

17 Vinum

17.1

가 :

- 가
- 가
- 가

Vinum

17.2 가

Vinum

가

가

가

가

10

17.3

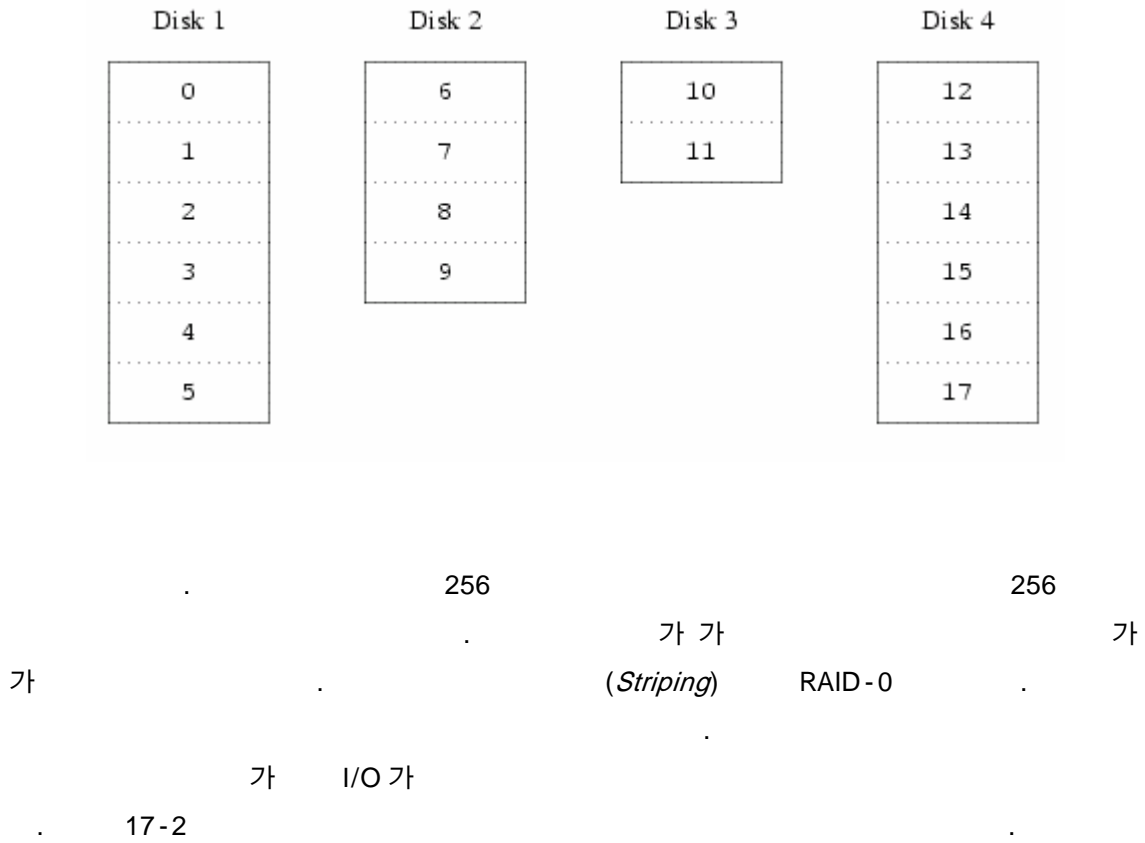
가

가

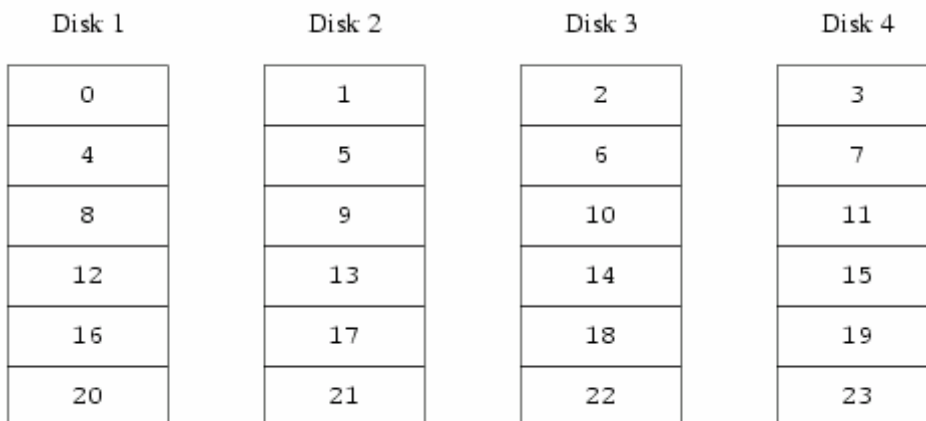
FTP HTTP

가

100Mbit/s



17-2.



17.4

가 . 가

:

(mirroring) . RAID 가 RAID 1
RAID-1 .

가

가 가 :

- 가 .
- ;

가 RAID 2, 3, 4 5 (parity) . RAID-5 가
. Vinum

Vinum RAID-5 (plex) RAID-5 가 (plex)

. RAID-5

17-3. RAID-5

Disk 1	Disk 2	Disk 3	Disk 4
0	1	2	Parity
3	4	Parity	5
6	Parity	7	8
Parity	9	10	11
12	13	14	Parity
15	16	Parity	17

RAID-5
25%가
가
가 RAID-4 RAID-5 (spare disk)
가

17.5 Vinum

Vinum 4 :

- 가 (volume) 가 가

- (plexes)
가

- Vinum
: 가 Vinum
()

- Vinum () . Vinum

Vinum

17.5.1

Vinum

17.5.2

Vinum

```

.          1      8          .
.
가          (
)          (          )
.          가
.

```

17.5.3

Vinum concatenation striping

- *(concatenated plex)*
- *(striped plex)*

17.5.4 가?

FreeBSD 5.2.1 Vinum :

- : 가 가
. CPU

CPU

- (RAID-0) 가 :
(256KB) :
가
가 Vinum 가 Vinum
가 : 가 가
가

17-1

17-1. Vinum

		가 가 ?	?	
Concatenated	1	Yes	No	
Striped	2	No	Yes	

17.6 가

Vinum 가
vinum(8)
Vinum
(Vinum) 가
Vinum

17.6.1

Vinum

:

```
drive a device /dev/da3h
  volume myvol
    plex org concat
      sd length 512m drive a
```

4 Vinum :

- *drive* (drive)
 - a*
- *volume* *myvol*
- *plex*
 - concat* : *.px* *myvol.p0*
- *sd*
 - .sx* : *.x* *myvol.p0.s0*

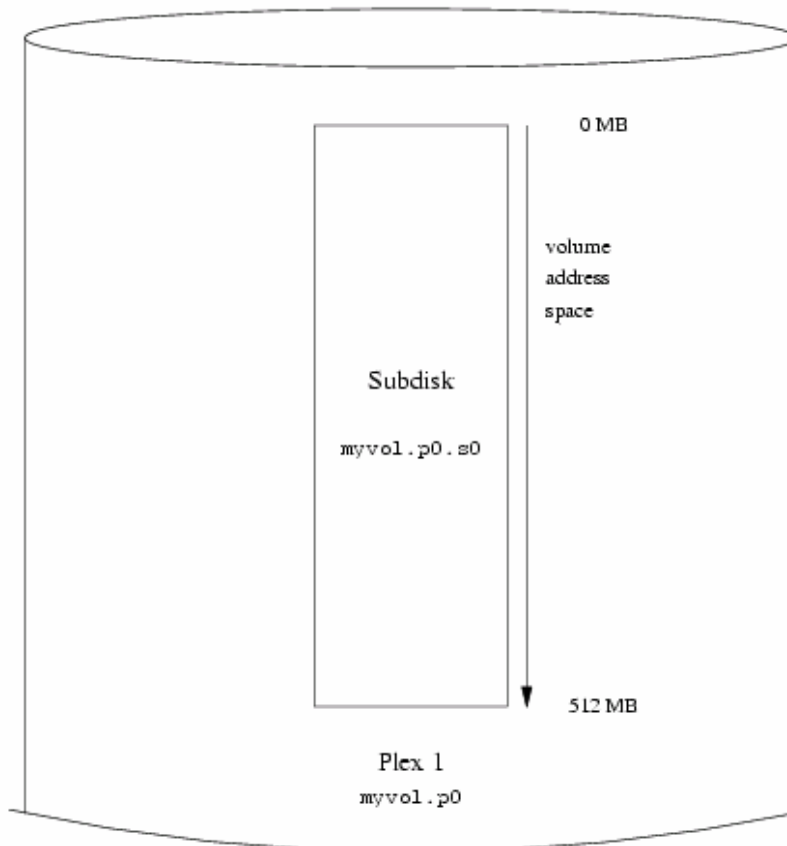
가 vinum(8) :

```
# vinum -> create config1
Configuration summary
Drives:      1 (4 configured)
Volumes:     1 (4 configured)
Plexes:      1 (8 configured)
```

Subdisks:		1 (16 configured)	
D a	State: up	Device /dev/da3h	Avail:
2061/2573 MB (80%)			
V myvol	State: up	Plexes: 1	Size: 512 MB
P myvol.p0	C State: up	Subdisks: 1	Size: 512 MB
S myvol.p0.s0	State: up	PO: 0	B Size: 512 MB

vinum(8) 17-4

17-4. Vinum



가

가

가

가

17.6.2 가:

가

가

가

:

```
drive b device /dev/da4h
  volume mirror
    plex org concat
      sd length 512m drive a
    plex org concat
      sd length 512m drive b
```

Vinum

a

가

:

```
Drives:      2 (4 configured)
Volumes:     2 (4 configured)
Plexes:      3 (8 configured)
Subdisks:    3 (16 configured)

D a          State: up      Device /dev/da3h      Avail: 1549/2573 MB (60%)
D b          State: up      Device /dev/da4h      Avail: 2061/2573 MB (80%)

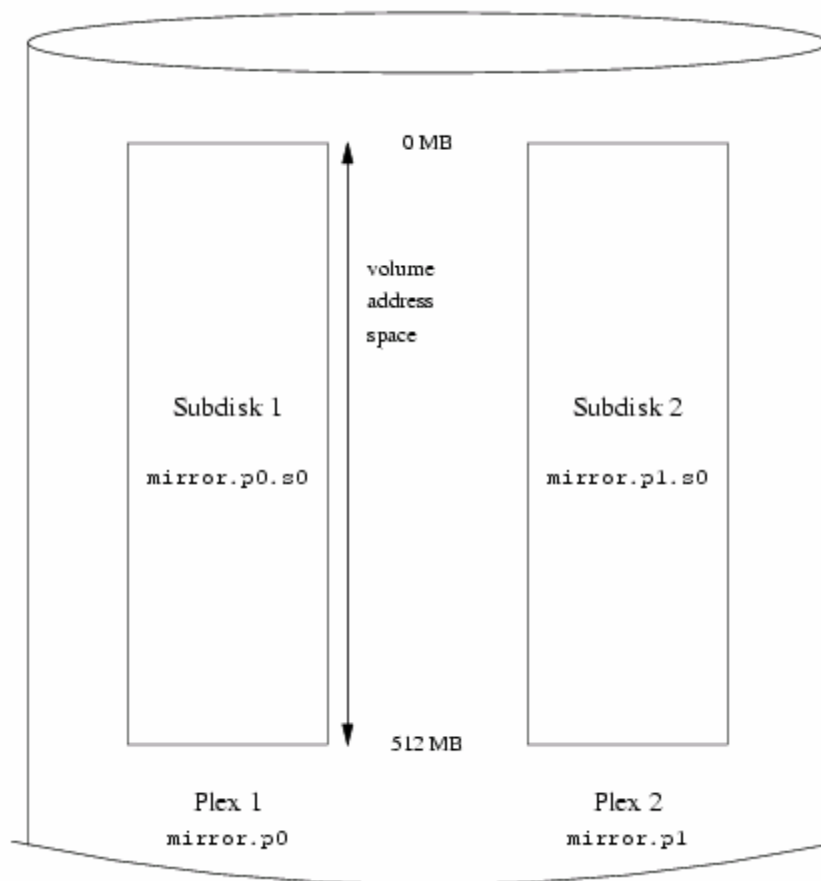
V myvol      State: up      Plexes:      1 Size:      512 MB
V mirror     State: up      Plexes:      2 Size:      512 MB

P myvol.p0   C State: up    Subdisks:    1 Size:      512 MB
```

P mirror.p0	C State: up	Subdisks:	1	Size:	512 MB
P mirror.p1	C State: initializing	Subdisks:	1	Size:	512 MB
S myvol.p0.s0	State: up	PO:	0	B Size:	512 MB
S mirror.p0.s0	State: up	PO:	0	B Size:	512 MB
S mirror.p1.s0	State: empty	PO:	0	B Size:	512 MB

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17-5 Vinum

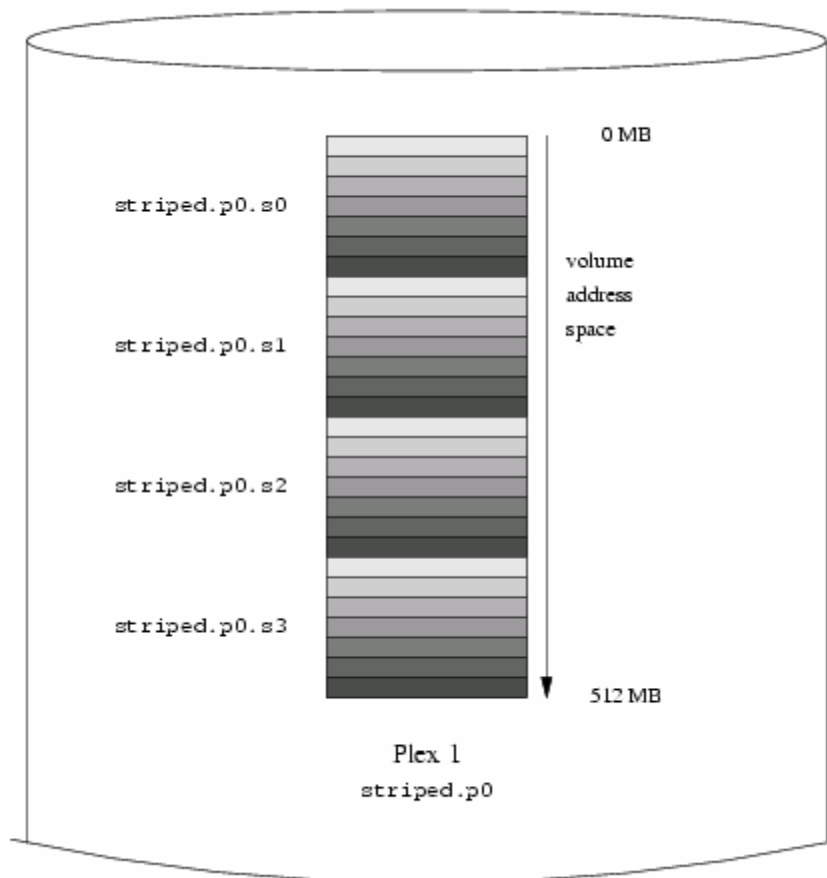


512MB 가

P mirror.p1	C State: initializing	Subdisks:	1	Size:	512 MB
P striped.p1	State: up	Subdisks:	1	Size:	512 MB
S myvol.p0.s0	State: up	PO:	0	B Size:	512 MB
S mirror.p0.s0	State: up	PO:	0	B Size:	512 MB
S mirror.p1.s0	State: empty	PO:	0	B Size:	512 MB
S striped.p0.s0	State: up	PO:	0	B Size:	128 MB
S striped.p0.s1	State: up	PO:	512 kB	Size:	128 MB
S striped.p0.s2	State: up	PO:	1024 kB	Size:	128 MB
S striped.p0.s3	State: up	PO:	1536 kB	Size:	128 MB

17-6

17-6. Vinum



: 가

17.6.4

가

:

```
volume raid10
```

```
plex org striped 512k
```

```
sd length 102480k drive a
```

```
sd length 102480k drive b
```

```
sd length 102480k drive c
```

```
sd length 102480k drive d
```

```
sd length 102480k drive e
```

```
plex org striped 512k
```

```
sd length 102480k drive c
```

```
sd length 102480k drive d
```

```
sd length 102480k drive e
```

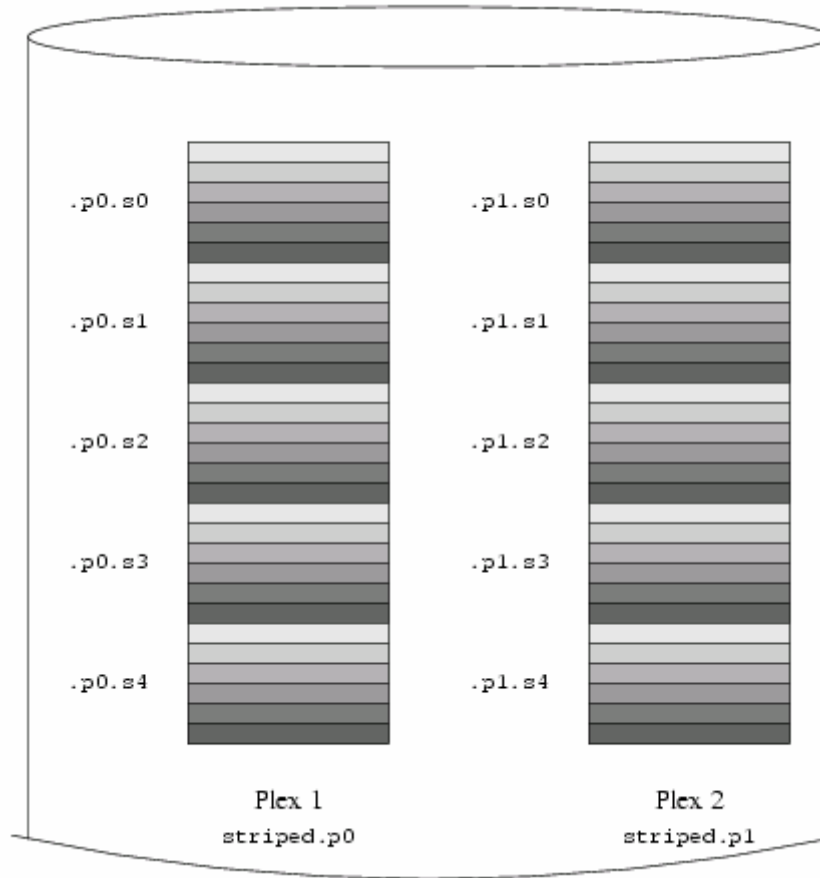
```
sd length 102480k drive a
```

```
sd length 102480k drive b
```

(offset) : 가

17-7

17-7. Vinum



17.7

Vinum

VERITAS :

가

(-)

64

32

Vinum /dev/vinum

Vinum :

- `vinum(8)` Vinum `/dev/vinum/control`
`/dev/vinum/control` .
- Vinum BSD
`r` . `/dev/vinum/myvol, /dev/vinum/mirror,`
`/dev/vinum/striped, /dev/vinum/raid5 /dev/vinum/raid10` .
`/dev/vinum/rmyvol, /dev/vinum/rmrror, /dev/vinum/rstriped,`
`/dev/vinum/rraid5 /dev/vinum/rraid10` . 가 : `r rr`
가 `/dev/vinum/rr` :
`r rr` 가? Vinum
:
- `/dev/vinum/volume` .
- `/dev/vinum/volume` .
가 .
- 가 `/dev/vinum/plex, /dev/vinum/sd /dev/vinum/rsd`
:

```
drive drive1 device /dev/sd1h
drive drive2 device /dev/sd2h
drive drive3 device /dev/sd3h
drive drive4 device /dev/sd4h
volume s64 setupstate
plex org striped 64k
sd length 100m drive drive1
sd length 100m drive drive2
sd length 100m drive drive3
```

sd length 100m drive drive4

vinum(8) /dev/vinum :

```
brwx----- 1 root wheel 25, 0x40000001 Apr 13 16:46 Control
brwx----- 1 root wheel 25, 0x40000002 Apr 13 16:46 control
brwx----- 1 root wheel 25, 0x40000000 Apr 13 16:46 controld
drwxr-xr-x 2 root wheel 512 Apr 13 16:46 drive
drwxr-xr-x 2 root wheel 512 Apr 13 16:46 plex
crwxr-xr-- 1 root wheel 91, 2 Apr 13 16:46 rs64
drwxr-xr-x 2 root wheel 512 Apr 13 16:46 rsd
drwxr-xr-x 2 root wheel 512 Apr 13 16:46 rvol
brwxr-xr-- 1 root wheel 25, 2 Apr 13 16:46 s64
drwxr-xr-x 2 root wheel 512 Apr 13 16:46 sd
drwxr-xr-x 3 root wheel 512 Apr 13 16:46 vol
```

/dev/vinum/drive:

total 0

```
lrwxr-xr-x 1 root wheel 9 Apr 13 16:46 drive1 -> /dev/sd1h
lrwxr-xr-x 1 root wheel 9 Apr 13 16:46 drive2 -> /dev/sd2h
lrwxr-xr-x 1 root wheel 9 Apr 13 16:46 drive3 -> /dev/sd3h
lrwxr-xr-x 1 root wheel 9 Apr 13 16:46 drive4 -> /dev/sd4h
```

/dev/vinum/plex:

total 0

```
brwxr-xr-- 1 root wheel 25, 0x10000002 Apr 13 16:46 s64.p0
```

/dev/vinum/rsd:

total 0

```
crwxr-xr-- 1 root wheel 91, 0x20000002 Apr 13 16:46 s64.p0.s0
crwxr-xr-- 1 root wheel 91, 0x20100002 Apr 13 16:46 s64.p0.s1
crwxr-xr-- 1 root wheel 91, 0x20200002 Apr 13 16:46 s64.p0.s2
crwxr-xr-- 1 root wheel 91, 0x20300002 Apr 13 16:46 s64.p0.s3
```

/dev/vinum/rvol:

```
total 0
crwxr-xr--  1 root  wheel   91,  2 Apr 13 16:46 s64

/dev/vinum/sd:
total 0
brwxr-xr--  1 root  wheel   25, 0x20000002 Apr 13 16:46 s64.p0.s0
brwxr-xr--  1 root  wheel   25, 0x20100002 Apr 13 16:46 s64.p0.s1
brwxr-xr--  1 root  wheel   25, 0x20200002 Apr 13 16:46 s64.p0.s2
brwxr-xr--  1 root  wheel   25, 0x20300002 Apr 13 16:46 s64.p0.s3

/dev/vinum/vol:
total 1
brwxr-xr--  1 root  wheel   25,  2 Apr 13 16:46 s64
drwxr-xr-x  3 root  wheel   512 Apr 13 16:46 s64.plex

/dev/vinum/vol/s64.plex:
total 1
brwxr-xr--  1 root  wheel   25, 0x10000002 Apr 13 16:46 s64.p0
drwxr-xr-x  2 root  wheel   512 Apr 13 16:46 s64.p0.sd

/dev/vinum/vol/s64.plex/s64.p0.sd:
total 0
brwxr-xr--  1 root  wheel   25, 0x20000002 Apr 13 16:46 s64.p0.s0
brwxr-xr--  1 root  wheel   25, 0x20100002 Apr 13 16:46 s64.p0.s1
brwxr-xr--  1 root  wheel   25, 0x20200002 Apr 13 16:46 s64.p0.s2
brwxr-xr--  1 root  wheel   25, 0x20300002 Apr 13 16:46 s64.p0.s3
```

Vinum

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17.7.1

가

Vinum

```

.          Vinum
newfs(8) .          /dev/ad0a      /dev/da2h      가
.          (0) IDE      (ad)          (a)          (2)
SCSI      (da)          (h)          .          Vinum
          /dev/vinum/concat
newfs(8)
:

```

```
# newfs /dev/vinum/concat
```

```
newfs: /dev/vinum/concat: can't figure out file system partition
```

Note: FreeBSD 5.0

```
newfs(8) -v
```

```
# newfs -v /dev/vinum/concat
```

17.8 Vinum

```

GENERIC      Vinum      . Vinum
. Vinum      (kld).
Vinum      kldload(8)      : vinum(8)

```

17.8.1 Startup

```

Vinum
      Vinum
:

```

```
volume myvol state up
volume bigraid state down
plex name myvol.p0 state up org concat vol myvol
plex name myvol.p1 state up org concat vol myvol
plex name myvol.p2 state init org striped 512b vol myvol
plex name bigraid.p0 state initializing org raid5 512b vol bigraid
sd name myvol.p0.s0 drive a plex myvol.p0 state up len 1048576b driveoffset 265b
plexoffset 0b
sd name myvol.p0.s1 drive b plex myvol.p0 state up len 1048576b driveoffset 265b
plexoffset 1048576b
sd name myvol.p1.s0 drive c plex myvol.p1 state up len 1048576b driveoffset 265b
plexoffset 0b
sd name myvol.p1.s1 drive d plex myvol.p1 state up len 1048576b driveoffset 265b
plexoffset 1048576b
sd name myvol.p2.s0 drive a plex myvol.p2 state init len 524288b driveoffset
1048841b plexoffset 0b
sd name myvol.p2.s1 drive b plex myvol.p2 state init len 524288b driveoffset
1048841b plexoffset 524288b
sd name myvol.p2.s2 drive c plex myvol.p2 state init len 524288b driveoffset
1048841b plexoffset 1048576b
sd name myvol.p2.s3 drive d plex myvol.p2 state init len 524288b driveoffset
1048841b plexoffset 1572864b
sd name bigraid.p0.s0 drive a plex bigraid.p0 state initializing len 4194304b driveoff
set 1573129b plexoffset 0b
sd name bigraid.p0.s1 drive b plex bigraid.p0 state initializing len 4194304b driveoff
set 1573129b plexoffset 4194304b
sd name bigraid.p0.s2 drive c plex bigraid.p0 state initializing len 4194304b driveoff
set 1573129b plexoffset 8388608b
sd name bigraid.p0.s3 drive d plex bigraid.p0 state initializing len 4194304b driveoff
set 1573129b plexoffset 12582912b
sd name bigraid.p0.s4 drive e plex bigraid.p0 state initializing len 4194304b driveoff
set 1573129b plexoffset 16777216b
```

) . Vinum (가
: Vinum

ID Vinum

17.8.1.1

Vinum /etc/rc.conf 가

:

`start_vinum="YES" # set to YES to start vinum`

/etc/rc.conf

Vinum kld

fsck(8) Vinum

vinum start Vinum Vinum Vinum

가 가 가 가
Vinum 가 가

17.9 Root

Vinum

Vinum root

:

- root Vinum

- Vinum root 가

(: PC BIOS)

가

root . root
가 ID (major/minor)

17.9.2 Vinum root

FreeBSD 7.5KB UFS
Vinum 가 . Vinum
"a" root 가
가 .

root :

- root RAID-5 .
- root .

root 가 root 가 가
root

root 가 "a" (illusion) 가
. root 가 (faked) "a"
가

Vinum .

root "a"
:

root

vinum l -rv root

```
Vinum          (bytes)      . disklable
                512          .
```

```
root          .
```

disklabel -e devname

```
devname          (da0      )
(ad0s1          ).
```

```
(          Vinum root          가          ) "a"
          가          (          )
          .          (          root
          )          "Fixit"          (
)          가          .
```

```
Vinum          root
가          .          "a"          "offset"
"size"          .          "fstype" 4.2BSD
          "fsize", "bsize" "cpd"
```

```
"a"          Vinum          . Vinum
"vinum"          disklabel
```

```
"a"          root          가          .
```

fsck -n /dev/devnamea

```

Vinum root , root
Vinum 가 root
. /etc/fstab /boot/loader.conf .
. 가
. 가 :
    
```

Mounting root from ufs:/dev/vinum/root

17.9.3 Vinum root

```

Vinum root vinum l -rv root :
    
```

```

...
Subdisk root.p0.s0:
  Size:      125829120 bytes (120 MB)
  State: up
  Plex root.p0 at offset 0 (0 B)
  Drive disk0 (/dev/da0h) at offset 135680 (132 kB)

Subdisk root.p1.s0:
  Size:      125829120 bytes (120 MB)
  State: up
  Plex root.p1 at offset 0 (0 B)
  Drive disk1 (/dev/da1h) at offset 135680 (132 kB)
    
```

```

offset( /dev/da0h ) 135680 . disklabel 265
512 . root 245760
512- 가 /dev/da1h
가
:
    
```

```
...
8 partitions:
#      size  offset  fstype  [fsize bsize bps/cpg]
a:  245760   281    4.2BSD  2048 16384   0 # (Cyl.  0* - 15*)
c: 71771688    0   unused    0    0      # (Cyl.  0 - 4467*)
h: 71771672   16   vinum      # (Cyl.  0* - 4467*)
```

```
"a"                                "size"                                "offset"
      Vinum      "h"                                (      )
      .          17.9.4.3                                .
"a"                                Vinum      가                                "h"
      .
      가 Vinum      Vinum
      Vinum root
```

17.9.4

가 . 가

17.9.4.1

```

10                                space
(vinum.autostrt ) show
set  unset
      Vinum                                load vinum
가  boot -as                                -as      root
      (-a)                                root
      (-s)
      가
```

```

root                                root      가
                                . /etc/fstab 가
ufs:/dev/vinum/root                .          Vinum root
가      ufs:da0d                    . Vinum root
"a"      가                          root
                                .
                                Vinum root

```

17.9.4.2

```

/boot/loader                        (      가
                                -          )      space
12.3.2      .      "a"      root      가

```

17.9.4.3

```

                                .          Vinum
Vinum                                .          Vinum
Vinum                                4KB
                                가
8KB 가      .          Vinum      가      0
                                Vinum
                                .
"Fixit"                                12.3.2
disklabel -B      ,          Vinum
                                .          Vinum      가
Vinum      가      Vinum      가
                                . Vinum
                                .
4kb      Vinum

```


ufs:vinum/root
가
("askroot" /dev/).