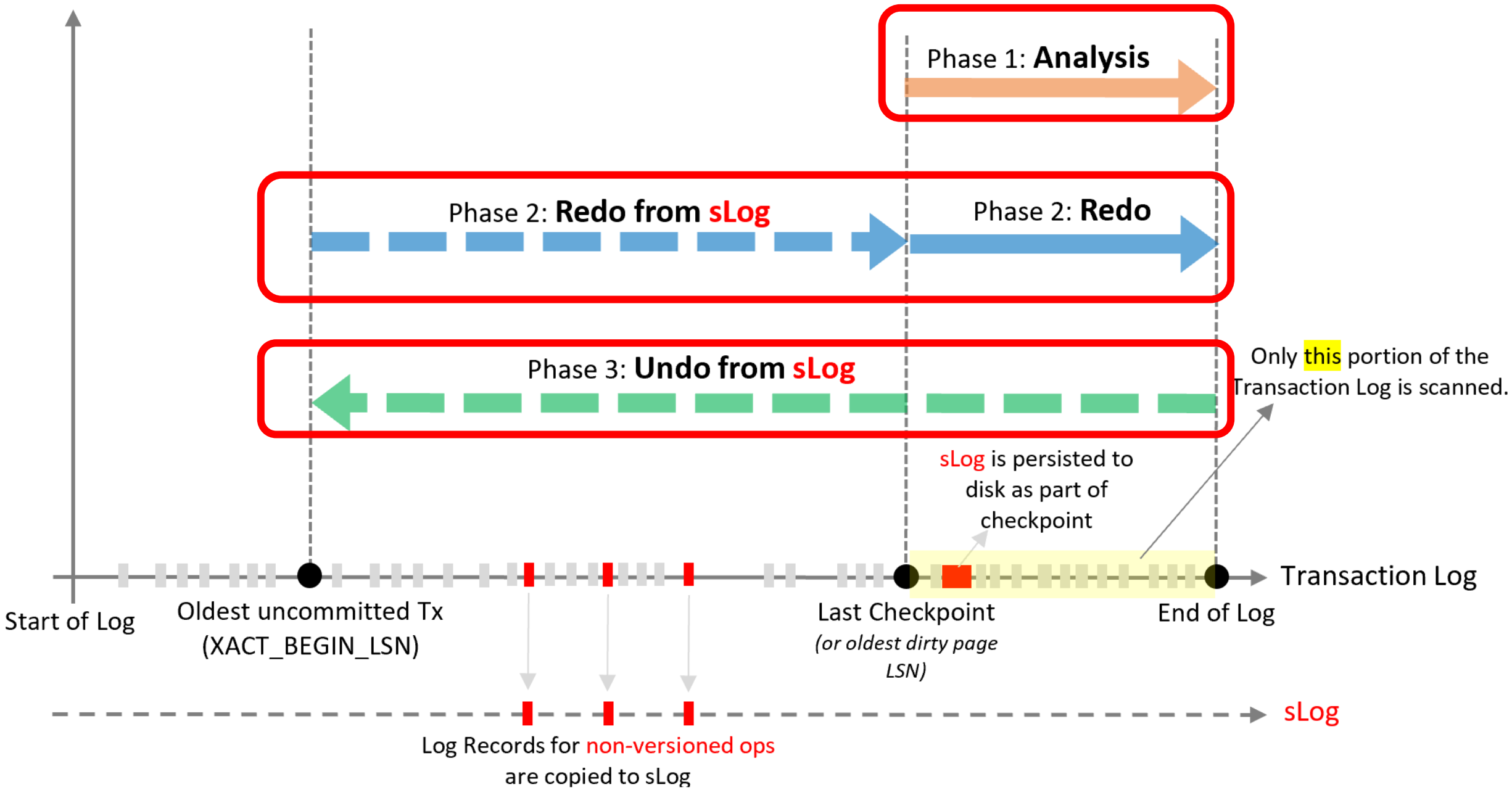


Rollback is proportional to longest running transaction

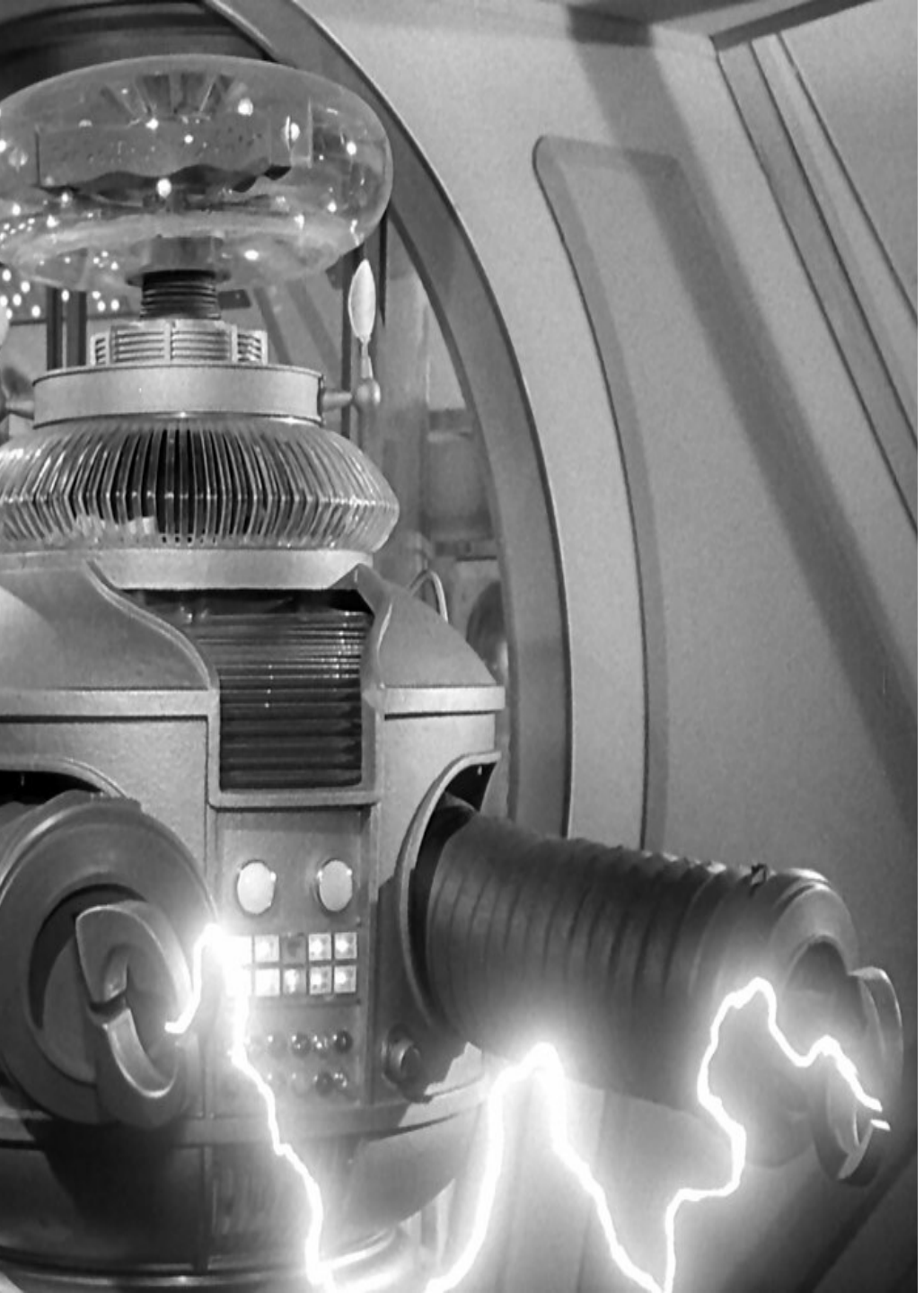
Rollin',
rollin',
rollin'

Rawhide!

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

Extremely highly transactional

High volume of data modifications

Most likely edge case

Monitor PVS Store for issues

Summary

Faster rollbacks

Faster crash recovery upon startup/failover

Aggressive log truncation

Enable for majority of use cases

Simple to enable

Resources

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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