

P51 - Running Latency Tests

Dr Noa Zilberman

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The goal of this handout is to introduce you to simple latency tests of your design, using the OSNT platform.

1 Test Machines

For measuring latency you will use your NetFPGA platform (and its development machine) as the device under test (DUT), and the testing machine will be nf-test111. You will interact with the machines via ssh:

1. On a computer in the Practicals Classroom, log in using your own UIS credentials.
2. `ssh -X root@<hostname>.nf.cl.cam.ac.uk` and enter the password. Hosts ending in `.cl.cam.ac.uk` are permitted to ssh into these machines. `-X` enables X11 forwarding, allowing you to run graphical applications.
To ssh to the machines from outside the lab, follow the instructions on <https://www.cl.cam.ac.uk/local/sys/ssh/>.

Hostname	IP Address
nf-test101	128.232.82.84
nf-test108	128.232.82.78
nf-test110	128.232.82.93
nf-test111	128.232.82.71

Important: The IP addresses noted above should not be used for anything except for communication with the machines. The network interfaces assigned for the tests use different IP addresses.

2 Test Description

OSNT is an open source network tester, running on NetFPGA. It allows to generate traffic at full rate, and to capture traffic. Note that only low rate traffic, on a single port, is can be captured.

In our experiment we will use OSNT to generate traffic using different packet sizes, and measure the latency per packet size. The script compensates for the setup's latency, however in general this fixed-value should be measured and updated in the settings.

The test environment is shared between all projects. If you'd like to change any of the scripts, please copy the environment to a different folder (under crsid) first.

3 Practical Instructions

This section provides step-by-step instructions to running the latency test.

3.1 Accessing the board

1. Login to the development machine and program the board

```
$ ssh root@<hostname>.nf.cl.cam.ac.uk
$ cd ~/P51/NetFPGA-SUME-live/
$ source tools/settings.sh
$ cd tools/scripts/
$ ./run_load_image.sh $NF_DESIGN_DIR/bitfiles/reference_switch.sh
```

2. Login to the test machine and program the board

```
$ ssh root@<hostname>.nf.cl.cam.ac.uk
$ cd ~/P51/OSNT-SUME-live/projects/osnt/test/
$ ./run_load_image.sh osnt_20170129.bit
```

3. Connect OSNT on the test machine to NetFPGA on the development machine. Connect port nf0 on OSNT to port nf0 on NetFPGA, port nf1 on OSNT to port nf1 on NetFPGA etc. Use the provided fibres.
4. Run a latency test using a single port:

```
$ cd ~/P51/OSNT-SUME-live/p51/
$ make oneport
```

Results will be displayed on the screen and written under the folder *oneport*.

5. Building and running the full test suite:

```
$ cd ~/P51/OSNT-SUME-live/p51/
$ make
```

note that some of the tests may be updated at a later stage, allowing you to test more aspects of your design.

4 OSNT Resources

The best source for information on OSNT is <https://github.com/NetFPGA/OSNT-Public/wiki>. In addition:

- When programming the board for the first time, or after power up, a reset (init 6 / reboot) is required. After the reset, you need to reprogramme the board.
- Check if OSNT is recognized by the motherboard by running `lspci -vvx | grep Xil`. The expected result will show an entry stating Xilinx and a value (typically 7038).
- Check that OSNT-SUME-live repo is cloned under `/root/P51/` and that make was run as detailed in <https://github.com/NetFPGA/OSNT-Public/wiki/OSNT-SUME-Getting-Started-Guide>.
- Check that the leds are green on connected interfaces.