



Automotive Grade Linux System Architecture Team Meeting

Walt Miner, Engineering Project Manager

June 19, 2018



Agenda

10:00 - 10:15 Introductions and Agenda review

10:15 - 12:00 System Architecture Team

- Schedule updates for FF and GG
- AGL Spec Spec Update proposal from Toyota
- Roadmap review
- Device Profiles - Telematics and Instrument Cluster
- EG Updates

12:00 - 13:00 Window Manager and Home Screen

13:00 - 14:00 Lunch

14:00 - 15:00 Web App Framework

15:00 - 16:00 Audio

16:00 - 17:00 - Speech EG

Top 25 Git Committers in 2018

Commits	Name	Company
141	Jose Bollo	IoT.bzh
76	Matt Ranostay	Konsulko
71	Changhyeok Bae	LG
68	Romain Forlot	IoT.bzh
67	Khang Nguyen	Renesas
51	Ronan Le Martret	IoT.bzh
39	Thuy Tran	Renesas
31	Jan-Simon Moeller	Linux Foundation
31	Kazumasa Mitsunari	Witz
28	Jonathan Aillet	IoT.bzh
18	Thao Nguyen	Renesas
15	Kevin Hilman	BayLibre
15	Loic Collignon	IoT.bzh

Commits	Name	Company
13	Sebastien Douheret	IoT.bzh
11	Martin Kelly	Xevo
11	Matt Porter	Konsulko
9	Harunobu Kurokawa	Renesas
9	Kotaro Hashimoto	Mitsubishi Electric
7	Loys Ollivier	BayLibre
7	Stephane Desneux	IoT.bzh
7	Tadao Tanikawa	Panasonic
7	Tobias Jahnke	Microchip
7	Tom Rini	Konsulko
5	Christian Gromm	Microchip
5	Scott Murray	Konsulko
5	Thierry Bultel	IoT.bzh

796 Total Commits
47 Committers
19 Companies

- 01 Jan 2018 – 14 June 2018
- Commits to master



Commits by Company in 2018

Company	Commits
IoT.bzh	329
Renesas	140
Konsulko	106
LG	71
Witz	33
Linux Foundation	31
BayLibre	25
Microchip	12
Mitsubishi Electric	11

Company	Commits
Xevo	11
Panasonic	7
Intel	5
FiberDyne	4
Individual	3
Qt Company	3
Nexty	2
AisinAW	1
Cogent Embedded	1
Virtual Open Systems	1

796 Total Commits
47 Committers
19 Companies

- 01 Jan 2018 – 14 June 2018
- Commits to master



Other Numbers

- 137 commits to eel release branch in 2018
- 5 commits to dab release branch in 2018
- 101 unique individuals and 36 unique companies have contributed to AGL since the start of the project
 - 11 New committers in 2018
- 11 individuals not affiliated with a member company have contributed
- 192 Jira issues closed during 2018
 - 1082 issues closed since start of project

Vision for 2018

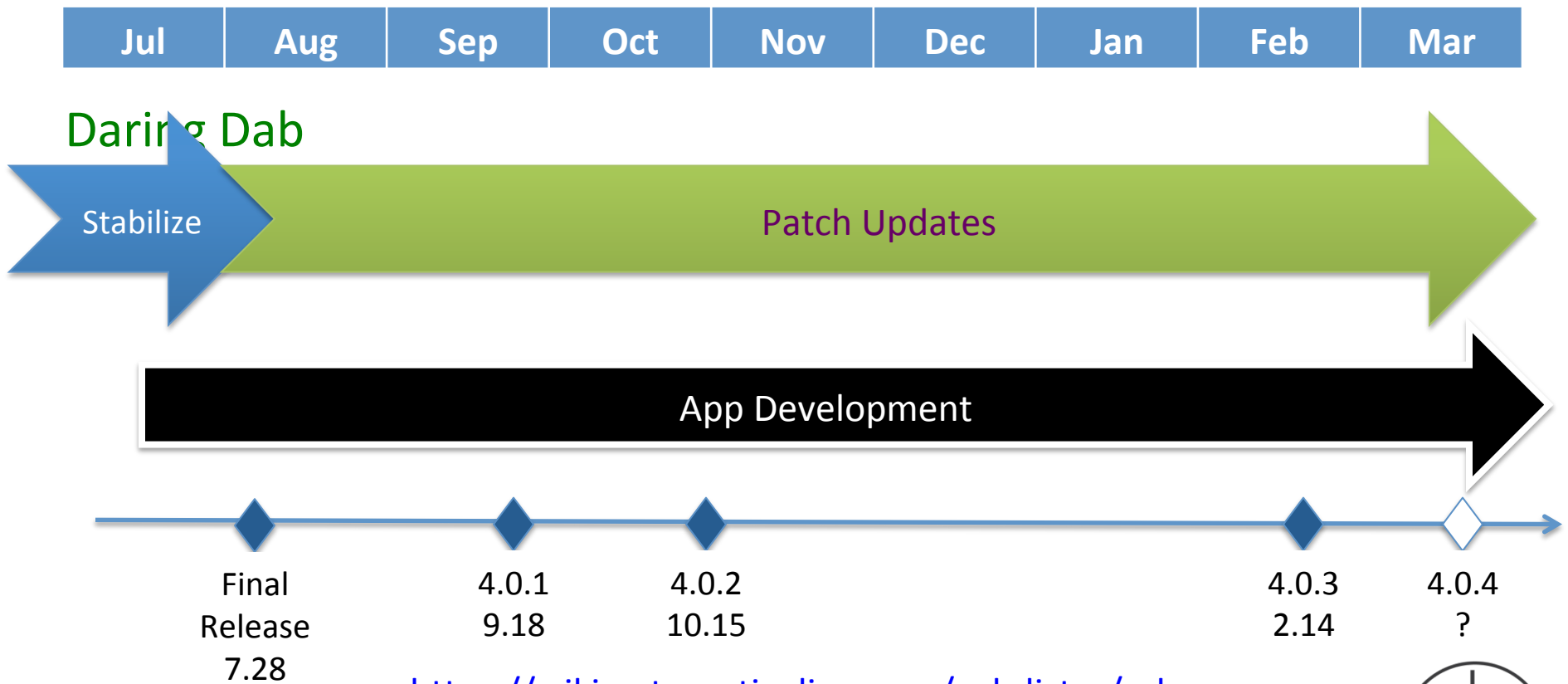
- Major Content Providers Develop AGL Apps
- Support for Developers to Port Legacy Apps to AGL
- Releases: Funky Flounder July 2018 and Grumpy Guppy January 2019
- AGL App Framework Evolution
 - User Management
 - Power Management
 - Memory and CPU management
- Sustainable Audio Solution
- Video Player Reference App
- Home Screen and Window Manager Services Complete
- Chromium based HTML5 Apps
- Vehicle to Cloud Services
- Speech and Text to Speech Services
- Reference Hardware System Architecture
- Expanded AGL Automated Test Suite

2018 F2F Workshops

- Feb 19- 21 – AGL AMM – [Tokyo](#)
- Apr 12 – 13 – [Karlsruhe, Germany](#) (Microchip)
- June 5 – 8 – [Lorient, France](#) (IoT.bzh)
- June 19 – Day before Automotive Linux Summit - [Tokyo](#)
- Sep 11 -13 – Santa Clara (LG Office)
- October 15 – 18 - [Fall AMM](#) – Dresden, Germany
- Nov 6-8 – [CES Integration Session](#) – Yokohama
- Dec 4-6 – CES Integration Session - Yokohama

DARING DAB

Daring Dab Patch Releases



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

ELECTRIC EEL

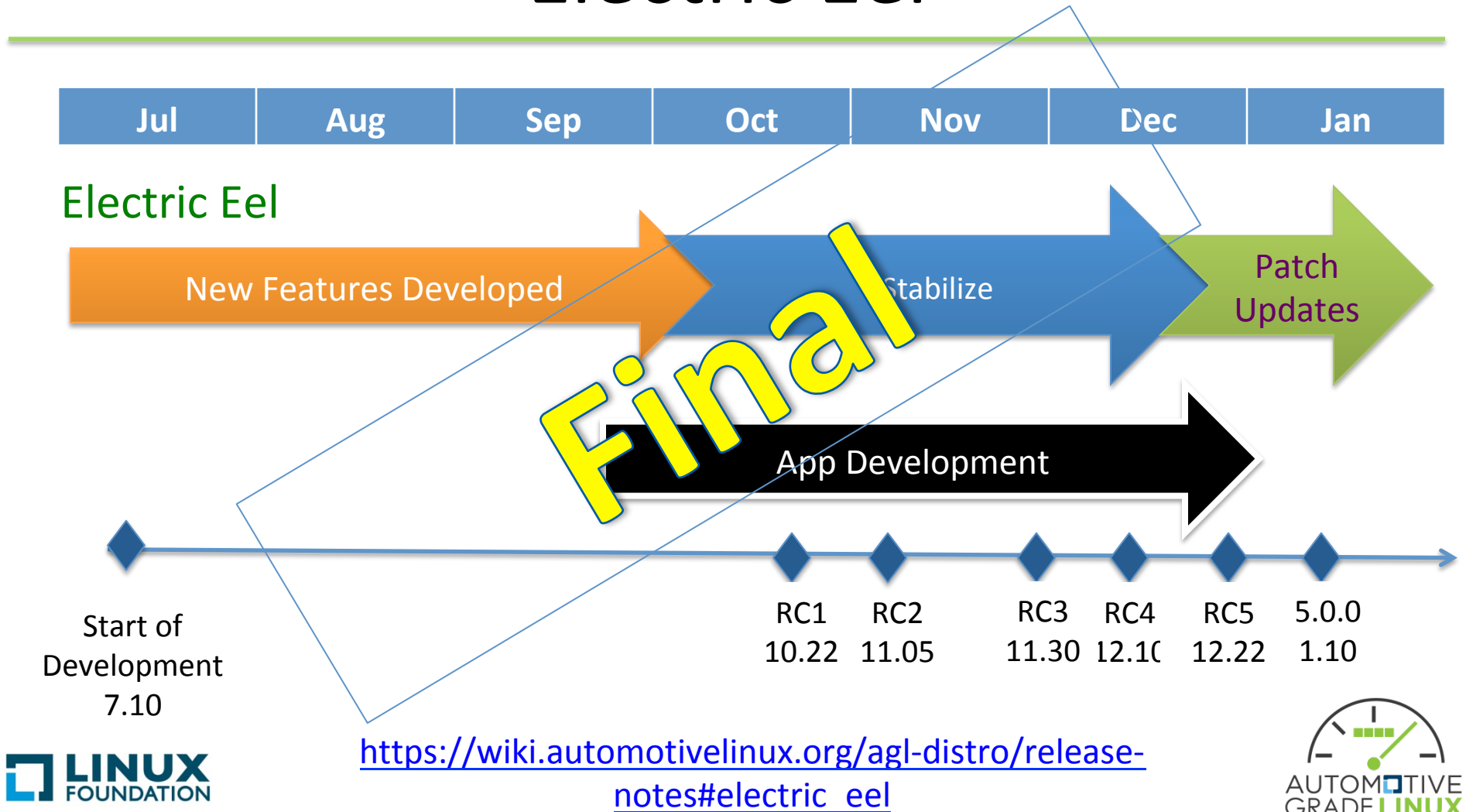
Electric Eel

- Yocto 2.3 – Pyro branch
- Window Manager updates
- Home Screen as an app
- SDK improvements (XDS support for apps)
- App Repository available to download pre-built binaries
- Audio Manager architecture
 - High Level API Service Binder via AGL Advanced Audio Agent (4a)
 - UNICENS binder for ethernet, audio, and video
 - HALs available for UNICENS, USB Audio, Intel, Renesas

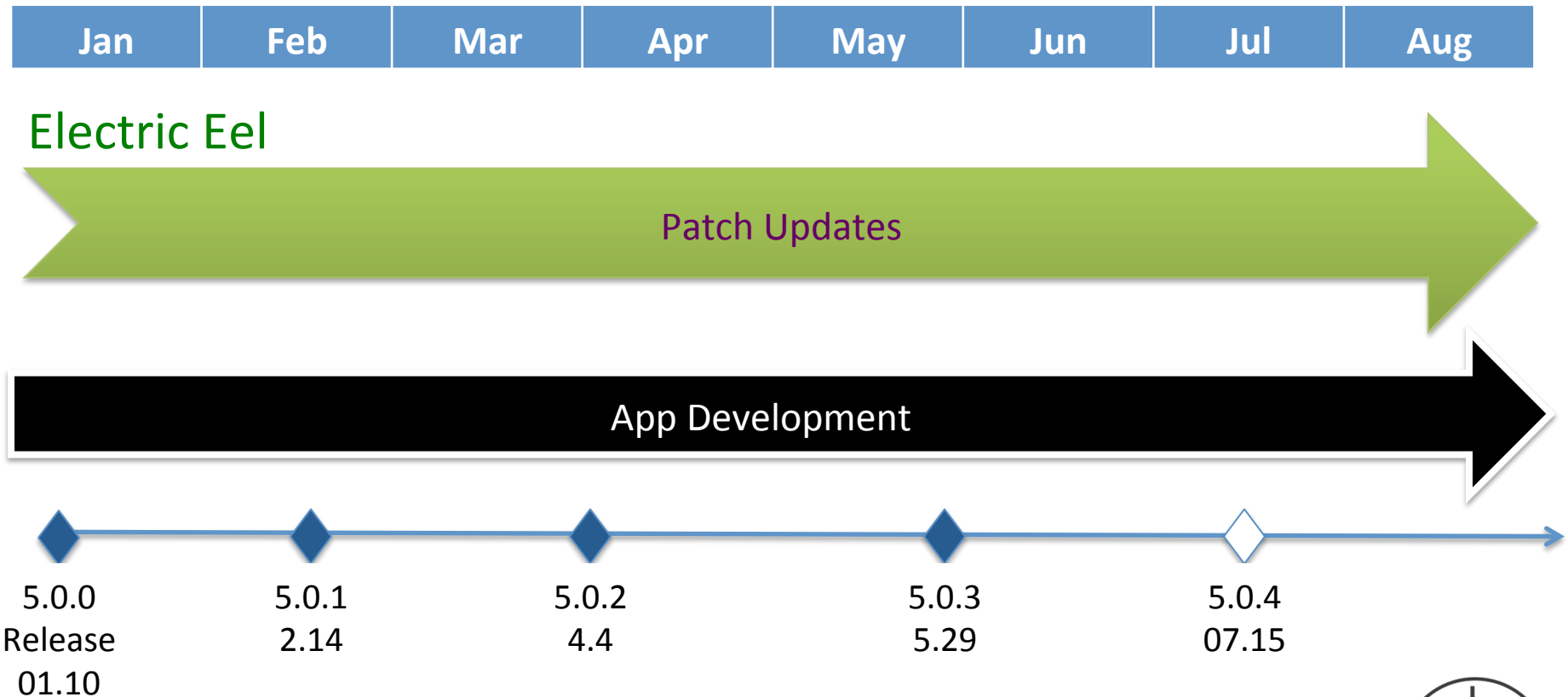
Electric Eel

- New BSPs
 - Renesas R-Car M3
 - Intel Compute Card and UpSquared board
- Identity Agent with Cloud Identity
 - Secure Application Data per user
 - Local Identity persistence
 - OpenID Connect
 - NFC and Bluetooth token
- Vehicle Messaging and Signaling
 - Virtual Signal Composer
 - Improved CAN performance
 - Permissions enforced for accessing CAN signals

Electric Eel

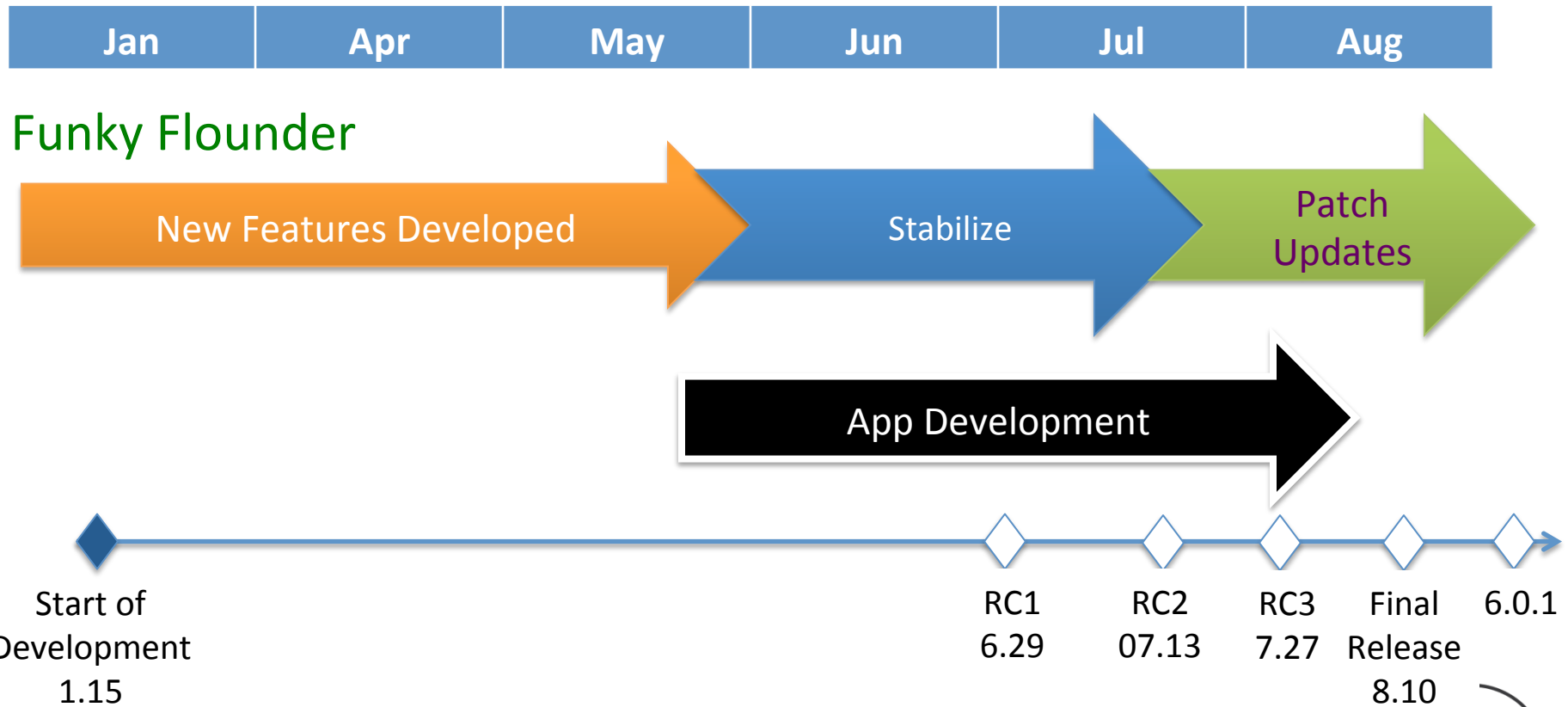


Electric Eel Patch Releases



FUNKY FLOUNDER

Funky Flounder



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



Funky Flounder Results

- Yocto 2.4 – Rocko branch - Done
- Device Profiles
 - Build system and profiles changes completed
 - Core AGL Service layer available
 - Need someone to take ownership of Telematics and Instrument Cluster

Funky Flounder Results

- App Framework
 - API V3 including binder discovery and dynamic API extensions completed
 - HTML5 App Management – LGE completed a demo of Web OSe Web App Manager running on AGL App FW. Need plan to incorporate into AGL git.
 - Change to run as non-root – **Deferred to Grumpy Guppy**
- AGL SDK for App Developers
 - XDS support improvements – **V2.0 Ready**
 - Improved debug and monitoring capabilities – **Ready**

Funky Flounder Results

- Graphics and Window Manager
 - **Window Manager and Home Screen Stalled due to uncertainty over ownership and lack of resources**
 - ~~Pop Ups and Focus Management~~
 - ~~Transition Animation~~
 - ~~Hardware Plane Management~~
 - Secondary Display Support – **Waltham added to AGL. Still in review.**

Funky Flounder Results

- Audio Refinements
 - Demonstrating improvements during ALS on EE.
 - **Still not good enough for production systems.**
- Connectivity Improvements
 - Bluetooth and Wifi improved stability
 - General Networking improvements
 - Bluetooth PBAB and Contacts App Available
 - Vehicle Signaling updated to include dynamic signal creation

Funky Flounder Results

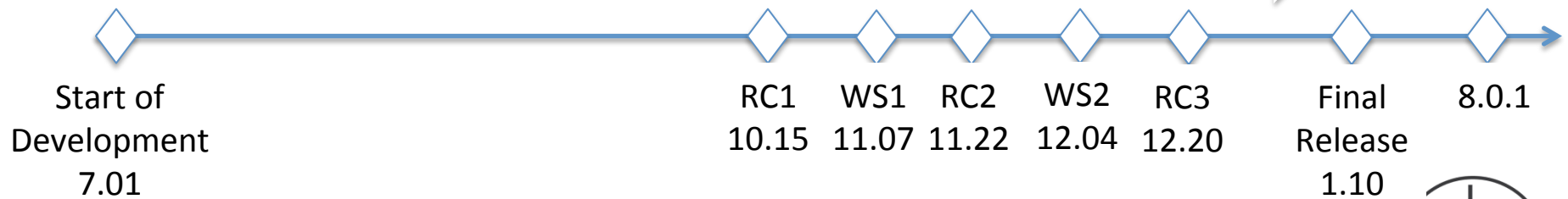
- Continuous Integration and Test
 - Generic binder and application unit testing
 - Four binders made available
 - Code Coverage of test procedure

GRUMPY GUPPY

Grumpy Guppy



Grumpy Guppy



Grumpy Guppy

- Stay on Yocto 2.4 – Rocko branch
 - Semis aligning on rocko
 - Less churn at start of dev cycle
 - 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
- Vehicle to Cloud

Grumpy Guppy

- Production Ready Audio Solution
- Introduce Application Lifecycle Model
 - Management of applications as resources are depleted.
 - Standard methods for launch and kill of AGL apps
 - Foreground and background app notifications
 - Event notifications to apps to manage system states
 - Plan to migrate Window Manager and Home Screen to Application Lifecycle Model in HH.

EXPERT GROUP UPDATE

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

App Framework and Security EG

- *Application lifecycle (install, run, remove, applications)*
- *SDK and application developer experience both in security and APIs*
- *Security framework, policies, and strategy for the distribution*
- *Network and vehicle firewalls in conjunction with the Connectivity EG*
- *Software Update and secure update*
- Diagnostic log and trace
- Secure boot

App Framework Accomplishments

- AGL App Framework Available
- AGL Reference Apps available for both Qt5
- APIs available as App FW Service Binders
- SDK with XDS Available
 - App Templates and developer guide
 - Widget creation
 - Service Binders with developer guide

App Framework Accomplishments

- Security Blueprint Revision Published
- API V3
 - Dynamic API creation
 - Service Binder Discovery

App Framework Tasks

- Change to run as non-root/ Multi-user
- Improved debug capabilities
- Speech Enablement
- HTML5 App Management
 - XDG Launcher
 - App Updates
 - Privacy and Security
- Security workflow for Device and App developers

Connectivity EG

- *Vehicle Connectivity (CAN, MOST, LIN)*
- *Network and vehicle firewalls*
- *Bluetooth, Wifi, NFC*
- Smart Device Link (SDL)

<https://wiki.automotivelinux.org/eg-connectivity>

Connectivity Accomplishments

- Bluetooth
 - Existing binders refactored for improved stability and responsiveness
 - PBAB binder available
- Wifi binder refactored
- Telephony binder new features
- Vehicle messaging
 - Signal composer stabilization and improvements
 - API to define new virtual messages at run-time

Connectivity Task List

- Network management binding
 - Connman improvements or replacement
 - IPv4/v6 configuration
 - Network Bridging, Tethering, QOS and switching
 - User profiles to allow authorized users to configure interfacing
 - Support multiple low-level interface binding backends including Ethernet, WiFi, BT PAN, and WWAN

Connectivity Task List

- Signal composer stabilization and improvements
 - Ready to Extend beyond CAN
 - Factory programming of CAN message set based on final vehicle configuration

Connectivity Task List

- Bluetooth
 - PBAP binder and Contacts App
- Wifi binder
 - AP Mode
 - Additional Wifi hardware support
- Telephony binder
 - Extend to hardwired telephone use case
- NFC binder and NFC for user identification

CI and Automated Test EG

- *Build and smoke test of Gerrit submissions on all hardware*
- *Daily snapshot build and testing*
- *Device tests on real hardware*
- *Test environments such as JTA and Lava*
- Test suites such as LTP
- UI testing (OpenQA)

<https://wiki.automotivelinux.org/eg-ciat>

CIAT Accomplishments

- Gerrit – Jenkins – Lava workflow improvements
- Web interface for test results
- “Lab in a Box” portable test environment
- Lab in a Box and test case creation training
- New reference boards added to Lava and Jenkins
- CI system builds and checks for optional features when testing patches

CIAT Task List

- Lab in a box
 - Board management
 - Board on developer's desk
- Improved web interface for test results
- Additional tests
 - Applications
 - Platform
 - BSPs
- Fuego integration
- Static code analysis tools

UI and Graphics EG

- *AGL Compositor, Layer Manager, Window Manager and GPU interface*
- *Multimedia video manager (including multi-display and display sharing) and audio manager, and media manager/player.*
- Browser Engine
- ~~Speech Recognition~~

Move to
Speech EG

<https://wiki.automotivelinux.org/eg-ui-graphics>

Graphics and UI Accomplishments

- Update to Wayland 2.0
- Refactored Home Screen including splitting out Window Manager
- XDG Launcher started
- Internode display protocol
 - Control IC display output from navi running on IVI system
 - Waltham
- Support for Chromium browser engine

Graphics and UI Accomplishments

- Improved Audio management configuration and policies
 - High Level audio API
 - AGL Advanced Audio Agent (AAAA)
 - UNICENS binder
 - HALs available for UNICENS, USB audio, Renesas and Intel on-board audio

Graphics and UI Tasks

- Investigate replacement for Qt; HTML5, GTK+, etc.
 - LG involvement
- Finish Window Manager and Homescreen work
 - Pop-up support and interactive user response
 - Focus management for out of focus apps
 - Improved secondary display support
 - Transition Animation
 - Hardware plane management
- Upstream to Wayland/Weston
- XDG protocol
- Waltham protocol for internode display

Graphics and UI Tasks

- Audio
 - Complete AGL Advanced Audio Agent (AAAA)
 - Make PulseAudio optional
 - Switch to Bluez / Alsa for Bluetooth audio
 - Speech and Text to Speech Services collaboration
 - Policy management between mic input and Media player output

Navigation EG

- Navigation API
- Location Based Services API
- Reference Navigation and POI apps
- Speech recognition integration

<https://wiki.automotivelinux.org/eg-navi>

Navigation Accomplishments

- Navigation and POI reference Apps
- GPS, Geofence binder available

Navigation Task List

- Navigation API 1.0 fully implemented
- GPS binder available
- Map creation process
- New Navi app from Comtech

Virtualization EG

- Hypervisor/ LXC
- Looking at Xen, Jailhouse, and others

<https://wiki.automotivelinux.org/eg-virt>

Virtualization Accomplishments

- Automotive Virtualization White Paper Completed
- Several CES demos ran in virtualized environments (Panasonic, Denso, EB, etc.)

Virtualization Task List

- Standard Protocol for communications between VMs
- Resource sharing (e.g. GPU) between VMs
- Extend KVM support beyond Renesas
- Additional open source hypervisors

Reference Hardware System Arch

- Create system architecture to be used across AGL profiles

Speech EG

- Members: Amazon, Nuance, VoiceBox Technologies
- Create a standardized set of speech recognition APIs that app developers can use regardless of underlying speech engine
 - Natural language or grammar tree based
 - On board or cloud based speech
- Text to Speech API
- Amazon and Nuance have open APIs that could be used as a starting point
 - Nuance started on a Speech API Binding that is being reviewed by the team

Speech EG

- Signal processing for noise reduction and echo cancellation
- Grammar development tools

System Architecture Team

- Overall System Architecture
- Yocto
- Build system and Device Profiles
- Cross EG coordination

V2C Expert Group - Objectives

- Refine V2C Use Cases
 - Telematics
 - Personalization
 - Authentication & Authorization
 - Etc.
- Define Reference Architecture
 - Identify existing, missing or reusable components
- Identify reference application(s)



THANK YOU

