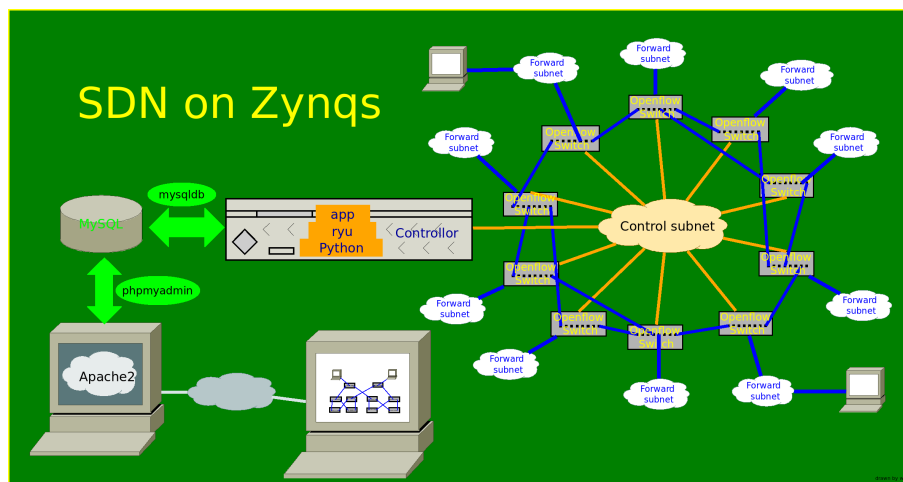# Configuration of Controllor for SDN Based on Zedboard

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1　System Chart

A SDN used openflow protocol is implemented on a platform of openflow switches based on zedboard. The system chart is shown as the following picture:

More info about the project can be found on [1]

2　Controllor Installation Guide

2.1　platform information

A PC installed Ubuntu 14.04 is used to serve as the controllor of the SDN. It has python 2.7 installed.

---

[1]

This computer is used to run the controllor program, store information about the network into mysql database and distribute the information through apache HTTP.

Material needed to install ryu controllor can be found in the forder ryu, Other software can be installed by apt-get.

2.2 Datebase

Install mysql

```
xup@xilinx-E6500:~/Desktop$ sudo apt-get install mysql-server mysql-client
```

config the password of mysql database to be mysql.

```
┤ Configuring mysql-server-5.5 ├
While not mandatory, it is highly recommended that you set a password for the MySQL administrative "root" user.

If this field is left blank, the password will not be changed.

New password for the MySQL "root" user:

*****

                                    <Ok>
```

Configuration   create database we need

```
xup@xilinx-E6500:~/Desktop/new_sdn
xup@xilinx-E6500:~/Desktop/new_sdn$ mysql -u root -p
Enter password:
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 54
Server version: 5.5.35-1ubuntu1 (Ubuntu)

Copyright (c) 2000, 2013, Oracle and/or its affiliates. All rights reserved.

Oracle is a registered trademark of Oracle Corporation and/or its
affiliates. Other names may be trademarks of their respective
owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql> create database meshsr;
Query OK, 1 row affected (0.00 sec)

mysql> use meshsr;
Database changed
mysql> source meshsr.sql
Query OK, 0 rows affected (0.00 sec)

Query OK, 0 rows affected (0.00 sec)

Query OK, 0 rows affected (0.00 sec)

Query OK, 0 rows affected (0.00 sec)

Query OK, 0 rows affected (0.00 sec)

Query OK, 0 rows affected (0.00 sec)

Query OK, 0 rows affected (0.09 sec)

Query OK, 0 rows affected (0.08 sec)

Query OK, 0 rows affected (0.09 sec)

Query OK, 0 rows affected (0.25 sec)

Query OK, 0 rows affected (0.08 sec)

Query OK, 0 rows affected (0.09 sec)

Query OK, 0 rows affected (0.07 sec)

Query OK, 0 rows affected (0.30 sec)
Records: 0  Duplicates: 0  Warnings: 0

Query OK, 0 rows affected (0.25 sec)
Records: 0  Duplicates: 0  Warnings: 0

Query OK, 0 rows affected (0.21 sec)
Records: 0  Duplicates: 0  Warnings: 0

Query OK, 0 rows affected (0.18 sec)
Records: 0  Duplicates: 0  Warnings: 0

Query OK, 0 rows affected (0.00 sec)

Query OK, 0 rows affected (0.00 sec)

Query OK, 0 rows affected (0.00 sec)
```

check the table in database meshsr

```
mysql> show tables;
+-------------------+
| Tables_in_meshsr  |
+-------------------+
| flowEntry         |
| meshsr_connection |
| meshsr_node       |
| phyLink           |
| ports             |
| serverNIC         |
| switches          |
+-------------------+
7 rows in set (0.01 sec)
```

2.3 python-mysqldb

install python module named mysqldb

```
xup@xilinx-E6500:~/Desktop$ sudo apt-get install python-mysqldb
```
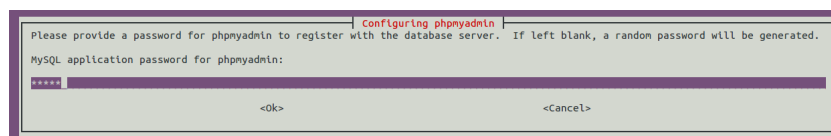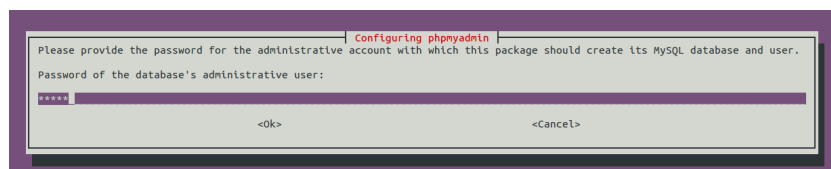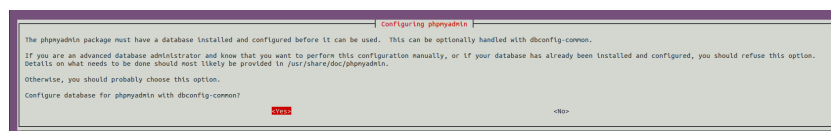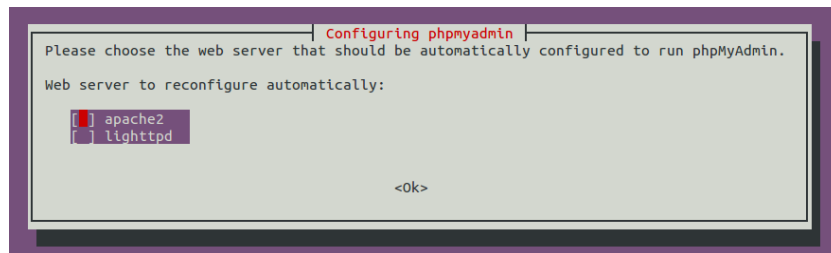
2.4 Website

install apache2

```
xup@xilinx-E6500:~/Desktop$ sudo apt-get install apache2
```

install php5 and libapache2-mod-php5

```
xup@xilinx-E6500:~/Desktop$ sudo apt-get install php5 libapache2-mod-php5
```

install myphpadmin

```
xup@xilinx-E6500:~/Desktop$ sudo apt-get install phpmyadmin
```

Configuration

```
root@xilinx-E6500: ~/Desktop
<VirtualHost *:80>
        # The ServerName directive sets the request scheme, hostname and port that
        # the server uses to identify itself. This is used when creating
        # redirection URLs. In the context of virtual hosts, the ServerName
        # specifies what hostname must appear in the request's Host: header to
        # match this virtual host. For the default virtual host (this file) this
        # value is not decisive as it is used as a last resort host regardless.
        # However, you must set it for any further virtual host explicitly.
        #ServerName www.example.com

        ServerAdmin webmaster@localhost
        ServerName localhost
        DocumentRoot /var/www/meshsr
        <Directory /var/www/meshsr>
        Require all granted
        AddHandler mod_php5 .php
        Options Indexes FollowSymLinks
        AllowOverride None
        DirectoryIndex index.php
        </Directory>

        # Available loglevels: trace8, ..., trace1, debug, info, notice, warn,
        # error, crit, alert, emerg.
        # It is also possible to configure the loglevel for particular
        # modules, e.g.
        #LogLevel info ssl:warn

        ErrorLog ${APACHE_LOG_DIR}/error.log
        CustomLog ${APACHE_LOG_DIR}/access.log combined

        # For most configuration files from conf-available/, which are
        # enabled or disabled at a global level, it is possible to
        # include a line for only one particular virtual host. For example the
        # following line enables the CGI configuration for this host only
        # after it has been globally disabled with "a2disconf".
        #Include conf-available/serve-cgi-bin.conf
</VirtualHost>
```

```
xup@xilinx-E6500:~/Desktop/new_sdn$ sudo cp -r meshsr /var/www/
```

```
root@xilinx-E6500:/var/www# chmod -R 755 meshsr/
```

```
root@xilinx-E6500:/var/www# /etc/init.d/apache2 restart
* Restarting web server apache2
AH00558: apache2: Could not reliably determine the server's fully qualified domain name, using 127.0.0.1. Set the 'ServerName' directive globally to suppress this message
root@xilinx-E6500:/var/www#                                                                                              [ OK ]
```

2.5 ryu

install ryu

```
xup@xilinx-E6500:~/Desktop/new_sdn/ryu$ sudo apt-get install python-pip
```

```
xup@xilinx-E6500:~/Desktop/new_sdn/ryu$ sudo python setup.py install
```

install some missing modules of python

```
root@xilinx-E6500:/home# ryu-manager -v
Traceback (most recent call last):
  File "/usr/local/bin/ryu-manager", line 5, in <module>
    from pkg_resources import load_entry_point
  File "/usr/lib/python2.7/dist-packages/pkg_resources.py", line 2749, in <module>
    working_set = WorkingSet._build_master()
  File "/usr/lib/python2.7/dist-packages/pkg_resources.py", line 444, in _build_master
    ws.require(__requires__)
  File "/usr/lib/python2.7/dist-packages/pkg_resources.py", line 725, in require
    needed = self.resolve(parse_requirements(requirements))
  File "/usr/lib/python2.7/dist-packages/pkg_resources.py", line 628, in resolve
    raise DistributionNotFound(req)
pkg_resources.DistributionNotFound: repoze.lru>=0.3
```

```
root@xilinx-E6500:/home# sudo apt-cache search repoz
python-repoze.lru - tiny LRU cache implementation and decorator
python3-repoze.lru - tiny LRU cache implementation and decorator for Python 3
python-pyramid - Pyramid web application framework, a Pylons project
python-repoze.sphinx.autointerface - Sphinx extension that auto-generates API docs from Zope interfaces
python-repoze.tm2 - Zope-like transaction manager via WSGI middleware
python-repoze.what - authorization framework for Python WSGI applications
python-repoze.what-plugins - authorization framework for Python WSGI applications - plugins collection
python-repoze.who - identification and authentication framework for Python WSGI applications
python-repoze.who-plugins - authentication framework for Python WSGI applications - plugins collection
python-translationstring - Utility library for i18n relied on by various Repoze packages - Python 3.x
python3-translationstring - Utility library for i18n relied on by various Repoze packages - Python 2.x
```

```
xup@xilinx-E6500:~$ sudo apt-get install python-repoze.lru
```