實驗三
Cisco Packet Tracer與
Switch設定

計算機網路 computer network

實驗目的

- 了解Packet Tracer使用環境
- 認識各種網路元件
- 熟悉Switch
- 實作管理型Switch的IP設定

實驗步驟

- 1.至Cisco網頁申請帳號並下載Packet Tracer
- 2.實作Packet Tracer 網管型Switch的IP設定
- 3.回答題目問題

Packet Tracer簡介

- 由Cisco開發的路由配置模擬器
- 主要用於培訓和教育
- Cisco路由指令極多，但Packet Tracer主能模擬部分功能
- URL：https://www.netacad.com/courses/packet-tracer-download/

安裝Packet Tracer

- 1.至 https://www.netacad.com/courses/packet-tracer-download/ 點選下方 Download
  PS.有會員的請先上方Log In

- 2.沒會員的請右邊申請帳號並註冊Packet Tracer課程，有會員的直接註冊Packet Tracer課程

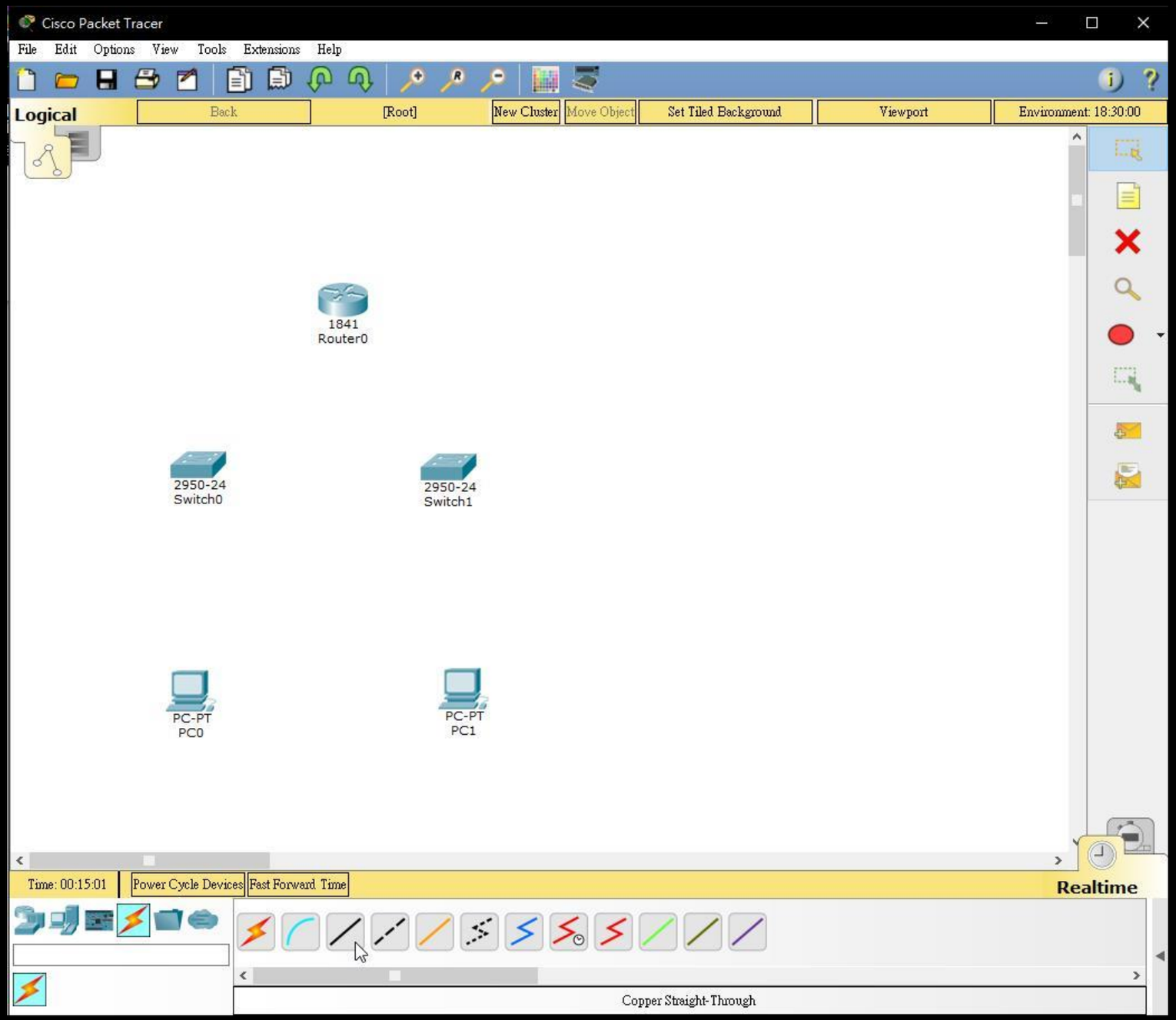
- 3.根據使用的作業系統選擇下載（只有Windows，Linux ）

Packet Tracer使用教學

- 請下載此教學PTT

- https://goo.gl/y53xsM

基本網路連接

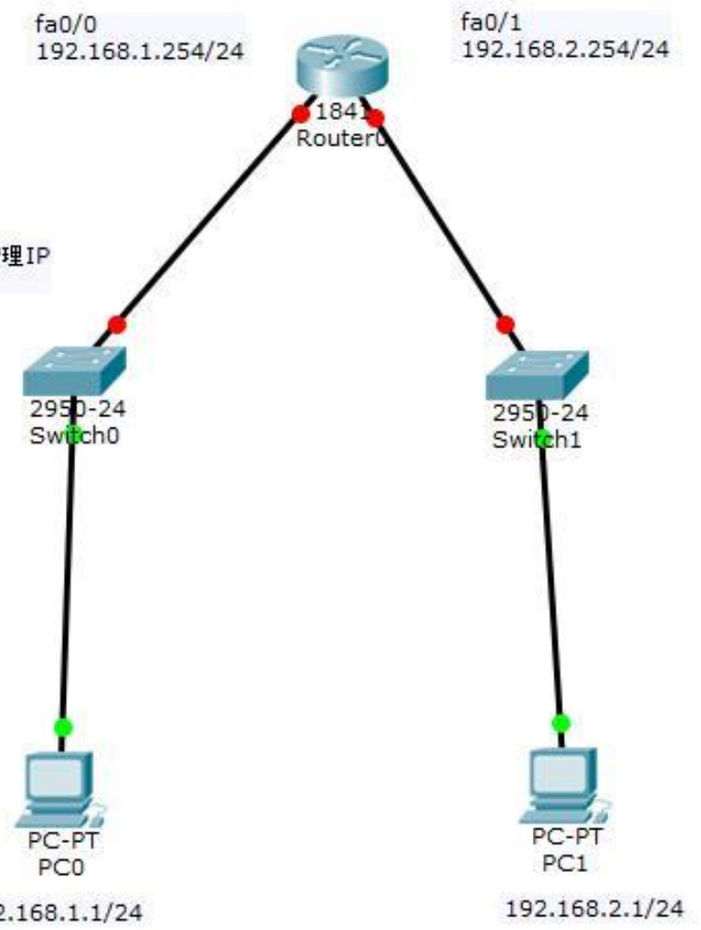


選取一個Router (型號1841)
2個Switch（型號2950-24）
2個PC

Cisco Packet Tracer

File Edit Options View Tools Extensions Help

Logical | Back | [Root] | New Cluster | Move Object | Set Tiled Background | Viewport | Environment: 10:30:00



先設定好router的IP Gateway
還有PC0和PC1的IP

使用Copper Straight-Through將設備連接起來

Time: 00:18:44 | Power Cycle Devices | Fast Forward Time | Realtime

Copper Straight-Through

Physical | Config | Desktop | Attributes | Software/Services

MODULES
WMP300N
PT-HOST-NM-1AM
PT-HOST-NM-1CE
PT-HOST-NM-1CFE
PT-HOST-NM-1CGE
PT-HOST-NM-1FFE
PT-HOST-NM-1FGE
PT-HOST-NM-1W
PT-HOST-NM-1W-A
PT-HOST-NM-3G/4G
PT-HEADPHONE
PT-MICROPHONE

Physical Device View

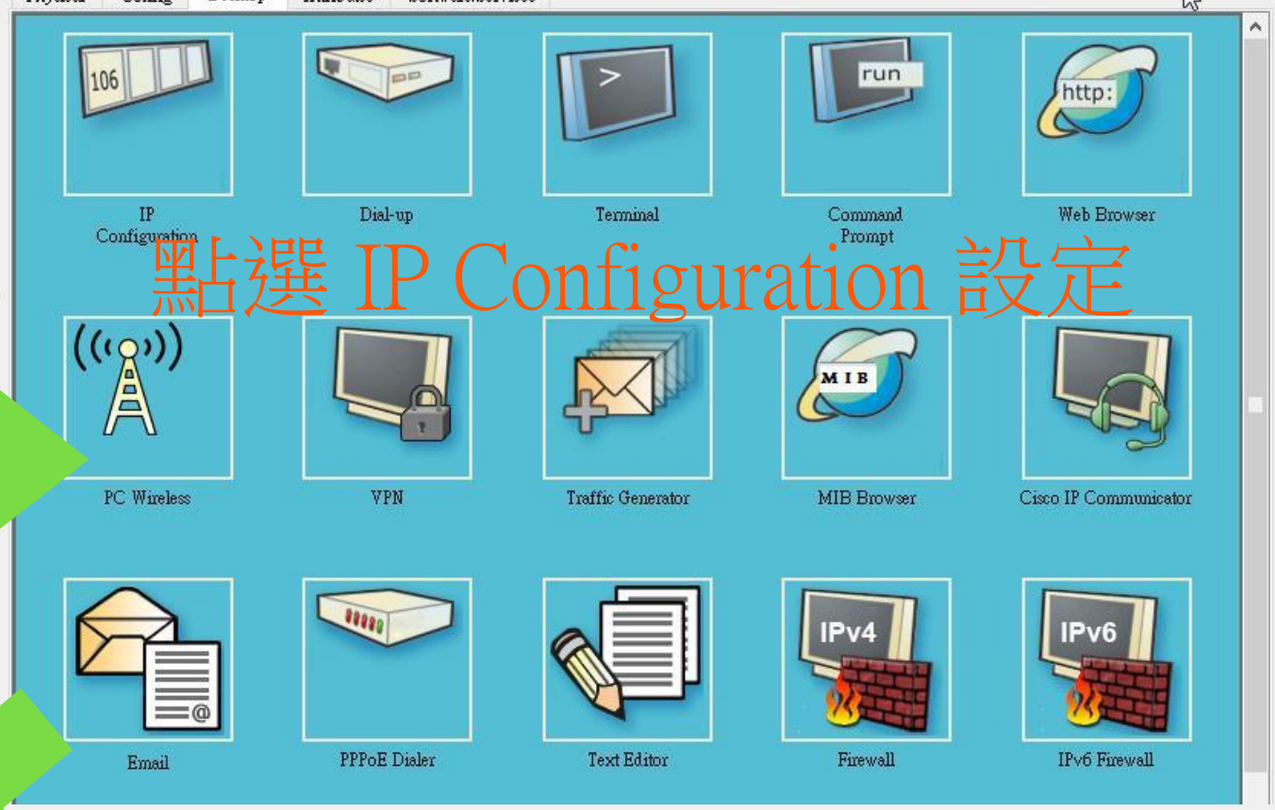
Zoom In | Original Size | Zoom Out

Customize Icon in Physical View

Customize Icon in Logical View

左鍵單點PC0
並點選上方Desktop

Physical | Config | Desktop | Attributes | Software/Services



點選 IP Configuration 設定

Physical | Config | Desktop | Attributes | Software/Services

IP Configuration

IP Configuration

DHCP | Static

IP Address
Subnet Mask
Default Gateway
DNS Server

IPv6 Configuration

DHCP | Auto Config | Static

IPv6 Address
Link Local Address: FE80::260:2FFF:FE1D:C118
IPv6 Gateway
IPv6 DNS Server

IP address 192.168.1.1
Submet Mask 255.255.255.0
Default Gateway 192.168.1.254

Top

Config | Desktop | Attributes | Software/Services

IP Configuration

IP Configuration

DHCP | Static

IP Address: 192.168.1.1
Subnet Mask: 255.255.255.0
Default Gateway: 192.168.1.254
DNS Server

IPv6 Configuration

DHCP | Auto Config | Static

Link Local Address: FE80::260:2FFF:FE1D:C118
IPv6 Gateway
IPv6 DNS Server

設定完PC0也要記得設定PC1

Top

Physical | Config | CLI | Attributes

MODULES
HWIC-2T
HWIC-4ESW
HWIC-8A
HWIC-AP-AG-B
WIC-1AM
WIC-1ENET
WIC-1T
WIC-2AM
WIC-2T

Physical Device View

Zoom In | Original Size | Zoom Out

左鍵單點Router0

Physical | Config | CLI | Attributes

點選上方Config

GLOBAL
Settings
Algorithm Settings
ROUTING
Static
RIP
SWITCHING
VLAN Database
INTERFACE
FastEthernet0/0

Global Settings

Display Name: Router0
Hostname: Router
NVRAM: Erase | Save
Startup Config: Load... | Export...
Running Config: Export... | Merge...

Physical | Config | CLI | Attributes

GLOBAL
Settings
Algorithm Settings
ROUTING
Static
RIP
SWITCHING
VLAN Database
INTERFACE
FastEthernet0/0
FastEthernet0/1

FastEthernet0/0

Port Status
Bandwidth: 100 Mbps | 10 Mbps | Au
Duplex: Half Duplex | Full Duplex | Au
MAC Address: 000D.BD09.4801

IP Configuration
IP Address:
Subnet Mask:

Tx Ring Limit: 10

點選左邊的FastEthernet0/0

Equivalent IOS Commands

```
Press RETURN to get started!



Router>enable
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface FastEthernet0/0
Router(config-if)#
```

Physical | Config | CLI | Attributes

GLOBAL
Settings
Algorithm Settings
ROUTING
Static
RIP
SWITCHING
VLAN Database
INTERFACE
FastEthernet0/0
FastEthernet0/1

FastEthernet0/0

Port Status: On
Bandwidth: 100 Mbps | 10 Mbps | Auto
Duplex: Half Duplex | Full Duplex | Auto
MAC Address: 000D.BD09.4801

IP Configuration
IP Address: 192.168.1.254
Subnet Mask: 255.255.255.0

Tx Ring Limit: 10

IP address 192.168.1.254
Subnet Mask 255.255.255.0

Equivalent IOS Commands

```
Press RETURN to get started!



Router>enable
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface FastEthernet0/0
Router(config-if)#ip address 192.168.1.254 255.255.255.0
Router(config-if)#
```

Top

Top

Physical | Config | CLI | Attributes

GLOBAL
Settings
Algorithm Settings
ROUTING
Static
RIP
SWITCHING
VLAN Database
INTERFACE
FastEthernet0/0
FastEthernet0/1

FastEthernet0/0

Port Status: On

Bandwidth: 100 Mbps / 10 Mbps / Auto

Duplex: Half Duplex / Full Duplex / Auto

MAC Address: 000D.BD09.4801

IP Configuration

IP Address: 192.168.1.254

Subnet Mask: 255.255.255.0

Tx Ring Limit: 10

輸入完請按下右上方的On按鈕
意思就是No shutdown 要啟動的意思

Equivalent IOS Commands

```
Router(config-if)#exit
Router(config)#interface FastEthernet0/0
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0,
changed state to up
```

同理 FastEthernet0/1 也是同樣設定方法

Top

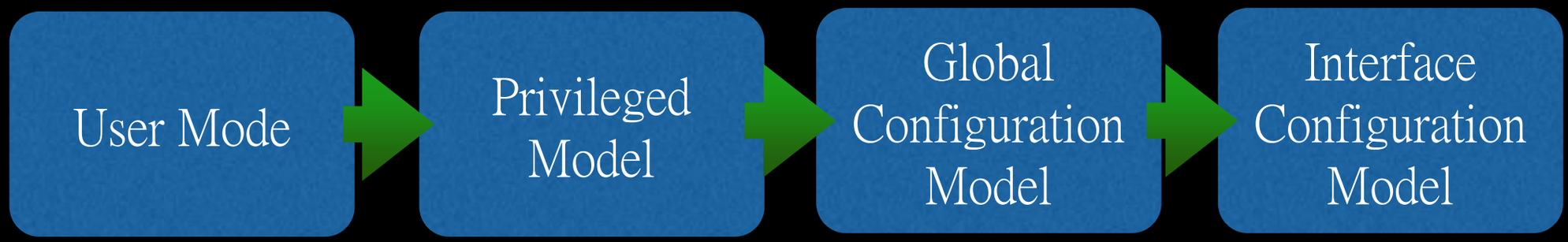
・以上是先將IP設定好。

・以上步驟也可以使用Cisco的指令去完成。（我們可以發現在設定的過程中，下方的Commands欄也會出現對應的指令）

Cisco指令簡單介紹

- 模式切換指令

- 不同的模式代表不同的用途和權限等級，而各種不同的模式切換有其關聯性，並不能隨意從任意兩者之間來切換



- User mode -> Privileged Model

```
Switch>
Switch>en
Switch#
```

- Privileged mode -> User Model

```
Switch>en
Switch#disable
Switch>
```

- Privileged Model -> Global Configuration Model

```
Switch#
Switch#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#
```

- Global Configuration Model -> Privileged Model

```
Switch(config)#
Switch(config)#^Z
Switch#
```

- Global Configuration Model -> Interface Configuration Model

```
Switch(config)#
Switch(config)#int fa0/1
Switch(config-if)#
```

- Interface Configuration Model -> Global Configuration Model

```
Switch(config)#int fa0/1
Switch(config-if)#exit
Switch(config)#
```

設定Switch的管理IP

- Switch一般來說可以分成網管型和非網管型的Switch。而網管型的Switch又可以分為L2和L3的。
- 網管型：指內建許多可調整的功能選項
- 非網管型：沒有內建任何管理性功能
- 而Cisco的Switch大多為網管型

- 網管型的Switch有些可以用telnet, http的方式對它進行設定, 而那將會用到telnet 跟 http
- 因此適必就一定需要設定一個 IP address, 這樣才可以透過 telnet or brower 來進行設定

IOS Command Line Interface

```
Compiled Wed 18-May-05 22:31 by jharirba

Press RETURN to get started!


%LINK-5-CHANGED: Interface FastEthernet0/2, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/2, changed state to up

%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up


Switch>en
Switch#sh ip int br
Interface              IP-Address      OK? Method Status                Protocol
FastEthernet0/1        unassigned      YES manual up                    up
FastEthernet0/2        unassigned      YES manual up                    up
FastEthernet0/3        unassigned      YES manual down                  down
FastEthernet0/4        unassigned      YES manual down                  down
FastEthernet0/5        unassigned      YES manual down                  down
FastEthernet0/6        unassigned      YES manual down                  down
FastEthernet0/7        unassigned      YES manual down                  down
FastEthernet0/8        unassigned      YES manual down                  down
FastEthernet0/9        unassigned      YES manual down                  down
FastEthernet0/10       unassigned      YES manual down                  down
FastEthernet0/11       unassigned      YES manual down                  down
FastEthernet0/12       unassigned      YES manual down                  down
FastEthernet0/13       unassigned      YES manual down                  down
FastEthernet0/14       unassigned      YES manual down                  down
FastEthernet0/15       unassigned      YES manual down                  down
FastEthernet0/16       unassigned      YES manual down                  down
FastEthernet0/17       unassigned      YES manual down                  down
FastEthernet0/18       unassigned      YES manual down                  down
FastEthernet0/19       unassigned      YES manual down                  down
FastEthernet0/20       unassigned      YES manual down                  down
FastEthernet0/21       unassigned      YES manual down                  down
FastEthernet0/22       unassigned      YES manual down                  down
FastEthernet0/23       unassigned      YES manual down                  down
FastEthernet0/24       unassigned      YES manual down                  down
Vlan1                  unassigned      YES manual administratively down down
Switch#
```

進入特權模式

顯示Switch的介面

裡面有實體的介面
也有虛擬的介面

```
Switch#conf t 進入全域設定
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#int fa0/2 進入FastEthernet0/2的port
Switch(config-if)#ip ? 透過 “IP ?” 我們可以發現沒有設定IP的指令
  dhcp  Configure DHCP parameters for this interface
Switch(config-if)#ip
% Incomplete command.
Switch(config-if)#int vlan 2
Switch(config-if)#do sh ip int br
Interface              IP-Address      OK? Method Status
Protocol
FastEthernet0/1        unassigned      YES manual up
up
FastEthernet0/2        unassigned      YES manual up
up
FastEthernet0/3        unassigned      YES manual down
down
FastEthernet0/4        unassigned      YES manual down
down
FastEthernet0/5        unassigned      YES manual down
down
FastEthernet0/6        unassigned      YES manual down
down
FastEthernet0/7        unassigned      YES manual down
down
```

雖然說此處有保留IP的欄位
但我們進入實體介面
我們可以發現並沒有IP可以設定

理論上Switch還是可以設IP
但不是在實體介面設定
而是要在Vlan的介面上去做設定
（Switch的虛擬介面）

Physical | Config | CLI | Attributes

IOS Command Line Interface

```
Switch(config)#int fa0/2
Switch(config-if)#ip ?
  dhcp  Configure DHCP parameters for this interface
Switch(config-if)#int vlan 2
Switch(config-if)#do sh ip int br
```

建立一個新的Vlan

顯示Switch的介面

Physical | Config | CLI | Attributes

IOS Command Line Interface

```
Switch(config)#int fa0/2
Switch(config-if)#ip ?
  dhcp  Configure DHCP parameters for this interface
Switch(config-if)#int vlan 2
Switch(config-if)#do sh ip int br
Interface              IP-Address      OK? Method Status                Protocol
FastEthernet0/1        unassigned      YES manual up                    up
FastEthernet0/2        unassigned      YES manual up                    up
FastEthernet0/3        unassigned      YES manual down                  down
FastEthernet0/4        unassigned      YES manual down                  down
FastEthernet0/5        unassigned      YES manual down                  down
FastEthernet0/6        unassigned      YES manual down                  down
FastEthernet0/7        unassigned      YES manual down                  down
FastEthernet0/8        unassigned      YES manual down                  down
FastEthernet0/9        unassigned      YES manual down                  down
FastEthernet0/10       unassigned      YES manual down                  down
FastEthernet0/11       unassigned      YES manual down                  down
FastEthernet0/12       unassigned      YES manual down                  down
FastEthernet0/13       unassigned      YES manual down                  down
FastEthernet0/14       unassigned      YES manual down                  down
FastEthernet0/15       unassigned      YES manual down                  down
FastEthernet0/16       unassigned      YES manual down                  down
FastEthernet0/17       unassigned      YES manual down                  down
FastEthernet0/18       unassigned      YES manual down                  down
FastEthernet0/19       unassigned      YES manual down                  down
FastEthernet0/20       unassigned      YES manual down                  down
FastEthernet0/21       unassigned      YES manual down                  down
FastEthernet0/22       unassigned      YES manual down                  down
FastEthernet0/23       unassigned      YES manual down                  down
FastEthernet0/24       unassigned      YES manual down                  down
Vlan1                  unassigned      YES manual administratively down down
Vlan2                  unassigned      YES manual down                  down
Switch(config-if)#
```

Copy | Paste

可以發現新的介面被建立起來了

而我們也要在上面去輸入IP

Top

這邊我們使用Vlan 1的介面去設定IP

```
Switch(config-if)#
Switch(config-if)#
Switch(config-if)#
Switch(config-if)#int vlan 1   進入Vlan 1的介面
Switch(config-if)#no sh   先把它啟動（預設是關閉）

Switch(config-if)#
%LINK-5-CHANGED: Interface Vlan1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan1, changed
state to up

Switch(config-if)#ip ?  此時我們透過 “ip ?” 的指令，發現可以輸入IP了
  address           Set the IP address of an interface
  helper-address    Specify a destination address for UDP
broadcasts                    這邊我們輸入管理的IP和其子網路遮罩
Switch(config-if)#ip address 192.168.1.15 255.255.255.0
Switch(config-if)#
Switch(config-if)#
```

這樣就完成Switch上的IP設定了

接著我們點選PC0
透過Desktop裡的Command Prompt
去ping Switch的管理IP
可以發現可以成功Ping到

```
C:\>ping 192.168.1.15

Pinging 192.168.1.15 with 32 bytes of data:

Reply from 192.168.1.15: bytes=32 time<1ms TTL=255
Reply from 192.168.1.15: bytes=32 time<1ms TTL=255
Reply from 192.168.1.15: bytes=32 time<1ms TTL=255
Reply from 192.168.1.15: bytes=32 time<1ms TTL=255

Ping statistics for 192.168.1.15:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

作業

- 1.請將PC1的部分，實作完並截圖下來（透過介面設定或是輸入指令均可）
- 2.請嘗試用PC1的電腦去ping Switch的管理IP，
  我們會發現無法ping到。
  (1)請解釋為何無法ping到
  (2)請將解決方法實做出來（截圖即可)
  (Hint)在Global Configuration Model在層下“ip ?”(中間有空格)
  可以找到指令去做

參考影片

- https://youtu.be/cxuTa0FoG1Y

當PC1的電腦可以ping到Switch時，我們可以透過Telnet指令來連到Switch

```
C:\>telnet 192.168.1.15
Trying 192.168.1.15 ...Open

[Connection to 192.168.1.15 closed by foreign host]
C:\>
```

但因為Cisco Switch保護的機制，我們還需要設定Telnet的密碼

至Switch 的第二層模式輸入
line vey 0 4
password 1234 (1234為設定的密碼）
Login

```
Switch(config)#line vty 0 4
Switch(config-line)#password 1234
Switch(config-line)#loggi
Switch(config-line)#logging
% Incomplete command.
Switch(config-line)#log
Switch(config-line)#log ?
Switch(config-line)#log in
Switch(config-line)#log in
% Ambiguous command: "log in"
Switch(config-line)#login
Switch(config-line)#
```

```
C:\>telnet 192.168.1.15
Trying 192.168.1.15 ...Open


User Access Verification

Password:
Switch>
Switch>
```

最終即可連接上去

作業

- 3.請完成最終密碼設定，並截圖下來(如上一頁投影片的兩張圖)

- 4.在此次實作，運用到了vlan和telnet。請簡單介紹vlan和telnet是什麼。並說明他們的優點和其原因。

參考影片

- https://youtu.be/sQ_hvB8kKPI

作業

- 請使用pdf檔繳交作業
- 說明：
  - 1.封面（班級、學號、姓名). EX：106XXXXXX(學號)_Lab3。
  - 2.請回答上述問題，將答案截圖貼上，並做上說明。
  - 3.實驗心得（約100字）。
- 請將問題答案和圖示標示清楚，以利助教批改。
- 請將作業上傳至ftp。如果無法上傳，可將作業email給助教。
- email：zxc95452@gmail.com
- 有任何問題都可以email給助教或是FB私訊。