Building Genivi 15 for YP 2.6 (Thud) on the Renesas R-Car SoCs

This page describes building the Genivi v15 platforms for Yocto Project 2.6 (Thud) using Renesas R-Car SoC BSPs. Specifically the page was written for the R-Car Generation 3 SoCs: H3, M3, M3N and E3

General (read first)

This section provides information that applies to all platforms. Information for specific platforms, such as the Genivi Yocto Baseline (meta-ivi) and GDP, is covered in the following section. Please read this section first.

Yocto BSP Compatibility

The standard Renesas customer Yocto BSP meets the functional and version requirements of the Genivi 14 compliance specification. The kernel simply needs to be configured for the requirements of the specification and platform.

At a minimum the following kernel config options are enabled:

- FHANDLE
- EXPERIMENTAL
- ECRYPT_FS
- QUOTA
- BT
- CGROUPS

The Genivi 14 compliance specification does not specify a build system and instead allows the implementer the freedom to choose what fits their needs best. The Genivi implementations of the specification in the shape of the Genivi Yocto Baseline (meta-ivi v15.0x) and Genivi Development Platform (GDP v15.x - currently in development) released in the first half of 2019 both use Yocto Project 2.6 (Thud).

At the time of writing Renesas provide Yocto Project 2.6 support in the R-Car Community Yocto BSP. Then as a service to the community Renesas maintains the Yocto layer meta-ivi-renesas which adapts the Yocto BSP to the needs of the Genivi Yocto Baseline. The combination of the two layers can then be used to build Genivi 15 software for Yocto Project 2.6. Renesas works in the Genivi Baseline Integration Team (BIT) and Genivi Development Platform (GDP) to ensure that the combination can be used to build those images for example.

Here are the details:

<table>
<thead>
<tr>
<th>Purpose</th>
<th>Repository location</th>
<th>Branch</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upstream Yocto BSP support</td>
<td><a href="https://github.com/renesas-rcar/meta-renesas.git">https://github.com/renesas-rcar/meta-renesas.git</a></td>
<td>thud-dev</td>
</tr>
<tr>
<td>Adapt Yocto BSP (meta-renesas) to Genivi Yocto Baseline (meta-ivi)</td>
<td><a href="https://github.com/GENIVI/meta-ivi-renesas.git">https://github.com/GENIVI/meta-ivi-renesas.git</a></td>
<td>15.x-thud</td>
</tr>
</tbody>
</table>

Specific Genivi Platforms

This section provides information for specific Genivi platforms such as the Genivi Baseline (meta-ivi) and GDP.

Genivi Development Platform (GDP)

WARNING: GDP information below is for sumo. GDP is in the process of being rebased on Thud in Github PR 231. R-Car support is updated to Thud in PR #9. This section will be updated as the rebase progresses.

Instructions for building and deploying GDP on the R-Car H3/M3 Starter Kit and H3/M3 Salvator-X(S) boards are maintained in the GDP wiki pages. The current working branch can be found in the 14.1.x-sumo branch of GDP.

Instructions for building and deploying GDP on the R-Car H3/M3 Starter Kit and H3/M3 Salvator-X boards are maintained in the GDP Master wiki page.

Issues are maintained in the Genivi JIRA GDP project.

Genivi Yocto Baseline and meta-ivi (GYB)

For those familiar with Yocto and meta-ivi you can find the Thud Renesas Yocto BSP details for Gen 3 in the table below. At the time of writing they have been successfully tested with meta-ivi 15.0.0 and Thud BSP v3.15 and v3.19.

Steps:
1) Clone and checkout Genivi Yocto Baseline repositories

See the meta-ivi Readme.md for details.

2) Clone and checkout the Renesas required layers.

Historical note: With YP 2.4 meta-renesas switched from the linaro gcc toolchain to using the poky gcc toolchain by default. You therefore no longer need to use the meta-linaro-toolchain layers.

<table>
<thead>
<tr>
<th>R-Car Generation</th>
<th>Repository Location</th>
<th>Branch</th>
</tr>
</thead>
<tbody>
<tr>
<td>R-Car Gen 3 (H3/M3/E3 SoCs)</td>
<td><a href="https://github.com/renesas-rcar/meta-renesas.git">https://github.com/renesas-rcar/meta-renesas.git</a></td>
<td>thud-dev</td>
</tr>
<tr>
<td></td>
<td><a href="https://github.com/GENIVI/meta-ivi-renesas.git">https://github.com/GENIVI/meta-ivi-renesas.git</a></td>
<td>15.x-thud</td>
</tr>
<tr>
<td></td>
<td><a href="https://git.linaro.org/openembedded/meta-linaro.git">https://git.linaro.org/openembedded/meta-linaro.git</a></td>
<td>thud</td>
</tr>
</tbody>
</table>

3) Obtain and install the Renesas R-Car Graphics and Multimedia packages

For R-Car Gen 3 instructions for installing the click-through packages can be found on elinux.org.

Download the R-Car Gen 3 Linux Drivers and Gfx/MMP packages for **YBSP v3.19.0 and Wayland 1.16/Weston 5.0** from the section for **YP 2.6 (Thud)** from here.

4) You can now follow the build instructions in the meta-ivi Readme.md.

   4a) Export TEMPLATECONF to pick up correct configuration for the build

   ```bash
   export TEMPLATECONF="/full/path/to/meta-ivi/meta-ivi/conf"
   ```

   4b) Run the following command:

   ```bash
   > $ source poky/oe-init-build-env
   ```

   4c) Setup your Yocto local.conf and bblayers.conf

   For R-Car Gen 3 add the following to bblayers.conf:

   ```
   BBLAYERS += " \\
   $(TOPDIR)/../meta-renesas/meta-rcar-gen3 \\
   $(TOPDIR)/../meta-openembedded/meta-oe \\
   $(TOPDIR)/../meta-openembedded/meta-filesystems \\
   $(TOPDIR)/../meta-linaro/meta-optee \\
   $(TOPDIR)/../meta-ivi-renesas "
   ```

   Examples of the additions to add to your Yocto local.conf:

   ```
<table>
<thead>
<tr>
<th>M3 Starter Kit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local.conf</td>
</tr>
<tr>
<td>link</td>
</tr>
</tbody>
</table>
   ```

   At the time of writing meta-ivi does not add the weston-init package required to start weston using systemd to the rootfs by default. If you would like to run gfx applications, such as the wayland ivi-extension mock navigation application, please add the following line to your local.conf so weston-init is added:

   ```
   IMAGE_INSTALL_append = " weston-init"
   ```

   To add the R-Car gfx and mmp packages to the image please add the following line to your local.conf:

   ```
   # Add R-Car Gfx and Mmp packages to install
   IMAGE_INSTALL_append_rcar-gen3 = " \\
   packagegroup-gstreamer1.0-plugins \\
   packagegroup-wayland-community \\
   packagegroup-graphics-renesas-proprietary \\
   packagegroup-graphics-renesas-wayland "
   ```

   4d) Build the baseline including the Genivi components

   ```bash
   > $ bitbake meta-ivi-image
   ```