Architecture
Tizen Architecture for Mobile

Applications

Web Applications

Native Applications

Core

Web Framework

Native Framework

Application Framework

Web

Messaging

Location

Security

System

Base

Connectivity

Telephony

PIM

Kernel

Multimedia

Linux Kernel & device drivers

Mobile Specific Component
Tizen Architecture for TV (ongoing)

- **Applications**
  - Web Applications
  - Native Applications

- **Web Framework**
  - Native Framework

- **Core**
  - Application Framework
  - Graphics & UI
  - Multimedia
  - Web
  - Messaging
  - Location
  - Security
  - System
  - Base
  - Connectivity
  - PIM
  - TV Broadcasting

- **Kernel**
  - Linux Kernel & device drivers

- **Removed component**
Tizen Architecture for TV (ongoing)

- **Applications**
  - Web Applications

- **Web Framework**
  - W3C/HTML5
  - Device APIs
  - Web UI FW
  - Caph
  - Web Runtime

- **Core**
  - Application Framework
  - Graphics & UI
  - Multimedia
  - Web
  - System
  - Base
  - TV Broadcasting
  - Connectivity
  - Security
  - System
  - Base

- **Kernel**
  - Linux Kernel & device drivers
Hardware Adaption and Kernel

- **Features:**
  - Linux Kernel & Device Drivers
  - Hardware Adaptation Layer
    - Plug-ins
  - OpenGL ES/EGL Graphics Driver
    - DRM-based graphics stack
  - DVB subsystem for TV Broadcasting
Core subsystems

Core API

App FW
- AppLife Cycle Mgmt (app-core)
- App Launch (AUL, app-service)
- TV Context Manager (context-manager)
- Package Mgmt (slp-pkgmgr)

Graphics & Input
- 2D (EFL, cairo)
- 3D (DALI, OpenGL ES/EGL)
- Window Mgmt (e17)

TV Broadcasting
- TV Service (tv-service)
- TV Player (tv-player)
- Broadcast Stream (Gstreamer, plugin)

Multimedia
- Video (Gst, plugin)
- Audio (Gst, PulseAudio)
- Camera (GStreamer)
- Audio Policy (ASM)
- 3D Audio (OpenAL)

Security
- Access Control (SMACK)
- Certification (cert-svc)
- Crypto (OpenSSL)

Connectivity
- Network Configuration (net-config)
- Bluetooth (Bluez)
- HTTP (libsoup, libcurl)
- Connection (ConnMan)
- Wi-Fi (wpa_supplicant)

Base
- IPC (D-Bus)
- Database (SQLite)
- Essentials (glibc, …)

System
- System (system-server)
- Sensor (sensor-fw, plugin)
- Power Mgmt (libsip-pm)

Web
- Web UI FW & Caph (web-ui-fw)
- JS Engine (JavaScriptCore)
- Runtime (WRT)
- Layout & Rendering (WebKit2/EFL)

App FW
- AppLife Cycle Mgmt (app-core)
- App Launch (AUL, app-service)
- TV Context Manager (context-manager)
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Web
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App FW
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Web
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New for TV
Web API

- Standard HTML5 + Tizen Device API
Applications

- **Web Applications for all profiles**
  - Web has been the primary app. development env. from Tizen 1.0
  - SDK is available for Web App development
  - Many sample apps included in the SDK

- **Core Applications**
  - Available for device implementers through components in Core subsystem

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**Web Framework**

- W3C/HTML5
  - getUserMedia
  - CSS3
  - Web Worker
- Device APIs
  - Key Mapping
  - Game Pad
  - Application
  - Download
- Web UI FW
  - BT
  - TV Control
  - Media Con.
- Core Applications (in-house)
  - Caph
  - Web Runtime

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**Core subsystem**

- App. Framework
- Graphics & UI
- Multimedia
- Web
- TV Broadcasting
- Security
- System
- Base
- Connectivity

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Core subsystems

: Major changes from Tizen Mobile
TV Broadcasting

• Provides
  • Capability to scan and store TV broadcasting programs.
  • Data of the electronic program guide (EPG).
  • Play a live broadcasting stream (DTV/ATV).
  • Various formats and standards of captions.
Application Framework (1/3)

- **Provides**
  - **Launching Application (AUL, App-Service)**
    - Explicit or implicit information (Combination of Action, URI, and MIME) can be used to determine an app to launch
    - Allow to launch different type of app (i.e. Web to Core and Core to Web)
  - **Application life cycle management and handling system events (App-core)**
    - Getting app state change notification or system events through main loop
    - Then, calling registered callbacks for the events
  - **Installing/Uninstalling application (package-manager)**
  - **Managing application launched history (RUA)**
  - **Setting an alarm to launch at specific time (alarm-manager)**
## Application Framework (2/3)

- **Provides**
  - Handling global key events with the remote controller to launch application based on TV UX scenario (TV Context Manager)

### Application Framework

<table>
<thead>
<tr>
<th>TV Context Manager</th>
<th>App-core</th>
<th>App-service</th>
</tr>
</thead>
<tbody>
<tr>
<td>AUL</td>
<td>VCONF</td>
<td>RUA</td>
</tr>
<tr>
<td>Application DB</td>
<td>Launch PAD (AUL Daemon)</td>
<td>package-manager</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AIL</td>
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</tbody>
</table>
Application Framework (3/3)

- **TV Context Manager**
  - Launching an application with AUL by key input on a TV remote control
  - Running rule-based actions based on TV UX scenario
    - ex) Running an OSD app exclusively; when launching an OSD app, then other apps exit
    - ex) Pushing “Exit” key terminates the running application and activate Live TV application on top-level
Graphics & Input (1/2)

- **Consists of:**
  - Window System based on X11
  - EFL (Enlightenment Foundation Libraries)
    - Rich Widgets multiple theme supports by Elementary
    - Retained mode canvas by Evas (Scene-graph, OpenGL ES back-end)
    - Composite Window Manager
  - **TV ref. theme for TV UX** (elementary)
  - 3D UI Toolkit - DALi
  - 3D (OpenGL ES)
  - Input Service (SCIM), Voice FW (STT, TTS)
  - Font (freetype2, fontconfig)
Graphics & Input (2/2)

Graphics & Input

X Window System

edje
eina
freetype2
fontconfig
cairo
OpenGL ES/EGL
ecore
evas
eet
elementary
DALi
Input Svc
Voice FW

New for TV
Tizen TV
Reference UX
Tizen TV Reference UX (1/2)

home screen – live tv

Apps panel
Tizen TV Reference UX (2/2)

Media Browser

Music Player
Conclusion
Conclusion (1/2)

- Building Tizen TV Platform Architecture is ongoing
- Web APIs
  - TV control API added
  - Mobile specific APIs removed
- New core applications with TV ref. UX
  - Home screen, Live TV, Web browser, App. launcher, Multimedia Apps, etc.
Conclusion (2/2)

- **Major new/ revised core subsystems**
  - TV Broadcasting
  - TV Specific Input & Application Scenario
    - TV Context Manager
  - Web UI Framework, Caph
  - Graphics & UI
    - TV theme for UI: GUI theme for TV widgets (EFL)
    - DALi, 3D UI Toolkit.
  - Kernel & Device Driver
    - Linux DVB subsystem for DTV broadcasting
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