

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

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](#)



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



AUTOMOTIVE GRADE LINUX

the only
organization
addressing
all software in
the car



Infotainment



Instrument
Cluster



Heads-up
Display (HUD)



Telematics/
Connectivity



Functional
Safety



Advanced Driver
Assistance Systems
(ADAS)



Autonomous Driving

AGL is CODE FIRST

AGL is a “Code First” organization!
Specifications lead to fragmentation!

AGL Members - Total of 134 companies!

Platinum



Gold



Silver



Bronze



30 New AGL Members in 2018



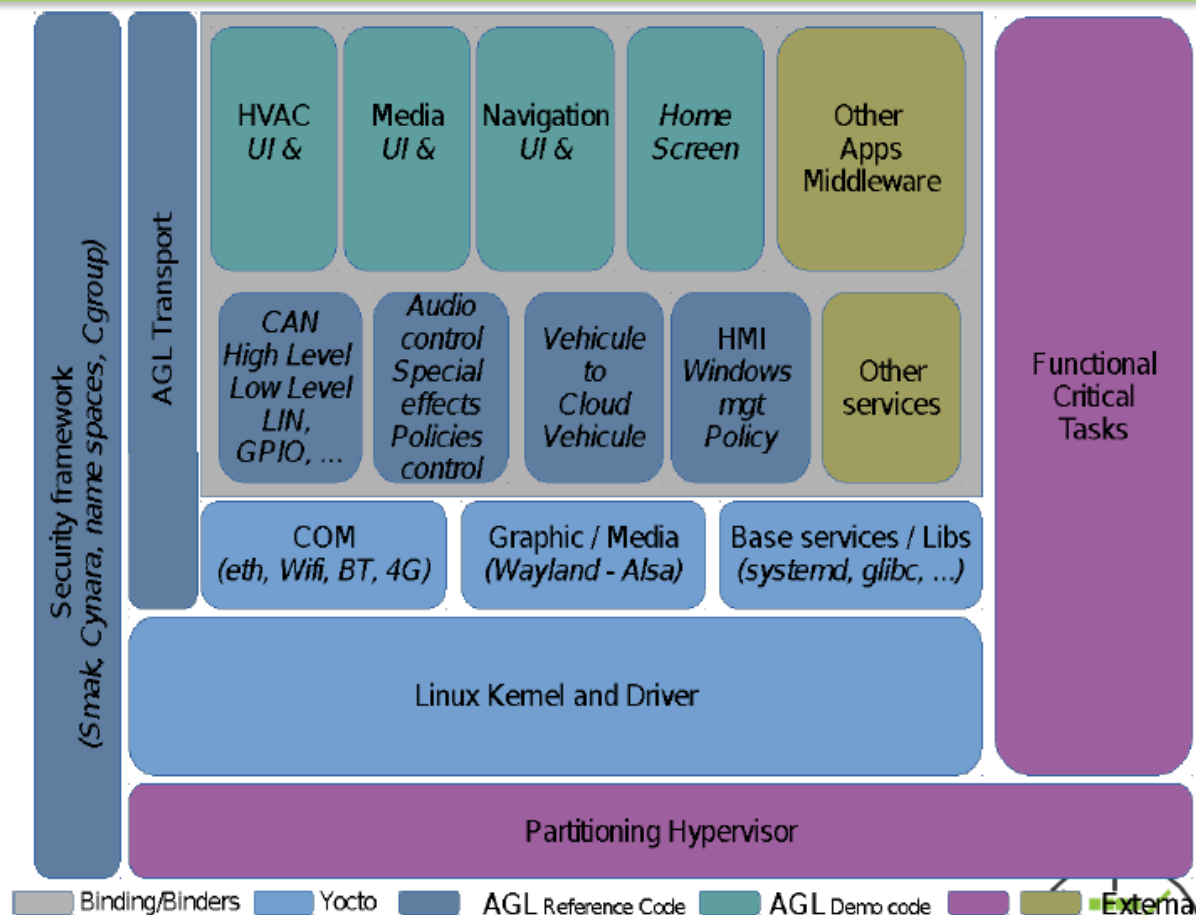
*One stealth startup not shown



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 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)~~

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



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 – Oct 2018
Grumpy Guppy – Jan 2019
Happy Halibut – July 2019
Itchy Icefish – Jan 2020



Grumpy Guppy

- Continue on Yocto 2.4 – Rocko branch
 - Semis aligned on rocko, skipping sumo
 - Focus on new features for CES rather than BSPs
- Speech Services Integrated
 - Speech Rec and TTS binders
 - Speech enablement in App Framework
 - Speech Enabled Apps for CES 2019

Grumpy Guppy

- Audio
 - Speech Enablement
 - Bluetooth SCO connection for HFP
 - Further hardening to make production ready
- Window Manager and Home Screen Service Evolution
- Instrument Cluster Reference Applications to replace CES demo unit

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



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

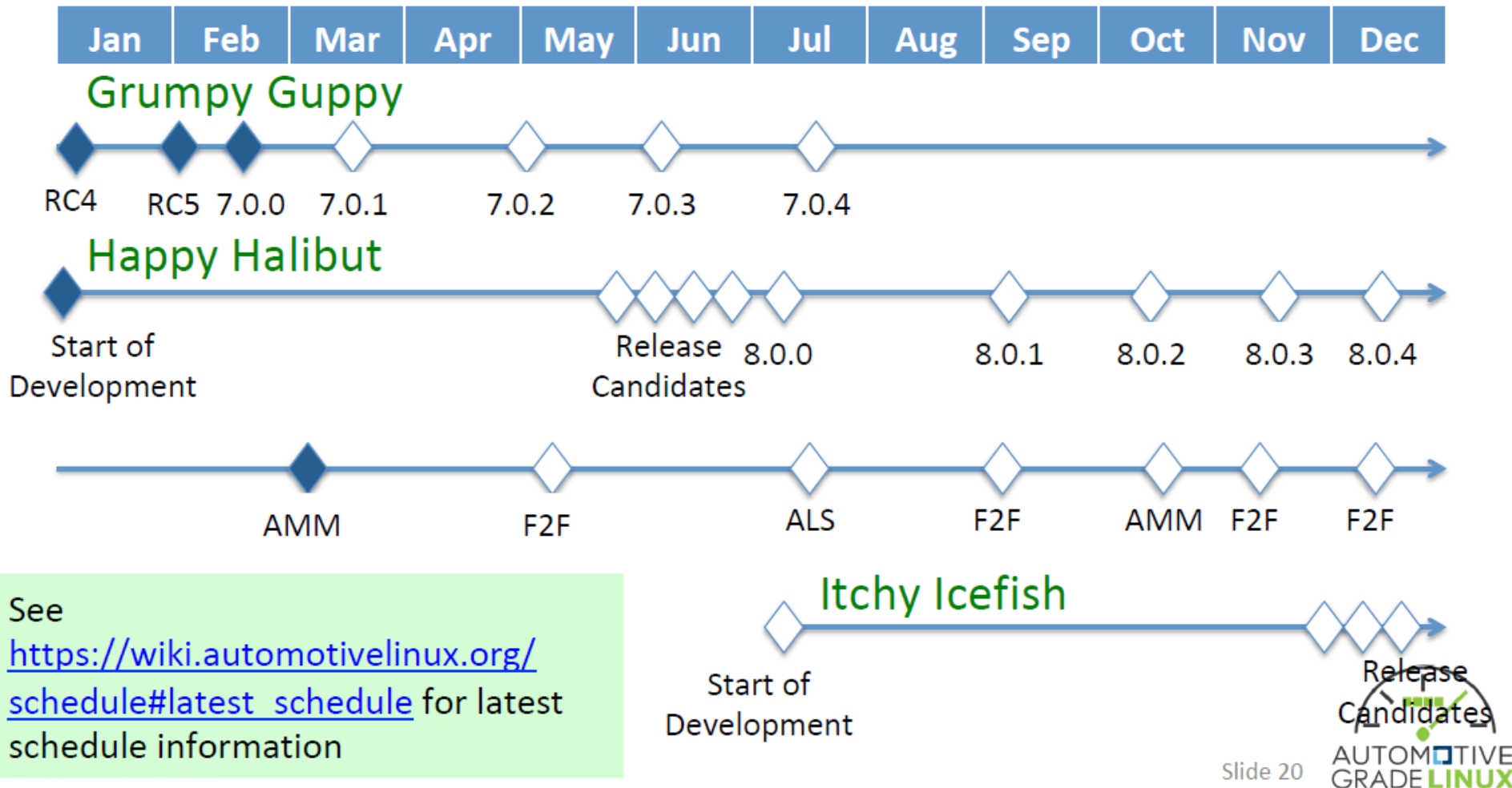
3764 Total Commits
73 Committers
28 Companies

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

Slide 12



2019 AGL Schedule



2019 F2F Workshop Proposal

- Mar 5-7 – [Tokyo](#) AGL AMM
- May 7-9 – [A Coruña, Spain](#) (Igalia)
- July 16 – Tokyo - Day before Automotive Linux Summit
- Sep 10 – 12 - TBD
- October 21 - 24 – TBD – 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

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>
- Latest Source Code and Build Instructions
 - <https://wiki.automotivelinux.org/agl-distro/source-code>
- 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>

- 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>



Trace: • [start](#)

[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](#)

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](#).

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[start](#)





Automotive Apps with HTML5, Qt OpenGL

Multiple platforms on a common code base

Free and open source

[GET STARTED](#)

[CONTRIBUTE](#)



Reusable code
across platforms



Support for
Connected
Vehicles



Security Built In

2018AMM@Dresden

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13:00

AGL Application Design with AGL/FF Binding Version 3 - José Bollo, IoT.BzH

Improve CIAT Workflow: Build Once, Deploy Anywhere - Khiem Nguyen and Thuy Tran, Renesas Design Vietnam

Introduction to AGL - Walt Miner, The Linux Foundation

13:55

From "Connected Cars" to "Connected Boats:" Expanding AGL Adoption to Other Industries - Fulup Ar Foll, IoT.bzh

Open-Source Automotive Safety with the L4Re Microhypervisor - Michael Hohmuth and Adam Lackorzynski, Kernkonzept

Realization of a Remote Privilege Management for SDL-enabled Applications with SDL Server - Hiroto Imamura and Koichi Miyata, NTT DATA MSE Corporation

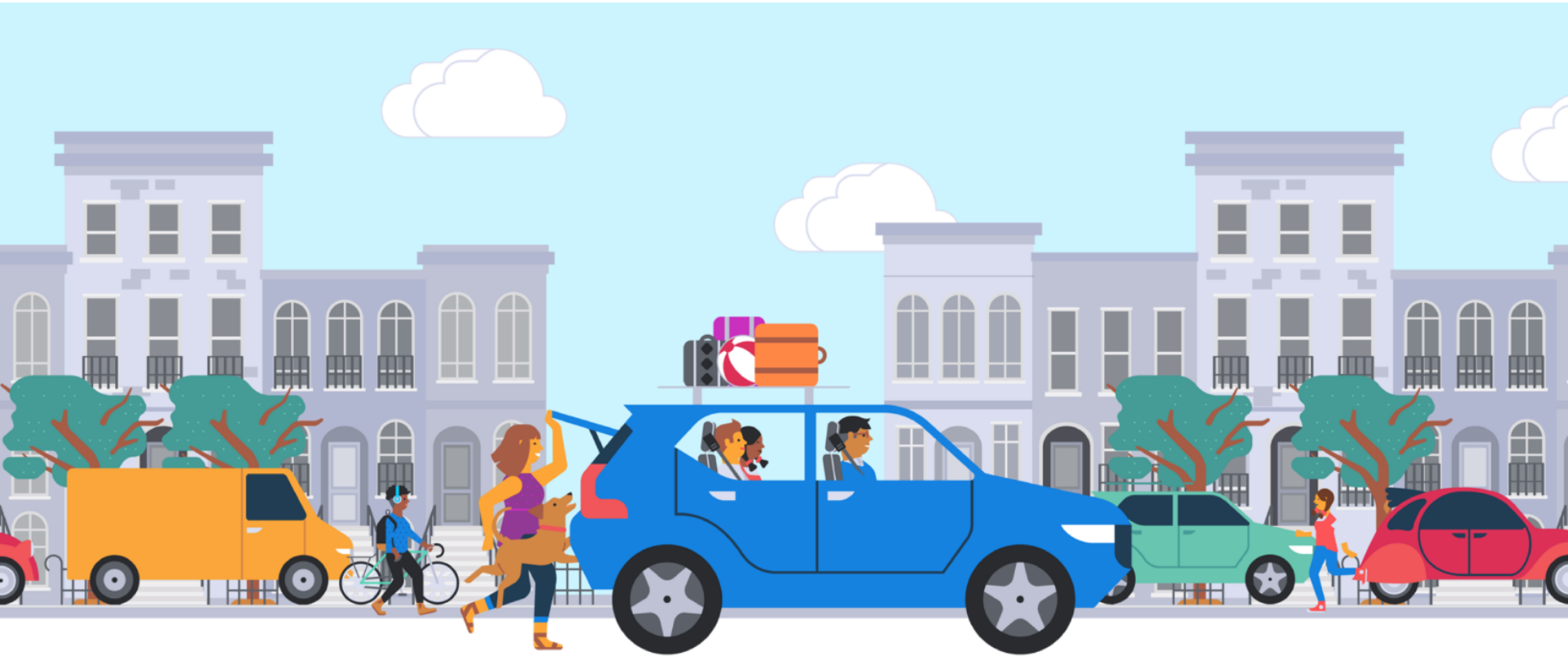
14:50

Google Summer of Code & Automotive Grade Linux Experience - Yordan Dimitrov, GSoC

Introducing a Secure Virtual Dynamic Sound Card for AGL - Mark Farrugia and Karl Gladigau, Fiberdyne Systems

State of Connectivity in AGL - Matt Ranostay, Konsulko

2018AMM@Dresden



Multi-Assistant Considerations for Alexa on AGL

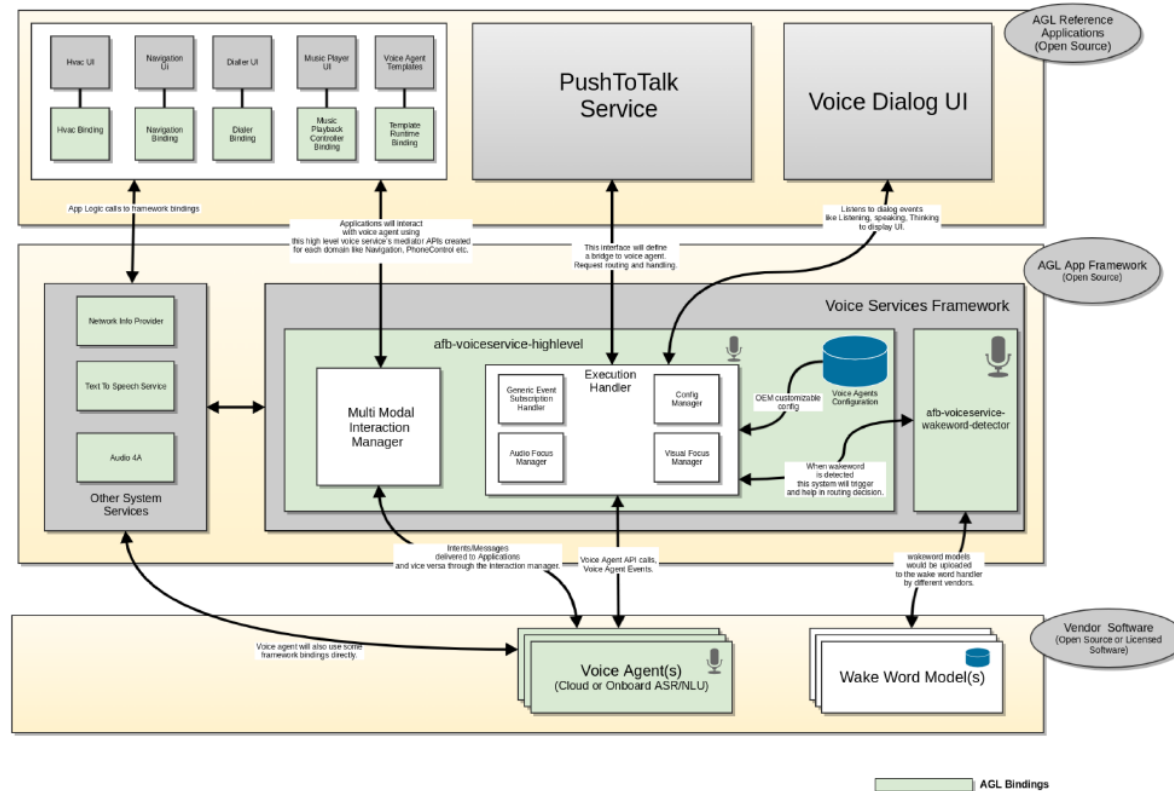
Ricardo DeMatos
Principal Solutions Architect
Alexa Automotive

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2018AMM@Dresden

AGL Voice Services Architecture – High Level Workflow



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https://schd.ws/hosted_files/aglmmu2018/d0/AGL_Alexa.pdf

<https://confluence.automotivelinux.org/display/SpeechArch/Speech+EG+Architecture>

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

[齊藤由希, MONOist]



印刷



通知



9



35



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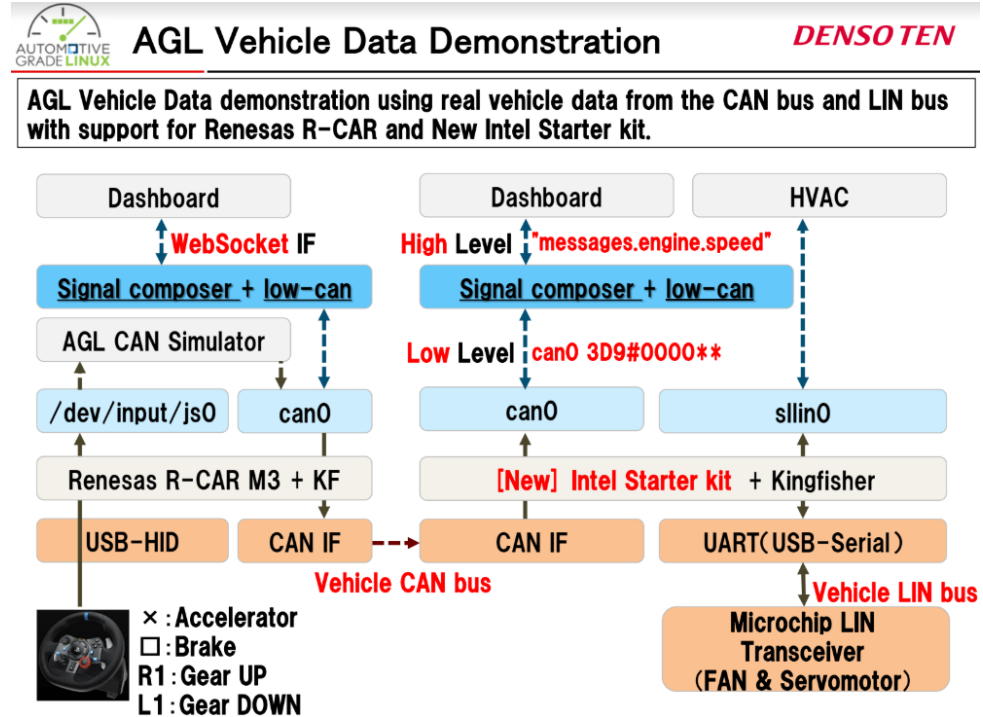
Linuxベースの車載情報機器関連のオープンソースプロジェクトAutomotive Grade Linux (AGL) は、消費者向けエレクトロニクス展示会「CES 2019」(2019年1月8~11日、米国ネバダ州ラスベガス)において、サプライヤーなど日系企業のAGLメンバーで開発したインフォテインメントシステムでデモンストレーションを行った。

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とも成果や課題を共有してさらに作り込んでいく。



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ー用。写真右の縦長のディスプレイはIVI用(クリックして拡大)

2019CES@LasVegas (New Intel board)



ALS (Automotive Linux Summit) & OSS (Open Source Summit)

 **AUTOMOTIVE
LINUX SUMMIT**

2019年7月17日～19日
東京 – 虎ノ門
虎ノ門ヒルズフォーラム
#autolinux

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イノベーションを促進

Automotive Linux Summitは、自動車向けLinuxのイノベーションを促進している開発者コミュニティと、自動車分野における組込み機器の未来を開くためにコードを提供・使用するベンダーやユーザーとを結びつけます。[くわしく見る](#)

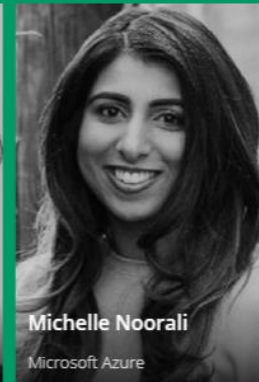
[2018年のWEBサイトを見る](#)

ALS最新情報などのニュースを受け取る

[SUBMIT »](#)

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2018年の登壇者



Thank you!!!

yuichi.kusakabe@denso-ten.com