PERCONA

Percona Backup for MongoDB Documentation

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INTRODUCTION

Percona Backup for MongoDB is a distributed, low-impact solution for achieving consistent backups of MongoDB sharded clusters and replica sets.

As of version 1.7.0, Percona Backup for MongoDB supports both physical and logical backups and restores. *Point-in-Time Recovery* is currently supported only for logical backups.

Important: Physical backups and restores is the technical preview feature[1]. Before using them in production, we recommend that you test restoring from physical backups in your environment, and also use an alternative backup method for redundancy.

Supported MongoDB versions

Percona Backup for MongoDB is compatible with the following MongoDB versions:

- For *logical* backups - Percona Server for MongoDB and MongoDB Community v4.0 and higher with MongoDB Replication enabled.
- For *physical* backups - Percona Server for MongoDB starting from versions 4.2.15-16, 4.4.6-8, 5.0 and higher with MongoDB Replication enabled and WiredTiger configured as the storage engine.

Important: Percona Backup for MongoDB doesn't work on standalone MongoDB instances. This is because Percona Backup for MongoDB requires an *oplog* to guarantee backup consistency. Oplog is available on nodes with replication enabled.

For testing purposes, you can deploy Percona Backup for MongoDB on a single-node replica set. (Specify the `replication.replSetName` option in the configuration file of the standalone server.)

See also:

MongoDB Documentation: Convert a Standalone to a Replica Set https://docs.mongodb.com/manual/tutorial/convert-standalone-to-replica-set/

The Percona Backup for MongoDB project is inherited from and replaces *mongodb_consistent_backup*, which is no longer actively developed or supported.

[1] Tech Preview Features are not yet ready for enterprise use and are not included in support via SLA (Service License Agreement). They are included in this release so that users can provide feedback prior to the full release of the feature in a future GA (General Availability) release (or removal of the feature if it is deemed not useful). This functionality can change (APIs, CLIs, etc.) from tech preview to GA.

Part I

Features

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- Logical backup and restore
- Physical (a.k.a. 'hot') backup and restore (with Percona Server for MongoDB 4.2.15-16, 4.4.6-8, 5.0.2-1 and higher)
- Works for both for sharded clusters and classic, non-sharded replica sets.
- Point-in-time recovery (for logical backups only)
- Simple command-line management utility
- Simple, integrated-with-MongoDB authentication
- Distributed transaction consistency with MongoDB 4.2+
- Use with any S3-compatible storage
- Users with classic, locally-mounted remote filesystem backup servers can use 'filesystem' instead of 's3' storage type.

Part II

Introduction

CHAPTER

ONE

HOW PERCONA BACKUP FOR MONGODB WORKS

Even in a highly-available architecture, such as with MongoDB replication, backups are still required even though losing one server is not fatal. Whether for a complete or partial data disaster, you can use PBM (Percona Backup for MongoDB) to go back in time to the best available backup snapshot.

Percona Backup for MongoDB is a command line interface. It provides the set of commands to make backup and restore operations in your database.

The following example illustrates how to use Percona Backup for MongoDB.

With Percona Backup for MongoDB up and running in your environment, make a backup:

```
$ pbm backup
```

To also save all events that occurred to the data between the backups, enable saving oplog slices:

```
$ pbm config --set pitr.enabled=true
```

Tip: You can *schedule the frequency of backups* via a cron task

Now, imagine that your web application's update was released on February 7th 03:00 UTC. By 15:23 UTC, someone realizes that this update has a bug that is wiping the historical data of any user who logged in. To remediate this negative impact on data, it's time to roll back up to the time of the application's update - up to February 7th, 03:00 UTC

```
$ pbm list
```

Output

```
Backup snapshots:
  2021-02-03T08:08:15Z [complete: 2021-02-03T08:08:35Z]
  2021-02-05T13:55:55Z [complete: 2021-02-05T13:56:15Z]
  2021-02-07T13:57:58Z [complete: 2021-02-07T13:58:17Z]
  2021-02-09T14:06:06Z [complete: 2021-02-09T14:06:26Z]
  2021-02-11T14:22:41Z [complete: 2021-02-11T14:23:01Z]

PITR <on>:
 2021-02-03T08:08:36Z-2021-02-09T12:20:23Z
 2021-02-09T14:06:27Z-2021-02-11T14:22:40Z
```

The output lists the valid time ranges for the restore. The desired time (February 7th, 03:00 UTC) falls within the `2021-02-03T08:08:36Z-2021-02-09T12:20:23Z` range, so let's restore the database up to that time.

Since the restore and saving oplog slices are exclusive operations and cannot run together, let's stop oplog slicing first:

```
$ pbm config --set pitr.enabled=false
```

Now, restore the database:

```
$ pbm restore --time 2021-02-07T02:59:59
```

To be on the safe side, it is a good practice to make a fresh backup after the restore is complete.

```
$ pbm backup
```

This backup refreshes the timeline and serves as the base for saving oplog slices. To re-enable this process, run:

```
$ pbm config --set pitr.enabled=true
```

Find the full set of commands available in Percona Backup for MongoDB in *pbm commands*.

CHAPTER

TWO

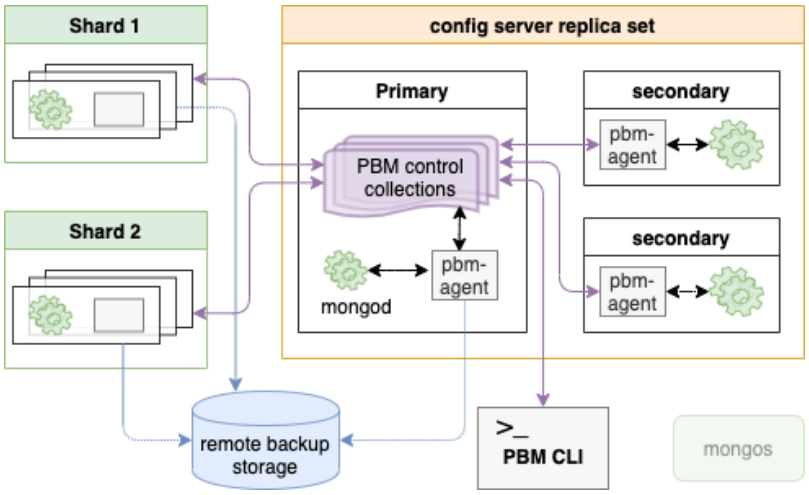
PERCONA BACKUP FOR MONGODB COMPONENTS

Percona Backup for MongoDB consists of the following components:

- *pbm-agent* is a process running on every `mongod` node within the cluster or a replica set that performs backup and restore operations.
- *PBM CLI* is a command-line utility that instructs pbm-agents to perform an operation.

  A single **`pbm-agent`** is only involved with one cluster (or non-sharded replica set). The `pbm` CLI utility can connect to any cluster it has network access to, so it is possible for one user to list and launch backups or restores on many clusters.
- *PBM Control collections* are special collections in MongoDB that store the configuration data and backup states. Both `pbm` CLI and **`pbm-agent`** use PBM Control collections to check backup status in MongoDB and communicate with each other.
- Remote backup storage is where Percona Backup for MongoDB saves backups. It can be either an *S3 compatible storage* or a filesystem-type storage.

The following diagram illustrates how Percona Backup for MongoDB components communicate with MongoDB.



To learn more about Percona Backup for MongoDB architecture, see *Architecture*.

Part III

Getting started

CHAPTER

THREE

INSTALLING PERCONA BACKUP FOR MONGODB

Percona provides and supports Percona Backup for MongoDB installation packages for Debian, Ubuntu, Red Hat Enterprise Linux and CentOS Linux distributions. Find detailed information about supported Linux distributions on the Percona Software and Platform Lifecycle page.

You can install Percona Backup for MongoDB in one of the following ways:

- *from Percona repositories (recommended)*
- *build from source code* if you want full control over the installation
- *download packages from Percona website* and install them using the package manager of your operating system

Alternatively, you can run Percona Backup for MongoDB in a Docker container

Regardless of the installation method you choose, the following tools are at your disposal after the installation completes:

Tool	Purpose
pbm	Command-line interface for controlling the backup system
pbm-agent	An agent for running backup/restore actions on a database host
pbm-speed-test	An interface for field-testing compression and backup upload speed

Install **pbm-agent** on every server that has `mongod` nodes in the MongoDB cluster (or non-sharded replica set). You don't need to install **pbm-agent** on arbiter nodes since they don't have the data set.

You can install `pbm` CLI on any or all servers or desktop computers you wish to use it from, so long as those computers aren't network-blocked from accessing the MongoDB cluster.

3.1 Installing from Percona repositories

This is the recommended installation method. Percona provides the `percona-release` configuration tool that simplifies operating repositories and enables to install and update both Percona Backup for MongoDB packages and required dependencies smoothly.

Install `percona-release` tool using the package manager of your operating system. Follow the instructions in Percona Software repositories documentation to install `percona-release`.

Enable the repository. As of version 1.3.0, Percona Backup for MongoDB packages are stored in the *pbm* repository.

```
$ sudo percona-release enable pbm release
```

3.1.1 Install Percona Backup for MongoDB on Debian and Ubuntu

Reload the local package database:

```
$ sudo apt update
```

Install Percona Backup for MongoDB:

```
$ sudo apt install percona-backup-mongodb
```

3.1.2 Install Percona Backup for MongoDB on Red Hat Enterprise Linux and CentOS

Use the following command to install Percona Backup for MongoDB:

```
$ sudo yum install percona-backup-mongodb
```

3.2 Building from source code

Building the project requires:

- Go 1.15 or above
- make
- git
- `krb5-devel` for Red Hat Enterprise Linux / CentOS or `libkrb5-dev` for Debian / Ubuntu. This package is required for Kerberos authentication in Percona Server for MongoDB.

See also:

Installing and setting up Go tools https://golang.org/doc/install

To build the project (from the project dir):

```
$ git clone https://github.com/percona/percona-backup-mongodb
$ cd percona-backup-mongodb
$ make build
```

After **`make`** completes, you can find `pbm` and **`pbm-agent`** binaries in the `./bin` directory:

```
$ cd bin
$ ./pbm version
```

By running **pbm version**, you can verify if Percona Backup for MongoDB has been built correctly and is ready for use.

Output

```
Version:   [pbm version number]
Platform:  linux/amd64
GitCommit: [commit hash]
GitBranch: main
BuildTime: [time when this version was produced in UTC format]
GoVersion: [Go version number]
```

Tip: Instead of specifying the path to pbm binaries, you can add it to the `PATH` environment variable:

```
export PATH=/percona-backup-mongodb/bin:$PATH
```

3.2.1 Post-install steps

1. Create the environment file:
   - The path for Debian and Ubuntu is `/etc/default/pbm-agent`.
   - The path for RHEL and CentOS is `/etc/sysconfig/pbm-agent`.
2. Create the `pbm-agent.service` systemd unit file.

   In Ubuntu and Debian, the `pbm-agent.service` systemd unit file is at the path `/lib/systemd/system/pbm-agent.service`.

   In RHEL and CentOS, the path to this file is `/usr/lib/systemd/system/pbm-agent.service`.
3. In the `pbm-agent.service` file, specify the following:

```
[Unit]
Description=pbm-agent
After=time-sync.target network.target

[Service]
EnvironmentFile=-/etc/default/pbm-agent
Type=simple
User=mongod
Group=mongod
PermissionsStartOnly=true
ExecStart=/usr/bin/pbm-agent

[Install]
WantedBy=multi-user.target
```

Note: Make sure that the `ExecStart` directory includes the Percona Backup for MongoDB binaries. Otherwise, copy them from the `./bin` directory of you installation path.

4. Make `systemd` aware of the new service:

```
$ sudo systemctl daemon-reload
```

3.3 Download packages from Percona website

You can download installation packages specific for your operating system from Percona website and install them using `dpkg` (Debian and Ubuntu) or `rpm` (Red Hat Enterprise Linux and CentOS). However, you must make sure that all dependencies are satisfied.

Alternatively, you can download and install Percona Backup for MongoDB from binary tarballs.

3.3.1 Install from binary tarball

Find the link to the binary tarballs under the *Generic Linux* menu item on Percona website.

1. Fetch the binary tarball. Replace the <version> with the required version.

```
$ wget https://downloads.percona.com/downloads/percona-backup-mongodb/percona-
↪backup-mongodb-<version>/binary/tarball/percona-backup-mongodb-<version>-x86_64.
↪tar.gz
```

2. Extract the tarball

```
$ tar -xf percona-backup-mongodb-<version>-x86_64.tar.gz
```

3. Export the location of the binaries to the `PATH` variable. For example, if you've extracted the tarball to your `home` directory, the command would be the following:

```
$ export PATH=~/percona-backup-mongodb-<version>/:$PATH
```

After Percona Backup for MongoDB is successfully installed on your system, you have `pbm` and **`pbm-agent`** programs available. See *Initial setup* for guidelines how to set up Percona Backup for MongoDB.

CHAPTER

FOUR

INITIAL SETUP

The following diagram shows the overview of the installation and setup steps:

Refer to *Installing Percona Backup for MongoDB* for installation instructions. Remember to install **pbm-agent** on every server with a `mongod` node that is not an arbiter node.

The setup steps are the following:

1. *Configure authentication in MongoDB*
2. *Insert the config information for remote backup storage*
3. *Start pbm-agent process*

4.1 Configure authentication in MongoDB

Percona Backup for MongoDB has no authentication and authorization subsystem of its own - it uses the one of MongoDB. This means that to authenticate Percona Backup for MongoDB, you need to create a corresponding `pbm` user in the `admin` database and set a valid MongoDB connection URI string for both **pbm-agent** and `pbm` CLI.

4.1.1 Create the `pbm` user

First create the role that allows any action on any resource.

```
db.getSiblingDB("admin").createRole({ "role": "pbmAnyAction",
      "privileges": [
         { "resource": { "anyResource": true },
           "actions": [ "anyAction" ]
         }
      ],
      "roles": []
   });
```

Then create the user and assign the role you created to it.

```
db.getSiblingDB("admin").createUser({user: "pbmuser",
       "pwd": "secretpwd",
       "roles" : [
          { "db" : "admin", "role" : "readWrite", "collection": "" },
          { "db" : "admin", "role" : "backup" },
```

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```
        { "db" : "admin", "role" : "clusterMonitor" },
        { "db" : "admin", "role" : "restore" },
        { "db" : "admin", "role" : "pbmAnyAction" }
    ]
});
```

You can specify username and password values and other options of the `createUser` command as you require so long as the roles shown above are granted.

Create the `pbm` user on every replica set. In a sharded cluster, this means every shard replica set and the config server replica set.

Note: In a cluster run *db.getSiblingDB("config").shards.find({}, {"host": true, "_id": false})* to list all the host+port lists for the shard replica sets. The replica set name at the *front* of these "host" strings will have to be placed as a "/?replicaSet=xxxx" argument in the parameters part of the connection URI (see below).

4.1.2 Set the MongoDB connection URI for `pbm-agent`

A **`pbm-agent`** process connects to its localhost `mongod` node with a standalone type of connection. To set the MongoDB URI connection string means to configure a service init script (`pbm-agent.service` systemd unit file) that runs a **`pbm-agent`**.

The `pbm-agent.service` systemd unit file includes the environment file. You set the MongoDB URI connection string for the `PBM_MONGODB_URI` variable within the environment file.

The environment file for Debian and Ubuntu is `/etc/default/pbm-agent`. For Redhat and CentOS, it is `/etc/sysconfig/pbm-agent`.

Edit the environment file and specify MongoDB connection URI string for the `pbm` user to the local `mongod` node. For example, if `mongod` node listens on port 27018, the MongoDB connection URI string will be the following:

```
PBM_MONGODB_URI="mongodb://pbmuser:secretpwd@localhost:27018/?authSource=admin"
```

Note: If the password includes special characters like `#`, `@`, `/` and so on, you must convert these characters using the percent-encoding mechanism when passing them to Percona Backup for MongoDB. For example, the password `secret#pwd` should be passed as follows in `PBM_MONGODB_URI`:

```
PBM_MONGODB_URI="mongodb://pbmuser:secret%23pwd@localhost:27018/?authSource=admin"
```

Configure the service init script for every **`pbm-agent`**.

Hint: How to find the environment file

The path to the environment file is specified in the `pbm-agent.service` systemd unit file.

In Ubuntu and Debian, the `pbm-agent.service` systemd unit file is at the path `/lib/systemd/system/pbm-agent.service`.

In Red Hat and CentOS, the path to this file is `/usr/lib/systemd/system/pbm-agent.service`.

Example of pbm-agent.service systemd unit file

```
[Unit]
Description=pbm-agent
After=time-sync.target network.target

[Service]
EnvironmentFile=-/etc/default/pbm-agent
Type=simple
User=pbm
Group=pbm
PermissionsStartOnly=true
ExecStart=/usr/bin/pbm-agent

[Install]
WantedBy=multi-user.target
```

See also:

More information about standard MongoDB connection strings *Authentication*

4.1.3 Set the MongoDB connection URI for `pbm CLI`

Provide the MongoDB URI connection string for `pbm` in your shell. This allows you to call `pbm` commands without the `--mongodb-uri` flag.

Use the following command:

```
export PBM_MONGODB_URI="mongodb://pbmuser:secretpwd@localhost:27018/?authSource=admin&
↪replSetName=xxxx"
```

For more information what connection string to specify, refer to *The pbm connection string* section.

4.1.4 External authentication support in Percona Backup for MongoDB

In addition to SCRAM, Percona Backup for MongoDB supports other authentication method that you use in MongoDB or Percona Server for MongoDB.

For external authentication, you *create the pbm user* in the format used by the authentication system and set the MongoDB connection URI string to include both the authentication method and authentication source.

For example, for Kerberos authentication, create the `pbm` user in the `$external` database in the format `<username@KERBEROS_REALM>` (e.g. pbm@PERCONATEST.COM).

Specify the following string for MongoDB connection URI:

```
PBM_MONGODB_URI="mongodb://<username>%40<KERBEROS_REALM>@<hostname>:27018/?
↪authMechanism=GSSAPI&authSource=%24external&replSetName=xxxx"
```

Note that you must first obtain the ticket for the `pbm` user with the `kinit` command before you start the **`pbm-agent`**:

```
$ sudo -u {USER} kinit pbm
```

Note that the `{USER}` is the user that you will run the `pbm-agent` process.

For authentication and authorization via Native LDAP, you only create roles for LDAP groups in MongoDB as the users are stored and managed on the LDAP server. However, you still define the `$external` database as your authentication source:

```
PBM_MONGODB_URI="mongodb://<user>:<password>@<hostname>:27018/?authMechanism=PLAIN&
↪authSource=%24external&replSetName=xxxx"
```

4.2 Configure remote backup storage

The easiest way to provide remote backup storage configuration is to specify it in a YAML config file and upload this file to Percona Backup for MongoDB using `pbm CLI`.

The storage configuration itself is out of scope of the present document. We assume that you have configured one of the *supported remote backup storages*.

Important:

- When using a remote backup storage (S3 or Microsoft Azure), grant the `List/Get/Put/Delete` permissions to the storage for the user identified by the access credentials. Please refer to the documentation of your selected storage for the permissions configuration.
- When using a filesystem storage, verify that the user running Percona Backup for MongoDB is the owner of the backup directory. The recommended user is *mongod*, so it should be the owner of the backup directory.

```
$ sudo chown mongod:mongod <backup_directory>
```

---

1. Create a config file (e.g. `pbm_config.yaml`).
2. Specify the storage information within.

   The following is the sample configuration for Amazon AWS:

```
storage:
  type: s3
  s3:
    region: us-west-2
    bucket: pbm-test-bucket
    prefix: data/pbm/backup
    credentials:
      access-key-id: <your-access-key-id-here>
      secret-access-key: <your-secret-key-here>
    serverSideEncryption:
      sseAlgorithm: aws:kms
      kmsKeyID: <your-kms-key-here>
```

   This is the sample configuration for Microsoft Azure Blob storage:

```
storage:
  type: azure
  azure:
    account: <your-account>
    container: <your-container>
    prefix: pbm
```

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```
    credentials:
      key: <your-access-key>
```

This is the sample configuration for filesystem storage:

```
storage:
  type: filesystem
  filesystem:
    path: /data/local_backups
```

See more examples in *Example config files*.

3. Insert the config file

```
$ pbm config --file pbm_config.yaml
```

For a sharded cluster, run this command whilst connecting to config server replica set. Otherwise connect to the non-sharded replica set as normal.

To learn more about Percona Backup for MongoDB configuration, see *Percona Backup for MongoDB configuration in a cluster (or non-sharded replica set)*.

4.3 Start the pbm-agent process

Start **pbm-agent** on every server with the mongod node installed. It is best to use the packaged service scripts to run **pbm-agent**.

```
$ sudo systemctl start pbm-agent
$ sudo systemctl status pbm-agent
```

Example

Imagine you put configsvr nodes (listen port 27019) collocated on the same servers as the first shard's mongod nodes (listen port 27018, replica set name "sh1rs"). In this server there should be two **pbm-agent** processes, one connected to the shard (e.g. "mongodb://username:password@localhost:27018/") and one to the configsvr node (e.g. "mongodb://username:password@localhost:27019/").

For reference, the following is an example of starting **pbm-agent** manually. The output is redirected to a file and the process is backgrounded.

Attention: Start the pbm-agent as the mongod user. The pbm-agent requires write access to the MongoDB data directory to make physical restores.

```
$ su mongod nohup pbm-agent --mongodb-uri "mongodb://username:password@localhost:27018/"␣
↪> /data/mdb_node_xyz/pbm-agent.$(hostname -s).27018.log 2>&1 &
```

Replace username and password with those of your pbm user. /data/mdb_node_xyz/ is the path where **pbm-agent** log files will be written. Make sure you have created this directory and granted write permissions to it for the mongod user.

Alternatively, you can run `pbm-agent` on a shell terminal temporarily if you want to observe and/or debug the startup from the log messages.

4.3.1 How to see the pbm-agent log

With the packaged systemd service, the log output to stdout is captured by systemd's default redirection to systemd-journald. You can view it with the command below. See **`man journalctl`** for useful options such as `--lines`, `--follow`, etc.

```
~$ journalctl -u pbm-agent.service
-- Logs begin at Tue 2019-10-22 09:31:34 JST. --
Jan 22 15:59:14 akira-x1 systemd[1]: Started pbm-agent.
Jan 22 15:59:14 akira-x1 pbm-agent[3579]: pbm agent is listening for the commands
...
...
```

If you started **`pbm-agent`** manually, see the file you redirected stdout and stderr to.

When a message *"pbm agent is listening for the commands"* is printed to the **`pbm-agent`** log file, **`pbm-agent`** confirms that it has connected to its `mongod` node successfully.

Part IV

Usage

CHAPTER

FIVE

RUNNING PERCONA BACKUP FOR MONGODB

This document provides examples of using `pbm` commands to operate your backup system. For detailed description of pbm commands, refer to *pbm commands*.

5.1 Listing backups

To view all completed backups, run the **`pbm list`** command.

```
$ pbm list
```

As of version 1.4.0, the **`pbm list`** output shows the completion time. This is the time to which the sharded cluster / non-shared replica set will be returned to after the restore.

Sample output

```
Backup snapshots:
  2021-01-13T15:50:54Z [complete: 2021-01-13T15:53:40Z]
  2021-01-13T16:10:20Z [complete: 2021-01-13T16:13:00Z]
  2021-01-20T17:09:46Z [complete: 2021-01-20T17:10:33Z]
```

In *logical* backups, the completion time almost coincides with the backup finish time. To define the completion time, Percona Backup for MongoDB waits for the backup snapshot to finish on all cluster nodes. Then it captures the oplog

from the backup start time up to that time.

In *physical* backups, the completion time is only a few seconds after the backup start time. By holding the `$backupCursor` open guarantees that the checkpoint data won't change during the backup, and Percona Backup for MongoDB can define the completion time ahead.

5.2 Starting a backup

```
$ pbm backup --type=TYPE
```

As of version 1.7.0, you can specify what type of a backup you wish to make: physical or logical.

Note: Physical backups is the tech preview feature[1]. Before using them in production, we recommend that you test restoring from physical backups in your environment, and also use the alternative backup method for redundancy.

When *physical* backup is selected, Percona Backup for MongoDB copies the contents of the `dbpath` directory (data and metadata files, indexes, journal and logs) from every shard and config server replica set to the backup storage.

During *logical* backups, Percona Backup for MongoDB copies the actual data to the backup storage. When no `--type` flag is passed, Percona Backup for MongoDB makes a logical backup.

For more information about backup types, see *Backup and restore types*.

By default, Percona Backup for MongoDB uses `s2` compression method when making a backup. You can start a backup with a different compression method by passing the `--compression` flag to the **`pbm backup`** command.

For example, to start a backup with gzip compression, use the following command

```
$ pbm backup --compression=gzip
```

Supported compression types are: `gzip`, `snappy`, `lz4`, `pgzip`, `zstd`. The `none` value means no compression is done during backup.

As of version 1.7.0, you can configure the compression level for backups. Specify the value for the `--compression-level` flag. Note that the higher value you specify, the longer it takes to compress / retrieve the data.

Backup in sharded clusters

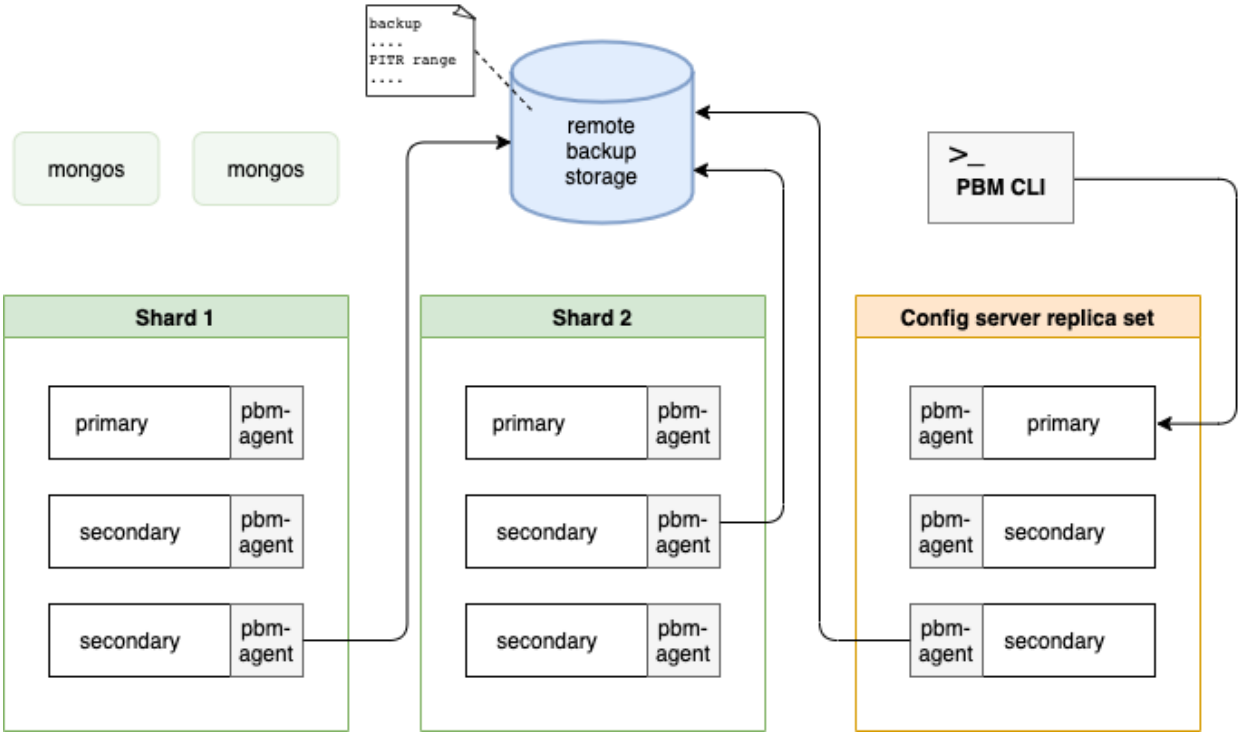
Important: For PBM v1.0 (only): before running **`pbm backup`** on a cluster, stop the balancer.

In sharded clusters, one of **`pbm-agent`** processes for every shard and the config server replica set writes backup snapshots into the remote backup storage directly. For *logical* backups, `pbm-agents` also write *oplog slices*. To learn more about oplog slicing, see *Point-in-Time Recovery*.

The `mongos` nodes are not involved in the backup process.

The following diagram illustrates the backup flow.

[1] Tech Preview Features are not yet ready for enterprise use and are not included in support via SLA. They are included in this release so that users can provide feedback prior to the full release of the feature in a future GA release (or removal of the feature if it is deemed not useful). This functionality can change (APIs, CLIs, etc.) from tech preview to GA.



Important: If you reshard a collection in MongoDB 5.0 and higher versions, make a fresh backup to prevent data inconsistency and restore failure.

Adjust node priority for backups

In Percona Backup for MongoDB prior to version 1.5.0, the `pbm-agent` to do a backup is elected randomly among secondary nodes in a replica set. In sharded cluster deployments, the `pbm-agent` is elected among the secondary nodes in every shard and the config server replica sets. If no secondary node responds in a defined period, then the `pbm-agent` on the primary node is elected to do a backup.

As of version 1.5.0, you can influence the `pbm-agent` election by assigning a priority to `mongod` nodes in the Percona Backup for MongoDB *configuration file*.

```
backup:
  priority:
    "localhost:28019": 2.5
    "localhost:27018": 2.5
    "localhost:27020": 2.0
    "localhost:27017": 0.1
```

The format of the *priority* array is `<hostname:port>:<priority>`.

To define priority in a sharded cluster, you can either list all nodes or specify priority for one node in each shard and config server replica set. The hostname and port uniquely identifies a node so that Percona Backup for MongoDB

recognizes where it belongs to and grants the priority accordingly.

Note that if you listed only specific nodes, the remaining nodes will be automatically assigned priority 1.0. For example, you assigned priority 2.5 to only one secondary node in every shard and config server replica set of the sharded cluster.

```
backup:
  priority:
    "localhost:27027": 2.5  # config server replica set
    "localhost:27018": 2.5  # shard 1
    "localhost:28018": 2.5  # shard 2
```

The remaining secondaries and the primary nodes in the cluster receive priority 1.0.

The `mongod` node with the highest priority makes the backup. If this node is unavailable, next priority node is selected. If there are several nodes with the same priority, one of them is randomly elected to make the backup.

If you haven't listed any nodes for the `priority` option in the config, the nodes have the default priority for making backups as follows:

- hidden nodes - priority 2.0
- secondary nodes - priority 1.0
- primary node - priority 0.5

This ability to adjust node priority helps you manage your backup strategy by selecting specific nodes or nodes from preferred data centers. In geographically distributed infrastructures, you can reduce network latency by making backups from nodes in geographically closest locations.

Important: As soon as you adjust node priorities in the configuration file, it is assumed that you take manual control over them. The default rule to prefer secondary nodes over primary stops working.

5.3 Checking an in-progress backup

Important: As of version 1.4.0, the information about running backups is not available in the **`pbm list`** output. Use the **`pbm status`** command instead to check for running backups. See *Percona Backup for MongoDB status* for more information.

For Percona Backup for MongoDB version 1.3.4 and earlier, run the **`pbm list`** command and you will see the running backup listed with a 'In progress' label. When that is absent, the backup is complete.

As of version 1.7.0, the `pbm list` output includes the type of backup.

```
$ pbm list

  Backup snapshots:
    2021-12-13T13:05:14Z <physical> [complete: 2021-12-13T13:05:17Z]
```

5.4 Restoring a backup

Warning: Backups made with Percona Backup for MongoDB prior to v1.5.0 are incompatible for restore with Percona Backup for MongoDB v1.5.0 and later. This is because processing of system collections `Users` and `Roles` has changed: in v1.5.0, `Users` and `Roles` are copied to temporary collection during backup and must be present in the backup during restore. In earlier versions of Percona Backup for MongoDB, `Users` and `Roles` are copied to a temporary collection during restore. Therefore, restoring from these backups with Percona Backup for MongoDB v1.5.0 isn't possible.

The recommended approach is to make a fresh backup after *upgrading Percona Backup for MongoDB* to version 1.5.0.

To restore a backup that you have made using **`pbm backup`**, use the **`pbm restore`** command supplying the time stamp of the backup that you intend to restore. Percona Backup for MongoDB identifies the type of the backup (physical or logical) and restores the database up to the backup completion time (available in pbm list output as of version 1.4.0).

Important: Consider these important notes on restore operation:

1. Percona Backup for MongoDB is designed to be a full-database restore tool. As of version <=1.x, it performs a full all-databases, all collections restore and does not offer an option to restore only a subset of collections in the backup, as MongoDB's `mongodump` tool does. But to avoid surprising `mongodump` users, as of versions 1.x, Percona Backup for MongoDB replicates mongodump's behavior to only drop collections in the backup. It does not drop collections that are created new after the time of the backup and before the restore. Run a `db.dropDatabase()` manually in all non-system databases (these are all databases except "local", "config" and "admin") before running **`pbm restore`** if you want to guarantee that the post-restore database only includes collections that are in the backup.
2. Whilst the restore is running, prevent clients from accessing the database. The data will naturally be incomplete whilst the restore is in progress, and writes the clients make cause the final restored data to differ from the backed-up data.
3. If you enabled *Point-in-Time Recovery*, disable it before running **`pbm restore`**. This is because Point-in-Time Recovery incremental backups and restore are incompatible operations and cannot be run together.

```
$ pbm restore 2019-06-09T07:03:50Z
```

Adjust memory consumption

New in version 1.3.2: The Percona Backup for MongoDB config includes the restore options to adjust the memory consumption by the **`pbm-agent`** in environments with tight memory bounds. This allows preventing out of memory errors during the restore operation.

```
restore:
  batchSize: 500
  numInsertionWorkers: 10
```

The default values were adjusted to fit the setups with the memory allocation of 1GB and less for the agent.

Note: The lower the values, the less memory is allocated for the restore. However, the performance decreases too.

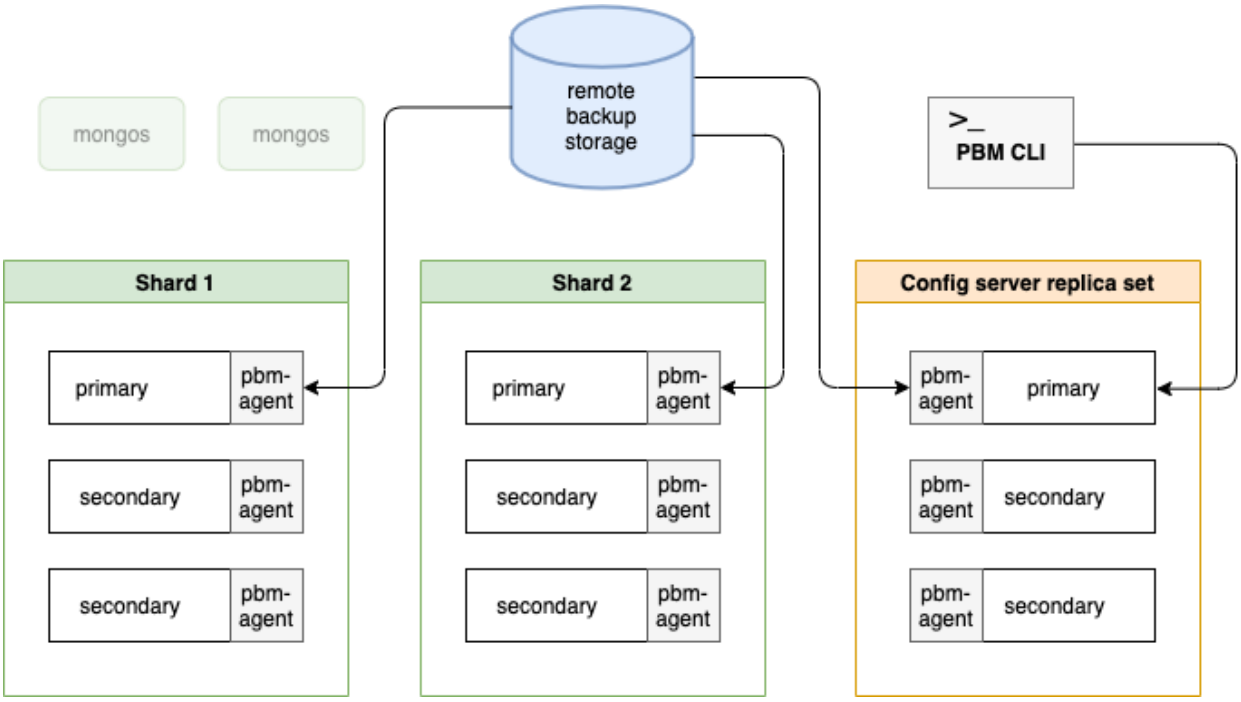
5.4.1 Restoring a backup in sharded clusters

Important: As preconditions for restoring a backup in a sharded cluster, complete the following steps:

1. Stop the balancer.
2. Shut down all `mongos` nodes to stop clients from accessing the database while restore is in progress. This ensures that the final restored data doesn't differ from the backed-up data.
3. Disable point-in-time recovery if it is enabled. To learn more about point-in-time recovery, see *Point-in-Time Recovery*.

Note that you can restore a sharded backup only into a sharded environment. It can be your existing cluster or a new one. To learn how to restore a backup into a new environment, see *Restoring a backup into a new environment*.

During the restore, the **`pbm-agent`** processes write data to primary nodes in the cluster. The following diagram shows the restore flow.



After a cluster's restore is complete, restart all `mongos` nodes to reload the sharding metadata.

Physical restore known limitations

Tracking restore progress via `pbm status` is currently not available during physical restores. To check the restore status, the options are:

- Check the stderr logs of the leader **`pbm-agent`**. The leader ID is printed once the restore has started.
- Check the status in the metadata file created on the remote storage for the restore. This file is in the root of the storage path and has the format `.pbm.restore/<restore_timestamp>.json`

After the restore is complete, do the following:

- Restart all `mongod` nodes
- Restart all `pbm-agents`
- Run the following command to resync the backup list with the storage:

```
$ pbm config --force-resync
```

5.4.2 Restoring a backup into a new environment

To restore a backup from one environment to another, consider the following key points about the destination environment:

- Replica set names (both the config servers and the shards) in your new destination cluster and in the cluster that was backed up must be exactly the same.
- Percona Backup for MongoDB configuration in the new environment must point to the same remote storage that is defined for the original environment, including the authentication credentials if it is an object store. Once you run **`pbm list`** and see the backups made from the original environment, then you can run the **`pbm restore`** command.

  Of course, make sure not to run **`pbm backup`** from the new environment whilst the Percona Backup for MongoDB config is pointing to the remote storage location of the original environment.

5.4.3 Restoring into a cluster / replica set with a different name

Starting with version 1.8.0, you can restore **logical backups** into a new environment that has the same or more number of shards and these shards have different replica set names.

To restore data to the environment with different replica set names, configure the name mapping between the source and target environments. You can either set the `PBM_REPLSET_REMAPPING` environment variable for `pbm` CLI or use the `--replset-remapping` flag for PBM commands. The mapping format is `<rsTarget>=<rsSource>`.

Important: Configure replica set name mapping for all shards in your cluster. Otherwise, Percona Backup for MongoDB attempts to restore the unspecified shard to the target shard with the same name. If there is no shard with such name or it is already mapped to another source shard, the restore fails.

Configure the replica set name mapping:

- Using the environment variable for `pbm` CLI in your shell:

```
$ export PBM_REPLSET_REMAPPING="rsX=rsA,rsY=rsB"
```

- Using the command line:

```
$ pbm restore <timestamp> --replset-remapping="rsX=rsA,rsY=rsB"
```

The `--replset-remapping` flag is available for the following commands: `pbm restore`, `pbm list`, `pbm status`, `pbm oplog-replay`.

Note: Don't forget to make a fresh backup on the new environment after the restore is complete.

This ability to restore data to clusters with different replica set names and the number of shards extends the set of environments compatible for the restore.

5.5 Canceling a backup

You can cancel a running backup if, for example, you want to do another maintenance of a server and don't want to wait for the large backup to finish first.

To cancel the backup, use the **pbm cancel-backup** command.

```
$ pbm cancel-backup
Backup cancellation has started
```

After the command execution, the backup is marked as canceled in the **pbm status** output:

```
$ pbm status
...
2020-04-30T18:05:26Z  Canceled at 2020-04-30T18:05:37Z
```

5.6 Deleting backups

Use the **pbm delete-backup** command to delete a specified backup or all backups older than the specified time.

The command deletes the backup regardless of the remote storage used: either S3-compatible or a filesystem-type remote storage.

Note: You can only delete a backup that is not running (has the "done" or the "error" state).

As of version 1.4.0, **pbm list** shows only successfully completed backups. To check for backups with other states, run **pbm status**.

To delete a backup, specify the <backup_name> as an argument.

```
$ pbm delete-backup 2020-12-20T13:45:59Z
```

By default, the **pbm delete-backup** command asks for your confirmation to proceed with the deletion. To bypass it, add the `-f` or `--force` flag.

```
$ pbm delete-backup --force 2020-04-20T13:45:59Z
```

To delete backups that were created before the specified time, pass the `--older-than` flag to the **pbm delete-backup** command. Specify the timestamp as an argument for **pbm delete-backup** in the following format:

- `%Y-%M-%DT%H:%M:%S` (for example, 2020-04-20T13:13:20Z) or
- `%Y-%M-%D` (2020-04-20).

```
$ #View backups
$ pbm list
Backup snapshots:
  2020-04-20T20:55:42Z
  2020-04-20T23:47:34Z
```

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```
  2020-04-20T23:53:20Z
  2020-04-21T02:16:33Z
$ #Delete backups created before the specified timestamp
$ pbm delete-backup -f --older-than 2020-04-21
Backup snapshots:
  2020-04-21T02:16:33Z
```

5.7 Viewing backup logs

As of version 1.4.0, you can see the logs from all `pbm-agents` in your MongoDB environment using `pbm CLI`. This reduces time for finding required information when troubleshooting issues.

Note: The log information about restores from physical backups not available in pbm logs.

To view **`pbm-agent`** logs, run the **`pbm logs`** command and pass one or several flags to narrow down the search.

The following flags are available:

- `-t`, `--tail` - Show the last N rows of the log
- `-e`, `--event` - Filter logs by all backups or a specific backup
- `-n`, `--node` - Filter logs by a specific node or a replica set
- `-s`, `--severity` - Filter logs by severity level. The following values are supported (from low to high):
- D - Debug
- I - Info
- W - Warning
- E - Error
- F - Fatal
- `-o`, `--output` - Show log information as text (default) or in JSON format.
- `-i`, `--opid` - Filter logs by the operation ID

Examples

The following are some examples of filtering logs:

Show logs for all backups

```
$ pbm logs --event=backup
```

Show the last 100 lines of the log about a specific backup 2020-10-15T17:42:54Z

```
$ pbm logs --tail=100 --event=backup/2020-10-15T17:42:54Z
```

Include only errors from the specific replica set

```
$ pbm logs -n rs1 -s E
```

The output includes log messages of the specified severity type and all higher levels. Thus, when ERROR is specified, both ERROR and FATAL messages are shown in the output.

Implementation details

`pbm-agents` write log information into the `pbmLog` collection in the *PBM Control collections*. Every **`pbm-agent`** also writes log information to stderr so that you can retrieve it when there is no healthy mongod node in your cluster or replica set. For how to view an individual **`pbm-agent`** log, see *How to see the pbm-agent log*.

Note that log information from `pbmLog` collection is shown in the UTC timezone and from the stderr - in the server's time zone.

CHAPTER

SIX

POINT-IN-TIME RECOVERY

Important: Point-in-Time Recovery is currently supported only for logical backups.

Point-in-Time Recovery is restoring a database up to a specific moment. Point-in-Time Recovery includes restoring the data from a backup snapshot and replaying all events that occurred to this data up to a specified moment from *oplog slices*. Point-in-Time Recovery helps you prevent data loss during a disaster such as crashed database, accidental data deletion or drop of tables, unwanted update of multiple fields instead of a single one.

Point-in-Time Recovery is available in Percona Backup for MongoDB starting from v1.3.0. Point-in-Time Recovery is enabled via the `pitr.enabled` config option.

```
$ pbm config --set pitr.enabled=true
```

6.1 Oplog slicing

When Point-in-Time Recovery is enabled, **pbm-agent** periodically saves consecutive slices of the *oplog*. A method similar to the way replica set nodes elect a new primary is used to select the **pbm-agent** that saves the oplog slices. (Find more information in *pbm-agent*.)

To start saving oplog, Percona Backup for MongoDB requires a backup snapshot. Therefore, make sure a backup exists when enabling Point-in-Time Recovery.

By default, a slice covers a 10 minute span of oplog events. It can be shorter if Point-in-Time Recovery is disabled or interrupted by the start of a backup snapshot operation.

Important: If you reshard a collection in MongoDB 5.0 and higher versions, make a fresh backup and re-enable Point-in-Time Recovery oplog slicing to prevent data inconsistency and restore failure.

As of version 1.6.0, you can change the duration of an oplog span via the configuration file. Specify the new value (in minutes) for the `pitr.oplogSpanMin` option.

```
$ pbm config --set pitr.oplogSpanMin=5
```

If you set the new duration when the **pbm-agent** is making an oplog slice, the slice's span is updated right away.

If the new duration is shorter, this triggers the **pbm-agent** to make a new slice with the updated span immediately. If the new duration is larger, the **pbm-agent** makes the next slice with the updated span in its scheduled time.

The oplog slices are saved with the `s2` compression method by default. As of version 1.7.0, you can specify a different compression method via the configuration file. Specify the new value for the `pitr.compression` option.

```
$ pbm config --set pitr.compression=gzip
```

Supported compression methods are: `gzip`, `snappy`, `lz4`, `s2`, `pgzip`, `zstd`.

Additionally, you can override the compression level used by the compression method by setting the `pitr.compressionLevel` option. Note that the higher value you specify, the more time and computing resources it will take to compress / retrieve the data.

Note: You can use different compression methods for backup snapshots and Point-in-Time Recovery slices. However, backup snapshot-related oplog is compressed with the same compression method as the backup itself.

The oplog slices are stored in the `pbmPitr` subdirectory in the *remote storage defined in the config*. A slice name reflects the start and end time this slice covers.

The **`pbm list`** output includes the following information:

- Backup snapshots. As of version 1.4.0, it also shows the completion time
- Valid time ranges for recovery
- Point-in-Time Recovery status.

```
$ pbm list

  2021-08-04T13:00:58Z [complete: 2021-08-04T13:01:23Z]
  2021-08-05T13:00:47Z [complete: 2021-08-05T13:01:11Z]
  2021-08-06T08:02:44Z [complete: 2021-08-06T08:03:09Z]
  2021-08-06T08:03:43Z [complete: 2021-08-06T08:04:08Z]
  2021-08-06T08:18:17Z [complete: 2021-08-06T08:18:41Z]

PITR <off>:
  2021-08-04T13:01:24 - 2021-08-05T13:00:11
  2021-08-06T08:03:10 - 2021-08-06T08:18:29
  2021-08-06T08:18:42 - 2021-08-06T08:33:09
```

Note: If you just enabled Point-in-Time Recovery, the time range list in the `pbm list` output is empty. It requires 10 minutes for the first chunk to appear in the list.

6.2 Restore to the point in time

A restore and Point-in-Time Recovery oplog slicing are incompatible operations and cannot be run simultaneously. You must disable Point-in-Time Recovery before restoring a database:

```
$ pbm config --set pitr.enabled=false
```

Run **`pbm restore`** and specify the timestamp from the valid range:

```
$ pbm restore --time="2020-12-14T14:27:04"
```

Restoring to the point in time requires both a backup snapshot and oplog slices that can be replayed on top of this backup. The timestamp you specify for the restore must be within the time ranges in the PITR section of `pbm list` output.

Percona Backup for MongoDB automatically selects the most recent backup in relation to the specified timestamp and uses that as the base for the restore.

To illustrate this behavior, let's use the `pbm list` output from the previous example. For timestamp `2021-08-06T08:10:10`, the backup snapshot `2021-08-06T08:02:44Z [complete: 2021-08-06T08:03:09]` is used as the base for the restore as it is the most recent one.

If you *select a backup snapshot for the restore with the –base-snapshot option*, the timestamp for the restore must also be later than the selected backup.

See also:

Restoring a backup.

A restore operation changes the time line of oplog events. Therefore, all oplog slices made after the restore time stamp and before the last backup become invalid. After the restore is complete, make a new backup to serve as the starting point for oplog updates:

```
$ pbm backup
```

Re-enable Point-in-Time Recovery to resume saving oplog slices:

```
$ pbm config --set pitr.enabled=true
```

Selecting a backup snapshot for the restore

As of version 1.6.0, you can recover your database to the specific point in time using any backup snapshot, and not only the most recent one. Run the `pbm restore` command with the `--base-snapshot=<backup_name>` flag where you specify the desired backup snapshot.

To restore from any backup snapshot, Percona Backup for MongoDB requires continuous oplog. After the backup snapshot is made and Point-in-Time Recovery is re-enabled, it copies the oplog saved with the backup snapshot and creates oplog slices from the end time of the latest slice to the new starting point thus making the oplog continuous.

6.3 Delete backups

As of version 1.6.0, backup snapshots and incremental backups (oplog slices) are deleted using separate commands: **`pbm delete-backup`** and **`pbm delete-pitr`** respectively.

Running **`pbm delete-backup`** deletes any backup snapshot but for the following ones:

- A backup that can serve as the base for any point in time recovery and has Point-in-Time Recovery time ranges deriving from it
- The most recent backup if Point-in-Time Recovery is enabled and there are no oplog slices following this backup yet.

To illustrate this, let's take the following `pbm list` output:

```
$ pbm list
Backup snapshots:
2021-07-20T03:10:59Z [complete: 2021-07-20T03:21:19Z]
2021-07-21T22:27:09Z [complete: 2021-07-21T22:36:58Z]
2021-07-24T23:00:01Z [complete: 2021-07-24T23:09:02Z]
2021-07-26T17:42:04Z [complete: 2021-07-26T17:52:21Z]
```

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```
PITR <on>:
2021-07-21T22:36:59-2021-07-22T12:20:23
2021-07-24T23:09:03-2021-07-26T17:52:21
```

You can delete a backup `2021-07-20T03:10:59Z` since it has no time ranges for point-in-time recovery deriving from it. You cannot delete `2021-07-21T22:27:09Z` as it can be the base for recovery to any point in time from the `PITR` time range `2021-07-21T22:36:59-2021-07-22T12:20:23`. Nor can you delete `2021-07-26T17:42:04Z` backup since there are no oplog slices following it yet.

Running **pbm delete-pitr** allows you to delete old and/or unnecessary slices and save storage space. You can either delete all chunks by passing the `--all` flag. Or you can delete all slices that are made earlier than the specified time by passing the `--older-than` flag. In this case, specify the timestamp as an argument for **pbm delete-pitr** in the following format:

- `%Y-%M-%DT%H:%M:%S` (for example, 2021-07-20T10:01:18) or
- `%Y-%M-%D` (2021-07-20).

```
$ pbm delete-pitr --older-than 2021-07-20T10:01:18
```

Note: To enable point in time recovery from the most recent backup snapshot, Percona Backup for MongoDB does not delete slices that were made after that snapshot. For example, if the most recent snapshot is `2021-07-20T07:05:23Z [complete: 2021-07-21T07:05:44]` and you specify the timestamp `2021-07-20T07:05:44`, Percona Backup for MongoDB deletes only slices that were made before `2021-07-20T07:05:23Z`.

For Percona Backup for MongoDB 1.5.0 and earlier versions, when you *delete a backup*, all oplog slices that relate to this backup are deleted too. For example, you delete a backup snapshot 2020-07-24T18:13:09 while there is another snapshot 2020-08-05T04:27:55 created after it. **pbm-agent** deletes only oplog slices that relate to 2020-07-24T18:13:09.

The same applies if you delete backups older than the specified time.

Note that when Point-in-Time Recovery is enabled, the most recent backup snapshot and oplog slices that relate to it are not deleted.

CHAPTER

SEVEN

POINT-IN-TIME RECOVERY OPLOG REPLAY

Starting with version 1.7.0, you can replay the *oplog* for a specific period on top of any backup: logical, physical, storage level snapshot (like EBS-snapshot). Starting with version 1.8.0, you can save oplog slices without the mandatory base backup snapshot. This behavior is controlled by the `pitr.oplogOnly` configuration parameter

```
pitr:
   oplogOnly: true
```

By replaying these oplog slices on top of the backup snapshot with the `oplog replay` command, you can manually restore sharded clusters and non sharded replica sets to a specific point in time from a backup made by any tool and not only by Percona Backup for MongoDB. Plus, you reduce time, storage space and administration efforts on making the redundant base backup snapshot.

Warning: Use the oplog replay functionality with caution, only when you are sure about the starting time to replay oplog from. The oplog replay does not guarantee data consistency when restoring from any backup, however, it is less error-prone for backups made with Percona Backup for MongoDB.

7.1 Oplog replay for physical backups

To replay the oplog on top of physical backups made with Percona Backup for MongoDB, do the following:

1. Stop Point-in-Time Recovery, if enabled, to release the lock.
2. Run `pbm status` or `pbm list` commands to find oplog chunks available for replay.
3. Run the `pbm oplog-replay` command and specify the `--start` and `--end` flags with the timestamps.

   ```
   $ pbm oplog-replay --start="2022-01-02T15:00:00" --end="2022-01-03T15:00:00"
   ```

4. After the oplog replay, make a fresh backup and enable the Point-in-Time Recovery oplog slicing.

7.2 Oplog replay for storage level snapshots

When making a backup, Percona Backup for MongoDB stops the Point-in-Time Recovery. This is done to maintain data consistency after the restore.

Storage-level snapshots are saved with Point-in-Time Recovery enabled. Thus, after the database restore from such a backup, Point-in-Time Recovery is automatically enabled and starts oplog slicing. These new oplog slices might conflict with the existing oplogs saved during the backup. To replay the oplog in such a case, do the following after the restore:

1. Disable Point-in-Time Recovery
2. Delete the oplog slices that might have been created
3. Resync the data from the storage
4. Run the `pbm oplog-replay` command and specify the `--start` and `--end` flags with the timestamps.

   ```
   $ pbm oplog-replay --start="2022-01-02T15:00:00" --end="2022-01-03T15:00:00"
   ```

5. After the oplog replay, make a fresh backup and enable the Point-in-Time Recovery oplog slicing.

Known limitations

The oplog replay fails if you rename the entire database or a collection.

Part V

Details

CHAPTER

EIGHT

ARCHITECTURE

8.1 pbm-agent

pbm-agent is a process that runs backup, restore, delete and other operations available with Percona Backup for MongoDB.

A **pbm-agent** instance must run on each mongod instance. This includes replica set nodes that are currently secondaries and config server replica set nodes in a sharded cluster.

An operation is triggered when the pbm CLI makes an update to the PBM Control collection. All pbm-agents monitor changes to the PBM control collections but only one **pbm-agent** in each replica set will be elected to execute an operation. The elections are done by a random choice among secondary nodes. If no secondary nodes respond, then the **pbm-agent** on the primary node is elected for an operation.

The elected **pbm-agent** acquires a lock for an operation. This prevents mutually exclusive operations like backup and restore to be executed simultaneously.

When the operation is complete, the **pbm-agent** releases the lock and updates the PBM control collections.

8.2 PBM Command Line Utility (pbm)

pbm CLI is the command line tool with which you operate Percona Backup for MongoDB. pbm provides the **pbm** command that you will use manually in the shell. It will also work as a command that can be executed in scripts (for example, by crond).

The set of *pbm sub-commands* enables you to manage backups in your MongoDB environment.

pbm uses *PBM Control collections* to communicate with **pbm-agent** processes. It starts and monitors backup or restore operations by updating and reading the corresponding PBM control collections for operations, log, etc. Likewise, it modifies the PBM config by saving it in the PBM Control collection for config values.

pbm does not have its own config and/or cache files. Setting the PBM_MONGODB_URI environment variable in your shell is a configuration-like step that should be done for practical ease though. (Without PBM_MONGODB_URI the --mongodb-uri command line argument will need to be specified each time.)

To learn how to set the PBM_MONGODB_URI environment variable, see *Set the MongoDB connection URI for pbm CLI*. For more information about MongoDB URI connection strings, see *Authentication*.

8.3 PBM Control Collections

The config and state (current and historical) for backups is stored in collections in the MongoDB cluster or non-sharded replica set itself. These are put in the system admin db to keep them cleanly separated from user db namespaces.

In sharded clusters, this is the admin db of the config server replica set. In a non-sharded replica set, the PBM Control Collections are stored in admin db of the replica set itself.

- *admin.pbmBackups* - Log / status of each backup
- *admin.pbmAgents* - Contains information about pbm-agents statuses and health
- *admin.pbmConfig* - Contains configuration information for Percona Backup for MongoDB
- *admin.pbmCmd* - Is used to define and trigger operations
- *admin.pbmLock* - **pbm-agent** synchronization-lock structure
- *admin.pbmLockOp* - Is used to coordinate operations that are not mutually-exclusive such as make backup and delete backup.
- *admin.pbmLog* - Stores log information from all pbm-agents in the MongoDB environment. Available in Percona Backup for MongoDB as of version 1.4.0
- *admin.pbmOpLog* - Stores *operation IDs*
- *admin.pbmPITRChunks* - Stores *Point-in-Time Recovery* oplog slices
- *admin.pbmPITRState* - Contains current state of Point-in-Time Recovery incremental backups
- *admin.pbmRestores* - Contains restore history and the restore state for all replica sets
- *admin.pbmStatus* - Stores Percona Backup for MongoDB status records

The pbm command line tool creates these collections as needed. You do not have to maintain these collections, but you should not drop them unnecessarily either. Dropping them during a backup will cause an abort of the backup.

Filling the config collection is a prerequisite to using Percona Backup for MongoDB for executing backups or restores. (See config page later.)

8.4 Remote Backup Storage

Percona Backup for MongoDB saves your files to a directory. Conceptually in the case of object store; actually if you are using filesystem-type remote storage. Using **pbm list**, a user can scan this directory to find existing backups even if they never used pbm on their computer before.

The files are prefixed with the (UTC) starting time of the backup. For each backup there is one metadata file. For each replica set, a backup includes the following:

- A mongodump-format compressed archive that is the dump of collections
- A (compressed) BSON file dump of the oplog covering the timespan of the backup.

The end time of the oplog slice(s) is the data-consistent point in time of a backup snapshot.

For details about supported backup storages, see *Remote backup storage*.

CHAPTER

NINE

AUTHENTICATION

Percona Backup for MongoDB has no authentication and authorization subsystem of its own - it uses MongoDB's, i.e. `pbm` and **`pbm-agent`** only require a valid MongoDB connection URI string for the PBM user.

For the S3-compatible remote storage authentication config, see *Percona Backup for MongoDB configuration in a cluster (or non-sharded replica set)*.

9.1 MongoDB connection strings - A Reminder (or Primer)

Percona Backup for MongoDB uses MongoDB Connection URI strings to open MongoDB connections. Neither `pbm` or **`pbm-agent`** accept legacy-style command-line arguments for `--host`, `--port`, `--user`, `--password`, etc. as the `mongo` shell or `mongodump` command does.

```
$ pbm-agent --mongodb-uri "mongodb://pbmuser:secretpwd@localhost:27018/?authSource=admin"
$ #Alternatively:
$ export PBM_MONGODB_URI="mongodb://pbmuser:secretpwd@localhost:27018/?authSource=admin"
$ pbm-agent
```

```
$ pbm list --mongodb-uri "mongodb://pbmuser:secretpwd@mongocsvr1:27018,mongocsvr2:27018,
↪mongocsvr3:27018/?replicaSet=configrs&authSource=admin"
$ #Alternatively:
$ export PBM_MONGODB_URI="mongodb://pbmuser:secretpwd@mongocsvr1:27018,mongocsvr2:27018,
↪mongocsvr3:27018/?replicaSet=configrs&authSource=admin"
$ pbm list
```

The connection URI above is the format that MongoDB drivers accept universally since approximately the release time of MongoDB server v3.6. The `mongo` shell accepts it too since v4.0. Using a v4.0+ mongo shell is a recommended way to debug connection URI validity from the command line.

> Since Percona Backup for MongoDB must authenticate in MongoDB, we recommend specifying the authentication database associated with the `pbm` user's credentials in the connection URI string using the `authSource` option.
>
> The MongoDB Connection URI specification also allows specifying the authentication database via the `defaultauthdb` component. However, in this case, Percona Backup for MongoDB makes a backup of only this specified database.
>
> If both `authSource` and `defaultauthdb` are unspecified, the authentication database defaults to the `admin` database.

The MongoDB Connection URI specification includes several non-default options you may need to use. For example the TLS certificates/keys needed to connect to a cluster or non-sharded replicaset with network encryption enabled are "tls=true" plus "tlsCAFile" and/or "tlsCertificateKeyFile" (see tls options).

Technical note

As of v1.0 the driver used by Percona Backup for MongoDB is the official v1.1 mongo-go-driver.

9.1.1 The `pbm-agent` connection string

`pbm-agent` processes should connect to their localhost mongod with a standalone type of connection.

9.1.2 The `pbm` connection string

The `pbm` CLI will ultimately connect to the replica set with the *PBM control collections*.

- In a non-sharded replica set it is simply that replica set.
- In a cluster it is the config server replica set.

You do not necessarily have to provide that connection string. If you provide a connection to any live node (shard, configsvr, or non-sharded replicaset member), it will automatically determine the right hosts and establish a new connection to those instead.

Tip: When running `pbm` from an unsupervised script, we recommend using a replica set connection string. A standalone-style connection string will fail if that `mongod` host happens to be down temporarily.

CHAPTER

TEN

BACKUP AND RESTORE TYPES

As of version 1.7.0, Percona Backup for MongoDB supports physical and logical backups and restores. This document describes each type.

Important: Physical backups and restores is the technical preview feature[1]. Before using them in production, we recommend that you test restoring from physical backups in your environment, and also use an alternative backup method for redundancy.

Physical backup is copying of physical files from the Percona Server for MongoDB `dbPath` data directory to the remote backup storage. These files include data files, journal, index files, etc. Physical restore is the reverse process: `pbm-agents` shut down the `mongod` nodes, clean up the `dbPath` data directory and copy the physical files from the storage to it.

During physical backups and restores, `pbm-agents` don't connect to the database and don't read the data. This significantly reduces the backup / restore time compared to logical ones and is the recommended backup method for big (multi-terabyte) databases.

Physical backups and restores are available for Percona Server for MongoDB starting from versions 4.2.15-16, 4.4.6-8, 5.0 and higher. Since physical backups heavily rely on the WiredTiger $backupCursor functionality, they are available only for WiredTiger storage engine.

See also:

Percona Blog:

- Physical Backup Support in Percona Backup for MongoDB
- $backupCursorExtend in Percona Server for MongoDB

Logical backup is the copying of the actual database data. A `pbm-agent` connects to the database, retrieves the data and writes it to the remote backup storage. During the restore, the reverse process occurs: the `pbm-agent` retrieves the backup data from the storage and inserts it to the `dbPath` data directory.

Logical backups allow for point in time recovery

[1] Tech Preview Features are not yet ready for enterprise use and are not included in support via SLA. They are included in this release so that users can provide feedback prior to the full release of the feature in a future GA release (or removal of the feature if it is deemed not useful). This functionality can change (APIs, CLIs, etc.) from tech preview to GA.

Type	Advantages	Disadvantages
Physical	• Faster backup and restore speed • Recommended for big, multi-terabyte datasets • No database overhead	• The backup size is bigger than for logical backups due to data fragmentation extra cost of keeping data and indexes in appropriate data structures • Extra manual operations are required after the restore • Point in time recovery is not supported
Logical	• Easy to operate with, using a single command • Support for incremental backups and point-in-time recovery • The backup size is smaller as it includes only the data	• Much slower than physical backup / restore • Adds database overhead on reading and inserting the data

CHAPTER

ELEVEN

PERCONA BACKUP FOR MONGODB CONFIGURATION IN A CLUSTER (OR NON-SHARDED REPLICA SET)

The configuration information is stored in a single document of the *admin.pbmConfig* collection. That single copy is shared by all the **pbm-agent** processes in a cluster (or non-sharded replica set), and can be read or updated using the `pbm` tool.

You can see the whole config by running *db.getSiblingDB("admin").pbmConfig.findOne()*. But you don't have to use the mongo shell; the `pbm` CLI has a "config" subcommand to read and update it.

Percona Backup for MongoDB config contains the following settings:

- *Remote backup storage* configuration is available as of v1.0 or v1.1
- *Point-in-Time Recovery* configuration is available as of v1.3.0
- *Restore options* are available as of v1.3.2

Run **`pbm config --list`** to see the whole config. (Sensitive fields such as keys will be redacted.)

11.1 Insert the whole Percona Backup for MongoDB config from a YAML file

If you are initializing a cluster or non-sharded replica set for the first time, it is simplest to write the whole config as YAML file and use the **`pbm config --file`** method to upload all the values in one command.

The *Example config files* section provides config file examples for the remote backup storage (required). For more information about available config file options, see *Configuration file options*.

Use the following command to upload the config file (e.g. `pbm_config.yaml`):

```
$ pbm config --file pbm_config.yaml
```

Execute whilst connecting to config server replica set if it is a cluster. Otherwise just connect to the non-sharded replica set as normal. (See *MongoDB connection strings - A Reminder (or Primer)* if you are not familiar with MongoDB connection strings yet.)

11.2 Accessing or updating single config values

You can set a single value at time. For nested values use dot-concatenated key names as shown in the following example:

```
$ pbm config --set storage.s3.bucket="operator-testing"
```

To list a single value you can specify just the key name by itself and the value will be returned (if set)

```
$ pbm config storage.s3.bucket
operator-testing
$ pbm config storage.s3.INVALID-KEY
Error: unable to get config key: invalid config key
```

CHAPTER

TWELVE

REMOTE BACKUP STORAGE

On this page:

12.1 Overview

Percona Backup for MongoDB supports the following types of remote backup storage:

- *S3-compatible storage*
- *Filesystem type storage*
- *Microsoft Azure Blob storage*

S3 compatible storage

Percona Backup for MongoDB should work with other S3-compatible storages, but was only tested with the following ones:

- Amazon Simple Storage Service
- Google Cloud Storage
- MinIO

As of version 1.3.2, Percona Backup for MongoDB supports *server-side encryption* for *S3 buckets* with customer managed keys stored in AWS KMS (AWS Key Management Service).

See also:

Protecting Data Using Server-Side Encryption with CMKs Stored in AWS Key Management Service (SSE-KMS)

New in version 1.7.0: You can enable debug logging for different types of S3 requests in Percona Backup for MongoDB. Percona Backup for MongoDB prints S3 log messages in the `pbm logs` output so that you can debug and diagnose S3 request issues or failures.

To enable S3 debug logging, set the `storage.s3.DebugLogLevel` option in Percona Backup for MongoDB configuration. The supported values are: `LogDebug`, `Signing`, `HTTPBody`, `RequestRetries`, `RequestErrors`, `EventStreamBody`.

Starting with version 1.7.0, Percona Backup for MongoDB supports Amazon S3 storage classes. Knowing your data access patterns, you can set the S3 storage class in Percona Backup for MongoDB configuration. When Percona Backup

for MongoDB uploads data to S3, the data is distributed to the corresponding storage class. The support of S3 bucket storage types allows you to effectively manage S3 storage space and costs.

To set the storage class, specify the `storage.s3.storageClass` option in Percona Backup for MongoDB configuration file

```
storage:
  type: s3
  s3:
    storageClass: INTELLIGENT_TIERING
```

When the option is undefined, the S3 Standard storage type is used.

See also:

Using Amazon S3 storage classes

As of version 1.7.0, you can set up the number of attempts for Percona Backup for MongoDB to upload data to S3 storage as well as the min and max time to wait for the next retry. Set the options `storage.s3.retryer.numMaxRetries`, `storage.s3.retryer.minRetryDelay` and `storage.s3.retryer.maxRetryDelay` in Percona Backup for MongoDB configuration.

```
retryer:
       numMaxRetries: 3
       minRetryDelay: 30
       maxRetryDelay: 5
```

This upload retry increases the chances of data upload completion in cases of unstable connection.

New in version 1.7.0: Percona Backup for MongoDB supports data upload to S3-like storage that supports self-issued TLS certificates. To make this happen, disable the TLS verification of the S3 storage in Percona Backup for MongoDB configuration:

```
$ pbm config --set storage.s3.insecureSkipTLSVerify=True
```

Warning: Use this option with caution as it might leave a hole for man-in-the-middle attacks.

Remote Filesystem Server Storage

This storage must be a remote file server mounted to a local directory. It is the responsibility of the server administrators to guarantee that the same remote directory is mounted at exactly the same local path on all servers in the MongoDB cluster or non-sharded replica set.

Warning: Percona Backup for MongoDB uses the directory as if it were any normal directory, and does not attempt to confirm it is mounted from a remote server. If the path is accidentally a normal local directory, errors will eventually occur, most likely during a restore attempt. This will happen because **pbm-agent** processes of other nodes in the same replica set can't access backup archive files in a normal local directory on another server.

Local Filesystem Storage

This cannot be used except if you have a single-node replica set. (See the warning note above as to why). We recommend using any object store you might be already familiar with for testing. If you don't have an object store yet, we recommend using MinIO for testing as it has simple setup. If you plan to use a remote filesytem-type backup server, please see the *Remote Filesystem Server Storage* above.

Microsoft Azure Blob Storage

As of v1.5.0, you can use Microsoft Azure Blob Storage as the remote backup storage for Percona Backup for MongoDB.

This gives users a vendor choice. Companies with Microsoft-based infrastructure can set up Percona Backup for MongoDB with less administrative efforts.

Note: Regardless of the remote backup storage you use, grant the `List/Get/Put/Delete` permissions to this storage for the user identified by the access credentials.

The following example shows the permissions configuration to the `pbm-testing` bucket on the AWS S3 storage.

```
{
    "Version": "2021-10-17",
    "Statement": [
        {
            "Effect": "Allow",
            "Action": [
                "s3:ListBucket"
            ],
            "Resource": "arn:aws:s3:::pbm-testing"
        },
        {
            "Effect": "Allow",
            "Action": [
                "s3:PutObject",
                "s3:PutObjectAcl",
                "s3:GetObject",
                "s3:GetObjectAcl",
                "s3:DeleteObject"
            ],
            "Resource": "arn:aws:s3:::pbm-testing/*"
        }
    ]
}
```

Please refer to the documentation of your selected storage for the data access management.

See also:

- AWS documentation: Controlling access to a bucket with user policies
- Google Cloud Storage documentation: Overview of access control
- Microsoft Azure documentation: Assign an Azure role for access to blob data
- MinIO documentation : Policy Management

12.2 Example config files

Provide the remote backup storage configuration as a YAML config file. The following are the examples of config fles for supported remote storages. For how to insert the config file, see *Insert the whole Percona Backup for MongoDB config from a YAML file*.

S3-compatible remote storage

Amazon Simple Storage Service

```
storage:
  type: s3
  s3:
    region: us-west-2
    bucket: pbm-test-bucket
    prefix: data/pbm/backup
    credentials:
      access-key-id: <your-access-key-id-here>
      secret-access-key: <your-secret-key-here>
    serverSideEncryption:
      sseAlgorithm: aws:kms
      kmsKeyID: <your-kms-key-here>
```

GCS

```
storage:
 type: s3
 s3:
     region: us-east1
     bucket: pbm-testing
     prefix: pbm/test
     endpointUrl: https://storage.googleapis.com
     credentials:
       access-key-id: <your-access-key-id-here>
       secret-access-key: <your-secret-key-here>
```

MinIO

```
storage:
  type: s3
  s3:
    endpointUrl: "http://localhost:9000"
    region: my-region
    bucket: pbm-example
    prefix: data/pbm/test
    credentials:
      access-key-id: <your-access-key-id-here>
      secret-access-key: <your-secret-key-here>
```

Remote filesystem server storage

```
storage:
  type: filesystem
  filesystem:
    path: /data/local_backups
```

Microsoft Azure Blob Storage

```
storage:
  type: azure
  azure:
    account: <your-account>
    container: <your-container>
    prefix: pbm
    credentials:
      key: <your-access-key>
```

For the description of configuration options, see *Configuration file options*.

Part VI

How to

CHAPTER

THIRTEEN

SCHEDULE BACKUPS

In Percona Backup for MongoDB version 1.4.1 and earlier, we recommend using `crond` or similar services to schedule backup snapshots.

Important: Before configuring `crond`, make sure that you have *installed* and *configured* Percona Backup for MongoDB to make backups in your database. Start a backup manually to verify this: **`pbm backup`**.

The recommended approach is to create a `crontab` file in the `/etc/cron.d` directory and specify the command in it. This simplifies server administration especially if multiple users have access to it.

`pbm` CLI requires a valid MongoDB URI connection string to authenticate in MongoDB. Instead of specifying the MongoDB URI connection string as a command line argument, which is a potential security risk, we recommend creating an environment file and specify the `export PBM_MONGODB_URI=$PBM_MONGODB_URI` statement within.

As an example, let's configure to run backup snapshots on 23:30 every Sunday. The steps are the following:

1. Create an environment file. Let's name it `pbm-cron`. The path for this file on Debian and Ubuntu is `/etc/default/pbm-cron`. For Red Hat Enterprise Linux and CentOS, the path is `/etc/sysconfig/pbm-cron`.
2. Specify the environment variable in `pbm-cron`:

```
export PBM_MONGODB_URI="mongodb://pbmuser:secretpwd@localhost:27018?/
↪replSetName=xxxx"
```

3. Grant access to the `pbm-cron` file for the user that will execute the `cron` task.
4. Create a `crontab` file. Let's name it `pbm-backup`.
5. Specify the command in the file:

```
30 23 * * sun <user-to-execute-cron-task> . /etc/default/pbm-cron; /usr/bin/pbm␣
↪backup
```

   Note the dot `.` before the environment file. It sources (includes) the environment file for the rest of the shell commands.

1. Verify that backups are running in `/var/log/cron` or `/var/log/syslog` logs:

```
$ grep CRON /var/log/syslog
```

Backup storage cleanup

Previous backups are not automatically removed from the backup storage. You need to remove the oldest ones periodically to limit the amount of space used in the backup storage.

We recommend using the **pbm delete backup --older-than <timestamp>** command. You can configure a `cron` task to automate backup deletion by specifying the following command in the `crontab` file:

```
/usr/bin/pbm delete-backup -f --older-than $(date -d '-1 month' +\%Y-\%m-\%d)
```

This command deletes backups that are older than 30 days. You can change the period by specifying a desired interval for the `date` function.

13.1 Schedule backups with Point-in-Time Recovery running

It is convenient to automate making backups on a schedule using `crond` if you enabled *Point-in-Time Recovery*.

You can configure Point-in-Time Recovery and `crond` in any order. Note, however, that Point-in-Time Recovery will only start running after at least one full backup has been made.

- Make a fresh backup manually. It will serve as the starting point for incremental backups
- Enable point-in-time recovery
- Configure `crond` to run backup snapshots on a schedule

When it is time for another backup snapshot, Percona Backup for MongoDB automatically disables Point-in-Time Recovery and re-enables it once the backup is complete.

CHAPTER

FOURTEEN

UPGRADING PERCONA BACKUP FOR MONGODB

Similar to installing, the recommended and most convenient way to upgrade Percona Backup for MongoDB is from the Percona repository.

You can upgrade Percona Backup for MongoDB to the **latest version** or to a **specific version**. Since all packages of Percona Backup for MongoDB are stored in the same repository, the following steps apply to both upgrade scenarios:

1. Enable Percona repository.
2. Stop **pbm-agent**.
3. Install new version packages (the old ones are automatically removed).
4. Start **pbm-agent**.

Important notes

1. Backward compatibility between data backup and restore is supported for upgrades within one major version only (for example, from 1.1.x to 1.2.y). When you upgrade Percona Backup for MongoDB over several major versions (for example, from 1.0.x to 1.2.y), we recommend to make a backup right after the upgrade.
2. Percona Backup for MongoDB v1.5.0 and later is incompatible with Percona Backup for MongoDB v1.4.1 and earlier due to different processing of system collections `Users` and `Roles` during backup / restore operations. After the upgrade to Percona Backup for MongoDB v1.5.0 and later, make sure to make a fresh backup.
3. Starting from v1.7.0, the user running the `pbm-agent` process is changed from `pbm` to `mongod`. This is done for the following reasons:
   - To make physical backups and restores, the user running the `pbm-agent` process must have the read / write permissions to the MongoDB `dataDir`.
   - To use the filesystem-based backup storage, the user running the `pbm-agent` process must also have the read / write permissions to the backup directory.

4. Starting from version 1.3.0, Percona Backup for MongoDB packages are stored in the *pbm* repository and the *tools* repository for backward compatibility.
5. Upgrade Percona Backup for MongoDB on all nodes where it is installed.

14.1 Enable Percona repository

Install the `percona-release` utility or update it to the latest version as described in Percona Software Repositories Documentation.

Enable the repository running the command as root or via **sudo**

```
$ sudo percona-release enable pbm
```

Note: For `apt`-based systems, run **`$ sudo apt update`** to update the local cache.

14.2 Upgrade Percona Backup for MongoDB using `apt`

Important: Run all commands as root or via **sudo**.

14.2.1 Upgrade to the latest version

1. Stop **`pbm-agent`**

   ```
   $ sudo systemctl stop pbm-agent
   ```

2. Install new packages

   ```
   $ sudo apt install percona-backup-mongodb
   ```

3. Starting from v1.7.0, reload the `systemd` process to update the unit file with the following command:

   ```
   $ sudo systemctl daemon-reload
   ```

4. If you have a filesystem-based backup storage, grant read / write permissions to the backup directory to the `mongod` user.
5. Start **`pbm-agent`**

   ```
   $ sudo systemctl start pbm-agent
   ```

14.2.2 Upgrade to a specific version

1. List available options:

```
$ sudo apt-cache madison percona-backup-mongodb
```

Sample output

```
percona-backup-mongodb | 1.3.1-1.stretch | http://repo.percona.com/tools/apt␣
↪stretch/main amd64 Packages
percona-backup-mongodb | 1.3.0-1.stretch | http://repo.percona.com/tools/apt␣
↪stretch/main amd64 Packages
percona-backup-mongodb | 1.2.1-1.stretch | http://repo.percona.com/tools/apt␣
↪stretch/main amd64 Packages
percona-backup-mongodb | 1.2.0-1.stretch | http://repo.percona.com/tools/apt␣
↪stretch/main amd64 Packages
percona-backup-mongodb | 1.1.3-1.stretch | http://repo.percona.com/tools/apt␣
↪stretch/main amd64 Packages
percona-backup-mongodb | 1.1.1-1.stretch | http://repo.percona.com/tools/apt␣
↪stretch/main amd64 Packages
percona-backup-mongodb | 1.0.0-1.stretch | http://repo.percona.com/tools/apt␣
↪stretch/main amd64 Packages
percona-backup-mongodb | 1.0-1.stretch | http://repo.percona.com/tools/apt stretch/
↪main amd64 Packages
```

2. Stop **pbm-agent**:

```
$ sudo systemctl stop pbm-agent
```

3. Install a specific version packages. For example, to upgrade to Percona Backup for MongoDB 1.3.1, run the following command:

```
$ sudo apt install percona-backup-mongodb=1.3.1-1.stretch
```

4. Starting from v1.7.0, reload the `systemd` process to update the unit file with the following command:

```
$ sudo systemctl daemon-reload
```

5. If you have a filesystem-based backup storage, grant read / write permissions to the backup directory to the `mongod` user.

6. Start **pbm-agent**:

```
$ sudo systemctl start pbm-agent
```

14.3 Upgrade Percona Backup for MongoDB using yum

Important: Run all commands as root or via **sudo**.

14.3.1 Upgrade to the latest version

1. Stop **pbm-agent**

```
$ sudo systemctl stop pbm-agent
```

2. Install new packages

```
$ sudo yum install percona-backup-mongodb
```

3. Starting from v1.7.0, reload the `systemd` process to update the unit file with the following command:

```
$ sudo systemctl daemon-reload
```

4. If you have a filesystem-based backup storage, grant read / write permissions to the backup directory to the `mongod` user.

5. Start **pbm-agent**

```
$ sudo systemctl start pbm-agent
```

14.3.2 Upgrade to a specific version

1. List available versions

```
$ sudo yum list percona-backup-mongodb --showduplicates
```

Sample output

```
Available Packages
percona-backup-mongodb.x86_64    1.0-1.el7           tools-release-x86_64
percona-backup-mongodb.x86_64    1.0.0-1.el7         tools-release-x86_64
percona-backup-mongodb.x86_64    1.1.1-1.el7         tools-release-x86_64
percona-backup-mongodb.x86_64    1.1.3-1.el7         tools-release-x86_64
percona-backup-mongodb.x86_64    1.2.0-1.el7         tools-release-x86_64
percona-backup-mongodb.x86_64    1.2.1-1.el7         tools-release-x86_64
percona-backup-mongodb.x86_64    1.3.0-1.el7         tools-release-x86_64
percona-backup-mongodb.x86_64    1.3.1-1.el7         tools-release-x86_64
```

2. Stop **pbm-agent**:

```
$ sudo systemctl stop pbm-agent
```

3. Install a specific version packages. For example, to upgrade Percona Backup for MongoDB to version 1.3.1, use the following command:

```
$ sudo yum install percona-backup-mongodb-1.3.1-1.el7
```

4. Starting from v1.7.0, reload the `systemd` process to update the unit file with the following command:

```
$ sudo systemctl daemon-reload
```

5. If you have a filesystem-based backup storage, grant read / write permissions to the backup directory to the `mongod` user.

6. Start **`pbm-agent`**:

```
$ sudo systemctl start pbm-agent
```

Note: If MongoDB runs under a *different user than mongod* (the default configuration for Percona Server for MongoDB), use the same user to run the `pbm-agent`. For filesystem-based storage, grant the read / write permissions to the backup directory for this user.

CHAPTER

FIFTEEN

TROUBLESHOOTING PERCONA BACKUP FOR MONGODB

Percona Backup for MongoDB provides troubleshooting tools to operate data backups.

15.1 pbm-speed-test

pbm-speed-test allows field-testing compression and backup upload speed. You can use it:

- to check performance before starting a backup;
- to find out what slows down the running backup.

By default, **pbm-speed-test** operates with fake semi random data documents. To run **pbm-speed-test** on a real collection, provide a valid *MongoDB connection URI string* for the `--mongodb-uri` flag.

Run **pbm-speed-test** for the full set of available commands.

15.1.1 Compression test

```
$ pbm-speed-test compression --compression=s2 --size-gb 10
Test started ....
10.00GB sent in 8s.
Avg upload rate = 1217.13MB/s.
```

pbm-speed-test compression uses the compression library from the config file and sends a fake semi random data document (1 GB by default) to the black hole storage. (Use the `pbm config` command to change the compression library).

To test compression on a real collection, pass the `--sample-collection` flag with the <my_db.my_collection> value.

Run `pbm-speed-test compression --help` for the full set of supported flags:

```
$ pbm-speed-test compression --help
usage: pbm-speed-test compression

```

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```
Run compression test

Flags:
      --help                     Show context-sensitive help (also try
                                 --help-long and --help-man).
      --mongodb-uri=MONGODB-URI  MongoDB connection string
  -c, --sample-collection=SAMPLE-COLLECTION
                                 Set collection as the data source
  -s, --size-gb=SIZE-GB          Set data size in GB. Default 1
      --compression=s2           Compression type
                                 <none>/<gzip>/<snappy>/<lz4>/<s2>/<pgzip>/<zstd>
      --compression-level=COMPRESSION-LEVEL
                                 Compression level (specific to the compression type)
                                 <none>/<gzip>/<snappy>/<lz4>/<s2>/<pgzip>/<zstd>
```

15.1.2 Upload speed test

```
$ pbm-speed-test storage --compression=s2
Test started
1.00GB sent in 1s.
Avg upload rate = 1744.43MB/s.
```

`pbm-speed-test storage` sends the semi random data (1 GB by default) to the remote storage defined in the config file. Pass the `--size-gb` flag to change the data size.

To run the test with the real collection's data instead of the semi random data, pass the `--sample-collection` flag with the <my_db.my_collection> value.

Run `pbm-speed-test storage --help` for the full set of available flags:

```
$ pbm-speed-test storage --help
usage: pbm-speed-test storage

Run storage test

Flags:
      --help                     Show context-sensitive help (also try --help-long and --
↪help-man).
      --mongodb-uri=MONGODB-URI  MongoDB connection string
  -c, --sample-collection=SAMPLE-COLLECTION
                                 Set collection as the data source
  -s, --size-gb=SIZE-GB          Set data size in GB. Default 1
      --compression=s2           Compression type <none>/<gzip>/<snappy>/<lz4>/<s2>/
↪<pgzip>/<zstd>
      --compression-level=COMPRESSION-LEVEL
                                 Compression level (specific to the compression type)
```

15.2 Backup progress tracking

If you have a large backup you can track backup progress in **pbm-agent** logs. A line is appended every minute showing bytes copied vs. total size for the current collection.

```
# Start a backup
$ pbm backup
#Check backup progress
journalctl -u pbm-agent.service
2020/05/06 21:31:12 Backup 2020-05-06T18:31:12Z started on node rs2/localhost:28018
2020-05-06T21:31:14.797+0300 writing admin.system.users to archive on stdout
2020-05-06T21:31:14.799+0300 done dumping admin.system.users (2 documents)
2020-05-06T21:31:14.800+0300 writing admin.system.roles to archive on stdout
2020-05-06T21:31:14.807+0300 done dumping admin.system.roles (1 document)
2020-05-06T21:31:14.807+0300 writing admin.system.version to archive on stdout
2020-05-06T21:31:14.815+0300 done dumping admin.system.version (3 documents)
2020-05-06T21:31:14.816+0300 writing test.testt to archive on stdout
2020-05-06T21:31:14.829+0300 writing test.testt2 to archive on stdout
2020-05-06T21:31:14.829+0300 writing config.cache.chunks.config.system.sessions to␣
↪archive on stdout
2020-05-06T21:31:14.832+0300 done dumping config.cache.chunks.config.system.sessions (1␣
↪document)
2020-05-06T21:31:14.834+0300 writing config.cache.collections to archive on stdout
2020-05-06T21:31:14.835+0300 done dumping config.cache.collections (1 document)
2020/05/06 21:31:24 [##......................]   test.testt  130841/1073901  (12.2%)
2020/05/06 21:31:24 [##########..............]  test.testt2   131370/300000  (43.8%)
2020/05/06 21:31:24
2020/05/06 21:31:34 [#####...................]   test.testt  249603/1073901  (23.2%)
2020/05/06 21:31:34 [###################.....]  test.testt2   249603/300000  (83.2%)
2020/05/06 21:31:34
2020/05/06 21:31:37 [########################]  test.testt2  300000/300000  (100.0%)
```

15.3 Percona Backup for MongoDB status

As of version 1.4.0, you can check the status of Percona Backup for MongoDB running in your MongoDB environment using the **pbm status** command.

```
$ pbm status
```

The output provides the information about:

- Your MongoDB deployment and `pbm-agents` running in it: to what `mongod` node each agent is connected, the Percona Backup for MongoDB version it runs and the agent's state
- The currently running backups / restores, if any
- Backups stored in the remote backup storage: backup name, completion time, size and status (complete, canceled, failed)
- *Point-in-Time Recovery* status (enabled or disabled).
- Valid time ranges for point-in-time recovery and the data size

This simplifies troubleshooting since the whole information is provided in one place.

Sample output

```
$ pbm status

Cluster:
========
config:
  - config/localhost:27027: pbm-agent v1.3.2 OK
  - config/localhost:27028: pbm-agent v1.3.2 OK
  - config/localhost:27029: pbm-agent v1.3.2 OK
rs1:
  - rs1/localhost:27018: pbm-agent v1.3.2 OK
  - rs1/localhost:27019: pbm-agent v1.3.2 OK
  - rs1/localhost:27020: pbm-agent v1.3.2 OK
rs2:
  - rs2/localhost:28018: pbm-agent v1.3.2 OK
  - rs2/localhost:28019: pbm-agent v1.3.2 OK
  - rs2/localhost:28020: pbm-agent v1.3.2 OK

PITR incremental backup:
========================
Status [OFF]

Currently running:
==================
(none)

Backups:
========
S3 us-east-1 https://storage.googleapis.com/backup-test
   Snapshots:
     2020-12-16T10:36:52Z 491.98KB [complete: 2020-12-16T10:37:13Z]
     2020-12-15T12:59:47Z 284.06KB [complete: 2020-12-15T13:00:08Z]
     2020-12-15T11:40:46Z 0.00B [canceled: 2020-12-15T11:41:07Z]
     2020-12-11T16:23:55Z 284.82KB [complete: 2020-12-11T16:24:16Z]
     2020-12-11T16:22:35Z 284.04KB [complete: 2020-12-11T16:22:56Z]
     2020-12-11T16:21:15Z 283.36KB [complete: 2020-12-11T16:21:36Z]
     2020-12-11T16:19:54Z 281.73KB [complete: 2020-12-11T16:20:15Z]
     2020-12-11T16:19:00Z 281.73KB [complete: 2020-12-11T16:19:21Z]
     2020-12-11T15:30:38Z 287.07KB [complete: 2020-12-11T15:30:59Z]
PITR chunks:
     2020-12-16T10:37:13 - 2020-12-16T10:43:26 44.17KB
```

15.4 pbm-agent logs

To troubleshoot issues with specific events or node(s), use the *pbm logs* command. It provides logs of all `pbm-agent` processes in your environment. The command is available as of version 1.4.0.

`pbm logs` has the set of filters to refine logs for specific events like `backup`, `restore`, `pitr` or for a specific node, and to manage log verbosity level. For example, to view logs about a specific backup with the Debug verbosity level, run the `pbm logs` command as follows:

```
$ pbm logs --severity=D --event=backup/2020-10-15T17:42:54Z
```

To learn more about available filters and usage examples, refer to *Viewing backup logs*.

CHAPTER

SIXTEEN

AUTOMATE ACCESS TO S3 BUCKETS FOR PERCONA BACKUP FOR MONGODB

When you run MongoDB and Percona Backup for MongoDB using AWS EC2 instances, you can automate access to AWS S3 buckets for Percona Backup for MongoDB. As of version 1.6.1, Percona Backup for MongoDB uses the EC2 environment variables and metadata to access S3 buckets so that you don't have to explicitly specify the S3 credentials in the Percona Backup for MongoDB configuration file. Thereby you control the access to your cloud infrastructure from a single place.

The steps to automate S3 buckets access for PBM are the following:

1. Create the IAM instance profile and the permission policy within where you specify the access level that grants the access to S3 buckets.
2. Attach the IAM profile to an EC2 instance.
3. Configure an S3 storage bucket and verify the connection from the EC2 instance to it.
4. Provide the *remote storage information for PBM in a config file*. Leave the `s3.credentials` array empty

```
storage:
  type: s3
  s3:
   region: <your-S3-region>
   bucket: <bucket-name>
```

Note: If you specify S3 credentials, they override the EC2 instance environment variables and metadata, and are used for authentication instead.

5. *Start the pbm-agent process*

See also:

AWS documentation: How can I grant my Amazon EC2 instance access to an Amazon S3 bucket?

CHAPTER

SEVENTEEN

UNINSTALLING PERCONA BACKUP FOR MONGODB

To uninstall Percona Backup for MongoDB perform the following steps:

1. Check no backups are currently in progress in the output of **pbm list**.
2. Before the next 2 steps make sure you know where the remote backup storage is, so you can delete backups made by Percona Backup for MongoDB. If it is S3-compatible object storage you will need to use another tool such as Amazon AWS's "aws s3", Minio's `mc`, the web AWS Management Console, etc. to do that once Percona Backup for MongoDB is uninstalled. Don't forget to note the connection credentials before they are deleted too.
3. Uninstall the **pbm-agent** and `pbm` executables. If you installed using a package manager, see *Installing Percona Backup for MongoDB* for relevant package names and commands for your OS distribution.
4. Drop the *PBM control collections*.
5. Drop the PBM database user. If this is a cluster the dropUser command will need to be run on each shard as well as in the config server replica set.
6. (Optional) Delete the backups from the remote backup storage.

Part VII

FAQ

CHAPTER

EIGHTEEN

FAQ

18.1 What's the difference between PBM and mongodump?

Both Percona Backup for MongoDB and `mongodump` are 'logical' backup solutions and have equal performance for non-sharded replica sets. However, as opposed to `mongodump`, Percona Backup for MongoDB allows you to achieve the following goals:

- make consistent backups and restores in sharded clusters
- restore your database to a specific point in time
- run backups / restores on each replica set in parallel while `mongodump` runs in one process on `mongos` node.

18.2 Why does Percona Backup for MongoDB use UTC timezone instead of server local timezone?

`pbm-agents` use UTC time zone by design. The reason behind this is to avoid user misunderstandings when replica set / cluster nodes are distributed geographically in different time zones.

18.3 Can I restore a single collection with Percona Backup for MongoDB?

No, Percona Backup for MongoDB makes backups of and restores the whole state of a replica set / sharded cluster.

If single-collection restores are your primary requirement and you are not using a sharded cluster, or the sharded cluster is only 2 or 3 shards, we recommend using `-d` and `-c` options with `mongodump` and/or `mongorestore`. As `mongodump`/`mongorestore` connects directly to the primary (in a non-sharded replica set) or via a `mongos` node in a cluster, it sees the cluster as if it were a single node, making it simple. `mongodump`/`mongorestore` work in a single process, so if you aren't reinserting to many shards, the lack of parallelization won't be too bad.

18.4 Can I backup specific shards in a cluster?

No, since this would result in backups with inconsistent timestamps across the cluster. Such backups would be invalid for restore.

Percona Backup for MongoDB backs up the whole state of a sharded cluster and this guarantees data consistency during the restore.

18.5 Do I need to stop the balancer for PITR restore?

Yes. The preconditions for both Point-in-Time Recovery restore and regular restore are the same:

1. In sharded cluster, stop the balancer
2. Make sure no writes are made to the database during restore. This ensures data consistency.
3. Disable Point-in-Time Recovery if it is enabled. This is because oplog slicing and restore are exclusive operations and cannot be run together. Note that oplog slices made after the restore and before the next backup snapshot become invalid. Make a fresh backup and re-enable Point-in-Time Recovery.

Part VIII

Reference

CHAPTER

NINETEEN

PBM COMMANDS

pbm CLI is the command line utility to control the backup system. This page describes pbm commands available in Percona Backup for MongoDB.

For how to get started with Percona Backup for MongoDB, see *Initial setup*.

19.1 pbm help

Returns the help information about pbm commands.

19.2 pbm config

Sets, changes or lists Percona Backup for MongoDB configuration.

The command has the following syntax:

```
$ pbm config [<flags>] [<key>]
```

The command accepts the following flags:

Flag	Description
--force-resync	Resync backup list with the current storage
--list	List current settings
--file=FILE	Upload the config information from a YAML file
--set=SET	Set a new config option value. Specify the option in the <key.name=value> format.
-o, --out=text	Shows the output format as either plain text or a JSON object. Supported values: text, json

Percona Backup for MongoDB configuration output

```
{
  "pitr": {
    "enabled": false,
    "oplogSpanMin": 0
  },
  "storage": {
    "type": "filesystem",
```

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```
    "s3": {
      "region": "",
      "endpointUrl": "",
      "bucket": ""
    },
    "azure": {},
    "filesystem": {
      "path": "<my-backup-dir>"
    }
  },
  "restore": {
    "batchSize": 500,
    "numInsertionWorkers": 10
  },
  "backup": {}
}
```

Setting a config value

```
[
  {
    "key": "pitr.enabled",
    "value": "true"
  }
]
```

19.3 pbm backup

Creates a backup snapshot and saves it in the remote backup storage.

The command has the following syntax:

```
$ pbm backup [<flags>]
```

For more information about using `pbm backup`, see *Starting a backup*

The command accepts the following flags:

Flag	Description
`-t, --type`	The type of backup. Supported values: physical, logical (default). When not specified, Percona Backup for MongoDB makes a logical backup. **Note:** Physical backups feature is the technical preview quality.
`--compression`	Create a backup with compression. Supported compression methods: `gzip`, `snappy`, `lz4`, `s2`, `pgzip`, `zstd`. Default: `s2` The `none` value means no compression is done during backup.
`--compression-level`	Configure the compression level from 0 to 10. The default value depends on the compression method used.
`-o, --out=text`	Shows the output format as either plain text or a JSON object. Supported values: text, json
`--wait`	Wait for the backup to finish. The flag blocks the shell session.

JSON output

```
{
  "name": "<backup_name>",
  "storage": "<my-backup-dir>"
}
```

19.4 pbm restore

Restores database from a specified backup / to a specified point in time. Depending on the backup type, makes either logical or physical restore.

The command has the following syntax:

```
$ pbm restore [<flags>] [<backup_name>]
```

For more information about using `pbm restore`, see *Restoring a backup*.

The command accepts the following flags:

Flag	Description
`--time=TIME`	Restores the database to the specified point in time. Available for logical restores and if *Point-in-Time Recovery* is enabled.
`-w`	Wait for the restore to finish. The flag blocks the shell session.
`-o, --out=text`	Shows the output format as either plain text or a JSON object. Supported values: text, json
`--base-snapshot`	Restores the database from a specified backup to the specified point in time. Without this flag, the most recent backup preceding the timestamp is used for point in recovery. Available in Percona Backup for MongoDB starting from version 1.6.0.
`--replset-remapping`	Maps the replica set names for the data restore / oplog replay. The value format is `to_name_1=from_name_1,to_name_2=from_name_2`

Restore output

```
{
  "snapshot": "<backup_name>"
}
```

Point-in-time restore

```
{
  "point-in-time": "<backup_name>"
}
```

19.5 pbm cancel-backup

Cancels a running backup. The backup is marked as canceled in the backup list.

The command accepts the following flags:

Flag	Description
`-o, --out=text`	Shows the output format as either plain text or a JSON object. Supported values: text, json

JSON output

```
{
  "msg": "Backup cancellation has started"
}
```

19.6 pbm list

Provides the list of backups. In versions 1.3.4 and earlier, the command lists all backups and their states. Backup states are the following:

- In progress - A backup is running
- Canceled - A backup was canceled
- Error - A backup was finished with an error
- No status means a backup is complete

As of version 1.4.0, only successfully completed backups are listed. To view currently running backup information, run *pbm status*.

When *Point-in-Time Recovery* is enabled, the `pbm list` also provides the list of valid time ranges for recovery and point-in-time recovery status.

The command has the following syntax:

```
$ pbm list [<flags>]
```

The command accepts the following flags:

Flag	Description
`--restore`	Shows last N restores.
`--size=0`	Shows last N backups.
`-o`, `--out=text`	Shows the output format as either plain text or a JSON object. Supported values: `text`, `json`
`--unbacked`	Shows Point-in-Time Recovery oplog slices that were saved without the base backup snapshot. Available starting with version 1.8.0.
`--replset-remapping`	Maps the replica set names for the data restore / oplog replay. The value format is `to_name_1=from_name_1,to_name_2=from_name_2`

List of backups

```
{
  "snapshots": [
    {
      "name": "<backup_name>",
      "status": "done",
      "completeTS": Timestamp,
      "pbmVersion": "1.6.0"
    }
  ],
  "pitr": {
    "on": false,
    "ranges": [
      {
        "range": {
          "start": Timestamp,
          "end": Timestamp
        }
      },
      {
        "range": {
          "start": Timestamp,
          "end": Timestamp
        },
      {
        "range": {
          "start": Timestamp,
          "end": Timestamp (no base snapshot)
        }
      }
    ]
  }
}
```

Restore history

```
[
  {
    "start": Timestamp,
    "status": "done",
    "type": "snapshot",
    "snapshot": "<backup_name>",
    "name": "2021-07-26T10:08:54.0867213Z"
  },
  {
    "start": Timestamp,
    "status": "done",
    "type": "pitr",
    "snapshot": "<backup_name>",
    "point-in-time": Timestamp,
    "name": "2021-07-26T11:09:53.7500545Z"
  }
]
```

19.7 pbm delete-backup

Deletes the specified backup snapshot or all backup snapshots that are older than the specified time. The command deletes backups that are not running regardless of the remote backup storage being used.

The following is the command syntax:

```
$ pbm delete-backup [<flags>] [<name>]
```

The command accepts the following flags:

Flag	Description
`--older-than=TIMESTAMP`	Deletes backups older than date / time specified in the format: • `%Y-%M-%DT%H:%M:%S` (e.g. 2020-04-20T13:13:20) or • `%Y-%M-%D` (e.g. 2020-04-20)
`--force`	Forcibly deletes backups without asking for user's confirmation

19.8 pbm delete-pitr

Deletes *oplog slices* produced for *Point-in-Time Recovery*.

The command has the following syntax:

```
$ pbm delete-pitr [<flags>]
```

The command accepts the following flags:

Flag	Description
`-a`, `--all`	Deletes all oplog slices

`--older-than=TIMESTAMP`	Deletes oplog slices older than date / time specified in the format:
	• `%Y-%M-%DT%H:%M:%S` (e.g. 2020-04-20T13:13:20) or
	• `%Y-%M-%D` (e.g. 2020-04-20)
	When you specify a timestamp, Percona Backup for MongoDB rounds it down to align with the completion time of the closest backup snapshot and deletes oplog slices that precede this time. Thus, extra slices remain. This is done to ensure oplog continuity. To illustrate, the PITR time range is `2021-08-11T11:16:21 - 2021-08-12T08:55:25` and backup snapshots are:
	`2021-08-12T08:49:46Z 13.49MB [complete: 2021-08-12T08:50:06]`
	`2021-08-11T11:36:17Z 7.37MB [complete: 2021-08-11T11:36:38]`
	Say you specify the timestamp `2021-08-11T19:16:21`. The closest backup is `2021-08-11T11:36:17Z 7.37KB [complete: 2021-08-11T11:36:38]`. PBM rounds down the timestamp to `2021-08-11T11:36:38` and deletes all slices that precede this time. As a result, your PITR time range is `2021-08-11T11:36:38 - 2021-08-12T09:00:25`.
	Note: Percona Backup for MongoDB doesn't delete the oplog slices that follow the most recent backup. This is done to ensure point in time recovery from that backup snapshot. For example, if the snapshot is `2021-07-20T07:05:23Z [complete: 2021-07-21T07:05:44]` and you specify the timestamp `2021-07-20T07:05:45`, Percona Backup for MongoDB deletes only slices that were made before `2021-07-20T07:05:23Z`.

`--force`	Forcibly deletes oplog slices without asking a user's confirmation
`-o`, `--out=json`	Shows the output as either the plain text (default) or a JSON object. Supported values: `text`, `json`.

19.9 pbm version

Shows the version of Percona Backup for MongoDB.

The command accepts the following flags:

Flag	Description
`--short`	Shows only version info
`--commit`	Shows only git commit info
`-o`, `--out=text`	Shows the output as either plain text or a JSON object. Supported values: `text`, `json`

Version information

```
{
  "Version": "1.6.0",
  "Platform": "linux/amd64",
  "GitCommit": "f9b9948bb8201ba1a6400f6558496934a0685efd",
  "GitBranch": "main",
```

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```
  "BuildTime": "2021-07-28_15:24_UTC",
  "GoVersion": "go1.16.6"
}
```

19.10 pbm status

Shows the status of Percona Backup for MongoDB. The output provides the following information:

- pbm-agent processes version and state,
- currently running backups or restores
- backups stored in the remote storage
- Point-in-Time Recovery status
- Valid time ranges for point-in-time recovery and the data size

The command accepts the following flags:

Flag	Description
`-o, --out=text`	Shows the status as either plain text or a JSON object. Supported values: text, json
`-s, --sections=SECTIONS`	Shows the status for the specified section. You can pass several flags to view the status for multiple sections. Supported values: cluster, pitr, running, backups.
`--replset-remapping`	Maps the replica set names for the data restore / oplog replay. The value format is `to_name_1=from_name_1,to_name_2=from_name_2`

Status information

```
{
  "backups": {
    "type": "FS",
    "path": "<my-backup-dir>",
    "snapshot": [
       ...
      {
        "name": "<backup_name>",
        "size": 3143396168,
        "status": "done",
        "completeTS": Timestamp,
        "pbmVersion": "1.6.0"
      },
    ],
    "pitrChunks": {
      "pitrChunks": [
         ...
        {
          "range": {
            "start": Timestamp,
            "end": Timestamp
```

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```
          }
        },
        {
          "range": {
            "start": Timestamp,
            "end": Timestamp (no base snapshot) !!! no backup found
          }
        },
      ],
      "size": 677901884
    }
  },
  "cluster": [
    {
      "rs": "<replSet_name>",
      "nodes": [
        {
          "host": "<replSet_name>/example.mongodb:27017",
          "agent": "v1.6.0",
          "ok": true
        }
      ]
    }
  ],
  "pitr": {
    "conf": true,
    "run": false,
    "error": "Timestamp.000+0000 E [<replSet_name>/example.mongodb:27017] [pitr] <error_
↪message>"
  },
  "running": {
      "type": "backup",
      "name": "<backup_name>",
      "startTS": Timestamp,
      "status": "oplog backup",
      "opID": "6113b631ea9ba5b815fee7c6"
    }
}
```


19.11 pbm logs

Shows log information from all **pbm-agent** processes.

The command has the following syntax:

```
pbm logs [<flags>]
```

The command accepts the following flags:

Flag	Description
`-t, --tail=20`	Shows last N entries. By default, the output shows last 20 entries. `0` means to show all log messages.
`-e, --event=EVENT`	Shows logs filtered by a specified event. Supported events: • backup • restore • resyncBcpList • pitr • pitrestore • delete
`-o, --out=text`	Shows log information as text (default) or in JSON format. Supported values: text, json
`-n, --node=NODE`	Shows logs for a specified node or a replica set. Specify the node in the format `replset[/host:port]`
`-s, --severity=I`	Shows logs filtered by severity level. Supported levels are (from low to high): D - Debug, I - Info (default), W - Warning, E - Error, F - Fatal. The output includes both the specified severity level and all higher ones
`-i, --opid=OPID`	Show logs for an operation in progress. The operation is identified by the *OpID*
`-x, --extra`	Show extra data in the text format

Find the usage examples in *Viewing backup logs*.

Logs output

```
[
  {
    "t": "",
    "s": 3,
    "rs": "rs0",
    "node": "example.mongodb.com:27017",
    "e": "",
    "eobj": "",
    "ep": {
      "T": 0,
      "I": 0
    },
    "msg": "listening for the commands"
  },
  ....
]
```

19.12 pbm oplog-replay

Allows to replay the oplog on top of any backup: logical, physical, storage level snapshot (like EBS-snapshot) and restore it to a specific point in time.

To learn more about the usage, refer to *Point-in-Time Recovery oplog replay*.

The command has the following syntax:

```
pbm oplog-replay [<flags>]
```

The command accepts the following flags:

`start=timestamp`	The start time for the oplog replay.
`end=timestamp`	The end time for the oplog replay.
`--replset-remapping`	Maps the replica set names for the oplog replay. The value format is `to_name_1=from_name_1,to_name_2=from_name_2`.

CHAPTER

TWENTY

CONFIGURATION FILE OPTIONS

This page describes configuration file options available in Percona Backup for MongoDB. For how to use configuration file, see *Percona Backup for MongoDB configuration in a cluster (or non-sharded replica set)*.

20.1 Remote backup storage options

Percona Backup for MongoDB supports the following types of remote storages:

- S3-compatible storage,
- Microsoft Azure Blob storage, and
- filesystem.

Percona Backup for MongoDB should work with other S3-compatible storage but was only tested with the following ones:

- Amazon Simple Storage Service,
- Google Cloud Storage,
- MinIO.

20.1.1 storage.type

type string

required YES

Remote backup storage type. Supported values: `s3`, `filesystem`, `azure`.

S3 type storage options

```
storage:
  type: s3
  s3:
    region: <string>
    bucket: <string>
    prefix: <string>
    endpointUrl: <string>
    credentials:
      access-key-id: <your-access-key-id-here>
```

(continues on next page)

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```
    secret-access-key: <your-secret-key-here>
  uploadPartSize: <int>
  maxUploadParts: <int>
  storageClass: <string>
  serverSideEncryption:
    sseAlgorithm: aws:kms
    kmsKeyID: <your-kms-key-here>
```

20.1.2 storage.s3.provider

type string

required NO

The storage provider's name. Supported values: aws, gcs

20.1.3 storage.s3.bucket

type string

required YES

The name of the storage *bucket*. See the AWS Bucket naming rules and GCS bucket naming guidelines for bucket name requirements

20.1.4 storage.s3.region

type string

required YES (for AWS and GCS)

The location of the storage bucket. Use the AWS region list and GCS region list to define the bucket region

20.1.5 storage.s3.prefix

type string

required NO

The path to the data directory on the bucket. If undefined, backups are stored in the bucket root directory

20.1.6 storage.s3.endpointUrl

type string

required YES (for MinIO and GCS)

The URL to access the bucket. The default value for GCS is `https://storage.googleapis.com`

20.1.7 storage.s3.credentials.access-key-id

type string

required YES

Your access key to the storage bucket. This option can be ommitted when you run Percona Backup for MongoDB using an EC2 instance profile. To learn more, refer to *Automate access to S3 buckets for Percona Backup for MongoDB*

20.1.8 storage.s3.credentials.secret-access-key

type string

required YES

The key to sign your programmatic requests to the storage bucket. This option can be ommitted when you run Percona Backup for MongoDB using an EC2 instance profile. To learn more, refer to *Automate access to S3 buckets for Percona Backup for MongoDB*

20.1.9 storage.s3.uploadPartSize

type int

required NO

The size of data chunks in bytes to be uploaded to the storage bucket. Default: 10MB

Percona Backup for MongoDB automatically increases the `uploadPartSize` value if the size of the file to be uploaded exceeds the max allowed file size. (The max allowed file size is calculated with the default values of uploadPartSize * maxUploadParts and is appr. 97,6 GB).

The `uploadPartSize` value is printed in the *pbm-agent log*.

By setting this option, you can manually adjust the size of data chunks if Percona Backup for MongoDB failed to do it for some reason. The defined `uploadPartSize` value overrides the default value and is used for calculating the max allowed file size

20.1.10 storage.s3.maxUploadParts

type int

required NO

default 10,000

The maximum number of data chunks to be uploaded to the storage bucket. Default: 10,000

By setting this option, you can override the value defined in the AWS SDK.

It can be useful when using an S3 provider that supports a smaller number of chunks for multipart uploads.

The `maxUploadParts` value is printed in the *pbm-agent log*.

20.1.11 storage.s3.storageClass

type string

required NO

The storage class assigned to objects stored in the S3 bucket. If not provided, the `STANDARD` storage class will be used. This option is available in Percona Backup for MongoDB as of v1.7.0.

20.1.12 storage.s3.debugLogLevels

type string

required NO

Enables S3 debug logging for different types of S3 requests. S3 log messages are printed in the `pbm logs` output.

Supported values are: `LogDebug`, `Signing`, `HTTPBody`, `RequestRetries`, `RequestErrors`, `EventStreamBody`.

To specify several event types, separate them by comma. To lean more about the event types, see the documentation

When undefined, no S3 debug logging is performed.

20.1.13 storage.s3.insecureSkipTLSVerify

type bool

default False

required NO

Disables the TLS verification of the S3 storage. This allows Percona Backup for MongoDB to upload data to S3-like storages that use self-issued TLS certificates. Available in Percona Backup for MongoDB as of version 1.7.0.

> **Warning:** Use this option with caution as it might leave a hole for man-in-the-middle attacks.

Server-side encryption options

20.1.14 serverSideEncryption.sseAlgorythm

type string

required NO

The key management mode used for server-side encryption

Supported value: `aws:kms`

20.1.15 serverSideEncryption.kmsKeyID

type string

required NO

Your customer-managed key

Upload retry options

20.1.16 retryer.numMaxRetries

type int

required NO

default 3

The maximum number of retries to upload data to S3 storage. A zero value means no retries will be performed. Available in Percona Backup for MongoDB as of 1.7.0.

20.1.17 retryer.minRetryDelay

type time.Duration

required NO

default 30

The minimum time (in ms) to wait till the next retry. Available in Percona Backup for MongoDB as of 1.7.0.

20.1.18 retryer.maxRetryDelay

type time.Duration

required NO

default 5

The maximum time (in minutes) to wait till the next retry. Available in Percona Backup for MongoDB as of 1.7.0.

Filesystem storage options

```
storage:
  type: filesystem
  filesystem:
    path: <string>
```

20.1.19 storage.filesystem.path

type string

required YES

The path to the backup directory

Microsoft Azure Blob storage options

```
storage:
  type: azure
  azure:
    account: <string>
    container: <string>
    prefix: <string>
    credentials:
      key: <your-access-key>
```

20.1.20 storage.azure.account

type string

required YES

The name of your storage account.

20.1.21 storage.azure.container

type string

required YES

The name of the storage *container*. See the Container names for naming conventions.

20.1.22 storage.azure.prefix

type string

required NO

The path (sub-folder) to the backups inside the container. If undefined, backups are stored in the container root directory.

20.1.23 storage.azure.credentials.key

type string

required YES

Your access key to authorize access to data in your storage account.

20.2 Point-in-time recovery options

```
pitr:
  enabled: <boolean>
  oplogSpanMin: <float64>
  compression: <string>
  compressionLevel: <int>
```

20.2.1 pitr.enabled

type boolean

default False

Enables point-in-time recovery

20.2.2 pitr.oplogSpanMin

type float64

default 10

The duration of an oplog span in minutes. If set when the **pbm-agent** is making an oplog slice, the slice's span is updated right away.

If the new duration is smaller than the previous one, the **pbm-agent** is triggered to save a new slice with the updated span. If the duration is larger, then the next slice is saved with the updated span in scheduled time.

20.2.3 pitr.compression

type string

default s2

The compression method for Point-in-Time Recovery oplog slices. Available in Percona Backup for MongoDB as of version 1.7.0.

Supported values: `gzip`, `snappy`, `lz4`, `s2`, `pgzip`, `zstd`. Default: `s2`.

20.2.4 pitr.compressionLevel

type int

The compression level is from `0` till `10`. Default value depends on the compression method used.

Note that the higher value you specify, the more time and computing resources it will take to compress / retrieve the data.

20.2.5 pitr.oplogOnly

type boolean

default False

required NO

Controls whether the base backup is required to start Point-in-Time Recovery recovery oplog slicing. When set to true, Percona Backup for MongoDB saves oplog chunks without the base backup snapshot. Available in Percona Backup for MongoDB starting with version 1.8.0. To learn more about the usage, see *Point-in-Time Recovery oplog replay*.

20.3 Backup options

```
backup:
  priority:
    "localhost:28019": 2.5
    "localhost:27018": 2.5
    "localhost:27020": 2.0
    "localhost:27017": 0.1
  compression: <string>
  compressionLevel: <int>
```

20.3.1 priority

type array of strings

The list of `mongod` nodes and their priority for making backups. The node with the highest priority is elected for making a backup. If several nodes have the same priority, the one among them is randomly elected to make a backup.

If not set, the replica set nodes have the default priority as follows:

- hidden nodes - 2.0,
- secondary nodes - 1.0,
- primary node - 0.5.

20.3.2 backup.compression

type string

default s2

The compression method for backup snapshots. Available in Percona Backup for MongoDB as of version 1.8.0.

When `none` is specified, backups are made without compression.

Supported values: `gzip`, `snappy`, `lz4`, `s2`, `pgzip`, `zstd`. Default: `s2`.

20.3.3 backup.compressionLevel

type int

The compression level from `0` till `10`. Default value depends on the compression method used.

Note that the higher value you specify, the more time and computing resources it will take to compress / retrieve the data.

20.4 Restore options

```
restore:
  batchSize: <int>
  numInsertionWorkers: <int>
```

20.4.1 batchSize

type int

default 500

The number of documents to buffer.

20.4.2 numInsertionWorkers

type int

default 10

The number of workers that add the documents to buffer.

CHAPTER

TWENTYONE

SUBMITTING BUG REPORTS OR FEATURE REQUESTS

If you find a bug in Percona Backup for MongoDB, you can submit a report to the JIRA issue tracker for Percona Backup for MongoDB.

Start by searching the open tickets for a similar report. If you find that someone else has already reported your problem, then you can upvote that report to increase its visibility.

If there is no existing report, submit a report following these steps:

1. Sign in to JIRA issue tracker. You will need to create an account if you do not have one.
2. In the *Summary*, *Description*, *Steps To Reproduce*, *Affects Version* fields describe the problem you have detected. For PBM the important diagnostic information is: log files from the pbm-agents; a dump of the PBM control collections.

As a general rule of thumb, try to create bug reports that are:

- *Reproducible*: describe the steps to reproduce the problem.
- *Specific*: include the version of Percona Backup for MongoDB, your environment, and so on.
- *Unique*: check if there already exists a JIRA ticket to describe the problem.
- *Scoped to a Single Bug*: only report one bug in one JIRA ticket.

CHAPTER

TWENTYTWO

GLOSSARY

ACID Set of properties that guarantee database transactions are processed reliably. Stands for *Atomicity*, *Consistency*, *Isolation*, *Durability*.

Amazon S3 Amazon S3 (Simple Storage Service) is an object storage service provided through a web service interface offered by Amazon Web Services.

Atomicity Atomicity means that database operations are applied following a "all or nothing" rule. A transaction is either fully applied or not at all.

Blob A blob stands for Binary Large Object, which includes objects such as images and multimedia files. In other words these are various data files that you store in Microsoft's data storage platform. Blobs are organized in *containers* which are kept in Azure Blob storage under your storage account.

Bucket A bucket is a container on the s3 remote storage that stores backups.

Collection A collection is the way data is organized in MongoDB. It is analogous to a table in relational databases.

Completion time The completion time is the time to which the sharded cluster / non-shared replica set will be returned to after the restore. It is reflected in the "complete" section of the `pbm list` / `pbm status` command outputs.

In *logical* backups, the completion time almost coincides with the backup finish time. To define the completion time, Percona Backup for MongoDB waits for the backup snapshot to finish on all cluster nodes. Then it captures the oplog from the backup start time up to that time.

In *physical* backups, the completion time is only a few seconds after the backup start time. By holding the `$backupCursor` open guarantees that the checkpoint data won't change during the backup, and Percona Backup for MongoDB can define the completion time ahead.

Consistency In the context of backup and restore, consistency means that the data restored will be consistent in a given point in time. Partial or incomplete writes to disk of atomic operations (for example, to table and index data structures separately) won't be served to the client after the restore. The same applies to multi-document transactions, that started but didn't complete by the time the backup was finished.

Container A container is like a directory in Azure Blob storage that contains a set of *blobs*.

Durability Once a transaction is committed, it will remain so.

GCP GCP (Google Cloud Platform) is the set of services, including storage service, that runs on Google Cloud infrastructure.

Isolation The Isolation requirement means that no transaction can interfere with another.

Jenkins Jenkins is a continuous integration system that we use to help ensure the continued quality of the software we produce. It helps us achieve the aims of:

- no failed tests in trunk on any platform,
- aid developers in ensuring merge requests build and test on all platforms,

- no known performance regressions (without a damn good explanation).

MinIO MinIO is a cloud storage server compatible with *Amazon S3*, released under Apache License v2.

Oplog Oplog (operations log) is a fixed-size collection that keeps a rolling record of all operations that modify data in the database.

Oplog slice A compressed bundle of *oplog* entries stored in the Oplog Store database in MongoDB. The oplog size captures an approximately 10-minute frame. For a snapshot, the oplog size is defined by the time that the slowest replica set member requires to perform mongodump.

OpID A unique identifier of an operation such as backup, restore, resync. When a pbm-agent starts processing an operation, it acquires a lock and an opID. This prevents processing the same operation twice (for example, if there are network issues in distributed systems). Using opID as a log filter allows viewing logs for an operation in progress.

pbm-agent A `pbm-agent` is a *PBM* process running on the mongod node for backup and restore operations. A pbm-agent instance is required for every mongod node (including replica set secondary members and config server replica set nodes).

pbm CLI Command-line interface for controlling the backup system. PBM CLI can connect to several clusters so that a user can manage backups on many clusters.

PBM Control collections PBM Control collections are *collections* with config, authentication data and backup states. They are stored in the admin db in the cluster or non-sharded replica set and serve as the communication channel between *pbm-agent* and *pbm CLI*. *pbm CLI* creates a new pbmCmd document for a new operation. *pbm-agents* monitor it and update as they process the operation.

Percona Backup for MongoDB Percona Backup for MongoDB (PBM) is a low-impact backup solution for MongoDB non-sharded replica sets and clusters. It supports both *Percona Server for MongoDB* and MongoDB Community Edition.

Percona Server for MongoDB Percona Server for MongoDB is a drop-in replacement for MongoDB Community Edition with enterprise-grade features.

Point-in-Time Recovery Point-in-Time Recovery is restoring the database up to a specific moment in time. The data is restored from the backup snapshot and then events that occurred to the data are replayed from oplog.

Replica set A replica set is a group of mongod nodes that host the same data set.

S3 compatible storage This is the storage that is built on the *S3* API.

Server-side encryption Server-side encryption is the encryption of data by the remote storage server as it receives it. The data is encrypted when it is written to S3 bucket and decrypted when you access the data.

CHAPTER

TWENTYTHREE

COPYRIGHT AND LICENSING INFORMATION

23.1 Documentation Licensing

CHAPTER

TWENTYFOUR

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Part IX

Release notes

CHAPTER

TWENTYFIVE

RELEASE NOTES

25.1 *Percona Backup for MongoDB* 1.8.1 (2022-07-12)

Date July 12, 2022

Installation Installing Percona Backup for MongoDB

Percona Backup for MongoDB is a distributed, low-impact solution for consistent backups of MongoDB sharded clusters and replica sets. This is a tool for creating consistent backups across a MongoDB sharded cluster (or a non-sharded replica set), and for restoring those backups to a specific point in time.

25.1.1 Release Highlights

- PBM-871 - Fixed the restore failure on a different cluster. Now the UUID of users and system collections are not preserved when replaying the oplog.
- PBM-881 - The PITR (Point-in-time recovery) chunks display is now consistent in both `pbm status` and `pbm list` outputs.

25.2 *Percona Backup for MongoDB* 1.8.0 (2022-06-09)

Date June 9, 2022

Installation Installing Percona Backup for MongoDB

Percona Backup for MongoDB is a distributed, low-impact solution for consistent backups of MongoDB sharded clusters and replica sets. This is a tool for creating consistent backups across a MongoDB sharded cluster (or a single replica set), and for restoring those backups to a specific point in time.

25.2.1 Release Highlights

- Ability to *restore data to a replica set with a different name and configuration*. This extends the list of environments compatible for the restore.
- When you use EBS-snapshots or other tools for physical backups, you *no longer have to create a mandatory base backup snapshot in |Percona Backup for MongoDB| as the starting point for Point-in-Time Recovery oplog slicing*. This reduces time and effort on managing excessive backups and makes Point-in-Time Recovery from physical or storage-level backups more straightforward.
- The ability to wait for the backup operation to finish before doing further actions through the session lock. This simplifies the automation of operations with Percona Backup for MongoDB.

- Ability to define backup compression level and method in Percona Backup for MongoDB configuration.
- To simplify the Percona Backup for MongoDB configuration, the example configuration file is now included in the Percona Backup for MongoDB package.
- Ubuntu 22.04 (Jammy Jellyfish) is added to the list of supported platforms

25.2.2 New Features

- PBM-776: Allow data restore into the replica set with a different name
- PBM-866: Add the ability to wait for the backup operation to finish and print the result
- PBM-782: Allow saving Point-in-Time Recovery oplog without base snapshot
- PBM-838: Add the ability to configure default compression method and level for backups

25.2.3 Improvements

- PBM-828: Add the full reference configuration file to packages
- PBM-751: Format timestamps according to RFC3339 (Thanks to Damiano Albani for reporting this issue)

25.2.4 Bugs Fixed

- PBM-820: Fix a bug where PBM crashed if backup cancelled right after it started by cancelling the backup gracefully

25.3 *Percona Backup for MongoDB* 1.7.0

Date April 18, 2022

Installation Installing Percona Backup for MongoDB

Percona Backup for MongoDB is a distributed, low-impact solution for consistent backups of MongoDB sharded clusters and replica sets. This is a tool for creating consistent backups across a MongoDB sharded cluster (or a single replica set), and for restoring those backups to a specific point in time.

Important: To make *physical backups* and restores (technical preview feature), the `pbm-agent` must have the read / write access to the `dataDir`. If you use the filesystem-based backup storage, the `pbm-agent` must also have the read / write access to the backup directory. Therefore, starting from version 1.7.0, the user running the `pbm-agent` is changed from `pbm` to `mongod` in Percona Backup for MongoDB packages.

To upgrade Percona Backup for MongoDB to version 1.7.0, do the following:

1. Stop the `pbm-agent` process
2. *Upgrade* new version packages
3. Reload the `systemd` process to update the unit file with the following command:

```
$ sudo  systemctl daemon-reload
```

5. If you have a filesystem-based backup storage, grant read / write permissions to the backup directory to the `mongod` user.

6. Restart the `pbm-agent` process.

If MongoDB runs under a *different user than mongod* (the default configuration for Percona Server for MongoDB), use the same user to run the `pbm-agent`. For filesystem-based storage, grant the read / write permissions to the backup directory for this user.

25.3.1 Release highlights

- Support for *physical backups* in Percona Server for MongoDB starting from versions 4.2.15-16 and 4.4.6-8 and higher. Physical backups drastically speed up backup and restore performance for large databases (several terabytes). This is a technical preview feature[1].
- *Oplog replay* from the arbitrary start time. This reduces Recovery Point Objective (RPO) when database is recovered from physical or storage-level backups.
- Ability to configure compression method and level for Point-in-Time Recovery chunks and compression level for backups.
- Ability to configure the number of S3 multipart upload chunks to comply with various S3-compatible storage provider requirements.
- Ability to configure the number of upload retries. This facilitates data upload in case of unstable network connection.

25.3.2 New Features

- PBM-734: Add the config option to set *debug log levels* for S3 requests
- PBM-805: Implement physical backups to improve performance for large databases
- PBM-742: Add the ability to *replay oplog* from arbitrary start time. This reduces Recovery Point Objective (RPO) when database is recovered from physical backups.

25.3.3 Improvements

- PBM-680: *Skip TLS verification* for object storage. This can be useful for private object storage with self-signed certificates.
- PBM-770: Support configurable compression *method* / *level* for Point-in-Time Recovery chunks (Thanks to Damiano Albani for reporting this issue and contributing to it)
- PBM-764: Support Zstandard compression format (Thanks to Damiano Albani for reporting this issue and contributing to it)
- PBM-750: Make max number of S3 upload parts configurable (Thanks to Damiano Albani for reporting this issue and contributing to it)
- PBM-777: Expand / fix the configuration API to support compression method for Point-in-Time Recovery chunks (Thanks to Damiano Albani for reporting and contributing to this issue)
- PBM-756: Add the ability to configure *logging levels for S3 requests* to debug issues with object storage (Thanks to Damiano Albani for reporting this issue and contributing to it)

[1] Tech Preview Features are not yet ready for enterprise use and are not included in support via SLA. They are included in this release so that users can provide feedback prior to the full release of the feature in a future GA release (or removal of the feature if it is deemed not useful). This functionality can change (APIs, CLIs, etc.) from tech preview to GA.

- PBM-577: It is now possible to choose an *S3 storage class* for granular control over various S3 tiers (Thanks to Damiano Albani for the contribution)

25.3.4 Bugs Fixed

- PBM-721: Fixed a bug where an upload of the backup to S3-storage was failing due to unstable network connection. Percona Backup for MongoDB can now be configured to retry the upload with flexible timeouts.
- PBM-773: Check distributed transactions on all participating shards to avoid commit timestamp inconsistency upon restore

25.4 *Percona Backup for MongoDB* 1.6.1

Date November 4, 2021

Installation Installing Percona Backup for MongoDB

Percona Backup for MongoDB is a distributed, low-impact solution for consistent backups of MongoDB sharded clusters and replica sets. This is a tool for creating consistent backups across a MongoDB sharded cluster (or a single replica set), and for restoring those backups to a specific point in time.

25.4.1 Release Highlights

- Deprecated support for MongoDB 3.6. Percona Backup for MongoDB remains compatible with MongoDB 3.6 and Percona Server for MongoDB 3.6; however, further enhancements and bug fixes are no longer tested against this version.
- Improved backup and PITR routines alignment by using sequential `delete-pitr`/`install-backup` operations instead of in-memory backup intent. This fixes the inability of a backup to start.
- Added support for automated access to S3 buckets using an EC2 instance profile. When Percona Backup for MongoDB is deployed using an EC2 instance, EC2 environment variables and metadata are used for S3 authentication, saving you from explicitly specifying S3 credentials in the Percona Backup for MongoDB configuration file. This comes handy for architectures deployed using the services like Amazon EC2, kiam, kube2iam or irsa.
- Extended logging for `pbm-agents`. This improves user experience with Percona Backup for MongoDB.

25.4.2 Improvements

- PBM-740: Use AWS EC2 instance profile to simplify access to S3 buckets for PBM

25.4.3 Bugs Fixed

- PBM-714: Fix backup and point-in-time recovery routines alignment algorithm to avoid backup failure
- PBM-722: Fix `pbm-agent`'s crash during the `delete-pitr` request execution if there is nothing to delete (Thanks to Daniel Oliver for reporting this issue)
- PBM-735: Fix a possible failure of a PITR catchup process to copy backup slices
- PBM-712: Fix an empty time value in JSON formatted log records by using Unix timestamps for time output

25.5 *Percona Backup for MongoDB* 1.6.0

Date August 16, 2021

Installation Installing Percona Backup for MongoDB

Percona Backup for MongoDB is a distributed, low-impact solution for consistent backups of MongoDB sharded clusters and replica sets. This is a tool for creating consistent backups across a MongoDB sharded cluster (or a single replica set), and for restoring those backups to a specific point in time.

Release highlights:

- Support for Percona Server for MongoDB and MongoDB Community 5.0
- Point-in-time recovery enhancements: ability to restore from any previous snapshot and configurable span of oplog events
- JSON output for PBM commands to simplify interfacing PBM with applications

25.5.1 New Features

- PBM-617: Ability to restore from previous snapshots to point-in-time

25.5.2 Improvements

- PBM-543: Configure the size of the span of oplog events for point-in-time recovery
- PBM-403: Mask user credentials in `ps` output of `pbm-agent`
- PBM-700: Improve backup/pitr tasks synchronization and align oplogs creation
- PBM-697: Add support of MongoDB 5.0 TS collections
- PBM-686: Do not show the starting second of a PITR range which cannot be used for PITR restore
- PBM-652: Add a command to delete PITR chunks
- PBM-632: Add JSON output for all commands

25.5.3 Bugs Fixed

- PBM-694: Fix restoring from a backup when it contains VIEWS collection (Thanks to Danish Qamar for reporting this issue)
- PBM-647: Reduce frequency of S3 header GET requests during agent health checks (Thanks to Ryan Gunner for reporting this issue)
- PBM-708: Ignore config.system.indexBuilds collection
- PBM-705: Avoid writing the "Read/Write on closed pipe" error in logs on expected connection closure
- PBM-703: PITR restore fails due to error "Failed to apply operation due to missing collection config.transactions"
- PBM-701: Prevent restore to time which is not covered by PITR chunks
- PBM-683: Show PITR restore as failed if an error occurred during data retrieval from storage
- PBM-640: Remove `cancelBackup` and fix `pitrestore` filters for `pbm logs` command
- PBM-480: Make `path` attribute mandatory for backups on local storage

25.6 *Percona Backup for MongoDB* 1.5.0

Date May 10, 2021

Installation Installing Percona Backup for MongoDB

Percona Backup for MongoDB is a distributed, low-impact solution for consistent backups of MongoDB sharded clusters and replica sets. This is a tool for creating consistent backups across a MongoDB sharded cluster (or a single replica set), and for restoring those backups to a specific point in time.

Important: Backups made with previous versions are incompatible for restore with Percona Backup for MongoDB 1.5.0. This is because processing of system collections `users` and `roles` has changed during backup / restore operations. For details, refer to *Restoring a backup* and PBM-636.

25.6.1 New Features

- PBM-596: Azure Blob Storage support
- PBM-488: Create weight or tag method to influence with `pbm-agent` node will do backups

25.6.2 Improvements

- PBM-662: Show PITR Status based on `admin.pbmLock` instead of config settings
- PBM-494: Prefer a (healthy) hidden secondary to any other node in automatic selection

25.6.3 Bugs Fixed

- PBM-642: Display `priority=0` members on agent list in `pbm status` output
- PBM-636: Different collection UUID after restore (Thanks to Nikolay for reporting this issue and Dmitry Kuzmin for contributing)
- PBM-646: Stop the balancer during backup to make sure it doesn't start running during restore
- PBM-635: Wait for the leader's metadata before starting backups
- PBM-490: Use cluster time for the snapshot start time

25.7 *Percona Backup for MongoDB* 1.4.1

Date January 28, 2021

Installation Installing Percona Backup for MongoDB

Percona Backup for MongoDB is a distributed, low-impact solution for consistent backups of MongoDB sharded clusters and replica sets. This is a tool for creating consistent backups across a MongoDB sharded cluster (or a single replica set), and for restoring those backups to a specific point in time.

25.7.1 Improvements

- PBM-621: Show incomplete backups in `pbm status` output
- PBM-619: Optimise response time from storage for `pbm status`
- PBM-615: Check backup validity for current cluster
- PBM-608: Enable Kerberos authentication for PBM by adding support for GSSAPI
- PBM-478: Prevent restore from incomplete backup
- PBM-610: Fix response time from GCS for `pbm status` command

25.7.2 Bugs Fixed

- PBM-618: Check for the complete file set in backup snapshot before processing it

25.8 *Percona Backup for MongoDB* 1.4.0

Date December 24, 2020

Installation Installing Percona Backup for MongoDB

Percona Backup for MongoDB is a distributed, low-impact solution for consistent backups of MongoDB sharded clusters and replica sets. This is a tool for creating consistent backups across a MongoDB sharded cluster (or a single replica set), and for restoring those backups to a specific point in time.

25.8.1 New Features

- PBM-345: Centralize logs
- PBM-435: `pbm status` command

25.8.2 Improvements

- PBM-572: Change backup 'name' in 'pbm list' etc to be consistent time (~= end time) rather than start time
- PBM-556: Introduce operation ID

25.8.3 Bugs Fixed

- PBM-595: Shard backup with different rset name
- PBM-604: Compression flag for 'pbm list' command doesn't change the output
- PBM-602: Empty PITR files are created on storage if PBM fails to upload oplog chunk due to insufficient range
- PBM-597: Properly handle mongo fail while PITR slicing is enabled

25.9 *Percona Backup for MongoDB* 1.3.4

Date November 19, 2020

Installation Installing Percona Backup for MongoDB

Percona Backup for MongoDB is a distributed, low-impact solution for consistent backups of MongoDB sharded clusters and replica sets. This is a tool for creating consistent backups across a MongoDB sharded cluster (or a single replica set), and for restoring those backups to a specific point in time.

25.9.1 Improvements

- PBM-586: Add a request timeout to the S3 downloader during the restore
- PBM-584: Ignore shard configuration during the restore

25.9.2 Bugs Fixed

- PBM-555: Fix the " error demultiplexing archive" error during restore by downloading backup from s3 storage in chunks
- PBM-460: Restore fails with conflicting namespace destinations (Thanks to user pedroalb for reporting this issue)

25.10 *Percona Backup for MongoDB* 1.3.3

Date November 4, 2020

Installation Installing Percona Backup for MongoDB

Percona Backup for MongoDB is a distributed, low-impact solution for consistent backups of MongoDB sharded clusters and replica sets. This is a tool for creating consistent backups across a MongoDB sharded cluster (or a single replica set), and for restoring those backups to a specific point in time.

25.10.1 Bugs Fixed

- PBM-575: `mongodump` connects to the primary node

25.11 *Percona Backup for MongoDB* 1.3.2

Date October 14, 2020

Installation Installing Percona Backup for MongoDB

Percona Backup for MongoDB is a distributed, low-impact solution for consistent backups of MongoDB sharded clusters and replica sets. This is a tool for creating consistent backups across a MongoDB sharded cluster (or a single replica set), and for restoring those backups to a specific point in time.

25.11.1 New Features

- PBM-426: Add AWS KMS key encryption/decryption for S3 buckets

  Config format

```
storage:
  s3:
    serverSideEncryption:
      sseAlgorithm: "aws:kms"
      kmsKeyID: "........"
```

  (Thanks to user pedroalb for reporting this issue)

25.11.2 Improvements

- PBM-568: Print uploadPartSize value to log during backup
- PBM-560: Use s2 compression as default for `pbm-speed-test` instead of gzip

25.11.3 Bugs Fixed

- PBM-485: Fix backups to S3 failing with `MaxUploadParts` limit by auto-adjusting `uploadPartSize` value (Thanks to user pedroalb for reporting this issue)
- PBM-559: pbm-agent runs out of memory while doing restore of large backup (Thanks to user Simon Bernier St-Pierre for reporting this issue)
- PBM-562: Correct calculation of available PITR time ranges by pbm list
- PBM-561: Fix setting of numeric options in config
- PBM-547: Allow deleting backups from local filesystem by moving delete operations to pbm-agents

25.12 *Percona Backup for MongoDB* 1.3.1

Date September 3, 2020

Installation Installing Percona Backup for MongoDB

Percona Backup for MongoDB is a distributed, low-impact solution for consistent backups of MongoDB sharded clusters and replica sets. This is a tool for creating consistent backups across a MongoDB sharded cluster (or a single replica set), and for restoring those backups to a specific point in time.

25.12.1 Bugs Fixed

- PBM-542: Fix backup folder permissions on filesystem storage for Point-in-Time recovery

25.13 *Percona Backup for MongoDB* 1.3.0

Date August 26, 2020

Installation Installing Percona Backup for MongoDB

Percona Backup for MongoDB is a distributed, low-impact solution for consistent backups of MongoDB sharded clusters and replica sets. This is a tool for creating consistent backups across a MongoDB sharded cluster (or a single replica set), and for restoring those backups to a specific point in time.

25.13.1 New Features

- PBM-455: Add oplog archiver thread for PITR
- PBM-491: Modify "pbm restore" to accept arbitrary point in time when PITR oplog archives available

25.13.2 Improvements

- PBM-526: Add pbm version information to the backup metadata

25.14 *Percona Backup for MongoDB* 1.2.1

Date July 27, 2020

Installation Installing Percona Backup for MongoDB

Percona Backup for MongoDB is a distributed, low-impact solution for consistent backups of MongoDB sharded clusters and replica sets. This is a tool for creating consistent backups across a MongoDB sharded cluster (or a single replica set).

25.14.1 Bugs Fixed

- PBM-509: Include "pbm-speed-test" binary for debian packages

25.15 *Percona Backup for MongoDB* 1.2.0

Date May 13, 2020

Installation Installing Percona Backup for MongoDB

Percona Backup for MongoDB is a distributed, low-impact solution for consistent backups of MongoDB sharded clusters and replica sets. This is a tool for creating consistent backups across a MongoDB sharded cluster (or a single replica set).

25.15.1 New Features

- PBM-348: Add ability to delete old backups
- PBM-447: pbm-speed-test: Add a tool to field-test compression and upload speeds

25.15.2 Improvements

- PBM-431: Raise dump output speed through compression tuning, parallelization
- PBM-461: s2 is set as the default compression mechanism
- PBM-429: Periodic backup progress messages added to pbm-agent logs
- PBM-140: Added ability to cancel a backup

25.15.3 Bugs Fixed

- PBM-451: Resync didn't work if storage type was set to filesystem

25.16 Percona Backup for MongoDB 1.1.3

Date April 14, 2020

Installation *Installing Percona Backup for MongoDB*

25.16.1 Improvements

- PBM-424: Remove the `--mongodb-uri` arg from `pbm-agent.service` unit file
- PBM-419: Resolve restore-blocking issues related to admin.system.version
- PBM-417: Improve pbm control collection etc. metadata for restores

25.16.2 Bugs Fixed

- PBM-425: pbm-agent could fail when restoring
- PBM-430: S3 store resync didn't work if the store had a prefix
- PBM-438: `pbm list --size=5` worked in reverse

25.17 Percona Backup for MongoDB 1.1.1

Date January 31, 2020

Installation *Installing Percona Backup for MongoDB*

Percona Backup for MongoDB is a distributed, low-impact solution for consistent backups of MongoDB sharded clusters and replica sets. This is a tool for creating consistent backups across a MongoDB sharded cluster (or a single replica set), and for restoring those backups to a specific point in time. The project was inspired by (and intends to replace) the Percona-Lab/mongodb_consistent_backup tool.

Percona Backup for MongoDB supports Percona Server for MongoDB or MongoDB Community Server version 3.6 or higher with MongoDB replication enabled. Binaries for the supported platforms as well as the tarball with source code are available from the Percona Backup for MongoDB download page. For more information about Percona Backup for MongoDB and the installation steps, see the *documentation*.

25.17.1 Bugs Fixed

- PBM-407: Very large collections experienced timeout due to full-collection scan for a preliminary count
- PBM-414: The upload on Google cloud storage was broken with "InvalidArgument: Invalid argument. status code: 400"
- PBM-409: Restore failed with "incompatible auth version with target server"

25.18 Percona Backup for MongoDB 1.1.0

Percona is happy to announce the release of Percona Backup for MongoDB 1.1.0 on January 16, 2020.

Percona Backup for MongoDB is a distributed, low-impact solution for consistent backups of MongoDB sharded clusters and replica sets. This is a tool for creating consistent backups across a MongoDB sharded cluster (or a single replica set), and for restoring those backups to a specific point in time. The project was inspired by (and intends to replace) the Percona-Lab/mongodb_consistent_backup tool.

Percona Backup for MongoDB supports Percona Server for MongoDB or MongoDB Community Server version 3.6 or higher with MongoDB replication enabled. Binaries for the supported platforms as well as the tarball with source code are available from the Percona Backup for MongoDB download page. For more information about Percona Backup for MongoDB and the installation steps, see the *documentation*.

Percona Backup for MongoDB 1.1.0 introduces the new `pbm config` command to enable configuring the store from the command line in addition to the configuration file. This command effectively replaces *pbm store* which was only able to read store configuration from the configuration file.

```
$ pbm config --set storage.s3.bucket="operator-testing"
```

25.18.1 New Features

- PBM-344: New *pbm config* command to support configuring the store from the command line.

25.18.2 Improvements

- PBM-361: Improved the processing of timestamps when using oplog.

25.18.3 Bugs Fixed

- PBM-214: `pbm-agent` could crash with restore command running forever, if the primary node became unavailable during the *restore* operation.
- PBM-279: `pbm-agent` could be started with an invalid config file.
- PBM-338: Backups that failed could appear in the output of the *pbm list* command.
- PBM-362: The `pbm backup` could fail when called from the primary node if there were no healthy secondaries.
- PBM-369: ReplicaSets could not establish connections when TLS was used in the cluster.

25.19 Percona Backup for MongoDB 1.0.0

Percona is happy to announce the GA release of our latest software product Percona Backup for MongoDB 1.8 on September 19, 2019.

Percona Backup for MongoDB is a distributed, low-impact solution for consistent backups of MongoDB sharded clusters and replica sets. This is a tool for creating consistent backups across a MongoDB sharded cluster (or a single replica set), and for restoring those backups to a specific point in time. The project was inspired by (and intends to replace) the Percona-Lab/mongodb_consistent_backup tool.

Percona Backup for MongoDB supports Percona Server for MongoDB or MongoDB Community Server version 3.6 or higher with MongoDB replication enabled. Binaries for the supported platforms as well as the tarball with source code are available from the Percona Backup for MongoDB download page. For more information about Percona Backup for MongoDB and the installation steps, see the *documentation*.

Percona Backup for MongoDB 1.0.0 features the following:

- The architecture and the authentication of Percona Backup for MongoDB have been simplified compared to the previous release.
- Stores backup data on Amazon Simple Storage Service or compatible storages, such as MinIO.
- The output of **`pbm list`** shows all backups created from the connected MongoDB sharded cluster or replica set.

25.20 Percona Backup for MongoDB 0.5.0

Percona is pleased to announce the early release of Percona Backup for MongoDB 0.5.0 of our latest software product on June 17, 2019. The GA version of Percona Backup for MongoDB is scheduled to be released later in 2019.

Percona Backup for MongoDB is a distributed, low-impact solution for consistent backups of MongoDB sharded clusters and replica sets. This is a tool for creating consistent backups across a MongoDB sharded cluster (or a single replica set), and for restoring those backups to a specific point in time. Percona Backup for MongoDB uses a distributed client/server architecture to perform backup/restore actions.

The project was inspired by (and intends to replace) the Percona-Lab/mongodb_consistent_backup tool.

Percona Backup for MongoDB supports Percona Server for MongoDB or MongoDB Community Server version 3.6 or higher with MongoDB replication enabled. Binaries for the supported platforms as well as the tarball with source code are available from the Percona Backup for MongoDB download page <https://www.percona.com/downloads/percona-backup-mongodb/LATEST/>`_. For more information about Percona Backup for MongoDB and the installation steps, see the documentation.

Percona Backup for MongoDB 0.5.0 features the following:

- Enables storing backup metadata on Amazon Simple Storage Service storages.

- The API of Percona Backup for MongoDB introduces HTTP basic authentication to prevent an unauthorized user from running backups or restoring data if they manage to access the API port.
- To optimize the usage of network resources, the pbm-agent on `mongos` is not needed any more and backup-coordinator automatically establishes connection to the appropriate `mongos` instance.
- The output of `pbmctl list nodes` now includes the replica set name and informs the backup status of the node.

Percona doesn't recommend this release for production as its API and configuration fields are still likely to change. It only features a basic API level security. Please report any bugs you encounter in our bug tracking system.

25.20.1 New Features and Improvements

- 93: Support storage of backup metadata on AWS S3.
- 99: **`pbm-agent`** is deprecated on `mongos`.
- 105: Log a warning if a Primary node-type is used for a backup
- 122: Include the replica set name to the output of `pmbctl list nodes`
- 130: Add HTTP Basic Authentication to gRPC servers (API and RPC)
- 139: Support listing backup status in the output of `pmbctl list nodes`
- 170: Enable setting the 'stopOnError' attribute in `mongorestore` to ensure consistency of the data being restored.

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