Dell EMC PowerScale and Cloudera Replication Manager QATS Certification Report and Process

January 2022

H19036

White Paper

Abstract

This document provides the test summary report of the Cloudera Quality Assurance Test Suite (QATS) certification of Cloudera CDH 6.3.4 to Cloudera CDP 7.1.7 cluster replication using Cloudera Replication Manager on Dell EMC PowerScale powered by Dell EMC PowerScale OneFS 8.2.2.

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Executive summary

Overview

This document provides details for functional testing of Cloudera Replication Manager to replicate Cloudera CDH 6.3.4 to Cloudera Data Platform (CDP) Private Cloud Base 7.1.7 with Dell EMC PowerScale through the HDFS protocol as a primary file system. Dell Technologies and Cloudera field and sales teams can use the information when engaging with customers who want to use Replication Manager to replicate Hadoop clusters running on PowerScale with HDFS as a primary file system.

Revisions

Date	Description
January 2022	Initial release

We value your feedback

Dell Technologies and the authors of this document welcome your feedback on this document. Contact the Dell Technologies team by email.

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Note: For links to other documentation for this topic, see the PowerScale Info Hub.

QATS test environment

The following table details the QATS test environment:

Table 1. QATS test environment

Component	Version/resource
Source cluster: Cloudera CDH	Cloudera Manager 6.3.4: See download information here
	Cloudera Runtime 6.3.4: See download information here
CDP Private Cloud Base version	Cloudera Manager 7.4.4-17486246: See download information here
	Cloudera Runtime 7.1.7: See download information here
Cloudera Replication Manager	CDP 7.1.7 Replication Manager: See more information here
Dell EMC PowerScale CSD	PowerScale-1.1.0.jar
Dell EMC Isilon node	A200-4U-Single-16GB-1x1GE-2X10GE SFP+-30TB-400GB SSD
OneFS operating system	Isilon OneFS v8.2.2.0 B_8_2_2_007(RELEASE)
Compute and operating system	Virtual machines
	CentOS Linux release 7.7.1908 (Core)
	Memory: 64 GB
	CPUs: 32

Note: CDP Ranger had an issue described at RANGER-2626. A OneFS custom patch was developed to fix this Ranger issue for the QATS testing, and the same fix is incorporated in the ***"[PSP-1091]"*** patch made available as a Roll Up Patch (RUP) in May 2021.

PowerScale Custom Service Descriptors (CSD) are built for Dell EMC PowerScale. You can download CSD from the product download page and extract the contents on to the Cloudera Manager server.

The Cloudera full release documentation, including the Cloudera Manager Release Notes and Cloudera Runtime Release Notes, is available here.

Cloudera Replication Manager features certified on Dell EMC PowerScale

Introduction

This section discusses the Cloudera Replication Manager features that are supported and those that are not supported on PowerScale OneFS 8.2.2.

Certified and supported Replication Manager features

The following Cloudera Replication Manager features successfully completed all the functional test cases of the Cloudera QATS Appliance. This feature-specific test success determines the support for HDFS replication of the components on PowerScale OneFS 8.2.2.

HBase snapshots

HBase snapshots allow you to create point-in-time backups of tables without making data copies and with minimal impact on RegionServers. For detailed information, see Snapshots under Replication Manager.

HDFS replication

HDFS replication enables you to copy (replicate) your HDFS data from one HDFS service to another, synchronizing the data set on the destination service with the data set on the source service, based on a specified replication policy. The destination service must be managed by the Cloudera Manager Server where the replication is being set up, and the source service can be managed by that same server or by a peer Cloudera Manager Server. You can also replicate HDFS data within a cluster by specifying different source and destination directories.

Remote Replication Manager automatically copies HDFS metadata to the destination cluster as it copies files. HDFS metadata need only be backed up locally. For detailed information, see HDFS Replication under Replication Manager.

Hive/Impala replication

Hive/Impala replication enables you to copy (replicate) your Hive metastore and data from one cluster to another and synchronize the Hive metastore and data set on the destination cluster with the source, based on a specified replication policy. For detailed information, see Hive/Impala replication under Replication Manager.

Sentry to Ranger replication

When you create or edit a Hive replication policy, you can choose to migrate the Sentry policies for Hive objects, Impala data, and URLs that are being replicated. The Replication Manager converts the Sentry policies to Ranger policies for the migrated data in the target cluster. The minimum supported Cloudera Manager version 6.3.1 and above is required to replicate Sentry policies to Ranger. For detailed information, see Sentry to Ranger replication for Hive replication policies.

Unsupported Replication Manager features

Any Replication Manager features not listed in Certified and supported Replication Manager features are to be considered as not supported features of the Cloudera Replication Manager for a Cloudera cluster deployed on PowerScale OneFS 8.2.2.

Setup, issues, and workarounds

Environment setup

Cloudera CDP 7.1.7 installation on PowerScale OneFS 8.2.2

The following steps outline the standard process that is used for setting up the Cloudera Data Platform Private Cloud Base 7.1.7, including any service-specific workaround employed during the Cloudera QATS testing:

1. Set up the CDP 7.1.7 cluster using the instructions in the *CDP Private Cloud Base Installation Guide*.
2. Set up CDP on PowerScale. Dell Technologies used the following installation guide, which can be downloaded from the product download page: *Dell EMC PowerScale OneFS 8.2.2 and CDP Private Base 7.1.6 Install Guide*

Replication Manager setup on PowerScale

The following steps outline the process used for setting up Replication Manager on PowerScale:

1. Source cluster: Cloudera CDH 6.3.4 cluster health check

   Ensure that the source cluster is healthy and that any errors or warnings are addressed before proceeding with the cluster replication process.

2. Source cluster: Cloudera Manager upgrade

   Upgrade the source Cloudera Manager to the target cluster Cloudera Manager. We recommend upgrading it to 7.4.4 (7.4.4-17486246). For detailed information, see Upgrading Cloudera Manager 6.

3. Target cluster: Cloudera CDP 7.1.7 cluster health check

   Ensure that the target cluster is healthy and that any errors or warnings are addressed before proceeding with the cluster replication process.

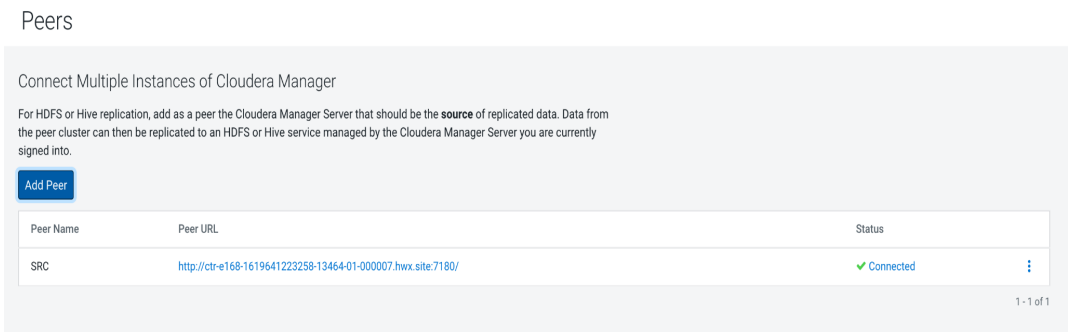
4. Enabling replication between clusters with Kerberos authentication

   To enable replication between clusters, additional setup steps are required to ensure that the source and destination clusters can communicate. For detailed information, see Enabling replication between clusters with Kerberos Authentication.

5. Configuring replication with Kerberos and PowerScale

   If you plan to use replication between clusters that have enabled Kerberos, then you need to create a Custom Kerberos Keytab and principal for replication jobs to use to authenticate. For detailed information, see Configuring Replication with Kerberos and Dell EMC PowerScale.

6. Target cluster: Adding “Peers” in the CDP cluster and creating replication policies

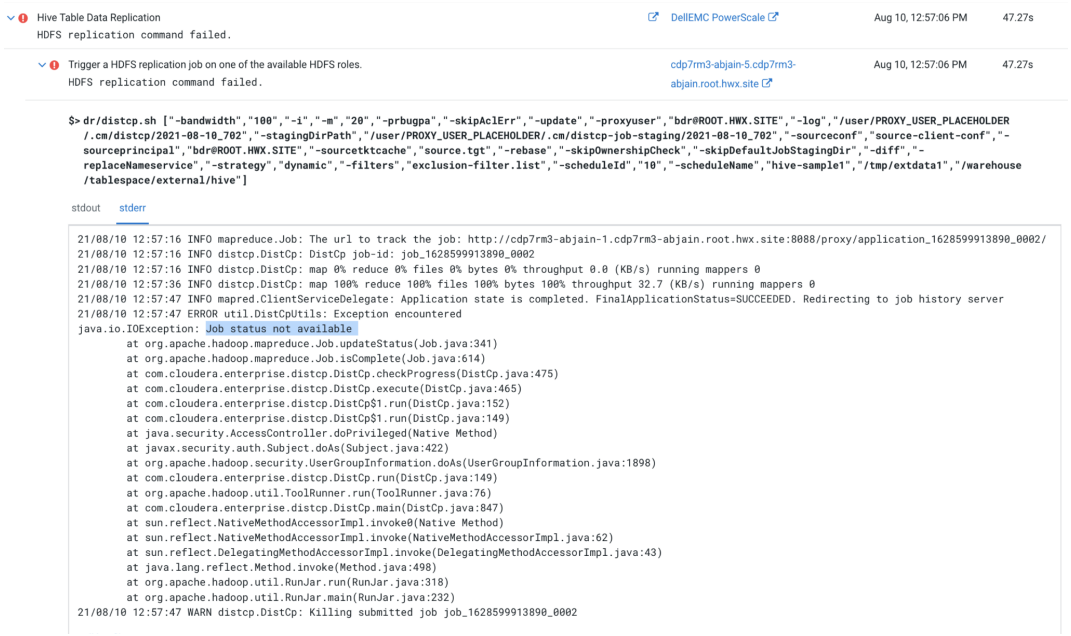


NOTE: Ensure that the Cloudera Manager version of the source cluster is 7.4.4 (7.4.4-17486246) and not 6.3.x.

Issues and workaround

Note the following known issues and workarounds:

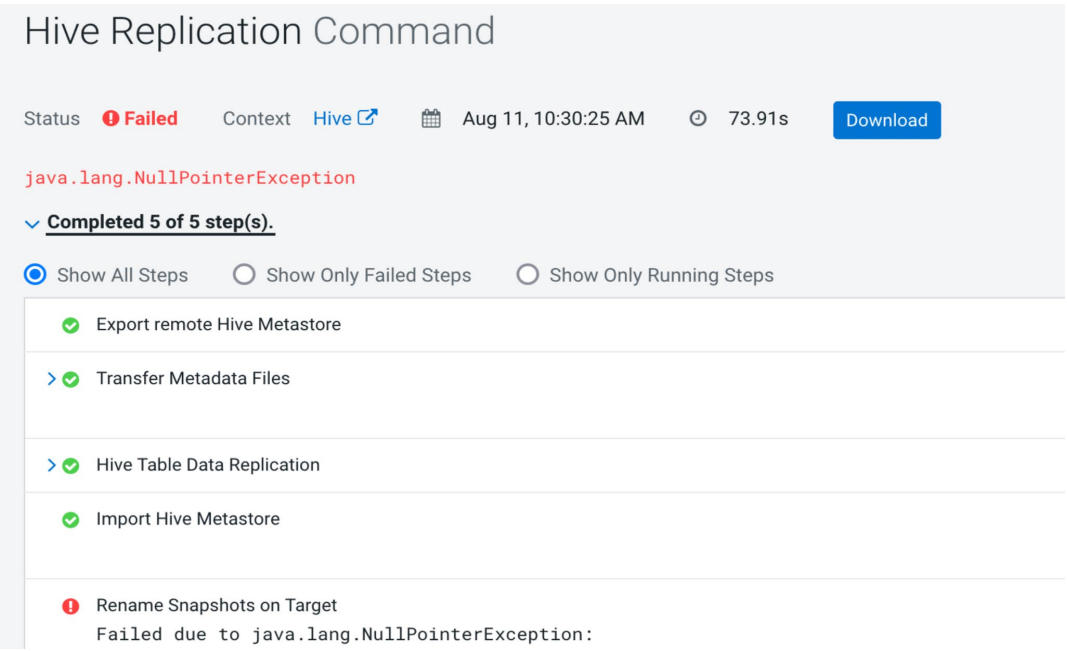
- **Hive Replication issue:** When copying (distCp), the data is copied to the target cluster, but the job fails to get the job status at the **Hive Table Data Replication** step.



Solution: CM > Yarn > Configuration > HDFS Replication Advanced Configuration Snippet (Safety Valve) for yarn-site.xml

```
<property><name>mapreduce.jobhistory.intermediate-done-
dir</name><value>/user/history/done_intermediate</value></pro
perty>
```

- **Hive Replication issue:** Replication fails at the last step, **Rename Snapshots on Target**, with NullPointerException.



  Solution: Set `distcp.copy.diff` to `false` in hdfs_client_config_safety_valve

- **Impersonation error**: To avoid an impersonation error, add root, bdr (Run As User) to the hive proxyusers in PowerScale.

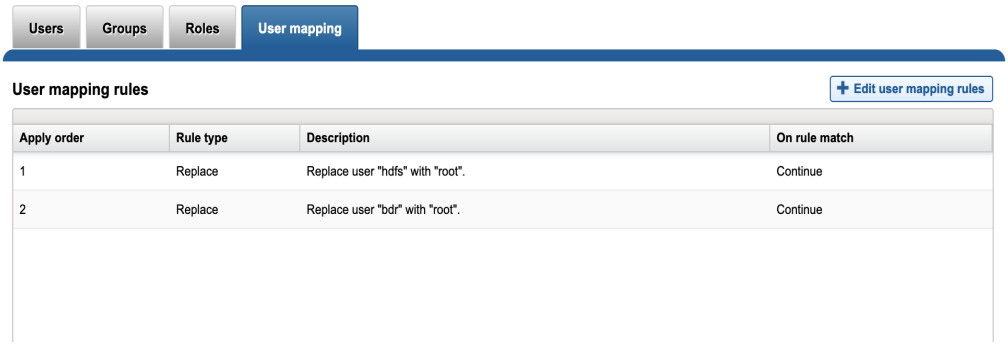
  ```
  isi hdfs proxyusers modify hive --zone=System --add-user=root
  isi hdfs proxyusers view hive --zone=System
  ```

- **Error in getting credentials for local/remote HDFS service**

  Solution: Add the group name of the user (for example, bdr) who will be used as Run As Username of the replication schedule as “Authorized Admin Group” in target cluster HDFS/PowerScale service's configuration in CM.

- **Change permission not working after distcp job is run**

  Solution: Add a user mapping rule in PowerScale. For example:



- **No option to change default “Log Expiration” for BDR**

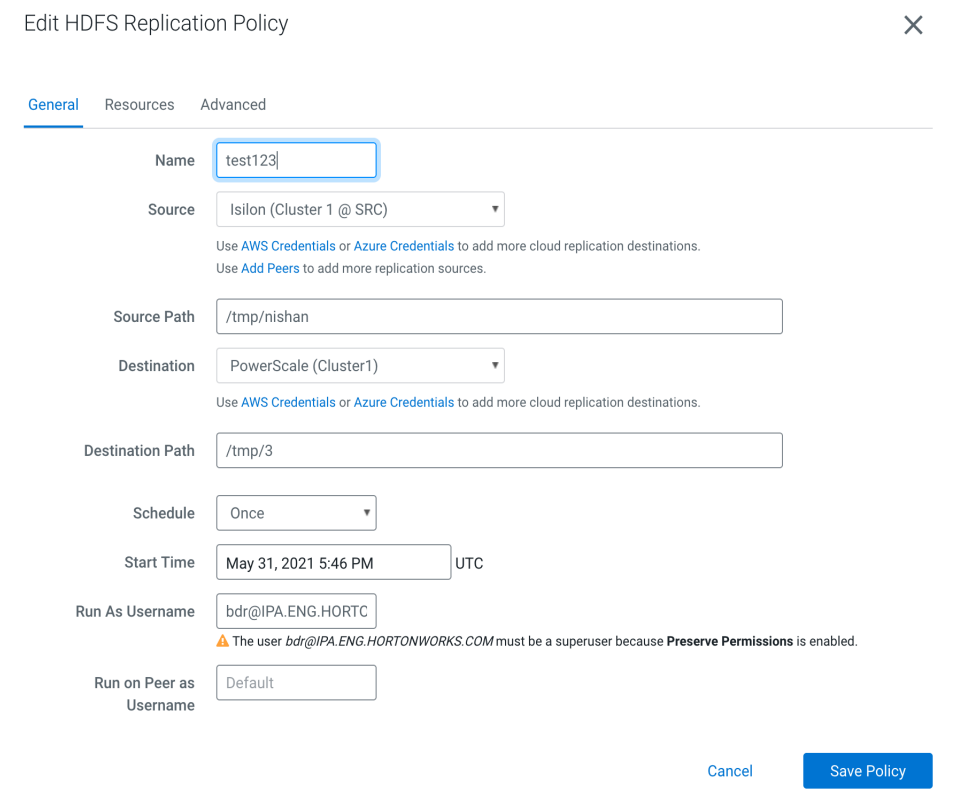
  Workaround: By default (if the Log Path is not provided under the replication policy in CM), the logs are kept under “/user/<username>/.cm/distcp”; otherwise, “<userProvidedLogPath>/.cm/distcp” is used to keep the logs for distcp jobs. Currently, the user cannot change the default log expiration time (internal Cloudera Jira). Thus, if the space is the constraint, these logs have to be cleaned up manually.

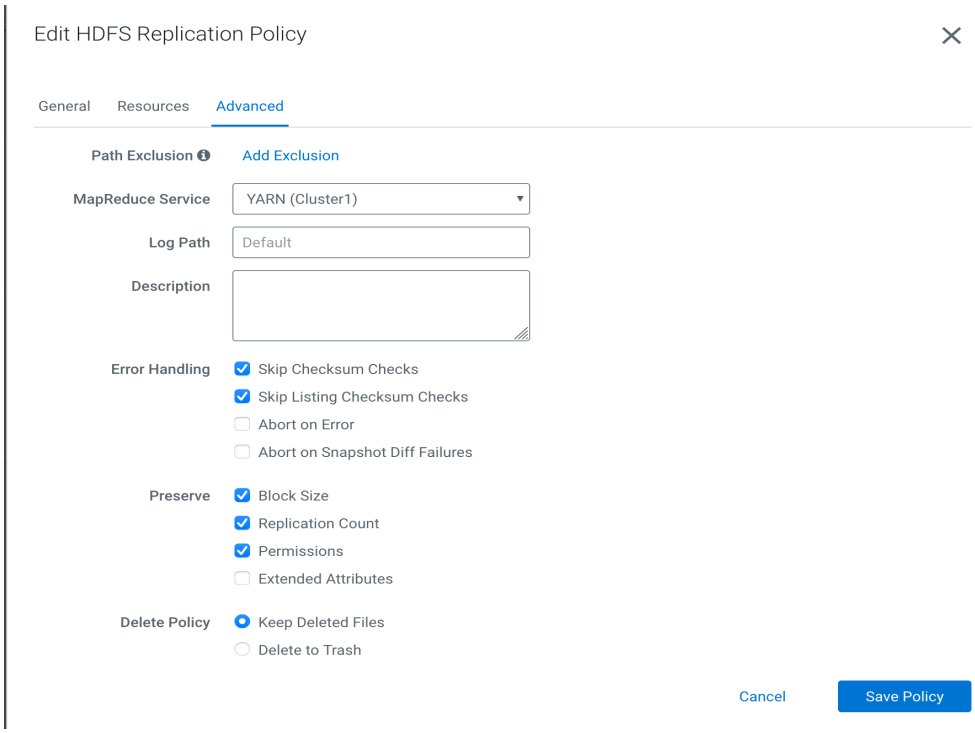
Technical support and resources

Dell.com/support is focused on meeting customer needs with proven services and support.

Storage technical documents and videos provide expertise that helps to ensure customer success on Dell EMC storage platforms.

Appendix: HDFS replication policy reference





Replication Policies

Replication History

Name repltest Type HDFS Source isilon (Cluster 1 @ SRC) Destination PowerScale (Cluster1) Next Run None scheduled.

Start Time	Duration	Outcome	Files Expected		Files Copied		Files Failed		Files Deleted		Files Skipped	
May 31, 2021 6:04 PM	1 min	Successful	2	(80 B)	2	(80 B)	0	(0 B)	0	0		(0 B)
May 31, 2021 5:56 PM	1 min	Successful	2	(80 B)	0	(0 B)	0	(0 B)	0	2		(80 B)
May 31, 2021 5:54 PM	0 min	Failed Dry Run	0	(0 B)	0	(0 B)	0	(0 B)	0	0		(0 B)
May 31, 2021 5:52 PM	1 min	Successful	2	(80 B)	0	(0 B)	0	(0 B)	0	2		(80 B)
May 31, 2021 5:36 PM	1 min	Successful	2	(80 B)	0	(0 B)	0	(0 B)	0	2		(80 B)
May 31, 2021 5:32 PM	1 min	Failed	2	(80 B)	0	(0 B)	2	(80 B)	0	2		(80 B)
May 26, 2021 12:23 PM	1 min	Failed	2	(80 B)	2	(80 B)	2	(80 B)	0	0		(0 B)
May 26, 2021 12:20 PM	0 min	Failed	0	(0 B)	0	(0 B)	0	(0 B)	0	0		(0 B)

Edit Snapshot Policy

Service: HBase (Cluster1)

Name: snaptest1

Description:

Tables: t1

Schedule: Hourly

Take snapshots every hour at 05 minute(s)

Hourly snapshots to keep 10

Daily

Weekly

Monthly

Yearly

Alerts: On failure

Cancel Save Policy

Snapshot Policies

Snapshots History

Policy Name snaptest1 Type HBASE Cluster Cluster1 Service HBase Snapshot Prefix cm-auto-21e161f6-7d73-401a-bbdb-36a0fa197b9c

Start Time	Outcome	Tables Processed	Tables Unprocessed	Snapshots Created	Snapshots Deleted	Errors During Creation	Errors During Deletion
May 31, 2021 1:05 PM	Successful	1	0	1	1	0	0
May 31, 2021 12:05 PM	Successful	1	0	1	1	0	0
May 31, 2021 11:05 AM	Successful	1	0	1	1	0	0
May 31, 2021 10:05 AM	Successful	1	0	1	1	0	0
May 31, 2021 9:05 AM	Successful	1	0	1	1	0	0
May 31, 2021 8:05 AM	Successful	1	0	1	1	0	0
May 31, 2021 7:05 AM	Successful	1	0	1	1	0	0
May 31, 2021 6:05 AM	Successful	1	0	1	1	0	0