



Automotive Grade Linux System Architecture Team Meeting

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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

Vision for 2018

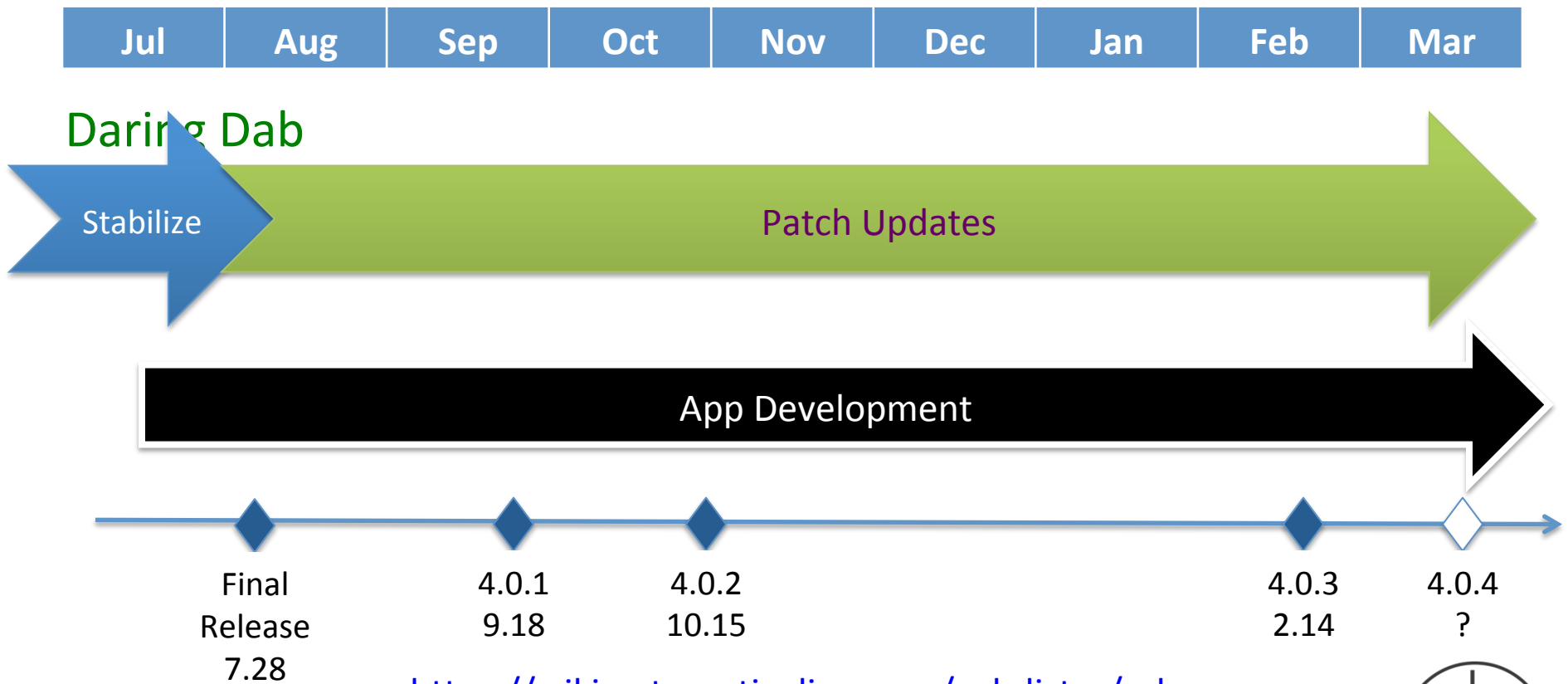
- Major Content Providers Develop AGL Apps
- Support for Developers to Port Legacy Apps to AGL
- Releases: Funky Flounder July 2018 and Grumpy Guppy January 2019
- AGL App Framework Evolution
 - User Management
 - Power Management
 - Memory and CPU management
- Sustainable Audio Solution
- Video Player 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
- Portable AGL Test Rig - “Lab in a Box”

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](#)
- Early Sep? – 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

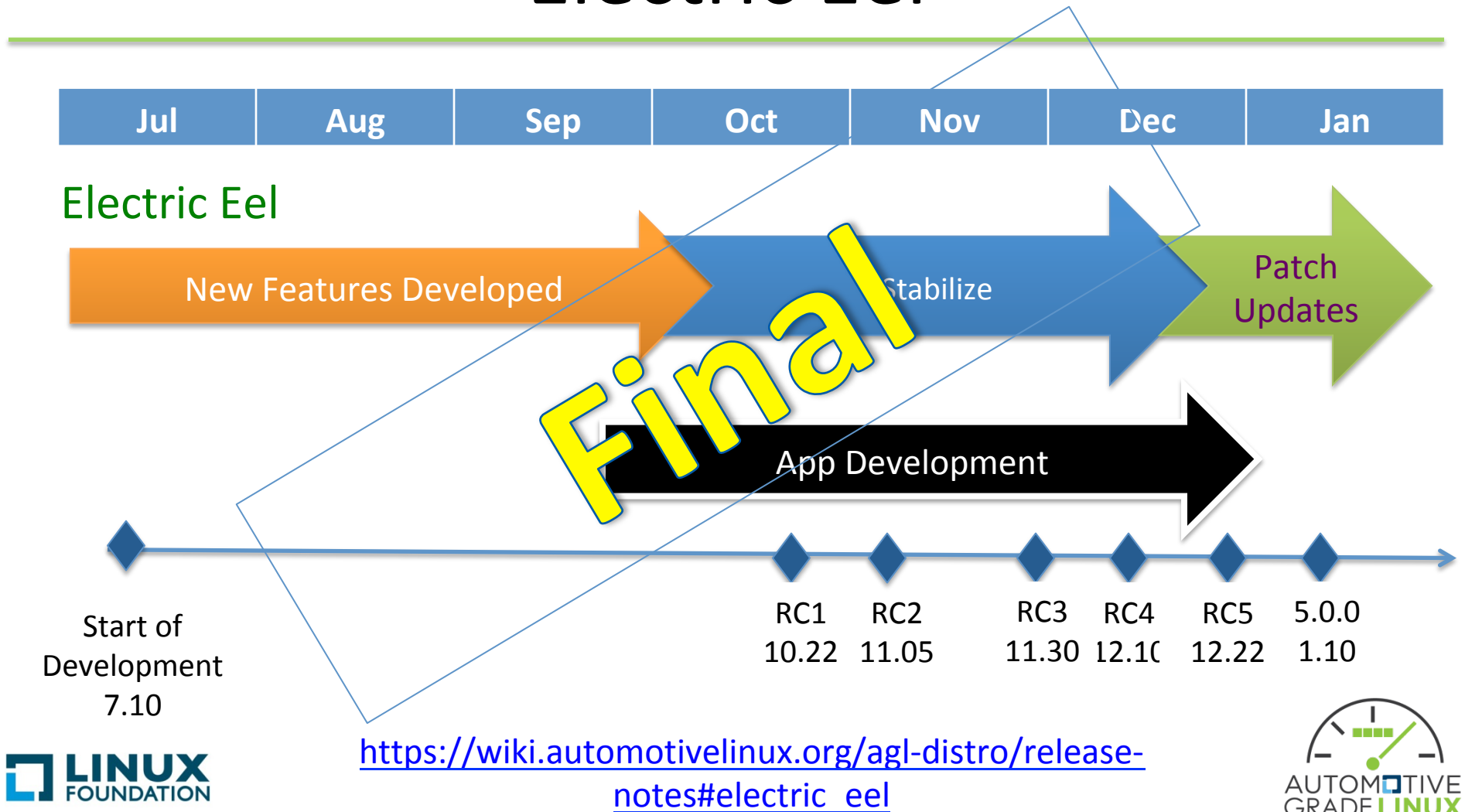
Electric Eel

- 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

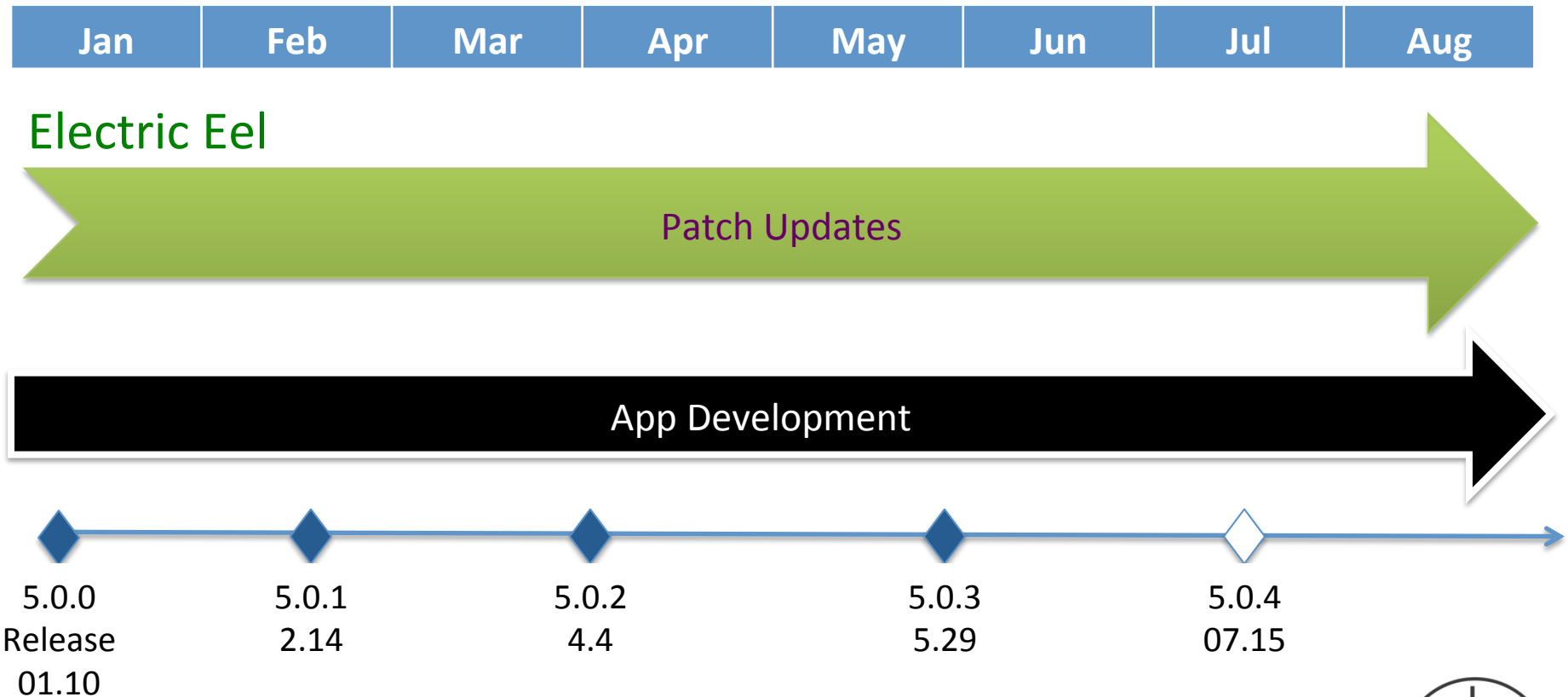
Electric Eel

- 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

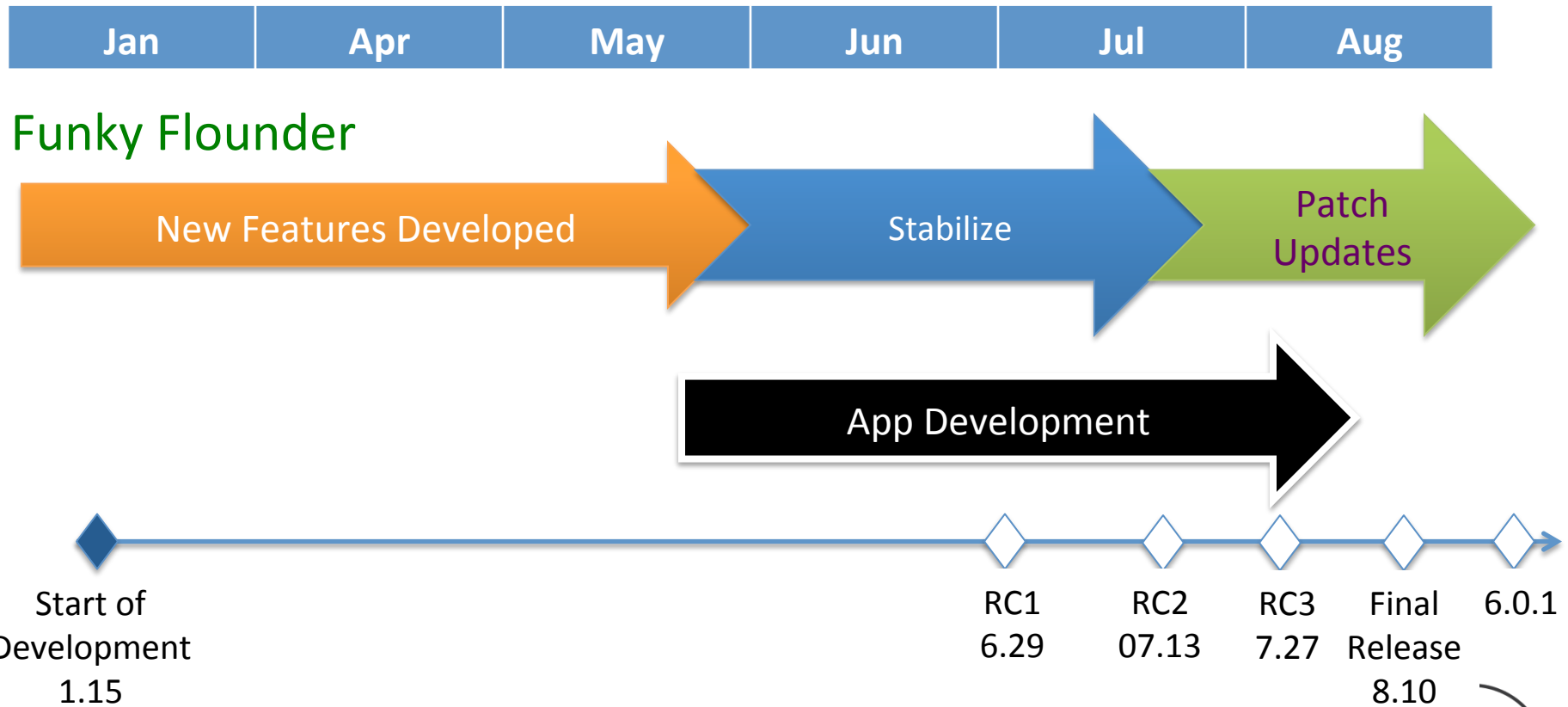


https://wiki.automotivelinux.org/agl-distro/release-notes#electric_eel



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

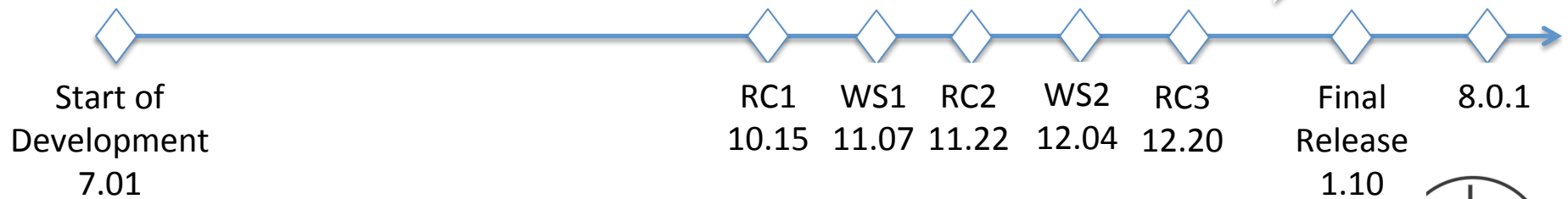
- Continuous Integration and Test
 - Generic binder and application unit testing
 - Four binders made available
 - Code Coverage of test procedure

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)
- No Meetings since February AMM



THANK YOU

