webOS:
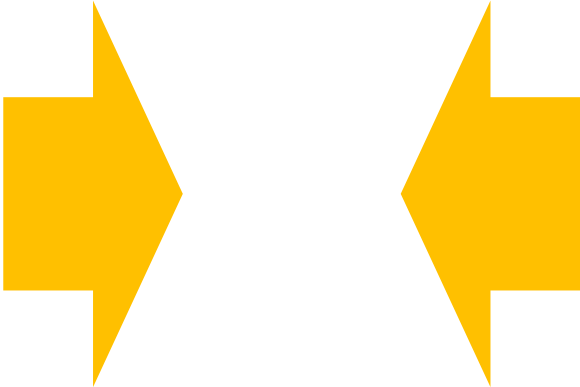# The Long Journey to webOS Open Source Edition

AGENDA

webOS
Open Source Edition

webOS : History and Evolution

Joseph Park

Encounter

Why web based Platform

Upcoming web era...

Mobile Internet	Embedded Chipset	HTML5 Standard
2Mbps in '02	Performance ↑	
25Gbps in '18	Price ↓	

Mobile Internet

2Mbps in '02

25Gbps in '18

Embedded Chipset

Performance ↑

Price ↓

3GHz

⋮

1MHz

... 2018
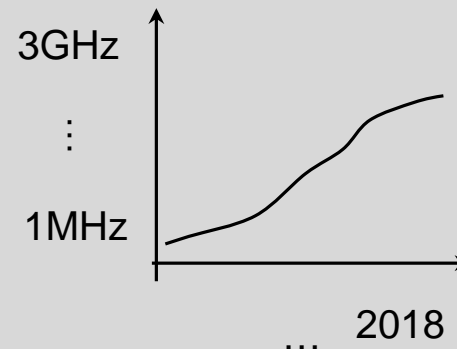
HTML5 Standard

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

`15.2

`14.6

`14.2

webOS Open

2014

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2018

- 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!
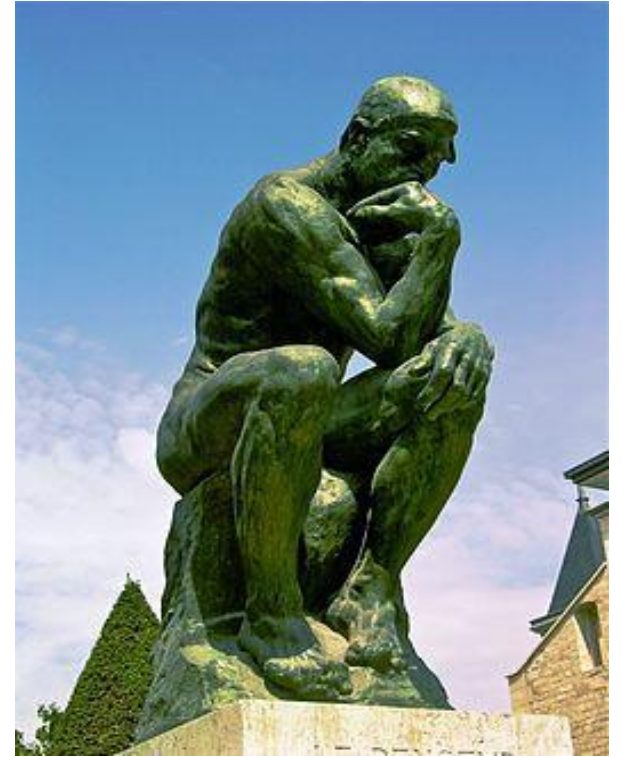
webOS OSE: why open source

Compatible with Industry Standards

Feature-rich Roadmap

100M+ devices

Mature Platform

webOS OSE

500+ engineers

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

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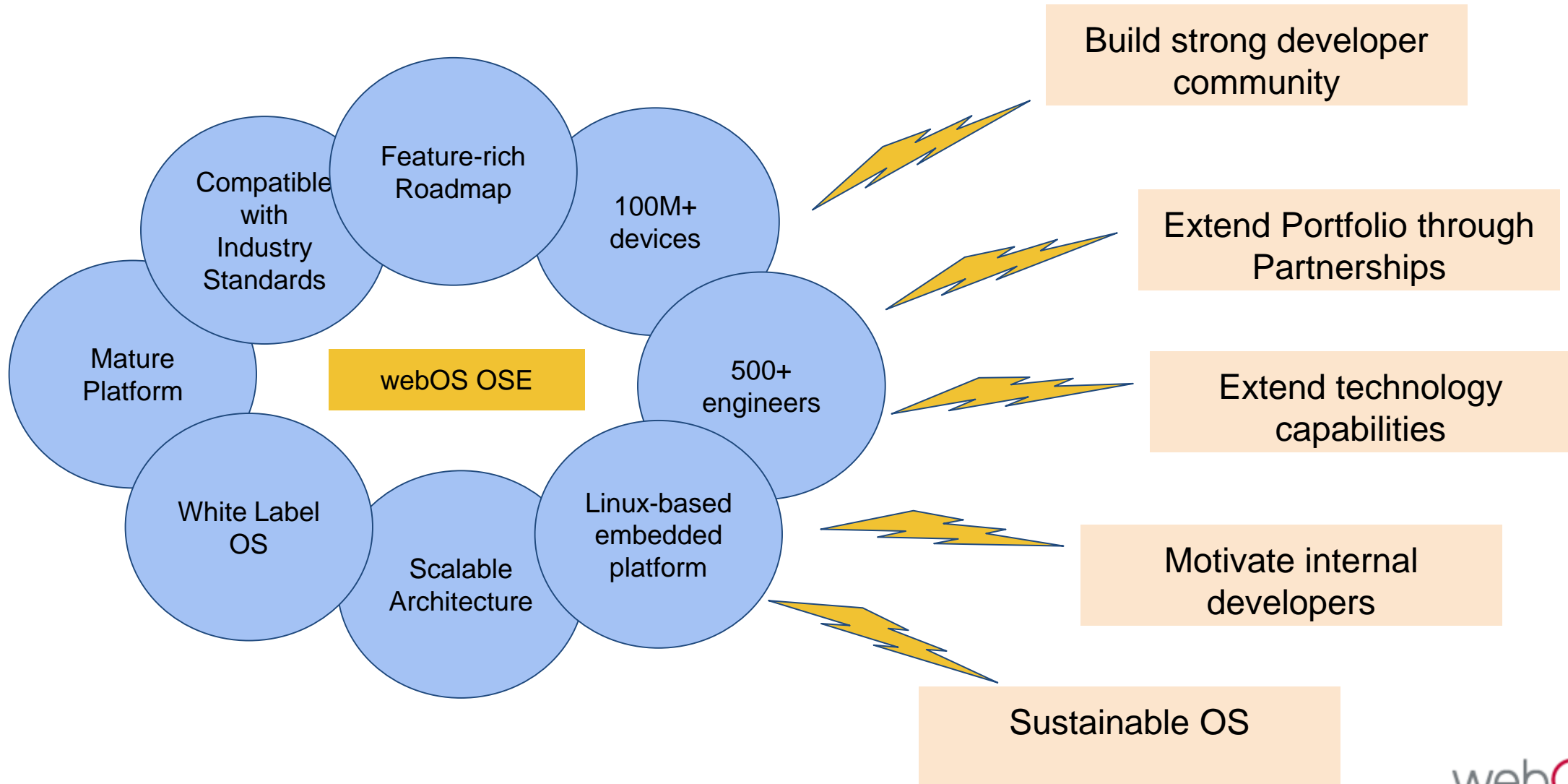
webOS OSE: Where & How?

🐧 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

http://enactjs.com/

Roadmap: http://webosose.org/discover/webos-ose-roadmap/
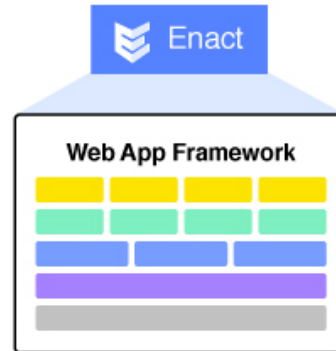
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webOS OSE: Where & How?

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

- **Source code from
  https://github.com/webosose**

webOS OSE Components: Layered View

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

Application Framework	**SDK** Cli	**Web** Enact					

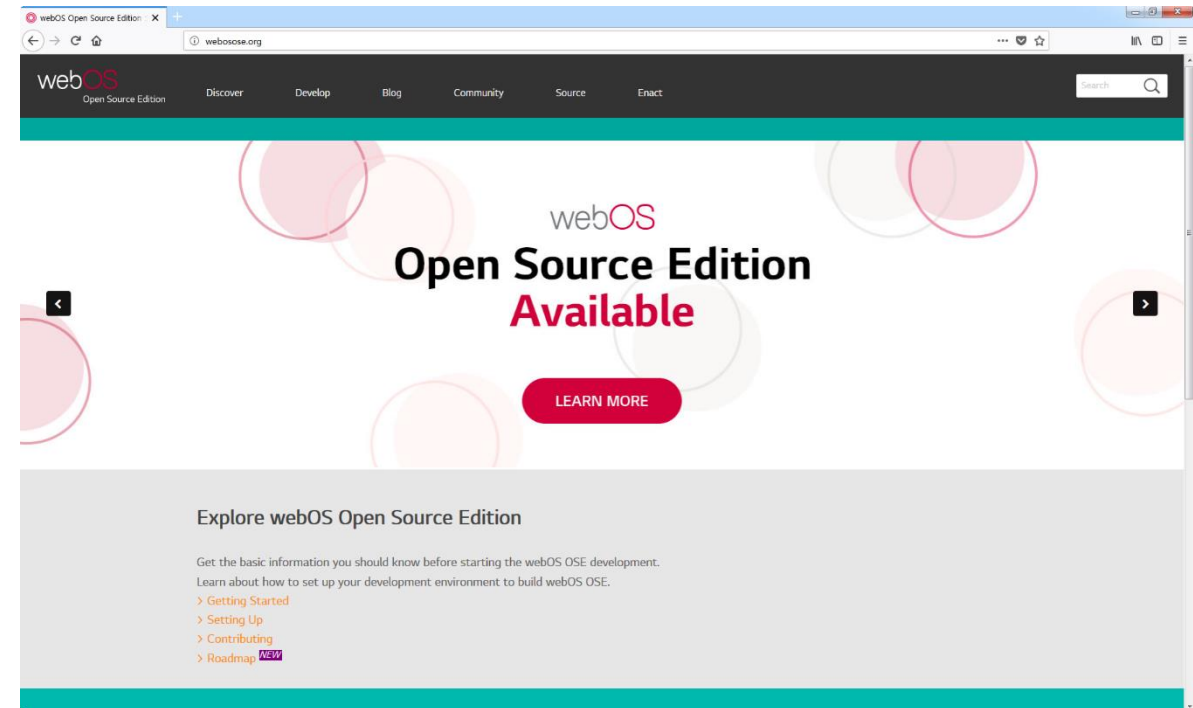| Managers & Services	**App** SAM WAM Activity mgr	**Display** LSM	**Media** uMS Avoutputd DirectMedia	**i18n** Imemanager Locdata Fontconfig	**Diagnostics** Crashd Rdxd	**Setting** Settings service configd	**JS Service** nodejs-module mojoservicelauncher
	Boot Initscripts	**App Update** Appinstalld2 Download mgr	**Connectivity** Network mgr	**Notification** Notification mgr	**Time** Sysservice	**Event** Event mgr	**Development** Devmode

Base Components	**Bus** LS2	**Display** Qt QPA Qt Wayland	**Media** audiod PulseAudio	**i18n** Ilib Icu Maliit Loctool Automata Font	**Diagnostics** Pmlog Pmtrace	**Connectivity** Connnam WiFi Wired	**JS Service** Node.js
	Boot Bootd Systemd	**Web Engine** Chromium	**Performance** Filecache	**Base Libs** OE libs	**HAL** nyx	**DB** DB8 Configurator	

BSP	**Event** Evdev	**Display** egl Wayland egl Mesa KMS/DRM OpenGL ES	**Media** OMX IL alsa	**Device** USB	**Connectivity** 100BT wpa-supplicant	**General** hal-libs	

Kernel							

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webOS OSE Components: Dynamic View

webOS OSE architecture diagram showing: Product Specific Services, QML Apps, Other Native Apps, and Web Apps connected via Luna Bus. Node.js Service Framework, Memory Manager, Media (A/V) Manager, System App Manager connect to Luna Bus. Other Services, Update Manager, Diagnostic Services below. Luna Surface Manager, Qt/QtWayland, DRM/KMS at bottom. Web Apps, Enact Framework, Web App Manager grouped as webOS Web Runtime.
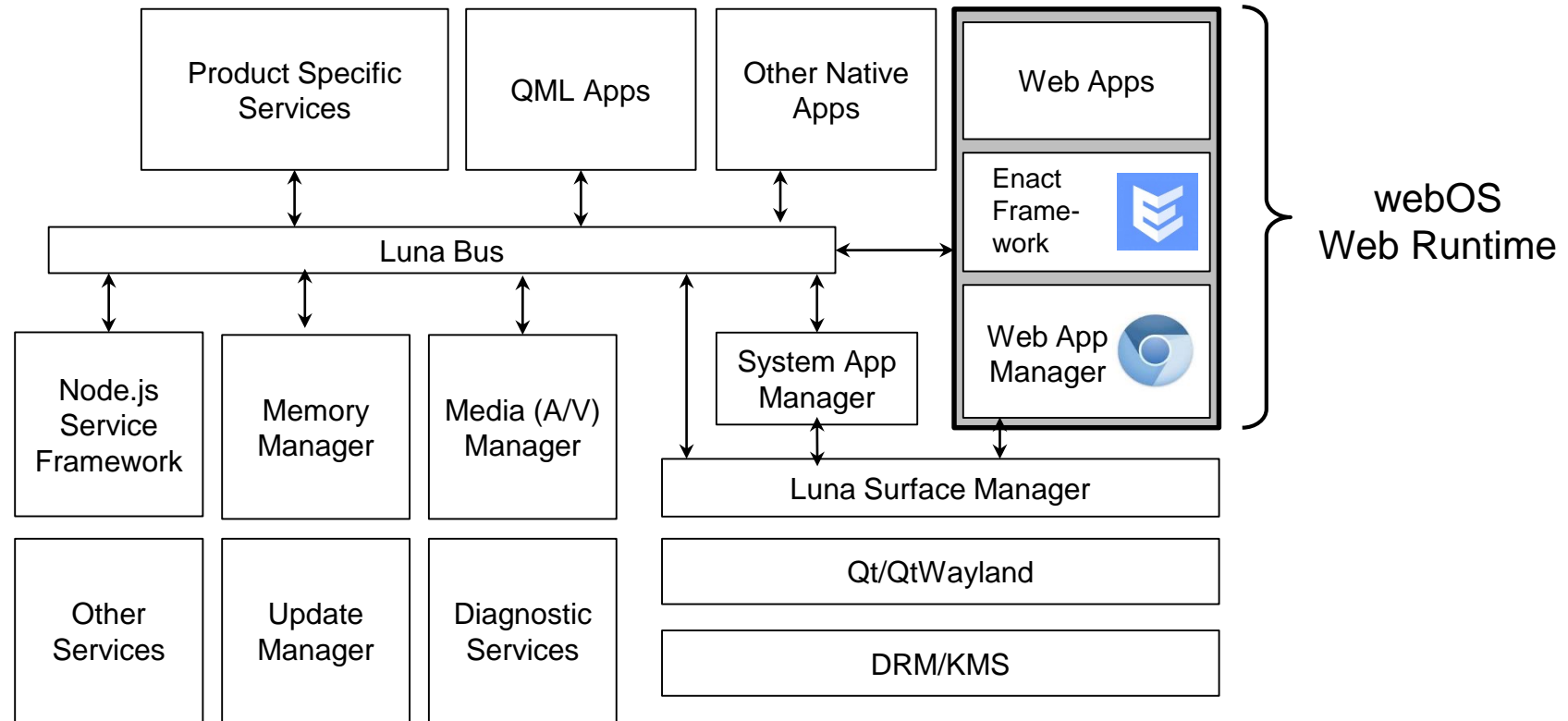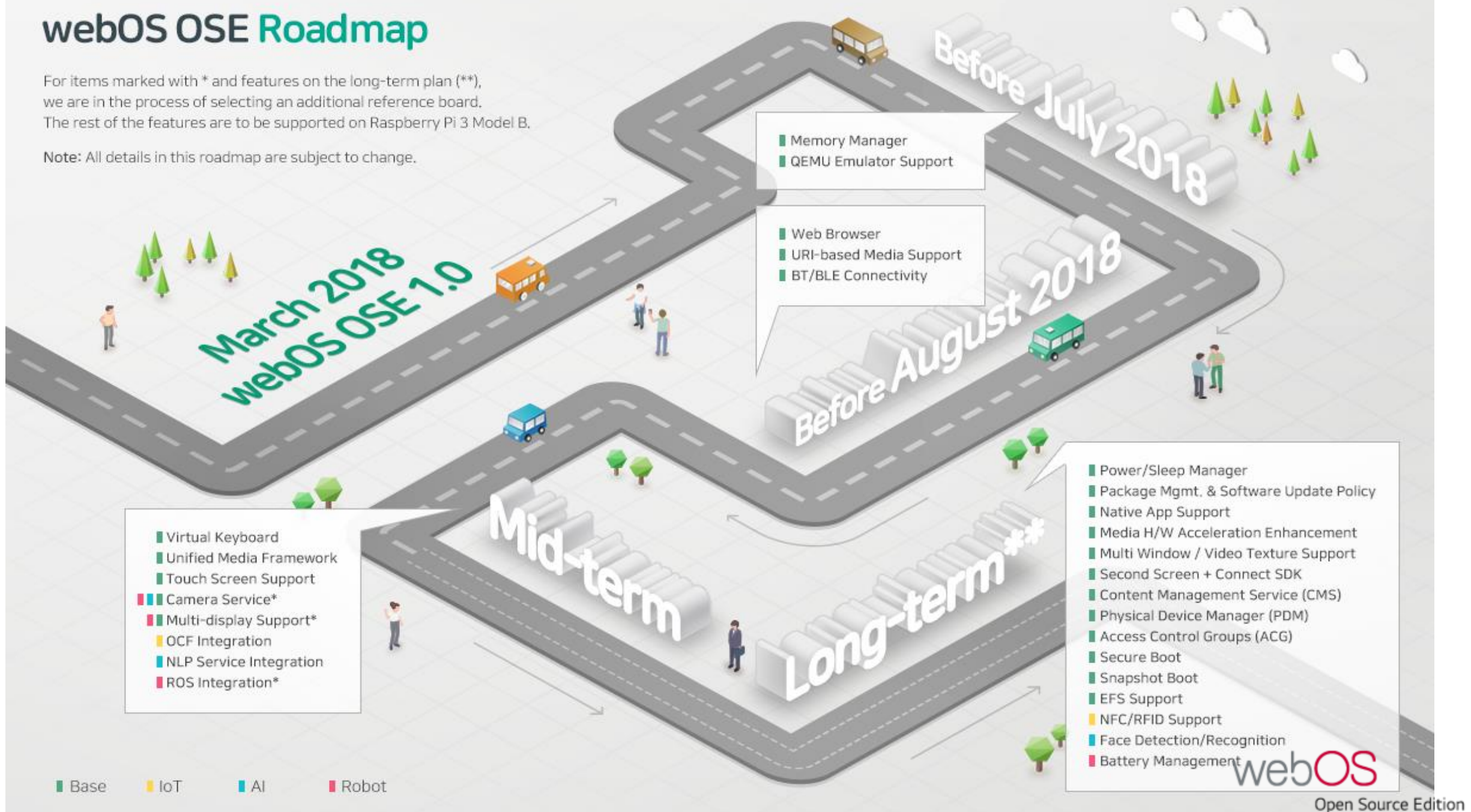
webOS OSE Roadmap

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.

March 2018 webOS OSE 1.0

Before July 2018
- Memory Manager
- QEMU Emulator Support

Before August 2018
- Web Browser
- URI-based Media Support
- BT/BLE Connectivity

Mid-term
- Virtual Keyboard
- Unified Media Framework
- Touch Screen Support
- Camera Service*
- Multi-display Support*
- OCF Integration
- NLP Service Integration
- ROS Integration*

Long-term**
- Power/Sleep Manager
- Package Mgmt. & Software Update Policy
- Native App Support
- Media H/W Acceleration Enhancement
- Multi Window / Video Texture Support
- Second Screen + Connect SDK
- Content Management Service (CMS)
- Physical Device Manager (PDM)
- Access Control Groups (ACG)
- Secure Boot
- Snapshot Boot
- EFS Support
- NFC/RFID Support
- Face Detection/Recognition
- Battery Management

Base   IoT   AI   Robot

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Introduction
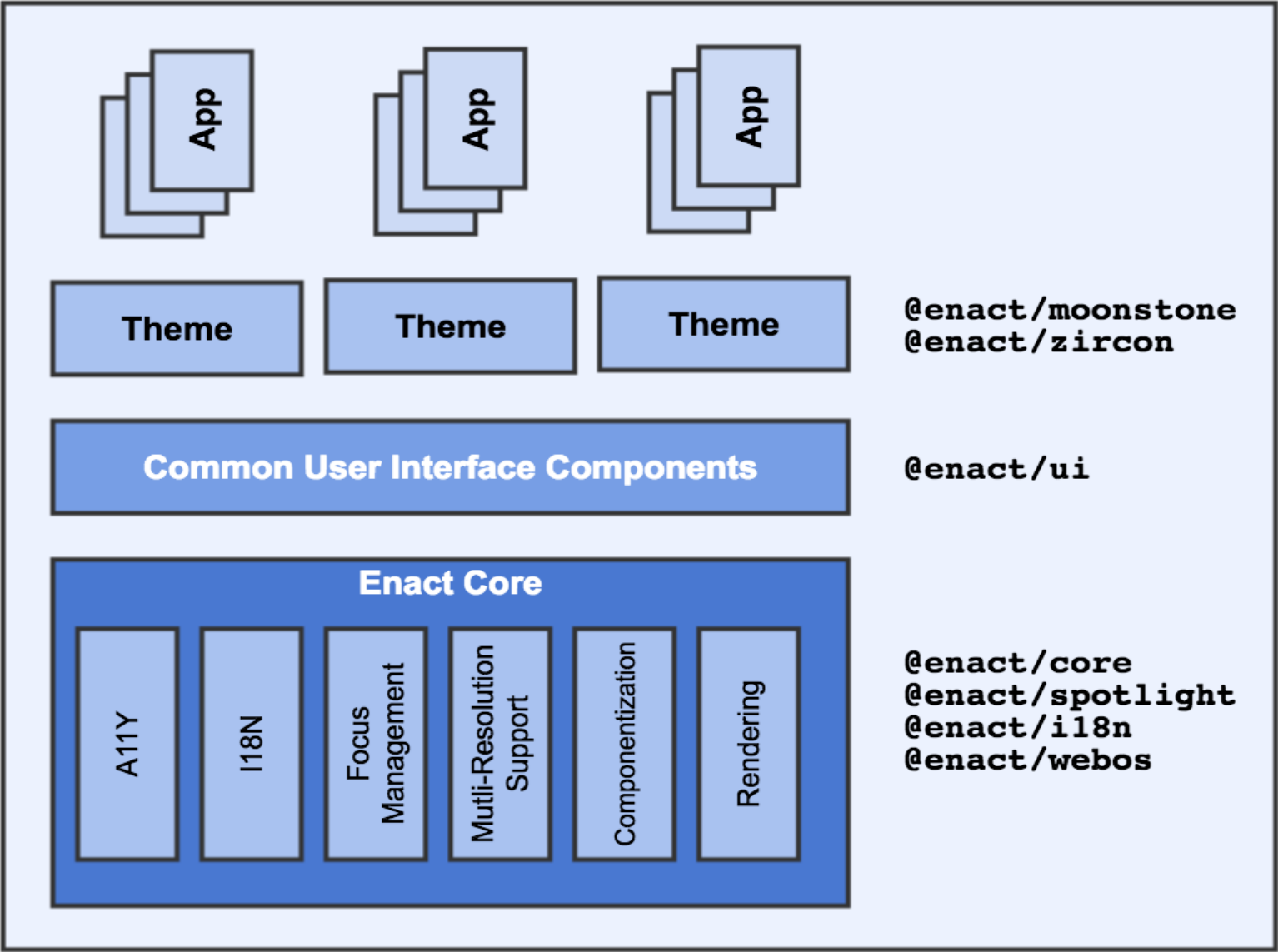
Why do you need a framework?

- 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

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Enact Components

App
App
App

| Theme | Theme | Theme | `@enact/moonstone`
`@enact/zircon` |

Common User Interface Components — `@enact/ui`

Enact Core

A11Y | I18N | Focus Management | Mutli-Resolution Support | Componentization | Rendering

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

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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
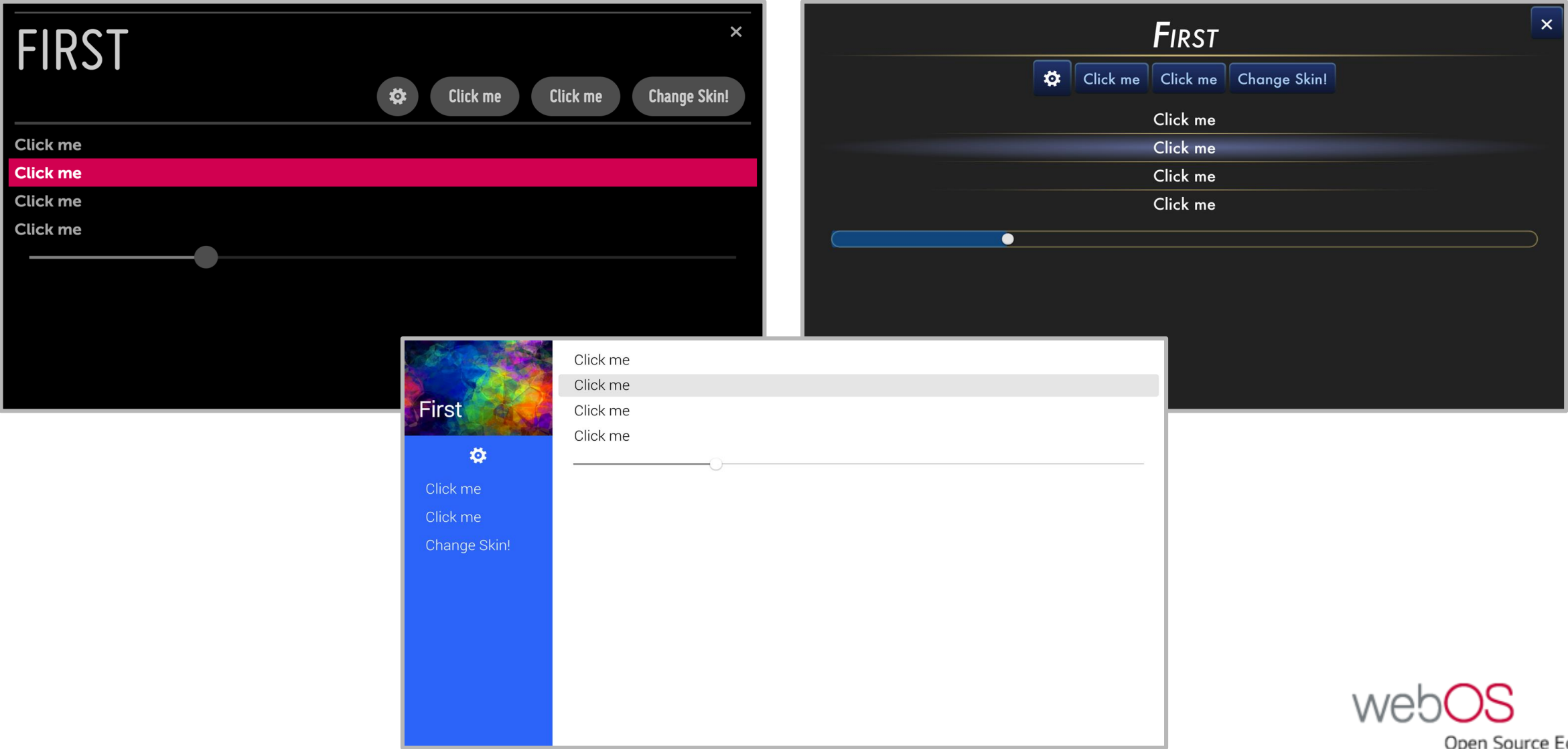
- V8 snapshot support

Source code on GitHub: https://github.com/enactjs (Apache License)

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Without Enact

Developing with Enact

```
> npm install -g @enact/cli

> enact create myApp

> cd myApp

> npm run serve
```

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Theming and Skinning

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webOS Open Source Edition Community Reach-out

Steve Lemke

webOS OSE and other OSS Projects

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

AUTOMOTIVE GRADE LINUX

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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

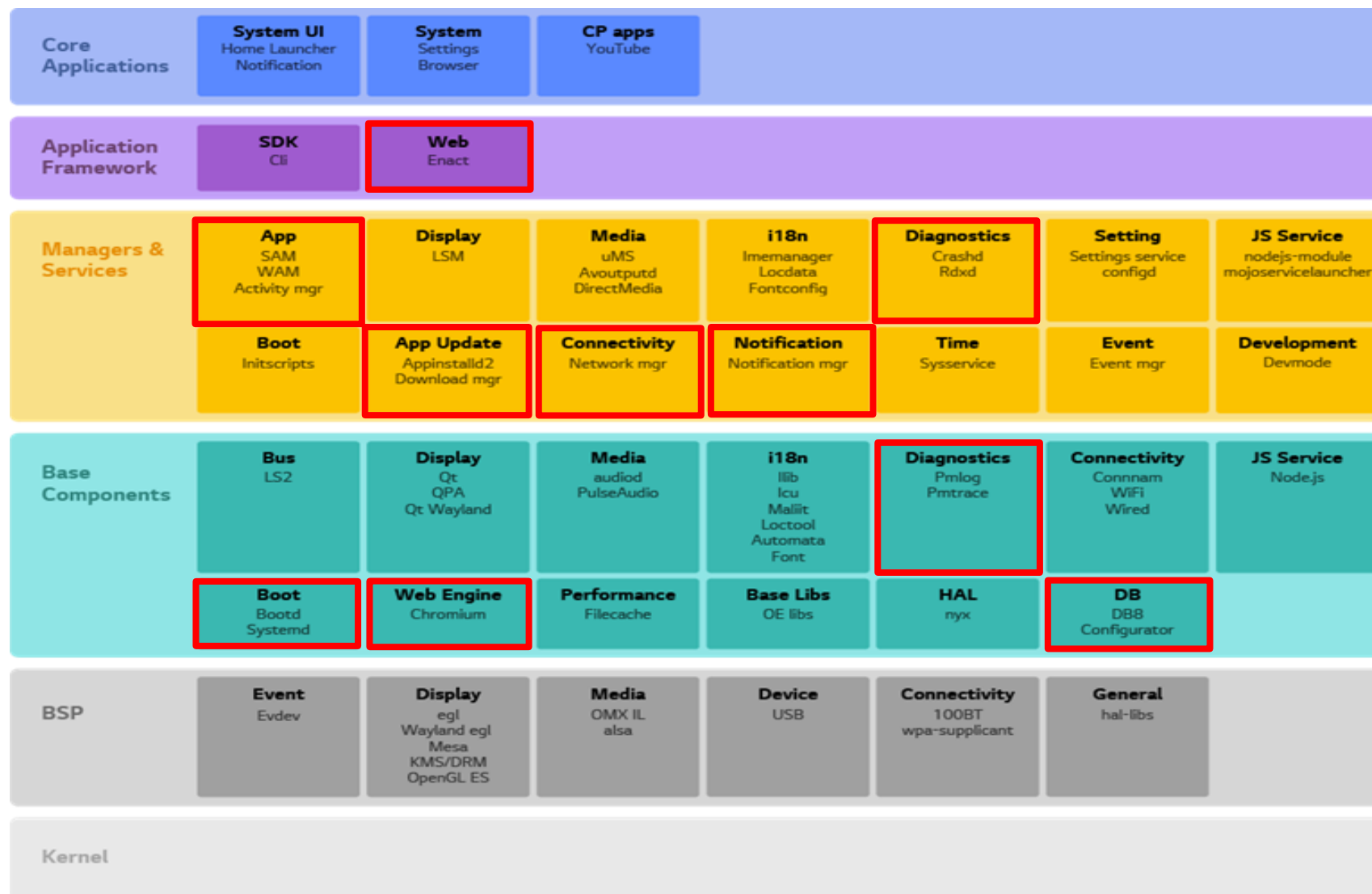- Bringing the heart of webOS to AGL, and much more...

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webOS at AGL Member Showcase at CES 2018 AGL + webOS OSE

webOS OSE Components on AGL

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

Application Framework	SDK Cli	Web Enact					

Managers & Services

App SAM WAM Activity mgr	Display LSM	Media uMS Avoutputd DirectMedia	i18n Imemanager Locdata Fontconfig	Diagnostics Crashd Rdxd	Setting Settings service configd	JS Service nodejs-module mojoservicelauncher
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BSP

Event Evdev	Display egl Wayland egl Mesa KMS/DRM OpenGL ES	Media OMX IL alsa	Device USB	Connectivity 100BT wpa-supplicant	General hal-libs	

Kernel

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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"

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**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

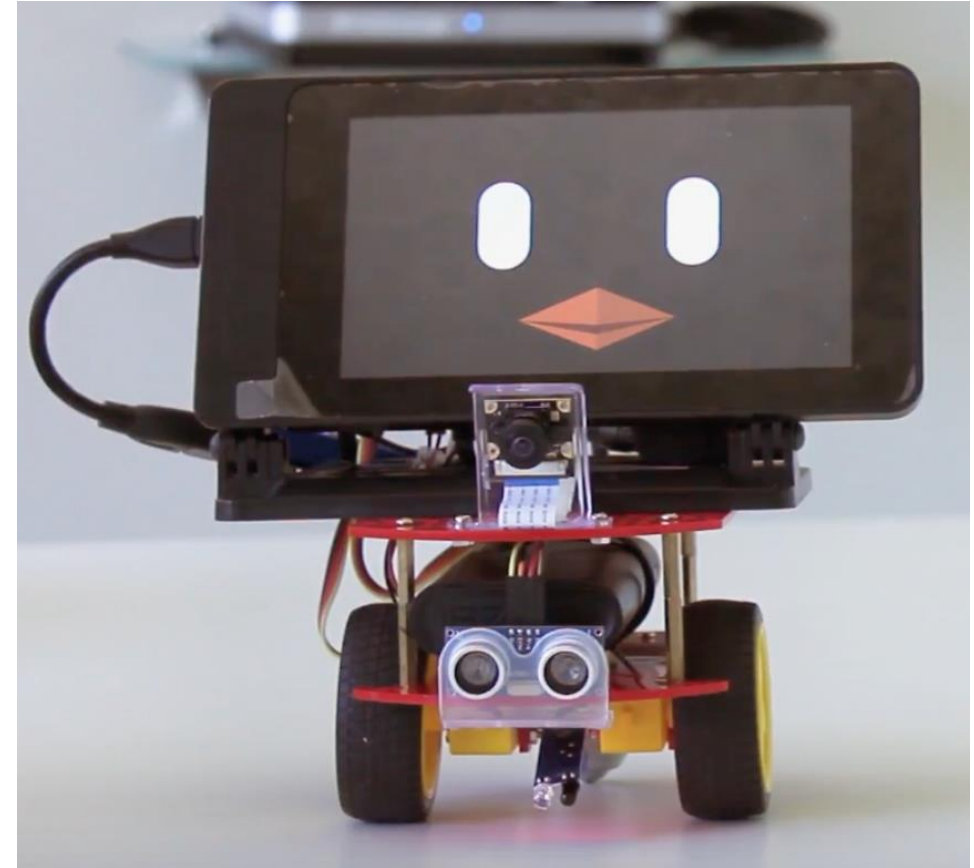- New project: avoids making intrusive changes to ROS1

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Integrating webOS OSE and ROS2

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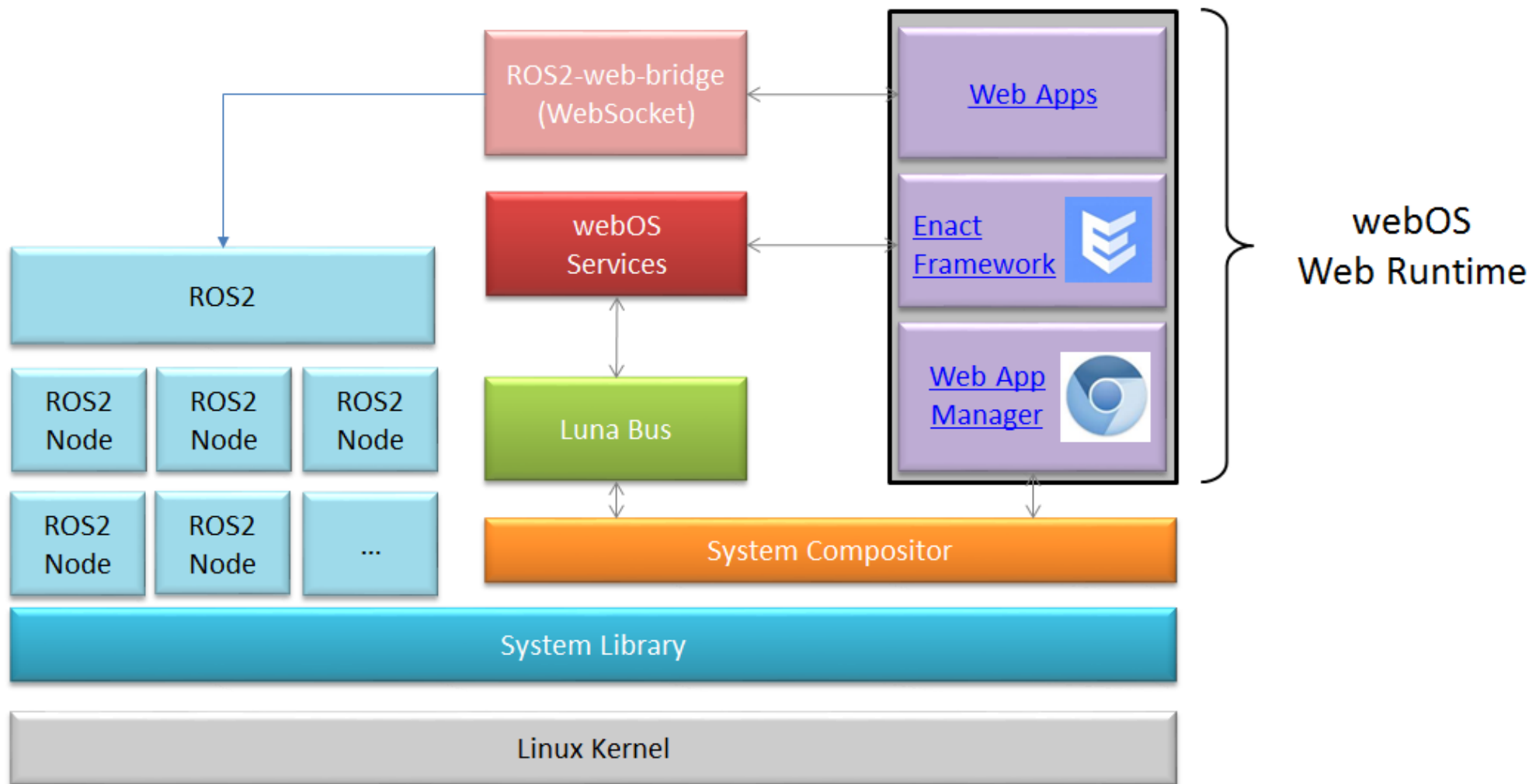
Demo of webOS OSE + ROS2

- **ROS2 on webOS:
  Web-app enabled robots**

  https://youtu.be/lCGa7LkDNp0

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webOS OSE and other OSS Projects