



How To Guide:

WAN Load Balancing with DNS Routing

Introduction

In a multiple WAN network, link load balancer or firewall usually decides the outbound path for a destined domain with the IP address from its first DNS lookup.

Issue

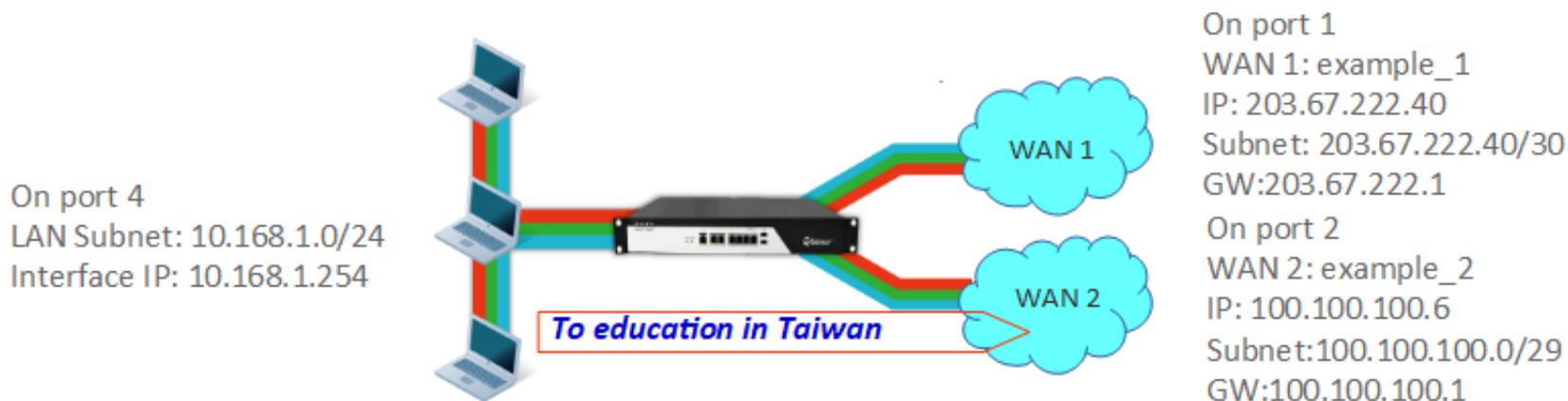
When new requests to the same destined domains arise, they will take the same path. However some domains, especially large organizations, have multiple IP addresses and randomly change their IP resolution from time to time. Therefore, path decisions based on destined FQDN cannot work accurately as new sessions will possibly not match the policy-based routing rules.

Solution: WAN Load Balancing with DNS Routing

With the advanced mechanism of DNS routing, the Q-Balancer is able to precisely route traffic to the Internet via a particular gateway based on the destined domain names. Whenever a request to a destined domain arises, the solution will dynamically check its updated DNS database and then decides the path.

Diagram Example

The following is a simplified version of network diagram:



Requirements

In this case, we are requested to:

1. direct all traffic to the Internet via WAN 1 and WAN 2 at the same time, while LAN users can still access the Internet when/if one of the WAN links is down or saturated.
2. direct traffic to all education organizations in Taiwan via WAN 2, and via WAN 1 in case WAN 2 is down.

Follow the steps below to configure the appliance:

1. *WAN > ADD > Static*
2. *LAN > ADD*
3. *Object > Host > ADD > FQDN*
4. *Object > DPS > ADD > Weight Round Robin by Connection*
5. *Object > DPS > ADD > Priority*
6. *Policy Routing > ADD*

WAN > ADD > Static

Name

example_1

Port

Port 1



Path Monitoring

dns_ipv4

Subnet

203.67.222.40/30

IP

203.67.222.40

Gateway

203.67.222.1

OK

CANCEL

WAN > ADD > Static

Name

example_2

Port

Port 2

Path Monitoring

dns_ipv4

Subnet

100.100.100.0/29

IP

100.100.100.6

Gateway

100.100.100.1

Down/Up Speed

15.3 / 2.9 Mbps

OK

CANCEL

WAN

WAN configuration is done as follows:

WAN

ADD ▾

DELETE

Status	Type	↕	Name	↕	Port	↕	Interface	↕	Subnet	↕	IP	↕	Gateway	↕
✓	Static		example_1		Port 1		eth0_6		203.67.222.40/30		203.67.222.40		203.67.222.1	
✓	Static		example_2		Port 2		eth1_2		100.100.100.0/29		100.100.100.6		100.100.100.1	

LAN > ADD

Name

LAN_10.168.1.0

Related ISP

Auto



Port

Port 4



Subnet

10.168.1.0/24

Route

Interface Gateway

IP

10.168.1.254

DHCP

Enabled



OK

CANCEL

LAN

LAN configuration is done as follows:

LAN

ADD

DELETE

Name	↑↓	Port	↑↓	Interface	↑↓	Subnet	↑↓	Route	↑↓	IP	↑↓
LAN_10.168.1.0		Port 4		eth3_3		10.168.1.0/24		Interface		10.168.1.254	

Object > Host > ADD > FQDN

FQDN

Name

all_edu_tw

Addresses

*.edu.tw



OK

CANCEL

Object > Host

Host Object configuration is done as follows:

Hosts

ADD ▼		DELETE					
<input type="checkbox"/>	Edit	Type	↑↓	Name	↑↓	Addresses	Other
<input type="checkbox"/>		FQDN		all_edu_tw		*.edu.tw	▼
<input type="checkbox"/>		IPv4		LAN_10.168.1.0/24		10.168.1.0/24	▼

Objects > DPS > ADD > WRR by Connection

This is for LAN users to access the Internet via both WAN links.

Name

WRRbyConn_DPS

Backup Pool

None

Algorithm

Weighted Round Robin by Connection

Links

example_1, example_2

Weight

example_1

example_2

1

1

Dragging for weight adjustment

Proxy

OK

CANCEL

Object > DPS > ADD > Priority

Sending traffic destined for all.edu.tw via WAN 2, and via WAN 1 if/when WAN 2 is down.

Name

Priority_DPS

Backup Pool

None

Algorithm

Priority

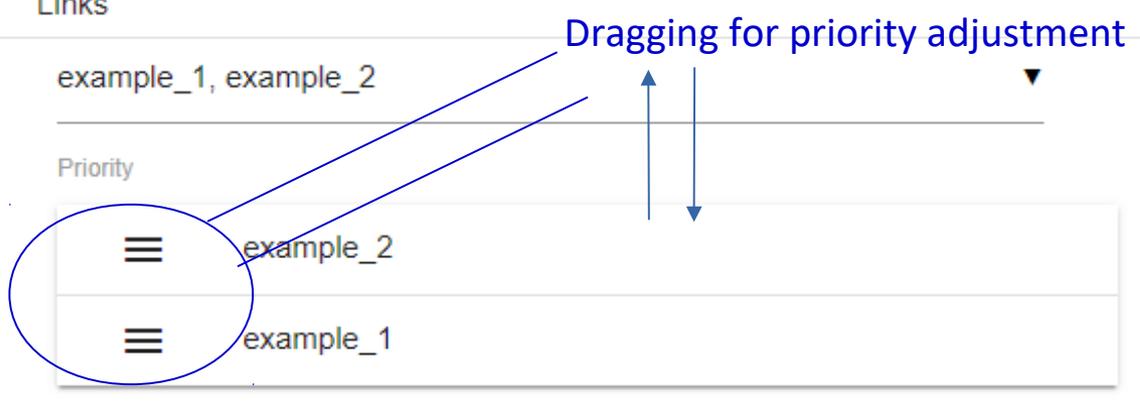
Links

example_1, example_2

Priority

☰	example_2
☰	example_1

Dragging for priority adjustment



Proxy

OK

CANCEL

Dynamic Path Selection (DPS)

DPS configuration is done as follows:

Dynamic Path Selection

<input type="checkbox"/>	ADD	DELETE						
<input type="checkbox"/>	Edit	Name	↑↓ Backup Pool	↑↓ Algorithm	↑↓	Information		Other
<input type="checkbox"/>		Priority_DPS	-	Priority		example_2	example_1	▼
<input type="checkbox"/>		WRRbyConn_DPS	-	WRRC		example_1 1	example_2 1	▼

Policy Routing > ADD

This is for all traffic to the Internet.

Priority 7

Highest
 Lowest

Source
 LAN_10.168.1.0/24 +

Destination
 Any +

Direction
 Both
 Request
 Reply

Services
 Any
 Services
 Applications

Schedules
 Always
 Custom

Choose your option +

Pool
 WRRbyConn_DPS ▼

NAT
 Smart
 Manual
 No

Policy Routing > ADD

This is for the traffic destined for all.edu.tw.

Priority 7

Highest Lowest

Source
LAN_10.168.1.0/24 +

Destination +

all_edu_tw

Direction

Both Request Reply

Services

Any Services Applications

Schedules

Always Custom

Choose your option +

Pool
Priority_DPS ▼

NAT

Smart Manual No

OK CANCEL

Policy Routing

Policy Routing

ADD DELETE Search

Priority	Source	Destination	Services	Schedules	Pool	NAT
7	LAN_10.168.1.0/24	Any	Any	Always	WRRbyConn_DPS	Smart
7	LAN_10.168.1.0/24	all_edu_tw	Any	Always	Priority_DPS	Smart

Policy Routing for traffic destined for all.edu.tw is done.

Done!

1. The LAN hosts of 10.168.1.0/24 should be able to access the Internet via both WAN links concurrently.

2. Check if traffic destined for all.edu.tw goes to the Internet via WAN 2.

```
C:\WINDOWS\system32\cmd.exe

C:\Users\installation>ping 8.8.8.8

Pinging 8.8.8.8 with 32 bytes of data:
Reply from 8.8.8.8: bytes=32 time=24ms TTL=56
Reply from 8.8.8.8: bytes=32 time=23ms TTL=56
Reply from 8.8.8.8: bytes=32 time=23ms TTL=56
Reply from 8.8.8.8: bytes=32 time=23ms TTL=56

Ping statistics for 8.8.8.8:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 23ms, Maximum = 24ms, Average = 23ms

C:\Users\installation>
```