

HCL OneDB 2.0.1

OneDB Backup and Restore Guide



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Chapter 1. Backup and Restore Guide

The *HCL OneDB™ Backup and Restore Guide* describes how to use the HCL® OneDB® ON-Bar utility to back up and restore database server data. This will enable you to recover your databases after data is lost or becomes corrupted due to hardware or software failure or accident.

These topics are of interest to the following users:

- Database administrators
- System administrators
- Backup operators
- Technical support personnel

These topics are written with the assumption that you have the following background:

- Some experience with storage managers, which are applications that manage the storage devices and media that contain backups
- A working knowledge of your computer, your operating system, and the utilities that your operating system provides
- Some experience working with relational databases or exposure to database concepts
- Some experience with database server administration, operating-system administration, or network administration

Overview of backup and restore

These topics provide an overview of backup and restore concepts. They also provide information about planning for backup and restore operations.

Backup and restore concepts

HCL OneDB™ provides two utilities for backing up and restoring database server data. Both utilities back up and restore storage spaces and logical logs. However, they support different features and it is important to know the differences. These topics explain basic backup and restore concepts for HCL® OneDB® database servers and compares the ON-Bar and ontape utilities.

ON-Bar backs up and restores storage spaces (dbspaces) and logical file, by using a storage manager, whereas ontape does not use a storage manager.

Recovery system

A *recovery system*, which includes backup and restore systems, enables you to back up your database server data and later restore it if your current data becomes corrupted or inaccessible.

The causes of data corruption or loss can range from a program error to a disk failure to a disaster that damages the entire facility. A recovery system enables you to recover data that you already lost due to such mishaps.

Backup systems

A *backup* is a copy of one or more *dbspaces* (also called *storage spaces*) and logical logs that the database server maintains. You can also back up *blobspaces* and *sbspaces*.

The backup copy is typically written to a *secondary storage* medium such as disk or magnetic tape. Store the media offline and keep a copy off site if possible.

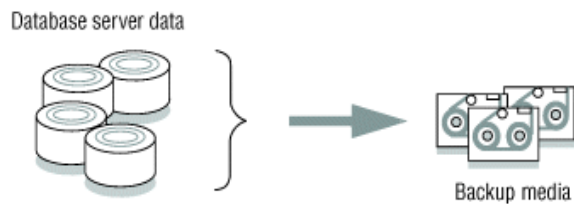
The backup copy is typically written to a *secondary storage* medium such as disk, magnetic tape, or optical disk. Store the media offline and keep a copy off site if possible.



Important: Database backups do not replace ordinary operating-system backups, which back up files other than HCL® OneDB® database files.

The following figure illustrates the basic concept of a database backup.

Figure 1. A backup of database server data



You do not always have to back up all the storage spaces. If some tables change daily but others rarely change, it is inefficient to back up the storage spaces that contain the unchanged tables every time that you back up the database server. You need to plan your backup schedule carefully to avoid long delays for backing up or restoring data.

Backup levels

To provide flexibility, the ON-Bar and ontape utilities support three backup levels.

Level 0

Level 0 backs up all used pages that contain data for the specified storage spaces.

You need all these pages to restore the database to the state that it was in at the time that you made the backup.

Level-0 backups can be time-consuming because ON-Bar writes all the disk pages to back up media. Level-1 and level-2 backups might take almost as much time as a level-0 backup because the database server must scan all the data to determine what has changed since the last backup. It takes less time to restore data from level-0, level-1, and level-2 backups than from level-0 backups and a long series of logical-log backups.

Level 1

Level 1 backs up only data that has changed since the last level-0 backup of the specified storage spaces.

All changed table and index pages are backed up, including those pages with deleted data. The data that is copied to the backup reflects the state of the changed data at the time that the level-1 backup began.

A level-1 backup takes less space and might take less time than a level-0 backup because only data that changed since the last level-0 backup is copied to the storage manager.

Level 2

Level 2 backs up only data that has changed since the last level-1 backup of the specified storage spaces.

A level-2 backup contains a copy of every table and index page in a storage space that has changed since the last level-1 backup.

A level-2 backup takes less space and might take less time than a level-1 backup because only data that changed since the last level-1 backup is copied to the storage manager.



Important: If disks and other media are destroyed and need to be replaced, you need at least a level-0 backup of all storage spaces and relevant logical logs to restore data completely on the replacement hardware.

Related reference

[Schedule backups on page 15](#)

Logical-log backup

A *logical-log backup* is a copy to disk or tape of all full logical-log files. The logical-log files store a record of database server activity that occurs between backups.

To free full logical-log files, back them up. The database server reuses the freed logical-log files for recording new transactions. For a complete description of the logical log, see your *HCL OneDB™ Administrator's Guide*.



Restriction: Even if you do not specify logging for databases or tables, you need to back up the logical logs because they contain administrative information such as checkpoint records and additions and deletions of chunks. When you back up these logical-log files, you can do warm restores even when you do not use logging for any of your databases.

Manual and continuous logical-log backups

You can manually back up logical logs or you can enable continuous logical-log backup.

A *manual logical-log backup* backs up all the full logical-log files and stops at the current logical-log file. You must monitor your logical logs carefully and start logical-log backups as needed.

To find out if a logical-log file is ready to be backed up, check the flags field of `onstat -l`. After the logical-log file is marked as backed up, it can be reused. When the flags field displays any of the following values, the logical-log file is ready to be backed up:

```
U-----
U-----L
```

The value `U` means that the logical-log file is used. The value `L` means that the last checkpoint occurred when the indicated logical-log file was current. The value `C` indicates the current log. If `B` appears in the third column, the logical-log file is already backed up and can be reused.

```
U-B---L
```

The flag values `U---C-L` or `U---C--` represent the current logical log. While you are allowed to back up the current logical log, doing so forces a log switch that wastes logical-log space. Wait until a logical-log file fills before you back it up.

If you turn on *continuous logical-log backup*, the database server backs up each logical log automatically when it becomes full. If you turn off continuous logical-log backup, the logical-log files continue to fill. If all logical logs are filled, the database server hangs until the logs are backed up. You can start continuous logical log backups by setting the `ALARMPROGRAM` configuration parameter in the `onconfig` file or by running an `ON-Bar` or `ontape` command.

Log salvage

When the database server is offline, you can perform a special logical-log backup, called a *log salvage*. In a log salvage, the database server accesses the log files directly from disk. The log salvage backs up any logical logs that have not yet been backed up and are not corrupted or destroyed.

The log salvage enables you to recover all of your data up to the last available and uncorrupted logical-log file and the last complete transaction.

Save logical-log backups

You should perform frequent logical-log backups and then save the logical-log backups from at least the last two level-0 backups so that you can use them to complete a restore.

Perform frequent logical-log backups for the following reasons:

- To free full logical-log files
- To minimize data loss if a disk that contains logical logs fails
- To ensure that restores contain consistent and the latest transactions

You should save the logical-log backups from the last two level-0 backups because if a level-0 backup is inaccessible or unusable, you can restore data from an older backup. If any of the logical-log backups are also inaccessible or unusable, however, you cannot roll forward the transactions from those logical-log files or from any subsequent logical-log files.

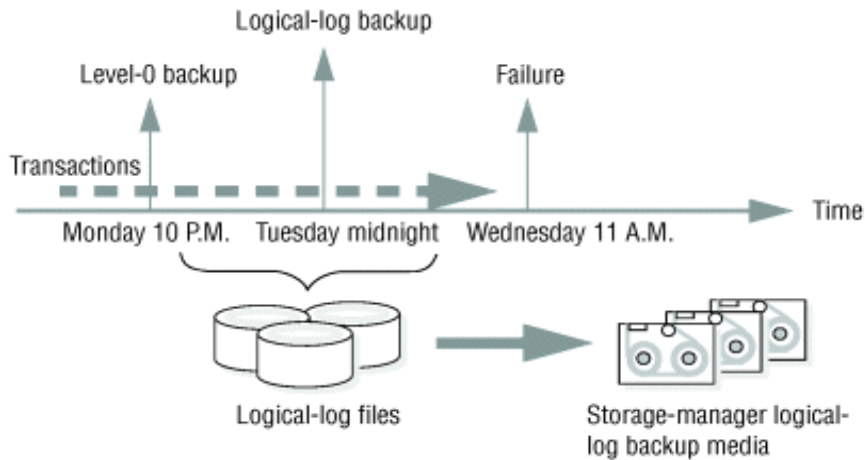


Important: You lose transactions in logical-log files that are not backed up or salvaged.

To illustrate, as the following figure shows, suppose you perform a level-0 backup on Monday at 10 p.m. and then back up the logical logs on Tuesday at midnight. On Wednesday at 11 a.m., you suffer a mishap that destroys your databases. You would be unable to restore the transactions that occurred between midnight on Tuesday and 11 a.m. on Wednesday unless you had continuous logical-log backup setup.

If the disks that contain the storage spaces with the logical logs are damaged, the transactions after midnight on Tuesday might be lost. To restore these transactions from the last logical-log backup, try to salvage the logical logs before you repair or replace the bad disk and then perform a cold restore.

Figure 2. Storage space and logical-log backups



Restore systems

A *restore* recreates database server data from backed-up storage spaces and logical-log files.

A restore recreates database server data that has become inaccessible because of any of the following conditions:

- You need to replace a failed disk that contains database server data.
- A logic error in a program has corrupted a database.
- You need to move your database server data to a new computer.
- A user accidentally corrupted or destroyed data.

To restore data up to the time of the failure, you must have at least one level-0 backup of each of your storage spaces from before the failure and the logical-log files that contain all transactions since these backups.

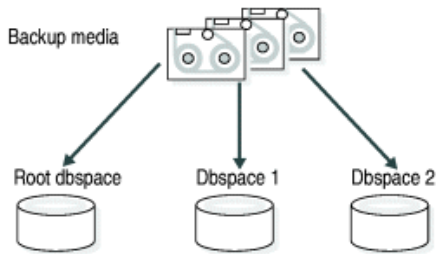
Physical and logical restores

ON-Bar and ontape restore database server data in two phases. The first phase is the *physical restore*, which restores data from backups of all or selected storage spaces. The second phase is the *logical restore*, which restores transactions from the logical-log backups.

Physical restore

During a physical restore, ON-Bar or ontape restores the data from the most recent level-0, level-1, and level-2 backups. When you suffer a disk failure, you can restore to a new disk only those storage spaces with chunks that resided on the failed disk. The following figure illustrates a physical restore.

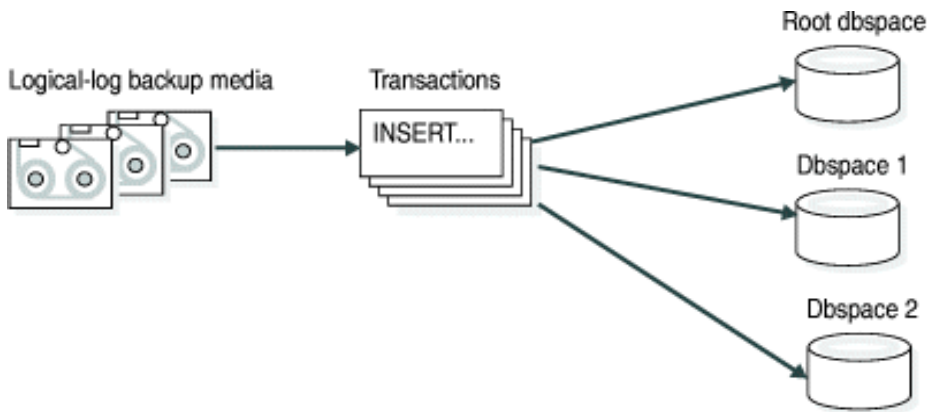
Figure 3. Physical restore



Logical restore

As the following figure shows, the database server *replays* the logical logs to reapply any database transactions that occurred after the last backup. The logical restore applies only to the physically restored storage spaces.

Figure 4. Logical restore



The database server automatically knows which logical logs to restore.

For more information, see [Restore data with ON-Bar on page 59](#) and [Restore with ontape](#).

Warm, cold, and mixed restores

When you restore data, you must decide whether to do so while the database server is in quiescent, online, or offline mode. The type of restore depends on which of these operating modes the server is in.

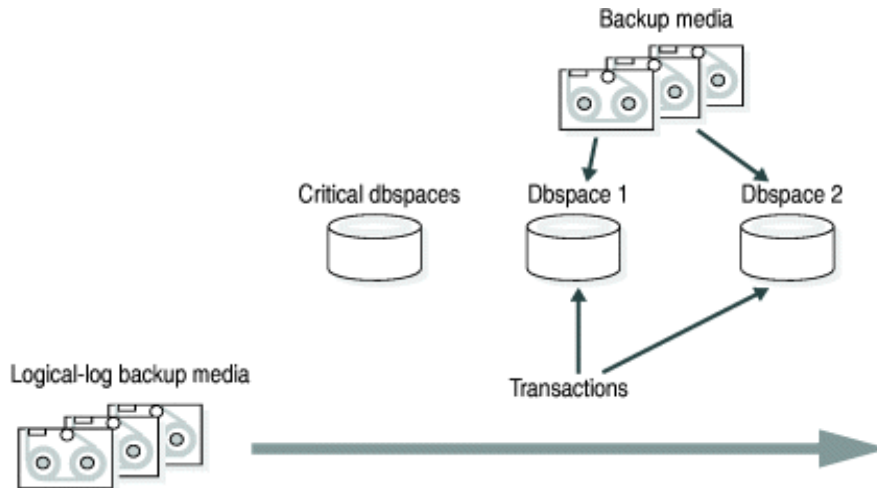
The types of restores are as follows:

- If you restore noncritical dbspaces while the database server is online or quiescent, that process is called a *warm restore*.
- When HCL OneDB™ is offline, you can perform only a *cold restore*.
- A *mixed restore* is a cold restore of some storage spaces followed by a warm restore of the remaining storage spaces.

Warm restore

As the following figure shows, a warm restore restores noncritical storage spaces. A warm restore consists of one or more physical restores, a logical-log backup, and a logical restore.

Figure 5. Warm restore

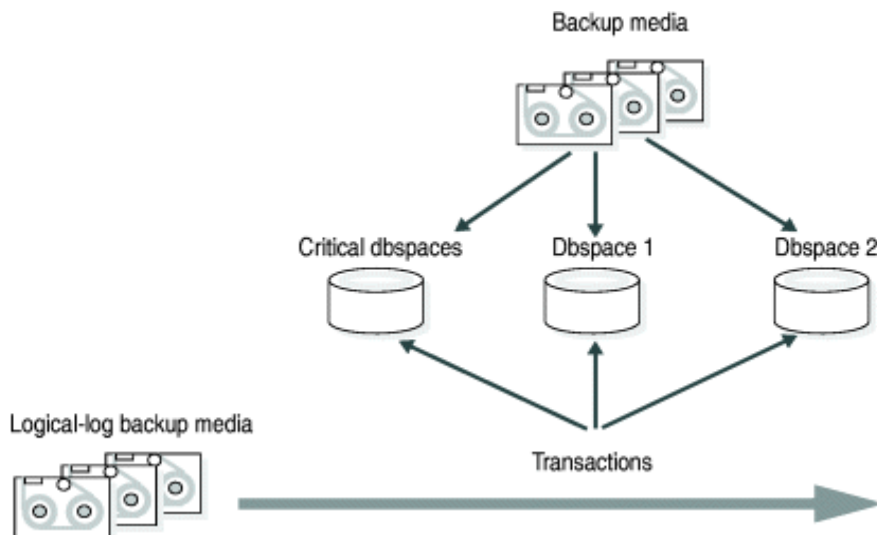


You cannot perform more than one simultaneous warm restore.

Cold restore

As the following figure shows, a cold restore salvages the logical logs, and restores the critical dbspaces (root dbspace and the dbspaces that contain the physical log and logical-log files), other storage spaces, and the logical logs.

Figure 6. Cold restore





You can perform a cold restore onto a computer that is not identical to the one on which the backup was performed by giving any chunk a new path name and offset during the restore.

When restoring a whole-system backup, it is not necessary to restore the logical logs. A whole-system backup contains a snapshot of the entire instance at the moment the backup was performed, which is logically consistent across all dbspaces.

When restoring a standard backup, you must restore the logical logs by performing a logical restore.

A cold restore starts by physically restoring all critical storage spaces, then the noncritical storage spaces, and finally the logical logs. The database server goes into recovery mode after the reserved pages of the root dbspace are restored. When the logical restore is complete, the database server goes into quiescent mode. Use the `onmode` command to bring the database server online.

 **Tip:** If you mirror the critical dbspaces, you are less likely to have to perform a cold restore after a disk failure because the database server can use the mirrored storage space. If you mirror the logical-log spaces, you are more likely to be able to salvage logical-log data if one or more disks fail.

 **Required:** Cold restores are required for Enterprise Replication servers before resuming replication.

Mixed restores

A mixed restore makes the critical data available sooner, however, the complete restore takes longer because the logical logs are restored and replayed several times, once for the initial cold restore and once for each subsequent warm restore.

The initial set of storage spaces you restore in the cold restore must include all critical storage spaces in the server. To the extent that you do not restore all storage spaces during the initial cold restore and avoid the time necessary to restore them, you can bring the server online faster than if you were to perform a cold restore of the entire server. You can then restore the remaining storage spaces in one or more warm restores.

The storage spaces that you do not restore during the cold restore are not available until after you restore them during a warm restore, although they might not have been damaged by the failure.

Related reference

[Determine failure severity on page 14](#)

Continuous log restore

A *continuous log restore* keeps a second system available to replace the primary system if the primary system for restoring logs fails.

Normal log restore restores all of the available log file backups and applies the log records. After the last available log is restored and applied, the log restore finishes. Transactions that are still open are rolled back in the transaction cleanup phase, then the server is brought into quiescent mode. After the server is quiesced, no more logical logs can be restored.

With continuous log restore, instead of transaction clean up the server is put into log restore suspended state after the last available log is restored. The restore client (ontape or ON-Bar) exits and returns control to you. With the server in this state, you can start another logical restore after additional logical logs become available. As long as you start each log restore as a continuous log restore, you can continue this cycle indefinitely.

One use of continuous log restore is to keep a second system available in case the primary system fails. You can restore logical logs backed up on the primary system on the secondary system as they become available. If the primary system fails, you can restore remaining available logical logs on the secondary system and bring that secondary system online as the new primary system.

Continuous log restore requires much less network bandwidth than High-Availability Data Replication (HDR) and enterprise data replication (ER). Continuous log restore is more flexible than HDR and ER because you can start continuous log restore at any time. As a result, continuous log restore is more robust than HDR or ER in unpredictable circumstances, such as intermittent network availability.

For more information, see [Configuring a continuous log restore by using ON-Bar on page 71](#) and [Configuring continuous log restore with ontape](#).

Related information

[Configuring a continuous log restore by using ON-Bar on page 71](#)

[Configuring continuous log restore with ontape](#)

Comparison of the ON-Bar and ontape utilities

This topic contains information to help you compare the ON-Bar and ontape utilities, so you can determine when to use each utility.

ON-Bar

Backs up and restores storage spaces (dbspaces) and logical files, by using a storage manager to track backups and storage media. Use this utility when you need to:

- Select specific storage spaces
- Back up to a specific point in time
- Perform separate physical and logical restores
- Back up and restore different storage spaces in parallel
- Use multiple tape drives concurrently for backups and restores
- Perform imported restores
- Perform external backups and restores

ontape

Logs, backs up, and restores data, and enables you to change the logging status of a database. It does not use a storage manager. Use this utility when you need to:

- Back up and restore data without a storage manager
- Back up without selecting storage spaces
- Change the logging mode for databases



Important: The backup that ontape and ON-Bar produce are not compatible. You cannot create a backup with ontape and restore it with ON-Bar, or vice versa.

The following table compares ON-Bar and ontape.

Table 1. Differences between ON-Bar and ontape

Can the utility	ON-Bar	ontape
Use a storage manager to track backups and storage media?	yes	no
Back up all database server data?	yes	yes
Back up selected storage spaces?	yes	no
Back up logical-log files?	yes	yes
Perform continuous logical-log backups?	yes	yes
Perform continuous logical-log restore?	yes	yes
Back up while the database server is online?	yes	yes
Back up while the database server is in quiescent mode?	yes	yes
Restore all database server data?	yes	yes
Restore selected storage spaces?	yes	yes
Back up and restore storage spaces serially?	yes	yes
Perform cold restores with the database server offline?	yes	yes
Initialize high availability data replication?	yes	yes
Restore data to a specific point in time?	yes	no
Perform separate physical and logical restores?	yes	yes
Back up and restore different storage spaces in parallel?	yes	no
Use multiple tape drives concurrently for backups and restores?	yes	no
Restart a restore?	yes	no
Rename a chunk path name or device during a cold restore?	yes	yes
Perform imported restores?	yes	yes
Perform external backups and restores?	yes	yes
Monitor performance?	yes	no
Change logging mode for databases?	no	yes
Transform data with external programs?	yes	yes

Table 1. Differences between ON-Bar and ontape (continued)

Can the utility	ON-Bar	ontape
Back up to or restore from cloud storage?	no	yes
Encrypt or decrypt a storage space during a restore?	yes	yes

Additional differences:

- Emergency boot files and sysutils database

The ontape utility does not use the **sysutils** database or the emergency boot files.

- Simultaneous sessions

ON-Bar, with HCL OneDB™ Primary Storage Manager, supports simultaneous sessions.

ON-Bar, with ISM, supports up to four simultaneous sessions per ISM instance. The ontape utility supports two simultaneous sessions, one for physical backup or restore, and one for log backup.

- Device support and storage management

The ontape utility supports remote backup devices on other hosts.

ON-Bar, with the OneDB® Primary Storage Manager, supports the export of backup generations into specified directories and devices.

ON-Bar supports different sets of tape drives on various hardware platforms.

You can also use ON-Bar with the Tivoli® Storage Manager or third-party storage managers to obtain device support and storage management.

- Changing the logging mode of a database

You cannot change the logging mode for ON-Bar; however you can use the `ondblog` utility to do this task when using ON-Bar.

You can also use the SQL administration API alternative, `ALTER LOGMODE` to change the logging mode.

For details about each utility, see [Back up with ON-Bar on page 39](#) and [Back up with ontape](#).

Related reference

[Configure ontape](#)

Plan for backup and restore

These topics describe the planning for backup and restore, for example by planning your recovery strategy and backup system.

Plan a recovery strategy

Before you use ON-Bar or ontape, plan your recovery goals.

Types of data loss

The first step in planning a recovery strategy is to determine how much data loss, if any, is acceptable.

The following types of data loss can occur:

- Deletion of the following:
 - Rows, columns, tables, or databases
 - Chunks, storage spaces, or logical logs
- Data corruption or incorrect data created
- Hardware failure (such as a disk that contains chunk files fails or a backup tape that wears out)
- Database server failure
- Natural disaster

Determine failure severity

After you determine your recovery goals, create your recovery plan. The plan should include recovery goals for multiple levels of failure.

The following table shows recovery plans for failures with amounts of lost data.

Table 2. Sample recovery plans

Failure severity	Data loss	Suggested recovery plan
Small	Noncritical data is lost.	Restore of the data can wait until a nonpeak time. Use a warm restore.
Medium	The data that is lost is critical for your business but does not reside in a critical dbspace.	Perform a warm restore of this data as soon as possible.
Large	Critical dbspaces are lost.	Use a mixed restore to restore the critical data right away and a warm restore to restore noncritical data during off-peak hours.
Disaster	All data is lost.	Perform a cold or mixed restore as soon as possible.

Related information

[Warm, cold, and mixed restores on page 8](#)

Data use determines your backup schedule

After you develop your recovery plan, create a backup plan based on how you use your data.

How you use the data determines how you plan your backup schedule, as follows:

- Data usage

How do users use the data?

- Critical dbspaces (root dbspace and dbspaces that contain the physical log and at least one logical-log file)
- Critical business application data
- Long-term data storage for legal or record-keeping reasons
- Data sharing among groups
- Test data

- Transaction Time

How much transaction time can be lost? Also, how long might it take to re-enter lost transactions manually? For example, can you afford to re-enter all transactions that occurred over the past three hours?

- Quantity and Distribution

How much data can you afford to lose? For example, you lost one fourth of your customer profiles, or you lost the Midwest regional sales figures but the West Coast figures are intact.

Ask the following questions to assist in deciding how often and when you want to back up the data:

- Does your business have downtime where the system can be restored?
- If your system is 24x7 (no downtime), is there a nonpeak time where a restore could occur?
- If a restore must occur during a peak period, how critical is the time?
- Which data can you restore with the database server online (warm restore)? Which data must be restored offline (cold restore)?
- How many storage devices are available to back up and restore the data?

Schedule backups

Your recovery strategy should include a schedule of backups. Tailor your backup plan to the requirements of your system. The more often the data changes and the more important it is, the more frequently you need to back it up.

Your backup plan should also specify the backup level.

The following table shows a sample backup plan for a small or medium-sized system.

Table 3. Sample backup plan

Backup level	Backup schedule
Complete backup (level-0)	Saturday at 6 p.m.
Incremental backup (level-1)	Tuesday and Thursday at 6 p.m.

Table 3. Sample backup plan (continued)

Backup level	Backup schedule
Incremental backup (level-2)	Daily at 6 p.m.
Level-0 backup of storage spaces that are updated frequently	Hourly



Important: Perform a level-0 backup after you change the physical schema, such as adding a chunk to a storage space. (See [Preparing to back up data on page 40.](#))

Related information

[Backup levels on page 4](#)

Security requirements for label-based access control

For label-based access control (LBAC), the person who runs ON-Bar does not require an exemption to security policies or an additional privilege to back up or restore data.

LBAC protection remains intact after you restore data with ON-Bar.

Plan a backup system for a production database server

To plan for adequate backup protection for your data, analyze your database server configuration and activity and the types of backup media available at your installation.


Also, consider your budget for storage media, disks, computers and controllers, and the size of your network.

Actions after which to perform a level-0 back up

You must perform a level-0 backup of, at minimum, the root dbspace and the modified storage spaces after you perform any of the following actions:

- Add or drop mirroring.
- Move, drop, or resize a logical-log file.
- Change the size or location of the physical log.
- Change your storage-manager configuration.
- Add, move, or drop a dbspace.
- Add, move, or drop a chunk to any type of storage space.
- Add, move, or drop a blobspace or sbospace.

For example, if you add a new dbspace **dbs1**, you see a warning in the message log that asks you to perform a level-0 backup of the root dbspace and the new dbspace. If you attempt an incremental backup of the root dbspace or the new dbspace instead, ON-Bar automatically performs a level-0 backup of the new dbspace.

 **Tip:** Although you no longer need to back up immediately after adding a log file, your next backup should be level-0 because the data structures have changed.

If you create a storage space with the same name as a deleted storage space, perform a level-0 backup twice:

1. Back up the root dbspace after you drop the storage space and before you create the storage space with the same name.
2. After you create the storage space, back up the root dbspace and the new storage space.

Actions before which to perform a level-0 back up

You must perform a level-0 backup of the modified storage spaces before you perform any of the following actions:

- Convert a nonlogging database to a logging database.
- Before you alter a RAW table to type STANDARD. This backup ensures that the unlogged data is restorable before you switch to a logging table type.

Related reference

[onbar -b syntax: Backing up on page 41](#)

Evaluate hardware and memory resources

When planning your backup system, evaluate your hardware and memory resources.

Evaluate the following database server and hardware configuration elements to determine which storage manager and storage devices to use:

- The number of I/O virtual processors
- The amount of memory available and the distribution of processor activity

Also consider temporary disk space needed for backup and restore. The database server uses temporary disk space to store the before images of data that are overwritten while backups are occurring and overflow from query processing that occurs in memory.

When preparing to back up data, make sure that you correctly set the DBSPACETEMP environment variable or parameter to specify dbspaces with enough space for your needs. If there is not enough room in the specified dbspaces, the backup will fail, root dbspace will be used, or the backup will fail after filling the root dbspace.

Evaluate backup and restore time

Several factors, including database server configuration and the size of your database, affect the amount of time that the system needs to back up and restore data.

How long your backup or restore takes depends on the following factors:

- The speed of disks or tape devices

The faster the storage devices, the faster the backup or restore time.

- The number of incremental backups that you want to restore if a disk or system failure requires you to rebuild the database

Incremental backups use less storage space than full backups and also reduce restore time.

- The size and number of storage spaces in the database

Backups: Many small storage spaces take slightly longer to back up than a few large storage spaces of the same total size.

Restores: A restore usually takes as long to recover the largest storage space and the logical logs.

- Whether storage spaces are mirrored

If storage spaces are mirrored, you reduce the chance of having to restore damaged or corrupted data. You can restore the mirror at nonpeak time with the database server online.

- The length of time users are interrupted during backups and restores

If you perform backups and warm restores while the database server is online, users can continue their work but might notice a slower response. If you perform backups and warm restores with the database server in quiescent mode, users must exit the database server. If you perform a cold restore with the database server offline, the database server is unavailable to users, so the faster the restore, the better. An external backup and restore eliminates system downtime.

- The backup schedule

Not all storage spaces need to be included in each backup or restore session. Schedule backups so that you can back up more often the storage spaces that change rapidly than those storage spaces that seldom or never change. Be sure to back up each storage space at level-0 at least once.

- The layout of the tables across the dbspaces and the layout of dbspaces across the disks

When you design your database server schema, organize the data so that you can restore important information quickly. For example, you isolate critical and frequently used data in a small set of storage spaces on the fastest disks. You also can fragment large tables across dbspaces to balance I/O and maximize throughput across multiple disks. For more information, see your *HCL OneDB™ Performance Guide*.

- The database server and system workload

The greater the workload on the database server or system, the longer the backup or restore time.

- The values of backup and restore configuration parameters

For example, the number and size of data buffers that ON-Bar uses to exchange data with the database server can affect performance. Use the `BAR_NB_XPORT_COUNT` and `BAR_XFER_BUF_SIZE` configuration parameters to control the number and size of data buffers.

Evaluate logging and transaction activity

When planning your backup system, also consider logging and transaction activity.

The following database server usage requirements affect your decisions about the storage manager and storage devices:

- The amount and rate of transaction activity that you expect
- The number and size of logical logs

If you need to restore data from a database server with little transaction activity, define many small logical logs. You are less likely to lose data because of infrequent logical-log backups.

- How fast the logical-log files fill

Back up log files before they fill so that the database server does not hang.

- Database and table logging modes

When you use many nonlogging databases or tables, logical-log backups might become less frequent.

Compress row data

Compressing row data can make backing up and restoring data more efficient.

Compressing row data before backing it up can improve the speed of backing up and restoring and requires less backup media. A smaller size of data results in the following advantages over uncompressed data during backup and restore:


- Backing up is quicker.
- Restoring is quicker.
- The logical logs are smaller.
- The backup image is smaller.

Using an external compression utility to compress a backup image of compressed row data might not reduce the size of the backup image, because already compressed data usually cannot be further compressed. In some cases, the size of the backup image of compressed row data might be larger than the size of the backup image that was compressed by an external utility.

Transform data with external programs

You can use external programs as filter plug-ins to transform data to a different format before a backup and transform it back after the restore.

To compress or transform data, use the `BACKUP_FILTER` and `RESTORE_FILTER` configuration parameters to call external programs.

 **Tip:** If you compress row data before backing it up, compressing the backup image with an external utility might not result in a smaller backup image.

The filter can be owned by anyone, but cannot have write access to non-privileged users. Permission on the filters is the same as that of permission on any other executable file that is called by the HCL OneDB™ server or HCL OneDB™ utilities.

ON-Bar backup and restore system

Related reference

[Backup and restore configuration parameters on page 179](#)

Overview of the ON-Bar backup and restore system

ON-Bar consists of various components and it works with a storage manager to back up and restore data.

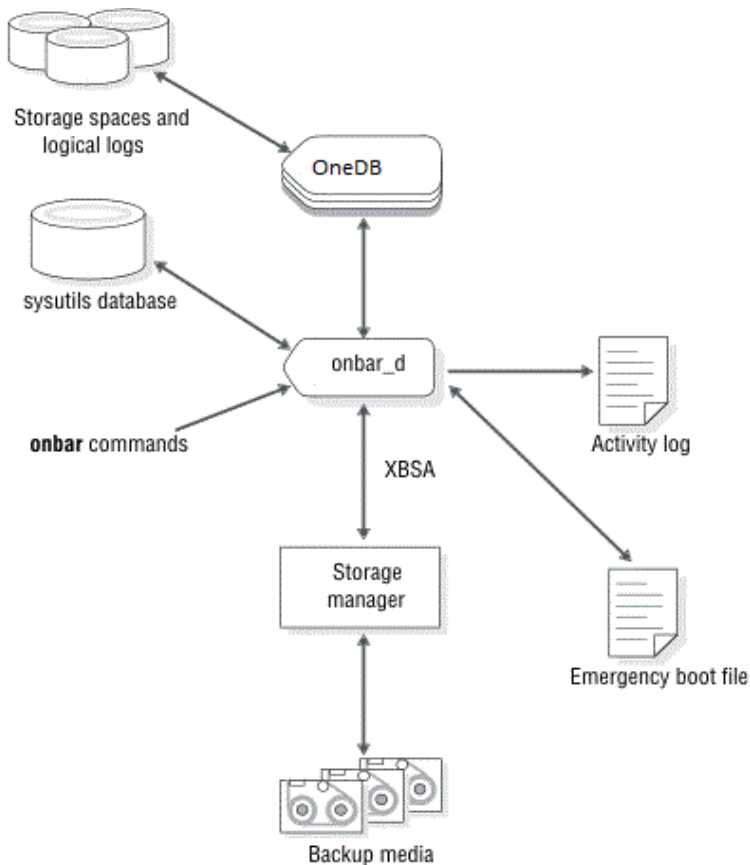
ON-Bar components

ON-Bar components include a command-line utility, catalog tables, an activity log, and an emergency boot file. You use ON-Bar with a storage manager and the XBSA shared library for the storage manager.

The following figure shows the ON-Bar and database server components:

- The storage spaces (dbspaces, blobspaces, and sbspaces) and logical logs from the database server
- The **sysutils** database, which includes ON-Bar catalog tables
- The onbar and the onbar-d command-line utilities
- The XBSA shared library for the storage manager on your system
- The storage media for storing backups
- The ON-Bar activity log
- The ON-Bar emergency boot file

Figure 7. ON-Bar components for HCL OneDB™



ON-Bar communicates with both the database server and the storage manager. You use the `onbar` command to start a backup or restore operation. By default, ON-Bar backs up and restores storage spaces in parallel. ON-Bar always processes log files serially.

For a backup session, ON-Bar requests the contents of storage spaces and logical logs from the database server and passes them to the storage manager. The storage manager stores the data on storage media. For a restore session, ON-Bar requests the backed up data from the storage manager and restores it on the database server.

ON-Bar backs up the critical `dbspaces` first, then the remaining storage spaces, and finally the logical logs. The *critical dbspaces* are the **rootdbs** and the `dbspaces` that contain the logical logs and physical log.

ON-Bar also places the following critical files in the archive during backups:

- The `onconfig` file
- UNIX™: The `sqlhosts` file
- The ON-Bar emergency boot file: `ixbar.servernum`
- The server boot file: `oncfg_servername.servernum`

You can restore storage spaces stored in both raw and cooked files. If your system contains primary and mirror storage spaces, ON-Bar writes to both the primary and mirror chunks at the same time during the restore, except for an external restore.

ON-Bar status and error messages are written to the activity log file: `bar_act.log`.

Backup Services API (XBSA)

ON-Bar and the storage manager communicate through the Backup Services Application Programming Interface (XBSA), which enables the storage manager to manage media for the database server. By using an open-system interface to the storage manager, ON-Bar can work with various storage managers that also use XBSA.

Each storage manager develops and distributes a unique version of the XBSA shared library. You must use the version of the XBSA shared library provided with the storage manager. For example, if you use HCL OneDB™ Primary Storage Manager, you must also use the XBSA shared library provided with ON-Bar. ON-Bar and the XBSA shared library must be compiled the same way (32-bit or 64-bit). For example, if you use ISM, also use the XBSA shared library provided with ON-Bar. ON-Bar and the XBSA shared library must be compiled the same way (32-bit or 64-bit).

ON-Bar uses XBSA to exchange the following types of information with a storage manager:

Control data

ON-Bar exchanges control data with a storage manager to verify that ON-Bar and XBSA are compatible, to ensure that objects are restored in the correct order to the correct instance of the database server, and to track the history of backup objects.

Backup or restore data

During backups and restores, ON-Bar and the storage manager use XBSA to exchange data from specified storage spaces or logical-log files.

ON-Bar uses XBSA transactions to ensure data consistency. All operations included in a transaction are treated as a unit. All operations within a transaction must succeed for objects transferred to the storage manager to be restorable.

Related information

[HCL OneDB Primary Storage Manager on page 132](#)

ON-Bar catalog tables

ON-Bar uses the catalog tables in the **sysutils** database to track backup and restore operations. The `onsmsync` utility uses other catalog tables to track its operations.

ON-Bar uses the following catalog tables in the **sysutils** database to track backup and restore operations:

- The **bar_server** table tracks instances of the database server.
- The **bar_object** table tracks backup objects. A *backup object* is a backup of a dbspace, blobspace, sbspace, or logical-log file.

- The **bar_action** table tracks all backup and restore attempts against each backup object, except some log salvage and cold restore events.
- The **bar_instance** table describes each object that is backed up during a successful backup attempt.

The `onsmsync` utility uses and maintains the following tables to track its operations:

- The **bar_ixbar** table contains the history of all unexpired successful backups in all timelines.
- The **bar_syncdeltab** table is normally empty except when `onsmsync` is running.

For a description of the content of these tables, see [ON-Bar catalog tables on page 111](#).

ixbar file: ON-Bar emergency boot file

The emergency boot file is automatically updated after every backup. It contains the information that ON-Bar needs to perform a cold restore.



Important: Do not modify the emergency boot file. Doing so might cause ON-Bar to select the wrong backup as part of a restore, possibly leading to data corruption or system failure.

The file name for the boot file is `ixbar.servernum`, where `servernum` is the value of the `SERVENUM` configuration parameter.

The ON-Bar emergency boot file is in the `$ONEDB_HOME/etc` directory on UNIX™ and in the `%ONEDB_HOME%\etc` directory on Windows™. You can override the default path and name of the boot file by changing the information specified in the `BAR_IXBAR_PATH` configuration parameter.

bar_act.log file: ON-Bar activity log

ON-Bar writes informational, progress, warning, error, and debugging messages to the ON-Bar activity log, `bar_act.log`.

ON-Bar backup and restore errors do not appear in standard output. If an error occurs when you back up and restore data, check information in the ON-Bar activity log

You can also use the activity log to:

- Monitor backup and restore activities such as, which storage spaces and logical logs were backed up or restored, the progress of the operation, and approximately how long it took.
- Verify whether a backup or restore succeeded.
- Track errors from the `onblog` utility.
- Track ON-Bar performance statistics

The ON-Bar activity log is in the `/tmp` directory on UNIX™ and in the `%ONEDB_HOME%\etc` directory on Windows™. You specify the location of the ON-Bar activity log with the `BAR_ACT_LOG` configuration parameter.

Related reference

[BAR_ACT_LOG configuration parameter on page 181](#)

[ON-Bar messages and return codes on page 117](#)

[View ON-Bar backup and restore performance statistics on page 109](#)

[onbar -m syntax: Monitoring recent ON-Bar activity on page 49](#)

ON-Bar script

The ON-Bar utility includes a shell script on UNIX™ and a batch script on Windows™ for customizing backup and restore operations.

When you install ON-Bar with the database server, a default script is included. The name and location of the script depends on the operating system:

UNIX™

The onbar shell script is in the `$ONEDB_HOME/bin` directory.

Windows™

The onbar.bat batch script is in the `%ONEDB_HOME%\bin` directory.

When you issue ON-Bar commands from the command line, the arguments are passed to the script, and then to the `onbar_d` utility.

Table 4. ON-Bar utilities

Utility	Description
onbar_d utility	Transfers data between the database server and the storage manager. The onbar command calls the onbar_d utility that starts the onbar-driver. The onbar-driver starts and controls backup and restore activities.
onmsmsync utility	Synchronizes the contents of the sysutils database, the emergency boot files, and the storage manager catalogs. Use this utility to purge backups that are no longer needed.
ondblog utility	Changes the database-logging mode. The ondblog utility logs its output in the ON-Bar activity log, <code>bar_act.log</code> .
archecker utility	Verifies backups, and restores table-level data from an archive.

Related reference

[The onmsmsync utility on page 102](#)

Related information

[Overview of the archecker utility on page 163](#)

Configure the storage manager and ON-Bar

The topics in this section provide the information that you need to plan and to set up ON-Bar with a storage manager.

Related information

[Preparing to back up data on page 40](#)

Configure a storage manager

ON-Bar backup and restore operations require a storage manager that integrates with ON-Bar through an XBSA shared library interface.

You can choose to use the HCL OneDB™ Primary Storage Manager, the HCL® Tivoli® Storage Manager (TSM), or a third-party storage manager with ON-Bar. The OneDB® Primary Storage Manager is bundled with HCL OneDB™. If you are using TSM, the XBSA shared library needed for ON-Bar to communicate with TSM is bundled with HCL OneDB™.

You can choose to use the HCL® OneDB® Storage Manager, the HCL® Tivoli® Storage Manager (TSM), or a third-party storage manager with ON-Bar. ISM is installed with the database server. If use TSM, the XBSA shared library needed for ON-Bar to communicate with TSM is bundled with the database server.

The OneDB® Primary Storage Manager manages storage for ON-Bar backup and restore operations, including parallel backups, that use file devices (disks) only, not tapes. By default, the HCL OneDB™ Primary Storage Manager is automatically configured with the information specified in OneDB® Primary Storage Manager and some ON-Bar configuration parameters. This storage manager is also automatically configured when you use the onpsm utility. You can change the configuration. For information, see [HCL OneDB Primary Storage Manager on page 132](#) and [Configuring OneDB Primary Storage Manager on page 136](#)

Related information

[HCL OneDB Primary Storage Manager on page 132](#)

[Setting up OneDB Primary Storage Manager on page 135](#)

Determine what storage devices you need

Before backing up, determine what and how many storage devices you need.

Ask the following interrelated questions to determine what storage devices you need. For example, the speed and type of storage devices partly determine the number of storage devices that you need.

- What type of storage devices do you need?

The transaction volume and the size of your database are major factors in determining the type of storage devices that you need.

HCL® OneDB® Storage Manager supports simple tape devices such as QIC, 4 mm, 8 mm, DLT, optical devices, and disk backups. If ISM cannot manage the storage devices that you need, you need to purchase a different storage manager. For more information, see the .

- What is the availability requirement for each device?

Is it important for your storage devices to allow random and sequential access? If so, you cannot use tape storage devices.

- How many storage devices do you need?

ISM supports up to four devices per host.

The number of storage devices that you need depends on the storage devices you have, how much transaction activity occurs on the database server, how fast throughput is, how much time you can allow for backups, and other similar factors.

Storage-manager definitions in the `sm_versions` file

Most storage managers must have an entry in the `sm_versions` file.

The HCL OneDB™ Primary Storage Manager and Tivoli® Storage Manager do not require an entry in the `sm_versions` file.

The Tivoli® Storage Manager does not require an entry in the `sm_versions` file.

The storage-manager definition in the `sm_versions` file uses this format:

```
1 | XBSA_ver | sm_name | sm_ver
```

In the format, `XBSA_ver` is the release version of the XBSA shared library for the storage manager, `sm_name` is the name of the storage manager, and `sm_ver` is the storage-manager version. The maximum field length is 128 characters.

Before ON-Bar starts a backup or restore process with the Tivoli® Storage Manager, ISM, and third-party storage managers, ON-Bar calls the currently installed version of the storage-manager-specific XBSA shared library to get its version number. If this version is compatible with the current version of ON-Bar and is defined in the `sm_versions` file, ON-Bar begins the requested operation.

Related information

[Updating the storage-manager definition in the `sm_versions` file for TSM on page 31](#)

[Configuring a third-party storage manager on page 32](#)

Configuring TSM

To use HCL® Tivoli® Storage Manager (TSM) with HCL® OneDB® databases, you must install and configure the Tivoli® Storage Manager client on your database server computer and Tivoli® Storage Manager on your storage computer.

You must also configure HCL® OneDB® Interface for TSM and perform other TSM configuration tasks on your HCL® OneDB® database server computer.

To configure TSM:

1. Edit the TSM client options files.
2. Assign a TSM management class for the server to use for backups.
3. Set the HCL® OneDB® Interface for TSM environment variables.
4. Register with the TSM server.
5. Initialize the HCL® OneDB® Interface for TSM.
6. Optional. Configure ON-Bar to support optional TSM features.

The version of the XBSA shared library for TSM is 1.0.3.

For details about TSM, read the following manuals:

- *Tivoli® Storage Manager Backup-Archive Clients Installation and User's Guide*
- *Tivoli® Storage Manager Using the Application Program Interface*
- *Tivoli® Storage Manager Administrator's Guide*
- *Tivoli® Storage Manager Administrator's Reference*

Editing the TSM client options files

The HCL® OneDB® Interface for Tivoli® Storage Manager (TSM) communicates with the TSM server with the TSM API. By default, HCL® OneDB® Interface for TSM uses the client user options file (`dsm.opt`) and, on UNIX™ systems, the client system options file (`dsm.sys`), both of which are located in the TSM API installation directory.

On UNIX™ systems, edit both the `dsm.opt` and the `dsm.sys` files as the **root** user:

- Specify the TSM server to use in the client user options file, `dsm.opt`.
- Identify the TSM server name, communication method, and server options in the client system options file, `dsm.sys`.

Use the sample `dsm.opt.smp` and `dsm.sys.smp` files distributed with the TSM API to help you get started quickly.

On Windows™ systems, specify the TSM server name, communication method, and server options in the `dsm.opt` file.

The following example shows an example `dsm.opt` file on Windows™:

```
SErvername PAX12_TSMSEVER1
COMMethod TCPip
TCPPort 1500
TCPADMINPort 1500
TCPServeraddress 9.25.148.226
PasswordAccess generate
```

See *TSM Installing the Clients* and *TSM Trace Facility Guide* for information regarding options you can specify in these files.

Editing the TSM client user options file

You can edit the HCL® Tivoli® Storage Manager (TSM) client user options file, `dsm.opt`. This file must refer to the correct TSM server instance, as listed in the `dsm.sys` file.

Set the following options in the `dsm.opt` file:

SERVERNAME

Identifies which TSM server instance, as listed in the `dsm.sys` file, that HCL® OneDB® Interface for TSM contacts for services.

TRACEFILE

Sends trace output information to a designated file.

TRACEFLAG

Sets specific trace flags

Editing the TSM client system options file

You can edit the HCL® Tivoli® Storage Manager (TSM) client systems options file, `dsm.sys`. This file must refer to the correct TSM server address and communication method.

The following TSM options are the most important to set in the `dsm.sys` file:

SERVERNAME

Specifies the name that you want to use to identify a server when it is referred to in the `dsm.opt` file and to create an instance that contains options for that server.

COMMMETHOD

Identifies the communication method.

TCPSERVERADDRESS

Identifies the TSM server.

PASSWORDACCESS

Specifies GENERATE to store the TSM password.

The SERVERNAME option in the `dsm.opt` and `dsm.sys` files define server instance names only. The TCPSERVERADDRESS option controls which server is contacted.

You can enable deduplication by including the DEDUP=CLIENTORSERVER option in the client system options file. You must also set the **IFX_BAR_USE_DEDUP** environment variable in the database server environment and restart the database server. See the *Tivoli® Storage Manager Backup-Archive Client Installation and User's Guide* for information about configuring deduplication.

You can set up multiple server instances in the `dsm.sys` file. See the *Tivoli® Storage Manager Backup-Archive Client Installation and User's Guide* for information about multiple server instances.

Related reference

[IFX_BAR_USE_DEDUP environment variable on page 201](#)

Related information

[Configuring ON-Bar for optional TSM features on page 31](#)

Assigning a TSM management class for a backup

When you back up a database, the default management class for your node is *used*. You can override the default value with a different value that is specified in the `INCLUDE` option.

The `INCLUDE` option is placed in the `include-exclude` options file. The file name of the `include-exclude` options file is in the client system options file (`dsm.sys`). For more information, see the *Tivoli® Storage Manager Backup-Archive Client Installation and User's Guide*.

Use the following naming conventions for ON-Bar files:

- A database backup:

```
/dbservername/dbservername/dbspacename/level
```

- For a database backup, an example of the `INCLUDE` statement is as follows:

```
Include /dbserverA/dbserverA/dbspaceA/* InformixDbMgmt
```

- A log backup:

```
/dbservername/dbservername/server_number/unique_logid
```

For a logical log backup, an example of the `INCLUDE` statement is as follows:

```
Include /dbserverA/dbserverA/55/* InformixLogMgmt
```

where the number `55` is the value of the `SERVERNUM` parameter in the `onconfig` file.

Setting the HCL OneDB™ Interface for TSM environment variables

When you use the HCL OneDB™ Interface for TSM, you need to set certain environment variables in the environment of the user.

The following table describes these environment variables.

Table 5. HCL OneDB™ Interface for TSM environment variables

Environment variable	Description
DSMI_CONFIG	The fully qualified name for the client user option file (<code>dsm.opt</code>). The default value is <code>dsm.opt</code> in the TSM API installation directory.
DSMI_DIR	<p>On UNIX™, points to the TSM API installed path. This environment variable needs to be defined only if the TSM API is installed in a different path from the default path. The <code>DSMI_DIR</code> environment variable is also used to find the <code>dsm.sys</code> file.</p> <p>On Windows™, specifies the installation location of the TSM Backup-Archive Client. Typically, the TMS Backup-Archive Client is installed in the <code>C:\Tivoli\TSMClient\baclient</code> directory.</p>
DSMI_LOG	<p>Points to the directory that contains the API error log file (<code>dsiererror.log</code>).</p> <p>For error log files, create a directory for the error logs to be created in, then set the DSMI_LOG environment variable to that directory. The user informix or the backup operator should have write permission on this directory.</p>

The following example shows how to set up these environment variables for Solaris 32-bit if the TSM API is installed in the `/opt/Tivoli/tsm/client/api` directory:

```
export DSMI_CONFIG=/opt/Tivoli/tsm/client/api/bin/dsm.opt
export DSMI_DIR=/opt/Tivoli/tsm/client/api/bin
export DSMI_LOG=/home/user_a/logdir
```

The following example shows how to set up these environment variables for Windows™ if the TSM API is installed in the `C:\Tivoli\TSMClient\api` directory:

```
set DSMI_CONFIG=C:\Tivoli\TSMClient\api\BIN\dsm.opt
set DSMI_DIR=C:\Tivoli\TSMClient\baclient
set DSMI_LOG=C:\logdir
```

Registering with the TSM server

Before backing up to and recovering from an HCL® Tivoli® Storage Manager (TSM) server, you must have a TSM registered node name and a password. The process of setting up a node name and password is called *registration*.

After the HCL® OneDB® Interface for TSM node is registered with a TSM server, you can begin using the HCL® OneDB® Interface for TSM to back up and restore your HCL® OneDB® storage spaces and logical logs. If your workstation has a node name assigned to the TSM backup-archive client, you should have a different node name for HCL® OneDB® Interface for TSM. For information about performing the registration process, see the *Tivoli® Storage Manager Backup-Archive Client Installation and User's Guide*.

Initializing the HCL OneDB™ Interface for TSM password

To initialize the password for HCL OneDB™ Interface for TSM, use the **txbsapswd** program. This program sets up a connection with the server instance that you specified in the `dsm.opt` file.

About this task

You must run the **txbsapswd** program as user **root** before using HCL OneDB™ Interface for TSM.

To initialize the password:

1. Start the **txbsapswd** program located in the `$ONEDB_HOME/bin` directory.
2. Enter the password and press **Return**. To retain your current password, press **Return** without a value.

Updating the storage-manager definition in the `sm_versions` file for TSM

You must update the storage-manager definition in `sm_versions` file for ON-Bar to use with HCL® Tivoli® Storage Manager (TSM).

About this task

Before ON-Bar starts a backup or restore process, it calls the currently installed version of the storage-manager-specific XBSA shared library to get its version number. If this version is compatible with the current version of ON-Bar and is defined in the `sm_versions` file, ON-Bar begins the requested operation.

To update the storage-manager definition in `sm_versions` file:

1. Copy the `sm_versions.std` template to a new file, `sm_versions` in the `$ONEDB_HOME/etc` directory on UNIX™ or the `%ONEDB_HOME%\etc` directory on Windows™.
2. Put `tsm` in the **sm_name** field of the `sm_versions` file. The value `adsm` is also valid but will be deprecated in a future release.
3. Stop any ON-Bar processes (`onbar_d`, `onbar_w`, or `onbar_m`) that are currently running and restart them for the changes to take effect.

Example

The following example shows the Tivoli® Storage Manager definition in the `sm_versions` file:

```
1|5.3|tsm|5
```

Related reference

[Storage-manager definitions in the `sm_versions` file on page 26](#)

Configuring ON-Bar for optional TSM features

You can configure ON-Bar to enable or disable optional features in HCL® Tivoli® Storage Manager (TSM).

Apply all patches and updates to TSM before you use the following TSM features.

Deduplication

Deduplication eliminates redundant data in backups. To enable the database server to support deduplication, set the **IFX_BAR_USE_DEDUP** environment variable in the HCL OneDB™ environment and restart the database server. Update the TSM client systems option file.

Large transfer buffer size

The default transfer buffer size is 64 KB. Set the **BAR_XFER_BUF_SIZE** configuration parameter to specify a transfer buffer of up to 65 MB.

To limit the transfer buffer size to 64 KB regardless of the value of the **BAR_XFER_BUF_SIZE** configuration parameter, set the **IFX_NO_LONG_BUFFERS** environment variable to 1.

Replicate, import, and export backup objects

Replicating, importing, or exporting backup objects between TSM servers requires unique IDs for backup objects. ON-Bar automatically stores IDs in the metadata of backup objects that are unique for all TSM server with version 11.70.xC8 or later with version 12.10.xC2 or later.

To disable the ability to restore backup objects that are moved between TSM servers, set the **IFX_TSM_OBJINFO_OFF** environment variable to 1.

Related reference

[IFX_BAR_USE_DEDUP environment variable on page 201](#)

[BAR_XFER_BUF_SIZE configuration parameter on page 199](#)

[Editing the TSM client system options file on page 28](#)

[IFX_TSM_OBJINFO_OFF environment variable on page 202](#)

[IFX_BAR_NO_LONG_BUFFERS environment variable on page 201](#)

Configuring a third-party storage manager

Storage managers have slightly different installation and configuration requirements. If you use a third-party storage manager, make sure that you follow the manufacturer instructions carefully. If you have difficulty with the storage-manager installation and configuration, contact the manufacturer directly.

About this task

For the list of certified storage managers for your ON-Bar version, consult your marketing representative.



Important: Some storage managers let you specify the data to back up to specific storage devices. Configure the storage manager to back up logical logs to one device and storage spaces to a different device for more efficient backups and restores.

To configure a third-party storage manager:

1. Set ON-Bar configuration parameters and environment variables.
2. Configure the storage manager so that ON-Bar can communicate correctly with it.
For information, see your storage-manager documentation.
3. Configure your storage devices by following the instructions in your storage-manager documentation.
The storage manager must know the device names of the storage devices that it uses.
4. Label your storage volumes.
5. Mount the storage volumes on the storage devices.
6. Create the storage-manager definition in the `sm_versions` file. Use the definition provided by the vendor of the third-party storage manager.
 - a. Copy the `sm_versions.std` template to a new file, `sm_versions` in the `$ONEDB_HOME/etc` directory on UNIX™ or the `%ONEDB_HOME%\etc` directory on Windows™.
 - b. Create your own `sm_versions` file with the correct data for the storage manager by using the format in `sm_versions.std` as a template. To find out which code name to use in `sm_versions` for third-party storage managers, see the storage-manager documentation.
 - c. Stop any ON-Bar processes (`onbar_d` or `onbar_d.exe`) that are currently running and restart them for the changes to take effect.
7. Verify that the `BAR_BSALIB_PATH` configuration parameter points to the correct XBSA shared library for your storage manager.
8. If you enabled deduplication for your storage manager, set the `IFX_BAR_USE_DEDUP` environment variable and restart the database server.
9. ON-Bar uses the value of the `SERVERNUM` configuration parameter as part of the storage path for the logical logs in the storage manager. If the storage manager does not use a wildcard for the server number, set the appropriate server number environment variable for the storage manager.

What to do next

After you configure the storage manager and storage devices and label volumes for your database server and logical-log backups, you are ready to initiate a backup or restore operation with ON-Bar.

Related reference

[IFX_BAR_USE_DEDUP environment variable on page 201](#)

[Storage-manager definitions in the `sm_versions` file on page 26](#)

Specifying the location of the XBSA Library

By default, ON-Bar looks for the XBSA shared library in `$ONEDB_HOME/lib/ibsad001.s[ol]` on UNIX™. To specify a different name or location of the XBSA shared library, use the `BAR_BSALIB_PATH` configuration parameter.

UNIX™

You can also make `$ONEDB_HOME/lib/ibsad001.s[ol]` a symbolic link to the correct library.

For example, if you are using ISM, you can do either of the following:

- Link `$ONEDB_HOME/lib/ibsad001.so` to `$ONEDB_HOME/lib/libbsa.so`
- Set `BAR_BSALIB_PATH` to `$ONEDB_HOME/lib/libbsa.so`

For example, if you are using TSM, you can do either of the following:

- Link `$ONEDB_HOME/lib/ibsad001.so` to `$ONEDB_HOME/lib/libtxbsa.so`
- Set `BAR_BSALIB_PATH` to `$ONEDB_HOME/lib/libtxbsa.so`

Windows™

On Windows™, because no default XBSA shared library name exists, you must specify its name and location in the `BAR_BSALIB_PATH` configuration parameter. For example:

- If you are using PSM, set `BAR_BSALIB_PATH` to `%ONEDB_HOME%/bin/libbsapsm.dll`
- If you are using TSM, set `BAR_BSALIB_PATH` to `%DIR%\bin\libtxbsa.dll`.

If you are using a third-party storage manager, ON-Bar must use the version of the XBSA library that the storage-manager manufacturer provides. For more information, see [BAR_BSALIB_PATH configuration parameter on page 182](#) and your release notes.



Important: To set the path name of the XBSA library with the `BAR_BSALIB_PATH` configuration parameter in the `onconfig` file, specify the absolute path name. If you specify a relative path name, then the following message is written to the ON-Bar activity log: `BAR_BSALIB_PATH in ONCONFIG is not an absolute path name.`

Validating your storage manager

When you convert or revert the HCL® OneDB® database server, the storage manager that you used on the old version might not be validated for the version that you are migrating to. Verify that the storage-manager vendor successfully completed the HCL® OneDB® validation process for the database server version and platform.

If not, you need to install a validated storage manager before you perform backups with ON-Bar.

Configuring ON-Bar

Before you begin your first backup, review the default ON-Bar parameters in the `onconfig` file and adjust the values as needed. You can also set an environment variable.

You can configure the behavior of ON-Bar by setting the following configuration parameters and environment variable.

Table 6. ON-Bar configuration parameters and environment variable

Behavior	Configuration parameters
Control the number and size of data buffers and the number of parallel processes.	BAR_NB_XPORT_COUNT configuration parameter on page 193 BAR_XFER_BUF_SIZE configuration parameter on page 199 IFX_BAR_NO_LONG_BUFFERS environment variable on page 201 BAR_MAX_BACKUP configuration parameter on page 191 BAR_MAX_RESTORE configuration parameter on page 192
Set the debugging level and the location of debug log file.	BAR_DEBUG configuration parameter on page 185 BAR_DEBUG_LOG configuration parameter on page 188
Change the path of the ON-Bar boot file.	BAR_IXBAR_PATH configuration parameter on page 190
Maintain a history of expired backups.	BAR_HISTORY configuration parameter on page 189
Change the location and contents of ON-Bar activity log.	BAR_IXBAR_PATH configuration parameter on page 190
Maintain a history of expired backups.	BAR_ACT_LOG configuration parameter on page 181 BAR_PROGRESS_FREQ configuration parameter on page 195

Table 6. ON-Bar configuration parameters and environment variable

(continued)

Behavior	Configuration parameters
	BAR_PERFORMANCE configuration parameter on page 194
Set automatic retrying of failed back ups or restores.	BAR_RETRY configuration parameter on page 196
Allow a failed restore to be restarted.	RESTARTABLE_RESTORE configuration parameter on page 203
Increase backup size estimate sent to the storage manager.	BAR_SIZE_FACTOR configuration parameter on page 198
Extend the time an RS secondary server waits for a checkpoint during an external backup.	BAR_CKPTSEC_TIMEOUT configuration parameter on page 184
Configure continuous log backup.	ALARMPROGRAM configuration parameter on page
Filter or transform backed up data with an external program.	BACKUP_FILTER configuration parameter on page 180 RESTORE_FILTER configuration parameter on page 204
Optimize the deduplication capabilities of storage managers.	IFX_BAR_USE_DEDUP environment variable on page 201
Disable the ability to replicate, import, or export backup objects among TSM servers.	IFX_TSM_OBJINFO_OFF environment variable on page 202
Force the use of the <code>sm_versions</code> file.	IFX_BAR_NO_BSA_PROVIDER environment variable on page 200

ON-Bar security

By default, only the **informix** or **root** users on UNIX™ system or members of the **Informix-Admin** group on Windows™ systems can run ON-Bar commands.

To enable additional users to run ON-Bar commands:

- On UNIX™ systems, create a **bargroup** group and add users to the group. For instructions on how to create a group, see your UNIX™ documentation.
- On Windows™ systems, add the users to the **Informix-Admin** group.



Restriction: For security, it is recommended that ON-Bar commands not be run by the **root** user.

Related reference

[onbar -r syntax: Restoring data on page 62](#)

[onbar -b syntax: Backing up on page 41](#)

[onbar -v syntax: Verifying backups on page 53](#)

[onbar -m syntax: Monitoring recent ON-Bar activity on page 49](#)

[onbar -P syntax: Printing backed-up logical logs on page 51](#)

[onbar -RESTART syntax: Restarting a failed restore on page 82](#)

Verifying the configuration of ON-Bar and your storage manager

Before you begin using ON-Bar and your storage manager, make sure that ON-Bar and your storage manager are set up correctly.

Verify your configuration by checking the items in the following list:

- The storage manager is installed and configured to manage specific storage devices.
- For UNIX™, make sure that the `BAR_BSALIB_PATH` configuration parameter specifies correctly the XBSA shared library or it is not set and the library is in the default location.
- For Windows™, make sure that the `BAR_BSALIB_PATH` configuration parameter specifies correctly the XBSA shared library.
- The `sm_versions` file contains a row that identifies the version number of the storage-manager-specific XBSA shared library.

After you verify that ON-Bar and your storage manager are set up correctly, run ON-Bar on your test database to make sure that you can back up and restore data. For more information, follow the instructions in [Back up with ON-Bar on page 39](#).

Files that ON-Bar and storage managers use

ON-Bar, HCL OneDB™ Primary Storage Manager, HCL® OneDB® Storage Manager, and HCL® Tivoli® Storage Manager (TSM) use particular files in your installation.

The following table lists the files that ON-Bar, HCL® OneDB® Storage Manager, and HCL® Tivoli® Storage Manager (TSM) use and the directories where the files are. These names and locations change if you set up the `onconfig` file to values different from the defaults.

Table 7. List of files that ON-Bar, ISM, and TSM use

File name	Directory	Purpose
<code>ac_config.std</code>	UNIX™: <code>\$ONEDB_HOME/etc</code>	Template for archecker parameter values.

Table 7. List of files that ON-Bar, ISM, and TSM use (continued)

File name	Directory	Purpose
	Windows™: %ONEDB_HOME%\etc	The <code>ac_config.std</code> file contains the default archecker (archive checking) utility parameters. To use the template, copy it into another file and modify the values.
<code>ac_msg.log</code>	/tmp %ONEDB_HOME%\etc	The archecker message log. When you use archecker with ON-Bar to verify a backup, it writes brief status and error messages to the ON-Bar activity log and writes detailed status and error messages to the archecker message log. Technical Support uses the archecker message log to diagnose problems with backups and restores. Specify the location of the archecker message log with the <code>AC_MSGPATH</code> configuration parameter.
<code>bar_act.log</code>	/tmp %ONEDB_HOME%	ON-Bar activity log. For more information, see bar_act.log file: ON-Bar activity log on page 23 .
<code>bldutil.process_id</code>	/tmp \tmp	When the <code>sysutils</code> database is created, error messages appear in this file.
<code>dsierror.log</code>	\$DSMI_LOG	TSM API error log.
<code>dsm.opt</code>	\$DSMI_CONFIG	TSM client user option file.
<code>dsm.sys</code>	\$DSMI_DIR	TSM client system option file.
Emergency boot files (<code>ixbar*</code> files)	\$ONEDB_HOME/etc %ONEDB_HOME%\etc	Used in a cold restore. For more information, see ixbar file: ON-Bar emergency boot file on page 23 .
ISM catalog	\$ONEDB_HOME/ism %ISM%	Records information about backup and restore save sets and storage volumes that ISM uses. ISM creates the ISM catalog during the <code>ism_startup</code> initialization. The ISM catalog records are stored in the <code>mm</code> , <code>index</code> , and <code>res</code> files. For more information, see the .
ISM logs	\$ONEDB_HOME/ism/logs %ISM\logs	Operator alert messages, back-end status, additional ISM information. The ISM log names are <code>daemon.log</code> , <code>messages</code> , and <code>summary</code> .
<code>ISMversion</code>	\$ONEDB_HOME/ism	Identifies the ISM version. Do not edit this file.

Table 7. List of files that ON-Bar, ISM, and TSM use (continued)

File name	Directory	Purpose
	DIR%\bin	
<i>oncfg_servername.servernum</i>	\$ONEDB_HOME/etc %ONEDB_HOME%\etc	Configuration information for ON-Bar restores. The database server creates the <i>oncfg_servername.servernum</i> file when you initialize disk space. The database server updates the file every time that you add or delete a dbspace, a logical-log file, or a chunk. The database server uses the <i>oncfg*</i> file when it salvages logical-log files during a cold restore. The database server uses the <i>oncfg*</i> files, so do not delete them.
save, savegrp, savefs	\$ONEDB_HOME/bin %ISM%\bin	
<i>sm_versions</i>	\$ONEDB_HOME/etc %ONEDB_HOME%\etc	Identifies the version of ISM or a third-party storage manager. To update the storage-manager version, edit the <i>sm_versions</i> file directly. The OneDB® Primary Storage Manager does not use the <i>sm_versions.std</i> file.
<i>xbsa.messages</i>	\$ONEDB_HOME/ism/appl ogs %ISM%\applogs	XBSA library call information. ON-Bar and ISM use XBSA to communicate with each other. Technical Support uses the <i>xbsa.messages</i> log to fix problems with ON-Bar and ISM communications.

Back up with ON-Bar

You can use the ON-Bar utility to back up and verify storage spaces (dbspaces, blobspaces, and sbspaces) and logical-log files.

To perform a backup with ON-Bar:

1. Prepare for backup.
2. Back up with ON-Bar
3. Monitor backup progress.
4. Verify backups.
5. Back up storage manager information.

You can customize ON-Bar and storage manager commands in a shell or batch script. You can call ON-Bar from a job-scheduling program.

Related reference

[Customizing ON-Bar and storage-manager commands on page 98](#)

Preparing to back up data

Before you back up storage spaces and logical logs, you must prepare the system and copy critical administrative files.

To prepare to back up data:

1. Configure ON-Bar and your storage manager.
2. Ensure that you have enough logical log space.
ON-Bar checks for available logical-log space at the beginning of a backup. If the logs are nearly full, ON-Bar backs up and frees the logs before attempting to back up the storage spaces. If the logs contain ample space, ON-Bar backs up the storage spaces, then the logical logs.
3. Verify that you have enough temporary disk space.
The database server uses temporary disk space to store the before images of data that are overwritten while backups are occurring and overflow from query processing that occurs in memory. Verify that the **DBSPACETEMP** environment variable and DBSPACETEMP configuration parameter specify dbspaces that have enough space for your needs. If there is not enough room in the specified dbspaces, the backup will fail, root dbspace will be used, or the backup will fail after filling the root dbspace.
4. Back up administrative files to a different location.
5. Run the `oncheck -cD` command to verify that all database server data is consistent.
You do not need to check for consistency before every level-0 backup. Do not discard a backup that is known to be consistent until the next time that you verify the consistency of your databases.

Related reference

[Configure the storage manager and ON-Bar on page 25](#)

[onbar -b syntax: Backing up on page 41](#)

Related information

[oncheck -cd and oncheck -cD commands: Check pages on page](#)

Administrative files to back up

Although ON-Bar backs up some critical administrative files, you must also include critical files in normal operating-system backups of important configuration files.

Files that ON-Bar backs up

When you back up a storage space, ON-Bar also backs up the following critical files:

- The `onconfig` file
- UNIX™: The `sqlhosts` file
- The ON-Bar emergency boot file: `ixbar.servernum`
- The server boot file: `oncfg_servername.servernum`

You must restore these files if you need to replace disks or if you restore to a second computer system (imported restore).

Look at the `bar_act.log` file to determine whether critical files are successfully backed up. The return code for the `onbar -b` command indicates only whether storage spaces are successfully backed up. The following lines from the `bar_act.log` file show that the ON-Bar emergency boot file, `ixbar.0`, is backed up:

```
Begin backup of critical file '/opt/informix-11.70.fc7/etc/ixbar.0'.
Completed backup of critical file '/opt/informix-11.70.fc7/etc/ixbar.0'
```

Files that you must manually back up

In addition to the critical files, you must also manually back up the following administrative files:

- The `sm_versions` file
- Storage-manager configuration and data files
- Simple-large-object data in blobspaces that are stored on disks
- Simple-large-object data in blobspaces that are stored on disks or optical platters
- Externally stored data such as external tables that a DataBlade® maintains
- The keystore and stash files for encrypting storage spaces, as specified by the `DISK_ENCRYPTION` configuration parameter



Tip: Even though ON-Bar includes the critical files with the files it backs up, it is a good practice to also include the critical files in your system archive. Having the critical files included in both the HCL OneDB™ and system archives gives you more options if you need them.

Files that ON-Bar re-creates

Although ON-Bar does not back up the following items, ON-Bar automatically re-creates them during a restore. You do not need to make backup copies of these files:

- The dbspace pages that are allocated to the database server but that are not yet allocated to a tblspace extent
- Mirror chunks, if the corresponding primary chunks are accessible
- Temporary dbspaces

ON-Bar does not back up or restore the data in temporary dbspaces. Upon restore, the database server re-creates empty temporary dbspaces.

onbar -b syntax: Backing up

Use the `onbar -b` command to back up storage spaces and logical logs.

To run ON-Bar commands, you must be user **root**, user **informix**, a member of the **bargroup** group on UNIX™, or a member of the HCL OneDB™-Admin group on Windows™.

- [Usage on page 44](#)
- [Example: Back up a whole system on page 45](#)
- [Example: Back up all online storage spaces and logical logs on page 45](#)
- [Example: Perform an incremental backup on page 45](#)
- [Example: Back up specified storage spaces and all logical logs on page 46](#)
- [Example: Back up a list of storage spaces specified in a file on page 46](#)
- [Example: Back up logical logs on page 46](#)
- [Example: Physical backup on page 46](#)

Syntax for backing up with ON-Bar

```
onbar -b {{{| -L {0 | 1 | 2} | -p | -f filename | dbspace_list | [-w]}} | -l [{ -c | -c | -s}] [-o] [-cf {yes | no | only}] | -F }
```

Table 8. Options for the onbar -b command

Option	Description
-b	Specifies a backup Backs up the storage spaces and logical logs, including the current logical log.
<i>dbspace_list</i>	Specifies the storage spaces to be backed up, separated by blank spaces. If you do not enter <i>dbspace_list</i> or <i>-f filename</i> , ON-Bar backs up all online storage spaces on the database server.
-c	Closes and backs up the current logical log and the other full logical logs.
-C	Starts a continuous log backup. Reserve a dedicated storage device and terminal window because the continuous log backups run indefinitely waiting for logical logs to fill. To stop a continuous log backup, stop the ON-Bar process with an interrupt command, such as CTRL-C or SIGTERM.
-cf	Specifies whether the critical files are backed up. The critical files are the <i>onconfig</i> file, the <i>sqlhosts</i> file, and the <i>ixbar.servnum</i> file. Valid values are:

Table 8. Options for the onbar -b command (continued)

Option	Description
	<ul style="list-style-type: none"> • yes = Backs up the critical files. Default when performing a level 0, 1, or 2 backup. • no = Does not back up the critical files. Default when backing up the logical log files. • only = Backs up only the critical files.
-f <i>filename</i>	<p>Backs up the storage spaces that are listed in the text file that is specified by the <i>filename</i> value.</p> <p>Use this option to avoid entering a long list of storage spaces every time that you back up.</p> <p>For more information, see List of storage spaces in a file on page 47.</p>
-F	<p>Performs a fake backup</p> <p>A storage-manager application is not necessary. No backup actually occurs, so no restore is possible from a fake backup. Use fake backups sparingly, if at all. Fake backups might be appropriate in the following situations:</p> <ul style="list-style-type: none"> • Change database logging modes • Change a RAW table to a STANDARD table • Allow the user to use new logs, chunks, or mirrors without performing a backup • In special situations when you, the administrator, judge that a backup is not needed
-L	<p>Specifies the level of backup to perform on storage spaces:</p> <ul style="list-style-type: none"> • 0 = a complete backup (Default) • 1 = changes since the last level-0 backup • 2 = changes since the last level-1 backup <p>If you request an incremental backup and ON-Bar finds that no previous level backup was performed for a particular storage space, ON-Bar backs up that storage space at the previous level. For example, if you request a level-1 backup, and ON-Bar finds no level-0 backup, it makes a level-0 backup instead.</p>
-l	<p>Performs a backup of full logical-log files.</p> <p>The current logical-log file is not backed up.</p>

Table 8. Options for the onbar -b command (continued)

Option	Description
-O	<p>If you are using ISM, it also backs up the ISM catalog.</p> <p>Overrides normal backup restrictions.</p> <p>Use this option to back up logical logs when blobspaces are offline.</p> <p>If a log backup occurs when blobspaces are offline, return code 178 displays in the ON-Bar activity log.</p>
-p	<p>Backs up only physical storage spaces without logical logs.</p> <p>A warning message is written to the activity log listing the log unique ID of the latest log file that is required for a restore of the storage spaces. Use this option if logical logs are being continuously backed up. If necessary, a log switch is initiated, so that this log can be backed up. If the current log is already newer than the log with the archive checkpoint of the last storage space, then no log switch is initiated.</p>
-s	<p>Salvages any logical logs that are still on disk after a database server failure. You can run the onbar -l -s command while the server is offline.</p> <p>If possible, use this option before you replace a damaged disk. If you use onbar -r to perform a cold restore on an undamaged disk, ON-Bar automatically salvages the logical logs.</p>
-w	<p>Backs up a whole system, which includes all storage spaces and logical logs based on a single checkpoint.</p> <p>The time of the backup is stored with the backup information. The data in all storage spaces is consistent in a whole-system backup, therefore, you do not need to restore the logical logs to make the data consistent. If you do not save the logical logs, you must use the -w option.</p>

Usage

Before you back up your data, make sure that your data is consistent by running the oncheck -cD command.

To run ON-Bar commands, you must be user **root**, user **informix**, or a member of the **bargroup** group on UNIX™, or a member of the **Informix-Admin** group on Windows™. For more information, see [ON-Bar security on page 36](#).

You can back up storage spaces and logical logs when the database server is in online, quiescent, or fast-recovery mode.

The storage-space chunks can be stored on raw disk storage space, in cooked files, or on an NTFS file system (Windows™).

Only online storage spaces are backed up. Use the `onstat -d` command to determine which storage spaces are online. During a backup, if ON-Bar encounters a down dbspace, it skips it and later returns an error. If a storage space is offline, restart the backup when the storage space is back online.

After you begin the backup, monitor its progress in the ON-Bar activity log and database server message log.

You can either back up the logical logs separately or with storage spaces. Back up the logical logs as soon as they fill so that you can reuse them and to protect against data loss if the disks that contain the logs are lost. If the log files fill, the database server pauses until you back up the logical logs. You can either back up the logical logs manually or start a continuous logical-log backup by running the `onbar -b -C` command. Logical-log backups are always level 0. After you close the current logical log, you can back it up.

If you perform whole-system backups and restores, you do not need to restore logical logs. However, back up the logical logs when you use whole-system backups. These log backups allow you to recover your data to a time after the whole-system backup, minimizing data loss.

If you are running continuous logical log backup and then start a whole system backup, the ON-Bar process attempts to save the logical logs. Because the continuous logical log backup is running, an error message is returned indicating that a logical log backup is already running, and the whole system backup returns a non-zero error code. In this case the logical logs are backed up only one time. To avoid the error, create a physical backup with the `onbar -b -w -p` command.

To back up a specific table or set of tables in ON-Bar, store these tables in a separate dbspace and then back up this dbspace. Alternatively, you can perform table level restores with the `archecker` utility.

Example

Example: Back up a whole system

The following command performs a level-0 whole system backup after taking a checkpoint of all online storage spaces and logical logs:

```
onbar -b -w
```

The following command performs a level-1 whole system backup:

```
onbar -b -w -L 1
```

Example

Example: Back up all online storage spaces and logical logs

The following command performs a standard, level-0 backup of all online storage spaces and used logical logs:

```
onbar -b
```

Example

Example: Perform an incremental backup

The following command performs a standard, level-1 backup:

```
onbar -b -L 1
```

Example

Example: Back up specified storage spaces and all logical logs

The following command performs a level-0 backup of the dbspaces named **fin_dbspace1** and **fin_dbspace2** and all logical logs:

```
onbar -b fin_dbspace1 fin_dbspace2
```

Example

Example: Back up a list of storage spaces specified in a file

The following sample file named `listfile3` contains a list of storage spaces to be backed up: **blobsp2.1**, **my_dbspace1**, **blobsp2.2**, **dbsl.1**, **rootdbs.1**, and **dbsl.2**.

```
blobsp2.1
# a comment                ignore this text

    my_dbspace1            # back up this dbspace
; another comment
blobsp2.2                dbsl.1
rootdbs.1    dbsl.2    ; backing up two spaces
```

The following command backs up the storage spaces listed in the `listfile3` file:

```
onbar -b -f listfile3
```

Example

Example: Back up logical logs

The following command starts a manual logical-log backup:

```
onbar -b -l
```

The following command backs up the current logical-log file:

```
onbar -b -l -c
```

Example

Example: Physical backup

The following command backs up all storage spaces without backing up any logical logs:

```
onbar -b -p -L 0
```

A warning message is written to the ON-Bar activity log file stating that log file backup was not initiated. The message also contains the log unique ID of the latest log file that is required for a restore of the storage spaces. The latest required log file contains the archive checkpoint of the last dbspace backed up.

Example message:

```
2011-12-14 09:30:35 14277 14275 (-43354) WARNING: Logical logs were
not backed up as part of this operation. Logs through log unique ID 9
are needed for restoring this backup. Make sure these logs are backed
up separately.
```

Related reference

[Plan a backup system for a production database server on page 16](#)

[ON-Bar security on page 36](#)

Related information

[Configuring a continuous log restore by using ON-Bar on page 71](#)

[Replacing disks during a restore on page 76](#)

[Preparing to back up data on page 40](#)

List of storage spaces in a file

You can list storage spaces to back up or restore in a file.

The *filename* value can be any valid UNIX™ or Windows™ file name:

- Simple file names, for example: `listfile_1`)
- Relative file names, for example: `../backup_lists/listfile_2` or `..\backup_lists\listfile2`
- absolute file names, for example: `/usr//backup_lists/listfile3` or `c:\backup_lists\listfile3`

The format rules for the file are:

- If you are restoring chunks, list storage space names without paths. Each line can list more than one storage space, separated by spaces or a tab.
- If you are renaming chunks, list the old chunk path name, the old offset, the new chunk path name, and the new offset. Put a blank space or a tab between each item. Put information for each chunk on a separate line.
- Comments begin with a # or a ; symbol and continue to the end of the current line.
- ON-Bar ignores all comment or blank lines in the file.

Use ISM during a backup

Use the `ism_watch` command to monitor backups and restores sent to the HCL® OneDB® Storage Manager server. During a backup, the ISM server automatically routes storage-space data to volumes in the ISMData volume pool and logical-log files to volumes in the ISMLogs volume pool.

Always keep the volumes from the ISMLogs pool mounted to ensure that a storage device is always available to accept logical-log data. If the volume is not mounted, the backup pauses. For more information about using devices and ISM commands, see the .

During the backup operation, ISM creates save sets of the backed up data and enters information about the backed up data in the ISM catalog. You can also use the `ism_catalog -create_bootstrap` command to back up the ISM catalog:

If you use the `onbar` script to back up storage spaces and logical logs, it backs up the ISM catalog automatically. If you call `onbar_d` directly, you must use the `ism_catalog -create_bootstrap` command.

Backing up the ISM catalog

The `ism_catalog -create_bootstrap` command creates a full backup of the HCL® OneDB® Storage Manager catalog when the catalog is first used. Afterwards, the `ism_catalog -create_bootstrap` command performs incremental backups.

Therefore, the media or volume containing the first bootstrap creation is always necessary in order to restore the bootstrap successfully.

To avoid the need for the first media or volume during bootstrap restore, a full bootstrap backup must be performed every time. The level must be specified explicitly by using, the underlying `savegrp` command that `ism_catalog -create_bootstrap` calls.

To perform a full backup of the ISM catalog every time, run the `$ONEDB_HOME/bin/savegrp -O -l full ISMData` command as the user root.

In this command, `-O` is a capital O (not a zero), and `ISMData` is the pool name where the bootstrap data is saved.

You can edit the `$ONEDB_HOME/bin/onbar` shell script to replace the `ism_catalog -create_bootstrap` command with the `savegrp` command.

Redirect the output (both `stdout` and `stderr`) of the `savegrp` command to the ON-Bar activity log file (specified by the `BAR_ACT_LOG` configuration parameter in `onconfig` file).

Backing up blobspaces

You can back up blobspaces in a database that uses transaction logging.

Before you begin

Before you back up a new blobspace, make sure that the log file that recorded the creation of the blobspace is no longer the current log file. You can run the `onstat -l` command to verify the logical-log status.

About this task

When users update or delete simple large objects in blobspaces, the blobpages are not freed for reuse until the log file that contains the delete records is freed. To free the log file, you must back it up.



Important: If you perform a warm restore of a blobspace without backing up the logical logs after updating or deleting data in it, that blobspace might not be restorable.

To back up blobspaces:

1. Verify the logical-log status by running the `onstat -l` or `xctl onstat -l` command.
2. Switch to the next log file by running the `onmode -l` command.
3. Back up the logical logs:

Choose from:

- If the blobospace is online, run the `onbar -b -l -c` command.
- If the blobospace is offline, run the `onbar -b -l -O` or `onbar -b -O` command. If this backup is successful, ON-Bar returns 178.

4. Back up the blobspaces by running the `onbar -b` or `onbar -b -w` command.

Related information

[onstat -L command: Print the number of free locks on page](#)

onbar -m syntax: Monitoring recent ON-Bar activity

You can monitor recent ON-Bar activity with the `onbar -m` command. Only users who have permission to perform backup and restore operations can use this option.

Monitor recent ON-Bar activity

```
onbar -m { 20 | [lines] } [ -r { 5 | [seconds] } ]
```

Table 9. Options for the `onbar -m` command

Option	Description
<code>-m</code>	Prints the recent activity of ON-Bar from the activity log file.
<code>lines</code>	Specifies the number of lines to output. Default is 20 lines.
<code>-r</code>	Causes the <code>onbar -m</code> command to repeat.
<code>seconds</code>	Specifies the number of seconds to wait before repeating. Default is 5 seconds.

Related reference

[ON-Bar messages and return codes on page 117](#)

[Message format in the ON-Bar message log on page 118](#)

[ON-Bar security on page 36](#)

Related information

[bar_act.log file: ON-Bar activity log on page 23](#)

Viewing a list of registered backups

You can create a list of the registered ON-Bar backups performed on your system.

To view the list of registered backups:

1. Create a view in the **sysutils** database that contains information from the **bar_action**, **bar_instance**, and **bar_object** catalog tables.

Include the following fields in the view:

- Backup_ID: The internally generated ID for the backup
- Type: Defines whether the backup is a whole system backup, dbspace backup, or logical log backup.
- Object_Name: The name of the object backed up.
- Ifx_Time: Time at which the object was created. For dbspace backups, the checkpoint time that started the backup. For logical logs, the time when the log become full.
- CopyID_HI: The High part of the ID to locate the object in the storage manager.
- CopyID_LO: The Low part of the ID to locate the object in the storage manager.
- Backup_Start: Date and time when the backup started for this object
- Backup_End: Date and time when the backup ended for this object.
- Verify_Date: The time of the last verification made to this object, if any.

2. Run a SELECT statement against the view.

Example

Example

The following statement creates a view that contains backup information:

```
CREATE VIEW list_backups(Backup_ID, Type, Object_Name, Ifx_Time, CopyID_HI,
    CopyID_LO, Backup_Start, Backup_End, Verify_Date)
AS SELECT * FROM (
SELECT
    act_aid AS backup_id,
    DECODE(act_type, 5, "Whole-System", DECODE(obj_type, "L",
        "Logical log", "Dbspace")) AS Type,
    substr(obj_name,1, 8) AS Object_Name,
    min(DBINFO ('utc_to_datetime', seal_time)) AS Ifx_Time,
    ins_copyid_hi AS CopyID_HI,
    ins_copyid_lo AS CopyID_LO,
    act_start AS Backup_Start,
    act_end AS Backup_End,
    ins_verify_date AS Verify_Date

FROM
    bar_action A,
    bar_instance I,
    bar_object O

WHERE
    A.act_aid = I.ins_aid AND
    A.act_oid = O.obj_oid AND
    A.act_oid = I.ins_oid AND
    O.obj_type in ("R", "CD", "ND", "L")

GROUP BY 1,2,3,5,6,7,8,9
ORDER BY Ifx_Time, Backup_ID) AS view_list_backups
```

The following query returns all the backups:

```
SELECT * FROM list_backups
```

Related information

[The sysutils Tables on page](#)

onbar -P syntax: Printing backed-up logical logs

You can use the `onbar -P` command to print logical logs that are backed up using the ON-Bar utility.

To run ON-Bar commands, you must be user **root**, user **informix**, a member of the **bargroup** group on UNIX™, or a member of the HCL OneDB™-Admin group on Windows™.

- [Usage on page 52](#)
- [Example: Print a specific transaction on page 52](#)
- [Example: Print multiple logical log files on page 53](#)

Print backed-up logical logs

```
onbar -P -n { unique_id | starting_id-ending_id } [-l] [-q] [-b] [-c] [-uusername] [-tblspace_num] [-xtransaction_num]
```

Table 10. Options for the onbar -P command

Option	Purpose
-b	Print logical-log records associated with blob space blob pages. The database server stores these records on the logical-log backup media as part of blob space logging.
-c	Use the compression dictionary to expand compressed data.
-l	Print the long listing of the logical-log record. The long listing of a log record includes complex hexadecimal and ASCII dumps of the entire log record.
-n <i>starting_id-ending_id</i>	Print the logical-log records contained in the specified range of log files. The <i>starting_id</i> option is the ID of the first log to print. The <i>ending_id</i> option is ID of the last log to print. The value of the <i>starting_id</i> option must be smaller than the value of the <i>ending_id</i> option. Separate the starting and ending ID values with a hyphen. Do not include blank spaces.

Table 10. Options for the onbar -P command (continued)

Option	Purpose
-n <i>unique_id</i>	Print the logical-log records contained in the specified log file. The <i>unique_id</i> option is the unique ID number of the logical log. To determine the unique ID of a specific logical-log file, use the <code>onstat -l</code> command.
-P	Print backed-up logical log information
-q	Do not print the program header
-t <i>tblspace_num</i>	Print the records associated with the <code>tblspace</code> that you specify with the <i>tblspace_num</i> option. Specify the <i>tblspace_num</i> value as either an unsigned integer or hexadecimal value. If you do not use a prefix of <code>0x</code> , the value is interpreted as an integer. The integer must be greater than zero and must exist in the partnum column of the systables system catalog table.
-u <i>username</i>	Print the records for a specific user. The user name must be an existing login name and conform to operating-system-specific rules for login names.
-x <i>transaction_num</i>	Print only the records associated with the transaction that you specify. The <i>transaction_num</i> must be an unsigned integer between zero and <code>TRANSACTIONS -1</code> , inclusive. Additional Information: Use the <code>-x</code> option only in the unlikely situation of an error being generated during a roll-forward. When this situation occurs, the database server sends a message to the message log that includes the transaction ID of the offending transaction. You can use this transaction ID with the <code>-x</code> option to investigate the cause of the error.

Usage

To view the backed-up logical logs, the storage manager must be running.

The output of this command is printed to stdout.

Example

Example: Print a specific transaction

The following command prints information about a single transaction that was performed by the user **informix** against the tablespace 1048722 and is contained in the logical log file 2:

```
onbar -P -n 2 -l -q -b -u "informix" -t 1048722 -x 1
```

The output for this command might be:

```
log unqid: 2.
1665d0  120 DPT      1      2 0      5
        00000078 0002006c 00000010 0000fefe ...x...l .....
        00000001 00000000 000077e3 00000000 .....e...w.....
        00000005 00000005 00002a24 00000001 .....*$.
        00100004 0a0c21b8 00002a48 00000001 .....!. ..*H...
        00100006 0a0c2288 00002ea1 00000001 .....". .....
        0010001b 0a0c3810 00002bee 00000001 .....8. ..+.....
        00100015 0a0c3a18 00002a3d 00000001 .....: ..*=.....
        00100005 0a0c57c0 .....W.
166648  60  CKPOINT  1      0 1665d0  1
        0000003c 00000042 00000010 0000fefe ...<...B .....
        00000001 001665d0 000077e3 00000000 .....e...w.....
        00010005 00000002 00000002 001665a0 ..... ..e..e.
        00000007 ffffffff 00084403 ..... ..D.
```

Example**Example: Print multiple logical log files**

The following command prints the logical log records for the logical logs files that have IDs of 2, 3, 4, 5, 10, 11, and 12:

```
onbar -P -n 2-5 -n 10-12
```

Related reference

[ON-Bar security on page 36](#)

Related information

[onstat -l command: Print physical and logical log information on page](#)

[onstat -L command: Print the number of free locks on page](#)

[SYSTABLES on page](#)

onbar -v syntax: Verifying backups

Use the `onbar -v` command to verify that backups that were created by the ON-Bar utility are complete and can be restored.

To run ON-Bar commands, you must be user **root**, user **informix**, a member of the **bargroup** group on UNIX™, or a member of the HCL OneDB™-Admin group on Windows™.

Sufficient temporary space must be available. For more information, see [Temporary space for backup verification on page 56](#).

- Usage on page 55
- Example: Perform a point-in-time verification of a backup on page 55
- Example: Verify backups of storage spaces listed in a file on page 55
- Example: ON-Bar activity log verification messages on page 55
- Example: archecker message log verification messages on page 55

Verify backups

```
onbar -v [-p] [-t "time"] [{ -f filename | space | [-w] }
```

Table 11. Options for the onbar -v command

Option	Description
-v	<p>Verifies a backup. The server can be in any mode.</p> <p>If verification is successful, you can restore the storage spaces safely.</p> <p>You can verify a whole-system or physical-only backup. You cannot verify the logical logs.</p>
space	<p>Names of storage spaces to verify.</p> <p>If you enter more than one storage-space name, use a space to separate the names.</p>
-f filename	<p>Verifies the storage spaces that are listed in the text file whose path name <i>filename</i> provides.</p> <p>Use this option to avoid entering a long list of storage spaces every time that you verify them.</p> <p>You can use any valid UNIX™ or Windows™ path name and file name. For the format of this file, see List of storage spaces in a file on page 47.</p> <p>The file can list multiple storage spaces per line.</p>
-p	Verifies a physical-only backup.
-t "time"	<p>Specifies the date and time to which dbspaces are verified. Must be surrounded by quotation marks.</p> <p>How you enter the time depends on your current GLS locale convention. If the GL_DATETIME environment variable is set, you must specify the date and time according to that variable. If the GLS locale is not set, use ANSI-style date format: <code>YYYY-MM-DD HH:MM:SS</code>.</p>
-w	Verifies a whole-system backup.

Usage

The `onbar -v` command runs the `archecker` utility. The `archecker` utility verifies that all pages required to restore a backup exist on the media in the correct form. After you successfully verify a backup, you can restore it safely.

When you verify a backup, ON-Bar writes summary messages to the `bar_act.log` that report which storage spaces were verified and whether the verification succeeded or failed. The `archecker` utility writes detailed messages to the `ac_msg.log`. HCL Software Support uses the `ac_msg.log` to diagnose problems with backups and restores.

The `onbar -v` command verifies only the smart-large-object extents in an `sbspace`. For a complete check, use the `oncheck -cS` command.

The `onbar -v` command cannot verify the links between data rows and simple large objects in a `blobospace`. Use the `oncheck -cD` command instead to verify the links in a `blobospace`.

Example

Example: Perform a point-in-time verification of a backup

The following command verifies a backup at a point-in-time:

```
onbar -v -t "2011-12-10 10:20:50"
```

Example

Example: Verify backups of storage spaces listed in a file

The following command verifies the backed-up storage spaces that are listed in the file `bkup1`:

```
onbar -v -f /usr/backups/bkup1
```

Example

Example: ON-Bar activity log verification messages

The following examples show messages about verification in the ON-Bar activity log:

The level-0 backup of `dbspace db2.2` passed verification, as follows:

```
Begin backup verification of level0 for db2.2 (Storage Manager Copy ID:##)
Completed level-0 backup verification successfully.
```

The level-0 backup of `rootdbs` failed verification, as follows:

```
Begin backup verification of level0 for rootdbs (Storage Manager Copy ID:##).
ERROR: Unable to close the physical check: error_message.
```

Example

Example: archecker message log verification messages

More detailed information is available in the `archecker` message log, as follows:

```

STATUS: Scan PASSED
STATUS: Control page checks PASSED
STATUS: Starting checks of dbspace dbs2.2.
STATUS: Checking dbs2.2:TBLSpace
.
.
STATUS: Tables/Fragments Validated: 1
Archive Validation Passed

```

Related reference

[ON-Bar security on page 36](#)

Related information

[Verifying an expired backup on page 58](#)

Temporary space for backup verification

When you verify backups, 15-25 MB of temporary space must be available.

During backup verification, the archecker utility requires about 15 MB of temporary space for a medium-size system (40-50 GB) and 25 MB for a large system. This temporary space is stored on the file system in the directory that the AC_STORAGE parameter specifies, not in the dbspaces. The temporary files contain bitmap information about the backup and copies of partition pages, free pages in a chunk, reserved pages, and optionally, free pages in a blob space and debugging information. The archecker utility must have permissions to the temporary directory.

If the backup is verified successfully, these files are deleted. If the backup fails verification, these files remain. Copy them to another location so that HCL Software Support can review them.

If your database server contains only dbspaces, use the following formula to estimate the amount of temporary space in KB for the archecker temporary files:

$$\text{space} = (130 \text{ KB} * \text{number_of_chunks}) + (\text{pagesize} * \text{number_of_tables}) + (.05 \text{ KB} * \text{number_of_logs})$$

For HCL OneDB™, if your database server contains blob spaces or sbspaces, use the following formula to estimate the amount of temporary space for the archecker temporary files:

$$\text{space} = (130 \text{ KB} * \text{number_of_chunks}) + (\text{pagesize} * \text{number_of_tables}) + (.05 \text{ KB} * \text{number_of_logs}) + (\text{pagesize} * (\text{num_of_blobpages}/252))$$
number_of_chunks

The maximum number of chunks that you estimate for the database server.

pagesize

The system page size in KB.

number_of_tables

The maximum number of tables that you estimate for the database server.

number_of_logs

The number of logical logs on the database server.

num_of_blobpages

The number of blobpages in the blobspaces or the number of sbspaces. (If your database server contains sbspaces, substitute *num_of_blobpages* with the number of sbspaces.)

For example, you would need 12.9 megabytes of temporary disk space on a 50-gigabyte system with a page size of 2 KB. This system does not contain any blobspaces, as the following statement shows:

```
13,252 KB = (130 KB * 25 chunks) + (2 KB * 5000 tables) +
            (.05 KB * 50 logs) + (2 KB * 0)
```

To convert KB to MB, divide the result by 1024:

```
12.9 MB = 13,252/1024
```

Verification failures

The verification of a backup can fail for various reasons. If a backup fails verification, do not attempt to restore it.

The causes of a verification failure are unpredictable and range from corruption of the database server to a failed restore because ON-Bar cannot find the backup object on the storage manager. In fact, the restore might appear to be successful but it hides the real problem with the data or media.

Backups with corrupted pages

If the pages are corrupted, the problem is with the databases rather than with the backup or the media.

Run `oncheck -cd` on any tables that produce errors and then redo the backup and verification. To check extents and reserved pages, run `oncheck -ce` and `oncheck -cr`.

Backups with corrupted control information

In this case, all the data is correct, but some of the backup control information is incorrect, which might cause problems with the restore. Ask HCL Software Support for assistance.

Backups with missing data

When a backup is missing data, it might not be recoverable. After a data loss, try to restore from an older backup. Then restore the current logical logs.

Backups of inconsistent database server data

There are cases where `archecker` returns “success” to ON-Bar but shows “failure” in the `archecker` message logs. This situation occurs when `archecker` verifies that ON-Bar backed up the data correctly, but the database server data was invalid or inconsistent when it was backed up.

Diagnosing why a backup failed verification

If a backup failed verification, you can take steps to diagnose and attempt to fix the problem.

About this task

To diagnose why a backup failed verification:

1. Verify that the **AC_CONFIG** environment variable and the contents of the archecker configuration file are set correctly. If these variables are set incorrectly, the ON-Bar activity log prints a message.
2. Back up the data onto different media.

Do not reuse the original backup media because it might be damaged.

Do not use any backups based on this backup. If the level-0 backup failed verification, do not use the corresponding level-1 and level-2 backups.

3. Verify this new backup. If verification succeeds, you can restore the storage spaces.
4. Use your storage manager to expire the backup that failed verification and then run the `onsmsync` utility without arguments to remove the bad backup from the **sysutils** and emergency boot files.
5. If verification fails again, call HCL Software Support and provide them with the following information:
 - Your backup tool name (ON-Bar)
 - The database server `online.log`
 - The archecker message log
 - The `AC_STORAGE` directory that contains the bitmap of the backup and copies of important backed-up pages

If only part of the backup is corrupted, HCL Software Support can help you determine which portion of the backup can be restored in an emergency.

HCL Software Support might advise you to run `oncheck` options against a set of tables.

Verifying an expired backup

You can verify an expired backup in case subsequent backups are not valid.

About this task

To verify an expired backup:

1. Check that the status of the backup save set on the storage manager. If the storage manager expired the backup save set, the archecker utility cannot verify it.
2. Use the storage-manager commands for activating the expired backup save set. See your storage-manager documentation.
3. Run the `onbar -v` command again.

Related reference

[onbar -v syntax: Verifying backups on page 53](#)

Restoring when a backup is missing data

If a backup fails verification because of missing data, you can perform a restore from an older backup.

About this task

To restore when a backup is missing data:

1. Choose the date and time of an older backup than the one that failed. To perform a point-in-time verification, use the `onbar -v -t time space` command.
2. If the older backup passes verification, perform a point-in-time physical restore by using the same *time* value, then perform a log restore, as follows:

```
onbar -r -p -t time space
onbar -r -l
```

3. Expire the corrupted backup at your storage manager.
4. Run the `onsmsync` command without arguments.
The `onsmsync` utility removes backups that are no longer held by the storage manager from the emergency boot file and the **sysutils** database, preventing ON-Bar from attempting to use such backups.

Related reference

[The onsmsync utility on page 102](#)

[onbar -r syntax: Restoring data on page 62](#)

Restore data with ON-Bar

You can use the ON-Bar utility to restore data that was backed up by the ON-Bar utility.

Before you restore data, use the pre-restore checklist to determine if whether a restore is needed and to prepare for a restore.

To perform a restore with the ON-Bar utility:

1. Make the storage devices that were available during the backup available for the restore.
2. If necessary, add enough temporary space to perform the restore. The logical log restore portion of a warm restore requires temporary space. The minimum amount of temporary space is equal to the smaller of the total amount of allocated logical-log space and the number of log files to be replayed.
3. Run the `onbar -r` command with the appropriate options to restore the data.
4. Monitor the ON-Bar activity log.
5. After the restore is complete, run the `onstat -d` command to verify that all storage spaces are restored. The letter O in the flags column indicates that the chunk is online.

Pre-restore checklist

Use this checklist to determine if a restore is necessary and to prepare for a restore.

To prepare for a restore:

- Determine if you need to restore. If one or more of these problems is true, you perform a restore to fix the problem:
 - Has data been lost or corrupted?
 - Does a committed transaction error need to be undone?
 - Is the database server down or has a disk failed?
 - Is a storage space or chunk down or inconsistent?
- Diagnose the problem by using database server monitoring tools.
- If the root dbspace or the dbspaces that contain the physical log and logical-log files need to be restored, you must perform a cold restore. The database server must be offline during a cold restore. Ask your client users to log off the system.
- Contact the appropriate vendor to resolve the following types of problems before doing a restore:
 - The storage manager
 - The XBSA connection
 - The operating system
 - The storage media

Related information

[Database server monitoring on page](#)

Storage space status and required actions

To determine the state of each storage space and its chunks, examine the output of the `onstat -d` command. The storage space status determines the action you need to take to solve the problem. The database server must be online.

The following table describes `onstat -d` command output about chunk status and the actions required to solve the problems. The chunk status information is in the second position of the **flags** column in the first (storage spaces) and second (chunks) sections of the output.

Table 12. Chunk flag descriptions and required actions

chunk flag	Storage space or chunk state	Action required
(No flag)	Storage space no longer exists.	Perform a point-in-time cold restore to a time before the storage space was dropped.
D	Chunk is down or storage space is disabled.	Perform a warm restore of the affected storage space.
I	Chunk is physically restored, but needs a logical restore.	Perform a logical restore.

Table 12. Chunk flag descriptions and required actions (continued)

chunk flag	Storage space or chunk state	Action required
L	Storage space is being logically restored.	Try the logical restore again.
N	Chunk is renamed and either down or inconsistent.	Perform a warm restore of the chunk when the physical device is available.
O	Chunk is online.	No action required.
P	Storage space is physically restored.	Perform a logical restore, if one is not already in progress.
R	Storage space is being restored.	Perform a physical or logical restore.
X	Storage space or chunk is newly mirrored.	No action required.

Related reference

[onbar -r syntax: Restoring data on page 62](#)

Related information

[onstat -d command: Print chunk information on page](#)

Restore save sets with ISM

If you are using HCL® OneDB® Storage Manager , you can restore data from save sets on the storage volume. When the ISM server receives a restore request, the `ism_watch` command prompts you to mount the required storage volume on the storage device. When you mount the volume, the restore resumes.

You can set the retention period for either a save set or volume. Unless all the save sets on the volume are expired, you can use ON-Bar to restore it.

After the retention period for a save set expires, ON-Bar can no longer restore it. To recreate an expired save set, use the `ism_catalog -recreate` from command.

If you set the retention period for a volume, ISM retains the save sets until all the save sets on that volume are expired. To recover an expired volume, use the `ism_catalog -recover` from command.

Storage device availability

Verify that the storage devices and files used in the backup are available for the restore.

If you drop a dbspace or mirror device after a level-0 backup, the dbspace or mirror device must be available to the database server when you begin the restore. If the storage device is not available, the database server cannot write to the chunk and the restore fails.

If you add a chunk after your last backup, the chunk device must be available to the database server when it rolls forward the logical log.

onbar -r syntax: Restoring data

To run a complete restore, use onbar -r command.

To run ON-Bar commands, you must be user **root**, user **informix**, a member of the **bargroup** group on UNIX™, or a member of the HCL OneDB™-Admin group on Windows™.

- [Usage on page 67](#)
- [Example: Perform a whole-system restore on page 68](#)
- [Example: Restore specific storage spaces on page 68](#)
- [Example: Perform a warm restore in stages on page 68](#)
- [Example: Point-in-time restore on page 69](#)
- [Example: Point-in-time restore in stages on page 69](#)
- [Example: Restore a dropped storage space and chunks on page 69](#)
- [Example: Restore critical files on page 69](#)

```

Run a full or physical restore
>>onbar-- -r----->
      '- -p-' +- -e-----+ '- -w-'
              +- -encrypt--+
              '- -decrypt-'

>+-----+----->
+- -t--"time"--+ '- -pw+-----+--'
'- -n--log----'   '--filename--'

>+-----+-----+----->
+- -0-----+-----+
'-+- -rename-- -f--filename-----+'
| .----- . |
| V          |
'|--- -rename-- -p--old_path-- -o--old_offset-- -n--new_path-- -o--new_offset+--'

>+-----+-----+-----><
+- -f--filename+ '- -cf--+yes--+-'
| .----- . | +-no---+
| V          | | '-only-'
'|---space+-----'
    
```

Run a logical restore

```
onbar -r -l [{ -c | -x | -t "time" | -n log }]
```

Run a tenant restore

```
onbar -r -T tenant_database [{ -encrypt | -decrypt } ] -t "time" [-O]
```

Table 13. Options for the onbar -r command.

Option	Description
-r	<p>Specifies a restore. If the database server is offline, ON-Bar performs a cold restore. If the database server is in online, quiescent, or fast recovery mode, ON-Bar performs a warm restore.</p> <p>In a cold restore, the -r option restores all storage spaces and salvages and restores the logical logs. In a warm restore, the -r option restores all storage spaces that are offline and restores the logical logs.</p> <p>You must specify the -r option first.</p>
space	<p>Specifies which storage spaces to back up as a list of one or more dbspace, blobspace, or sbspace names, separated by blank spaces.</p> <p>ON-Bar restores only the storage spaces listed. If the database server is offline, you must list all the critical dbspaces. You cannot specify temporary spaces.</p>
-C	<p>Continuously restores logical logs from the current logical log tape without sending prompts to mount the tape.</p> <p>The server is placed in suspend log restore state, and the command exits after the last applicable log is restored. The server sends a prompt if a log spans tapes. The configuration parameter RESTARTABLE_RESTORE does not affect continuous log restoration.</p>
-cf	<p>Specifies whether the critical files are restored during a cold restore.</p> <p>The critical files are the <code>onconfig</code> file, the <code>sqlhosts</code> file (on UNIX™), the <code>oncfg_servername.servernum</code> file, and the <code>ixbar.servernum</code> file.</p> <p>Valid values are:</p> <ul style="list-style-type: none"> • <code>yes</code> = Restores the critical files. • <code>no</code> = Default. Does not restore the critical files. • <code>only</code> = Restores only the critical files.
-decrypt	<p>Specifies to decrypt any encrypted storage spaces during the physical restore of the spaces.</p>
-encrypt	<p>Specifies to encrypt storage spaces during the physical restore of the spaces. Storage space encryption must be enabled by the <code>DISK_ENCRYPTION</code> configuration parameter. Otherwise, the restore fails.</p>

Table 13. Options for the onbar -r command. (continued)


Option	Description
	For more information about storage space encryption, see Changing storage space encryption during a restore on page 47 .
-e	Specifies an external restore. Run the onbar -r -e command after you externally restore the storage spaces. Marks storage spaces as physically restored, restores the logical logs, and brings the storage spaces online.
-f <i>filename</i>	<p>Specifies the path and file name of a text file that lists the storage spaces to restore or rename.</p> <p>Use this option to avoid entering a long list of storage spaces.</p> <p>For more information, see List of storage spaces in a file on page 47.</p>
-l	<p>Specifies a logical restore only. Restores and rolls forward the logical logs. The logical restore applies only to those storage spaces that are already physically restored.</p> <p> Important: To improve performance, replay logical-log transactions in parallel during a warm restore. Use the ON_RECVRY_THREADS configuration parameter to set the number of parallel threads. To replay logical-log transactions in parallel during a cold restore, use the OFF_RECVRY_THREADS configuration parameter. For more information, see your <i>HCL OneDB™ Performance Guide</i>.</p>
-n <i>log</i>	<p>Indicates the unique ID of the last logical log to be restored in a cold restore. The database server must be offline.</p> <p>To find the unique ID, use the onstat -l command.</p> <p>A point-in-log restore is a special point-in-time restore. You must restore all storage spaces in a point-in-log restore so that the data is consistent. If any logical logs exist after the specified log, ON-Bar does not restore them and their data is lost. If the specific logical log applies to more than one timeline, ON-Bar uses the latest one.</p> <p>Cannot be combined with the -t option.</p>
-n <i>new_path</i>	Specifies the new path of the chunk. Use with the -rename option.
-O	Overrides internal error checks. Allows the restore of online storage spaces. Forces the recreation of chunk files that no longer exist.

Table 13. Options for the onbar -r command. (continued)

Option	Description
	<p>Used to override internal error checks to perform the following tasks:</p> <ul style="list-style-type: none"> • Force the restore of online storage spaces. If a storage space in the list of storage spaces to restore is online, ON-Bar takes the storage space offline and then restores it. If this operation succeeds, ON-Bar completes with an exit code of 177. • Force the creation of nonexistent chunk files. If a chunk file for a storage space being restored no longer exists, ON-Bar recreates it. The newly created chunk file is cooked disk space, not raw disk space. If ON-Bar successfully recreates the missing chunk file, ON-Bar completes with an exit code of 179. • Force a cold restore to proceed if a critical storage space is missing. In a cold restore, ON-Bar checks whether every critical space is being restored. This check occasionally causes false warnings. If the warning was valid, the restore fails. If the warning was false and ON-Bar successfully restores the server, ON-Bar completes with an exit code of 115. <p>Use the -O option with a whole-system restore only to recreate missing chunk files. You cannot use the onbar -r -w -O command when the database server is online because the root dbspace cannot be taken offline during the whole-system restore. Cannot be combined with the -rename option.</p>
-pw <i>[file name]</i>	<p>The -pw option is required only when the storage space encryption feature is enabled and no stash file is in use. Supply an optional path to a file containing the keystore password, otherwise onbar will prompt for a password before performing the restore.</p>
-o <i>new_offset</i>	<p>Specifies the offset of the renamed chunk. Use with the -rename option.</p>
-o <i>old_offset</i>	<p>Specifies the offset of the chunk to be renamed. Use with the -rename option.</p>
-p	<p>Specifies a physical restore only.</p> <p>You must follow a physical restore with a logical restore before data is accessible unless you use a whole-system restore. This option turns off automatic log salvage before a cold restore. If the LTAPEDEV configuration parameter is set to <code>/dev/null</code> or <code>NUL</code>, you must use the -p option during a restore.</p>

Table 13. Options for the onbar -r command. (continued)

Option	Description
-p <i>old_path</i>	Specifies the path of the chunk to be renamed. Use with the -rename option.
-rename	Renames one or more chunks during a cold restore. The database server must be offline. This option is useful if you need to restore storage spaces to a different disk from the one on which the backup was made. You can rename any type of chunk, including critical chunks and mirror chunks. You can rename chunks that have level-0 backups. Cannot be combined with the -O option.
-T <i>tenant_database</i>	Restores a tenant database. The database server must be online. No other warm restores or tenant restores can be in progress. If you include the -t option, the data is restored to the specified point in time. If you do not include the -t option, the data is restored to the current time. Include the -O option unless all of the permanent tenant storage spaces are marked as down. Temporary storage spaces are never backed up or restored. For more information, see Restoring a tenant database to a point in time on page .
-t " <i>time</i> "	Specifies the time of the last transaction to be restored from the logical logs in a cold restore. The database server must be offline. Specifies the time of the last transaction to be restored from the logical logs in a cold restore or a tenant database point-in-time restore. For a cold restore, the database server must be offline. For a tenant database point-in-time restore, the database server must be online. All storage spaces specified are restored to the same point in time. However, for a cold restore, if you perform a physical restore followed by a logical restore, the logical restore can be to a later point in time. For example you might detect that your current backup is corrupted, and that you need to restore the previous backup. In this case, start your physical restore with the timestamp of your previous backup, and subsequently start the logical recovery to a more recent timestamp. A point-in-time restore is typically used to recover from a mistake. For example, if you accidentally dropped a database, you can restore the server to a point in time just before you dropped the database.

Table 13. Options for the onbar -r command. (continued)

Option	Description
	<p>To determine the appropriate date and time for the point-in-time restore, use the onlog utility. The onlog utility output shows the date and time of the committed transactions in the logical log. All data transactions that occurred after the time you specify in the restore command are lost.</p> <p>Use quotation marks around the date and time. The format for the English locale is <code>yyyy-mm-dd hh:mm:ss</code>. If the GL_DATETIME environment variable is set, you must specify the date and time according to that variable.</p> <p>Cannot be combined with the <code>-n log</code> option.</p>
-w	<p>Performs a whole-system restore of all storage spaces and logical logs from the last whole-system backup. The database server must be offline.</p> <p>After the whole-system restore is complete, the server is in quiescent mode.</p> <p>If you specify <code>onbar -r -w</code> without a whole-system backup, return code 147 is returned because ON-Bar cannot find any storage spaces backed up as part of a whole-system backup.</p>
-X	<p>Stops continuous logical log restore. Leaves the server in quiescent mode in a logical restore suspend state without restoring additional logs.</p>

Usage


You can restore storage spaces stored in both raw and cooked files. If your system contains primary and mirror storage spaces, ON-Bar writes to both chunks simultaneously during the restore, except for an external restore. You cannot specify to restore temporary spaces. When you restore the critical dbspaces (for example, the root dbspace), the database server recreates the temporary dbspaces, but they are empty.

ON-Bar restores the storage spaces in parallel if the `BAR_MAX_BACKUP` or `BAR_MAX_RESTORE` configuration parameter is set to a value greater than 1. To speed up restores, you can add additional CPU virtual processors.

You can restore noncritical storage spaces in a warm restore, when the database server is online, in the following circumstances:

- The storage space is online, but one of its chunks is offline, recovering, or inconsistent.
- The storage space is offline or down.

You cannot perform more than one warm restore simultaneously. If you need to restore multiple storage spaces, specify the set of storage spaces to restore to ON-Bar or allow ON-Bar to restore all down storage spaces by not explicitly specifying any spaces.

 **Tip:** For faster performance in a restore, assign separate storage devices for backing up storage spaces and logical logs. If physical and logical backups are mixed together on the storage media, it takes longer to scan the media during a restore.

In certain situations, you might want to perform a restore in stages. If multiple devices are available for the restore, you can restore multiple storage spaces separately or concurrently, and then perform a single logical restore.

By default, ON-Bar restores the latest backup. If you do not want to restore the latest backup, you can restore from an older backup: for example, when backup verification failed or the backup media was lost. You can perform a point-in-time restore or a point-in-log restore. Alternatively, you can expire a bad backup in the storage manager, run the `onsmsync` command, and then restore from the older backup. If you accidentally drop a storage space, you can use a point-in-time restore or a point-in-log restore to recover it.

You can force a restore of online storage spaces (except critical dbspaces) by using the `-O` option. The database server automatically shuts down each storage space before it starts to restore it. Taking the storage space offline ensures that users do not try to update its tables during the restore process.

You can restore critical files during a cold restore by including the `-cf yes` option.

You can rename chunks by specifying new chunks paths and offsets during a cold restore with ON-Bar. This option is useful if you need to restore storage spaces to a different disk from the one on which the backup was made. You can rename any type of chunk, including critical chunks and mirror chunks.

When storage space encryption is enabled, by default storage spaces retain the same encryption state after a restore as during the back up. You can specify to encrypt or decrypt a storage space during a restore with the `-encrypt` or `-decrypt` options.

Example

Example: Perform a whole-system restore

A whole-system restore is a cold restore and must be performed while the server is offline. The following command restores a whole-system backup:

```
onbar -r -w
```

Example

Example: Restore specific storage spaces

The following example restores two specific storage spaces, `fin_dbspace1` and `fin_dbspace2`:

```
onbar -r fin_dbspace1 fin_dbspace2
```

Example

Example: Perform a warm restore in stages

The following commands perform a physical restore, back up logical logs, and perform a logical restore:

```
onbar -r -p
onbar -b -l
onbar -r -l
```

Example**Example: Point-in-time restore**

The following command restores database server data to its state at a specific date and time:

```
onbar -r -t "2011-05-10 11:35:57"
```

In this example, the restore replays transactions that committed on or before the specified time, including any transactions with a commit time of 11:35:57. Transactions in progress but not committed by 11:35:57 are rolled back.

Example**Example: Point-in-time restore in stages**

The following commands perform a physical restore and a logical restore to the same point in time:

```
onbar -r -p -t "2011-05-10 11:35:57"
onbar -r -l -t "2011-05-10 11:35:57"
```

Example**Example: Restore a dropped storage space and chunks**

Suppose that a transaction dropped a storage space named **dbspace1** and deleted chunks at the time 2011-05-10 12:00:00. The following command restores the storage space and recreates the deleted chunks while the server is offline:

```
onbar -r -t "2011-05-10 11:59:59" -0
```

Example**Example: Restore critical files**

The following command restores data and the critical files during a cold restore:

```
onbar -r -cf yes
```

Related reference

[Storage space status and required actions on page 60](#)

[External restore commands on page 93](#)

[ON-Bar security on page 36](#)

[onbar -RESTART syntax: Restarting a failed restore on page 82](#)

Related information

[Restoring when a backup is missing data on page 59](#)

[Replacing disks during a restore on page 76](#)

Avoid salvaging logical logs

The `onbar -r` command automatically salvages the logical logs. However, avoid salvaging logical logs in some situations.

Use the `onbar -r -p` and then `onbar -r -l` commands to skip log salvage.

If you set the `LOG_BACKUP_MODE` configuration parameter to `NONE`, the logical logs are not salvaged in any ON-Bar restore (`onbar -r` or `onbar -r -w`, for example).

Avoid salvaging the logical logs in the following situations:

- When you perform an imported restore
Salvage the logical logs on the source database server but not on the target database server.
- If you reinitialize the database server (`oninit -i`) before you perform a cold restore
Reinitialization creates new logical logs that do not contain the data that you want to restore.
- If you install a new disk for the `dbspace` that contains the logical logs
Salvage the logs from the old disk, but not from the new disk.

Related information

[Restoring to a different computer on page 78](#)

Performing a cold restore

If a critical storage space is damaged because of a disk failure or corrupted data, you must perform a cold restore. If a disk fails, you need to replace it before you can perform a cold restore to recover data.

About this task

If you try to perform a cold restore without a backup, data in the storage spaces that were not backed up are lost.

To perform a cold restore:

1. Shut down the server by running the `onmode -ky` command.
2. If the disk that contains the logical-log files must be replaced or repaired, use the `onbar -b -l -s` command to salvage logical-log files on the damaged disk.
Otherwise, ON-Bar automatically salvages the logical logs.
3. If necessary, repair or replace the damaged disk.
4. If the files in `ONEDB_HOME` are damaged, copy the back ups of administrative files to their original locations.

Otherwise, you do not need to copy the administrative files.

5. Restore the critical and noncritical storage spaces by running the onbar -r command.
When the restore is complete, the database server is in quiescent mode.
6. Start the server by running the onmode -m command.
7. Synchronize the storage manager by running the onsmsync command.

Related reference

[The onsmsync utility on page 102](#)

Related information

[onmode -k, -m, -s, -u, -j: Change database server mode on page](#)

Configuring a continuous log restore by using ON-Bar

Use continuous log restore to keep a second system (hot backup) available to replace the primary system if the primary system fails.

Before you begin

The version of HCL OneDB™ must be identical on both the primary and secondary systems.

To configure continuous log restore by using ON-Bar:

1. On the primary system, perform a level-0 backup with the onbar -b -L 0 command.
2. Import the backup objects that were created to the storage manager of the secondary server.
3. On the secondary system, perform a physical restore with the onbar -r -p command.
After the physical restore completes on the secondary system, the database server waits in fast recovery mode to restore logical logs.
4. On the primary system, back up logical logs with the onbar -b -l command.
5. Transfer the backed up logical logs to the secondary system and restore them with the onbar -r -l -C command.
6. Repeat steps [4 on page 71](#) and [5 on page 71](#) for all logical logs that are available to back up and restore.
7. If you are doing continuous log restore on a secondary system as an emergency standby, run the following commands to complete restoring logical logs and quiesce the server:
 - If logical logs are available to restore, run the onbar -r -l command.
 - After all available logical logs are restored, run the onbar -r -l -X command.

Related reference

[onbar -b syntax: Backing up on page 41](#)

Related information

[Continuous log restore on page 10](#)

Restoring data by using a mixed restore

You can use mixed restore to reduce the time until urgent data becomes online and available when you need to restore the server. Urgent data is data that you deem as critical to your business operation.

About this task

In a mixed restore, you first perform a cold restore of the critical dbspaces (the root dbspace and the dbspaces that contain the physical and logical logs) and the dbspaces containing your urgent data. Because you do not restore all dbspaces, you can bring the server online faster. You then restore the remaining storage spaces in one or more warm restores.

To perform a mixed restore:

1. Shut down the database server by running the `onmode -ky` command.
2. Perform a cold restore of the critical and urgent dbspaces by running the `onbar -r` command with the list of critical and urgent dbspace names.
You can specify a point in time to restore from an older backup.
3. Start the server by running the `onmode -m` command.
4. Synchronize the storage manager by running the `onsmsync` command.
5. Perform a warm restore of the remaining storage spaces by running the `onbar -r` command.
You can perform multiple warm restores to prioritize certain storage spaces.

Example

Examples

Example 1: Simple mixed restore

A database server has five dbspaces in addition to the root dbspace: **logdbs**, **dbs_1**, **dbs_2**, **dbs_3**, and **dbs_4**. The logical logs are stored in **logdbs** and the physical log is in the root dbspace. The critical dbspaces that must be restored during the initial cold restore are **rootdbs** and **logdbs**. The dbspace that contains urgent data is **dbs_1**. The following commands shut down the database server, perform a cold restore on the critical and urgent dbspaces, and restart the database server:

```
onmode -ky
onbar -r rootdbs logdbs dbs_1
onmode -m
```

After the database server starts, any data stored in **rootdbs**, **logdbs**, and **dbs_1** dbspaces is accessible.

The following commands synchronize the storage manager and perform a warm restore of the remaining dbspaces, **dbs_2**, **dbs_3**, and **dbs_4**:

```
onsmsync
onbar -r
```


Example 2: Point-in-time mixed restore

The following commands perform a cold restore for a subset of the storage spaces (including all critical dbspaces) in the initial cold restore, perform a warm restore for **dbspace_2** and **dbspace_3**, followed by a warm restore of **dbspace_4** and **dbspace_5**, and finally perform a warm restore of all remaining storage spaces:

```
onbar -r -t "2011-05-10 11:35:57" rootdbs logspace_1 dbspace_1
onmode -m
onsmsync
onbar -r dbspace_2 dbspace_3
onbar -r dbspace_4 dbspace_5
onbar -r
```

Strategies for using a mixed restore

To implement a mixed-restore strategy, carefully select the set of dbspaces in which you place your databases and database objects when you create them.

ON-Bar backs up and restores physical, not logical, entities. Thus, ON-Bar cannot restore a particular database or a particular set of tables. Instead, ON-Bar restores a particular set of storage spaces. It is up to you to track what is stored in those storage spaces.

For example, consider a database with the catalogs in the dbspace **cat_dbs**:

```
create database mydb in cat_dbs with log;
```

A table in this database is fragmented among the dbspaces **tab_dbs_1** and **tab_dbs_2**:

```
create table mytab (i integer, c char(20))
fragment by round robin in tab_dbs_1, tab_dbs_2;
```

An index for the table is stored in the dbspace **idx_dbs**:

```
create index myidx on mytab(i) in idx_dbs;
```

If you need to restore the server, you cannot access all of the data in the example database until you restore the dbspaces containing the database catalogs, table data, and index: in this case, the dbspaces **cat_dbs**, **tab_dbs_1**, **tab_dbs_2**, and **idx_dbs**.

To simplify the management and tracking of your data, divide your set of dbspaces into subsets in which you store data of a particular urgency. When you create your database objects, place them in dbspaces appropriate to their urgency. For example, if you have data with three levels of urgency, you might want to place all the objects (database catalogs, tables, and indexes) associated with your most urgent data in a particular set of dbspaces: for example, **urgent_dbs_1**, **urgent_dbs_2**, ... **urgent_dbs_n**. You would place all the objects associated with less urgent data in a different set of dbspaces: for example, **less_urgent_dbs_1**, **less_urgent_dbs_2**, ... **less_urgent_dbs_k**. Lastly, you would place your remaining data in a different set of dbspaces: for example, **non_urgent_dbs_1**, **non_urgent_dbs_2**, **non_urgent_dbs_r**.

If you need to restore the server, you would first perform a cold restore of all critical dbspaces and dbspaces containing urgent data, **urgent_dbs_1** through **urgent_dbs_n**. For example, assume that logical logs are distributed among two dbspaces, **logdbsp_1** and **logdbsp_2**, and the physical log is in **rootdbs**. The critical dbspaces are therefore **rootdbs**, **logdbsp_1**, and **logdbsp_2**.

You would perform the initial cold restore by issuing the following ON-Bar command:

```
onbar -r rootdbs logdbbsp_1 logdbbsp_2 urgent_dbs_1 ... urgent_dbs_2
```

You can bring the server online and all business-urgent data is available.

Next, perform a warm restore for the less-urgent data:

```
onmsync
onbar -r less_urgent_dbs_1 less_urgent_dbs_2 ..... less_urgent_dbs_k
```

Finally, you can perform a warm restore for the rest of the server by issuing the following command.

```
onbar -r
```

In a larger system with dozens of dbspaces, you can divide the warm restore portion of the mixed restore into several warm restores, each restoring only a small subset of the dbspaces remaining to be restored in the system.

Recreating chunk files during a restore

If the disk or file system fails, one or more chunk files might be missing from the dbspace. Use the `-O` option to recreate missing chunk files and any necessary directories during a restore.

About this task

The restore fails if insufficient space exists on the file system. The newly created chunk files are cooked files and are owned by group **informix** on UNIX™ or group **Informix-Admin** on Windows™.

Restoring when using cooked chunks

You can recreate missing cooked chunk files during a restore.

About this task



Restriction: ON-Bar does not recreate chunk files during a logical restore if the logical logs contain chunk-creation records.

To restore when using cooked chunks:

1. Install the new disk.
2. Based on your system, perform one of the following tasks:
 - Choose from:**
 - On UNIX™, mount the device as a file system.
 - On Windows™, format the disk.
3. Allocate disk space for the chunk file.
4. Run the `onbar -r -O space` command to recreate the chunk files and restore the dbspace.

Related information

[Allocating cooked file spaces on UNIX on page](#)

Restoring when using raw chunks

You can recreate missing raw chunk files during a restore.

To restore when using raw chunks:

1. Install the new disk.
2. For UNIX™, if you use symbolic links to raw devices, create new links for the down chunks that point to the newly installed disk.
ON-Bar restores the chunk file to where the symbolic link points.
3. Issue the `onbar -r space` command to restore the dbspace.

Related information

[Allocating raw disk space on UNIX on page](#)

[Allocating raw disk space on Windows on page](#)

Reinitializing the database server and restoring data

Reinitializing disk space destroys all existing data managed by the database server. However, you can restore data from a backup that was performed before reinitialization.

Before you begin

You must have a current, level-0 backup of all storage spaces.

About this task

During initialization, ON-Bar saves the emergency boot file elsewhere and starts a new, empty emergency boot file. Therefore, any backups that you performed before reinitializing the database server are not recognized. You must use the copy of the emergency boot file you saved before initialization to restore the previous database server instance.

To reinitialize the database server and restore the old data:

1. Copy the emergency boot file, the `oncfg` file, and the `onconfig` file to a different directory.
2. Set the `FULL_DISK_INIT` configuration parameter to 1 in the `onconfig` file.
3. Shut down the database server.
4. Reinitialize the database server by running the `oninit -i` command.
5. Move the administrative files into the database server directory.
If the administrative files are unavailable, copy them from the last backup into the database server directory.
6. Perform a restore by running the `onbar -r -p -w` command.

Do not salvage the logical logs.

7. Verify that you restored the correct instance of the critical and noncritical storage spaces.

Related information

[The oninit utility on page](#)

Replacing disks during a restore

You can replace disks during a restore by renaming chunks. You rename chunks by specifying new chunks paths and offsets during a cold restore with ON-Bar. This option is useful if you need to restore storage spaces to a different disk from the one on which the backup was made. You can rename any type of chunk, including critical chunks and mirror chunks.

Before you begin

The old chunk must be included in the last level-0 backup.

The following guidelines apply to new chunks:

- The new chunk does not need to exist. You can install the new chunk later and perform a warm restore of a storage space containing it. If you specify a nonexistent chunk, ON-Bar records the rename information in the chunk reserved pages, but does not restore the data. The renamed (but not restored) chunks have a status of offline, designated by an `N` flag in the output of the `onstat -d` command.
- The new chunk must have the correct permissions.
- The new chunk must be included in the last level-0 backup.
- The new chunk path name and offset cannot overlap existing chunks.

About this task



Tip: If you use symbolic links to chunk names, you might not need to rename chunks; you only need to edit the symbolic name definitions.

To rename chunks during a restore:

1. Shut down the database server.
2. Run the `onbar -r` command with the `-rename` option and the chunk information options.
If you are renaming the primary root or mirror root chunk, ON-Bar updates the values of the `ROOTPATH` and `ROOTOFFSET`, or `MIRRORPATH`, and `MIRROROFFSET` configuration parameters. The old version of the `onconfig` file is saved as `$ONCONFIG.localtime`.
3. Perform a level-0 archive so that you can restore the renamed chunks.

Example

Examples

The following table lists example values for two chunks that are used in the examples in this section.

Element	Value for first chunk	Value for second chunk
Old path	/chunk1	/chunk2
Old offset	0	10000
New path	/chunk1N	/chunk2N
New offset	20000	0

Example 1: Rename chunks by supplying chunk information in the command

The following command renames the chunks **chunk1** to **chunk1N** and **chunk2** to **chunk2N**:

```
onbar -r -rename -p /chunk1 -o 0 -n /chunk1N -o 20000
      -rename -p /chunk2 -o 10000 -n /chunk2N -o 0
```

Example 2: Rename chunks by supplying chunk information in a file

Suppose that you have a file named `listfile` that has the following contents:

```
/chunk1 0 /chunk1N 20000
/chunk2 10000 /chunk2N 0
```

The following command renames the chunks **chunk1** to **chunk1N** and **chunk2** to **chunk2N**:

```
onbar -r -rename -f listfile
```

Related reference

[onbar -r syntax: Restoring data on page 62](#)

[onbar -b syntax: Backing up on page 41](#)

Renaming a chunk to a nonexistent device

To rename a chunk to a nonexistent device, specify the new path name, but restore the storage spaces after you install the physical device. This option is useful if you need to rename a chunk and it is convenient to perform a cold restore before you install the new device. When the new chunk device is ready, you can perform a warm restore of a storage space onto it.

About this task

You can combine renaming chunks with existing devices and renaming chunks with nonexistent devices in the same rename operation. This example shows how to rename a single chunk to a nonexistent device name.

The following table lists example values for the chunks used in this example.

Storage space	Old chunk path	Old offset	New chunk path	New offset
sbspace1	/chunk3	0	/chunk3N	0

To rename a chunk to a nonexistent device:

1. Rename the chunk with the following command: `onbar -r -rename -p /chunk3 -o 0 -n /chunk3N -o 0`
2. When you see the following prompt, enter `y` to continue:

```
The chunk /chunk3N does not exist. If you continue, the
restore may fail later for the dbspace which contains this chunk.
Continue without creating this chunk? (y/n)
```

The chunk `/chunk3` is renamed to `/chunk3N`, but the data is not yet restored to `/chunk3N`.

3. Perform a level-0 archive.
4. Add the physical device for `/chunk3N`.
5. Perform a warm restore of **sbspace1** with the `onbar -r sbspace1` command.
6. Perform a level-0 archive.

Restoring to a different computer

You can back up data on one computer and restore the data on a different computer. Importing a restore is useful for disaster recovery or upgrading a database server. After you back up your data and move over the storage-manager objects, you can perform an imported restore. An imported restore involves copying files from the source to the target computer and performing the restore in one of several ways.

Before you begin


Prerequisites:

- Your storage manager must support imported restores.
- A whole-system backup must include all storage spaces; logical logs are optional.

The level-0 backup must include all storage spaces and logical logs.


- Both the source and target computers must be on the same LAN or WAN and must have the following attributes:
 - Identical hardware and operating systems
 - Identical database server versions and editions
 - The same configuration and ROOTPATH information, although the server names and numbers can differ.
 - Identical storage-manager versions
 - Compatible XBSA libraries

About this task

 **Important:** Every chunk (including mirrors) must match exactly in size, location, and offset on the source and target computers for the imported restore to complete.

To perform the imported restore:

1. Install the database server and the storage manager on the target computer.
2. Set up the storage manager on the target database server instance.
 - a. Set the necessary environment variables.
 - b. Define the same type of storage devices as on the source instance.
 - c. Label the storage media with the correct pool names.
 - d. Mount the storage devices.
 - e. Update the `sm_versions` file on the target computer with the storage-manager version.
3. Be sure that the target computer has the devices and links in place for the chunks that match the devices and links on the source computer
4. Perform a level-0 backup (`onbar -b` or `onbar -b -w`) of all storage spaces on the source database server.

 **Restriction:** Do not perform an incremental backup.

5. If you are using HCL® OneDB® Storage Manager , follow these steps:
 - a. Shut down the storage manager on both computers.
 - b. Create a tar file of the storage-manager directories on the source computer.
 - c. Copy this tar file and unpack it on the target computer.

With other storage managers, you might be able to use backup tapes or import the storage-manager directories over the network. For more information, see your storage-manager documentation.

6. Mount the transferred storage volumes.

Choose from:

- If the backup files are on disk, copy them from the source computer to the target computer.
 - If the backup is on tapes, mount the transferred volumes on the storage devices that are attached to the target computer. Both the source and target computers must use the same type of storage devices such as 8-mm tape or disk.
 - If the backup is on the backup server, retrieve the backup from that backup server.
7. Use storage-manager commands to add the source host name as a client on the target computer.
 8. Copy the following files from the source computer to the target computer.

Table 14. Administrative files to copy

File	Action
Emergency boot file	Rename the emergency boot file with the target database server number. For example, rename <code>ixbar.51</code> to <code>ixbar.52</code> . The emergency boot file needs only the entries from the level-0 backup on the source computer.
	The file name is <code>ixbar.servernum</code> .

File	Action
The <code>oncfg</code> files: <code>oncfg_servername.s</code> <code>oncfg_servernum</code>	ON-Bar needs the <code>oncfg</code> file to know what dbspaces to retrieve. Rename the <code>oncfg</code> file with the target database server name and number. For example, rename <code>oncfg_bostonserver.51</code> to <code>oncfg_chicagoserver.52</code> . The file name must match the <code>DBSERVERNAME</code> and <code>SERVENUM</code> on the target computer.
The <code>onconfig</code> file	In the <code>onconfig</code> file, update the <code>DBSERVERNAME</code> and <code>SERVENUM</code> parameters with the target database server name and number.
Storage-manager configuration files, if any	The storage-manager configuration files might need updating.

9. Restore the data in one of the following ways:

Table 15. Restore data options

Option	Action
If you did not start the HCL OneDB™ instance on the target server	Use the <code>onbar -r</code> command to restore the data.
If you are importing a whole-system backup	Use the <code>onbar -r -w -p</code> command to restore the data.
If you started the HCL OneDB™ instance on the target server.	Restore the data in stages: <ol style="list-style-type: none"> a. Use the <code>onbar -r -p</code> command to restore the physical data. b. Use the <code>onbar -r -l</code> command to restore the logical logs. <p>This process avoids salvaging the logs and any potential corruption of the instance.</p>

10. Before you expire objects on the target computer and the storage manager with the `onmsync` utility, perform one of the following tasks.

Otherwise, `onmsync` expires the incorrect objects.

Choose from:

- Manually edit the emergency boot file `viz ixbar.servernum` in the `$ONEDB_HOME/etc` directory on the target computer. Replace the HCL® OneDB® server name that is used on the source computer with the HCL® OneDB® server name of the target computer
- Run the `onmsync -b` command as user **informix** on the target computer to regenerate the emergency boot file from the **sysutils** database only. The regenerated emergency boot file reflects the server name of the target computer.

Related reference

[Avoid salvaging logical logs on page 70](#)

Example: performing an imported restore with ON-Bar and the HCL OneDB™ Storage Manager

This example shows how to set up an imported restore of an instance using ON-Bar, the HCL OneDB™ Storage Manager (ISM), and file devices for the archives.

There is more than one way to perform an imported restore. This example shows the ISM catalog copy method. Another method, the bootstrap recovery method, is described in the HCL OneDB™ Storage Manager Administrator's Guide.

**Prerequisites:**

- A source machine and a target machine with the same configuration. However, the server name and number can be different.
- A ROOTPATH that is the same on both machines.
- The target machine has the devices and links in place for the chunks and these devices and links match those on the source machine.
- ISM is initialized on both computers.
- The paths to the device directories, volume names, and pool names are the same on both machines.
- User **root** and user **informix** are ISM administrators on both machines.

In this example the directories for dbspace and log backups are:

```
<directory path>/dbspaces1
<directory path>/logfiles1
```

Additional environment parameters set in the source environment are:

```
ISM_server = source computer
export IDS_server
```

Additional environment parameters set on the target machine are:

```
ISM_client = source computer
export IDS_client
SM_server = target computer
export ISM_server
```

1. As user **informix**, perform level-0 backup on the source machine.
2. As user **root**, stop ISM on both computers by running this command: `%ism_shutdown`

3. As user **root**, compress the appropriate ISM directories on the source machine as follows:

```
%cd /nsr
%tar -cvf nsr.tar index mm
```

4. FTP the `nsr.tar` file from the previous step to target machine in binary mode.

5. As user **root**, unpack the `nsr.tar` file on the target machine as follows:

```
%cd /nsr
%tar -xvf nsr.tar
```

6. As user **root** on the source machine, tar the backup directories (devices) as follows:

```
%tar -cvf logfiles1.tar logfiles1
%tar -cvf dbspaces1.tar dbspaces1
```

7. FTP the archived directories from the previous step to the target machine in binary mode.

8. As user **root** on the target machine, overwrite the existing log and archive directories with the directories from the source machine, as follows:

```
%tar -xvf logfiles1.tar
%tar -xvf dbspaces1.tar
```

9. As user **root** on the target machine

a. Start ISM by running this command: `ism_startup`

b. Run the `ism_show -devices` command to show the devices as mounted.

10. On the target machine, create a file (for example, **nsr.txt**) with this content:

```
create type: NSR client; name: source_machine;
remote access: root@target_machine, informix@target_machine;
```

11. As user **informix** on the target machine, run this command:

```
%nsradmin -s target_machine -i nsr.txt
```

The command returns this output: `created resource id <IP information>`

12. As user **informix**, FTP the following files from the `$ONEDB_HOME/etc` directory on the source machine to the `$ONEDB_HOME/etc` directory on the target machine

`ixbar,servernum`

`oncfg_servername,servernum`

13. On the target machine change the file names for the files in the previous step to the corresponding names for the local server.

14. Run the restore command.

onbar -RESTART syntax: Restarting a failed restore

If a failure occurs with the database server, media, storage manager, or ON-Bar during a restore, you can restart the restore from the place that it failed. To restart a failed restore, the `RESTARTABLE_RESTORE` configuration parameter must be set to `ON` in the `onconfig` file when the restore fails.

Restart a restore

`onbar-RESTART`

Table 16. onbar -RESTART command

Option	Description
-RESTART	<p>Restarts a restore after a database server, storage manager, or ON-Bar failure.</p> <p>The <code>RESTARTABLE_RESTORE</code> configuration parameter must be set to ON when the restore failure occurs.</p> <p>You can restart the following types of restores:</p> <ul style="list-style-type: none"> • Whole system • Point in time • Storage spaces • Logical part of a cold restore <p>Do not use the <code>-RESTART</code> option if a failure occurs during a warm logical restore.</p>

Usage

When you enable restartable restore, the logical restore is slower if many logical logs are restored. However, you save time if the restore fails and you restart the restore. Whether a restore is restartable does not affect the speed of the physical restore.

The physical restore restarts at the storage space and level where the failure occurred. If the restore failed while some, but not all, chunks of a storage space were restored, all chunks of that storage space are restored. If storage spaces and incremental backups are restored successfully before the failure, they are not restored again.

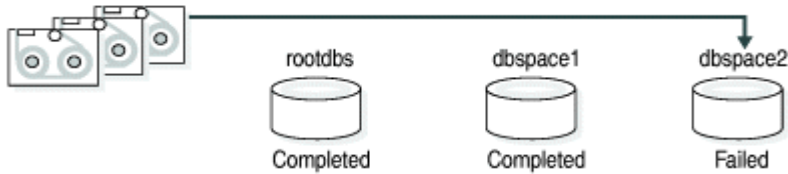
If the `BAR_RETRY` configuration parameter is set to 2, ON-Bar automatically tries to restore any failed storage spaces and logical logs again. If the restore is successful, you do not need to restart the restore.

If the `BAR_RETRY` configuration parameter is set to 0 or 1, ON-Bar does not try to restore any failed storage spaces and logical logs again. If the database server is still running, ON-Bar skips the failed storage space and attempts to restore the remaining storage spaces. To complete the restore, run the `onbar -RESTART` command.

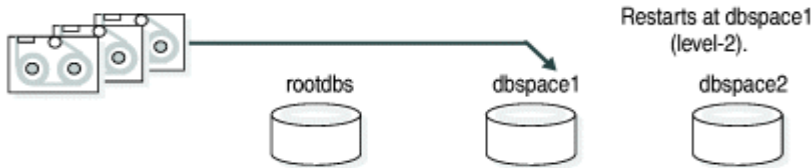
The following figure shows how a restartable restore works when the restore failed during a physical restore of **dbspace2**. The level-0, level-1, and level-2 backups of **rootdbs**, and the level-0 and level-1 backups of **dbspace1** and **dbspace2** are successfully restored. The database server fails while restoring the level-1 backup of **dbspace2**. When you restart the restore, ON-Bar restores the level-2 backup of **dbspace 1**, the level-1 and level-2 backups of **dbspace2**, and the logical logs.

Figure 15. Restartable physical restore

Restore failed during a physical restore of dbspace2:



Restart the restore:



If a restore fails during the logical phase and you restart the restore, ON-Bar verifies that the storage spaces are restored, skips the physical restore, and restarts the logical restore. The following figure shows a cold restore that failed while restoring logical log LL-3. When you restart the cold logical restore, log replay starts from the last restored checkpoint. In this example, the last checkpoint is in logical log LL-2.

If a failure occurs during a cold logical restore, ON-Bar restarts the restore at the place of failure.

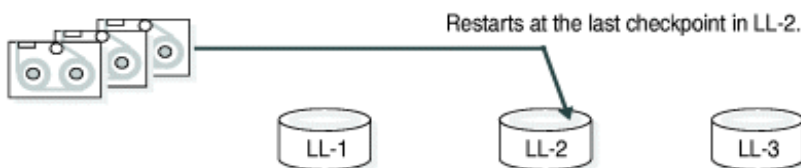
! **Important:** If a failure occurs during a warm logical restore, restart the restore from the beginning. If the database server is still running, run the `onbar -r -l` command to complete the restore.

Figure 16. Restartable cold logical restore

Cold restore failed during a logical restore of LL-3. The last checkpoint is in LL-2.



Restart the cold restore:



Related reference

[onbar -r syntax: Restoring data on page 62](#)

[BAR_RETRY configuration parameter on page 196](#)

[RESTARTABLE_RESTORE configuration parameter on page 203](#)

[ON-Bar security on page 36](#)

Resolve a failed restore

How you resolve a failed restore depends on the cause of the failure.

You can save some failed restores even if restartable restore is turned off. For example, if the restore fails because of a storage-manager or storage-device error, you can fix the tape drive or storage-manager problem, remount a tape, and then continue the restore.

The following table shows what results to expect when physical restore fails and the value of the BAR_RETRY configuration parameter is > 1.

Table 17. Failed physical restore scenarios

Type of error	RESTARTABLE_RESTORE setting	What to do when the physical restore fails?
Database server, ON-Bar, or storage-manager error (database server is still running)	ON or OFF	<p>ON-Bar tries each failed restore again. If the storage manager failed, fix the storage-manager error.</p> <p>If the tried restore fails, issue <code>onbar -r spaces</code> where <i>spaces</i> is the list of storage spaces not yet restored. Use <code>onstat -d</code> to obtain the list of storage spaces that need to be restored. ON-Bar restores the level-0 backup of each storage space, then the level-1 and level-2 backups, if any.</p>
ON-Bar or storage-manager error (database server is still running)	ON	<p>Issue the <code>onbar -RESTART</code> command.</p> <p>If the storage manager failed, fix the storage-manager error.</p> <p>The restore restarts at the storage space and backup level where the first restore failed. If the level-0 backup of a storage space was successfully restored, the restarted restore skips the level-0 backup and restores the level-1 and level-2 backups, if any.</p>
Database server failure	ON or OFF	<p>Because the database server is down, perform a cold restore. Use <code>onbar -r</code> to restore the critical dbspaces and any noncritical spaces that were not restored the first time.</p>
Database server failure	ON	<p>Issue the <code>onbar -RESTART</code> command.</p> <p>The restore restarts at the storage space and backup level where the first restore failed. If the level-0 backup of a storage space was</p>

Table 17. Failed physical restore scenarios (continued)

Type of error	RESTARTABLE_RESTORE setting	What to do when the physical restore fails?
		successfully restored, the restarted restore skips the level-0 backup and restores the level-1 and level-2 backups, if any.

The following table shows what results to expect when logical restore fails.

Table 18. Failed logical restore scenarios

Type of error	RESTARTABLE_RESTORE setting	What to do when a logical restore fails?
Database server or ON-Bar error in a cold restore (database server is still running)	ON	Issue the onbar -RESTART command. The logical restore restarts at the last checkpoint. If this restore fails, shut down and restart the database server to initiate fast recovery of the logical logs. All logical logs not restored are lost.
Database server or ON-Bar error (database server is still running)	ON or OFF	Issue the onbar -r -l command. The restore restarts at the failed logical log. If onbar -r -l still fails, shut down and restart the database server. The database server completes a fast recovery. All logical logs that were not restored are lost. If fast recovery does not work, you must do a cold restore.
Database server error	ON	If the cold logical restore failed, issue onbar -RESTART. If the warm logical restore failed, issue the onbar -r -l command. If that fails, restart the entire restore from the beginning.
Storage-manager error	ON or OFF	ON-Bar tries each failed logical restore again. If the tried restore fails, the logical restore is suspended. Fix the storage-manager error. Then issue the onbar -r -l command. The restore restarts at the failed logical log.

Related reference

[BAR_RETRY configuration parameter on page 196](#)

[RESTARTABLE_RESTORE configuration parameter on page 203](#)

External backup and restore

These topics discuss recovering data by using external backup and restore.

External backup and restore overview

An external backup and restore eliminates the downtime of systems because the backup and restore operations are performed external to the HCL® OneDB® system.

ON-Bar does not move the data during the backup or physical restore. An external backup allows you to copy disks that contain storage-space chunks without using ON-Bar. When disks fail, replace them and use vendor software to restore the data, then use ON-Bar for the logical restore. For more information, see [Data restored in an external restore on page 92](#).

The following are typical scenarios for external backup and restore:

- Availability with disk mirroring

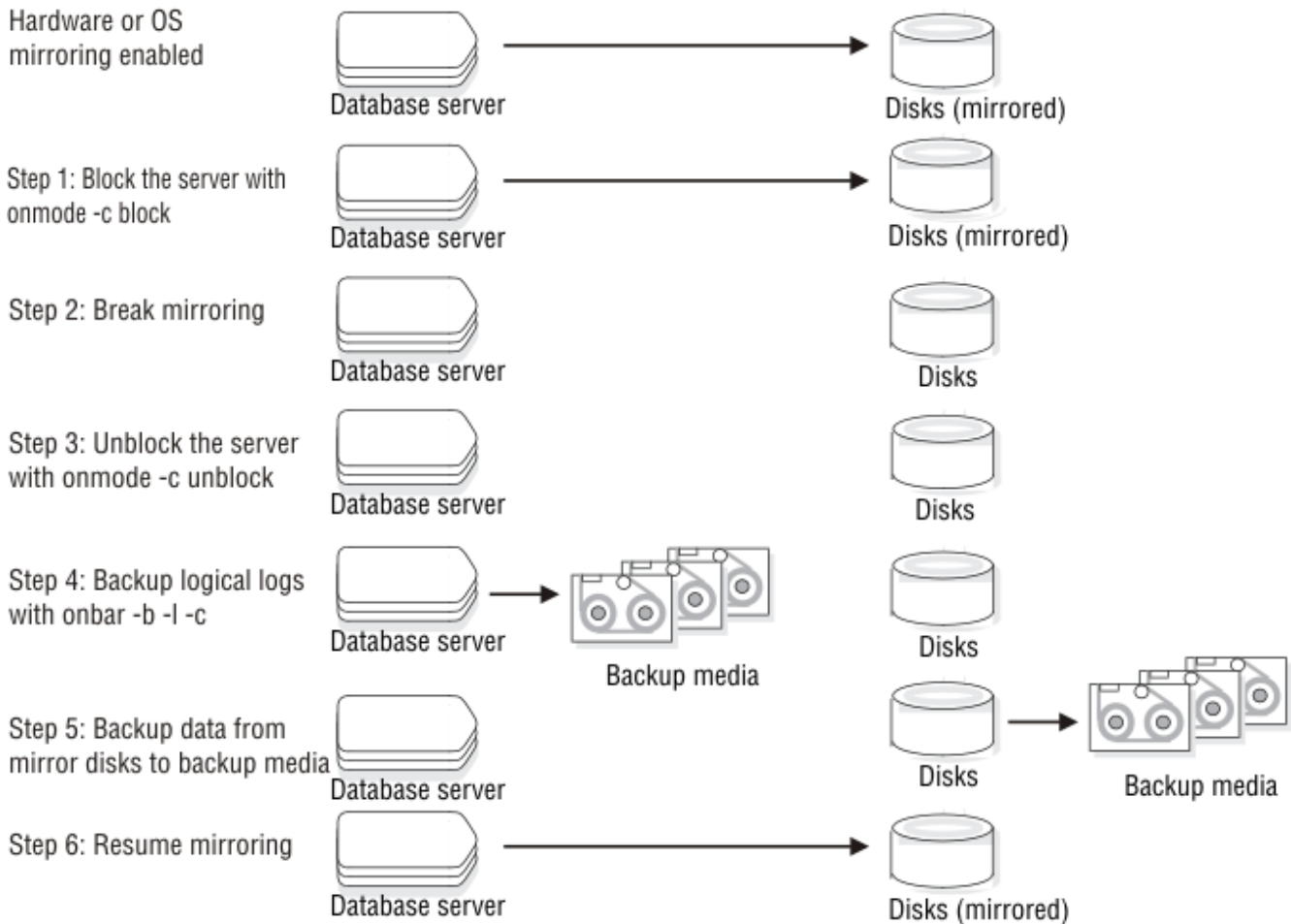
If you use hardware disk mirroring, you can get your system online faster with external backup and restore than with conventional ON-Bar commands.

- Cloning

You can use external backup and restore to clone an existing production system for testing or migration without disturbing the production system.

The following figure shows how to perform a backup with mirroring.

Figure 17. Perform a backup with mirroring



In this configuration, the database server is running continuously, except for the short time when the database server is blocked to break the mirror. The mirrored disks contain a copy of the database server storage spaces. To create a backup, block the database server to stop transactions and disable mirroring. The mirrored disks now contain a copy of the consistent data at a specific point in time. After disabling mirroring, unblock the database server to allow transactions to resume and then backup the logical logs. Copy the data from the offline mirrored disks to back up media with external commands. Now you can resume mirroring.

Block before backing up

Before you begin an external backup, block the database server. Blocking forces a checkpoint, flushes buffers to disk, and blocks user transactions that involve temporary tables.

During the blocking operation, users can access that database server in read-only mode. Then you can physically back up or copy the data to another set of disks or storage media by using operating-system or third-party tools. When you complete the external backup, unblock the database server so that transactions can resume. You should include all the chunk files in each storage space, administrative files, such as `onconfig`, and the emergency boot file, in an external backup.

! **Important:** To make tracking backups easier, you should back up all storage spaces in each external backup.

ON-Bar treats an external backup as equivalent to a level-0 backup. You cannot perform an external backup and then use ON-Bar to perform a level-1 backup, or vice versa because ON-Bar does not have any record of the external backup. For more information, see [Performing an external backup when chunks are not mirrored on page 90](#).

Rules for an external backup

Before you begin an external backup, review the rules for performing an external backup.

The rules that you must follow are:

- The database server must be online or in quiescent mode during an external backup.
- Use ON-Bar to back up all logical logs including the current log so that you can restore the logical logs at the end of the external restore.
- Suspend continuous logical-log backups before you block the database server for an external backup. After the external backup is complete, resume the continuous logical-log backup.

To stop continuous logical-log backup, use the CTRL-C command. To resume continuous logical-log backup, use the `onbar -b -l -C` command.

- Wait until all ON-Bar backup sessions have completed before you block the database server. If any backup sessions are active, the block command displays an error message.
- Any OLTP work or queries are suspended while the database server is blocked. They resume after the database server is unblocked.
- All critical dbspaces of the database server instance must be backed up together simultaneously within the same command bracket of `onmode -c block ..`; `onmode -c unblock`. Backups of different critical dbspaces done at different times cannot be restored to a consistent system.
- On AIX® operating systems, if the server is running with concurrent I/O because the `DIRECT_IO` configuration parameter is set to enable concurrent I/O, an online external backup program must also use concurrent I/O.

! **Important:** Because the external backup is outside the control of ON-Bar, you must track these backups manually. For more information, see [Track an external backup on page 90](#).

Prepare for an external backup

These topics describe the commands used to prepare for an external backup. For the procedure, see [Performing an external backup when chunks are not mirrored on page 90](#).

Block and unblock database server

This topic shows the syntax of the block and unblock commands on HCL OneDB™.

```
onmode -c [{block | unblock}]
```

Element	Purpose	Key considerations
onmode -c	Performs a checkpoint and blocks or unblocks the database server	None.
block	Blocks the database server from any transactions	Sets up the database server for an external backup. While the database server is blocked, users can access it in read-only mode. Sample command: onmode -c block
unblock	Unblocks the database server, allowing data transactions and normal database server operations to resume	Do not unblock until the external backup is finished. Sample command: onmode -c unblock

Track an external backup

The database server and ON-Bar do not track external backups. To track the external backup data, use a third-party storage manager or track the data manually.

The following table shows which items we recommend that you track in an external backup. ON-Bar keeps a limited history of external restores.

Table 19. Items to track when you use external backup and restore

Items to track	Examples
Full path names of each chunk file for each backed up storage space	/work/dbspaces/rootdbs (UNIX™) c:\work\dbspaces\rootdbs (Windows™)
Object type	Critical dbspaces, noncritical storage spaces
ins_copyid_hi and ins_copyid_lo	Copy ID that the storage manager assigns to each backup object
Backup date and time	The times that the database server was blocked and unblocked
Backup media	Tape volume number or disk path name
Database server version	The database server version from which the backup was taken.

Performing an external backup when chunks are not mirrored

About this task

The database server must be online or in quiescent mode during an external backup.

To perform an external backup when chunks are not mirrored:

1. To obtain an external backup, block the database server with the onmode -c block command.
The system takes a checkpoint and suspends all update transactions. Users can access the database server in read-only mode.

2. To back up the storage spaces and administrative files, use a copy command, such as `cp`, `dd`, or `tar` on UNIX™ or `copy` on Windows™, or a file-backup program.

You must back up all chunks in the storage spaces.

3. To allow normal operations to resume, unblock the database server with the `onmode -c unblock` command.

4. Back up all the logical logs including the current log so that checkpoint information is available for the external restore.

! **Important:** Because external backup is not done through ON-Bar, you must ensure that you have a backup of the current logical log from the time when you execute the `onmode -c block` command. Without a backup of this logical-log file, the external backup is not restorable.

5. After you perform an external backup, back up the current log with the `onbar -b -l -c` command.

Results

If you lose a disk, or the whole system, you are now ready to perform an external restore.

RS secondary server external backup

You can perform an external backup of an RS secondary server. Performing a backup of an RS secondary server blocks that RS secondary server, but does not block the primary server.

You can perform a logical restore from the logs backed up from the primary instance. The backup obtained from the secondary server cannot be restored with level-1 or level-2 backups.

! **Important:** The external backup is not completed if the database instance contains any of the following:

- Nonlogging smart large objects
- Regular blobspaces
- Nonlogging databases
- Raw tables

If an external backup is performed on an instance that contains any of the previously mentioned items, then the backup is incomplete and cannot be used to restore the primary server.

If the backup fails because the checkpoint from the primary has timed out, you can use the `BAR_CKPTSEC_TIMEOUT` configuration parameter to increase the amount of time, in seconds, that an RS secondary server should wait for a checkpoint to arrive from the primary server while performing an external backup.

Performing an external backup of an RS secondary server

Before you begin

To perform an external backup of an RS secondary server, the `STOP_APPLY` configuration parameter must not be enabled. If `STOP_APPLY` is enabled, an error is returned. The server switches to `STOP_APPLY` mode when a backup is performed on an

RS secondary. After the archive checkpoint is processed, the RS secondary server stops applying logical logs, but continues receiving logs from the primary server.

To perform an external backup of an RS secondary server that has a DELAY_APPLY configuration parameter value greater than 0, it might be necessary to temporarily decrease the parameter value. Performing the backup requires that the RSS process a checkpoint in the logical log, and if no checkpoint is observed within the amount of time that is specified by the onmode -c block *timeout* command in the second step of the following procedure, a backup is not permitted. The DELAY_APPLY configuration parameter can be decreased by the onmode -wf DELAY_APPLY=*setting* command.

About this task

The primary database server must be online or in quiescent mode during an external backup.

To perform an external backup:

1. Ensure that the LOG_STAGING_DIR configuration parameter on the RS secondary server is set to point to a valid staging directory.
2. To obtain an external backup, block the database server with the onmode -c block *timeout* command. The *timeout* parameter indicates the number of seconds that the RS secondary server waits to receive a checkpoint. The *timeout* parameter is valid only when the onmode -c block command is run on an RS secondary server. You must wait for the onmode -c block command to return successfully before you proceed with the external backup.
3. To back up the storage spaces and administrative files, use a copy command, such as cp, dd, or tar on UNIX™ or copy on Windows™, or a file-backup program. You must back up all chunks in the storage spaces.
4. To resume normal operations, unblock the database server by using the onmode -c unblock command.
5. After you perform the external backup, back up the current log and any new logs with the ON-Bar or ontape utilities.



Important: Logical log backup is only possible on the primary server.

If the DELAY_APPLY configuration parameter is set, the logs that are required for the restore process are not necessarily those logs that are currently active on the primary server because some logs could already be archived.

Results

After the backup completes, if the DELAY_APPLY setting on the RS secondary server was decreased, it can be set to its original value by the onmode -wf DELAY_APPLY=*setting* command. After an external backup, you can perform an external restore if a disk or the whole system fails.

Data restored in an external restore

If you lose a disk, or the whole system, you can externally restore data only if it was externally backed up. You must use the same third-party utility for both the external backup and restore. To externally restore the storage spaces, copy the backed-up data to disk. Use the onbar -r -e command to mark the storage spaces as physically restored, replay the logical logs, and

bring the storage spaces back online. If you do not specify an external restore command, the database server thinks that these storage spaces are still down.

You can perform these types of external restores:

- Warm external restore

Mark noncritical storage spaces as physically restored, then perform a logical restore of these storage spaces.

- Cold external restore

Mark storage spaces as physically restored, then perform a logical restore of all storage spaces. Optionally, you can do a point-in-time cold external restore.



Restriction: When you perform a cold external restore, ON-Bar does not first attempt to salvage logical-log files from the database server because the external backup has already copied over the logical-log data.

To salvage logical logs, perform `onbar -l -s` before you copy the external backup and perform the external restore (`onbar -r -e`).

Rename chunks

You can rename chunks in an external cold restore by using the rename options syntax for other restores. Use the following commands to specify new chunk names during restore:

```
onbar -r -e -rename -f filename
```

or

```
onbar -r -e rename -p old_path -o old_offset -n new_path -o new_offset
```

External restore commands

Use the `onbar -r -e` command to perform a warm or cold external restore. This command marks the storage spaces as physically restored and restores the logical logs. The following diagram shows the external restore syntax.

Performing an external restore with ON-Bar

```
onbar -r -e [ <Rename chunks> (explicit id) ] [ { -p | -ttime | -n last_log } ] [ { -o } ] [ { -filename | dbspace_list | -w [ { -ttime | -nlog } ] } ]
```

Element	Purpose	Key considerations
<code>onbar -r</code>	Specifies a restore	In a cold restore, if you do not specify storage space names, all of them are marked as restored.

Element	Purpose	Key considerations
-e	Specifies an external restore	Must be used with the -r option. In a warm external restore, marks the down storage spaces as restored unless the -O option is specified.
<i>dbspace_list</i>	Names one or more storage spaces to be marked as restored in a warm restore	If you do not enter <i>dbspace_list</i> or -f filename and the database server is online or quiescent, ON-Bar marks only the down storage spaces as restored. If you enter more than one storage-space name, use a space to separate the names.
-filename	Restores the storage spaces that are listed in the text file whose path name <i>filename</i> provides	To avoid entering a long list of storage spaces every time, use this option. The <i>filename</i> can be any valid UNIX™ or Windows™ file name.
-n last_log	Indicates the number of the last log to restore	If any logical logs exist after this one, ON-Bar does not restore them and data is lost. The -n option does not work with the -p option.
-O	Restores online storage spaces	None.
-p	Specifies an external physical restore only	After the physical restore completes, you must perform a logical restore.
-t time	Restores the last backup before the specified point in time. If you pick a backup made after the point in time, the restore will fail.	You can use a point-in-time restore in a cold restore only. You must restore all storage spaces. How you enter the time depends on your current GLS locale convention. If the GLS locale is not set, use English-style date format.
-w	Performs a whole-system restore of all storage spaces and logical logs from the last whole-system backup	You must specify the -w option in a cold restore. If you specify <code>onbar -r -w</code> without a whole-system backup, return code 147 appears because ON-Bar cannot find any storage spaces backed up as part of a whole-system backup.

Related reference

[onbar -r syntax: Restoring data on page 62](#)

Rules for an external restore

External restores have specific rules.

The following rules apply to external restores:

- You must externally restore from an external backup. Although the external backup is treated as a level-0 backup, it might actually be an incremental backup not related to HCL OneDB™.
- A warm external restore restores only noncritical storage spaces.
- You cannot externally restore temporary dbspaces.
- You cannot externally restore from regular ON-Bar backups.
- You cannot verify that you are restoring from the correct backup and that the storage media is readable with ON-Bar.
- If the external backups are from different times, the external restore uses the beginning logical log from the oldest backup.
- You cannot perform a mixed restore. If critical dbspaces must be restored, you must perform a full cold restore.

The following rules apply to external cold restores:

- Salvage the logical logs (`onbar -b -l -s`) before you switch the disks that contain the critical storage spaces.
- If you are restoring critical dbspaces, the database server must be offline.
- Point-in-time external restores must be cold and restore all storage spaces.
- The external backups of all critical dbspaces of the database server instance must be simultaneous. All critical dbspaces must have to be backed up within the same set of `onmode -c block ... onmode -c unblock` commands.

Performing an external restore

About this task

This section describes procedures for performing cold and warm external restores.

Performing a cold external restore

About this task

If you specify the `onbar -r -e` command in a cold restore, you must restore all storage spaces. Use the `onbar -r -e -p` command to restore all or specific storage spaces.

To perform a cold external restore:

1. Shut down the database server with the `onmode -ky` command.
2. Salvage the logical logs with the `onbar -b -l -s` command.
3. To restore the storage spaces from an external backup, use a copy command, such as `cp`, `dd`, or `tar` on UNIX™ or a file-backup program.

You must restore the storage spaces to the same path as the original data and include all the chunk files.

4. To perform an external restore of all storage spaces and logical logs, use the `onbar -r -e` command.
5. To perform a point-in-time external restore of all storage spaces, use the `onbar -r -e -t datetime` command.

This step brings the database server to fast-recovery mode.

ON-Bar and the database server roll forward the logical logs and bring the storage spaces online.

Performing a warm external restore

About this task

The database server is online during a warm external restore. A warm external restore involves only noncritical storage spaces.

To perform a warm external restore:

1. To restore the storage spaces from an external backup, use a copy command, such as `cp`, `dd`, or `tar` on UNIX™ or a file-backup program.

You must restore the storage spaces to the same path as the original data and include all the chunk files for each restored storage space.

2. Perform a warm external restore of the noncritical storage spaces to bring them online.

Choose from:

- To restore selected storage spaces and all logical logs, use the `onbar -r -e dbspace_list` command.
- To restore the down noncritical storage space named `dbsp1` and logical logs in separate steps, use the following commands:


```
onbar -r -e -p dbsp1
onbar -r -l dbsp1
```
- To restore all the noncritical storage spaces and logical logs, use the `onbar -r -e -O` command.

Examples of external restore commands

The following table contains examples of external restore commands.

External restore command	Action	Comments
<code>onbar -r -e</code>	Complete external restore	In a cold restore, restores everything. In a warm restore, restores all down noncritical storage spaces.
<code>onbar -r -e -p</code> <code>onbar -r -l</code>	Physical external restore and separate logical restore	If the external backups come from different times, you must perform a logical restore. The system restores the logical logs from the oldest external backup.
<code>onbar -r -e <i>dbspace_list</i></code>	External restore of selected storage spaces and logical logs	Use this command in a warm external restore only.
<code>onbar -r -e -p <i>dbspace_list</i></code> <code>onbar -r -l</code>	External restore of selected storage spaces and separate logical restore	Use this command in a warm external restore only.

External restore command	Action	Comments
<code>onbar -r -e -t <i>datetime</i></code>	External point-in-time (cold) restore	Be sure to select a collection of backups from before the specified time.
<code>onbar -r -e rename -p <i>old_path</i> -o <i>old_offset</i> -n <i>new_path</i> -o <i>new_offset</i></code>	External (cold) restore with renamed chunks	Use this command to rename chunks in cold external restore only.
<code>onbar -r -e -w</code> <code>onbar -r -e -p -w</code>	Whole-system external restore	When you use <code>onbar -r -e -w -p</code> , back up all storage spaces in one block and unblock session. That way, all storage spaces have the same checkpoint.

Initializing HDR with an external backup and restore

About this task

You can use external backups to initialize High-Availability Data Replication (HDR).

To initialize HDR with an external backup and restore:

1. Block the source database server with the `onmode -c block` command.
2. Externally back up all chunks on the source database server.
3. When the backup completes, unblock the source database server with the `onmode -c unblock` command.
4. Make the source database server the primary server with the following command: `onmode -d primary secondary_servername`
5. On the target database server, restore the data from the external backup with a copy or file-backup program.
6. On the target database server, restore the external backup of all chunks with the `onbar -r -e -p` command.
On HDR, secondary server can restore only level-0 archives.
7. Make the target database server the secondary server with the following command: `onmode -d secondary primary_servername`
8. If the logical-log records written to the primary database server since step 1 still reside on the primary database server disk, the secondary database server reads these records to perform the logical recovery. Otherwise, perform the logical recovery with the `onbar -r -l` command.

The `database server operational` messages appear in the message log on the primary and secondary servers.

Customize and maintain ON-Bar

These topics discuss the following:

- Customizing ON-Bar and storage-manager commands with the `onbar` script
- Starting `onbar-worker` processes manually
- Expiring and synchronizing the backup history

Customizing ON-Bar and storage-manager commands

You can edit the script that is installed with ON-Bar to customize backup and restore commands, and storage manager commands.

On UNIX™ operating systems, the onbar shell script is in the `$ONEDB_HOME/bin` directory. On Windows™ operating systems, the onbar.bat batch script is in the `%ONEDB_HOME%\bin` directory.

Edit the script and backup a copy of the original file in case you need to revert to it.



Important: Edit the script with caution and test your changes. Do not change the cleanup code at the bottom of the script. Doing so might result in unexpected behavior, for example, leftover temporary files during backup verification.

The script includes commands for HCL® OneDB® Storage Manager and backs up the ISM catalogs. If you are using a different storage manager, delete the ISM-specific lines, and optionally, add commands for the storage manager that you are using.

The script contains the following sections:

- Add startup processing here

Use this section to initialize the storage manager, if necessary, and set environment variables.

- End startup processing here

This section starts the onbar_d driver and checks the return code. Use this section for onbar_d and storage-manager commands.

- Add cleanup processing here

The code in this section backs up the ISM catalogs to the ISMData volume pool after the backup operation is complete. If you are using a third-party storage manager, delete the ISM-specific information.

If you use a name other than ISMData for the volume pool, change it to the name specified in the ISM_DATA_POOL configuration parameter.

This section removes the archecker temporary files.

- End cleanup processing here

Use this section to return onbar_d error codes.

Related reference

[Back up with ON-Bar on page 39](#)

Updating the ON-Bar script during reinstallation

After you reinstall the database server, you might need to update the script that is installed with ON-Bar. Existing customized scripts were backed up by the installation process so that you can reuse the content.

The installation program installs the default onbar shell script on UNIX™ and the default onbar.bat batch script on Windows™. If the default script differs from the local script, the installation program backs up the local script and issues a message to inform you that the local script was renamed. The naming convention of the renamed file is `onbar.date`, where `date` is the date when the file was renamed. For example, the file `onbar.2012.05.15` was renamed on May 15, 2012.

You can update the default script by adding information to it from the renamed script.

Print the backup boot files

Use the following examples of what to add to the onbar script to print the emergency boot file if the backup is successful. Each time that you issue the `onbar -b` command, the emergency boot file is printed.

The following example is for UNIX™:

```
onbar_d "$@" # receives onbar arguments from command line return_code = $?
# check return code

# if backup (onbar -b) is successful, prints emergency boot file
if [$return_code -eq 0 -a "$1" = "-b"]; then
    servernum='awk '/^SERVERNUM/ {print $2}' $ONEDB_HOME/etc/$ONCONFIG '
    lpr \ $ONEDB_HOME/etc/ixbar.$servernum
fi
exit $return_code
```

The following example is for Windows™:

```
@echo off
%ONEDB_HOME%\bin\onbar_d %*
set onbar_d_return=%errorlevel%

if "%onbar_d_return%" == "0" goto backupcom
goto skip

REM Check if this is a backup command

:backupcom
if "%1" == "-b" goto printboot
goto skip

REM Print the onbar boot file

:printboot
print %ONEDB_HOME%\etc\ixbar.???

REM Set the return code from onbar_d (this must be on the last line of the script)

:skip
%ONEDB_HOME%\bin\set_error %onbar_d_return%
:end
```

Migrate backed-up logical logs to tape

You can set up your storage manager to back up logical logs to disk and then write a script to automatically migrate the logical logs from disk to tape for off-site storage. Edit the onbar script to call this migration script after the onbar_d process completes. The following example shows a script that calls the migration script:

The following example is for UNIX™:

```
onbar_d "$@" # starts the backup or restore
EXIT_CODE=$? # any errors?

PHYS_ONLY=false #if it's physical-only, do nothing
for OPTION in $*; do
    if [ $OPTION = -p ]; then
        PHYS_ONLY = true
    fi
done
if ! PHYS_ONLY; then # if logs were backed up, call another
    migrate_logs # program to move them to tape
fi
```

This example for Windows™ invokes the migration script:

```
%ONEDB_HOME%\bin\onbar_d %*
set onbar_d_return=%errorlevel%

if "%onbar_d_return%" == "0" goto backupcom
goto skip

REM Check if the command is a backup command

:backupcom
if "%1" == "-b" goto m_log
if "%1" == "-l" goto m_log
goto skip

REM Invoke the user-defined program to migrate the logs

:m_log
migrate_log

REM Set the return code from onbar_d (this must be on the last line of the script)

:skip
%ONEDB_HOME%\bin\set_error %onbar_d_return%

:end
```

Expire and synchronize the backup catalogs

ON-Bar maintains a history of backup and restore operations in the **sysutils** database and an extra copy of the backup history in the emergency boot file. ON-Bar uses the **sysutils** database in a warm restore when only a portion of the data is lost.

ON-Bar uses the emergency boot file in a cold restore because the **sysutils** database cannot be accessed. You can use the **onsmsync** utility to regenerate the emergency boot file and expire old backups.

Depending on the command options you supply, the **onsmsync** utility can remove the following items from the **sysutils** database and the emergency boot file:

- Backups that the storage manager has expired
- Old backups based on the age of backup
- Old backups based on the number of times they have been backed up

Use **onsmsync** with the database server online or in quiescent mode to synchronize both the **sysutils** database and the emergency boot file.

To synchronize the **sysutils** database:

1. Bring the database server online or to quiescent mode.
2. Run the **onsmsync** utility without any options.

The **onsmsync** utility synchronizes the **sysutils** database, the storage manager, and the emergency boot file as follows:

- Adds backup history to **sysutils** that is in the emergency boot file but is missing from the **sysutils** database.
- Removes the records of restores, whole-system restores, fake backups, successful and failed backups from the **sysutils** database.
- Expires old logical logs that are no longer needed.
- Regenerates the emergency boot file from the **sysutils** database.

Choose an expiration policy

You can choose from the following three expiration policies:

Retention date (-t)

Deletes all backups before a particular date and time.

Retention interval (-i)

Deletes all backups older than a specified period.

Retention generation (-g)

Keeps a certain number of versions of each backup.

ON-Bar always retains the latest level-0 backup for each storage space. It expires all level-0 backups older than the specified time unless they are required to restore from the oldest retained level-1 backup.

ON-Bar expires all level-1 backups older than the specified time unless they are required to restore from the oldest retained level-2 backup.

ON-Bar retains a whole-system backup that starts before the specified retention time and ends after the specified retention time.

Table 20. Elements for onsmsync commands (continued)

Element	Purpose	Key considerations
<i>dbspace</i>	Specifies the storage space or storage spaces to expire	If you enter the name of more than one storage space, use a blank space to separate the names.
<i>-f filename</i>	Specifies the path name of a file that contains a list of storage spaces to expire	Use this option to avoid entering a long list of storage spaces. The file name can be any valid UNIX™ or Windows™ file name.
<i>-g generation</i>	Specifies the number of versions of each level-0 backup to retain	The latest generation of backups is retained and all earlier ones are expired.
<i>-i interval</i>	Specifies the time interval for retaining backups.	<p>The utility:</p> <ul style="list-style-type: none"> • Retains backups that were created after this interval. • Expires backups that were created before this interval and removes the backups if expired objects are also removed. <p>Backups older than interval are not expired if they are needed to restore from other backups after that interval. Use the ANSI or GLS format for the <i>interval</i>: YYYY-MM or DD HH:MM:SS</p>
<i>-O</i>	Overrides internal error checks and enforces expiration policy	If used with the <i>-t</i> , <i>-g</i> , or <i>-i</i> option, expires all levels of a backup, even if some of them are needed to restore from a backup that occurred after the expiration date. The <i>-O</i> option does not affect logical-log expiration. See Expire all backups on page 108 .
<i>-s</i>	Skips synchronizing expired backups	The object expiration is based on other arguments if the <i>-s</i> option is provided.
<i>-t timestamp</i>	Expires all backups before a particular date and time	<p>Retains backups that completed after the specified timestamp. Backups that occurred before the timestamp are not expired if they are needed to restore from other backups that occurred after the timestamp.</p> <p>Use the ANSI or GLS_DATETIME format for the timestamp.</p>
<i>-cf</i>	<p>Specifies whether to expire the critical files.</p> <p>When used with the <i>-g</i>, <i>-i</i>, or <i>-t</i>, deletes critical file backups</p>	The critical files are the <code>onconfig</code> file, the <code>sqlhosts</code> file (on UNIX™), the <code>oncfg_servername.servernum</code> file, and the <code>ixbar.servernum</code> file. Valid values are:

Table 20. Elements for onsmsync commands (continued)

Element	Purpose	Key considerations
	from the OneDB® Primary Storage Manager	<ul style="list-style-type: none"> • yes = Deletes backups of the critical files. • no = Does not delete backups of the critical files. • only = Deletes only the backups of critical files.

Table 21. Elements for onsmsync export and import commands

Element	Purpose	Key considerations
-E	Exports a single backup generation to the OneDB® Primary Storage Manager external pool	<p>Use this option only if you set up a OneDB® Primary Storage Manager external pool.</p> <p>If you export a backup generation, you must specify a prefix, which identifies the exported backup. The onsmsync utility creates a subdirectory that includes the prefix in the external pool, and deposits the exported objects in that directory.</p>
-g <i>generation</i>	Specifies the backup generation to export.	The default value is the current backup.
-I	Imports a single backup generation from the external OneDB® Primary Storage Manager pool.	If you import a backup generation from an external pool, you must specify the prefix for exported backup. The prefix identifies the backup generation that you want to import.
-l <i>log_ID</i>	Exports the backup generation that includes a logical log ID.	
-p <i>prefix</i>	Specifies the prefix that you are assigning to a backup generation that you are exporting or are using to identify the backup that you want to import.	When the onsmsync utility exports a backup generation, it uses the prefix as the name of the subdirectory in which it places the backup.
-t <i>timestamp</i>	Specifies a backup generation that includes a particular date and time (used only for exporting).	<p>Use the ANSI or GLS_DATETIME format.</p> <p>You might want to include the date and time when you roll out a new version of an application.</p>

Usage

If no options are specified, the onsmsync command synchronizes the **sysutils** database and emergency boot file with the storage-manager catalog. The onsmsync utility compares the backups in the **sysutils** database and emergency boot file with

the backups in the storage-manager catalog and then removes all backups that are not in the storage manager catalog from the **sysutils** database and emergency boot file.

i **Tip:** To control whether the **sysutils** database maintains a history for expired backups and restores, use the **BAR_HISTORY** configuration parameter. For information, see [BAR_HISTORY configuration parameter on page 189](#).

The order of the commands does not matter except that the storage-space names or file name must come last.

The order of the commands does not matter except:

- The storage-space names or file name must come last.
- When exporting or importing, the **-E** or **-I** option must be first. For example, specify `onsmsync -E -g 2`, not `onsmsync -g 2 -E`.

Prerequisites for importing and exporting backup generations on different computers:

- You must have the same version of HCL OneDB™ on the source and target computers and the computers must use the same operating system.
- You must set up the OneDB® Primary Storage Manager and create an external pool on the source and target computers.

When you use the **-E** or **-I** options to export or import a backup generation, you must specify the prefix that identifies the subdirectory where the backup generation is placed.

If you use the **-E** or **-I** options to export or import a backup generation, you cannot use any `onsmsync` command options that are not related to the export or import operation. For example, you cannot export a backup generation and regenerate the emergency boot file at the same time.

The `onsmsync -I` command renames your current `ixbar` file and creates a new file that contains only the information that is necessary to restore the imported backup.

You can use the `-cf` option with the `-g`, `-i`, or `-t` option to delete critical file backups from the storage manager.

If you apply the `-g` option and the `onsmsync` utility list of objects contains only logical logs and no space backups, the log backups are not expired. In this situation, use the `-t` or `-i` option to expire logical log backups.

Examples

The following example expires backups that started before November 30, 2012:

```
onsmsync -t "2012-11-30 00:00:00"
```

The following command exports the last backup generation to the directory called `gen` in the external pool:

```
onsmsync -E -p gen -g 1
```

The following command exports the fourth most recent backup generation to the directory called `gen` in the external pool:

```
onmsync -E -p gen -g 4
```

The following command exports the current backup generation to the directory called `gen` in the external pool:

```
onmsync -E -p gen
```

The following command exports all backup objects in generation 2 to the directory called `gen` in the external pool:

```
onmsync -E -p gen -g 2
```

The following command exports all backup objects that have a timestamp of `2012-12-31 12:00:00` to the directory called `gen` in the external pool:

```
onmsync -E -p gen -t 2012-12-31 12:00:00
```

The following command imports all objects in the subdirectory that is identified by the prefix `gen`:

```
onmsync -I -p gen
```

The following command imports all backup objects that were exporting using the prefix `gen` and the timestamp of `2012-12-31 12:00:00`. Because the prefix identifies the backup generation, you do not specify a timestamp.

```
onmsync -I -p gen
```

The following command deletes all but the last two generations of critical file backups:

```
onmsync -g 2 -cf yes
```

Related reference

[ON-Bar script on page 24](#)

Related information

[Managing backup devices on page 143](#)

[Examples: Manage storage devices with OneDB Primary Storage Manager on page 157](#)

[OneDB Primary Storage Manager file-naming conventions on page 155](#)

[Restoring when a backup is missing data on page 59](#)

[Performing a cold restore on page 70](#)

Expiring old backups on ISM

HCL® OneDB® Storage Manager and certain third-party storage managers do not allow the `onmsync` utility to delete backups from the storage manager.

About this task

You must manually expire or delete the old backups from the storage manager. Then, run `onmsync` without any parameters.

To expire old backups on ISM:

1. To manually expire the old backups from ISM, use the `ism_config -retention #days` command.

For more information, see the .

2. Run `onsmsync` without any options.

Regenerate the emergency boot file

To regenerate the emergency boot file only, use the `onsmsync -b` command.

The `onsmsync -b` command saves the old emergency boot file as `ixbar.server_number.system_time` and regenerates it as `ixbar.server_number`.

Regenerate the sysutils database

If you lose the **sysutils** database, use the `bldutil` utility in `$ONEDB_HOME/etc` on UNIX™ or `%ONEDB_HOME%\etc` on Windows™ to recreate the **sysutils** database with empty tables.

Then use the `onsmsync` utility to recreate the backup and restore data in **sysutils**.



Restriction: If both the **sysutils** database and emergency boot file are missing, you cannot regenerate them with `onsmsync`. Be sure to back up the emergency boot file with your other operating-system files.

Delete a bad backup

The `onsmsync` utility cannot tell which backups failed verification. If the latest backup failed verification but an earlier one was successful, you must manually delete the failed backup records from the storage manager and then run `onsmsync` with no options to synchronize ON-Bar. For more information, see [onbar -v syntax: Verifying backups on page 53](#).

Expire backups based on the retention date

The following example expires backups that started before November 24, 2006, and all fake backups, failed backups, and restores:

```
onsmsync -t "2006-11-24 00:00:00"
```

Expire a generation of backups

The following example retains the latest three sets of level-0 backups and the associated incremental backups, and expires all earlier backups and all restores, fake backups, and failed backups: `onsmsync -g 3`

Expire backups based on the retention interval

The following example expires all backups that are older than three days and all fake backups, failed backups, and restores:

```
onsmsync -i "3 00:00:00"
```

The following example expires all backups older than 18 months (written as 1 year + 6 months):

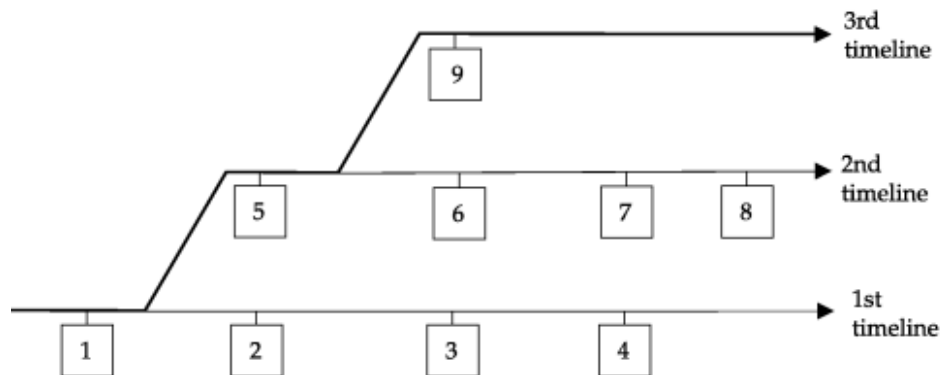
```
onsmsync -i "1-6"
```

Expire backups with multiple point-in-time restores

If you perform more than one point-in-time restores, multiple timelines for backups exist.

The following figure shows three timelines with their backups.

Figure 19. Multiple timelines for backups



In this example, the second timeline begins with a point-in-time restore to backup 1. The second timeline consists of backups 1, 5, 6, 7, and 8. The third timeline (in bold) consists of backups 1, 5, and 9. The third timeline is considered the current timeline because it contains the latest backup.

When you run the `onsmsync` utility to expire old backups, `onsmsync` removes the old backups from the current timeline, and make sure that the current timeline is restorable from the backup objects that are retained. All other backups that are not in the current timeline are also expired but `onsmsync` does not make sure that the other timelines are restorable from the objects retained.

The `onsmsync` utility applies expiration policies in the following order to make sure that objects from current timeline are expired according to the specified expiration policy and that the current timeline is restorable:

- Apply the expiration policy on all sets of backup objects.
- Unexpire backup objects that belong to the current timeline.
- Apply the expiration policy on the current timeline to ensure that the current timeline is restorable.

At the same time, the expiration policy is applied to backups in other timelines.

For example, if you execute the `onsmsync -g 2` command on the example in the previous figure, backup 1 from the current timeline is expired, and backups 2, 3, 4, 6, and 7 from the first and second timelines are expired. Backups 1, 5, and 9 from the current timeline are retained. Backup 8 is retained from other timelines.

Expire all backups

The `onsmsync` utility retains the latest level-0 backup unless you use the `-O` option. If you use the `-O` and `-t` options, all backups from before the specified time are removed even if they are needed for restore. If you use the `-O` and `-i` options, all backups from before the specified interval are removed even if they are needed for restore.

For example, to expire all backups, specify the following:

```
onmsync -0 -g 0
```



Important: If you use the -0 option with the -t, -i, or -g options, you might accidentally delete critical backups, making restores impossible.

Monitor the performance of ON-Bar and the storage managers

You can monitor the performance of ON-Bar and your storage manager. You can specify the level of performance monitoring and have the statistics print to the ON-Bar activity log. The `BAR_PERFORMANCE` configuration parameter specifies whether to gather statistics. The following statistics are gathered:

- Total time spent in XBSA calls.
- Total time spent in Archive API calls.
- Time spent by ON-Bar in transferring data to and from XBSA (storage manager calls).
- Time spent by ON-Bar in transferring data between ON-Bar to HCL OneDB™.
- Amount of data transferred to or from the XBSA API.
- Amount of data transferred to or from the Archive API.

Set ON-Bar performance statistics levels

To specify the level of performance statistics that are printed to the ON-Bar activity log, set the `BAR_PERFORMANCE` configuration parameter in the `onconfig` file.

For example, the `BAR_PERFORMANCE 1` setting displays the time spent transferring data between the HCL OneDB™ instance and the storage manager.

See [BAR_PERFORMANCE configuration parameter on page 194](#) for information about the options for this parameter.

View ON-Bar backup and restore performance statistics

To view ON-Bar performance results, open the ON-Bar activity log file, `bar_act.log`.

The location of the `bar_act.log` file is set by the `BAR_ACT_LOG` configuration parameter.

When the `BAR_PERFORMANCE` configuration parameter is set to 1 or 3, the activity report shows a transfer rate report.

Figure 20. Sample transfer rate performance in the ON-Bar activity log

```

2013-06-03 15:38:02 8597 8595 Begin restore logical log 310 (Storage Manager
copy ID: 28206 0).
2013-06-03 15:38:03 8597 8595 Completed restore logical log 310.
2013-06-03 15:38:08 8597 8595 Completed logical restore.
2013-06-03 15:38:19 8597 8595 PERFORMANCE INFORMATION

```

TRANSFER RATES									
OBJECT NAME	XBSA API				SERVER API				
	xfer-kbytes	xfer-time	RATIO(kb/s)	API-TIME	xfer-kbytes	xfer-time	RATIO(kb/s)	API-TIME	
309	62	0.479	129	1.078	62	0.019	3310	0.310	
310	62	0.407	152	1.098	62	0.025	2522	0.025	
rootdbs	5828	0.618	9436	1.864	5828	8.922	653	8.931	
datadbs01	62	0.488	127	1.768	62	0.004	17174	0.004	
datadbs02	62	0.306	203	1.568	62	0.008	8106	0.008	
datadbs03	62	0.304	204	1.574	62	0.007	8843	0.007	
datadbs04	62	0.306	202	1.563	62	0.007	8664	0.007	
datadbs05	62	0.315	197	1.585	62	0.007	8513	0.007	
datadbs06	62	0.310	200	1.583	62	0.002	25348	0.002	
...									
PID =	8597	14722	26.758	550	107.476	14756	10.678	1382	15.829

```

2013-06-03 15:38:19 8597 8595 PERFORMANCE INFORMATION

```

PERFORMANCE CLOCKS	
ITEM DESCRIPTION	TIME SPENT
Time to Analyze ixbar file	0.000

When the BAR_PERFORMANCE configuration parameter is set to 2 or 3, the activity report has microsecond timestamps.

Figure 21. Sample processing rates, in microseconds, in the ON-Bar activity log

```

2013-06-03 16:34:04 15272 15270 /usr/informix/bin/onbar_d complete,
returning 0 (0x00)
2013-06-03 16:45:11.608424 17085 17083 /usr/informix/bin/onbar_d -r -w
2013-06-03 16:46:07.926097 17085 17083 Successfully connected to Storage Manager.
2013-06-03 16:46:08.590675 17085 17083 Begin salvage for log 311.
2013-06-03 16:48:07.817487 17085 17083 Completed salvage of logical log 311.
2013-06-03 16:48:08.790782 17085 17083 Begin salvage for log 312.
2013-06-03 16:48:10.129534 17085 17083 Completed salvage of logical log 312.
2013-06-03 17:06:00.836390 17085 17083 Successfully connected to Storage Manager.
...
2013-06-03 17:07:26.357521 17085 17083 Completed cold level 0 restore datadbs07.
2013-06-03 17:07:28.268562 17085 17083 Begin cold level 0 restore datadbs08
(Storage Manager copy ID: 28122 0).
2013-06-03 17:07:29.378405 17085 17083 Completed cold level 0 restore datadbs08.

```

Related reference

- [BAR_ACT_LOG configuration parameter on page 181](#)
- [BAR_PERFORMANCE configuration parameter on page 194](#)

Related information

- [bar_act.log file: ON-Bar activity log on page 23](#)

ON-Bar catalog tables

These topics describe the ON-Bar tables that are stored in the **sysutils** database.

ON-Bar uses these tables for tracking backups and performing restores.

You can query these tables for backup and restore data to evaluate performance or identify object instances for a restore.

The bar_action table

The **bar_action** table lists all backup and restore actions that are attempted against an object, except during certain types of cold restores. Use the information in this table to track backup and restore history.

Table 22. bar_action table columns

Column name	Type	Explanation
act_aid	SERIAL	Action identifier. A unique number within the table. Can be used with act_oid column to join with the bar_instance table.
act_oid	INTEGER	Object identifier. Identifies the backup object against which a backup or restore attempt is made. Can be used with act_aid to join with bar_instance . The act_oid column of the bar_action table equals the obj_oid column of the bar_object table.
act_type	SMALLINT	Identifies the attempted action: 1 for backup, 2 for restore, 3 for a foreign or imported restore, 4 for a fake backup, 5 for a whole-system backup, 6 for a whole-system restore, 7 for expired or deleted objects, 8 for an external restore.
act_status	INTEGER	Identifies the result of the action: 0 if successful, otherwise an ON-Bar-specific error code. For more information, see ON-Bar messages and return codes on page 117 .
act_start	DATETIME YEAR TO SECONDS	The date and time when the action began.
act_end	DATETIME YEAR TO SECONDS	The date and time when the action finished.

The bar_instance table

The **bar_instance** table contains descriptions of each object that is backed up.

ON-Bar writes a record to the **bar_instance** table for each successful backup. ON-Bar might later use the information for a restore operation. For example, if you specify a level-2 backup, ON-Bar uses this table to ensure that a level-1 backup was done previously.

Table 23. bar_instance table columns

Column name	Type	Explanation
ins_aid	INTEGER	Action identifier. Identifies the successful action that created this instance of the backup object. Combined with ins_oid , can be used to join with the bar_action table.
ins_oid	INTEGER	Object identifier. Identifies the affected object. Can be used to join with the bar_object table. Combined with ins_aid , can be used to join with the bar_action table.
ins_time	INTEGER	Timestamp (real clock time). The database server uses this value when it creates the next-level backup. Value represents the number of seconds since midnight, January 1, 1970, Greenwich mean time. The ins_time value is 0.
rsam_time	INTEGER	The backup checkpoint time stamp. Not a clock time. The database server uses this value when it creates the next level backup.
seal_time	INTEGER	The time that the log file was sealed after a backup completed.
prev_seal_time	INTEGER	The time that the previous log file was sealed.
ins_level	SMALLINT	Level of the backup action: 0 for a complete backup, 1 for a backup of any changes to this object since its last level-0 backup, 2 for a backup of any changes since the last level-1 backup. This value is always 0 for logical-log backups.
ins_copyid_hi	INTEGER	The high bits of the instance copy identifier. Combined with ins_copyid_lo , it is a unique value that the storage manager assigns to link the ON-Bar object identifier with the storage-manager object identifier.
ins_copyid_lo	INTEGER	The low bits of the instance copy identifier. Combined with ins_copyid_hi , it is a unique value that the storage manager assigns to link the ON-Bar object identifier with the storage-manager object identifier.
ins_req_aid	INTEGER	Stores the required action ID for a backup object. Used in a restore to determine which level-0 backup goes with the level-1 backup, and which level-1 backup goes with the level-2 backup. For a level-0 backup, the value of ins_req_aid is the same as ins_aid in this table. For example, if this backup is level-1, ins_req_aid holds the action ID of the corresponding level-0 backup of this object.
ins_logstream	INTEGER	Not used.

Table 23. `bar_instance` table columns (continued)

Column name	Type	Explanation
<code>ins_first_log</code>	INTEGER	In a standard backup, identifies the first logical log required to restore from this backup.
<code>ins_chpt_log</code>	INTEGER	The logical log that contains the archive checkpoint in the dbspace backup.
<code>ins_last_log</code>	INTEGER	In a standard backup, identifies the last logical log required to restore from this backup.
<code>ins_partial</code>	INTEGER	Partial flag from salvage.
<code>ins_sm_id</code>	INTEGER	Not used.
<code>ins_sm_name</code>	CHAR(128)	Not used.
<code>ins_verify</code>	INTEGER	Value is 1 if the backup is verified. Value is 0 if the backup is not verified.
<code>ins_verify_date</code>	DATETIME YEAR TO SECOND	The current date is inserted when a backup is verified. If this backup has not been not verified, a dash represents each date and time.
<code>ins_backup_order</code>	INTEGER	The order in which backups occur.

The `bar_ixbar` table

The `bar_ixbar` table, which stores a history of all unexpired successful backups in all timelines, is maintained and used by the `onmsync` utility only.

The schema of the `bar_ixbar` table is identical to the schema of the `bar_syncdeltab` table, except for its primary key.

Table 24. `bar_ixbar` table columns

Column name	Type	Explanation
<code>ixb_sm_id</code>	INTEGER	Storage-manager instance ID. Created from <code>BAR_SM</code> in <code>\$ONCONFIG</code> or <code>%ONCONFIG%</code> .
<code>ixb_copyid_hi</code>	INTEGER	The high bits of the instance copy identifier. Combined with <code>ixb_copyid_lo</code> , it is a unique value that the storage manager assigns to link the ON-Bar object identifier with the storage-manager object identifier.
<code>ixb_copyid_lo</code>	INTEGER	The low bits of the instance copy identifier. Combined with <code>ixb_copyid_hi</code> , it is a unique value that the storage manager assigns to link the ON-Bar object identifier with the storage-manager object identifier.

Table 24. bar_ixbar table columns (continued)

Column name	Type	Explanation
ixb_aid	INTEGER	Action identifier, Identifies the successful action that created this instance of the backup object.
ixb_old	INTEGER	Object identifier. Identifies the affected object.
ixb_time	INTEGER	Time stamp (real clock time). The database server uses this value when it creates the next-level backup. Value represents the number of seconds since midnight, January 1, 1970, Greenwich mean time.
ixb_prevtime	INTEGER	Time stamp (real clock time). This value specifies the time stamp of the previous object. Value represents the number of seconds since midnight, January 1, 1970 Greenwich mean time.
ixb_rsam_time	INTEGER	The backup checkpoint time stamp. Not a clock time. The database server uses this value when it creates the next level backup.
ixb_act_start	datetime year to second	The date and time when the action began.
ixb_act_end	datetime year to second	The date and time when the action finished.
ixb_level	SMALLINT	Level of the backup action: 0 for a complete backup, 1 for a backup of any changes to this object since its last level-0 backup, 2 for a backup of any changes since the last level-1 backup. This value is always 0 for logical-log backups.
ixb_req_aid	INTEGER	Stores the required action ID for a backup object. Used in a restore to determine which level-0 backup Goes with the level-1 backup, and which level-1 backup goes with the level-2 backup. For a level-0 backup, the value of ixb_req_aid is the same as ixb_aid in this table. For example, if this backup is level-1, ixb_req_aid holds the action ID of the corresponding level-0 backup of this object.
ixb_first_log	INTEGER	In a standard backup, identifies the first logical log. Required to restore from this backup.
ixb_chpt_log	INTEGER	The ID of the log that contains the rsam_time checkpoint. Used during back up to verify that logs needed for restore are backed up.
ixb_last_log	INTEGER	Log ID of the last log needed during logical restore for this storage space to restore it to the time of the backup.
ixb_lbuflags	INTEGER	Flags describing log backup.

Table 24. `bar_ixbar` table columns (continued)

Column name	Type	Explanation
<code>ixb_verify</code>	INTEGER	Value is 1 if the backup is verified. Value is 0 if the backup is not verified.
<code>ixb_verify_date</code>	datetime year to second	The current date is inserted when a backup is verified. If this backup has not been verified, a dash represents each date and time.
<code>ixb_sm_name</code>	VARCHAR(128)	Storage-manager instance name. Created from the <code>BAR_SM_NAME</code> parameter in the <code>onconfig</code> file.
<code>ixb_srv_name</code>	VARCHAR(128)	The database server name. Used to ensure that objects are restored to the correct database server. Used when multiple database servers are on the node to ensure that objects are restored in the database server instance to which the object belongs. The database server name can be up to 128 characters.
<code>ixb_obj_name</code>	VARCHAR(128)	The user name for the object. The name can be up to 128 characters.
<code>ixb_obj_type</code>	CHAR(2)	Backup object type: CD critical dbspace L logical log ND noncritical dbspace or sbspace R rootdbs B blobospace

Related reference

[The `bar_syncdeltab` table on page 117](#)

The `bar_object` table

The **`bar_object`** table contains descriptions of each backup object. This table is a list of all storage spaces and logical logs from each database server for which at least one backup attempt was made.

Table 25. bar_object table columns

Column name	Type	Explanation
obj_srv_name	VARCHAR(128,0)	The database server name. Used to ensure that objects are restored to the correct database server. Used when multiple database servers are on the node to ensure that objects are restored in the database server instance to which the object belongs. The database server name can be up to 128 characters.
obj_oid	SERIAL	The object identifier. A unique number within the table. Can be used to join with the bar_action and bar_instance tables.
obj_name	VARCHAR(128,0)	The user name for the object. The name can be up to 128 characters.
obj_type	CHAR(2)	Backup object type: CD critical dbspace L logical log ND noncritical dbspace or sbspace R rootdbs B blobspace

The bar_server table

The **bar_server** table lists the database servers in an installation. This table is used to ensure that backup objects are returned to their proper places during a restore.

Table 26. bar_server table columns

Column name	Type	Explanation
srv_name	VARCHAR(128,0)	DBSERVERNAME value specified in the <code>onconfig</code> file. Database server name can be up to 128 characters.
srv_node	CHAR(256)	Host name of the computer where the database server resides.

Table 26. bar_server table columns (continued)

Column name	Type	Explanation
		The host name can be up to 256 characters.
srv_synctime	INTEGER	The time onsmsync was run.

The bar_syncdeltab table

The **bar_syncdeltab** table is maintained and used by the onsmsync utility only. This table is empty except when onsmsync is running.

The schema of the **bar_syncdeltab** table is identical to the schema of the **bar_ixbar** table, except for its primary key.

Related reference

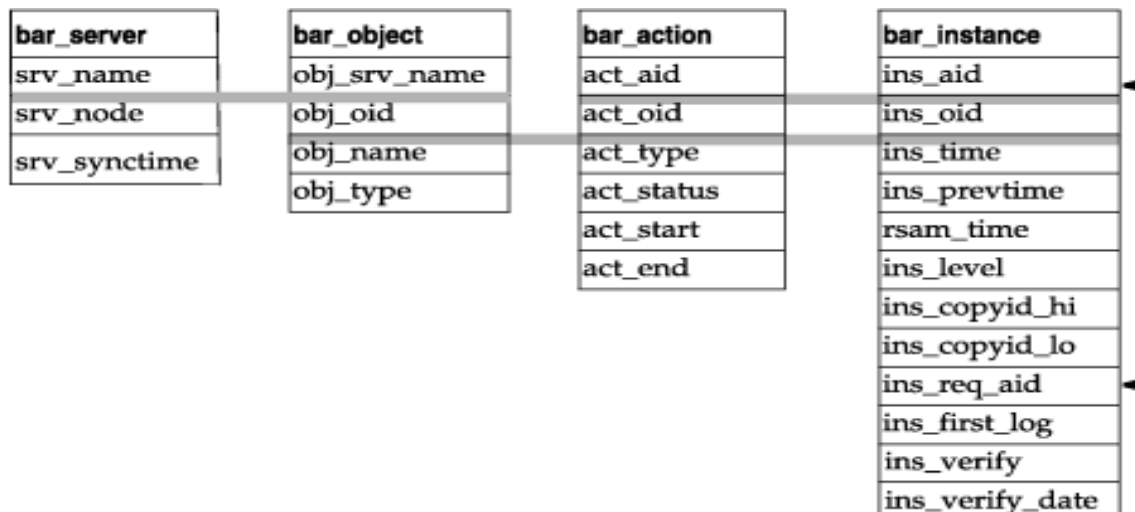
[The bar_ixbar table on page 113](#)

ON-Bar catalog map

This topic contains an example mapping between ON-Bar tables.

The following figure maps the ON-Bar tables on HCL OneDB™. In this figure, the gray lines show the relations between tables. The arrows show that the **ins_req_aid** value must be a valid **ins_aid** value.

Figure 22. ON-Bar catalog map on HCL OneDB™



ON-Bar messages and return codes

ON-Bar prints informational, progress, warning, and error messages to the ON-Bar activity log file. ON-Bar return codes indicate the status of the command.

For a description of an error message, use the finderr utility.

Related reference

[onbar -m syntax: Monitoring recent ON-Bar activity on page 49](#)

Related information

[bar_act.log file: ON-Bar activity log on page 23](#)

Message format in the ON-Bar message log

Messages in the ON-Bar activity log file contain timestamps, process IDs, and explanatory text.

A message in the ON-Bar activity log file, `bar_act.log`, has the following format:

```
timestamp process_id parent_process_id message
```

The following table describes each field in the message. No error message numbers appear in the ON-Bar activity log.

Table 27. ON-Bar message format

Message field	Description
<i>timestamp</i>	Date and time when ON-Bar writes the message.
<i>process_id</i>	The number that the operating system uses to identify this instance of ON-Bar.
<i>parent_process_id</i>	The number that the operating system uses to identify the process that executed this instance of ON-Bar.
<i>message</i>	The ON-Bar message text.

The following example illustrates a typical entry in the ON-Bar activity log:

```
1999-08-18 10:09:59 773    772 Completed logical restore.
```



Important: If you receive an XBSA error message, consult the storage-manager logs for more details.

Timestamps when storage managers hang

If a storage manager process hangs, the timestamp for the process in the ON-Bar activity log is inaccurate. An asterisk symbol is appended to the timestamp and the message indicates how long the storage manager process hung. The following example shows that the storage manager process hung for two minutes starting at 10:27. At 10:29, the storage manager completed the backup.

```
2013-02-26 10:27:10* 13410 25695 (-43085) WARNING: BAR_TIMEOUT Storage
                Manager Progress may be stalled for at least 2 minutes.

2013-02-26 10:29:12 13410 25695 Completed level 0 backup dbspace1 (Storage Manager
                copy ID: 1509564809 0).
```

Related reference

[onbar -m syntax: Monitoring recent ON-Bar activity on page 49](#)

Message numbers

The ON-Bar message numbers range from -43000 to -43421.

The following table lists the ON-Bar message groups. Because message numbers do not display in the activity log, the best way to find information about ON-Bar messages is to search for the message text in the error messages file, which is in the subdirectory for your locale under the `$ONEDB_HOME/msg` directory.

ON-Bar message type	Message numbers
ON-Bar usage	-43000 to -43007 and -43357
Options checking	-43010 to -43034
Permission checking	-43035 to -43039
Emergency boot file interface	-43040 to -43059
<code>onconfig</code> file interface	-43060 to -43074
Operating system interface	-43075 to -43099
Database server interface	-43100 to -43229
Back up and restore status	-43230 to -43239
onbar-worker processes	-43240 to -43254
XBSA interface	-43255 to -43301
onsmsync	-43302 to -43319
archecker	-43320 to -43334
ondblog	-43400 to -43424

ON-Bar return codes

You can troubleshoot problems by viewing activity log messages that are applicable for particular return codes.

The following table shows the ON-Bar return codes for all HCL OneDB™ database servers. These return codes are accompanied by messages in the ON-Bar activity log. For details about an error, review the activity log before you call Technical Support.

Table 28. Common ON-Bar return codes

Decimal value	ON-Bar return code description
2 through 34	These return codes are produced by XBSA. For more information, consult your storage-manager documentation and log files.
100	<p>ON-Bar cannot find something in sysutils, the emergency boot file, or storage-manager catalogs that it needs for processing.</p> <p>Check the ON-Bar activity log for messages that say what could not be found and try to resolve that problem. If the problem recurs, contact Technical Support.</p>
104	<p>Adstar Distributed Storage Manager (ADSM) is in generate-password mode.</p> <p>ON-Bar does not support ADSM running in generate-password mode. For information about changing the ADSM security configuration, refer to your ADSM manual.</p>
115	A critical dbspace is not in the set of dbspaces being cold-restored.
116	The onsmsync utility is already running.
117	The information contained in the sysutils database and the emergency boot file are inconsistent.
118	An error trying to commit a backup object to the storage manager. An error in tenant restore occurred since another tenant restore was in progress.
119	An error in tenant restore occurred since another restore was in progress.
120	The transport buffer size has changed since this object was last backed up. This object cannot be restored. Set the transport-buffer size to its original value and try the restore again. An internal On-Bar error occurred when starting a tenant restore.
121	ON-Bar was unable to determine the list of dbspaces.
122	<p>Deadlock detected.</p> <p>The ON-Bar command is contending with another process. Try the ON-Bar command again.</p>
123	<p>The root dbspace was not in the cold restore.</p> <p>You cannot perform a cold restore without restoring the root dbspace. To resolve the problem, try one of the following procedures:</p> <ul style="list-style-type: none"> • Bring the database server to quiescent or online mode and restore just the storage spaces that need to be restored. • If the database server is offline, issue the onbar -r command to restore all the storage spaces. • Make sure that the root dbspace and other critical dbspaces are listed on the command line or in the -f filename.
124	The buffer had an incomplete page during the backup.

Table 28. Common ON-Bar return codes (continued)

Decimal value	ON-Bar return code description
	For assistance, contact Technical Support.
126	<p data-bbox="355 411 792 436">Error processing the emergency boot file.</p> <p data-bbox="355 474 1451 579">Check the ON-Bar activity log for descriptions of the problem and the emergency boot file for corruption such as non-ASCII characters or lines with varying numbers of columns. If the source of the problem is not obvious, contact Technical Support.</p>
127	<p data-bbox="355 621 805 646">Could not write to the emergency boot file.</p> <p data-bbox="355 684 1414 751">Often, an operating-system error message accompanies this problem. Check the permissions on the following files and directories:</p> <ul data-bbox="418 800 1170 867" style="list-style-type: none"> • \$ONEDB_HOME/etc on UNIX™ or %ONEDB_HOME%\etc on Windows™ • The emergency boot file
128	<p data-bbox="355 894 784 919">Data is missing in the object description.</p> <p data-bbox="355 957 805 982">For assistance, contact Technical Support.</p>
129	<p data-bbox="355 1031 1435 1098">ON-Bar received a different object for restore than it had expected. (The backup object did not match.) The requested backup object might have been deleted or expired from the storage manager.</p> <p data-bbox="355 1136 1365 1203">Run onsmsync to synchronize the sysutils database, emergency boot file, and storage-manager catalogs. For assistance, contact Technical Support.</p>
130	<p data-bbox="355 1245 724 1270">Database server is not responding.</p> <p data-bbox="355 1308 1430 1375">The database server probably failed during the backup or restore. Run the onstat - command to check the database server status and then:</p> <ul data-bbox="418 1423 1451 1533" style="list-style-type: none"> • If the operation was a cold restore, restart it. • If the operation was a backup or warm restore, restart the database server and try the backup or warm restore again.
131	<p data-bbox="355 1560 1154 1585">A failure occurred in the interface between ON-Bar and the database server.</p> <p data-bbox="355 1623 805 1648">For assistance, contact Technical Support.</p>
132	<p data-bbox="355 1696 800 1722">Function is not in the XBSA shared library.</p> <p data-bbox="355 1759 1382 1827">Verify that you are using the correct XBSA for the storage manager. For information, consult your storage-manager manual.</p>
133	<p data-bbox="355 1871 789 1896">Failed to load the XBSA library functions.</p>

Table 28. Common ON-Bar return codes (continued)

Decimal value	ON-Bar return code description
	Verify that you are using the correct XBSA for the storage manager. Ensure that the <code>BAR_BSALIB_PATH</code> value in the <code>onconfig</code> file points to the correct location of the XBSA shared library. For information, consult your storage-manager manual.
134	<p>User wants to restore a logical-log file that is too early.</p> <p>You probably tried a point-in-log restore (<code>onbar -r -l -n</code>) after performing a separate physical restore. The specified logical log is too old to match the backups used in the physical restore. Perform either of the following steps:</p> <ul style="list-style-type: none"> • Rerun the physical restore from an older set of physical backups. • Specify a later logical log in the <code>-n</code> option when you rerun the point-in-log restore. To find the earliest logical log that you can use, look at the emergency boot file. For assistance, contact Technical Support.
136	<p>ON-Bar cannot warm restore the critical dbspaces.</p> <p>Perform either of the following steps:</p> <ul style="list-style-type: none"> • Reissue the warm-restore command without listing any critical dbspaces. • Shut down the database server and perform a cold restore.
137	<p>The <code>MAX_DBSPACE_COUNT</code> was exceeded.</p> <p>For assistance, contact Technical Support.</p>
138	<p>An XBSA error occurred.</p> <p>Verify that you are using the correct XBSA for the storage manager. Also check the <code>bar_act.log</code> for XBSA error messages. For information, consult your storage-manager manual.</p>
139	<p>Either the XBSA version is missing from the <code>sm_versions</code> file or the incorrect XBSA version is in the <code>sm_versions</code> file.</p> <p>Insert the correct XBSA version into the <code>sm_versions</code> file. For more information, consult your storage-manager manual.</p>
140	<p>A fake backup failed.</p> <p>Try the fake backup with the <code>onbar -b -F</code> command again. Only HCL OneDB™ supports fake backups. If the fake backup fails again, contact Technical Support.</p>
141	<p>ON-Bar received an operating-system signal. Most likely, the user entered the <code>Ctrl-C</code> command to stop an ON-Bar process.</p>

Table 28. Common ON-Bar return codes (continued)

Decimal value	ON-Bar return code description
	Fix the cause of the interruption and then try the ON-Bar command again.
142	<p data-bbox="355 386 708 411">ON-Bar was unable to open a file.</p> <p data-bbox="355 449 1438 516">Verify that the named file exists and that the permissions are correct. Check the ON-Bar activity log for an operating-system error message.</p>
143	<p data-bbox="355 560 829 585">ON-Bar was unable to create a child process.</p> <p data-bbox="355 623 1463 732">If BAR_MAX_BACKUP is not 0, ON-Bar could not create child processes to perform the parallel backup or restore. The operating system probably ran out of resources. Either not enough memory is available to start a new process or no empty slot exists in the process table.</p> <p data-bbox="355 770 1117 795">Check the operating-system logs, the ON-Bar activity log, or the console.</p>
144	<p data-bbox="355 840 1146 865">The log backup was stopped because one or more blobspaces were down.</p> <p data-bbox="355 903 1422 970">Attempt to restore the blobspace. If the restore fails, try the log backup with the onbar -l -O command again. Executing this command might make the blobspace unrestoreable.</p>
145	<p data-bbox="355 1014 899 1039">ON-Bar was unable to acquire more memory space.</p> <p data-bbox="355 1077 1127 1102">Wait for system resources to free up and try the ON-Bar command again.</p>
146	<p data-bbox="355 1146 927 1171">ON-Bar was unable to connect to the database server.</p> <p data-bbox="355 1209 1357 1234">The network or the database server might be down. For assistance, contact Technical Support.</p>
147	<p data-bbox="355 1278 1281 1304">ON-Bar was unable to discover any storage spaces or logical logs to back up or restore.</p> <p data-bbox="355 1341 1463 1451">For example, if you specify a point-in-time restore but use a <i>datetime</i> value from before the first standard backup, ON-Bar cannot build a list of storage spaces to restore. This return code also displays if you specify a whole-system restore without having performed a whole-system backup.</p> <p data-bbox="355 1488 1450 1556">Verify that the database server and the storage spaces are in the correct state for the backup or restore request. Contact Technical Support.</p>
148	<p data-bbox="355 1600 683 1625">An internal SQL error occurred.</p> <p data-bbox="355 1663 1159 1688">Provide Technical Support with the information from the ON-Bar activity log.</p>
149	<p data-bbox="355 1732 1398 1795">Either you entered the wrong ON-Bar syntax on the command line or entered an invalid or incorrect <i>datetime</i> value for your GLS environment.</p>

Table 28. Common ON-Bar return codes (continued)

Decimal value	ON-Bar return code description
	<p>Check the command that you tried against the usage message in the ON-Bar activity log. If that does not help, then try the command with quotes around the <i>datetime</i> value again. If your database locale is not English, use the GL_DATE or GL_DATETIME environment variables to set the date and time format.</p>
150	<p>Error collecting data from the <code>onconfig</code> file.</p> <p>Check the permissions, format, and values in the <code>onconfig</code> file. Check that the ONCONFIG environment variable is set correctly.</p>
151	<p>The database server is in an incorrect state for this backup or restore request, or an error occurred while determining the database server state.</p> <p>Either you attempted an operation that is not compatible with the database server mode or ON-Bar is unable to determine the database server state. For example, you cannot do a physical backup with the database server in recovery mode.</p> <p>Check the error message in the ON-Bar activity log. If an ASF error occurred, the following message displays in the ON-Bar activity log:</p> <pre data-bbox="370 978 941 1003">Fatal error initializing ASF; asfcode = code</pre> <p>To determine the cause of the ASF error, refer to the ASF error code in this message and repeat the backup or restore command. If an ASF error did not occur, change the database server state and repeat the backup or restore command.</p>
152	<p>ON-Bar cannot back up the logical logs.</p> <p>The logical logs are not backed up for either of the following reasons:</p> <ul data-bbox="418 1335 1451 1440" style="list-style-type: none"> • If another log backup is currently running. • If you perform a logical-log backup with the LTAPEDEV parameter set to <code>/dev/null</code> (UNIX™) or <code>NUL</code> (Windows™). <p>You receive this return code when no log backups can be done.</p> <p>To enable log backups, change the LTAPEDEV parameter to a valid value.</p>
153	<p>ON-Bar cannot set the process group ID. If <code>BAR_MAX_BACKUP</code> is set to any value other than 1 and ON-Bar encounters an error setting the process group ID, this value is returned.</p> <p>This message is a warning of a possible operating-system problem.</p>
154	<p>The ON-Bar user does not have the correct permissions.</p>

Table 28. Common ON-Bar return codes (continued)

Decimal value	ON-Bar return code description
	You must be user root or informix or a member of the bargroup group on UNIX™ or a member of the Informix-Admin group on Windows™ to execute ON-Bar commands.
155	The ONEDB_SERVER environment variable is not set. Set the ONEDB_SERVER environment variable to the correct database server name.
156	Backup or restore was not performed because the LTAPEDEV parameter value is not valid. If LTAPEDEV is not set or <code>/dev/null</code> on UNIX™, or if it is <code>NUL</code> on Windows™, the logical logs are not backed up, and ON-Bar returns warning 152.
157	Error attempting to set the ONEDB_SHMBASE environment variable to -1. ON-Bar could not set ONEDB_SHMBASE to -1. For assistance, contact either the system administrator or Technical Support.
158	An internal ON-Bar error occurred. Contact Technical Support.
159	An unexpected error occurred. Contact Technical Support.
160	External restore failed. To determine what went wrong with the external restore, look at the <code>bar_act.log</code> and the <code>online.log</code> files. Ensure that you already performed the manual part of the external restore before you try the <code>onbar-r -e</code> command again to complete the external restore. If that does not work, try the external restore from a different external backup.
161	Restarted restore failed. Verify that <code>RESTARTABLE_RESTORE</code> is set to <code>ON</code> and try the original restore again. For more information, check the ON-Bar activity log and database server message logs.
162	The ON-Bar log file cannot be a symbolic link. Remove the symbolic link or change the <code>onconfig</code> file so that the ON-Bar parameters <code>BAR_DEBUG_LOG</code> or <code>BAR_ACT_LOG</code> point to non-symbolic linked files.
163	The ON-Bar log file must be owned by user informix .

Table 28. Common ON-Bar return codes (continued)

Decimal value	ON-Bar return code description
	Change the ownership of the log file to be owned by user informix or change the BAR_ACT_LOG or BAR_DEBUG_LOG values in the <code>onconfig</code> file to point to different log files.
164	Unable to open file. The file or its directory permissions prevent it from being created or opened. Verify the permissions on the file and its directory.
177	An online dbspace was restored. This return code notifies the user that the -O option overrode the internal checks in ON-Bar. You do not need to take any action.
178	The logical log was backed up while one or more blobspaces were down. This return code notifies the user that the -O option overrode the internal checks in ON-Bar. Examine the data in the blobspace to determine which simple large objects you need to recreate. These blobspaces might not be restorable. For assistance, contact Technical Support.
179	ON-Bar created the chunk needed to restore the dbspace. This return code notifies the user that the -O option overrode the internal checks in ON-Bar. You do not need to take any action.
180	ON-Bar could not create the chunk needed to restore the dbspace. Create the chunk file manually. Try the restore without the -O option again.
181	ON-Bar expired an object that was needed for a backup or restore. The onmsync utility expired an object that might be needed for a restore. You probably specified onmsync with the -O option. If you used the -O option by mistake, contact Technical Support to recover the object from the storage manager.
183	ON-Bar could not obtain the logical-log unique ID from the storage manager. The backup of the specified logical log is missing. Query your storage manager to determine if the backup of the specified logical-log file exists and if it is restorable.
247	On UNIX™, look in <code>/tmp/bar_act.log</code> and the file that the BAR_ACT_LOG parameter points to for clues. (The onbar-merger writes to <code>/tmp/bar_act.log</code> until it has enough information to read the <code>onconfig</code> file.) Resolve the problems that the <code>bar_act.log</code> describes and try the cold restore again. If the cold restore still fails, contact Technical Support.

Table 28. Common ON-Bar return codes (continued)

Decimal value	ON-Bar return code description
252	For assistance, contact Technical Support.

Backup and restore a Remote Secondary Server(RSS)

It is possible to archive a Remote Secondary Server and to back up logical logs on that node using [onbar on page 20](#). This archive may then be used to rebuild the RSS if necessary, saving time over using an archive that is taken on the primary and copied to the secondary machine.

Although an archive and log backups taken on an RSS node may be used to restore a primary node, they are recommended for this purpose only when no other archive exists. The logical log position on the secondary is often several logs behind that of the primary, which means the last logical logs backed up on the RSS may not be the last log completed on the primary. This is not a problem when the archive is used to recreate the RSS, because once reconnected to the primary the logs will be resynchronized and no transactions will be lost.

Prerequisites for taking archives and log backups on an RSS node are as follows:

1. Enable the feature by setting the [BAR_SEC_ALLOW_BACKUP on page 197](#) configuration parameter to 1 and restarting the RSS. This parameter may not be tuned dynamically.
2. Ensure that the RSS node has one or more active [temporary dbspaces](#), and that they are listed in the [DBSPACETEMP](#) configuration parameter. Once an archive begins, all pages physically logged for a particular space will need to be stored until that space has been archived. The temporary dbspaces listed in DBSPACETEMP are used for this before-image storage. The total amount of temporary space required will vary according to the update load on the RSS during the archive, which will fail to complete if it runs out of temporary space.
3. Set the [BAR-related configuration parameters](#) to appropriate values depending on your preferred backup utility.
4. The primary node must not contain any of the following non-logged objects:

- 1) BLOB spaces
- 2) Non-logged smartblobs
- 3) No-logging databases
- 4) Raw tables

If any of these unlogged objects are present in the instance, an archive taken on the RSS node will fail because the archive would be incomplete and therefore unusable for restoration on a primary node.

5. In order to back up logical logs on an RSS node, the LOG_BACKUP_MODE configuration parameter must *not* be set to NONE. If logical logs will not be backed up on the RSS node, LOG_BACKUP_MODE *must* be set to the NONE. Note that these two rules apply on an RSS node only when BAR_SEC_ALLOW_BACKUP is set to 1. When

BAR_SEC_ALLOW_BACKUP is set to 0 the setting of LOG_BACKUP_MODE on the RSS node must be in sync with that of the primary, and no logical log backups will be allowed or required on the RSS node regardless of the LOG_BACKUP_MODE setting.

If it becomes necessary to recreate the RSS node from an archive and log backups taken on that node, the same procedures used for restoring archives taken on the primary may be used with the local archive. No new configuration changes or steps are required.

Even when taking archives and log backups on an RSS node, it is recommended that archives and log backups be taken on the primary as well, because restoration of the primary is likely to be faster with a local backup and there is a greater chance that all committed transactions will be salvaged and restored. Again, the risk of lost transactions is not an issue when recreating the RSS from a local backup as long as the primary node can forward all missing logs to the RSS during synchronization.

In an emergency it is possible to perform a cold restore of a primary node using an archive taken on an RSS and log backups taken either on the RSS or the primary.



Note: The storage manager containing all backup objects must be available on the primary, and you must replace the [ixbar file](#) on the primary with the ixbar file from the RSS node before performing the restore.



Attention: Using an archive taken on an RSS node for a warm restore on the primary node is not recommended.

Related reference

[BAR_SEC_ALLOW_BACKUP configuration parameter on page 197](#)

Integrated Backup Encryption

These topics provide information about Integrated Backup Encryption.

Although it is possible to encrypt backups since version 11.10.xC1 using Backup Filters, the process of setting up encryption keys and keeping track of all the elements necessary for the encryption and decryption of backups is neither short or easy, and so, the Backup filter functionally has been mostly relegated to compress/decompress backups, which can be achieved more easily.



Note: Encrypting backups is risky. If you misplace your encryption key or delete a remote master encryption key, you can render any number of backups unusable. If you misplace the encryption key for a backup or lose access to the



Remote Master Key, there is no way for anybody, including technical support, to restore those backups, they are lost forever.

Although there is a way to encrypt the backups using a local encryption key provided by the operator, Integrated backup Encryption was designed to work mainly with Remote Key Servers because they offer the flexibility and reliability needed to minimize the likelihood of rendering backups unusable due to misplaced/missing encryption keys.

Integrated Backup Encryption does not reuse the encryption keys used for Storage Space Encryption. When a backup is performed, the engine decrypts the pages before sending them to the backup client and the On-Bar/ontape utilities receive a stream of unencrypted pages.

The backup client then generates an encryption key called Backup Encryption Key (Depending on the capabilities of the RKS, the backup encryption key can be generated locally, or at the RKS). The backup encryption key is then used to encrypt the backup data.

The backup client also encrypts the backup encryption key using a Remote Master Encryption Key (RMEK) to generate an Encrypted Backup Encryption Key (EBEK) and stores the identification of the Remote Master Key, the Encrypted Backup Encryption Key, and other relevant information necessary to decrypt the data in a structure called the Encryption Envelope (envelope for simplicity). The envelope structure is stored together with the encrypted backup data and therefore it is impossible to lose or misplace the backup encryption key since it is always stored together with the data that it protects.

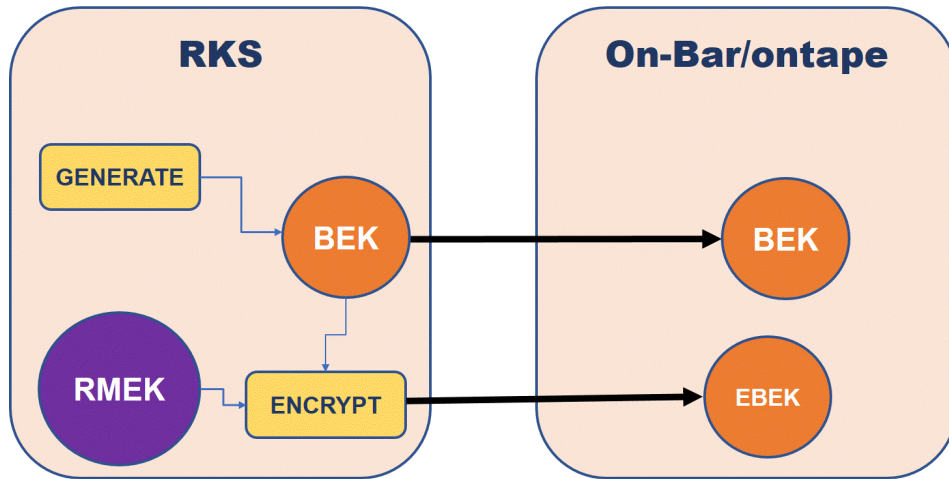
As long as there is access to the RKS and the Remote Master Encryption Key is not deactivated, the backup will be decryptable.

The process of encrypting a backup, as already described above, requires the generation of a backup encryption key for each backup session. All backup objects generated in that session will share the same BEK (For On-Bar, this means that each storage space and log file backed up will share the same BEK.).

Depending on the capabilities of the RKS, there are two ways in which this BEK can be generated:

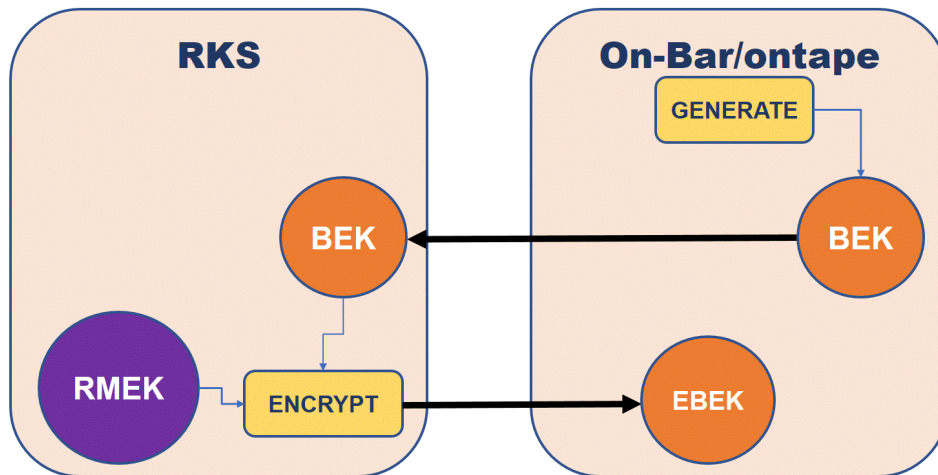
- Method 1: The RKS is capable of generating symmetric encryption keys. In this case the RKS will generate the BEK and provide the backup client with both the BEK and the product of encrypting the BEK with the Remote Master Encryption Key (EBEK).

Figure 23. Method 1 to generate BEK



Method 2: If the Remote Key Server does not support the creation of symmetric encryption keys, the BEK is locally generated, the BEK is then transferred to the RKS where it is encrypted using the RMEK, then RKS returns the EBEK to generate the encryption envelope.

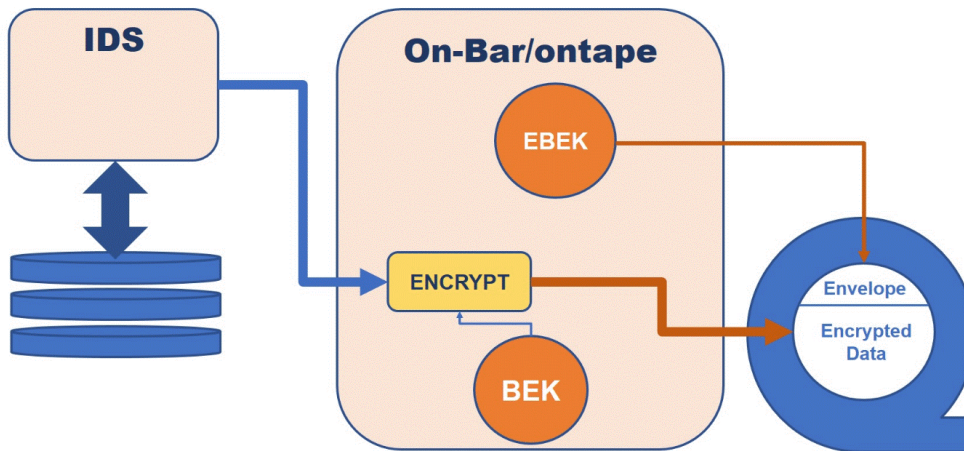
Figure 24. Method 2 to generate BEK



Note: In both methods, it is necessary that the RKS has cryptographic capabilities, meaning that the RKS has to be capable of encrypting and decrypting data using the RMEK. If the RKS is not capable of providing cryptographic operations (which is the case of some KMIP-enabled servers) it is not possible to use Integrated Backup Encryption with that server. This is done to minimize the risk of key exposure/leakage (since the RMEK never leaves the RKS, the chances of compromising the key are minimized).

Once the BEK is generated and the backup client has the RMEK Id, the BEK, and the EBEK, it can generate the encryption envelope, encrypt the backup data and send the encrypted data to the backup medium/server.

Figure 25. Backup Encryption



The `BAR_ENCRYPTION` configuration parameter

In order to use Integrated Backup Encryption, you must setup either a local key file or access to a remote keys server. Then you need to set the `BAR_ENCRYPTION` configuration parameter to let know the backup client that you want to use Integrated Backup Encryption and which method you want to use.

Using a Remote Key Server

These topics provide information about Remote Key Server.

The usage of a remote key server allows you to work with Integrated Backup Encryption.

We currently support:

1. KMIP compliant servers that support the ENCRYPT and DECRYPT cryptographic operations.
2. The Amazon Web Services Key Management Service (AWS-KMS).
3. The Microsoft Azure Key Vault service.

In order to use a remote key server, you must provide the appropriate credentials to connect to it. The credentials to access the server are stored in a keystore generated by the `onkstore` utility.

The credential types supported by [Integrated backup encryption on page 128](#) are "kmip" for KMIP servers, "aws-bar" for AWS Key Management System and "azure-bar" for Azure KeyVault. Any keystore with other types of credentials (ie AWS-EAR) are not supported and its usage will result in an error.

The parameters required to create each type of credentials vary depending from the provider, you will need to understand the meaning of this parameters and how to request/generate them. For example, what we describe in this document as Remote Master Encryption Key (RMEK) is known as "Azure Key Name?" for Azure KeyVault or "AWS CMD Id? (AWS Customer Master Key Id) for AWS KMS.

For more information, see [The onkstore Utility on page](#)

Using a Local Encryption Key

These topics provide information about Local Encryption Key

To use a local encryption key, the operator must manually generate an encryption key of the appropriate size for the cipher you want to use (ie a 192-bit, or 24 byte long encryption key). Then store it in a text file in base64 format. The file must have 600 permissions in UNIX/Linux and must be readable only the DBSA. In Windows the file must be owned by the Administrators group or the Informix user and readable only by the owner.

Once the file has been created the full path to the file must be set in the BAR_ENCRYPTION configuration parameter together with the cipher to use.



Note: It is not recommended to use local encryption keys, however they are necessary in certain scenarios. If you misplace your encryption key, there is no way for anybody, including technical support, to recover that backup.

Example to create the local encryption file for aes192 using the openssl utility:

```
openssl rand -base64 24 > /home/informix/etc/l_key192
```

Example to create the local encryption file for aes128 using the openssl and base64 utilities:

```
openssl rand 16 | base64 > /home/informix/etc/l_key128
```

Example on how the BAR_ENCRYPTION configuration parameter will look for the first example:

```
BAR_ENCRYPTION keyfile=/home/informix/etc/l_key192,cipher=aes192
```

The keystore used to hold local Master Encryption Keys for Storage Space Encryption is not supported by Integrated Backup Encryption.

HCL OneDB™ Primary Storage Manager

HCL OneDB™ Primary Storage Manager is an application that manages storage devices used for backup and restore requests that are issued by ON-Bar. This storage manager supports both serial and parallel processing for backup and restore requests.

OneDB® Primary Storage Manager consists of the following components:

onpsm utility

A command-line utility that you can use to perform the following tasks:

- Create, modify, and delete storage devices
- Define and modify the maximum sizes for devices
- Move backup information from one device to another within a device pool
- Determine whether volumes, storage objects, and devices are locked or busy
- Release locked volumes, storage objects, and devices
- Verify volume names and labels

XBSA shared library

A unique version of the X/Open Backup Services API (XBSA) shared library that ON-Bar and the OneDB® Primary Storage Manager use to communicate with each other. When ON-Bar stores or retrieves data that is stored on storage devices, the storage manager coordinates the request through the XBSA interface at the device level. You specify the location of the XBSA shared library with the `BAR_BSALIB_PATH` configuration parameter.

Storage catalog tables

A set of flat files that track information about all storage objects, devices, and device pools. These files are required to restore backup objects that are created by OneDB® Primary Storage Manager. By default, these files are stored in the `$ONEDB_HOME/etc/psm` directory. You can use the `PSM_CATALOG_PATH` configuration parameter to specify another location for the storage catalog tables.

**Important:**

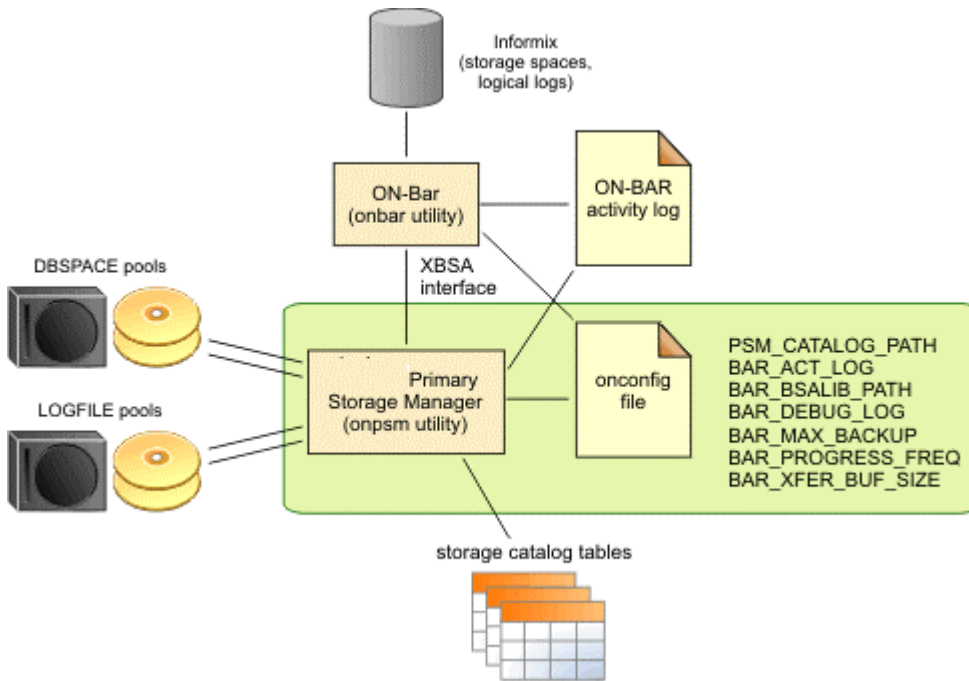
- Back up the storage catalog tables with your operating system tools as part of a disaster recovery strategy. The storage catalog tables are not backed up with the database instance and they are not associated with system catalog tables.
- To prevent the storage catalog tables from getting too large, delete old generations of backups regularly. Use the `onsmsync` utility to manage expiration policies.

The configuration parameters that you use to configure the OneDB® Primary Storage Manager are in the `onconfig` file.

You define and maintain storage devices with the `onpsm` command-line utility. You can configure one device at a time or generate a device-configuration file to configure multiple devices. During backups, OneDB® Primary Storage Manager selects a device from a pool of available devices. If the device becomes full or fails, the storage manager automatically moves to another device in the same pool.

OneDB® Primary Storage Manager writes informational, warning and error messages to the storage manager activity log. You can use the `PSM_ACT_LOG` configuration parameter to specify the location of the activity log. If the `PSM_ACT_LOG` configuration parameter does not contain information, the storage manager puts activity information in the directory specified with the `BAR_ACT_LOG` configuration parameter.

Figure 26. Components of OneDB® Primary Storage Manager



Storage manager feature	Explanation
Storage devices to use with the storage manager	File devices only The storage manager automatically creates a default device when a catalog is created. The default device is \$ONEDB_HOME/backups. You can remove the default device.
Buffer transfer size	Unlimited
Encryption and compression	Achieved with BACKUP_FILTER, RESTORE_FILTER FILTERS in ON-Bar (The storage manager does not provide encryption or compression.)(The storage manager does not provide compression.)
Expiration policies of the storage manager	No expiration policies. (You manually expire backup objects from the storage manager with the onsmsync utility. The onsmsync object expiration commands remove objects from the storage manager.)

You can perform an imported restore with ON-Bar and the OneDB® Primary Storage Manager. In an imported restore, you back up the HCL OneDB™ instance on one machine and restore the instance on a different machine. Use the onsmsync export and import options to export the backup objects from the storage manager on the backup machine and import the backup objects into the storage manager on the restore machine.

Backups to Cloud and STDIO devices

Using STDIO devices for backup and restore:

- PSM will write/read a stream of data to an external utility (i.e. sftp or curl)
- Operator to provide parameters to invoke the utility for read/write/drop operations
- Transfer of data to the third party program will happen using STDIO, PSM will write to the standard input of the utility and will read from its standard output
- The Operator do not have direct access to the stream of data
- In order to use this feature the operator must create a PSM device of type "STDIO"
- A device of type STDIO will require you provide the path to the program to be executed as the device name (i.e. /usr/bin/curl)
- Also you must provide the arguments to call the program during backup, restore and drop
- You can optionally provide the maximum size of a file, if the backup is bigger than this size, it will be broken up in pieces of this size

The new command line is:

```
onpsm -D -add /usr/bin/sftp.sh -t STDIO --stdio_warg "BACKUP @obj_name1@.@obj_id@.@obj_part@"
--stdio_rarg "RESTORE @obj_name1@.@obj_id@.@obj_part@"
--stdio_darg "DELETE @obj_name1@.@obj_id@.@obj_part@" --max_part_size <size in KB>
```

Related reference

[Configure a storage manager on page 25](#)

[The onpsm utility for storage management on page 145](#)

[OneDB Primary Storage Manager configuration parameters on page 136](#)

Related information

[Backup Services API \(XBSA\) on page 22](#)

[Device pools on page 155](#)

[Examples: Manage storage devices with OneDB Primary Storage Manager on page 157](#)

Setting up OneDB® Primary Storage Manager

Setting up involves gathering and specifying information about your storage devices and, if necessary, changing the default configuration of the storage manager.

Related reference

[Configure a storage manager on page 25](#)

[The onpsm utility for storage management on page 145](#)

[OneDB Primary Storage Manager configuration parameters on page 136](#)

Configuring OneDB® Primary Storage Manager

By default, the HCL OneDB™ Primary Storage Manager is automatically configured with the information specified in the storage manager and with some ON-Bar configuration parameters. It is also automatically configured when you use the `onpsm` utility. You can change the configuration.

About this task

The OneDB® Primary Storage Manager uses file devices (disks) only, not tapes. You cannot configure the storage manager to use tapes.

To manually configure the OneDB® Primary Storage Manager:

1. Update the `BAR_BSALIB_PATH` configuration parameter to point to the storage manager library.

For example, on Linux™ or Solaris, specify:

```
BAR_BSALIB_PATH $ONEDB_HOME/lib/libbsapsm.so
```

2. Specify the destination and source devices for backup and restore operations by using the `onpsm` utility.
3. Change the default configuration for the storage manager if necessary for your environment:
 - a. To override the default values for the location of storage manager log files and catalogs, debugging activity, and pool names, specify new values in the OneDB® Primary Storage Manager configuration parameters.
 - b. To specify a larger transfer buffer with ON-Bar and the OneDB® Primary Storage Manager, increase the size in the `BAR_XFER_BUF_SIZE` configuration parameter.
 - c. To change the frequency of the progress messages in the ON-Bar activity log, update the value specified in the `BAR_PROGRESS_FREQ` configuration parameter.
 - d. To change the number of processes that ON-Bar runs concurrently, update the value specified in the `BAR_MAX_BACKUP` configuration parameter.

Related reference

[OneDB Primary Storage Manager configuration parameters on page 136](#)

[ON-Bar configuration parameters and environment variable on page 180](#)

[The `onpsm` utility for storage management on page 145](#)

OneDB® Primary Storage Manager configuration parameters

The HCL OneDB™ Primary Storage Manager uses the information in some specific configuration parameters.

Related information

[HCL OneDB Primary Storage Manager on page 132](#)

[Setting up OneDB Primary Storage Manager on page 135](#)

[Configuring OneDB Primary Storage Manager on page 136](#)

[Examples: Manage storage devices with OneDB Primary Storage Manager on page 157](#)

PSM_ACT_LOG configuration parameter

Use the PSM_ACT_LOG configuration parameter to specify the location of the HCL OneDB™ Primary Storage Manager activity log if you do not want the log information included in the ON-Bar activity log.

onconfig.std value

none

if value not present

The value of the BAR_ACT_LOG configuration parameter is used

range of values

Full path name

takes effect

When the **onpsm** utility starts

When you reset the value dynamically in your `onconfig` file by running the `onmode -wf` command.

Usage

Specify a path to an existing directory with an appropriate amount of space available or use `$ONEDB_HOME/psm_act.log`. If you specify a file name only, the storage manager creates the activity log in the working directory in which you started the storage manager.

If the PSM_ACT_LOG configuration parameter is not set, the OneDB® Primary Storage Manager puts activity information in the directory specified with the BAR_ACT_LOG configuration parameter. To clearly distinguish ON-Bar and OneDB® Primary Storage Manager activity information, use the PSM_ACT_LOG to specify a different location for the storage manager activity log.

The format of the file resembles the format of the database server message log. You can examine the activity log to determine the results of storage manager actions.

The file specified by the PSM_ACT_LOG configuration parameter is created if it does not exist.

You can also use the **PSM_ACT_LOG** environment variable to specify the location of the OneDB® Primary Storage Manager activity log for your environment, for example, for a single session.

Related reference

[Message logs for OneDB Primary Storage Manager on page 156](#)

[BAR_ACT_LOG configuration parameter on page 181](#)

Related information

[PSM_ACT_LOG environment variable on page](#)

[onmode -wf, -wm: Dynamically change certain configuration parameters on page](#)

PSM_CATALOG_PATH configuration parameter

Use the PSM_CATALOG_PATH configuration parameter to specify the full path to the directory that contains the HCL OneDB™ Primary Storage Manager catalog tables. These catalog tables contain information about the pools, devices, and objects managed by the storage manager.

onconfig.std value

Not set. The default value is used.

default value

UNIX™ or Linux™: `$ONEDB_HOME/etc/psm`

Windows™: `%ONEDB_HOME%\etc\psm`

range of values

Full path name for the directory that contains the OneDB® Primary Storage Manager catalog tables

takes effect

When the ON-Bar or **onpsm** utility starts

When you reset the value dynamically in your `onconfig` file by running the `onmode -wf` command.

When you reset the value in memory by running the `onmode -wm` command.

Usage

You can change the default path to another location. The OneDB® Primary Storage Manager places the file that information about the devices and objects in whatever directory you specify.

If you move the backup file to another location, change the value of the PSM_CATALOG_PATH configuration parameter.

You can back up the contents of the file whenever you want.

If you have multiple instances, all instances contain the same catalog tables if the PSM_CATALOG_PATH in each instance is set to the same path. You can specify a different path for each instance.

The storage manager automatically creates the catalog tables the first time you run an `onpsm` utility command or the first time that the XBSA shared library is used.

You can also use the **PSM_CATALOG_PATH** environment variable to specify the location of the OneDB® Primary Storage Manager catalog tables for your environment, for example, for a single session.

Related information

[PSM_CATALOG_PATH environment variable on page](#)

[onmode -wf, -wm: Dynamically change certain configuration parameters on page](#)

PSM_CATALOG_BACKUP configuration parameter

Use the PSM_CATALOG_BACKUP configuration parameter to automatically backup the PSM catalog every time a new device is created and restore the catalog if it does not exist.

onconfig.std value

Empty

takes effect

When the **onpsm** utility starts

When the **onbar** utility starts

Usage

```
<location>[, creds=<keystore-file>][, autoscan=[yes|no]]
```

Set the *location* to a local file in the current machine (ie `/home/onedb/backup/catalog/mycatalog.json`) or to a URL for a supported cloud provider (ie `https://mybucket.s3.amazonaws.com/mycatalog.json`)



Note: If a URL is used, you must provide the full path of a keystore file containing the credentials to access the URL.

If `autoscan` is set to `yes` and the catalog is recreated, PSM will start an automatic scan of all devices.

PSM_DBS_POOL configuration parameter

Use the PSM_DBS_POOL configuration parameter to change the name of the pool in which the HCL OneDB™ Primary Storage Manager places backup and restore dbspace data.

onconfig.std value

DBSPool

takes effect

When the **onpsm** utility starts

When you reset the value dynamically in your `onconfig` file by running the `onmode -wf` command.

When you reset the value in memory by running the `onmode -wm` command.

Usage

The storage manager automatically places the dbspace data in the `DBSPPOOL` or the pool you specify. You can use any combination of letters and digits.

You can also use the `PSM_DBS_POOL` environment variable to change the name of the pool for your environment, for example, for a single session.

Related information

[Device pools on page 155](#)

[PSM_DBS_POOL environment variable on page](#)

[onmode -wf, -wm: Dynamically change certain configuration parameters on page](#)

PSM_DEBUG configuration parameter

Use the `PSM_DEBUG` configuration parameter to specify the amount of debugging information that prints in the OneDB® Primary Storage Manager debug log if you want to use a debug level that is different from the one used by ON-Bar.

onconfig.std value

Not set. The default value is used.

default value

The value of the `BAR_DEBUG` configuration parameter is used.

units

One digit to represent the level of debugging information that you want

range of values

0 = No debugging messages.

1 = Prints only internal errors.

2 = Prints information about the entry and exit of functions and prints internal errors.

3 = Prints the information specified by 1-2 with additional details.

4 = Prints information about parallel operations and the information specified by 1-3.

5 = Prints information about internal states in the OneDB® Primary Storage Manager.

6 = Prints the information specified by 1-5 with additional details.

7 = Prints information specified by 1-6 with additional details.

8 = Prints information specified by 1-7 with additional details.

9 = Prints all debugging information.

takes effect

When the onpsm utility starts

When the ON-Bar utility executes commands and reads information that is specified in the BAR_DEBUG configuration parameter

When you reset the value dynamically in your `onconfig` file by running the `onmode -wf` command.

When you reset the value in memory by running the `onmode -wm` command.

Usage

If you set the PSM_DEBUG configuration parameter to a valid value that is higher than 0, the OneDB® Primary Storage Manager logs debug messages to its debug log.

You can experiment with the debug values to find the right amount of information. Generally, if the PSM_DEBUG configuration parameter is set to 5, the storage manager prints enough information for tracing and debugging purposes.

Settings of 8 and 9 require a large amount of space.

You can also use the **PSM_DEBUG** environment variable to specify the amount of debugging information that prints in the storage manager debug log for your environment, for example, for a single session.

Related reference

[Message logs for OneDB Primary Storage Manager on page 156](#)

Related information

[PSM_DEBUG environment variable on page](#)

[onmode -wf, -wm: Dynamically change certain configuration parameters on page](#)

PSM_DEBUG_LOG configuration parameter

Use the PSM_DEBUG_LOG configuration parameter to specify the location of the debug log to which the HCL OneDB™ Primary Storage Manager writes debugging messages if you do not want the log information included in the ON-Bar debug log.

onconfig.std value

Not set. The default value is used.

default value

The value of the BAR_DEBUG_LOG configuration parameter is used.

takes effect

When the onpsm utility starts

When you reset the value dynamically in your `onconfig` file by running the `onmode -wf` command.

When you reset the value in memory by running the `onmode -wm` command.

Usage

If the `PSM_DEBUG_LOG` configuration parameter is not set, the OneDB® Primary Storage Manager puts activity information in the directory specified with the `BAR_DEBUG_LOG` configuration parameter. To clearly distinguish ON-Bar and OneDB® Primary Storage Manager activity information, use the `PSM_DEBUG_LOG` to specify a different location for the OneDB® Primary Storage Manager activity log.

For security reasons, set the `PSM_DEBUG_LOG` configuration parameter to a directory with restricted permissions, such as the `$ONEDB_HOME` directory.

If the directory that holds the debug file becomes too large, you can erase the file. You need to retain information only if there are problems that need to be debugged.

You can also use the **`PSM_DEBUG_LOG`** environment variable to specify the location of the debug log for your environment, for example, for a single session.

Related reference

[Message logs for OneDB Primary Storage Manager on page 156](#)

[BAR_DEBUG_LOG configuration parameter on page 188](#)

Related information

[PSM_DEBUG_LOG environment variable on page](#)

[onmode -wf, -wm: Dynamically change certain configuration parameters on page](#)

PSM_LOG_POOL configuration parameter

Use the `PSM_LOG_POOL` configuration parameter to change the name of the pool in which the HCL OneDB™ Primary Storage Manager places backup and restore log data.

onconfig.std value

LOGPOOL

takes effect

When the **onpsm** utility starts

When you reset the value dynamically in your `onconfig` file by running the `onmode -wf` command.

When you reset the value in memory by running the `onmode -wm` command.

Usage

The storage manager automatically places the log data in the `LOGPOOL` or the pool you specify. You can use any combination of letters and digits.

You can also use the **PSM_LOG_POOL** environment variable to change the name of the pool for your environment, for example, for a single session.

Related information

[Device pools on page 155](#)

[PSM_LOG_POOL environment variable on page](#)

[onmode -wf, -wm: Dynamically change certain configuration parameters on page](#)

Managing backup devices

The PSM uses the directory backups under the installation directory (<Installation-Directory>/backups in Linux/UNIX) to store backup objects.

In most cases you will want to move or change this location to a more suitable place, either one with more space or in a safer, less volatile location.

Use the onpsm utility (option -D) to manage (add, delete, update, scan, purge or list) devices in the PSM.

Scan devices

The PSM stores backup objects in its devices and keeps track of them in its catalog. In order to retrieve any backup object from PSM, it is not enough to have the backup devices but also they must be cataloged. If for some reason the PSM catalog is lost, or if you need to copy the devices to another machine (ie to create a test machine based in a backup from the production machine), you can do so by copying the whole directory structure of the device and copy it into a new empty device in the new location, then perform a scan operation on that device to catalog all the objects.

It is recommended that you do not take objects from multiple PSM installations into a single one, as the object identifier for each object cannot be duplicated. Once an object id is taken for a specific object, another object cannot be created with the same id. If a scan operation attempts to catalog an object that has an object id already in our catalog, then the scan of that object will fail.

Purge devices

Under normal circumstances, objects are removed from the PSM using the *del* action in the object sub-menu (option -O) or by expiring objects using the onsmsync utility.

However, if for some reason an backup object is physically removed from the backups device and you also want to remove it from the catalog, you can do so by using the *purge* action of the device sub-menu.



Note: Scan and Purge operations are only supported in *FILE* and *CLOUD* type devices.

Related reference

[The onpsm utility for storage management on page 145](#)

[The onsmsync utility on page 102](#)

Managing the PSM catalog

The PSM stores information about every object that is backed up in a catalog for later reference and been able to locate the objects.

The catalog is stored in the directory pointed by the configuration parameter **PSM_CATALOG_PATH**. It consists a set of files that represent tables and indexes. The tables are in binary format and you cannot access or modify its information directly. The only supported way to access the catalog is using the different options of the onpsm command utility.

If the catalog is lost, access to the backed up objects becomes impossible. If this situation happens, you have the following options:

1. Since the PSM catalog consist of regular operating system files, you can restore those files if you have a recent file system backup. The backup must be taken while the PSM catalog was not being used.
2. You can import a catalog export generated with the onpsm utility (action *export* in the catalog (-C) menu).
3. You can restore a catalog backup, generated with the onpsm utility (action *backup* in the catalog (-C) menu).



Attention: Any objects created after the catalog was backed up or exported will not be present in the catalog and therefore will not be restorable. In order to make those objects restorable, you need to scan the PSM devices to add any additional objects.

If you do not have any suitable copy/backup of the catalog you can scan the devices, however scanning the devices is a potentially slow operation and it preferably to use it to add a few objects after the restore instead of scanning every single object.

Catalog backup

A new functionality to backup/restore the catalog was introduced in OneDB 1.0.1.0. This option allows you to generate a backup to a single file that contains a JSON representation of the PSM catalog.

The catalog backup can be stored in a local file in the machine:

```
onpsm -C backup /home/onedb/psm/catalog_backup/psm_catalog.json
```

Or to a suitable cloud location (Currently only S3), if using a cloud location, you must provide the information about how to connect to the cloud location in a keystore generated with the onkstore utility:


```
onpsm -C backup https://mybucket.s3.amazonaws.com/dir1/psm_catalog.json --creds /home/onedb/keystores/psm_s3.p12
```

If the **PSM_CATALOG_BACKUP** configuration parameter is set, the PSM will automatically backup the catalog every time that a new device is added. Also the onbar script contains logic to detect that the parameter is set and, in that case, start a catalog backup every time that a level 0 backup is performed.

If the **PSM_CATALOG_BACKUP** configuration parameter is set, the PSM will automatically restore the catalog if the catalog does not exist. If the catalog is restored, the default devices will not be created if they did not exist in the original catalog.

Related reference

[PSM_CATALOG_BACKUP configuration parameter on page 139](#)

The onpsm utility for storage management

Use the onpsm utility to manage the HCL OneDB™ Primary Storage Manager catalogs, devices, locks, and objects.

Pre-requisite: To run the onpsm utility, you must be user **root** or **informix**.

Syntax

```
>>-onpsm---+---| Catalog options |---+-----><
| +-| Device options |--+ |
| +-| Object options |--+ |
| '-| Pool options |----' |
+--- -h -----+
'-+-----+'
+- -V -----+
+- -version-----+
'- -version all-'

Catalog options

|-- -C +-check---+-----+-----|
|          +- -l +          |
|          '- -n '          |
+-----+-----+
| 'backup---location-- --creds ---credentials_file|
+-----+-----+
| 'restore---location-- --creds ---credentials_file|
+-----+-----+
| '- detail-'          |
+-----+-----+
| '- export-'          |
+- import + |
|          '- -y ----' |
+-----+-----+
| +- init ---+          |
| +- init -d +          |
| '- -y ----'          |
'-+-----+'
'- unlock '
```

```

Device options
|-- -D --add--path-- -p -priority-- -g -pool_name-- -t -type-------+-- -b -block_size+--|
|                                     '- -s -size-' |
+-del--path--+ -g -pool_name--+-----+-----+-----+-----+-----+-----+
|                                     | '- -y ' |
|                                     '- -d +-----+-----+' |
|                                     | '- -y ' |
+-list--+ -u +-----+-----+-----+-----+-----+-----+-----+
|                                     '- -l -dev_def_file.txt-' |
+-purge--path-----+-----+-----+-----+-----+-----+
+-scan--path-----+-----+-----+-----+-----+-----+
'+update--path-----+-----+-----+-----+-----+-----+
|                                     '- -p -priority-' '- -s -size-'

Object options

|-- -O --del-- -o -object_id--+-----+-----+-----+-----+-----+-----+
|                                     | '- -y ' |
+-detail-- -o -object_id-----+
+-dump-- -o -object_id-----+
'-list-----+-----+-----+-----+-----+-----+

Pool options

|-- P --add--pool_name-----+-----+-----+-----+-----+-----+
+-del--pool_name--+-----+-----+
|                                     | '- -y ' |
'-list-----+-----+-----+-----+-----+-----+
    
```

Table 29. onpsm utility catalog options

Element	Purpose	Key Considerations
-C check	Checks storage manager catalog tables, which store metadata about the pools and devices that the storage manager manages	This command identifies files that have problems.
-C check -l	Displays index keys while checking the catalog tables	
-C check -n	Indicates that the storage manager does not fix errors that are found	
-C detail	Shows details about the storage manager catalog tables	
-C export	Exports the OneDB® Primary Storage Manager catalog tables to a directory called <code>psm_catalog.exp</code>	

Table 29. onpsm utility catalog options (continued)

Element	Purpose	Key Considerations
-C import	Replaces the current OneDB® Primary Storage Manager catalog with a catalog that is recreated from files that are in the <code>psm_catalog.exp</code> directory	Only import the catalog if you have a system problem, lost your current catalog, and need to revert to the exported catalog. If you need to import a catalog, run the <code>onpsm -C init</code> command before you run the <code>onpsm -C import</code> command.
-C init	Deletes storage manager catalog tables	
-C init -d	Deletes storage manager catalog table and the backup objects in file devices	
-C unlock	Unlocks the storage manager catalog	If the storage manager exits abnormally from a backup or restore session because a failure occurred, storage manager catalog tables might remain locked. If catalog tables are locked, you can release the locks.
-y	Specifies to not to ask for confirmation before deleting catalog tables	

Table 30. onpsm utility device options

Element	Purpose	Key Considerations
-D add	Adds a device to the pool specified with the <code>-g</code> option	Before adding devices, gather information about the device. See <i>Collecting information about file directories and devices</i> .
-D del	Removes a device: <ul style="list-style-type: none"> If you use the <code>-g</code> option, removes a device from the pool specified with the <code>-g</code> option, while retaining the device objects in the OneDB® Primary Storage Manager catalog. If you use the <code>-d</code> option, removes the device from all pools and removes all backup objects from the file system in that device 	If you delete the device using <code>-g</code> option, you can restore the objects if necessary. If you remove a device, the storage manager cannot add new objects to the device.
-D list	Displays a list of all devices in the system	

Table 30. onpsm utility device options (continued)

Element	Purpose	Key Considerations
-D purge	Removes missing storage manager objects from the OneDB® Primary Storage Manager catalog	
-D scan	Scans objects in the device to verify that the objects exist in the OneDB® Primary Storage Manager catalog so the objects can be restored if necessary If an object is not in the catalog, this command adds the object to the catalog.	If the command cannot add an object to the catalog, the command ignores the missing file. Before a missing object can be added to a catalog, the following conditions must occur: <ul style="list-style-type: none"> • The object ID must not be assigned to any other object in the storage manager. • Files must not be renamed or relocated to different directories inside the device • The object version must not be assigned to any other object in the storage manager.
-D update	Modifies information about a device	If you want to modify information about more than one device, run a separate command for each device.
<i>path</i>	Full name and path to the device (for TAPE devices) or to a directory (for FILE devices)	The path must be in the format appropriate to the operating system to which the device is attached . The name of the device must be unique within a pool. You can include the same device in multiple pools. If you are deleting, listing, purging, scanning, or updating information, the path must be to an existing device.
-b <i>block_size</i>	For tape devices only, the minimum number of bytes of data that need to accrue before the data is written to the device	The block size is required for tape devices.
-d	Deletes the pool from all pools and deletes backup objects	The block size is required for tape devices.
-g <i>pool_name</i>	The pool in which to add the device, either DBSPool, LOG POOL, or EXTPool	Information about pools is stored in the OneDB® Primary Storage Manager catalog. If you do not provide a pool name, the command fails. Specify:

Table 30. onpsm utility device options (continued)

Element	Purpose	Key Considerations
		<ul style="list-style-type: none"> • DBSPPOOL for backups of dbspaces, blobspaces, and sbspaces • LOGPOOL for backups of logical logs • EXTPPOOL that serves as a staging area from which you can move specific backups or backup generations to permanent storage or onto a different computer.
-l <i>dev_def_file.txt</i>	Loads information about the device from a device-definition file	
-p <i>priority</i>	Priority of the device, either HIGHEST, HIGH, LOW, or READ-ONLY	<p>The storage manager fills high-priority devices in a pool before placing data into low-priority devices in that pool. If the high-priority devices are busy at the moment when the storage manager is ready to fill a pool, the storage manager uses low priority devices.</p> <p>Only one device in a pool can have the priority of HIGHEST.</p> <p>If multiple devices have the same priority in the same pool, the storage manager determines which device to use first.</p> <p>When a device becomes full, the storage manager changes the priority to READ-ONLY. You can change the priority after you add more space to the device.</p>
-s <i>size</i>	For tape devices only, the maximum storage capacity of the device in kilobytes	<p>The size is optional for tape devices. If a size is not specified, or if you specify 0, the storage manager interprets the size as unlimited. When the size is unlimited, the device is not considered full until it returns an error that specifies that the device is full.</p> <p>To specify the size enter the numeric value of the size followed by the suffix B, K, M, G, T, or P (for bytes, kilobytes, megabytes, gigabytes, terabytes, or petabytes). The suffix can be upper or lowercase.</p>
-t <i>type</i>	Type of device, either FILE or TAPE	Information about devices is stored in the OneDB® Primary Storage Manager catalog,
-u	Unloads information about the device to a device-definition file	The device definition file is a text file with a specific format. The storage manager uses the file to recreate the

Table 30. onpsm utility device options (continued)

Element	Purpose	Key Considerations
		information when you run an onpsm command with the load option.
-y	Specifies not to ask for confirmation to complete the requested action	

Table 31. onpsm object options

Element	Purpose	Key Considerations
-O del	Deletes physical objects from a pool	
-O detail	Displays details about the specified object. Details include the location of the object.	
-O dump	Extracts the object data to a file in the current directory	
-o <i>object_id</i>	Identifies the particular object	You can delete or dump one or more objects with a single command, as shown in Usage on page 151 .
-O list	Displays all objects in a pool	For each object, the list includes the date and time the object was created, the size of the object, and the path name of the object.
-y	Specifies not to ask for confirmation to complete the requested action.	

Table 32. onpsm pool options

Element	Purpose	Key Considerations
-P add <i>pool_name</i>	Adds a new pool	
-P del <i>pool_name</i>	Deletes the specified pool	
-P list	Lists all pools in the system	
-y	Specifies not to ask for confirmation to complete the requested action.	

Table 33. onpsm utility general options

Element	Purpose	Key Considerations
-h	Displays help information	

Table 33. onpsm utility general options (continued)

Element	Purpose	Key Considerations
-V	Displays the software version number and the serial number	For more details about the standard -V and -version options, see Obtaining utility version information on page .
-version	Displays the software version number, serial number, and additional information such as the host, operating system, build date, and the Global Language Support (GLS) version	For more details about the standard -V and -version options, see Obtaining utility version information on page .
-version all	Displays onpsm version information and information about the PSM shared library	

Usage

When you run an onpsm command to define a device, the storage manager automatically creates storage manager catalogs if they do not exist.

The default device for the storage manager is `$ONEDB_HOME/backups`. The device, which is low priority, is automatically created when the catalog is created. You can remove the default device.

When you create a device, the storage manager automatically creates the directory for the device if the directory does not exist. The storage manager uses the directory path that you specify in the `onpsm -D add` command.

You can delete one or more objects with a single command, for example, by running a command that has this format:

```
onpsm _0 del -o obj_1 -o obj_2
```

You can also dump one or more objects with a single command, for example, by running a command that has this format:

```
onpsm _0 dump -o obj_1 -o obj_2
```

If the data is not needed, run the `onsmsync` utility to delete backup objects from the OneDB® Primary Storage Manager.

Some third-party storage managers do not allow the `onsmsync` utility to delete backup objects from the storage manager. If you have a third-party storage manager, you might need to manually delete backup objects that you no longer need.

Example

Examples

The following command adds a file device with the path name `$ONEDB_HOME/backups` in the `DBSPool` pool:

```
onpsm -D add $ONEDB_HOME/backups -g DBSPool -t FILE -p HIGH
```

The following command checks OneDB® Primary Storage Manager catalog tables and indicates that the storage manager does not fix any errors found during the check:

```
onpsm -C check -n
```

The following command lists objects in pools, including the date and time the object was created, the size of the object, and the path name of the object.

```
onpsm -O list
```

Related information

[HCL OneDB Primary Storage Manager on page 132](#)

[Setting up OneDB Primary Storage Manager on page 135](#)

[Configuring OneDB Primary Storage Manager on page 136](#)

[Managing backup devices on page 143](#)

[Examples: Manage storage devices with OneDB Primary Storage Manager on page 157](#)

[Device pools on page 155](#)

onpsm -C detail output

Use the onpsm -C detail command to view details about the storage manager catalog tables.

Sample onpsm -C detail command output

```
D:\IFMXDATA\gacpsm>onpsm -C detail
```

```
HCL
```

```
OneDB™ Primary Storage Manager State:
```

```
PSM Unique ID      : 1358735848
Catalog Location   : D:\database\1210\etc\psm\
Catalog State      : Locked
Catalog Owner      : 2
Catalog Lock Mode  : Regular
```

```
Sessions:
```

```
Session ID      Process ID
-----
2                1576
3                4556
4                5555
```

```
HCL
```

```
OneDB™ PSM Locked Objects
```

Session	Object Id	Date	Time	Server	Object Name
3	116	2012-12-09	20:54:34	/gacpsm_tcp	/gacpsm_tcp/168/242
4	117	2012-12-09	21:07:44	/gacpsm_tcp	/gacpsm_tcp/168/242

The output contains the following sections:

OneDB® Primary Storage Manager State

Shows general information about all of the sessions that are active in the system and whether the catalog is locked.

PSM Unique ID

ID for the catalog

Catalog Location

Path to the catalog

Catalog State

Indicates whether the catalog is locked

Catalog Owner

OneDB® Primary Storage Manager session ID

Catalog Lock Mode

Lock category

For example, `Regular` means that the lock is a user lock.

Sessions

Lists all of the sessions that are active in the system and the process IDs that match the sessions.

Session ID

ID of the session. This is the same ID that appears in the `Catalog Owner` field.

Process ID

Internal ID for the ON-Bar, archecker, or storage manager process that is locking the catalog.

HCL OneDB™ PSM Locked Objects

Shows the locks in devices or objects that are held by storage manager sessions. For each lock, the output shows the session number, the object ID, the date and time that the lock was placed, the server, and the object name.

onpsm -D list output

The `onpsm -D list` command displays information about all of the devices in each HCL OneDB™ Primary Storage Manager pool. You can use this list to determine whether you need to change information about your devices.

Sample onpsm -D list command output

Type	Prio	Block/Size (MB)	Pool Name	Device Name
FILE	LOW	--/--	DBSPool	/informix/backups
FILE	LOW	--/--	LOGPOOL	/informix/backups

Type

Type of device, either FILE or TAPE (Currently only the FILE type is supported.)

Prio

Priority of the device, either HIGH, HIGHEST, LOW, or READ-ONLY

HIGH is the default priority if a priority is not specified. Only one device in a pool can have a priority of HIGHEST.

Block Size

Size of the device (only applies to devices of the TAPE type)

Pool Name

The name of the pool (DBSPool, LOGPOOL, or EXTPool)

In the example output above, there are no EXTPool devices.

Device Name

Complete path name for the device

onpsm -O list output

The onpsm -O list command displays all of the objects stored in a pool.

Sample onpsm -O list command output

```
Object List Report
```

Obj ID	Date Created	Size (MB)	Logical Path
			Name.Version (omits piece #)
1	2012-07-06 14:39:47	12.0	/gacpsm_tcp/rootdbs/0/gacpsm_tcp.1
2	2012-07-06 14:41:18	12.0	/gacpsm_tcp/rootdbs/0/gacpsm_tcp.2
3	2012-07-11 13:42:10	3.9	/gacpsm_tcp/160/14/gacpsm_tcp.1
4	2012-07-11 13:42:13	3.9	/gacpsm_tcp/160/15/gacpsm_tcp.1
5	2012-07-11 13:42:15	3.9	/gacpsm_tcp/160/16/gacpsm_tcp.1
6	2012-07-11 13:42:15	3.9	/gacpsm_tcp/160/17/gacpsm_tcp.1
7	2012-07-11 13:42:15	3.9	/gacpsm_tcp/160/18/gacpsm_tcp.1
8	2012-07-11 13:42:15	3.9	/gacpsm_tcp/160/19/gacpsm_tcp.1
9	2012-07-11 13:42:16	3.9	/gacpsm_tcp/160/20/gacpsm_tcp.1
10	2012-07-11 13:42:16	3.9	/gacpsm_tcp/160/21/gacpsm_tcp.1

Obj ID

The ID of the stored object

Date Created

The date and time when the object was created

Size

The size of the object in megabytes

Name.Version

The path name of the object followed by . and the version of the object (for example, .2 to indication version 2)

Device pools

The HCL OneDB™ Primary Storage Manager pool is a named group of disk devices that you use as a repository for backups.

When storing backup objects, the OneDB® Primary Storage Manager selects particular devices from the pool and moves automatically from one device to another when devices are full or when they fail. You maintain pools by using the `onpsm` utility to add, modify, view, and drop devices in the pool.

Three pools are available:

DBSPOOL

Holds online backups of dbspaces, blobspaces, and sbspaces

LOGPOOL

Holds online backups of logical logs

EXTPOOL

Serves as a staging area for exporting a backup set of objects to a single large, external logical object or for importing the backed up objects. You can move specific backups or backups generations in this pool to permanent storage or onto a different computer. Files in the EXTERNAL pool are offline. The files are not visible to ON-Bar, and the OneDB® Primary Storage Manager does not track them.

Related reference

[PSM_DBS_POOL configuration parameter on page 139](#)

[PSM_LOG_POOL configuration parameter on page 142](#)

[The `onpsm` utility for storage management on page 145](#)

Related information

[HCL OneDB Primary Storage Manager on page 132](#)

[OneDB Primary Storage Manager file-naming conventions on page 155](#)

OneDB® Primary Storage Manager file-naming conventions

When creating files that store your backup data, the HCL OneDB™ Primary Storage Manager uses specific file-naming conventions.

For the DBSPOOL and LOGPOOL device pools, the path name of the storage file consists of:

1. Category information:
 - For space backups, the category consists of the device name, the database server name, and the space name
 - For log backups, the category consists of the device name, the database server name, server number, and a log file number
2. For space backups, the backup level, either: 0, 1, or 2

3. A version number, which is an integer that starts at 1 for an object of that category and is incremented for each subsequent backup of an object of that category.
4. An ID that identifies a piece of the backed up object

For space backups, file names have this format:

```
/device/DBSERVERNAME/dbspace/backup_level/DBSERVERNAME.version.piece
```

For example, the name of the file for the third piece of a second level 0 backup of the dbspace `rootdbs` for the server named `SERVER1` is:

```
/my_device/SERVER1/rootdbs/0/SERVER1.2.3
```

For log backups, file names have this format:

```
/device/DBSERVERNAME/SERVERNUM/LOG_UNIQUE_ID/DBSERVERNAME.version.piece
```

If you use the `onsmsync` utility with the `-E` option to export a backup generation in the OneDB® Primary Storage Manager, the `onsmsync` utility creates and places the backup files in a subdirectory of the storage manager `EXTPOOL` device. You must provide a *prefix* (the name of a subdirectory) when you use the `onsmsync` utility with the `-E` or `-I` options. ON-Bar uses the specified path as a key to communication with the storage manager to store and retrieve objects.

Related reference

[The `onsmsync` utility on page 102](#)

Related information

[Device pools on page 155](#)

Message logs for OneDB® Primary Storage Manager

The OneDB® Primary Storage Manager writes messages to a storage manager activity log and debug log.

The message logs are stored in the directories specified in the `BAR_DEBUG_LOG` or `BAR_ACT_LOG` configuration parameters. You can use the `PSM_ACT_LOG` and `PSM_DEBUG_LOG` configuration parameters to specify another directory for each of these logs.

The `PSM_DEBUG` configuration parameter specifies the level of debugging activity that is captured in the debug log.

Related reference

[PSM_ACT_LOG configuration parameter on page 137](#)

[PSM_DEBUG_LOG configuration parameter on page 141](#)

[PSM_DEBUG configuration parameter on page 140](#)

Examples: Manage storage devices with OneDB® Primary Storage Manager

Learn how to set up and use OneDB® Primary Storage Manager to manage storage devices that the **onbar** utility uses for backing up and restoring instances. Each example shows how you can use the storage manager for a specific backup strategy.

Before you begin

Prerequisites:

- HCL OneDB™ is installed with the ON-Bar utility.
- Environment variable ONEDB_HOME is set to the path where the database server is installed.
- Environment variable ONCONFIG is set to the file in `$(ONEDB_HOME)/etc` that contains the configuration parameters for your database. The name of the file must be unique for each database server instance.
- User **informix** or root privileges.

About this task

[Examples: Manage storage devices with OneDB Primary Storage Manager on page 157](#)

[Examples: Manage storage devices with OneDB Primary Storage Manager on page 157](#)

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In these examples, *storage manager* refers to OneDB® Primary Storage Manager.

Related reference

[OneDB Primary Storage Manager configuration parameters on page 136](#)

[The onpsm utility for storage management on page 145](#)

[The onsmsync utility on page 102](#)

Related information

[HCL OneDB Primary Storage Manager on page 132](#)

Example 1: Storing backups for an instance

This example shows how to set up and use OneDB® Primary Storage Manager to back up the data and logical logs for a single database server instance to a directory: `$(ONEDB_HOME)/backups`.

About this task

In this example, you update the configuration file so that the OneDB® Primary Storage Manager can communicate with ON-Bar and you specify the directory where you want backups stored. Then you use the **onbar** utility to perform a standard, level-0 backup of all online storage spaces and used logical logs. You validate the backup by checking the messages that were logged and by using the **onpsm** utility to confirm that storage objects were created.

1. Set the `BAR_BSALIB_PATH` configuration parameter to the full path and name of the shared library for the storage manager.

Example

For example, on Linux™, Solaris:

```
BAR_BSALIB_PATH $ONEDB_HOME/lib/libbsapsm.so
```

You must use the version of the XBSA shared library that is provided for OneDB® Primary Storage Manager. If you do not specify the path with the `BAR_BSALIB_PATH` configuration parameter, you must ensure that the XBSA library is in the default location on your operating system.

2. If needed, create the directory in which to store the backup objects.

By default, the storage manger includes the default pools LOGPOOL and DBSPOOL, with the default directory `$ONEDB_HOME/backups` in each pool.

- If you want to use the default backup directory, verify that the `$ONEDB_HOME/backups` directory exists.
- If you want to use a different backup directory, use the `onpsm -D add` command to add a new backup directory for LOGPOOL and DBSPOOL. For example, run the following commands to add different backup directories for the LOGPOOL and DBSPOOL pools:

```
onpsm -D add /backups/infx/logs -g LOGPOOL -p HIGHEST -t FILE
onpsm -D add /backups/infx/spaces -g DBSPOOL -p HIGHEST -t FILE
```

Use the HIGHEST priority for the device that should be filled first. Only one device in a pool can have the priority setting of HIGHEST.

3. Run the **onbar** utility to perform a standard, level-0 backup of all online storage spaces and used logical logs.

Example

```
onbar -b -L 0
```

Result

If the storage catalog tables do not exist, they are created in the `$ONEDB_HOME/etc/psm` directory.

4. Validate that the storage manager is set up and that the backup objects are created.

- a. Look in the ON-Bar activity log to confirm that the storage manager is ready and that ON-Bar recognizes the storage manager.

By default, the storage manager posts messages to the ON-Bar activity log. The location of the activity log is set by the `BAR_ACT_LOG` configuration parameter. If you want the storage manager messages to be logged separately, you must set the `PSM_ACT_LOG` configuration parameter.

- b. Run the `onpsm -O list` command to list the storage objects that were created:

Result

The list includes the storage object IDs, the date the storage objects were created, the size of the storage objects, and where the storage objects are in the storage device. The object IDs are also stored in the `ixbar` file and are used by ON-Bar to locate the objects.

- c. Run the `onpsm -D list` command to display a list that shows that the device was added to the DBSPool and LOGPOOL pools. The following example shows output of the command:

Result

Type	Prio	Block/Size (MB)	Pool Name	Device Name---
FILE	HIGHEST	--/--	DBSPool	/backups/infx/logs
FILE	HIGHEST	--/--	LOGPOOL	/backups/infx/spaces

Results

With a few simple steps, you configured the storage manager and performed a full backup of an instance to a file device. Very little configuration was required because the storage manager uses the default settings for various ON-Bar configuration parameters.

What to do next

Storage catalog tables are not included in a backup. Be sure to back up the storage catalog tables with your operating system tools as part of a disaster recovery strategy. If the storage catalog tables are lost, the **onbar** utility cannot restore the backup objects that OneDB® Primary Storage Manager created. The location of the storage catalog tables is set by the `PSM_CATALOG_PATH` configuration parameter (default = `$ONEDB_HOME/etc/psm`).

To restore the instance from the backup objects, use the **onbar** utility. The storage manager tracks the backup objects and storage devices for you.

Example 2: Storing backups for two instances

This example shows how to configure one instance of OneDB® Primary Storage Manager to manage the storage devices for two database server instances in a multiple residency environment.

About this task

In this example, you set up two independent database server environments on the same computer. Each database server is installed in a separate directory: (`/usr/informix/ids1210fc1` and `/usr/informix/ids1210fc1b`) and has a database server instance. Storage for backup operations on both database server instances is managed by one instance of OneDB® Primary Storage Manager. Pools of storage devices for physical and logical data are configured for each instance.

1. For *each* instance, edit the **onconfig** file to configure storage management for ON-Bar.

Table 34. Configuration parameters and their associated values

Configuration parameter	Value
BAR_BSALIB_PATH	<code>/usr/informix/ids1210fc1b/lib/lib</code>
Specify the full path and name of the shared library for the storage manager.	<code>bsapsm.so</code>

Configuration parameter	Value
PSM_CATALOG_PATH Specify the path of the storage catalog tables.	<code>/usr/informix/ids1210fc1b/etc/psm</code>
PSM_DBS_POOL Specify the name for a group of devices for storing online data (dbspace) backups.	FC1: <code>DBSPPOOL_FC1</code> FC1B: <code>DBSPPOOL_FC1B</code>
PSM_LOG_POOL Specify the name for a group of devices for storing online logical log backups.	FC1: <code>LOGPOOL_FC1</code> FC1B: <code>LOGPOOL_FC1B</code>

- For *each* instance, create a directory in which to store the backup objects.

Example

```
mkdir $ONEDB_HOME/backups/dev_for_1201fc1
mkdir $ONEDB_HOME/backups/dev_for_1201fc1b
```

- Run the **onpsm** utility to create device pools for each instance. For example, specify:

Example

```
onpsm -P add DBSPPOOL_FC1
onpsm -P add LOGPOOL_FC1
onpsm -P add DBSPPOOL_FC1B
onpsm -P add LOGPOOL_FC1B
```

- Run the **onpsm** utility to add the storage devices.

Example

```
onpsm -D add $ONEDB_HOME/backups/dev_for_1201fc1 -t FILE -g DBSPPOOL_FC1
onpsm -D add $ONEDB_HOME/backups/dev_for_1201fc1 -t FILE -g LOGPOOL_FC1
onpsm -D add $ONEDB_HOME/backups/dev_for_1201fc1b -t FILE -g DBSPPOOL_FC1B
onpsm -D add $ONEDB_HOME/backups/dev_for_1201fc1b -t FILE -g LOGPOOL_FC1B
```

- For *each* instance, run the **onbar** utility to perform a standard, level-0 backup of all online storage spaces and used logical logs.

Example

```
onbar -b -L 0
```

Result

- Validate that the storage manager is set up and that the backup objects are created.

- For *each* instance, look in the ON-Bar activity log to confirm that the storage manager is ready and that ON-Bar recognizes the storage manager. For example, look for this information:

Example

```
2012-01-03 15:51:23 11193 2569 Informix PSM is ready.
2012-01-03 15:51:23 11193 2569 Using Informix PSM version 14.10.FC1
as the Storage Manager. XBSA API version is 1.0.3.
```

- Use the **onpsm** utility to list the storage objects that were created:

Example

```
onpsm -O list
```

Result

The report includes the storage object IDs, the date the storage objects were created, the size of the storage objects, and the location of the storage objects in the storage device.

Example 3: Exporting backups to and restoring them from another directory

This example shows how to export backups to a new directory and import the backup objects from that directory.

About this task

Suppose that you keep five generations of backups. As an added precaution, you also keep copies of the most recent backups in a separate directory. In this example, you use the `onmsync` utility to export your most recent backup to and import it from the OneDB® Primary Storage Manager external pool in a separate directory.

The storage manager tracks devices in the external device pool (EXTPOOL) so it can copy objects to and from external devices. (Although the storage manager tracks devices, it does not track files and objects that are inside the EXTPOOL pool in the storage manager catalogs.)

1. Store backups for an instance, following the steps in [Examples: Manage storage devices with OneDB Primary Storage Manager on page 157](#).
2. Run the `onpsm -D list` command to check that there is a device in the EXTPOOL pool.
 - a. If there is no device in the EXTPOOL pool, add one using the `onpsm -D add` command.

Example

The following example shows how to add a device with the path `/export/informix/psm_exportdir` to the EXTPOOL pool.

```
$ onpsm -D add /export/informix/psm_exportdir -g EXTPOOL -t FILE
```

3. Run the `onmsync` command to export all backup objects in the generation 1 level-0 backup, using prefix `pw_sept5`, which becomes the name of the subdirectory in which the utility places the backup:

Example

```
onmsync -E -p pw_sept5 -g 1
```

After you run the `onmsync -E` command to export the backup objects, you will see a subdirectory in the EXTPOOL directory that includes a directory holding the backup objects and a file called `export.bom`.

What to do next

Suppose that something happens to the backup generation stored in your primary backup directory and you want to import the `pw_sept5` backup generation from the second directory. To import the backup generation:

1. Run the `onmsync` command to import all backup objects in the `pw_sept5` subdirectory:

```
onmsync -I -p pw_sept5
```

Use your own file-transfer methods to move the exported backups, as needed, to other machines.

Example 4: Exporting a backup from one server and importing it into another server

This example shows how to use the `onmsync` utility to export a backup from a database server that has the name `informix_serv1`. Then the example shows how to use the `onmsync` utility to import the data into a server that has the name `informix_serv2`.

1. Set up and export files on database server `informix_serv1`:

- a. Set the `ONEDB_HOME`, `ONEDB_SERVER`, `ONCONFIG`, `PATH`, `ONEDB_SQLHOSTS` environment variables for `informix_serv1`.
- b. Run the `onpsm -D list` command to check that there is a device in the `EXTPOOL` pool. If there is no device in the `EXTPOOL` pool, add one using the `onpsm -D add` command.
- c. Run the `onmsync` command to export all backup objects in the generation 1 level-0 backup, using prefix `serv1_20120810`, which becomes the name of the subdirectory in which the utility places the backup:

Example

```
$ onmsync -E -p serv1_20120810 -g 1
```

2. Prepare to import files on the second database server, `informix_serv2`, as follows:

- a. Set the `ONEDB_HOME`, `ONEDB_SERVER`, `ONCONFIG`, `PATH`, `ONEDB_SQLHOSTS` environment variables for `informix_serv2`.
- b. Run the `onpsm -D list` command to determine if the `EXTPOOL` has the same device that you viewed or added in step 1b. (This could occur for shared devices). If there is no device in the `EXTPOOL` pool, add one using the `onpsm -D add` command.
- c. Copy the previously exported backup objects (for example, subdirectory `serv1_20120810`) into the `EXTPOOL` device from which you will import the backup objects.
- d. Run the following command to import backup objects from `EXTPOOL` device:

Example

```
$ onmsync -I -p serv1_20120810
```

Result

After you run the `onmsync -I` command to import the backup objects, the objects are stored in the new `LOGPOOL` and `DBSPool` pools.

- e. Run the `onpsm -O list` command to view the imported objects.

Result

Notice that the import command also creates a new `ixbar` file in `$ONEDB_HOME/etc/` directory.

```
$ ls -l $ONEDB_HOME/etc/*ixbar*
-rw-rw-- 1 informix informix    0 Aug 10 19:44
```

```

/usr/informix/etc/ixbar.12.20120810.194441
-rw-rw-- 1 informix informix 2704 Aug 10 19:44
/usr/informix/etc/ixbar.12

```

The new `ixbar` file lists the imported backup objects so that you can perform an ON-BAR cold restore to restore the `informix_serv1` instance from the first database server to the `informix_serv2` instance on the second database server.

archecker table level restore utility

archecker table level restore utility

You can use the `archecker` utility to perform point-in-time table-level restores that extract tables or portion of tables from archives and logical logs.

The `archecker` utility restores tables by specifying the source table to be extracted, the destination table where the data is placed, and an INSERT statement that links the two tables.

For information about using the `archecker` utility to verify backups, see [onbar -v syntax: Verifying backups on page 53](#).

Related reference

[The archecker utility configuration parameters and environment variable on page 212](#)

Overview of the archecker utility

The **archecker** utility is useful where portions of a database, a table, a portion of a table, or a set of tables need to be recovered. It is also useful in situations where tables need to be moved across server versions or platforms.

Use `archecker` utility in the following situations:

- Restore data

You can use the `archecker` utility to restore a specific table or set of tables that have previously been backed up with ON-Bar or `ontape`. These tables can be restored to a specific point in time. This is useful, for example, to restore a table that has accidentally been dropped.

The following restrictions, however, limit the functionality of the `archecker` utility in some table-level restore operations:

- The `archecker` utility is not JSON compatible. If you try to use the utility with target tables that contain columns of JSON or BSON (binary JSON) data types, the utility will abort and return an error message. (Besides data-restore contexts, this limitation affects all `archecker` operations on tables with JSON or BSON columns.)
- You cannot logically restore a table when restoring smart large objects. Only a physical restore of BLOB or CLOB objects is supported for table-level restore operations using the `archecker` utility.

- You cannot restore data from a remote device.
- You cannot use a shared memory connection when performing a table-level restore.
- Copy data

The archecker utility can also be used as a method of copying data. For example, you can move a table from the production system to another system.

The archecker utility is more efficient than other mechanisms for copying data. Because archecker extracts data as text, it can copy data between platforms or server versions.

- Migrate data

You can also use the archecker utility as a migration tool to move a table to other HCL® OneDB® servers.

The archecker utility is designed to recover specific tables or sets of tables. Other situations require that you use different utilities. For example, use ON-Bar or ontape in the following data recovery scenarios:

- Full system restore
- Recovery from disk failure

To configure the behavior of the archecker utility, use the archecker configuration file. To define the schema of the data that archecker recovers, use the archecker schema command file. These files are described in the following sections.

Related reference

[ON-Bar script on page 24](#)

The archecker configuration file

The archecker utility uses a configuration file to set certain parameters.

Set the **AC_CONFIG** environment variable to the full path name of the archecker configuration file. By default, the **AC_CONFIG** environment variable is set to `$ONEDB_HOME/etc/ac_config.std`. If you set **AC_CONFIG** to a user-defined file, you must specify the entire path including the file name.

For information about the configuration parameters used in this file, see [The archecker utility configuration parameters and environment variable on page 212](#).

Schema command file

The archecker utility uses a schema command file to specify the following:

- Source tables
- Destination tables
- Table schemas
- Databases
- External tables

- Point in time the table is restored to
- Other options

This file uses an SQL-like language to provide information archecker uses to perform data recovery. For complete information about the supported statements and syntax, see [The archecker schema reference on page 171](#).

There are two methods to set the schema command file:

- Set the AC_SCHEMA configuration parameter in the archecker configuration file. For more information, see [AC_SCHEMA configuration parameter on page 216](#).
- Use the `-f cmdname` command-line option. For more information, see [Syntax for archecker utility commands on page 167](#).

If both methods are specified, the `-f` command-line option takes precedence.

Table-level restore and locales

For table-level restore, if the table being restored (table on the archive) has a locale code set different from the default locale (en_US.8859-1) the **DB_LOCALE** environment variable must be set to have the same code set as the locale of the archived table being restored.

No code set conversion is performed during a table-level restore; the locale code set of the database or table being restored must match the locale code set of the database or table that the data is being restored to. In addition, the same **DB_LOCALE** information is used for all of the tables being restored by using the same table-level restore command schema file.

Data restore with archecker

Use the **archecker** utility to perform to types of restore operations.

The two types of restores that the **archecker** utility performs are:

- A physical restore that is based on a level-0 archive.
- A physical restore followed by a logical restore, which uses both a level-0 archive and logical logs to restore data to a specific point in time.

When reading the command file, archecker determines whether to perform a physical restore only or a physical restore followed by a logical restore. By default, archecker performs a physical and logical restore. If you use the `WITH NO LOG` clause, archecker does not perform a logical restore.

The procedures and resources that archecker uses differ between a physical-only restore and a physical and logical restore. These procedures are outlined in the following sections.

Physical restore

When the archecker utility performs a physical restore, the utility extracts data from a level-0 archive.

When performing a physical restore, archecker performs the following tasks:

- Disables all constraints (including foreign constraints that reference the target table), indexes, and triggers until the data is restored. Restore performance is better if the table has no constraints, indexes, or triggers.
- Reads the schema command file to determine the following:
 - The source tables
 - The destination tables
 - The schema of all tables
 - The dbspace names of where tables are located
 - The specific archive to extract data from
- Scans the archive for pages belonging to the tables being restored
- Processes each row from the data page and determines if the row is complete or partial.

If the row is a partial row, then archecker determines if the remaining portion of the row has been staged, and if not, it stages the row for later processing.

- For a physical-only restore, applies filters to the row and rejects rows that are not required.
- Inserts the row into the destination table.

To restore a table with the original schema, the source schema must be specified. To restore a table with a different schema, the table name in the target schema must be different from the table name in the source schema. After restoring by using a different schema, the table can be renamed with the **rename table** statement.

Logical restore

After a physical restore, logical recovery can further restore tables to a user-specified point in time. To do this, the archecker utility reads backed-up logical logs, converts them to SQL statements, and then replays these statements to restore data.

Before performing a logical recovery, ensure that all transactions you want to restore are contained in backed-up logical logs. The archecker utility cannot replay transactions from the current log. You cannot perform a logical restore on an external table.

If a table is altered, dropped, or truncated during a logical restore, the restore terminates for that table. Termination occurs at the point that the alter was performed. A message in the archecker message log file records that an alter operation occurred.

The archecker utility cannot process compression dictionaries during a logical restore of compressed tables in non-logged databases. A logical restore stops for a table if it finds that a new compression dictionary was created for that table.

When performing a logical restore, archecker uses two processes that run simultaneously:

Stager

Assembles the logical logs and saves them in tables.

Applier

Converts the log records to SQL statements and executes the statements.

The stager

To collect the pertinent logical log records, the stager performs the following steps:

1. Scans only the backed-up logical logs

The stager reads the backed-up logical log files and assembles complete log records.

2. Tests the logical log records

Any log record that is not applicable to the tables being restored is rejected.

3. Inserts the logical log information in to a table

If the logical log record is not rejected, it is inserted into a stage table.

The applier

The *applier* reads data from the control table created by the stager. It begins processing the required transaction and updates the control table to show that this transaction is in process. Next, it operates on each successive log record, row by row, until the transaction commits.

All updates to the control table occur in the same transaction as the log record modification. This allows all work to be completed or undone as a single unit, maintaining integrity at all times. If an error occurs, the transaction is rolled back and the error is recorded in the control table entry for this transaction.

When data is being restored and the DBA has elected to include a logical restore, two additional work columns and an index are added to the destination table. These columns contain the original rowid and original part number. These columns provide a unique key which identifies the location of the row on the original source archive. To control the storage of the index, use the SET WORKSPACE command (see [The SET statement on page 176](#)). Otherwise, the index is stored in the same space as the table.

After the applier has finished and the restore is complete, these columns, and any indexes created on them, are dropped from the destination table.

Syntax for archecker utility commands

The archecker utility provides a command-line interface for restoring data from an archive. To use archecker, you must specify both a configuration file and a schema command file.

```
archecker {{{-b|-t} <Table-level restore> [-d] | -D | -i} [-v] [-s] | -V | -version }
```

Table-level restore

```
" [-x {{{-i cmd_file} [-1 {phys | stage | apply}]] | -D }]"
```

Table 35. Options for the archecker command

Element	Description
-b	Provides direct XBSA access for backups created with ON-Bar.
-d	Deletes previous archecker restore files, except the archecker message log. For more information, see When to delete restore files on page 171 .
-D	Deletes previous archecker restore files, except the archecker message log, and then exits. The -D option can be used with the -X option to delete previous restore files plus any table-level-restore working tables in the sysutils database. For more information, see When to delete restore files on page 171 .
-f <i>cmdfile</i>	Specifies that archecker use the command file specified by <i>cmdfile</i> . This option overrides the value of the AC_SCHEMA configuration parameter. For more information, see Schema command file on page 164 .
-i	Manually initializes the system.
- lphys,stage,apply	Specifies the level of logical restore: phys Starts a logical restore of the system, but stops after physical recovery is complete. The backed up logical logs must be available. stage After physical recovery is complete, extracts the logical logs from the storage manager and stages them in their corresponding tables, and starts the stager. apply Starts the applier. The applier takes the transactions stored in the stage tables and converts them to SQL and replays the operations. The default level of logical restore if -l is not listed is -lphys,stage,apply. You can specify any combination of the logical restore levels, separated with commas. Spaces are not allowed between -l and levels. For more information, see Manually control a logical restore on page 169 .
-s	Prints a status message to the screen.
-t	Specifies ontape as the backup utility.
-v	Specifies verbose mode.
-X	Specifies a table-level restore.
-V	Displays HCL OneDB™ version information.

Table 35. Options for the archecker command

(continued)

Element	Description
-version	Displays additional version information about the build operation system, build number, and build date for HCL OneDB™.

When you use ON-Bar, you can use an ON-Bar command to access archecker information to verify a backup. For information on the syntax for this command, see [onbar -v syntax: Verifying backups on page 53](#).

Manually control a logical restore

You can manually control the stager and applier with the `-l` command-line option.

The following examples show how to perform a logical restore. In all examples, the name of the schema command file is `cmdfile`.

The following example is a typical usage:

```
archecker -bvs -f cmdfile
```

This command is equivalent to the following command:

```
archecker -bvs -f cmdfile -lphys,stage,apply
```

After the physical restore is complete, the archecker utility starts the stager. After the stager has started, the applier is automatically started.

In the following example, the `-lphys` option performs a physical-only restore:

```
archecker -bvs -f cmdfile -lphys
```

In the following example, the `-lstage` option starts the archecker stager. The stager extracts the logical log records from the storage manager and saves the applicable records to a table.

```
archecker -bvs -f cmdfile -lstage
```

The stager should only be started after physical recovery has completed.

In the following example, the `-lapply` option starts the archecker applier. It looks in the `acu_control` table for the transaction to recover. The applier should only be started after the stager has been started.

```
archecker -bvs -f cmdfile -lapply
```


Performing a restore with multiple storage managers

About this task


If you use multiple storage managers, you can perform a table-level restore with archecker by configuring archecker on every node.

To perform a table-level restore that involves multiple storage managers:

1. Create an archecker configuration file on every node.
2. Create a schema command file on every node.
3. Remove old restores by executing the archecker -DX command on a single node.
4. Start the physical restore by executing the archecker -bX -lphys command on each node.

 **Restriction:** Do not use the -d option.

5. After the physical restore completes, start the logical restore by executing the archecker -bX -lstage command on each node that contains logical log records.

 **Restriction:** Do not use the -d option.

6. After starting all stagers, complete the restore by executing the archecker -bX -lapply command on a single node.

Perform a parallel restore

If you have a fragmented table that resides in separate dbspaces, you can perform a physical table-level restore in parallel by executing multiple archecker commands with different schema command files for each dbspace.

During a level-0 archive, there cannot be any open transactions that would change the schema of the table. The table or table fragments being recovered must exist in the level-0 archive. The table or fragment cannot be created or added during the logical recovery. Tables created or fragments added during the logical recovery are ignored.

Because a detached fragment is no longer part of the original table, the applier does not process the detached fragment log record or any other log records for this fragment from this point forward. A message in the archecker message log file indicates a detach occurred.

In this example, the table is fragmented across three dbspaces. The corresponding schema command files are named `cmdfile1`, `cmdfile2`, `cmdfile3`. The following commands delete previous restores and then perform physical restores on each dbspace in parallel:

- `archecker -DX`
- `archecker -bvs -f cmdfile1 -lphys`
- `archecker -bvs -f cmdfile2 -lphys`
- `archecker -bvs -f cmdfile3 -lphys`

You cannot perform a logical restore in parallel.

Restore tables with large objects

ON-Bar supports table-level restores of smart large objects and binary large objects.

- Smart large objects

Table-level restore also supports smart large objects for physical restore only (restore from level-0 archive).

The storage location of the smart large object columns being restored must be specified with the PUT clause in the CREATE TABLE statement. The restored smart large objects are created with the create-time flags LO_NOLOG and LO_NOKEEP_LASTACCESS_TIME. These flags override the LOG and KEEP ACCESS TIME column attributes if they are specified in the target table for the smart large object column.

- Binary large objects

Table-level restore supports restoring tblspace binary large objects, but not blobspace binary large objects. If you attempt to restore a blobspace binary large object, the value is set to NULL and a warning is issued.

When to delete restore files

If you repeatedly run the same archecker table-level restore, you must clean up the archecker table-level restore working files and tables from the previous runs. These working tables refer to acu_tables in the **sysutils** database that are created during an archecker table-level restore. The archecker table-level restore working files and tables are kept after an archecker table-level restore completes in case these files and tables are needed for diagnosing problems.

You can remove the working files and tables by explicitly running the command archecker -DX or by using the -d option when you run the next archecker table-level restore command. The -d option indicates that all files and tables from the previous run of archecker table-level restore are removed before the new restore begins.

- ontape example: archecker -tdvs -fschema_command_file
- onbar example: archecker -bdvs -fschema_command_file

The archecker schema reference

The topics in this section describe the SQL-like statements used by the archecker schema command file. This file provides information that the archecker utility uses to perform data recovery.

Use the schema command file to specify the source and destination tables and to define the table schema.

For information about specifying which command file archecker uses, see [Schema command file on page 164](#).

The following are statements supported by archecker:

- CREATE TABLE
- DATABASE
- INSERT INTO
- RESTORE
- SET

! **Important:** Standard SQL comments are allowed in the archecker utility file and are ignored during processing.

The syntax of these statements is described in the following topics.

The CREATE TABLE statement

The CREATE TABLE statement describes the schema of the source and target tables. If the target table is external, use the CREATE EXTERNAL TABLE statement described in the section [The CREATE EXTERNAL TABLE statement on page 173](#).

Syntax

The syntax of the CREATE TABLE used in the archecker schema command file is identical to the corresponding HCL® OneDB® SQL statement. For a description of this syntax, see the *HCL OneDB™ Guide to SQL: Syntax*.

Usage

You must include the schema for the source table in the archecker schema command file. This schema must be identical to the schema of the source table at the time the archive was created.

The schema of the source table is not validated by archecker. Failing to provide an accurate schema leads to unpredictable results.

The source table cannot be a synonym or view. The schema of the source table only needs the column list and storage options. Other attributes such as extent sizes, lock modes, and so on are ignored. For an ON-Bar archive, archecker uses the list of storage spaces for the source table to create its list of objects to retrieve from the storage manager. If the source table is fragmented, you must list all dbspaces that contain data for the source table. The archecker utility only extracts data from the dbspaces listed in the schema command file.

If the source table contains constraints, indexes, or triggers, they are automatically disabled during the restore. Foreign constraints that reference the target table are also disabled. After the restore is complete, the constraints, indexes, and triggers are enabled. For better performance, remove constraints, indexes, and triggers prior to performing a restore.

You must also include the schema of the target table in the command file. If the target table does not exist at the time the restore is performed, it is created using the schema provided.

If the target table exists, its schema must match the schema specified in the command file. Data is then appended to the existing table.

Examples

The schema of the source and target tables do not have to be identical. The following example shows how you can repartition the source data after performing the data extraction:

```
CREATE TABLE source (col1 integer, ...) IN dbspace1;
CREATE TABLE target (col1 integer, ...)
  FRAGMENT BY EXPRESSION
    MOD(col1, 3) = 0 in dbspace3,
    MOD(col1, 3) = 1 in dbspace4,
```

```
MOD(col1, 3) = 2 in dbspace5;
INSERT INTO target SELECT * FROM source;
```

The CREATE EXTERNAL TABLE statement

The CREATE EXTERNAL TABLE statement describes the schema of an external target table.

Syntax

The syntax of the CREATE EXTERNAL TABLE statement for the archecker schema file is not identical to the SQL CREATE EXTERNAL TABLE statement.

```
CREATE EXTERNAL TABLE name ( columndata_type ) USING( "filename" [ , { DELIMITED | INFORMIX } ] );
```

Element	Description
<i>column</i>	The name of the column. Must conform to SQL identifier syntax rules. For more information, see the <i>HCL OneDB™ Guide to SQL: Syntax</i> .
<i>data_type</i>	The built-in data type of the column. For more information about data types, see the <i>HCL OneDB™ Guide to SQL: Reference</i> .
<i>filename</i>	Either the name of the file in which to place the data or a pipe device. The pipe device must exist before starting the archecker utility.
<i>name</i>	The name of the table to store the external data. Must be unique among names of tables, views, and synonyms in the current database. Must conform to SQL database object name rules. For more information, see the <i>HCL OneDB™ Guide to SQL: Syntax</i> .

Usage

When you use the CREATE EXTERNAL TABLE statement to send data to an external table, the data is only extracted from a level-0 archive. Logical logs are not rolled forward on an external table.

You can specify either of the following formats for external files:

- DELIMITED: ASCII delimited file. This is the default format.
- INFORMIX: internal binary representation. To optimize performance, filters are not applied to external tables. If filters exist, a warning indicates that they are ignored.

For an example of using the CREATE EXTERNAL TABLE statement, see [Restore to an external table on page 178](#).

The DATABASE statement

In the **archecker** utility, the DATABASE statement sets the current database.

Syntax

```
DATABASE dbname [LOG MODE ANSI] ;
```

Element	Description
<i>dbname</i>	The name of the current database.

Usage

Multiple DATABASE statements can be used. All table names referenced following this statement are associated with the current database.

If the logging mode of the source database is ANSI and default decimal columns are used in the table schemas, then the logging mode of the database must be declared.

If the logging mode of the source database is not declared no error will be returned, but unexpected results and data can occur.

Examples

In the following example, both the source and target tables reside in the same database **dfs**.

```
DATABASE dfs;
CREATE TABLE source (...);
CREATE TABLE target (...);
INSERT INTO target SELECT * from source;
```

You can use multiple database statements to extract a table from one database into another database.

```
DATABASE dfs1;
CREATE TABLE source (...) IN dbspace1;
DATABASE dfs2;
CREATE TABLE target (...) IN dbspace2;
INSERT INTO dfs2:target SELECT * FROM dfs1:source;
```

The INSERT statement

The INSERT statement tells the archecker utility what tables to extract and where to place the extracted data.

Syntax

```
INSERT INTO target_table [ ( target_column ) ] SELECT { src_column | * } FROM src_table [ WHERE filter ]
```

Element	Description
<i>filter</i>	<p>The following filters are supported by the INSERT statement:</p> <ul style="list-style-type: none"> • =, !=, <> • >, >=, <, <= • [NOT] MATCHES, [NOT] LIKE • IS [NOT] NULL • AND, OR • TODAY, CURRENT

Element	Description
	<p>The following operators are not supported by the archecker utility:</p> <ul style="list-style-type: none"> • Aggregates • Functions and procedures • Subscripts • Subqueries • Views • Joins <p>Filters can only be applied to physical-only restore.</p>
<i>src_column</i>	A list of columns to be extracted.
<i>src_table</i>	The source table on the archive where the data is restored from.
<i>target_column</i>	The destination column or columns where the data will be restored.
<i>target_table</i>	The destination table where the data will be restored.

Examples

The following example demonstrates the simplest form of the INSERT statement. This statement extracts all rows and columns from the source to the target table.

```
INSERT INTO target SELECT * FROM source;
```

You can also extract a subset of columns. In the following example, only two columns from the source table are inserted into the destination table.

```
CREATE TABLE source (col1 integer, col2 integer, col3 integer, col4 integer);
CREATE TABLE target (col1 integer, col2 integer);
INSERT INTO target (col1, col2) SELECT col3, col4 FROM source;
```

The RESTORE statement

The RESTORE statement is an optional command to restore tables to a specific point in time.

Syntax

```
RESTORE [ TO { "time" | CURRENT } [ WITH NO LOG ] ]
```


Element	Description
"time"	The date and time the table is to be restored to.

Usage

The TO clause is used to restore the table to a specific point in time, which is specified by a date and time or the reserved word CURRENT.

Only one RESTORE statement can be specified in a command file. If this statement is not present in the command file, then the system will be restored to the most current time using logical logs.

If the WITH NO LOG clause is present, only a physical restore is performed. In addition, the two extra columns and the index are not added to the destination table. Physical-only restores are based on level-0 archives only.

 **Tip:** Use this option when you do not have logical logs. You will not receive any messages about logical recovery.

Example

```
RESTORE TO CURRENT WITH NO LOG;
```

The SET statement

The SET statement controls the different features in the table-level unload library.

Syntax

```
SET { COMMIT TO number | WORKSPACE TO { / dbspace } }
```

Element	Description
<i>number</i>	Sets the number of records to insert before committing during a physical restore. The default is 1000.
<i>dbspace</i>	The dbspaces to use for the working storage space. The default is the root dbspace. You cannot use temporary dbspaces for the working storage space.

The archecker utility creates several tables for the staging of logical log records during a logical restore. These tables are created in the **sysutils** database and stored in the working storage space.

Examples

```
SET COMMIT TO 20000;
SET WORKSPACE to dbspace1;
```

Schema command file examples

This section contains examples that show different command file syntax for different data recovery scenarios.

Simple schema command file

The schema command file in this example extracts a table from the most recent level-0 backup of **dbspace1**. The data is placed in the **table test1:tlr** and the logs are applied to bring the table **tlr** to the current point in time.

```
database test1;
create table tlr (
  a_serial serial,
  b_integer integer,
  c_char char,
  d_decimal decimal
```



```

) in dbspace1;
insert into tlr select * from tlr;

```

Restore a table from a previous backup

The schema command file in this example extracts a table from the level-0 backup of **dbspace1**. The logical logs are used to bring the table to the time of "2003-01-01 01:01:01". The data is placed in the table **test1:tlr**.

```

database test1;
create table tlr (
  a_serial serial,
  b_integer integer,
  c_char char,
  d_decimal decimal
) in dbspace1;
insert into tlr select * from tlr;
restore to '2003-01-01 01:01:01';

```

Restore to a different table

The schema command file in this example extracts a table called **test1:tlr** from the most recent backup of **dbspace1** and places the data in the table **test1:tlr_dest**.

```

database test1;
create table tlr (
  a_serial serial,
  b_integer integer,
  c_char char(20),
  d_decimal decimal,
) in dbspace1;
create table tlr_dest (
  a_serial serial,
  b_integer integer,
  c_char char(20),
  d_decimal decimal
) in dbspace2;
insert into tlr_dest select * from tlr;

```

Extract a subset of columns

The schema command file in this example extracts a table **test1:tlr** from the most recent backup of **dbspace1** and places a subset of the data into the table **test1:new_dest**


```

database test1;
create table tlr (
  a_serial serial,
  b_integer integer,
  c_char char(20),
  d_decimal decimal
) in dbspace1;
create table new_dest (
  X_char char(20),
  Y_decimal decimal,
  Z_name char(40)
) in dbspace2;
insert into new_dest (X_char, Y_decimal) select c_char,d_decimal from tlr;

```

Use data filtering

The schema command file in this example extracts a table **test1:tlr** from the most recent backup of **dbspace1** and places the data in the table **test1:tlr** only where the list conditions are true.

 **Important:** Filters can only be applied to a physical restore.

```
database test1;
create table tlr (
  a_serial serial,
  b_integer integer,
  c_char char(20),
  d_decimal decimal,
) in dbspace1;
insert into tlr
select * from tlr
where c_char matches 'john*'
and d_decimal is NOT NULL
and b_integer > 100;
restore to current with no log;
```

Restore to an external table

The schema command file in this example extracts a table called **test1:tlr** from the most recent backup of **dbspace1** and places the data in a file called `/tmp/tlr.unl`.

```
database test1;
create table tlr
(a_serial serial,
 b_integer integer
) in dbspace1;
create external table tlr_dest
(a_serial serial,
 b_integer integer
) using ("/tmp/tlr.unl", delimited );
insert into tlr_dest select * from tlr;
restore to current with no log;
```

Restore multiple tables

The schema command file in this example extracts a table **test1:tlr_1** and **test1:tlr_2** from the most recent backup of **dbspace1** and places the data in **test1:tlr_1_dest** and **test1:tlr_2_dest**. This is an efficient way of restoring multiple tables because it requires only one scan of the archive and logical log files.

```
database test1;
create table tlr_1
( columns ) in dbspace1;
create table tlr_1_dest ( columns );
create table tlr_2
( columns ) in dbspace1;
create table tlr_2_dest ( columns );
insert into tlr_1_dest select * from tlr_1;
insert into tlr_2_dest select * from tlr_2;
```

Perform a distributed restore

The schema command file in this example extracts a table **test:tlr_1** from the most recent backup of **dbspace1** and places the data on the database server **rem_srv** in the table **rem_dbs:tlr_1**.

```
database rem_dbs
create table tlr_1
  ( columns );
database test1;
create table tlr_1
  ( columns ) in dbspace1;
insert into rem_dbs@rem_srv.tlr_1
select * from tlr_1;
```

Backup and restore configuration parameter reference

Backup and restore configuration parameters

These topics describe the configuration parameters that you use with the ON-Bar, *ontape*, and *archecker* utilities.

You set most of these configuration parameters in the `onconfig` file. However, you set some of the *archecker* configuration parameters in the **AC_CONFIG** file.

Be sure to configure your storage manager. Depending on the storage manager that you choose, you might set different ON-Bar configuration parameters. If you are using a third-party storage manager, see [Configuring a third-party storage manager on page 32](#), before you start ON-Bar.

The following table describes the following attributes (if relevant) for each parameter.

Attribute	Description
<code>ac_config</code> . <i>std value</i>	For <i>archecker</i> configuration variables. The default value that appears in the <code>ac_config.std</code> file.
<code>onconfig</code> . <i>std value</i>	For <code>onconfig</code> configuration variables. The default value that appears in the <code>onconfig.std</code> file.
<i>if value not present</i>	The value that the database server supplies if the parameter is missing from your <code>onconfig</code> file. If this value is present in <code>onconfig.std</code> , the database server uses the <code>onconfig.std</code> value. If this value is not present in <code>onconfig.std</code> , the database server uses this value.
<i>units</i>	The units in which the parameter is expressed
<i>range of values</i>	The valid values for this parameter
<i>takes effect</i>	The time at which a change to the value of the parameter affects ON-Bar operation. Except where indicated, you can change the parameter value between a backup and a restore.

Attribute	Description
<i>refer to</i>	Cross-reference to further discussion

Related reference

[ON-Bar backup and restore system on page 20](#)

ON-Bar configuration parameters and environment variable

Many properties of the ON-Bar utility is controlled by configuration parameters in the `onconfig` file. ON-Bar also has an environment variable.

Related information

[Configuring OneDB Primary Storage Manager on page 136](#)

BACKUP_FILTER configuration parameter

Use the `BACKUP_FILTER` configuration parameter to specify the path name and any options for an external filter program that you use with the ON-Bar utility.

onconfig.std value

Not set. Backup data is not filtered.

values

The path name of a command and any options. By default, the path name is relative to the `$ONEDB_HOME/bin` directory, otherwise, the path name must be the absolute path of the program. If you include command-line options, both the filter name and the options must be surrounded by single quotation marks.

takes effect

After you edit your `onconfig` file and ON-Bar or **ontape** starts.

Usage

This filter transforms data before backing it up, such as compressing it. The transformed data is then backed up and stored as a single file. When you perform a restore, you must transform the data back to its original format. Specify the appropriate program to transform data before a restore by setting the `RESTORE_FILTER` configuration parameter.

For security purposes, filters should not have write permission to non-privileged users. Permission on the filters is the same as that of permission on other executable files that are called by the HCL OneDB™ server or utilities.



Note: If the `BACKUP_FILTER` parameter is set in the `onconfig` file, the `LTAPESIZE` configuration parameter cannot be set to 0. Otherwise the ON-Bar or **ontape** utility returns an error when backing up logical logs to a directory on disk. The error message is:

```
The LTAPESIZE configuration parameter cannot be set to 0 when the BACKUP_FILTER
configuration parameter is set; change the value of LTAPESIZE.
Program over.
```

A workaround is to set the `LTAPESIZE` configuration parameter to a high value. Log files are not much higher than the `LOGSIZE` configuration parameter. Use the value in the `LOGSIZE` as the upper limit for this database.

When you specify filter information in the `BACKUP_FILTER` configuration parameter, specify the path name of a filter program, and any options, as shown in this example:

```
BACKUP_FILTER /bin/compress
```

Output produced by this filter is saved as a single object in the storage manager.

The `BACKUP_FILTER` configuration parameter can include command-line options as well as the filter name. For example, specify:

```
BACKUP_FILTER 'my_encrypt -file /var/adm/encryption.pass'
```

```
BACKUP_FILTER 'my_secret -file /var/adm/secret.pass'
```

Related reference

[RESTORE_FILTER configuration parameter on page 204](#)

BAR_ACT_LOG configuration parameter

Use the `BAR_ACT_LOG` configuration parameter to specify the full path name of the ON-Bar activity log.

onconfig.std value

UNIX™: `BAR_ACT_LOG $ONEDB_HOME/tmp/bar_act.log`

Windows™: `BAR_ACT_LOG %ONEDB_HOME%\tmp\bar_act.log`

range of values

Full path name

takes effect

When `onbar-driver` starts

When you reset the value dynamically in your `onconfig` file by running the `onmode -wf` or equivalent SQL administration API command.

Usage

You should specify a path to an existing directory with an appropriate amount of space available or use `$ONEDB_HOME/bar_act.log`.

Whenever a backup or restore activity or error occurs, ON-Bar writes a brief description to the activity log. The format of the file resembles the format of the database server message log. You can examine the activity log to determine the results of ON-Bar actions.

The file specified by the `BAR_ACT_LOG` configuration parameter is created if it does not exist. If the ON-Bar command (or any ON-Bar-related utility such as the `onsmsync` utility) never ran on the system, then the file does not exist.

The `sysbaract_log` table is a system monitoring interface pseudo table that reads data from the file specified by `BAR_ACT_LOG`. The following errors are returned if you attempt to query the `sysbaract_log` on a system where the `BAR_ACT_LOG` file does not exist:

```
244: Could not do a physical-order read to fetch next row.
101: ISAM error: file is not open.
```

Usage when you specify a file name only

If you specify a file name only in the `BAR_ACT_LOG` configuration parameter, ON-Bar creates the ON-Bar activity log in the working directory in which you started ON-Bar. For example, if you started ON-Bar from `/usr/mydata` on UNIX™, the activity log is written to that directory.

For UNIX™, if the database server launches a continuous logical-log backup, ON-Bar writes to the ON-Bar activity log in the working directory for the database server.

For Windows™, if the database server launches a continuous logical-log backup, ON-Bar writes to the activity log in the `%ONEDB_HOME%\bin` directory instead.

Related reference

[View ON-Bar backup and restore performance statistics on page 109](#)

[PSM_ACT_LOG configuration parameter on page 137](#)

Related information

[bar_act.log file: ON-Bar activity log on page 23](#)

[onmode -wf, -wm: Dynamically change certain configuration parameters on page](#)

BAR_BSALIB_PATH configuration parameter

Use the `BAR_BSALIB_PATH` configuration parameter to specify the path name and file name of the XBSA shared library for the storage manager that you use.

default value

UNIX™: `$ONEDB_HOME/lib/ibsad001.extension`

Windows™: %ONEDB_HOME%\lib\ibsad001.extension

The *extension* is platform specific.

onconfig.std value

Not set.

takes effect

When onbar-driver starts

When you reset the value dynamically in your `onconfig` file by running the `onmode -wf` or equivalent SQL administration API command.

Usage

ON-Bar and the storage manager rely on a shared library to integrate with each other. Configure the `BAR_BSALIB_PATH` configuration parameter for your storage-manager library. Support for `BAR_BSALIB_PATH` is platform-specific. Check your machine notes to determine whether you can use this configuration parameter with your operating system. You can change the value of `BAR_BSALIB_PATH` between a backup and restore.

To ensure that this integration takes place, specify the shared-library path name. Set one of the following options:

UNIX™:

- Place the storage-manager library in the default directory.

For example, the suffix for Solaris is `so`, so you specify `$ONEDB_HOME/lib/ibsad001.so` on a Solaris system.

For example, the suffix for Solaris is `so`, so you specify `$ONEDB_HOME/lib/libbsapm.so` on a Solaris system.

- Place the storage-manager library in any directory and create a symbolic link from `$ONEDB_HOME/lib/ibsad001.platform_extension` to it.

If you use HCL® OneDB® Storage Manager , create a symbolic link to `$ONEDB_HOME/lib/libbsa.platform_extension` or set `BAR_BSALIB_PATH` to this absolute path value.

If you use HCL® Tivoli® Storage Manager (TSM), create a symbolic link to `$ONEDB_HOME/lib/libtxbsa.platform_extension` or set `BAR_BSALIB_PATH` to this absolute path value.

- Set the `LD_LIBRARY_PATH` environment variable. For example, set `LD_LIBRARY_PATH` to `$ONEDB_HOME/lib`.

Windows™:

- Place the storage-manager library in the default directory.
- Set the path name for the ISM shared library to the installation directory for ISM: `%ISMDIR%\bin\libbsa.dll`.

The `%ismDIR%` variable includes a version or release number. For example: set `ISMDIR=C:\program files\informix\ism\2.20`. This directory is set when the database server is installed on Windows™. This path name is different if you use a different storage manager.

If the parameter `BAR_BSALIB_PATH` is missing or has no value and the database server cannot open the XBSA shared library for your platform, ON-BAR tries to use the HCL OneDB™ Primary Storage Manager as the storage manager in all platforms.



Tip: Be sure that the shared library can access the backup data in the storage manager in a restore. You cannot back up on to one storage manager and restore from a different storage manager.

Related information

[onmode -wf, -wm: Dynamically change certain configuration parameters on page](#)

BAR_CKPTSEC_TIMEOUT configuration parameter

The `BAR_CKPTSEC_TIMEOUT` configuration parameter specifies the amount of time, in seconds, that an RS secondary server should wait for a checkpoint to arrive from the primary server while performing an external backup.

onconfig.std value

UNIX™: 15

Windows™: 16

15

default value

UNIX™: 15

Windows™: 16

15

units

seconds

range of values

5 through twice the value of the `CKPTINTVL` configuration parameter

takes effect

After you edit your `onconfig` file and restart the database server.

When you reset the value dynamically in your `onconfig` file by running the `onmode -wf` command.

When you reset the value in memory by running the `onmode -wm` command.

Usage

When an external backup is performed on an RS secondary server, the secondary server must wait until a checkpoint arrives in the logical logs from the primary server. A checkpoint flushes buffers to disk, and blocks user transactions that involve

temporary tables. If the checkpoint on the primary does not complete in the time-out period, the backup on the RS secondary server fails. You can set the `BAR_CKPTSEC_TIMEOUT` configuration parameter to a longer amount of time, in seconds, that an RS secondary server should wait for a checkpoint to arrive from the primary server while performing an external backup.

Related information

[onmode -wf, -wm: Dynamically change certain configuration parameters on page](#)
[CKPTINTVL configuration parameter on page](#)

BAR_DEBUG configuration parameter

Use the `BAR_DEBUG` configuration parameter to specify the amount of debugging information that the database server captures in the ON-Bar activity log.

onconfig.std value

`BAR_DEBUG 0`

values

0 = Do not display debugging information.

1 = Print a small amount of information

2 = Print a message every time ON-Bar:

- Enters a function.
- Exits a function. The message includes the return code for the function.

3 = Print exit and entry information with additional details.

4 = Also print information about ON-Bar parallel operations.

5 = Also print information about:

- Objects that are being backed up or restored.
- The `act_node` structure corresponding with the `bar_action` table.

6 = Print additional information about:

- Objects that are being backed up or restored.
- The `act_node` structure corresponding with the `bar_action` table.

7 = Also print:

- Information about the contents of the `ins_node` structure corresponding with the `bar_instance` table.
- Information about modifications to the `bar_action` table.

- Information about logical logs and objects that are restored.
- SQL statements done on the **sysutils** database and SQLCODES that were returned.

8 = Also print page headers of all pages archived and restored. This setting requires a large amount of space.

9 = Print the contents of:

- The `bar_ins` structure after it was initialized.
- The object descriptors that are cold restored.

takes effect

Immediately after you edit your `onconfig` file for any currently executing ON-Bar command and any subsequent commands. Any ON-Bar command that is currently executing when you update `BAR_DEBUG` reads the new value of `BAR_DEBUG` and prints debug messages at the new level.

When you reset the value dynamically in your `onconfig` file by running the `onmode -wf` or equivalent SQL administration API command.

Usage

The default value of 0 displays no debugging information. Set the `BAR_DEBUG` configuration parameter to a higher value to display more detailed debugging information in the ON-Bar activity log.

You can dynamically update the value of `BAR_DEBUG` in the `onconfig` file during a session.

Related reference

[BAR_DEBUG_LOG configuration parameter on page 188](#)

Related information

[onmode -wf, -wm: Dynamically change certain configuration parameters on page](#)

BAR_ENCRYPTION configuration parameter

Use the `BAR_ENCRYPTION` parameter to encrypt the backups.

onconfig.std value

Not set. Backup data is not encrypted.

takes effect

When ON-Bar starts.

onconfig.std value

Not set. If BACKUP_DECRYPTION is not set, backup data that will not be decrypted.

takes effect

When ON-Bar, ontape, onlog and archecker starts.

Usage

Use the BAR_DECRYPTION to override the BAR_ENCRYPTION configuration parameter during a restore. Like with BAR_DECRYPTION, you can set the path to a keystore or to a keyfile. You cannot set the cipher in this parameter as the cipher is set by the object to be restored.

```
Syntax for the BAR_DECRYPTION configuration parameter

>>--BAR_DECRYPTION--keystore----keystore_name----->
      '--keyfile----keyfile_name--'
```

Table 37. Option for the BAR_DECRYPTION configuration parameter value

Field	Value
keystore	<p>The <i>keystore</i> specifies the name of the keystore and stash file names. The files are created in the <code>ONEDB_HOME/etc</code> directory:</p> <ul style="list-style-type: none"> • <i>keystore.p12</i> = The keystore file that contains the security certificates. • <i>keystore.sth</i> = The stash file that contains the decryption password. <p>You must manually back up the keystore and password stash files. These files are not backed up when you run a back up with the ON-Bar or ontape utilities.</p>
keyfile	<p>The <i>keyfile</i> specifies the full path of a text file that contains a backup decryption key. The key must be encoded in base64 format.</p>

BAR_DEBUG_LOG configuration parameter

Use the BAR_DEBUG_LOG parameter to specify the location and name of the ON-Bar debug log.

onconfig.std value

`/usr/informix/bar_debug.log`

if value not present

UNIX™: /tmp/bar_debug.log

Windows™: \tmp\bar_debug.log

takes effect

When ON-Bar starts

When you reset the value dynamically in your `onconfig` file by running the `onmode -wf` or equivalent SQL administration API command.

Usage

For security reasons, set the `BAR_DEBUG_LOG` configuration parameter to a directory with restricted permissions, such as the `$ONEDB_HOME` directory.

Related reference

[BAR_DEBUG configuration parameter on page 185](#)

[PSM_DEBUG_LOG configuration parameter on page 141](#)

Related information

[onmode -wf, -wm: Dynamically change certain configuration parameters on page](#)

BAR_HISTORY configuration parameter

Use the `BAR_HISTORY` configuration parameter to specify whether the **sysutils** database maintains a backup history when you use `onsmsync` to expire old backups.

onconfig.std value

Not in the `onconfig.std` file.

default value

0

range of values

0 = Remove records for expired backup objects from the **sysutils** database

1 = Keep records for expired backup objects in the **sysutils** database

takes effect

When `onsmsync` starts

When you reset the value dynamically in your `onconfig` file by running the `onmode -wf` or equivalent SQL administration API command.

Usage

If you set the value to 0, `onsmsync` removes the **bar_object**, **bar_action**, and **bar_instance** rows for the expired backup objects from the `sysutils` database. If you set the value to 1, `onsmsync` sets the **act_type** value to 7 in the **bar_action** row and keeps the **bar_action** and **bar_instance** rows for expired backup objects in the `sysutils` database. If you do not set `BAR_HISTORY` to 1, the restore history is removed.

Regardless of the value of `BAR_HISTORY`, `onsmsync` removes the line that describes the backup object from the emergency boot file and removes the object from the storage manager when the storage manager expires the object.

For more information about `onsmsync`, see [The `onsmsync` utility on page 102](#).

Related information

[onmode -wf, -wm: Dynamically change certain configuration parameters on page](#)

BAR_IXBAR_PATH configuration parameter

Use the `BAR_IXBAR_PATH` configuration parameter to change the path and name of the ON-Bar boot file.

onconfig.std value

Not set in `onconfig.std`.

default value

UNIX™ or Linux™: `$ONEDB_HOME/etc/ixbar.servernum`

Windows™: `%ONEDB_HOME%\etc\ixbar.servernum`

range of values

Full path name for the ON-Bar boot file

takes effect

When ON-Bar or `onsmsync` starts

When you reset the value dynamically in your `onconfig` file by running the `onmode -wf` or equivalent SQL administration API command.

Usage

By default, the ON-Bar boot file is created in the `%ONEDB_HOME%\etc` folder on Windows™ and in the `$ONEDB_HOME/etc` folder on UNIX™ or Linux™. The default name for this file is `ixbar.servernum`, where `servernum` is the value of the `SERVERNUM` configuration parameter.

For example, in an instance with the `SERVERNUM` configuration parameter equal to 41, the ON-Bar boot file is created by default with this path and name in UNIX™:

```
BAR_IXBAR_PATH $ONEDB_HOME/etc/ixbarboot.41
```

You can change the path to create the file in another location. For example, if you want to create the ON-Bar boot file in the directory `/usr/informix` with the name `ixbar.new`, specify:

```
BAR_IXBAR_PATH=/usr/informix/ixbar.new
```

Related information

[onmode -wf, -wm: Dynamically change certain configuration parameters on page](#)

BAR_MAX_BACKUP configuration parameter

Use the `BAR_MAX_BACKUP` parameter to specify the maximum number of parallel processes that are allowed for each ON-Bar command.

onconfig.std value

0

if value not present

4

units

ON-Bar processes

values

0 = Maximum number of processes allowed on system

1 = Serial backup or restore

n = Specified number of processes created

takes effect

When ON-Bar starts

When you reset the value dynamically in your `onconfig` file by running the `onmode -wf` or equivalent SQL administration API command.

Although the database server default value for `BAR_MAX_BACKUP` is 4, the `onconfig.std` value is 0.

Both UNIX™ and Windows™ support parallel backups.

Specify serial backups and restores

To perform a serial backup or restore, including a serial whole system backup or restore, set `BAR_MAX_BACKUP` to 1.

Specify parallel backups and restores

To specify parallel backups and restores, including parallel whole system backups and restores, set `BAR_MAX_BACKUP` to a value higher than 1. For example, if you set `BAR_MAX_BACKUP` to 5 and execute an ON-Bar command, the maximum

number of processes that ON-Bar creates concurrently is 5. Configure `BAR_MAX_BACKUP` to any number up to the maximum number of storage devices or the maximum number of streams available for physical backups and restores. ON-Bar groups the dbspaces by size for efficient use of parallel resources.

If you set `BAR_MAX_BACKUP` to 0, the system creates as many ON-Bar processes as needed. The number of ON-Bar processes is limited only by the number of storage spaces or the amount of memory available to the database server, whichever is less.

The amount of memory available is based on `SHMTOTAL`. ON-Bar performs the following calculation where `N` is the maximum number of ON-Bar processes that are allowed:

```
N = SHMTOTAL / (# transport buffers * size of transport buffers / 1024)
```

If `SHMTOTAL` is 0, `BAR_MAX_BACKUP` is reset to 1. If `N` is greater than `BAR_MAX_BACKUP`, ON-Bar uses the `BAR_MAX_BACKUP` value. Otherwise, ON-Bar starts `N` backup or restore processes.

Related information

[onmode -wf, -wm: Dynamically change certain configuration parameters on page](#)

BAR_MAX_RESTORE configuration parameter

Use the `BAR_MAX_RESTORE` parameter to specify the maximum number of parallel restore processes that are allowed during an ON-Bar restore operation.

onconfig.std value

0

if value not present

The value of the `BAR_MAX_BACKUP` configuration parameter

units

ON-Bar processes

values

0 = Maximum number of restore processes allowed on system

1 = Serial restore

n = Specified number of restore processes created

takes effect

When ON-Bar starts

When you reset the value dynamically in your `onconfig` file by running the `onmode -wf` or equivalent SQL administration API command.

Both UNIX™ and Windows™ support parallel restores.

Specify serial restores

To perform a serial restore, including a serial whole system restore, set `BAR_MAX_RESTORE` to 1.

Specify parallel restores

To specify parallel restores, including parallel whole system restores, set `BAR_MAX_RESTORE` to a value higher than 1. For example, if you set `BAR_MAX_RESTORE` to 5 and start a restore, the maximum number of restore processes that ON-Bar creates concurrently is 5. Configure `BAR_MAX_RESTORE` to any number up to the maximum number of storage devices or the maximum number of streams available for physical restores. ON-Bar groups the dbspaces by size for efficient use of parallel resources.

If you set `BAR_MAX_RESTORE` to 0, the system creates as many ON-Bar restore processes as needed. The number of restore processes is limited only by the number of storage spaces or the amount of memory available to the database server, whichever is less.

The amount of memory available is based on `SHMTOTAL`. ON-Bar performs the following calculation where N is the maximum number of ON-Bar processes that are allowed:

$$N = \text{SHMTOTAL} / (\# \text{ transport buffers} * \text{size of transport buffers} / 1024)$$

If `SHMTOTAL` is 0, `BAR_MAX_RESTORE` is reset to 1. If N is greater than `BAR_MAX_RESTORE`, ON-Bar uses the `BAR_MAX_RESTORE` value. Otherwise, ON-Bar starts N restore processes.

Related information

[onmode -wf, -wm: Dynamically change certain configuration parameters on page](#)

BAR_NB_XPORT_COUNT configuration parameter

Use the `BAR_NB_XPORT_COUNT` configuration parameter to specify the number of data buffers that each `onbar_d` process can use to exchange data with the database server.

onconfig.std value

20

if value not present

20

units

Buffers

range of values

3 to unlimited

takes effect

When ON-Bar starts

When you reset the value dynamically in your `onconfig` file by running the `onmode -wf` or equivalent SQL administration API command.

The value of this parameter affects ON-Bar performance. For example, if you set `BAR_NB_XPORT_COUNT` to 5 and then issue five ON-Bar commands, the resulting 25 ON-Bar processes use a total of 125 buffers.

To calculate the amount of memory that each `onbar_d` process requires, use the following formula. For information about the page size for your system, see the release notes:

```
required_memory = (BAR_NB_XPORT_COUNT * BAR_XFER_BUF_SIZE
                  * page_size) + 5 MB
```

Related information

[onmode -wf, -wm: Dynamically change certain configuration parameters on page](#)

BAR_PERFORMANCE configuration parameter

Use the `BAR_PERFORMANCE` configuration parameter to specify the type of performance statistics to report to the ON-Bar activity log for backup and restore operations.

onconfig.std value

0

units

Levels of statistics

values

0 = Does not collect performance statistics

1 = Reports time spent transferring data between the database server and the storage manager.

2 = Reports ON-Bar processing performance, in microseconds, in the timestamps in the activity log and the error log

3 = Reports both microsecond timestamps and transfer statistics.

takes effect

When ON-Bar starts

When you reset the value dynamically in your `onconfig` file by running the `onmode -wf` or equivalent SQL administration API command.

Usage

For example, if you set `BAR_PERFORMANCE` to 3, ON-Bar reports the time spent transferring data between the HCL OneDB™ instance and the storage manager, in the activity log. If you set `BAR_PERFORMANCE` to 0 or do not set it, ON-Bar does not report performance statistics.

- To turn performance monitoring off, set the value to 0. This is the default.
- To display the time spent transferring data between the HCL OneDB™ instance and the storage manager, set the parameter to 1.
- To display timestamps in microseconds, set the parameter to 2.
- To display both timestamps and transfer statistics, set the parameter to 3.

Related reference

[View ON-Bar backup and restore performance statistics on page 109](#)

Related information

[onmode -wf, -wm: Dynamically change certain configuration parameters on page](#)

BAR_PROGRESS_FREQ configuration parameter

Use the `BAR_PROGRESS_FREQ` configuration parameter to specify, in minutes, the frequency of the progress messages in the ON-Bar activity log for backup and restore operations.

onconfig.std value

0

if value not present

0

units

minutes

range of values

0, then 5 to unlimited

takes effect

When ON-Bar starts

When you reset the value dynamically in your `onconfig` file by running the `onmode -wf` or equivalent SQL administration API command.

Usage

Example: If you set `BAR_PROGRESS_FREQ` to 5, ON-Bar reports the percentage of the object backed up or restored every 5 minutes. If you set `BAR_PROGRESS_FREQ` to 0 or do not set it, ON-Bar does not write any progress messages to the activity log.

Specify a value 5 minutes or over. Do not set `BAR_PROGRESS_FREQ` to 1, 2, 3, or 4, ON-Bar automatically resets it to 5 to prevent overflow in the ON-Bar activity log.

If ON-Bar cannot determine the size of the backup or restore object, it reports the number of transfer buffers sent to the database server instead of the percentage of the object backed up or restored.

Related information

[onmode -wf, -wm: Dynamically change certain configuration parameters on page](#)

BAR_RETRY configuration parameter

Use the `BAR_RETRY` configuration parameter to specify how many times onbar should try a data backup, logical-log backup, or restore operation if the first attempt fails.

onconfig.std value

1

if value not present

1

units

integer

range of values

0 = `BAR_ABORT`, stop the rest of the backup/restore

1 = `BAR_CONT`, continue the rest of the backup/restore

$n = 2$ to 32766

takes effect

When ON-Bar starts

When you reset the value dynamically in your `onconfig` file by running the `onmode -wf` or equivalent SQL administration API command.

Usage

The setting of the `BAR_RETRY` parameter determines ON-Bar behavior in the following ways:

- If set to 0 (BAR_ABORT), ON-Bar stops the backup or restore session when an error occurs for a storage space or logical log, returns an error, and quits. If ON-Bar is running in parallel, the already running processes finish but no new ones are started.
- If set to 1 (BAR_CONT), ON-Bar stops the backup or restore attempt for that particular storage space, returns an error, and attempts to back up or restore any storage spaces or logical logs that remain.
- If set to a specific number (retry backup and restore operations 2 to 32766 times), ON-Bar attempts to back up or restore this storage space or logical log the specified number of times before it gives up and moves on to the next one.

Related reference

[onbar -RESTART syntax: Restarting a failed restore on page 82](#)

[Resolve a failed restore on page 85](#)

Related information

[onmode -wf, -wm: Dynamically change certain configuration parameters on page](#)

BAR_SEC_ALLOW_BACKUP configuration parameter

Use the BAR_SEC_ALLOW_BACKUP configuration parameter on an RSS node to enable the taking of archives and log backups on that node using onbar.

onconfig.std value

0

default value

0

range of values

0 = Do not allow archives or log backups to be taken on this RSS node.

1 = Allow archives and log backups to be taken on this RSS node.

takes effect

When the RSS starts

Usage

The setting of the BAR_SEC_ALLOW_BACKUP parameter on an RSS node determines whether the onbar utility may take archives or log backups on that node.

- If set to 0, onbar will return an error if one attempts to archive spaces or back up logical logs.
- If set to 1 and the RSS node has been properly configured, onbar may be used to take archives and log backups locally.

The value of `BAR_SEC_ALLOW_BACKUP` is ignored on any non-RSS node.

Related information

[Backup and restore a Remote Secondary Server\(RSS\) on page 127](#)

BAR_SIZE_FACTOR configuration parameter

Use the `BAR_SIZE_FACTOR` configuration parameter to augment the estimate for the size of a backup object, before the backup.

onconfig.std value

Not in `onconfig.std`.

default value

0

range of values

0 = The estimated size of the backup is not augmented.

Positive integers = The percentage of the original backup size.

takes effect

When the database server starts

When you reset the value dynamically in your `onconfig` file by running the `onmode -wf` or equivalent SQL administration API command.

Usage

The estimate is handled before the backup and is calculated so that the storage manager can allocate the storage media appropriately. Because the backup is done online, the number of pages to back up can change during the backup. Some storage managers are strict and if the backup estimate is too low, the backup results in an error.

The value of `BAR_SIZE_FACTOR` is taken as percentage of the original backup object size, and then added to the estimate, before communicating it to the storage manager. `BAR_SIZE_FACTOR` is used only for `dbspace` backup objects, not for logical log backup objects.

The formula used for calculating the new estimated backup object size is:

$$new_estimate = original_estimate \times (1 + (BAR_SIZE_FACTOR / 100))$$

The value to which you set this parameter in a specific server environment depends on the activity on the system during backup or archive. Therefore, determining the value needs to be based on the individual experience with that system.

Related information

[onmode -wf, -wm: Dynamically change certain configuration parameters on page](#)

BAR_XFER_BUF_SIZE configuration parameter

Use the BAR_XFER_BUF_SIZE configuration parameter to specify the size of each transfer buffer.

onconfig.std value

31 if the page size is 2 KB

15 if the page size is 4 KB

units

pages

range of values

For storage managers that support long transfer buffers:

- 1 - 16383 pages when the page size is 4 KB
- 1 - 32766 pages when the page size is 2 KB

For storage managers that do not support long transfer buffers:

- 1 - 15 if the database server base page size is 4 KB
- 1 - 31 if the database server base page size is 2 KB

takes effect

When ON-Bar starts

When you reset the value dynamically in your `onconfig` file by running the `onmode -wf` or equivalent SQL administration API command.

Usage

The database server passes the transfer buffer to ON-Bar and the storage manager.

The value of BAR_XFER_BUF_SIZE is in database server base page sizes. For Linux™, Solaris, and HP, the database server base page size is 2 KB; and for AIX®, Windows™, and Mac, the database server base page size is 4 KB. To calculate the size of the transfer buffer in a storage space or logical-log backup, multiply the value of the BAR_XFER_BUF_SIZE configuration parameter by the system page size, as shown in the following formula:

```
one transfer buffer KB = BAR_XFER_BUF_SIZE * pagesize
```

You can determine the system page size by running the `onstat -b` command.

The maximum size of the transfer buffer for most storage managers is 64 KB. HCL® Tivoli® Storage Manager (TSM) supports long transfer buffer sizes of up to 65532 KB.

The maximum size of the transfer buffer for many storage managers is 64 KB. HCL® Tivoli® Storage Manager (TSM) and HCL OneDB™ Primary Storage Manager support long transfer buffer sizes of up to 65532 KB.

To calculate how much memory, in KB, the database server needs for each transfer buffer, use the following formula:

```
memory KB = (BAR_XFER_BUF_SIZE * pagesize) + 500 bytes/1028
```

The extra 500 bytes is for system use. For example, if BAR_XFER_BUF_SIZE is 15, the transfer buffer can be 66,292 bytes, or 64.5 KB.

The number of transfer buffers per backup stream is specified by the value of the BAR_NB_XPORT_COUNT configuration parameter, and the number of parallel backup streams is specified by the BAR_MAX_BACKUP configuration parameter.



Restriction: You cannot change the buffer size between a backup and restore. The values of the AC_TAPEBLOCK and AC_LTAPEBLOCK configuration parameters must be the same value as the value of the BAR_XFER_BUF_SIZE configuration parameter was at the time of backup.

Example

Example

For example, for a transfer buffer size of 128*2 KB (a value of 256 KB) on Linux™, specify:

```
BAR_XFER_BUF_SIZE 128
```

Related information

[Configuring ON-Bar for optional TSM features on page 31](#)

[onmode -wf, -wm: Dynamically change certain configuration parameters on page](#)

[onstat -b command: Print buffer information for buffers in use on page](#)

IFX_BAR_NO_BSA_PROVIDER environment variable

Set the **IFX_BAR_NO_BSA_PROVIDER** environment variable to force ON-Bar to use the `sm_versions` file as the source of information about the XBSA library for the storage manager.

```
setenvIFX_BAR_NO_BSA_PROVIDER1
```

By default, ON-Bar communicates directly with the XBSA library for some storage managers. ON-Bar does not require that the `sm_versions` file is updated to contain information about the XBSA library for those storage managers.

Set the **IFX_BAR_NO_BSA_PROVIDER** environment variable if you are instructed to do so by HCL Software Support.

To unset the **IFX_BAR_NO_BSA_PROVIDER** environment variable, run the following command:


```
unset IFX_BAR_NO_BSA_PROVIDER
```

IFX_BAR_NO_LONG_BUFFERS environment variable

Set the **IFX_BAR_NO_LONG_BUFFERS** environment variable to prevent the size of transfer buffers from exceeding 64 KB when the **BAR_XFER_BUF_SIZE** configuration parameter is set to a long transfer buffer size value.

```
setenv IFX_BAR_NO_LONG_BUFFERS 1
```

HCL® Tivoli® Storage Manager (TSM) supports long transfer buffer sizes of up to 65532 KB.

HCL® Tivoli® Storage Manager (TSM) and HCL OneDB™ Primary Storage Manager support long transfer buffer sizes of up to 65532 KB.

Set the **IFX_BAR_NO_LONG_BUFFERS** environment variable if you are instructed to do so by HCL Software Support.

To unset the **IFX_BAR_NO_LONG_BUFFERS** environment variable, run the following command:

```
unset IFX_BAR_NO_LONG_BUFFERS
```

Related information

[Configuring ON-Bar for optional TSM features on page 31](#)

IFX_BAR_USE_DEDUP environment variable

Set the **IFX_BAR_USE_DEDUP** environment variable to optimize the deduplication capabilities of storage managers.

```
setenv IFX_BAR_USE_DEDUP
```

You are not required to set the **IFX_BAR_USE_DEDUP** environment variable to a value. You can set it to any value or to no value.

Deduplication is a storage manager feature that reduces the size of backups by removing data that exists in older backups. To use deduplication, enable deduplication for your storage manager and set the **IFX_BAR_USE_DEDUP** environment variable in the database server environment and then restart the database server. When you set the **IFX_BAR_USE_DEDUP** environment variable, the backup format has fewer unique pages, which optimizes the deduplication process.

Deduplication is incompatible with incremental backups. Do not make incremental backups while the **IFX_BAR_USE_DEDUP** environment variable is set.



Important: Backups that you take while the **IFX_BAR_USE_DEDUP** environment variable is set must be restored while the **IFX_BAR_USE_DEDUP** environment variable is set.

HCL OneDB™ Primary Storage Manager does not support deduplication.

To unset the **IFX_BAR_USE_DEDUP** environment variable, run the following command:

```
unset IFX_BAR_USE_DEDUP
```

After you unset the **IFX_BAR_USE_DEDUP** environment variable, you must perform a level-0 backup.

Related reference

[Editing the TSM client system options file on page 28](#)

Configure ontape

Related information

[Configuring ON-Bar for optional TSM features on page 31](#)

[Configuring a third-party storage manager on page 32](#)

IFX_TSM_OBJINFO_OFF environment variable

Set the **IFX_TSM_OBJINFO_OFF** environment variable to disable support for restoring backup objects that are replicated, imported, or exported between HCL® Tivoli® Storage Manager (TSM) servers.

```
setenvIFX_TSM_OBJINFO_OFF1
```

By default, ON-Bar stores unique IDs in the metadata of backup objects that are created by TSM. During a restore, ON-Bar checks the metadata to identify the object. Therefore, ON-Bar can restore a backup whose original ID, which is stored as CopyID columns in the ON-Bar catalog, changed because the object was replicated, exported, or imported between TSM servers. To prevent the ability to restore backup objects that are moved between TSM servers, set the **IFX_TSM_OBJINFO_OFF** environment variable to 1.

To unset the **IFX_TSM_OBJINFO_OFF** environment variable, run the following command:

```
unset IFX_TSM_OBJINFO_OFF
```

Related information

[Configuring ON-Bar for optional TSM features on page 31](#)

LOG_BACKUP_MODE configuration parameter

Use the LOG_BACKUP_MODE configuration parameter to specify the log retention policy the database server will follow.

onconfig.std value

Not present.

if not present

NONE

takes effect

- When the database server is shut down and restarted.
- When you reset the value dynamically in your `onconfig` file by running the `onmode -wf` command.
- When you reset the value in memory by running the `onmode -wm` command.

Usage

Set `LOG_BACKUP_MODE` to `NONE` or leave it blank only if you do not want to back up the logical logs. If you do so:

- The database server frees the logical logs without requiring that you back up those logs. The logical logs do not get marked as free, but the database server can reuse them.
- If you perform a backup that requires logical log backup (A backup without the `-p` flag), the ON-Bar activity log shows a warning and return code 152 because they are not available for backup anymore. All transactions in those logs are lost, in case the database server needs to be restored from a backup.
- Only whole-system backups (backups performed with the `-w` flag) can be performed when `LOG_BACKUP_MODE` is set to `NONE`.
- `LOG_BACKUP_MODE` replaces and overrides the former `LTAPEDEV` configuration parameter for server log retention purposes.

RESTARTABLE_RESTORE configuration parameter

Use the `RESTARTABLE_RESTORE` configuration parameter to enable or disable restartable restores.

onconfig.std value

```
RESTARTABLE_RESTORE ON
```

values**OFF**

Disables restartable restore. If a restore fails and `RESTARTABLE_RESTORE` is `OFF`, you are not able to restart it.

ON

Enables restartable restore. Set `RESTARTABLE_RESTORE` to `ON` before you begin a restore. Otherwise, you will be unable to restart the restore after a failure.

takes effect

After you edit your `onconfig` file. If you need to restart a physical restore, you do not need to restart the database server before you can use `RESTARTABLE_RESTORE`. If you need to restart a logical restore, you must restart the database server before you can use restartable restore.

Turning on `RESTARTABLE_RESTORE` slows down logical restore performance. For more information, see [onbar -RESTART syntax: Restarting a failed restore on page 82](#).

Related reference

[onbar -RESTART syntax: Restarting a failed restore on page 82](#)

[Resolve a failed restore on page 85](#)

RESTORE_FILTER configuration parameter

Use the RESTORE_FILTER configuration parameter to specify the path name of a filter program, and any options.

onconfig.std value

Not set. Restored data is not filtered.

values

The path name of a command and any options. By default, the path name is relative to the `$ONEDB_HOME/bin` directory, otherwise, the path name must be the absolute path of the program. If you include command-line options, both the filter name and the options must be surrounded by single quotation marks.

takes effect

After you edit your `onconfig` file and ON-Bar or **ontape** starts.

Usage

This filter transforms data that was transformed during backup to its original format prior to a restore. The filter specified by the RESTORE_FILTER configuration parameter must match the filter specified by the BACKUP_FILTER configuration parameter. For example, if data was compressed during backup, data must be uncompressed during a restore.

For security purposes, filters should not have write permission to non-privileged users. Permission on the filters are the same as that of permission on other executable files that are called by the HCL OneDB™ server or utilities.

For example, if you want to compress backed up data, you could set the BACKUP_FILTER and RESTORE_FILTER configuration parameters to the following values:

```
BACKUP_FILTER /bin/compress
RESTORE_FILTER /bin/uncompress
```

The RESTORE_FILTER configuration parameter can include command-line options as well as the filter name. For example, specify:

```
RESTORE_FILTER 'my_decrypt -file /var/adm/encryption.pass'
RESTORE_FILTER 'my_unsecret -file /var/adm/secret.pass'
```

In this example, the command in quotation marks is used as the filter.

Related reference

[BACKUP_FILTER configuration parameter on page 180](#)

LTAPEBLK configuration parameter (DEPRECATED)

Use the LTAPEBLK configuration parameter to specify the block size of the device to which the logical logs are backed up when you use **ontape** for dbspace backups.

LTAPEBLK also specifies the block size for the device to which data is loaded or unloaded when you use the **-l** option of **onload** or **onunload**. If you are using **onload** or **onunload**, you can specify a different block size at the command line.

onconfig.std value

- On UNIX™: 32
- On Windows™: 16

units

Kilobytes

range of values

Values greater than (*page size*/`1024`)

To obtain the page size, run the `onstat -b` command.

takes effect

For **ontape**:

- When you execute **ontape**.
- When you reset the value dynamically in your `onconfig` file by running the `onmode -wf` command.

For **onload** and **onunload**: When the database server is shut down and restarted

Usage

Specify LTAPEBLK as the largest block size permitted by your tape device. The database server does not check the tape device when you specify the block size. Verify that the LTAPEDEV tape device can read the block size that you specify. If not, you might not be able to read from the tape.

UNIX™ only: The UNIX™ `dd` utility can verify that the LTAPEDEV tape device can read the block size. It is available with most UNIX™ systems.

Related reference

Changing your ontape configuration

[LTAPEDEV configuration parameter \(DEPRECATED\) on page 206](#)

[LTAPESIZE configuration parameter on page 207](#)

ontape backup and restore system

[TAPEBLK configuration parameter on page 208](#)

Related information

[onmode -wf, -wm: Dynamically change certain configuration parameters on page](#)

LTAPEDEV configuration parameter (DEPRECATED)

Use the LTAPEDEV configuration parameter to specify the device or directory file system to which the logical logs are backed up when you use **ontape** for backups.

The LTAPEDEV configuration parameter also specifies the device to which data is loaded or unloaded when you use the **-l** option of **onload** or **onunload**. If you are using LTAPEDEV to specify a device for **onunload** or **onload**, the same information for TAPEDEV is relevant for LTAPEDEV.

onconfig.std value

On UNIX™: **/dev/tapedev** On Windows™: **NUL**

if not present

On UNIX™: **/dev/null** On Windows™: **NUL**

takes effect

For **ontape**:

- When you execute **ontape**, if set to a tape device.
- When the database server is shut down and restarted, if set to **/dev/null** on UNIX™ or **nul** on Windows™.
- When you reset the value dynamically in your `onconfig` file by running the `onmode -wf` command.
- When you reset the value in memory by running the `onmode -wm` command.

For **onload** and **onunload**: When the database server is shut down and restarted

Usage

Warning: Do not set LTAPEDEV to **/dev/null** or **nul** when you use ON-Bar to back up logical logs.

If you specify a tape device in the LTAPEDEV configuration parameter, ON-Bar ignores the value.



Important: Set LTAPEDEV to `/dev/null` or leave it blank on UNIX™ or `NUL` on Windows™ only if you do not want to back up the logical logs. You must take the database server offline before you change the value of LTAPEDEV to `/dev/null`.

When you set LTAPEDEV to `/dev/null`:



- The database server frees the logical logs without requiring that you back up those logs. The logical logs do not get marked as free, but the database server can reuse them.
- The ON-Bar activity log shows a warning and return code 152. Because the database server marks the logical logs as backed up when they are no longer current, ON-Bar cannot find logical logs to back up. All transactions in those logs are lost, and you are not able to restore them.

If you performed a whole-system backup with `LTAPEDEV` set to null, you must use the `onbar -r -w -p` command during restore to notify ON-Bar that you do not want to restore the logs. .

Related reference

Changing your ontape configuration

[LTAPEBLK configuration parameter \(DEPRECATED\) on page 205](#)

[TAPEDEV configuration parameter on page 209](#)

Related information

[onmode -wf, -wm: Dynamically change certain configuration parameters on page](#)

LTAPESIZE configuration parameter

Use the `LTAPESIZE` configuration parameter to specify the maximum tape size of the device to which the logical logs are backed up when you use `ontape` for backups.

The `LTAPESIZE` configuration parameter also specifies the maximum tape size of the device to which data is loaded or unloaded when you use the `-l` option of the `onload` or `onunload` utility. If you are using `onload` or `onunload`, you can specify a different tape size on the command line. If you want to use the full capacity of a tape, set `LTAPESIZE` to 0.

onconfig.std value

`LTAPESIZE 0`

units

KB

range of values

0 - 4294967296 (4 TB)

0 - 9223372036854775807 (9 ZB)

takes effect

For the `ontape` utility:

- When you run an `ontape` command.
- When you reset the value dynamically in your `onconfig` file by running the `onmode -wf` command.

For the onload and onunload utilities: When the database server is shut down and restarted

Usage

LTAPESIZE specifies the maximum tape size of the device to which the logical logs are backed up when you run the `ontape` utility for backups. LTAPESIZE also specifies the maximum tape size of the device to which data is loaded or unloaded when you use the `-l` option of the onload or onunload utility. If you are using the onload or onunload utility, you can specify a different tape size on the command line. If you want to use the full capacity of a tape, set LTAPESIZE to 0.



Note: If the `BACKUP_FILTER` parameter is set in the `ONCONFIG` file, the LTAPESIZE cannot be set to 0. Otherwise the `ontape` utility returns an error when backing up logical logs to a directory on disk. The error message is:

```
The LTAPESIZE configuration parameter cannot be set to 0 when the BACKUP_FILTER
configuration parameter is set; change the value of LTAPESIZE.
Program over.
```

A workaround is to set the LTAPESIZE configuration parameter to a very high value. Log files are not much higher than the LOGSIZE configuration parameter. Use the value in the LOGSIZE as the upper limit for this database.

If you specify a LTAPESIZE value, ON-Bar ignores the value.

Related reference

Changing your `ontape` configuration

Specify the tape size

[LTAPEBLK configuration parameter \(DEPRECATED\) on page 205](#)

[TAPESIZE configuration parameter on page 211](#)

Related information

[onmode -wf, -wm: Dynamically change certain configuration parameters on page](#)

TAPEBLK configuration parameter

Use the TAPEBLK configuration parameter to specify the block size of the device to which **ontape** writes during a storage-space backup.

onconfig.std value

- On UNIX™: 32
- On Windows™: 16

units

Kilobytes

range of values

Values greater than `pagesize/1024`

To obtain the page size, run the `onstat -b` command.

takes effect

For **ontape**:

- When you execute **ontape**.
- When you reset the value dynamically in your `onconfig` file by running the `onmode -wf` command.
- When you reset the value in memory by running the `onmode -wm` command.

For **onload** and **onunload**: When the database server is shut down and restarted

Usage

TAPEBLK also specifies the default block size of the device to which data is loaded or unloaded when you use the **onload** or **onunload** utilities. If you are using **onload** or **onunload**, you can specify a different block size on the command line.

The database server does not check the tape device when you specify the block size. Verify that the TAPEBLK tape device can read the block size that you specify. If not, you might not be able to read from the tape.

If you specify a TAPEBLK value, ON-Bar ignores the value.

Related reference

Changing your `ontape` configuration

[TAPEDEV configuration parameter on page 209](#)

[TAPESIZE configuration parameter on page 211](#)

[LTAPEBLK configuration parameter \(DEPRECATED\) on page 205](#)

Related information

[onmode -wf, -wm: Dynamically change certain configuration parameters on page](#)

TAPEDEV configuration parameter

Use the TAPEDEV configuration parameter to specify the device or directory file system to which the `ontape` utility backs up storage spaces.

onconfig.std value

On UNIX™: `/dev/tapedev`

On Windows™: `\\.\TAPE0`

if not present

On UNIX™: `/dev/null`

On Windows™: **NUL**

units

Path name

takes effect

For the `ontape` utility:

- If it is set to `/dev/null` on UNIX™ or `NUL` on Windows™, when the database server is shut down and restarted
- If it is set to a tape device, when you run the `ontape` utility
- When you reset the value dynamically in your `onconfig` file by running the `onmode -wf` command.
- When you reset the value in memory by running the `onmode -wm` command.

For the `onload` and `onunload` utilities: When the database server is shut down and restarted

Usage

The `ontape` utility reads the value of the `TAPEDEV` parameter at the start of processing. If you set `TAPEDEV` to `/dev/null`, you must do it before you start `ontape` to request the backup. When you set `TAPEDEV` to `/dev/null` and request a backup, the database server bypasses the backup but still updates the `dbspaces` with the new backup time stamps.

You can set the `TAPEDEV` configuration parameter to `STDIO` to direct **ontape** utility back up and restore operations to standard I/O instead of to a device.

The `TAPEDEV` configuration parameter also specifies the default device to which data is loaded or unloaded when you use the `onload` or `onunload` utilities. However, if `TAPEDEV` is set to `STDIO`, the `onunload` utility will not be able to unload data.

If you change the tape device, verify that the `TAPEBLK` and `TAPESIZE` configuration parameter values are correct for the new device.

If you specify a `TAPEDEV` value, `ON-Bar` ignores the value.

Remote devices (UNIX™)

You can perform a storage-space backup across your network to a remote device attached to another host computer on UNIX™ and Linux™ platforms. The remote device and the database server computer must have a trusted relationship so that the `rsh` or the `rlogin` utility can connect from the database server computer to the remote device computer without asking for password. You can establish a trusted relationship by configuring the `/etc/hosts.equiv` file, the user's `~/.rhosts` files, or any equivalent mechanism for your system on the remote device computer. If you want to use a different utility to handle the remote session than the default utility used by your platform, you can set the `DBREMOTECMD` environment variable to the specific utility that you want to use.

Symbolic links to remote devices (UNIX™)

The `TAPEDEV` configuration parameter can be a symbolic link, enabling you to switch between tape devices without changing the path name that the `TAPEDEV` configuration parameter specifies.

Use the following syntax to specify a tape device attached to another host computer:

```
host_machine_name:tape_device_pathname
```

The following example specifies a tape device on the host computer **kyoto**:

```
kyoto:/dev/rmt01
```

Rewinding tape devices before opening and on closing

The tape device that The TAPEDEV configuration parameter specifies must perform a rewind before it opens and when it closes. The database server requires this action because of a series of checks that it performs before it writes to a tape.

When the database server attempts to write to any tape other than the first tape in a multivolume dbspace or logical-log backup, the database server first reads the tape header to make sure that the tape is available for use. Then the device is closed and reopened. The database server assumes the tape was rewound when it closed, and the database server begins to write.

Whenever the database server attempts to read a tape, it first reads the header and looks for the correct information. The database server does not find the correct header information at the start of the tape if the tape device did not rewind when it closed during the write process.

Related reference

Changing your ontape configuration

[TAPEBLK configuration parameter on page 208](#)

[LTAPEDEV configuration parameter \(DEPRECATED\) on page 206](#)

Related information

[onmode -wf, -wm: Dynamically change certain configuration parameters on page](#)

TAPESIZE configuration parameter

Use the TAPESIZE parameter specifies the size of the device to which the ontape utility backs up storage spaces.

onconfig.std value

TAPESIZE 0

units

KB

range of values

0 - 4294967296 (4 TB)

0 - 9223372036854775807 (9 ZB)

takes effect

For ontape:

- When you run an ontape command.
- When you reset the value dynamically in your `onconfig` file by running the `onmode -wf` command.
- When you reset the value in memory by running the `onmode -wm` command.

For the onload and onunload utilities: When the database server is shut down and restarted.

Usage

The TAPESIZE also specifies the size of the default device to which data is loaded or unloaded when you use the onload or onunload utility. When you run the onload or onunload utility, you can specify a different tape size on the command line. If you want to use the full physical capacity of a tape, set TAPESIZE to 0.



Note: Tape size is irrelevant if TAPEDEV is set to `STDIO`.

If you specify a TAPESIZE value, ON-Bar ignores the value.

Related reference

Changing your ontape configuration

Specify the tape size

[TAPEBLK configuration parameter on page 208](#)

[LTAPESIZE configuration parameter on page 207](#)

Related information

[onmode -wf, -wm: Dynamically change certain configuration parameters on page](#)

The archecker utility configuration parameters and environment variable

These topics describe the **AC_CONFIG** environment variable and the configuration parameters that you use with the archecker utility.

The **archecker** utility uses the configuration parameters in the `ac_config.std` template to verify a backup or perform a table-level restore. If you need to change these parameters, copy the `ac_config.std` template to the AC_CONFIG file. The AC_CONFIG environment variable specifies the location of the AC_CONFIG file.

Because ON-Bar calls the archecker utility to verify backups, you must configure the archecker environment variable and parameters before you can use the `onbar -v` option.

You can also use other archecker configuration parameters that do not have default values in the `ac_config.std` file, but are valid in that file.

Table 38. Configuration parameters that the archecker utility uses

Configuration parameter	Description
AC_DBSPACES	A comma separated list of dbspaces to scan.
AC_DEBUG	Prints debugging messages in the archecker message log.
AC_IXBAR	Specifies the path name to the IXBAR file. If not set in the <code>ac_config</code> file, the value of the <code>BAR_IXBAR_PATH</code> configuration parameter is used.
AC_MSGPATH	Specifies the location of the archecker message log. This configuration parameter is in the default <code>ac_config</code> file.
AC_SCHEMA	Specifies the path name to the archecker schema command file.
AC_STORAGE	Specifies the location of the temporary files that archecker builds. This configuration parameter is in the default <code>ac_config</code> file.
AC_TIMEOUT	Specifies the timeout value for the onbar and the archecker processes if one of them exits prematurely.
AC_VERBOSE	Specifies either verbose or terse mode for archecker messages. This configuration parameter is in the default <code>ac_config</code> file.
BAR_BSA LIB_PATH	Identical to the <code>BAR_BSA LIB_PATH</code> server configuration parameter that is in the <code>onconfig.std</code> file. For more information, see BAR_BSA LIB_PATH configuration parameter on page 182 .

Related reference

[archecker table level restore utility on page 163](#)

AC_CONFIG file environment variable

Set the **AC_CONFIG** environment variable to the full path name for the archecker configuration file (either `ac_config.std` or user defined).

```
setenvAC_CONFIG pathname
```

default value

```
UNIX™: $ONEDB_HOME/etc/ac_config.std
```

Windows™: %ONEDB_HOME%\etc\ac_config.std

takes effect

When ON-Bar starts

The following are examples of valid **AC_CONFIG** path names:

- UNIX™: /usr/dbserver/etc/ac_config.std and /usr/local/my_ac_config.std
- Windows™: c:\dbserver\etc\ac_config.std and c:\dbserver\etc\my_ac_config.std

If **AC_CONFIG** is not set, the archecker utility sets the default location for the archecker configuration file to \$ONEDB_HOME/etc/ac_config.std on UNIX™ or %ONEDB_HOME%\etc\ac_config.std on Windows™.

Important: If you do not specify the entire path, including the configuration file name in the AC_CONFIG file, the archecker utility might not work correctly.

AC_DEBUG configuration parameter

The AC_DEBUG configuration parameter causes debugging messages to be printed in the archecker message file. Use this parameter only as directed by technical support.

The use of this configuration parameter can cause the archecker message log file to grow very large and can substantially slow down archecker processing.

Default value

Off

Range

1-16

AC_IXBAR configuration parameter

Use the AC_IXBAR configuration parameter to specify the location of the IXBAR file.

Default value

None

Range

Any valid path name

AC_LTAPEBLOCK configuration parameter

Use the AC_LTAPEBLOCK configuration parameter to the **ontape** block size for reading logical logs.

Default value

32 kilobytes

Range

0 - 2,000,000,000

Usage

When you perform an archive with:

- `onbar -b`, the value of `AC_TAPEBLOCK` should be the value the `BAR_XFER_BUF_SIZE` configuration parameter multiplied by the current page size. For more information, see [BAR_XFER_BUF_SIZE configuration parameter on page 199](#).
- `ontape -t`, the value of `AC_LTAPEBLOCK` should be the value that the `TAPEBLK ONCONFIG` configuration parameter was set to at the time of the archive. For more information, see [Specify the tape-block-size](#).

AC_LTAPPEDEV parameter

Use the `AC_LTAPPEDEV` configuration parameter to specify the local device name that is used by the `ontape` utility.

If the tape device is set to `STDIO`, `archecker` receives input from standard input.

Default value

None

RangeAny valid path name or `STDIO`**AC_MSGPATH configuration parameter**

Use the `AC_MSGPATH` parameter in the **AC_CONFIG** file to specify the location of the `archecker` message log (`ac_msg.log`).

ac_config.std value

UNIX™: `AC_MSGPATH /tmp/ac_msg.log`

Windows™: `AC_MSGPATH c:\temp\ac_msg.log`

takes effect

When ON-Bar starts

Usage

You must specify the entire path of the message log in the **AC_CONFIG** file or else the `archecker` utility might not work correctly.

When you verify backups with `onbar -v`, the `archecker` utility writes summary messages to the `bar_act.log` and indicates whether the verification succeeded or failed. It writes detailed messages to the `ac_msg.log`. If the backup fails verification, discard the backup and try another backup, or give the `ac_msg.log` to HCL Software Support. For sample messages, see [onbar -v syntax: Verifying backups on page 53](#).

AC_SCHEMA configuration parameter

Use the AC_SCHEMA configuration parameter to specify the path name to the archecker schema command file.

Default value

None

Range

Any valid path name

This configuration parameter is overridden by the `-f cmdfile` command line option.

AC_STORAGE configuration parameter

Use the AC_STORAGE configuration parameter in the **AC_CONFIG** file to specify the location of the directory where archecker stores its temporary files.

ac_config.std value

UNIX™: /tmp

Windows™: c:\temp

takes effect

When ON-Bar starts

Usage

You must specify the entire path of the storage location in the **AC_CONFIG** file or else the archecker utility might not work correctly.

The following table lists the directories and files that archecker builds. If verification is successful, these files are deleted.

Table 39. The archecker temporary files

Directory	Files
CHUNK_BM	Bitmap information for every backed up storage space.
INFO	Statistical analysis and debugging information for the backup.
SAVE	Partition pages in the <code>PT. #####</code> file.
	Chunk-free pages in the <code>FL. #####</code> file.
	Reserved pages in the <code>RS. #####</code> file.
	Blob-free map pages in the <code>BF. #####</code> file

To calculate the amount of free space that you need, see [Temporary space for backup verification on page 56](#). It is recommended that you set AC_STORAGE to a location with plenty of free space.

AC_TIMEOUT configuration parameter

Use the AC_TIMEOUT configuration parameter to specify the timeout value for the onbar and the archecker processes if one of them exits prematurely.

ac_config.std value

UNIX™: 300

Windows™: 300

units

seconds

takes effect

When the onbar-v command starts

The AC_TIMEOUT configuration parameter was introduced to avoid onbar and archecker processes waiting for each other indefinitely if one of them exits prematurely, thus avoiding the creation of an orphan and zombie process during data server initialization.

AC_VERBOSE configuration parameter

Use the AC_VERBOSE parameter in the **AC_CONFIG** file to specify either verbose or terse output in the archecker message log (`ac_msg.log`).

ac_config.std value

1

range of values

1 = verbose messages in `ac_msg.log`

0 = terse messages in `ac_msg.log`

takes effect

When ON-Bar starts

OneDB® Primary Storage Manager configuration parameters

The HCL OneDB™ Primary Storage Manager uses the information in some specific configuration parameters.

Related information

[HCL OneDB Primary Storage Manager on page 132](#)

[Setting up OneDB Primary Storage Manager on page 135](#)

[Configuring OneDB Primary Storage Manager on page 136](#)

[Examples: Manage storage devices with OneDB Primary Storage Manager on page 157](#)

PSM_ACT_LOG configuration parameter

Use the PSM_ACT_LOG configuration parameter to specify the location of the HCL OneDB™ Primary Storage Manager activity log if you do not want the log information included in the ON-Bar activity log.

onconfig.std value

none

if value not present

The value of the BAR_ACT_LOG configuration parameter is used

range of values

Full path name

takes effect

When the **onpsm** utility starts

When you reset the value dynamically in your `onconfig` file by running the `onmode -wf` command.

Usage

Specify a path to an existing directory with an appropriate amount of space available or use `$ONEDB_HOME/psm_act.log`. If you specify a file name only, the storage manager creates the activity log in the working directory in which you started the storage manager.

If the PSM_ACT_LOG configuration parameter is not set, the OneDB® Primary Storage Manager puts activity information in the directory specified with the BAR_ACT_LOG configuration parameter. To clearly distinguish ON-Bar and OneDB® Primary Storage Manager activity information, use the PSM_ACT_LOG to specify a different location for the storage manager activity log.

The format of the file resembles the format of the database server message log. You can examine the activity log to determine the results of storage manager actions.

The file specified by the PSM_ACT_LOG configuration parameter is created if it does not exist.

You can also use the **PSM_ACT_LOG** environment variable to specify the location of the OneDB® Primary Storage Manager activity log for your environment, for example, for a single session.

Related reference

[Message logs for OneDB Primary Storage Manager on page 156](#)

[BAR_ACT_LOG configuration parameter on page 181](#)

Related information

[PSM_ACT_LOG environment variable on page](#)

[onmode -wf, -wm: Dynamically change certain configuration parameters on page](#)

PSM_CATALOG_PATH configuration parameter

Use the PSM_CATALOG_PATH configuration parameter to specify the full path to the directory that contains the HCL OneDB™ Primary Storage Manager catalog tables. These catalog tables contain information about the pools, devices, and objects managed by the storage manager.

onconfig.std value

Not set. The default value is used.

default value

UNIX™ or Linux™: \$ONEDB_HOME/etc/psm

Windows™: %ONEDB_HOME%\etc\psm

range of values

Full path name for the directory that contains the OneDB® Primary Storage Manager catalog tables

takes effect

When the ON-Bar or **onpsm** utility starts

When you reset the value dynamically in your `onconfig` file by running the `onmode -wf` command.

When you reset the value in memory by running the `onmode -wm` command.

Usage

You can change the default path to another location. The OneDB® Primary Storage Manager places the file that information about the devices and objects in whatever directory you specify.

If you move the backup file to another location, change the value of the PSM_CATALOG_PATH configuration parameter.

You can back up the contents of the file whenever you want.

If you have multiple instances, all instances contain the same catalog tables if the PSM_CATALOG_PATH in each instance is set to the same path. You can specify a different path for each instance.

The storage manager automatically creates the catalog tables the first time you run an `onpsm` utility command or the first time that the XBSA shared library is used.

You can also use the **PSM_CATALOG_PATH** environment variable to specify the location of the OneDB® Primary Storage Manager catalog tables for your environment, for example, for a single session.

Related information

[PSM_CATALOG_PATH environment variable on page](#)

[onmode -wf, -wm: Dynamically change certain configuration parameters on page](#)

PSM_DBS_POOL configuration parameter

Use the PSM_DBS_POOL configuration parameter to change the name of the pool in which the HCL OneDB™ Primary Storage Manager places backup and restore dbspace data.

onconfig.std value

DBSPool

takes effect

When the **onpsm** utility starts

When you reset the value dynamically in your `onconfig` file by running the `onmode -wf` command.

When you reset the value in memory by running the `onmode -wm` command.

Usage

The storage manager automatically places the dbspace data in the `DBSPool` or the pool you specify. You can use any combination of letters and digits.

You can also use the **PSM_DBS_POOL** environment variable to change the name of the pool for your environment, for example, for a single session.

Related information

[Device pools on page 155](#)

[PSM_DBS_POOL environment variable on page](#)

[onmode -wf, -wm: Dynamically change certain configuration parameters on page](#)

PSM_DEBUG configuration parameter

Use the PSM_DEBUG configuration parameter to specify the amount of debugging information that prints in the OneDB® Primary Storage Manager debug log if you want to use a debug level that is different from the one used by ON-Bar.

onconfig.std value

Not set. The default value is used.

default value

The value of the `BAR_DEBUG` configuration parameter is used.

units

One digit to represent the level of debugging information that you want

range of values

0 = No debugging messages.

1 = Prints only internal errors.

2 = Prints information about the entry and exit of functions and prints internal errors.

3 = Prints the information specified by 1-2 with additional details.

4 = Prints information about parallel operations and the information specified by 1-3.

5 = Prints information about internal states in the OneDB® Primary Storage Manager.

6 = Prints the information specified by 1-5 with additional details.

7 = Prints information specified by 1-6 with additional details.

8 = Prints information specified by 1-7 with additional details.

9 = Prints all debugging information.

takes effect

When the onpsm utility starts

When the ON-Bar utility executes commands and reads information that is specified in the BAR_DEBUG configuration parameter

When you reset the value dynamically in your `onconfig` file by running the `onmode -wf` command.

When you reset the value in memory by running the `onmode -wm` command.

Usage

If you set the PSM_DEBUG configuration parameter to a valid value that is higher than 0, the OneDB® Primary Storage Manager logs debug messages to its debug log.

You can experiment with the debug values to find the right amount of information. Generally, if the PSM_DEBUG configuration parameter is set to 5, the storage manager prints enough information for tracing and debugging purposes.

Settings of 8 and 9 require a large amount of space.

You can also use the **PSM_DEBUG** environment variable to specify the amount of debugging information that prints in the storage manager debug log for your environment, for example, for a single session.

Related reference

[Message logs for OneDB Primary Storage Manager on page 156](#)

Related information

[PSM_DEBUG environment variable on page](#)

[onmode -wf, -wm: Dynamically change certain configuration parameters on page](#)

PSM_DEBUG_LOG configuration parameter

Use the PSM_DEBUG_LOG configuration parameter to specify the location of the debug log to which the HCL OneDB™ Primary Storage Manager writes debugging messages if you do not want the log information included in the ON-Bar debug log.

onconfig.std value

Not set. The default value is used.

default value

The value of the BAR_DEBUG_LOG configuration parameter is used.

takes effect

When the onpsm utility starts

When you reset the value dynamically in your `onconfig` file by running the `onmode -wf` command.

When you reset the value in memory by running the `onmode -wm` command.

Usage

If the PSM_DEBUG_LOG configuration parameter is not set, the OneDB® Primary Storage Manager puts activity information in the directory specified with the BAR_DEBUG_LOG configuration parameter. To clearly distinguish ON-Bar and OneDB® Primary Storage Manager activity information, use the PSM_DEBUG_LOG to specify a different location for the OneDB® Primary Storage Manager activity log.

For security reasons, set the PSM_DEBUG_LOG configuration parameter to a directory with restricted permissions, such as the `$ONEDB_HOME` directory.

If the directory that holds the debug file becomes too large, you can erase the file. You need to retain information only if there are problems that need to be debugged.

You can also use the **PSM_DEBUG_LOG** environment variable to specify the location of the debug log for your environment, for example, for a single session.

Related reference

[Message logs for OneDB Primary Storage Manager on page 156](#)

[BAR_DEBUG_LOG configuration parameter on page 188](#)

Related information

[PSM_DEBUG_LOG environment variable on page](#)

[onmode -wf, -wm: Dynamically change certain configuration parameters on page](#)

PSM_LOG_POOL configuration parameter

Use the PSM_LOG_POOL configuration parameter to change the name of the pool in which the HCL OneDB™ Primary Storage Manager places backup and restore log data.

onconfig.std value

LOGPOOL

takes effect

When the **onpsm** utility starts

When you reset the value dynamically in your `onconfig` file by running the `onmode -wf` command.

When you reset the value in memory by running the `onmode -wm` command.

Usage

The storage manager automatically places the log data in the `LOGPOOL` or the pool you specify. You can use any combination of letters and digits.

You can also use the **PSM_LOG_POOL** environment variable to change the name of the pool for your environment, for example, for a single session.

Related information

[Device pools on page 155](#)

[PSM_LOG_POOL environment variable on page](#)

[onmode -wf, -wm: Dynamically change certain configuration parameters on page](#)

PSM_CATALOG_BACKUP configuration parameter

Use the PSM_CATALOG_BACKUP configuration parameter to automatically backup the PSM catalog every time a new device is created and restore the catalog if it does not exist.

onconfig.std value

Empty

takes effect

When the **onpsm** utility starts

When the **onbar** utility starts

Usage

```
<location>[, creds=<keystore-file>][, autoscan=[yes|no]
```

Set the *location* to a local file in the current machine (ie `/home/onedb/backup/catalog/mycatalog.json`) or to a URL for a supported cloud provider (ie `https://mybucket.s3.amazonaws.com/mycatalog.json`)



Note: If a URL is used, you must provide the full path of a keystore file containing the credentials to access the URL.

If *autoscan* is set to `yes` and the catalog is recreated, PSM will start an automatic scan of all devices.

Event alarm configuration parameters

When you set configuration parameters for use with the ON-Bar and **ontape** utilities, also determine if you need to adjust the `ALARMPROGRAM` and `ALRM_ALL_EVENTS` configuration parameters.

Use the [ALARMPROGRAM configuration parameter on page](#) to set the **log_full.sh** script to automatically back up log files when they become full.

Use the [ALRM_ALL_EVENTS configuration parameter on page](#) to cause `ALARMPROGRAM` to execute every time an alarm event is invoked.

Cloud Backup

These topics provide information about storing and retrieving the backups directly to the ecosystem of selected cloud providers, namely Amazon S3 and any OpenStack SWIFT object storage provider compliant with the OpenStack identity service (V1) .

Back up to Amazon Simple Storage Service using ON-Bar and the PSM

You can use ON-Bar and the Primary Storage Manager to back up and restore data to or from the Amazon Simple Storage Service (S3). You are responsible for terms and any charges associated with your use of the Amazon Simple Storage Service.

Before you begin

Prerequisites:

- You must have an Amazon account to perform cloud storage backups. See the Amazon website for instructions about setting up an account.

About this task

The following steps show how to back up data to the Amazon Simple Storage Service (S3) System and restore from it by using ON-Bar and the PSM. In this context, cloud storage refers to an online storage service over the Internet. If you choose to back up to cloud storage, you do not need to provide local devices. Instead, you back up the data to a virtual device, most likely located on the Internet.

1. Create a group to access S3

- a. Using a web browser, navigate to the Amazon S3 website and log on.
- b. Select **Groups** tab and click **Create New Group**.
- c. Specify the Group name and click **Next Step**.
- d. In the Attach Policy page, attach a policy to the group. In this case we will select **AmazonS3FullAccess** . As the name implies, this policy will allow any member of this group to do anything in all the containers in S3. Click **Next Step**.



Note:

If you want to use S3 for other purposes or for multiple instances, you can change this by going in to the **Policies** tab before creating the group and creating a customized policy that suits your needs. Ensure to be careful before granting full access to the Amazon S3, as it will provide the user to access all the S3 data in the account .

- e. In the Review page, review your entries and click **Create Group**.

Result

The new group is created.

2. Create a User to Access S3

- a. Select **Users** tab and click **Create New Users**.
- b. Specify the User name and select **Generate and access key for each user**.
- c. Click **Create**.

Result

Access Key and the Secret Access Key are generated. These keys are equivalent to username and password that can be used to store and retrieve data from S3 using APIs.



Note: Only authorized user can access these keys. You need to download these credentials into a text file and store in a safe location. If you lose them, you need to create a new user again.

- d. Click **Close**.

Result

User page with newly created user will be displayed.

3. Assign the user to the group.
 - a. Click the check box next to the user and select **User Actions**.
 - b. Click **Add User to Groups**.
4. Create a bucket.
 - a. Select **Services** tab and click **Amazon S3**.
 - b. Click **Create Bucket**.
 - c. Specify a bucket name and select the appropriate region.
5. Use the onkstore utility to create a keystore of type "aws-bar" with your AWS credentials
6. Configure Primary Storage Manager to use the Bucket and Credentials you just created.

Create a device in PSM of type CLOUD using S3 as provider.

```
onpsm -D add https://ifmx-s3-dev.s3.amazonaws.com \
-g DBSPPOOL \
-p HIGHEST \
-t CLOUD \
--creds /home/onedb/keystores/aws-bar.p12 \
-max_part_size 25600
```

In this command line:

- a. The URL must be provided in Virtual-Hosted style and not in Path style. This allows us also to use prefixes in the URL, Therefore you can use the same container for several purposes and you can choose to store your onedb data in the "onedb" prefix. For example "https://ifmx-s3-dev.s3.amazonaws.com/onedb".
 - b. **'-t CLOUD'**, is the device type that enable PSM to store/retrieve the data to/from a CLOUD infrastructure.
 - c. **--creds** is the full path of the keystore containing the credentials to access the S3 object storage.
 - d. **--max_part_size 25600** will fragment your objects in 25MB pieces, in the case of S3, size between 25 and 100 MB is recommended.
7. Check the created device:

```
$ onpsm -D list

OneDB Primary Storage Manager Devices List

Type   Prio   Pool      Provider Name                               Keystore
CLOUD  HIGH   DBSPPOOL  https://ifmx-s3-dev.s3.amazonaws.com       /home/onedb/keystores/aws-bar.p12
CLOUD  HIGH   LOGPOOL   https://ifmx-s3-dev.s3.amazonaws.com       /home/onedb/keystores/aws-bar.p12
```

8. Take a Level Zero Backup:

```
$ onbar -b -L 0 -w
$ echo $?
0
```

9. Check Backup Data in your Bucket using S3 management console.

Back up to OpenStack SWIFT using ON-Bar and the PSM (DEPRECATED)

You can use ON-Bar and the Primary Storage Manager to back up and restore data to or from the OpenStack SWIFT Object Storage. You are responsible for terms and any charges associated with your use of the Object Storage.

Before you begin

Notice of Deprecation:

This feature is provided for backward compatibility and could be removed in the future or its interface changed. It uses the OpenStack identity service (V1) .

Prerequisites:

- You must have a OpenStack Swift compliant server and account to perform cloud storage backups.
1. You must use the onkstore utility to create a keystore of type "open-stack-v1" (OpenStack SWIFT Version 1) and provide the Authentication User and its Authentication Key
 2. Configure Primary Storage Manager.

Create a device in PSM of type CLOUD using SWIFT as provider.

```
onpsm -D add https://myobjectstorage.net/auth/v1.0/mycontainer/onedb \
-g DBSPool \
-p HIGHEST \
-t CLOUD \
--creds /home/onedb/keystores/swift.p12
```

In this command line:

- a. The name of the device is formatted using "https://{HOST}/auth/v1.0/{CONTAINER}/{PREFIX}".
 - b. **'-t CLOUD'**, is the device type that enable PSM to store/retrieve the data to/from a CLOUD infrastructure.
 - c. **--creds** is the full path of the keystore containing the credentials to access the OpenStack SWIFT object storage.
3. Check the created device:

```
$ onpsm -D list

OneDB Primary Storage Manager Devices List

Type      Prio      Pool      Provider Name      Keystore
CLOUD     HIGH     DBSPool   https://myobjectstorage.net/auth/v1.0/mycontainer/onedb /home/onedb/keystores/swift.p12
CLOUD     HIGH     LOGPool   https://myobjectstorage.net/auth/v1.0/mycontainer/onedb /home/onedb/keystores/swift.p12
```

4. Take a Level Zero Backup:

```
$ onbar -b -L 0 -w
$ echo $?
0
```

Appendixes

Troubleshooting some backup and restore errors

This appendix lists some error and informational messages that you can receive during a backup or restore, describes under what circumstances the errors might occur or the message might appear, and provides possible solutions or workarounds.

Find errors by viewing the ON-Bar activity log

The database server does not show errors in standard output (stdout) if an error occurs when you use `onbar -b` to back up storage spaces or `onbar -r` to restore storage spaces. Therefore, when you use `onbar -b` or `onbar -r`, you must check information in the ON-Bar activity log (`bar_act_log`). As ON-Bar backs up and restores data, it writes progress messages, warnings, and error messages to the `bar_act.log`.

Corrupt page during an archive

The message `Archive detects that page is corrupt` indicates that page validation failed. If you receive this message, you can identify the table that has the corrupt page.

During an archive, the database server validates every page before writing it to the archive device. This validation checks that the elements on the page are consistent with the expected values. When a page fails this validation, a message similar to the following is written to the `online.log` file:

```
16:27:49 Assert Warning: Archive detects that page 1:10164 is corrupt.
16:27:49 Who: Session(5, informix@cronus, 23467, 10a921048)
16:27:49 Thread(40, arcbackup1, 10a8e8ae8, 1)
16:27:49 File: rsarcbu.c Line: 2915
16:27:49 stack trace for pid 23358 written to /tmp/af.41043f4
16:27:49 See Also: /tmp/af.41043f4
16:27:49 Archive detects that page 1:10164 is corrupt.
16:27:50 Archive on rootdbs Completed with 1 corrupted pages detected.
```

The archive stops after detecting 10 corrupt pages. The `online.log` file displays the full error message, including the page address, for the first 10 errors. Subsequently, only the count of the number of corrupt pages is put in to the `online.log`.

After you receive this message, identify which table the corrupt page belongs to by examining the output of the `oncheck -pe` command. To determine the extent of the corruption, execute the `oncheck -cID` command for that table.

A corrupt page is saved onto the backup media. During a restore, the corrupt page is returned in its corrupt form. No error messages are written to the `online.log` when corrupt pages are restored, only when they are archived.

Log backup already running

When using ON-Bar to create a backup, the informational messages `log backup is already running` in the `bar_act.log` file and `Process exited with return code 152` in the `online.log` file might appear under some circumstances.

These messages can appear under the following circumstances:

- When the ALARMPROGRAM configuration parameter is set to `log_full.sh`.

Periodically, events cause `log_full.sh` to trigger the `onbar -b -l` command. If a log fills while the `onbar -b -l` command is running, then ON-Bar backs up that log as well. If the backup has not completed by the time of the next event trigger, it generates a warning in the `bar_act.log` file. At the time of the next event trigger, the log backup can continue.

- When the `onbar -b -l` command is started automatically.

A level-0 archive (especially when started with the `-w` option) first archives the database and then automatically start the `onbar -b -l` command to back up any logical logs that are currently full and not yet backed up. There might not be a `log_full.sh` message in `online.log`, because the `onbar -b -l` command is started directly.

- When you mount a new tape after filling a previous tape, a `log_full.sh` event is scheduled but not triggered.

As soon as the next log fills and generates an event trigger in the `log_full.sh` file, all available logs are archived.

You can force the archive by running `onbar -b -l` or force `log_full.sh` to be triggered by running `onmode -l`.

No server connection during a restore

During a whole system restore with ON-Bar, the error `archive api error: no server connection` might appear in the `bar_act.log` file. ON-Bar then connects to the storage manager successfully, but eventually fails with the error `archive api error: not yet open`. If you receive these message, you can take steps to solve the problem.

The `bar_act.log` file contains information similar to the following messages:

```
2000-03-09 10:51:06 19304 19303 /usr/informix/bin/onbar_d -r -w
2000-03-09 10:51:09 19304 19303 ERROR: Unable to start the physical restore:
Archive API error: no server connection.
2000-03-09 10:51:09 19304 19303 Successfully connected to Storage Manager.
2000-03-09 10:51:36 19304 19303 Process 19304 received signal 3. Process will
exit after cleanup.
2000-03-09 10:59:13 19811 19810 /usr/informix/bin/onbar_d -r -w
2000-03-09 10:59:16 19811 19810 ERROR: Unable to start the physical restore:
Archive API error: no server connection.
2000-03-09 10:59:16 19811 19810 Successfully connected to Storage Manager.
2000-03-09 11:01:12 19811 19810 Begin cold level 0 restore llog1.
2000-03-09 11:01:12 19811 19810 ERROR: Unable to write restore data to the
database server: Archive API error: not yet open.
```

To solve this problem, check if the database server is still running. If it is, shut down the database server and run the command again.

Drop a database before a restore

If you perform a level-0 archive using ON-Bar and a storage manager, then drop a database, and then perform a restore with the `onbar -r` command, the database remains dropped. The restore salvages the logs and the logs contains the DROP DATABASE statement. When the logs are salvaged, or replayed, the database is dropped. If you receive these message, you can take steps to solve the problem.

To prevent this situation, perform a physical restore using the `onbar -r -p` command, and then a logical restore using the `onbar -r -l` command. This sequence does not salvage the logs and does restore the database.

No dbspaces or blobspaces during a backup or restore

If the emergency boot file, `ixbar.servernum`, does not have the correct entries for objects in the backup, the message `There are no DB/BLOBspaces to backup/restore` appears in `bar_act.log` file during a restore started with the `onbar -r` or `onbar -r -w` command.

This error can appear under the following circumstances:

- During an external restore, if the emergency boot file was not copied from the source system.
- If the emergency boot file was recreated after the archive backup was made. The previous file is saved in the form: `ixbar.xx.xxxx`.
- An attempt to execute the `onbar -r -w` command with a backup that is not a full system backup.

Restore blobspace BLOBs

You can use table-level restore to restore a BLOB that is stored in a table. However, restoring a BLOB that is stored in a blobspace is not supported. If you attempt to restore a blobspace BLOB, the column is set to NULL.

Changing the system time on the backup system

In some circumstances when there is a problem with the system time, ON-Bar fails with the message `There are no storage spaces or logical logs to backup or restore`. If this occurs, you can take steps to solve the problem.

About this task

Time lines use the UNIX™ time as the archive checkpoint time for dbspaces and the closing time for logical logs. If logs are not automatically backed up and the system clock is changed, the time line can get corrupted.

For example, if you have logical logs that were closed before the archive checkpoint time, they have a timestamp that is higher than the archive checkpoint time. The dbspace does not need the logs and ON-Bar will try to restore the backup immediately. If a log cannot be found, ON-Bar fails with the following message: `There are no storage spaces or logical logs to backup or restore`.

To restore the storage space and logical logs:


1. Change the clock back to its original value.
2. Recover the system from backup.
3. Change the clock back to the new time.

Migrate data, servers, and tools

Backing up before a database server or storage-manager upgrade

Before you upgrade to a new version of the database server, you must perform a complete backup.

About this task

 **Important:** The database server conversion software automatically recreates the **sysutils** database when you upgrade to the latest version of the database server. All backup and restore information from the old database server version is lost. Backups that you make under the older version of the database server are not compatible with the newer version of the database server.

To prepare for an upgrade:

1. Use ON-Bar to perform a level-0 backup of all your data before you upgrade your database server, ISM, or change storage managers.
2. Save these backups so that you can restore the data in case you need to revert to the old database server version.
3. Before you upgrade, back up the administrative files.
4. After you upgrade the database server, back up all storage spaces and logical logs.

For complete information about database server migration, see the *HCL OneDB™ Migration Guide*.

If you change storage manager vendors, do not remove the old storage manager until you verify that the new storage manager works for both backup and restore operations.

Related reference

[Upgrading a third-party storage manager on page 231](#)

[Changing storage-manager vendors on page 232](#)

Upgrading a third-party storage manager

If you upgrade a third-party storage manager vendors, do not remove the old storage manager until you verify that the new storage manager works for both backup and restore operations.

Prerequisite: Before upgrading, perform a complete backup of the database server.

To use a new version of a third-party storage manager with the database server:

1. Install the new storage manager before you bring up the database server.
2. Update the `sm_versions` file with the new storage-manager definition.

Verify that the new storage manager operates correctly before you use it in a production environment:

- Make sure that the storage manager can find the backup objects that ON-Bar requests.
- Make sure that the new storage-manager version is able to read media written with your old version.

If you have continuous logical-log backup set up on the database server, ON-Bar can start backing up the logical logs soon after the database server comes online.

Use the `onsmsync` utility to expire old backup history in the `sysutils` database and emergency boot files.

Related information

[Backing up before a database server or storage-manager upgrade on page 231](#)

Changing storage-manager vendors

If you change storage manager vendors, do not remove the old storage manager until you have proof that the new storage manager works for both backup and restore operations. You can use the old storage manager as a backup storage manager to use in case the new storage manager does not meet your needs.

ON-Bar supports working with multiple storage managers at the same time. To set up to test one storage manager and keep the other as a backup storage manager, specify information for both of the storage managers in the `BAR_BSALIB_PATH` configuration parameter and in the `$ONEDB_HOME/etc/sm_versions` file.

If you cannot use the old and new storage managers at the same time, use ON-Bar and the HCL OneDB™ Primary Storage ManagerISM or `ontape` as an alternative for backups while you check that backup and restore operations work correctly with the new storage manager. Until you confirm that the new storage manager works correctly, perform all your backups as whole system level-0 backups (`onbar -b -L 0 -w`)

If you change physical connectivity, such as moving a storage device from a local connection to a network server, make sure the new storage manager can move the data across the network. Also ensure that the new storage manager can send multiple data streams to storage devices. It also might use a different version of XBSA.

Related information

[Backing up before a database server or storage-manager upgrade on page 231](#)

GLS support

This appendix contains information about using Global Language Support (GLS) with ON-Bar.

Use GLS with the ON-Bar utility

The ON-Bar utility supports Global Language Support (GLS), which allows users to work in their native language. The language that the client application uses is called the *client locale*. The language that the database uses for its server-specific files is called the *server locale*.

ON-Bar must run on the same computer as the database server. However, you can run ON-Bar in any locale for which you have the supporting message and globalization files.

The following command performs a level-0 backup of the dbspaces specified in the file, `tomb`: `onbar -b -L 0 -f tomb`

On Windows™, you cannot use multibyte file names in backup or restore commands because they are not supported.

The **sysutils** database, the emergency boot files, and the storage-manager boot file are created with the en_us.8859-1 (default English) locale. The ON-Bar catalog tables in the **sysutils** database are in English. Change the client and database locales to en_us.8859-1 before you attempt to connect to the **sysutils** database with DB-Access or third-party utilities.

Identifiers that support non-ASCII characters

You can use non-ASCII characters in the database names and filenames with the ON-Bar and ondblog commands, and for file names in the `onconfig` file.

The *HCL OneDB™ GLS User's Guide* describes the SQL identifiers that support non-ASCII characters. Non-ASCII characters include both 8-bit and multibyte characters.

For example, you can specify a non-ASCII file name for the ON-Bar activity login `BAR_ACT_LOG` and a non-ASCII path name for the storage-manager library in `BAR_BSALIB_PATH`.

Identifiers that require 7-bit ASCII characters

You must use 7-bit ASCII characters for storage space names and database server names.

Locale of ON-Bar messages

All ON-Bar messages appear in the activity log in the client locale except the messages that the database server issues.

For example, the part of the message that tells you that a database server error occurred appears in the client locale, and the server-generated part appears in the server locale.

Use the `GL_DATETIME` environment variable with ON-Bar

The database server must know how to interpret and convert the end-user formats when they appear in date or time data that the client application sends. You can use the **GL_DATE** and **GL_DATETIME** environment variables to specify alternative date and time formats.

If you do not set these environment variables, ON-Bar uses the date and time format of the client locale.

If you perform a point-in-time restore, enter the date and time in the format specified in the **GL_DATETIME** environment variable if it is set.

Use GLS with the `ontape` utility

The `ontape` utility supports GLS in the same way as ON-Bar does. You can specify the database name in the national locale.

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