Tizen Architecture

Łukasz Stelmach
Samsung R&D Institute Poland

2013-10-10

Tizen Architecture

Outline

Introduction to Tizen

Inside Tizen

Tizen and others

Q&A
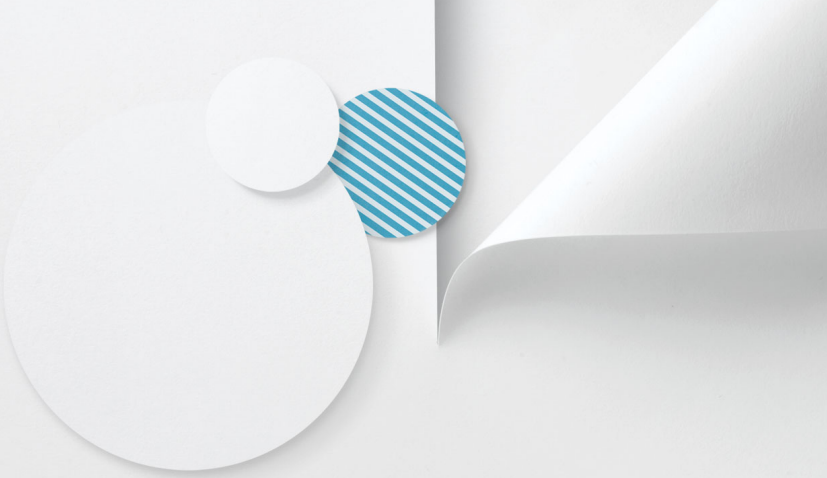
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Tizen Architecture

└─Outline

Good morning everyone, my name is Łukasz Stelmach, I work for Samsung R&D Institute Poland and I am going to talk about Tizen and some of its internals.

Introduction to Tizen

Tizen Architecture
└─ Introduction to Tizen

Introduction to Tizen

Tizen isn't the most popular operating system yet so I suppose a brief introduciton will be helpful.

Tizen

- **Open source**
  - GNU/Linux
  - WebKit
  - EFL
- **Standards-based**
  - POSIX
  - HTML5
- **Smart-embedded**
  - Phones
  - Tablets
  - IVI
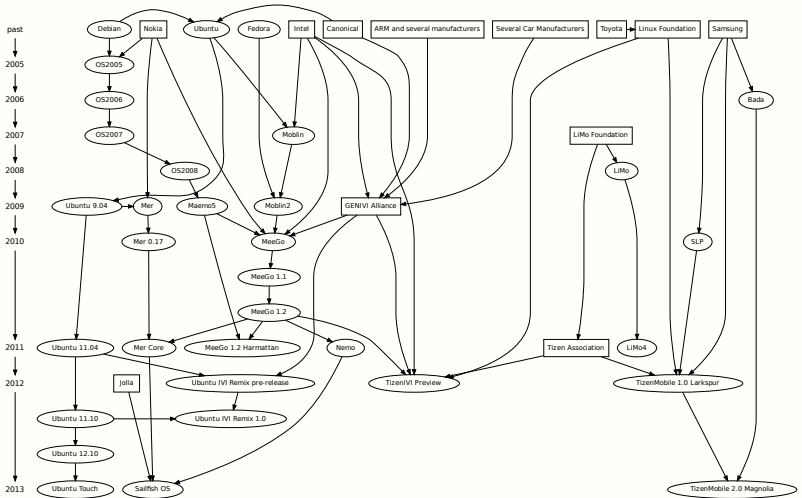 - TV

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Tizen Architecture
└─ Introduction to Tizen

└─ Tizen

- **It has GNU/Linux basic userland**
- **POSIX + HTML5**
- **Smart-embedded devices**

Family tree

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Tizen Architecture
└─Introduction to Tizen

└─Family tree (https://github.com/kumadasu/tizen-history)

As you all probably know ←→ Samsung Electronics has been making mobiles for quite some time. Some of theme were smarter than other.

Family tree (https://github.com/kumadasu/tizen-history)

Tizen History (In Construction March, 2013)

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Tizen Architecture
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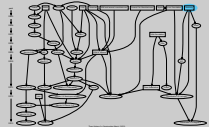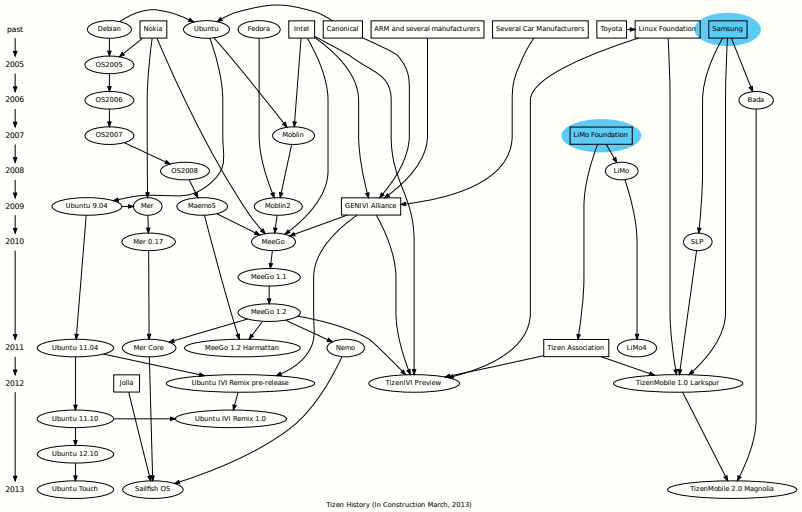Tizen History (In Construction March, 2013)

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Tizen Architecture
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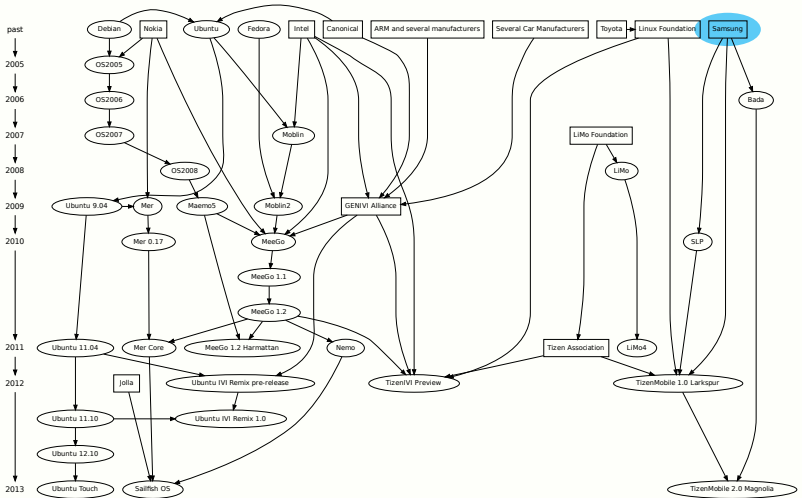
In 2007, Samsung together with other manufacturers established LiMo Foundation. Its mission was to create an open, Linux-based software platform for mobile devices.
http://www.theregister.co.uk/2007/01/26/limo_founded/

Family tree (https://github.com/kumadasu/tizen-history)
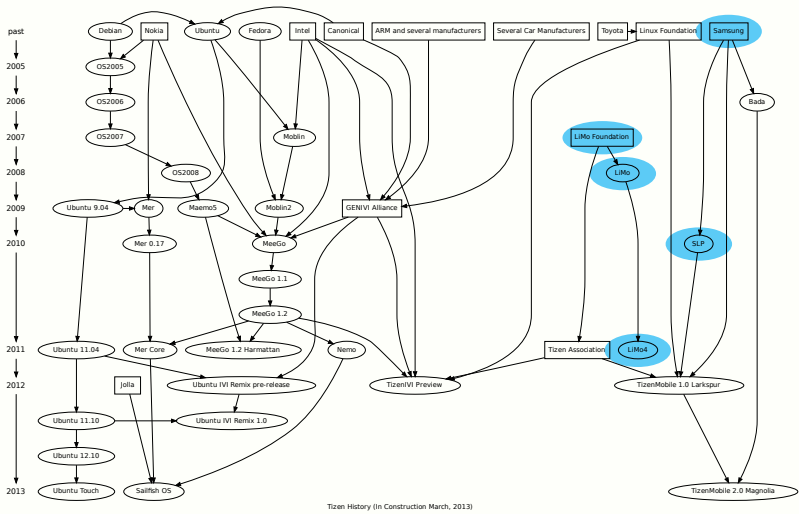
Tizen History (In Construction March, 2013)

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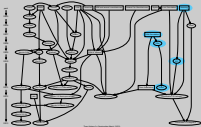
The foundation released two version of the platform with significant contribution ported from Samsung's SLP.

Family tree (https://github.com/kumadasu/tizen-history)

Tizen History (In Construction March, 2013)

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Tizen Architecture
└─ Introduction to Tizen

└─ Family tree (https://github.com/kumadasu/tizen-history)

Family tree

In the meantime, Intel, was working on its own Moblin distribution. It was later merged with Nokia's Maemo to form ↩ MeeGo.

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Tizen History (In Construction March, 2013)

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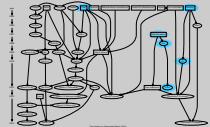**TIZEN**

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Tizen Architecture
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   └─ Family tree (https://github.com/kumadasu/tizen-history)

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Shortly after releasing version 1.2, Intel decided to discontinue developemnt of MeeGo, and join LiMo Foundation which, at the same time, together with ← Linux Foundation, announced a new project named Tizen. Few months later LiMo Foundation changed its name to ← Tizen Association.

Family tree

Tizen History (In Construction March, 2013)

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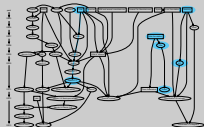

Tizen History (In Construction March, 2013)

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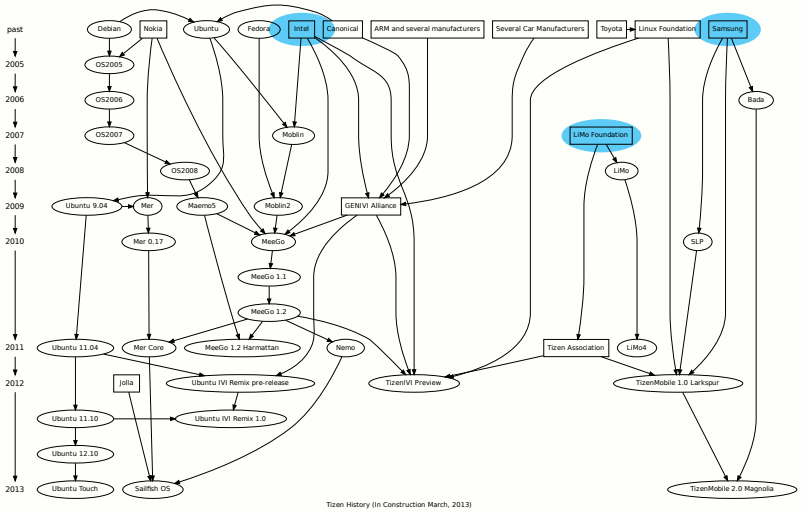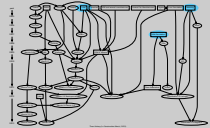
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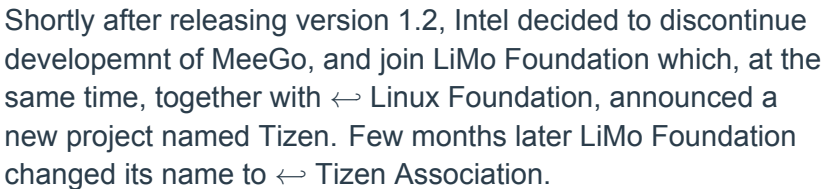Family tree (https://github.com/kumadasu/tizen-history)

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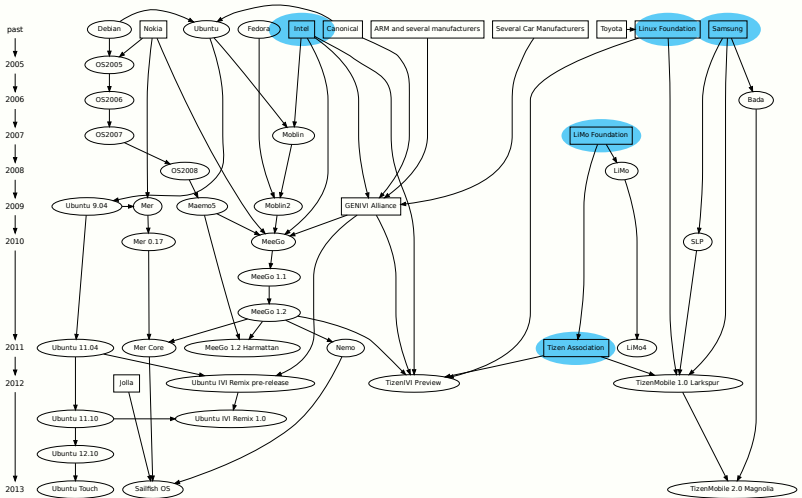
Family tree

Tizen History (In Construction March, 2013)

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Tizen Architecture
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In 2012, the first version of Tizen SDK was released ↩
followed by versions 2.0 and 2.2 in 2013, which provide official
Native API from Samsung's Bada.

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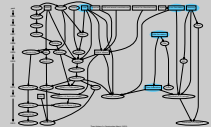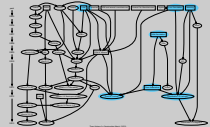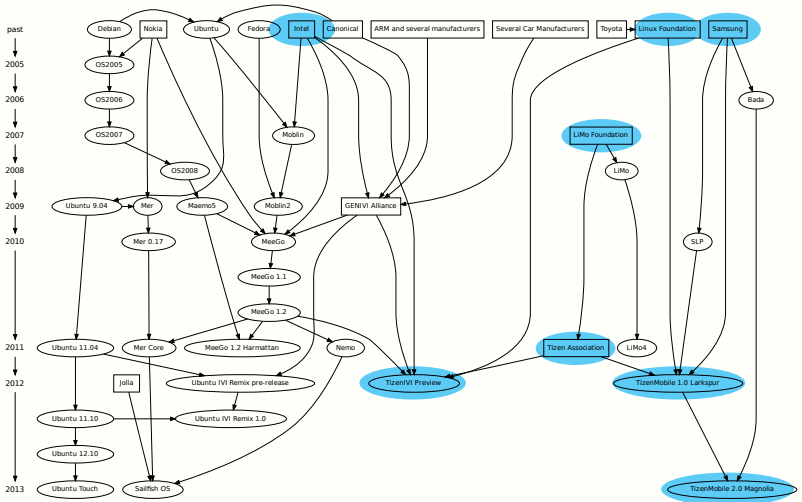**TIZEN**

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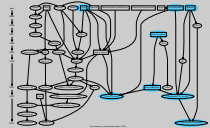
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Tizen's origins, things to remember

- **LiMo → Tizen Association**
- **Samsung + Intel**
- **Tizen ≠ MeeGo**
- **Tizen has got few bits from MeeGo**
    - Connman
    - oFono
    - BlueZ
    - RPM
    - staff
- **I assure you we are open.** http://www.tizen.org

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Tizen Architecture
└─ Introduction to Tizen

└─ Tizen's origins, things to remember

The things I would like you to remember are:

- **Tizen Association continues efforts of LiMo foundation**
- **Samsung and Intel are the main contributors to Tizen**
- **Tizen is not MeeGo although Intel brought some useful bits from it.**

The first releases have been developed in a closed environment and released afterwards. The development process of the 3.0 is fully transparent. http://www.tizen.org

Inside Tizen

Layers

| Web Apps | Native Apps |

| Web API | Native API |

Core Services

Linux Kernel
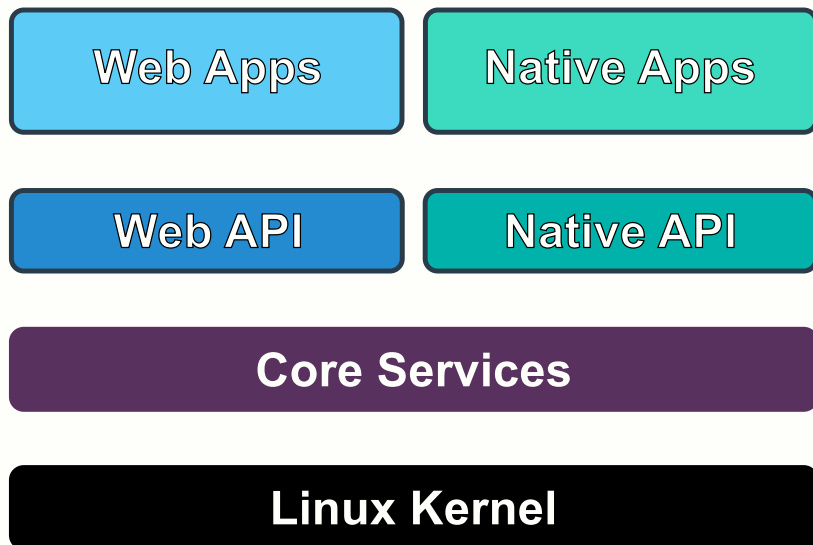
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Tizen Architecture
└─Inside Tizen

     └─Layers
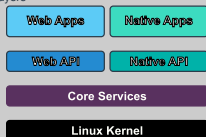
Layers… we like them don't we. The picture is pretty simple while still being true, unbelivable.

- **Kernel (*mainline*)**
- **Core (GNU + Tizen)**
- **APIs (Bada + WebRuntime)**
- **Applications (C++ + HTML)**

In my team we develop one of many parts of the Core layer. This is what I know best and it isn't exposed directly to developers so I would like to talk about it a little.

Tizen Core Services

- **Application Framework**
- **Base**
- **Connectivity**
- **Graphics & UI**
- **Location**
- **Messageing**

- **Multimedia**
- **PIM**
- **Security**
- **System**
- **Telephony**
- **Web**

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Tizen Architecture
└─Inside Tizen
└─Tizen Core Services

Tizen Core Services

- Application Framework
- Base
- Connectivity
- Graphics & UI
- Location
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- Multimedia
- PIM
- Security
- System
- Telephony
- Web

Application Framework, Base, Connectivity, Graphics & UI, Location, Messageing, Multimedia, PIM, Security, System, Telephony, Web

Base

- **A basic self-contained GNU/Linux userland**
- **Boots to console with a login prompt**
- **Toolchain**
- **Support libraries**
  - database access
  - i18n
  - XML and others

Tizen Architecture
└─ Inside Tizen

                  └─ Base

Although this part is completely invisible to the end-user and even developers aren't supposed to be exposed to it to much it is crucial that it works flawlessly. To make sure it does we put here as much free software as possible.

- **gnu/linux userland**
- **systemd as init**
- **gcc toolchain**
- **some libraries**

Application Framework

- **Application state management**
- **Pre-defined services like dialer**
- **Notifications**
- **Package management**
- **Alarm/time management**

Tizen Architecture
└─ Inside Tizen

└─ Application Framework

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Network & Connectivity

- **TCP/IP connection**
- **Bluetooth**
- **HTTP**
- **NFC**
- **Wi-Fi**

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Tizen Architecture
└─Inside Tizen

  └─Network & Connectivity

- **connectivity ConnMan**
- **Bluetooth (BlueZ)**
- **HTTP: libsoup, curl**
- **NFC**
- **Wi-Fi: direct**

Graphics & UI

- **X11**
- **OpenGL**
- **Enlightenment Foundation Libraries (EFL)**
- **input methods**

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Tizen Architecture
└─ Inside Tizen
　　　└─ Graphics & UI

- **Tizen graphics stack is based on X11, we are experimenting with Wayland**
- **OpenGL**
- **EFL present, several applications use it but not an official API**
- **Input Methods**

Location

- **GeoClue**
  - GPS
  - WiFi
  - 3G
  - GeoIP
  - Geocoding

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Tizen Architecture
└─Inside Tizen

        └─Location

Location

- **GeoClue**
  - GPS
  - WiFi
  - 3G
  - GeoIP
  - Geocoding

Location services are based on GeoClue. Currently the
following we've got plugins to do the following tasks.
GPS, WiFi, 3G/Network, GeoIP, Geocoding

Messaging

- **SMS, MMS**
- **Email**
- **Push**

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Tizen Architecture
└─Inside Tizen

└─Messaging

Messaging

- SMS, MMS
- Email
- Push

Samsung is going to provide application developers with a cloud-part of the push. You need to register your application and you can use Samsung's cloud to forward messages for it.

Multimedia

- **Video**
- **Audio**
- **Camera**
- **Audio Policy**
- **3D Audio**

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Tizen Architecture
└─ Inside Tizen
        └─ Multimedia

Multimedia

- Video
- Audio
- Camera
- Audio Policy
- 3D Audio

Multimedia framework is ready to support hardware codecs for Video. There are ongoing works to support audio.
Audio policy, scenarios provided by PulseAudio.

PIM

- **Contacts**
- **Calendar**
- **Accounts**
- **Synchronisation**

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Tizen Architecture
└─Inside Tizen
　　└─PIM

PIM

- Contacts
- Calendar
- Accounts
- Synchronisation

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Security

- **Access control**
- **Certificates**
- **Secure storage**
- **Cryptography**
- **DRM**

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Security

- Access control
- Certificates
- Secure storage
- Cryptography
- DRM

- **Tizen is the first commercial-grade system to use SMACK**
  Certificats, Secure storage, Cryptography, DRM

System

- **Sensors**
- **Power management**
- **System settings**

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Tizen Architecture
└─Inside Tizen

└─System

System

- Sensors
- Power management
- System settings

Telephony

- **Telephony services**
- **Network communication**
- **SIM management**

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Tizen Architecture
└─Inside Tizen
     └─Telephony

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Telephony

- **Telephony services**
- **Network communication**
- **SIM management**

Web

- **WebKit: layout + rendering**
- **WebRuntime**

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Tizen Architecture
└─Inside Tizen
└─Web

- **You can find my colleagues' contribution at WebKit.org**
- **Saturday, 2013-09-14 09:00 — *Webruntime in Tizen*, Janusz Majnert (T2)**

API

- **HTML5**
- **Native C++ (Bada)**

- **Tizen Common**
- **Application**
- **Communication**
- **Content**
- **Input/Output**
- **Social**
- **System**
- **User Interface**

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Tizen Architecture
└─ Inside Tizen
        └─ API

Thre are two official sets of APIs: HTML5 and C++. The former based on WebRuntime the latter is a Linux port of Samsung's OSP Bada framework.

Those services are available through proper APIs to both native and HTML5 applications.

Tizen and others

Tizen Architecture
└─Tizen and others

Tizen and others

No numbers. I don't want to speak about numbers. Most of you porbably, know them better than I do. I'd like to show a qualitive comparison between the most common mobile operatiing systems.

The players

- **Android**
- **iOS**
- **RIM (BlackBerry OS, QNX)**
- **Windows Phone**
- **Tizen**

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Tizen Architecture
└─ Tizen and others
        └─ The players

- **Windows Phone: that's becoming quite interesting**

Areas of applications

- **Android: pretty much anything**
- **iOS: iStuff**
- **RIM: Blackberry**
- **Windows Phone: Nokia (mostly)**
- **Tizen: pretty much anything**

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Tizen Architecture
└─Tizen and others
        └─Areas of applications

Software development

- **Android: Java**
- **iOS: ObjectiveC**
- **RIM: Native (C/C++), HTML5, Adobe AIR, Android (BB10)**
- **Windows Phone: .NET, C++**
- **Tizen: Native (C++), HTML5**

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Tizen Architecture
└─Tizen and others
　　　└─Software development

- **iOS Developer licens**
- **RIM: most versatile**

Software distribution

- **Android: Play Store**
- **iOS: App Store**
- **RIM: BlackBerry World**
- **Windows Phonde: Windows Phone Store**
- **Tizen: Tizen Store and more…**

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Tizen Architecture
└─Tizen and others
        └─Software distribution

Q&A

Tizen Architecture
└─ Q&A

Q&A

Thank you

Łukasz Stelmach <l.stelmach@samsung.com>

Tizen Architecture
└─Q&A

└─Thank you

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More About Tizen

- **Friday, 2013-09-13**
  - 15:15 — *Creating a Tizen Application*, Kamil Grondys (T1)
  - 17:30 — *HTML5* Features, Wojciech Bielawski (T2)
- **Saturday, 2013-09-14**
  - 09:00 — *Webruntime in Tizen*, Janusz Majnert (T2)
  - 11:15 — *Porting Qt to a new Smarthone for Fun and Fame*, Jarosław Staniek (T1)
  - 11:15 — Solution for Tizen/, Michał Knapiński and Michal Pawluk (T2)

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Tizen Architecture
└─Q&A
    └─More About Tizen