



NETWORK  
DESIGN &  
ADMINISTRATION  
(NDA) - LAB

NOTTINGHAM  
TRENT UNIVERSITY 

# Network Design and Administration Lab Book.

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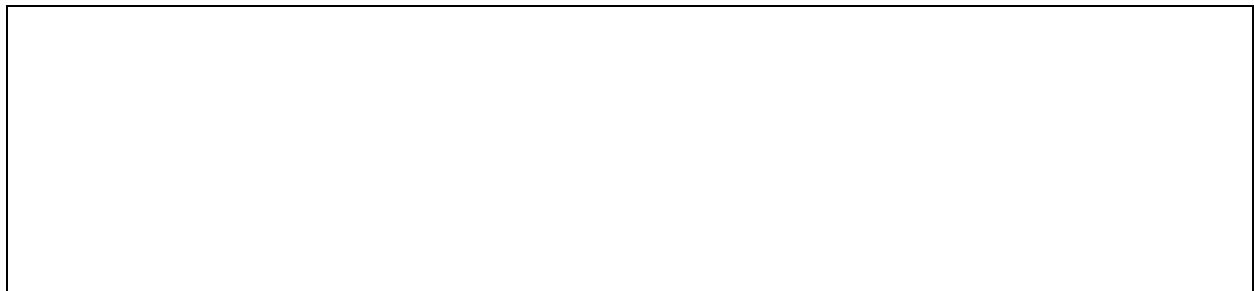
# **Part 1:**

## **Installing and configuring the network & servers**

# Lab 3: Integrating Windows and Linux clients into an Active Directory Windows Domain

## 3.1 Server Configurations

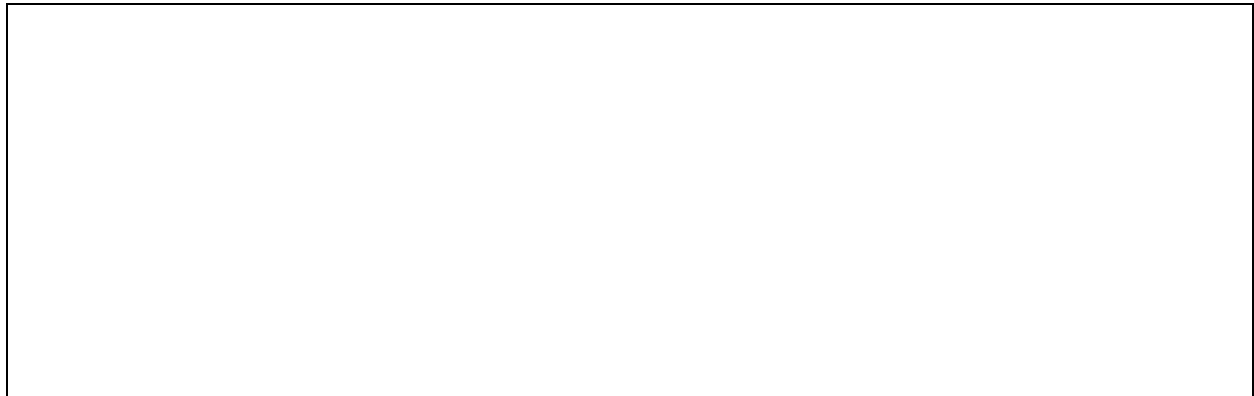
1. Start the “Windows Server 2008 R2 AD” virtual machine.
2. Type the password into the “password” box and press enter or click on the round blue arrow button. The password should be **P@ssword**. If you have previously received a message prompt that says “**Your password has expired and must be changed**” then following the instruction given in Lab1, you must have changed the password to **P@ssword1**. However, use whichever one is the case based on action you have previously performed.
3. Investigate how to update and install the latest “Windows Update” for the Windows Server 2008 R2 AD” virtual machine.
4. In order to install and update the windows, ensure that your window server is re-configured back so that it can access the internet.
5. Click on “Start” and then “Administrative Tools”. Select “Active Directory Users and Computers”.
6. Expand “**dailyplanet.com**” and click on the “Computers” container.
7. **Make a note of what is currently in the container and explain what you think the container is used for.**



8. Close the window.
9. In “Administrative Tools”, select “DNS”.

10. Expand **“DailyPlanetServer”**, **“Forward Lookup Zones”** and then **“dailyplanet.com”**. Carry out the same action for the **“Reverse Lookup Zones”**.

11. **Make a note of what is currently in these containers and explain what you think the containers are used for.**



**Research, investigate and properly study the details in these Zones. Check to see if there are missing entries. Fix and incorporate these entries and configurations accordingly.**

**Also remember the notes on dynamic DNS updates that was provided in Section 2.3 of Lab 2.**

## 3.2 Integrating Windows 7 client

1. Start the **“Windows 7 Client”** virtual machine.
2. Investigate how to change the computer machine name. Change the computer name to **“WIN7-CLIENT-1”**. You might need to restart the Windows 7 VM.
3. Follow the steps below to change the IP address of the client to static address.
  - a. Click on the **“Open Network and Sharing Center”** option.
  - b. Click on the **“Local Area Connection”** option for the **“Unidentified network”**.
  - c. Click on the **“properties”** button.
  - d. Highlight the **“Internet Protocol Version 4 (TCP/IPv4)”** option and click on **“properties”**.
  - e. Select **“Use the following IP address”** and enter the following information:
  - f. IP address: 192.168.1.10 (**why do we prefer to use this IP address**)
  - g. Subnet mask: 255.255.255.0
  - h. Select **“Use the following DNS server addresses”** and enter 192.168.1.1 (server IP address) in to the **“Preferred DNS server”** box.
  - i. Click on the **“OK”** button.
  - j. Click on the **“Close”** button on the **“Local Area Connection Properties”** window.
  - k. Click on the **“Close”** button on the **“Local Area Connection Status”** window.
  - l. Move back to the command prompt window.

m. Confirm that the IP address of the client has now changed.

**Reminder on year 1 module. Investigate how you can ping another machine. Before moving forward, you need to ensure that the client can ping the server.**

4. Click on the “Start” button and open “Control Panel”.
5. Click on “System and Security” and then “System”.
6. Scroll down the window until you can see the “Computer name, domain and workgroup settings” section. Click on the “Change Settings” option.
7. Click on the “Network ID...” button.
8. Make sure the “This computer is part of a business network” option is selected and click on “Next”.
9. Make sure the “My company uses a network with a domain” option is selected and click on “Next”.
10. Make note of the “Information” screen and click on “Next”.
11. Enter **administrator** into the “username” box.
12. Enter the administrator’s password of the windows server 2008 R2 into the “Password” box.
13. Enter “**dailyplanet**” into the “Domain name” box.
14. Click on “Next”.
15. Type “**dailyplanet**” into the “Computer domain” box and click on “Next”.
16. In the “Domain Username and Password” dialogue box, enter the details in steps 13-15 again and then click on “OK”.
17. In the “Do you want to enable a domain user account on this computer?” window select the “Do not add a domain user account” option and click on “Next”.
18. Click on “Finish” and then “OK” into the open window to reboot the client.
19. Click on the “Switch User” button.
20. Now click on the “Other User” option.
21. Type in “**dailyplanet\administrator**” in to the “Username” box.

22. Type in the administrator's password of the windows server 2008 R2 into the "Password" box and press enter. Then, follow the rest of the instructions to join the computer to the domain.

## **Now Switch back to the server virtual machine.**

23. Open "Active Directory Users and Computers" and note what has changed in the "Computers" container.
24. Now open "DNS" and expand the "**DailyPlanetServer**" forward lookup zone and make note of what is contained within "dailyplanet.com".
25. Now, compare this with what you noted down in (Section 3.1, Number 11).

## **Now Switch back to the Windows client.**


1. Investigate how to remove a computer from the DOMAIN.
2. Remove WIN7-CLIENT-1 from the DOMAIN back to the WORKGROUP.
3. Now change the computer name from WIN7-CLIENT-1 to "WIN7-CLIENT-2". You might need to restart the Windows 7 VM.
4. Follow the whole process again and re-join WIN7-CLIENT-2 back to the domain.

Go to Control Panel\System and Security\System

Your windows client should be similar to the screenshot below after joining the domain.

Computer name, domain, and workgroup settings

Computer name: WIN7-CLIENT-2

 Change settings

Full computer name: WIN7-CLIENT-2.dailyplanet.com

Computer description:

Domain: dailyplanet.com

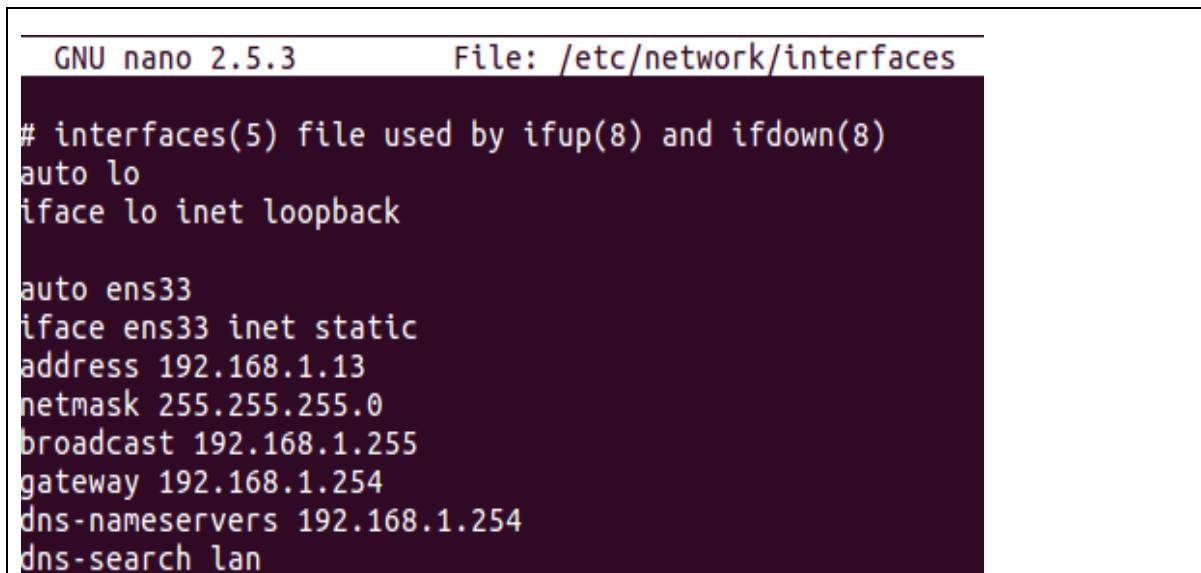




## 3.3 Integrating Linux client

***Note: As a systems administrator you can encounter non-Microsoft based machines which need to be added to an Active Directory network. For instance, Linux is widely used on research machines at universities.***

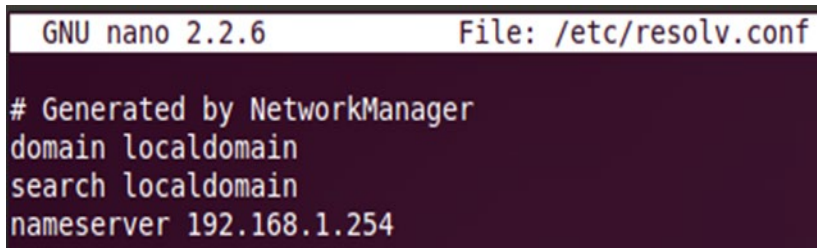
1. Start the “Ubuntu Client” virtual machine. Ubuntu version is 16.04
2. In the “ntu-virtual-machine” window, click on “NTU”.
3. Type your password into the “Password” box and click on “Login”.
4. Double click on the “Terminal” icon on the Ubuntu desktop.
5. Type in **ifconfig** at the prompt. Check, study and take note of the interface.
6. Next step is to use static IP address instead of DHCP assigned IP address. Decide for yourself the IP address to use for the Ubuntu client. (Bear in mind that you plan to add this machine to the server 2008 domain). Ensure that the IP address is consistent in the subsequent files and configurations.
7. Ensure that it is Static IP address by updating the file `/etc/network/interfaces` to look similar to the screenshot below.



```
GNU nano 2.5.3      File: /etc/network/interfaces
# interfaces(5) file used by ifup(8) and ifdown(8)
auto lo
iface lo inet loopback

auto ens33
iface ens33 inet static
address 192.168.1.13
netmask 255.255.255.0
broadcast 192.168.1.255
gateway 192.168.1.254
dns-nameservers 192.168.1.254
dns-search lan
```

8. Update the file `/etc/resolv.conf` to look similar to the screenshot below.



```
GNU nano 2.2.6      File: /etc/resolv.conf

# Generated by NetworkManager
domain localdomain
search localdomain
nameserver 192.168.1.254
```

### 3.3.1 Renaming the machine

**Note:** The virtual machine has been configured to use the name “ntu-virtual-machine”. However, this is 19 characters in length and will have to be reduced to something which is 15 characters or less for it to successfully join a domain.

1. First type in `cp /etc/hostname ~/` to make a backup of the hostname file.
2. Type in `sudo nano /etc/hostname`
3. Type in the password when prompted to enter a password.

Note: You can scroll up/down left/right using the arrow keys when within nano.

4. Change the “ntu-virtual-machine” to ntu-vm
5. Press Ctrl+X.
6. Press Y to save the “modified buffer”.
7. Press enter when it asks you to confirm the file name.

***Note: the machine name will be changed the next time you reboot. However, another change must be made to the hosts file.***

8. Type in `cp /etc/hosts ~/` to make a backup of the hosts file.
9. Type in `sudo nano /etc/hosts`
10. Change the “ntu-virtual-machine” reference so that it reads ntu-vm instead.
11. Press Ctrl+X.
12. Press Y to save the “modified buffer”. Press enter when it asks you to confirm the file name

13. Update both files `/etc/hosts` and `/etc/resolv.conf` appropriately with correct IP addresses.

Update the file `/etc/hosts` to look similar to the screenshot below. Use appropriate machine name and appropriate IP addresses.

```
GNU nano 2.2.6 File: /etc/hosts
127.0.0.1 localhost
192.168.1.12 ntu-vm
192.168.1.2 DailyplanetServer.dailyplanet.com
```

14. Ensure that you can ping from client to server and vice versa.

After that, at the prompt, type in **`sudo reboot`**

***Note: The virtual machine will now reboot. When you get to the log in screen, notice the virtual machine name difference.***

***Before moving forward, you need to ensure that the client can ping the server.***

15. Log on as “NTU” and enter the required password into the password box.
16. Once logged in, open another terminal window.

## 3.3.2 Configuring Kerberos 5

1. Make a backup copy of the Kerberos configuration file by typing in **`cp /etc/krb5.conf ~/`**
2. Now edit the file by typing in **`sudo nano /etc/krb5.conf`**
3. Type in your password when prompted to enter a password.

### **Notes:**

***The configurations here are case sensitive.***

***The first change is to make is within the [libdefaults] section.***

4. Change the default\_realm so that it reads:  
**`default_realm = DAILYPLANET.COM`**
5. Now scroll down until you find the [realms] section.
6. If the following lines below are **available**, then replace these:

**`ntu-virtual-machine = {`**

```
kdc = ntu-virtual-machine  
admin_server = ntu-virtual-machine  
}
```

if the above lines are not available, then ensure that the 5 lines below are included

with:

```
DAILYPLANET.COM = {  
kdc = DAILYPLANETSERVER.DAILYPLANET.COM  
admin_server = DAILYPLANETSERVER.DAILYPLANET.COM  
default_domain = DAILYPLANET.COM  
}
```

7. The final change is to add the following lines at the beginning of the [domain\_realm] section:

```
.dailyplanet.com = DAILYPLANET.COM  
dailyplanet.com = DAILYPLANET.COM
```

8. Press Ctrl+X.
9. Press Y to save the “modified buffer”.
10. Press enter when it asks you to confirm the file name.
11. At the prompt, type in ***sudo kinit Administrator@DAILYPLANET.COM***
12. Type in the required passwords accordingly in the following prompts; the local password for ntu-vm and the administrator account domain password (stored on the Windows 2008 Server).
13. If you experience any error, check to make sure that you have made the correct changes.
14. However, if you are returned to the prompt you can check to see what Kerberos ticket has been issued by typing in ***sudo klist***.

### 3.3.3 Configuring samba

1. Type in `cd /etc/samba` and press enter.
2. Type in `ls -l` and press enter.
3. Type in `sudo nano smb.conf` and press enter.
4. Scroll down until you reach the [global] section.
5. Change the “**workgroup = WORKGROUP**” line so that it now says **workgroup=DAILYPLANET**
6. Now add a new line: **realm = DAILYPLANET.COM**
7. Scroll down until you find the “Authentication” section.
8. If exists, then change the “# security = user” line so that it reads `security = ads` (note: remove # at the start). Add the entry if it doesn’t exist. (Depends on the version of Ubuntu)
9. Scroll down until you find the “Misc” section. Note: The next step is to set the ID ranges that winbind uses to allocate against users and groups within the network.
10. Remove the semi-colon from the beginning of the `idmap uid`, `idmap gid` lines and `template shell = /bin/bash` lines.
11. If not already existing, add these lines at the end of the file  
`winbind enum groups = yes`  
`winbind enum users = yes`  
or if already existing, remove the comments by removing the semi- colon from the beginning of each of the lines.
12. Add a new line by typing in the following `winbind use default domain = yes`
13. Press Ctrl+X.
14. Press Y to save the “modified buffer”.
15. Press enter when it asks you to confirm the file name.

***Note: it is best to update winbind at this point.***

16. Type in `cp /etc/nsswitch.conf ~/` to make a backup.
17. Type in `sudo nano /etc/nsswitch.conf`

18. Scroll down a few lines until you read the line that starts with “passwd” and type in winbind at the end of the line.
19. Repeat step 18 for the “group” and “shadow” lines.
20. Find the “networks” line and type in dns at the end.
21. Press Ctrl+X and save and exit.
22. Now type in ***sudo net ads join -U Administrator -S DailyPlanetServer.dailyplanet.com***
23. Type in the required password accordingly when you receive the prompt.

***Note: You will now receive a message that you have joined NTU-VM to the DAILYPLANET.COM domain. However, kindly ignore the DNS warning message as the DNS configuration has not been specified.***

24. Check that the domain information and DC has been picked up correctly by typing in ***sudo net ads info***. The message should be similar to the screenshot below

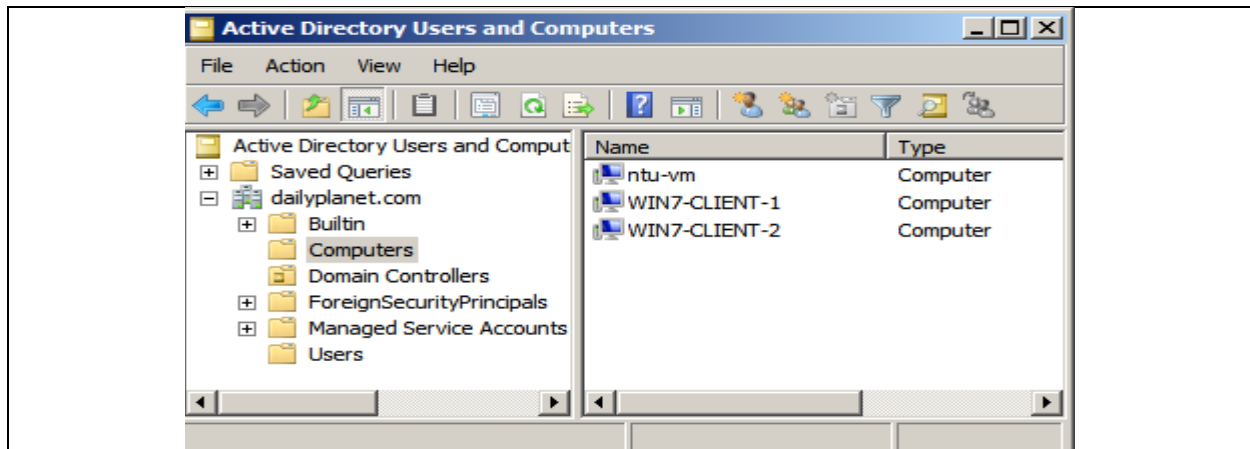
```
LDAP server: 192.168.1.1
LDAP server name: dailyplanetserver.dailyplanet.com
Realm: DAILYPLANET.COM
Bind Path: dc=DAILYPLANET,dc=COM
LDAP port: 389
Server time: Fri, 20 Nov 2020 19:22:40 GMT
KDC server: 192.168.1.1
Server time offset: 0
```

25. Switch back to the Windows Server virtual machine and open “Active Directory Users and Computers”.
26. Open the “Computers” container and note the machine names.
- 27. Make notes explaining what you have done.**

28. Shutdown the server.
29. In an Ubuntu terminal window type in ***“sudo shutdown -h now”*** and type in the password when asked.

## 3.4 Tests

At the end of this lab, the active directory of users and computers should be similar to the screenshot below.



## 3.5 Network shares

Investigate how to Enable or Disable Network Sharing Discovery in Windows.

From the windows 7 client (WIN7-CLIENT-2), turn on network discovery.

From Ubuntu client, type `sudo nano /etc/default/avahi-daemon`.

Edit the file and ensure that the value is changed from 1 to 0.

**From WINDOWS SERVER 2008 R2**

