Tracking FreeBSD in a Commercial Environment

Warner Losh
imp@FreeBSD.org

The FreeBSD Project

BSDCan 2009 — Ottawa, Canada
8 May 2009

Outline

Outline

FreeBSD Based Development

- Develop an initial product based on FreeBSD
- Development on product continues
- Development on FreeBSD continues
- Product needs a newer FreeBSD
- Now what?

FreeBSD Based Products

- Product includes BSD
- May be used unmodified
- May have extensive local changes
- May include custom software
- May have custom settings

Outline

FreeBSD Branching Model

- Main development branch “Current”
- Periodic major releases
- Major release creates new stable branch (aka RELENG_X)
- Minor releases done from stable branch
- Security/Errata branches

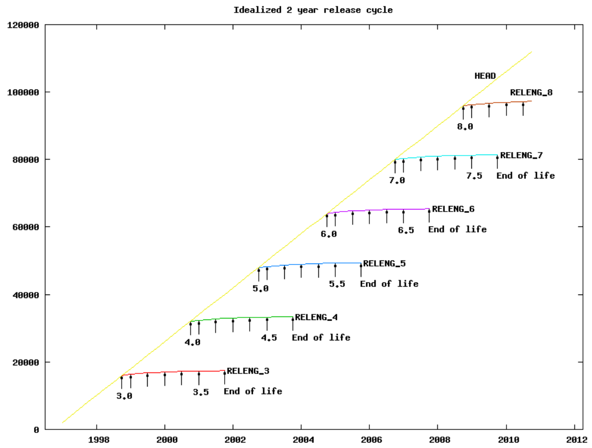
FreeBSD Code Work Flow

- Patches Submitted to the Project
- Code reviewed
- Code goes into “Current”
- Code refined, if necessary, based on testing
- Code merged to RELENG_X branch
- New release off RELENG_X called X.Y

Theoretical Release Schedule

- New major release every 18-24 months
- Branch active 24 months
- Branches terminate after 3 years
- Gradual reduction in activity
- Usually one stable branch active, plus “current”
- Worst case, two branches are active

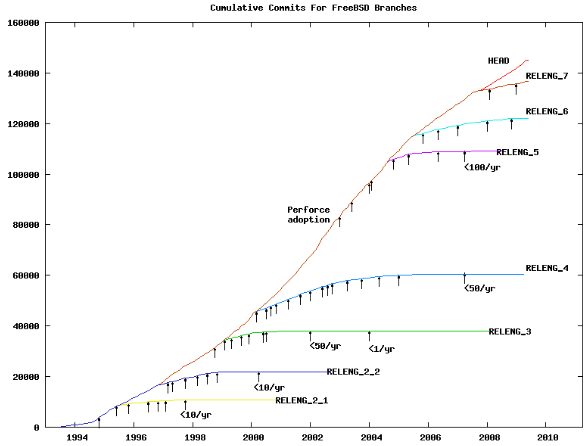
Theoretical Release Schedule



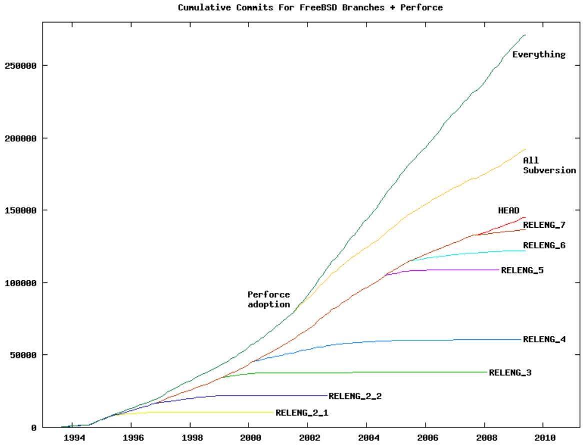
Actual Release Schedule

- Major releases not evenly spaced
- Branches can live for a long time
- Some branches get more attention
- Pent up demand and code freezes distort graph
- On the average, especially lately, we match theory
- Graphs can be misleading

Actual Release Schedule



Full Development Graph

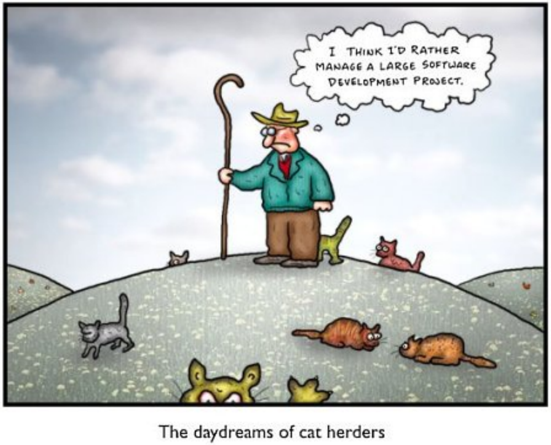


Outline

Product Life Cycle

- Import FreeBSD and other software
- Make modifications and customizations
- Maybe develop applications
- Release the product
- What happens next?
  - Profit!
  - New Release?
  - Bubble Brust?

Product Life Cycle


I THINK I'D RATHER MANAGE A LARGE SOFTWARE DEVELOPMENT PROJECT.
The daydreams of cat herders

Source: Doctor Fun by David Farley

Problems Upgrading

- First version is easy, later versions hard
- Forward porting local modification
- Forward porting applications
- Bug fixes
- Managing change, both upstream and local
- Conflicts between FreeBSD bug fixes and local bug fixes

Why Upgrade?

- New hardware support
- New features (SMP, threads, devices, gcc, etc)
- Better performance
- Bug fixes
- Easier integration into FreeBSD community

A Bad FreeBSD Experience

- Import FreeBSD code into a product
- Modify FreeBSD heavily
- Limited community involvement
- Release products, make money, celebrate
- Time passes
- Pent up demand forces FreeBSD upgrade
- Major porting effort
- Few community ties to ease effort

What to do?

- How can the pain be avoided
- Where to find advice on best practices
- Learn from other's misfortune
- Leverage the community
- Plan for upgrades
- Bug fixes aren't a competitive advantage

Outline

Tracking Options

- Grab and go / upgrade
- Track Stable Branches
- Mirror FreeBSD's development process
- Major porting to a new release

Grab and Go

- Grab a version of FreeBSD
- Make changes to FreeBSD
- Never upgrade or participate in Community

Grab and Go, Pros

- Easy
- Simple
- Management understands
- No interaction with community

Grab and Go, Cons

- Upgrades Hard
- Difficult to add local changes
- New features of FreeBSD not reflected in products
- New hardware often needs new OS support
- No interaction with community

Grab and Upgrade

- Grab a version of FreeBSD
- Use unmodified
- Upgrade as needed

Grab and Upgrade, Pros

- Easy
- Simple
- Management understands

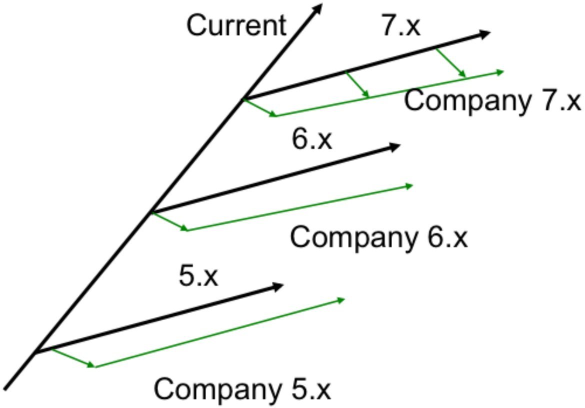
Grab and Upgrade, Cons

- Difficult to add local changes
- New hardware can be slow to appear in a release

Tracking Major Branches

- Import major release sources into local SCM
- Make local changes to SCM
- Merge minor releases into SCM
- Each major branch has its own SCM model

Tracking Major Branches



Tracking Major Branches, Pros

- Get bug fixes from FreeBSD
- Local bug fixes tracked
- Local bug fixes easy to push upstream
- Stable branches best place to base release

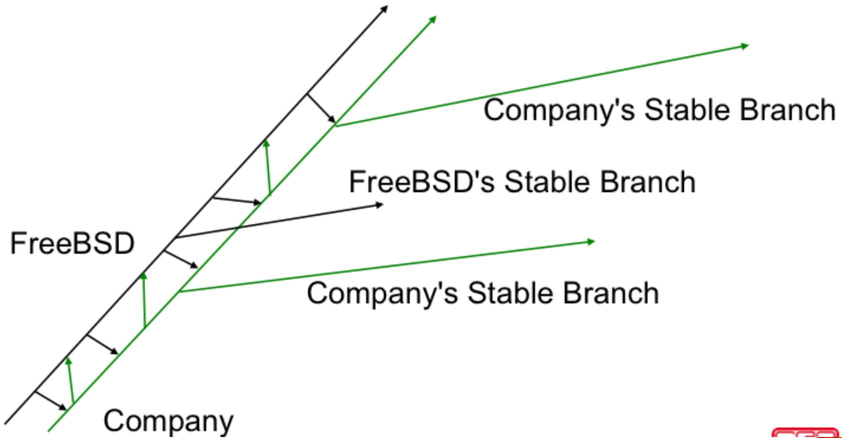
Tracking Major Branches, Cons

- Multiple Branches
- Local changes not automatically included on major upgrades
- Current/stable divergence makes some fixes hard to push upstream
- Major releases not completely predictable

Mirroring FreeBSD's Development Process

- Import FreeBSD-current into SCM
- Maintain branch of current + local changes
- Make own stable branches
- Push changes to FreeBSD early and often

Mirroring FreeBSD's Development Process



Mirroring FreeBSD's Development Process, Pros

- Changes typically easy to merge both directions
- Continuous porting amortizes upgrade pain
- Much community involvement
- Choice of time to cut stable branch

Mirroring FreeBSD's Development Process, Cons

- Duplicating effort done by FreeBSD's release engineering
- Internal stable branch gets less testing
- Management views work as being done twice
- Harder to get help from community on problems on private branch

Major Porting Effort

- Start with Grab and Go, no plans to upgrade
- Lots of time passes
- Upgrade required for new features/devices/etc
- Major efforts, much pain, desire to do it better

Outline

Creating a SVK Repository

- `svk depotmap yoyobsd /path/to/repo`
- `svk mirror svn://svn.freebsd.org/base /yoyobsd/mirror/FreeBSD`
- `svk sync /yoyobsd/mirror/FreeBSD`

Creating a company branch

- `svk cp /yoyobsd/mirror/FreeBSD/stable/7 /yoyobsd/yoyodyne/7`
- use svk to manage merges, or interacting with mirror etc

Checking out a YoyoBSD branch

- `svn co file:///path/to/repo/yoyodyne/7`

Merging Changes from FreeBSD

- `svk sync /yoyobsd/mirror/FreeBSD`
- `svk smerge /yoyobsd/mirror/FreeBSD/stable/7 /yoyobsd/yoyodyne/7`
- Note: you can pass -C to check before committing

Optional: Tag it

- `svn cp file:///path/to/repo/mirror/FreeBSD/stable/7 file:///path/to/repo/freebsd-sync-7/YYYYMMDD`

Optional: Tag it

- Real svn repo
- history works
- merging works
- NB: change numbers differ

Questions? Comments?

Warner Losh

`imp@FreeBSD.org`