

# OpenWorld 2016

## What's New and Coming in the Next Generation of Oracle Automatic Storage Management

### CON6565



September 18–22, 2016  
San Francisco

Jim Williams  
ASM Product Manager  
September 21, 2016

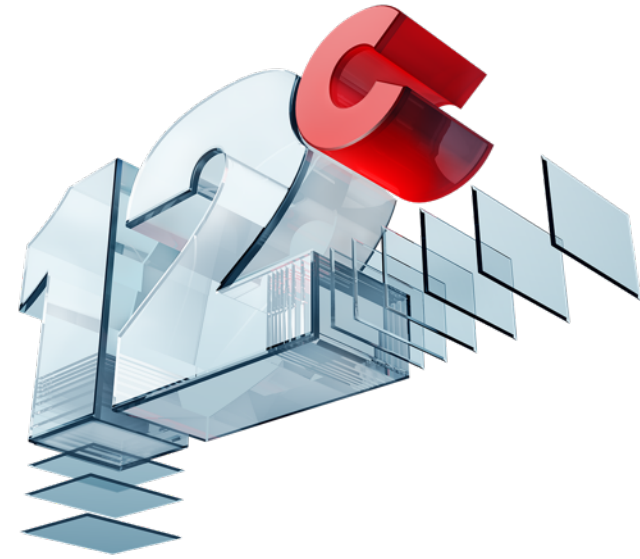


# Safe Harbor Statement

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# Announcing Oracle Database 12c Release 2 on Oracle Cloud

- Available now
  - Exadata Express Cloud Service
- Coming soon
  - Database Cloud Services
  - Exadata Cloud Machine



Oracle is presenting features for Oracle Database 12c Release 2 on Oracle Cloud. We will announce availability of the On-Prem release sometime after Open World.

# Program Agenda

- 1 ➤ ASM/ACFS as the Storage Stack for Oracle Environments
- 2 ➤ Oracle ASM/ACFS Feature Progression
- 3 ➤ What's New and Coming in ASM
- 4 ➤ New ACFS Features
- 5 ➤ If You're Not Using ASM, then Why?

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# ASM History 101

## The Simple Idea for addressing the complexity of storage management

- Provides an integrated cluster volume manager and file system
- Stripes and mirrors files across disks in ASM Disk Groups
- Automatic rebalances after storage configuration changes
- Built on the Oracle instance architecture
- I/O operations DO NOT go through the ASM instance!
- Manages storage as a global cluster of *shared Disk Groups*
- ACFS extends the ASM management umbrella for non-database data
- ASM along with ACFS define the Oracle Storage Stack

# Oracle Stack versus Other Host-based Alternatives

*ASM*

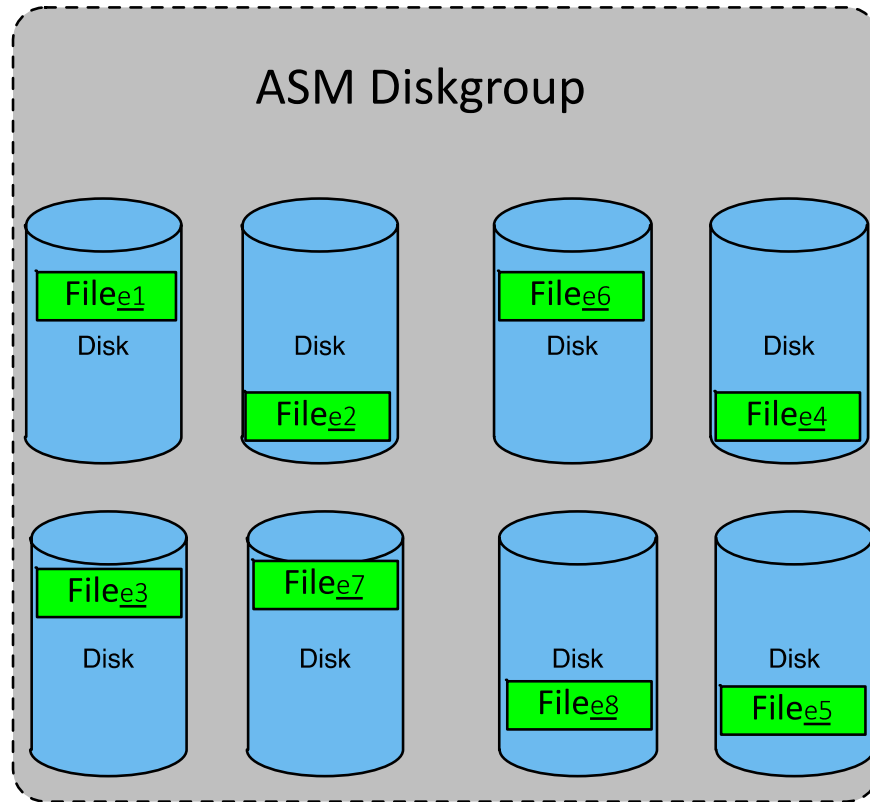
*Host-based LVM/FS*

ALL database files are striped and mirrored automatically across all ASM Disks

Individual file mount points are created for each database.

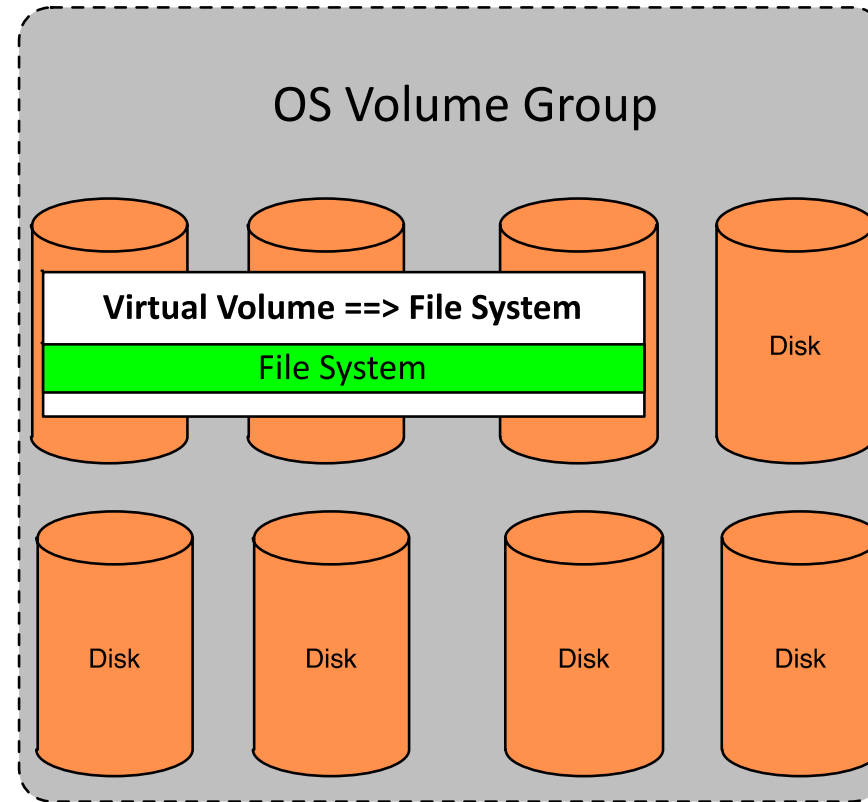
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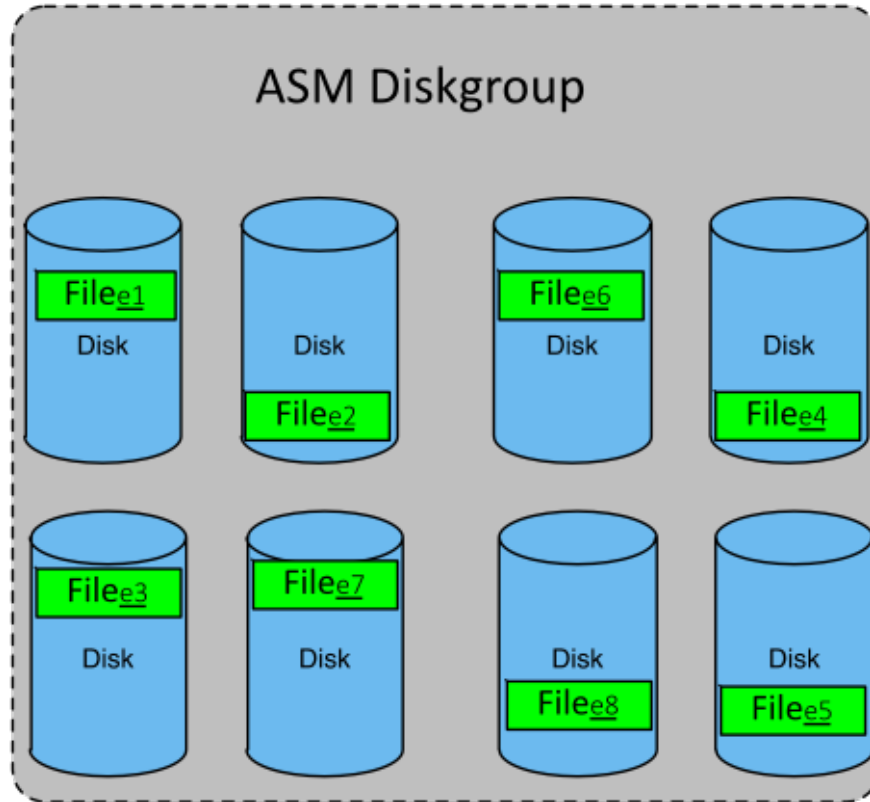


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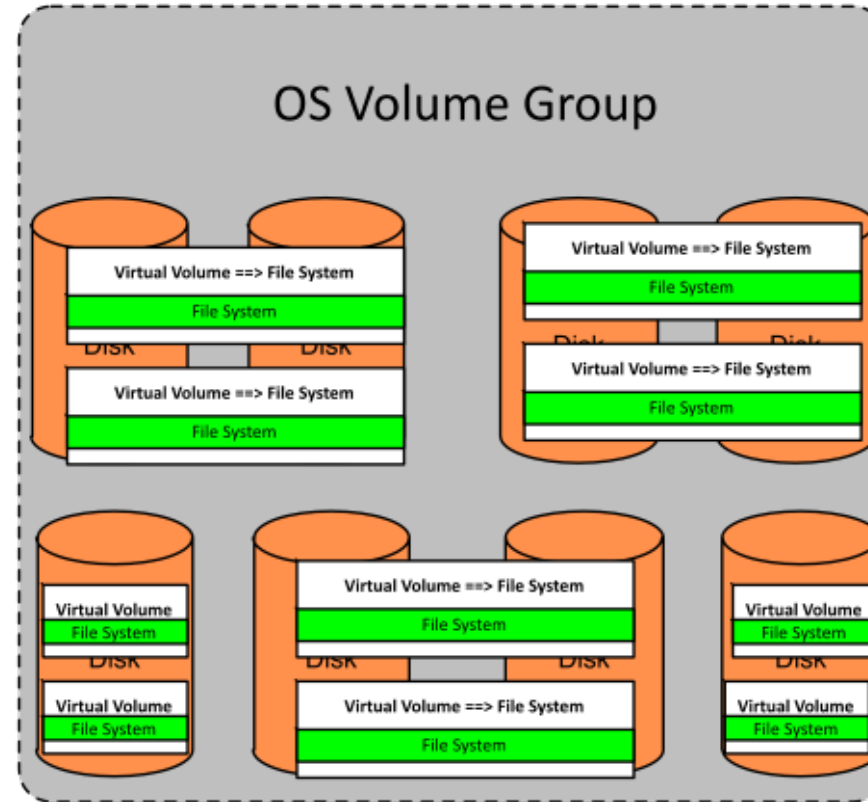
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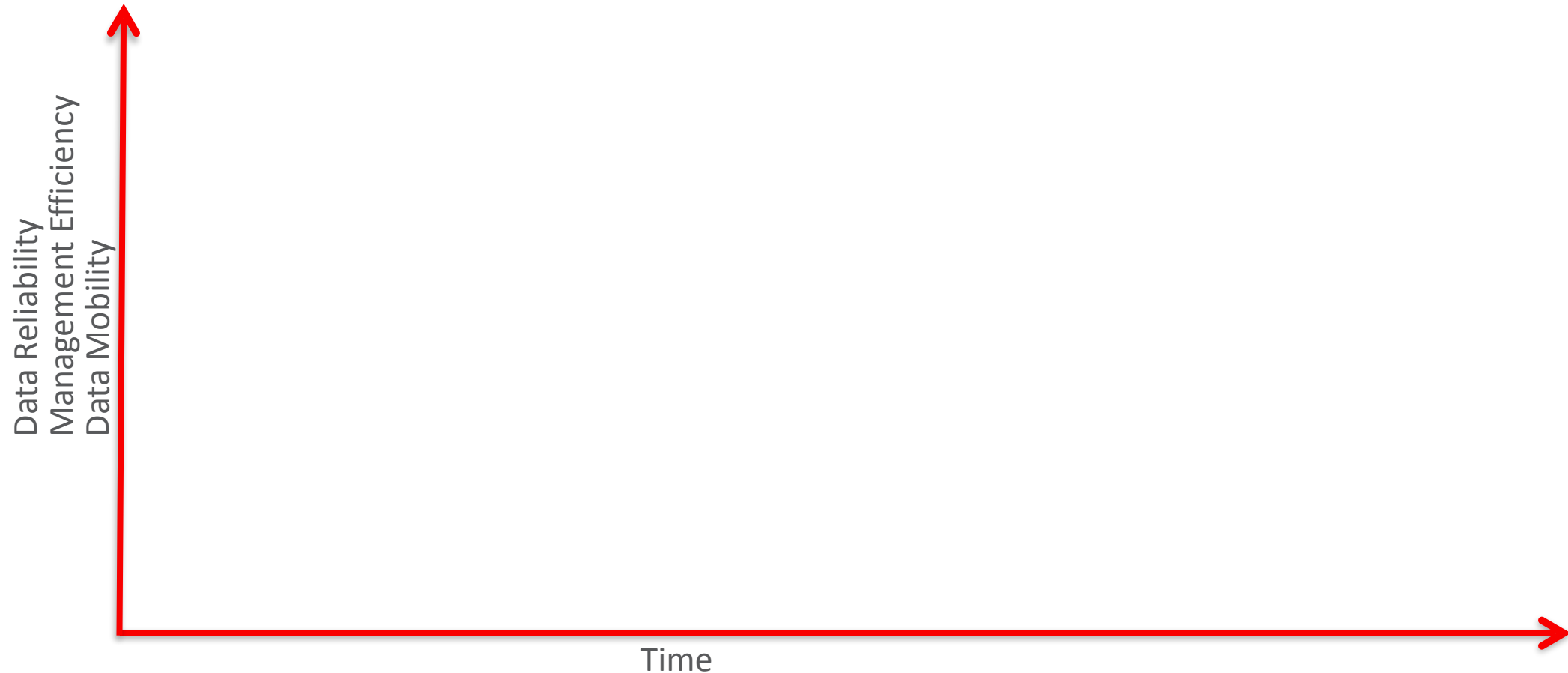
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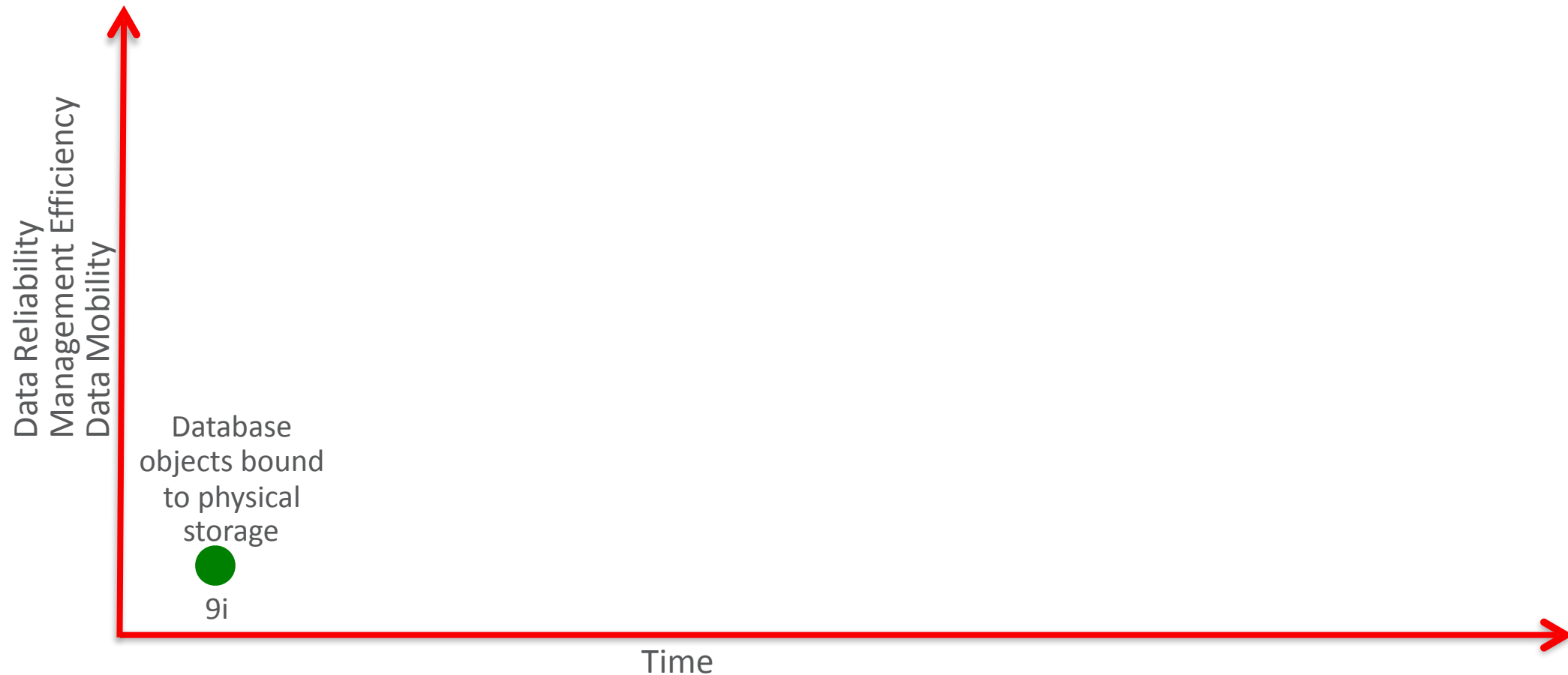
# Evolution of the Oracle Storage Stack

High Demand Databases



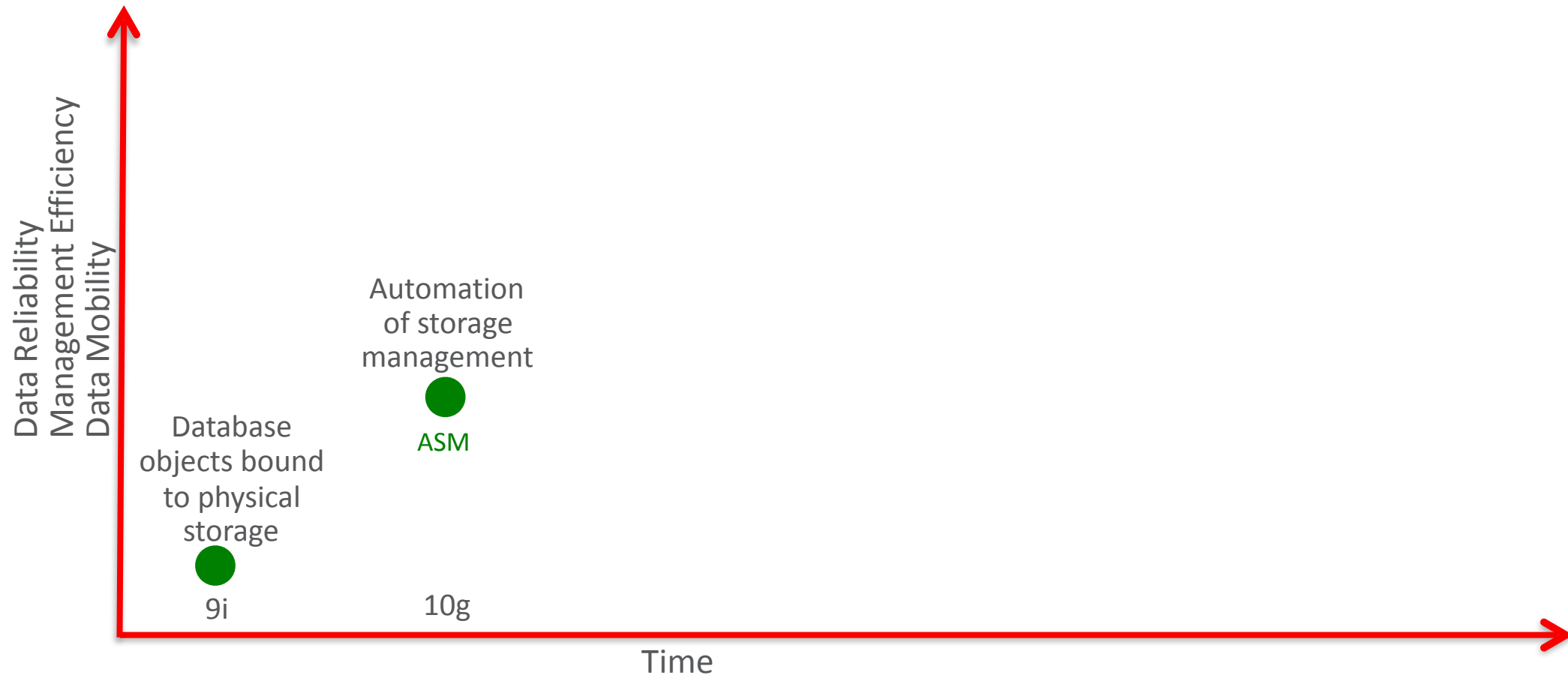
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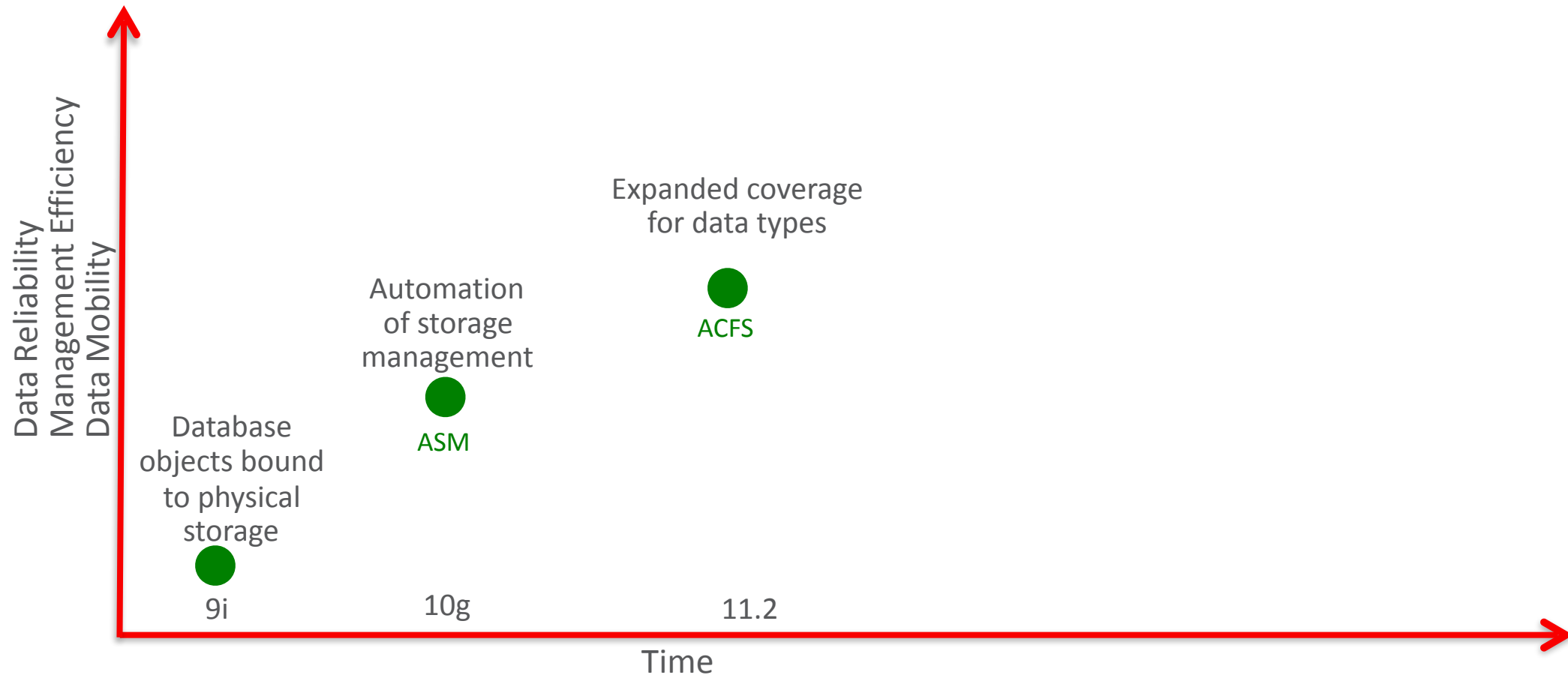
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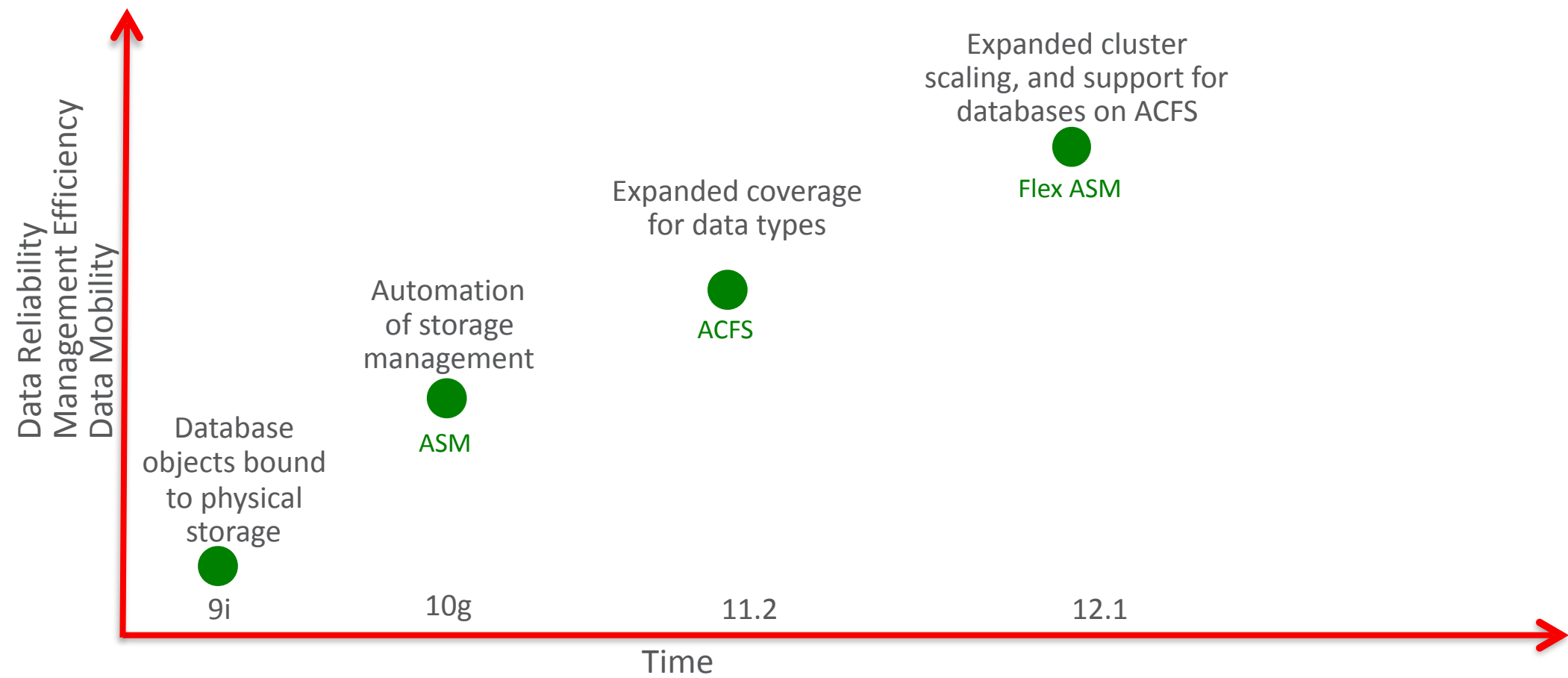
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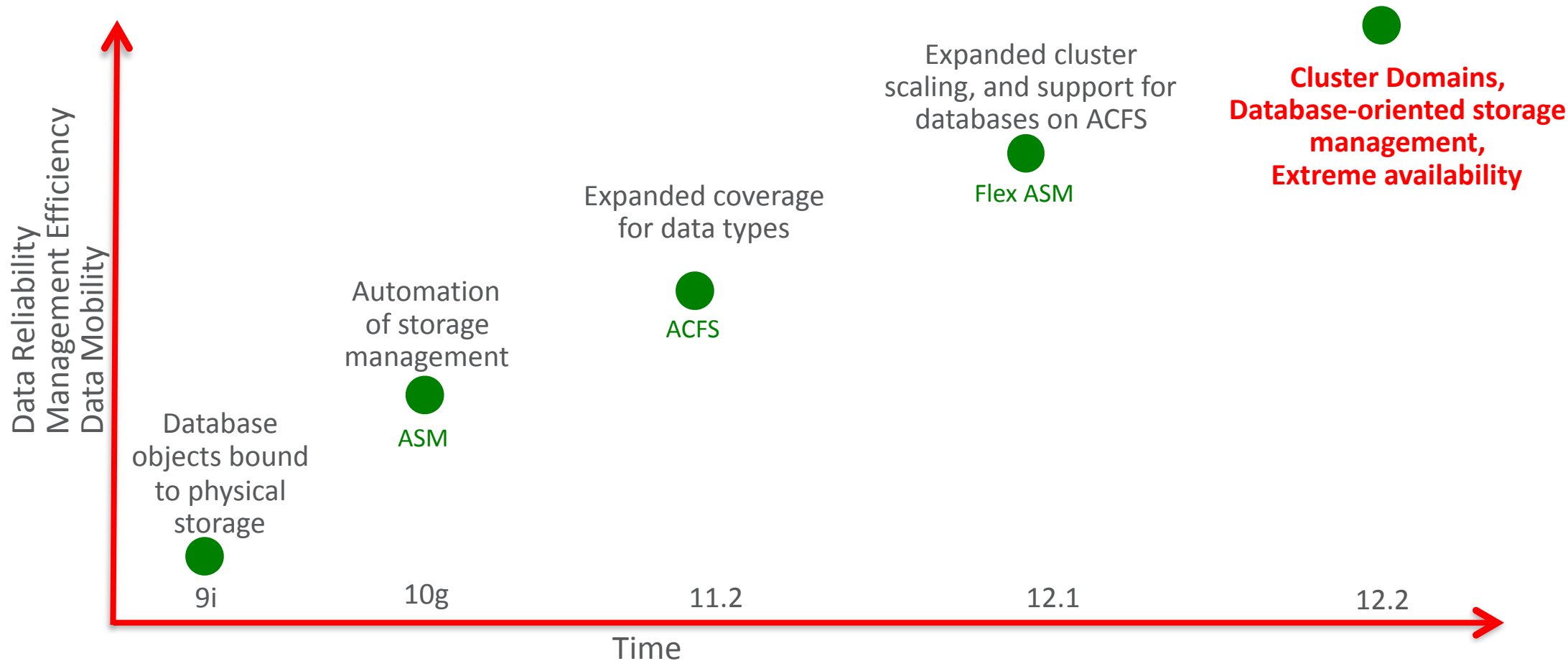
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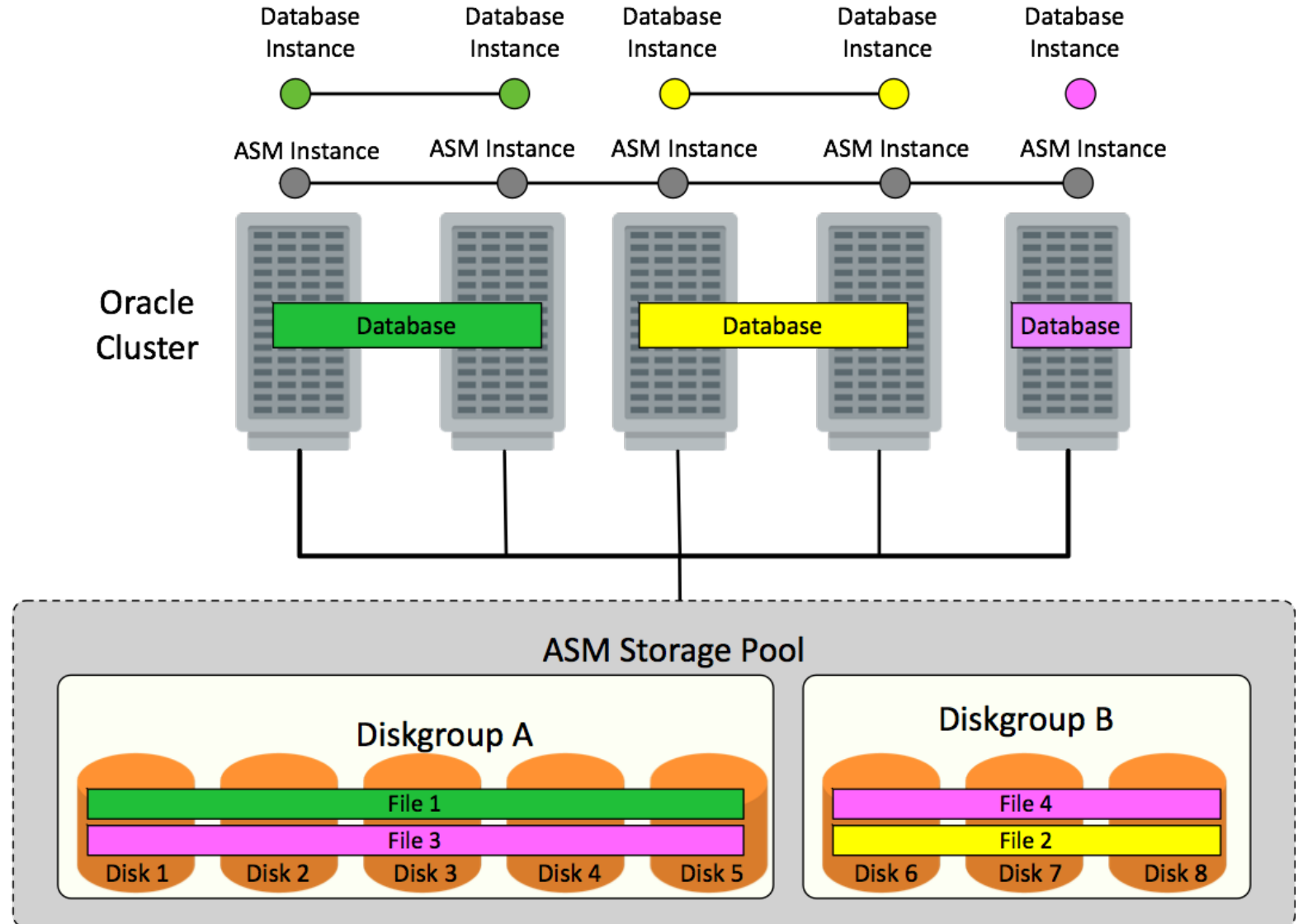
# ASM History 101

## Before Oracle 12c

1-1 ASM to Server

Shared Diskgroups

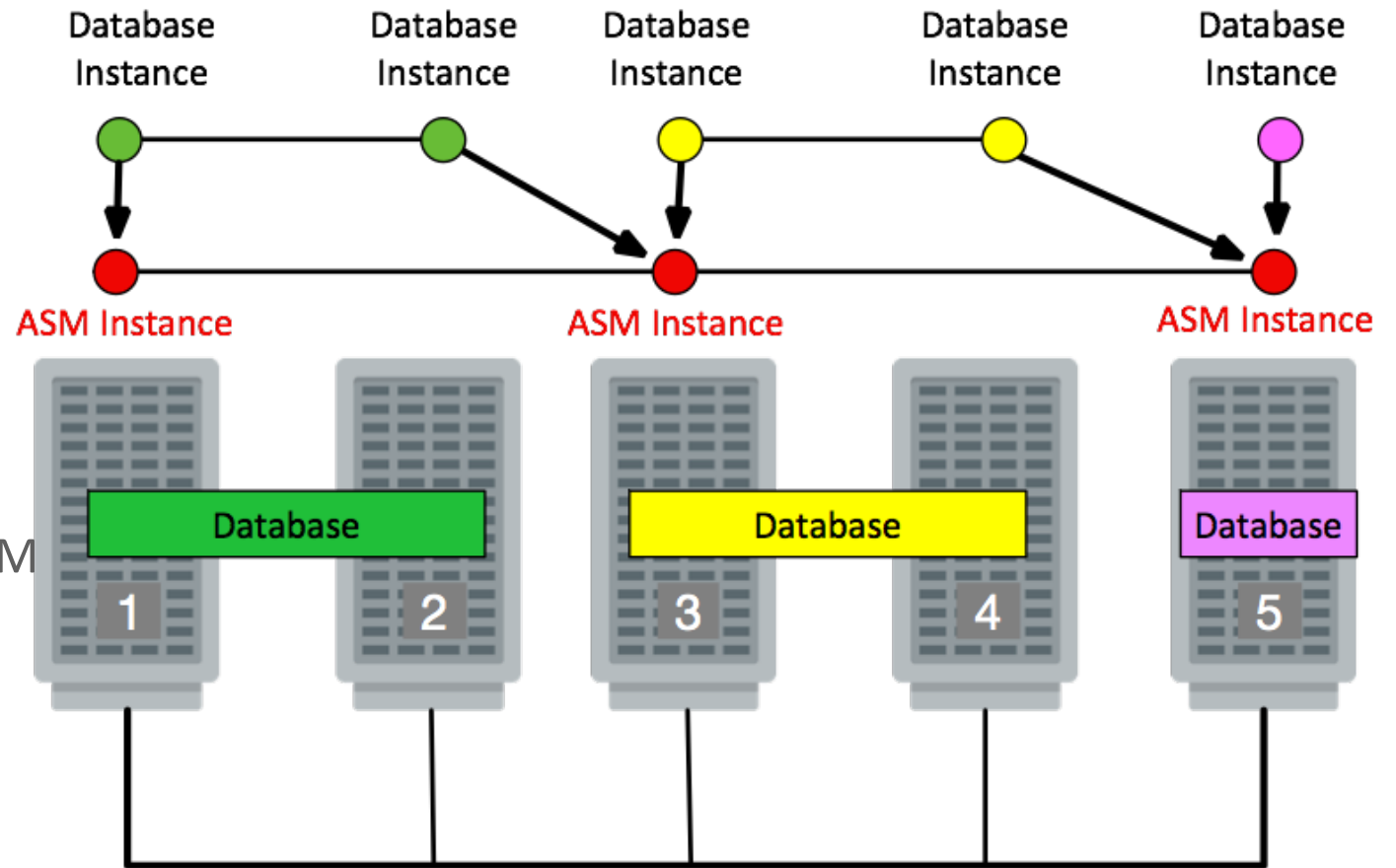
Wide File Striping



# Flex ASM

Oracle 12c Release 1

- Eliminates requirement for an ASM instance on every server
  - Database instances connects to any ASM instance in the cluster
  - Database instances can failover to a secondary ASM instance
  - Administrators specify the cardinality of ASM instances (default is 3)
  - Clusterware ensures ASM cardinality is maintained

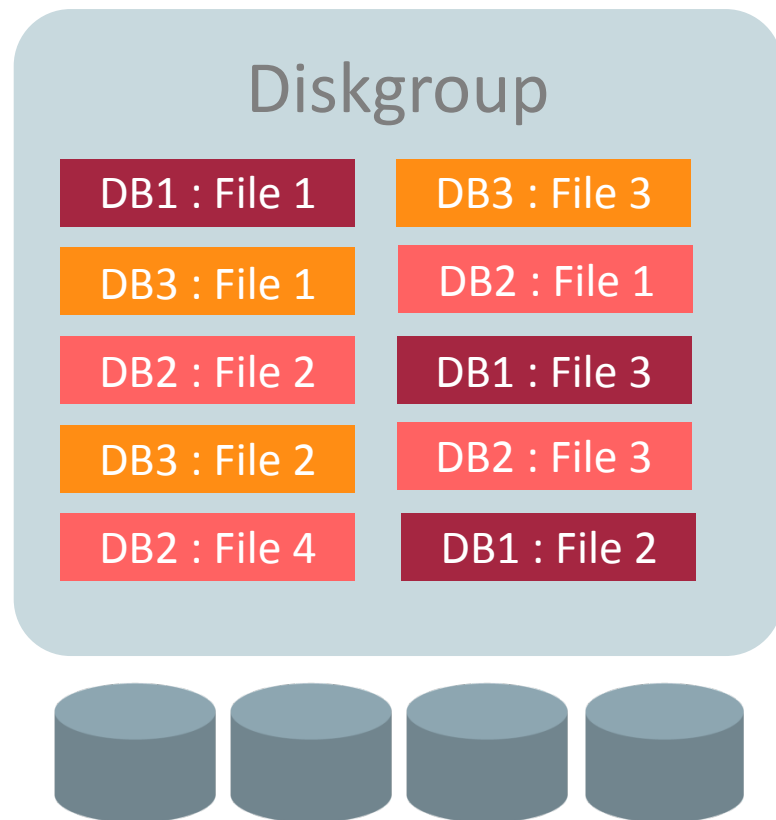


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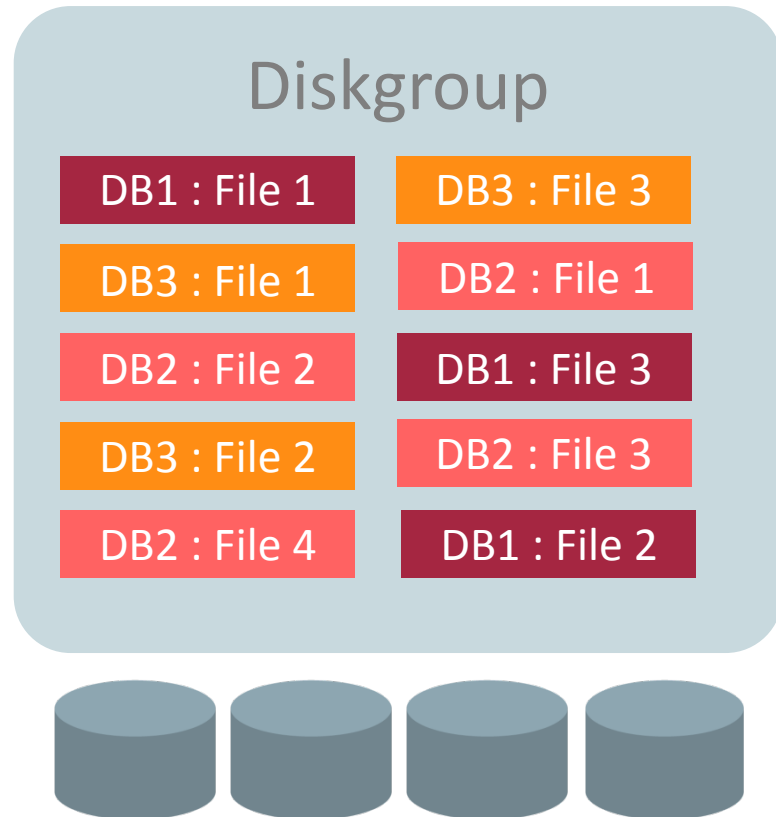
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## Pre-12.2 Diskgroup Organization



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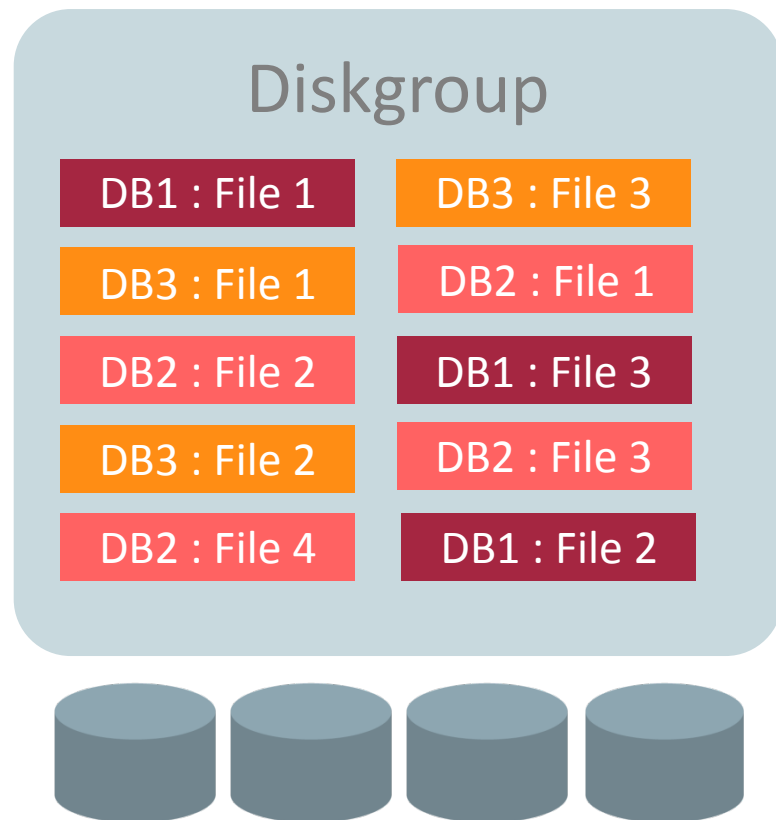
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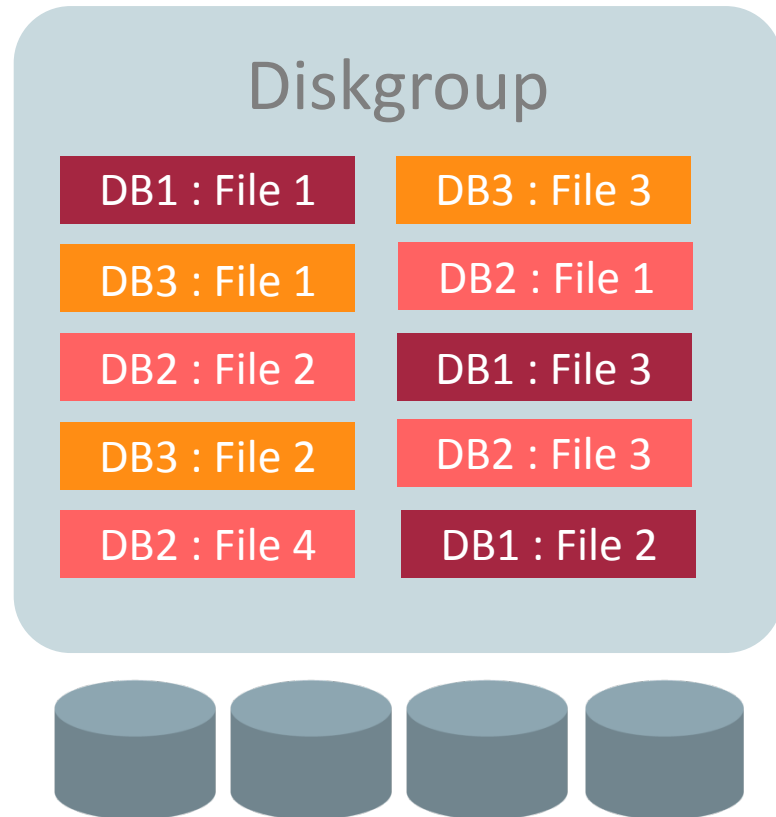
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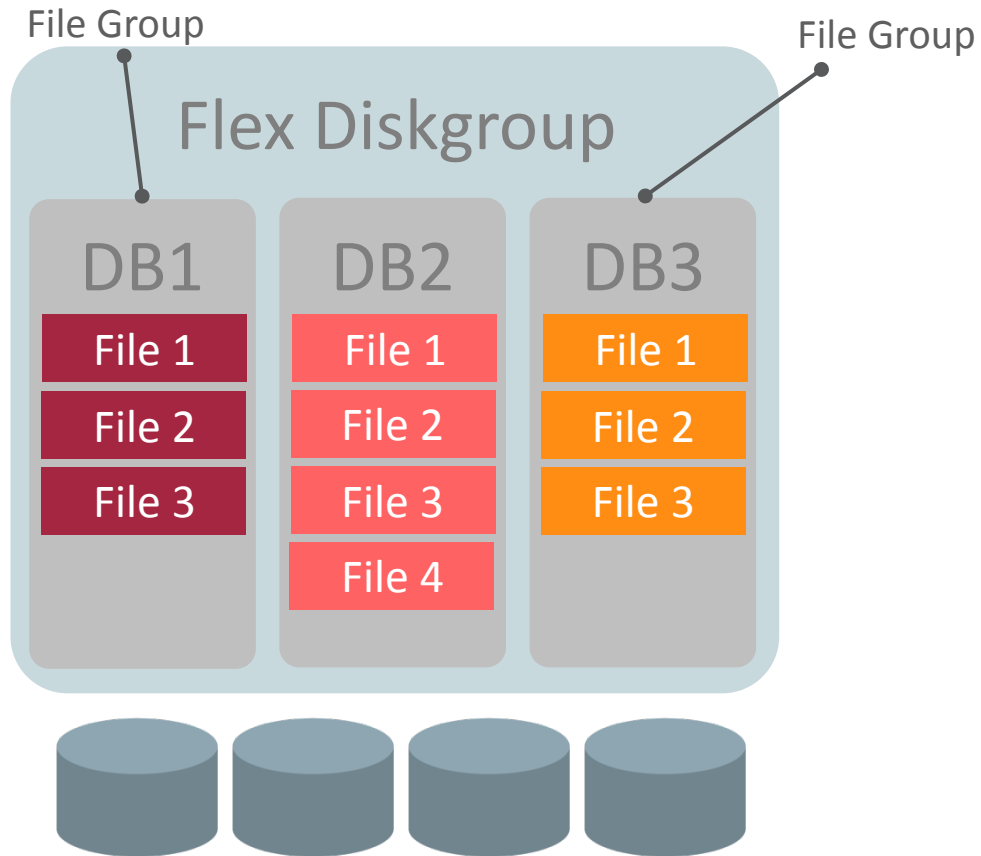
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- No distinction between individual databases
- Easy to manage, but made consolidation difficult

# Database-oriented Storage Management (12.2)

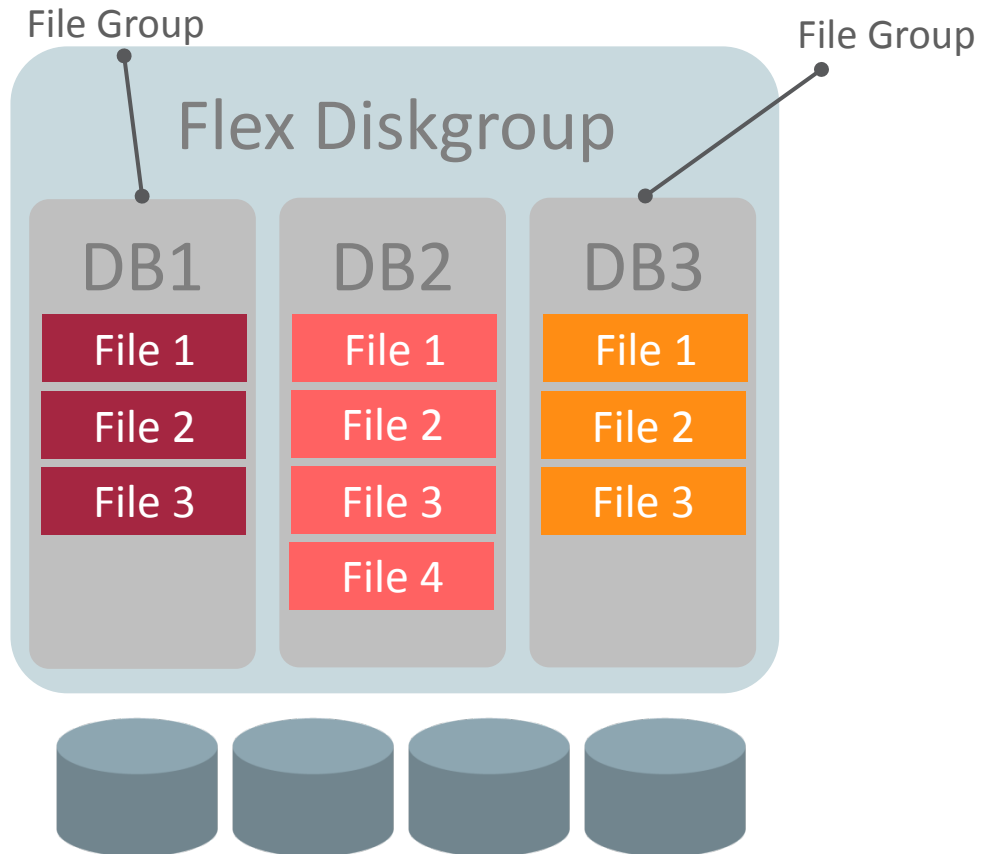
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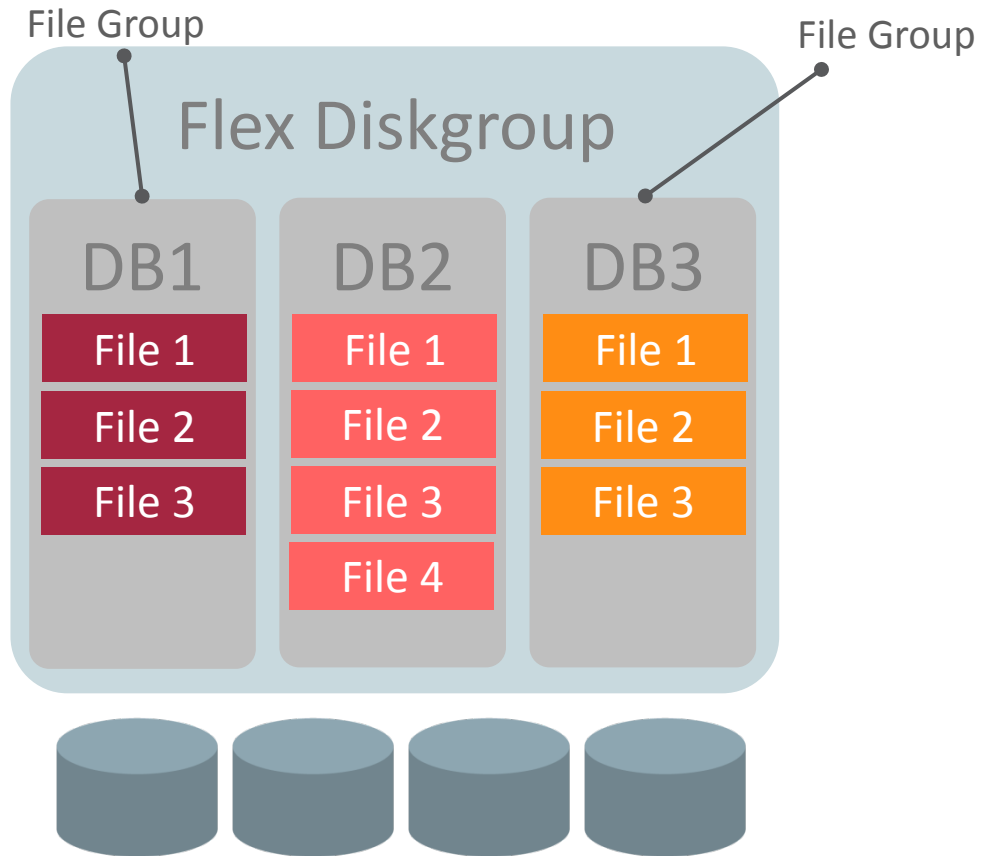
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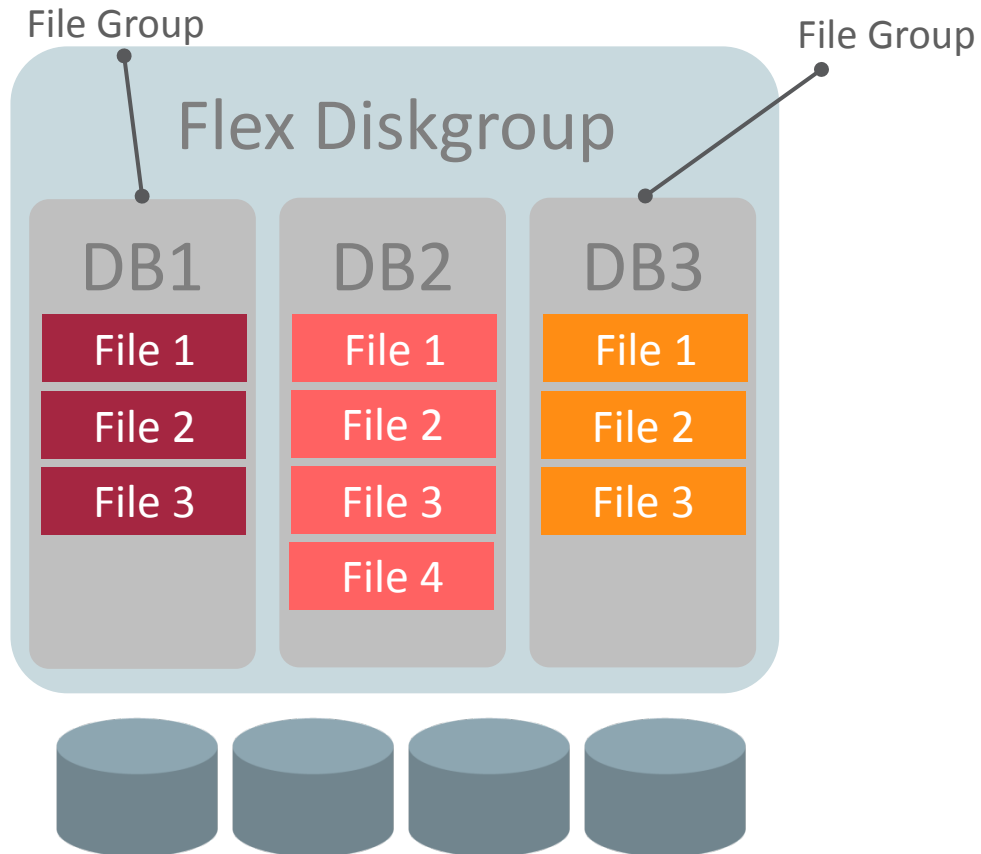
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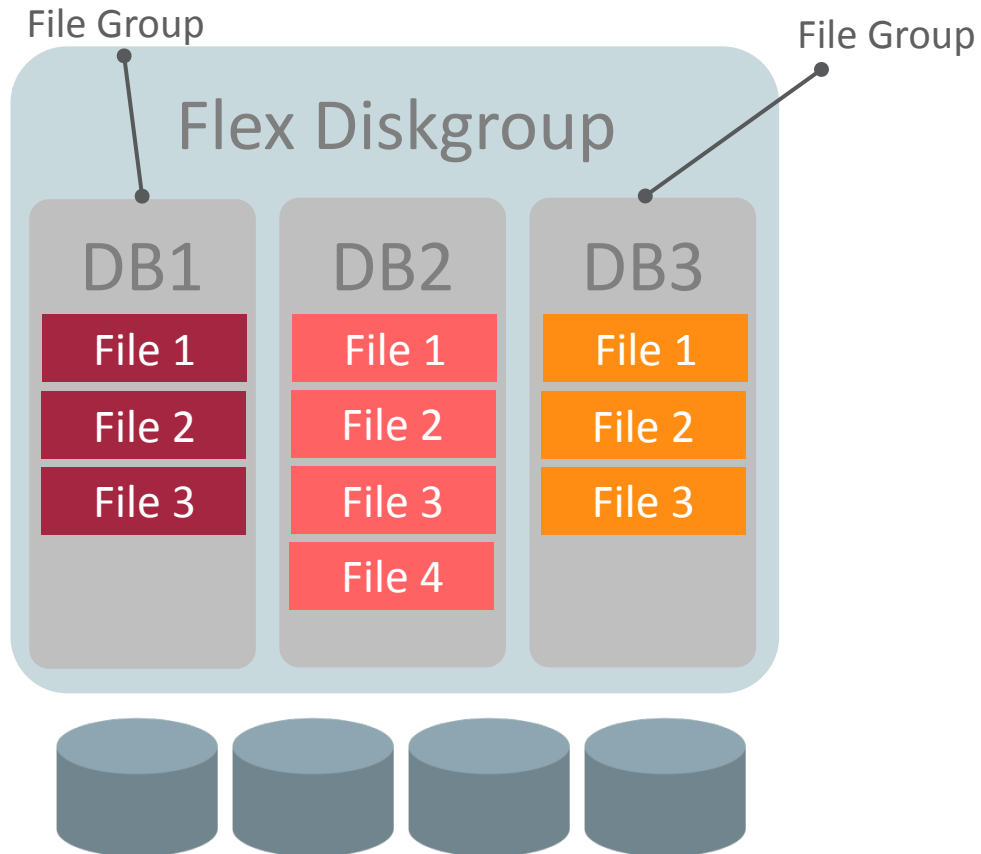
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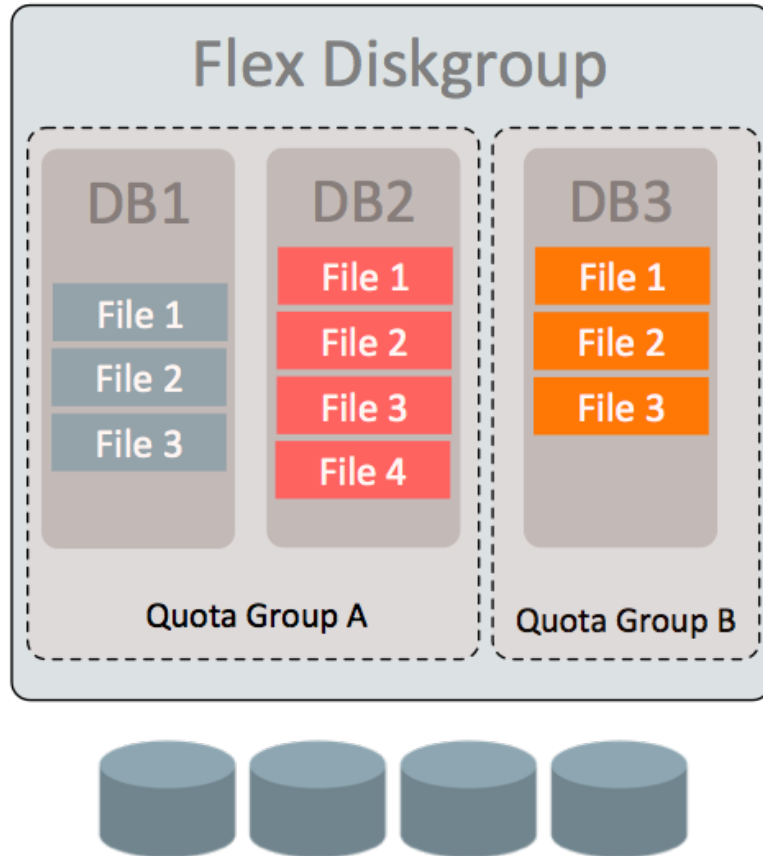
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- A File Group's name defaults to the database or PDB name

# ASM File Group Flexibility and Availability

- Flex Diskgroups enable

# ASM File Group Flexibility and Availability

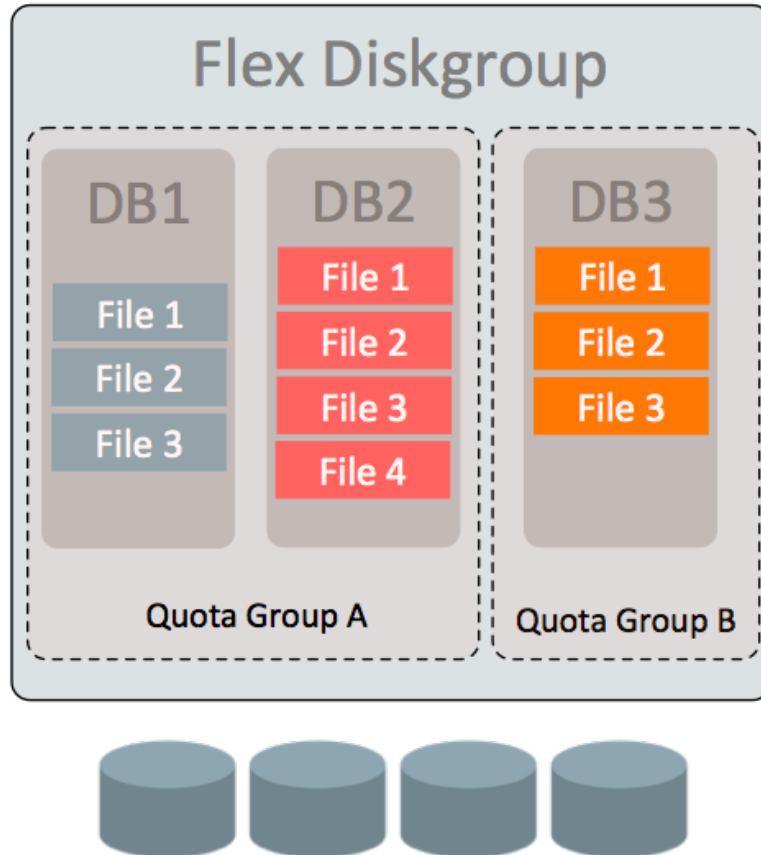
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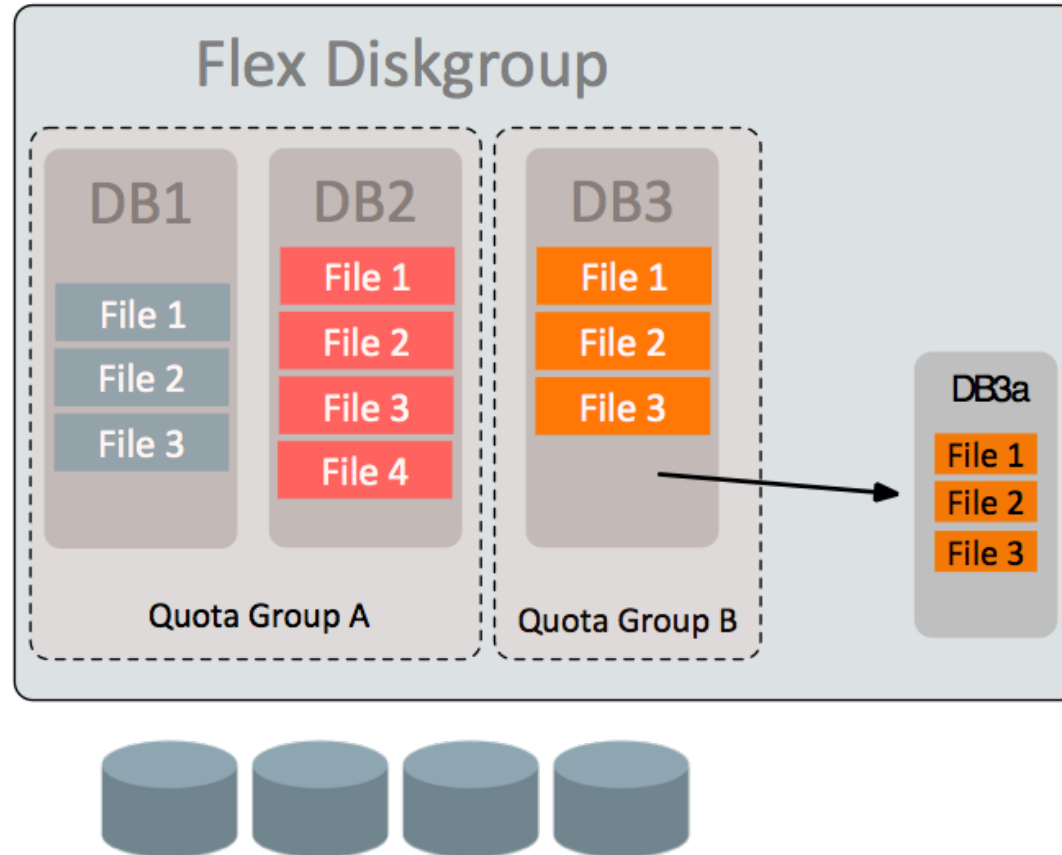
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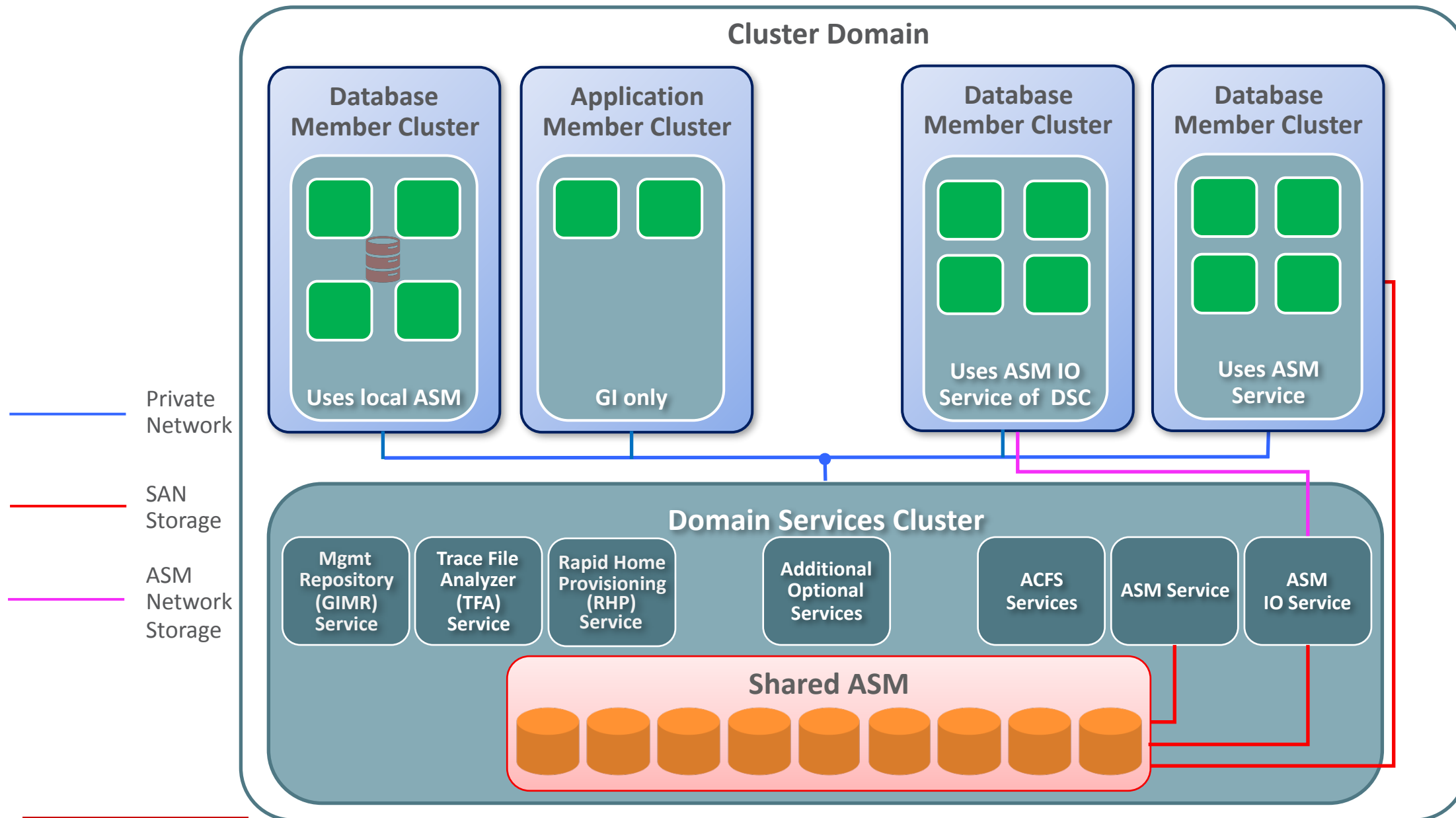
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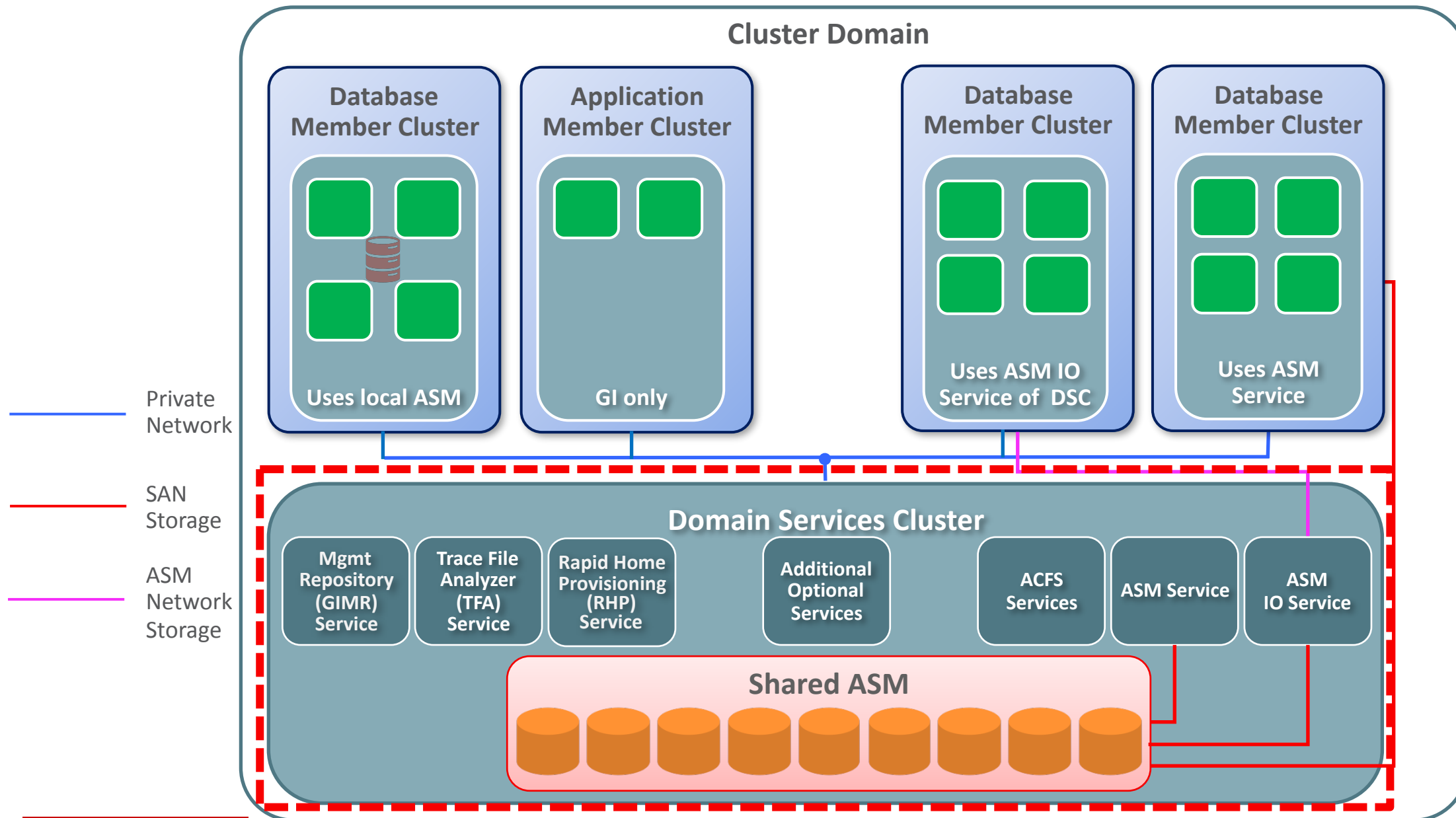
## Flex Diskgroup Database Clone

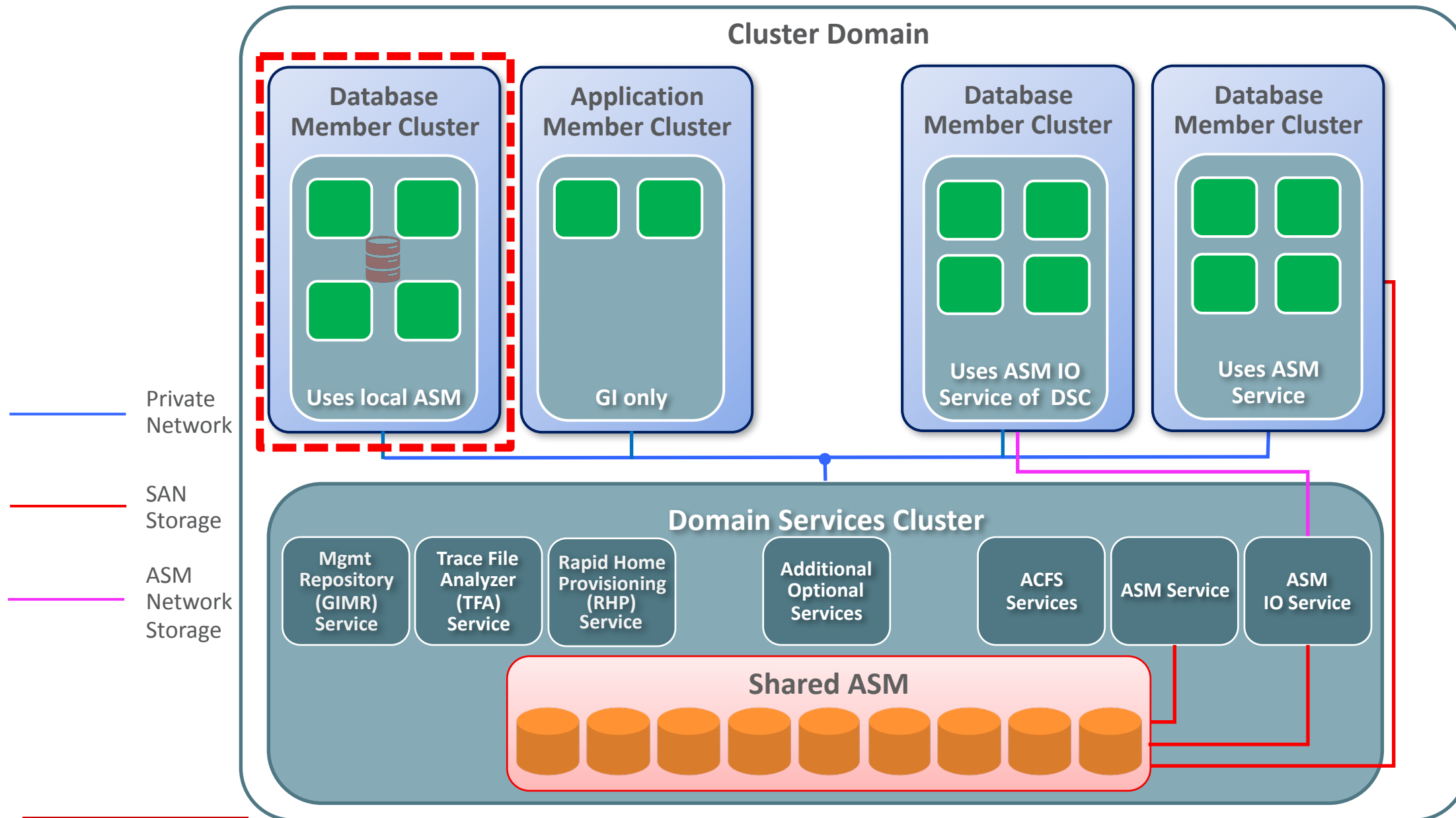


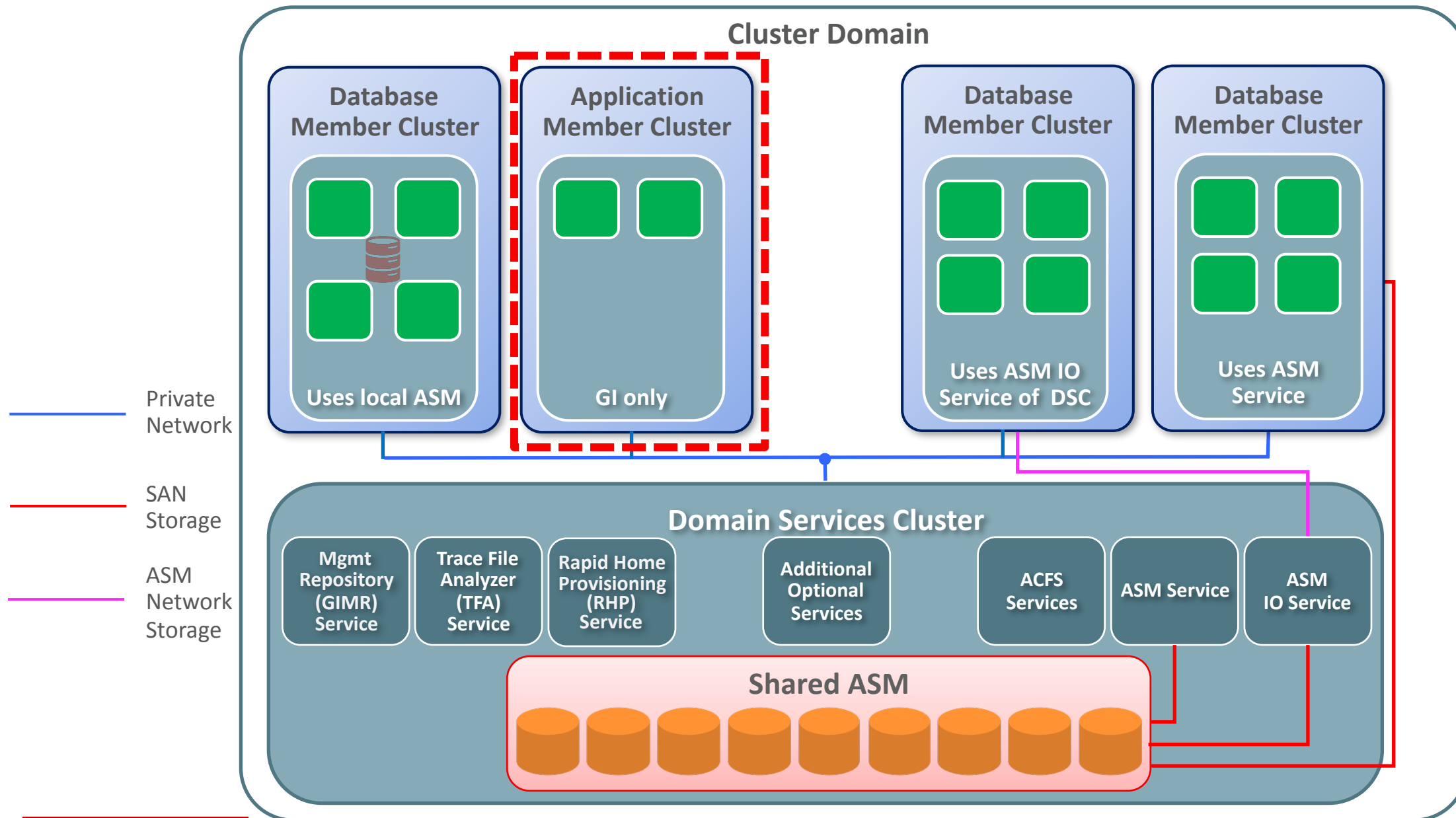
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  - **ASM Database Clones** to easily and dynamically create database clones for test/dev or production databases

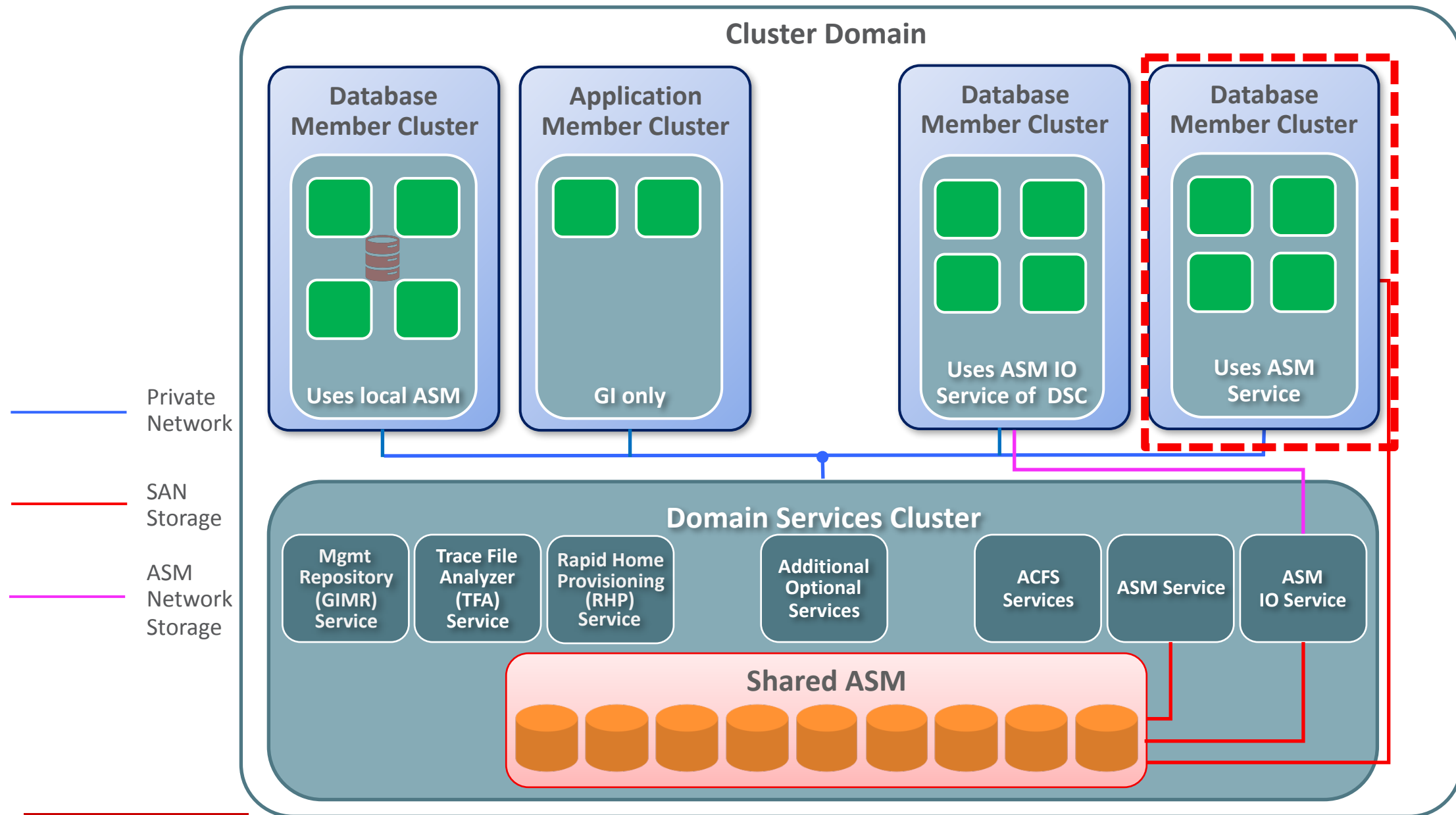


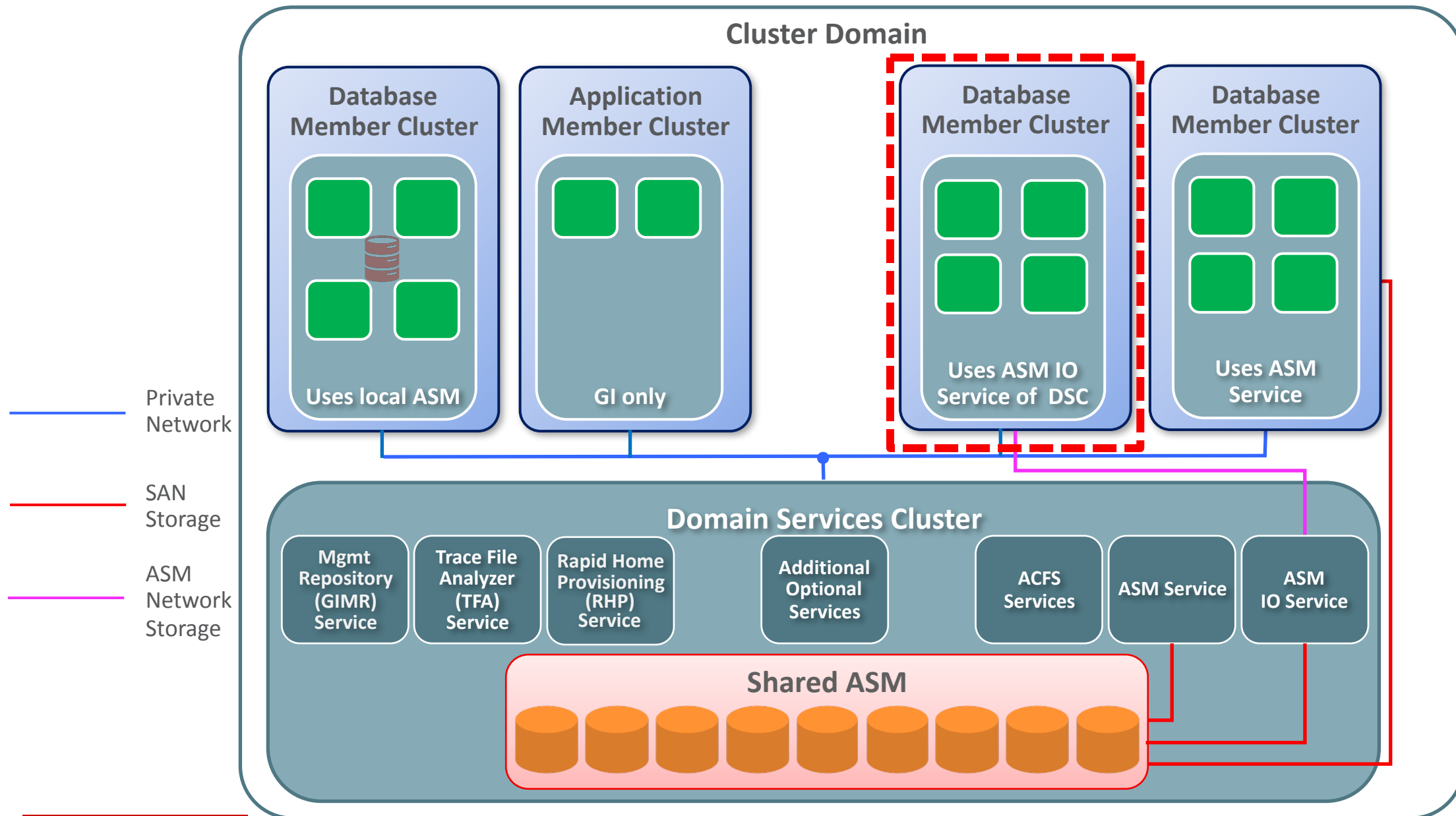








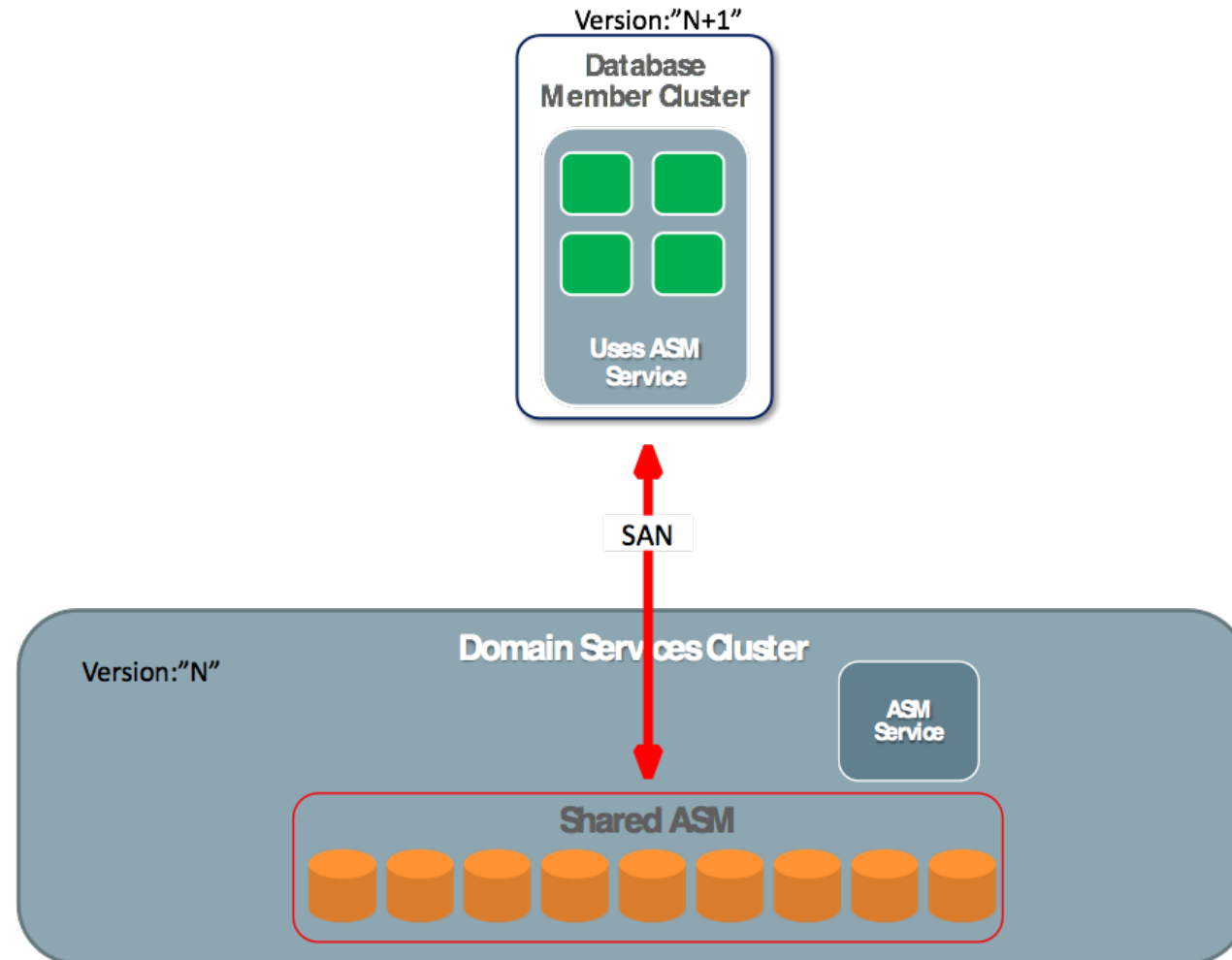




# Storage Services – Cross Cluster Access

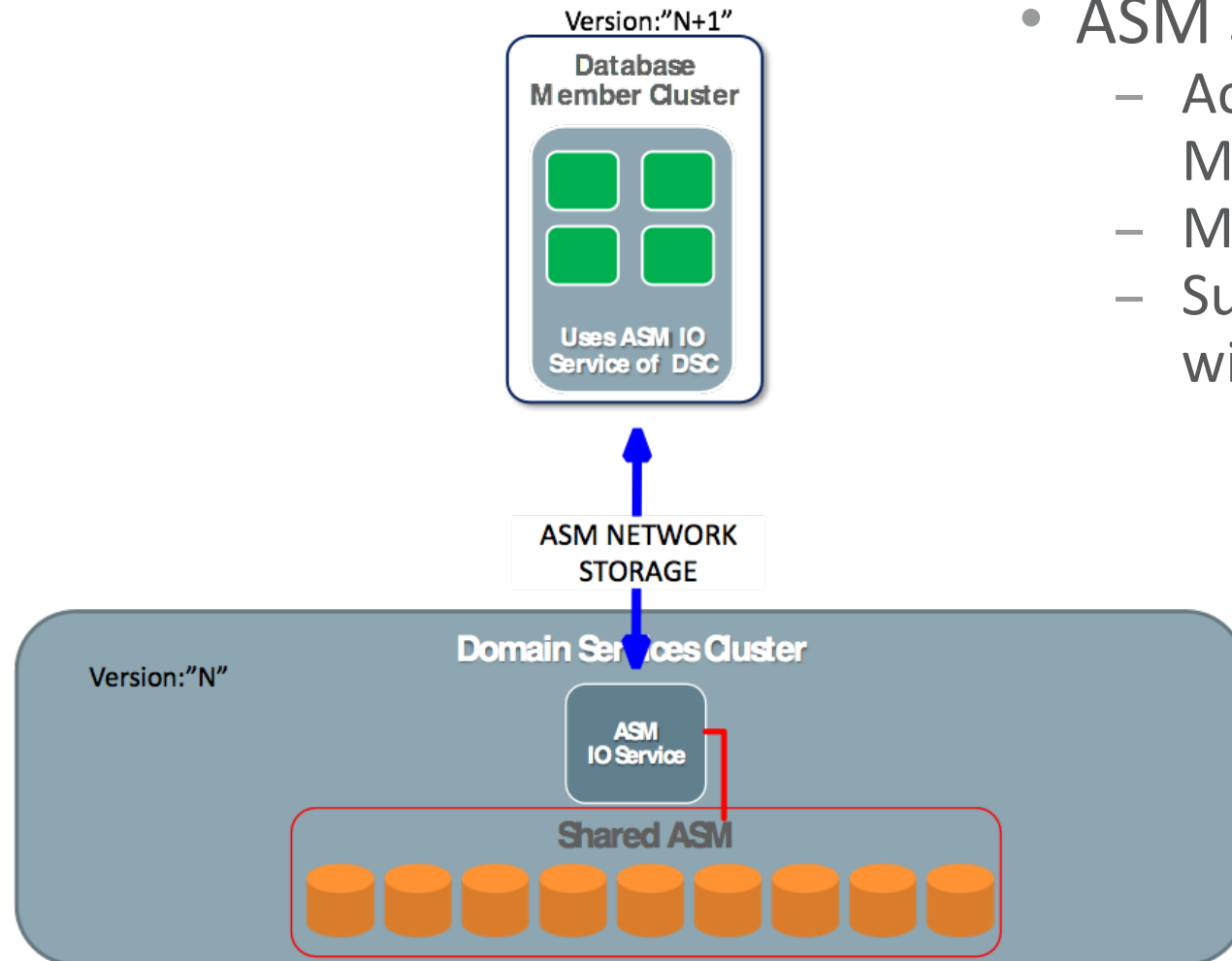
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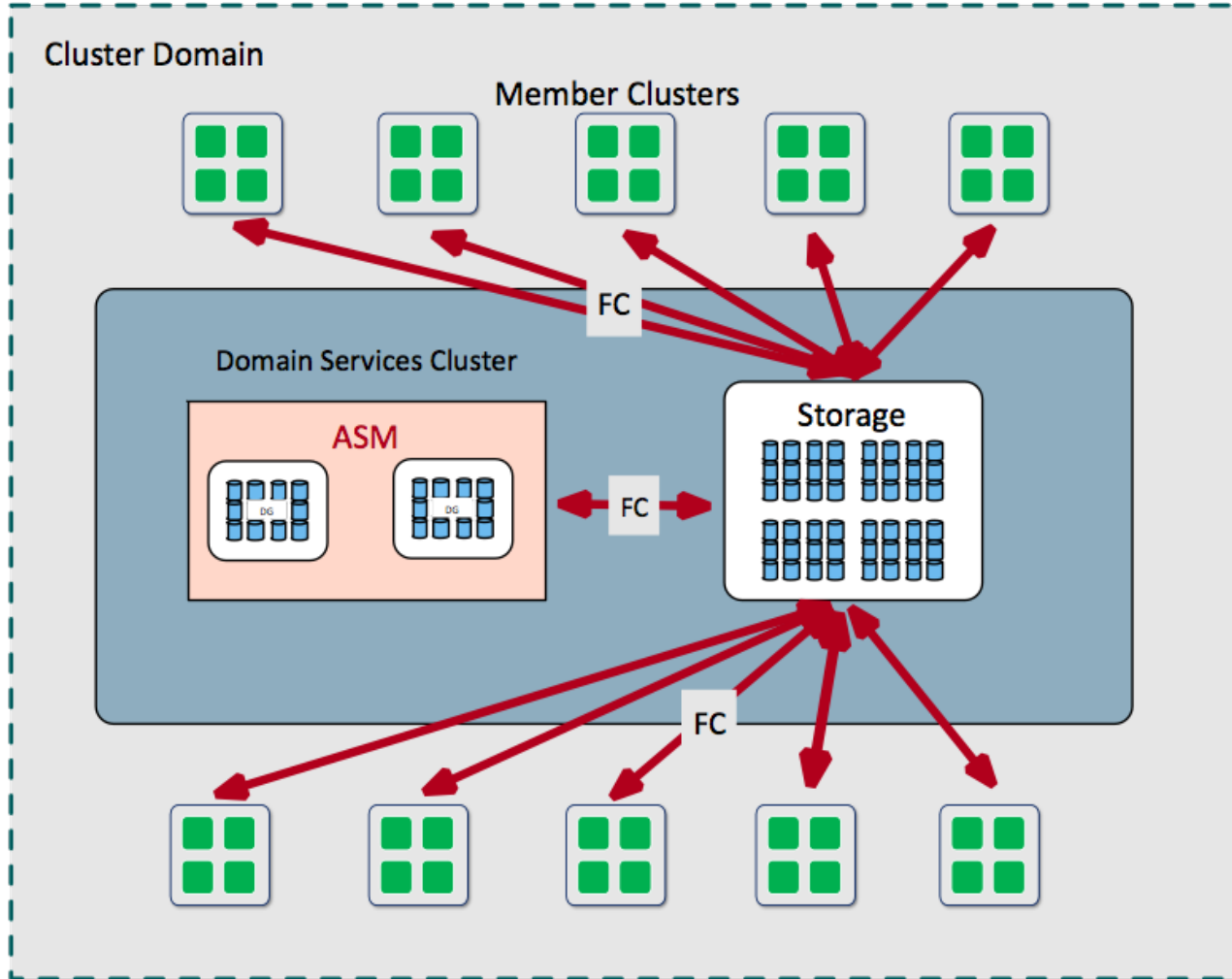


# Storage Services – Cross Cluster Access



- ASM Storage Services
  - Access ASM Diskgroups from different Member Clusters
  - Multi-versioning support
  - Support for SAN or ASM network access with ASM IO Service

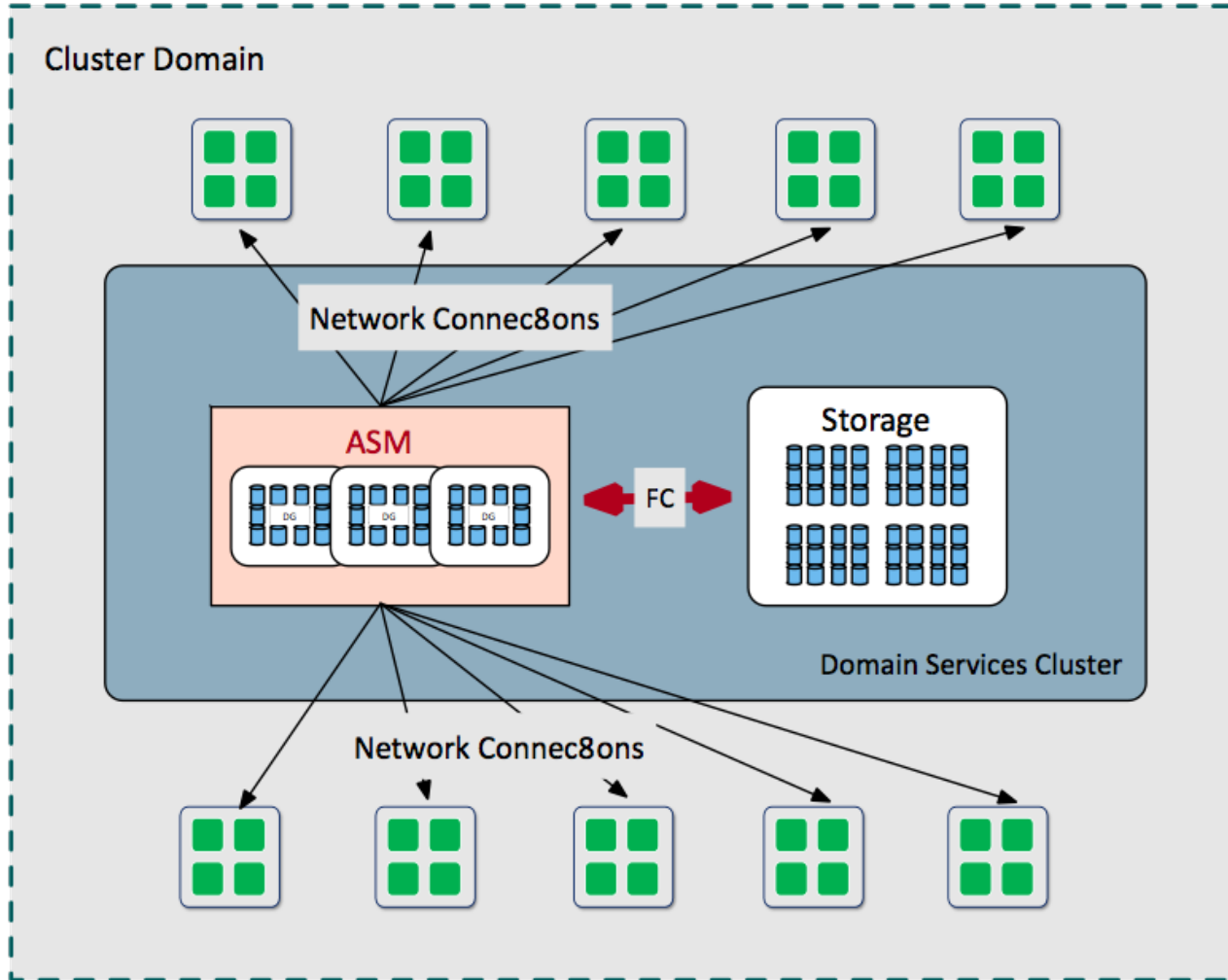
# DSC Configuration using SAN (FC) Connection



## Connectivity Requirements

- Storage to Domain Cluster
  - 75 LUN definitions
  - 2 Fibre Channel paths
  - 150 disk I/F definitions
- Storage to Member Clusters
  - 150 LUN definitions/MC
  - >20 Fibre Channel paths
  - 1500 disk I/F definitions/MC
  - >3000 total disk I/F definitions

# Advantages of DSC Configuration with ASM IO Service



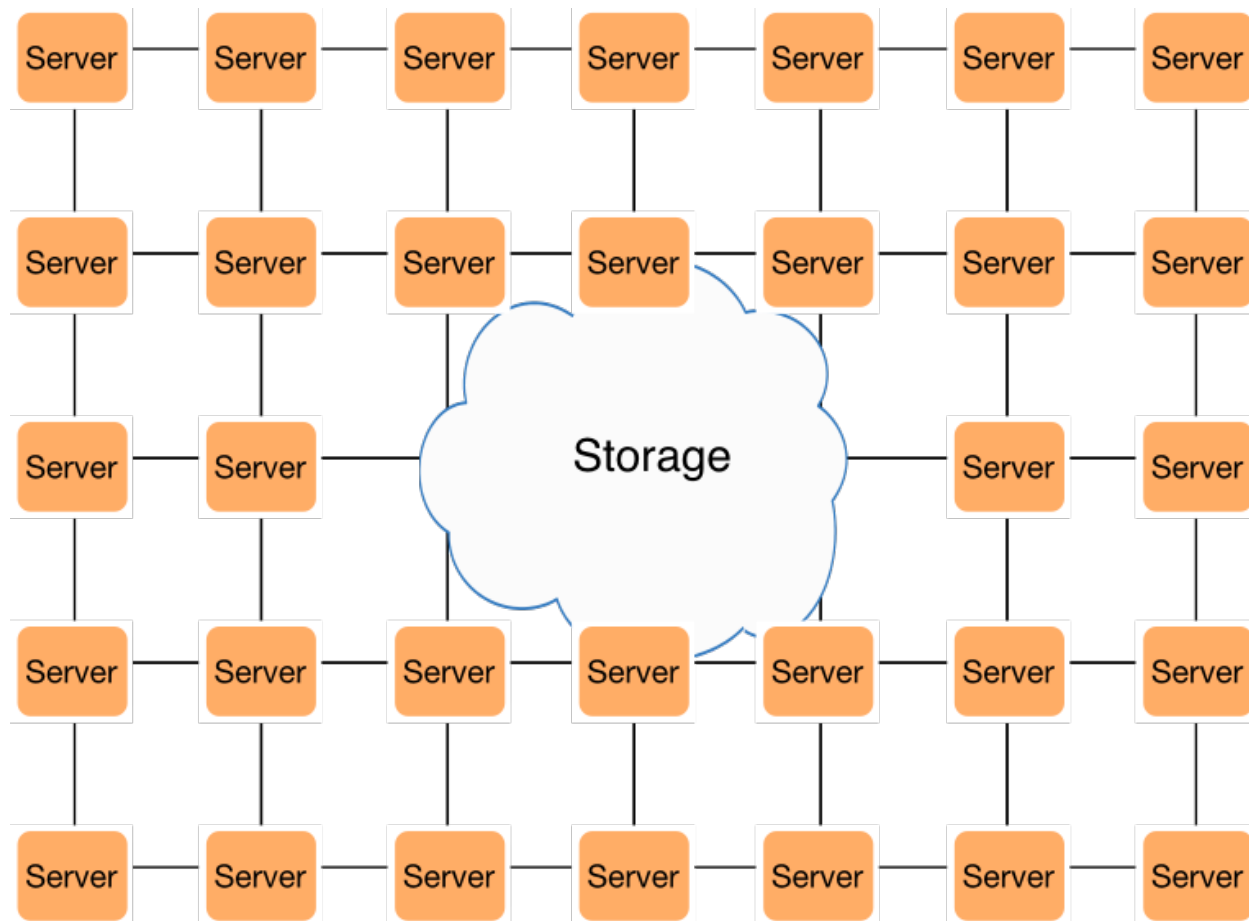
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- DSC to Member Clusters
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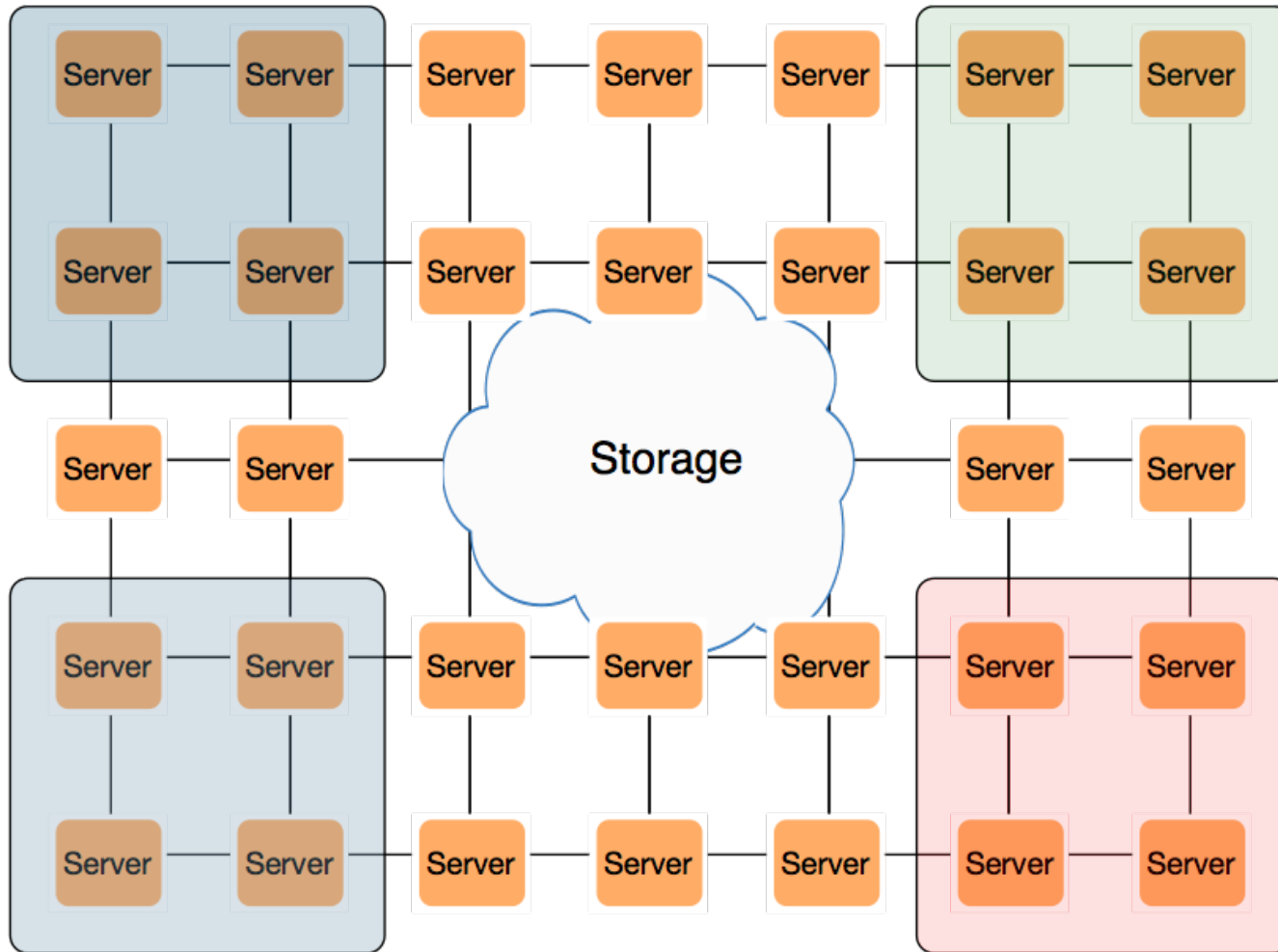
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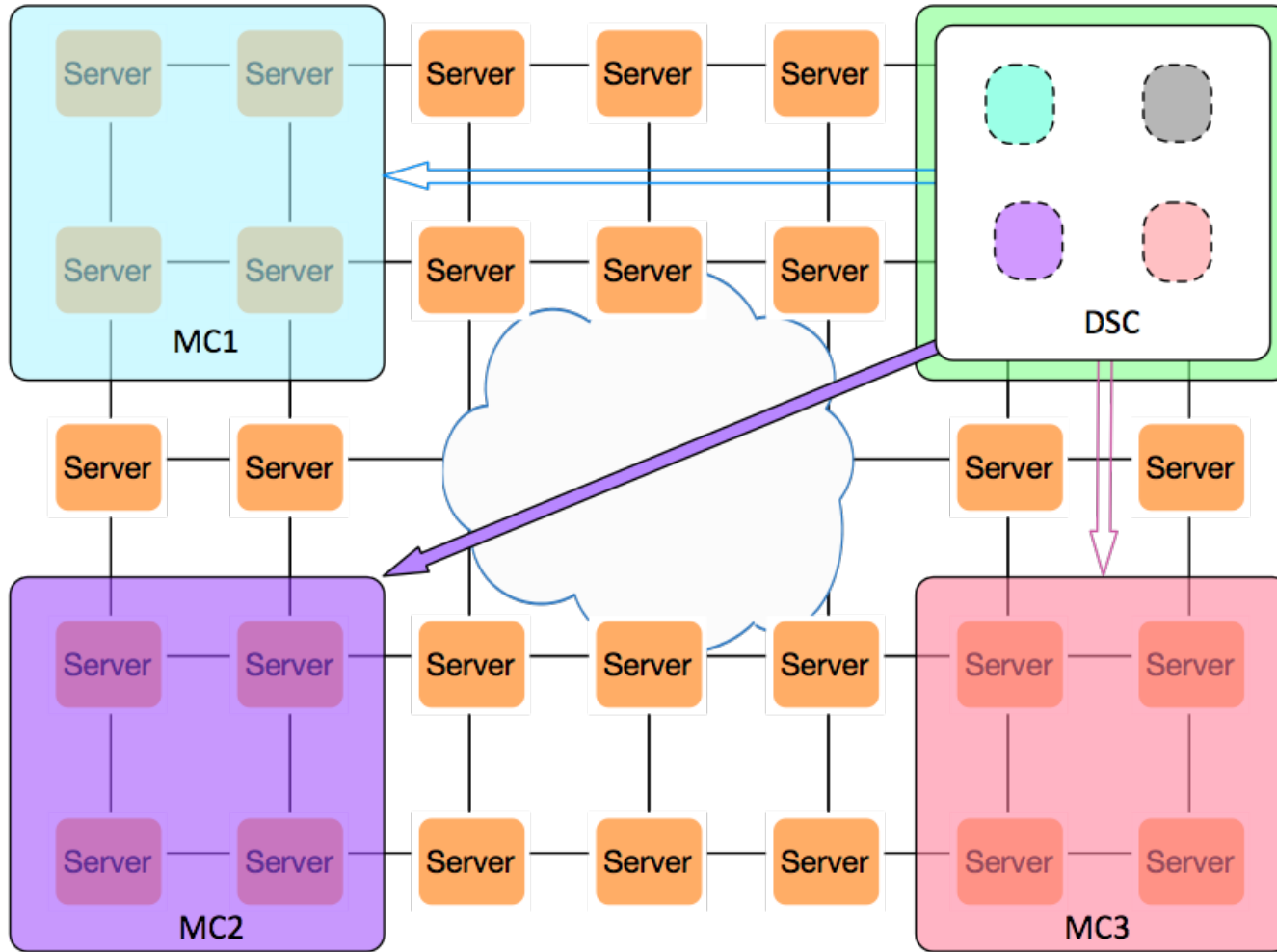


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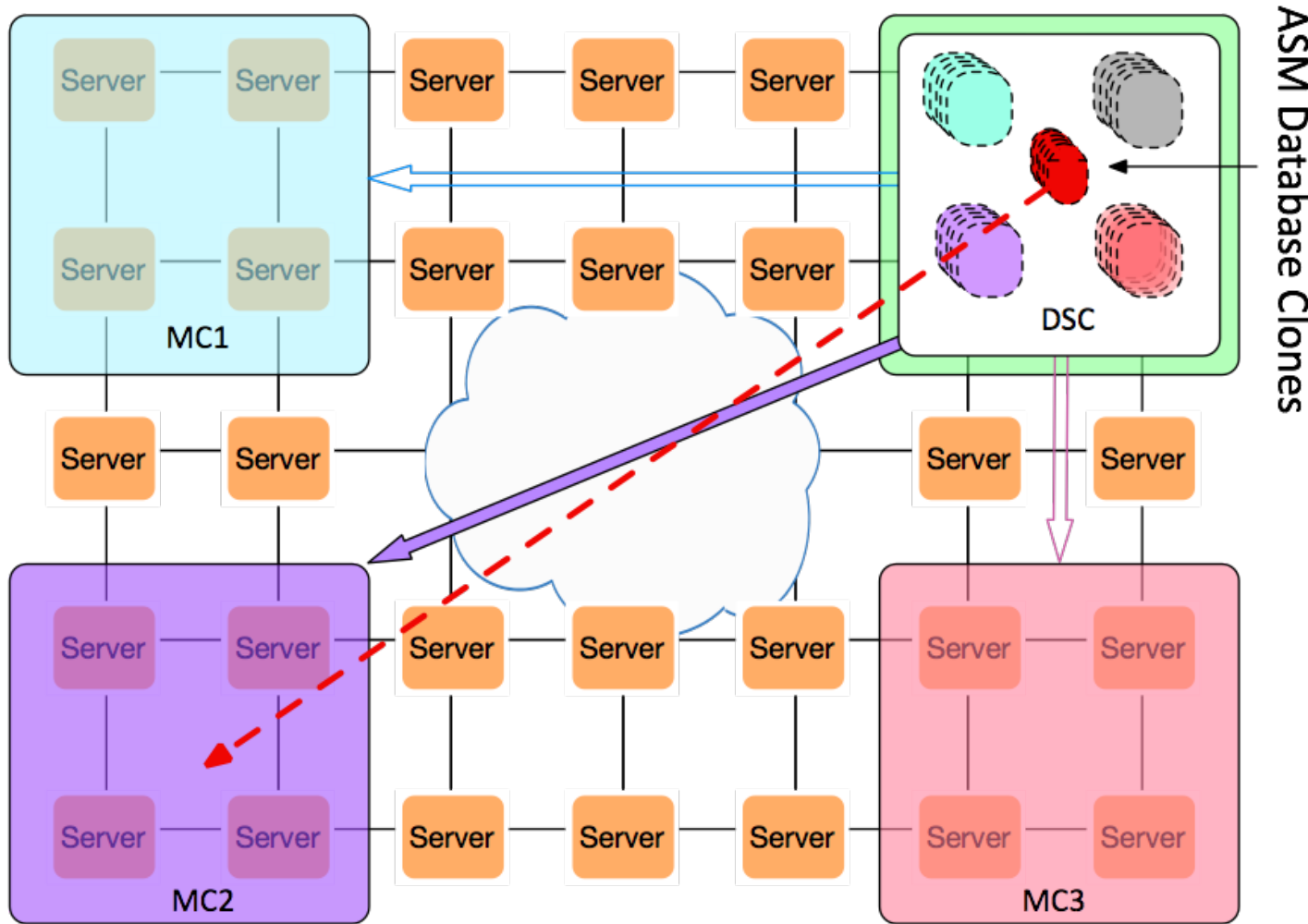
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- Cross-cluster data access including database clones
- Integrates with Oracle Rapid Home Provisioning



# Oracle RAC on Extended Clusters

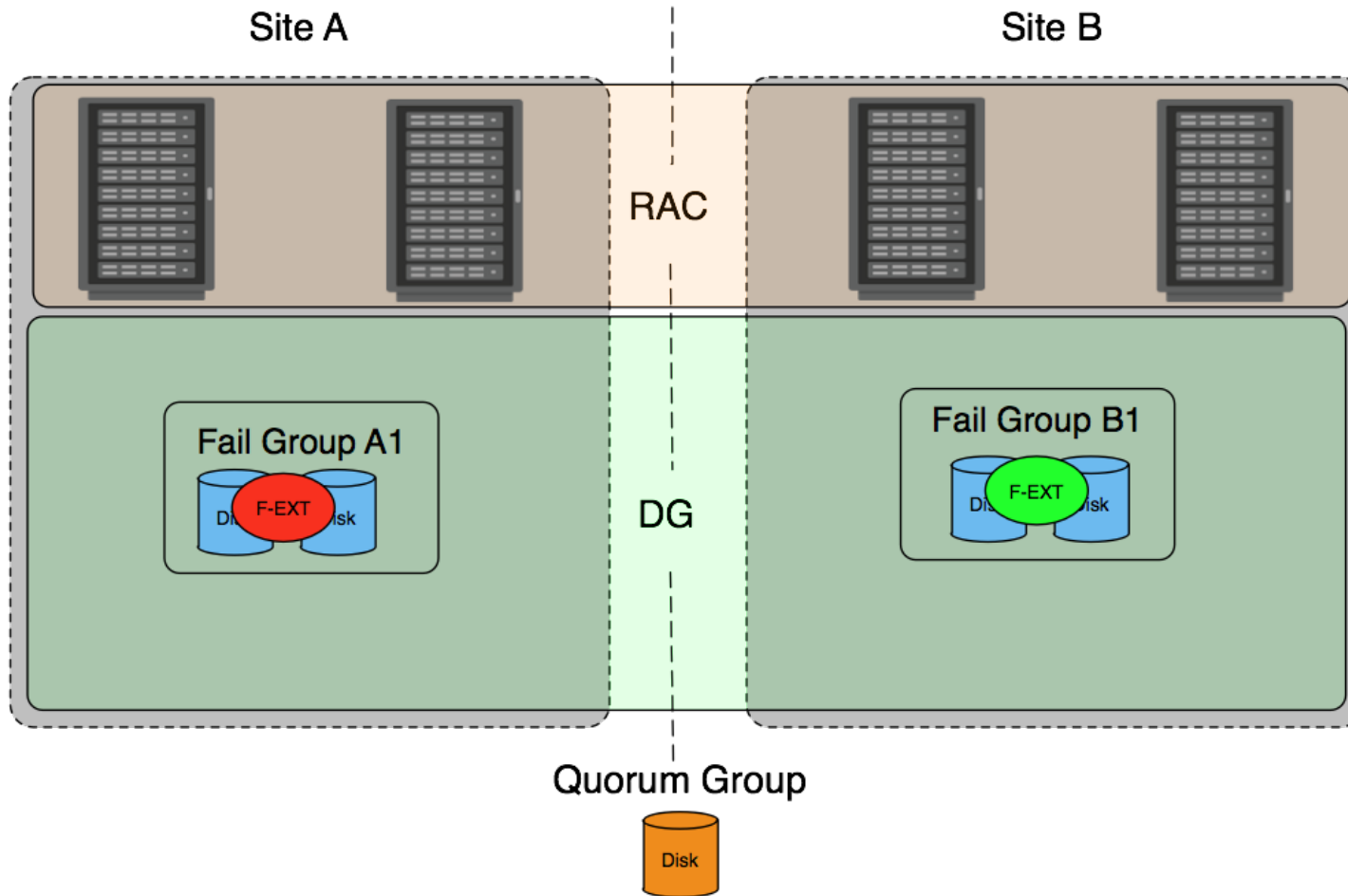
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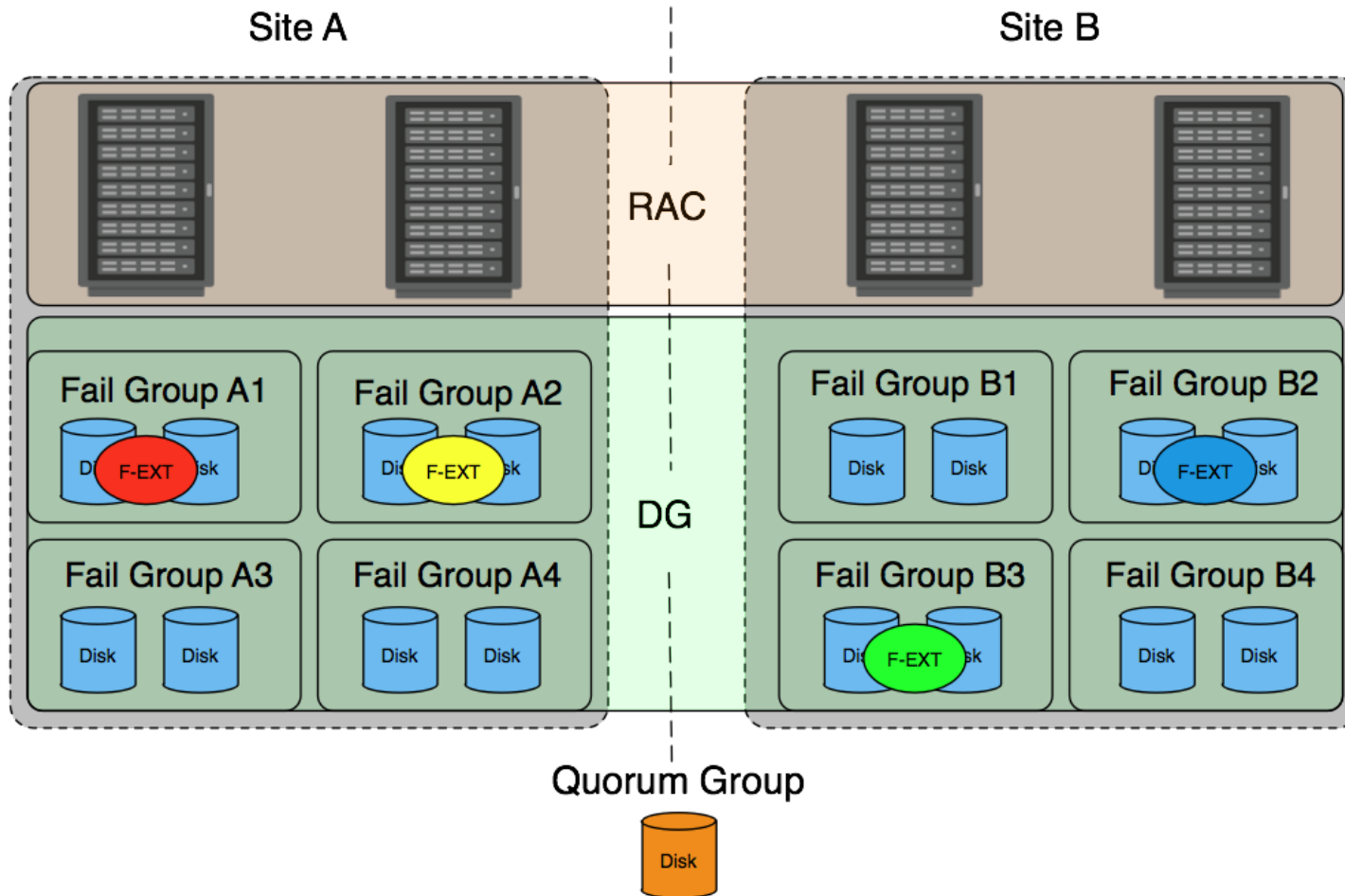
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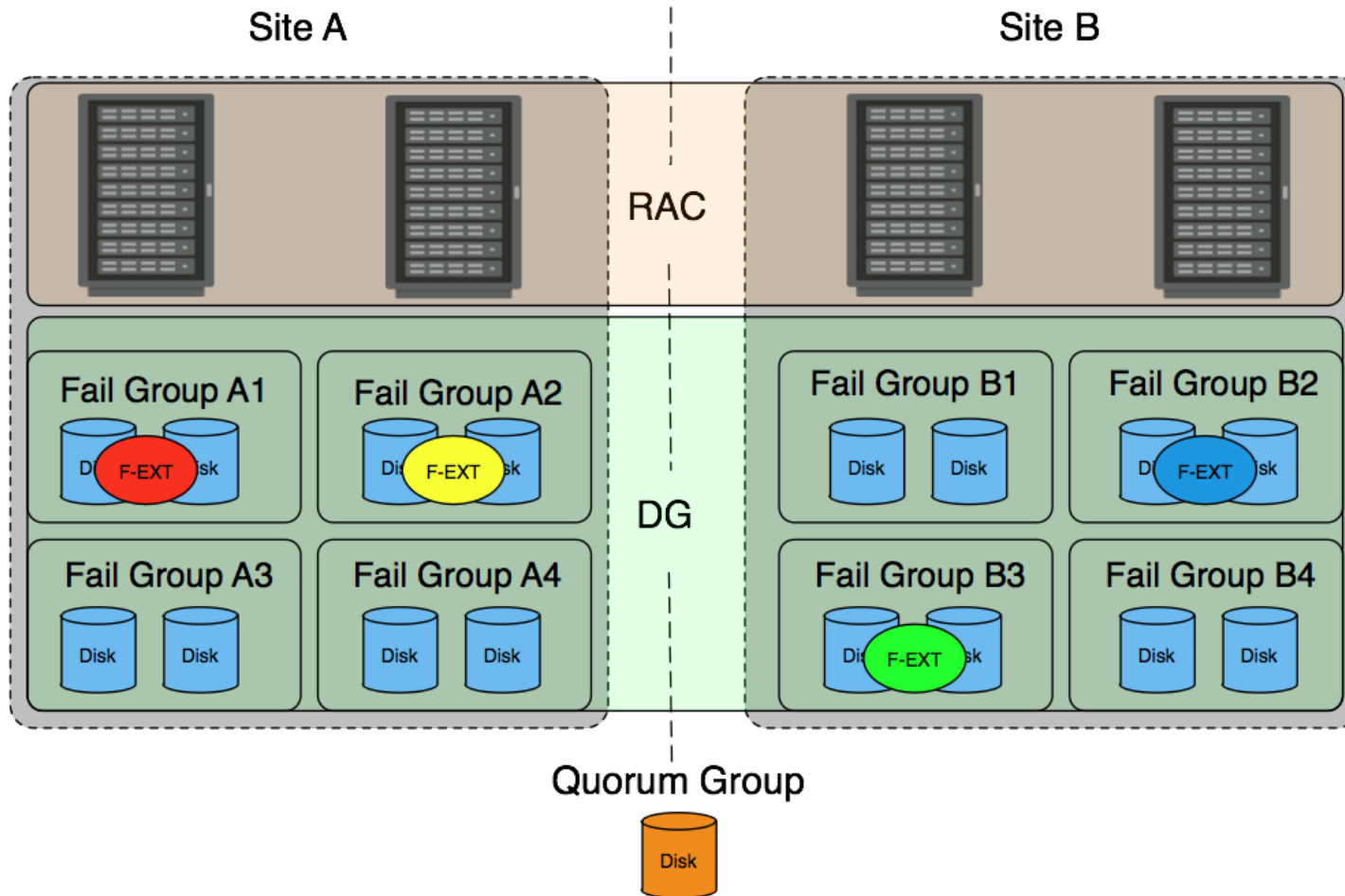
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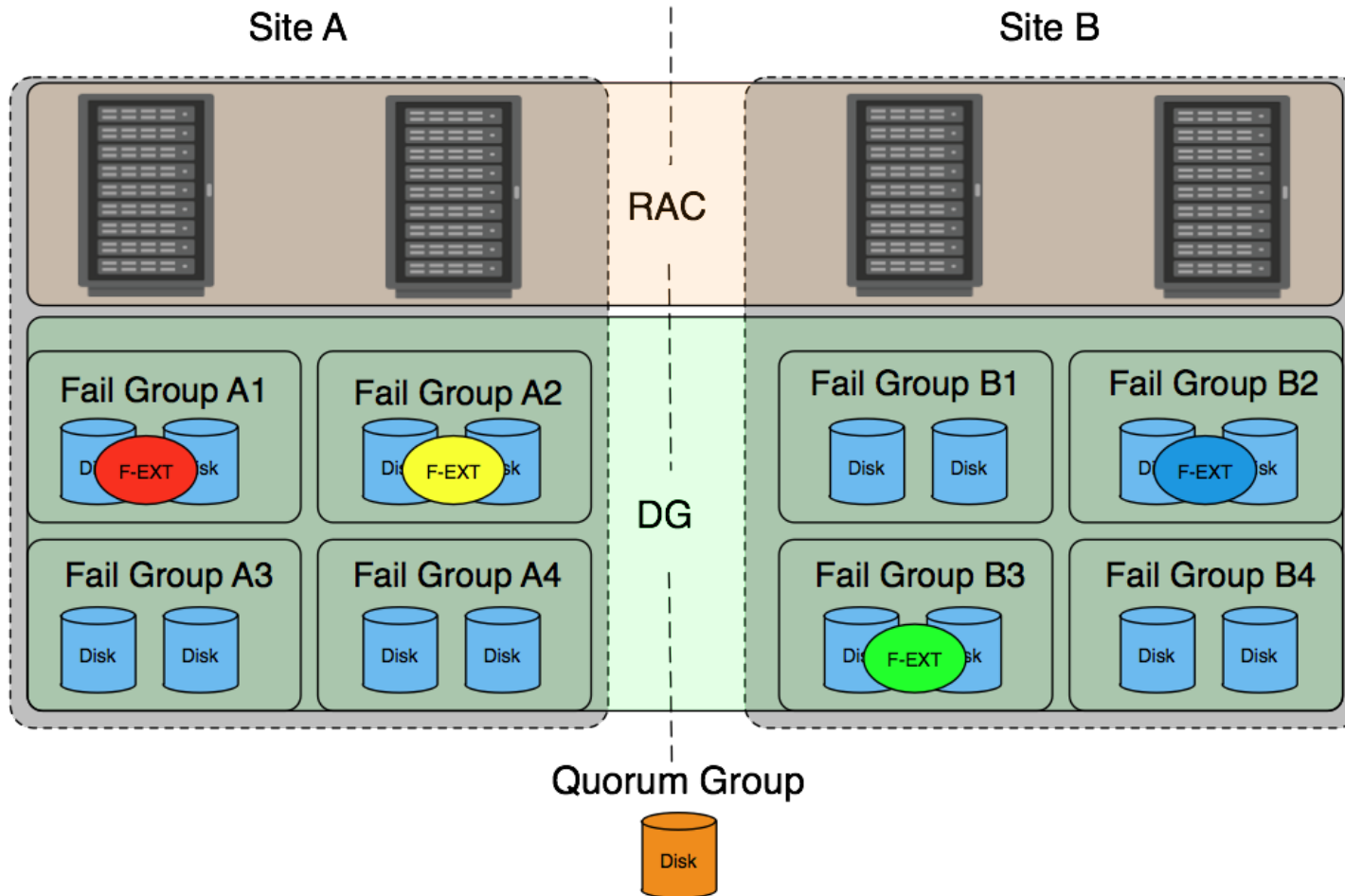
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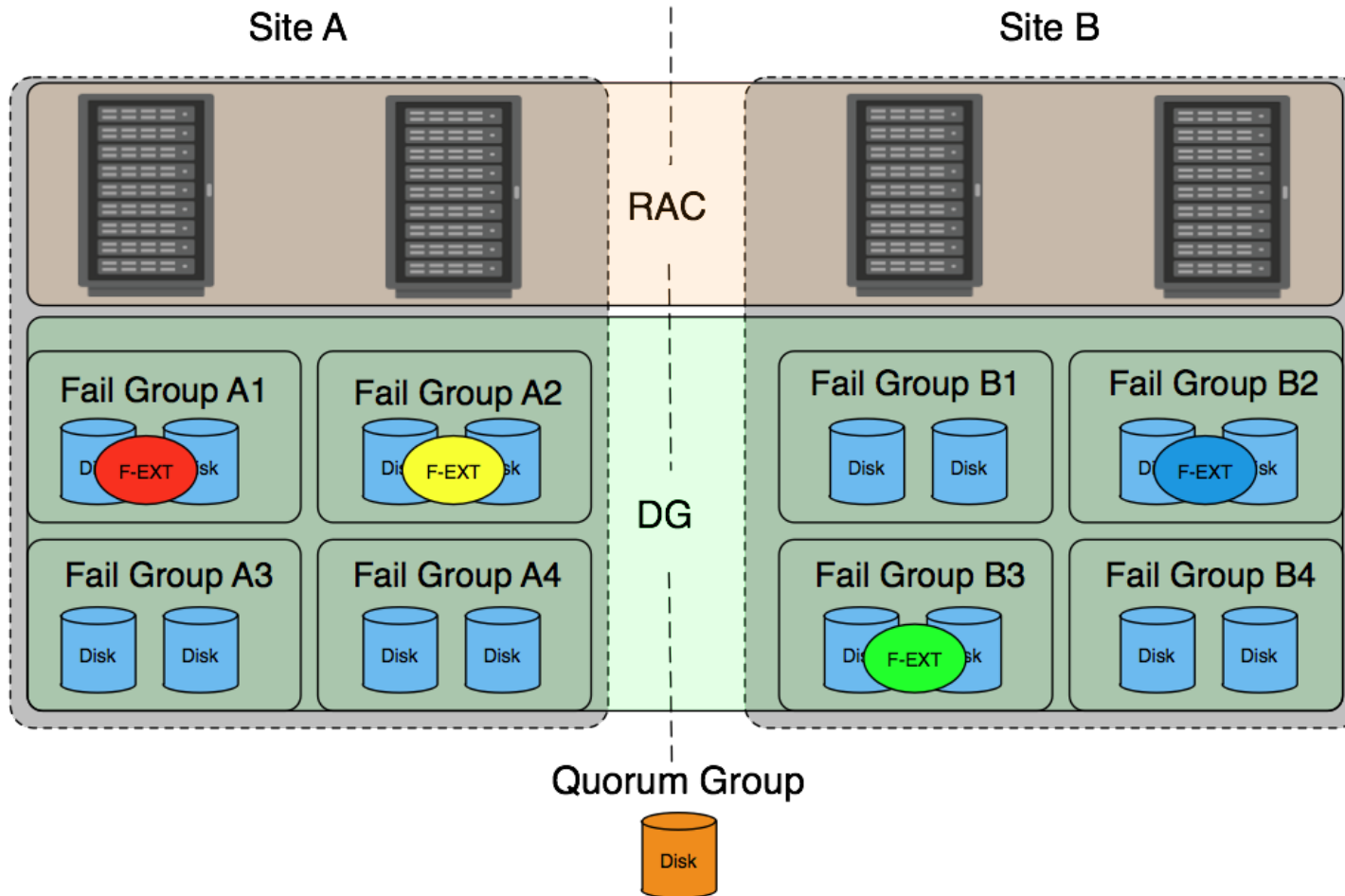


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  - Flex Diskgroups
- Supported by Oracle installer

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- T10 end to end Data Integrity
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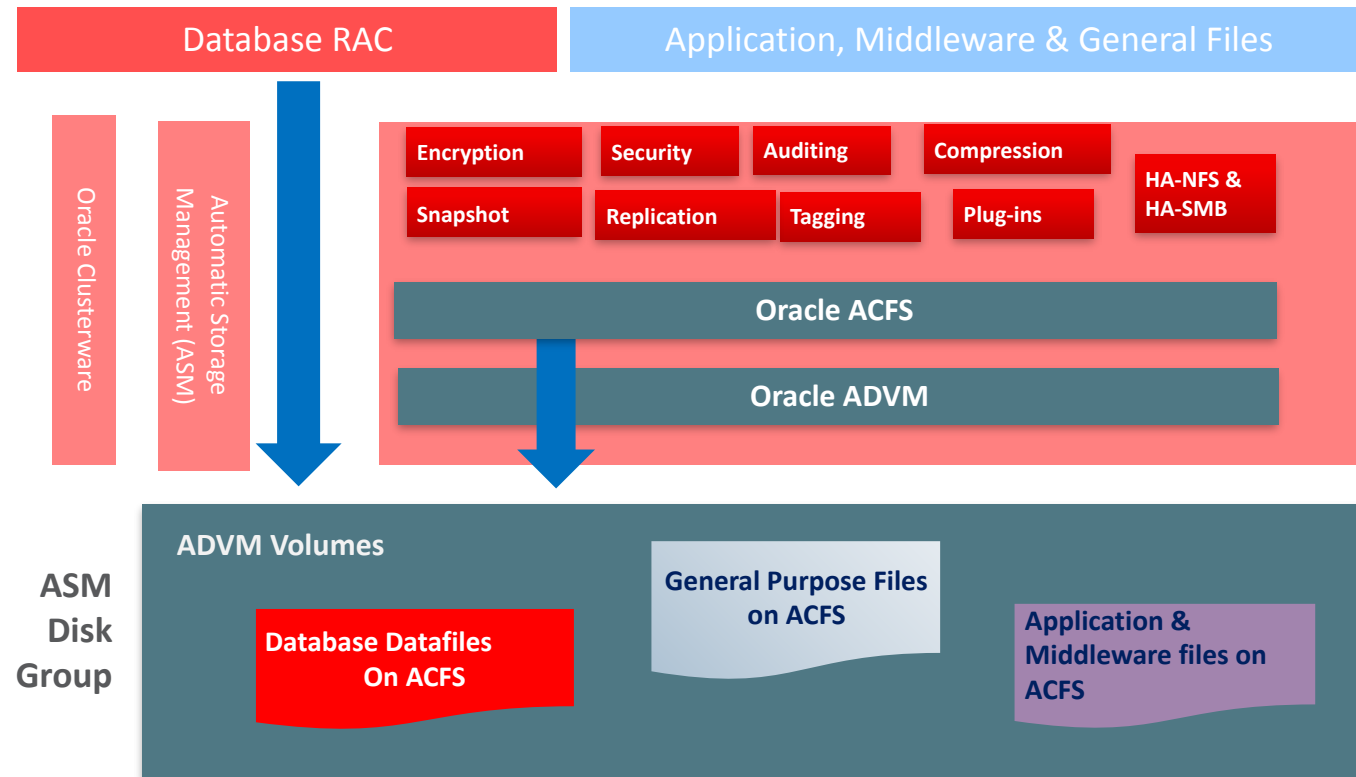
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- ASMFD is Oracle's platform for future advanced storage feature integration

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# ACFS - A Complete Oracle Storage Solution



- Industry standard POSIX & Windows Compliant Cluster File System
- Supports database and general purpose files
- Seamless integration with ASM and Oracle Clusterware
- Thousands of customers

# New ACFS Features in Oracle 12c Release 2



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NEW IN  
12.2

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HA-SMB NAS  
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- Oracle 12c Release 2 introduces Database-oriented Storage Management for greater management efficiency, data reliability and mobility.

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- Deploying small databases using local or 3<sup>rd</sup> party file systems
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- **ASM is Oracle's strategic platform for managing all data**

ORACLE®