The Chinese University of Hong Kong
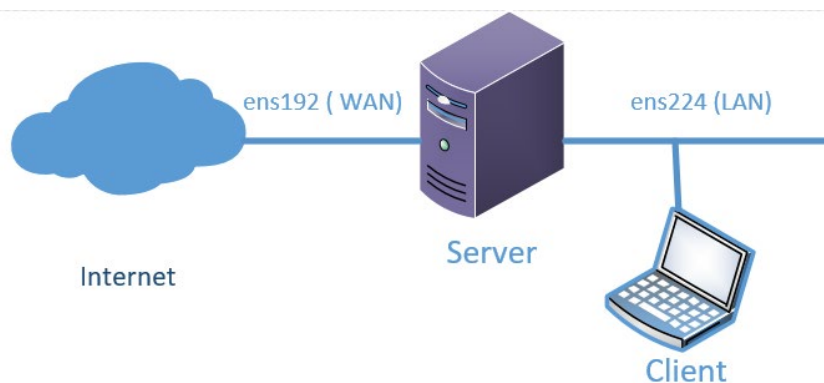**Department of Information Engineering**

IERG1000 Introduction to Information Engineering
Project 1
Basic Linux configurations and Website building under LAMP
(Linux, Apache, MySQL/MariaDB, PHP)
(Student Worksheet)

Missions

In this project, you will be assigned two Linux VM hosts forming a network similar to your home network. The Server Linux VM will act like your home Broadband router and the Client VM act like your home PC. You will gain experience on how to do some essential Linux Operating System's basic network setup using command line solely. The Linux distribution used is CentOS 7 (a free variant of RedHat Enterprise Linux 7). Moreover, you will learn a little bit about using the secure shell. At the next stage, you will need to build a simple course enrollment system using LAMP (Linux, Apache, MySQL/MariaDB and PHP 7)

Detail step-by-step instructions are only given at the 1st part, and you need to do more research at the internet to complete the tasks for the 2nd part of the project.
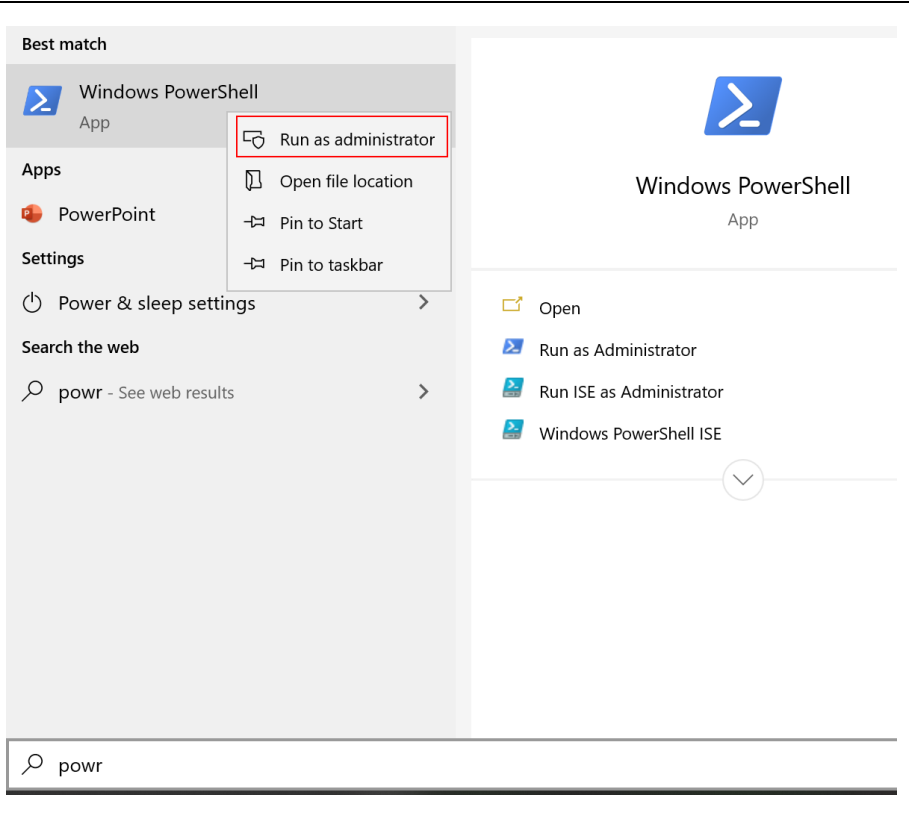
Contents

3

A. Project Console Connection Instructions

Setup and Connect to Project NTEC VPN Service

- If you are using the IE Computing Lab's PC, no VPN is required. The Project VM Management Console and VMs are directly accessible in the Lab. The below steps are required if you would like to work on the project using your own machines

- If you are outside the IE Computing Lab Network, please follow the procedures below to create the VPN connection:

- For Windows machine running Windows 10/11 x64 , you can add the VPN connection via PowerShell:

Launch PowerShell in administrator mode by Press ⊞Win + R keys to open the Run dialog and input powershell	
Paste the right PowerShell cmdlets at the PowerShell terminal and Press Enter	`Add-VpnConnection -Name 'NTEC VPN' -ServerAddress ntecvpnr.ie.cuhk.edu.hk -TunnelType L2TP -AllUserConnection -L2tpPsk 'ipsec-vpn' -AuthenticationMethod MSChapv2 -EncryptionLevel Required -force` *You need to copy and paste the above in a single line without line break. Click the below link for easy copy and paste in your powershell :*

	https://staff.ie.cuhk.edu.hk/~sfluk/files/ntecvpn.txt ``` Administrator: Windows PowerShell − □ Windows PowerShell Copyright (C) Microsoft Corporation. All rights reserved. Try the new cross-platform PowerShell https://aka.ms/pscore6 PS C:\WINDOWS\system32> Add-VpnConnection -Name 'NTEC VPN' -ServerAddress ntecvpnr.ie.cuhk.edu.hk -TunnelType L2TP -A1 serConnection -L2tpPsk 'ipsec-vpn' -AuthenticationMethod MSChapv2 -EncryptionLevel Required -force ```
After the creation of the NTEC VPN connection, Press Win + R keys to open the Run dialog. Type *ncpa.cpl* into the Run box, and click the OK button or hit the Enter key	**Run** ✕ Type the name of a program, folder, document, or Internet resource, and Windows will open it for you. Open: `ncpa.cpl` OK Cancel Browse...
Select the network interface of your PC. Wifi or Ethernet (wired)	**Network Connections** ← → ∨ ↑ ⬛ › Control Panel › All Control Panel Items › Network Connections Organize ▾ Disable this network device Diagnose this connection Rename this co... CUHK VPN Disconnected WAN Miniport (L2TP) Ethernet Network 2 Intel(R) Ethernet Connection (2) I2... ievpn_win7 Disconnected WAN Miniport (L2TP) NTEC VPN Disconnected WAN Miniport (L2TP)

Right click it and select properties and disable the ipv6 setting by unchecking the checkbox beside it and click **OK**	**Ethernet Properties** ✕ Networking Sharing Connect using: Intel(R) Ethernet Connection (2) I219-V Configure... This connection uses the following items: ☑ QoS Packet Scheduler ☑ Bridge Driver ☑ Internet Protocol Version 4 (TCP/IPv4) ☐ Microsoft Network Adapter Multiplexor Protocol ☑ Microsoft LLDP Protocol Driver ☐ Internet Protocol Version 6 (TCP/IPv6) ☑ Link-Layer Topology Discovery Responder Install... Uninstall Properties Description TCP/IP version 6. The latest version of the internet protocol that provides communication across diverse interconnected networks. OK Cancel
Lauch NTECVPN, by Press `Win` + `R` keys to open the Run dialog. Type *rasphone* into the Run box, and click the OK button or hit the `Enter` key.	**Run** ✕ Type the name of a program, folder, document, or Internet resource, and Windows will open it for you. Open: rasphone OK Cancel Browse...
Choose **NTEC VPN**	**Network Connections** ✕ Choose a network connection: NTEC VPN Connect... Properties New... Close
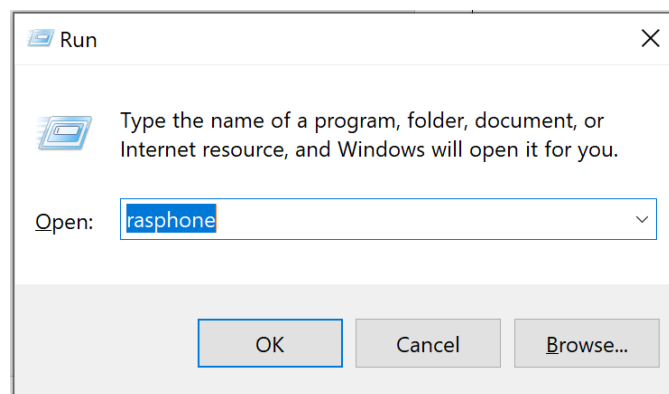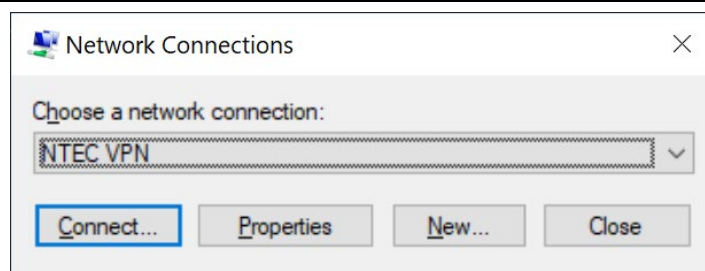
Input your IE IEPLAN username and password as the diagram shown and press **Connect**	

- For **MacOSX** machines:

Choose Apple menu > System Preferences, then click Network. Click the Add button ＋ in the list at the left, click the Interface pop-up menu, then choose *VPN*, VPN type : *L2TP over IPSec*, Service Name : *NTEC VPN*	
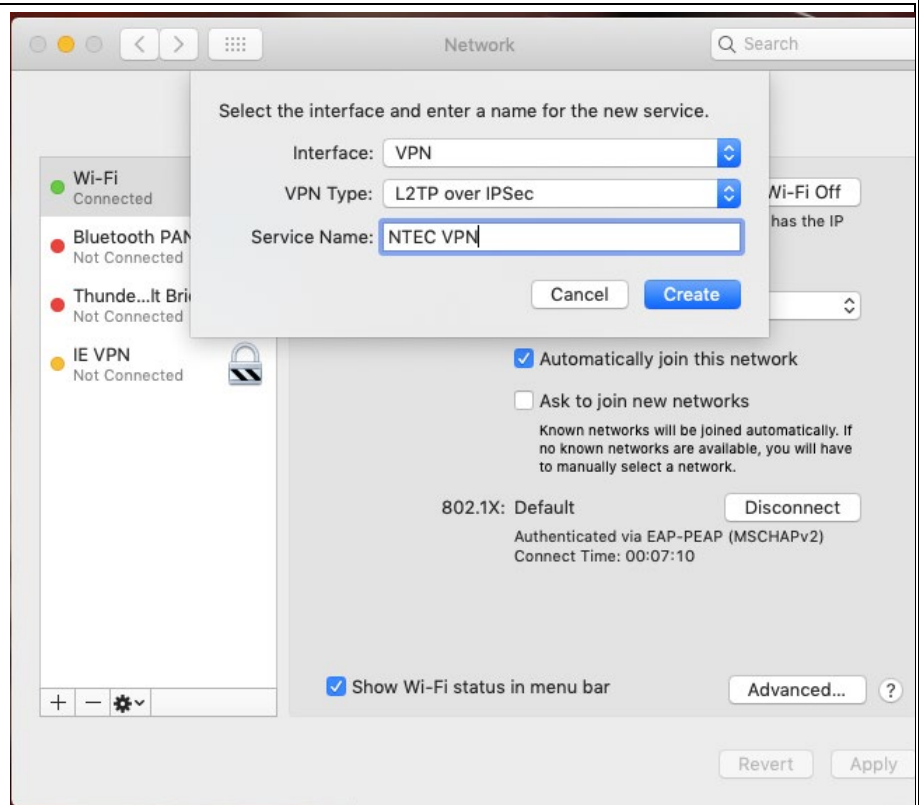
Enter the *ntecvpnr.ie.cuhk.edu.hk* as server address and the *iepclan\username* as account name for the VPN connection. Click *Authentication Settings* button for further settings.	
Enter ***ipsec-vpn*** as the Shared Secret	
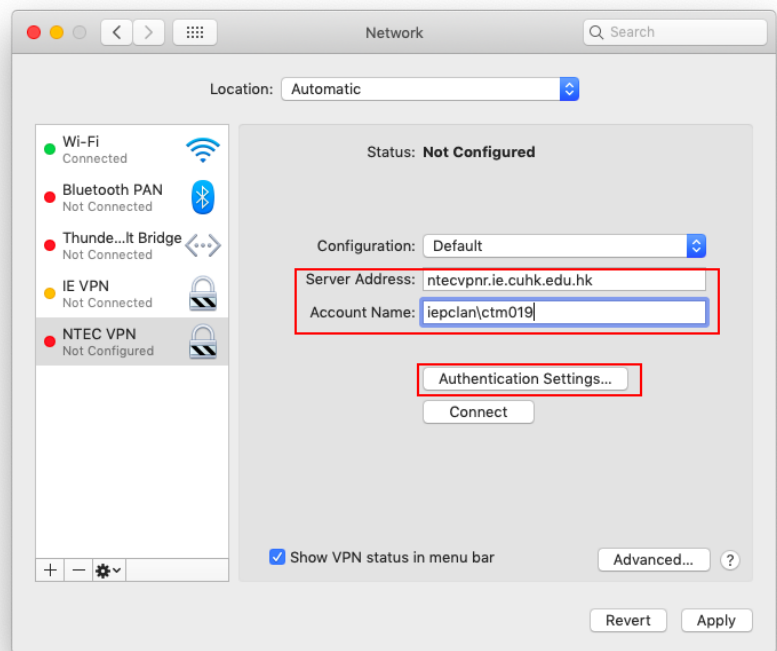
8
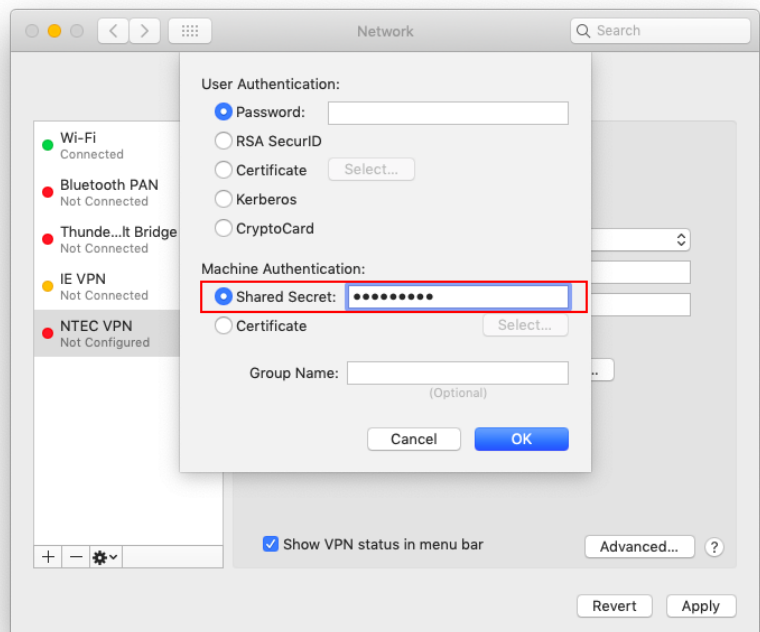
Click *Advanced* button for further settings	
Check *Send all traffic over VPN connection.*	
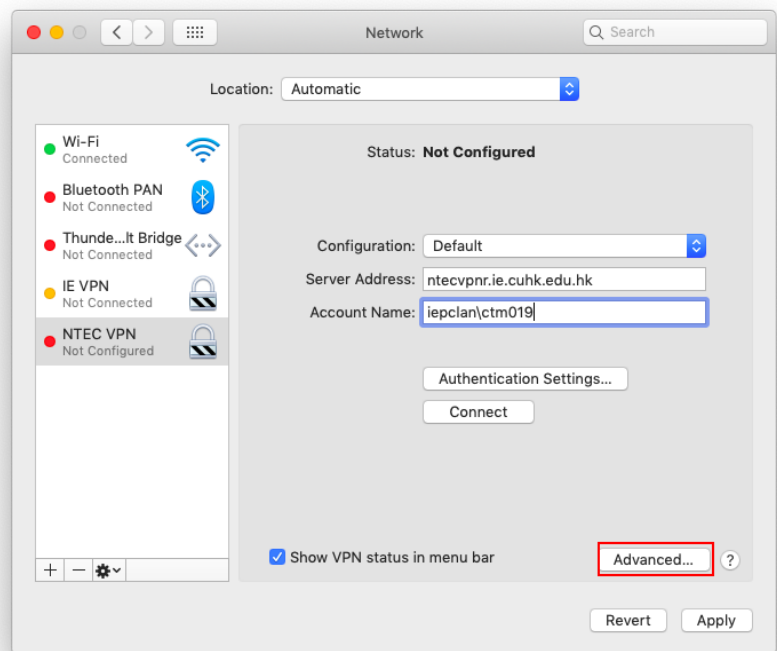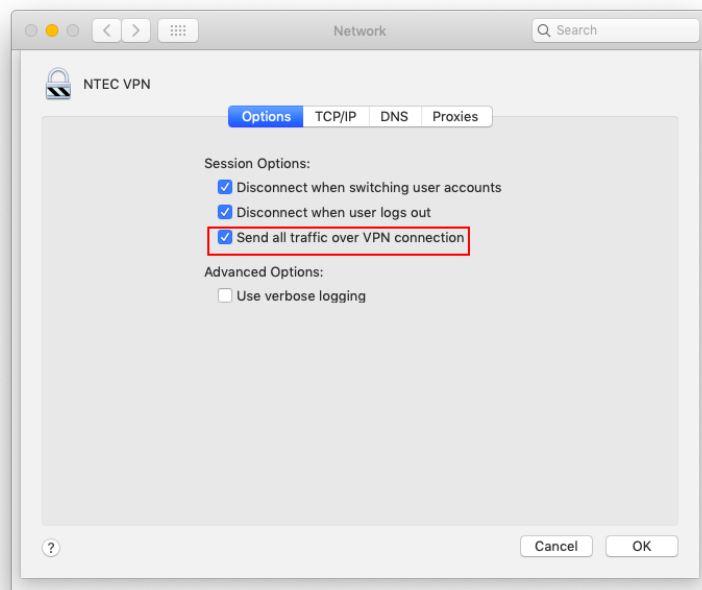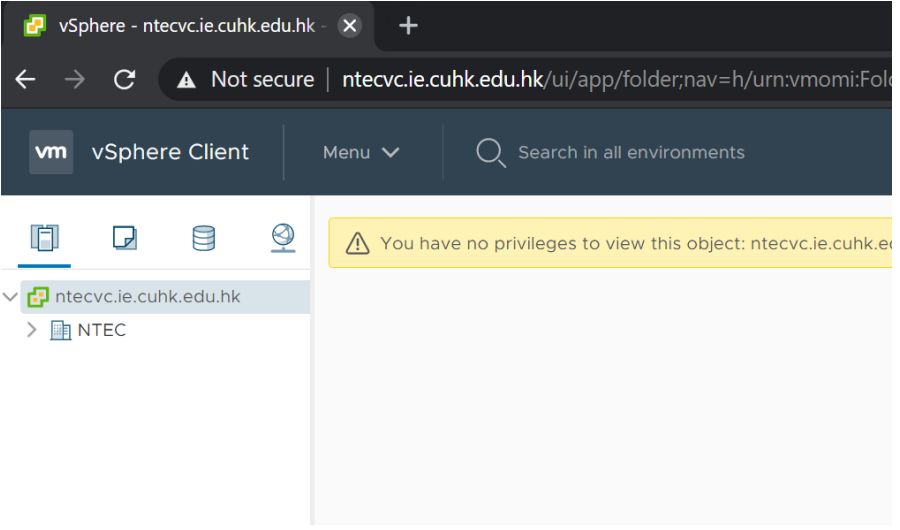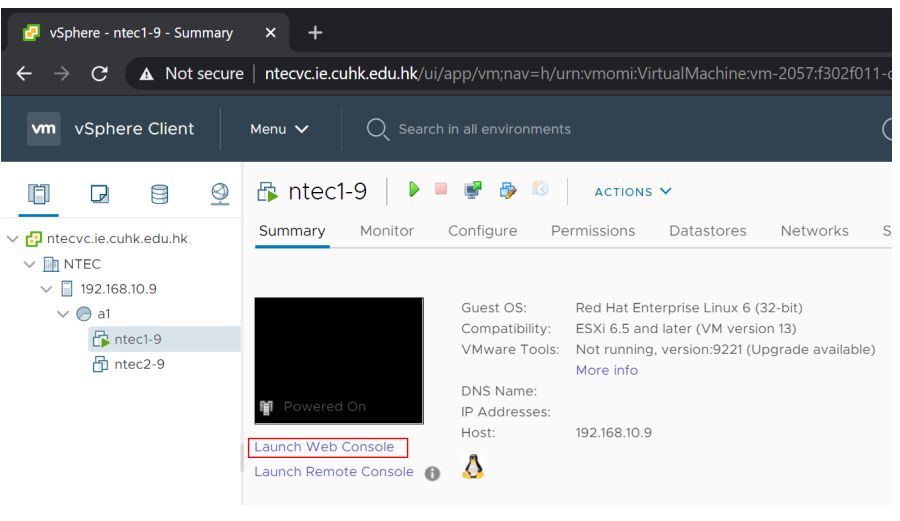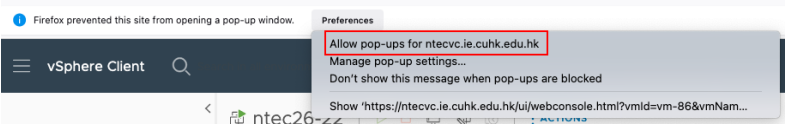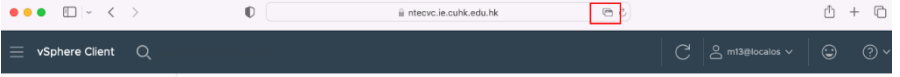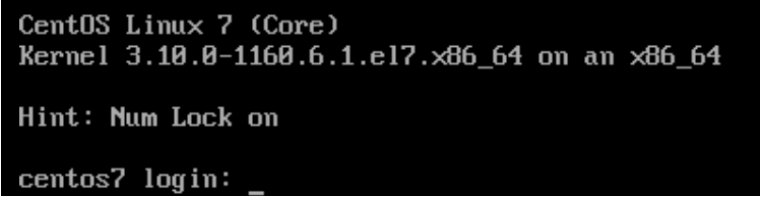
Connect to the vCenter and VM Console

launch chrome browser directly and type https://ntecvc.ie.cuhk.edu.hk/ at the address bar. If you are using your own PC/Notebook, connect to the Project NTEC VPN first Click LAUNCH VSPHERE CLIENT (HTML5)	← → C 🔒 ntecvc.ie.cuhk.edu.hk **vm**ware· **Getting Started** LAUNCH VSPHERE CLIENT (HTML5) **Documentation** VMware vSphere Documentation Center
Input your assigned group username and password from the IERG1000/IERG3800 account memo	VMware® vSphere a1 ••••••••• ☐ Use Windows session authentication LOGIN
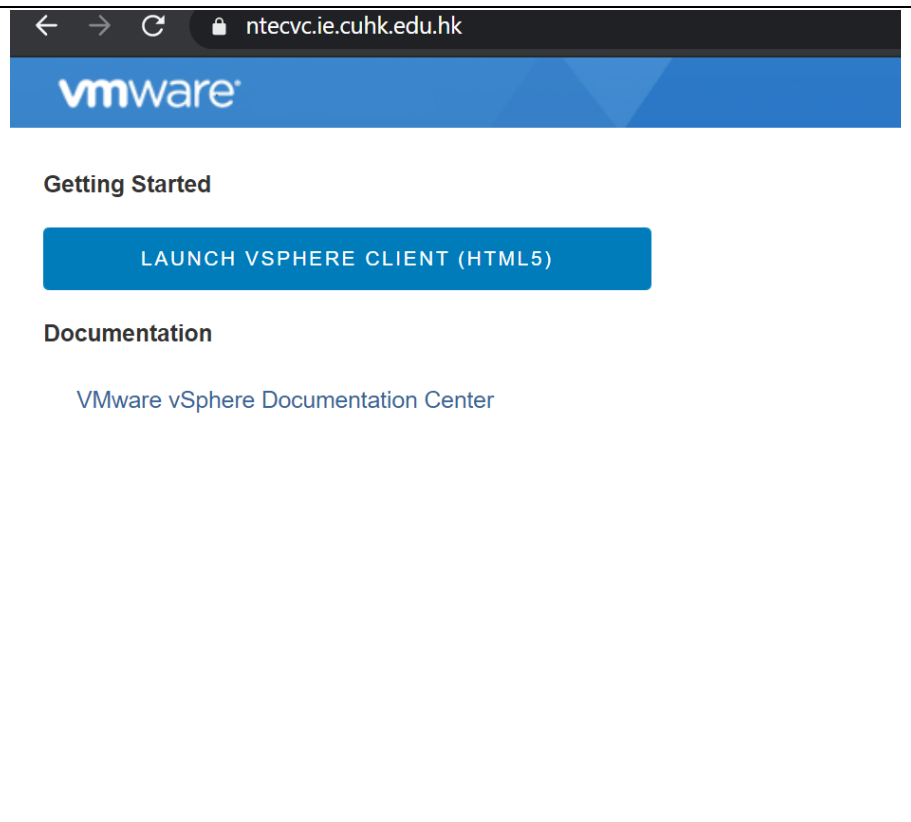
After login, you will be at the below screen, click and expand the NTEC icon and tree the below it	
You will see your assigned VMs then and Click *Launch Web Console* to launch the console to login the VM.	
Please allow the pop-up windows from your browser if the site pop-up is blocked. (eg: firefox and safari)	Firefox Safari
You will be presented with the login console at another tab of the browser.	

B1. Pre-Project Reading for Task 1

- The whole project requires you to learn some basic setup of networking and Linux commands like cd, cp, ls and the editor vim, and use etc. If you are not familiar with Linux command line and have no knowledge about using the UNIX default editor vim, you are advised to do some background readings about it. Some useful free online eBooks and references are listed below :
  - Introduction to Linux : http://staff.ie.cuhk.edu.hk/~sfluk/files/introduction_to_linux.pdf
  - Introduction to Linux (from tldp) : http://tldp.org/LDP/intro-linux/html/index.html
  - Introduction to Networking: https://landoflinux.com/linux_networking.html
  - IPv4 Addressing : http://technet.microsoft.com/en-us/library/dd469716%28v=ws.10%29.aspx
  - The Linux Command Line : http://staff.ie.cuhk.edu.hk/~sfluk/files/TLCL-13.07.pdf
  - Linux Command line cheat sheet : http://staff.ie.cuhk.edu.hk/~sfluk/files/linux_command_cheat_sheet.pdf
  - Linux Command Line: A complete Introduction (Available viewing online by searching the title at http://www.lib.cuhk.edu.hk)
  - Linux text editor: vim tutorial http://yannesposito.com/Scratch/en/blog/Learn-Vim-Progressively/

⚠️ **All Packages required in the project were pre-installed, you do not need to download and install any addition packages**

Task 1: Simple configuration of Linux network connectivity and Internet connection sharing (IP forwarding and masquerade) (25%)

1.1 Linux network configuration

- Connect to the VMware Management Console and login as instructed at **A. Project Console Connection Instructions**

- Go to **P1. Table of your group's assigned Linux vm hosts, subnet and ip addresses** to get your group's assigned Linux VM hosts' name, subnet and ip address

- Login the console of the the assigned VM Linux hosts (Server) using the username : **root**, password : **cuhkie2ok**

```
CentOS Linux 7 (Core)
Kernel 3.10.0-1160.6.1.el7.x86_64 on an x86_64

ntec1-9 login: root
Password:
Last login: Wed Dec 23 23:42:38 from 192.168.43.254
====================================
All packages are already preinstalled
yum is disabled in this VM
====================================
[root@ntec1-9 ~]# cat /etc/redhat-release
CentOS Linux release 7.9.2009 (Core)
[root@ntec1-9 ~]# _
```

- **Hint: To edit text file under Linux, you will use the default linux text editor: vim (just like notepad on Windows). However, vim is a command-based editor unlike the Microsoft Windows based editor you are accustomed to. You need to spend 15 to 30min to read the tutorial at the pre-Project reading to learn to use it. For a quick start, you can launch** `vimtutor` **in the command line to start the online tutorial or read the vim references above).**

- Set the hostname of the server (ie. ntecxx-xx according to your assigned group at appendix) by running the command : **`hostnamectl set-hostname ntec-xx`** (reboot to make it effective)

  > *If you still do not know what ip address, netmask, default gateway and name server are, you are suggested to stop and read the pre-project reading first. In short, an ipv4 address is a 32 bit address divided into four octets. To make the ip address more readable, the binary representation is typically shown in decimal form. The address, in conjunction with a subnet mask, identifies: the unique identity of the computer which is the host ID and the subnet on which the computer resides, which is the network ID.*
  >
  > *A default gateway is a device, usually a router that forwards IP packets to other subnet*
  >
  > *DNS is a service that manages the resolution of host names to ip addresses. DNS assigns user-friendly names to the computer's IPv4 address. The name server help to translate DNS names to ip addresses.*

- Set the ip address and netmask of network interface ens192 of server as assigned to your group and the default gateway to **192.168.43.254** by using editor to edit /etc/sysconfig/network-scripts/ifcfg-ens192) as below: (please note 192.168.x.x should be the ip address assigned to your group at appendix P1

```
TYPE="Ethernet"
PROXY_METHOD="none"
BROWSER_ONLY="no"
BOOTPROTO="static"
DEFROUTE="yes"
IPV4_FAILURE_FATAL="no"
IPV6INIT="yes"
IPV6_AUTOCONF="yes"
IPV6_DEFROUTE="yes"
IPV6_FAILURE_FATAL="no"
IPV6_ADDR_GEN_MODE="stable-privacy"
NAME="ens192"
```

```
DEVICE="ens192"
ONBOOT="yes"
IPADDR=192.168.x.x
NETMASK=255.255.254.0
GATEWAY=192.168.43.254
```

- Create a configuration file for network interface: ens224 by copying ifcfg-ens192 as : ifcfg-ens224 in /etc/sysconfig/network-scripts. Set the ip address similar to ens192 according to the information at appendix P1. No GATEWAY clause is required for ens224. Eg:

```
BROWSER_ONLY="no"
BOOTPROTO="static"
DEFROUTE="yes"
IPV4_FAILURE_FATAL="no"
IPV6INIT="yes"
IPV6_AUTOCONF="yes"
IPV6_DEFROUTE="yes"
IPV6_FAILURE_FATAL="no"
IPV6_ADDR_GEN_MODE="stable-privacy"
NAME="ens224"
DEVICE="ens224"
ONBOOT="yes"
IPADDR=172.16.x.1
NETMASK=255.255.255.0
```

Run the command: **systemctl restart network.service** to make your changes effective.

Checkpoint 1.1

- Check if the ip has been set at network interface ens192 and ens224 by the command : **ifconfig -a**
- Check the server uplink network connectivity by the command: **ping -c 1 192.168.43.254**
- Check the server internet connectivity by the command: **ping -c 1 137.189.99.254**
- Check the normal working of dns by the command : **host www.google.com**
- Screen cap the above results and put in the Lab report

1.2 Setup of DHCP Server on the server vm Linux host

- After completing task 1.1, you should be able to use ssh to login your server vm remotely without using the console. If you are using the IE Computing Lab desktop, connect to the server vm assigned ip (192.168.42.x or 192.168.43.x) directly by using the installed putty/secure shell program, or connect to Project VPN first if you are using your notebook/PC. (If you are using windows on your own

notebook, you need to download and install putty (by google it). If your using Mac, open your terminal app and use the ssh command).

- Setup DHCP Service (refer to the Task 1 pre-reading list to get a brief idea of what is DHCP) on the server so that it can assign ip, netmask, default gateway and name server to the client (just similar to that you notebook/phone will be given an ip address automatically when connected to CUHK wifi). The details is as follow:

- Download a sample template of dhcpd.conf of the project at : http://staff.ie.cuhk.edu.hk/~sfluk/files/dhcpd.conf and put it as /etc/dhcp/dhcpd.conf, you can use the command curl to do this.

  Eg: `curl https://staff.ie.cuhk.edu.hk/~sfluk/files/dhcpd.conf > /etc/dhcp/dhcpd.conf`

- **Replace all 172.16.13.x with your assigned network of your server ens224(/etc/sysconfig/network-scripts/ifcfg-ens224) in the /etc/dhcp/dhcpd.conf file (eg: 172.16.28.x). ie, you need to replace those marked with a red rectangle as shown below:**

```
default-lease-time 7200;
max-lease-time 14400;
#
#include "/etc/rndc.key";
#ddns-updates                on;
#ddns-update-style           interim;
#ddns-domainname             "demo.ntec.ie.cuhk.edu.hk.";
#ddns-rev-domainname         "in-addr.arpa.";
ignore                       client-updates;
subnet 172.16.13.0 netmask 255.255.255.0{
        range 172.16.13.2 172.16.13.10;
        default-lease-time 90000;
        max-lease-time 172800;
        #If you have fixed-address entries you want to use dynamic dns
        update-static-leases          on;
        use-host-decl-names           on;
        #option domain-name              "demo.ntec.ie.cuhk.edu.hk";
        option domain-name-servers      192.168.128.230;
        option routers          172.16.13.1;
        option subnet-mask              255.255.255.0;
        #deny unknown-clients;
}
```

- Use command: `systemctl start dhcpd.service` to start the service
- Use command: `systemctl status dhcpd.service` to check if the service is started successfully nor not. You should get the output similar to below:

```
[root@ntec1-9 dhcp]# systemctl status dhcpd.service
● dhcpd.service - DHCPv4 Server Daemon
   Loaded: loaded (/usr/lib/systemd/system/dhcpd.service; disabled; vendor preset: disabled)
   Active: active (running) since Wed 2020-12-23 14:30:55 HKT; 27s ago
     Docs: man:dhcpd(8)
           man:dhcpd.conf(5)
 Main PID: 5059 (dhcpd)
   Status: "Dispatching packets..."
   CGroup: /system.slice/dhcpd.service
           └─5059 /usr/sbin/dhcpd -f -cf /etc/dhcp/dhcpd.conf -user dhcpd -group dhcpd --no-p...

Dec 23 14:30:55 ntec1-9 dhcpd[5059]: Sending on    LPF/ens224/00:50:56:a2:e1:cd/172.16.42.0/24
Dec 23 14:30:55 ntec1-9 dhcpd[5059]:
Dec 23 14:30:55 ntec1-9 dhcpd[5059]: No subnet declaration for ens192 (192.168.42.11).
Dec 23 14:30:55 ntec1-9 dhcpd[5059]: ** Ignoring requests on ens192.  If this is not what
Dec 23 14:30:55 ntec1-9 dhcpd[5059]:    you want, please write a subnet declaration
Dec 23 14:30:55 ntec1-9 systemd[1]: Started DHCPv4 Server Daemon.
Dec 23 14:30:55 ntec1-9 dhcpd[5059]:    in your dhcpd.conf file for the network segment
Dec 23 14:30:55 ntec1-9 dhcpd[5059]:    to which interface ens192 is attached. **
Dec 23 14:30:55 ntec1-9 dhcpd[5059]:
Dec 23 14:30:55 ntec1-9 dhcpd[5059]: Sending on    Socket/fallback/fallback-net
[root@ntec1-9 dhcp]#
```

- If you start the service unsuccessfully, check the file **/var/log/messages** to see if there is any clue given by the system. Run the command **systemnctl restart dhcpd.service** to restart the service after you have fixed the problem.
- Use command: **systemctl enable dhcpd.service** to make the service start automatically after reboot

1.3 Setup of the client VM Linux host

- Login the console of client with username: **root**, password : **cuhkie2ok**
- Set hostname of client as assigned. (ie. ntecxx-xx according to your assigned group at appendix) (reboot to make it effective)
- Use editor to edit /etc/sysconfig/network-scripts/ ifcfg-ens192 and configure it to use dhcp to get ip address/netmask/gateway for your server dhcp service. The content should be look exactly as below:

```
TYPE="Ethernet"
PROXY_METHOD="none"
BROWSER_ONLY="no"
BOOTPROTO="dhcp"
DEFROUTE="yes"
IPV4_FAILURE_FATAL="no"
IPV6INIT="yes"
IPV6_AUTOCONF="yes"
IPV6_DEFROUTE="yes"
IPV6_FAILURE_FATAL="no"
IPV6_ADDR_GEN_MODE="stable-privacy"
NAME="ens192"
DEVICE="ens192"
ONBOOT="yes"
```

Run the command: **systemctl restart network.service** to make your changes effective.

Checkpoint 1.2

- At the Client VM, check if the network interface ens192 can get the ip via DHCP

or not by the command: `ifconfig ens192`
- At the Client VM, check the client network connectivity by checking the connectivity to your server vm ens224 interface. You can get the server ens224 (LAN) interface ip using the command: `route -n` Eg: `ping -c 1 172.16.x.1`
- Screen cap the above results and put in the Lab report

1.4 Linux internet connection sharing (IP Forwarding and masquerade on Server)

- Configure Linux internet connection sharing on Server VM so that the client can reach the outside network via the server, just like your home broadband router do for your home PC and other clients.

> *To configure the IP Forwarding and IP masquerade, you should have some basic knowledge about Public and Private IPv4 address*
>
> *Public IP Address :*
>
> - *Required by devices and hosts connect directly to internet*
> - *Must be uniquex`*
> - *Routable on the internet*
> - *Must be assigned by IANA*
>
> *Private IP Address :*
>
> - *Non-routable on the internet*
> - *Can be locally assigned by organization*
> - *Must be translated (masquerade) to access the internet*
> - *The IP range Reserved by IANA as private :*
>   - *10.0.0.0/8 (255.0.0.0)*
>   - *172.16.0.0/12 (255.240.0.0)*
>   - *192.168.0.0/16 (255.255.0.0)*

Step # 1: Enable Packet Forwarding

Use editor to edit `/etc/sysctl.conf` file :

Add the following line to enable packet forwarding for IPv4:

`net.ipv4.ip_forward = 1`

Save and close the file. Restart networking:

`systemctl restart network.service`

Step # 2: Enable IP masquerading

In Linux networking, Network Address Translation (NAT) or Network Masquerading (IP Masquerading) is a technique of transceiving network traffic through a router that involves re-writing the source and/or destination IP addresses and usually also the TCP/UDP port numbers of IP packets as they pass through. In short, IP masquerading is used to share the internet connection.

Share internet connection

To share network connection via ens192, enter the following rule at command prompt:

```
# systemctl restart iptables

# iptables -I INPUT 4 -j ACCEPT

# iptables -I FORWARD 1 -j ACCEPT

# iptables -t nat -A POSTROUTING -o ens192 -j MASQUERADE
# service iptables save
# systemctl restart iptables
```

- Run the command: `systemctl enable iptables` to enable the service so that the service can be started automatically after reboot.

Checkpoint 1.3

- At the Server VM, run the command : iptables -t nat -nvL to check the running of the NAT ruleset. The output should be similar to below and screen cap it and put in the report :

```
[root@ntec1-9 ~]# iptables -t nat -nvL
Chain PREROUTING (policy ACCEPT 2 packets, 96 bytes)
 pkts bytes target     prot opt in     out      source               destination

Chain INPUT (policy ACCEPT 2 packets, 96 bytes)
 pkts bytes target     prot opt in     out      source               destination

Chain OUTPUT (policy ACCEPT 13 packets, 1101 bytes)
 pkts bytes target     prot opt in     out      source               destination

Chain POSTROUTING (policy ACCEPT 1 packets, 236 bytes)
 pkts bytes target     prot opt in     out      source               destination
   12   865 MASQUERADE  all  --  *      ens192  0.0.0.0/0            0.0.0.0/0
```

- At the Client VM, check the client uplink network connectivity by the command: `ping –c 1 192.168.43.254`
- At the Client VM , check the client internet connectivity by the command : `ping –c 1 137.189.99.254`

- At the Client VM , check the client normal working of dns by the command : `host www.google.com`
- Screen cap the above results and put in the Lab report

Make sure you change the default root password of your server vm by running the command: `passwd root` for security purpose. If not, others may be able to login your VM after the configuration of the VM ip address. After changing your password, pls draft an email to i1000_pj1@ie.cuhk.edu.hk with subject : [IERG1000] root password. In the content, pls specify your group no and the new root password.

B2. Pre-Project Reading for Task 2

- Ref : http://polydistortion.net/doc/ssh.html

Task 2 : Usage of ssh/scp command, setup of apache web server and MySQL/MariaDB server, setup of phpMyAdmin (25%)

2.1 Use of the ssh client to login your server and client Linux VM hosts

- If you are using the IE Computing Lab desktop, connect to the server vm ip (192.168.43.x) directly by using the installed putty/secure shell, or connect to Project VPN first if you are using your notebook/PC.
- After login the server Linux vm, you can use the linux ssh command to login the client
- Try to use the scp command to transfer files from the server vm to the client and vice versa. Eg:

  At your Server VM :

  Use vim to create a text file

  scp yourfile your_client_ip:~

  At Your Client VM:

  Use vim to create a text file

  scp yourfile your_server_ens224_ip:~

- Try to use the winscp (a scp implementation at windows, if you are Mac user, just use ssh command directly at Mac terminal) installed at the IE Lab PC (or google and download and install on your own PC) to transfer files between the server vm and your machine.
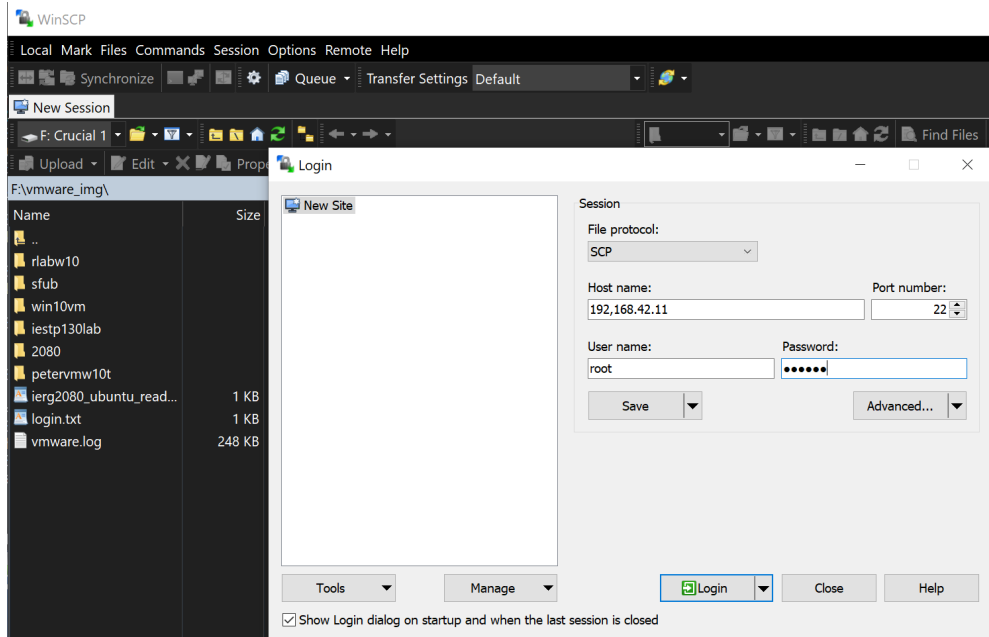
Checkpoint 2.1

- You should be able to login the server and client VM using ssh, not via the Console
- You should be able to use scp to transfer files between the server and the client VM.

2.2 Setup SSH with DSA public key authentication (password less login)

- Setup SSH with RSA public key authentication for the root user between the server and client Linux VM so that the root user at the server will be to login the client without entering any password.

At Server VM:

```
Run: ssh-keygen -t rsa

(Press enter key to accept all the defaults)
```

```
[root@ntec1-9 ~]# ssh-keygen -t rsa
Generating public/private rsa key pair.
Enter file in which to save the key (/root/.ssh/id_rsa):
Created directory '/root/.ssh'.
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in /root/.ssh/id_rsa.
Your public key has been saved in /root/.ssh/id_rsa.pub.
The key fingerprint is:
SHA256:4AhVBMG2TONnLgaZKIO293eioS4dklGwMwuciywkQWE root@ntec1-9
The key's randomart image is:
+---[RSA 2048]----+
|oEoo+Bo          |
|=+=+* . o        |
|+O=..+.+         |
|*.=..==+..       |
|o+o o+=oS        |
|.o o ..          |
|   + .           |
|  . o            |
|   .             |
+----[SHA256]-----+
```

Copy the Server private key to your Client VM using the command `ssh-copy-id`:

`ssh-copy-id -i ~/.ssh/id_rsa.pub root@client_vm_ip`

eg:

```
[root@ntec49-22 ~]# ssh-copy-id -i ~/.ssh/id_rsa.pub root@172.16.225.2
/bin/ssh-copy-id: INFO: Source of key(s) to be installed: "/root/.ssh/id_rsa.pub"
/bin/ssh-copy-id: INFO: attempting to log in with the new key(s), to filter out any that are already
 installed
/bin/ssh-copy-id: INFO: 1 key(s) remain to be installed -- if you are prompted now it is to install
the new keys
root@172.16.225.2's password:

Number of key(s) added: 1

Now try logging into the machine, with:   "ssh 'root@172.16.225.2'"
and check to make sure that only the key(s) you wanted were added.

[root@ntec49-22 ~]# ssh root@172.16.225.2
```

Checkpoint .2

- You should be able to transfer files from the server VM to the client VM without entering any password
- Screen cap then content of `~/.ssh/authorized_keys` at client VM

2.3 Setup of Apache Web Server

- In this project, you just need to do minimal configuration of Apache Web server
- Start the Apache Web server at the server VM, make sure it will be startup after reboot

  `systemctl start httpd.service`

  `systemctl enable httpd.service`

Checkpoint 2.3

- Try to access the Apache Web Server of our server vm by typing http://192.168.4x.x
  on a browser. Screen cap your browser output at the Report.

2.4 Setup of MySQL/MariaDB Service at the CLIENT VM

- Start and configure the MariaDB SQL service at the **Client VM (ie. Not at the
  Server VM)**:

  systemctl start mariadb

  systemctl enable mariadb

  systemctl status mariadb

- Run the **mysql_secure_installation** script to setup the service root password
  and remove the testing db, etc**:**

  **Make sure you set the root password of the database service (ie. not none)
  and allow for the remote root login during the setup process. BTW, the
  database root is different with the system login root account**

```
[root@ntec2-9 ~]# mysql_secure_installation

NOTE: RUNNING ALL PARTS OF THIS SCRIPT IS RECOMMENDED FOR ALL MariaDB
      SERVERS IN PRODUCTION USE!  PLEASE READ EACH STEP CAREFULLY!

In order to log into MariaDB to secure it, we'll need the current
password for the root user.  If you've just installed MariaDB, and
you haven't set the root password yet, the password will be blank,
so you should just press enter here.

Enter current password for root (enter for none):
ERROR 1045 (28000): Access denied for user 'root'@'localhost' (using password: YES)
Enter current password for root (enter for none):
OK, successfully used password, moving on...

Setting the root password ensures that nobody can log into the MariaDB
root user without the proper authorisation.

Set root password? [Y/n] y
New password:
Re-enter new password:
Password updated successfully!
Reloading privilege tables..
 ... Success!


By default, a MariaDB installation has an anonymous user, allowing anyone
to log into MariaDB without having to have a user account created for
them.  This is intended only for testing, and to make the installation
go a bit smoother.  You should remove them before moving into a
production environment.

Remove anonymous users? [Y/n] y
 ... Success!

Normally, root should only be allowed to connect from 'localhost'.  This
ensures that someone cannot guess at the root password from the network.

Disallow root login remotely? [Y/n] n
 ... skipping.
```

```
By default, MariaDB comes with a database named 'test' that anyone can
access.  This is also intended only for testing, and should be removed
before moving into a production environment.

Remove test database and access to it? [Y/n] y
 - Dropping test database...
 ... Success!
 - Removing privileges on test database...
 ... Success!

Reloading the privilege tables will ensure that all changes made so far
will take effect immediately.

Reload privilege tables now? [Y/n] y
 ... Success!

Cleaning up...

All done!  If you've completed all of the above steps, your MariaDB
installation should now be secure.

Thanks for using MariaDB!
```

- At Client VM, run the commands below to enable remote access of any hosts
  inside your internal network (pls ignore the **mysql>** prompt when copying the
  below commands and *your-mysql-root-password* is just a template, pls replace
  with the one you entered in the **mysql_secure_installation**)

```
mysql -u root -p
mysql> GRANT ALL PRIVILEGES ON *.* TO root@'%' IDENTIFIED BY 'your-
mysql-root-password' WITH GRANT OPTION;
mysql> FLUSH PRIVILEGES;
mysql> exit;
```

Checkpoint 2.4

- Test the remote root access of the MySQL server: At the server VM, use the
  command: **mysql -u root –p –h your_client_ip**
- Screen cap the results and put   in the Lab report

2.5 Setup of phMyAdmin at the Server VM

- phpMyAdmin is a popular web based MySQL/MariaDB administration tools
  written in PHP. You need to configure phpMyAdmin installed at the Server VM to
  manage the MySQL/mariaDB service started at the client VM

    Use editor to edit /etc/phpMyAdmin/config.inc.php

    Replace localhost with your Client VM ip within the file

    This is the only change you to need to make in this file

    Use editor to edit /etc/httpd/conf.d/phpMyAdmin.conf

Add the clause: *Require all granted* **as below:**

```
<Directory /usr/share/phpMyAdmin/>
   AddDefaultCharset UTF-8

   <IfModule mod_authz_core.c>
     # Apache 2.4
     <RequireAny>
       Require ip 127.0.0.1
       Require ip ::1
       Require all granted
     </RequireAny>
   </IfModule>
   <IfModule !mod_authz_core.c>
     # Apache 2.2
     Order Deny,Allow
     Deny from All
     Allow from 127.0.0.1
```

- Restart the apache service: `systemctl restart httpd.service`

Checkpoint 2.5

- Try to access phpMyAdmin by typing http://192.168.4x.x/phpMyAdmin on a browser
- Screen cap the phpMyAdmin webpage and put in the Lab report. BTW, you also need to put down the phpMyAdmin login username (root) and the login password for the TA to check at the backend.

At that point, we will have CHKPT1 of the above tasks according to the work schedule and you submit Lab report 1. TA will mark and grade your work at the backend. The file format of the Lab report should be as follow: IERG1000_REPORT1_yousid.docx. You can get a sample of Lab Report 1 at:

http://staff.ie.cuhk.edu.hk/~sfluk/files/IERG1000_REPORT1_110011000.docx

B3. Pre-Project Reading for Task 3

- If you are not familiar with PHP and MySQL, make sure you read through the book : PHP and MySQL for Dummies (Available viewing online by searching the title at http://www.lib.cuhk.edu.hk) And the PHP tutorial at W3schools Web site : http://w3schools.com/php/default.asp

- PHP & MySQL tutorial from tutorial republic : http://www.tutorialrepublic.com/php-tutorial/

- PHP Manual http://php.net/manual/en/index.php

- MySQL introduction at W3schools Web site : http://www.w3schools.com/php/php_mysql_intro.asp

- PHP & MySQL: https://alexwebdevelop.com/php-with-mysql/

- Password protection of directory under Apache http://www.cyberciti.biz/faq/howto-setup-apache-password-protect-directory-with-htaccess-file/

Task 3: Design and Build a simple Course Enrollment System (50%)

For this part and beyond, no detailed steps by steps are provided. They are considered as a bonus port of the project. You should reuse the previous instructions to edit the tables/database and write your code. You can go to the project references and search on the internet to get resources to complete the missing pieces.

- At this task, you are required to build a Course Enrollment System which users can enroll a list of training courses list at your web. Details of the requirement will be given when you go through the tasks below :

> **The suggested steps listed are just guidelines to help students with less background knowledge. You do not need to follow it exactly and can use your own proficient way (say using a different scripting language like Perl or Python rather than PHP) to complete the tasks. The final system just need to have similar functionality with the one described in the suggested guidelines.**

Task 3.1 Creation of the Course Enrollment front page (10%)

- You need to first create the Course Enrollment Front page by showing a list of courses available for enrollment. A sample outlook is provided at http://staff.ie.cuhk.edu.hk/~sfluk/2600/form1.htm (The design and outlook of your own

system will be varied)

- Create a MySQL user: coursedb and a new database: coursedb and grant the user using the commands as below at the Client VM: (please replace *mypass* with your own user/database password)

```
# mysql –u root –p
-> CREATE DATABASE IF NOT EXISTS coursedb DEFAULT CHARACTER SET
utf8 DEFAULT COLLATE utf8_general_ci;
-> CREATE USER 'coursedb'@'localhost' IDENTIFIED BY 'mypass';
-> CREATE USER 'coursedb'@'%' IDENTIFIED BY 'mypass';
-> GRANT ALL PRIVILEGES on coursedb.* to 'coursedb'@'localhost';
-> GRANT ALL PRIVILEGES on coursedb.* to 'coursedb'@'%';
-> FLUSH PRIVILEGES;
-> quit;
```

- Create a table coursetbl to store course-related information. You can do it using the phpMyAdmin or using the command similar as below :

```
# mysql –u coursedb –p
-> use coursedb;
-> create table coursetbl(courseno int(4)not null, coursetitle
char(255) not null, startdate date, coursefee int(4), quota
int(4), quotaused int(4), primary key(courseno) );
```

- Insert some entries (at least 5) into the coursetbl table using phpMyAdmin or the insert statement below:

```
-> insert into coursetbl values (1001,'Web Page Design Using
HTML5','2020-04-03',950,50,0);
```

- Create a PHP script to retrieve the coursetbl data and display as the Course Enrollment Front page. A sample PHP script is given at

  https://staff.ie.cuhk.edu.hk/~sfluk/2600/course.php.txt. You can save it and modify to produce the required results. Note that your MySQL server is housed at the client VM while the PHP script is running at the Server VM.

- After the modification, put the script at /var/www/html/course.php, and point your browser to http://192.168.4x.x/course.php to view page generated by the script (remember to replace 192.168.4x.x with your Server VM ip)

- If you cannot see any output, you can do the debugging by looking at the Apache error log at /var/log/httpd/error_log.

Task 3.2 Creation of the Course Application Form (15%)

After the creation of the Course Enrollment system front page, you need to create the Couse Application form similar to http://staff.ie.cuhk.edu.hk/~sfluk/2600/apply.htm

- Create the applytbl table with applyno as the primary key using phpMyAdmin or using command line with the following fields:
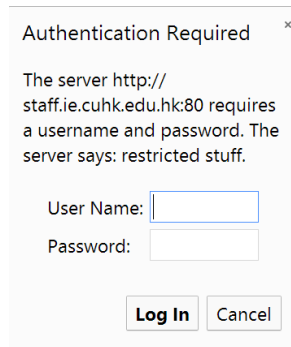
- applyno int(7) : Application number. It should be generated based on courseno. Eg : An applicant apply for course no : 1001, his/her applyno should be 1001001. The 2nd applicant should be 1001002
- name varchar(30)
- studentid varchar(15)
- hkid int(6)
- email varchar(30)
- tel varchar(15)

- Create a PHP script to get the data from the application form and store in applytbl table, do some simple error checking (eg: hkid should contain integer only) and return the application number to the applicant. (In order to write that PHP script, make sure you have already familiar with PHP form handling in the W3schools PHP tutorial: http://www.w3schools.com/php/php_forms.asp. More tutorials are: http://www.html-form-guide.com/php-form/php-form-tutorial.html, http://webcheatsheet.com/php/form_processing.php

- There are many related references in the web. You should be able to search all those sample codes for your references.

Task 3.3 Creation of the Application Details Change Form (20%)

- After the creation of the course application Form, you need to create a web form which allow the applicants to retrieve their applications details for modification by entering the application number and HKID. Only the telephone and the email address can be changed within this form. The form may look like http://staff.ie.cuhk.edu.hk/~sfluk/2600/change.htm

Task 3.4 Creation of a Password protected page for Admin to check course quota left (5%)

- In this task, you will need to write a PHP script to generate a webpage showing the quota left for each course like http://staff.ie.cuhk.edu.hk/~sfluk/2600/quotalist.htm. This page should be protected by password using the User Authentication feature of Apache. i.e. a username and password must be provided to view this page

Authentication Required ×

The server http://
staff.ie.cuhk.edu.hk:80 requires
a username and password. The
server says: restricted stuff.

User Name: [   ]
Password: [   ]

[**Log In**] [Cancel]

Checkpoint 3

- Your Course Enrollment system built should meet the below specifications :
    - Show a list of available courses for application
    - Do not allow duplicate application for the same applicant for the same course
    - Allow the applicant to change his/her telephone/email addresses after the application
    - Provide a password-protected page for authorized users to view the quota left of all the courses.
- Screen cap the Course enrollment front page, course application form, application details change form and the quota page in the Lab report

At that point, you have to attend DEMO 2 (subjected to change) for the above tasks as the work schedule and submit Lab report 2. The file and naming format of the Lab report should be as follow: IERG1000_REPORT2_yousid.docx. You can get a sample of Lab Report 2 at: https://staff.ie.cuhk.edu.hk/~sfluk/files/IERG1000_REPORT2_110011000.docx

P1. Table of your group's assigned Linux VM subnet and ip addresses

Group	Assigned vm Linux hosts	ip address/subnet
a1	ntec1-9 (server)	ens192 : ip=192.168.42.11, netmask=255.255.254.0 ens224 : ip=172.16.11.1, netmask=255.255.255.0
	ntec2-9 (client)	ens192 : get from server ens224 network, see task 1.3
a2	ntec3-9 (server)	ens192 : ip=192.168.42.12, netmask=255.255.254.0 ens224 : ip=172.16.12.1, netmask=255.255.255.0
	ntec4-9 (client)	ens192 : get from server ens224 network, see task 1.3
a3	ntec5-9 (server)	ens192 : ip=192.168.42.13, netmask=255.255.254.0 ens224 : ip=172.16.13.1, netmask=255.255.255.0
	ntec6-9 (client)	ens192 : get from server ens224 network, see task 1.3
a4	ntec7-9 (server)	ens192 : ip=192.168.42.14, netmask=255.255.254.0 ens224 : ip=172.16.14.1, netmask=255.255.255.0
	ntec8-9 (client)	ens192 : get from server ens224 network, see task 1.3
a5	ntec9-9 (server)	ens192 : ip=192.168.42.15, netmask=255.255.254.0 ens224 : ip=172.16.15.1, netmask=255.255.255.0
	ntec10-9 (client)	ens192 : get from server ens224 network, see task 1.3
a6	ntec11-9(server)	ens192 : ip=192.168.42.16, netmask=255.255.254.0 ens224 : ip=172.16.16.1, netmask=255.255.255.0
	ntec12-9 (client)	ens192 : get from server ens224 network, see task 1.3
a7	ntec13-9 (server)	ens192 : ip=192.168.42.17, netmask=255.255.254.0 ens224 : ip=172.16.17.1, netmask=255.255.255.0
	ntec14-9 (client)	ens192 : get from server ens224 network, see task 1.3
a8	ntec15-9 (server)	ens192 : ip=192.168.42.18, netmask=255.255.254.0 ens224 : ip=172.16.18.1, netmask=255.255.255.0
	ntec16-9 (client)	ens192 : get from server ens224 network, see task 1.3

Group	Assigned vm Linux hosts	ip address/subnet
b1	ntec1-10 (server)	ens192 : ip=192.168.42.31, netmask=255.255.254.0 ens224 : ip=172.16.31.1, netmask=255.255.255.0

	ntec2-10 (client)	ens192 : get from server ens224 network, see task 1.3
b2	ntec3-10 (server)	ens192 : ip=192.168.42.32, netmask=255.255.254.0
		ens224 : ip=172.16.32.1, netmask=255.255.255.0
	ntec4-10 (client)	ens192 : get from server ens224 network, see task 1.3
b3	ntec5-10 (server)	ens192 : ip=192.168.42.33, netmask=255.255.254.0
		ens224 : ip=172.16.33.1, netmask=255.255.255.0
	ntec6-10 (client)	ens192 : get from server ens224 network, see task 1.3
b4	ntec7-10 (server)	ens192 : ip=192.168.42.34, netmask=255.255.254.0
		ens224 : ip=172.16.34.1, netmask=255.255.255.0
	ntec8-10 (client)	ens192 : get from server ens224 network, see task 1.3
b5	ntec9-10 (server)	ens192 : ip=192.168.42.35, netmask=255.255.254.0
		ens224 : ip=172.16.35.1, netmask=255.255.255.0
	ntec10-10 (client)	ens192 : get from server ens224 network, see task 1.3
b6	ntec11-10 (server)	ens192 : ip=192.168.42.36, netmask=255.255.254.0
		ens224 : ip=172.16.36.1, netmask=255.255.255.0
	ntec12-10 (client)	ens192 : get from server ens224 network, see task 1.3
b7	ntec13-10 (server)	ens192 : ip=192.168.42.37, netmask=255.255.254.0
		ens224 : ip=172.16.37.1, netmask=255.255.255.0
	ntec14-10 (client)	ens192 : get from server ens224 network, see task 1.3
b8	ntec15-10 (server)	ens192 : ip=192.168.42.38, netmask=255.255.254.0
		ens224 : ip=172.16.38.1, netmask=255.255.255.0
	ntec16-10 (client)	ens192 : get from server ens224 network, see task 1.3

Group	Assigned vm Linux hosts	ip address/subnet
c1	ntec1-11 (server)	ens192 : ip=192.168.42.51, netmask=255.255.254.0
		ens224 : ip=172.16.51.1, netmask=255.255.255.0
	ntec2-11 (client)	ens192 : get from server ens224 network, see task 1.3
c2	ntec3-11 (server)	ens192 : ip=192.168.42.52, netmask=255.255.254.0
		ens224 : ip=172.16.52.1, netmask=255.255.255.0
	ntec4-11 (client)	ens192 : get from server ens224 network, see task 1.3
c3	ntec5-11 (server)	ens192 : ip=192.168.42.53, netmask=255.255.254.0

Group	Assigned vm Linux hosts	ip address/subnet
		ens224 : ip=172.16.53.1, netmask=255.255.255.0
	ntec6-11 (client)	ens192 : get from server ens224 network, see task 1.3
c4	ntec7-11 (server)	ens192 : ip=192.168.42.54, netmask=255.255.254.0
		ens224 : ip=172.16.54.1, netmask=255.255.255.0
	ntec8-11 (client)	ens192 : get from server ens224 network, see task 1.3
c5	ntec9-11 (server)	ens192 : ip=192.168.42.55, netmask=255.255.254.0
		ens224 : ip=172.16.55.1, netmask=255.255.255.0
	ntec10-11 (client)	ens192 : get from server ens224 network, see task 1.3
c6	ntec11-11 (server)	ens192 : ip=192.168.42.56, netmask=255.255.254.0
		ens224 : ip=172.16.56.1, netmask=255.255.255.0
	ntec12-11 (client)	ens192 : get from server ens224 network, see task 1.3
c7	ntec13-11 (server)	ens192 : ip=192.168.42.57, netmask=255.255.254.0
		ens224 : ip=172.16.57.1, netmask=255.255.255.0
	ntec14-11 (client)	ens192 : get from server ens224 network, see task 1.3
c8	ntec15-11 (server)	ens192 : ip=192.168.42.58, netmask=255.255.254.0
		ens224 : ip=172.16.58.1, netmask=255.255.255.0
	ntec16-11 (client)	ens192 : get from server ens224 network, see task 1.3
C9	ntec17-11 (server)	ens192 : ip=192.168.42.59, netmask=255.255.254.0
		ens224 : ip=172.16.59.1, netmask=255.255.255.0
	ntec18-11 (client)	ens192 : get from server ens224 network, see task 1.3
C10	ntec19-11 (server)	ens192 : ip=192.168.42.60, netmask=255.255.254.0
		ens224 : ip=172.16.60.1, netmask=255.255.255.0
	ntec20-11 (client)	ens192 : get from server ens224 network, see task 1.3
C11	ntec21-11 (server)	ens192 : ip=192.168.42.61, netmask=255.255.254.0
		ens224 : ip=172.16.61.1, netmask=255.255.255.0
	ntec22-11 (client)	ens192 : get from server ens224 network, see task 1.3
C12	ntec23-11 (server)	ens192 : ip=192.168.42.62, netmask=255.255.254.0
		ens224 : ip=172.16.62.1, netmask=255.255.255.0
	ntec24-11 (client)	ens192 : get from server ens224 network, see task 1.3

Group	Assigned vm Linux hosts	ip address/subnet

d1	ntec1-12 (server)	ens192 : ip=192.168.42.71, netmask=255.255.254.0
		ens224 : ip=172.16.71.1, netmask=255.255.255.0
	ntec2-12 (client)	ens192 : get from server ens224 network, see task 1.3
d2	ntec3-12 (server)	ens192 : ip=192.168.42.72, netmask=255.255.254.0
		ens224 : ip=172.16.72.1, netmask=255.255.255.0
	ntec4-12 (client)	ens192 : get from server ens224 network, see task 1.3
d3	ntec5-12 (server)	ens192 : ip=192.168.42.73, netmask=255.255.254.0
		ens224 : ip=172.16.73.1, netmask=255.255.255.0
	ntec6-12 (client)	ens192 : get from server ens224 network, see task 1.3
d4	ntec7-12 (server)	ens192 : ip=192.168.42.74, netmask=255.255.254.0
		ens224 : ip=172.16.74.1, netmask=255.255.255.0
	ntec8-12 (client)	ens192 : get from server ens224 network, see task 1.3
d5	ntec9-12 (server)	ens192 : ip=192.168.42.75, netmask=255.255.254.0
		ens224 : ip=172.16.75.1, netmask=255.255.255.0
	ntec10-12 (client)	ens192 : get from server ens224 network, see task 1.3
d6	ntec11-12 (server)	ens192 : ip=192.168.42.76, netmask=255.255.254.0
		ens224 : ip=172.16.76.1, netmask=255.255.255.0
	ntec12-12 (client)	ens192 : get from server ens224 network, see task 1.3
d7	ntec13-12 (server)	ens192 : ip=192.168.42.77, netmask=255.255.254.0
		ens224 : ip=172.16.77.1, netmask=255.255.255.0
	ntec14-12 (client)	ens192 : get from server ens224 network, see task 1.3
d8	ntec15-12 (server)	ens192 : ip=192.168.42.78, netmask=255.255.254.0
		ens224 : ip=172.16.78.1, netmask=255.255.255.0
	ntec16-12 (client)	ens192 : get from server ens224 network, see task 1.3
d9	ntec17-12 (server)	ens192 : ip=192.168.42.79, netmask=255.255.254.0
		ens224 : ip=172.16.79.1, netmask=255.255.255.0
	ntec18-12 (client)	ens192 : get from server ens224 network, see task 1.3
d10	ntec19-12 (server)	ens192 : ip=192.168.42.80, netmask=255.255.254.0
		ens224 : ip=172.16.80.1, netmask=255.255.255.0
	ntec20-12 (client)	ens192 : get from server ens224 network, see task 1.3
d11	ntec21-12 (server)	ens192 : ip=192.168.42.81, netmask=255.255.254.0

		ens224 : ip=172.16.81.1, netmask=255.255.255.0
	ntec22-12 (client)	ens192 : get from server ens224 network, see task 1.3
d12	ntec23-12 (server)	ens192 : ip=192.168.42.82, netmask=255.255.254.0
		ens224 : ip=172.16.82.1, netmask=255.255.255.0
	ntec24-12 (client)	ens192 : get from server ens224 network, see task 1.3
d13	ntec25-12 (server)	ens192 : ip=192.168.42.83, netmask=255.255.254.0
		ens224 : ip=172.16.83.1, netmask=255.255.255.0
	ntec26-12 (client)	ens192 : get from server ens224 network, see task 1.3
d14	ntec27-12 (server)	ens192 : ip=192.168.42.84, netmask=255.255.254.0
		ens224 : ip=172.16.84.1, netmask=255.255.255.0
	ntec28-12 (client)	ens192 : get from server ens224 network, see task 1.3
d15	ntec29-12 (server)	ens192 : ip=192.168.42.85, netmask=255.255.254.0
		ens224 : ip=172.16.85.1, netmask=255.255.255.0
	ntec30-12 (client)	ens192 : get from server ens224 network, see task 1.3
d16	ntec31-12 (server)	ens192 : ip=192.168.42.86, netmask=255.255.254.0
		ens224 : ip=172.16.86.1, netmask=255.255.255.0
	ntec32-12 (client)	ens192 : get from server ens224 network, see task 1.3
d17	ntec33-12 (server)	ens192 : ip=192.168.42.87, netmask=255.255.254.0
		ens224 : ip=172.16.87.1, netmask=255.255.255.0
	ntec34-12 (client)	ens192 : get from server ens224 network, see task 1.3
d18	ntec35-12 (server)	ens192 : ip=192.168.42.88, netmask=255.255.254.0
		ens224 : ip=172.16.88.1, netmask=255.255.255.0
	ntec36-12 (client)	ens192 : get from server ens224 network, see task 1.3
d19	ntec37-12 (server)	ens192 : ip=192.168.42.89, netmask=255.255.254.0
		ens224 : ip=172.16.89.1, netmask=255.255.255.0
	ntec38-12 (client)	ens192 : get from server ens224 network, see task 1.3
d20	ntec39-12 (server)	ens192 : ip=192.168.42.90, netmask=255.255.254.0
		ens224 : ip=172.16.90.1, netmask=255.255.255.0
	ntec40-12 (client)	ens192 : get from server ens224 network, see task 1.3
d21	ntec41-12 (server)	ens192 : ip=192.168.42.91, netmask=255.255.254.0
		ens224 : ip=172.16.91.1, netmask=255.255.255.0

	ntec42-12 (client)	ens192 : get from server ens224 network, see task 1.3
d22	ntec43-12 (server)	ens192 : ip=192.168.42.92, netmask=255.255.254.0
		ens224 : ip=172.16.92.1, netmask=255.255.255.0
	ntec44-12 (client)	ens192 : get from server ens224 network, see task 1.3

Group	Assigned vm Linux hosts	ip address/subnet
e1	ntec1-13 (server)	ens192 : ip=192.168.42.101, netmask=255.255.254.0
		ens224 : ip=172.16.101.1, netmask=255.255.255.0
	ntec2-13 (client)	ens192 : get from server ens224 network, see task 1.3
e2	ntec3-13 (server)	ens192 : ip=192.168.42.102, netmask=255.255.254.0
		ens224 : ip=172.16.102.1, netmask=255.255.255.0
	ntec4-13 (client)	ens192 : get from server ens224 network, see task 1.3
e3	ntec5-13 (server)	ens192 : ip=192.168.42.103, netmask=255.255.254.0
		ens224 : ip=172.16.103.1, netmask=255.255.255.0
	ntec6-13 (client)	ens192 : get from server ens224 network, see task 1.3
e4	ntec7-13 (server)	ens192 : ip=192.168.42.104, netmask=255.255.254.0
		ens224 : ip=172.16.104.1, netmask=255.255.255.0
	ntec8-13 (client)	ens192 : get from server ens224 network, see task 1.3
e5	ntec9-13(server)	ens192 : ip=192.168.42.105, netmask=255.255.254.0
		ens224 : ip=172.16.105.1, netmask=255.255.255.0
	ntec10-13 (client)	ens192 : get from server ens224 network, see task 1.3
e6	ntec11-13 (server)	ens192 : ip=192.168.42.106, netmask=255.255.254.0
		ens224 : ip=172.16.106.1, netmask=255.255.255.0
	ntec12-13 (client)	ens192 : get from server ens224 network, see task 1.3
e7	ntec13-13 (server)	ens192 : ip=192.168.42.107, netmask=255.255.254.0
		ens224 : ip=172.16.107.1, netmask=255.255.255.0
	ntec14-13 (client)	ens192 : get from server ens224 network, see task 1.3
e8	ntec15-13 (server)	ens192 : ip=192.168.42.108, netmask=255.255.254.0
		ens224 : ip=172.16.108.1, netmask=255.255.255.0
	ntec16-13 (client)	ens192 : get from server ens224 network, see task 1.3
e9	ntec17-13 (server)	ens192 : ip=192.168.42.109, netmask=255.255.254.0

		ens224 : ip=172.16.109.1, netmask=255.255.255.0
	ntec18-13 (client)	ens192 : get from server ens224 network, see task 1.3
e10	ntec19-13 (server)	ens192 : ip=192.168.42.110, netmask=255.255.254.0
		ens224 : ip=172.16.110.1, netmask=255.255.255.0
	ntec20-13 (client)	ens192 : get from server ens224 network, see task 1.3
e11	ntec21-13 (server)	ens192 : ip=192.168.42.111, netmask=255.255.254.0
		ens224 : ip=172.16.111.1, netmask=255.255.255.0
	ntec22-13 (client)	ens192 : get from server ens224 network, see task 1.3
e12	ntec23-13 (server)	ens192 : ip=192.168.42.112, netmask=255.255.254.0
		ens224 : ip=172.16.112.1, netmask=255.255.255.0
	ntec24-13 (client)	ens192 : get from server ens224 network, see task 1.3
e13	ntec25-13 (server)	ens192 : ip=192.168.42.113, netmask=255.255.254.0
		ens224 : ip=172.16.113.1, netmask=255.255.255.0
	ntec26-13 (client)	ens192 : get from server ens224 network, see task 1.3
e14	ntec27-13 (server)	ens192 : ip=192.168.42.114, netmask=255.255.254.0
		ens224 : ip=172.16.114.1, netmask=255.255.255.0
	ntec28-13 (client)	ens192 : get from server ens224 network, see task 1.3
e15	ntec29-13 (server)	ens192 : ip=192.168.42.115, netmask=255.255.254.0
		ens224 : ip=172.16.115.1, netmask=255.255.255.0
	ntec30-13 (client)	ens192 : get from server ens224 network, see task 1.3
e16	ntec31-13 (server)	ens192 : ip=192.168.42.116, netmask=255.255.254.0
		ens224 : ip=172.16.116.1, netmask=255.255.255.0
	ntec32-13 (client)	ens192 : get from server ens224 network, see task 1.3

Group	Assigned vm Linux hosts	ip address/subnet
f1	ntec1-14 (server)	ens192 : ip=192.168.42.131, netmask=255.255.254.0
		ens224 : ip=172.16.131.1, netmask=255.255.255.0
	ntec2-14 (client)	ens192 : get from server ens224 network, see task 1.3
f2	ntec3-14 (server)	ens192 : ip=192.168.42.132, netmask=255.255.254.0
		ens224 : ip=172.16.132.1, netmask=255.255.255.0

	ntec4-14(client)	ens192 : get from server ens224 network, see task 1.3
f3	ntec5-14 (server)	ens192 : ip=192.168.42.133, netmask=255.255.254.0
		ens224 : ip=172.16.133.1, netmask=255.255.255.0
	ntec6-14(client)	ens192 : get from server ens224 network, see task 1.3
f4	ntec7-14 (server)	ens192 : ip=192.168.42.134, netmask=255.255.254.0
		ens224 : ip=172.16.134.1, netmask=255.255.255.0
	ntec8-14 (client)	ens192 : get from server ens224 network, see task 1.3
f5	ntec9-14 (server)	ens192 : ip=192.168.42.135, netmask=255.255.254.0
		ens224 : ip=172.16.135.1, netmask=255.255.255.0
	ntec10-14 (client)	ens192 : get from server ens224 network, see task 1.3
f6	ntec11-14 (server)	ens192 : ip=192.168.42.136, netmask=255.255.254.0
		ens224 : ip=172.16.136.1, netmask=255.255.255.0
	ntec12-14 (client)	ens192 : get from server ens224 network, see task 1.3
f7	ntec13-14 (server)	ens192 : ip=192.168.42.137, netmask=255.255.254.0
		ens224 : ip=172.16.137.1, netmask=255.255.255.0
	ntec14-14 (client)	ens192 : get from server ens224 network, see task 1.3
f8	ntec15-14 (server)	ens192 : ip=192.168.42.138, netmask=255.255.254.0
		ens224 : ip=172.16.138.1, netmask=255.255.255.0
	ntec16-14 (client)	ens192 : get from server ens224 network, see task 1.3
f9	ntec17-14 (server)	ens192 : ip=192.168.42.139, netmask=255.255.254.0
		ens224 : ip=172.16.139.1, netmask=255.255.255.0
	ntec18-14 (client)	ens192 : get from server ens224 network, see task 1.3
f10	ntec19-14 (server)	ens192 : ip=192.168.42.140, netmask=255.255.254.0
		ens224 : ip=172.16.140.1, netmask=255.255.255.0
	ntec20-14 (client)	ens192 : get from server ens224 network, see task 1.3
f11	ntec21-14 (server)	ens192 : ip=192.168.42.141, netmask=255.255.254.0
		ens224 : ip=172.16.141.1, netmask=255.255.255.0
	ntec22-14 (client)	ens192 : get from server ens224 network, see task 1.3
f12	ntec23-14 (server)	ens192 : ip=192.168.42.142, netmask=255.255.254.0
		ens224 : ip=172.16.142.1, netmask=255.255.255.0
	ntec24-14 (client)	ens192 : get from server ens224 network, see task 1.3

f13	ntec25-14 (server)	ens192 : ip=192.168.42.143, netmask=255.255.254.0
		ens224 : ip=172.16.143.1, netmask=255.255.255.0
	ntec26-14 (client)	ens192 : get from server ens224 network, see task 1.3
f14	ntec27-14 (server)	ens192 : ip=192.168.42.144, netmask=255.255.254.0
		ens224 : ip=172.16.144.1, netmask=255.255.255.0
	ntec28-14 (client)	ens192 : get from server ens224 network, see task 1.3
f15	ntec29-14 (server)	ens192 : ip=192.168.42.145, netmask=255.255.254.0
		ens224 : ip=172.16.145.1, netmask=255.255.255.0
	ntec30-14 (client)	ens192 : get from server ens224 network, see task 1.3
f16	ntec31-14 (server)	ens192 : ip=192.168.42.146, netmask=255.255.254.0
		ens224 : ip=172.16.146.1, netmask=255.255.255.0
	ntec32-14 (client)	ens192 : get from server ens224 network, see task 1.3
f17	ntec33-14 (server)	ens192 : ip=192.168.42.147, netmask=255.255.254.0
		ens224 : ip=172.16.147.1, netmask=255.255.255.0
	ntec34-14 (client)	ens192 : get from server ens224 network, see task 1.3
f18	ntec35-14 (server)	ens192 : ip=192.168.42.148, netmask=255.255.254.0
		ens224 : ip=172.16.148.1, netmask=255.255.255.0
	ntec36-14 (client)	ens192 : get from server ens224 network, see task 1.3
f19	ntec37-14 (server)	ens192 : ip=192.168.42.149, netmask=255.255.254.0
		ens224 : ip=172.16.149.1, netmask=255.255.255.0
	ntec38-14 (client)	ens192 : get from server ens224 network, see task 1.3
f20	ntec39-14 (server)	ens192 : ip=192.168.42.150, netmask=255.255.254.0
		ens224 : ip=172.16.150.1, netmask=255.255.255.0
	ntec40-14 (client)	ens192 : get from server ens224 network, see task 1.3
f21	ntec41-14 (server)	ens192 : ip=192.168.42.151, netmask=255.255.254.0
		ens224 : ip=172.16.151.1, netmask=255.255.255.0
	ntec42-14 (client)	ens192 : get from server ens224 network, see task 1.3
f22	ntec43-14 (server)	ens192 : ip=192.168.42.152, netmask=255.255.254.0
		ens224 : ip=172.16.152.1, netmask=255.255.255.0
	ntec44-14 (client)	ens192 : get from server ens224 network, see task 1.3

Group	Assigned vm Linux hosts	ip address/subnet
g1	ntec1-15 (server)	ens192 : ip=192.168.42.170, netmask=255.255.254.0 ens224 : ip=172.16.170.1, netmask=255.255.255.0
	ntec2-15 (client)	ens192 : get from server ens224 network, see task 1.3
g2	ntec3-15 (server)	ens192 : ip=192.168.42.171, netmask=255.255.254.0 ens224 : ip=172.16.171.1, netmask=255.255.255.0
	ntec4-15 (client)	ens192 : get from server ens224 network, see task 1.3
g3	ntec5-15 (server)	ens192 : ip=192.168.42.172, netmask=255.255.254.0 ens224 : ip=172.16.172.1, netmask=255.255.255.0
	ntec6-15 (client)	ens192 : get from server ens224 network, see task 1.3
g4	ntec7-15 (server)	ens192 : ip=192.168.42.173, netmask=255.255.254.0 ens224 : ip=172.16.173.1, netmask=255.255.255.0
	ntec8-15 (client)	ens192 : get from server ens224 network, see task 1.3
g5	ntec9-15 (server)	ens192 : ip=192.168.42.174, netmask=255.255.254.0 ens224 : ip=172.16.174.1, netmask=255.255.255.0
	ntec10-15 (client)	ens192 : get from server ens224 network, see task 1.3
g6	ntec11-15 (server)	ens192 : ip=192.168.42.175, netmask=255.255.254.0 ens224 : ip=172.16.175.1, netmask=255.255.255.0
	ntec12-15 (client)	ens192 : get from server ens224 network, see task 1.3
g7	ntec13-15 (server)	ens192 : ip=192.168.42.176, netmask=255.255.254.0 ens224 : ip=172.16.176.1, netmask=255.255.255.0
	ntec14-15 (client)	ens192 : get from server ens224 network, see task 1.3
g8	ntec15-15 (server)	ens192 : ip=192.168.42.177, netmask=255.255.254.0 ens224 : ip=172.16.177.1, netmask=255.255.255.0
	ntec16-15 (client)	ens192 : get from server ens224 network, see task 1.3
g9	ntec17-15(server)	ens192 : ip=192.168.42.178, netmask=255.255.254.0 ens224 : ip=172.16.178.1, netmask=255.255.255.0
	ntec18-15 (client)	ens192 : get from server ens224 network, see task 1.3
g10	ntec19-15 (server)	ens192 : ip=192.168.42.179, netmask=255.255.254.0 ens224 : ip=172.16.179.1, netmask=255.255.255.0
	ntec20-15 (client)	ens192 : get from server ens224 network, see task 1.3

g11	ntec21-15 (server)	ens192 : ip=192.168.42.180, netmask=255.255.254.0
		ens224 : ip=172.16.180.1, netmask=255.255.255.0
	ntec22-15 (client)	ens192 : get from server ens224 network, see task 1.3
g12	ntec23-15 (server)	ens192 : ip=192.168.42.181, netmask=255.255.254.0
		ens224 : ip=172.16.181.1, netmask=255.255.255.0
	ntec24-15 (client)	ens192 : get from server ens224 network, see task 1.3
g13	ntec25-15 (server)	ens192 : ip=192.168.42.182, netmask=255.255.254.0
		ens224 : ip=172.16.182.1, netmask=255.255.255.0
	ntec26-15 (client)	ens192 : get from server ens224 network, see task 1.3
g14	ntec27-15 (server)	ens192 : ip=192.168.42.183, netmask=255.255.254.0
		ens224 : ip=172.16.183.1, netmask=255.255.255.0
	ntec28-15 (client)	ens192 : get from server ens224 network, see task 1.3
g15	ntec29-15 (server)	ens192 : ip=192.168.42.184, netmask=255.255.254.0
		ens224 : ip=172.16.184.1, netmask=255.255.255.0
	ntec30-15 (client)	ens192 : get from server ens224 network, see task 1.3
g16	ntec31-15 (server)	ens192 : ip=192.168.42.185, netmask=255.255.254.0
		ens224 : ip=172.16.185.1, netmask=255.255.255.0
	ntec32-15 (client)	ens192 : get from server ens224 network, see task 1.3
g17	ntec33-15 (server)	ens192 : ip=192.168.42.186, netmask=255.255.254.0
		ens224 : ip=172.16.186.1, netmask=255.255.255.0
	ntec34-15 (client)	ens192 : get from server ens224 network, see task 1.3
g18	ntec35-15 (server)	ens192 : ip=192.168.42.187, netmask=255.255.254.0
		ens224 : ip=172.16.187.1, netmask=255.255.255.0
	ntec36-15 (client)	ens192 : get from server ens224 network, see task 1.3
g19	ntec37-15 (server)	ens192 : ip=192.168.42.188, netmask=255.255.254.0
		ens224 : ip=172.16.188.1, netmask=255.255.255.0
	ntec38-15 (client)	ens192 : get from server ens224 network, see task 1.3
g20	ntec39-15 (server)	ens192 : ip=192.168.42.189, netmask=255.255.254.0
		ens224 : ip=172.16.189.1, netmask=255.255.255.0
	ntec40-15 (client)	ens192 : get from server ens224 network, see task 1.3
g21	ntec41-15 (server)	ens192 : ip=192.168.42.190, netmask=255.255.254.0

		ens224 : ip=172.16.190.1, netmask=255.255.255.0
	ntec42-15 (client)	ens192 : get from server ens224 network, see task 1.3
g22	ntec43-15 (server)	ens192 : ip=192.168.42.191, netmask=255.255.254.0
		ens224 : ip=172.16.191.1, netmask=255.255.255.0
	ntec44-15 (client)	ens192 : get from server ens224 network, see task 1.3
Group	Assigned vm Linux hosts	ip address/subnet
n1	ntec1-16 (server)	ens192 : ip=192.168.42.201, netmask=255.255.254.0
		ens224 : ip=172.16.201.1, netmask=255.255.255.0
	ntec2-16(client)	ens192 : get from server ens224 network, see task 1.3
n2	ntec3-16 (server)	ens192 : ip=192.168.42.202, netmask=255.255.254.0
		ens224 : ip=172.16.202.1, netmask=255.255.255.0
	ntec4-16 (client)	ens192 : get from server ens224 network, see task 1.3
n3	ntec5-16 (server)	ens192 : ip=192.168.42.203, netmask=255.255.254.0
		ens224 : ip=172.16.203.1, netmask=255.255.255.0
	ntec6-16 (client)	ens192 : get from server ens224 network, see task 1.3
n4	ntec7-16 (server)	ens192 : ip=192.168.42.204, netmask=255.255.254.0
		ens224 : ip=172.16.204.1, netmask=255.255.255.0
	ntec8-16 (client)	ens192 : get from server ens224 network, see task 1.3
n5	ntec9-16 (server)	ens192 : ip=192.168.42.205, netmask=255.255.254.0
		ens224 : ip=172.16.205.1, netmask=255.255.255.0
	ntec10-16 (client)	ens192 : get from server ens224 network, see task 1.3
n6	ntec11-16 (server)	ens192 : ip=192.168.42.206, netmask=255.255.254.0
		ens224 : ip=172.16.206.1, netmask=255.255.255.0
	ntec12-16 (client)	ens192 : get from server ens224 network, see task 1.3
n7	ntec13-16 (server)	ens192 : ip=192.168.42.207, netmask=255.255.254.0
		ens224 : ip=172.16.207.1, netmask=255.255.255.0
	ntec14-16 (client)	ens192 : get from server ens224 network, see task 1.3
n8	ntec15-16 (server)	ens192 : ip=192.168.42.208, netmask=255.255.254.0
		ens224 : ip=172.16.208.1, netmask=255.255.255.0
	ntec16-16 (client)	ens192 : get from server ens224 network, see task 1.3
n9	ntec17-16 (server)	ens192 : ip=192.168.42.209, netmask=255.255.254.0

		ens224 : ip=172.16.209.1, netmask=255.255.255.0
	ntec18-16 (client)	ens192 : get from server ens224 network, see task 1.3
n10	ntec19-16 (server)	ens192 : ip=192.168.42.210, netmask=255.255.254.0
		ens224 : ip=172.16.210.1, netmask=255.255.255.0
	ntec20-16 (client)	ens192 : get from server ens224 network, see task 1.3
n11	ntec21-16 (server)	ens192 : ip=192.168.42.211, netmask=255.255.254.0
		ens224 : ip=172.16.211.1, netmask=255.255.255.0
	ntec22-16 (client)	ens192 : get from server ens224 network, see task 1.3
n12	ntec23-16 (server)	ens192 : ip=192.168.42.212, netmask=255.255.254.0
		ens224 : ip=172.16.212.1, netmask=255.255.255.0
	ntec24-16 (client)	ens192 : get from server ens224 network, see task 1.3
n13	ntec25-16 (server)	ens192 : ip=192.168.42.213, netmask=255.255.254.0
		ens224 : ip=172.16.213.1, netmask=255.255.255.0
	ntec26-16 (client)	ens192 : get from server ens224 network, see task 1.3
n14	ntec27-16 (server)	ens192 : ip=192.168.42.214, netmask=255.255.254.0
		ens224 : ip=172.16.214.1, netmask=255.255.255.0
	ntec28-16 (client)	ens192 : get from server ens224 network, see task 1.3
n15	ntec29-16 (server)	ens192 : ip=192.168.42.215, netmask=255.255.254.0
		ens224 : ip=172.16.215.1, netmask=255.255.255.0
	ntec30-16 (client)	ens192 : get from server ens224 network, see task 1.3
n16	ntec31-16 (server)	ens192 : ip=192.168.42.216, netmask=255.255.254.0
		ens224 : ip=172.16.216.1, netmask=255.255.255.0
	ntec32-16 (client)	ens192 : get from server ens224 network, see task 1.3
n17	ntec33-16 (server)	ens192 : ip=192.168.42.217, netmask=255.255.254.0
		ens224 : ip=172.16.217.1, netmask=255.255.255.0
	ntec34-16 (client)	ens192 : get from server ens224 network, see task 1.3
n18	ntec35-16 (server)	ens192 : ip=192.168.42.218, netmask=255.255.254.0
		ens224 : ip=172.16.218.1, netmask=255.255.255.0
	ntec36-16 (client)	ens192 : get from server ens224 network, see task 1.3
n19	ntec37-16 (server)	ens192 : ip=192.168.42.219, netmask=255.255.254.0
		ens224 : ip=172.16.219.1, netmask=255.255.255.0

	ntec38-16 (client)	ens192 : get from server ens224 network, see task 1.3
n20	ntec39-16 (server)	ens192 : ip=192.168.42.220, netmask=255.255.254.0
		ens224 : ip=172.16.220.1, netmask=255.255.255.0
	ntec40-16(client)	ens192 : get from server ens224 network, see task 1.3
n21	ntec41-16 (server)	ens192 : ip=192.168.42.221, netmask=255.255.254.0
		ens224 : ip=172.16.221.1, netmask=255.255.255.0
	ntec42-16 (client)	ens192 : get from server ens224 network, see task 1.3
n22	ntec43-16 (server)	ens192 : ip=192.168.42.222, netmask=255.255.254.0
		ens224 : ip=172.16.222.1, netmask=255.255.255.0
	ntec44-16 (client)	ens192 : get from server ens224 network, see task 1.3
n23	ntec45-16(server)	ens192 : ip=192.168.42.223, netmask=255.255.254.0
		ens224 : ip=172.16.223.1, netmask=255.255.255.0
	ntec46-16 (client)	ens192 : get from server ens224 network, see task 1.3
n24	ntec47-16 (server)	ens192 : ip=192.168.42.224, netmask=255.255.254.0
		ens224 : ip=172.16.224.1, netmask=255.255.255.0
	ntec48-16 (client)	ens192 : get from server ens224 network, see task 1.3
n25	ntec49-16 (server)	ens192 : ip=192.168.42.225, netmask=255.255.254.0
		ens224 : ip=172.16.225.1, netmask=255.255.255.0
	ntec50-16 (client)	ens192 : get from server ens224 network, see task 1.3

Group	Assigned vm Linux hosts	ip address/subnet
h1	ntec1-17 (server)	ens192 : ip=192.168.43.31, netmask=255.255.254.0
		ens224 : ip=172.16.31.1, netmask=255.255.255.0
	ntec2-17 (client)	ens192 : get from server ens224 network, see task 1.3
h2	ntec3-17 (server)	ens192 : ip=192.168.43.32, netmask=255.255.254.0
		ens224 : ip=172.16.32.1, netmask=255.255.255.0
	ntec4-17 (client)	ens192 : get from server ens224 network, see task 1.3
h3	ntec5-17 (server)	ens192 : ip=192.168.43.33, netmask=255.255.254.0
		ens224 : ip=172.16.33.1, netmask=255.255.255.0

	ntec6-17(client)	ens192 : get from server ens224 network, see task 1.3
h4	ntec7-17 (server)	ens192 : ip=192.168.43.34, netmask=255.255.254.0
		ens224 : ip=172.16.34.1, netmask=255.255.255.0
	ntec8-17 (client)	ens192 : get from server ens224 network, see task 1.3
h5	ntec9-17 (server)	ens192 : ip=192.168.43.35, netmask=255.255.254.0
		ens224 : ip=172.16.35.1, netmask=255.255.255.0
	ntec10-17 (client)	ens192 : get from server ens224 network, see task 1.3
h6	ntec11-17 (server)	ens192 : ip=192.168.43.36, netmask=255.255.254.0
		ens224 : ip=172.16.36.1, netmask=255.255.255.0
	ntec12-17 (client)	ens192 : get from server ens224 network, see task 1.3
h7	ntec13-17 (server)	ens192 : ip=192.168.43.37, netmask=255.255.254.0
		ens224 : ip=172.16.37.1, netmask=255.255.255.0
	ntec14-17 (client)	ens192 : get from server ens224 network, see task 1.3
h8	ntec15-17 (server)	ens192 : ip=192.168.43.38, netmask=255.255.254.0
		ens224 : ip=172.16.38.1, netmask=255.255.255.0
	ntec16-17 (client)	ens192 : get from server ens224 network, see task 1.3
h9	ntec17-17 (server)	ens192 : ip=192.168.43.39, netmask=255.255.254.0
		ens224 : ip=172.16.39.1, netmask=255.255.255.0
	ntec18-17 (client)	ens192 : get from server ens224 network, see task 1.3
h10	ntec19-17 (server)	ens192 : ip=192.168.43.40, netmask=255.255.254.0
		ens224 : ip=172.16.40.1, netmask=255.255.255.0
	ntec20-17 (client)	ens192 : get from server ens224 network, see task 1.3
h11	ntec21-17 (server)	ens192 : ip=192.168.43.41, netmask=255.255.254.0
		ens224 : ip=172.16.41.1, netmask=255.255.255.0
	ntec22-17 (client)	ens192 : get from server ens224 network, see task 1.3
h12	ntec23-17 (server)	ens192 : ip=192.168.43.42, netmask=255.255.254.0
		ens224 : ip=172.16.42.1, netmask=255.255.255.0
	ntec24-17 (client)	ens192 : get from server ens224 network, see task 1.3
h13	ntec25-17 (server)	ens192 : ip=192.168.43.43, netmask=255.255.254.0
		ens224 : ip=172.16.43.1, netmask=255.255.255.0
	ntec26-17 (client)	ens192 : get from server ens224 network, see task 1.3

h14	ntec27-17 (server)	ens192 : ip=192.168.43.44, netmask=255.255.254.0
		ens224 : ip=172.16.44.1, netmask=255.255.255.0
	ntec28-17 (client)	ens192 : get from server ens224 network, see task 1.3
h15	ntec29-17 (server)	ens192 : ip=192.168.43.45, netmask=255.255.254.0
		ens224 : ip=172.16.45.1, netmask=255.255.255.0
	ntec30-17 (client)	ens192 : get from server ens224 network, see task 1.3
h16	ntec31-17 (server)	ens192 : ip=192.168.43.46, netmask=255.255.254.0
		ens224 : ip=172.16.46.1, netmask=255.255.255.0
	ntec32-17 (client)	ens192 : get from server ens224 network, see task 1.3
h17	ntec33-17 (server)	ens192 : ip=192.168.43.47, netmask=255.255.254.0
		ens224 : ip=172.16.47.1, netmask=255.255.255.0
	ntec34-17 (client)	ens192 : get from server ens224 network, see task 1.3
h18	ntec35-17 (server)	ens192 : ip=192.168.43.48, netmask=255.255.254.0
		ens224 : ip=172.16.48.1, netmask=255.255.255.0
	ntec36-17 (client)	ens192 : get from server ens224 network, see task 1.3
h19	ntec37-17 (server)	ens192 : ip=192.168.43.49, netmask=255.255.254.0
		ens224 : ip=172.16.49.1, netmask=255.255.255.0
	ntec38-17 (client)	ens192 : get from server ens224 network, see task 1.3
h20	ntec39-17 (server)	ens192 : ip=192.168.43.50, netmask=255.255.254.0
		ens224 : ip=172.16.50.1, netmask=255.255.255.0
	ntec40-17 (client)	ens192 : get from server ens224 network, see task 1.3
h21	ntec41-17 (server)	ens192 : ip=192.168.43.51, netmask=255.255.254.0
		ens224 : ip=172.16.51.1, netmask=255.255.255.0
	ntec42-17 (client)	ens192 : get from server ens224 network, see task 1.3
h22	ntec43-17 (server)	ens192 : ip=192.168.43.52, netmask=255.255.254.0
		ens224 : ip=172.16.52.1, netmask=255.255.255.0
	ntec44-17 (client)	ens192 : get from server ens224 network, see task 1.3
h23	ntec45-17 (server)	ens192 : ip=192.168.43.53, netmask=255.255.254.0
		ens224 : ip=172.16.53.1, netmask=255.255.255.0
	ntec46-17 (client)	ens192 : get from server ens224 network, see task 1.3
h22	ntec47-17 (server)	ens192 : ip=192.168.43.54, netmask=255.255.254.0

		ens224 : ip=172.16.54.1, netmask=255.255.255.0
	ntec48-17 (client)	ens192 : get from server ens224 network, see task 1.3
h25	ntec49-17 (server)	ens192 : ip=192.168.43.55, netmask=255.255.254.0
		ens224 : ip=172.16.55.1, netmask=255.255.255.0
	ntec50-17 (client)	ens192 : get from server ens224 network, see task 1.3

Group	Assigned vm Linux hosts	ip address/subnet
i1	ntec1-18 (server)	ens192 : ip=192.168.43.71, netmask=255.255.254.0
		ens224 : ip=172.16.71.1, netmask=255.255.255.0
	ntec2-18 (client)	ens192 : get from server ens224 network, see task 1.3
i2	ntec3-18 (server)	ens192 : ip=192.168.43.72, netmask=255.255.254.0
		ens224 : ip=172.16.72.1, netmask=255.255.255.0
	ntec4-18 (client)	ens192 : get from server ens224 network, see task 1.3
i3	ntec5-18 (server)	ens192 : ip=192.168.43.73, netmask=255.255.254.0
		ens224 : ip=172.16.73.1, netmask=255.255.255.0
	ntec6-18 (client)	ens192 : get from server ens224 network, see task 1.3
i4	ntec7-18 (server)	ens192 : ip=192.168.43.74, netmask=255.255.254.0
		ens224 : ip=172.16.74.1, netmask=255.255.255.0
	ntec8-18 (client)	ens192 : get from server ens224 network, see task 1.3
i5	ntec9-18 (server)	ens192 : ip=192.168.43.75, netmask=255.255.254.0
		ens224 : ip=172.16.75.1, netmask=255.255.255.0
	ntec10-18 (client)	ens192 : get from server ens224 network, see task 1.3
i6	ntec11-18 (server)	ens192 : ip=192.168.43.76, netmask=255.255.254.0
		ens224 : ip=172.16.76.1, netmask=255.255.255.0
	ntec12-18 (client)	ens192 : get from server ens224 network, see task 1.3
i7	ntec13-18 (server)	ens192 : ip=192.168.43.77, netmask=255.255.254.0
		ens224 : ip=172.16.77.1, netmask=255.255.255.0
	ntec14-18 (client)	ens192 : get from server ens224 network, see task 1.3
i8	ntec15-18 (server)	ens192 : ip=192.168.43.78, netmask=255.255.254.0
		ens224 : ip=172.16.78.1, netmask=255.255.255.0

	ntec16-18 (client)	ens192 : get from server ens224 network, see task 1.3
i9	ntec17-18 (server)	ens192 : ip=192.168.43.79, netmask=255.255.254.0 ens224 : ip=172.16.79.1, netmask=255.255.255.0
	ntec18-18 (client)	ens192 : get from server ens224 network, see task 1.3
i10	ntec19-18 (server)	ens192 : ip=192.168.43.80, netmask=255.255.254.0 ens224 : ip=172.16.80.1, netmask=255.255.255.0
	ntec20-18 (client)	ens192 : get from server ens224 network, see task 1.3
i11	ntec21-18 (server)	ens192 : ip=192.168.43.81, netmask=255.255.254.0 ens224 : ip=172.16.81.1, netmask=255.255.255.0
	ntec22-18 (client)	ens192 : get from server ens224 network, see task 1.3
i12	ntec23-18 (server)	ens192 : ip=192.168.43.82, netmask=255.255.254.0 ens224 : ip=172.16.82.1, netmask=255.255.255.0
	ntec24-18 (client)	ens192 : get from server ens224 network, see task 1.3
i13	ntec25-18 (server)	ens192 : ip=192.168.43.83, netmask=255.255.254.0 ens224 : ip=172.16.83.1, netmask=255.255.255.0
	ntec26-18 (client)	ens192 : get from server ens224 network, see task 1.3
i14	ntec27-18 (server)	ens192 : ip=192.168.43.84, netmask=255.255.254.0 ens224 : ip=172.16.84.1, netmask=255.255.255.0
	ntec28-18 (client)	ens192 : get from server ens224 network, see task 1.3
i15	ntec29-18 (server)	ens192 : ip=192.168.43.85, netmask=255.255.254.0 ens224 : ip=172.16.85.1, netmask=255.255.255.0
	ntec30-18 (client)	ens192 : get from server ens224 network, see task 1.3
i16	Ntec31-18 (server)	ens192 : ip=192.168.43.86, netmask=255.255.254.0 ens224 : ip=172.16.86.1, netmask=255.255.255.0
	ntec32-18 (client)	ens192 : get from server ens224 network, see task 1.3
i17	ntec33-18 (server)	ens192 : ip=192.168.43.87, netmask=255.255.254.0 ens224 : ip=172.16.87.1, netmask=255.255.255.0
	ntec34-18 (client)	ens192 : get from server ens224 network, see task 1.3
i18	ntec35-18 (server)	ens192 : ip=192.168.43.88, netmask=255.255.254.0 ens224 : ip=172.16.88.1, netmask=255.255.255.0
	ntec36-18 (client)	ens192 : get from server ens224 network, see task 1.3

i19	ntec37-18 (server)	ens192 : ip=192.168.43.89, netmask=255.255.254.0
		ens224 : ip=172.16.89.1, netmask=255.255.255.0
	ntec38-18 (client)	ens192 : get from server ens224 network, see task 1.3
i20	ntec39-18 (server)	ens192 : ip=192.168.43.90, netmask=255.255.254.0
		ens224 : ip=172.16.90.1, netmask=255.255.255.0
	ntec40-18 (client)	ens192 : get from server ens224 network, see task 1.3
i21	ntec41-18 (server)	ens192 : ip=192.168.43.91, netmask=255.255.254.0
		ens224 : ip=172.16.91.1, netmask=255.255.255.0
	ntec42-18 (client)	ens192 : get from server ens224 network, see task 1.3
i22	ntec43-18 (server)	ens192 : ip=192.168.43.92, netmask=255.255.254.0
		ens224 : ip=172.16.92.1, netmask=255.255.255.0
	ntec44-18 (client)	ens192 : get from server ens224 network, see task 1.3
i23	ntec45-18 (server)	ens192 : ip=192.168.43.93, netmask=255.255.254.0
		ens224 : ip=172.16.93.1, netmask=255.255.255.0
	ntec46-18 (client)	ens192 : get from server ens224 network, see task 1.3
i24	ntec47-18 (server)	ens192 : ip=192.168.43.94, netmask=255.255.254.0
		ens224 : ip=172.16.94.1, netmask=255.255.255.0
	ntec48-18 (client)	ens192 : get from server ens224 network, see task 1.3
i25	ntec49-18 (server)	ens192 : ip=192.168.43.95, netmask=255.255.254.0
		ens224 : ip=172.16.95.1, netmask=255.255.255.0
	Ntec50-18 (client)	ens192 : get from server ens224 network, see task 1.3

Group	Assigned vm Linux hosts	ip address/subnet
j1	ntec1-19 (server)	ens192 : ip=192.168.43.111, netmask=255.255.254.0
		ens224 : ip=172.16.111.1, netmask=255.255.255.0
	ntec2-19 (client)	ens192 : get from server ens224 network, see task 1.3
j2	ntec3-19 (server)	ens192 : ip=192.168.43.112, netmask=255.255.254.0
		ens224 : ip=172.16.112.1, netmask=255.255.255.0
	ntec4-19 (client)	ens192 : get from server ens224 network, see task 1.3
j3	ntec5-19 (server)	ens192 : ip=192.168.43.113, netmask=255.255.254.0
		ens224 : ip=172.16.113.1, netmask=255.255.255.0

	ntec6-19 (client)	ens192 : get from server ens224 network, see task 1.3
j4	ntec7-19 (server)	ens192 : ip=192.168.43.114, netmask=255.255.254.0 ens224 : ip=172.16.114.1, netmask=255.255.255.0
	ntec8-19 (client)	ens192 : get from server ens224 network, see task 1.3
j5	ntec9-19 (server)	ens192 : ip=192.168.43.115, netmask=255.255.254.0 ens224 : ip=172.16.115.1, netmask=255.255.255.0
	ntec10-19 (client)	ens192 : get from server ens224 network, see task 1.3
j6	ntec11-19 (server)	ens192 : ip=192.168.43.116, netmask=255.255.254.0 ens224 : ip=172.16.116.1, netmask=255.255.255.0
	ntec12-19 (client)	ens192 : get from server ens224 network, see task 1.3
j7	ntec13-19 (server)	ens192 : ip=192.168.43.117, netmask=255.255.254.0 ens224 : ip=172.16.117.1, netmask=255.255.255.0
	ntec14-19 (client)	ens192 : get from server ens224 network, see task 1.3
j8	ntec15-19 (server)	ens192 : ip=192.168.43.118, netmask=255.255.254.0 ens224 : ip=172.16.118.1, netmask=255.255.255.0
	ntec16-19 (client)	ens192 : get from server ens224 network, see task 1.3
J9	ntec17-19 (server)	ens192 : ip=192.168.43.119, netmask=255.255.254.0 ens224 : ip=172.16.119.1, netmask=255.255.255.0
	ntec18-19 (client)	ens192 : get from server ens224 network, see task 1.3
J10	ntec19-19 (server)	ens192 : ip=192.168.43.120, netmask=255.255.254.0 ens224 : ip=172.16.120.1, netmask=255.255.255.0
	ntec20-19 (client)	ens192 : get from server ens224 network, see task 1.3
J11	ntec21-19 (server)	ens192 : ip=192.168.43.121, netmask=255.255.254.0 ens224 : ip=172.16.121.1, netmask=255.255.255.0
	ntec22-19 (client)	ens192 : get from server ens224 network, see task 1.3
J12	ntec23-19 (server)	ens192 : ip=192.168.43.122, netmask=255.255.254.0 ens224 : ip=172.16.122.1, netmask=255.255.255.0
	ntec24-19 (client)	ens192 : get from server ens224 network, see task 1.3
J13	ntec25-19 (server)	ens192 : ip=192.168.43.123, netmask=255.255.254.0 ens224 : ip=172.16.123.1, netmask=255.255.255.0
	ntec26-19 (client)	ens192 : get from server ens224 network, see task 1.3

Group	Assigned vm Linux hosts	ip address/subnet
J14	ntec27-19 (server)	ens192 : ip=192.168.43.124, netmask=255.255.254.0
		ens224 : ip=172.16.124.1, netmask=255.255.255.0
	ntec28-19 (client)	ens192 : get from server ens224 network, see task 1.3
J15	ntec29-19 (server)	ens192 : ip=192.168.43.125, netmask=255.255.254.0
		ens224 : ip=172.16.125.1, netmask=255.255.255.0
	ntec30-19 (client)	ens192 : get from server ens224 network, see task 1.3
J16	ntec31-19 (server)	ens192 : ip=192.168.43.126, netmask=255.255.254.0
		ens224 : ip=172.16.126.1, netmask=255.255.255.0
	ntec32-19 (client)	ens192 : get from server ens224 network, see task 1.3
J17	ntec33-19 (server)	ens192 : ip=192.168.43.127, netmask=255.255.254.0
		ens224 : ip=172.16.127.1, netmask=255.255.255.0
	ntec34-19 (client)	ens192 : get from server ens224 network, see task 1.3
J18	ntec35-19 (server)	ens192 : ip=192.168.43.128, netmask=255.255.254.0
		ens224 : ip=172.16.128.1, netmask=255.255.255.0
	ntec36-19 (client)	ens192 : get from server ens224 network, see task 1.3
J19	ntec37-19 (server)	ens192 : ip=192.168.43.129, netmask=255.255.254.0
		ens224 : ip=172.16.129.1, netmask=255.255.255.0
	ntec38-19 (client)	ens192 : get from server ens224 network, see task 1.3
j20	ntec39-19 (server)	ens192 : ip=192.168.43.130, netmask=255.255.254.0
		ens224 : ip=172.16.130.1, netmask=255.255.255.0
	ntec40-19 (client)	ens192 : get from server ens224 network, see task 1.3
j21	ntec41-19 (server)	ens192 : ip=192.168.43.131, netmask=255.255.254.0
		ens224 : ip=172.16.131.1, netmask=255.255.255.0
	ntec42-19 (client)	ens192 : get from server ens224 network, see task 1.3
j22	ntec43-19 (server)	ens192 : ip=192.168.43.132, netmask=255.255.254.0
		ens224 : ip=172.16.132.1, netmask=255.255.255.0
	ntec44-19 (client)	ens192 : get from server ens224 network, see task 1.3

Group	Assigned vm Linux hosts	ip address/subnet
k1	ntec1-20 (server)	ens192 : ip=192.168.43.141, netmask=255.255.254.0

		ens224 : ip=172.16.141.1, netmask=255.255.255.0
	ntec2-20 (client)	ens192 : get from server ens224 network, see task 1.3
k2	ntec3-20 (server)	ens192 : ip=192.168.43.142, netmask=255.255.254.0
		ens224 : ip=172.16.142.1, netmask=255.255.255.0
	ntec4-20 (client)	ens192 : get from server ens224 network, see task 1.3
k3	ntec5-20 (server)	ens192 : ip=192.168.43.143, netmask=255.255.254.0
		ens224 : ip=172.16.143.1, netmask=255.255.255.0
	ntec6-20 (client)	ens192 : get from server ens224 network, see task 1.3
k4	ntec7-20 (server)	ens192 : ip=192.168.43.144, netmask=255.255.254.0
		ens224 : ip=172.16.144.1, netmask=255.255.255.0
	ntec8-20 (client)	ens192 : get from server ens224 network, see task 1.3
k5	ntec9-20 (server)	ens192 : ip=192.168.43.145, netmask=255.255.254.0
		ens224 : ip=172.16.145.1, netmask=255.255.255.0
	ntec10-20 (client)	ens192 : get from server ens224 network, see task 1.3
k6	ntec11-20 (server)	ens192 : ip=192.168.43.146, netmask=255.255.254.0
		ens224 : ip=172.16.146.1, netmask=255.255.255.0
	ntec12-20 (client)	ens192 : get from server ens224 network, see task 1.3
k7	ntec13-20 (server)	ens192 : ip=192.168.43.147, netmask=255.255.254.0
		ens224 : ip=172.16.147.1, netmask=255.255.255.0
	ntec14-20 (client)	ens192 : get from server ens224 network, see task 1.3
k8	ntec15-20 (server)	ens192 : ip=192.168.43.148, netmask=255.255.254.0
		ens224 : ip=172.16.148.1, netmask=255.255.255.0
	ntec16-20 (client)	ens192 : get from server ens224 network, see task 1.3
k9	ntec17-20 (server)	ens192 : ip=192.168.43.149, netmask=255.255.254.0
		ens224 : ip=172.16.149.1, netmask=255.255.255.0
	ntec18-20 (client)	ens192 : get from server ens224 network, see task 1.3
k10	ntec19-20 (server)	ens192 : ip=192.168.43.150, netmask=255.255.254.0
		ens224 : ip=172.16.150.1, netmask=255.255.255.0
	ntec20-20 (client)	ens192 : get from server ens224 network, see task 1.3
k11	ntec21-20 (server)	ens192 : ip=192.168.43.151, netmask=255.255.254.0
		ens224 : ip=172.16.151.1, netmask=255.255.255.0

	ntec22-20 (client)	ens192 : get from server ens224 network, see task 1.3
k12	ntec23-20 (server)	ens192 : ip=192.168.43.152, netmask=255.255.254.0 ens224 : ip=172.16.152.1, netmask=255.255.255.0
	ntec24-20 (client)	ens192 : get from server ens224 network, see task 1.3
k13	ntec25-20 (server)	ens192 : ip=192.168.43.153, netmask=255.255.254.0 ens224 : ip=172.16.153.1, netmask=255.255.255.0
	ntec26-20 (client)	ens192 : get from server ens224 network, see task 1.3
k14	ntec27-20 (server)	ens192 : ip=192.168.43.154, netmask=255.255.254.0 ens224 : ip=172.16.154.1, netmask=255.255.255.0
	ntec28-20 (client)	ens192 : get from server ens224 network, see task 1.3
k15	ntec29-20 (server)	ens192 : ip=192.168.43.155, netmask=255.255.254.0 ens224 : ip=172.16.155.1, netmask=255.255.255.0
	ntec30-20 (client)	ens192 : get from server ens224 network, see task 1.3
k16	ntec31-20 (server)	ens192 : ip=192.168.43.156, netmask=255.255.254.0 ens224 : ip=172.16.156.1, netmask=255.255.255.0
	ntec32-20 (client)	ens192 : get from server ens224 network, see task 1.3
k17	ntec33-20 (server)	ens192 : ip=192.168.43.157, netmask=255.255.254.0 ens224 : ip=172.16.157.1, netmask=255.255.255.0
	ntec34-20 (client)	ens192 : get from server ens224 network, see task 1.3
k18	ntec35-20 (server)	ens192 : ip=192.168.43.158, netmask=255.255.254.0 ens224 : ip=172.16.158.1, netmask=255.255.255.0
	ntec36-20 (client)	ens192 : get from server ens224 network, see task 1.3
k19	ntec37-20 (server)	ens192 : ip=192.168.43.159, netmask=255.255.254.0 ens224 : ip=172.16.159.1, netmask=255.255.255.0
	ntec38-20 (client)	ens192 : get from server ens224 network, see task 1.3
k20	ntec39-20 (server)	ens192 : ip=192.168.43.160, netmask=255.255.254.0 ens224 : ip=172.16.160.1, netmask=255.255.255.0
	ntec40-20 (client)	ens192 : get from server ens224 network, see task 1.3
k21	ntec41-20 (server)	ens192 : ip=192.168.43.161, netmask=255.255.254.0 ens224 : ip=172.16.161.1, netmask=255.255.255.0
	ntec42-20 (client)	ens192 : get from server ens224 network, see task 1.3

Group	Assigned vm Linux hosts	ip address/subnet
k22	ntec43-20 (server)	ens192 : ip=192.168.43.162, netmask=255.255.254.0
		ens224 : ip=172.16.162.1, netmask=255.255.255.0
	ntec44-20 (client)	ens192 : get from server ens224 network, see task 1.3

Group	Assigned vm Linux hosts	ip address/subnet
l1	ntec1-21 (server)	ens192 : ip=192.168.43.171, netmask=255.255.254.0
		ens224 : ip=172.16.171.1, netmask=255.255.255.0
	ntec2-21 (client)	ens192 : get from server ens224 network, see task 1.3
l2	ntec3-21 (server)	ens192 : ip=192.168.43.172, netmask=255.255.254.0
		ens224 : ip=172.16.172.1, netmask=255.255.255.0
	ntec4-21 (client)	ens192 : get from server ens224 network, see task 1.3
l3	ntec5-21 (server)	ens192 : ip=192.168.43.173, netmask=255.255.254.0
		ens224 : ip=172.16.173.1, netmask=255.255.255.0
	ntec6-21 (client)	ens192 : get from server ens224 network, see task 1.3
l4	ntec7-21 (server)	ens192 : ip=192.168.43.174, netmask=255.255.254.0
		ens224 : ip=172.16.174.1, netmask=255.255.255.0
	ntec8-21 (client)	ens192 : get from server ens224 network, see task 1.3
l5	ntec9-21 (server)	ens192 : ip=192.168.43.175, netmask=255.255.254.0
		ens224 : ip=172.16.175.1, netmask=255.255.255.0
	ntec10-21 (client)	ens192 : get from server ens224 network, see task 1.3
l6	ntec11-21 (server)	ens192 : ip=192.168.43.176, netmask=255.255.254.0
		ens224 : ip=172.16.176.1, netmask=255.255.255.0
	ntec12-21 (client)	ens192 : get from server ens224 network, see task 1.3
l7	ntec13-21 (server)	ens192 : ip=192.168.43.177, netmask=255.255.254.0
		ens224 : ip=172.16.177.1, netmask=255.255.255.0
	ntec14-21 (client)	ens192 : get from server ens224 network, see task

		1.3
l8	ntec15-21 (server)	ens192 : ip=192.168.43.178, netmask=255.255.254.0 ens224 : ip=172.16.178.1, netmask=255.255.255.0
	ntec16-21 (client)	ens192 : get from server ens224 network, see task 1.3
l9	ntec17-21 (server)	ens192 : ip=192.168.43.179, netmask=255.255.254.0 ens224 : ip=172.16.179.1, netmask=255.255.255.0
	ntec18-21 (client)	ens192 : get from server ens224 network, see task 1.3
l10	ntec19-21 (server)	ens192 : ip=192.168.43.180, netmask=255.255.254.0 ens224 : ip=172.16.180.1, netmask=255.255.255.0
	ntec20-21 (client)	ens192 : get from server ens224 network, see task 1.3
l11	ntec21-21 (server)	ens192 : ip=192.168.43.181, netmask=255.255.254.0 ens224 : ip=172.16.181.1, netmask=255.255.255.0
	ntec22-21 (client)	ens192 : get from server ens224 network, see task 1.3
l12	ntec23-21 (server)	ens192 : ip=192.168.43.182, netmask=255.255.254.0 ens224 : ip=172.16.182.1, netmask=255.255.255.0
	ntec24-21 (client)	ens192 : get from server ens224 network, see task 1.3
l13	ntec25-21 (server)	ens192 : ip=192.168.43.183, netmask=255.255.254.0 ens224 : ip=172.16.183.1, netmask=255.255.255.0
	ntec26-21 (client)	ens192 : get from server ens224 network, see task 1.3
l14	ntec27-21 (server)	ens192 : ip=192.168.43.184, netmask=255.255.254.0 ens224 : ip=172.16.184.1, netmask=255.255.255.0
	ntec28-21 (client)	ens192 : get from server ens224 network, see task 1.3
l15	ntec29-21 (server)	ens192 : ip=192.168.43.185, netmask=255.255.254.0 ens224 : ip=172.16.185.1, netmask=255.255.255.0
	ntec30-21 (client)	ens192 : get from server ens224 network, see task

		1.3
l16	ntec31-21 (server)	ens192 : ip=192.168.43.186, netmask=255.255.254.0 ens224 : ip=172.16.186.1, netmask=255.255.255.0
	ntec32-21 (client)	ens192 : get from server ens224 network, see task 1.3
l17	ntec33-21 (server)	ens192 : ip=192.168.43.187, netmask=255.255.254.0 ens224 : ip=172.16.187.1, netmask=255.255.255.0
	ntec34-21 (client)	ens192 : get from server ens224 network, see task 1.3
l18	ntec35-21 (server)	ens192 : ip=192.168.43.188, netmask=255.255.254.0 ens224 : ip=172.16.188.1, netmask=255.255.255.0
	ntec36-21 (client)	ens192 : get from server ens224 network, see task 1.3
l19	ntec37-21 (server)	ens192 : ip=192.168.43.189, netmask=255.255.254.0 ens224 : ip=172.16.189.1, netmask=255.255.255.0
	ntec38-21 (client)	ens192 : get from server ens224 network, see task 1.3
l20	ntec39-21 (server)	ens192 : ip=192.168.43.190, netmask=255.255.254.0 ens224 : ip=172.16.190.1, netmask=255.255.255.0
	ntec40-21 (client)	ens192 : get from server ens224 network, see task 1.3
l21	ntec41-21 (server)	ens192 : ip=192.168.43.191, netmask=255.255.254.0 ens224 : ip=172.16.191.1, netmask=255.255.255.0
	ntec42-21 (client)	ens192 : get from server ens224 network, see task 1.3
l22	ntec43-21 (server)	ens192 : ip=192.168.43.192, netmask=255.255.254.0 ens224 : ip=172.16.192.1, netmask=255.255.255.0
	ntec44-21 (client)	ens192 : get from server ens224 network, see task 1.3

Group	Assigned vm Linux hosts	ip address/subnet
m1	ntec1-22 (server)	ens192 : ip=192.168.43.201, netmask=255.255.254.0

		ens224 : ip=172.16.201.1, netmask=255.255.255.0
	ntec2-22 (client)	ens192 : get from server ens224 network, see task 1.3
m2	ntec3-22 (server)	ens192 : ip=192.168.43.202, netmask=255.255.254.0
		ens224 : ip=172.16.202.1, netmask=255.255.255.0
	ntec4-22 (client)	ens192 : get from server ens224 network, see task 1.3
m3	ntec5-22 (server)	ens192 : ip=192.168.43.203, netmask=255.255.254.0
		ens224 : ip=172.16.203.1, netmask=255.255.255.0
	ntec6-22 (client)	ens192 : get from server ens224 network, see task 1.3
m4	ntec7-22 (server)	ens192 : ip=192.168.43.204, netmask=255.255.254.0
		ens224 : ip=172.16.204.1, netmask=255.255.255.0
	ntec8-22 (client)	ens192 : get from server ens224 network, see task 1.3
m5	ntec9-22 (server)	ens192 : ip=192.168.43.205, netmask=255.255.254.0
		ens224 : ip=172.16.205.1, netmask=255.255.255.0
	ntec10-22 (client)	ens192 : get from server ens224 network, see task 1.3
m6	ntec11-22 (server)	ens192 : ip=192.168.43.206, netmask=255.255.254.0
		ens224 : ip=172.16.206.1, netmask=255.255.255.0
	ntec12-22 (client)	ens192 : get from server ens224 network, see task 1.3
m7	ntec13-22 (server)	ens192 : ip=192.168.43.207, netmask=255.255.254.0
		ens224 : ip=172.16.207.1, netmask=255.255.255.0
	ntec14-22 (client)	ens192 : get from server ens224 network, see task 1.3
m8	ntec15-22 (server)	ens192 : ip=192.168.43.208, netmask=255.255.254.0
		ens224 : ip=172.16.208.1, netmask=255.255.255.0
	ntec16-22 (client)	ens192 : get from server ens224 network, see task 1.3
m9	ntec17-22 (server)	ens192 : ip=192.168.43.209, netmask=255.255.254.0
		ens224 : ip=172.16.209.1, netmask=255.255.255.0
	ntec18-22 (client)	ens192 : get from server ens224 network, see task 1.3
m10	ntec19-22 (server)	ens192 : ip=192.168.43.210, netmask=255.255.254.0
		ens224 : ip=172.16.210.1, netmask=255.255.255.0
	ntec20-22 (client)	ens192 : get from server ens224 network, see task 1.3
m11	ntec21-22 (server)	ens192 : ip=192.168.43.211, netmask=255.255.254.0
		ens224 : ip=172.16.211.1, netmask=255.255.255.0

	ntec22-22 (client)	ens192 : get from server ens224 network, see task 1.3
m12	ntec23-22 (server)	ens192 : ip=192.168.43.212, netmask=255.255.254.0
		ens224 : ip=172.16.212.1, netmask=255.255.255.0
	ntec24-22 (client)	ens192 : get from server ens224 network, see task 1.3
m13	ntec25-22 (server)	ens192 : ip=192.168.43.213, netmask=255.255.254.0
		ens224 : ip=172.16.213.1, netmask=255.255.255.0
	ntec26-22 (client)	ens192 : get from server ens224 network, see task 1.3
m14	ntec27-22 (server)	ens192 : ip=192.168.43.214, netmask=255.255.254.0
		ens224 : ip=172.16.214.1, netmask=255.255.255.0
	ntec28-22 (client)	ens192 : get from server ens224 network, see task 1.3
m15	ntec29-22 (server)	ens192 : ip=192.168.43.215, netmask=255.255.254.0
		ens224 : ip=172.16.215.1, netmask=255.255.255.0
	ntec30-22 (client)	ens192 : get from server ens224 network, see task 1.3
m16	ntec31-22 (server)	ens192 : ip=192.168.43.216, netmask=255.255.254.0
		ens224 : ip=172.16.216.1, netmask=255.255.255.0
	ntec32-22 (client)	ens192 : get from server ens224 network, see task 1.3
m17	ntec33-22 (server)	ens192 : ip=192.168.43.217, netmask=255.255.254.0
		ens224 : ip=172.16.217.1, netmask=255.255.255.0
	ntec34-22 (client)	ens192 : get from server ens224 network, see task 1.3
m18	ntec35-22 (server)	ens192 : ip=192.168.43.218, netmask=255.255.254.0
		ens224 : ip=172.16.218.1, netmask=255.255.255.0
	ntec36-22 (client)	ens192 : get from server ens224 network, see task 1.3
m19	ntec37-22 (server)	ens192 : ip=192.168.43.219, netmask=255.255.254.0
		ens224 : ip=172.16.219.1, netmask=255.255.255.0
	ntec38-22 (client)	ens192 : get from server ens224 network, see task 1.3
m20	ntec39-22 (server)	ens192 : ip=192.168.43.220, netmask=255.255.254.0
		ens224 : ip=172.16.220.1, netmask=255.255.255.0
	ntec40-22 (client)	ens192 : get from server ens224 network, see task 1.3
m21	ntec41-22 (server)	ens192 : ip=192.168.43.221, netmask=255.255.254.0
		ens224 : ip=172.16.221.1, netmask=255.255.255.0
	ntec42-22 (client)	ens192 : get from server ens224 network, see task 1.3

m22	ntec43-22 (server)	ens192 : ip=192.168.43.222, netmask=255.255.254.0
		ens224 : ip=172.16.222.1, netmask=255.255.255.0
	ntec44-22 (client)	ens192 : get from server ens224 network, see task 1.3
m23	ntec45-22 (server)	ens192 : ip=192.168.43.223, netmask=255.255.254.0
		ens224 : ip=172.16.223.1, netmask=255.255.255.0
	ntec46-22 (client)	ens192 : get from server ens224 network, see task 1.3
m24	ntec47-22 (server)	ens192 : ip=192.168.43.224, netmask=255.255.254.0
		ens224 : ip=172.16.224.1, netmask=255.255.255.0
	ntec48-22 (client)	ens192 : get from server ens224 network, see task 1.3
m25	ntec49-22 (server)	ens192 : ip=192.168.43.225, netmask=255.255.254.0
		ens224 : ip=172.16.225.1, netmask=255.255.255.0
	ntec50-22 (client)	ens192 : get from server ens224 network, see task 1.3