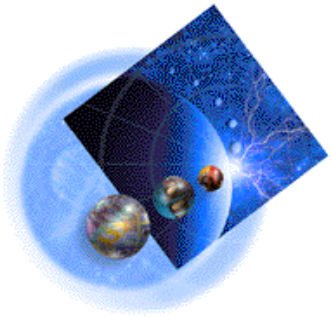

Data Path Optimizer

# IBM Subsystem Device Driver / Data Path Optimizer on an ESS

## Installation Procedures/Potential Gotchas

*Jesse I. Adams III*
**IBM Global Services**

*Last Updated: 11/28/2001 12:03 PM*

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# Section 1: Installation Procedures

## 1.1 Additional Documentation & Business Reasons for Data Path Optimizer?

This document is current as of 8/28/2000. Future revisions may work differently. (Note that this document was implemented in a SP environment. If you do not have a SP environment, obviously you do not want to use the "dsh" command. For those not familiar with a SP environment, the "dsh –av" means to execute the distributed shell command to all available nodes in the SP environment. This is a quick way to run a single command on many machines at one time. The "pcp –av –p command will implement a parallel copy to all available nodes and preserve the permission bits of the original copy.)

Note that this document is based on SSD / DPO V1.2.0. In 1999, Data Path Optimizer (DPO) was the official name for the software referenced in this document. During the first quarter of 2000, IBM began to include this software at no additional charge to Enterprise Storage Server (ESS 2105) customers. The no charge version of this software (same code, different name) is called Subsystem Device Driver (SDD). This document may use the names interchangeably.

The major two reasons to install Subsystem Device Driver / Data Path Optimizer on your machines are:

1. Load balancing – Data Path Optimizer automatically adjusts data routing for optimum performance.
2. Path failover and online recovery – Data Path Optimizer automatically and nondisruptively redirects data to an alternate data path.

## 1.2 ESS, Fiber, and SDD/DPO Software

In order to make your "lsdev –Ccdisk" output show that your disks are truly 2105 disks, you will need to install the ibm2105.rte fileset. In order to make SDD / DPO work, you will need to install dpo.ibmssd.rte.432 (on an AIX 4.3.1, 4.3.2 or 4.3.3 system). In order to get your Fiber adapters (FC 6227) to work in your RS/6000 and/or RS/6000 SP node, you will need all of the filesets in the table below. The versions that are in the table below were current on 8/08/2000.

| Fileset | Current Version (as of 8/08/2000) | Source |
|---|---|---|
| devices.fcp.disk.array.diag | 4.3.3.10 | Gigabit Fiber Channel PCI Adapter Software Upgrade CD-ROM |
| devices.fcp.disk.array.rte | 4.3.3.10 | Gigabit Fiber Channel PCI Adapter Software Upgrade CD-ROM |
| devices.fcp.disk.rte | 4.3.3.11 | Gigabit Fiber Channel PCI Adapter Software Upgrade CD-ROM |
| devices.scsi.scarray.rte | 4.3.3.10 | Gigabit Fiber Channel PCI Adapter Software Upgrade CD-ROM |
| ibm2105.rte | 32.6.100.3 | http://ssddom01.storage.ibm.com/techsup/swtechsup.nsf/support/sddupdates |
| dpo.ibmssd.rte.432 | 1.2.0.0 | http://ssddom01.storage.ibm.com/techsup/swtechsup.nsf/support/sddupdates |

The base level filesets for the "devices" filesets above are on a CD-ROM named "Gigabit Fiber Channel PCI Adapter Software Upgrade". (Version 1.3, P/N 00P2189, EC D72835, CL: 0001). This CD-ROM comes with your Fiber Channel PCI Adapter (or your system that contains the adapter). Updates for the "devices" filesets can be obtained from the following AIX service FTP site:
ftp://service.software.ibm.com/aix/fixes/v4/devices/.
Other updates can be found by navigating around this FTP site.

The software for SDD / Data Path Optimizer and the "ibm2105.rte" fileset can be obtained from the following website:

http://ssddom01.storage.ibm.com/techsup/swtechsup.nsf/support/sddupdates
Today, it is in the section "Host Attachment Scripts for SHARK. The link says "Download AIX Script".

## 1.3 Install ESS (IBM2105) Software (without Fiber)

Install the fileset "ibm2105. rte". In a SP environment, you may want to do the following:

```
dsh –av mount cws:/spdata/sys1/install/aix433/lppsource  /mnt

vi /tmp/install.ibm2105 # Put in the few lines below.
chmod 700 /tmp/install.ibm2105
pcp –av –p /tmp/install.ibm2105
dsh –av /tmp/install.ibm2105
```

```
#!/bin/ksh
#####################################################
# First, mount the lppsource to /mnt
# mount wcws:/spdata/sys1/install/aix433/lppsource /mnt
# You may want to "dsh" the mount command.
#####################################################

JOB="${0##*/}"
mkdir /tmp/joblog 2>/dev/null
JOBLOG=/tmp/joblog/${JOB}.joblog
{
      InputDir="/mnt"
      FileSet="ibm2105.rte"
      /usr/sbin/installp -acgNqQwXd ${InputDir} ${FileSet}
}  2>&1 | tee ${JOBLOG}    #Review the output and save it for
later review
```

Sample lslpp output:

***lslpp -l ibm2105.rte***

```
  Fileset                      Level  State      Description
  ----------------------------------------------------------------------------
Path: /usr/lib/objrepos
  ibm2105.rte             32.6.100.3  COMMITTED  IBM 2105 runtime for AIX

Path: /etc/objrepos
  ibm2105.rte             32.6.100.3  COMMITTED  IBM 2105 runtime for AIX
```

## 1.4 Install ESS (IBM2105) Software (with Fiber)

In order to get the IBM Enterprise Storage Server (IBM 2105) to work via Fiber Channel connections, you will need several filesets. These are listed in the 1.2 section above. (Note that the DPO / SDD software will be installed in a separate section.)

In a SP environment, you may want to do the following:

```
dsh –av mount cws:/spdata/sys1/install/aix433/lppsource  /mnt

vi /tmp/install.ibm2105 # Put in the few lines below.
chmod 700 /tmp/install.ibm2105
pcp –av –p /tmp/install.ibm2105
dsh –av /tmp/install.ibm2105
```

```
#!/bin/ksh
##################################################
# First, mount the lppsource to /mnt
# mount wcws:/spdata/sys1/install/aix433/lppsource /mnt
# You may want to "dsh" the mount command.
##################################################

JOB="${0##*/}"
mkdir /tmp/joblog 2>/dev/null
JOBLOG=/tmp/joblog/${JOB}.joblog
{
      InputDir="/mnt"
      FileSets=" devices.fcp.disk.array.diag \
      devices.fcp.disk.array.rte \
      devices.fcp.disk.rte devices.scsi.scarray.rte \
      ibm2105.rte"
      /usr/sbin/installp -acgNqQwXd ${InputDir} ${FileSets}
}  2>&1 | tee ${JOBLOG}    #Review the output and save it for
later review
```

## 1.5 Run cfgmgr –v

Now, you are ready to configure them:

```
dsh –av cfgmgr -v
```

**NOTE: There is an undocumented option on cfgmgr in AIX 4.3.3 (At least it's not in the man pages). The –S option will run cfgmgr serially!** Although you would not want to twin-tail and use DPO, since that is not supported at the time of this document's creating, you should know that cfgmgr in AIX 4.3.3 runs in parallel down each SCSI adapter. Therefore, since the second SCSI adapter could finish earlier than your first SCSI adapter, your disk drives may be in a weird order. This is usually not a big deal, unless you are doing a rollout of lots of machines that should look exactly alike, or UNLESS you are twin tailing and you want the hdisk numbers to be in the same order on each machine. In order to force the disk drives to be configured in the order of the scsi adapters, you can remove all of the disk drives and run "cfgmgr –S".

## 1.6 Verify IBM Disk Drive Connectivity

Run the following command:

***lsdev -Ccdisk***

```
hdisk0  Available 10-68-00-0,0 16 Bit LVD SCSI Disk Drive
hdisk1  Available 10-68-00-1,0 16 Bit LVD SCSI Disk Drive
hdisk2  Available 10-68-00-2,0 16 Bit LVD SCSI Disk Drive
hdisk3  Available 10-68-00-3,0 16 Bit LVD SCSI Disk Drive
hdisk4  Available 10-80-01     IBM FC 2105F20
hdisk5  Available 10-80-01     IBM FC 2105F20
hdisk6  Available 10-80-01     IBM FC 2105F20
hdisk7  Available 10-80-01     IBM FC 2105F20
hdisk8  Available 10-80-01     IBM FC 2105F20
hdisk9  Available 10-80-01     IBM FC 2105F20
hdisk10 Available 10-80-01     IBM FC 2105F20
hdisk11 Available 10-80-01     IBM FC 2105F20
hdisk12 Available 10-80-01     IBM FC 2105F20
hdisk13 Available 10-80-01     IBM FC 2105F20
hdisk14 Available 10-80-01     IBM FC 2105F20
hdisk15 Available 10-80-01     IBM FC 2105F20
hdisk16 Available 10-80-01     IBM FC 2105F20
hdisk17 Available 10-80-01     IBM FC 2105F20
hdisk18 Available 10-80-01     IBM FC 2105F20
hdisk19 Available 10-80-01     IBM FC 2105F20
hdisk20 Available 10-80-01     IBM FC 2105F20
hdisk21 Available 10-80-01     IBM FC 2105F20
hdisk22 Available 10-80-01     IBM FC 2105F20
hdisk23 Available 10-80-01     IBM FC 2105F20
hdisk24 Available 10-80-01     IBM FC 2105F20
hdisk25 Available 10-80-01     IBM FC 2105F20
hdisk26 Available 10-80-01     IBM FC 2105F20
hdisk27 Available 10-80-01     IBM FC 2105F20
hdisk28 Available 10-80-01     IBM FC 2105F20
hdisk29 Available 10-80-01     IBM FC 2105F20
```

```
hdisk30 Available 10-80-01     IBM FC 2105F20
hdisk31 Available 10-80-01     IBM FC 2105F20
hdisk32 Available 10-80-01     IBM FC 2105F20
hdisk33 Available 10-80-01     IBM FC 2105F20
hdisk34 Available 10-80-01     IBM FC 2105F20
hdisk35 Available 10-80-01     IBM FC 2105F20
hdisk36 Available 20-58-01     IBM FC 2105F20
hdisk37 Available 20-58-01     IBM FC 2105F20
hdisk38 Available 20-58-01     IBM FC 2105F20
hdisk39 Available 20-58-01     IBM FC 2105F20
hdisk40 Available 20-58-01     IBM FC 2105F20
hdisk41 Available 20-58-01     IBM FC 2105F20
hdisk42 Available 20-58-01     IBM FC 2105F20
hdisk43 Available 20-58-01     IBM FC 2105F20
hdisk44 Available 20-58-01     IBM FC 2105F20
hdisk45 Available 20-58-01     IBM FC 2105F20
hdisk46 Available 20-58-01     IBM FC 2105F20
hdisk47 Available 20-58-01     IBM FC 2105F20
hdisk48 Available 20-58-01     IBM FC 2105F20
hdisk49 Available 20-58-01     IBM FC 2105F20
hdisk50 Available 20-58-01     IBM FC 2105F20
hdisk51 Available 20-58-01     IBM FC 2105F20
hdisk52 Available 20-58-01     IBM FC 2105F20
hdisk53 Available 20-58-01     IBM FC 2105F20
hdisk54 Available 20-58-01     IBM FC 2105F20
hdisk55 Available 20-58-01     IBM FC 2105F20
hdisk56 Available 20-58-01     IBM FC 2105F20
hdisk57 Available 20-58-01     IBM FC 2105F20
hdisk58 Available 20-58-01     IBM FC 2105F20
hdisk59 Available 20-58-01     IBM FC 2105F20
hdisk60 Available 20-58-01     IBM FC 2105F20
hdisk61 Available 20-58-01     IBM FC 2105F20
hdisk62 Available 20-58-01     IBM FC 2105F20
hdisk63 Available 20-58-01     IBM FC 2105F20
hdisk64 Available 20-58-01     IBM FC 2105F20
hdisk65 Available 20-58-01     IBM FC 2105F20
hdisk66 Available 20-58-01     IBM FC 2105F20
hdisk67 Available 20-58-01     IBM FC 2105F20
```

If your output says “Other SCSI disk” (similar to the following),

```
hdisk26 Available 10-80-01     Other SCSI Disk Drive
hdisk27 Available 10-80-01     Other SCSI Disk Drive
hdisk28 Available 10-80-01     Other SCSI Disk Drive
hdisk29 Available 10-80-01     Other SCSI Disk Drive
hdisk30 Available 10-80-01     Other SCSI Disk Drive
hdisk31 Available 10-80-01     Other SCSI Disk Drive
```

instead of “IBM 2105F20” (or something similar), then you have not successfully completed the installation of the IBM 2105 software and/or your disk connectivity needs more work.

## 1.7 Install Data Path Optimizer Code

Install the fileset "dpo.ibmssd.rte.432". In a SP environment, you may want to do the following:

```
dsh –av mount cws:/spdata/sys1/install/aix433/lppsource  /mnt
vi /tmp/install.dpo # Put in the few lines below.
chmod 700 /tmp/install.dpo
pcp –av –p /tmp/install.dpo
dsh –av /tmp/install.dpo
```

```
#!/bin/ksh
##################################################
# First, mount the lppsource to /mnt
# mount wcws:/spdata/sys1/install/aix433/lppsource /mnt
# You may want to "dsh" the mount command.
##################################################

JOB="${0##*/}"
mkdir /tmp/joblog 2>/dev/null
JOBLOG=/tmp/joblog/${JOB}.joblog
{
      InputDir="/mnt"
      FileSet="dpo.ibmssd.rte.432"
      /usr/sbin/installp -acgNqQwXd ${InputDir} ${FileSet}
}  2>&1 | tee ${JOBLOG}    #Review the output and save it for
later review
```

Sample lslpp output:

***lslpp -l dpo.ibmssd.rte.432***

```
  Fileset                      Level  State      Description
  ----------------------------------------------------------------------------
Path: /usr/lib/objrepos
  dpo.ibmssd.rte.432         1.2.0.0  COMMITTED  IBM Subsystem Device Driver
                                                 runtime for AIX V432

Path: /etc/objrepos
  dpo.ibmssd.rte.432         1.2.0.0  COMMITTED  IBM Subsystem Device Driver
                                                 runtime for AIX V432
```

NOTE: The new "IBM Subsystem Device Driver (SDD)" code is the old DPO with the same fileset name, but with a new revision. If you were familiar with the old DPO, then most things should look familiar to you!

### 1.8 Run cfgmgr –v

Your disk drives should be recognized as ESS disk drives at this point. Now, you will configure your DPO devices (vpath devices) to take advantage of Data Path Optimizer.

***dsh –av cfgmgr -v***

In case you missed this note above, I am repeating it!

**NOTE: There is an undocumented option on cfgmgr in AIX 4.3.3 (At least it's not in the man pages). The –S option will run cfgmgr serially!** Although you would not want to twin-tail and use DPO, since that is not supported at the time of this document's creating, you should know that cfgmgr in AIX 4.3.3 runs in parallel down each SCSI adapter. Therefore, since the second SCSI adapter could finish earlier than your first SCSI adapter, your disk drives may be in a weird order. This is usually not a big deal, unless you are doing a rollout of lots of machines that should look exactly alike, or UNLESS you are twin tailing and you want the hdisk numbers to be in the same order on each machine. In order to force the disk drives to be configured in the order of the scsi adapters, you can remove all of the disk drives and run "cfgmgr –S".

Afterwards, run the following command:

***lsdev –Ccdisk***

```
hdisk0  Available 10-68-00-0,0 16 Bit LVD SCSI Disk Drive
hdisk1  Available 10-68-00-1,0 16 Bit LVD SCSI Disk Drive
hdisk2  Available 10-68-00-2,0 16 Bit LVD SCSI Disk Drive
hdisk3  Available 10-68-00-3,0 16 Bit LVD SCSI Disk Drive
hdisk4  Available 10-80-01     IBM FC 2105F20
hdisk5  Available 10-80-01     IBM FC 2105F20
hdisk6  Available 10-80-01     IBM FC 2105F20
hdisk7  Available 10-80-01     IBM FC 2105F20
hdisk8  Available 10-80-01     IBM FC 2105F20
hdisk9  Available 10-80-01     IBM FC 2105F20
hdisk10 Available 10-80-01     IBM FC 2105F20
hdisk11 Available 10-80-01     IBM FC 2105F20
hdisk12 Available 10-80-01     IBM FC 2105F20
hdisk13 Available 10-80-01     IBM FC 2105F20
hdisk14 Available 10-80-01     IBM FC 2105F20
hdisk15 Available 10-80-01     IBM FC 2105F20
hdisk16 Available 10-80-01     IBM FC 2105F20
hdisk17 Available 10-80-01     IBM FC 2105F20
hdisk18 Available 10-80-01     IBM FC 2105F20
hdisk19 Available 10-80-01     IBM FC 2105F20
```

```
hdisk20 Available 10-80-01     IBM FC 2105F20
hdisk21 Available 10-80-01     IBM FC 2105F20
hdisk22 Available 10-80-01     IBM FC 2105F20
hdisk23 Available 10-80-01     IBM FC 2105F20
hdisk24 Available 10-80-01     IBM FC 2105F20
hdisk25 Available 10-80-01     IBM FC 2105F20
hdisk26 Available 10-80-01     IBM FC 2105F20
hdisk27 Available 10-80-01     IBM FC 2105F20
hdisk28 Available 10-80-01     IBM FC 2105F20
hdisk29 Available 10-80-01     IBM FC 2105F20
hdisk30 Available 10-80-01     IBM FC 2105F20
hdisk31 Available 10-80-01     IBM FC 2105F20
hdisk32 Available 10-80-01     IBM FC 2105F20
hdisk33 Available 10-80-01     IBM FC 2105F20
hdisk34 Available 10-80-01     IBM FC 2105F20
hdisk35 Available 10-80-01     IBM FC 2105F20
hdisk36 Available 20-58-01     IBM FC 2105F20
hdisk37 Available 20-58-01     IBM FC 2105F20
hdisk38 Available 20-58-01     IBM FC 2105F20
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hdisk43 Available 20-58-01     IBM FC 2105F20
hdisk44 Available 20-58-01     IBM FC 2105F20
hdisk45 Available 20-58-01     IBM FC 2105F20
hdisk46 Available 20-58-01     IBM FC 2105F20
hdisk47 Available 20-58-01     IBM FC 2105F20
hdisk48 Available 20-58-01     IBM FC 2105F20
hdisk49 Available 20-58-01     IBM FC 2105F20
hdisk50 Available 20-58-01     IBM FC 2105F20
hdisk51 Available 20-58-01     IBM FC 2105F20
hdisk52 Available 20-58-01     IBM FC 2105F20
hdisk53 Available 20-58-01     IBM FC 2105F20
hdisk54 Available 20-58-01     IBM FC 2105F20
hdisk55 Available 20-58-01     IBM FC 2105F20
hdisk56 Available 20-58-01     IBM FC 2105F20
hdisk57 Available 20-58-01     IBM FC 2105F20
hdisk58 Available 20-58-01     IBM FC 2105F20
hdisk59 Available 20-58-01     IBM FC 2105F20
hdisk60 Available 20-58-01     IBM FC 2105F20
hdisk61 Available 20-58-01     IBM FC 2105F20
hdisk62 Available 20-58-01     IBM FC 2105F20
hdisk63 Available 20-58-01     IBM FC 2105F20
hdisk64 Available 20-58-01     IBM FC 2105F20
hdisk65 Available 20-58-01     IBM FC 2105F20
hdisk66 Available 20-58-01     IBM FC 2105F20
hdisk67 Available 20-58-01     IBM FC 2105F20
vpath0  Available              Data Path Optimizer Pseudo Device Driver
vpath1  Available              Data Path Optimizer Pseudo Device Driver
vpath2  Available              Data Path Optimizer Pseudo Device Driver
vpath3  Available              Data Path Optimizer Pseudo Device Driver
vpath4  Available              Data Path Optimizer Pseudo Device Driver
vpath5  Available              Data Path Optimizer Pseudo Device Driver
vpath6  Available              Data Path Optimizer Pseudo Device Driver
vpath7  Available              Data Path Optimizer Pseudo Device Driver
vpath8  Available              Data Path Optimizer Pseudo Device Driver
```

```
vpath9  Available             Data Path Optimizer Pseudo Device Driver
vpath10 Available             Data Path Optimizer Pseudo Device Driver
vpath11 Available             Data Path Optimizer Pseudo Device Driver
vpath12 Available             Data Path Optimizer Pseudo Device Driver
vpath13 Available             Data Path Optimizer Pseudo Device Driver
vpath14 Available             Data Path Optimizer Pseudo Device Driver
vpath15 Available             Data Path Optimizer Pseudo Device Driver
vpath16 Available             Data Path Optimizer Pseudo Device Driver
vpath17 Available             Data Path Optimizer Pseudo Device Driver
vpath18 Available             Data Path Optimizer Pseudo Device Driver
vpath19 Available             Data Path Optimizer Pseudo Device Driver
vpath20 Available             Data Path Optimizer Pseudo Device Driver
vpath21 Available             Data Path Optimizer Pseudo Device Driver
vpath22 Available             Data Path Optimizer Pseudo Device Driver
vpath23 Available             Data Path Optimizer Pseudo Device Driver
vpath24 Available             Data Path Optimizer Pseudo Device Driver
vpath25 Available             Data Path Optimizer Pseudo Device Driver
vpath26 Available             Data Path Optimizer Pseudo Device Driver
vpath27 Available             Data Path Optimizer Pseudo Device Driver
vpath28 Available             Data Path Optimizer Pseudo Device Driver
vpath29 Available             Data Path Optimizer Pseudo Device Driver
vpath30 Available             Data Path Optimizer Pseudo Device Driver
vpath31 Available             Data Path Optimizer Pseudo Device Driver
```

For this particular machine, I had 4 internal SCSI drives, and 32 usable external IBM ESS drives. You will notice that each of those 32 drives is visible down the 10-80 Fiber path and down the 20-58 path.

***lsdev –C –t df1000f7***

```
fcs0 Available 10-80 FC Adapter
fcs1 Available 20-58 FC Adapter
```

The “vpath” devices can see the disk drives down both interfaces. In this case, I will use vpath0 through vpath15 for volume group creation.

NOTE: To just see the vpath devices, run the command “lsdev –Ctvpath”.

***lsdev –Ctvpath***

```
vpath0  Available  Data Path Optimizer Pseudo Device Driver
vpath1  Available  Data Path Optimizer Pseudo Device Driver
vpath2  Available  Data Path Optimizer Pseudo Device Driver
vpath3  Available  Data Path Optimizer Pseudo Device Driver
vpath4  Available  Data Path Optimizer Pseudo Device Driver
vpath5  Available  Data Path Optimizer Pseudo Device Driver
vpath6  Available  Data Path Optimizer Pseudo Device Driver
```

```
vpath7  Available  Data Path Optimizer Pseudo Device Driver
vpath8  Available  Data Path Optimizer Pseudo Device Driver
vpath9  Available  Data Path Optimizer Pseudo Device Driver
vpath10 Available  Data Path Optimizer Pseudo Device Driver
vpath11 Available  Data Path Optimizer Pseudo Device Driver
vpath12 Available  Data Path Optimizer Pseudo Device Driver
vpath13 Available  Data Path Optimizer Pseudo Device Driver
vpath14 Available  Data Path Optimizer Pseudo Device Driver
vpath15 Available  Data Path Optimizer Pseudo Device Driver
vpath16 Available  Data Path Optimizer Pseudo Device Driver
vpath17 Available  Data Path Optimizer Pseudo Device Driver
vpath18 Available  Data Path Optimizer Pseudo Device Driver
vpath19 Available  Data Path Optimizer Pseudo Device Driver
vpath20 Available  Data Path Optimizer Pseudo Device Driver
vpath21 Available  Data Path Optimizer Pseudo Device Driver
vpath22 Available  Data Path Optimizer Pseudo Device Driver
vpath23 Available  Data Path Optimizer Pseudo Device Driver
vpath24 Available  Data Path Optimizer Pseudo Device Driver
vpath25 Available  Data Path Optimizer Pseudo Device Driver
vpath26 Available  Data Path Optimizer Pseudo Device Driver
vpath27 Available  Data Path Optimizer Pseudo Device Driver
vpath28 Available  Data Path Optimizer Pseudo Device Driver
vpath29 Available  Data Path Optimizer Pseudo Device Driver
vpath30 Available  Data Path Optimizer Pseudo Device Driver
vpath31 Available  Data Path Optimizer Pseudo Device Driver
```

## 1.9 Check the status of your disk drives

In order to check on your disk drives, log into a node and run the following command:

***datapath query device***

```
Total Devices : 32


DEV#:   0  DEVICE NAME: vpath0  TYPE: 2105F20   SERIAL: 60D15244
===========================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                  fscsi0/hdisk4     OPEN   NORMAL       7606          0
    1                 fscsi1/hdisk36     OPEN   NORMAL       7665          0

DEV#:   1  DEVICE NAME: vpath1  TYPE: 2105F20   SERIAL: 60E15244
===========================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                  fscsi0/hdisk5     OPEN   NORMAL       7659          0
    1                 fscsi1/hdisk37     OPEN   NORMAL       7612          0

DEV#:   2  DEVICE NAME: vpath2  TYPE: 2105F20   SERIAL: 60F15244
===========================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                  fscsi0/hdisk6     OPEN   NORMAL       7543          0
    1                 fscsi1/hdisk38     OPEN   NORMAL       7728          0

DEV#:   3  DEVICE NAME: vpath3  TYPE: 2105F20   SERIAL: 61015244
===========================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                  fscsi0/hdisk7     OPEN   NORMAL       7688          0
    1                 fscsi1/hdisk39     OPEN   NORMAL       7583          0

DEV#:   4  DEVICE NAME: vpath4  TYPE: 2105F20   SERIAL: 61115244
===========================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                  fscsi0/hdisk8     OPEN   NORMAL       7592          0
    1                 fscsi1/hdisk40     OPEN   NORMAL       7679          0

DEV#:   5  DEVICE NAME: vpath5  TYPE: 2105F20   SERIAL: 40C15244
===========================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                  fscsi0/hdisk9     OPEN   NORMAL        964          0
    1                 fscsi1/hdisk41     OPEN   NORMAL        973          0

DEV#:   6  DEVICE NAME: vpath6  TYPE: 2105F20   SERIAL: 40D15244
===========================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk10     OPEN   NORMAL        959          0
    1                 fscsi1/hdisk42     OPEN   NORMAL        978          0

DEV#:   7  DEVICE NAME: vpath7  TYPE: 2105F20   SERIAL: 40E15244
===========================================================
```

```
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk11     OPEN   NORMAL        999          0
    1                 fscsi1/hdisk43     OPEN   NORMAL        938          0

DEV#:   8  DEVICE NAME: vpath8  TYPE: 2105F20   SERIAL: 40F15244
============================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk12     OPEN   NORMAL        995          0
    1                 fscsi1/hdisk44     OPEN   NORMAL        942          0

DEV#:   9  DEVICE NAME: vpath9  TYPE: 2105F20   SERIAL: 41015244
============================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk13     OPEN   NORMAL        971          0
    1                 fscsi1/hdisk45     OPEN   NORMAL        966          0

DEV#:  10  DEVICE NAME: vpath10  TYPE: 2105F20   SERIAL: 41115244
============================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk14     OPEN   NORMAL        947          0
    1                 fscsi1/hdisk46     OPEN   NORMAL        964          0

DEV#:  11  DEVICE NAME: vpath11  TYPE: 2105F20   SERIAL: 70B15244
============================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk15     OPEN   NORMAL        973          0
    1                 fscsi1/hdisk47     OPEN   NORMAL        938          0

DEV#:  12  DEVICE NAME: vpath12  TYPE: 2105F20   SERIAL: 70C15244
============================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk16     OPEN   NORMAL        947          0
    1                 fscsi1/hdisk48     OPEN   NORMAL        964          0

DEV#:  13  DEVICE NAME: vpath13  TYPE: 2105F20   SERIAL: 70D15244
============================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk17     OPEN   NORMAL        970          0
    1                 fscsi1/hdisk49     OPEN   NORMAL        941          0

DEV#:  14  DEVICE NAME: vpath14  TYPE: 2105F20   SERIAL: 70E15244
============================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk18     OPEN   NORMAL        994          0
    1                 fscsi1/hdisk50     OPEN   NORMAL        917          0

DEV#:  15  DEVICE NAME: vpath15  TYPE: 2105F20   SERIAL: 20C15244
============================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk19     OPEN   NORMAL        925          0
    1                 fscsi1/hdisk51     OPEN   NORMAL        986          0

DEV#:  16  DEVICE NAME: vpath16  TYPE: 2105F20   SERIAL: 20D15244
============================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk20     OPEN   NORMAL        956          0
    1                 fscsi1/hdisk52     OPEN   NORMAL        955          0
```

```
DEV#:  17  DEVICE NAME: vpath17  TYPE: 2105F20   SERIAL: 20E15244
===========================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk21     OPEN   NORMAL        983          0
    1                 fscsi1/hdisk53     OPEN   NORMAL        928          0

DEV#:  18  DEVICE NAME: vpath18  TYPE: 2105F20   SERIAL: 50B15244
===========================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk22     OPEN   NORMAL        929          0
    1                 fscsi1/hdisk54     OPEN   NORMAL        982          0

DEV#:  19  DEVICE NAME: vpath19  TYPE: 2105F20   SERIAL: 50C15244
===========================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk23     OPEN   NORMAL        930          0
    1                 fscsi1/hdisk55     OPEN   NORMAL        981          0

DEV#:  20  DEVICE NAME: vpath20  TYPE: 2105F20   SERIAL: 50D15244
===========================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk24     OPEN   NORMAL        984          0
    1                 fscsi1/hdisk56     OPEN   NORMAL        953          0

DEV#:  21  DEVICE NAME: vpath21  TYPE: 2105F20   SERIAL: 00C15244
===========================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk25     OPEN   NORMAL        981          0
    1                 fscsi1/hdisk57     OPEN   NORMAL        956          0

DEV#:  22  DEVICE NAME: vpath22  TYPE: 2105F20   SERIAL: 00D15244
===========================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk26     OPEN   NORMAL        960          0
    1                 fscsi1/hdisk58     OPEN   NORMAL        977          0

DEV#:  23  DEVICE NAME: vpath23  TYPE: 2105F20   SERIAL: 00E15244
===========================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk27     OPEN   NORMAL        967          0
    1                 fscsi1/hdisk59     OPEN   NORMAL        970          0

DEV#:  24  DEVICE NAME: vpath24  TYPE: 2105F20   SERIAL: 30C15244
===========================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk28     OPEN   NORMAL        960          0
    1                 fscsi1/hdisk60     OPEN   NORMAL        977          0

DEV#:  25  DEVICE NAME: vpath25  TYPE: 2105F20   SERIAL: 30D15244
===========================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk29     OPEN   NORMAL        965          0
    1                 fscsi1/hdisk61     OPEN   NORMAL        972          0

DEV#:  26  DEVICE NAME: vpath26  TYPE: 2105F20   SERIAL: 30E15244
===========================================================
```

```
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk30     OPEN   NORMAL        968          0
    1                 fscsi1/hdisk62     OPEN   NORMAL        969          0

DEV#:  27  DEVICE NAME: vpath27  TYPE: 2105F20   SERIAL: 10915244
===========================================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk31     OPEN   NORMAL        962          0
    1                 fscsi1/hdisk63     OPEN   NORMAL        975          0

DEV#:  28  DEVICE NAME: vpath28  TYPE: 2105F20   SERIAL: 10A15244
===========================================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk32     OPEN   NORMAL        971          0
    1                 fscsi1/hdisk64     OPEN   NORMAL        966          0

DEV#:  29  DEVICE NAME: vpath29  TYPE: 2105F20   SERIAL: 10B15244
===========================================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk33     OPEN   NORMAL       1002          0
    1                 fscsi1/hdisk65     OPEN   NORMAL        935          0

DEV#:  30  DEVICE NAME: vpath30  TYPE: 2105F20   SERIAL: 10C15244
===========================================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk34     OPEN   NORMAL       5400          0
    1                 fscsi1/hdisk66     OPEN   NORMAL       5409          0

DEV#:  31  DEVICE NAME: vpath31  TYPE: 2105F20   SERIAL: 10D15244
===========================================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk35     OPEN   NORMAL        672          0
    1                 fscsi1/hdisk67     OPEN   NORMAL        657          0
```

The following command will show what hdisk devices can be seen down the vpath devices.

***lsvpcfg***

```
vpath0 (Avail pv f1n9100vg) 60D15244 = hdisk4 (Avail ) hdisk36 (Avail )
vpath1 (Avail pv f1n9101vg) 60E15244 = hdisk5 (Avail ) hdisk37 (Avail )
vpath2 (Avail pv f1n9102vg) 60F15244 = hdisk6 (Avail ) hdisk38 (Avail )
vpath3 (Avail pv f1n9103vg) 61015244 = hdisk7 (Avail ) hdisk39 (Avail )
vpath4 (Avail pv f1n9104vg) 61115244 = hdisk8 (Avail ) hdisk40 (Avail )
vpath5 (Avail pv f1n9100vg) 40C15244 = hdisk9 (Avail ) hdisk41 (Avail )
vpath6 (Avail pv f1n9101vg) 40D15244 = hdisk10 (Avail ) hdisk42 (Avail )
vpath7 (Avail pv f1n9102vg) 40E15244 = hdisk11 (Avail ) hdisk43 (Avail )
vpath8 (Avail pv f1n9103vg) 40F15244 = hdisk12 (Avail ) hdisk44 (Avail )
vpath9 (Avail pv f1n9104vg) 41015244 = hdisk13 (Avail ) hdisk45 (Avail )
vpath10 (Avail pv f1n9100vg) 41115244 = hdisk14 (Avail ) hdisk46 (Avail )
vpath11 (Avail pv f1n9101vg) 70B15244 = hdisk15 (Avail ) hdisk47 (Avail )
vpath12 (Avail pv f1n9102vg) 70C15244 = hdisk16 (Avail ) hdisk48 (Avail )
vpath13 (Avail pv f1n9103vg) 70D15244 = hdisk17 (Avail ) hdisk49 (Avail )
```

```
vpath14 (Avail pv f1n9104vg) 70E15244 = hdisk18 (Avail ) hdisk50 (Avail )
vpath15 (Avail pv f1n9100vg) 20C15244 = hdisk19 (Avail ) hdisk51 (Avail )
vpath16 (Avail pv f1n9101vg) 20D15244 = hdisk20 (Avail ) hdisk52 (Avail )
vpath17 (Avail pv f1n9102vg) 20E15244 = hdisk21 (Avail ) hdisk53 (Avail )
vpath18 (Avail pv f1n9103vg) 50B15244 = hdisk22 (Avail ) hdisk54 (Avail )
vpath19 (Avail pv f1n9104vg) 50C15244 = hdisk23 (Avail ) hdisk55 (Avail )
vpath20 (Avail pv f1n9100vg) 50D15244 = hdisk24 (Avail ) hdisk56 (Avail )
vpath21 (Avail pv f1n9101vg) 00C15244 = hdisk25 (Avail ) hdisk57 (Avail )
vpath22 (Avail pv f1n9102vg) 00D15244 = hdisk26 (Avail ) hdisk58 (Avail )
vpath23 (Avail pv f1n9103vg) 00E15244 = hdisk27 (Avail ) hdisk59 (Avail )
vpath24 (Avail pv f1n9104vg) 30C15244 = hdisk28 (Avail ) hdisk60 (Avail )
vpath25 (Avail pv f1n9100vg) 30D15244 = hdisk29 (Avail ) hdisk61 (Avail )
vpath26 (Avail pv f1n9101vg) 30E15244 = hdisk30 (Avail ) hdisk62 (Avail )
vpath27 (Avail pv f1n9102vg) 10915244 = hdisk31 (Avail ) hdisk63 (Avail )
vpath28 (Avail pv f1n9103vg) 10A15244 = hdisk32 (Avail ) hdisk64 (Avail )
vpath29 (Avail pv f1n9104vg) 10B15244 = hdisk33 (Avail ) hdisk65 (Avail )
vpath30 (Avail pv f1n9105vg) 10C15244 = hdisk34 (Avail ) hdisk66 (Avail )
vpath31 (Avail pv f1n9105vg) 10D15244 = hdisk35 (Avail ) hdisk67 (Avail )
```

# Section 2: Possible Gotcha

At this installation, we installed three IBM 2105 ESS machines. Although we did not run into any hardware problems, you may. When debugging, you may want to delete all of your ESS disk drives and vpath devices. Be careful.

## 2.1 How to Dig Yourself into a Hole

After you have successfully installed Data Path Optimizer and created a volume group (or anything else that creates PVIDs), you may fall into a trap. Suppose that you do the following:

Let's say that for some reason you are doing some testing and you discover that you need to remove all of your external disk devices. First, you umount all of your filesystems and varyoff all of your volume groups. Then, you run "rmdev –dl devicename" on all of your external hdisk devices and your vpath devices.

When you finish your testing, you run "cfgmgr" to get your disk drives back.

With many disk configurations, this will get you back to your original disk configuration. Oops, you are not running those configurations. You should be careful if you are running SDD / DPO or some other vendors "load balancing" solution in an AIX environment to make sure that you are able to see the underlying hdisks below the "load balancing" disk definitions. This challenge is NOT unique to SDD / DPO.

## 2.2 Why You are in this Hole

1) When you first created your vpath devices, "***datapath query device"*** should show two paths (or more) to each of your vpath devices.

```
lspv
```

```
hdisk34         none                 None
hdisk35         none                 None
hdisk66         none                 None
hdisk67         none                 None
vpath30         00014310cb8bbba7     f1n9105vg
vpath31         00014310cb8bc184     f1n9105vg
```

The above just shows the drives of interest!
A couple of things to note! One, the "hdisk" devices show "none" in the PVID field. The PVIDs for these hdisks are deleted from the ODM database when the "***mkvg4vp***" DPO command is used to create a DPO volume group or the "***extendvg4vp***" DPO command is used to extend an existing DPO volume group with DPO physical volumes. Two, the "vpath" devices DO have PVIDs.

2) Then, you remove all of the hdisk and vpath devices.
(You may do this if you are doing some troubleshooting.)

3) Then you run cfgmgr (this is usually the most sensible way to get your drives back.)

First, you walk fcs0, and you find hdisk34 as PVID 00014310cb8bbba7. I believe that cfgmgr defaults to "pvid=yes" for all new hdisks. Then, you walk fcs1, and you find PVID 00014310cb8bbba7. Well, the "cfgmgr" program is smart enough to know that the original PVID belongs to hdisk34, so the program will NOT configure hdisk67.

After "cfgmgr" configures the hdisks, it will then configure the vpath devices, with only one path to the disk, since there is NOT an hdisk66 to provide an alternate path to the disk drive.

If this happens, then you will still see the vpath devices, but you will not be protected against a fiber adapter failure and you will not get any load balancing, since Data Path Optimizer will only know about the path via fcs0.

In order to get your load balancing features and redundant path features, you will need to proceed with the next chapter.

# Section 3: DPO Recovery from PVID Issues

If you find that "***datapath query device"*** only shows one path to your vpath device, or you have PVIDs on the hdisk devices that are associated with your vpath devices, then you need to be here. Although other combinations may work, this is the combination of commands that I have found to clear up any PVID confusion and get DPO back on track.

Also, if you want to add paths to your DPO devices, then you should follow the steps in this chapter. For example, you currently have two SCSI adapters going to the ESS, and you wish to add a third SCSI adapter for greater redundancy or greater throughput, then you can follow the steps in this chapter.

NOTE: The key to this magic is to get AIX to recognize that there is an hdisk on each of the SCSI paths. If AIX cannot determine the true identity (PVID) of this drive, then AIX thinks that the drive on the 30-70 path and the drive on the 30-68 path are different drives. IBM Data Path Optimizer is counting on this behavior. IBM Data Path Optimizer looks at the SCSI LUNS and who knows what else to determine that the drives are really the same drives, and then configures a logical device (vpath#) on top of the two hdisks to provide load balancing and an alternate path to the single disk drive.

## NOTE THAT THE FOLLOWING STEPS REQUIRE DOWN TIME! ALSO NOTE THAT YOU SHOULD BE PROFICIENT IN AIX BEFORE USING THE FOLLOWING PROCEDURES.

Back to the meat of the matter. In order to recover from wherever you are in SSD/DPO land, try the following steps:

### 3.1 Get a list of volume groups on your vpath devices

You may already know what volume groups are on the vpath disk drives, or you can try the lspv command. The following is an example of lspv output when the drives are OK. If you do not have any hdisks or vpath devices, and you do not know the volume groups that were on the disk drives, then skip this step, and hopefully you can figure this out later.

This list will be used in a few of the future steps, so if you figure this out in a later step, then save the list.

***lspv***

```
hdisk0          0001463813cb05e1    rootvg
hdisk1          000143109e546712    rootvg
hdisk2          none                None
hdisk3          none                None
hdisk4          none                None
hdisk5          none                None
hdisk6          none                None
hdisk7          none                None
hdisk8          none                None
hdisk9          none                None
hdisk10         none                None
hdisk11         none                None
hdisk12         none                None
hdisk13         none                None
hdisk14         none                None
hdisk15         none                None
hdisk16         none                None
hdisk17         none                None
hdisk18         none                None
hdisk19         none                None
hdisk20         none                None
hdisk21         none                None
hdisk22         none                None
hdisk23         none                None
hdisk24         none                None
hdisk25         none                None
hdisk26         none                None
hdisk27         none                None
hdisk28         none                None
hdisk29         none                None
hdisk30         none                None
hdisk31         none                None
hdisk32         none                None
hdisk33         none                None
hdisk34         none                None
hdisk35         none                None
hdisk36         none                None
hdisk37         none                None
hdisk38         none                None
hdisk39         none                None
hdisk40         none                None
hdisk41         none                None
hdisk42         none                None
hdisk43         none                None
hdisk44         none                None
hdisk45         none                None
hdisk46         none                None
hdisk47         none                None
hdisk48         none                None
hdisk49         none                None
hdisk50         none                None
hdisk51         none                None
hdisk52         none                None
```

```
hdisk53         none                None
hdisk54         none                None
hdisk55         none                None
hdisk56         none                None
hdisk57         none                None
hdisk58         none                None
hdisk59         none                None
hdisk60         none                None
hdisk61         none                None
hdisk62         none                None
hdisk63         none                None
hdisk64         none                None
hdisk65         none                None
hdisk66         none                None
hdisk67         none                None
vpath0          00014310cb8b0b60    f1n9100vg
vpath1          00014310cb8b1153    f1n9101vg
vpath2          00014310cb8b16d5    f1n9102vg
vpath3          00014310cb8b1c94    f1n9103vg
vpath4          00014310cb8b22e3    f1n9104vg
vpath5          00014310cb8b28bf    f1n9100vg
vpath6          00014310cb8b2eaf    f1n9101vg
vpath7          00014310cb8b3495    f1n9102vg
vpath8          00014310cb8b3aad    f1n9103vg
vpath9          00014310cb8b40a4    f1n9104vg
vpath10         00014310cb8b4683    f1n9100vg
vpath11         00014310cb8b4c64    f1n9101vg
vpath12         00014310cb8b5210    f1n9102vg
vpath13         00014310cb8b580c    f1n9103vg
vpath14         00014310cb8b5de8    f1n9104vg
vpath15         00014310cb8b63b1    f1n9100vg
vpath16         00014310cb8b6970    f1n9101vg
vpath17         00014310cb8b6f69    f1n9102vg
vpath18         00014310cb8b7564    f1n9103vg
vpath19         00014310cb8b7b71    f1n9104vg
vpath20         00014310cb8b8155    f1n9100vg
vpath21         00014310cb8b8749    f1n9101vg
vpath22         00014310cb8b8d0d    f1n9102vg
vpath23         00014310cb8b92d4    f1n9103vg
vpath24         00014310cb8b98a8    f1n9104vg
vpath25         00014310cb8b9e9b    f1n9100vg
vpath26         00014310cb8ba476    f1n9101vg
vpath27         00014310cb8baa45    f1n9102vg
vpath28         00014310cb8bb00e    f1n9103vg
vpath29         00014310cb8bb5fe    f1n9104vg
vpath30         00014310cb8bbba7    f1n9105vg
vpath31         00014310cb8bc184    f1n9105vg
```

NOTE: In this case, the volume group list consists of several volume groups. Also, note that this is the desired output that we are working towards. You will see the list go from good, to bad, to better, to the above configuration.

## 3.2 Run "vp2hd" on Each Volume Group

NOTE: For each volume group, the filesystems have to be unmounted (and all raw logical volumes need to be closed) before running vp2hd. If not, you will get a message similar to the following:

***/usr/sbin/vp2hd f1n9105vg***

```
f1n9105vg
Please unmount following filesystems from f1n9105vg before run this program.
 /var/dce
```

In order to umount the filesystems, I have written a short script, named "fsoff.vg". It looks as follows:

```
#!/bin/ksh
lsvg -l ${1} | tail +3 | awk '{print $7}'|grep -v "N/A" | xargs -i umount {}
```

***/home/sysadm/ESS/fsoff.vg f1n9105vg***

Then, you can run the vp2hd for each volume group.

***/usr/sbin/vp2hd f1n9100vg***
***/usr/sbin/vp2hd f1n9101vg***
***/usr/sbin/vp2hd f1n9102vg***
***/usr/sbin/vp2hd f1n9103vg***
***/usr/sbin/vp2hd f1n9104vg***
***/usr/sbin/vp2hd f1n9105vg # output for this command below***

```
f1n9105vg
f1n9105vg contains these vpathes and pvids
   00014310cb8bbba7 vpath30
00014310cb8bc184 vpath31

hdisk34 is part of vpath30.
hdisk66 is part of vpath30.
hdisk35 is part of vpath31.
hdisk67 is part of vpath31.
f1n9105vg
Deleting pvid of vpath30 from ODM database
Create hdisk34 pvid of 00014310cb8bbba7 in ODM database.
lname=hdisk34, pvid=00014310cb8bbba7
Create hdisk66 pvid of 00014310cb8bbba7 in ODM database.
lname=hdisk66, pvid=00014310cb8bbba7
Deleting pvid of vpath31 from ODM database
```

```
Create hdisk35 pvid of 00014310cb8bc184 in ODM database.
lname=hdisk35, pvid=00014310cb8bc184
Create hdisk67 pvid of 00014310cb8bc184 in ODM database.
lname=hdisk67, pvid=00014310cb8bc184
varyon f1n9105vg was successful.
f1n9105vg is converted to hdisks successfully!
```

### 3.3 Varyoff the Volume Groups

For each volume group that you listed in step 1, you need to run "varyoffvg vgname".

```
varyoffvg f1n9100vg
varyoffvg f1n9101vg
varyoffvg f1n9102vg
varyoffvg f1n9103vg
varyoffvg f1n9104vg
varyoffvg f1n9105vg
```

### 3.4 OPTIONAL STEP - Add or Remove Hardware or Software

If you want to add additional SCSI adapters to your RS/6000 or SP system, I would do that in this step.

1. Shut the system down.
2. Add the adapters.
3. Boot your system.
4. Do the next step – Remove all hdisk and vpath devices.
5. Continue with the rest of this section.

Also, if you need to install/de-install any SSD/DPO/2105 software, I would do that in this step.

### 3.5 OPTIONAL STEP - Remove all hdisk and vpath devices.

Although you do not have to remove all hdisk and vpath devices, you may find an occasion that you need to or just want to do so. In that case, this is the step where you should do it.

First, remove the vpath devices as follows:

***rmdev –dl dpo –R***

```
vpath0  deleted
vpath1  deleted
vpath2  deleted
vpath3  deleted
vpath4  deleted
vpath5  deleted
vpath6  deleted
vpath7  deleted
vpath8  deleted
vpath9  deleted
vpath10  deleted
vpath11  deleted
vpath12  deleted
vpath13  deleted
vpath14  deleted
vpath15  deleted
vpath16  deleted
vpath17  deleted
vpath18  deleted
vpath19  deleted
vpath20  deleted
vpath21  deleted
```

```
vpath22  deleted

vpath23  deleted

vpath24  deleted

vpath25  deleted

vpath26  deleted

vpath27  deleted

vpath28  deleted

vpath29  deleted

vpath30  deleted

vpath31  deleted

dpo  deleted
```

Then, remove all of the 2105 disk drives. I have written a short script, named "rmdev.2105". It looks as follows:

```
#!/bin/ksh
for d in $(lsdev -Ccdisk|grep "2105"|awk '{print $1}')
do
       rmdev -dl ${d}
done
```

Put this script in your favorite script directory and run it!

***/home/sysadm/ESS/rmdev.2105***

```
hdisk4  deleted

hdisk5  deleted

hdisk6  deleted

hdisk7  deleted

hdisk8  deleted

hdisk9  deleted

hdisk10  deleted

hdisk11  deleted

hdisk12  deleted
```

```
hdisk13  deleted
hdisk14  deleted
hdisk15  deleted
hdisk16  deleted
hdisk17  deleted
hdisk18  deleted
hdisk19  deleted
hdisk20  deleted
hdisk21  deleted
hdisk22  deleted
hdisk23  deleted
hdisk24  deleted
hdisk25  deleted
hdisk26  deleted
hdisk27  deleted
hdisk28  deleted
hdisk29  deleted
hdisk30  deleted
hdisk31  deleted
hdisk32  deleted
hdisk33  deleted
hdisk34  deleted
hdisk35  deleted
hdisk36  deleted
hdisk37  deleted
hdisk38  deleted
hdisk39  deleted
hdisk40  deleted
hdisk41  deleted
```

```
hdisk42  deleted
hdisk43  deleted
hdisk44  deleted
hdisk45  deleted
hdisk46  deleted
hdisk47  deleted
hdisk48  deleted
hdisk49  deleted
hdisk50  deleted
hdisk51  deleted
hdisk52  deleted
hdisk53  deleted
hdisk54  deleted
hdisk55  deleted
hdisk56  deleted
hdisk57  deleted
hdisk58  deleted
hdisk59  deleted
hdisk60  deleted
hdisk61  deleted
hdisk62  deleted
hdisk63  deleted
hdisk64  deleted
hdisk65  deleted
hdisk66  deleted
hdisk67  deleted
```

**3.6 Run cfgmgr “N” times (“N” is the number of paths of a DPO device)**

For this step, you need to run cfgmgr (with the –S option or the –v option or without any options) "N" times, where "N" is the maximum number of SCSI paths that you have to a DPO device. For example, if you have 2 paths to your DPO devices (or ESS) from your RS/6000 or SP node, then you should run cfgmgr twice. If you have 4 paths, you should run cfgmgr four times. In the example, I will show some preliminary output between times. Note that I chose the optional step to remove all of my vpath devices and 2105 hdisk devices also.

***cfgmgr*** ***# The first time.***

```
Method error (/etc/methods/cfglft -l lft0 ):
       0514-032 Cannot perform the requested function because the
                specified device is dependent on another device which does
                not exist.
```

Note that the above method error is fairly common in a SP environment, but will not impact your running system. Your output may be different.

***lspv***

```
hdisk0          0001463813cb05e1    rootvg
hdisk1          000143109e546712    rootvg
hdisk2          none                None
hdisk3          none                None
hdisk4          00014310cb8b7564    f1n9103vg
hdisk5          00014310cb8b7b71    f1n9104vg
hdisk6          00014310cb8b8155    f1n9100vg
hdisk7          00014310cb8b28bf    f1n9100vg
hdisk8          00014310cb8b2eaf    f1n9101vg
hdisk9          00014310cb8b3495    f1n9102vg
hdisk10         00014310cb8b3aad    f1n9103vg
hdisk11         00014310cb8b40a4    f1n9104vg
hdisk12         00014310cb8b4683    f1n9100vg
hdisk13         00014310cb8b4c64    f1n9101vg
hdisk14         00014310cb8b5210    f1n9102vg
hdisk15         00014310cb8b580c    f1n9103vg
hdisk16         00014310cb8b5de8    f1n9104vg
hdisk17         00014310cb8b0b60    f1n9100vg
hdisk18         00014310cb8b1153    f1n9101vg
hdisk19         00014310cb8b16d5    f1n9102vg
hdisk20         00014310cb8b1c94    f1n9103vg
hdisk21         00014310cb8b22e3    f1n9104vg
hdisk22         00014310cb8baa45    f1n9102vg
hdisk23         00014310cb8bb00e    f1n9103vg
hdisk24         00014310cb8bb5fe    f1n9104vg
hdisk25         00014310cb8bbba7    f1n9105vg
hdisk26         00014310cb8bc184    f1n9105vg
hdisk27         00014310cb8b8749    f1n9101vg
hdisk28         00014310cb8b8d0d    f1n9102vg
hdisk29         00014310cb8b92d4    f1n9103vg
hdisk30         00014310cb8b98a8    f1n9104vg
hdisk31         00014310cb8b9e9b    f1n9100vg
hdisk32         00014310cb8ba476    f1n9101vg
```

```
hdisk33         00014310cb8b63b1    f1n9100vg
hdisk34         00014310cb8b6970    f1n9101vg
hdisk35         00014310cb8b6f69    f1n9102vg
vpath0          none                None
vpath1          none                None
vpath2          none                None
vpath3          none                None
vpath4          none                None
vpath5          none                None
vpath6          none                None
vpath7          none                None
vpath8          none                None
vpath9          none                None
vpath10         none                None
vpath11         none                None
vpath12         none                None
vpath13         none                None
vpath14         none                None
vpath15         none                None
vpath16         none                None
vpath17         none                None
vpath18         none                None
vpath19         none                None
vpath20         none                None
vpath21         none                None
vpath22         none                None
vpath23         none                None
vpath24         none                None
vpath25         none                None
vpath26         none                None
vpath27         none                None
vpath28         none                None
vpath29         none                None
vpath30         none                None
vpath31         none                None
```

***lsvpcfg***

```
vpath0 (Avail ) 50B15244 = hdisk4 (Avail pv f1n9103vg)
vpath1 (Avail ) 50C15244 = hdisk5 (Avail pv f1n9104vg)
vpath2 (Avail ) 50D15244 = hdisk6 (Avail pv f1n9100vg)
vpath3 (Avail ) 40C15244 = hdisk7 (Avail pv f1n9100vg)
vpath4 (Avail ) 40D15244 = hdisk8 (Avail pv f1n9101vg)
vpath5 (Avail ) 40E15244 = hdisk9 (Avail pv f1n9102vg)
vpath6 (Avail ) 40F15244 = hdisk10 (Avail pv f1n9103vg)
vpath7 (Avail ) 41015244 = hdisk11 (Avail pv f1n9104vg)
vpath8 (Avail ) 41115244 = hdisk12 (Avail pv f1n9100vg)
vpath9 (Avail ) 70B15244 = hdisk13 (Avail pv f1n9101vg)
vpath10 (Avail ) 70C15244 = hdisk14 (Avail pv f1n9102vg)
vpath11 (Avail ) 70D15244 = hdisk15 (Avail pv f1n9103vg)
vpath12 (Avail ) 70E15244 = hdisk16 (Avail pv f1n9104vg)
vpath13 (Avail ) 60D15244 = hdisk17 (Avail pv f1n9100vg)
vpath14 (Avail ) 60E15244 = hdisk18 (Avail pv f1n9101vg)
vpath15 (Avail ) 60F15244 = hdisk19 (Avail pv f1n9102vg)
vpath16 (Avail ) 61015244 = hdisk20 (Avail pv f1n9103vg)
vpath17 (Avail ) 61115244 = hdisk21 (Avail pv f1n9104vg)
vpath18 (Avail ) 10915244 = hdisk22 (Avail pv f1n9102vg)
vpath19 (Avail ) 10A15244 = hdisk23 (Avail pv f1n9103vg)
vpath20 (Avail ) 10B15244 = hdisk24 (Avail pv f1n9104vg)
vpath21 (Avail ) 10C15244 = hdisk25 (Avail pv f1n9105vg)
vpath22 (Avail ) 10D15244 = hdisk26 (Avail pv f1n9105vg)
vpath23 (Avail ) 00C15244 = hdisk27 (Avail pv f1n9101vg)
vpath24 (Avail ) 00D15244 = hdisk28 (Avail pv f1n9102vg)
vpath25 (Avail ) 00E15244 = hdisk29 (Avail pv f1n9103vg)
vpath26 (Avail ) 30C15244 = hdisk30 (Avail pv f1n9104vg)
vpath27 (Avail ) 30D15244 = hdisk31 (Avail pv f1n9100vg)
vpath28 (Avail ) 30E15244 = hdisk32 (Avail pv f1n9101vg)
vpath29 (Avail ) 20C15244 = hdisk33 (Avail pv f1n9100vg)
vpath30 (Avail ) 20D15244 = hdisk34 (Avail pv f1n9101vg)
vpath31 (Avail ) 20E15244 = hdisk35 (Avail pv f1n9102vg)
```

***datapath query device***

```
Total Devices : 32


DEV#:   0  DEVICE NAME: vpath0  TYPE: 2105F20   SERIAL: 50B15244
==========================================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                  fscsi0/hdisk4    CLOSE   NORMAL          0          0

DEV#:   1  DEVICE NAME: vpath1  TYPE: 2105F20   SERIAL: 50C15244
==========================================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                  fscsi0/hdisk5    CLOSE   NORMAL          0          0

DEV#:   2  DEVICE NAME: vpath2  TYPE: 2105F20   SERIAL: 50D15244
==========================================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
```

```
    0                 fscsi0/hdisk6    CLOSE   NORMAL          0          0


DEV#:   3  DEVICE NAME: vpath3  TYPE: 2105F20   SERIAL: 40C15244
===========================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk7    CLOSE   NORMAL          0          0

DEV#:   4  DEVICE NAME: vpath4  TYPE: 2105F20   SERIAL: 40D15244
===========================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk8    CLOSE   NORMAL          0          0

DEV#:   5  DEVICE NAME: vpath5  TYPE: 2105F20   SERIAL: 40E15244
===========================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk9    CLOSE   NORMAL          0          0

DEV#:   6  DEVICE NAME: vpath6  TYPE: 2105F20   SERIAL: 40F15244
===========================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                fscsi0/hdisk10    CLOSE   NORMAL          0          0

DEV#:   7  DEVICE NAME: vpath7  TYPE: 2105F20   SERIAL: 41015244
===========================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                fscsi0/hdisk11    CLOSE   NORMAL          0          0

DEV#:   8  DEVICE NAME: vpath8  TYPE: 2105F20   SERIAL: 41115244
===========================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                fscsi0/hdisk12    CLOSE   NORMAL          0          0

DEV#:   9  DEVICE NAME: vpath9  TYPE: 2105F20   SERIAL: 70B15244
===========================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                fscsi0/hdisk13    CLOSE   NORMAL          0          0

DEV#:  10  DEVICE NAME: vpath10  TYPE: 2105F20   SERIAL: 70C15244
===========================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                fscsi0/hdisk14    CLOSE   NORMAL          0          0

DEV#:  11  DEVICE NAME: vpath11  TYPE: 2105F20   SERIAL: 70D15244
===========================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                fscsi0/hdisk15    CLOSE   NORMAL          0          0

DEV#:  12  DEVICE NAME: vpath12  TYPE: 2105F20   SERIAL: 70E15244
===========================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                fscsi0/hdisk16    CLOSE   NORMAL          0          0

DEV#:  13  DEVICE NAME: vpath13  TYPE: 2105F20   SERIAL: 60D15244
===========================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                fscsi0/hdisk17    CLOSE   NORMAL          0          0
```

```
DEV#:  14  DEVICE NAME: vpath14  TYPE: 2105F20   SERIAL: 60E15244
===========================================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk18    CLOSE   NORMAL          0          0

DEV#:  15  DEVICE NAME: vpath15  TYPE: 2105F20   SERIAL: 60F15244
===========================================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk19    CLOSE   NORMAL          0          0

DEV#:  16  DEVICE NAME: vpath16  TYPE: 2105F20   SERIAL: 61015244
===========================================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk20    CLOSE   NORMAL          0          0

DEV#:  17  DEVICE NAME: vpath17  TYPE: 2105F20   SERIAL: 61115244
===========================================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk21    CLOSE   NORMAL          0          0

DEV#:  18  DEVICE NAME: vpath18  TYPE: 2105F20   SERIAL: 10915244
===========================================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk22    CLOSE   NORMAL          0          0

DEV#:  19  DEVICE NAME: vpath19  TYPE: 2105F20   SERIAL: 10A15244
===========================================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk23    CLOSE   NORMAL          0          0

DEV#:  20  DEVICE NAME: vpath20  TYPE: 2105F20   SERIAL: 10B15244
===========================================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk24    CLOSE   NORMAL          0          0

DEV#:  21  DEVICE NAME: vpath21  TYPE: 2105F20   SERIAL: 10C15244
===========================================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk25    CLOSE   NORMAL          0          0

DEV#:  22  DEVICE NAME: vpath22  TYPE: 2105F20   SERIAL: 10D15244
===========================================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk26    CLOSE   NORMAL          0          0

DEV#:  23  DEVICE NAME: vpath23  TYPE: 2105F20   SERIAL: 00C15244
===========================================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk27    CLOSE   NORMAL          0          0

DEV#:  24  DEVICE NAME: vpath24  TYPE: 2105F20   SERIAL: 00D15244
===========================================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk28    CLOSE   NORMAL          0          0

DEV#:  25  DEVICE NAME: vpath25  TYPE: 2105F20   SERIAL: 00E15244
===========================================================================
```

```
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk29    CLOSE   NORMAL          0          0

DEV#:  26  DEVICE NAME: vpath26  TYPE: 2105F20   SERIAL: 30C15244
============================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk30    CLOSE   NORMAL          0          0

DEV#:  27  DEVICE NAME: vpath27  TYPE: 2105F20   SERIAL: 30D15244
============================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk31    CLOSE   NORMAL          0          0

DEV#:  28  DEVICE NAME: vpath28  TYPE: 2105F20   SERIAL: 30E15244
============================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk32    CLOSE   NORMAL          0          0

DEV#:  29  DEVICE NAME: vpath29  TYPE: 2105F20   SERIAL: 20C15244
============================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk33    CLOSE   NORMAL          0          0

DEV#:  30  DEVICE NAME: vpath30  TYPE: 2105F20   SERIAL: 20D15244
============================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk34    CLOSE   NORMAL          0          0

DEV#:  31  DEVICE NAME: vpath31  TYPE: 2105F20   SERIAL: 20E15244
============================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk35    CLOSE   NORMAL          0          0
```

***cfgmgr # Second time.***

```
Method error (/etc/methods/cfglft -l lft0 ):
       0514-032 Cannot perform the requested function because the
                specified device is dependent on another device which does
                not exist.
```

***lspv***

```
hdisk0          0001463813cb05e1    rootvg
hdisk1          000143109e546712    rootvg
hdisk2          none                None
hdisk3          none                None
hdisk4          00014310cb8b7564    f1n9103vg
hdisk5          00014310cb8b7b71    f1n9104vg
hdisk6          00014310cb8b8155    f1n9100vg
hdisk7          00014310cb8b28bf    f1n9100vg
hdisk8          00014310cb8b2eaf    f1n9101vg
hdisk9          00014310cb8b3495    f1n9102vg
hdisk10         00014310cb8b3aad    f1n9103vg
hdisk11         00014310cb8b40a4    f1n9104vg
hdisk12         00014310cb8b4683    f1n9100vg
hdisk13         00014310cb8b4c64    f1n9101vg
hdisk14         00014310cb8b5210    f1n9102vg
hdisk15         00014310cb8b580c    f1n9103vg
hdisk16         00014310cb8b5de8    f1n9104vg
hdisk17         00014310cb8b0b60    f1n9100vg
hdisk18         00014310cb8b1153    f1n9101vg
hdisk19         00014310cb8b16d5    f1n9102vg
hdisk20         00014310cb8b1c94    f1n9103vg
hdisk21         00014310cb8b22e3    f1n9104vg
hdisk22         00014310cb8baa45    f1n9102vg
hdisk23         00014310cb8bb00e    f1n9103vg
hdisk24         00014310cb8bb5fe    f1n9104vg
hdisk25         00014310cb8bbba7    f1n9105vg
hdisk26         00014310cb8bc184    f1n9105vg
hdisk27         00014310cb8b8749    f1n9101vg
hdisk28         00014310cb8b8d0d    f1n9102vg
hdisk29         00014310cb8b92d4    f1n9103vg
hdisk30         00014310cb8b98a8    f1n9104vg
hdisk31         00014310cb8b9e9b    f1n9100vg
hdisk32         00014310cb8ba476    f1n9101vg
hdisk33         00014310cb8b63b1    f1n9100vg
hdisk34         00014310cb8b6970    f1n9101vg
hdisk35         00014310cb8b6f69    f1n9102vg
vpath0          none                None
vpath1          none                None
vpath2          none                None
vpath3          none                None
vpath4          none                None
vpath5          none                None
vpath6          none                None
vpath7          none                None
vpath8          none                None
vpath9          none                None
```

```
vpath10       none               None
vpath11       none               None
vpath12       none               None
vpath13       none               None
vpath14       none               None
vpath15       none               None
vpath16       none               None
vpath17       none               None
vpath18       none               None
vpath19       none               None
vpath20       none               None
vpath21       none               None
vpath22       none               None
vpath23       none               None
vpath24       none               None
vpath25       none               None
vpath26       none               None
vpath27       none               None
vpath28       none               None
vpath29       none               None
vpath30       none               None
vpath31       none               None
hdisk36       00014310cb8b7564   f1n9103vg
hdisk37       00014310cb8b7b71   f1n9104vg
hdisk38       00014310cb8b8155   f1n9100vg
hdisk39       00014310cb8b28bf   f1n9100vg
hdisk40       00014310cb8b2eaf   f1n9101vg
hdisk41       00014310cb8b3495   f1n9102vg
hdisk42       00014310cb8b3aad   f1n9103vg
hdisk43       00014310cb8b40a4   f1n9104vg
hdisk44       00014310cb8b4683   f1n9100vg
hdisk45       00014310cb8b4c64   f1n9101vg
hdisk46       00014310cb8b5210   f1n9102vg
hdisk47       00014310cb8b580c   f1n9103vg
hdisk48       00014310cb8b5de8   f1n9104vg
hdisk49       00014310cb8b0b60   f1n9100vg
hdisk50       00014310cb8b1153   f1n9101vg
hdisk51       00014310cb8b16d5   f1n9102vg
hdisk52       00014310cb8b1c94   f1n9103vg
hdisk53       00014310cb8b22e3   f1n9104vg
hdisk54       00014310cb8baa45   f1n9102vg
hdisk55       00014310cb8bb00e   f1n9103vg
hdisk56       00014310cb8bb5fe   f1n9104vg
hdisk57       00014310cb8bbba7   f1n9105vg
hdisk58       00014310cb8bc184   f1n9105vg
hdisk59       00014310cb8b8749   f1n9101vg
hdisk60       00014310cb8b8d0d   f1n9102vg
hdisk61       00014310cb8b92d4   f1n9103vg
hdisk62       00014310cb8b98a8   f1n9104vg
hdisk63       00014310cb8b9e9b   f1n9100vg
hdisk64       00014310cb8ba476   f1n9101vg
hdisk65       00014310cb8b63b1   f1n9100vg
hdisk66       00014310cb8b6970   f1n9101vg
hdisk67       00014310cb8b6f69   f1n9102vg
```

***lsvpcfg***

```
vpath0 (Avail ) 50B15244 = hdisk4 (Avail pv f1n9103vg)
vpath1 (Avail ) 50C15244 = hdisk5 (Avail pv f1n9104vg)
vpath2 (Avail ) 50D15244 = hdisk6 (Avail pv f1n9100vg)
vpath3 (Avail ) 40C15244 = hdisk7 (Avail pv f1n9100vg)
vpath4 (Avail ) 40D15244 = hdisk8 (Avail pv f1n9101vg)
vpath5 (Avail ) 40E15244 = hdisk9 (Avail pv f1n9102vg)
vpath6 (Avail ) 40F15244 = hdisk10 (Avail pv f1n9103vg)
vpath7 (Avail ) 41015244 = hdisk11 (Avail pv f1n9104vg)
vpath8 (Avail ) 41115244 = hdisk12 (Avail pv f1n9100vg)
vpath9 (Avail ) 70B15244 = hdisk13 (Avail pv f1n9101vg)
vpath10 (Avail ) 70C15244 = hdisk14 (Avail pv f1n9102vg)
vpath11 (Avail ) 70D15244 = hdisk15 (Avail pv f1n9103vg)
vpath12 (Avail ) 70E15244 = hdisk16 (Avail pv f1n9104vg)
vpath13 (Avail ) 60D15244 = hdisk17 (Avail pv f1n9100vg)
vpath14 (Avail ) 60E15244 = hdisk18 (Avail pv f1n9101vg)
vpath15 (Avail ) 60F15244 = hdisk19 (Avail pv f1n9102vg)
vpath16 (Avail ) 61015244 = hdisk20 (Avail pv f1n9103vg)
vpath17 (Avail ) 61115244 = hdisk21 (Avail pv f1n9104vg)
vpath18 (Avail ) 10915244 = hdisk22 (Avail pv f1n9102vg)
vpath19 (Avail ) 10A15244 = hdisk23 (Avail pv f1n9103vg)
vpath20 (Avail ) 10B15244 = hdisk24 (Avail pv f1n9104vg)
vpath21 (Avail ) 10C15244 = hdisk25 (Avail pv f1n9105vg)
vpath22 (Avail ) 10D15244 = hdisk26 (Avail pv f1n9105vg)
vpath23 (Avail ) 00C15244 = hdisk27 (Avail pv f1n9101vg)
vpath24 (Avail ) 00D15244 = hdisk28 (Avail pv f1n9102vg)
vpath25 (Avail ) 00E15244 = hdisk29 (Avail pv f1n9103vg)
vpath26 (Avail ) 30C15244 = hdisk30 (Avail pv f1n9104vg)
vpath27 (Avail ) 30D15244 = hdisk31 (Avail pv f1n9100vg)
vpath28 (Avail ) 30E15244 = hdisk32 (Avail pv f1n9101vg)
vpath29 (Avail ) 20C15244 = hdisk33 (Avail pv f1n9100vg)
vpath30 (Avail ) 20D15244 = hdisk34 (Avail pv f1n9101vg)
vpath31 (Avail ) 20E15244 = hdisk35 (Avail pv f1n9102vg)
```

NOTE: We are not done yet, because the above output does not look like we want it to look. It only has one device per vpath.

***datapath query device***

```
Total Devices : 32


DEV#:   0  DEVICE NAME: vpath0  TYPE: 2105F20   SERIAL: 50B15244
===========================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                  fscsi0/hdisk4    CLOSE   NORMAL          0          0

DEV#:   1  DEVICE NAME: vpath1  TYPE: 2105F20   SERIAL: 50C15244
===========================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                  fscsi0/hdisk5    CLOSE   NORMAL          0          0

DEV#:   2  DEVICE NAME: vpath2  TYPE: 2105F20   SERIAL: 50D15244
===========================================================
```

```
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                  fscsi0/hdisk6    CLOSE   NORMAL          0          0


DEV#:   3  DEVICE NAME: vpath3  TYPE: 2105F20   SERIAL: 40C15244
===========================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                  fscsi0/hdisk7    CLOSE   NORMAL          0          0

DEV#:   4  DEVICE NAME: vpath4  TYPE: 2105F20   SERIAL: 40D15244
===========================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                  fscsi0/hdisk8    CLOSE   NORMAL          0          0

DEV#:   5  DEVICE NAME: vpath5  TYPE: 2105F20   SERIAL: 40E15244
===========================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                  fscsi0/hdisk9    CLOSE   NORMAL          0          0

DEV#:   6  DEVICE NAME: vpath6  TYPE: 2105F20   SERIAL: 40F15244
===========================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk10    CLOSE   NORMAL          0          0

DEV#:   7  DEVICE NAME: vpath7  TYPE: 2105F20   SERIAL: 41015244
===========================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk11    CLOSE   NORMAL          0          0

DEV#:   8  DEVICE NAME: vpath8  TYPE: 2105F20   SERIAL: 41115244
===========================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk12    CLOSE   NORMAL          0          0

DEV#:   9  DEVICE NAME: vpath9  TYPE: 2105F20   SERIAL: 70B15244
===========================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk13    CLOSE   NORMAL          0          0

DEV#:  10  DEVICE NAME: vpath10  TYPE: 2105F20   SERIAL: 70C15244
===========================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk14    CLOSE   NORMAL          0          0

DEV#:  11  DEVICE NAME: vpath11  TYPE: 2105F20   SERIAL: 70D15244
===========================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk15    CLOSE   NORMAL          0          0

DEV#:  12  DEVICE NAME: vpath12  TYPE: 2105F20   SERIAL: 70E15244
===========================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk16    CLOSE   NORMAL          0          0

DEV#:  13  DEVICE NAME: vpath13  TYPE: 2105F20   SERIAL: 60D15244
===========================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk17    CLOSE   NORMAL          0          0
```

```
DEV#:  14  DEVICE NAME: vpath14  TYPE: 2105F20   SERIAL: 60E15244
===========================================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk18    CLOSE   NORMAL          0          0

DEV#:  15  DEVICE NAME: vpath15  TYPE: 2105F20   SERIAL: 60F15244
===========================================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk19    CLOSE   NORMAL          0          0

DEV#:  16  DEVICE NAME: vpath16  TYPE: 2105F20   SERIAL: 61015244
===========================================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk20    CLOSE   NORMAL          0          0

DEV#:  17  DEVICE NAME: vpath17  TYPE: 2105F20   SERIAL: 61115244
===========================================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk21    CLOSE   NORMAL          0          0

DEV#:  18  DEVICE NAME: vpath18  TYPE: 2105F20   SERIAL: 10915244
===========================================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk22    CLOSE   NORMAL          0          0

DEV#:  19  DEVICE NAME: vpath19  TYPE: 2105F20   SERIAL: 10A15244
===========================================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk23    CLOSE   NORMAL          0          0

DEV#:  20  DEVICE NAME: vpath20  TYPE: 2105F20   SERIAL: 10B15244
===========================================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk24    CLOSE   NORMAL          0          0

DEV#:  21  DEVICE NAME: vpath21  TYPE: 2105F20   SERIAL: 10C15244
===========================================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk25    CLOSE   NORMAL          0          0

DEV#:  22  DEVICE NAME: vpath22  TYPE: 2105F20   SERIAL: 10D15244
===========================================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk26    CLOSE   NORMAL          0          0

DEV#:  23  DEVICE NAME: vpath23  TYPE: 2105F20   SERIAL: 00C15244
===========================================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk27    CLOSE   NORMAL          0          0

DEV#:  24  DEVICE NAME: vpath24  TYPE: 2105F20   SERIAL: 00D15244
===========================================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk28    CLOSE   NORMAL          0          0

DEV#:  25  DEVICE NAME: vpath25  TYPE: 2105F20   SERIAL: 00E15244
```

```
==============================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk29    CLOSE   NORMAL          0          0


DEV#:  26  DEVICE NAME: vpath26  TYPE: 2105F20   SERIAL: 30C15244
==============================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk30    CLOSE   NORMAL          0          0

DEV#:  27  DEVICE NAME: vpath27  TYPE: 2105F20   SERIAL: 30D15244
==============================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk31    CLOSE   NORMAL          0          0

DEV#:  28  DEVICE NAME: vpath28  TYPE: 2105F20   SERIAL: 30E15244
==============================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk32    CLOSE   NORMAL          0          0

DEV#:  29  DEVICE NAME: vpath29  TYPE: 2105F20   SERIAL: 20C15244
==============================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk33    CLOSE   NORMAL          0          0

DEV#:  30  DEVICE NAME: vpath30  TYPE: 2105F20   SERIAL: 20D15244
==============================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk34    CLOSE   NORMAL          0          0

DEV#:  31  DEVICE NAME: vpath31  TYPE: 2105F20   SERIAL: 20E15244
==============================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk35    CLOSE   NORMAL          0          0
```

## 3.7 Unconfigure all DPO Devices

For this step, we need to take all DPO devices (vpath devices) to a “Defined” state.

***rmdev -l dpo -R***

```
vpath0 Defined
vpath1 Defined
vpath2 Defined
vpath3 Defined
vpath4 Defined
vpath5 Defined
vpath6 Defined
vpath7 Defined
vpath8 Defined
vpath9 Defined
vpath10 Defined
vpath11 Defined
```

```
vpath12 Defined
vpath13 Defined
vpath14 Defined
vpath15 Defined
vpath16 Defined
vpath17 Defined
vpath18 Defined
vpath19 Defined
vpath20 Defined
vpath21 Defined
vpath22 Defined
vpath23 Defined
vpath24 Defined
vpath25 Defined
vpath26 Defined
vpath27 Defined
vpath28 Defined
vpath29 Defined
vpath30 Defined
vpath31 Defined
dpo Defined
```

## 3.8 Configure all DPO Devices

***smit***

✍✍Then Devices

✍✍Then Data Path Devices

✍✍Define and Configure all Data Path Devices

OR, you can fastpath

***smitty datapath_cfgall***

```
COMMAND STATUS

Command: OK            stdout: yes           stderr: no

Before command completion, additional instructions may appear below.

vpath0  Available  Data Path Optimizer Pseudo Device Driver
vpath1  Available  Data Path Optimizer Pseudo Device Driver
vpath2  Available  Data Path Optimizer Pseudo Device Driver
vpath3  Available  Data Path Optimizer Pseudo Device Driver
vpath4  Available  Data Path Optimizer Pseudo Device Driver
vpath5  Available  Data Path Optimizer Pseudo Device Driver
vpath6  Available  Data Path Optimizer Pseudo Device Driver
vpath7  Available  Data Path Optimizer Pseudo Device Driver
vpath8  Available  Data Path Optimizer Pseudo Device Driver
vpath9  Available  Data Path Optimizer Pseudo Device Driver
vpath10 Available  Data Path Optimizer Pseudo Device Driver
```

```
vpath11 Available  Data Path Optimizer Pseudo Device Driver
vpath12 Available  Data Path Optimizer Pseudo Device Driver
vpath13 Available  Data Path Optimizer Pseudo Device Driver
vpath14 Available  Data Path Optimizer Pseudo Device Driver
vpath15 Available  Data Path Optimizer Pseudo Device Driver
vpath16 Available  Data Path Optimizer Pseudo Device Driver
vpath17 Available  Data Path Optimizer Pseudo Device Driver
vpath18 Available  Data Path Optimizer Pseudo Device Driver
vpath19 Available  Data Path Optimizer Pseudo Device Driver
vpath20 Available  Data Path Optimizer Pseudo Device Driver
vpath21 Available  Data Path Optimizer Pseudo Device Driver
vpath22 Available  Data Path Optimizer Pseudo Device Driver
vpath23 Available  Data Path Optimizer Pseudo Device Driver
vpath24 Available  Data Path Optimizer Pseudo Device Driver
vpath25 Available  Data Path Optimizer Pseudo Device Driver
vpath26 Available  Data Path Optimizer Pseudo Device Driver
vpath27 Available  Data Path Optimizer Pseudo Device Driver
vpath28 Available  Data Path Optimizer Pseudo Device Driver
vpath29 Available  Data Path Optimizer Pseudo Device Driver
vpath30 Available  Data Path Optimizer Pseudo Device Driver
vpath31 Available  Data Path Optimizer Pseudo Device Driver


F1=Help             F2=Refresh          F3=Cancel           Esc+6=Command
Esc+8=Image         Esc+9=Shell         Esc+0=Exit          /=Find
n=Find Next
```

(NOTE: The best I can tell, this is running a "cfgmgr –l dpo" and an "lsdev –Ctvpath" command to show the results.)

## 3.9 Run "lsvpcfg" to Check the Status

***lsvpcfg***

```
vpath0 (Avail ) 50B15244 = hdisk4 (Avail pv f1n9103vg) hdisk36 (Avail pv
f1n9103vg)
vpath1 (Avail ) 50C15244 = hdisk5 (Avail pv f1n9104vg) hdisk37 (Avail pv
f1n9104vg)
vpath2 (Avail ) 50D15244 = hdisk6 (Avail pv f1n9100vg) hdisk38 (Avail pv
f1n9100vg)
vpath3 (Avail ) 40C15244 = hdisk7 (Avail pv f1n9100vg) hdisk39 (Avail pv
f1n9100vg)
vpath4 (Avail ) 40D15244 = hdisk8 (Avail pv f1n9101vg) hdisk40 (Avail pv
f1n9101vg)
vpath5 (Avail ) 40E15244 = hdisk9 (Avail pv f1n9102vg) hdisk41 (Avail pv
f1n9102vg)
vpath6 (Avail ) 40F15244 = hdisk10 (Avail pv f1n9103vg) hdisk42 (Avail pv
f1n9103vg)
vpath7 (Avail ) 41015244 = hdisk11 (Avail pv f1n9104vg) hdisk43 (Avail pv
f1n9104vg)
vpath8 (Avail ) 41115244 = hdisk12 (Avail pv f1n9100vg) hdisk44 (Avail pv
f1n9100vg)
vpath9 (Avail ) 70B15244 = hdisk13 (Avail pv f1n9101vg) hdisk45 (Avail pv
f1n9101vg)
```

```
vpath10 (Avail ) 70C15244 = hdisk14 (Avail pv f1n9102vg) hdisk46 (Avail pv
f1n9102vg)
vpath11 (Avail ) 70D15244 = hdisk15 (Avail pv f1n9103vg) hdisk47 (Avail pv
f1n9103vg)
vpath12 (Avail ) 70E15244 = hdisk16 (Avail pv f1n9104vg) hdisk48 (Avail pv
f1n9104vg)
vpath13 (Avail ) 60D15244 = hdisk17 (Avail pv f1n9100vg) hdisk49 (Avail pv
f1n9100vg)
vpath14 (Avail ) 60E15244 = hdisk18 (Avail pv f1n9101vg) hdisk50 (Avail pv
f1n9101vg)
vpath15 (Avail ) 60F15244 = hdisk19 (Avail pv f1n9102vg) hdisk51 (Avail pv
f1n9102vg)
vpath16 (Avail ) 61015244 = hdisk20 (Avail pv f1n9103vg) hdisk52 (Avail pv
f1n9103vg)
vpath17 (Avail ) 61115244 = hdisk21 (Avail pv f1n9104vg) hdisk53 (Avail pv
f1n9104vg)
vpath18 (Avail ) 10915244 = hdisk22 (Avail pv f1n9102vg) hdisk54 (Avail pv
f1n9102vg)
vpath19 (Avail ) 10A15244 = hdisk23 (Avail pv f1n9103vg) hdisk55 (Avail pv
f1n9103vg)
vpath20 (Avail ) 10B15244 = hdisk24 (Avail pv f1n9104vg) hdisk56 (Avail pv
f1n9104vg)
vpath21 (Avail ) 10C15244 = hdisk25 (Avail pv f1n9105vg) hdisk57 (Avail pv
f1n9105vg)
vpath22 (Avail ) 10D15244 = hdisk26 (Avail pv f1n9105vg) hdisk58 (Avail pv
f1n9105vg)
vpath23 (Avail ) 00C15244 = hdisk27 (Avail pv f1n9101vg) hdisk59 (Avail pv
f1n9101vg)
vpath24 (Avail ) 00D15244 = hdisk28 (Avail pv f1n9102vg) hdisk60 (Avail pv
f1n9102vg)
vpath25 (Avail ) 00E15244 = hdisk29 (Avail pv f1n9103vg) hdisk61 (Avail pv
f1n9103vg)
vpath26 (Avail ) 30C15244 = hdisk30 (Avail pv f1n9104vg) hdisk62 (Avail pv
f1n9104vg)
vpath27 (Avail ) 30D15244 = hdisk31 (Avail pv f1n9100vg) hdisk63 (Avail pv
f1n9100vg)
vpath28 (Avail ) 30E15244 = hdisk32 (Avail pv f1n9101vg) hdisk64 (Avail pv
f1n9101vg)
vpath29 (Avail ) 20C15244 = hdisk33 (Avail pv f1n9100vg) hdisk65 (Avail pv
f1n9100vg)
vpath30 (Avail ) 20D15244 = hdisk34 (Avail pv f1n9101vg) hdisk66 (Avail pv
f1n9101vg)
vpath31 (Avail ) 20E15244 = hdisk35 (Avail pv f1n9102vg) hdisk67 (Avail pv
f1n9102vg)
```

NOTE: This output looks a lot better. We have two hdisks available per vpath. The following command is extra – not necessary.

***datapath query device***

```
Total Devices : 32


DEV#:   0  DEVICE NAME: vpath0  TYPE: 2105F20   SERIAL: 50B15244
===========================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                  fscsi0/hdisk4    CLOSE   NORMAL          0          0
    1                 fscsi1/hdisk36    CLOSE   NORMAL          0          0

DEV#:   1  DEVICE NAME: vpath1  TYPE: 2105F20   SERIAL: 50C15244
===========================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                  fscsi0/hdisk5    CLOSE   NORMAL          0          0
    1                 fscsi1/hdisk37    CLOSE   NORMAL          0          0

DEV#:   2  DEVICE NAME: vpath2  TYPE: 2105F20   SERIAL: 50D15244
===========================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                  fscsi0/hdisk6    CLOSE   NORMAL          0          0
    1                 fscsi1/hdisk38    CLOSE   NORMAL          0          0

DEV#:   3  DEVICE NAME: vpath3  TYPE: 2105F20   SERIAL: 40C15244
===========================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                  fscsi0/hdisk7    CLOSE   NORMAL          0          0
    1                 fscsi1/hdisk39    CLOSE   NORMAL          0          0

DEV#:   4  DEVICE NAME: vpath4  TYPE: 2105F20   SERIAL: 40D15244
===========================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                  fscsi0/hdisk8    CLOSE   NORMAL          0          0
    1                 fscsi1/hdisk40    CLOSE   NORMAL          0          0

DEV#:   5  DEVICE NAME: vpath5  TYPE: 2105F20   SERIAL: 40E15244
===========================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                  fscsi0/hdisk9    CLOSE   NORMAL          0          0
    1                 fscsi1/hdisk41    CLOSE   NORMAL          0          0

DEV#:   6  DEVICE NAME: vpath6  TYPE: 2105F20   SERIAL: 40F15244
===========================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk10    CLOSE   NORMAL          0          0
    1                 fscsi1/hdisk42    CLOSE   NORMAL          0          0

DEV#:   7  DEVICE NAME: vpath7  TYPE: 2105F20   SERIAL: 41015244
===========================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk11    CLOSE   NORMAL          0          0
    1                 fscsi1/hdisk43    CLOSE   NORMAL          0          0

DEV#:   8  DEVICE NAME: vpath8  TYPE: 2105F20   SERIAL: 41115244
===========================================================
```

```
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk12    CLOSE   NORMAL          0          0
    1                 fscsi1/hdisk44    CLOSE   NORMAL          0          0

DEV#:   9  DEVICE NAME: vpath9  TYPE: 2105F20   SERIAL: 70B15244
===========================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk13    CLOSE   NORMAL          0          0
    1                 fscsi1/hdisk45    CLOSE   NORMAL          0          0

DEV#:  10  DEVICE NAME: vpath10  TYPE: 2105F20   SERIAL: 70C15244
===========================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk14    CLOSE   NORMAL          0          0
    1                 fscsi1/hdisk46    CLOSE   NORMAL          0          0

DEV#:  11  DEVICE NAME: vpath11  TYPE: 2105F20   SERIAL: 70D15244
===========================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk15    CLOSE   NORMAL          0          0
    1                 fscsi1/hdisk47    CLOSE   NORMAL          0          0

DEV#:  12  DEVICE NAME: vpath12  TYPE: 2105F20   SERIAL: 70E15244
===========================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk16    CLOSE   NORMAL          0          0
    1                 fscsi1/hdisk48    CLOSE   NORMAL          0          0

DEV#:  13  DEVICE NAME: vpath13  TYPE: 2105F20   SERIAL: 60D15244
===========================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk17    CLOSE   NORMAL          0          0
    1                 fscsi1/hdisk49    CLOSE   NORMAL          0          0

DEV#:  14  DEVICE NAME: vpath14  TYPE: 2105F20   SERIAL: 60E15244
===========================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk18    CLOSE   NORMAL          0          0
    1                 fscsi1/hdisk50    CLOSE   NORMAL          0          0

DEV#:  15  DEVICE NAME: vpath15  TYPE: 2105F20   SERIAL: 60F15244
===========================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk19    CLOSE   NORMAL          0          0
    1                 fscsi1/hdisk51    CLOSE   NORMAL          0          0

DEV#:  16  DEVICE NAME: vpath16  TYPE: 2105F20   SERIAL: 61015244
===========================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk20    CLOSE   NORMAL          0          0
    1                 fscsi1/hdisk52    CLOSE   NORMAL          0          0

DEV#:  17  DEVICE NAME: vpath17  TYPE: 2105F20   SERIAL: 61115244
===========================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk21    CLOSE   NORMAL          0          0
    1                 fscsi1/hdisk53    CLOSE   NORMAL          0          0
```

```
DEV#:  18  DEVICE NAME: vpath18  TYPE: 2105F20   SERIAL: 10915244
===========================================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk22    CLOSE   NORMAL          0          0
    1                 fscsi1/hdisk54    CLOSE   NORMAL          0          0

DEV#:  19  DEVICE NAME: vpath19  TYPE: 2105F20   SERIAL: 10A15244
===========================================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk23    CLOSE   NORMAL          0          0
    1                 fscsi1/hdisk55    CLOSE   NORMAL          0          0

DEV#:  20  DEVICE NAME: vpath20  TYPE: 2105F20   SERIAL: 10B15244
===========================================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk24    CLOSE   NORMAL          0          0
    1                 fscsi1/hdisk56    CLOSE   NORMAL          0          0

DEV#:  21  DEVICE NAME: vpath21  TYPE: 2105F20   SERIAL: 10C15244
===========================================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk25    CLOSE   NORMAL          0          0
    1                 fscsi1/hdisk57    CLOSE   NORMAL          0          0

DEV#:  22  DEVICE NAME: vpath22  TYPE: 2105F20   SERIAL: 10D15244
===========================================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk26    CLOSE   NORMAL          0          0
    1                 fscsi1/hdisk58    CLOSE   NORMAL          0          0

DEV#:  23  DEVICE NAME: vpath23  TYPE: 2105F20   SERIAL: 00C15244
===========================================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk27    CLOSE   NORMAL          0          0
    1                 fscsi1/hdisk59    CLOSE   NORMAL          0          0

DEV#:  24  DEVICE NAME: vpath24  TYPE: 2105F20   SERIAL: 00D15244
===========================================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk28    CLOSE   NORMAL          0          0
    1                 fscsi1/hdisk60    CLOSE   NORMAL          0          0

DEV#:  25  DEVICE NAME: vpath25  TYPE: 2105F20   SERIAL: 00E15244
===========================================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk29    CLOSE   NORMAL          0          0
    1                 fscsi1/hdisk61    CLOSE   NORMAL          0          0

DEV#:  26  DEVICE NAME: vpath26  TYPE: 2105F20   SERIAL: 30C15244
===========================================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk30    CLOSE   NORMAL          0          0
    1                 fscsi1/hdisk62    CLOSE   NORMAL          0          0

DEV#:  27  DEVICE NAME: vpath27  TYPE: 2105F20   SERIAL: 30D15244
===========================================================================
```

```
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk31    CLOSE   NORMAL          0          0
    1                 fscsi1/hdisk63    CLOSE   NORMAL          0          0


DEV#:  28  DEVICE NAME: vpath28  TYPE: 2105F20   SERIAL: 30E15244
===========================================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk32    CLOSE   NORMAL          0          0
    1                 fscsi1/hdisk64    CLOSE   NORMAL          0          0

DEV#:  29  DEVICE NAME: vpath29  TYPE: 2105F20   SERIAL: 20C15244
===========================================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk33    CLOSE   NORMAL          0          0
    1                 fscsi1/hdisk65    CLOSE   NORMAL          0          0

DEV#:  30  DEVICE NAME: vpath30  TYPE: 2105F20   SERIAL: 20D15244
===========================================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk34    CLOSE   NORMAL          0          0
    1                 fscsi1/hdisk66    CLOSE   NORMAL          0          0

DEV#:  31  DEVICE NAME: vpath31  TYPE: 2105F20   SERIAL: 20E15244
===========================================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi0/hdisk35    CLOSE   NORMAL          0          0
    1                 fscsi1/hdisk67    CLOSE   NORMAL          0          0
```

## 3.10 Varyon the Volume Groups

For each volume group that you listed in step 1, you need to run "varyonvg vgname".

```
varyonvg f1n9100vg
varyonvg f1n9101vg
varyonvg f1n9102vg
varyonvg f1n9103vg
varyonvg f1n9104vg
varyonvg f1n9105vg
```

## 3.11 Run "hd2vp" on Each Volume Group

```
hd2vp f1n9100vg
hd2vp f1n9101vg
hd2vp f1n9102vg
hd2vp f1n9103vg
hd2vp f1n9104vg
hd2vp f1n9105vg      # output for this command below
```

```
f1n9105vg
f1n9105vg contains these hdisks and pvids
   00014310cb8bbba7 hdisk25
00014310cb8bc184 hdisk26

hdisk25 is part of vpath21.
hdisk26 is part of vpath22.
f1n9105vg
Deleting pvid of hdisk26 from ODM database
Deleting pvid of hdisk58 from ODM database
Create vpath22 pvid of 00014310cb8bc184 in ODM database.
lname=vpath22, pvid=00014310cb8bc184
Deleting pvid of hdisk25 from ODM database
Deleting pvid of hdisk57 from ODM database
Create vpath21 pvid of 00014310cb8bbba7 in ODM database.
lname=vpath21, pvid=00014310cb8bbba7
varyon f1n9105vg was successful.
f1n9105vg is converted to dpo device vpathes successfully!
```

NOTE: After deleting all of the disks are re-running cfgmgr, you may have noticed that some hdisk definitions have moved (What was hdisk34 is now hdisk26). For volume group, logical volume, and filesystem considerations, AIX only cares about the PVIDs. If you are writing directly to an hdisk or vpath device (e. g. /dev/rhdisk34 or /dev/rvpath30), then you should be very careful to configure your system the way it was originally configured.

## 3.12 Verification

Now, you should be OK! Let's run some commands to verify this.

***lspv***

```
hdisk0          0001463813cb05e1    rootvg
hdisk1          000143109e546712    rootvg
hdisk2          none                None
hdisk3          none                None
hdisk4          none                None
hdisk5          none                None
hdisk6          none                None
hdisk7          none                None
hdisk8          none                None
hdisk9          none                None
hdisk10         none                None
hdisk11         none                None
hdisk12         none                None
hdisk13         none                None
hdisk14         none                None
hdisk15         none                None
hdisk16         none                None
hdisk17         none                None
hdisk18         none                None
hdisk19         none                None
hdisk20         none                None
hdisk21         none                None
hdisk22         none                None
hdisk23         none                None
hdisk24         none                None
hdisk25         none                None
hdisk26         none                None
hdisk27         none                None
hdisk28         none                None
hdisk29         none                None
hdisk30         none                None
hdisk31         none                None
hdisk32         none                None
hdisk33         none                None
hdisk34         none                None
hdisk35         none                None
vpath0          00014310cb8b7564    f1n9103vg
vpath1          00014310cb8b7b71    f1n9104vg
vpath2          00014310cb8b8155    f1n9100vg
vpath3          00014310cb8b28bf    f1n9100vg
vpath4          00014310cb8b2eaf    f1n9101vg
vpath5          00014310cb8b3495    f1n9102vg
vpath6          00014310cb8b3aad    f1n9103vg
vpath7          00014310cb8b40a4    f1n9104vg
vpath8          00014310cb8b4683    f1n9100vg
vpath9          00014310cb8b4c64    f1n9101vg
vpath10         00014310cb8b5210    f1n9102vg
vpath11         00014310cb8b580c    f1n9103vg
```

```
vpath12         00014310cb8b5de8    f1n9104vg
vpath13         00014310cb8b0b60    f1n9100vg
vpath14         00014310cb8b1153    f1n9101vg
vpath15         00014310cb8b16d5    f1n9102vg
vpath16         00014310cb8b1c94    f1n9103vg
vpath17         00014310cb8b22e3    f1n9104vg
vpath18         00014310cb8baa45    f1n9102vg
vpath19         00014310cb8bb00e    f1n9103vg
vpath20         00014310cb8bb5fe    f1n9104vg
vpath21         00014310cb8bbba7    f1n9105vg
vpath22         00014310cb8bc184    f1n9105vg
vpath23         00014310cb8b8749    f1n9101vg
vpath24         00014310cb8b8d0d    f1n9102vg
vpath25         00014310cb8b92d4    f1n9103vg
vpath26         00014310cb8b98a8    f1n9104vg
vpath27         00014310cb8b9e9b    f1n9100vg
vpath28         00014310cb8ba476    f1n9101vg
vpath29         00014310cb8b63b1    f1n9100vg
vpath30         00014310cb8b6970    f1n9101vg
vpath31         00014310cb8b6f69    f1n9102vg
hdisk36         none                None
hdisk37         none                None
hdisk38         none                None
hdisk39         none                None
hdisk40         none                None
hdisk41         none                None
hdisk42         none                None
hdisk43         none                None
hdisk44         none                None
hdisk45         none                None
hdisk46         none                None
hdisk47         none                None
hdisk48         none                None
hdisk49         none                None
hdisk50         none                None
hdisk51         none                None
hdisk52         none                None
hdisk53         none                None
hdisk54         none                None
hdisk55         none                None
hdisk56         none                None
hdisk57         none                None
hdisk58         none                None
hdisk59         none                None
hdisk60         none                None
hdisk61         none                None
hdisk62         none                None
hdisk63         none                None
hdisk64         none                None
hdisk65         none                None
hdisk66         none                None
hdisk67         none                None
```

Note that you do not have PVIDs on your ESS disk drives. Also, note that your vpath devices DO have pvids and volume group definitions. Finally, note that all of your hdisk definitions are there.

***datapath query device***

```
Total Devices : 32
```

```
DEV#:   0  DEVICE NAME: vpath0  TYPE: 2105F20   SERIAL: 50B15244
==========================================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                  fscsi1/hdisk4     OPEN   NORMAL          8          0
    1                 fscsi0/hdisk36     OPEN   NORMAL         13          0

DEV#:   1  DEVICE NAME: vpath1  TYPE: 2105F20   SERIAL: 50C15244
==========================================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                  fscsi1/hdisk5     OPEN   NORMAL          9          0
    1                 fscsi0/hdisk37     OPEN   NORMAL         12          0

DEV#:   2  DEVICE NAME: vpath2  TYPE: 2105F20   SERIAL: 50D15244
==========================================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                  fscsi1/hdisk6     OPEN   NORMAL          7          0
    1                 fscsi0/hdisk38     OPEN   NORMAL         14          0

DEV#:   3  DEVICE NAME: vpath3  TYPE: 2105F20   SERIAL: 40C15244
==========================================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                  fscsi1/hdisk7     OPEN   NORMAL          7          0
    1                 fscsi0/hdisk39     OPEN   NORMAL         14          0

DEV#:   4  DEVICE NAME: vpath4  TYPE: 2105F20   SERIAL: 40D15244
==========================================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                  fscsi1/hdisk8     OPEN   NORMAL          8          0
    1                 fscsi0/hdisk40     OPEN   NORMAL         13          0

DEV#:   5  DEVICE NAME: vpath5  TYPE: 2105F20   SERIAL: 40E15244
==========================================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                  fscsi1/hdisk9     OPEN   NORMAL          9          0
    1                 fscsi0/hdisk41     OPEN   NORMAL         12          0

DEV#:   6  DEVICE NAME: vpath6  TYPE: 2105F20   SERIAL: 40F15244
==========================================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi1/hdisk10     OPEN   NORMAL          9          0
    1                 fscsi0/hdisk42     OPEN   NORMAL         12          0

DEV#:   7  DEVICE NAME: vpath7  TYPE: 2105F20   SERIAL: 41015244
==========================================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi1/hdisk11     OPEN   NORMAL         10          0
```

```
    1                fscsi0/hdisk43     OPEN   NORMAL         11          0


DEV#:   8  DEVICE NAME: vpath8  TYPE: 2105F20   SERIAL: 41115244
===========================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi1/hdisk12     OPEN   NORMAL         11          0
    1                 fscsi0/hdisk44     OPEN   NORMAL         10          0

DEV#:   9  DEVICE NAME: vpath9  TYPE: 2105F20   SERIAL: 70B15244
===========================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi1/hdisk13     OPEN   NORMAL         12          0
    1                 fscsi0/hdisk45     OPEN   NORMAL          9          0

DEV#:  10  DEVICE NAME: vpath10  TYPE: 2105F20   SERIAL: 70C15244
===========================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi1/hdisk14     OPEN   NORMAL          6          0
    1                 fscsi0/hdisk46     OPEN   NORMAL         15          0

DEV#:  11  DEVICE NAME: vpath11  TYPE: 2105F20   SERIAL: 70D15244
===========================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi1/hdisk15     OPEN   NORMAL         12          0
    1                 fscsi0/hdisk47     OPEN   NORMAL          9          0

DEV#:  12  DEVICE NAME: vpath12  TYPE: 2105F20   SERIAL: 70E15244
===========================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi1/hdisk16     OPEN   NORMAL         10          0
    1                 fscsi0/hdisk48     OPEN   NORMAL         11          0

DEV#:  13  DEVICE NAME: vpath13  TYPE: 2105F20   SERIAL: 60D15244
===========================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi1/hdisk17     OPEN   NORMAL         25          0
    1                 fscsi0/hdisk49     OPEN   NORMAL         31          0

DEV#:  14  DEVICE NAME: vpath14  TYPE: 2105F20   SERIAL: 60E15244
===========================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi1/hdisk18     OPEN   NORMAL         26          0
    1                 fscsi0/hdisk50     OPEN   NORMAL         30          0

DEV#:  15  DEVICE NAME: vpath15  TYPE: 2105F20   SERIAL: 60F15244
===========================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi1/hdisk19     OPEN   NORMAL         32          0
    1                 fscsi0/hdisk51     OPEN   NORMAL         24          0

DEV#:  16  DEVICE NAME: vpath16  TYPE: 2105F20   SERIAL: 61015244
===========================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi1/hdisk20     OPEN   NORMAL         27          0
    1                 fscsi0/hdisk52     OPEN   NORMAL         29          0

DEV#:  17  DEVICE NAME: vpath17  TYPE: 2105F20   SERIAL: 61115244
```

```
============================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi1/hdisk21     OPEN   NORMAL         30          0
    1                 fscsi0/hdisk53     OPEN   NORMAL         26          0

DEV#:  18  DEVICE NAME: vpath18  TYPE: 2105F20   SERIAL: 10915244
============================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi1/hdisk22     OPEN   NORMAL         12          0
    1                 fscsi0/hdisk54     OPEN   NORMAL          9          0

DEV#:  19  DEVICE NAME: vpath19  TYPE: 2105F20   SERIAL: 10A15244
============================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi1/hdisk23     OPEN   NORMAL         11          0
    1                 fscsi0/hdisk55     OPEN   NORMAL         10          0

DEV#:  20  DEVICE NAME: vpath20  TYPE: 2105F20   SERIAL: 10B15244
============================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi1/hdisk24     OPEN   NORMAL         10          0
    1                 fscsi0/hdisk56     OPEN   NORMAL         11          0

DEV#:  21  DEVICE NAME: vpath21  TYPE: 2105F20   SERIAL: 10C15244
============================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi1/hdisk25     OPEN   NORMAL         29          0
    1                 fscsi0/hdisk57     OPEN   NORMAL         30          0

DEV#:  22  DEVICE NAME: vpath22  TYPE: 2105F20   SERIAL: 10D15244
============================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi1/hdisk26     OPEN   NORMAL         10          0
    1                 fscsi0/hdisk58     OPEN   NORMAL         11          0

DEV#:  23  DEVICE NAME: vpath23  TYPE: 2105F20   SERIAL: 00C15244
============================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi1/hdisk27     OPEN   NORMAL         10          0
    1                 fscsi0/hdisk59     OPEN   NORMAL         11          0

DEV#:  24  DEVICE NAME: vpath24  TYPE: 2105F20   SERIAL: 00D15244
============================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi1/hdisk28     OPEN   NORMAL          5          0
    1                 fscsi0/hdisk60     OPEN   NORMAL         16          0

DEV#:  25  DEVICE NAME: vpath25  TYPE: 2105F20   SERIAL: 00E15244
============================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi1/hdisk29     OPEN   NORMAL         11          0
    1                 fscsi0/hdisk61     OPEN   NORMAL         10          0

DEV#:  26  DEVICE NAME: vpath26  TYPE: 2105F20   SERIAL: 30C15244
============================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi1/hdisk30     OPEN   NORMAL          7          0
```

```
    1                 fscsi0/hdisk62     OPEN   NORMAL         14          0

DEV#:  27  DEVICE NAME: vpath27  TYPE: 2105F20   SERIAL: 30D15244
==========================================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi1/hdisk31     OPEN   NORMAL         13          0
    1                 fscsi0/hdisk63     OPEN   NORMAL          8          0

DEV#:  28  DEVICE NAME: vpath28  TYPE: 2105F20   SERIAL: 30E15244
==========================================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi1/hdisk32     OPEN   NORMAL         11          0
    1                 fscsi0/hdisk64     OPEN   NORMAL         10          0

DEV#:  29  DEVICE NAME: vpath29  TYPE: 2105F20   SERIAL: 20C15244
==========================================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi1/hdisk33     OPEN   NORMAL          8          0
    1                 fscsi0/hdisk65     OPEN   NORMAL         13          0

DEV#:  30  DEVICE NAME: vpath30  TYPE: 2105F20   SERIAL: 20D15244
==========================================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi1/hdisk34     OPEN   NORMAL         10          0
    1                 fscsi0/hdisk66     OPEN   NORMAL         11          0

DEV#:  31  DEVICE NAME: vpath31  TYPE: 2105F20   SERIAL: 20E15244
==========================================================================
Path#              Adapter/Hard Disk    State     Mode     Select     Errors
    0                 fscsi1/hdisk35     OPEN   NORMAL          8          0
    1                 fscsi0/hdisk67     OPEN   NORMAL         13          0
```

Note that each vpath device has two paths to access the device.

***lsvpcfg***

```
vpath0 (Avail pv f1n9103vg) 50B15244 = hdisk4 (Avail ) hdisk36 (Avail )
vpath1 (Avail pv f1n9104vg) 50C15244 = hdisk5 (Avail ) hdisk37 (Avail )
vpath2 (Avail pv f1n9100vg) 50D15244 = hdisk6 (Avail ) hdisk38 (Avail )
vpath3 (Avail pv f1n9100vg) 40C15244 = hdisk7 (Avail ) hdisk39 (Avail )
vpath4 (Avail pv f1n9101vg) 40D15244 = hdisk8 (Avail ) hdisk40 (Avail )
vpath5 (Avail pv f1n9102vg) 40E15244 = hdisk9 (Avail ) hdisk41 (Avail )
vpath6 (Avail pv f1n9103vg) 40F15244 = hdisk10 (Avail ) hdisk42 (Avail )
vpath7 (Avail pv f1n9104vg) 41015244 = hdisk11 (Avail ) hdisk43 (Avail )
vpath8 (Avail pv f1n9100vg) 41115244 = hdisk12 (Avail ) hdisk44 (Avail )
vpath9 (Avail pv f1n9101vg) 70B15244 = hdisk13 (Avail ) hdisk45 (Avail )
vpath10 (Avail pv f1n9102vg) 70C15244 = hdisk14 (Avail ) hdisk46 (Avail )
vpath11 (Avail pv f1n9103vg) 70D15244 = hdisk15 (Avail ) hdisk47 (Avail )
vpath12 (Avail pv f1n9104vg) 70E15244 = hdisk16 (Avail ) hdisk48 (Avail )
vpath13 (Avail pv f1n9100vg) 60D15244 = hdisk17 (Avail ) hdisk49 (Avail )
vpath14 (Avail pv f1n9101vg) 60E15244 = hdisk18 (Avail ) hdisk50 (Avail )
vpath15 (Avail pv f1n9102vg) 60F15244 = hdisk19 (Avail ) hdisk51 (Avail )
vpath16 (Avail pv f1n9103vg) 61015244 = hdisk20 (Avail ) hdisk52 (Avail )
vpath17 (Avail pv f1n9104vg) 61115244 = hdisk21 (Avail ) hdisk53 (Avail )
```

```
vpath18 (Avail pv f1n9102vg) 10915244 = hdisk22 (Avail ) hdisk54 (Avail )
vpath19 (Avail pv f1n9103vg) 10A15244 = hdisk23 (Avail ) hdisk55 (Avail )
vpath20 (Avail pv f1n9104vg) 10B15244 = hdisk24 (Avail ) hdisk56 (Avail )
vpath21 (Avail pv f1n9105vg) 10C15244 = hdisk25 (Avail ) hdisk57 (Avail )
vpath22 (Avail pv f1n9105vg) 10D15244 = hdisk26 (Avail ) hdisk58 (Avail )
vpath23 (Avail pv f1n9101vg) 00C15244 = hdisk27 (Avail ) hdisk59 (Avail )
vpath24 (Avail pv f1n9102vg) 00D15244 = hdisk28 (Avail ) hdisk60 (Avail )
vpath25 (Avail pv f1n9103vg) 00E15244 = hdisk29 (Avail ) hdisk61 (Avail )
vpath26 (Avail pv f1n9104vg) 30C15244 = hdisk30 (Avail ) hdisk62 (Avail )
vpath27 (Avail pv f1n9100vg) 30D15244 = hdisk31 (Avail ) hdisk63 (Avail )
vpath28 (Avail pv f1n9101vg) 30E15244 = hdisk32 (Avail ) hdisk64 (Avail )
vpath29 (Avail pv f1n9100vg) 20C15244 = hdisk33 (Avail ) hdisk65 (Avail )
vpath30 (Avail pv f1n9101vg) 20D15244 = hdisk34 (Avail ) hdisk66 (Avail )
vpath31 (Avail pv f1n9102vg) 20E15244 = hdisk35 (Avail ) hdisk67 (Avail )
```

Again, note that each vpath device has two paths to access the device and that they are both available.

Oh yeah, you may want to mount your filesystems back for normal use.

# Section 4: Items of Interest

At this installation, we installed three IBM 2105 ESS machines. Although we did not run into any hardware problems, you may. When debugging, you may want to delete all of your ESS disk drives and vpath devices. Be careful.

## 4.1 Making Volume Groups – Special Command

If you are used to scripting your volume group creation, please use the ***/usr/sbin/mkvg4vp*** command instead of the ***/usr/sbin/mkvg*** command. You will be much more satisfied with the results.

You can do this from smit via the following panels:

***smit***
Select "System Storage Management (Physical & Logical Storage)"
Select "Logical Volume Manager"
Select "Volume Groups"
Select "Add a Volume Group with Data Path Devices"

## 4.2 Making Volume Groups – Again!

This problem existed in SDD V1.1.4. I have not verified the existence of this problem in SDD V1.2.0.

Suppose that you have already made a volume group on some vpath devices. Then, suppose you wanted to export the volume group, and create a NEW volume group. You may run into a slight challenge. The command that smit uses to create this volume group looks similar to the following:

***VGNAME=`/usr/sbin/mkvg4vp -y'f1n9105vg' -s'256' -V'80' vpath0 vpath1 vpath2`***

```
0516-014 lcreatevg: The physical volume appears to belong to another
        volume group.
00607388ef28df09
0516-631 mkvg: Warning, all data belonging to physical
        volume vpath0 will be destroyed.
mkvg: Do you wish to continue? y(es) n(o)? y
0516-014 linstallpv: The physical volume appears to belong to another
```

```
        volume group.
00607388ef28df09
y
0516-014 linstallpv: The physical volume appears to belong to another
        volume group.
00607388ef28df09
y
```

If you notice above, the output asked me if I wanted to continue on the first disk, but I had to know the answer to the question for disks 2 and so on. Just keep answering "y" for yes!

BETTER YET! If you are scripting the VG creation, just add a "-f" option (after the command but before the –y option) as follows:

***VGNAME=`/usr/sbin/mkvg4vp –f -y'f1n9105vg' -s'256' -V'80' vpath0 vpath1 vpath2`***

## 4.3 Extending Volume Groups – Special Command

If you are used to scripting your volume group extensions, please use the ***/usr/sbin/extendvg4vp*** command instead of the ***/usr/sbin/extendvg*** command. You will be much more satisfied with the results. If you would like to use smit to do the exact same thing, see the very next section below!

## 4.4 Extending Volume Groups

You would get to this menu via the following:

***smit***
Select "System Storage Management (Physical & Logical Storage)"
Select "Logical Volume Manager"
Select "Volume Groups"
Select "Add a Data Path Volume to a Volume Group"

```
Add a Datapath Physical Volume to a Volume Group

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

                                                      [Entry Fields]
* VOLUME GROUP name                                  []                      +
* PHYSICAL VOLUME names                              []                      +
```

## 4.5 dpovgfix – Special Circumstances

It is possible for certain AIX commands to cause an hdisk to register its PVID. Scenarios that will cause this exist as follows:

1. chdev –l hdisk2 –a queue_depth=64
   This command will change the attributes of the hdisk, which causes AIX to unconfigure and then reconfigure the hdisk. This in turn creates the hdisk's PVID in the ODM.

2. restoring from a mksysb
   After restoring a mksysb, the physical volumes of the DPO volume group are switched back to the hdisks.

The basic idea is that the hdisks that exist under the vpath devices should not reflect the hdisks PVID. If they do, then you should "fix" the offending hdisks that are in the DPO volume group.

To determine if you have this problem, you can run the following command (on your DPO volume group):

***lspv |grep f1n9105vg***

```
hdisk25         00014310cb8bbba7    f1n9105vg
vpath21         00014310cb8bbba7    f1n9105vg
vpath22         00014310cb8bc184    f1n9105vg
```

If you see some hdisk devices mixed in with your vpath devices (or all hdisk devices), then you may not be utilizing DPO for those disk drives, i. e. you are not load balancing for the offending disk drives and you are not protected from the failure of the single scsi adapter that is servicing those hdisk devices.

NOTE: You certainly have a problem if the "***lsvg –p vgname***" shows a mixture of hdisk and vpath devices.

In order to "fix" the above problem, you will need to run the "***dpovgfix***" command on the dpo volume group in question:

***dpovgfix f1n9105vg***

```
f1n9105vg
f1n9105vg contains following devices and pvids
   00014310cb8bbba7 vpath21
00014310cb8bc184 vpath22

f1n9105vg
0518-307 odmdelete: 1 objects deleted.
0518-307 odmdelete: 0 objects deleted.
0518-307 odmdelete: 0 objects deleted.
0518-307 odmdelete: 0 objects deleted.
varyon f1n9105vg was successful.
Volume Group f1n9105vg is cleaned up to dpo devices successfully.
```

The bad news is that you will need to umount all filesystems and close all raw logical volumes before running dpovgfix. This will require a scheduled outage. "***dpovgfix***" will varyon your volume group for you, so you will need to mount all filesystems and restart your applications when it has completed running. Just for good measure, I suggest that you re-run your "***lsvg –p dpo_vgname***" or the "***lspv***" command to verify that you configuration is good. Note that the lspv output should show pvids associated with vpath devices and not with hdisks that are being utilized for DPO. Also, vg names should be associated with vpath devices and not with hdisks that are being utilized for DPO.

## 4.6 Upgrading from DPO V 1.2.0

Unfortunately, this will require some down time. It will be necessary to follow the steps in Chapter 3 to convert your disk drives from datapath devices to hdisks. Then, in the "OPTIONAL STEP - Add or Remove Hardware or Software", you will need to de-install the old version of DPO and install the newer version of DPO. Afterwards, continue with the remaining steps to convert your hdisks back to vpath devices.

## 4.7 Equating LUNs back to Hdisks

There are some new utilities – lsess, lssdd, and lsvp that are discussed below. Before working to hard on this section, you may want to scan ahead!

To equate LUNs back to hdisks, do the following:

On the Storage Specialist (ESS) side – do the following:

Look for the tabular view under Storage Allocation. Find the machine that you want and the disk you want. Look at its serial number.

On the AIX side, you can run the following command:

***lscfg -vl hdisk4***

```
  DEVICE            LOCATION          DESCRIPTION

  hdisk4            20-58-01          IBM FC 2105F20

        Manufacturer.................IBM
        Machine Type and Model......2105F20
        Serial Number...............50B15244
        EC Level....................5828
        Device Specific.(Z0)........10
        Device Specific.(Z1)........00A4
        Device Specific.(Z2)........0075
        Device Specific.(Z3)........17600
        Device Specific.(Z4)........05
        Device Specific.(Z5)........00
```

## 4.8 Alternative Method to Find Hdisks

Another method to find out which hdisks comprise a vpath is as follows:

***lsattr -El vpath0***

```
pvid         00014310cb8b756400000000000000000 Data Path Optimizer Parent False
policy       df                                Scheduling Policy          True
active_hdisk hdisk4/50B15244                   Active hdisk               False
active_hdisk hdisk36/50B15244
```

## 4.9 Some Very Nice Utilities

A gentleman in the San Jose group who shall remain nameless has written some very nice utilities. They are lsess, lssdd, and lsvp. First, you need to get the utilites from the website (Look for an essutil.tar file). Second, in order to install them, you need to read the README. I will list sample installation instructions here for your convenience:

```
#!/bin/ksh
RUNDIR=$(dirname $0)

cp ${RUNDIR}/fcmap /usr/bin           # If you have fiber connections
cp ${RUNDIR}/fcmap /usr/lib/methods   # If you have fiber connections
cp ${RUNDIR}/scsimap /usr/bin         # If you have SCSI connections
cp ${RUNDIR}/scsimap /usr/lib/methods # If you have SCSI connections
cp ${RUNDIR}/lsess /usr/bin
cp ${RUNDIR}/lsvp /usr/bin
cp ${RUNDIR}/lssdd /usr/bin

echo "After a reboot, run the following:"
echo lsess
echo lssdd
echo lsvp
echo "
To run lsess and lsvp you will need to either re-boot the host or run
cfgmgr with all 2105 vg's offline.  This is only necessary for the initial
run.
lssdd does not require a re-boot or vg's to be offline for initial run,
however it does require the ibm2105.rte package to be at 32.6.100.3 or above.
If lsess has not been run the lssdd output will not contain LSS, Volume,
and Rank information. "
```

Please note that the ODM stanza that you added has information for SCSI attached ESS devices and Fiber attached ESS devices. Whenever you run cfgmgr, you will get a method error if you only have one type of ESS devices, say either all SCSI attached 2105 devices or all Fiber attached 2105 devices.

If you have all Fiber attached 2105 ESS devices, then you can run the following command to eliminate the method error:

***odmadd ${RUNDIR}/fc_map.stanza***

If you have all SCSI attached 2105 ESS devices, then you can run the following command to eliminate the method error:

***odmadd ${RUNDIR}/scsi_map.stanza***

I will show the output from these utilities here – just to show you what is available. The utilities need to be downloaded from the web site where you found this document.

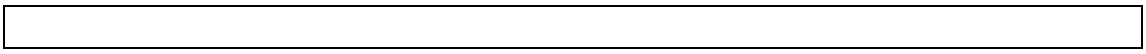
***lsess # Pulls information out of ODM from last boot***

```
 Disk        Location     LUN SN       Type       Size   LSS    Vol    Rank   S    Connection
------     ------------  --------  ------------   ----   ---    ---    ----   -   -----------
hdisk4     20-58-01[FC]  50B15244  IBM 2105-F20   16.0    21     11    1501   Y   R1-B4-H2-ZA
hdisk5     20-58-01[FC]  50C15244  IBM 2105-F20   16.0    21     12    1502   Y   R1-B4-H2-ZA
```

```
hdisk6     20-58-01[FC]  50D15244  IBM 2105-F20   16.0    21     13    1502   Y   R1-B4-H2-ZA
hdisk7     20-58-01[FC]  40C15244  IBM 2105-F20   16.0    20     12    1401   Y   R1-B4-H2-ZA
hdisk8     20-58-01[FC]  40D15244  IBM 2105-F20   16.0    20     13    1402   Y   R1-B4-H2-ZA
hdisk9     20-58-01[FC]  40E15244  IBM 2105-F20   16.0    20     14    1402   Y   R1-B4-H2-ZA
hdisk10    20-58-01[FC]  40F15244  IBM 2105-F20   16.0    20     15    1403   Y   R1-B4-H2-ZA
hdisk11    20-58-01[FC]  41015244  IBM 2105-F20   16.0    20     16    1404   Y   R1-B4-H2-ZA
hdisk12    20-58-01[FC]  41115244  IBM 2105-F20   16.0    20     17    1405   Y   R1-B4-H2-ZA
hdisk13    20-58-01[FC]  70B15244  IBM 2105-F20   16.0    23     11    1701   Y   R1-B4-H2-ZA
hdisk14    20-58-01[FC]  70C15244  IBM 2105-F20   16.0    23     12    1702   Y   R1-B4-H2-ZA
hdisk15    20-58-01[FC]  70D15244  IBM 2105-F20   16.0    23     13    1703   Y   R1-B4-H2-ZA
hdisk16    20-58-01[FC]  70E15244  IBM 2105-F20   16.0    23     14    1704   Y   R1-B4-H2-ZA
hdisk17    20-58-01[FC]  60D15244  IBM 2105-F20   16.0    22     13    1601   Y   R1-B4-H2-ZA
hdisk18    20-58-01[FC]  60E15244  IBM 2105-F20   16.0    22     14    1602   Y   R1-B4-H2-ZA
hdisk19    20-58-01[FC]  60F15244  IBM 2105-F20   16.0    22     15    1603   Y   R1-B4-H2-ZA
hdisk20    20-58-01[FC]  61015244  IBM 2105-F20   16.0    22     16    1604   Y   R1-B4-H2-ZA
hdisk21    20-58-01[FC]  61115244  IBM 2105-F20   16.0    22     17    1605   Y   R1-B4-H2-ZA
hdisk22    20-58-01[FC]  10915244  IBM 2105-F20   16.0    17      9    1100   Y   R1-B4-H2-ZA
hdisk23    20-58-01[FC]  10A15244  IBM 2105-F20   16.0    17     10    1101   Y   R1-B4-H2-ZA
hdisk24    20-58-01[FC]  10B15244  IBM 2105-F20   16.0    17     11    1101   Y   R1-B4-H2-ZA
hdisk25    20-58-01[FC]  10C15244  IBM 2105-F20   16.0    17     12    1102   Y   R1-B4-H2-ZA
hdisk26    20-58-01[FC]  10D15244  IBM 2105-F20   16.0    17     13    1102   Y   R1-B4-H2-ZA
hdisk27    20-58-01[FC]  00C15244  IBM 2105-F20   16.0    16     12    1001   Y   R1-B4-H2-ZA
hdisk28    20-58-01[FC]  00D15244  IBM 2105-F20   16.0    16     13    1002   Y   R1-B4-H2-ZA
hdisk29    20-58-01[FC]  00E15244  IBM 2105-F20   16.0    16     14    1002   Y   R1-B4-H2-ZA
hdisk30    20-58-01[FC]  30C15244  IBM 2105-F20   16.0    19     12    1301   Y   R1-B4-H2-ZA
hdisk31    20-58-01[FC]  30D15244  IBM 2105-F20   16.0    19     13    1302   Y   R1-B4-H2-ZA
hdisk32    20-58-01[FC]  30E15244  IBM 2105-F20   16.0    19     14    1302   Y   R1-B4-H2-ZA
hdisk33    20-58-01[FC]  20C15244  IBM 2105-F20   16.0    18     12    1201   Y   R1-B4-H2-ZA
hdisk34    20-58-01[FC]  20D15244  IBM 2105-F20   16.0    18     13    1202   Y   R1-B4-H2-ZA
hdisk35    20-58-01[FC]  20E15244  IBM 2105-F20   16.0    18     14    1202   Y   R1-B4-H2-ZA
hdisk36    10-80-01[FC]  50B15244  IBM 2105-F20   16.0    21     11    1501   Y   R1-B1-H3-ZA
hdisk37    10-80-01[FC]  50C15244  IBM 2105-F20   16.0    21     12    1502   Y   R1-B1-H3-ZA
hdisk38    10-80-01[FC]  50D15244  IBM 2105-F20   16.0    21     13    1502   Y   R1-B1-H3-ZA
hdisk39    10-80-01[FC]  40C15244  IBM 2105-F20   16.0    20     12    1401   Y   R1-B1-H3-ZA
hdisk40    10-80-01[FC]  40D15244  IBM 2105-F20   16.0    20     13    1402   Y   R1-B1-H3-ZA
hdisk41    10-80-01[FC]  40E15244  IBM 2105-F20   16.0    20     14    1402   Y   R1-B1-H3-ZA
hdisk42    10-80-01[FC]  40F15244  IBM 2105-F20   16.0    20     15    1403   Y   R1-B1-H3-ZA
hdisk43    10-80-01[FC]  41015244  IBM 2105-F20   16.0    20     16    1404   Y   R1-B1-H3-ZA
hdisk44    10-80-01[FC]  41115244  IBM 2105-F20   16.0    20     17    1405   Y   R1-B1-H3-ZA
hdisk45    10-80-01[FC]  70B15244  IBM 2105-F20   16.0    23     11    1701   Y   R1-B1-H3-ZA
hdisk46    10-80-01[FC]  70C15244  IBM 2105-F20   16.0    23     12    1702   Y   R1-B1-H3-ZA
hdisk47    10-80-01[FC]  70D15244  IBM 2105-F20   16.0    23     13    1703   Y   R1-B1-H3-ZA
hdisk48    10-80-01[FC]  70E15244  IBM 2105-F20   16.0    23     14    1704   Y   R1-B1-H3-ZA
hdisk49    10-80-01[FC]  60D15244  IBM 2105-F20   16.0    22     13    1601   Y   R1-B1-H3-ZA
hdisk50    10-80-01[FC]  60E15244  IBM 2105-F20   16.0    22     14    1602   Y   R1-B1-H3-ZA
hdisk51    10-80-01[FC]  60F15244  IBM 2105-F20   16.0    22     15    1603   Y   R1-B1-H3-ZA
hdisk52    10-80-01[FC]  61015244  IBM 2105-F20   16.0    22     16    1604   Y   R1-B1-H3-ZA
hdisk53    10-80-01[FC]  61115244  IBM 2105-F20   16.0    22     17    1605   Y   R1-B1-H3-ZA
hdisk54    10-80-01[FC]  10915244  IBM 2105-F20   16.0    17      9    1100   Y   R1-B1-H3-ZA
hdisk55    10-80-01[FC]  10A15244  IBM 2105-F20   16.0    17     10    1101   Y   R1-B1-H3-ZA
hdisk56    10-80-01[FC]  10B15244  IBM 2105-F20   16.0    17     11    1101   Y   R1-B1-H3-ZA
hdisk57    10-80-01[FC]  10C15244  IBM 2105-F20   16.0    17     12    1102   Y   R1-B1-H3-ZA
hdisk58    10-80-01[FC]  10D15244  IBM 2105-F20   16.0    17     13    1102   Y   R1-B1-H3-ZA
hdisk59    10-80-01[FC]  00C15244  IBM 2105-F20   16.0    16     12    1001   Y   R1-B1-H3-ZA
hdisk60    10-80-01[FC]  00D15244  IBM 2105-F20   16.0    16     13    1002   Y   R1-B1-H3-ZA
hdisk61    10-80-01[FC]  00E15244  IBM 2105-F20   16.0    16     14    1002   Y   R1-B1-H3-ZA
hdisk62    10-80-01[FC]  30C15244  IBM 2105-F20   16.0    19     12    1301   Y   R1-B1-H3-ZA
hdisk63    10-80-01[FC]  30D15244  IBM 2105-F20   16.0    19     13    1302   Y   R1-B1-H3-ZA
hdisk64    10-80-01[FC]  30E15244  IBM 2105-F20   16.0    19     14    1302   Y   R1-B1-H3-ZA
hdisk65    10-80-01[FC]  20C15244  IBM 2105-F20   16.0    18     12    1201   Y   R1-B1-H3-ZA
hdisk66    10-80-01[FC]  20D15244  IBM 2105-F20   16.0    18     13    1202   Y   R1-B1-H3-ZA
hdisk67    10-80-01[FC]  20E15244  IBM 2105-F20   16.0    18     14    1202   Y   R1-B1-H3-ZA
```

***lssdd  # Current information - runs slower, lots of information***

```
Hostname   VG         vpath    hdisk    Location       Type        LUN SN   EC    S  Connection  Size  LSS  Vol  Rank
--------   --         -----    -----    --------       ----        ------   --    -  ----------  ----  ---  ---  ----

cpcf1n9sw  f1n9103vg  vpath0   hdisk4   20-58-01       IBM-2105F20 50B15244 5828  N  R1-B4-H2-ZA 16.0  22   13   1601
                               hdisk36  10-80-01       IBM-2105F20 50B15244 5828  N  R1-B1-H3-ZA 16.0  22   13   1601

cpcf1n9sw  f1n9104vg  vpath1   hdisk5   20-58-01       IBM-2105F20 50C15244 5828  N  R1-B4-H2-ZA 16.0  22   14   1602
                               hdisk37  10-80-01       IBM-2105F20 50C15244 5828  N  R1-B1-H3-ZA 16.0  22   14   1602

cpcf1n9sw  f1n9100vg  vpath2   hdisk6   20-58-01       IBM-2105F20 50D15244 5828  N  R1-B4-H2-ZA 16.0  22   15   1603
                               hdisk38  10-80-01       IBM-2105F20 50D15244 5828  N  R1-B1-H3-ZA 16.0  22   15   1603

cpcf1n9sw  f1n9100vg  vpath3   hdisk7   20-58-01       IBM-2105F20 40C15244 5828  N  R1-B4-H2-ZA 16.0  22   16   1604
                               hdisk39  10-80-01       IBM-2105F20 40C15244 5828  N  R1-B1-H3-ZA 16.0  22   16   1604

cpcf1n9sw  f1n9101vg  vpath4   hdisk8   20-58-01       IBM-2105F20 40D15244 5828  N  R1-B4-H2-ZA 16.0  22   17   1605
                               hdisk40  10-80-01       IBM-2105F20 40D15244 5828  N  R1-B1-H3-ZA 16.0  22   17   1605

cpcf1n9sw  f1n9102vg  vpath5   hdisk9   20-58-01       IBM-2105F20 40E15244 5828  N  R1-B4-H2-ZA 16.0  20   12   1401
                               hdisk41  10-80-01       IBM-2105F20 40E15244 5828  N  R1-B1-H3-ZA 16.0  20   12   1401

cpcf1n9sw  f1n9103vg  vpath6   hdisk10  20-58-01       IBM-2105F20 40F15244 5828  N  R1-B4-H2-ZA 16.0  20   13   1402
                               hdisk42  10-80-01       IBM-2105F20 40F15244 5828  N  R1-B1-H3-ZA 16.0  20   13   1402

cpcf1n9sw  f1n9104vg  vpath7   hdisk11  20-58-01       IBM-2105F20 41015244 5828  N  R1-B4-H2-ZA 16.0  20   14   1402
                               hdisk43  10-80-01       IBM-2105F20 41015244 5828  N  R1-B1-H3-ZA 16.0  20   14   1402

cpcf1n9sw  f1n9100vg  vpath8   hdisk12  20-58-01       IBM-2105F20 41115244 5828  N  R1-B4-H2-ZA 16.0  20   15   1403
                               hdisk44  10-80-01       IBM-2105F20 41115244 5828  N  R1-B1-H3-ZA 16.0  20   15   1403

cpcf1n9sw  f1n9101vg  vpath9   hdisk13  20-58-01       IBM-2105F20 70B15244 5828  N  R1-B4-H2-ZA 16.0  20   16   1404
                               hdisk45  10-80-01       IBM-2105F20 70B15244 5828  N  R1-B1-H3-ZA 16.0  20   16   1404

cpcf1n9sw  f1n9102vg  vpath10  hdisk14  20-58-01       IBM-2105F20 70C15244 5828  N  R1-B4-H2-ZA 16.0  20   17   1405
                               hdisk46  10-80-01       IBM-2105F20 70C15244 5828  N  R1-B1-H3-ZA 16.0  20   17   1405

cpcf1n9sw  f1n9103vg  vpath11  hdisk15  20-58-01       IBM-2105F20 70D15244 5828  N  R1-B4-H2-ZA 16.0  23   11   1701
                               hdisk47  10-80-01       IBM-2105F20 70D15244 5828  N  R1-B1-H3-ZA 16.0  23   11   1701

cpcf1n9sw  f1n9104vg  vpath12  hdisk16  20-58-01       IBM-2105F20 70E15244 5828  N  R1-B4-H2-ZA 16.0  23   12   1702
                               hdisk48  10-80-01       IBM-2105F20 70E15244 5828  N  R1-B1-H3-ZA 16.0  23   12   1702

cpcf1n9sw  f1n9100vg  vpath13  hdisk17  20-58-01       IBM-2105F20 60D15244 5828  N  R1-B4-H2-ZA 16.0  23   13   1703
                               hdisk49  10-80-01       IBM-2105F20 60D15244 5828  N  R1-B1-H3-ZA 16.0  23   13   1703

cpcf1n9sw  f1n9101vg  vpath14  hdisk18  20-58-01       IBM-2105F20 60E15244 5828  N  R1-B4-H2-ZA 16.0  23   14   1704
                               hdisk50  10-80-01       IBM-2105F20 60E15244 5828  N  R1-B1-H3-ZA 16.0  23   14   1704

cpcf1n9sw  f1n9102vg  vpath15  hdisk19  20-58-01       IBM-2105F20 60F15244 5828  N  R1-B4-H2-ZA 16.0  18   12   1201
                               hdisk51  10-80-01       IBM-2105F20 60F15244 5828  N  R1-B1-H3-ZA 16.0  18   12   1201

cpcf1n9sw  f1n9103vg  vpath16  hdisk20  20-58-01       IBM-2105F20 61015244 5828  N  R1-B4-H2-ZA 16.0  18   13   1202
                               hdisk52  10-80-01       IBM-2105F20 61015244 5828  N  R1-B1-H3-ZA 16.0  18   13   1202

cpcf1n9sw  f1n9104vg  vpath17  hdisk21  20-58-01       IBM-2105F20 61115244 5828  N  R1-B4-H2-ZA 16.0  18   14   1202
                               hdisk53  10-80-01       IBM-2105F20 61115244 5828  N  R1-B1-H3-ZA 16.0  18   14   1202

cpcf1n9sw  f1n9102vg  vpath18  hdisk22  20-58-01       IBM-2105F20 10915244 5828  N  R1-B4-H2-ZA 16.0  21   11   1501
                               hdisk54  10-80-01       IBM-2105F20 10915244 5828  N  R1-B1-H3-ZA 16.0  21   11   1501

cpcf1n9sw  f1n9103vg  vpath19  hdisk23  20-58-01       IBM-2105F20 10A15244 5828  N  R1-B4-H2-ZA 16.0  21   12   1502
                               hdisk55  10-80-01       IBM-2105F20 10A15244 5828  N  R1-B1-H3-ZA 16.0  21   12   1502

cpcf1n9sw  f1n9104vg  vpath20  hdisk24  20-58-01       IBM-2105F20 10B15244 5828  N  R1-B4-H2-ZA 16.0  21   13   1502
                               hdisk56  10-80-01       IBM-2105F20 10B15244 5828  N  R1-B1-H3-ZA 16.0  21   13   1502

cpcf1n9sw  f1n9105vg  vpath21  hdisk25  20-58-01       IBM-2105F20 10C15244 5828  N  R1-B4-H2-ZA 16.0  16   12   1001
                               hdisk57  10-80-01       IBM-2105F20 10C15244 5828  N  R1-B1-H3-ZA 16.0  16   12   1001

cpcf1n9sw  f1n9105vg  vpath22  hdisk26  20-58-01       IBM-2105F20 10D15244 5828  N  R1-B4-H2-ZA 16.0  16   13   1002
                               hdisk58  10-80-01       IBM-2105F20 10D15244 5828  N  R1-B1-H3-ZA 16.0  16   13   1002

cpcf1n9sw  f1n9101vg  vpath23  hdisk27  20-58-01       IBM-2105F20 00C15244 5828  N  R1-B4-H2-ZA 16.0  16   14   1002
                               hdisk59  10-80-01       IBM-2105F20 00C15244 5828  N  R1-B1-H3-ZA 16.0  16   14   1002

cpcf1n9sw  f1n9102vg  vpath24  hdisk28  20-58-01       IBM-2105F20 00D15244 5828  N  R1-B4-H2-ZA 16.0  19   12   1301
                               hdisk60  10-80-01       IBM-2105F20 00D15244 5828  N  R1-B1-H3-ZA 16.0  19   12   1301

cpcf1n9sw  f1n9103vg  vpath25  hdisk29  20-58-01       IBM-2105F20 00E15244 5828  N  R1-B4-H2-ZA 16.0  19   13   1302
                               hdisk61  10-80-01       IBM-2105F20 00E15244 5828  N  R1-B1-H3-ZA 16.0  19   13   1302

cpcf1n9sw  f1n9104vg  vpath26  hdisk30  20-58-01       IBM-2105F20 30C15244 5828  N  R1-B4-H2-ZA 16.0  19   14   1302
                               hdisk62  10-80-01       IBM-2105F20 30C15244 5828  N  R1-B1-H3-ZA 16.0  19   14   1302

cpcf1n9sw  f1n9100vg  vpath27  hdisk31  20-58-01       IBM-2105F20 30D15244 5828  N  R1-B4-H2-ZA 16.0  17   9    1100
                               hdisk63  10-80-01       IBM-2105F20 30D15244 5828  N  R1-B1-H3-ZA 16.0  17   9    1100

cpcf1n9sw  f1n9101vg  vpath28  hdisk32  20-58-01       IBM-2105F20 30E15244 5828  N  R1-B4-H2-ZA 16.0  17   10   1101
                               hdisk64  10-80-01       IBM-2105F20 30E15244 5828  N  R1-B1-H3-ZA 16.0  17   10   1101

cpcf1n9sw  f1n9100vg  vpath29  hdisk33  20-58-01       IBM-2105F20 20C15244 5828  N  R1-B4-H2-ZA 16.0  17   11   1101
                               hdisk65  10-80-01       IBM-2105F20 20C15244 5828  N  R1-B1-H3-ZA 16.0  17   11   1101

cpcf1n9sw  f1n9101vg  vpath30  hdisk34  20-58-01       IBM-2105F20 20D15244 5828  N  R1-B4-H2-ZA 16.0  17   12   1102
                               hdisk66  10-80-01       IBM-2105F20 20D15244 5828  N  R1-B1-H3-ZA 16.0  17   12   1102

cpcf1n9sw  f1n9102vg  vpath31  hdisk35  20-58-01       IBM-2105F20 20E15244 5828  N  R1-B4-H2-ZA 16.0  17   13   1102
                               hdisk67  10-80-01       IBM-2105F20 20E15244 5828  N  R1-B1-H3-ZA 16.0  17   13   1102
```



***lsvp  # Pulls information out of ODM from last boot***

```
Processing /var/adm/lsess.out file ..............................
            BAY-1(B1)           BAY-2(B2)           BAY-3(B3)           BAY-4(B4)
          H1  H2  H3  H4      H1  H2  H3  H4      H1  H2  H3  H4      H1  H2  H3  H4
         A B A B A B A B     A B A B A B A B     A B A B A B A B     A B A B A B A B

  vpath0  - - - - - Y - -     - - - - - - - -     - - - - - - - -     - - - Y - - - -
  vpath1  - - - - - Y - -     - - - - - - - -     - - - - - - - -     - - - Y - - - -
  vpath2  - - - - - Y - -     - - - - - - - -     - - - - - - - -     - - - Y - - - -
  vpath3  - - - - - Y - -     - - - - - - - -     - - - - - - - -     - - - Y - - - -
  vpath4  - - - - - Y - -     - - - - - - - -     - - - - - - - -     - - - Y - - - -
  vpath5  - - - - - Y - -     - - - - - - - -     - - - - - - - -     - - - Y - - - -
  vpath6  - - - - - Y - -     - - - - - - - -     - - - - - - - -     - - - Y - - - -
  vpath7  - - - - - Y - -     - - - - - - - -     - - - - - - - -     - - - Y - - - -
  vpath8  - - - - - Y - -     - - - - - - - -     - - - - - - - -     - - - Y - - - -
  vpath9  - - - - - Y - -     - - - - - - - -     - - - - - - - -     - - - Y - - - -
 vpath10  - - - - - Y - -     - - - - - - - -     - - - - - - - -     - - - Y - - - -
 vpath11  - - - - - Y - -     - - - - - - - -     - - - - - - - -     - - - Y - - - -
 vpath12  - - - - - Y - -     - - - - - - - -     - - - - - - - -     - - - Y - - - -
 vpath13  - - - - - Y - -     - - - - - - - -     - - - - - - - -     - - - Y - - - -
 vpath14  - - - - - Y - -     - - - - - - - -     - - - - - - - -     - - - Y - - - -
 vpath15  - - - - - Y - -     - - - - - - - -     - - - - - - - -     - - - Y - - - -
 vpath16  - - - - - Y - -     - - - - - - - -     - - - - - - - -     - - - Y - - - -
 vpath17  - - - - - Y - -     - - - - - - - -     - - - - - - - -     - - - Y - - - -
 vpath18  - - - - - Y - -     - - - - - - - -     - - - - - - - -     - - - Y - - - -
 vpath19  - - - - - Y - -     - - - - - - - -     - - - - - - - -     - - - Y - - - -
 vpath20  - - - - - Y - -     - - - - - - - -     - - - - - - - -     - - - Y - - - -
 vpath21  - - - - - Y - -     - - - - - - - -     - - - - - - - -     - - - Y - - - -
 vpath22  - - - - - Y - -     - - - - - - - -     - - - - - - - -     - - - Y - - - -
 vpath23  - - - - - Y - -     - - - - - - - -     - - - - - - - -     - - - Y - - - -
 vpath24  - - - - - Y - -     - - - - - - - -     - - - - - - - -     - - - Y - - - -
 vpath25  - - - - - Y - -     - - - - - - - -     - - - - - - - -     - - - Y - - - -
 vpath26  - - - - - Y - -     - - - - - - - -     - - - - - - - -     - - - Y - - - -
 vpath27  - - - - - Y - -     - - - - - - - -     - - - - - - - -     - - - Y - - - -
 vpath28  - - - - - Y - -     - - - - - - - -     - - - - - - - -     - - - Y - - - -
 vpath29  - - - - - Y - -     - - - - - - - -     - - - - - - - -     - - - Y - - - -
 vpath30  - - - - - Y - -     - - - - - - - -     - - - - - - - -     - - - Y - - - -
 vpath31  - - - - - Y - -     - - - - - - - -     - - - - - - - -     - - - Y - - - -

Y = online/open
O = online/closed
N = offline
X = not-available
- = path not configured
? = path information not available
```

## 4.10 Web Pages / Books of Interest

Subsystem Device Driver downloadable code (and this document) is available at the following website:
http://ssddom01.storage.ibm.com/techsup/swtechsup.nsf/support/sddupdates

ESS Reference Material is availabe at the following website:
http://www.storage.ibm.com/hardsoft/products/ess/refinfo.htm

If you are looking for a nice image of an ESS for a glossy brochure, please send this URL to your IBM Representative. It is on the IBM Intranet at the following website:
http://w3.ssd.ibm.com/marketing/storage2.nsf/7d5e951cd96e748f082565bd00652388/134649c5014b8d43882567e5002b53ae?OpenDocument

There is a really nice red piece availabe – SG24-6113 – Implementing Fibre Channel Attachment on the ESS. Go to http://www.redbooks.ibm.com and search on "SG246113" to find it.

Hopefully this document was helpful. E-mails are appreciated at jiadams@us.ibm.com.
Good luck and God Bless!