FreeBSD: packaging base
A rainbow bikeshed

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BSDCan 2015
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Packaging base?
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Do not split
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Let’s try to paint it rainbow

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Why?

- Binary upgrade of the system
  - For RELEASE (like freebsd-update)
  - For STABLE
  - For CURRENT
- Allow users to do fine grain installations (no toolchain, no sendmail, etc.)
- Allow developers to provide packages for users to test
- Fine grain merging of configuration files
- Being able to upgrade the loader and its configurations!
Goals

- Integrated into the build system
  - $ make packages

- Buildable as regular user

- Reproductible
  - $ make repackages

- Automatic version bump on the right packages when patching a release
  - $ make rerelease

- Automatically handling configuration files (merging)

- Cross installable
Versionning

- CURRENT: 12.s<date>
- STABLE: After 11.0-RELEASE and before 11.1-RELEASE: 11.1.s<date>
- RELEASE:
  - ALPHA: 11.0.aX
  - BETA: 11.0.bX
  - RC: 11.0.pX (not r to not confuse with "release")
  - RELEASE: 11.0
  - Security fix: 11.0_1
Modification needed in pkg(8)

- Handling file flags immutable (added in pkg 1.5)
- Ability to handle configuration files and merge them (added in pkg 1.5)
  - new keyword @config
  - 3 way merge code from the fossil VCS
- Better support for cross installation:
  - pkg -r <rootdir> (added in pkg 1.5)
  - scripts PKG_ROOTDIR (added in pkg 1.5)
Hooking in the build system

- Reuse the -DNO_ROOT mechanism
- Add tags to the generated mtree to determine packages content
- Automatic plist generation
- Packages metadata
  - UCL manifest
  - release/packages/*.ucl
- New targets:
  - stageworld
  - stagekernel
  - packages
Integration in the build system

- **Tags (automatic via bsd.*.mk):**
  - `package=runtime`
  - `development`
  - `config (not automatic)`

- **Overwritting (cherrypicking files for a new package)**

```
PROG= bhyve
PACKAGE= bhyve

MAN= bhyve.8

[...]
```
Issues with the build system: NO_ROOT

▶ mtree(8): In stdout:

```plaintext
=== > share/examples (install)
.: user (0, 1001, not modified: Operation not permitted)
lib32: user (0, 1001, not modified: Operation not permitted)
lib32/dtrace:
    user (0, 1001, not modified: Operation not permitted)
lib32/i18n:
    user (0, 1001, not modified: Operation not permitted)
```

▶ chflags(1) vs modes:

```plaintext
chflags: /usr/obj/home/bapt/dev/src-trees/release-pkg/stage/usr/bin/chpass
        : Operation not permitted
chflags: /usr/obj/home/bapt/dev/src-trees/release-pkg/stage/usr/bin/passwd
        : Operation not permitted
```

▶ Installation not using install(1)
Issues with the build system: installworld crap

- bsd.tests.mk/bsd.progs.mk installing files multiple times - BLOCKER
  
  ====> Creating FreeBSD-runtime-11.0.s20150612175342
  pkg: duplicate file listing: /usr/tests/lib/libc/db/db_test, ignoring
  pkg: duplicate file listing: /usr/tests/lib/libc/gen/posix_spawn/h_nonexec, ignoring
  pkg: duplicate file listing: /usr/tests/lib/libc/gen/posix_spawn/h_zero, ignoring
  pkg: duplicate file listing: /usr/tests/lib/libc/gen/posix_spawn/h_nonexec, ignoring

- etc configuration files
  - generates the db files
  - not installed at installworld time
End user point of view

- Upgrading the system:
  
  $ pkg upgrade

- Creating a FreeBSD disk:
  
  $ mkdir newimage
  $ pkg -r newimage install FreeBSD
  $ makefs -B little FreeBSD.img newimage

- Creating an armv6 disk image on an amd64 host:
  
  $ mkdir armv6image
  $ pkg -r armv6image -o "ABI=FreeBSD:11:armv6" install FreeBSD-minimal
  $ makefs -B little FreeBSD.img armv6newimage

- Upgrading and armv6 image on an amd64 host:
  
  $ pkg -r armv6image upgrade
Questions?

Thanks