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

```bash
$ 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:

```bash
$ 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"
```

- Reuse of metadata
- Adding package to image
- Changing the image name
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/palmsre/xorg.conf
  recipes/xorg-xserver/xserver-xorg-conf_0.1.bb | 4 ++--
2 files changed, 3 insertions(+), 3 deletions(-)

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

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

On 2010-10-10 20:51, Simon Busch wrote:
> Signed-off-by: Simon Busch <morphis@gravedo.de>
> ---
> ../xserver-xorg-conf/palmsre/xorg.conf
>recipes/xorg-xserver/xserver-xorg-conf_0.1.bb | 4 ++--
> 2 files changed, 3 insertions(+), 3 deletions(-)
>diff --git a/recipes/xorg-xserver/xserver-xorg-conf/palmsre/xorg.conf
>index 87001f6..38e99e8 100644
>--- a/recipes/xorg-xserver/xserver-xorg-conf/palmsre/xorg.conf
>+--- b/recipes/xorg-xserver/xserver-xorg-conf/palmsre/xorg.conf
>+@@ -31,8 +31,8 @@ EndSection
>         > Session "inputDevice"
>         >     Identifier "Touchscreen"
>         >         Driver "tslib"
>         >         Option "Device" '/dev/touchscreen"
>         >         Driver "evdev"
>         >         Option "Device" '/dev/input/event6"
>
You're better off using /dev/input/touchscreen for that since event numbers are pretty much random.

regards,

Koen
-----BEGIN PGP SIGNATURE-----
Version: GnuPG v1.4.8 (Darwin)

3DH6EQ9LqFqQXkzGzyG54DpRhAPkJqazWLqFlkX+3CBa/1laz0BMz9aQl+2/XQCaAmwA
2uS7/f00jO6EwJpf7MaLWZbM=
=4Gnt
-----END PGP SIGNATURE-----

Discussion
Patchwork sample #2

Patchwork [oe,12/22] libtool: update package LICENSE

Submitter  Chase Maupin
Date  2010-12-21 13:33:20
Message ID <1287688010-11510-13-git-send-email-Chase.Maupin@ti.com>
Download em abusing
Permalink (patch/2852)
State New
Headers show

Patch Properties

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

Bundling

Create bundle:  Create
Add to bundle:  clutter  Add

Comments

Chase Maupin - 2010-12-21 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 97fbd30..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 \n the complexity of generating special library types (such as shared \n 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 –l/usr/include and –l/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

Runtime dependency change

Package size change
### OE metadata revision change

- Package version change:
  - `libgnutls26_2.10.1-r10.2.6.armv7a.ipk`
  - `libgnutls-extra26_2.10.1-r10.2.6.armv7a.ipk`

### Package version change

- `angstrom-feed-configs_1.0-r11.6-beagleboard.ipk`
- `angstrom-version_1:2010.7-test-20101017-r6.6.beagleboard.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 463a4f992db344a39861bd67600e79e30f4b18

22:41  testlab committed 3f232a2
mini2440: console-image configured for angstrom 2010.7-test-20101018 using branch org.openembedded.dev and revision 121b15fdafa8a08b3999acbfc9ed20a72854692ab

21:56  testlab committed 62ec1c1
omap4430-panda: x11-image configured for angstrom 2010.7-test-20101018 using branch org.openembedded.dev and revision 121b15fdafa8a08b3999acbfc9ed20a72854692ab

21:47  testlab committed e52e229
omap4430-panda: console-image configured for angstrom 2010.7-test-20101018 using branch org.openembedded.dev and revision 121b15fdafa8a08b3999acbfc9ed20a72854692ab

21:37  testlab committed b99776d
beagleboard: x11-image configured for angstrom 2010.7-test-20101018 using branch org.openembedded.dev and revision 121b15fdafa8a08b3999acbfc9ed20a72854692ab

21:34  testlab committed 9b35a16
beagleboard: console-image configured for angstrom 2010.7-test-20101018 using branch org.openembedded.dev and revision 121b15fdafa8a08b3999acbfc9ed20a72854692ab

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

### Build 2010-10-18 04:08:02

#### Package builds

<table>
<thead>
<tr>
<th>start</th>
<th>package</th>
<th>version</th>
<th>revision</th>
<th>last task</th>
<th>status</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010-10-18 04:08:56</td>
<td>swig-native</td>
<td>2.0.0</td>
<td>r1.0</td>
<td>do_rm_work</td>
<td>Succeeded</td>
</tr>
<tr>
<td>2010-10-18 04:08:24</td>
<td>opencv</td>
<td>2.1.0+svnr..</td>
<td>r2</td>
<td>do_rm_work_all</td>
<td>Succeeded</td>
</tr>
</tbody>
</table>

#### Tasks

<table>
<thead>
<tr>
<th>timestamp</th>
<th>task</th>
<th>time (s)</th>
<th>status</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010-10-18 04:08:24</td>
<td>do_setscene</td>
<td>13.32</td>
<td>Succeeded</td>
</tr>
<tr>
<td>2010-10-18 04:08:24</td>
<td>do_fetch</td>
<td>10387.54</td>
<td>Succeeded</td>
</tr>
<tr>
<td>2010-10-18 04:08:24</td>
<td>do_distribute_sources</td>
<td>0.09</td>
<td>Succeeded</td>
</tr>
<tr>
<td>2010-10-18 04:08:24</td>
<td>do_unpack</td>
<td>2.30</td>
<td>Succeeded</td>
</tr>
<tr>
<td>2010-10-18 04:08:24</td>
<td>do_patch</td>
<td>0.02</td>
<td>Succeeded</td>
</tr>
<tr>
<td>2010-10-18 04:08:24</td>
<td>do_generate_toolchain_file</td>
<td>0.05</td>
<td>Succeeded</td>
</tr>
<tr>
<td>2010-10-18 04:08:24</td>
<td>do_configure</td>
<td>7.31</td>
<td>Succeeded</td>
</tr>
<tr>
<td>2010-10-18 04:08:24</td>
<td>do_qa_tools</td>
<td>2.18</td>
<td>Succeeded</td>
</tr>
<tr>
<td>2010-10-18 04:08:24</td>
<td>do_compile</td>
<td>192.75</td>
<td>Succeeded</td>
</tr>
<tr>
<td>2010-10-18 04:08:24</td>
<td>do_install</td>
<td>1.72</td>
<td>Succeeded</td>
</tr>
<tr>
<td>2010-10-18 04:08:24</td>
<td>do_populate_sysroot</td>
<td>5.59</td>
<td>Succeeded</td>
</tr>
<tr>
<td>2010-10-18 04:08:24</td>
<td>do_qa_staging</td>
<td>21.68</td>
<td>Succeeded</td>
</tr>
<tr>
<td>2010-10-18 04:08:24</td>
<td>do_package</td>
<td>40.87</td>
<td>Succeeded</td>
</tr>
<tr>
<td>2010-10-18 04:08:24</td>
<td>do_package_write_ipk</td>
<td>7.52</td>
<td>Succeeded</td>
</tr>
<tr>
<td>2010-10-18 04:08:24</td>
<td>do_package_write</td>
<td>0.04</td>
<td>Succeeded</td>
</tr>
<tr>
<td>2010-10-18 04:08:24</td>
<td>do_package_stage</td>
<td>5.04</td>
<td>Succeeded</td>
</tr>
<tr>
<td>2010-10-18 04:08:24</td>
<td>do_package_stage_all</td>
<td>0.04</td>
<td>Succeeded</td>
</tr>
<tr>
<td>2010-10-18 04:08:24</td>
<td>do_build</td>
<td>0.00</td>
<td>Succeeded</td>
</tr>
<tr>
<td>2010-10-18 04:08:24</td>
<td>do_rm_work</td>
<td>0.41</td>
<td>Succeeded</td>
</tr>
<tr>
<td>2010-10-18 04:08:24</td>
<td>do_rm_work_all</td>
<td>0.04</td>
<td>Succeeded</td>
</tr>
</tbody>
</table>

#### 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
  - autotool-native
  - automake-native
  - libtool-native
  - libtool-cross
  - gnu-config-native
  - coreutils-native
  - virtual/arm-angstrom-linux-gnueabigcc
  - 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
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

**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

Preconfiguring image ✓
Installing packages:
  task-base ✓
  udev ✓
  angstrom-version ✓
  tinylogin ✓
  initscripts ✓
  sysvinit ✓
  sysvinit-pidof ✓
Assembling image ✓

Current configuration:
  Machine: beagleboard
  Image name: ELCE-2010
  Image type: tbz2

Additional Packages:

Angstrom-2010.10-narcissus-beagleboard-x86_64-ELCE-2010-image-sdk.tar.bz2 [49.01 MiB]: sdk for the generated rootfs.
ELCE-2010-image-beagleboard.tar.bz2 [8.46 MiB]: This is the rootfs 'ELCE-2010' for beagleboard you just built. This will get automatically deleted after 3 days.
  You can also have a look at the software manifest for this rootfs.

The raw SD card image(s) below have a vfat partition populated with the bootloader and kernel, but an empty ext3 partition. You can extract the tarball to that partition to make it ready to boot.
  The intended size for the SD card is encoded in the file name, e.g. 1GiB for a one gigabyte card.
ELCE-2010-image-beagleboard-sd-1GiB.img.gz [4.1 MiB]
Current uncompressed image size: 30M
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](button)

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

![64bit Intel](button)
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

```bash
$ 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

<table>
<thead>
<tr>
<th>Package Name</th>
<th>The name of the application or files</th>
</tr>
</thead>
<tbody>
<tr>
<td>Version</td>
<td>Version of the application or files</td>
</tr>
<tr>
<td>License</td>
<td>Name of the license or licenses that apply to the Package.</td>
</tr>
<tr>
<td>Location</td>
<td>The directory name and path on the media (or in an archive) where the Package is located.</td>
</tr>
<tr>
<td>Delivered As</td>
<td>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.</td>
</tr>
<tr>
<td>Modified</td>
<td>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.</td>
</tr>
</tbody>
</table>

### Obtained from

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 it will open the location in the browser. If this field contains a file name it will open the file in the browser. If this field contains a comment it will open the comment in the browser.

### Manifest

**Narcissus package list:** task-base udev angstrom-version tinylogin initscripts sysvinit sysvinit-pidof

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

**Complete package list:**

<table>
<thead>
<tr>
<th>Package Name</th>
<th>Version</th>
<th>License</th>
<th>Delivered As</th>
<th>Modified</th>
<th>Location</th>
<th>Obtained from</th>
</tr>
</thead>
<tbody>
<tr>
<td>alsa-conf-base</td>
<td>1.0.23-r0.6</td>
<td>LGPLv2.1</td>
<td>Binary</td>
<td></td>
<td>alsa-conf-base_1.0.23-r0.6_armv7a.ipk</td>
<td>ftp://ftp.alsa-project.org/pub/lib/alsa-lib-1.0.23.tar.gz</td>
</tr>
<tr>
<td>alsa-state</td>
<td>0.2.0-r21.6</td>
<td>MIT</td>
<td>Binary</td>
<td></td>
<td>alsa-state_0.2.0-r21.6_beagleboard.ipk</td>
<td>Angstrom/OE metadata</td>
</tr>
</tbody>
</table>

export `IMAGE_BASENAME = "ELCE-2010-image"`

`IMAGE_INSTALL = " task-base udev angstrom-version \ tinylogin initscripts sysvinit \ sysvinit-pidof"`

`inherit image`