

**Advanced Cyberinfrastructure  
Research & Education Facilitators  
Virtual Residency 2016**

**Lab 3: Exploring SDN Software**

## **Purpose:**

The purpose of this lab is to introduce the OpenDaylight (<http://www.opendaylight.org>) project. The user will become familiar with the OpenDaylight software defined networking controller.

## **Pre-requisites:**

The user should have a basic knowledge of:

- A computer with at least 2GB of RAM and 10GB of free hard disk space
- Administrative access to your computer
- Operating System (OS) Graphical User Interface (GUI) navigation.
- Comfort with typing text into a command or shell window.
- Basic grasp of computer networking terms such as “host”, “switch”, and “IP Address”.

## **Lab Requirements:**

- A laptop, mobile device, or access to a remote device that meets the basic hardware requirements for running Oracle’s Virtual Box.
- A functioning installation of the latest version of Oracle’s Virtual Box, available via: <https://www.virtualbox.org/wiki/Downloads>. Depending on your host device, you should also load the VirtualBox Extension Pack, located at the same URL.
- A copy of the “All-in-one SDN App Development Starter VM” 64bit virtual machine image, provided on a USB device, and also available within the download section here: <http://sdnhub.org/tutorials/sdn-tutorial-vm/>
- A functioning Internet connection.
- Successful completion of Lab 2 – Exploring Opendaylight

## Lab 3

In this lab section, we will explore different ways to interact with the Opendaylight SDN controller

This lab section assumes that VirtualBox is already installed on your desktop environment, imported the SDN App Development Starter VM and completed Lab 2 – Exploring Opendaylight.

### Setting up the Environment

Open Virtualbox and start your SDN Hub Tutorial VM. Allow the Ubuntu installation to fully boot (should take ~30 seconds).

**Installing Postman**, an API tool (<https://www.getpostman.com/>)

Start Chromium in the virtual desktop by clicking on *Applications Menu* > *Internet* > *Chromium Web Browser*

Go to the Postman page in the Chrome Web Store  
(shortened) <http://bit.ly/1K5ZGHG>  
(actual) <https://chrome.google.com/webstore/detail/postman/fhbjgbiflinjbdggfhcddcbncdddomop>

Select “*Add to Chrome*” on the upper right

Select “*Add App*” to confirm installation

### Start OpenDaylight and Load the Required Features

Double-click the “*Terminal Emulator*” desktop icon

Enter these commands

```
$cd ~/Downloads/distribution-karaf-0.4.2-Beryllium-SR2  
$./bin/karaf
```

At the prompt, type in the following commands. Note: Some of these may take awhile to complete so be patient!!

```
>feature:install odl-dlux-all
>feature:install odl-l2switch-switch
>feature:install odl-dlux-core
>feature:install odl-dlux-node
>feature:install odl-dlux-yangui
>feature:install odl-dlux-yangvisualizer
```

## Start Mininet

Open a second terminal window by double-click the “*Terminal Emulator*” desktop icon

Enter this command (all on one line)

```
$sudo mn --topo tree,depth=3 --switch=ovsk
--controller=remote
```

Mininet will start with seven switches and eight hosts

## Interfacing with Opendaylight

Open Chromium and go to <http://127.0.0.1:8181>

Login to Opendaylight using the username and password of ‘*admin*’

Start “Postman” by opening a new tab in Chromium, clicking on *Apps* and selecting *Postman*

Once Postman starts, In the “Enter request URL here” next to the GET buttonfield enter <http://localhost:8080/restconf/operational/network-topology:network-topology/>

Before pressing the *Send* button you’ll also need to add an authorization method. Click on the *Authorization* tab below the GET button, change the Type to *Basic Auth* and in both the username and password fields, enter *admin*

Now press *Send*

Review the data provided in the window below the request

Next, In the “Enter request URL here” next to the GET buttonfield enter  
`http://localhost:8080/restconf/operational/opendaylight-  
inventory:nodes/node/openflow:1`

Before pressing the *Send* button you’ll also need to add an authorization method. Click on the *Authorization* tab below the GET button, change the Type to *Basic Auth* and in both the username and password fields, enter *admin*

Now press *Send*

Review the data provided in the window below the request

### **Congratulations!**

You have used a REST API to interact with an Open Daylight Controller