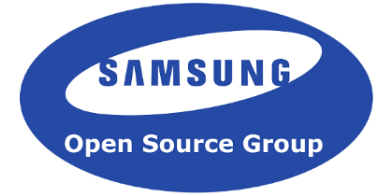





FOSDEM 16
Brussels 30 & 31 January
.org



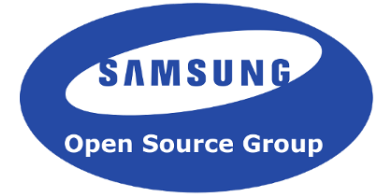
Connected TIZEN™

*Bringing  to your connected devices
using the **Yocto Project**.*

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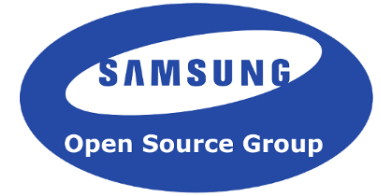
Agenda



- Introduction to Tizen
- Building Tizen using Yocto/OE
- Connected device with IoTivity
- Showcases
- Contributing to Tizen



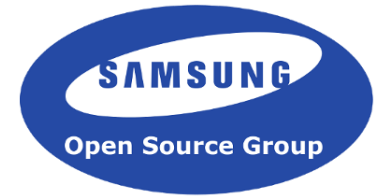
Tizen



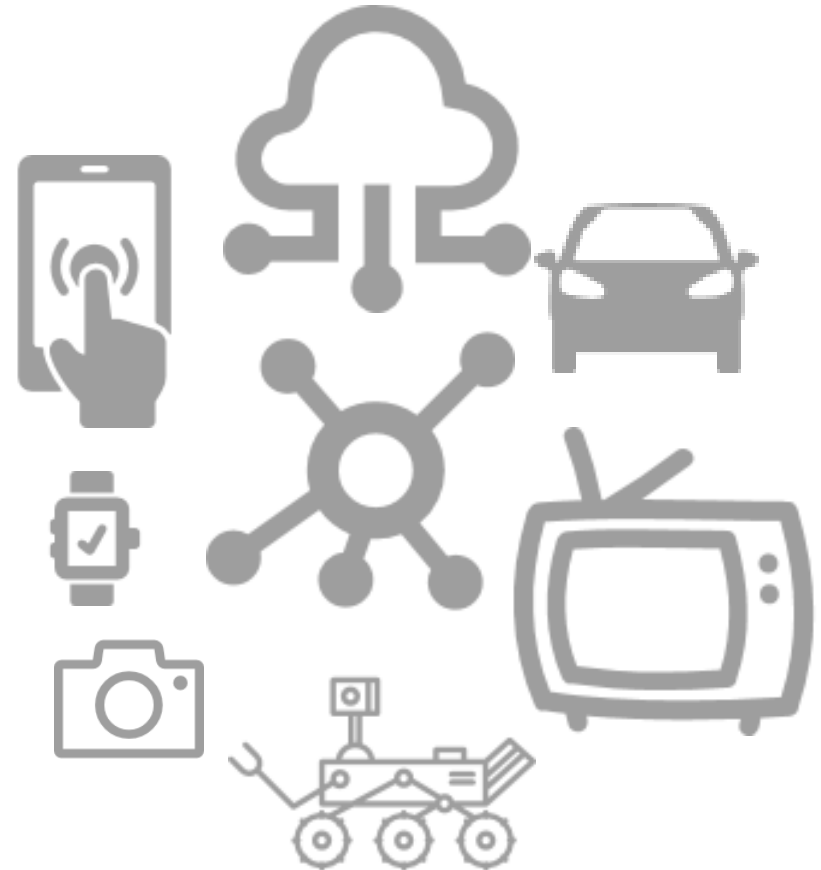
- Free and open source software platform
- Uses **mainline Linux Kernel**
- Introduces a **profile** concept
 - Multiple architectures (32/64 bits, ARM/x86)
 - Cross graphics system (Wayland/X11)
 - Supports native applications (EFL)
 - or HTML5 web apps



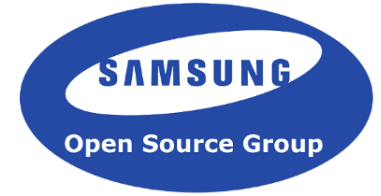
Tizen 3 Profiles



- Tizen:Common
 - IVI (automotive)
 - Wearable
 - Mobile
 - TV
 - Micro (headless)



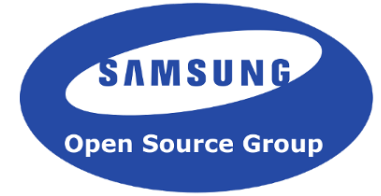
How to build Tizen from scratch?



- **GBS** (Git Build System)
 - Supported workflow : GBS, MIC ...
 - Uses tizen Infra (OBS)
- **Yocto** / OpenEmbedded (OE)
 - Alternative build system
 - Standalone



The Yocto Project



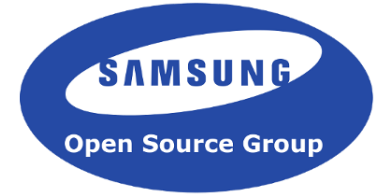
Linux foundation collaborative project

- create **custom** Linux-based systems
- for embedded devices
- use OpenEmbedded framework
- **Industry** & community support



yocto .
PROJECT

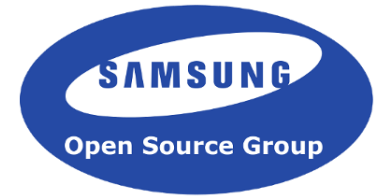
Tizen on Yocto



- Project which aims at
 - building Tizen images
 - using the tools provided by the Yocto Project
- Tizen **distribution** layer (meta-tizen)
 - for Yocto/OpenEmbedded
- **Easy** to setup for ARM or Intel



Building Tizen Yocto/OE (1/3)



- Download **tizen-distro**

```
git clone git://review.tizen.org/scm/bb/tizen-distro
cd tizen-distro
```

- Download meta layers:
 - with **board support packages (BSP)**
- Initialize build environment

```
source ./tizen-common-init-build-env build-common
```


Building Tizen Yocto/OE (2/3)



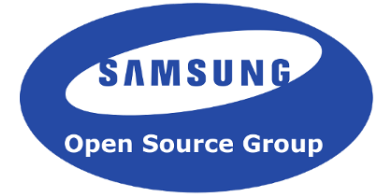
- Configure `conf/local.conf`

```
MACHINE ??= "intel-corei7-64"  
PARALLEL_MAKE ?= "-j 8"  
BB_NUMBER_THREADS ?= "8"  
...
```

- Add BSP meta layer(s) to `conf/bblayers.conf`

```
...  
BBLAYERS += ".../meta-${bsp}"  
BBLAYERS_NON_REMOVABLE += ".../meta-${bsp}"
```

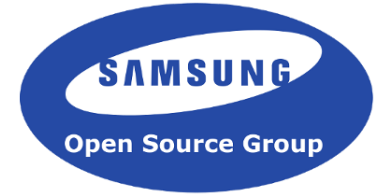
Building Tizen Yocto/OE (3/3)



- Build an image using **bitbake**
 - Get some coffee...
- Install the generated image from
 - `tmp-glibc/deploy/images/${MACHINE}`

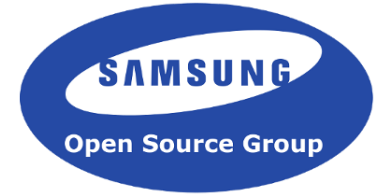


Connectivity



- Interoperability, Cloud services : Convergence?
- Provided by Tizen stack with High level APIs
 - Networking, Bluetooth, Telephony, NFC.
 - Based on FLOSS, Connman, wpa_s, Bluez, ofono (IVI)
- Open to any other/future FLOSS technology
 - Hint : Use **contrib** repository
 - **IoT**: OIC's IoTivity...

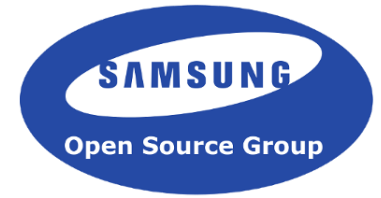




- Reference implementation lib (C/C++, binding)
 - Standard: Open Interconnect Consortium (OIC)
 - FLOSS: Apache-2.0, Linux Foundation
 - Services: Interop, **comm**, discovery, sec, plugins...
 - Cross platform : Linux, Tizen, Android, Arduino...
- Strategy: just add **meta-oic** layer

```
BBLAYERS += ".../meta-oic"
```

- linux or tizen target OS : Kernel .config fragments

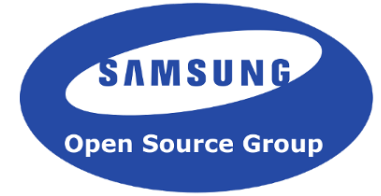


Showcase

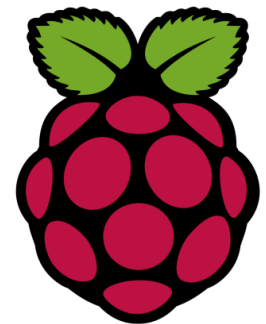
More live demos at booth (K)



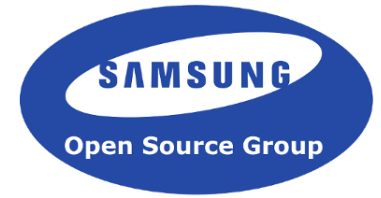
Raspberry Pi



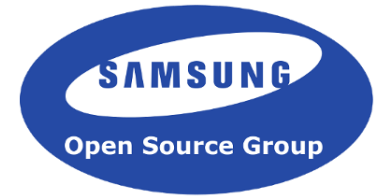
- Any Raspberry Pi model and versions
 - meta-raspberrypi BSP
 - + GPU/DRI patches
- Initial porting efforts by Samsung OSG
- Used as reference for **Tizen:Micro**
- Demo : IoTivity phone controlling fan



Tizen phone controls RPI's fan



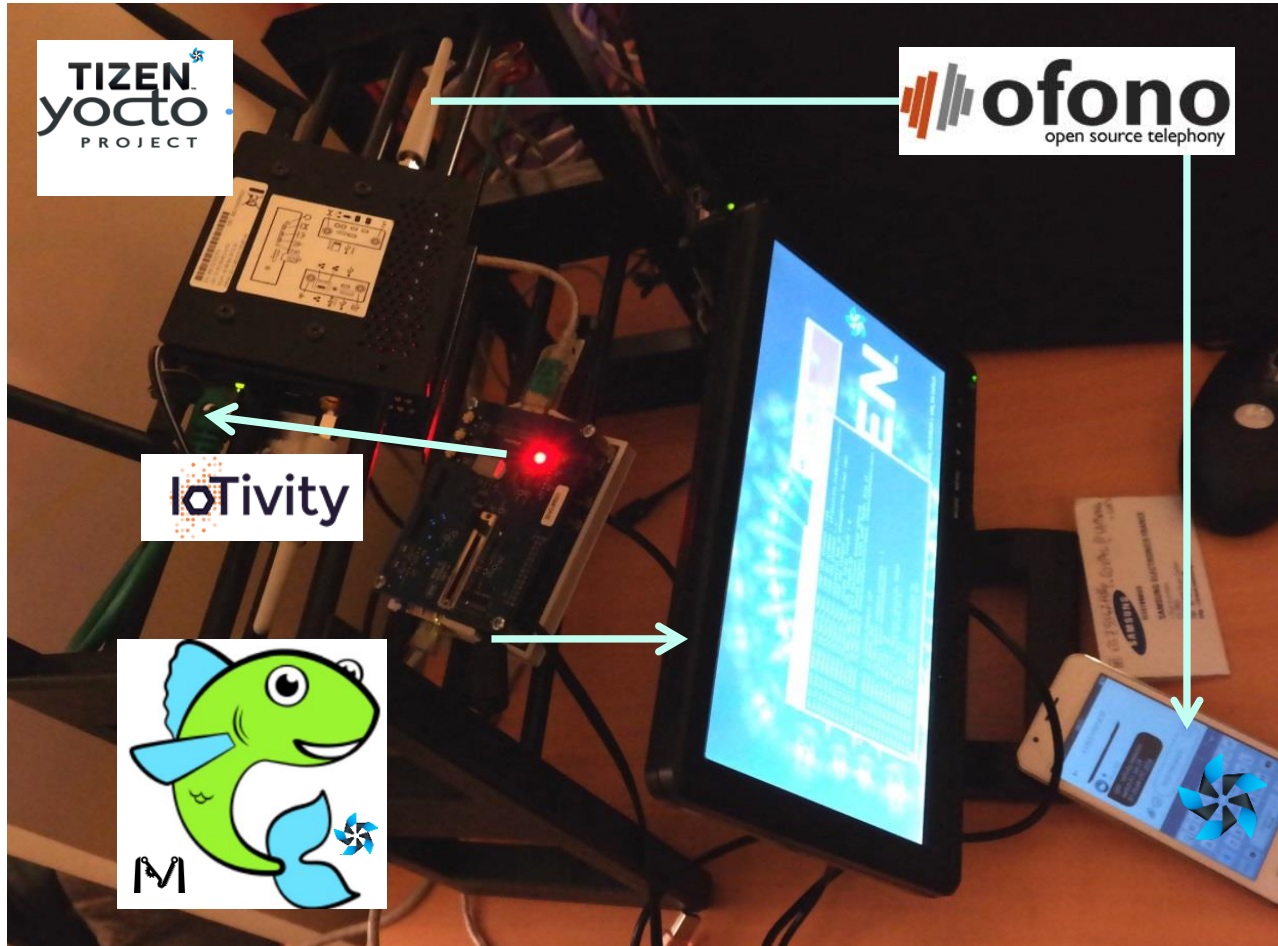
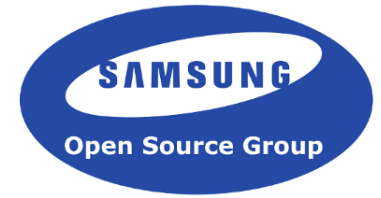
Kontron M2M device



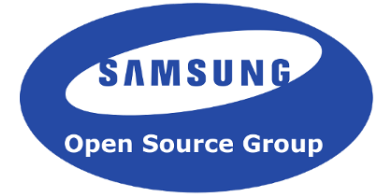
- Hardware: to embed in your car ?
 - Atom, 3G Modem, CAN, 6LowPAN, 12V
 - Support: BSP meta-intel / meta-fri2 (dizzy)
- Strategy: IVI or Micro ?
 - Tizen:IVI : PVR GPU = SW Rendering on Wayland
 - Tizen:Micro : profile for **headless**
 - Demo : IoTivity **observer** that send SMS (ofono)



Observe IoTivity resource by SMS

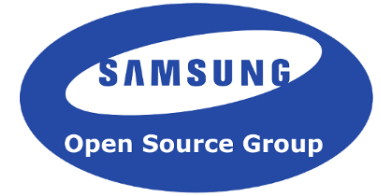


HummingBoard (i.MX6 SoC)



- Support:
 - BSP: meta-fsl-arm and meta-fsl-arm-extra
- Features:
 - Hardware graphics acceleration for Wayland/Weston
 - Standalone HTML5 applications
- <https://wiki.tizen.org/wiki/HummingBoard>

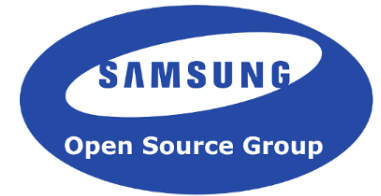
Challenges



- **Align** meta-tizen
 - with newer releases of Yocto Project / T.Common
- Support more hardware platforms
 - Support BSP = Extend **community**
 - SBCs: Odroids, Artik, RPI0, +MIPS...
- Test and fix meta-tizen (gcc5, security fw, ...)
- Focus on Tizen:Micro (headless / IoT)



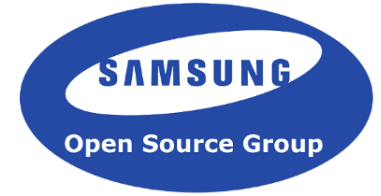
Contributing to Tizen



- Git / Gerrit
 - <https://review.tizen.org/gerrit/>
- JIRA
 - <https://bugs.tizen.org/>
- Mailing lists
 - <https://www.tizen.org/community/mailling-lists>
- Live online
 - <irc://irc.freenode.net/#tizen>



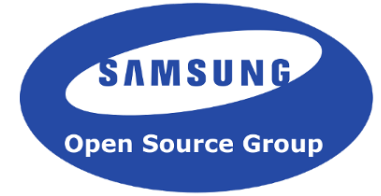
Contributing to Tizen on Yocto



- **tizen-distro** layers:
 - bitbake, openembedded-core,
 - meta-openembedded, meta-qt5
 - **meta-tizen:**
git://git.tizen.org/scm/bb/meta-tizen
- Combined using combo-layer script in:
- *git://git.tizen.org/scm/bb/tizen-distro*



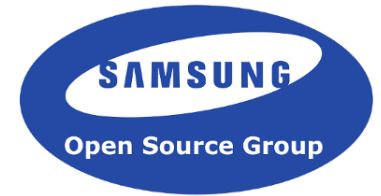
Contributing to Tizen on Yocto



- Exact steps:
https://wiki.tizen.org/wiki/How_to_contribute_to_Tizen_on_Yocto_Project
- Any contributors **welcome**
 - File bugs in TY Section
 - Don't be shy, ask us for **support**



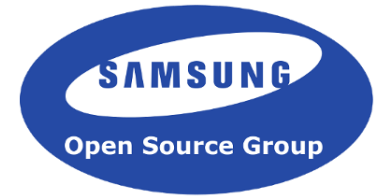
Summary



- Cooperation between Tizen and Yocto/OE
- **Flexibility:**
 - Autonomous build system
- **Extensibility:** Add any existing layer
 - For supporting new hardware
 - Or new IoT features like IoTivity (using meta-oic)
- Open to contributions



Resources:

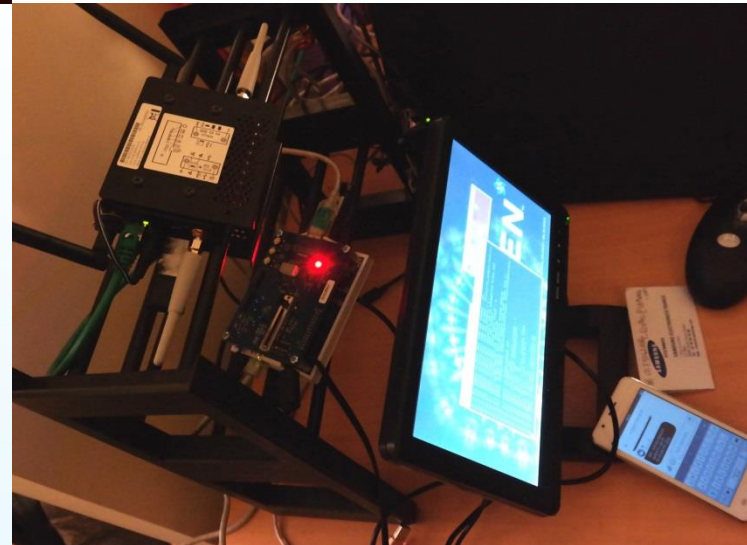


- <https://wiki.tizen.org/wiki/Category:Yocto>
- <https://wiki.iotivity.org/tizen>
- <https://www.yoctoproject.org/documentation>
- https://wiki.tizen.org/wiki/Build_Tizen_with_Yocto_Project
- <http://wiki.tizen.org/wiki/ARM>
- <http://blogs.s-osg.org/category/tizen/>
- <http://elinux.org/FRI>
- https://wiki.tizen.org/wiki/Tizen_Micro





Q&A ?

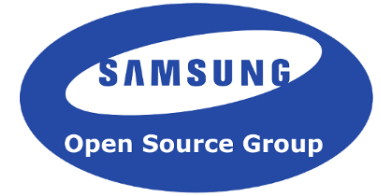




Thank You!

Samsung, Intel, Linux Foundation, JLR, Konsulko group, Eurogiel/Intel bzh team, Olimex, Kontron, Atmel, Allwinner, Ingenic, SolidRun. Tizen, EFL, Yocto/OE, IoTivity contributors, Flaticons (CC BY 2.0), OSHW, FLOSS communities, FOSDEM team and volunteers...

Demo Sources (WIP)



- meta-yocto-demos

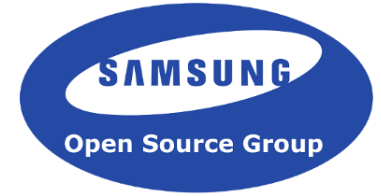
- To stage changes, recipes and configurations
- Helper to build images with simpler “make” call
- Machines : raspberrypi2, odroidc1, ...
- Request your SBC to be supported



- iotivity-example

- Minimal client/server + mraa + integration files

Hardware support & Devices



- **X86 / x86_64 (Generic) :**
 - MinnowMAX (OSHW), Intel NUC, FRI2
 - Your PC?
- **ARM:**
 - RaspberryPi (ARMv6 / ARMv7)
 - HummingBoard (i.MX6 SoC)
- ...

