



Introduction to Tizen Mobile & Wearable Profile

Taesoo Jun, Ph.D.
@Software Center
Samsung Electronics

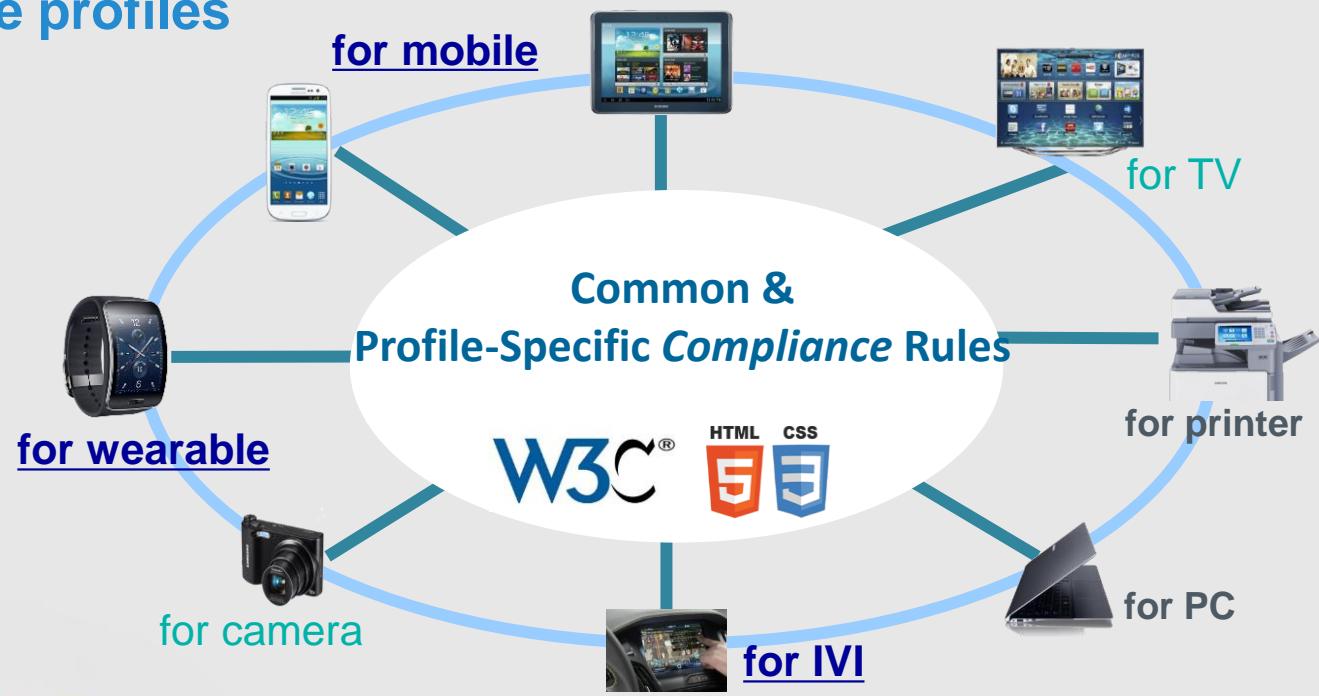


Tizen Overview



Tizen...

- Is **W3C** standard-based
- Has strong industry support
- Is **open source** project
- Covers **multiple profiles**



- Releasing Profiles
- Preparing Profiles
- Potential Profiles

Release History

Apr. '12

1.0

**Web-centric
Platform**

- Highest HTML5
- Tizen Device Web API
- Web UI framework

Linux kernel

2.6.36

Feb. '13

2.0

**Web/Native
Framework**

- Native API
- Unified SDK for Web & native
- WebKit2

May '13

2.1

**Hybrid
Web/Native,
Enhanced
Security and
Performance
Optimization**

- Hybrid Web/Native app.
- Systemd

July '13

2.2

**Commercial
Ready w/
Enhanced UX**

- H/W Menu & Back key
- UI Customizer

Nov. '13

2.2.1

Minor Update

- App. installation in SD card

Add-on SDK

- OpenCL & WebCL
- In app purchase

Oct. '14

2.3

**Multi-profile,
New Native
Framework**

- Mobile/ Wearable profile
- New native subsystem

Linux kernel

3.4

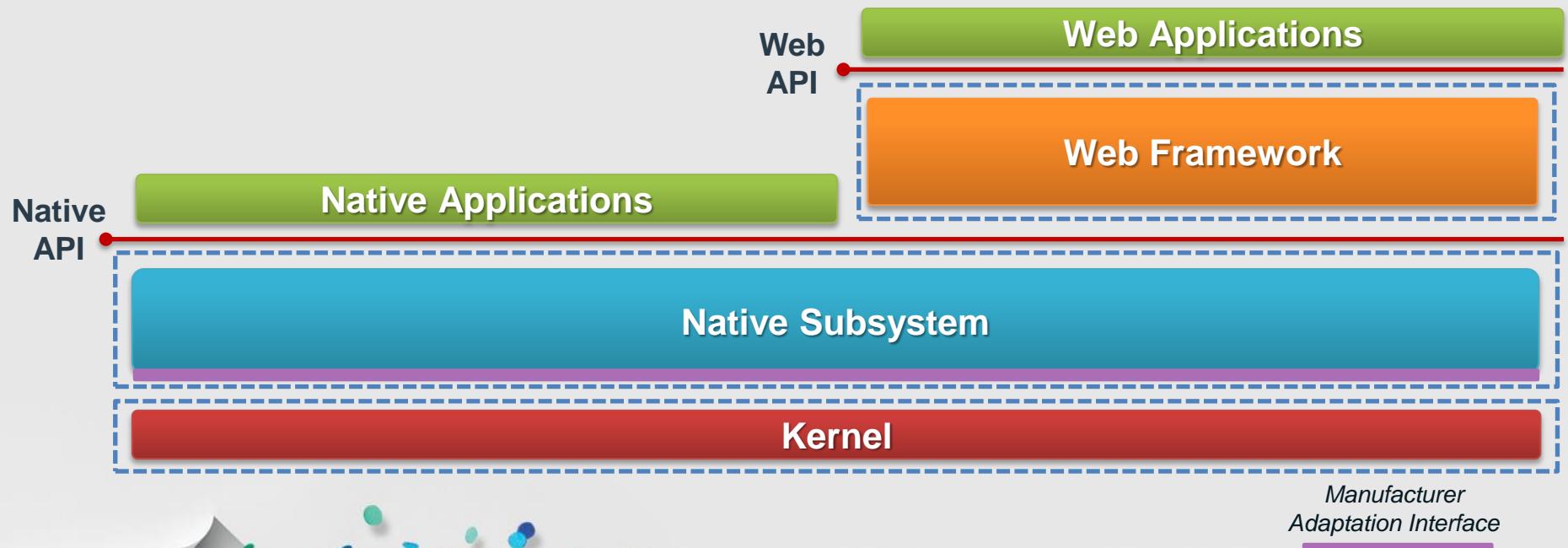
3.0 w/ 3.4 features (e.g., CMA/IOMMU, eMMC 4.5, V4L2)

Tizen Mobile Profile



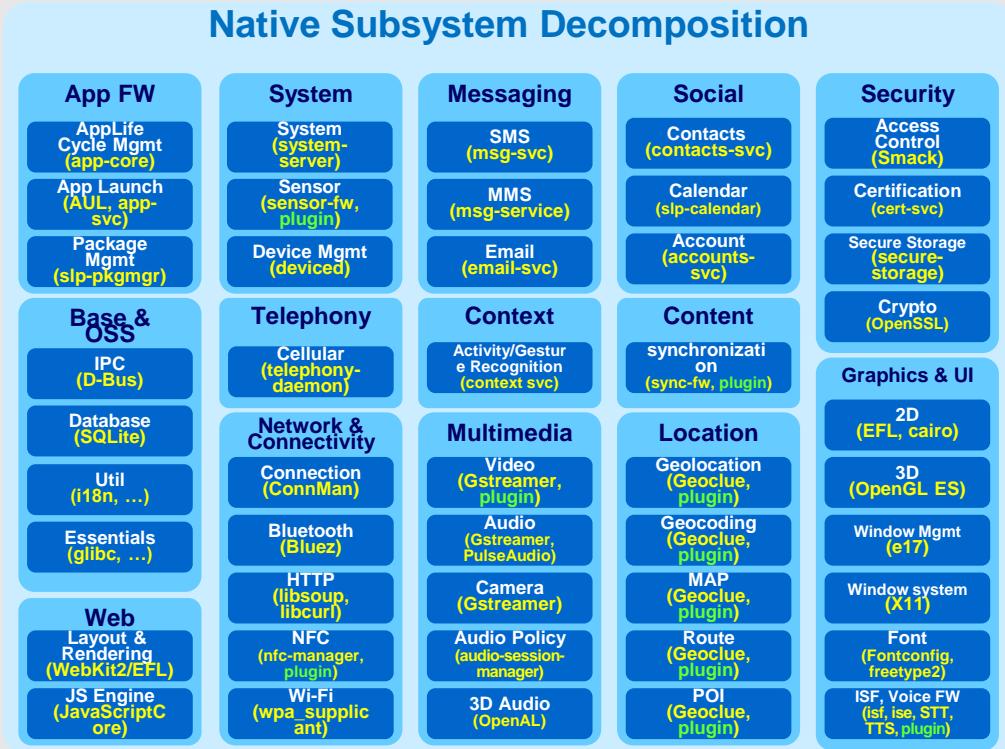
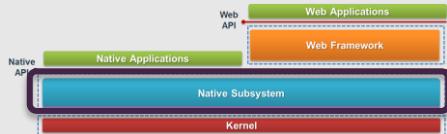
Architecture Overview

- Kernel: Linux kernel + device drivers
- Native Subsystem: **core** functionalities for Tizen platform
- Web Framework: **web** environment above Native subsystem
- API
 - Native API: **direct access** to core functions in mobile profile
 - Web API: **web-style**(i.e., JS, markup) **access** to W3C standard and device functions



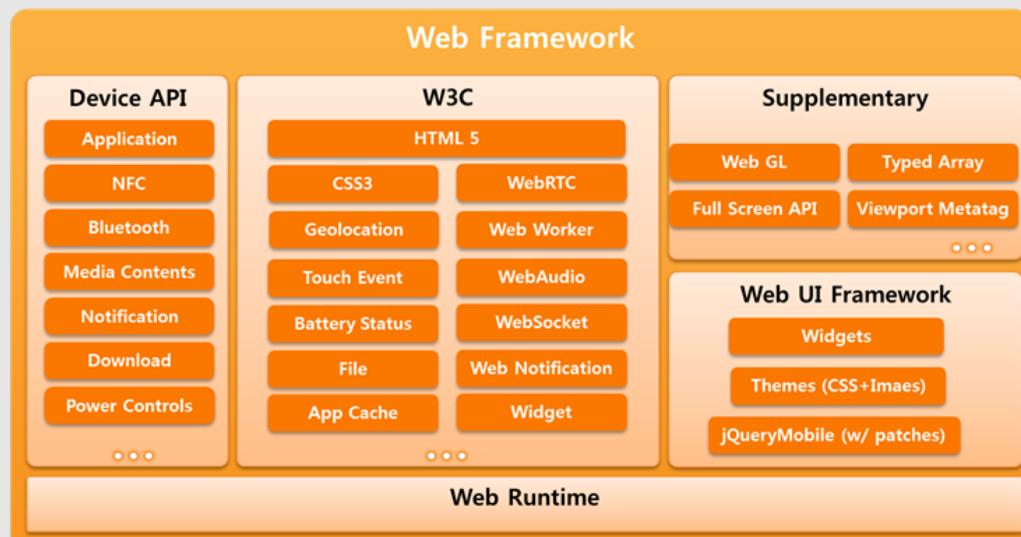
Native Subsystems

- **Providing platform functions**
 - Expose **Native API**
 - Implement **core** functionalities
 - Support Web functionalities
- **Unified management for**
 - Communication
 - Sensor value retrieval
 - Launching applications
 - Window for apps with E17
 - Power consumption control
 - Security enforcement with SMACK
 - Package un/installation and upgrade
 - And more...
- **Flexible architecture with plugins**
 - Service extension
 - Hardware abstraction



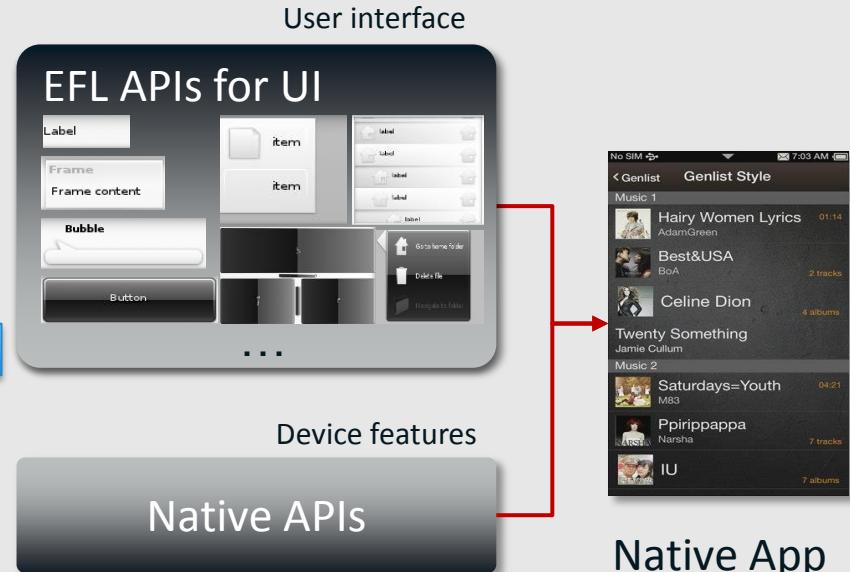
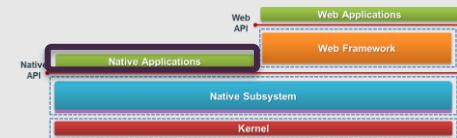
Web Framework

- **W3C standard Web APIs**
 - W3C/HTML5 markup, CSS and JavaScript APIs
 - Supplementary APIs
 - De-facto APIs (e.g., Khronos and Mozilla)
 - Tizen device APIs
 - Advanced access to the device's platform capabilities
- **UI framework**
 - jQueryMobile-based
 - Tools support (e.g., widgets, events, effects, animation)



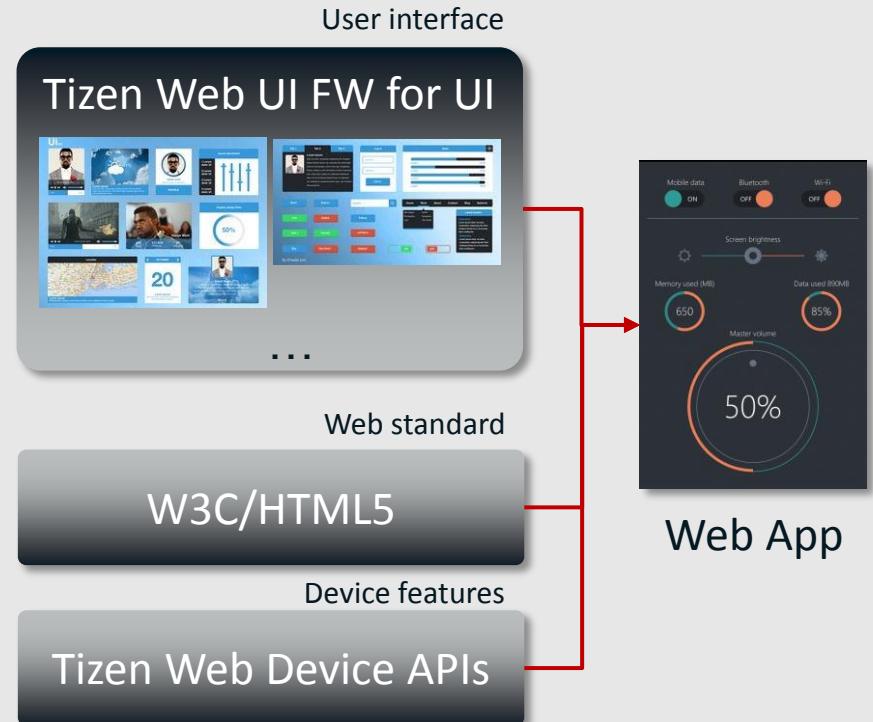
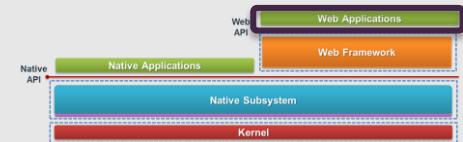
Native Applications

- Application written in Native API for Tizen (C language)
- Packaged into .tpk with privileges and features
- Full access to device features
- User interface:
 - Enlightenment Foundation Libraries (EFL) 
- Device features (Tizen defined + OSS)
 - App framework: application, package, etc.
 - Social: contacts, calendar, etc.
 - Multimedia: image, video, audio, etc.
 - Other device-related features



Web Applications

- Application written in Web API for Tizen
- Packaged in W3C widget with configuration 
- Limited access to device features via Tizen Web Device API
- User interface:
 - W3C/HTML5, CSS3
 - Tizen Web UI FW
- Device features (Tizen defined + W3C)
 - W3C/HTML5 and de-facto Supplementary APIs
 - Tizen Web Device APIs

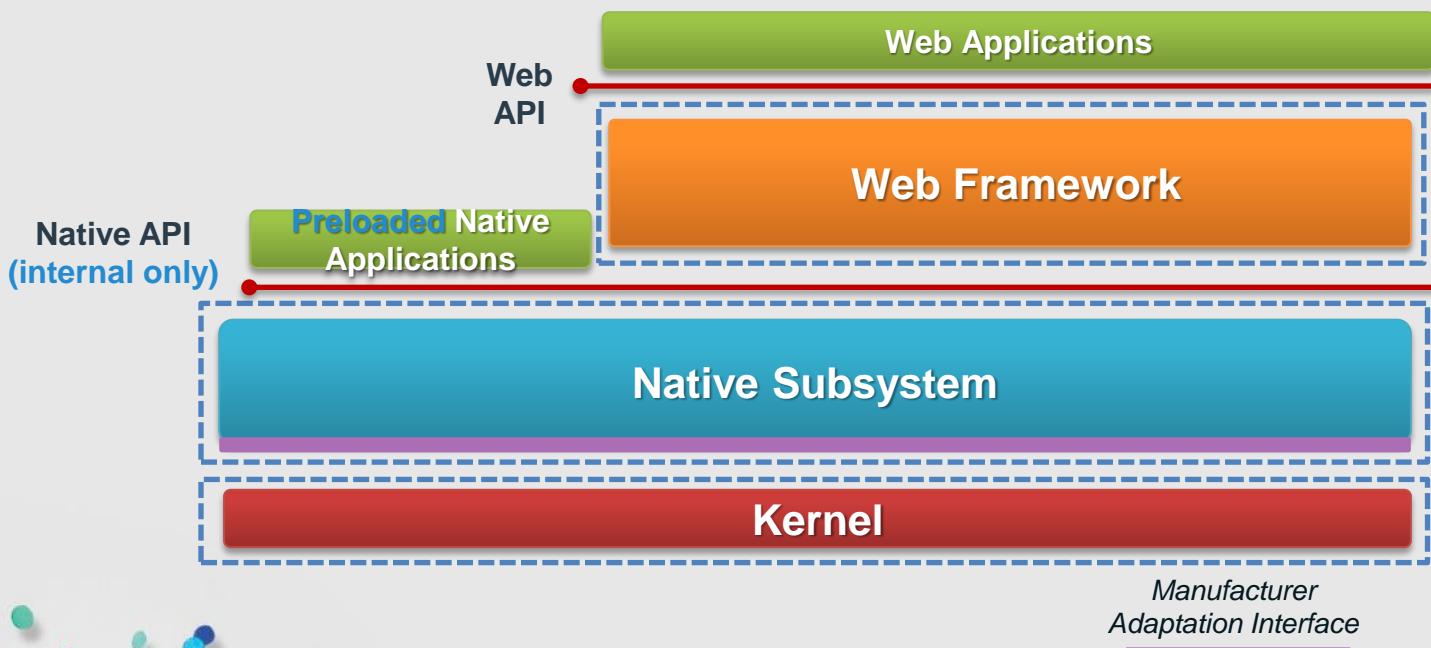


Tizen Wearable Profile



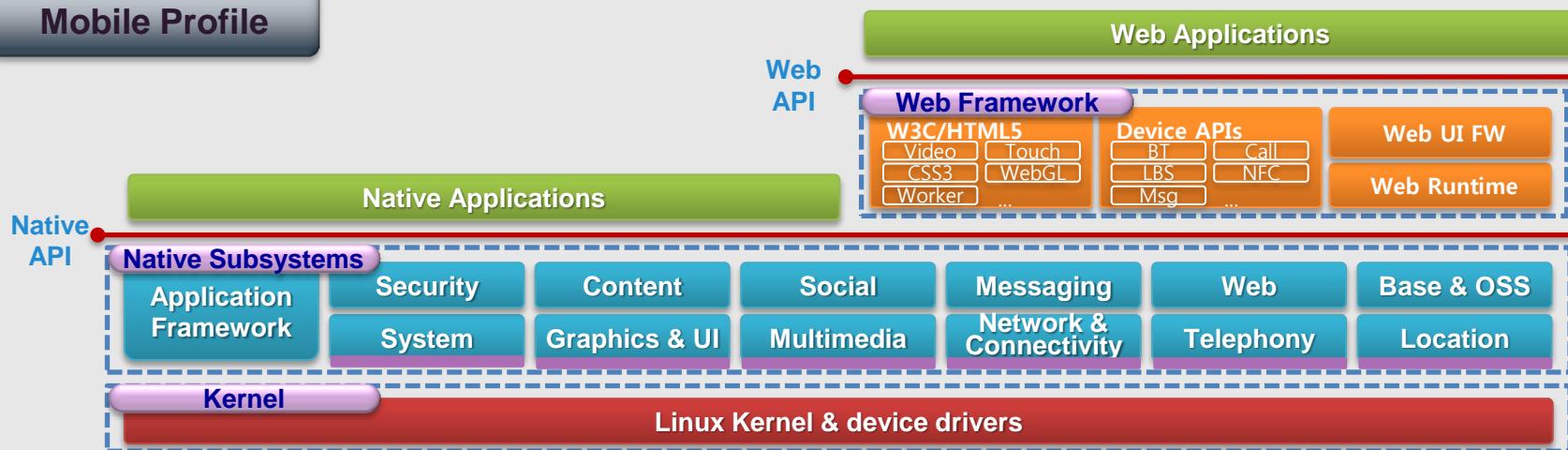
Architecture Overview

- Kernel: Linux kernel + device drivers
- Native Subsystem: **core** functionalities for Tizen platform
- Web Framework: **web** environment above Native subsystem
- API
 - Native API: **direct access** to core functions by restricted developers
 - Web API: **web-style**(i.e., JS, markup) **access** to W3C standard and device functions

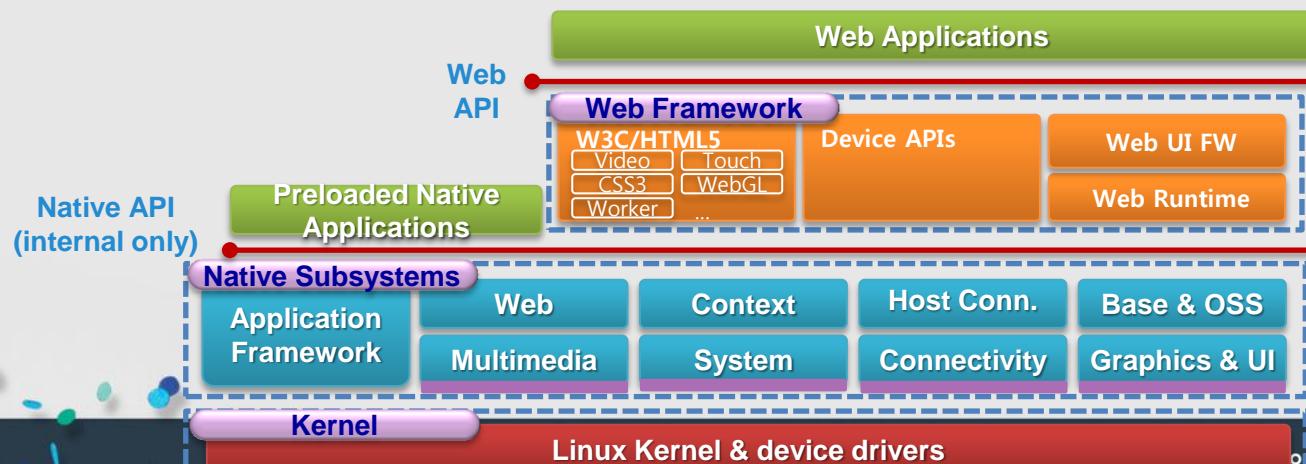


Architecture Comparison

Mobile Profile



Wearable Profile



Wearable Profile Features | Lightweight Components

- **Fit for wearable device**
 - **Webkit engine**: W3C APIs(scalable vector graphics, WebSQL, web message, drag&drop, session history etc.) and Device APIs (account, archive, bookmark, calendar, call, contact, push message, secure element etc.)
 - **EFL**: emotion, clipboard, copy & paste, optimized theme for wearable UX, unused elementary resources
 - **X server & Window manager**: simplified window policy for wearable UX
 - **Bluetooth**: GATT client, user-space HID

Native Subsystems

Mobile Profile

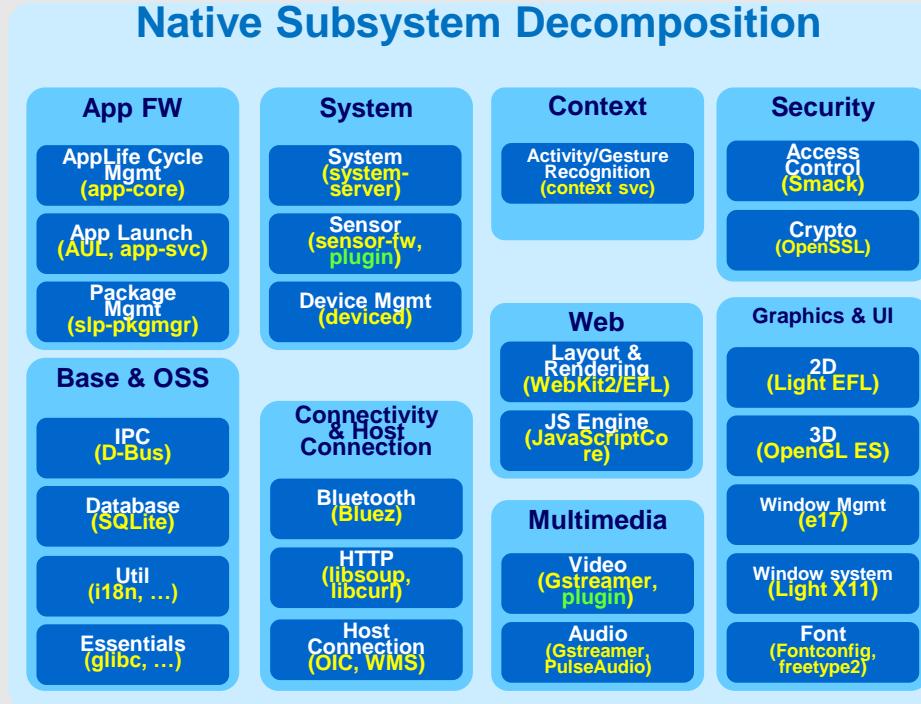
Native Subsystem Decomposition



Native Subsystems

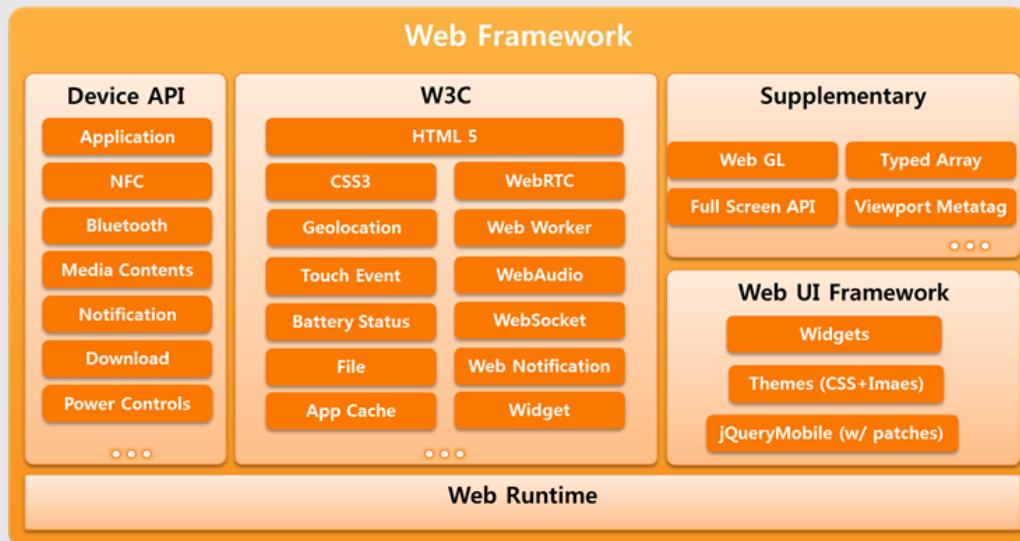
Wearable Profile

Native Subsystem Decomposition



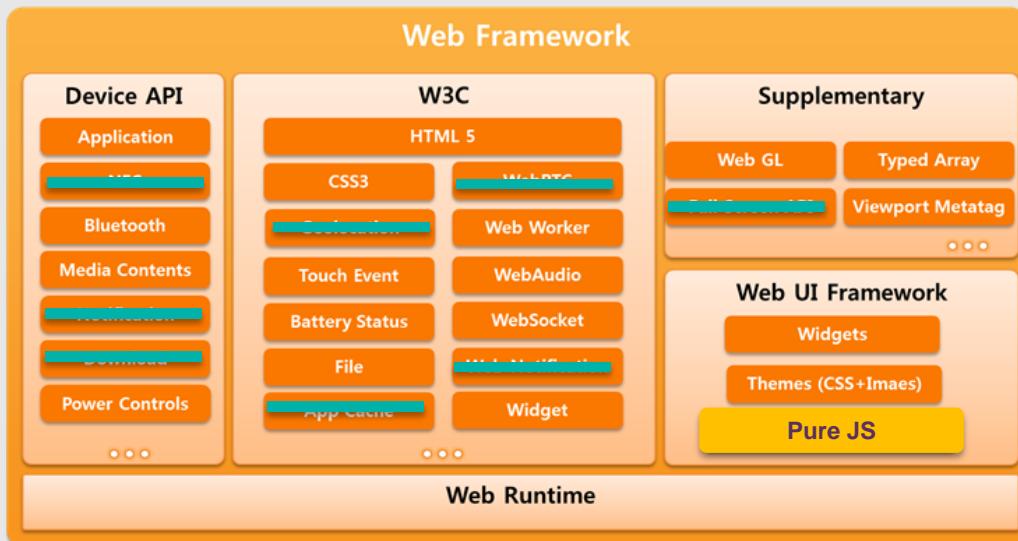
Web Framework

Mobile Profile



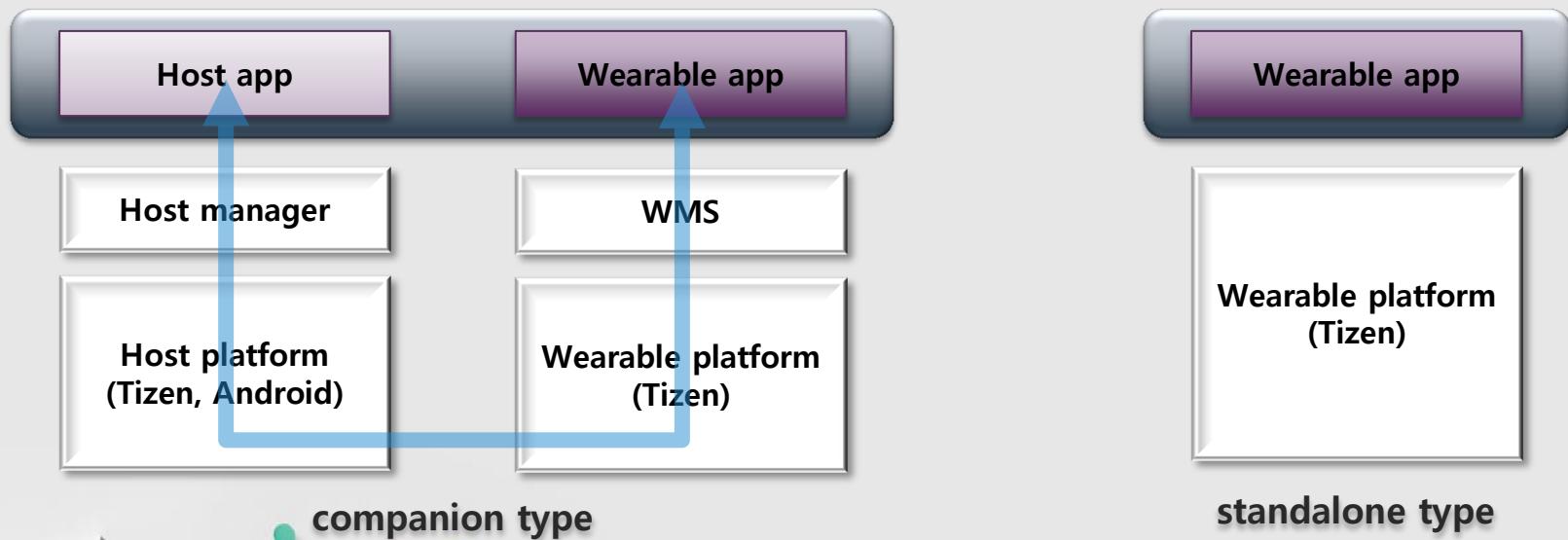
Web Framework

Wearable Profile



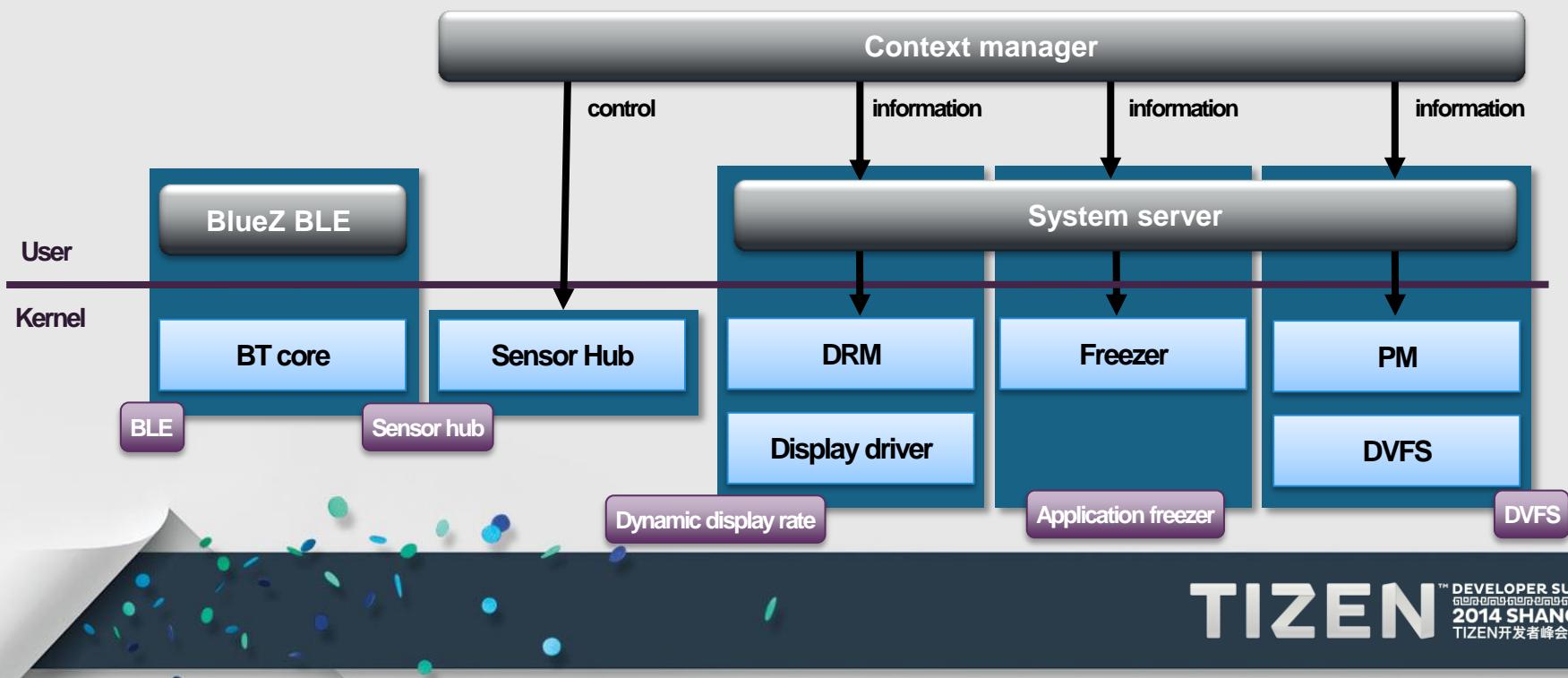
Application Model

- **Companion type**
 - One actual application consisting of host app and wearable app via connectivity
- **Standalone type**
 - Independent wearable app without host app or device



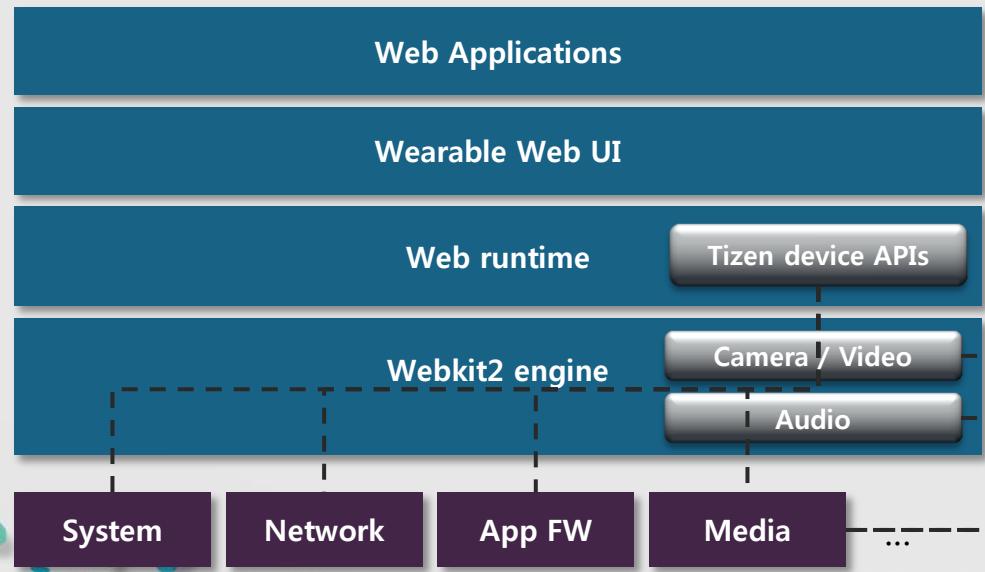
Wearable Profile Features | Power Saving

- Bluetooth low energy (BLE)
- Sensor hub
- Dynamic display rate
- Application freezer
- Dynamic Voltage & Frequency Scaling (DVFS)



Wearable Profile Features | Enhanced Web Performance

- **Downsizing webkit2**
 - Feature out unused functionalities (e.g., SVG*, WebSQL)
- **Add multimedia features**
- **Lightweight web widgets and themes**
 - Replace bottleneck point on performance with pure JavaScript
 - Optimize launching time



Upcoming Tizen Platform

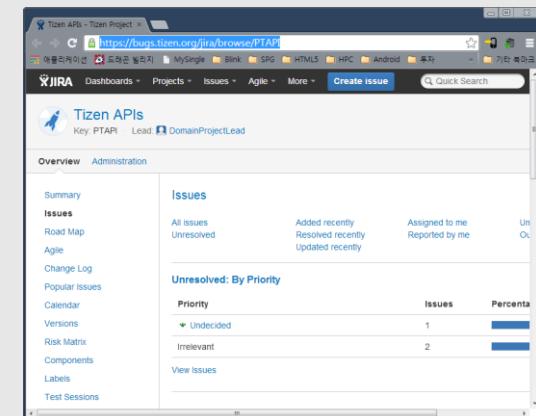
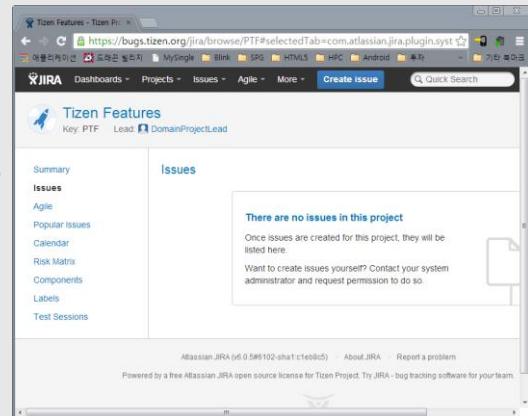


Tizen 3.0 @ tizen.org

- Until 2.3, source code uploaded to tizen.org only at milestones
 - Platform development has not been shown to public
 - No continuity and transparency
- From 3.0, development and contribution are made at tizen.org
 - For specific purposes(e.g., commercialization), main code tree can be pulled out and built anywhere by anyone
- Moved from in-out to out-in development

Development Infrastructure

- Platform development discussion
 - dev@lists.tizen.org
- Bug Tracker
 - Tracking Tizen bugs, gathering feature requests, and more
<https://bugs.tizen.org/>
- 3.0 features
 - “Tizen Features” @ JIRA > Projects > Tizen Features
<https://bugs.tizen.org/jira/browse/PTF>
- 3.0 APIs discussion
 - tsg-arch-api@lists.tizen.org
 - “Tizen APIs” @ JIRA > Projects > Tizen APIs
<https://bugs.tizen.org/jira/browse/PTAPI>
- Tizen modules
 - Git repositories
 - Development on *tizen* branch



Tizen 3.0 Major Features

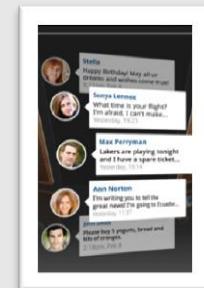
- **Upgraded core platform and tool-chains**
- **Multi-user**
 - Multiple user supports with privacy protection
- **64bit architecture support**
 - ARM and IA support
 - Performance improvements
 - Larger memory address space
- **3D UI framework**
 - 3D rendering engine for 2D & 3D objects in 3D world
 - Dynamic animation library



Different home screen with Multi-user support



2D/3D objects in 3D space



2D objects in 3D space

Closing



Summary

- Tizen is W3C standard-based, cross category, strongly industry supported open source software platform under Linux Foundation
- Architecture
 - Mobile profile
 - Linux Kernel 3.4
 - Native subsystems and Web FW
 - Native and Web application
 - Wearable profile
 - Similar architecture to mobile profile
 - Diet for resource restrict device with wearable application
 - Customization: power saving, better web performance, lightweight components
- Join Tizen 3.0 Development @ tizen.org
 - Your contributions and suggestions are welcome at dev@lists.tizen.org





Thanks !!

Contact: steve.jun@samsung.com

