

# INFOSCALE AVAILABILITY (VCS) REPLICATION AGENT FOR DELL EMC SC- SERIES STORAGE ARRAYS

V3.0

## Installation and Configuration Guide

This document describes the installation procedure of Dell EMC SC-Series Veritas Cluster Server (Infoscale Availability) replication agent on UNIX platforms.

Linux, AIX, Solaris

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# TABLE OF CONTENTS

- ABOUT THE AGENT FOR DELL EMC SC ..... 4
- SUPPORTED ENVIRONMENTS..... 4
- INSTALLATION PREPARATION..... 5
- TYPICAL DELL EMC SC SETUP IN A VCS CLUSTER..... 6
- INSTALLING THE AGENT FOR DELL EMC SC..... 7
- CONFIGURING THE AGENT ..... 8
  - ATTRIBUTE DEFINITIONS ..... 8
  - SAMPLE CONFIGURATION OF THE AGENT ..... 9
  - PROTECTING DISKGROUP RESOURCES BY THE AGENT ..... 10
- ABOUT CLUSTER HEARTBEATS ..... 10
- ABOUT PREVENTING SPLIT-BRAIN ..... 10

# ABOUT THE AGENT FOR DELL EMC SC

The Cluster Server agent for Dell EMC SC-Series storage arrays provides support for application failover and recovery in the environments where data is replicated between Dell EMC SC arrays using Live Volume (sync or async) or Live Volume Auto Failover technology.

The agent monitors and manages the state of replicated Dell EMC SC devices that are attached to VCS nodes. The agent ensures that the system that has the Dell SC resource online also has safe and exclusive access to the configured devices.

The agent for Dell EMC SC-Series supports the following:

- Local clusters that run VCS
- Volumes for Synchronous replication with High Availability mode
- Volumes for Live Volume replication with Synchronous mode (except Auto-Failover mode)
- FC SAN connectivity between hosts and SC-Series arrays. iSCSI SAN is NOT supported at the moment.
- FC and/or iSCSI connectivity between SC-Series arrays for replication (iSCSI connectivity for hosts is NOT supported at the moment).
- Only block storage devices are supported. NAS storage isn't supported. FS8600 file option isn't supported.

The agent for Dell EMC SC-Series does NOT support "High Consistency" option of synchronous Live Volume replication. Please, use "High Availability" mode instead.

Please note that in case of Live Volume Auto Failover, the usage of SC Agent for is optional and not required.

## SUPPORTED ENVIRONMENTS

This installation guide applies to the following VCS environments:

Agent version:	3.0
VCS:	Infoscale Availability 7.3.1, 7.2, 7.1, 7.0; VCS 6.1
OS platforms:	RHEL 7.3, 7.4, 7.5; AIX 7.1, 7.2; Solaris 11.3;
SCOS:	7.1, 7.2, 7.3
SC REST API:	3.3 or later
DSM version:	2016 R3 or later

# INSTALLATION PREPARATION

This installation guide requires that you have the following components installed, up and running on all cluster nodes before you continue with the SC Agent installation:

- Veritas Cluster Server
- VxVM
- VxDMP
- Make sure that all VCS nodes have TCP/IP connection with DSM Primary (mandatory) and DSM Secondary (if deployed) servers

Please make sure that the following components of the SC-Series infrastructure are deployed correctly:

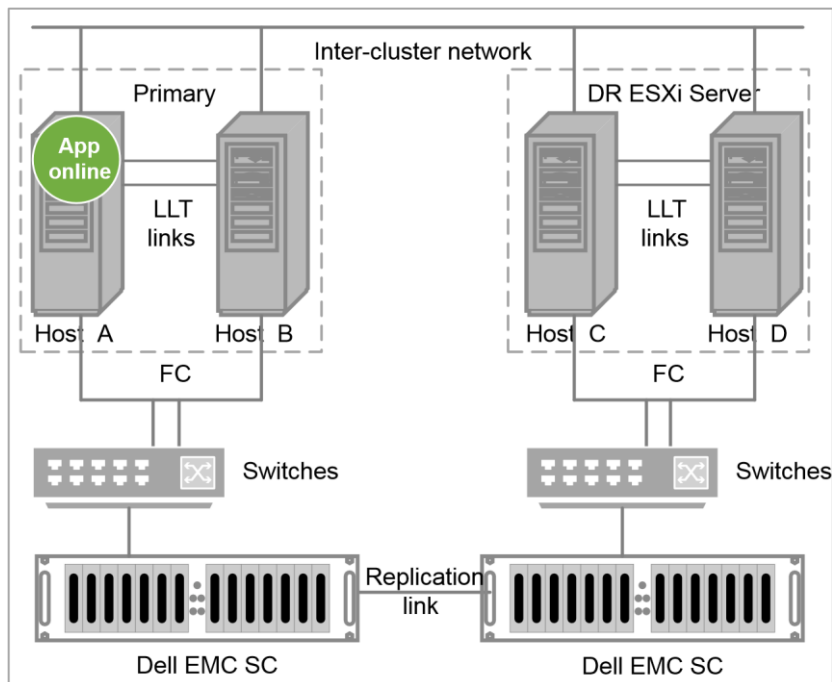
1. Dell Storage Manager (DSM) version 2016 R3 or higher
2. Optionally: Secondary (replica mode) Dell Storage Manager server, version 2016 R3 or higher
3. REST API version 3.3 or higher
4. SCOS firmware version 7.1 or higher
5. Replication functionality is configured between a Primary SC-Series array and a Secondary SC-Series array(s)
6. A Volume or a set of volumes (further referred as “Primary Volumes”) are created on the Primary SC-Series array.
7. Primary Volumes should be mapped for read and write to the Primary Site VCS node(s). Please make sure, that Primary Site VCS nodes do have access to the Primary Volumes for read and write.
8. A synchronous replication (either Live Volume or Live Volume Auto Failover) is established between Primary Volumes and corresponding Secondary Volumes on the Secondary SC-Series array.
9. The Secondary Volumes must be mapped to the Secondary VCS nodes for read-only access (please check advanced settings of the Mapping Profile of the Secondary Volume).

Before continuing with the installation, please run the following commands and write down the output in to the installation pre-check document:

```
# vxddladm list hbas
# vxddladm list ports
# vxdmpadm getctlr all
# vxdisk list
# vxdisk -x LUN_SERIAL_NO -x PRIV_UDID -p list
```

# TYPICAL DELL EMC SC SETUP IN A VCS CLUSTER

The following figure displays a typical cluster setup in a Dell SC environment:



VCS clusters using Dell SC for replication uses the following hardware infrastructure:

- The primary array has one or more source volumes. A Fibre Channel attaches the volumes in the array to the cluster node over FC SAN.
- The secondary array has one or more destination volumes. A Fibre Channel attaches these volumes to a cluster node over FC SAN. The destination volumes are paired with the source volumes in the source array. The destination volumes and arrays must be at a significant distance to survive a disaster that may occur at the source site.
- Network heartbeating between the two data centers to determine their health; this network heartbeating could be LLT or TCP/IP.
- In a global cluster environment, you must attach all hosts in a cluster to the same Dell EMC SC array.

# INSTALLING THE AGENT FOR DELL EMC SC

1. Identify VCS home and config paths:
  - # Default home path (\$VCS\_HOME) is “/opt/VRTSvcs”
  - # Default config path (\$VCS\_CONF) is “/etc/VRTSvcs”
2. Unpack the agent script files into the “\$VCS\_HOME/bin/SC” directory:
  - # `cd $VCS_HOME`
  - # `tar -xvf /tmp/scagent.2.1.180215.tar bin`

At the completion of this command you should get the following file listing:

Full path (for the case when \$VCS_HOME=/opt/VRTSvcs)	item type
/opt/VRTSvcs/bin/SC/actions	directory
/opt/VRTSvcs/bin/SC/sc	directory
/opt/VRTSvcs/bin/SC/ISerializable.pm	file
/opt/VRTSvcs/bin/SC/SCAgent.pm	file
/opt/VRTSvcs/bin/SC/SCAgentServer.pm	file
/opt/VRTSvcs/bin/SC/SCAgentVPair.pm	file
/opt/VRTSvcs/bin/SC/SCLogger.pm	file
/opt/VRTSvcs/bin/SC/SCTools.pm	file
/opt/VRTSvcs/bin/SC/clean	file
/opt/VRTSvcs/bin/SC/info	file
/opt/VRTSvcs/bin/SC/monitor	file
/opt/VRTSvcs/bin/SC/offline	file
/opt/VRTSvcs/bin/SC/online	file

3. Unpack the agent type definition files into the “\$VCS\_CONF/conf/config” directory
  - # `cd $VCS_CONF`
  - # `tar -xvf /tmp/scagent.2.1.180215.tar conf`

Full path (for the case when \$VCS_CONF =/etc/VRTSvcs)	item type
/etc/VRTSvcs/conf/config/SCTypes.cf	file
/etc/VRTSvcs/conf/addSCType.sh	file

4. Create a symbolic link to Script51Agent inside the SC directory:

```
# ln -s $VCS_HOME/bin/Script51Agent $VCS_HOME/bin/SC/SCAgent
# chmod +x $VCS_HOME/bin/SC/SCAgent
```
5. Register a new resource type using “addSCType.sh” shell script included in the package:

```
# cd $VCS_CONF/conf
# chmod +x addSCType.sh
# ./addSCType.sh
```
6. Verify that the resource type is successfully registered:

```
# hatype -list
# hatype -display SC
```

## CONFIGURING THE AGENT

### ATTRIBUTE DEFINITIONS

The following table describes the agent attributes:

Attribute	Description
Name: <b>DSMPPrimary</b> Type: <b>String</b> Dimension: <b>Scalar</b>	Mandatory. IP address or host name of a Primary Dell Storage Manager server
Name: <b>DSMStandby</b> Type: <b>String</b> Dimension: <b>Scalar</b>	Optional. IP address or host name of a Secondary Dell Storage Manager server (if deployed)
Name: <b>DSMPort</b> Type: <b>Integer</b> Dimension: <b>Scalar</b>	Mandatory. IP port number to be used for REST API connection to DSM Primary and Secondary servers. Default value: 3033
Name: <b>UserName</b> Type: <b>String</b> Dimension: <b>Scalar</b>	Mandatory. User name to connect to the Primary and Secondary Dell Storage Managers.
Name: <b>Password</b> Type: <b>String</b> Dimension: <b>Scalar</b>	Mandatory. Password for the user to connect to the Primary and Secondary Dell Storage Managers.

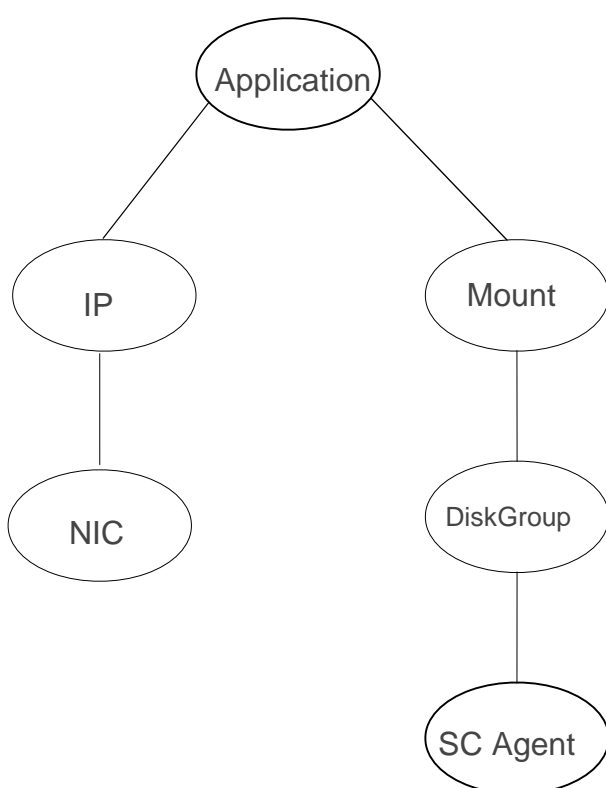


Name: <b>LogFile</b> Type: <b>String</b> Dimension: <b>Scalar</b>	Optional. Full path to a verbose log file. Default value: "/tmp/sc.agent"
Name: <b>Volumes</b> Type: <b>String</b> Dimension: <b>Vector</b>	Internal. Should not be altered directly. To configure this attribute please run the "configure" agent action. This attribute is used by the agent to store information on the members of the volume consistency group. Can be used by the user for monitoring and troubleshooting purposes.
Name: <b>Servers</b> Type: <b>String</b> Dimension: <b>Vector</b>	Internal. Should not be altered directly. To configure this attribute please run the "configure" agent action. This attribute is used by the agent to store information on topology and mapping of volumes to VCS nodes. Can be used by the user for monitoring and troubleshooting purposes.

## SAMPLE CONFIGURATION OF THE AGENT

In order to configure the agent, a DiskGroup resource should be defined as well as an SC Agent resource.

For successful configuration of the agent, the DiskGroup resource should be linked to the agent resource. This linkage allows the agent to obtain information on SC-Series Volumes that should be monitored and protected.



## PROTECTING DISKGROUP RESOURCES BY THE AGENT

1. Create and present block devices (Volumes) on the SC-Series arrays. Establish replication (either Legacy synchronous or Live Volume) between primary and secondary volumes. In case of Live Volume, present the secondary volumes to secondary VCS nodes.
2. Create and import Disk Groups
3. Create and configure DiskGroup resources
4. Create SC resource that will represent the agent
5. Set appropriate values to the DSMPrimary, DSMSecondary, DSMPort, UserName and Password attributes of the SC resource.
6. Link the DiskGroup resource(s) to the newly creates SC resource
7. After the DiskGroup(s) is(are) linked to the SC resource, right-click on the SC resource, choose actions and run “configure” action
8. When “Configure” action is finished, review Volumes, Servers and LocalNodes attributes – they should represent your actual topology and volume set.

## ABOUT CLUSTER HEARTBEATS

In a global cluster, VCS sends ICMP pings over the public network between the two sites for network heartbeating. To minimize the risk of split-brain, VCS sends ICMP pings to highly available IP addresses. VCS global clusters also notify the administrators when the sites cannot communicate.

## ABOUT PREVENTING SPLIT-BRAIN

Split-brain occurs when all heartbeat links between the primary and secondary hosts are cut. In this situation, each side mistakenly assumes that the other side is down. You can minimize the effects of split-brain by ensuring that the cluster heartbeat links pass through a similar physical infrastructure as the replication links. When you ensure that both pass through the same infrastructure, if one breaks, so does the other.

Sometimes you cannot place the heartbeats alongside the replication links. In this situation, a possibility exists that the cluster heartbeats are disabled, but the replication link is not. A failover transitions the original Source to Destination and Destination to Source. In this case, the application faults because its underlying volumes become write-disabled, causing the service group to fault. VCS tries to fail it over to another host, causing the same consequence in the reverse direction. This phenomenon continues until the group comes online on the final node. You can avoid this situation by setting up your infrastructure such that loss of heartbeat links also means the loss of replication links.

To minimize the chances of split-brain, use the steward process.