

Übungsprotokoll - NWG2 - Übung 05

Link Aggregation

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1 Konfiguration der Endsysteme

In der folgenden Übung haben wir die PCs 4.1 und 4.2 benutzt, somit sind die Netze 4.x verwendet worden. Die IP-Konfiguration wird folgendermaßen vergeben: Klick auf „Network“ in der Taskleiste → „Network & Internet Settings“ → „Change adapter options“ → gewünschtes Netzwerk Interface auswählen, in diesem Fall Ethernet 2 → „Properties“ → Doppelklick auf „Internet Protocol Version 4“ bzw. „Internet Protocol Version 6“. In den geöffneten Fenstern können wir nun jeweils die IP-Adresse, Subnetzmaske/Präfix und das Gateway eingeben. Folglich sind die Konfigurationen beider PCs zu sehen:

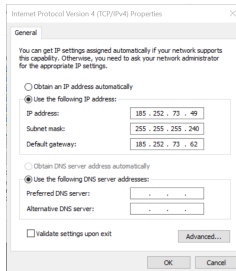


Figure 1: PC41 IPv4 config

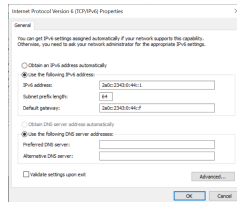


Figure 2: PC41 IPv6 config

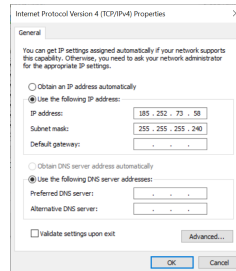


Figure 3: PC42 IPv4 config

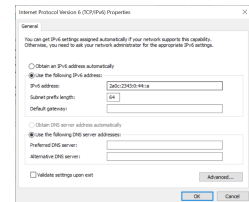


Figure 4: PC42 IPv6 config

2 Konfiguration des Gruppenrouters

...

Befehl	Erklärung
...	...
...	...

Table 1: Verwendete Befehle zur Konfiguration des Gruppenrouters

notes...

3 Konfiguration der Gruppenswitches

...

Befehl	Erklärung
...	...
...	...

Table 2: Verwendete Befehle zur Konfiguration der Gruppenswitches

notes...

4 Fragen zur Konfiguration

Frage 4.1 Warum können ohne die Link Aggregation (das Erstellen der Channel Group) nicht beide Links verwendet werden?

...

Frage 4.2 Wie kann durch ein geeignetes Load Balancing sichergestellt werden, dass beide Rechner mit voller Geschwindigkeit bedient werden?

...

Frage 4.3 Wenn Gruppe A die ACLs bereits fertig konfiguriert hat, Gruppe B aber nicht, wie wirkt sich das auf Ping zwischen den linken PCs aus? Falls es nicht geht, welche Fehlermeldungen erscheinen wann?

...

Frage 4.4 Wie wirken sich die ACLs auf den Kontakt zum FTP Server aus, und warum?

...

Frage 4.5 Was bedeutet es für den linken PC, dass er an einem Mirror Port hängt? Wie wirkt sich das auf seine Kommunikationsfähigkeit aus? Welche ports sollten für einen Mirror Port verwendet werden und warum?

...

5 Tests und Interpretation ihrer Resultate

5.1 GS41 & GS42

Verwendete "Load-Balancing" Konfiguration auf des Switches GS41 und GS42:

```
GS41#  
GS41#show etherchannel load-balance  
EtherChannel Load-Balancing Configuration:  
    src-dst-ip  
  
EtherChannel Load-Balancing Addresses Used Per-Protocol:  
Non-IP: Source XOR Destination MAC address  
  IPv4: Source XOR Destination IP address  
  IPv6: Source XOR Destination IP address  
GS41#S
```

Figure 5: GS41 EtherChannel Load-Balancing Configuration

```
GS41#  
GS41#show etherchannel load-balance  
EtherChannel Load-Balancing Configuration:  
    src-dst-ip  
  
EtherChannel Load-Balancing Addresses Used Per-Protocol:  
Non-IP: Source XOR Destination MAC address  
  IPv4: Source XOR Destination IP address  
  IPv6: Source XOR Destination IP address  
GS41#S
```

Figure 6: GS41 EtherChannel Load-Balancing Configuration

5.2 PC41

Ping von PC41 zu PC42, Ping zu Netz 8 - PC81 (fehlgeschlagen da ACL) und FTP-Verbindung

```
Microsoft Windows [Version 10.0.19043.1645]
(c) Microsoft Corporation. All rights reserved.

C:\Users\admin_SIN>ping 185.252.73.58

Pinging 185.252.73.58 with 32 bytes of data:
Reply from 185.252.73.58: bytes=32 time=1ms TTL=128
Reply from 185.252.73.58: bytes=32 time=1ms TTL=128
Reply from 185.252.73.58: bytes=32 time=1ms TTL=128
Reply from 185.252.73.58: bytes=32 time=1ms TTL=128

Ping statistics for 185.252.73.58:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\Users\admin_SIN>ping 2a0c:2343:0:44::a

Pinging 2a0c:2343:0:44::a with 32 bytes of data:
Reply from 2a0c:2343:0:44::a: time=1ms
Reply from 2a0c:2343:0:44::a: time=1ms
Reply from 2a0c:2343:0:44::a: time=1ms
Reply from 2a0c:2343:0:44::a: time=1ms

Ping statistics for 2a0c:2343:0:44::a:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

Figure 7: PC41 ping PC42

```
Microsoft Windows [Version 10.0.19043.1645]
(c) Microsoft Corporation. All rights reserved.

C:\Users\admin_SIN>ping 185.252.73.133

Pinging 185.252.73.133 with 32 bytes of data:
Reply from 172.16.1.8: Destination net unreachable.
Reply from 172.16.1.8: Destination net unreachable.
Reply from 172.16.1.8: Destination net unreachable.
Reply from 172.16.1.8: Destination net unreachable.

Ping statistics for 185.252.73.133:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\Users\admin_SIN>ping 2a0c:2343:0:48::1

Pinging 2a0c:2343:0:48::1 with 32 bytes of data:
Destination net unreachable.
Destination net unreachable.
Destination net unreachable.
Destination net unreachable.

Ping statistics for 2a0c:2343:0:48::1:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\Users\admin_SIN>
```

Figure 8: PC41 Ping zu Netz 8 - PC81 (fehlgeschlagen da ACL)

```
Microsoft Windows [Version 10.0.19043.1645]
(c) Microsoft Corporation. All rights reserved.

C:\Users\admin_SIN>ftp 185.252.73.133
Connected to 185.252.73.133.
220 Welcome to the Network Shell!
220 Please login with user and pass.
User (185.252.73.133:1022) user: user
230 Password required for user.
Password:
230 User successfully logged in.
ftp> dir
200 Port command successful.
212 Opening ASCII mode data connection for directory list.
212 Transfer complete.
-rw-r--r-- 1 user:group 18432000 Oct 15 16:16 testfile.txt
ftp> get testfile.txt
212 18432000 file(s) transferred in 0.000000000 seconds (0.000000000 bytes/sec).
212 Transfer complete.
ftp>
200 Port command successful.
212 Opening ASCII mode data connection for file transfer.
212 Transfer complete.
ftp> get testfile.txt
212 18432000 bytes received in 0.000000000 seconds (0.000000000 bytes/sec).
212 Transfer complete.
ftp>
200 Port command successful.
212 Opening ASCII mode data connection for file transfer.
212 Transfer complete.
ftp>
200 Port command successful.
212 Opening ASCII mode data connection for file transfer.
212 Transfer complete.
ftp>
```

Figure 9: PC41 FTP-Verbindung

5.3 PC42

Ping von PC42 zu PC41, Ping zu Netz 8 - PC82 (fehlgeschlagen da ACL) und FTP-Verbindung

```
Microsoft Windows [Version 10.0.19043.1645]
(c) Microsoft Corporation. All rights reserved.

C:\Users\admin_SIN>ping 185.252.73.58

Pinging 185.252.73.58 with 32 bytes of data:
Reply from 185.252.73.58: bytes=32 time=1ms TTL=128
Reply from 185.252.73.58: bytes=32 time=1ms TTL=128
Reply from 185.252.73.58: bytes=32 time=1ms TTL=128
Reply from 185.252.73.58: bytes=32 time=1ms TTL=128

Ping statistics for 185.252.73.58:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\Users\admin_SIN>ping 2a0c:2343:0:44::a

Pinging 2a0c:2343:0:44::a with 32 bytes of data:
Reply from 2a0c:2343:0:44::a: time=1ms
Reply from 2a0c:2343:0:44::a: time=1ms
Reply from 2a0c:2343:0:44::a: time=1ms
Reply from 2a0c:2343:0:44::a: time=1ms

Ping statistics for 2a0c:2343:0:44::a:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

Figure 10: PC42 ping PC41

```
Microsoft Windows [Version 10.0.19043.1645]
(c) Microsoft Corporation. All rights reserved.

C:\Users\admin_SIN>ping 185.252.73.133

Pinging 185.252.73.133 with 32 bytes of data:
Reply from 172.16.1.8: Destination net unreachable.
Reply from 172.16.1.8: Destination net unreachable.
Reply from 172.16.1.8: Destination net unreachable.
Reply from 172.16.1.8: Destination net unreachable.

Ping statistics for 185.252.73.133:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\Users\admin_SIN>ping 2a0c:2343:0:48::1

Pinging 2a0c:2343:0:48::1 with 32 bytes of data:
Destination net unreachable.
Destination net unreachable.
Destination net unreachable.
Destination net unreachable.

Ping statistics for 2a0c:2343:0:48::1:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\Users\admin_SIN>
```

Figure 11: PC42 Ping zu Netz 8 - PC82 (fehlgeschlagen da ACL)

```
Microsoft Windows [Version 10.0.19043.1645]
(c) Microsoft Corporation. All rights reserved.

C:\Users\admin_SIN>ftp 185.252.73.133
Connected to 185.252.73.133.
220 Welcome to the Network Shell!
220 Please login with user and pass.
User (185.252.73.133:1022) user: user
230 Password required for user.
Password:
230 User successfully logged in.
ftp> dir
200 Port command successful.
212 Opening ASCII mode data connection for directory list.
212 Transfer complete.
-rw-r--r-- 1 user:group 18432000 Oct 15 16:16 testfile.txt
ftp> get testfile.txt
212 18432000 file(s) transferred in 0.000000000 seconds (0.000000000 bytes/sec).
212 Transfer complete.
ftp>
200 Port command successful.
212 Opening ASCII mode data connection for file transfer.
212 Transfer complete.
ftp>
200 Port command successful.
212 Opening ASCII mode data connection for file transfer.
212 Transfer complete.
ftp>
```

Figure 12: PC42 FTP-Verbindung