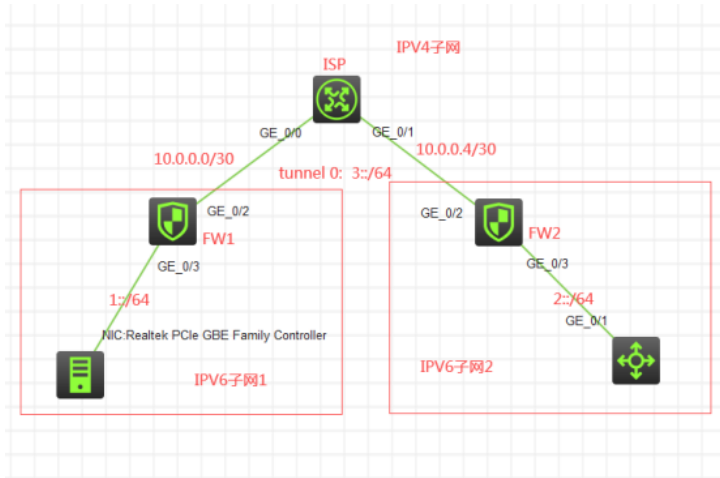


知 F1060 IPV6 OVER IPV4典型组网配置案例

NAT H3C模拟器 韦家宁 2020-04-11 发表

组网及说明



组网说明:

本案例采用H3C HCL模拟器的F1060来模拟IPv6 OVER IPV4的典型组网配置。IPv6子网和IPv4子网在网络拓扑图中已经有了明确的标识，要求IPv6子网1和IPv6子网2能穿越IPv4子网互通，因此需要在FW1与FW2之间建立IPv6 OVER IPV4隧道。

配置步骤

- 1、按照网络拓扑图正确配置IP地址。
- 2、FW1与FW2建立IPv6 OVER IPV4隧道。

特别说明:

由于本案例承载了IPv4及IPv6的子网，因此在F1060的域间策略不仅要放行IPv4的安全策略，也要放行IPv6的安全策略。

配置关键点

ISP:

```
<H3C>sys
System View: return to User View with Ctrl+Z.
[H3C]sysname ISP
[ISP]int gi 0/0
[ISP-GigabitEthernet0/0]des <connect to FW1>
[ISP-GigabitEthernet0/0]ip address 10.0.0.1 30
[ISP-GigabitEthernet0/0]quit
[ISP]int gi 0/1
[ISP-GigabitEthernet0/1]des <connect to FW2>
[ISP-GigabitEthernet0/1]ip address 10.0.0.5 30
[ISP-GigabitEthernet0/1]quit
```

SW1:

```
<H3C>sys
System View: return to User View with Ctrl+Z.
[H3C]sysname SW1
[SW1]int gi 1/0/1
[SW1-GigabitEthernet1/0/1]port link-mode route
[SW1-GigabitEthernet1/0/1]des <connect to FW2>
[SW1-GigabitEthernet1/0/1]ipv6 address 2::2 64
[SW1-GigabitEthernet1/0/1]quit
[SW1]ipv6 route-static :: 0 2::1
```

FW1:

```
<H3C>sys
System View: return to User View with Ctrl+Z.
[H3C]sysname FW1
```

在FW1域间策略放通IPv6安全策略:

```
[FW1]acl ipv6 basic 2001
[FW1-acl-ipv6-basic-2001]rule 0 permit source any
[FW1-acl-ipv6-basic-2001]quit
[FW1]
[FW1]zone-pair security source trust destination untrust
[FW1-zone-pair-security-Trust-Untrust]packet-filter ipv6 2001
[FW1-zone-pair-security-Trust-Untrust]quit
[FW1]
[FW1]zone-pair security source untrust destination trust
[FW1-zone-pair-security-Untrust-Trust]packet-filter ipv6 2001
[FW1-zone-pair-security-Untrust-Trust]quit
[FW1]
[FW1]zone-pair security source trust destination local
[FW1-zone-pair-security-Trust-Local]packet-filter ipv6 2001
[FW1-zone-pair-security-Trust-Local]quit
[FW1]
[FW1]zone-pair security source local destination trust
[FW1-zone-pair-security-Local-Trust]packet-filter ipv6 2001
[FW1-zone-pair-security-Local-Trust]quit
[FW1]
[FW1]zone-pair security source untrust destination local
[FW1-zone-pair-security-Untrust-Local]packet-filter ipv6 2001
[FW1-zone-pair-security-Untrust-Local]quit
[FW1]
[FW1]zone-pair security source local destination untrust
[FW1-zone-pair-security-Local-Untrust]packet-filter ipv6 2001
[FW1-zone-pair-security-Local-Untrust]quit
[FW1]
[FW1]zone-pair security source trust destination trust
[FW1-zone-pair-security-Trust-Trust]packet-filter ipv6 2001
[FW1-zone-pair-security-Trust-Trust]quit
```

在FW1域间策略放通IPv4安全策略:

```
[FW1]acl basic 2002
[FW1-acl-ipv4-basic-2002]rule 0 permit source any
[FW1-acl-ipv4-basic-2002]quit
[FW1]
[FW1]zone-pair security source trust destination untrust
[FW1-zone-pair-security-Trust-Untrust]packet-filter 2002
[FW1-zone-pair-security-Trust-Untrust]quit
[FW1]
[FW1]zone-pair security source untrust destination trust
[FW1-zone-pair-security-Untrust-Trust]packet-filter 2002
[FW1-zone-pair-security-Untrust-Trust]quit
[FW1]
[FW1]zone-pair security source trust destination local
[FW1-zone-pair-security-Trust-Local]packet-filter 2002
[FW1-zone-pair-security-Trust-Local]quit
[FW1]
[FW1]zone-pair security source local destination trust
[FW1-zone-pair-security-Local-Trust]packet-filter 2002
[FW1-zone-pair-security-Local-Trust]quit
[FW1]
[FW1]zone-pair security source untrust destination local
[FW1-zone-pair-security-Untrust-Local]packet-filter 2002
[FW1-zone-pair-security-Untrust-Local]quit
[FW1]
[FW1]zone-pair security source local destination untrust
[FW1-zone-pair-security-Local-Untrust]packet-filter 2002
[FW1-zone-pair-security-Local-Untrust]quit
[FW1]
[FW1]zone-pair security source trust destination trust
```

```
[FW1-zone-pair-security-Trust-Trust]packet-filter 2002
[FW1-zone-pair-security-Trust-Trust]quit
[FW1]
[FW1]zone-pair security source untrust destination untrust
[FW1-zone-pair-security-Untrust-Untrust]packet-filter 2002
[FW1-zone-pair-security-Untrust-Untrust]quit
[FW1]zone-pair security source untrust destination untrust
[FW1-zone-pair-security-Untrust-Untrust]packet-filter ipv6 2001
[FW1-zone-pair-security-Untrust-Untrust]quit
[FW1]int gi 1/0/3
[FW1-GigabitEthernet1/0/3]ipv6 address 1::1 64
[FW1-GigabitEthernet1/0/3]quit
[FW1]int gi 1/0/2
[FW1-GigabitEthernet1/0/2]des <connect to ISP>
[FW1-GigabitEthernet1/0/2]ip address 10.0.0.2 30
[FW1-GigabitEthernet1/0/2]quit
[FW1]ip route-static 0.0.0.0 0.0.0.0 10.0.0.1
[FW1]security-zone name trust
[FW1-security-zone-Trust]import interface GigabitEthernet 1/0/3
[FW1-security-zone-Trust]quit
[FW1]security-zone name Untrust
[FW1-security-zone-Untrust]import interface GigabitEthernet 1/0/2
[FW1-security-zone-Untrust]quit
```

FW1 IPV6 OVER IPV4隧道关键配置点:

```
[FW1]int Tunnel 0 mode ipv6-ipv4
[FW1-Tunnel0]ipv6 address 3::1 64
[FW1-Tunnel0]source GigabitEthernet 1/0/2
[FW1-Tunnel0]destination 10.0.0.6
[FW1-Tunnel0]quit
[FW1]ipv6 route-static 2:: 64 3::2
[FW1]security-zone name Untrust
[FW1-security-zone-Untrust]import interface Tunnel 0
[FW1-security-zone-Untrust]quit
```

FW2:

```
<H3C>sys
System View: return to User View with Ctrl+Z.
[H3C]sysname FW2
```

在FW2域间策略放通IPv6安全策略:

```
[FW2]acl ipv6 basic 2001
[FW2-acl-ipv6-basic-2001]rule 0 permit source any
[FW2-acl-ipv6-basic-2001]quit
[FW2]
[FW2]zone-pair security source trust destination untrust
[FW2-zone-pair-security-Trust-Untrust]packet-filter ipv6 2001
[FW2-zone-pair-security-Trust-Untrust]quit
[FW2]
[FW2]zone-pair security source untrust destination trust
[FW2-zone-pair-security-Untrust-Trust]packet-filter ipv6 2001
[FW2-zone-pair-security-Untrust-Trust]quit
[FW2]
[FW2]zone-pair security source trust destination local
[FW2-zone-pair-security-Trust-Local]packet-filter ipv6 2001
[FW2-zone-pair-security-Trust-Local]quit
[FW2]
[FW2]zone-pair security source local destination trust
[FW2-zone-pair-security-Local-Trust]packet-filter ipv6 2001
[FW2-zone-pair-security-Local-Trust]quit
[FW2]
[FW2]zone-pair security source untrust destination local
[FW2-zone-pair-security-Untrust-Local]packet-filter ipv6 2001
[FW2-zone-pair-security-Untrust-Local]quit
```

```
[FW2]
[FW2]zone-pair security source local destination untrust
[FW2-zone-pair-security-Local-Untrust]packet-filter ipv6 2001
[FW2-zone-pair-security-Local-Untrust]quit
[FW2]
[FW2]zone-pair security source trust destination trust
[FW2-zone-pair-security-Trust-Trust]packet-filter ipv6 2001
[FW2-zone-pair-security-Trust-Trust]quit
[FW2]
[FW2]zone-pair security source untrust destination untrust
[FW2-zone-pair-security-Untrust-Untrust]packet-filter ipv6 2001
[FW2-zone-pair-security-Untrust-Untrust]quit
```

在FW2域间策略放通IPv4安全策略：

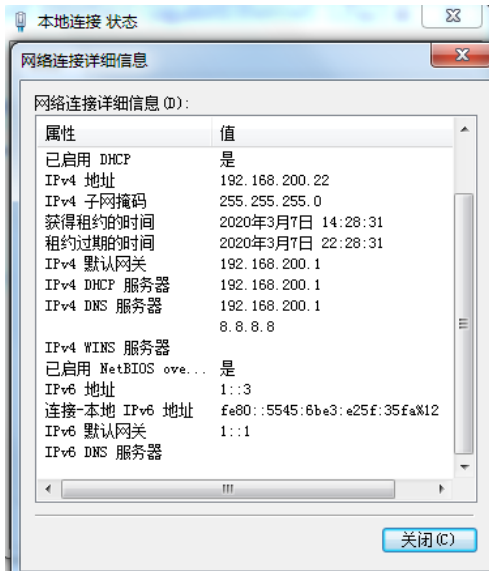
```
[FW2]acl basic 2002
[FW2-acl-ipv4-basic-2002]rule 0 permit source any
[FW2-acl-ipv4-basic-2002]quit
[FW2]
[FW2]zone-pair security source trust destination untrust
[FW2-zone-pair-security-Trust-Untrust]packet-filter 2002
[FW2-zone-pair-security-Trust-Untrust]quit
[FW2]
[FW2]zone-pair security source untrust destination trust
[FW2-zone-pair-security-Untrust-Trust]packet-filter 2002
[FW2-zone-pair-security-Untrust-Trust]quit
[FW2]
[FW2]zone-pair security source trust destination local
[FW2-zone-pair-security-Trust-Local]packet-filter 2002
[FW2-zone-pair-security-Trust-Local]quit
[FW2]
[FW2]zone-pair security source local destination trust
[FW2-zone-pair-security-Local-Trust]packet-filter 2002
[FW2-zone-pair-security-Local-Trust]quit
[FW2]
[FW2]zone-pair security source untrust destination local
[FW2-zone-pair-security-Untrust-Local]packet-filter 2002
[FW2-zone-pair-security-Untrust-Local]quit
[FW2]
[FW2]zone-pair security source local destination untrust
[FW2-zone-pair-security-Local-Untrust]packet-filter 2002
[FW2-zone-pair-security-Local-Untrust]quit
[FW2]
[FW2]zone-pair security source trust destination trust
[FW2-zone-pair-security-Trust-Trust]packet-filter 2002
[FW2-zone-pair-security-Trust-Trust]quit
[FW2]
[FW2]zone-pair security source untrust destination untrust
[FW2-zone-pair-security-Untrust-Untrust]packet-filter 2002
[FW2-zone-pair-security-Untrust-Untrust]quit

[FW2]int gi 1/0/3
[FW2-GigabitEthernet1/0/3]ipv6 address 2::1 64
[FW2-GigabitEthernet1/0/3]quit
[FW2]int gi 1/0/2
[FW2-GigabitEthernet1/0/2]des <connect to ISP>
[FW2-GigabitEthernet1/0/2]ip address 10.0.0.6 30
[FW2-GigabitEthernet1/0/2]quit
[FW2]ip route-static 0.0.0.0 0.0.0.0 10.0.0.5
[FW2]security-zone name Untrust
[FW2-security-zone-Untrust]import interface GigabitEthernet 1/0/2
[FW2-security-zone-Untrust]quit
[FW2]security-zone name Trust
[FW2-security-zone-Trust]import interface GigabitEthernet 1/0/3
[FW2-security-zone-Trust]quit
```

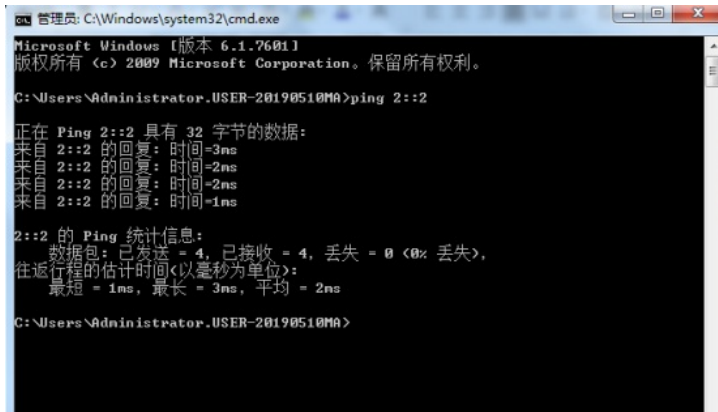
FW2 IPV6 OVER IPV4隧道配置关键点:

```
[FW2]int Tunnel 0 mode ipv6-ipv4
[FW2-Tunnel0]ipv6 address 3::2 64
[FW2-Tunnel0]source GigabitEthernet 1/0/2
[FW2-Tunnel0]destination 10.0.0.2
[FW2-Tunnel0]quit
[FW2]ipv6 route-static 1:: 64 3::1
[FW2]security-zone name Untrust
[FW2-security-zone-Untrust]import interface Tunnel 0
[FW2-security-zone-Untrust]quit
```

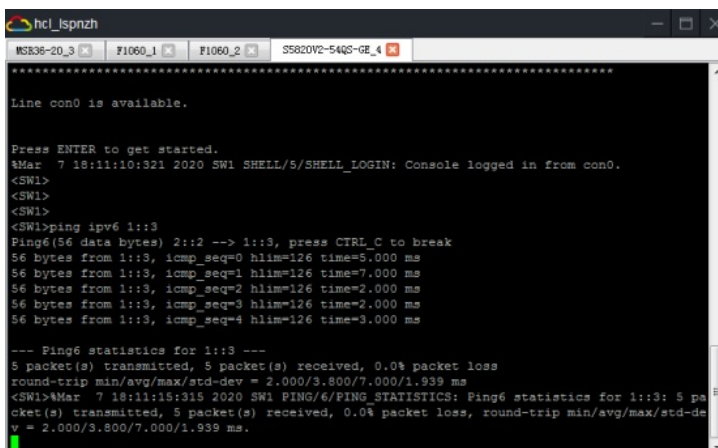
IPV6子网1填写IPV6地址:



IPV6子网1的PC可以PING通IPV6子网2的SW1:



IPV6子网2的SW1也可PING通IPV6子网1的PC:



分别查看FW1、FW2的隧道状态:

```
[FW1]dis int Tunnel 0 brief
Brief information on interfaces in route mode:
Link: ADM - administratively down; Stby - standby
Protocol: (s) - spoofing
Interface          Link Protocol Primary IP      Description
Tun0               UP      UP      --
[FW1]dis ipv6 int Tunnel 0 brief
*down: administratively down
(s): spoofing
Interface          Physical Protocol IPv6 Address
Tunnel0           up      up      3::1
[FW1]
```

```
[FW2]dis ipv6 int Tunnel brief
*down: administratively down
(s): spoofing
Interface          Physical Protocol IPv6 Address
Tunnel0           up      up      3::2
[FW2]
```

分别查看FW1、FW2的IPV6路由表, 可看到隧道的路由:

```
[FW1]dis ipv6 routing-table
Destinations : 8      Routes : 8

Destination: ::1/128      Protocol : Direct
NextHop : ::1            Preference: 0
Interface : InLoop0      Cost : 0

Destination: 1::/64      Protocol : Direct
NextHop : ::            Preference: 0
Interface : GE1/0/3      Cost : 0

Destination: 1::1/128    Protocol : Direct
NextHop : ::1           Preference: 0
Interface : InLoop0      Cost : 0

Destination: 2::/64      Protocol : Static
NextHop : 3::2          Preference: 60
Interface : Tun0         Cost : 0

Destination: 3::/64      Protocol : Direct
NextHop : ::            Preference: 0
Interface : Tun0         Cost : 0

Destination: 3::1/128    Protocol : Direct
NextHop : ::1           Preference: 0
Interface : InLoop0      Cost : 0

Destination: FE80::/10   Protocol : Direct
NextHop : ::            Preference: 0
Interface : InLoop0      Cost : 0

Destination: FF00::/8    Protocol : Direct
NextHop : ::            Preference: 0
Interface : NULL0        Cost : 0
[FW1]
```

```
[FW2]dis ipv6 routing-table
Destinations : 8      Routes : 8

Destination: ::1/128      Protocol : Direct
NextHop : ::1            Preference: 0
Interface : InLoop0      Cost : 0

Destination: 1::/64      Protocol : Static
NextHop : 3::1          Preference: 60
Interface : Tun0         Cost : 0

Destination: 2::/64      Protocol : Direct
NextHop : ::            Preference: 0
Interface : GE1/0/3      Cost : 0

Destination: 2::1/128    Protocol : Direct
NextHop : ::1           Preference: 0
Interface : InLoop0      Cost : 0

Destination: 3::/64      Protocol : Direct
NextHop : ::            Preference: 0
Interface : Tun0         Cost : 0

Destination: 3::2/128    Protocol : Direct
NextHop : ::1           Preference: 0
Interface : InLoop0      Cost : 0

Destination: FE80::/10   Protocol : Direct
NextHop : ::            Preference: 0
Interface : InLoop0      Cost : 0

Destination: FF00::/8    Protocol : Direct
NextHop : ::            Preference: 0
Interface : NULL0        Cost : 0
[FW2]
```

至此, F1060之IPV6 OVER IPV4隧道典型组网配置案例已完成!