

Automating FreeBSD deployment with Cobbler

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Bruce Simpson
bms@FreeBSD.org

About me & my work

- Currently: consulting in comms...
- FreeBSD Committer since ~2003
 - Networking stack, ports, docs
 - MLD/IGMP co-author with rwatson
- XORP Open Router – Core Team alumnus
- PhD (2016), Univ. St Andrews
 - ILNPv6, an IPv6 based, scalable ILSA
 - Basis of this talk

The Cobbler Back-story

- Bare-metal provisioning is not new
 - Solaris Jumpstart
 - Ubuntu/Debian Seed Files
 - XenServer Templates
 - Windows Deployment Kit
 - ...
- ... but it's relatively new to FreeBSD.
- We can leverage Cobbler now.

But why?

- Much industry focus on IT automation
 - Chef, Puppet, Ansible
 - See Michael DeHaan's blog
 - ISP/ASP Operations Support
- But often focused on cloud
 - FreeBSD often deployed bare-metal (e.g. pfSense, ixSystems)
- We must support both in some scenarios, e.g. soft real-time systems

But why Cobbler?

- A path well trodden.
- I needed to build a lab of servers, with cookie-cutter configuration.
 - FreeBSD must co-exist with Linux.
- OpenStack uses it!
 - Ubuntu uses it surprisingly well!
- Use Python Cheetah to template OS
- And it can deal with basic IPMI-like power/shutdown tasks, too.

Cobbling the ILNP Testbed

- We need: 10+ servers
- Heterogeneous test environment
 - FreeBSD and Linux support needed
- Soft PTP time distribution
- Extreme Networks X450 series switches
 - pfSense in VMware ESXi -control
 - OpenVPN for remote access
- Mixture of Cisco UCS & Gateway F1 servers

- Am I, on my own, going to install those by hand?
 - Seriously?

CobbleBSD Archaeology

- Patches by Jonathan Sabo
 - Intrusive changes to libfetch & sysinstall
 - Could not be taken into tree as-is
 - Basic support for Cobbler templates in sysinstall
 - https://github.com/jsabo/cobbler_misc

What I built: CobbleBSD

- Analyse problem domain
 - FreeBSD legacy diskless boot is too complex
 - Simply staging sysinstall with HTTP package fetch + PXE + TFTP is not enough (jsabo)
 - And sysinstall itself is now considered obsolete.
 - But bsdinstall unsuited for auto install
 - Lacks config/template server wrapper.
- Solution: Hybrid approach.
 - Ship pc-sysinstall in an MFSBSD image, and Cobblerrise its config. Fetch template from Cobbler at install time. Job done.

Deployment environment

- PXE, TFTP, HTTP; no NFS required
 - Some or all can be under Cobbler's direct control (automated config)
- DHCP: Provisioning VLAN, pfSense
- MFSBSD USB install image for FreeBSD
 - CobbleBSD for FreeBSD 8.x / 9.x+
 - Future proofed for pkg-ng
 - Uses 9.x+ style system *.txz for 8.x
- PXE! SYSLINUX memdisk driver used to load CobbleBSD ('USB') from TFTP

Cobbler Configuration

- Cobbler basic tables
 - Distro, Profile – generic PXE boot menu
 - System – specific server OS config
- Kickstart templates
 - Templated pc-sysinstall file
 - e.g. customising machine roles.
 - Delivered in one payload on install.
- Cobbler snippets for other functions
 - e.g. pre-installing packages, Ansible...

Cobbler Signatures

- La la la la la, Lady with the spinning head!
- They might be gone, but you know they'll be back!
- Open source branch on GitHub has some instability
 - Gists submitted by me against 2.6.10 for XenServer support
 - FreeBSD potentially affected also
- Moral of story: Cobbler signatures aid 'cobbler import' workflow
 - But not always up-to-date across Oses
 - And my biggest change is:
 - **Stop assuming Linux-style ISO/image layout.**
 - That's the bug that ate XenServer 6+ support.
- I can also talk about: pushing Cobbler environment into the kernel environment, through /boot/loader, MEMDISK and ACPI table tricks

The road ahead

- Cobbler was Red Hat originally.
 - OpenStack uses it, but not currently maintained full-time.
- SYSLINUX “memdisk” may need to be forked & revision controlled
 - BIOS issues on some platforms, e.g. Dell PE 2970.
- Merge pc-sysinstall and bsdinstall?

The road ahead (II)

- FreeBSD should consider forking Cobbler & offering pulls quid-pro-quo.
- `cobbler import FreeBSD?`
 - Awesome. Out-of-box private cloud experience? Other than AWS/EC2!
- Only possible if we accommodate it in FreeBSD -RELEASE ISO images
 - But CobbleBSD style 'PXE-able system image' may need up to ~50MB in ISO.

Thank you

- Questions? Comments?
- Staging gists for XenServer now:
 - <https://gist.github.com/bms/>
- Ongoing projects of mine...
 - ELK support for pfSense/Python
 - USB 3.1 xHCI DBG: Generic pipe
 - Netgraph ng_pppoe debugging
- Email: bms@FreeBSD.org
- Web: <http://people.freebsd.org/~bms/>

Uncovered topics

- Cobbler “Images”
 - Tries to fit Cobbler concepts to koan: Kickstart-over-a-Network
- koan itself
- Packer
 - AWS Machine Images (AMIs)
 - VMware images (VMDKs)