Actifio GO

Backup and Disaster Recovery-as-a-Service

for Google Cloud

Support Matrix - Hybrid

Last updated on June 7, 2022

Contents

Backup and DR End-of-Support-Life Policy

The Backup and DR End-of-Support-Life ("EOSL") Policy covers the process and details regarding the end of support from Backup and DR for third-party systems and software, as well as Backup and DR software and hardware.

Third-party hardware and software include hardware platforms, operating systems, and application software protected by Backup/DR appliances. When a third-party hardware, operating system, or application software/configuration reaches EOSL from the vendor, Backup and DR support for such configurations will be limited to commercially reasonable assistance. Backup and DR will not issue any more hotfixes or updates to support software and hardware systems that are beyond the end of support life from their respective vendors.

Deployment Information

Supported Hypervisors for Sky Deployment

Below table lists the supported VMware hypervisor versions needed to deploy Actifio Sky Virtual Appliance.

Table 1: VMware Hypervisor versions for Actifio Sky Virtual Appliance

VMware	vSphere 6.5, 6.5 u1, 6.5 u2, u3, 6.7, 6.7 u1, 6.7 u2, u3, 7.0, 7.0 u1, 7.0 u2, 7.0 u3
Cloud Hypervisors	Google Cloud, GCVE

Supported Network Protocols

Actifio VDP supports networking over:

- IP - Internet Protocol (IP) is supported only for VMware virtual machines backup and leverages VMware Network Block Device (NBD) transport mode
- iSCSI
- NFS - Actifio supports NFS for capturing and presenting data in following deployment configurations:
    - Presenting any backups to VMware hosts via a NFS datastore
    - Presenting a staging disk for connector-based data capture within a VMware VM

Note: *Only NFS V3 is supported.*

Supported Environments for Backups

Agent-Based Backups

Actifio agent (a.k.a connector) can backup & recover supported databases, file systems & entire system state of supported Microsoft Windows & Linux operating systems in the following environments.

Table 2: Agent-Based Backups

Application Type	GCE Instances	GCVE VMs	VMware VMs (on-premises)	Other Hypervisors (Hyper-V, KVM, Nutanix)	Physical servers[1]
Databases	Yes	Yes	Yes	Yes	Yes
File Systems	Yes	Yes	Yes	Yes	Yes

1 Only file level recovery is supported. Full recovery of the machine (physical or VM) back to the source environment is not supported.

Agentless Backups

Actifio supports the VM backups in the following environments without needing an agent inside the VM.

- On-prem VMware VMs (leverages VMware VADP APIs)

Object Storage Compatibility for OnVault

Actifio OnVault supports the following S3 compatible object storage backends.

Note: *The "versioning" feature should be disabled on buckets used with OnVault for all the below supported object storage.*

Table 3:

Vendor	Storage Type	Min Required Actifio Version
Google	Nearline	V10.0.1
	Coldline	V10.0.1
	Archival	V10.0.4

External Snapshot Pool (a.k.a ESP)

The Actifio GO Sky data mover typically manages its snapshot pool internally, on storage provisioned to it directly (PD on Google Cloud Engine or VMDK in a VMware environment). In addition, the Sky data mover can also manage external snapshot pools by leveraging snapshot capabilities of storage arrays. This can be used in two ways:

- **In-place Capture**: In this configuration, the production volumes reside on the same storage array as the external snapshot pool and Actifio GO controls the storage array to take snapshots of these production volumes. In this configuration, the data in the snapshot pool relies on the production volumes to be available - this is not considered a true backup and it is recommended to also send backups to an OnVault pool and/or to another Sky data mover.
- **Out of Band Capture**: This is similar to a regular snapshot pool capture in that Actifio tracks the changed production blocks and copies them into a staging disk in the snapshot pool (albeit an external snapshot pool). However, it is different in that the staging disk and snapshots are managed externally on the storage array - a full copy is initially made into the ESP and then snapshots of that are incremental. Data movement for backups and recoveries is done directly between the host and the array, without going through the Sky data mover, potentially offering better performance and availability. The production data can reside on the same array as the ESP or on a different array, though typically a different one is used to provide better protection and redundancy.

Note that while both regular snapshot and external snapshot pools can be configured for data capture, you can only use one of those for a given application.

Actifio GO supports ESP on the following storage arrays:

- IBM Storwize models and SAN Volume Controller with firmware 7.5 and later
- Pure Storage FlashArray models with Purity 4.8.8 or later
- Dell EMC Unity storage arrays running UnityOS 4.5 (and above)

Actifio GO supports FC & iSCSI communication protocol between host and the array. However, iSCSI configuration needs to be in place between the Actifio Sky data mover and the storage array.

Note: *ESP is supported only on Windows and Linux versions of operating systems supported by the Actifio connector.*

ESP Supported Application Types

Actifio GO supports Oracle, Microsoft SQL Server, IBM Db2, SAP HANA, SAP ASE, SAP IQ, SAP MaxDB, MySQL, MariaDB, PostgreSQL databases and file system applications.

ESP Limitations with Oracle

- Logs are always copied in full regardless of whether the data capture topology is “In-place” or “Out of Band”.
- For Oracle databases running on ASM:
    - For Linux servers you can use both “In-place” and “Out of Band” capture
    - For Windows servers only “Out of Band” capture is supported
- For Oracle databases running on file systems:
    - Only “Out of Band” capture are supported if the Oracle disk has only one filesystem containing a single database.
    - Only “Out of Band” is supported if multiple databases or multiple filesystems are on the Oracle disk

Application Data Virtualization with Actifio Connector

Actifio agent (commonly also known as connector) is a light weight executable that delivers the following advanced capabilities during the data capture and recovery processes.

- **Application Discovery**: Actifio connectors enable deep discovery of databases and file systems configured on a production host
- **API integration**: Where possible, Actifio connectors integrate with the application specific native APIs/commands for efficient capture of application data
- **Change Block Tracking**: In situations where the production applications do not have a built-in change block tracking, Actifio connector introduces change block tracking on select platforms
- **Application aware recovery/mount**: Actifio connectors have built in application awareness. The connector enables users of Actifio to leverage this awareness to instantiate usable instances of applications during recovery mount operations thereby eliminating the need for performing manual/scripted actions post mount.
- **Generic Application Data Capture framework**: Actifio Connectors provide a generic framework to capture data from any application running on VDP supported Linux operating systems. This framework provides hooks to call custom scripts to achieve application consistent data capture and application instantiation from backup data.

Microsoft Windows Server Support

The Actifio connector supports the following Microsoft Windows operating systems.

Table 4:

Operating System Version	Basic Connector Support	Change Block Tracking Support [2]	Cloud Mobility Support GCP	Cloud Mobility Support VMware	Min Required Connector Version
Windows Server 2012 [1]	Yes	Yes	Yes	Yes	V10.0.1
Windows Server 2012 R2 [1]	Yes	Yes	Yes	Yes	V10.0.1
Windows Server 2016 [1]	Yes	Yes	Yes	Yes	V10.0.1
Windows Server 2019	Yes	Yes	Yes	Yes	V10.0.1
Windows Server 2022	Yes	Yes	Yes	Yes	V10.0.4

1 CSV configurations only supported on these versions

2 CBT is supported only for Microsoft SQL Server

Linux Operating System Support

Actifio connector supports the following Linux (x86) operating systems:.

Table 5:

OS	Version	Basic Connector Support	Change Block Tracking	System State Support (Cloud Mobility) GCP	VMware	Min Required Connector Version
RHEL [1]	6.1 & up	Yes	Yes [2]	Yes	Yes	V10.0.1
	7.0-7.8	Yes	Yes	Yes	Yes	V10.0.1
	7.9	Yes	Yes	Yes	Yes	V10.0.2
	8.0-8.1[4]	Yes	Yes	Yes	Yes	V10.0.1 [5]
	8.2	Yes	Yes	Yes	Yes	V10.0.2 [5]
	8.3	Yes	Yes	Yes	Yes	V10.0.4
	8.4	Yes	Yes	Yes	Yes	V10.0.4
	8.5	Yes	Yes	Yes	Yes	V10.0.4
SLES [1]	11 SP1-4	Yes	Yes [3]	Yes	Yes	V10.0.1
	12 SP0-4	Yes	Yes	Yes	Yes	V10.0.1
	12 SP5	Yes	Yes	No	No	V10.0.1 [5]
	15 SP0-1	Yes	Yes	No	No	V10.0.1 [5]
	15 SP2	Yes	Yes	Yes	Yes	V10.0.4
	15 SP3	Yes	Yes	Yes	Yes	V10.0.4
CentOS [1]	6.0-6.10	Yes	Yes [2]	Yes	Yes	V10.0.1
	7.0-7.6	Yes	Yes	Yes	Yes	V10.0.1
	7.7	Yes	Yes	No	No	V10.0.1 [5]
	7.8	Yes	Yes	No	No	V10.0.2 [5]
	7.9	Yes	Yes	Yes	Yes	V10.0.4
	8.0-8.1 [4, 6]	Yes	Yes	No	No	V10.0.1 [5]
	8.2 [6]	Yes	Yes	No	No	V10.0.2 [5]
	8.3 [6]	Yes	Yes	Yes	Yes	V10.0.4

Table 5:

OS	Version	Basic Connector Support	Change Block Tracking	System State Support (Cloud Mobility)		Min Required Connector Version
				GCP	VMware	
Ubuntu [5]	16.04 LTS	No	No	Yes	Yes	V10.0.1
	18.04 LTS	No	No	Yes	Yes	V10.0.1
	20.04 LTS	No	No	Yes	Yes	V10.0.4
Oracle Enterprise Linux [1]	6.0-6.10	Yes	No	Yes	Yes	V10.0.1
	7.0-7.6	Yes	No	Yes	Yes	V10.0.1
	7.7	Yes	No	Yes	Yes	V10.0.1 [5]
	7.8	Yes	No	Yes	Yes	V10.0.2 [5]
	8.0-8.1	Yes	No	Yes	Yes	V10.0.1 [5]
	8.2	Yes	No	Yes	Yes	V10.0.2 [5]
	8.3	Yes	No	Yes	Yes	V10.0.4
	8.4	No	No	Yes	Yes	V10.0.4
	8.5	No	No	Yes	Yes	V10.0.4

[1] Symantec (Veritas) Dynamic Multi Pathing (DMP) is NOT supported

[2] Change block tracking (CBT) for RHEL 6.x is only supported from RHEL 6.8 onwards and requires kernel version 2.6.32-642.3.1 and above. CBT on CentOS 6.x is supported from CentOS 6.9 onwards.

[3] Change block tracking (CBT) for SLES 11.x is only supported from SLES 11.3 (SP3) onwards.

[4] In rare cases, LVM snapshot command on this OS version may cause the VDP backups to hang. This is a known Red Hat issue. Internal bug ID for this bug as maintained by Red Hat is 1758605. Actifio recommends that you upgrade the Linux kernel to the latest available one on RHEL/CentOS 8.1 release. For more information, visit https://access.redhat.com/solutions/5049041. Alternatively, customers can contact the Red Hat / CentOS support team for further assistance.

[5] Minimum connector version required for CloudMobility (SystemState) for this OS version is V10.0.4

[6] The CentOS Project declared end-of-life for CentOS Linux 8.x as of 31 December 2021, and as a result it is unsupported in Backup and DR. CentOS Linux 7.x is still supported.

Microsoft SQL Server

Actifio connectors support database consistent data capture (snapshots) from Microsoft SQL Server.

Table 6:

Version	Supported Configurations	Min Required Connector Version
2019	Standalone	V10.0.1
	AAG	V10.0.1
	Failover Instance [1]	V10.0.1
2017	Standalone	V10.0.1
	AAG	V10.0.1
	Failover Instance 1	V10.0.1
2016	Standalone	V10.0.1
	AAG	V10.0.1
	Failover Instance 1	V10.0.1
2014	Standalone	V10.0.1
	AAG	V10.0.1
	Failover Instance 1	V10.0.1
2012, 2012 R2	Standalone	V10.0.1
	AAG	V10.0.1
	Failover Instance 1	V10.0.1

1 No support for app-aware mounts into a SQL Server Instance running on a Microsoft Failover Cluster if any of its nodes have been discovered as a virtual machine

Oracle

Actifio connectors enable database consistent data capture of Oracle databases. Oracle must be run in ARCHIVELOG mode. Data capture supports capturing data to staging disks formatted as file systems or presented as ASM disk group targets.

Data can also be captured from Oracle Non Active Data Guard and Active Data Guard configurations.

Table 7:

Oracle Family	Versions	Config Types	Min Required Connector Version
Oracle 19c [4]	All Versions	Standalone	V10.0.1
		RAC	V10.0.1
		Exadata [2]	V10.0.1
		Non Active Data Guard [3]	V10.0.1
		Active Data Guard [3]	V10.0.1
Oracle 18c [4]	All Versions	Standalone	V10.0.1
		RAC	V10.0.1
		Exadata [2]	V10.0.1
		Non Active Data Guard [3]	V10.0.1
		Active Data Guard [3]	V10.0.1
Oracle 12c [1], [4]	12c R1, R2	Standalone	V10.0.1
		RAC	V10.0.1
		Exadata [2]	V10.0.1
		Non Active Data Guard [3]	V10.0.1
		Active Data Guard [3]	V10.0.1

1 App aware mounts require a minimum version of 12.1.0.2 with patch 19404068

2 Oracle Exadata system is supported with iSCSI and NFS

3 Oracle database CBT is enabled on ActiveDG only by Oracle

4 Data capture of Oracle 12c is at container level (that includes all PDBs). App-aware mount on a target is at Container level. Virtual PDBs to an existing container is supported using custom scripts

Oracle Exadata Support

Actifio supports the following configurations of Oracle Exadata:

- Exadata Database Machine versions: X4 and higher
- Oracle versions: 11g, 12c, 18c and 19c

Note: *Actifio support is limited to Exadata machines running Oracle Enterprise Linux version 6.0+.*

Supported Data Capture And Data Presentation Methods

Actifio supports a variety of capture and presentation methods for Oracle databases under various configurations. This includes backup, recovery and App aware mount operations of Oracle database with TDE (Transparent Data Encryption). For Oracle databases with TDE, the wallet for TDE can be captured by setting the Oracle Configuration file location advanced setting for the Oracle app. App aware mounts for TDE enabled databases requires the wallet to be copied to the appropriate location on the mount host.

Note: *Recovery of Oracle data captured from a Big Endian machine onto a Little Endian machine and vice versa are not supported.*

Also note that dNFS with Oracle is supported on Linux operating systems.

Table 8:

Production DB Configuration	Capture Format[1]	Presentation Format[2]
DB files on ASM/ RAC	Filesystem (Block Device)	Standalone Filesystem
	Filesystem (NFS)	Standalone Filesystem (NFS)
	Filesystem (NFS)	RAC Filesystem (NFS)
	ASM Disk Group [3, 5]	Standalone ASM
	ASM Disk Group [3, 6]	ASM RAC (one or more nodes)
DB files on filesystem	Filesystem (Block Device)	Standalone Filesystem
	Filesystem (NFS)	Standalone Filesystem (NFS)
	ASM Disk Group [3, 4, 5]	Standalone ASM
	ASM Disk Group [3, 4, 6]	ASM RAC (one or more nodes)

1 Capture Format is the resulting format of the copy managed by Actifio.

2 App aware mounts of Oracle 12c PDB backup images to Windows hosts is not supported.

3 Capture from ASM to ASM and presentation of backups in ASM format not supported on Windows operating systems

4 Oracle ASM instance required on the source system for this capture method

5 The combination of ASM Disk (capture format) and Standalone ASM (presentation format) is not supported when data is captured over NFS

6 The combination of ASM Disk (capture format) and ASM RAC (presentation format) is not supported when data is captured over NFS

Table 9: Supported Data Capture and Presentation Methods for Oracle Exadata

Supported Data Capture formats	Using File System Using ASM Disk Group
Backup support	HCC or Non HCC Data
Traditional Recovery using RMAN	HCC or non HCC
App-Aware Mount [1]	Exadata to Exadata Exadata to non Exadata

1 Accessing data from virtual copies of HCC compressed data will require the data to be uncompressed before access

IBM Db2

With VDP 9.0.3 release, Actifio enhanced its out-of-the-box support for data management of IBM Db2 database applications and supports the following data capture methods:

- Db2 on Linux can be captured at the volume level in an incremental-forever fashion with instant access and virtual clone creation for Test Data Management (TDM). This leverages Linux LVM and Actifio's Changed Block Tracking capabilities and is the recommended alternative.
- For customers not using LVM or who cannot use volume level capture, Db2 on Linux can alternatively be captured using full + incremental backup. This uses the database's traditional dump-based backup and typically runs as a weekly full and daily incremental. Recovery involves reconstructing the incrementals on top of the latest full backup.

Table 10:

Database	Supported Versions	Min Required Connector Version
Db2	10.5, 11.1, 11.5	V10.0.1

SAP

Actifio supports SAP on all the databases covered/supported in this document.

SAP HANA

Actifio connector supports capturing SAP HANA in the following configurations.

Table 11:

Supported Configuration	Supported Capture Mode		Min Required Connector Version
	SAP HANA storage snapshot API [2]	SAP file-based (HDBSQL/Backint) [3]	
Single Container System (HANA 1.0) [1]	Yes (Preferred)	Yes	V10.0.1
MDC: Multiple-Container Systems (HANA 2.0) with one tenant database [1]	Yes (Preferred)	Yes	V10.0.1
MDC: Multiple-Container Systems (HANA 2.0) with more than one tenant database [1]	Yes (Preferred) [5]	Yes	V10.0.1
Scale-out MDC: Multiple-Container Systems (HANA 2.0) non shared storage	Yes (Preferred) [5]	Yes	V10.0.1
Scale-out MDC: Multiple-Container Systems (HANA 2.0) shared storage [4]	Not Supported	Yes	V10.0.1
SAP HANA System Replication as a high-availability HANA (1+1)	Yes (Preferred) [5]	Yes	V10.0.1

1 Supports both Actifio block and NFS disk mapping options

2 HANA storage snapshot API leverages Actifio CBT and supports incremental-forever and app-aware instant mount feature with log roll forward option. Actifio supports CBT with HANA on RHEL 7.2 and above & SLES 11 SP3 and above. For full list of CBT qualified RHEL & SLES versions see table 2.3

3 HANA File-based (HDBSQL/Backint) API only supports weekly full with daily incrementals. Supports traditional recovery using HANA HDBSQL/Backint commands. Also App-aware instant mount capability is not supported with HANA File-based (HDBSQL/Backint) API

4 Supports only Actifio NFS disk mapping option. NFS disk is always mapped to all HANA nodes

5 Requires SAP HANA 2.0 SPS 04 or above

Note: *HANA log backup is integrated with database backup policies. It is automatic in all configurations.*

SAP HANA – Supported Operating Systems & Architectures

Below table captures VDP support for SAP HANA supported operating systems on various architectures.

Table 12:

OS	Supported Backup Type	
	HANA Storage Snapshot API (Leverages Actifio CBT)[1]	**HANA File-based (HDBSQL) API [2]**
RHEL	RHEL 7.2 or later [1]	RHEL 7.2 or later [2]
SLES	SLES 11 SP3 or later [1]	SLES 11 SP3 or later [2]

1 For the full list of CBT qualified RHEL & SLES versions and minimum required VDP versions, see Linux Operating System Support.

2 For Non-CBT qualified RHEL & SLES versions, see Linux Operating System Support.

> ***Note:*** *Underlying volumes of SAP HANA should NOT be protected using Actifio as SAP HANA DB backup before their file systems are protected by using SystemState backups. If the underlying volumes are protected using Actifio as SAP HANA DB backup (using LVM snapshot with CBT or file-based backup integrated with backint) and if their filesystems are protected by using SystemState backups, then exclude '/hana/log' & '/hana/data' from the SystemState.*

SAP ASE (formerly Sybase ASE)

With VDP 9.0.3 release, Actifio enhanced its out-of-the-box support for data management of SAP ASE database applications and supports the following data capture methods:

- SAP ASE on Linux can be captured at the volume level in an incremental-forever fashion with instant access and virtual clone creation for TDM. This leverages Linux LVM and Actifio's Changed Block Tracking capabilities and is the recommended alternative.
- For customers not using LVM or who cannot use volume level capture, SAP ASE on Linux can alternatively be captured using full + incremental backup. This uses the database's traditional dump-based backup and typically runs as a weekly full and daily incremental. Recovery involves reconstructing the incrementals on top of the latest full backup.

Table 13:

Database	Supported Versions	Min Required Connector Version
SAP ASE	15.7, 16.0.x	V10.0.1

MySQL

With VDP 9.0.4 release, Actifio enhanced its out-of-the-box support for data management of MySQL database applications and supports the following data capture methods:

- MySQL on Linux can be captured at the volume level in an incremental-forever fashion with instant access and virtual clone creation for TDM. This leverages Linux LVM and Actifio's Changed Block Tracking capabilities and is the recommended alternative.
- For customers not using LVM or who cannot use volume level capture, MySQL on Linux can alternatively be captured using full + incremental backup. This uses the database's traditional dump-based backup and typically runs as a weekly full and daily incremental. Recovery involves reconstructing the incrementals on top of the latest full backup.

Table 14:

Database	Supported Versions	Min Required Connector Version
MySQL	5.7, 8.0	V10.0.1

MariaDB

VDP 10.0.0 release provides enhanced out-of-the-box support for data management of MariaDB database applications and supports the following data capture methods:

- MariaDB on Linux can be captured at the volume level in an incremental-forever fashion with instant access and virtual clone creation for TDM. This leverages Linux LVM and VDP Changed Block Tracking capabilities and is the recommended alternative.
- For customers not using LVM or who cannot use volume level capture, MariaDB on Linux can alternatively be captured using full + incremental backup. This uses the database's traditional dump-based backup and typically runs as a weekly full and daily incremental. Recovery involves reconstructing the incrementals on top of the latest full backup.

Table 15:

Database	Supported Versions	Min Required Connector Version
MariaDB	10.3.9	V10.0.1

SAP IQ (formerly Sybase IQ)

VDP 10.0.0 release provided enhanced out-of-the-box support for data management of SAP IQ database applications using full + incremental capture method using the database's traditional dump-based backup, typically as a weekly full and daily incremental. Recovery involves reconstructing the incrementals on top of the latest full backup.
With 10.0.1 release, VDP supports capturing SAP IQ at the volume level in an incremental-forever fashion with instant access and virtual clone creation for TDM. This leverages Linux LVM and VDP Changed Block Tracking capabilities and is the recommended alternative.

Table 16:

Database	Supported Versions	Min Required Connector Version
SAP IQ (Full + Incremental)	16.x	V10.0.1
SAP IQ (LVM + CBT) 1	16.x	V10.0.1

SAP MaxDB

VDP 10.0.1 release provides enhanced out-of-the-box support for data management of SAP MaxDB database applications and supports the following data capture methods:

- SAP MaxDB on Linux can be captured at the volume level in an incremental-forever fashion with instant access and virtual clone creation for TDM. This leverages Linux LVM and VDP Changed Block Tracking capabilities and is the recommended alternative.
- For customers not using LVM or who cannot use volume level capture, MaxDB on Linux can alternatively be captured using full + incremental backup. This uses the database's traditional dump-based backup and typically runs as a weekly full and daily incremental. Recovery involves reconstructing the incrementals on top of the latest full backup.

Table 17:

Database	Supported Versions	Min Required Connector Version
MaxDB	7.9	V10.0.1

PostgreSQL

With VDP 10.0.2 release, Actifio enhanced its out-of-the-box support for data management of PostgreSQL database applications and supports the following data capture methods:

- PostgreSQL on Linux can be captured at the volume level in an incremental-forever fashion with instant access and virtual clone creation for TDM. This leverages Linux LVM and Actifio's Changed Block Tracking capabilities and is the recommended alternative.
- For customers not using LVM or who cannot use volume level capture, PostgreSQL on Linux can alternatively be captured using full + incremental backup. This uses the database's traditional dump-based backup and typically runs as a weekly full and daily incremental. Recovery involves reconstructing the incrementals on top of the latest full backup.

Table 18:

Database	Supported Versions	Min Required Connector Version
PostgreSQL	9.6.x, 10.x, 11.x & 12.x	V10.0.2

MongoDB

With VDP 10.0.0 release, Actifio supports the following versions of MongoDB.

Table 19:

Database	Supported Versions	Min Required Connector Version
MongoDB	3.4.x to 4.2.x	V10.0.0

Note: *MongoDB support is limited to replica set based configurations only. MongoDB clusters in sharded configuration are not supported.*
Support for MongoDB is provided through a generic application framework and requires manual discovery of MongoDB database and configuration of pre/post scripts

File Systems

Actifio connectors discover each volume/network mount point as a protectable application. For each of these discovered applications, Actifio connector orchestrates the process of achieving consistency (through VSS/LVM snapshots), presents a staging disk which will be formatted with a file system of the same type as source or a compatible file system type as documented below.

Table 20:

Operating System	Source FS	Staging Disk FS	Min Required Connector Version
Windows	NTFS	NTFS	V10.0.1
	CIFS	NTFS	V10.0.1
	ReFS	ReFS	V10.0.1
Linux [1]	EXT2	EXT2 or NFS [4]	V10.0.1
	EXT3	EXT3 or NFS [4]	V10.0.1
	EXT4	EXT4 or NFS [4]	V10.0.1
	XFS	XFS or NFS [4]	V10.0.1
	ReiserFS	ReiserFS or NFS [4]	V10.0.1
	NFS	EXT3 or NFS [4]	V10.0.1
	BTRFS	EXT3 or NFS [4]	V10.0.2

1 LVM snapshot is used as source, if present. LVM mount back to same server is supported

2 Built in versions only

3 Encryption not supported

4 Only V3 of NFS protocol is supported

Test Data Management with Containers

Actifio VDP 10.0.1 leverages Kubernetes NFS volumes to make application data captured with VDP available as NFS shares to containers. This allows for creating virtual clones of supported databases that's easily accessible from within the containerized environment.

> ***Note:*** *Only MySQL and PostgreSQL databases on supported Linux OS are eligible for Test Data Management with containers.*

Applications that are Unsupported in GO Hybrid

Existing Actifio customers when migrating to Actifio GO should note that these applications, operating systems, cloud providers and object storage will not be supported.

Applications

- Microsoft Exchange
- Microsoft Sharepoint

Operating Systems

- HP-UX
- IBM AIX
- Solaris

Hypervisors

- Microsoft Hyper-V

Cloud Providers

- Amazon AWS
- VMware Cloud
- Microsoft Azure
- Oracle Cloud
- Alibaba Cloud

Cloud Object Storage

- Amazon S3 & S3-IAS
- Microsoft Azure Blob Storage
- Wasabi object storage
- Alibaba Cloud Object Storage
- Catalyst Cloud Container Service (S3 buckets)
- Oracle Cloud Infrastructure Object Storage
- Fujitsu NIFCLOUD Object Storage
- iland Secure Cloud Object Storage

All on-premises object storage

Data Virtualization for Virtual Environments

VMware

Actifio supports capturing data from VMware virtual machines by leveraging VMware APIs for data protection (VADP) calls to capture an entire virtual server. Specifically, the API calls can:

- Perform change block tracking: Makes an initial full snapshot of a database, then going forward only snapshots the changes to the database thereby enabling Actifio's incremental forever capture strategy.
- Quiesce applications: Ensures application consistency during capture.

Note: *Protection of VMware View virtual machines not supported*

Table 21:

vCenter	6.0 U1 [1], 6.0 U2, 6.0 U3 [2]
	6.5, 6.5 U1, 6.5 U2, 6.5 U3
	6.7, 6.7 U1, 6.7 U2, 6.7 U3
	7.0 [9], 7.0 U1 [9], 7.0 U2 [9,] 7.0 U3
ESX Server	6.0 U1 [1], 6.0 U2, 6.0 U3 [2]
	6.5, 6.5 U1, 6.5 U2, 6.5 U3
	6.7, 6.7 U1, 6.7 U2, 6.7 U3
	7.0, 7.0 U1, 7.0 U2
Virtual Hardware	7 to 15 [7] and 17 [7], 18 [7], 19 [7]
Guest OS	All VMware supported OS
Quiesce applications [5]	Yes, based on VMware Tools
vSAN Support [3, 8]	vSAN 6.0-6.6, vSAN 6.7, vSAN 6.7 U1, vSAN 6.7 U2 & U3, vSAN 7.0 U1, vSAN 7.0 U2, vSAN 7.0 U3
Change Block Tracking [6]	Leverages VMware VADP API

1 Minimum version of ESX required is 6.0 Update 1 with a build number 3247720

2 vSphere/ESX 6.0 u3 requires Actifio software version 7.0.3 or higher

3 vSAN 6.0-6.6 requires a minimum Actifio Sky version 7.0.2

4 Actifio connector not required for Out Of Band capture

5 Capability applicable to any application with a VSS Writer or pre/post scripts to achieve application consistent capture.

6 Not supported for disks presented to production VM's as pRDM

7 NVME Controller types (found on ESX 6.5 and above) are not supported. Virtual hardware version 14 and above are supported only with ESX 6.7 U2 (and above)

8 Since VMware vSAN does not support RDM device access features, mounting of a VM is not supported by Actifio when using RDMs. Restores and Clones of VMs are supported. However, mounting of a VM is supported on Actifio Sky when using NFS transport instead of RDM.

9 Leverages VMware VDDK version 6.7.3

VMware Virtual Volumes

Actifio backup and Mount operations are transparent to VMware VVOLs. Therefore, the backup of a VM, the Mount of a backup as a new VM, and the mount of volumes from a backup into an existing VM are fully supported. These are the most common customer operations. A mount of a backup as a new VM is the fastest way to recover a VM, typically followed by a Storage vMotion operation to move the data online into the desired storage.

The Actifio Restore operation to a VMware VVOL datastore cannot be supported at this time. This operation overwrites the volumes of a backed-up VM with volumes from a point-in-time backup, thereby restoring the original VM to how it was in the past. Actifio has found that although all VVOL implementations by storage vendors are correct for the support of backup and mount operations, some implementations do not fully or correctly support the restore operation.

While most customers typically recover a VM with a Mount as a new VM operation, this operation does create a new VM with a new UUID, MAC address, path within VMware, resource group, and similar settings. If that is unacceptable, and the original VM is still available, a workaround is to perform the following:

1. Mount all the volumes from a backup to the existing, original VM (the one to be recovered).
2. Use VMware edit settings to remove all the original drives.
3. Reboot the VM
4. Once the VM is up, use Storage vMotion to move the data back to production storage.

This will maintain all the original VM's settings.

Orchestrated Disaster Recovery

Actifio GO supports Disaster Recovery orchestration through AGM APIs and custom DR orchestration scripts.

AGM APIs enable you to develop your own automation to perform all DR related tasks. In addition, DR orchestration script examples that use the AGM APIs are available for the following use cases:

- DR orchestration for on-premises VMware to GCVE
- Single-database recoveries for Oracle
- Single-instance recoveries for SQL Server

The script examples can be found on GitHub, using the following links:

- https://github.com/Actifio/AGMPowerCLI: foundation PowerShell module used for AGM API communications.
- https://github.com/Actifio/AGMPowerLib: PowerShell module with user-functions to perform various tasks, including DR orchestration tasks.