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Agenda

Backup
Recovery
Support for multitenant database containers
Database copy
Dynamic Tiering integration
Backint certification
What’s new?
Backup
SAP HANA Backup and Recovery
In-memory data and persistent storage

In-memory computing is safe: SAP HANA holds the bulk of its data in memory for maximum performance, but still uses persistent storage to provide a fallback in case of failure.

During normal operation, data is automatically saved from memory to disk at regular savepoints. Additionally, all data changes are captured in redo log entries. A redo log entry is written to disk after each committed database transaction.

After a power failure, SAP HANA can be restarted like any disk-based database and returns to its last consistent state by replaying the redo log entries since the last savepoint.
SAP HANA Backup and Recovery

Why backups?

While savepoints and redo log writing protect your data against power failures, this does not help when the persistent storage itself is damaged or a logical error occurs.

**Backups are required**
- To protect against disk failures
- To make it possible to reset the database to an earlier point in time

Backups are also used for other scenarios such as database copies.

Backups complement other availability strategies such as system replication or storage replication.
SAP HANA Backup and Recovery
Comparison of different high availability and disaster recovery options

**RPO** (Recovery Point Objective) = worst-case data-loss

**RTO** (Recovery Time Objective) = time to recover from outage

<table>
<thead>
<tr>
<th>Solution</th>
<th>Used for</th>
<th>Cost</th>
<th>RPO</th>
<th>RTO</th>
<th>Perf. ramp</th>
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<tr>
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<td>HA &amp; DR</td>
<td>$</td>
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<td>med</td>
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<td>$**/$$</td>
<td>0*</td>
<td>med</td>
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</tr>
</tbody>
</table>

** single host installations

* synchronous solution
**SAP HANA Backup and Recovery**

**Memory → disk → backup**

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**Data backups/snapshots**

- A full data backup saves all current data that is contained in the data area (payload only). Delta backups save subsequently changed data.
- A snapshot saves the content of the whole data area. Snapshots are an alternative to full data backups.
- Data backups and snapshots are executed manually (scheduling possible)

**Log backups**

- Log backups save the redo log entries that are contained in the log area
- Log backups are carried out automatically (asynchronously)
SAP HANA Backup and Recovery
Terminology

Data
- Data area = all data volumes
- 1 data volume per service with persisted data
- Data volumes contain the data and the undo log entries

Redo log entries
- Log area = all log volumes
- 1 log volume per service with persisted data
- Log volumes contain log segments, which contain the individual redo log entries
- A log segment is closed and automatically backed up if it is full, or the log backup timeout has elapsed and the log segment contains at least one COMMIT redo log entry
- A log segment is released for overwriting once it has been backed up and is no longer needed for restart
SAP HANA Backup and Recovery
Data backups: full and delta

**Full data backup**
- all data

**Incremental backup**
- changed data since the last data backup (full or delta)

**Differential backup**
- changed data since the last full data backup

A full data backup contains all current data

**Note:**
- Old data that is no longer valid but might still be physically present in the data volumes is not part of the data backup

Delta backups contain data that was changed since an earlier data backup

Two types: incremental and differential

**Notes:**
- Delta backups are data backups – they contain actual data. In contrast, log backups contain redo log entries (=sequence of changes)
- Delta backups cannot be used together with a snapshot for recovery
SAP HANA Backup and Recovery
Delta backups – when to use what

Incremental backups...
- ...are the smallest data backups as unchanged data will not be backed up in multiple backups → faster backup
- ...are restored one after the other during a recovery → longer recovery times

Differential backups...
- ...increase the amount of data saved with each backup → longer backup times
- ...reduce the number of data backups during recovery → faster recovery

Note: You can also mix incremental and differential backups in your backup strategy
**SAP HANA Backup and Recovery**

**What happens during a data backup?**

While backups are running, users can continue to work normally.

All services that persist data are backed up
- E.g. master name server, index servers

Global backup savepoint for these services
- Synchronized across all hosts and services
  ➔ No user interaction for synchronization required!

Data marked in the global backup savepoint is read from the data volumes and written to the backups
- Parallelization by asynchronous reading per service
There are different options for carrying out backups for SAP HANA

- Backups to the file system
- Backups via the “Backint for SAP HANA” API to 3rd party tools
- Data snapshots using storage tools

Note: You can mix different backup options, e.g. write the data backups to the file system and the log backups to Backint.
SAP HANA Backup and Recovery
Options for backups: File system

You can back up data and logs to the file system

Data backups can be triggered using
• SAP HANA Cockpit
• SAP HANA Studio
• SQL commands
• DBA Cockpit (scheduling)

Log backups are written automatically

More information:
• File systems that are not supported: SAP Note 1820529
• Scheduling using the XS scheduler: SCN blog
You can back up data and logs using 3rd party backup tools

SAP HANA provides an API (“Backint for SAP HANA”) via which 3rd party backup tools can be connected

- 3rd party backup agent runs on the SAP HANA server
- Backups are transferred via pipe

Direct integration with SAP HANA:

- Data backups to Backint can be triggered using SAP HANA Cockpit, SAP HANA Studio, SQL commands, or DBA Cockpit (scheduling)
- Log backups are automatically written to Backint (if configured)
For improved performance Backint can now use multiple parallel streams for data backups

If parallel streams have been configured, the individual service backups are distributed across all available streams. Note that the different services always use dedicated backup streams. Backups will only be distributed if they are bigger than 128 GB. Both full and delta backups are supported.

To configure the number of parallel streams, use the `parallel_data_backup_backint_channels` ini file parameter (default: 1, max: 32).

During recovery, the number of streams used is the same as during backup (independent of the current setting of the parameter).

Note: It is recommended to adapt the configuration of the 3rd party backup tool accordingly.
SAP HANA Backup and Recovery
Options for backup: Backint – parallel streaming (II)

In the example below, 3 parallel streams have been configured.

- The index server backup is distributed across 3 streams.
- Because both name server and XS engine backups are smaller than 128 GB, they are not distributed across several streams.

![Diagram showing parallel streams for backup]
SAP HANA Backup and Recovery
Options for backups: Snapshots

As an alternative to data backups to the file system or to Backint, you can use snapshots (data only)

1. First, you trigger the creation of an internal data snapshot in SAP HANA using SAP HANA Studio or SQL commands (“prepare database”)
2. Using a storage tool or similar, you create a snapshot of the whole data area
3. Confirm the snapshot as successful, using SAP HANA Studio or SQL commands. This is necessary to include the snapshot in SAP HANA’s backup catalog

**Note**: No other data backup is possible until the snapshot has either been confirmed or canceled
# SAP HANA Backup and Recovery

## Options for backup: Comparison

<table>
<thead>
<tr>
<th></th>
<th>File system</th>
<th>Backint</th>
<th>Snapshot</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Advantages</strong></td>
<td>• Consistency checks on block level</td>
<td>• Consistency checks on block level</td>
<td>• Usually created/restored very fast</td>
</tr>
<tr>
<td></td>
<td>• Additional features, e.g. encryption or de-duplication</td>
<td>• Data center integration</td>
<td>• Negligible network load</td>
</tr>
<tr>
<td></td>
<td>• Data center integration</td>
<td>• Backups immediately available for recovery</td>
<td></td>
</tr>
<tr>
<td><strong>Disadvantages</strong></td>
<td>• Additional storage → cost impact</td>
<td>• Network load</td>
<td>• No consistency checks on block level</td>
</tr>
<tr>
<td></td>
<td>• File system fill level needs to be monitored</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Additional time needed to make backups available for recovery</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Network load</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Size</strong></td>
<td>• Current data only (backup size usually smaller than the data area)</td>
<td>• Current data only (backup size usually smaller than the data area)</td>
<td>• ~ Size of the data area, but usually compressed/de-duplicated by storage</td>
</tr>
<tr>
<td><strong>Duration</strong></td>
<td>• IO-bound (reading from data volumes, writing to file system)</td>
<td>• IO-bound (reading from data volumes)</td>
<td>• Usually negligible (logical pointers are replicated)</td>
</tr>
<tr>
<td></td>
<td>• Network-bound (writing to file system)</td>
<td>• Network-bound (writing to backup server)</td>
<td></td>
</tr>
</tbody>
</table>
SAP HANA Backup and Recovery

Tools

By SAP

- SAP HANA Cockpit (web-based administration tool)
- SAP HANA Studio (Eclipse-based administration tool and IDE)
- DBA Cockpit (ABAP-based tool for high-level database administration tasks)

3rd party

- Certified backup tools (connected via Backint API)
- Storage tools (for snapshots)
Support for backup operations has been extended in SAP HANA Cockpit

The Data Backup tile shows the state of the current backup. Clicking on the tile takes you to the backup catalog.
SAP HANA Backup and Recovery
Displaying the backup catalog in SAP HANA Cockpit

The backup catalog provides detailed information on backups, including snapshots. The backup catalog is stored within SAP HANA. It is backed up itself as part of the log backup (even in log mode OVERWRITE). This allows for offline access to the backup catalog during recovery.

Displaying the backup catalog
1. In SAP HANA Cockpit, click on the Data Backup tile
2. By clicking on an entry in the catalog, detailed information on the respective backup is displayed
You can select which columns are displayed in the backup catalog in SAP HANA Cockpit

To hide/unhide columns, use the check boxes in the Columns dialog.

To change the order in which the columns are displayed, use the arrow buttons at the top of the sort dialog.

Note: You can also customize the details pages of the backup catalog in the same way.
SAP HANA Backup and Recovery
Filtering the backup catalog in SAP HANA Cockpit (I)

You can filter the backup catalog in SAP HANA Cockpit
The filter dialog displays the number of filters that are set for the different columns.
Click on the filter type to change the filter values.
SAP HANA Backup and Recovery
Filtering the backup catalog in SAP HANA Cockpit (III)

The current filter settings are displayed in the blue filter bar at the top of the backup catalog.

To change the settings, you can either click on the filter bar or the filter button.
You can also use SAP HANA Studio to display the current backup status

The backup overview displays information on:

- Progress of the currently running data backup, with information on the services included in the backup
- Last successful data backup
  - Start/end time, duration, size, and throughput
  - To display more detailed information on this data backup, click More Information
- Open snapshot (if available)

Buttons for:

- Starting a data backup
- Creating/confirming a snapshot
- Displaying backup.log file
You can also display the backup catalog using SAP HANA Studio
Creating a data backup in SAP HANA Cockpit

Using SAP HANA Cockpit, you can create data backups to the file system or to Backint. Both full and delta backups are supported.

Creating a data backup
1. In SAP HANA Cockpit, click on the Data Backup tile
2. On the Backup Catalog page, choose Start New Backup
3. Specify your backup settings
4. Start the backup by choosing Back Up
5. The progress is displayed on the Data Backup tile
   To view the progress details, click the tile
SAP HANA Backup and Recovery
Creating a data backup in SAP HANA Studio

You can also use SAP HANA Studio to create data backups
SAP HANA Backup and Recovery
Creating a delta backup in SAP HANA Studio

To create delta backups, you can use SAP HANA Studio or SQL commands

Creating a delta backup
1. In the Systems view in SAP HANA Studio, right-click on the system and choose Backup and Recovery → Backup System...
2. Choose the backup type, for a delta backup: either Differential Data Backup or Incremental Data Backup, and specify further settings
3. Start the backup

Note: The creation of delta backups is not yet available in SAP HANA Cockpit
To create snapshots, you can use SAP HANA Studio or SQL commands

Some storage tools can also trigger snapshots in SAP HANA directly

Creating a snapshot

1. In the Systems view in SAP HANA Studio, right-click on the system and choose Storage Snapshot... → Prepare.
   Alternatively, you can use the SQL command: BACKUP DATA CREATE SNAPSHOT COMMENT 'My Snapshot Test'

2. Using the storage tool, create a snapshot of the SAP HANA data area

3. In SAP HANA Studio, confirm the successful snapshot and enter the external snapshot ID.
   Alternatively, you can use the SQL command: BACKUP DATA CLOSE SNAPSHOT BACKUP_ID 3456789 SUCCESSFUL 'storage_id_12345'
To change the backup configuration, use SAP HANA Studio

- **Backint**
  - If a 3rd party backup tool is installed, it is displayed automatically. You can optionally specify vendor-specific parameter files

- **Data backup**
  - Default settings for data backups to the file system (destination, maximum file size).
    
    Note: You specify the destination type (file or Backint) when executing the data backup

- **Log backup**
  - Default settings for log backups (destination type – file or Backint), destination, backup interval). Log backups are carried out automatically unless disabled

Note: This is not yet available in SAP HANA Cockpit
You can use SAP HANA Studio or SQL commands to delete old backups

Deleting old backups may be required in order to manage your backup storage space or to fulfill regulatory deletion requirements.

You can delete old backups:
- From the backup catalog (logical view)
- Physically (from disk and/or from a 3rd party backup server via the Backint API)

You can enable an audit event to create an entry in the audit trail whenever a backup is deleted using this function.

Note: Not yet available in SAP HANA Cockpit
Recovery
SAP HANA Backup and Recovery

Backups during normal operation

1. Last full backup
2. Incremental backup
3. Differential backup
4. Log backup
5. Most recent redo log entries from the log area

Time

Now
SAP HANA Backup and Recovery

Recovery options

(A) To the most recent state
- Full backup (data backup to the file system/Backint or snapshot)
  + last differential backup (Note: not supported if a snapshot is used as basis)
  + subsequent incremental backups (Note: not supported if a snapshot is used as basis)
  + subsequent log backups
  + redo log entries that are still available in the log area (if it was not destroyed by the failure)

(B) To a point in time in the past
- Same as above; redo log entries from the log area might not be required

(C) To a specified full backup
- Full backup, but no replay of redo log entries (“clear log”)
After the initial collection of system information required for the recovery, there are the following recovery phases:

1. Data recovery (full backup + delta backups, if applicable)
2. Log replay (log backups + log entries from the log area, if applicable)
3. Restart
If a recovery fails during log replay, SAP HANA can now resume the recovery after the data recovery, thus shortening the outage significantly.

Data recovery usually takes up most of the time of a recovery.

A typical example that could cause a failure during log replay would be a temporary outage of the backup network.
Starting a recovery in SAP HANA Studio

You can use SAP HANA Studio or SQL commands to execute a recovery

Caution: For a recovery, SAP HANA will be shut down

In the *Systems* view in SAP HANA Studio, choose *Backup and Recovery → Recover System...* from the context menu of the database and enter the credentials of the SAP HANA operating system user `<sid>adm`

Note: Recovery is not yet available in SAP HANA Cockpit
You can use either a data backup (from the file system or Backint), or a snapshot as the basis for the recovery.
You can use either a data backup (from the file system or Backint), or a snapshot as the basis for the recovery.
You can use either a data backup (from the file system or Backint), or a snapshot as the basis for the recovery. Note that you do not need the backup catalog for this recovery option but can also directly specify a backup.
SAP HANA Backup and Recovery
Further recovery settings, e.g. use of delta backups during recovery

**Recovery includes delta backups automatically**

SAP HANA automatically determines the best recovery strategy based on all available backups, including delta backups. If you do not want SAP HANA to use delta backups for the recovery, de-select *Use Delta Backups* when specifying your recovery settings.
You can display the SQL statement for a specific recovery in SAP HANA Studio

After you have specified your recovery settings, a summary screen is displayed. You can display the SQL statement equivalent to these recovery settings by clicking the relevant button.

```
RECOVER DATABASE UNTIL TIMESTAMP 2016-09-11 08:12:27
USING DATA PATH ‘/usr/sap/R10/HDB10/backup/data’
USING LOG PATH ‘/usr/sap/R10/HDB10/backup/log’ USING
BACKUP_ID 14418946920490 CHECK ACCESS USING FILE
```
SAP HANA Backup and Recovery

Recovery phases

After the initial collection of system information required for the recovery, there are the following recovery phases:

**Phase 1: Data recovery**
- Using data backups or snapshot plus delta backups if available

**Phase 2: Log recovery**
- Redo log entries are replayed
  - from the log backups and/or
  - from the log area (if still available/required)

**Phase 3: Restart**
- SAP HANA is restarted
As an alternative to a full data backup to the file system/Backint, you can use a snapshot as the basis for a recovery.

We recommend that you already transfer the snapshot back to the data area of SAP HANA before starting the recovery.
Support for multitenant database containers
Multitenant database containers allow you to run multiple applications on one SAP HANA system

- 1 system database and multiple tenant databases
- Shared installation of the database system software
- Strong isolation features per default, the system database and each of the tenant databases have their own:
  - Database users, database catalog, repository, persistence, backups, traces and diagnosis files
- The system database contains information about the system as a whole and is used for central system administration
- The tenant databases contain the actual business data

More information:
- SAP Note 2096000
MDC systems follow the same backup/recovery principles as single-container systems

The system database plays a central role for MDC backup and recovery

- It can initiate both backups of the system database itself and of individual tenants databases. A tenant database can also carry out its own backups unless this feature has been disabled for this tenant database. Note that the backup location in the file system is specified system-wide and tenant databases always back up to sub-directories of this location.

- Recoveries are always initiated from the system database

- The system privilege DATABASE ADMIN authorizes the administration of tenant databases from the system database

To recover a complete MDC system, first the system database and then all tenants need to be recovered individually.

Note: Snapshots are currently not supported in multi-tenant database container systems
The current Backint API specification also covers MDC systems

There are a few points that you need to be aware of when using a 3rd party backup tool

Isolation level “high”
With SPS10, a new option “isolation level” was introduced for MDC systems. If the isolation level is set to high, all tenant databases run under individual operating system users.
In high isolation scenarios, Backint is supported from the SAP HANA side but you need to check with your 3rd party tool vendor whether any tool-specific restrictions apply.

Tenant copy
Tenant copy using Backint is currently not supported. Use file system backups for tenant copy instead.
You can use SAP HANA Cockpit to create data backups of the system database and of individual tenant databases.

Log on to the relevant database and click on the Data Backup tile.

Create data backups and view backup information in the same way as for single-container databases.

Note: You can also use SAP HANA Studio to create data backups. Backup lifecycle management is currently not available in SAP HANA Cockpit.
You regularly need to create data backups of the system database.

The system database contains information about the system as a whole and all tenant databases and is used for central system administration.

Creating a data backup of the system database

1. In the *Systems* view in SAP HANA Studio, right-click on the system database and choose *Backup and Recovery* → *Backup Up System Database*...
2. Specify your backup settings and start the backup.
SAP HANA Backup and Recovery
Multitenant database containers: Backing up a tenant database from the system DB

You regularly need to create data backups of the tenant databases
The tenant databases contain the business data. They have their own index servers.
Note: Depending on the system configuration, it may also be possible to initiate a data backup directly from a tenant database

Creating a data backup of a tenant database
1. In the Systems view in SAP HANA Studio, right-click on the system database and choose Backup and Recovery → Backup Up Tenant Database...
2. Select the tenant database to be backed up
3. Specify your backup settings and start the backup
SAP HANA Backup and Recovery
Multitenant database containers: Viewing backup information

Backup information is contained in the backup catalog

Viewing information for all databases
1. In the Systems view of the system database in SAP HANA Studio, expand the system database and double-click on **Backup**
2. Open the **Backup Catalog** tab and select the database for which you want to view the information

Viewing information for a tenant database
1. In the Systems view in SAP HANA Studio, expand the tenant database and double-click on **Backup**
2. Open the **Backup Catalog** tab
You can delete backups that are not needed any longer

Deleting old backups

1. In the **Systems** view of the system database in SAP HANA Studio, expand the system database and double-click on **Backup**

2. Open the **Backup Catalog** tab and select the database for which you want to delete backups

3. From the context menu, choose which backups you want to delete. Specify whether the backups should be deleted from the backup catalog only, or also from the file system/3rd party backup tool
Use SAP HANA Studio or SQL commands to recover the system database

**Caution:** The whole system will be shut down, including all tenant databases

- You need the `<sid>adm` operating system user credentials for recovering the system database
- The system database can only be recovered to the latest state
- Only the system database will be recovered, the content of the tenant databases is not affected

**Note:** Recovery is currently not available in SAP HANA Cockpit
Use SAP HANA Studio or SQL commands to recover an individual tenant database

- Tenant databases can be recovered to the latest state, a point in time, or to a specific backup
- The system database and all other tenant databases are not affected by the recovery of an individual tenant database
- Recovery of a tenant database can only be initiated from the system database. Note that the system database needs to be online for this.

Note: Recovery is currently not available in SAP HANA Cockpit
Database copy
You can copy a database using SAP HANA’s standard backup/recovery functions

A typical use case would be to copy your production system to a smaller QA system. Note that if the target system has less resources, e.g. less CPU and RAM, performance cannot be expected to be the same as in the source system.

As a basis for a database copy, you can use a full backup: data backup to the file system/Backint or a snapshot. You can choose to also use delta backups/log backups

The number of hosts can differ between source and target system
The following scenarios are possible:

\[ n \rightarrow n \] hosts

\[ n \rightarrow n+x \] hosts (not supported for snapshots)

\[ n \rightarrow n-x \] hosts (not supported for snapshots)
SAP HANA Backup and Recovery
Database copy from \( n \rightarrow n \)

**Source and target system have the same number of hosts**

Source database with \( n \) **hosts** (e.g. PROD)

Data backup or snapshot + log backups

Target database with \( n \) **hosts** (e.g. DEV)
SAP HANA Backup and Recovery
Database copy from $n \rightarrow n+x$

First copy to a system with the same number of hosts ($n \rightarrow n$), then add more hosts ($+x$)

Source database with $n$ hosts (e.g. PROD)

Data backup + log backups

Target database with $n$ hosts (e.g. PROD_NEW)

Add host and distribute data

Target database with $n+1$ hosts (e.g. PROD_NEW)
Before you copy the database, configure x additional index servers in the target system.
Integration with Dynamic Tiering
Dynamic tiering is an add-on option for SAP HANA for managing data of different temperatures.
Backup and recovery always apply to all of SAP HANA, both the hot and the warm store.

Hot data
- Always in memory
- Classical SAP HANA database tables

Warm data
- In extended table = disk-based columnar table
- “Dynamic Tiering” option

Note: Snapshots are currently not supported.
SAP HANA Backup and Recovery
Dynamic tiering – backup/recovery

Backup
- Backup paths for the warm store are the same as for the hot store
- Data backups are carried out as usual for SAP HANA either using SAP HANA Studio, SAP HANA Cockpit, or SQL commands. They will automatically include the warm store
- Log backups are carried out automatically (unless disabled)
- The SAP HANA backup catalog also contains information about backups of the warm store

Recovery
- Both data and log backups for the hot and the warm store are required for a recovery. You cannot recover one without the other
- The number and type of services must be identical in both the source and target system
- Recovery can be carried out in SAP HANA Studio or using SQL commands
Backint certification
Certification is an installation prerequisite for tools using the “Backint for SAP HANA” API

- See SAP Note 1730932 (Using backup tools with Backint)

Certified tools (as of 2015-09-01)

<table>
<thead>
<tr>
<th>Vendor</th>
<th>Backup tool</th>
<th>Support process (SAP Notes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allen Systems</td>
<td>ASG-Time Navigator 4.4</td>
<td>2212571</td>
</tr>
<tr>
<td>Commvault</td>
<td>Simpana 10.0, Hitachi Data Protection Suite 10 (via Simpana Backint interface)</td>
<td>1957450</td>
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<tr>
<td>EMC</td>
<td>NetWorker 8.2, Interface for Data Domain Boost 1.0</td>
<td>1999166, 1970559</td>
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<tr>
<td>HP</td>
<td>Data Protector 7.0, 8.1, 9.0; StoreOnce Plug-in for SAP HANA 1.0</td>
<td>1970558</td>
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<tr>
<td>IBM</td>
<td>Tivoli Storage Manager for Enterprise 6.4</td>
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<td>Libelle</td>
<td>BusinessShadow 6.0.6</td>
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<td>Symantec</td>
<td>NetBackup 7.5</td>
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</table>

Online listing of certified tools: Application Development Partner Directory
- Enter the search term HANA-BRINT and click on a partner name → "SAP Certified Solutions" for further details
What’s new?

SAP HANA SPS11
SAP HANA Backup and Recovery
What’s New in SAP HANA SPS11

- Extended backup functionality in SAP HANA Cockpit
- Performance improvements for Backint-based data backups
- Database recovery can be resumed after error
- New Backint certifications
More information
SAP HANA Backup and Recovery
More information

- **Overview presentation**: SAP HANA Backup/Recovery Overview
- **Certification**: “Backint for SAP HANA” Certification
- **Best practice**: SAP Note 2091951: SAP HANA Backup and Restore
- **Training**: HA200: SAP HANA - Operations & Administration

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Further SAP notes are available on component HAN-DB-BAC
Thank You!

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