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## INTRODUCTION

Building and implementing a modern IT infrastructure for a web hosting company with headquarters in Singapore and Los Angeles is the aim of this project. The goal is to provide a single, safe networked environment that facilitates smooth operations in both locations. Strong hardware for office and front-end support personal, advanced virtualization servers, and tools for device management, ticketing, monitoring, and collaboration are all necessary parts. There will be no need for VPN connectivity because the infrastructure will function within the same 172.24.77.X IP range, guaranteeing dependable communication. The system, which is built with scalability at its core, will offer centralized management and reliable operations to satisfy the expectations of the business both now and in the future.

Virtualization servers will house critical services and Zabbix, a Linux-based monitoring tool, will guarantee protective problem. Features like ticket creation and assignment will make customer service more efficient using Zammad, a Linux-based ticketing system. Confluence will facilitate team collaboration and centralized document management, while headwind will provide strong mobile device security. Active directory (AD) integration will centralize user and device authentication, while Apache servers with docker-based deployment will host the company website for scalability and dependability.

Centralized data administration, backups, and disaster recovery will be made easier with a SAN (Storage Area Network) linked to the primary domain controller. Furthermore, a windows dependable email correspondence and teamwork, guaranteeing seamless coordination. This extensive infrastructure will assist the company's expansion and web hosting capabilities by enabling safe, effective, and scalable international operations.

**ABSTRACT**

The design and implementation of a modern IT infrastructure for a web hosting business growing into Singapore and Los Angles is described in this build book. Using a single 172.24.77.X IP range, the project aims to create a safe, connected environment that ensures smooth communication without the need for VPNs. Important elements include Headwind MDM for device security, Confluence for collaboration, Zammad for ticketing, Zabbix for monitoring, and Docker – based website hosting with Apache on Linux servers. While a SAN (Storage Area Network) connected to the principal domain controller guarantees centralized data storage, backups, and disaster recovery, Active Directory (AD) connectivity centralizes user authentication. Furthermore, dependable email correspondence and teamwork. Reliable operations are ensured by the infrastructure's emphasis on redundancy, scalability, and high availability. This project provides a secure, future-proof solution that is suited to the business's operating requirements and international goals.

## WHAT IS NEXTGEN WEB HOSTING COMPANY?

The goal of NextGen Web Hosting Company is to provide dependable, secure, and scalable web hosting solutions to organizations all over the world. We offer a variety of services, such as website hosting, cloud storage, and application deployment, and are well-known for our dedication to innovation and client pleasure. To better serve our clients and provide round-the-clock service, we are establishing additional offices in Singapore and Los Angeles as part of our expansion plan. Our worldwide operations will be supported by these offices, which will seamlessly link teams and resources via a single 172.24.77.X network. We are creating an infrastructure that guarantees effectiveness, dependability, and scalability by utilizing cutting-edge technologies like virtualization, containerization, and centralized management. Our dedication to remaining at the forefront of the web hosting sector and meeting the changing needs of companies worldwide is reflected in this expansion.

## OBJECTIVES

To help NextGen Web Hosting company grow its presence in Singapore and Los Angles, this project is all about building modern and reliable IT infrastructure. The goal is to create a secure, scalable, and efficient system that ensures smooth day-to-day operations and effortless communication between the two offices. Here's what we aim to achieve:

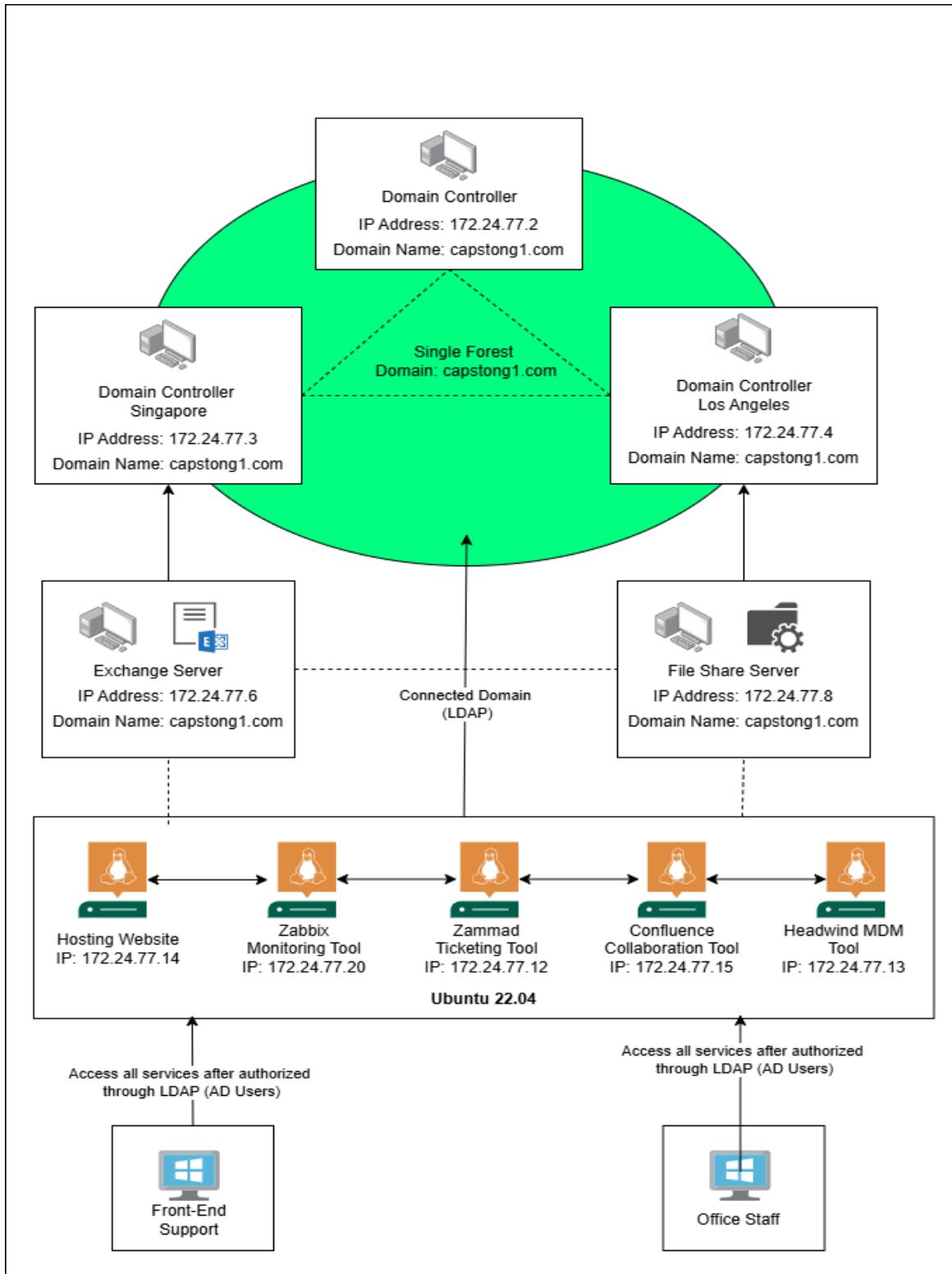
- Build office infrastructure for web hosting companies in Singapore and Los Angles.
- Choose suitable hardware for office staff and front-end support for each site.
- Install servers' hardware for virtualization.
- Provide smooth system administration with redundancy and security.
- Integrate monitoring tool and customer service portal.
- Hosting a website with database implementation.
- AD integration with collaboration tool in LINUX to authorize users and computers.
- Implement mobile Device deployment to provide stable and reliable service between two sites.

## PROJECT SCOPE

To support NextGen Web Hosting Company's activities in its new offices in Singapore and Los Angles, this project focuses on developing an advanced and scalable IT infrastructure. The following essential components are included in the scope:

- Office infrastructure design: Establish a dependable IT configuration that is suited to the operational requirements of the front-end support teams and office employees at both sites.
- Hardware Deployment: To host necessary services, choose and install the right hardware for front-end support, office workers, and virtualization servers.
- Unified Network Setup: Create a fluid network design that connects both utilizing the 172.24.77.X IP range to facilitate resource sharing and communication.
- Redundancy and security: To ensure high availability and data protection, put advanced security measures and system redundancy into place.
- Tool integration: Use Confluence for centralized teamwork, Zammad for customer support tickets, and Zabbix for real-time monitoring.
- Website Hosting and Database Management: to accommodate changing web hosting requirements, use Apache on Linux servers to build a dependable and scalable website with database integration.
- Active Directory Integration: to provide centralized user and device authentication and authorization across both sites, integrate Active Directory (AD).
- MDM or Mobile Device Management: Use Head Wind MDM to control and safeguard mobile devices inside the company.
- Docker-Based Deployment: Make use of Docker to effectively and consistently deploy services across both sites.
- SAN Storage Integration: For centralized data administration, backups, and disaster recovery, link a Storage Area Network (SAN) to the main domain controller.

## DIAGRAM



**TASK ALLOCATION**

| TASK  | NAME  | OS                    |
|---|---|-----------------------|
| Customer service portal with ticketing tool   | Aagam Shah, Yug Patel                         | LINUX                 |
| Monitoring tool                               | Rishi Patel, Urvish Sangani                   | LINUX                 |
| Collaboration tool                            | Pragnesh Chaudhary                            | LINUX                 |
| Security solution with redundancy, Deployment | Urvish Sangani, Rishi Patel, Aagam Shah       | WINDOWS + LINUX       |
| MDM Solution                                  | Taranjit Chani, Pragnesh Chaudhary            | LINUX                 |
| Website hosting                               | Yug Patel, Pragnesh Chaudhary, Urvish Sangani | LINUX                 |
| Presentation                                  | Yug Patel, Rishi Patel                        | Microsoft Power Point |
| Build Book                                    | All members                                   | Microsoft Word        |

## PROJECT REQUIREMENTS

### Security Solutions

- We must back up our data so that we can protect our sites from hardware failures or cyberattacks. For that, we must enable cross-site SAN replication between Singapore and Los Angeles to recover the data. This SAN backup ensures that data is fully protected and backed up.
- Apart from this, we have to implement proper group policies so that we can limit the software access to the users, which allows users to run pre-approved applications only, and there should be some sort of password complexity.
- A proxy server should be there that filters, monitors, and controls the web traffic. It includes URL filtering, which does not allow users to access any malicious website.
- Moreover, we also have a failover cluster installed on our servers, which ensures that a user can access data or other information even during hardware or software failures with the help of a failover cluster.

### Zabbix Monitoring Tool

1. With agent and without agent monitoring
  - Monitor using both clients installed agents and agentless technologies such as SNMP, ICMP and IPMI.
2. Data analysis
  - Metrics include CPU usage, memory consumption, disk usage, network traffic, and application-specific performance.
  - Moreover, it provides data visualization through charts, graphs, and user-friendly dashboards.
3. Distributed and centralized monitoring
  - Monitor geographically distant environments with proxies, ensuring scalability for large scale systems. Event management and alerts.
  - Zabbix sends real-time alerts and notifications by email, SMS, or integration with third-party tools like zammad, rocket chat, office 365, telegram and more.
4. Dashboard customization
  - We can edit the dashboard with our requirement and flexibility and add specific wizard such as clock, graphs, host etc., that will improve user friendly interface and improve monitoring.

### Ticketing tool (Zammad)

- In Zammad, with the help of smart chat, our support team can solve each and every customer query faster than in conventional email.
- Zammad allows you to create individual fields, such as specific dates or query classifications, and it works not only for tickets but also for users and organizations.
- Changes to objects, for example, changing a status or adding a note, are immediately displayed in Zammad.
- If we close Zammad without saving our data, there will be no effect on it as all the work is saved automatically and can be edited from any other device in future.
- Zammad lets you set up custom ticket templates. This means you won't have to type more than you need to, saving you precious time.
- Zammad offers you centralized user/rights management options using our secure LDAP integration.

### MDM tool (Headwind)

- Multiple users can access this tool by scanning the QR code that is available on the dashboard so that they can do their work.
- A user can install or uninstall any application by having remote access. also, they can deploy any custom apps from the Google Play Store and can restrict the application usage.
- We can also enforce security policies like setting up the PIN code or any other password, and a user can do a factory reset.
- We can also have the real-time location of any device that has access to the tool, and we can monitor the status of the battery life of the device.
- We can lock or unlock any device as well as wipe any mobile device by having remote access.
- If a mobile device connected to our tool has been lost or stolen anywhere, we can do a factory reset on that device.
- With the help of the Headwind tool, we can customize the home screen with specific wallpaper as well as shortcuts and layouts.

### Collaboration tool (Confluence)

- By offering a central location for content creation, sharing, and management, Confluence facilitates team collaboration by keeping everyone in sync.
- Because of its integration with Active Directory and LDAP, controlling user access and permissions is simple and safe.
- With options to upload, organize, and track changes, sharing files is easy and facilitates collaboration on papers and resources.
- It keeps meetings productive and guarantees that everyone is aware of their next steps by providing pre-made agenda and note templates.

- It integrates easily with Jira and Slack, allowing for real-time changes and more efficient teamwork.

### Integration of Active Directory using LDAP

- Active Directory (AD) using LDAP offers a way to handle users, devices, and resources in a structured directory. This setup makes it super easy for admins to manage and access company data all from one spot.
- Active Directory lets admins set up and change user accounts and group memberships. They can also use Group Policy Objects (GPOs) to apply policies, making sure everything works fine for users and devices.
- With the help of LDAP, Active Directory can easily connect with a wide range of third-party applications, such as email servers, web platforms, and VPNs.
- LDAP serves as the main protocol for searching and authenticating users and devices within Active Directory.
- Active Directory enables the creation of trust relationships between domains, making it easier to share resources and authenticate users across various sections of an organization.
- Active Directory allows for the delegation of administrative responsibilities, which assigns certain permissions to selected users or groups. This helps lighten the load for IT teams while ensuring that sensitive operations remain under control.

## TOOLS DEPLOYED THROUGH DOCKER

- ❖ Zammad:
  - Zammad can be easily set up using Docker, which packages all essential components, such as Elasticsearch and PostgreSQL, into one convenient container.
  - This setup simplifies the configuration process and guarantees that all dependencies function smoothly together.
  - With the help of docker, we can handle multi-container deployments, enhancing both scalability and customization.
  
- ❖ Website:
  - With Apache2 as the hosting server, we deploy our website using Docker. With a Dockerfile to specify the environment, an images folder containing every image, and a single.html file for the webpage, the setup is straightforward.
  - The Dockerfile takes care of Apache2 setup, file location copying, and website accessibility. As a result, the deployment process is straightforward to manage, consistent, and seamless.

## HARDWARE REQUIREMENTS

- Linux Servers

| Server No.     | Tools/Service   | Processor           | RAM                     | Storage (SSD)            | Network                 | Backup                                 |
|----------------|-----------------|---------------------|-------------------------|--------------------------|-------------------------|--|
| Linux Server 1 | Zabbix          | Quad-core, 2.4 GHz+ | 4 GB (Min), 8 GB (Rec)  | 512 GB (Min), 1 TB (Rec) | 1 Gbps NIC, low latency | RAID 10, backup storage (2x Main Disk) |
| Linux Server 2 | Zammad          | Quad-core, 2.4 GHz+ | 8 GB (Min), 16 GB (Rec) | 512 GB (Min), 1 TB (Rec) | 1 Gbps NIC, low latency | RAID 10, backup storage (2x Main Disk) |
| Linux Server 3 | Headwind MDM    | Quad-core, 2.4 GHz+ | 8 GB (Min), 16 GB (Rec) | 512 GB (Min), 1 TB (Rec) | 1 Gbps NIC, low latency | RAID 10, backup storage (2x Main Disk) |
| Linux Server 4 | Confluence      | Quad-core, 2.4 GHz+ | 8 GB (Min), 16 GB (Rec) | 512 GB (Min), 1 TB (Rec) | 1 Gbps NIC, low latency | RAID 10, backup storage (2x Main Disk) |
| Linux Server 5 | Website Hosting | Quad-core, 2.4 GHz+ | 4 GB (Min), 8 GB (Rec)  | 512 GB (Min), 1 TB (Rec) | 1 Gbps NIC, low latency | RAID 10, backup storage (2x Main Disk) |

- Windows Server

### Domain Controller

| Component         | Minimum Requirements  |
|-------------------|---|
| Processor         | Quad-core CPU, 3.0 GHz or higher (e.g. Intel Xenon or AMD Ryzen Series)     |
| RAM               | 16 GB (Minimum), 32 GB (Recommended for higher workloads)                   |
| Storage (SSD)     | 1 TB (Minimum), 2 TB (Recommended for logs, DHCP database, and SAN backups) |
| Network Interface | 10 Gbps NIC with redundancy   |
| Backup Storage    | 1 TB - Direct access to SAN storage with proper authorization               |
| Operating System  | Windows Server 2019 with ADDS, DHCP, etc..                                  |

**Member Server**

| <b>Component</b>   | <b>Minimum Requirements</b>   |
|--------------------|---|
| Processor          | Quad-core CPU, 3.0 GHz or higher (e.g. Intel Xenon or AMD Ryzen Series) |
| RAM                | 16 GB (Minimum), 32 GB (Recommended for higher workloads)               |
| Storage (SSD)      | 512 GB (Minimum), 1 TB (Recommended for logs)                           |
| Network Interface  | 10 Gbps NIC with redundancy   |
| Backup Storage     | 100 GB (SAN Virtual Drive)  |
| Operating System   | Windows Server 2019 with Exchange Server and File Share Server          |
| Disk Configuration | OS (80 GB), Exchange DB (250 GB), Share Drive (100 GB)                  |

- Client Machine

**Office Staff**

| <b>Component</b>  | <b>Minimum Requirements</b>                              |
|-------------------|--|
| Processor         | Intel Core i5-13400                                      |
| RAM               | 8 GB (Minimum), 16 GB (Recommended for higher workloads) |
| Storage (SSD)     | 256 GB (Minimum), 512 GB (Recommended for logs)          |
| Network Interface | Wi-Fi 802.11ac   |
| Graphics          | Intel UHD Graphics                                       |
| Operating System  | Windows 10 Professional Version                          |

**Front-end support**

| <b>Component</b>  | <b>Minimum Requirements</b>                               |
|-------------------|---|
| Processor         | Intel Core i5-13400F                                      |
| RAM               | 16 GB (Minimum), 32 GB (Recommended for higher workloads) |
| Storage (SSD)     | 512 GB (Minimum), 1 TB (Recommended for logs)             |
| Network Interface | Wi-Fi 802.11ac  |
| Graphics          | NVIDIA Quadro P400  |
| Operating System  | Windows 10 Professional Version                           |

**IP MATRIX**

| Sr No. | Server Name                    | IP address      | Default Gateway | Subnet Mask      | DNS                         |
|--------|--------------------------------|-----------------|-----------------|------------------|-----------------------------|
| 1      | Capstone-DC                    | 172.24.77.2/24  | 172.24.77.1     | 255.255.255.0/24 | 127.0.0.1                   |
| 2      | Capstone-SI-DC1                | 172.24.77.3/24  | 172.24.77.1     | 255.255.255.0/24 | 172.24.77.2,<br>172.24.77.4 |
| 3      | Capstone-LA-DC1                | 172.24.77.4/24  | 172.24.77.1     | 255.255.255.0/24 | 172.24.77.2,<br>172.24.77.3 |
| 4      | Capstone-MS1<br>(Exchange)     | 172.24.77.6/24  | 172.24.77.1     | 255.255.255.0/24 | 172.24.77.3,<br>172.24.77.4 |
| 5      | Capstone-MS2<br>(File server)  | 172.24.77.8/24  | 172.24.77.1     | 255.255.255.0/24 | 172.24.77.3,<br>172.24.77.4 |
| 6      | Captstone-G1-Linux-Website     | 172.24.77.14/24 | 172.24.77.1     | 255.255.255.0/24 | 172.24.77.3,<br>172.24.77.4 |
| 7      | Captstone-G1-Linux-Zabbix      | 172.24.77.20/24 | 172.24.77.1     | 255.255.255.0/24 | 172.24.77.3,<br>172.24.77.4 |
| 8      | Captstone-G1-Linux-Zammad      | 172.24.77.12/24 | 172.24.77.1     | 255.255.255.0/24 | 172.24.77.3,<br>172.24.77.4 |
| 9      | Captstone-G1-Linux-Confluence  | 172.24.77.15/24 | 172.24.77.1     | 255.255.255.0/24 | 172.24.77.3,<br>172.24.77.4 |
| 10     | Captstone-G1-Linux-HeadwindMDM | 172.24.77.13/24 | 172.24.77.1     | 255.255.255.0/24 | 172.24.77.3,<br>172.24.77.4 |

- **Domain Name:** capstong1.com
- **Admin Login:**
  - **Username:** [administrator@capstong1.com](mailto:administrator@capstong1.com)
  - **Password:** Secret55!

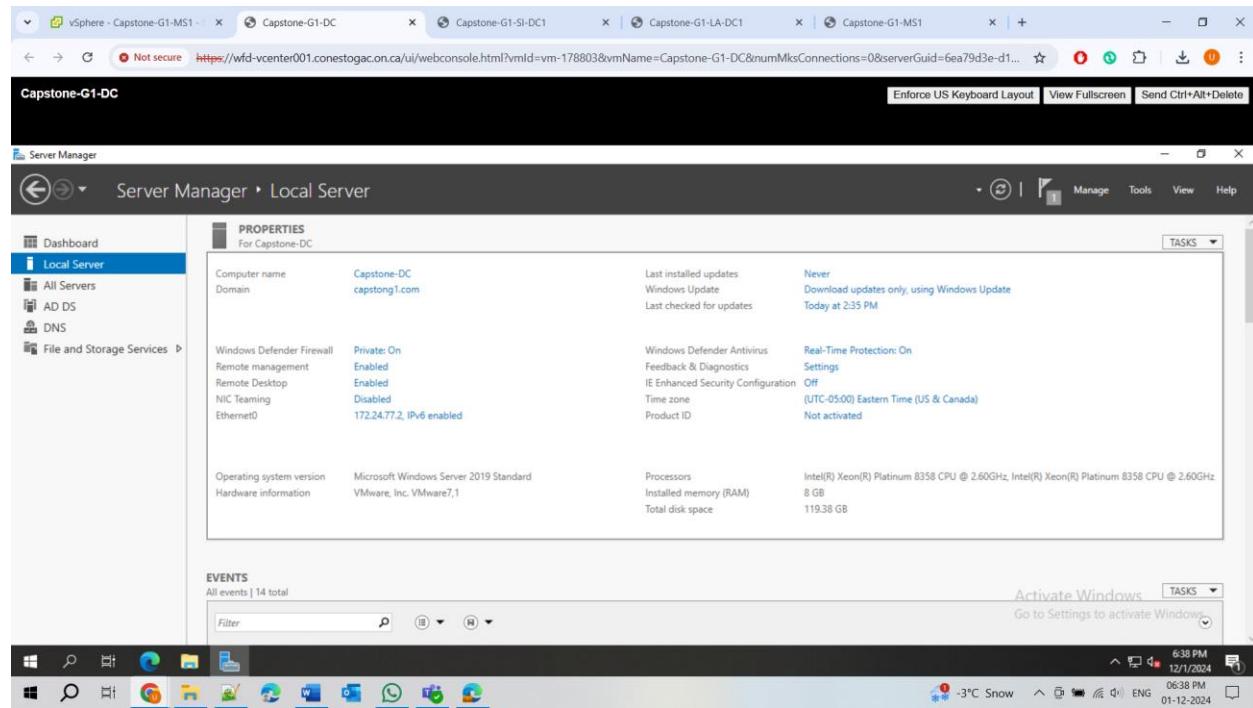
## DNS Records

|               |          |              |        |
|---------------|----------|--------------|--------|
| collaboration | Host (A) | 172.24.77.15 | static |
| email         | Host (A) | 172.24.77.6  | static |
| mdm           | Host (A) | 172.24.77.13 | static |
| www           | Host (A) | 172.24.77.14 | static |
| zabbix        | Host (A) | 172.24.77.20 | static |
| zammad        | Host (A) | 172.24.77.12 | static |

## MACHINE CONFIGURATION

### Windows Server (Domain Controller)

- Installed Domain Controller server name: Capstone-DC and Domain name: capstong1.com, IP address: 172.24.77.2

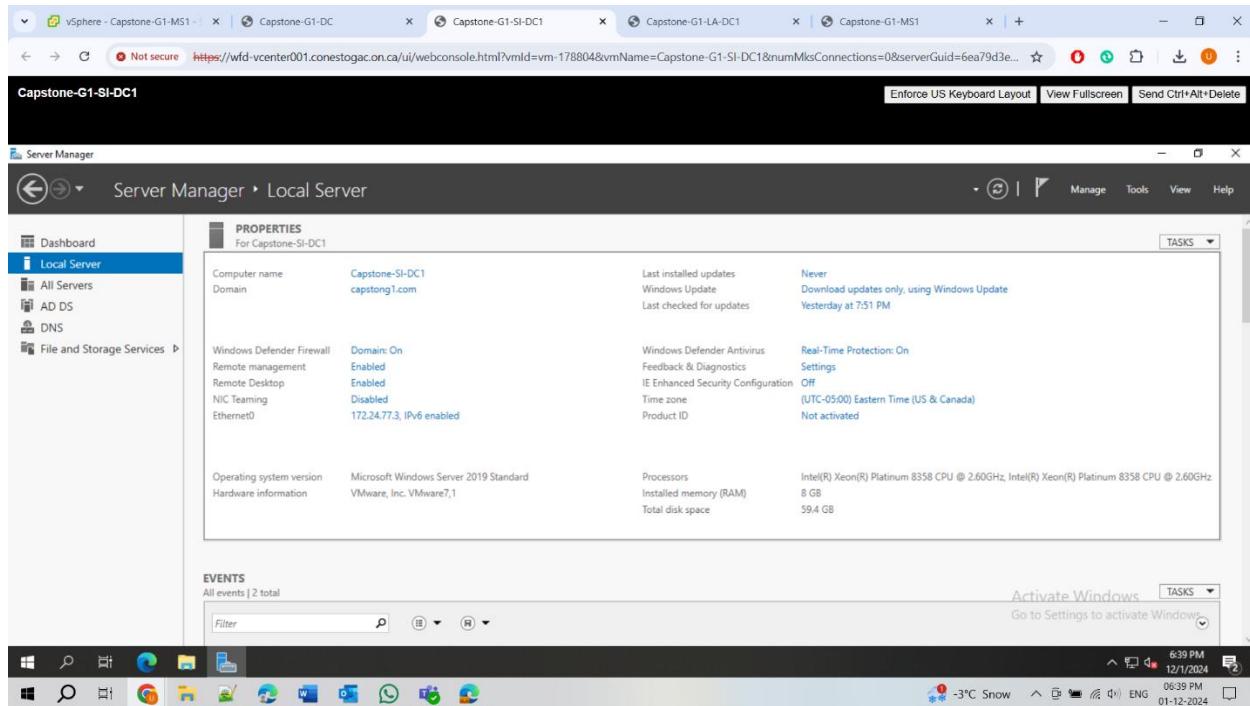


The screenshot shows the Windows Server 2019 Local Server Properties window. The main pane displays the following system information:

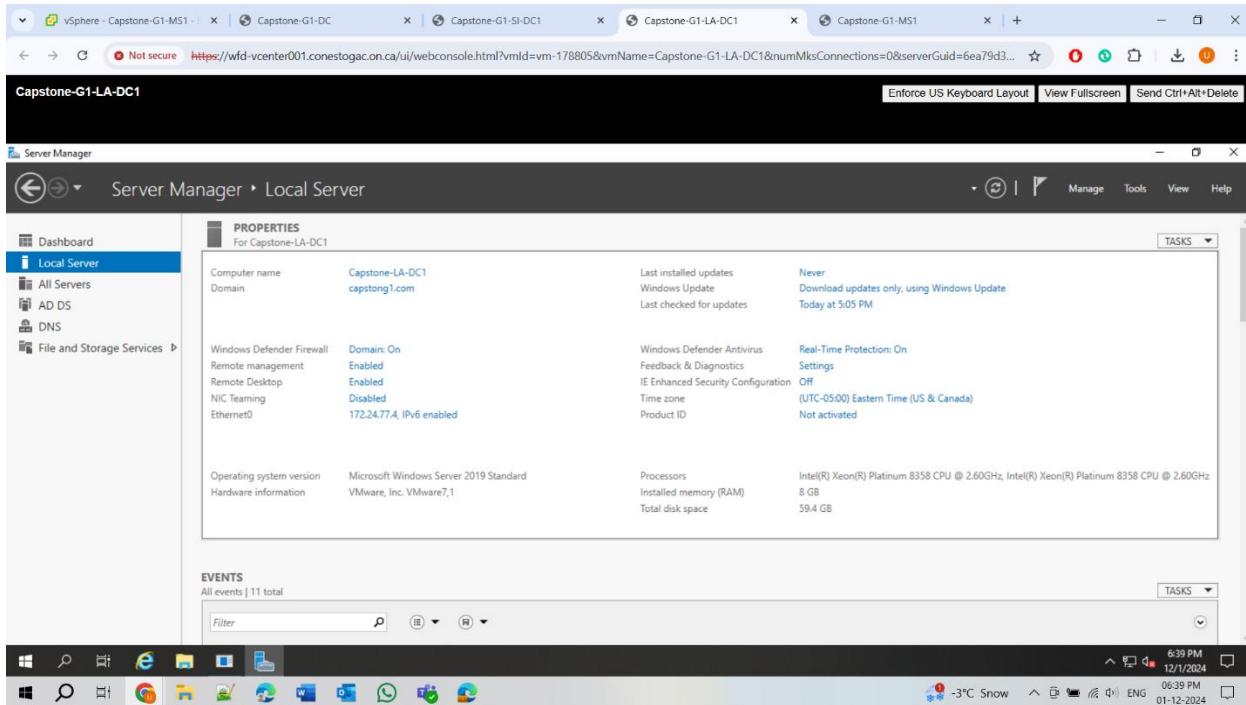
| PROPERTIES                         |  |
|------------------------------------|--|
| Computer name                      | Capstone-DC  |
| Domain                             | capstong1.com  |
| Windows Defender Firewall          | Private: On  |
| Remote management                  | Enabled  |
| Remote Desktop                     | Enabled  |
| NIC Teaming                        | Disabled   |
| Ethernet0                          | 172.24.77.2, IPv6 enabled  |
| Operating system version           | Microsoft Windows Server 2019 Standard   |
| Hardware information               | VMware, Inc. VMware7.1   |
| Last installed updates             | Never  |
| Windows Update                     | Download updates only, using Windows Update  |
| Last checked for updates           | Today at 2:35 PM   |
| Windows Defender Antivirus         | Real-Time Protection: On   |
| Feedback & Diagnostics             | Settings   |
| IE Enhanced Security Configuration | Off  |
| Time zone                          | (UTC-05:00) Eastern Time (US & Canada)   |
| Product ID                         | Not activated  |
| Processors                         | Intel(R) Xeon(R) Platinum 8358 CPU @ 2.60GHz, Intel(R) Xeon(R) Platinum 8358 CPU @ 2.60GHz |
| Installed memory (RAM)             | 8 GB   |
| Total disk space                   | 119.38 GB  |

The left sidebar shows the navigation menu for the Server Manager.

- Installed Singapore Domain Controller: Capstone-SI-DC1 and Domain Name: capstong1.com with IP address: 172.24.77.3

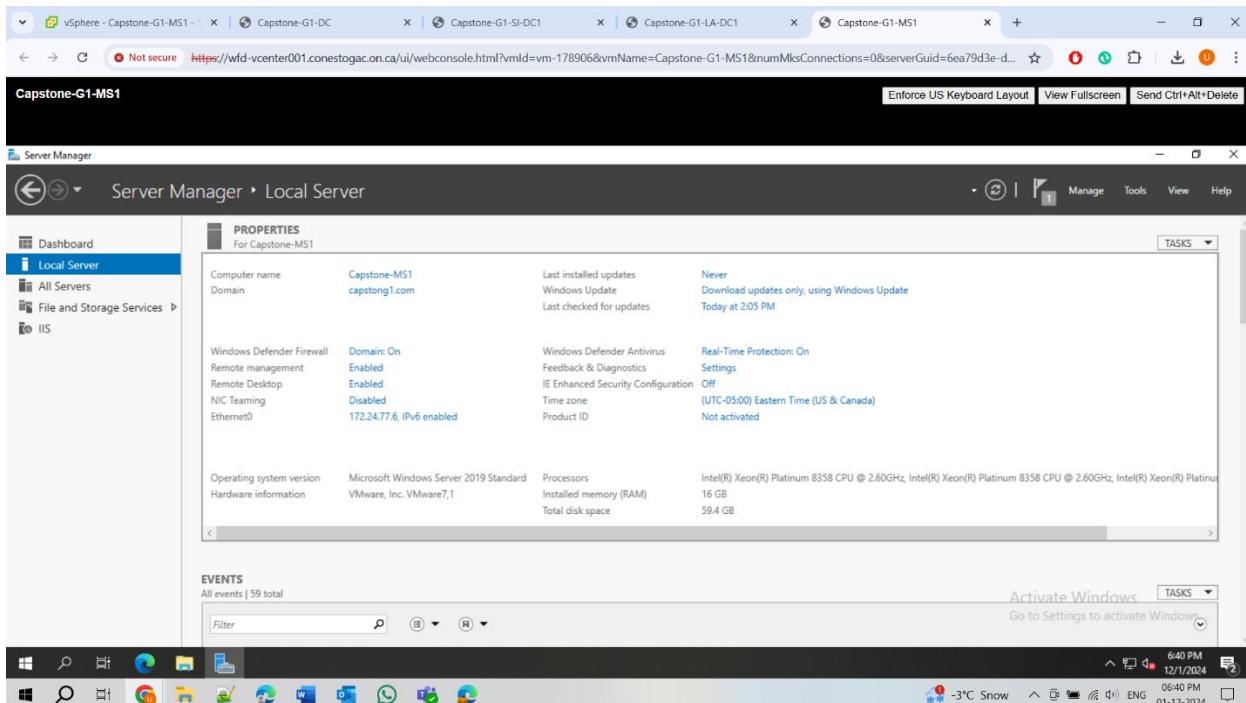


- Installation of LosAngeles Domain Controller name: Capstone-LA-DC1 and Domain name: capstong1.com with IP address: 172.24.77.4

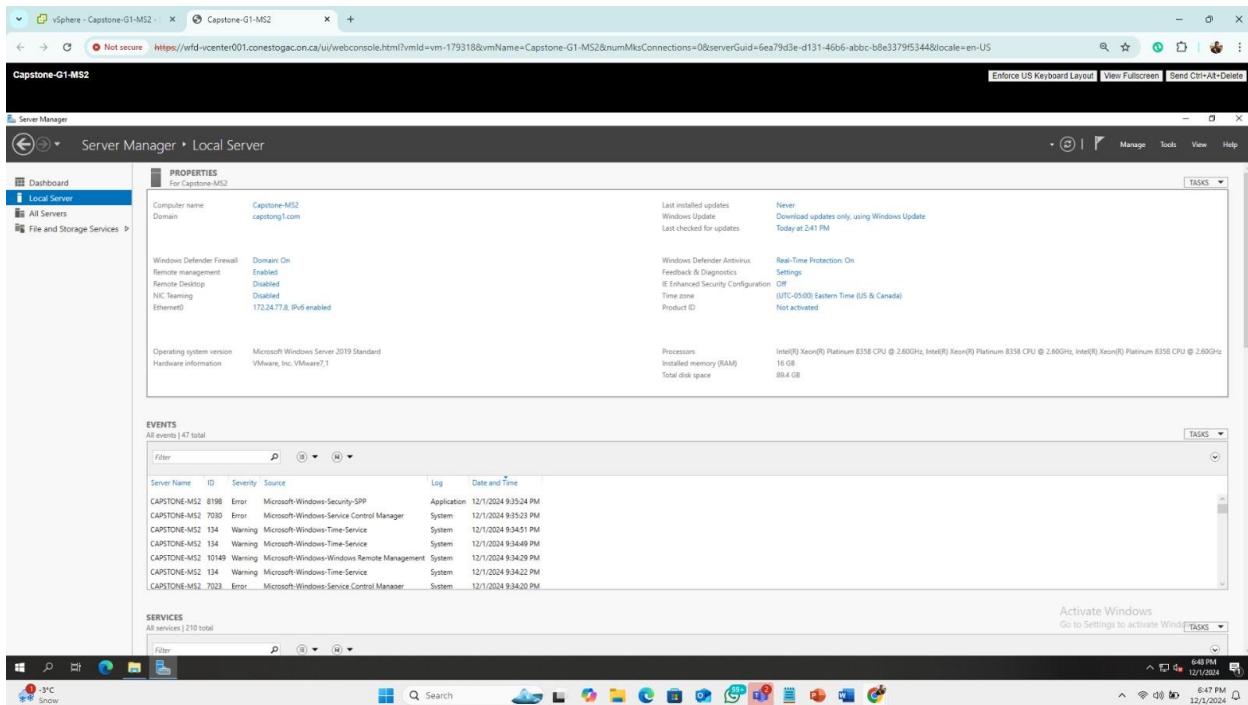


## Windows Server (Member Server)

- Configured Member Server as Capstone-MS1 with Domain Name: 172.24.77.6



- Configured Member Server as Capstone-MS2 with Domain Name: 172.24.77.8



## Linux Server (Ubuntu 22.04)

- Installed Linux Server for NextGEN Website and configured with IP:172.24.77.14 and domain name:Capstong1.com Configured Server as Capstone-G1-Linux-Website

```

# This is the network config written by 'subiquity'
network:
  ethernets:
    ens160:
      addresses:
        - 172.24.77.14/24
      gateway4: 172.24.77.1
      nameservers:
        addresses:
          - 172.24.77.3
          - 172.24.77.4
        search:
          - capstong1.com
  version: 2

```

- Configured Linux Server for hosting Zabbix Monitoring tool on it with IP:172.24.77.20

The screenshot shows a web browser window titled "vSphere - CAPSTONE-LA-ZABBIX-CLONE" with the URL <https://wfd-vcenter001.conestogac.on.ca/ui/webconsole.html?vmId=vm-178957&vmName=CAPSTONE-LA-ZABBIX-CLONE&numMksConnections=0&serverGuid=6ea79d3e-d131-46b6-abbc-b8e3379f534&locale=en-US>. The page displays a terminal session with the command "nano /etc/netplan/00-installer-config.yaml". The configuration file content is as follows:

```
GNU nano 6.2          /etc/netplan/00-installer-config.yaml
# This is the network config written by 'subiquity'
network:
  ethernets:
    ens160:
      addresses:
        - 172.24.77.20/24
      gateway4: 172.24.77.1
  nameservers:
    addresses:
      - 142.156.150.112
      - 172.24.77.2
      - 172.24.77.3
    search: []
version: 2
```

The terminal prompt at the bottom is "rpzabbix@rpatel:/etc\$". The taskbar at the bottom shows various icons for system functions like power, volume, and network.

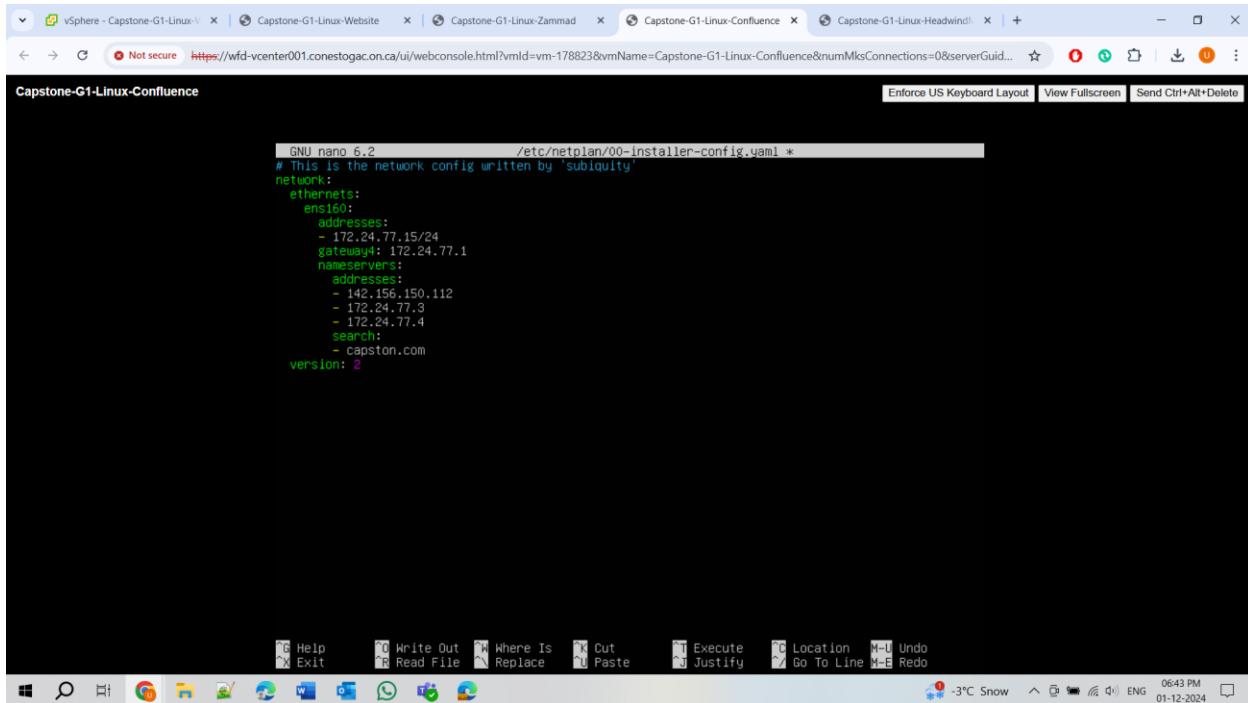
- Configured Linux Server for Hosting Zammad Ticketing tool on it with IP: 172.24.77.12

The screenshot shows a web browser window titled "Capstone-G1-Linux-Zammad" with the URL <https://wfd-vcenter001.conestogac.on.ca/ui/webconsole.html?vmId=vm-178814&vmName=Capstone-G1-Linux-Zammad&numMksConnections=0&serverGuid=6...>. The page displays a terminal session with the command "nano /etc/netplan/00-installer-config.yaml". The configuration file content is as follows:

```
GNU nano 6.2          /etc/netplan/00-installer-config.yaml
# This is the network config written by 'subiquity'
network:
  ethernets:
    ens160:
      addresses:
        - 172.24.77.12/24
      gateway4: 172.24.77.1
  nameservers:
    addresses:
      - 172.24.77.2
      - 172.24.77.3
    search:
      - capstone1.com
version: 2
```

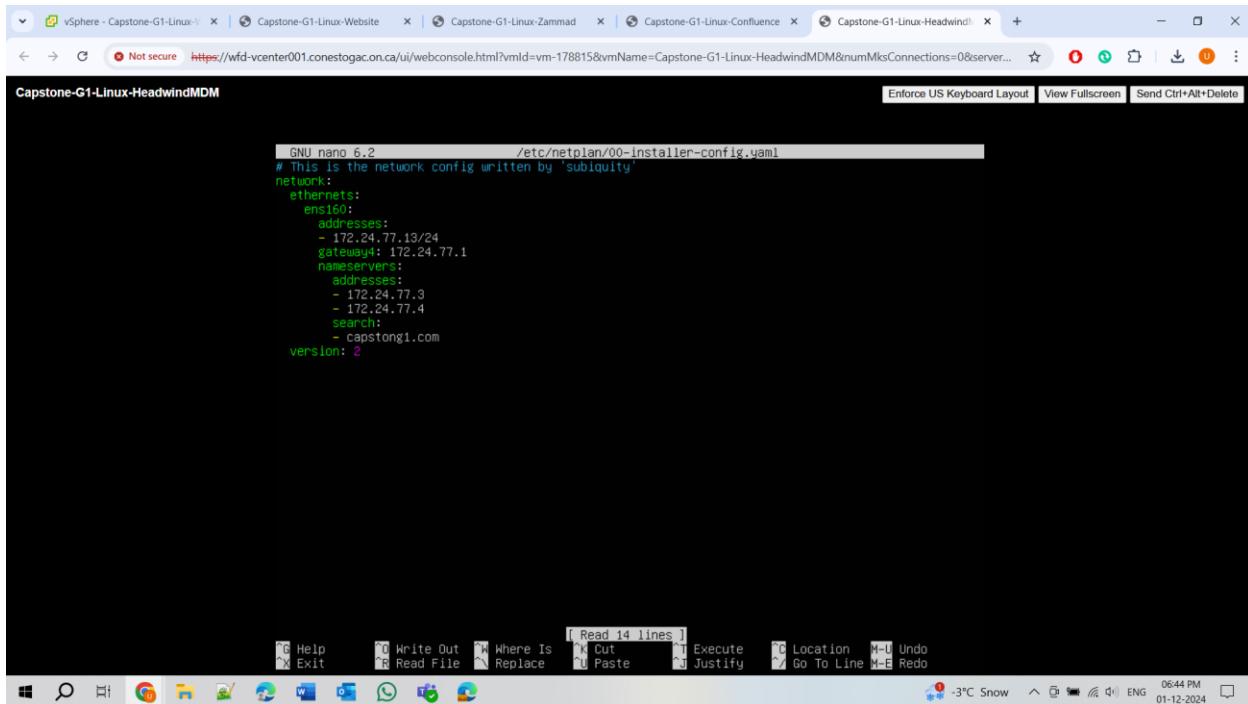
The terminal prompt at the bottom is "capstone-g1@capstone-g1:~\$". The taskbar at the bottom shows various icons for system functions like power, volume, and network.

- Configured Linux Server for hosting Confluence collaboration tool on it with IP:172.24.77.15



```
GNU nano 6.2          /etc/netplan/00-installer-config.yaml *
# This is the network config written by 'subiquity'
network:
  ethernets:
    ens160:
      addresses:
        - 172.24.77.15/24
      gateway4: 172.24.77.1
      nameservers:
        addresses:
          - 142.156.150.112
          - 172.24.77.3
          - 172.24.77.4
        search:
          - capston.com
  version: 2
```

- Configured Linux Server for hosting Headwind MDM tool on it with IP:172.24.77.13



```
GNU nano 6.2          /etc/netplan/00-installer-config.yaml *
# This is the network config written by 'subiquity'
network:
  ethernets:
    ens160:
      addresses:
        - 172.24.77.13/24
      gateway4: 172.24.77.1
      nameservers:
        addresses:
          - 172.24.77.3
          - 172.24.77.4
        search:
          - capstong1.com
  version: 2
```

## OU structure

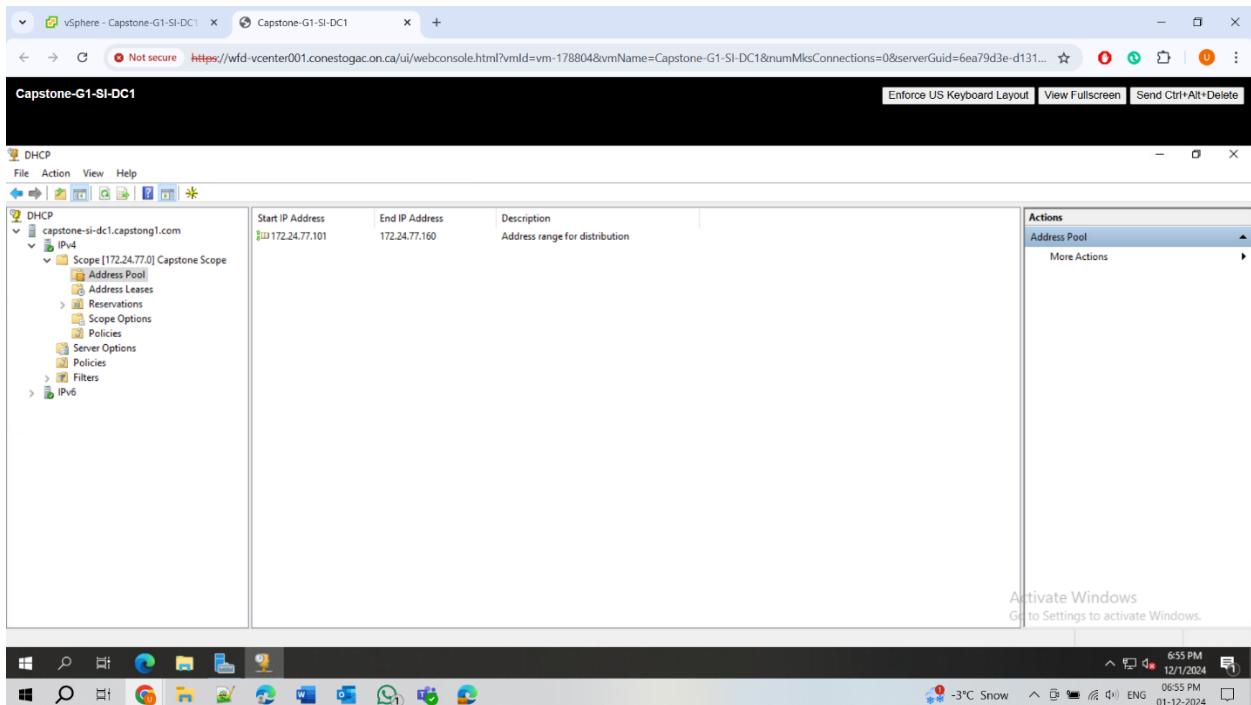
- OU Structure created for different departments in the Organization such as Accounting, Admin, IT Support, HR, Sales.

The screenshot shows the Windows Active Directory Users and Computers management console. The left pane displays a tree view of organizational units (OUs) under 'Capstone-G1-DC'. The 'Sites' node is expanded, showing 'Los Angeles' and 'Singapore' OUs. 'Los Angeles' is further expanded to show 'Accounting', 'Admin', 'HR', 'IT Support', 'Sales', and 'System' OUs. Each OU contains 'Computers', 'Groups', and 'Users' sub-nodes. The right pane lists users from the 'Admin' OU in Los Angeles, categorized by type (User or Group). A status bar at the bottom indicates 'Activate Windows' and provides system information like date and time.

| Name                | Type | Description |
|---------------------|------|-------------|
| Admin Confluence LA | User |             |
| Admin MDM LA        | User |             |
| Admin Zabbix LA     | User |             |
| Admin Zamdad LA     | User |             |

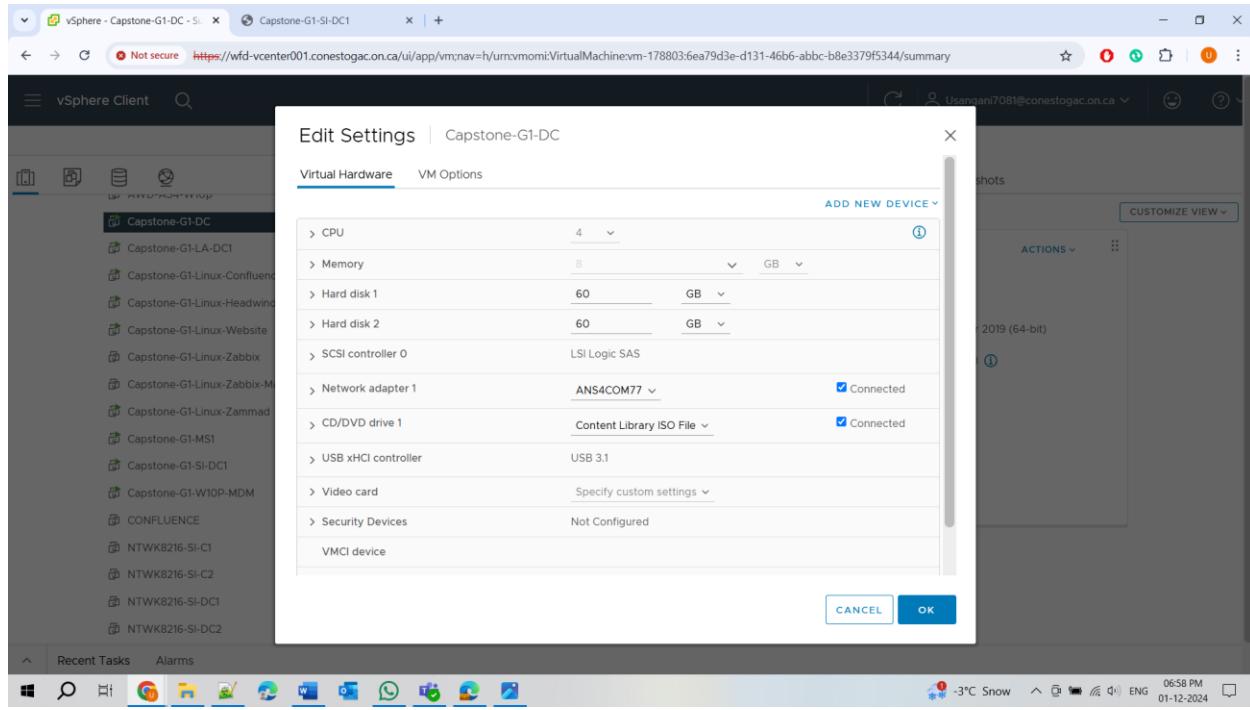
## DHCP Configuration

- DHCP management installed on Singapore Domain Controller. DHCP Pool configured and active IP range from 172.24.77.101-160

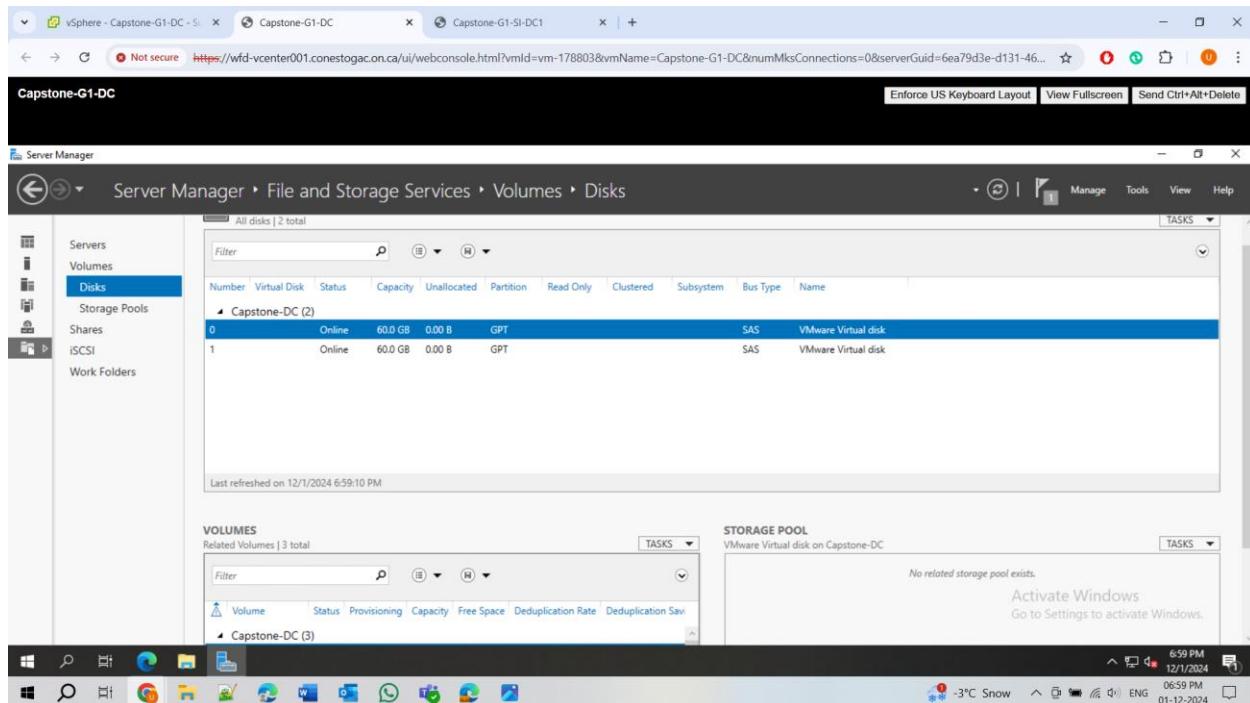


## SAN storage (Share Storage or Virtual Drive)

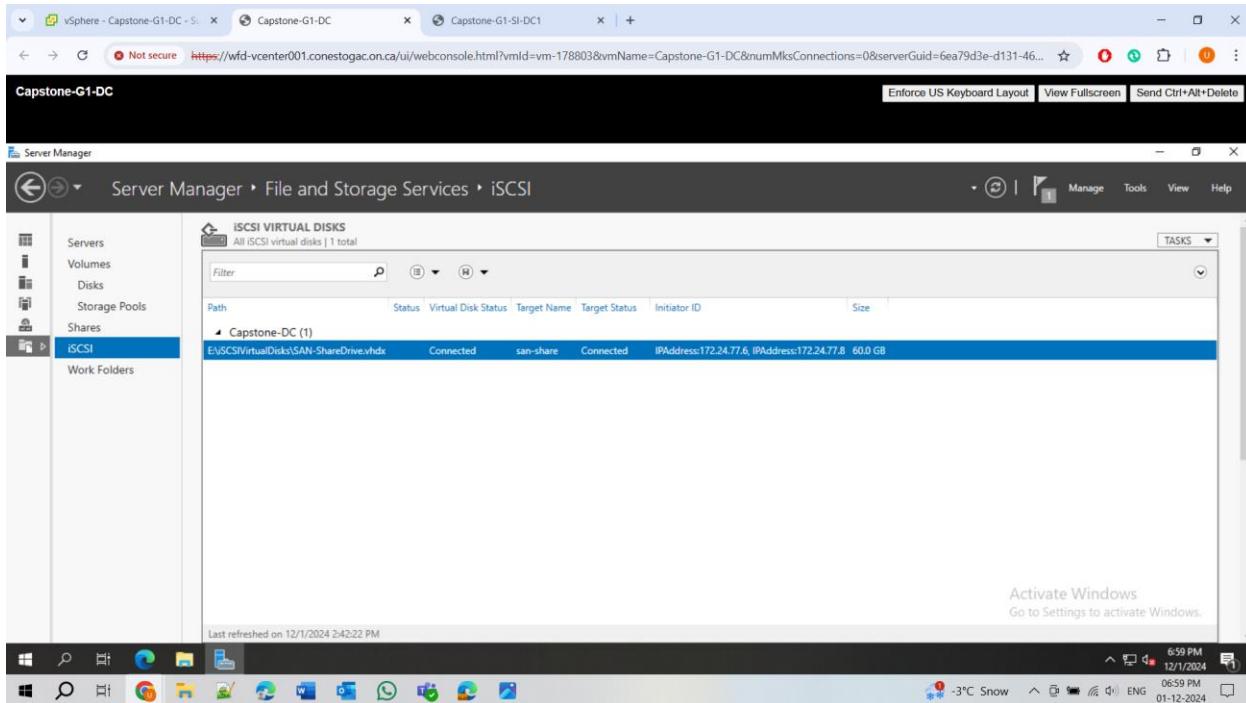
- 60 GB SAN storage created by adding additional disk, naming system name: Capstone-G1-DC



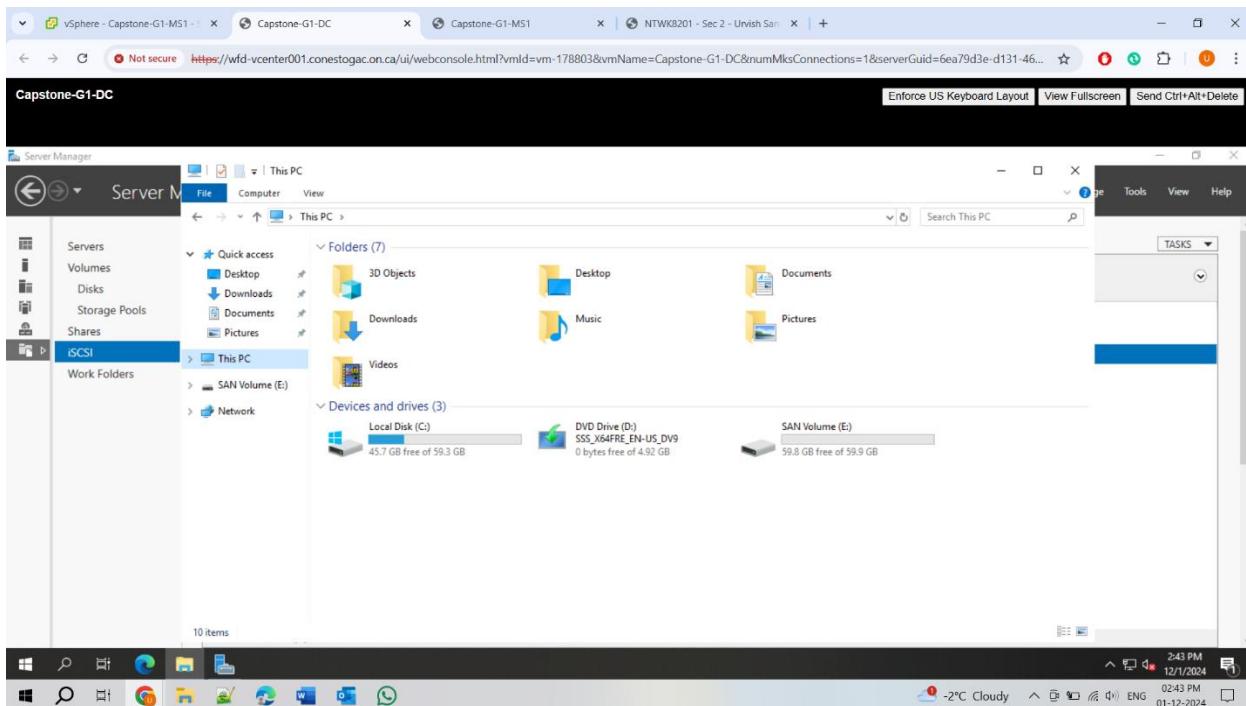
- The screenshot shows disk with 60 GB in Server Manager Volumes



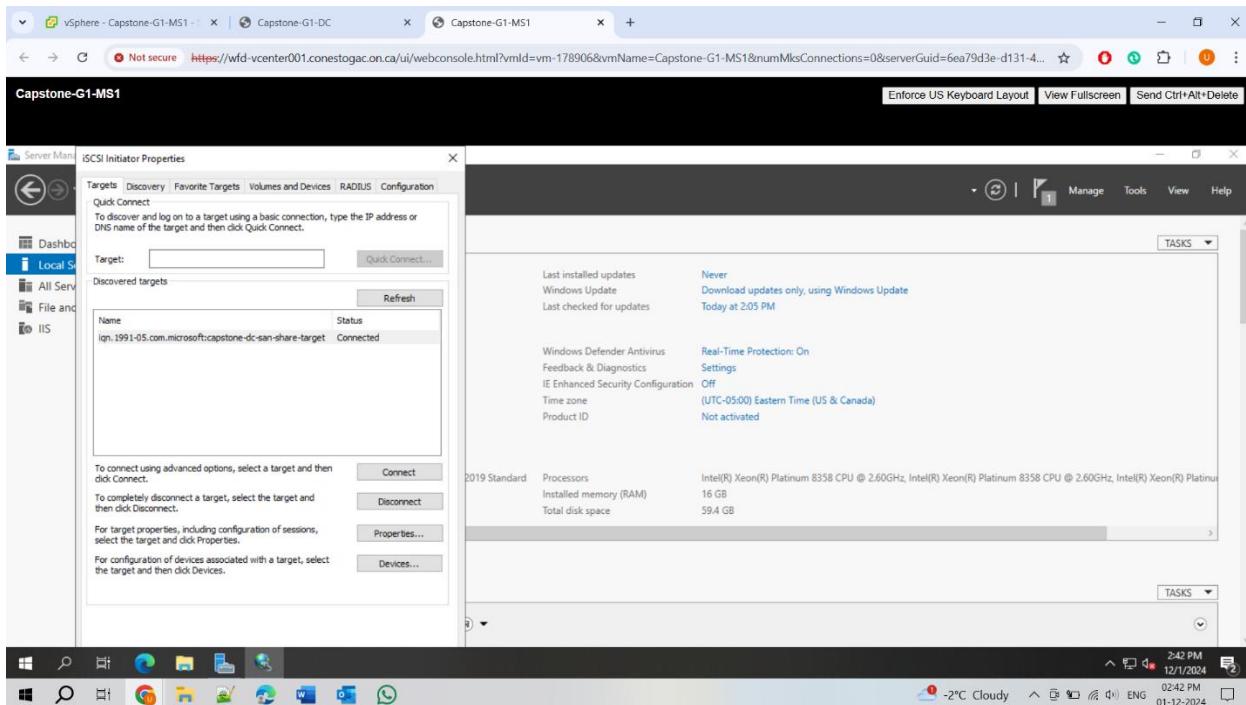
- Configured iSCSI feature on server Capstone-G1-DC and adding 2 servers for accessibility of 60 GB virtual disk, servers connected are 172.24.77.6, 172.24.77.8



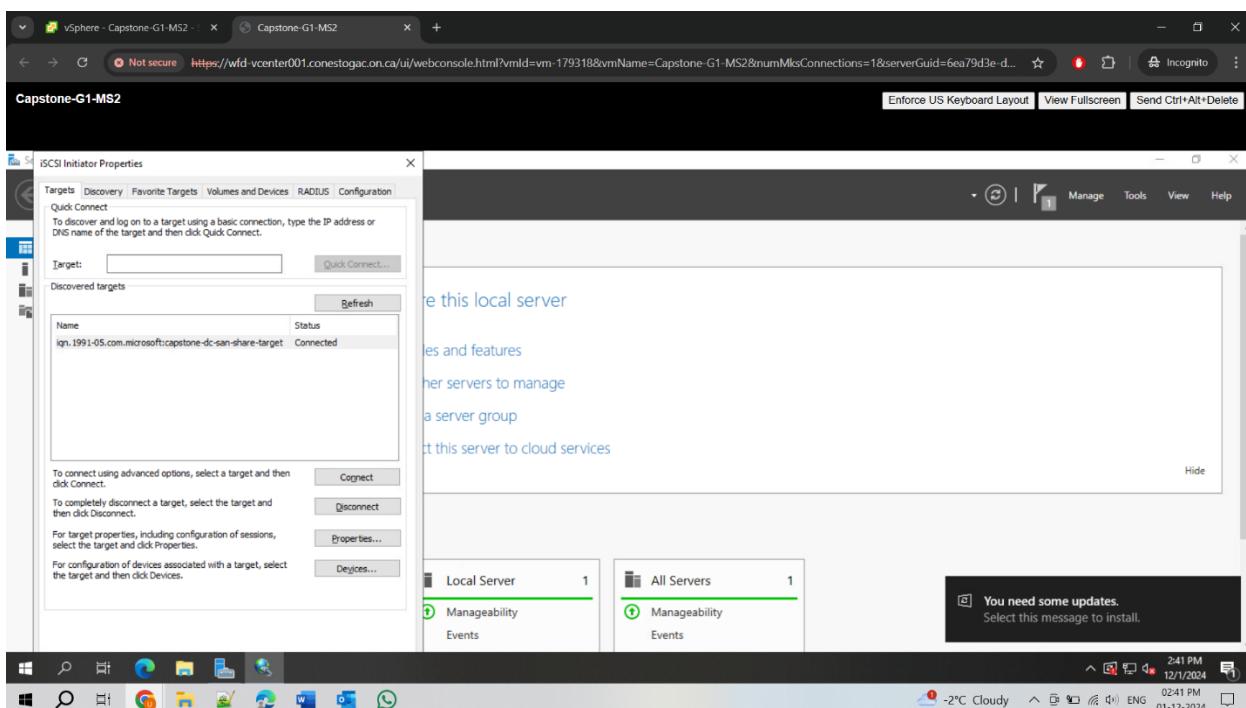
- Checking the accessibility of SAN Volume of 60GB accessible by IP: 172.24.77.6

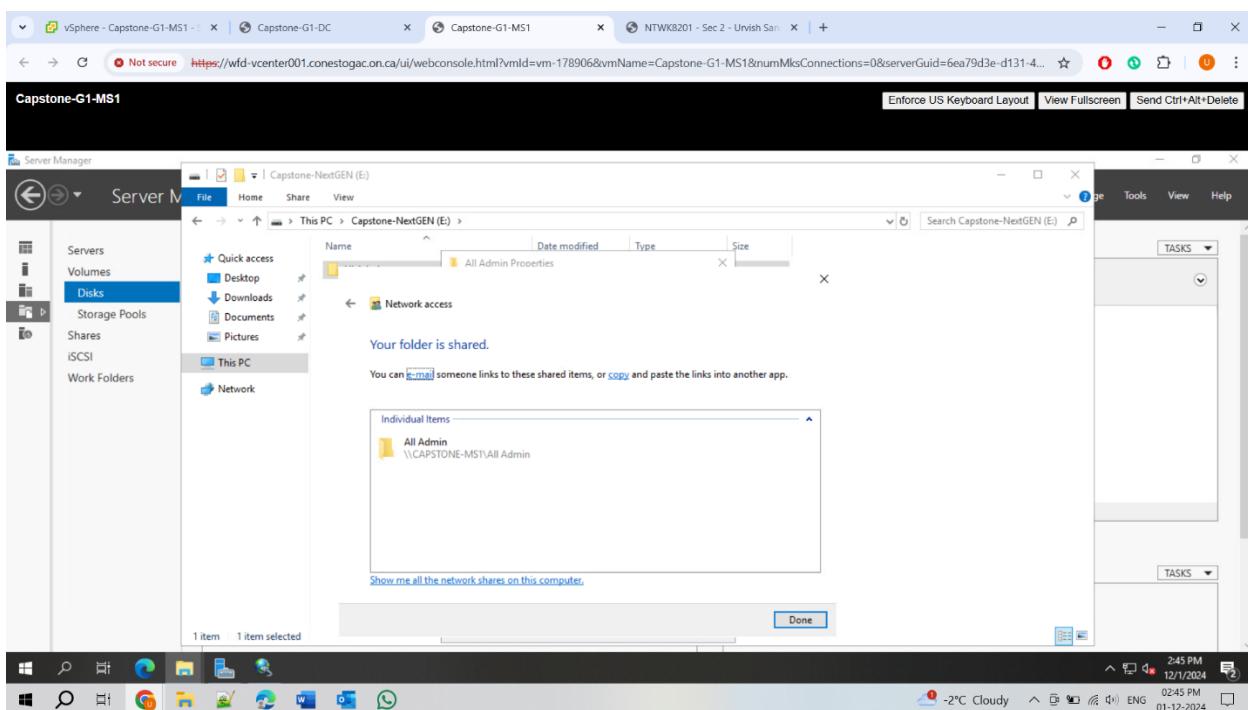
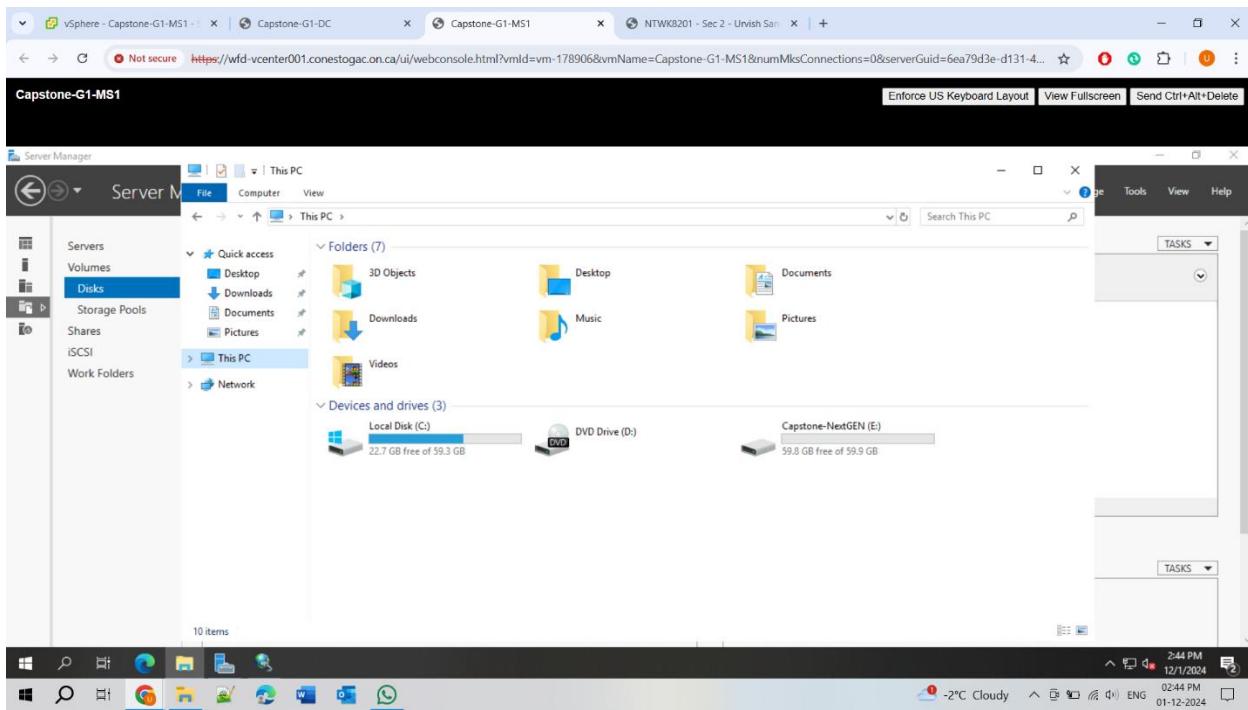


- Checking status of SAN storage on Member Server: Capstone-G1-MS1 and status: connected

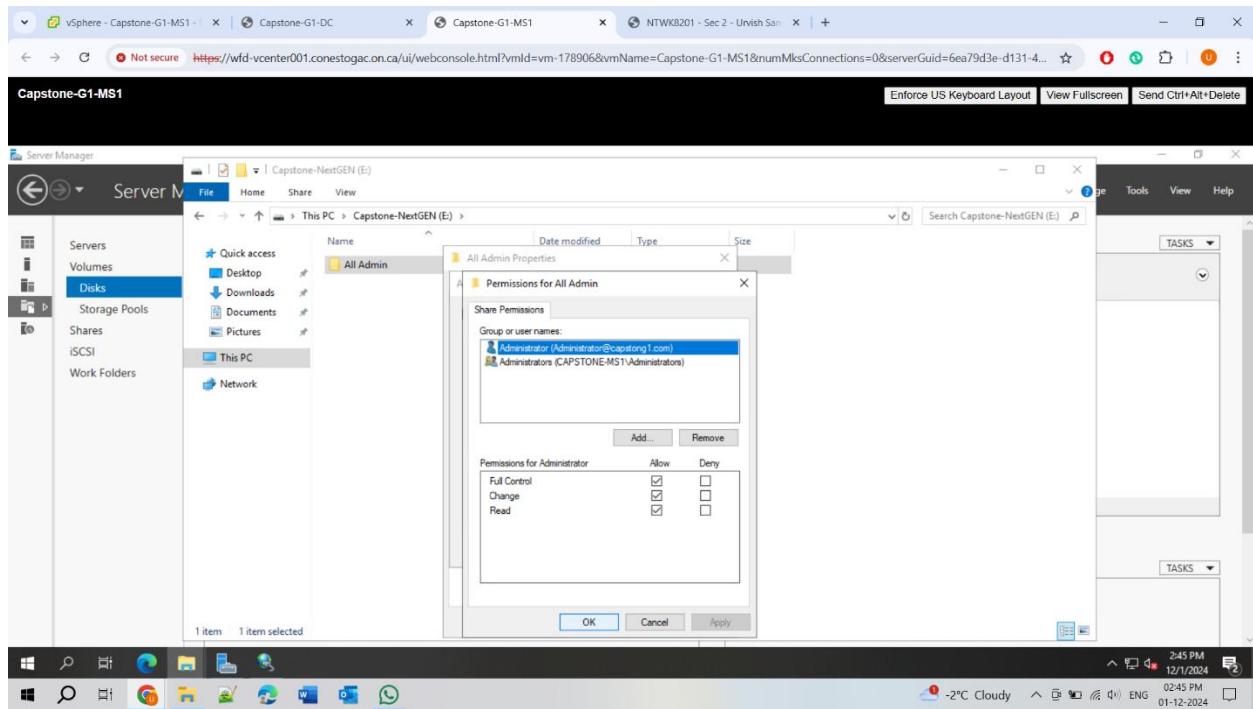


- Similarly, checking the connection status on Member Server 2:Capstone-G1-MS2 as Connected





- Allowing permission of Administrators to access the folder.



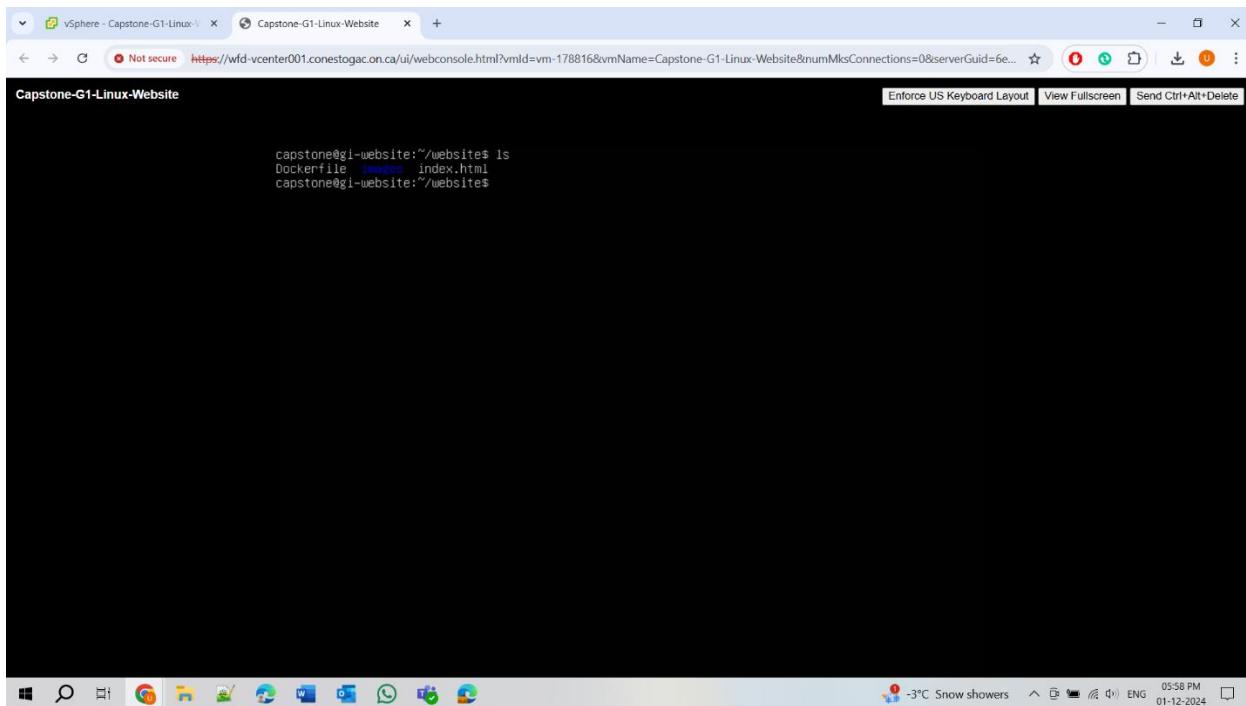
## TOOLS INSTALLATION AND CONFIGURATION

### Website (Apache HTTP Server)

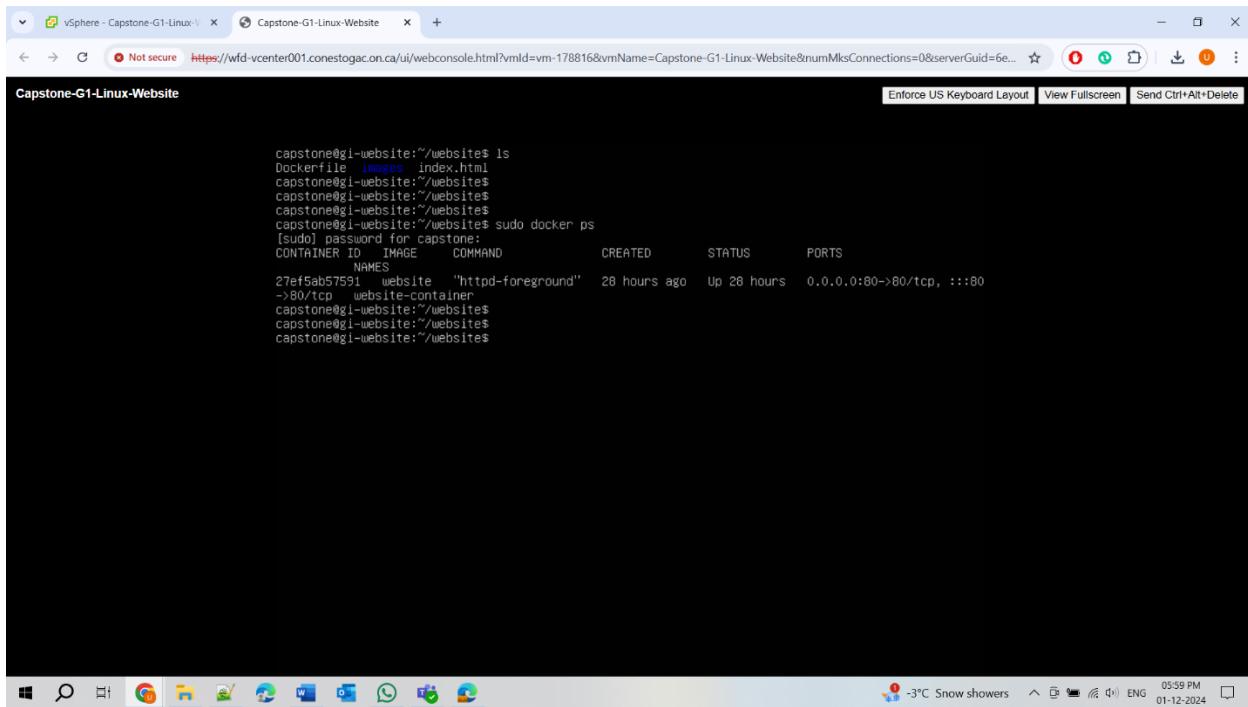
- Apache is being used to host the website on a Linux server within a Docker container. The home page is clean and simple to use, with clickable alternatives for other tools like Zabbix, Zammad, Confluence and HeadwindMDM.
- A popup window containing some basic tool information and a "Visit Tool" button appears when a user clicks on one of these tools.
- When the user clicks this button, the tool's dashboard is displayed.
- The pictures folder adds visual components to the dashboard to make it more visually appealing, and the design is simple and easy to use.
- Docker makes ensuring the website functions properly and is simple to maintain.

Server configuration detail:

- This is our website directory in linux server which contains index.html file, one DockerFile and images directory with all required images for website.

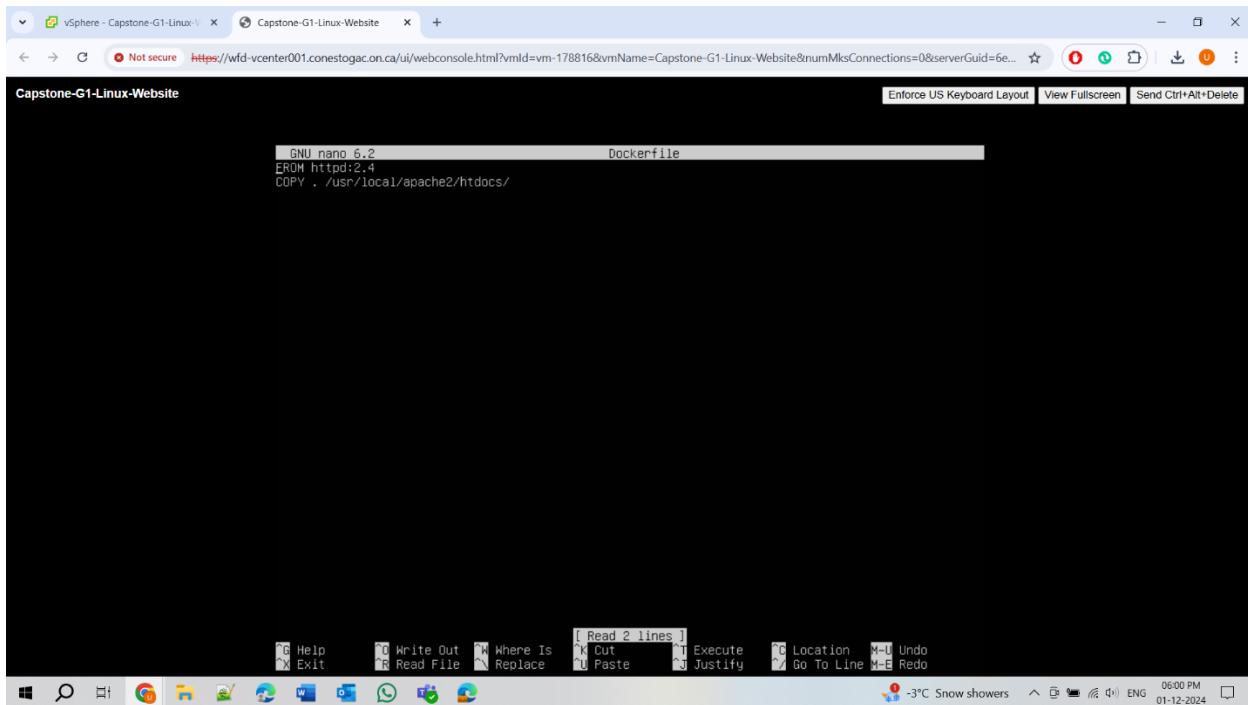


- We used docker for deployment of the website. Here is all information about the docker file.



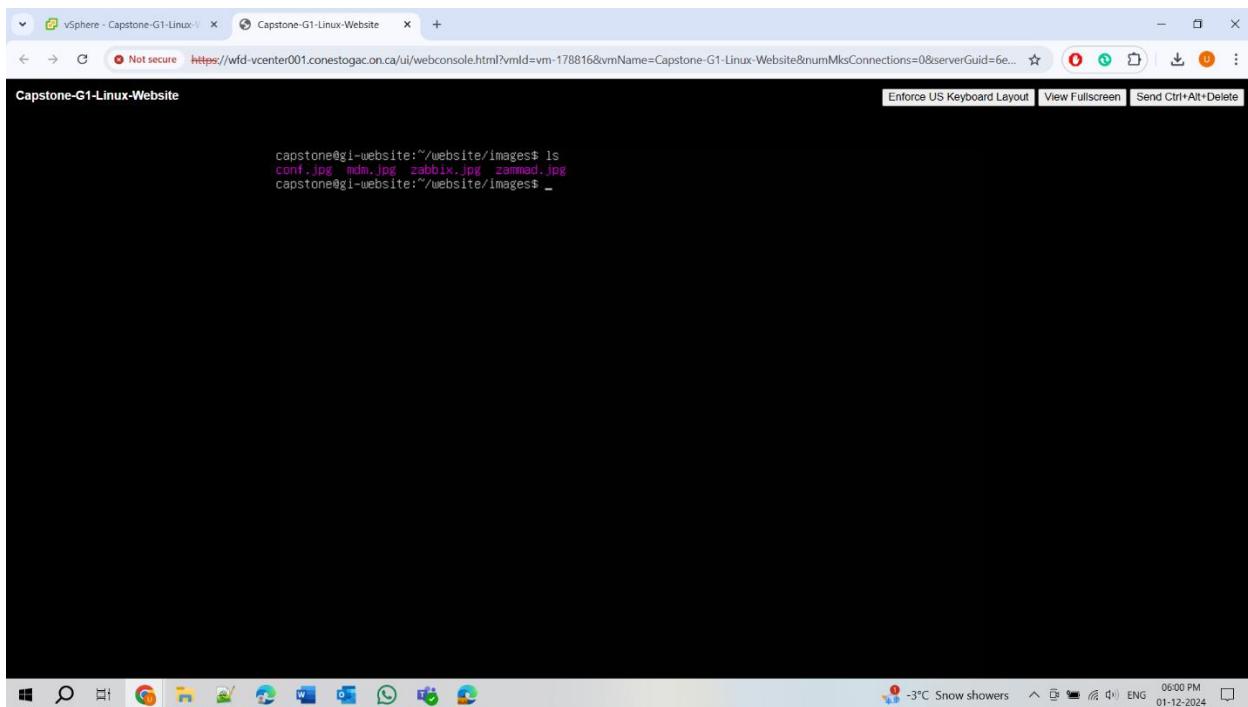
```
capstone@gl-website:~/websites$ ls
Dockerfile  index.html
capstone@gl-website:~/websites$ capstone@gl-website:~/websites$ capstone@gl-website:~/websites$ capstone@gl-website:~/websites$ sudo docker ps
[sudo] password for capstone:
CONTAINER ID        IMAGE               COMMAND             CREATED            STATUS              PORTS
 NAMES
27ef5ab57591        website            "httpd-foreground"   28 hours ago       Up 28 hours        0.0.0.0:80->80/tcp, :::80
capstone@gl-website:~/websites$ capstone@gl-website:~/websites$ capstone@gl-website:~/websites$
```

- This DockerFile contained the required information for deploy website form HTTP Apache Server in docker.



```
GNU nano 6.2                               Dockerfile
FROM httpd:2.4
COPY . /usr/local/apache2/htdocs/
```

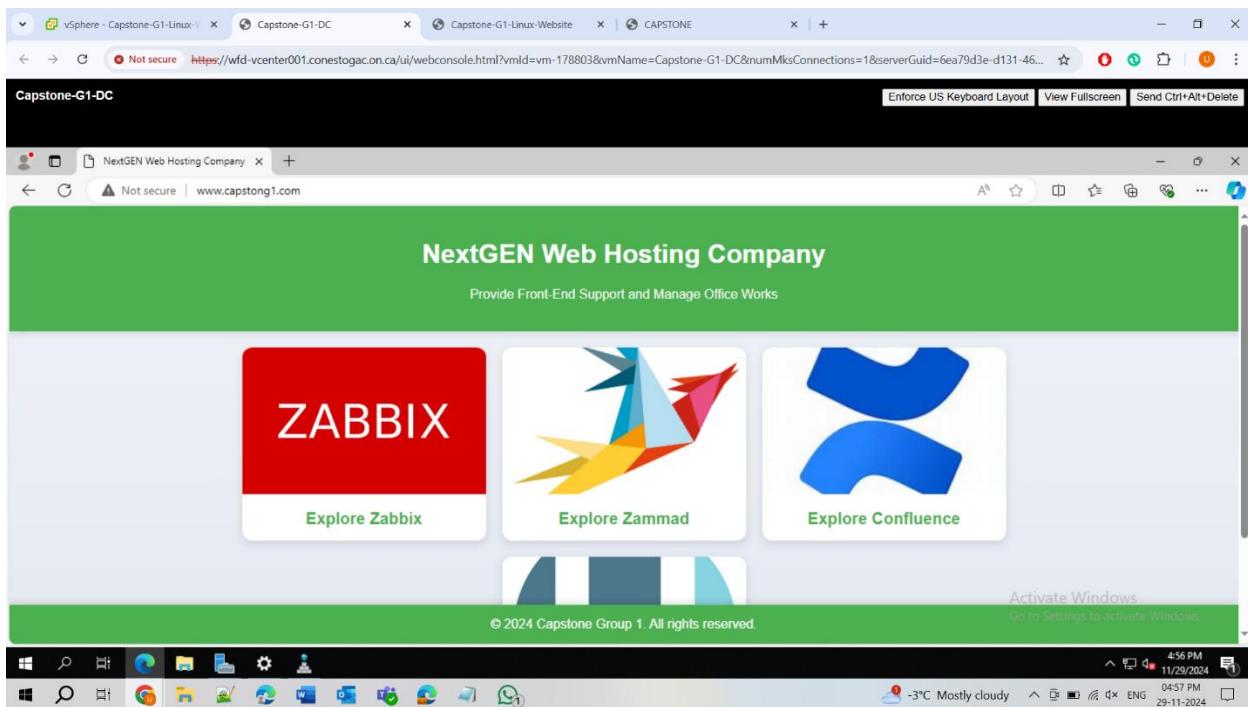
- Images directory with all images used in website.



A screenshot of a terminal window titled "Capstone-G1-Linux-Website". The window shows a command-line interface with the following output:

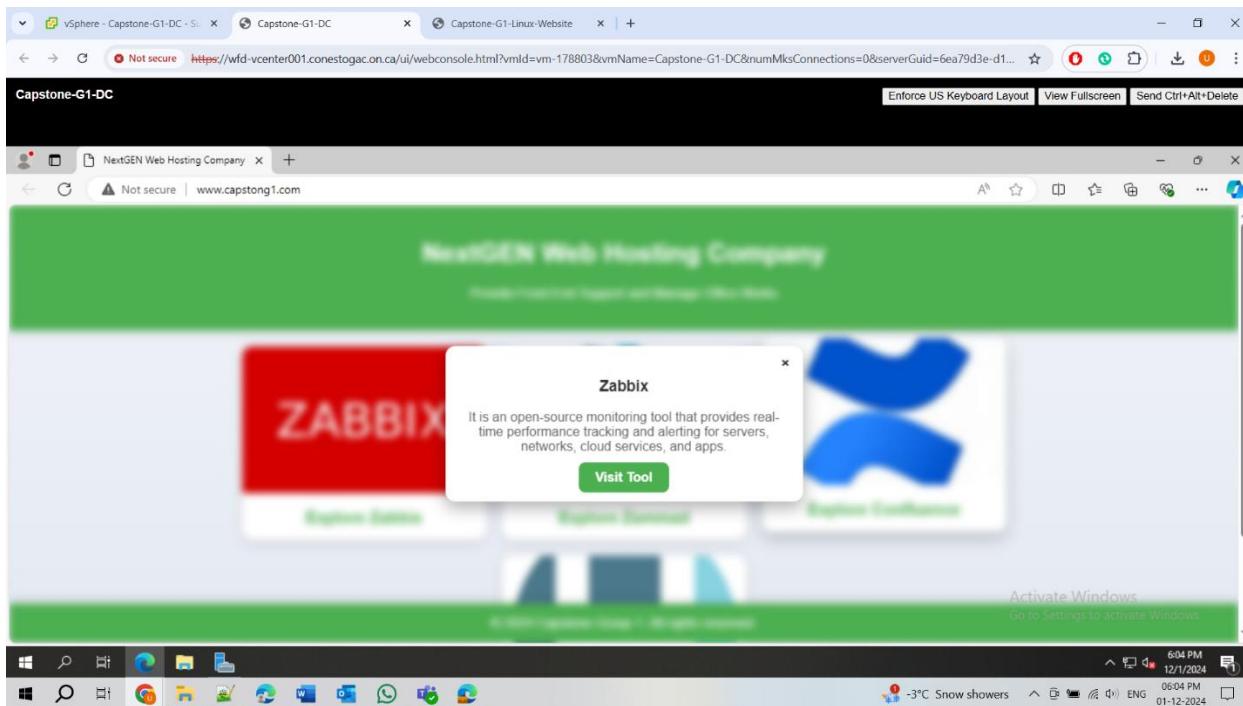
```
capstone@gl-website:~/website/images$ ls
conf.jpg  ndm.jpg  zabbix.jpg  zammad.jpg
capstone@gl-website:~/website/Images$ _
```

- After build docker, hit this URL: <http://www.capstong1.com> (www is HOST A record for 172.24.77.14in DNS), we got our company website.

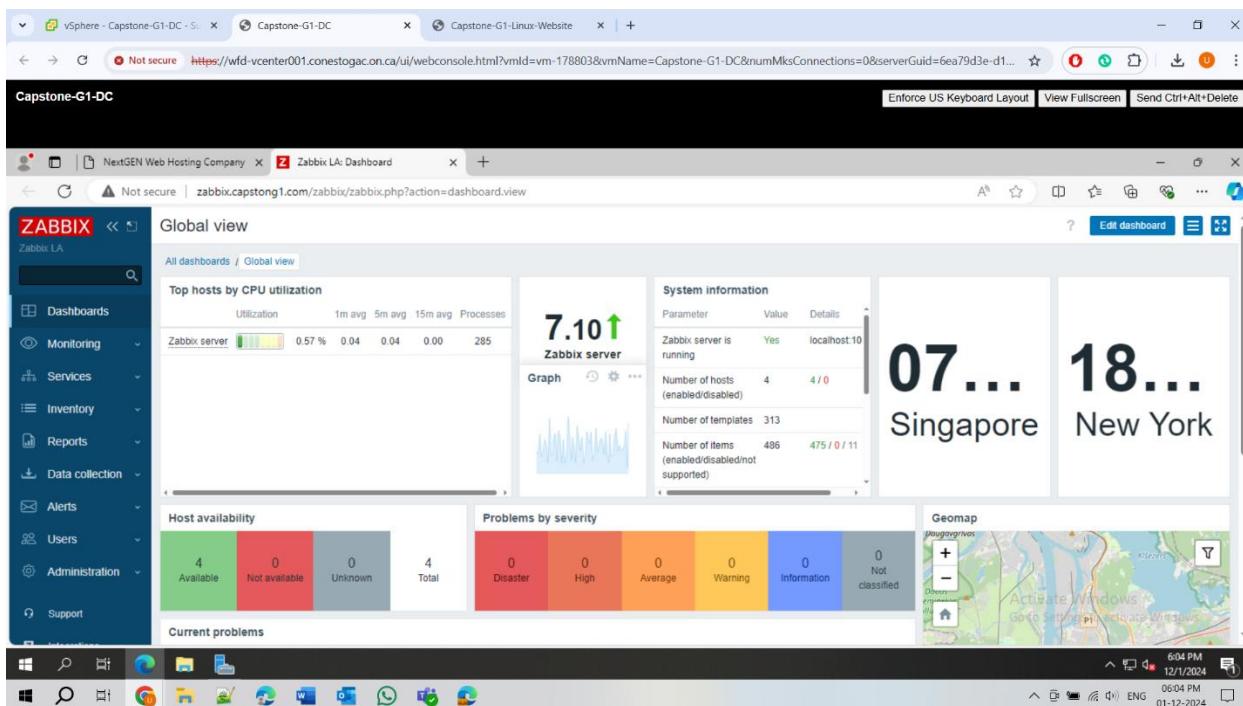


This is how website works.

- If user click on any of image, for example, here I clicked on Zabbix, one popup would displayed with some information about tool and “Visit Tool” button.



- If I clicked on “Visit Tool” button, it will redirect me to the login page of the tool, which running on the separate server, and I can access tool after log in into tool.

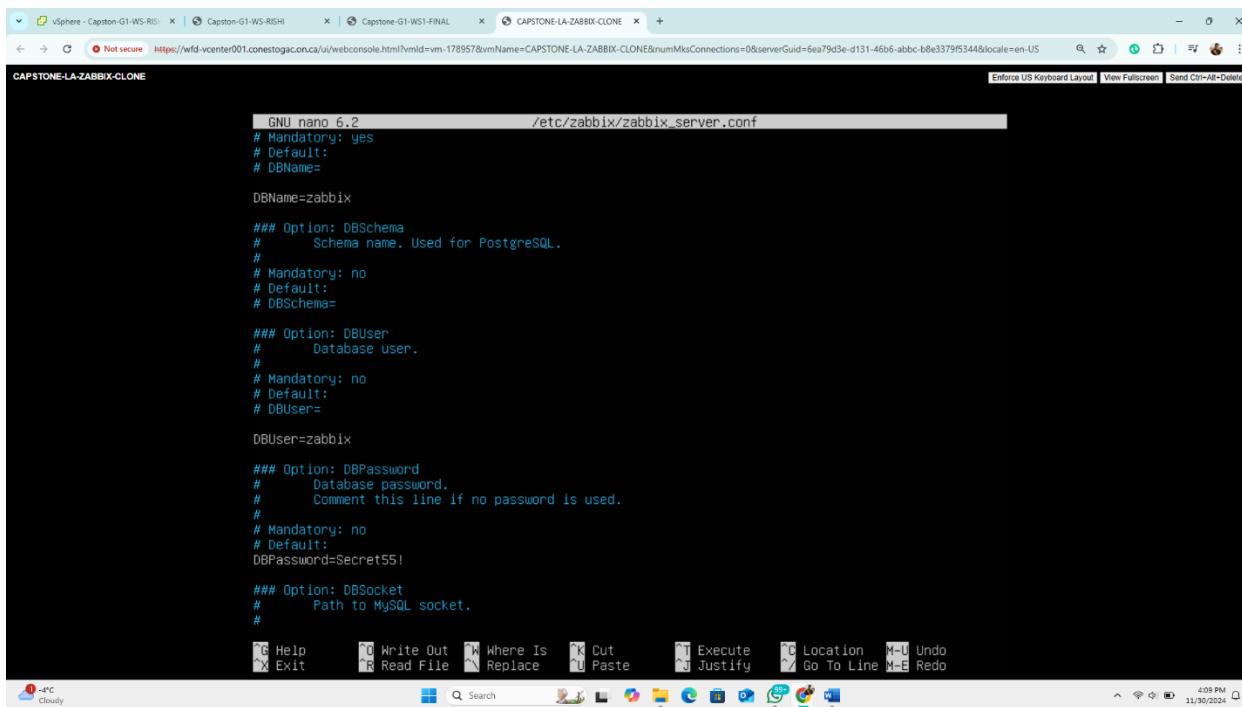


## Zabbix monitoring Tool

Zabbix is an open-source enterprise-level monitoring tool that measures and tracks the performance and availability of IT infrastructure, services, applications, and other resources. It offers a single platform for gathering, evaluating and altering system metrics.

### Zabbix installation and configuration

- We have installed and configured Zabbix 6.4, and the implementation steps are following,
- We have to start with the Apache server and dependencies installation. And then we need to install the Zabbix zip file and extract in Zabbix directory.
- Configure the Zabbix.conf file by requirement.
- Create Zabbix database in MySQL and allow certain permissions.
- Enable the Zabbix Agent service and then restart Apache.



```
GNU nano 6.2          /etc/zabbix/zabbix_server.conf

# Mandatory: yes
# Default:
# DBName:

DBName=zabbix

### Option: DBSchema
# Schema name. Used for PostgreSQL.
#
# Mandatory: no
# Default:
# DBSchema=

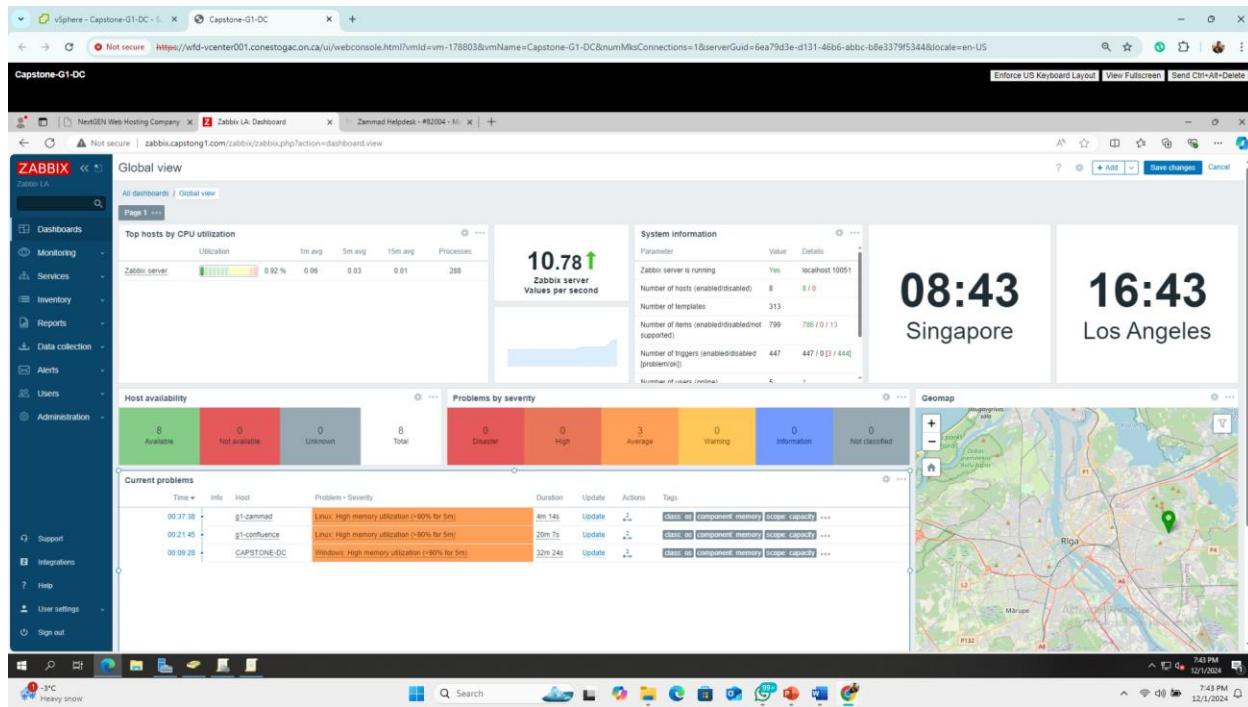
### Option: DBUser
# Database user.
#
# Mandatory: no
# Default:
# DBUser=

DBUser=zabbix

### Option: DBPassword
# Database password.
# Comment this line if no password is used.
#
# Mandatory: no
# Default:
# DBPassword=Secret55!

### Option: DBSocket
# Path to MySQL socket.
#
```

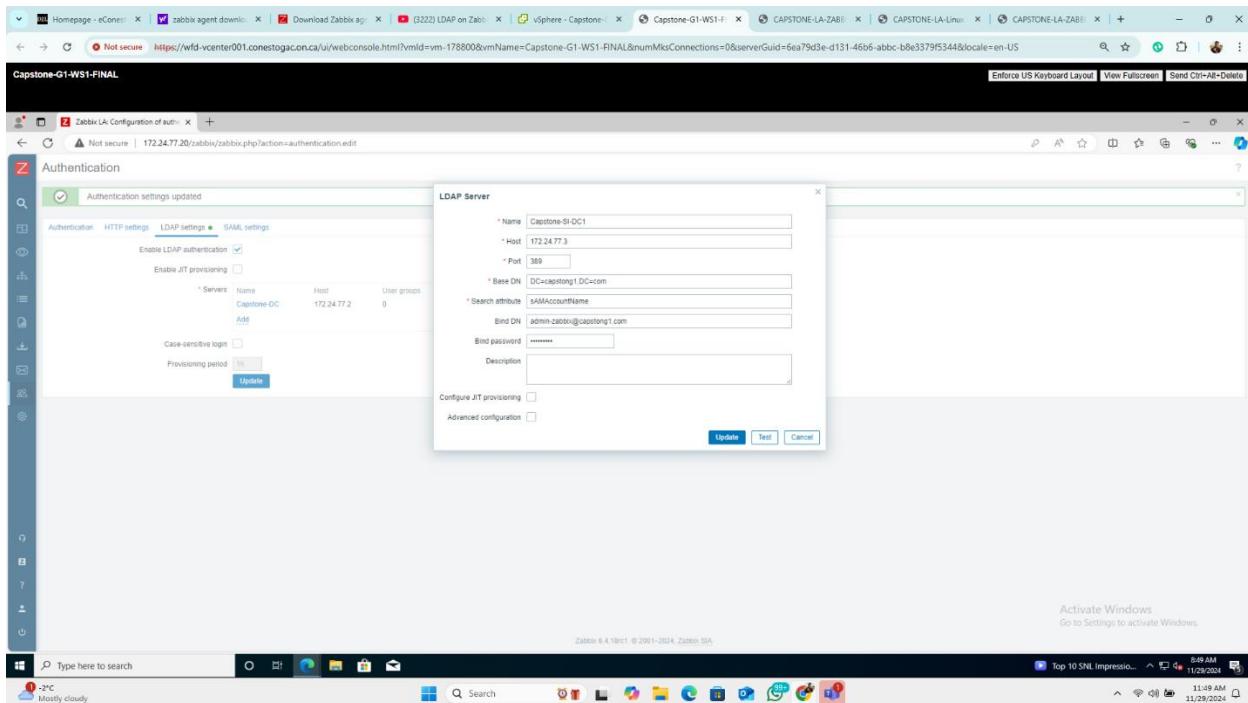
- Here, we can see the Zabbix configuration file.



- This is the Zabbix customizable dashboard, here We have set the this appropriates the project requirement such as Clocks, host and system information.
- By installing and configuring Zabbix agent in all machines (Windows and Linux) we can monitor them centrally.
- We can monitor various things like CPU utilization, memory utilization, Disk utilization, all the services and application running in the host.

## LDAP Configuration for Zabbix Server

- LDAP configuration is required to authenticate and give roll base access to the Active directory users.
- Some users have basic access like monitoring host and graphs and Admins and Super admins has assigned an administrative access of the Zabbix.



- Here, we added three LDAP configurations as we have 3 Domain controllers because Zabbix 6.4 supports multiple LDAP. This will help to increase High Availability.

The screenshot shows the Zabbix 6.4 web interface under the 'Authentication' tab. The 'LDAP settings' tab is selected. Three LDAP servers are listed:

| Servers         | Name        | Host | User groups                      | Default                          | Action |
|-----------------|-------------|------|----------------------------------|----------------------------------|--------|
| Capstone-G1-DC  | 172.24.77.2 | 0    | <input checked="" type="radio"/> | <input type="radio"/>            | Remove |
| Capstone-LA-DC1 | 172.24.77.4 | 0    | <input type="radio"/>            | <input checked="" type="radio"/> | Remove |
| Capstone-SI-DC1 | 172.24.77.3 | 0    | <input type="radio"/>            | <input checked="" type="radio"/> | Remove |

Below the table, there are fields for 'Case-sensitive login' and 'Provisioning period' (set to 10), with an 'Update' button. The left sidebar shows navigation links like Dashboards, Monitoring, Services, Inventory, Reports, Data Collection, Alerts, Users, User Groups, User Roles, API Tokens, and Authentication.

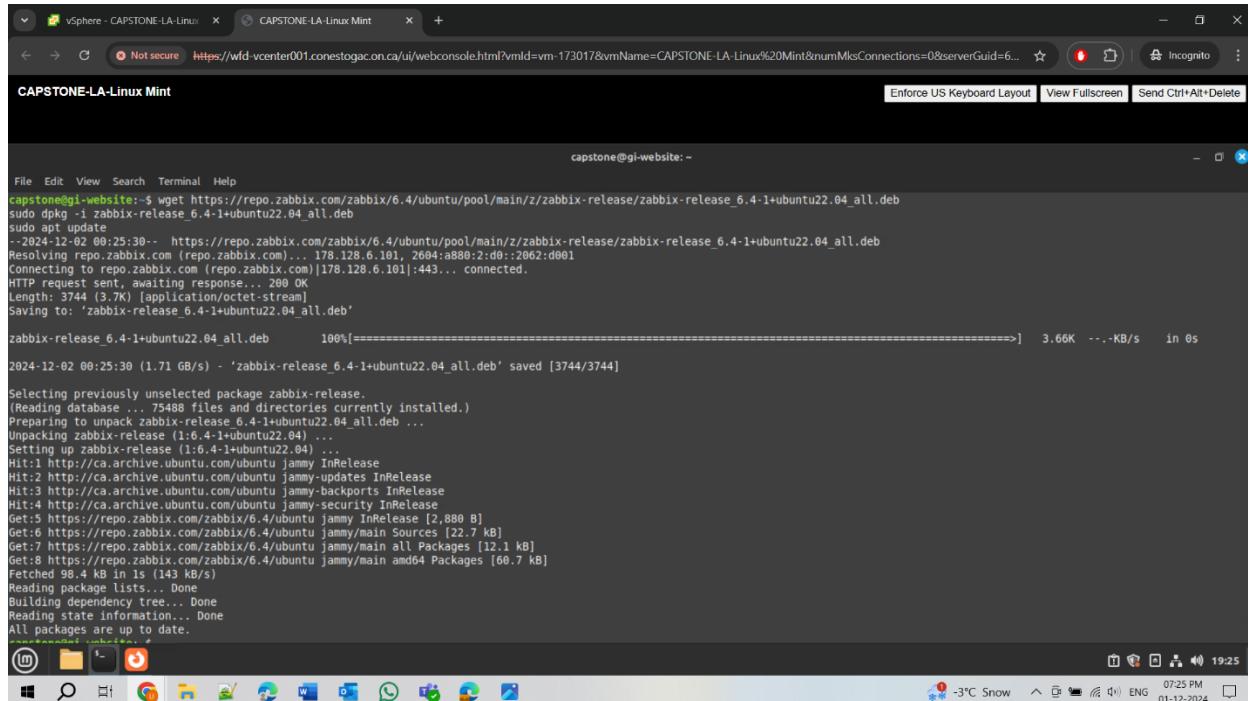
- Now, we have to install Zabbix 6.4 agent in all VMs (Windows + Linux). We can download it from Zabbix official page. While configuring we need the host name of server and IP address of Linux machine which hosting Zabbix services.

The screenshot shows the Zabbix Agent 6.4-bit v7.0.6 Setup window. The 'Zabbix Agent service configuration' step is displayed, prompting for information to configure the Zabbix Agent. The fields are as follows:

- Host name: CAPSTONE-DC
- Zabbix server IP/DNS: 172.24.77.11
- Agent listen port: 10050
- Server or Proxy for active checks: 172.24.77.11
- Enable PSK (checkbox)
- Add agent location to the PATH (checkbox)

The background shows a browser window displaying the Zabbix download page for the Windows agent, and a taskbar at the bottom with various icons.

- This is a screenshot of Main Domain Controller (172.24.77.2), we are installing the Zabbix agent and do need to same for all servers.
- We can install and configure Zabbix agent in Linux machines as following way,



```
File Edit View Search Terminal Help
capstone@gi-website:~$ wget https://repo.zabbix.com/zabbix/6.4/ubuntu/pool/main/z/zabbix-release/zabbix-release_6.4-1+ubuntu22.04_all.deb
sudo dpkg -i zabbix-release_6.4-1+ubuntu22.04_all.deb
sudo apt update
--2024-12-02 00:25:30-- https://repo.zabbix.com/zabbix/6.4/ubuntu/pool/main/z/zabbix-release/zabbix-release_6.4-1+ubuntu22.04_all.deb
Resolving repo.zabbix.com (repo.zabbix.com)... 178.128.6.101, 2604:a880:2:d0::2062:d001
Connecting to repo.zabbix.com (repo.zabbix.com)|178.128.6.101|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 3744 (3.7K) [application/octet-stream]
Saving to: 'zabbix-release_6.4-1+ubuntu22.04_all.deb'

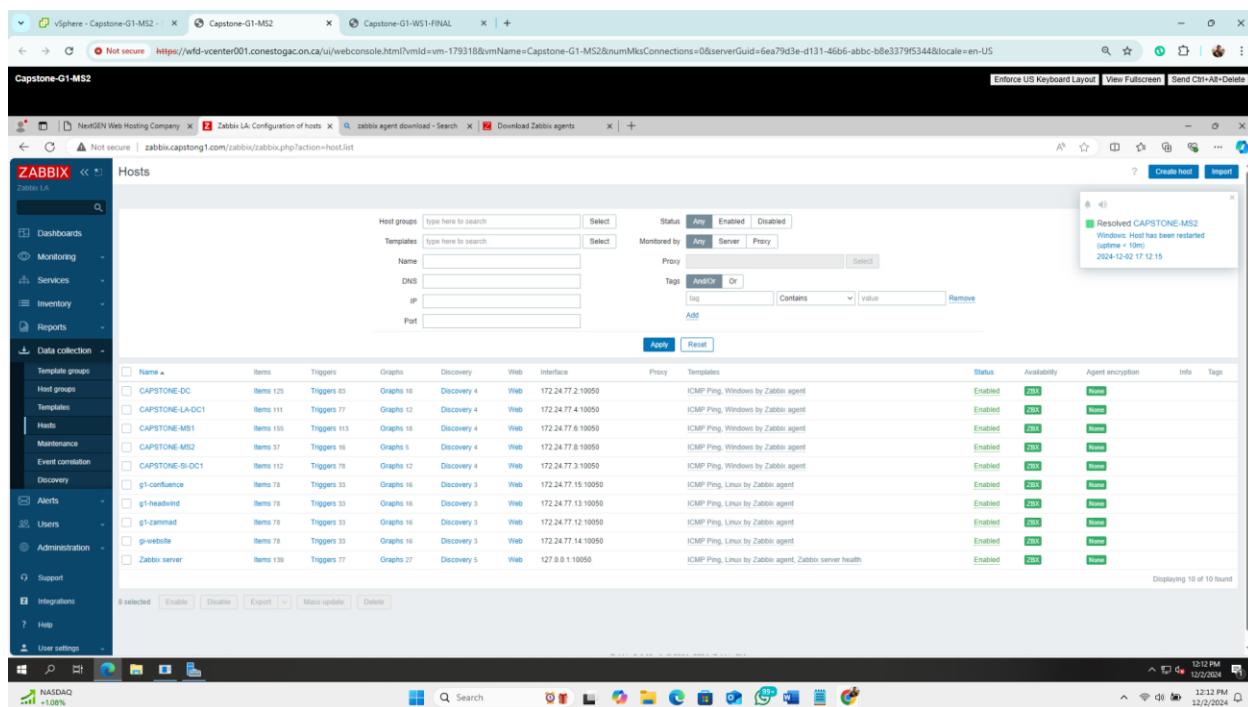
zabbix-release_6.4-1+ubuntu22.04_all.deb      100%[=====] 3.66K --.-KB/s   in 0s

2024-12-02 00:25:30 (1.71 GB/s) - 'zabbix-release_6.4-1+ubuntu22.04_all.deb' saved [3744/3744]

Selecting previously unselected package zabbix-release.
(Reading database ... 75488 files and directories currently installed.)
Preparing to unpack zabbix-release_6.4-1+ubuntu22.04_all.deb ...
Unpacking zabbix-release (1:6.4-1+ubuntu22.04) ...
Setting up zabbix-release (1:6.4-1+ubuntu22.04) ...
Hit:1 http://ca.archive.ubuntu.com/ubuntu jammy InRelease
Hit:2 http://ca.archive.ubuntu.com/ubuntu jammy-updates InRelease
Hit:3 http://ca.archive.ubuntu.com/ubuntu jammy-backports InRelease
Hit:4 http://ca.archive.ubuntu.com/ubuntu jammy-security InRelease
Get:5 https://repo.zabbix.com/zabbix/6.4/ubuntu jammy InRelease [2,888 B]
Get:6 https://repo.zabbix.com/zabbix/6.4/ubuntu jammy/main Sources [22.7 kB]
Get:7 https://repo.zabbix.com/zabbix/6.4/ubuntu jammy/main Packages [12.1 kB]
Get:8 https://repo.zabbix.com/zabbix/6.4/ubuntu jammy/main amd64 Packages [60.7 kB]
Fetched 98.4 kB in 1s (143 kB/s)
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
All packages are up to date.

capstone@gi-website:~$
```

The terminal window shows the command to download the Zabbix agent package from the official repository, its verification, and its successful installation. The system is identified as 'jammy' (Ubuntu 22.04). The desktop environment includes icons for file explorer, terminal, and various applications.



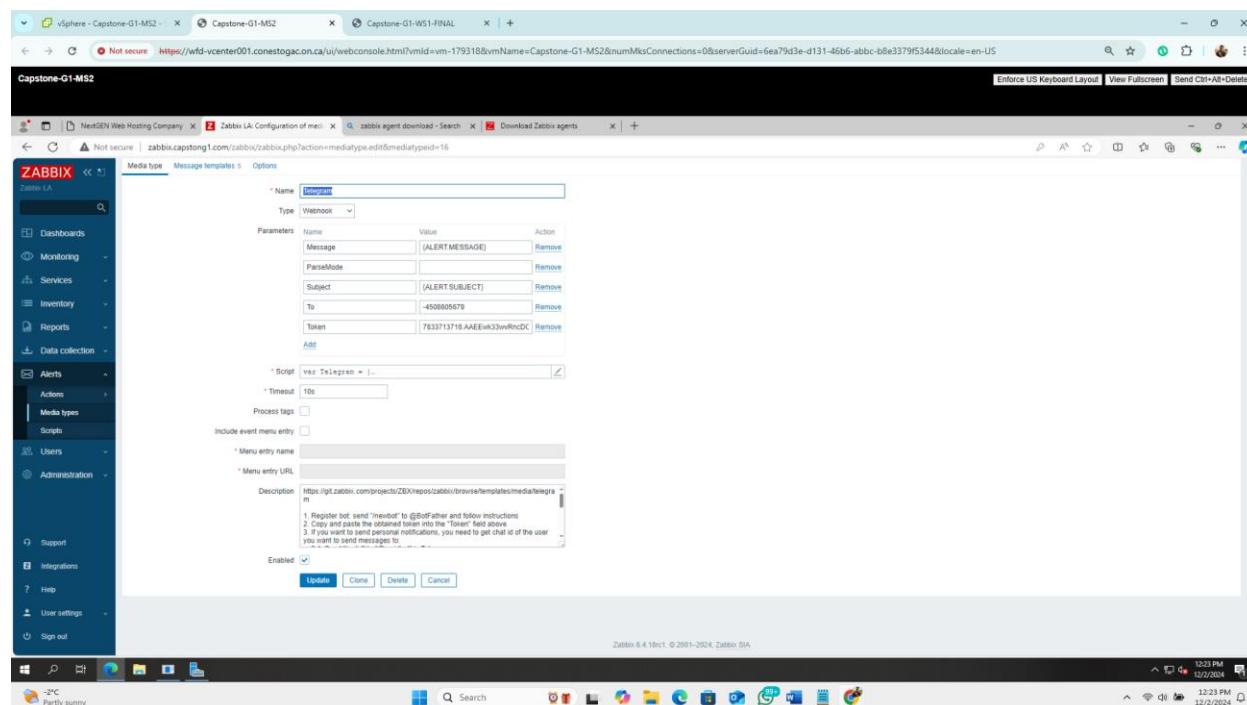
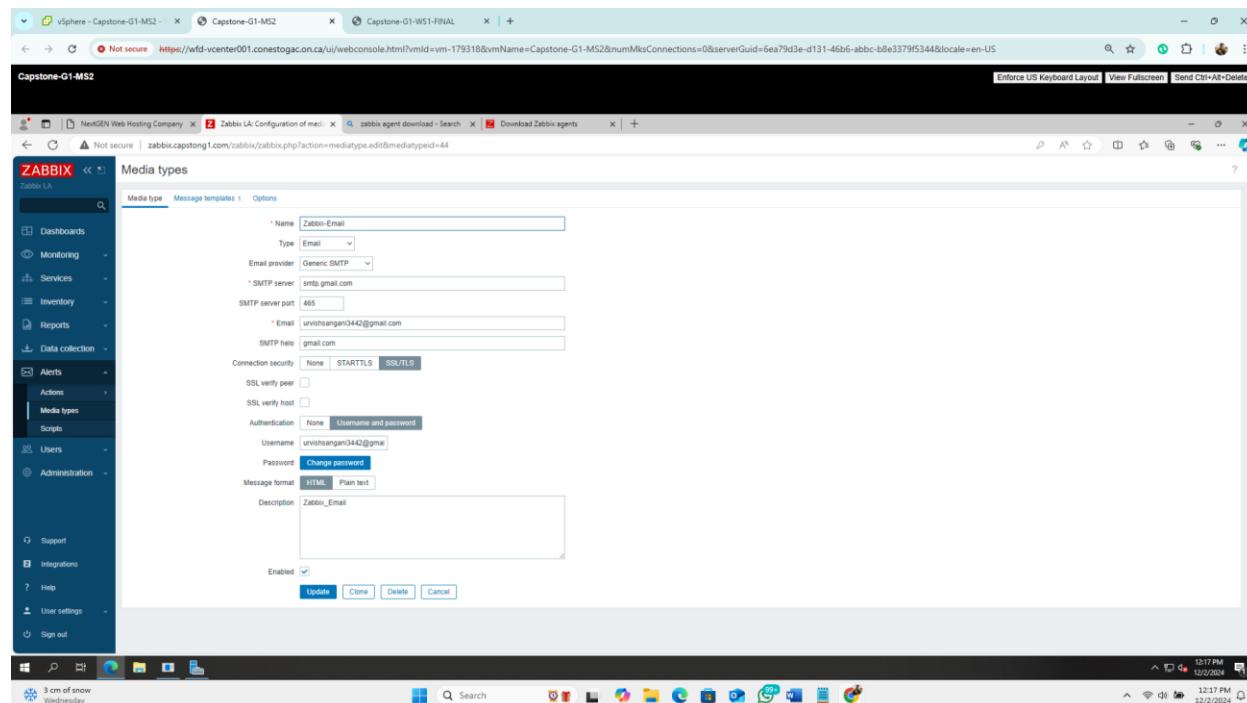
The screenshot shows the Zabbix web interface for managing hosts. On the left, there's a navigation sidebar with links like 'Hosts', 'Discoveries', 'Alerts', 'Users', 'Administration', and 'Support'. The main area displays a table of hosts:

| Name            | Items     | Triggers     | Graphs    | Discovery   | Web | Interface          | Proxy | Templates  | Status  | Availability | Agent encryption | Info | Tags |
|-----------------|-----------|--------------|-----------|-------------|-----|--------------------|-------|--|---------|--------------|------------------|------|------|
| CAPSTONE-DC     | Items 125 | Triggers 03  | Graphs 18 | Discovery 4 | Web | 172.24.77.2:10050  |       | ICMP Ping, Windows by Zabbix agent                     | Enabled | 200%         | None             |      |      |
| CAPSTONE-LA-DC1 | Items 111 | Triggers 77  | Graphs 12 | Discovery 4 | Web | 172.24.77.4:10050  |       | ICMP Ping, Windows by Zabbix agent                     | Enabled | 200%         | None             |      |      |
| CAPSTONE-MS1    | Items 115 | Triggers 113 | Graphs 18 | Discovery 4 | Web | 172.24.77.6:10050  |       | ICMP Ping, Windows by Zabbix agent                     | Enabled | 200%         | None             |      |      |
| CAPSTONE-MS2    | Items 37  | Triggers 16  | Graphs 5  | Discovery 4 | Web | 172.24.77.8:10050  |       | ICMP Ping, Windows by Zabbix agent                     | Enabled | 200%         | None             |      |      |
| CAPSTONE-SI-DC1 | Items 112 | Triggers 78  | Graphs 12 | Discovery 4 | Web | 172.24.77.3:10050  |       | ICMP Ping, Windows by Zabbix agent                     | Enabled | 200%         | None             |      |      |
| g1-confluence   | Items 78  | Triggers 33  | Graphs 16 | Discovery 3 | Web | 172.24.77.15:10050 |       | ICMP Ping, Linux by Zabbix agent                       | Enabled | 200%         | None             |      |      |
| g1-headwind     | Items 78  | Triggers 33  | Graphs 16 | Discovery 3 | Web | 172.24.77.13:10050 |       | ICMP Ping, Linux by Zabbix agent                       | Enabled | 200%         | None             |      |      |
| g1-hammad       | Items 78  | Triggers 33  | Graphs 16 | Discovery 3 | Web | 172.24.77.12:10050 |       | ICMP Ping, Linux by Zabbix agent                       | Enabled | 200%         | None             |      |      |
| g1-website      | Items 78  | Triggers 33  | Graphs 16 | Discovery 3 | Web | 172.24.77.14:10050 |       | ICMP Ping, Linux by Zabbix agent                       | Enabled | 200%         | None             |      |      |
| Zabbix server   | Items 139 | Triggers 77  | Graphs 27 | Discovery 5 | Web | 127.0.0.1:10050    |       | ICMP Ping, Linux by Zabbix agent, Zabbix server health | Enabled | 200%         | None             |      |      |

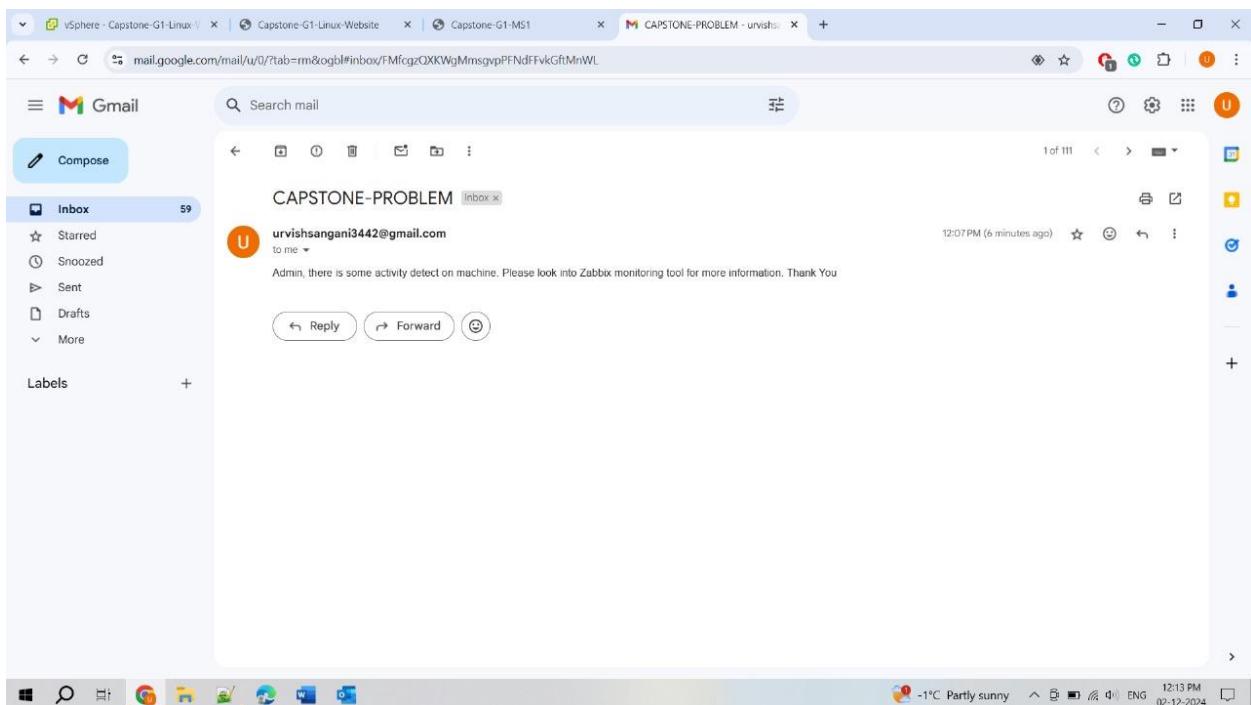
A message bubble in the top right corner indicates: 'Resolved CAPSTONE-MS2 Windows: Host has been restarted (within 10min) 2024-12-02 17:15'.

The taskbar at the bottom shows various application icons and the date/time: 12/2/2024, 12:12 PM.

- Now, we Can see all the VMs of domains are up and running.
- Now, let's configure the communication media Gmail (SMTP server) and Telegram as third-party applications so admin can get alerts when any activity happened in the network.

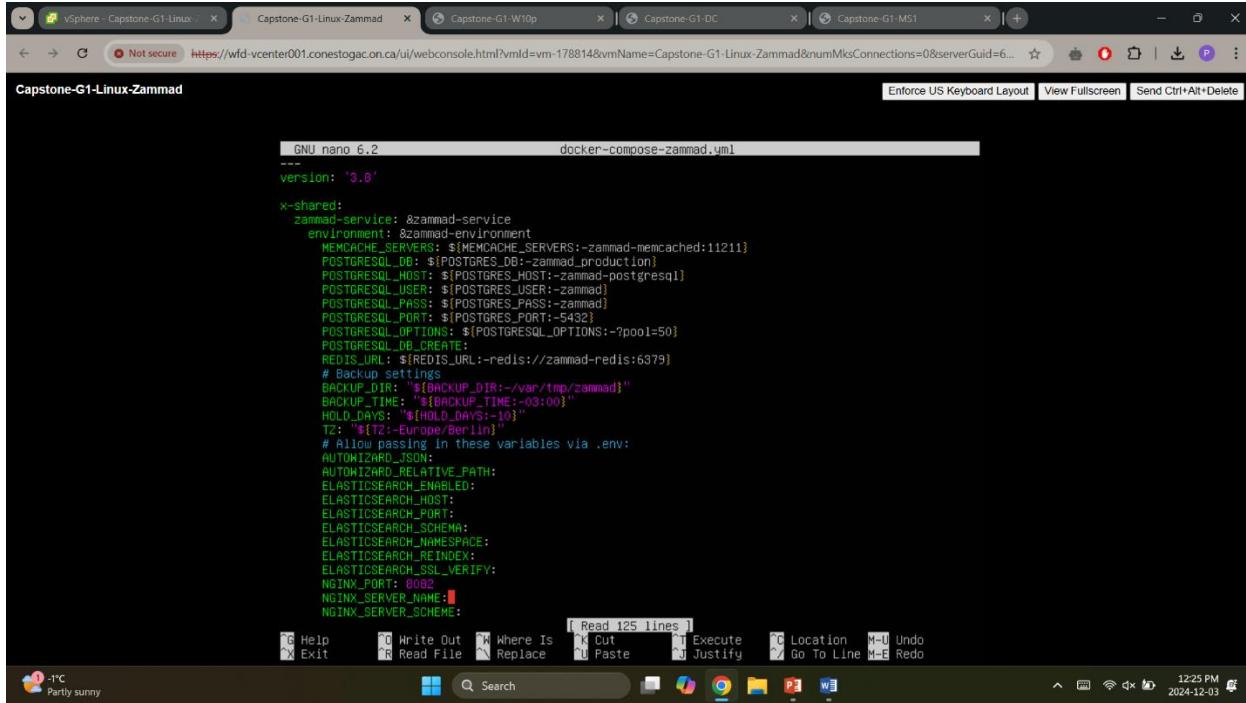


- Here, we got the mail for any changes happened in network.



## Zammad Ticketing Tool

- This is the configuration file of Docker file of Zammad(docker-compose-zammad.yml).



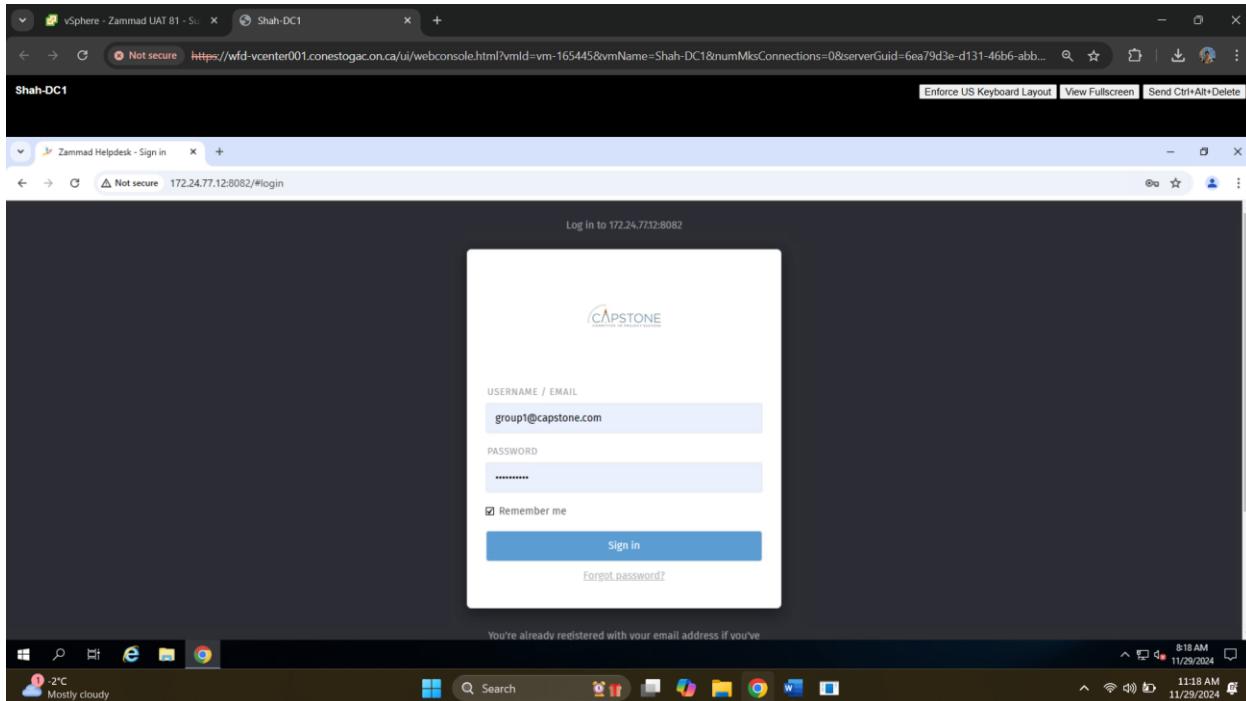
```

GNU nano 6.2                               docker-compose-zammad.yml
version: '3.8'

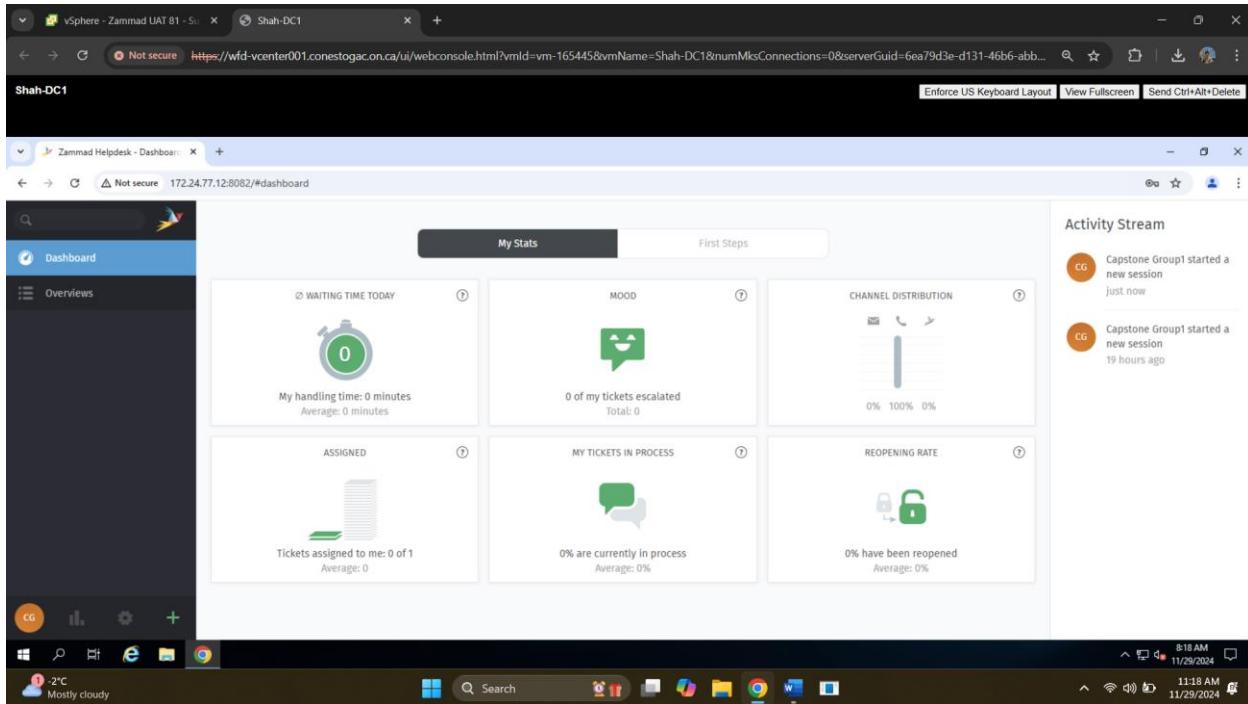
x-shared:
  zammad-service: & zammad-service
    environment: & zammad-environment
      MEMCACHE_SERVERS: ${MEMCACHE_SERVERS:-zammad-memcached:11211}
      POSTGRES_HOST: ${POSTGRES_HOST:-zammad_postgresql}
      POSTGRES_USER: ${POSTGRES_USER:-zammad}
      POSTGRES_PASS: ${POSTGRES_PASS:-zammad}
      POSTGRES_PORT: ${POSTGRES_PORT:-5432}
      POSTGRES_OPTIONS: ${POSTGRES_OPTIONS:-?pool=50}
      POSTGRES_CREATE_DB: ${POSTGRES_CREATE_DB:-true}
      REDIS_URL: ${REDIS_URL:-redis://zammad-redis:6379}
      # Backup settings
      BACKUP_DIR: ${BACKUP_DIR:-/var/tmp/zammad}
      BACKUP_TIME: ${BACKUP_TIME:-03:00}
      HOLD_DAYS: ${HOLD_DAYS:-10}
      TZ: ${TZ:-Europe/Berlin}
      # Allow passing in these variables via .env:
      AUTOMIZARD_JSON:
      AUTOMIZARD_RELATIVE_PATH:
      ELASTICSEARCH_ENABLED:
      ELASTICSEARCH_HOST:
      ELASTICSEARCH_PORT:
      ELASTICSEARCH_SCHEMA:
      ELASTICSEARCH_NAMESPACE:
      ELASTICSEARCH_INDEX:
      ELASTICSEARCH_SSL_VERIFY:
      NGINX_PORT: 8082
      NGINX_SERVER_NAME:
      NGINX_SERVER_SCHEME:

```

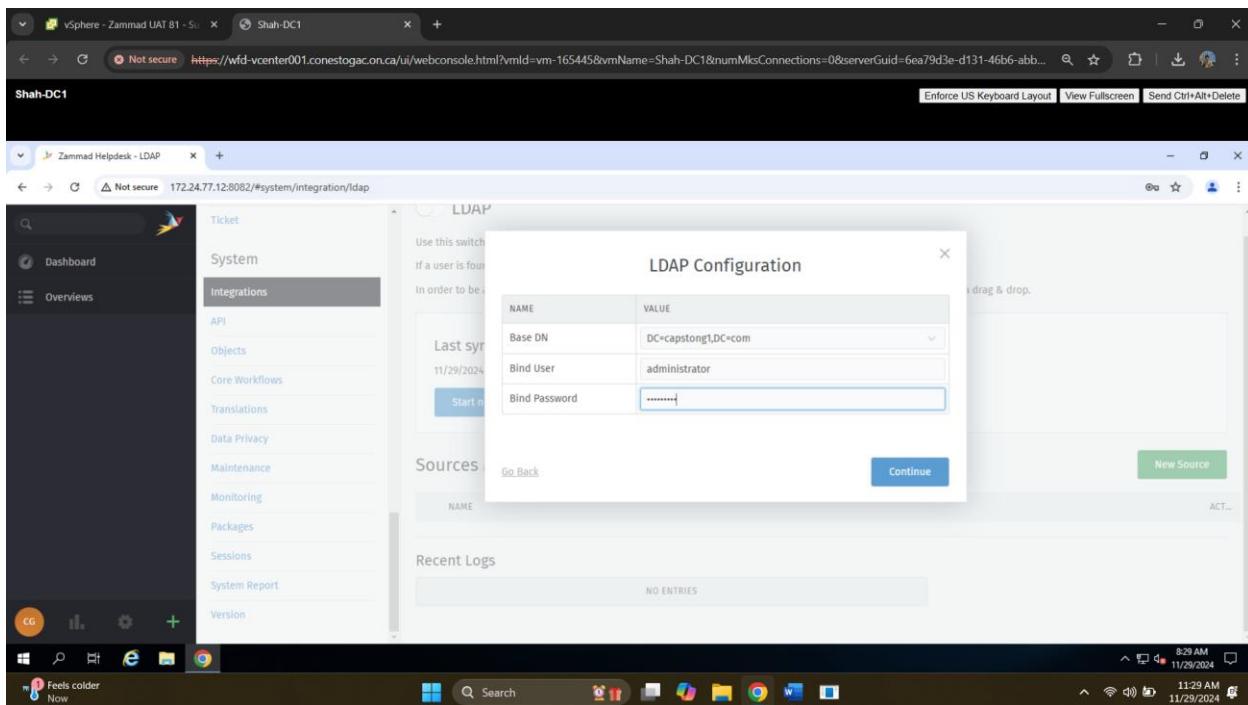
- Configured Zammad Tool using Docker and checking the accessibility through administrator i.e. [group1@capstone.com](mailto:group1@capstone.com)



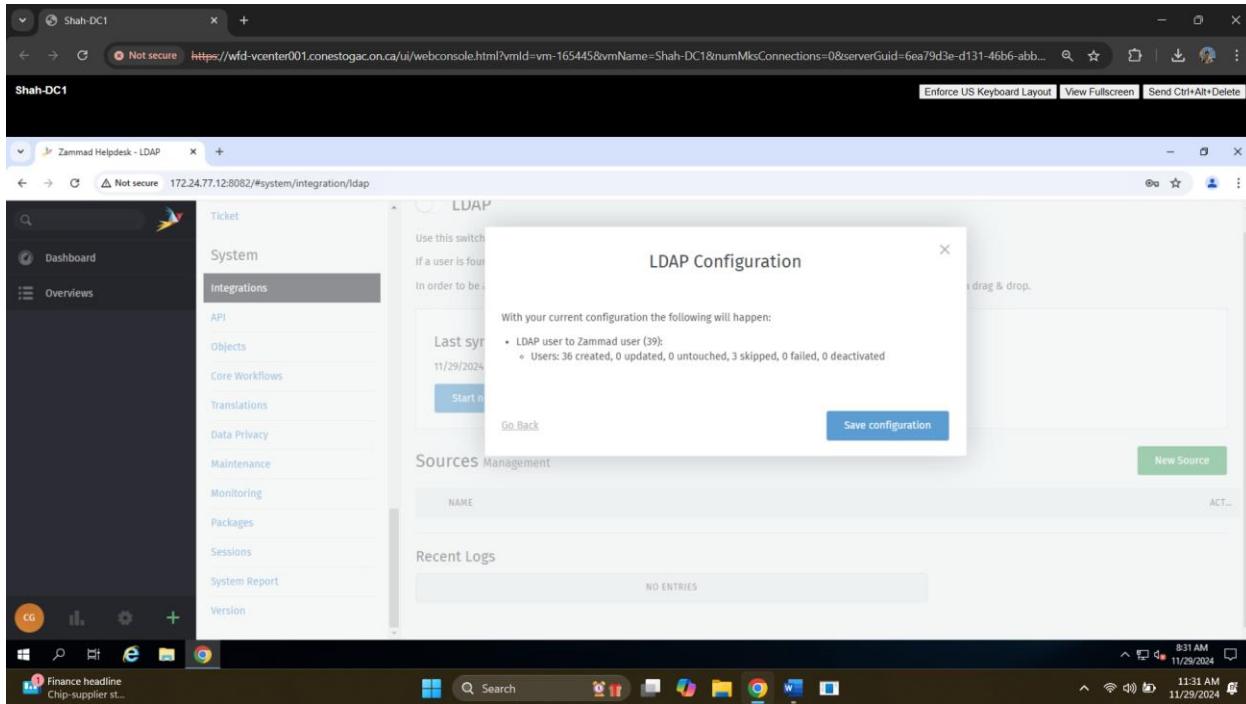
- The Dashboard of the tool shows the login done by Group1 user



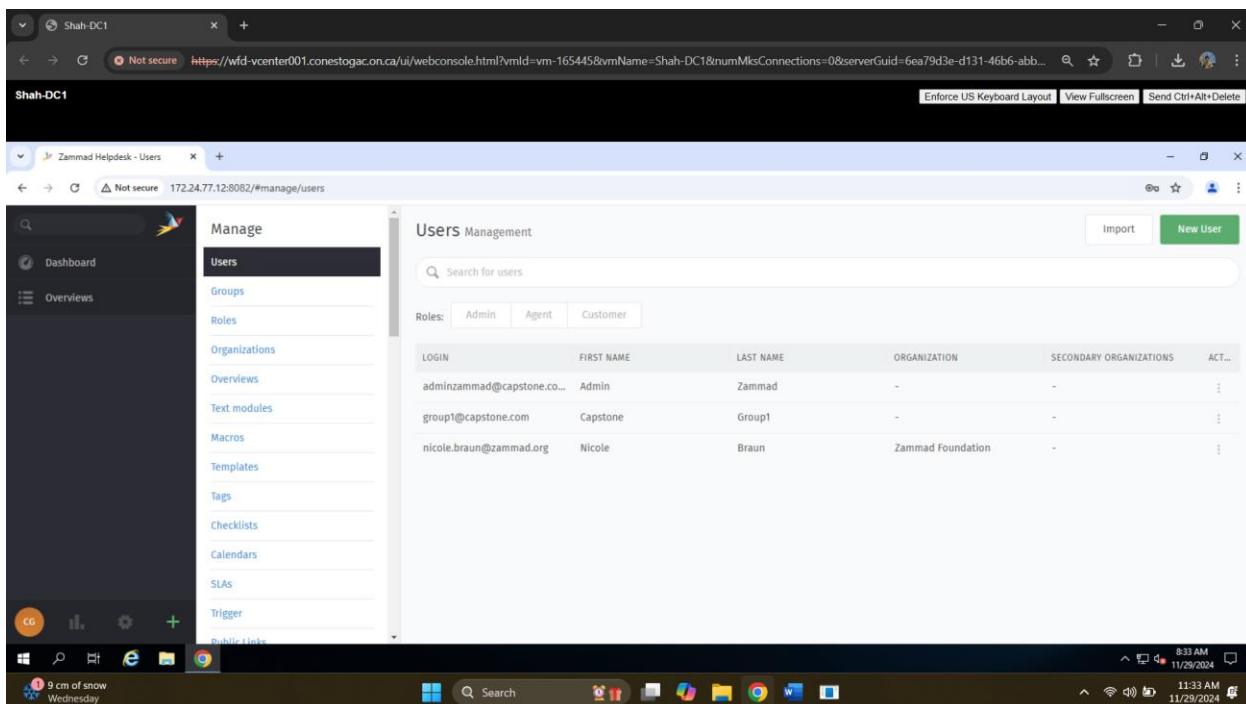
- Configuring LDAP on Zammad Tool with domain:capstong1.com by administrator credentials.



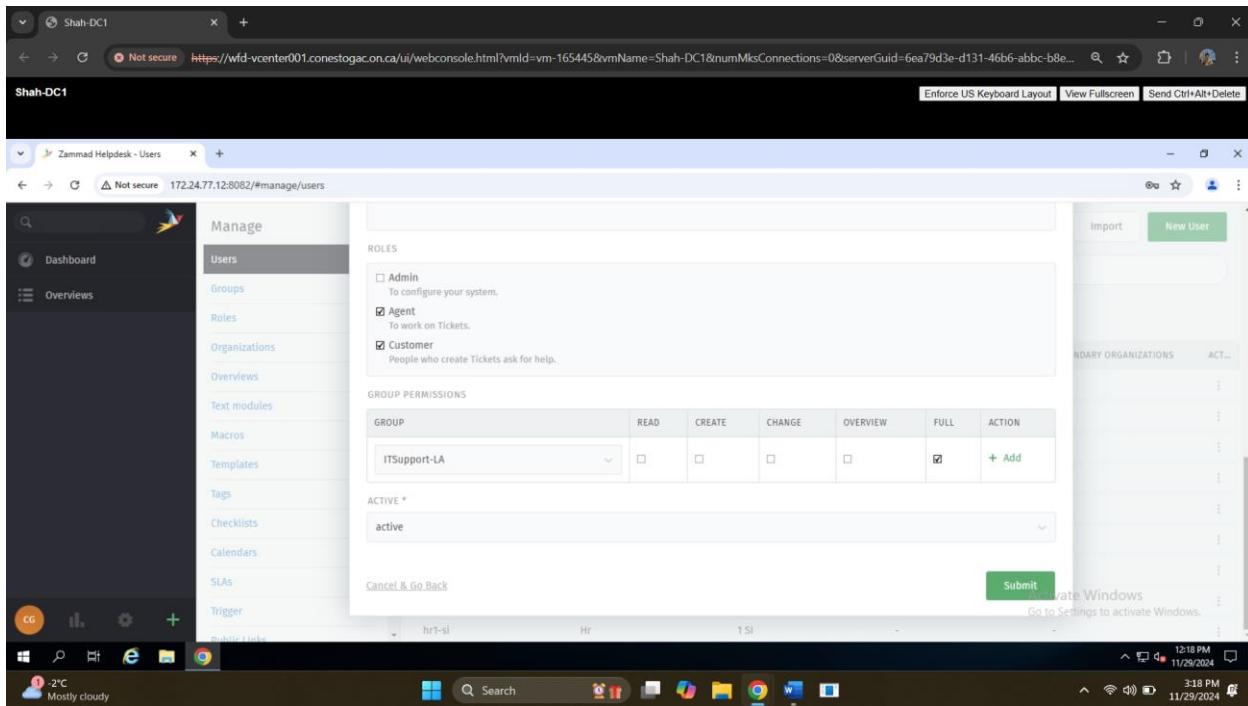
- LDAP is successfully configured and 36 users synced with Zammad Tool, further saving the configuration and sync.



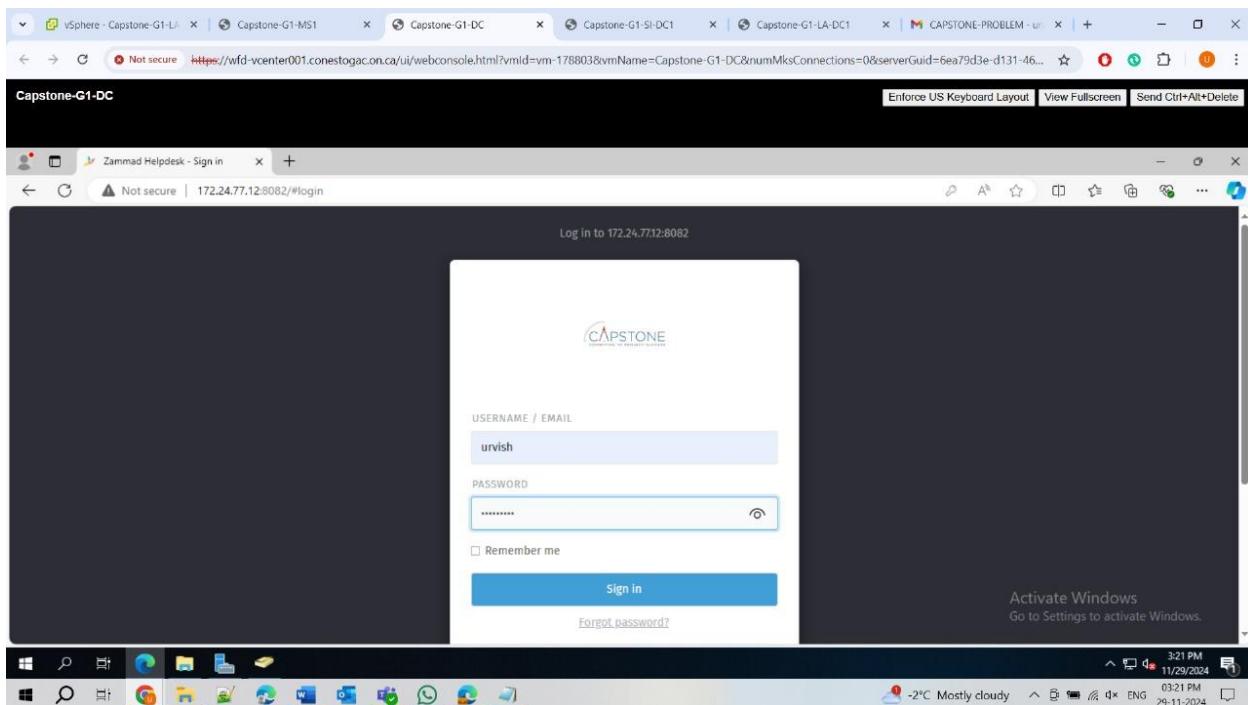
- Default and admin users created on the Zammad tool.



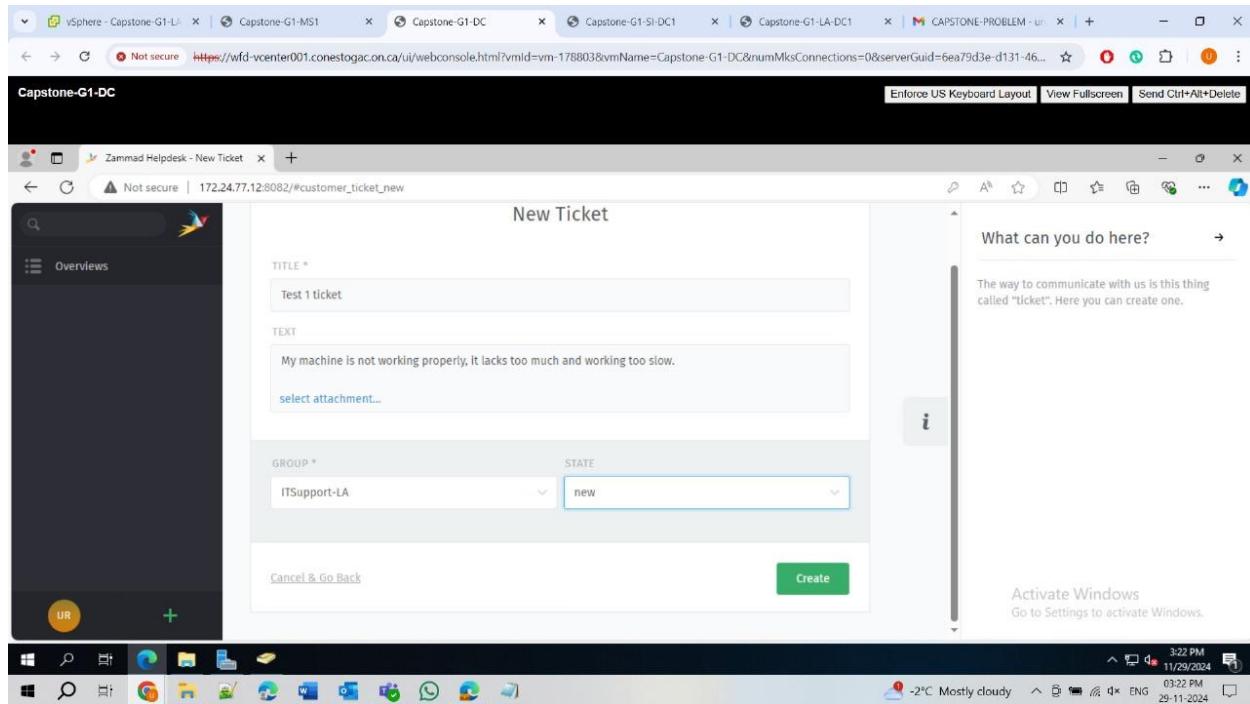
- Granting access of different roles to the User, such as admin given full access of particular group called ITSupport-LA.



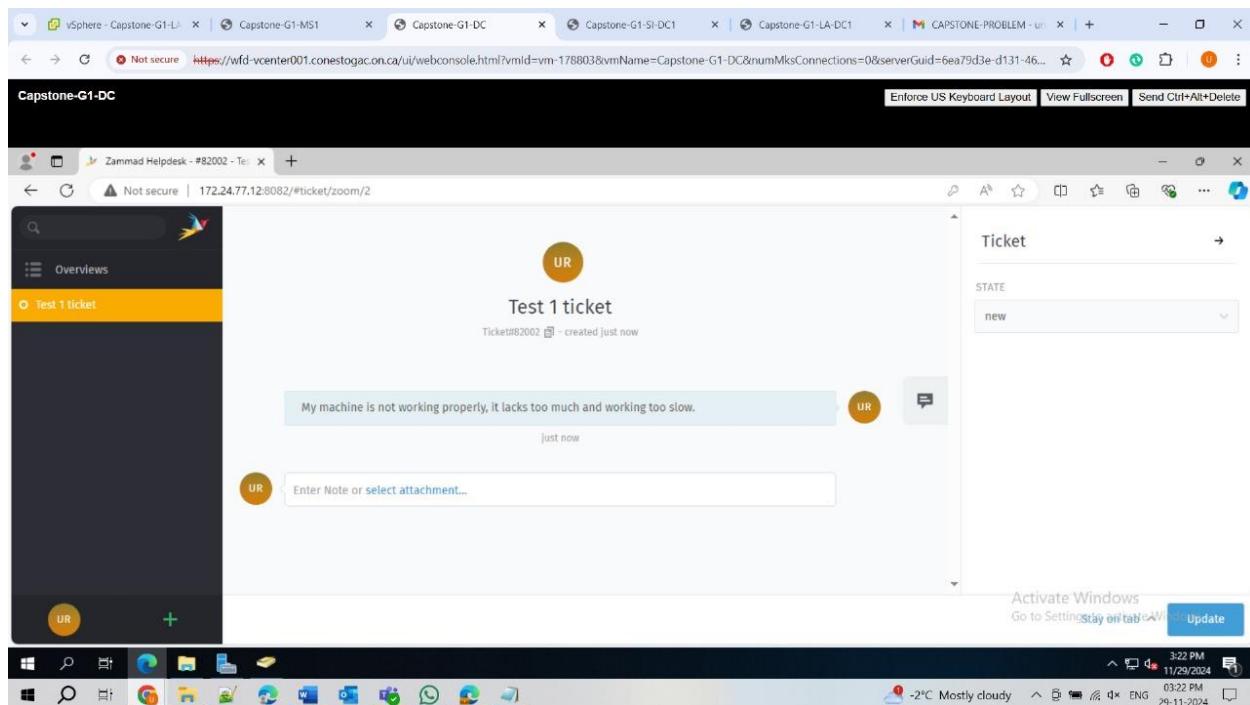
- Checking accessibility from other users of the organization synced by domain such as user name: urvish.



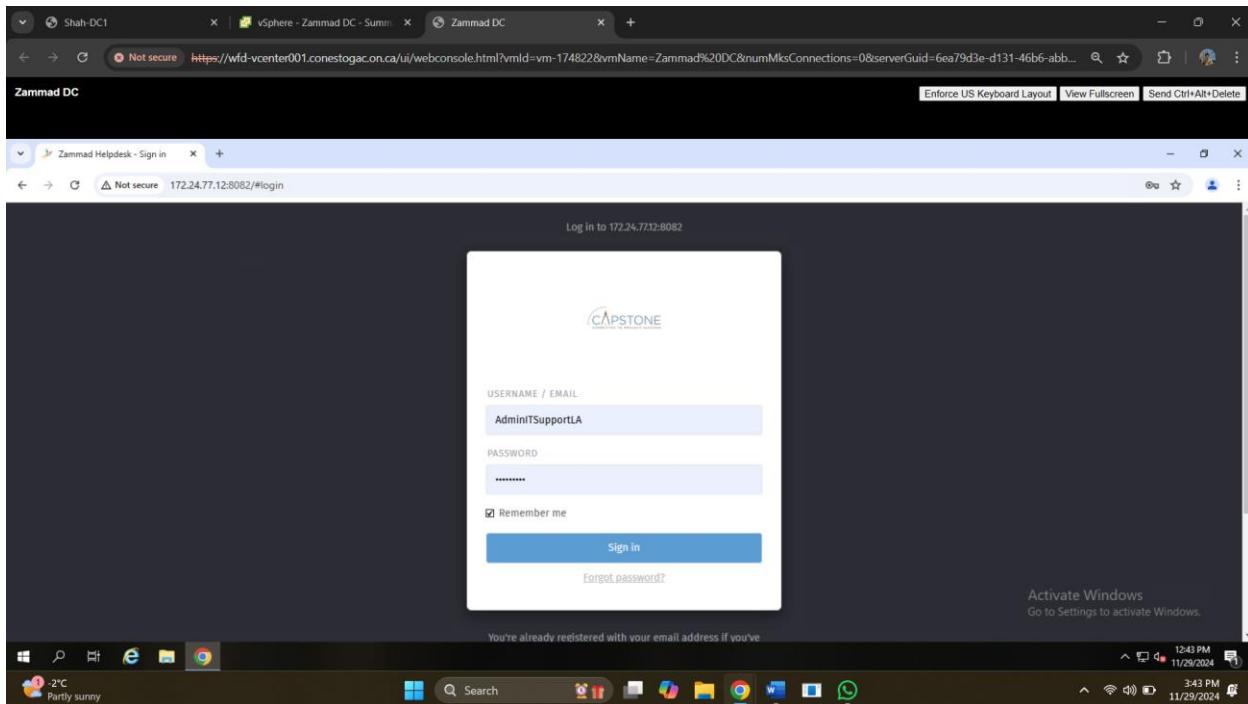
- Creating ticket with issue related to ITSupport-LA.



- Below image shows ticket generated by user uvisht as Test1 ticket is in new state.



- Now admin of ITSupportLA department is checking the tickets to work on.



- The ticket generated by users is reflected in the tool to Admin of ITSupportLA. Currently, it is in an unassigned & open state.

- Moving ticket from unassigned state to assigned state.

The screenshot shows the Zammad Helpdesk interface. The main title is 'My Assigned Tickets'. There is one ticket listed:

| TITLE         | CUSTOMER | GROUP        | CREATED AT     |
|---------------|----------|--------------|----------------|
| Test 1 ticket | Urvish   | ITSupport-LA | 23 minutes ago |

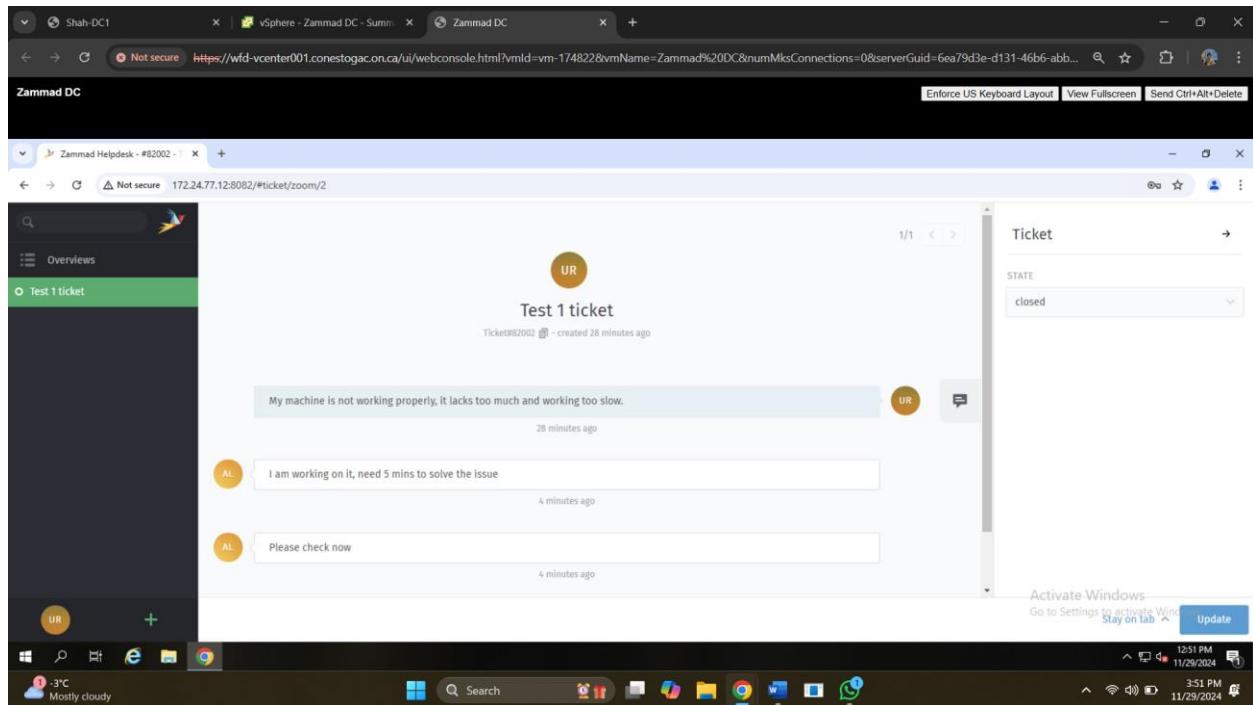
- Admin of ITSupportLA is working on ticket and updating status by providing the description.

The screenshot shows the Zammad Helpdesk interface with the ticket details for 'Test 1 ticket'. The ticket status is 'closed'. The ticket body contains the following messages:

- I am working on it, need 5 mins to solve the issue
- Please check now
- LAN cable was loose, issue resolved now, system is connected

The ticket is currently being updated with the message 'select attachment...'. The right sidebar shows the ticket's current state as closed.

- As user checks the working done on ticket and it is in closed state as working done by ITSupportLA user.S.



## Confluence Collaboration Tool

- Checking the confluence user and Database on PostgreSQL

```

root@el1-confluence:/home/capstone$ sudo su postgres
postgres@el1-confluence:/home/capstone$ psql
could not change directory to '/home/capstone': Permission denied
psql (14.13 (Ubuntu 14.15-ubuntu22.04.1))
Type "help;" for help.

postgres=# \du
Role name | List of roles
           | Attributes
-----+-----
confluenceuser | Create DB
postgres | Superuser, Create role, Create DB, Replication, Bypass RLS

postgres=# \l
          Name | Owner | Encoding | Collate | Ctype | Access privileges
-----+-----+-----+-----+-----+-----+
confluence | confluenceuser | UTF8 | en_US.UTF-8 | en_US.UTF-8 | =c/postgres
postgres | postgres | UTF8 | en_US.UTF-8 | en_US.UTF-8 | =c/postgres=Tc/postgres
template0 | postgres | UTF8 | en_US.UTF-8 | en_US.UTF-8 | =c/postgres
template1 | postgres | UTF8 | en_US.UTF-8 | en_US.UTF-8 | =c/postgres=cfc/postgres
(4 rows)

postgres=#

```

- Downloading the Atlassian Confluence installer from the official source and verify its integrity.

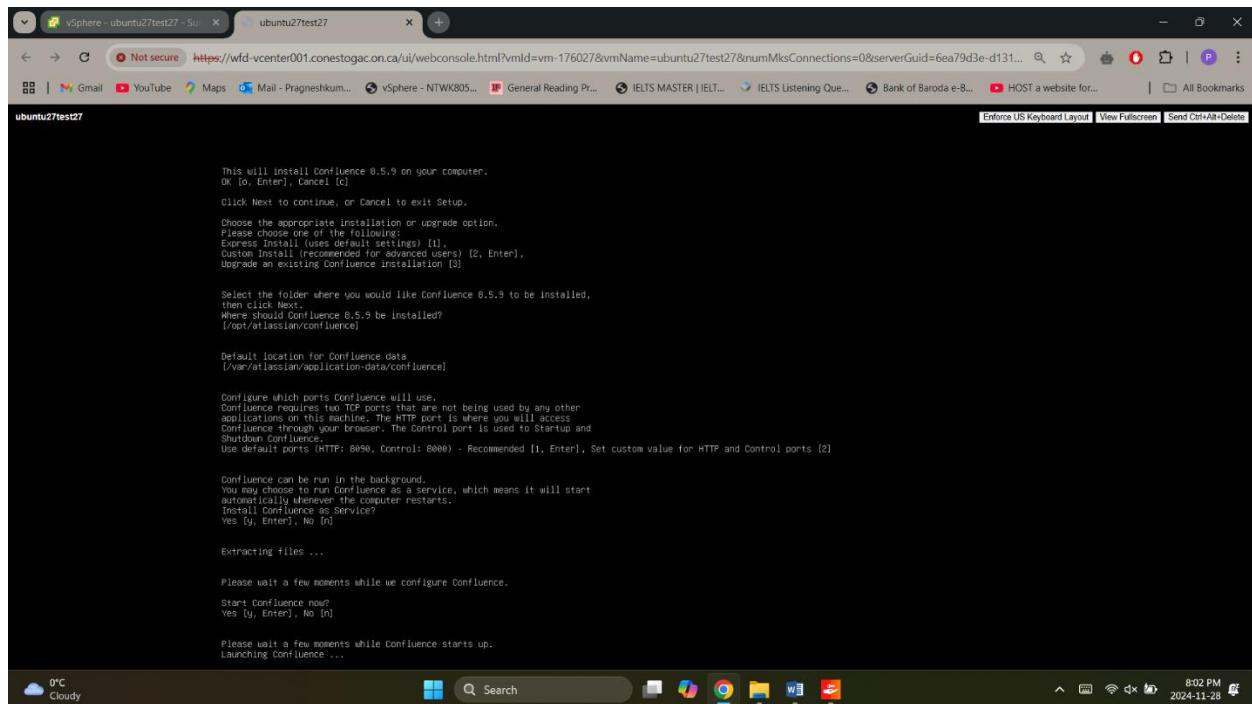
```

root@el1-confluence:/home/capstone$ wget https://www.atlassian.com/software/confluence/downloads/binaries/atlassian-confluence-8.5.9-x64.bin
--2024-11-29 00:57:19-- https://www.atlassian.com/software/confluence/downloads/binaries/atlassian-confluence-8.5.9-x64.bin
Resolving www.atlassian.com (www.atlassian.com)... 19.227.213.2, 19.227.213.10, 19.227.213.20, ...
Connecting to www.atlassian.com (www.atlassian.com)|19.227.213.2|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 525149365 (697M) [application/octet-stream]
Saving to: /tmp/atlassian-confluence-8.5.9-x64.bin

atlassian-confluence-8.5.9-x64.bin      0%[=====] 0 --.-KB/s

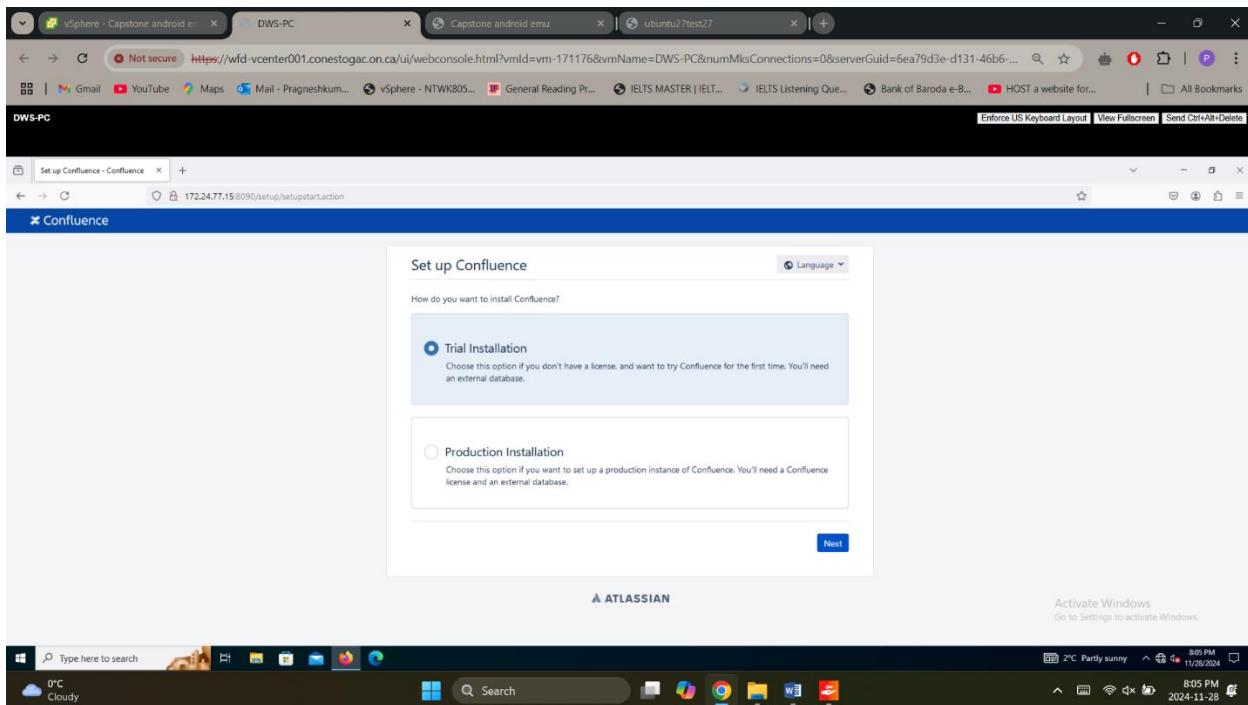
```

- The terminal will display the download progress. Ensure the download completes without any errors.
- Verify the file presence by ls -al command to confirm that the installer file downloaded.
- Execute the installer to start the installation process

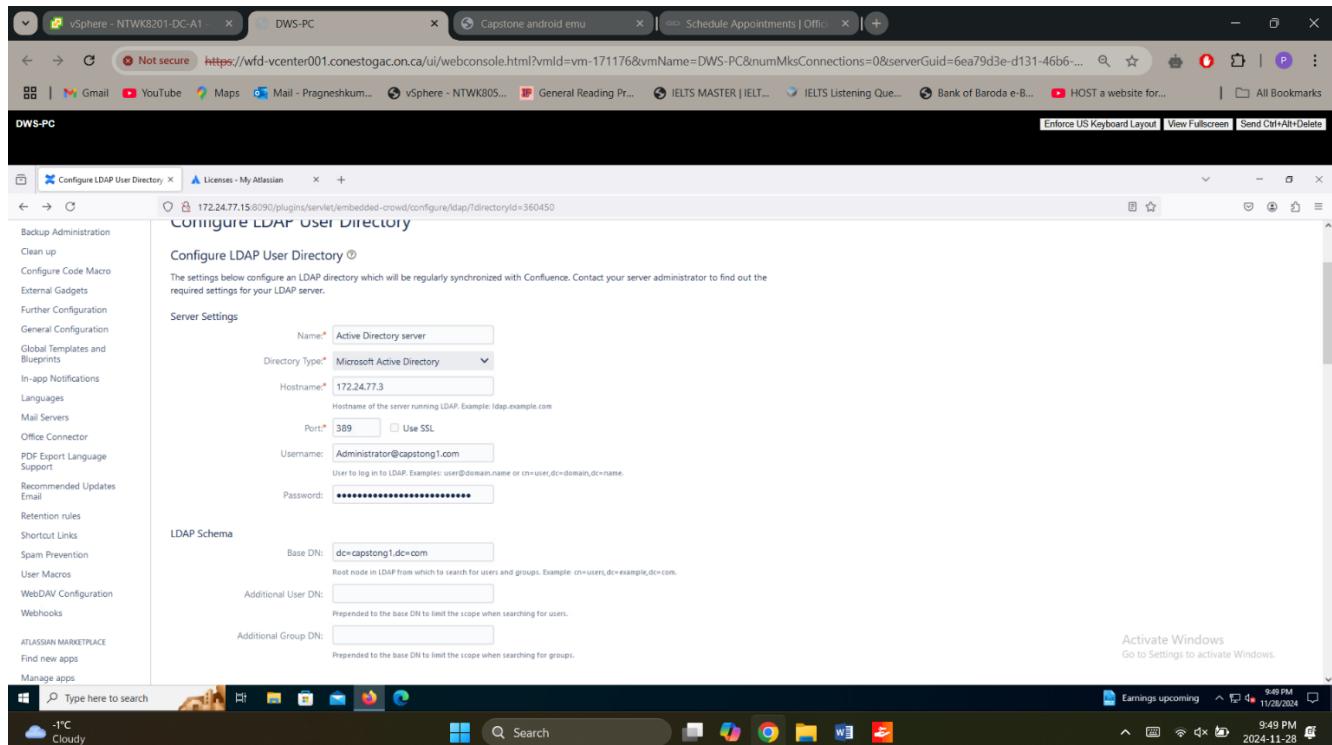


## Configuration confluence Via Web Interface

- Access confluence page with Server IP address and port where Confluence is running  
<http://172.24.77.15:8090>



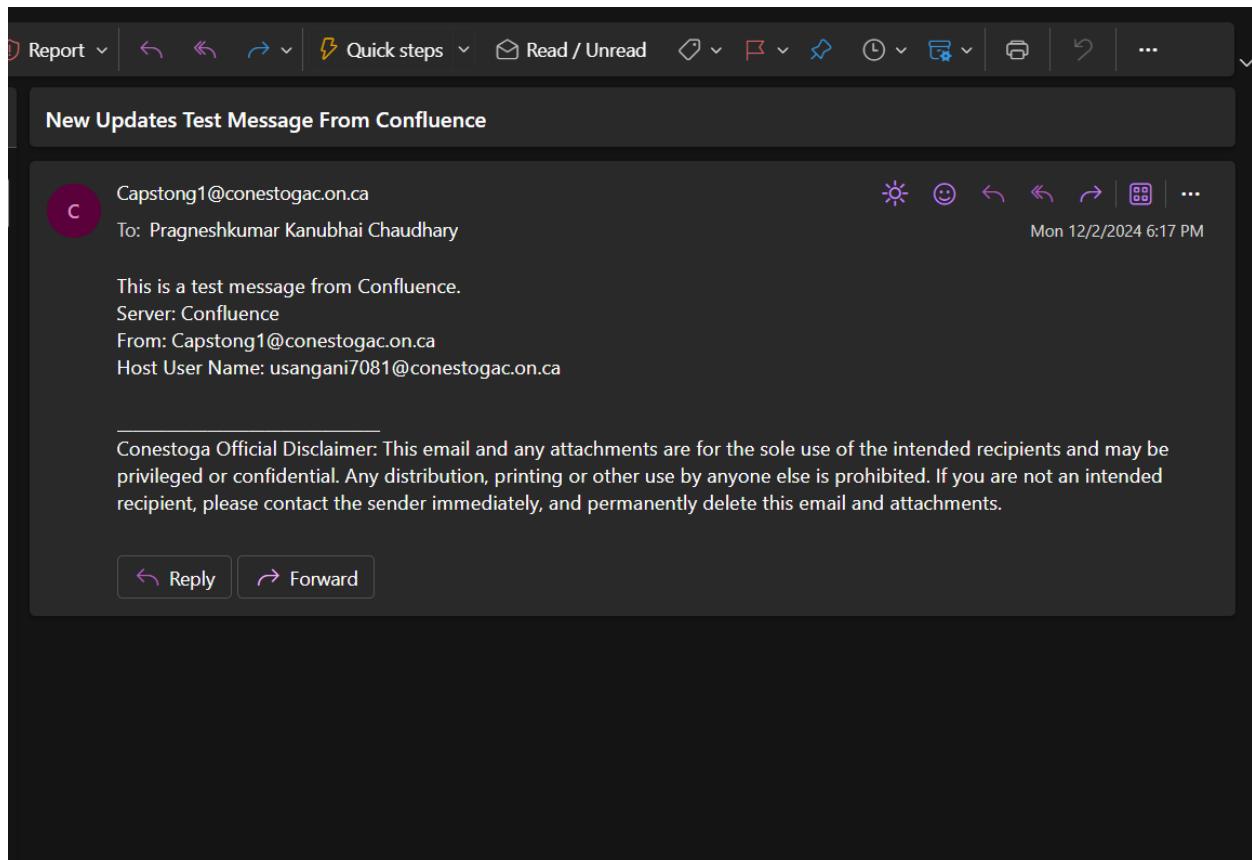
- To configure LDAP in confluence, Navigate to User Directory setting and select Microsoft Directory Type. Enter required details and credential



- The user directory in confluence is connected to an external Active directory and enabling centralized user management. This integration ensure that AD users can login to the confluence using their existing credentials without requiring separate user account in confluence.

- After enabling LDAP, we configure SMTP server.

- User successfully received mail from confluence SMTP server



## Headwind MDM Tool

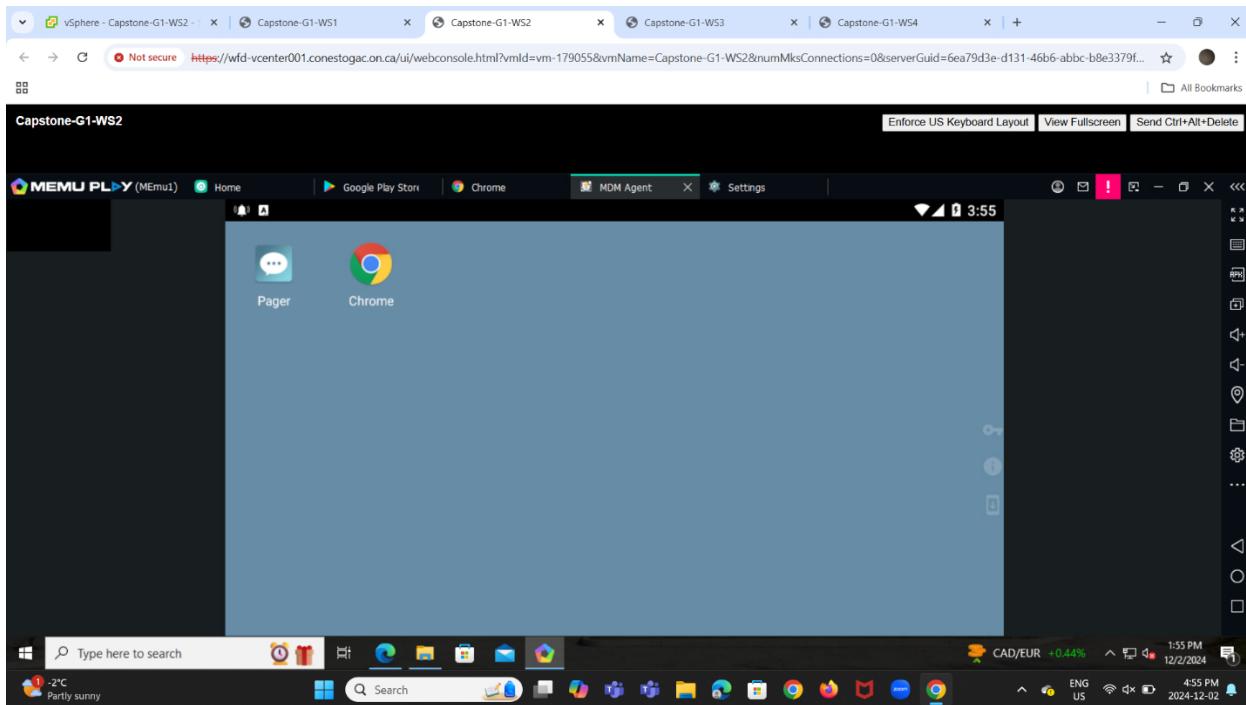
- Connecting a new device to our MDM tool:

The screenshot shows a web browser window with multiple tabs open, all titled 'Capstone-G1-WS'. The active tab is 'Headwind MDM Web Panel' at the URL <https://172.24.77.13:8080/#/>. The interface is a dashboard for managing devices. On the left, there's a sidebar with 'Devices' selected, followed by 'Applications', 'Configurations', and 'Files'. Below the sidebar is a search bar and a table listing devices: G1, G2, G3, and T1. A modal dialog box is open in the center, prompting for device details: 'Number' (T1), 'Description' (empty), 'Groups' (No groups selected), 'Configuration' (set to 'Managed Launcher'), 'IMEI' (empty), and 'Phone Number' (empty). At the bottom of the modal are 'Save' and 'Cancel' buttons. To the right of the modal, a list of configurations is shown with actions like edit, delete, and more. The system status bar at the bottom indicates it's 1:54 PM on 12/2/2024, with a temperature of -3°C and mostly cloudy weather.

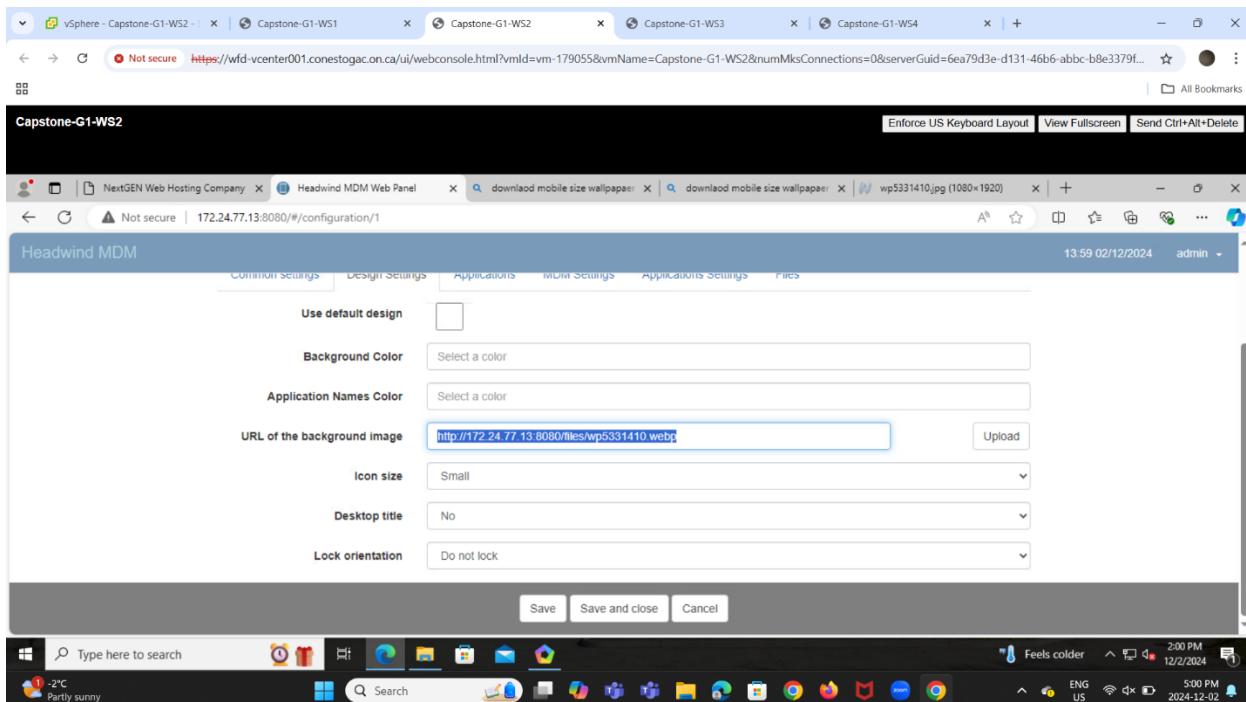
- These are the list of devices that we connected to our MDM tool:

The screenshot shows the same web browser window with the 'Devices' tab selected. The main area displays a table of connected devices: G1, G2, G3, and T1. Each device row includes columns for Status (red dot), Date (e.g., 29/11/24 08:23), Device Number (G1, G2, G3, T1), Permission Status (yellow dot), Installation Status (green dot), Files status (green dot), Configuration (Managed Launcher), and Actions (edit, delete, more). The system status bar at the bottom indicates it's 1:54 PM on 12/2/2024, with a temperature of -2°C and partly sunny weather.

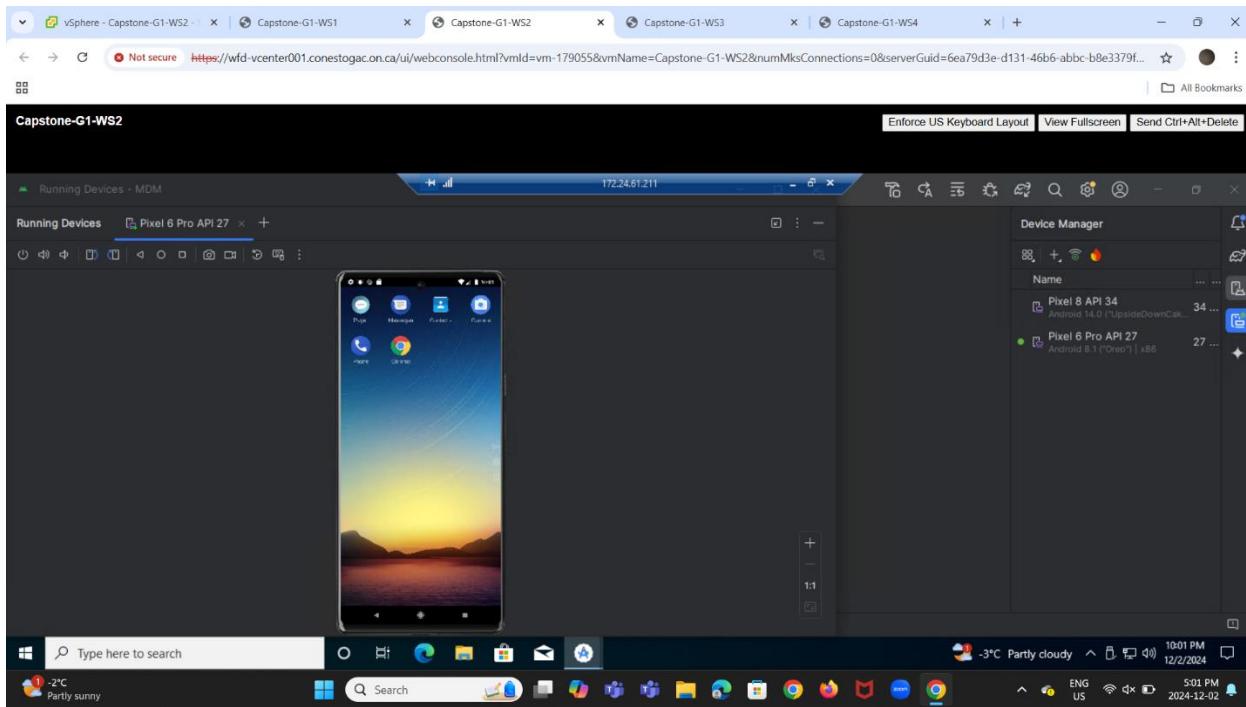
- Here is the screenshot of the mobile device that has configured using the MDM tool:



- To change the background picture on the mobile device, go to device settings, then upload the download picture by clicking on the upload button, and click on the save button:



- A background image has been changed successfully:

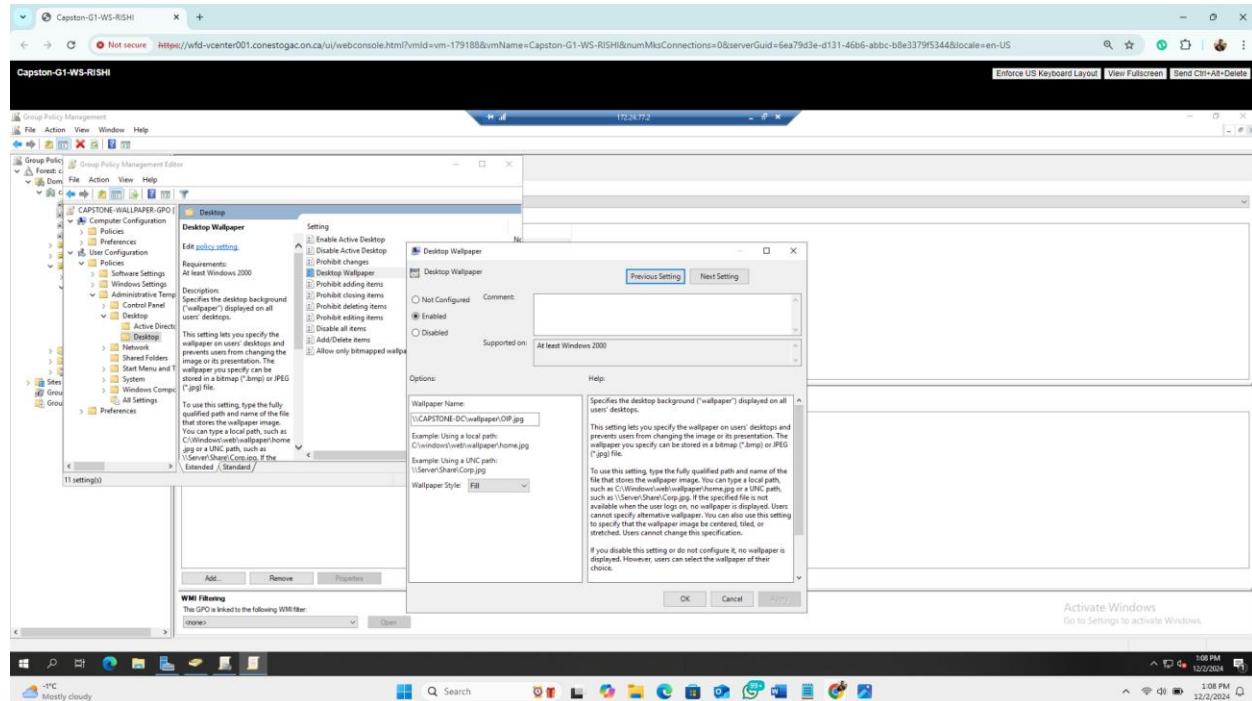


## Exchange Server

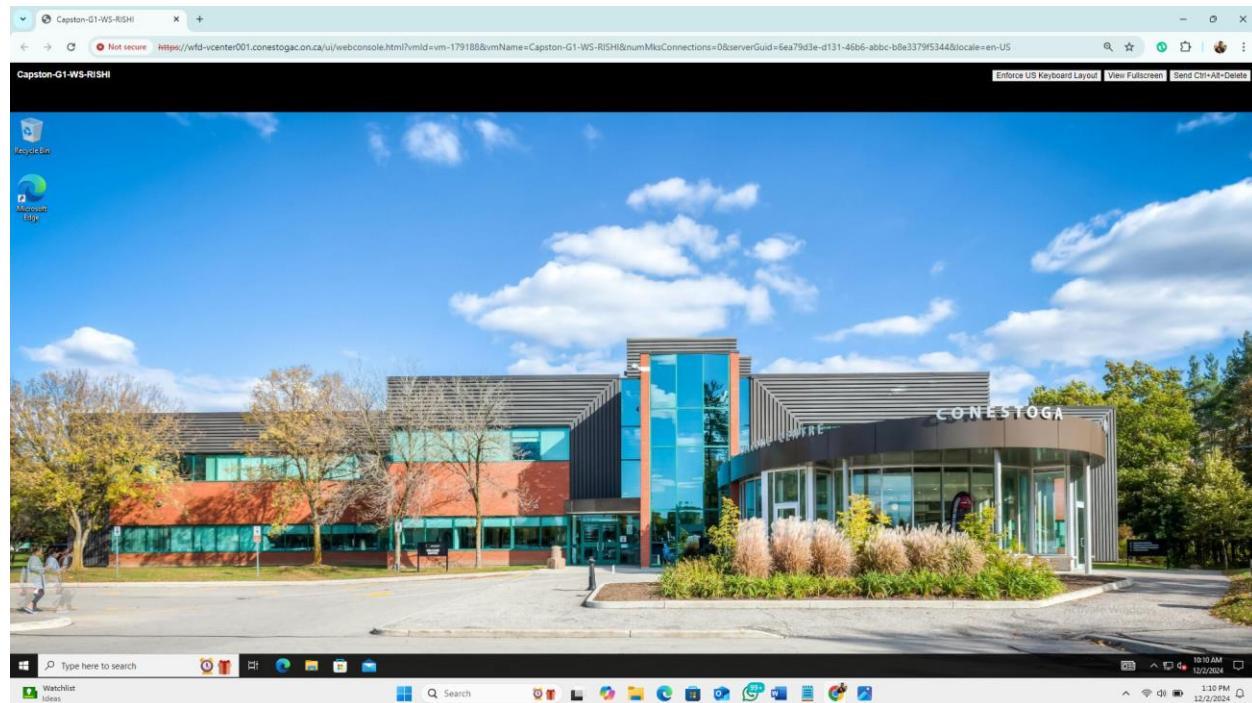
The screenshot shows the Exchange admin center interface. On the left, a navigation pane includes links for recipients, permissions, compliance management, organization, protection, mail flow, mobile, public folders, servers, and hybrid. The main area displays a list of mailboxes under the 'mailboxes' tab. One mailbox, 'HR 1 SI', is selected, showing its details: Display Name 'HR 1 SI', Mailbox Type 'User', and Email Address 'hr1-si@capstong1.com'. The details pane on the right provides more information about this user, including their title, office, work phone, and phone and voice features. The taskbar at the bottom shows system status and pinned icons.

## Group policy

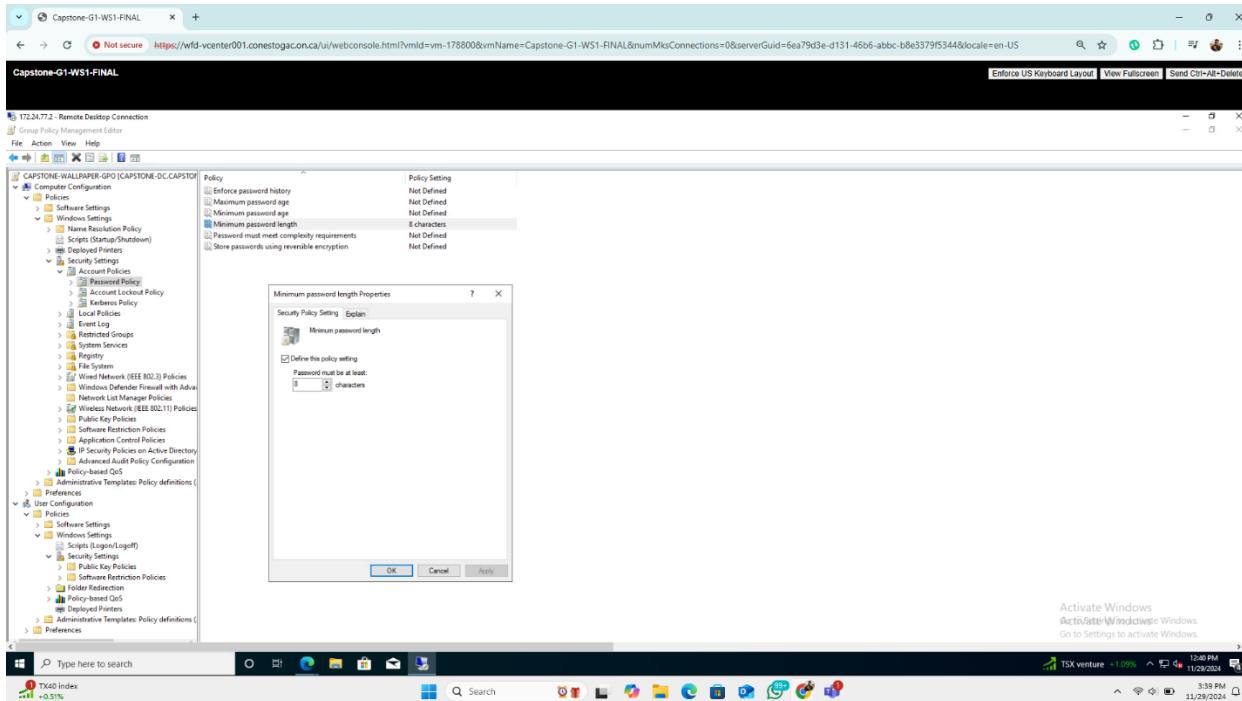
- Default wallpaper



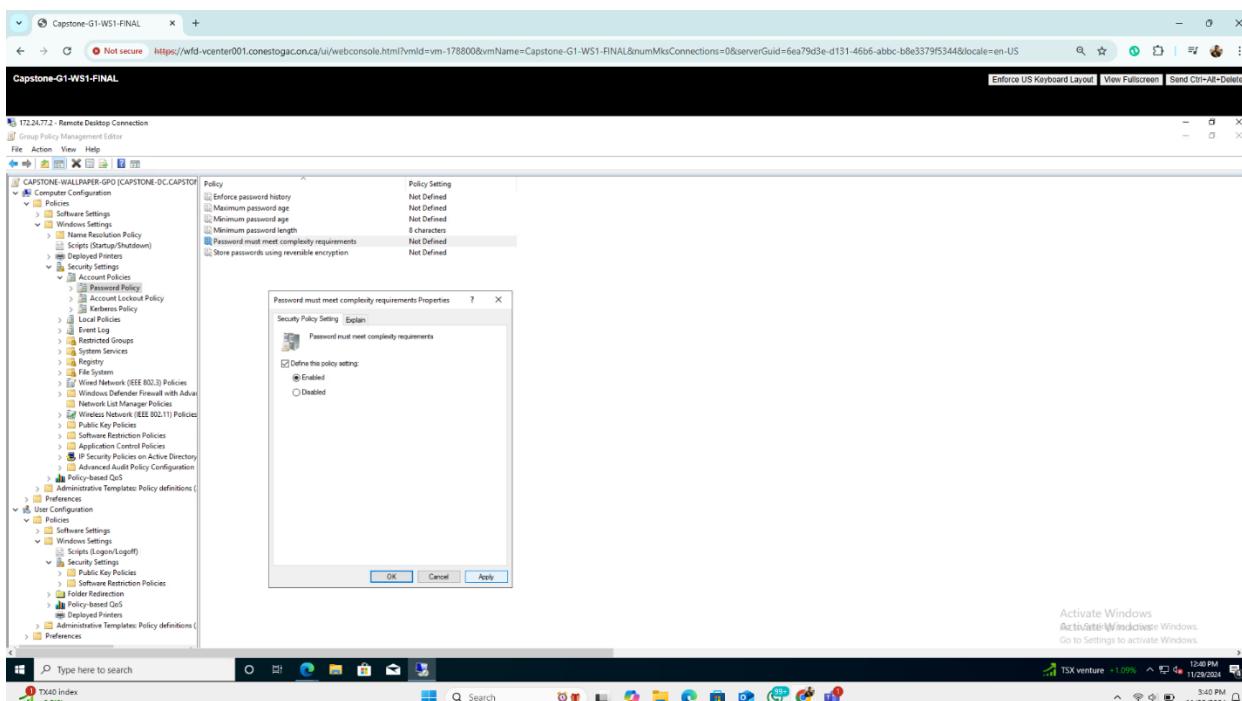
- When any domain user login in windows client, will get default wallpaper of Conestoga collage.

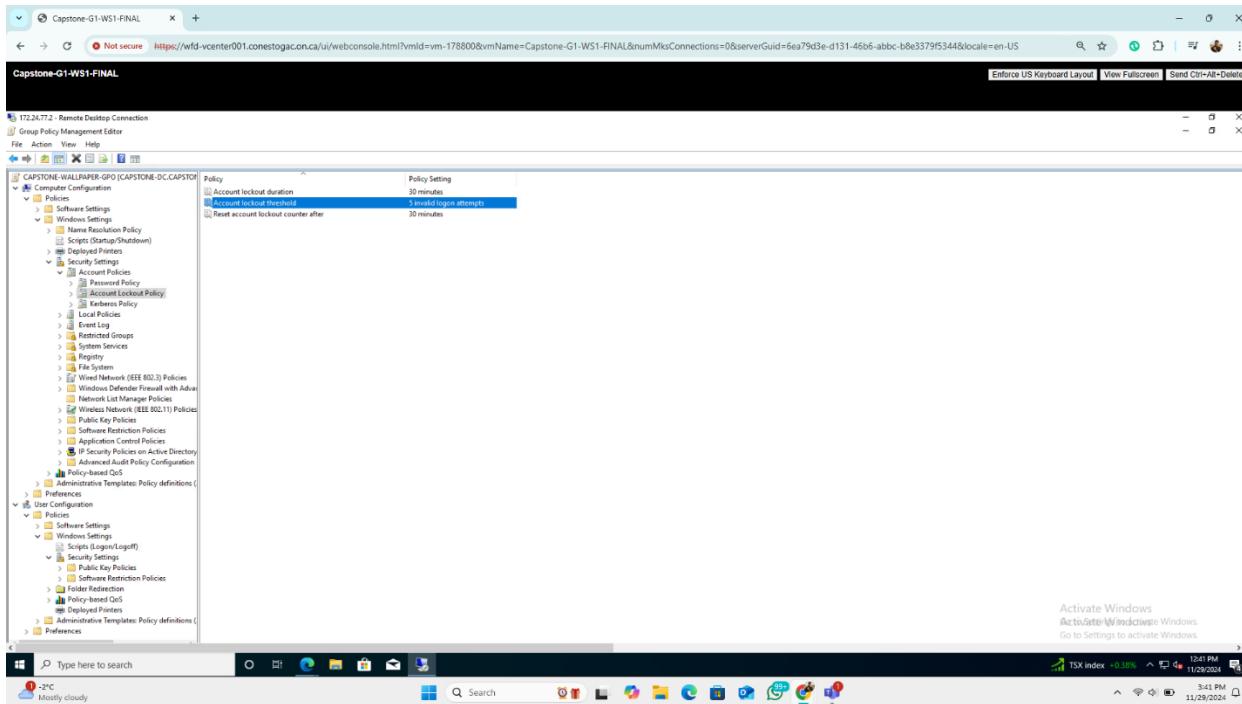


- Password complexity and Account block policy



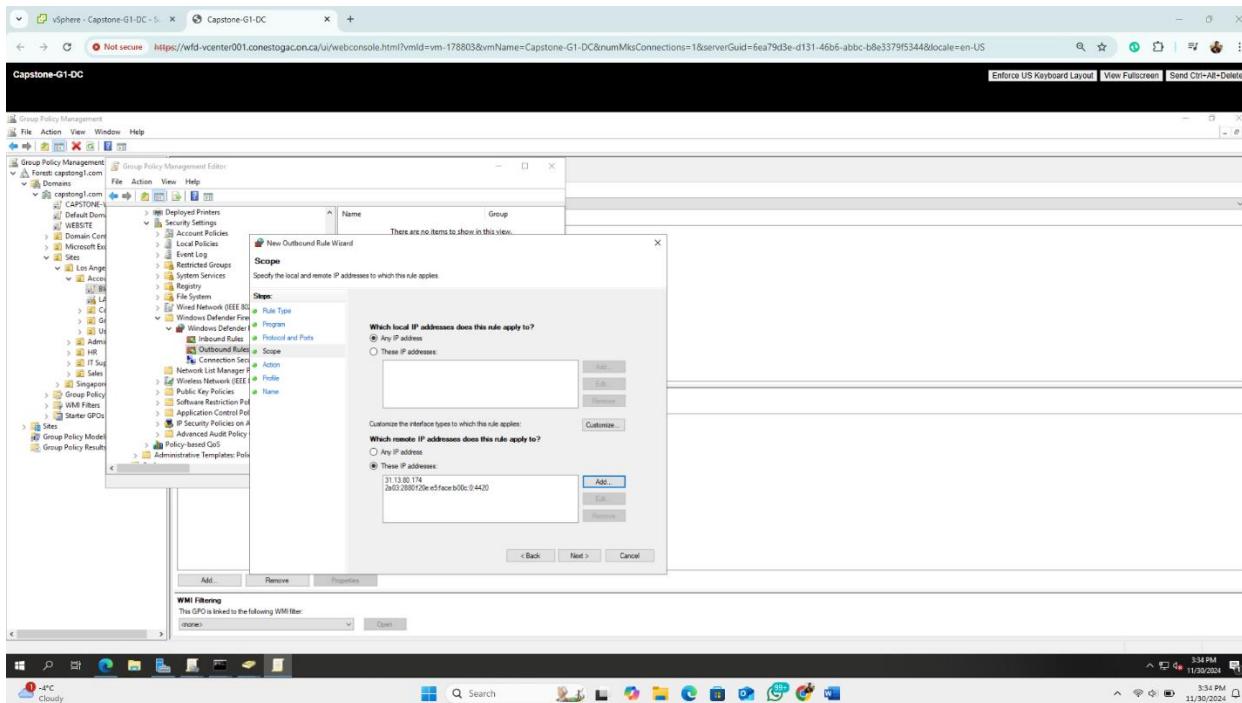
- User password must be 8 characters and complex.
- This policy secures unauthorized access in the domain computers and applied on the Domain level.



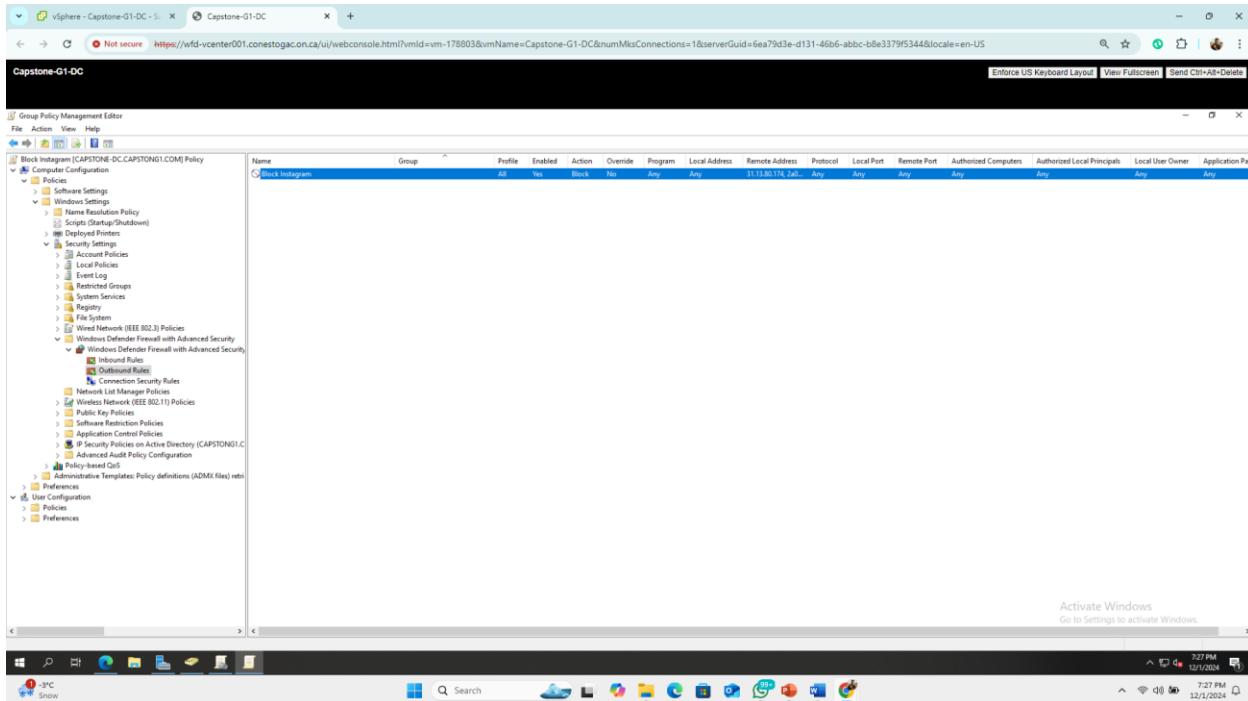


- It allows only 5 attempts to the users and then after the user account will be blocked for 30 minutes.

## Block Social Site (Instagram)

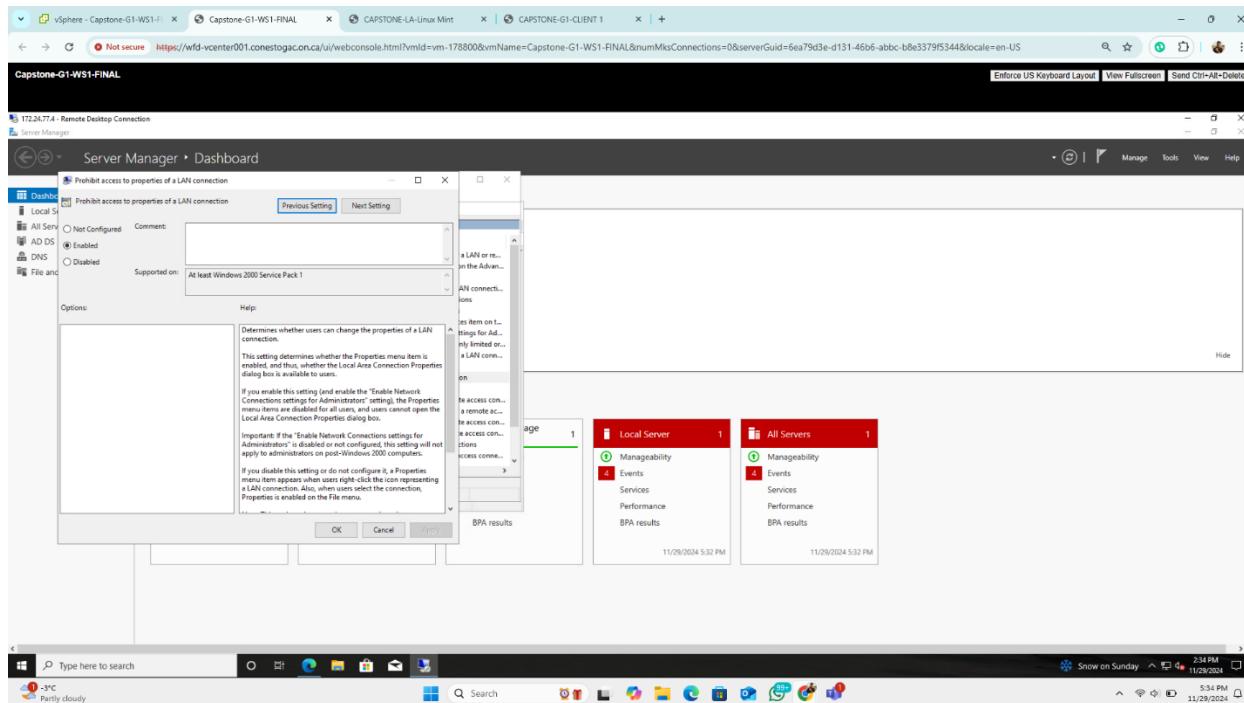


- We have configured a GPO for all marketing Computers to block the access of Instagram.
- We need to enforce the GPO of OU (Marketing) Level.
- Basically, we have to create inbound role and Block the IP addresses (IPv4 and IPv6) in our network.

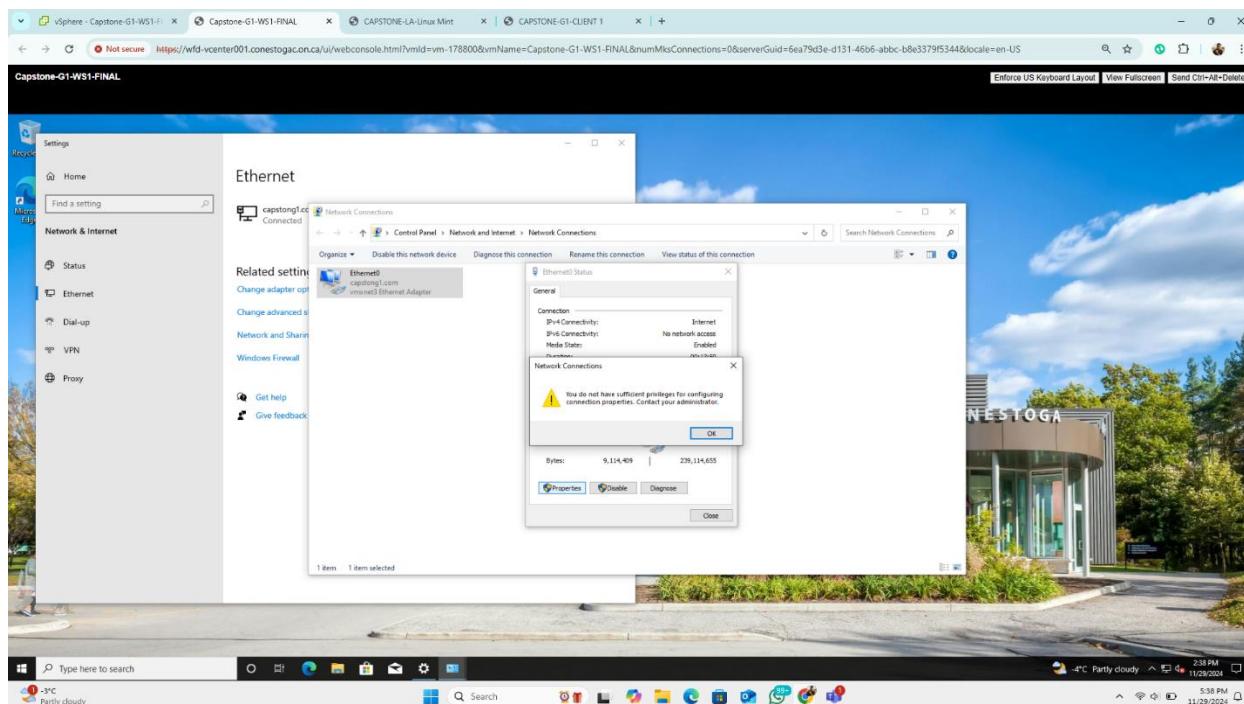


- We can see the GPO configured and enforced.

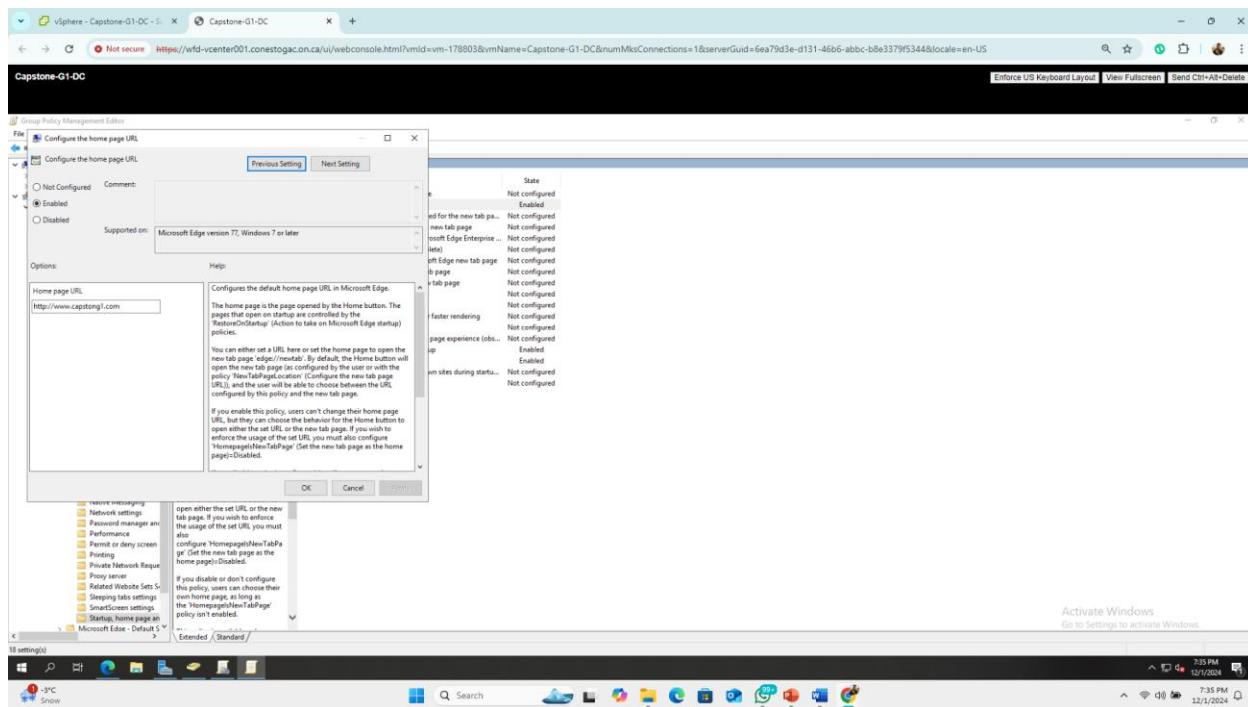
## LAN Property Restriction



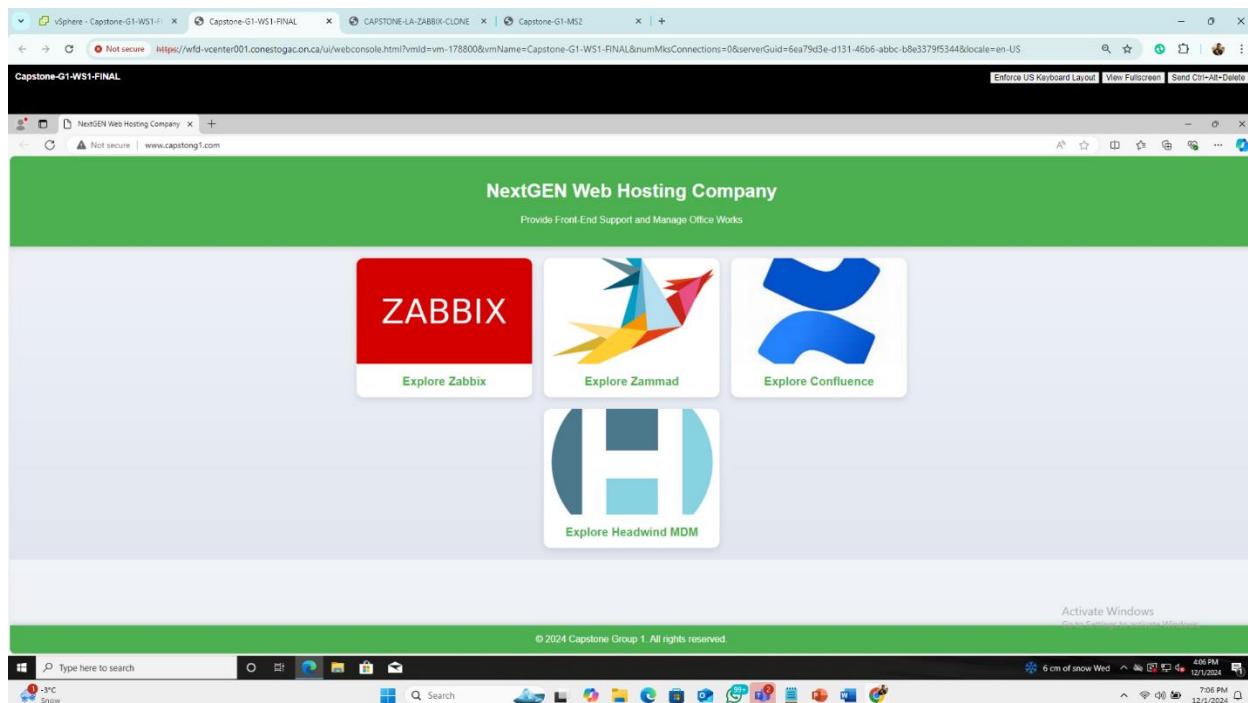
- We need to apply the LAN property access restriction for the specific group of people (Sales, HR, Accounting).



- Default Website of NextGen



- When any domain user opens Edge, will get the automatic launch of the company default website.
- This GPO applied on Domain Level.



## ADVANTAGES OF THIS PROJECT

### Scalability

- The suggested infrastructure is built for scalability, guaranteeing that the hardware and network can support future business expansion. High performance servers, such as Linux Ubuntu 22.0 live, Windows server 2019, Exchange server 2019 with 4 core CPU and 8 GB RAM can host many virtual machines for a variety of tasks. DHCP is capable enough to provide IP for both enterprises. This modular strategy ensures that the infrastructure evolves with the company's growth.

### High-performance

- High-performance virtualization servers and efficient office computers ensure that both the back-end infrastructure and the front-end employees operate smoothly and quickly. Virtualization maximizes resource utilization, allowing organizations to run multiple applications on a single host. It will allow seamless operation across both sites and reduce downtime.

### Security

- Whole infrastructure is secured with many advanced features and technology supporting by the servers like Active directory allows user Authentication, and role based access, Linux server support advanced firewall. Moreover, Company has 3 domain controllers which enhance high availability.
- Apart from that, the Company has strong backup and recovery plan which includes vSAN (Virtual Storage Area Network) on Main domain controller.

## DISADVANTAGES OF THIS PROJECT

### Hard Maintenance

- The modern technological stack needs qualified IT workers for effective management. Expertise is required to ensure correct configuration maintenance of virtualization platforms. Moreover, troubleshooting issues in a geographically scattered environment increases complexity, Daley in data synchronization.

### High Cost

- A lot of money requires us to buy advanced infrastructure, its maintenance, and Skilled IT staff to handle troubleshooting for both sites.

### Single Point of Failure

- Each Tool hosted by individual Linux machine may result in single point of failure.

### Area of Improvement

- VPN required for site-to-site connectivity, resource sharing, secure communication such as SD-WAN with encryption.
- Load Balancing (Proxy Server): Load balancer is an effective solution to balance the load between two sites, it can work as proxy server as well to hide the direct request of main server.
- Failover Clustering: Details on regular testing of failover mechanisms and disaster recovery plans would ensure operational reliability.

### Challenges faced while implementation

- We have tried to configure all tools with a single container, but we failed to do so as we have different databases for each tool resulted in database conflict.
- We have configured zammad with two docker containers but fail to synchronize the data.
- In Zabbix monitoring tool we have configured the communication media Gmail using SMTP configuration but the Gmail service delay to send the mail.

## Conclusion

The proposed infrastructure of NextGen company for the Los Angeles and Singapore location is designed to be durable, scalable, and secure, making it ideal. By incorporating high-performance hardware, virtualization technology, and secure inter office communication, the design ensures operational efficiency and future development. While the initial investment and complexity of upkeep present obstacles, the usage of open-source tools and standardization systems helps to reduce long-term expenses and dependency. Addressing latency and assuring dependable service providers are critical to improving cross-office cooperation. Overall, the infrastructure achieves a compromise between creativity and practicality, preparing the organization for success in a comparative global marketplace.