What is Tizen? (1/2)

- Designed for various category of devices
- A completely open source software platform
What is Tizen? (2/2)

- Strong product line
- Core platform of ‘Internet of Things’
Why Tizen?

- Developer friendly Tizen Store
- Game Development Support
- Rich Multimedia, UI Support
- Strong Development Environment, Supported by SDK
- Different Application Types
- Performance

- Unity
- gstreamer
- YouTube
## Why Tizen? : Powerful SDK

<table>
<thead>
<tr>
<th>Eclipse based IDE</th>
<th>Targets like Emulator</th>
<th>GUI Builder</th>
<th>Tools</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Competitive Editor for HTML5, C, C++&lt;br&gt;• Project management, Sample Apps</td>
<td>• Emulator Support&lt;br&gt;• Event Injector&lt;br&gt;• Resolution support</td>
<td>• GUI Builder&lt;br&gt;• Storyboard</td>
<td>• Code Analysis Tools&lt;br&gt;• Profiling Tools&lt;br&gt;• Web inspector</td>
</tr>
</tbody>
</table>
Why Tizen?: App models

Web Applications
- HTML5, W3C
- Web API
- High Portability

Native Applications
- Full Device Access
- Native APIs
- High Performance

Hybrid Applications
- Web ↔ Native
- Multiplatform portable
- Average Performance
Why Tizen? : Web support

- Tizen Browser has best HTML5 support and power usage

<table>
<thead>
<tr>
<th>Browser (Ref. TV)</th>
<th>Tizen Browser Samsung Smart TV</th>
</tr>
</thead>
<tbody>
<tr>
<td>434</td>
<td>465</td>
</tr>
</tbody>
</table>

Best among all Smart TVs
Reference TV with same spec

Power usage of browser
(Lower is Better)

<table>
<thead>
<tr>
<th>Reference Phone</th>
<th>Tizen Z1</th>
</tr>
</thead>
<tbody>
<tr>
<td>319.9</td>
<td>225.47</td>
</tr>
</tbody>
</table>

^ Reference Phone with same spec
Why Tizen? : Web support

- 2D Canvas and Sunspider Benchmark:

<table>
<thead>
<tr>
<th></th>
<th>Tizen Z1</th>
<th>Reference Phone</th>
</tr>
</thead>
<tbody>
<tr>
<td>2D Canvas FishETank (fps)</td>
<td>60</td>
<td>30</td>
</tr>
<tr>
<td>Javascript Sunspider</td>
<td>1370</td>
<td>2149</td>
</tr>
</tbody>
</table>

* Reference Phone with same spec

(Lower is Better)
Why Tizen? : Best 2D/3D graphics

- 2D Graphics: Cairo H/W Acceleration
- 3D Graphics: WebGL support

2D Canvas perf. score

<table>
<thead>
<tr>
<th>Method</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>WebGL (Aquarium : fps)</td>
<td>60</td>
</tr>
<tr>
<td>Stock Browser @Reference device</td>
<td>2.80*</td>
</tr>
</tbody>
</table>

WebGL  (Aquarium : fps)

Web Game Applications

2D Game

3D Game

* Stock Browser @Reference device
Why Tizen? : Rich Multimedia support

- High Quality Video Playback based on Plug-in Architecture
  - Play almost every media formats without transcoding
  - Rich media support for Browser and web applications

**Codecs, Demuxers & DRMs**
- H.264
- HEVC
- PlayReady®
- MP4
- DIVX
- UHD

**Rich Web Media Support**
- YouTube
- TED
- mpeg-DAS H
- HTML5 Video

**Video Rendering on Any Surface**
- Video animation effects
Why Tizen? : Multiple Game Engine Support

Full List
https://wiki.tizen.org/wiki/Game_development
Why Tizen? : Tizen Store

• Single app store for multi profile devices
• Developer friendly Tizen Store Seller Promotion
• Available in 182 countries.
Tizen Device Profiles
Device profile

- Profile is a device specific extension to Common Platform
- Common Platform is common in all devices
- Profile has device specific optimizations.
- Mobile and Wearable profiles are released, TV profile is ready
- Refrigerator, IoT, and other profiles will be released in future.

Common Platform Libraries

- Mobile
- Wearables
- IVI
- TV
- ...

TIZEN DEVELOPER CONFERENCE 2015 SHENZHEN
Device profile – device specific optimization

Mobile
- Telephony & Messaging Services
- Rich Connectivity, Location service
- Touch Navigation
- Battery Consumption

Wearable
- Gesture Controls, Health Care
- Host device connected services
- Simplified UX, Voice Recognition
- Health Sensors

TV*
- Broadcast & Secured A/V Play
- TV A/V inputs & I/O devices
- Focus Navigation, Web Controls
- Big Screen Display
- Home Center

IoT**
- Intelligent N/W abstraction
- Device to Device communication
- Intelligent Convergence Services
- Networking of Things
- Intelligent Sensors

* TV profile will be released in Tizen 3.0
** IoT framework will be released in Tizen 3.0
Device profile – Mobile profile

- Complete stack for full features smartphone
- Native/Web/Hybrid App models

Native Framework

Application Framework

Security

System

Content

Graphics & UI

Social

Multimedia

Messaging

Connectivity

Telephony

Web

Location

Base & OSS

Web Applications

Device APIs

Web UI FW

Web Runtime

Linux Kernel & device drivers

W3C/HTML

CSS3

Worker

Video

Touch

WebGL

...
Device profile – Wearable profile

- Dual App Model
  - Companion (Host-Dev)
  - Standalone (Dev)
- Context awareness / Sensor enhancement
- Slim down profiles

Wearable Profile

Web API

Web Applications

Web Framework
- W3C/HTML
- CSS3
- WebGL
- Worker

Device APIs

Web UI FW

Web Runtime

Slim Profile

Native API

Native Framework
- Application Framework
- Web
- Multimedia
- Context
- System
- Host Conn.
- Connectivity
- Base & OSS
- Graphics & UI

Kernel
- Linux Kernel & device drivers

Preloaded Native Applications

Native Framework

Web Framework

Device APIs

Web Applications

Wearable Profile

Mobile

Wearable

TV
Device profile – TV profile

- Well established TV service and TV player
  - ATSC/DVB support
  - TV service to scan / tune
  - Manage channel database
  - TV player for live channel play
  - Analog input drivers
  - Caption/Subtitle support

* EPG – Electronic Program Guide
Tizen 2.4 - Enhanced Features

- Allows 3D object rendering with ease.
- DALi provides built-in effects like page turn, particles, gaussian blur etc.
Tizen 2.4 - Enhanced Features

AIR UX

- New UI Design philosophy in Tizen enables more user friendly and intuitive UX.
- Provides a rich and fulfilling UI experience.
Tizen 2.4 - Features

Native & Web IME API

✓ For 3rd party keyboard developers
✓ Allows creating custom keyboard

Sync Manager

✓ Allows to schedule sync requests
✓ Option for periodic and on-demand sync.
Tizen 3.0 Overview
Tizen 3.0 - overview

- Better performance through Wayland and KDBus
- Restructured to support Multi-user and 64-bit CPU
- 3 domain SMACK based new security architecture
- Chromium and Crosswalk
- Iotivity and IoT framework

3.0 Native API

Linux Kernel

UI
- UI widgets
- EFL
- AT-SPI2
- E19 Wayland

MM
- Broadcast Middleware
- Theme
- DALi
- OpenGL ES

System
- Screen Mirroring
- PulseAudio
- Gstreamer
- Lifecycle management
- Launcher
- Package Manager
- Buxton

Security
- DBus
- Devedced / Resourced
- Murphy
- Systemd
- Login management
- User management
- Security Manager
- Cynara

Context
- Interaction FW
- User management
- Security Manager
- Cynara

Connectivity
- Iotivity
- Location FW
- Sensor FW
- BT FW / BlueZ
- WiFi
- WiFi Direct
- Telephony

Web
- Crosswalk
- 3.0 Web API
- Chromium-efl
Tizen 3.0 – What it Offers

- **Increased Performance**
  - Wayland
- **Multi user Architecture and 64 bit Support**
- **Convergence**
- **Modern Web Technology Support**
  - CROSSWALK
- **Enhanced Security**
  - Cynara
  - Smack
  - DAC
- **Micro Profile**
Tizen 3.0 - performance

Better performance through Wayland

More than 30% improvement in response time and computation efficiency
Tizen 3.0 – multi-user architecture and 64bits

User contents will be protected by multi-user architecture (easy personalization)
Tizen 3.0 - Micro Profile

- Targeting Devices With Connectivity But No Display
- Minimized Profile With Device Common Features & Programmable App (JS-based) Supporting

IoT Devices

- Full (TV, Mobile)
- Micro (Linux, RTOS)

JavaScript Framework (IoT.js for RTOS)
IoTivity
Light-weight System
Tizen 3.0 – 3 domain SMACK

Developer don’t need to write his own SMACK rule (security system will auto-generate SMACK rule for each module)

Floor
- RO system directories
- Kernel helpers

System
- /run, /dev, /var/log
- System services

User
- Home directories
- Launcher and user services
Modern web technology is integrated into platform

Tizen Package (.tpk)

- Stub Application (C)
- XWalkView (Embedding API)
- Web App (HTML / JavaScript)
- User-defined API (JavaScript + C/JS-native)

Crosswalk Webview

Chromium EFL
- Browser Process
  - EvasGL
- Renderer Process
  - Skia

Crosswalk Tizen port
IoTivity is integrated into platform and simplified interface is provided by IoT FW

<table>
<thead>
<tr>
<th>IoTivity</th>
<th>Bluetooth</th>
<th>WiFi / WiFi Direct</th>
<th>ZigBee</th>
<th>...</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discovery</td>
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<tr>
<td>Data transmission</td>
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<tr>
<td>Device management</td>
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<tr>
<td>Data management</td>
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Tizen IoT FW
Providing TIZEN PASS API for sharing data between Tizen Devices.

Remember 3 steps -
• Toss the data.
• Share the data in stream.
• Act with the data.
What’s next? (1/2)

Powerful Smart Device → Various Smart Device → Connected Smart Device

We’re here!

Intelligent convergence
What's next? (2/2)

Profiles

- Tizen Platform Released
- Mobile Profile Introduced
- Wearable Profile Introduced
- TV Profile, Micro Profile to be Introduced
- IoT profile

Profiles timeline:
- 2012: Tizen Platform Released
- 2013: Mobile Profile Introduced
- 2014: Wearable Profile Introduced
- 2015: TV Profile, Micro Profile to be Introduced
- 2016: IoT profile

- Developers UI Builder, Storyboard
- Wayland, 64bit, IoTivity Convergence Multi-User
Conclusion

- Multiple Profiles
- Convergence
- Strong Industry Support
- Strong Product Portfolio
- Strong Developer Support
- Opensource