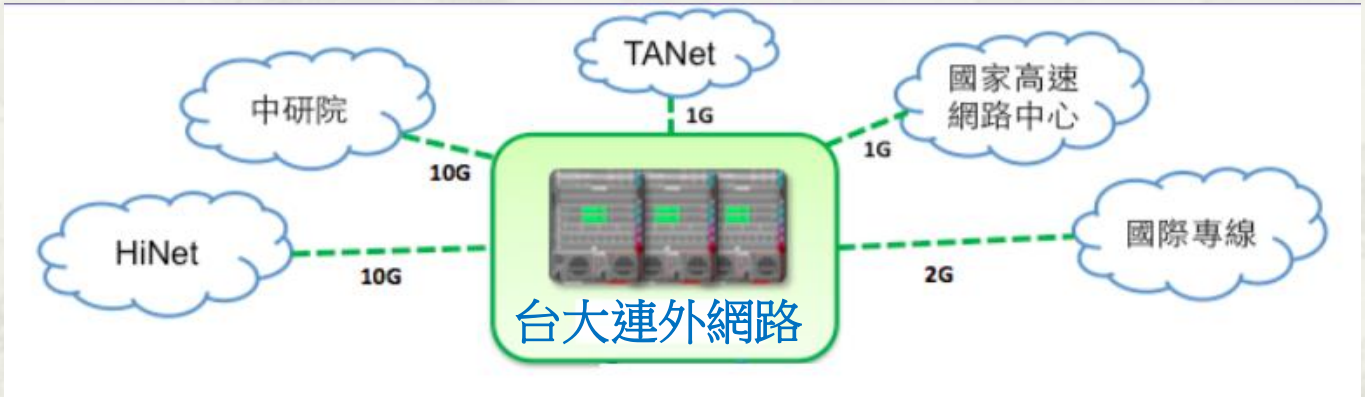
pfSense
網頁multi-home備援建置

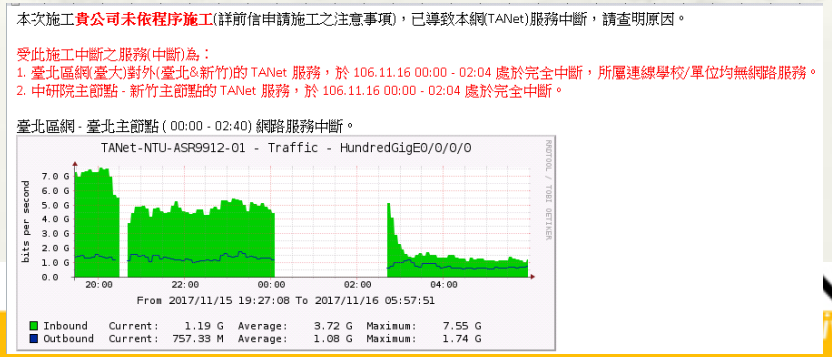
游子興
台大計中網路組
davisyou@ntu.edu.tw
02-33665008

臺大區網網頁備援建置

- 臺大連外網路為 Multi-Home 架構
- 建構TANet與臺大網路互為備援之區網網頁
  - TANet 斷線時仍可由臺大網路在網頁公告事項



11/16 凌晨區網斷線近 3小時

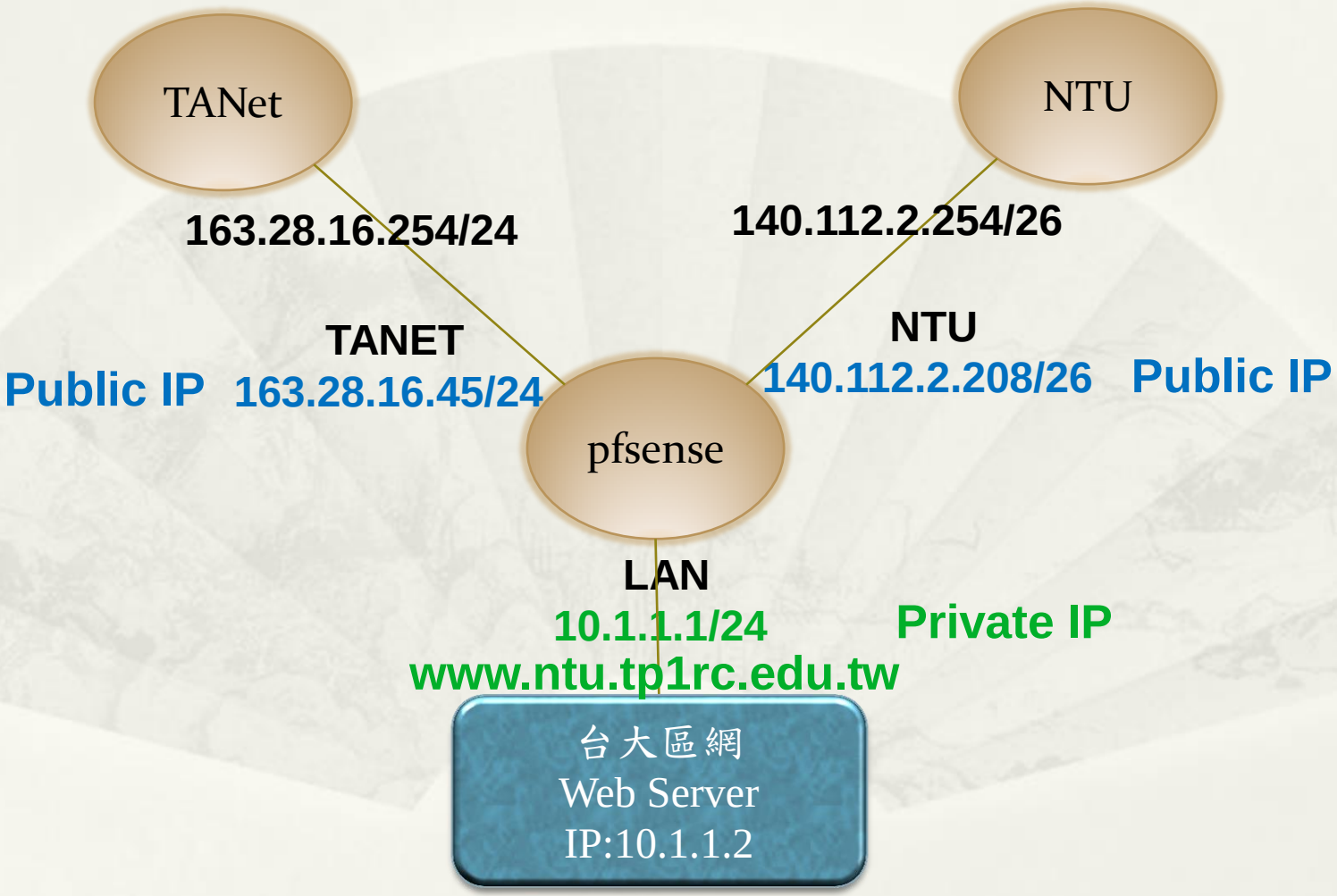

本次施工**貴公司未依程序施工**(詳前信申請施工之注意事項)，已導致本網(TANet)服務中斷，請查明原因。

受此施工中斷之服務(中斷)為：
1. 臺北區網(臺大)對外(臺北&新竹)的 TANet 服務，於 106.11.16 00:00 - 02:04 處於完全中斷，所屬連線學校/單位均無網路服務。
2. 中研院主節點 - 新竹主節點的 TANet 服務，於 106.11.16 00:00 - 02:04 處於完全中斷。

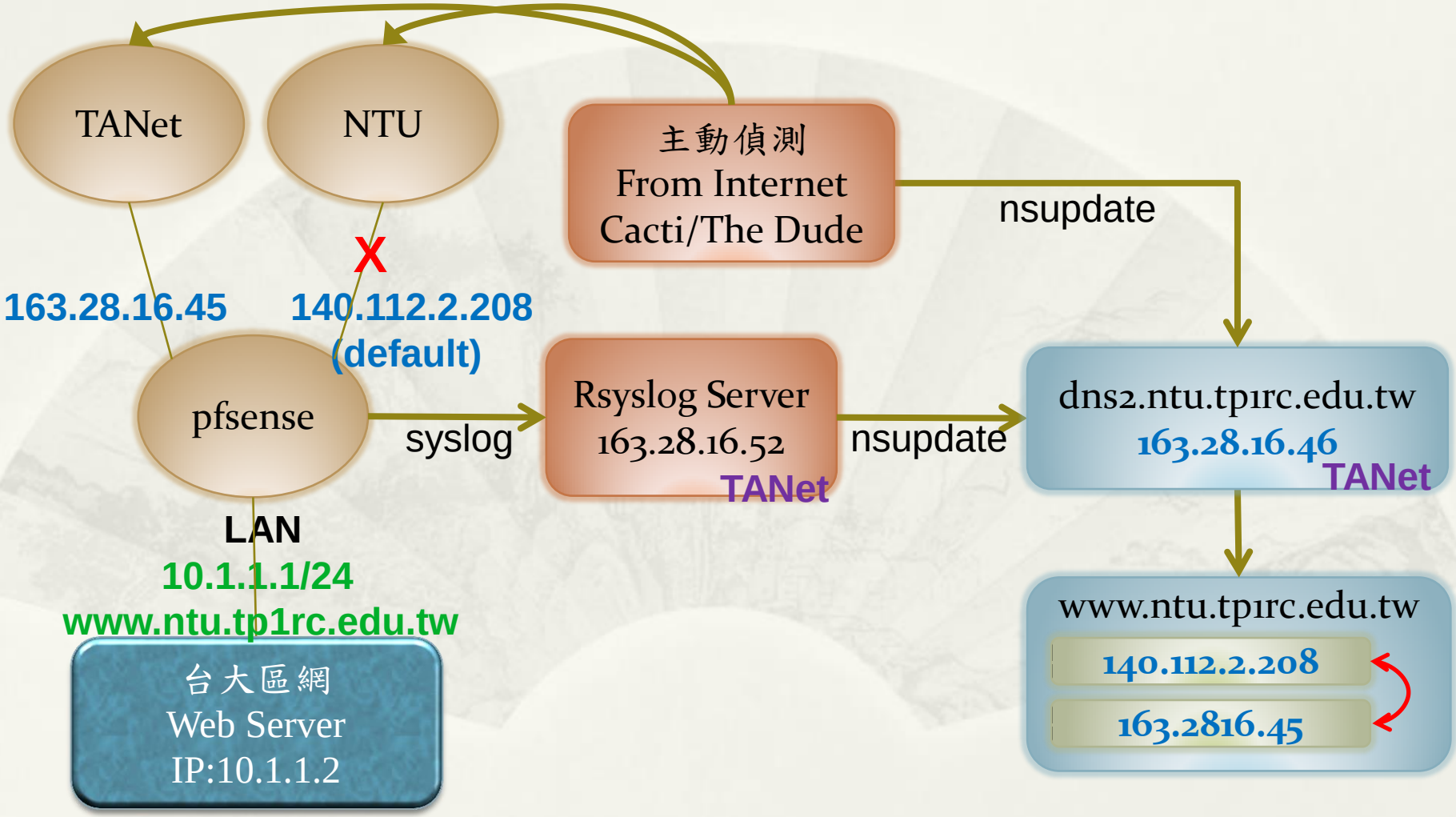
臺北區網 - 臺北主節點 (00:00 - 02:40) 網路服務中斷。

NAT MODE
MULTI-WAN
WEB SERVER

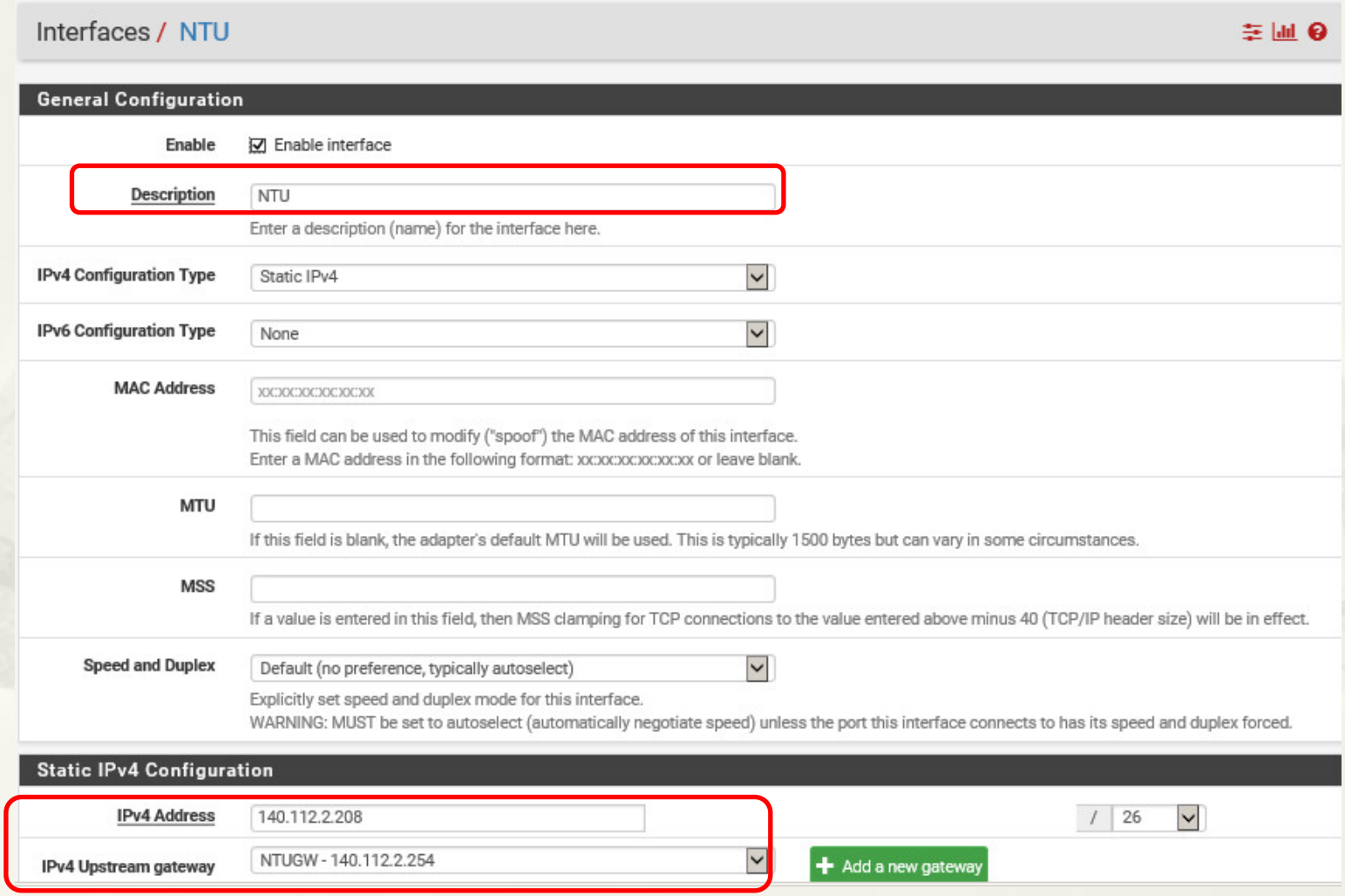
網頁備援運作架構


TANet
NTU
163.28.16.254/24
140.112.2.254/26
TANET
Public IP
163.28.16.45/24
NTU
140.112.2.208/26
Public IP
pfsense
LAN
10.1.1.1/24
Private IP
www.ntu.tp1rc.edu.tw
台大區網
Web Server
IP:10.1.1.2

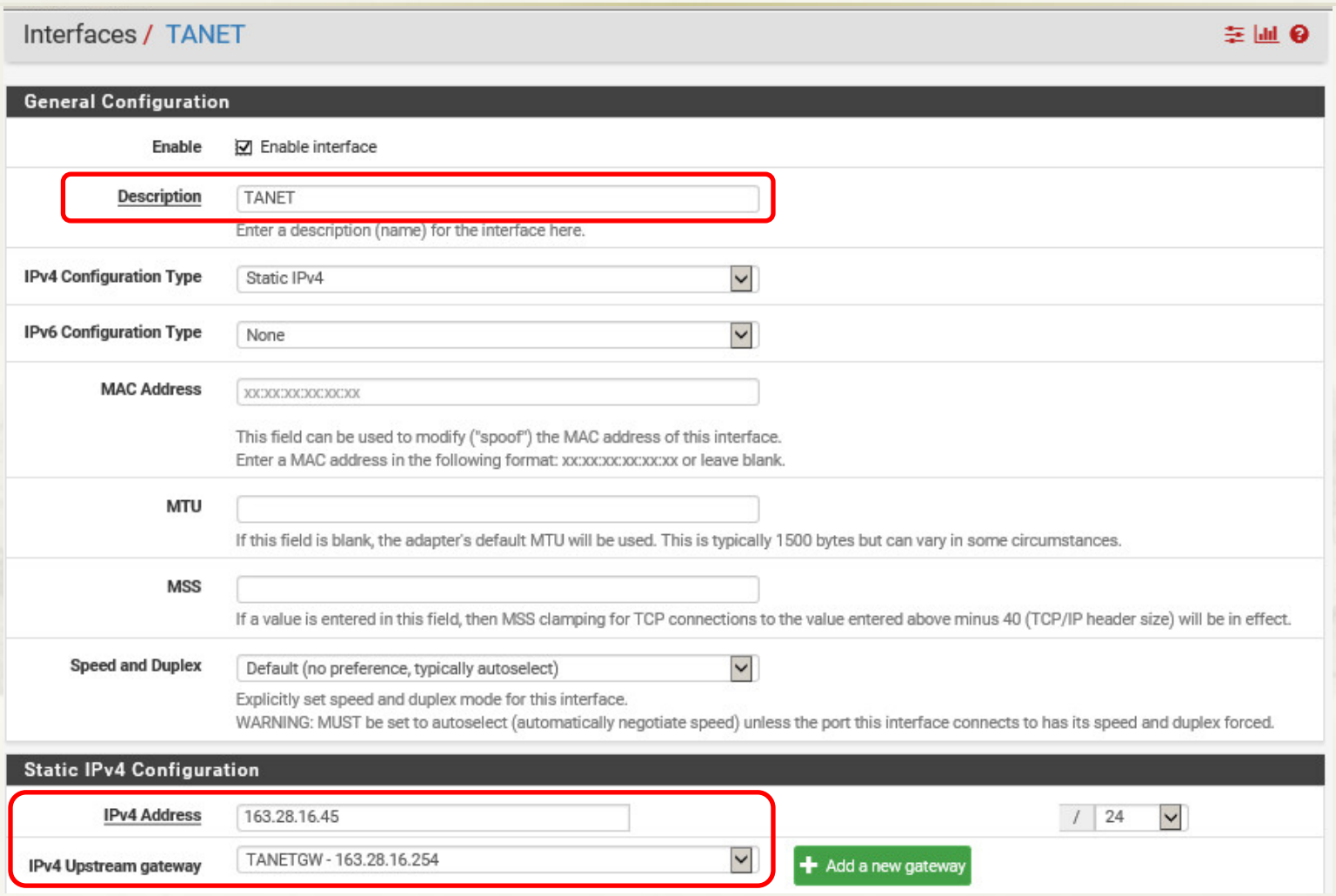
NAT & Multi-WAN



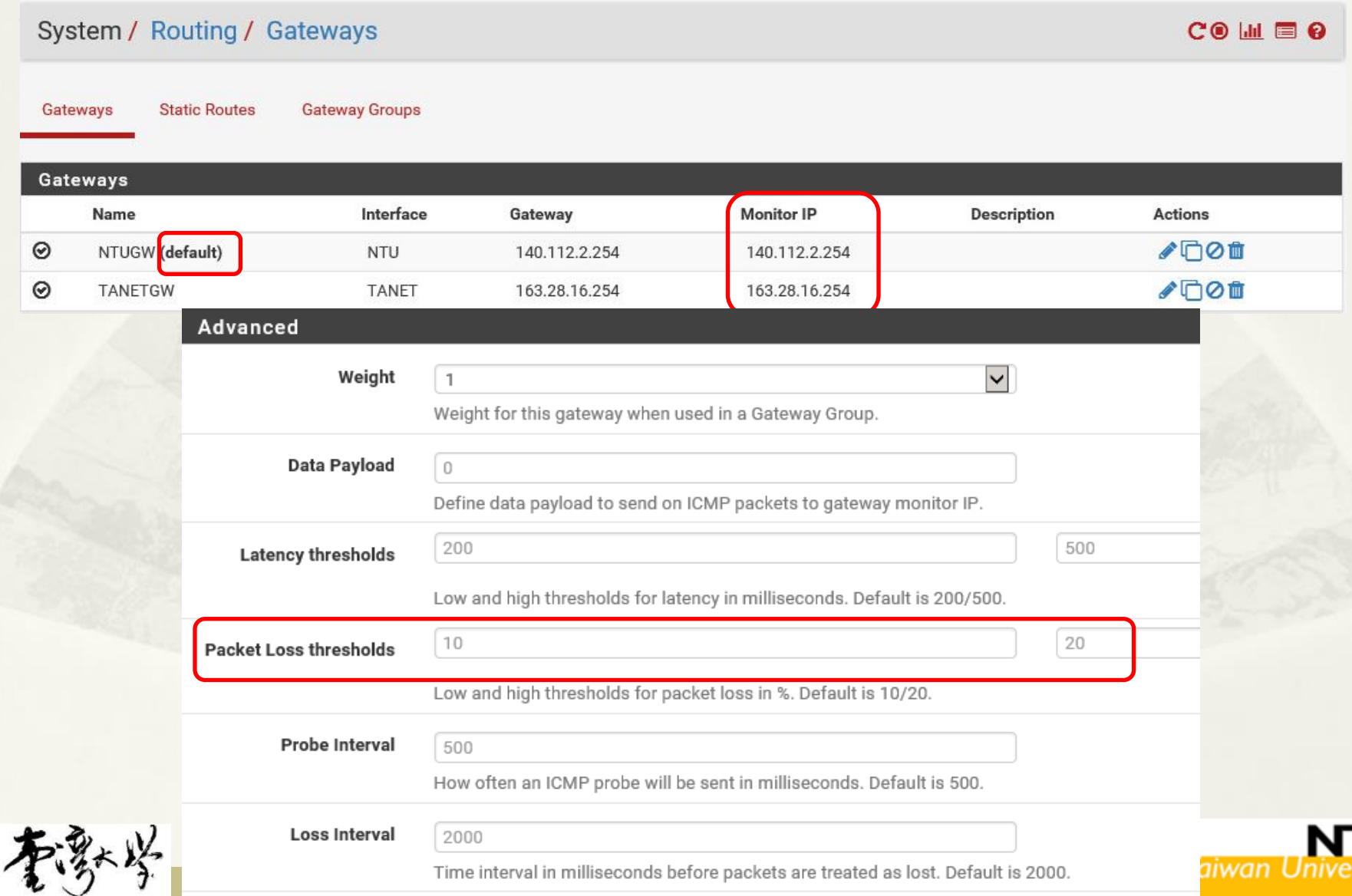
Interfaces > NTU



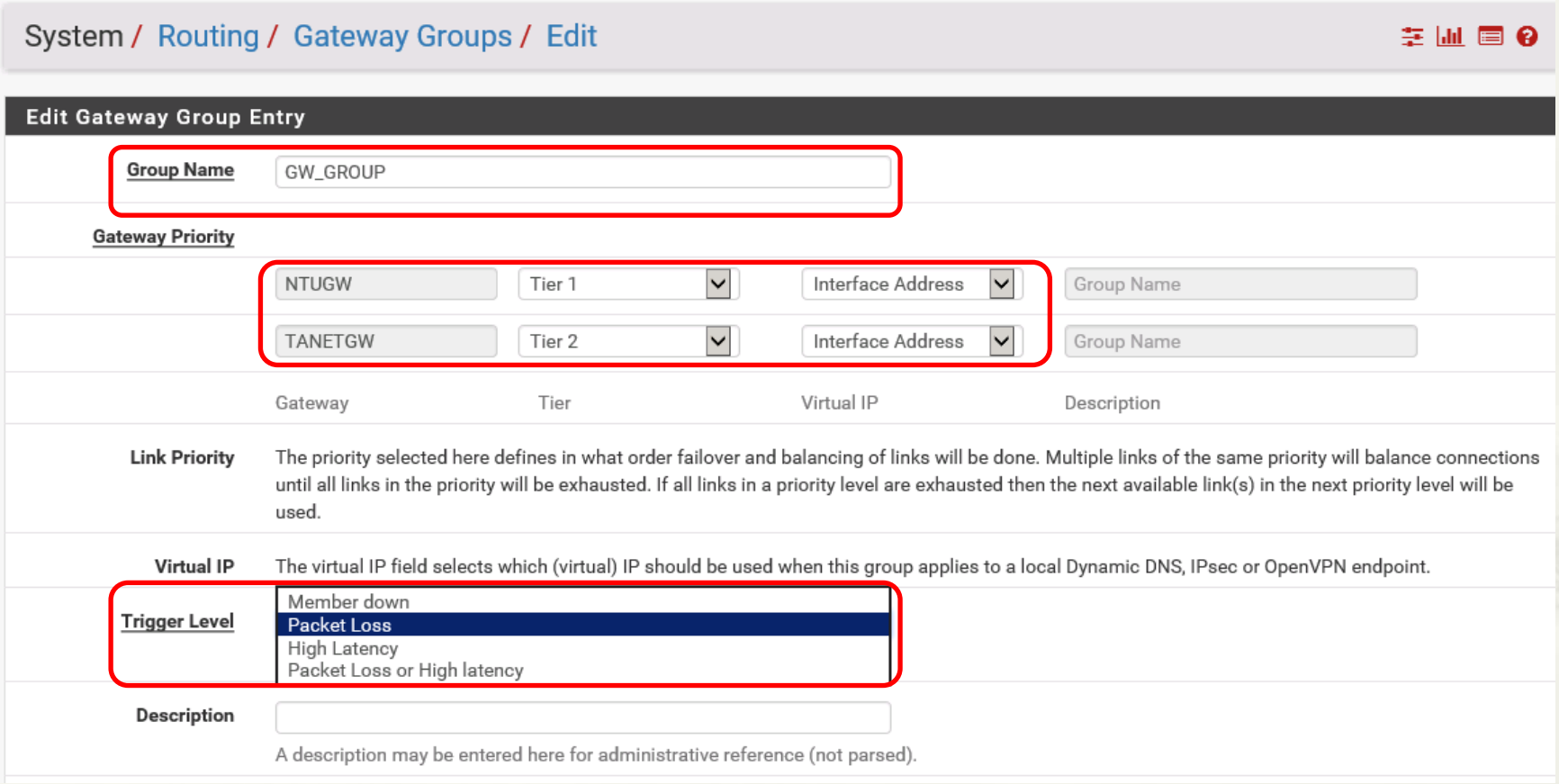
Interfaces > TANET



System > Routing > Gateways

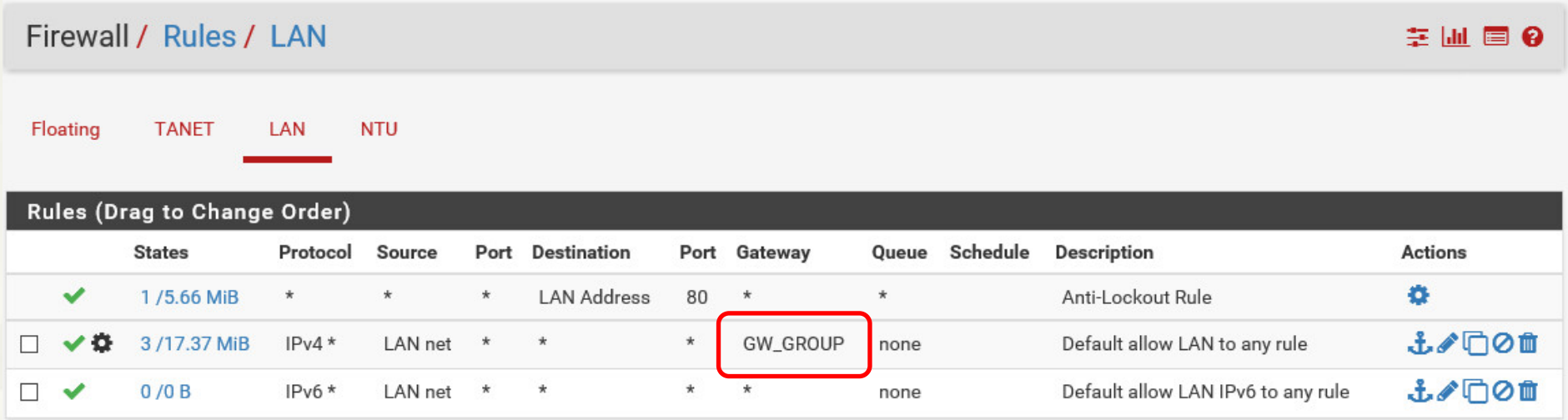


System > Routing > Gateway Groups

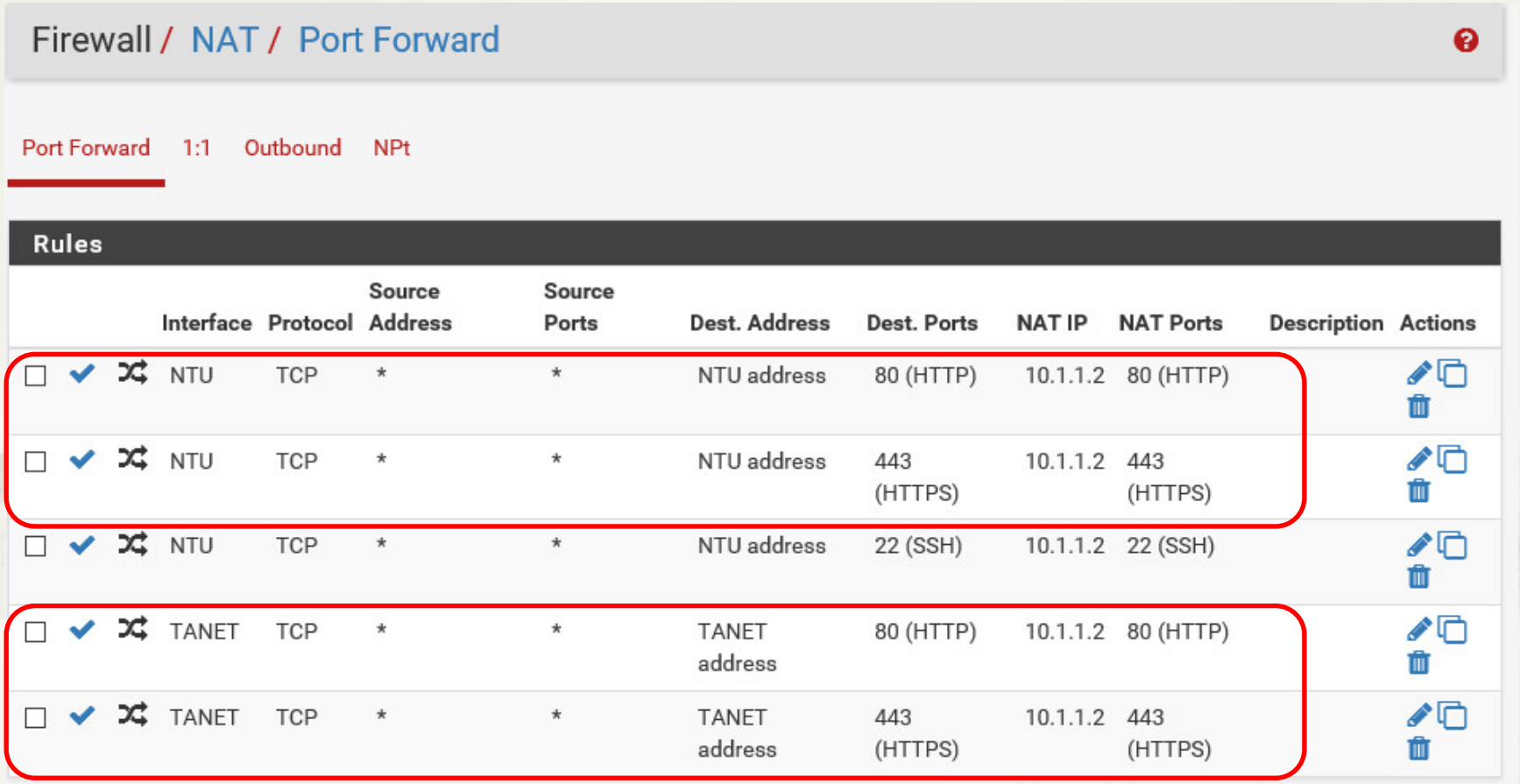


Firewall > Rules > LAN

* LAN to any 全部開放
* Gateway= GW_GROUP



Firewall > NAT > Port Forward



Status > Gateways

Status / Gateways / Gateways

Gateways | Gateway Groups

Gateways

Name	Gateway	Monitor	RTT	RTTsd	Loss	Status
NTUGW	140.112.2.254	140.112.2.254	0.785ms	0.921ms	0.0%	Online
TANETGW	163.28.16.254	163.28.16.254	0.874ms	0.823ms	0.0%	Online

Status / Gateways / Gateway Groups

Gateways | Gateway Groups

Gateway Groups

Group Name	Gateways	
	Tier 1	Tier 2
GW_GROUP	NTUGW Online	
		TANETGW Online

```
[root@tp1rc ~]# traceroute -n  168.95.1.1
traceroute to 168.95.1.1 (168.95.1.1), 30 hops max, 60 byte packets
 1  140.112.2.254  1.707 ms  1.614 ms  1.635 ms
 2  * * *
 3  140.112.0.190  1.546 ms  1.540 ms  1.556 ms
 4  140.112.0.198  2.068 ms  1.985 ms  2.027 ms
 5  211.22.226.202  2.057 ms  1.999 ms  2.219 ms
 6  220.128.12.58  8.311 ms 220.128.2.50  3.101 ms 220.128.12.54  8.583 ms
 7  220.128.1.249  1.396 ms  1.590 ms  1.591 ms
 8  210.59.204.217  1.358 ms  1.743 ms  1.544 ms
 9  220.128.32.68  1.864 ms  1.923 ms  2.079 ms
```

Status > Gateways

Status / Gateways / Gateways

Gateways | Gateway Groups

Gateways

Name	Gateway	Monitor	RTT	RTTsd	Loss	Status
NTUGW	140.112.2.254	140.112.2.254	0.641ms	0.473ms	50%	Offline
TANETGW	163.28.16.254	163.28.16.254	0.802ms	0.182ms	0.0%	Online

Status / Gateways / Gateway Groups

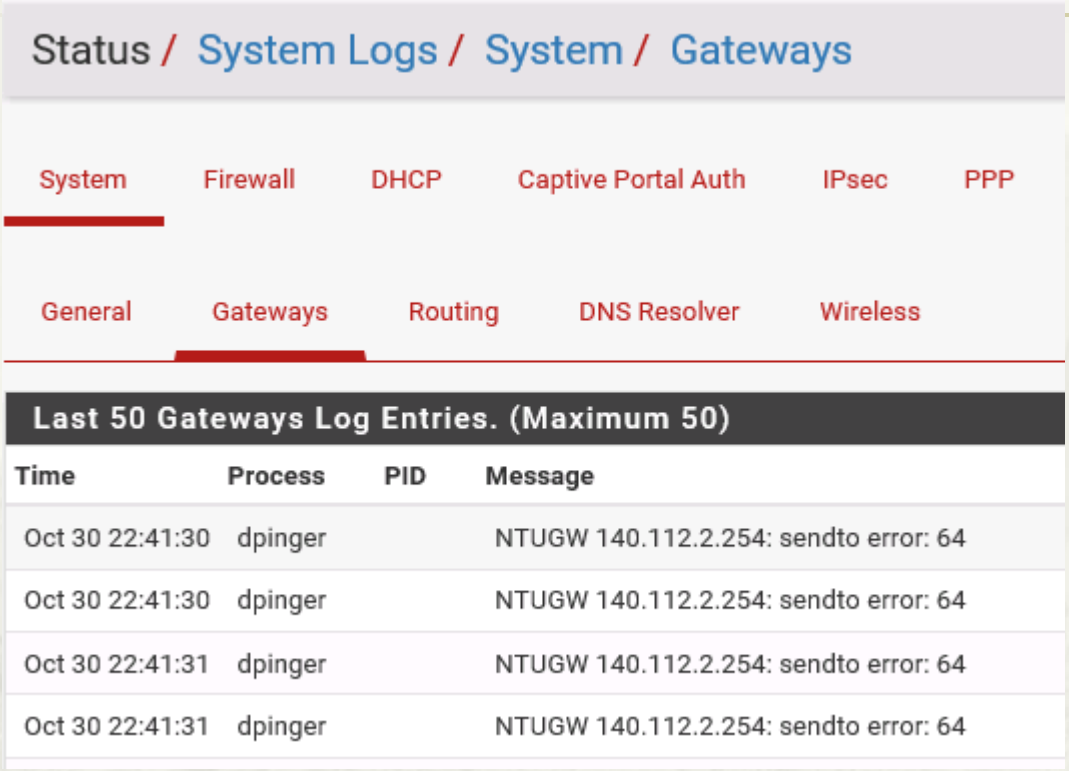
Gateways | Gateway Groups

Gateway Groups

Group Name	Gateways	
	Tier 1	Tier 2
GW_GROUP	NTUGW Offline	
		TANETGW Online

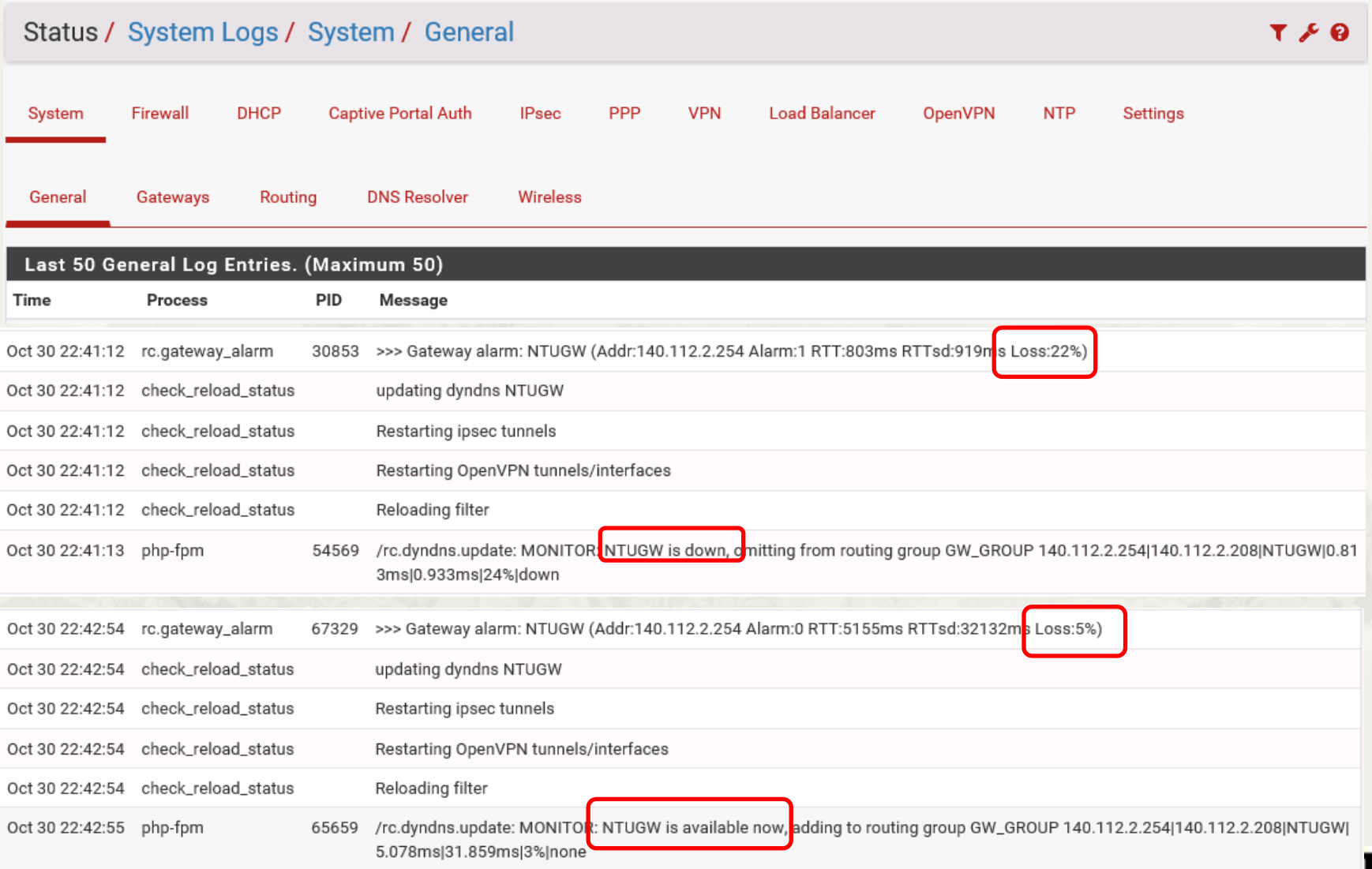
```
[root@tp1rc ~]# traceroute -n  168.95.1.1
traceroute to 168.95.1.1 (168.95.1.1), 30 hops max, 60 byte packets
 1  163.28.16.254  1.181 ms  1.271 ms  1.266 ms
 2  211.20.43.62  0.719 ms 211.22.226.186  0.653 ms 211.20.43.62  0.632 ms
 3  210.59.204.225  0.609 ms  0.725 ms  0.603 ms
 4  220.128.32.68  0.682 ms  0.697 ms  0.661 ms
```

Status > System Logs > System > Gateways

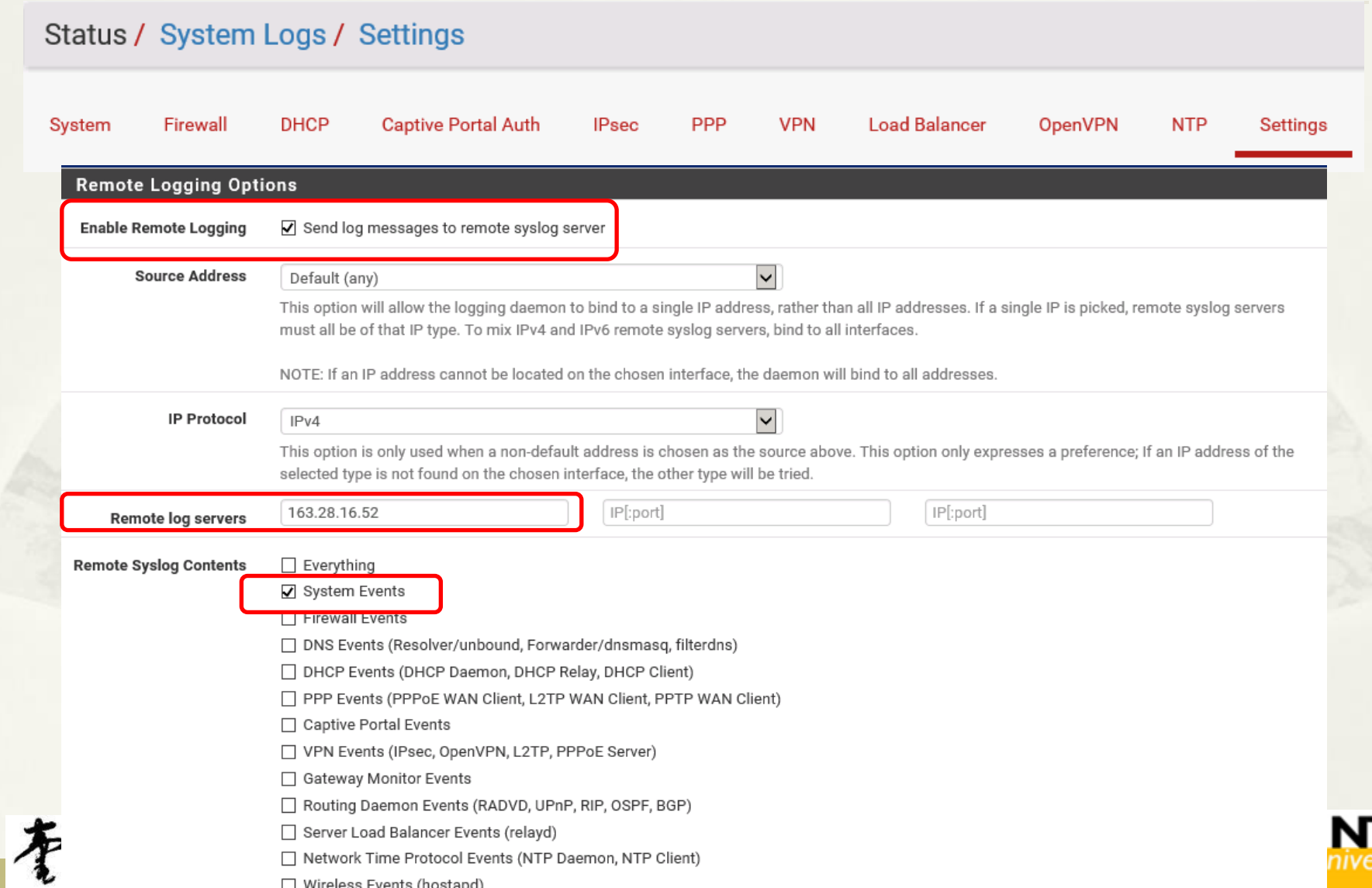


Oct 30 22:41:55	dpinger	NTUGW 140.112.2.254: Alarm latency 13226299us stddev 24088921us loss 89%
Oct 30 22:42:10	dpinger	NTUGW 140.112.2.254: Alarm latency 15719us stddev 60230us loss 74%
Oct 30 22:42:54	dpinger	NTUGW 140.112.2.254: Clear latency 5155us stddev 32132us loss 5%

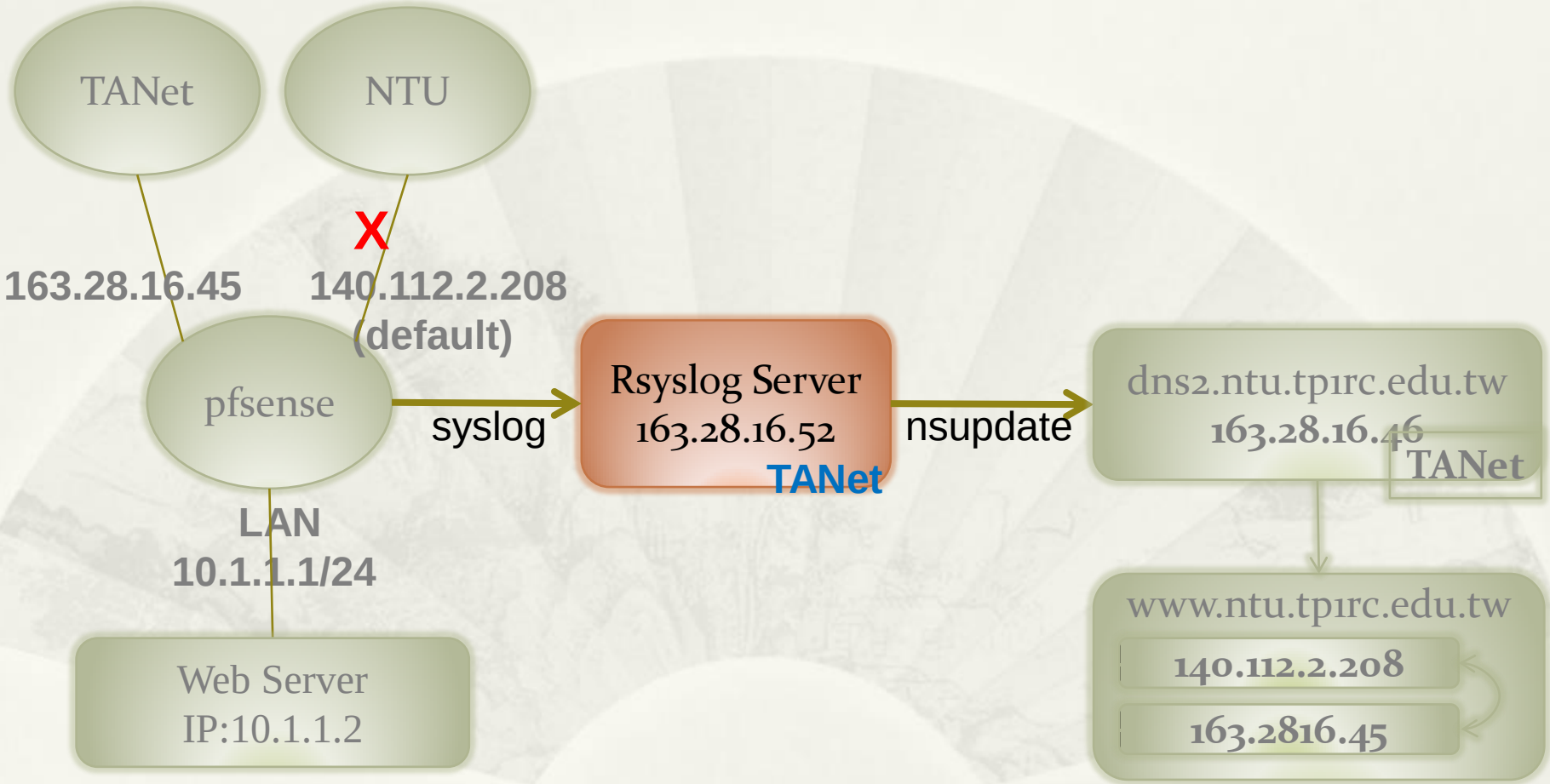
Status > System Logs > System > General



Status > System Logs > Settings



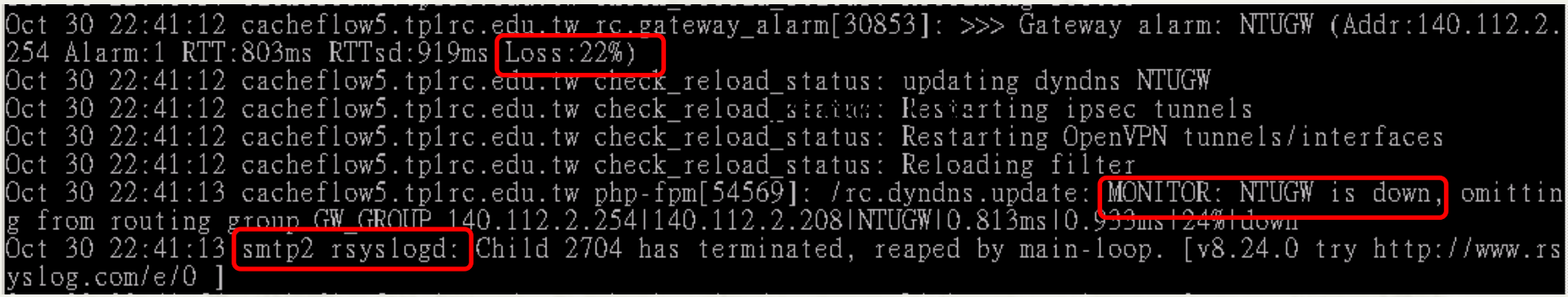
NAT & Multi-WAN

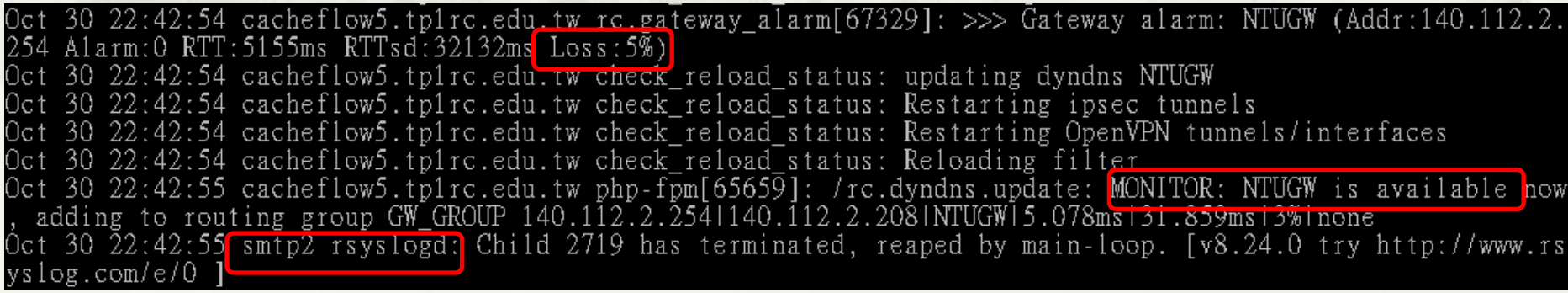


* /etc/rsyslog.conf

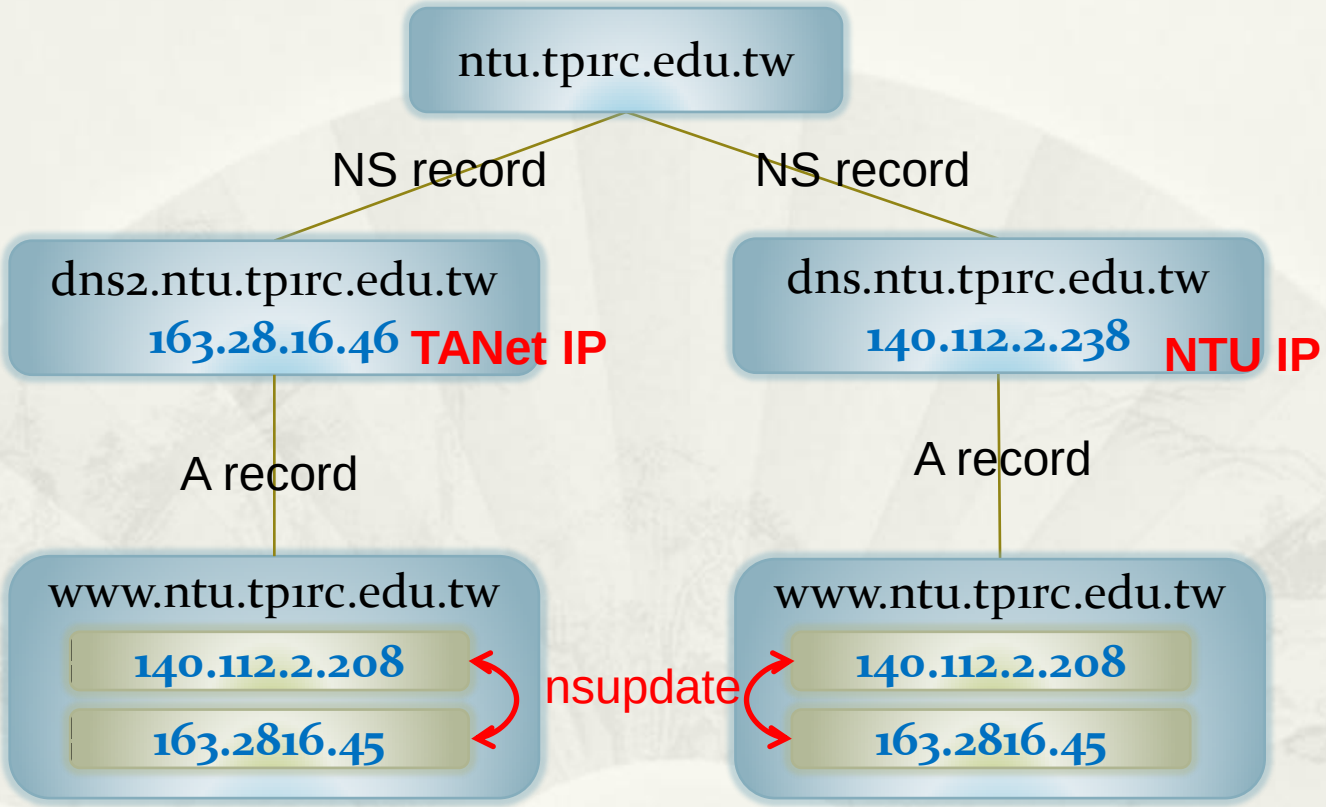
```
# Provides UDP syslog reception
$ModLoad imudp
$UDPServerRun 514


module(load="omprog")
if ($msg contains "NTUGW is down") then {
  action(type="omprog" binary="/usr/bin/nsupdate -v
/root/nsupdate_tp1rc.txt")
} else if ($msg contains "NTUGW is available now") then {
  action(type="omprog" binary="/usr/bin/nsupdate -v
/root/nsupdate_ntu.txt")}
```


Oct 30 22:41:12 cacheflow5.tp1rc.edu.tw rc.gateway_alarm[30853]: >>> Gateway alarm: NTUGW (Addr:140.112.2.
254 Alarm:1 RTT:803ms RTTsd:919ms Loss:22%)
Oct 30 22:41:12 cacheflow5.tp1rc.edu.tw check_reload_status: updating dyndns NTUGW
Oct 30 22:41:12 cacheflow5.tp1rc.edu.tw check_reload_status: Restarting ipsec tunnels
Oct 30 22:41:12 cacheflow5.tp1rc.edu.tw check_reload_status: Restarting OpenVPN tunnels/interfaces
Oct 30 22:41:12 cacheflow5.tp1rc.edu.tw check_reload_status: Reloading filter
Oct 30 22:41:13 cacheflow5.tp1rc.edu.tw php-fpm[54569]: /rc.dyndns.update: MONITOR: NTUGW is down, omittin
g from routing group GW_GROUP 140.112.2.254|140.112.2.208|NTUGW|0.813ms|0.933ms|24%|down
Oct 30 22:41:13 smtp2 rsyslogd: Child 2704 has terminated, reaped by main-loop. [v8.24.0 try http://www.rs
yslog.com/e/0]


Oct 30 22:42:54 cacheflow5.tp1rc.edu.tw rc.gateway_alarm[67329]: >>> Gateway alarm: NTUGW (Addr:140.112.2.
254 Alarm:0 RTT:5155ms RTTsd:32132ms Loss:5%)
Oct 30 22:42:54 cacheflow5.tp1rc.edu.tw check_reload_status: updating dyndns NTUGW
Oct 30 22:42:54 cacheflow5.tp1rc.edu.tw check_reload_status: Restarting ipsec tunnels
Oct 30 22:42:54 cacheflow5.tp1rc.edu.tw check_reload_status: Restarting OpenVPN tunnels/interfaces
Oct 30 22:42:54 cacheflow5.tp1rc.edu.tw check_reload_status: Reloading filter
Oct 30 22:42:55 cacheflow5.tp1rc.edu.tw php-fpm[65659]: /rc.dyndns.update: MONITOR: NTUGW is available now
, adding to routing group GW_GROUP 140.112.2.254|140.112.2.208|NTUGW|5.078ms|31.859ms|3%|none
Oct 30 22:42:55 smtp2 rsyslogd: Child 2719 has terminated, reaped by main-loop. [v8.24.0 try http://www.rs
yslog.com/e/0]

NAT & Multi-WAN



Zone file for tp1rc.edu.tw

- Named record

```
$ORIGIN      tp1rc.edu.tw.
@     IN     SOA    dns.ntu.edu.tw. madeline.ntu.edu.tw (
...
ntu           IN     NS     dns.ntu.tp1rc.edu.tw.
              IN     NS     dns2.ntu.tp1rc.edu.tw.
dns.ntu       IN     A      140.112.2.238
dns2.ntu      IN     A      163.28.16.46
```

```
> set type=ns
> ntu.tp1rc.edu.tw
伺服器:  dns.ntu.edu.tw
Address:  140.112.254.4

未經授權的回答:
ntu.tp1rc.edu.tw        nameserver = dns.ntu.tp1rc.edu.tw
ntu.tp1rc.edu.tw        nameserver = dns2.ntu.tp1rc.edu.tw
```

Config file for ntu.tp1rc.edu.tw

```
zone "ntu.tp1rc.edu.tw"{
        type master;
        file "named.ntu";
        allow-update { 163.28.16.0/24; };
};
```

Zone file for ntu.tp1rc.edu.tw

```
$TTL 120          ; 2 minutes
@   IN SOA  dns.ntu.tp1rc.edu.tw. root.mail.ntu.tp1rc.edu.tw.
(           2017102101          ; serial
            1D          ; refresh
            1H          ; retry
            1W          ; expire
            3H )        ; minimum
            IN      NS      dns.ntu.tp1rc.edu.tw.
            IN      NS      dns2.ntu.tp1rc.edu.tw.
dns         IN      A       140.112.2.238
dns2        IN      A       163.28.16.46
www         IN      A       140.112.2.208
```

nsupdate

* nsupdate -v /root/nsupdate_tp1rc.txt
* nsupdate_tp1rc.txt

```
server 140.112.2.238
update delete www.ntu.tp1rc.edu.tw A
update add www.ntu.tp1rc.edu.tw 120 A 163.28.16.45
send
server 163.28.16.46
update delete www.ntu.tp1rc.edu.tw A
update add www.ntu.tp1rc.edu.tw 120 A 163.28.16.45
send
```

nsupdate

* nsupdate -v /root/nsupdate_ntu.txt
* nsupdate_ntu.txt

```
server 140.112.2.238
update delete www.ntu.tp1rc.edu.tw A
update add www.ntu.tp1rc.edu.tw 120 A 140.112.2.208
send
server 163.28.16.46
update delete www.ntu.tp1rc.edu.tw A
update add www.ntu.tp1rc.edu.tw 120 A 140.112.2.208
send
```


C:\Windows\System32>ping www.ntu.tp1rc.edu.tw
Ping www.ntu.tp1rc.edu.tw [140.112.2.208] (使用 32 位元組的資料):
Control-C
^C
C:\Windows\System32>ping www.ntu.tp1rc.edu.tw
Ping www.ntu.tp1rc.edu.tw [163.28.16.45] (使用 32 位元組的資料):

* index.html

```
<html>
<head>
  <META HTTP-EQUIV="Refresh" CONTENT="0;
url=http://www.ntu.tp1rc.edu.tw/index.php">
</head>
</html>
```

簡報完畢
謝謝