オープンソースカンファレンス 2019 Kyoto

State of the AGL

車載向けOSS AGL(AutomotiveGradeLinux)の取り組みと成果について

Linux Foundation
AGL（Automotive Grade Linux）
Advisory Board
Yuichi Kusakabe

yuichi.kusakabe@automotivelinux.org

About Myself

- Yuichi Kusakabe (DENSO TEN LIMITED)

- Software Engineer of IVI about 14 years
  (for 16-bit and 64-bit architecture)

- Linux Software Engineer(2011-2013)
- Linux Software Lead Engineer(2013-Now)

- BSP Porting/Customizing
- Supporting for in-house software developers
- AGL(Automotive Grade Linux) Advisory Board member

Introduction to Automotive Grade Linux

AGL All-Member Meeting Tokyo

March 5, 2019

Walt Miner (@VStarWalt)

Community Manager, AGL , The Linux Foundation

https://static.sched.com/hosted_files/aglammjapan2019/b8/AMM%20Tokyo%202019%20Intro%20to%20AGL.pdf

What is AGL?

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

https://static.sched.com/hosted_files/aglammjapan2019/b8/AMM%20Tokyo%202019%20Intro%20to%20AGL.pdf

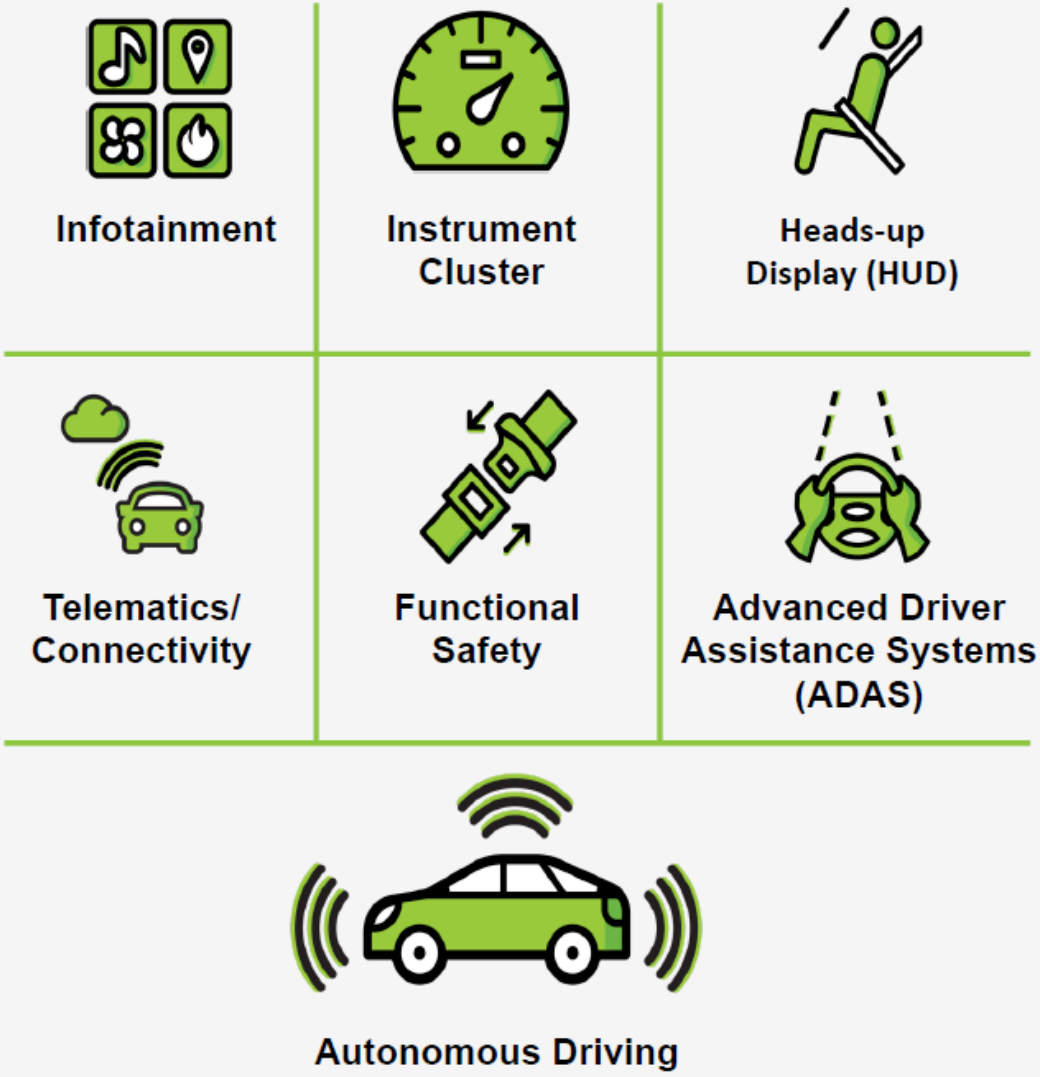
Goals of AGL

- 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

https://static.sched.com/hosted_files/aglammjapan2019/b8/AMM%20Tokyo%202019%20Intro%20to%20AGL.pdf

AUTOMOTIVE GRADE LINUX

the only organization addressing all software in the car



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AGL is CODE FIRST

AGL is a "Code First" organization!

Specifications lead to fragmentation!

https://static.sched.com/hosted_files/aglammjapan2019/b8/AMM%20Tokyo%202019%20Intro%20to%20AGL.pdf

AGL Members - Total of 146 companies!

Platinum

DENSO

mazda

Panasonic

RENESAS

SUZUKI

TOYOTA

Gold

HONDA
The Power of Dreams

Silver

AISIN AW CO.,LTD.

amazon

Mercedes-Benz

DENSO TEN

DRIMAES

NTT DATA
NTT DATA MSE Corporation

QUALCOMM

VOLKSWAGEN
AKTIENGESELLSCHAFT

WIND RIVER

蓝星科技

Bronze

https://static.sched.com/hosted_files/ossalsjp19/4a/ALS%202019%20AGL%20BoF%20Miner.pdf

Total of 9 OEMs supporting AGL!

Accounts for approximately 50% of worldwide annual vehicle shipments*

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*Sources (42.8M vehicles out of 86.4M):
https://en.wikipedia.org/wiki/List_of_manufacturers_by_motor_vehicle_production
https://www.statista.com/statistics/275520/ranking-of-car-manufacturers-based-on-global-sales/

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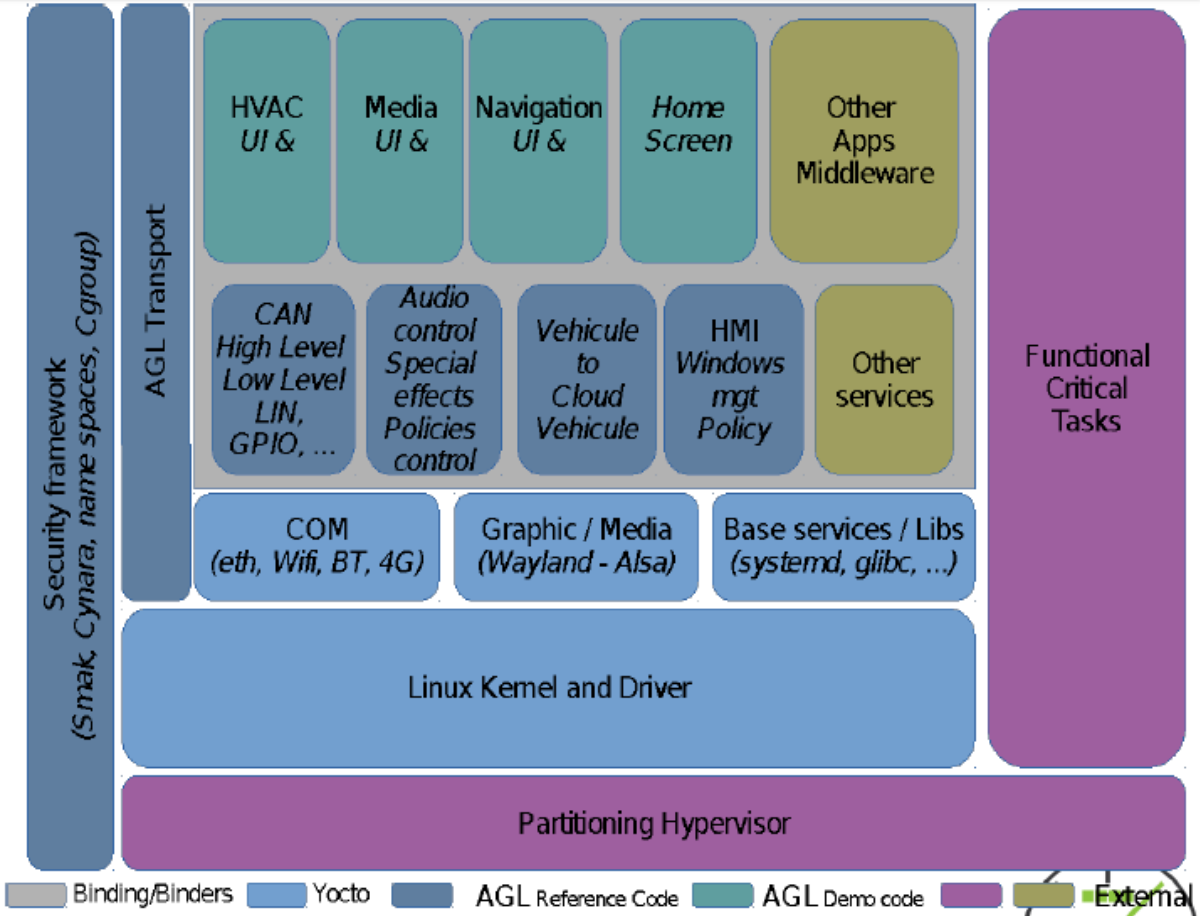
https://static.sched.com/hosted_files/ossalsjp19/4a/ALS%202019%20AGL%20BoF%20Miner.pdf

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



https://static.sched.com/hosted_files/aglammjapan2019/b8/AMM%20Tokyo%202019%20Intro%20to%20AGL.pdf

AGL Distribution Supported Hardware

- Reference BSPs – Fully supported by manufacturer, CI, etc.
  - ✓ Renesas R-Car 3 – M3 board (ARM 64)
  - ~~✓ Renesas R-Car 2 - Porter board (ARM 32)~~
  - ✓ Intel - Minnowboard Turbot and Joule (Intel 64 bit)
  - ✓ TI - Jacinto 6 - Vayu board (ARM 32)
  - ✓ QEMU (Intel 64 bit)
- Community BSP – Best effort by AGL community
  - ✓ Raspberry Pi 2/3 (ARM 32 bit)
  - ✓ NXP – i.MX6 – SABRE (ARM 32 bit)
  - ✓ QCOM – Dragonboard 410-c (ARM 64 bit)
  - ✓ Qualcomm SnapDragon 820 (ARM 64 bit)
  - ~~✓ TI BeagleBone Black (ARM 32 bit medium profile)~~

https://wiki.automotivelinux.org/agl-distro
http://events17.linuxfoundation.org/sites/events/files/slides/ALS%202017%20AGL%20Update%20Miner.pdf

Active Expert Groups

- Application Framework and Security
- Connectivity
- Continuous Integration and Automated Test
- Graphics and UI
- Navigation
- Virtualization
- Reference Hardware System Architecture
- Speech
- Vehicle to Cloud
- Instrument Cluster
- Requirements Specification

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https://static.sched.com/hosted_files/aglammjapan2019/b8/AMM%20Tokyo%202019%20Intro%20to%20AGL.pdf

Thanks for all the fish...

Agile Albacore – Jan 2016
Brilliant Blowfish – July 2016
Charming Chinook – Dec 2016
Daring Dab – July 2017
Electric Eel – Jan 2018
Funky Flounder – Ocr 2018
Grumpy Guppy – Jan 2019
Happy Halibut – July 2019
Itchy Icefish – Jan 2020

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https://static.sched.com/hosted_files/aglammjapan2019/b8/AMM%20Tokyo%202019%20Intro%20to%20AGL.pdf

Top 25 Git Committers in 2018

Commits	Name	Company
942	Romain Forlot	IoT.bzh
400	Jose Bollo	IoT.bzh
306	Jonathan Aillet	IoT.bzh
231	Matt Ranostay	Konsulko
188	Kazumasa Mitsunari	Witz
170	Jan-Simon Moeller	Linux Foundation
115	Ronan Le Martret	IoT.bzh
108	Thierry Bultel	IoT.bzh
98	Mark Farrugia	FiberDyne
87	Khang Nguyen	Renesas
82	Stephane Desneux	IoT.bzh
78	Sebastien Douheret	IoT.bzh

Commits	Name	Company
77	Loic Collignon	Iot.bzh
73	Changhyeok Bae	LG
72	Fulup Ar Foll	IoT.bzh
59	Frederic Marec	IoT.bzh
58	Zheng Wenlong	Nexty
57	Tadao Tanikawa	Panasonic
52	Matt Porter	Konsulko
41	Kevin Hilman	BayLibre
41	Tobias Jahnke	Microchip
41	Wang Zhiqiang	Nexty
39	Clement Benier	IoT.bzh
39	Thuy Tran	Renesas
31	Yuta Doi	Witz

3764 Total Commits
73 Committers
28 Companies

- 01 Jan 2018 – 31 Dec 2018
- Commits to master

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https://static.sched.com/hosted_files/aglammjapan2019/b8/AMM%20Tokyo%202019%20Intro%20to%20AGL.pdf

Top 20 Companies in 2018

Company	Commits
IoT.bzh	2301
Konsulko	351
Witz	219
Linux Foundation	170
Renesas	167
FiberDyne	120
Nexty	99
LG	73
BayLibre	61
Panasonic	57

Company	Commits
Microchip	50
Collabora	21
Mitsubishi Electric	12
Xevo	11
ADIT	10
Intel	8
Qt Company	7
Individual	6
AisinAW	5
Amazon	5

3764 Total Commits
73 Committers
28 Companies

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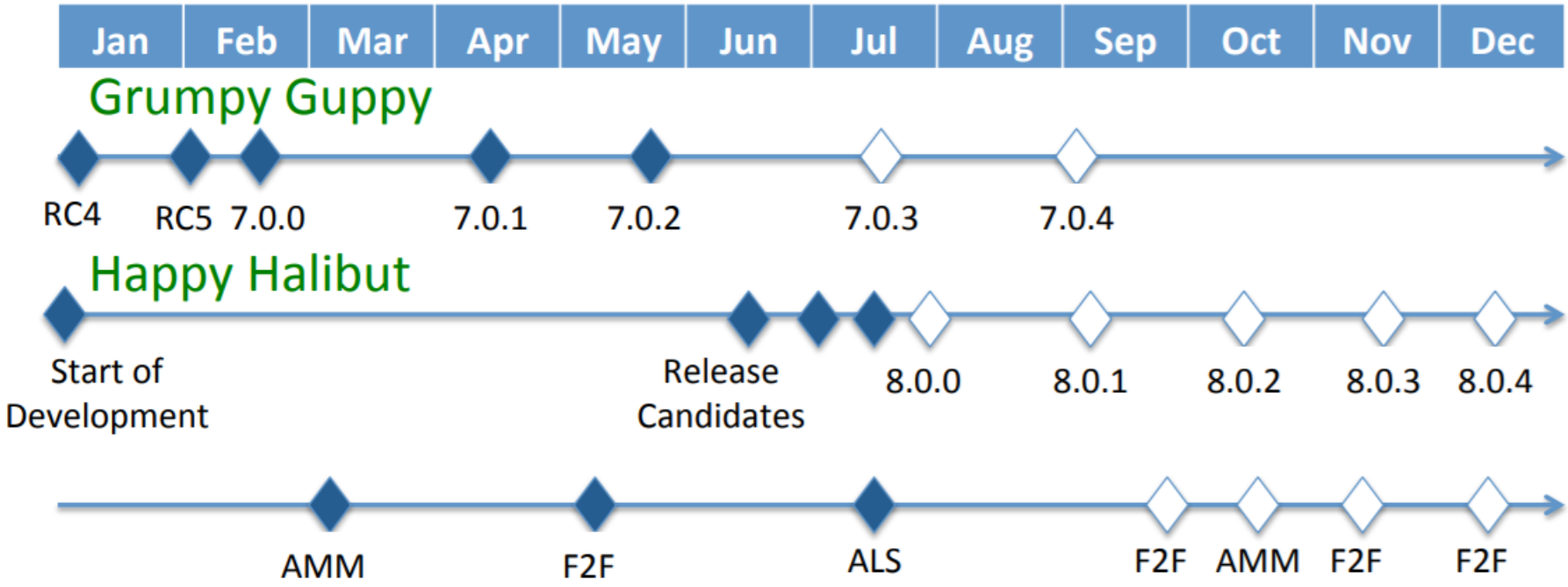
AUTOMOTIVE GRADE LINUX

https://static.sched.com/hosted_files/aglammjapan2019/b8/AMM%20Tokyo%202019%20Intro%20to%20AGL.pdf

2019 AGL Schedule (Current)



See https://wiki.automotivelinux.org/schedule#latest_schedule for latest schedule information

AUTOMOTIVE GRADE LINUX

https://events.linuxfoundation.jp/wp-content/uploads/2018/07/ALS-2019-AGL-Roadmap-Miner.pdf

Vision for 2019 & Beyond

- AGL production readiness
  - Speech Architecture
  - Web App Manager
  - Audio – PipeWire vs. 4a –
  - CAN and Vehicle signaling – CAN output + J1939
  - API Gap Analysis – Confluence Page

https://events.linuxfoundation.jp/wp-content/uploads/2018/07/ALS-2019-AGL-Roadmap-Miner.pdf

Vision for 2019 & Beyond

- AGL production readiness
  - Long-Term Support for AGL – Confluence Page
  - Getting agreement on what AGL will provide as part of LTS
  - Alignment with upsteam (e.g., Yocto, board vendors, etc)

https://events.linuxfoundation.jp/wp-content/uploads/2018/07/ALS-2019-AGL-Roadmap-Miner.pdf

Vision for 2019 & Beyond

- Instrument Cluster evolution
  - IC EG Started. Requirements definition and architecture work ongoing
  - Konsulko continuing to evolve current IC profile and reference device
  - Hardware reference?
- Telematics, ADAS, and HUD reference devices
  - Telematics Reference Device released with HH
  - Requirements evolving. Need more Tier One support.
  - Hardware reference?
- Next generation SOCs (RCAR gen 4, i.MX8)

https://events.linuxfoundation.jp/wp-content/uploads/2018/07/ALS-2019-AGL-Roadmap-Miner.pdf

Vision for 2019 & Beyond

- Window Manager and Home Screen Services
  - Weston 6.0 + Waltham
  - Consolidated Window Manager and Compositor
  - Reference Home Screen
- Video architecture for IVI, ADAS and Autonomous
  - Will start to be addressed by Collabora work in 2H 2019.
- Sensor fusion architecture
- Smartphone connectivity – Plug in solution for Apple CarPlay and Android Auto

https://events.linuxfoundation.jp/wp-content/uploads/2018/07/ALS-2019-AGL-Roadmap-Miner.pdf

2019 F2F Workshops

- Mar 5-7 – Tokyo AGL AMM
- May 7-9 – A Coruña, Spain (Igalia)
- July 16 – Tokyo - Day before Automotive Linux Summit
- Sep 24-26 – Berlin (VW/ Carmeq)
- October 21 - 24 – Monte Carlo – AGL Fall AMM
- Nov 12 – 14 – TBD – CES Integration Session #1
- Dec 10 – 12 – San Francisco – CES Integration Session #2
- Jan 7-10 : CES 2020

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AUTOMOTIVE GRADE LINUX

https://static.sched.com/hosted_files/ossalsjp19/4a/ALS%202019%20AGL%20BoF%20Miner.pdf

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/

https://static.sched.com/hosted_files/aglammjapan2019/b8/AMM%20Tokyo%202019%20Intro%20to%20AGL.pdf

Get The Code

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

  https://wiki.automotivelinux.org/agl-distro/release-notes

https://static.sched.com/hosted_files/aglammjapan2019/b8/AMM%20Tokyo%202019%20Intro%20to%20AGL.pdf

AGL Code

- AGL gerrit

  http://gerrit.automotivelinux.org/

- AGL git

  https://git.automotivelinux.org/

https://static.sched.com/hosted_files/aglammjapan2019/b8/AMM%20Tokyo%202019%20Intro%20to%20AGL.pdf

Ask Questions

- Weekly Developer Call on Tuesdays

  https://wiki.automotivelinux.org/dev-call-info

- IRC channel #automotive on freenode.net

  Discussion about open source software for vehicles. No help for mechanical issues should be accepted from anyone on this channel.

- Discussions Mail List

  https://lists.linuxfoundation.org/mailman/listinfo/automotive-discussions

Automotive Linux Wiki

Visit the AGL Web Site
AGL Projects
2018 CES Demonstrator

AGL Software

Schedule and Milestones
AGL Software Distribution
Subteam Pages
Demo Apps
AGL Developer Web Site
Contributing to the AGL Code
Tips and tricks
Release Notes

Expert Groups

System Architecture Team
App Framework and Security
Connectivity
Continuous Integration and Test
UI and Graphics
Virtualization
Navigation
Reference Hardware System Architecture
Vehicle to Cloud

start

Table of Contents

The Automotive Grade Linux (AGL) initiative is

- driven by the Automotive Grade Linux Collaborative Project of the Linux Foundation
- about improving open source components for automotive use cases
- follows an upstream-first policy in publishing the improvements
- using a common reference platform for test and integration purposes

The overall direction of the Automotive Grade Linux Collaborative Project is set by the AGL Advisory Board and Steering Committee. All work is carried out by the Expert Groups.

You are cordially invited to join and contribute to AGL and this Wiki. See Getting Started with AGL to register for accounts to contribute to the requirements, source code, or documentation of AGL.

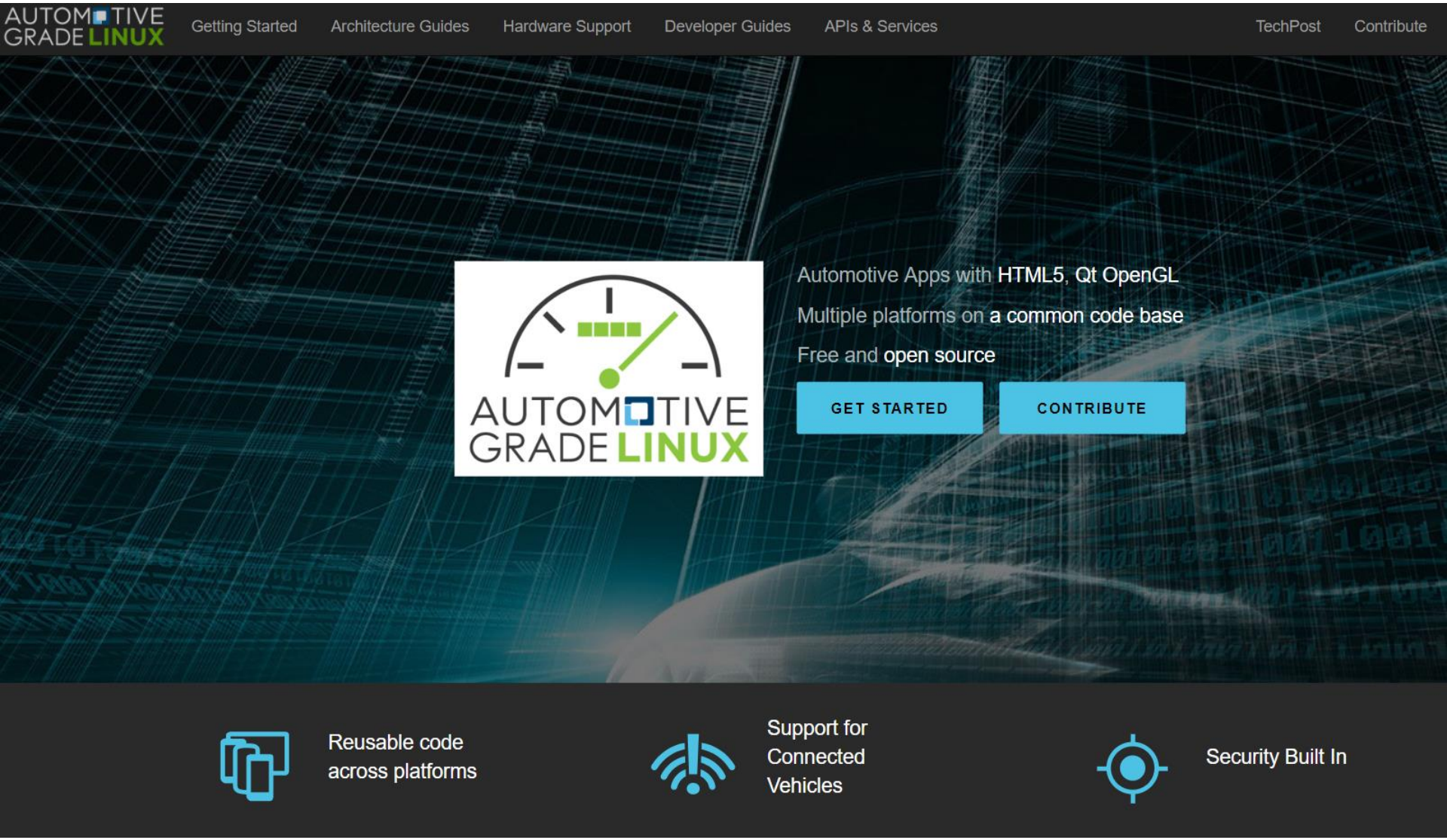
Weekly Developer Meeting held on Tuesdays at 14:00 UTC (6 am Pacific Standard Time)

Conference Info and Meeting Notes

News

You can find the latest AGL News here.

https://wiki.automotivelinux.org/



http://docs.automotivelinux.org/

OSSコンプライアンスへの取り組み

- AGLからリリースするソフトについて、OSSライセンス情報に関係する情報、ツールも一緒に提供予定

- ライセンス情報：SPDX Lite
  - https://github.com/spdx/spdx-spec/pull/133/commits/c9423c7727b3e8dc8eb1c97598725b0baf8d0c99

- ツール：SW360、FOSSology、meta-spdxscanner
  - https://github.com/sw360/
  - https://www.fossology.org/
  - https://github.com/dl9pf/meta-spdxscanner

2019CES@LasVegas

AGL Demo Plan at CES 2019

- 2019 Toyota Rav4 in the booth with AGL-based system and Amazon Alexa
- Two AGL main demos (Including Speech Rec)
- 16 member companies showing AGL demos:
  - AISIN-AW
  - Audiokinetic
  - Cognomotiv
  - DENSO
  - DENSO TEN
  - Fiberdyne
  - ForgeRock
  - Igalia
  - LGE
  - Microchip
  - NTT DATA MSE
  - Panasonic
  - Renesas
  - SafeRide
  - Tuxera
  - RealVNC Automotive

2019CES@LasVegas

2019CES@LasVegas

2019CES@LasVegas

2019CES@LasVegas

CES2019：

日本のAGLメンバーでコックピットを共同開発、量産車向けの機能盛り込む

2019年01月16日 06時00分 公開

[齋藤由希，MONOist]

印刷　通知　9　35　B! 0

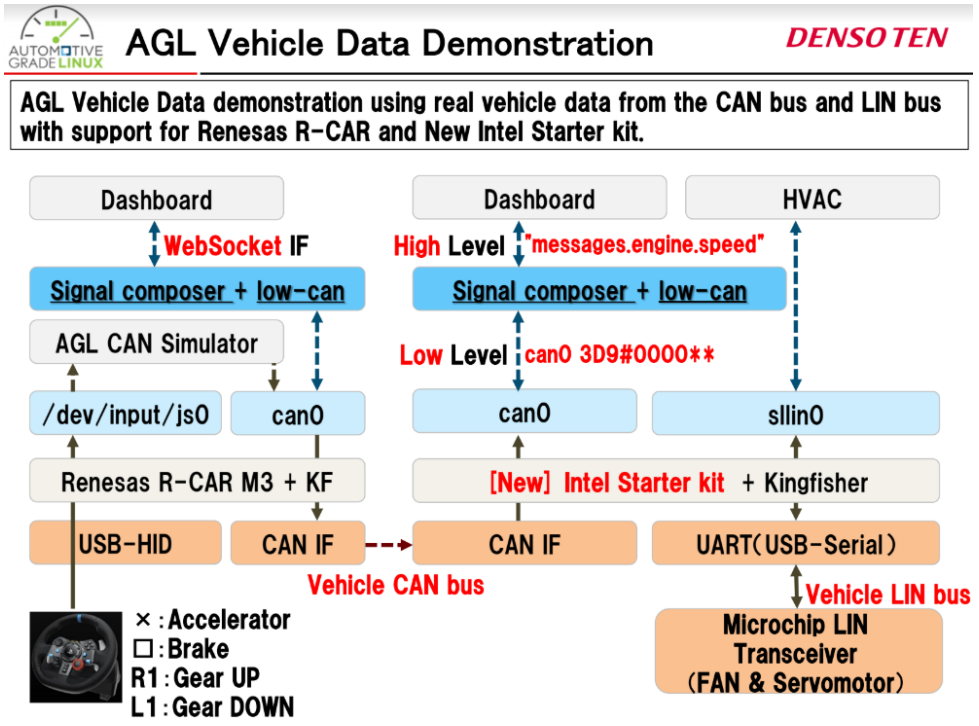
Linuxベースの車載情報機器関連のオープンソースプロジェクトAutomotive Grade Linux（AGL）は、消費者向けエレクトロニクス展示会「CES 2019」（2019年1月8～11日、米国ネバダ州ラスベガス）において、サプライヤーなど日系企業のAGLメンバーで開発したインフォテインメントシステムでデモンストレーションを行った。

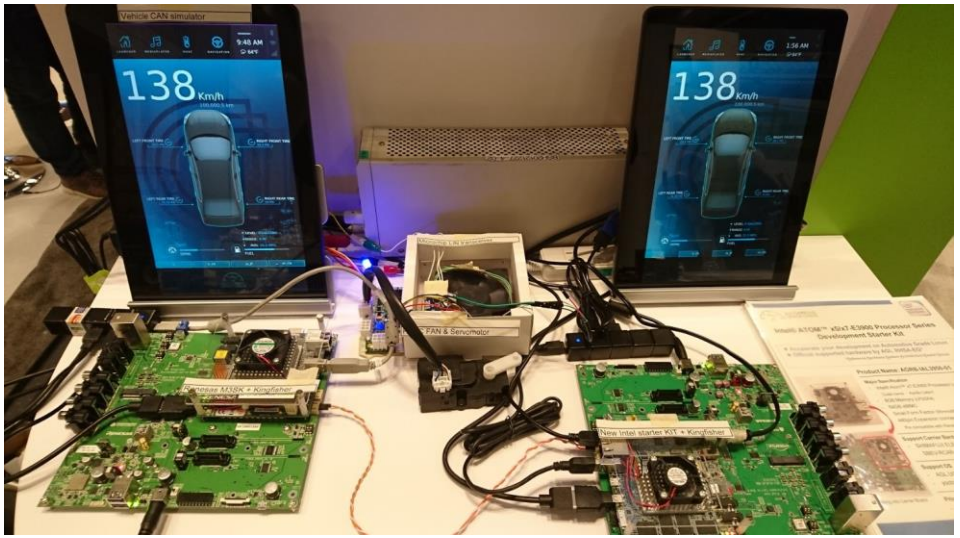
日本のAGLメンバーで共同開発したインフォテインメントシステム。写真左の横長のディスプレイがクラスタ用。写真右の縦長のディスプレイはIVI用（クリックして拡大）

デモ機には量産車にAGLを使っていくにあたって実現したい機能を実装した。日本向けの閉じた取り組みではなく、グローバルのコミュニティーとも成果や課題を共有してさらに作り込んでいく。

http://monoist.atmarkit.co.jp/mn/articles/1901/16/news070.html

2019CES@LasVegas（New Intel board）





Thank you!!!

yuichi.kusakabe@denso-ten.com