Transitioning from FreeNAS to FreeBSD

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Background

System administrator working within the Air Transport Industry

I mostly work with RedHat Enterprise Linux

Working in the IT sector for 14 years

This is my 3rd BSD conference, first time speaking

I'm very new to presenting!

I run FreeBSD at home

# How I got started with FreeNAS

- I knew I wanted a NAS for storing family photos, home video, media (movies, TV shows, etc.).
- I was planning to buy an off-the-shelf NAS from Synology or QNAP.
- A friend told me to check out FreeNAS.
- I went down the rabbit hole looking at FreeNAS and finding suitable hardware.
- I read the FreeNAS manual twice before installing it.

Becoming a FreeNAS power user

- Contributing back to the community by giving assistance to other FreeNAS users, regardless of their technical abilities.

- Created video tutorials (SAMBA & Unifi) for the community.

- Participate in the IRC chatroom offering assistance and advise.

- Filing bugs and feature requests.

- But most importantly; the many hours of discussion with key community members (AllanJude, cyberjock, DrKK`, Ericloewe).

FreeNAS Samba permissions video

Over 100,000 views!

https://youtu.be/RxggaE935PM
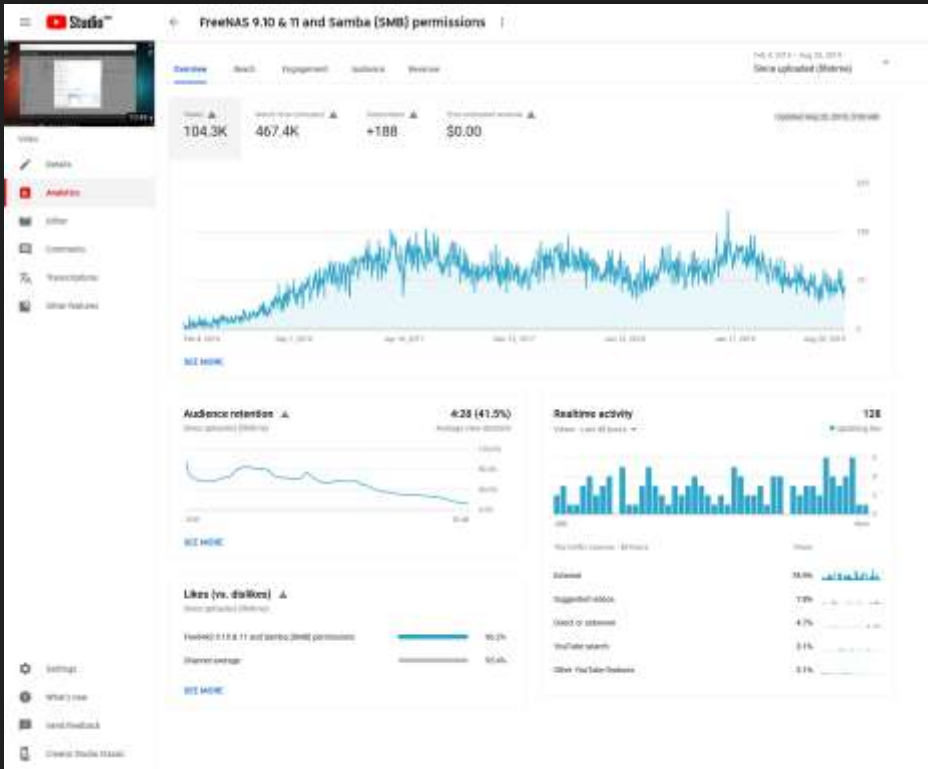
Community resources

Forums (iXsystems Community and FreeBSD Forums)

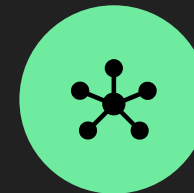Freenode IRC (#freenas, ##freenas-social, #freebsd)

Mumble (real-time voice chat)

BSDNow weekly podcast

Mailing lists

Slack

Must read books

- The Design and Implementation of the FreeBSD Operating Systems
- Absolute FreeBSD, 3rd Edition
- FreeBSD Mastery: Storage Essentials
- FreeBSD Mastery: ZFS
- FreeBSD Mastery: Advanced ZFS
- FreeBSD Mastery: Jails
- SSH Mastery

Goals

- Replicate most functionality of FreeNAS
  - Configure a failover link aggregation with bridging (giving jails their own network stack using VNET)
  - SAMBA with "previous versions" enabled
  - Set-up and manage jails
  - Monitor hard drive heath using S.M.A.R.T.
  - Configure the UPS to shutdown on power outage

Moving to FreeBSD

- Making a note of my settings in FreeNAS, sysctls, 'tunables' and screen shots for reference.
- Making a copy of the generated configuration files for running services in FreeNAS for reference.
- Back-up all data, including jails.
- Now the scary part – Installing FreeBSD!

Here I go!

Network configuration in /etc/rc.conf

- Setting the hostname

- Configure failover for resiliency (lagg)

- Configure a bridge for jails

- Turn on IP forwarding (`echo net.inet.ip.forward=1 >> /etc/sysctl.conf`)

```
hostname="tardis.localdomain"
cloned_interfaces="lagg0 bridge0"
ifconfig_lagg0="laggproto failover laggport igb0 laggport igb1"
ifconfig_bridge0="inet 192.168.1.5 netmask 255.255.255.0 addm lagg0 up"
ifconfig_igb0="up"
ifconfig_igb1="up"
defaultrouter="192.168.1.1"
```

Using ZFS

Import existing pool or create a new one?

I decided to create a new pool, so I could learn how to create a ZFS pool and configure it manually from scratch. My data is backed up. It takes more time to restore, but I learn more along the way.

What I learned along the way:

Set the mountpoint for /home

Enable LZ4 compression

Configuring snapshots using sysutils/zfstools

Disable atime

Setting appropriate recordsize for media datasets

Configuring ZFS snapshots

○ Install sysutils/zfsutils via pkg

○ The zfsutils package helpfully provides an example crontab after install. The schedule works for me .. let's use that!

```
# crontab -l -u root
PATH=/etc:/bin:/sbin:/usr/bin:/usr/sbin:/usr/local/bin
15,30,45 * * * * /usr/local/sbin/zfs-auto-snapshot frequent  4
0        * * * * /usr/local/sbin/zfs-auto-snapshot hourly   24
7        0 * * * /usr/local/sbin/zfs-auto-snapshot daily     7
14       0 * * 7 /usr/local/sbin/zfs-auto-snapshot weekly    4
28       0 1 * * /usr/local/sbin/zfs-auto-snapshot monthly  12
```

○ Enable snapshots on the pool and/or select datasets

```
zfs set com.sun:auto-snapshot=true storage
```

SAMBA

- Real basic configuration and enabling "previous versions" (aka shadow copies)

- Googling Samba configuration examples, reading man page (man smb.conf 5)

- Learn how to set ACLs using get/setfacl.

- smbpasswd -a dave

```
[global]

        netbios name = TARDIS
        Workgroup = WORKGROUP
        shadow: snapdir = .zfs/snapshot
        shadow: sort = desc
        shadow: localtime = yes
        shadow: format = zfs-auto-snap_monthly-%Y-%m-%d-%Hh%M
        shadow: format = zfs-auto-snap_weekly-%Y-%m-%d-%Hh%M
        shadow: format = zfs-auto-snap_daily-%Y-%m-%d-%Hh%M
        shadow: snapdirseverywhere = yes


[homes]

        browsable = no
        map archive = yes
        writeable = yes
        public = no
        vfs objects = zfsacl,shadow_copy2


[storage]

        path = /storage
        read only = no
        public = no
        writable = yes
        vfs objects = zfsacl,shadow_copy2
        nfs4:mode = special
        nfs4:acedup = merge
        nfs4:chown = yes
```

Jails

- Decided to go with iocage – it's what is in FreeNAS, so this is only natural to continue using it since I'm already familiar.

- Configured jails to use VNET – I created a bridge to do this.

- What other jail management tools are there?

  - /etc/jail.conf

  - ezjail

  - cbsd

  - iocell

  - … there are many … (https://wiki.freebsd.org/Jails#Jail_Management_Tools)

S.M.A.R.T.

- Monitoring hard drives using SMART for predictive failures.

- I admit, I cheated! Used the example configuration from the Arch Linux wiki (https://wiki.archlinux.org/index.php/S.M.A.R.T.)

```
# cat /usr/local/etc/smartd.conf
DEVICESCAN -a -o on -S on -n standby,q -s (S/../../../02|L/../../6/03) -W 4,10,45 -m root
```

- This configuration runs a short test every day at 2am, long test every Saturday at 3am, alerts on temps if below 10C and above 45C (tracking changes of at least 4C).

UPS (Apcupsd)

- Using an APC Back-UPS shared over the network from my pfSense firewall using Apcupsd.

- UPS is configured on pfSense for maximum uptime.

- Apcupsd is configured on my FreeBSD server to shut down when there is either 10 minutes runtime or 20% battery remaining.

```
# cat /usr/local/etc/apcupsd/apcupsd.conf
UPSCABLE ether
UPSTYPE net
DEVICE 192.168.1.1:3551
BATTERYLEVEL 20
MINUTES 10
```
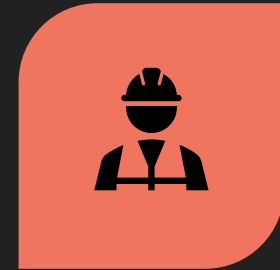
Keeping up-to-date

FREEBSD ANNOUNCEMENT MAILING LIST

CRON WITH FREEBSD-UPDATE

PKG

PORTMASTER

Why did I move from FreeNAS to FreeBSD?

○ Wanted to expand my knowledge of the OS underneath FreeNAS.

○ FreeNAS started to feel claustrophobic in terms of customization. FreeNAS is a software appliance, not a typical *NIX operating system.

○ Discovered the flexibility of FreeBSD – it can be what you need it to be, whether it's a desktop, file server, etc.

○ Awesome documentation!

What's easier to do in FreeBSD

○ OS and package updates – The user has control over updates using the standard mechanisms. FreeNAS is at the mercy of the developers release cycle.

○ Package installation – FreeNAS doesn't allow installing applications via pkg or ports into the base OS.

○ Getting support – There are multiple sources to get support for FreeBSD, weather it be a mailing list, forum, IRC. Not necessarily official sources. These may include 3rd party forums like Reddit, FreeBSD channels on other IRC networks (EFnet, DALnet, etc.).

What's harder to do without the UI

- It's much more work to configure.

- More thinking and reading.

- No single source on how to do something – FreeBSD has a fantastic handbook that covers most topics, but I don't consider it as a single source on how to do something. FreeNAS documentation mostly covers all aspects of file server configuration and settings.

- Configuring ZFS/Rsync replication tasks.

- Boot environments - FreeNAS creates a new environment for each upgrade.

That was my journey

But what about getting others interested?

Recruitment Dynamics

- Ask yourself: is the vector that brought me into this community still something that might be relevant if I were a young person today?

- Many young people today do not resonate with the history of UNIX.

- Despite growth in raw numbers of computer professionals, few younger ones seem to finding their way into operating systems communities.

- This is a Python/node.js/C#/web development world.

- At the school of your choice: ask how many students graduating with a B.S. in computer science could program a MergeSort() in C.

vBSDcon 2017

Recruitment through appliances

- FreeNAS was my gateway to FreeBSD. But what about other software appliances that people may use? When you look, there aren't that many.
  - pfSense & OPNsense
  - XigmaNAS (NAS4Free)

- What about commercial products?
  - MacOS, core is built on XNU kernel (part Mach, part FreeBSD)
  - Juniper Networks JunOS
  - NetApp filers
  - Nintendo Switch
  - PlayStation

What about our Linux counterparts?

- Asked within a Linux chatroom on Freenode.
  - Make BSD more approachable – how?
  - Hotplug USB.
  - Hard to track differences between FreeBSD and OpenBSD.
- Asked my sysadmin peers on how FreeBSD could be more attractive?
  - Make it easier to use, with a UI out of the box (a la Ubuntu) – TruOS and DesktopBSD already address this.
  - Driver support – somewhat lacking for various devices like WiFi, Bluetooth, support for new hardware takes time to be released (if at all).
  - Developers taking part in the forums.
  - Informal documentation, targeting difference audiences.

Contacting me

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Questions?

Thank you for listening