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General description of the product



Using FlashCopy to perform backups or tests in a CLONE partition

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Product description

The purpose of the **Flash for i** product is to automate, to drive and to report many operations by duplicating an IBM i partition with the aim to perform operations such as :

- backup,
- application testing
- data extraction
- anonymization
- ...

without disrupting production.

For instance, users can remain active on the production partition, while a full system backup (SAVE-21) is being carried out on the clone of this production partition.

Principles

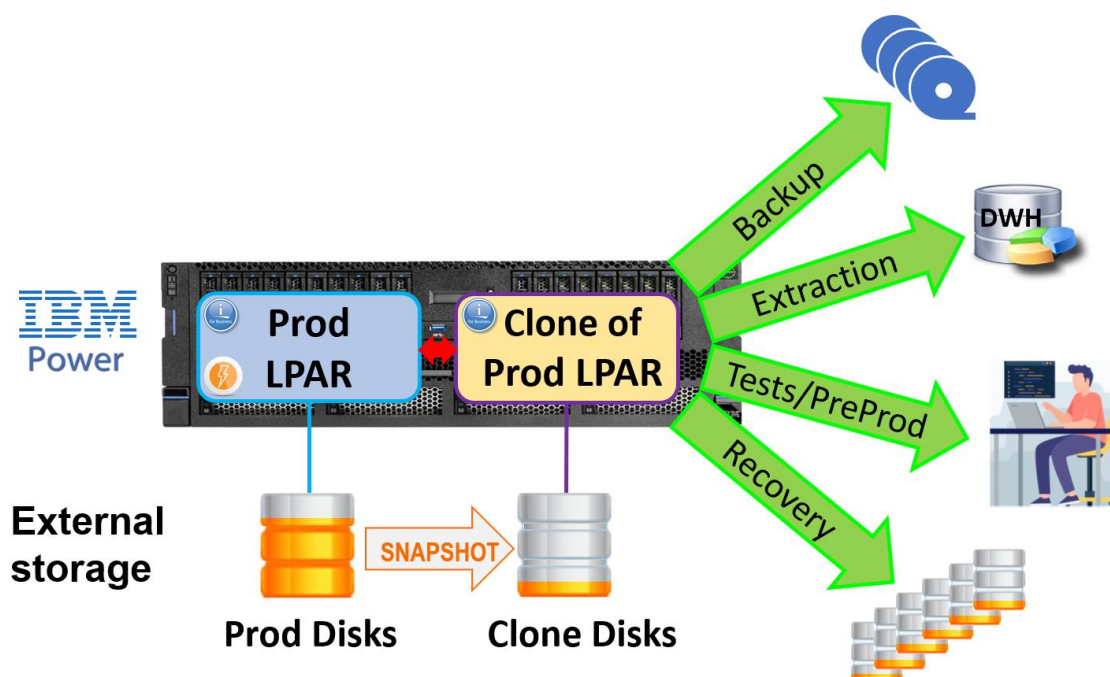
The **Flash for i** product manages the various hardware and software components involved by the IBM i production partition cloning process.

The cloning function of the external storage is generally called **SnapShot** and IBM named it **FlashCopy**. Depending on the Hardware, from 16 to 256 SnapShot / FlashCopy can be performed on the same set of disks. SnapShot or FlashCopy are NOT available with internal disks.

A SnapShot or a FlashCopy is an **INSTANT COPY** (performed in 1 second). It is also called "Point in time copy". The cloned disks are **immediately** available for another use than the standard production activity (from another partition)

Consistency groups are created on the source disks to allow the synchronous copy of a complete set of disks. This copy is not a replication. It is managed by the external storage through high level internal indexes. Generally, data are not really copied from Production to Clone (FlashCopy "space efficient" option). But a real copy can be setup. This copy will be made with background tasks.

Flash for i product supports all **IBM** external storage (SVC, Storwize, FlashSystem, DS8000) but also **EMC** (VMAX, Unity) and **PureStorage** units. **Other manufacturers** might come ...



All operations are managed from the Production partition (also called the "Source partition").

The *Source* partition is cloned in 4 steps:

- if still active, stop the previous clone partition:
 - The *Source* partition sends to the console (HMC, FSM, Novalink) an instruction to immediately stop the clone partition.
- Quiesce the *Source* partition:
 - Using the CHGASPACT command, the *Source* partition writes all the active data contained in the memory on the external storage.
- Start the SnapShot/FlashCopy for the consistency group (set of disks):
 - The *Source* partition sends an instruction to the external storage.
 - At that point, the Clone volumes are an exact copy of the *Source* partition volumes.
 - The *Source* and target volumes now can live their lives independently.
- Start the clone partition.
 - The *Source* partition sends to the console (HMC, FSM, Novalink) an instruction to start the clone partition with the clone disks.

When it starts after cloning, the clone partition adjusts several of its configuration parameters:

- Change of system name
- Change of the Network/IP configuration
- Change of Start-up program
- All scheduled jobs (WRKJOBSCDE, JS1, ...) are suspended

The clone partition then restarts in order to apply the new settings.

The *Flash for i* product also maps/unmaps volumes in the VIOS before stopping or after starting FlashCopy in order to avoid numerous error messages in the VIOS(es) (unless NPIV-type configuration has been performed).

Automation and monitoring

All processing is fully automated and conducted from the production partition.

Several commands can be used to view

- the status of the FlashCopy on the storage unit,
- the status of the Clone partition
- the progress of the requested function.

Several commands can be used to automatically monitor the smooth running of operations. These commands can be integrated into an enterprise monitoring tool such as Nagios, PRTG, etc.

Operations which are possible on the Clone partition

The partition for which the disks are created by FlashCopy is called the "Clone Partition".

The *Flash for i* product makes it possible to use this partition for several types of operation. The function to perform is specified when defining the running environment or profile.

The following functions are possible:

- *HOLD No automatic actions on the *Clone* partition
The purpose of this function is to create a *Clone* of the Production partition for safety reasons. The *Clone* partition will not be started. It will only be started if there is a major problem on the Production partition and it needs to be rolled back to the situation at the moment of the start of the cloning.
NB: if the *Clone* partition needs to be started, it must be done in "Manual" mode by selecting console start-up only in order to avoid causing conflicts with the production partition (same IP address, etc.)

- ***BRMS** Back up using BRMS (including a system backup)
 The purpose of this function is to perform a backup using the BRMS product.
 The control group and all the elements required for the backup are defined in BRMS as though it were going to be performed directly on the Production partition.
 During FlashCopy, **Flash for i** changes the *Clone* partition environment to automatically trigger backup then brings back the backup log to reintegrate it into BRMS at the end of the process.

- ***SAVE21** Perform SAVE21, without BRMS
 The purpose of this function is to perform a full save, including system, of the *Clone* partition as if it were the Production partition. In this case, before the full backup is performed in restricted mode, no settings are changed on the Clone partition relative to the Source partition.
 The performed save is the equivalent of the SAVE21 system function on the source partition.
 At the end of the backup, the backup log is transferred to the production partition so it can still be viewed after stopping the *Clone*.

- ***USER** Perform user-defined actions
 The purpose of this function is to enable the user to choose the operations he/she wants to perform on the *Clone* partition. The user can, for example, choose to perform a backup without using BRMS, to create a testing or acceptance partition or to perform any other operation for which a copy of the production *Clone* is useful and necessary.
 In the same way as for the previous functions, the log of what has been performed is sent to the Production partition so it can still be consulted after stopping the *Clone*.

Several environments (or profiles) can be defined, making it possible to perform several different types of action according to the situations or requirements. For example, it is possible to perform:

- around midnight a FlashCopy to make daily backups
- once a week, when the backup is made, the clone partition can be adapted to become a test/acceptance/pre-production partition
- in the morning and at midday FlashCopies for potential recovery, without starting the *Clone* partition
- on Sundays, FlashCopy to perform SAVE21

With the Version 3 of **Flash for i**, many environments can be started at the same time.

With the V4 came additional optional modules as:

- "Partition reconfiguration", which allows to automate a very large number of configuration changes on the 'Clone' partition so that it can be used for other purposes than backups. For example, to generate Test, Anonymisation, Acceptance, Pre-prod partition or an 'Infocenter'/BI partition.
- "Central Management" which, in a context with many **Flash for i** partitions to be managed, allows to designate one partition to become the « primary site ».
- **Flash for i** can be used normally on this partition, but in addition :
 - all definition entries are made on the « primary site » and then sent to the other partitions,
 - all the histories from the other partitions are centralised and visible on the « primary site »."

Logs and historical data available on Production partition

Every backup operation is realised on the *Clone* partition, which disks will be erased next day to start a new clone for a new backup. Then, it is important to export a maximum of information from the *Clone* partition to the production partition, where they will stay accessible for a long time.

The product **Flash for i** considers this need, and automatically transfers several elements:

- A product internal log to know every step realized, with date and time, and potential logs errors
- The system Log (DSPLOG command) of the *Clone* partition is retrieved, and sent to the Production partition. A command allows to display those information during several days.
- The JOBLOG of the job that realized the backup (or any other function) is sent to the production partition.
- The FLDSPHST command gives the list of every cloning operation realized, and shows the duration of each operation. Disk space used on the external storage is also displayed.

Here is an example of FLDSPHST command.

```

FLDSPHST                                     Display Cloning history                                     M81FLASH
                                                                                                     21/05/19 18:32:22
Local partition type . . . . . PROD
Subsystem status . . . . . Active
Position to . . . . . 0/00/00
Enter your options, then press Enter
5=Display 6=Flash for i Logs 8 =Joblog 9=Clone's system Log

----- Elapse time for each phase -----
Opt Envir.      Cloning  -- Start FLCLONE --      Nb  Nb      Prepa  Prepa  Save  Partition  Flashcopy  %
                  Number   Date      Time      Status  Msg  Err  on Prod on Clone  active  active  active  Disk
- DEMO_BRMS      830    21/05/19  09:52:35 *BRMS_END  81   1    1:37   6:17   22:37                7:52:41    15%
- DEMO_BRMS      829    21/05/19  02:00:00 *END_FC    64   0    1:36   5:50   23:54                10:25:44   15%
- DEMO_BRMS      828    20/05/19  15:34:21 *END_FC    72   0    1:42   5:36   22:12                32:13     54:37    15%
- DEMO_BRMS      827    20/05/19  14:39:49 *END_FC    86   0    1:37   5:38   22:06                37:45     38:06    13%
- DEMO_BRMS      826    20/05/19  11:23:51 *END_FC    68   0    1:52   8:10   25:32                33:23:51  33:23:57  14%
- DEMO_BRMS      825    20/05/19  11:03:33 *ERROR     3   2    1:44   7:13   24:33                24:00:01  24:00:07  1%
- DEMO_BRMS      824    19/05/19  02:00:00 *END_FC    59   0    1:40   7:17   6:45   9:12:46   9:12:52  1%
- DEMO_BRMS      823    18/05/19  02:00:00 *END_FC    42   1    1:38   7:22   1:10:39  1:10:45  %
- DEMO_BRMS      822    17/05/19  16:47:15 *END_FC    46   1    1:40   7:00   24:55   13:36:36  13:36:42  13%
- DEMO_BRMS      821    17/05/19  15:36:36 *END_FC    44   0    1:35   6:42   10:50:34  10:50:40  1%
- DEMO_BRMS      820    16/05/19  15:09:26 *END_FC    64   0    1:39   6:46   23:53   23:59  %
- DEMO_BRMS      819    16/05/19  14:45:33 *END_FC    43   0    1:37   7:36   30:03   3:04:57  3:05:04  14%
- DEMO_BRMS      818    16/05/19  14:45:33 *END_FC    43   0
- DEMO_BRMS      817    16/05/19  11:40:36 *END_FC    67   0
                                                                                                     More...
F3=Exit  F5=Refresh  F11=Display time  F12=Cancel
    
```

Some customer references

These are only ~40 out of more than 160 customers!

