IBM Spectrum Protect Snapshot
Version 8.1.4

Oracle in an SAP environment
SVC DTA

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SVCDTA for Oracle in an SAP environment

Updates for IBM Spectrum Protect Snapshot for SVCDTA

Learn about new features and enhancements in IBM® Spectrum Protect Snapshot Version 8.1.4.

New and changed information in this product documentation is indicated by a vertical bar (|) to the left-hand side of the change.

Specify different backup version retention values
For all storage devices, you can specify different backup retention periods for each device class that is configured. During the configuration process, you can define different values for each device class with the **MAX_VERSIONS** parameter in the profile. For more information about this feature, see Backup version retention.

Specify different MAX_VERSIONS for different device classes

When you are configuring IBM Spectrum Protect™ Snapshot, you can specify multiple instances of the **MAX_VERSIONS** parameter with different values. In previous versions, it was possible to specify only one instance of **MAX_VERSIONS**. This configuration is true for all storage devices.

For more information about **MAX_VERSIONS** settings, see Backup version retention.

IBM SAN Volume Controller Dynamic Target Allocation (SVC DTA) incremental backups
Run incremental backups for SVCDTA with the **FLASHCOPY_TYPE** option INCR. After the initial FlashCopy backup, incremental FlashCopy backups are run to the same target volume. The ability to run incremental backups to the SVC, results in improvements in how long the backup takes and eases the load on the SVC. For more information about incremental flash copies, see Incremental backups and MAX_VERSIONS.

New and modified parameters or functions

The following parameters are modified for IBM Spectrum Protect Snapshot 8.1.4:

MAX_VERSIONS for all device classes
Use this parameter in the CLIENT section of the profile for each **DEVICE_CLASS** to create incremental FlashCopies. When **FLASHCOPY_TYPE** is set to INCR, the incremental FlashCopy is refreshed depending on the **MAX_VERSIONS** value set. Specify the maximum number of snapshot backup versions to be kept before the oldest backup is deleted by using **MAX_VERSIONS** to specify the maximum. For SVCDTA, when the version-delete deletes the oldest snapshot backup with an incremental FlashCopy relation, it reuses the target volumes of the expired backup and refreshes the FlashCopy relationship instead of deleting it. For more information about **MAX_VERSIONS**, see "CLIENT" on page 10.

Backup version retention

Specify the number backups to be retained by using the **MAX_VERSIONS** parameter when you are configuring IBM Spectrum Protect Snapshot.

For example, if two device classes are configured and the first has a **MAX_VERSIONS** set to 2 there are always two versions that are kept for that device class. The oldest version is deleted once a new backup is made. If you configure another device class with **MAX_VERSIONS** set to 3, it always retains three backup versions for that device class. If you do not specify a USE_FOR device class option, and you have two device classes in use with a **MAX_VERSIONS** set to 2, there are four versions that are kept in total.

Example of **MAX_VERSIONS** for different device classes profile

In the following example, there are four backup versions to be kept when backups are taken with DC_XIV1 and four backup versions to be kept when backups are taken with DC_XIV2. Three backup versions are kept for backups that are taken with device class STANDARD. All other device classes have a **MAX_VERSIONS** value of two, in this case SOME_OTHER_DC. That means that 13 backup versions are kept with this profile: two for SOME_OTHER_DC, three for STANDARD, and four each for DC_XIV1 and DC_XIV2. Thirteen backups are retained for this sample profile.

```
>>> CLIENT
MAX_VERSIONS 2
MAX_VERSIONS 3 USE_FOR STANDARD
MAX_VERSIONS 4 USE_FOR DC_XIV1
MAX_VERSIONS 4 USE_FOR DC_XIV2
DEVICE_CLASS STANDARD DC_XIV1 DC_XIV2 SOME_OTHER_DC
APPLICATION_TYPE GENERIC
TSM_BACKUP NO
NEGATIVE_LIST NO_CHECK
<<<

>>> DEVICE_CLASS STANDARD
...
<<<

>>> DEVICE_CLASS SOME_OTHER_DC
...
<<<

>>> DEVICE_CLASS DC_XIV1
...
<<<

>>> DEVICE_CLASS DC_XIV2
...
<<<
```

In the following example, **MAX_VERSIONS** is set to 2. There are four backup versions retained, two for each device class as there is no USE_FOR device class option specified.

```
MAX_VERSIONS 2

>>> DEVICE_CLASS STANDARD
...
<<<
>>> DEVICE_CLASS SOME_OTHER_DC
...
<<<
```

```
is the same like:

MAX_VERSIONS 2 USE_FOR STANDARD
MAX_VERSIONS 2 USE_FOR SOME_OTHER_DC

>>> DEVICE_CLASS STANDARD
...
<<<
>>> DEVICE_CLASS SOME_OTHER_DC
...
<<<
```

Incremental backups and `MAX_VERSIONS` for SVCDTA

When you configure SAN Volume Controller Dynamic target allocation, you can
choose to run incremental backups. When the maximum number of backups as
defined by **MAX_VERSIONS** is reached for a device class with **FLASHCOPY_TYPE** INCR,
the oldest backup is deleted just before the new backup is taken. This new backup
refreshes the INCR FlashCopy relation of the previous deleted backup.

For more information about device class settings, see Device class backup version
retention.

Related tasks:

"Configuring Storwize family and SAN Volume Controller dynamic target
allocation (SVCDTA)"

Configuring Storwize family and SAN Volume Controller dynamic target allocation (SVCDTA)

To allow dynamic volume creation during backup operations, you must enable
Secure Shell (SSH) remote access to the storage system command-line interface
(CLI) with Secure Shell (SSH) keys. An SSH key pair must be created to
authenticate users for a secure connection to SAN Volume Controller.

Before you begin

Verify that the OpenSSH client is installed on the production server, and the
backup or clone server where IBM Spectrum Protect Snapshot is installed. The
OpenSSH client is installed by default on most AIX and Linux distributions. If it is
not installed on your system, consult your AIX or Linux installation
documentation.

About this task

SSH is used to remotely enter commands on the SAN Volume Controller CLI. The
following steps are required to enable CLI access with SSH keys:

* Generate a public and a private key pair
* Import the public key to the storage system
* Configure IBM Spectrum Protect Snapshot to authenticate with the private key.

The IBM Spectrum Protect Snapshot user must have a unique SSH key at the SAN
Volume Controller. After you generate the key pair, import the public key and add
a key file for the SAN Volume Controller user as specified in the IBM Spectrum
Protect Snapshot profile. The parameters are **COPYSERVICES_USERNAME** and
COPYSERVICES_REMOTE_USERNAME. The user at the remote site also needs a key file.

The IBM Spectrum Protect Snapshot user owns the private key and has RW access to that key file.

The full path to the private key file is specified in the profile. By default, the path is $HOME/.ssh/svc_sshkey. The public counterpart of the private key file must be imported to the SAN Volume Controller and associated to the user.

Procedure

1. Generate an RSA key pair on the production server for the storage user name to access the storage system by entering the following command from the $HOME/.ssh directory. Ensure to enter the command as the database instance owner or application backup user from the $HOME/.ssh directory.

   ```
   ssh-keygen -t rsa
   ```

   This command generates two files, which you are prompted to name. If you select the name svc_sshkey, the private key is named svc_sshkey, and the public key is named svc_sshkey.pub.

   Tip: Do not enter a passphrase for the file when prompted. For SVCDTA dynamic target allocation, the passphrase must be empty.

2. If you do not remotely install the backup or cloning servers with SSH, you must copy the key pair to the backup and clone servers. Ensure that the key pair is stored in the same path as on the production server.

3. Upload the public key to the storage system for the SAN Volume Controller user that is specified by **COPYSERVICES_USERNAME** in the profile.

   For instructions about how to upload to the storage system, see the documentation that is provided for your storage system. The documentation is available in IBM SAN Volume Controller Knowledge Center http://www.ibm.com/support/knowledgecenter/STPVGU/welcome?lang=en.

4. Switch to the IBM Spectrum Protect Snapshot instance directory and run the setup script in advanced mode:

   ```
   ./setup_orasap.sh [-advanced]
   ```

   Note: If you do not want to use an alternative SSH binary and the private key file is named svc_sshkey in the default path $HOME/.ssh, you can proceed to run the setup script in basic mode.

5. When prompted to specify a **SSH_DIR** path, enter the path where the Secure Shell protocols and executable files are installed. The default location is /usr/bin.

6. When prompted to specify a **SVC_SSHKEY_FULLPATH** path, enter the path and the file name for the private keyfile. The following example shows the default path and file name:

   ```
   SVC_SSHKEY_FULLPATH    $HOME/.ssh/svc_sshkey
   ```

7. Continue configuring IBM Spectrum Protect Snapshot for SAN Volume Controller with the setup script for your component. When you are configuring SAN Volume Controller Dynamic Target Allocation, the profile that is created is saved with the necessary parameters.

8. The IBM Spectrum Protect Snapshot daemons are automatically restarted by running the setup script either in basic mode or in advanced mode.

What to do next

If you are using SAN Volume Controller remote mirroring, the setup script asks if you want to create another SSH key to facilitate mirroring with the remote cluster.

The key file **SVC_REMOTE_SSHKEY_FULLPATH** parameter specifies the private key file that is used for connecting to the secondary SAN Volume Controller site, and is specified by **COPYSERVICES_REMOTE_SERVERNAME**. The remote site user is the one specified by the parameter **COPYSERVICES_REMOTE_USERNAME**.

Migrating SVC with static target allocation to SVCDTA (dynamic target allocation)

Change an existing configuration of IBM Spectrum Protect Snapshot for UNIX and Linux to use SVC dynamic target allocation (DTA) without losing older backups. Change the value of **COPYSERVICES_HARDWARE_TYPE: SVC** to **SVCDTA** to update the profile and complete the migration.

About this task

Use the following information to modify an existing IBM Spectrum Protect Snapshot profile and reconfigure the product to SVCDTA.

Procedure

1. To start the configuration process, run the setup script.
2. Choose (m) to modify the profile.
3. Change the value of **COPYSERVICES_HARDWARE_TYPE** from SVC to SVCDTA.
4. If **MAX_VERSIONS** is set to ADAPTIVE, you must return to the CLIENT section, and change the **MAX_VERSIONS** parameter from ADAPTIVE to a fixed number.
5. Enter the existing server information for the storage system host name **COPYSERVICES_SERVERNAME**<TCP/IP host name>.
6. Enter the user name for the primary storage device **COPYSERVICES_USERNAME**. The default value is superuser.
7. Enter the path and the file name of the private SSH key file in parameter **SVC_SSHKEY_FULLPATH**. For example,

   SVC_SSHKEY_FULLPATH   *$HOME*/.ssh/svc_sshkey
8. Accept the defaults for the remaining parameters, or change the values where required.

   Note: Do not change the FlashCopy® type.

Results

The updated profile is saved, and if required you can specify a backup system or quit the configuration.IBM Spectrum Protect Snapshot for UNIX and Linux is configured to use the SAN Volume Controller storage adapter with dynamic target allocation.

After reconfiguring the profile for SVCDTA, all backups are managed by the new dynamic target allocation adapter, including all backups that were taken with the CIM adapter. Continue to mount, restore, delete, and expire backups as usual. When **FLASHCOPY_TYPE** is set to INCR, you can also refresh backups as required.

DEVICE_CLASS parameters for dynamic target allocation

The device class parameters for dynamic target allocation are defined in the `DEVICE_CLASS` section of the IBM Spectrum Protect Snapshot profile. These parameters configure IBM Spectrum Protect Snapshot to use dynamic target allocation with IBM Storwize® family or IBM System Storage® SAN Volume Controller storage systems.

CLONE_DATABASE
> This parameter indicates whether the device class is used for cloning. The following list identifies the possible options:

> **YES**   Use the device class for cloning. When the parameter is set to `YES`, the device class is unavailable for non-cloning backup or restore operations. The device class is ignored during backup expiration and reconciliation processing.

> **NO**   Do not use the device class for cloning.

> **Default**
>> No

> **Advanced mode only**
>> No

COPYSERVICES_HARDWARE_TYPE

> This parameter is required. Only one device can be specified.

> **SVCDTA**
>> Specify the `SVCDTA` option when the storage system is SAN Volume Controller or Storwize family and you require the target volumes to be dynamically allocated during the backup process.

> **Default**
>> None

> **Advanced mode only**
>> No

COPYSERVICES_SERVERNAME
> Defines the TCP/IP host name of the storage system where the application data to protect is allocated.

> **Default**
>> None

> **Advanced mode only**
>> No

COPYSERVICES_USERNAME
> Identifies the user name. Specify the user name that is used to log on to the SAN Volume Controller cluster. For Storwize family, specify the Storwize family user name.

> **Default**
>> superuser

> **Advanced mode only**
>> No

SVC_SSHKEY_FULLPATH
> Specifies the path and the file name to the private SSH key file. The key file is used to authenticate to the storage system with the user name specified for the `COPYSERVICES_USERNAME` parameter. In an Oracle SAP environment, both the

Oracle and `sidadm` users can start Snapshot operations. The private SSH key must be located in the home directory `<$HOME>/.ssh` for both users.

Default

> `<$HOME>`/.ssh/svc_sshkey

Advanced mode only

> Yes

`SVC_REMOTE_SSHKEY_FULLPATH`

This parameter specifies the second SSH key file to be used for authentication on the remote site storage device. The key file is used to authenticate to the storage system with the user name that is specified for the `COPYSERVICES_REMOTE_USERNAME` parameter. If you do not want to create a new key pair for the remote site, one key can be shared for both storage sites.

Default

> `<$HOME>`/.ssh/svc_sshkey

Advanced mode only

> Yes

`SSH_DIR`

Specifies the path to the Secure Shell protocols and executable files.

Default

> */usr/bin*

Advanced mode only

> Yes

`SVC_COPY_RATE`

Specifies the priority that the storage system gives to the FlashCopy background process for the current backup or restore operation. Enter a value from the range 1 - 100.

The `SVC_COPY_RATE` parameter applies only for full copy backups (FLASHCOPY_TYPE COPY). For space-efficient backups (FLASHCOPY_TYPE NOCOPY), the copy rate is implicitly set to 0.

Default

> 0

Advanced mode only

> Yes

`LVM_MIRRORING`

Set this parameter to YES if your volume groups use AIX Logical Volume Manager mirroring.

Default

> No.

Advanced mode only

> Yes.

`FLASHCOPY_TYPE`

Specifies whether the storage solution does a bit-level copy of data from one logical volume to another. This parameter applies to any FlashCopy storage system. The following options are available:

`COPY`   Directs the storage system to run a bit-level copy of the data from one physical volume to another. Specify this value when the following conditions are true:

- A fast snapshot restore of a backed-up database is required.
- A complete copy of the database data on the target volume is required.

NOCOPY Directs the storage system to run a bit-level copy of a track if the data is modified after the initial FlashCopy request. This technique is typically referred as copy-on-write. Specify this value when the following conditions are true:

- A complete copy of the source volumes that contain the database files is not required on the target volumes.
- A fast snapshot restore of a backed-up database is required.
- Backup time constraints are a concern.

INCR This option is similar to the COPY option but the INCR option copies only those tracks that were modified since the previous incremental FlashCopy was created. This option applies only to FlashCopy devices. Specify this value when the following conditions are true:

- IBM Spectrum Protect backups are taken from disk copies. This type of backup creates less burden on the storage system than for the COPY option.
- A snapshot restore operation of the backed up database is to be completed.
- More frequent backups for the database are scheduled.

Default
> NOCOPY

Advanced mode only
> No

SVC_GRAIN_SIZE

Specifies the grain size, in KB, for FlashCopy mapping for space-efficient virtual disks on SAN Volume Controller or Storwize family. The grain size of the space-efficient virtual disk must match the grain size of the FlashCopy. The options for this parameter are 64, and 256.

After the parameter is set, the value cannot be changed until the backup is deleted with the option -F to remove the mappings.

Note: When you are migrating from the SVC adapter with static target allocation, you must ensure that the grain size for the new SVCDTA device classes is set to the same value as it was for the device classes for SVC.

Default
> 256

Advanced mode only
> Yes

SVC_POOLNAME
This parameter specifies the name of the storage pool that is used to create target volumes for the FlashCopy backups. A value must be assigned if a source volume has two copies in the SVC, and these copies are in two different storage pools. If the DEVICE_CLASS is configured for remote site backup **COPYSERVICES_REMOTE** YES, the specified pool name is related to the remote site storage device.

Default
> Name of the storage pool where the source volume is located.

Advanced mode only
> Yes

SVC_IOGROUP
> Specifies the name of the input and output (IO) group, which is used to create target volumes for the FlashCopy backups. If the DEVICE_CLASS is configured for remote site backup COPYSERVICES_REMOTE YES, the specified IO group is related to the remote site storage device.
>
> **Default**
> > Name of the IO group on the source volume where the FlashCopy relationship is established.
>
> **Advanced mode only**
> > Yes

SVC_MOUNT_POOLNAME
> Specifies the name of the storage pool that is used to create temporary duplicates of the target volumes of a FlashCopy backup, which then mounts to a host. If the DEVICE_CLASS is configured for remote site backup COPYSERVICES_REMOTE YES, the specified pool name is related to the remote site storage device.
>
> **Default**
> > Name of the storage pool that is used to create target volumes.
>
> **Advanced mode only**
> > Yes

SVC_MOUNT_IOGROUP
> Specifies the name of the IO group, which is used to create duplicate volumes for the mount operation. If the DEVICE_CLASS is configured for remote site backup COPYSERVICES_REMOTE YES, the specified IO group is related to the remote site storage device.
>
> **Default**
> > Name of the IO group on the storage system that is used to create target volumes.
>
> **Advanced mode only**
> > Yes

SVC_TARGET_VOLUME_REAL_SIZE
> Specify the percentage of the source volume size to allocate, which is used to create the actual target volumes during the backup operation.
>
> The **SVC_TARGET_VOLUME_REAL_SIZE** parameter applies only to **FLASHCOPY_TYPE NOCOPY**.
>
> **Default**
> > 10
>
> **Advanced mode only**
> > Yes

RECON_INTERVAL
> This parameter specifies the interval, in hours, between two subsequent reconciliation operations. The options are whole numbers between 0 and 24 inclusive.
>
> **Default**
> > 12

Advanced mode only
    Yes

Interdependency of `LVM_FREEZE_THAW` and `TARGET_DATABASE_SUSPEND`

The `LVM_FREEZE_THAW` and `TARGET_DATABASE_SUSPEND` parameters are interdependent.

These two IBM Spectrum Protect Snapshot profile parameters are interdependent in the following manner:

- If `LVM_FREEZE_THAW` is set to YES, the database must be suspended. Otherwise, write operations to the database might time out and leave the database in an inconsistent state. A specified value of YES for `TARGET_DATABASE_SUSPEND` prevents this situation.
- If `LVM_FREEZE_THAW` is set to NO, the user might want to suspend the database without freezing the file system. Also, if JFS is used, freeze and thaw are not supported.
- If `LVM_FREEZE_THAW` is set to AUTO, and the file systems support the freeze function, the effect of AUTO is described in the following table. If the file systems do not support the freeze function, the AUTO value resolves to NO.

The following table summarizes the actions taken depending on the values of the two parameters:

Table 1. Actions taken depending on values of `LVM_FREEZE_THAW` and `TARGET_DATABASE_SUSPEND`

Value of `LVM_FREEZE_THAW`	Value of `TARGET_DATABASE_SUSPEND`		
	YES	NO	OFFLINE
YES	Suspend and freeze	Terminate with an appropriate error message. Conflicting parameters.	Offline with freeze
NO	Suspend, no freeze	No suspend, no freeze	Offline without freeze
AUTO	Treat as `LVM_FREEZE_THAW` YES	Treat as `LVM_FREEZE_THAW` NO	Offline with freeze

CLIENT

When you use an Oracle database in an SAP environment with IBM Spectrum Protect for Enterprise Resource Planning, the client parameters are stored in the IBM Spectrum Protect for Enterprise Resource Planning configuration `.utl` file.

For information about the IBM Spectrum Protect for Enterprise Resource Planning configuration file, see "BACKINT configuration file" on page 16. In addition, parameters must be specified in the SAP BRTOOLS configuration file, `.sap` file. For more information, see "Oracle in an SAP environment BR*Tools configuration profile (`.sap`)" on page 23.

APPLICATION_TYPE
    This parameter is used to specify the environment. For IBM Spectrum Protect Snapshot for Oracle in an SAP environment, the **SAP_ORACLE** parameter must be specified.

    SAP_ORACLE
        For IBM Spectrum Protect Snapshot for Oracle in an SAP Environment, specify **SAP_ORACLE**.

DEVICE_CLASS

This parameter specifies the device classes to use. The following sample identifies the syntax that can be used with the **DEVICE_CLASS** parameter:

```
DEVICE_CLASS <list_of_device_classes> [<conditions>]
```

When a list of device classes is specified, the software determines which device class matches the device class in the environment. When multiple device classes are specified, separate the device classes names with a space. The condition statement is optional. When you use the condition statement, use the following syntax:

```
[USE_AT <days of week>] [FROM <time> TO <time>]
```

The time period that is specified cannot span midnight for a device class. If a device class time period is required to span midnight, you must specify two time periods for the device class. The first time period must end with a value 1 minute before midnight and the second time period must start at midnight. The following example shows how to specify a time period that spans midnight for a device class:

```
DEVICE_CLASS myClass FROM 20:00 TO 23:59
DEVICE_CLASS myClass FROM 00:00 TO 06:00
```

When there are different devices, multiple sections can be used. Each section provides information about a particular device. To select a particular section, use the **DEVICE_CLASS** parameter. When the software restores data, the software uses the **DEVICE_CLASS** value that is specified when the data was backed up.

The setup script automatically adds **DEVICE_CLASS** sections to the IBM Spectrum Protect Snapshot profile when you add more instances of the **DEVICE_CLASS** parameter to the CLIENT section of the profile.

Default
> STANDARD

Advanced mode only
> No

ENHANCED_PARTITIONING

The **ENHANCED_PARTITIONING** parameter is used to control processing of the application file systems during the backup or restore operation. IBM Spectrum Protect Snapshot fails, when a file system contains symbolic links that point to a file system on a different volume group that is not part of the snapshot operation. Set the **ENHANCED_PARTITIONING** parameter to NO to ensure that symbolic links if present are not processed. With this setting, there is no check for additional files that are not associated with the application. If you use this setting, the run time of the backup operation is likely to decrease depending on the file system structure. The following list identifies the possible options:

YES
> Use this option to ensure that IBM Spectrum Protect Snapshot processes all symbolic links of files or directories.

NO Use this option to ensure that IBM Spectrum Protect Snapshot does not process symbolic links of files or directories.

Default
> YES

Advanced mode only
> Yes.

LVM_FREEZE_THAW

This parameter specifies when to enable file system freeze and thaw actions. The following list identifies the possible options:

YES

Enable file system freeze before the snapshot operation and the thaw after the snapshot operation. For AIX®, the YES value can be used only when all file systems included in the backup are JFS2 file systems.

NO Do not freeze the file system. To set this parameter to NO, a licensed version of IBM Spectrum Protect Snapshot is needed and a backup server is required for mounting the snapshot to ensure file system consistency.

The value NO is required if at least one file system that does not support freeze or thaw actions, such as JFS, is involved.

AUTO

If the **TARGET_DATABASE_SUSPEND** parameter is set to YES, then this parameter is set with the following option: **LVM_FREEZE_THAW** YES. If the file system does not support freeze actions, the AUTO value sets the parameter to **LVM_FREEZE_THAW** NO.

For more information, see "Interdependency of **LVM_FREEZE_THAW** and **TARGET_DATABASE_SUSPEND**" on page 10.

Default

AUTO

Advanced mode only

Yes

NEGATIVE_LIST

This parameter is used to control file processing. This processing occurs when files that are not associated with the database are stored within the same file system that is used for the backup and restore operations. This parameter is required. The following list identifies the possible options:

NO_CHECK

This is the default value, and it means that there are no checks for extra files. The operation ignores any additional files that are identified. When you use the default value and data is restored, all files on the file system or volume group are overwritten.

WARN

Use this option to receive a warning message for each file that is identified on the volume, but not part of the snapshot operation. The processing continues. When you use this option and data is restored, all files on the file system or volume group are overwritten.

ERROR

Use this option to receive an error message for each file that is discovered on the volume, but not part of the snapshot operation. The processing ends.

filename

Where *filename* is a name of a file that contains a list of fully qualified names of files and directories, each name requires a new line. Only files or directories that are not associated with the database but are stored within the file system that is used for backup operations are listed. Any file that is identified by IBM Spectrum Protect Snapshot that is not part of the database files or is not in the **NEGATIVE_LIST** file, causes processing to end.

Any directory that is listed in the **NEGATIVE_LIST** file is processed recursively. For example, all files within the directory, including subdirectories, are processed during a backup or restore request.

When you are restoring data with remote mirroring, the value of this parameter is forced to *NO_CHECK*. This value is used because at the time after the takeover operation there are no file systems mounted on the takeover host.

Default
> NO_CHECK

Advanced mode only
> Yes

MAX_VERSIONS
This parameter specifies the number of snapshot versions to store for each device class. The following list identifies the possible options:

```
MAX_VERSIONS ADAPTIVE
MAX_VERSIONS 2
MAX_VERSIONS 3 USE_FOR DC_TEST
```

ADAPTIVE
> The maximum number varies depending on the available space. IBM Spectrum Protect Snapshot reuses the oldest target set as the target for the current backup.

n
> Where *n* is the maximum number of snapshot versions to be stored per device class. The amount of space that is required depends on the following factors:
> - The number of snapshots.
> - For each snapshot, the number of changes to the file system content since the snapshot was taken.
>
> When this limit is reached, the oldest version is deleted.

Optional
> When you use value n you can add a device class after it USE_FOR <device class> to specify that **MAX_VERSIONS** n is valid for that device class only.

Default
> None

Advanced mode only
> No

When you add another **MAX_VERSIONS** parameter, specify values based on the following criteria:
- **MAX_VERSIONS** with a specific value for a specific device class.
- **MAX_VERSIONS** with a default value for all device classes that have no **MAX_VERSIONS** already specified.
- **MAX_VERSIONS** with an adpative value. This value must be used only when there are no other values set for any **MAX_VERSIONS** for any device classes.

TARGET_DATABASE_SUSPEND
This parameter determines if the activity is suspended on the target database until the snapshot operation completes. For more information about this parameter, see "Interdependency of **LVM_FREEZE_THAW** and The following list identifies the possible options:

Yes
> This option suspends the target database until the snapshot operation completes. When there are numerous transactions processing at the same time, use this option.

NO This option means that the target database is available while snapshot operations run.

OFFLINE
> All backups must be offline for the snapshot operations to run. If the SAP software requests an offline backup, this parameter is ignored.

Default
> Yes.

Advanced mode only
> Yes.

TIMEOUT_FLASH
> This parameter specifies the maximum time, in seconds, that the database agent waits for a response to the management agent call during the *flash* phase. If the database agent does not receive a response within the specified time, an error message is displayed. This parameter allows the maximum time to be specified for a database to be suspended. This parameter also implies the maximum time when JFS2 file systems can be frozen. When the timeout is reached, the file systems thaw, the database is resumed, and the backup operation ends with an error. If the **LVM_FREEZE_THAW** parameter is set to either AUTO or YES, the minimal value for **TIMEOUT_FLASH** is *5* seconds. In other scenarios, the minimal value is *1* second.

Default
> The default value is *120* seconds.

Advanced mode only
> Yes

TIMEOUT_<*PHASE*>
> This parameter specifies the maximum time, in seconds, that the database agent waits for a response to the management agent call during a specific operation phase. If the database agent does not receive a response within the specified time, either the backup or restore operation ends and an error message is shown.

Specify one of the following phase values for a snapshot backup:
- **PARTITION**
- **PREPARE**
- **FLASH** (this parameter has a separate description)
- **VERIFY**
- **CLOSE**

For example, **TIMEOUT_PREPARE**.

Specify one of the following phase values for a snapshot restore:
- **PREPARERESTORE**
- **FLASHRESTORE**
- **COMPLETERESTORE**
- **CLOSE**

For example, **TIMEOUT_FLASHRESTORE**.

Default
> The default value is *3600* seconds.

Advanced mode only
> Yes

TSM_BACKUP

This parameter specifies whether or not to create a IBM Spectrum Protect backup from a snapshot. For Oracle in an SAP environment, in the .utl file, this parameter is named **TSM_BACKUP_FROM_SNAPSHOT**. For more information about the Oracle in an SAP environment .utl file, see "BACKINT configuration file" on page 16.

When IBM Spectrum Protect Snapshot is installed on a backup server, you can create a IBM Spectrum Protect backup from a snapshot. When the **TSM_BACKUP** parameter is set to YES, MANDATE, or LATEST, and after the offload agent runs, a IBM Spectrum Protect backup is created from the snapshot. The following list identifies the possible options:

YES
> This option creates a IBM Spectrum Protect backup from this snapshot. If the IBM Spectrum Protect backup operation does not successfully complete, the target set can be reused.

MANDATE
> This option creates a IBM Spectrum Protect backup but the target set cannot be reused until the IBM Spectrum Protect backup successfully completes.

LATEST
> This option removes a backup request to IBM Spectrum Protect from a previous backup. When a new snapshot with **TSM_BACKUP** set to LATEST, YES, or MANDATE is created, IBM Spectrum Protect Snapshot removes any unsuccessful backup request that were previously created with the **TSM_BACKUP** option set to LATEST. This option prevents backup requests to IBM Spectrum Protect from queuing if they are not completed in time.

NO Keeps the snapshot backup but the snapshot is not used as a source for a subsequent tape backup operation.

TSM_ONLY
> After the IBM Spectrum Protect backup is completed, during the unmount operation, the backup is automatically marked for deletion. This action occurs regardless of whether the backup is successful or not.

USE_FOR *<list of device classes>*
> To create a IBM Spectrum Protect backup from snapshots that are performed with particular device classes, as specified in the profile, combine this attribute with other options. When you list device classes, separate device classes with the space character. There is no limit of the number of device classes.

Default
> None

Advanced mode only
> No

BACKINT configuration file

The BACKINT configuration file (.utl) includes parameters for the SAP with Oracle BACKINT interface and the backup server. The file extension for the BACKINT configuration file is .utl.

IBM Spectrum Protect Snapshot for Oracle in an SAP environment with an IBM Spectrum Protect server Storage Manager
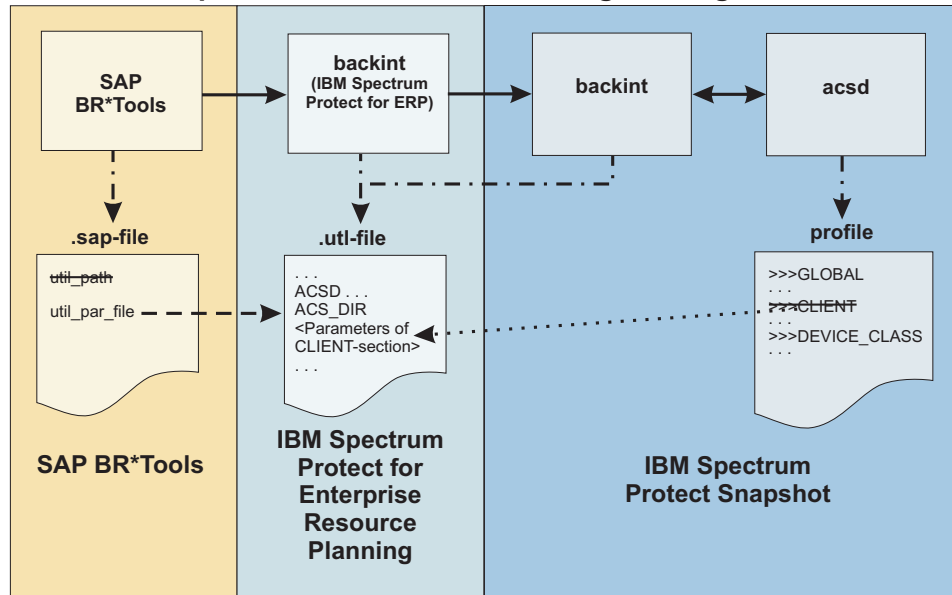
Figure 1. SAP with Oracle, IBM Spectrum Protect Snapshot with IBM Spectrum Protect

If IBM Spectrum Protect Snapshot is used with IBM Spectrum Protect for Enterprise Resource Planning to protect an SAP system that runs with an Oracle database. The parameters that are typically specified in the CLIENT section can be added to the IBM Spectrum Protect for Enterprise Resource Planning configuration file (.utl file).

If the parameters are specified in the IBM Spectrum Protect for Enterprise Resource Planning configuration file, IBM Spectrum Protect Snapshot does not require a separate .utl file.

When you use the IBM Spectrum Protect Snapshot setup script, new instances of the DEVICE_CLASS parameter are added to the CLIENT section of the profile configuration file. If you use IBM Spectrum Protect Snapshot with IBM Spectrum Protect for Enterprise Resource Planning, the IBM Spectrum Protect Snapshot profile does not contain a CLIENT section.

The following list describes each parameter, associated values, and default values that are relevant for IBM Spectrum Protect Snapshot in the .utl file. The **TSM_BACKUP_FROM_SNAPSHOT**, **TARGET_DATABASE_SUSPEND**, and **ACS_DIR** parameters are required. All other parameters are optional and are not required to be specified in the .utl file by IBM Spectrum Protect Snapshot.

TSM_BACKUP_FROM_SNAPSHOT
> This parameter is equivalent to the **TSM_BACKUP** parameter in the IBM Spectrum Protect Snapshot profile. When a backup server is configured, the offload agent

triggers an IBM Spectrum Protect backup from any snapshot that is created with **TSM_BACKUP** set to YES, MANDATE, or LATEST.

When IBM Spectrum Protect Snapshot is used in combination with IBM Spectrum Protect for Enterprise Resource Planning, the **TSM_BACKUP** parameter is moved to the `.utl` file and renamed to **TSM_BACKUP_FROM_SNAPSHOTS**.

⌂The following options are available:

YES
Create an IBM Spectrum Protect backup from this snapshot. If the IBM Spectrum Protect backup operation does not complete successfully, the target set can be reused.

MANDATE
In contrast to YES, the target volumes are not reused until the IBM Spectrum Protect backup completes successfully.

LATEST
When a snapshot backup was run with **TSM_BACKUP_FROM_SNAPSHOT**, and the offloaded backup to the IBM Spectrum Protect server failed or did not start, any new snapshot backup with option **TSM_BACKUP_FROM_SNAPSHOT** set to LATEST, YES, or MANDATE, removes the backup request to IBM Spectrum Protect from the previous backup. This removal prevents backup requests to IBM Spectrum Protect from queuing if the requests cannot be completed in time.

NO Keep the snapshot backup and do not use it as a source for a subsequent tape backup operation.

TSM_ONLY
The backup is automatically marked for deletion during the unmount operation after the IBM Spectrum Protect backup is completed. The backup is marked for deletion when the backup is successful and when the backup is unsuccessful.

USE_FOR *<list of device classes>*
This attribute can be combined with any of the options to limit application to snapshots run with particular device classes as specified in the profile. Use a space to separate device classes.

Default
There is no default value, you must specify a value from one of the possible options.

Advanced mode only
No

MAX_SNAPSHOT_VERSIONS
This parameter is equivalent to the **MAX_VERSIONS** parameter in the IBM Spectrum Protect Snapshot profile, and it specifies the number of snapshot versions to keep. When IBM Spectrum Protect Snapshot is used in combination with IBM Spectrum Protect for Enterprise Resource Planning, the **MAX_VERSIONS** parameter is moved to the `.utl` file and renamed to **MAX_SNAPSHOT_VERSIONS**.

The following options are available:

ADAPTIVE
The maximum number varies depending on the available space in the storage device. IBM Spectrum Protect Snapshot reuses the oldest target set as the target for the current backup.

n Where n is the maximum number of snapshot versions to be stored. When this limit is reached, the oldest version is deleted.

Default
The default value is **ADAPTIVE**.

Advanced mode only
Yes

LVM_FREEZE_THAW

The **LVM_FREEZE_THAW** parameter specifies when to enable file system freeze and thaw actions. For more information, see "Interdependency of **LVM_FREEZE_THAW** and **TARGET_DATABASE_SUSPEND**" on page 10.

The following options are available:

YES
Enable file system freeze before the snapshot operation and thaw after the snapshot operation. For AIX, the value YES can be used only when all file systems included in the backup are JFS2 file systems.

NO Do not enable a freeze. The value NO is required if at least one file system that does not support freeze or thaw actions, such as JFS, is involved.

AUTO
If the **TARGET_DATABASE_SUSPEND** parameter is YES, then this parameter is set with the following option: **LVM_FREEZE_THAW** YES. If the file system does not support freeze actions, the **AUTO** value is NO.

Default
AUTO

Advanced mode only
Yes

TARGET_DATABASE_SUSPEND

The **TARGET_DATABASE_SUSPEND** parameter determines whether the activity on the target database is suspended until the FlashCopy operation completes. For more information, see "Interdependency of **LVM_FREEZE_THAW** and **TARGET_DATABASE_SUSPEND**" on page 10

The following options are available:

YES
Suspend the target database until the FlashCopy operation completes. Use this value when the level of transaction processing is high.

NO Do not suspend the target database.

OFFLINE
All backups must be offline. If SAP requests an offline backup, this parameter is ignored.

The values YES and NO imply an online backup type. When you run a backup with OFFLINE specified, the target database on the production system must be in a *startup mount* state at the time that either acsora or acsutil is issued. Otherwise, recovery must be run to restore the database.

Default
There is no default. A value for this parameter must be specified by the user.

Advanced mode only
No

DEVICE_CLASS

This parameter specifies the device classes to use. The following sample identifies the syntax that can be used with the **DEVICE_CLASS** parameter:

`DEVICE_CLASS <list_of_device_classes> [conditions]`

When a list of device classes is specified, the software determines which device class matches the device class in the environment. When multiple device classes are specified, separate the device classes with the space character. The condition statement is optional. When you use the condition statement, use the following syntax:

`[USE_AT <days of week>] [FROM <time> TO <time>]`

Note: The time period that is specified cannot span midnight for a device class. If a device class time period is required to span midnight, you must specify two time periods for the device class. The first time period must end with a value 1 minute before midnight and the second time period must start at midnight. The following example shows how to specify a time period that spans midnight for a device class:

```
DEVICE_CLASS myClass FROM 20:00 TO 23:59
DEVICE_CLASS myClass FROM 00:00 TO 06:00
```

When there are different devices, multiple sections can be used. Each section provides information about a particular device. To select a particular section, use the **DEVICE_CLASS** parameter. When the software restores data, the software uses the **DEVICE_CLASS** value that is specified when the data was backed up.

The setup script automatically adds **DEVICE_CLASS** sections to the IBM Spectrum Protect Snapshot profile when you add more instances of the **DEVICE_CLASS** parameter to the CLIENT section of the profile.

Default
STANDARD

Advanced mode only
No.

ALLOW_FULL_FILE_BACKUP

This parameter cannot be changed when you use the setup script. The options are YES and NO. This value specifies whether a full file backup is stored to the repository. Storing a full file backup or a full database backup to the repository affects performance, and is therefore not recommended.

Default
NO

Advanced mode only
Yes

TIMEOUT_FLASH

This parameter specifies the maximum time, in seconds, that the database agent waits for a response to the management agent call during the *flash* phase. If the database agent does not receive a response within the specified time, an error message is displayed. The **TIMEOUT_FLASH** parameter allows the maximum time to be specified for a database to be suspended. This parameter also implies the maximum time when JFS2 file systems can be frozen. When the timeout is reached, the file systems thaw, the database is resumed, and the backup operation ends with an error. If the **LVM_FREEZE_THAW** parameter is set to either AUTO or YES, the minimal value for **TIMEOUT_FLASH** is *5* seconds. In other scenarios, the minimal value is *1* second.

Default
>   120 seconds

Advanced mode only
>   Yes

TIMEOUT_<PHASE>
>   This parameter specifies the maximum time, in seconds, that the database
>   agent waits for a response to the management agent call during a specific
>   operation phase. If the database agent does not receive a response within the
>   specified time, either the backup or restore operation ends and an error
>   message is shown.
>
>   Specify one of the following phase values for a FlashCopy backup:
>   - **PARTITION**
>   - **PREPARE**
>   - **FLASH** (this parameter has a separate description)
>   - **VERIFY**
>   - **CLOSE**
>
>   For example, **TIMEOUT_PREPARE**.
>
>   Specify one of the following phase values for a snapshot restore:
>   - **PREPARERESTORE**
>   - **FLASHRESTORE**
>   - **COMPLETERESTORE**
>   - **CLOSE**
>
>   For example, **TIMEOUT_FLASHRESTORE**.

Default
>   3600 seconds

Advanced mode only
>   Yes

ACS_DIR
>   Path to the IBM Spectrum Protect Snapshot configuration directory. This
>   parameter is required. The following subdirectories are included in this
>   directory:
>
>   **logs** The subdirectory contains all log and trace information for IBM
>   Spectrum Protect Snapshot.
>
>   **shared** The subdirectory contains information that is shared among all IBM
>   Spectrum Protect Snapshot components.
>
>   When the subdirectory is initially created, the only file that is stored in
>   the directory is the password file: pwd.acsd. This file contains the
>   passwords for all devices that are specified within the profile. The file
>   also contains a master password that is used from all components for
>   authentication when they are connecting to the management agent.
>   When you are running remote configuration tasks from the production
>   system with SSH, the information in these directories is promoted to
>   all systems that belong to the instance where IBM Spectrum Protect
>   Snapshot is configured. When you run configuration tasks separately,
>   you must promote the information manually.

Default
>   *<instance_owner_$HOME>*/acs

Advanced mode only
> Yes

ACSD

> The ACSD is the host name of the system where the management agent is running, and the port it is listening to. The following format is used for **ACSD**: *<hostname> <port>*

> This parameter must be identical on all systems where IBM Spectrum Protect Snapshot is installed for a database instance. While the parameter must be identical, each database instance can be managed by an individual management agent.

> **Default**
> > `localhost 57328`

> **Advanced mode only**
> > No

BACKUPIDPREFIX

> This parameter specifies a string that is added in front of the backup ID that is generated by FlashCopy Manager. This parameter can be used to separate the backups within the same repository so that other clients are not able to query, restore, or delete these backups.

> The string can contain letters, integers, or the underscore character. The string must be 6 characters.

> This parameter has the same meaning as the corresponding parameter in the IBM Spectrum Protect for Enterprise Resource Planning `*.utl` file. Use the same value.

> **Default**
> > None

> **Advanced mode only**
> > Yes

INCREMENTAL

> This parameter is relevant when Oracle Recovery Manager (RMAN) is used in combination with IBM Spectrum Protect for Enterprise Resource Planning to create incremental offload backups to an IBM Spectrum Protect server.

> **NO** No is the default value. If it is set to `NO`, all the other **INCREMENTAL*** parameters have no effect.

> **CUMULATIVE**
> > The backup type is cumulative RMAN. Cumulative backups are run by using RMAN.

> **DIFFERENTAL**
> > The backup type is incremental RMAN. Incremental backups are run by using RMAN.

> **Default**
> > `NO`

> **Advanced mode only**
> > No

INCREMENTAL_CATALOG_CONNECT_STRING

The `INCREMENTAL_CATALOG_CONNECT_STRING` parameter is only for use with Oracle Recovery Manager (RMAN).

This parameter specifies the name of the catalog that is passed to RMAN to connect to the catalog database. It is the name of the listener for the catalog database. If the `INCREMENTAL` parameter is enabled and this value is missing, an error message is displayed.

Default
> There is no default value. You must specify a value if the `INCREMENTAL` parameter has any value other than NO.

Advanced mode only
> No

INCREMENTAL_CATALOG_USER

This parameter is only for use with Oracle Recovery Manager (RMAN).

This parameter specifies the name of the catalog that is passed to RMAN to connect to the catalog database. If the `INCREMENTAL` parameter is enabled, and this value is missing, an error message is displayed.

Default
> There is no default value. You must specify a value if the `INCREMENTAL` parameter has any value other than NO.

Advanced mode only
> No

INCREMENTAL_CHANNELS

This parameter is only for use with Oracle Recovery Manager (RMAN).

Specifies the number of parallel RMAN channels, *1* or more, that transfer the data.

Default
> 1

Advanced mode only
> No

.

INCREMENTAL_LEVEL

This parameter is only for use with Oracle Recovery Manager (RMAN).

The RMAN incremental level is an integer of value *0* or *1*. An `INCREMENTAL_LEVEL` of *0* generates a full backup and an `INCREMENTAL_LEVEL` value of *1* generates an incremental backup. The specification of day and time is optional. If day and time are used, multiple occurrences of this parameter are valid if the time specifications do not overlap. Time must be specified in the 24-hour format. Days can be specified by weekday abbreviations such as *Mon* or *Tue*, or by numerical values *0* or *6* where *0* is Sunday and *6* is Saturday. The syntax for day and time specification is [USE_AT *<days of week>*] [FROM *<time>* TO *<time>*]

Default
> 0

Advanced mode only
> No

Oracle in an SAP environment BR*Tools configuration profile (`.sap`)

This configuration profile is stored in the *$ORACLE_HOME*/dbs directory.

The `.sap` profile is described in detail in the SAP documentation, *SAP database guide for Oracle*. There might be an existing `.sap` file in your environment. The following information identifies the profile parameters that are valid in the `.sap` profile in combination with IBM Spectrum Protect Snapshot.

The following keywords are found in the `.sap` profile:

backup_type
Identifies the default type of the database backup. This parameter is only used by brbackup (default is offline).

backup_mode
Identifies the scope of the backup. This parameter is only used by brbackup. The default is all; however, if the parameter is set to all and Oracle RMAN is used, an incremental backup cannot be created. When the **backup_mode** parameter is set to all, a backup of all data files is completed with the backint interface.

For an incremental backup of an Oracle in an SAP environment database using Oracle RMAN, set the BR*Tools option for the **backup_mode** parameter to full.

backup_dev_type
Determines the backup medium that is used (the default is tape). To create a snapshot backup with IBM Spectrum Protect Snapshot, this parameter must be set to util_vol or to util_vol_online.

util_par_file
If you are running IBM Spectrum Protect Snapshot with IBM Spectrum Protect for Enterprise Resource Planning, set this parameter to the fully qualified path of the IBM Spectrum Protect for Enterprise Resource Planning profile (.utl file).

This way IBM Spectrum Protect Snapshot uses the configuration that was added to the IBM Spectrum Protect for Enterprise Resource Planning configuration file (.utl file).

If you are running IBM Spectrum Protect Snapshot in an environment where IBM Spectrum Protect for Enterprise Resource Planning is not configured, set this parameter to the fully qualified path of the IBM Spectrum Protect Snapshot profile. This way IBM Spectrum Protect Snapshot uses the configuration that was added to the CLIENT section of that profile.

util_path
Specifies the path to the backint executable. If you are running IBM Spectrum Protect Snapshot with IBM Spectrum Protect for Enterprise Resource Planning, you do not need to set this parameter. If you are running IBM Spectrum Protect Snapshot in an environment where IBM Spectrum Protect for Enterprise Resource Planning is not available, set this parameter to the instance directory (*<Instance owner $HOME>*/acs/).

util_vol_unit
Specifies the smallest unit that can be backed up with a snapshot or clone, and also determines restore granularity. The possible values are sap_data (finest restore granularity), all_data, and all_dbf (not typically used).

Note: SAP requires that the setting of this parameter correctly describes the disk layout of your database.

If your disk layout consists of the following volume groups, use `sap_data`:

- At least one volume group for each `sapdata` directory
- At least one volume group for each `origlog` directory
- At least one volume group for each `mirrlog` directory

For `sap_data`, there must be exactly one volume group for each `sapdata` directory, exactly one volume group for each `origlog` directory, and exactly one volume group for each `mirrlog` directory. If one of the `sap_data`, `origlog`, or `mirrlog` directories contain more than one volume group, a fourth parameter value `disk_vol` must be used. The parameters `disk_vol` and `all_dbf` contradict the SAP recommendation about the separation of data files and redo log files. The default value set by SAP is `sap_data`.

If your disk layout consists of the following volume groups, use `all_data`:

- At least one volume group for `sapdata`
- At least one volume group for `origlog`
- At least one volume group for `mirrlog`

util_vol_access
Specifies the accessibility of snapshot backup volumes:

- None (required on the production system)
- Copy (not supported)
- Mount (required on the backup system if SAP BR*Tools are installed on the backup system)
- Both (not supported)

util_vol_nlist = (<nfile_name1>, <nfile_name2>, ...) | no_check
This parameter defines a list of non-database files or directories that are on the database disk volumes but do not need to appear in the list of files to back up in the input file. These files are automatically included in the backup, but are never reported in the BACKINT interface messages, especially not in the #ERRFILE message. During a restore, these files (and possibly fixed files) might be overwritten without prior warning.

`no_check` deactivates the BACKINT check of the backup volumes. This check makes sure that the backup volumes do not contain either non-database files or database files that belong to a database other than the database to be backed up. When `no_check` is set, the user takes responsibility for making sure that the database volumes (directories `sapdata`, `origlog`, and `mirrlog`) contain only database files of the database to be backed up. Or, if the database volumes contain non-database files or database files from a database other than the database to be backed up, the user accepts that such files can be overwritten without warning.

util_options = <additional_backint_options>
This parameter defines extra BACKINT options that BR*Tools places after the standard command-line options when it calls the BACKINT program. With this parameter, the IBM Spectrum Protect Snapshot backint options `-0 <TSM_BACKUP_FROM_SNAPSHOT value>` and `-S <device class>` can be specified. For more information about backint options, see "BR*TOOLS - User interface for Oracle in an SAP environment" on page 25.

Example:

`util_options = "-0 yes -S STANDARD"`

BR*TOOLS - User interface for Oracle in an SAP environment

Because IBM Spectrum Protect Snapshot fully integrates with SAP® BR*TOOLS, IBM Spectrum Protect Snapshot does not provide a separate user interface. Information is provided about the query and deletion of snapshot backups, operations that are not directly supported by BR*TOOLS.

For detailed information about how to use BR*TOOLS to create snapshot backups, see *SAP Database Guide for Oracle*. IBM Spectrum Protect Snapshot provides a console user interface that can be used instead of BR*TOOLS for query and restore operations. See "acsutil Snapshot Object Manager for Oracle" on page 27 for detailed information.

Important: If IBM Spectrum Protect for Enterprise Resource Planning is not installed, IBM Spectrum Protect Snapshot does not use the default path /usr/sap/*<SID>*/SYS/exe/run to install the `backint` executable file. By not using the default path, an existing `backint` file cannot be overwritten. Therefore, you must start the `backint` executable file from the IBM Spectrum Protect Snapshot installation directory (*<INSTANCE_DIR>*).

If IBM Spectrum Protect for Enterprise Resource Planning is installed, you can run the backint executable file from the default installation path. IBM Spectrum Protect Snapshot inquire and delete commands can use the **backint** interface.

The syntax of the **backint** command is as follows:

```
backint [-p profile] -f <function> -t <backup_type> [-F]
```

where *<function>* is one of the following options:

```
       inquire
       inquire_detail
       delete
```

and *<backup_type>* is one of the following options:

```
       volume
       file
```

Table 2. Parameters for IBM Spectrum Protect Snapshot `backint` *command*

Option	Meaning
-p	IBM Spectrum Protect Snapshot Backint profile (see "BACKINT configuration file" on page 16)
-f inquire or inquire_detail	Inquire function with or without detailed information about the backups.
-f delete	Delete function.
-t volume	This option can be used to manage snapshot backups that are created with IBM Spectrum Protect Snapshot.
-t file	Use this option to manage files that are backed up directly to the IBM Spectrum Protect Snapshot repository. **Note:** When IBM Spectrum Protect for Enterprise Resource Planning is installed, both options are also supported by IBM Spectrum Protect for Enterprise Resource Planning. However, in this case option -t file is used to manage backups that are sent to the IBM Spectrum Protect server instead.

Table 2. Parameters for IBM Spectrum Protect Snapshot **backint** *command (continued)*

Option	Meaning
-F	Force option to be used with **inquire**, **inquire_detail**, or **delete** functions. When used with **inquire** or **inquire_detail**, all available backups and all backups marked for deletion are displayed. When used with the **delete** function, the option withdraws the source target FlashCopy relations on DS8000® and SAN Volume Controller.

-f inquire **and** -f inquire_detail **functions**

The **inquire** function that is run by SAP BR*Tools and BRRESTORE, is used to query the IBM Spectrum Protect server for backup IDs or files that belong to a particular backup ID. For troubleshooting, run this function from the command line. You must specify the *backup_type* as -t volume when you use the **inquire** function to obtain details about IBM Spectrum Protect Snapshot backups. The following code is provided as an example:

```
backint -p /oracle/<SID>/dbs/init<SID>.utl -f inquire -t volume
```

IBM Spectrum Protect Snapshot prompts you to enter the inquiry in one of the following formats:

#NULL
> Use to display all saved backup IDs. The following sample is provided:
> ```
> #BACKUP JE0___A0DNE9Z74C
> ```
>
> In this example, JE0___A0DNE9Z74C is the backup ID. #BACKUP is not part of the backup ID. The first 6 characters are the user-defined prefix. The following 10 characters represent the unique ID for the backup.

BackupID
> Use to display all of the files that relate to this backup ID. The following sample result is provided:
> ```
> #BACKUP JE0___A0DNE9Z74C /oracle/C21/dbs/initC21.utl.
> ```

#NULL*filename*
> Use to display all of the backup IDs corresponding to this file. The *filename* variable must include both the path to and name of the file.

BackupID *filename*
> Use to verify if a specific file is saved with a particular backup ID. The *filename* variable must include both the path to and name of the file.

-f delete

IBM Spectrum Protect Snapshot version control mechanism deletes backups. However, you can manually delete a IBM Spectrum Protect Snapshot backup by using the **delete** function and specifying the backup to delete. You must specify the *backup_type* as -t volume when you use the **delete** function to delete IBM Spectrum Protect Snapshot backups. The delete function can delete full backups only.

This function can be started from the command line as follows:

```
backint -p /oracle/<SID>/dbs/init<SID>.utl -f delete -t volume
```

You are prompted to enter the backup ID.

acsutil Snapshot Object Manager for Oracle

The Snapshot Object Manager for Oracle, acsutil, provides a snapshot backup query and restore interface for Oracle and Oracle in an SAP environment environments.

Functions of the `acsutil` command

The Snapshot Object Manager for Oracle, acsutil, provides an interface for acsora to show available backups, run restore operations, and delete unwanted backups. It communicates with acsora through input and output files.
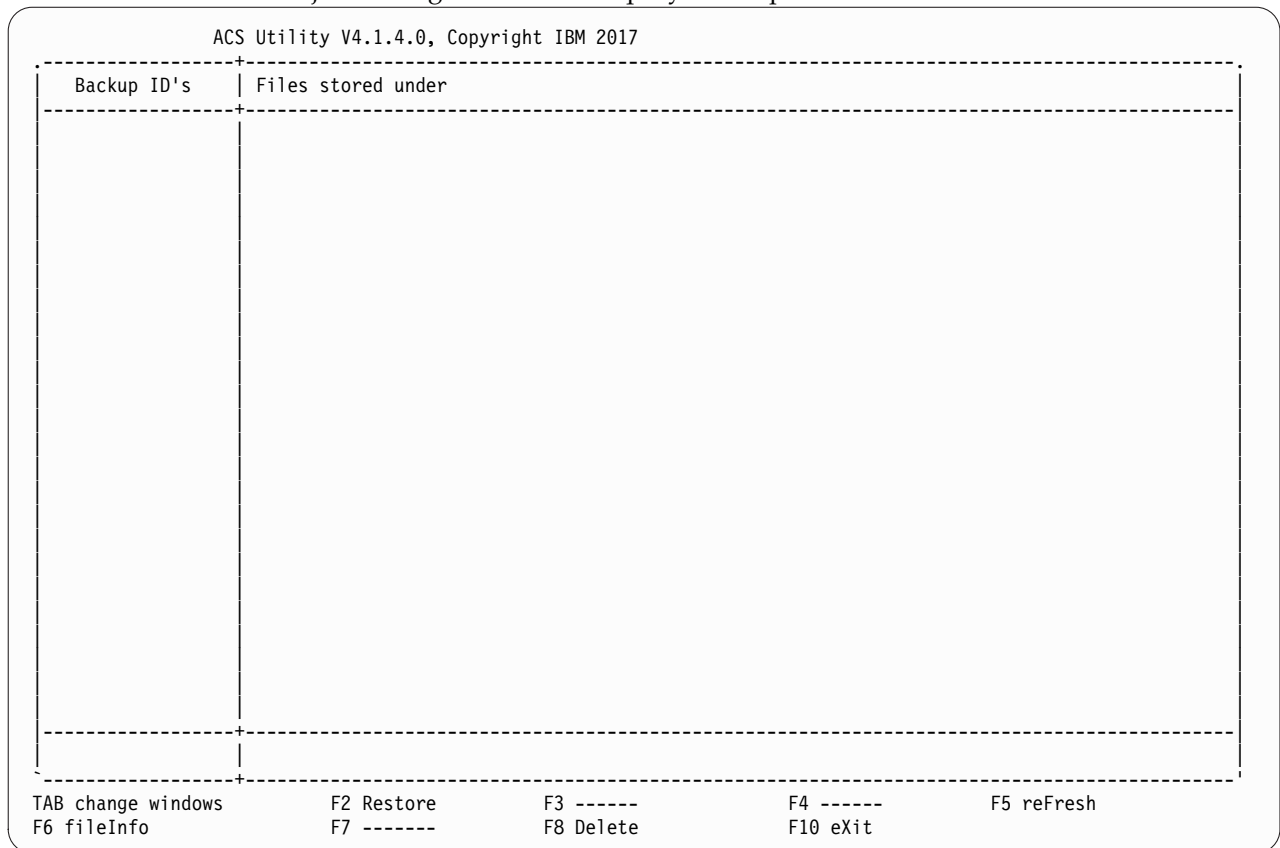
Syntax of the `acsutil` command

acsutil [-p *<profile>*]

Where **-p** `profile` is the path and name of the IBM Spectrum Protect Snapshot profile. The default value is *ACS_DIR*/`profile`.

The Snapshot Object Manager user interface consists of a split window, which is character-based.

The first step is an automatic inquire operation for all backup IDs. The following figure shows the screen layout for the list of backup IDs found by the Snapshot Object Manager when the inquiry is complete.

```
             ACS Utility V4.1.4.0, Copyright IBM 2017
.-----------------+--------------------------------------------------------------------.
|   Backup ID's   | Files stored under                                                 |
|-----------------+--------------------------------------------------------------------|
|                 |                                                                    |
|                 |                                                                    |
|                 |                                                                    |
|                 |                                                                    |
|                 |                                                                    |
|                 |                                                                    |
|                 |                                                                    |
|                 |                                                                    |
|                 |                                                                    |
|                 |                                                                    |
|                 |                                                                    |
|                 |                                                                    |
|                 |                                                                    |
|                 |                                                                    |
|                 |                                                                    |
|                 |                                                                    |
|                 |                                                                    |
|                 |                                                                    |
| ----------------+--------------------------------------------------------------------|
|                 |                                                                    |
'-----------------+--------------------------------------------------------------------'
TAB change windows       F2 Restore       F3 ------       F4 ------       F5 reFresh
F6 fileInfo              F7 -------        F8 Delete       F10 eXit
```

If you mark the backup ID you are interested in and then press the Tab key, all file names that belong to the marked backup ID are displayed.

Tab - Switch window side
> Move the cursor between the sides of the window.

F2 - Restore
> Restore the marked backup ID.

F5 - Refresh
> Refresh the list of backup IDs and file names.

F6 - Fileinfo
> Opens a separate window to display file information.
>
> For backup IDs, the sequence number (backup version count) is shown.

F8 - Delete
> Delete the selected backup ID and all corresponding files.

F10 - Exit
> Exit from Snapshot Object Manager

ENTER - Mark/unmark backup ID
> Mark or unmark the backup ID.

The Snapshot Object Manager can delete backup IDs with all included files. It is not possible to delete single files within a backup ID. To delete a backup ID, it must be highlighted. After pressing F8 you must confirm the deletion operation. The backup ID and all included files are deleted.

For each restore, a log file is created.

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