webOS:
The Long Journey to webOS Open Source Edition
AGENDA

- webOS: History and Evolution
- Overview of webOS Open Source Edition (OSE)
- webOS OSE: Architecture
- webOS OSE: Roadmap
- webOS OSE: Contribution
- Introduction to Enact (Web App Framework)
webOS : History and Evolution

Joseph Park
Encounter
Why web based Platform

Upcoming web era...

Mobile Internet
2Mbps in ’02
25Gbps in ’18

Embedded Chipset
Performance ↑
Price ↓

HTML5 Standard

... 2018
Why web based Platform

Best solution to deliver contents

- TV is a device to show contents delivered from outside
- The contents used to be linear video, but are becoming complicated

Best solution to satisfy all stakeholders

- Many manufacturers, and service providers
- Web is based on open standards
- OTT services on the web
webOS TV in CES 2014

“For LG, this isn't just another smart TV platform, but a rebirth for the company, not unlike WebOS itself.”
Jared Newman. TIME

“It's the best smart TV UI we've ever used.”
Michael Gorman, Engadget

“I can say without question that it's the best smart TV interface I've ever seen. It was actually smart!”
Brent Rose, Gizmodo
webOS based products
webOS Open

- To build up ecosystem in the emerging areas
- To leverage external capabilities to enrich webOS
- webOS is now a mature, stable and ready to move beyond TV
webOS Next

Robot  Auto  Home
Come change the world together!
Overview of webOS Open Source Edition (OSE)

Lokesh Kumar Goel
webOS OSE: why open source

Overview

- Feature-rich Roadmap
- 100M+ devices
- 500+ engineers
- Compatible with Industry Standards
- White Label OS
- Scalable Architecture
- Linux-based embedded platform
- Build strong developer community
- Extend Portfolio through Partnerships
- Extend technology capabilities
- Motivate internal developers
- Sustainable OS
webOS OSE: Where & How?

webOS Open Source Edition (OSE)

- Powerful and Easy-to-use Open Software Platform
- Highly Optimized Open Source Web App Framework
- Open Platform for All Industries and Participants


webOS OSE: Where & How?

- webOS Open Source Edition (OSE) is now available at http://webosose.org

- Source code from https://github.com/webosose
webOS Open Source Edition
Architecture

Lokesh Kumar Goel
webOS OSE Components: Layered View

Architecture

Core Applications
- System UI
  - Home Launcher
  - Notification
- System
  - Settings
  - Browser
- CP apps
  - YouTube

Application Framework
- SDK
  - CI
- Web
  - Enact

Managers & Services
- App
  - SAM
  - WAM
  - Activity mgr
- Display
  - LSM
- Media
  - UMS
  - Avrcdp
  - DirectMedia
- iTBN
  - Imemanager
  - Lockscreen
  - Fontconfig
- Diagnostics
  - Crash
  - Rbid
- Setting
  - Settings service
  - config
- JS Service
  - nodejs-module
  - mojoservice
  - launcher

Boot
- Inscription
- App Update
  - Appinstall2
  - Download mgr
- Connectivity
  - Networkmgr
- Notification
  - Notification mgr
- Time
  - Sysertime
- Event
  - Event mgr
- Development
  - Devmode

Base Components
- Bas
  - L5 2
- Display
  - Qt
  - QPA
  - Qt Wayland
- Media
  - audiold
  - PulseAudio
- iTBN
  - lib
  - buffer
  - Mailbox
  - Loki
  - Automata
  - Font
- Diagnostics
  - Pmlog
  - Pretrace
- Connectivity
  - Comman
  - WiFi
  - Wired
- JS Service
  - Node.js

Boot
- Boot
  - System

Web Engine
- Chromium

Performance
- Filecache

Base Libs
- OE lib

HAL
- nyx

DB
- DB8

Configuration

BSP
- Event
  -Framebuffer
- Display
  - Wayland
  - mgl
  - Mesa
  - KMS/DRM
  - OpenGL ES
- Media
  - OMX II
  -alsa
- Device
  - USB
- Connectivity
  - 1DBG
  - wpa_supplicant
- General
  - hrt

Kernel
webOS OSE Components: Dynamic View

Architecture

- **webOS OSE Components**
  - **Dynamic View**
  - **Luna Bus**
    - **Product Specific Services**
    - **QML Apps**
    - **Other Native Apps**
  - **webOS Web Runtime**
    - **Web Apps**
      - **Enact Framework**
      - **Web App Manager**
    - **Luna Surface Manager**
      - **Node.js Service Framework**
      - **Memory Manager**
      - **Media (A/V) Manager**
      - **System App Manager**
      - **Diagnostic Services**
      - **Update Manager**
      - **Other Services**
      - **Qt/QtWayland**
      - **DRM/KMS**
webOS Open Source Edition
Roadmap

Lokesh Kumar Goel
webOS OSE Roadmap

For items marked with * and features on the long-term plan (**), we are in the process of selecting an additional reference board. The rest of the features are to be supported on Raspberry Pi 3 Model B.

Note: All details in this roadmap are subject to change.
Introduction to Enact (Web App Framework)

Lokesh Kumar Goel
Introduction

Why do you need a framework?

• Consistent look, feel and behavior across apps
• Consistently high performance across apps
• Ability to make improvements across apps, quickly and efficiently
• Avoidance of duplicated effort across app teams
• Consistency of architecture, practices and style across app teams
  • Increased ability to share code between apps
  • Reduced fragmentation
Enact Components

Common User Interface Components

Enact Core

Theme

App

Theme

App

Theme

@enact/moonstone
@enact/zircon

@enact/ui

@enact/core
@enact/spotlight
@enact/i18n
@enact/webos

A11Y
I18N
Focus Management
Multi-Resolution Support
Componentization
Rendering
Enact Features

Enact provides…

- Composable widget set
- Command-line tool
- Theming and skinning support
- Internationalization & Localization
- Accessibility
- Layout
- Support modules
- Linting and testing architecture
- Documentation and samples
- Optimized scrolling and virtual list support
- V8 snapshot support

Source code on GitHub: [https://github.com/enactjs](https://github.com/enactjs) (Apache License)
Without Enact
Developing with Enact

> npm install -g @enact/cli

> enact create myApp

> cd myApp

> npm run serve
Theming and Skinning
webOS Open Source Edition
Community Reach-out
webOS OSE and other OSS Projects

- Automotive Grade Linux
- AUTOSAR
- RDK (Reference Design Kit)
- Linaro
- ROS
- RISC-V
webOS Open Source Edition
Automotive Grade Linux (AGL)

Steve Lemke
What is AGL?

An open software platform for automotive

- 127 member companies: OEMs, Tier Ones and other suppliers
- Initially addressing Infotainment, but aims to address all auto software

The de facto standard for the industry

- Goals: Code first; reduce fragmentation
- Foster an ecosystem and decrease time to market
- Drive rapid innovation
What can LG and webOS OSE do for AGL?

LG SVL has been working with AGL for over a year

- Used for internal research and prototyping at Silicon Valley Lab
- Created multi-screen demo with 3D driving simulator: IVI, Cluster, RSE
- Best demo at AGL Member Showcase in Vegas at CES 2018
- Google “LG AGL CES”: https://youtu.be/W36EA0SVEaQ

Leveraging LG webOS expertise in UI/UX

- Over a decade of experience building webOS
- Fully customizable User Experience
- WAM: First class native experience for Web Apps
- Bringing the heart of webOS to AGL, and much more...
webOS at AGL Member Showcase at CES 2018

AGL + webOS OSE
# webOS OSE Components on AGL

**AGL + webOS OSE**

## Core Applications
- System UI: Home Launcher, Notification
- System: Settings, Browser
- CP apps: YouTube

## Application Framework
- SDK
- Web Enact

## Managers & Services
- **App**
  - SAML
  - WAM
  - Activity mgr
- **Display**
  - LSM
- **Media**
  - UMS
  - Awaitguard, DirectMedia
- **i18n**
  - Imemanager, Locals
  - Fontconfig
- **Diagnostics**
  - Crash, Radix
- **Setting**
  - Settings service, config
- **JS Service**
  - nodejs-module, mojoservice, launcher

## Boot
- Introspect

## App Update
- Approach2, Download mgr

## Connectivity
- Network mgr

## Notification
- Notification mgr

## Time
- SysTime

## Event
- Event mgr

## Development
- Devmode

## Base Components
- Bas LS2
- Display: Qt, QPA, Qt Weylend
- Media: audiolib, PulseAudio
- i18n: libu, libm, Libxml, Libxslt, Automata
- Font
- Diagnostics: Pmlog, Pretrace
- Connectivity: Conman, WiFi, Wired
- JS Service: Node.js

## Boot
- Boot: systemd
- Web Engine: Chromium
- Performance: Filecache
- Base Libs: OE lib, lib
- HAL
- DB: DBB, Configurator

## BSP
- Event: Fddev
- Display: evl
- Wayland egl
- Mesa, KMS/DRM
- OpenGL ES
- Media: OMX lib
- Device: USB
- Connectivity: 10GBIF, wpa_supplicant
- General: i55-lib

## Kernel
webOS OSE WebApp Runtime on AGL

- webOS Web App Runtime and Chromium
  - Developed POC of WAM on AGL (abstracted from OSE)
  - Presented at Automotive Linux Summit 2018
  - webOS WAM called “best solution for [web apps] on automotive”
webOS Open Source Edition
ROS2 on webOS OSE

Steve Lemke
What is ROS and ROS2?

**ROS: Flexible framework for writing robot software**
- Collection of tools, libraries, and conventions
- Distributed framework of processes (nodes)
- Enables a wide variety of robotic platforms

**ROS2: Next generation ROS platform**
- New use cases: new APIs and a new architecture
- New technologies: DDS, Zeroconf, Websockets, and more
- New project: avoids making intrusive changes to ROS1
Integrating webOS OSE and ROS2

ROS2 + webOS OSE

webOS Web Runtime

System Library

Linux Kernel
Demo of webOS OSE + ROS2

- ROS2 on webOS:
  Web-app enabled robots

https://youtu.be/lCGa7LkDNp0
webOS OSE and other OSS Projects
ABOUT webOS

QUESTIONS

? ?

? ANSWERS