Arcserve® Backup for Unix and Linux

Enterprise Option for SAP HANA Guide

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Arcserve Product References

This document references the following Arcserve products:

- Arcserve® Backup
- Arcserve® Unified Data Protection
- Arcserve® Unified Data Protection Agent for Windows
- Arcserve® Unified Data Protection Agent for Linux
- Arcserve® Replication and High Availability

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Chapter 1: Introduction

This section contains the following topics:

Introduction (see page 7)
How the Enterprise Option Protects SAP HANA (see page 7)
Supported Functionality (see page 8)

Introduction

Arcserve Backup is a comprehensive storage solution for applications, databases, distributed servers, and file systems. Arcserve Backup provides backup and restore capabilities for databases, business-critical applications, and network clients. In addition, Arcserve Backup helps administrators simplify running backup and restore jobs using graphical user interface (GUI), parallel streaming, and advanced device management.

Among the options Arcserve Backup offers the Enterprise Option for SAP HANA. The Enterprise Option for SAP HANA lets you back up SAP HANA data to storage devices and recover SAP HANA data from storage devices.

How the Enterprise Option Protects SAP HANA

The Enterprise Option for SAP HANA lets you backup and restore online SAP HANA databases. The option handles all communications between Arcserve Backup and the SAP HANA database server while data is being backed up and restored. This communication includes preparing, retrieving, and processing the data sent back and forth across the network.

The Enterprise Option for SAP HANA lets you process jobs efficiently, without interrupting operations, and assists in performing the following functions:

Action	Function
Backup	When a backup request is made, the Enterprise Option for SAP HANA contacts the database, retrieves the necessary data, and sends it to Arcserve Backup, where the objects are backed up to storage devices.

Action	Function
Recovery	Arcserve Backup retrieves the objects that you want to restore from the storage devices and passes them to the Enterprise Option for SAP HANA. The Enterprise Option for SAP HANA then writes this data to the database, completing the recovery process.

The Enterprise Option for SAP HANA lets you manage your SAP HANA environment by performing the following action:

- Manage remote backups
- Backup complete databases
- Recover a complete database
- Backup to a wide array of storage devices

Supported Functionality

The Enterprise Option for SAP HANA provides the following functionalities that enhance performance:

- **The backup option integration module:** Provides the infrastructure for the Enterprise Option for SAP HANA. The backup option integration module serves as the interface that communicates information between Arcserve Backup and SAP HANA.
- **Enhanced destination options:** Lets you specify different destination tapes for each day of the week in single stream mode or specify media pools. Using the enhanced destination options, you can better organize your backup tapes.

Chapter 2: Installing and Configuring the Enterprise Option for SAP HANA

This section contains the following topics:

Prerequisites to install the SAP HANA Agent (see page 9)
How to Complete Prerequisite Tasks (see page 9)
Install the Enterprise Option for SAP HANA on Database Servers (see page 10)
Configure the Enterprise Option for SAP HANA (see page 10)
Installation (see page 18)
Uninstall the Enterprise Option for SAP HANA from UNIX and Linux Systems (see page 19)

Prerequisites to install the SAP HANA Agent

You need to install the relevant compat (32-bit) (libstdc++33-32bit.*) package to proceed with the smooth installation of the agent.

Important: If you see the following error do not proceed with the installation:

```
The components you selected require this library file: libstdc++.so.5.
Typically, Linux comes with this library file. It is located in the /usr/lib
path.  Before you rerun the installation, install the following package:

compat-libstdc++ (32-bit)
```

How to Complete Prerequisite Tasks

Before installing the Enterprise Option for SAP HANA, complete the following tasks:

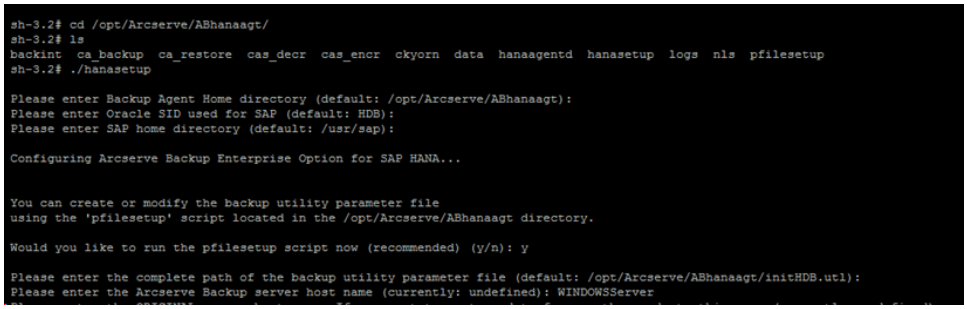
- Verify that your system meets the minimum hardware and software requirements needed to the Enterprise Option for SAP HANA. For a list of requirements, see the Readme file.
- Verify that the Arcserve Backup server component is installed in your system.
- Verify that you have super user privileges.
- Verify that the SAP HANA server component is installed on the computer where you will install the Enterprise Option for SAP HANA.

Install the Enterprise Option for SAP HANA on Database Servers

You must install the Enterprise Option for SAP HANA on all database servers that you want Arcserve Backup to manage.

Install the Enterprise Option for SAP HANA and Client agent for Linux on SAP HANA server.

Refer to the *Install the Client Agents* section in the *Client Agent* guide for Unix and Linux installation instructions.



Configure the Enterprise Option for SAP HANA

After you install the ABhana and the ABhanabaim packages on your system, you need to run the configuration script to configure the Enterprise Option for SAP HANA. However, before you configure the Enterprise Option for SAP HANA, verify that the following information is available:

Check This Item	Your Value
The SAP HANA SID	
The path to the SAP home directory	
The path for the Enterprise Option for SAP HANA home directory	

Now, you can start configuring the Enterprise Option for SAP HANA.

Configure SAP Using the Configuration Script

The SAP HANA configuration setup script lets you configure the Enterprise Option for SAP HANA on SAP HANA servers.

Follow these steps:

1. Enter the following command in the Enterprise Option for SAP HANA home directory:

   ./hanasetup

2. To provide a directory, perform one of the following options:

   - To select the default home directory for the Enterprise Option for SAP HANA, press Enter. The default directory is:
     /opt/Arcserve/ABhanaagt
   - To enter a directory other than the default, enter the directory path and press Enter.

3. To enter the SAP HANA SID, perform one of the following options:

   - To select the default, press Enter. The default ID is:
     HDB
   - To enter an SID other than the default, type the alternate SID and press Enter.

4. To enter the SAP home directory, perform one of the following options:

   - To select the default directory press Enter. The default directory is:
     /usr/sap
   - To enter a directory other than the default, type the directory path and press Enter.

5. The script confirms if you want to run the pfilesetup script now.

   Note: You can run pfilesetup later if you want to create different utility parameter files. If you want to run the pfilesetup script later, type n.

   Perform one of the following options:

   - **Type y**

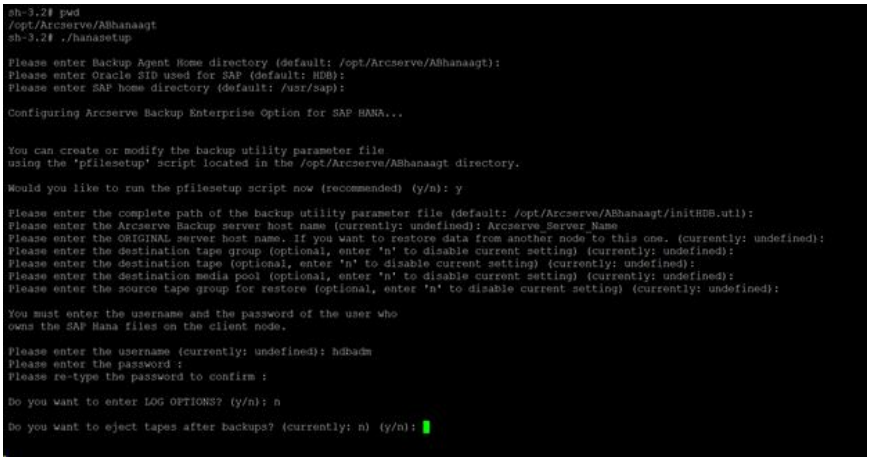
     The configuration script (hanasetup) calls the utility parameter file setup script (pfilesetup). The pfilesetup script configures the utility parameter file needed by ABhanabaim.

     The following is an example of the entries in pfilesetup:

     HOST =<server where Arcserve Backup is installed>
     USERNAME=<name of a user who has access to the SAP/HANA files on the client node>
     PASSWORD=<password of that user>
     DESTGROUP=<Arcserve Backup device group>
     DESTTAPE=<tape name>
     MEDIAPOOL=<media pool name>

   - **Type n**

     The setup is complete.



   Note: The next step is to edit the backup and restore configuration profiles.

Configuration Files

You can edit the following configuration files if you intend to edit any parameters at a later point of time or run the pfilesetup command to edit the configuration files:

- **util_par_file:** Lets you customize the backup option integration module parameter file that controls the backup process. The default location of this configuration file is as follows:

  $CASAP_HOME(/opt/Arcserve/ABhanaagt)

  Note: Optionally, you can rename util_par_file and save the file at a specific location when you run pfilesetup.

Edit util_par_file to Define Environment Variables

By editing util_par_file, you define the environment variables for the backup option integration module. To set the values for the parameters in this file, run hanasetup or pfilesetup.

When the Enterprise Option for SAP HANA performs a SAP HANA backup job, the backup option integration module creates a backup job and sends to the Arcserve Backup server for execution. The job is submitted using the backup parameters that you set in util_par_file. In util_par_file you can perform the following options:

- Designate tapes that you want to use
- Define backup group properties
- Define media pool properties

Required Options

You must set the following parameters in util_par_file:

HOST=<Arcserve Backup Server Name >
USERNAME=<name of a user who has access to the SAP HANA files on the client node>
PASSWORD= <password of that user>

Additional Options

You can set the following optional parameters to customize options for tapes, group names, and media pools:

Options:
ORIGINALHOST=< Original Hostname of the Backup when restoring one hosts data to another host >.

Log Options:
SNMP=< True/False >
TNG=< True/False >
EMAIL=< john.smith@ca.com >
PRINTER=< lp >

Destination Options:
EJECT=< True/False >
DESTTAPE=< Tape Name >
DESTGROUP=< Device Group Name >
MEDIAPOOL= < Media Pool Name >
TAPEMETHOD=< Append / Owritesameblank / Owritesameblankany >
SPANTAPEMETHOD=< Owritesameblank / Owritesameblankany >
TAPETIMEOUT=< minutes >
SPANTAPETIMEOUT=< minutes >

Description of Additional Options:

- **SNMP:** Lets you send alert information through SNMP.
- **TNG:** Lets you send alert information through TNG.
- **EMAIL:** Lets you send alert information through EMAIL.
- **PRINTER:** Lets you send alert information to a printer.

Note: Configure the SNMP, TNG, EMAIL, and PRINTER options using the Arcserve Backup Alert Manager before you configure the parameters in the util_par_file configuration file. For more information, see the *Administration Guide*.

- **EJECT:** Lets you eject tapes after backups are complete.
- **DESTTAPE:** Lets you specify tape names that you use for backups.

  Note: Arcserve Backup ignores this option when you specify the MEDIAPOOL option.
- **DESTGROUP:** Lets you specify the tape group to use for backups.

  Note: Arcserve Backup ignores this option when you specify the MEDIAPOOL option.
- **MEDIAPOOL:** Lets you specify the media pool to use for the backup.
- **TAPEMETHOD:** Lets you specify the overwrite method to use on the first tape during the backup. You can specify one of the following values:
  - Append
  - Owritesameblank
  - Owritesameblankany
- **SPANTAPEMETHOD:** Lets you specify the tape spanning method to use on additional tapes during the backup. You can specify one of the following values:
  - Owritesameblank
  - Owritesameblankany
- **TAPETIMEOUT:** Lets you specify a timeout value for the first tape.
- **SPANTAPETIMEOUT:** Lets you specify a timeout value for additional tapes.

Schedule Options

You can set the following schedule options, that enable you to use a different tape, media pool, or both, following a seven-day cycle:

DAYOFWEEK =< True / False >

Without Multistreaming

DESTTAPESUN=< Tape Name to use on Sunday >
DESTTAPEMON=< Tape Name to use on Monday >
DESTTAPETUE=< Tape Name to use on Tuesday >
DESTTAPEWED=< Tape Name to use on Wednesday >
DESTTAPETHU=< Tape Name to use on Thursday >
DESTTAPEFRI=< Tape Name to use on Friday >
DESTTAPESAT=< Tape Name to use on Saturday >

If you do not specify a tape for the current day when you set the schedule options, the tape specified in the DESTTAPE is used as the default.

Considerations:

- Tape names cannot exceed 24 characters.
- To comment out a line, enter # at the beginning of a line. This method applies to all options.

Add User Equivalence to the SAPDBA User

Before you can use the Enterprise Option for SAP HANA, add the HDBADM user as an Arcserve Backup user. This provides necessary permission and enables the backup option integration module to send jobs to the Arcserve Backup server. You must establish the authentication equivalence settings with proper privileges.

Note: Within Arcserve Backup, the unique key is hostname.username. You cannot use the User Profile Manager.

Follow these steps:

1. As a prerequisite, verify that the Arcserve Backup server is running.
2. Open the command line on the Arcserve Backup server and set the user equivalence using the following syntax:

   ca_auth [-cahost <BackupServer hostname>] –equiv add <HDBADMUser> <SAPAgent hostname> <ABBackupUser> [<ABUsername> <ABpassword>]

   Example:

   $>ca_auth –cahost BackupSever -equiv add hdbadm hanaserver caroot caroot""

   This command authorizes HDBADM user, hdbadm, on the hanaserver machine, to use the Arcserve Backup user name, caroot, on the Arcserve Backup Server host.

   Note: In this example, caroot has no password, so " " is used.

For more information about setting user equivalence, see the *Command Line Reference Guide*.

Set the Environment Variables on UNIX and Linux Systems

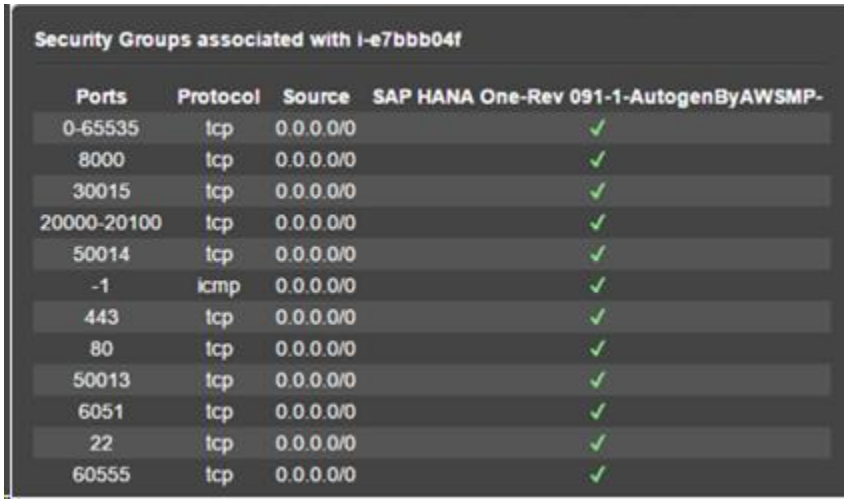
Before you can back up your database, set the following environment variables on SAP HANA server.

CASAP_HOME= (to the path of the Enterprise Option for SAP HANA)

Installation

Set the following security rules for Windows and Linux instances if you are using SAP HANA One on Amazon EC2 instances:

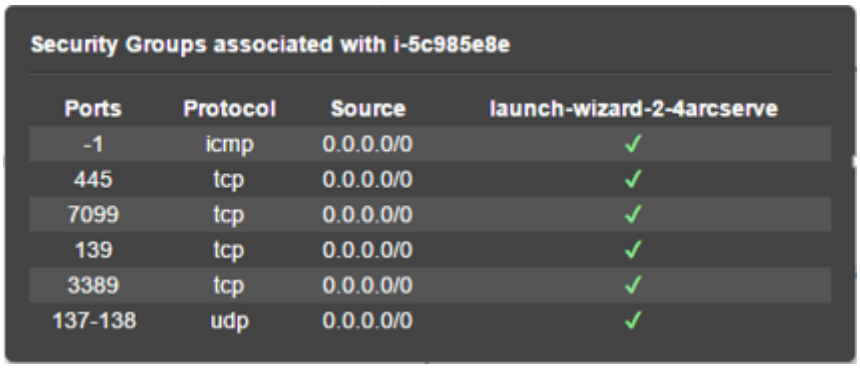
- SAP HANA instance



Security Groups associated with i-e7bbb04f

Ports	Protocol	Source	SAP HANA One-Rev 091-1-AutogenByAWSMP-
0-65535	tcp	0.0.0.0/0	✓
8000	tcp	0.0.0.0/0	✓
30015	tcp	0.0.0.0/0	✓
20000-20100	tcp	0.0.0.0/0	✓
50014	tcp	0.0.0.0/0	✓
-1	icmp	0.0.0.0/0	✓
443	tcp	0.0.0.0/0	✓
80	tcp	0.0.0.0/0	✓
50013	tcp	0.0.0.0/0	✓
6051	tcp	0.0.0.0/0	✓
22	tcp	0.0.0.0/0	✓
60555	tcp	0.0.0.0/0	✓

- Windows Instance (Arcserve Backup):



Security Groups associated with i-5c985e8e

Ports	Protocol	Source	launch-wizard-2-4arcserve
-1	icmp	0.0.0.0/0	✓
445	tcp	0.0.0.0/0	✓
7099	tcp	0.0.0.0/0	✓
139	tcp	0.0.0.0/0	✓
3389	tcp	0.0.0.0/0	✓
137-138	udp	0.0.0.0/0	✓

Uninstall the Enterprise Option for SAP HANA from UNIX and Linux Systems

Arcserve Backup contains an uninstallation script that lets you uninstall the Enterprise Option for SAP HANA.

Follow these steps:

1. From the command prompt, access the Arcserve Backup Common Agent directory using the following command:

   ```
   # cd /opt/Arcserve/ABcmagt
   ```

2. Execute the following command:

   ```
   # ./uninstall
   ```

3. Follow the on-screen instructions to complete the uninstallation process.

Note: Optionally, you can use the package management tool provided with your operating system to uninstall the Enterprise Option for SAP HANA.

Use the rpm tool from the command line prompt and execute the following command:

```
rpm –e ABhana
```

Chapter 3: Backing Up and Recovering SAP HANA Data

SAP HANA backup and recovery can be performed by using SAP HANA Studio or by using hdbsql command line. This chapter provides information on how to perform backup and recovery of SAP HANA database.

SAP HANA Studio is the most common tool to backup and to recover HANA databases, as it is pre-installed on SAP HANA. SAP HANA Studio is used by administrators to administer activities such as start and stop the services, monitor the system, configure system settings, and manage users and authorizations. SAP HANA Studio is a client environment that is used to access the SAP HANA database located in the same environment or at a remote location.

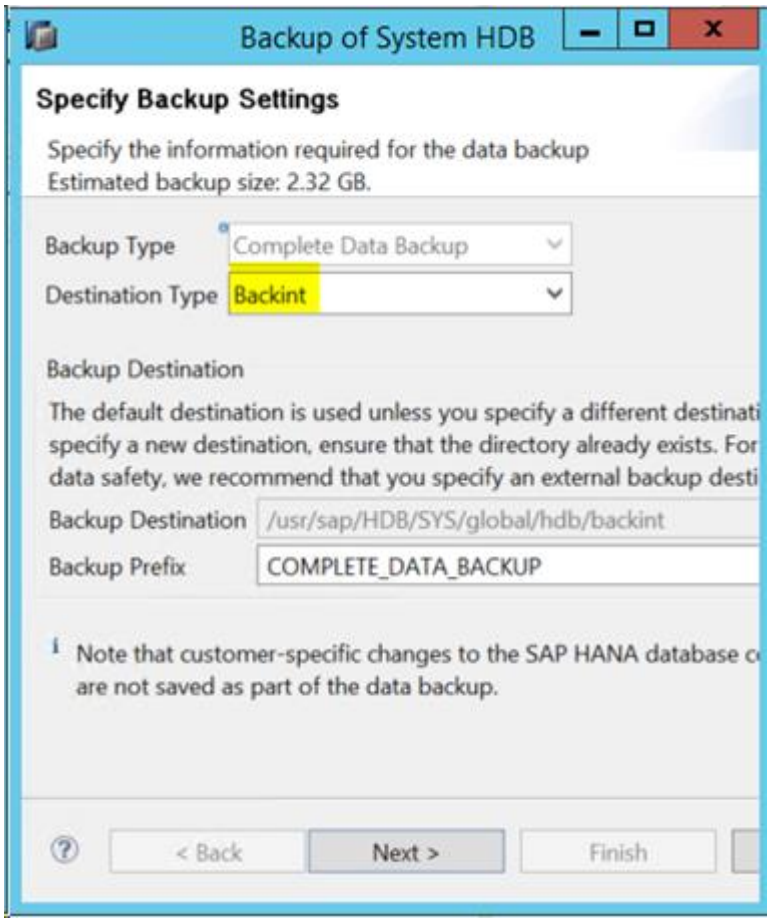
After configuring SAP HANA agent, SAP HANA database is ready to perform backup and recovery operations of database by using both SAP HANA Studio and hdbsql commands.

Online Complete Database Backup

You can perform the SAP HANA database backup when the database is online using BACKINT. SAP HANA provides BACKINT interface to the third party vendors to implement backups\recoveries to external storage devices.

Once you configure SAP HANA agent, backup server and destination tapes details are stored in Parameter file. Backint refers to the parameter file and submits backup to that backup server as per the configurations.

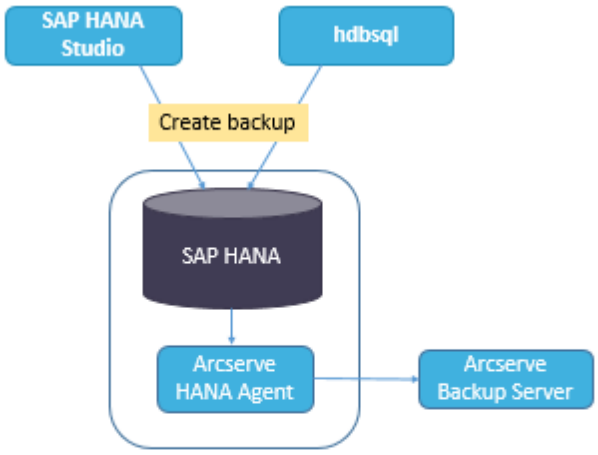
When you submit the backup from SAP HANA studio, mention the destination type as backint while submitting the backup job.



You can perform a backup from hdbsql command.

Follow these steps:

1. Connect to SAP HANA Admin user.
2. Run the following command:
   hdbsql -i 00 -u SYSTEM -p Password "backup data using backint ('Full_Backup')"



Log Backups

Consider the following steps while configuring the log backups:

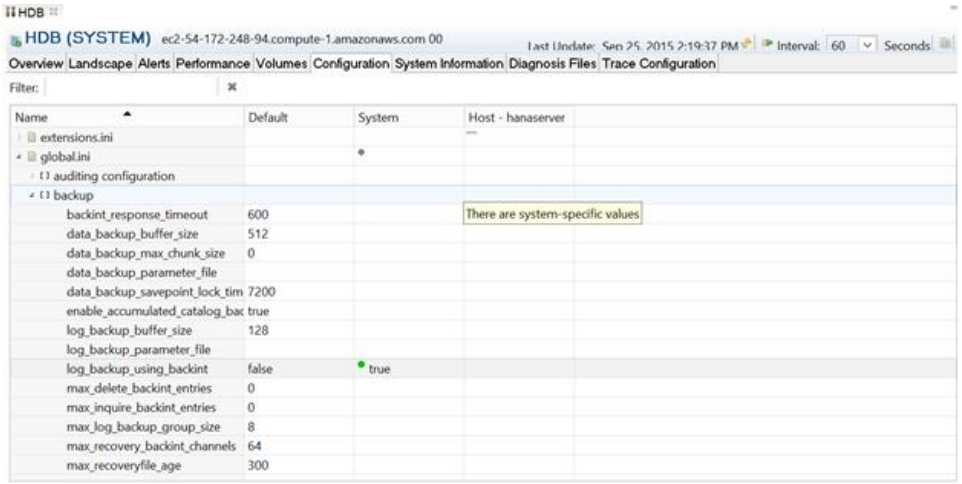
- Always considers the default settings for log backups.
- Destination type is either a file or Backint whichever is configured under instance configuration.
- Destination location and backup interval is considered from the configuration.
- Log backups are carried out automatically unless disabled.

To perform log backups automatically to backint, you need to configure the log backups from SAP HANA Studio or from Global.ini file. The backups are written to the file if **Enable Automatic Log Backup** option is enabled. By default, the **Enable Automatic Log Backup** option is enabled by SAP HANA.

You can configure log backups to backint from SAP HANA Studio:

Follow these steps:

1. Launch **SAP HANA Studio.**
2. Double click on the Instance Name.
3. Navigate to **Instance, Configuration, Global.ini , [ ]backup**
4. Change the system value of **log_backup_using_backint** from **false** to **true**.



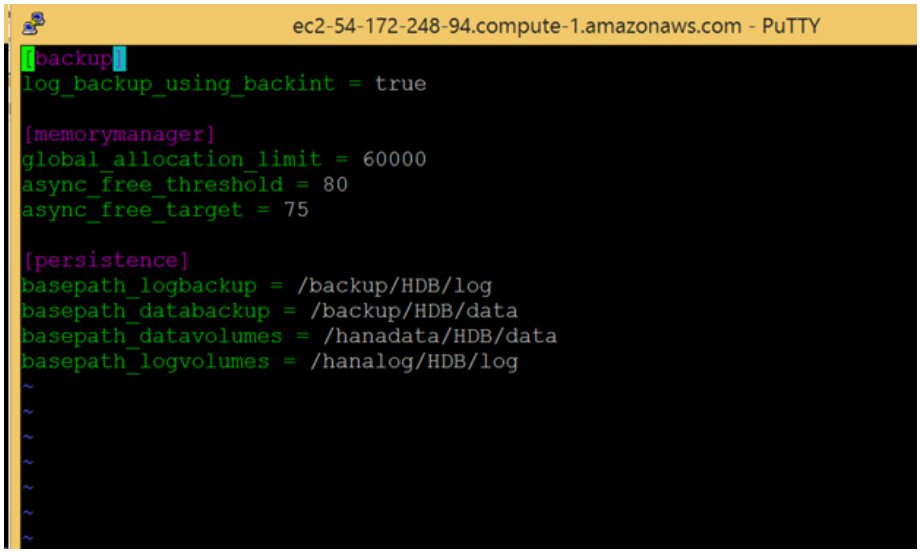
Note: Once you change the value of **log_backup_using_backint**, the impact is immediate.

You can configure log backups to backint from global.ini file:

Follow these steps:

1. Edit **global.ini** file from /usr/sap/HDB/global/hdb/custom/config.
2. Add the following line under [backup] section:

   log_backup_using_backint = true



Note: If you do not see the [backup] section, create a section and then add the code.

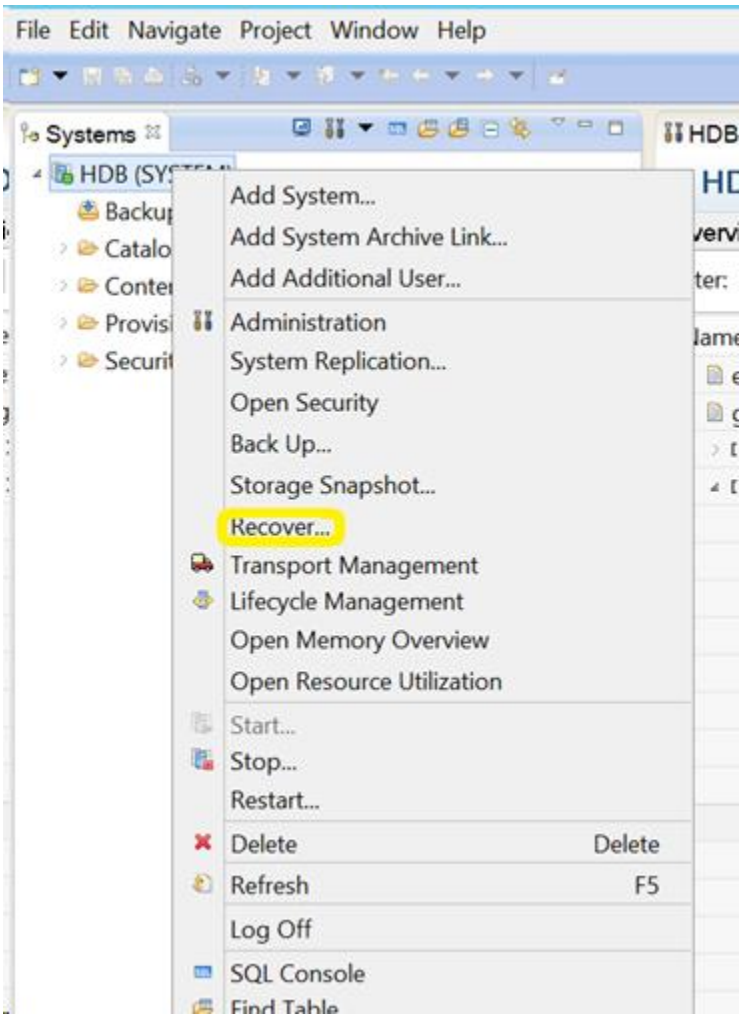
Database Recovery

SAP HANA database has the capability to restore data in case of data loss.

You can perform database recovery from SAP HANA Studio:

Follow these steps:

1. Right click on the instance and choose **Recover** from the context menu of the database.



2. Enter the credentials of the SAP HANA operating system user **<SID>adm**.

   Note: To perform a recovery, the SAP HANA database will shut down.

Supported Recovery Methods

The following methods are supported by SAP HANA for recovery of system:

1. Recover the database to its most recent state.

   To recover a database to its most recent state, recovery uses:

   a. The latest specified data backup

   b. Subsequent log backups

   c. Entries that are still available in the log area (if they were not destroyed by the failure)

2. Recover the database to the following point in time:

   To recover a database to the following point in time, recovery uses

   a. Data backup based on the specified time

   b. Subsequent log backups

   c. Entries that are still available in the log area (if they was not destroyed by the failure)

3. Recover Database to a Specific Data Backup.

   To Recover Database to a specific Data Backup, recovery uses

   a. Specified data backup, but no log backups.

   b. Entries that are still available in the log area (if they were not destroyed by the failure).

Chapter 4: Command Line Support

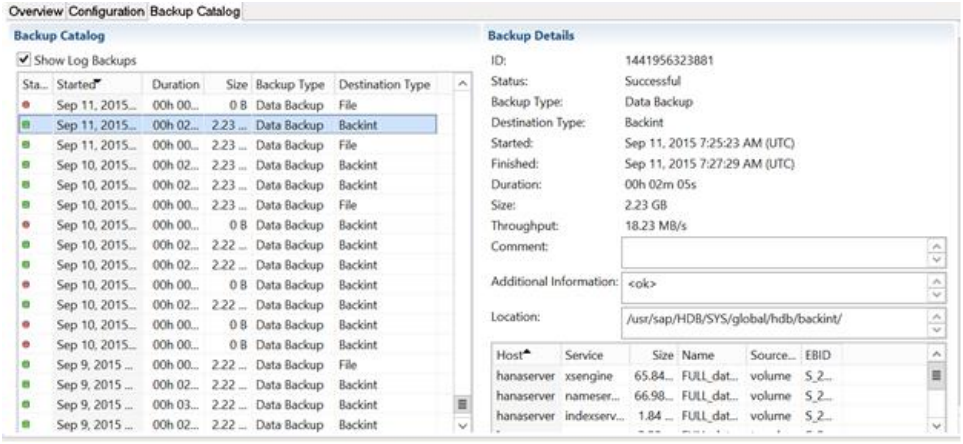
Backup and restore operations are initiated from the SAP HANA command line as per the requirements. Arcserve Backup Agent for SAP HANA is fully integrated with hdbsql command line interface.

Job Monitoring

Backup and restore jobs that you submit from HANA Studio or from hdbsql command line interface are monitored from **Arcserve Backup Job Status Manager**. At Activity Log you can view all the logs that are related to backup and at /opt/Arcserve/ABhanaagt/logs you can view all the logs related to Agent.

Backup Catalog

You can view all the logs related to backup jobs at SAP HANA Studio Backup Catalog. Double click on **Backup** under the **Systems** view to see the **Backup Catalog**.



Chapter 5: Limitations

Following are the limitations while using SAP HANA agent:

- Currently Data Mover is not supported with SAP HANA database.
- Multistreaming is not supported in the current release.

Chapter 6: Troubleshooting the Enterprise Option for SAP HANA

Following are the troubleshooting options when you experience specific errors that are listed below:

- When backup fails to submit with an error in /opt/Arcserve/ABhanaagt/logs/ca_backup.log as "failed to authenticate with Primary server",

  Solution:

  Verify whether the equivalence is provided for SAP HANA Admin from the Arcserve Server. If yes, comment the below line in etc/hosts file of the Agent machine as:

  #127.0.0.2 hanaserver.site hanaserver

- If you see a similar type of error as shown below in the SAP HANA Studio, the space in the **Backup Prefix** is the reason.

  backup could not be completed: [110512] Backint reported 'BACKINT did not return result for [/usr/sap/HDB/SYS/global/hdb/backint/Full db_databackup_0_1]' in file '/var/tmp/hdbbackint_HDB.wdyiE3' SQLSTATE: HY000

  Solution:

  When **Backup Prefix** has a space, Agent terminates the job but the job gets submitted to Arcserve Backup server and continues to be in "Active State" until you cancel the job manually on Arcserve server.

Note: SAP HANA does not support empty spaces in **Backup Prefix**. Remove the space for backup to complete successfully.

Debugging

You can use debug methods to troubleshoot problems of the SAP HANA agent.

Follow these steps:

1. Edit /opt/Arcserve/ABhanaagt/env_backint.sh
2. Add "export ASSAP_DEBUG=1"
3. Add "export ASSAP_DESTDIR=/backint_log_file"

   Note: If it is not set, the default debug log file is /opt/Arcserve/ABhanaagt/logs/backint.trc

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