IBM Tivoli Storage FlashCopy® Manager 3.2.0 for VMware®

Objective of this document

This document provides comprehensive information on the complete environment required to support FlashCopy® Manager based solutions:

- •Prepare for implementation:
    Complete this check list prior to implementation start to avoid late issues.
- •Identify and involve all responsible organizations required for implementation.
- •Identify proper release levels of ancillary software.
- •Get the most current tips and hints for installation.

Note: This document refers to the FlashCopy® Storage Systems IBM System Storage DS8000, IBM System Storage SAN Volume Controller (SVC), IBM Storwize V7000, IBM XIV® Storage System, IBM N Series, and NetApp®.

1. Hardware Requirements (general)

	Prerequisite	checked
1.0.1	A VMware vSphere environment consisting of one vCenter server and one or more ESX/ESXi hosts.	
1.0.2	One Linux server for the FlashCopy Manager installation. This server can either be a physical server or a virtual machine running within the vSphere environment. SAN connectivity to storage subsystems is not required for this server.	
1.0.3	The Linux server (1.0.2) has a LAN connection to the CIM Agent for DS, SVC cluster respectively, IBM Storwize V7000, XIV or IBM N Series or NetApp.	
1.0.4	LUNs of the VMware datastores to be backed up within one backup run must not be distributed over multiple disk storage subsystems / SVC storage clusters. (DS8000): FCM supports one LUN per VMware datastore only	
1.0.5	For FlashCopy Manager operations the LUNs of the disk storage subsystem intended to be used as target volumes must be accessible to the ESX/ESXi host used as auxiliary ESX host. This applies to DS storage devices and also to SVC and IBM Storwize V7000 if preassigned volumes are used. For XIV, N Series or NetApp the target LUNs will be created automatically during snapshot process and will be assigned to the auxiliary ESX host. See documentation of profile parameter HOST_NAME_MAPPING in the User's manual for more details. Note: In case preassigned volumes are used, the AUXILIARY_ESX_HOST parameter needs to be set in the FCM profile so that the forced mount operation can be executed as part of the backup operation.	
1.0.6	A source volume and its corresponding target volumes must be of same size. DS requires source and target volume pairs be located in the same disk storage subsystem. For SVC and IBM Storwize V7000 those can be located in different storage devices within one and the same SVC cluster.	

1.1 Hardware Requirements for DS8000

	Prerequisite	checked
1.1.1	IBM System Storage DS8000 (DS8100, DS8300, DS8700 or DS8800) with the Point in Time Copy feature enabled. With DS8000 Release 4.1 (bundle 64.1.16.0) and later the embedded CIM agent in the HMC is enabled and configured by default and can be used with FlashCopy Manager. For all DS8000 Releases a proxy CIM agent (IBM Common Interface Model (CIM) Agent for DS Open API) can be installed and configured on a separate machine supported by this CIM agent. **Note:** IBM CIM Agent for DS Open API version 5.4.2 has a known problem with refresh of an incremental FlashCopy using FCM. Therefore make sure that CIM Agent 5.4.2.xx is not used. Please upgrade the DS microcode to a level that provides CIM Agent > 5.4.3 (for example: DS8000 bundle version 64.30.78.0 comes with CIM Agent 5.4.3.52)	
1.1.2	DS8000 LIC level for FlashCopy to work with FlashCopy Manager: FlashCopy Manager supports all DS8000 Releases >= R3.1. For older DS8000 releases, the following minimum microcode levels are required: mcode 6.1.600.52/DSCLI 5.0.5.17, mcode 6.2.400.7x/DSCLI 5.2.400 or higher mcode	
1.1.3	Support is provided for Fibre Channel attached volumes	

1.2 Hardware Requirements for SVC / Storwize V7000

	Prerequisite	checked
1.2.1	IBM System Storage SAN Volume Controller versions 5.1, 6.1, 6.2, 6.3 and 6.4 IBM Storwize®V7000 v1 Disk System IBM Storwize®V7000 6.4 IBM Storwize®v3700 IBM Storwize®V7000 Unified v1.3 Disk System (block level support only) IBM Storwize®V7000 Unified v1.4 Disk System (block level support only) IBM Flex System™v7000 Note: FlashCopy Manager communicates with the SVC only. There is no communication among FlashCopy Manager and storage systems attached to the SVC.	
1.2.2	Support is provided for Fibre Channel and iSCSI attached volumes	

Note: The SVC Console V5.1.0 package does not include a CIM agent for the SAN Volume Controller cluster. Instead, FlashCopy Manager should be configured to directly access the CIM agent running on the SVC cluster itself.

Starting with SVC 6.1, the CIM agent can be restarted using the Service Assistant for 6.1.0 - http://clusterip/service go to the Restart Service navigation item and select the CIMOM.

1.3 Hardware Requirements for XIV

	Prerequisite	checked
1.3.1	Supported system versions are 10.0.0.b or later 10.x levels, 11.x levels	
1.3.2	Support is provided for Fibre Channel and iSCSI attached volumes	

1.4 Hardware requirements for N Series/NetApp

	Prerequisite	checked
1.4.1	Supported ONTAP versions are 7.3 or later 7.3.x levels and 8.1 or later 8.1.x levels	
1.4.2	Volumes must be attached over SAN, iSCSI or NAS to the ESX hosts	
1.4.3	The user account that will be used by FlashCopy Manager to log onto the storage system must have the permissions / capabilities: api-system-*, login-http-admin, api-volume*, api-lun-list*, api-lun-get-serial-number, api-cg-start, api-cg-commit and snapshot-list-info.	

2. Software Requirements – general

The following software - if not otherwise specified - is required.

	Prerequisite	checked
2.0.1	A VMware vSphere environment consisting of: VMware vCenter Server 4.1, 5.0 or 5.1 and ESX hosts in the following versions: VMware ESX/ESXi 4.1, 5.0 or 5.1	
2.0.2	FlashCopy Manager is not able to work in a vSphere environment where the VMware vCenter Site Recovery Manager (SRM) is active. For more information please see the Known Issues and Limitations tech note of FlashCopy Manager.	
2.0.3	On the Linux server for the FlashCopy Manager installation: Red Hat Enterprise Linux 6 x64 Version 6.0 or higher Red Hat Enterprise Linux 5 x64 Version 5.1 or higher SUSE Enterprise Linux 10 x64 with SP2, or later SUSE Enterprise Linux 11 x64	

	Prerequisite	checked
	All platforms	
2.0.3	(DS with proxy CIM Agent) IBM System Storage CIM Agent for DS Open (API) is required for DS8000 storage subsystems corresponding to the installed microcode levels. Refer to the CIM Agent compatibility matrix. The package (see download URLs below) is recommended to be installed on the vStorage Backup server or on a separate server. (SVC) For SVC, starting with version 5.1, the CIM Agent comes integrated with the master console code package or in the SVC cluster.	
2.0.4	(DS with proxy CIM Agent) The CIM Agent for DS8000 must be configured for http or https communication. An application user must be defined in the CIM agent for use by FC Manager (see 8.2). Check for the following parameter settings in cimom.properties: Port=5988 or 5989 ServerCommunication=HTTP or HTTPS DigestAuthentication=false	
2.0.5	(XIV®) XIV® CLI 2.3.1 or later	
2.0.6	(SVC) The CIM Agent is integrated with the master console code package or in the SVC cluster (starting with SVC 5.1). The CIM Agent for SVC must be configured for https or http communication. An application user must be defined in the CIM agent for use by FlashCopy Manager (see 8.3). **By default, SVC is configured for HTTPS communication. Usually, there is no need to alter this default configuration.** However, if the configuration needs to be changed anyhow this can be done on the SVC master console with the `cimconfig` command which can be found in C:\Program Files\IBM\svcconsole\cimom\pegasus\bin. E.g. with the following command the default HTTPS port can be set to 5999: `cimconfig -s httpsPort=5999 -p`	SVC master console
2.0.7	(SVC) For SAN Volume Controller the COPYSERVICES_USERNAME parameter as specified in the FlashCopy Manager profile needs to be assigned to the "Administrator" role.	
2.0.8	(IBM Storwize V7000) The CIM Agent is integrated in the SVC cluster	

IBM CIM Agent for DS Open API Compatibility Matrix:

http://www.ibm.com/support/docview.wss?&uid=ssg1S1002714

Check also the web page: "Technote IBM CIM Agent for DS Open API FAQ - Answers to commonly asked questions"
http://www.ibm.com/support/docview.wss?&uid=ssg1S1003070

CIM Agent 5.4 Download page:

http://www.ibm.com/support/search.wss?rs=1118&tc=STC4NKB&atrn=SWVersion&atrv=5.4*&atrwcs=on&dc=D400&dtm

XCLI download page:

http://www-01.ibm.com/support/docview.wss?rs=1319&context=STJTAG&dc=D400&q1=ssg1*&uid=ssg1S4000813&loc=en_US&cs=utf-8&lang=en

3. Environmental Requirements (general)

	Prerequisite	checked

3.0.1	The ulimits of the tdpvmware user on the Linux server (1.0.2) should at a minimum be set to (check with ulimit -a):
	`data seg size (kbytes)        unlimited`
	`max memory size (kbytes)      131000`
	`stack size (kbytes)           131000`
	Depending on the user's shell and OS level, the output of the command ulimit -a can vary.	

3.0.2	Port 9080 of the Linux server (1.0.2) needs to be accessible from all hosts that use vSphere clients to access the GUI plugin delivered with FlashCopy Manager.	
3.0.3	Internet explorer security settings on all hosts that use vSphere clients to access the GUI plugin delivered with FlashCopy Manager need to permit access to the Linux server (1.0.2).	
3.0.4	The following characters are allowed in data center, datastore and virtual machine names: [A-Z][a-z][0-9]${}=~|:#!&+-._(),; and whitespace	
3.0.5	When naming datastores that are going to be backed up, the name length cannot exceed 31 characters. When the snapshot of the datastore is	

	created, an 11-character identifier is appended to the datastore name. VMware requires datastore names do not exceed 42 characters.	
3.0.6	In order to use Tivoli Storage FlashCopy Manager for VMware to back up and recover virtual machines, you must authenticate to the VMware vCenter Server with a user ID which has a role that has sufficient privileges to perform these operations. You need to add the following privileges: • Datastore -> Allocate space, Browse datastore, Configure datastore, Remove datastore, Rename datastore, Low level file operations, Update virtual machine files • Folder -> Create folder, Delete folder, Rename folder • Host Configuration -> Storage partition configuration, System Management, System resources • Network -> Assign network • Resource -> Assign virtual machine to resource pool • Virtual machine Configuration -> Add existing disk, Add new disk, Add or Remove device, Advanced, Change CPU count, Change resource, Disk change tracking, Disk Lease, Host USB device, Memory, Modify device setting, Raw device, Reload from path, Remove disk, Rename, Reset guest information,Settings, Swapfile placement, Upgrade virtual hardware • Virtual Machine Interaction -> Answer question, Backup operation on virtual machine, Power off, Power on, Reset, Suspend • Virtual machine Inventory -> Create new, Register, Remove, Unregister • Virtual machine Provisioning -> Allow disk access, Allow read-only disk access, Allow virtual machine download, Allow virtual machine files upload • Virtual machine State -> Create snapshot, Remove snapshot, Revert to snapshot Because the recovery operation requires privileges for operations on hosts,networks, and datastores, this new role must be applied to the datacenter object or higher in the VMware vCenter Server hierarchy. Ensure that the checkbox "Propagate to Child Object" is selected when adding the permission. Note: You should consider adding other privileges to this role that might be needed for the user to perform other tasks not related to backup and recovery.	

3.1 CIM Agent User Setup for DS8000

Note: This section can be skipped when the embedded CIM Agent in the HMC of the DS8000 is used with FlashCopy Manager.

	Prerequisite	Checked

3.1.1	See 'DS Open Application Programming Interface Reference' GC35-0493-03 for complete installation instructions for the CIM agent. To allow the CIM agent to communicate with a DS8000 you must first define a DS user, for example by using the DScli:
	
	    /opt/ibm/dscli/dscli
	    dscli> mkuser -pw <password> -group admin <DS-user>
	
	You can change the password settings for the DS user. For example, you can set the expiration to 0 and avoid the locking of a DS user in case of failed logins by using the DScli command:
	
	    dscli> chpass -expire 0 -fail 0	

3.1.2	After installing the CIM agent, a default CIM-user is defined as:
	
	    username: superuser
	    password: passw0rd (with a zero instead of an 'o')
	
	You can add a new CIM-user with CIM 5.1.0.x with the following command:
	
	    /opt/IBM/cimagent/setuser -u superuser -p passw0rd
	    >>> adduser <CIM-user> <password>
	
	You can add a new CIM-user with CIM 5.2.x or 5.3.x with the following command:
	
	    . /opt/IBM/dsagent/config/envConf
	    dscimcli mkuser <CIM-user> -password <password>
	
	This CIM user is used by FlashCopy Manager to connect to the CIM agent, and the CIM user is the one you need to specify in the profile parameter COPYSERVICES_USERNAME of IBM Tivoli Storage Manager for Enterprise Resource Planning.	

3.1.3	After creating the DS user, you can create the DS8000 entry in the CIM agent configuration. For the definition, you have to use with CIM 5.1.0.x the command: /opt/IBM/cimagent/setdevice >>> addessserver <DS-IP-name> <DS-user> <password> For the definition, you have to use with CIM 5.2.x or 5.3.x the command: . /opt/IBM/dsagent/config/envConf dscimcli <DS-IP-name> -type ds -user <DS-user> -password <password>	

3.2 CIM agent user setup for SVC

	Prerequisite	checked
3.2.1	After installing the SVC and its CIM agent, a default CIM-user is defined as: username: superuser password: password You can add a new CIM user with the SVC Web Interface. This CIM user is used by FlashCopy Manager to connect to the CIM agent, and the CIM user is the one you need to specify in the FlashCopy Manager profile parameter COPYSERVICES_USERNAME.	

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