

TinyOS安装教程

步骤0：实验环境

本实验以如下版本为例，其他系统版本可能会出现未知的问题。同学们在安装过程可能会出现不同的问题，本教程尽量罗列出部分问题的解决方案，大家一定要耐心解决哦。

- ubuntu-14.04.6
- VMware Workstation 12 Player

步骤1：卸载老版本，第一次使用tinyOS可跳过

1.如果你以前没有安装过tinyos可以跳过这个步骤，如果你以前安装的是老的版本的tinyos（像2.1.1版本）那么你必须卸载掉有关tinyos的文件以及GCC-430的编译器以及工具等。卸载流程如下：打开终端（ctrl+alt+t）输入以下命令：卸载tinyos老的版本：

```
sudo apt-get remove tinyos-2.1.1
```

2.卸载gcc-msp430编译器：

```
sudo apt-get autoremove --purge msp430*
```

通过这两步就把你以前老版本的tinyos卸载掉了。

步骤2：tinyOS基础工作

1.在ubuntu的package list file添加源。这个命令使用的是gedit编辑器，当然你也可以使用vim等。

```
sudo gedit /etc/apt/sources.list
```

2.将以下代码添加到sources.list里面，保存后退出。

```
# TinyOS Repository
deb http://tinyos.stanford.edu/tinyos/dists/ubuntu lucid main
```

3.再执行以下命令：（务必确保虚拟机连上网！！！！）

```
sudo apt-get update
```

4.(成功执行update则跳到第5点) 若出现fail to fetch的情况，先备份原有的sources.list（以防出错可以恢复），再将如下代码拷贝到sources.list中：

```
# 默认注释了源码镜像以提高 apt update 速度，如有需要可自行取消注释

deb https://mirrors.tuna.tsinghua.edu.cn/ubuntu/ trusty main restricted universe multiverse

# deb-src https://mirrors.tuna.tsinghua.edu.cn/ubuntu/ trusty main restricted universe
multiverse

deb https://mirrors.tuna.tsinghua.edu.cn/ubuntu/ trusty-updates main restricted universe
multiverse

# deb-src https://mirrors.tuna.tsinghua.edu.cn/ubuntu/ trusty-updates main restricted
universe multiverse

deb https://mirrors.tuna.tsinghua.edu.cn/ubuntu/ trusty-backports main restricted universe
multiverse

# deb-src https://mirrors.tuna.tsinghua.edu.cn/ubuntu/ trusty-backports main restricted
universe multiverse

deb https://mirrors.tuna.tsinghua.edu.cn/ubuntu/ trusty-security main restricted universe
multiverse

# deb-src https://mirrors.tuna.tsinghua.edu.cn/ubuntu/ trusty-security main restricted
universe multiverse

#tinyos

deb http://tinyos.stanford.edu/tinyos/dists/ubuntu lucid main

deb http://tinyos.stanford.edu/tinyos/dists/ubuntu hardy main

deb http://hinrg.cs.jhu.edu/tinyos oneiric main
```

保存后再执行：

```
sudo apt-get update
```

5.update成功后，执行安装tinyos命令：

```
sudo apt-get install tinyos-2.1.2
```

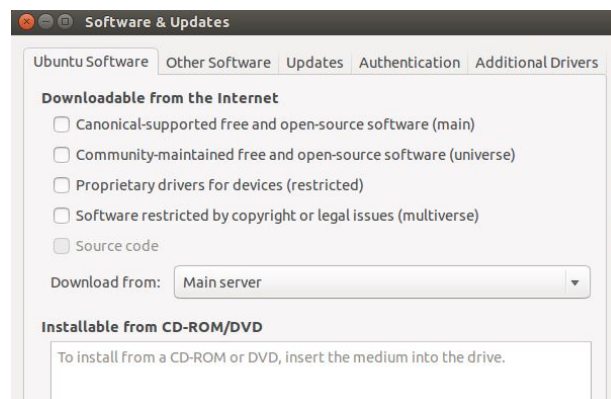
install成功如下：

```

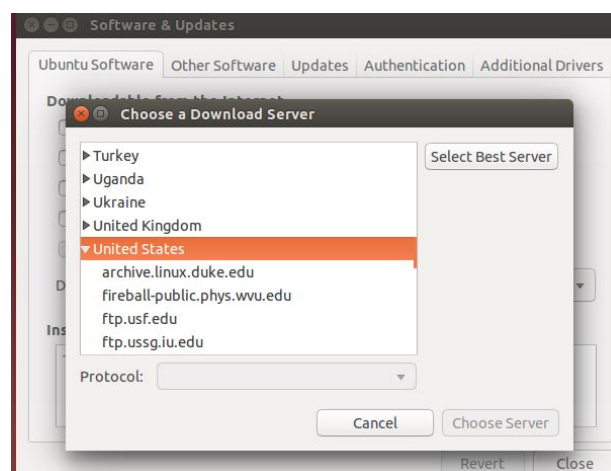
update-alternatives: using /usr/lib/jvm/java-6-openjdk-amd64/bin/schemagen to provide /usr/bin/schemagen (schemagen) in auto mode
update-alternatives: using /usr/lib/jvm/java-6-openjdk-amd64/bin/serialver to provide /usr/bin/serialver (serialver) in auto mode
update-alternatives: using /usr/lib/jvm/java-6-openjdk-amd64/bin/wsgen to provide /usr/bin/wsgen (wsgen) in auto mode
update-alternatives: using /usr/lib/jvm/java-6-openjdk-amd64/bin/wsimport to provide /usr/bin/wsimport (wsimport) in auto mode
update-alternatives: using /usr/lib/jvm/java-6-openjdk-amd64/bin/xjc to provide /usr/bin/xjc (xjc) in auto mode
Setting up openjdk-6-jre-lib (6b41-1.13.13-0ubuntu0.14.04.1) ...
Setting up libatk-wrapper-java-jni:amd64 (0.30.4-4) ...
Processing triggers for libc-bin (2.19-0ubuntu6.15) ...
Processing triggers for ca-certificates (20170717~14.04.2) ...
Updating certificates in /etc/ssl/certs... 0 added, 0 removed; done.
Running hooks in /etc/ca-certificates/update.d....
done.

```

6. **(成功install则跳到步骤3)** 若安装过程出现 Unable to locate package的错误，可能软件源有问题，可尝试换一个。通过文件系统进入/etc/apt/目录下，双击目录下的sources.list文件，可以打开一个图形化窗口，如图：



点击"Download from"下拉框，选择"Other"，会出现下图弹框：



首先点击“Select Best Server”，系统开始自动查找最合适的软件源，待系统搜索完成后会自动定位到最合适的一个源上，此时再点击“Choose Server”，会提示reload进行更新，更新成功后可以成功执行 `sudo apt-get install tinyos-2.1.2`

7. **(成功install则跳到步骤3)** 若在安装过程出现：Unable to fetch some archives, maybe run apt-get update or try with --fix-missing? 可 `sudo vim /etc/resolv.conf` 添加 `nameserver 8.8.8.8` 重新update和install，可继续完成安装。

安装成功后，现在tinyos的基础工作已经做好，接下来就是完成配置以及安装相应的编译器即可。

步骤3：tinyOS的配置

1.改变tinyos文件夹的所有权，才能完成后面的配置，分别输入如下命令：（注：yourusername要替换成你自己的用户名）

```
sudo chown your_user_name:your_user_name -R /opt/tinyos-2.1.2/
sudo chown your_user_name -R /opt/tinyos-2.1.2
```

```
jiangchengling@ubuntu:~$ sudo chown jiangchengling:jiangchengling -R /opt/tinyos-2.1.2/
[sudo] password for jiangchengling:
jiangchengling@ubuntu:~$ sudo chown jiangchengling -R /opt/tinyos-2.1.2
jiangchengling@ubuntu:~$
```

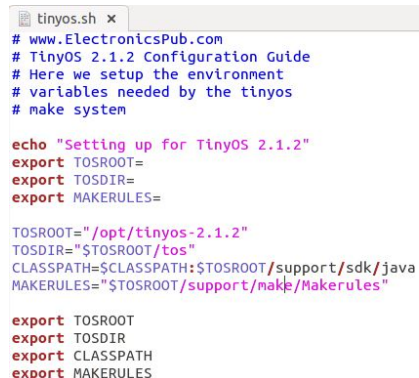
2.进入到tinyos-2.1.2目录下检查是否有tinyos.sh文件，如果没有新建这个文件并添加以下代码：

```
#!/usr/bin/env bash
# www.ElectronicsPub.com
# TinyOS 2.1.2 Configuration Guide
# Here we setup the environment
# variables needed by the tinyos
# make system

echo "Setting up for TinyOS 2.1.2"
export TOSROOT=
export TOSDIR=
export MAKERULES=

TOSROOT="/opt/tinyos-2.1.2"
TOSDIR="$TOSROOT/tos"
CLASSPATH=$CLASSPATH:$TOSROOT/support/sdk/java
MAKERULES="$TOSROOT/support/make/Makerules"

export TOSROOT
export TOSDIR
export CLASSPATH
export MAKERULES
```



```
tinyos.sh x
# www.ElectronicsPub.com
# TinyOS 2.1.2 Configuration Guide
# Here we setup the environment
# variables needed by the tinyos
# make system

echo "Setting up for TinyOS 2.1.2"
export TOSROOT=
export TOSDIR=
export MAKERULES=

TOSROOT="/opt/tinyos-2.1.2"
TOSDIR="$TOSROOT/tos"
CLASSPATH=$CLASSPATH:$TOSROOT/support/sdk/java
MAKERULES="$TOSROOT/support/make/Makerules"

export TOSROOT
export TOSDIR
export CLASSPATH
export MAKERULES
```

3.接下来我们配置环境变量，使用以下命令打开bash.bashrc

```
sudo gedit ~/.bashrc
```

在最下面添加以下代码：

```
# Start TinyOS environment pathing
export TOSROOT=/opt/tinyos-2.1.2
export TOSDIR=$TOSROOT/tos
export CLASSPATH=$TOSROOT/support/sdk/java/tinyos.jar:.$CLASSPATH
export MAKERULES=$TOSROOT/support/make/Makerules
export PATH=/opt/msp430/bin:$PATH
source /opt/tinyos-2.1.2/tinyos.sh
# End TinyOS pathing
```

4.用以下命令执行更改：

```
source ~/.bashrc
```

步骤4：安装java

在终端依次输入如下命令：

```
cd $TOSROOT/support/sdk/java
sudo tos-install-jni
make
make install
```

如果是第一次安装tinyos，MSP430一些工具会通过tinyos的安装自动安装，可以通过以下命令检查：

```
msp430-gcc --version
```

如果提示：command not found or msp430 compiler is not installed 请参考步骤5；或者提示已经安装了这个编译器但是版本在4.6.3以下，你也须按照步骤5安装。如果提示：现在编译器版本已经是4.6.3，那么可以尝试使用tinyos提供的demo进行试验了。

步骤5：安装编译器

依次输入以下命令：

```
sudo apt-get install gcc g++
sudo apt-get install python2.7 python2.7-dev
```

现在环境就搭建好了。可以进行仿真程序的测试了~

步骤6：测试仿真程序

进入程序所在的目录：

```
cd /opt/tinyos-2.1.2/apps/Blink
make micaz sim
```

```
jiangchengling@ubuntu:/opt/tinyos-2.1.2/support/sdk/java$ cd /opt/tinyos-2.1.2/apps/Blink
jiangchengling@ubuntu:/opt/tinyos-2.1.2/apps/Blink$ make micaz sim
mkdir -p simbuild/micaz
placing object files in simbuild/micaz
writing XML schema to app.xml
compiling BlinkAppC to object file sim.o
ncc -c -shared -fPIC -o simbuild/micaz/sim.o -g -O0 -tossin -fnesc-nido-tosnodes=1000 -fnesc-simulate -fnesc-nido-notenumber=sim_node(\\) -fnesc-gcc=gcc -Wall -Wshadow -Wnesc-all -target=micaz -fnesc-cfiles=simbuild/micaz/app.c -board=micazb -DDEFINED_TOS_ARM_GROUP=0x22 -param max-inline-tinsingle=100000 -DIDENT_APPNAME=\"BlinkAppC\" -DIDENT_USERNAME=\"jiangchengling\" -DIDENT_HOSTNAME=\"ubuntu\" -DIDENT_USERHASH=0x2dadd06bl -DIDENT_TIMESTAMP=0x5e83063dL -DIDENT_UIDHASH=0x430baccal -Wno-nesc-data-race BlinkAppC.nc -fnesc-dump=components -fnesc-dump=variables -fnesc-dump=constants -fnesc-dump=typedefs -fnesc-dump=interfacedefs -fnesc-dump=tags -fnesc-dump=file=app.xml
/opt/tinyos-2.1.2/tos/lib/tossin/sin_noise.c: In function 'sin_noise_gen':
/opt/tinyos-2.1.2/tos/lib/tossin/sin_noise.c:291:7: warning: variable 'noiseIndex' set but not used [-Wunused-but-set-variable]
    int noiseIndex = 0;
    ^
compiling Python support and C libraries into pytossim.o, tossin.o, and c-support.o
g++ -c -shared -fPIC -o simbuild/micaz/pytossim.o -g -O0 -DIDENT_APPNAME=\"BlinkAppC\" -DIDENT_USERNAME=\"jiangchengling\" -DIDENT_HOSTNAME=\"ubuntu\" -DIDENT_USERHASH=0x2dadd06bl -DIDENT_TIMESTAMP=0x5e83063dL -DIDENT_UIDHASH=0x430baccal /opt/tinyos-2.1.2/tos/lib/tossin/tossin_wrap.cxx -I/usr/include/python2.7 -I/opt/tinyos-2.1.2/tos/lib/tossin -DHAVE_CONFIG_H
/opt/tinyos-2.1.2/tos/lib/tossin/tossin_wrap.cxx: In function 'void SWIG_Python_AddErrorMsg(const char*)':
/opt/tinyos-2.1.2/tos/lib/tossin/tossin_wrap.cxx:880:42: warning: format not a string literal and no format arguments [-Wformat-security]
    PyErr_Format(PyExc_RuntimeError, msg);
                                     ^
g++ -c -shared -fPIC -o simbuild/micaz/tossin.o -g -O0 -DIDENT_APPNAME=\"BlinkAppC\" -DIDENT_USERNAME=\"jiangchengling\" -DIDENT_HOSTNAME=\"ubuntu\" -DIDENT_USERHASH=0x2dadd06bl -DIDENT_TIMESTAMP=0x5e83063dL -DIDENT_UIDHASH=0x430baccal /opt/tinyos-2.1.2/tos/lib/tossin/tossin.c -I/usr/include/python2.7 -I/opt/tinyos-2.1.2/tos/lib/tossin
g++ -c -shared -fPIC -o simbuild/micaz/c-support.o -g -O0 -DIDENT_APPNAME=\"BlinkAppC\" -DIDENT_USERNAME=\"jiangchengling\" -DIDENT_HOSTNAME=\"ubuntu\" -DIDENT_USERHASH=0x2dadd06bl -DIDENT_TIMESTAMP=0x5e83063dL -DIDENT_UIDHASH=0x430baccal /opt/tinyos-2.1.2/tos/lib/tossin/hashtable.c -I/usr/include/python2.7 -I/opt/tinyos-2.1.2/tos/lib/tossin
linking into shared object ./TOSSIMmodule.so
g++ -shared -fPIC -o simbuild/micaz/pytossim.o simbuild/micaz/sim.o simbuild/micaz/tossin.o simbuild/micaz/c-support.o -lstdc++ -o TOSSIMmodule.so
copying Python script interface TOSSIM.py from lib/tossin to local directory
*** Successfully built micaz TOSSIM library.
```

成功啦！