# I2NSF Hackathon Manual

## Hackathon, IETF 108, Online

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# Environment

- OS: Ubuntu 16.04 (64-bit)
- Openstack: Queens version
- ConfD: 6.6 version
- MySQL: 14.14 version
- RestConf: JETCONF server
- Suricata: 3.2.1 Release
- **Where to get code:** https://github.com/jaehoonpaul/i2nsf-framework

# Openstack Installation

The installation is installed on a freshly installed Ubuntu 16.04 Desktop version.

Installation Step:

1. Update Advanced package tool

```
$ sudo apt-get update
```

2. Create a stack user

```
$ sudo useradd -s /bin/bash -d /opt/stack -m stack
$ echo "stack ALL=(ALL) NOPASSWD: ALL" | sudo tee /etc/sudoers.d/stack
$ sudo su – stack
```

3. Download source code for from the github link

```
$ git clone https://opendev.org/openstack/devstack
```

4. Go to devstack folder

```
$ cd devstack
```

# Openstack Installation

5. Create a local.conf file

   ```
   $ touch local.conf
   ```

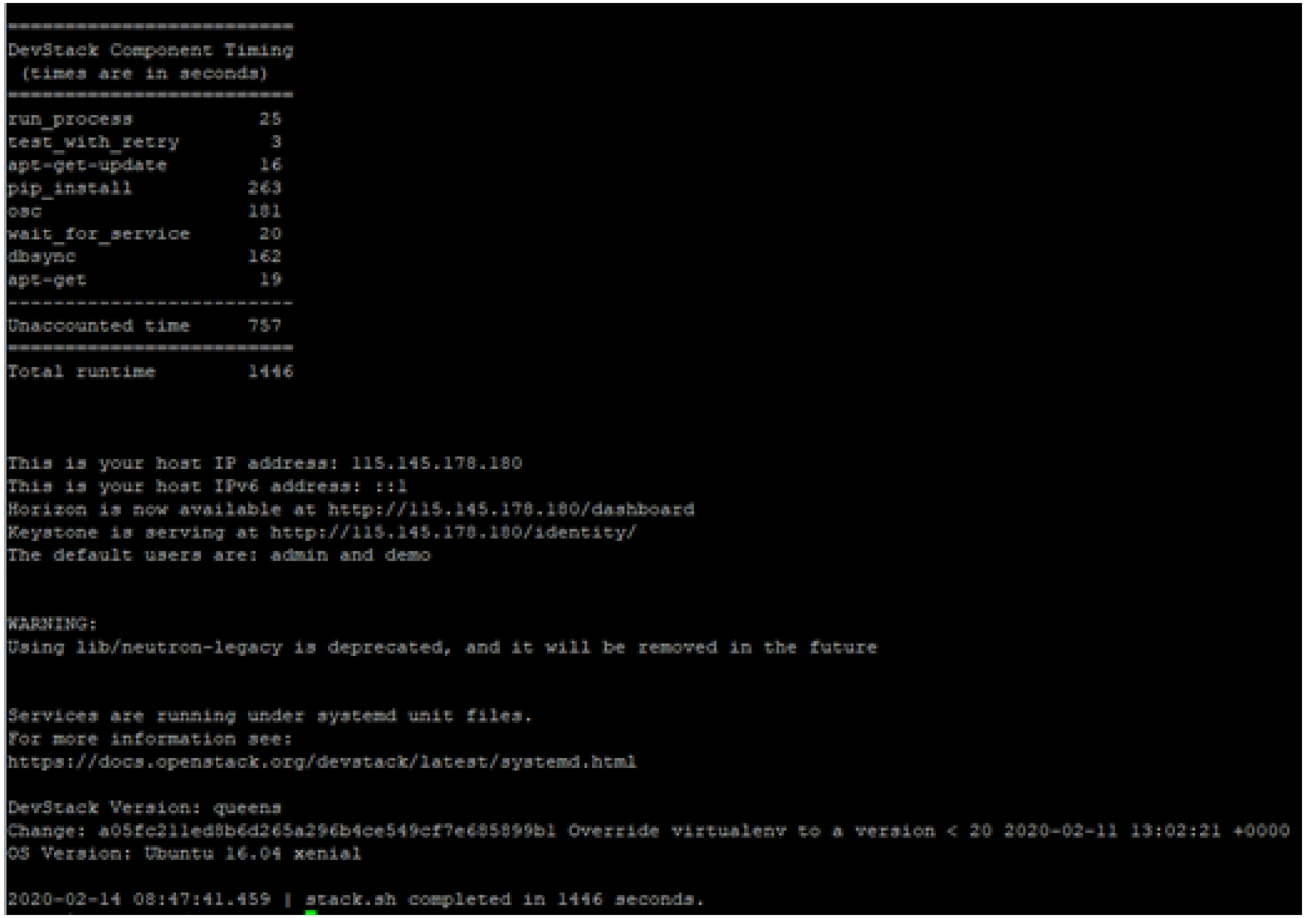
6. Edit the local.conf file with the file from:
   https://github.com/jaehoonpaul/i2nsf-framework/blob/master/Hackathon-108/devstack/local.conf
   Note: Make sure to change the IP address according to your IP address in local.conf

7. Run stack.sh

   ```
   $ ./stack.sh
   ```

# Openstack Installation

8. Wait until installation finish



```
=========================
DevStack Component Timing
 (times are in seconds)
=========================
run_process           25
test_with_retry        3
apt-get-update        16
pip_install          263
osc                  181
wait_for_service      20
dbsync               162
apt-get               19
-------------------------
Unaccounted time     757
=========================
Total runtime        1446



This is your host IP address: 115.145.178.180
This is your host IPv6 address: ::1
Horizon is now available at http://115.145.178.180/dashboard
Keystone is serving at http://115.145.178.180/identity/
The default users are: admin and demo


WARNING:
Using lib/neutron-legacy is deprecated, and it will be removed in the future


Services are running under systemd unit files.
For more information see:
https://docs.openstack.org/devstack/latest/systemd.html

DevStack Version: queens
Change: a05fc211ed8b6d265a296b4ce549cf7e685899b1 Override virtualenv to a version < 20 2020-02-11 13:02:21 +0000
OS Version: Ubuntu 16.04 xenial

2020-02-14 08:47:41.459 | stack.sh completed in 1446 seconds.
```

# Openstack Installation

9. Download source code

```
$ git clone https://github.com/jaehoonpaul/i2nsf-framework
```

10. Move i2nsf-framework/Hackathon-108/openstack/ to /opt/stack

```
$ mv i2nsf-framework/Hackathon-108/openstack/* /opt/stack/
```

11. Edit openstack_server.py IP address to your IP address

# I2NSF Framework Setup

- Security Controller, DMS Server, and employee example in Hackathon-108 use Ubuntu 16.04 cloud images.

- Download link: [http://cloud-images.ubuntu.com/xenial/current/](http://cloud-images.ubuntu.com/xenial/current/)

- Upload the image to OpenStack

```
$ glance image-create –visibility public –
disk-format qcow2 xenial-server-cloudimg-
amd64-disk1.img
```

- Setup Security groups in Openstack so Instances are able to connect to internet

# Security Controller

Installation:

1. Create Security Controller instance using Ubuntu 16.04 Cloud image
   ```
   $ nova boot --image xenial-server-cloudimg-amd64-disk1 --flavor m1.small --nic net-id=<private_network_id> --key-name <keypair-name> security_controller
   ```
2. Allocate Floating IP for Security Controller
3. Access Security Controller using SSH
4. Download the security controller source code from github
5. Update Advanced package tool
   ```
   $ sudo apt-get update
   ```

# Security Controller

6. Install packages

```
$ sudo add-apt-repository ppa:deadsnakes/ppa
$ sudo apt-get update
$ sudo apt-get install python python-pip python-mysqldb python-de
v libmysqlclient-dev mysql-client-core-5.7 libxml2-utils mysql-se
rver apache2 php-pear libapache2-mod-php php-mysql php-fpm php-cl
i php-mysqlnd php-pgsql php-sqlite3 php-redis php-apcu php-intl p
hp-imagick php-json php-gd php-curl python3.6 python3-pip build-e
ssential nghttp2 libnghttp2-dev libssl-dev make

$ pip install numpy==1.14.6 MySQL-python
*Notes: In this Hackathon-108 MySQL Password = secu
```

7. Install confd

```
$ cp /home/ubuntu/i2nsf-framework/Hackathon-108/* /home/ubuntu/
$ cd /home/ubuntu/confd-basic-linux.x86_64/
$ sh confd-basic-6.6.linux.x86_64.installer.bin
/home/ubuntu/confd-6.6
$ source /home/ubuntu/confd-6.6/confdrc
```

8. Edit server.py with the proper IP address

# Security Controller

9. Extract jetconf.tar in security_controller_web-v2

```
$ tar –xvf jetconf.tar
$ mv jetconf.tar /home/ubuntu/works/jetconf
```

10. Install JETCONF

```
$ cd /home/ubuntu/works/jetconf
$ pip install -r requirements.txt
$ python3 -m pip install .
```

11. Activate I2NSF web server for user

```
$ sudo cp -r /security_controller_web-v2/html /var/www/
```

# DMS Server

1. Create DMS server instance using Ubuntu 16.04 Cloud image
   ```
   $ nova boot --image xenial-server-cloudimg-amd64-disk1 --flavor m1.small --nic net-id=<private_network_id> --key-name <keypair-name> dms
   ```
2. Allocate Floating IP for DMS Server
3. Access DMS Server using SSH
4. Download the security controller source code from github
5. Update Advanced package tool
   ```
   $ sudo apt-get update
   ```

# DMS Server

6. Install packages

```
$ sudo apt-get install python python-pip python-mysqldb python-dev libmysqlclient-dev mysql-client-core-5.7 libxml2-utils mysql-server libxml2-utils
$ pip install numpy MySQL-python paramiko --user
```

7. Install confd

```
$ ./home/ubuntu/confd-basic-linux.x86_64/confd-basic-6.6.linux.x86_64.installer.bin /home/ubuntu/confd-6.6
$ source /home/ubuntu/confd-6.6/confdrc
```

8. Edit dms_server.py with the proper IP address

# Employee example

1. Create employee instance using Ubuntu 16.04 Cloud image

   ```
   $ nova boot --image xenial-server-cloudimg-amd64-disk1 --flavor m1.small --nic net-id=<private_network_id> --key-name <keypair-name> employee
   ```

2. Allocate Floating IP for employee
3. Access employee instance using SSH
4. Open web browser (ex: firefox)

   ```
   $ firefox
   ```

# Time-Based Firewall

1. Create Time-Based Firewall instance using Ubuntu 16.04 Cloud image
   ```
   $ nova boot --image xenial-server-cloudimg-amd64-disk1 --flavor m1.small --nic net-id=<private_network_id> --key-name <keypair-name> time_based_firewall
   ```
2. Download the repository from github
3. Move time-based-firewall to /home/ubuntu
   ```
   $ cp -r i2nsf-framework/Hackathon-108/NSF/time-based-firewall/* /home/ubuntu
   ```
4. Run install.sh
   ```
   $ sudo su
   $ sh install.sh
   ```
5. Wait until installation finished

# Time-Based Firewall

6. Create an image snapshot from openstack server

```
$ nova image-create --poll time_based_firewall
time_based_firewall2
```

7. Create VNFD in openstack server

```
$ tacker vnfd-create --vnfd-file time_based_firewall_vnfd.yaml
time_based_firewall_vnfd
```

# URL Filtering

1. Create Time-Based Firewall instance using Ubuntu 16.04 Cloud image
```
$ nova boot --image xenial-server-cloudimg-amd64-disk1 --flavor m1.small --nic net-id=<private_network_id> --key-name <keypair-name> url_filtering
```
2. Download the repository from github
3. Move time-based-firewall to /home/ubuntu
```
$ cp -r i2nsf-framework/Hackathon-108/NSF/url-filtering/* /home/ubuntu
```
4. Run install.sh
```
$ sudo su
$ sh install.sh
```
5. Wait until installation finished

# URL Filtering

6. Create an image snapshot from openstack server

```
$ nova image-create --poll url_filtering url_filtering2
```

7. Create VNFD in openstack server

```
$ tacker vnfd-create --vnfd-file url_filtering_vnfd.yaml
url_filtering_vnfd
```

# Operation

1. Start Security Controller

```
# ACCESS SECURITY CONTROLLER WITH 3 CONSOLES CONNECTION (SSH)
$ ssh -i (PATH_TO_KEYPAIR) ubuntu@Sec_controller_IP
# 1ST CONSOLE:
$ cd /home/ubuntu/Registration
$ sudo make clean all start

# 2nd CONSOLE:
$ cd /home/ubuntu
$ make target=testserver.py

# 3rd CONSOLE:
$ cd /home/ubuntu/works/jetconf
$ python3.6 run.py –c example.config
```

2. Run DMS Server

```
# ACCESS DMS WITH CONSOLES CONNECTION (SSH)
$ ssh -i (PATH_TO_KEYPAIR) ubuntu@DMS_IP
$ python dms_server.py
```

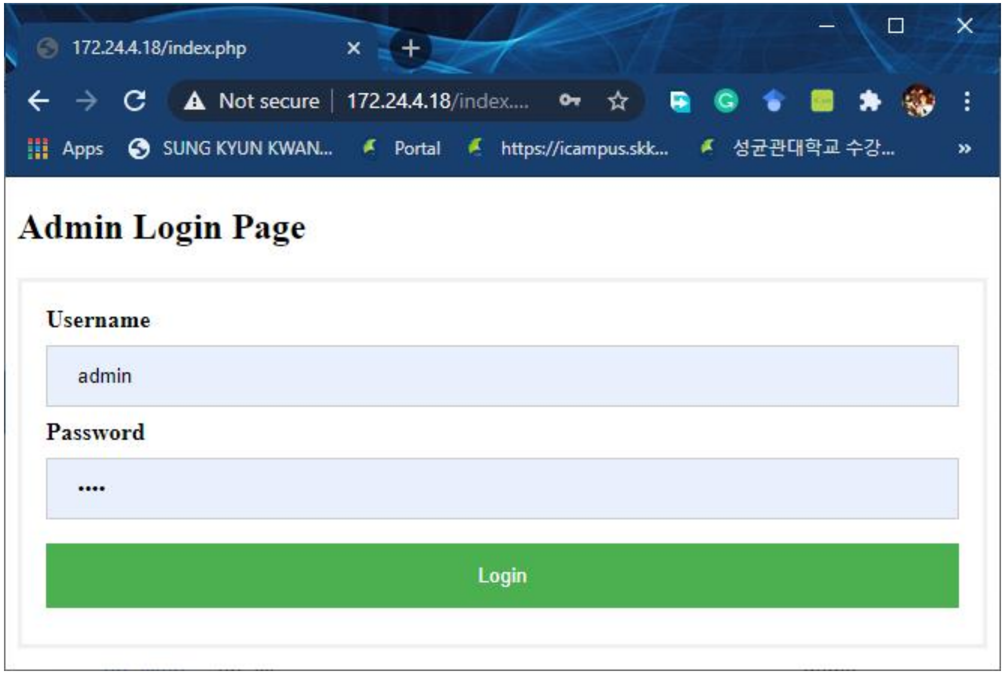
3. Start Socket For OpenStack

```
#In the openstack console, run openstack_server.py
$ . demorc
$ python openstack_server.py
```

# Operation

## 4. Run web-based I2NSF user

```
#Use a web browser and enter sec_controller_ip/index.php
#username: admin
#password: secu
```



### Admin Login Page

Username

admin

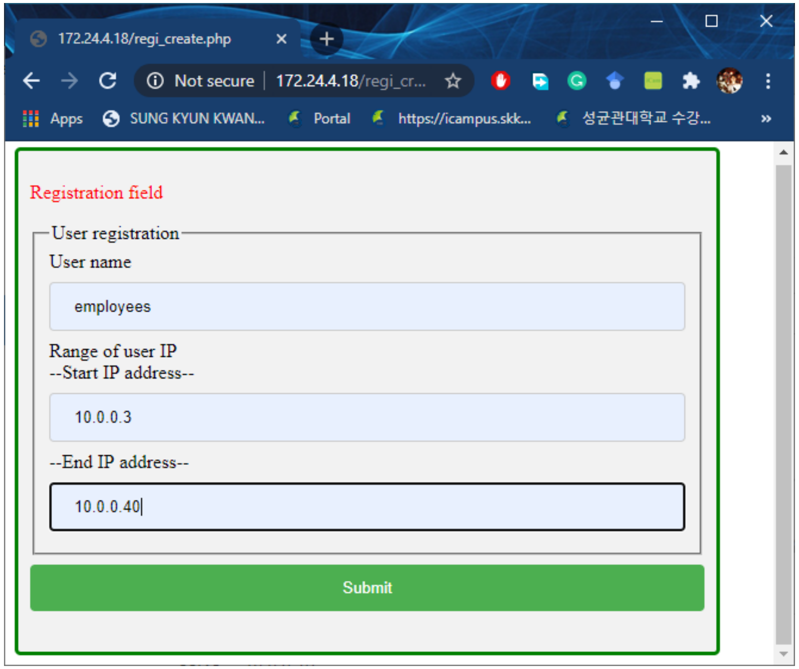
Password

••••

Login

# Operation

## 5. Register User-group and URL-Websites



Registration field

User registration

User name

employees

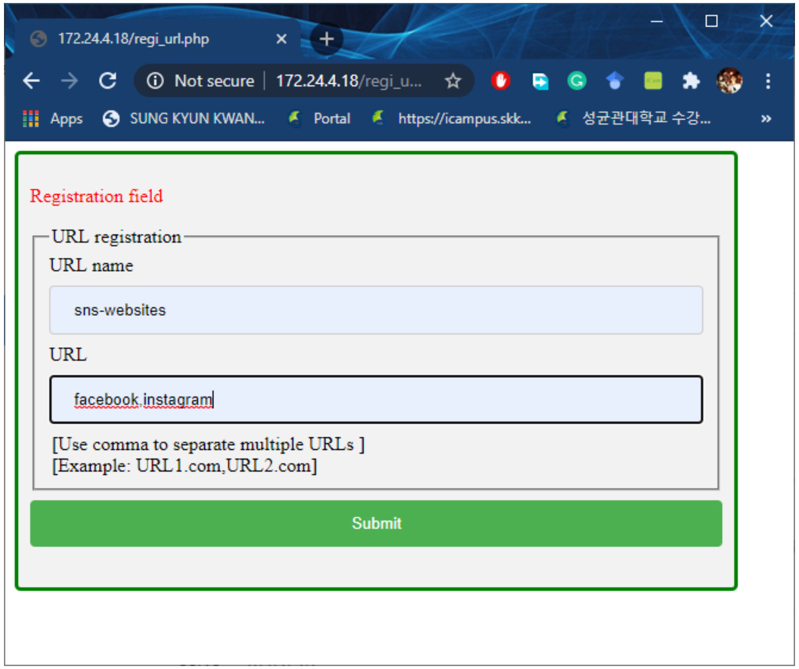
Range of user IP
--Start IP address--

10.0.0.3

--End IP address--

10.0.0.40

Submit



Registration field

URL registration

URL name

sns-websites

URL

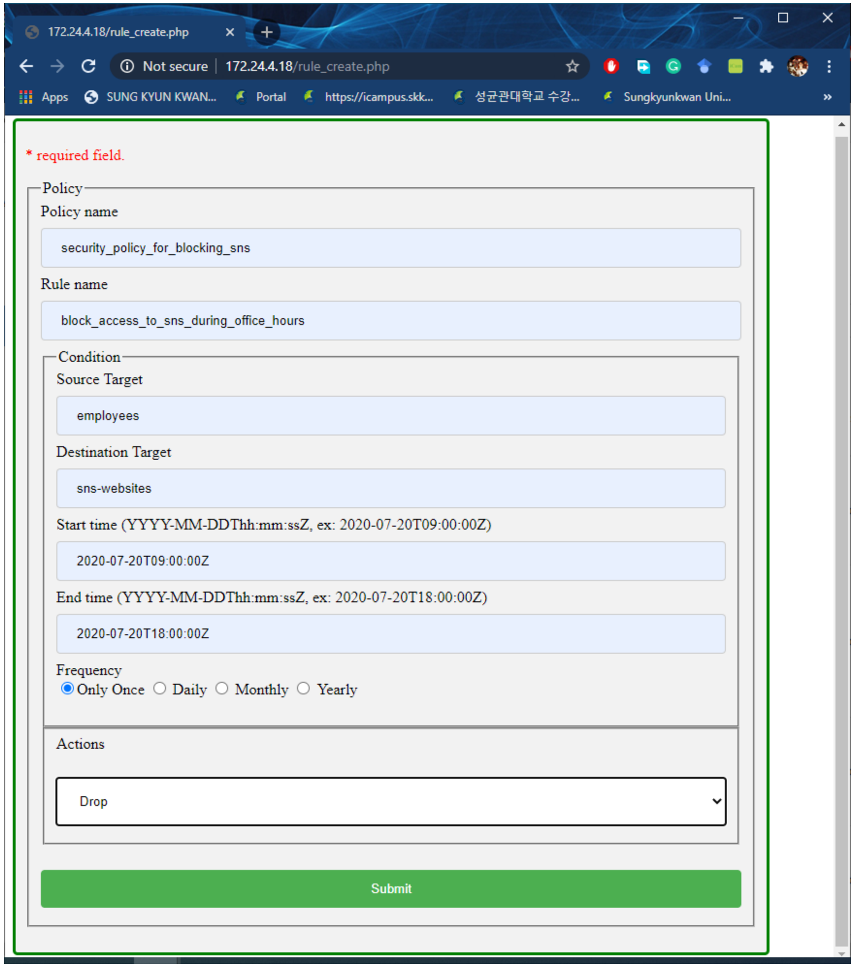
facebook,instagram

[Use comma to separate multiple URLs ]
[Example: URL1.com,URL2.com]

Submit

# Operation

## 6. Enter the configuration



* required field.

Policy

Policy name

security_policy_for_blocking_sns

Rule name

block_access_to_sns_during_office_hours

Condition

Source Target

employees

Destination Target

sns-websites

Start time (YYYY-MM-DDThh:mm:ssZ, ex: 2020-07-20T09:00:00Z)

2020-07-20T09:00:00Z

End time (YYYY-MM-DDThh:mm:ssZ, ex: 2020-07-20T18:00:00Z)

2020-07-20T18:00:00Z

Frequency

● Only Once ○ Daily ○ Monthly ○ Yearly

Actions

Drop

Submit

# Operation

7. Open employee web browser and try connect to SNS websites
8. Employee instance should not be able to connect to facebook and instagram

# Termination

1. Security Controller

```
#In JETCONF console, press ctrl + c
#Go to /home/ubuntu directory and enter
$ ./clean_security_controller
```

2. DMS

```
#In DMS Console, press ctrl + c
```

3. Openstack

```
#In openstack console, press ctrl + c and enter
$ python clean.py
```

# Thanks!

**If you have any questions, contact email:**

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