



யாழ்ப்பாணப் பல்கலைக்கழகம், இலங்கை
சாசனம் விஸ்வவித்யாலய, ஸ்ரீ லங்கை
UNIVERSITY OF JAFFNA, SRI LANKA



NETWORK OPERATING CENTER



Outline

- Introduction
- Size of the Network
- Bandwidth
- Network Structure
- Firewall and Security
- VLAN
- NOC Services
- Network Monitoring
- Future Development Plans



Introduction

- University of Jaffna
 - 11 Faculties (Five different locations)
 - 11 Centers & Units
- The Network Infrastructure
 - Servers
 - Firewall
 - Core Switch, Distribution Switch, Access Switch
 - Wireless AP
 - IP Phone

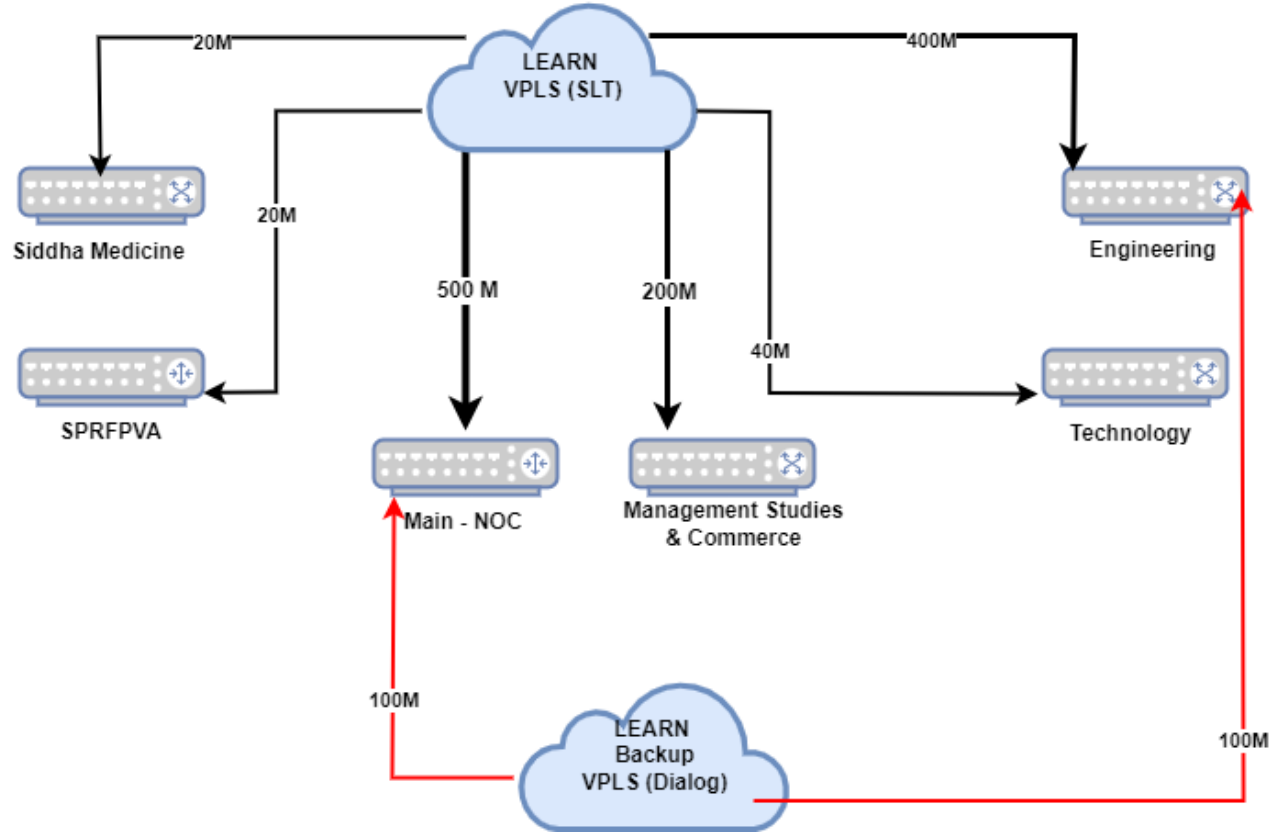


Size of the Network

- Firewall - 02
- Core Switch - 02
- Distribution Switches - 11
- Access Switches
 - Main Premises - 120
 - Management Studies & Commerce - 10
 - Killinochchi Premises - 20
 - RAFA - 2
 - Siddha Medicine - 3
- Wireless AP - 130
- Data Points ~ 5000
- No of Users ~ 15000



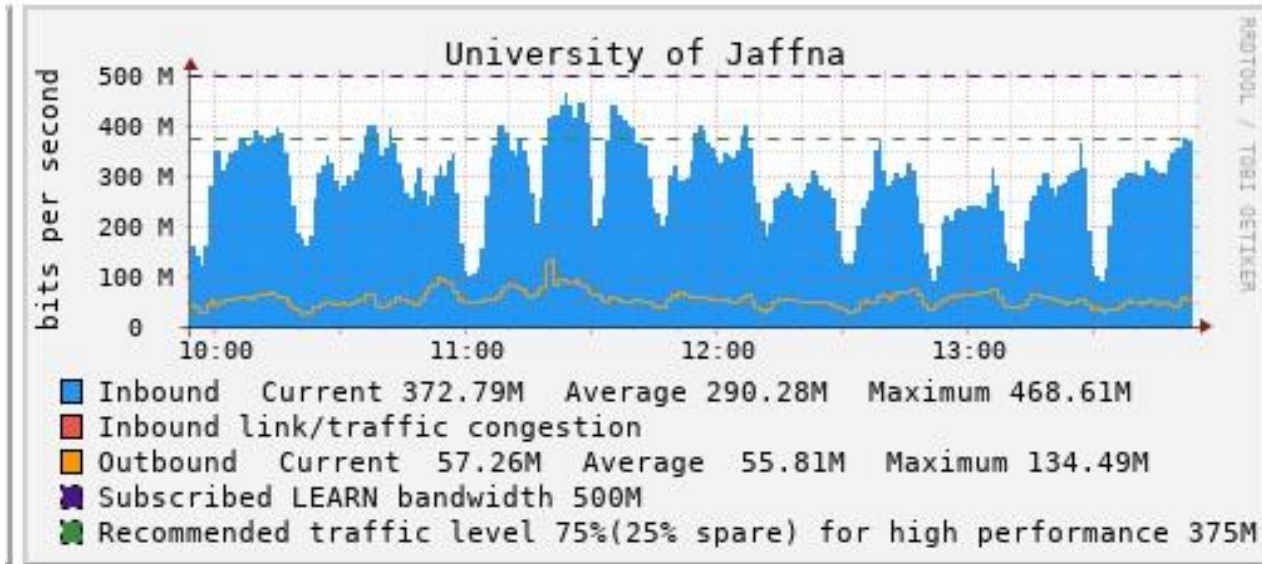
UoJ Bandwidth





Bandwidth (500M) – Main

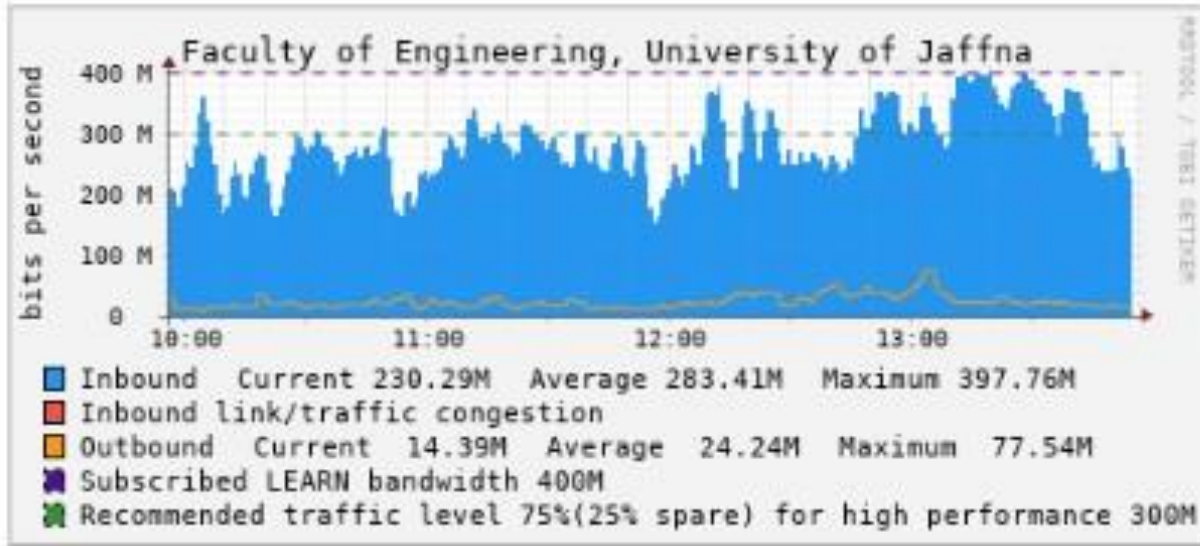
University of Jaffna - D61366





Bandwidth(400M) – Engineering

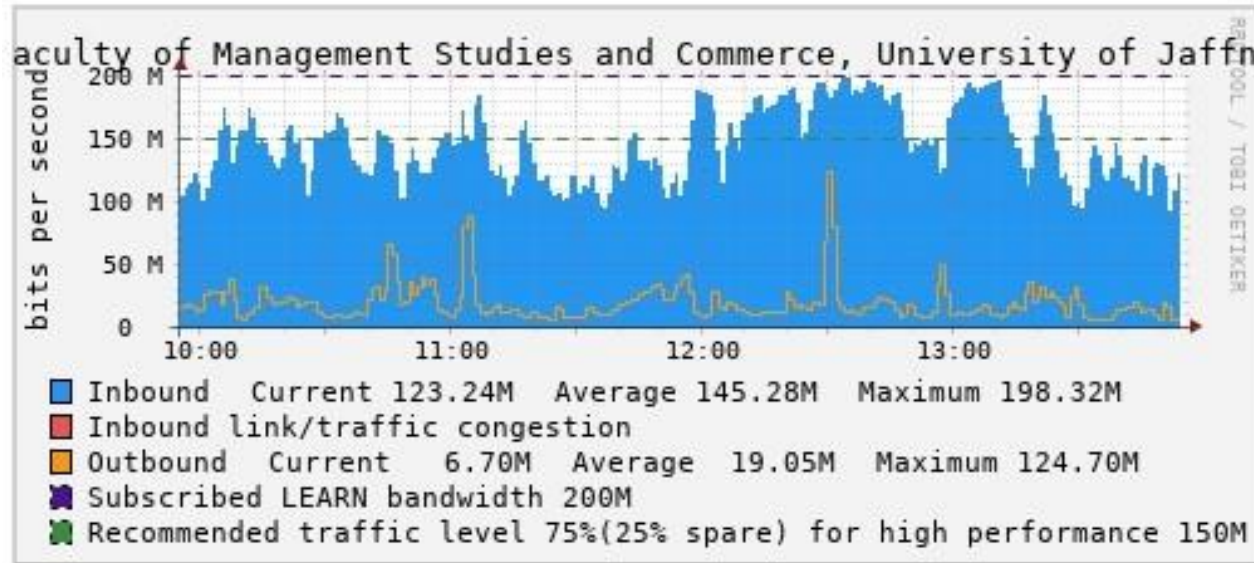
Faculty of Engineering, University of Jaffna - D70999





Bandwidth(200M) – Management

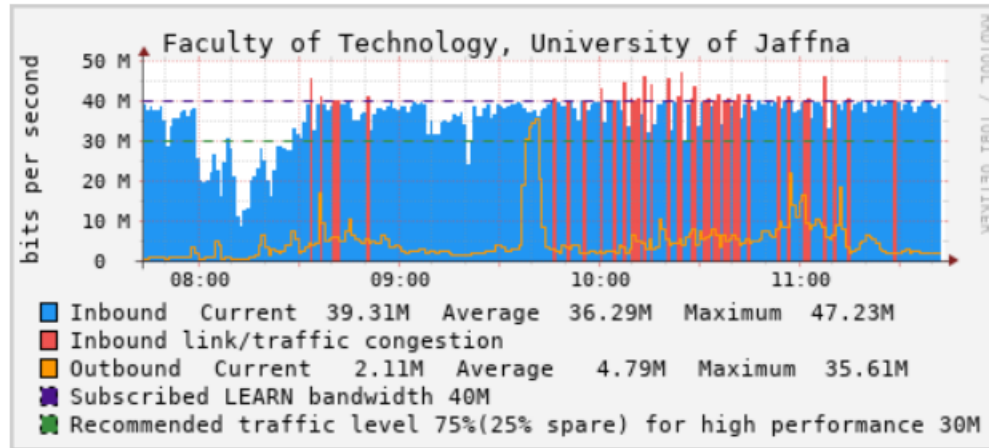
Faculty of Management Studies and Commerce, University of Jaffna - D41547





Bandwidth(40M) – Technology

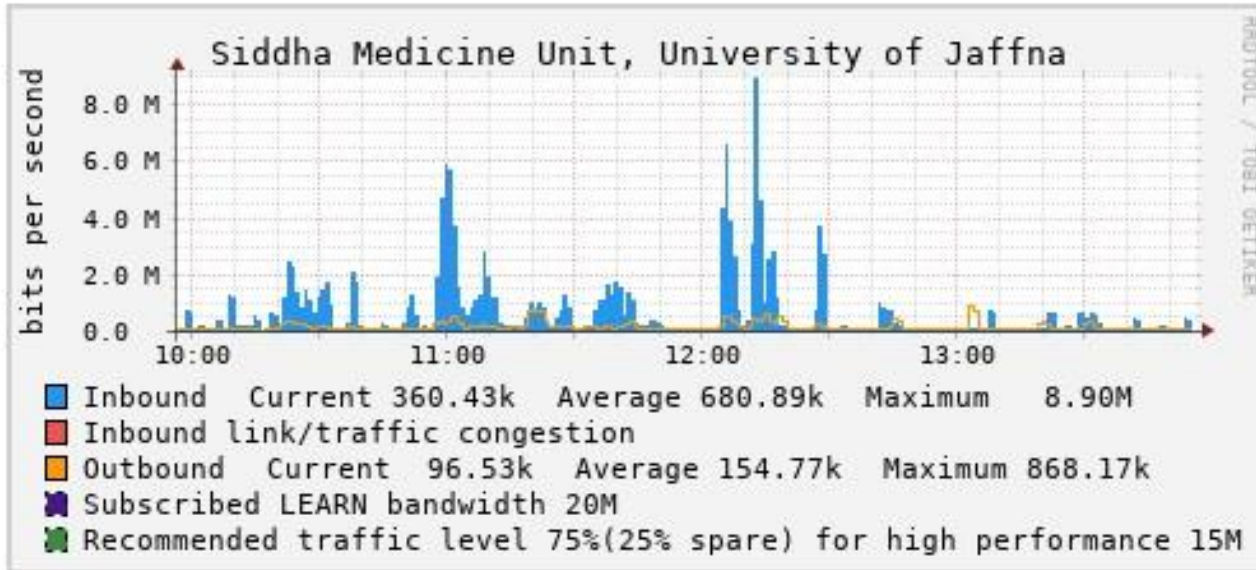
Faculty of Technology, University of Jaffna - D46740





Bandwidth(20M) – Siddha Medicine

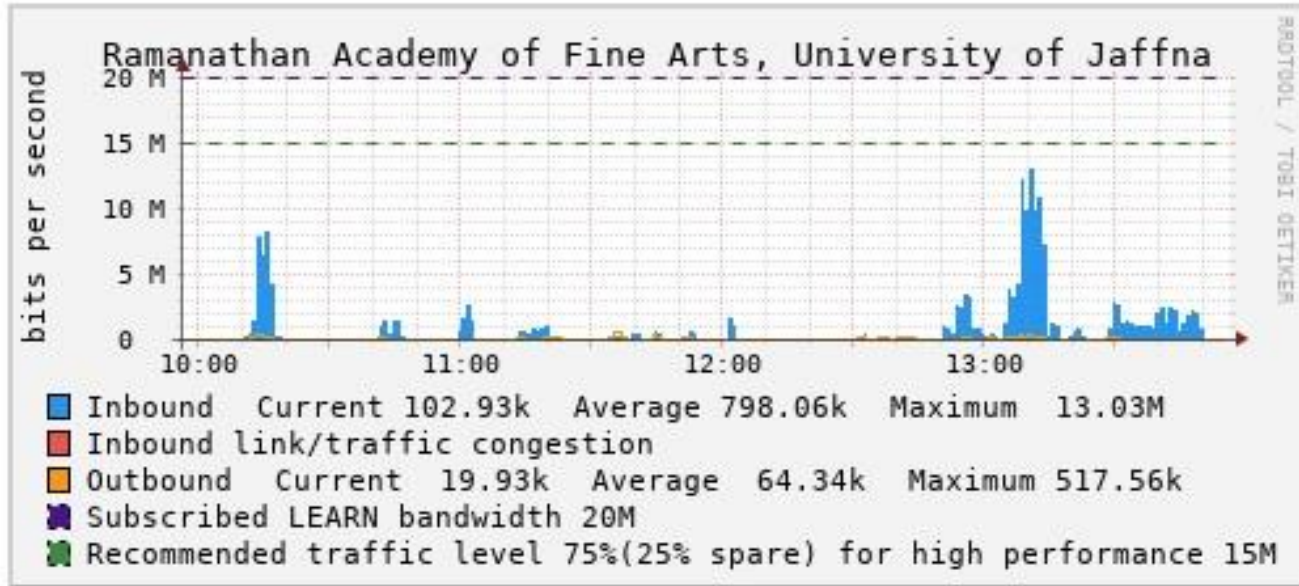
Siddha Medicine Unit, University of Jaffna - D43170





Bandwidth(20M) – SPRFPVA

Ramanathan Academy of Fine Arts, University of Jaffna - D43329

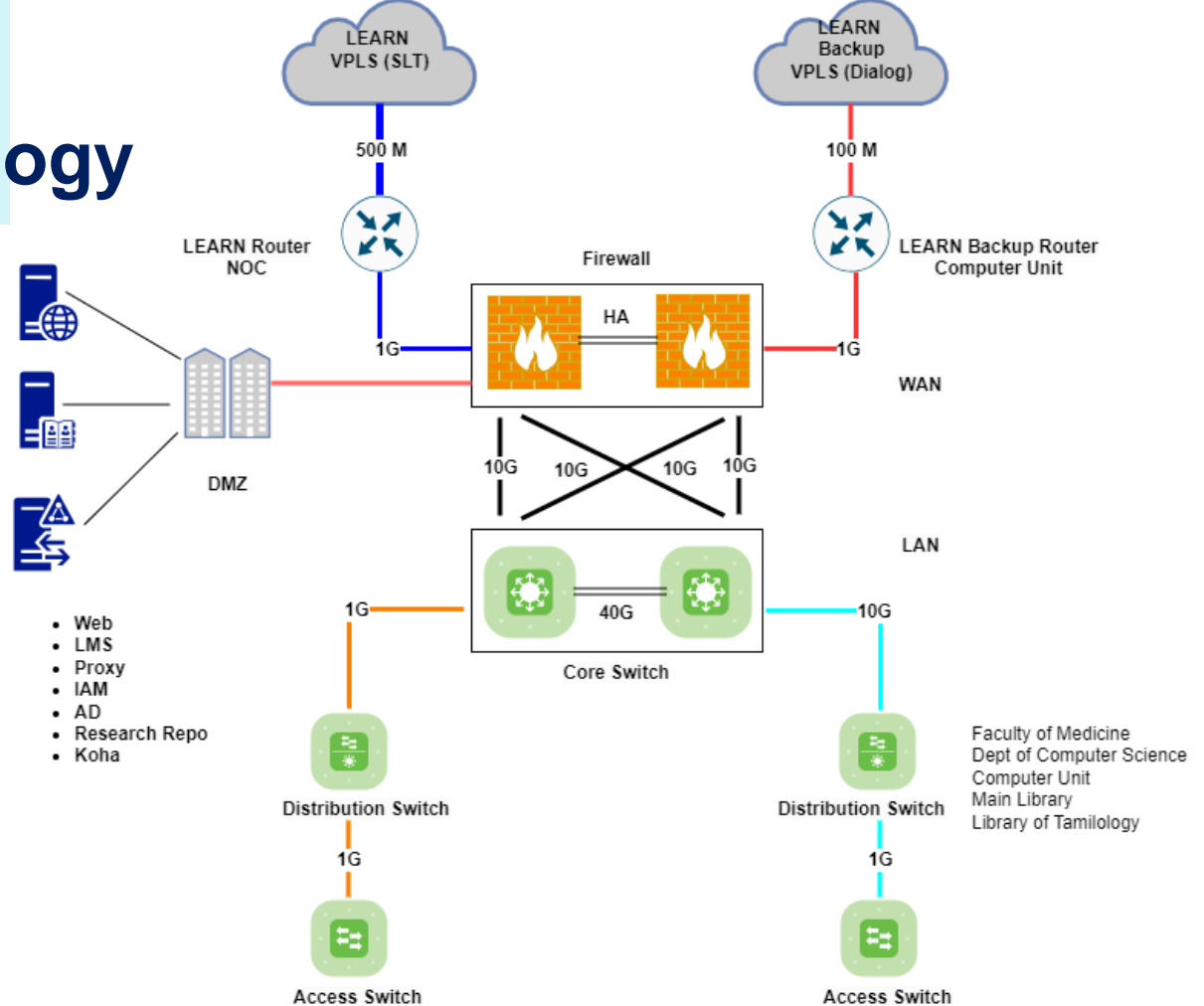




Bandwidth

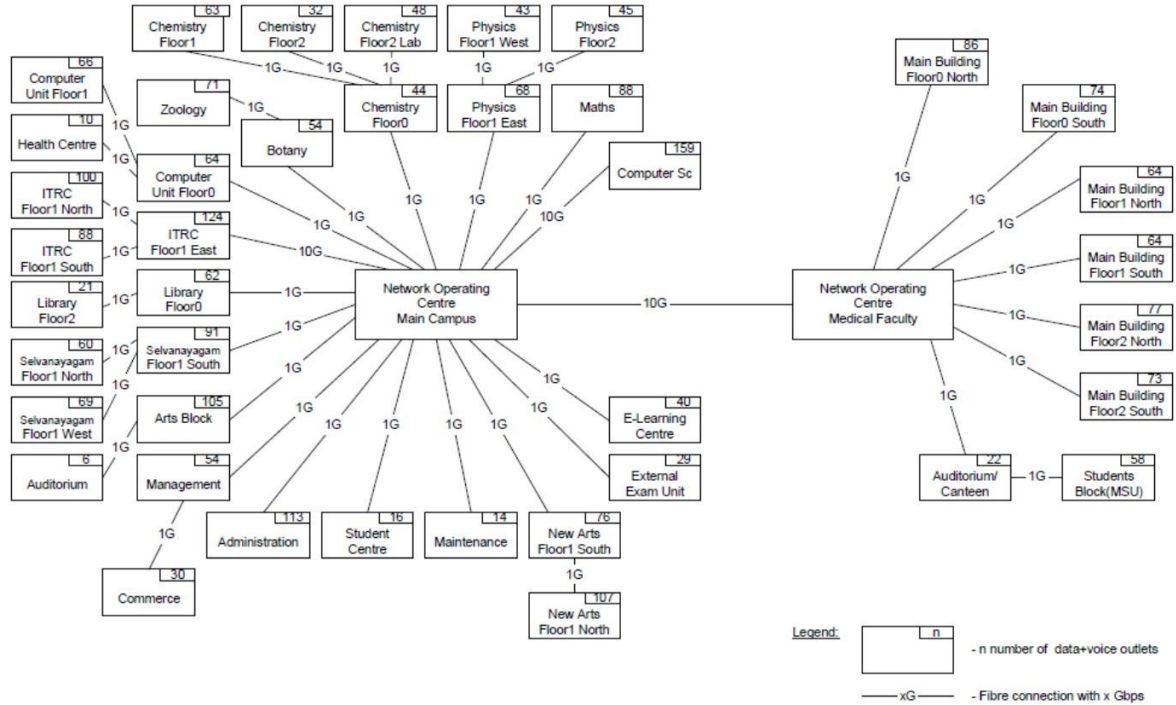
Locations	Primary(Mbps)	Backup(Mbps)
Main	500	100
Engineering	400	100
Management	200	
Technology	40	
Siddha Medicine	20	
SPRFPVA	20	
Total	1180	200

Network Topology





Structure of the Network



Fiber optic backbone architecture (Tree Topology)
Campus Network (Star Topology)

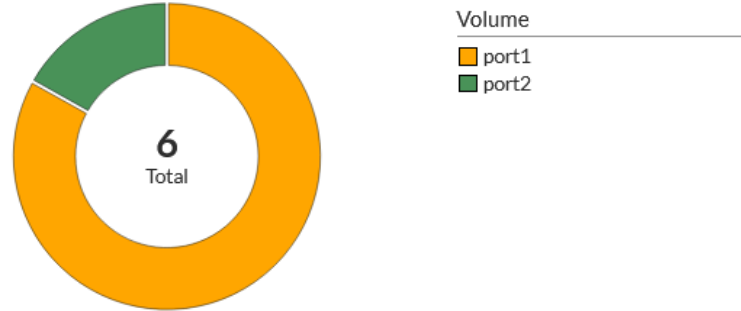


Bandwidth Load Balancing

Load Balancing Algorithm

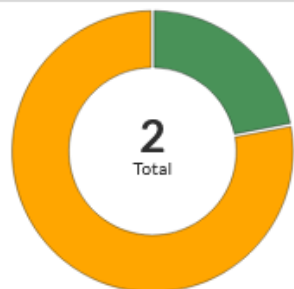
The workload is distributed based on the number of packets that are going through the member.

Volume Configuration

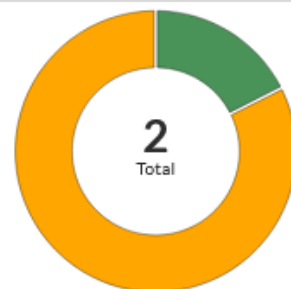


Member	Weight
 port2	<input type="text" value="1"/>
 port1	<input type="text" value="5"/>

Bandwidth **Volume** Sessions



Bytes Received



Bytes Sent



+ Create New ▾

✎ Edit

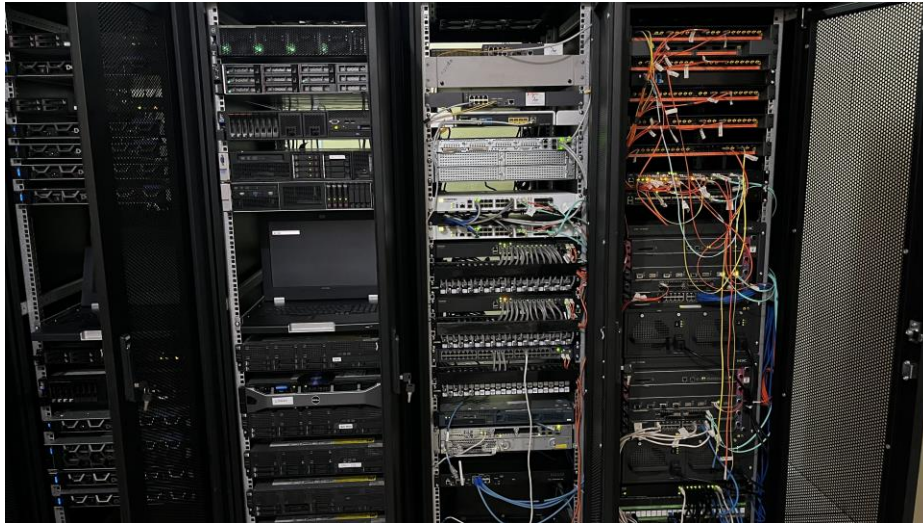
🗑 Delete

	Interfaces ⇅	Gateway ⇅	Cost ⇅	Download ⇅	Upload ⇅
	virtual-wan-link				
•	port2	103.77.65.126	0	69.28 Mbps <div style="width: 60%;"></div>	7.85 Mbps <div style="width: 10%;"></div>
•	port1	192.248.56.62	0	290.91 Mbps <div style="width: 95%;"></div>	44.85 Mbps <div style="width: 100%;"></div>

Data Center

Physical Server - 27

45 VM Applications - Operating Systems: Centos 7, Ubuntu Server, Debian and Windows Server



Firewall and Security



- Using the Next-Generation Firewall (Fortigate 201F)
- NAT
- Policy to Access to Servers/Switch with in LAN
- VPN based login to SSH Access to Servers





Power Supply - NOC

- Our Server room power supply has 3 phase supply line together with UPS (4 x 10kVA) protection for sudden power failures. And also we have generator backup and power supply to provide the service to maintain the continuous services.





VLAN

- Staff
- Student
- Wi-Fi
- Management
- Voice

Computer Science	ComScStaff	10.10.10.0/24	101
	ComScStudent	10.20.10.0/24	201
	Voice	10.30.10.0/22	301
Math	MathStaff	10.10.20.0/24	102
	MathStudent	10.20.20.0/24	202
	Voice	10.30.10.0/22	301
Physics	PhysicsStaff	10.10.30.0/24	103
	PhysicsStudent	10.20.30.0/24	203
	Voice	10.30.10.0/22	301
Chemistry	ChemistryStaff	10.10.40.0/24	104
	ChemistryStudent	10.20.40.0/24	204
	Voice	10.30.10.0/22	301
Botany	BotanyStaff	10.10.50.0/24	105
	Voice	10.30.10.0/22	301
	ZoologyStaff	10.10.60.0/24	106
	Voice	10.30.10.0/22	301
Computer Unit	ComUniteStaff	10.10.70.0/24	107
	ComUniteStudent	10.20.70.0/24	207
	Voice	10.30.10.0/22	301

Services



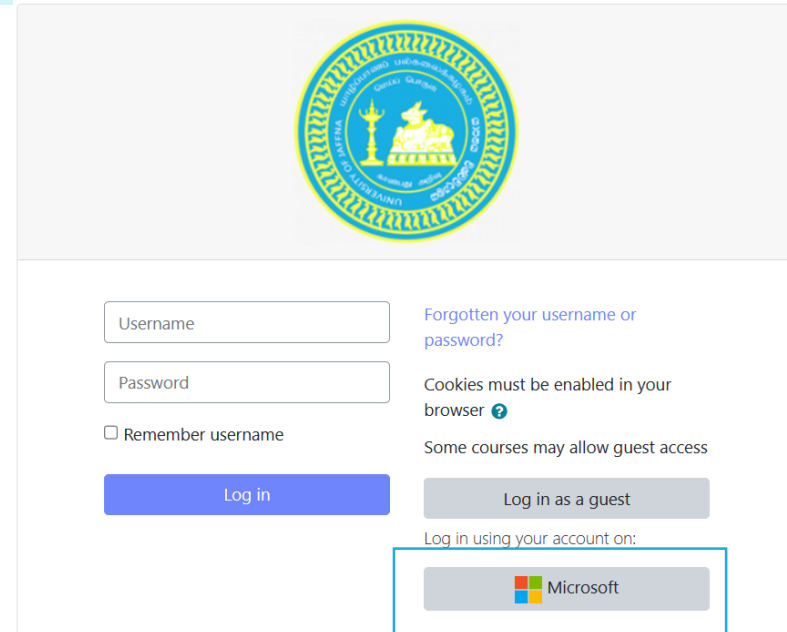
Web Servers

- Main website:- <https://www.jfn.ac.lk>
- Each Faculty and Department maintains their own website.
 - CMS – Wordpress
 - e.g. <https://www.sci.jfn.ac.lk>.
- All the website are enable SSL certificate.
 - Lets Encrypts



LMS

- University of Jaffna's Learning Management Systems are based on the Moodle Platform
- Students access course contents/materials through LMS.
 - <https://lms.jfn.ac.lk>
 - <https://mclms.jfn.ac.lk>
 - <https://odlms.jfn.ac.lk>
 - <https://bbmlms.maco.jfn.ac.lk>

A screenshot of the University of Jaffna LMS login page. At the top center is the university's logo. Below it are two input fields: 'Username' and 'Password'. To the right of the 'Username' field is a link that says 'Forgotten your username or password?'. Below the 'Password' field is a checkbox labeled 'Remember username'. To the right of the password field is a message: 'Cookies must be enabled in your browser' with a help icon. Below that is another message: 'Some courses may allow guest access'. There are two buttons: a blue 'Log in' button and a grey 'Log in as a guest' button. Below these buttons is the text 'Log in using your account on:' followed by a button for 'Microsoft' with the Microsoft logo. A blue box highlights the Microsoft button, and a blue arrow points from it to the text 'Microsoft Azure SSO' below the screenshot.

Microsoft Azure SSO



IAM Services


- IDP - Shibboleth IdP v4
 - We are upgraded Shibboleth IdP v4 and LDAP on 27th April 2023.
- IDB – Open LDAP
- IRS – FreeRADIUS

A screenshot of a Zoom login page for the University of Jaffna. The page features the university's logo and name in Sinhala and English. Below the logo, it says "Login to Zoom Video Conference". The Zoom logo is prominently displayed in blue. Underneath, it reads "Zoom Video Conferencing by LEARN". There are two input fields for "Username" and "Password". Below these fields are two checkboxes: "Don't Remember Login" and "Clear prior granting of permission for release of your information to this service.". A blue "Login" button is positioned below the checkboxes. At the bottom, there are two links: "Forgot your password?" and "Need Help?". The footer of the page contains the text "Copyright Computer Unit University of Jaffna".



Password Management Portal

University of Jaffna Password Change Portal



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ශාසනය විශ්වවිද්‍යාලය, ශ්‍රී ලංකාව
UNIVERSITY OF JAFFNA, SRI LANKA

Change your password

i Enter your old password and chose a new password with minimum 8 characters including digits and non alphanumeric characters (eg:- @0we5Dxc)

If you forgot your password - click here to get a password reset link.


- Email a password reset link.

User Name

Old password

New password

Confirm New Password

I'm not a robot 



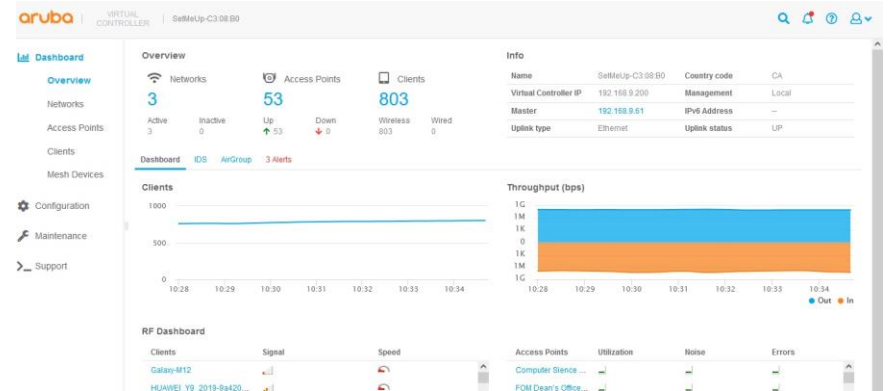
Cloud Services

- Google for Education (G Suite)
- Microsoft Azure (A1)



Wireless

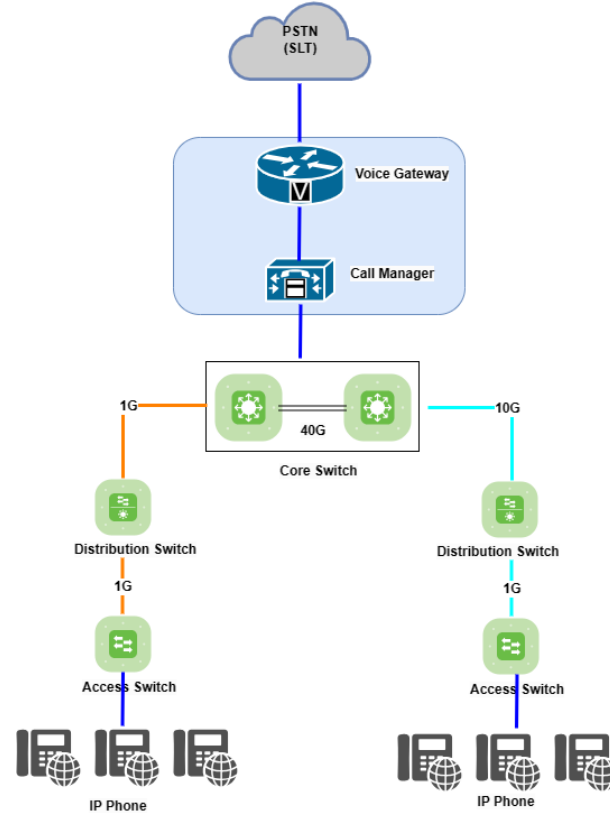
- 100+ Access Point (Aruba)
- 5000+ wireless devices.
(Range 10.X.Y.Z/20)
- Uses WPA2/AES with PEAP for extended security in eduroam
- DHCP
- eduroam





VoIP

- Cisco Call Manager
- Around 250 Phones





VPN

- Main – Engineering
- Main – Management

			MTU 1500			
port1 248.56.6.1/26	IPv6		413Mbps 37.4Mbps 38.4kpps 20.8kpps	Ethernet 1Gbps (full) MTU 1500	d4:76:a0:59:fb:f8 2023-12-09 16:35:35	To_Killinochchi Tunnel UoJ-to-MF Tunnel
port2 77.65.113.1/28	IPv6		95.7Mbps 6.29Mbps 8.84kpps 5.31kpps	Ethernet 1Gbps (full) MTU 1500	d4:76:a0:59:fb:f9 2023-12-09 16:35:35	
port3	IPv6			Ethernet	d4:76:a0:59:fb:f...	



Library Services

- Online Public Access Catalogue (Koha) to search Books and Materials in the Library Network.
 - libcat.lib.jfn.ac.lk
- The portal for Research Collection (DSpace), the Journals, Articles, Conference Proceeding and Various Publications done by the University Staff.
 - repo.lib.jfn.ac.lk/ujrr/
- The Shibboleth Quick Access to E-Journals, E-Database and E-Books
 - Emerald
 - Oxford Academic Collection
 - Taylor & Francis



MyUoJ Apps

- Runs on Containers (Docker)



Monitoring

- Network Devices - Observium
- Server Room – Sensor based

The screenshot displays the Observium monitoring interface for a Fortinet FortiGate VM. The top navigation bar includes 'Overview', 'Graphs', 'Health', 'Ports', 'Inventory', 'Logs', and 'Alerts'. The main content area is divided into several sections:

- Vendor/Hardware:** Fortinet FortiGate VM
- Operating system:** Fortinet Fortigate 7.2.4 (build1396)
- System name:** fg201-fw1.jfn.ac.lk
- Serial:** FG201FT921904682
- Uptime:** 2 days, 17h 1m 7s
- Last reboot:** 2023-12-09 16:35:35

The **Ports** section features a graph showing network traffic over time, with a summary of 40 ports, 15 active, 23 disabled, and 2 unknown. Below the graph, a list of ports is shown, including x1, x2, x3, x4, port1 through port24, modem, mgmt, ha, SwitchMgt, Server_MGMT, sst.root, na.root, l2t.root, UoJ-to-MF, To_Killinochochi, lan, and LAN_interface.

The **Eventlog** section displays a list of recent events, such as MAC address changes for various interfaces.

The **Processors** section shows a graph of CPU usage and a summary of Processor Intel (3%) and Processor Types.11 9 (0%).

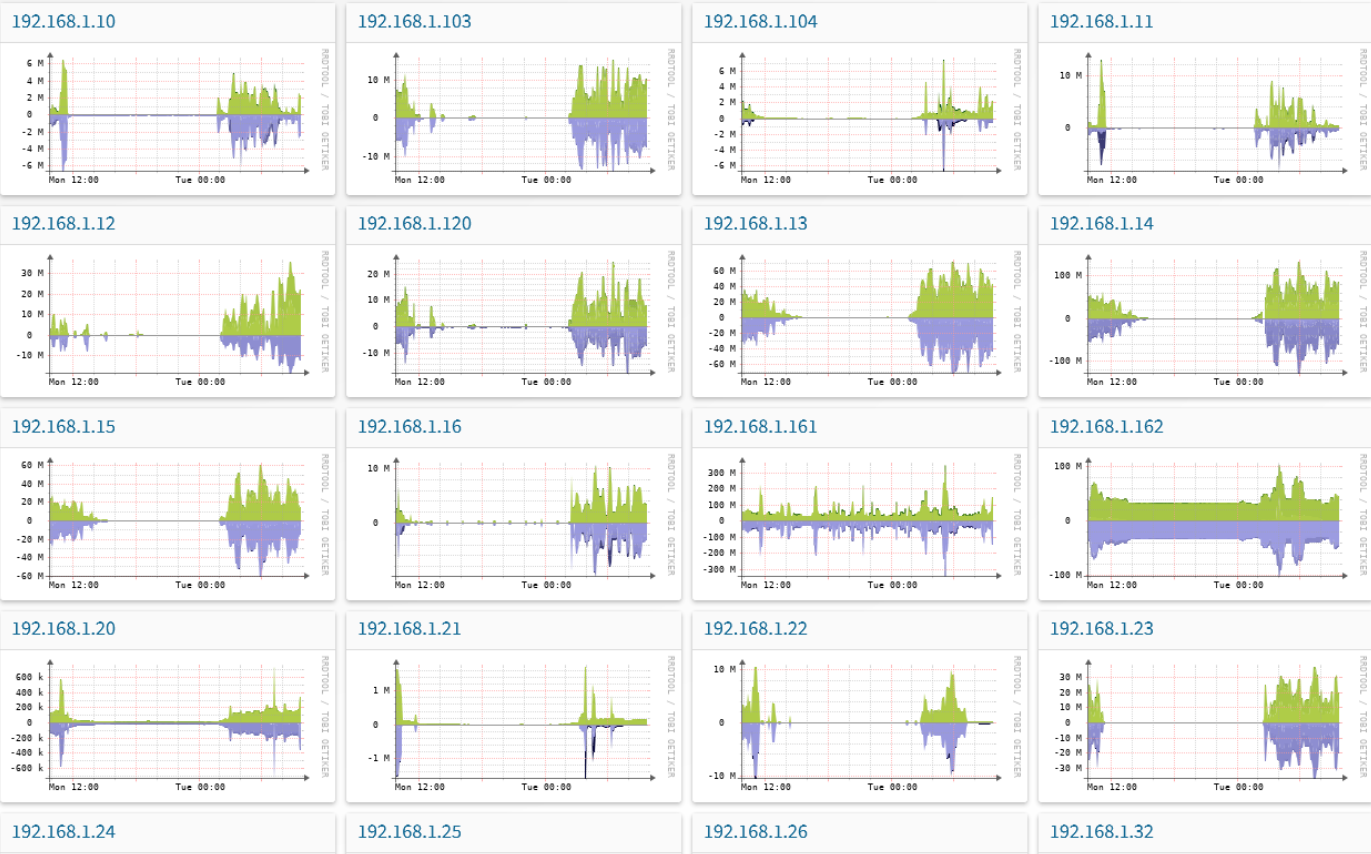
The **Memory** section shows a summary of memory usage: 3.97GB / 7.79GB (51%) and 3.82GB (49%).

The **Storage** section shows a summary of storage usage: 3.92GB / 440GB (1%) and 436GB (99%).

The **Status Indicators** section shows the HA Mode (uofw-ha) as active/Passive, and HA Sync Status for FG201-FW1 and FG201-FW2 as synchronized.

The **Fanspeed** section shows the speed of three fans: FAN 1 CPU FAN (7848RPM), FAN 2 SYS FAN (7627RPM), and FAN 3 AUX2 FAN (7941RPM).

The **Temperature** section is partially visible at the bottom.





Future Development Plans

- Expanding the network to new buildings
 - Faculty of Medicine
 - Faculty of Management Studies and Commerce
 - RAFA
 - Siddha Medicine
- Upgrade the Bandwidth to the Faculty of Technology
- Students related services connected to SSO
- Extend the Network to Hostels
- Upgrade the backbone to 10G



Challenges

- Access Switch – 100 Mbps
- Power Failure
- Automatic Backup
- Budget Allocation
- Device Failure



Thank you