කැලණීය විශ්වවිද්‍යාලය
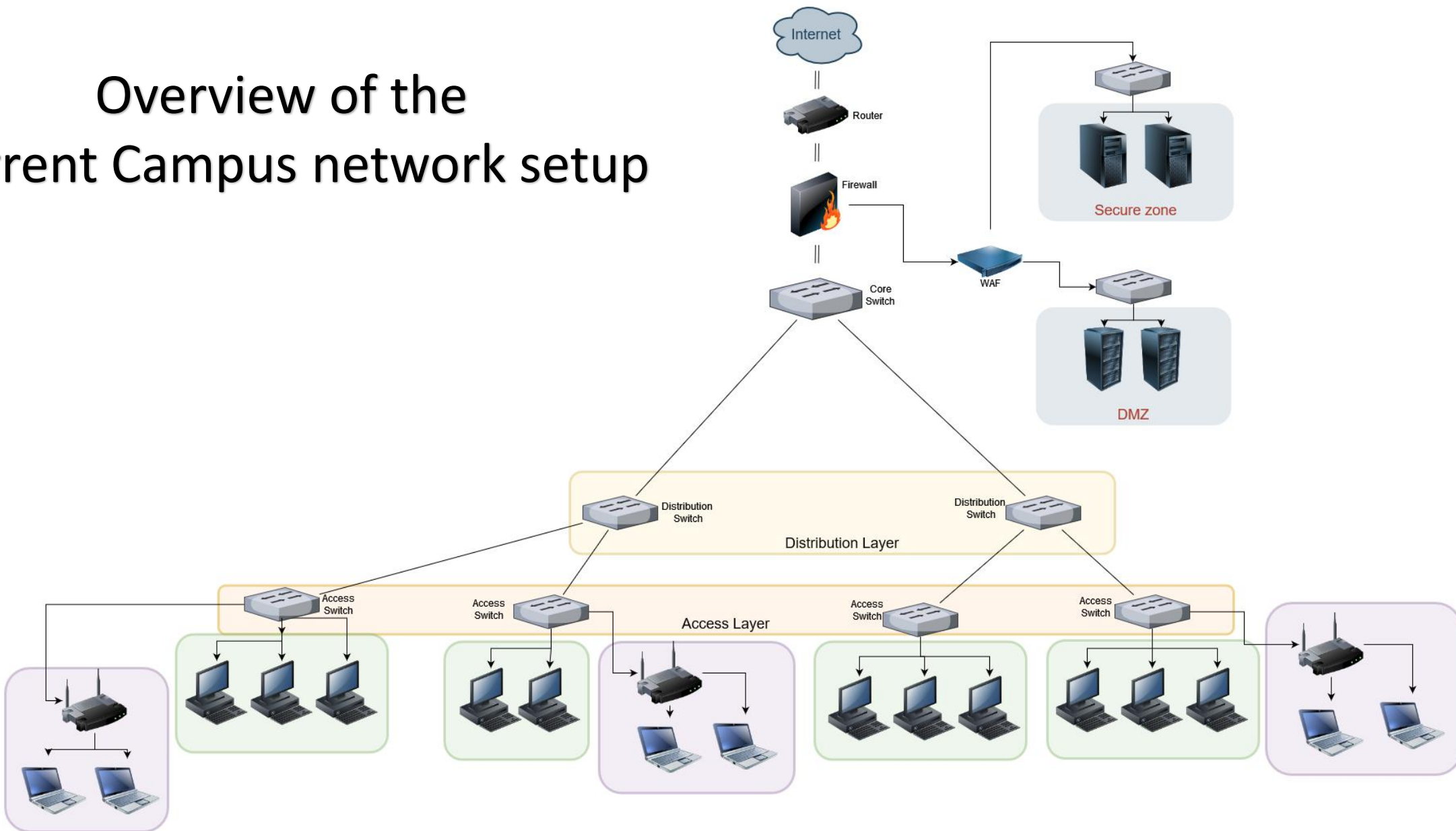களனிப் பல்கலைக்கழகம்
UNIVERSITY OF KELANIYA

Thiwanka Umagiliyage
Asst. Network Manager

Indrajith Solangaarachchi
System Engineer
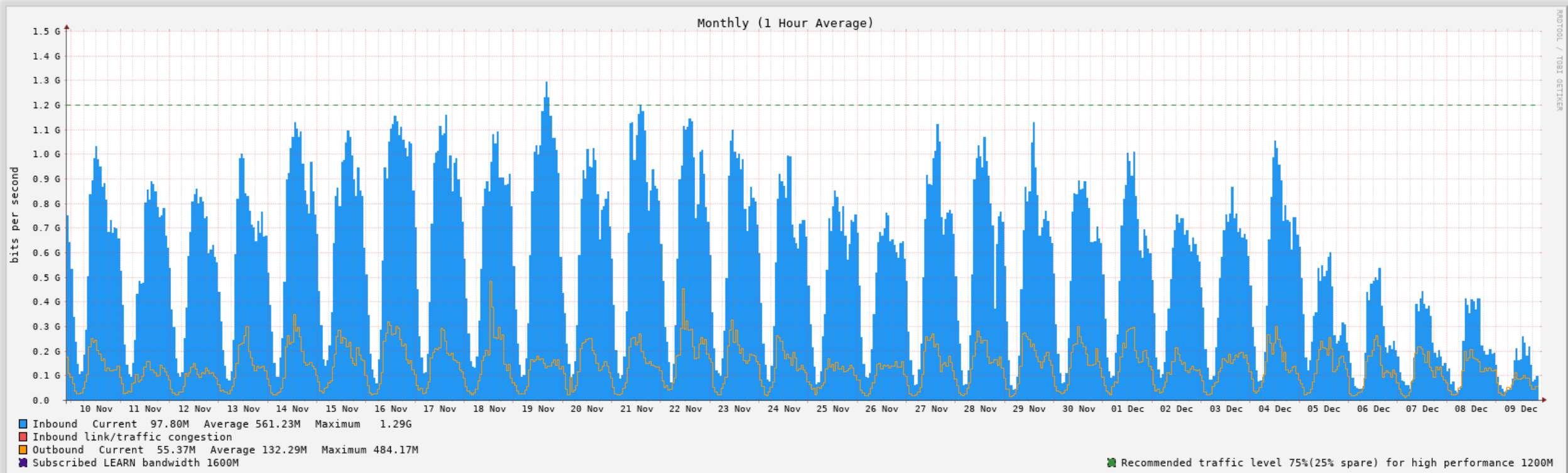
Campus Network

Overview of the current Campus network setup

- Main ILL (Internet Leased Line): 1600 Mbps (1.6 Gbps)
- Backup ILL (Internet Leased Line): 200 Mbps
- Two separate Connections for Computing Faculty (100 Mbps) and Medical Faculty (300 Mbps)

- Palo Alto 5220 NGFW

- Imperva V4500 WAF

- A10 Thunder 940 GSLB/ADC Load Balancer

- Cisco Nexus 9372PX Core Switch (Data Center)

- We have 3 Server Rooms (within the Dalugama Premises)
  - Main ICTC Center Server Room
  - Administration Building Server Room
  - New ICTC Center Server Room

- Disaster Recovery Site (Faculty of Medicine)

- Maintaining Servers up to 150 (including VMs)

- Wireless Access points: More than 500 (Including Hostels)

- Providing services to more than 20000 Users
  - Including Employees, Undergraduates, Postgraduates, Diploma level and Certificate level students
 - Concurrent users 4500 to 5000

External Hostel Map

Hostels

- Seewali Girls Hostel (UoK)
- Soma Guna Mahal (SGM) Hostel (UoK)
- Koholvila Science Faculty Boys Hostel (UoK)
- Bulugaha Girls Hostel (UoK)
- Mahara Boys Hostel (UoK)
- Pannarama Boys Hostel (UoK)
- C.W.W. Kannangara Boys Hostel (UoK)
- Nurses Training Road Girls Hostel (UoK)
- Wewelduwa Girls Hostel
- Lakmadura Girls Hostel
- A7 P2P link Base Station UoK
- Admin Server Room UoK
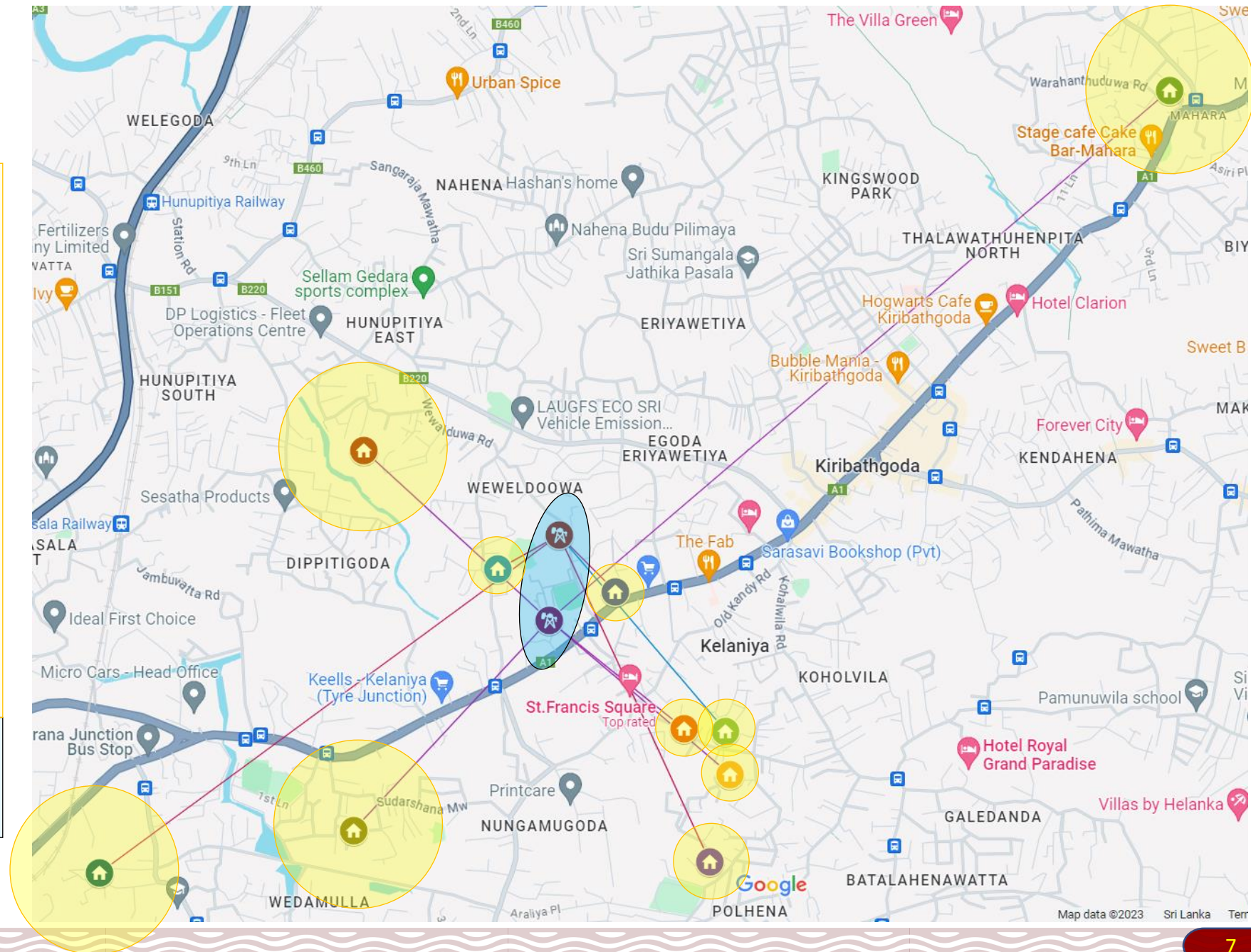
Monitoring
- LibreNMS, Zabbix

Separate monitoring portals for Wi-Fi Networks
- Cisco, Unifi, Aruba, Extreme
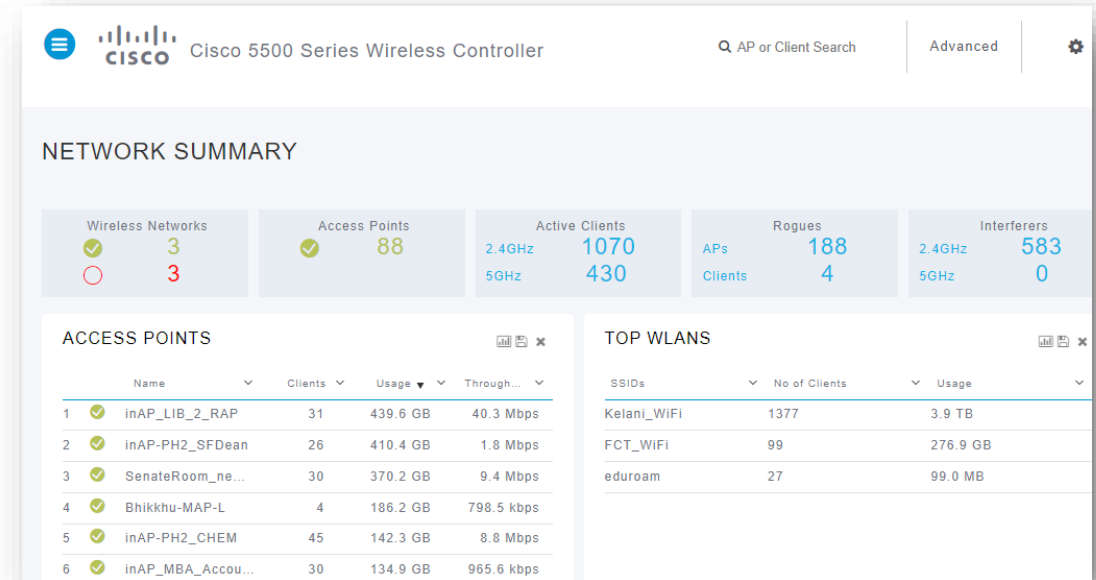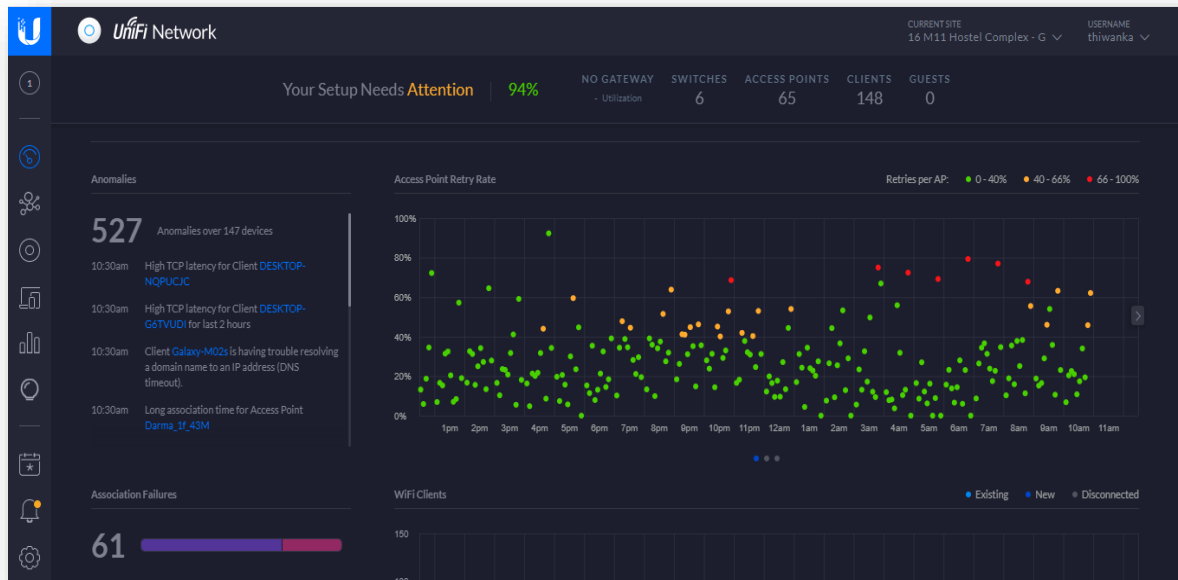
Systems & Services

- Learning Management Systems – [LMS](LMS)

We have

1. Ekel.kln.ac.lk
2. Eval.kln.ac.lk (for online Exam)
3. Dplms.kln.ac.lk
4. Pglms.kln.ac.lk
5. Cdcelms.kln.ac.lk
6. Pgiarlms.kln.ac.lk

- Provide Internet facility via LAN and Wireless technologies - 3 SSID's:
  - Kelani_WiFi / Eduroam / FCT_WiFi
- Email Services (Cloud based):
  - For Staff: Google Platform
  - For Students: Microsoft Platform
- Helpdesk Service via Ticketing system
- HRIS, Payment Gateway, Registration systems, etc…
- Furthermore: VPN, O365, Zoom, Azure, etc… More Services

UNIVERSITY OF KELANIYA

- Provides a central authentication system for IT services.

  - Only uses 1 username and Password.

- Provides SSO for Zoom, Library Past Papers, and Journals accessing services.

- Provides Self Service Password Management system for Password management. SSPR

Password Policy මුරපද පුතිපත්තිය

The new password should according to the following,
නව මුරපදය පහත සඳහන් පරිදි විය යුතුය,

- Minimum 10 characters
  අවම වශයෙන් අක්ෂර 10 ක්

- Not contain the user's account name or parts of the user's full name that exceed two consecutive characters
  පරිශීලක නමෙහි එක ළඟ අකුරු දෙකකට වඩා හෝ පරිශීලකයාගේ සම්පූර්ණ නමේ කොටස් වල එක ළඟ අකුරු දෙකකට වඩා අඩංගු නොවිය යුතුය.

- Contain characters from three of the following four categories:
  පහත දැක්වෙන කාණ්ඩ හතරෙන් තුනකින් අක්ෂර අඩංගු විය යුතුය:
    1. English uppercase characters (A through Z)
       ඉංග්‍රීසි ලොකු අකුරු (A සිට Z දක්වා)
    2. English lowercase characters (a through z)
       ඉංග්‍රීසි කුඩා අකුරු (a සිට z දක්වා)
    3. Numbers (0 through 9)
       අංක (0 සිට 9 දක්වා)
    4. Non-alphabetic characters (for example, !, $, #, %)
       අකාරාදී නොවන අක්ෂර (උදාහරණයක් ලෙස !, $, #, %)

Ongoing and Future implementations

- Improve the Wi-Fi access experience in the entire university.

- Replace the Core switches with high availability aspect and SD-WAN technologies.

- Continue the rest of the Fiber Ring project.

- Continue and Improve the IT roadmap.

- Bring our Private cloud platform into the Live usage level.

- New domain name: uok.lk

- End point protections

UNIVERSITY OF KELANIYA

Challenges and Requirements

- Need more Budgets for maintaining and future implementation.

- Technical People are leaving and don't allow for new recruitments.

- Hackers are targeting on University system to steal some data for some reasons and need more security on that.

Updates of Faculty of Medicine, University of Kelaniya

Faculty Network

- Faculty of Medicine, University of Kelaniya is located at Ragama close to North Colombo Teaching Hospital.

- Connected to Kelaniya main university through site to site VPN

- Maintaining Servers around 10 (including VMs)

- Wireless Access points: More than 150 (Including Hostels)

Faculty Network Diagram
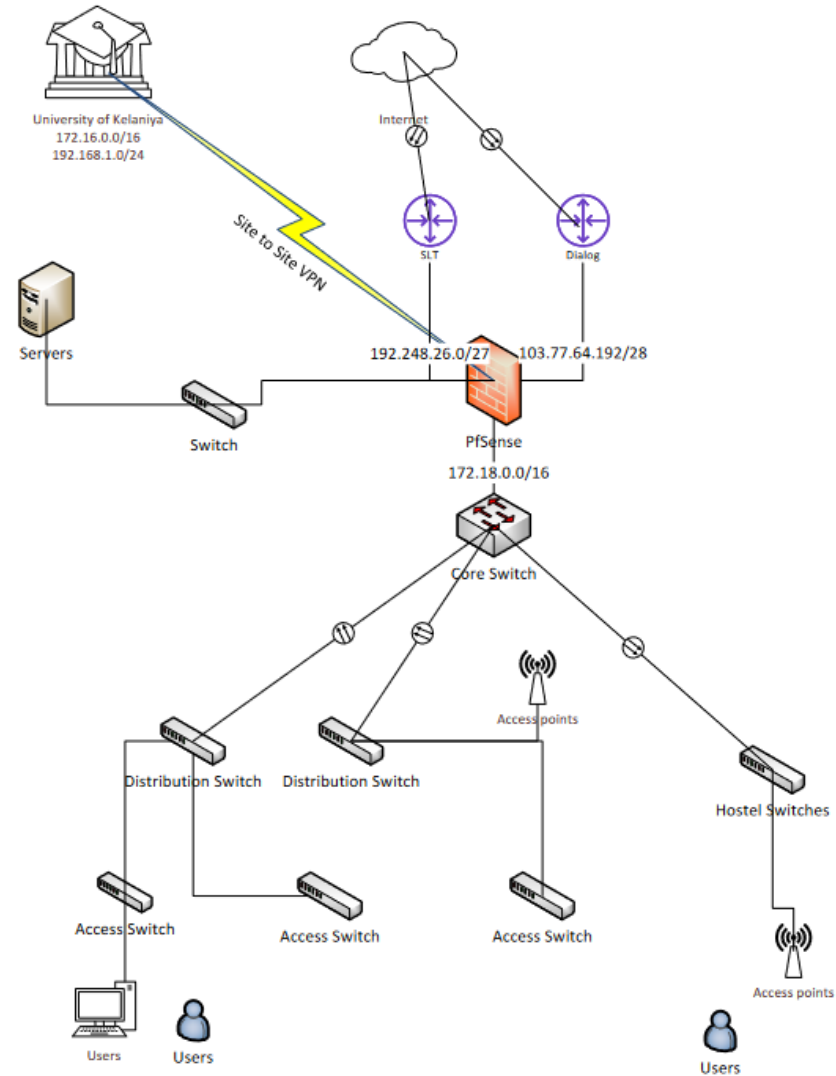
Capacity

- Over 800 Concurrent users

- Over 1500 users

- Internet bandwidth 300Mbps +100Mbps

- Provide Internet facility via LAN and Wireless technologies 2 SSID's:
  - Kelani_WiFi / Eduroam

Faculty Wi-Fi Map
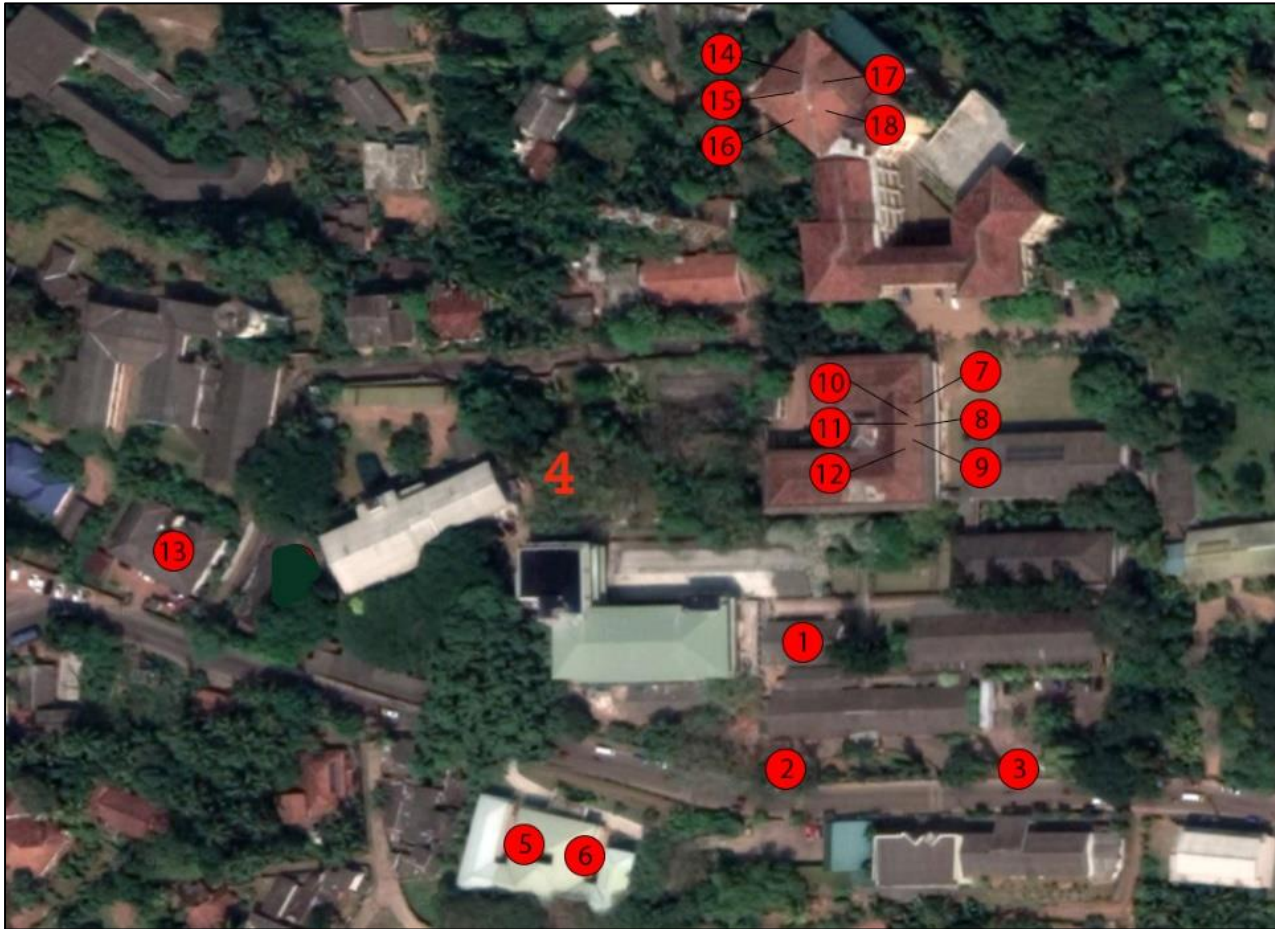
- Main ILL (Internet Leased Line): 300 Mbps
- Backup ILL (Internet Leased Line): 100 Mbps
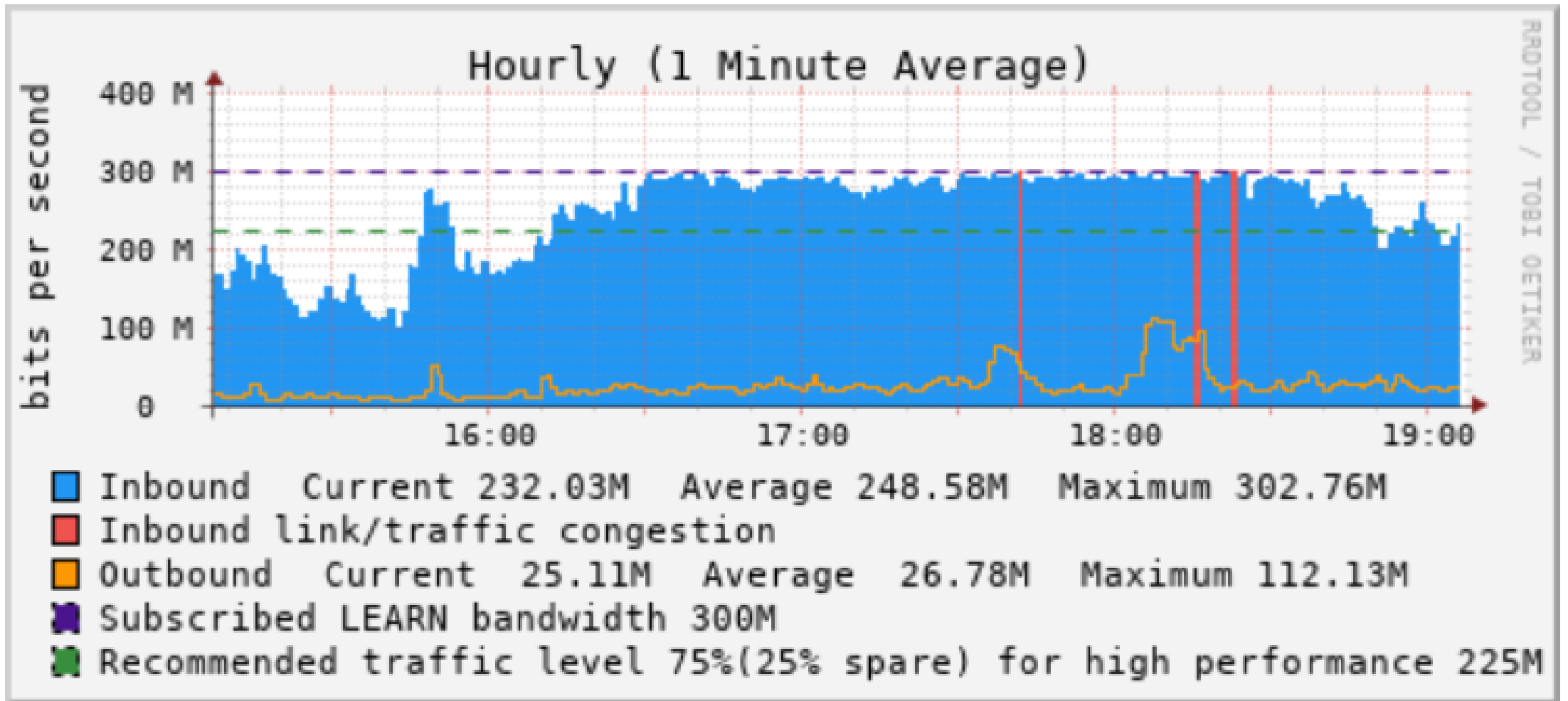
Computer labs

- Computer lab 1
- Computer Lab 2
- Virtual Lab (Anatomy Department)

Hostel Wi-Fi

Local servers

- AD Replica

- Local DNS

- DHCP

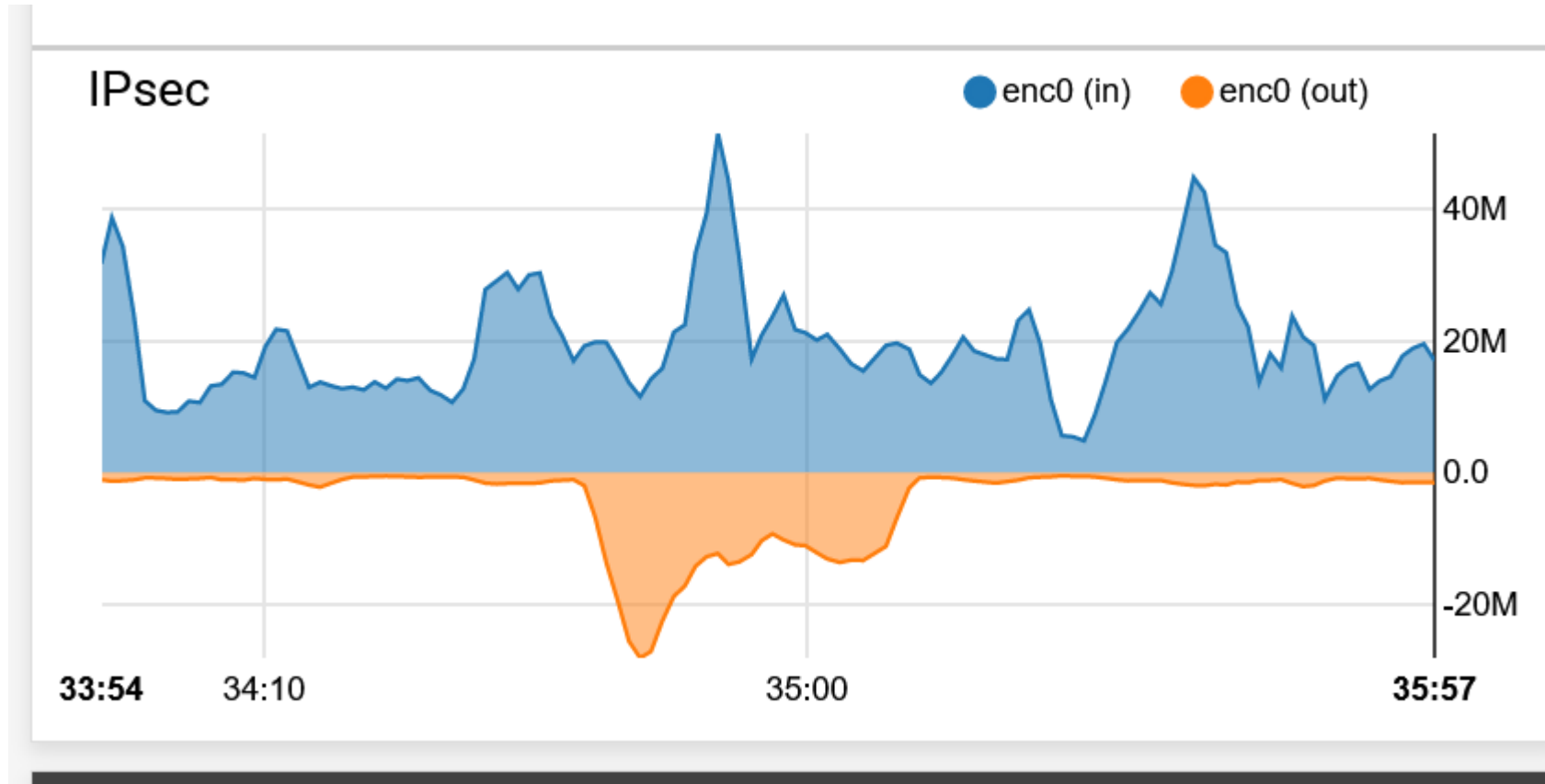- Web server

  - SIS

  - LMS

Public servers

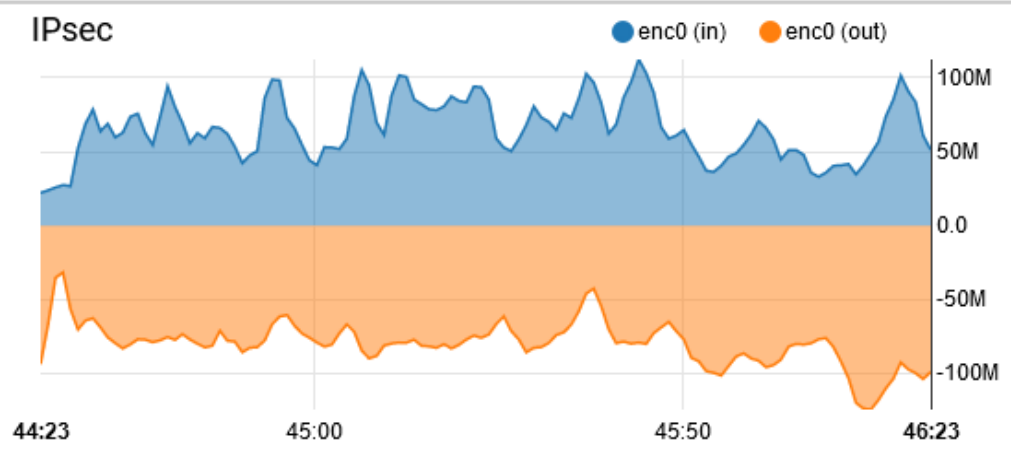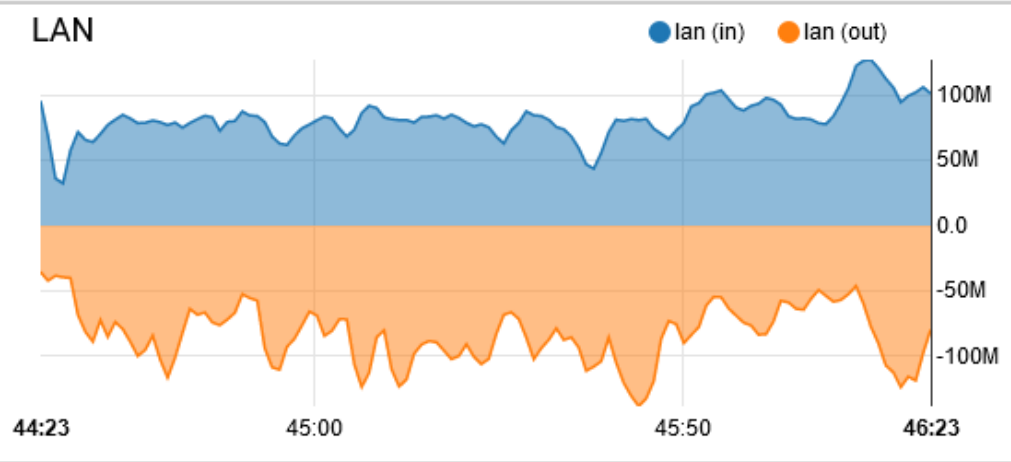- Web Server

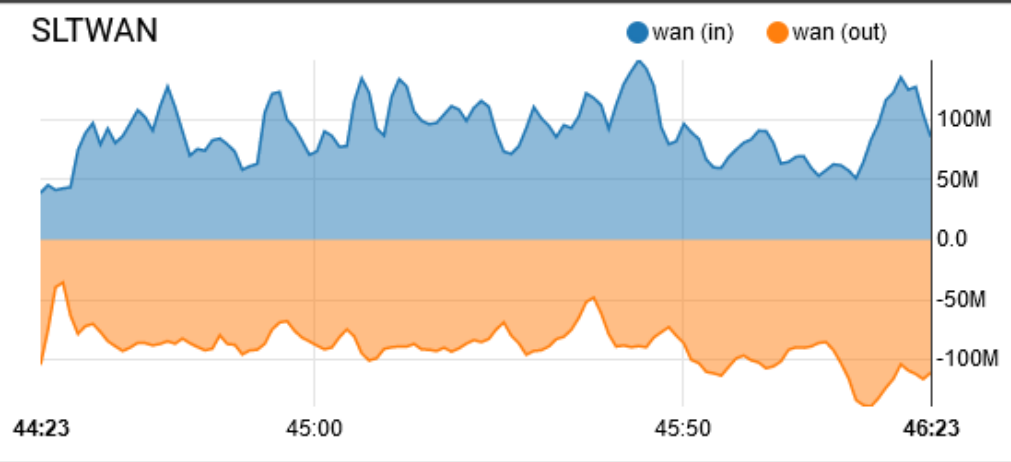 - Redcap

  - Café Billing System
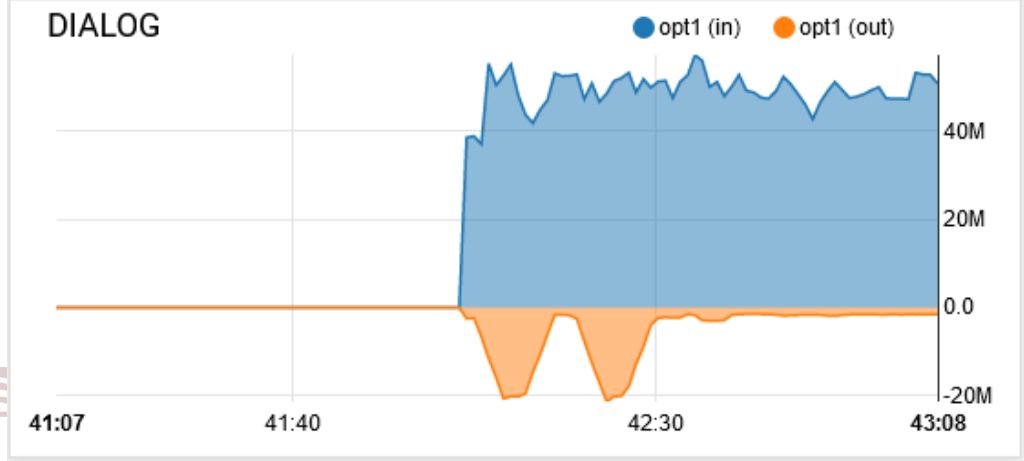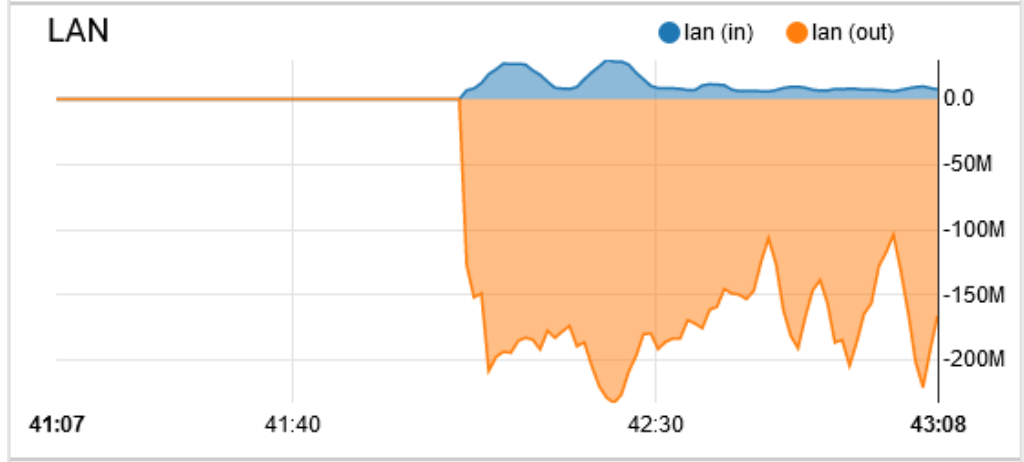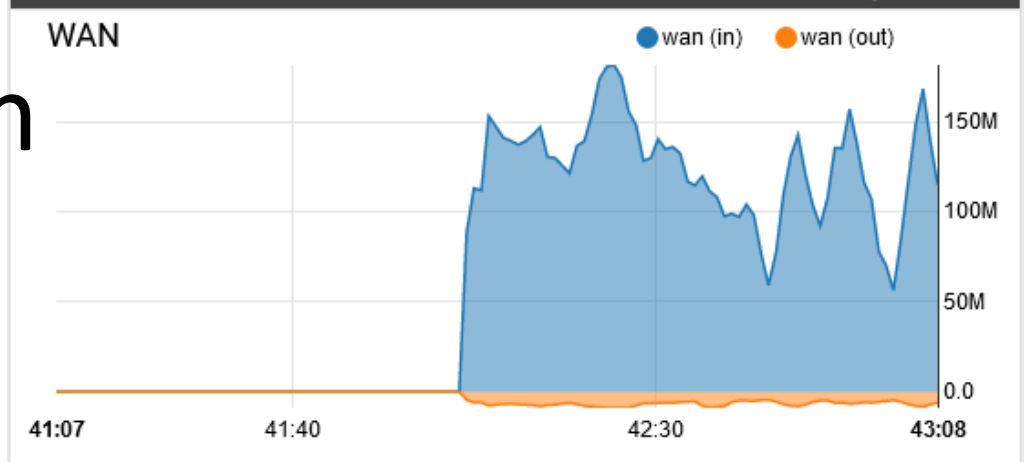
- OPAC (Koha)

.

PfSense Firewall

Site to site vpn

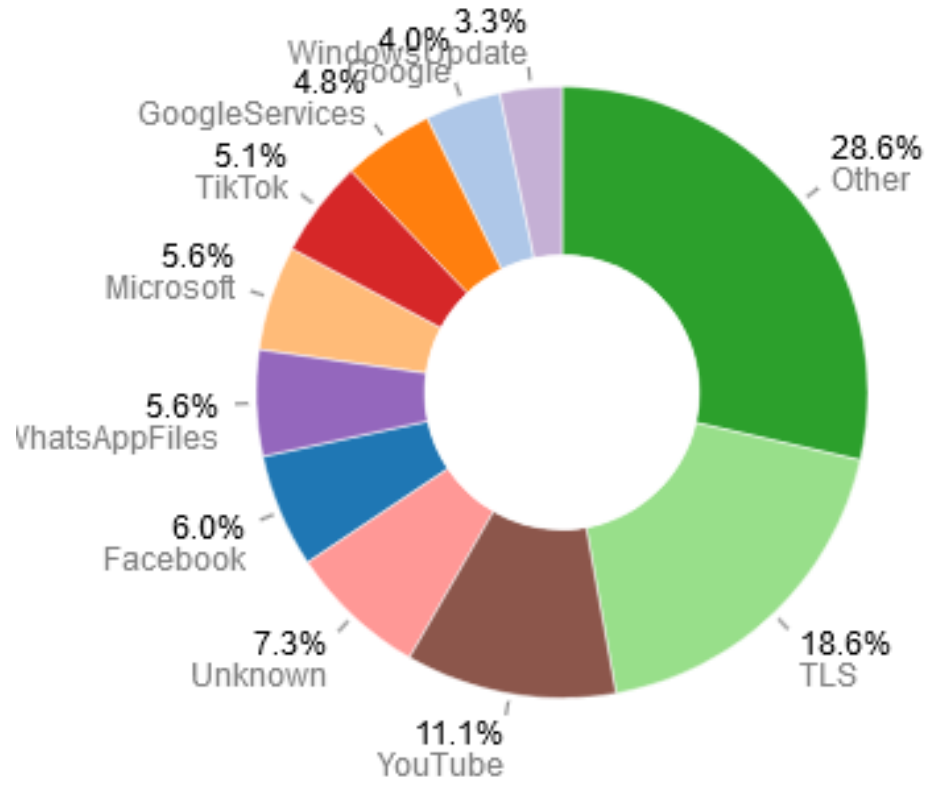# Bandwidth Utilization

Top applicatiom protocols

ls

IPV6 implementation

- FoM, UoK   was allocated a /48   subnet (2401:dd00:20::/48)

- Core Network is currently in IPv6

Test your IPv6 connectivity.

Summary	Tests Run	Share Results / Contact	Other IPv6 Sites	For the Help Desk

Your IPv4 address on the public Internet appears to be 192.248.26.13

Your IPv6 address on the public Internet appears to be 2401:dd00:21:1002::7

Your Internet Service Provider (ISP) appears to be LEARN-LK Lanka Education & Research Network, NREN

Since you have IPv6, we are including a tab that shows how well you can reach other IPv6 sites. *[more info]*

Your DNS server (possibly run by your ISP) appears to have IPv6 Internet access.

Your readiness score

for your IPv6 stability and readiness, when publishers are forced to go IPv6 only

10/10

Click to see Test Data

(Updated server side IPv6 readiness stats)

This instance of test-ipv6.com is provided by HostVirtual

UNIVERSITY OF KELANIYA

Network monitoring system
LibreNMS

Core Switch- Current utilization

Devices

Core switch port wise utilization

Ethernet1/2 Ethernet1/2	Default		← 690.4 kbps → 10.53 Mbps ← 323 pps → 1.98 Kipps	1 Gbps fullDuplex VLANs: 45	Ethernet -	00:b7:71:74:e5:99 MTU 1500	**+ 26** on **C8 Bulding hostel**
Ethernet1/3 Ethernet1/3	Default		← 1.74 Mbps → 39.76 Mbps ← 2.4 Kipps → 4.83 Kipps	1 Gbps fullDuplex VLANs: 45	Ethernet -	00:b7:71:74:e5:9a MTU 1500	
Ethernet1/4 Ethernet1/4	Default		← 65.11 kbps → 931.52 kbps ← 34 pps → 110 pps	1 Gbps fullDuplex VLANs: 45	Ethernet -	00:b7:71:74:e5:9b MTU 1500	**+ ge-0/1/0.0** on **172.18.1.6**
Ethernet1/5 Ethernet1/5	Default		← 2.57 Mbps → 24.48 Mbps ← 885 pps → 2.32 Kipps	1 Gbps fullDuplex VLANs: 45	Ethernet -	00:b7:71:74:e5:9c MTU 1500	**+ 24 gigabit - level** on **172.18.1.8** **+ ge-0/1/0.0** on **172.18.1.5**
Ethernet1/6 Ethernet1/6	Default		← 207.87 Mbps → 31.72 Mbps ← 23.06 Kipps → 9.36 Kipps	1 Gbps fullDuplex VLANs: 45	Ethernet -	00:b7:71:74:e5:9d MTU 1500	**+ 25** on **172.18.1.3** **+ 24 gigabit - level** on **172.18.1.11**
Ethernet1/7 Ethernet1/7	Default		← 10.06 Mbps → 1.62 Mbps ← 1.19 Kipps → 767 pps	1 Gbps fullDuplex VLANs: 45	Ethernet -	00:b7:71:74:e5:9e MTU 1500	**+ Gi1/0/26** on **172.18.1.252**
Ethernet1/8 Ethernet1/8	Default		← 10.52 Mbps → 10.24 Mbps ← 1.61 Kipps → 2.18 Kipps	1 Gbps fullDuplex VLANs: 45	Ethernet -	00:b7:71:74:e5:9f MTU 1500	
Ethernet1/9 Ethernet1/9	Default		← 391.33 kbps → 4.74 Mbps ← 228 pps → 575 pps	1 Gbps fullDuplex VLANs: 45	Ethernet -	00:b7:71:74:e5:a0 MTU 1500	**+ Gi0/25** on **172.18.1.93**

UNIVERSITY OF KELANIYA

Wi-Fi AP utilization
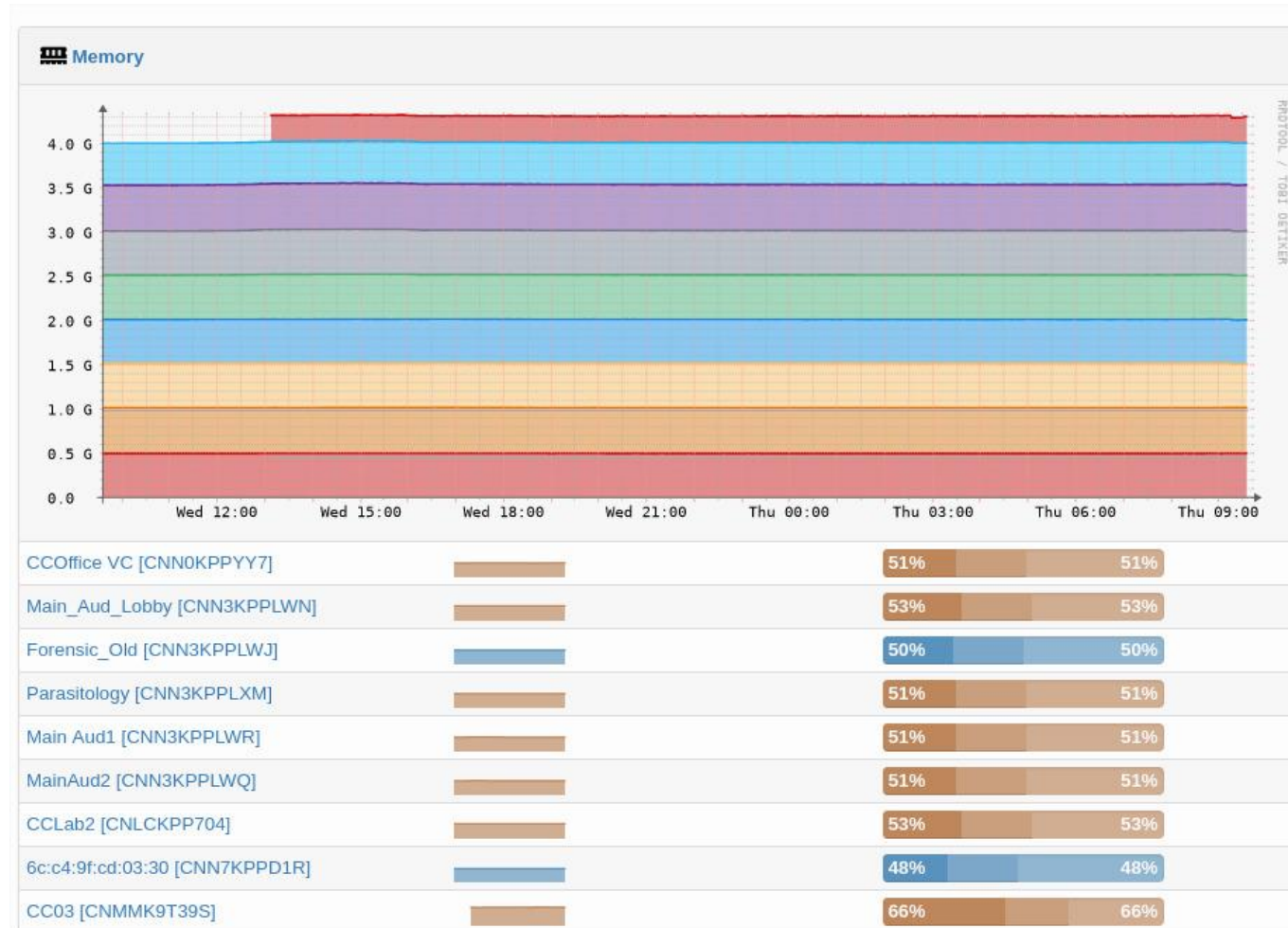
Ongoing and Future implementations

- Replacing existing Wi-Fi system in the faculty.

- Finding a solution for sustainable infrastruture

Challenges & Requirements

- Lightening

- Firewall

- Staff

- Attitudes

- Reluctance to adopt new technologies

- Methodology to share knowledge among us

Thank you