

## SSD7120 for FreeBSD for NVMe Test Report

2020/9/11	Initial version
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### 1. Test Environment

MotherBoard	GIGABYTE X299
CPU	Intel Core i9-7900X @ 3.30GHz
Memory	16G
OS	FreeBSD 12.1 (r354233 GENERIC amd64)
Product	SSD7120
SSD	WD Ultrastar SN640 3.2TB*2
Driver	/
WebGUI	/

### 2. Test Procedure:

#### A. Legacy:

- 1) Install FreeBSD12.1 system;
- 2) Insert SSD7120to motherboard with two SSDs;
- 3) Open the system to check if the SSD7120 device is loaded;

#pciconf -lv

```
class = base peripheral
pcib100pci0:23:0:0: class=0x060400 card=0x874710b5 chip=0x874710b5 rev=0x00
hdr=0x01
vendor = 'PLX Technology, Inc.'
device = 'PEX 8747 48-Lane, 5-Port PCI Express Gen 3 (8.0 GT/s) Switch'
class = bridge
subclass = PCI-PCI
pcib110pci0:24:8:0: class=0x060400 card=0x874710b5 chip=0x874710b5 rev=0x00
hdr=0x01
vendor = 'PLX Technology, Inc.'
device = 'PEX 8747 48-Lane, 5-Port PCI Express Gen 3 (8.0 GT/s) Switch'
class = bridge
subclass = PCI-PCI
pcib120pci0:24:9:0: class=0x060400 card=0x874710b5 chip=0x874710b5 rev=0x00
hdr=0x01
vendor = 'PLX Technology, Inc.'
device = 'PEX 8747 48-Lane, 5-Port PCI Express Gen 3 (8.0 GT/s) Switch'
class = bridge
subclass = PCI-PCI
pcib130pci0:24:16:0: class=0x060400 card=0x874710b5 chip=0x874710b5 rev=0x00
hdr=0x01
vendor = 'PLX Technology, Inc.'
device = 'PEX 8747 48-Lane, 5-Port PCI Express Gen 3 (8.0 GT/s) Switch'
class = bridge
subclass = PCI-PCI
```

- 4) Check whether the connected disk is loaded;

#dmesg | less

- 5) Partition and format the disk;

#newfs /dev/nvd0

```
root@test:/ # newfs -j /dev/nvd0
```

- 6) Create mount directory;

#mkdir /mnt/test

```
root@test:/ # mkdir /mnt/test
```

- 7) Mount the disk to the file system;

#mount /dev/nvd0 /mnt/test

```
root@test:/ # mount /dev/nvd0 /mnt/test/
```

- 8) Do R/W operation to the disk;

```
#cd /mnt/test
#vi test.txt
#ll
```

```
root@test:/ # cd /mnt/test/
root@test:/mnt/test # vi test.txt

root@test:/mnt/test # ll
total 32808
drwxrwxr-x  2 root  operator    512 Sep 11 06:44 .snap/
-r-----  1 root  wheel   33554432 Sep 11 06:44 .sujournal
-rw-r--r--  1 root  wheel    106 Sep 11 06:49 test.txt
root@test:/mnt/test #
```

- B. RAID0(gstripe:<https://www.freebsd.org/cgi/man.cgi?query=gmirror&sektion=&manpath=freebsd-release-ports> )

**EXAMPLES**

The following example shows how to set up a striped device from four disks with a 128KB stripe size for automatic configuration, create a file system on it, and mount it:

```
gstripe label -v -s 131072 data /dev/da0 /dev/da1 /dev/da2 /dev/da3
newfs /dev/stripe/data
mount /dev/stripe/data /mnt
[...]
umount /mnt
gstripe stop data
gstripe unload
```

- C. RAID1(gmirror: <https://www.freebsd.org/cgi/man.cgi?query=gstripe> )

**EXAMPLES**

Use 3 disks to setup a mirror. Choose split balance algorithm, split only requests which are bigger than or equal to 2kB. Create file system, mount it, then unmount it and stop device:

```
gmirror label -v -b split -s 2048 data da0 da1 da2
newfs /dev/mirror/data
mount /dev/mirror/data /mnt
...
umount /mnt
gmirror stop data
gmirror unload
```

3. Test result:

- 1) The NVMe driver of FreeBSD 12.1 can load the disk on the SSD7120 and can read and write normally;

```
uhub0: <0x0006 XHCI root HUB> (1024 byte sectors)
uhub1: <0x1b21 XHCI root HUB, class 9/0, rev 3.00/1.00, addr 1> on usb0
ugen3.1: <0x1b21 XHCI root HUB, class 9/0, rev 3.00/1.00, addr 1> on usb0
uhub2: <0x1b21 XHCI root HUB> at usb0
uhub3: <0x1b21 XHCI root HUB, class 9/0, rev 3.00/1.00, addr 1> on usb0
uhub4: <0x1b21 XHCI root HUB, class 9/0, rev 3.00/1.00, addr 1> on usb0
nvd0: <WUS4CB032D7P3E3> NVMe namespace
nvd0: 3052360MB (781404246 4096 byte sectors)
nvd1: <WUS4CB032D7P3E3> NVMe namespace
nvd1: 3052360MB (781404246 4096 byte sectors)
hdacc1: <NVIDIA (0x0051) HDMI CODEC> at cad 0 on hdac1
hdaa1: <NVIDIA (0x0051) Audio Function Group> at nid 1 on hdac1
pcm3: <NVIDIA (0x0051) (HDMI/DP 8ch)> at nid 4 on hdaa1
pcm4: <NVIDIA (0x0051) (HDMI/DP 8ch)> at nid 5 on hdaa1
Trying to mount root from ufs:/dev/ada0s1a [rw]...
uhub1: 4 ports with 4 removable, self powered

root@test:/ # cd /mnt/test
root@test:/ # mount /dev/nvd0 /mnt/test/
root@test:/ # df -h
Filesystem      Size  Used  Avail Capacity  Mounted on
/dev/ada0s1a    105G   1.7G   95G      2%      /
devfs            1.0K   1.0K    0B    100%    /dev
/dev/nvd0        2.8T   32M   2.6T     0%    /mnt/test
root@test:/ #
```

2) SSD7120 can create OS RAID0 on FreeBSD12.1

```

root@test:~ # gstripe label -v -s 131072 RAID0 /dev/nvd0 /dev/nvd1
GEOM_STRIPE: Device RAID0 created (id=1872497396).
GEOM_STRIPE: Disk nvd0 attached to RAID0.
GEOM_STRIPE: Cannot add disk ufsid/5f5b27f9460e2a05 to RAID0 (error=17).
GEOM_STRIPE: Cannot add disk diskid/DISK-A050F496 to RAID0 (error=17).
Metadata value stored on /dev/nvd0.
GEOM_STRIPE: Disk nvd1 attached to RAID0.
GEOM_STRIPE: Device stripe/RAID0 activated.
GEOM_STRIPE: Cannot add disk diskid/DISK-A050F496 to RAID0 (error=17).
Metadata value stored on /dev/nvd1.
Done.

```

```

root@test:~ # gstripe list
Geom name: RAID0
State: UP
Status: Total=2, Online=2
Type: AUTOMATIC
Stripesize: 131072
ID: 790690557
Providers:
1. Name: stripe/RAID0
   Mediasize: 6401263403008 (5.8T)
   Sectorsize: 4096
   Stripessize: 131072
   Stripeoffset: 0
   Mode: r0w0e0
Consumers:
1. Name: nvd0
   Mediasize: 3200631791616 (2.9T)
   Sectorsize: 4096
   Mode: r0w0e0
   Number: 0
2. Name: nvd1
   Mediasize: 3200631791616 (2.9T)
   Sectorsize: 4096
   Mode: r0w0e0
   Number: 1

```

```

root@test:~ # mount /dev/stripe/RAID0 /mnt/test/
root@test:~ # df -h

```

Filesystem	Size	Used	Avail	Capacity	Mounted on
/dev/ada0s1a	105G	1.7G	95G	2%	/
devfs	1.0K	1.0K	0B	100%	/dev
/dev/stripe/RAID0	5.6T	12K	5.2T	0%	/mnt/test

3) SSD7120 can create OS RAID1 on FreeBSD12.1

```

root@test:~ # qmirror label -vb round-robin raidone /dev/nvd0 /dev/nvd1
Metadata value stored on /dev/nvd0.
Metadata value stored on /dev/nvd1.
Done.

```

```

ID: 2058064298
Type: AUTOMATIC
Providers:
1. Name: mirror/raidone
   Mediasize: 3200631787520 (2.9T)
   Sectorsize: 4096
   Mode: r0w0e0
Consumers:
1. Name: diskid/DISK-A050F496
   Mediasize: 3200631791616 (2.9T)
   Sectorsize: 4096
   Mode: r1w1e1
   State: ACTIVE
   Priority: 1
   Flags: (null)
   GenID: 0
   SyncID: 1
   ID: 2845411666
2. Name: diskid/DISK-A050F496
   Mediasize: 3200631791616 (2.9T)
   Sectorsize: 4096
   Mode: r1w1e1
   State: ACTIVE
   Priority: 0
   Flags: (null)
   GenID: 0
   SyncID: 1
   ID: 3065498294

```

```
root@test:~ # mount /dev/mirror/raidone /mnt/test/
root@test:~ # df -h
Filesystem      Size  Used Avail Capacity  Mounted on
/dev/ada0s1a    105G   1.7G   95G     2%      /
devfs           1.0K   1.0K    0B    100%    /dev
/dev/mirror/raidone 2.8T   8.0K   2.6T     0%    /mnt/test
root@test:~ #
```

4. Test conclusion

- 1) SSD7120 can be used on FreeBSD12.1, and can create OS RAID0 and OS RAID1