From Android to Tizen

How to port Tizen OS on an Android Supported Device
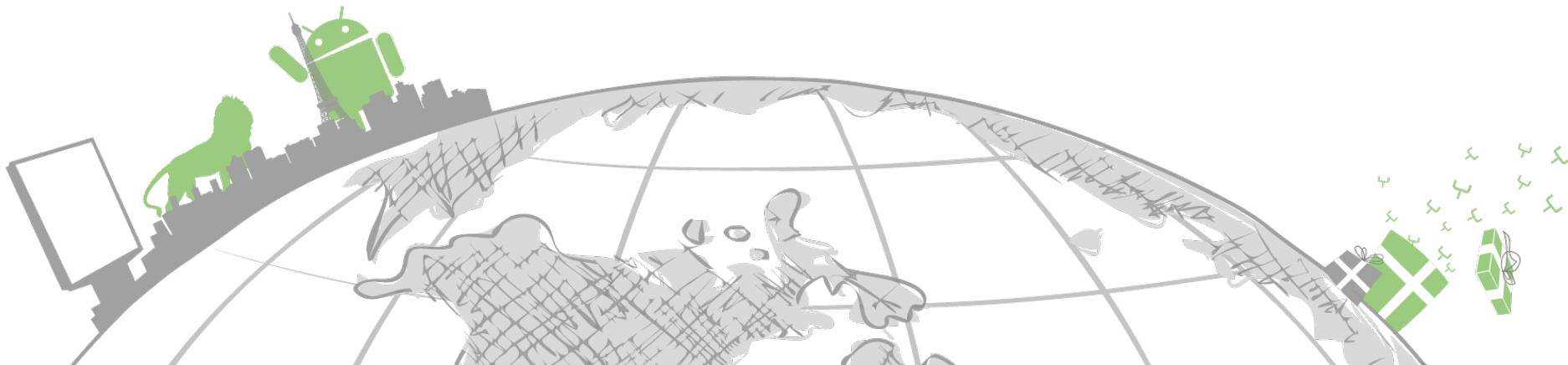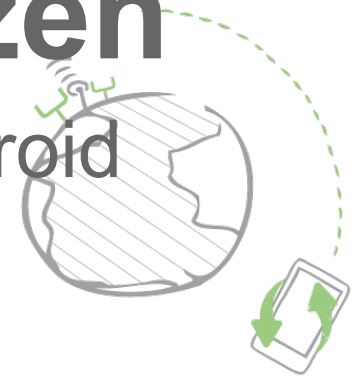
Genymobile

Identité

Genymobile is the first European company to choose to **focus** its **expertise** on **Android**.

Genymobile is able to work on the whole Android operating system : would it be kernel, libs, system, Android framework or apps.

The founders

Cedric Ravalec - *CEO*

Angélique Zettor - *CFO*

Arnaud Dupuis - *COO*

Ecosystem

En bref

- Young innovative company

- Created in 2011

- 2013 estimated turnover : 4,5 m€

- 40 Employees

- Paris 3ème

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Me !

Few quick words about me

Open Source
- Perl contributor
- KDE
- Many personnal projects

Professional
- Started as a conception and development engineer (a **developer** in short)
- Went into technical team leading
- And this slipery fatal slope led me to **management**
- Devoteam
- Creation of **Genymobile** !

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Content

During this talk we will discuss :

- **Context**
- **A bit of history**
- **Systems architectures**
- **Requirements**
- **Two ways to use Tizen on Android devices**
- **Focus on kexec**
- **Q&A**
- **Conclusion**

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Why oh why should I try something like that ?

Many reasons to port a Linux based OS on another Linux based OS supported plateform :
- The joy of bricking your device
- The pleasure to waste lots of money
- The satisfaction to know that thanks to you hardware manufacturer do not know the meaning of "financial crisis"

Or else in the real world, IVI systems **shares** more and more **hardware components** with mobile plateforms like for exemple :
- SoC
- GPS chipset
- Wi-Fi chipset
- Bluetooth chipset
- and so on...
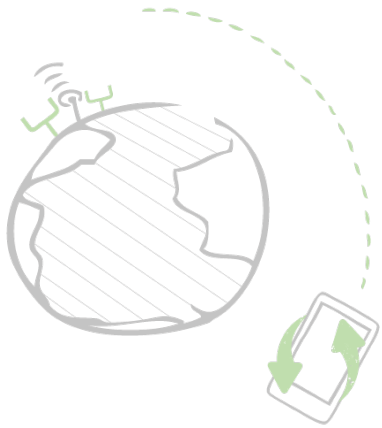
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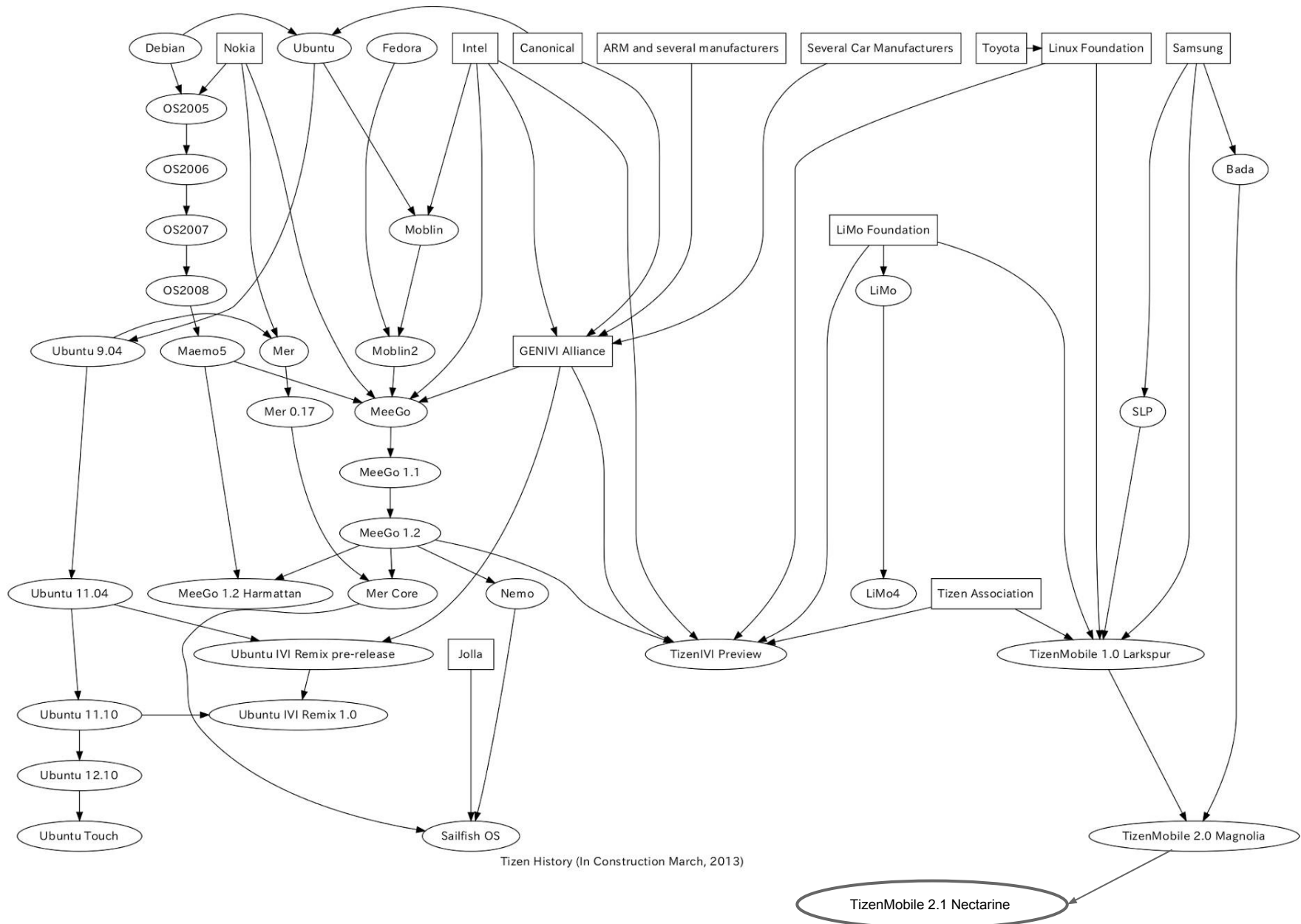- Focus on kexec
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A hisory of IT that leads to Tizen

- 2005: *Maemo* (Nokia)
- 2007: *Moblin* (Intel)
- 2010: *MeeGo* (Nokia, Intel, other major hardware & software companies)
- 2010: *Bada* (Samsung : for less Android dependance)
- 2011: *MeeGo* abandoned by Nokia (for Windows Phone)
- 2011: *MeeGo* abandoned by Intel, and then by its other supporters
- 2011: *LiMo 4* (LiMo Foundation - Samsung collaboration with the EFL project (Carsten Haitzler = Rasterman)
- 2011: Intel joins *LiMo*, which is renamed *Tizen*
- 2012: LiMo Foundation is renamed Tizen Association
- 2012: Samsung has aim to merge *Bada* with *Tizen*

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Timeline (left axis): past, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013

Nodes:

- Debian
- Nokia
- Ubuntu
- Fedora
- Intel
- Canonical
- ARM and several manufacturers
- Several Car Manufacturers
- Toyota
- Linux Foundation
- Samsung
- OS2005
- OS2006
- OS2007
- OS2008
- Moblin
- LiMo Foundation
- Bada
- Ubuntu 9.04
- Maemo5
- Mer
- Moblin2
- GENIVI Alliance
- LiMo
- Mer 0.17
- MeeGo
- SLP
- MeeGo 1.1
- MeeGo 1.2
- Ubuntu 11.04
- MeeGo 1.2 Harmattan
- Mer Core
- Nemo
- LiMo4
- Tizen Association
- Ubuntu IVI Remix pre-release
- Jolla
- TizenIVI Preview
- TizenMobile 1.0 Larkspur
- Ubuntu 11.10
- Ubuntu IVI Remix 1.0
- Ubuntu 12.10
- Ubuntu Touch
- Sailfish OS
- TizenMobile 2.0 Magnolia
- TizenMobile 2.1 Nectarine

Tizen History (In Construction March, 2013)
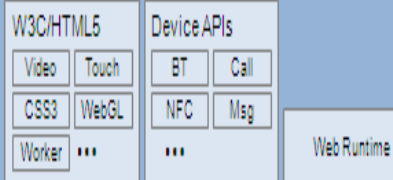
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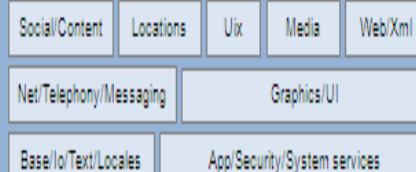- Focus on kexec
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Architecture

Architecture

Web applications

Native applications

Web framework

W3C/HTML5
Video	Touch
CSS3	WebGL
Worker	•••

Device APIs
BT	Call
NFC	Msg
•••	

Web Runtime

Native framework

| Social/Content | Locations | Uix | Media | Web/Xml |

| Net/Telephony/Messaging | Graphics/UI |

| Base/Io/Text/Locales | App/Security/System services |

Core

| App framework | Graphics/UI | Multimedia | Location | Messaging | Web |
| Security | System | Base | Connectivity | Telephony | PIM |

Linux Kernel and Device Drivers

Architecture

APPLICATIONS

| Home | Contacts | Phone | Browser | ... |

APPLICATION FRAMEWORK

| Activity Manager | Window Manager | Content Providers | View System |

| Package Manager | Telephony Manager | Resource Manager | Location Manager | Notification Manager |

LIBRARIES

Surface Manager	Media Framework	SQLite
OpenGL	ES	FreeType	WebKit
SGL	SSL	libc

ANDROID RUNTIME

Core Libraries

Dalvik Virtual Machine

LINUX KERNEL

| Display Driver | Camera Driver | Flash Memory Driver | Binder (IPC) Driver |
| Keypad Driver | WiFi Driver | Audio Drivers | Power Management |

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What do I need to start the porting work ?

The hardware :
- Linux compatible hardware
- Hardware supported by manufacturer
- Hardware were drivers can be found

Firmware :
- Have full access to the system
- Unlockable bootloader
- Fastboot capable
- Access to the recovery

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Two ways of doing it

You can choose two ways for installing Tizen on your Android device :

- **Full system wipe and installation**
- **Use kexec to multiboot your device**

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What is kexec and what can it do for us ?

In short, kexec is Linux booting itself. In less short, it is a syscall that allows a Linux kernel to boot another Linux kernel without restarting the device. As of every technic there are advantages and disadvantages to use this :

Advantages :
- Does not require a device restart : boot faster
- For Android it is a bit like having fastboot inside the device
- Skips the bootloader

Disadvantages :
- Skips the bootloader
- Boot over the previous kernel and get the RAM in an intermediate state
- Does not restart devices/chipsets so, new kernel does not get the devices in sane state as expected, that can be troublesome.
- Does not work on Nexus 7...

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Focus on kexec

So what ?

This is where XDA comes handy! Mike Kasick developped a patch call kexec-hardboot.
Main difference with kexec : it actually restarts the device.

Advantages :
- All kexec advantages
- Works on Nexus 7

Disadvantages :
- Needs a patched kernel on both ends.

And then comes the easy part !

In the end the porting on Nexus 7 is really easy, you will need some pieces of software though :

- An unlocked bootloader
- A patched kernel for the Android host
- The teamwin recovery
- Multiboot v10
- A Tizen ROM (use mine if you have a Nexus 7 3G)

Demo time !

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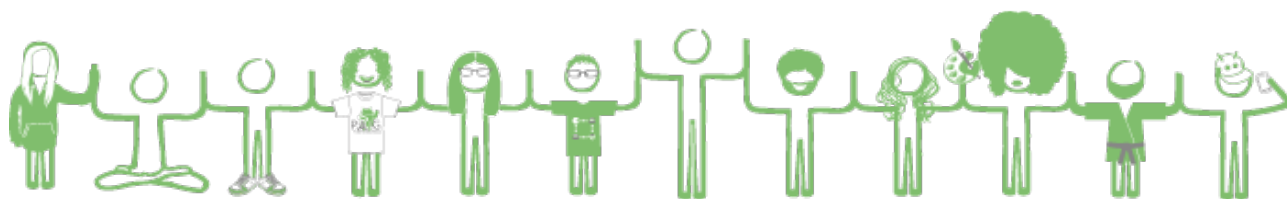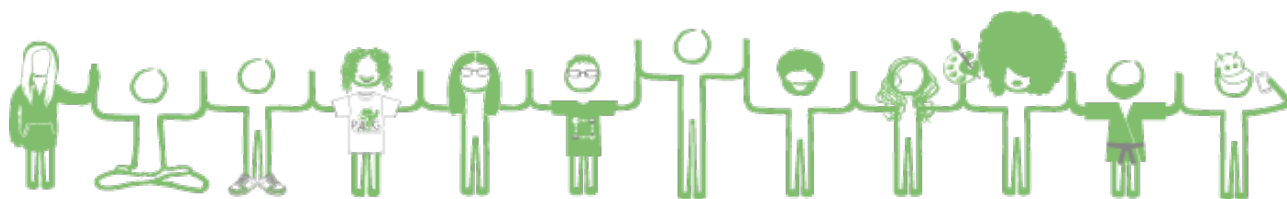- Focus on kexec
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Feel free to ask anything !
(well... within the scope of the presentation !)

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