The State of OpenEmbedded

and Tooling to Make Life Easier

Don’t hesitate to interrupt

if you have questions or remarks!

Short introduction into OE

- OE is a collection of metadata collected into so called recipes
  - The recipes specify things like dependencies, source locations, packaging rules, etc.
- The bitbake tool parses those recipes and runs the actions specified
- Can create complete filesystems, SDKs and more

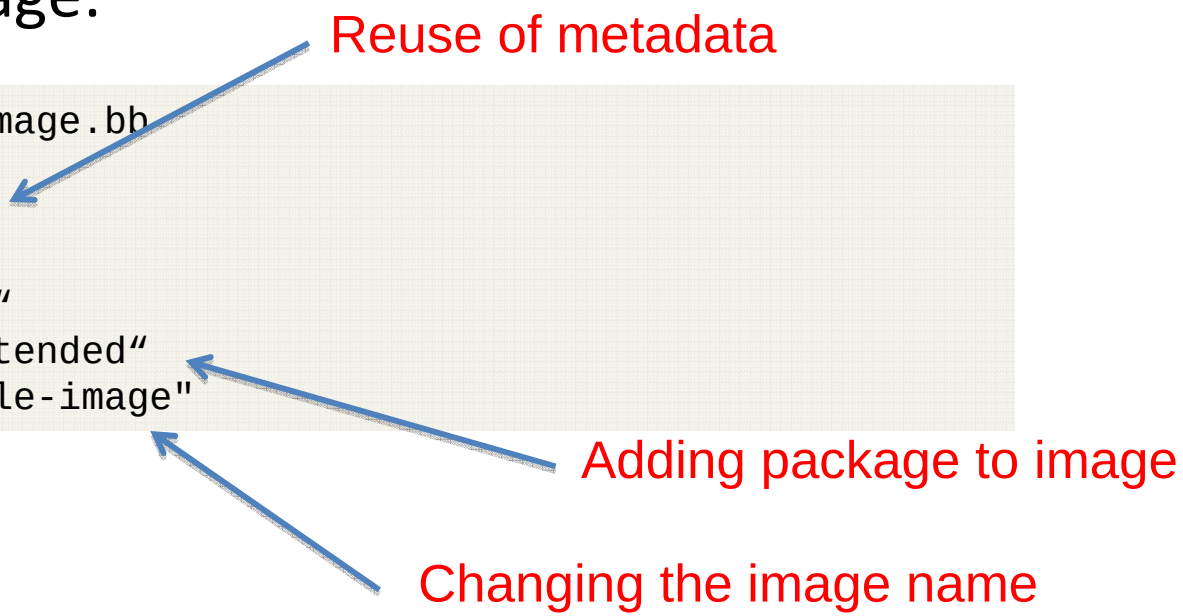
Getting started with OE

- Solving the tl;dr problem

```
$ git clone http://git.gitorious.org/angstrom/angstrom-setup-scripts.git
$ cd angstrom-setup-scripts
$ MACHINE=beagleboard ./oebb.sh bitbake console-image
```

- Definition of console image:

```
$ cat recipes/images/console-image.bb
#Angstrom bootstrap image
require console-base-image.bb

DEPENDS += "task-base-extended“
IMAGE_INSTALL += "task-base-extended“
export IMAGE_BASENAME = "console-image"
```



How to keep it working

- >7000 recipes
- Almost 300 machine definitions
- 31 distro conf files
- 100 image definitions

Patch QA

- Review on mailinglist
  - Two ACKs from developers
  - Two weeks without comment
- Usually applied by downloading patch from patchwork
- Attention points
  - Style
  - Solution generic enough?
  - Does it impact other things?
  - Any upgrade paths to worry about?

Patchwork sample #1

Comments

Simon Busch - 2010-10-18 18:51:23

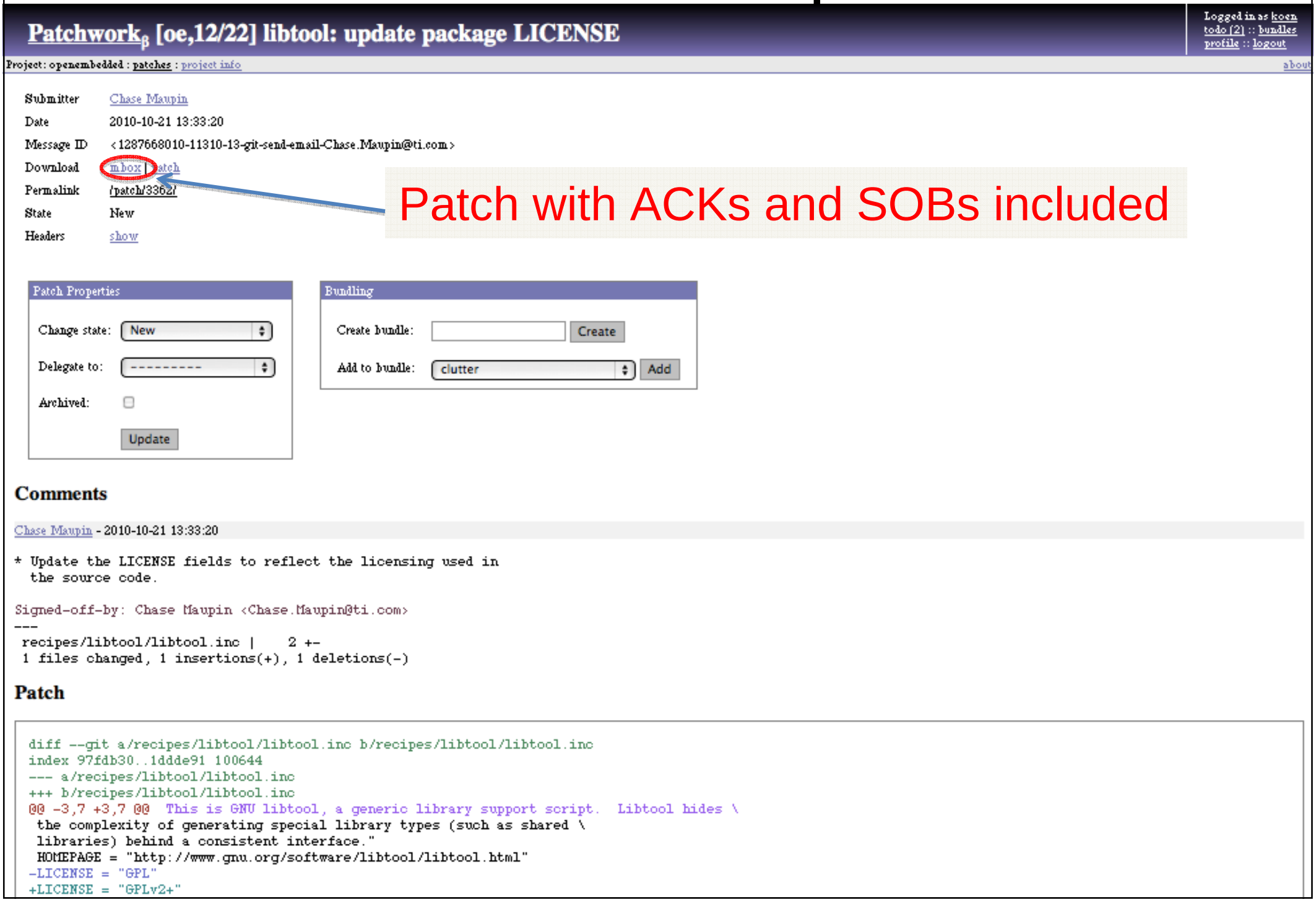
```
Signed-off-by: Simon Busch <morphis@gravedo.de>
---
 .../xserver-xorg-conf/palmpre/xorg.conf            |    4 ++--
 recipes/xorg-xserver/xserver-xorg-conf_0.1.bb      |    2 +-
 2 files changed, 3 insertions(+), 3 deletions(-)
```

Koen Kooi - 2010-10-18 21:11:58

```
-----BEGIN PGP SIGNED MESSAGE-----
Hash: SHA1

On 18-10-10 20:51, Simon Busch wrote:
> Signed-off-by: Simon Busch <morphis@gravedo.de>
> ---
>  .../xserver-xorg-conf/palmpre/xorg.conf            |    4 ++--
>  recipes/xorg-xserver/xserver-xorg-conf_0.1.bb      |    2 +-
>  2 files changed, 3 insertions(+), 3 deletions(-)
>
> diff --git a/recipes/xorg-xserver/xserver-xorg-conf/palmpre/xorg.conf b/recipes/xorg-xserver/xserver-xorg-conf/palmpre/xorg.conf
> index 87001f0..08e99e8 100644
> --- a/recipes/xorg-xserver/xserver-xorg-conf/palmpre/xorg.conf
> +++ b/recipes/xorg-xserver/xserver-xorg-conf/palmpre/xorg.conf
> @@ -31,8 +31,8 @@ EndSection
>
>  Section "InputDevice"
>      Identifier  "Touchscreen"
> -    Driver      "tslib"
> -    Option      "Device"                "/dev/touchscreen"
> +    Driver      "evdev"
> +    Option      "Device"                "/dev/input/event6"

You're better of using /dev/input/touchscreen0 for that since event
numbers are pretty much random.

regards,

Koen
-----BEGIN PGP SIGNATURE-----
Version: GnuPG v1.4.5 (Darwin)

iD8DBQFMvLgeMkyGM64RGpERApKwAJwLqF1X+3CBz/IlaOBMrRoQl+2/XQCaAsxA
2u57/t0OjO6EJOjhTaLWYbM=
=4Gwt
-----END PGP SIGNATURE-----
```

Discussion

Patchwork sample #2



Patchwork$_\beta$ [oe,12/22] libtool: update package LICENSE

Logged in as koen
todo [2] :: bundles
profile :: logout

Project: openembedded : patches : project info

about

Submitter Chase Maupin
Date 2010-10-21 13:33:20
Message ID <1287668010-11310-13-git-send-email-Chase.Maupin@ti.com>
Download mbox | patch
Permalink /patch/3362/
State New
Headers show

Patch with ACKs and SOBs included

Patch Properties

Change state: New
Delegate to: ---------
Archived:
Update

Bundling

Create bundle: Create
Add to bundle: clutter Add

Comments

Chase Maupin - 2010-10-21 13:33:20

```
* Update the LICENSE fields to reflect the licensing used in
  the source code.

Signed-off-by: Chase Maupin <Chase.Maupin@ti.com>
---
 recipes/libtool/libtool.inc |    2 +-
 1 files changed, 1 insertions(+), 1 deletions(-)
```

Patch

```
diff --git a/recipes/libtool/libtool.inc b/recipes/libtool/libtool.inc
index 97fdb30..1ddde91 100644
--- a/recipes/libtool/libtool.inc
+++ b/recipes/libtool/libtool.inc
@@ -3,7 +3,7 @@  This is GNU libtool, a generic library support script.  Libtool hides \
 the complexity of generating special library types (such as shared \
 libraries) behind a consistent interface."
 HOMEPAGE = "http://www.gnu.org/software/libtool/libtool.html"
-LICENSE = "GPL"
+LICENSE = "GPLv2+"
```

Compile time QA

- MD5 and SHA256 checksums on sources
  - Catches corrupt downloads
  - Catches upstream silently changing a release
- All distributable sources mirrored by angstrom
  - Sources disappear or move
  - Keeps angstrom GPL compliant
- Gcc patched to ICE when encountering –I/usr/include and –I/usr/local/include
  - Prevents host headers from being used
- Check for bad rpath in binaries
  - Bad rpath would point to build location e.g. /home/koen/oe/[..]/lib/libfoo instead of /lib/foo

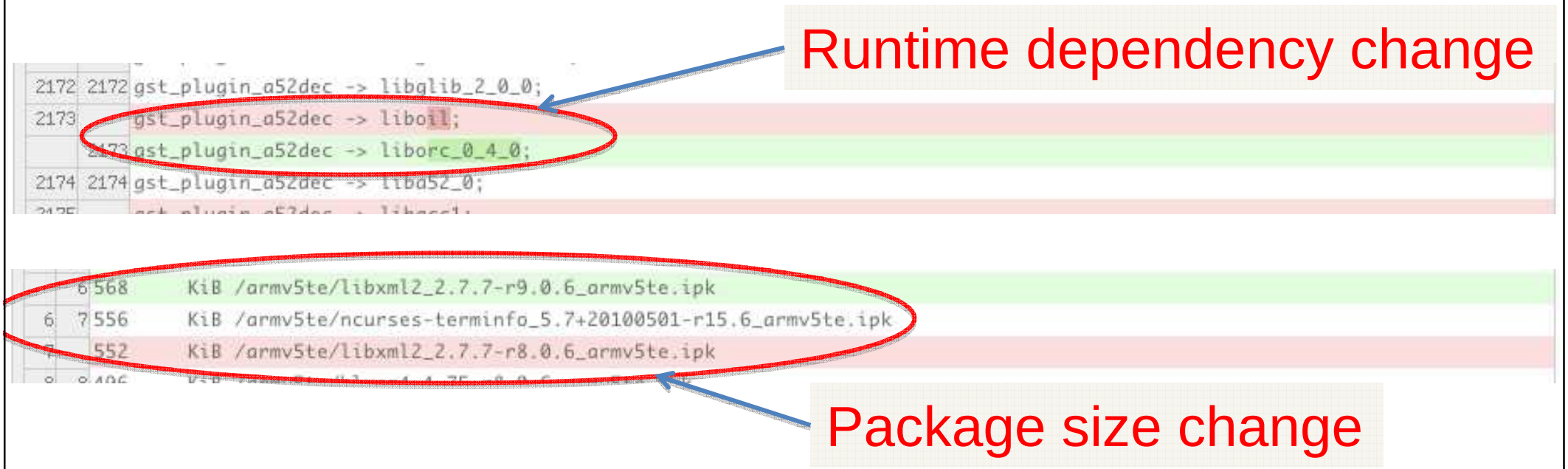
Compile time QA (cont'd)

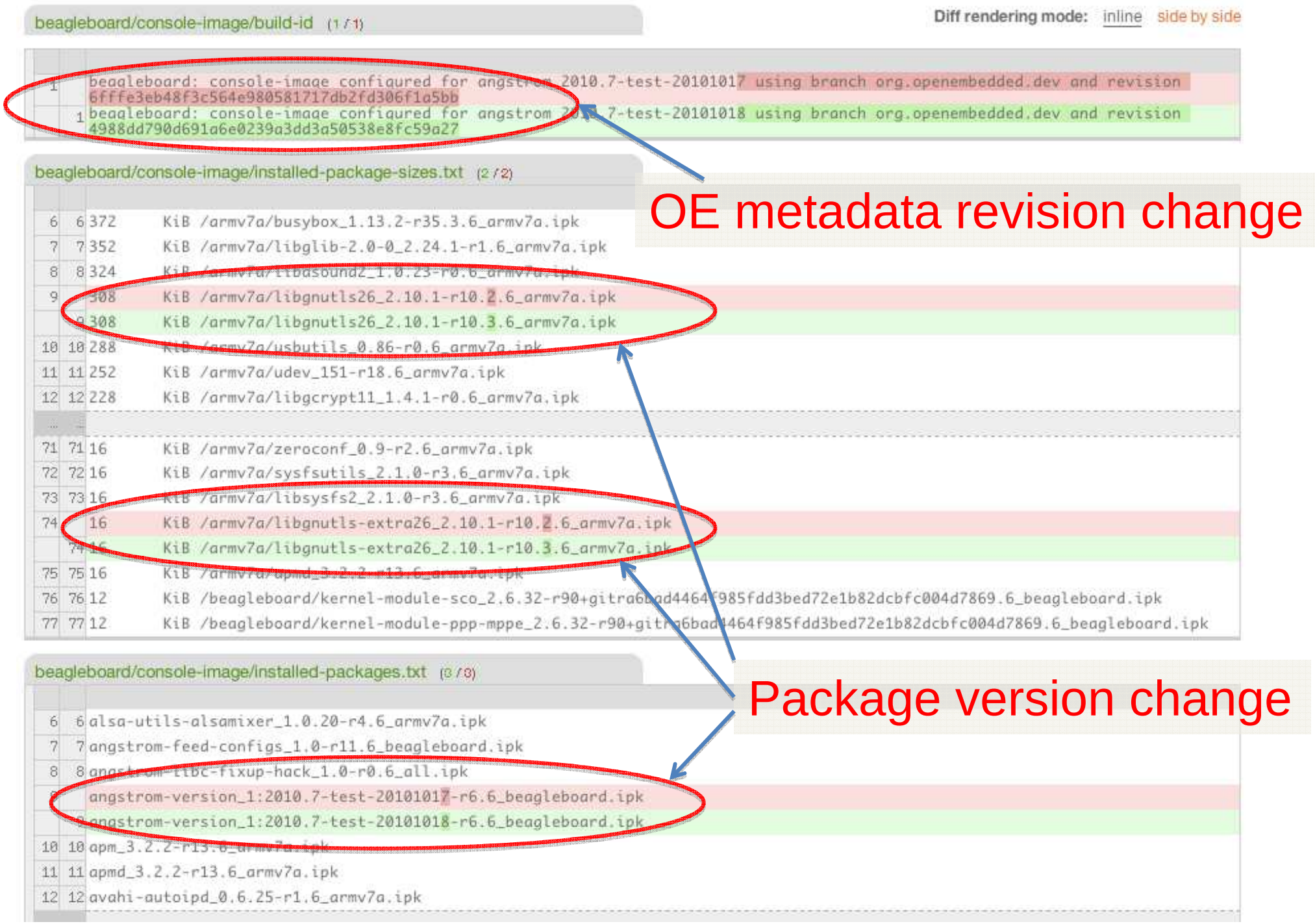
- Check for missing LDFLAGS
  - Ensured things like Bdirect and hashstyle=gnu don't get lost
- Check for .desktop entries
  - Warns on faulty entries
  - GNOME project is worst offender

Image time QA

- Opkg-cl checks for multiple packages installing the same file and missing packages
- Angstrom testlab class stores
  - Package dependency info
  - Package sizes
  - Package list
- Tinderbox reports build reports to a central server
  - Not master/slave like buildbot
  - Used as sidekick to buildbot/hudson/etc

Testlab samples




beagleboard/console-image/build-id (1 / 1)
Diff rendering mode: inline side by side
beagleboard: console-image configured for angstrom 2010.7-test-20101017 using branch org.openembedded.dev and revision 6fffe3eb48f3c564e980581717db2fd306f1a5bb
beagleboard: console-image configured for angstrom 2010.7-test-20101018 using branch org.openembedded.dev and revision 4988dd790d691a6e0239a3dd3a50538e8fc59a27
OE metadata revision change
beagleboard/console-image/installed-package-sizes.txt (2 / 2)
6 6 372 KiB /armv7a/busybox_1.13.2-r35.3.6_armv7a.ipk
7 7 352 KiB /armv7a/libglib-2.0-0_2.24.1-r1.6_armv7a.ipk
8 8 324 KiB /armv7a/libasound2_1.0.23-r0.6_armv7a.ipk
9 308 KiB /armv7a/libgnutls26_2.10.1-r10.2.6_armv7a.ipk
9 308 KiB /armv7a/libgnutls26_2.10.1-r10.3.6_armv7a.ipk
10 10 288 KiB /armv7a/usbutils_0.86-r0.6_armv7a.ipk
11 11 252 KiB /armv7a/udev_151-r18.6_armv7a.ipk
12 12 228 KiB /armv7a/libgcrypt11_1.4.1-r0.6_armv7a.ipk
71 71 16 KiB /armv7a/zeroconf_0.9-r2.6_armv7a.ipk
72 72 16 KiB /armv7a/sysfsutils_2.1.0-r3.6_armv7a.ipk
73 73 16 KiB /armv7a/libsysfs2_2.1.0-r3.6_armv7a.ipk
74 16 KiB /armv7a/libgnutls-extra26_2.10.1-r10.2.6_armv7a.ipk
74 16 KiB /armv7a/libgnutls-extra26_2.10.1-r10.3.6_armv7a.ipk
75 75 16 KiB /armv7a/apmd_3.2.2-r13.6_armv7a.ipk
76 76 12 KiB /beagleboard/kernel-module-sco_2.6.32-r90+gitra6bad4464f985fdd3bed72e1b82dcbfc004d7869.6_beagleboard.ipk
77 77 12 KiB /beagleboard/kernel-module-ppp-mppe_2.6.32-r90+gitra6bad4464f985fdd3bed72e1b82dcbfc004d7869.6_beagleboard.ipk
Package version change
beagleboard/console-image/installed-packages.txt (3 / 3)
6 6 alsa-utils-alsamixer_1.0.20-r4.6_armv7a.ipk
7 7 angstrom-feed-configs_1.0-r11.6_beagleboard.ipk
8 8 angstrom-libc-fixup-hack_1.0-r0.6_all.ipk
angstrom-version_1:2010.7-test-20101017-r6.6_beagleboard.ipk
angstrom-version_1:2010.7-test-20101018-r6.6_beagleboard.ipk
10 10 apm_3.2.2-r13.6_armv7a.ipk
11 11 apmd_3.2.2-r13.6_armv7a.ipk
12 12 avahi-autoipd_0.6.25-r1.6_armv7a.ipk

Testlab results pushed to central server

Monday October 18 2010

23:06 testlab **committed** f378c74

```
mini2440: x11-image configured for angstrom 2010.7-test-
20101018 using branch org.openembedded.dev and revision
463a4f992db344a39861bd67600e79e30fe41b18
```

22:41 testlab **committed** 3f232a2

```
mini2440: console-image configured for angstrom 2010.7-test-
20101018 using branch org.openembedded.dev and revision
121b15fdfaa8a08b39b9abcf9ed20a72854692ab
```

21:56 testlab **committed** 62ec1c1

```
omap4430-panda: x11-image configured for angstrom 2010.7-
test-20101018 using branch org.openembedded.dev and revision
121b15fdfaa8a08b39b9abcf9ed20a72854692ab
```

21:47 testlab **committed** e52e229

```
omap4430-panda: console-image configured for angstrom 2010.7-
test-20101018 using branch org.openembedded.dev and revision
121b15fdfaa8a08b39b9abcf9ed20a72854692ab
```

21:37 testlab **committed** b99776d

```
beagleboard: x11-image configured for angstrom 2010.7-test-
20101018 using branch org.openembedded.dev and revision
121b15fdfaa8a08b39b9abcf9ed20a72854692ab
```

21:34 testlab **committed** 9b35a16

```
beagleboard: console-image configured for angstrom 2010.7-
test-20101018 using branch org.openembedded.dev and revision
121b15fdfaa8a08b39b9abcf9ed20a72854692ab
```

17:31 testlab **committed** 0a117cf

```
omap4430-panda: x11-image configured for angstrom 2010.7-
test-20101018 using branch org.openembedded.dev and revision
4988dd790d691a6e0239a3dd3a50538e8fc59a27
```

17:23 testlab **committed** 06cd01e

```
omap4430-panda: console-image configured for angstrom 2010.7-
test-20101018 using branch org.openembedded.dev and revision
4988dd790d691a6e0239a3dd3a50538e8fc59a27
```

Tinderbox sample

Home › Builds › 2010-10-18 04:08:02

Build 2010-10-18 04:08:02

Package builds

start	package	version	revision	last task	status
2010-10-18 04:08:56	swig-native	2.0.0	r1.0	do_rm_work	Succeeded
2010-10-18 04:08:24	opencv	2.1.0+svnr..	r2	do_rm_work_all	Succeeded

Tasks

timestamp	task	time (s)	status
2010-10-18 04:08:24	do_setscene	13.32	Succeeded
2010-10-18 07:01:33	do_fetch	10387.54	Succeeded
2010-10-18 07:01:33	do_distribute_sources	0.09	Succeeded
2010-10-18 07:01:36	do_unpack	2.30	Succeeded
2010-10-18 07:01:36	do_patch	0.02	Succeeded
2010-10-18 07:01:37	do_generate_toolchain_file	0.05	Succeeded
2010-10-18 07:01:44	do_configure	7.31	Succeeded
2010-10-18 07:01:47	do_qa_configure	2.18	Succeeded
2010-10-18 07:05:00	do_compile	192.75	Succeeded
2010-10-18 07:05:02	do_install	1.72	Succeeded
2010-10-18 07:05:08	do_populate_sysroot	5.59	Succeeded
2010-10-18 07:05:31	do_qa_staging	21.68	Succeeded
2010-10-18 07:05:44	do_package	40.87	Succeeded
2010-10-18 07:05:54	do_package_write_ipk	7.52	Succeeded
2010-10-18 07:05:55	do_package_write	0.04	Succeeded
2010-10-18 07:06:00	do_package_stage	5.04	Succeeded
2010-10-18 07:06:01	do_package_stage_all	0.04	Succeeded
2010-10-18 07:06:01	do_build	0.00	Succeeded
2010-10-18 07:06:02	do_rm_work	0.41	Succeeded
2010-10-18 07:06:02	do_rm_work_all	0.04	Succeeded

Build information

Start	2010-10-18 04:08:02
Builder	ec2build
Build arch	i686
Metadata branch	<unknown>
Metadata revision	e7632af7a4..
Distribution	angstrom
Machine	beagleboard
Status	Succeeded

Package information

Start	2010-10-18 04:08:24
Package	opencv
Version	2.1.0+svnr3241
Revision	r2
Depends	pkgconfig-native autoconf-native automake-native libtool-native libtool-cross gnu-config-native coreutils-native virtual/arm-angstrom-linux-gnueabi-gcc virtual/libc ffmpeg gtk+ libtool swig swig-native python jpeg bzip2 zlib

Runtime QA

- Not allowing duplicate packages to get uploaded to public feeds
- Opkg-cl checks for multiple packages installing the same file and missing packages
- MD5 checks during download

Angstrom Narcissus

- Online tool to assemble custom filesystems
- Uses Angstrom package feeds
- Supports multiple filesystem types
  - Tar.bz2
  - Ext2.gz
  - Ubifs
  - Jffs2
- Excellent tool to test package sanity

Narcissus

Welcome!

This is an online tool to create so called 'rootfs' images for your favourite device. This page will guide through the basic options and will close to let you select the additional packages you want.

Base settings:

Select the machine you want to build your rootfs image for:

beagleboard

Choose your image name.
This is used in the filename offered for download, makes it easier to distinguish between rootfs images after downloading.

CEFL-test

Choose the complexity of the options below.
simple will hide the options most users don't need to care about and *advanced* will give you lots of options to fiddle with.

simple

Current configuration:
Machine: beagleboard
Image name: CEFL-test
Image type: tbz2

Additional Packages:

User environment selection:

Console gives you a bare commandline interface where you can install a GUI into later on. X11 will install an X-window environment and present you with a Desktop Environment option below. Opie is a qt/e 2.0 based environment for PDA style devices.

Console only

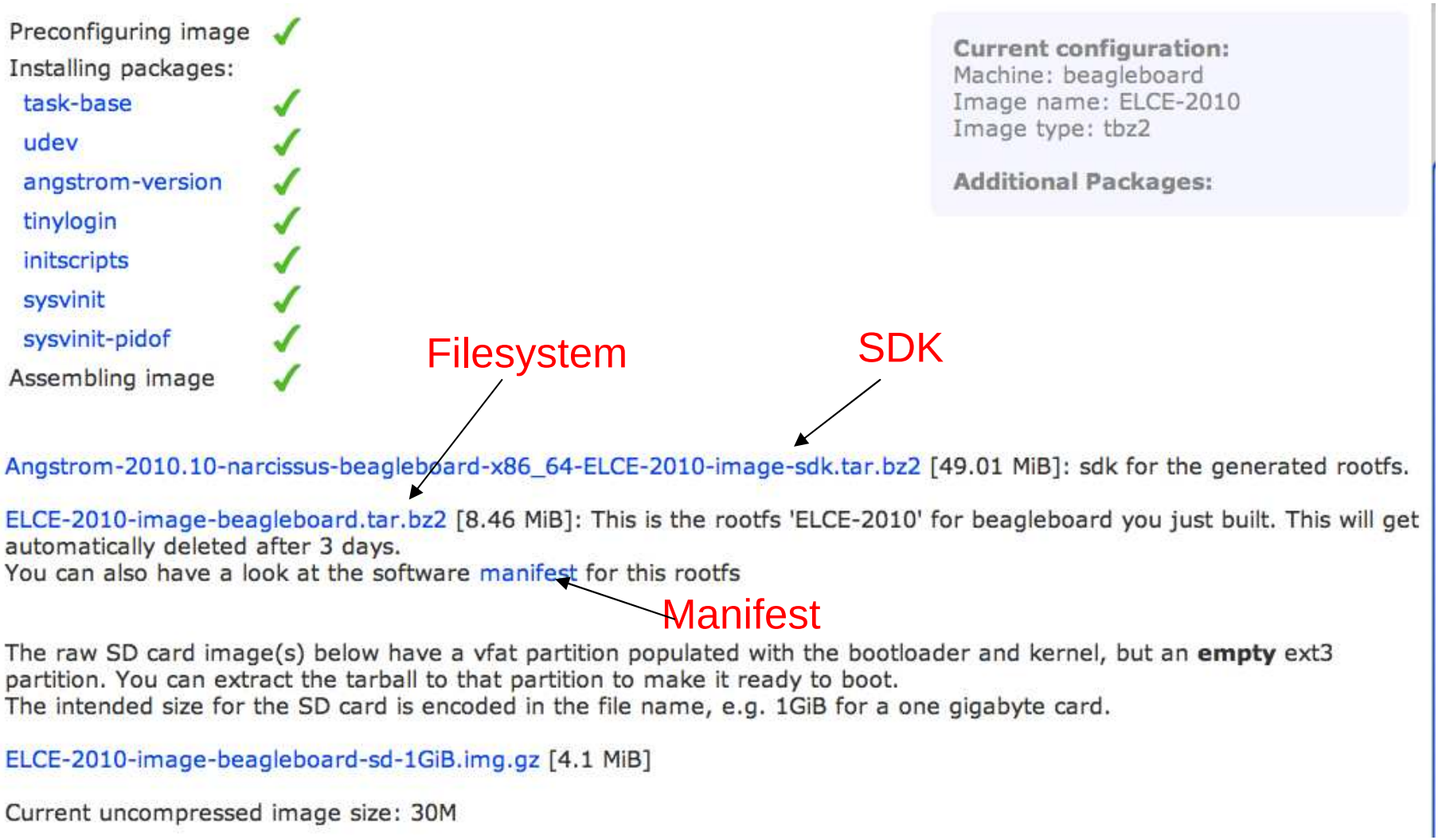
Additional packages selection:

Select additional packages below, click the + icon to expand or collaps a section. When you're done, click the 'build me!' button.

+ Development packages:
+ Additional console packages:
+ Network related packages:
+ Java packages:
+ Platform specific packages:

Build me!

Narcissus output sample



Narcissus SDK

SDK type

Select the kind of SDK you want. The options are:

- *none* for no SDK
- *toolchain* for simple toolchain with compiler, C library, binutils and not much else
- *full SDK for generated filesystem*, which as the name implies, gives you an SDK that contains all the libraries and headers for the things you selected to be put in the filesystem narcissus will generate.

Note that these are for **linux** hosts, so you need a linux computer or virtual machine to use these.

full SDK for generated filesystem

SDK hostsystem

Select the host system the SDK is going to run on, currenly only Intel (and AMD, VIA, etc) architectures are supported. If you are unsure, choose the 32bit option.

64bit Intel

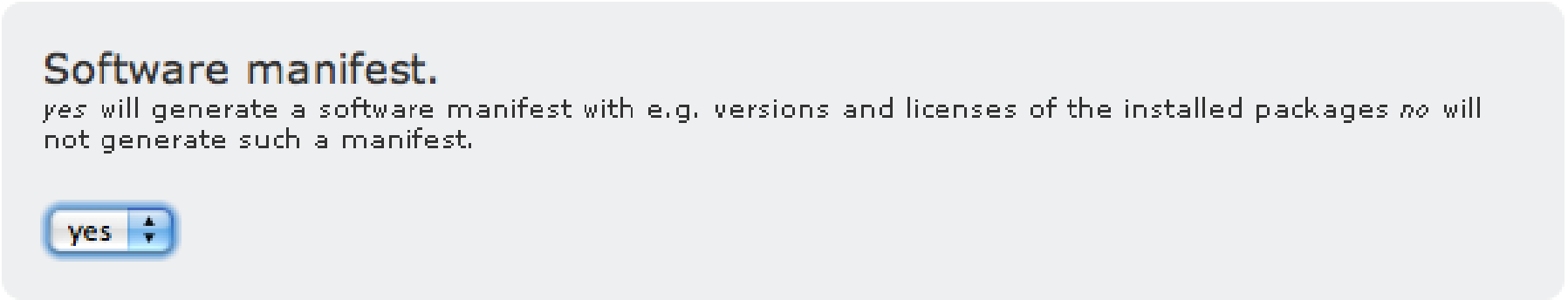
Narcissus SDK (cont'd)

- Different flavours
  - Simple toolchain: gcc, (eg,uc,g)libc, gcc, binutils, make, etc
  - SDK: toolchain + all headers and libs for filesystem content
- Currently only x86 and x86_64 host support
- Tries to be relocatable, but best used in default location
- Tries to be distribution agnostic, but debian based works best

Sample SDK usage

```
$ sudo tar xjf –C / Angstrom-2010.10-narcissus-beagleboard-x86_64-ELCE-2010-
image-sdk.tar.bz2
$ . /usr/local/angstrom/arm/environment-setup
$ git clone http://git.gitorious.org/angstrom/angstrom-linux.git
$ cd angstrom-linux
$ ARCH=arm CROSS_COMPILE=arm-angstrom-linux-gnueabi- make menuconfig
$ ARCH=arm CROSS_COMPILE=arm-angstrom-linux-gnueabi- make zImage
```

Narcissus software manifest



- Lists all installed packages
  - License
  - source
- Sample image recipe for use with OE

Narcissus manifest sample

Angstrom Filesystem Software Manifest

Legend

Package Name	The name of the application or files
Version	Version of the application or files
License	Name of the license or licenses that apply to the Package.
Location	The directory name and path on the media (or in an archive) where the Package is located.
Delivered As	This field will either be "Source", "Binary" or "Source and Binary" and is the form the content of the Package is delivered in. If the Package is delivered in an archive format, this field applies to the contents of the archive. If the word Limited is used with Source, as in "Limited Source" or "Limited Source and Binary" then only portions of the Source for the application are provided.
Modified	This field will either be "Yes", "No" or "OE". A "Yes" means Angstrom had made changes to the Package. A "No" means Angstrom has not made any changes. An "OE" means the Package has been modified by OpenEmbedded.
Obtained from[1]	This field specifies where Angstrom obtained the Package from. It may be a URL to an Open Source site, a 3rd party company name or Angstrom. If this field contains a link t

Manifest

Narcissus package list: task-base udev angstrom-version t

Sample OE image recipe: ELCE-2010-image.bb

```
export IMAGE_BASENAME = "ELCE-2010-image"
IMAGE_INSTALL = " task-base udev angstrom-version \
                  tinylogin initscripts sysvinit \
                  sysvinit-pidof"

inherit image
```

Complete package list:

Package Name	Version	License	Delivered as	Modified		
alsa-conf-base	1.0.23-r0.6	LGPLv2.1	Binary		Location	alsa-conf-base_1.0.23-r0.6_armv7a.ipk
					Obtained from	ftp://ftp.alsa-project.org/pub/lib/alsa-lib-1.0.23.t
alsa-state	0.2.0-r21.6	MIT	Binary		Location	alsa-state_0.2.0-r21.6_beagleboard.ipk
					Obtained from	Angstrom/OE metadata