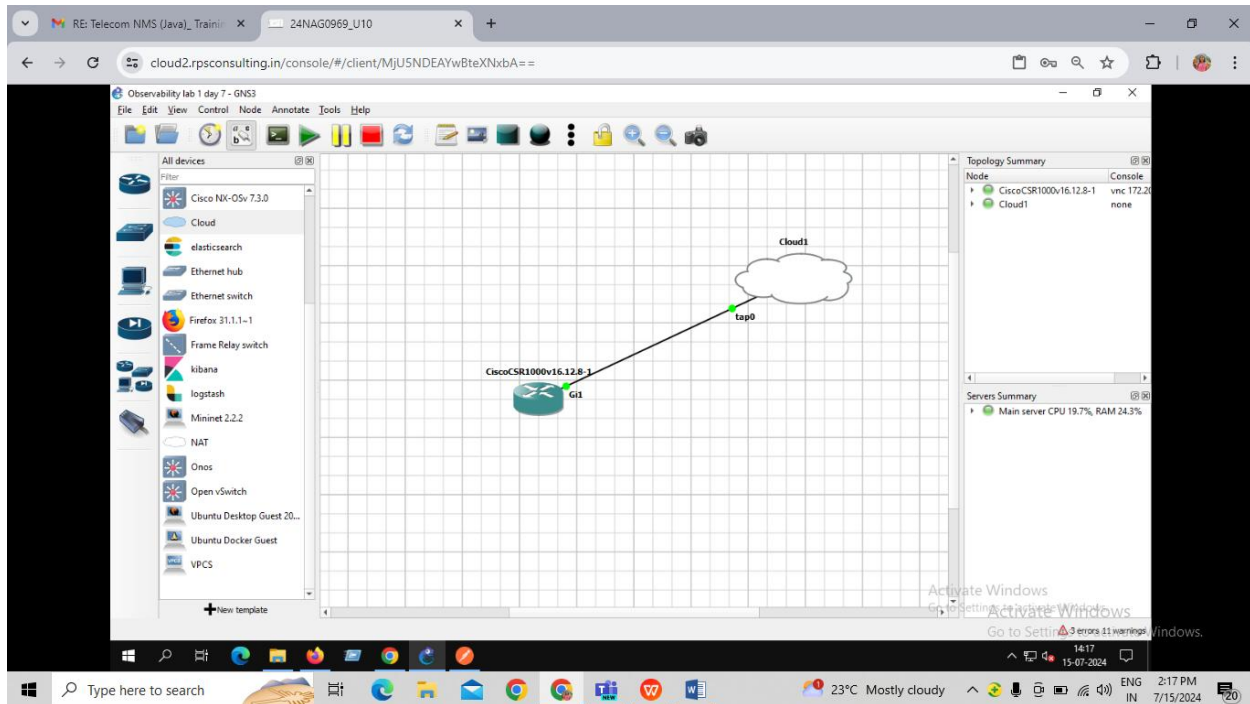


OBSERVABILITY LAB 1

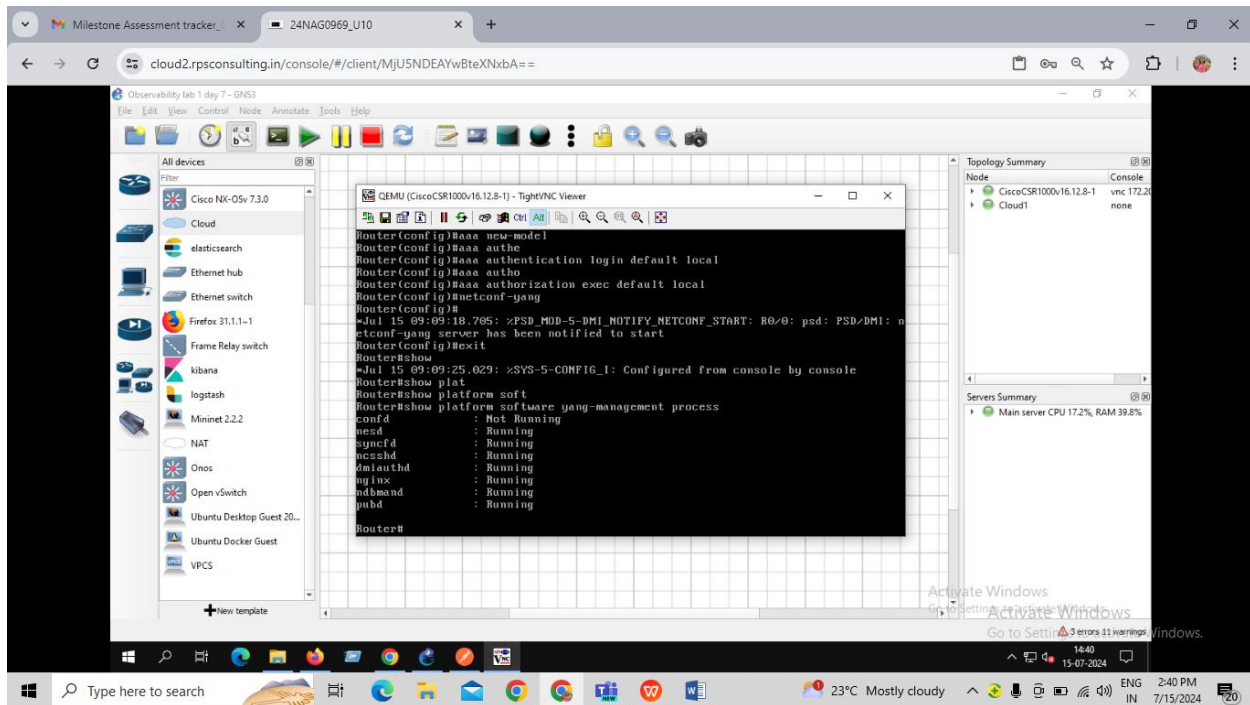
LAB: Enable the Telemetry configuration on Cisco Router, Telegraf will receive the stats and store in Influx DB , Grafana will be used to display the stats.

Topology:



```
QEMU (CiscoCSR1000v16.12.8-1) - TightVNC Viewer
%Error opening tftp://255.255.255.255/cisconet.cfg (Timed out)
%Error opening tftp://255.255.255.255/router-config (Timed out)
%Error opening tftp://255.255.255.255/ciscortr.cfg (Timed out)
*Jul 15 09:01:12.512: AUTOINSTALL: Tftp script execution not successful for Gi1.
*Jul 15 09:04:50.305: %SYS-5-CONFIG_P: Configured programmatically by process PnP
P Agent Discovery from console as vty0
*Jul 15 09:04:51.392: %SYS-5-CONFIG_P: Configured programmatically by process PnP
P Agent Discovery from console as vty0
*Jul 15 09:05:04.455: %SYS-5-CONFIG_P: Configured programmatically by process PnP
P Agent Discovery from console as vty0
*Jul 15 09:05:04.752: %SYS-5-CONFIG_P: Configured programmatically by process PnP
P Agent Discovery from console as vty0
Router>
Router>en
Router#show ip int br
Interface                IP-Address      OK? Method Status      Protocol
GigabitEthernet1         172.20.0.113    YES DHCP    up          up
GigabitEthernet2         unassigned      YES unset   down        down
GigabitEthernet3         unassigned      YES unset   down        down
GigabitEthernet4         unassigned      YES unset   down        down
Router#
*Jul 15 09:05:41.335: %PNP-6-PNP_SAVING_TECH_SUMMARY: Saving PnP tech summary (pnp-tech-discovery-summary)... Please wait. Do not interrupt.
*Jul 15 09:05:42.514: %SYS-5-CONFIG_P: Configured programmatically by process PnP
P Agent Discovery from console as vty0_
```

Step 2: Configure the router for Yang-Management process



Step 3: Configure the Telemetry on router for CPU, Memory, and Interface

Login to below URL:

<https://github.com/jeremycohoe/cisco-ios-xe-mdt/blob/master/cat9k-174-device-health-dashboa>

Configure the Telemetry for IETF 3305, 3307, 3310, 3313, 3314 as per the commands described on above URL

Source IP address: Ip address of router (check show ip interface br)

Receiver IP: 172.20.0.11 (Telegraf IP address)

CPU – 3305

```
Router>
*Jul 15 09:35:08.316: %SEC_LOGIN-5-LOGIN_SUCCESS: Login Success [user: admin] [S
ource: LOCAL] [localport: 0] at 09:35:08 UTC Mon Jul 15 2024
Router>
Router>en
Router#
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#
Router(config)#telemetry ietf subscription 3305
Router(config-mdt-subs)#encoding encode-kvgpb
Router(config-mdt-subs)#$h /process-cpu-ios-xe-oper:cpu-usage/cpu-utilization
Router(config-mdt-subs)#source-address 172.20.0.113
Router(config-mdt-subs)#stream yang-push
Router(config-mdt-subs)#update-policy periodic 3000
Router(config-mdt-subs)#$ address 172.20.0.11 57500 protocol grpc-tcp
Router(config-mdt-subs)#
```

```
Router#show telemetry ietf subscription all
Telemetry subscription brief
```

ID	Type	State	Filter type
3305	Configured	Valid	xpath

```
Router#_
```

Memory - 3307

```
Router#
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#telemetry ietf subscription 3307
Router(config-mdt-subs)#encoding encode-kvgpb
Router(config-mdt-subs)#$ios-xe-oper:memory-statistics/memory-statistic
Router(config-mdt-subs)#source-address 172.20.0.113
Router(config-mdt-subs)#stream yang-push
Router(config-mdt-subs)#update-policy periodic 3000
Router(config-mdt-subs)#$ address 172.20.0.11 57500 protocol grpc-tcp
Router(config-mdt-subs)#_
```

```
Router#show telemetry ietf subscription all
Telemetry subscription brief
```

ID	Type	State	Filter type
3305	Configured	Valid	xpath
3307	Configured	Valid	xpath

```
Router#
```

MDT - 3310

```
Router#
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#telemetry ietf subscription 3310
Router(config-mdt-subs)#encoding encode-kvgpb
Router(config-mdt-subs)#$h /mdt-oper:mdt-oper-data/mdt-subscriptions
Router(config-mdt-subs)#source-address 172.20.0.113
Router(config-mdt-subs)#stream yang-push
Router(config-mdt-subs)#update-policy periodic 3000
Router(config-mdt-subs)#receiver ip address 172.20.0.11 57500 protocol grpc-tcp
Router(config-mdt-subs)#
Router(config-mdt-subs)#_
```

```
Router#
Router#show telemetry ietf subscription all
Telemetry subscription brief
```

ID	Type	State	Filter type
3305	Configured	Valid	xpath
3307	Configured	Valid	xpath
3310	Configured	Valid	xpath

```
Router#
```

OpenConfig Interfaces - 3313

```
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#telemetry ietf subscription 3313
Router(config-mdt-subs)#encoding encode-kvgpb
Router(config-mdt-subs)#$h /oc-if:interfaces/interface/state/counters
Router(config-mdt-subs)#source-address 172.20.0.113
Router(config-mdt-subs)#stream yang-push
Router(config-mdt-subs)#update-policy periodic 3000
Router(config-mdt-subs)#$ address 172.20.0.11 57500 protocol grpc-tcp
Router(config-mdt-subs)#
Router(config-mdt-subs)#
```

```
Router#
Router#show telemetry ietf subscription all
Telemetry subscription brief
```

ID	Type	State	Filter type
3305	Configured	Valid	xpath
3307	Configured	Valid	xpath
3310	Configured	Valid	xpath
3313	Configured	Valid	xpath

```
Router#
```

Native Interfaces - 3314

```
Router#
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#telemetry ietf subscription 3314
Router(config-mdt-subs)#encoding encode-kvgpb
Router(config-mdt-subs)#$h /interfaces-ios-xe-oper:interfaces/interface
Router(config-mdt-subs)#source-address 172.20.0.113
Router(config-mdt-subs)#stream yang-push
Router(config-mdt-subs)#update-policy periodic 3000
Router(config-mdt-subs)#$ address 172.20.0.11 57500 protocol grpc-tcp
Router(config-mdt-subs)#
Router(config-mdt-subs)#
```

Post configuration, check the status of Telemetry on router

```
Router#
Router#show telemetry ietf subscription all
Telemetry subscription brief
```

ID	Type	State	Filter type
3305	Configured	Valid	xpath
3307	Configured	Valid	xpath
3310	Configured	Valid	xpath
3313	Configured	Valid	xpath
3314	Configured	Valid	xpath

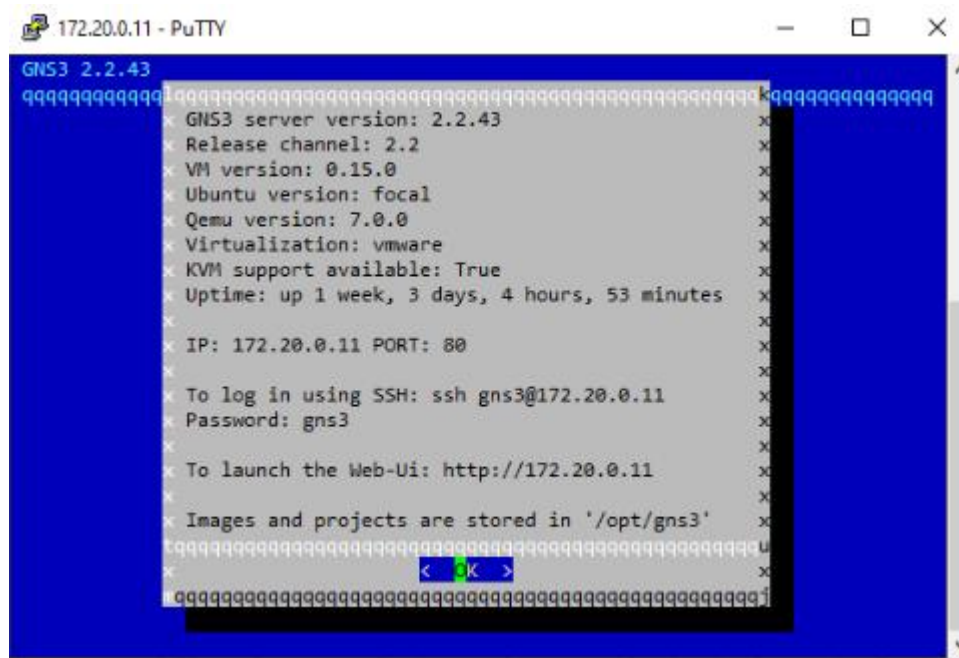
```
Router#
```

```
Router#
Router#show telemetry internal connection
Telemetry connection
```

Peer Address	Port	URF	Source Address	Transport	State	Profile
172.20.0.11	57500	0	172.20.0.113	grpc-tcp	Connecting	

```
Router#_
```

Step4: Login via putty (IP: 172.20.0.11) (user : gns3 Pass: gns3)




```
gns3@gns3vm: ~  
GNS3 2.2.43  
x x Information Display VM information x x  
x x Channel Select the release channel x x  
x x Upgrade Upgrade the GNS3 VM x x  
x x Shell Open a shell x x  
x x Log Show the GNS3 server log x x  
x x Test Check Internet connection x x  
x x Qemu Switch Qemu version x x  
x x Security Configure server authentication x x  
x x Keyboard Change keyboard layout x x  
x x Console Change console settings (font size etc.) x x  
x x Configure Edit server configuration (advanced users ONLY) x x  
x x Proxy Configure proxy settings x x  
x x Network Configure network settings x x  
x x Migrate Migrate data to another GNS3 VM x x  
x x 77% x x  
gns3@gns3vm:~$  
< OK > <Cancel>
```

Check the telegraf and influxdb container configuration

```
gns3@gns3vm: /opt/others/telegraf  
gns3@gns3vm:~$ cd /opt/others/telegraf  
gns3@gns3vm:/opt/others/telegraf$ cat docker-compose.yml  
version: '3.6'  
services:  
  telegraf:  
    image: telegraf:1.18-alpine  
    volumes:  
      - ./telegraf_etc/telegraf.conf:/etc/telegraf/telegraf.conf:ro  
    depends_on:  
      - influxdb  
    links:  
      - influxdb  
    ports:  
      - '57500:57500'  
  
  influxdb:  
    image: influxdb:1.8-alpine  
    env_file: configuration.env  
    ports:  
      - '8086:8086'  
    volumes:  
      - ./:/imports  
      - ./influxdb_data:/var/lib/influxdb  
gns3@gns3vm:/opt/others/telegraf$
```

```
gns3@gns3vm: /opt/others/telegraf
- '8086:8086'
volumes:
- ./imports
- ./influxdb_data:/var/lib/influxdb
gns3@gns3vm:/opt/others/telegraf$ cat telegraf_etc/telegraf.conf
# Global Agent Configuration
[agent]
hostname = "cisco_mdt"
flush_interval = "5s"
interval = "5s"

# gRPC Dial-Out Telemetry Listener
[[inputs.cisco_telemetry_mdt]]
transport = "grpc"
service_address = ":57500"

# Output Plugin InfluxDB
[[outputs.influxdb]]
database = "mdt_grpc"
urls = [ "http://172.20.0.11:8086" ]

[[outputs.file]]
files = [ "/tmp/telegraf-grpc.log" ]
gns3@gns3vm:/opt/others/telegraf$
```

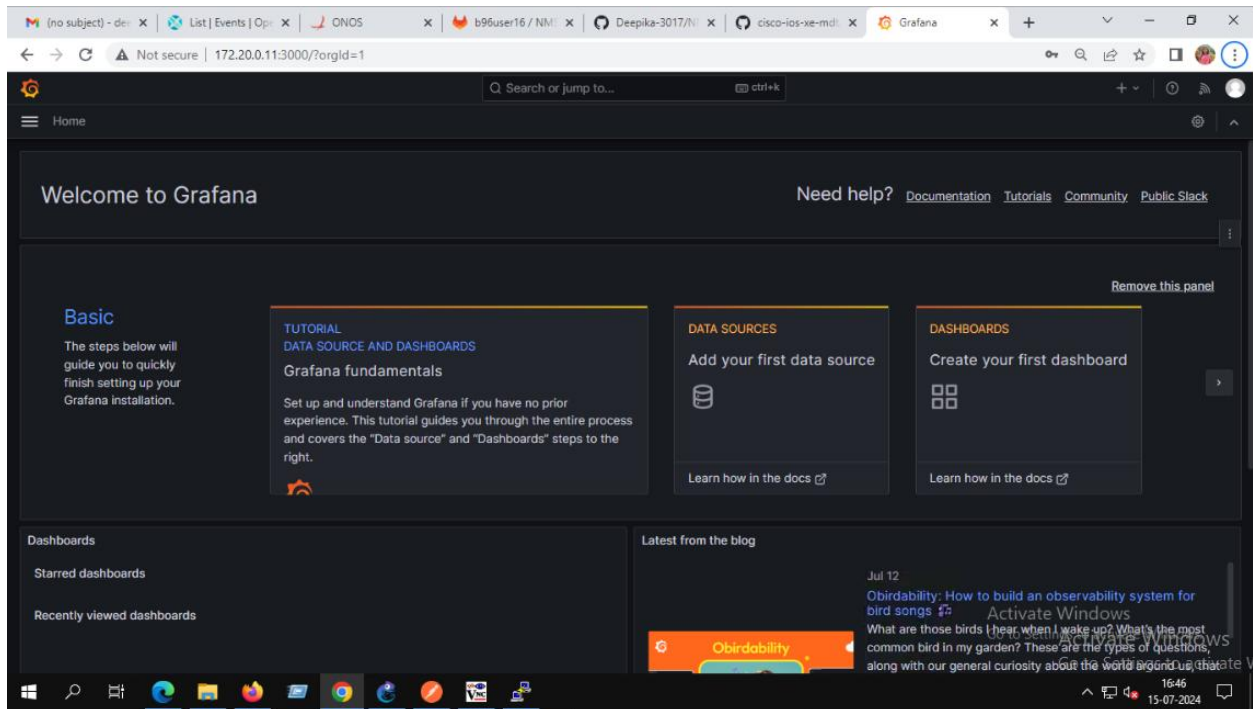
```
gns3@gns3vm: /opt/others/telegraf

# gRPC Dial-Out Telemetry Listener
[[inputs.cisco_telemetry_mdt]]
transport = "grpc"
service_address = ":57500"

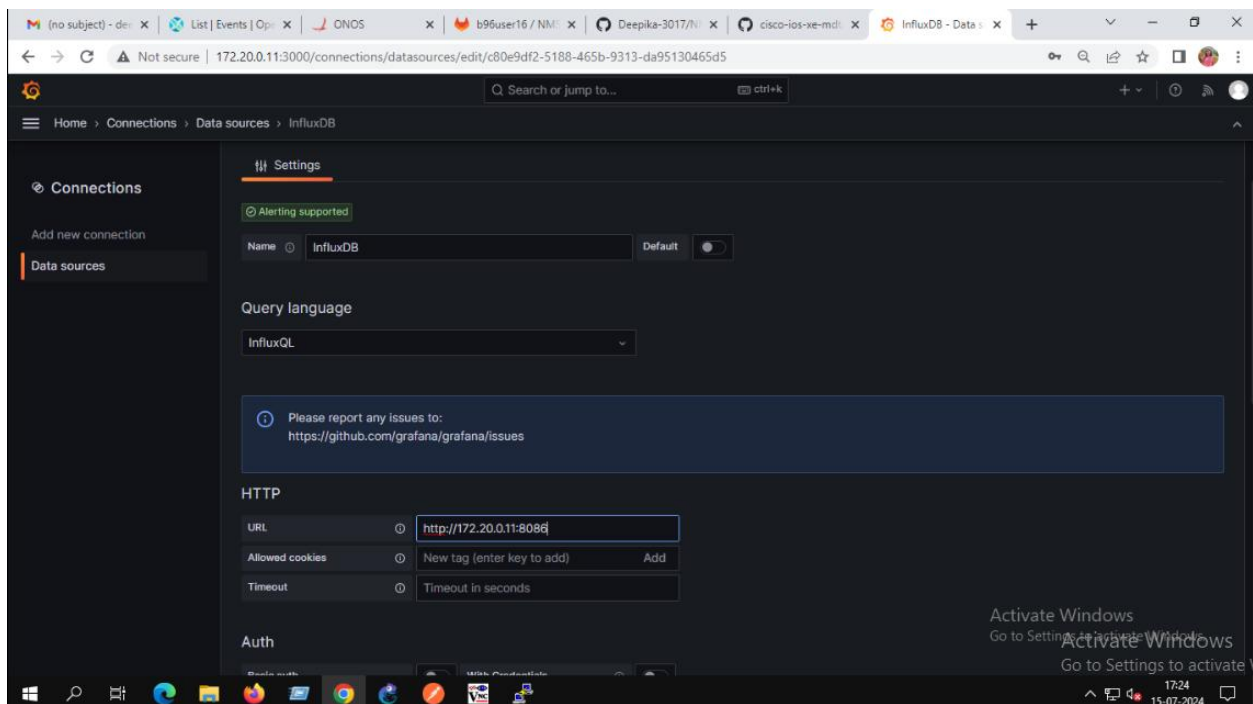
# Output Plugin InfluxDB
[[outputs.influxdb]]
database = "mdt_grpc"
urls = [ "http://172.20.0.11:8086" ]

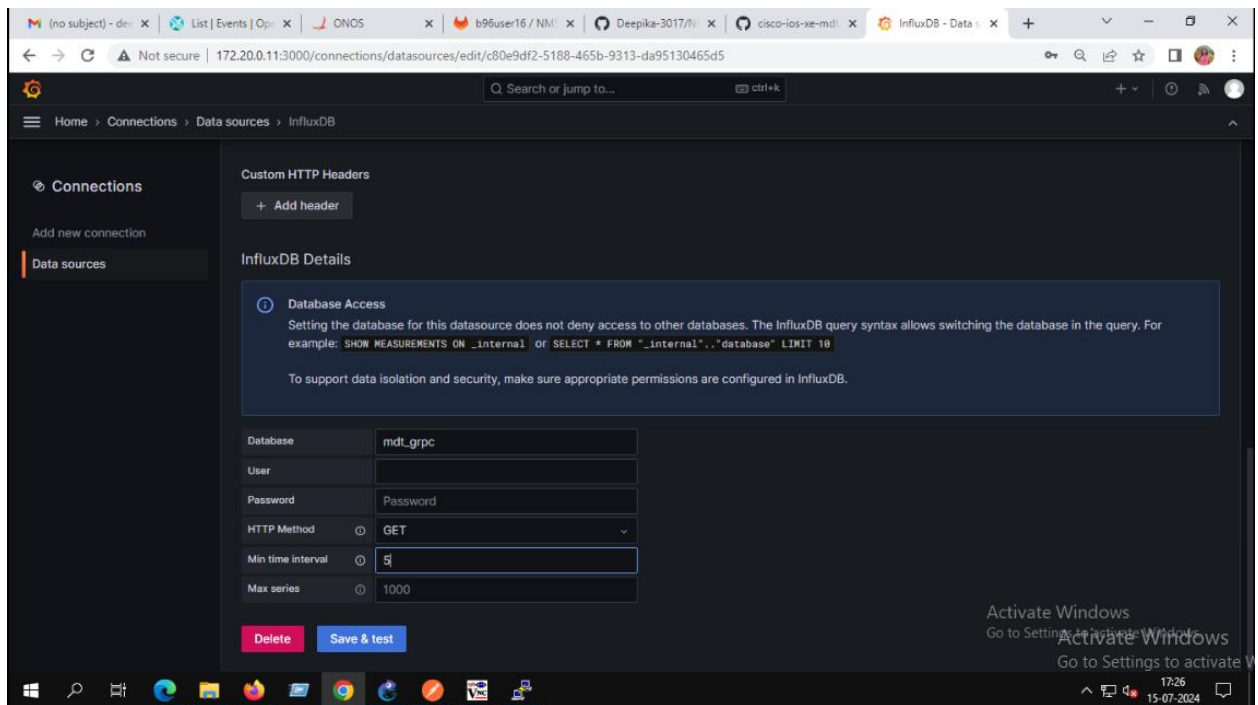
[[outputs.file]]
files = [ "/tmp/telegraf-grpc.log" ]
gns3@gns3vm:/opt/others/telegraf$ docker-compose up -d
[+] Building 0.0s (0/0)                                docker:default
[+] Running 2/2
  ✓ Container telegraf-influxdb-1 Start...             0.0s
  ✓ Container telegraf-telegraf-1 Start...             0.0s
gns3@gns3vm:/opt/others/telegraf$ docker-compose up -d
[+] Building 0.0s (0/0)                                docker:default
[+] Running 2/0
  ✓ Container telegraf-influxdb-1 Runni...            0.0s
  ✓ Container telegraf-telegraf-1 Runni...            0.0s
gns3@gns3vm:/opt/others/telegraf$
```

Step 5: Login to Grafana:



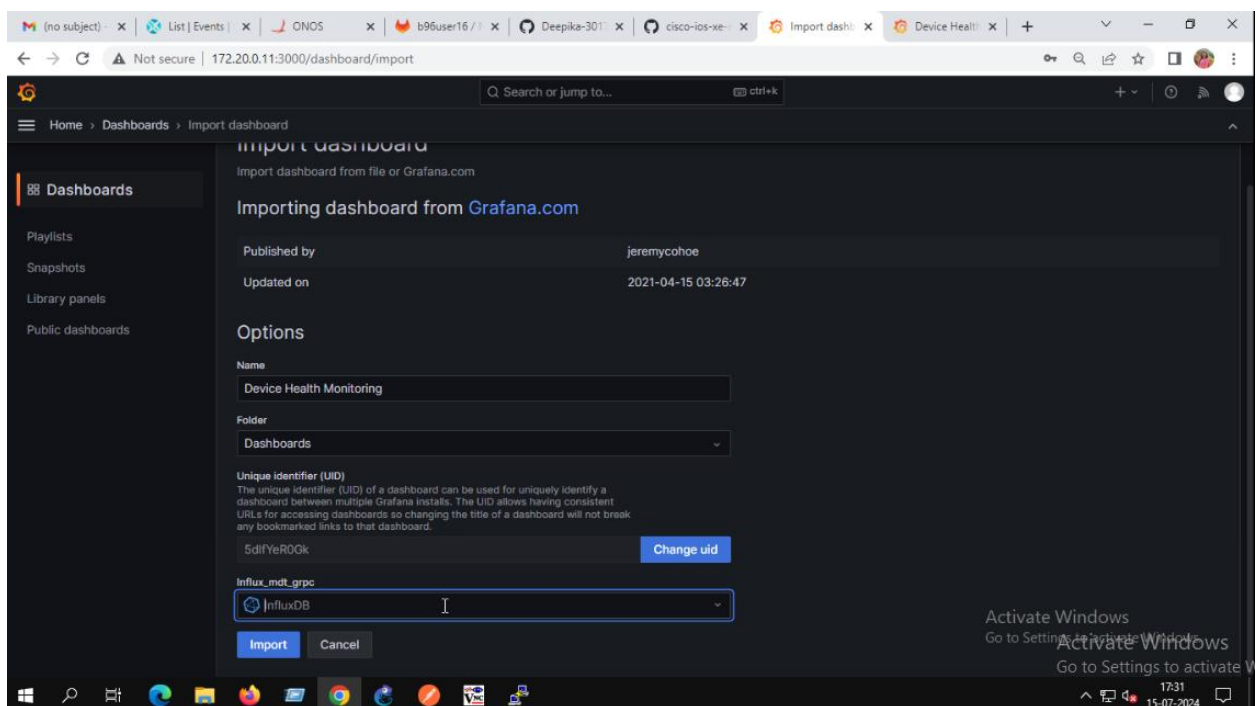
Import the InfluxDB database



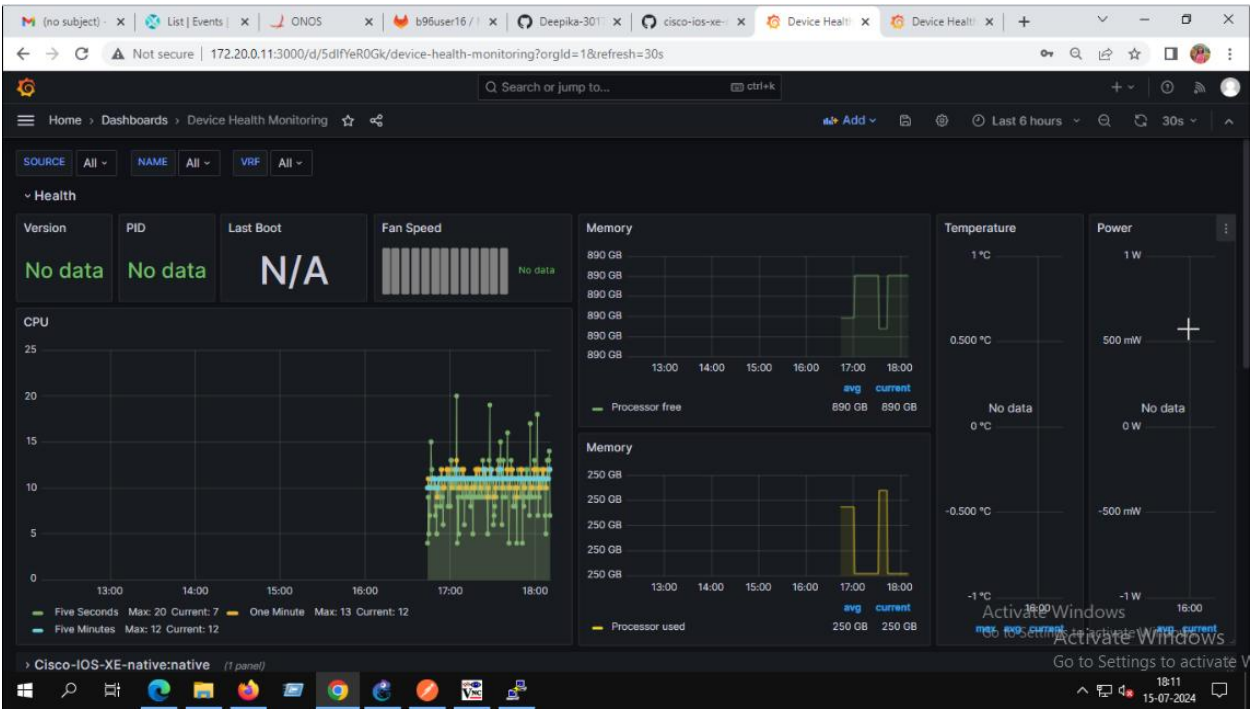


Import the Dashboard:

<https://grafana.com/grafana/dashboards/13462-device-health-monitoring/>



Check the Grafana Dashboard: CPU, Memory, and interface stats to be updated



```
Router#show telemetry internal connection
Telemetry connection

Peer Address      Port  VRF Source Address  Transport  State      Profile
-----
172.20.0.11       57500  0 172.20.0.113    grpc-tcp   Active

Router#
*Jul 15 12:04:13.808: hwidb pointer not found for Control Plane
```