System Administration with pkgsrc

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PkgsrcCon 2006
Who ? What ?

• Networks (data & voice) department of Paris 7 University
• About 20 supporting servers
• All running NetBSD, /i386 or /sparc64
• Of course all using pkgsrc!
Which kind of packages?

- About 300 packages used (leaf & non-leaf), all architectures and NetBSD versions accounted for.
- Mostly “server type” packages (read no KDE or Gnome).
Building method

- Limited bulk builds (mk/bulk/build -s)
- Builds done by each sysadmins in “personal” pkg_comp(8) sandboxes
- Builds usually done on “washing machines”, see http://asg.web.cmu.edu/depot/SoftMgmt.html
- 1 washing machine per architecture
- pkg_comp's+(lib)kver(3): 1 washing machine serves all supported NetBSD releases on its architecture
mk.conf

• 1 mk.conf used for all builds
• General build settings
• Packages configuration and options
• Inventory of packages per host via Make variables

    SITE_SPECIFIC_PKGS+= devel/subversion-base
    ...
    SPECIFIC_PKGS.snmp-tools+= local/cisco-mibs
    SPECIFIC_PKGS.snmp-tools+= net/net-snmp
    ...
    YHOSTS+= grissom
    YHOSTS+= yamaguchi
    ...
    .for h in ${YHOSTS}
    HOST_SPECIFIC_PKGS.${h}+= local/arpwatch
    HOST_SPECIFIC_PKGS.${h}+= net/bind9
    ...
    HOST_SPECIFIC_PKGS.${h}+= ${SPECIFIC_PKGS.snmp-tools}
    .endfor
List of packages to build

pkgsrc/local/etc/mk.conf

SITE_SPECIFIC_PKGS:= ${SITE_SPECIFIC_PKGS:0:u}

for h in ${HOSTS.{$OPSYS}-${MACHINE_ARCH}}
GROUP_SPECIFIC_PKGS+= ${HOST_SPECIFIC_PKGS.$h}
.endfor

GROUP_SPECIFIC_PKGS:= ${GROUP_SPECIFIC_PKGS:0:u}

USER_SPECIFIC_PKGS+= ${USER_SPECIFIC_PKGS.$OPSYS}
USER_SPECIFIC_PKGS+= ${USER_SPECIFIC_PKGS.$OPSYS-$MACHINE_ARCH}
USER_SPECIFIC_PKGS:= ${USER_SPECIFIC_PKGS:0:u}
pkgsrc/local/etc

- Makefile, pkg_comp(8) configuration templates, mk.conf, build.conf
- pkgsrc/local/etc/Makefile's convenience targets
  - Cvs update pkgsrc
  - Create pkg_comp sandboxes
  - Launch limited bulk builds in sandboxes
  - Upload packages
  - Generate manifest of packages per hosts from *_SPECIFIC_PKGS

```plaintext
# from      $Id: mk.conf 6107 2006-04-20 13:27:39Z
seb $ 
bozeman archivers/unzip 
bozeman archivers/zip
...```

Binary packages sets

- Binary packages set = binary packages built by one bulk build run
- Sets are pruned (PRUNEPACKAGES=yes in build.conf) and uploaded on a FTP server (BULK_ID set at upload time)
- Sets also contains:
  - lintpkgsrc “internal database” build by the bulk build framework (LINTPKGSRCCACHE=yes in build.conf)
  - pkgsrcmap file built by lintpkgsrc -g from pkgsrc/local/etc/Makefile
Sets on our FTP

All packages sets:

```bash
cd NetBSD-2.0_STABLE-i386
ls
NetBSD-2.0_STABLE-i386
NetBSD-2.0_STABLE-i386_eh-20060330
NetBSD-2.0_STABLE-i386_seb-20060420
NetBSD-2.0_STABLE-sparc64
NetBSD-2.0_STABLE-sparc64_eh-20060330
NetBSD-2.0_STABLE-sparc64_seb-20060420
NetBSD-2.1_STABLE-sparc64
NetBSD-3.0_STABLE-i386
NetBSD-3.0_STABLE-i386_eh-20060330
NetBSD-3.0_STABLE-i386_seb-20060420
NetBSD-3.0_STABLE-sparc64
NetBSD-3.0_STABLE-sparc64_eh-20060330
NetBSD-3.0_STABLE-sparc64_seb-20060420
```

Blessed packages sets:

```bash
cd NetBSD-3.0_STABLE-i386
ls -l
lrwxr-xr-x 1 seb staff 35 Apr 20 16:12 NetBSD-3.0_STABLE-i386 -> NetBSD-3.0_STABLE-i386_seb-20060420
lrwxr-xr-x 1 seb staff 38 Apr 20 21:59 NetBSD-3.0_STABLE-sparc64 -> NetBSD-3.0_STABLE-sparc64_seb-20060420
```
Now what?

- On servers daily audit-packages(8) of course
- To update packages:
  - Get package set “manifest”
  - Compare with installed version
  - Remove obsolete ones
  - Install required packages
  - ... 
- Lots of typing (ftp, lintpkgsrc, audit-packages, pkg_delete, pkg_add, ...)
usage: mpkg.sh [options] operations [operations...]
add=PKG
    Install package PKG from PKG_PATH

db
    If PKGSRCDB_URL is set, get lintpkgsrc internal database from PKGSRCDB_URL and pkgsrc map from PKGSRCMAP_URL.
    If PKGSRCDB_URL is not set or option -f is given build lintpkgsrc internal database and pkgsrc map. This requires lintpkgsrc(1) and PKGSRCDIR.
    If option -e is given build or fetch may be skipped altogether.

check
    Check installed packages versions, with lintpkgsrc(1) -i against latest versions available as listed in lintpkgsrc internal database. Check security vulnerabilities of installed packages with audit-packages(8).
getmanifest
  Get manifest of packages per hosts from PKGMANIFEST_URL
  and save it in VARDIR/hosts-pkgs.
checkreq
  Check if required packages as listed in manifest of packages
  per hosts are installed.
installreq
  Install missing required packages as listed in manifest of
  packages per hosts.
perm
  Fix package's files permissions via mtree(8) using mtree
  specification files in MTREEDIR/*.mtree.
  When a specification filename is foo.mtree it is only
  considered if a package named 'foo' is installed.
  The specification file 'pkg.mtree' is always considered.
pkgdepgraph
Generate various files and scripts with pkgdepgraph(1)
VARDIR/pkgs-delete-order
list of out-of-date and vulnerable packages that need to be deleted, in least required first order
VARDIR/pkgs.sh
generic "do it" script for each out-of-date and vulnerable packages VARDIR/pkgs.dot
dependencies graphs of installed packages
VARDIR/pkgs-out-of-date.dot
dependencies graphs of out-of-date installed packages
VARDIR/pkgs-add.sh
package add script

autopilot
runs canned sequence of operations:
db, getmanifest, check, checkreq, pkgdepgraph.

checkpoint
Not yet implemented.
# helper script to set PKG_PATH
# BULK_ID?
: ${BULK_ID:=}
# Sanitize BULK_ID
case "${BULK_ID}" in""|_*) : ;;*) BULK_ID="_${BULK_ID}" ;; esac
# default PKG_PATH
DEFAULT_PKG_PATH="ftp://ftp.univ-paris7.fr/pub/SSR/packages/NetBSD-$(uname -r)-$(uname -m) ${BULK_ID}/All"
# PKG_PATH in env?
: ${PKG_PATH:=${DEFAULT_PKG_PATH}}
# export it
export PKG_PATH
$ /etc/sf/mpkg autopilot | BRAIN
... 
# pkg_delete $(cat /var/mpkg/pkgs-delete-order)
... 
# /etc/sf/mpkg installreq
... 
# /etc/sf/mpkg perm
... 
# pkg_admin check
...
Mpkg check output

;:/etc/sf/mpkg check
=> check
pkg_info: disabling PKG_PATH when operating on all packages.
Reading pkgsrc database: 5915 / 5915 (6026 / 6026) pkgs...done
Version mismatch: 'Radiator' 3.13nb3 vs 3.14p649
Version mismatch: 'amanda-client' 2.4.4p4nb1 vs 2.4.4p4nb3
...
Package php-4.4.1nb2 has a inject-smtp-headers vulnerability
(vulnid:unknown), see
http://cve.mitre.org/cgi-bin/cvename.cgi?name=CAN-2005-3883
...
Missing: foobar-0.1
...
;
:: ls /var/mpkg/
hosts-pkgs pkgs-delete-order pkgs.sh
pkgdepgraph.in pkgs-out-of-date.dot pkgs.src.db
pkgs-add.sh pkgs.dot pkgsrc.map

:: head -2 /var/mpkg/pkgs.sh
( pkg_info -qe perl || ( cd /usr/pkgsrc/lang/perl5 && make "@$" ) ) &&
( pkg_info -qe p5-MIME-Base64 || ( cd /usr/pkgsrc/converters/p5-MIME-Base64 && make "@$" ) ) &&
Future work

- Implement mpkg's checkpoint operation
- Integrate/work on recent pkg_summary(5) to get ride of lintpkgsrc -i in mpkg check operation?
- May be return again on pkg_chk(8)?
- Support per host packages configuration using BULK_ID
That's it

- Thanks for your attention!
- Any questions?