



**Intelligent Wireless Network Group**  
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# ns-3 Tutorial (Part II) Installation

**JCSSE 2011's tutorials and workshops**  
Wednesday, 11 May 2011, 9:00 - 16:00

# Time Table

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- ▶ 09:00 - 10:15 ns-3 Introduction & Installation
- ▶ 10:15 - 10.30 Break
- ▶ 10:30 - 12:00 Hands-On:  
Point-to-point and CSMA (Ethernet)
- ▶ 12:00 - 13:00 Lunch
- ▶ 13:00 - 14:15 Hands-On:  
Wireless & Tracing System and Visualizing Results
- ▶ 14:15 - 14:30 Break
- ▶ 14:30 - 15:30 Demonstation:  
ns-3 protocol stack modification
- ▶ 15:30 - 16:00 Q&A

# Supported platforms

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- ▶ **ns-3 is primarily developed on GNU/Linux platforms.**
- ▶ **Current supported platforms are listed as follow**
  - ▶ **Linux** x86 gcc 4.4, 4.3, 4.2, 4.1, and, 3.4.6.
  - ▶ **Linux** x86\_64 gcc 4.4.0, 4.3.2, 4.2.3, 4.2.1, 4.1.3, 3.4.6
  - ▶ **MacOS X** ppc and x86 (gcc 4.0.x and 4.2.x)
  - ▶ **Cygwin** gcc 3.4.4 (debug only), gcc 4.3.2 (debug and optimized)

# Installation instructions

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- ▶ Install prerequisite packages
- ▶ Download ns3 codes
- ▶ Build ns3
- ▶ Validate ns3

# Prerequisite packages for Ubuntu

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- ▶ *Minimal requirements for Python:* gcc g++ python python-dev
- ▶ *Debugging and GNU Scientific Library (GSL) support:* gdb valgrind gsl-bin libgsl0-dev libgsl0ldbl
- ▶ *Network Simulation Cradle (nsc):* flex bison
- ▶ *Reading pcap packet traces:* tcpdump
- ▶ *Database support for statistics framework:* sqlite sqlite3 libsqlite3-dev
- ▶ *Xml-based version of the config store:* libxml2 libxml2-dev
- ▶ *A GTK-based configuration system:* libgtk2.0-0 libgtk2.0-dev
- ▶ *Experimental with virtual machines and ns-3:* vtun lxc

# Prerequisite packages for Ubuntu

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- ▶ *Doxygen and related inline documentation:* doxygen graphviz imagemagick texlive texlive-latex-extra texlive-generic-extra texlive-generic-recommended
- ▶ *Ns3 maunal and tutorial:* texinfo dia texlive texlive-latex-extra texlive-extra-utils texlive-generic-recommended texi2html
- ▶ *Support for Gustavo Carneiro's ns-3-pyviz visualizer:* python-pygraphviz python-kiwi python-pygoocanvas libgoocanvas-dev
- ▶ *Support ns-3 development repositories:* mercurial bazaar
- ▶ *Boost C++ Libraries:* libboost-all-dev

# All In One Ubuntu Installation command

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```
sudo apt-get install gcc g++ python python-dev gdb \  
valgrind gsl-bin libgsl0-dev libgsl0ldbl flex bison tcpdump \  
sqlite sqlite3 libsqlite3-dev libxml2 libxml2-dev \  
libgtk2.0-0 libgtk2.0-dev vtun lxc \  
doxygen graphviz imagemagick texlive \  
texlive-latex-extra texlive-generic-extra \  
texlive-generic-recommended texinfo dia \  
texlive-extra-utils texi2html python-pygraphviz \  
python-kiwi python-pygoocanvas libgoocanvas-dev \  
mercurial bzip2 libboost-all-dev
```

# Downloading ns3 code (ns 3.10)

---

## ► By Mercurial

```
cd  
mkdir repos  
cd repos  
hg clone http://code.nsnam.org/ns-3-allinone  
cd ns-3-allinone  
./download.py -n ns-3.10
```



# http://code.nsnam.org/

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## Repositories list

<a href="#">Name</a>	<a href="#">Description</a>	<a href="#">Contact</a>
<b>ns-3-allinone</b>	ns-3 allinone scripts	<ns-developers@isi.edu>
<b>ns-3-bib</b>	unknown	unknown
<b>ns-3-dev</b>	ns-3 development tree	<ns-developers@isi.edu>
<b>ns-3-dev-ref-traces</b>	reference traces for ns-3-dev regression	<ns-developers@isi.edu>
<b>ns-3.10</b>	ns-3.10 release	<ns-developers@isi.edu>
<b>ns-3.4</b>	ns-3.4 release	<ns-developers@isi.edu>
<b>ns-3.4-ref-traces</b>	reference traces for ns-3.4	<ns-developers@isi.edu>
<b>ns-3.5</b>	ns-3.5 release branch	<ns-developers@isi.edu>
<b>ns-3.5-ref-traces</b>	unknown	unknown
<b>ns-3.5.1</b>	unknown	unknown
<b>ns-3.6</b>	ns-3.6 release	<ns-developers@isi.edu>
<b>ns-3.6-ref-traces</b>	reference traces for ns-3.6	<ns-developers@isi.edu>
<b>ns-3.7</b>	ns-3.7 release	<ns-developers@isi.edu>
<b>ns-3.7-ref-traces</b>	reference traces for ns-3.7 release	<ns-developers@isi.edu>
<b>ns-3.8</b>	ns-3.8 release	<ns-developers@isi.edu>
<b>ns-3.8-ref-traces</b>	reference traces for ns-3.8 release	<ns-developers@isi.edu>
<b>ns-3.9</b>	ns-3.9 release	<ns-developers@isi.edu>

# Downloading ns3 code (ns 3.10)

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## ► By Tarball

```
cd  
mkdir repos  
cd repos  
wget http://www.nsnam.org/releases/ns-allinone-3.10.tar.bz2  
tar xjf ns-allinone-3.10.tar.bz2
```

# Archived release:

<http://www.nsnam.org/releases/>

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<u>Name</u>	<u>Last modified</u>	<u>Size</u>	<u>Description</u>
 <a href="#">Parent Directory</a>		-	
 <a href="#">ns-3.0-pre-releases/</a>	13-Feb-2009 10:13	-	
 <a href="#">ns-3.1-ref-traces.tar.bz2</a>	30-Oct-2008 10:12	829K	
 <a href="#">ns-3.1.tar.bz2</a>	30-Oct-2008 10:12	771K	
 <a href="#">ns-3.2-ref-traces.tar.bz2</a>	30-Oct-2008 10:12	902K	
 <a href="#">ns-3.2.1-ref-traces.tar.bz2</a>	20-Nov-2008 09:39	892K	
 <a href="#">ns-3.2.1.tar.bz2</a>	20-Nov-2008 09:53	1.0M	
 <a href="#">ns-3.2.tar.bz2</a>	30-Oct-2008 10:12	1.0M	
 <a href="#">ns-3.3-ref-traces.tar.bz2</a>	19-Dec-2008 02:22	1.1M	
 <a href="#">ns-3.3.tar.bz2</a>	19-Dec-2008 02:21	1.1M	
 <a href="#">ns-allinone-3.4.tar.bz2</a>	01-Apr-2009 20:40	16M	
 <a href="#">ns-allinone-3.5.1.tar.bz2</a>	23-Sep-2009 03:30	17M	
 <a href="#">ns-allinone-3.5.tar.bz2</a>	04-Jul-2009 02:42	16M	
 <a href="#">ns-allinone-3.6.tar.bz2</a>	21-Oct-2009 20:54	87M	
 <a href="#">ns-allinone-3.7.1.tar.bz2</a>	17-Mar-2010 05:56	17M	
 <a href="#">ns-allinone-3.7.tar.bz2</a>	27-Jan-2010 05:45	17M	
 <a href="#">ns-allinone-3.8.tar.bz2</a>	04-May-2010 09:40	18M	
 <a href="#">ns-allinone-3.9.tar.bz2</a>	20-Aug-2010 15:20	18M	
 <a href="#">ns-allinone-3.10.tar.bz2</a>	06-Jan-2011 00:08	17M	



# Building ns-3 with ns-allinone-3.10 (Tarball)

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- ▶ For the first run, using ***build.py*** to create ***waf***

```
cd repos/ns-allinone-3.10
./build.py
```

```
# Build NSC
Entering directory `nsc'
=> python scons.py
scons: Reading SConscript files ...
Checking target architecture...(cached) x86
scons: done reading SConscript files.
```

```
[1707/1707] pfile: build/debug/src/template/libns3-template.pc
Waf: Leaving directory `/home/ns3/repos/ns-3-allinone/ns-3-dev/build'
'build' finished successfully (12m18.864s)
```

```
Modules built:
aodv             applications             bridge
```

```
visualizer      wifi                     wimax
```

```
Leaving directory `./ns-3-dev'
```

# Validating ns3 by test.py

---

- ▶ cd ns-3.10
- ▶ ./test.py

```
ns3@ns3-vbox:~/repos/ns-allinone-3.10/ns-3.10$ ./test.py
Waf: Entering directory `/home/ns3/repos/ns-allinone-3.10/ns-3.10/build'
Waf: Leaving directory `/home/ns3/repos/ns-allinone-3.10/ns-3.10/build'
'build' finished successfully (3.582s)
PASS: TestSuite rocketfuel-topology-reader
PASS: TestSuite lte-propagation-loss-model
PASS: TestSuite lte-bearer
PASS: TestSuite lte-device
PASS: TestSuite lte-phy
```

```
PASS: Example src/contrib/flow-monitor/examples/wifi-olsr-flowmon.py
PASS: Example examples/routing/simple-routing-ping6.py
PASS: Example examples/tutorial/first.py
PASS: Example examples/wireless/wifi-ap.py
PASS: Example examples/wireless/mixed-wireless.py
167 of 167 tests passed (167 passed, 0 skipped, 0 failed, 0 crashed)
ns3@ns3-vbox:~/repos/ns-allinone-3.10/ns-3.10$
```

# Running: Hello Simulator

---

```
./waf --run hello-simulator
```

```
ns3@ns3-vbox:~/repos/ns-allinone-3.10/ns-3.10$ ./waf --run hello-simulator
Waf: Entering directory `/home/ns3/repos/ns-allinone-3.10/ns-3.10/build'
Waf: Leaving directory `/home/ns3/repos/ns-allinone-3.10/ns-3.10/build'
'build' finished successfully (1.465s)
Hello Simulator
ns3@ns3-vbox:~/repos/ns-allinone-3.10/ns-3.10$ █
```



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# Installation: ns-3-dev

**JCSSE 2011's tutorials and workshops**  
Wednesday, 11 May 2011, 9:00 - 16:00

# ns-3-dev: Only install via Mercurial method

---

## ▶ Download ns-3-dev

```
cd  
mkdir repos  
cd repos  
hg clone http://code.nsnam.org/ns-3-allinone  
cd ns-3-allinone  
./download.py -n ns-3-dev
```



# Building ns-3-dev with ns-3-allinone

- ▶ For the first run, using ***build.py*** to create ***waf***

```
cd repos/ns-3-allinone
./build.py --enable-examples --enable-tests
```

```
ns3@ns3-vbox:~/repos/ns-3-allinone$ ./build.py --enable-examples --enable-tests
# Build NSC
Entering directory `nsc'
=> python sconscript.py
scons: Reading SConscript files ...
Checking target architecture...(cached) x86
scons: done reading SConscript files
```

```
[1703/1706] pfile: build/debug/src/visualizer/libns3-visualizer.pc
[1704/1706] pfile: build/debug/src/point-to-point-layout/libns3-point-to-point-layo
[1705/1706] pfile: build/debug/src/csma-layout/libns3-csma-layout.pc
[1706/1706] pfile: build/debug/src/template/libns3-template.pc
Waf: Leaving directory `/home/ns3/repos/ns-3-allinone/ns-3-dev/build'
'build' finished successfully (30m1.528s)
```

```
topology      pdu
visualizer    wifi          wimax
```

```
Leaving directory `./ns-3-dev'
ns3@ns3-vbox:~/repos/ns-3-allinone$
```

# Building ns-3-dev: build.py options

---

```
cd repos/ns-3-allinone
./build.py --help
```

```
ns3@ns3-vbox:~/repos/ns-3-allinone$ ./build.py --help
Usage: build.py [options]

Options:
  -h, --help            show this help message and exit
  --disable-nsc         Don't try to build NSC (built by default)
  --enable-examples    Do try to build examples (not built by default)
  --enable-tests       Do try to build tests (not built by default)
ns3@ns3-vbox:~/repos/ns-3-allinone$
```

# Validating ns-3-dev by test.py

---

- ▶ cd ns-3-dev
- ▶ ./test.py

```
ns3@ns3-vbox:~/repos/ns-3-allinone/ns-3-dev$ ./test.py
Waf: Entering directory `/home/ns3/repos/ns-3-allinone/ns-3-dev/build'
Waf: Leaving directory `/home/ns3/repos/ns-3-allinone/ns-3-dev/build'
'build' finished successfully (6.657s)

Modules built:
aodv                applications        bridge
click              config-store       core
csma                csma-layout        dsdu

PASS: Example /home/ns3/repos/ns-3-allinone/ns-3-dev/build/debug/src/mesh/ex
PASS: Example /home/ns3/repos/ns-3-allinone/ns-3-dev/build/debug/src/wimax/e
PASS: Example /home/ns3/repos/ns-3-allinone/ns-3-dev/build/debug/src/wimax/e
PASS: Example /home/ns3/repos/ns-3-allinone/ns-3-dev/build/debug/src/wimax/e
PASS: Example examples/routing/simple-routing-ping6.py
PASS: Example examples/wireless/wifi-ap.py
PASS: Example examples/wireless/mixed-wireless.py
PASS: Example examples/tutorial/first.py
PASS: Example src/core/examples/sample-simulator.py
PASS: Example src/bridge/examples/csma-bridge.py
PASS: Example src/flow-monitor/examples/wifi-olsr-flowmon.py
170 of 170 tests passed (170 passed, 0 skipped, 0 failed, 0 crashed, 0 valgr
ns3@ns3-vbox:~/repos/ns-3-allinone/ns-3-dev$
```