



最貼近客戶需求的
伺服器負載平衡與容錯設備

ServerDiff

本文件版本 v5.0.2
適用軟體版本 v5.0.x

ServerDiff 型號與規格

| Model | SGU1800 | | | SGU4200 | | |
|-------------|---------|----------|----------|---------|----------|----------|
| License | Lite | Standard | Advanced | Lite | Standard | Advanced |
| 機身尺寸 | 1U | | | 1U | | |
| 10G fiber | 0 | 0 | 0 | 2 | 2 | 2 |
| Giga fiber | 0 | 0 | 0 | 4 | 4 | 4 |
| Giga copper | 8 | 8 | 8 | 8 | 8 | 8 |
| 同時連線數 | 0.5M | 1M | 2M | 2M | 4M | 8M |
| 頻寬實測值(bps) | 400M | 800M | 1.5G | 1.2G | 2.4G | 4.8G |
| 群組數 | 2 | 10 | 50 | 10 | 100 | 200 |
| 每群組伺服器數 | 4 | 10 | 50 | 10 | 100 | 200 |
| 伺服器總數 | 4 | 50 | 200 | 50 | 500 | 1000 |

| Model | SGU1800 | | | SGU4200 | | |
|----------------------|----------|----------|----------|----------|----------|----------|
| License | Lite | Standard | Advanced | Lite | Standard | Advanced |
| LAN bypass | Yes | | | Yes | | |
| 雙機備援 | Yes | | | Yes | | |
| AP LB in bridge mode | Yes | Yes | Yes | Yes | Yes | Yes |
| AP LB in router mode | No | Yes | Yes | No | Yes | Yes |
| Advanced LB modes | No | No | Yes | No | No | Yes |
| GSLB | Optional | | | Optional | | |

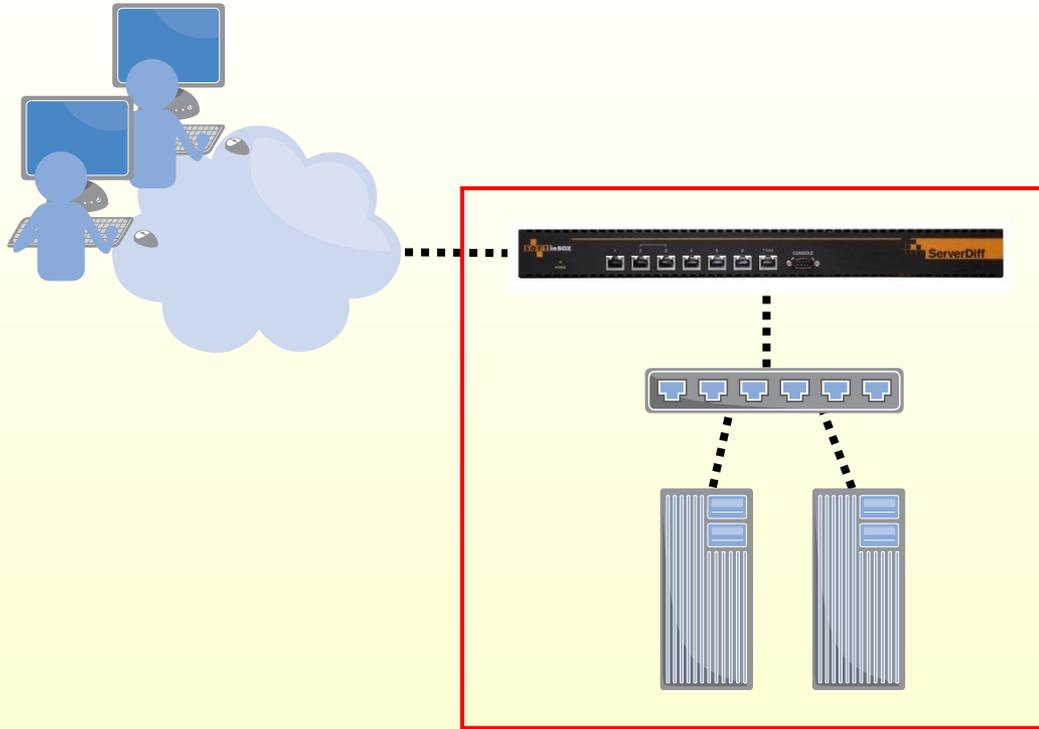
Main Functions

- Load Balancing and Fault Tolerance.
- DNS proxy

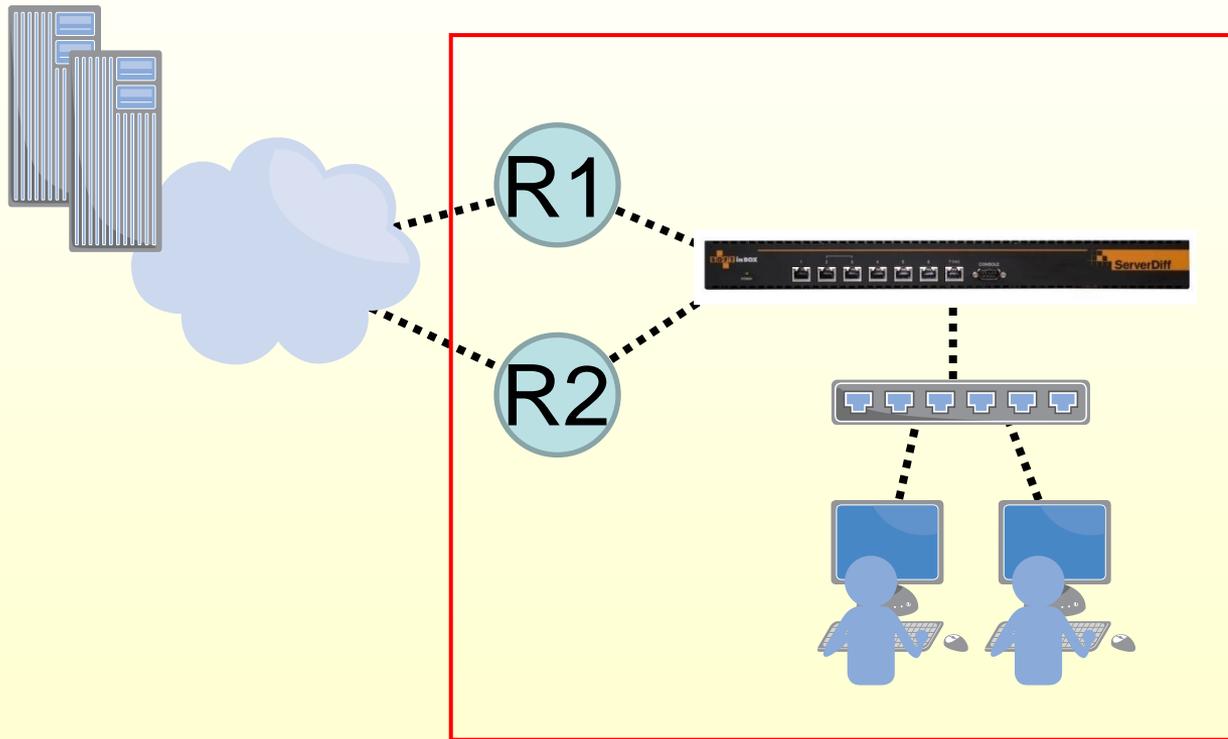
Application Examples

- 1. Server Load Balancing
- 2. Outbound WAN Load Balancing
- 3. Inbound WAN Load Balancing
- 4. Global Server Load Balancing

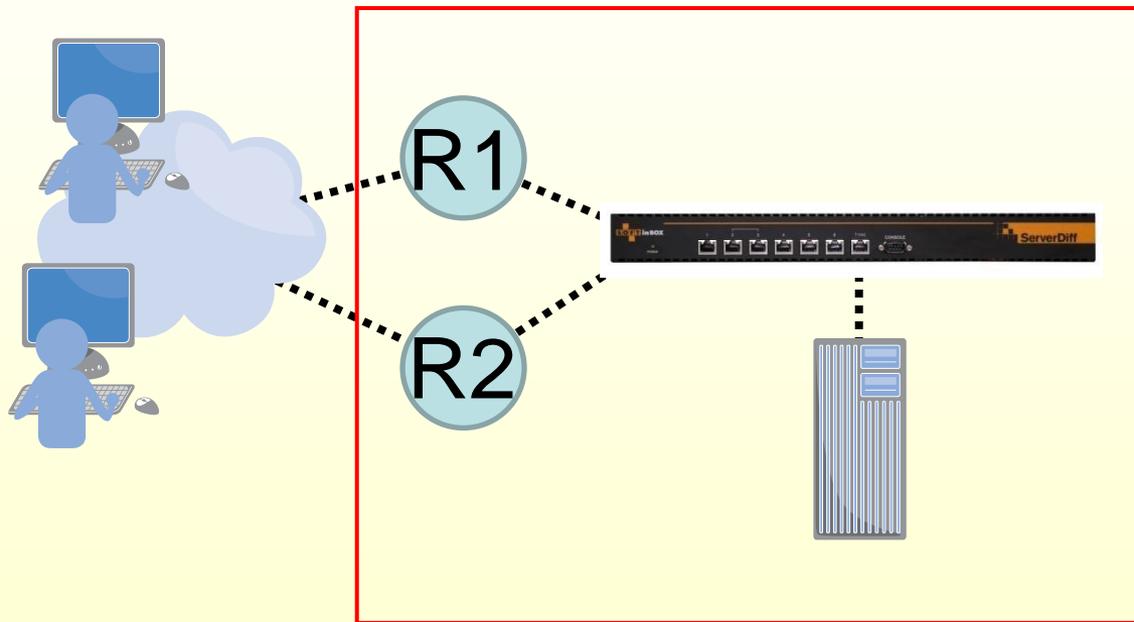
1. LB on Servers (Server LB)



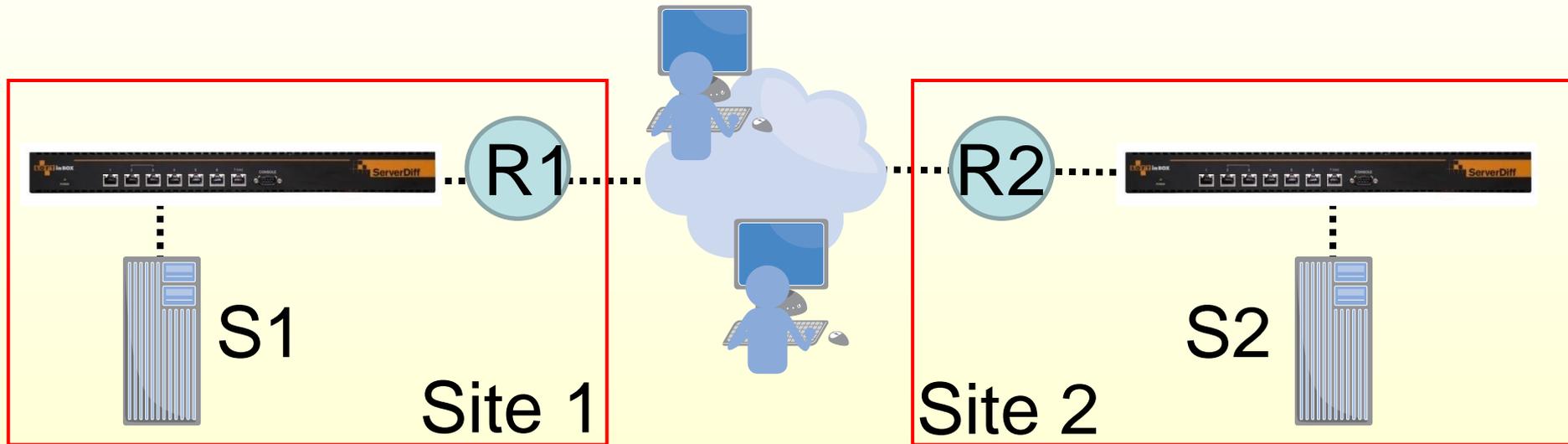
2. LB on WAN Routers (Outbound WAN LB)



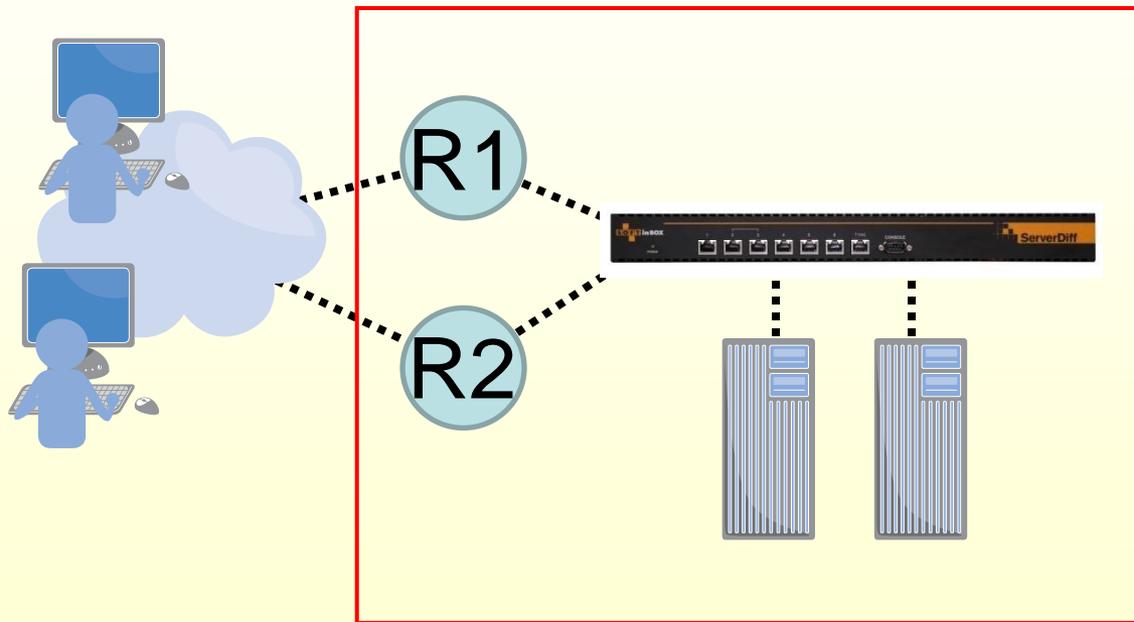
3. DNS Proxy on WANs (Inbound WAN LB)



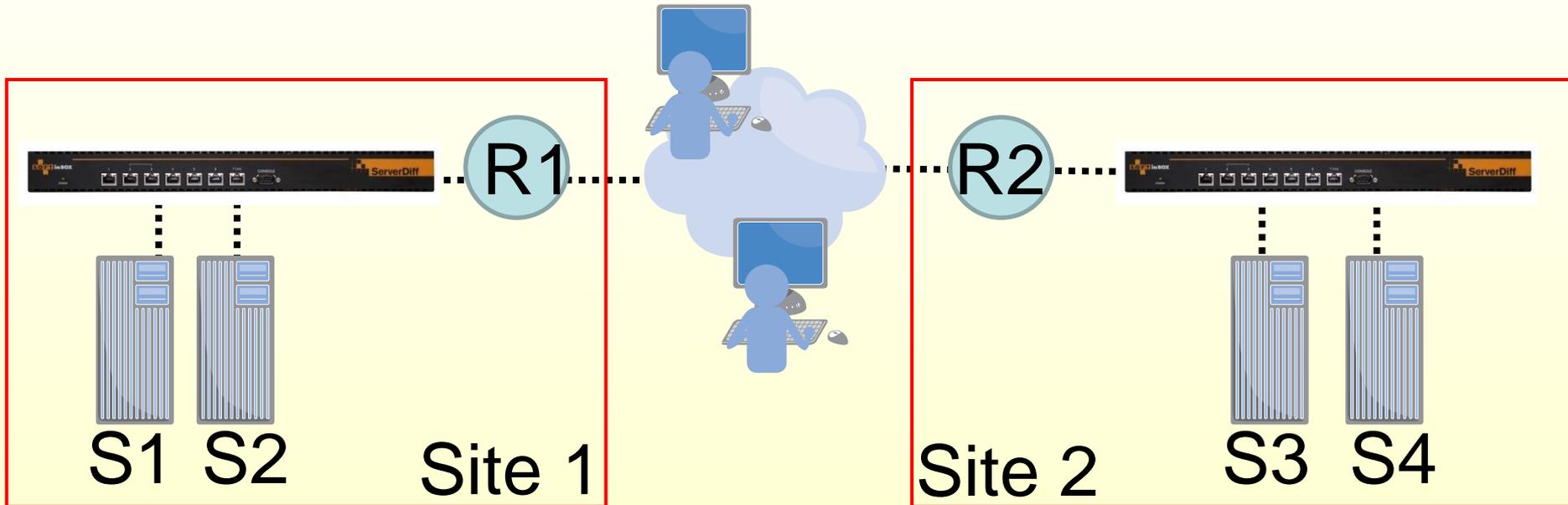
4. DNS Proxy on Sites (GSLB)



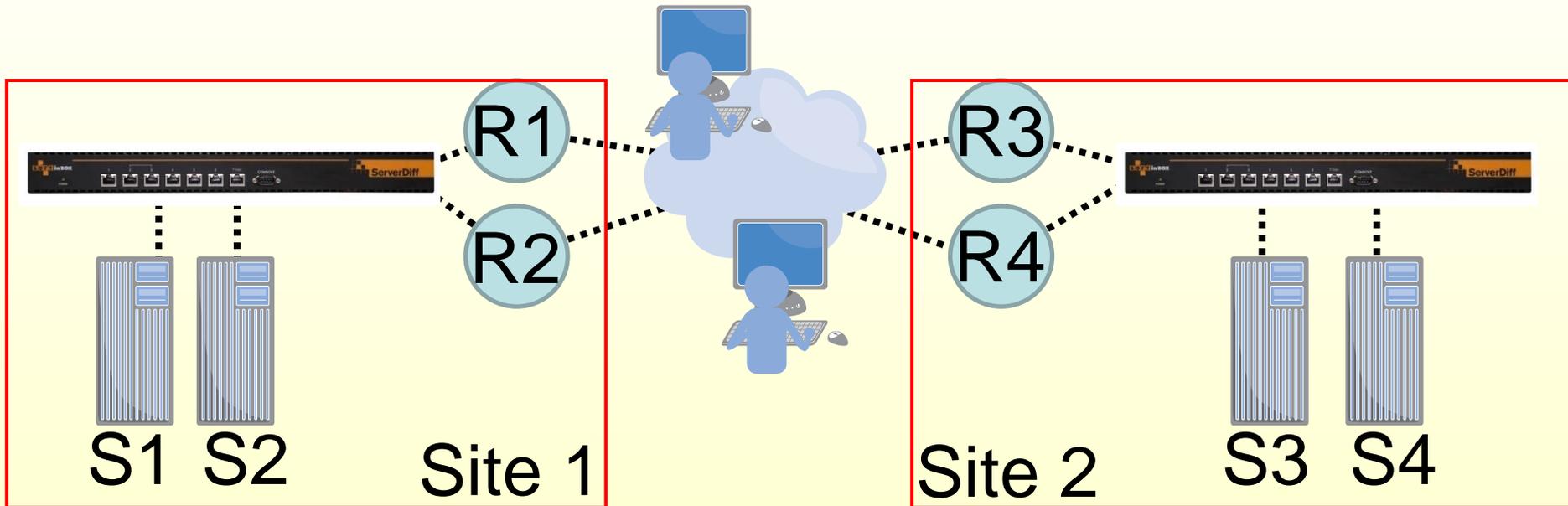
5 = 1 + 3 (Inbound WAN LB + SLB)



6 = 1 + 4 (GSLB + SLB)



7 = 1 + 3 + 4 (GSLB + In. WAN LB + SLB)



連上使用者介面

UI (User Interface)

■ Web UI

- <https://192.168.1.99/>
- <http://192.168.1.99/>

■ CLI

- telnet 192.168.1.99
- ssh 192.168.1.99
- RS232 console (115200, 8, N, 1, N)

預設值

- Management IP : 192.168.1.99/24
- RS232 console is always on
- https and ssh are on
- http and telnet are off
- Username: admin
- Password: admin

回復出廠設定

- 開機時長按F.D.按鈕
- Status燈號快閃時放開按鈕

緊急帳號

- Username: emergency
- Password: emergency
- RS232 console port , 開機後30秒
- 常用的CLI 命令:
 - get all 列出現在的設定
 - save config from default to system 還原出廠設定

WEB UI Login



Username

Password

Login

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選單

UI簡介

選擇語言

語言：

Last update: Sat Jun 15 18:35:44 2013 User: admin [\[登出\]](#)

使用者名稱

登出

主頁面

SO inBOX

監看

- 系統資訊
- 伺服器狀態
- 系統記錄
- 乙太網路資訊

設定

- 乙太網路
- IP位址
- 路由與DNS
- 過濾器
- 伺服器負載平衡
- 時間
- 管理介面及帳號
- SNMP
- 送出記錄

工具

- 網路診斷
- 系統設定管理
- 系統

橋接器 b1 IP

| 編號 | IP位址/子網路遮罩 | 新增 |
|----|--|--------------------|
| 1 | 192.168.1.99/24 修改 刪除 下移 新增 | |
| 2 | 192.168.1.100/24 修改 刪除 上移 新增 | |

橋接器 b1 IPv6

| 編號 | IPv6/mask | 新增 |
|----|--|--------------------|
| 1 | ::ff/64 修改 刪除 下移 新增 | |
| 2 | ::100/64 修改 刪除 上移 新增 | |

Bridge b1 MAC aging time

300 sec

[修改](#)

Bridge b1 spanning tree

Off

[修改](#)

IP watch

編號 IP 橋接器 [新增](#)

IP6 watch

編號 IP6 橋接器 [新增](#)

變更系統設定

主頁面

管理用IP

IP位址： 192.168.1.99

子網路遮罩： 255.255.255.0

[修改](#)

路由設定

預設閘道： 192.168.1.1

[修改](#)

DNS伺服器

192.168.1.1

[修改](#)

虛擬IP

192.168.1.100

[修改](#)

IP位址：

子網路遮罩：

[儲存設定](#) [返回](#)

修改頁面

設定失敗。原因是：

192.168.1.999不是合法的IP位址。

IP位址：

子網路遮罩：

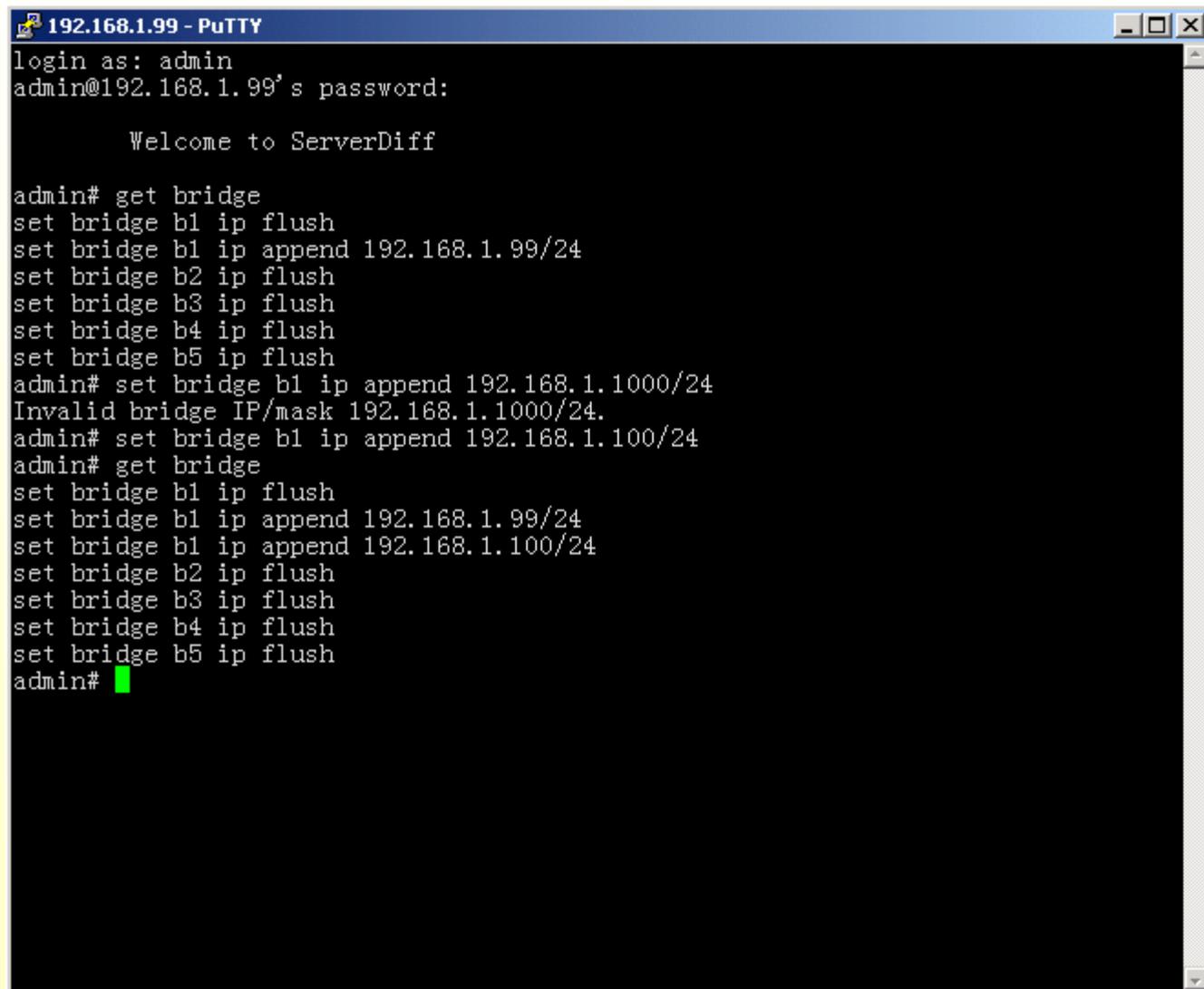
[儲存設定](#) [返回](#)

設定失敗
頁面

變更系統設定

- 有顏色的頁面用來顯示目前的設定
- 按「修改」 變更設定
- 「修改頁面」為素色
- 變更結束後請按「儲存設定」
- 有錯誤時，會出現「設定失敗頁面」，並告知原因
- 若設定正確會回到正常有顏色的頁面，表示設定已生效並儲存

CLI命令列介面



```
192.168.1.99 - PuTTY
login as: admin
admin@192.168.1.99's password:

Welcome to ServerDiff

admin# get bridge
set bridge b1 ip flush
set bridge b1 ip append 192.168.1.99/24
set bridge b2 ip flush
set bridge b3 ip flush
set bridge b4 ip flush
set bridge b5 ip flush
admin# set bridge b1 ip append 192.168.1.1000/24
Invalid bridge IP/mask 192.168.1.1000/24.
admin# set bridge b1 ip append 192.168.1.100/24
admin# get bridge
set bridge b1 ip flush
set bridge b1 ip append 192.168.1.99/24
set bridge b1 ip append 192.168.1.100/24
set bridge b2 ip flush
set bridge b3 ip flush
set bridge b4 ip flush
set bridge b5 ip flush
admin# █
```

編輯鍵

| 按鍵名稱 | 功能 |
|------------------------|---|
| Control-A | 跳到命令的最前。 |
| Control-B or LEFT | 往前（左）一個字元。 |
| Control-C | 取消命令。 |
| Control-D or DELETE | 刪除游標上的字元。 |
| Control-E | 跳到命令的最後。 |
| Control-F or RIGHT | 往後（右）一個字元。 |
| Control-H or Backspace | 刪除游標左邊的字元。 |
| Control-P or UP | 命令列介面有命令歷史區，最後執行的幾個命令會存在此區。瀏覽歷史區時，Control-P或UP可用來選取前一個命令。 |
| Control-N or DOWN | 瀏覽歷史區時，Control-N或DOWN可用來選取下一個命令。 |
| Control-R | 清除頁面。 |
| TAB | 顯示幫助。 |
| Enter | 執行命令。 |

CLI命令

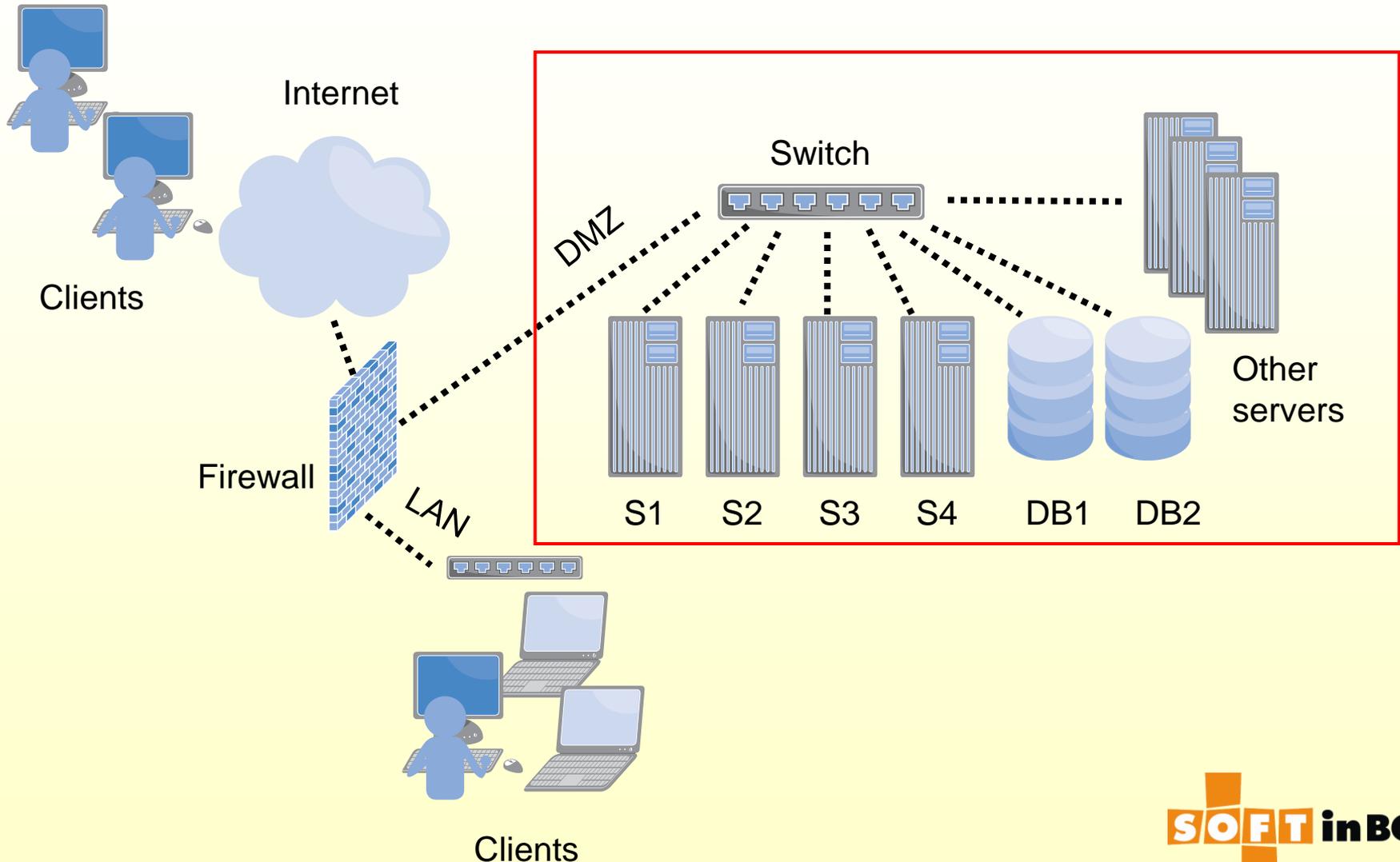
- set bridge b1 ip flush
- set brdige b1 ip append 192.168.1.99/24
- set route default 192.168.1.1
- 出現error message -->設定無效
- 未顯示任何訊息-->設定生效
- get bridge
- get all
- tool ping www.yahoo.com

IPv4與IPv6位址

- 192.168.1.32
- 192.168.1.0/24
- 192.168.1.99/24
- 192.168.1.99/255.255.255.0

- 2001:db8:1111:2222::ff
(==2001:db8:1111:2222:0:0:0:ff)
- 2001:db8:1111:2222::ff/64
- 2001:db8:1111:2222::/64

裝置 ServerDiff 之前的架構



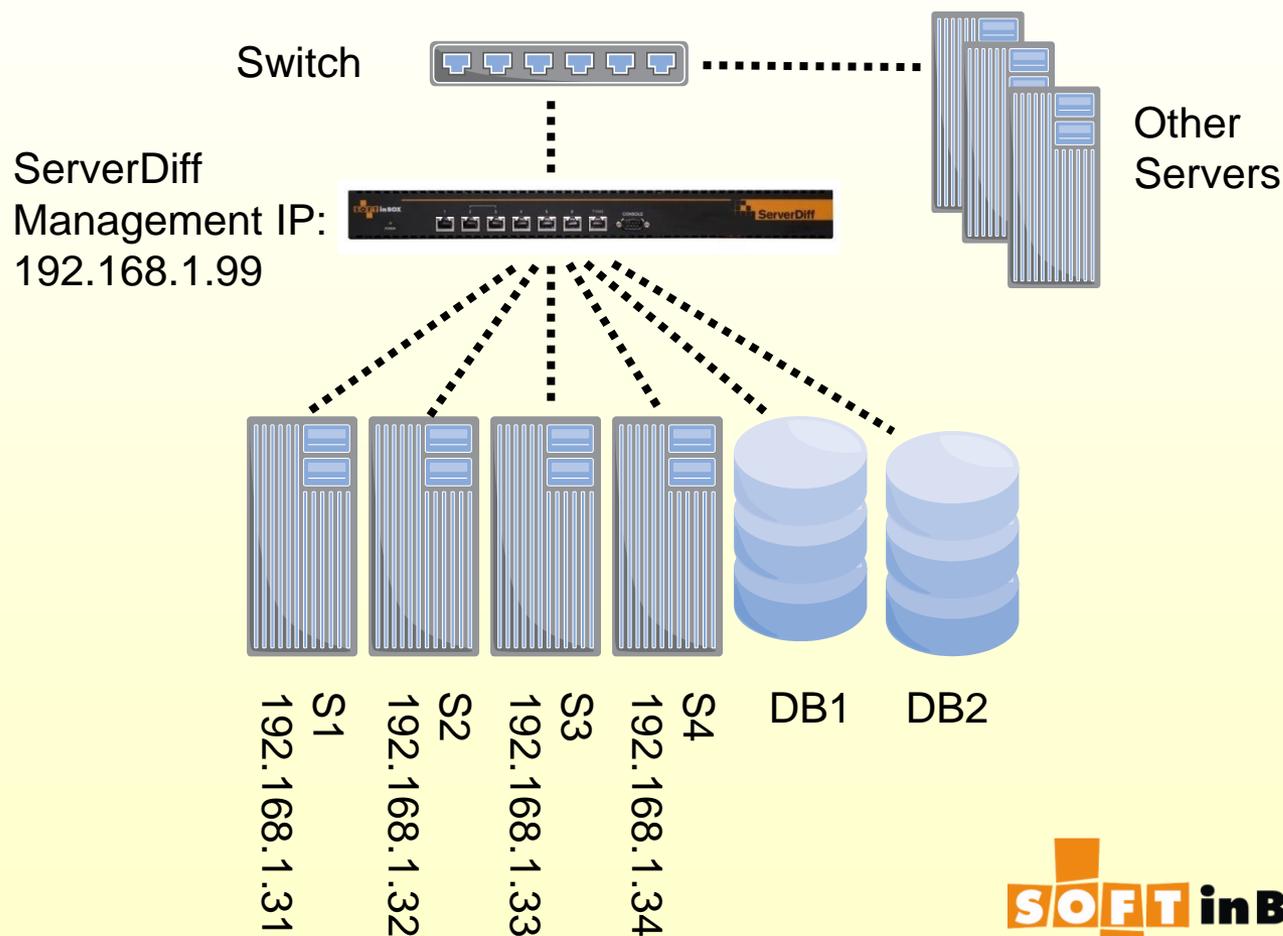
LB Modes

| | | Lite | Standard | Advanced |
|----|--------------------------------|------|----------|----------|
| 1 | AP LB: Transparent Bridge Mode | Y | Y | Y |
| 2 | AP LB: VIP Bridge Mode | Y | Y | Y |
| 3 | AP LB: One-Arm Mode | Y | Y | Y |
| 4 | AP LB: Transparent Router Mode | | Y | Y |
| 5 | AP LB: VIP Router Mode | | Y | Y |
| 6 | AP LB: FW Mode | | Y | Y |
| 7 | AP LB: Triangle Routing Mode | | | Y |
| 8 | Transparent Proxy LB | | | Y |
| 9 | Router LB | | | Y |
| 10 | Bridge LB | | | Y |
| 11 | FW LB | | | Y |
| 12 | Mirror Port LB | | | Y |

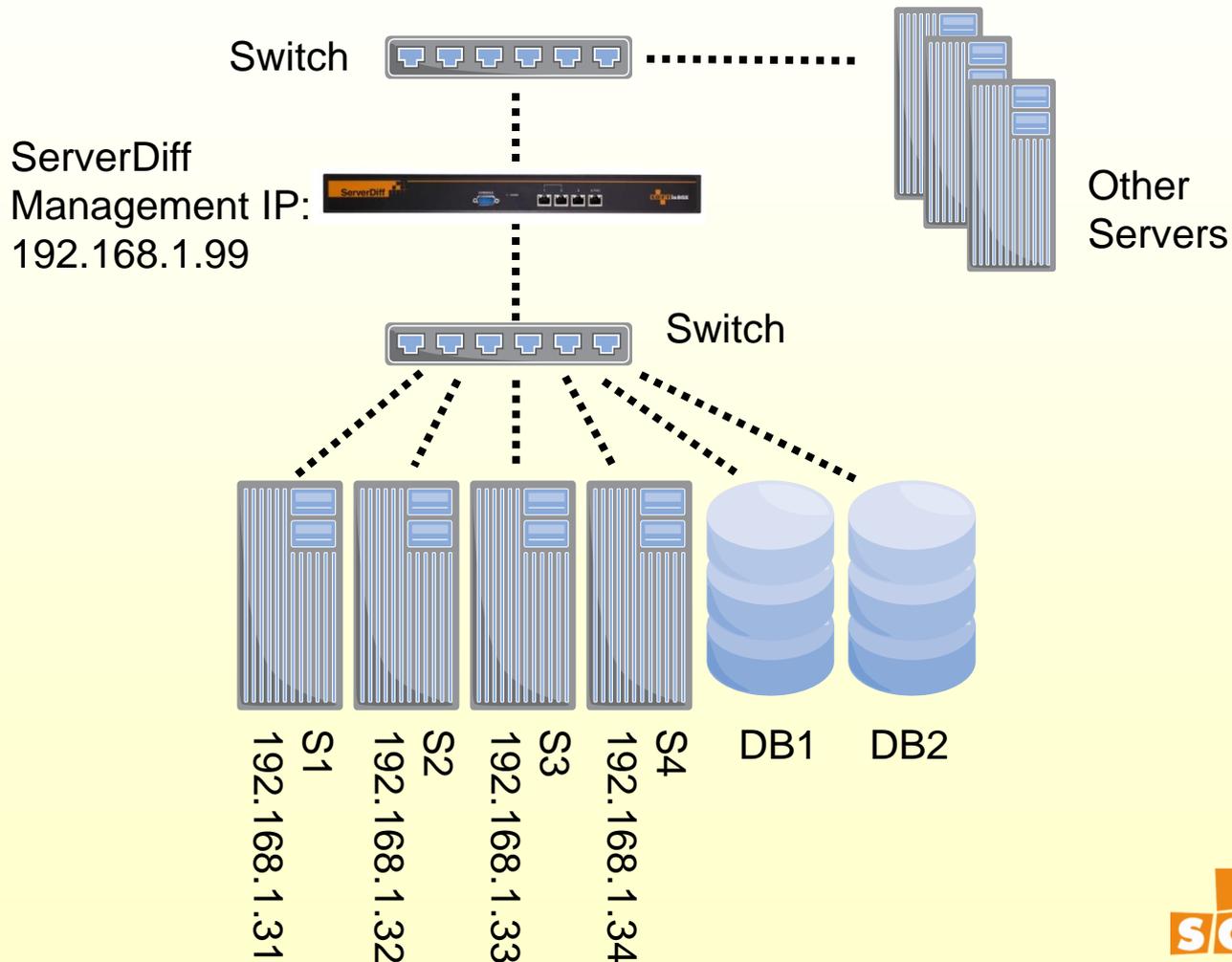
一：AP LB, Transparent Bridge Mode, 透明橋接模式

把ServerDiff當成
bridge(也就是switch)
擋在伺服器前面

ServerDiff設定完成
後，使用者照舊連上
S1—S4操作，即可
享有負載平衡與容錯
的益處



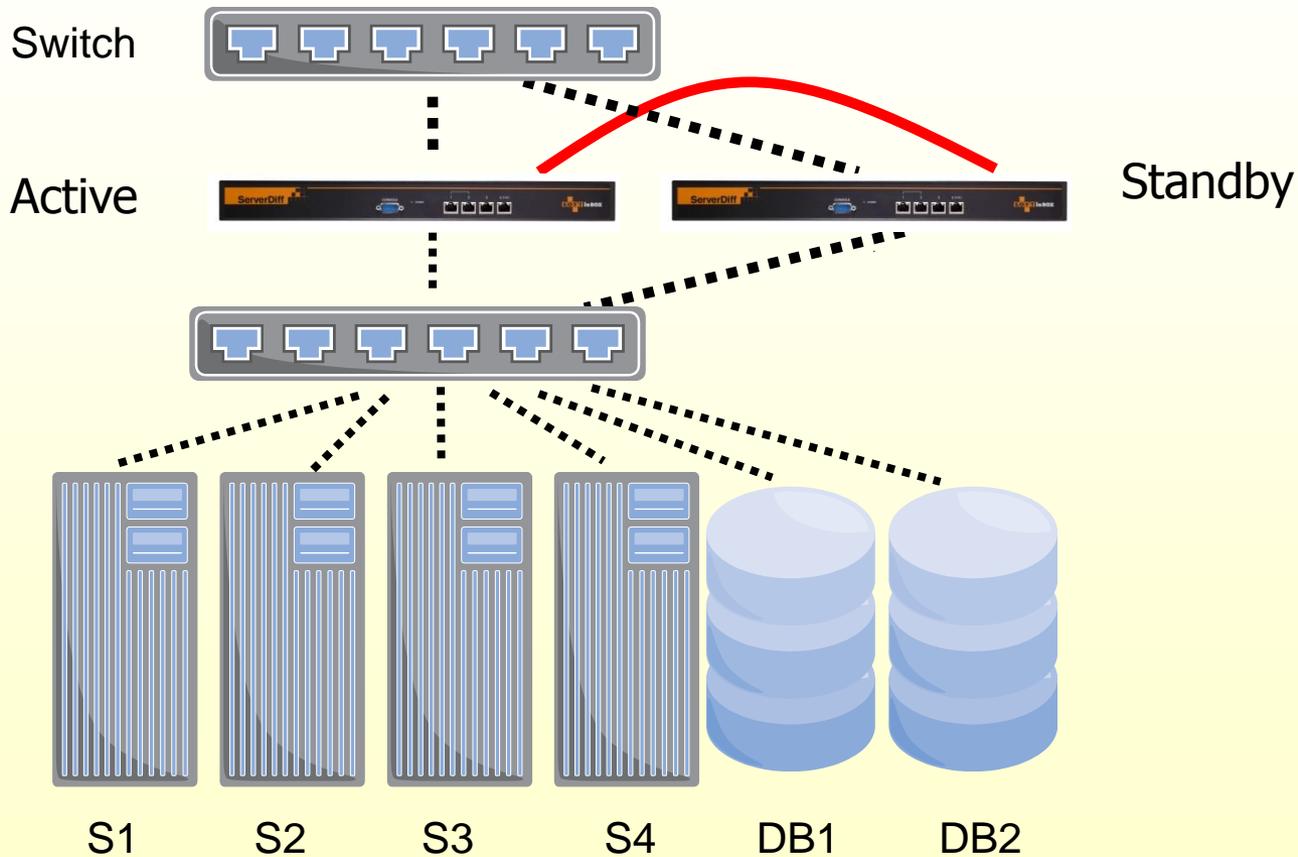
可增加集線器，自由擴充



透明橋接模式的特性

- 使用者照舊連去S1-S4，使用習慣不需改變，即可享有伺服器負載平衡與容錯的益處
- Server可看到使用者的原始IP
- 在**ServerDiff**底下有可能需要多加一個switch或是多切一個VLAN

透明橋接模式的雙機備援



透明橋接模式的設定

Ethernet speed, duplex and autonegotiation

| Ethernet | Speed, duplex and autonegotiation | |
|----------|-----------------------------------|----------------------|
| e1 | (HA) | |
| e2 | (HA) | |
| e3 | all-auto | Edit |
| e4 | all-auto | Edit |
| e5 | all-auto | Edit |
| e6 | all-auto | Edit |
| e7 | all-auto | Edit |
| e8 | all-auto | Edit |

Ethernet bonding

| Ethernet | Bonding mode | Bonding master | |
|----------|--------------|----------------|----------------------|
| e1 | (HA) | | |
| e2 | (HA) | | |
| e3 | balance-rr | --- | Edit |
| e4 | balance-rr | --- | Edit |
| e5 | balance-rr | --- | Edit |
| e6 | balance-rr | --- | Edit |
| e7 | balance-rr | --- | Edit |
| e8 | balance-rr | --- | Edit |

e3 VLAN setting

| VLAN ID | Attach to bridge | Path cost | Port priority | |
|---------|------------------|-----------|---------------|--|
| none | b1 | 100 | 32 | Edit |
| | | | | Insert Flush |

e4 VLAN setting

| VLAN ID | Attach to bridge | Path cost | Port priority | |
|---------|------------------|-----------|---------------|--|
| none | b1 | 100 | 32 | Edit |
| | | | | Insert Flush |

e5 VLAN setting

| VLAN ID | Attach to bridge | Path cost | Port priority | |
|---------|------------------|-----------|---------------|--|
| none | b1 | 100 | 32 | Edit |
| | | | | Insert Flush |

e6 VLAN setting

| VLAN ID | Attach to bridge | Path cost | Port priority | |
|---------|------------------|-----------|---------------|--|
| none | b1 | 100 | 32 | Edit |
| | | | | Insert Flush |

透明橋接模式的設定

Bridge b1 IP

| Index | IP/mask | Insert |
|-------|-----------------|--|
| 1 | 192.168.1.99/24 | Edit Delete Insert |

Bridge b1 IPv6

| Index | IPv6/mask | Insert |
|-------|---------------------|--|
| 1 | 2001:db8:1:2::ff/64 | Edit Delete Insert |

IP watch

| Index | IP | Bridge | Insert |
|-------|--------------|--------|--|
| 1 | 192.168.1.31 | b1 | Edit Delete Down Insert |
| 2 | 192.168.1.32 | b1 | Edit Delete Up Down Insert |
| 3 | 192.168.1.33 | b1 | Edit Delete Up Down Insert |
| 4 | 192.168.1.34 | b1 | Edit Delete Up Insert |

IP6 watch

| Index | IP6 | Bridge | Insert |
|-------|------------------|--------|--|
| 1 | 2001:db8:1:2::31 | b1 | Edit Delete Down Insert |
| 2 | 2001:db8:1:2::32 | b1 | Edit Delete Up Down Insert |
| 3 | 2001:db8:1:2::33 | b1 | Edit Delete Up Down Insert |
| 4 | 2001:db8:1:2::34 | b1 | Edit Delete Up Insert |

Static routes

| Index | Destination subnet | Gateway | Insert |
|-------|--------------------|---------|------------------------|
|-------|--------------------|---------|------------------------|

Default route

192.168.1.1

[Edit](#)

IPv6 static routes

| Index | Destination subnet | Gateway | Insert |
|-------|--------------------|---------|------------------------|
|-------|--------------------|---------|------------------------|

IPv6 default route

2001:db8:1:2::1

[Edit](#)

DNS servers

8.8.8.8

[Edit](#)

透明橋接模式的設定

Parameters

Enabled or disabled: Enabled

Group name: Transparent_Bridge

Virtual IP: 192.168.1.31

Virtual IP6: 2001:db8:1:2::31

Ports: TCP80,TCP443

Load balancing algorithm: WRR

Health check method: HTTP

Health check port: TCP80

HTTP URL to check: /

HTTP text to match: 200 OK

HTTP host to check:

HTTP additional header 1:

HTTP additional header 2:

HTTP additional header 3:

Health check interval (in sec): 10

Health check counts: 1:1:0:1:1:0

Granularity: S

SD timeout (in sec): 60

SD connection limit:1000000

Log: on

SNAT IP:

SNAT IP6:

All servers down action: DROP

One server down action: CONTINUE

Server list

| Index | Server IP | Server IP6 | Weight | Connection limit | SD limit | |
|-------|--------------|------------------|--------|------------------|------------|----------------------|
| 1 | 192.168.1.31 | 2001:db8:1:2::31 | 1 | 1000000000 | 1000000000 | Edit |
| 2 | 192.168.1.32 | 2001:db8:1:2::32 | 1 | 1000000000 | 1000000000 | Edit |
| 3 | 192.168.1.33 | 2001:db8:1:2::33 | 1 | 1000000000 | 1000000000 | Edit |
| 4 | 192.168.1.34 | 2001:db8:1:2::34 | 1 | 1000000000 | 1000000000 | Edit |

Inbound filters

| Index | Label | Bridge | Source IP | Destination IP | Misc. | Log | Action | |
|-------|-------|--------|--------------|---------------------------|--------------------|-----|------------|----------------------|
| 1 | | | | 192.168.1.31-192.168.1.34 | TCP dstport=80 | on | L4SW G1 | Edit |
| 2 | | | | 192.168.1.31-192.168.1.34 | TCP dstport=443 | on | L4SW G1 | Edit |
| 3 | | | 10.10.10.123 | | | on | ACCEPT | Edit |

[Edit](#)

HA網路孔數目

- 可以設定0個，1個，或2個網路孔，當成HA網路孔
- 請在命令列下使用 (RS232, SSH, telnet)
- `tool halink 0`
- `tool halink 1 e1 all-auto`
- `tool halink 2 e1 all-auto e2 all-auto`
- 需重開機才會生效
- 二台機器需分別設定

雙機備援(HA)

- 兩台ServerDiff需同型號，同軟體版，halink設定也要一樣
- 把設定儲存下來（以防萬一）
- 先把HA線接好，才可以把備援機開機
- 主機故障，備援機會自動接手，變成新的主機
- 主機設定有改變，會自動傳給備援機
- 備援機不需額外IP

雙機備援(HA)

- 驗證：
- (1)找一台PC持續ping management IP.
- (2)主機斷電。
- (3)過一陣子備援機會自動接手，接手時間長短可以由之前的ping掉了幾個pong驗證。
- (4)如果網路線L2都順利連接&伺服器健康測試順利，那VIP也都可以順利使用。

主機備援機區分

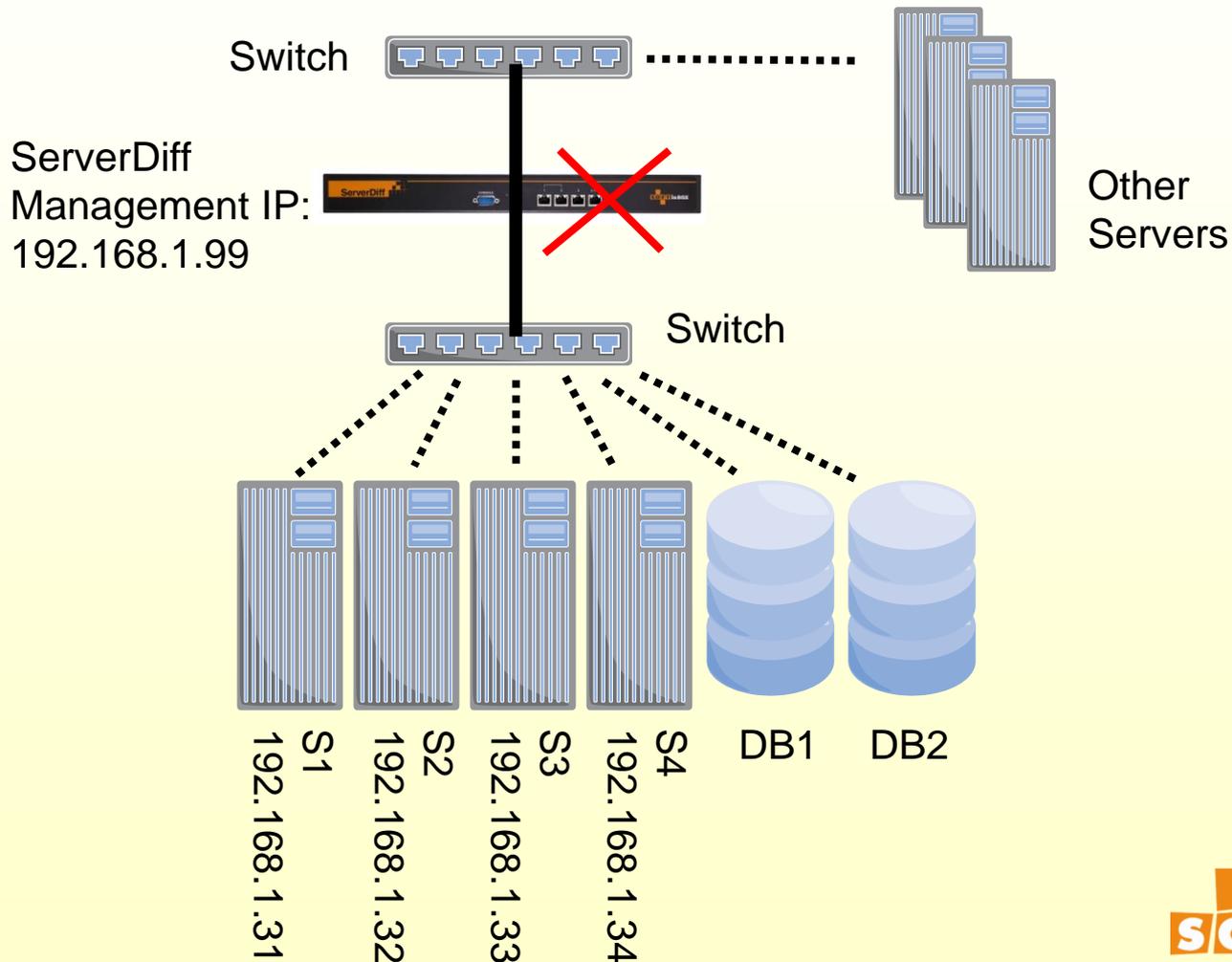
- Status燈閃爍快慢不同
- 主機閃2次 / 秒
- 備援機閃1次 / 秒

透明橋接模式可配合LAN Bypass 功能，單機使用

表示port 1 and port 2有
bypass功能，斷電時port 1
and port 2會連起來



就像是上下二台switches直接接



注意事項

- 只能配合透明橋接模式使用。
- 驗證: ServerDiff斷電。過一會應該看到上下二顆switch亮燈接起來。
- ServerDiff上下的二條網路線有可能需要普通線 / cross-over線的四種配對的其中一種，請自行嘗試。

LAN Bypass 設定

- 請在命令列下使用 (RS232, SSH, telnet)
- on啟用，off停用
- 有二組
- 二組都啟用：tool bypass on on
- 都停用：tool bypass off off
- 須重開機才會生效

HA & LAN Bypass

- 注意：LAN Bypass和HA不相容，絕對不可同時使用。
- 用HA時要長這樣
- 用LAN bypass時要長這樣

System information

```
Hostname: [REDACTED]
Model name: ServerDiff SGU4200
Serial number: [REDACTED]
License: Lite
HW version: 4.0.0
HW setup: halink=2,e1,all-auto,e2,all-auto;bypass=off,off;
SW version: [REDACTED]
Uptime: 34 min
Max load (%): 0.25xx
```

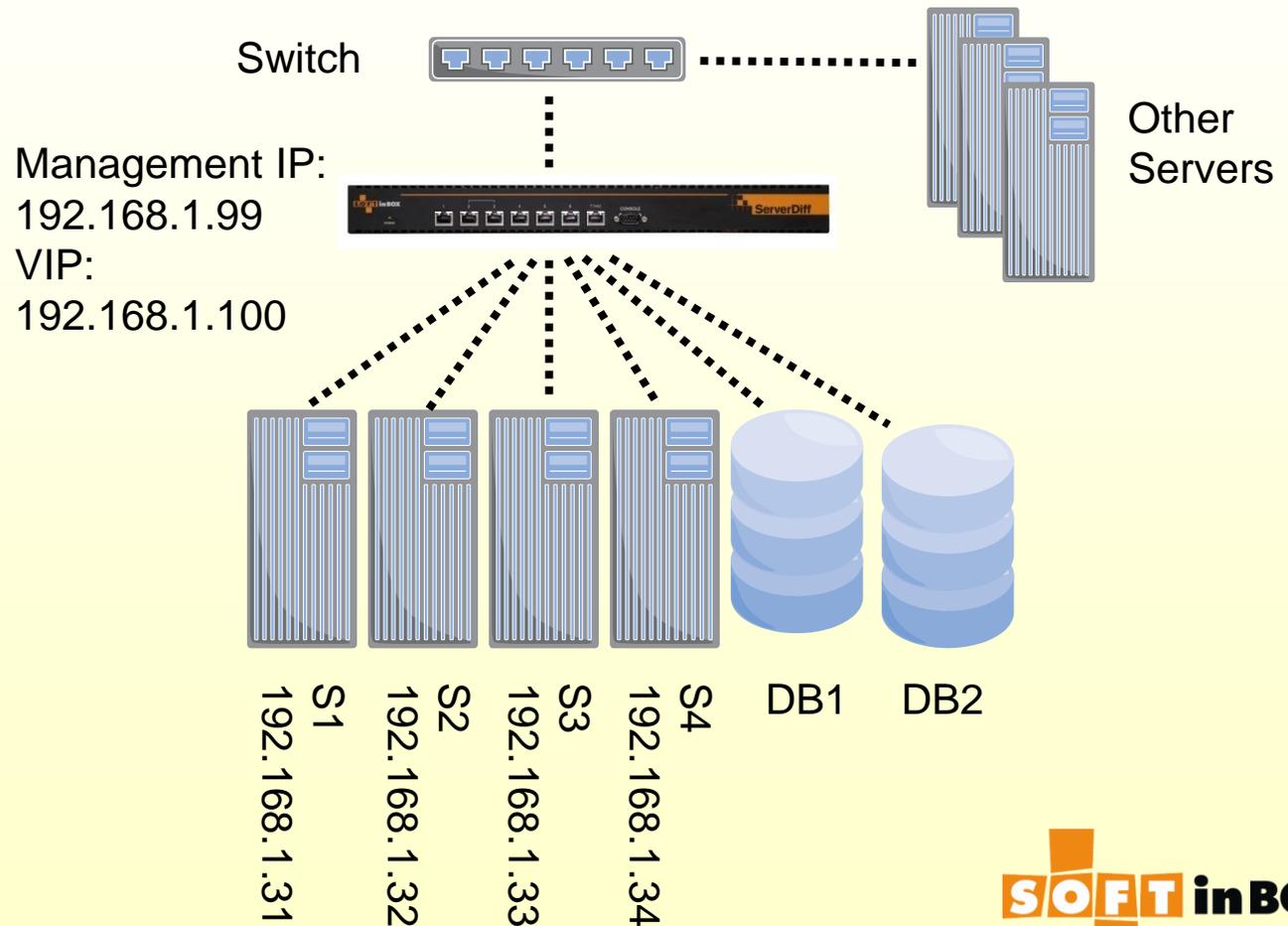
System information

```
Hostname: [REDACTED]
Model name: ServerDiff SGU4200
Serial number: [REDACTED]
License: Lite
HW version: 4.0.0
HW setup: halink=0;bypass=on,on;
SW version: [REDACTED]
Uptime: 2 min
Max load (%): 0xxxx
```

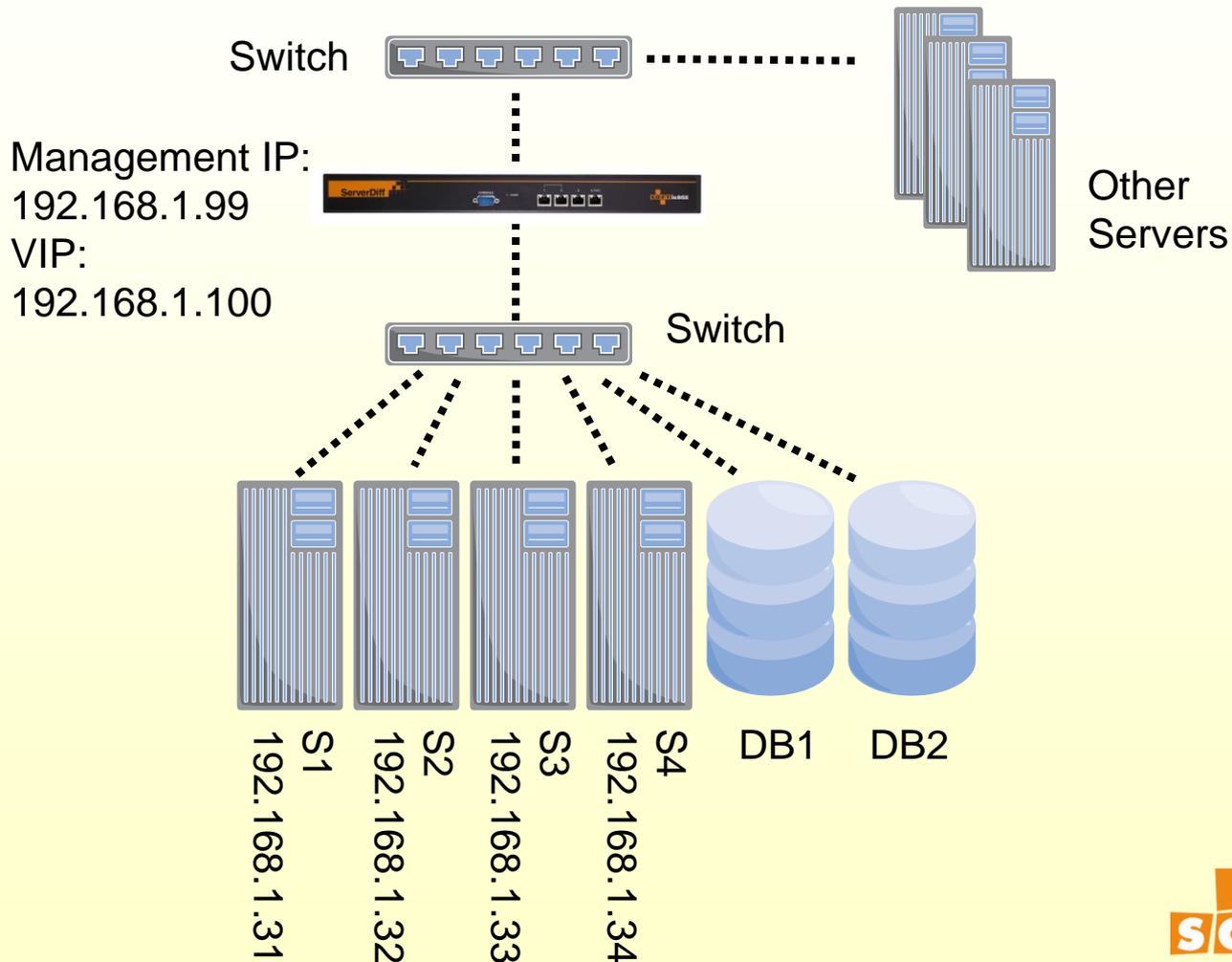
二：AP LB, VIP Bridge Mode, VIP橋接模式

把ServerDiff當成
bridge(也就是switch)
擋在伺服器前面

ServerDiff設定完成
後，使用者連上VIP
操作，即可享有負載
平衡與容錯的益處



可增加集線器，自由擴充



VIP橋接模式的特性

- 使用者連至VIP，即可享有伺服器負載平衡與容錯的益處
- Server可看到使用者的原始IP
- 在**ServerDiff** 底下有可能需要增加一個switch或是多切一個VLAN
- 直接連上S1—S4是沒有負載平衡的，方便管理者管理

VIP橋接模式的雙機備援



VIP橋接模式的設定

Ethernet speed, duplex and autonegotiation

| Ethernet | Speed, duplex and autonegotiation | |
|----------|-----------------------------------|----------------------|
| e1 | (HA) | |
| e2 | (HA) | |
| e3 | all-auto | Edit |
| e4 | all-auto | Edit |
| e5 | all-auto | Edit |
| e6 | all-auto | Edit |
| e7 | all-auto | Edit |
| e8 | all-auto | Edit |

Ethernet bonding

| Ethernet | Bonding mode | Bonding master | |
|----------|--------------|----------------|----------------------|
| e1 | (HA) | | |
| e2 | (HA) | | |
| e3 | balance-rr | --- | Edit |
| e4 | balance-rr | --- | Edit |
| e5 | balance-rr | --- | Edit |
| e6 | balance-rr | --- | Edit |
| e7 | balance-rr | --- | Edit |
| e8 | balance-rr | --- | Edit |

e3 VLAN setting

| VLAN ID | Attach to bridge | Path cost | Port priority | |
|---------|------------------|-----------|---------------|--|
| none | b1 | 100 | 32 | Edit |
| | | | | Insert Flush |

e4 VLAN setting

| VLAN ID | Attach to bridge | Path cost | Port priority | |
|---------|------------------|-----------|---------------|--|
| none | b1 | 100 | 32 | Edit |
| | | | | Insert Flush |

e5 VLAN setting

| VLAN ID | Attach to bridge | Path cost | Port priority | |
|---------|------------------|-----------|---------------|--|
| none | b1 | 100 | 32 | Edit |
| | | | | Insert Flush |

e6 VLAN setting

| VLAN ID | Attach to bridge | Path cost | Port priority | |
|---------|------------------|-----------|---------------|--|
| none | b1 | 100 | 32 | Edit |
| | | | | Insert Flush |

VIP橋接模式的設定

Bridge b1 IP

| Index | IP/mask | Insert |
|-------|------------------|---|
| 1 | 192.168.1.99/24 | Edit Delete Down Insert |
| 2 | 192.168.1.100/24 | Edit Delete Up Insert |

Static routes

| Index | Destination subnet | Gateway | Insert |
|-------|--------------------|---------|------------------------|
|-------|--------------------|---------|------------------------|

Default route

192.168.1.1

[Edit](#)

IPv6 static routes

| Index | Destination subnet | Gateway | Insert |
|-------|--------------------|---------|------------------------|
|-------|--------------------|---------|------------------------|

IPv6 default route

::1

[Edit](#)

DNS servers

8.8.8.8

[Edit](#)

VIP橋接模式的設定

Parameters

Enabled or disabled: Enabled

Group name: VIP_Bridge

Virtual IP: 192.168.1.100

Virtual IP6:

Ports: TCP80,TCP443

Load balancing algorithm: WRR

Health check method: HTTP

Health check port: TCP80

HTTP URL to check: /

HTTP text to match: 200 OK

HTTP host to check:

HTTP additional header 1:

HTTP additional header 2:

HTTP additional header 3:

Health check interval (in sec): 10

Health check counts: 1:1:0:1:1:0

Granularity: S

SD timeout (in sec): 60

SD connection limit:1000000

Log: on

SNAT IP:

SNAT IP6:

All servers down action: DROP

One server down action: CONTINUE

Server list

| Index | Server IP | Server IP6 | Weight | Connection limit | SD limit | |
|-------|--------------|------------|--------|------------------|------------|-------------------|
| 1 | 192.168.1.31 | | 1 | 1000000000 | 1000000000 | E |
| 2 | 192.168.1.32 | | 1 | 1000000000 | 1000000000 | E |
| 3 | 192.168.1.33 | | 1 | 1000000000 | 1000000000 | E |
| 4 | 192.168.1.34 | | 1 | 1000000000 | 1000000000 | E |

[Edit](#)

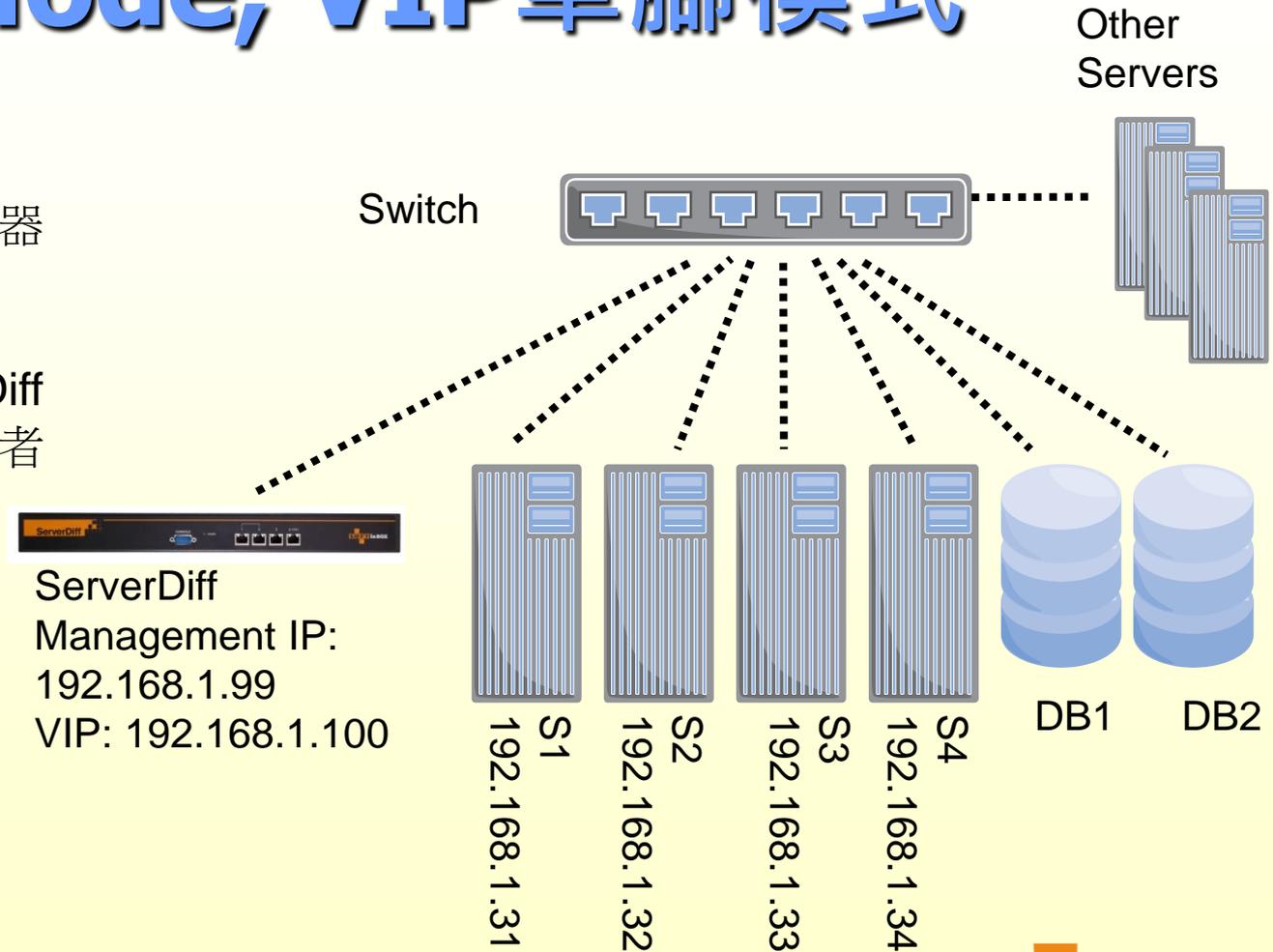
三：AP LB, VIP One-Armed Mode, VIP單腳模式

去程

- 使用者連至VIP
- ServerDiff連去伺服器

回程

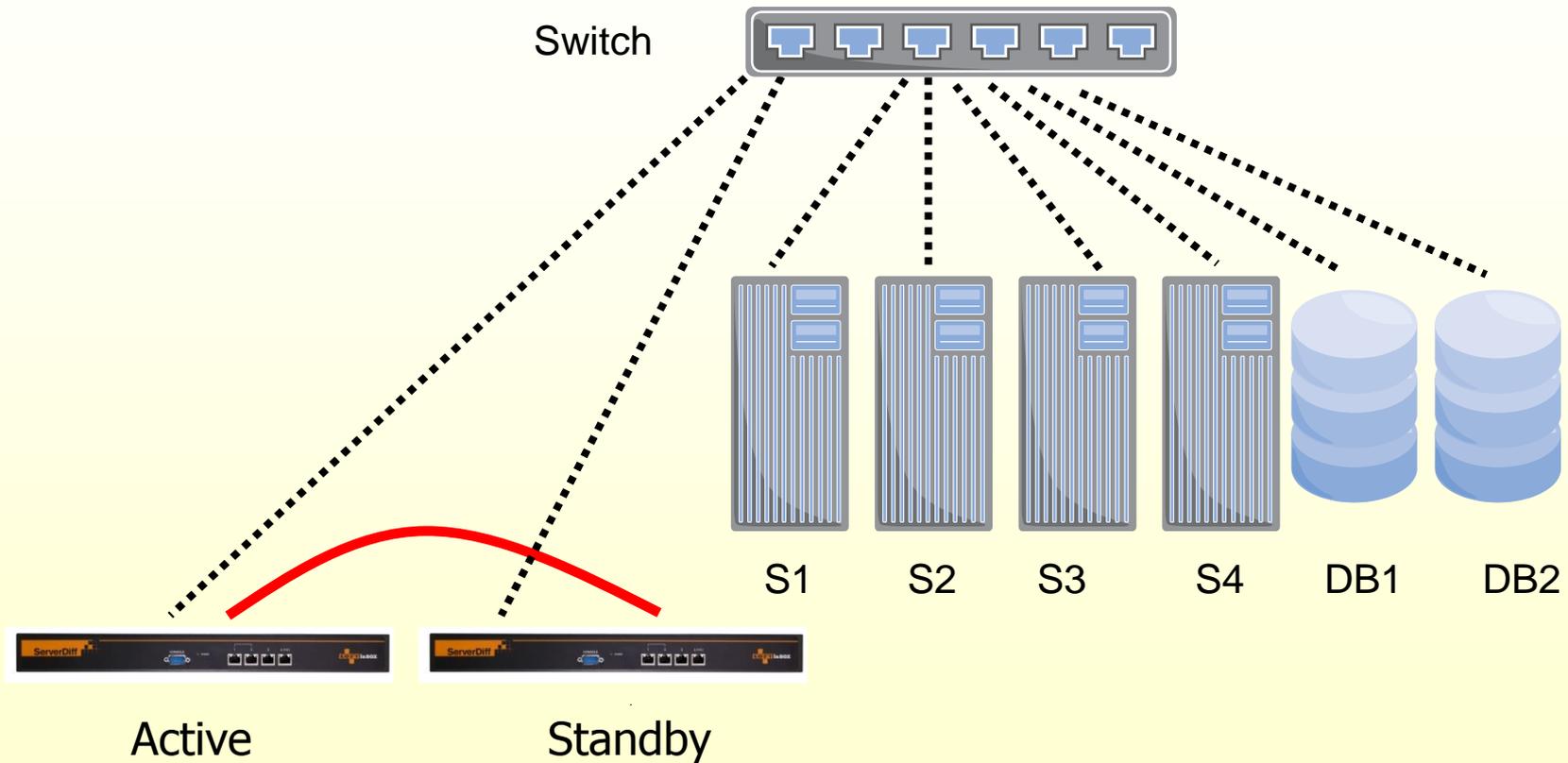
- 伺服器回給ServerDiff
- ServerDiff回給使用者



VIP單腳模式的特性

- 接線簡單，將**ServerDiff** 當成一台主機，和Server一樣連在Switch下即可
- 使用者要改連至VIP 192.168.1.100
- Server看到的連線都是來自**ServerDiff**

VIP單腳模式的雙機備援



VIP單腳模式的設定

Ethernet speed, duplex and autonegotiation

| Ethernet | Speed, duplex and autonegotiation | |
|----------|-----------------------------------|----------------------|
| e1 | (HA) | |
| e2 | (HA) | |
| e3 | all-auto | Edit |
| e4 | all-auto | Edit |
| e5 | all-auto | Edit |
| e6 | all-auto | Edit |
| e7 | all-auto | Edit |
| e8 | all-auto | Edit |

Ethernet bonding

| Ethernet | Bonding mode | Bonding master | |
|----------|--------------|----------------|----------------------|
| e1 | (HA) | | |
| e2 | (HA) | | |
| e3 | balance-rr | --- | Edit |
| e4 | balance-rr | --- | Edit |
| e5 | balance-rr | --- | Edit |
| e6 | balance-rr | --- | Edit |
| e7 | balance-rr | --- | Edit |
| e8 | balance-rr | --- | Edit |

e3 VLAN setting

| VLAN ID | Attach to bridge | Path cost | Port priority | |
|---------|------------------|-----------|---------------|--|
| none | b1 | 100 | 32 | Edit |
| | | | | Insert Flush |

e4 VLAN setting

| VLAN ID | Attach to bridge | Path cost | Port priority | |
|---------|------------------|-----------|---------------|--|
| none | b1 | 100 | 32 | Edit |
| | | | | Insert Flush |

e5 VLAN setting

| VLAN ID | Attach to bridge | Path cost | Port priority | |
|---------|------------------|-----------|---------------|--|
| none | b1 | 100 | 32 | Edit |
| | | | | Insert Flush |

e6 VLAN setting

| VLAN ID | Attach to bridge | Path cost | Port priority | |
|---------|------------------|-----------|---------------|--|
| none | b1 | 100 | 32 | Edit |
| | | | | Insert Flush |

VIP單腳模式的設定

Bridge b1 IP

| Index | IP/mask | | Insert |
|-------|------------------|--|------------------------|
| 1 | 192.168.1.99/24 | Edit Delete Down | Insert |
| 2 | 192.168.1.100/24 | Edit Delete Up | Insert |

Static routes

Index Destination subnet Gateway [Insert](#)

Default route

192.168.1.1

[Edit](#)

IPv6 static routes

Index Destination subnet Gateway [Insert](#)

IPv6 default route

:::1

[Edit](#)

DNS servers

8.8.8.8

[Edit](#)

VIP單腳模式的設定

Parameters

Enabled or disabled: Enabled

Group name: One_Arm

Virtual IP: 192.168.1.100

Virtual IP6:

Ports: TCP80,TCP443

Load balancing algorithm: WRR

Health check method: HTTP

Health check port: TCP80

HTTP URL to check: /

HTTP text to match: 200 OK

HTTP host to check:

HTTP additional header 1:

HTTP additional header 2:

HTTP additional header 3:

Health check interval (in sec): 10

Health check counts: 1:1:0:1:1:0

Granularity: S

SD timeout (in sec): 60

SD connection limit: 1000000

Log: on

SNAT IP: 192.168.1.100

SNAT IP6:

All servers down action: DROP

One server down action: CONTINUE

[Edit](#)

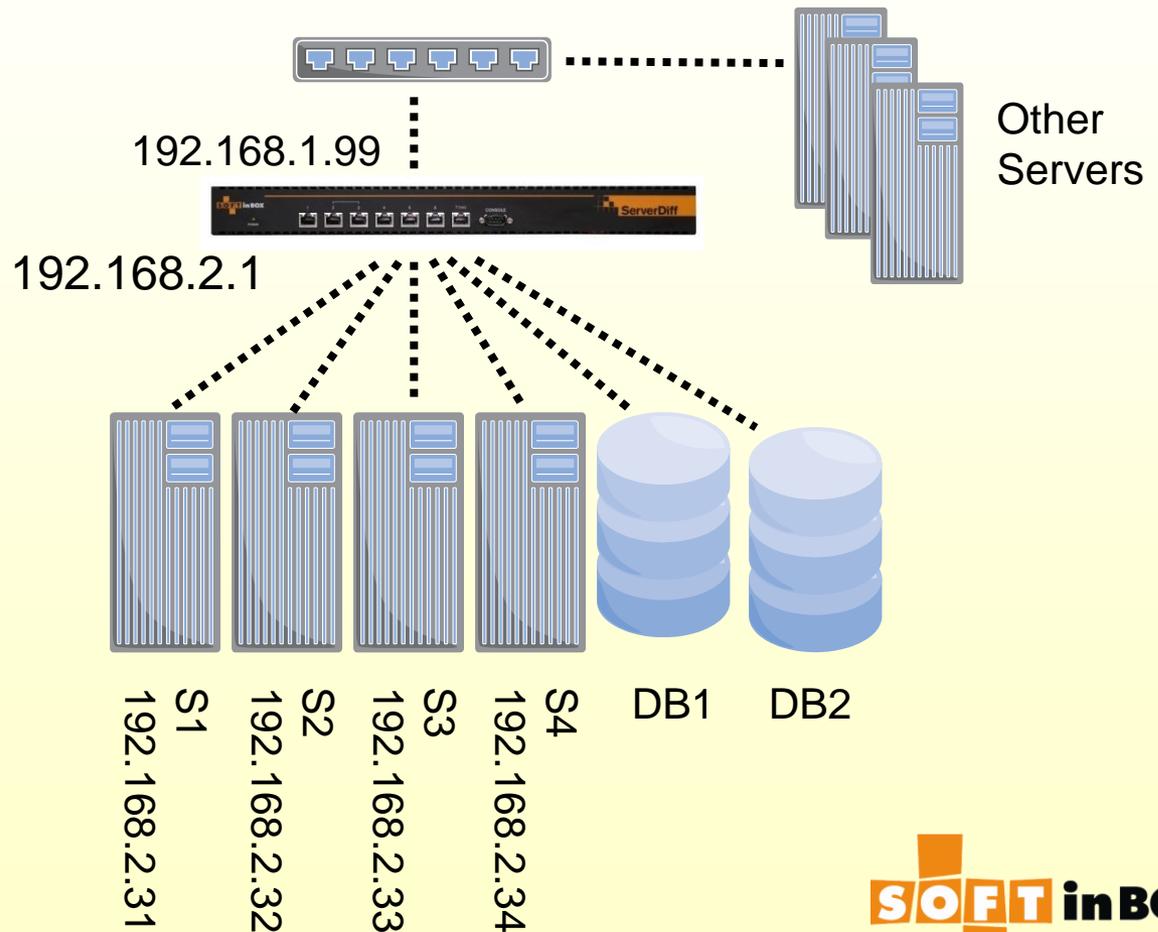
Server list

| Index | Server IP | Server IP6 | Weight | Connection limit | SD limit | |
|-------|--------------|------------|--------|------------------|------------|-------------------|
| 1 | 192.168.1.31 | | 1 | 1000000000 | 1000000000 | E |
| 2 | 192.168.1.32 | | 1 | 1000000000 | 1000000000 | E |
| 3 | 192.168.1.33 | | 1 | 1000000000 | 1000000000 | E |
| 4 | 192.168.1.34 | | 1 | 1000000000 | 1000000000 | E |

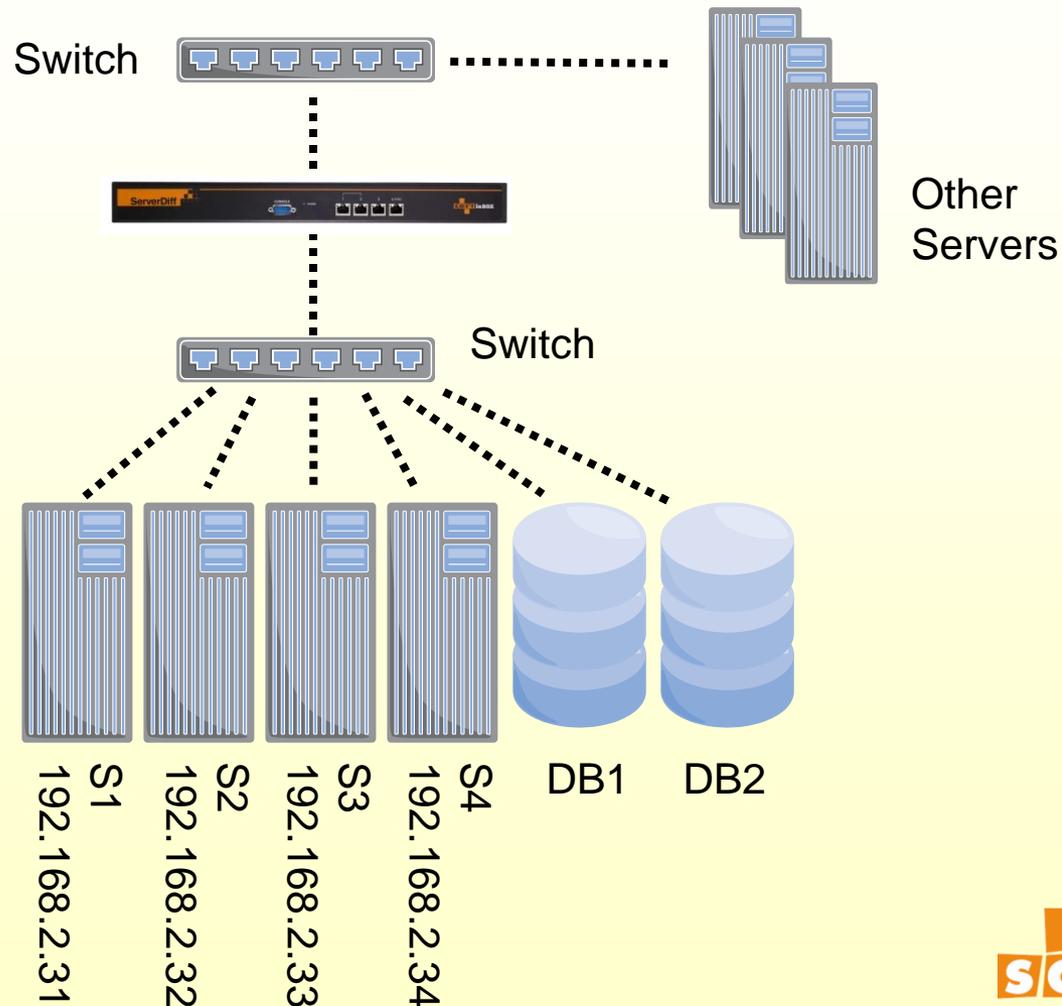
四：AP LB, Transparent Routing Mode, 透明路由模式

把ServerDiff當成路由器。以上網段是192.168.1.0/24，以下網段是192.168.2.0/24

ServerDiff設定完成後，使用者照舊連上S1—S4操作，即可享有負載平衡與容錯的好處



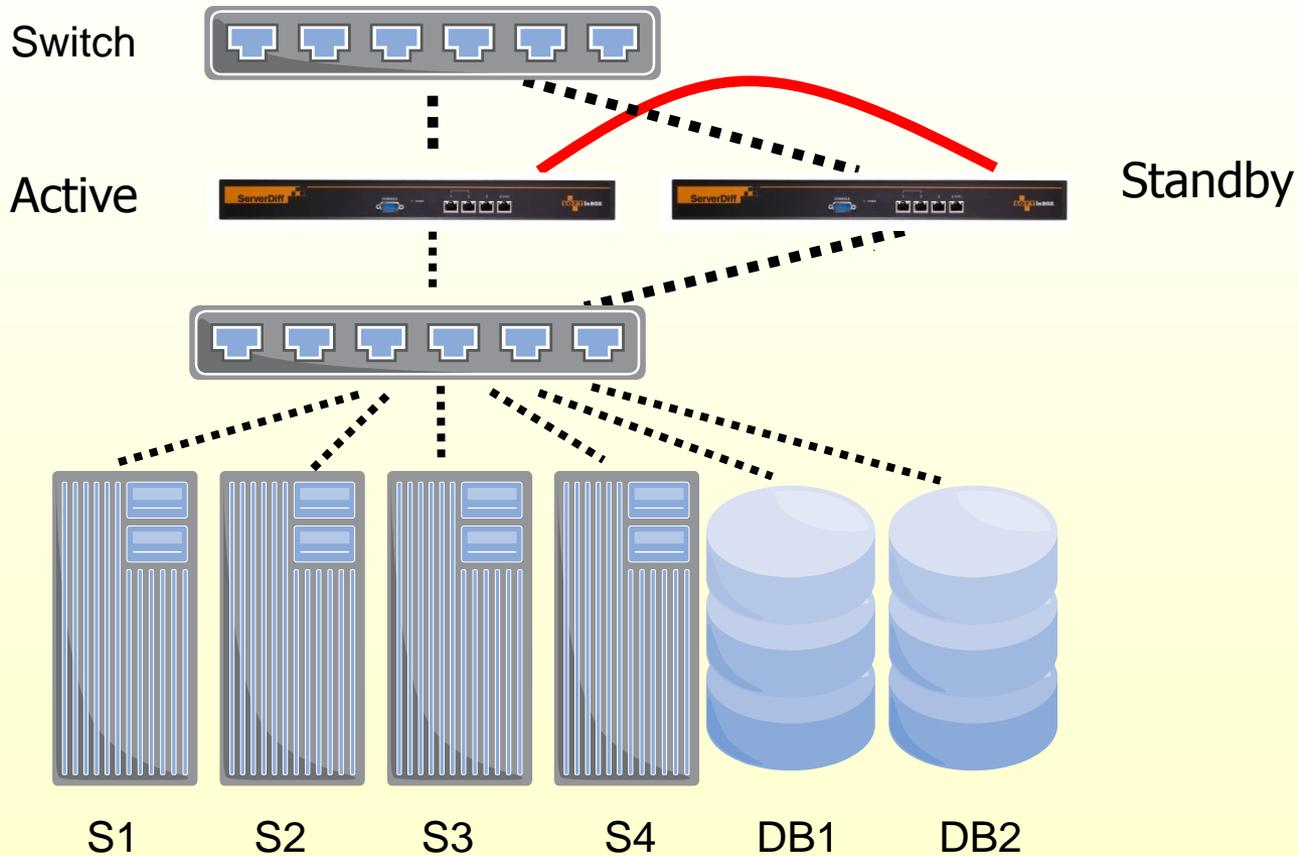
可增加集線器，自由擴充



透明路由模式的特性

- 使用者照舊連去S1-S4，即可享有伺服器負載平衡與容錯帶來的好處
- Server可看到使用者的原始IP
- 在**ServerDiff**底下有可能需要多加一個switch或是多切一個VLAN

透明路由模式的雙機備援



透明路由模式的設定

Ethernet speed, duplex and autonegotiation

| Ethernet | Speed, duplex and autonegotiation | |
|----------|-----------------------------------|----------------------|
| e1 | (HA) | |
| e2 | (HA) | |
| e3 | all-auto | Edit |
| e4 | all-auto | Edit |
| e5 | all-auto | Edit |
| e6 | all-auto | Edit |
| e7 | all-auto | Edit |
| e8 | all-auto | Edit |

Ethernet bonding

| Ethernet | Bonding mode | Bonding master | |
|----------|--------------|----------------|----------------------|
| e1 | (HA) | | |
| e2 | (HA) | | |
| e3 | balance-rr | --- | Edit |
| e4 | balance-rr | --- | Edit |
| e5 | balance-rr | --- | Edit |
| e6 | balance-rr | --- | Edit |
| e7 | balance-rr | --- | Edit |
| e8 | balance-rr | --- | Edit |

e3 VLAN setting

| VLAN ID | Attach to bridge | Path cost | Port priority | |
|---------|------------------|-----------|---------------|--|
| none | b1 | 100 | 32 | Edit |
| | | | | Insert Flush |

e4 VLAN setting

| VLAN ID | Attach to bridge | Path cost | Port priority | |
|---------|------------------|-----------|---------------|--|
| none | b1 | 100 | 32 | Edit |
| | | | | Insert Flush |

e5 VLAN setting

| VLAN ID | Attach to bridge | Path cost | Port priority | |
|---------|------------------|-----------|---------------|--|
| none | b2 | 100 | 32 | Edit |
| | | | | Insert Flush |

e6 VLAN setting

| VLAN ID | Attach to bridge | Path cost | Port priority | |
|---------|------------------|-----------|---------------|--|
| none | b2 | 100 | 32 | Edit |
| | | | | Insert Flush |

透明路由模式的設定

Bridge b1 IP

| Index | IP/mask | Insert |
|-------|-----------------|--|
| 1 | 192.168.1.99/24 | Edit Delete Insert |

Bridge b2 IP

| Index | IP/mask | Insert |
|-------|----------------|--|
| 1 | 192.168.2.1/24 | Edit Delete Insert |

Static routes

| Index | Destination subnet | Gateway | Insert |
|-------|--------------------|---------|------------------------|
|-------|--------------------|---------|------------------------|

Default route

192.168.1.1

[Edit](#)

IPv6 static routes

| Index | Destination subnet | Gateway | Insert |
|-------|--------------------|---------|------------------------|
|-------|--------------------|---------|------------------------|

IPv6 default route

::1

[Edit](#)

DNS servers

8.8.8.8

[Edit](#)

透明路由模式的設定

Parameters

Enabled or disabled: Enabled
Group name: Transparent_Router
Virtual IP: 192.168.2.31
Virtual IP6:
Ports: TCP80,TCP443
Load balancing algorithm: WRR
Health check method: HTTP
 Health check port: TCP80
 HTTP URL to check: /
 HTTP text to match: 200 OK
 HTTP host to check:
 HTTP additional header 1:
 HTTP additional header 2:
 HTTP additional header 3:
Health check interval (in sec): 10
Health check counts: 1:1:0:1:1:0
Granularity: S
 SD timeout (in sec): 60
 SD connection limit:1000000
Log: on
SNAT IP:
SNAT IP6:
All servers down action: DROP
One server down action: CONTINUE

[Edit](#)

Server list

| Index | Server IP | Server IP6 | Weight | Connection limit | SD limit | |
|-------|--------------|------------|--------|------------------|------------|----------------------|
| 1 | 192.168.2.31 | | 1 | 1000000000 | 1000000000 | Edit |
| 2 | 192.168.2.32 | | 1 | 1000000000 | 1000000000 | Edit |
| 3 | 192.168.2.33 | | 1 | 1000000000 | 1000000000 | Edit |
| 4 | 192.168.2.34 | | 1 | 1000000000 | 1000000000 | Edit |

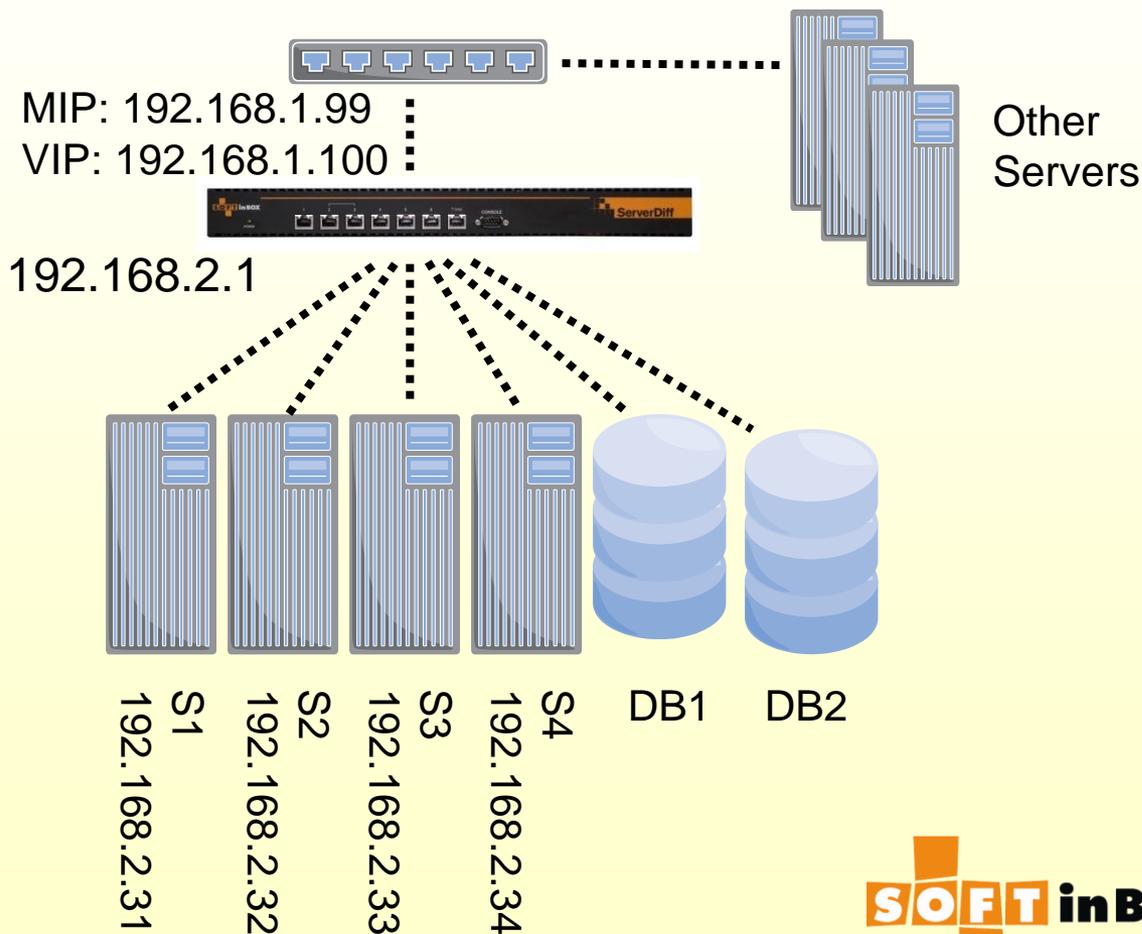
透明路由模式的設定

| Inbound filters | | | | | | | |
|-----------------|-------|--------|--------------|---------------------------|--------------------|-----|-------------------------------|
| Index | Label | Bridge | Source IP | Destination IP | Misc. | Log | Action |
| 1 | | | | 192.168.2.31-192.168.2.34 | TCP dstport=80 | on | L4SW G1 Ed |
| 2 | | | | 192.168.2.31-192.168.2.34 | TCP dstport=443 | on | L4SW G1 Ed |
| 3 | | | 10.10.10.123 | | | on | ACCEPT Ed |

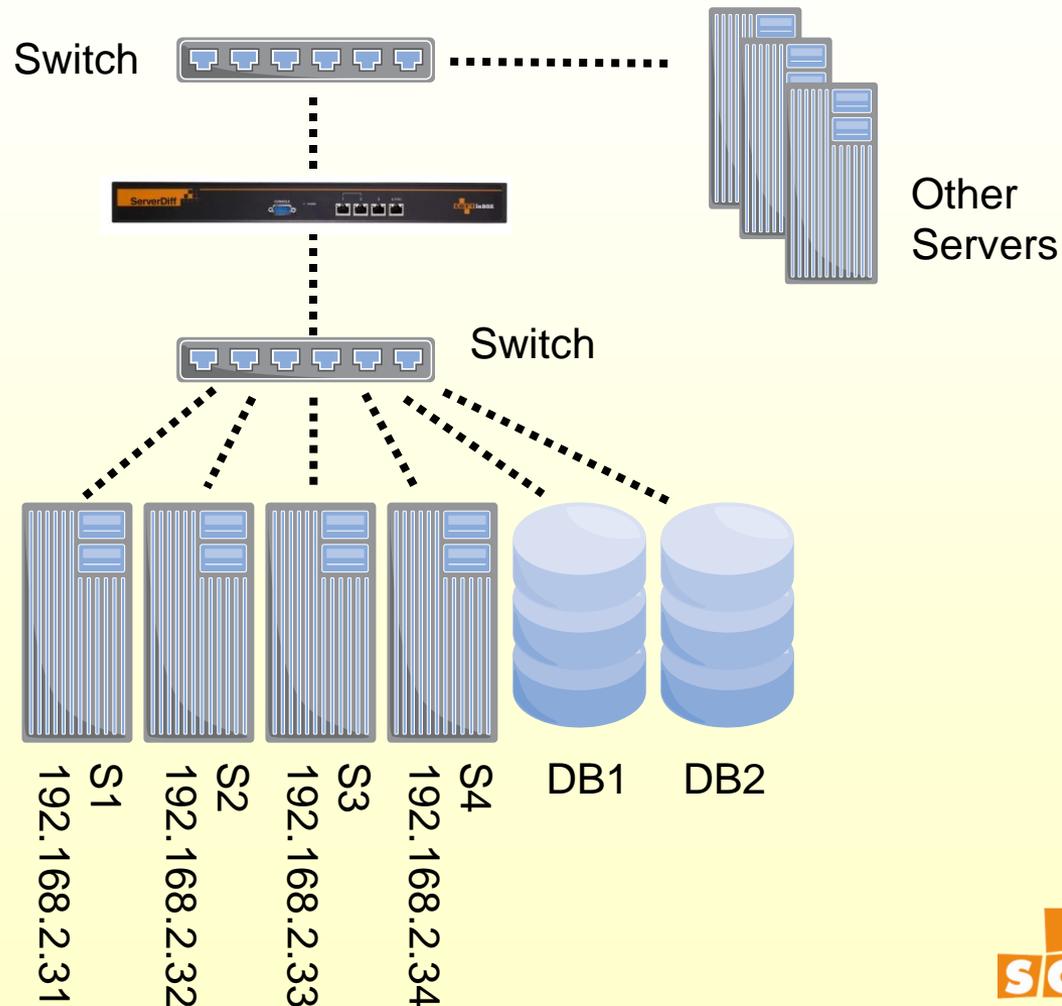
五：AP LB, VIP Routing Mode, VIP路由模式

把ServerDiff當成路由
器。以上網段是
192.168.1.0/24，以
下網段是
192.168.2.0/24

ServerDiff設定完成
後，使用者連上VIP
操作，即可享有負載
平衡與容錯



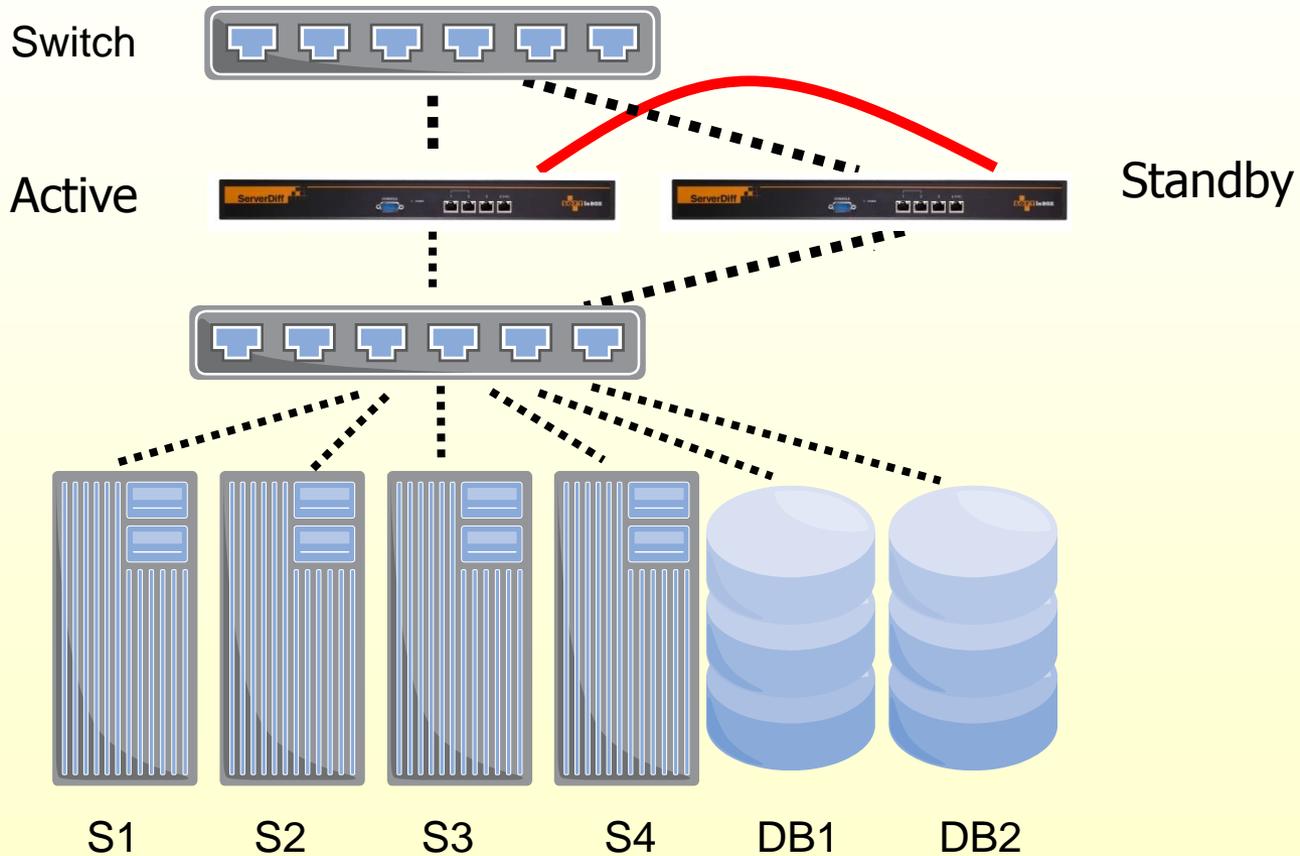
可增加集線器，自由擴充



VIP路由模式的特性

- 使用者連至VIP，即可享有伺服器負載平衡與容錯
- Server可看到使用者的原始IP
- 在**ServerDiff** 底下有可能需要多加一個switch或是多切一個VLAN
- 直接連至S1—S4是沒有負載平衡的，方便管理者管理

VIP路由模式的雙機備援



VIP路由模式的設定

Ethernet speed, duplex and autonegotiation

| Ethernet | Speed, duplex and autonegotiation | |
|----------|-----------------------------------|----------------------|
| e1 | (HA) | |
| e2 | (HA) | |
| e3 | all-auto | Edit |
| e4 | all-auto | Edit |
| e5 | all-auto | Edit |
| e6 | all-auto | Edit |
| e7 | all-auto | Edit |
| e8 | all-auto | Edit |

Ethernet bonding

| Ethernet | Bonding mode | Bonding master | |
|----------|--------------|----------------|----------------------|
| e1 | (HA) | | |
| e2 | (HA) | | |
| e3 | balance-rr | --- | Edit |
| e4 | balance-rr | --- | Edit |
| e5 | balance-rr | --- | Edit |
| e6 | balance-rr | --- | Edit |
| e7 | balance-rr | --- | Edit |
| e8 | balance-rr | --- | Edit |

e3 VLAN setting

| VLAN ID | Attach to bridge | Path cost | Port priority | |
|---------|------------------|-----------|---------------|--|
| none | b1 | 100 | 32 | Edit |
| | | | | Insert Flush |

e4 VLAN setting

| VLAN ID | Attach to bridge | Path cost | Port priority | |
|---------|------------------|-----------|---------------|--|
| none | b1 | 100 | 32 | Edit |
| | | | | Insert Flush |

e5 VLAN setting

| VLAN ID | Attach to bridge | Path cost | Port priority | |
|---------|------------------|-----------|---------------|--|
| none | b2 | 100 | 32 | Edit |
| | | | | Insert Flush |

e6 VLAN setting

| VLAN ID | Attach to bridge | Path cost | Port priority | |
|---------|------------------|-----------|---------------|--|
| none | b2 | 100 | 32 | Edit |
| | | | | Insert Flush |

VIP路由模式的設定

Bridge b1 IP

| Index | IP/mask | | Insert |
|-------|------------------|--|---|
| 1 | 192.168.1.99/24 | Edit Delete | Down Insert |
| 2 | 192.168.1.100/24 | Edit Delete Up | Insert |

Bridge b2 IP

| Index | IP/mask | | Insert |
|-------|----------------|---|------------------------|
| 1 | 192.168.2.1/24 | Edit Delete | Insert |

Static routes

| Index | Destination subnet | Gateway | Insert |
|-------|--------------------|---------|------------------------|
|-------|--------------------|---------|------------------------|

Default route

192.168.1.1

[Edit](#)

IPv6 static routes

| Index | Destination subnet | Gateway | Insert |
|-------|--------------------|---------|------------------------|
|-------|--------------------|---------|------------------------|

IPv6 default route

::1

[Edit](#)

DNS servers

8.8.8.8

[Edit](#)

VIP路由模式的設定

Parameters

Enabled or disabled: Enabled
Group name: VIP_Router
Virtual IP: 192.168.1.100
Virtual IP6:
Ports: TCP80,TCP443
Load balancing algorithm: WRR
Health check method: HTTP
 Health check port: TCP80
 HTTP URL to check: /
 HTTP text to match: 200 OK
 HTTP host to check:
 HTTP additional header 1:
 HTTP additional header 2:
 HTTP additional header 3:
Health check interval (in sec): 10
Health check counts: 1:1:0:1:1:0
Granularity: S
 SD timeout (in sec): 60
 SD connection limit: 1000000
Log: on
SNAT IP:
SNAT IP6:
All servers down action: DROP
One server down action: CONTINUE

[Edit](#)

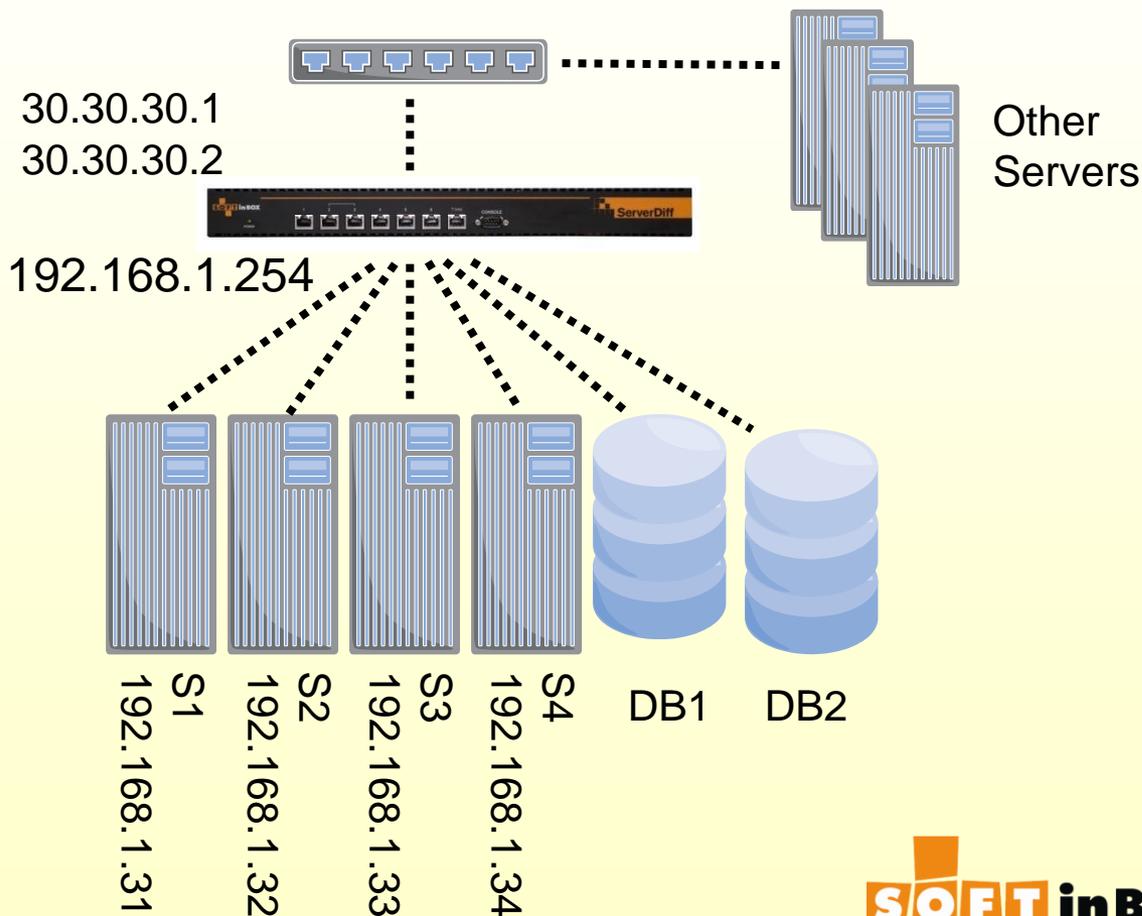
Server list

| Index | Server IP | Server IP6 | Weight | Connection limit | SD limit | |
|-------|--------------|------------|--------|------------------|------------|----------------------|
| 1 | 192.168.2.31 | | 1 | 1000000000 | 1000000000 | Edit |
| 2 | 192.168.2.32 | | 1 | 1000000000 | 1000000000 | Edit |
| 3 | 192.168.2.33 | | 1 | 1000000000 | 1000000000 | Edit |
| 4 | 192.168.2.34 | | 1 | 1000000000 | 1000000000 | Edit |

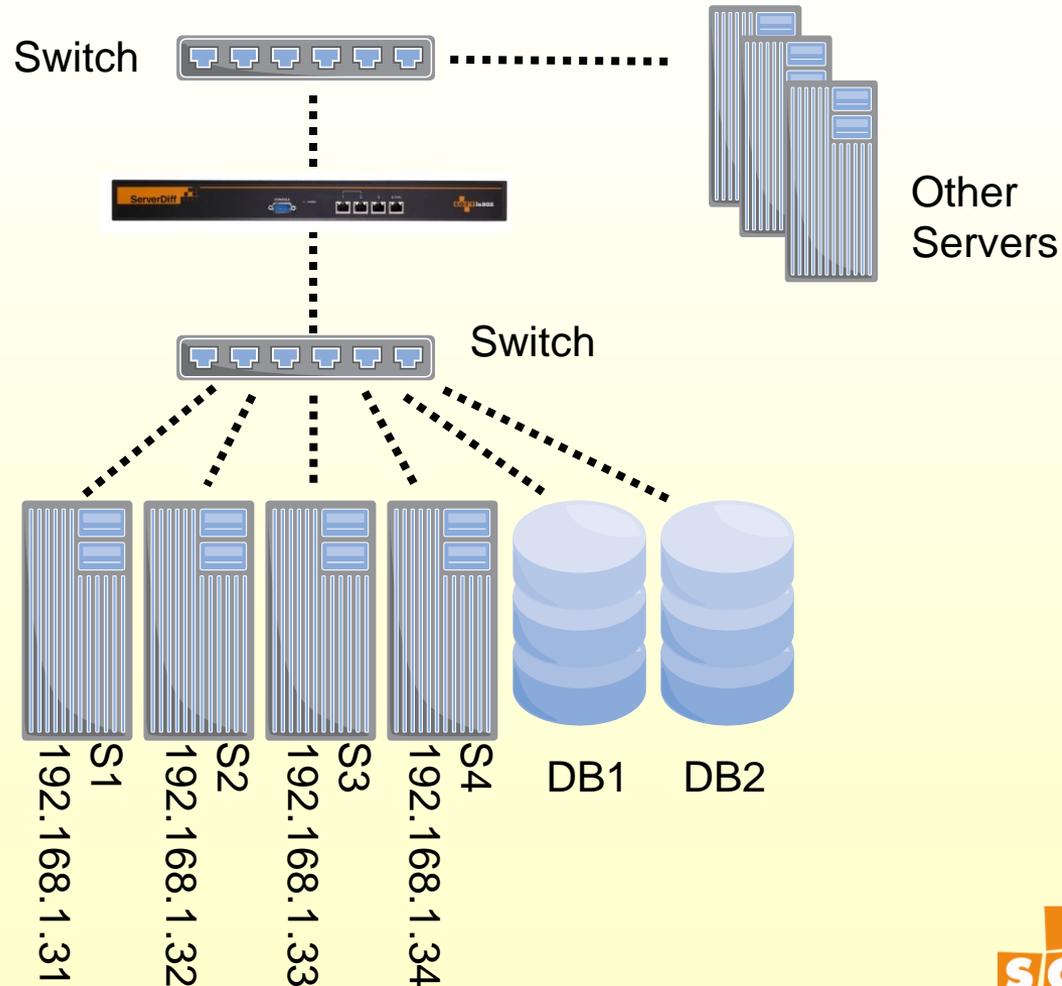
六：AP LB, VIP FW Mode, VIP防火牆模式

把ServerDiff當成基本的防火牆。以上是30.30.30.0/24公有網段，以下是192.168.1.0/24私有網段

ServerDiff設定完成後，使用者連上VIP操作，即可享有負載平衡與容錯



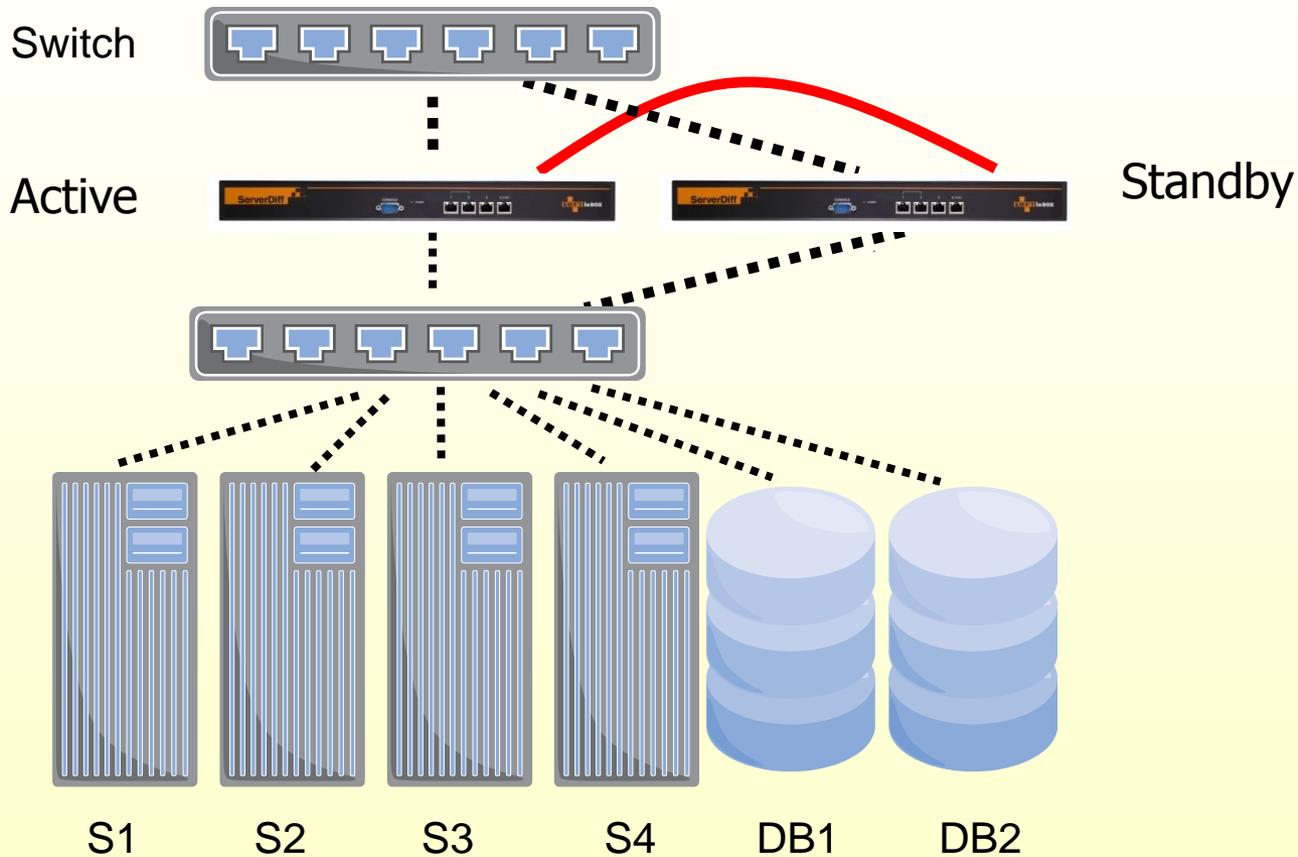
可增加集線器，自由擴充



VIP防火牆模式的特性

- **ServerDiff**可當成一座簡易的防火牆，分隔對外的公有IP網段和內部放伺服器的私有IP網段
- 使用者連至VIP，即可享有伺服器負載平衡與容錯
- Server可看到使用者的原始IP
- 在**ServerDiff**底下有可能需要多加一個switch或是多切一個VLAN

VIP防火牆模式的雙機備援



VIP防火牆模式的設定

Ethernet speed, duplex and autonegotiation

| Ethernet | Speed, duplex and autonegotiation | |
|----------|-----------------------------------|----------------------|
| e1 | (HA) | |
| e2 | (HA) | |
| e3 | all-auto | Edit |
| e4 | all-auto | Edit |
| e5 | all-auto | Edit |
| e6 | all-auto | Edit |
| e7 | all-auto | Edit |
| e8 | all-auto | Edit |

Ethernet bonding

| Ethernet | Bonding mode | Bonding master | |
|----------|--------------|----------------|----------------------|
| e1 | (HA) | | |
| e2 | (HA) | | |
| e3 | balance-rr | --- | Edit |
| e4 | balance-rr | --- | Edit |
| e5 | balance-rr | --- | Edit |
| e6 | balance-rr | --- | Edit |
| e7 | balance-rr | --- | Edit |
| e8 | balance-rr | --- | Edit |

e3 VLAN setting

| VLAN ID | Attach to bridge | Path cost | Port priority | |
|---------|------------------|-----------|---------------|--|
| none | b1 | 100 | 32 | Edit |
| | | | | Insert Flush |

e4 VLAN setting

| VLAN ID | Attach to bridge | Path cost | Port priority | |
|---------|------------------|-----------|---------------|--|
| none | b1 | 100 | 32 | Edit |
| | | | | Insert Flush |

e5 VLAN setting

| VLAN ID | Attach to bridge | Path cost | Port priority | |
|---------|------------------|-----------|---------------|--|
| none | b2 | 100 | 32 | Edit |
| | | | | Insert Flush |

e6 VLAN setting

| VLAN ID | Attach to bridge | Path cost | Port priority | |
|---------|------------------|-----------|---------------|--|
| none | b2 | 100 | 32 | Edit |
| | | | | Insert Flush |

VIP防火牆模式的設定

Bridge b1 IP

| Index | IP/mask | Insert |
|-------|------------------|--|
| 1 | 192.168.1.254/24 | Edit Delete Insert |

Bridge b2 IP

| Index | IP/mask | Insert |
|-------|---------------|--|
| 1 | 30.30.30.1/24 | Edit Delete Down Insert |
| 2 | 30.30.30.2/24 | Edit Delete Up Down Insert |
| 3 | 30.30.30.3/24 | Edit Delete Up Insert |

Static routes

| Index | Destination subnet | Gateway | Insert |
|-------|--------------------|---------|--|
| 1 | [REDACTED] | | Edit Delete Insert |

Default route

30.30.30.254

[Edit](#)

IPv6 static routes

| Index | Destination subnet | Gateway | Insert |
|-------|--------------------|---------|------------------------|
|-------|--------------------|---------|------------------------|

IPv6 default route

::1

[Edit](#)

DNS servers

8.8.8.8

[Edit](#)

VIP防火牆模式的設定

Inbound filters

| Index | Label | Bridge | Source IP | Destination IP | Misc. | Log | Action | |
|-------|-------|--------|-----------|----------------|---------------------|-----|---------------------------------|----------------------|
| 1 | | | | 30.30.30.2 | TCP dstport=1022 | on | DNAT 192.168.1.31 port 22 | Edit |

Outbound filters

| Index | Bridge | Source IP | Destination IP | Misc. | Log | Action | |
|-------|--------|----------------|----------------|-------|-----|--------------------|---|
| 1 | | 192.168.1.0/24 | | | on | SNAT 30.30.30.1 | Edit Delete |

VIP防火牆模式的設定

Parameters

Enabled or disabled: Enabled

Group name: FW

Virtual IP: 30.30.30.3

Virtual IP6:

Ports: TCP80,TCP443

Load balancing algorithm: WRR

Health check method: HTTP

Health check port: TCP80

HTTP URL to check: /

HTTP text to match: 200 OK

HTTP host to check:

HTTP additional header 1:

HTTP additional header 2:

HTTP additional header 3:

Health check interval (in sec): 10

Health check counts: 1:1:0:1:1:0

Granularity: S

SD timeout (in sec): 60

SD connection limit: 1000000

Log: on

SNAT IP:

SNAT IP6:

All servers down action: DROP

One server down action: CONTINUE

[Edit](#)

Server list

| Index | Server IP | Server IP6 | Weight | Connection limit | SD limit | |
|-------|--------------|------------|--------|------------------|------------|-------------------|
| 1 | 192.168.1.31 | | 1 | 1000000000 | 1000000000 | E |
| 2 | 192.168.1.32 | | 1 | 1000000000 | 1000000000 | E |
| 3 | 192.168.1.33 | | 1 | 1000000000 | 1000000000 | E |
| 4 | 192.168.1.34 | | 1 | 1000000000 | 1000000000 | E |

七：AP LB, VIP Triangle Routing Mode, VIP三角路由 模式

去程

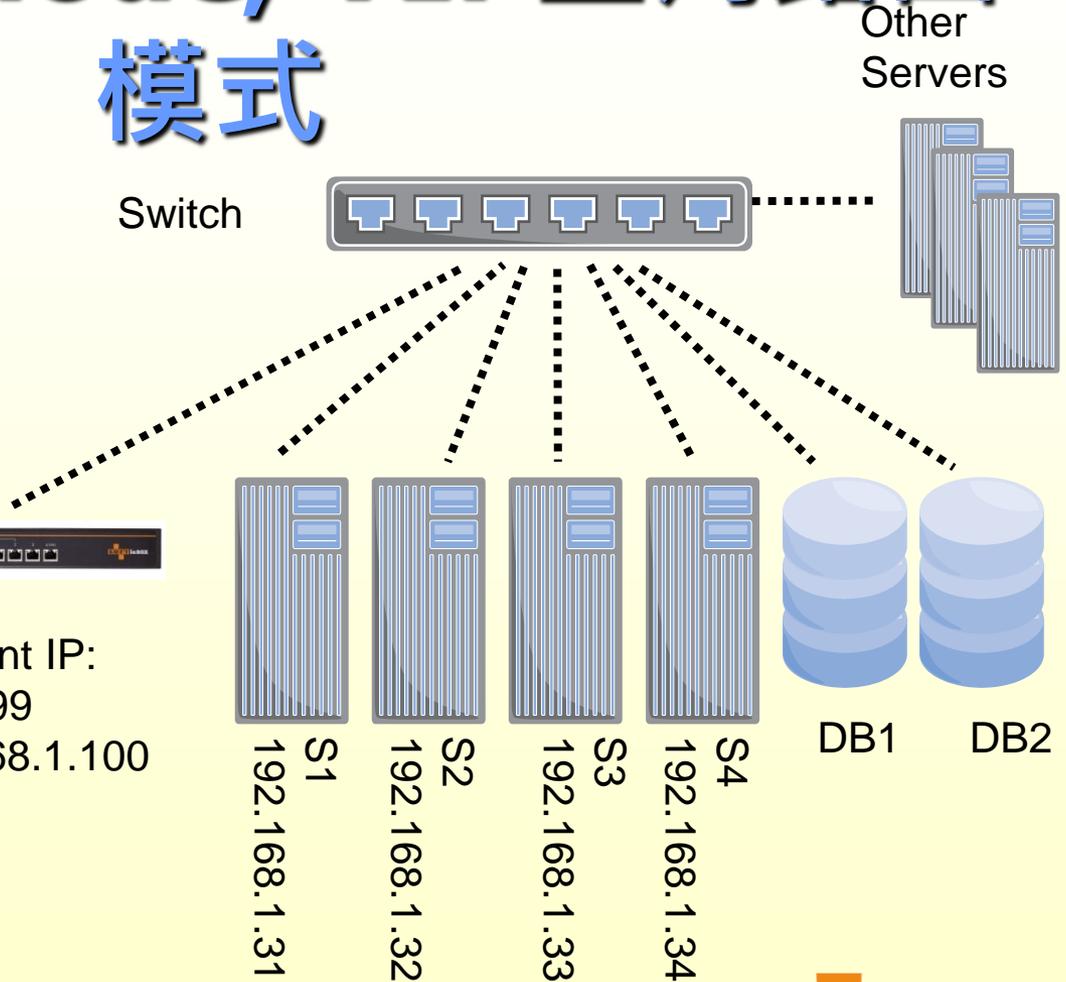
- 使用者連去VIP
- ServerDiff連去伺服器，此時來源IP還是使用者的IP

回程

- 伺服器直接回給使用者，不經過ServerDiff



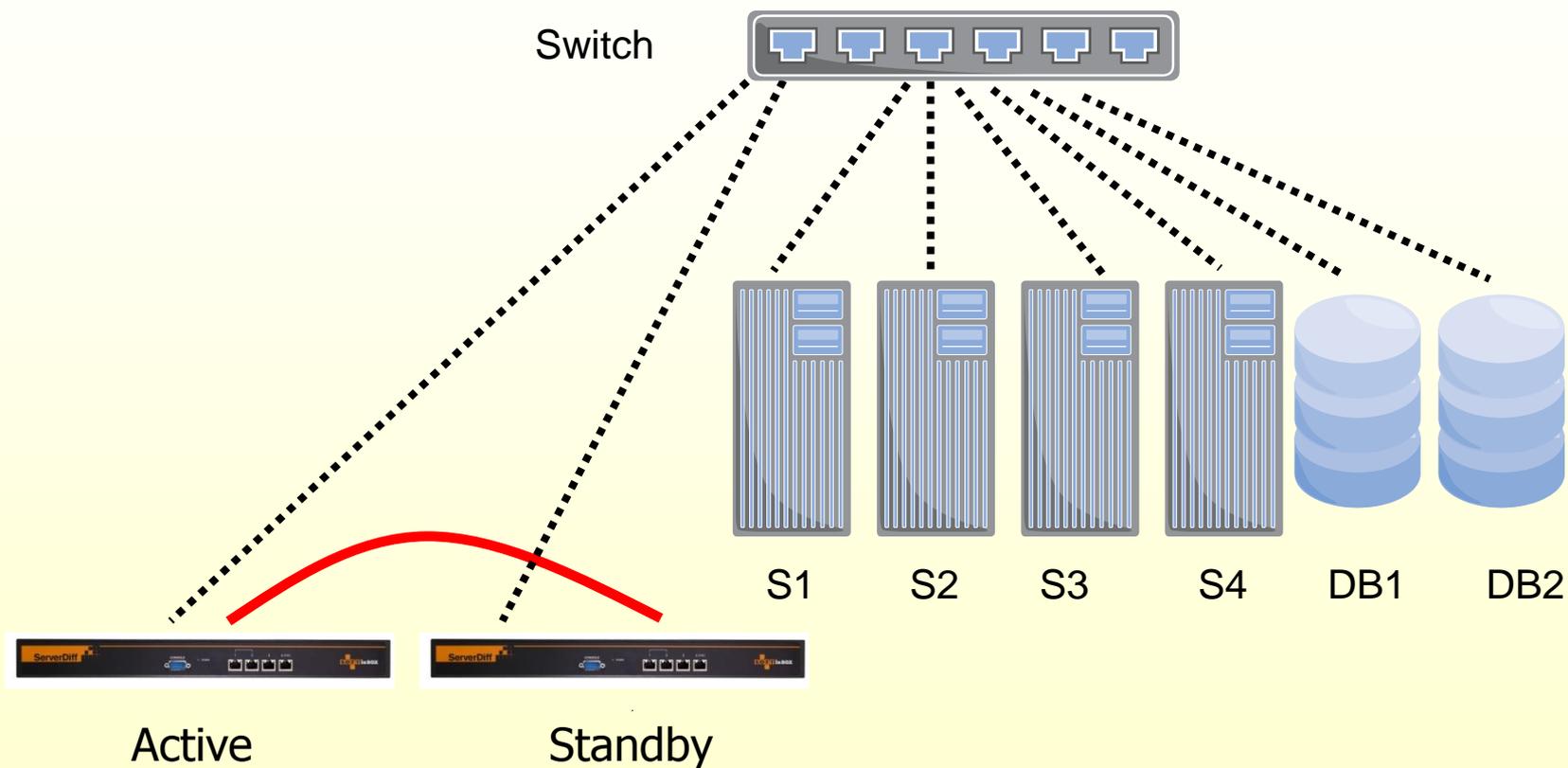
ServerDiff
Management IP:
192.168.1.99
VIP: 192.168.1.100



VIP三角路由模式的特性

- 接線簡單，將**ServerDiff** 當成一台主機，和Server一樣連在Switch下面即可
- 使用者要改連至VIP 192.168.1.100
- Server要額外設定192.168.1.100在loopback虛擬網路卡上
- **ServerDiff**和Server之間要有直接的L2連接，不可經過路由器
- Server直接回給使用者，不用經過**ServerDiff**，可應付更大的流量

VIP三角路由模式的雙機備援



VIP三角路由模式的設定

Ethernet speed, duplex and autonegotiation

| Ethernet | Speed, duplex and autonegotiation | |
|----------|-----------------------------------|----------------------|
| e1 | (HA) | |
| e2 | (HA) | |
| e3 | all-auto | Edit |
| e4 | all-auto | Edit |
| e5 | all-auto | Edit |
| e6 | all-auto | Edit |
| e7 | all-auto | Edit |
| e8 | all-auto | Edit |

Ethernet bonding

| Ethernet | Bonding mode | Bonding master | |
|----------|--------------|----------------|----------------------|
| e1 | (HA) | | |
| e2 | (HA) | | |
| e3 | balance-rr | --- | Edit |
| e4 | balance-rr | --- | Edit |
| e5 | balance-rr | --- | Edit |
| e6 | balance-rr | --- | Edit |
| e7 | balance-rr | --- | Edit |
| e8 | balance-rr | --- | Edit |

e3 VLAN setting

| VLAN ID | Attach to bridge | Path cost | Port priority | |
|---------|------------------|-----------|---------------|--|
| none | b1 | 100 | 32 | Edit |
| | | | | Insert Flush |

e4 VLAN setting

| VLAN ID | Attach to bridge | Path cost | Port priority | |
|---------|------------------|-----------|---------------|--|
| none | b1 | 100 | 32 | Edit |
| | | | | Insert Flush |

e5 VLAN setting

| VLAN ID | Attach to bridge | Path cost | Port priority | |
|---------|------------------|-----------|---------------|--|
| none | b1 | 100 | 32 | Edit |
| | | | | Insert Flush |

e6 VLAN setting

| VLAN ID | Attach to bridge | Path cost | Port priority | |
|---------|------------------|-----------|---------------|--|
| none | b1 | 100 | 32 | Edit |
| | | | | Insert Flush |

VIP三角路由模式的設定

Bridge b1 IP

| Index | IP/mask | | Insert |
|-------|------------------|--|------------------------|
| 1 | 192.168.1.99/24 | Edit Delete Down | Insert |
| 2 | 192.168.1.100/24 | Edit Delete Up | Insert |

Static routes

Index Destination subnet Gateway [Insert](#)

Default route

192.168.1.1

[Edit](#)

IPv6 static routes

Index Destination subnet Gateway [Insert](#)

IPv6 default route

::1

[Edit](#)

DNS servers

8.8.8.8

[Edit](#)

VIP三角路由模式的設定

Parameters

Enabled or disabled: Enabled
Group name: Triangle
Virtual IP: 192.168.1.100
Virtual IP6:
Ports: TCP80,TCP443
Load balancing algorithm: WRR
Health check method: HTTP
 Health check port: TCP80
 HTTP URL to check: /
 HTTP text to match: 200 OK
 HTTP host to check:
 HTTP additional header 1:
 HTTP additional header 2:
 HTTP additional header 3:
Health check interval (in sec): 10
Health check target:
Health check counts: 1:1:0:1:1:0

Granularity: S
 SD timeout (in sec): 60
 SD connection limit: 1000000
Log: on
SNAT IP:
SNAT IP6:
DNAT: off
Allow unreplied: on
Reply to server: off
All servers down action: DROP
One server down action: CONTINUE

[Edit](#)

Server list

| Index | Server IP | Server IP6 | Weight | Connection limit | SD limit | |
|-------|--------------|------------|--------|------------------|------------|-------------------|
| 1 | 192.168.1.31 | | 1 | 1000000000 | 1000000000 | E |
| 2 | 192.168.1.32 | | 1 | 1000000000 | 1000000000 | E |
| 3 | 192.168.1.33 | | 1 | 1000000000 | 1000000000 | E |
| 4 | 192.168.1.34 | | 1 | 1000000000 | 1000000000 | E |

負載平衡演算法

- 平均分配連線 Round Robin (no weight)
- 依照權重分配連線 Weighted Round Robin (weighted)
- 依照權重平衡頻寬使用量 Balance bandwidth consumption (weighted)
- 依照權重平衡現有連線數目 Balance number of active connection (weighted)
- 依照伺服器的回應速度自動平衡 Balance automatically by response time (no weight)
- 雜湊分配 Hash (weighted)

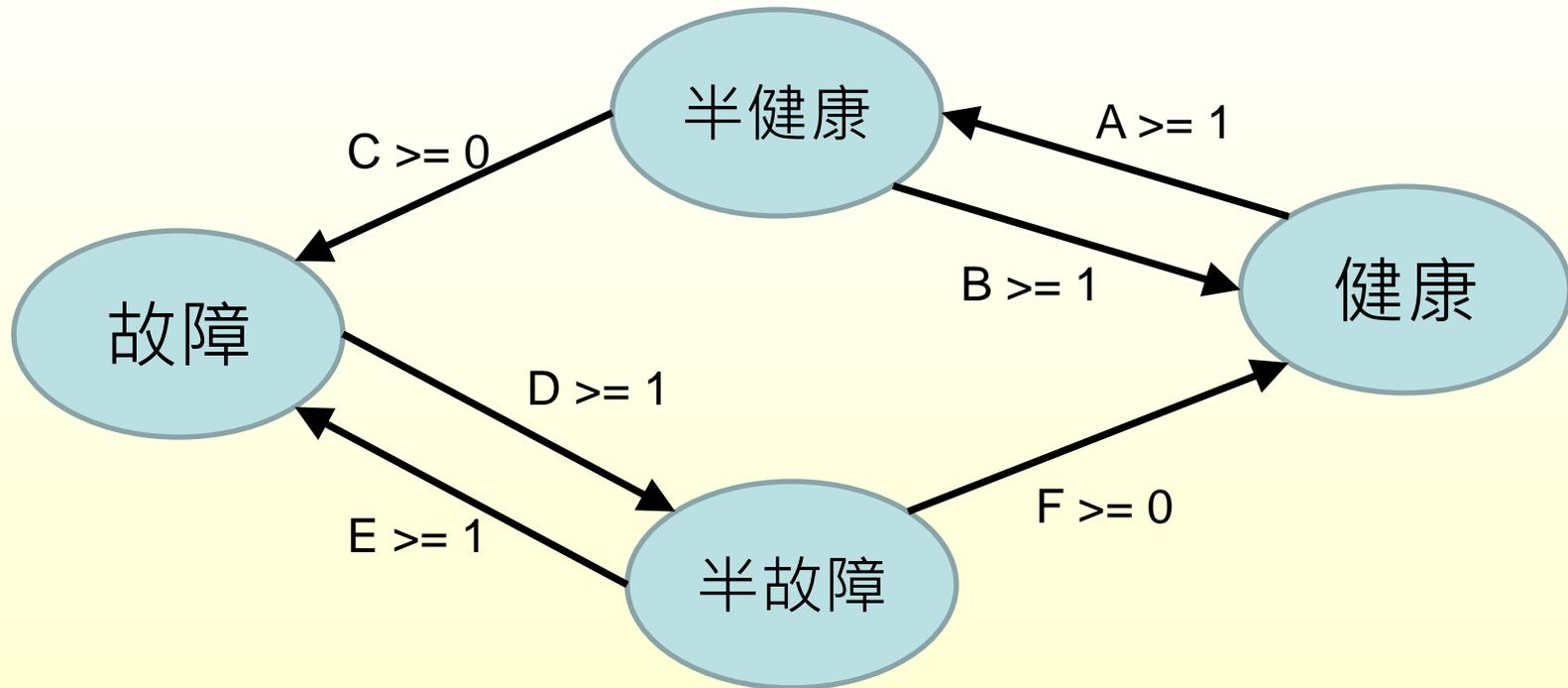
連線分配決定時機

- 每個TCP/UDP連線作一次分配。(不管SD表，不維持連線)
- 參考來源與目的IP作分配。(利用SD表維持連線)
- 參考來源IP作分配。(同樣利用SD表維持連線，但只看來源IP)

伺服器健康測試法

- Ping
- TCP connection establishment
- SMTP banner
- HTTP page test
(<http://www.abc.com/health.php>)
 - http host (www.abc.com或空白)
 - http url (</health.php>)
 - text to match

健康測試狀態轉換



- 健康：正常接受新連線
- 半健康 / 半故障：只接受舊session裡面的新連線
- 故障：不接受新連線

配合網頁伺服器

- Port: TCP80 TCP443
- 伺服器健康測試：網頁測試
 - 要測試的網頁：/
 - 要找到的文字：200 OK
- 連線分配決定時機：S或SD。

配合MS Terminal伺服器

- Port: TCP3389
- 伺服器健康測試：TCP連線建立
- 連線分配決定時機：S或SD。

配合電子郵件(SMTP)伺服器

- Port: TCP25
- 伺服器健康測試：SMTP伺服器的220回答
- 連線分配決定時機：每個TCP連線分配。

配合MS Exchange伺服器

- Port: TCP80
- 伺服器健康測試：網頁測試
 - 要測試的網頁：/
 - 要找到的文字：200 OK
- 連線分配決定時機：S或SD。
- 假設用192.168.1.100當成VIP，設定成所有到VIP的連線都進行負載平衡：

| Inbound filters | | | | | | | |
|-----------------|-------|--------|-----------|----------------|-------|-----|-------------------------------|
| Index | Label | Bridge | Source IP | Destination IP | Misc. | Log | Action |
| 1 | | | | 192.168.1.100 | | off | L4SW G1 Ed |

保護伺服器的設定

- 每台伺服器的連線數上限（伺服器列表）
- 每台伺服器的**session**數上限（伺服器列表）
- **SD**表連線數限制（群組參數）

All Servers Down Action

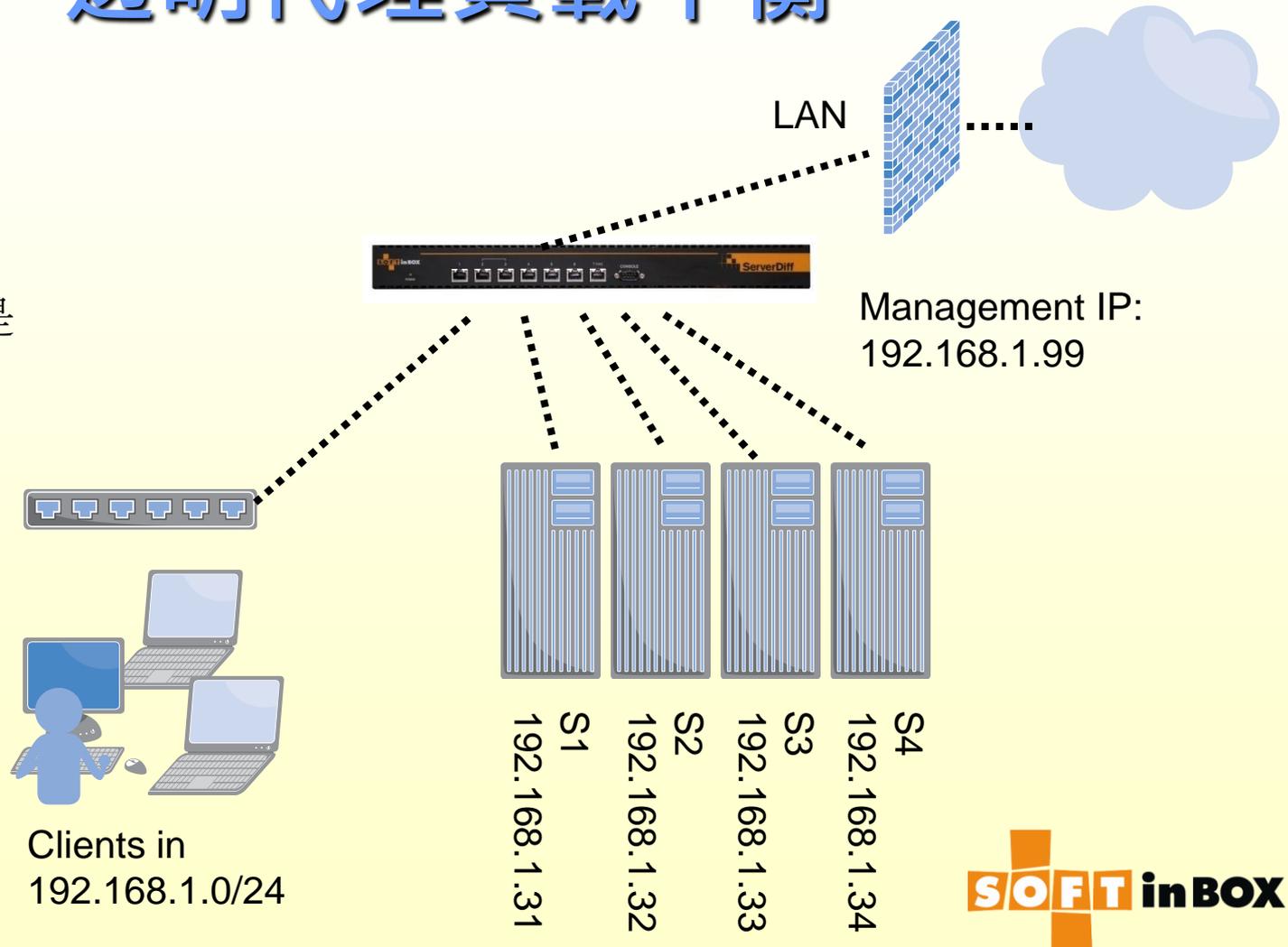
- 所有的伺服器都故障了，或是連線數都滿了，或是session數都滿了，那新來的連線要如何處理。
- **CONTINUE**: 不做LB，讓連線流過。
- **DROP**: 丟棄連線。This is the default action.
- **REJECT**: 丟棄連線，並回覆reject封包。

One Server Down Action

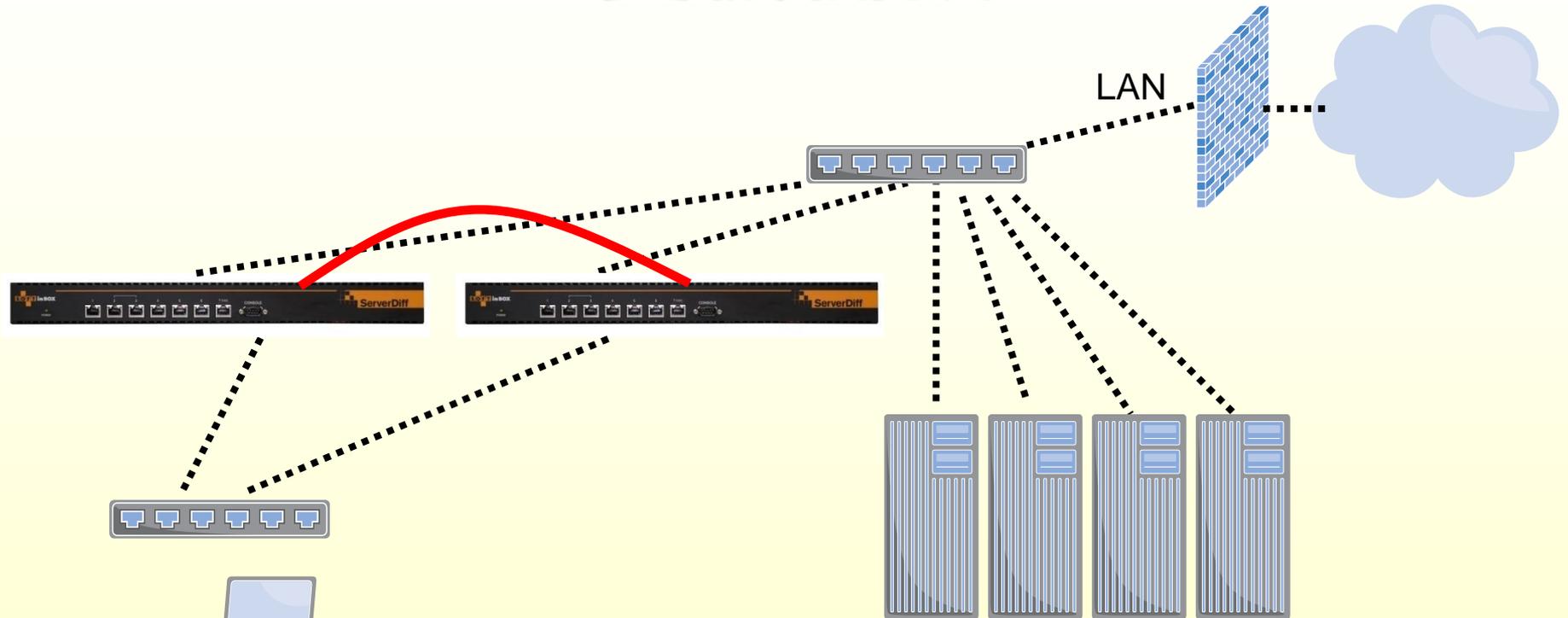
- 某條連線已經被分配去某台伺服器了，但是在中途ServerDiff判定這台伺服器故障了，那這條連線繼續產生的封包，要如何處理。
- CONTINUE: 繼續收送。This is the default action.
- DROP: 丟棄封包。
- REJECT: 丟棄封包並回覆reject封包。

八：Transparent Proxy LB, 透明代理負載平衡

- Clients -> Internet 的http traffic (TCP port 80) 導往proxy group.
- 導往proxy時，還是帶原來的目的IP。



增加switch，方便擴充伺服器及雙機備援



Clients in
192.168.1.0/24

透明代理負載平衡的特性

- 使用者不需在瀏覽器設定proxy，也不會發現其實有被導去proxy。
- **ServerDiff**把流量導往proxy時，不改變目的IP。Proxy需支援收下這樣的特別流量。
- Proxy和**ServerDiff**之間必須有L2直接連接，不可經過路由器。

透明代理負載平衡的設定

Ethernet speed, duplex and autonegotiation

| Ethernet | Speed, duplex and autonegotiation | |
|----------|-----------------------------------|----------------------|
| e1 | (HA) | |
| e2 | (HA) | |
| e3 | all-auto | Edit |
| e4 | all-auto | Edit |
| e5 | all-auto | Edit |
| e6 | all-auto | Edit |
| e7 | all-auto | Edit |
| e8 | all-auto | Edit |

Ethernet bonding

| Ethernet | Bonding mode | Bonding master | |
|----------|--------------|----------------|----------------------|
| e1 | (HA) | | |
| e2 | (HA) | | |
| e3 | balance-rr | --- | Edit |
| e4 | balance-rr | --- | Edit |
| e5 | balance-rr | --- | Edit |
| e6 | balance-rr | --- | Edit |
| e7 | balance-rr | --- | Edit |
| e8 | balance-rr | --- | Edit |

e3 VLAN setting

| VLAN ID | Attach to bridge | Path cost | Port priority | |
|---------|------------------|-----------|---------------|--|
| none | b1 | 100 | 32 | Edit |
| | | | | Insert Flush |

e4 VLAN setting

| VLAN ID | Attach to bridge | Path cost | Port priority | |
|---------|------------------|-----------|---------------|--|
| none | b1 | 100 | 32 | Edit |
| | | | | Insert Flush |

e5 VLAN setting

| VLAN ID | Attach to bridge | Path cost | Port priority | |
|---------|------------------|-----------|---------------|--|
| none | b1 | 100 | 32 | Edit |
| | | | | Insert Flush |

e6 VLAN setting

| VLAN ID | Attach to bridge | Path cost | Port priority | |
|---------|------------------|-----------|---------------|--|
| none | b1 | 100 | 32 | Edit |
| | | | | Insert Flush |

透明代理負載平衡的設定

Bridge b1 IP

| Index | IP/mask | Insert |
|-------|-----------------|--|
| 1 | 192.168.1.99/24 | Edit Delete Insert |

Static routes

| Index | Destination subnet | Gateway | Insert |
|-------|--------------------|---------|------------------------|
|-------|--------------------|---------|------------------------|

Default route

192.168.1.1

[Edit](#)

IPv6 static routes

| Index | Destination subnet | Gateway | Insert |
|-------|--------------------|---------|------------------------|
|-------|--------------------|---------|------------------------|

IPv6 default route

::1

[Edit](#)

DNS servers

8.8.8.8

[Edit](#)

透明代理負載平衡的設定

Parameters

Enabled or disabled: Enabled
Group name: Transparent_Proxy
Virtual IP:
Virtual IP6:
Ports: TCP80,TCP443
Load balancing algorithm: WRR
Health check method: HTTP
 Health check port: TCP80
 HTTP URL to check: /
 HTTP text to match: 200 OK
 HTTP host to check:
 HTTP additional header 1:
 HTTP additional header 2:
 HTTP additional header 3:
Health check interval (in sec): 10
Health check target:
Health check counts: 1:1:0:1:1:0

Granularity: S
 SD timeout (in sec): 60
 SD connection limit:1000000
Log: on
SNAT IP:
SNAT IP6:
DNAT: off
Allow unreplied: off
Reply to server: off
All servers down action: CONTINUE
One server down action: CONTINUE

[Edit](#)

Server list

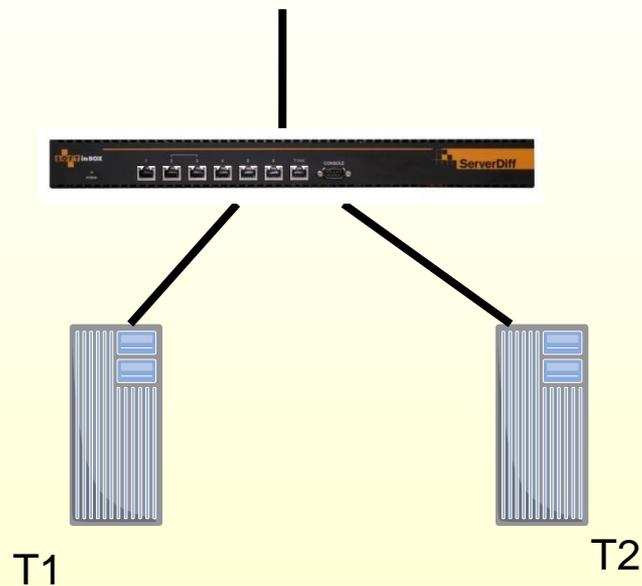
| Index | Server IP | Server IP6 | Weight | Connection limit | SD limit | |
|-------|--------------|------------|--------|------------------|------------|-------------------|
| 1 | 192.168.1.31 | | 1 | 1000000000 | 1000000000 | E |
| 2 | 192.168.1.32 | | 1 | 1000000000 | 1000000000 | E |
| 3 | 192.168.1.33 | | 1 | 1000000000 | 1000000000 | E |
| 4 | 192.168.1.34 | | 1 | 1000000000 | 1000000000 | E |

透明代理負載平衡的設定

Inbound filters

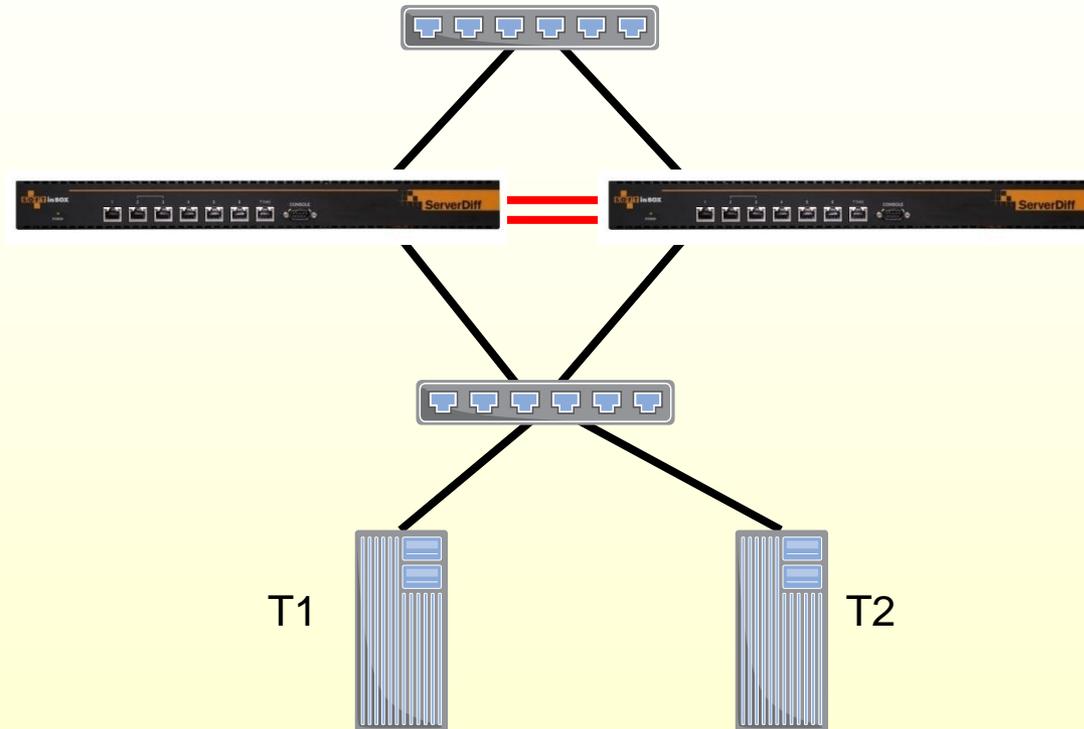
| Index | Label | Bridge | Source IP | Destination IP | Misc. | Log | Action | |
|-------|-------------|--------|---------------------------|---------------------------|-------|-----|---------------------|--------------------|
| 1 | | | | | | on | CALL Management | Ei |
| 2 | | | | | | on | CALL TP_Out | Ei |
| 3 | | | | | | on | CALL Local_Local | Ei |
| 4 | | | 192.168.1.0/24 | | | off | L4SW G1 | Ei |
| 5 | Local_Local | | 192.168.1.0/24 | 192.168.1.0/24 | | on | ACCEPT | Ei |
| 6 | Management | | | 192.168.1.99 | | on | ACCEPT | Ei |
| 7 | | | | 192.168.1.31-192.168.1.34 | | on | ACCEPT | Ei |
| 8 | TP_Out | | 192.168.1.31-192.168.1.34 | | | on | ACCEPT | Ei |

Building Block for Advanced LB Modes

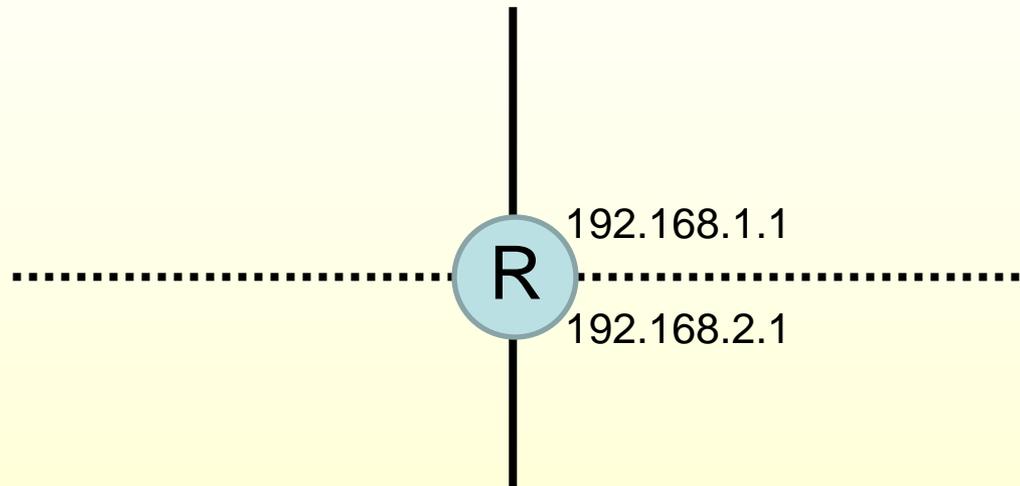


- 由上往下的 connection, 由 ServerDiff 做 LB.
- 由下往上的 connection, ServerDiff 會記得是從 T1 或 T2 來的, 回程的 packets 會送去對的 Tx.
- 健康測試：測 Tx。或是測 Tx 再往下的設備。

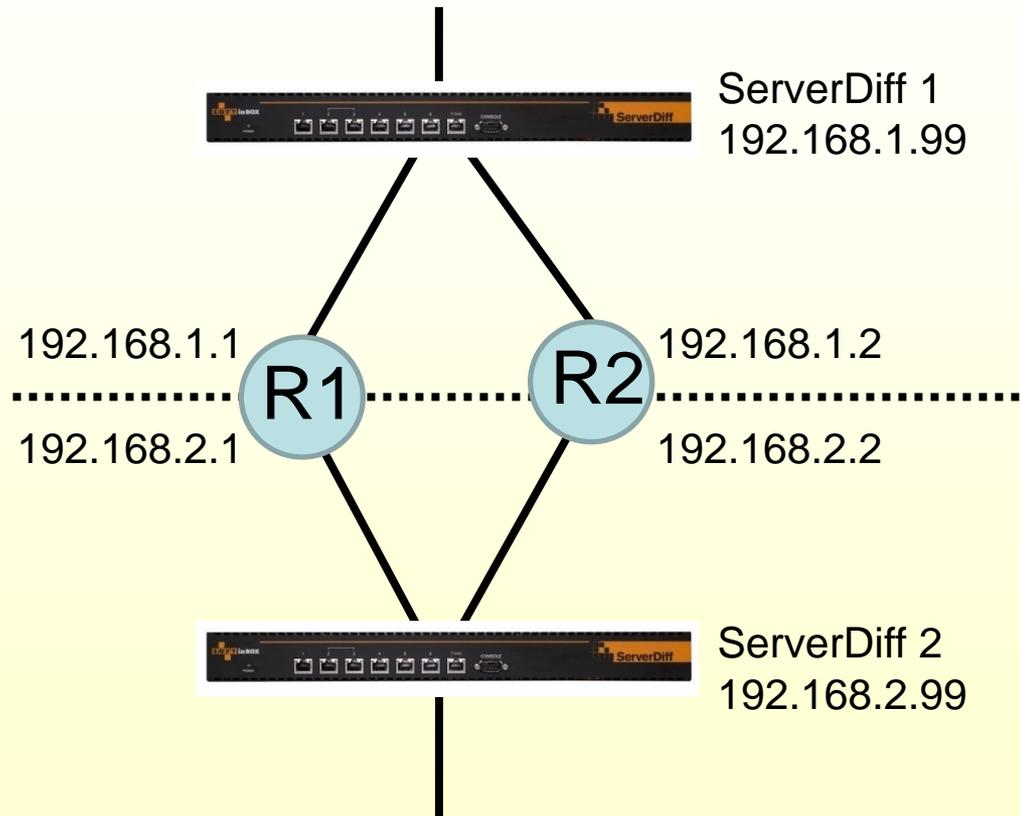
ABB in HA



九：Router LB, 路由器負載平衡, Before



Router LB, After



Router LB, One bridge

Ethernet speed, duplex and autonegotiation

| Ethernet | Speed, duplex and autonegotiation | |
|----------|-----------------------------------|----------------------|
| e1 | (HA) | |
| e2 | (HA) | |
| e3 | all-auto | Edit |
| e4 | all-auto | Edit |
| e5 | all-auto | Edit |
| e6 | all-auto | Edit |
| e7 | all-auto | Edit |
| e8 | all-auto | Edit |

Ethernet bonding

| Ethernet | Bonding mode | Bonding master | |
|----------|--------------|----------------|----------------------|
| e1 | (HA) | | |
| e2 | (HA) | | |
| e3 | balance-rr | --- | Edit |
| e4 | balance-rr | --- | Edit |
| e5 | balance-rr | --- | Edit |
| e6 | balance-rr | --- | Edit |
| e7 | balance-rr | --- | Edit |
| e8 | balance-rr | --- | Edit |

e3 VLAN setting

| VLAN ID | Attach to bridge | Path cost | Port priority | |
|---------|------------------|-----------|---------------|--|
| none | b1 | 100 | 32 | Edit |
| | | | | Insert Flush |

e4 VLAN setting

| VLAN ID | Attach to bridge | Path cost | Port priority | |
|---------|------------------|-----------|---------------|--|
| none | b1 | 100 | 32 | Edit |
| | | | | Insert Flush |

e5 VLAN setting

| VLAN ID | Attach to bridge | Path cost | Port priority | |
|---------|------------------|-----------|---------------|--|
| none | b1 | 100 | 32 | Edit |
| | | | | Insert Flush |

e6 VLAN setting

| VLAN ID | Attach to bridge | Path cost | Port priority | |
|---------|------------------|-----------|---------------|--|
| none | b1 | 100 | 32 | Edit |
| | | | | Insert Flush |

Router LB IP

Bridge b1 IP

| Index | IP/mask | Insert |
|-------|-----------------|--|
| 1 | 192.168.1.99/24 | Edit Delete Insert |

Static routes

| Index | Destination subnet | Gateway | Insert |
|-------|--------------------|---------|------------------------|
|-------|--------------------|---------|------------------------|

Default route

192.168.1.1

[Edit](#)

IPv6 static routes

| Index | Destination subnet | Gateway | Insert |
|-------|--------------------|---------|------------------------|
|-------|--------------------|---------|------------------------|

IPv6 default route

[Edit](#)

DNS servers

192.168.1.1

[Edit](#)

Router LB

SLB Group 1

Parameters

Enabled or disabled: Enabled

Group name: Router_LB

Virtual IP:

Virtual IP6:

Ports: TCP80,TCP443

Load balancing algorithm: WRR

Health check method: PING

 Ping TTL: 128

Health check interval (in sec): 10

Health check target: 192.168.2.99

Health check counts: 1:1:0:1:1:0

Granularity: S

 SD timeout (in sec): 600

 SD connection limit:1000000

Log: on

SNAT IP:

SNAT IP6:

DNAT: off

Allow unreplied: off

Reply to server: off

All servers down action: DROP

One server down action: CONTINUE

[Edit](#)

Server list

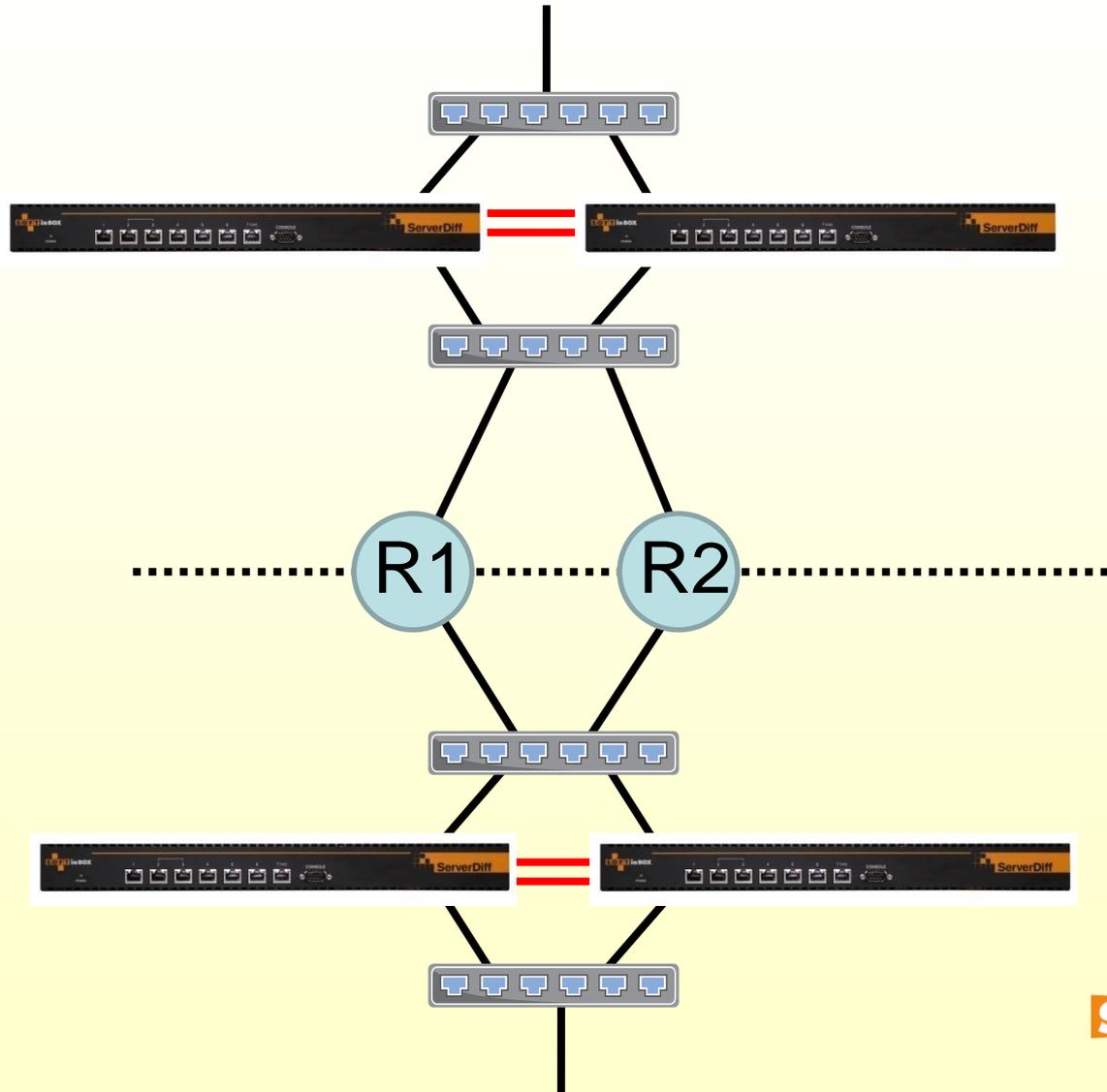
| Index | Server IP | Server IP6 | Weight | Connection limit | SD limit | |
|-------|-------------|------------|--------|------------------|------------|--------------------|
| 1 | 192.168.1.1 | | 1 | 1000000000 | 1000000000 | Ed |
| 2 | 192.168.1.2 | | 1 | 1000000000 | 1000000000 | Ed |

Router LB Infilter

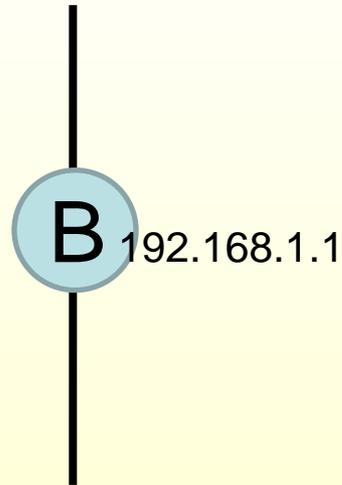
Inbound filters

| Index | Label | Bridge | Source IP | Destination IP | Misc. | Log | Action | |
|-------|---------|--------|-----------|----------------|----------------------------|-----|--------------------------|--------------------|
| 1 | | | | | forwarded_from=192.168.1.1 | on | CALL From_R1 | Ed |
| 2 | | | | | forwarded_from=192.168.1.2 | on | CALL From_R2 | Ed |
| 3 | | | | 192.168.1.99 | | on | ACCEPT | Ed |
| 4 | | | | | | on | L4SW G1 | Ed |
| 5 | From_R1 | | | | | on | REPLY_GW 192.168.1.1 | Ed |
| 6 | | | | | | on | ACCOUNT_FROM G1 S1 | Ed |
| 7 | | | | | | on | ACCEPT | Ed |
| 8 | From_R2 | | | | | on | REPLY_GW 192.168.1.2 | Ed |
| 9 | | | | | | on | ACCOUNT_FROM G1 S2 | Ed |
| 10 | | | | | | on | ACCEPT | Ed |

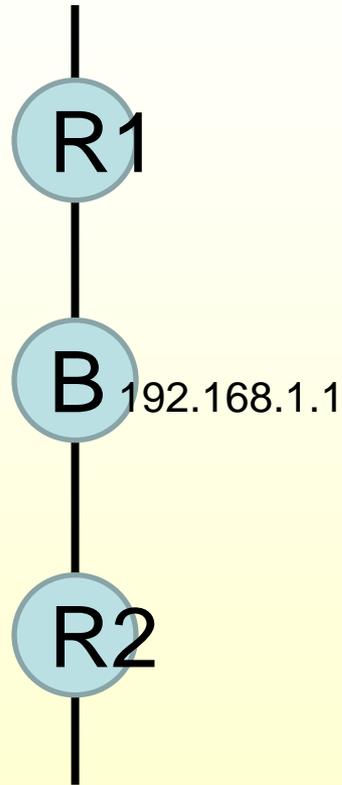
Router LB, After, HA



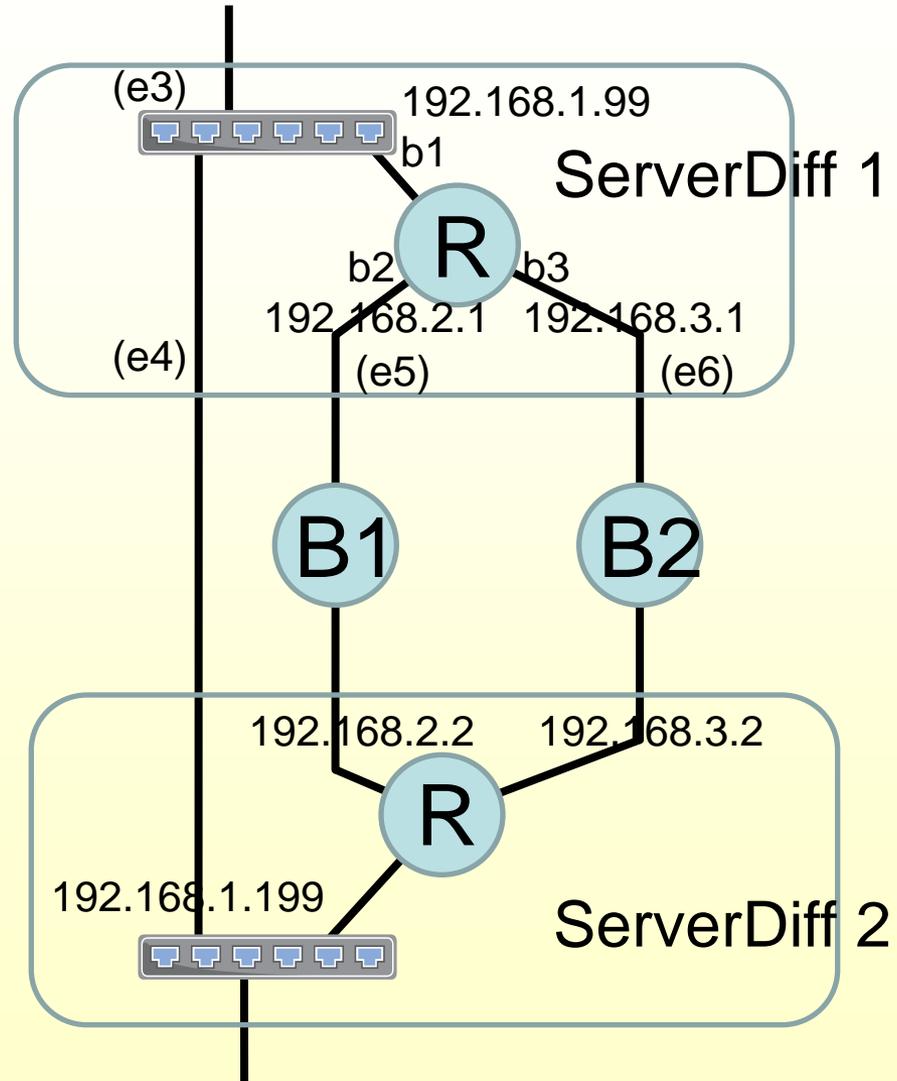
十：Bridge LB, 橋接器負載平衡, Before



Bridge LB, 包裝成router



Bridge LB, After



Bridge LB, Diff1, Three bridges

Ethernet speed, duplex and autonegotiation

| Ethernet | Speed, duplex and autonegotiation | |
|----------|-----------------------------------|----------------------|
| e1 | (HA) | |
| e2 | (HA) | |
| e3 | all-auto | Edit |
| e4 | all-auto | Edit |
| e5 | all-auto | Edit |
| e6 | all-auto | Edit |
| e7 | all-auto | Edit |
| e8 | all-auto | Edit |

Ethernet bonding

| Ethernet | Bonding mode | Bonding master | |
|----------|--------------|----------------|----------------------|
| e1 | (HA) | | |
| e2 | (HA) | | |
| e3 | balance-rr | --- | Edit |
| e4 | balance-rr | --- | Edit |
| e5 | balance-rr | --- | Edit |
| e6 | balance-rr | --- | Edit |
| e7 | balance-rr | --- | Edit |
| e8 | balance-rr | --- | Edit |

e3 VLAN setting

| VLAN ID | Attach to bridge | Path cost | Port priority | |
|---------|------------------|-----------|---------------|--|
| none | b1 | 100 | 32 | Edit |
| | | | | Insert Flush |

e4 VLAN setting

| VLAN ID | Attach to bridge | Path cost | Port priority | |
|---------|------------------|-----------|---------------|--|
| none | b1 | 100 | 32 | Edit |
| | | | | Insert Flush |

e5 VLAN setting

| VLAN ID | Attach to bridge | Path cost | Port priority | |
|---------|------------------|-----------|---------------|--|
| none | b2 | 100 | 32 | Edit |
| | | | | Insert Flush |

e6 VLAN setting

| VLAN ID | Attach to bridge | Path cost | Port priority | |
|---------|------------------|-----------|---------------|--|
| none | b3 | 100 | 32 | Edit |
| | | | | Insert Flush |

Bridge LB, Diff1 IP

Bridge b1 IP

| Index | IP/mask | Insert |
|-------|-----------------|--|
| 1 | 192.168.1.99/24 | Edit Delete Insert |

Bridge b2 IP

| Index | IP/mask | Insert |
|-------|----------------|--|
| 1 | 192.168.2.1/24 | Edit Delete Insert |

Bridge b3 IP

| Index | IP/mask | Insert |
|-------|----------------|--|
| 1 | 192.168.3.1/24 | Edit Delete Insert |

Static routes

| Index | Destination subnet | Gateway | Insert |
|-------|--------------------|---------|------------------------|
|-------|--------------------|---------|------------------------|

Default route

192.168.1.1

[Edit](#)

IPv6 static routes

| Index | Destination subnet | Gateway | Insert |
|-------|--------------------|---------|------------------------|
|-------|--------------------|---------|------------------------|

IPv6 default route

[Edit](#)

DNS servers

192.168.1.1

[Edit](#)

Bridge LB, Diff1 SLB group 1

Parameters

Enabled or disabled: Enabled

Group name: Bridge_LB

Virtual IP:

Virtual IP6:

Ports: TCP80,TCP443

Load balancing algorithm: WRR

Health check method: PING

Ping TTL: 128

Health check interval (in sec): 10

Health check target:

Health check counts: 1:1:0:1:1:0

Granularity: S

SD timeout (in sec): 600

SD connection limit:1000000

Log: on

SNAT IP:

SNAT IP6:

DNAT: off

Allow unreplied: off

Reply to server: off

All servers down action: CONTINUE

One server down action: CONTINUE

Server list

| Index | Server IP | Server IP6 | Weight | Connection limit | SD limit | |
|-------|-------------|------------|--------|------------------|------------|--------------------|
| 1 | 192.168.2.2 | | 1 | 1000000000 | 1000000000 | Ed |
| 2 | 192.168.3.2 | | 1 | 1000000000 | 1000000000 | Ed |

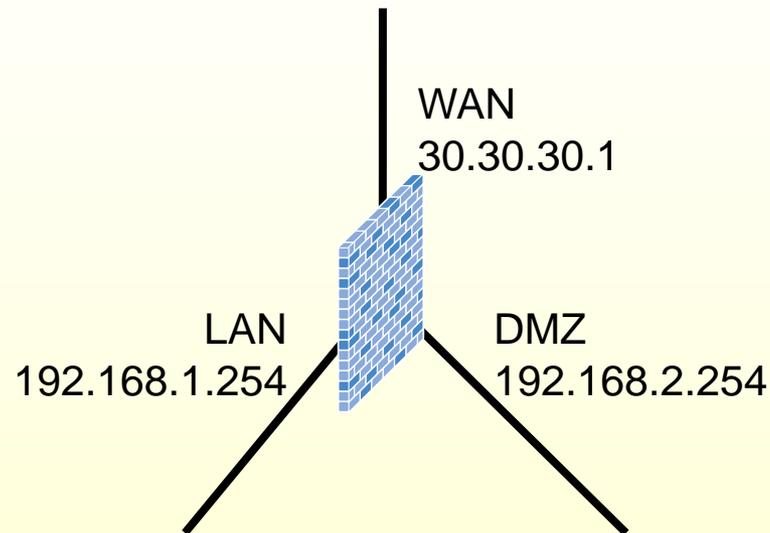
[Edit](#)

Bridge LB, Diff1 Infilter

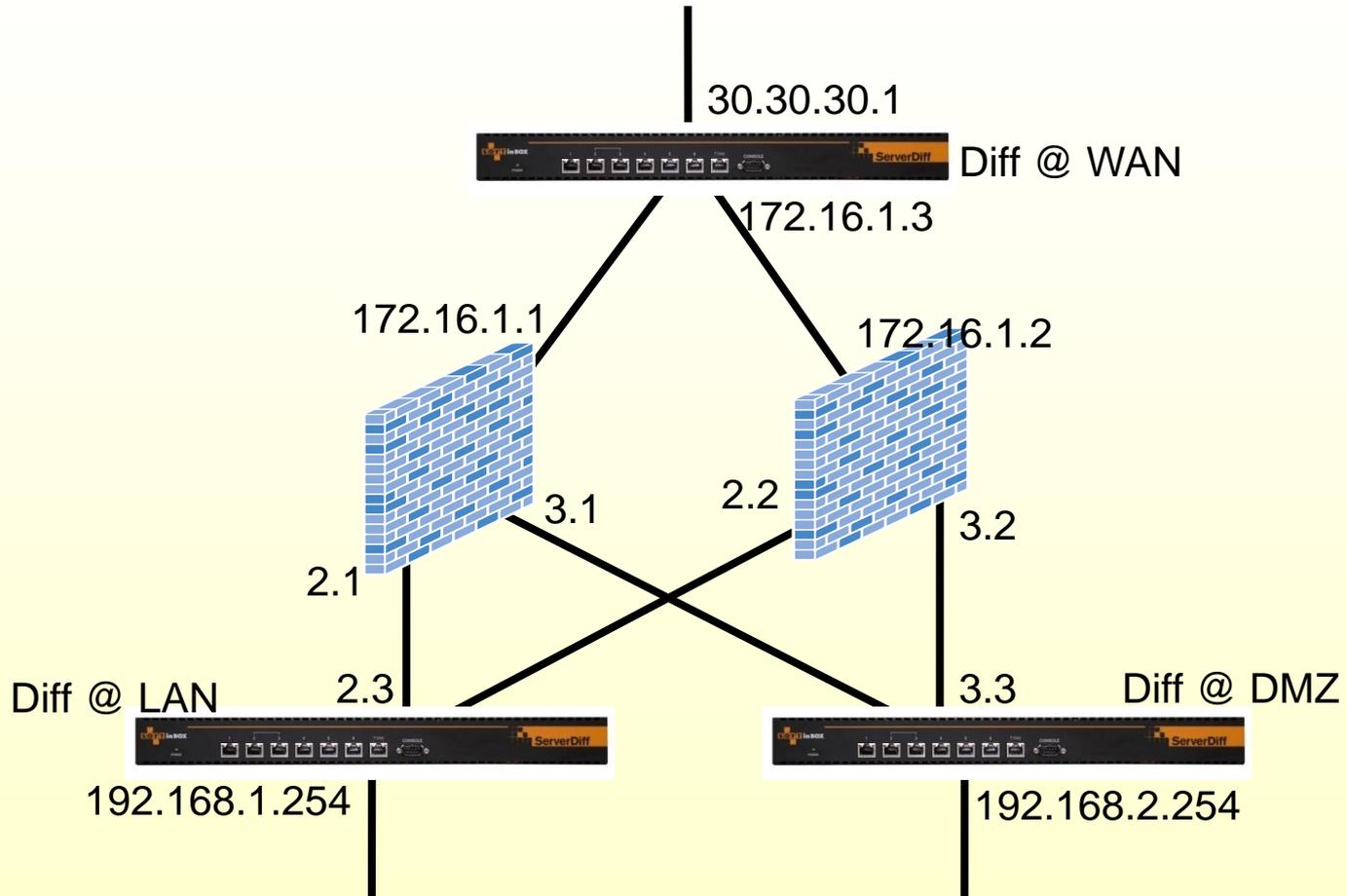
Inbound filters

| Index | Label | Bridge | Source IP | Destination IP | Misc. | Log | Action | |
|-------|---------|--------|-----------|----------------|----------------------------|-----|----------------------|--------------------|
| 1 | | | | | forwarded_from=192.168.2.2 | on | CALL From_B1 | Ec |
| 2 | | | | | forwarded_from=192.168.3.2 | on | CALL From_B2 | Ec |
| 3 | | | | 192.168.1.99 | | on | ACCEPT | Ec |
| 4 | | | | | | on | L4SW G1 | Ec |
| <hr/> | | | | | | | | |
| 5 | From_B1 | | | | | on | REPLY_GW 192.168.2.2 | Ec |
| 6 | | | | | | on | ACCOUNT_FROM G1 S1 | Ec |
| 7 | | | | | | on | ACCEPT | Ec |
| <hr/> | | | | | | | | |
| 8 | From_B2 | | | | | on | REPLY_GW 192.168.3.2 | Ec |
| 9 | | | | | | on | ACCOUNT_FROM G1 S2 | Ec |
| 10 | | | | | | on | ACCEPT | Ec |

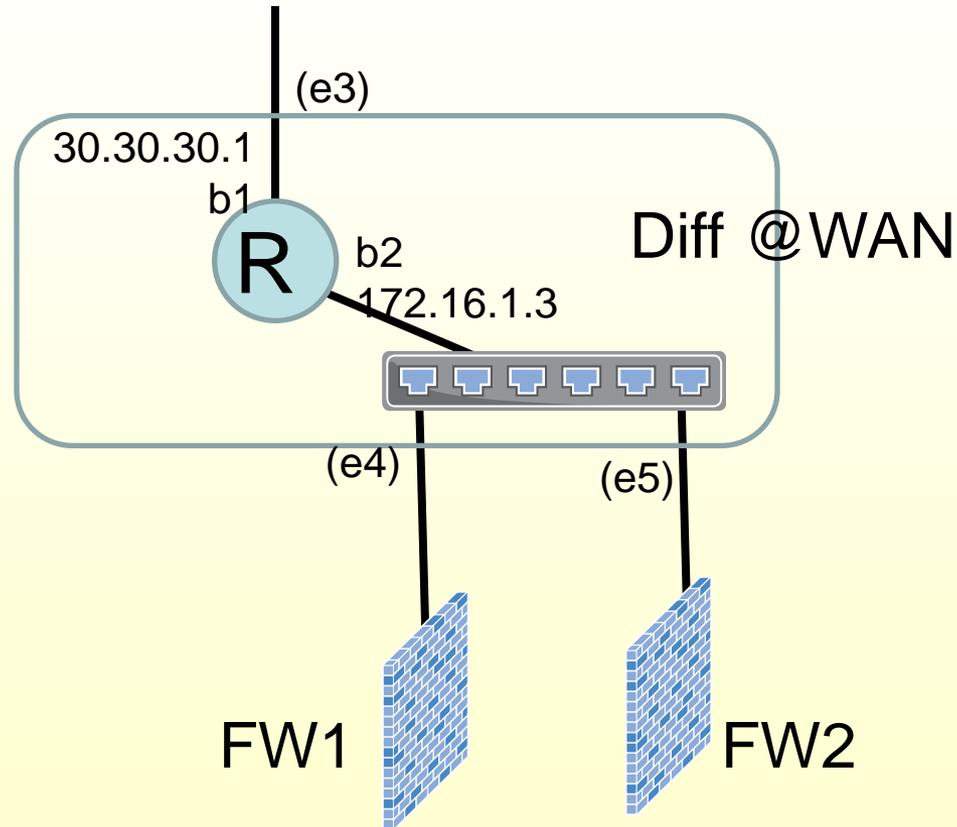
+ - : FW LB, Before



FW LB, After



FW LB, Diff @ WAN



FW LB, Diff @ WAN

Two Bridges

Ethernet speed, duplex and autonegotiation

| Ethernet | Speed, duplex and autonegotiation | |
|----------|-----------------------------------|----------------------|
| e1 | (HA) | |
| e2 | (HA) | |
| e3 | all-auto | Edit |
| e4 | all-auto | Edit |
| e5 | all-auto | Edit |
| e6 | all-auto | Edit |
| e7 | all-auto | Edit |
| e8 | all-auto | Edit |

Ethernet bonding

| Ethernet | Bonding mode | Bonding master | |
|----------|--------------|----------------|----------------------|
| e1 | (HA) | | |
| e2 | (HA) | | |
| e3 | balance-rr | --- | Edit |
| e4 | balance-rr | --- | Edit |
| e5 | balance-rr | --- | Edit |
| e6 | balance-rr | --- | Edit |
| e7 | balance-rr | --- | Edit |
| e8 | balance-rr | --- | Edit |

e3 VLAN setting

| VLAN ID | Attach to bridge | Path cost | Port priority | |
|---------|------------------|-----------|---------------|--|
| none | b1 | 100 | 32 | Edit |
| | | | | Insert Flush |

e4 VLAN setting

| VLAN ID | Attach to bridge | Path cost | Port priority | |
|---------|------------------|-----------|---------------|--|
| none | b2 | 100 | 32 | Edit |
| | | | | Insert Flush |

e5 VLAN setting

| VLAN ID | Attach to bridge | Path cost | Port priority | |
|---------|------------------|-----------|---------------|--|
| none | b2 | 100 | 32 | Edit |
| | | | | Insert Flush |

FW LB, Diff @ WAN IP configs

Bridge b1 IP

| Index | IP/mask | | Insert |
|-------|---------------|--|------------------------|
| 1 | 30.30.30.1/24 | Edit Delete Down | Insert |
| 2 | 30.30.30.5/24 | Edit Delete Up | Insert |

Bridge b2 IP

| Index | IP/mask | | Insert |
|-------|---------------|---|------------------------|
| 1 | 172.16.1.3/24 | Edit Delete | Insert |

Static routes

| Index | Destination subnet | Gateway | Insert |
|-------|--------------------|---------|--|
| 1 | | | Edit Delete Insert |

Default route

30.30.30.254

[Edit](#)

IPv6 static routes

| Index | Destination subnet | Gateway | Insert |
|-------|--------------------|---------|------------------------|
|-------|--------------------|---------|------------------------|

IPv6 default route

[Edit](#)

DNS servers

8.8.8.8

[Edit](#)

FW LB, Diff @ WAN

SLB Group 1

Enabled or disabled: Enabled
Group name: FW_LB_WAN
Virtual IP:
Virtual IP6:
Ports: TCP80
Load balancing algorithm: WRR
Health check method: PING
 Ping TTL: 128
Health check interval (in sec): 10
Health check target:
Health check counts: 1:1:0:1:1:0
Granularity: S
 SD timeout (in sec): 600
 SD connection limit: 1000000
Log: on
SNAT IP:
SNAT IP6:
DNAT: off
Allow unreplied: off
Reply to server: off
All servers down action: DROP
One server down action: CONTINUE

Server list

| Index | Server IP | Server IP6 | Weight | Connection limit | SD limit | |
|-------|------------|------------|--------|------------------|------------|----------------------|
| 1 | 172.16.1.1 | | 1 | 1000000000 | 1000000000 | Edit |
| 2 | 172.16.1.2 | | 1 | 1000000000 | 1000000000 | Edit |

FW LB, Diff @ WAN Infilters 1/2

Inbound filters

| Index | Label | Bridge | Source IP | Destination IP | Misc. | Log | Action | |
|-------|----------|--------|-----------|----------------|---------------------------|-----|---------------------|--------------------|
| 1 | | | | | forwarded_from=172.16.1.1 | on | CALL From_FW1 | Ed |
| 2 | | | | | forwarded_from=172.16.1.2 | on | CALL From_FW2 | Ed |
| 3 | | | | | | on | CALL Drill_Hole | Ed |
| 4 | | | | | | on | CALL Management | Ed |
| 5 | | | | | | on | L4SW G1 | Ed |
| 6 | From_FW1 | | | | | on | REPLY_GW 172.16.1.1 | Ed |
| 7 | | | | | | on | ACCOUNT_FROM G1 S1 | Ed |
| 8 | | | | | | on | ACCEPT | Ed |

Cont. Infilters 2/2

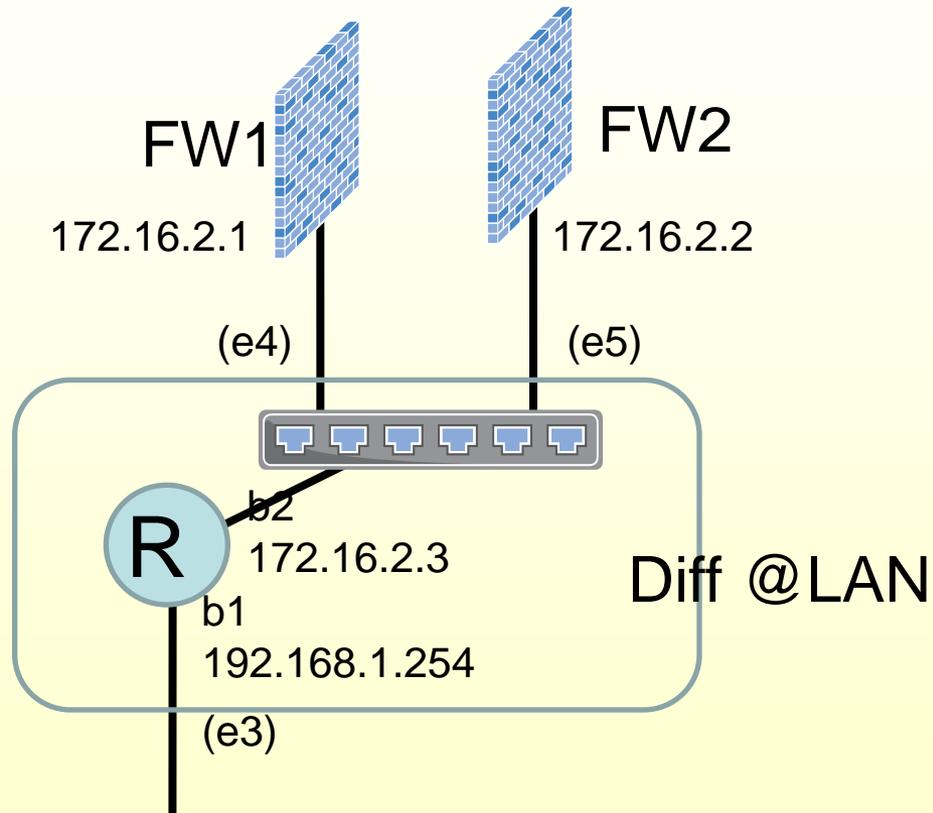
| | | | | | | | | |
|----|------------|--|------------|---------------------|--|----|--------------------------------|--------------------|
| 9 | From_FW2 | | | | | on | REPLY_GW 172.16.1.2 | Ec |
| 10 | | | | | | on | ACCOUNT_FROM G1 S2 | Ec |
| 11 | | | | | | on | ACCEPT | Ec |
| 12 | Drill_Hole | | 30.30.30.5 | TCP dstport=1022 | | on | DNAT 192.168.2.5 port 22 | Ec |
| 13 | Management | | 30.30.30.1 | | | on | DROP | Ec |
| 14 | | | 30.30.30.5 | | | on | DROP | Ec |
| 15 | | | 172.16.1.3 | | | on | ACCEPT | Ec |
| 16 | | | | | | on | ACCEPT | Ec |

FW LB, Diff @ WAN Outfilters

Outbound filters

| Index | Bridge | Source IP | Destination IP | Misc. | Log | Action | Insert |
|-------|--------|-----------|----------------|-------|-----|--------------------|--|
| 1 | b1 | | | | on | SNAT 30.30.30.1 | Edit Delete Insert |

FW LB, Diff @ LAN



FW LB, Diff @ LAN

Two Bridges

Ethernet speed, duplex and autonegotiation

Ethernet Speed, duplex and autonegotiation

| | | |
|----|----------|----------------------|
| e1 | (HA) | |
| e2 | (HA) | |
| e3 | all-auto | Edit |
| e4 | all-auto | Edit |
| e5 | all-auto | Edit |
| e6 | all-auto | Edit |
| e7 | all-auto | Edit |
| e8 | all-auto | Edit |

Ethernet bonding

Ethernet Bonding mode Bonding master

| | | | |
|----|------------|-----|----------------------|
| e1 | (HA) | | |
| e2 | (HA) | | |
| e3 | balance-rr | --- | Edit |
| e4 | balance-rr | --- | Edit |
| e5 | balance-rr | --- | Edit |
| e6 | balance-rr | --- | Edit |
| e7 | balance-rr | --- | Edit |
| e8 | balance-rr | --- | Edit |

e3 VLAN setting

| VLAN ID | Attach to bridge | Path cost | Port priority | |
|---------|------------------|-----------|---------------|--|
| none | b1 | 100 | 32 | Edit |
| | | | | Insert Flush |

e4 VLAN setting

| VLAN ID | Attach to bridge | Path cost | Port priority | |
|---------|------------------|-----------|---------------|--|
| none | b2 | 100 | 32 | Edit |
| | | | | Insert Flush |

e5 VLAN setting

| VLAN ID | Attach to bridge | Path cost | Port priority | |
|---------|------------------|-----------|---------------|--|
| none | b2 | 100 | 32 | Edit |
| | | | | Insert Flush |

FW LB, Diff @ LAN IP

Bridge b1 IP

| Index | IP/mask | Insert |
|-------|------------------|--|
| 1 | 192.168.1.254/24 | Edit Delete Insert |

Bridge b2 IP

| Index | IP/mask | Insert |
|-------|---------------|--|
| 1 | 172.16.2.3/24 | Edit Delete Insert |

Static routes

| Index | Destination subnet | Gateway | Insert |
|-------|--------------------|---------|--|
| 1 | | | Edit Delete Insert |

Default route

172.16.2.1

[Edit](#)

IPv6 static routes

| Index | Destination subnet | Gateway | Insert |
|-------|--------------------|---------|------------------------|
|-------|--------------------|---------|------------------------|

IPv6 default route

[Edit](#)

DNS servers

8.8.8.8

[Edit](#)

FW LB, Diff @ LAN

SLB Group 1

Enabled or disabled: Enabled

Group name: FW_LB_LAN

Virtual IP:

Virtual IP6:

Ports: TCP80

Load balancing algorithm: WRR

Health check method: PING

Ping TTL: 128

Health check interval (in sec): 10

Health check target:

Health check counts: 1:1:0:1:1:0

Granularity: SD

SD timeout (in sec): 600

SD connection limit: 1000000

Log: on

SNAT IP:

SNAT IP6:

DNAT: off

Allow unreplied: off

Reply to server: off

All servers down action: DROP

One server down action: CONTINUE

Server list

| Index | Server IP | Server IP6 | Weight | Connection limit | SD limit | |
|-------|------------|------------|--------|------------------|------------|----------------------|
| 1 | 172.16.2.1 | | 1 | 1000000000 | 1000000000 | Edit |
| 2 | 172.16.2.2 | | 1 | 1000000000 | 1000000000 | Edit |

[Edit](#)

FW LB, Diff @ LAN Infilters 1/2

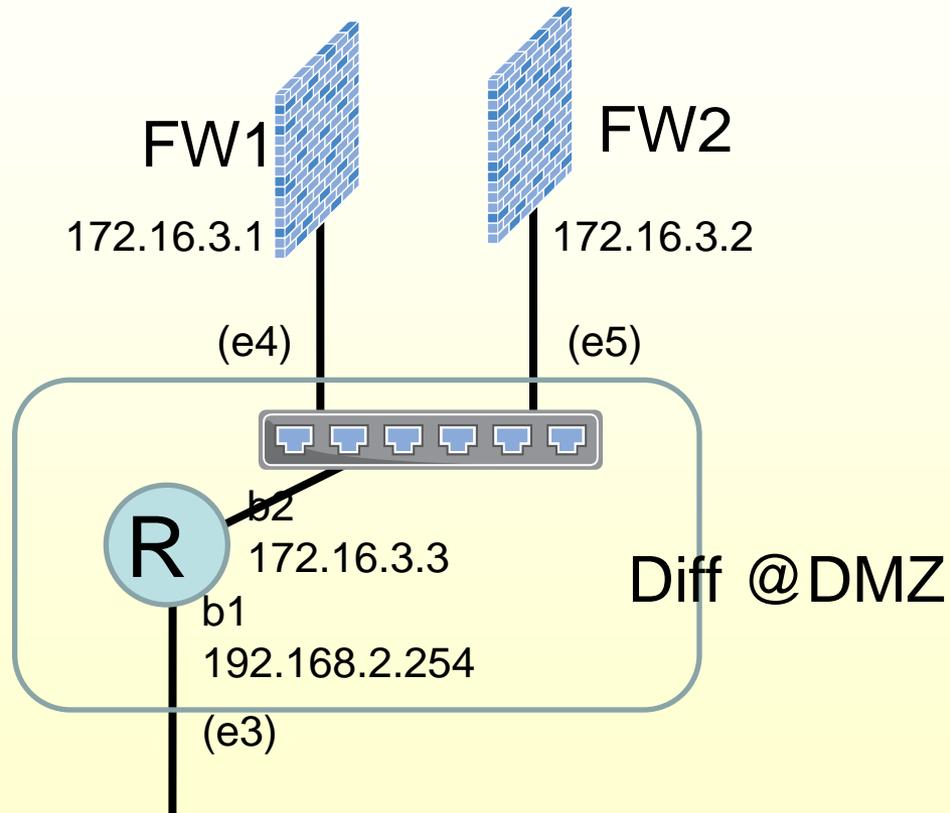
Inbound filters

| Index | Label | Bridge | Source IP | Destination IP | Misc. | Log | Action | |
|-------|-------|--------|-----------|-----------------|---------------------------|-----|--------------------|--------------------|
| 1 | | | | | forwarded_from=172.16.2.1 | on | CALL From_FW1 | Ed |
| 2 | | | | | forwarded_from=172.16.2.2 | on | CALL From_FW2 | Ed |
| 3 | | | | | | on | CALL Management | Ed |
| 4 | | | | 192.168.11.0/24 | | on | CALL VPN | Ed |
| 5 | | | | 192.168.12.0/24 | | on | CALL VPN | Ed |
| 6 | | | | | | on | L4SW G1 | Ed |

Cont. Infilters 2/2

| | | | | | | |
|----|------------|---------------|--|----|--------------------------|--------------------|
| 7 | From_FW1 | | | on | REPLY_GW 172.16.2.1 | Ec |
| 8 | | | | on | ACCOUNT_FROM G1 S1 | Ec |
| 9 | | | | on | ACCEPT | Ec |
| 10 | From_FW2 | | | on | REPLY_GW 172.16.2.2 | Ec |
| 11 | | | | on | ACCOUNT_FROM G1 S2 | Ec |
| 12 | | | | on | ACCEPT | Ec |
| 13 | Management | 192.168.1.254 | | on | ACCEPT | Ec |
| 14 | | 172.16.2.3 | | on | ACCEPT | Ec |
| 15 | | | | on | ACCEPT | Ec |
| 16 | VPN | | | on | REQ_GW 172.16.2.1 | Ec |
| 17 | | | | on | ACCEPT | Ec |

FW LB, Diff @ DMZ



FW LB, Diff @ DMZ

Two Bridges

Ethernet speed, duplex and autonegotiation

Ethernet Speed, duplex and autonegotiation

| | | |
|----|----------|----------------------|
| e1 | (HA) | |
| e2 | (HA) | |
| e3 | all-auto | Edit |
| e4 | all-auto | Edit |
| e5 | all-auto | Edit |
| e6 | all-auto | Edit |
| e7 | all-auto | Edit |
| e8 | all-auto | Edit |

Ethernet bonding

Ethernet Bonding mode Bonding master

| | | |
|----|------------|-----|
| e1 | (HA) | |
| e2 | (HA) | |
| e3 | balance-rr | --- |
| e4 | balance-rr | --- |
| e5 | balance-rr | --- |
| e6 | balance-rr | --- |
| e7 | balance-rr | --- |
| e8 | balance-rr | --- |

e3 VLAN setting

| VLAN ID | Attach to bridge | Path cost | Port priority | |
|---------|------------------|-----------|---------------|--|
| none | b1 | 100 | 32 | Edit |
| | | | | Insert Flush |

e4 VLAN setting

| VLAN ID | Attach to bridge | Path cost | Port priority | |
|---------|------------------|-----------|---------------|--|
| none | b2 | 100 | 32 | Edit |
| | | | | Insert Flush |

e5 VLAN setting

| VLAN ID | Attach to bridge | Path cost | Port priority | |
|---------|------------------|-----------|---------------|--|
| none | b2 | 100 | 32 | Edit |
| | | | | Insert Flush |

FW LB, Diff @ DMZ IP

Bridge b1 IP

| Index | IP/mask | Insert |
|-------|------------------|--|
| 1 | 192.168.2.254/24 | Edit Delete Insert |

Bridge b2 IP

| Index | IP/mask | Insert |
|-------|---------------|--|
| 1 | 172.16.3.3/24 | Edit Delete Insert |

Static routes

| Index | Destination subnet | Gateway | Insert |
|-------|--------------------|---------|--|
| 1 | [REDACTED] | | Edit Delete Insert |

Default route

172.16.3.1

[Edit](#)

IPv6 static routes

| Index | Destination subnet | Gateway | Insert |
|-------|--------------------|---------|------------------------|
|-------|--------------------|---------|------------------------|

IPv6 default route

[Edit](#)

DNS servers

8.8.8.8

[Edit](#)

FW LB, Diff @ DMZ

SLB Group 1

Enabled or disabled: Enabled

Group name: FW_LB_DMZ

Virtual IP:

Virtual IP6:

Ports: TCP80

Load balancing algorithm: WRR

Health check method: PING

 Ping TTL: 128

Health check interval (in sec): 10

Health check target:

Health check counts: 1:1:0:1:1:0

Granularity: SD

 SD timeout (in sec): 600

 SD connection limit: 1000000

Log: on

SNAT IP:

SNAT IP6:

DNAT: off

Allow unreplied: off

Reply to server: off

All servers down action: DROP

One server down action: CONTINUE

Server list

| Index | Server IP | Server IP6 | Weight | Connection limit | SD limit | |
|-------|------------|------------|--------|------------------|------------|----------------------|
| 1 | 172.16.3.1 | | 1 | 1000000000 | 1000000000 | Edit |
| 2 | 172.16.3.2 | | 1 | 1000000000 | 1000000000 | Edit |

[Edit](#)

FW LB, Diff @ DMZ

Infilters 1/2

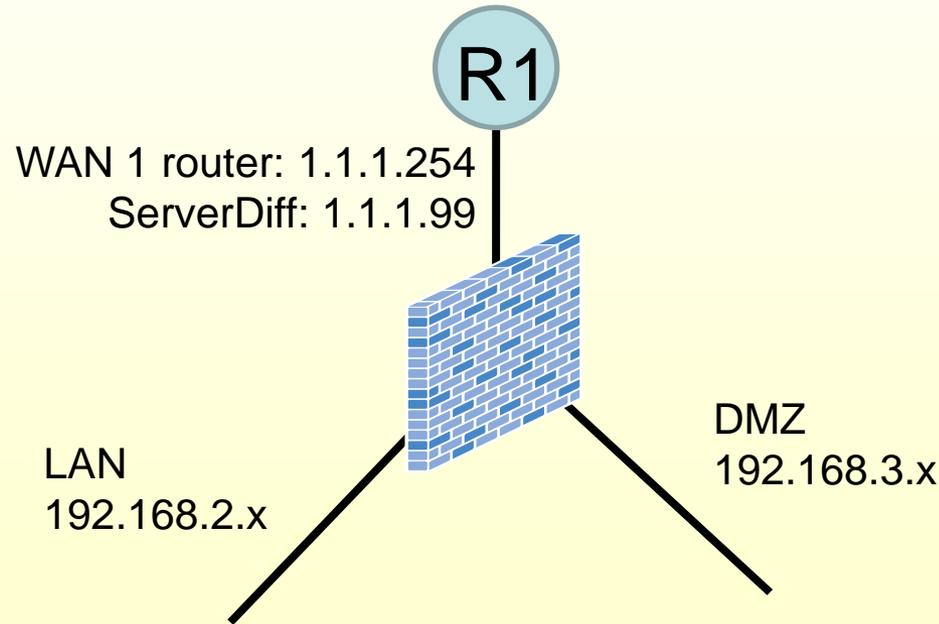
| Inbound filters | | | | | | | |
|-----------------|-------|--------|-----------|-----------------|---------------------------|-----|-----------------|
| Index | Label | Bridge | Source IP | Destination IP | Misc. | Log | Action |
| 1 | | | | | forwarded_from=172.16.3.1 | on | CALL From_FW1 |
| 2 | | | | | forwarded_from=172.16.3.2 | on | CALL From_FW2 |
| 3 | | | | | | on | CALL Management |
| 4 | | | | 192.168.11.0/24 | | on | CALL VPN |
| 5 | | | | 192.168.12.0/24 | | on | CALL VPN |
| 6 | | | | | | on | L4SW G1 |

Cont. Infilters 2/2

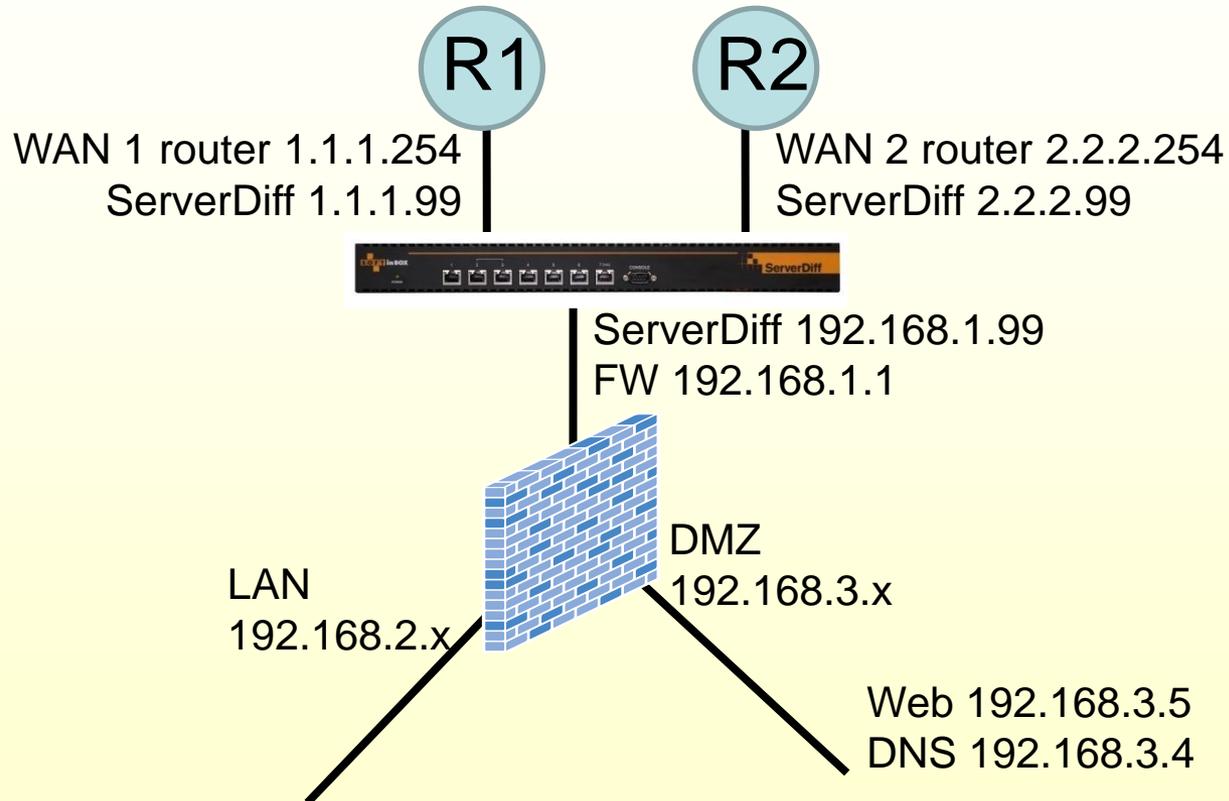
| | | | | | | |
|----|------------|---------------|--|----|--------------------------|-------------------|
| 7 | From_FW1 | | | on | REPLY_GW 172.16.3.1 | E |
| 8 | | | | on | ACCOUNT_FROM G1 S1 | E |
| 9 | | | | on | ACCEPT | E |
| 10 | From_FW2 | | | on | REPLY_GW 172.16.3.2 | E |
| 11 | | | | on | ACCOUNT_FROM G1 S2 | E |
| 12 | | | | on | ACCEPT | E |
| 13 | Management | 192.168.2.254 | | on | ACCEPT | E |
| 14 | | 172.16.3.3 | | on | ACCEPT | E |
| 15 | | | | on | ACCEPT | E |
| 16 | VPN | | | on | REQ_GW 172.16.3.1 | E |
| 17 | | | | on | ACCEPT | E |

十二: WAN LB

Inbound and Outbound Before



After



Tasks

- 從裡面(LAN & DMZ)往外(Internet)的連線：**LB在2條線路上。**
- 從外往內的連線：**哪條線進來的就從哪條線回去。**
- 到**1.1.1.5 & 2.2.2.5**，map去web server **192.168.3.5**
- 問**www.abc.com**：看線路的健康狀態，回答**1.1.1.5 & 2.2.2.5**

Bridge IP config

Bridge b1 IP

| Index | IP/mask | | Insert |
|-------|-----------------|--|------------------------|
| 1 | 192.168.1.99/24 | Edit Delete Down | Insert |
| 2 | 10.53.3.99/24 | Edit Delete Up | Insert |

Default route

192.168.1.1

[Edit](#)

Bridge b2 IP

| Index | IP/mask | | Insert |
|-------|-------------|---|------------------------|
| 1 | 1.1.1.99/24 | Edit Delete Down | Insert |
| 2 | 1.1.1.5/24 | Edit Delete Up Down | Insert |
| 3 | 1.1.1.4/24 | Edit Delete Up | Insert |

Bridge b3 IP

| Index | IP/mask | | Insert |
|-------|-------------|---|------------------------|
| 1 | 2.2.2.99/24 | Edit Delete Down | Insert |
| 2 | 2.2.2.5/24 | Edit Delete Up Down | Insert |
| 3 | 2.2.2.4/24 | Edit Delete Up | Insert |

Group 1: Outbound LB

Parameters

Enabled or disabled: Enabled

Group name: WAN_LB

Virtual IP:

Virtual IP6:

Ports: TCP80

Load balancing algorithm: WRR

Health check method: PING

 Ping TTL: 4

Health check interval (in sec): 10

Health check target: 8.8.8.8

Health check counts: 1:1:0:1:1:0

Granularity: SD

 SD timeout (in sec): 10

 SD connection limit: 1000000

Log: on

SNAT IP:

SNAT IP6:

DNAT: off

Allow unreplied: off

Reply to server: off

All servers down action: DROP

One server down action: CONTINUE

[Edit](#)

Server list

| Index | Server IP | Server IP6 | Weight | Connection limit | SD limit | SNAT IP | SNAT IP6 |
|-------|-----------|------------|--------|------------------|------------|----------|-------------------|
| 1 | 1.1.1.254 | | 1 | 1000000000 | 1000000000 | 1.1.1.99 | E |
| 2 | 2.2.2.254 | | 1 | 1000000000 | 1000000000 | 2.2.2.99 | E |

Infilter 1/2

| Inbound filters | | | | | | | |
|-----------------|------------|--------|-----------|----------------|-------|-----|--|
| Index | Label | Bridge | Source IP | Destination IP | Misc. | Log | Action |
| 1 | | | | | | on | CALL Management Ed |
| 2 | | | | | | on | CALL Reply_properly Ed |
| 3 | | | | | | on | CALL Static_mapping Ed |
| 4 | | | | | | on | CALL Inbound_LB Ed |
| 5 | | | | | | on | CALL Outbound_LB Ed |
| 6 | Management | b1 | | 192.168.1.99 | | on | ACCEPT Ed |
| 7 | | | | | | on | ACCEPT Ed |

Infilter 2/2

| | | | | | | | |
|----|----------------|----|---------|--------------------------|----|-----------------------|--------------------|
| 8 | Reply_properly | b2 | | forwarded_from=1.1.1.254 | on | REPLY_GW 1.1.1.254 | Ec |
| 9 | | b3 | | forwarded_from=2.2.2.254 | on | REPLY_GW 2.2.2.254 | Ec |
| 10 | Static_mapping | b2 | 1.1.1.5 | TCP dstport=80 | on | DNAT 192.168.3.5 | Ec |
| 11 | | b3 | 2.2.2.5 | TCP dstport=80 | on | DNAT 192.168.3.5 | Ec |
| 12 | Outbound_LB | b1 | | | on | L4SW G1 | Ec |
| 13 | Inbound_LB | b2 | 1.1.1.4 | UDP dstport=53 | on | DNSPROXY proxy 1 | Ec |
| 14 | | b3 | 2.2.2.4 | UDP dstport=53 | on | DNSPROXY proxy 1 | Ec |

DNS proxy for inbound LB

Proxy 1 parameters

Log: on
TTL: 30

[Edit](#)

Proxy 1 upstream server list

| Index | Domain | Server IP | Insert |
|-------|---------|-------------|--|
| 1 | abc.com | 192.168.3.4 | Edit Delete Insert |

Proxy 1 record 1 parameters

Hostname: www.abc.com
Algorithm: ALL

[Edit](#)

Proxy 1 record 1 target list

| Index | Reply IP | Health check |
|-------|----------|--------------------------------------|
| 1 | 1.1.1.5 | Local SLB group 2 Ec |
| 2 | 2.2.2.5 | Local SLB group 3 Ec |

Group 2: WAN 1 health check

Parameters

Enabled or disabled: Enabled

Group name: WAN_1_check

Virtual IP:

Virtual IP6:

Ports: TCP80

Load balancing algorithm: WRR

Health check method: PING

Ping TTL: 4

Health check interval (in sec): 10

Health check target: 8.8.8.8

Health check counts: 1:1:0:1:1:0

Granularity: TCP

Log: on

SNAT IP:

SNAT IP6:

DNAT: on

Allow unreplied: off

Reply to server: off

All servers down action: DROP

One server down action: CONTINUE

[Edit](#)

Server list

| Index | Server IP | Server IP6 | Weight | Connection limit | SNAT IP | SNAT IP6 |
|-------|-----------|------------|--------|------------------|----------|--------------------|
| 1 | 1.1.1.254 | | 1 | 1000000000 | 1.1.1.99 | Ec |

Group 3: WAN 2 health check

Parameters

Enabled or disabled: Enabled
Group name: WAN_2_check
Virtual IP:
Virtual IP6:
Ports: TCP80
Load balancing algorithm: WRR
Health check method: PING
 Ping TTL: 4
Health check interval (in sec): 10
Health check target: 8.8.8.8
Health check counts: 1:1:0:1:1:0
Granularity: TCP
Log: on
SNAT IP:
SNAT IP6:
DNAT: on
Allow unreplied: off
Reply to server: off
All servers down action: DROP
One server down action: CONTINUE

[Edit](#)

Server list

| Index | Server IP | Server IP6 | Weight | Connection limit | SNAT IP | SNAT IP6 |
|-------|-----------|------------|--------|------------------|----------|-------------------|
| 1 | 2.2.2.254 | | 1 | 1000000000 | 2.2.2.99 | E |

十三: GSLB

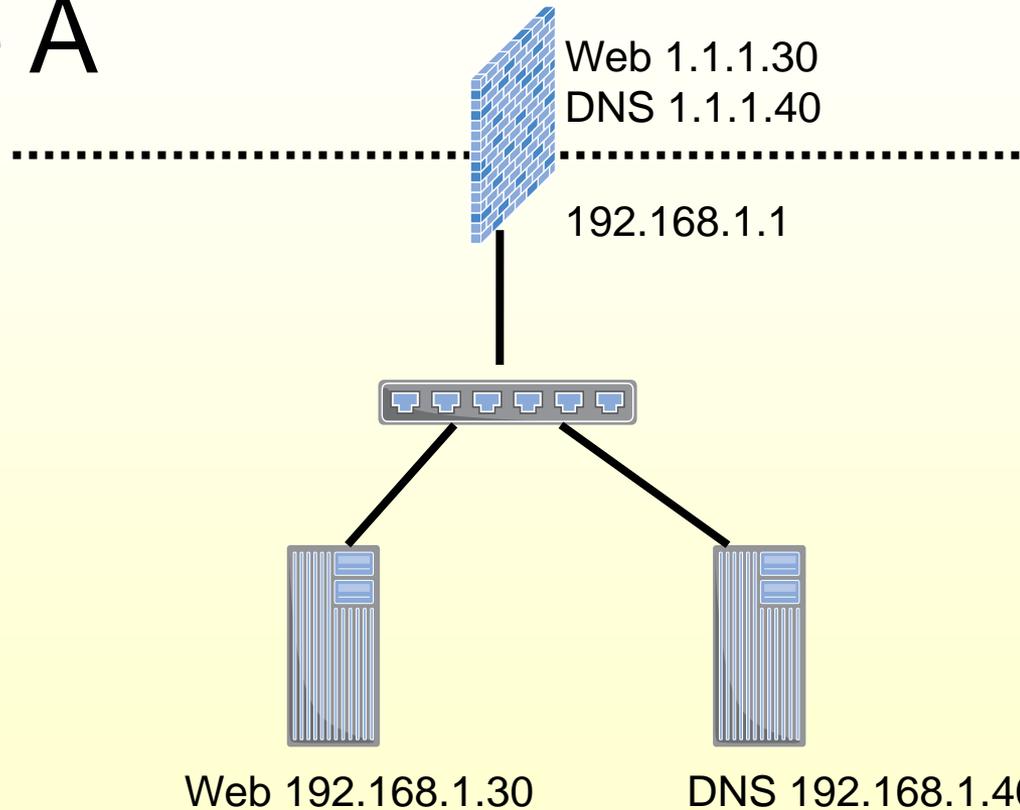
- **Global Server Load Balance** 廣域伺服器負載平衡。
- 地理上相隔遙遠的二個或多個提供相同服務的伺服器群組，可同時提供服務，互相備援。
- 藉由操作**DNS**回應，適當回應可以提供服務的伺服器群組。
- 支援透明安裝。不需變更**DNS**伺服器和上層**DNS**伺服器的設定。

GSLB: Before

- www.abc.com
- Two sites: Site A and Site B.
- Site A: Web_A at 1.1.1.30, DNS_A at 1.1.1.40
- Site B: Web_B at 2.2.2.30, DNS_B at 2.2.2.40
- DNS回答www.abc.com有1.1.1.30 and 2.2.2.30二個IP.

GSLB: Before

Site A

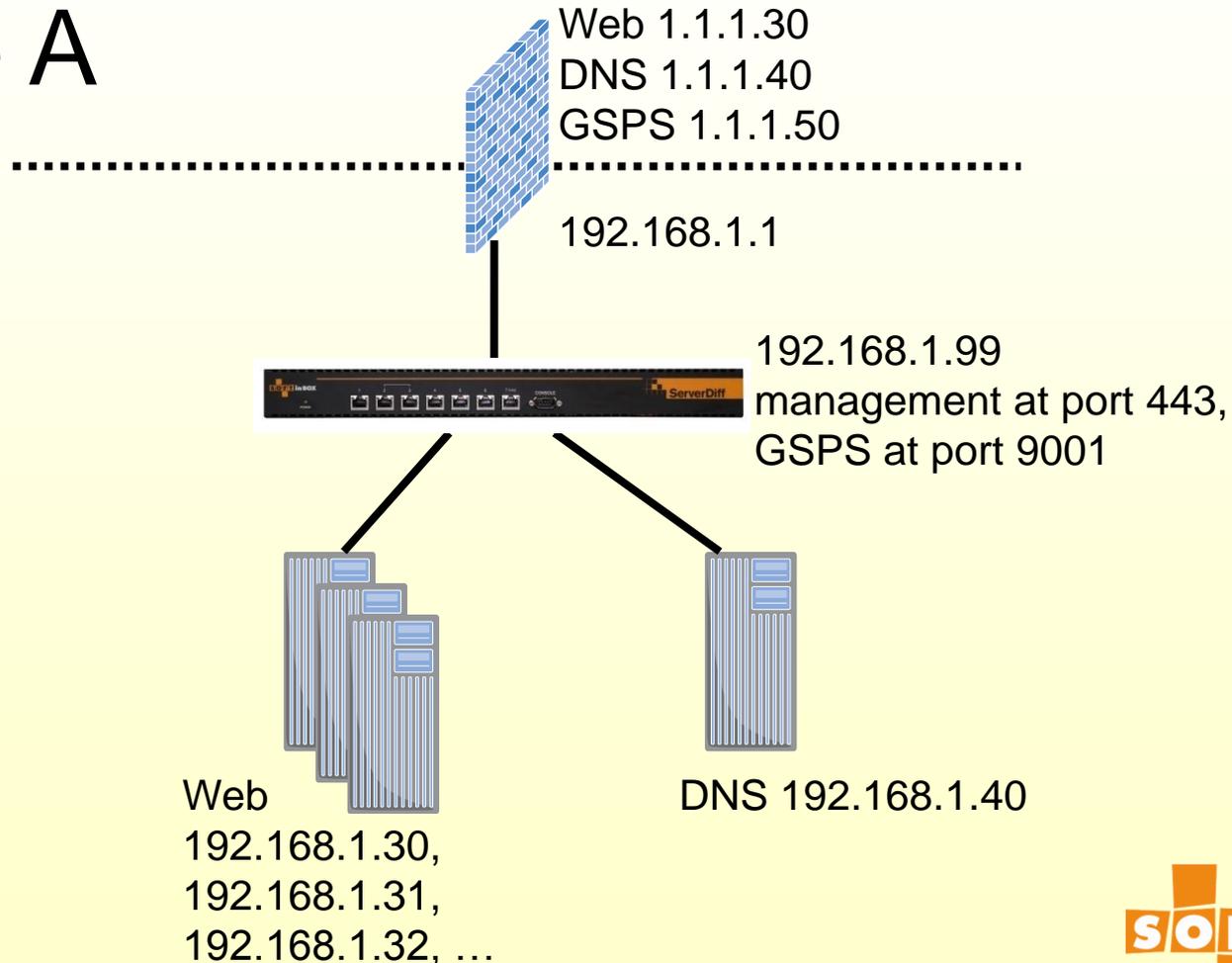


GSLB: After

- 每個site加一台ServerDiff，負責1) Monitor 二個sites的web service的狀態，and 2) 當成DNS proxy, 依照偵測的狀態，回答對應的一個或二個IP(s).

GSLB: After

Site A



GSLB config

Proxy 1 parameters

Log: on

TTL: 60

[Edit](#)

Proxy 1 upstream server list

| Index | Domain | Server IP | |
|-------|---------|--------------|---|
| 1 | abc.com | 192.168.1.40 | Edit Delete |

Proxy 1 record 1 parameters

Hostname: www.abc.com

Algorithm: ALL

[Edit](#)

Proxy 1 record 1 target list

| Index | Reply IP | Health check | |
|-------|----------|--|----------------------|
| 1 | 1.1.1.30 | Local SLB group 1 | Edit |
| 2 | 2.2.2.30 | Remote SLB group 1 at 2.2.2.50:9001 | Edit |

Inbound filters

| Index | Label | Bridge | Source IP | Destination IP | Misc. | Log | Action |
|-------|-------|--------|-----------|----------------|---------------------|-----|---------------------------------------|
| 1 | | | | 192.168.1.40 | UDP dstport=53 | on | DNSPROXY proxy 1 Edit |
| 2 | | | | 192.168.1.40 | TCP dstport=53 | on | DNSPROXY proxy 1 Edit |
| 3 | | | | 192.168.1.99 | TCP dstport=9001 | on | GSPS Edit |

IP watch

| Index | IP | Bridge | |
|-------|--------------|--------|--|
| 1 | 192.168.1.40 | b1 | Edit Delete Insert |

GSLB health check methods

- **Always on:** 假設這個群組永遠是健康的，可以提供服務。
- **Local:** 回應本地（本機）某個群組的健康狀態。
- **Remote:** 回應遠地某個群組的健康狀態。

GSLB algorithms

- ALL : 回答所有健康的伺服器群組
- FIRST : 回答第一個健康的伺服器群組

軟體更新

- 請先保留一份設定檔（以防萬一）
- 軟體更新檔檔名範例：`serverdiff-v5.0.0.bin`
- **Web UI:** 工具 / 系統 / 上傳軟體
- 要等UI有回應才算完成，期間絕對不可關掉電源
- 重開機後才是執行新版本
- 請自行確定設定是否依然正確（偶爾語法有變或是有新增功能）

代用機

- 機器故障維修期間，提供代用機服務
- 請配合提供：機器型號，機器序號，軟體版本
- 機器的設定檔平時務必要有備份
- 有些設定並未在設定檔裡：**tool hostname, tool halink, tool bypass**，請自行重新設定

伺服器測試次數調整

- 伺服器健康測試太敏感，容易在log看到down後很快(10S \doteq sd timeout)就up

```
Nov 2 08:25:59 serverdiff: Group 1 server 2 UP.  
Nov 2 08:26:26 serverdiff: Group 1 server 4 DOWN.  
Nov 2 08:26:35 serverdiff: Group 1 server 4 UP.  
Nov 2 08:26:53 serverdiff: Group 1 server 2 DOWN.  
Nov 2 08:27:02 serverdiff: Group 1 server 2 UP.  
Nov 2 08:27:47 serverdiff: Group 1 server 4 DOWN.  
Nov 2 08:27:56 serverdiff: Group 1 server 4 UP.  
Nov 2 08:28:23 serverdiff: Group 1 server 1 DOWN.  
Nov 2 08:28:32 serverdiff: Group 1 server 1 UP.  
Nov 2 08:28:59 serverdiff: Group 1 server 1 DOWN.  
Nov 2 08:29:08 serverdiff: Group 1 server 1 UP.  
Nov 2 08:29:08 serverdiff: Group 1 server 2 DOWN.  
Nov 2 08:29:17 serverdiff: Group 1 server 2 UP.  
Nov 2 08:30:11 serverdiff: Group 1 server 4 DOWN.
```

- 可調整健康測試次數，例1:1:0:1:1:0 -> 2:1:1:1:1:0

伺服器下線維修

- 伺服器4想要增加RAM，需要斷電下線。
- 首先把伺服器4的mode改成Half。

群組1 (Web sample) 狀態

| 編號 | 伺服器IP位址 | | 狀態 | 權重 | 連線數 | Session數 | Mode |
|----|------------|---|----|----|-------|----------|-------------------------|
| 1 | 10.53.3.13 |  | 健康 | 1 | 23953 | 179086 | On 變更 |
| 2 | 10.53.3.14 |  | 健康 | 1 | 23889 | 179086 | On 變更 |
| 3 | 10.53.3.15 |  | 健康 | 1 | 24114 | 179086 | On 變更 |
| 4 | 10.53.3.16 |  | 健康 | 1 | 24033 | 179085 | Half 變更 |

- 這樣，新的連線就不會進來伺服器4了。原來在伺服器4上的舊連線會繼續維持，不會中斷。

- 伺服器4的連線數和session數會漸漸變小，最後變成0。

群組1 (Web sample) 狀態

| 編號 | 伺服器IP位址 | | 狀態 | 權重 | 連線數 | Session數 | Mode |
|----|------------|---|----|----|-------|----------|-------------------------|
| 1 | 10.53.3.13 |  | 健康 | 1 | 31769 | 253618 | On 變更 |
| 2 | 10.53.3.14 |  | 健康 | 1 | 32033 | 253584 | On 變更 |
| 3 | 10.53.3.15 |  | 健康 | 1 | 32169 | 253561 | On 變更 |
| 4 | 10.53.3.16 |  | 健康 | 0 | 0 | 0 | Half 變更 |

- 這時候就可以把伺服器4斷電，加RAM。

- 維修完成後，把伺服器4的Mode換回On。就會漸漸有連線和session分給伺服器4。

群組1 (Web sample) 狀態

| 編號 | 伺服器IP位址 | | 狀態 | 權重 | 連線數 | Session數 | Mode |
|----|------------|---|----|----|-------|----------|-----------------------|
| 1 | 10.53.3.13 |  | 健康 | 1 | 24110 | 169118 | On 變更 |
| 2 | 10.53.3.14 |  | 健康 | 1 | 23794 | 169118 | On 變更 |
| 3 | 10.53.3.15 |  | 健康 | 1 | 23868 | 169117 | On 變更 |
| 4 | 10.53.3.16 |  | 健康 | 1 | 24198 | 169117 | On 變更 |

- 在這期間，所有的連線都可以好好完成，不會中斷。

Infilter行走規則

- 從第一條開始，一條一條往下走。
- 走某一條規則時，如果前半都符合（例如來源IP，目的IP等等），就會去做action指定的動作。如果log是on，也會在connection logs留下紀錄。

Infilter Actions 1/3

| | |
|----------------------|---|
| CONTINUE | 不做事。通常只是方便log。繼續走infilter。 |
| ACCEPT | 接受連線。離開infilter。 |
| DROP | 丟棄連線。離開infilter。 |
| REJECT | 丟棄連線，並回應reject封包。離開infilter。 |
| CALL <label> | 跳去label是<label>的infilter block。 |
| RETURN | 回到呼叫這塊infilter block的點。 |
| SLAVE | 如果連線是SNMP，會離開infilter並丟去備援機。不然會繼續走infilter。 |
| Reply GW <gateway> | 這連線的回程封包會送去指定的gateway。繼續走infilter。 |
| Request GW <gateway> | 這連線的去程封包會送去指定的gateway。繼續走infilter。 |

Infilter Actions 2/3

| | |
|--------------------------------------|---|
| SNAT <ip> | 連線的來源IP改成<ip>。繼續走infilter。 |
| DNAT <ip> [<port>] | 連線的目的IP改成<ip>。如果有指定<port>，那目的port也會改。繼續走infilter。 |
| Account From group <g> server <s> | 把這條連線當成是群組<g>伺服器<s>的連線。繼續走infilter。 |
| DNS Proxy | 把連線導去ServerDiff的DNS proxy，去做GSLB。繼續走infilter。 |
| GSPS | 把連線導去ServerDiff的GSPS (Group Status Protocol Service)。這是給GSLB用的。繼續走infilter。 |

Infilter Actions 3/3

| | |
|---|---|
| L4SW to group <g> | 導去群組<g>做load balance。如果有被load balance去某台伺服器，就會離開infilter。如果被drop，就會被drop。如果被continue，就會繼續走infilter。 |
| L4SW to group <g> with source IP over-ride <ip> | 導去群組<g>做load balance。假裝來源IP是<ip>。 |
| L4SW to group <g> with source mask <mask> | 導去群組<g>做load balance。來源IP會被<mask>遮罩。 |

Performance Evaluation

- 以100Mbps流量（頻寬實測值）為例：
- 測試參數：
 - Connection rate (connections per second): 1,000 CPS.
 - Per connection: 1.25KB to server and 12.5KB from server.
- 觀察結果：
 - L2 BW: 124M bps TX and RX.
 - L2 packet rate (packets per second): 25.8K PPS TX and RX.

IP衝突測試

- 請在console介面使用
- 使用例：看Management IP有沒有被其他主機占用
- `tool arping b1 192.168.1.99`
- 如果有回答，表示有IP衝突

網頁測試模擬

- 健康測試方式選用網頁測試時，有時很難 debug 到底哪裡設錯了
- 在 console 介面下使用
- `tool http_simulate group 1 server 1`

- 例如我設了group 2去測www.google.com的server, 但是抓不到200 OK

```
min# tool http_simulate group 2 server 1
GET / HTTP/1.1
Host: www.google.com

HTTP/1.1 302 Found
Cache-Control: private
Content-Type: text/html; charset=UTF-8
Location: http://www.google.com.tw/?gfe_rd=cr&ei=F559VPiDCc651QWPoIHwCA
Content-Length: 262
Date: Tue, 02 Dec 2014 11:10:15 GMT
Server: GFE/2.0
Alternate-Protocol: 80:quic,p=0.02

<HTML><HEAD><meta http-equiv="content-type" content="text/html; charset=utf-8">
<TITLE>302 Moved</TITLE></HEAD><BODY>
<H1>302 Moved</H1>
The document has moved
<A HREF="http://www.google.com.tw/?gfe_rd=cr&ei=F559VPiDCc651QWPoIHwCA">here
</A>.
</BODY></HTML>
admin#
```

- 把host to check改成www.google.com.tw就可以了

```
admin# tool http_simulate group 2 server 1
GET / HTTP/1.1
Host: www.google.com.tw

HTTP/1.1 200 OK
Date: Tue, 02 Dec 2014 11:12:01 GMT
Expires: -1
Cache-Control: private, max-age=0
Content-Type: text/html; charset=Big5
Set-Cookie: PREF=ID=6d64df77b2a801c8:FF=0:TM=1417518721:LM=1417518721:S=rOfucdB0
n3Wmg7MV; expires=Thu, 01-Dec-2016 11:12:01 GMT; path=/; domain=.google.com.tw
Set-Cookie: NID=67=eiUvhD090R3dSIiS-vcEzVe3TtwtUTIQknnInxQseU1VY17Rw01hVvCGK4qQF
jPht9Qs8NRCPw-26wXzXxYBGjyypupEUuuqx5C1IV8NoRAzGvFbmNpOxnYJGgGetTqb; expires=Wed
, 03-Jun-2015 11:12:01 GMT; path=/; domain=.google.com.tw; HttpOnly
P3P: CP="This is not a P3P policy! See http://www.google.com/support/accounts/bi
n3wmg7mv; expires=Thu, 01-Dec-2016 11:12:01 GMT; path=/; domain=.google.com.tw"
```