Automotive Grade Linux Developer BoF Session

Embedded Linux Conference Europe

October 22, 2018

Walt Miner ( @VStarWalt )
Community Manager, AGL, The Linux Foundation
Automotive Grade Linux

Collaborating to build the car of the future through rapid innovation

http://AutomotiveLinux.org
What is AGL?

- Non-profit
- Open source Linux-based collaborative project
- Hosted at Linux Foundation
- Focused on rapid innovation of vehicle software
Goals of AGL

- Build a single software platform for the entire industry
- Develop 70-80% of the starting point for a production project
- Reduce fragmentation by combining the best of open source
- Develop an ecosystem of developers, suppliers, expertise all using a single platform
the only organization addressing all software in the car
AGL is CODE FIRST

AGL is a “Code First” organization!

Specifications lead to fragmentation!
Thanks for all the fish...

- AGL Releases:
  - AA – Agile Albacore – Jan 2016
  - BB – Brilliant Blowfish – July 2016
  - CC – Charming Chinook – Dec 2016
  - DD – Daring Dab – July 2017
  - EE – Electric Eel – Dec 2017
  - FF – Funky Flounder – July 2018
  - GG – Grumpy Guppy – Jan 2019
# Top 20 Git Committers in 2018

<table>
<thead>
<tr>
<th>Commits</th>
<th>Name</th>
<th>Company</th>
</tr>
</thead>
<tbody>
<tr>
<td>359</td>
<td>Romain Forlot</td>
<td>IoT.bzh</td>
</tr>
<tr>
<td>277</td>
<td>Jose Bollo</td>
<td>IoT.bzh</td>
</tr>
<tr>
<td>144</td>
<td>Kazumasa Mitsunari</td>
<td>Witz</td>
</tr>
<tr>
<td>144</td>
<td>Matt Ranostay</td>
<td>Konsulko</td>
</tr>
<tr>
<td>128</td>
<td>Jan-Simon Moeller</td>
<td>Linux Foundation</td>
</tr>
<tr>
<td>91</td>
<td>Ronan Le Martret</td>
<td>IoT.bzh</td>
</tr>
<tr>
<td>73</td>
<td>Changhyeok Bae</td>
<td>LG</td>
</tr>
<tr>
<td>67</td>
<td>Khang Nguyen</td>
<td>Renesas</td>
</tr>
<tr>
<td>57</td>
<td>Zheng Wenlong</td>
<td>Nexty</td>
</tr>
<tr>
<td>52</td>
<td>Matt Porter</td>
<td>Konsulko</td>
</tr>
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<tr>
<td>52</td>
<td>Tadao Tanikawa</td>
<td>Panasonic</td>
</tr>
<tr>
<td>50</td>
<td>Loic Collignon</td>
<td>IoT.bzh</td>
</tr>
<tr>
<td>50</td>
<td>Sebastien Douheret</td>
<td>IoT.bzh</td>
</tr>
<tr>
<td>49</td>
<td>Jonathan Aillet</td>
<td>IoT.bzh</td>
</tr>
<tr>
<td>42</td>
<td>Stephane Desneux</td>
<td>IoT.bzh</td>
</tr>
<tr>
<td>39</td>
<td>Thuy Tran</td>
<td>Renesas</td>
</tr>
<tr>
<td>29</td>
<td>Yuta Doi</td>
<td>Witz</td>
</tr>
<tr>
<td>28</td>
<td>Clement Benier</td>
<td>IoT.bzh</td>
</tr>
<tr>
<td>28</td>
<td>Thierry Bultel</td>
<td>IoT.bzh</td>
</tr>
<tr>
<td>26</td>
<td>Kevin Hilman</td>
<td>BayLibre</td>
</tr>
</tbody>
</table>

1994 Total Commits  
59 Committers  
24 Companies  

- 01 Jan 2018 – 10 Oct 2018  
- Commits to master
## Commits by Company in 2018

<table>
<thead>
<tr>
<th>Company</th>
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</tr>
</thead>
<tbody>
<tr>
<td>IoT.bzh</td>
<td>1000</td>
</tr>
<tr>
<td>Konsulko</td>
<td>222</td>
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<tr>
<td>Witz</td>
<td>173</td>
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<td>Renesas</td>
<td>144</td>
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<td>Linux Foundation</td>
<td>128</td>
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<td>LG</td>
<td>73</td>
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<td>Nexty</td>
<td>61</td>
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<tr>
<td>Panasonic</td>
<td>52</td>
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<tr>
<td>BayLibre</td>
<td>45</td>
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<tr>
<td>Collabora</td>
<td>20</td>
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<tr>
<td>Microchip</td>
<td>20</td>
</tr>
<tr>
<td>Mitsubishi Electric</td>
<td>11</td>
</tr>
</tbody>
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<td>Xevo</td>
<td>11</td>
</tr>
<tr>
<td>Intel</td>
<td>7</td>
</tr>
<tr>
<td>Individual</td>
<td>6</td>
</tr>
<tr>
<td>AisinAW</td>
<td>5</td>
</tr>
<tr>
<td>FiberDyne</td>
<td>4</td>
</tr>
<tr>
<td>ADIT</td>
<td>3</td>
</tr>
<tr>
<td>Qt Company</td>
<td>3</td>
</tr>
<tr>
<td>AudioKinetic</td>
<td>2</td>
</tr>
<tr>
<td>Advanced Telematics Systems</td>
<td>1</td>
</tr>
<tr>
<td>Cogent Embedded</td>
<td>1</td>
</tr>
<tr>
<td>Nuance</td>
<td>1</td>
</tr>
<tr>
<td>Virtual Open Systems</td>
<td>1</td>
</tr>
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- 1994 Total Commits
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Other Numbers

- 63 commits to flounder release branch in 2018
- 160 commits to eel release branch in 2018
- 7 commits to dab release branch in 2018
- 110 unique individuals and 37 unique companies have contributed to AGL since the start of the project
  - 19 New committers in 2018
- 11 individuals not affiliated with a member company have contributed
- 482 Jira issues closed during 2018
  - 1371 issues closed since start of project
2018 AGL Schedule

**Electric Eel**

<table>
<thead>
<tr>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sep</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.0.0</td>
<td>5.0.1</td>
<td>5.0.2</td>
<td>5.0.3</td>
<td>5.1.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5.1.1</td>
<td></td>
</tr>
</tbody>
</table>

**Funky Flounder**

Feature Development

RC1 | RC2 | RC3 | RC4

6.0.0.0 | 6.0.2 | 6.0.3

**Grumpy Guppy**

Feature Development

RC1 | RC2 | RC3

As of 10 Oct 2018

See [https://wiki.automotivelinux.org/schedule#latest_schedule](https://wiki.automotivelinux.org/schedule#latest_schedule) for latest schedule information
2019 AGL Schedule

As of 10 Oct 2018

See https://wiki.automotivelinux.org/schedule#latest_schedule for latest schedule information
Vision for 2019 & Beyond

- Make AGL Production Ready
- Web App Manager and HTML5 apps
- Window Manager and Home Screen Services
- Decision and implementation towards a reference AGL Compositor and Qt Replacement
Vision for 2019 & Beyond

• Application lifecycle - starting & stopping apps and managing resources
  • Study WebOSe Configuration Service to see what can be reused
  • Study other possible available solutions
  • Determine best AGL path forward. Will take at least one month for study and several more months to implement. Will get estimate from IoT.bzh once the study is completed on delivery timing.
• Application lifecycle – window manager backgrounds an app which saves its context
Vision for 2019 & Beyond

- Low end hardware IVI profile – Memory and graphics constrained. Renesas E3 or RPI 3 for example
- L12 support in App Framework.
  - Multi-language
  - Icons
  - Set via settings app or NFC reader
- Running AGL as non-root.
- Updated open source navigation solution
- Speech, ADAS and beyond
AGL Architecture

Platform
• Base BSP
• Security
• AGL transport

• Micro Services based
• Middleware and App Binding / Binder Model
• Downloaded on platform
• Multi-ECU
• Car to Cloud
• Car to Car
AGL Binder/Binding

Security Context
- SMACK based

Binder
- Secure environment for an App
- Container process
- Transport
- Security
- Standardized Async API structure

Binding
- Adds one API to the Binder
- Implements feature
- Multi thread support
- Standardized integration

http://docs.automotivellinux.org/docs/apis_services/en/dev/#application-framework-binder
AGL Binder/Binding

• Available binders include
  • Home Screen
  • Window Manager
  • Audio
  • Connectivity (Networking, Wifi, Bluetooth, Vehicle Signaling, Telephone, Phone Book, NFC)
  • Location (GPS, Geofence)
  • Media Player, Media Scanner, AM/FM Tuner
  • Signal Composer, HVAC
SDK for App Developers

- XDS Based SDK
- Docker image to eliminate host dependency issues
- Available for reference boards with published images that include graphics drivers
- Enables rapid AGL application development
- Support for Qt (HTML5 planned!)
- No Yocto knowledge is needed or assumed for SDK users

http://docs.automotivelinux.org/docs/devguides/en/dev/#development-kit-build-agl-application
DEVELOPER RESOURCES
AGL Documentation

• Getting Started
  https://wiki.automotivelinux.org/start/getting-started

• AGL documentation site
  http://docs.automotivelinux.org/

• AGL Wiki
  https://wiki.automotivelinux.org/

• AGL Jira
  https://jira.automotivelinux.org/
Get The Code

- Pre-built binaries and source tar balls available
  - [https://www.automotivelinux.org/software/download](https://www.automotivelinux.org/software/download)
- Latest Source Code and Build Instructions
  - [https://wiki.automotivelinux.org/agl-distro/source-code](https://wiki.automotivelinux.org/agl-distro/source-code)
- Release Notes
  - [https://wiki.automotivelinux.org/agl-distro/release-notes](https://wiki.automotivelinux.org/agl-distro/release-notes)
AGL Code

- AGL gerrit
  
  http://gerrit.automotivelinux.org/

- AGL git
  
  https://git.automotivelinux.org/

- Ask Questions – Weekly Developer Call on Tuesdays
  
  https://wiki.automotivelinux.org/dev-call-info

- Discussions Mail List
  
  https://lists.linuxfoundation.org/mailman/listinfo/automotive-discussions
2018 F2F Workshops

- Sep 11 -13 – Santa Clara (LG Office)
- Oct 15 – 18 - Fall AMM – Dresden, Germany
- Nov 6-8 – Yokohama (NTT DATA MSE) (CES Demo 1 Focus)
- Nov 27-29 – Karlsruhe (Microchip) – (CES Demo 2 Focus)
- Dec 11-13 – Yokohama+EU (NTT DATA MSE) (CES Demo 1,3 Focus)
- Jan 8-11 : CES 2019
Q & A

• This is the segment where
  • You ask intelligent, well thought out questions
  • I ramble pointlessly and unintelligently

• And/Or
  • You ask “dumb” questions
  • I respond with concise, insightful, and well-reasoned answers
THANK YOU