GDP Hands on Session

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GENIVI Delivery

- **Baselines**: outcome of the compliance program.
  - Yocto baseline (meta-ivi).
  - Baserock baseline.
- **Master**: rolling release: focused on auto system devs
- **GDP**: GENIVI Development Platform for apps devs.
- New initiatives.
  - GDP spins: community driven systems based on Master
  - GDP SDK: development tools

Master

Why Master?

- Where collaboration takes place.
- Latest automotive software available.
  - In OSS for automotive, GENIVI is upstream.
- Targets FOSS auto system devs. & GDP contributors.
- Build GDP from scratch for your favourite target or customise your build.

What is Master?

- Rolling release with the latest integrated software for automotive.
- Central integration point.
- Yocto (poky) based.
- Two main repos:
  - genivi-dev-platform
  - meta -genivi-dev

GDP: GENIVI Development Platform

Why GDP?

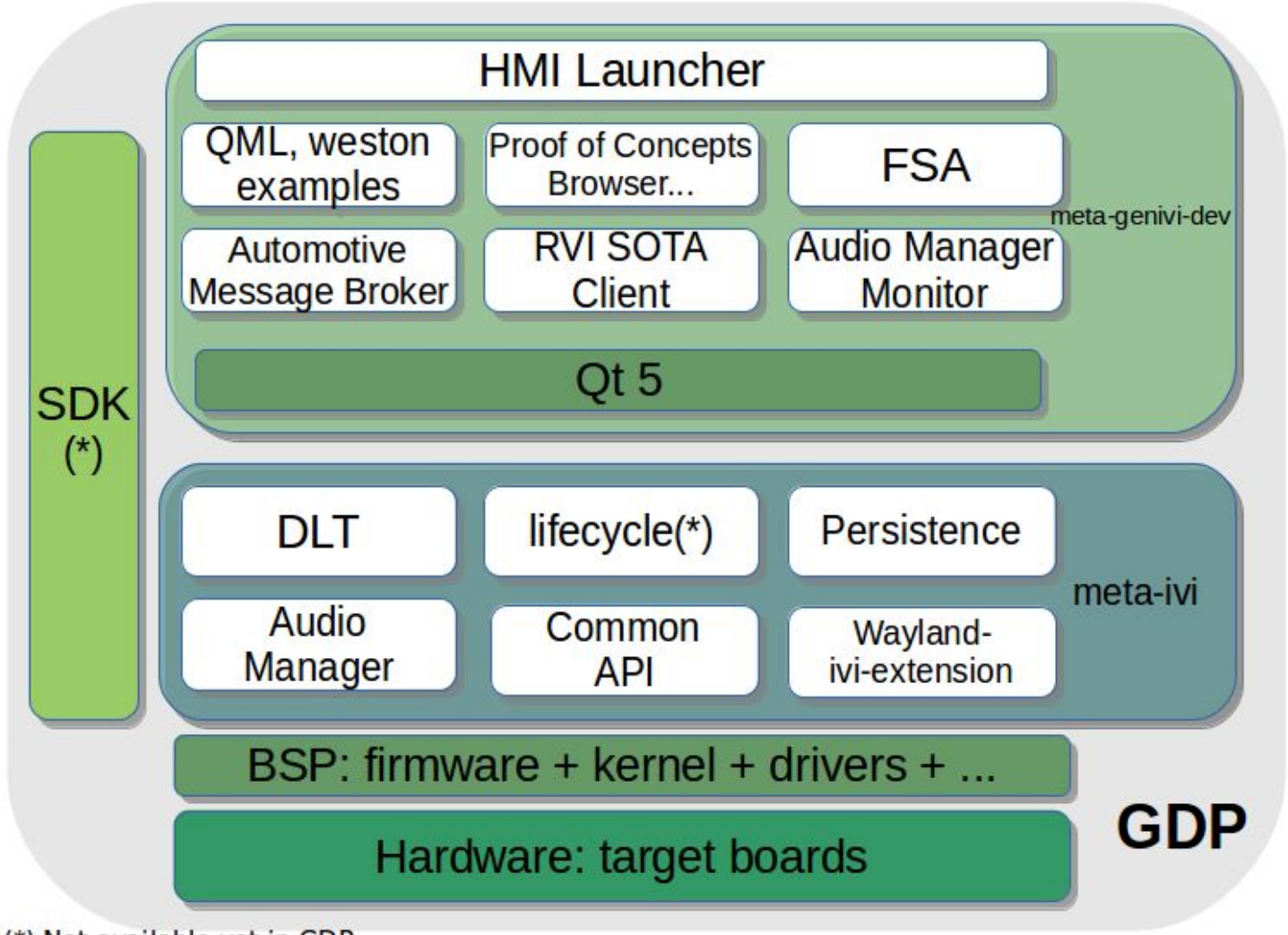
- It brings GENIVI components for automotive to the masses, including meta-ivi.
- Ideal for app developers and automotive newbies.
- Up to date stable software.
- Easier to consume and improved stability.

What is GDP?

- Acronym of GENIVI Development Platform
- FOSS and open delivery project.
- Published as binaries.
- GDP is based on Master (snapshot + stabilization).
- Available for several development boards & QEMU.
- Current stable version (GDP-ivi9)
  - Latest release: GDP 11 RC2.

GDP in detail

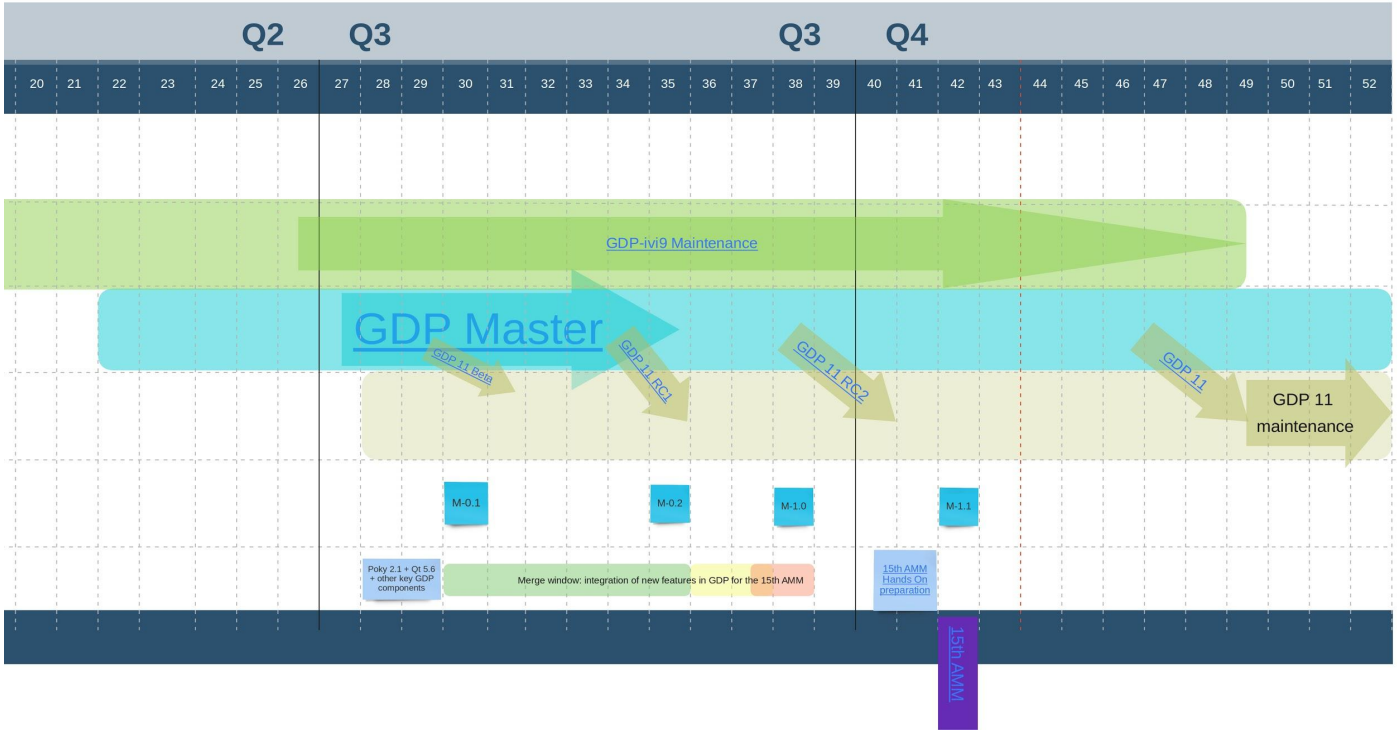
GDP block diagram...



(*) Not available yet in GDP

GDP roadmap

GDP 11 Timeline



GDP 11 RC2

- Released on October 4th 2016. Download it!
- Demoed for the first time at ELCE.
- GDP 11 RC2 highlights:
  - Software: Yocto 2.1, Qt 5.6, AM 7.0, wayland-ivi-extension 1.10.9 (1.11 pre-release), meta-ivi 11…
  - Ports: QEMU, RPi2 & RPi3, Intel Minnowboard MAX/Turbot and Dragonboard 410c. Also build GDP for Renesas Porter & Silk from scratch.

GDP 11 RC3

- Released on October 18th 2016. Download it!
- Demoed for the first time at GENIVI 15th AMM.
- GDP 11 RC3 highlights:
  - New Application launcher and demo apps. Call for testing.
  - System based on RC2 + some new patches like wifi config in RPi3.
  - Available for RPi3 only.
    - Final release will be available for Intel Minnowboard MAX/Turbot, RPi2/3 and Dragonboard 410c. Also build GDP for Renesas Porter & Silk from scratch through Master.

GDP delivery project: other aspects

People behind Master & GDP

Delivery

- GDP maintainers
  - **Changhyeok Bae**, community.
  - **Robert Marshall**, Codethink Ltd.
  - **Tom Pollard**, Codethink Ltd.
  - Community testers.
- Other key people:
  - Meta-ivi & Renesas BSP maintainers, community management, devops/IT service, PMO, delivery team lead, GENIVI architect, LRT team …

Development

- GENIVI Expert Groups
- Community contributors

GDP tools

Tools GDP project uses today:

- GitHub: git repositories and code review.
- JIRA: bug tracker and task management tool.
- Confluence: wiki and blog.
- go.cd: integration/delivery mgnt.
- Mailman: genivi-projects@lists.genivi.org
- IRC: #automotive at irc.freenode.net

New outcomes

- New deliverables
  - First release of the Software Development Environment (SDE) for GDP.
  - First GDP spin: QtAS
- Released on October 18th 2016, at GENIVI 15th AMM.

Future of GENIVI delivery program (GDP)

- GDP 11 to be released before end of 2016
  - Consolidation of the new features.
  - Further system stabilization.
- New deliverables: consolidation.
- Infrastructure and services:
  - Improvements in the build capacity and deployment infrastructure.
  - More and better metrics.
  - Acceptance feature testing.

Call for action

- Documentation of the automotive software components
  - Need docu for newbies to extend the content critical path.
- More integration and use cases for the existing automotive components.
  - We have now a nice platform. What for? Make it meaningful for this industry!
- Testing

Future of GDP

But above all…

More focus on automotive developers.

Check the latest GDP news.

Interesting links

- www.genivi.org
  - GENIVI FAQ
  - GDP latest GDP news
- GDP Master
  - genivi-dev-platform
  - meta-genivi-dev
- Download:
  - GDP-11 RC2 and RC3
  - GDP-ivi9
- Get involved:
  - Get the sources
  - Contribution policies
  - Report bugs
- Follow up
  - Delivery status reports
  - GDP overview (weekly)
  - GDP Out There

Questions?

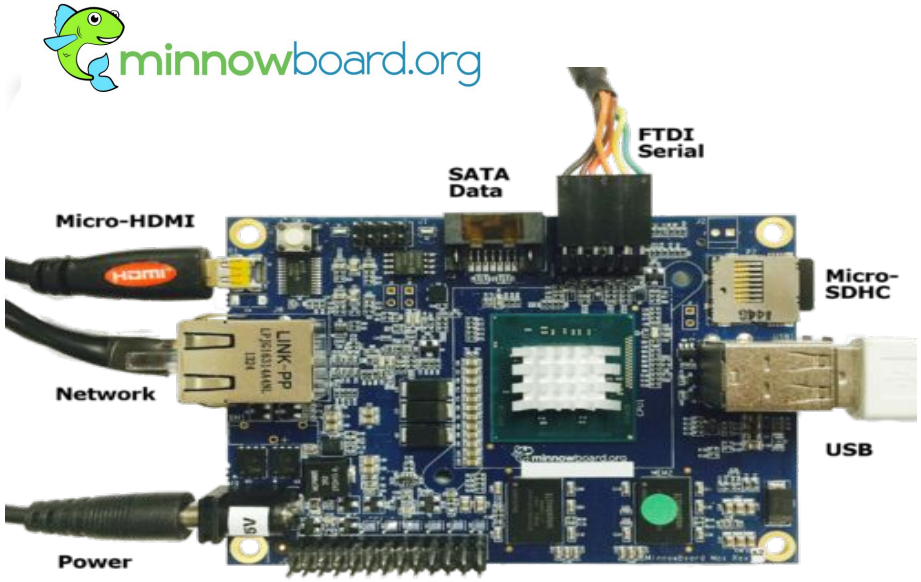
Call for testing

GDP 11 RC3

Boards for the GDP hands on session

MinnowBoard Turbot

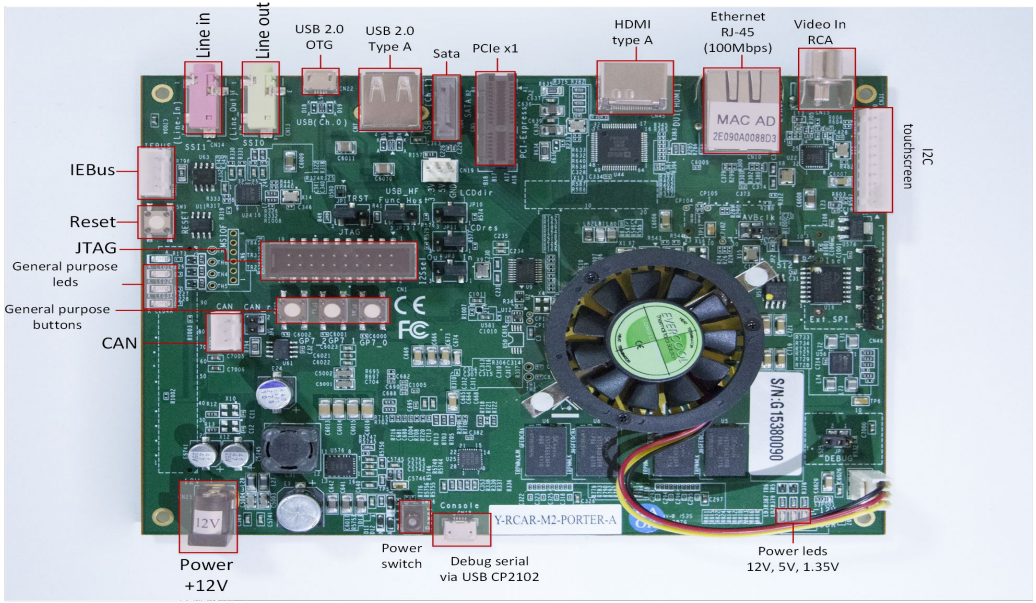
Form Factor	MinnowBoard compatible 99x74mm
CPU	Intel® Atom™ E3826 (2 x 1.46 GHz, 1MB cache, 7W, AES-NI)
DRAM	2GB DDR3L 1067MT/s, Memory down (non expandable)
Ethernet	1x 1Gb Ethernet RJ45
Video	Intel HD Graphics
	1x micro HDMI output
Storage	1x SATA2
	1x MicroSD
I/O Connectors	1x USB 2.0 host
	1x USB 3.0 host
	8x buffered GPIO
Expansion Interface	MinnowBoard Max compatible Lure interface
	High-speed expansion connector
	Low-speed expansion connector
Console	Serial via FTDI cable
Boot Loader	TianoCore UEFI
	CoreBoot / SeaBIOS
Power	5VDC via coaxial power jack



[1] http://www.adiengineering.com/products/minnowboard-turbot/
[2] http://wiki.minnowboard.org/MinnowBoard_Turbot
[3] http://git.yoctoproject.org/cgit/cgit.cgi/meta-intel

Renesas R-Car M2 Porter

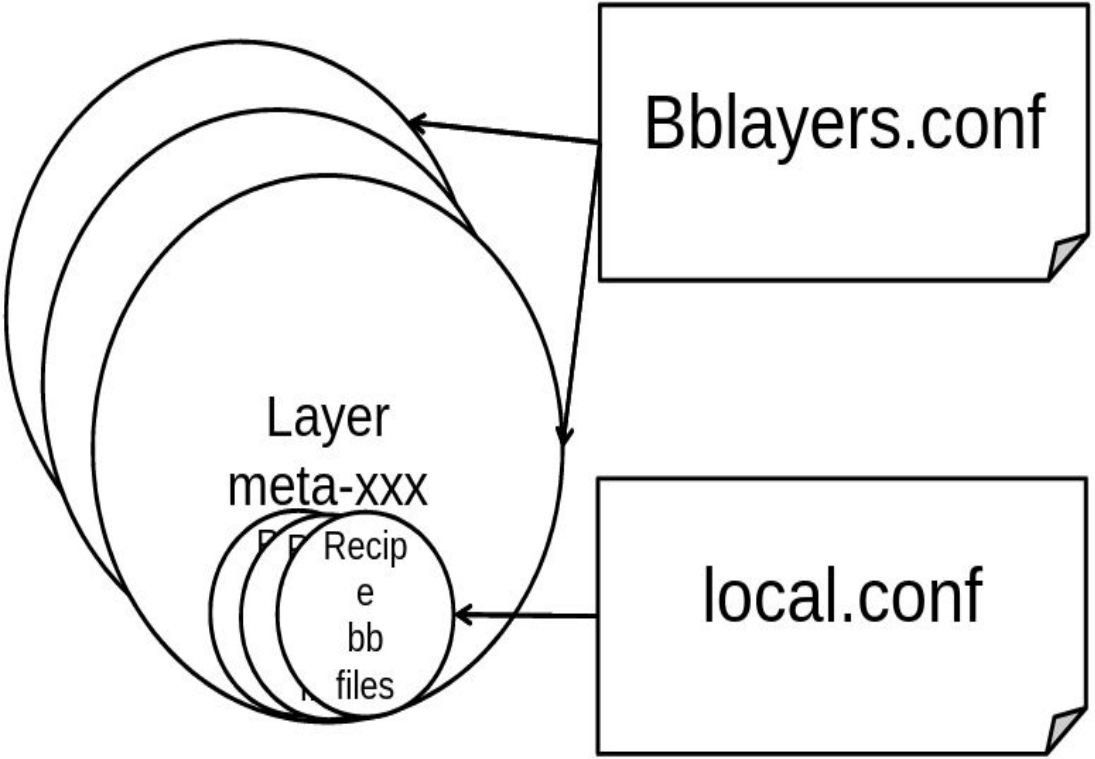
R-Car M2 SoC
ARM®Cortex-A15 Dual Core 1.5-GHz
Multimedia Engine SH-4A 780 MHz
GPU
-PowerVR SGX544MP2 (3D)
-Renesas graphics processor (2D)
2 GB DDR3 memory (dual channel)
Three flash memory chips
-4 MB SPI
-64 MB SPI
-128 MB NOR (one 128Mb bank or 2x 64MB banks)
Debug Ethernet (100 Mbps)
Storage connection
-one SATA rev. 3.1 port
-one SD card slot
-one microSD card slot
Analog Video In: ADV7180 Video Decoder
RCA jack
Audio codec: AK4643EN
Line In 3.5 mm jack
LineOut 3.5 mm jack
USB 2.0 port
microUSB port supports host, device and OTG modes
PCI Express x1 slot
CAN transceiver



[1]http://elinux.org/R-Car/Boards/Porter
[2]http://am.renesas.com/applications/automotive/cis/cis_highend/rcar_m2/
[3]https://github.com/slawr/meta-renesas

Yocto / bitbake: introduction

Yocto Overview



- What layers to look into for recipes

- bitbake = build tool
- Open Embedded (OE) = build system
- Yocto = umbrella project
- poky = reference system

- Distribution: poky-ivi-systemd
- Machine: porter, intel-corei7-64, …
- Package Extra Configuration
- Add more Packages in the build image

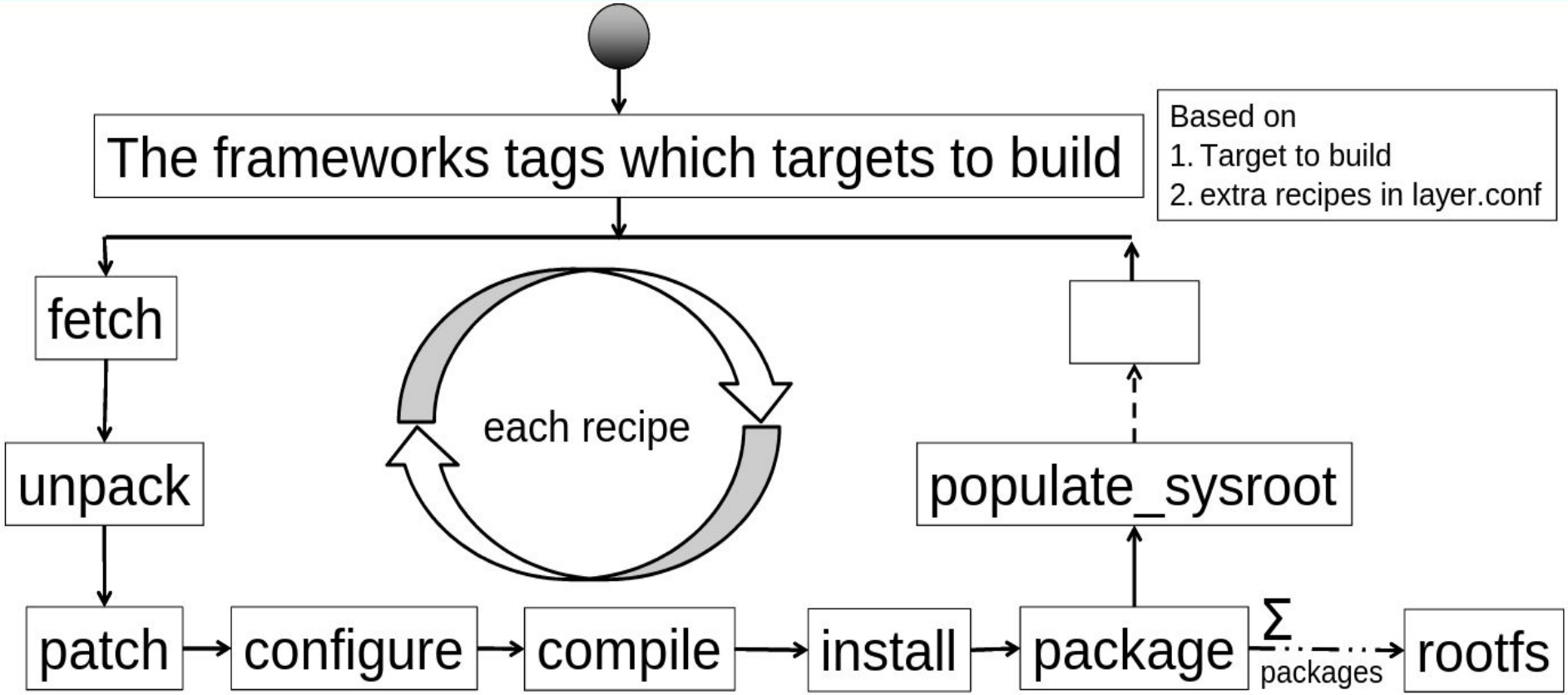
Recipe Overview

- Where to find to source code (git, svn, tar.gz, .c)
- What version
- Apply patches on it ?
- Special commands.

- FILES_{$PN}
- RDEPENDS
- Build tree
- Native packages vs deployed packages

```
SUMMARY = “aaa"
DESCRIPTION = “bbb"
HOMEPGAE = “ccc"
LICENSE = "LGPL-2.1"
LIC_FILES_CHKSUM = "file://ddd;md5=597c8d49137513c98683e1d73158292f"

inherit cmake

PV = “hhh+git${SRCPV}"

DEPENDS = “eee fff ggg"

SRC_URI = “iii.jjjj.kkk"
SRC_URI += "file://lll.patch"
SRCREV = "955972390d16ca275159891cad29c2166217094d"

S = "${WORKDIR}/mmm"
do_install_append() {
    mv ${D}/usr/include/nnn/* ${D}/usr/include
}
INSANE_SKIP_${PN} = "dev-deps"
```

Bitbake Build Process



Useful Bitbake Commands

Command	Description
bitbake <image>	**Bake an *image* (add *-k* to continue building even if errors are found in the task's execution)**
bitbake <package> -c <task>	**Execute a particular *package*'s *task*. Default Tasks names: *fetch, unpack*,*patch*, *configure*, *compile*, *install*, *package*, *package_write*, and *build.*** ***Example:* To (force) compile a kernel and then build, type:** ***$ bitbake linux-$target -f -c compile*** ***$ bitbake linux-$target***
bitbake <package> -c listtasks	**List all tasks for package**
bitbake-layers show-layers	**Show layers**
bitbake -s | grep $package	**Check recipe version available / default to bitbake**
bitbake -e $package	**Shows all the steps bitbake will perform on a package**

Bitbake demo

Bitbake Demo - Modifying existing source

1. This walkthrough will provide a generic example of how to modify an existing package included within the GDP system. It aims to provide a general overview of the workflow that can be used, involving tools recommended by the Yocto project such as quilt to create patches. This patch can then be added to the recipe, simulating a real workflow.
2. Removing the FSA icon from the HMI has been chosen as it provides visual feedback of the changes made to the source
3. It is important to remember that rebuilding a package will cause any package that has a build dependency on that package to rebuild.
4. Content Model

Bitbake Demo -Adding an existing package (I)

- This example will show the basic steps of adding an existing package to the generic GDP image, including finding & adding the recipe to the build environment
- This is a good starting point when attempting to add a package to a bitbake based system.
- bitbake -s | grep $package to check if it's already included in the bitbake environment. bitbake -g | grep $package will show if it's already built for the image (note this does not mean deployed)
- Ensure where possible to select a version of the recipe based against the same Yocto version as in use, currently this is 2.1 'Krogoth' in GDP Master

Bitbake Demo -Adding an existing package (II)

- The simplest way to add a new recipe to the GDP, especially for testing is to use the “IMAGE_INSTALL_append = " package-name"” variable.
- If a package recipe is correctly defined, it should build the packages and any needed runtime dependencies into your images sysroot.
- If the package is from a new layer not already imported by GDP, follow the steps to add it including git submodules, init.sh & bblayers templating
- If upstreaming the package addition into GDP, add the package name to an existing packagegroup if viable

Bitbake Demo - Adding a new package (I)

- This example will demonstrate how to add a new package to GDP, in the form of a simple Qt application.
- A simple recipe will be created, and the package will be deployed to the system.
- Diagram of generic recipe creation process .
- tspress:
  - tspress tracks touchscreen presses and movement
  - Add recipe and update packagegroup-gdp-hmi and bitbake
  - To run, stop and restart weston (systemctl stop weston; weston --tty=1 --no-config --log=weston.log &) and then kill launcher, background and panel
  - Then run tspress
- cepilosege.

Bitbake Demo - Adding a new package (II)

- Note repository does not contain license file, bitbake will report this warning during packaging if incorrectly set against source, or will refuse to configure if value not given at all.
- Depending on the dependencies of the package, a supporting package may need to be added to the GDP buildenv (meta-rust needed for SOTA client as an example).
- Check licensing, particularly important if attempting upstream the recipes into GDP / meta-ivi.
- To test the application works, kill weston and execute the binary over the ssh/serial connection.

Contribute

Contribute Patches (I)

Ensure you read over:

1. Contribute
2. How to contribute to GENIVI.
3. Relevant MAINTAINERS file.

Generic steps to generate patchset to mailing list:

1. Ensure you've created your commits against the head of the master or supported release branch following genivi submission guidelines.
2. git format-patch --cover-letter -M origin/$target -o outgoing/

   edit outgoing/0000-* (This is your cover letter)

   git send-email --to=maintainer@maintaineremployer.com --cc=genivi-projects@lists.genivi.org --cc=username2@personalaccount.com outgoing/*.patch

Contribute Patches (II)

This will generate the patch(set), allowing you to edit the default cover letter to add a blurb etc & finally send it. Patches to genivi-projects@lists.genivi.org are public and will be reviewed publically.

Please check Git Email Set Up for further help and examples.

Github Pull Requests

- So you've created & tested a change to GDP, the easiest way to contribute is using the Github Pull Request infrastructure. GDP repos are currently integrated with JIRA & go.cd support for CI testing, all of which are public.
- Dealing with two tightly linked repositories has issues in terms of handling integration, certain scenarios requires changes in both repos to be tested simultaneously

Examples

- Pulls
- GDP
- GDP policies
- Pull request example
- Go.cd explample

Review CI Pipeline

- Workflow & Infra still in development - http://go.genivi.org/go/pipelines
- We would expect all incoming PR's to pass builds in these pipelines before merging into the ''master' branch.
- Still in development and ultimately CD tooling is need for physical hardware tests.
- Dedicated release artifact pipelines, per target. Tasks
- Maintain Open Source license during your product lifecycle.
- Quick demo if time permits - This should be possible to show with whatever github PR demo we manage to make.

New in GDP 11 RC3

GDP-11 ‘New HMI’

- Wiki page.
- Pull request and commit.
- HMI repository.
- New demo applications:
  - FM Radio.
  - Connected home.
  - HVAC & commit.
- Currently released as ‘RC3’ for RPi3, but master can be built for any target supported by GDP.

GDP Software Development Environment (SDE)

Interesting links

- SDE wiki page.
- Follow the improvements and bugs.
- SDE current repository
- Tools included:
  - Qt Creator
  - Eclipse IDE
- Other interesting links related with the GDP SDE:
  - Yocto SDK
  - DLT viewer manual.

GDP Spins

Interesting links

- Qt AS spin wiki page.
- Download QtAS spin.
- QtAS repository.
- QtAS in Detail.
- QtAS roadmap.
- Contribute to QtAS.

Thank you

www.codethink.co.uk