FreeBSD Administration - Support #765

Install FreeBSD With ZFS Root The Hard Way

03/02/2016 09:38 PM - Daniel Curtis

Status:	Closed	**Start date:**	03/02/2016
Priority:	Normal	**Due date:**	
Assignee:	Daniel Curtis	**% Done:**	100%
Category:	Installation	**Estimated time:**	2.00 hours
Target version:	FreeBSD 10	**Spent time:**	3.00 hours

Description

This is a guide on how I manually setup FreeBSD with a ZFS root on a GPT formatted hard drive, without the help of a GUI or bsdinstall. This guide is intended to install FreeBSD using the installation DVD and will work offline.

- When the FreeBSD Installer Welcome message appears, choose **Shell**.
- Get a list of available drives:

```
camcontrol devlist
```

- Create the GPT slices:

```
gpart create -s gpt ada0
```

  1. Then create the boot slice:

```
gpart add -b 40 -s 512K -t freebsd-boot -a 4k -l boot0 ada0
```

  2. Create the swap slice:

```
gpart add -s 4G -t freebsd-swap -a 4k -l swap0 ada0
```

  3. Then create the root ZFS slice:

```
gpart add -t freebsd-zfs -a 4k -l disk0 ada0
```

- Create ZFS pool using the GPT disk labeled disk0, then export it:

```
zpool create -o altroot=/mnt -o cachefile=/tmp/zpool.cache -m / -f rpool /dev/gpt/disk0
zpool export rpool
```

- Next import the ZFS pool using /mnt as the alternate root create the root dataset and settings:

```
zpool import -o altroot=/mnt -o cachefile=/tmp/zpool.cache rpool
zpool set bootfs=rpool rpool
zfs set checksum=fletcher4 rpool
zfs set atime=off rpool
zfs create rpool/root
```

  - Then create some additional system datasets:

```
zfs create -o canmount=off rpool/root/usr
```

```
zfs create -o canmount=off rpool/root/var
zfs create -o compression=on   -o exec=on  -o setuid=off rpool/root/tmp
zfs create -o compression=gzip -o setuid=off  rpool/root/usr/ports
zfs create -o compression=off  -o exec=off -o setuid=off rpool/root/usr/ports/distfiles
zfs create -o compression=off  -o exec=off -o setuid=off rpool/root/usr/ports/packages
zfs create -o compression=gzip -o exec=off -o setuid=off  rpool/root/usr/src
zfs create -o compression=lzjb rpool/root/usr/obj
zfs create -o compression=lzjb -o exec=off -o setuid=off rpool/root/var/crash
zfs create -o compression=off  -o exec=off -o setuid=off rpool/root/var/empty
zfs create -o compression=lzjb -o exec=on  -o setuid=off rpool/root/var/tmp
```

- Set the permissions of the temp directories in the zfs mount:

```
chmod 1777 /mnt/tmp
chmod 1777 /mnt/var/tmp
```

- Extract the base.txz and kernel.txz to the zfs root to install the base system:

```
cat /usr/freebsd-dist/base.txz | tar --unlink -xpJf - -C /mnt
cat /usr/freebsd-dist/kernel.txz | tar --unlink -xpJf - -C /mnt
```

- Add the initial system configuration:

```
echo 'zfs_enable="YES"' >> /mnt/etc/rc.conf
echo 'sshd_enable="YES"' >> /mnt/etc/rc.conf
touch /mnt/etc/fstab
```

  - And setup networking using DHCP:

```
echo 'ifconfig_em0="DHCP"' >> /mnt/etc/rc.conf
echo 'hostname="freebsd.example.com"' >> /mnt/etc/rc.conf
```

  - (Optional) Setup networking using a static IP address instead:

```
echo 'ifconfig_em0="inet 192.168.10.70 netmask 255.255.255.0 broadcast 198.100.10.255"' >>
 /mnt/etc/rc.conf
echo 'defaultrouter="192.168.10.1"' >> /mnt/etc/rc.conf
echo 'hostname="freebsd.example.com"' >> /mnt/etc/rc.conf
echo 'nameserver 192.168.10.1' >> /mnt/etc/resolv.conf
```

- Install the bootcode and set the boot partion to active:

```
gpart bootcode -b /mnt/boot/pmbr -p /mnt/boot/gptzfsboot -i 1 ada0
gpart set -a bootme -i 1 ada0
```

- Add the bootloader config:

```
echo 'zfs_load="YES"' >> /mnt/boot/loader.conf
echo 'if_em_load="YES"' >> /mnt/boot/loader.conf
echo 'vfs.root.mountfrom="zfs:rpool"' >> /mnt/boot/loader.conf
```

- Copy the working zpool.cache file to the rpool:

```
cp /tmp/zpool.cache /mnt/boot/zfs/zpool.cache
```

- Unmount the zpool:

```
zpool export rpool
```

- Reboot the system and eject the FreeBSD install disc:

```
reboot
```

Resources

- https://forums.freebsd.org/threads/42773/
- https://wiki.freebsd.org/RootOnZFS/GPTZFSBoot/9.0-RELEASE
- https://calomel.org/zfs_freebsd_root_install.html
- http://daemon-notes.com/articles/system/install-zfs/gpart
- http://daemon-notes.com/articles/system/install-zfs/zfs
- http://daemon-notes.com/articles/system/install-zfs/finish

History

#1 - 03/02/2016 11:04 PM - Daniel Curtis

- Description updated

- Status changed from New to In Progress

- % Done changed from 0 to 30

#2 - 03/03/2016 08:45 AM - Daniel Curtis

- Subject changed from Install FreeBSD The Hard Way to Install FreeBSD With ZFS Root The Hard Way

#3 - 03/03/2016 10:18 AM - Daniel Curtis

- Description updated

#4 - 03/03/2016 05:42 PM - Daniel Curtis

- Description updated

- % Done changed from 30 to 40

#5 - 03/03/2016 10:50 PM - Daniel Curtis

- Description updated

- Status changed from In Progress to Resolved

- % Done changed from 40 to 100

#6 - 03/04/2016 11:59 AM - Daniel Curtis

- Description updated

- Category set to Installation

#7 - 03/12/2016 02:16 PM - Daniel Curtis

- Status changed from Resolved to Closed