

桃園區網：

IPv6 6to4 tunneling 測試

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報告大綱

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- 3. 6to4 Tunneling 建置/測試
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- 4. 總結



1. IPv6 Routing 設定

□ Is IPv6 ready ?

➤ Hardware

- Router/Switch
- Firewall
- Wireless AP
- End system

➤ Application

- httpd, SMTP, DNS, ssh, ftp, news, whois, ntp
- VoIP, multimedia streaming, Printing, Chat, Mysql



1. IPv6 Routing 設定 (cont.)

□ IPv6 address

- Linux
 - Default enable IPv4/IPv6
 - Can configure tun6to4
 - » `/etc/sysconfig/network-scripts/ifup-ipv6`
- Windows 7
 - Default enable IPv4/IPv6
 - Default enable **Teredo** tunneling
 - Configure **tun6to4** automatically
- Windows XP
 - Ipv6 install (tun6to4)
 - Configure IPv6 Manually (**netsh** >)



1. IPv6 Routing 設定 (cont.)

□ IPv6 routing

- Enable ipv6 routing
 - ipv6 unicast-routing
- Static Routing
 - Ipv6 address
 - TYRC 6509 Router Interface
 - » ipv6 address 2001:288:30ff:5::2
 - VNU (2001:288:3005::/48)
 - » ipv6 address 2001:288:30ff:5::1
 - ipv6 route
 - ipv6 route 2001:288:3005::/48 2001:288:30FF:5::1
 - show ipv6 route 2001:288:3005::



1. IPv6 Routing 設定 (cont.)

➤ Static Routing

- Ipv6 address
 - TYRC 6509 Router Interface
 - » ipv6 address 2001:288:30ff::1
 - NCU (2001:288:3001::/48)
 - » ipv6 address 2001:288:30ff::6
- ipv6 route
 - ipv6 route 2001:288:3001::/48 2001:288:30ff::6
 - show ipv6 route 2001:288:3001::
- traceroute -6 www.ncu.edu.tw



traceroute -6 www.ncu.edu.tw

traceroute to www.ncu.edu.tw (2001:288:3001:17:21a:64ff:fed4:486c)

- 1 2001:288:3000:163:2d0:3ff:fe50:b000
(2001:288:3000:163:2d0:3ff:fe50:b000) 0.444 ms 0.511 ms 0.635 ms
- 2 (2001:288:30ff::1) 0.680 ms 0.797 ms 0.655 ms
- 3 (2001:288:30ff::6) 0.623 ms 0.654 ms 0.731 ms
- 4 2001:288:3001:17:21a:64ff:fed4:486c
(2001:288:3001:17:21a:64ff:fed4:486c) 0.509 ms 0.502 ms 0.492 ms



traceroute -6 sun1.ncu.edu.tw

traceroute to sun1.ncu.edu.tw (2001:288:3001:1::31),

- 1 2001:288:3000:163:2d0:3ff:fe50:b000
(2001:288:3000:163:2d0:3ff:fe50:b000) 0.364 ms 0.438 ms 0.456 ms
- 2 (2001:288:30ff::1) 0.844 ms 0.986 ms 1.025 ms
- 3 (2001:288:30ff::6) 0.574 ms 0.678 ms 0.732 ms
- 4 **sun1.ncu.edu.tw (2001:288:3001:1::31)** 0.333 ms 0.325 ms 0.363 ms



sun1.ncu.edu.tw (DNS)

2001:288:3001:1::31

140.115.1.31

GE

(TYRC IPv6 測試網站)

audp.tyc.edu.tw

2001:288:3000:163:230:48ff:fe2e:e5a6

2002:a319:fe02::1

163.25.254.2

NCU 7609
IPv4/IPv6

GE

192.88.99.1 (Relay)

(2002:c058:6301::1)

TYRC 6509
IPv4/IPv6

TANET Backbone



1. IPv6 Routing 設定 (cont.)

[[DNSv6 named.conf 設定例]]

....

```
options {  
    allow-transfer {  
        140.115.19.42; //rs540.ncu.edu.tw  
        163.28.48.66; //rs540.ncu.edu.tw  
        163.30.0.1; //ns0.tyc.edu.tw (new)  
        163.28.49.253; //dns2.tyc.edu.tw  
    };  
    directory "/etc/namedb";  
    recursive-clients 1600000;  
    auth-nxdomain no;  
    allow-query { any; };  
    listen-on-v6 { any; };  
};
```

....



1. IPv6 Routing 設定 (cont.)

[[DNSv6 named.hosts設定例]]

```
noc4  IN      A      192.192.227.4
noc4  IN      AAAA    2001:288:3000:227::4
;=====
;
audp  IN      AAAA    2001:288:3000:163:230:48ff:fe2e:e5a6
audp  IN      AAAA    2002:a319:fe02::1
audp  IN      A       163.25.254.2

ewavs IN      A       163.25.254.5

too   IN      AAAA    2001:288:3000:163:254::6
too   IN      AAAA    2002:a319:fe06::1
too   IN      A       163.25.254.6

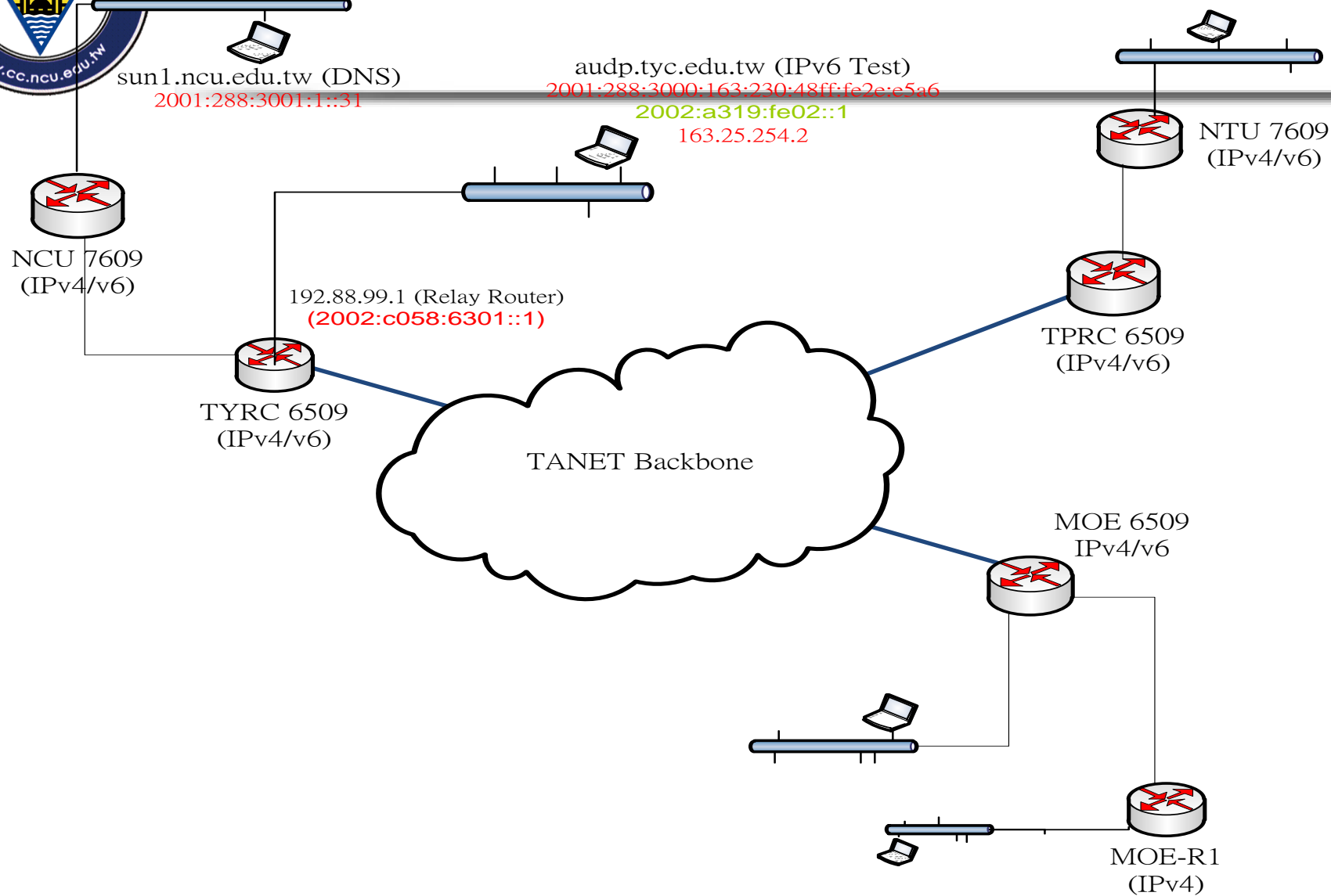
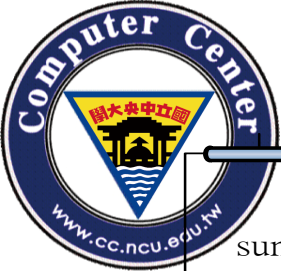
coco  IN      AAAA    2001:288:3000:163:202:b3ff:fe50:e8d4
coco  IN      A       163.25.254.11
```



1. IPv6 Routing 設定 (cont.)

[[DNSv6 named.rev 設定例]]

```
$ORIGIN .
$TTL 86400      ; 1 day
0.0.0.3.8.8.2.0.1.0.0.2.ip6.arpa IN SOA sun1.ncu.edu.tw. abuse.ncu.edu.tw. (
                                2010061801 ; serial
                                7200      ; refresh (2 hours)
                                3600      ; retry (1 hour)
                                604800    ; expire (1 week)
                                3600      ; minimum (1 hour)
                                )
    NS      noc4.tyc.edu.tw.
    NS      sun1.ncu.edu.tw.
    NS      rs540.ncu.edu.tw.
$ORIGIN 0.0.0.3.8.8.2.0.1.0.0.2.ip6.arpa.
4.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.7.2.2.0 PTR noc4.tyc.edu.tw.
```





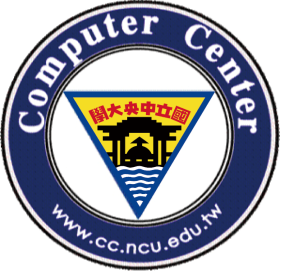
1. IPv6 Routing 設定 (cont.)

➤ Dynamic Routing

- TANET Backbone
 - OSPF for IPv6 dynamic routing

➤ Show ipv6 route

- show ipv6 route 2001:288:3005::
IPv6 Routing Table - 84 entries
S 2001:288:3005::/48 [1/0] via 2001:288:30FF:5::1
- show ipv6 route

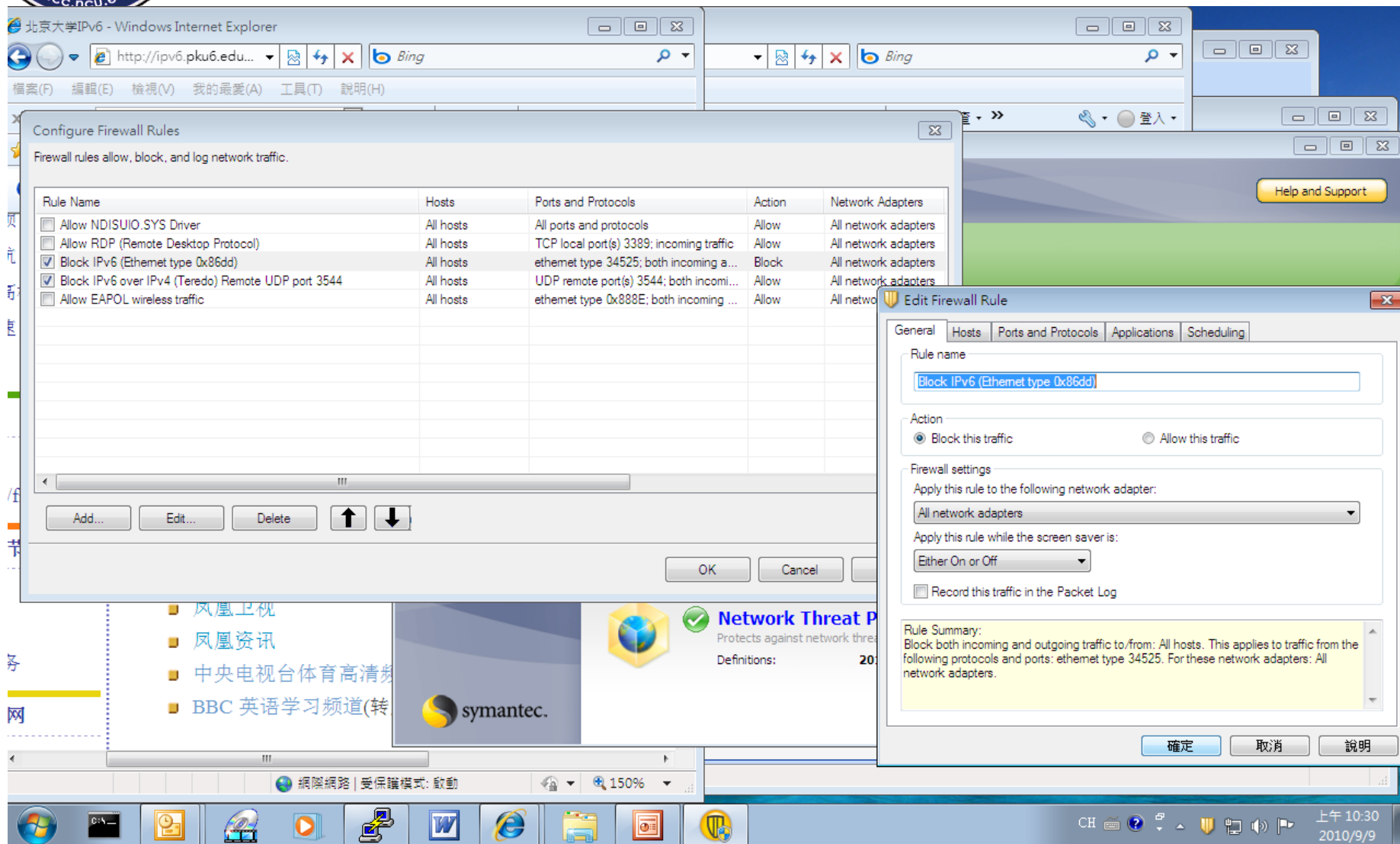


2. IPv6 測試網站

□ Httpd Server

- audp.tyc.edu.tw, showroom.twnic.net.tw
 - Show the remote/client ipv6 address
 - IPv4/IPv6 enable
 - Tun6to4 enable
- mrtgv6.tanet.edu.tw
 - MRTG traffic monitoring for TANET backbone
 - IPv6 enable
- Media Server
 - Ipv6.pku6.edu.cn & other mms links

2. IPv6 測試網站 (cont.)



The screenshot shows a Windows Firewall configuration window titled "Configure Firewall Rules". The window displays a list of rules with the following columns: Rule Name, Hosts, Ports and Protocols, Action, and Network Adapters.

Rule Name	Hosts	Ports and Protocols	Action	Network Adapters
<input type="checkbox"/> Allow NDISUIO.SYS Driver	All hosts	All ports and protocols	Allow	All network adapters
<input type="checkbox"/> Allow RDP (Remote Desktop Protocol)	All hosts	TCP local port(s) 3389; incoming traffic	Allow	All network adapters
<input checked="" type="checkbox"/> Block IPv6 (Ethernet type 0x86dd)	All hosts	ethernet type 34525; both incoming a...	Block	All network adapters
<input checked="" type="checkbox"/> Block IPv6 over IPv4 (Teredo) Remote UDP port 3544	All hosts	UDP remote port(s) 3544; both inco...	Allow	All network adapters
<input type="checkbox"/> Allow EAPOL wireless traffic	All hosts	ethernet type 0x888E; both incoming ...	Allow	All network adapters

The "Edit Firewall Rule" dialog box is open, showing the configuration for the "Block IPv6 (Ethernet type 0x86dd)" rule. The "Action" is set to "Block this traffic". The "Firewall settings" section shows "Apply this rule to the following network adapter:" set to "All network adapters" and "Apply this rule while the screen saver is:" set to "Either On or Off". The "Record this traffic in the Packet Log" checkbox is unchecked.

The "Rule Summary" section states: "Block both incoming and outgoing traffic to/from: All hosts. This applies to traffic from the following protocols and ports: ethernet type 34525. For these network adapters: All network adapters."

The taskbar at the bottom shows the Windows Start button, several application icons, and the system clock displaying "上午 10:30 2010/9/9".

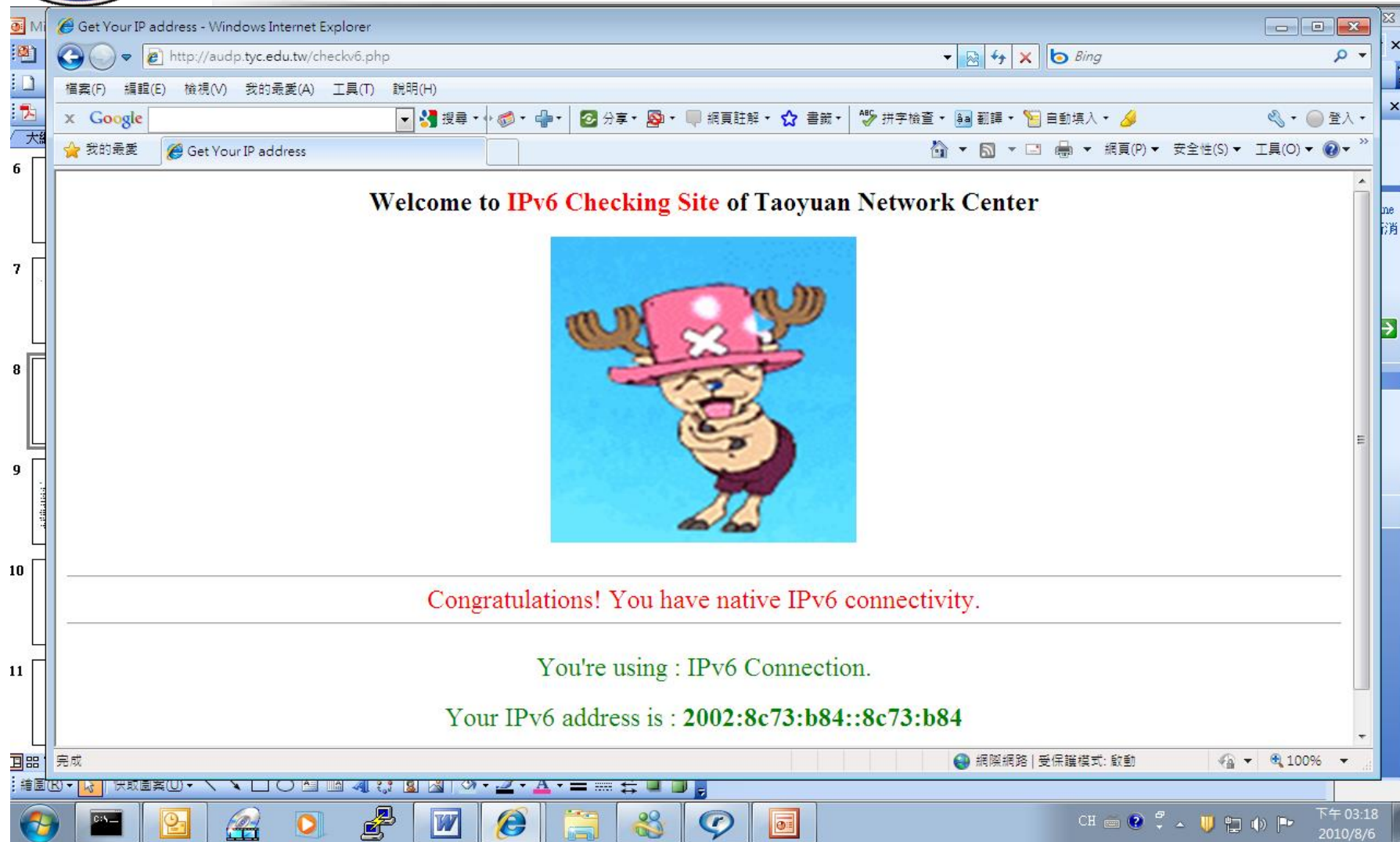


2. IPv6 測試網站 (cont.)



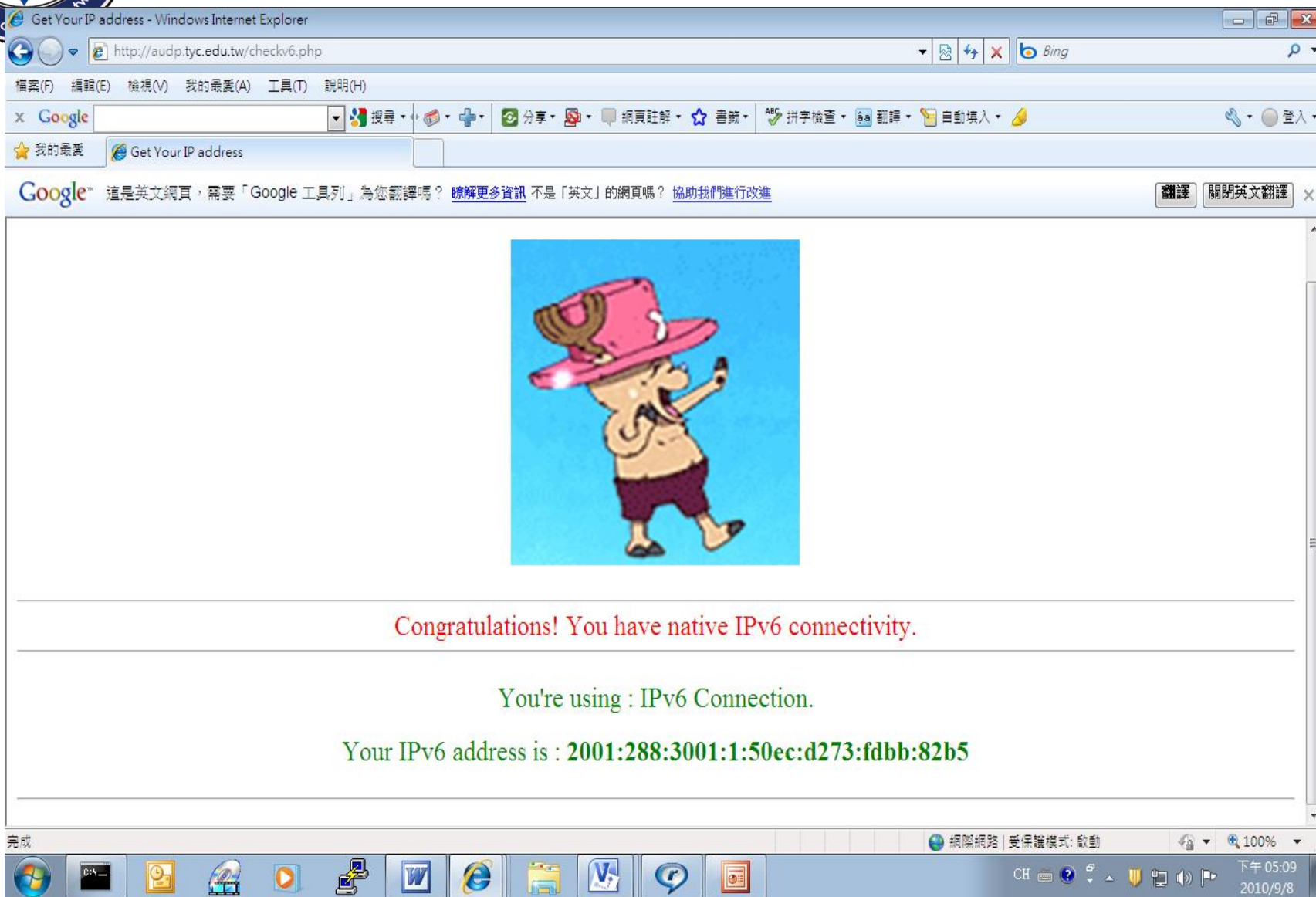


2. IPv6 測試網站 (cont.)





2. IPv6 測試網站 (cont.)





2. IPv6 測試網站 (cont.)

Traffic log for Discovery Channel of <mms://iptv.pku6.edu.cn/discovery>

15:07:00.717309 IP 192.88.99.1 > yang-PC: IP6 2001:da8:201:1129:21a:64ff:fe0a:c380.554
> yang-PC.49191: . 161958:163178(1220) ack 1 win 15868
15:07:00.717733 IP 192.88.99.1 > yang-PC: IP6 2001:da8:201:1129:21a:64ff:fe0a:c380.554
> yang-PC.49191: . 163178:164398(1220) ack 1 win 15868
15:07:00.717825 IP yang-PC > 203.72.244.130: IP6 yang-PC.49191 >
2001:da8:201:1129:21a:64ff
:fe0a:c380.554: . ack 164398 win 64660
15:07:00.718009 IP 192.88.99.1 > yang-PC: IP6 2001:da8:201:1129:21a:64ff:fe0a:c380.554
> yang-PC.49191: . 164398:165618(1220) ack 1 win 15868
15:07:00.718107 IP 192.88.99.1 > yang-PC: IP6 2001:da8:201:1129:21a:64ff:fe0a:c3
80.554 > yang-PC.49191: . 165618:166838(1220) ack 1 win 15868
15:07:00.718186 IP yang-PC > 203.72.244.130: IP6 yang-PC.49191 > 2001:da8:201:11
29:21a:64ff:fe0a:c380.554: . ack 166838 win 64660
15:07:00.718244 IP 192.88.99.1 > yang-PC: IP6 2001:da8:201:1129:21a:64ff:fe0a:c380.554
> yang-PC.49191: . 166838:168058(1220) ack 1 win 15868
15:07:00.718245 IP 192.88.99.1 > yang-PC: IP6 2001:da8:201:1129:21a:64ff:fe0a:c380.554
> yang-PC.49191: . 168058:169278(1220) ack 1 win 15868



2. IPv6 測試網站 (cont.)

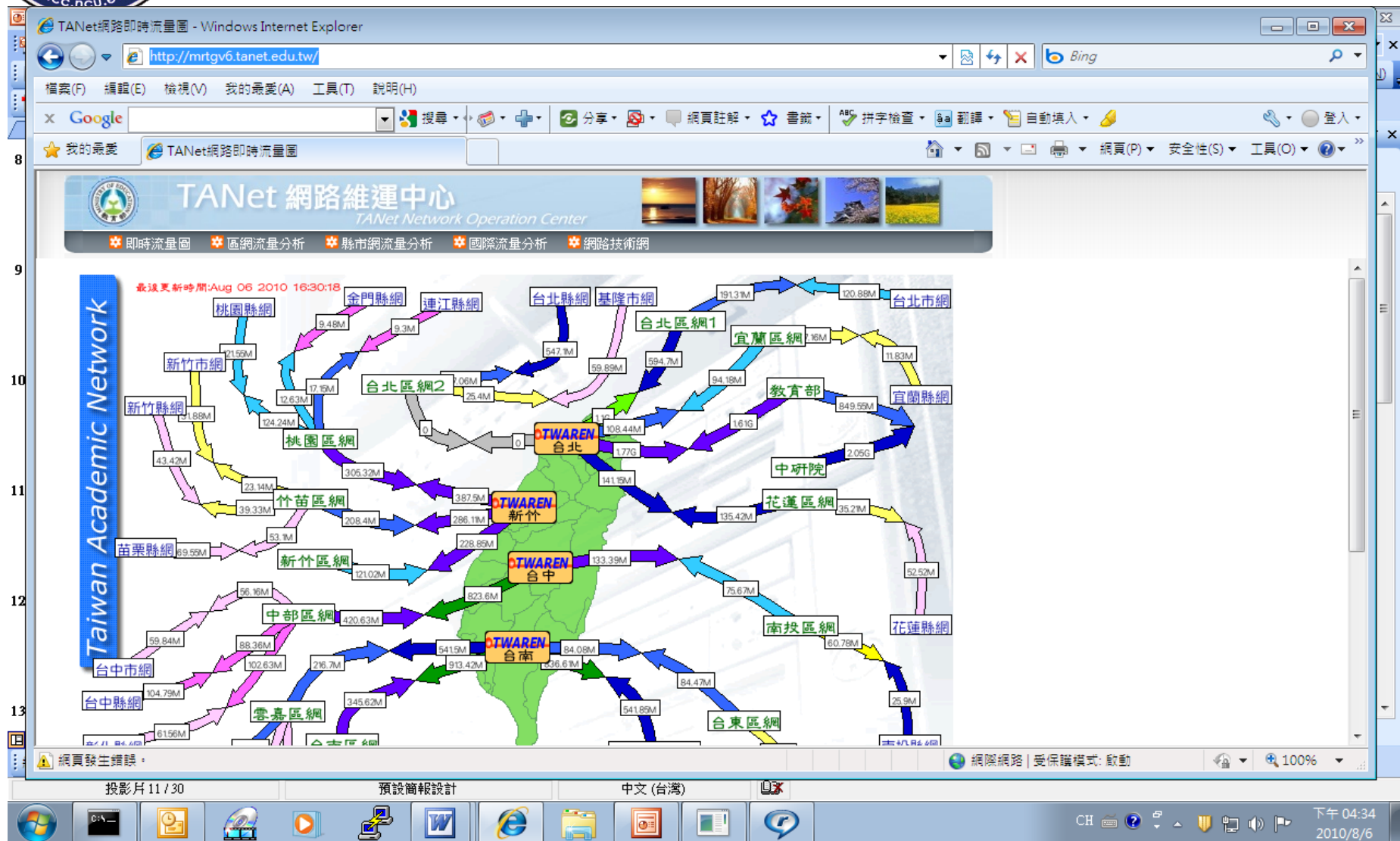
Traffic log for BBC Channel of <mms://tv.lzu.edu.cn/tv1>

```
15:33:02.235514 IP yang-PC > 192.88.99.1: IP6 yang-PC > 2002:c058:6301::c058:6301: ICMP6, echo
request, seq 120, length 8
15:33:02.236361 IP 203.72.244.130 > yang-PC: IP6 2002:cb48:f482::1 > yang-PC: ICMP6, time exceeded
in-transit[|icmp6]
15:33:03.738861 IP 251.63.97.65.in-addr.arpa.6882 > yang-PC.54046: UDP, length 98
15:33:03.739084 IP 251.63.97.65.in-addr.arpa.6882 > yang-PC.54046: UDP, length 98
15:33:03.739176 IP 251.63.97.65.in-addr.arpa.6882 > yang-PC.54046: UDP, length 98
15:33:05.768741 IP 236.144.251.212.customer.cdi.no.24417 > yang-PC.54046: UDP, length 103
15:33:08.458443 IP 60.25.243.1.42843 > yang-PC.54046: UDP, length 101
15:33:10.317164 IP 60.25.243.1.42843 > yang-PC.54046: UDP, length 149
15:33:13.229066 IP AOrleans-257-1-9-33.w90-8.abo.wanadoo.fr.11045 > ya-PC.54046: UDP, length 98
...

16:44:43.481085 IP yang-PC > 203.72.244.130: IP6 yang-PC.49348 > cernet2.net.554
: . ack 165190309 win 64660
16:44:43.481422 IP yang-PC > 203.72.244.130: IP6 yang-PC.49348 > cernet2.net.554: . ack 165192749
win 64660
16:44:43.484356 IP 192.88.99.1 > yang-PC: IP6 cernet2.net.554 > yang-PC.49348: .
165192749:165193969 (1220) ack 20837 win 17080
```

** CEMET, Center of Excellence for Multimedia Education and Technology

2. IPv6 測試網站 (cont.)

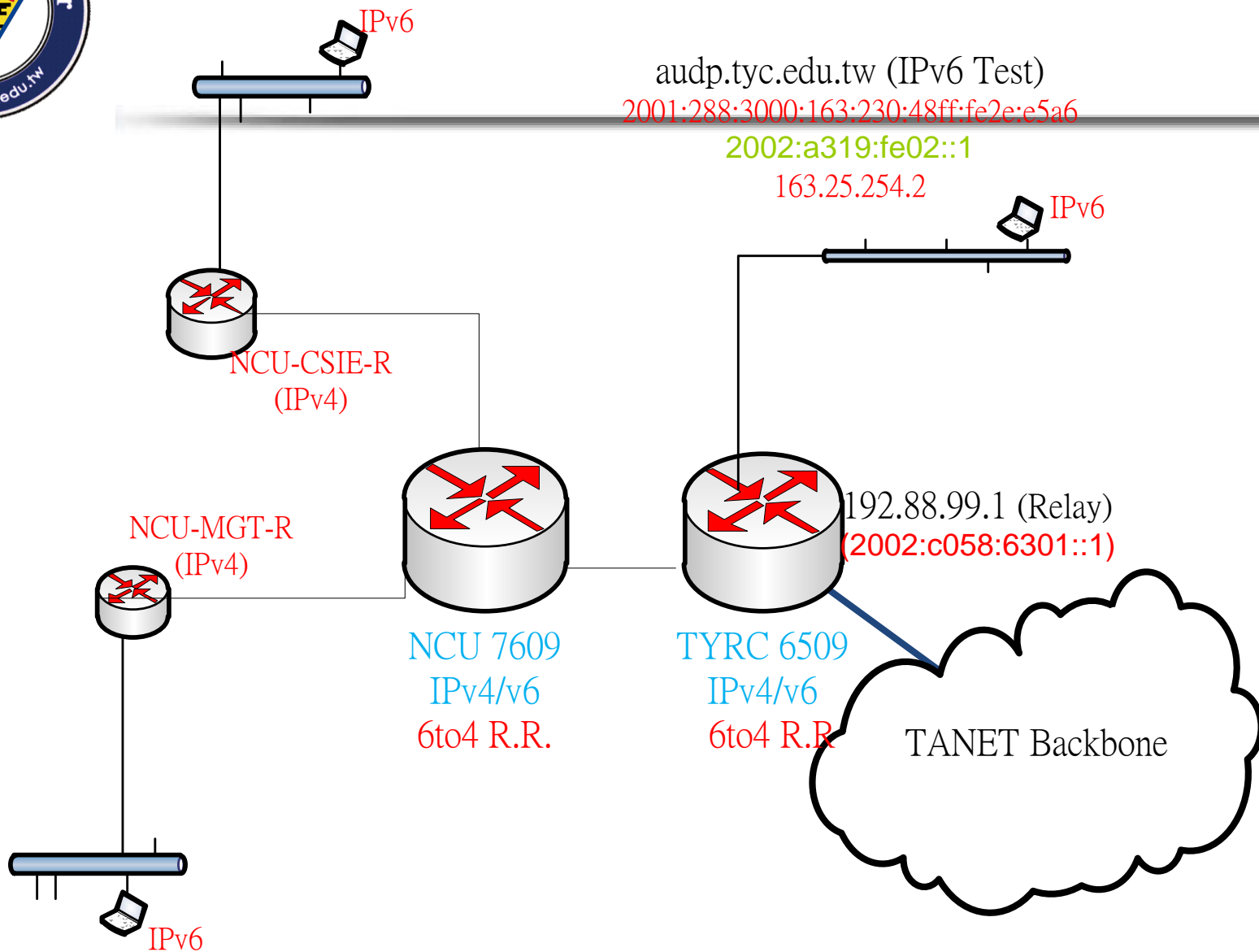




3. 6to4 Tunneling 建置/測試

□ IPv6 6to4 Tunneling

- 允許IPv6 主機經由 IPv4網路連接 IPv6 service
- 建置經驗
 - i) Enable ipv6 routing
 - li) Configure Router look-back ipv4 address
 - iii) Configure route 6to4 address
 - 192.88.99.1
 - 2002:c058:6301::1
 - iv) 動態交換 192.88.99.0/24 & 2002::/16 route





3. 6to4 Tunneling 建置/測試(cont.)

□ 6to4 Routing Relay 建置

➤ TYRC Configuration

```
ipv6 unicast-routing
```

```
interface Loopback0
```

```
ip address 192.88.99.1 255.255.255.0 secondary
```

```
ip address 192.3.2.3 255.255.255.255
```

```
ipv6 address 2002:c003:0203::1/128
```

```
ipv6 mtu 1480
```

```
no ipv6 mfib fast
```



3. 6to4 Tunneling 建置/測試(cont.)

!! tunnel 6to4 virtual interface

```
interface Tunnel2002
```

```
description anycast 6to4 Relay Interface
```

```
no ip address
```

```
no ip redirects
```

```
ipv6 address 2002:C058:6301::/128 anycast
```

```
ipv6 unnumbered Loopback0
```

```
no ipv6 mfib fast
```

```
tunnel source Loopback0
```

```
tunnel mode ipv6ip 6to4
```

```
tunnel path-mtu-discovery
```

參考 ” Cisco 6to4 Relay Service”

http://www.getipv6.info/index.php/Cisco_6to4_Relay_Service



3. 6to4 Tunneling 建置/測試(cont.)

➤ TYRC 6to4-RR

- Lookback12
 - 192.88.99.1
 - 163.25.246.251 (2002:a319:f6fb::1)
- Tunnel16
 - 2002:c058:6301::1

➤ NCU 6to4-RR

- Lookback0
 - 192.88.99.1
 - 203.72.244.130 (2002:cb48:f482::1)
- Tunnel2002
 - 2002:c058:6301::1



3. 6to4 Tunneling 建置/測試(cont.)

Testing from TYRC Segment

```
# traceroute -6 audp.tyc.edu.tw
traceroute to audp.tyc.edu.tw (2002:a319:fe02::1)
 1 2002:a319:fe02::1 (2002:a319:fe02::1) 0.411 ms 0.401 ms 0.386 ms

# traceroute 192.88.99.1
traceroute to 192.88.99.1 (192.88.99.1)
 1 163.25.254.254 (163.25.254.254) 0.966 ms * *

# traceroute -6 2002:c058:6301::1
traceroute to 2002:c058:6301::1 (2002:c058:6301::1)
 1 2002:a319:f6fb::1 (2002:a319:f6fb::1) 1.245 ms 1.333 ms 1.434 ms
 2 2002:a319:f6fb::1 (2002:a319:f6fb::1) 4.038 ms 4.134 ms 4.195 ms
```



3. 6to4 Tunneling 建置/測試(cont.)

Testing from NCU Campus --IPv6 enable

```
>tracert -6 audp.tyc.edu.tw
```

```
1  1 ms  1 ms  <1 ms  2001:288:3001:1::254 // 140.115.1.254
2  <1 ms  <1 ms  <1 ms  2001:288:30ff::5
3  <1 ms  <1 ms  <1 ms  2001:288:30ff::2
4  <1 ms  <1 ms  <1 ms  2001:288:3000:163:230:48ff:fe2e:e5a6
                               // 163.25.254.2 (audp.tyc.edu.tw)
```

```
>tracert 192.88.99.1
```

```
1  15 ms  1 ms  1 ms  192.88.99.1
```

```
>tracert -6 2002:c058:6301::1
```

```
1  1 ms  <1 ms  <1 ms  2001:288:3001:1::254
2  *      *      *      要求等候逾時。
```



3. 6to4 Tunneling 建置/測試(cont.)

Testing from NCU Campus -- IPv6 disable (6to4 enable)

```
>tracert -6 audp.tyc.edu.tw
```

```
1    <1 ms    <1 ms    <1 ms  2002:a319:fe02::1    // 163.25.254.2
```

```
>tracert 192.88.99.1
```

```
1    15 ms    2 ms    2 ms  192.88.99.1
```

```
>tracert -6 2002:c058:6301::1
```

```
追蹤 2002:c058:6301::1 的路由
```

```
1    1 ms    <1 ms    1 ms  2002:cb48:f482::1    // 203.72.244.130 (NCU RR)
```

```
2    1 ms    <1 ms    <1 ms  2002:cb48:f482::1
```



3. 6to4 Tunneling 建置/測試(cont.)

Testing from NCTU Campus

```
C:\>tracert -6 audp.tyc.edu.tw
```

追蹤 audp.tyc.edu.tw [2002:a319:fe02::1] 的路由:

```
1    3 ms    3 ms    3 ms  2002:a319:fe02::1
```

```
C:\>tracert 192.88.99.1
```

```
1    <1 ms   <1 ms   <1 ms  140.113.250.126
```

```
2    16 ms   <1 ms   <1 ms  140.113.0.158
```

```
3    <1 ms   <1 ms   <1 ms  140.113.0.74
```

```
4    <1 ms   <1 ms   <1 ms  v255-194.ntcu.net [211.76.255.194]
```

```
5   135 ms  135 ms  134 ms  sg-ge-05-v4.bb.tein3.net [202.179.249.109]
```

```
6   219 ms  219 ms  219 ms  au-pr-v4.bb.tein3.net [202.179.249.62]
```

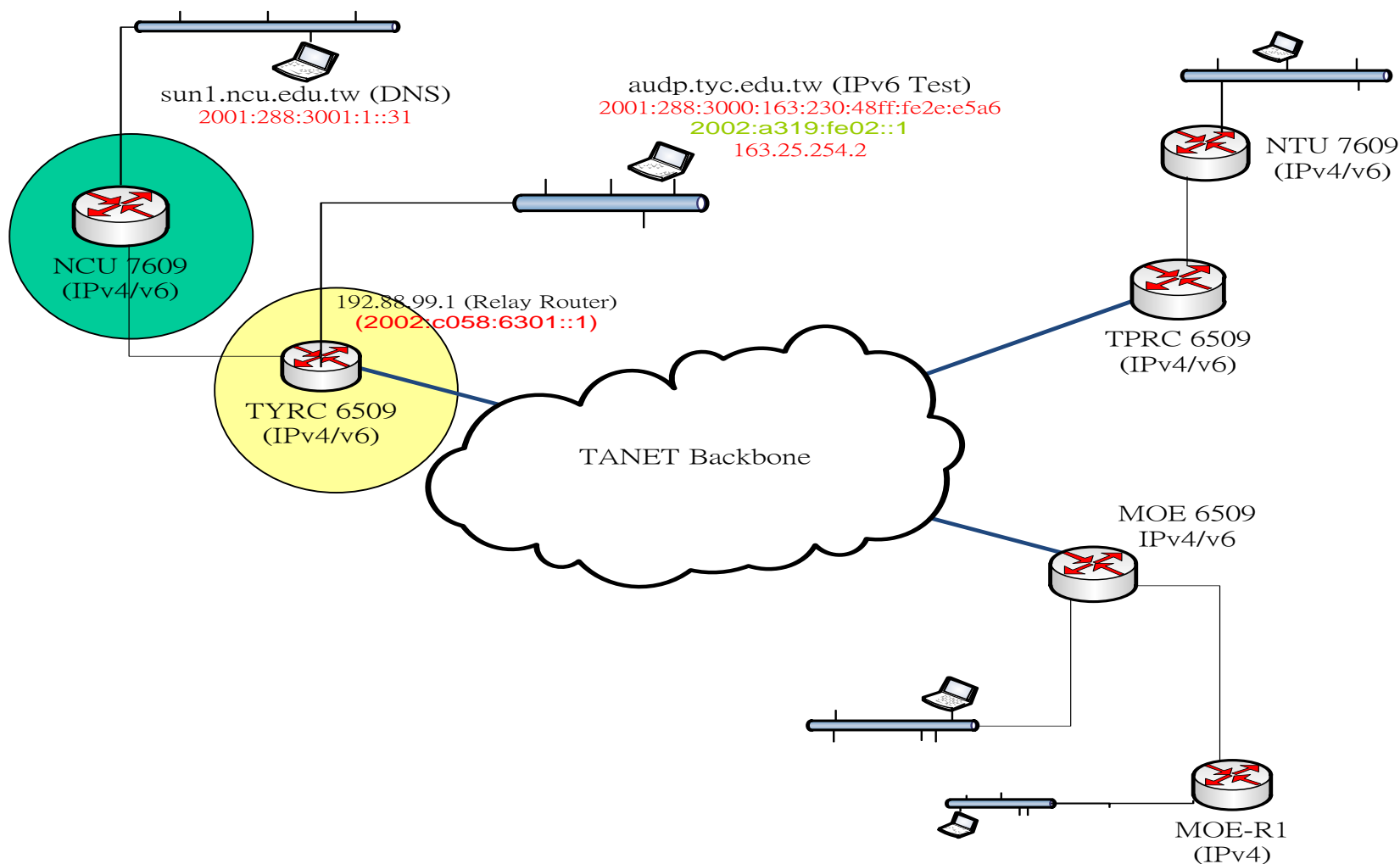
```
7   219 ms  219 ms  219 ms  so-3-2-0.bb1.a.per.aarnet.net.au [202.158.194.145]
```

```
8   221 ms  219 ms  219 ms  192.88.99.1
```

```
C:\>tracert -6 2002:c058:6301::1
```

```
1   220 ms  219 ms  219 ms  2002:c058:6301::1
```

3. 6to4 Tunneling 建置/測試(cont.)





3. 6to4 Tunneling 建置/測試(cont.)

□ TANET 6to4 tunnrling 測試與routing 修正

➤ TANet Backbone 測試 (骨幹串接之區網)

- TYRC 6to4 Relay
 - 192.88.99.1
 - 2002:c058:6301::1
- Dynamic routing 交換
 - EX: OSPF
 - » 192.88.99.0/24
 - » 2002::/16

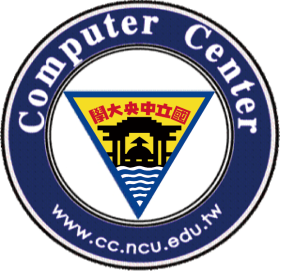


3. 6to4 Tunneling 建置/測試(cont.)

Testing from NTU Segment (台北區網 – 台灣大學) -- with ipv6 enabled

```
>tracert6 audp.tyc.edu.tw
```

1	1 ms	<1 ms	<1 ms	2001:288:1001:1005::
2	<1 ms	1 ms	1 ms	2001:288:1001:0:1::71
3	1 ms	1 ms	1 ms	2001:c08:7f:1::13
4	1 ms	1 ms	1 ms	2001:c08:7f::26
5	1 ms	2 ms	1 ms	2001:288:3b0:3::1
6	1 ms	1 ms	103 ms	2001:288:3b0:4::2
7	1 ms	1 ms	1 ms	2001:288:3b0:5:0:1:7717:1
8	1 ms	1 ms	2 ms	2001:288:e200::1
9	4 ms	4 ms	4 ms	2001:288:0:f:115::2f
10	4 ms	4 ms	4 ms	2001:288:3000:163:230:48ff:fe2e:e5a6 // audp.tyc.edu.tw



3. 6to4 Tunneling 建置/測試(cont.)

Testing from NTU Segment (台北區網 – 台灣大學)
-- with ipv6 enabled

Tracing route to 2002:c058:6301::1

from 2001:288:1001:1005:301f:956e:908d:2766 over a maximum of
30 hops:

```
tracert6 2002:c058:6301::1
```

1	<1 ms	<1 ms	<1 ms	2001:288:1001:1005::
2	1 ms	1 ms	1 ms	2001:288:1001:0:1::71
3	1 ms	1 ms	1 ms	2001:288:1001:0:1::11
4	4 ms	4 ms	4 ms	2001:288:0:f:115::2f
5	4 ms	4 ms	4 ms	2002:a319:f6fb::1 // 163.25.246.251 (TYRC RR)



3. 6to4 Tunneling 建置/測試(cont.)

Testing from NCHU Segment (中彰投區網 -- 中興大學)

-- ipv6 enabled (OSPF 交換之前)

```
>tracert -6 audp.tyc.edu.tw
```

1	1 ms	<1 ms	<1 ms	2001:288:5000:2::1
2	6 ms	6 ms	6 ms	2001:288:0:f:115::2f
3	6 ms	6 ms	6 ms	2001:288:3000:163:230:48ff:fe2e:e5a6

```
>>tracert -6 2002:c058:6301::1
```

1	<1 ms	<1 ms	<1 ms	2001:288:5000:2::1
2	3 ms	3 ms	*	2001:288:e200::1
3	3 ms	3 ms	3 ms	2001:288:0:7::1
4	4 ms	3 ms	3 ms	2001:288:3b0:5::9264:1
5	4 ms	3 ms	3 ms	2001:288:3b0:4::1
6	4 ms	3 ms	3 ms	2001:288:3b0:3::2
7	3 ms	3 ms	3 ms	2001:c08:7f:1::9
8	26 ms	25 ms	25 ms	2001:c08:7f::12
9	27 ms	27 ms	27 ms	hurricaneelectric-RGE.hkix.net [2001:7fa:0:1::ca28:a19e]
10	27 ms	27 ms	27 ms	2002:c058:6301::1



3. 6to4 Tunneling 建置/測試(cont.)

Testing from NCHU Segment (中彰投區網 -- 中興大學)

-- ipv6 enabled (OSPF 交換之後)

```
>tracert -6 2002:c058:6301::1
```

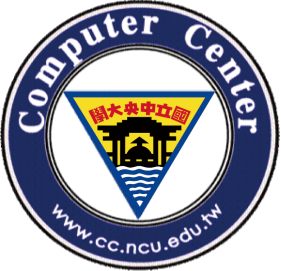
在上限 30 個躍點上追蹤 2002:c058:6301::1 的路由

1	1 ms	<1 ms	<1 ms	2001:288:5000:2::1
2	6 ms	6 ms	6 ms	2001:288:0:f:115::2f
3	6 ms	6 ms	6 ms	2002:a319:f6fb::1 // 163.25.246.251 (TYRC RR)

```
>tracert 192.88.99.1
```

追蹤 192.88.99.1 的路由

1	1 ms	<1 ms	<1 ms	163.28.82.126
2	11 ms	7 ms	6 ms	192.88.99.1



3. 6to4 Tunneling 建置/測試(cont.)

Testing from NCHU Campus (中彰投區網 -- 中興大學)
-- ipv6 disabled (6to4 enabled)

```
>tracert -6 audp.tyc.edu.tw
```

```
1    6 ms    6 ms    6 ms  2002:a319:fe02::1
```

```
>tracert -6 mrtgv6.tanet.edu.tw
```

```
1    7 ms    7 ms    6 ms  2002:a319:f6fb::1
```

```
2   12 ms   10 ms    9 ms  2001:288:e200::1
```

```
3   36 ms   36 ms   31 ms  2001:288:3b0:5:0:1:7717:1
```

```
4   30 ms   31 ms   31 ms  2001:288:1:1006:21d:72ff:fe60:a4fd
```



3. 6to4 Tunneling 建置/測試(cont.)

Testing from NCHU Segment (台南區網 / 成功大學)

-- ipv6 enabled

* tracer audp.tyc.edu.tw from windows 7

追蹤 audp.tyc.edu.tw [2002:a319:fe02::1] 的路由:

1 22 ms 22 ms 21 ms 2002:a319:fe02::1

* tracer audp.tyc.edu.tw from windows XP(install ipv6)

tracing route to audp.tyc.edu.tw [2002:a319:fe02::1]

over a maximum of 30 hops:

1 18 ms 17 ms 18 ms 2002:a319:fe02::1



3. 6to4 Tunneling 建置/測試(cont.)

Testing from NCHU Segment (台南區網 / 成功大學)

-- ipv6 disabled

* traceroute audp.tyc.edu.tw from windows XP (no ipv6)

tracing route to audp.tyc.edu.tw [163.25.254.2]

1	<1 ms	<1 ms	<1 ms	140.116.2.253
2	1 ms	<1 ms	1 ms	140.116.243.197
3	1 ms	1 ms	1 ms	140.116.243.177
4	18 ms	20 ms	16 ms	bb-NCU-TWAREN.TANet.edu.tw [192.83.196.115]
5	18 ms	18 ms	18 ms	audp.tyc.edu.tw [163.25.254.2]



3. 6to4 Tunneling 建置/測試(cont.)

Testing from NCTU Segment (竹苗區網 / 交通大學)

-- ipv6 enabled

```
C:\>tracert -6 audp.tyc.edu.tw
```

追蹤 audp.tyc.edu.tw [2002:a319:fe02::1] 的路由:

```
1    3 ms    3 ms    3 ms  2002:a319:fe02::1
```

```
C:\>tracert 192.88.99.1
```

```
1    <1 ms   <1 ms   <1 ms  140.113.250.126
2    16 ms   <1 ms   <1 ms  140.113.0.158
3    <1 ms   <1 ms   <1 ms  140.113.0.74
4    <1 ms   <1 ms   <1 ms  v255-194.ntcu.net [211.76.255.194]
5    135 ms  135 ms  134 ms  sg-ge-05-v4.bb.tein3.net [202.179.249.109]
6    219 ms  219 ms  219 ms  au-pr-v4.bb.tein3.net [202.179.249.62]
7    219 ms  219 ms  219 ms  so-3-2-0.bb1.a.per.aarnet.net.au [202.158.194.145]
8    221 ms  219 ms  219 ms  192.88.99.1
```

```
C:\>tracert -6 2002:c058:6301::1
```

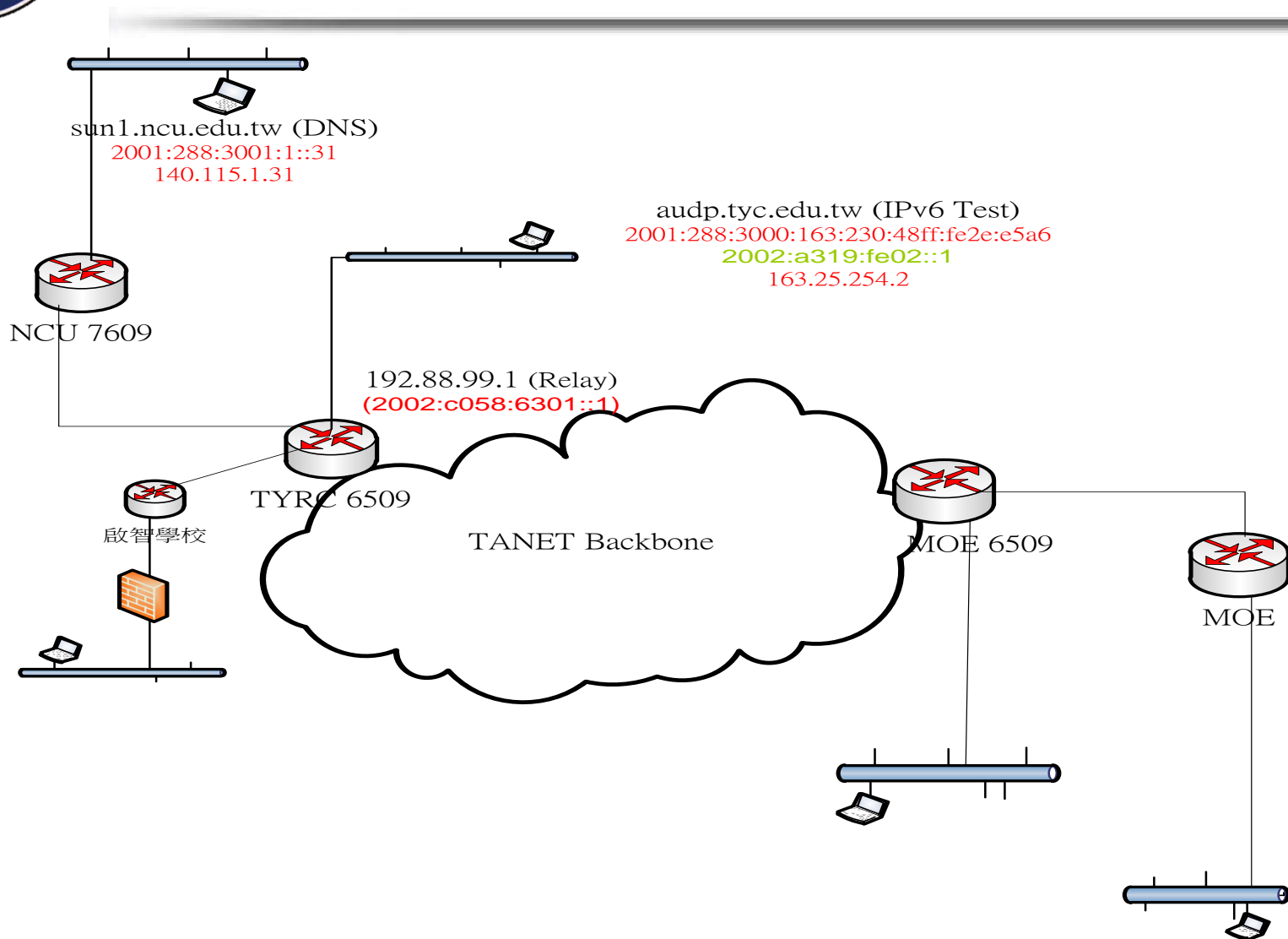
```
1    220 ms  219 ms  219 ms  2002:c058:6301::1
```



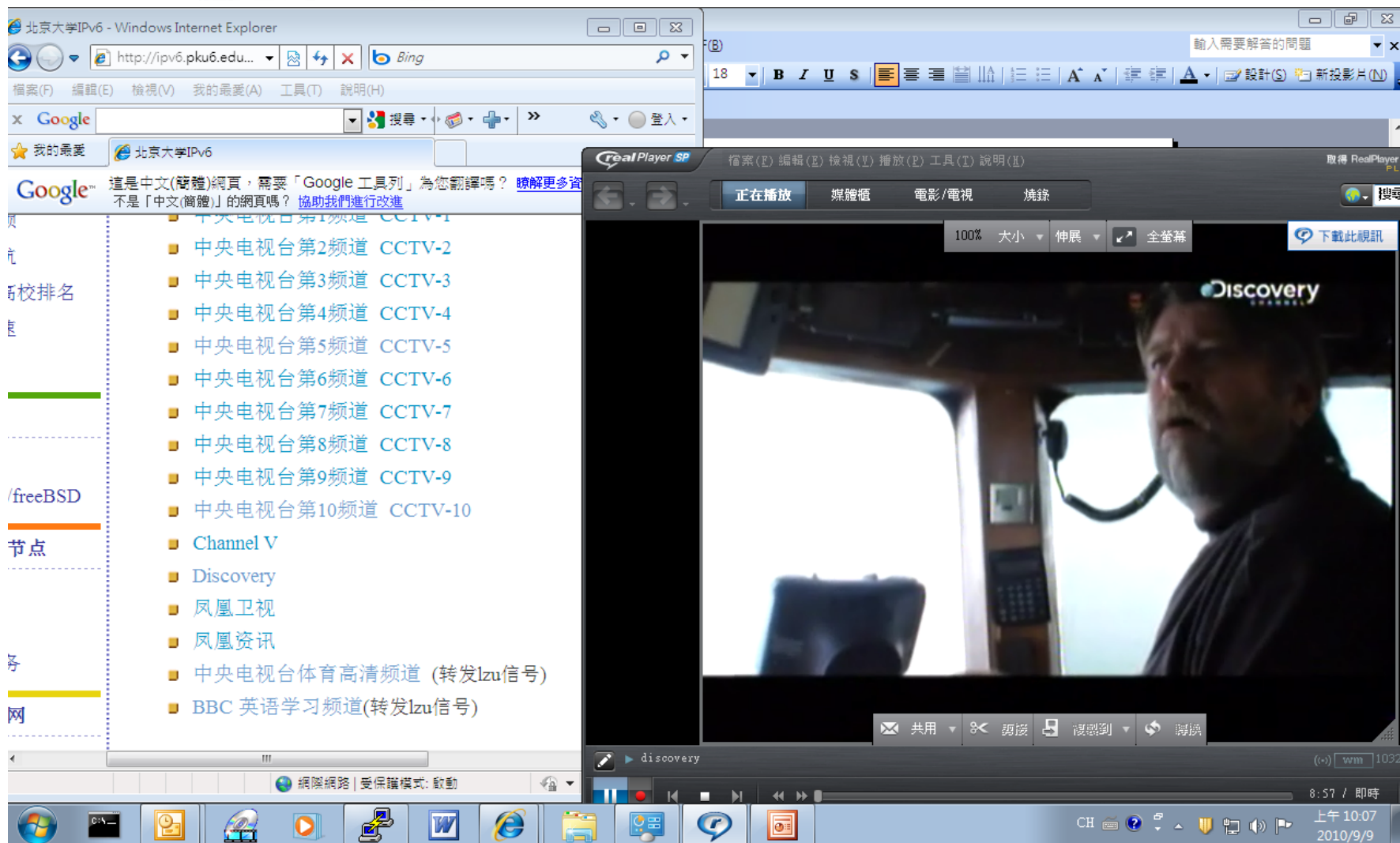
3. 6to4 Tunneling 建置/測試(cont.)

□ TYRC Links測試 (下連學校)

- 區網中心 <--> 桃園啟智學校
- Firewall 放行 192.88.99.0
 - tracert 192.88.99.1
 - <http://audp.tyc.edu.tw>
- 可過境 IPv4 網路
 - IPv6 host -- IPv4 network - IPv6 host



3. 6to4 Tunneling 建置/測試(cont.)



The screenshot displays a Windows XP desktop environment. On the left, a Windows Internet Explorer browser window is open, showing a Google search page with a list of links for various CCTV channels (CCTV-1 to CCTV-10) and other media sources like Channel V, Discovery, and BBC. The browser's address bar shows 'http://ipv6.pku.edu...'. To the right, a RealPlayer SP window is open, displaying a video stream from the Discovery Channel. The video shows a man in a cockpit. The RealPlayer interface includes playback controls and a progress bar. The Windows taskbar at the bottom shows the Start button, several application icons, and the system clock indicating 8:57 AM on 2010/9/9.



3. 6to4 Tunneling 建置/測試(cont.)





4. 總結

□ 6to4 tunnel

➤ Dynamic

- Enable IPv6 end-node connect to IPv6 end-node through **IPv4 transit network**

➤ Anycast

- 192.88.99.1
- 2002:c058:6301::1

➤ 6rd

- IPv6 Rapid Deployment



4. 總結 (cont.)

□ TANET 6to4 relay 測試

➤ 6to4 RR on TYRC 6509 Router

- 192.88.99.1
- 2002:a319:f6fb::1 (163.25.246.251)

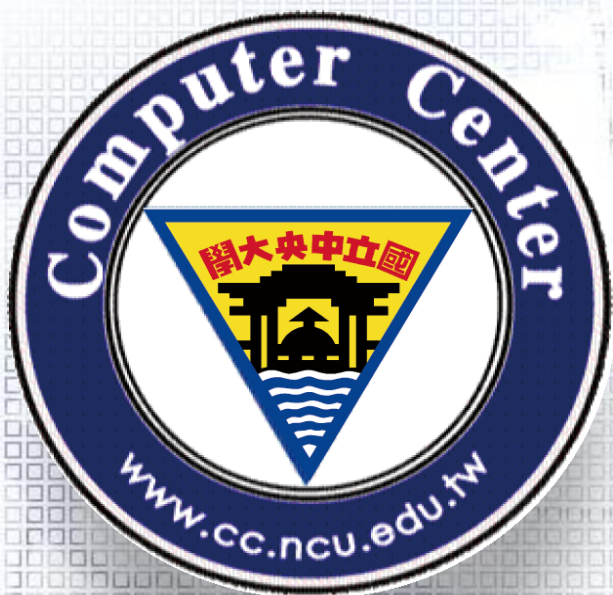
➤ Dynamic distributed routing through TANET backbone

- 2010-July
 - Enable IPv6 end-hosts connected IPv6 end-hosts through transit IPv4 network
 - Tested from NCU, NTU, NCHU, NDHU, NCKU



4. 總結 (cont.)

- NCU 7609 campus router
 - 192.88.99.1
 - 2002:cb48:f482::1 (203.72.244.130)
- IPv6 island over NCU campus
 - Force-10 router
 - Not supporting IPv6 routing
 - Windows XP
 - Ipv6 install
 - With 2002: v4_addr_hex :v4_addr_hex
- Test connecting to IPv6 www / media Servers



建議事項

Thank You!