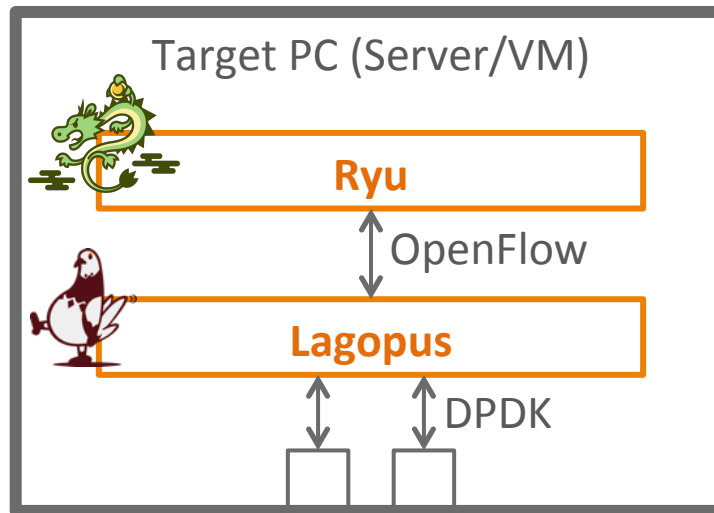


- Today's goal
- System requirements
- **Handson**
 - **Download the handson material**
 - **Setup essential packages**
 - **Setup DPDK**
 - **Setup Lagopus**
 - ~~Setup Ryu~~
 - ~~Run simple L2 switch application~~

Today's goal



- Setup DPDK, Ryu, and Lagopus in a single PC



System requirements



- **>= 2 CPU cores**
- **>= 1GB main memory**
- **>= 3 NICs**
 - One is for ssh connection
 - The others are for switch ports
 - Intel DPDK supported NICs
- **Intel DPDK supported Linux**
 - This document is for Ubuntu 14.04 LTS

● Download handson materials

- `$ cd`



ホームディレクトリに
移動してください

- `$ wget http://lagopus.github.io/handson/
handson.tar.xz`

- `$ tar Jxf handson.tar.xz`

● Install misc. packages

- `$ sudo apt-get update`
- `$ sudo apt-get install unzip build-essential libexpat1-dev libgmp-dev libncurses5-dev libssl-dev libpcap-dev byacc flex libreadline-dev python-dev python-pastedeploy python-paste python-twisted git python-setuptools python-pip libxml2-dev libxslt1-dev ethtool`

Setup essential software packages



1. unzip
2. build-essential
3. libexpat¹-dev
4. libgmp-dev
5. libncurses⁵-dev
6. libssl-dev
7. libpcap-dev
8. byacc
9. flex
10. libreadline-dev
11. python-dev
12. python-pastedeploy
13. python-paste
14. python-twisted
15. git
16. python-setuptools
17. python-pip
18. libxml²-dev
19. libxslt¹-dev
20. ethtool

● Setup hugepages

- `$ sudo vi /etc/default/grub`
 - `GRUB_CMDLINE_LINUX="hugepages=256"`
- `$ sudo update-grub`
- `$ sudo reboot`

● Compile DPDK libraries and kernel modules

- `$ cd ~/handson`
- `$ less compile-dpdk.sh`
- `$./compile-dpdk.sh`

Setup intel DPDK



- **Get PCI bus info. of NICs**

- `$./dpdk-1.7.0/tools/dpdk_nic_bind.py --status`

```
masutani@ubuntu1404:~$ ./dpdk-1.7.0/tools/dpdk_nic_bind.py --status
```

```
Network devices using DPDK-compatible driver
```

```
=====
```

```
<none>
```

```
Network devices using kernel driver
```

```
=====
```

```
0000:02:01.0 '82545EM Gigabit Ethernet Controller (Copper)' if=eth0 drv=e1000 unused= *Active*
0000:02:05.0 '82545EM Gigabit Ethernet Controller (Copper)' if=eth1 drv=e1000 unused=
0000:02:06.0 '82545EM Gigabit Ethernet Controller (Copper)' if=eth2 drv=e1000 unused=
0000:02:07.0 '82545EM Gigabit Ethernet Controller (Copper)' if=eth3 drv=e1000 unused=
```

```
Other network devices
```

```
=====
```

```
<none>
```


Setup intel DPDK



- **Set PCI info to install shell script**

- `$ sudo vi install-dpdk.sh`

```
DPDK_NIC_PCIS="0000:02:05.0 0000:02:06.0 0000:02:07.0"
```

- **Install modules, unbind NICs from kernel, and bind NICs to DPDK modules**

- `$./install-dpdk.sh`

Setup intel DPDK



- **For further information**

- <http://www.intel.com/content/www/us/en/intelligent-systems/intel-technology/packet-processing-is-enhanced-with-software-from-intel-dpdk.html>
- <http://dpdk.org/>

● Compile

- `$ cd ~/handson/lagopus`
- `$./configure --with-dpdk-dir=${HOME}/handson/dpdk-1.7.0`
- `$ make`

● Install

- `$ sudo make install`

● Prepare configuration file

- `$ sudo cp ~/handson/files/lagopus.conf /usr/local/etc/lagopus/`
- `$ vi /usr/local/etc/lagopus/lagopus.conf`

● For further information

- Docs in the source tree: <http://github.com/lagopus/>
- We also plan to prepare binary packages for Linux distributions

- **Run Lagopus**

- `$ sudo lagopus -d -- -c3 -n1 -- -p3`

- Options

- `-d`: Debug mode (foreground)
- `-c bitmask`: Which CPU cores to use
- `-n channels`: Memory channels
- `-p bitmask`: Which NICs to use

- `$ sudo pip install ryu`
- `$ sudo pip install six --upgrade`

- If you are familiar with docker, try

- `$ sudo docker pull osrg/ryu`

- **For further information**

- <http://osrg.github.io/ryu/>

- Or Ryu book

EBOOK: RYU SDN FRAMEWORK

› English Edition : [pdf](#), [mobi](#), [epub](#), [html](#)

› Japanese Edition : [pdf](#), [mobi](#), [epub](#), [html](#)



Run simple L2 switch application



- **Run Ryu with the application**

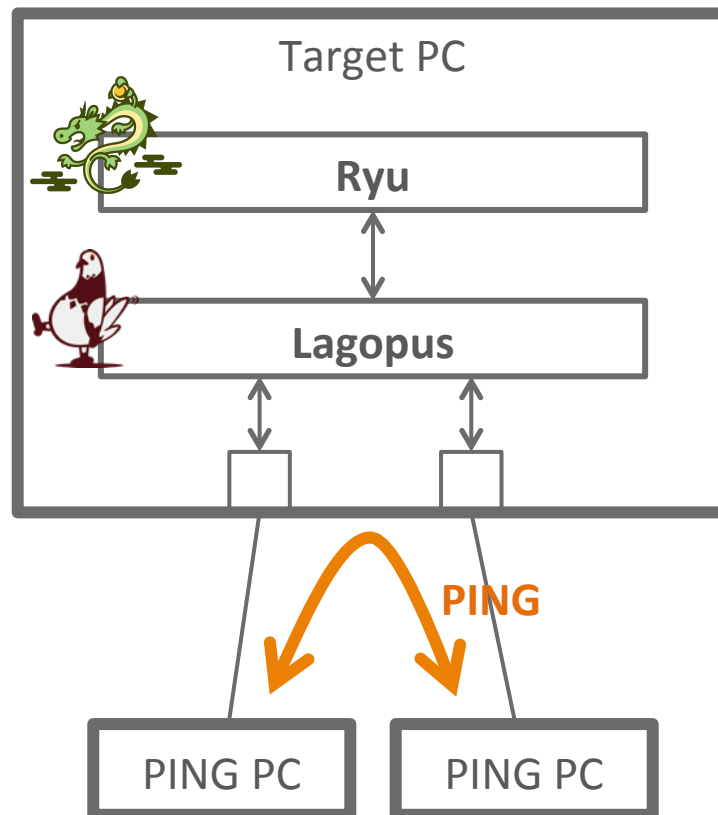
- `$ cd ~/handson/`

- `$ ryu-manager --verbose simple_switch_13.py &`

Run simple L2 switch application



- Your VM now acts as L2 switch
- You can check it by connecting another PCs or VMs





Innovative R&D by NTT

Thank you for your attention

lagopus

This research is a part of the project for “Research and Development of Network Virtualization Technology” supported by the Ministry of Internal Affairs and Communications.



- This document and necessary files can be downloaded from

<http://lagopus.github.io/handson/handson.pdf>

<http://lagopus.github.io/handson/handson.tar.xz>