



STORAGE DEVELOPER CONFERENCE

SNIA ■ SANTA CLARA, 2015

# **Enterprise-Grade Array-Based Replication and Disaster Recovery with SMI-S, Windows Server, System Center and Azure Site Recovery**

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# Session objectives

- ❑ Understand Microsoft Azure Site Recovery solution for business continuity
- ❑ Benefits of supporting SAN based replication using Azure Site Recovery and Virtual Machine Manager
- ❑ Deep dive into standards based work that enables this solution
- ❑ See it working!

# Business Continuity Challenges



Business  
Continuity



Roadblock



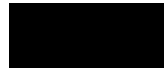
**Too many complications, problems and mistakes**



**Too much data with insufficient protection**



**Not enough data retention**



**Time-intensive media management**



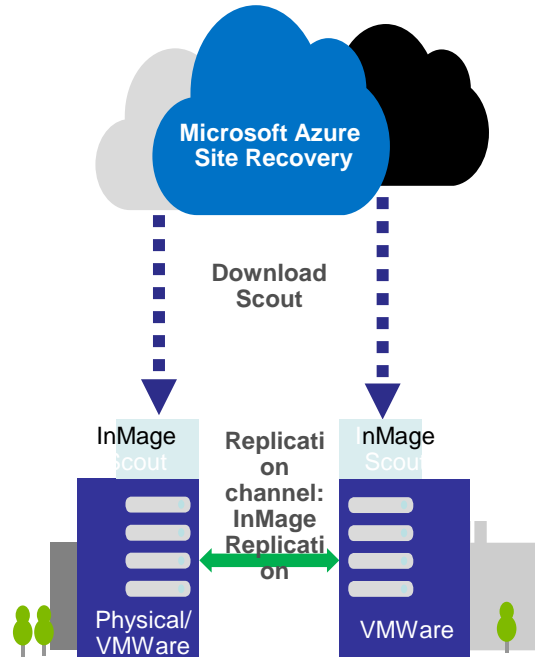
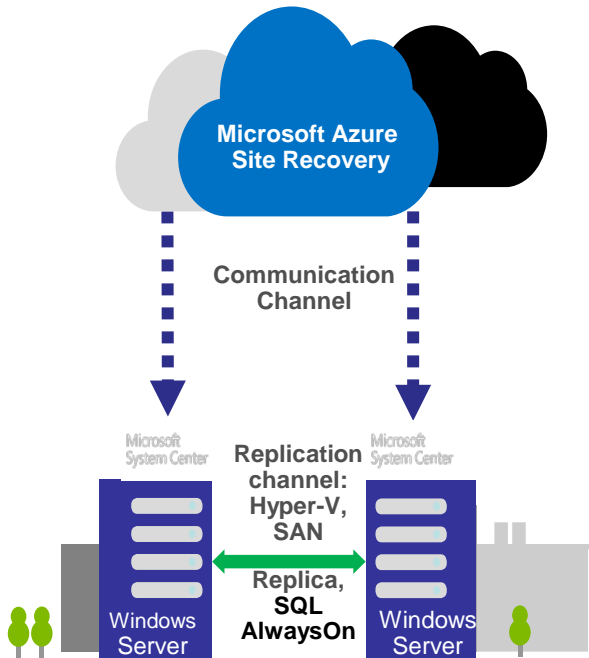
**Untested DR & decreasing recovery confidence**



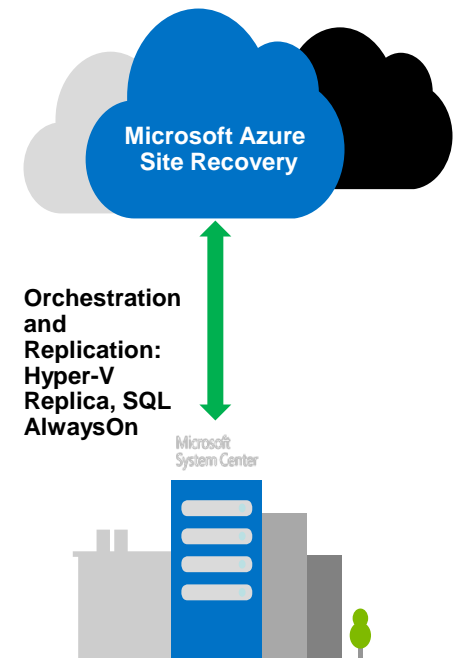
**Increasing costs**

# Azure Site Recovery – one solution

## On premises to On premises



## Protect to Azure



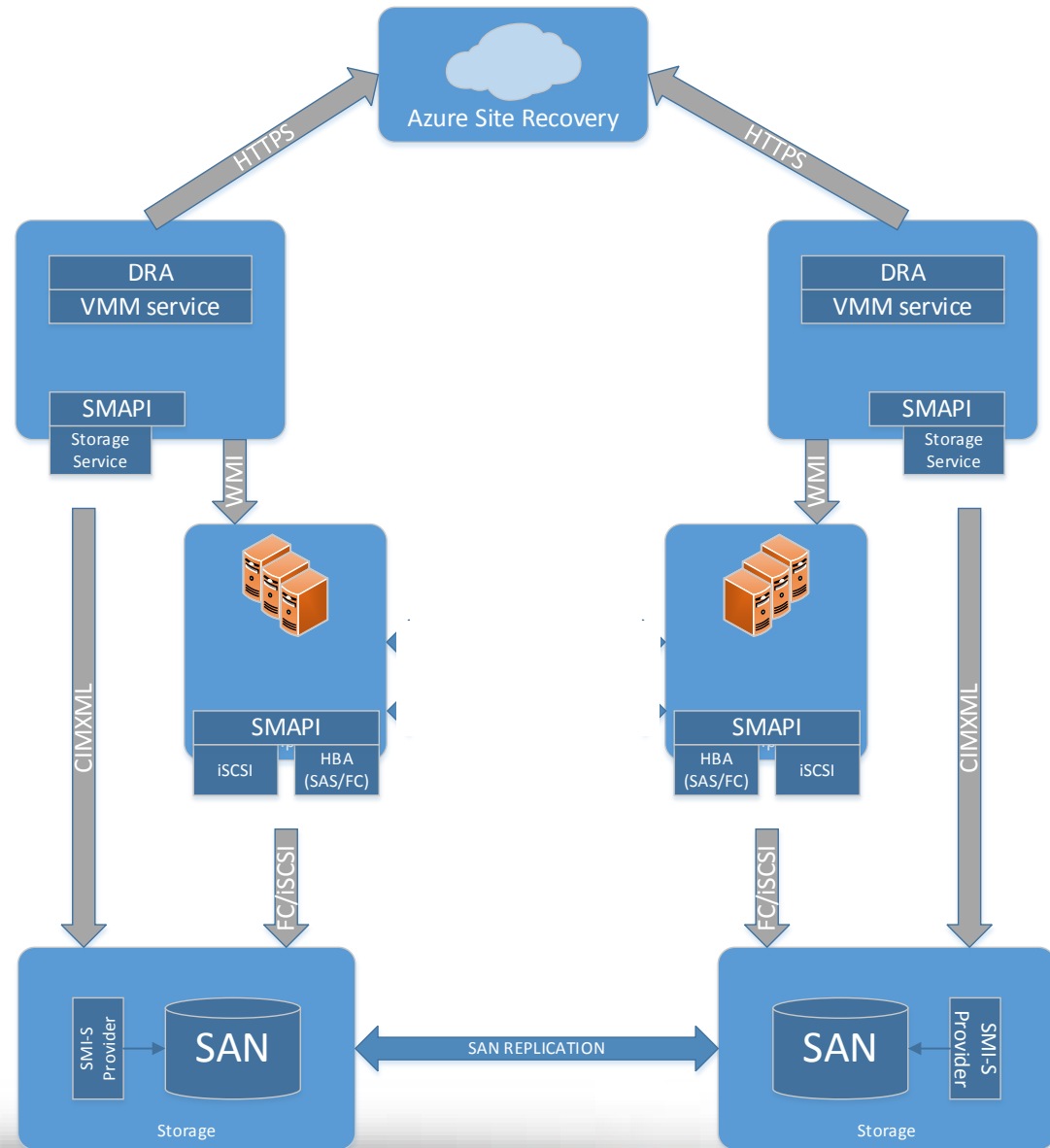
# ASR and VMM with SAN Replication

## □ SAN Replication

- Take advantage of SAN replication capabilities provided by enterprise storage partners for both FC and iSCSI
- Supports synchronous replication for the lowest RTO/RPO and asynchronous replication for flexibility
- Full DR orchestration for Hyper-V vms that are sitting on SAN storage
- Integration with SAN via SMI-S – VMM discovers and enumerates existing storage providing comprehensive SAN management

# How it works

- Discover and Enumerate Storage in VMM
  - Discover storage via SMI-S provider
  - Bring storage pools and LUNs under management
  - Create Replication Group
  - Expose Replication Groups to VMM Cloud
- Orchestration with ASR
  - Create ASR vault and register DR provider
  - Configure Clouds – ASR verifies SAN configuration
  - Map Storage Arrays and Pools
  - Enable Protection on RG
  - Map Networks
  - Enable VM protection



# VMM recap – discover and enumerate

- ❑ Configure devices for replication (device console)
- ❑ Install SMI-S provider
- ❑ Add provider to VMM

Select Specify protocol and address of the storage SMI-S provider

Before stor: Protocol: SMI-S CIMXML

Provider IP address or FQDN: dcmrrsmisymx.dcmanger.lab

TCP/IP port: 5988

Use Secure Sockets Layer (SSL) connection

Run As account: dcmrrsmisymx\_admin



# VMM recap – manage Pool and LUNs

## ❑ Add storage pools to VMM

Classifications (1), StoragePools (1), and Logical Units (611)

Select storage pools to place under management and assign a classification

Logical unit information will be imported from the selected storage pools. The assigned classification describes the capabilities of the selected storage pools.

Storage Device	Pool ID	Classification	Total Capacity	Available Capacity
000195700768			95,968.94 GB	72,436.37 GB
<input type="checkbox"/> DISK_GROUP_0001	SYMMETRIX+0001...		1,117.86 GB	346.13 GB
<input type="checkbox"/> DISK_GROUP_0002	SYMMETRIX+0001...		23,148.89 GB	20,550.14 GB
<input checked="" type="checkbox"/> DISK_GROUP_0003	SYMMETRIX+0001...	GoldSource	57,508.75 GB	37,356.16 GB

Description	Provisioning
DISK_GROUP_0003	
AmitSVD01	Fixed
ASTEMCPRIPOOL01...	Fixed
	Fixed
hector03test	Fixed
KFANG1022_LUN1-...	Fixed
KFANG1022_LUN2-...	Fixed
KFANG-Upg-01-2	Fixed
LUN01EMCPPOOL003	Fixed

Enumerate StorageVolume

Enumerate SPCs



# VMM recap – provision storage

- Assign storage to Hyper-V clusters

The screenshot shows two overlapping windows from the VMMR2RTMCLUS.dcmanger.lab Properties dialog box. The top window displays the 'Cluster Shared Volumes (3)' section, which contains a table with the following data:

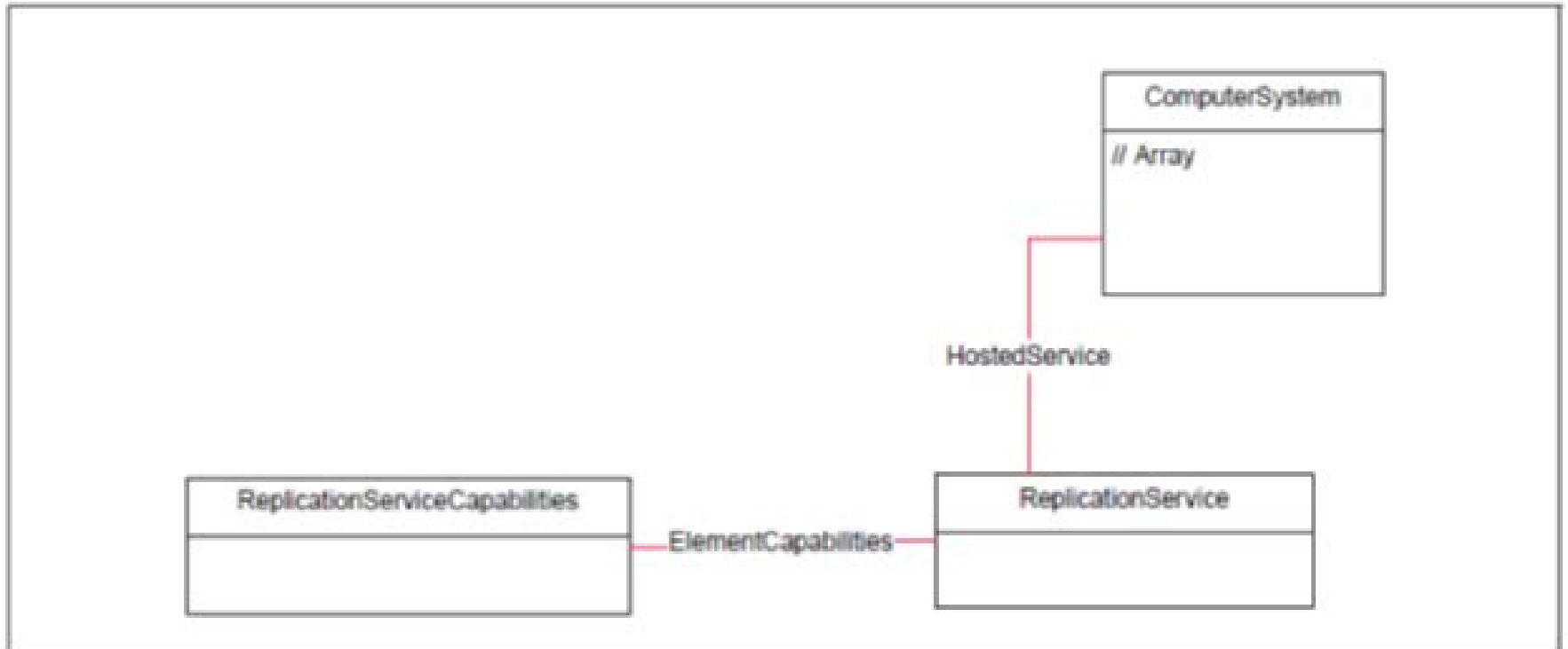
CSV Path	Current Owner	Capacity	Classification	Free Space	Total Space	Cluster Resource
C:\Cluste...	vmmlab1823n1		MYCOOLSTORAGE	73.88 GB	100.00 GB	Cluster Disk 1
C:\Cluste...	vmmlab1823n1		BU1-HIIOPS	0.95 GB	1.00 GB	Cluster Disk 2
C:\Cluste...	vmmlab1823n1		BU2-TIER1	19.89 GB	20.00 GB	Cluster Disk 3

The bottom window is titled 'Add Cluster Shared Volume' and prompts the user to 'Select the disks you want to add as Cluster Shared Volume'. It contains a table with the following data:

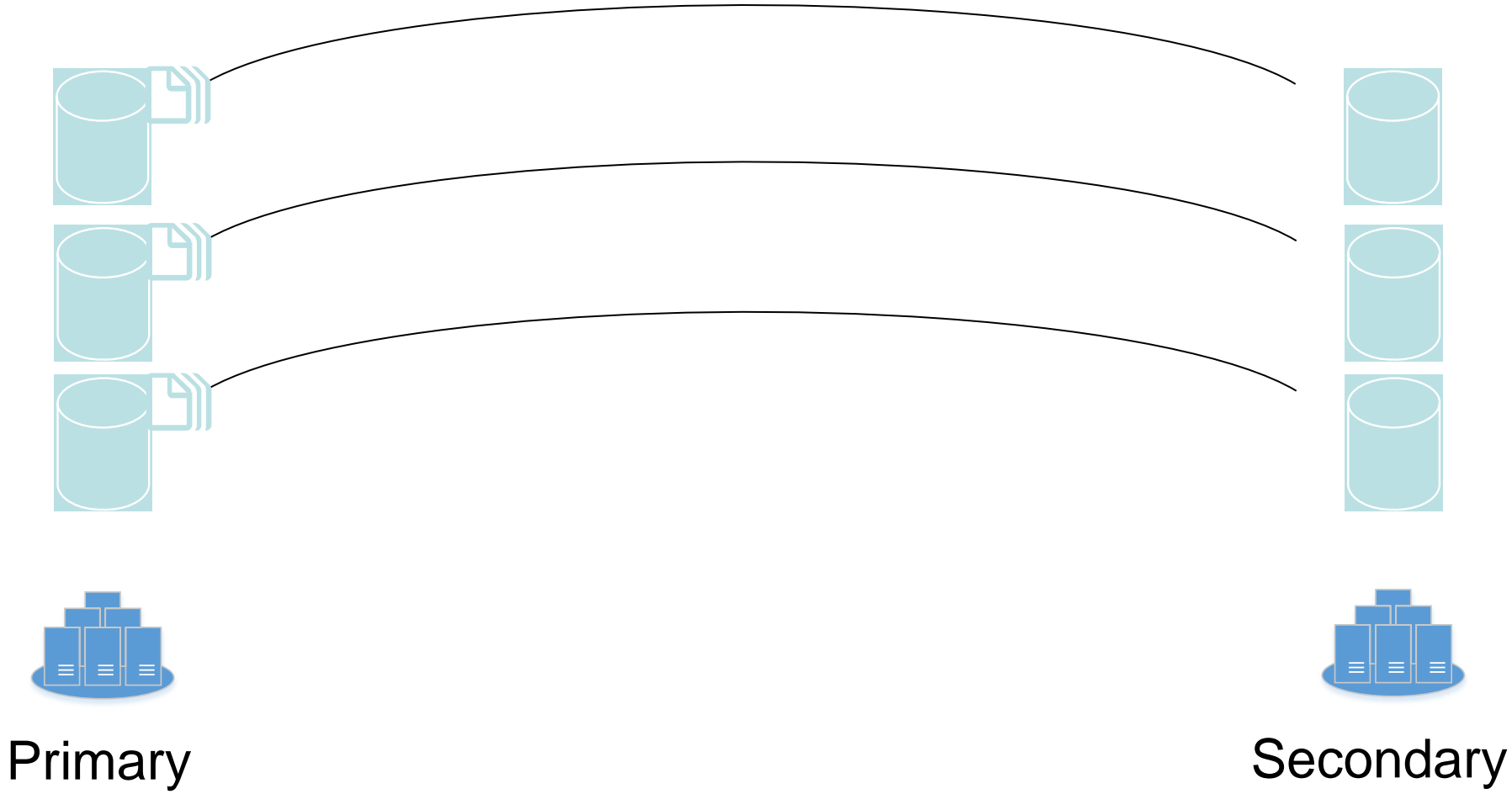
Name	Classification	Size	Partition Style	Volume Label	Quick Format	Force Format
<input checked="" type="checkbox"/> PSdemo	BU1-HIIOPS	1.00 GB	MBR		<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/> testcluster16k	BU1-HIIOPS	1.00 GB	MBR		<input checked="" type="checkbox"/>	<input type="checkbox"/>

# Discovering Replication artifacts

Clause 26 from the SMI-S Block Book

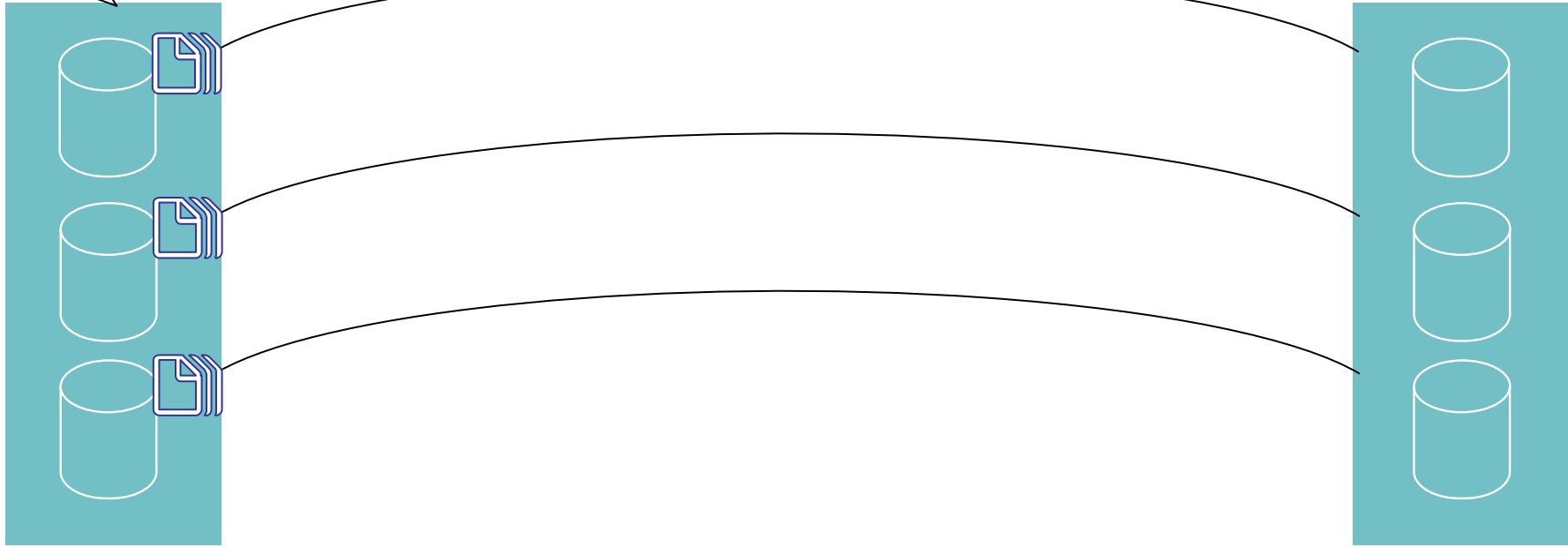


# What is a Replication Group



# What is Replication Group

Replication Group

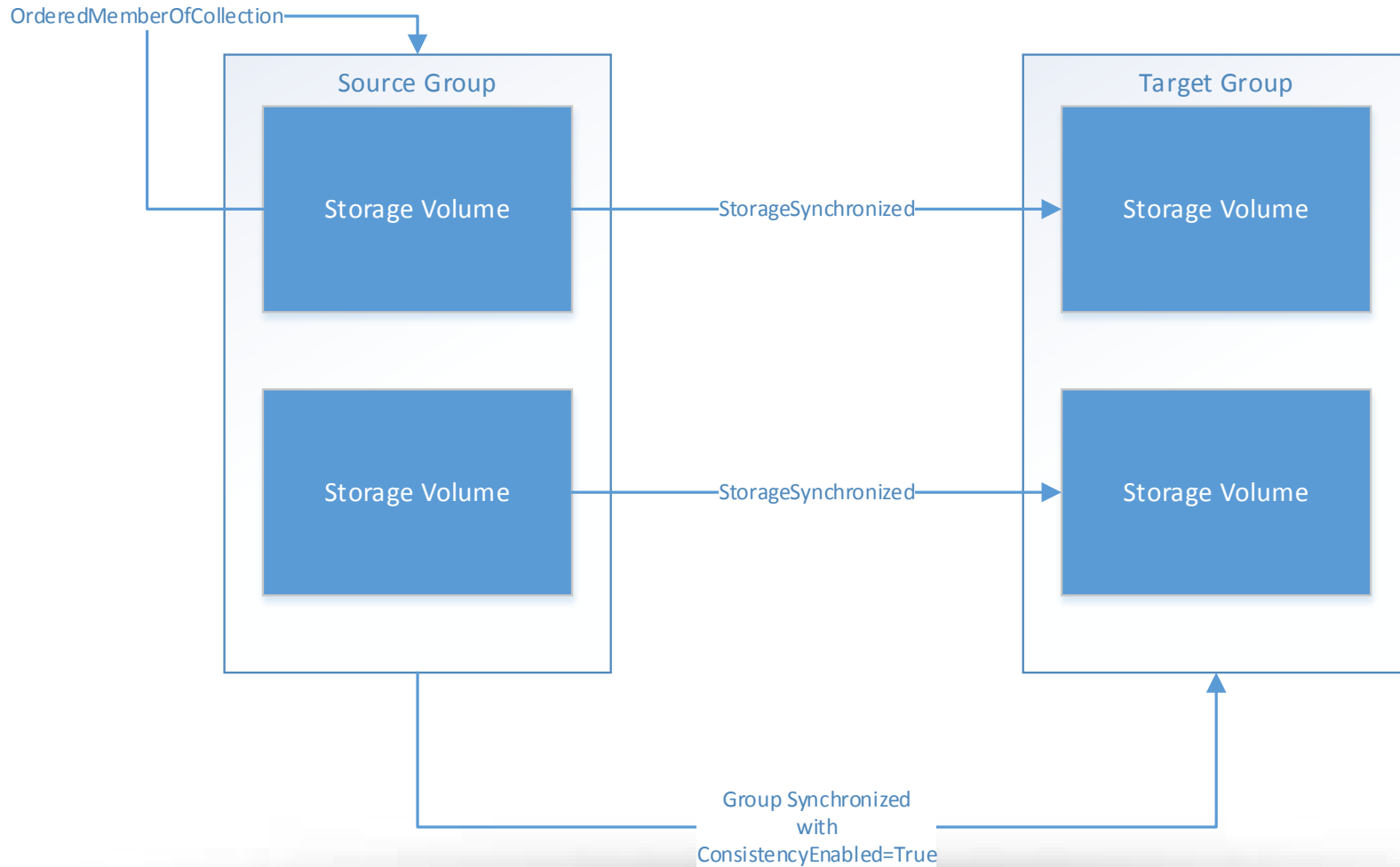


Primary



Secondary

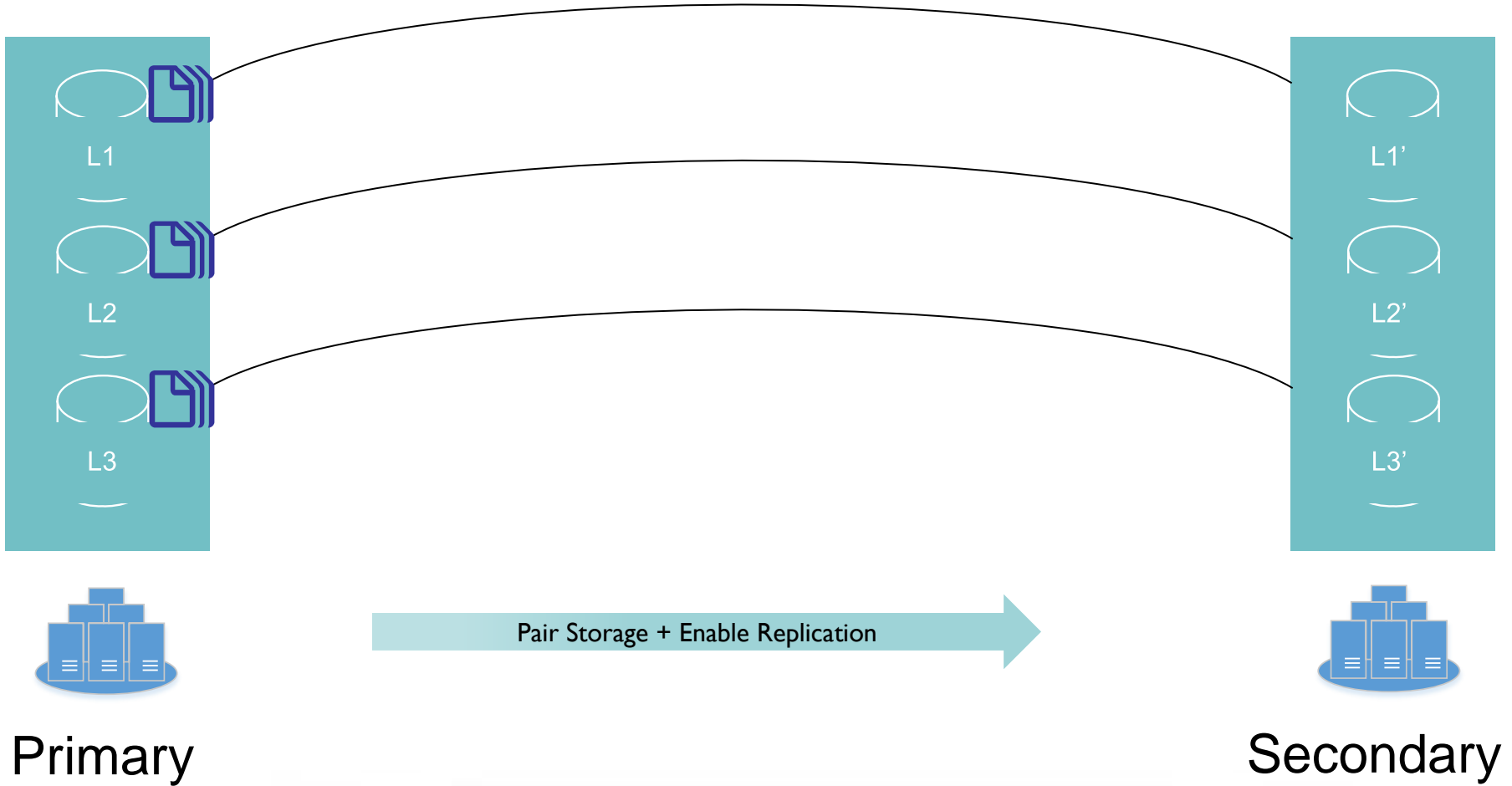
# Replication Group in the SMI-S profile



# Replication Capabilities

- ❑ `GetSupportedGroupFeatures` – how should the replica be created, DR operations
- ❑ `GetSupportedGroupOperations` – What operations does the provider support
- ❑ `GetSupportedGroupCopyStates` – What copy states does the provider support
- ❑ `GetSupportedReplicationSettingDataDateTime` – what RPO does the provider advertise

# Enable Protection



# SMIS methods for enabling protection -

## □ CreateGroupReplica parameters

- **RelationshipName** => a user relevant provided name.
- **SyncType** => Mirror (6) => determined through capabilities
- **Mode** => Sync (2) or Async (3) => determined through capabilities
- **SourceGroup** => Based on features either an empty group or group of source volumes
- **SourceElement** => null
- **SourceAccessPoint** => Reference to source access point information.
- **TargetGroup** => based on features, either null or target group with target volumes
- **TargetElementCount** => null
- **TargetAccessPoint** => Reference to target access point information.
- **Consistency** => "Sequential Consistency".
- **ReplicationSettingData** => with "Create New"
- **Job** => this method should have job support which can be queried for success or failure. The new target element can be accessed using AffectElement associator of the job. After the job is completed, we should be able to query for the new groupsynchronized association
- **Synchronization** => null
- **TargetSettingGoal** => setting goal when targetpool is passed.
- **TargetPool** => if no targetgroup is specified then pool will be passed
- **WaitForCopyState** => "Unsynchronized"

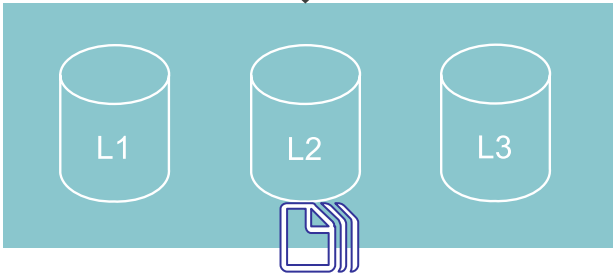
## □ CreateGroupReplicaFromElements parameters

- **Out SourceGroup** => new SourceGroup that gets created after the call
- **SourceElements** => List of source storage volumes
- **TargetPool** => StoragePool reference from the target system on which the new target elements are created

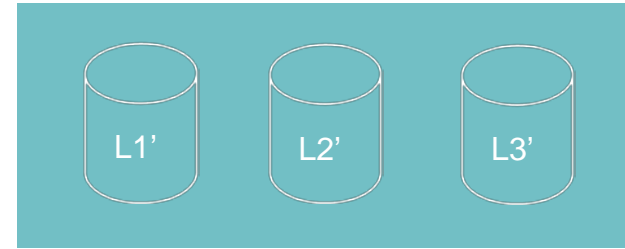


# Deploying a workload(VM)

VM deployed CSVs  
VM configuration  
registered



CSVs not exposed to servers  
VM exists in VMM database  
Capacity reserved for failover



Primary

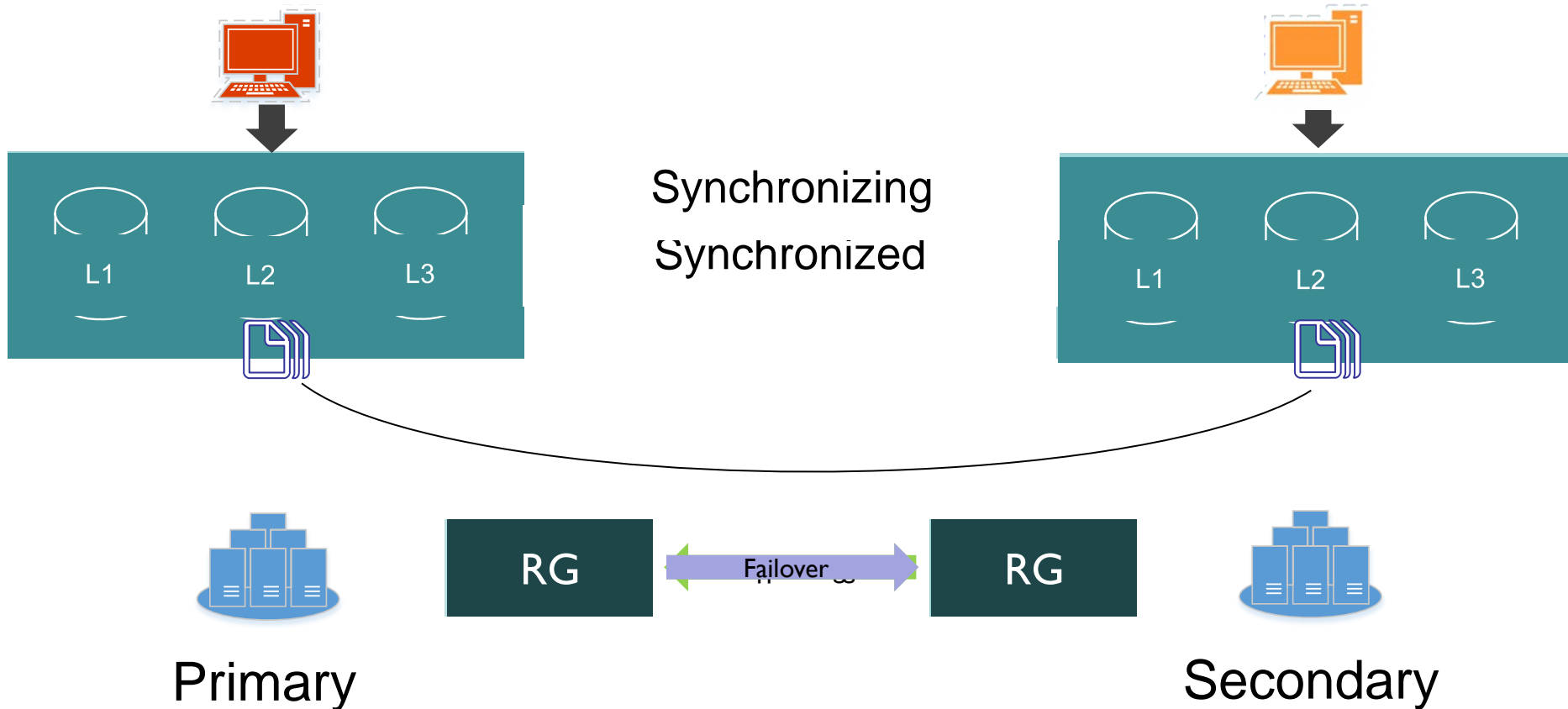


Secondary

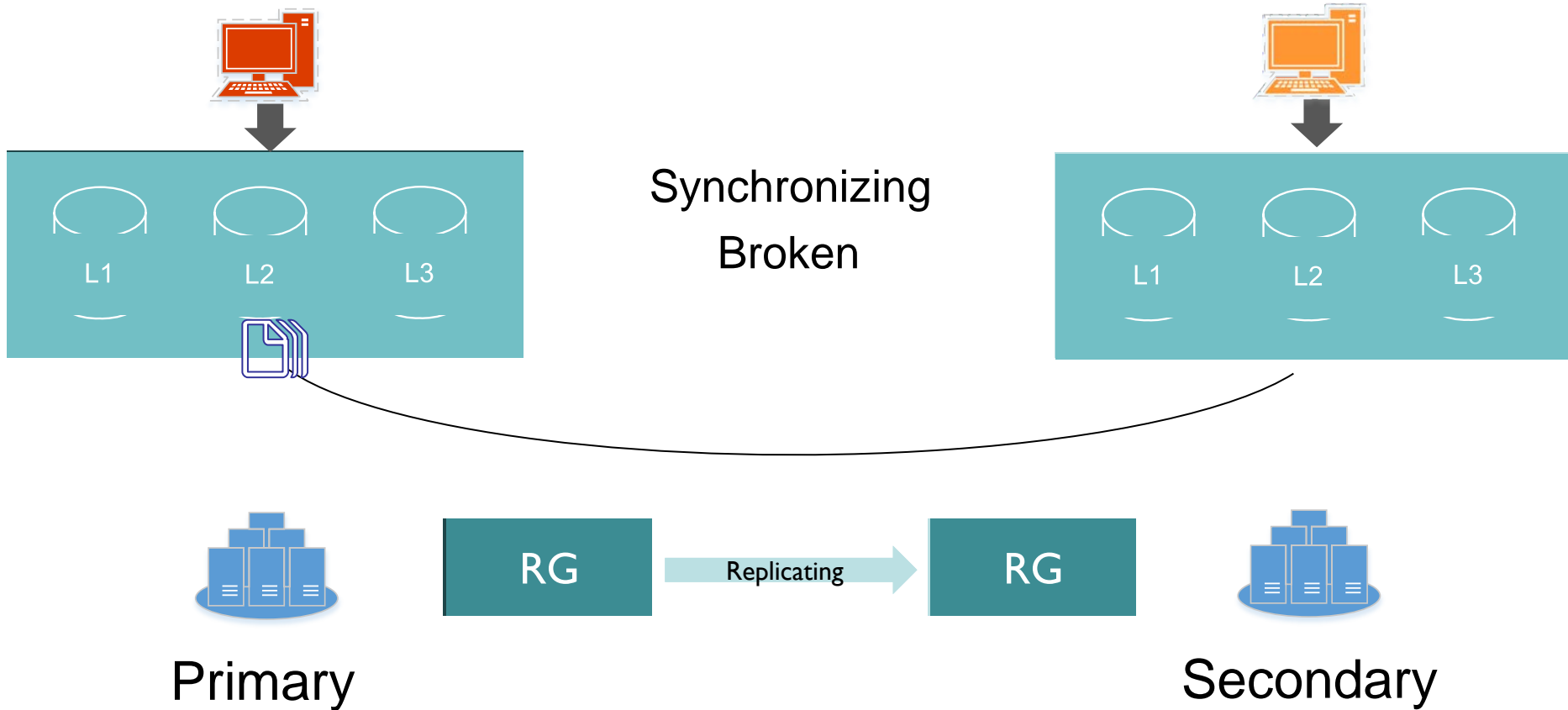
# DEMO

- Enable Protection

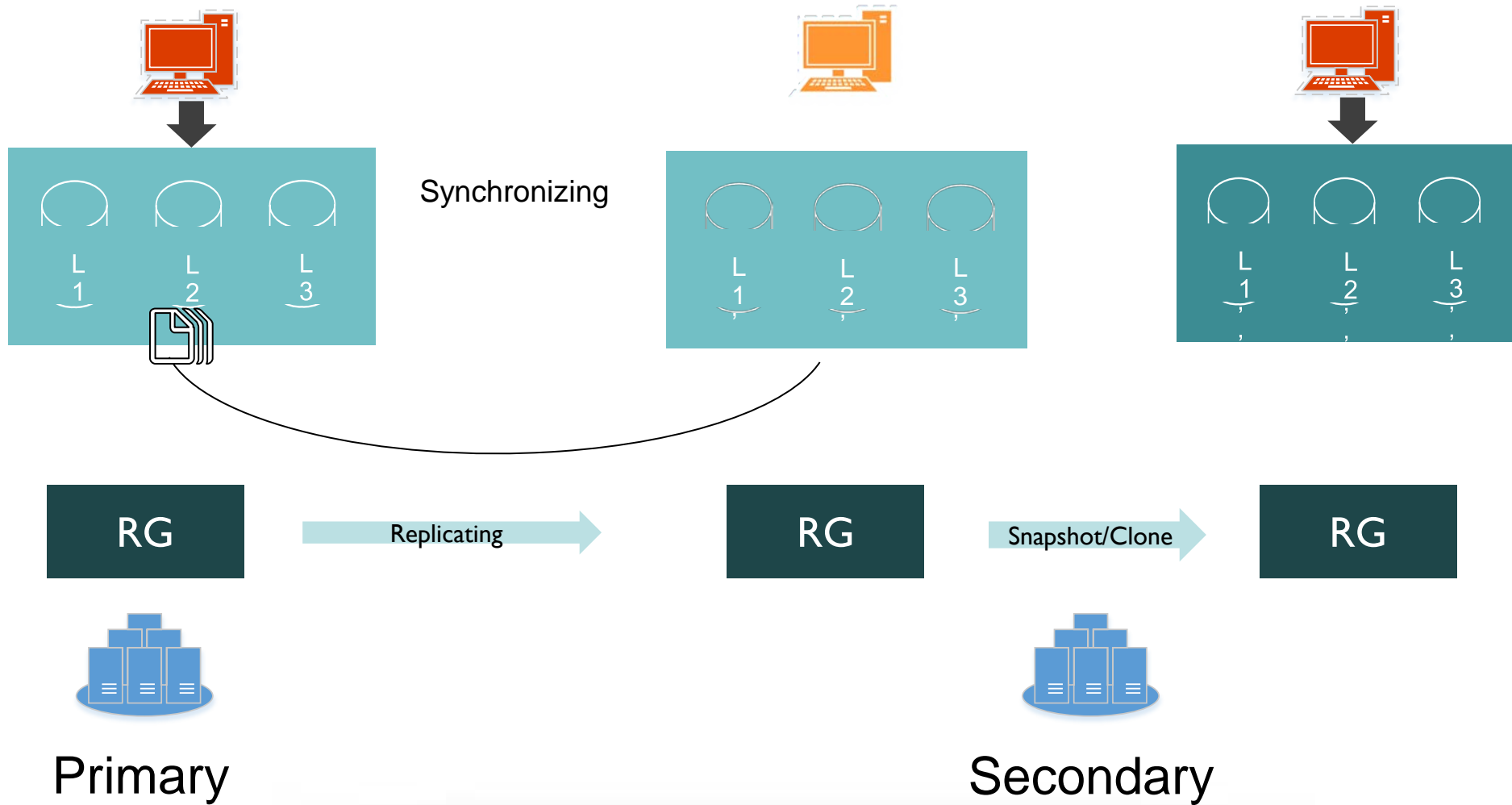
# Workload Failover – Planned Failover / Reverse Replication



# Workload Failover – Unplanned Failover



# Workload Failover Drill – Test Failover



# DEMO

- DR operations

# Availability status -

- ❑ ASR and SCVMM are GA – SCVMM UR6
- ❑ Partners – GA
  - ❑ EMC
  - ❑ NetApp
  - ❑ HP 3PAR
  - ❑ IBM
- ❑ Partners – In development
  - ❑ Hitachi
  - ❑ Dell Compellent
  - ❑ Fujitsu
  - ❑ Huawei



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## Wrap up – Q and A

Thank You





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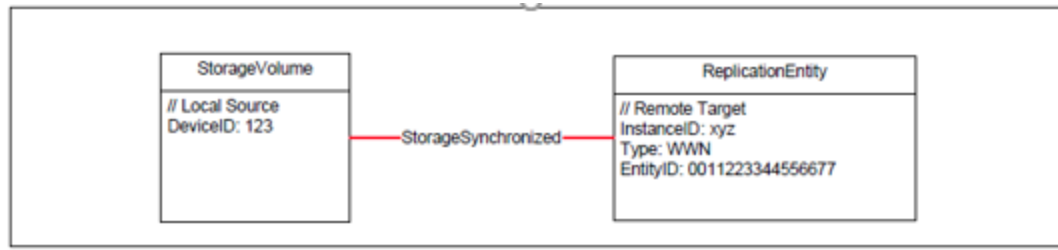
# Appendix and Additional details

# Single vs Multi provider discovery

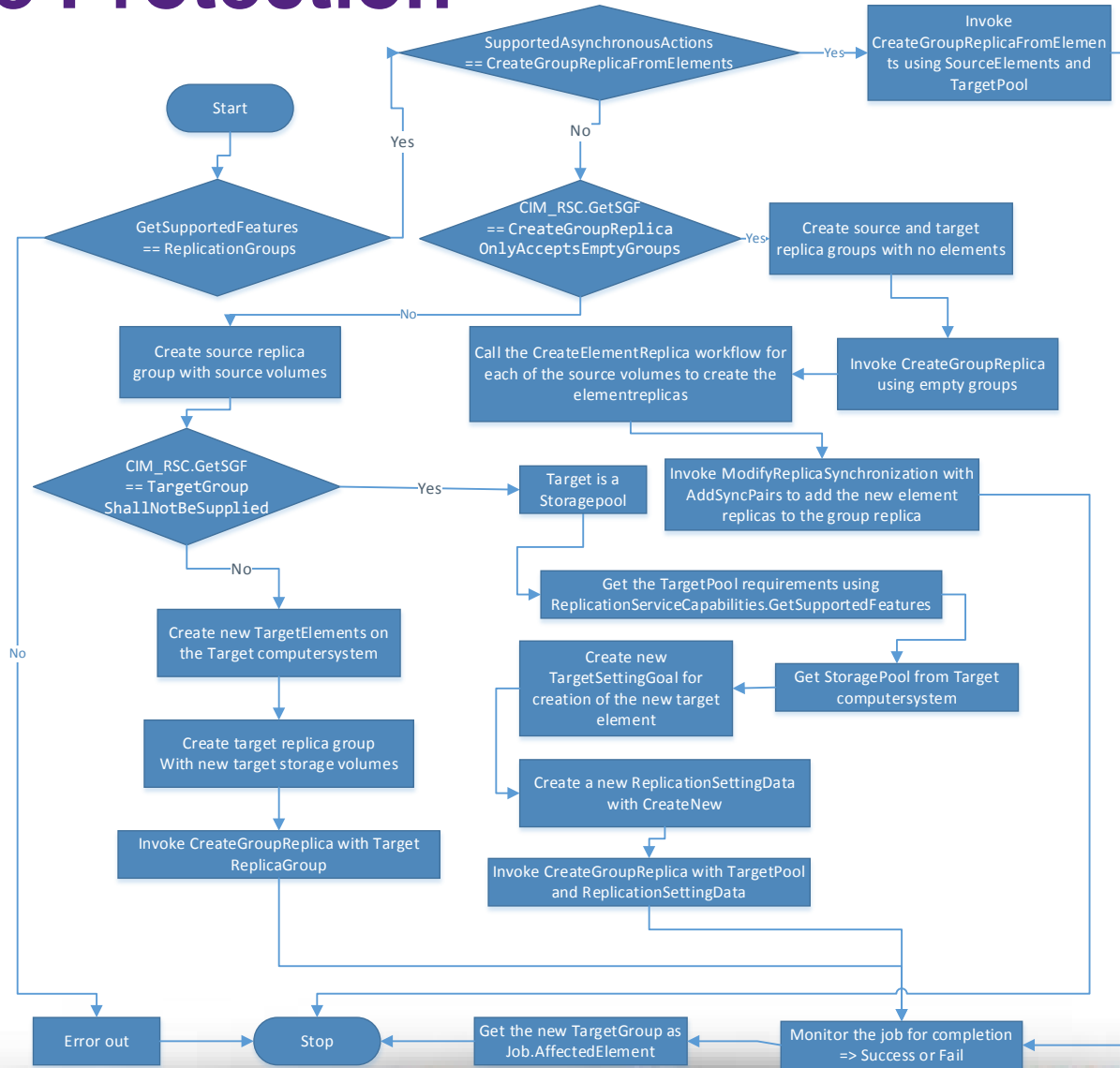
<b>"Requires full discovery of target ComputerSystem"</b>	Provider requires the remote ComputerSystems to be discovered. The absence of this capability indicates the service supports undiscovered resources.	Single provider managing both the primary and the remote subsystem
<b>"Remote resource requires remote CIMOM"</b>	Client is required to interact with two providers: the provider controlling the source element and the provider controlling the target element.	Multi provider

# Undiscovered resources - ReplicationEntity

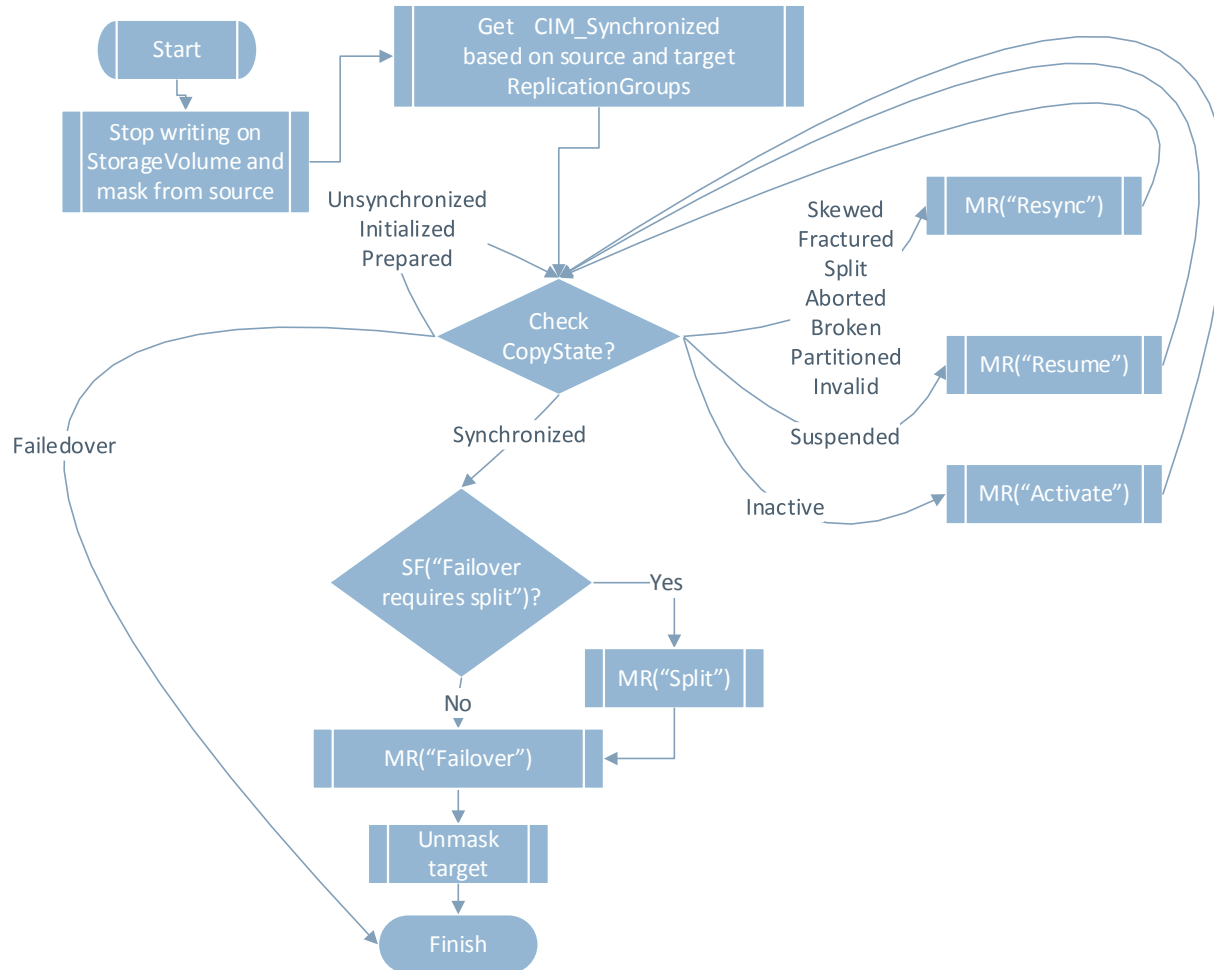
*Replication Service includes the necessary methods to create and manage the instances representing undiscovered resources*



# Enable Protection



# PFO



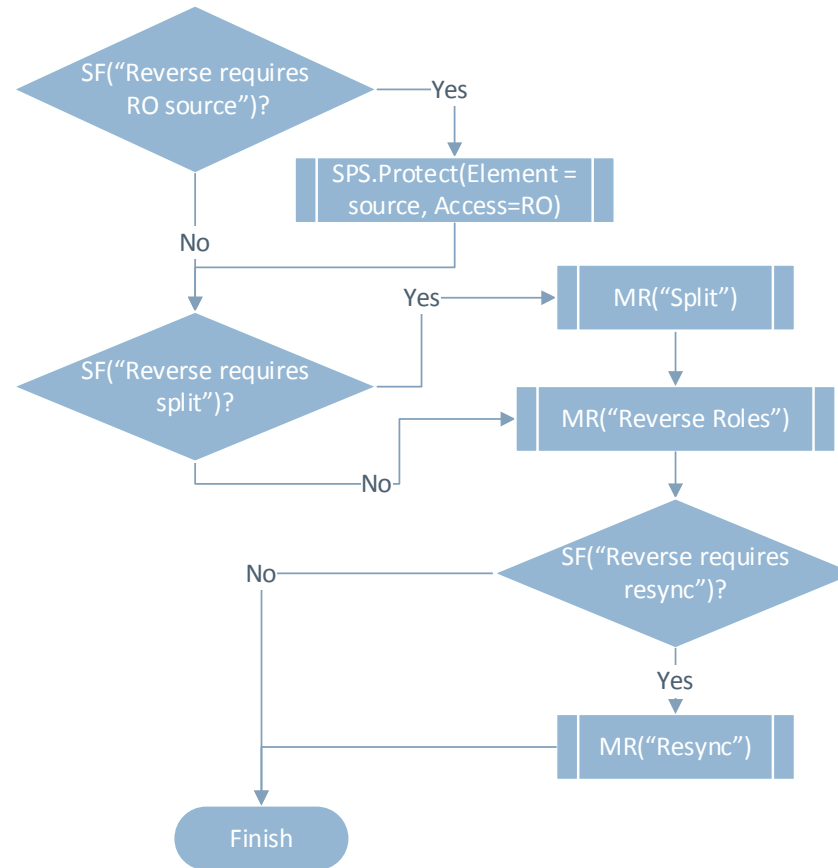
Legend:

MR("operation") => ReplicationService.ModifyReplicaSynchronization("operation", ...)

SF("feature")? => ReplicationServiceCapabilities.GetSupportedFeature(...) contains "feature"?

SPS => StorageProtectionService

# Reverse Roles



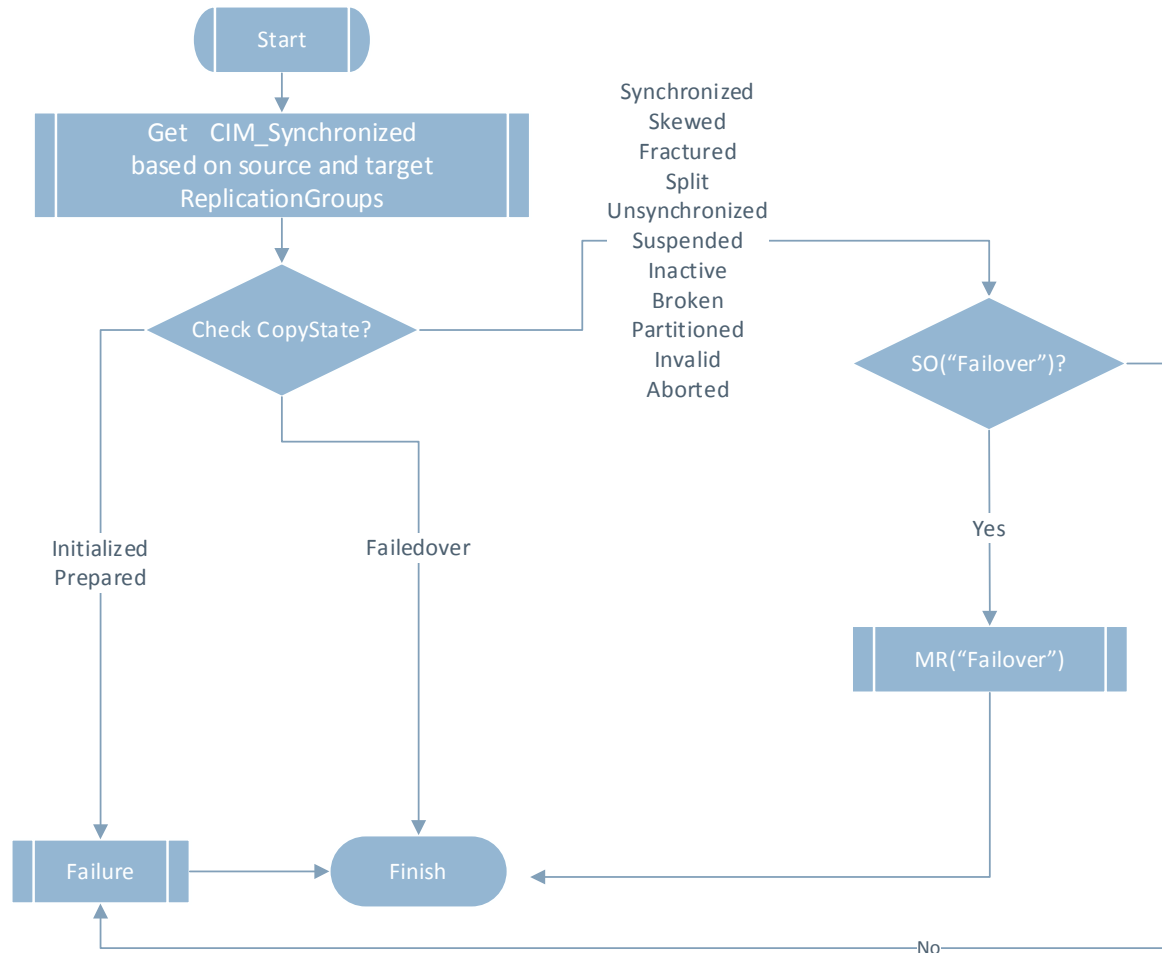
Legend:

MR("operation") => ReplicationService.ModifyReplicaSynchronization("operation", ...)

SF("feature")? => ReplicationServiceCapabilities.GetSupportedFeature(...) contains "feature"?

SPS => StorageProtectionService

# Unplanned FO



Legend:

MR("operation") => ReplicationService.ModifyReplicaSynchronization("operation", ...)

SO("operation") => ReplicationServiceCapabilities.GetSupportedOperations(...) contains "operation"?

# Test FailOver

