Yocto Project®
Prebuilt software development in OE way

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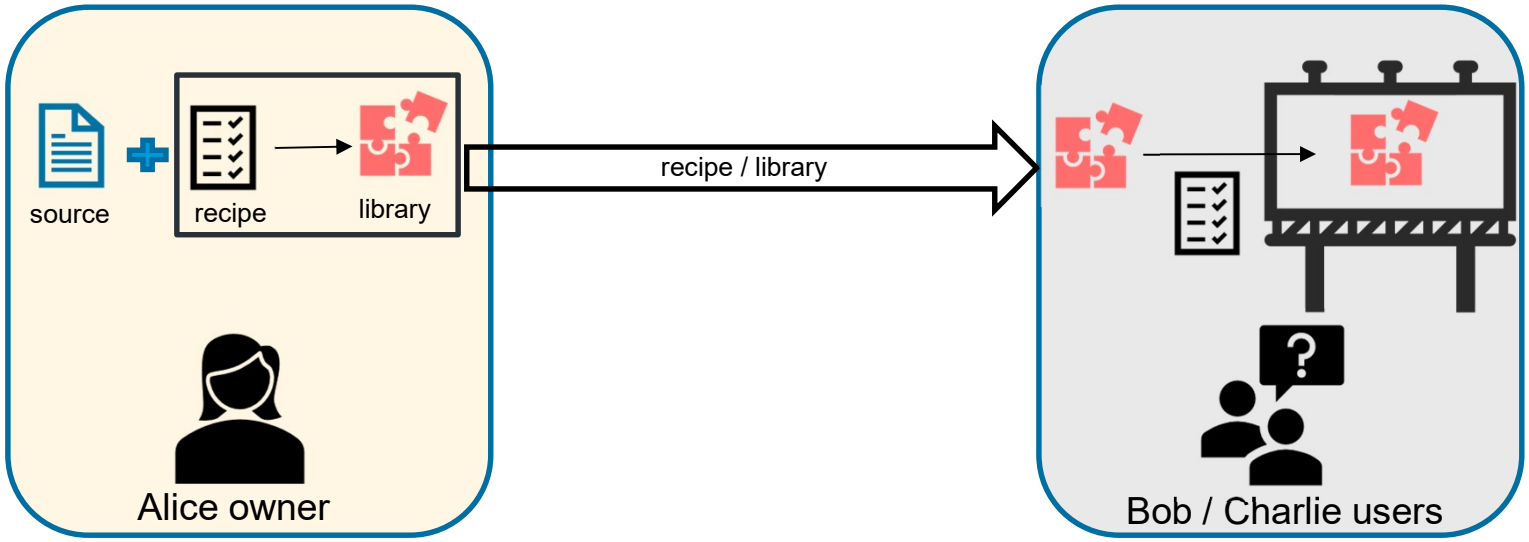
Yocto Project *Virtual* Summit Europe, October 29-30, 2020

What are we trying to solve

The situation is described in

https://www.yoctoproject.org/docs/latest/mega-manual/mega-manual.html#packaging-externally-produced-binaries

Problem Statement



Alice & Bob scenario is a real-world use case of proprietary software distribution for many companies.

Short comings of viable alternatives

- bin_package.bbclass
  - Need separate recipes for Alice and Bob.
  - Managing DEPENDS.

```
# Alice Recipe ##
inherit autotools
…
DEPENDS += “A B C-native D-toolchain”

SRC_URI = “http://example.com/git/?\
         p=internal/some.git;h=a1b2c3d4”
do_configure () {
…
}
do_compile () {
…
}
…
```

```
## Bob Recipe ##
inherit bin_package

DEPENDS += “A B”

SRC_URI = "git://example.com/downloads/ \
           somepackage.tar.gz;subpath=${BP}"
…
…
…
…
```

Short comings of viable alternatives

- package_tar
  - Just another packaging format
  - Can only create tar files after packages have been split.
  - Doesn't honor the users' package configuration options.
  - Can't handle DEPENDS
  - Not possible to create separate tar files for Bob / Charlie

prebuilt.bbclass

A custom bitbake class for prebuilt needs

Proposed solution – prebuilt.bbclass

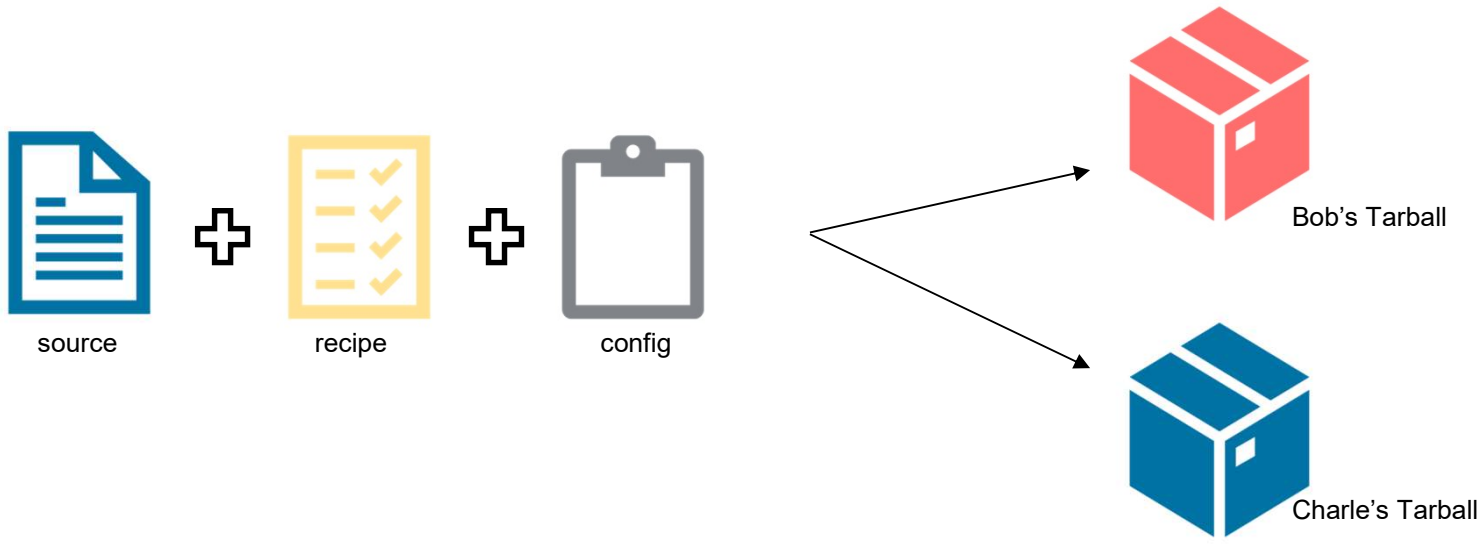
- Use same recipe at both sites.
- For Alice - generates tarball(s) out of ${D} directory suitable for each user.
- For Bob / Charlie - restores ${D} from shared tarball as sources are not available.

```
## prebuilt.bbclass ##
# Generate prebuilt tarball for Alice
do_generate_prebuilt[dirs] = "${D}"
do_generate_prebuilt[cleandirs] = "${PREBUILT_DIR}/${PACKAGE_ARCH}"
do_generate_prebuilt() {
    tar --owner 0 --group 0 -czvf ${PREBUILT_DST} -C ${D} . || [ $? -eq 1 ]
}

# Install Prebuilt tarball for Bob / Charle
do_install_prebuilt[dirs] = "${D}"
fakeroot do_install_prebuilt() {
   tar -xvzf ${PREBUILT_SRC} -C ${D}
}
```

prebuilt.bbclass - Alice workflow

- Generate tarball(s) out of ${D} suitable for Bob / Charlie.
- Optionally strip libs before creating tarball(s).



prebuilt.bbclass - Alice workflow

- Conf file with details of files to be shipped for Bob / Charlie

```
## prebuilt.conf ##

PB_VARIANTS = "bob charle"

 bob_PREBUILT_PACKAGES += " pkg1 pkg2 "
 bob_PREBUILT_FILES_pkg1+="/usr/bin/pkg1-bin"
 bob_PREBUILT_FILES_pkg2+="/usr/lib/pkg2-lib"
 bob_PREBUILT_FILES_pkg2+="/usr/include/pkg2-header1.h"
 bob_PREBUILT_FILES_pkg2+="/usr/include/pkg2-header2.h"


 charle_PREBUILT_PACKAGES += " pkg2 pkg3 "
 charle_PREBUILT_FILES_pkg2+="/usr/lib/pkg2-lib"
 charle_PREBUILT_FILES_pkg2+="/usr/include/pkg2-header1.h"
 charle_PREBUILT_FILES_pkg3+="/usr/bin/pkg3-bin"
```

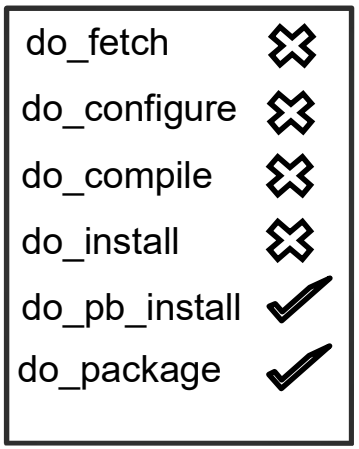
prebuilt.bbclass - Alice workflow

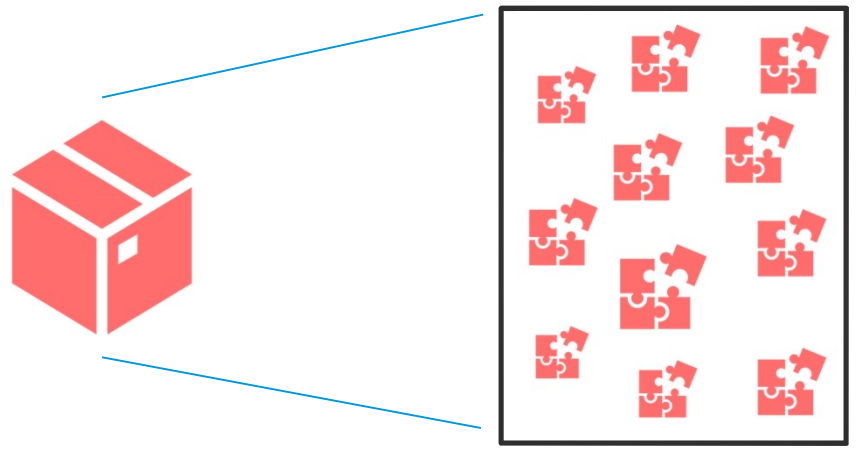
- Generate tarball(s) out of ${D} directory suitable for Bob / Charlie

```
do_generate_prebuilt[outputdirs] = "${DEPLOY_DIR_PREBUILT}"
do_generate_prebuilt() {
    packages = (d.getVar("PB_PACKAGES") or "").split()
    variants = (d.getVar("PB_VARIANTS") or "").split()
    for p in packages:
        for v in variants:
            files = d.getVar(v + "_PREBUILT_FILES_" + p)
            stripped = d.getVar("PREBUILT_STRIP_" + ppackage)
    cmd = "tar -cf %s -T /dev/null" % (tarball) # Create empty archive
    for f in files: #Append files
         cmd = "tar --owner 0 --group 0 -rvf %s ./%s" % (tarball, file)
         oe.utils.getstatusoutput(cmd)
}
python () {
    if d.getVar('USE_PREBUILTS'):
        .....
    elif d.getVar('DEPLOY_DIR_PREBUILT'): # generate prebuilt package
        bb.build.addtask('do_generate_prebuilt', 'do_package', 'do_install', d)
}
```

prebuilt.bbclass - Bob workflow

- Make tasks like fetch, compile, install etc. as noexec.
- Install tarball into ${D} and let post install tasks run as is.





${D} of WORKDIR at Bob

prebuilt.bbclass - Bob workflow

- Make tasks like fetch, compile, install etc. as noexec.
- Install tarball into ${D} and let post install tasks run as is.
- Prune DEPENDS to drop source dependencies.

```
# In case of prebuilt usage, these tasks are discarded
PREBUILT_BYPASS_TASKS += "\
  do_fetch do_unpack do_patch do_configure do_compile do_install do_populate_lic"

python () {
    if d.getVar('USE_PREBUILTS'):
        # use prebuilt package
        for task in d.getVar('PREBUILT_BYPASS_TASKS').split():
            d.setVarFlag(task, 'noexec', '1')
        bb.build.addtask('do_install_prebuilt', 'do_populate_sysroot', 'do_install', d)
}
```

prebuilt.bbclass - Bob workflow

- Install tarball into ${D} and let post install tasks run as is.

```
fakeroot python do_install_prebuilt() {
    arch = d.getVar('PACKAGE_ARCH')
    dest = d.getVar('D')
    pn = d.getVar("PN")
    pv = d.getVar('PV')
    tarball = ""
    done = True
    # Check if prebuilt tarball exist
    for prebuiltsrc in (get_prebuilt_paths(d) or "").split():
        ppackages = (d.getVar("PREBUILT_PACKAGES") or "").split()
        for ppackage in ppackages:
            tbpath = prebuiltsrc + "/" + ppackage + "_" + pv + "_" + arch + ".tar.gz"
            if os.path.exists(tbpath):
                tarball = tbpath
        if tarball:           cmd = "tar -xvzf %s -C %s" % (tarball, dest)
           (retval, output) = oe.utils.getstatusoutput(cmd)
        if retval:
           bb.warn("Errors in extracting prebuilt: %s (%s)" % ( tarball, output))
}
```

prebuilt.bbclass - Bob workflow

- Selectively remove build dependencies using PREBUILT_INHIBIT_DEPS

```
## myrecipe.bb ##
DEPENDS = "A B C-native D-toolchain"
...
PREBUILT_INHIBIT_DEPS = "C-native D-toolchain"
...
inherit prebuilt

### prebuilt.bbclass remove build-only deps ##
Python () {
    inhibit_deps = d.getVar('PREBUILT_INHIBIT_DEPS')
    if inhibit_deps == "1":
        d.setVar('DEPENDS_remove_pn-%s' % pn, d.getVar('DEPENDS'))
    elif inhibit_deps != "0":
        d.setVar('DEPENDS_remove_pn-%s' % pn, inhibit_deps)
}
```

Proposed solution – Conclusion

- Tested internally and want to consider upstream
- Known limitations
  - PACKAGECONFIGs are unsupported.
- Possible enhancements
  - Prebuilt tar files distribution.
- Related community discussion https://lists.openembedded.org/g/openembedded-core/topic/72381872#128488

Thanks for your time