Worldwide Response Center

HP 3000 APPLICATION NOTE #82

Private Volumes

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December 15, 1990
Document P/N #5960-4347

RESPONSE CENTER APPLICATION NOTES

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Private Volumes

Introduction

"Private volumes are too complicated".

"They use a lot of disc input-output".

"And it is expensive..."

"And what will I get out of it?"

Who among us has not heard these complaints? They are a good illustration of how most users feel about one of the most important MPE functionalities and perhaps the least understood. Together we will try and clear up some of these misunderstandings. This Application Note is intended for all users or system managers who have taken a training course equivalent to HP 3000 SYSTEM MANAGEMENT or the MPEXL equivalent. We will then illustrate through examples how private volumes are installed on MPE V and MPE XL. Both cases are more or less alike.

Rather than detail the syntax of each of the commands used, we felt it was more important to go into the general concepts and actual cases in which private volumes are configured, installed and used. For the command parameters, as well as a detailed description of each utility, please refer to the following MPE manuals:

MPE V:
MPE V Commands
MPE V Utilities
Quick Reference Guide
System Operation and Resource Management

MPE XL:
MPE XL Commands
System Administrator's Quick Reference Guide
Volume Management Reference Manual

As you can see this Application Note addresses all of us who use the HP 3000 under MPE V or MPE XL.

I - SOME DEFINITIONS:

It is clear that the misunderstanding about private volumes stems for the most part from a lack of available information. We will therefore first clarify a certain number of terms and concepts which are essential for understanding what follows. We will then describe the domains to which volumes can belong and present the notion of VOLUME SET and the notion of VOLUME CLASS. We will also go into the different kinds of volumes. Then we will study what is meant by mounting volumes. We will find out that volumes are mounted physically and logically. Finally, we will present the notion of DIRECTORY SPANNING.

DOMAINS

There are four domains to which a disc can belong.

- A disc belonging to the *SYSTEM DOMAIN* must be available and mounted in order to start the system. The system domain always exists regardless of the operating system used. Just as some are poets and don't know it, we all use the system domain without knowing it. The system domain includes at least one disc, the Ldev 1, called the system disc. Under MPEXL, the system domain is called MPEXL_SYSTEM_VOLUME_SET. All the discs making up the system domain must be available in order to start the HP 3000.

You cannot delete a disc from the system domain without reloading, in other words without doing a RELOAD under MPE V or an INSTALL under MPE XL.

- The *PRIVATE DOMAIN* consists of n volumes which do not have to be available when the system is started up. In addition, such volumes can be added or deleted without having to reload the system or even stop it. The private domain is divided into VOLUME SETS. A VOLUME SET includes one master and from zero to seven members. The master volume of a VOLUME SET usually contains the VOLUME SET DIRECTORY and, for MPE XL, the files used by TRANSACTION MANAGEMENT. Files are created on the master and members of a VOLUME SET. In order to mount a volume, the entire VOLUME SET must be available physically. Under MPE V, virtual memory cannot be located in a private volume. Under MPE XL the system cannot use space available in private volumes to copy transient objects (the MPE XL equivalent of MPE V virtual memory).

Any supported disc can be configured as a private disc. There is therefore no need to use a removable disc pack such as the HP7935. We will see later on the advantage of configuring a fixed disc as a private disc.

- There is also a *SERIAL DOMAIN* and a *FOREIGN DOMAIN*. A serial disc behaves like a tape unit. The foreign domain is a special case used by certain programs such as COPYCAT/3000. Both are notions which are completely distinct from that of a private volume. It should be noted that serial discs and COPYCAT are not yet supported under MPE XL.

VOLUME SETS

A VOLUME SET is defined as an entity which can be logically self-sufficient. This means that ALL the volumes making up the VOLUME SET must be physically present and recognized by the system to make up a viable entity. There are system VOLUME SETS and private VOLUME SETS. The system VOLUME SET makes up the system domain (see above). It is the minimal entity without which the system cannot be started. Under MPE V, this VOLUME SET is displayed as follows under SYSDUMP:

```
:sysdump $null                    << CAPABILITY OP required     >>

ANY CHANGES? y                    << Look at the system configuration...>>
SYSTEM ID = HP32033G.A3.02.?
```

```
MEMORY SIZE = 4096 (MIN=256, MAX=8192)?
I/O CONFIGURATION CHANGES? y        << Look at configured discs        >>
LIST I/O DEVICES? y
LOG DRT U  C T SUB              REC   OUTPUT  MODE    DRIVER   DEVICE
DEV  #  N  H Y TYPE  TERMINAL   WIDTH  DEV             NAME    CLASSES
 #      I  A P      TYPE SPEED
        T  N E
1   89  0  0 3  10               128    0              HIOMDSC2 DISC
                                                              SPOOL
2   90  0  0 3  10               128    0              HIOMDSC2 DISC
                                                              SPOOL
3   81  0  0 3  8                128    0              HIOMDSC2 PRIVATE
4   82  0  0 3  8                128    0              HIOMDSC2 PRIVATE

... / ...

LIST CS DEVICES?
LIST DEVICE DEFAULTS?
LOGICAL DEVICE #?
MAX # OF OPEN SPOOLFILES = 120 (MIN=8, MAX= 1012)?
LIST I/O DEVICES?
LIST CS DEVICES?
TERMINAL TYPE CHANGES?
CLASS CHANGES? y                    << To verify.....                  >>
LIST CLASSES? y
  CLASS      ACCESS  LOGICAL
  NAME       TYPE    DEVICES
DISC         3       1,2
SPOOL        DA      1,2
PRIVATE      3       3,4            << PRIVATE class is configured as DISC
                                      class, the name is arbitrary >>
... / ...

DELETE CLASSES?
ADD CLASSES?
LIST CLASSES?
LIST I/O DEVICES?
ADDITIONAL DRIVER CHANGES?
I/O CONFIGURATION CHANGES?
SYSTEM TABLE CHANGES?
MISC CONFIGURATION CHANGES?
LOGGING CHANGES?
DISC ALLOCATION CHANGES? y          << It is here !                    >>
MAX DIRECTORY SIZE (SECTORS) = 6000 (MIN=2526, MAX=65000, USED = 2511)?
LIST VOLUME TABLE? y                << It is what we are looking for   >>
VOLUME #    NAME    LOG DEV #
   1       MH7937U0     1
   2       MH7937U1     2
DELETE VOLUME?:
```

We have two discs configured in the system domain of this HP3000 MPE V. A disc configured as private volume does not figure in the VOLUME TABLE.

We could have gotten the same information as follows:

```
:DSTAT ALL
  LDEV-TYPE     STATUS      VOLUME (VOLUME SET-GEN)
 ------------ ---------  ------------------------
```

```
1-7937        SYSTEM     MH7937U0
2-7937        SYSTEM     MH7937U1
3-7933/7935   FOREIGN    *UNALLOCATED*
4-7933/7935   FOREIGN    *UNALLOCATED*
```

NOTE

Note that the volumes corresponding to DEVICES 3 and 4 were not mounted at the time we ran the DSTAT ALL command. We will see later on an example of DSTAT ALL where private volumes are mounted.

Under MPE XL, the system VOLUME SET is called MPEXL_SYSTEM_ VOLUME_SET. It can be listed as follows :

```
:DSTAT ALL
  LDEV-TYPE     STATUS      VOLUME (VOLUME SET - GEN)
 ------------ ---------  --------------------------
  1-079370   .  MASTER      MEMBER1          (MPEXL_SYSTEM_VOLUME_SET-0)
  2-079370      MEMBER      MEMBER2          (MPEXL_SYSTEM_VOLUME_SET-0)
  3-079350      MASTER      MEMBER1          (VTEST-0)
  4-079350      MEMBER      MEMBER2          (VTEST-0)
```

Let us briefly comment on each column.

The LDEV-TYPE column gives the logical number of the device and the type of disc we are dealing with. We can recognize LDEV 1 which is the system disc (the one from which the system was started). In this case it is a 7937 (571 MB).

The STATUS column gives the volume type :

- MASTER for the master volume of a set, in other words the one where the VOLUME SET DIRECTORY as well as the structures used by TRANSACTION MANAGEMENT for MPE XL are found.

- MEMBER for the member or members of the VOLUME SET if there are any.

Finally, the VOLUME column gives the name of each volume and the set to which it belongs. Note that in our example, the system VOLUME SET (therefore the system domain) has two volumes named MEMBER1 and MEMBER2 and that there is a private VOLUME SET called VTEST including a master called MEMBER1 and a member called MEMBER2. Unlike MPE V, the name of the master volume is only a conventional value.

As far as VOLUME SETS other than MPEXL_SYSTEM_VOLUME_SET are concerned, MPE XL makes a complete distinction between the notion of volume and that of LOGICAL DEVICE. This mainly means that when mounting a VOLUME SET on an HP 3000 series 900, you do not have to worry about the number of the LOGICAL DEVICE on which a particular volume is to be mounted. MPEXL-SYSTEM-VOLUME_SET is the exception which confirms the rule: the master volume of this set is the system disc and must be LDEV 1.

HOME VOLUME SET:

Once the structure of volumes and VOLUME SETS of a system have been defined, files must be installed. A HOME VOLUME SET is assigned to each group in the system . It will be the VOLUME SET which will contain the group's files. Note that a group is installed on a VOLUME SET and not on a volume. By default, a newly created group will be located in the system VOLUME SET. A group resides in one and

only one VOLUME SET. It is therefore impossible to located different groups of the same account on different VOLUME SETS. Under MPE V, the key word ;VS= is used to create a group in a VOLUME SET other than the system VOLUME SET. Under MPE XL, the key word ;HOMEVS= is used.

VOLUME CLASS:

There is an intermediate level between the notion of VOLUME SET and that of volume. It is the VOLUME CLASS. A VOLUME CLASS (which has nothing to do with DEVICE CLASS) can be thought of as a sub-division of a VOLUME SET including at least the MASTER and possibly one or more members.

A group can be assigned to a VOLUME CLASS rather than to a VOLUME SET which means that you do not have to mount all the volumes of the set in order to access the group's files.

A VOLUME CLASS always includes the set's MASTER because this master volume is the one which contains the VOLUME SET's DIRECTORY required to list the files in the group you want to access.

MOUNTING VOLUME SETS:

Mounting consists of all the operations required for a VOLUME SET to be accepted by the system and make its files accessible. There is physical mounting and logical mounting. The BINDING operation will also be described.

- Physical mounting:

Physical mounting concerns each volume independent from the other volumes that may make up a set. Each volume is physically mounted separately. The actual physical mounting consists of placing the PACK in the disc unit and in switching the disc ON -LINE. These operations are done from the disc control panel. There is a LOAD/UNLOAD key on the 7935 and a STOP/RUN switch on the 7920/7925.

On a removable disc pack, the unit must be powered up in order to open the door and therefore to insert a pack. On fixed disc pack units, physical mounting simply consists of powering up the unit. The remainder of the operations are carried out automatically by the disc itself.

- Logical mounting:

Once the volume has been mounted physically, it must then be recognized by the system. Logical mounting is not done volume by volume but for all the volumes in a set.

Under MPE V, the following commands are used:

```
VMOUNT:This command is used to enable the use of private volumes on
       the system (VMOUNT ON) and disable their use (VMOUNT OFF).
       Before being able to explicitly mount a VOLUME SET, you must
       first do VMOUNT ON. The command VMOUNT ON,AUTO can also be
       used to omit the REPLY on the console when a VOLUME SET is
       being mounted.

MOUNT :This command mounts the VOLUME SET logically. All the volumes
       which make up the set must be physically mounted for you to be
       able to mount the set logically.

DISMOUNT:This is the reverse operation used to dismount a VOLUME SET
       logically. You must always do a logical DISMOUNT before
       physically dismounting one of the volumes in a set.
```

LMOUNT, LDISMOUNT:

When no session or job is accessing the VOLUME SET, logical dismounting is implicit. To "lock" a VOLUME SET, in other words to keep it logically mounted between different accesses, there is an operator command called LMOUNT. This command locks the volume set logically. Its counterpart, LDISMOUNT, is used to unlock the VOLUME SET and allow it to be dismounted. An LDISMOUNT makes the VOLUME SET inaccessible until the next LMOUNT.

Under MPE XL, the following commands are used:

First of all VMOUNT does not exist. There is no longer any need to enable or disable the mounting of private volumes explicitly.

VOLUME MANAGEMENT is an MPE XL subsystem which is always available. We can therefore consider that the MPE XL equivalent of VMOUNT ON,AUTO is always done by default.

The MOUNT and DISMOUNT commands are replaced by VSOPEN and VSCLOSE. These commands are used to open a VOLUME SET and close a VOLUME SET, respectively. VSOPEN does not generate a REPLY on the operator console. VSOPEN will only run if all the volumes in the set are physically mounted.

Finally, LMOUNT and LDISMOUNT are replaced by VSRESERVE and VSRELEASE which perform the same function, that is to activate and deactivate a logical lock for a VOLUME SET.
A final remark concerning MPE XL. Once all the volumes of a set are physically mounted, logical mounting is done automatically. In other words, an implicit VSOPEN is carried out when the last volume of a set has been physically mounted on the system. This avoids operator manipulations.

DIRECTORY BINDING:

This operation is transparent to the user and consists in logically binding the system DIRECTORY to the private volume DIRECTORY. A certain amount of information is taken from each DIRECTORY:

```
SYSTEM DIRECTORY :
       Capabilities
       Local Attributes
       CPU counter and limit
       CONNECT counter and limit
       Maximum priority
       UDCs
       Password
       Home Volume Set
       Access type F, X, W, A and L

VOLUME SET DIRECTORY:
       Disc space counter
       Disc space limit
       Access type S (permanent file creation)
```

Both series of information must therefore be available on the system at the same time. Directory binding is not done using a command under MPE V or MPE XL since it is transparent to the user.

SPANNING:

The notion of spanning is a typical MPE V notion.

It consists in simultaneously updating the system DIRECTORY and the VOLUME SET directory. For example, in order not to have to run two NEWGROUP commands (one at the system level and one at the private volume level), the key word SPAN is used after the VOLUME SET in the NEWGROUP command.

This functionality will be implemented in a future version of MPE XL.

II - MPE V

We shall now describe the different steps required for installing, maintaining and deleting private volumes on a system running under MPE V.

First of all, installation consists of carrying out the following steps in order:

- Configuring the physical disc
- Defining the VOLUME SET, its MASTER and members
- Initializing the VOLUME SET
- Mounting the volume
- Defining the account structure
- Installing files

-CONFIGURING THE PHYSICAL DISC

As usual, we begin with a COOLSTART. The important points are as follows:

Use a class which does not yet exist on the system as the DEVICE CLASS for our private disc. The name is arbitrary. This class will be defined as being neither SERIAL nor FOREIGN.

Do not add the new disc to the system VOLUME TABLE. The notion of private volume already implies that the system domain should not be modified.

It should be noted that to add a disc to the system, a COOLSTART is enough. To change a disc which already exists into a private disc, you must do a RELOAD.

! It is a good idea to remind you that BACKUPS are absolutely necessary from the moment you're thinking of modifying the system.

Once our disc is configured, we can go to the next step.

-DEFINING THE VOLUME SET AND ITS MEMBERS:

This operation requires CV CAPABILITY (Create Volumes). Under MPE V, VOLUME SETS are conventionally assigned to a group, the one to which the user who created the VOLUME SET is connected.

Suppose we are connected to MANAGER.SYS. We would do the following:

```
:NEWVSET VTEST;MEMBERS=VTEST:HP7935
```

Note that the name of the first member (we could have requested up to 8) is that of the master, therefore the same as that of the VOLUME SET. We must also specify the type of disc which will be used.

Let us check that everything is OK:

```
:LISTVS,2
 ACCOUNT=SYS          GROUP=PUB

 VOLSET        MEMBERS       TYPE     LDEV     STATUS
 --------      --------     -------   ----     --------
```

```
VTEST          VTEST        HP7933/
                            HP7935
```

Since the VOLUME SET is not yet mounted logically, we have no information in the LDEV and STATUS columns. This is normal.

Once our VOLUME SET and any of its members have been correctly defined, we can go on to the next step...

-INITIALIZING THE VOLUME SET:

We are still connected to MANAGER.SYS (in order to have all CAPABILITIES) on the system console. We will mainly use the VINIT subsystem.

```
:DOWN 5                          << We are working on ldev 5>>
:VINIT
>INIT VTEST,5,VTEST.PUB.SYS      << Volume initialization   >>
  FOREIGN DISC TO BE INITIALIZED? Y
  DIRECTORY SIZE? 512            << 512 is a standard value >>
>EXIT
:UP 5
```

Now let us go to the next step...

-LOGICALLY MOUNTING THE VOLUME:

This operation requires only two commands:

Under OPERATOR.SYS and at the system console:

```
:VMOUNT ON,AUTO
```

Under MANAGER.SYS (user having created the VOLUME SET):

```
:MOUNT VTEST
```

-ACCOUNT STRUCTURES:

We now have an operational VOLUME SET mounted on the system (our example only contains the master volume, but it is just an example). We will now define our account structure.

```
:NEWACCT PVOL,MGR;CAP=UV,CV,IA,BA,ND,SF,AM,AL,GL;VS=VTEST.PUB.SYS:SPAN
```

UV and CV CAPABILITIES make it possible to use private volumes (to mount them logically and install files) and to install new entities such as groups using the key words :SPAN and/or ;VS=, respectively. The other CAPABILITIES are assigned by default when an account is created.

The key word ;VS= indicates that the account will be referenced to a private volume. :SPAN indicates that both the system DIRECTORY and that of the VTEST VOLUME SET will be updated. This avoids an extra operation.

```
:ALTGROUP PUB.PVOL;VS=VTEST.PUB.SYS:SPAN
```

This operation is absolutely necessary, otherwise the PUB group in the PVOL account will reside in the system domain. Note that using :SPAN here again avoids an extra operation.

So, we have created our minimum account structure. We can of course install other groups in our VOLUME SET using the NEWGROUP command with the parameters ;VS=VTEST.PUB.SYS and :SPAN .

-INSTALLING FILES:

Our account and our test group are now ready to be used. We can install files using BUILD,DBUTIL,RESTORE... Operations will be transparent for the end user. Note that in order to use LISTDIR5, we must enter the command MOUNT VTEST.PUB.SYS so that the information in the DIRECTORY of this VOLUME SET is accessible to the utility.

-MAINTAINING PRIVATE VOLUMES:

These operations present no particular difficulties. Backups are made using STORE/RESTORE or SYSDUMP just as in the system domain. Of course, to back up the contents of a private volume, the VOLUME SET must be mounted both physically and logically. The following commands can be used for private volumes:

LISTVS: Lists the VOLUME SETS configured on the system.

REPORT: The key word ;VS= is used to find out the contents of a VOLUME SET especially as far as occupied disc space is concerned.

DSTAT: See the examples of how DSTAT ALL is used above. This command gives the status of each system disc, its LOGICAL DEVICE number and the domain to which it belongs.

To find out how much free space is available on a private volume, use the FREE5 command without any special parameters or key words. Lastly, note that DISC CACHING is perfectly compatible with the notion of private volumes: here again, no special key word or parameter is required.

-DELETING VOLUME SETS:

This operation takes place in four steps:

1) Back up the information in the VOLUME SET using STORE.

2) Purge the groups and corresponding account(s), first on the private volume then on the system volume.
SPANNING is not possible at this level.

3) Delete the VOLUME SET using the command PURGEVS.

4) Deconfigure the disc physically using COOLSTART for example.

If you observe a certain number of simple procedures, you can see that installing private volumes under MPE V is easy and without any particular difficulty. In addition, once such a configuration is installed, there is no need to modify it except if you want to create new groups.

Backups, as we have seen, present no difficulty either, no more than maintaining regular databases (DBUNLOAD/DBLOAD).

We hope we have reinstated one of the major functions of MPE V. Now let us take a look at an HP 3000 series 900, in other words MPE XL.

III - MPE XL

As you will see, installing private volumes is even easier under MPE XL than under MPE V.

Some operations are no longer required, others have been combined together and still others are carried out implicitly by the system.

We shall describe the following steps of the installation process:

- Configuring the physical disc
- Initializing the VOLUME SET, the master and any members
- Mounting the volume
- Setting up the account structures
- Installing files

We shall also go into the maintenance procedures for private volumes under MPE XL as well as the ones to be used to delete private volumes.

-CONFIGURATION:

Let us assume we already have 2 discs LDEV 1 and 2 in the system domain. We are now going to make up our private VOLUME SET in a single volume which we will install as LDEV 3. We will configure the physical disc using SYSGEN as follows, connected to MANAGER.SYS :

```
:sysgen

SYSGEN version B.06.01 : catalog version B.06.02    MON, NOV 28, 1988,  4:09 PM
Copyright 1987 Hewlett-Packard Co. All Rights Reserved.


         ** First level command **

         io                log (lo)       misc (mi)        sysfile (sy)

         basegroup (ba)    keep(ke)       permyes (pe)     show (sh)
         tape (ta)

         clear (cl)(c)     exit (ex)(e)   help (he)(h)     oclose (oc)
         redo
sysgen> io

       ** IO configurator commands **

       aclass (ac)      adev (ad)       apath (ap)      avol (av)
       dclass (dc)      ddev (dd)       dpath (dp)      dvol (dv)
       lclass (lc)      ldev (ld)       lpath (lp)      lvol (lv)
       maddress(ma)     mclass (mc)     mdev (md)       mpath (mp)
       mvol (mv)

      clear (cl)(c)    exit (ex)(e)    help (he)(h)    hold (ho)
      oclose (oc)      redo
```

<<Now list the configuration to check that the LDEV 3 is available>>

```
io> ld

LDEV             PATH                          DEVICE ID
----  --------------------------------  --------------------------------
   1  2/4.0.0                           HP7933H
   2  2/4.0.1                           HP7933H
   6  6/4.0.6                           HP2567B
   7  6/4.0.3                           HP7978A
  10  6/4.0.7                           HP7978B
  20  2/4.1.0                           HP2392A
 100  NMMGR
 101  NMMGR
 102  NMMGR

LDEV   OUTDEV   DEV TYPE  JAID R xS  RSIZE   CLASS     CLASS     CLASS
----  --------  --------  ---- - --  -----  --------  --------  --------
   1  0         DISC                  128  DISC      SPOOL
   2  0         DISC                  128  DISC      SPOOL
   6  0         LP              OS     66  LP
   7  0       . TAPE                  128  TAPE
  10  LP        TAPE      JA          128  JOBTAPE
  20  20        TERM      JAID         40  CONSOLE
```

<<LDEV 3 is not yet assigned. We will use it to configure our private volume as follows using the AD (Add Device) >>

```
io> help ad
  adev (ad)       ldev         = #/#,#,...
                  path         = device path
                  id           = product id
                  [rsize       = record size]
                  [outdev      = output device]
                  [mode        = JOB|DATA|INTERACTIVE| DUPLICATIVE|
                                 INPUT|OUTPUT|AUTOREPLY|NONE]
                  [class       = classname,...]
                  [cmode       = IN|OUT|CIO|NCIO|RANDOM|
                                 DEFAULT]
                  [pmgr        = physical manager name]
                  [lmgr        = logical manager name]
                  [pmgrpri     = physical manager priority]
                  [mpetype     = comp. mode type]
                  [mpesubtype = comp. mode subtype]
```

<<Add LDEV 3. To simplify things, let us assume that we connect it after LDEVs 1 et 2, on the same HP-IB chain. Enter the following command : >>

```
io> ad ldev=3 path=2/4.0.2 id=hp7935
```

<<The other configuration parameters are assigned by default. Now save you modified configuration and Quit SYSGEN : >>

```
io> ho
```

```
     io> e
 sysgen> ke
         keeping to group CONFIG.SYS
         Purge old configuration (yes/no)? yes
         ** configuration files successfully saved **
 sysgen> e
```

```
Once your configuration has been saves to disc, you must stop
the system and restart using CTRL-B  RS and START NORECOVERY.
!! Be careful, this option cannot be used to recover SPOOL files
and scheduled JOBS. (not for native mode spooler files (after 2.1))
```

```
The configuration is complete. Now on to the next step.
```

-INITIALIZATION:

Now let us see what volumes are mounted on the system and add the one in our example :

```
:DSTAT ALL
  LDEV-TYPE      STATUS       VOLUME (VOLUME SET - GEN)
 -----------    ---------    --------------------------
  1-079370       MASTER       MEMBER1          (MPEXL_SYSTEM_VOLUME_SET-0)
  2-079370       MEMBER       MEMBER2          (MPEXL_SYSTEM_VOLUME_SET-0)
```

The MPEXL_SYSTEM_VOLUME_SET is there with its two volumes. We can now initialize the VOLUME SET in our example as LDEV 3. It will have a single member called MEMBER1.

To do this, use the VOLUTIL utility. This program is the one used to configure, modify and maintain private volumes under MPE XL.

Let us also assume that a disc pack has been mounted in the HP7935 unit configured as LDEV3 and that the unit is ON-LINE.

Here is where we will save time because the system will chain the following operations implicitly. It will define the VOLUME SET, initialize its single member (which will also be the master volume of the set) and logically mount the VOLUME SET

```
volutil: help

NEWSET          sname vname ldev [perm][trans][gen_number][(cname[[,cname]...
SHOWSET         [sname] [ CLASSES | VOLUMES | SETINFO | DSTATUS |
                          STORAGE [;FREE] [;PERM] [;TRANS] |
                          LABELS [;MPEXL] | STRUCT ]
COPYSET         sname from_ldev to_ldev
SETDEFAULTSET   [sname]
SHOWDEFAULTSET
NEWCLASS        sname:cname [(vname [[,vname]...])]
EXPANDCLASS     sname:cname (vname [[,vname]...])
SHOWCLASS       [sname:]cname [ VOLUMES | SETS | CLASSINFO | DSTATUS |
                                STORAGE [;FREE] [;PERM] [;TRANS] |
                                LABELS [;MPEXL] ]
NEWVOL          sname:vname ldev [perm] [trans] [(cname[[,cname]...])]
INITVOL         sname:vname ldev
ALTERVOL        sname:vname [perm] [trans]
SHOWVOL         [sname:]vname [ SETS | CLASSES | VOLINFO | DSTATUS |
                                STORAGE [;FREE] [;PERM] [;TRANS] |
                                LABEL [;MPEXL] ]
```

```
FORMATVOL       ldev
SCRATCHVOL      ldev
UNSCRATCHVOL    ldev
DSECTORSVOL     [sname:]vname | ldev
VERIFYVOL       [sname:]vname | ldev
COPYVOL         from_ldev to_ldev
HELP            [command_name]
USE             filename
LOG             filename
REDO            [cmd_id]
DO              [cmd_id]
LISTREDO
RECOVER         [;KEEP | ;NOKEEP]
EXIT
*****************************************************************
```

```
Let us begin by scratching our volume :

volutil: scratchvol 3

*Verify: Scratch volume on ldev 3 [Y/N] ? y

*Note: Lonervolume scratched on ldev 3.
```

Once this has been performed successfully, we can initialize the actual volume. We will initialize a VOLUME SET called VTEST on LDEV 3 and make up a single member called MEMBER1 on which the maximum permanent space will be configured to 100%:

```
volutil: newset VTEST MEMBER1 3 100 100

*Verify: Initialize new volume VTEST:MEMBER1 on ldev 3 [Y/N]? y

*Note: New master volume has been initialized on ldev 3.
```

Once the operation has been performed successfully, we can quit VOLUTIL :

```
        volutil:exit
```

Let us check the result of our work :

```
:DSTAT ALL
  LDEV-TYPE      STATUS       VOLUME (VOLUME SET - GEN)
 -----------    ---------    --------------------------
  1- 079370      MASTER       MEMBER1          (MPEXL_SYSTEM_VOLUME_SET-0)
  2- 079370      MEMBER       MEMBER2          (MPEXL_SYSTEM_VOLUME_SET-0)
  3- 079350      MASTER       MEMBER1          (VTEST-0)
```

Once everything is OK we can go on. Note that the VTEST VOLUME SET was implicitly mounted when it was initialized. This was possible because the volume was physically available when it was initialized.

-ACCOUNT STRUCTURE:

We are going to create an account PVOL whose user will be MGR. This account will include two groups: PUB of course and a group G1 which we will create. The account and its main user will have standard CAPABILITIES, plus UV and CV for private volumes. UV is required to mount a VOLUME SET logically and therefore access the files in the VOLUME SET. CV is required to specify the key words ;HOMEVS= and ;ONVS= when groups or accounts are created. Note that the USERS are absolutely independent of the

VOLUME SETS. Account and groups will be created once in the system DIRECTORY and once in the private volume DIRECTORY. There is no notion of SPANNING under MPE XL.

Here are the commands we will use to create the structures in our example :

```
:NEWACCT PVOL,MGR;CAP=CV,UV,AM,AL,GL,ND,SF,IA,BA

:NEWACCT PVOL,MGR;CAP=CV,UV,AM,AL,GL,ND,SF,IA,BA;ONVS=VTEST

:ALTGROUP PUB.PVOL;HOMEVS=VTEST

:NEWGROUP G1.PVOL;HOMEVS=VTEST

:NEWGROUP G1.PVOL;ONVS=VTEST
```

Note that we are reassigning the PUB.PVOL group to the VTEST VOLUME SET. The system installed it in the system domain by default.

Also note that the G1.PVOL group has to be created twice:

- once for the system DIRECTORY
- and once for the VTEST VOLUME SET DIRECTORY.

Our account structure is now ready to be used and we can go on to the next step.

-INSTALLING FILES:

We have the choice of how to install files in the groups of a private VOLUME SET. We can use the BUILD command or the DBUTIL or KSAMUTIL utilities or RESTORE. For RESTORE, we must specify the key word ;VOLSET=VTEST to force file installation on our VOLUME SET. This is particularly important when first installing private volumes or when migrating from MPE V to MPE XL. Apart from this basic precaution, private volumes are used transparently.

-MAINTENANCE:

Once private volumes have been installed, you have to be able to provide maintenance for them. The following commands are available:

VSOPEN:

Mounts a VOLUME SET logically. Note that if you mount all the members of a VOLUME SET physically, including the master, the system automatically mounts them logically. The operator has one less thing to do.

VSCLOSE:

Performs the reverse operation: it dismounts the VOLUME SET logically. Note that the physical dismounting of a volume is possible only if the VOLUME SET has first been dismounted logically.

VSRESERVE:

Locks a VOLUME SET, in other words inhibits it from being dismounted logically. This is useful for example if you want to be sure to keep a VOLUME SET mounted for backup purposes.

VSRELEASE:

Does the reverse operation: it enables a VOLUME SET to be dismounted logically.

The equivalent of the MPE V command VMOUNT does not exist under MPE XL. The notion of private volume is considered an integral part of the operating system, always available, and therefore does not have to be initialized.

The other maintenance operations are mainly done using VOLUTIL. This utility lets you add a volume to an existing set, delete a volume from a set (careful, not the master!), copy a VOLUME SET onto another... It is also used to define VOLUME CLASSES (see chapter I) which should not be confused with DEVICE CLASSES.

Backups are made using STORE and the key word ;ONVS= which is used to store VOLUME SETS selectively one after the other. Note that except for the system domain, volumes do not have to reside on a specific LOGICAL DEVICE. You can for example dismount a volume from a LOGICAL DEVICE and remount it on another one. This may prove useful when transferring a VOLUME SET from one system to another.

The free space available on a VOLUME SET can be displayed disc by disc using DISCFREE, independent of the notion of VOLUME SET.

Finally, to configure a VOLUME SET, you do not have to specify a special DEVICE CLASS like under MPE V. MPE XL hardly uses DEVICES CLASSES and does not require them when handling private volumes.

-DELETING A VOLUME SET:

This operation is extremely simple. It takes place as follows:

1) Back up the VOLUME SET you want to delete.

2) Purge the account(s) of the VOLUME SET. This operation must be done twice, once for the system DIRECTORY and once for the private volume DIRECTORY (;ONVS=).

3) If you want to reassign the physical disc or discs, restart using CTRL-B RS and START NORECOVERY without changing the configuration.

4) If you want to delete the disc, change the configuration under SYSGEN, back it up and restart using CTRL-B RS and START NORECOVERY. Remember that START NORECOVERY does not let you recover SPOOL files and SCHEDULED JOBS. (not for native mode spooler files.)

This concludes our description of how private volumes operate and are installed under MPE V and MPE XL.

We now propose to look into some of the advantages and disadvantages of private volumes.

IV - CONCLUSION: DISADVANTAGES AND ADVANTAGES OF PRIVATE VOLUMES.

We have already described in detail the various procedures (MPE V and MPE XL) required to install private volumes on an HP 3000. If the various steps of these procedures are followed, it is not very difficult to install private volumes. Moreover, this procedure is only carried out once.

It is true that opening a file on a private volume generates several extra disc inputs-outputs, but there are not really that many and they go practically unnoticed by the user.

The advantages of private volumes, on the other hand, are many. Here are just a few examples.

First, greater flexibility in making backups because the system domain can be backed up separately. While this is being done the system must be made inaccessible to users. This is why the system domain should be kept as small as possible. We suggest you limit it to two 400-MB or two 600-MB discs under MPE XL and only one under MPE V. We recommend that you install everything that makes up the operating system or directly concerns it in the system domain such as the SYS, SUPPORT, TELESUP, WPPL@ and HPOFFICE accounts. This way, once the system domain has been backed up, VOLUME SETS can then be backed up one at a time enabling the users whose VOLUME SET has already been backed up to resume work.

This type of backup is done under MPE V using an indirect file containing the list of accounts to be backed up, and under MPE XL by specifying the key word ;ONVS= in the STORE command.

The total time required for backup remains unchanged, but system availability is greatly improved: by spending less time in making backups, more time can be spent on work.

Next, better data protection can be provided: a confidentially sensitive application could reside on a private volume which can be dismounted as soon as it is no longer needed and for which access rights can be restricted to a small number of selected users.

Finally, the time required to reload the system is considerably reduced. No one argues with the fact that it is a good idea to reload the system periodically to compress disc space or to make room on LDEV 1 prior to an UPDATE.

There must be at least 25,000 contiguous sectors of space for recent versions of MPE V and 60,000 contiguous sectors for MPE XL.

Obviously the fewer the number of discs to be backed up and reloaded, the quicker the reloading. The system domain can be reloaded by backing up this domain then restarting in RELOAD from a SYSDUMP tape (MPE/V) or INSTALL from an SLT (MPE/XL).

You should first take care though to switch private discs OFF- LINE or switch the power off. Then of course you can recover the contents of the system domain from the backup tapes.

In addition, if a problem arises with a disc on a private volume, only the VOLUME SET which this disc is part of will be affected. The other applications can continue running transparently.

We might also mention better application transportability.

It is easy to transport a VOLUME SET from one system to another transparently for the user if the system DIRECTORY on the destination system uses the same account structure as the one on the originating system.

This account structure identity can be easily obtained using contributed utilities such as BUILDACCT .

One advantage of this is that it enables backup centers to be easily used.

Indeed, if you have a backup system with the same account structure as the main system, restarting operation on the backup system is easy and fast if you have the disc units required to install your 7935 packs and if these packs have not been destroyed physically, of course.

This completes the list of the major advantages of private volumes both under MPE V and MPE XL. The concepts behind both implementations are the same.

We hope we have convinced you that this functionality is well founded and useful.

We cannot tell you how much we encourage you to use it especially for its great advantage as far as system availability and operating flexibility are concerned.

Our primary goal when we started writing this article was mainly to debunk the actual concept of private volumes.

We feel we have reached our goal of showing you through examples that the concept is not very mysterious or complicated.

Hoping we have provided you with still another way of getting the most out of the many possibilities offered by the HP 3000 and meeting your users' computer needs, we wish you many a successful installation of private volumes.

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HP 3000

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2	5960-2841	Terminal types for HP 3000 HPIB Computers - Version 1
3	5960-2842	Plotter Configuration Guide
4	5960-2843	Printer Configuration Guide - Version 2
5	5960-2844	MPE System Logfile Record Formats
6	5960-2845	Stack Operation
7	5960-2846	COBOL II/3000 Programs: Tracing Illegal Data
8	5960-2847	KSAM Topics: COBOL's Index I/O: File Data Integrity
9	5960-2848	Port Failures, Terminal Hangs, TERMDSM
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11	5960-2850	System Configuration or System Table Related Errors
12	5960-2851	Pascal 3000 - Using Dynamic Variables
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22	5960-2861	Asynchronous Modems

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28	5960-2867	The Startup State Configurator
29	5960-2868	A Programmer's Guide to VPLUS 3000
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31	5960-2870	Calling the CREATEPROCESS Intrinsic
32	5960-2871	Configuring Terminal Buffers
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34B	5960-2874	Process Handling (Using COBOLII Examples) (B)
35	5960-2875	HPDESK IV (Script files, FSC, and Installation Considerations)
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