PUBLIC

Housekeeping for SAP HANA Platform

SAP

Typographic Conventions

Type Style	Description
Example	Words or characters quoted from the screen. These include field names, screen titles, pushbuttons labels, menu names, menu paths, and menu options. Textual cross-references to other documents.
Example	Emphasized words or expressions.
EXAMPLE	Technical names of system objects. These include report names, program names, transaction codes, table names, and key concepts of a programming language when they are surrounded by body text, for example, SELECT and INCLUDE.
Example	Output on the screen. This includes file and directory names and their paths, messages, names of variables and parameters, source text, and names of installation, upgrade and database tools.
Example	Exact user entry. These are words or characters that you enter in the system exactly as they appear in the documentation.
\<Example\>	Variable user entry. Angle brackets indicate that you replace these words and characters with appropriate entries to make entries in the system.
EXAMPLE	Keys on the keyboard, for example, F2 or ENTER.

Document History

Version	Date	Change
1.0	2018-11-07	Document Created

Contents

1   Introduction

In order to keep your SAP HANA database in healthy state, please follow the recommend task for housekeeping.

Area		Frequency	SAP note
Cleanup of Backup Catalog	mandatory	weekly	2096851
Cleanup of backup.log and backint.log	mandatory	weekly	1642148
Cleanup of Trace Files	mandatory	weekly	2380176
Data Volumes Fragmentation	mandatory	monthly	1870858
Cleanup of Row Store	mandatory	weekly	1813245
Cleanup of Log Segments	mandatory	monthly	2083715
Cleanup of Diagnostic Information	recommended	on demand	
Cleanup of Audit Logs	recommended	on demand	2159014
Cleanup of Alerts	recommended	on demand	2147247
Cleanup of Objects History	recommended	on demand	2479702
Cleanup of Unknown Object Locks Entries	recommended	on demand	1999998
Cleanup of Events	recommended	on demand	

2 SAP HANACleaner

Certain SAP HANA cleanup tasks can be performed automatically by using the SAP HANACleaner tool. For most of the housekeeping activities we recommend using this tool to make the operations automatically on regular bases. For more details please refer to the SAP note 2399996.

2.1 Create SAP HANA User for HANACleaner

- STEP 1 - There are two possible ways. You can directly login to the SAP HANA server using the **<SID>adm** user. Alternatively, you might change the user to **<SID>adm**, using the command: `su - <SID>adm`

```
calhost:~ # su - ndbadm
calhost:/usr/sap/NDB/HDB00>
```

Example command: `su - ndbadm`

- STEP 2 - Connection from the Linux command line client to SAP HANA, using the command:

`hdbsql -u <UserName> -p <YourSecretPassword> -n <host>:3<instance>15`

```
calhost:/usr/sap/NDB/HDB00> hdbsql -u SYSTEM -p          -n localhost:30015

Welcome to the SAP HANA Database interactive terminal.

Type:  \h for help with commands
       \q to quit

hdbsql NDB=>
```

Example command: `hdbsql -u SYSTEM -p MyPassword -n localhost:30015`

- STEP 3 - Create SAP HANA User for HANACleaner tool, using the command:

`CREATE USER <UserName> PASSWORD <YouInitialPassword>;`

```
hdbsql NDB=> CREATE USER HANACLEANER PASSWORD          ;
0 rows affected (overall time 13.680 msec; server time 12.429 msec)
```

Example command: `CREATE USER HANACLEANER PASSWORD MyStartPassword;`

- STEP 4 - Grant **System Privileges** for the newly created user, using the commands:

`GRANT AUDIT ADMIN TO <UserName>; GRANT AUDIT OPERATOR TO <UserName>; GRANT BACKUP ADMIN TO <UserName>; GRANT CATALOG READ TO <UserName>; GRANT LOG ADMIN TO <UserName>; GRANT MONITOR ADMIN TO <UserName>; GRANT RESOURCE ADMIN TO <UserName>;`

```
GRANT TRACE ADMIN TO <UserName>;
```

```
hdbsql NDB=> GRANT AUDIT ADMIN TO HANACLEANER;
0 rows affected (overall time 2649 usec; server time 1573 usec)

hdbsql NDB=> GRANT AUDIT OPERATOR TO HANACLEANER;
0 rows affected (overall time 2710 usec; server time 1482 usec)

hdbsql NDB=> GRANT BACKUP ADMIN TO HANACLEANER;
0 rows affected (overall time 2638 usec; server time 1409 usec)

hdbsql NDB=> GRANT BACKUP ADMIN TO HANACLEANER;
0 rows affected (overall time 2642 usec; server time 1435 usec)

hdbsql NDB=> GRANT LOG ADMIN TO HANACLEANER;
0 rows affected (overall time 2856 usec; server time 1504 usec)

hdbsql NDB=> GRANT MONITOR ADMIN TO HANACLEANER;
0 rows affected (overall time 2700 usec; server time 1555 usec)

hdbsql NDB=> GRANT RESOURCE ADMIN TO HANACLEANER;
0 rows affected (overall time 2714 usec; server time 1473 usec)

hdbsql NDB=> GRANT TRACE ADMIN TO HANACLEANER;
0 rows affected (overall time 2607 usec; server time 1412 usec)
```

Example command:

```
GRANT AUDIT ADMIN TO HANACLEANER; GRANT AUDIT OPERATOR TO HANACLEANER;

GRANT BACKUP ADMIN TO HANACLEANER; GRANT CATALOG READ TO HANACLEANER;

GRANT LOG ADMIN TO HANACLEANER; GRANT MONITOR ADMIN TO HANACLEANER;

GRANT RESOURCE ADMIN TO HANACLEANER; GRANT TRACE ADMIN TO HANACLEANER;
```

- STEP 5 - Grant `Object Privileges` for the newly created user, using the commands:

```
GRANT SELECT, DELETE ON _SYS_STATISTICS.STATISTICS_ALERTS_BASE TO <UserName>;

GRANT SELECT, DELETE ON _SYS_REPO.OBJECT_HISTORY TO <UserName>;

GRANT SELECT, DELETE ON _SYS_STATISTICS.HOST_OBJECT_LOCK_STATISTICS_BASE TO
<UserName>;
```

```
hdbsql NDB=> GRANT SELECT, DELETE ON _SYS_STATISTICS.STATISTICS_ALERTS_BASE TO H
ANACLEANER;
0 rows affected (overall time 2790 usec; server time 1454 usec)

hdbsql NDB=> GRANT SELECT, DELETE ON _SYS_REPO.OBJECT_HISTORY TO HANACLEANER;
0 rows affected (overall time 4218 usec; server time 2858 usec)

hdbsql NDB=> GRANT SELECT, DELETE ON _SYS_STATISTICS.HOST_OBJECT_LOCK_STATISTICS
_BASE TO HANACLEANER;
0 rows affected (overall time 2817 usec; server time 1474 usec)

hdbsql NDB=>
```

Example command:

```
GRANT SELECT, DELETE ON _SYS_STATISTICS.STATISTICS_ALERTS_BASE TO HANACLEANER;

GRANT SELECT, DELETE ON _SYS_REPO.OBJECT_HISTORY TO HANACLEANER;

GRANT SELECT, DELETE ON _SYS_STATISTICS.HOST_OBJECT_LOCK_STATISTICS_BASE TO
HANACLEANER;
```

- STEP 6 - Disconnection from the Linux command line client to SAP HANA, using the command: `exit`

```
hdbsql NDB=> exit
calhost:/usr/sap/NDB/HDB00>
```

- STEP 7 - Connection from the Linux command line client to SAP HANA with HANACleaner user to change his password, using the command: `hdbsql -u <UserName> -p <YourSecretPassword> -n <host>:3<instance>15`

```
calhost:/usr/sap/NDB/HDB00> hdbsql -u HANACLEANER -p          -n localhost:30015

You have to change your password.    I
Enter new Password:
Confirm new Password:

Welcome to the SAP HANA Database interactive terminal.

Type:   \h for help with commands
        \q to quit

hdbsql=>
```

Example command: `hdbsql -u HANACLEANER -p MyStartPassword -n localhost:30015`

- STEP 8 - Disconnection from the Linux command line client to SAP HANA, using the command: `exit`

```
hdbsql NDB=> exit
calhost:/usr/sap/NDB/HDB00>
```

2.2 Create Secure User Store of the SAP HANA client

- STEP 1 - There are two possible ways. You can directly login to the SAP HANA server using the **`<SID>adm`** user. Alternatively, you might change the user to **`<SID>adm`**, using the command: `su - <SID>adm`

```
calhost:~ # su - ndbadm
calhost:/usr/sap/NDB/HDB00>
```

Example command: `su - ndbadm`

- STEP 2 - Create Secured User Store for HANACleaner user, using the command: hdbuserstore SET <KeyName> <host>:3<instance>15 <UserName> <YourSecretPassword>

```
calhost:/usr/sap/NDB/HDB00> hdbuserstore SET HANACLEANERKEY calhost:30015 HANACL
EANER
calhost:/usr/sap/NDB/HDB00>
```

Example command:

`hdbuserstore SET HANACLEANERKEY calhost:30015 HANACLEANER MyPassword`

> **i** Note
>
> Do not use the localhost string for host name, because the HANACleaner tool cannot handle the Secured User Store later in the crontab.

2.3   Copy the HANACleaner script to the SAP HANA Server

- STEP 1 - login to the SAP HANA Server as a root or other user with similar permissions.

- STEP 2 - create directory on SAP HANA server, where the script will be placed, using command: `mkdir /<DirectoryName>`

```
calhost:~ # mkdir /HANACleaner
calhost:~ # []
```

Example command: `mkdir /HANACleaner`

- STEP 3 - create directory on SAP HANA server for HANACleaner Tool logs, using command: `mkdir /<DirectoryName>/log`

```
calhost:~ # mkdir /HANACleaner/log
calhost:~ # []
```

Example command: `mkdir /HANACleaner/log`

- STEP 4 - download the file **hanacleaner.py** from SAP note 2399996 and copy it to the newly created directory

2.4   Configure the HANACleaner utility

- STEP 1 - login to the SAP HANA Server as a root or other user with similar permissions.

- STEP 2 - create configuration file for the HANACleaner tool and define log configuration for the tool, using command: `vi /<DirectoryName>/<ConfigFileName>`

```
# log directory
-op /HANACleaner/log
```

Example command: `vi /HANACleaner/config.txt`

Example file content: `-op /HANACleaner/log`

You can save the file and exit from vi program by hitting the `ESC` and typing `:wq` `ENTER`

- STEP 3 - create new shell script, which will execute the **hanacleaner.py** script, using command:

`vi /<DirectoryName>/<SriptName>`

```
python /HANACleaner/hanacleaner.py -k HANACLEANERKEY  -ff /HANACleaner/config.txt
[]
```

Example command: `vi /HANACleaner/run.sh`

Example file content:

`python /HANACleaner/hanacleaner.py -k HANACLEANERKEY -ff /HANACleaner/config.txt`

- STEP 4 - make the newly created shell script executable, using command:

  `chmod +x /<DirectoryName>/<SriptName>`

  ```
  calhost:~ # chmod +x /HANACleaner/run.sh
  calhost:~ # []                      I
  ```

  Example command: `chmod +x /HANACleaner/run.sh`

- STEP 5 - change owner for the newly created directory, using command: `chown -R <SID>adm /<DirectoryName>`

  ```
  calhost:~ # chown -R ndbadm /HANACleaner
  calhost:~ # []
  ```

  Example command: `chown -R ndbadm /HANACleaner`

- STEP 6 - change user to **<SID>adm**, using command: `su - <SID>adm`

  ```
  calhost:~ # su - ndbadm
  calhost:/usr/sap/NDB/HDB00> █
  ```

  Example command: `su - ndbadm`

- STEP 7 - get the **PATH** variable content, by using command: `echo $PATH`

  ```
  calhost:/usr/sap/NDB/HDB00> echo $PATH
  /usr/sap/NDB/HDB00/exe/krb5/bin:/usr/sap/NDB/HDB00/exe/krb5/sbin:/usr/sap/NDB/HD
  B00/hanab1:/usr/sap/NDB/HDB00:/usr/sap/NDB/HDB00/exe:/usr/sap/NDB/HDB00/exe/mdc:
  /usr/sap/NDB/HDB00/exe/Python/bin:/usr/sap/NDB/HDB00/exe/dat_bin_dir:/usr/sap/ND
  B/home:/usr/sap/NDB/home/bin:/usr/local/bin:/usr/bin:/bin:/usr/bin/X11:/usr/X11R
  6/bin:/usr/games:/usr/lib/mit/bin:/usr/lib/mit/sbin
  calhost:/usr/sap/NDB/HDB00> []
  ```

  Copy the path variable value to the clipboard.

- STEP 8 - create scheduler for executing the HANACleaner tool, by using command: `crontab -e`

  Define the PATH by inserting the content from clipboard, example PATH, example command:

  `PATH=/usr/sap/NDB/HDB00/exe/krb5/bin:/usr/sap/NDB/HDB00/exe/krb5/sbin:/usr/sap/NDB/ HDB00/hanab1:/usr/sap/NDB/HDB00:/usr/sap/NDB/HDB00/exe:/usr/sap/NDB/HDB00/exe/mdc:/`

  ```
  PATH=/usr/sap/NDB/HDB00/exe/krb5/bin:/usr/sap/NDB/HDB00/exe/krb5/sbin:/usr/sap/N
  DB/HDB00/hanab1:/usr/sap/NDB/HDB00:/usr/sap/NDB/HDB00/exe:/usr/sap/NDB/HDB00/exe
  /mdc:/usr/sap/NDB/HDB00/exe/Python/bin:/usr/sap/NDB/HDB00/exe/dat_bin_dir:/usr/s
  ap/NDB/home:/usr/sap/NDB/home/bin:/usr/local/bin:/usr/bin:/bin:/usr/bin/X11:/usr
  /X11R6/bin:/usr/games:/usr/lib/mit/bin:/usr/lib/mit/sbin:/HANACleaner
  * 1 * * * /HANACleaner/run.sh >> /HANACleaner/log/cron.txt 2>&1
  []
  -- INSERT --                                          3,1          All
  ```

  `usr/sap/NDB/HDB00/exe/Python/bin:/usr/sap/NDB/HDB00/exe/dat_bin_dir:/usr/sap/NDB/ho me:/usr/sap/NDB/home/bin:/usr/local/bin:/usr/bin:/bin:/usr/bin/X11:/usr/X11R6/bin:/ usr/games:/usr/lib/mit/bin:/usr/lib/mit/sbin`

  Extend the path with the directory, where the HANACleaner tool is located: `:/HANACleaner`

  Define scheduler, for example for all days of the week starting at 1 AM, example:

  `0 1 * * * /HANACleaner/run.sh >> /HANACleaner/log/cron.txt 2>&1`

  For more details about the scheduler please refer to the following site.

3 Cleanup of Backup Catalog

The backup catalog contains information about the backup history.

3.1 Recommended theory

- SAP HANA Academy - Backup and Recovery: Concepts
- SAP HANA Academy - Backup and Recovery: Configuration

3.2 Check the status

In order to determine the current size of the Backup Catalog, please execute the query
HANA_Backups_CatalogSize available in archive SQLStatements.zip published in SAP note 1969700.

3.3 Automatic

- STEP 1 - login to the SAP HANA Server as a root or other user with similar permissions.

- STEP 2 - extend the HANACleaner configuration file (config.txt) with options relevant for Backup Catalog.

```
# cleanup the backup catalog older then 42 days, but at least 3 b
ackup entries are kept and the deleted backup entries are printed
 out
-bd 42 -be 5 -br true
```

  Example: the backup catalog entries (i.e. not the backups themselves) older than 42 days are deleted, but at least 5 backup entries are kept, and the deleted backup entries are printed out: -bd 42 -be 5 -br true

3.4 Manual

- STEP 1 - Generate the deletion command.

  Execute the query HANA_Backups_CatalogDeletion_CommandGenerator available in archive SQLStatements.zip published in SAP note 1969700 to generate an appropriate deletion command based on the defined retention time and the minimum amount of retained backups.

- STEP 2 - Execute the deletion command generated in the previous step.

4 Cleanup of backup.log and backint.log

By default, SAP HANA creates redo log backups automatically at regular intervals.

During a log backup, only the actual data (the "payload") of the log segments for each service with persistence is written from the log area to service-specific log backups in the file system or to a third-party backup tool.

After a system failure, you may need log backups to recover the database to the desired state.

4.1 Check the status

- STEP 1 - there are two possible ways. You can directly login to the SAP HANA server using the **<SID>adm** user. Alternatively, you might change the user to **<SID>adm**, using the command: `su - <SID>adm`

```
calhost:~ # su - ndbadm
calhost:/usr/sap/NDB/HDB00>
```

Example command: `su - ndbadm`

- STEP 2 - change directory to trace by running the command: `cdtrace`

- STEP 3 - get the size of the files backup.log and backing.log by executing the command:

```
du -h backup.log backint.log
```

```
calhost:/usr/sap/NDB/HDB00> cdtrace
calhost:/usr/sap/NDB/HDB00/hanab1/trace> du -h backup.log backint.log
632K    backup.log
du: cannot access `backint.log': No such file or directory
calhost:/usr/sap/NDB/HDB00/hanab1/trace>
```

4.2 Automatic

- STEP 1 - login to the SAP HANA Server as a root or other user with similar permissions.

- STEP 2 - extend the HANACleaner configuration file (config.txt) with options relevant for Backup Catalog.

```
# compressing backup and backint
-zb 2 -zp /HANACleaner/archive
```

Example: if any backup.log or backint.log found in the trace folder and that is larger than 20 MB will be compressed and renamed: `-zb 20`

5   Cleanup of Trace Files

Various traces are available for obtaining detailed information about the actions of the database system.

5.1   Check the status

- STEP 1 - there are two possible ways. You can directly login to the SAP HANA server using the **`<SID>adm`** user. Alternatively, you might change the user to **`<SID>adm`**, using the command: `su - <SID>adm`

```
calhost:~ # su - ndbadm
calhost:/usr/sap/NDB/HDB00>
```

Example command: `su - ndbadm`

- STEP 2 - change directory to trace by running the command: `cdtrace`

- STEP 3 - get the size of the all files with extensions .trc and .log by executing the command:

```
find . -type f \( -name "*.trc" -or -name "*.log" \) -exec du -ch {} + | grep
total$
```

```
calhost:/usr/sap/NDB/HDB00> cdtrace
calhost:/usr/sap/NDB/HDB00/hanab1/trace> find . -type f \( -name "*.trc" -or -na
me "*.log" \) -exec du -ch {} + | grep total$
138M    total
calhost:/usr/sap/NDB/HDB00/hanab1/trace>
```

5.2   Automatic

- STEP 1 - login to the SAP HANA Server as a root or other user with similar permissions.

- STEP 2 - extend the HANACleaner configuration file (config.txt) with options relevant for Traces.

```
# cleanup the trace file contents
-tc 42 -tf 42
```

Example: trace file contents older than 42 days is removed and trace files older than 42 days are deleted:

`-tc 42 -tf 42`

6 Cleanup of Data Volumes Fragmentation

Frees unused space inside an SAP HANA database disk persistence.

6.1 Check the status

In order to determine the current size of the Backup Catalog, please execute the query HANA_Disks_Overview available in archive SQLStatements.zip published in SAP note 1969700.

6.2 Automatic

- STEP 1 - login to the SAP HANA Server as a root or other user with similar permissions.

- STEP 2 - extend the HANACleaner configuration file (config.txt) with options relevant for Disk Defragmentation.

```
# disk fregmentation
-fl 20 -fo true
```

Example: defragmentation will be done for all data volumes, if fragmentation is more than 20% for volume, afterwards it will display data volume statistics before and after defragmentation:

```
-fl 20 -fo true
```

6.3 Manual

- STEP 1 - There are two possible ways. You can directly login to the SAP HANA server using the **`<SID>adm`** user. Alternatively, you might change the user to **`<SID>adm`**, using the command: `su - <SID>adm`

```
calhost:~ # su - ndbadm
calhost:/usr/sap/NDB/HDB00>
```

Example command: `su - ndbadm`

- STEP 2 - Connection from the Linux command line client to SAP HANA, using the command: `hdbsql -U <UserKey>`

```
calhost:/usr/sap/NDB/HDB00> hdbsql -U HANACLEANERKEY

Welcome to the SAP HANA Database interactive terminal.

Type:  \h for help with commands
       \q to quit

hdbsql=> 
```

Example command: `hdbsql -U HANACLEANERKEY`

- STEP 3 - Execute the command: `ALTER SYSTEM RECLAIM DATAVOLUME 120 DEFRAGMENT`

```
hdbsql=>  ALTER SYSTEM RECLAIM DATAVOLUME 120 DEFRAGMENT;
0 rows affected (overall time 56.424 msec; server time 55.475 msec)
```

7   Cleanup of Row Store

Row store grows by allocating a 64MB memory segment and shrinks by freeing empty segments. A segment is internally divided into fixed-size pages. When a row store table requires more memory to store records, the table takes a free page from existing segments. If no segment has a free page, a new segment is allocated. Deleting a large number of records may result in a number of sparse segments. In such a case, row store reorganization can be performed for memory compaction. The pages in sparse segments are moved to other segments and the resultant empty segments are freed.

7.1   Check the status

In order to determine the current size of the Backup Catalog, please execute the query HANA_RowStore_Overview available in archive SQLStatements.zip published in SAP note 1969700.

7.2   Manual

Follow the guide documented in SAP note 1813245.

8   Cleanup of Log Segments

The disk usage of log volumes only grows, if there are no more segment files available for overwriting/re-use (having state FREE, see Db-view m_log_segments). Log segments are available for re-use when they have been successfully backed up (in log_mode = normal) and are not required for a database restart. Aim of this SAP Note is to help you identifying the root cause, why log segments are not getting freed and remain in state TRUNCATED (indicating that the log-segment has not yet been backed up successfully). In a log volume full situation, no free log-segments are available for re-use & no more new log segments can be allocated due to limited disk quota/size, thus the database cannot be started or stops accepting requests. Apart from bringing the system up again as soon as possible, the root cause needs to be investigated and resolved. Otherwise you may run into log volume full situation again soon.

8.1   Check the status

In order to determine the current size of the Backup Catalog, please execute the query HANA_Logs_LogSegments available in archive SQLStatements.zip published in SAP note 1969700.

8.2   Automatic

- STEP 1 - login to the SAP HANA Server as a root or other user with similar permissions.

- STEP 2 - extend the HANACleaner configuration file (config.txt) with options relevant for Log Segments.

```
# reclaiming free log segments
-lr 1
```

Example command: ALTER SYSTEM RECLAIM LOG command is executed since there was a HANA process that had more than one free log segment: -lr 1

8.3   Manual

- STEP 1 - There are two possible ways. You can directly login to the SAP HANA server using the **<SID>adm** user. Alternatively, you might change the user to **<SID>adm**, using the command: su - <SID>adm

```
calhost:~ # su - ndbadm
calhost:/usr/sap/NDB/HDB00>
```

Example command: su - ndbadm

- STEP 2 - Connection from the Linux command line client to SAP HANA, using the command: `hdbsql -U <UserKey>`

```
calhost:/usr/sap/NDB/HDB00> hdbsql -U HANACLEANERKEY

Welcome to the SAP HANA Database interactive terminal.

Type:  \h for help with commands
       \q to quit

hdbsql=> []
```

Example command: `hdbsql -U HANACLEANERKEY`

- STEP 3 - Execute the command: `ALTER SYSTEM RECLAIM LOG`

```
hdbsql NDB=> ALTER SYSTEM RECLAIM LOG;
0 rows affected (overall time 2686 usec; server time 1627 usec)
```

9 Cleanup of Diagnostic Information

Remove of the dump files generated for additional root cause analyze.

9.1 Check the status

- STEP 1 - there are two possible ways. You can directly login to the SAP HANA server using the **<SID>adm** user. Alternatively, you might change the user to **<SID>adm**, using the command: `su - <SID>adm`

```
calhost:~ # su - ndbadm
calhost:/usr/sap/NDB/HDB00>
```

Example command: `su - ndbadm`

- STEP 2 - get the size of the default directory content used for diagnostic information (fullsysteminfodump)

```
du -sh /usr/sap/<SID>/SYS/global/sapcontrol/snapshots
```

```
calhost:/usr/sap/NDB/HDB00> du -sh /usr/sap/NDB/SYS/global/sapcontrol/snapshots
4.0K    /usr/sap/NDB/SYS/global/sapcontrol/snapshots
calhost:/usr/sap/NDB/HDB00>
```

Example command: `du -sh /usr/sap/NDB/SYS/global/sapcontrol/snapshots`

9.2 Automatic

- STEP 1 - login to the SAP HANA Server as a root or other user with similar permissions.

- STEP 2 - extend the HANACleaner configuration file (config.txt) with options relevant for Dump Files.

```
# cleanup dump files
-dr 1
```

- Example command: all dump files (diagnostic information) will be removed: `-dr 0`

9.3 Manual

- STEP 1 - There are two possible ways. You can directly login to the SAP HANA server using the **<SID>adm** user. Alternatively, you might change the user to **<SID>adm**, using the command: `su - <SID>adm`

```
calhost:~ # su - ndbadm
calhost:/usr/sap/NDB/HDB00>
```

Example command: `su - ndbadm`

- STEP 2 - Execute the deletion process manually by, using the command: `rm` `/usr/sap/<SID>/SYS/global/sapcontrol/snapshots/fullsysteminfodump_*.zip`

```
calhost:/usr/sap/NDB/HDB00> rm /usr/sap/NDB/SYS/global/sapcontrol/snapshots/full
systeminfodump_*.zip
calhost:/usr/sap/NDB/HDB00>
```

Example command: `rm` `/usr/sap/NDB/SYS/global/sapcontrol/snapshots/fullsysteminfodump_*.zip`

10 Cleanup of Audit Log

Deletes old audit data from the SAP HANA database audit table.

10.1 Check the status

STEP 1 - There are two possible ways. You can directly login to the SAP HANA server using the **<SID>adm**
user. Alternatively, you might change the user to **<SID>adm**, using the command: `su - <SID>adm`

```
calhost:~ # su - ndbadm
calhost:/usr/sap/NDB/HDB00>
```

Example command: `su - ndbadm`

- STEP 2 - Connection from the Linux command line client to SAP HANA, using the command: `hdbsql -U`
  `<UserKey>`

```
calhost:/usr/sap/NDB/HDB00> hdbsql -U HANACLEANERKEY

Welcome to the SAP HANA Database interactive terminal.

Type:  \h for help with commands
       \q to quit

hdbsql=>
```

Example command: `hdbsql -U HANACLEANERKEY`

STEP 3 - Execute the command: `SELECT COUNT(*) FROM "SYS"."AUDIT_LOG";`

```
hdbsql=> SELECT COUNT(*) FROM "SYS"."AUDIT_LOG";
COUNT(*)
0
```

10.2 Automatic

- STEP 1 - login to the SAP HANA Server as a root or other user with similar permissions.

- STEP 2 - extend the HANACleaner configuration file (config.txt) with options relevant for Audit Logs.

```
# cleanup audit logs
-ur 30
```

- Example command: audit logs older than 30 days will be removed: `-ur 30`

10.3 Manual

- STEP 1 - There are two possible ways. You can directly login to the SAP HANA server using the **<SID>adm** user. Alternatively, you might change the user to **<SID>adm**, using the command: `su - <SID>adm`

```
calhost:~ # su - ndbadm
calhost:/usr/sap/NDB/HDB00>
```

Example command: `su - ndbadm`

- STEP 2 - Connection from the Linux command line client to SAP HANA, using the command: `hdbsql -U <UserKey>`

```
calhost:/usr/sap/NDB/HDB00> hdbsql -U HANACLEANERKEY

Welcome to the SAP HANA Database interactive terminal.

Type:  \h for help with commands
       \q to quit

hdbsql=>
```

Example command: `hdbsql -U HANACLEANERKEY`

STEP 3 - Execute the command: `ALTER SYSTEM CLEAR AUDIT LOG UNTIL '<TimeStamp>';`

```
hdbsql=> ALTER SYSTEM CLEAR AUDIT LOG UNTIL '2018-05-14 23:59:59';
0 rows affected (overall time 9136 usec; server time 8231 usec)
```

Example command: `ALTER SYSTEM CLEAR AUDIT LOG UNTIL '2018-05-14 23:59:59';`

11 Cleanup of Alerts

Deleting old alerts from the alert table, which had been filled by the Statistics Service.

11.1 Check the status

- STEP 1 - There are two possible ways. You can directly login to the SAP HANA server using the **`<SID>adm`** user. Alternatively, you might change the user to **`<SID>adm`**, using the command: `su - <SID>adm`

```
calhost:~ # su - ndbadm
calhost:/usr/sap/NDB/HDB00>
```

Example command: `su - ndbadm`

- STEP 2 - Connection from the Linux command line client to SAP HANA, using the command: `hdbsql -U <UserKey>`

```
calhost:/usr/sap/NDB/HDB00> hdbsql -U HANACLEANERKEY

Welcome to the SAP HANA Database interactive terminal.

Type:   \h for help with commands
        \q to quit

hdbsql=>
```

Example command: `hdbsql -U HANACLEANERKEY`

- STEP 3 - Execute the command: SELECT COUNT(*) FROM "_SYS_STATISTICS"."STATISTICS_ALERTS_BASE";

```
hdbsql NDB=> SELECT COUNT(*) FROM "_SYS_STATISTICS"."STATISTICS_ALERTS_BASE";
COUNT(*)
533
```

11.2 Automatic

- STEP 1 - login to the SAP HANA Server as a root or other user with similar permissions.

- STEP 2 - extend the HANACleaner configuration file (config.txt) with options relevant for Alerts.

```
# cleanup alerts
-ar 14
```

Example command: alerts older than 14 days will be removed: `-ar 14`

12 Cleanup of Objects History

The Object History table "_SYS_REPO"."OBJECT_HISTORY" has a large on disk size and you want to clean up the data to reduce table size.

12.1 Check the status

- STEP 1 - There are two possible ways. You can directly login to the SAP HANA server using the **`<SID>adm`** user. Alternatively, you might change the user to **`<SID>adm`**, using the command: `su - <SID>adm`

```
calhost:~ # su - ndbadm
calhost:/usr/sap/NDB/HDB00>
```

Example command: `su - ndbadm`

- STEP 2 - Connection from the Linux command line client to SAP HANA, using the command: `hdbsql -U <UserKey>`

```
calhost:/usr/sap/NDB/HDB00> hdbsql -U HANACLEANERKEY

Welcome to the SAP HANA Database interactive terminal.

Type:  \h for help with commands
       \q to quit

hdbsql=>
```

Example command: `hdbsql -U HANACLEANERKEY`

- STEP 3 - Execute the command: SELECT "DISK_SIZE" FROM "SYS"."M_TABLE_PERSISTENCE_LOCATION_STATISTICS" WHERE "TABLE_NAME" = 'OBJECT_HISTORY';

```
hdbsql=> SELECT "DISK_SIZE" FROM "SYS"."M_TABLE_PERSISTENCE_LOCATION_STATISTICS"
 WHERE "TABLE_NAME" = 'OBJECT_HISTORY';
DISK_SIZE
3334144
```

12.2 Automatic

- STEP 1 - login to the SAP HANA Server as a root or other user with similar permissions.

- STEP 2 - extend the HANACleaner configuration file (config.txt) with options relevant for Object History.

```
# cleanup object history
-om 1 -oo true
```

Example command: keep only the recent history, and to remove the previous versions: `-om 1 -oo true`

12.3 Manual

- STEP 1 - There are two possible ways. You can directly login to the SAP HANA server using the **`<SID>adm`** user. Alternatively, you might change the user to **`<SID>adm`**, using the command: `su - <SID>adm`

```
calhost:~ # su - ndbadm
calhost:/usr/sap/NDB/HDB00>
```

Example command: `su - ndbadm`

- STEP 2 - Connection from the Linux command line client to SAP HANA, using the command: `hdbsql -U <UserKey>`

```
calhost:/usr/sap/NDB/HDB00> hdbsql -U HANACLEANERKEY

Welcome to the SAP HANA Database interactive terminal.

Type:  \h for help with commands
       \q to quit

hdbsql=>
```

Example command: `hdbsql -U HANACLEANERKEY`

- STEP 3 - Execute the command: `DELETE FROM _SYS_REPO.OBJECT_HISTORY WHERE (package_id, object_name, object_suffix, version_id) NOT IN (SELECT package_id, object_name, object_suffix, MAX(version_id) AS maxvid from _SYS_REPO.OBJECT_HISTORY GROUP BY package_id, object_name, object_suffix ORDER BY package_id, object_name, object_suffix);`

```
hdbsql=> DELETE FROM _SYS_REPO.OBJECT_HISTORY WHERE (package_id, object_name, ob
ject_suffix, version_id) NOT IN (SELECT package_id, object_name, object_suffix,
MAX(version_id) AS maxvid from _SYS_REPO.OBJECT_HISTORY GROUP BY package_id, obj
ect_name, object_suffix ORDER BY package_id, object_name, object_suffix);
0 rows affected (overall time 71.065 msec; server time 61.965 msec)
```

13 Cleanup of Unknown Object Locks Entries

The transactional lock history in HOST_OBJECT_LOCK_STATISTICS may have unknown object entries where that refer to dropped temporary tables

13.1 Check the status

- STEP 1 - There are two possible ways. You can directly login to the SAP HANA server using the **<SID>adm** user. Alternatively, you might change the user to **<SID>adm**, using the command: `su - <SID>adm`

```
calhost:~ # su - ndbadm
calhost:/usr/sap/NDB/HDB00>
```

Example command: `su - ndbadm`

- STEP 2 - Connection from the Linux command line client to SAP HANA, using the command: `hdbsql -U <UserKey>`

```
calhost:/usr/sap/NDB/HDB00> hdbsql -U HANACLEANERKEY

Welcome to the SAP HANA Database interactive terminal.

Type:   \h for help with commands
        \q to quit

hdbsql=>
```

Example command: `hdbsql -U HANACLEANERKEY`

- STEP 3 - Execute the command: `SELECT COUNT(*) FROM "_SYS_STATISTICS" ."HOST_OBJECT_LOCK_STATISTICS_BASE" WHERE OBJECT_NAME = '(unknown)';`

```
hdbsql NDB=> SELECT COUNT(*) FROM "_SYS_STATISTICS"."HOST_OBJECT_LOCK_STATISTICS
_BASE" WHERE OBJECT_NAME = '(unknown)';
COUNT(*)
0
```

13.2 Automatic

- STEP 1 - login to the SAP HANA Server as a root or other user with similar permissions.

- STEP 2 - extend the HANACleaner configuration file (config.txt) with options relevant for Unknown Objects Locks.

```
# cleanup unknown object locks
-kr 0
```

Example command: all transactional lock history entries with unknown object name are removed: `-kr 0`

14 Cleanup of Events

Events can be acknowledged and handled automatically.

14.1 Check the status

- STEP 1 - There are two possible ways. You can directly login to the SAP HANA server using the **`<SID>adm`** user. Alternatively, you might change the user to **`<SID>adm`**, using the command: `su – <SID>adm`

```
calhost:~ # su – ndbadm
calhost:/usr/sap/NDB/HDB00>
```

Example command: `su – ndbadm`

- STEP 2 - Connection from the Linux command line client to SAP HANA, using the command: `hdbsql –U <UserKey>`

```
calhost:/usr/sap/NDB/HDB00> hdbsql –U HANACLEANERKEY

Welcome to the SAP HANA Database interactive terminal.

Type:  \h for help with commands
       \q to quit

hdbsql=>
```

Example command: `hdbsql –U HANACLEANERKEY`

- STEP 3 - Execute the command: `SELECT COUNT(*) FROM "SYS"."M_EVENTS";`

```
hdbsql=> SELECT COUNT(*) FROM "SYS"."M_EVENTS";
COUNT(*)
0
```

14.2 Automatic

- STEP 1 - login to the SAP HANA Server as a root or other user with similar permissions.

- STEP 2 - extend the HANACleaner configuration file (config.txt) with options relevant for Events.

```
# cleanup events
–eh 5 –eu 31
```

Example command: events older than 5 days and unhandled events older than 31 days were deleted:

`–eh 5 –eu 31`

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