台北海洋技術學院
Taipei College of Miritime Technology
103 年 HP Switch 教育訓練

時間:103 年 12 月 12 日下午 13:00~17:00
地點:台北海洋技術學院福環樓 2F D212 教室
講師: 蕭玉龍 先生

博鉅資訊
BGIC

台北海洋技術學院

HPN 教育訓練

Agenda

簡報大綱

- 章節1 ： A系列產品型號
- 章節2 ： **Switch 產品簡介**
- 章節2 ： 章節3 ： **Switch Console操作**
- 章節4: **Switch WEB操作**
- **IRF簡介**

A-Series Box Switch Naming Rule

HP A 5 5 00-24 G- EI

A B C D E F G H

- (Brand)
- (Product Series Indicate)
  - / E / V – Product Line
  -
- (Sub Series Indicate)
  - –DC Chassis Switch
  - –Core Chassis Switch
  - –Core Router
  - –High-End Chassis Switch
  - –High-End Router
  - – GE Box Switch
  - – FE Box Switch with GE uplink

•D (L2, L3 Switch Indicate)

–>=5 – L3 Routing Switch

–<5 – L2 Switch

•E (Switch Model)

•F (Number of Available Ports)

•G (Port Type)

–None – 10/100

–G – GE Port

–P – GE SFP Uplink

–T – GE RJ45 Uplink

H (Service Type Indicate)

EI – Enhanced Software Image

SI – Standard Software Image

POE-EI – PoE Supported EI

POE-SI – PoE Supported SI

A -系列固定埠交換器

博鉅資訊 BGIC Design

10GE

Large campus distribution layer
DC access layer

A5820X-14/24 SFP+

1G plus 8 *10G

Large campus distribution layer
DC access layer

A5800-24/48G

GE Edge Plus 10G

SME core layer
Large campus distribution layer

A5120SI/EI

SI : No 10G Uplink and QoS

A5500 SI

SI : RIP Only, Lite IRF

A5500 EI

FE Edge

Access layer for campus LAN

A3100SI/EI

SI : Lite security , ACL/AM

A3600SI

SI : RIP Only, Lite IRF

A3600EI

A3610

No Stacking Feature

Layer 2 + | **Standard Layer 3** | **Full Layer 3** | **Function**

A-系列模組交換器

數據中心,
大型企業核心
高速運算中心
(HSC)

A9500 Series
12, 8 and 5-slot 1.4 terabit switches
Up to 192 10GB & 576 Gig ports
Load-sharing fabrics, redundant chassis, management, power supplies, fans
Intelligent Resilient Fabric (IRF2)

A12500
2.2 Bpps

A12500 Series
18 and 8-slot 6.6/3.3 terabit switches
Up to 128 (1:1)/512 (4:1) 10GB & 864 Gig ports
Non-blocking, zero service interruption design
Architecture supports 40/100-GbE
Wire speed L2/IPv4/IPv6/MPLS
Intelligent Resilient Fabric (IRF2)

中型數據中心
學術網核心

A9500
857 Mpps

企業核心
大型企業匯集層

A7500
714 Mpps

A7500 Series
10, 6, 3 and 2-slot, 2.4 terabit switch
Up to 84 10GB and 504 Gig ports
Red. main control; passive backplane; Intelligent Resilient Fabric (IRF2)
IPv4, IPv6, OSPF, BGP, IS-IS

功能與效能

HP Campus LAN Switch Comparison

Performance	A9512	A9508	A9505	A7510	A7506-V	A5820-14XG	A5800-48G-PoE
Chassis/Box Switching Capacity	1.44 Tbps	1.44 Tbps	720 Gbps	1.5 Tbps	768 Gbps	488 Gbps	284 Gbps
Throughput	857 Mpps	571 Mpps	357 Mpps	714 Mpps	488 Mpps	363Mpps	211 Mpps
10GE (1:1) Density (max per chassis/box)	48	32	20	40	24	22	8
10GE (x:1) Density (max per chassis/box)	192 (4:1)	128 (4:1)	90 (4:1)	84 (2:1)	52	22	8
1GE (1:1) Density (max per chassis/box)	576	384	240	504	312	4	80
Port to Port Latency	4-5 uSec	4-5 uSec	4-5 uSec	4-5 uSec	4-5 uSec	1.48 (sf) - 1.2 (ct) uSec	2.1 uSec
PoE(+)	No	No	No	Yes (integrated)	Yes (integrated)No		Yes

Flexible, energy efficient architecture, leveraging common OS, management and network design/resiliency protocols

Rounding out our Comprehensive Enterprise Switching Portfolio

	A3100-EI	A3600	A3610	A5120	A5500-SI	A5500-EI
Speeds	•10/100 •Gigabit	•10/100 •Gigabit	•10/100 •Gigabit • 10G	•Gigabit	•10/100 •Gigabit • 10GE	•10/100 •Gigabit •10GE
Expandability	Clustering	Clustering/Stackable	Clustering	IRF	Clustering/ Single IP Mgmt	IRF
Form Factor	Desk and 19" Rack Mountable	19" Rack Mountable	19" Rack Mountable	19" Rack Mountable	19" Rack Mountable	19" Rack Mountable
Management	CLI / Web / SNMP	CLI / Web / SNMP	CLI / Web / SNMP	CLI / Web / SNMP	CLI / Web / SNMP	CLI / Web / SNMP
Switching	L2	L2/3	L2/3/4	L2/3	L2/3	L2/3/4
Routing	Static Routes*	RIP/OSPF/PIM	RIP / OSPF / BGP/ IS-IS / PIM	Static Routes*	RIP	RIP / OSPF / BGP /IS-IS /PIM
IPv6	Management	Management	Routing, Management, VLANs	Management	Management, VLANs	Management/Routing/VLANs
Target Markets	Medium Business / Branch / Enterprise	Enterprise	Enterprise	Medium Business / Branch / Enterprise	Medium Business / Enterprise	Enterprise

- Integrated network mgmt and Common OS reduces complexity and IT training/personnel - lowers deployment and maintenance costs

HP Data Center Switch Portfolio

	A12518	A12508	A9512	A9508	A9505	A5820-24XG	A5820-14XG
Performance							
Chassis/Box Switching Capacity	6.6 Tbps	3.3 Tbps	1.44 Tbps	1.44 Tbps	720 Gbps	488 Gbps	488 Gbps
Throughput	2.2 Bpps	950 Mpps	857 Mpps	571 Mpps	357 Mpps	363Mpps	363Mpps
10GE (1:1) Density (max per chassis/box)	128	64	48	32	20	24	22
10GE (x:1) Density (max per chassis/box)	512 (4:1)	256 (4:1)	192 (4:1)	128 (4:1)	90 (4:1)	24	22
1GE (1:1) Density (max per chassis/box)	864	384	576	384	240	4	4
1GE (x:1) Density (max per chassis/box)	864	384	576	384	240	4	4
Port to Port Latency	8.15 uSec	8.15 uSec	4-5 uSec	4-5 uSec	4-5 uSec	1.48 (sf) - 1.2 (ct) uSec	
Power consumption (fully loaded chassis)	7,400 W	2,878 W	1,370 W	990 W	640 W	160 W	178 W

New modern architecture, leveraging common OS, management and network design/resiliency protocols

HP Networking Ethernet Switching Portfolio – Competitive Cross-Ref Matrix

	HP (A-Series)	HP (E-Series)	Cisco	Juniper	Brocade
Managed Switches	A12500		Nexus 7000		Big Iron RX Net Iron MLX
	A5820		Nexus 5000 Nexus 2000	EX4500	Turbo Iron / Net Iron / Fast Iron CX
	A9500/A7500		Catalyst 6500	EX8200	Big Iron MX
	A7500	E8200	Catalyst 4500R		Big Iron RX / Fast Iron Super X
		E5400	Catalyst 4500		
	A5820	E6600	Catalyst 4900M	EX2500/EX4500	Turbo Iron 24X
	A5800/A5500EI	E4800G	Catalyst 3750X (IP Services SW)	EX4200	Fast Iron CX
	A5500SI	E5400	Catalyst 3750X (IP Base SW)	EX4200	Fast Iron CX
	A5500SI	E5400	Catalyst 3750X (LAN Base)	EX4200	
	A5500EI	E4800G	Catalyst 3560X (IP Services SW)	EX3200	
	A5500SI	E3500G/E6200	Catalyst 3560X (IP Base SW)	EX3200	Fast Iron GS
	A5500SI	E2910G	Catalyst 3560X (LAN Base SW)	EX3200	
	A5120EI	E2910G	Catalyst 2960S (LAN-Base SW)	EX2200	
	A5120SI	E25XXG	Catalyst 2960S (LAN-Lite SW)	EX2200	
Managed Switches	A3600 EI(10/100)		Catalyst 3750v2 (IP Serv SW)		Fast Iron Edge
	A3600SI(10/100)	E5400	Catalyst 3750v2 (IP Base SW)		
	A3600EI(10/100)		Catalyst 3560v2 (IP Services SW)		
	A3600SI(10/100)	E3500	Catalyst 3560v2 (IP Base SW)	EX2x00	Fast Iron WS
	A3100EI(10/100)	E2610	Catalyst 2960 (LAN-Base SW)	EX2x00	
	A3100SI(10/100)	E25XX	Catalyst 2960 (LAN-Lite SW)		

博鉅資訊
BGIC

Switch Console操作

- 常用指令對照
- 進入CLI
- 常用快速鍵
- Port 名稱
- 超級終端機登入方式
- 進入設定模式
- 顯示設定檔(display current-configuration)
- 存檔(save)
- 查看版本(display version)
- 取消某一行設定(undo)
- 在vlan 1 查看設定

博鉅資訊 BGIC

Switch Console操作

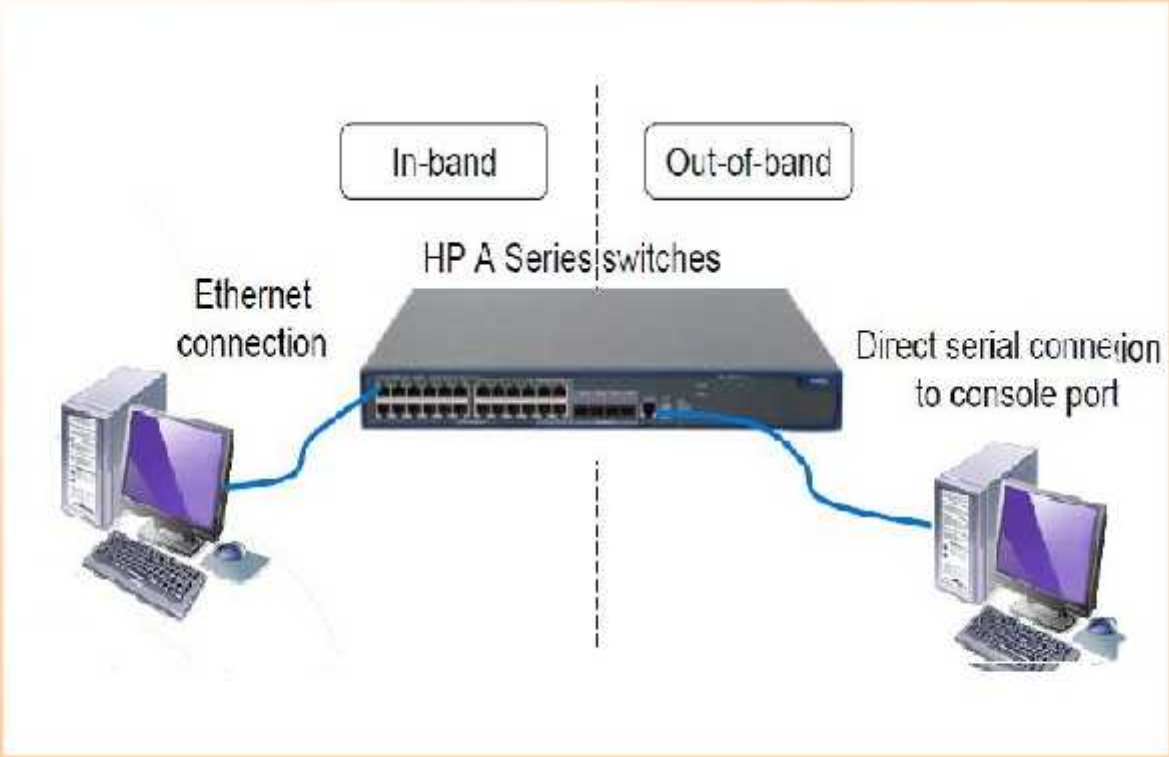
- 回上一層(quit)
- 重開機(reboot)
- 修改Console 名稱
- 新增VLAN(例如: 新增VLAN 5 ,名稱叫OFFICE)
- 移除VLAN 5
- Add vlan by port (例如:port 1 and port 2至VLAN2)
- 802.1Q(例如:把port 24 加入 VLAN 2，且讓每個vlan都放行)
- 802.3ad link-aggregation(例如: port 47 and port 48 掛在group 1)

常用指令對照

常用指令對照

ProVision	Comware 5	Cisco
enable	system-view	enable
show running-config	display current-config	show running-config
write memory	save	write
erase startup-config	reset saved-config	erase startup-config
no	undo	no
reload	reboot	reload
exit	quit	exit

進入CLI


In-band
Out-of-band
HP A Series switches
Ethernet connection
Direct serial connection to console port

常用快速鍵

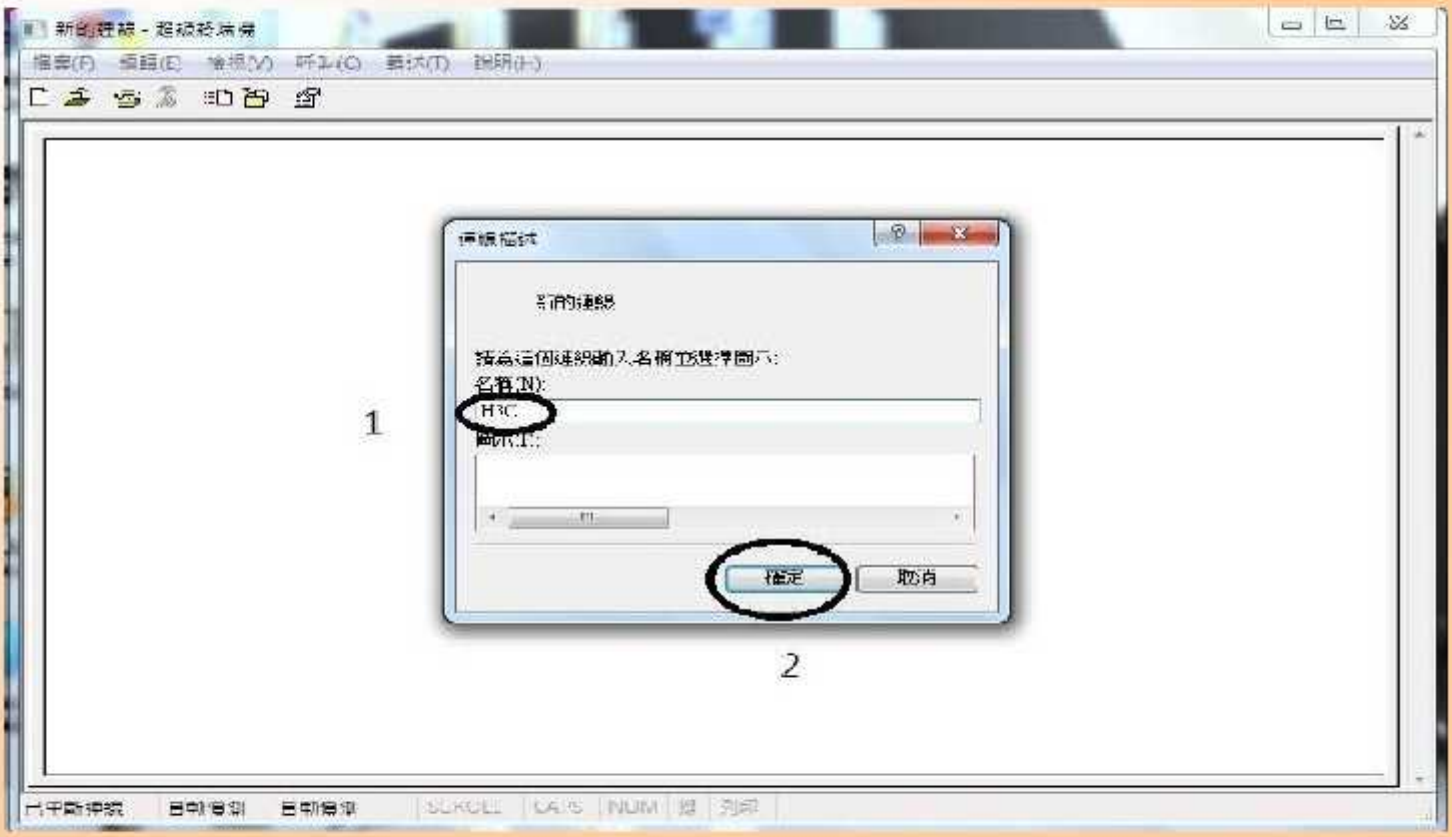
按鍵	功能
<?>	查詢可使用指令
<Tab>	自動補齊指令
<Ctrl + E>	移動至行尾
<Ctrl + X>	刪除游標左側所有字元
<Ctrl + A>	移動至行首
<↑>	顯示上一次輸入指令

Port 名稱

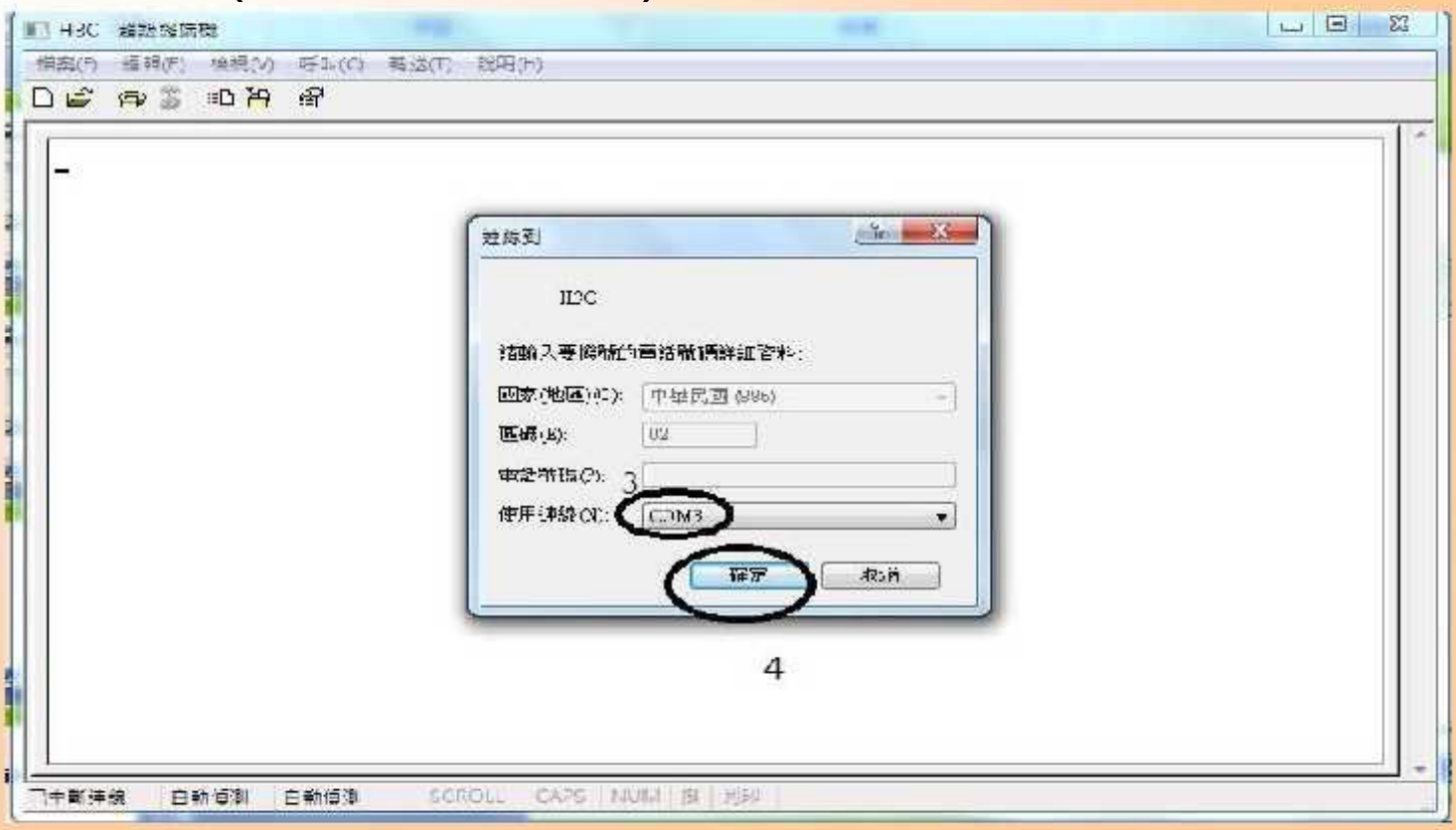
- Standalone
- slot/0/port number
- 例如
- e1/0/9
- g1/0/13

- Chassis
- Slot/module/0/port
- 例如
- g1/2/0/7
- ten2/2/0/18

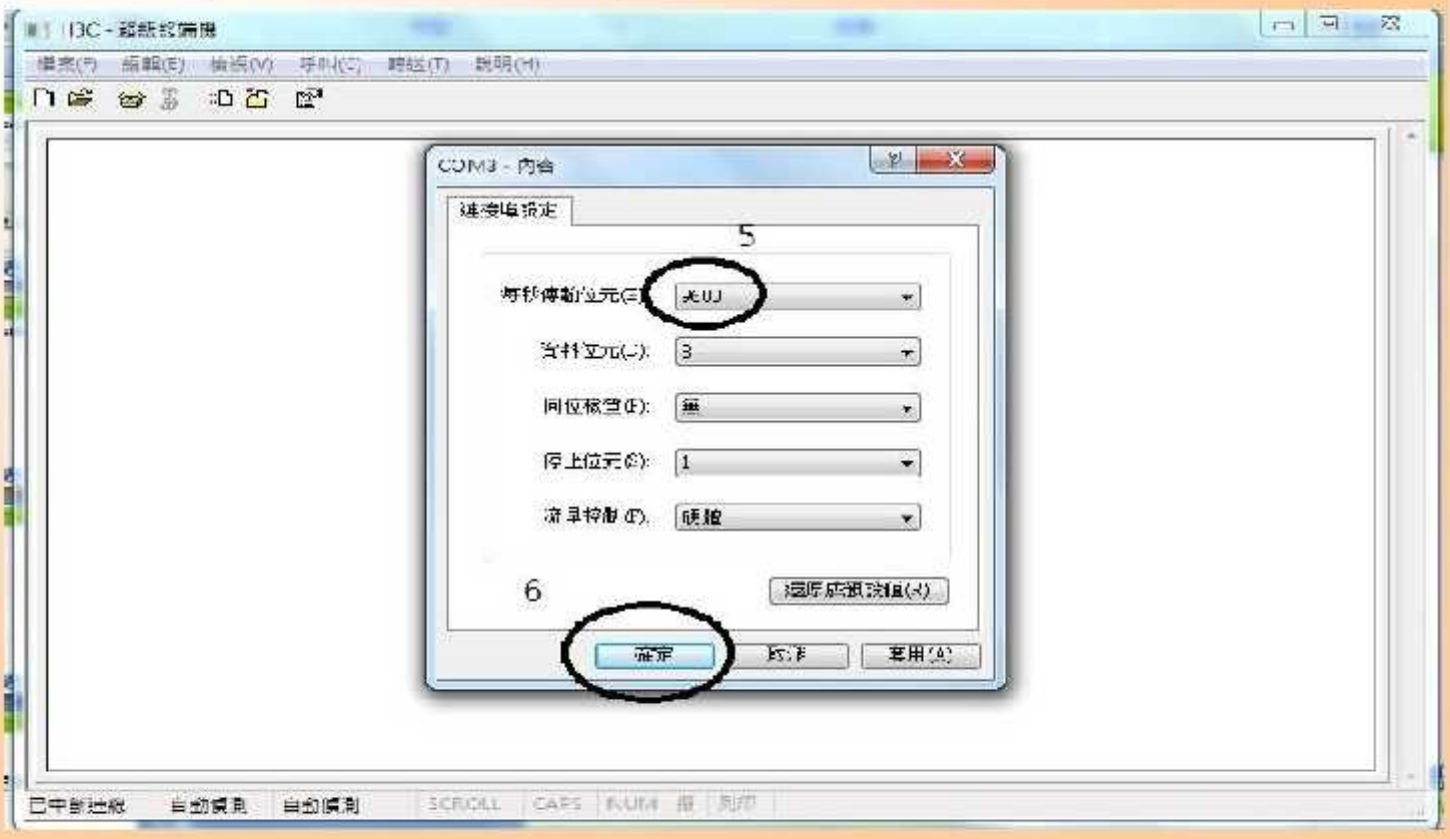
登入方式(超級終端機第1步驟)



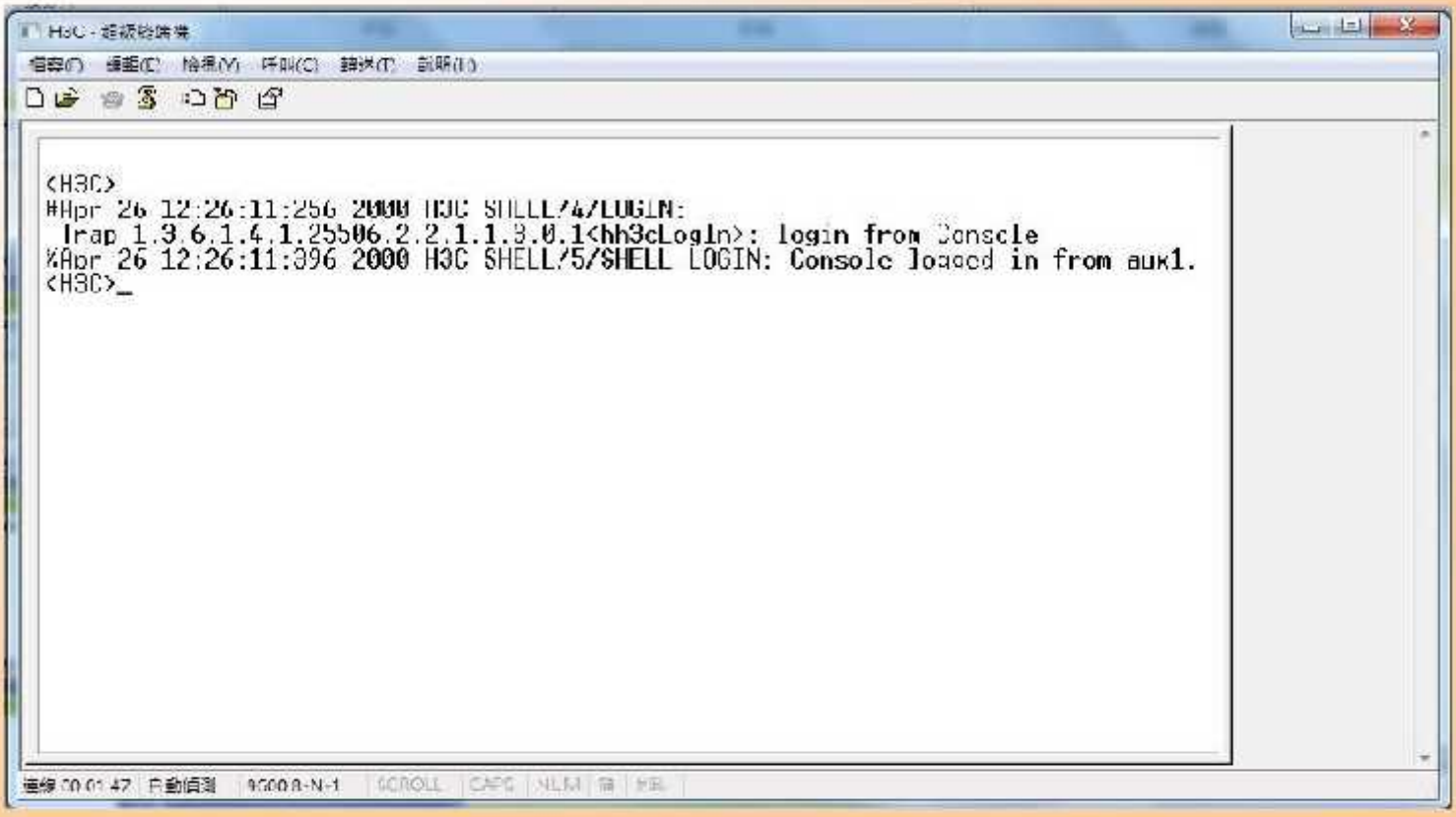
登入方式(超級終端機第2步驟)



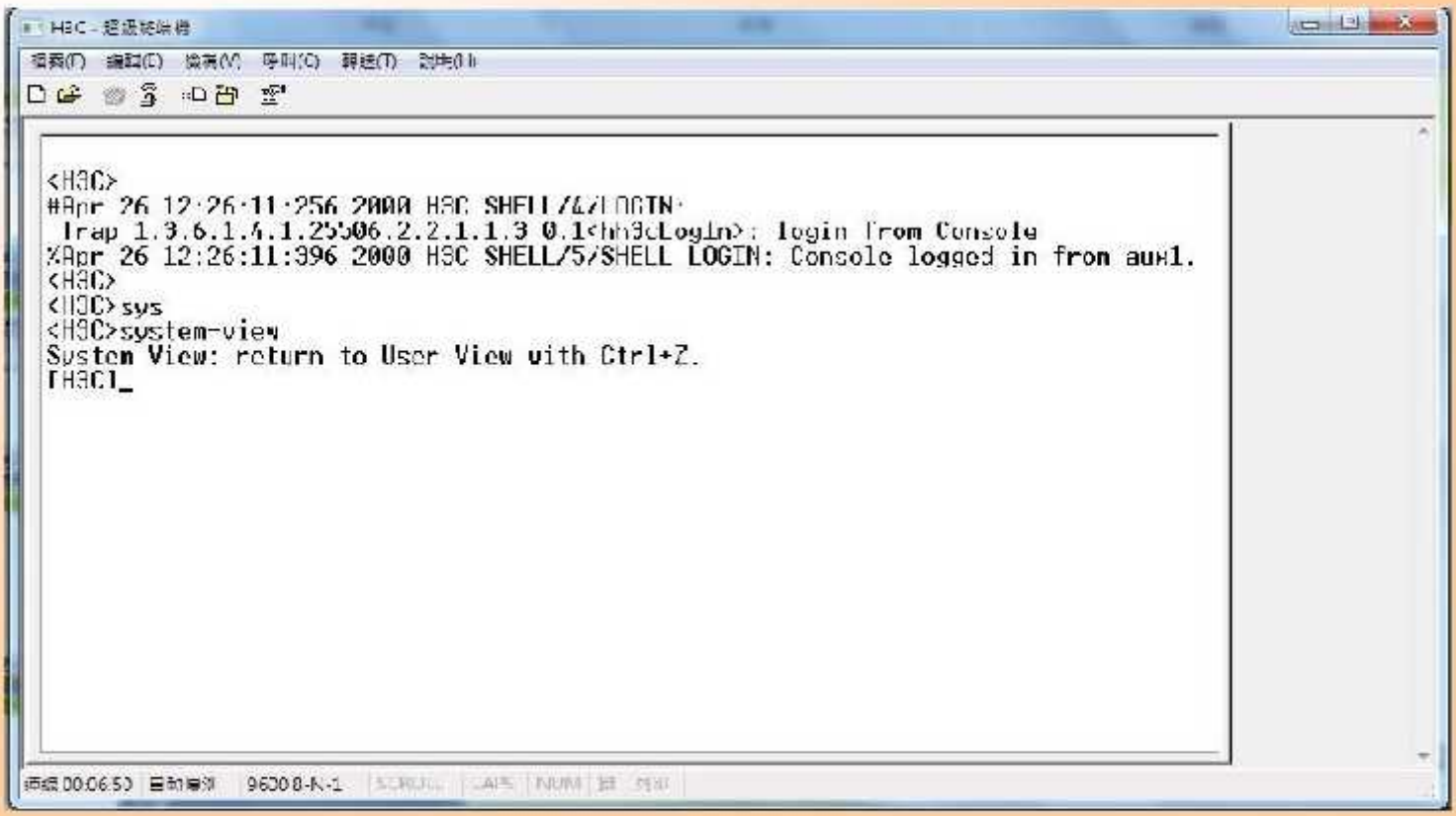
登入方式(超級終端機第3步驟)



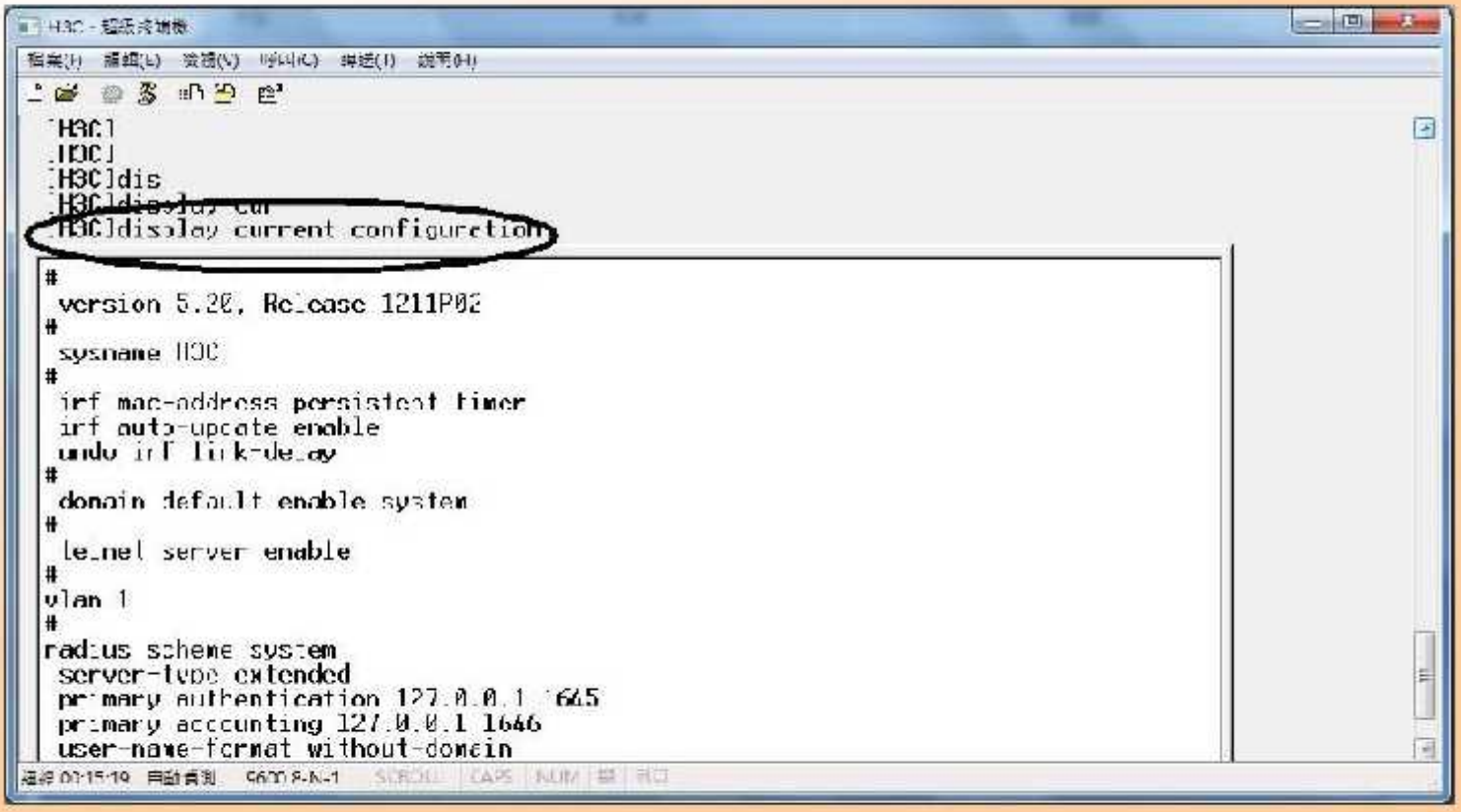
登入方式(超級終端機第4步驟)



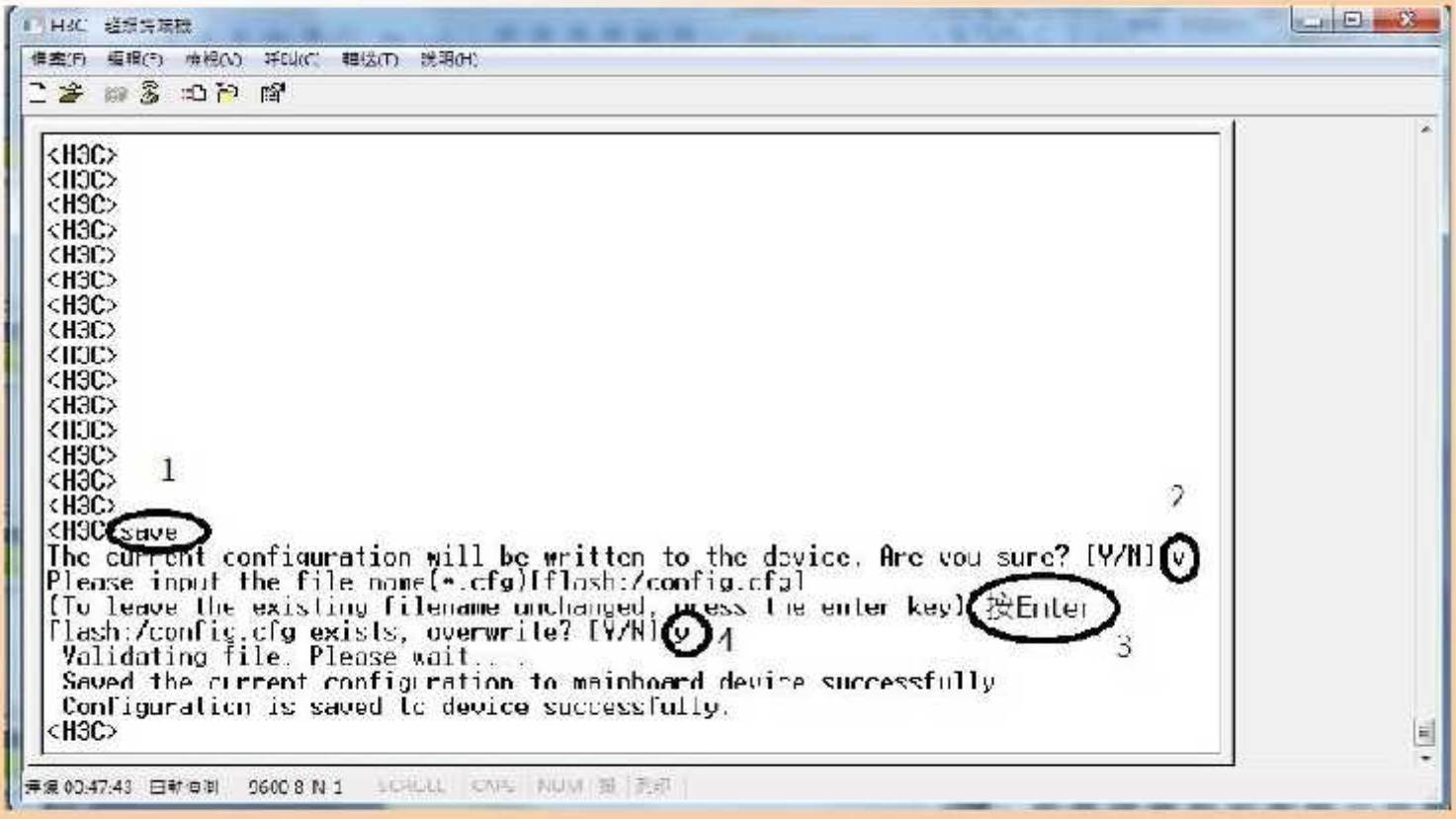
進入設定模式(system-view)



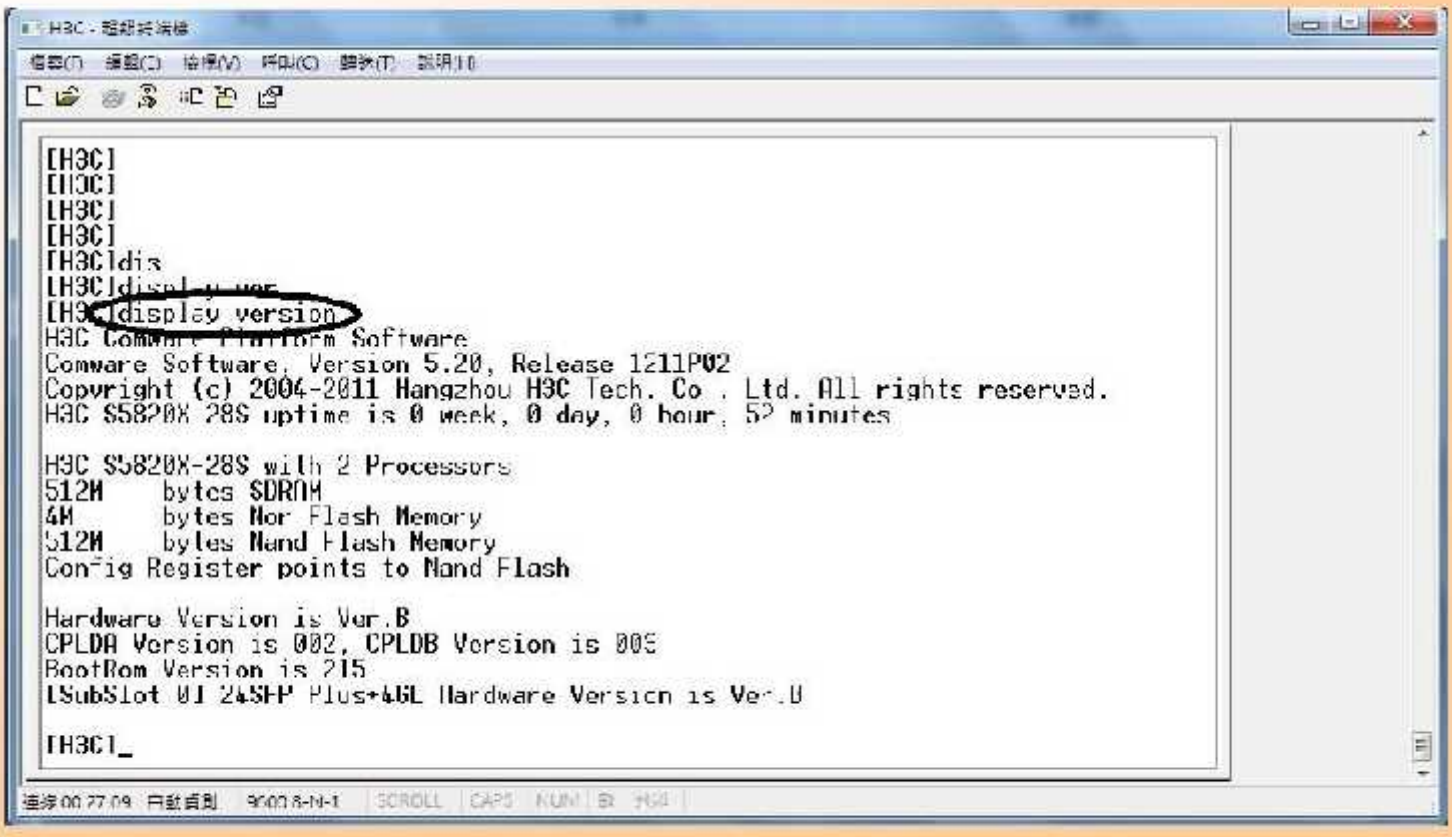
顯示設定檔(display current-configuration)



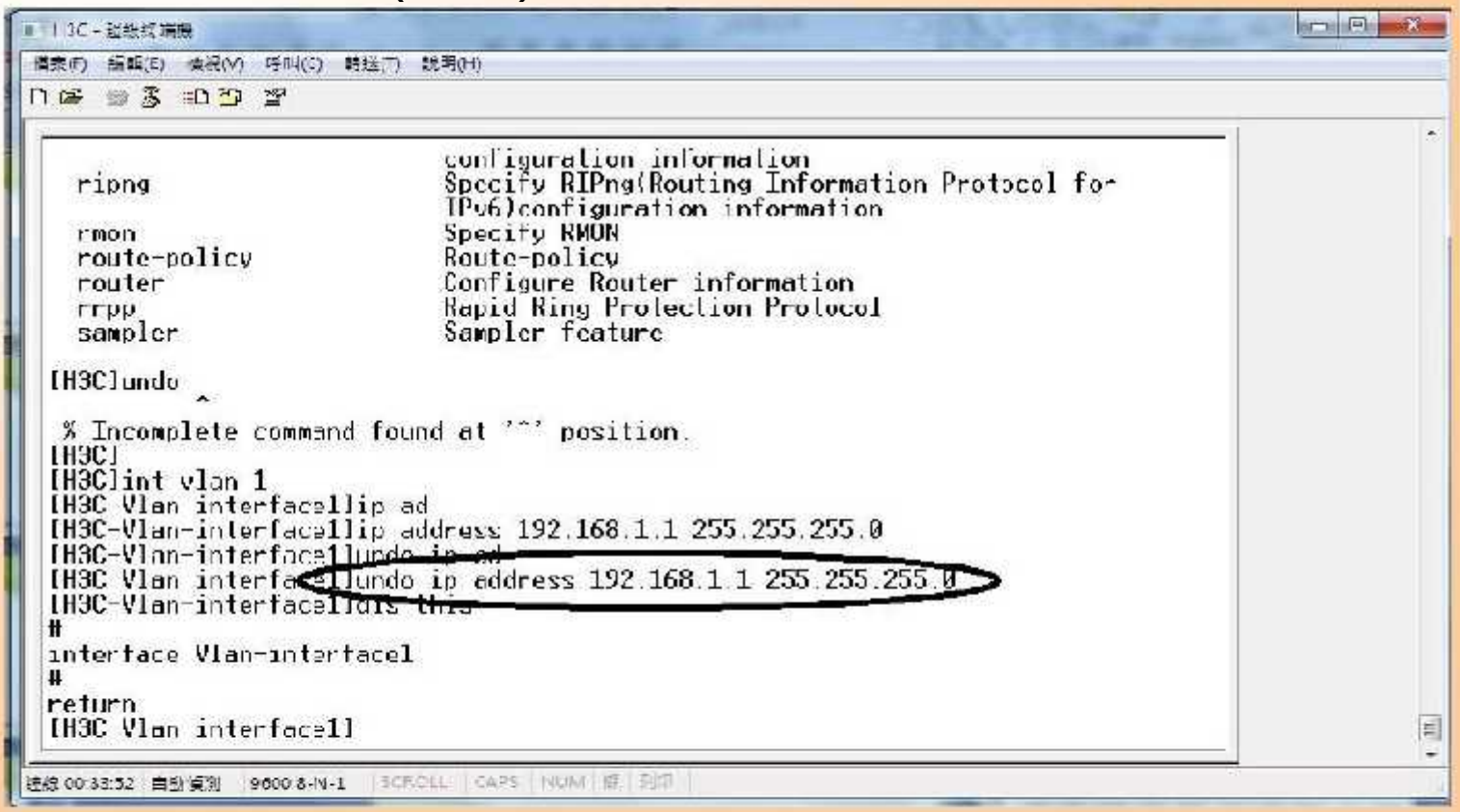
存檔(save)


<H3C>
<H3C>save
The current configuration will be written to the device. Are you sure? [Y/N]y
Please input the file name(*.cfg)[flash:/config.cfg]
(To leave the existing filename unchanged, press the enter key)按Enter
flash:/config.cfg exists, overwrite? [Y/N]y
Validating file. Please wait...
Saved the current configuration to mainboard device successfully
Configuration is saved to device successfully.
<H3C>
1
2
3
4

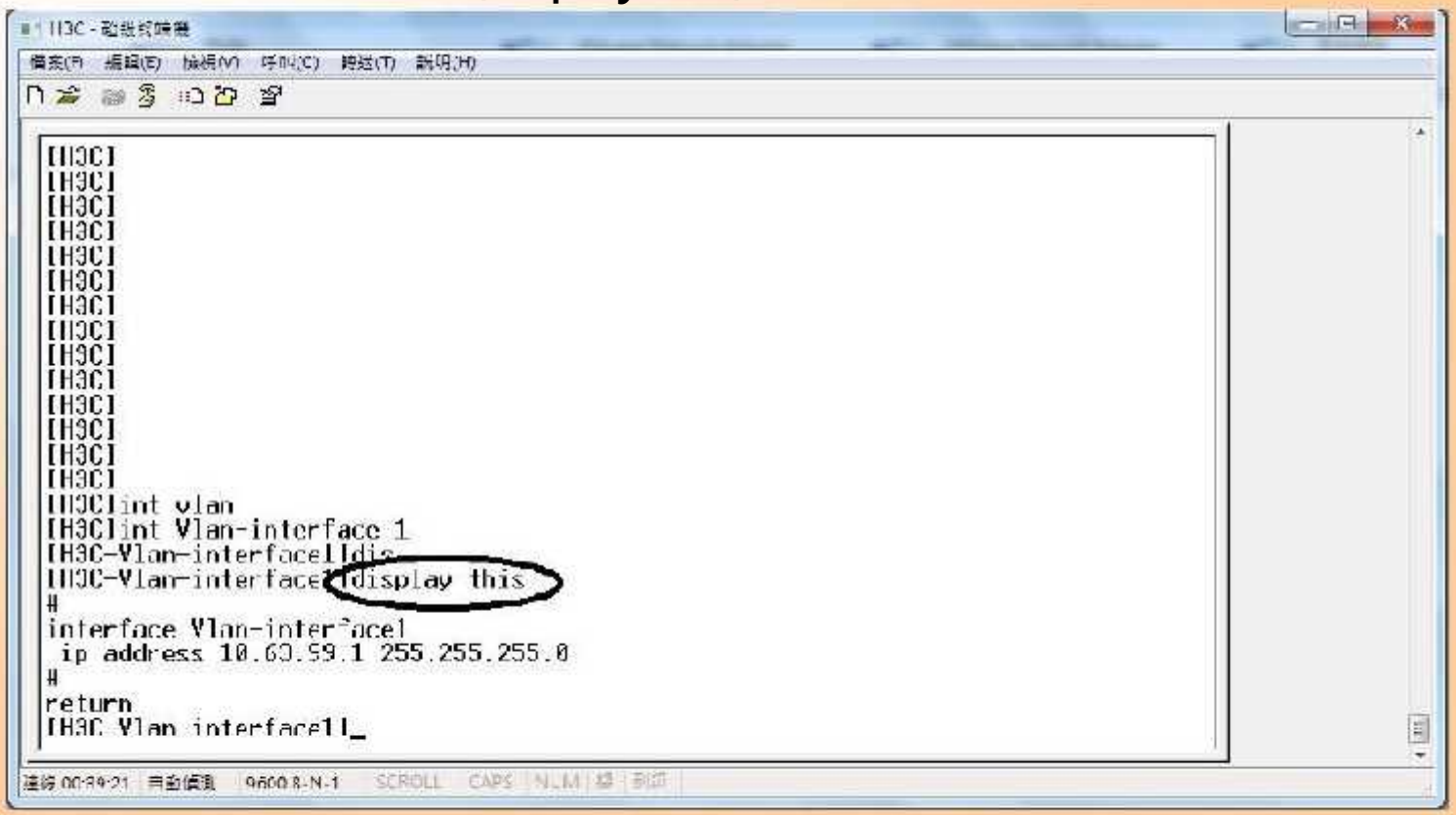
查看版本(display version)



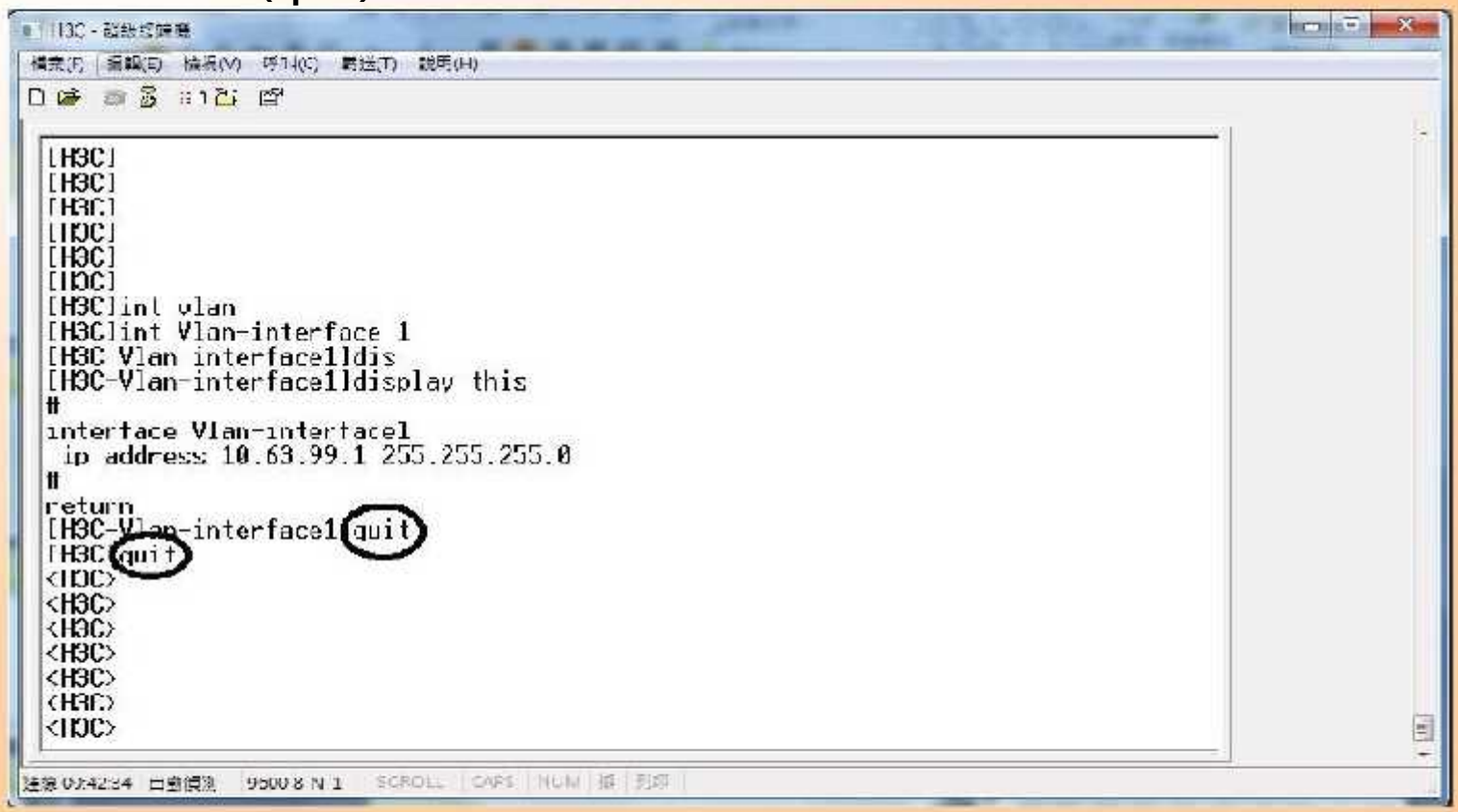
取消某一行設定(undo)



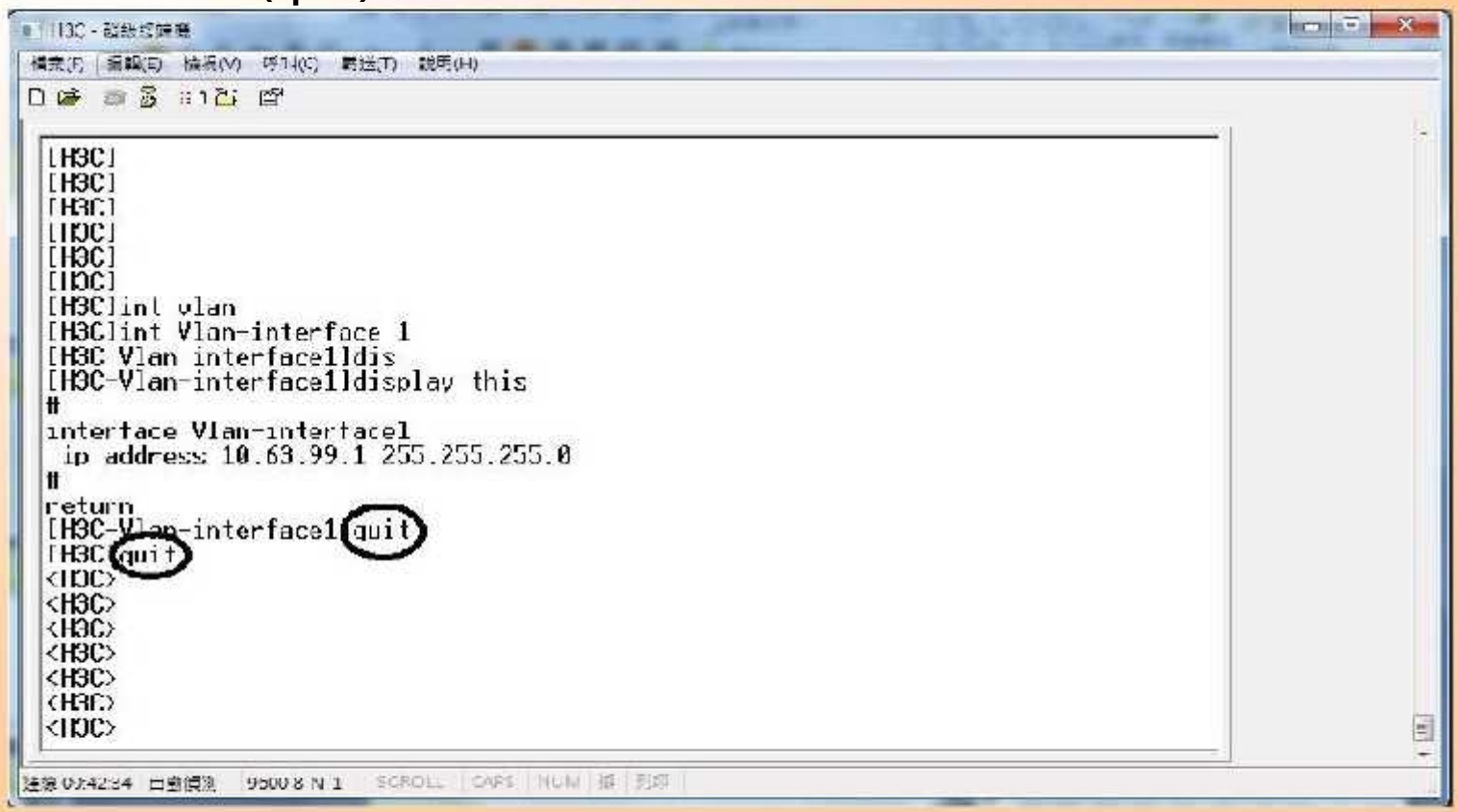
在vlan 1 查看 設定(display this)



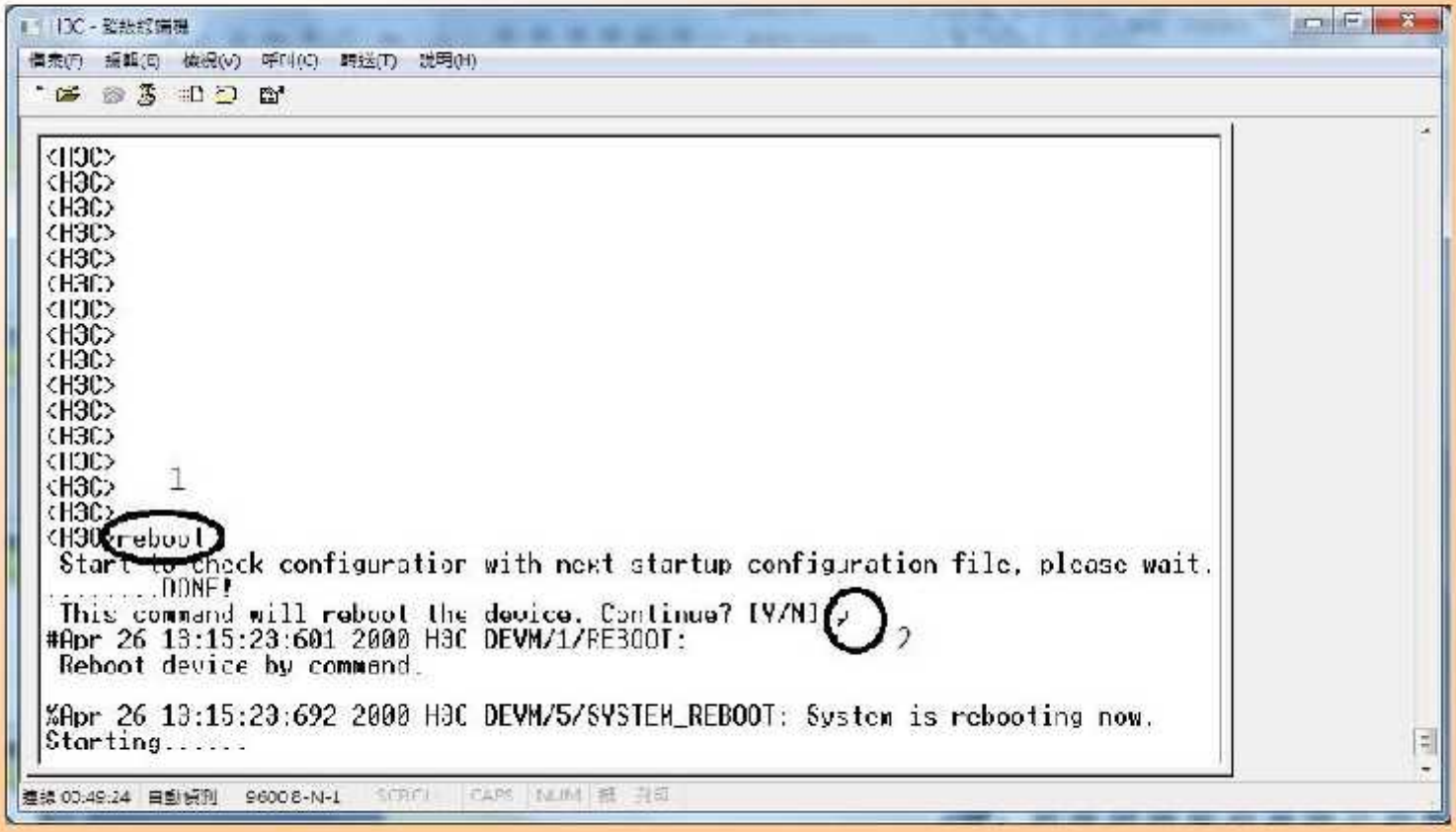
回上一層(quit)


[H3C]
[H3C]
[H3C]
[H3C]
[H3C]
[H3C]
[H3C]inl vlan
[H3C]int Vlan-interface 1
[H3C Vlan interface1]dis
[H3C-Vlan-interface1]display this
#
interface Vlan-interface1
ip address 10.63.99.1 255.255.255.0
#
return
[H3C-Vlan-interface1]quit
[H3C]quit
<H3C>
<H3C>
<H3C>
<H3C>
<H3C>
<H3C>
9600 8 N 1
SCROLL
CAPS
NUM

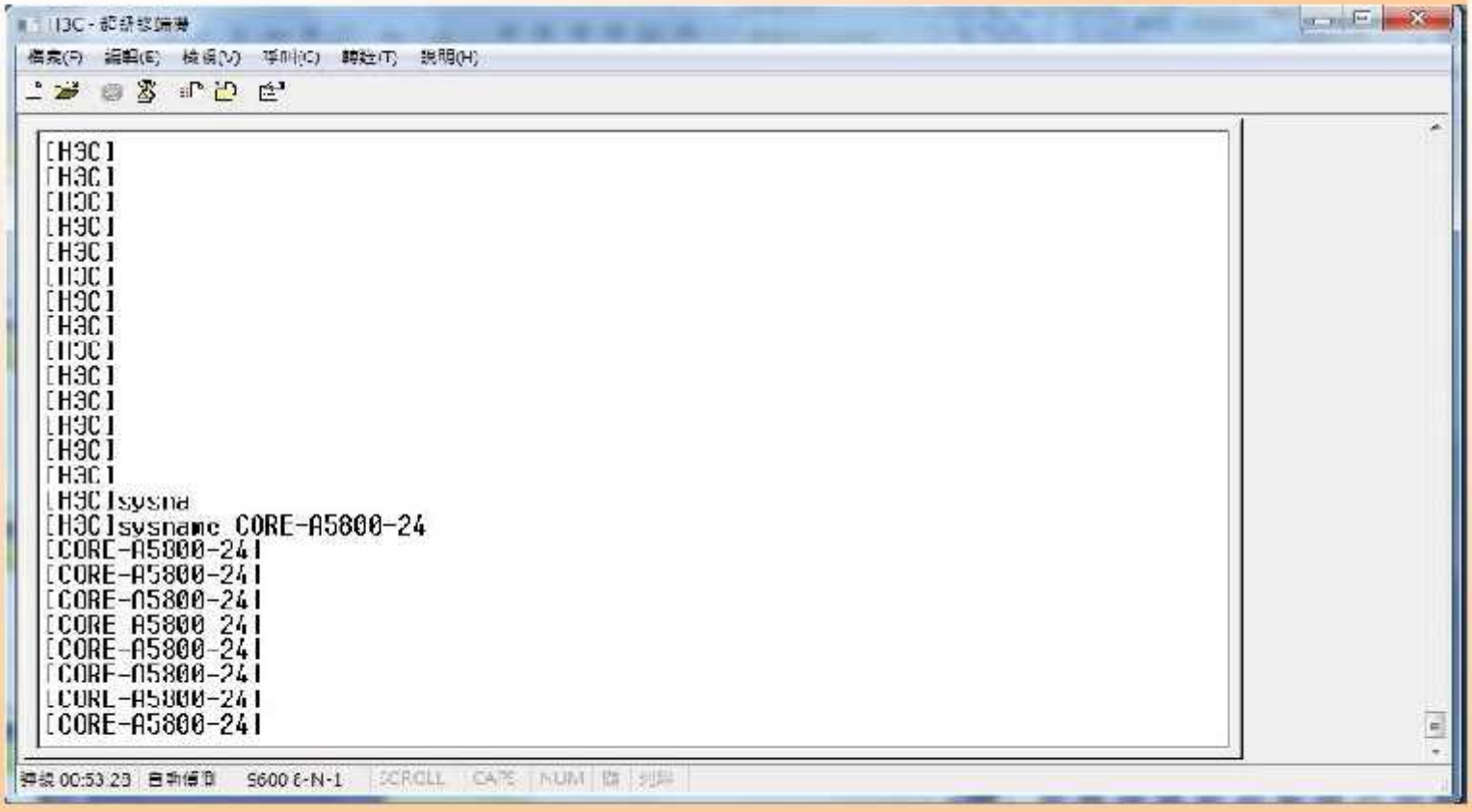
回上一層(quit)


[H3C]
[H3C]
[H3C]
[H3C]
[H3C]
[H3C]
[H3C]inl vlan
[H3C]int Vlan-interface 1
[H3C Vlan interface1]dis
[H3C-Vlan-interface1]display this
#
interface Vlan-interface1
ip address 10.63.99.1 255.255.255.0
#
return
[H3C-Vlan-interface1]quit
[H3C]quit
<H3C>
<H3C>
<H3C>
<H3C>
<H3C>
<H3C>
9600 8 N 1
SCROLL
CAPS
NUM

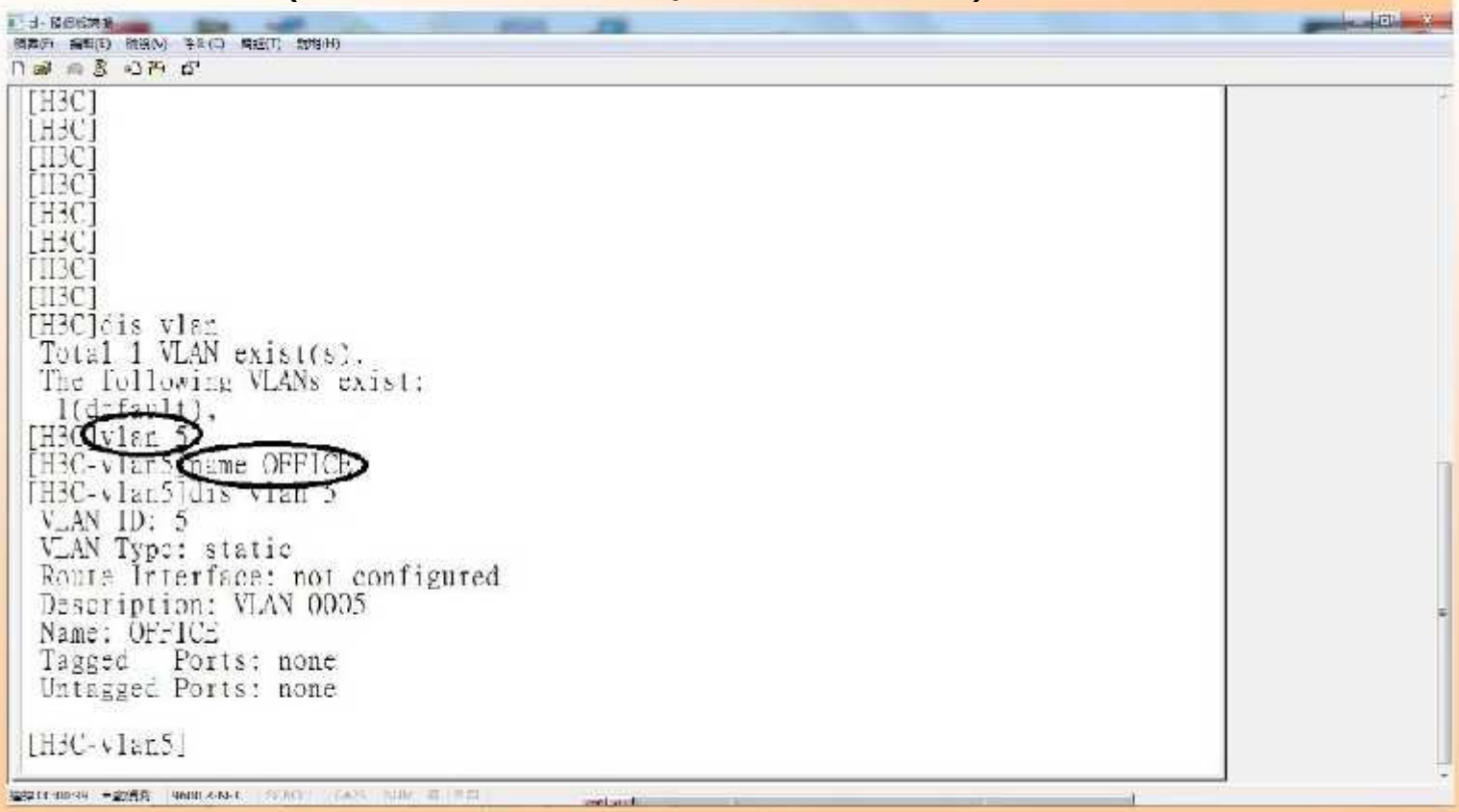
重開機(reboot)


H3C - 超級終端機
檔案(F) 編輯(E) 檢視(V) 呼叫(C) 轉送(T) 說明(H)
<H3C>
<H3C>
<H3C>
<H3C>
<H3C>
<H3C>
<H3C>
<H3C>
<H3C>
<H3C>
<H3C>
<H3C>
<H3C>
<H3C>
<H3C>
1
<H3C>reboot
Start to check configuration with next startup configuration file, please wait.
.....DONE!
This command will reboot the device. Continue? [Y/N]y
2
%Apr 26 13:15:23:601 2000 H3C DEVM/1/REBOOT:
Reboot device by command.
%Apr 26 13:15:23:692 2000 H3C DEVM/5/SYSTEM_REBOOT: System is rebooting now.
Starting.....
連線 00:49:24 自動偵測 9600 8-N-1 SCROLL CAPS NUM 擷 列印

修改Console 名稱



新增VLAN(例如：新增VLAN 5,名稱叫OFFICE)

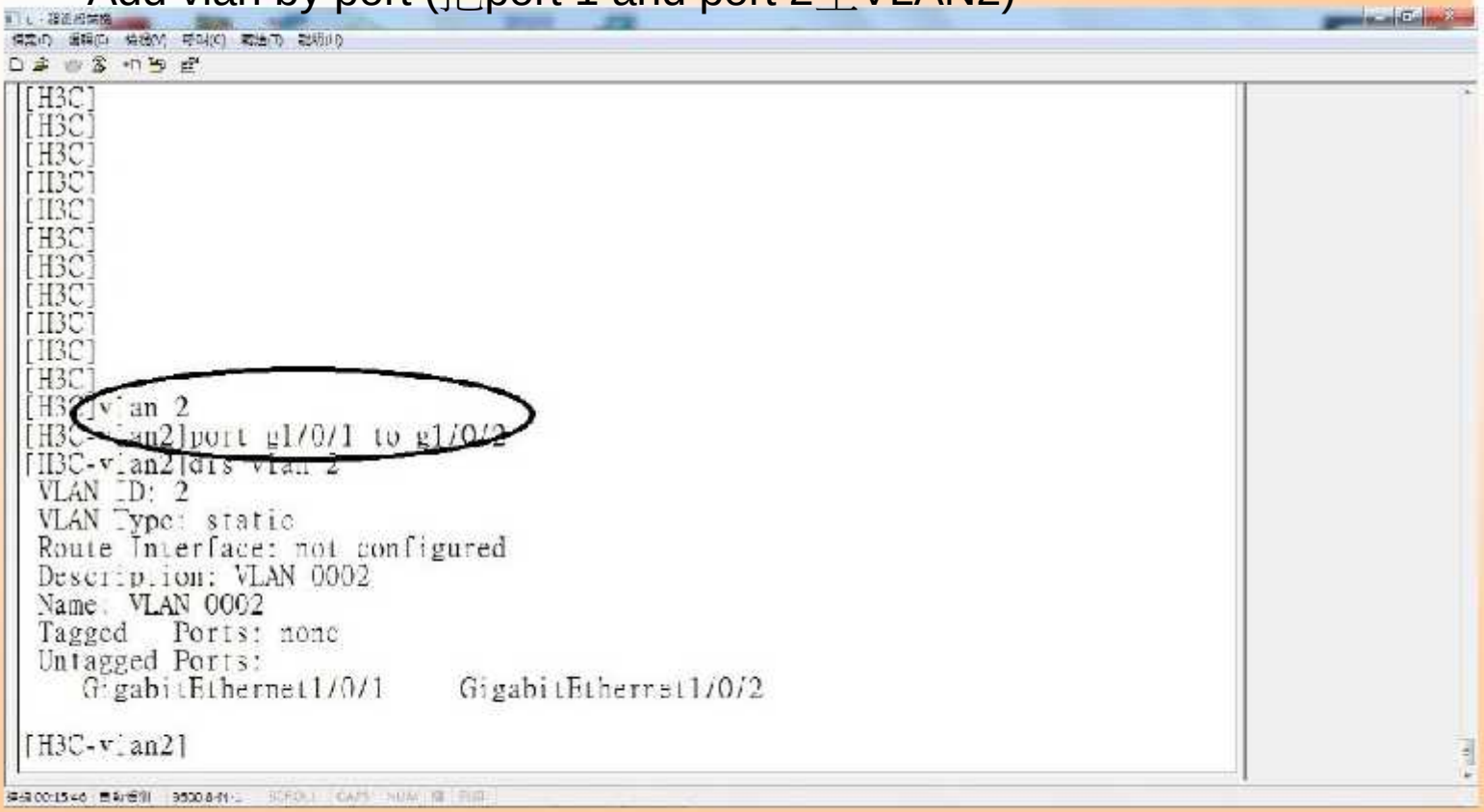


移除VLAN 5

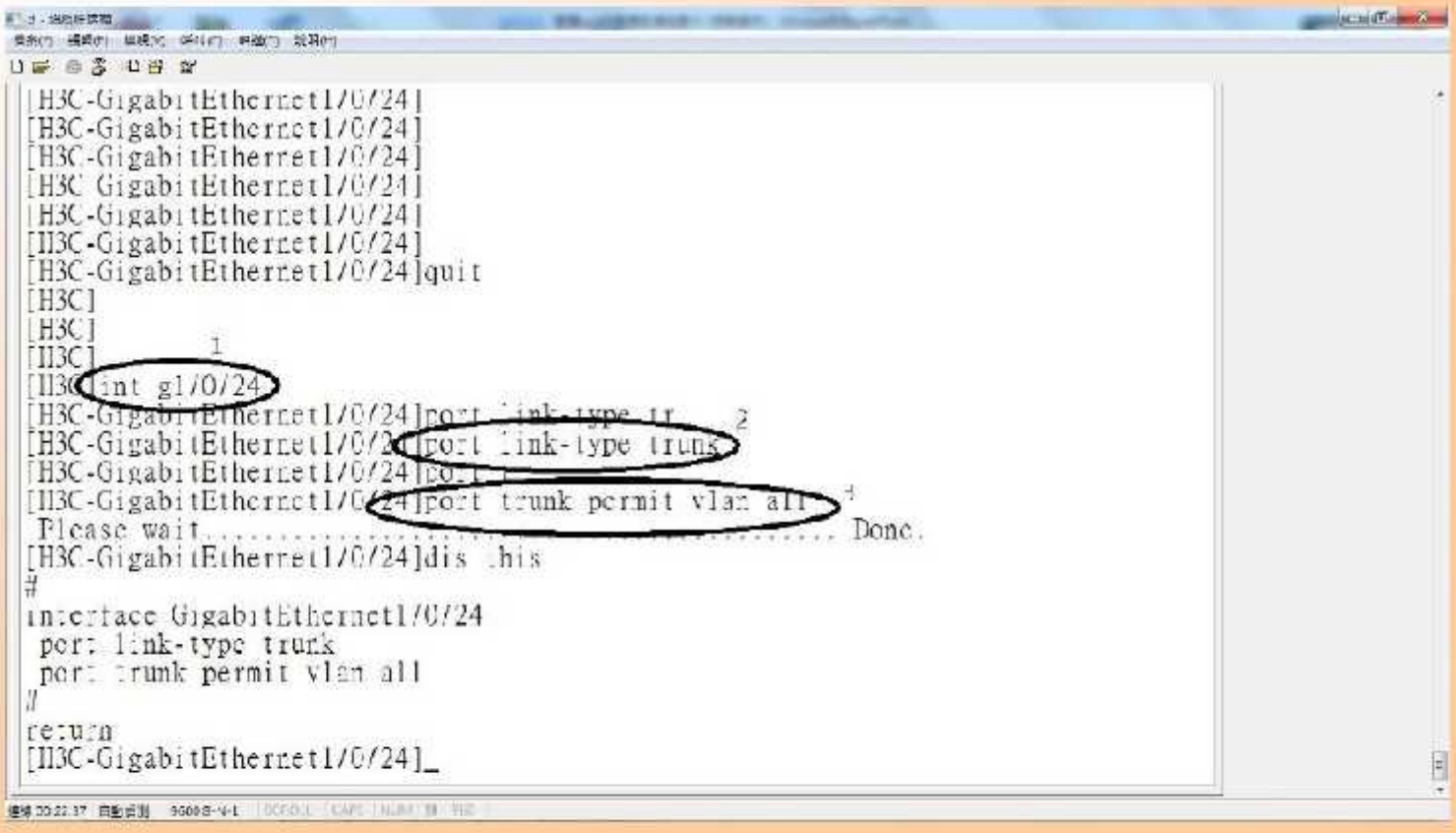
```
[H3C-vlan5]
[H3C-vlan5]
[H3C vlan5]QUIT
[H3C]
[H3C]
[H3C]
[H3C]
[H3C]
[H3C]
[H3C]dis vlan 5
 VLAN ID: 5
 VLAN Type: static
 Route interface: not configured
 Description: VLAN 0005
 Name: OFFICE
 Tagged   Ports: none
 Untagged Ports: none

[H3C]undo vlan 5
[H3C]dis vlan
 Total 1 VLAN exist(s).
 The following VLANs exist:
  1(default),
[H3C]_
```

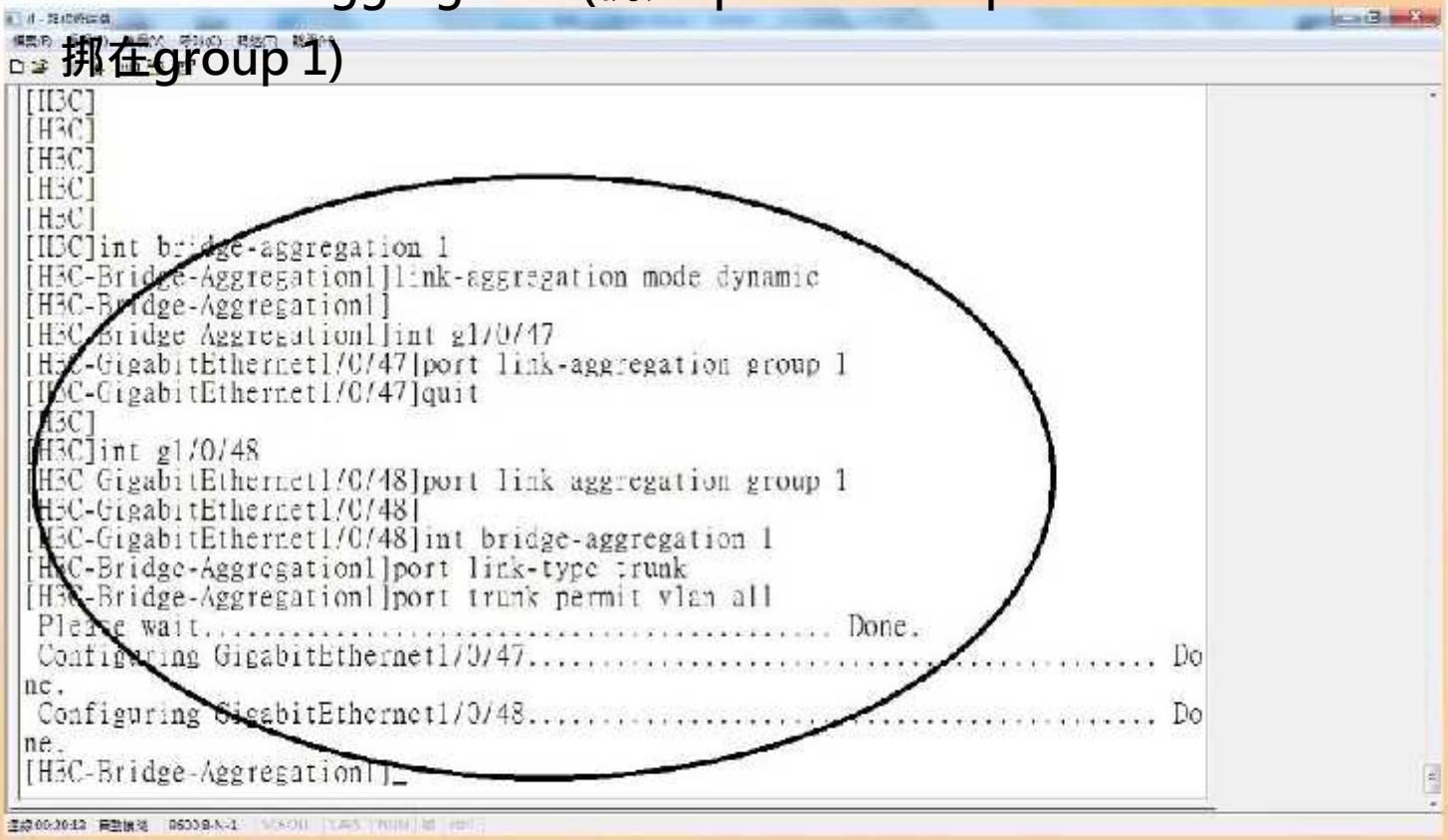
Add vlan by port (把port 1 and port 2至VLAN2)



802.1Q(例如:把port 24 加入 VLAN 2，且讓每個vlan都放行)



802.3ad link-aggregation(例如: port 47 and port 48 綁在group 1)



Switch WEB操作

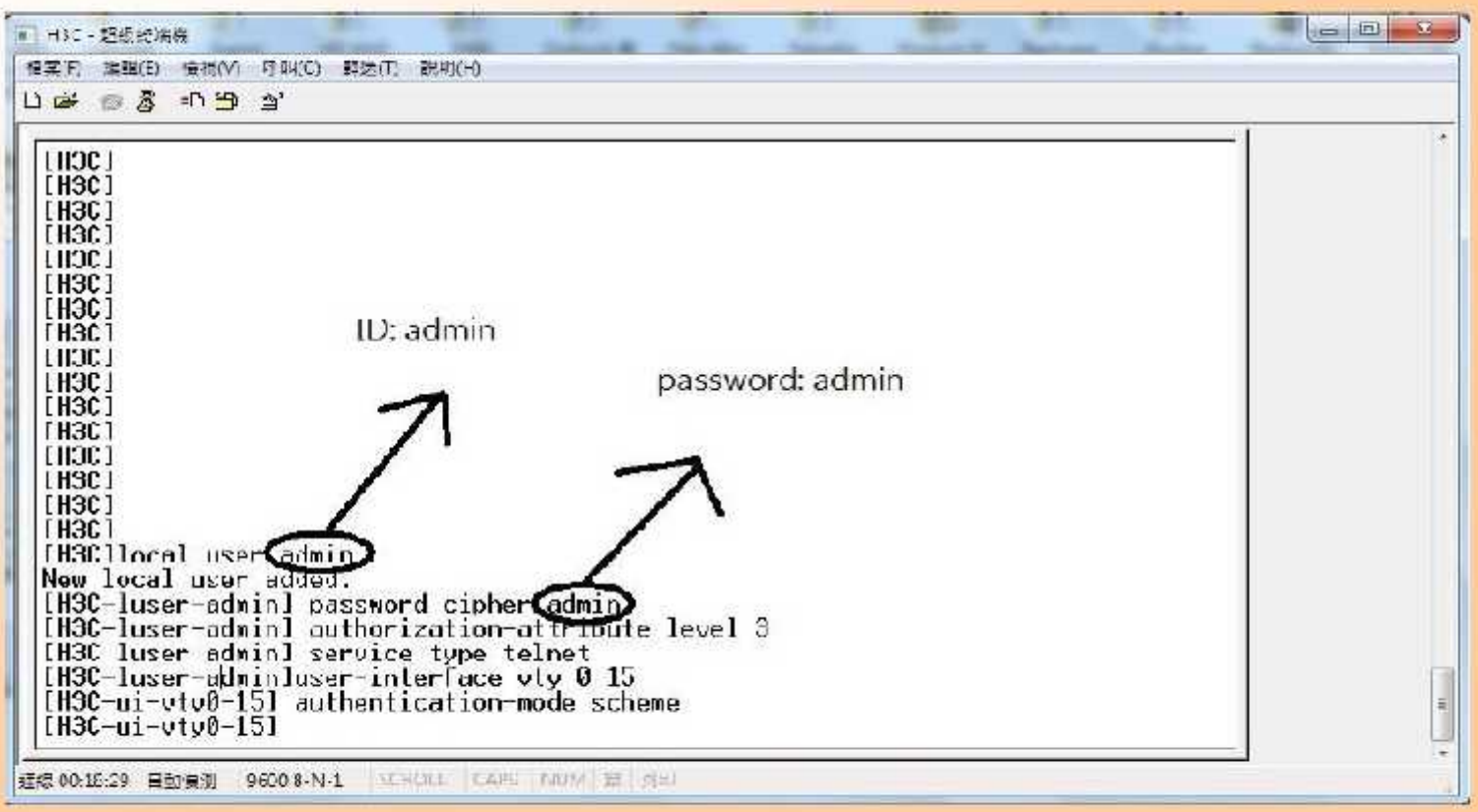
- 設定帳號與密碼登入WEB
- CLI Command Levels
- Wizard
- NTP時間設定
- 新增帳號
- 修改admin登入密碼
- 刪除nick帳號
- 查看CPU、溫度、記憶體使用率
- 查看Switch port up or down
- 新增VLAN 2
- 移除VLAN 2
-
-

博鉅資訊
BGIC

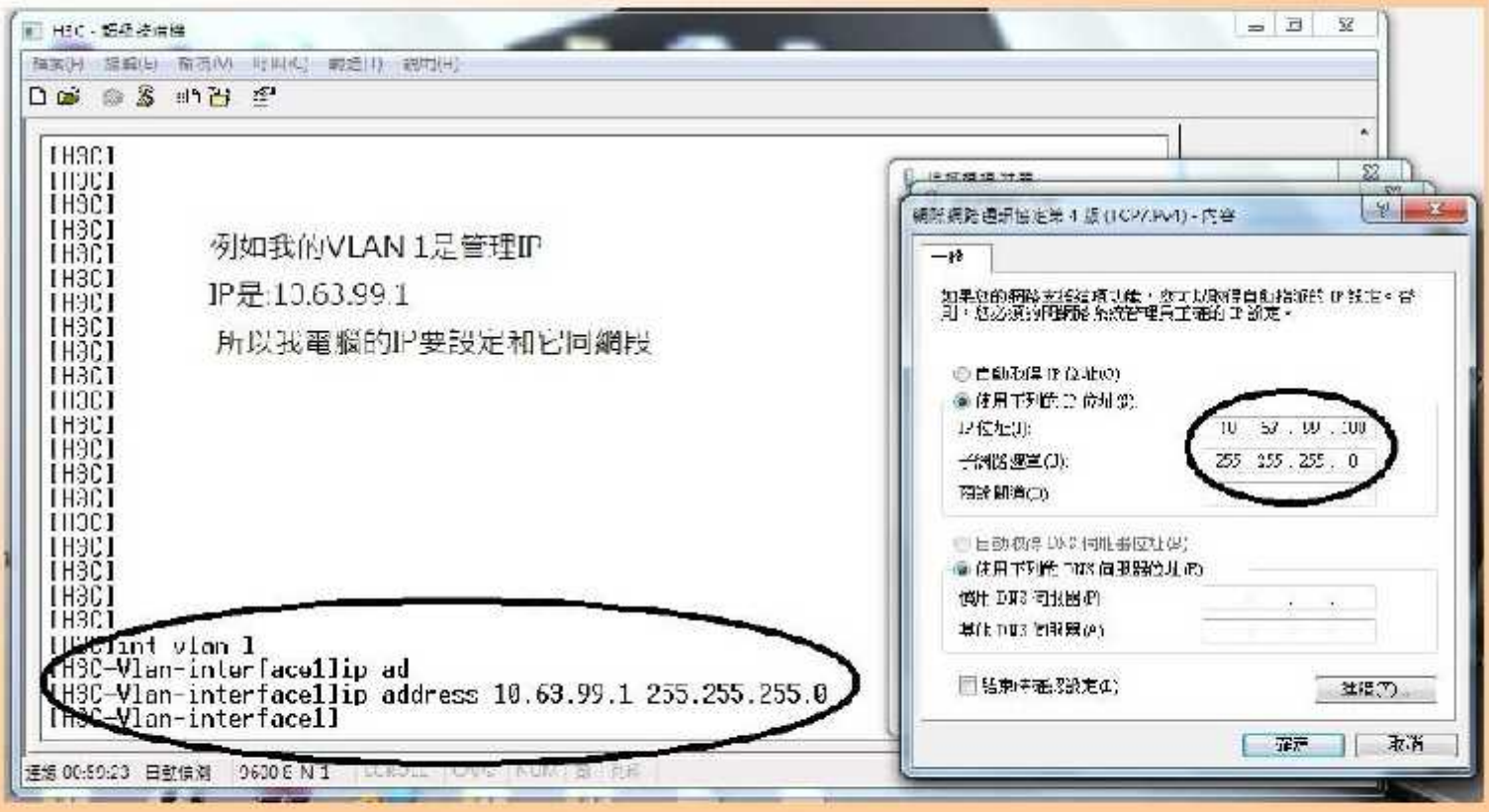
Switch WEB操作

- Add vlan by port (把port 1 and port 2至VLAN2)
- 802.1Q(把port 24 設定成trunk port)
- Detail(查看VLAN 2 的port 1、2、24)
- 假設我的vlan 2是管理ip的話，如何在vlan 2新增管理ip

設定帳號與密碼登入WEB 與console-1



設定帳號與密碼登入WEB 與console-2

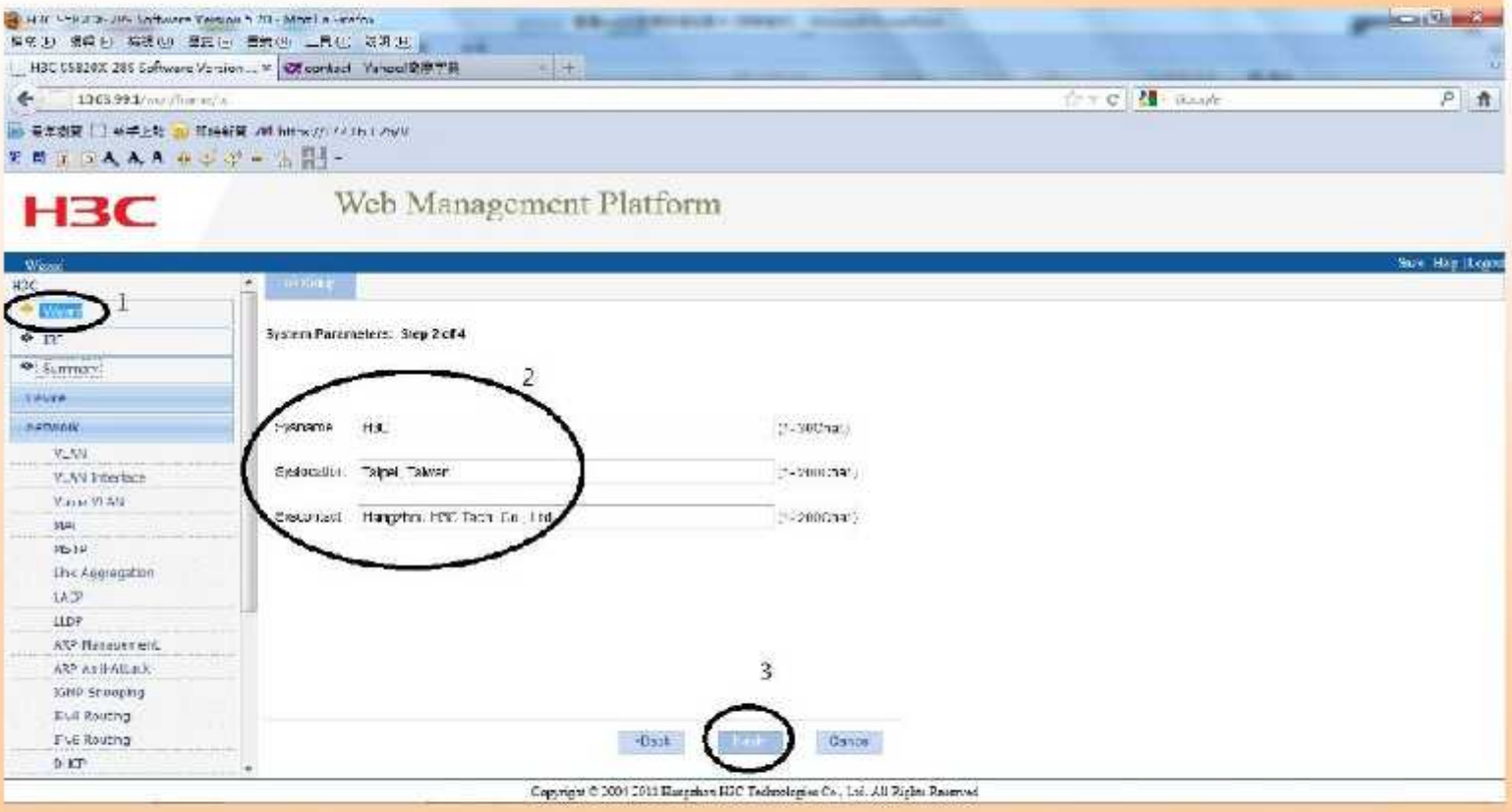


設定帳號與密碼登入WEB 與console-3

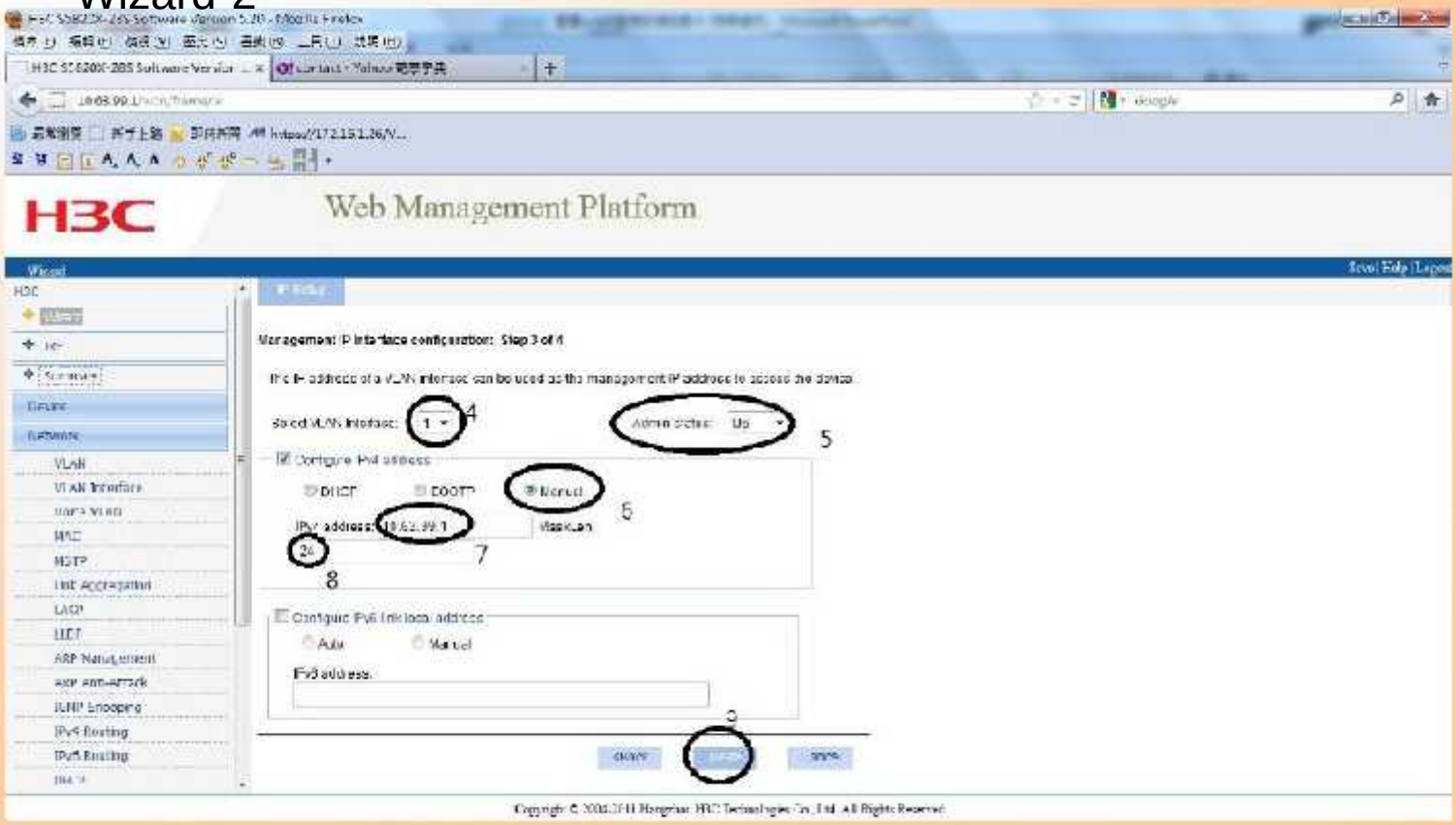
CLI Command Levels

- 0 -> Visitor
  - ping, traceroute
- 1 -> Monitor
  - Basic read-only commands
- 2 -> System
  - Services configuration commands
- 3 -> Manager
  - System(files, users) management commands

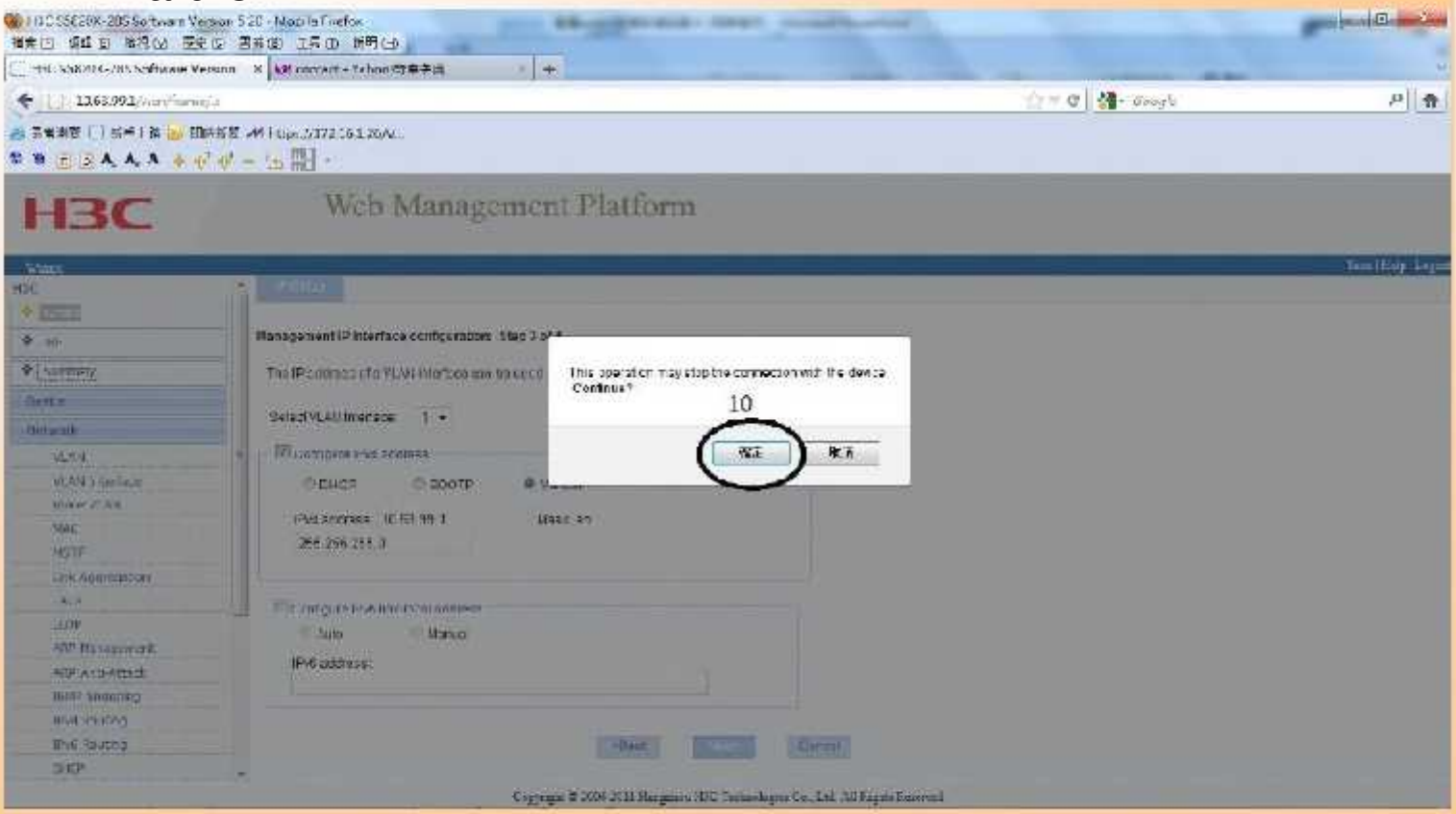
Wizard-1


H3C
Web Management Platform
1
2
3
Summary
System Parameters: Step 2 of 4
Next
Cancel
Copyright © 2004-2011 Hangzhou H3C Technologies Co., Ltd. All Rights Reserved

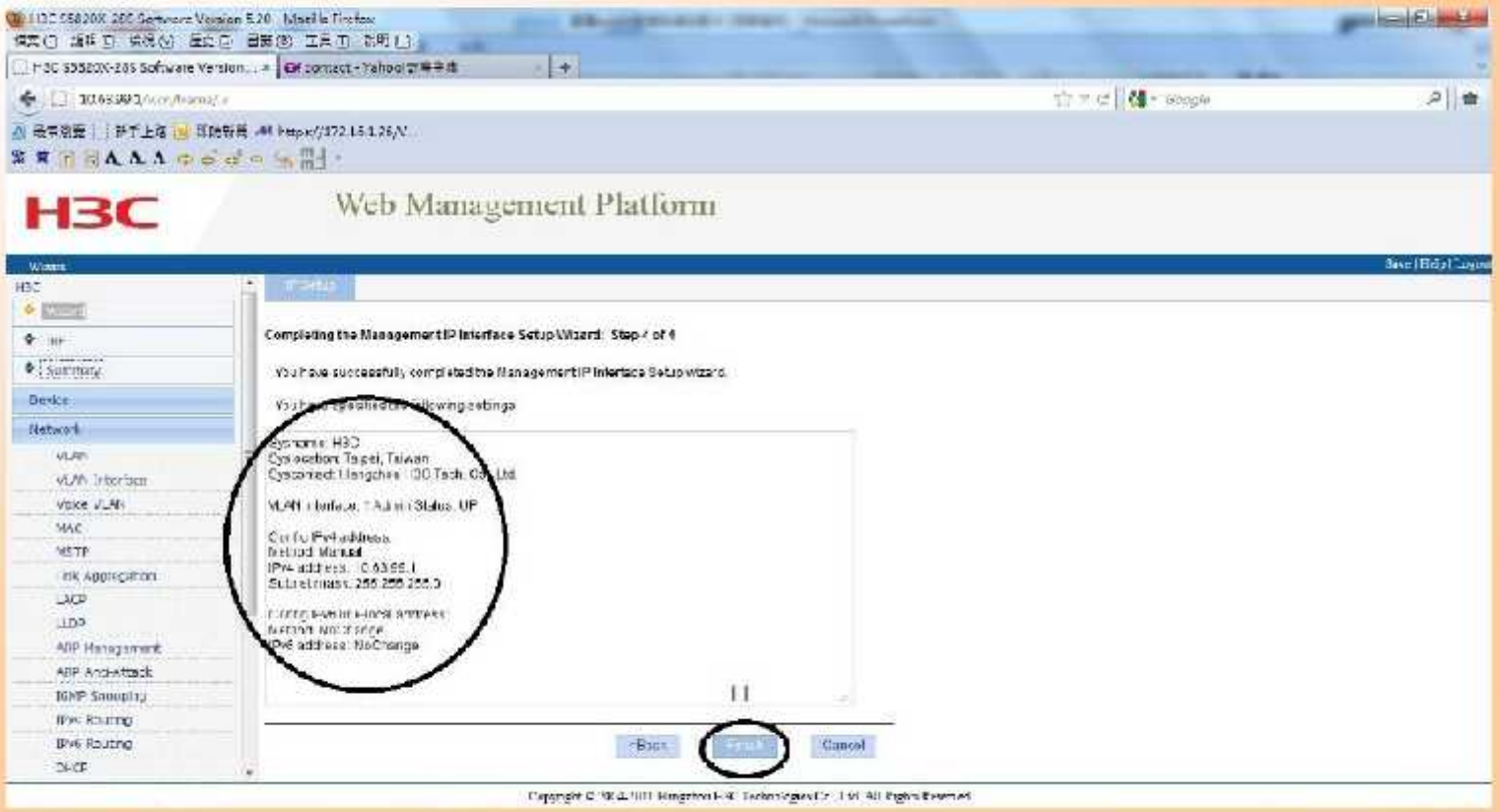
Wizard-2


H3C
Web Management Platform
Management IP interface configuration: Step 3 of 4
Select VLAN-interface:
Admin status:
Configure IPv4 address
DHCP
BOOTP
Manual
IPv4 address:
Configure IPv6 link-local address
Auto
Manual
IPv6 address:
VLAN
MAC
MSTP
LACP
LLDP
ARP Management
IGMP Snooping
IPv4 Routing
IPv6 Routing

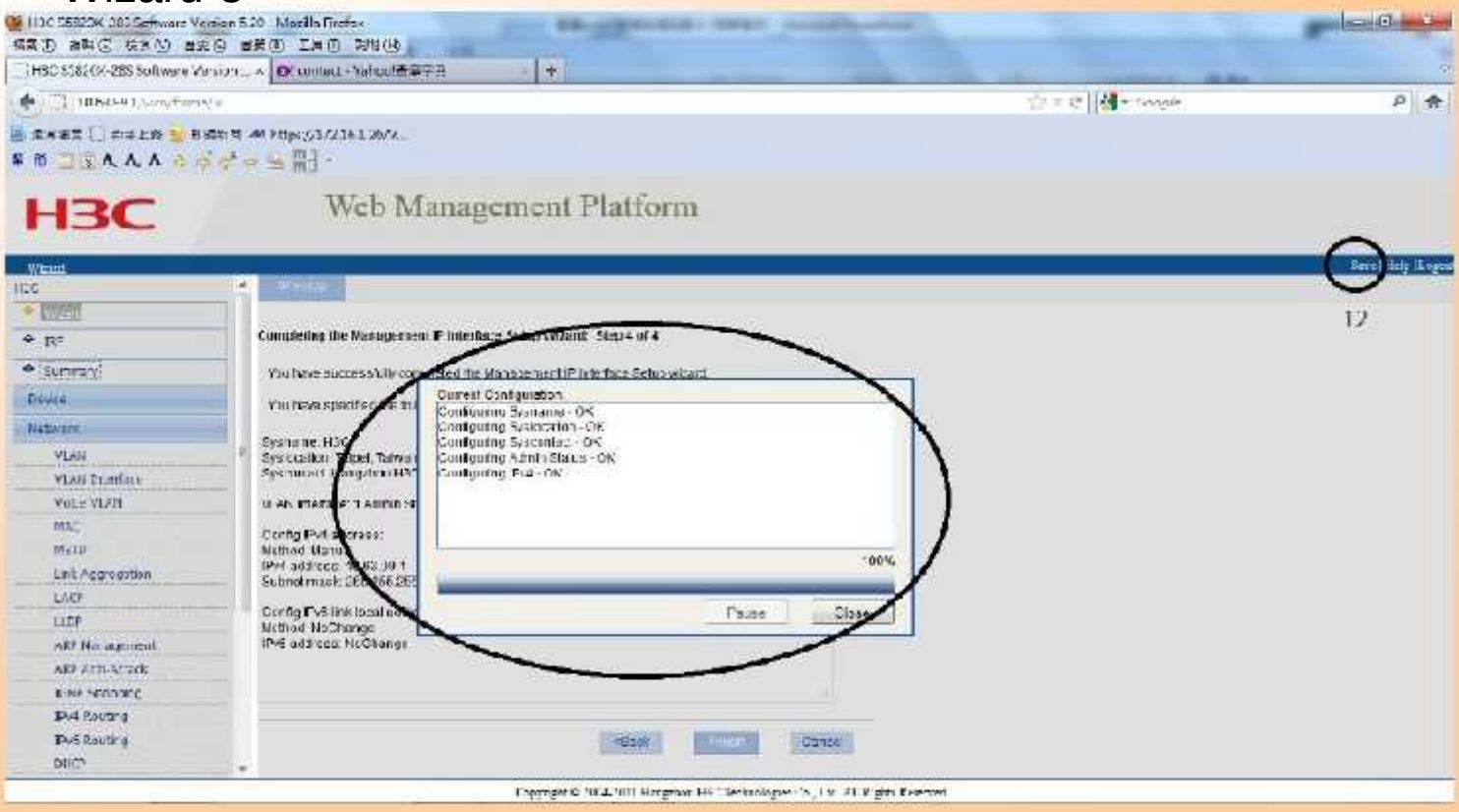
Wizard-3



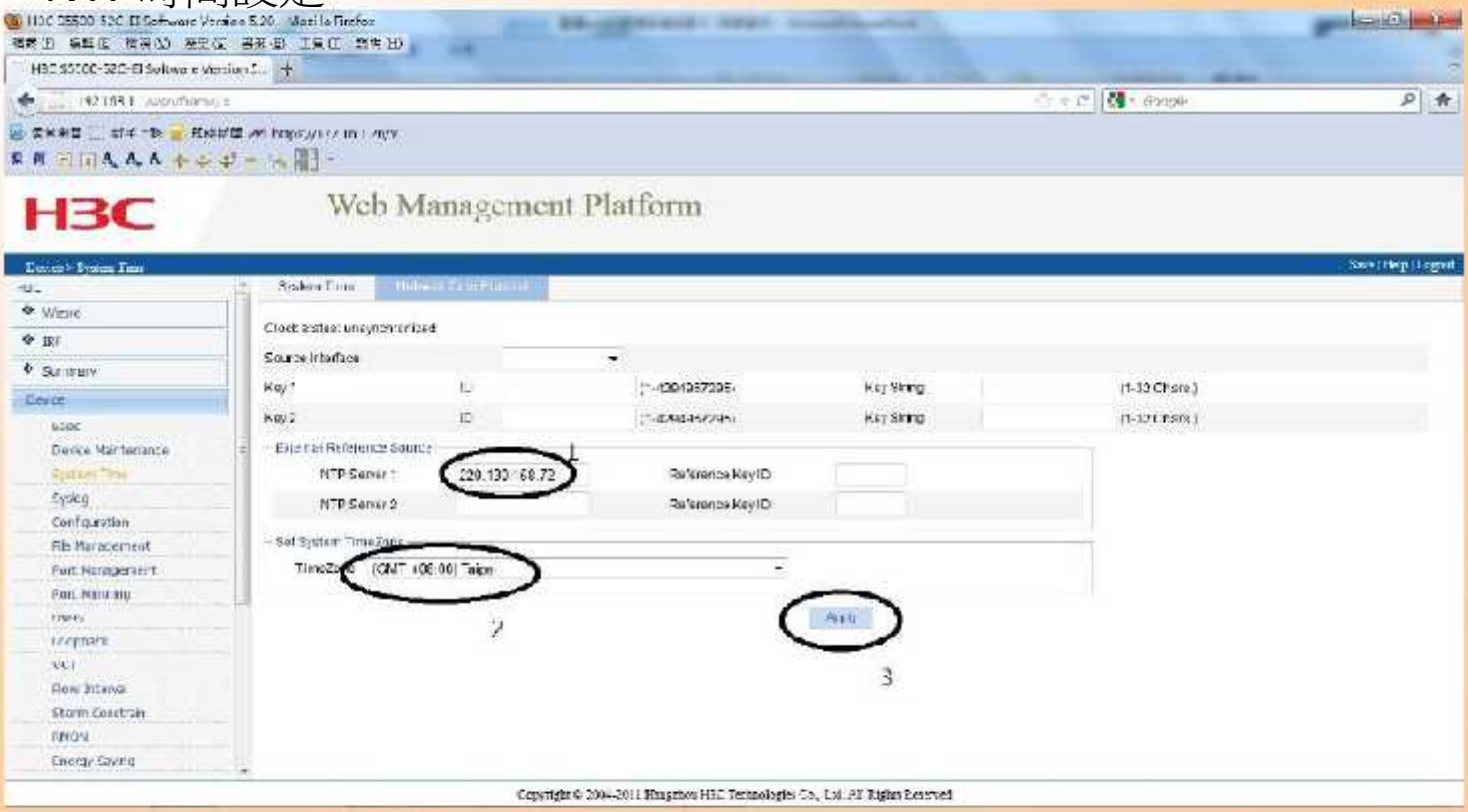
Wizard-4


H3C
Web Management Platform
Completing the Management IP Interface Setup Wizard: Step 4 of 4
You have successfully completed the Management IP Interface Setup wizard.
Device
Network
VLAN
VLAN Interface
Voice VLAN
MAC
MSTP
Link Aggregation
LACP
LLDP
ARP Management
ARP Anti-attack
IGMP Snooping
IPv4 Routing
IPv6 Routing
DHCP
Cancel

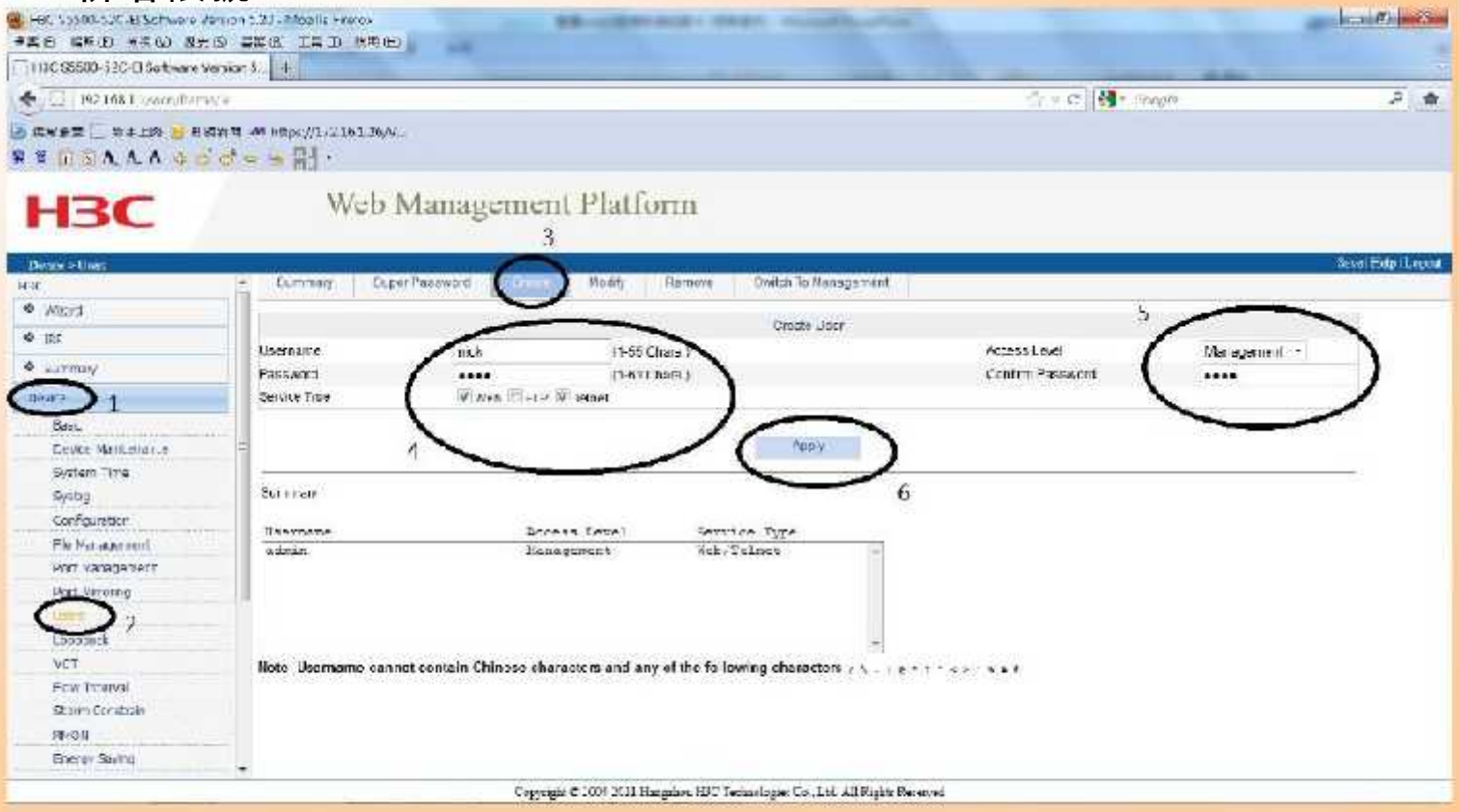
Wizard-5


H3C
Web Management Platform
Wizard
Save Help Logout
12
Summary
Device
Network
VLAN
Link Aggregation
Current Configuration:
Configuring Sysname ... OK
Configuring Syslocation ... OK
Configuring Syscontact ... OK
Configuring Admin Status ... OK
Configuring Port ... OK
100%
Pause
Close
Back
Finish
Cancel

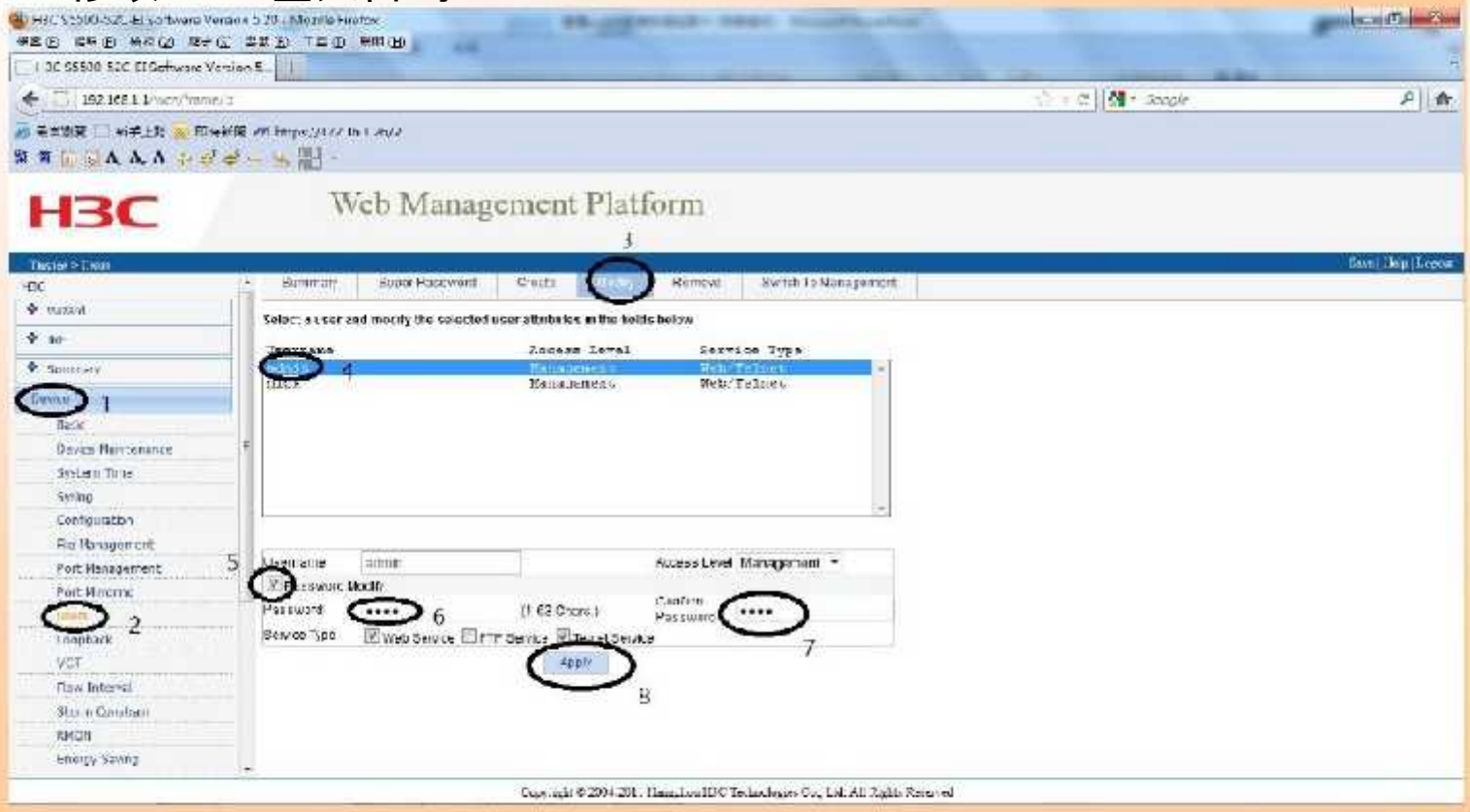
NTP時間設定


H3C
Web Management Platform
Device
Device Maintenance
Syslog
Configuration
File Management
Clock status: unsynchronized
Source Interface
Key 1
Key 2
Key String
NTP Server 1
220.130.158.72
NTP Server 2
Reference Key ID
(GMT +08:00) Taipei
Apply
1
2
3

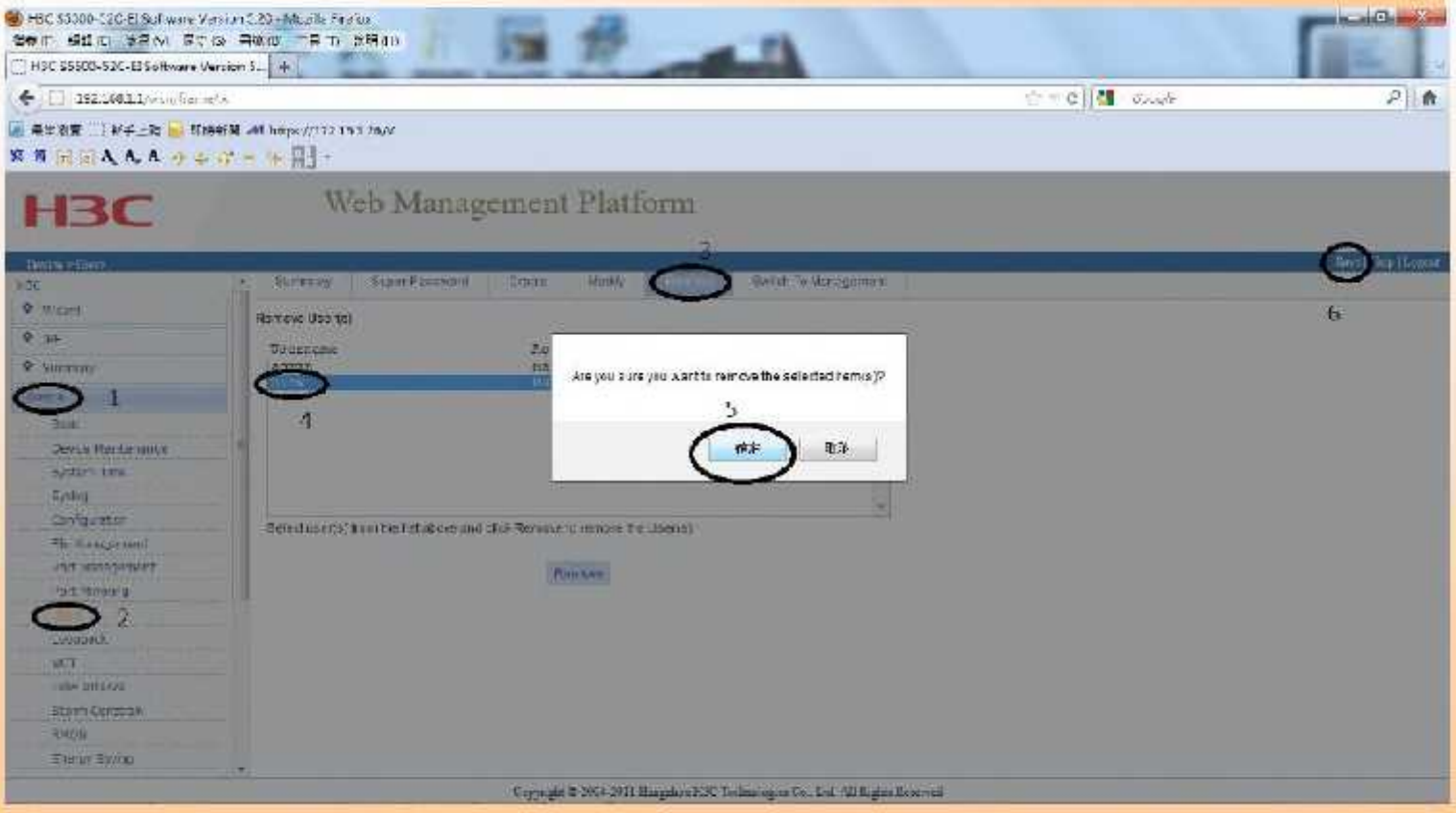
新增帳號


H3C
Web Management Platform
3
Summary
Super Password
Create
Modify
Remove
Switch To Management
Create User
Username
Password
Service Type
Access Level
Confirm Password
Apply
1
5
6
7
Note: Username cannot contain Chinese characters and any of the following characters

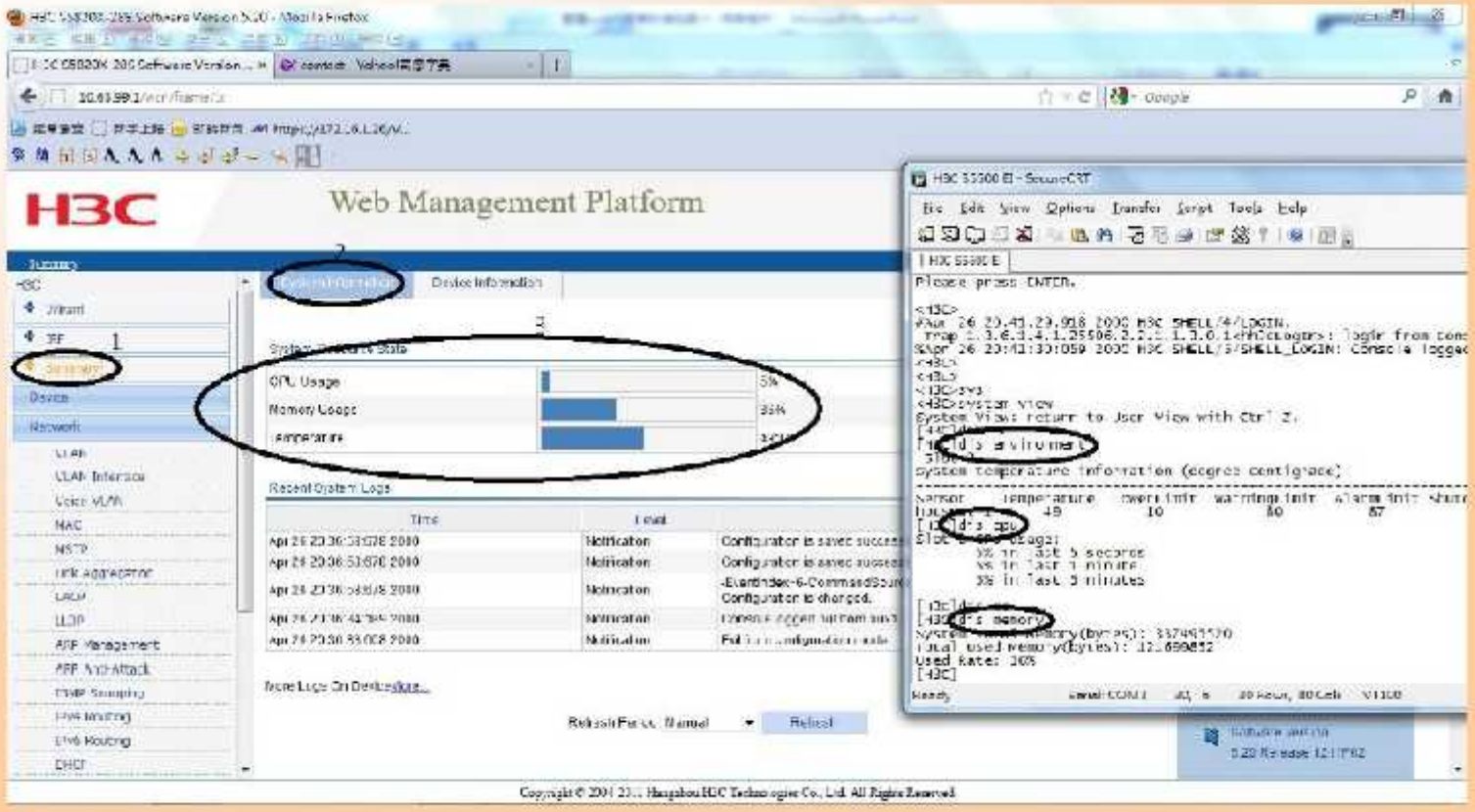
修改admin登入密碼



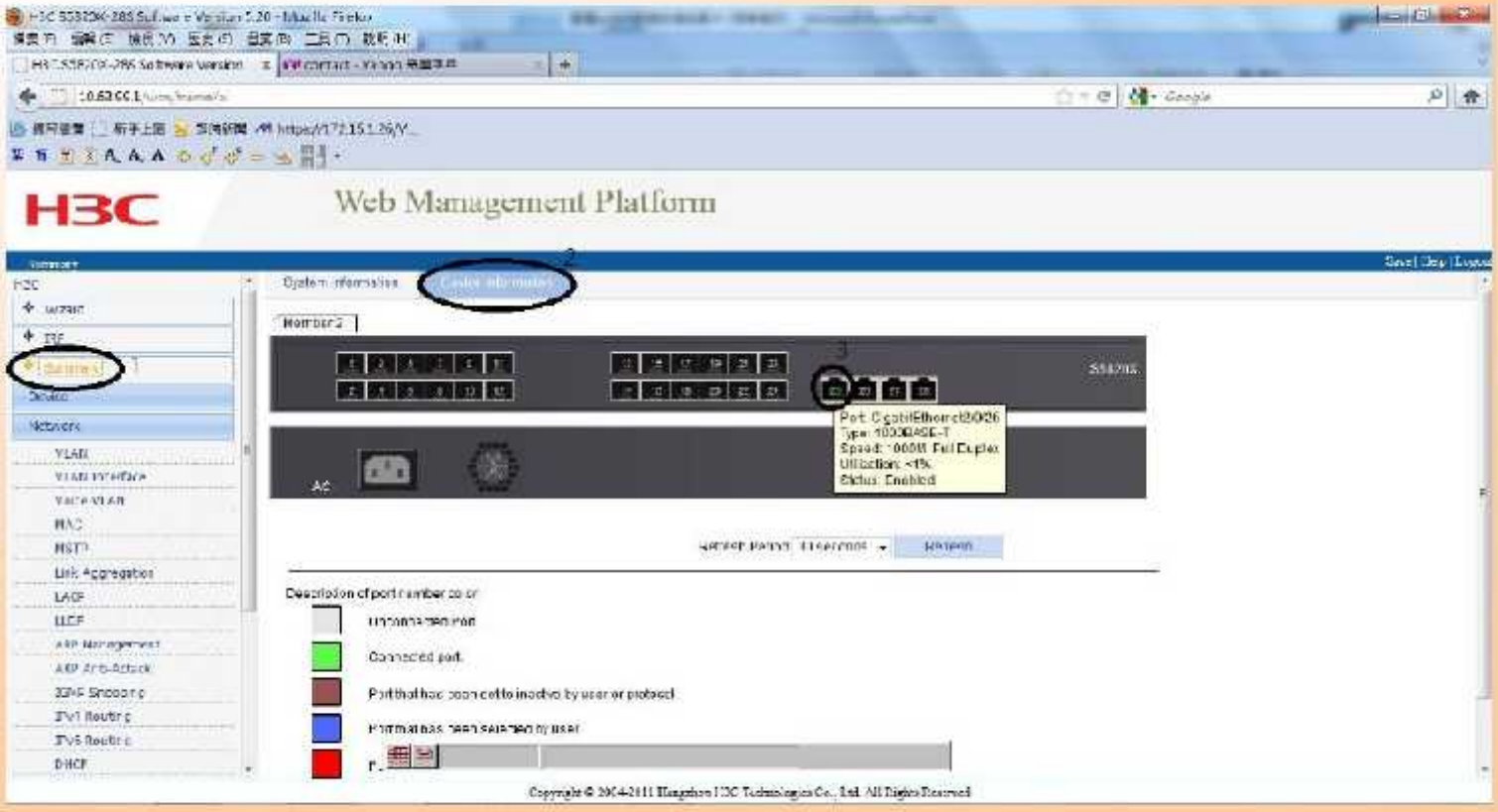
刪除nick帳號


HBC
Web Management Platform
Are you sure you want to remove the selected item(s)?
1
2
3
4
5
6

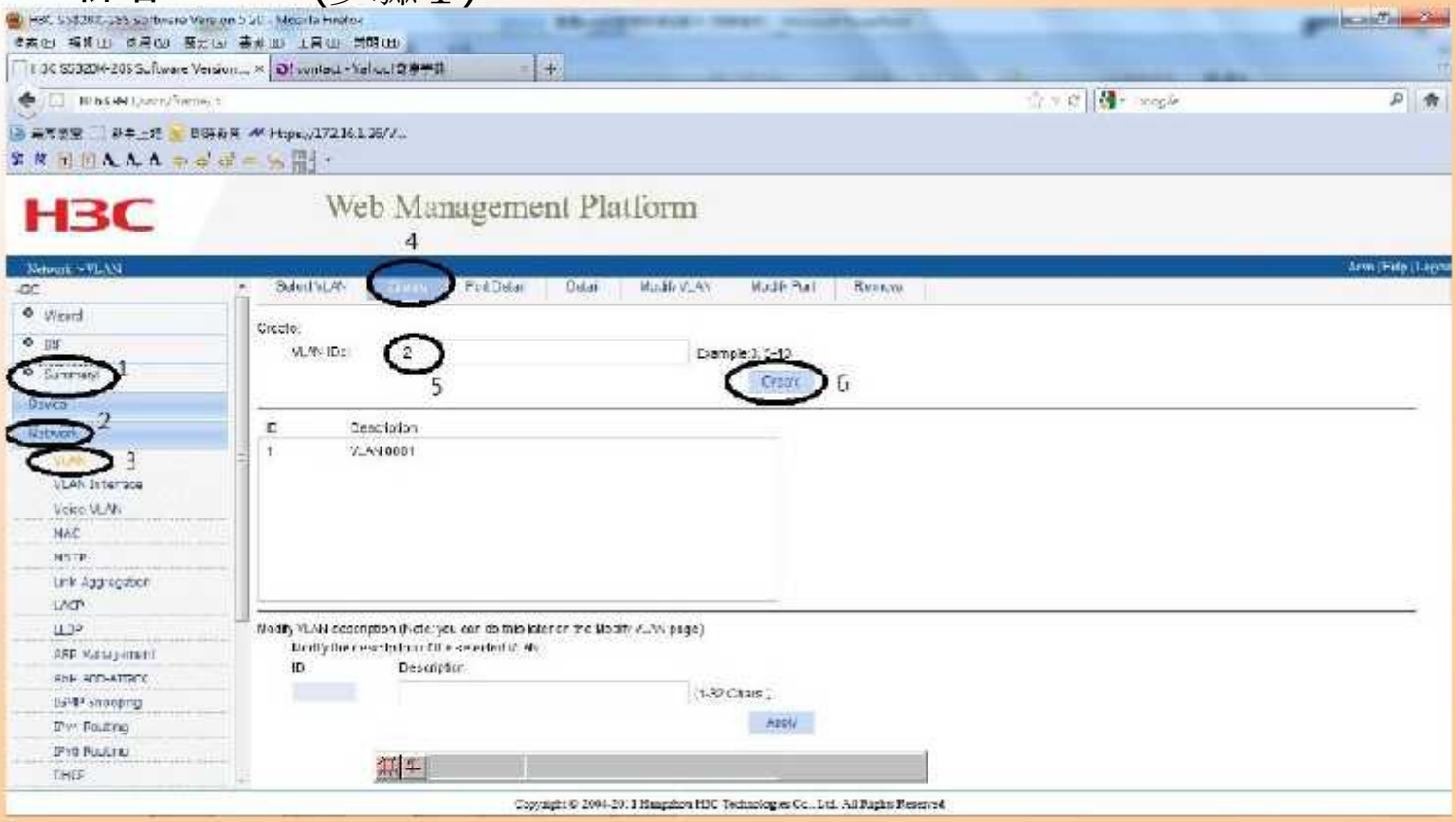
查看CPU、溫度、記憶體使用率



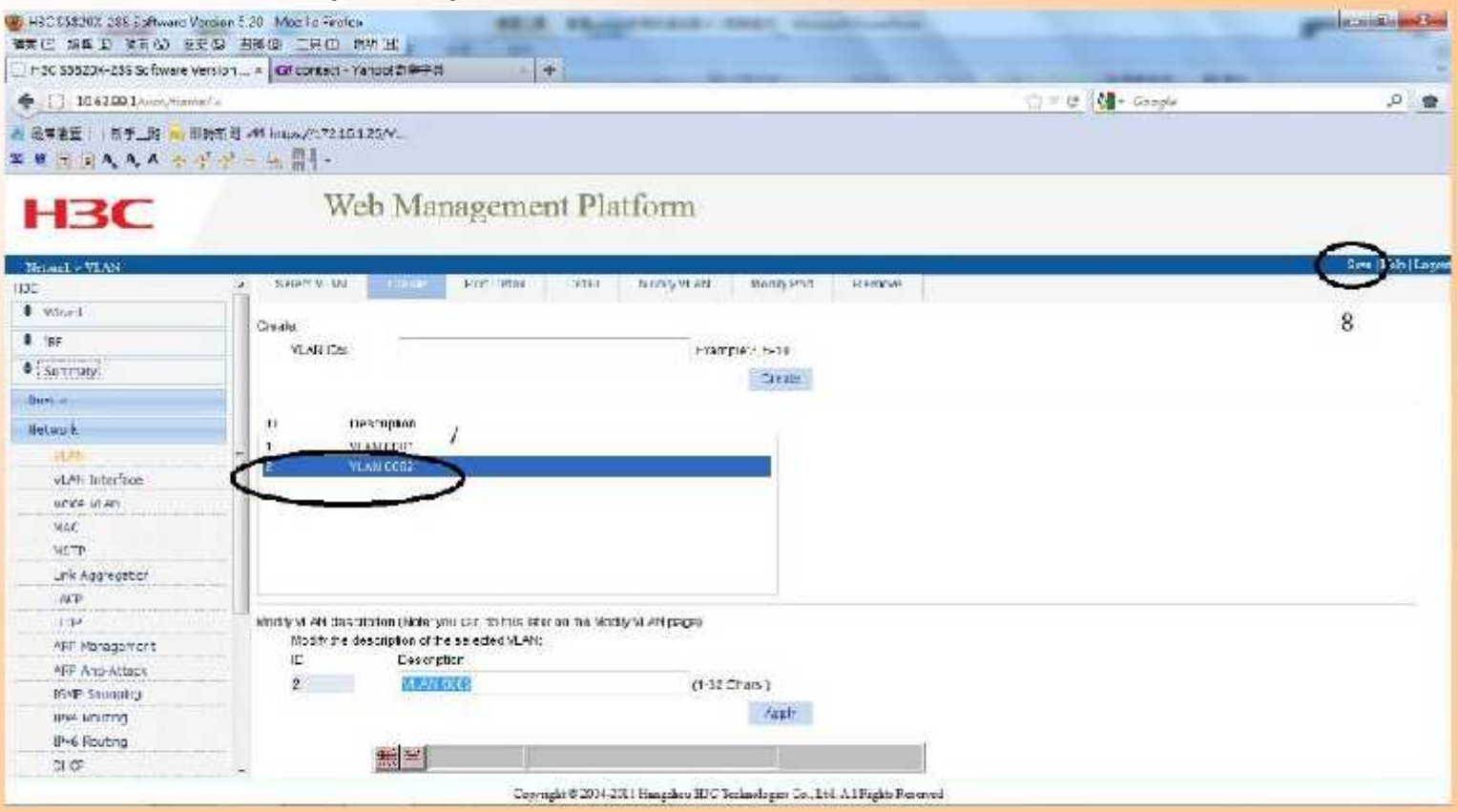
查看Switch port up or down



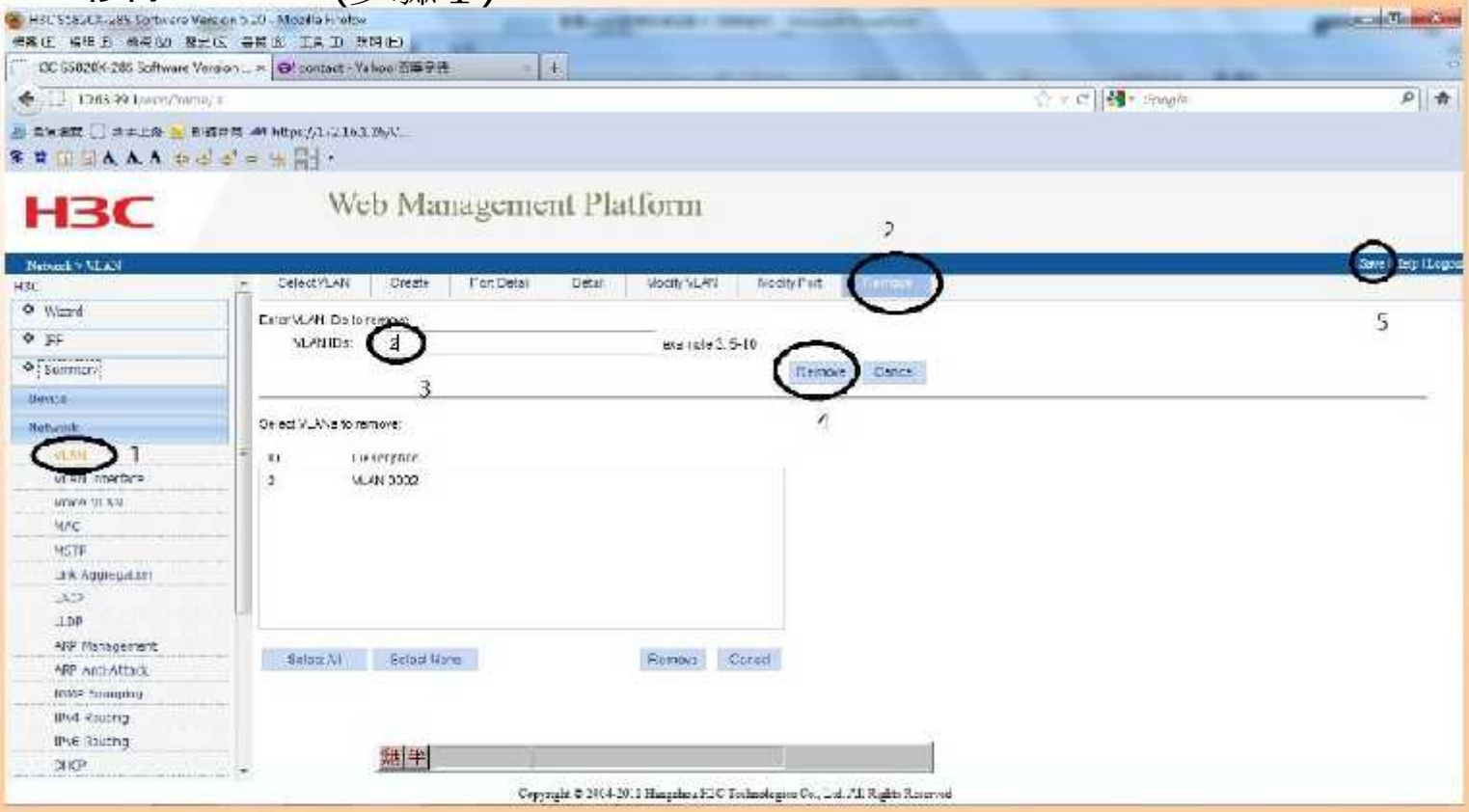
新增VLAN 2(步驟１)


H3C
Web Management Platform
4
1
2
3
5
6
VLAN ID:
Create
ID
Description
VLAN 0001
Modify VLAN description (Note: you can do this later on the Modify VLAN page)
ID
Description
Apply
Wizard
IRF
Summary
Device
Network
VLAN
VLAN Interface
Voice VLAN
MAC
MSTP
Link Aggregation
LACP
LLDP
DHCP

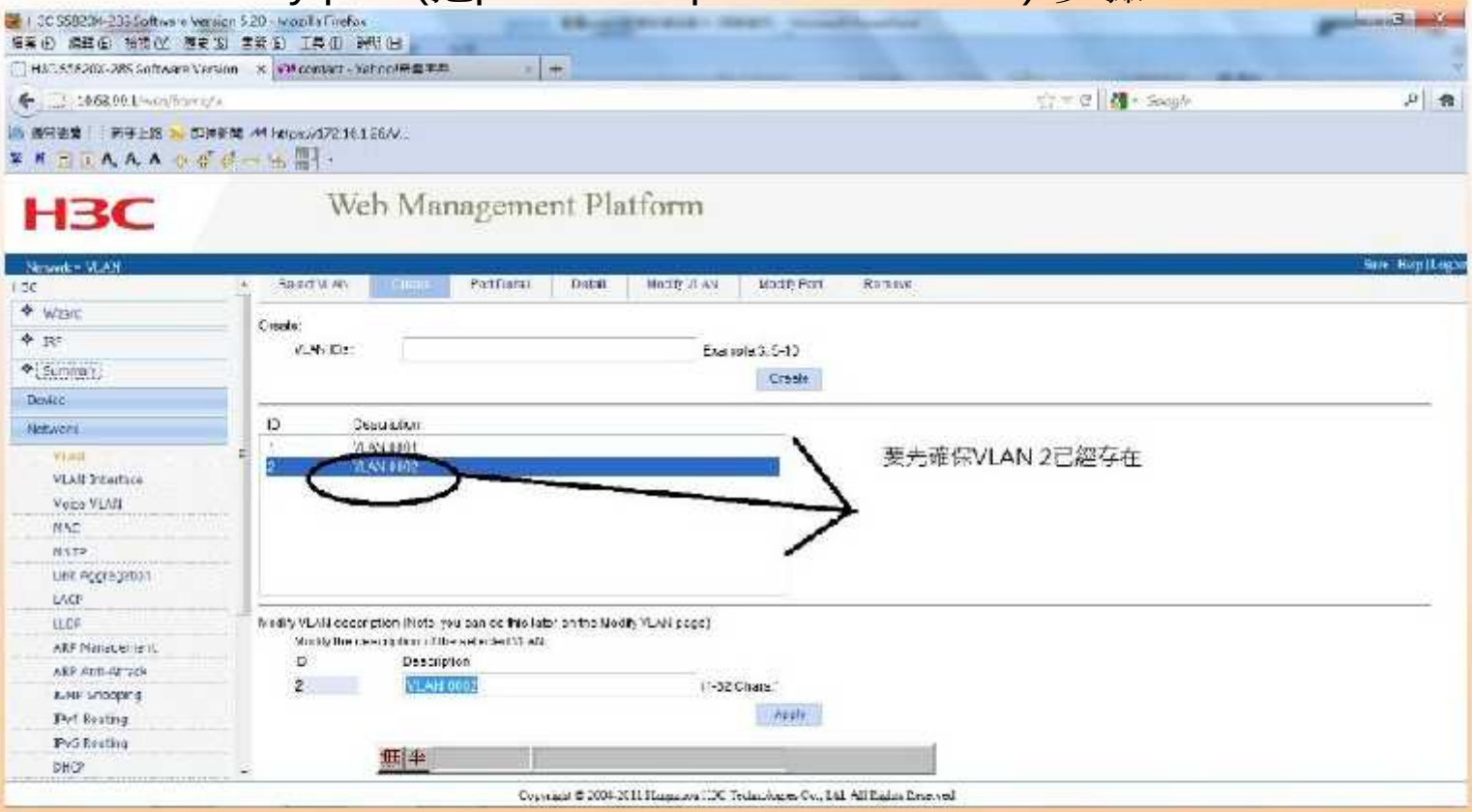
新增VLAN 2(步驟2)


Web Management Platform
Create
VLAN ID:
Create
ID
Description
VLAN 0002
Modify the description of the selected VLAN:
ID
Description
2
(1-32 Chars)
Apply
8

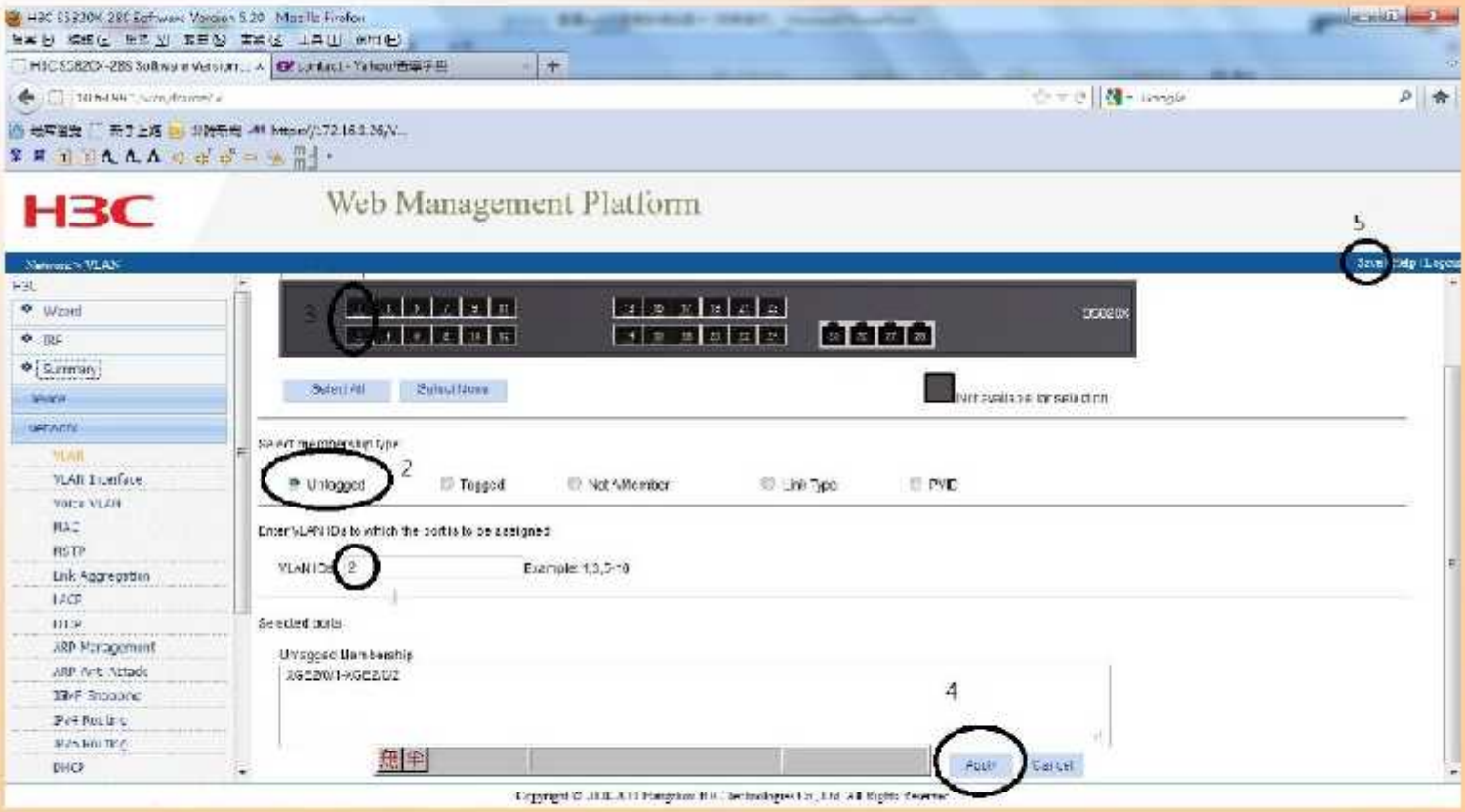
移除VLAN 2 (步驟１)


Web Management Platform
Select VLAN
Create
Port Detail
Detail
Modify VLAN
Modify Port
Remove
Save
Help
Logout
Wizard
IRF
Device
Network
VLAN
MAC
MSTP
LLDP
ARP Management
ARP Anti-Attack
IPv4 Routing
IPv6 Routing
DHCP
VLAN IDs:
Remove
Cancel
VLAN 0002
Select All
Select None
Remove
Cancel
1
2
3
4
5

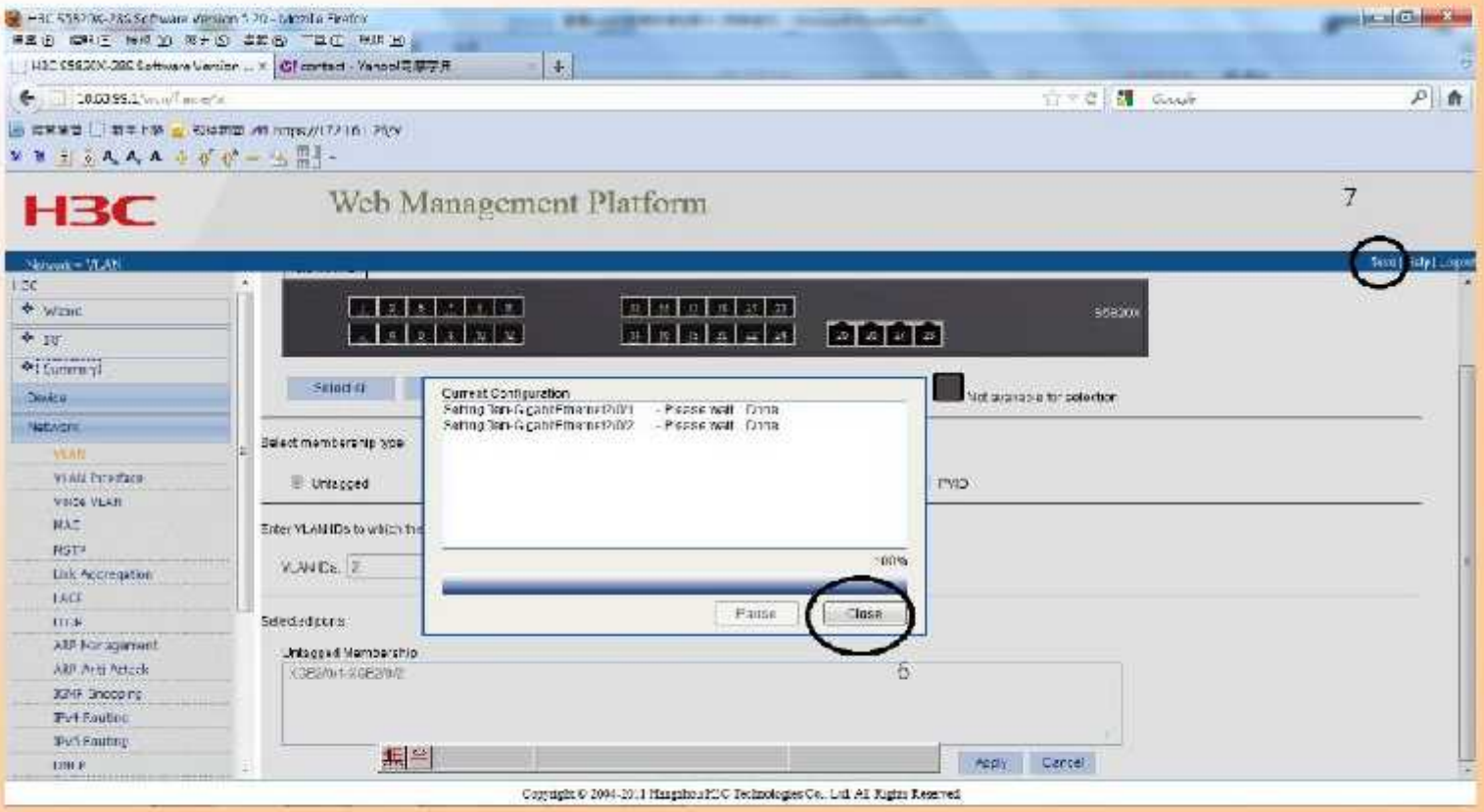
Add vlan by port (把port 1 and port 2 至VLAN 2)-步驟1



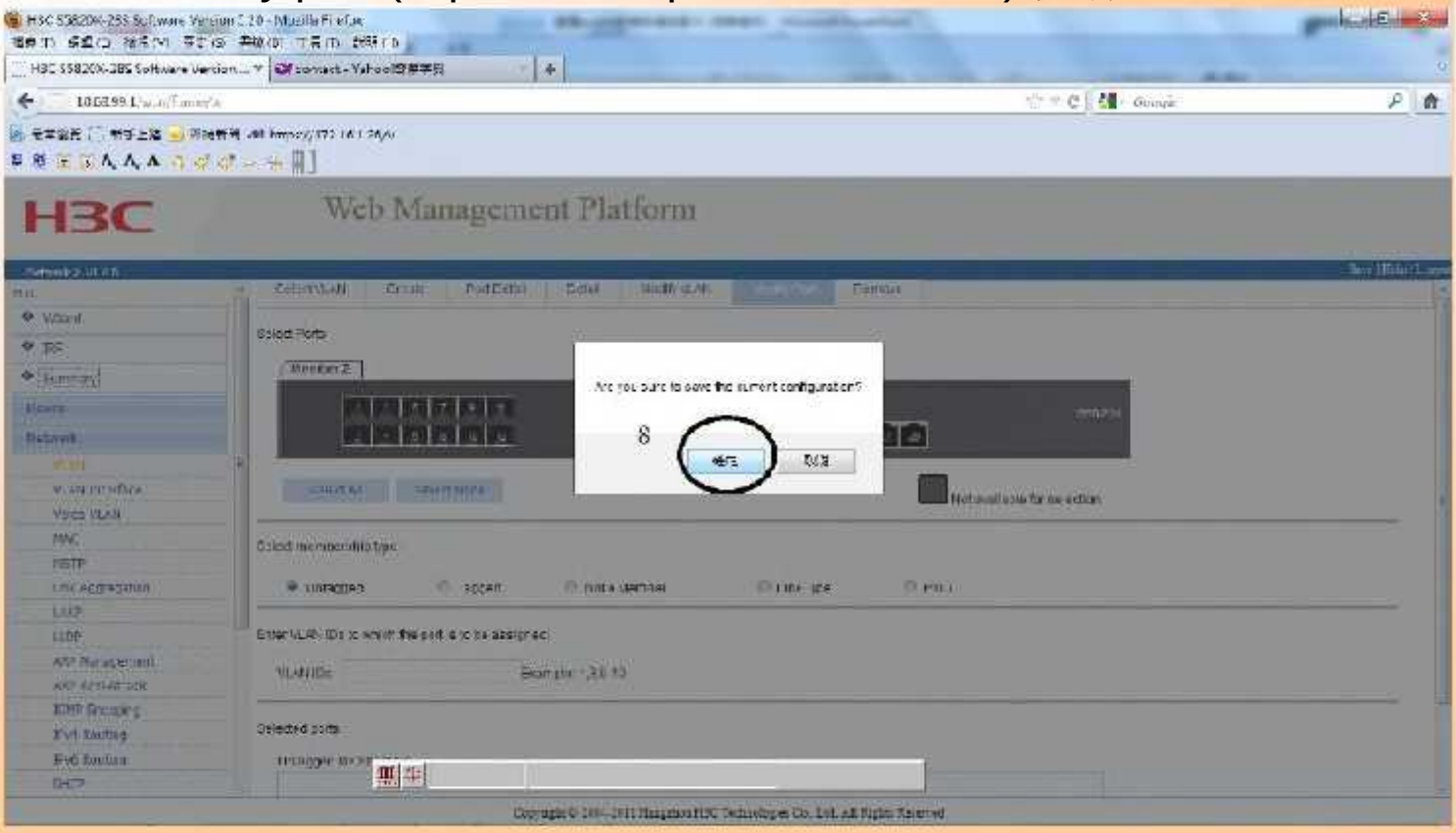
Add vlan by port (把port 1 and port 2 至VLAN 2)-步驟2



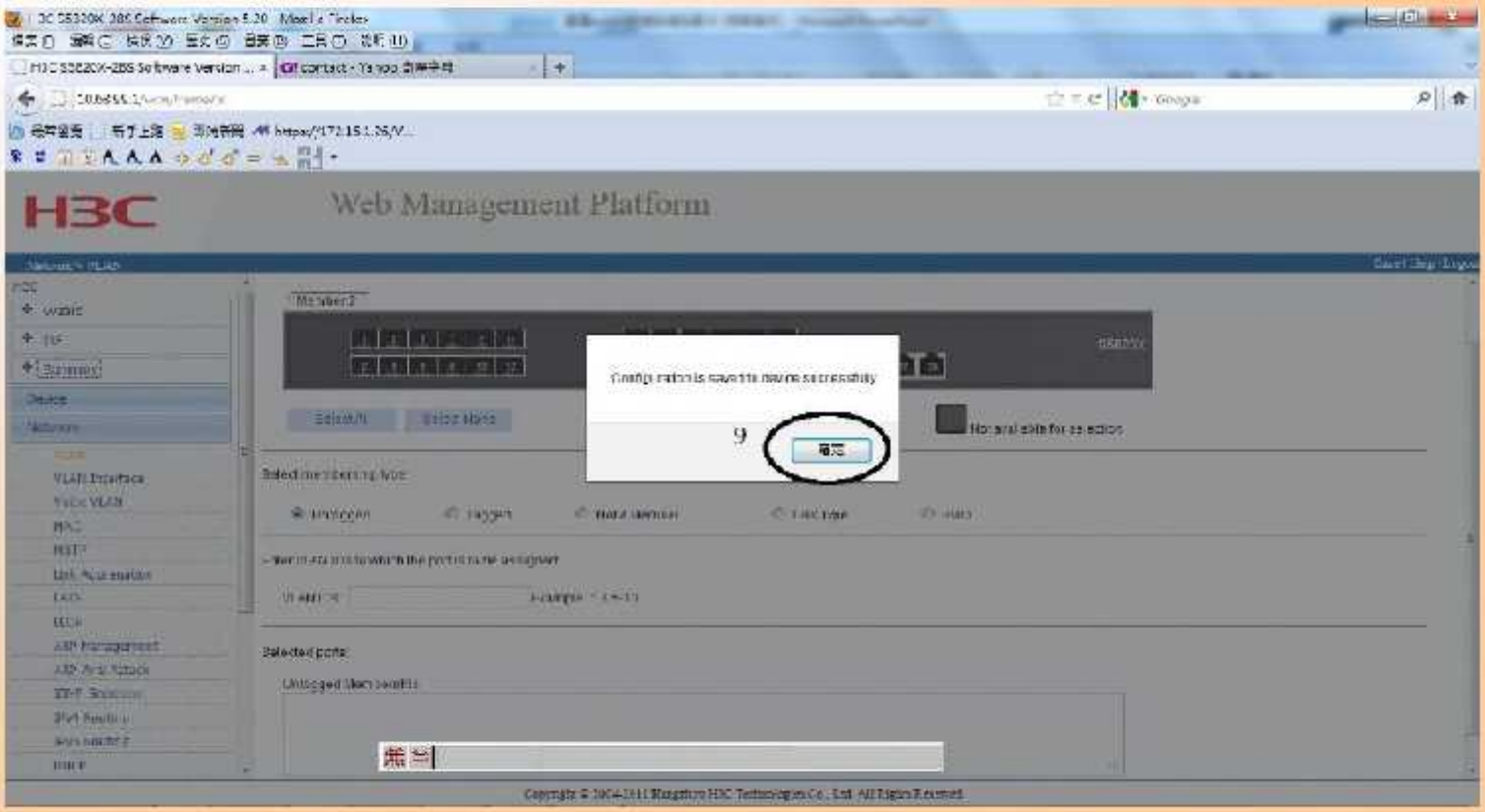
Add vlan by port (把port 1 and port 2 至VLAN 2)-步驟3



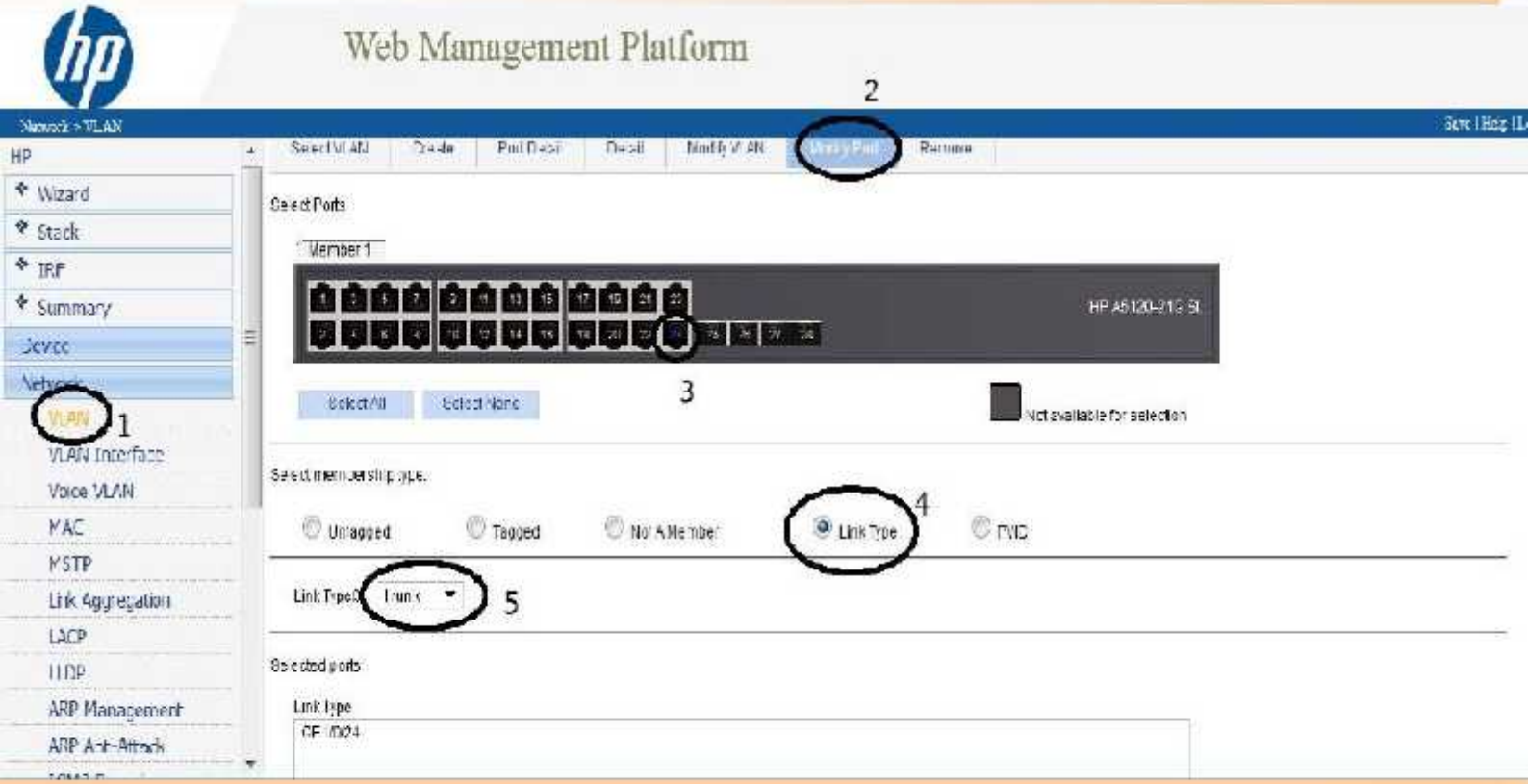
Add vlan by port (把port 1 and port 2 至VLAN 2)-步驟4



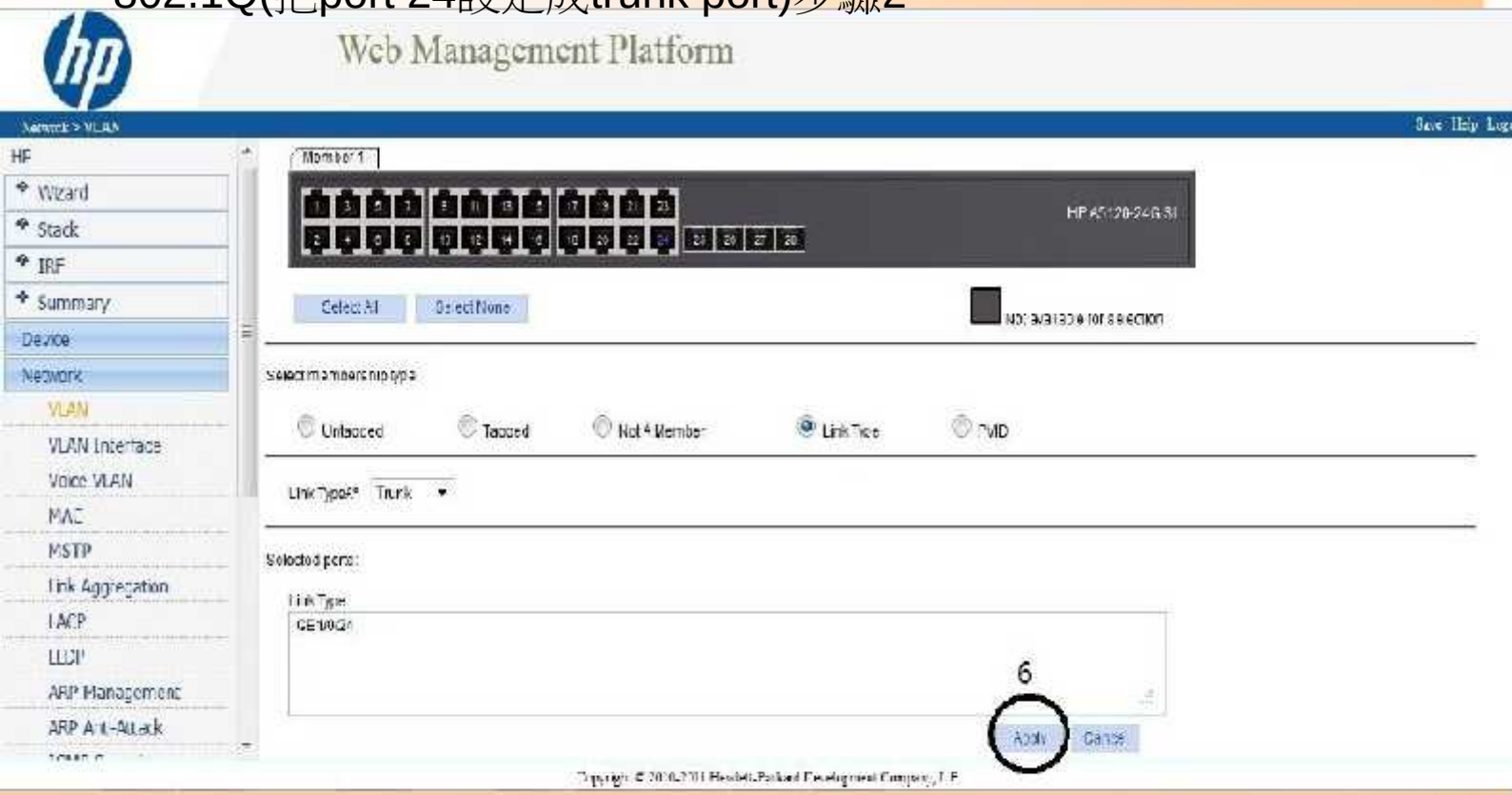
Add vlan by port (把port 1 and port 2 至VLAN 2)-步驟5



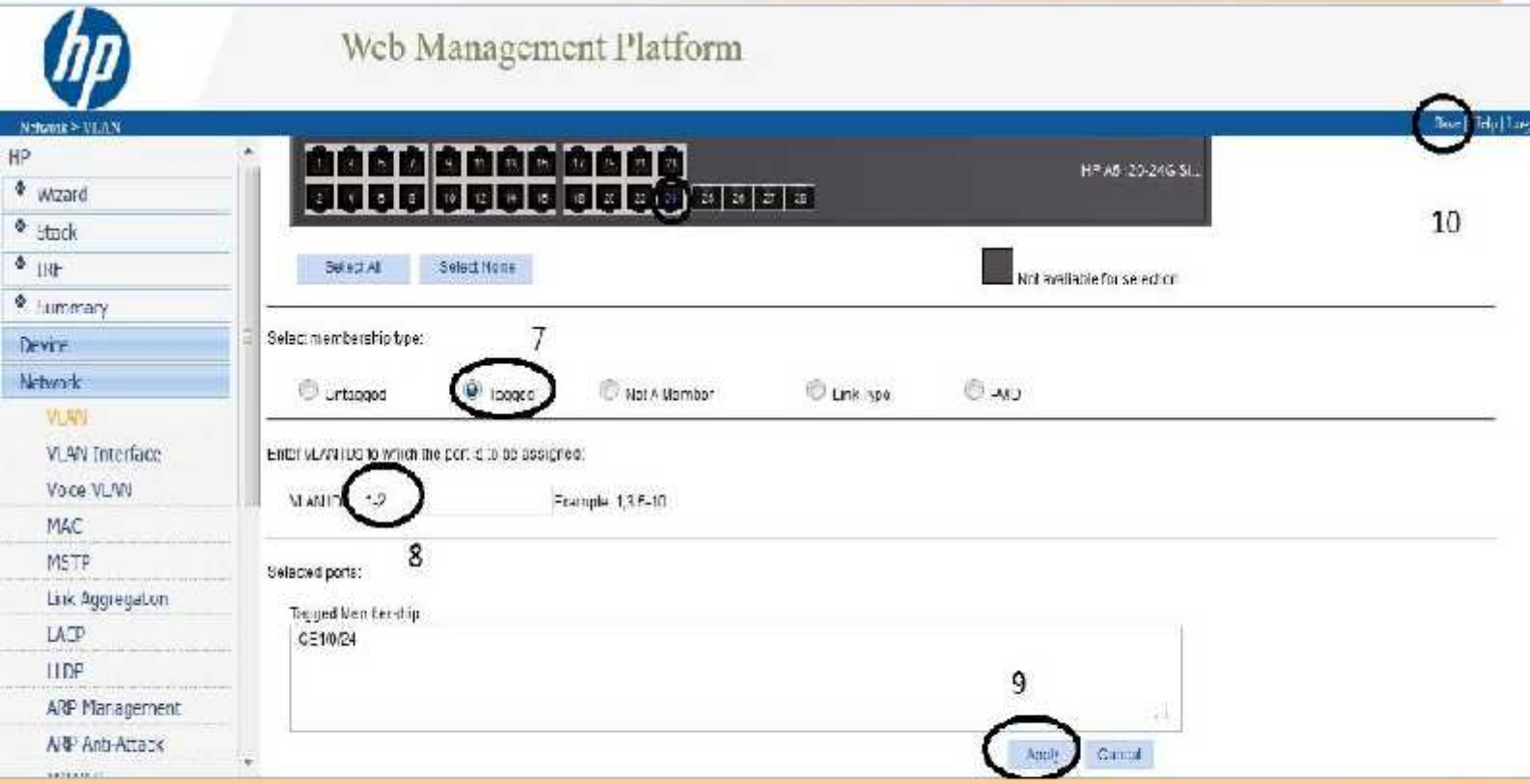
802.1Q(把port 24 設定成trunk port)-步驟1



802.1Q(把port 24設定成trunk port)步驟2



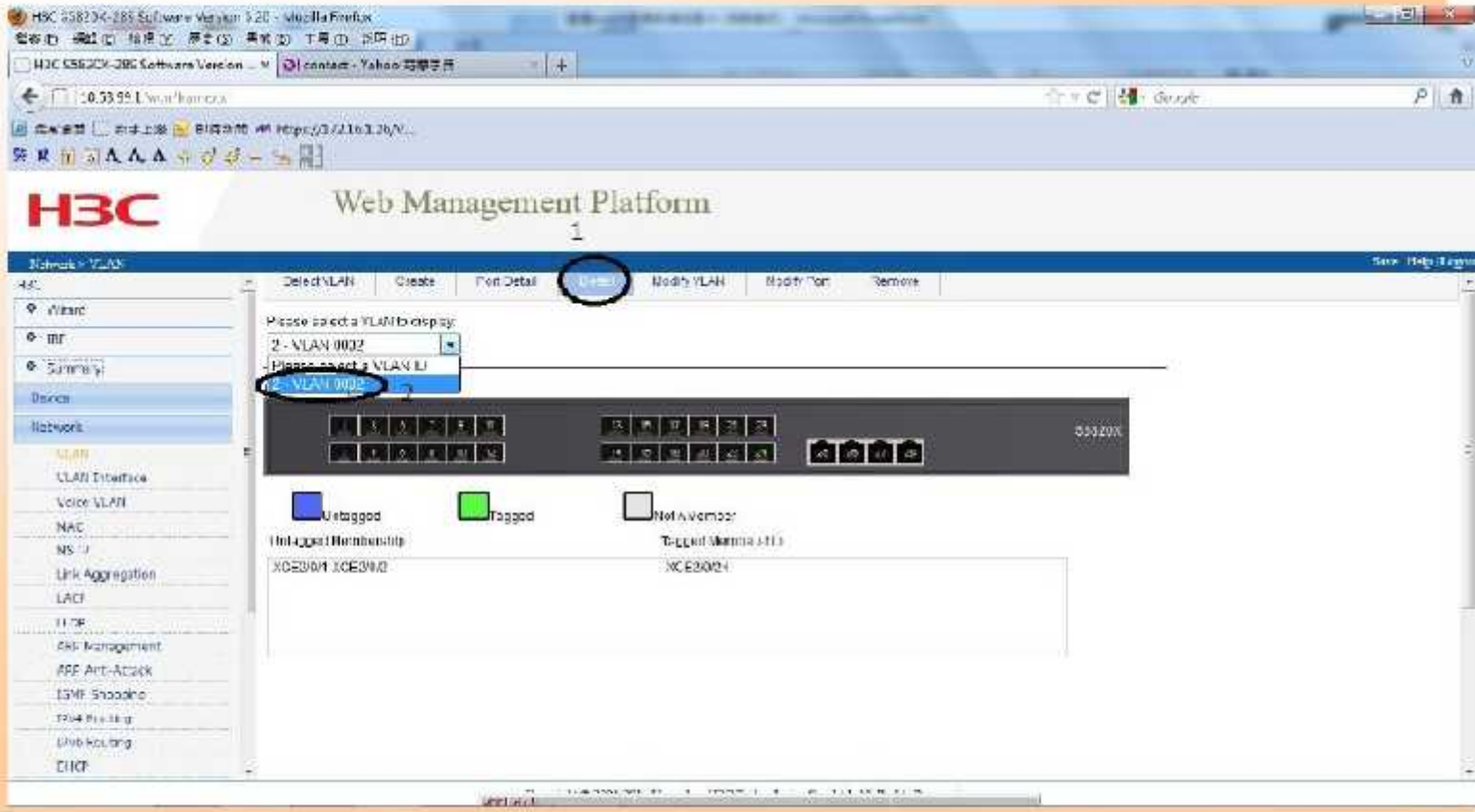
802.1Q(把port 24設定成trunk port)-步驟3



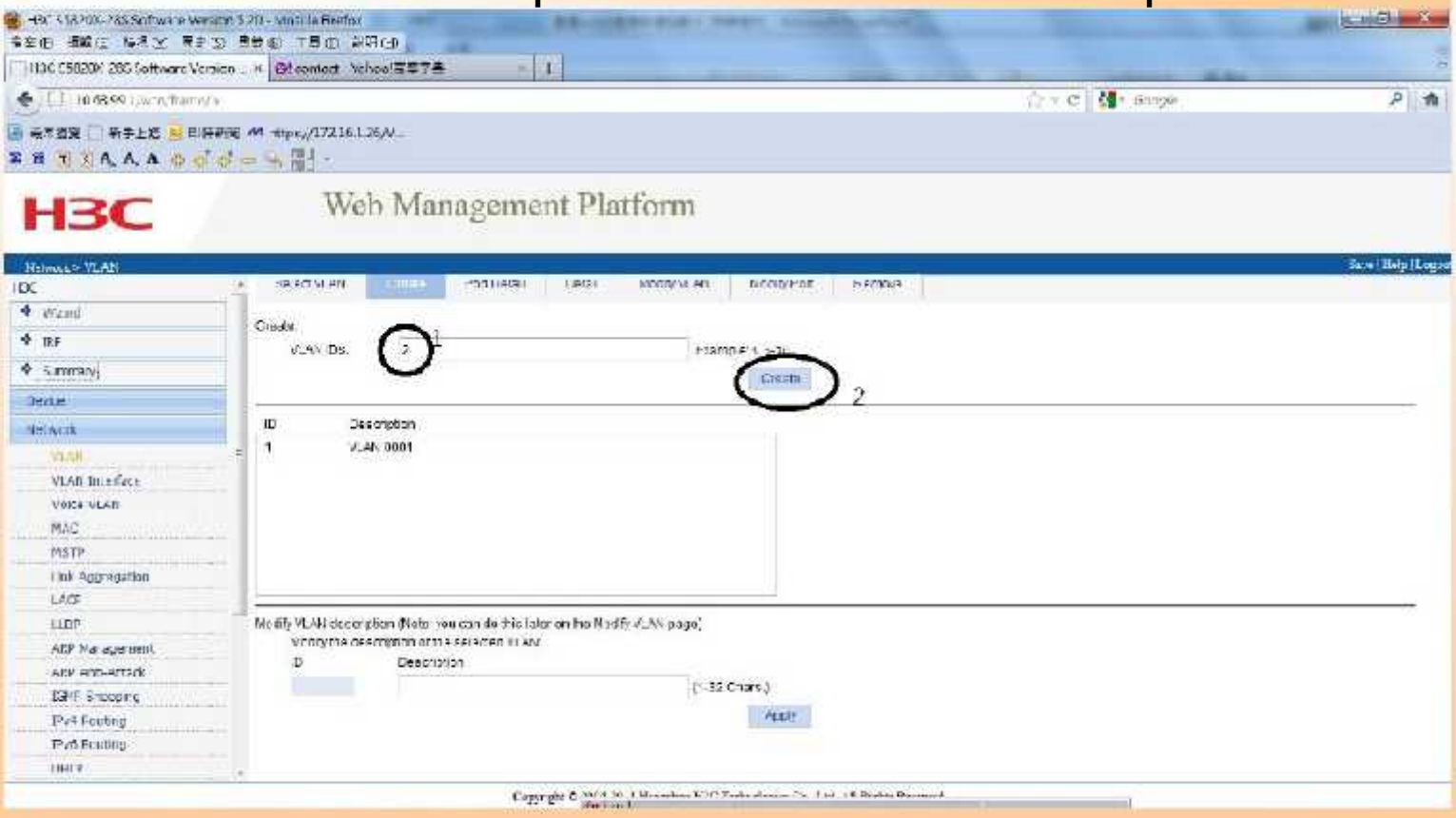
802.1Q(把port 24設定成trunk port)-步驟4

```
interface GigabitEthernet1/0/24
#
return
[HP-GigabitEthernet1/0/24]dis this
#
interface GigabitEthernet1/0/24
 port link-type trunk
 port trunk permit vlan 1 to 2
#
return
[HP-GigabitEthernet1/0/24]
```

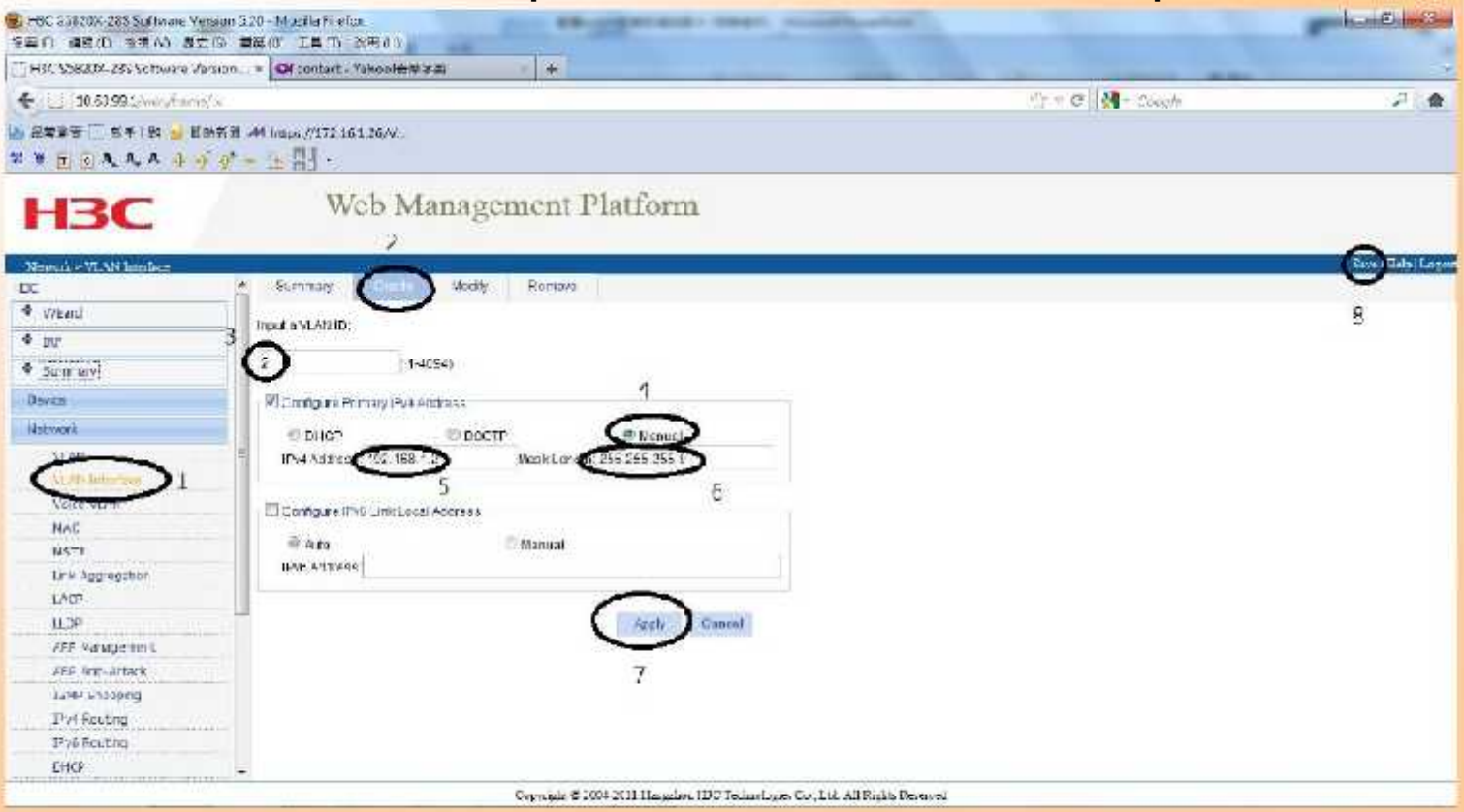
Detail(查看VLAN 2 的port 1、2、24)



假設我的vlan 2是管理ip的話，如何在vlan 2新增管理ip-1

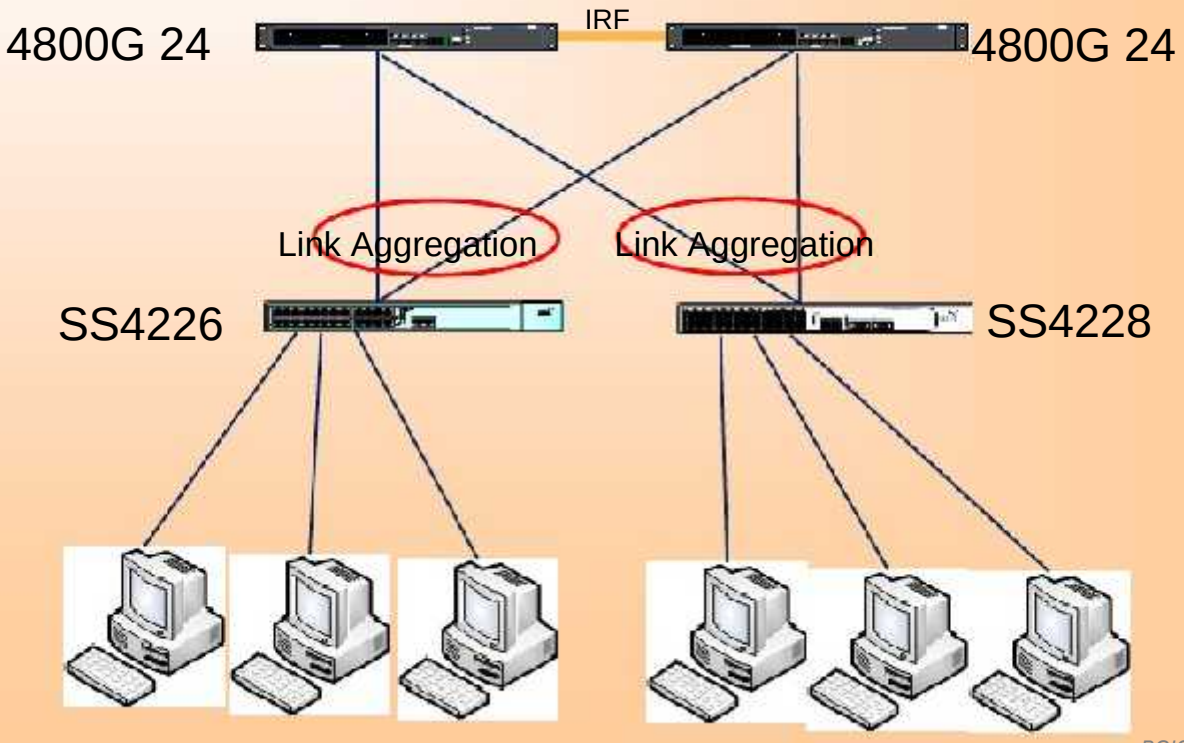


假設我的vlan 2是管理ip的話，如何在vlan 2新增管理ip-2



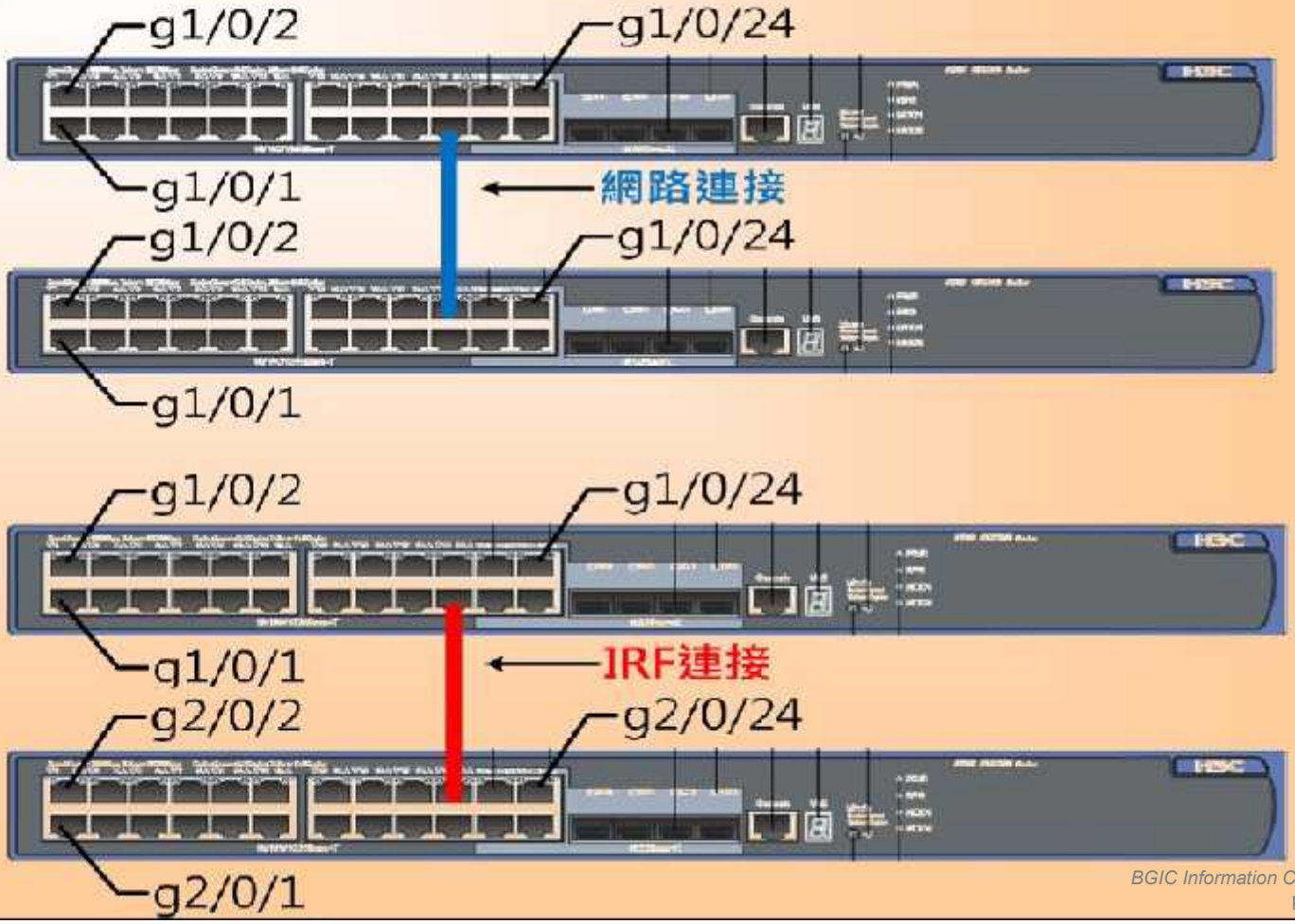
IRF簡介

IRF(Intelligent Resilient Framework)架構

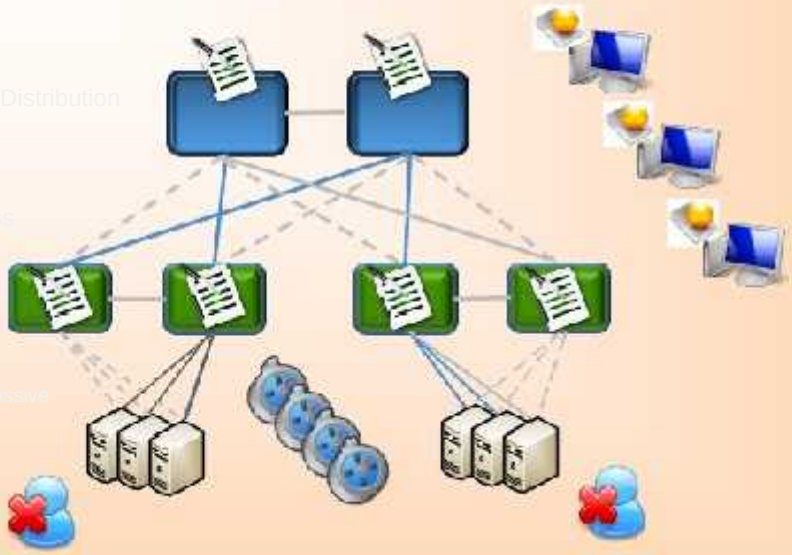


2台實體的24port的Switch

1台邏輯的48port的Switch


g1/0/2
g1/0/24
g1/0/1
網路連接
g1/0/2
g1/0/24
g1/0/1
g1/0/2
g1/0/24
g1/0/1
IRF連接
g2/0/2
g2/0/24
g2/0/1

今日網路設計面臨的挑戰



Legend

- Configuration effort
- Operational Complexity
- Active link
- Blocked/standby link
- Convergence time
- User user/app experience

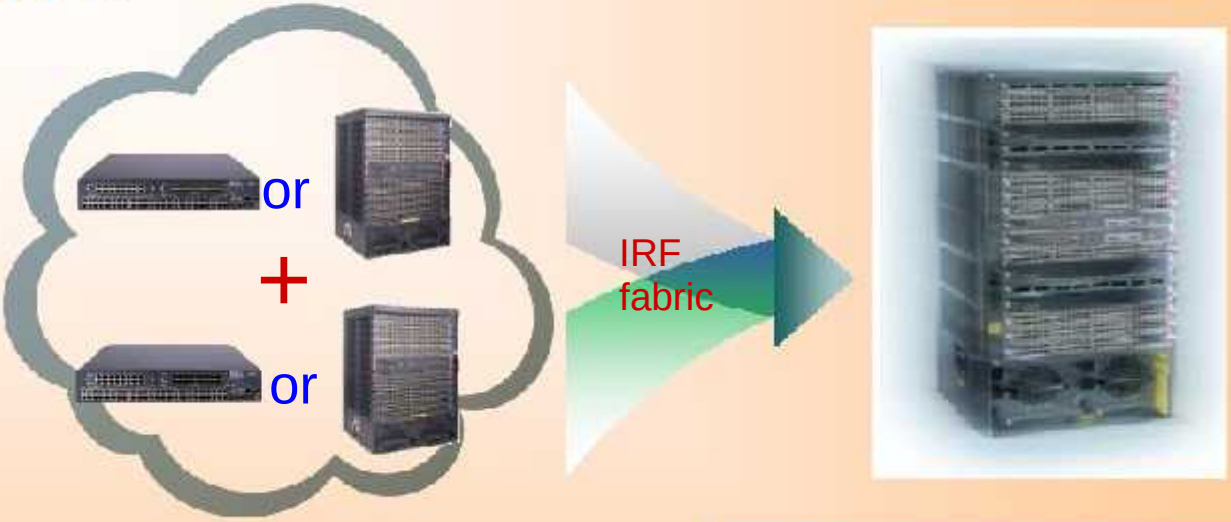
× STP stops loops, but blocks paths - reducing effective bandwidth

× Configuration Intensive (switch by switch)

× Operational complexity for configuration change and support

× Slow convergence during failure can often impact business applications and users

IRF2 (Intelligent Resilient Framework)技術 -Since 2003



多台實體交換器	IRF 虛擬交換器
個別設定與管理	單一介面設定與管理(DDM)
只負責本身封包轉發	路由同步再各自轉發(DRR)
只能點對點匯集鏈路	跨交換機做匯集鏈路(DLA)

IRF與堆疊？

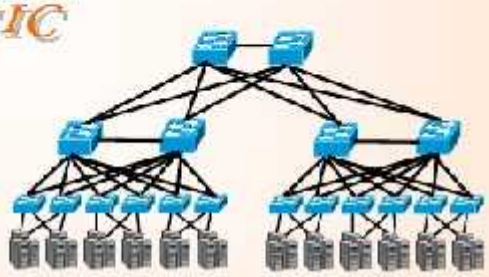
IRF2不就是堆疊麼？

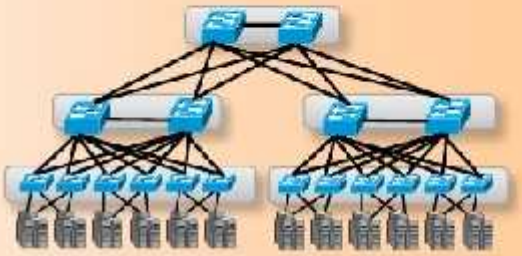
IRF2比堆疊強多了。堆疊只是將設備連在一起，設備之間還是各跑各的，而IRF是真正讓多台設備虛擬化成一台統一的設備，所有的控制，路由轉發都統一進行， **Active-Active**模式，真正當作一台設備來運行。

Why HP IRF?

Customer requirement; 1000 servers, GbE, 10 GbE
Core, dist and access layer, network resiliency,
Internet/extranet WAN connectivity

Other Vendor





STP, RSTP, Rapid-PVST, VSS, vPC , RPR, Stackwise

IRF

Other	Configuration	HP
136	VLANS	50
136	IP Subnets	50
2	OSPF Area	2
42	VRRP Groups	0
88	Access switch configs	5
4	Agg switch configs	2
2	Core switch Configs	1
42	STP Instances	0
196	OSPF adjacencies	8
250	Interfaces	50
94	Device configs	5

×Active / *Stand-by*

×Various *protocols*

×Failover *often measured in seconds or minutes*

×Highly *complex configuration intensive*

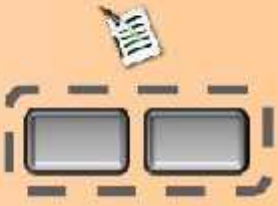
✓Active / *Stand-by*

✓Various *consistency*

✓Failover *measured in milliseconds and seconds*

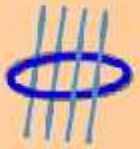
✓Highly *design configuration*

IRF 提供什麼優勢 ？



1 - 極簡化了網絡營運

通過整合多個獨立交換器到單一的管控，每一階層的網絡達到易於管理，與虛擬交換器，真正達到扁平化架構



2 – 提供超高效能

充分利用所有交換機和伺服器/匯聚層交換器之間的鏈路，可“依據需求“擴展 性能和能力，以支持關鍵業務應用

3 – 確保網路與業務的高取用性

不管是鏈路或設備故障，皆能確保快速的網絡回復（以毫秒為單位），以確保應用程序和服務不間斷

Core to Edge都支援IRF

- HP Campus LAN Switch Portfolio

Data Center /Campus Core

A12500 A9500 A7500 A5820

- Up to 512 10GE/864 GE
- Application Modules (inc. multi-core)
- IRF, IPv6

Edge/Aggregation / Core

A7500 A5800/A5820 A5500

- Chassis or Flex chassis + stackable
- IRF PoE(+), 10GE, App modules, IPv6

Edge/Access

A5120 A3600-EI

- Flexible
- Stackable stackable PoE(+), 10GE– IRF,
- OSN, PoE, Auto-voice VLAN uplinks, Ethernet, Gig, w/10G uplinksIPv6
- Fast

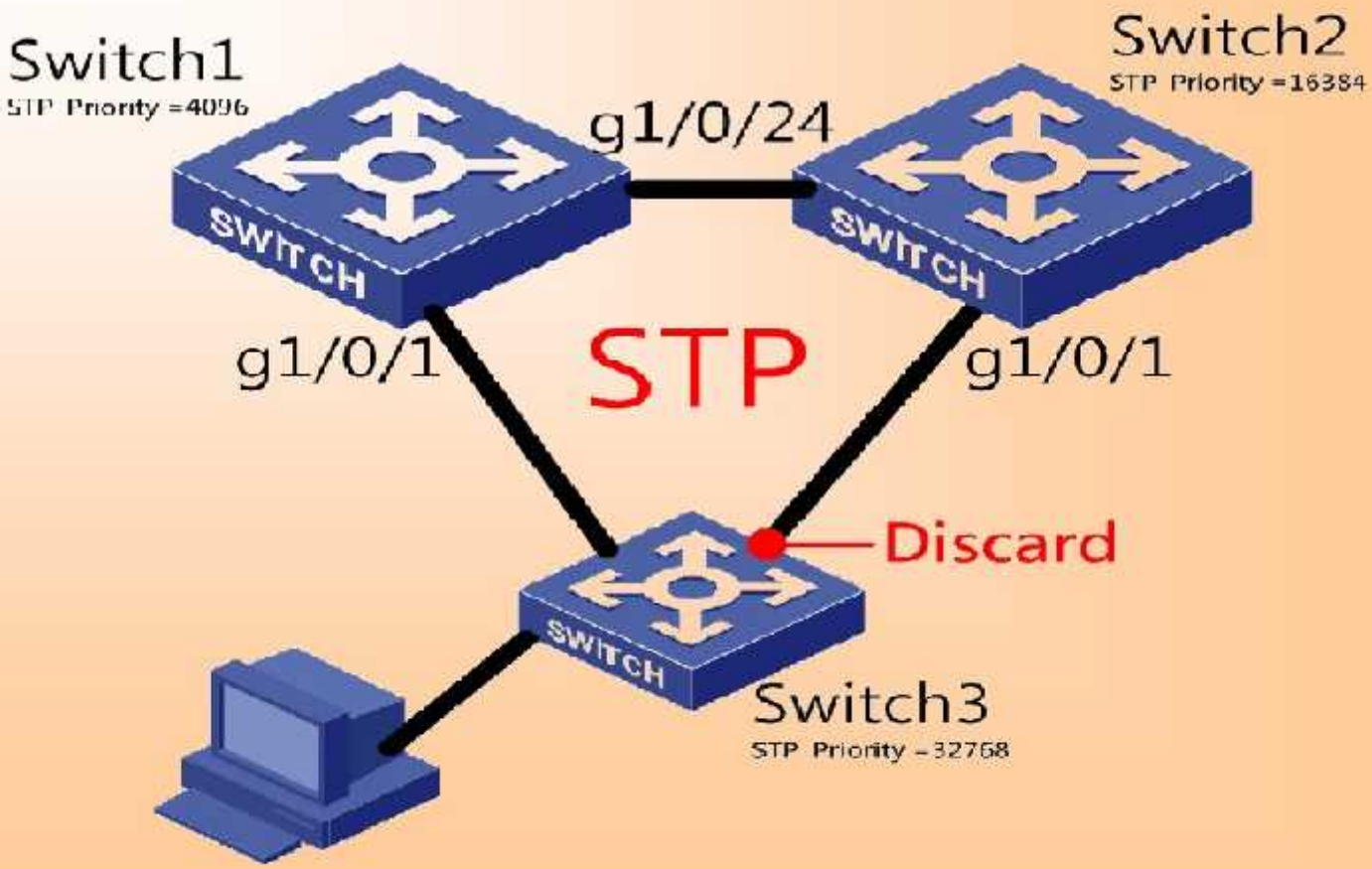
IRF 2.0 規格

功能	A3600-EI IRF 1.0 only (Comware 3)	A5120-SI	A5120-EI	A5500-SI	A5500-EI	A5800	A5820X	A7500	A9500	A12500
堆疊介面	GE	GE	GE or 10GE	10GE	10GE	10GE	10GE	10GE	10GE	10GE
Stack Bandwidth		2*GE	4*10GE	4*10GE	4*10GE	8*10GE	8*10GE	8*10GE	12*10G	12*10G
Stack Number	8	4	4	4	9	9	9	2	2	2
Stack with different model	No	No	No	No	No	Yes	Yes	No	No	No
Geographic Connection	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
IRF Split Detection (MAD)	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes

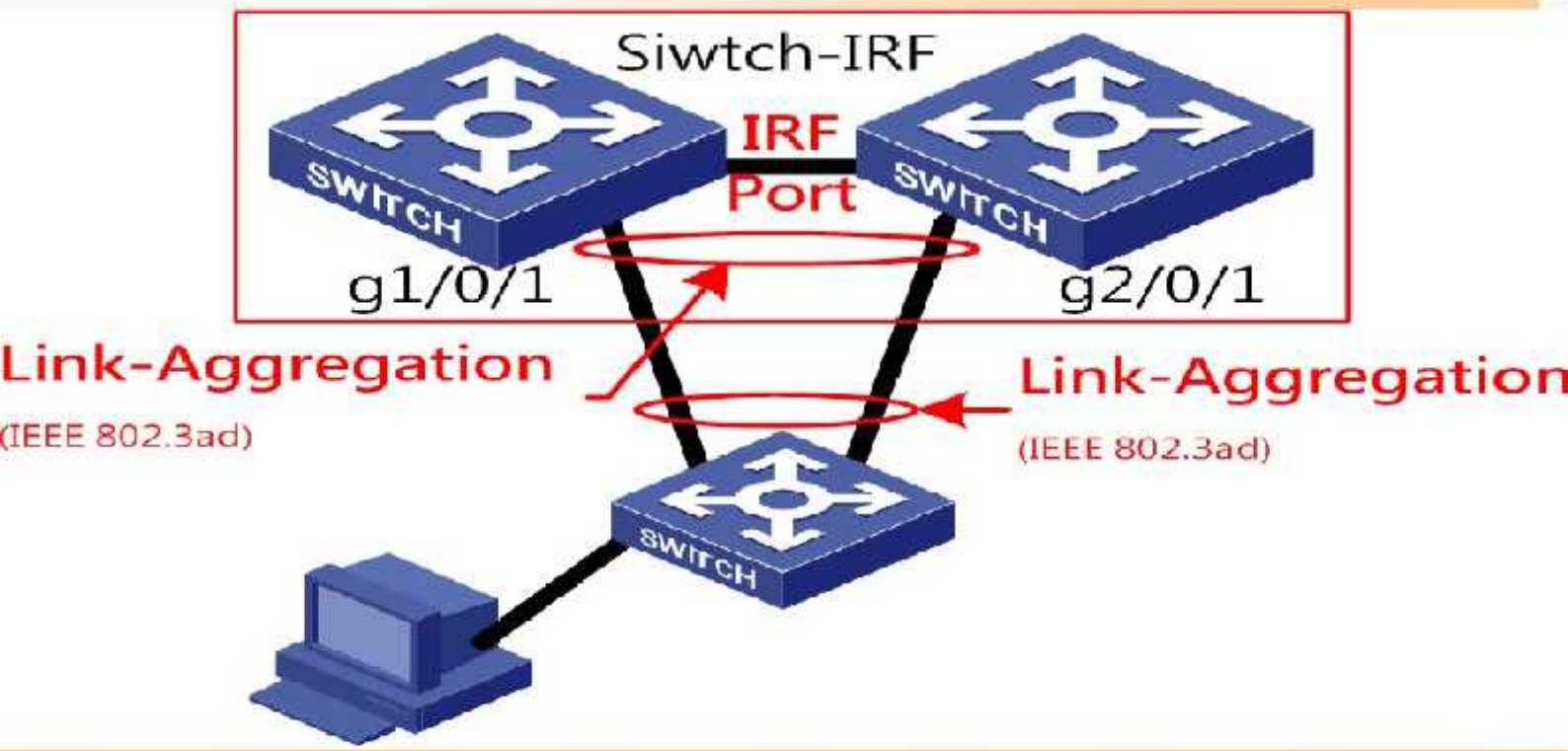
HPN IRF 與友商有何不同？

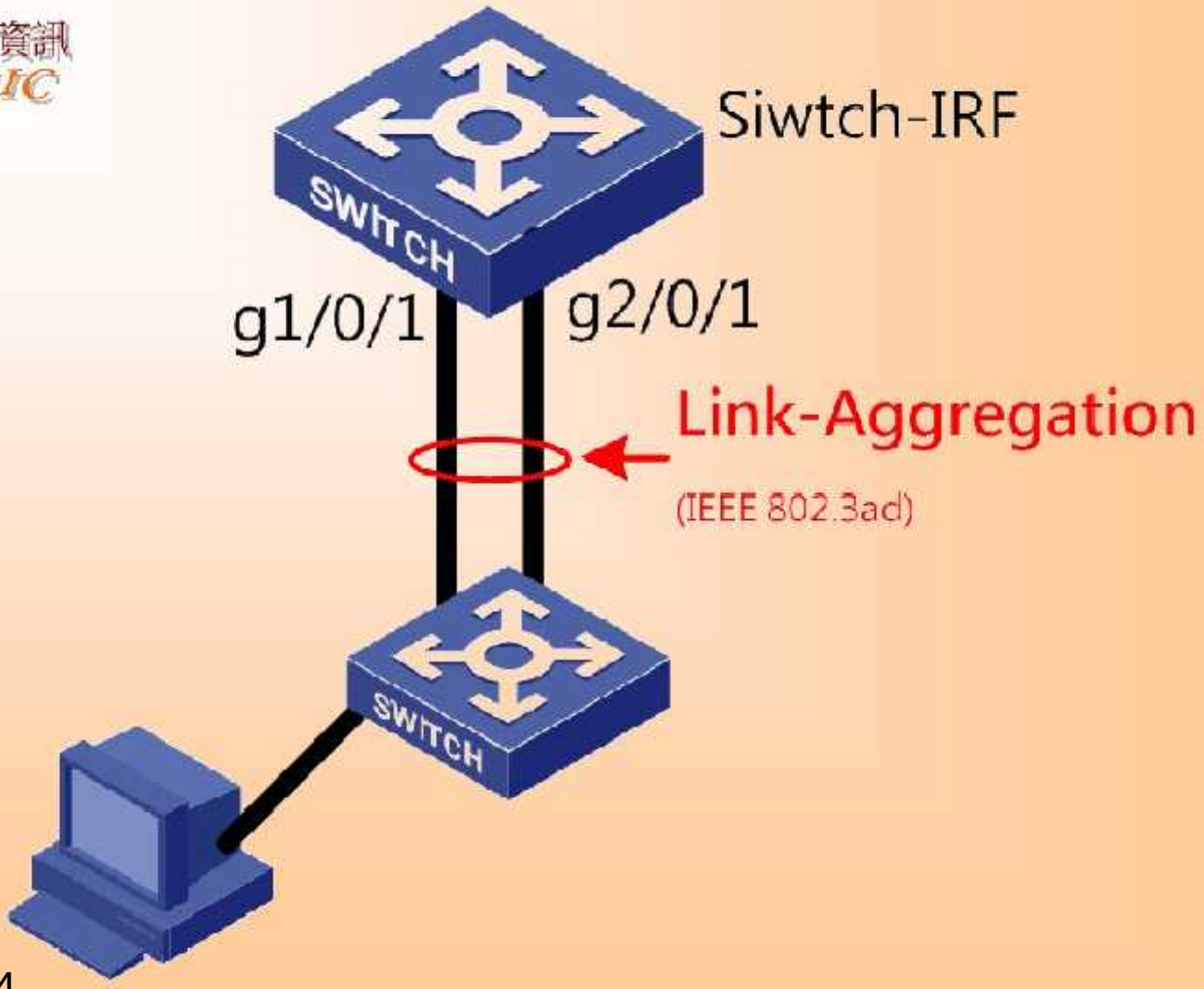
- 2003即研發出 XRN，一直到現在的IRF 2，技術成熟穩定，眾多成功案例
- 沒特殊限制，只要10G介面連接即可，無模組種類、韌體版本…等限制
- Core到Edge都有支援 IRF，完全扁平化網路架構
- IRF連線可以用光纖與銅線(CX4)，光纖可以跨機櫃，建築
- Failover切換速度較快
- 單機功能不會因為做IRF後，損失一些功能

非IRF的備援架構！


Switch1
STP Priority =4096
Switch2
STP Priority =16384
g1/0/24
SWITCH
SWITCH
g1/0/1
STP
g1/0/1
Discard
SWITCH
Switch3
STP Priority =32768

使用IRF的備援架構！

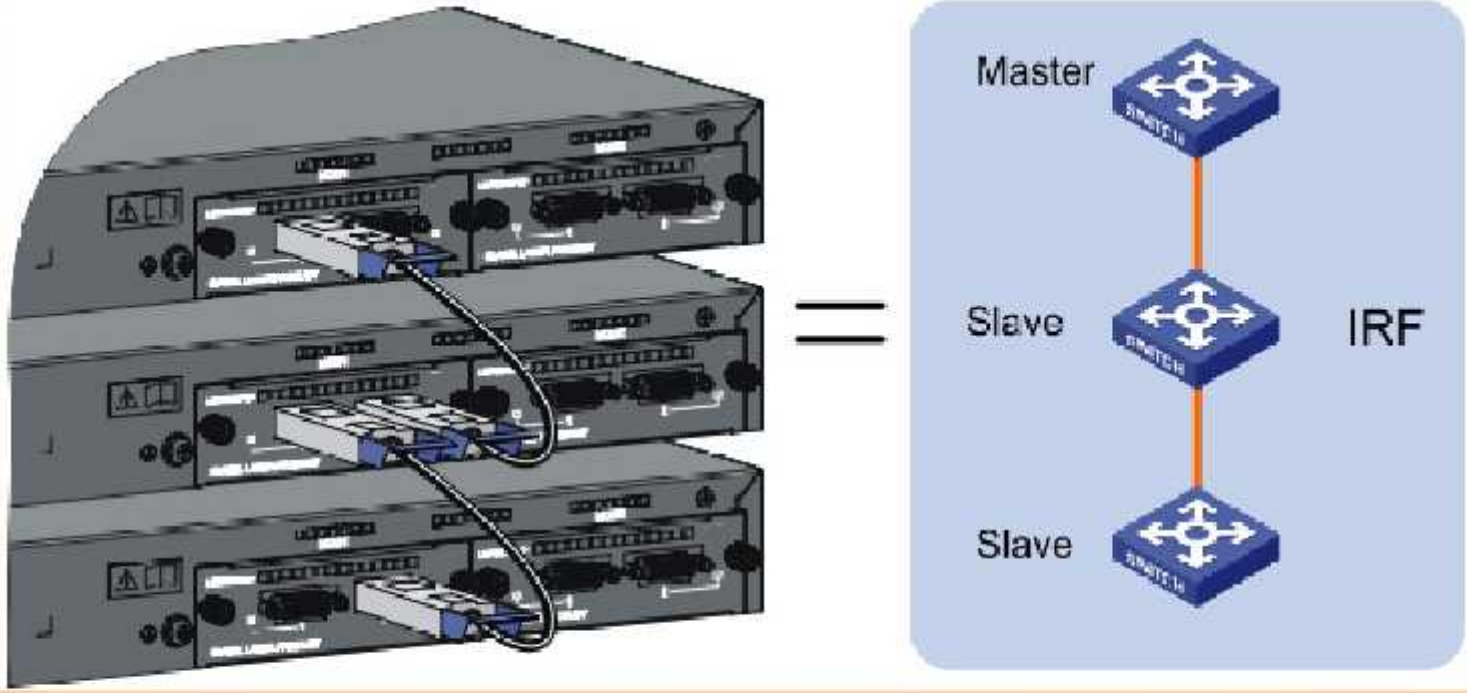

Siwtch-IRF
IRF
Port
SWITCH
SWITCH
g1/0/1
g2/0/1
Link-Aggregation
(IEEE 802.3ad)
Link-Aggregation
(IEEE 802.3ad)
SWITCH


Siwtch-IRF
SWITCH
g1/0/1
g2/0/1
Link-Aggregation
(IEEE 802.3ad)
SWITCH

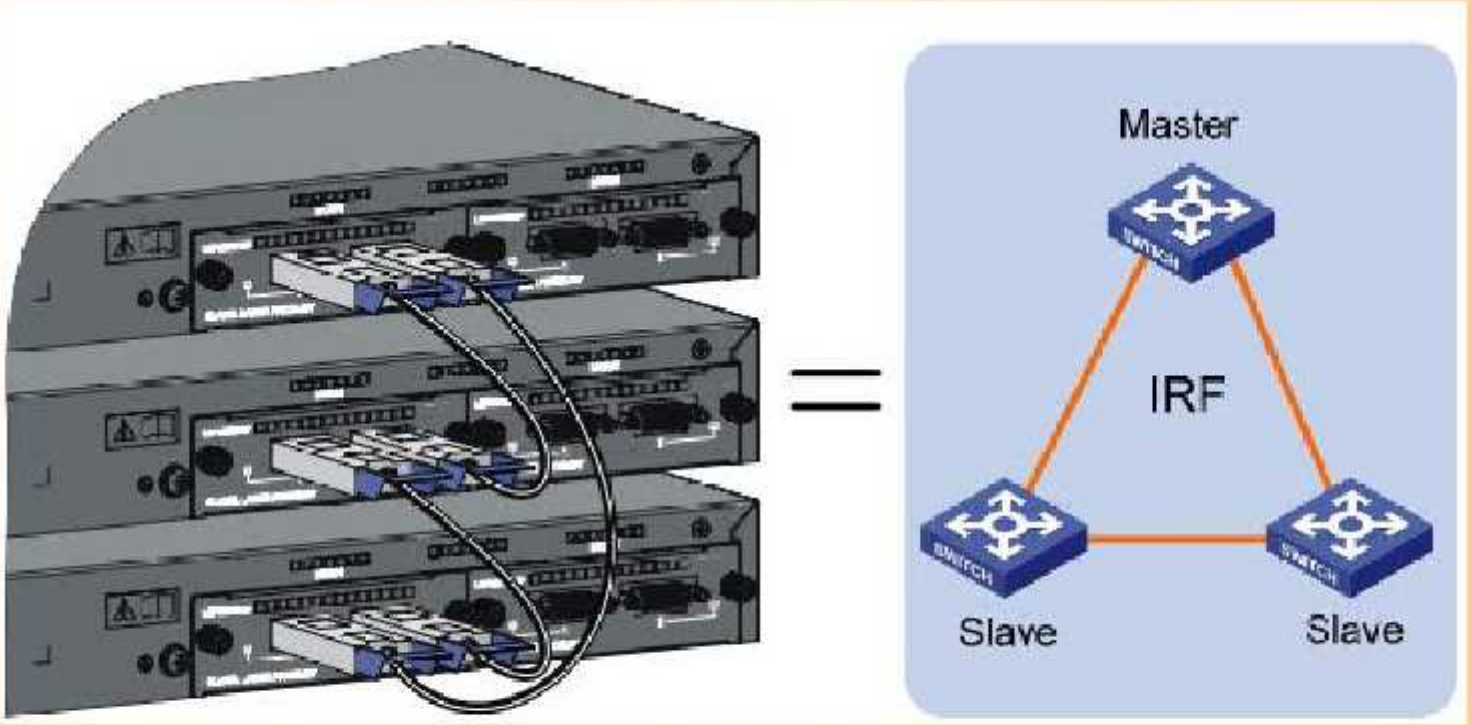
IRF-Port1接IRF-Port2

3com 4800G
H3C 5500EI / 5800

鏈型



3com 4800G
H3C 5500EI / 5800 環型



IRF Config(第1台)

- irf member 1 priority 32
- int Ten-GigabitEthernet1/0/25
- sh
- int Ten-GigabitEthernet1/0/26
- sh
- quit
- irf-port 1/1
- port group int Ten-GigabitEthernet 1/0/25
- irf-port 1/2
- port group int Ten-GigabitEthernet 1/0/26
- int Ten-GigabitEthernet1/0/25
- undo sh
- int Ten-GigabitEthernet1/0/26
- undo sh
- quit
- save
  y

IRF Config(第2台)

- irf member 1 renumber 2
- y
- quit
- Reboot
- Y
- int Ten-GigabitEthernet2/0/25
- sh
- int Ten-GigabitEthernet2/0/26
- sh
- quit
- irf-port 2/1
- port group int Ten-GigabitEthernet 2/0/25
- irf-port 2/2
- port group int Ten-GigabitEthernet 2/0/26

IRF Config (第2台)

```
int Ten-GigabitEthernet2/0/25
undo sh
int Ten-GigabitEthernet2/0/26
undo sh
quit
quit
save
y
```

驗證IRF運作狀況

- Display irf

```
<CORE-A5800-1>display irf
Switch   Role    Priority  CPU-Mac         Description
 *+1     Master  1         3822-d631-b22c  -----
--------------------------------------------------------------

 * indicates the device is the master.
 + indicates the device through which the user logs in.

 The Bridge MAC of the IRF is: 3822-d631-b228
 Auto upgrade                : yes
 Mac persistent              : 6 min
 Domain ID                   : 0
```

Thanks

博鉅資訊股份有限公司

網路設備教育訓練簽到表

日期：103年12月12日(五)
地點：台北海洋技術學院圖資大樓2F D212教室
講師：蕭玉龍先生

單位	與會人員	簽名
圖資中心網路組	顏偉光	顏偉光