



## 3. Setting up Active Directory in Windows Server

**PHỤC VỤ MỤC ĐÍCH GIÁO DỤC**  
FOR EDUCATIONAL PURPOSE ONLY

### NETWORKS AND SYSTEMS ADMINISTRATION LABS

(V03.2023)

#### A. OVERVIEW

##### 1. Learning objective

The learning objective in this task is learning about the fundamentals of Active Directory Domain Services (AD DS) in Windows Server, including forests, domains, sites, domain controllers, organization units (OUs), users, and groups.

After completing this lab, you will be able to:

- Understand the difference between Workgroup and Domain.
- Design and set up a Domain model with Active Directory.
- Understand how the Additional Domain Controller (ADC) and Read Only Domain Controller (RODC) work.

## 2. Practice Environment

Students need to prepare at least the following:

- **Two VMs** that installed Windows Server 2019 works as Domain Controllers.
- **A VM** that installed Windows Server 2019 works as Domain Controller.
- **Two VMs** that installed Windows OS (Windows 7, 8, 10, or Server) works as Client.

Doing this lab in groups of three or four would be best to get better results. Virtualization software such as VMWare or VirtualBox is recommended. When these VMs run on multiple PCs, you need to configure that all VMs can communicate with each other. All PC should join the same network (WiFi or Ethernet) and use the Bridge Network Adapter for VMs. For choosing the OS, we recommend the newest stable version of the OS to reach more recent functions and features.

	IP Address	DNS	Operating System
Domain Controller 1 (DC1)	192.168.1.5 / 24	192.168.1.5 192.168.1.6	Windows Server 2019
Domain Controller 2 (DC2)	192.168.1.6 / 24	192.168.1.5 192.168.1.6	Windows Server 2019
File Server	192.168.1.10 / 24	192.168.1.5	Windows Server 2019
Client 1	192.168.1.20 / 24	192.168.1.5	Windows 7,8,10, or newer
Client 2	192.168.1.21 / 24	192.168.1.5	Windows 7,8,10, or newer

Table 1: The information of VMs

All VMs which required to install the Windows Server, you should choose the *DataCenter Evaluation (Desktop Experience)* option to have a full Windows graphical environment.

## B. LAB TASKS

*Notice that you should complete all tasks of this lab sequentially!*

### 1. Active Directory and the domain model

In this task, we need to use four VMs (Domain Controller - DC1, File Server, and two Clients), as shown in Figure 1. IP addresses, recommended OS for these VMs declared in Table 1. The DNS on these VMs will point to DC1.

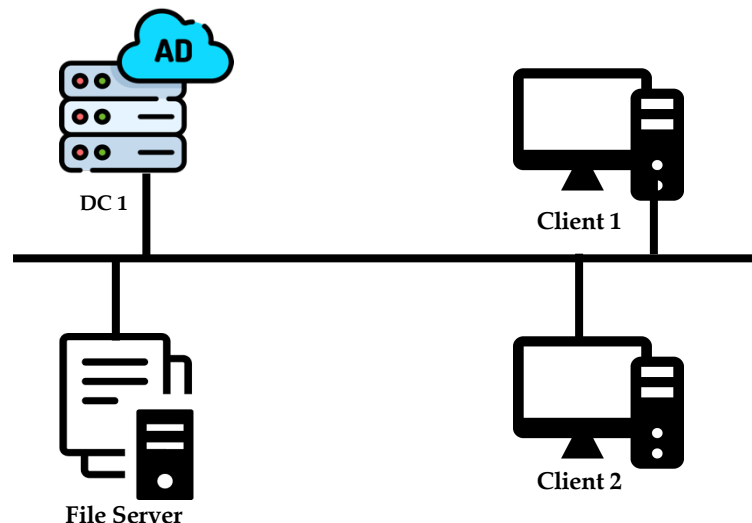


Figure 1: The Domain topology

First, we need to deploy a domain, a domain controller.

#### Domain Controller 1:

1. Set the Primary DNS Suffix to **groupX.local** (*X is to your Group ID*).
2. Install the Active Directory Domain Service (AD DS).
3. Promote this server to a domain controller. You need to create a new forest that its "root domain name" is **groupX.local** and set the "BIOS domain name" to **UIT** during promoting.
4. Log in to Domain Controller with **UIT\Administrator** account.
5. Create a new account for your group's members. The username is **student's ID** and the password is **123** on Active Directory. You may create and manage users through the "*Active Directory User and Computer*" tool.

*Notice that the password complexity policy is enabled by default on Windows Server. That's why you can not set a weak password for the user. Try to change this policy.*

**File Server:**

6. Join file server to **groupX.local** domain.
7. Create new folders as below.

```
Data/  
├─ <student 1>/  
├─ <student 2>/  
└─ .../
```

<student x>: Name of your group's members

8. All users (account on Active Directory) can access the folder Data. But only Administrator can write on it.
9. Grant the privileges to users on corresponding folders so that your group's member can write to their folders (student 1, student 2,...).

**Clients:**

10. Make this host is the member of **groupX.local** domain.
11. Log in to Windows with account **UIT\<student ID>** (this account is managed on Active Directory). Then access the folder **Data** on File Server, and test read/write capability.

**Summarization:**

12. Find out the purpose and the difference between Workgroup and Domain.

## 2. Additional Domain Controller

In this task, we need to use four VMs, as shown in Figure 2:

- Domain Controller 1 - DC1
- Domain Controller 2 - DC2
- Client 1
- Client 2

The DC1, Clients can reuse from the previous task or newly setup; that is up to you. You need to refer IP addresses for these VMs in Table 1. The DNS on DC VMs will point to the DC1 and DC2, the others VMs will point to the DC1.

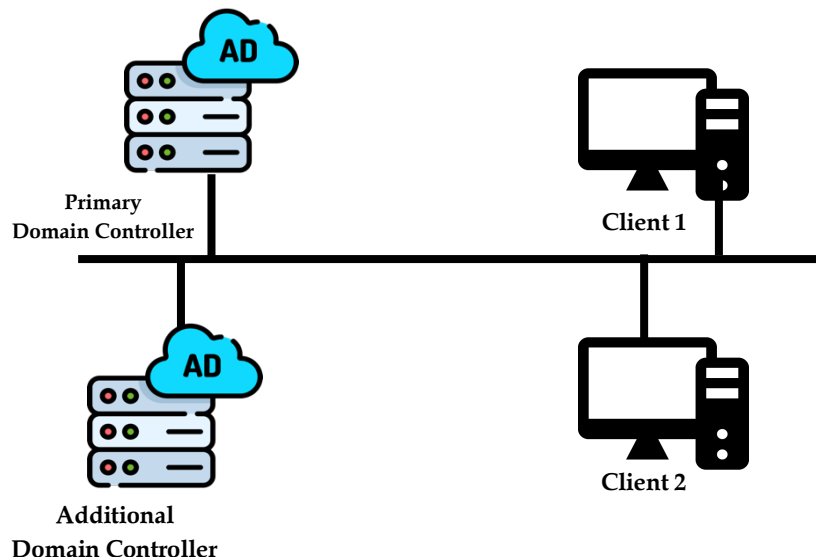


Figure 2: High Availability Domain Controller

**Domain Controller 1 – Primary Domain Controller:**

1. Deploy and promote this server to Primary Domain Controller *(or reuse the DC1 from the previous task)*

**Domain Controller 2 – Additional Domain Controller:**

2. Join this server to **groupX.local** domain.
3. Deploy and promote this server to an additional domain controller.

**Testing:**

4. On Primary Domain Controller, create new accounts u2/123, u3/123, and u4/123. Then observing on the Additional Domain Controller and verify whether these users are synchronized automatically or not.
5. On Additional Domain Controller, create a new account u10/123. Then observing on the Primary Domain Controller and verify whether the u10 is synchronized automatically or not.
6. Can we log in with the account UIT\u2 on Client?
7. Turn off the Primary Domain Controller, then log in with account UIT\u3 on Client. What's happened?
8. Turn off the Additional Domain Controller, then log in with account UIT\u4 on Client. What's happened?
9. Turn on the Primary Domain Controller, then log in with account UIT\u5 on Client. What's happened?
10. Turn on the Additional Domain Controller, then log in with account UIT\u5 on Client. What's happened?

11. From what you observe, let's briefly summarize the ADC model. Can the controller's workload be shared with all controllers on the domain (typically called load balancing) to avoid overloading?

### 3. The Active Directory Policies

Before doing this task, make sure that you already complete the “Additional Domain Controller” task. You will continue working on environment from this task to conquer requirements below.

**Let's research the Active Directory Group Policy and apply the following policies:**

1. Automatically set the picture specified by the domain's administrator as the desktop wallpaper when the user logs in any computer on domain.
2. Prevent clients from using external storage devices (such as USB, CD, DVD,...).
3. Prevent users on the domain using Task Manager or CMD.
4. Automatically distribute a program to client computers or users.

### 4. Read Only Domain Controller

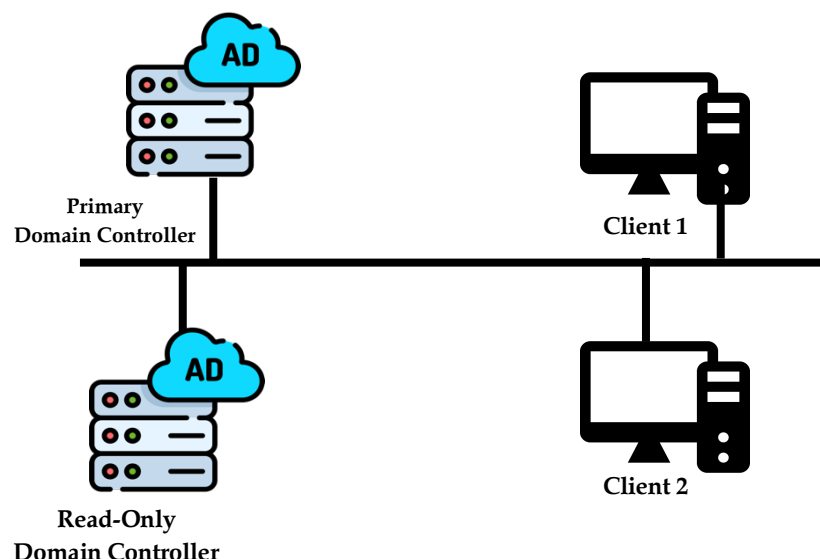


Figure 3: The RODC model

In this task, we need to use three VMs (a VM for the Primary Domain Controller - DC1, a VM for the Read Only Domain Controller - DC2, and a VM for the Client), as shown in Figure 2. We will install Windows Server 2019 (or newer) on the DC1 and



DC2. The Client can reuse from the previous task or newly set up; that is up to you. You need to refer IP addresses for these VMs in Table 1. The DNS on DC VMs will point to DC1 and DC2, and the other VMs will point to DC1.

Let's deploy the RODC model and clear all tasks described as the ADC task.

## C. REQUIREMENTS

You are expected to complete all tasks in section B (Lab tasks). Advanced tasks are optional, and you could get bonus points for completing those tasks. We prefer you work in a team of four to get the highest efficiency.

Your submission must meet the following requirements:

- You need to submit a **detailed lab report in .docx** (*Word Document*) format, **using the report template** provided on the UIT Courses website.
- Either Vietnamese or English report is accepted, that's up to you. The report written in the mixing of multiple languages is not allowed (except for the untranslatable keywords).
- When it comes to **programming tasks** (*require you to write an application or script*), please attach all source-code and executable files (if any) in your submission. Please also list the important code snippets followed by explanations and screenshots when running your application in your report. Simply attaching code without any explanation will not receive points.
- Submit work you are proud of – don't be sloppy and lazy!

Your submissions must be your own. You are free to discuss with other classmates to find the solution. However, copying reports is prohibited, even if only a part of your report. Both reports of the owner and the copier will be rejected. Please remember to cite any source of the material (website, book,...) that influences your solution.

**Notice:** Combine your lab report and all related files into a single **ZIP file (.zip)**, name it as follow:

*StudentID1\_StudentID2\_ReportLabX.zip*