
About Product-level Code from TOYOTA

TOYOTA MOTOR CORPORATION
Toshikazu Ohiwa

Agenda

- Proposal at previous AB (Jul, 2019)
 - Filling the gap between the current AGL UCB and production-level code ASAP
- About the software that Toyota disclose code
- Spec EG activity: Toward Spec 2.0

Proposal at previous AB (Jul, 2019)

Background

- In AGL's Advisory Board (AB), we proposed that we would like to fill the gap between the current AGL UCB and product-level code.

AGL Strategic Direction

- Discussion points
 - How to make AGL UCB closer to product ready
 - How to integrate contribution from product code (at least from Toyota soon)
 - Shift of spending development fund from Demo purpose to Product readiness
 - How to monitor progress of funded development, and navigate them efficiently



<Proposal-1>

Improvements of managing funding developments

- AGL governing body (AB, SC, SAT) should involve more on management of the funding development, especially in budget approval and progress/result evaluation.

<Proposal-2>

Filling the gap between the current AGL UCB and production-level code ASAP

- The gap should be filled as much as possible, and as soon as possible.
- Encourage members to contribute product-level code.
- Leverage the development find for the purpose.

Improvement of funding development (1/2)

1. Issues in management of AGL our sourcing

<Current situation>

	2018/4Q	2019/1Q	2019/2Q	2019/3Q	2019/4Q
Company-A	★AB (Issue #1) Approved by amount of money	(Issue #2) No progress report	★AB (Issue #2) Result are not examined	★AB (Issue #3) Contents of funding is not discussed	★AB

Issues #1 : Our sourcing tasks are ambiguous. Detailed tasks of out sourcing (SoW) are not clear at the timing of budget approval. Its total budget amount is examined, but their contents are not well examined by AB.

Issues #2 : Progress and artifacts of the outsourcing development are not well monitored.

Issues #3 : Contents of the funding is not well discussed.

<Comparison AMM Winter data at FY18 vs FY19>

Contractor Proposal FY 2018

Contractor	2017	2018	Comment
			CIAT
			App FW, SDK, Audio, Vehicle Messaging
			Apps, Service Binders, Connectivity, BSPs
			Chromium, HTML App FW, Browser
			Waltham, Graphics

Tasks were presented

Data presented at Feb 19, 2018 AB

Contractor Proposal FY 2019

Contractor	2018	2019	Comment
			CIAT
			4 heads
			4 heads
			Waltham, Audio, HS
			Documentation

Tasks were not described

Data presented at Mar 4, 2019 AB

Improvement of funding development (2/2)

<Proposal of the improvements>

	2018/4Q	2019/1Q	2019/2Q	2019/3Q	2019/4Q
Company-A	★AB	☆SAT Check the progress at SAT	★AB ☆SAT Check the result at SAT	★AB Contents of funding should be discussed	★AB

Improvement proposal #1:

Circulate the detailed SoW among SC and AB, and examine the detail before budget approval.

Improvement proposal #2:

The progress of out sourcing is examined by SAT at every quarter and report it to the AB.

Improvement proposal #3:

When new adding items to be developed by out source is come up, then it should be discussed and approve at Fall-AB.

Issues of gap for production (1/2)

2. Issues of the gap between AGL and product-level code

There are too much gap between AGL and product-level code (in API)

Cover ration = (# of AGL APIs) / (# of Product-level code APIs)

#	Function	Function detail	Cover ratio	Abstract of the Gap
1	App FW	① App FW	7%	Application lifecycle management
2	Services	① Voice recognition	4%	Voice control of services (Radio, Phone call, media player, etc.)
		② SW update	0%	SW update notification, download, install
		③ Comm. Mgmt.	48%	Routing though external devices, Priority control
		④ Modem	0%	MTU setting, Error handling, etc.
		⑤ Smartphone Connectivity	0%	Framework to deploy CarPlay, Android Auto, etc.
		⑥ Media player	15%	Integration in other services
		⑦ Radio	8%	Call preset station, regional specific station search (ex. RDS)
		⑧ TV	0%	DTV reception and control
		⑨ Bluetooth	8%	Hands-free (Call, Phone book search, answering), mailing and messaging
		⑩ Remote vehicle control	0%	Remote vehicle maintenance
		⑪ Vehicle info & control	15%	Vehicle control setting and display
3	Basic System	① Kernel and drivers	8%	System hardware resource control, power management, device lifecycle management
		② Diagnostics	0%	Logging and reporting hardware/application error
		③ Location (GPS)	80%	Location data handling
		④ Drawing	100%	Window manager, Display-out control
		⑤ Sound	100%	Routing sound, Sound output control

Issues of gap for production (2/2)

Resolution proposal #1:

Contribute the product-level code to AGL community

- If the contributed code is new code, use as a base of AGL community development.
- If the contributed code is overlapping existing AGL code, start to consider to integrate the functionality into AGL code.

Resolution proposal #2:

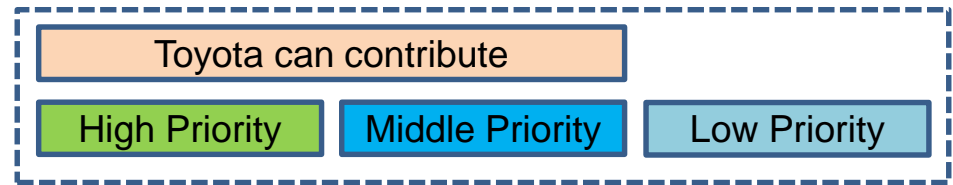
If no volunteer for the integration work, leverage the development fund.

- Ex.) Spec EG defines SoW based of discussions among company developing product-level code (OEM, Tier-1, etc.).

Note: Priority of filling the gap

Ex. Priority of Low grade products based on Browser

High Priority : For OEM Common (Standard Soft.)
 Middle Priority : For Common Grade
 Low Priority : For High Grade



#	Function	Coverage	Requirements with gaps	Assignment Idea	
1	App FW	① UI Tool-Kit	7%	GUI Library	Out of Scope
2	Service	① Browser	—	Security patch update	AGL(Fund)?
		② Smartphone cooperation	0%	SDL、(Contract required for Car Play、Android Auto)	AGL(Fund)?
		③ Arbitration	48%	Priority control (display, sound, communication)	AGL Member
		④ Vehicle information	15%	Display and setting for vehicle	AGL Member
		⑤ Bluetooth	8%	Hand free(incoming, Answering, Calling, Phonebook)、mail	AGL Member
		⑥ Re-programing	0%	Program update	AGL Member
		⑦ DCM	0%	Data communication control	AGL Member
		⑧ Radio	8%	Preset registration/Calling、Destination Func.	AGL Member
		⑨ Voice recognition	4%	Each service(Radio、TEL、MediaPlayer、etc.) control	AGL Member
		⑩ D-TV	0%	Receive and operation	AGL Member
		⑪ Media Player	15%	Basic operation、other service cooperation	AGL Member
		⑫ Remote Service	0%	Remote maintenance service	AGL Member
3	System	① Basic system	8%	Resource management、Power Management、Device management、etc.	Toyota
		② Location information	80%	Location information of GPS	Toyota
		③ Display system	100%	Window Management、Display output	
		④ Sound system	100%	Routing and output of sound	

Gap : Use API number of each function for product and AGL * Coverage =API number of AGL / API number of Product
 © TOYOTA MOTOR CORPORATION All Rights Reserved.

About the software that Toyota disclose

Relationship between AGL UCB code and Toyota product level code

The software that Toyota disclose today relate to the following components of AGL.

❑ Services Layer: Platform Service

- ✓ IPC
- ✓ Location Service
- ✓ Persistent Storage
- ✓ Resource Management
- ✓ Power Management
- ✓ Error Management
- ✓ Health Monitoring
- ✓ Network Management

❑ Operating System Layer

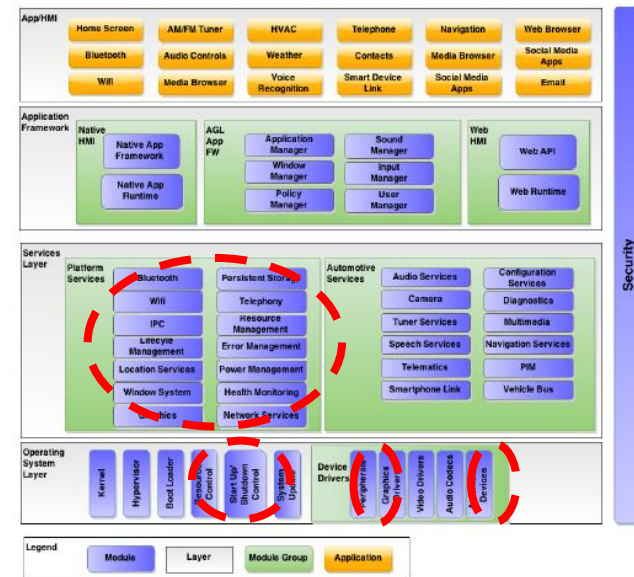
- ✓ Resource Control
- ✓ Startup/Shutdown Control
- ✓ Device Drivers: Peripheral / Automotive Device

Example of missing features in AGL

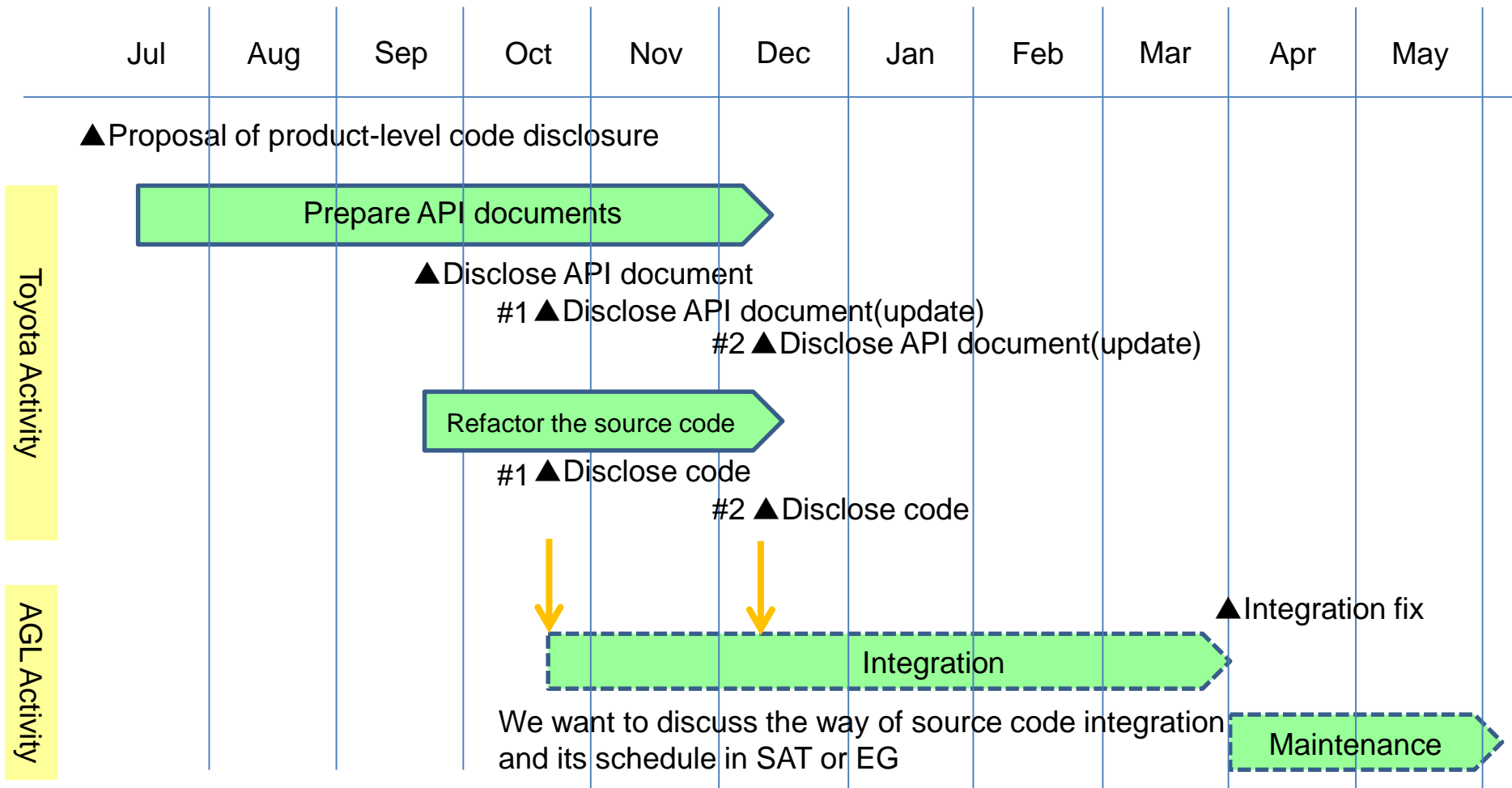
1. Shutdown processing
 - Low power consumption when ACC-OFF
2. Data backup
 - Maintain user usage
3. Resource monitoring
 - Prevention of system stop or reset

Example of similar features in AGL

1. Touch-Panel input control
2. Location Service
3. Task manager



Schedule for the activity



#1 : 7 modules of all 22 modules

#2 : All 22 modules

Explain function overview

- Explain features
 - Feature overview
 - Relation diagram
 - Use cases

Please refer other document: BaseSystem_Features.pdf

- API Introduction

<https://confluence.automotivelinux.org/display/TC/API+Documents>

Request

■ To Walt

- Please assign the appropriate person to review API documents and source code that we disclose from now on.

■ To Reviewers

- We would like you to review the software (documents and source code) in terms of following points
 - Some of the software is not in current AGL UCB. Therefore, please check that these software from us is acceptable to merge in AGL or not.
 - On the other hand, some software is similar to current AGL UCB. For these software, we would like you to propose
 - A: Replace AGL to Toyota software
 - B: Co-exist both AGL and Toyota Software
 - C: Reject to merge Toyota software
 - Also, please let us know the detail reason for above two terms.

Spec EG activity: Toward Spec 2.0

■ Background and Current Status

- We propose to update spec document from version 1.0 to 2.0
- So, we requested to several OEMs to extract the requirements for AGL software in F2F @ Spain (May, 2019)
- However, there were no new requirements from OEMs.

■ Re-Plan

- We will proceed in other way to update spec documents.
- Toyota will first propose the new requirements based on the software we disclose

