

# Support for using entire disk space on LDEV 1

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Beginning with MPE/iX 7.5 release, the MPE/iX operating system uses the full capacity of the disk configured as LDEV 1. This article explains the enhancement and briefly describes the user level changes of which customers need to be aware to use the system appropriately after installing MPE/iX 7.5 release.

## Background

Before this release, even if the actual capacity of the disk was more than 4GB (such as 18GB) and it was configured as LDEV 1, MPE/iX limited the access to only 4GB of the total disk space and rest of the disk was unavailable for use.

Primarily, this limitation existed due to the fact that the initial system loader (ISL> prompt) can access only the first 4GB of the disk and hence system utilities such as START, DUMP, DISKUTIL, etc. need to reside in the first 4GB of the disk. Therefore, LDEV 1 disk access was limited to 4GB of the disk space.

With this enhancement, even though the ISL limitation is not removed (system utilities need to be stored within the first 4GB of the disk), the operating system has now been enhanced to handle the entire disk space for storing other files.

## Hardware and Software requirements

This enhancement is provided and enabled by default once the MPE 7.5 version of the operating system (Release C.75.00) is installed.

This feature works with all HP supported disks and disk arrays irrespective of the disk capacity. This new feature is enabled for all the LDEV 1 disks with a disk capacity more than 5GB. Note: Even though this feature is to support all disks greater than 4GB, due to the operating system internal overhead involved in supporting this feature, it is only enabled for disks with a capacity more than 5GB.

## Enhancement Details

This enhancement distinguishes between files residing within 4GB and those beyond 4GB for disks configured as LDEV 1. As stated previously, for the proper functioning of the MPE/iX operating system, it is very critical that some of the system utilities reside in the first 4GB of the disk. Therefore, user files targeted for LDEV 1 will only be stored in the first 4GB under two circumstances: if there is not enough space beyond the first 4GB to accommodate the file OR when forced by the file equate option described below.

It is highly recommended that user files are kept in the disk space beyond 4GB, to preserve space for system files now and in the future. A process is provided to differentiate and help users keep files within or beyond 4GB.

### **;`DEV=**$SYSTEM_MASTER`**

In the file commands such as BUILD and FILE, file system intrinsics such as HPFOPEN, using \$SYSTEM\_MASTER refers to the first 4GB of LDEV 1 and files will be referenced/stored within this space.

WARNING: In case the requested space is not available within the 4GB, an error indicating out of space will be returned (even if enough space is available beyond the first 4GB) when creating this file.

OUT OF DISK SPACE (FSERR 46)

To make more space within 4GB, Read the section "Freeing up Space within 4GB"

For example, (to create files within the first 4GB of LDEV 1)

For all installation tools/applications such as PATCH/iX, AUTOINST, HPINSTAL, AUTORESTART/iX, etc., the following equation is used to create AXLDEV1 (for the purpose of reserving space):

```
: BUILD AXLDEV1;DISC=n,1,1;DEV=1
```

n= AXLDEV1 number, determined in "Estimating Disk Space" given in System Maintenance manual or use the default of 120,000 Sectors.

This above equation needs to be changed to

```
: BUILD AXLDEV1;DISC=n,1,1;DEV=**$SYSTEM_MASTER
```

## **;DEV=1**

For user files (i.e., for non system files) it is recommended that files are stored in private volumes. In the cases where user files are stored in LDEV 1, using the file commands, ;DEV=1 should be specified in the command. By specifying ;DEV=1 during creation, the system will attempt to create/store the files beyond 4GB. If the required space is not available in the area beyond 4GB, the system will create/store the files within the first 4GB of the disk.

## **Freeing-up disk space within 4GB**

During system update or otherwise, if there are OUT OF DISK SPACE (FSERR 46) errors even when the discfree utility shows plenty of free space, it may be required to free-up disk space within the first 4GB of LDEV 1 to enable system files to reside there. The following method can be used to free-up the disk space:

To identify where files are stored on LDEV 1, use the SHOWUSAGE command in VOLUTIL:

```
VOLUTIL:SHOWUSAGE 1;PERM;FORMAT=DETAIL
PERM Space on LDEV 1:
```

processing ...

SECTOR ADDRESS (in sectors)	SIZE	SPACE_USED_BY
48	96	MMSAVE.MPEXL.SYS
14128	32	MPEXLDIR.PUB.SYS
14160	320	ISL.MPEXL.SYS
14480	53904	START.MPEXL.SYS
68384	25120	DISCUTIL.MPEXL.SYS

The sector address of 4GB is 16777216. Any **user** file having an address lower than this number is a potential candidate to be moved beyond the first 4GB of disk space.

Once the files are identified, you may use the following set of commands to move the files beyond 4GB:

```
File t;dev=disc
Store <files>:*t
Restore *t;<files> (use ;olddate option if dates should remain as earlier)
```

Generally, the files loaded at ISL > are the files that SHOULD reside within 4GB. The list of such files can be obtained at the ISL prompt using the LS command.

```
ISL> LS
```

ISL	START	DISCUTIL	SAT	DUMP	STAGEISL
A1002AI	A1002AM	A1002AP	EDBC	EDPROC	MDIAG
MPROC	ODE	ODEDATA	ODEDATA2	TDIAG	UNIPROC
BCDIAG	CAEXR	XMAP	CLKUTIL	SADPATCH	

## Compatibility issues:

- STORE/RESTORE

If files stored from MPE/iX 7.5 are restored to a machine with pre-7.5 OS, the following warning message may appear. This is due to the \$SYSTEM\_MASTER interpretation (explained above) and can be ignored. However, the files that show this warning will be restored and restored on LDEV1.

```
COULD NOT BE RESTRICTED TO THE SYSTEM MASTER VOLUME
```

- SYSTEM REBOOT after MPE/iX 7.5 Installation/Update

During the first boot after install/update of this version, the following message may appear on the system console (the system reports that it is mapping the entire LDEV 1 disk capacity for use):

```
"relocate ssm map to(in sectors) #####"
"To map to the full disk size ##### in pages"
```

## Backdating your system

### Important Details Please Read

When backdating from MPE/iX 7.5 version (or later) to a previous version of MPE/iX (like 6.0, 6.5 or 7.0), it is critical to realize that this enhancement is not available in any of these pre-7.5 versions. Hence, these pre-7.5 versions of the operating system cannot differentiate whether the files are within the first 4GB of LDEV 1 or beyond it. After backdating, pre-7.5 versions of the operating system will still be able to access the entire capacity of LDEV 1 and start filling the disk from the beginning of the available free space. As a result of this, system utilities such as START and INSTALL may be stored in the disk space beyond the first 4GB. At that point, the system will not BOOT. A reinstall of the system from the pre-7.5 backup would then be required.

However, once the system is able to boot after the backdating, the entire disk is available for the operating system and entire disk files are available for use.

RECOMMENDATION if backdating from 7.5 to an older release:

It is highly recommended that the user performs an INSTALL from the pre-7.5 backup instead of backdating or that the user performs a full backup, INSTALL a pre-7.5 version and then restore from the backup.