

Lab5

1 Lab5 Part1 FTP Configuration

1.1 Introduction to FTP

FTP (File Transfer Protocol) is a standard network protocol used for transferring files between a client and server on a computer network. It is built on a client-server model architecture using separate control and data connections between the client and server.

- **TFTP** (Trivial File Transfer Protocol) - A simpler version without authentication.
- **SFTP** (Secure File Transfer Protocol) - Uses SSH for secure transfers.

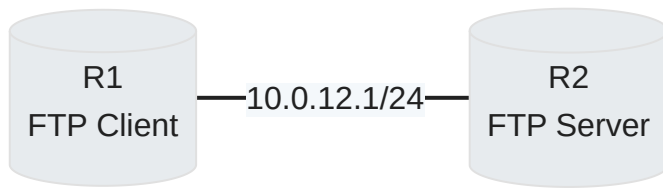
A device can operate as either:

- **Server**: Allows clients to manage and transfer files.
- **Client**: Connects to a server to manage and transfer files.

1.2 Lab Objectives

- Establish an FTP connection.
- Configure FTP server settings.
- Transfer files using FTP.

1.3 Networking Topology



1.4 Lab Configuration Steps

1.4.1 Step 1: Basic Device Setup

Set device names, configure IP addresses, and save initial configurations.

R1:

```
M↓ Markdown ↕
1 [R1]interface GigabitEthernet0/0/2
2 [R1-GigabitEthernet0/0/2]ip address 10.0.12.1 24
```

R2:

```
M↓ Markdown ↕
1 [R1]interface GigabitEthernet0/0/2
```

1.4.1.1 Display directory

<R1>dir

Directory of flash:/

| Idx | Attr | Size(Byte) | Date | Time(LMT) | FileName |
|-----|------|-------------|-------------|-----------|-------------------------------|
| 0 | -rw- | 126,538,240 | Jul 04 2016 | 17:57:22 | ar651c- v300r019c00Sspc100.cc |
| 1 | -rw- | 23,963 | Feb 21 2020 | 09:22:53 | mon_file.txt |
| 2 | -rw- | 721 | Feb 21 2020 | 10:14:33 | vrpcfg.zip |
| 3 | drw- | - | Jul 04 2016 | 18:51:04 | CPM_ENCRYPTED_FOLDER |
| 4 | -rw- | 783 | Jul 10 2018 | 14:46:16 | default_local.cer |
| 5 | -rw- | 0 | Sep 11 2017 | 00:00:54 | brdxpon_snmp_cfg.efs |
| 6 | drw- | - | Sep 11 2017 | 00:01:22 | update |
| 7 | drw- | - | Sep 11 2017 | 00:01:48 | shelldir |
| 8 | drw- | - | Feb 20 2020 | 21:33:16 | localuser |
| 9 | drw- | - | Sep 15 2017 | 04:35:52 | dhcp |
| 10 | -rw- | 509 | Feb 21 2020 | 10:18:31 | private-data.txt |
| 11 | -rw- | 2,686 | Dec 19 2019 | 15:05:18 | mon_lpu_file.txt |
| 12 | -rw- | 3,072 | Dec 18 2019 | 18:15:54 | Boot_LogFile |
| 13 | -rw- | 1,390 | Feb 21 2020 | 10:18:30 | test1.cfg |

510,484 KB total available (386,448 KB free)

<R2>dir

Directory of flash:/

| Idx | Attr | Size(Byte) | Date | Time(LMT) | FileName |
|-----|------|-------------|-------------|-----------|-------------------------------|
| 0 | -rw- | 126,538,240 | Jul 04 2016 | 17:57:22 | ar651c- v300r019c00Sspc100.cc |
| 1 | -rw- | 11,405 | Feb 21 2020 | 09:21:53 | mon_file.txt |
| 2 | -rw- | 809 | Feb 21 2020 | 10:14:10 | vrpcfg.zip |
| 3 | drw- | - | Jul 04 2016 | 18:51:04 | CPM_ENCRYPTED_FOLDER |
| 4 | -rw- | 782 | Jul 10 2018 | 14:48:14 | default_local.cer |
| 5 | -rw- | 0 | Oct 13 2017 | 15:36:32 | brdxpon_snmp_cfg.efs |
| 6 | drw- | - | Oct 13 2017 | 15:37:00 | update |
| 7 | drw- | - | Oct 13 2017 | 15:37:24 | shelldir |
| 8 | drw- | - | Feb 20 2020 | 20:51:34 | localuser |
| 9 | drw- | - | Oct 14 2017 | 11:27:04 | dhcp |
| 10 | -rw- | 1,586 | Feb 21 2020 | 10:16:51 | test2.cfg |
| 11 | -rw- | 445 | Feb 21 2020 | 10:16:52 | private-data.txt |
| 12 | -rw- | 4,096 | Aug 06 2019 | 11:19:08 | Boot_LogFile |

510,484 KB total available (386,464 KB free)

The configuration files of the two devices are saved successfully.

1.4.2 Step 2: Enable FTP Server on R2

Use the `ftp server enable` command to start the FTP service.



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```
1 [R2]ftp server enable
```

1.4.3 Step 3: Configure Local FTP Users on R2

Create user with password, set service type to FTP, assign privilege level, specify directory access.

The authorized directory of the FTP user is specified. This directory must

be specified. Otherwise, the FTP user cannot log in to the syst



Markdown



```
1 [R2]aaa
2 [R2-aaa]local-user ftp password cipher ftp
3 [R2-aaa]local-user ftp privilege level 15
4 [R2-aaa]local-user ftp service-type ftp
5 [R2-aaa]local-user ftp ftp-directory flash:/
```

1.4.4 Step 4: Login from R1 (FTP Client)

Connect to R2 using the `ftp` command followed by the IP address of the server (R2).

```
<R1>ftp 10.0.12.2
Trying 10.0.12.2 ...

Press CTRL+K to abort
Connected to 10.0.12.2.
220 FTP service ready.
User(10.0.12.2:(none)):ftp-client
331 Password required for ftp-client.
Enter password:
230 User logged in.

[R1-ftp]
You have logged in to the file system of R2.
```

1.4.5 Step 5: File Operations from Client Side (R1)

Transfer files using commands like `get` , `put` , or `delete` . Set transfer mode (`ascii` or `binary`) as needed.

```
[R1-ftp]get test2.cfg
200 Port command okay.
```

Download the configuration file

```
[R1-ftp]delete test2.cfg
Warning: The contents of file test2.cfg cannot be recycled. Continue? (y/n)[n]:y
250 DELE command successful.
```

Delete the configuration file

```
[R1-ftp]put test1.cfg
200 Port command okay.
150 Opening ASCII mode data connection for test1.cfg.
226 Transfer complete.
FTP: 875 byte(s) sent in 0.240 second(s) 3.64Kbyte(s)/sec.
```

Upload the configuration file

```
[R1-ftp]bye
221 Server closing.
```

```
<R1>
```

Close the FTP connection

1.5 Quiz

Question1

Does FTP work in active or passive mode by default

Answer1

By default, FTP works in **active** mode where the client initiates both command and data connections to the server.

2 Lab5 Part2 DHCP Configuration

2.1 Introduction

Dynamic Host Configuration Protocol (DHCP) is a protocol for automatic IP address assignment, simplifying network administration. It's defined in RFC 2131 and supports both dynamic and static IP allocation.

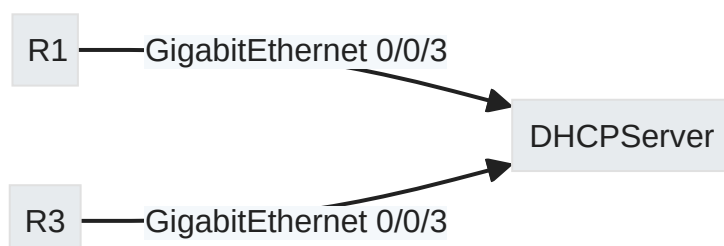
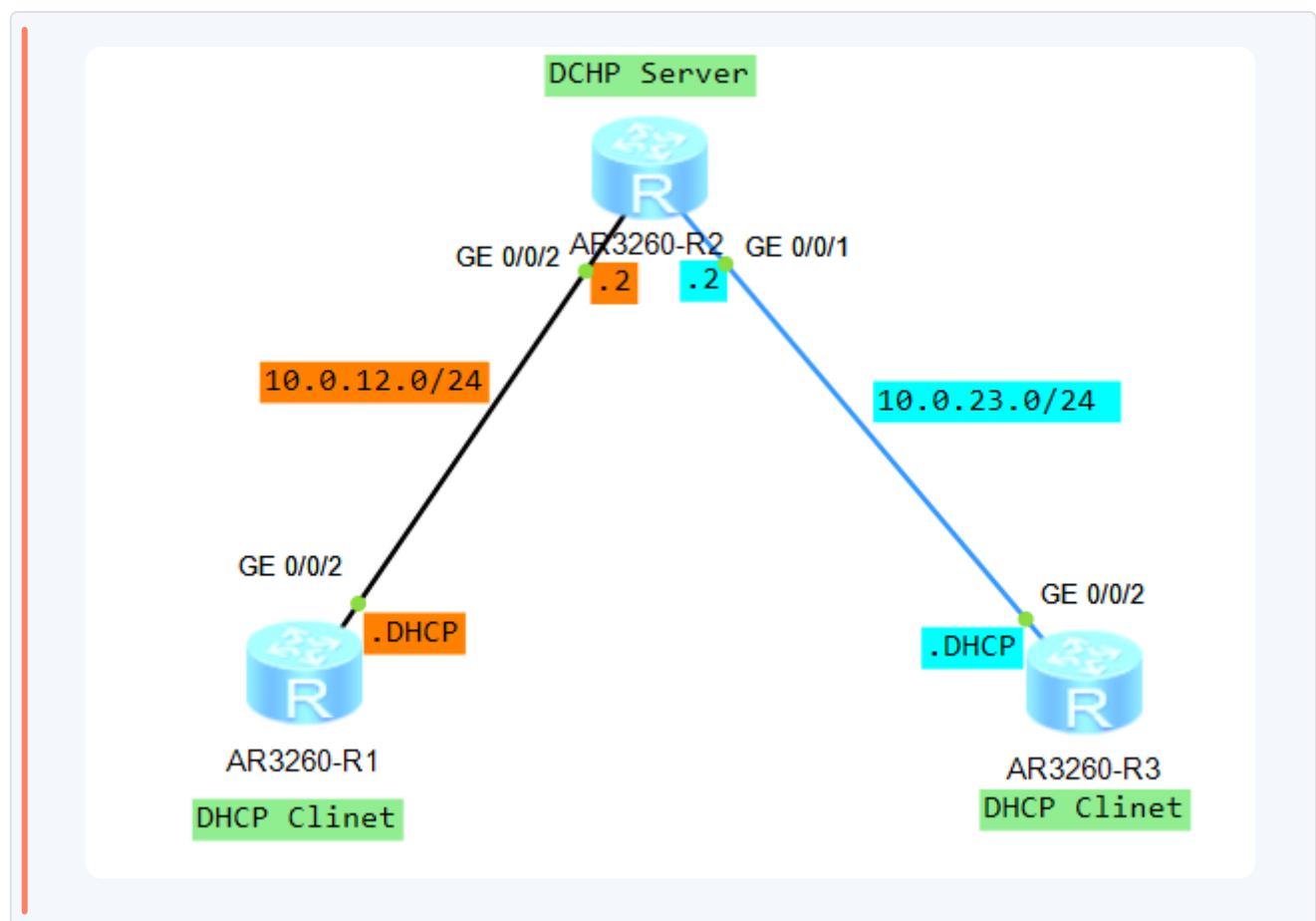
- **Dynamic allocation:** Grants an IP with a lease time, useful when the number of idle IPs is less than the total hosts.
- **Static allocation:** Grants a fixed IP to a client, preventing manual errors and facilitating management.

2.2 Objectives

- Configure an interface address pool on the DHCP server.
- Configure a global address pool on the DHCP server.
- Use DHCP to allocate static IP addresses.

2.3 Networking Topology

DHCP reduces the workload of IP address maintenance and improves utilization. The lab setup involves configuring R1 and R3 as DHCP clients and R2 as the DHCP server.



2.4 Lab Configuration Steps

2.4.1 Step 1: Basic Configurations

Configure interface addresses on router R2:

```
M↓ Markdown ⌵  
1 [R2]interface GigabitEthernet 0/0/2  
2 [R2-GigabitEthernet0/0/2] ip address 10.0.12.2 24  
3 [R2-GigabitEthernet0/0/2]quit  
4 [R2]interface GigabitEthernet 0/0/1  
5 [R2-GigabitEthernet0/0/1]ip address 10.0.23.2 24
```

2.4.2 Step 2: Enable DHCP on all routers

```
M↓ Markdown ⌵  
1 [R2]dhcp enable
```

The dhcp enable command must be executed before executing any other DHCP-related commands, regardless for DHCP servers or client

This configuration applied on R1 ,R2, R3

2.4.3 Step 3: Configure Address Pools

Interface pool for GE 0/0/3 (R1):

```
M↓ Markdown ⌵
```

```
1 [R2]interface GigabitEthernet 0/0/2
2 [R2-GigabitEthernet0/0/2]dhcp select interface
3 [R2-GigabitEthernet0/0/2]dhcp server dns-list 10.0.12.2
```

This dhcp pool used only on same devices connected on same interface

Global pool configuration:

```
M↓ Markdown ↕
1 [R2]ip pool GlobalPool
2 [R2-ip-pool-GlobalPool]network 10.0.23.0 mask 24
3 [R2-ip-pool-GlobalPool]dns-list 10.0.23.2
4 [R2-ip-pool-GlobalPool]gateway-list 10.0.23.2
5 [R2-ip-pool-GlobalPool]lease day 2 hour 2
```

The lease command specifies the lease for IP addresses in a global IP address pool. If the lease is set to unlimited, the lease is unlimited. By default, the lease of IP addresses is one day

Static binding in global pool:

```
M↓ Markdown ↕
1 [R2-ip-pool-GlobalPool]static-bind ip-address 10.0.23.3
  mac-address 00e0-fc07-2349
```

The static-bind command binds an IP address in a global address pool to a MAC address of a client

You can run the display interface GigabitEthernet0/0/1 to show the mac-address

2.4.4 Step 4: Enable DHCP Server Function on Interfaces

For global pools:



Markdown



```
1 [R2]interface GigabitEthernet 0/0/1
2 [R2-GigabitEthernet0/0/1]dhcp select global
```

2.4.5 Step 5: Configure DHCP Clients (R1 & R3)

Set interfaces to obtain IP via DHCP:



Markdown



```
1 [R1]interface GigabitEthernet 0/0/2
2 [R1-GigabitEthernet0/0/2] ip address dhcp-alloc
```

On router R1 & R2

2.5 Verification Commands

Check route received by client:

```
[R1]display ip interface brief
```

| Interface | IP Address/Mask | Physical | Protocol |
|----------------------|-----------------|----------|----------|
| GigabitEthernet0/0/3 | 10.0.12.254/24 | up | up |

[R1]display dns server

Type:

D:Dynamic S:Static

| No. | Type | IP Address |
|-----|------|------------|
| 1 | D | 10.0.12.2 |

[R3]display ip interface brief

| Interface | IP Address/Mask | Physical | Protocol |
|----------------------|---------------------|----------|----------|
| GigabitEthernet0/0/3 | 10.0.23.3/24 | up | up |

[R3]display dns server

Type:

D:Dynamic S:Static

| No. | Type | IP Address |
|-----|------|------------|
| 1 | D | 2.23.0.10 |

[R2]display ip pool name GlobalPool

Pool-name : GlobalPool
Pool-No : 1
Lease : 2 Days 2 Hours 0 Minutes
Domain-name : -
DNS-server0 : 10.0.23.2
NBNS-server0 : -
Netbios-type : -
Position : Local Status : Unlocked
Gateway-0 : **10.0.23.2**
Mask : **255.255.255.0**
VPN instance : --

| Start | End | Total | Used | Idle(Expired) | Conflict | Disable |
|-----------|-------------|-------|----------|---------------|----------|---------|
| 10.0.23.1 | 10.0.23.254 | 253 | 1 | 252(0) | 0 | 0 |

```
[R2]display ip pool interface GigabitEthernet0/0/4
```

```
Pool-name       : GigabitEthernet0/0/4
Pool-No        : 0
Lease          : 1 Days 0 Hours 0 Minutes
Domain-name    : -
DNS-server0    : 10.0.12.2
NBNS-server0   : -
Netbios-type   : -
Position       : Interface      Status      : Unlocked
Gateway-0      : 10.0.12.2
Mask           : 255.255.255.0
VPN instance    : --
```

| Start | End | Total | Used | Idle(Expired) | Conflict | Disable |
|-----------|-------------|-------|------|---------------|----------|---------|
| 10.0.12.1 | 10.0.12.254 | 253 | 1 | 252(0) | 0 | 0 |

2.6 Quiz Questions to Test Understanding

? Question1

What are the differences between the application scenarios of a global address pool and those of an interface address pool?

✓ Answer1

1. **Global Address Pool:** Used across multiple networks for centralized IP management; not tied to specific interfaces.
2. **Interface Address Pool:** Linked to a particular interface; allocates IPs to clients on that network segment.

? Question2

If there are multiple global address pools, how do you determine the global address pool for a DHCP client

✓ **Answer2**

When determining which global address pool to use for a DHCP client, the DHCP server considers the source of the request, relay information, and administrative policies to allocate an IP from the appropriate pool.