



ESPE

UNIVERSIDAD DE LAS FUERZAS ARMADAS
INNOVACIÓN PARA LA EXCELENCIA



Implementación, administración y monitoreo de una red corporativa simulada en el laboratorio de redes virtual de la universidad de las Fuerzas Armadas ESPE sede Latacunga mediante un servidor Zabbix

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Monografía previo a la obtención del título de Tecnólogo Superior en Redes y Telecomunicaciones

Ing. Caicedo Altamirano, Fernando Sebastián

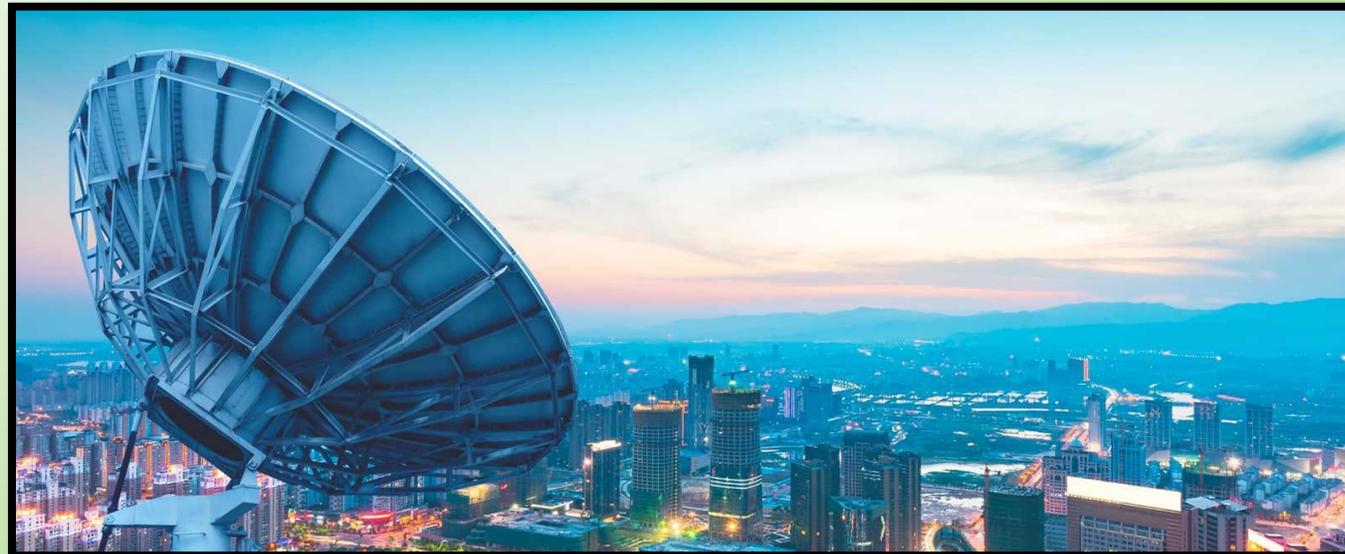
Introducción

- Planteamiento del problema
- Alcance

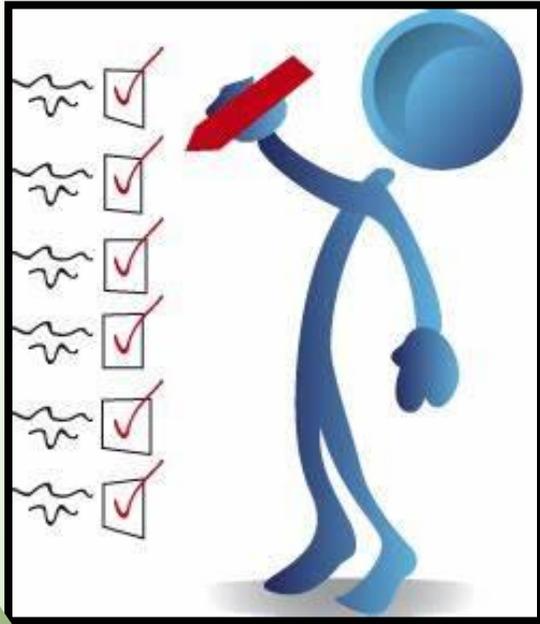


Objetivo General

Implementar, administrar y monitorear una red corporativa simulada en el laboratorio de redes virtual de la Universidad de las Fuerzas Armadas ESPE Sede Latacunga mediante un servidor Zabbix



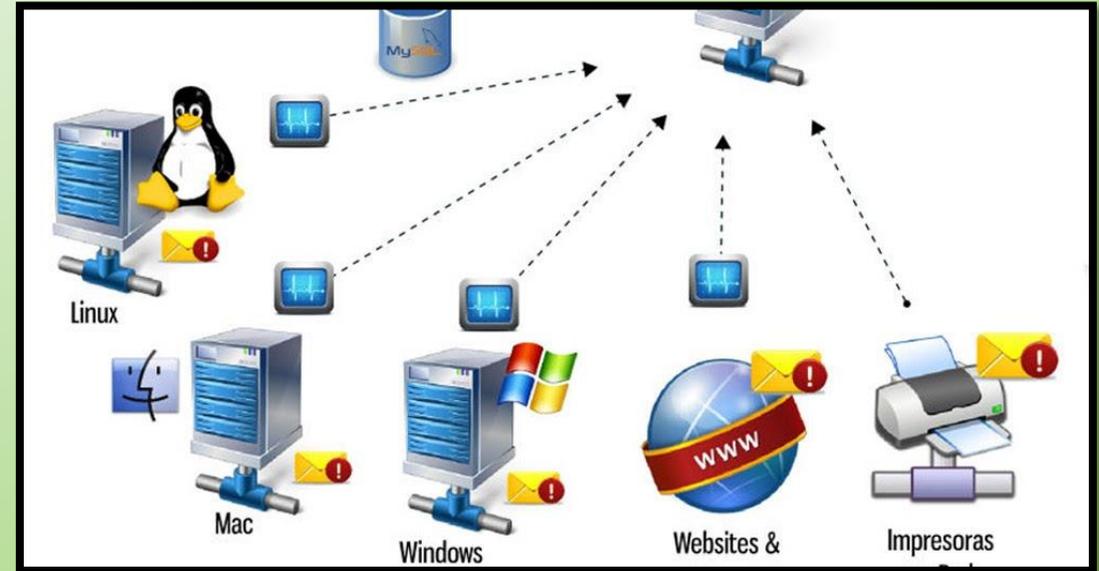
Objetivos específicos



- Investigar acerca del servidor Zabbix, su implementación y funcionamiento para aprovechar al máximo en la administración y monitoreo de la red corporativa.
- Implementar una red corporativa con por lo menos 3 sitios remotos simulándola en GNS3 utilizando el sistema operativo RouterOS
- Implementar un servidor de administración y monitoreo de redes Zabbix en las computadoras del laboratorio de comunicaciones de la ESPEL
- Implementar un manual de funcionamiento del servidor Zabbix y una guía de laboratorio de la administración de la red corporativa simulada.

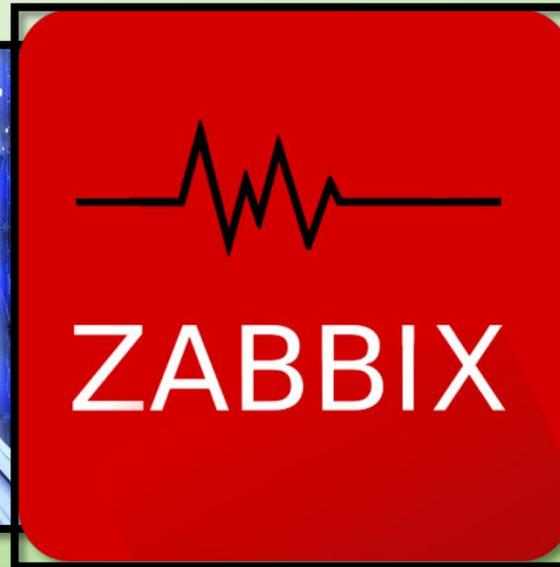
¿Qué es monitoreo de red?

¿Qué es administración de red?

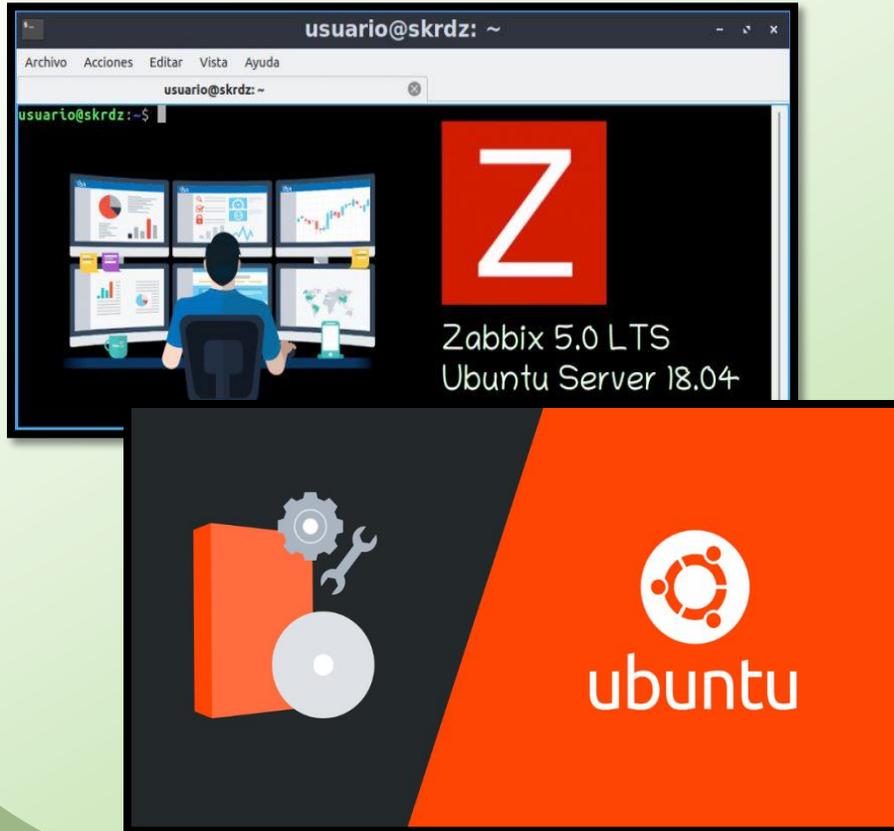


¿Qué es un servidor web?

¿Qué es un servidor Zabbix?



Implementación de Zabbix

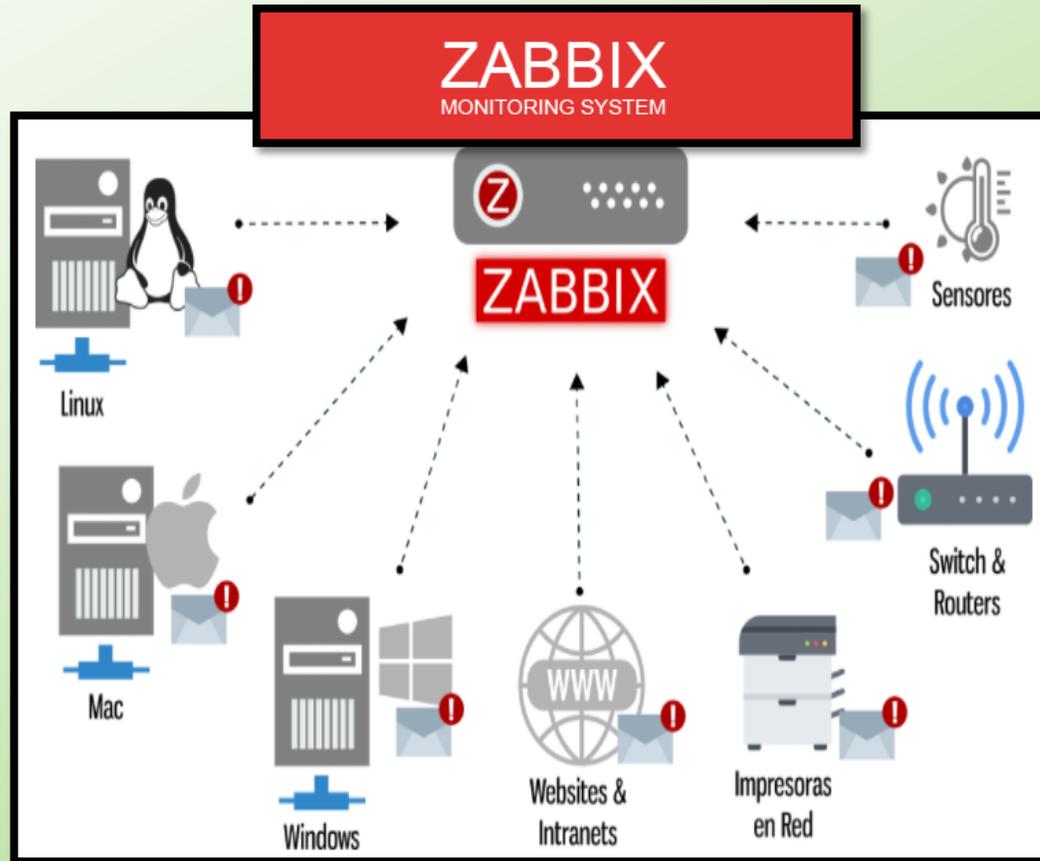


Requisitos:

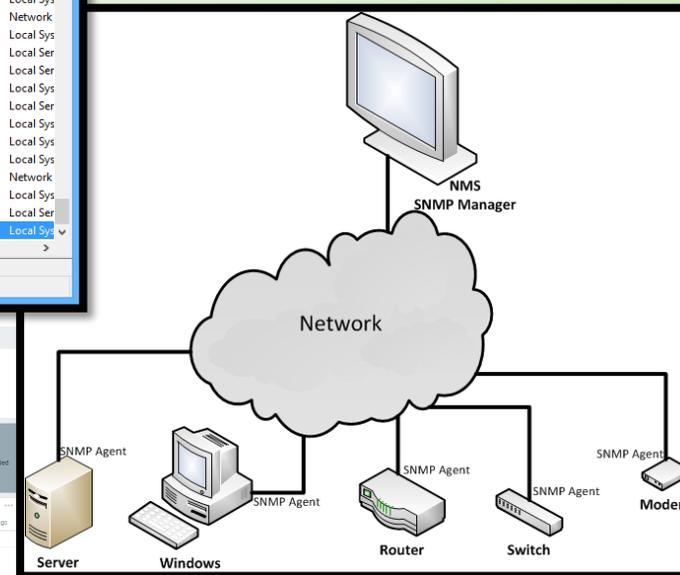
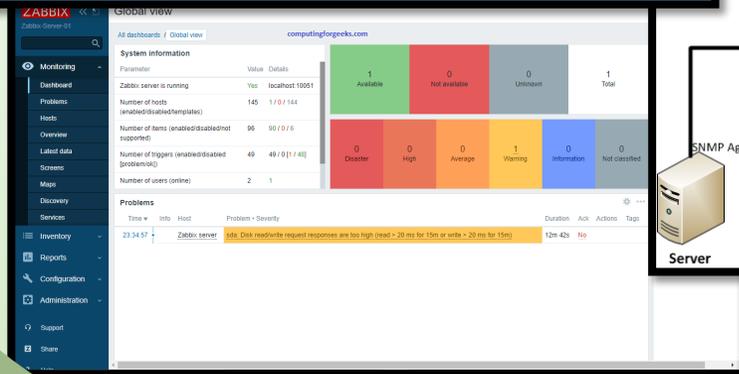
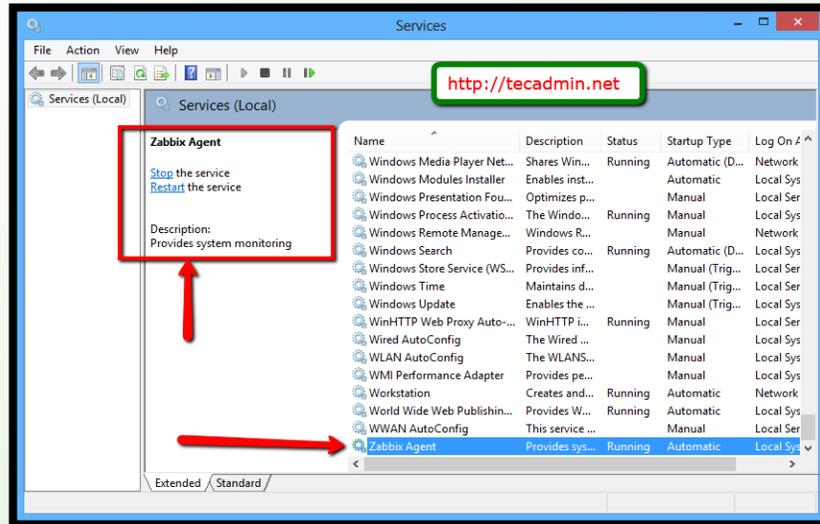
Memoria: 128MB

Espacio en disco: 256MB

Funcionamiento de Zabbix



Componentes de Zabbix



- Agente servidor
- Agente Zabbix
- Interfaz web (Frontend)
- Agente SNMP

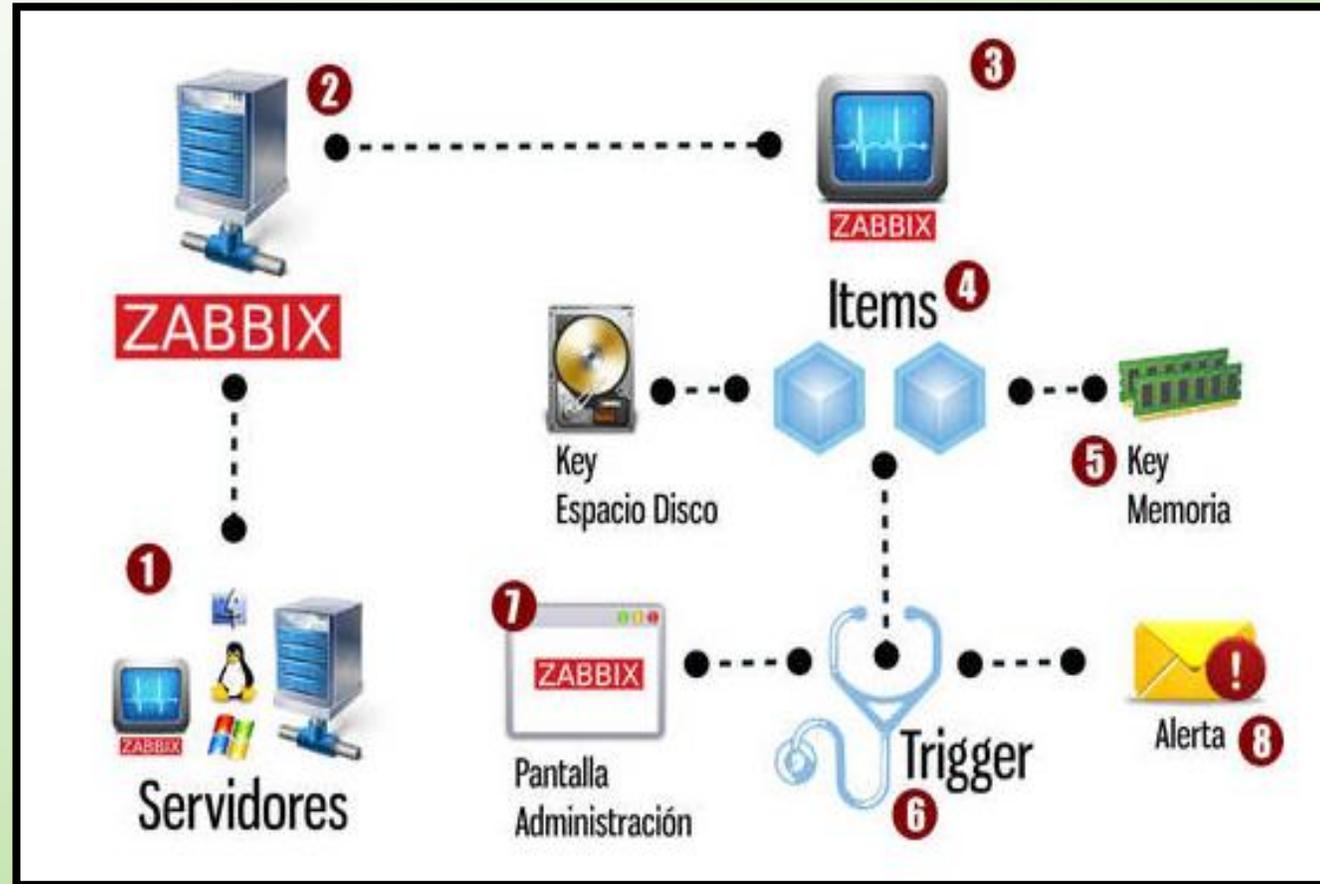
Interfaz web (Frontend)

The screenshot displays the Zabbix web interface for 'Zabbix-Server-01'. The left sidebar contains navigation menus for Monitoring, Inventory, Reports, Configuration, Administration, Support, and Share. The main content area is titled 'Global view' and shows system information for 'computingforgeeks.com'. The system information table lists parameters such as 'Zabbix server is running', 'Number of hosts', 'Number of items', 'Number of triggers', and 'Number of users (online)'. To the right of this table are two bar charts: the top one shows status counts (1 Available, 0 Not available, 0 Unknown, 1 Total), and the bottom one shows severity counts (0 Disaster, 0 High, 0 Average, 1 Warning, 0 Information, 0 Not classified). Below these charts is a 'Problems' table with one active problem: 'sda: Disk read/write request responses are too high (read > 20 ms for 15m or write > 20 ms for 15m)' with a duration of 12m 42s and a severity of 'No'.

Parameter	Value	Details
Zabbix server is running	Yes	localhost:10051
Number of hosts (enabled/disabled/templates)	145	1 / 0 / 144
Number of items (enabled/disabled/not supported)	96	90 / 0 / 6
Number of triggers (enabled/disabled [problem/ok])	49	49 / 0 [1 / 48]
Number of users (online)	2	1

Time	Info	Host	Problem • Severity	Duration	Ack	Actions	Tags
23:34:57		Zabbix server	sda: Disk read/write request responses are too high (read > 20 ms for 15m or write > 20 ms for 15m)	12m 42s	No		

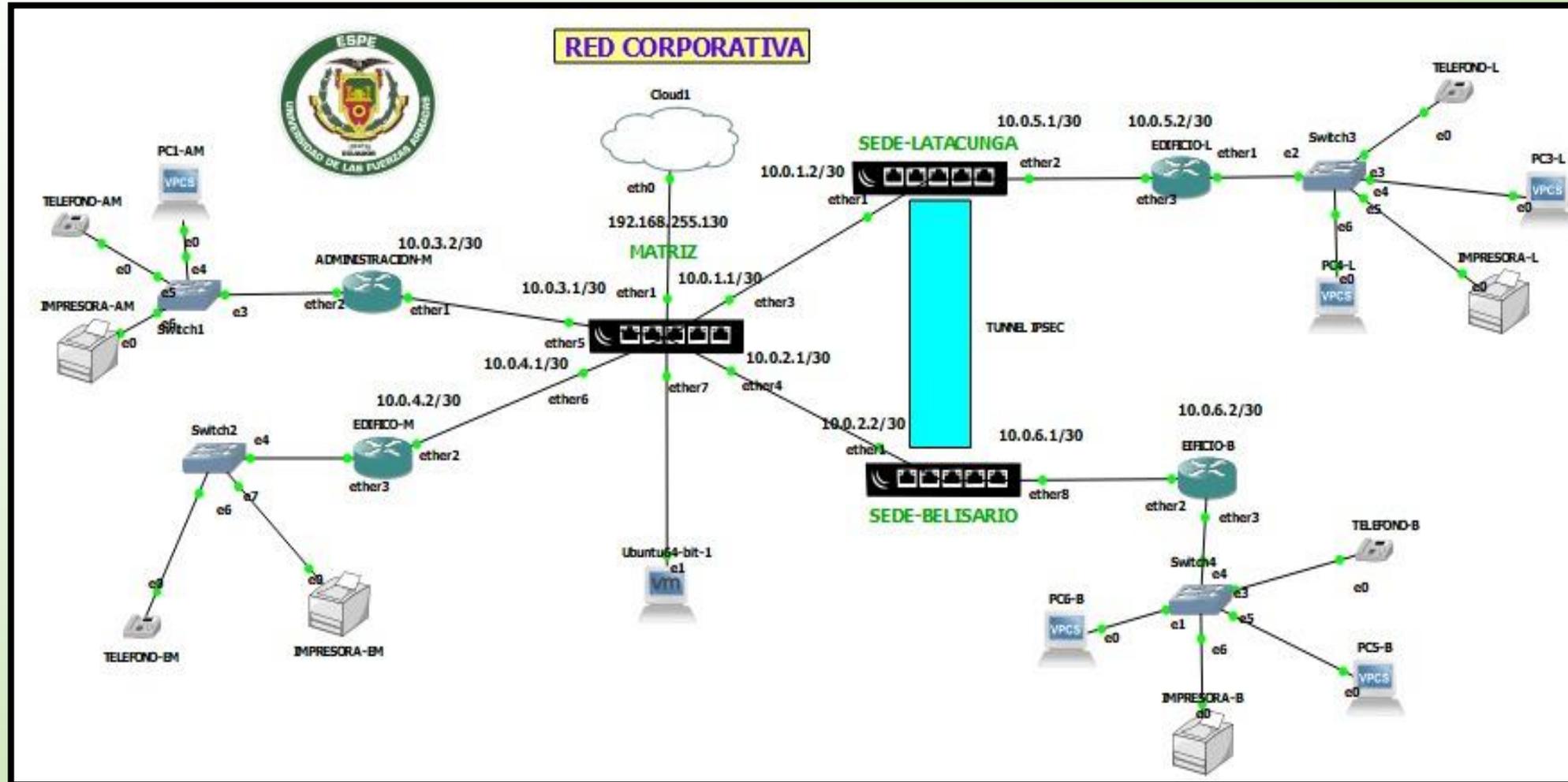
Funcionamiento de monitoreo en Zabbix





- ❑ **Instalación de VMware Workstation 15.5 Pro**
 - ✓ **Instalación de la maquina virtual Ubuntu 20.04 LTS**
 - ✓ **Instalación del servidor Web Zabbix**
- ❑ **Instalación de GNS3 2.2.21**
 - ✓ **Red Corporativa**
 - ✓ **Habilitación de Gns3/Vm**
- ❑ **Winbox**
 - ✓ **Configuración de RouterOS Mikrotik**

Red Corporativa



Winbox

WinBox (64bit) v3.28 (Addresses)

File Tools

Connect To: Keep Password

Login: Open In New Window

Password:

RoMON Agent: ▾

Managed RoMON Neighbors

Address	Cost	Hops	Path	L2MTU	Identity	Version	Board
0C:CC:C7:08:04:00	200	1	0C:CC:C7:08:04:00	1500	ADMINISTR...	6.45.6	CHR
0C:CC:C7:0F:7A:00	200	1	0C:CC:C7:0F:7A:00	1500	SEDE-LATAC...	6.47	CHR
0C:CC:C7:14:AC:01	200	1	0C:CC:C7:14:AC:01	1500	EDIFICIO-M	6.45.6	CHR
0C:CC:C7:21:15:00	400	2	0C:CC:C7:0F:7A:00, 0...	1500	EDIFICIO-L	6.45.6	CHR
0C:CC:C7:21:C4:01	400	2	0C:CC:C7:D2:87:00, 0...	1500	EDIFICIO-B	6.45.6	CHR
0C:CC:C7:D2:87:00	200	1	0C:CC:C7:D2:87:00	1500	SEDE-BELIS...	6.47	CHR



ZABBIX << Hosts

proyecto

Monitoring

Dashboard

Problems

Hosts

Overview

Latest data

Screens

Maps

Discovery

Services

Inventory

Reports

Configuration

Administration

Name:

Host groups:

IP:

DNS:

Port:

Status:

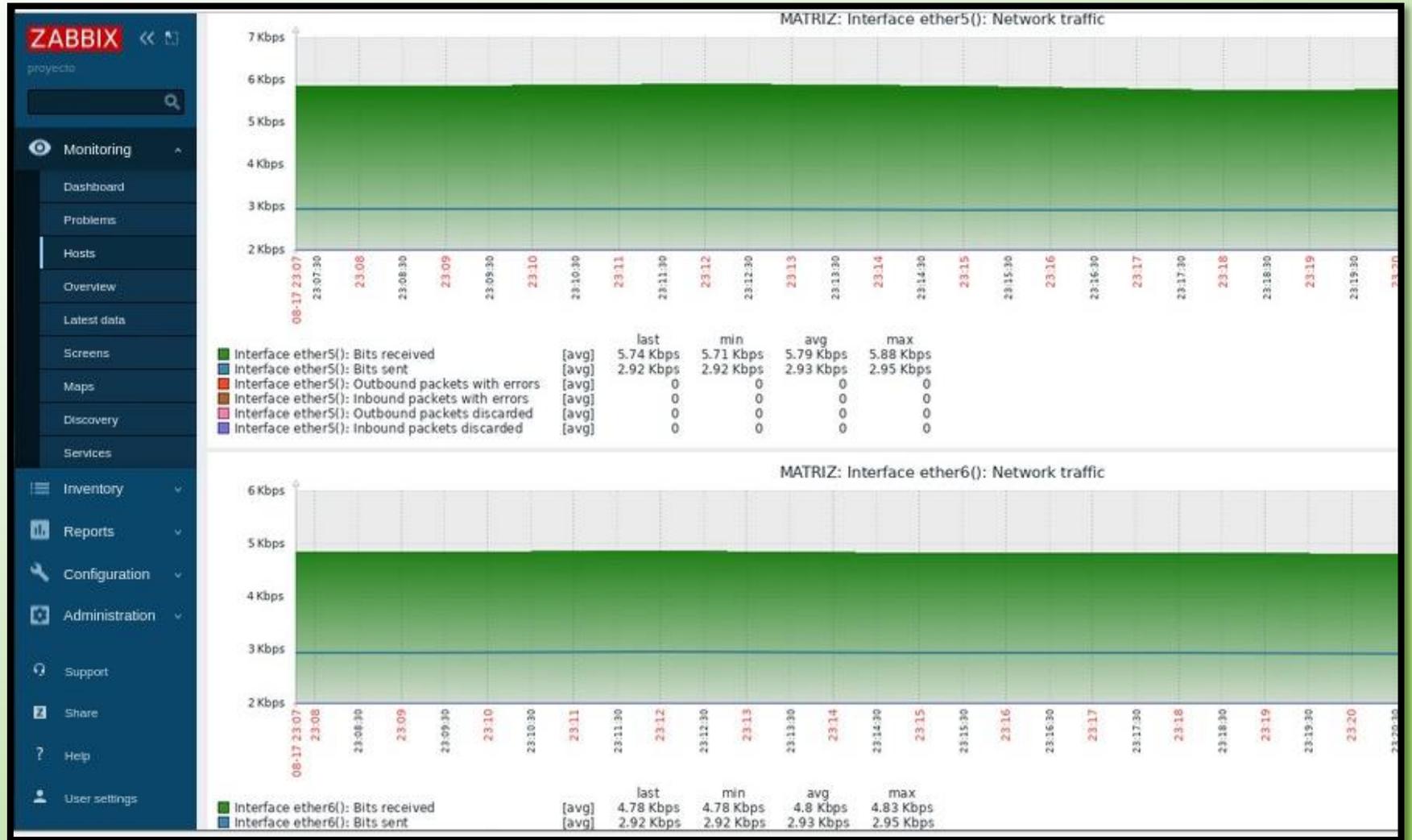
Tags:

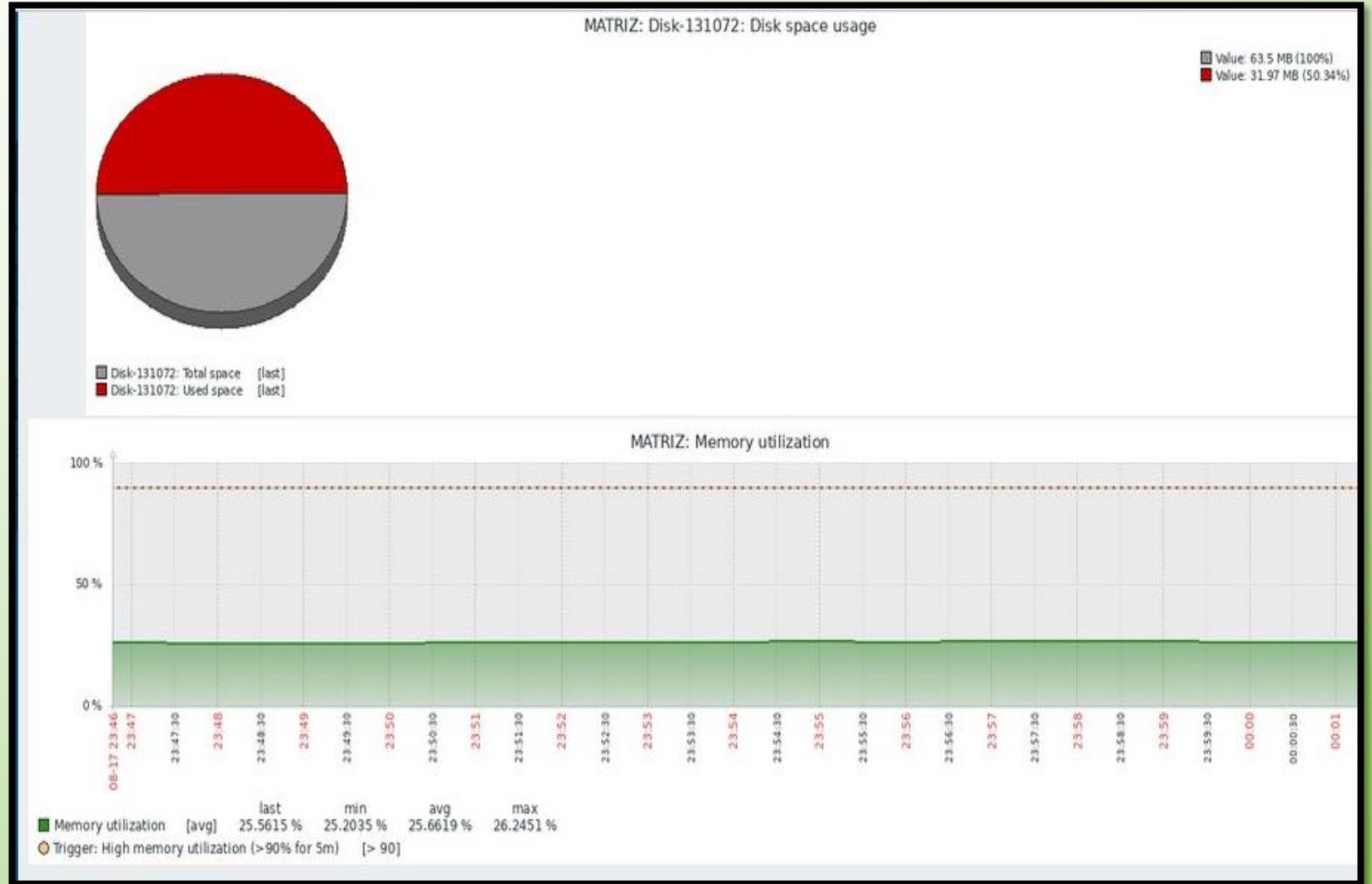
Severity: Not classified Warning High Information Average Disaster

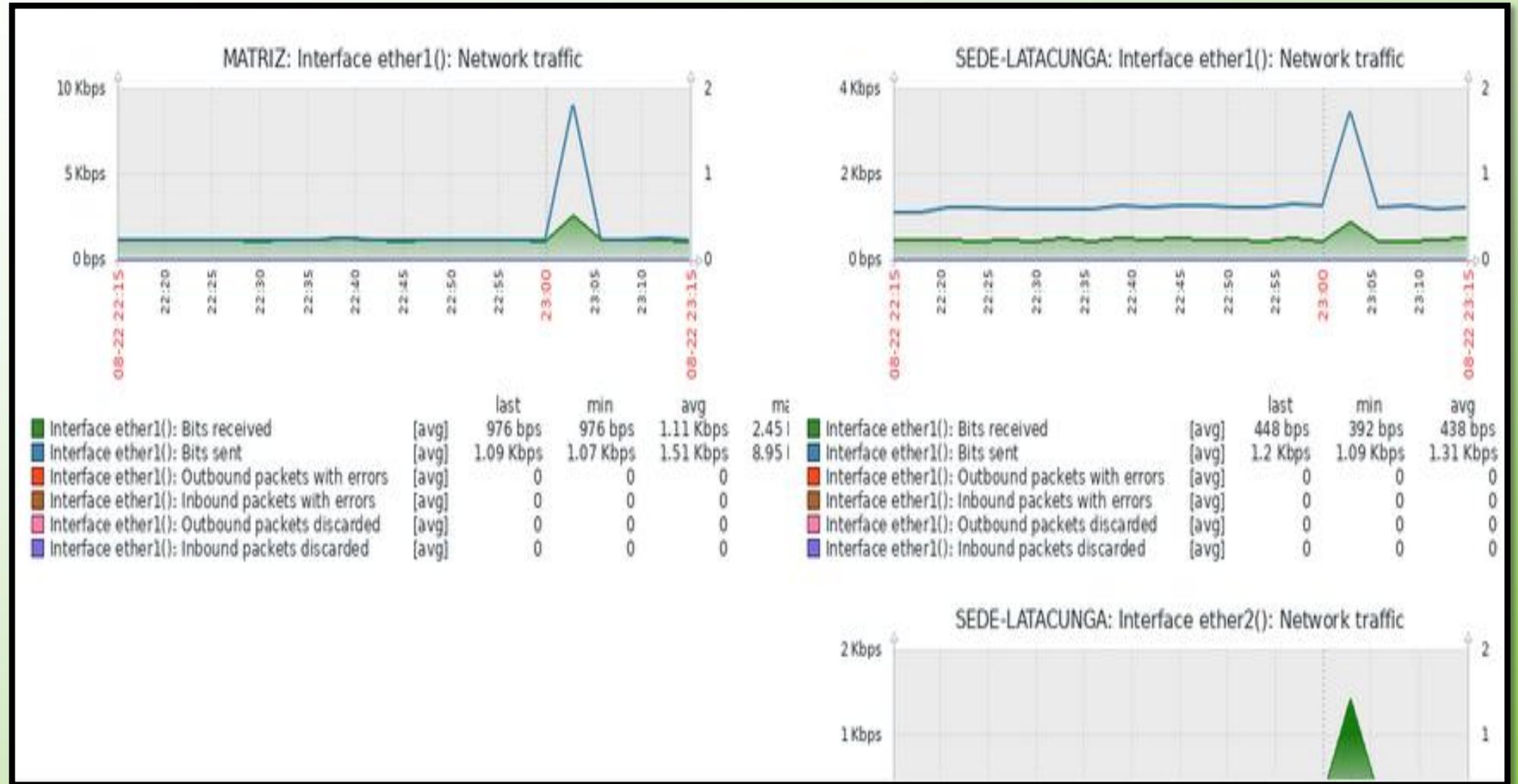
Show hosts in maintenance:

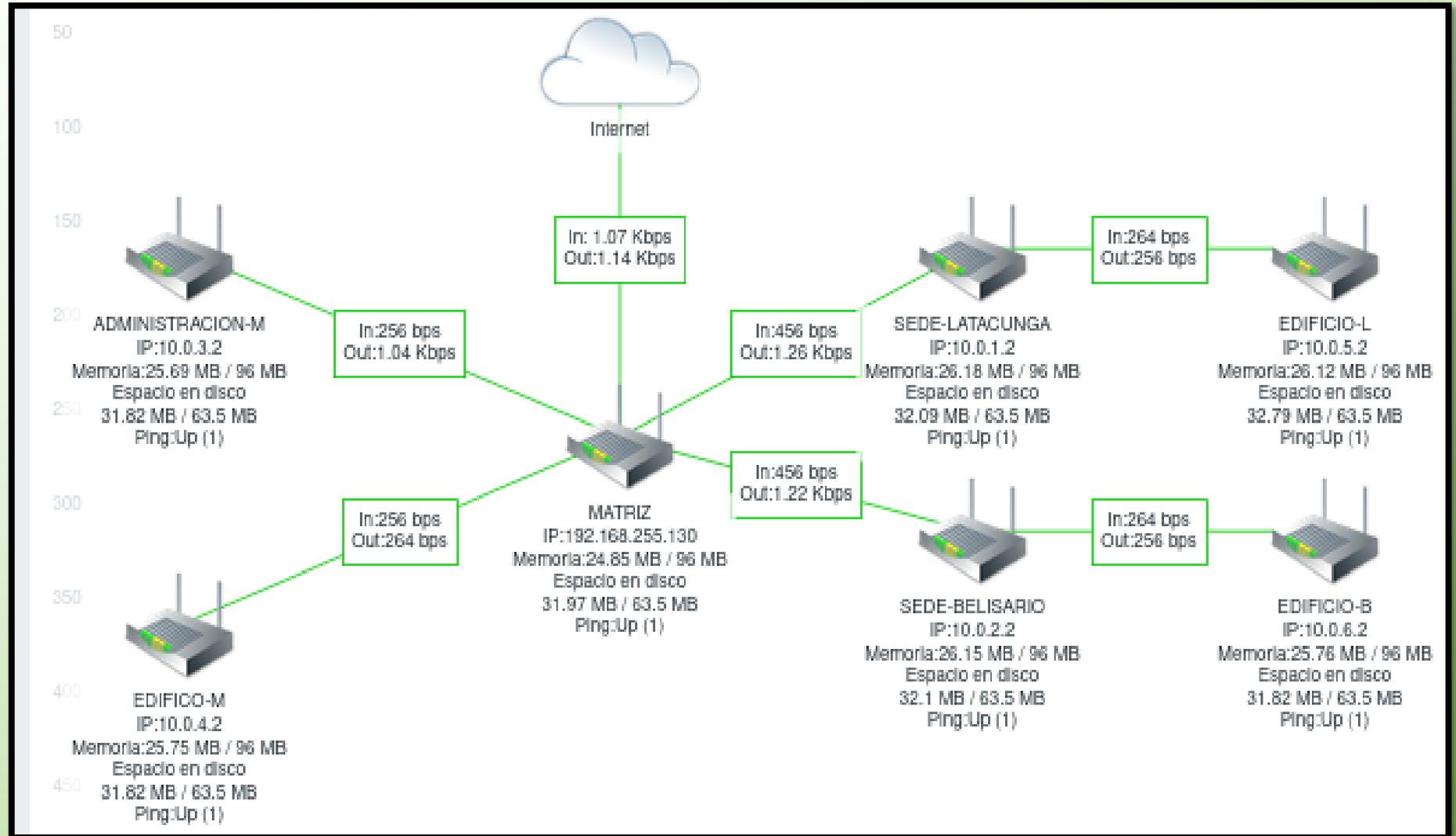
Name	Interface	Availability	Tags	Problems	Status
ADMINISTRACION-M	10.0.3.2: 161	ZBX SNMP JMX IPMI			Enabled
EDIFICIO-B	10.0.6.2: 161	ZBX SNMP JMX IPMI			Enabled
EDIFICIO-L	10.0.5.2: 161	ZBX SNMP JMX IPMI			Enabled
EDIFICIO-M	10.0.4.2: 161	ZBX SNMP JMX IPMI			Enabled
email test	192.168.30.1: 10050	ZBX SNMP JMX IPMI		1	Enabled
MATRIZ	192.168.255.130: 161	ZBX SNMP JMX IPMI			Enabled

Verificación de gráficas









Items

The screenshot displays the Zabbix web interface for configuring an item. The left sidebar shows the navigation menu with 'Configuration' selected, and 'Hosts' highlighted. The main content area is titled 'Items' and shows the configuration for 'Network traffic ether3'. The configuration includes fields for Name, Type (SNMP agent), Key (anything), Host interface (192.168.255.130 : 161), SNMP OID (1.3.6.1.2.1.31.1.1.1.6.3), Type of information (Numeric (unsigned)), Units (bps), and Update interval (20s). There is a table for Custom intervals with one entry: Flexible Scheduling, 50s, 1-7,00:00-24:00, and a Remove button. Below this are sections for History storage period (Do not keep history, Storage period 90d) and Trend storage period (Do not keep trends, Storage period 365d). A Show value dropdown is set to 'As is' with a 'show value mappings' link. A New application field is empty. The Applications list includes '-None-', 'CPU', 'General', 'Interface ether1()', 'Interface ether2()', and 'Interface ether3()' (highlighted in orange).

ZABBIX << >>

proyecto

Monitoring

Inventory

Reports

Configuration

- Host groups
- Templates
- Hosts
- Maintenance
- Actions
- Event correlation
- Discovery
- Services

Administration

Support

Name Network traffic ether3

Type SNMP agent

Key anything [Select](#)

Host interface 192.168.255.130 : 161

SNMP OID 1.3.6.1.2.1.31.1.1.1.6.3

Type of information Numeric (unsigned)

Units bps

Update interval 20s

Type	Interval	Period	Action
Flexible	Scheduling	50s	1-7,00:00-24:00 Remove

[Add](#)

History storage period Do not keep history [Storage period](#) 90d

Trend storage period Do not keep trends [Storage period](#) 365d

Show value As is [show value mappings](#)

New application

Applications

- None-
- CPU
- General
- Interface ether1()
- Interface ether2()
- Interface ether3()

Triggers

ZABBIX << >>

projecto

Monitoring

Inventory

Reports

Configuration

Host groups

Templates

Hosts

Maintenance

Actions

Event correlation

Discovery

Services

Administration

Triggers

All hosts / MATRIZ Enabled ZBX SNMP OMI IPMI Applications 17 Items 95 Triggers 47 Graphs 11 Discovery rules 8

Trigger Tags Dependencies

* Name network inbound traffic very high

Operational data

Severity Not classified Information Warning Average High Disaster

* Expression {MATRIZ:anything.last()}<0.5M Add

Expression constructor

OK event generation Expression Recovery expression None

PROBLEM event generation mode Single Multiple

OK event closes All problems All problems if tag values match

Allow manual close

URL

Bandwidth Test (Running)

Test To:

Protocol: udp tcp

Local UDP Tx Size:

Remote UDP Tx Size:

Direction:

Connection Count:

Local Tx Speed: ▲ bps

Remote Tx Speed: ▲ bps

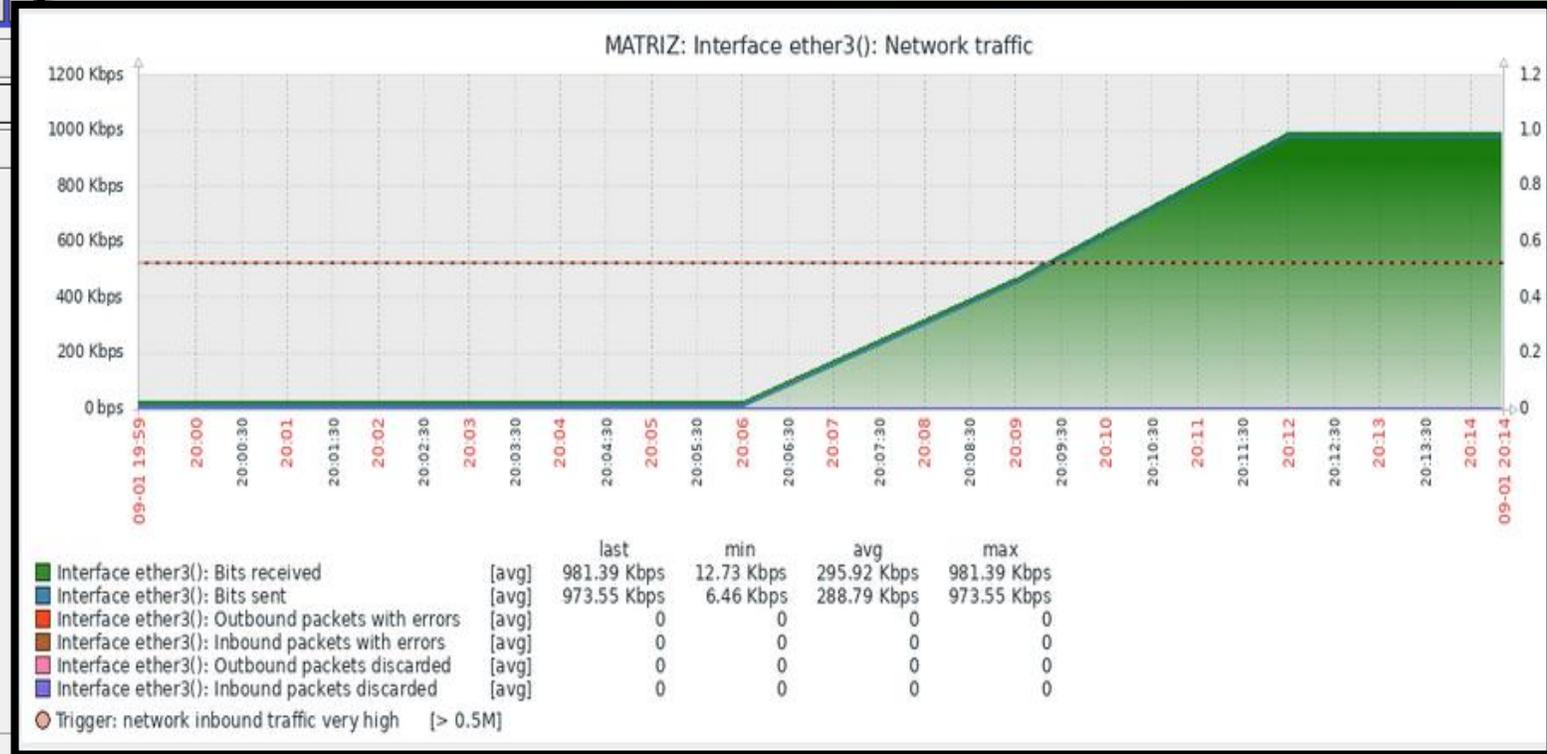
Random Data

User:

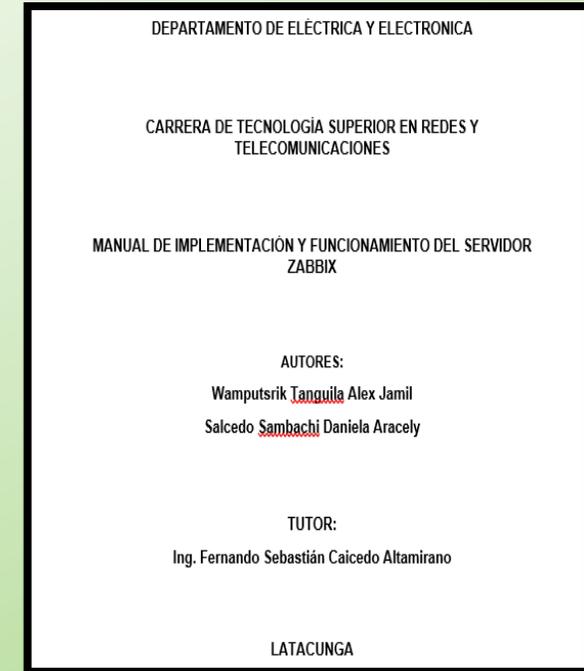
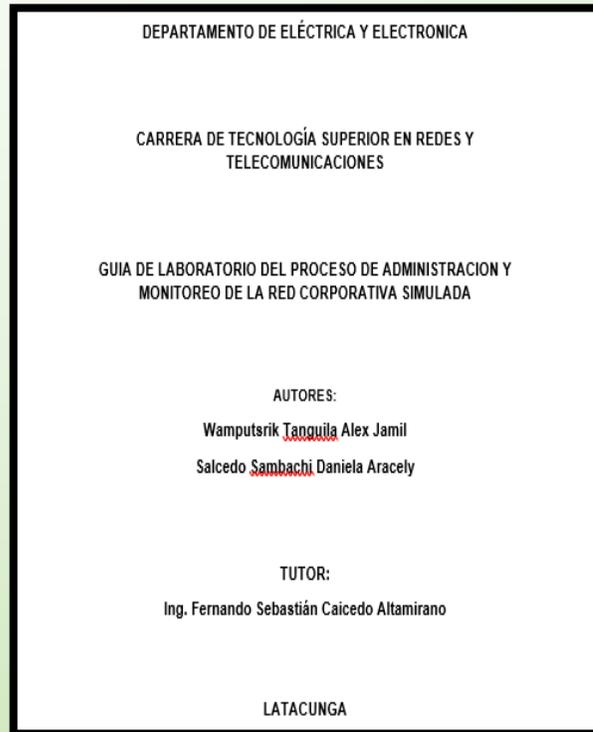
Password:

Lost Packets:

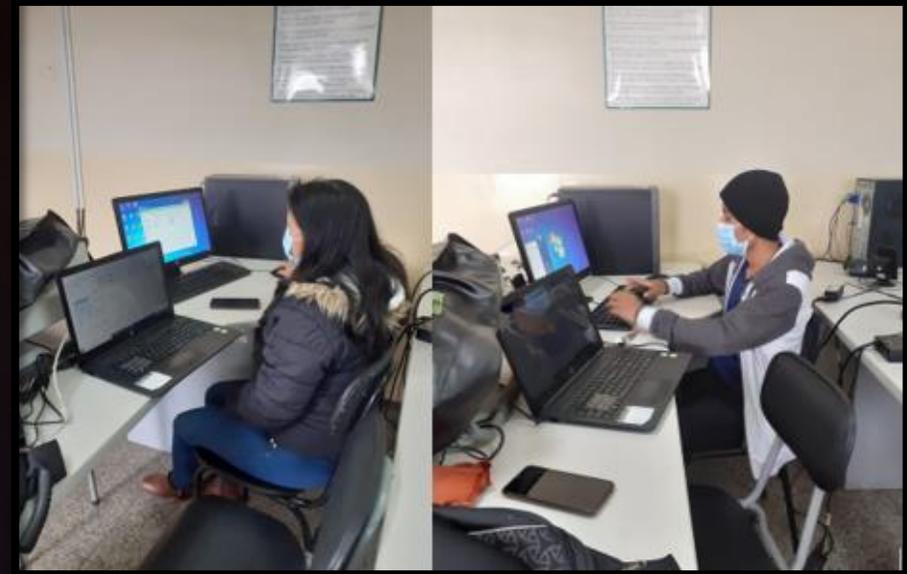
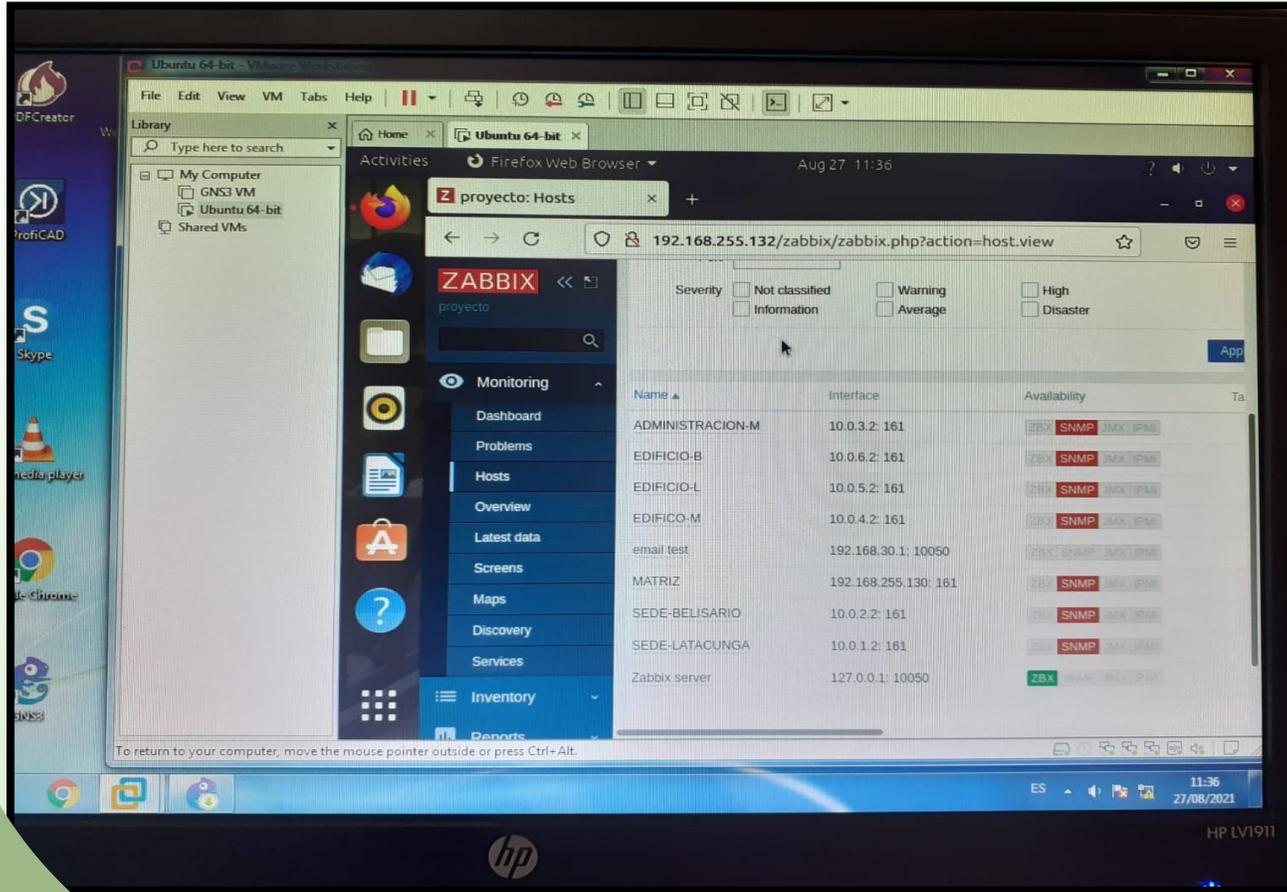
running...



➤ Manual de implementación del servidor Zabbix



➤ Guía de laboratorio de la administración servidor Zabbix



Conclusiones y Recomendaciones



GRACIAS



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