LAB 11
SNMP Lab for Network Monitoring with Mininet
CO515: Advances in Computer Networks: Selected topics

Objective

To understand and practice network performance monitoring using Simple Network Management Protocol (SNMP) within a Mininet simulated environment.

Prerequisites:

- Basic knowledge of networking concepts (OSI model, TCP/IP).
- Familiarity with command-line interface (CLI).
- Basic understanding of SNMP (agents, managers, MIBs).

Equipment and Software:

- Computers with internet access.
- Mininet installed on each computer.
- SNMP tools: snmpd (SNMP daemon) for Mininet hosts, snmpwalk/snmpget, SNMP manager (e.g., Nagios, Zabbix).

Activity 1: Setting up Mininet Environment

Setting Up Mininet

- Step 1: Install Mininet on the lab computers.
- Step 2: Create a basic network topology in Mininet using the CLI (e.g., a single switch with multiple hosts).
- Step 3: Verify the network setup by pinging between hosts.

sudo mn --topo single,3 --mac --switch ovsk --controller remote

Installing and Configuring SNMP on Mininet Hosts:

- **Step 1:** Open a terminal for each Mininet host.
  mininet> xterm h1 h2 h3

- **Step 2:** Install the SNMP daemon (snmpd) on each host.
  apt-get update
  apt-get install -y snmpd

- **Step 3:** Configure snmpd by editing the /etc/snmp/snmpd.conf file on each host.
  # Example configuration
  com2sec readonly default public
  group MyROGroup v1 readonly

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group MyROGroup v2c        readonly
group MyROGroup usm        readonly
view all    included  .1                80
access MyROGroup ""      any       noauth    exact  all    none   none
sysLocation    Mininet
sysContact    YourName your.email@example.com
```

- **Step 4:** Restart the SNMP daemon to apply the configuration.
  /etc/init.d/snmpd restart

Activity 2: Querying SNMP Data

- **Step 1:** Use snmpwalk to query the SNMP data from a Mininet host.
  snmpwalk -v2c -c public <host_ip_address>
- **Step 2:** Use snmpget to retrieve specific SNMP OIDs.
  snmpget -v2c -c public <host_ip_address> <OID>

Deliverables:

Exercise: Query SNMP data for system uptime, interface statistics, and other relevant metrics.

Activity 3: Setting Up an SNMP Manager (Nagios/Zabbix)

- **Step 1:** Install and configure an SNMP manager like Nagios or Zabbix on a separate machine or virtual machine.
- **Step 2**: Add Mininet hosts as monitored devices in the SNMP manager.
- **Step 3:** Configure alerts and notifications for critical events.

Activity 4: Monitoring Network Performance

- **Step 1:** Monitor bandwidth utilization, CPU load, memory usage, and other performance metrics.
- **Step 2:** Analyze the collected data to identify potential bottlenecks and issues.

Deliverables

Exercise: Simulate network traffic and monitor the impact on performance metrics.

Submission: Submit the following documents to your instructor by the end of the lab session:

1. Screenshots and outputs of the exercise in Activity 1.
2. Screenshots and outputs of the exercise in Activity 2.