



ANNUAL NOC MEETING - 2023

Damith S. Ekanayake

Wayamba University of Sri Lanka (Makandura Premises)

WAYAMBA UNIVERSITY OF SRI LANKA

- Kuliyaipitiya Premises
 - Faculty of Applied Sciences
 - Faculty of Business Studies and Finance
 - Faculty of Technology
- Makandura Premises
 - Faculty of Agriculture and Plantation Management
 - Faculty of Livestock, Fisheries and Nutrition
- Labuyaya Premises
 - Faculty of Medicine



ICT CENTRE – MAKANDURA PREMISES

ICT CENTRE STAFF

- Director – Prof. WJSK Weerakkody
- Senior Lecturer – Dr. HACK Jayathilaka
- Senior Lecturer – Dr. (Mrs.) Kanchana Weerasinghe
- Lecturer (Temporary) – Mr. Nuwan Rajarathna
- Assistant Network Manager – Mr. EMDS Ekanayake
- Systems Engineer – Vacant
- Instructor – Mr. SMCPB Herath
- Instructor – Mr. GWDD Fonseka
- Instructor (Temporary) – Mrs. Tharukee
- Technical Officer – Mr. HMSKYB Herath



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- Lab Attendant – Mr. Harsha Perera



ICT CENTRE STAFF

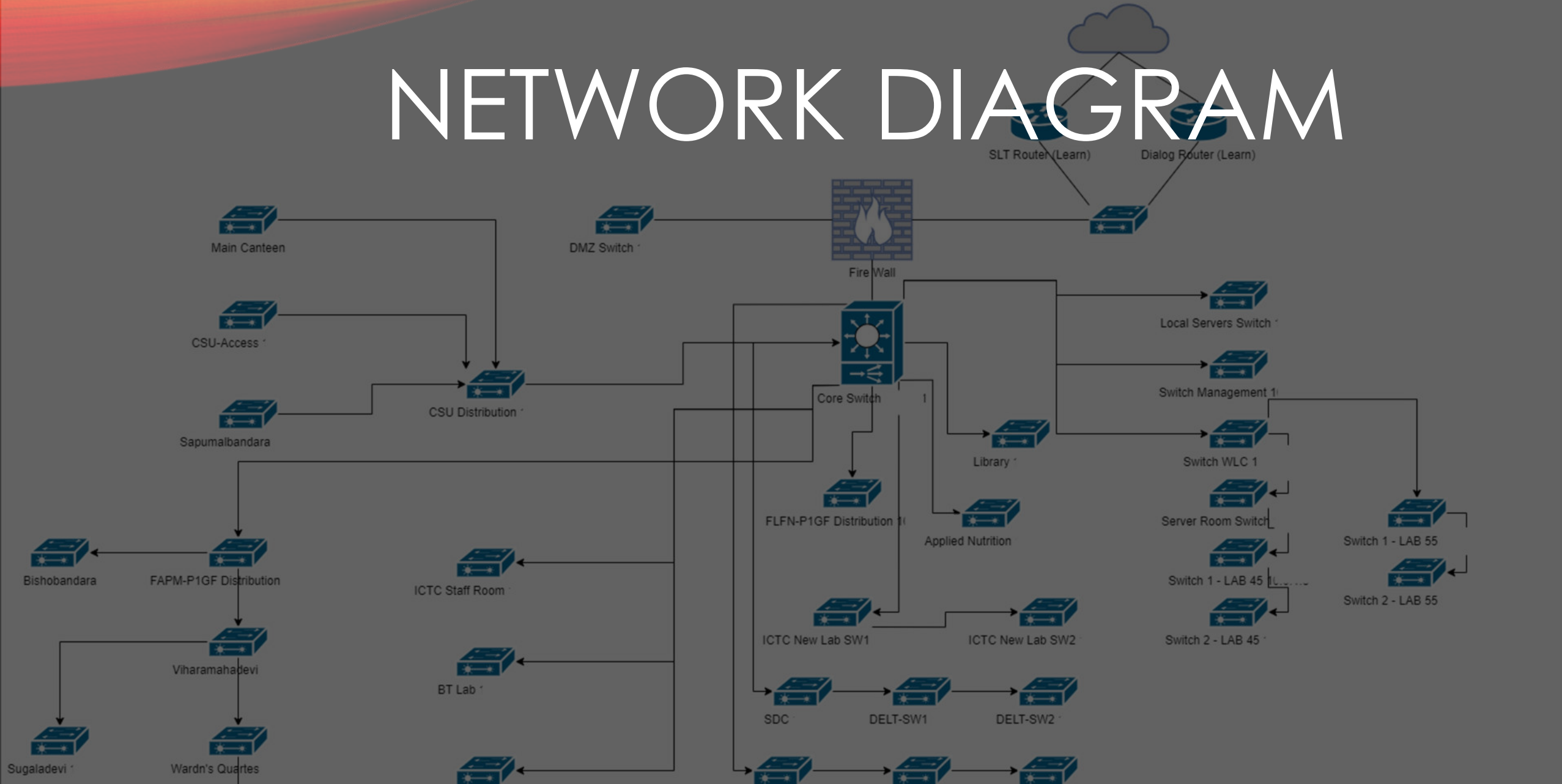
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- Lab Attendant – Mr. Harsha Perera
- Labourer – Mr. Gamini Wijerathne





CAMPUS NETWORK

NETWORK DIAGRAM





NOC SERVICES

DNS

- Master DNS Server
 - sapumal.wyb.ac.lk
 - Hosted at Kuliyaipitiya premises
- Slave DNS Server
 - biso.wyb.ac.lk
 - Hosted at Makandura premises

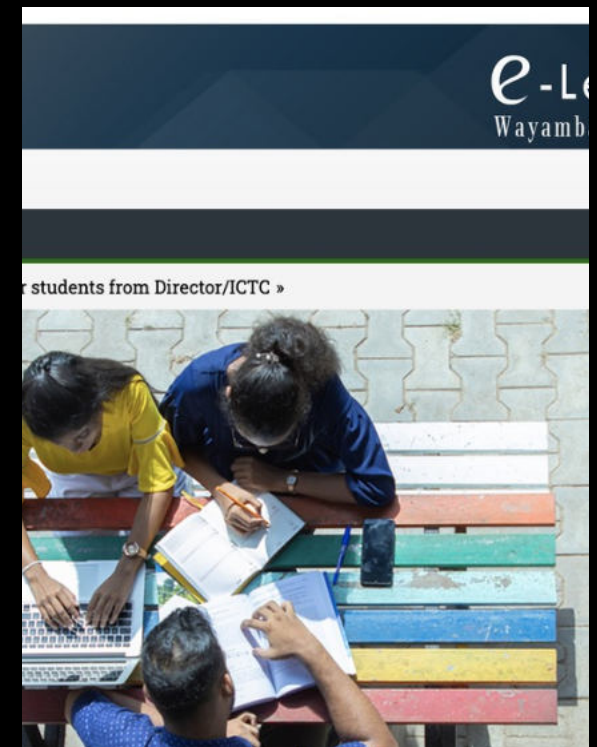
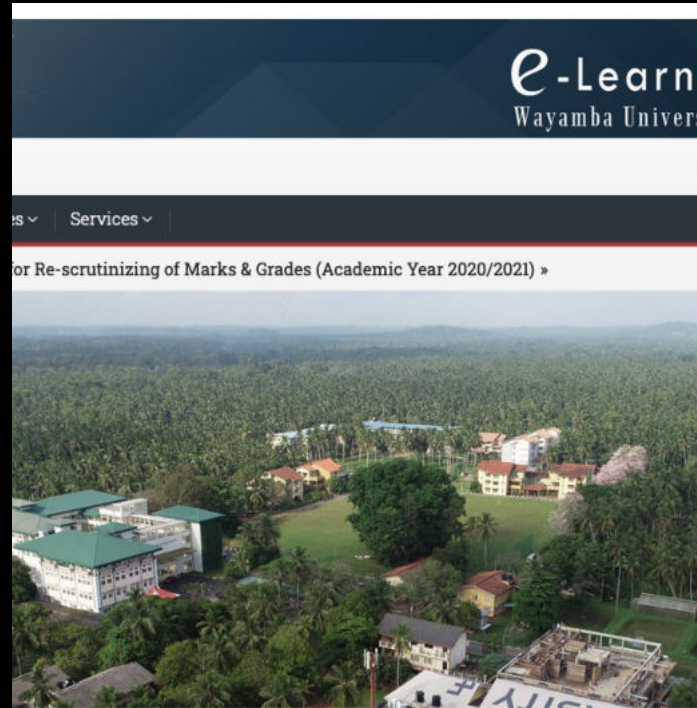


EMAIL

- Google Workspace
 - For Staff
- Microsoft Outlook
 - For Staff
 - For Students

LMS

- One LMS for each faculty
 - <https://elga.wyb.ac.lk>
 - <https://elgm.wyb.ac.lk>
- Configuration:
 - Moodle 3.10
 - NGINX
 - MariaDB
 - Memcached (Two instances per each LMS)



WEB SITES, MIS, AND OTHER

- <https://fapm.wyb.ac.lk>
- <https://flfn.wyb.ac.lk>
- <https://ictm.wyb.ac.lk>
- <https://aeb.wyb.ac.lk>
- <https://agress.wyb.ac.lk>
- <https://bitsoc.wyb.ac.lk>
- <https://pedmis.wyb.ac.lk>
- <https://eport-flfn.wyb.ac.lk>
- <https://ams.mkd.wyb.ac.lk>



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- <https://vmet.wyb.ac.lk>



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- <https://vmet.wyb.ac.lk>
- <https://pgnutrition.wyb.ac.lk>



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- <https://agress.wyb.ac.lk>
- <https://bitsoc.wyb.ac.lk>
- <https://pedmis.wyb.ac.lk>
- <https://eport-llfn.wyb.ac.lk>
- <https://ams.mkd.wyb.ac.lk>
- <https://vmet.wyb.ac.lk>
- <https://pgnutrition.wyb.ac.lk>
- <https://rightwrite.wyb.ac.lk>



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- <https://rightwrite.wyb.ac.lk>
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- <https://rightwrite.wyb.ac.lk>
- <https://sdc.wyb.ac.lk>
- <https://xpm.mkd.wyb.ac.lk>



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- <https://pgnutrition.wyb.ac.lk>
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- <https://xpm.mkd.wyb.ac.lk>
- <https://abse.wyb.ac.lk>





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இலங்கையின் வயாம்பா பல்கலைக்கழகம்
Wayamba University of Sri Lanka

Login to Zoom Video Conference

Username

> [Forgot your password?](#)

> [Need Help?](#)

Password

IDP Member Login
Granting of
permission for release of your
information to this service.

Login

Zoom Video Conference Zoom Video
Conferencing by LEARN

LDAP / AD

- Open LDAP
 - Zoom
 - eduGAIN
 - LMS
 - Proxmox
 - etc...
- Microsoft AD
 - Computer Labs

Search modules

System / Dashboard / Dashboard

System

Dashboard

Dashboard

Dashboard Applet Admin

Network

Users

Shutdown

Hardware Detector

Updates

Backup/Restore

Preferences

Agenda

Email

Fax

PBX

IM

Reports

Extras

Addons

VOIP

System Resources

CPU

3
%

RAM

13
%

SWAP

0
%

CPU Info: Common KVM processor
Uptime: 141 day(s) 1 hour(s) 20 minute(s)
CPU Speed: 2,665.91 MHz
Memory usage: RAM: 3,789.19 Mb SWAP: 8,080.00 Mb

Processes Status

Telephony Service	RUNNING
Instant Messaging Service	NOT RUNNING
Fax Service	RUNNING
Email Service	NOT RUNNING
Database Service	RUNNING
Web Server	RUNNING
Elastix Call Center Service	NOT INSTALLED

Hard Drives

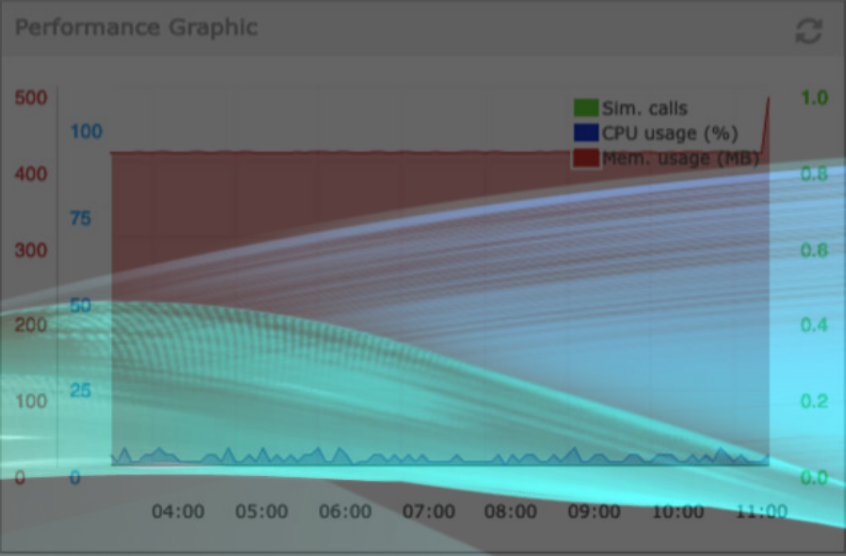
6
%

6% Used 94% Available

Hard Disk Capacity: 49.98GB
Mount Point: /
Manufacturer: N/A

Click below to fetch directory report. WARNING: this operation may take a long time AND impact system performance.

[Fetch directory report](#)



Communication Activity

Calls

- Configurations
 - pfSense-TCP4-1...
 - pfSense-TCP4-1...
 - WUSL_VPN

Log

Settings

VPN

+ - ⊖ ▾



Copy Diagnostic Info to Clipboard

Disconnect

Connect

LICENSING

- Microsoft Windows Server
- Microsoft Windows (Desktop)
- Microsoft Office
- Endpoint Security
- etc...

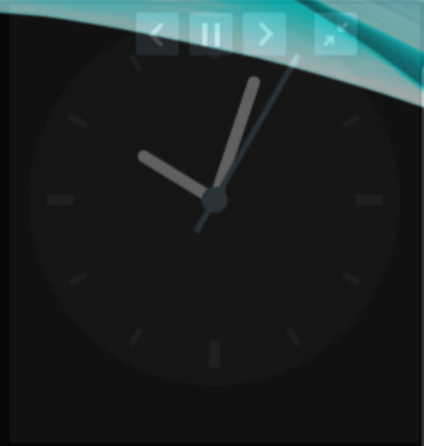


MONITORING

Parameter	Value	Details
Zabbix server is running	Yes	localhost:10051
Number of hosts (enabled/disabled)	49	49 / 0
Number of templates	297	
Number of items (enabled/disabled/not supported)	11006	10363 / 31 / 612
Number of triggers (enabled/disabled [problem/ok])	5231	5201 / 30 [257 / 4944]
Number of users (online)	3	1

	Available	Not available	Unknown	Total
Zabbix agent	4	0	0	4
SNMP	31	2	12	45

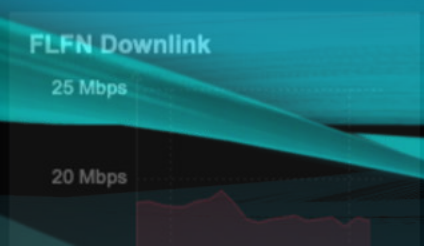
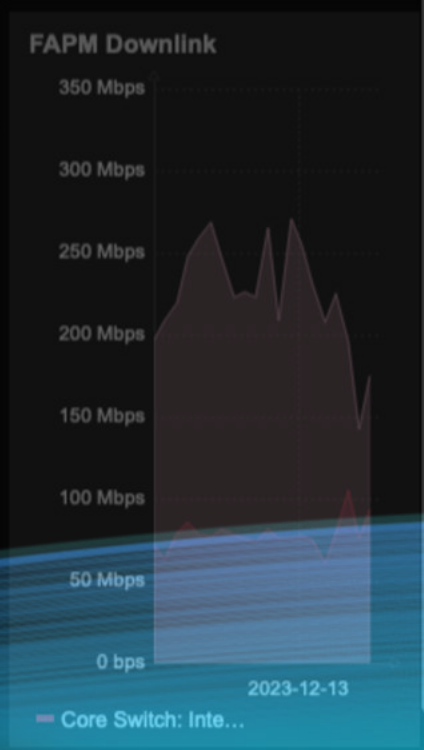
0 Disaster	1 High	Average	8 Warning	56 Information	0 Not classified
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Problems

Time	Info	Host	Problem + Severity	Duration	Ack	Actions	Tags
20:43:05		CCTV - ICTC Staff Room	Channel "101": Parameters of video stream are changed	1h 19m 21s	No		class: device component: stream scope: notice
20:00							
19:07:59		Switch - Camellia		2h 54m 27s	No	1	class: network component: network description
19:00							
18:42:24		Switch 2 -		3h 20m 2s	No	1	class: network component: network description
18:41:52		Switch - FA Floor		3h 20m 34s	No	1	class: network component: network description
18:35:24		Switch 2 - ICTC New Lab	Interface Gi1/0/8(): Ethernet has changed to lower speed than it was before	3h 27m 2s	No		class: network component: network description
18:33:24		Switch 2 - ICTC New Lab		3h 29m 2s	No	1	class: network component: network description
18:18:53		Switch - FAPM Phase 3 Ground Floor		3h 43m 33s	No	1	class: network component: network description
18:06:24		Switch 2 - ICTC New Lab		3h 56m 2s	No	1	class: network component: network description
18:03:50		Switch - FAPM Phase 1 Floor 3		3h 58m 36s	No	1	class: network component: network description

ZABBIX





ZABBIX

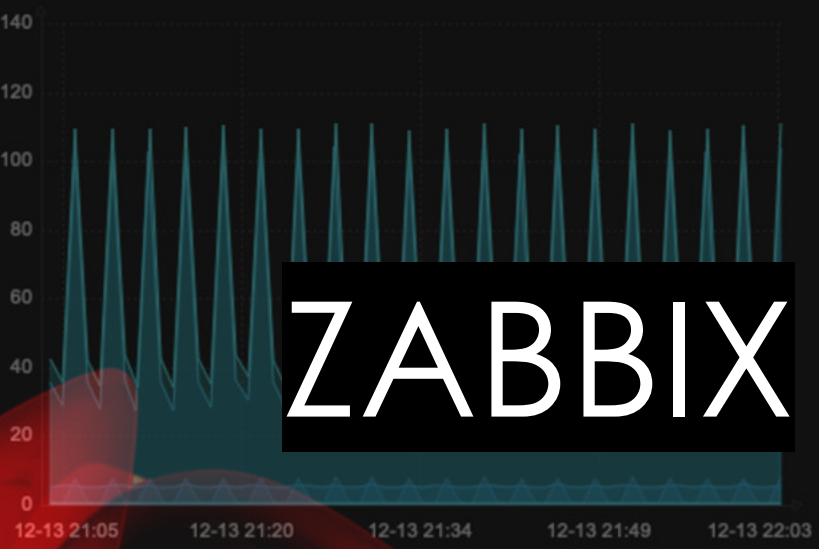


Zabbix server problems

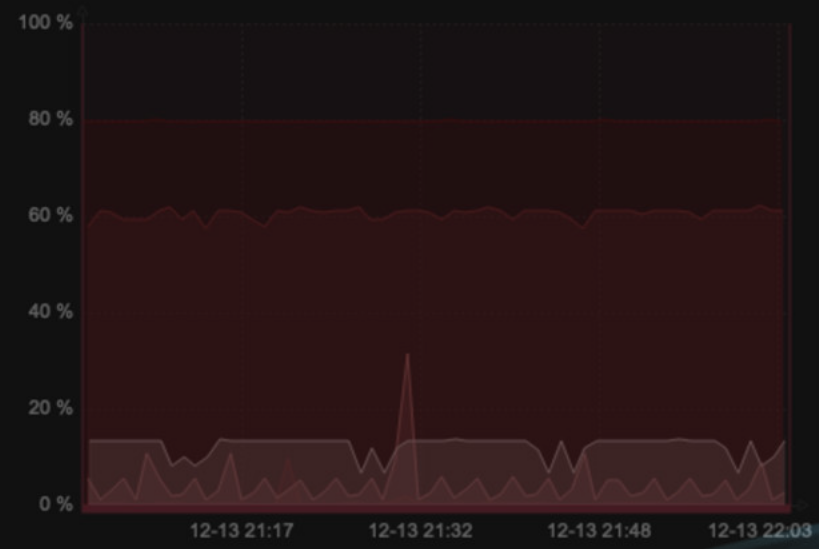
Time	Recovery time	Status	Info	Host	Problem	Severity	Duration	Ack	Actions
2023-11-27 22:25:55		PROBLEM		Zabbix server				No	1
2023-11-21 11:15:27		PROBLEM		Zabbix server				No	1



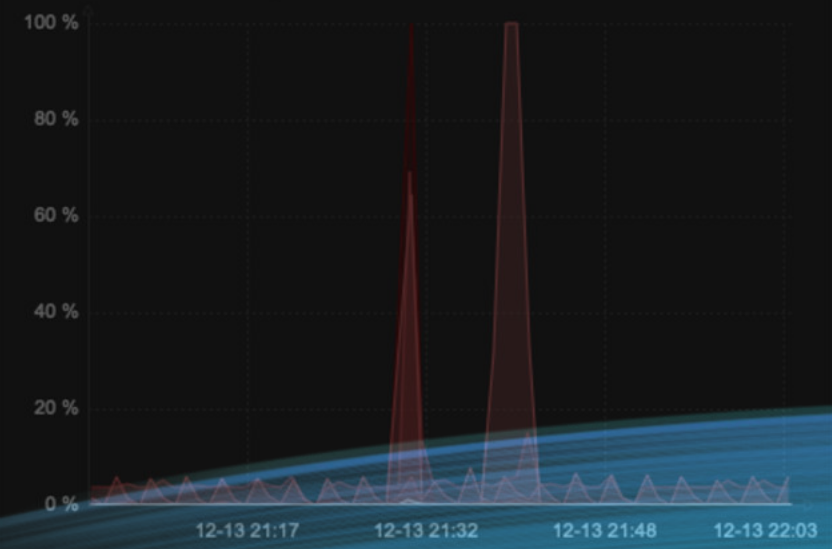
Values processed per second



Utilization of data collectors



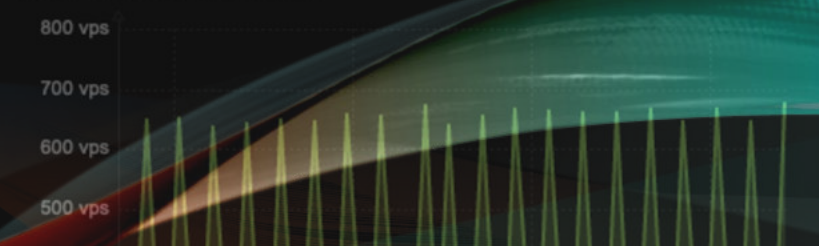
Utilization of internal processes



Cache usage



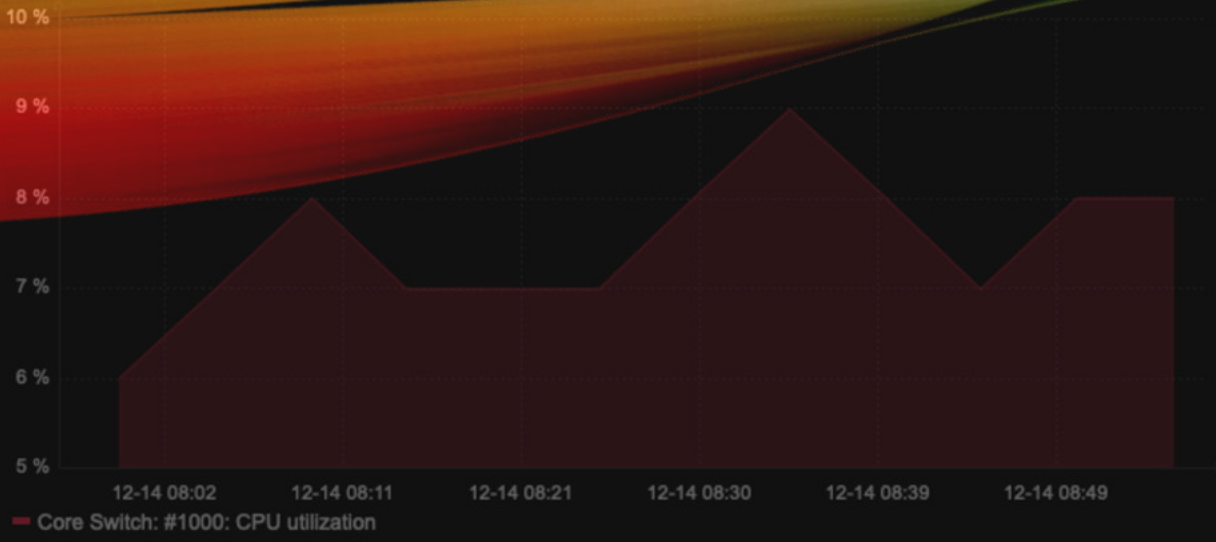
Value cache effectiveness



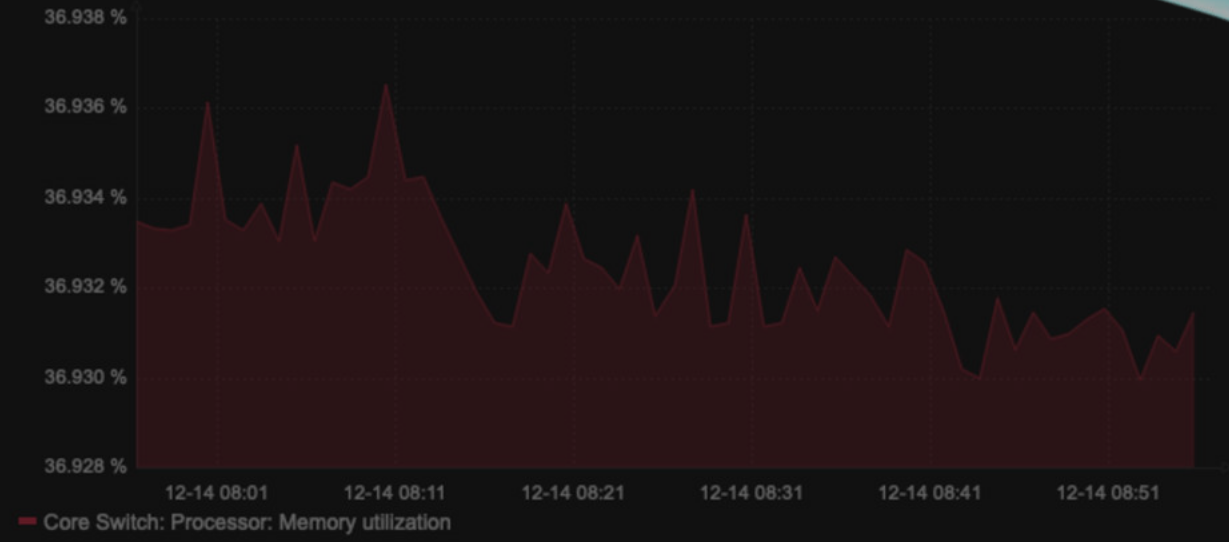
Queue size



CPU Utilization



Memory Utilization



Graph

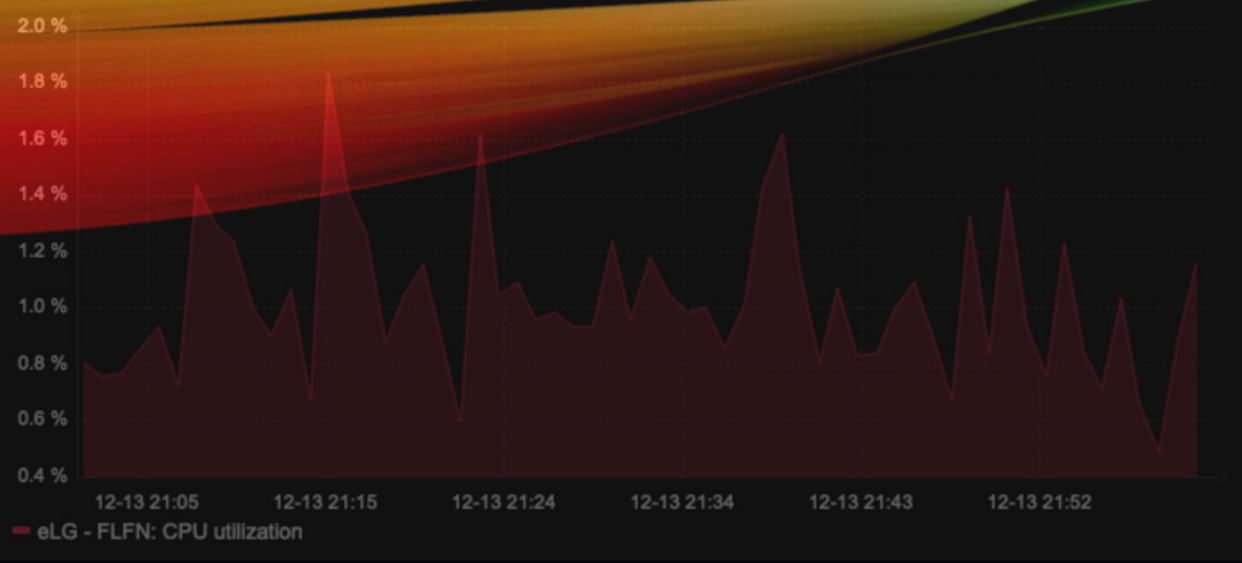


ZABBIX

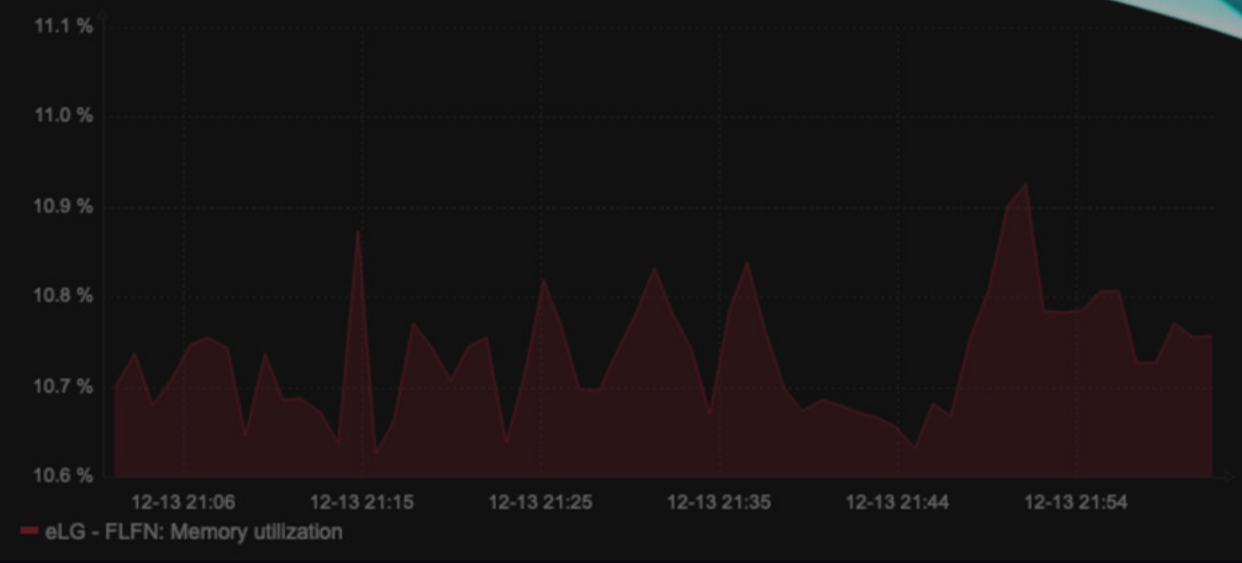
CPU Temperature



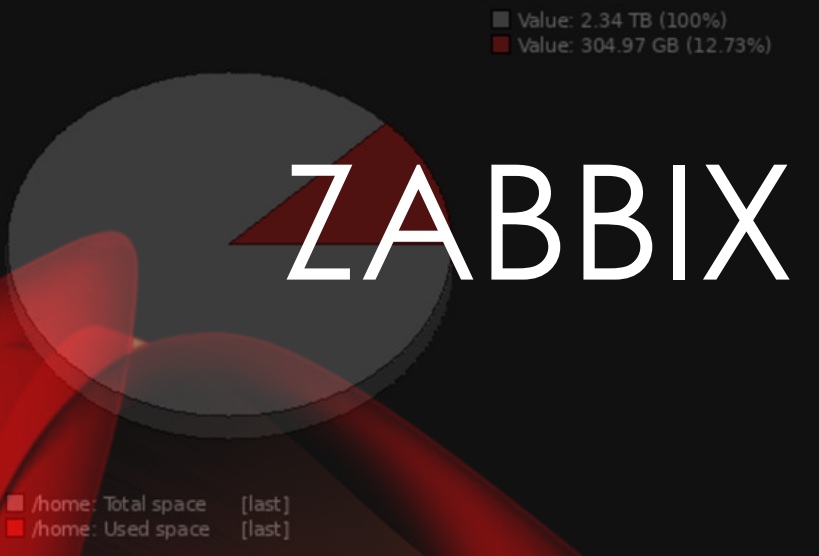
eLG FLFN CPU Utilisation



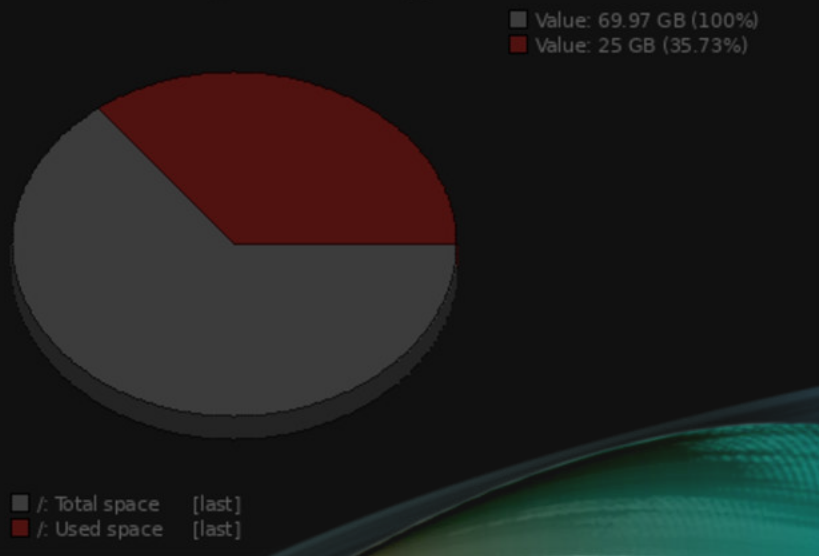
eLG FLFN Memory Utilisation



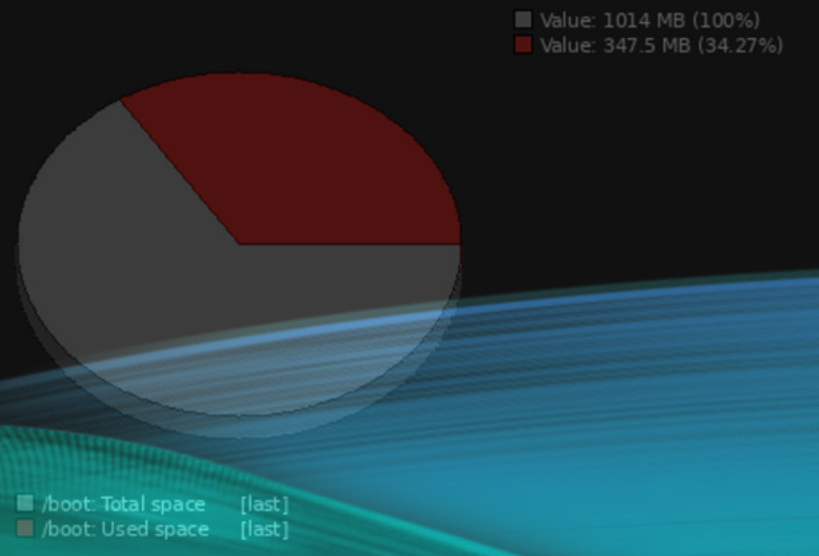
eLG FLFN Disk Space Utilisation (/home)



eLG FLFN Disk Space Utilisation (/)



eLG FLFN Disk Space Utilisation (/boot)



ZABBIX

eLG FLFN Network Traffic



eLG FLFN CPU I/O Wait Time



Event Info

← Reply



Zabbix Bot 09:15

Problem: Unavailable by ICMP ping
On Switch - Bisobandara

Last three attempts returned timeout. Please check device connectivity.

ZABBIX (WEBHOOKS)

Severity

High

Operational data

Down (0)

Event tags

class:network, component:health,
component:network, scope:availability, target:cisco,
target:cisco-ios

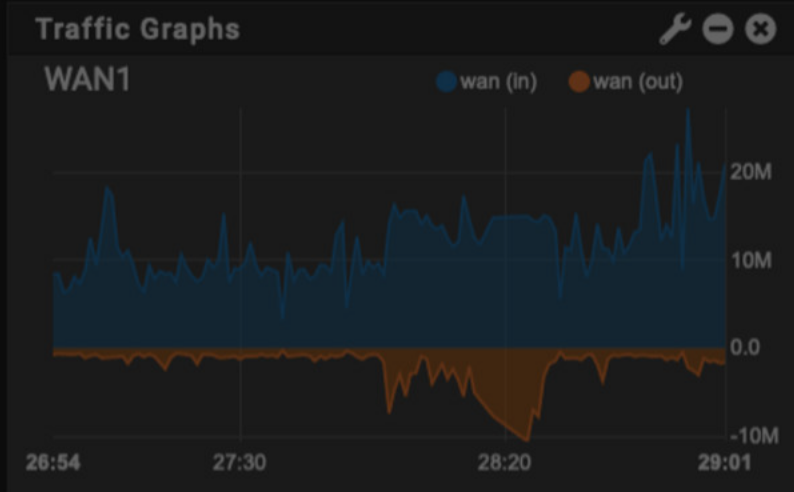
Status / Dashboard

Gateways

Name	RTT	RTTsd	Loss	Status
WANGW	9.5ms	9.0ms	0.0%	Online
WAN2GW	12.4ms	8.6ms	0.0%	Online
LANGW	1.0ms	1.2ms	0.0%	Online

Interfaces

WAN1	1000baseT <full-duplex>
LAN	LAGG Ports: ixl0 (ACTIVE, COLLECTING, DISTRIBUTING), ixl1 (ACTIVE, COLLECTING, DISTRIBUTING)
DMZ	LAGG Ports: bge0 (ACTIVE, COLLECTING, DISTRIBUTING), bge1 (ACTIVE, COLLECTING, DISTRIBUTING)
WAN2	1000baseT <full-duplex>



System Information

Name	pfSense.mkd.wyb.ac.lk
User	

System

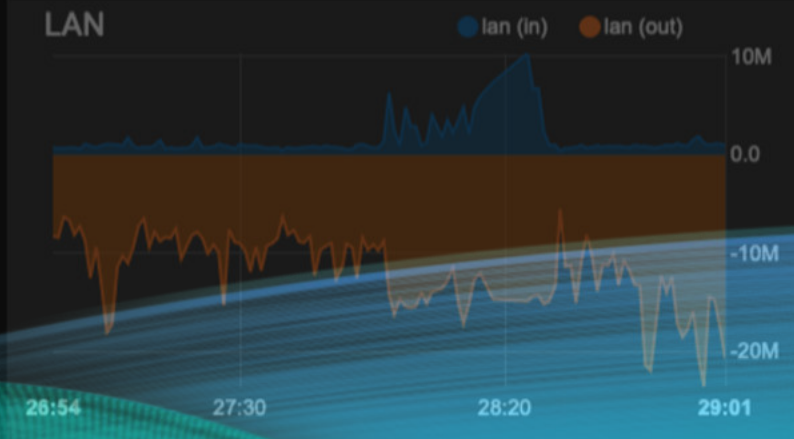
pfSense	
Serial	
Netgear	
Vendor	
Version	
Release Date	Fri Jul 17 2020

CPU Type

Intel(R) Xeon(R) Silver 4214 CPU @ 2.20GHz
24 CPUs: 1 package(s) x 12 core(s) x 2 hardware

Interface Statistics

	WAN1	LAN	DMZ	WAN2
Packets In	186489650297	99615338252	8924072645	2829651
Packets Out	104102373646	187242426904	3848320051	2058044
Bytes In	205.97 TiB	24.20 TiB	10.89 TiB	273.06 GiB
Bytes Out	31.23 TiB	209.48 TiB	653.64 GiB	37.08 GiB
Errors In	0	0	0	0
Errors Out	0	85	4	0
Collisions	0	0	0	0



PFSENSE

Garbage Collect Datastore 'pbs1-backups' successful 

vzdump backup status (n2c1.mkd.wyb.ac.lk) : backup successful 

PBS1-Alert

Sat, Dec 9, 7:14

to me

Datastore: pbs1-backups
Task ID: UPID:pbs1:0000050F:000005A8:000013C4:6574614C:garbage_collection:pbs1\vx2dbackups:root@p
Index file count: 64

Removed garbage: 120.547 GiB
Removed chunks: 54335
Removed bad chunks: 0

Leftover bad chunks: 0
Pending removals: 0 B (in 0 chunks)

Original Data usage: 23.571 TiB
On-Disk usage: 708.865 GiB (2.94%)
On-Disk chunks: 231237

Deduplication Factor: 34.05

Garbage collection successful.

Please visit the web interface for further details:

DMZ-Cluster-Alert

1:09AM (8 hours ago)

to me

VMID	NAME	STATUS	TIME	SIZE	FILENAME
103	idp	OK	00:00:17	40.00GB	vm/103/2023-12-13T19:30:01Z
107	pedmis	OK	00:02:22	17.97GB	cd/107/2023-12-13T19:30:18Z
117	eLG-FAPM-DB	OK	00:01:32	60.00GB	vm/117/2023-12-13T19:32:41Z
118	eLG-FAPM-CACHE	OK	00:00:05	40.00GB	vm/118/2023-12-13T19:34:13Z
119	eLG-FAPM	OK	00:04:43	2.44TB	vm/119/2023-12-13T19:34:18Z
TOTAL			00:09:00	2.60TB	

Detailed backup logs:

```
vzdump 107 117 118 119 103 --mode snapshot --mailnotification always --notes-template '{{guestname}}' --mailto pbs1-n2c1 --node n2c1 --quiet 1
```

```
103: 2023-12-14 01:00:01 INFO: Starting Backup of VM 103 (qemu)
103: 2023-12-14 01:00:01 INFO: status = running
103: 2023-12-14 01:00:01 INFO: VM Name: idp
103: 2023-12-14 01:00:01 INFO: include disk 'scsi0' 'local-lvm:vm-103-disk-1' 40G
103: 2023-12-14 01:00:01 INFO: backup mode: snapshot
103: 2023-12-14 01:00:01 INFO: ionice priority: 7
103: 2023-12-14 01:00:01 INFO: creating Proxmox Backup Server archive 'vm/103/2023-12-13T19:30:01Z'
103: 2023-12-14 01:00:01 INFO: issuing guest-agent 'fs-freeze' command
103: 2023-12-14 01:00:01 INFO: issuing guest-agent 'fs-thaw' command
103: 2023-12-14 01:00:02 INFO: started backup task '84545e9f-2022-4385-b315-ca639cc404c8'
```

Verify Datastore 'pbs1-backups' successful 

PBS1-Alert

to me

Job ID: v-91edf6ca-29ab

Datastore: pbs1-backups

Verification successful.

Please visit the web interface for further details:

PROXMOX



SECURITY

NETWORK SECURITY

- Firewall
- Guest VLAN
- ACLs on Core Switch
- Port Security on Switches
- MAC Filtering

SYSTEMS SECURITY

- Enforced password policy
- Multi-factor Authentication on SSO
- Multi-factor Authentication on Hypervisor Clusters
- NGINX Rules
- Application Security Testing

- Dashboard
- Notes
- Configuration
 - Access Control
 - Remotes
 - Traffic Control
 - Certificates
 - Subscription
- Administration
 - Shell
 - Storage / Disks
 - Tape Backup
 - Datastore
 - pbs1-backups
 - Add Datastore

Datastore: pbs1-backups

- Summary
- Content
- Prune & GC
- Sync Jobs
- Verify Jobs
- Options
- Permissions

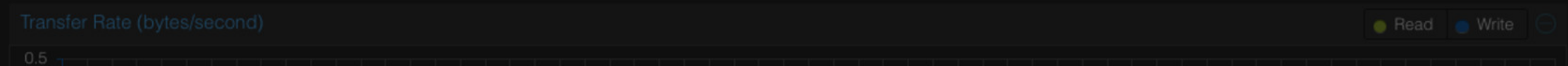
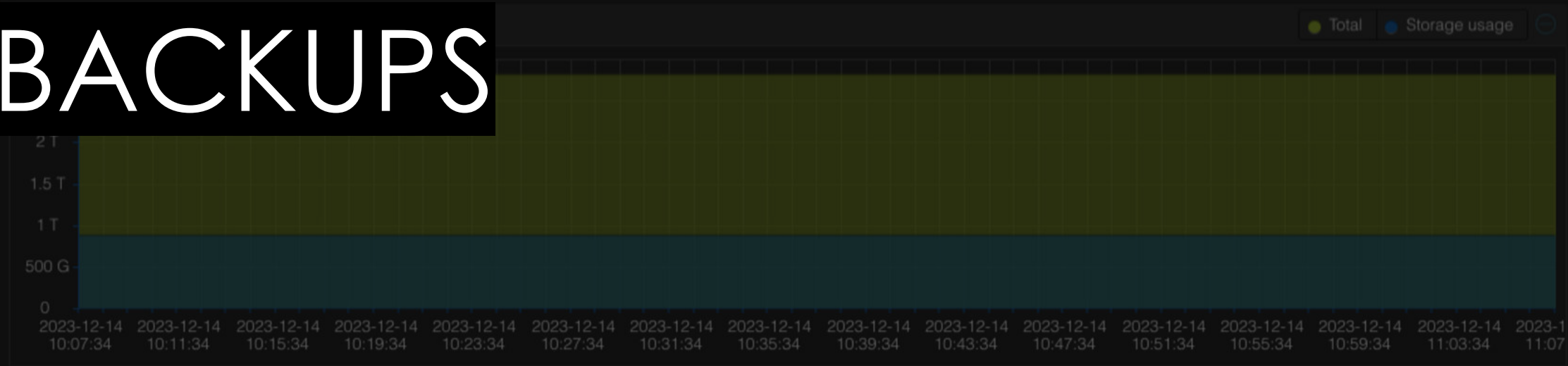
Hour (average)

pbs1-backups (/mnt/datastore/pbs1-backups)

Usage	30.92% (867.60 GB of 2.81 TB)
Backup Count	
CT	3 Groups, 9 Snapshots
Host	0 Groups, 0 Snapshots
VM	16 Groups, 46 Snapshots
Stats from last Garbage Collection	
Deduplication Factor	34.05

Comment

BACKUPS



AVAILABILITY

- Dedicated diesel generator for server room
- UPS backups
- Two separated UPS lines powering up each of the servers
- Redundant power supplies for each and every server
- Clones of VMs for critical services



CHALLENGES AND REQUIREMENTS

CHALLENGES

- Budget Restrictions
- Recruitment Restrions
- Central point of failures
- Lightening
- Reluctance of users in adopting new technologies
- Implementing back channel logout in some services

ONGOING AND FUTURE IMPLEMENTATIONS

- Implement IPv6
- Implement dynamic VLAN assignment in eduroam
- Implement redundant internal and external firewall solution
- Implement redundant core network
- Increase network bandwidth of the core network
- Implement CEPH cluster for Proxmox
- Implement Galera MariaDB Cluster
- Implement Kubernetes Cluster



DISCUSSION



THANK YOU!