

Title:- Workshop : Seamless Device Connectivity with IoTivity and Zephyr

Preferred Distribution:- **Ubuntu 16.04 LTS (Xenial)**, 64 bit preferred for Zephyr SDK

Option1:- Install Virtual Box to run preconfigured Ubuntu VM instance, run any Linux VM instance once before the event to ensure kernel module dependencies.

Option2:- Install following packages manually on a machine installed with Ubuntu 16.04 LTS

A) IoTivity simulator

- Download latest edition of eclipse (Java edition is preferred, works with CDT also) and extract in a suitable location like ~/IEW2018
- Launch the eclipse (~/IEW2018/eclipse/eclipse)
- In eclipse **Help** -> **Install New Software**, add one of the following repositories
 - <https://downloads.iotivity.org/tools/simulator/latest>
 - <https://mirrors.kernel.org/iotivity/tools/simulator/latest>
 - <ftp://mirrors.kernel.org/iotivity/tools/simulator/latest>
- Select Simulator from retrieved list and install it
Ref:-https://wiki.iotivity.org/iotivity_tool_guide

B) IoTivity (Native Build)

- Install necessary packages for build environment

```
sudo apt-get install \
    build-essential git scons libtool autoconf \
    valgrind doxygen wget unzip
```
- Install necessary development libraries

```
sudo apt-get install
    libboost-dev libboost-program-options-dev \
    libboost-thread-dev uuid-dev libexpat1-dev \
    libglib2.0-dev libsqlite3-dev libcurl4-gnutls-dev
```
- Download latest source code of iotivity, since latest version of available simulator is 1.2.1, let's build the same version
- Extract downloaded source in a suitable location like ~/IEW2018 and switch to extracted content (~/IEW2018/iotivity-1.2.1)

- Checkout necessary external libraries like tinycbor, mbedtls using git as specified during build (inside `~/IEW2018/iotivity-1.2.1`)

```
git clone https://github.com/01org/tinycbor.git \
    extlibs/tinycbor/tinycbor -b v0.4.1
```

```
git clone https://github.com/ARMmbed/mbedtls.git \
    extlibs/mbedtls/mbedtls -b mbedtls-2.4.0
```

- Build the source with following command (inside `~/IEW2018/iotivity-1.2.1`)
scons

Ref:- https://wiki.iotivity.org/build_iotivity_with_ubuntu_build_machine

C) Zephyr

- Install following dependencies to build zephyr and work with networking tools
sudo apt-get install python3-pip socat libpcap-dev
sudo pip install pyelftools pyyaml

- Install Qemu for x86, ARM targets for emulation purpose
sudo apt-get install qemu-system-x86 qemu-system-arm

- Download zephyr sdk v0.9.2 and install it to `/opt/zephyr-sdk` location
sudo ./zephyr-sdk-0.9.2-setup.run

Source:- <https://github.com/zephyrproject-rtos/meta-zephyr-sdk/releases/tag/0.9.2>

- Download source code of zephyr v1.9.2, extract the tarball to a convenient location, say `~/IEW2018` (let's not go to higher versions due to change in build process)

Source:- <https://github.com/zephyrproject-rtos/zephyr/releases/tag/zephyr-v1.9.2>

- Optionally you may build and run hello world application in Qemu environment

Ref:- http://docs.zephyrproject.org/1.9.0/getting_started/getting_started.html

Optional Packages:-

a) wireshark

```
sudo apt-get install wireshark
```

Configure wireshark to grant capture privileges to normal user as documented in <https://wiki.wireshark.org/CaptureSetup/CapturePrivileges>

```
setcap 'CAP_NET_RAW+eip CAP_NET_ADMIN+eip' /usr/sbin/dumpcap
```

```
chmod u+s /usr/bin/dumpcap
```

```
chgrp -a -G wireshark $USER
```

```
#logout and login once
```

```
groups
```

```
#ensure wireshark is listed
```

b) Firefox copper plugin

Ref:-<https://addons.mozilla.org/en-US/firefox/addon/copper-270430/>

c) Node-Red

```
sudo apt-get install nodejs npm
```

```
sudo npm install node-red -g
```

Ref:- <https://nodered.org/docs/getting-started/installation>