# AN APPROACH TO DELIVER HARDWARE -DEPENDENT PACKAGES IN ORDER TO REDUCE EFFORT OF UPDATING AGL DISTRIBUTION IMAGES

**AUTOMOTIVE LINUX SUMMIT JAPAN 2018** 

06/21/2018, TOKYO KHIEM NGUYEN SENIOR STAFF ENGINEER RENESAS DESIGN VIETNAM RENESAS ELECTRONICS CORPORATION



# WHO AM I?

- Name: Khiem Trong. Nguyen (KHIEM Nguyen キム グエン)
- Company : Renesas Design Vietnam

- Career : 10 years experiences in embedded software development
  - Development and verification for Mobile and In-vehicle software platform
  - Development for test automation solutions of In-vehicle software platform



## **ABOUT RENESAS AND RENESAS DESIGN VIETNAM**



#### Sales Companies

Renesas Electronics America Renesas Electronics Canada Renesas Electronics Brasil-Servicos Renesas Electronics Europe (UK) Renesas Electronics Europe (Germany) Renesas Electronics (China) Renesas Electronics (Shanghai) Renesas Electronics Hong Kong Renesas Electronics Taiwan Renesas Electronics Singapore Renesas Electronics Malaysia Renesas Electronics India Renesas Electronics India

#### Manufacturing and Engineering Service Companies

Renesas Semiconductor Manufacturing Renesas Semiconductor Package & Test Solutions Renesas Semiconductor (Beijing) Renesas Semiconductor (Suzhou) Renesas Semiconductor (Malaysia) Renesas Semiconductor (Kedah) Renesas Semiconductor Technology (Malaysia) Renesas Semiconductor KL

#### Design and Application Technologies Companies

Renesas System Design Renesas Engineering Services **Renesas Design Vietnam** Renesas Semiconductor Design (Beijing) Renesas Semiconductor Design (Malaysia)

**Business Corporation** 

Intersil Corporation

- Renesas Design Vietnam Co., Ltd. (RVC) was founded in October 2004, as one of the main design centers in Renesas group.
- Business line: Design of semiconductor for both hardware and software.



# AGENDA

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# MOTIVATION







### **MOTIVATION** TRADITIONAL AGL DEVELOPMENT WORKFLOW AND ISSUES (2/2)



(\*) https://build.automotivelinux.org/view/jjb-release-jobs/job/release-jjb-eel-snapshot/buildTimeTrend

- Take 9 hrs. 41 min total from scheduled to completion for all machine configurations.
- Simulation on each platform (e.g. Starter Kit Pro)
  - Full build & deploy time: ~5 hours.
  - AGL developers: 81 (\*\*)
    - -Cost = 81\*5 = 405 hours.

(\*\*) 81 unique individuals and 33 unique companies have contributed to

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AGL since the start of the project [2]

#### **MOTIVATION** AGL PROFILES – BUILD ONCE AND DEPLOY FOR EACH PLATFORM (1/2)

- Enable easy/flexible derivations of AGL for various purposes.
- Define a single location to control core functionalities.
- Deploy only the updated packages to optimize development cycle times early in the lifecycle.
- CI performance: avoid repeated full builds by composing binary packages.



Source: Yocto Layers and Device Profiles July 11, 2017, Automotive Grade Linux, https://github.com/dl9pf/layer-reorg/blob/master/doc/20170711\_1\_Yocto\_Layers\_and\_device\_profiles.pdf





Source: Yocto Layers and Device Profiles July 11, 2017, Automotive Grade Linux, https://github.com/dl9pf/layer-reorg/blob/master/doc/20170711\_1\_Yocto\_Layers\_and\_device\_profiles.pdf

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#### **MOTIVATION** SOFTWARE UPDATE SOLUTIONS

- Focus on value-added feature development by reducing integration effort.
- The comparison between Software update solutions [1] [2] [3]

Key criteria	Run-time Installation (RPM)	Dual A/B rootfs (SWUpdate)	Incremental atomic updates (OSTree)
Robust and secure			
Adapt existing environment			
Easy to get started			
Bandwidth consumption			
Downtime during update			



Acceptable



#### **MOTIVATION** SOFTWARE UPDATE SOLUTION - WHY RPM PACKAGE ?

- Used by OpenEmbedded.
- Many Package Manipulation tools: Smartpm, Dandified Yum (DNF), Zypper, etc.
- Be applicable for both updating on the device and SDK.
- Check Package License Information.
- Sign/re-sign packages created by using rpm-tool (\*) or Yocto build system.
- Combine with other tools (e.g. SPDX tools).



(\*) The rpm-tool: <a href="https://knowledge.windriver.com/en-us/000">https://knowledge.windriver.com/en-us/000</a> Products/000/060/010/030/000 Wind River Pulsar Linux Software Development Guide%2C 8/020/030

# **TECHNICAL OVERVIEW**





#### **TECHNICAL OVERVIEW [1/3]** RUNTIME PACKAGE MANAGEMENT

- Create an update server for over-the-air (OTA) updates.
- Allows update the system at runtime using package level, for many use cases.
  - In-field security updates.
  - System, packages or configuration customization at runtime.
  - Remote debugging.



#### **TECHNICAL OVERVIEW [2/3]** DANDIFIED YUM (DNF) PACKAGE MANAGER

- From Yocto Project 2.3, Smart package manager is replaced by DNF package manager.
- DNF is the next generation version of the Yellodog Updater Modified (YUM) and licensed under General Public License v2.
- DNF advanced functionalities (\*)
  - It's actively maintained and supports python 3.x.
  - An undocumented API—this meant more work for developers.
  - Is used to manage package installation and removal, as well as dependency resolution.

DNF version	Poky version	
2.0.0	Pyro (2.3)	
2.6.3	Rocko (2.4)	
2.7.5	Sumo (2.5)	
R	ecommend the most cent version	

(\*) DNF document: http://dnf.readthedocs.io/en/latest/command\_ref.html

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#### TECHNICAL OVERVIEW [3/3] META-YOMO

- Is maintained by Ronan Le Martret (IOT.BZH's member)
- Meta-yomo includes
  - SDK bootstrap: a SDK with DNF from Yocto to manage RPM repo and install dependencies for profile.
  - Scripts: allow to install a minimal set of packages on PC Host/ on the target.



Source: Deploy AGL OS and SDK as a Binary Packaging Distribution for Developer, <u>http://iot.bzh/en/publications/19-2017/44-deploy-agl-os-and-sdk-as-a-binary-packaging-distribution-for-developer</u>

# **DEMO – SCREEN CAST**





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## DEMO

- Install package-agl-demo-platform on AGL Eel 5.0.3.
- Demo for other use-cases (e.g. Updating SDK on PC Host)
- Sanity testing after an update
  - Checksum files after installation.
  - Automated tests on the board.
  - Check that you can install future updates.

# **DEMO – SCREEN CAST**

#### INSTALL PACKAGE-AGL-DEMO-PLATFORM ON AGL EEL 5.0.3/RENESAS R-CAR STARTER KIT PRO THROUGH RPMS







### Installing packagegroup-agl-demo-platform [1/3]

Automatically asked	noot@h3ulcbs/# ./dnf4Target Package	<sup>n.</sup> Arch	Version	Repository	Size
authorization to	Installing: packagenop-agl-deno-platform Installing dependencies: agl-service-bluetoth agl-service-pluetoth agl-service-people	noarch aarch64 aarch64 aarch64	1.0-r0 1.0-r0 1.0-r0110+752:0f40051-r0 1.0-r0110+05080876-r0	aarch64-agl-linux aarch64-agl-linux aarch64-agl-linux aarch64-agl-linux	5.9 k 226 k 33 k 38 k
install/download with	a) - ar vice - georate a) - service - pisce - 2017 a) - service - meta a - 2017 a) - service - meta - 2017 a) - service - 2017 a) - ser	aarch64 aarch64 aarch64 aarch64 aarch64 aarch64	1.0°976770822534-70 914-70 1.0°9110*4623078711-70 1.0°9110*4523078711-70 9.0°93110*31023361-70 0.1°93110*311172212-70	aarchof agi-i inux aarchof agi-i inux aarchof agi-i inux aarchof agi-i inux aarchof agi-i inux aarchof agi-i inux	48 k 29 k 54 k 85 k 459 k
all dependencies.	ag1-service-signal-composer ag1-service-signal-composer ag1-service-uniciens ag1-service-unici ag1-service-unici ag1-service-uniciens ag1-service-uniciens ag1-service-uniciens ag1-service-uniciens ag1-service-uniciens ag1-service-signal-composer ag1-serv	aarch64 aarch64 aarch64 aarch64 aarch64 aarch64	1.0+a;10+6f-002-3833-+70 4.0+4K5-a;110+cf-3109666-r0 0.1+a;10+5261383+6-r0 1.0+a;10+12<8934465-r0 2.4-r0	əərchoff-əqi-linux əərchoff-əqi-linux əərchoff-əqi-linux əərchoff-əqi-linux əərchoff-əqi-linux əərchoff-əqi-linux	// k 1.0 H 544 k 66 k 2.1 H 193 k
	adjonanger-plugins-config adjonanger-plugins-config adjonanger-plugins carrutils dashbaard dhcp-client	aarch64 aarch64 aarch64 aarch64 aarch64 aarch64	7.4-m0 git-m0 0.0-git0+67a2bdcd33-m0 1.0-git0+603t63t7>-m0 4.3.5-m0_	aarch64-agl-linux aarch64-agl-linux aarch64-agl-linux aarch64-agl-linux aarch64-agl-linux aarch64-agl-linux	10 k 303 k 74 k 1.1 H 760 k
	dlt-daenon flite flite-voicedata high-lavel-viµi-service howsecreen-2017	aarch64 aarch64 noarch aarch64 aarch64 aarch64	2.15.0-r0 1.05-r0 1.05-r0 5.0-bp10+585f184a83-r0 1.0-bp10+5825f184a83-r0 1.0-bp10+5825f184a8-r0 1.0-bp10+5825f184a8-r0	aarch64-ag  - linux aarch64-ag  - linux aarch64-ag  - linux aarch64-ag  - linux aarch64-ag  - linux aarch64-ag  - linux	147 k 378 k 1.0 H 366 k 5.3 H 384 k
	inato iproute2 kernel-module-ain-celev-4.9.0-yocto-standard kernel-module-ain-retuork-4.9.0-yocto-standard kernel-module-ain-vel2-4.9.0-yocto-standard kernel-module-ain-vel2-4.0.0-yocto-standard	aarch64 h3ulcb h3ulcb h3ulcb h3ulcb h3ulcb	4.10.0-+0 0.1-+0 0.1-+0 0.1-+0 0.1-+0 0.1-+0	aarch64 agi-i Inux aarch64 agi-i Inux aarch64 agi-i Inux aarch64 agi-i Inux aarch64 agi-i Inux aarch64 agi-i Inux	181 k 11 k 11 k 12 k 12 k
	kernel-modula-dafault-cont-4.9.0-yoCTo-standard kernel-modula-hdrn dic2-4.9.0-yoCto-standard kernel-modula-hdrn ti2-4.9.0-yoCto-standard kernel-modula-hdrn ust-0-0.0-yoCto-standard kernel-modula-mosCca-ust-4.9.0-yoCto-standard	h3ulcb h3ulcb h3ulcb h3ulcb h3ulcb h3ulcb	0.1-+0 0.1-+0 0.1-+0 0.1-+0 0.1-+0 0.1-+0	aarchoff-agi-i inux aarchoff-agi-i inux aarchoff-agi-i inux aarchoff-agi-i inux aarchoff-agi-i inux aarchoff-agi-i inux	8.2 k 17 k 10 k 14 k 10 k 17 k

- Use 2 configuration files to define the package repositories available to the device:
  - Repositories: /etc/yum.repos.d/\*.repo file(s).
  - Main Configuration: /etc/dnf/dnf.conf file.

aarch64-agl-linux/ aarch64 m3ulcb noarch repodata Structure of RPM repository The packagegroup-agl-demo-platform install has been successfully completed !

1 : Libopencv-xphoto3.2-3.2+git0+70bbf17b13-r0.aarch64 : opencv-apps-3.2+git0+70bbf17b13-r0.aarch64 : Libqt5charts5-5.8.0+git0+09b57b3e2d6a-r0.aarch64 : qtbase-dev-5.8.0+git0+49dc9aa409-r0.aarch64 : qtbase-tols=5.8.0+git0+49dc9aa409-r0.aarch64 : qtgraphicaleffects-qnlplugins-5.8.0+git0+1583bb5569-r0.aarch64 : qtuayland-tools=5.8.0+git0+4da4ab4cbf-r0.aarch64 : qtuayland-tools=5.8.0+git0+0e2a950895-r0.aarch64 : Libv41-1.12.3-r0.aarch64 : media-ct1-1.12.3-r0.aarch64 Verifying Verifying Verifying Verifying Verifying Verifying Verifying Verifying Verifying Verifuina Installed: packagegroup-agl-demo-platform.noarch 1.0-r0 agl-service-gps.aarch64 1.0+git0+46459c254+r0 agl-service-mavigation.aarch64 0.1+git0+16754f433e4-r0 audionanager-plugins.aarch64 git-r0 dlt-daemon.aarch64 2.15.0-r0 homescreen-2017.aarch64 1.0+git0+ec28d0bf46-r0 kernel-module-ain-network-4.9.0-yocto-standard.h3ulcb 0.1-r0 kernel-module-ain-network-4.9.0-yocto-standard.h3ulcb 0.1-r0 kernel-module-ain-network-4.9.0-yocto-standard.h3ulcb 0.1-r0 kernel-module-ain-network-4.9.0-yocto-standard.h3ulcb 0.1-r0 kernel-module-ain-network-4.9.0-yocto-standard.h3ulcb 0.1-r0 libevent.aarch64 2.0.22-r0 libopencv-bgsegn3.2.aarch64 3.2+git0+70bbf17b13-r0 libopencv-stgaegn3.2.aarch64 3.2+git0+70bbf17b13-r0 libopencv-ongt10u3.2.aarch64 3.2+git0+70bbf17b13-r0 libopencv-ongt10u3.2.aarch64 3.2+git0+70bbf17b13-r0 libopencv-sufseegn3.2.aarch64 3.2+git0+70bbf17b13-r0 nstalled: libopencv-xfeatures2d3.2.aarch64 3.2+git0+70bbf17b13-rl libqtbon2.7-1.0.aarch64 2.7.13-r1 libqt5svg5.aarch64 5.8.0+git0+1b3a7ae14d-r0 libqtapfu1.aarch64 0.0+git0+12fc8be47-r0 libuindounanager0.1.0.aarch64 1.0+git0+ee2b2fbb44-r0 linux-firnuare-ralink.noarch 1:0.0+git0+b14134583c-r0 lua.aarch64 5.3.3-r0 nocca-usb.h3ulcb 0.1-r0 opencv-apps.aarch64 3.2+git0+70bbf17b13-r0 packagegroup-agl-appfu-agl.noarch 1.0-r0 packagegroup-agl-appfu-mult-imedia\_nearch 1.0-r0 packagegroup-agl-appfu-mult-imedia\_nearch 1.0-r0 most.h3ulcb 0.1-r0 packagegrouppackager pytho qtb; qtla Complete ! qtqui. qtuayland settings.aarcm source-han-sa .noarch 2.37-r7 ttf-dejavu-

agl-service-bluetooth.aarch64 1.0+git0+7b2ef406b1-r0 agl-service-honescreen-2017.aarch64 git-r0 agl-service-radio.aarch64 1.0+git0+6fc0e7d83a-r0 agl-service-uindounanager-2017.aarch64 1.0+git0+12c8934465-r0 can-utils.aarch64 0.0+git0+67a2bdcd33-r0 flite.aarch64 1.06-r0 hvac.aarch64 1.0+git0+53925f1594-r0 hvac.aarch64 1.0+git0+53925f1594-r0 hvac.aarch64 1.0+git0+53925f1594+r0 kernel-nodule-ain-sound-4.9.0-yocto-standard.h3ulcb 0.1-r0 kernel-nodule-hdn-i2c-4.9.0-yocto-standard.h3ulcb 0.1-r0 libatasmart4.aarch64 0.19-r0 libonescreen0.1.aarch64 git-r0 libopencv-dpi3.2.aarch64 3.2+git0+70bbf17b13-r0 libopencv-fuzzy3.2.aarch64 3.2+git0+70bbf17b13-r0 libopencv-line-descriptor3.2.aarch64 3.2+git0+70bbf17b13-r0 libopencv-line-descriptor3.2.aarch64 3.2+git0+70bbf17b13-r0 libopencv-gh3.2.aarch64 3.2+git0+70bbf17b13-r0 libopencv-sitatching3.2.aarch64 3.2+git0+70bbf17b13-r0 libopencv-sitatching3.2.aarch64 3.2+git0+70bbf17b13-r0 libopencv-sitatching3.2.aarch64 3.2+git0+70bbf17b13-r0 libopencv-sitag3.2.aarch64 3.2+git0+70bbf17b13-r0 libopencv-sitag3.2.aarch64 3.2+git0+70bbf17b13-r0 libopencv-sitag10+3.2+git0+70bbf17b13-r0 libopencv-sitag3.2.aarch64 5.8.0+git0+2375f322-r0 libq5aglextras1.aarch64 5.8.0+git0+23dde4b26-r0 libqtsuebchannel5.aarch64 5.8.0+git0+23dde4b26-r0 libqt1x.aarch64 1.1.29-r0 libxs1t.aarch64 1.1.29-r0 linx=firmuare-ralink-license.noarch 1:0.0+git0+b14134583c-r0 nost.h3ulcb 0.1-r0 openjtalk.aarch64 1.09-r0 packagegroup-agl-appfu-automotive.noarch 1.0-r0 packagegroup-agl-appfu-native.noarch 1.0-r0 packagegroup-agl-appfu-speech-services.noarch 1.0-r0 packagegroup-agl-appfu-speech-services.noarch 1.0-r0 packagegroup-hni-framework-dev.noarch 1.0-r0 python-curses.aarch64 2.7.13-r1 qtbase-staticdev.aarch64 5.8.0+git0+49dc9aa409-r0 qtuultimedia.aarch64 5.8.0+git0+544a8a4251-r0 qtquickcontrols2-agl-style.aarch64 1.0+git0+f836d4d0ba-r0 qtuebengine.aarch64 5.8.0+git0+d740d6a7db\_15d257fd92-r0 sg3-utils.aarch64 1.42-r0 ttf-bitstream-vera.aarch64 1.10-r7 ttf-dejavu-serif.noarch 2.37-r7

agl-service-geoclue.aarch64 1.0+git0+0980980876-rD agl-service-Hediaplayer.aarch64 1.0+git0+eb2a078711-rD agl-service-signal-composer.aarch64 4.0+RC5+git0+ecfa709666-rD audionanager.aarch64 7.4-rD dashboard.aarch64 1.0+git0+6081fc3ff7-rD flite-voicedata.noarch 1.05-rD iproute2.aarch64 4.10.0-rD iproute2.aarch64 4.10.0-r0
kernel-nodule-ain-v412-4.9.0-yocto-standard.h3ulcb 0.1-r0
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libopencv-saliency3.2.aarch64 3.2+git0+70bbf17b13-r0
libopencv-sdeios.2.aarch64 3.2+git0+70bbf17b13-r0
libopencv-sobjdetect3.2.aarch64 3.2+git0+70bbf17b13-r0
libopencv-sobjdetect3.2.aarch64 3.2+git0+70bbf17b13-r0
libopencv-sobjdetect3.2.aarch64 3.2+git0+70bbf17b13-r0
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151/160 152/160 153/160 154/160 155/160 156/160 157/160 158/160 159/160 160/160 agl-service-geofence.aarch64 1.0+git0+7b8ac34dd9-r0 agl-service-mediascanner.aarch64 1.0+git0+7af0c33a6f-r0 agl-service-unicens.aarch64 0.1+git0+5d3fa8fb68-r0 audionanager-plugins-config.aarch64 7.4-r0 dhcp-client.aarch64 4.3.5-r0 dhcp-client.aarch64 4.3.5-r0 high-level-viµi-service.aarch64 5.0+git0+585f184a83-r0 kernel-nodule-default-conf-4.9.0-yocto-standard.h3ulcb 0.1-r0 kernel-nodule-default-conf-4.9.0-yocto-standard.h3ulcb 0.1-r0 libdbus-glib-1-2.aarch64 0.108-r0 libopencv-aruco3.2.aarch64 3.2+git0+70bbf17b13-r0 libopencv-ccallb3.2.aarch64 3.2+git0+70bbf17b13-r0 libopencv-features2d3.2.aarch64 3.2+git0+70bbf17b13-r0 libopencv-ingcodecs3.2.aarch64 3.2+git0+70bbf17b13-r0 libopencv-bjdetc13.2.aarch64 3.2+git0+70bbf17b13-r0 libopencv-bjdetc13.2.aarch64 3.2+git0+70bbf17b13-r0 libopencv-bjdetc13.2.aarch64 3.2+git0+70bbf17b13-r0 libopencv-bjdetc3.2.aarch64 3.2+git0+70bbf17b13-r0 libopencv-vjdestab3.2.aarch64 3.2+git0+70bbf17b13-r0 libopencv-sphoto3.2.aarch64 3.2+git0+70bbf17b13-r0 libuebp.aarch64 0.6.0-r0 linux-firmuare-atheros-license.noarch 1:0.0+git0+b14134583c-r0 lou-level-can-service.aarch64 5.0+git0+0df00bae84-r0 mixer.aarch64 1.0+git0+d8df8004b8-r0 opencv.aarch64 3.2+git0+70bbf17b13-r0 packagegroup-agl-appfu.noarch 1.0-r0 packagegroup-agl-appfu.noarch 1.0-r0

packagegroup-agl-appfu.noarch 1.0-r0 packagegroup-agl-appfu-graphics.noarch 1.0-r0 packagegroup-agl-appfu-navi-lbs.noarch 1.0-r0 packagegroup-agl-demo.noarch 1.0-r0 poiapp.aarch64 git-r0 python-re.aarch64 2.7.13-r1 qtgraphicaleffects-qnlplugins.aarch64 5.8.0+git0+1583bb5569-r0 qtuuickcontrols2.aarch64 5.8.0+git0+cfa83b0-r0 qtvirtualkeyboard.aarch64 5.8.0+git0+cfa83b0-r0 runxdg.aarch64 1.0+git0+57b44c9603-r0 source-han-sans-jp-fonts.noarch 1.004-r0 ttf-dejavu-sans.noarch 2.37-r7 unicens-config.aarch64 1.0-r0



Complete! root@h3ulcb:/#



- To show all the files installed by the package (e.g: homescreen)
  - rpm -ql homescreen-2017-1.0+git0+ec28d0bf46-r0.aarch64

/etc /etc/agl-postinsts /etc/agl-postinsts/10-homescreen-2017.sh /usr /usr/AGL /usr/AGL/apps /usr/AGL/apps/autoinstall /usr/AGL/apps/autoinstall/homescreen-2017.wgt

To install AGL applications, need to execute some scripts in /etc/agl-postins/\*.sh.



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### Installing AGL applications by running run-agl-postinsts [3/3]

	Running postinst /etc/agl-postinsts/10-agl-service-homescreen-2017.sh
	Running postinst /etc/agl-postinsts/10-agl-service-identity-agent.sh
Reboot board	Running postinst /etc/agl-postinsts/10-agl-service-mediaplayer.sh
ofter	Running postinst /etc/agl-postinsts/10-agl-service-mediascanner.sh
alter	Running postinst /etc/agl-postinsts/10-agl-service-navigation.sh
completing !	Running postinst /etc/agl-postinsts/10-agl-service-nfc.sh
	Running postinst /etc/agl-postinsts/10-agl-service-radio.sh
	Running postinst /etc/agl-postinsts/10-agl-service-signal-composer.sh
	Running postinst /etc/agl-postinsts/10-agl-service-unicens.sh
	Running postinst /etc/agl-postinsts/10-agl-service-wifi.sh
	Running postinst /etc/agl-postinsts/10-agl-service-windowmanager-2017.sh
	Running postinst /etc/agl-postinsts/10-dashboard.sh
	Running postinst /etc/agl-postinsts/10-high-level-viwi-service.sh
	Running postinst /etc/agl-postinsts/10-homescreen-2017.sh
	Running postinst /etc/agl-postinsts/10-hvac.sh
	Running postinst /etc/agl-postinsts/10-low-can-demo.sh
	Running postinst /etc/agl-postinsts/10-low-level-can-service.sh
	Running postinst /etc/agl-postinsts/10-mediaplayer.sh
	Running postinst /etc/agl-postinsts/10-mixer.sh
	Running postinst /etc/agl-postinsts/10-navigation.sh
	Running postinst /etc/agl-postinsts/10-phone.sh
	Running postinst /etc/agl-postinsts/10-poiapp.sh
	Running postinst /etc/agl-postinsts/10-radio.sh
	Running postinst /etc/agl-postinsts/10-settings.sh
	root@h3ulcb:~#





agl-demo-platform-m3ulcb.wic.xz





#### **Renesas R-Car Starter Kit Pro**



platform

# **DEMO – SCREEN CAST**

### **UPDATING SDK ON PC HOST**





## Initialize SDK rootfs by SDK bootstrap [1/3]

- SDK bootstrap use "m3ulcb-sdk-conf.sdk" configuration file.
- That *config* file includes:
- Arch, Target repositories.
- SDK native repositories.
- Default packages/packages groups/profiles.

```
SDK rootfs config
```

+ / yoc	sol/demo/x86_64- to sdk boots <u>trap</u>	sdk-bootstrap-5.0.3.sh -y -d /ssd/demo/sdk-bootstrap installer version 5.0.3
=== You Ext Set SDK Eac \$	are about to in racting SDK ting it updon has been succes h time you wish . /ssd/demo/sdk- ource /ssd/demo/	<pre>stall the SDK to "/ssd/demo/sdk-bootstrap". Proceed[Y/n]? Y .done e sfully set up and is ready to be used. to use the SDK in a new shell session, you need to source the environment setup script e. bootstrap/environment-setup-x86_64-aglsdk-linux sdk-bootstrap/environment-setup-x86_64-aglsdk-linux</pre>
###	# m3ulcb-sdk-con	f.sdk ####
Rep SDK	None: Name: Baseurl: TargetRepo: HostRepo: init_conf: TUNE_PKGARCH: TARGET_VENDOR: SDK_ARCH: SDK_VENDOR: SDK_VERSION: SDK_VERSION: SDK_OS: DISTRO: MACHINE:	<pre>m3ulcb http://192.168.10.53:5678 aarch64-agl-linux, x86_64-linux "aarch64" "-agl" "x86_64" "-aglsdk" "5.0.3" "linux" "poky-agl" "m3ulcb"</pre>



#### Install Native SDK sysroot [2/3]

 Use script dnf4Native to install nativesdk packages

Packages for native SDK

795 packages = agl-demo-platformcrosssdk native profile

t ast package pative		
s cat package-native		
nativesok-gn		
nativesok-xz		
nativesdk-lua		
nativesdk-zlib		
nativesdk-ninja		
nativesdk-gperf		
nativesdk-wayland		
nativesdk-nss-dev		
nativesdk-nspr-dev		
nativesdk-wayland-dev		
nativesdk-perl-modules		
nativesdk-packagegroup-sdk-host		
nativesdk-packagegroup-qt5-toolchain-host		
packagegroup-cross-canadian-m3ulcb		
\$ pkgs="`cat package-native`"		
\$ \${XDT SDK}/m3ulcb-sdk/dnf4Native install \$pkgs		
Last metadata expiration check: 0:00:00 ago on Fri May 18 06:	18:04 2018 UTC.	
Dependencies resolved.		
Dependencies resolved.		
Dependencies resolved. ====================================	Arch	 Version
Dependencies resolved. ====================================	Arch	Version
Dependencies resolved. ====================================	Arch	Version
Dependencies resolved. ====================================	Arch x86_64_nativesdk	Version 20170928.r4
Dependencies resolved. ====================================	Arch x86_64_nativesdk	Version 20170928.r4
Dependencies resolved. ====================================	Arch x86_64_nativesdk x86_64_nativesdk	Version 20170928.r4 3.0.4-r0
Dependencies resolved. ====================================	Arch x86_64_nativesdk x86_64_nativesdk x86_64_nativesdk x86_64_nativesdk	Version 20170928.r4 3.0.4-r0 1.2.11-r0
Dependencies resolved. Package Package Installing: nativesdk-gn nativesdk-libz1 Verifying : nativesdk-libreadline-dev-7.0-r0.x86_64_nativ	Arch x86_64_nativesdk x86_64_nativesdk x86_64_nativesdk x86_64_nativesdk esdk	Version 20170928.r4 3.0.4-r0 1.2.11-r0 780/795
Dependencies resolved. Package Package Installing: nativesdk-gperf nativesdk-libz1 Verifying : nativesdk-libreadline-dev-7.0-r0.x86_64_nativ Verifying : nativesdk-db-dev-1:5.3.28-r1.x86_64_nativesdk	Arch x86_64_nativesdk x86_64_nativesdk x86_64_nativesdk x86_64_nativesdk esdk	Version 20170928.r4 3.0.4-r0 1.2.11-r0 780/795 781/795
Dependencies resolved. Package Package Installing: nativesdk-gperf nativesdk-libz1 Verifying : nativesdk-libreadline-dev-7.0-r0.x86_64_nativ Verifying : nativesdk-db-dev-1:5.3.28-r1.x86_64_nativesdk Verifying : nativesdk-xz-dev-5.2.3-r0.x86_64_nativesdk	Arch x86_64_nativesdk x86_64_nativesdk x86_64_nativesdk x86_64_nativesdk esdk	Version 20170928.r4 3.0.4-r0 1.2.11-r0 780/795 781/795 782/795
Dependencies resolved. Package Package Installing: nativesdk-gperf nativesdk-libz1 Verifying : nativesdk-libreadline-dev-7.0-r0.x86_64_nativesdk Verifying : nativesdk-db-dev-1:5.3.28-r1.x86_64_nativesdk Verifying : nativesdk-xz-dev-5.2.3-r0.x86_64_nativesdk Verifying : nativesdk-cryptodev-linux-dev-1.8-r0.x86_64_nativesdk	Arch x86_64_nativesdk x86_64_nativesdk x86_64_nativesdk x86_64_nativesdk esdk	Version 20170928.r4 3.0.4-r0 1.2.11-r0 780/795 781/795 782/795 783/795
Dependencies resolved. Package Installing: nativesdk-gperf nativesdk-libz1 Verifying : nativesdk-libreadline-dev-7.0-r0.x86_64_native Verifying : nativesdk-libreadline-dev-7.0-r0.x86_64_nativesdk Verifying : nativesdk-db-dev-1:5.3.28-r1.x86_64_nativesdk Verifying : nativesdk-xz-dev-5.2.3-r0.x86_64_nativesdk Verifving : nativesdk-crvotodev-linux-dev-1.8-r0.x86_64_nativesdk Verifving : nativesdk-crvotodev-linux-dev-1.8-r0.x86_64_nativesdk	Arch x86_64_nativesdk x86_64_nativesdk x86_64_nativesdk x86_64_nativesdk esdk esdk itvesdk	Version 20170928.r4 3.0.4-r0 1.2.11-r0 780/795 781/795 782/795 783/795
Dependencies resolved. Package Installing: nativesdk-gperf nativesdk-libz1 Verifying : nativesdk-libreadline-dev-7.0-r0.x86_64_native Verifying : nativesdk-libreadline-dev-7.0-r0.x86_64_nativesdk Verifying : nativesdk-db-dev-1:5.3.28-r1.x86_64_nativesdk Verifying : nativesdk-xz-dev-5.2.3-r0.x86_64_nativesdk Verifying : nativesdk-crvntodev-linux-dev-1.8-r0.x86_64_nativesdk Verifving : nativesdk-crvntodev-linux-dev-1.8-r0.x86_64_nativesdk Net tert : nativesdk-crvntodev-linux-dev-1.8-r0.x86_64_nati	Arch x86_64_nativesdk x86_64_nativesdk x86_64_nativesdk x86_64_nativesdk esdk esdk	Version 20170928.r4 3.0.4-r0 1.2.11-r0 780/795 781/795 782/795 783/795
Dependencies resolved. Package Installing: nativesdk-gperf nativesdk-libz1 Verifying : nativesdk-libreadline-dev-7.0-r0.x86_64_native Verifying : nativesdk-libreadline-dev-7.0-r0.x86_64_native Verifying : nativesdk-db-dev-1:5.3.28-r1.x86_64_nativesdk Verifying : nativesdk-dev-5.2.3-r0.x86_64_nativesdk Verifying : nativesdk-crvntodev-linux-dev-1.8-r0.x86_64_nativesdk Verifving : nativesdk-crvntodev-linux-dev-1.8-r0.x86_64_nativesdk Verifving : nativesdk-crvntodev-linux-dev-1.8-r0.x86_64_nativesdk Verifving : nativesdk-crvntodev-linux-dev-1.8-r0.x86_64_nativesdk Verifving : nativesdk-crvntodev-linux-dev-1.8-r0.x86_64_nativesdk Verifving : nativesdk-crvntodev-linux-dev-1.8-r0.x86_64_nativesdk Nerifving : nativesdk-crvntodev-linux-dev-1.8-r0.x86_64_nativesdk Verifving : nativesdk-crvntodev-linux-dev-1.8-r0.x86_64_nativesdk Nerifving : nativesdk-crvntodev-linux-dev-1.8-r0.x86_64_nat	Arch x86_64_nativesdk x86_64_nativesdk x86_64_nativesdk x86_64_nativesdk esdk esdk	Version 20170928.r4 3.0.4-r0 1.2.11-r0 780/795 781/795 782/795 783/795
Dependencies resolved. Package Installing: nativesdk-gperf nativesdk-libz1 Verifying : nativesdk-libreadline-dev-7.0-r0.x86_64_native Verifying : nativesdk-libreadline-dev-7.0-r0.x86_64_native Verifying : nativesdk-db-dev-1:5.3.28-r1.x86_64_nativesdk Verifying : nativesdk-dev-5.2.3-r0.x86_64_nativesdk Verifying : nativesdk-crvntodev-linux-dev-1.8-r0.x86_64_nativesdk Verifving : nativesdk-crvntodev-linux-dev-1.8-r0.x86_64_nativesdk Verifving : nativesdk-crvntodev-linux-dev-1.8-r0.x86_64_nativesdk Verifving : nativesdk-crvntodev-linux-dev-1.8-r0.x86_64_nativesdk Nerifving : nativesdk-crvntodev-linux-dev-1.8-r0.x86_64_nat	Arch x86_64_nativesdk x86_64_nativesdk x86_64_nativesdk x86_64_nativesdk esdk esdk	Version 20170928.r4 3.0.4-r0 1.2.11-r0 780/795 781/795 782/795 783/795
Dependencies resolved. Package Installing: nativesdk-gperf nativesdk-libz1 Verifying : nativesdk-libreadline-dev-7.0-r0.x86_64_native Verifying : nativesdk-libreadline-dev-7.0-r0.x86_64_native Verifying : nativesdk-db-dev-1:5.3.28-r1.x86_64_nativesdk Verifying : nativesdk-dev-5.2.3-r0.x86_64_nativesdk Verifying : nativesdk-crvntodev-linux-dev-1.8-r0.x86_64_nativesdk Verifving : nativesdk-crvntodev-linux-dev-1.8-r0.x86_64_nativesdk Verifving : nativesdk-crvntodev-linux-dev-1.8-r0.x86_64_nativesdk Verifving : nativesdk-crvntodev-linux-dev-1.8-r0.x86_64_nativesdk Nerifving : nativesdk-crvntodev-linux-dev-1.8-r0.x86_64_nativesdk Verifving : nativesdk-crvntodev-linux-dev-1.8-r0.x86_64_nativesdk Net for the text text text text text text text	Arch x86_64_nativesdk x86_64_nativesdk x86_64_nativesdk x86_64_nativesdk resdk resdk	Version 20170928.r4 3.0.4-r0 1.2.11-r0 780/795 781/795 782/795 783/795

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### Install Target sysroot [3/3]

<ul> <li>Use script dnf4Target to install target packages</li> </ul>	<pre>\$ cat package-ta mc dnf rpm screa agl-desktop-con packagegroup-ag packagegroup-co packagegroup-co</pre>	arget en psplash run-postinsts omx-user-modul fig l-devel re-ssh-openssh re-tools-debug	e		
Packages for target	packagegroup-co packagegroup-co kernel-modules kernel-devicetro kernel-module-v	re-eclipse-debug re-tools-profile ee			
	kernel-module-v kernel-module-v kernel-module-v packagegroup-ag \$ pkgs="`cat pac \$ \${XDT_SDK}/m3 aarch64-agl-lin Last metadata e Dependencies re	spm spm-if vrsrvkm l-image-ivi ckage-target`" ulcb-sdk/dnf4Target install \$pkgs ux xpiration check: 0:00:00 ago on Fri May solved.	18 04:1	5:04 2018 UTC.	118 MB/s   2.4 MB
	Package		Arch	Version	Repository
890 packages = agl-image-ivi	Installing: agl-desktop-co dnf	nfig	aarch64 aarch64	0.1-r0 2.0.0+git0+f0093d672d-	aarch64-agl- r0 aarch64-agl-
profile	Verifying : o Verifying : o Verifying : o Verifying : o	openssh-keygen-7.4p1-r0.aarch64 openssh-scp-7.4p1-r0.aarch64 openssh-ssh-7.4p1-r0.aarch64			445/890 446/890 447/890
	wpa-supplicant xkeyboard-cont xmlsec1.aarch	fig.aarch64 2.6-r0 fig.aarch64 2.20-r0 64 1.2.20-r0			
	Complete!				

BIG IDEAS FOR EVERY SPACE RENESAS





## CONCLUSION

- Using RPM binary packages is a good approach for AGL development and collaboration.
  - Support applications/root filesystems update on development devices.
  - Easily update development environment (SDK) on the host machine.
  - Integrate with update server for over-the-air (OTA) updates.
- The approach is aligned with existing features on AGL software.
  - Easily move from one AGL profile to other AGL profiles
  - Generate the binary packages once and share to others



[1] Software Updates for Connected Devices:

https://elinux.org/images/7/72/Software\_Updates\_for\_Connected\_Devices.pdf

[2] Rapid Innovation With The OTA-Enabled AGL Reference Platform,

https://schd.ws/hosted\_files/aglmmwinter2017/61/AGL%20AMM%20Feb%20%2717%20-

%20Rapid%20Innovation%20with%20the%20OTA-

Enabled%20AGL%20Reference%20Platform.pdf

[3] OSTree, https://ostree.readthedocs.io/en/latest/







### **IMPLEMENTATION [1/6]** BUILD CONFIGURATION

- To demonstrate runtime package management
  - Enabling Additional PR Server Features

PRSERV\_HOST = "localhost:0"
INHERIT += buildhistory
BUILDHISTORY\_COMMIT = "1"

Use RPMs

PACKAGE\_CLASSES = "package\_rpm"

Have package tools

EXTRA\_IMAGE\_FEATURES += "package-management"

- Build agl-demo-platform
  - \$ bitbake agl-demo-platform

Update the package indices

#### \$ bitbake package-index

- Copy RPM and generate repositories
  - Use Update-SDK-repo.py tool [5] to copy and generate a local RPM repo.
- Feed local RPM repo on HTTP web service

#### **IMPLEMENTATION [2/6]** SIGNING PACKAGES IN A LOCAL RPM REPOSITORY

- To implement this function for the security and have to install Pulsar Linux SDK to use rpm-tool to sign all packages in the repository with your own private GPG keys at once.
  - \$ rpm-tool --repo-sign --repo-dir /path/to/rpm-repo \
     --gpg-name "gpg-private-key-name" \
     --gpg-key /path/to/gpg-private-key \
     --gpg-pass "gpg-key-passphrase"
- For details on all command options, see The rpm-tool Command Option Reference (\*)



#### **IMPLEMENTATION** [3/6] **BUILD SDK BOOTSTRAP**

- This may be changed in the near feature. These instructions are tentative.
- To build SDK-bootstrap:
  - Add "meta-yomo" to your bblayers as below:

BBLAYERS =+ " \${YoMo}/meta-yomo"

- Add runtime dependencies for init-sdk-rootfs and DNF by applying patch 0001
- Fix init-sdk-rootfs source code to be compatible with AGL v5.0.3 by applying patch 0002
- Run bitbake:



**BIG IDEAS FOR EVERY SPACE** 

#### **IMPLEMENTATION [4/6]** SDK CONF FILE

• This file is used to configure sdk rootfs

Repo:	
Name:	m3ulcb
Baseurl:	file:///local_repo
TargetRepo:	aarch64-agl-linux,
HostRepo:	x86_64-linux
SDK_init_conf:	
TUNE_PKGARCH:	"aarch64"
TARGET_VENDOR:	"-agl"
SDK_ARCH:	"x86_64"
SDK_VENDOR:	"-aglsdk"
SDK_VERSION:	"5.0.3"
SDK_OS:	"linux"
DISTRO:	"poky-agl"
MACHINE:	"m3ulcb"



#### **IMPLEMENTATION [5/6]** INSTALL SDK ROOTFS

- Initial SDK rootfs
- \$ export XDT\_SDK\_BOOTSTRAP=/home/user/sdk-bootstrap
- \$ export XDT\_SDK=/home/user/sdk-rootfs
- \$ \${DEPLOY\_DIR}/sdk/x86\_64-sdk-bootstrap-5.0.3.sh -y -d \${XDT\_SDK\_BOOTSTRAP}
- \$ source \${XDT\_SDK\_BOOTSTRAP}/environment-setup-x86\_64-aglsdk-linux
- \$ init-sdk-rootfs -i m3ulcb-sdk-conf.sdk -o \${XDT\_SDK}
- Use dnf4Native and dnf4Target to install native rootfs and target rootfs respectively
- \$ \${XDT\_SDK}/m3ulcb-sdk/dnf4Native install nativesdk-packagegroup-sdk-host
- \$ \${XDT\_SDK}/m3ulcb-sdk/dnf4Target install kernel-devsrc



### **IMPLEMENTATION [6/6]** TARGET CONFIGURATION (ON THE DEVICE)

Make directory for repos config

```
$ mkdir -p /etc/yum.repos.d
```

• Add the repo. The file name must end in '.repo' for instance agl-eel.repo

```
[aarch64-agl-linux]
name=aarch64-agl-linux
baseurl=file:///aarch64-agl-linux/
enabled=1
```

Import GPG Keys to the Device

```
$ rpm --import /path-to-public-key
```

Install RPM packages

\$ dnf -y install packagegroup-agl-demo-platform



Repository

/etc/yum.repos.d/

