

ASR 1000设备间NAT高可用性配置示例

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简介

本文档介绍Cisco IOS®-XE设备上的机箱到机箱NAT高可用性(B2B NAT HA)配置，重点介绍聚合服务路由器(ASR)1000系列。

B2B NAT HA是实现ASR 1000系列路由器之间基于区域的防火墙(ZBFW)、网络地址转换(NAT)、VPN、会话边界控制器(SBC)等应用高可用性的方法。本文档介绍如何在Cisco ASR 1000平台上配置B2B NAT HA以及验证。

先决条件

要求

Cisco 建议您了解以下主题：

- ASR 1000平台架构概述知识
- 关于高可用性和NAT技术的基本知识

使用的组件

本文档中的信息基于Cisco IOS XE 3.10及更高版本的ASR 1000系列。Cisco IOS-XE 3.5版及更高版本支持B2B NAT HA。

本文档中的信息都是基于特定实验室环境中的设备编写的。本文档中使用的所有设备最初均采用原始（默认）配置。如果您使用的是真实网络，请确保您已经了解所有命令的潜在影响。

配置

B2BHA故障切换触发器

一些常见故障切换触发器包括：

- 活动上的断电/重新加载（包括崩溃）。
- 重新加载嵌入式服务处理器(ESP)（计划内或计划外）。
- 冗余组(RG)的控制接口关闭/链路关闭。
- RG的数据接口关闭/链路关闭。
- 跟踪的对象故障（IP服务级别协议）。
- 协议保持连接失败。
- 活动的运行时优先级低于配置的阈值。
- 活动的运行时优先级低于备用的。

最低配置

本节介绍如何配置B2B NAT HA和拓扑信息。

B2 BHA部署可以有以下三种拓扑：

- LAN-LAN
- LAN-WAN
- LAN网状

注意：平均冗余数据包大小为256字节。

具有基本L2/L3连接的网络图

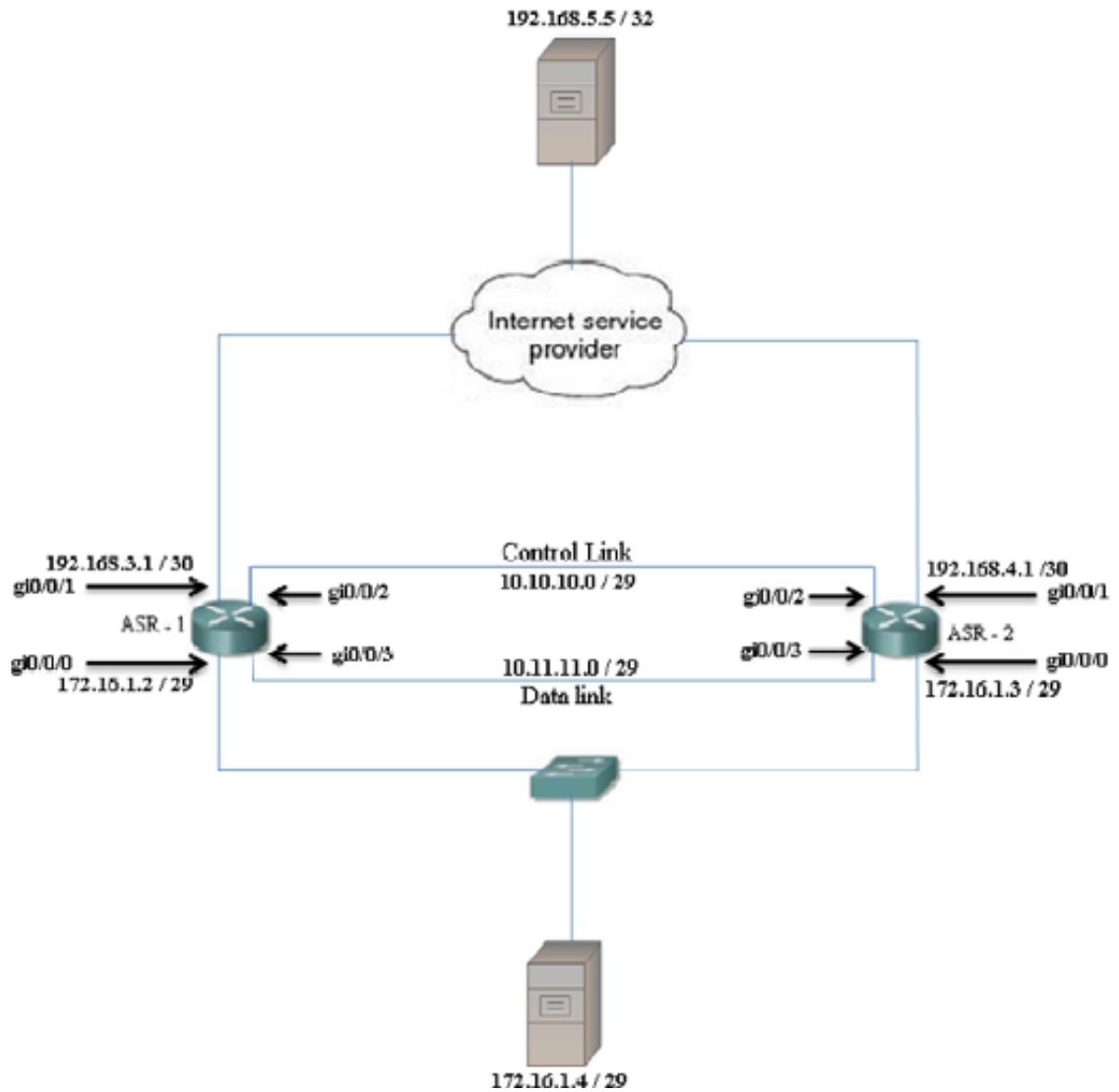
基本L2/L3连接

配置可分为两个主要部分。其中一部分是启用RG、冗余协议、计时器、控制和数据接口的基本配置。第二部分涉及实际数据/流量接口及其与RG的关联。

本示例尝试在ASR上通过LAN 172.16.1.4中的远端服务器192.168.5.5实现B2B NAT HA。这些配置目前使用静态NAT配置进行准备。

```
ip nat pool POOL1 200.200.200.200 200.200.200.200 netmask 255.255.255.252
ip nat inside source list NAT pool POOL1 redundancy 1 mapping-id 252
```

```
Extended IP access list NAT
 10 permit ip host 172.16.1.4 host 192.168.5.5
```



ASR-1

```

redundancy
 mode none
 application redundancy
 group 1
 name TEST
 preempt
 priority 150
 control GigabitEthernet0/0/2

```

```

protocol 1
 data GigabitEthernet0/0/3

```

ASR-2

```

redundancy
 mode none
 application redundancy
 group 1
 name TEST
 preempt
 priority 50
 control GigabitEthernet0/0/2

```

```

protocol 1
 data GigabitEthernet0/0/3

```

两个ASR应能到达ISP提供的公有IP地址。

ASR-1#**ping 200.200.200.200**

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 200.200.200.200, timeout is 2 seconds:

!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 1/1/1 ms

ASR-2#**ping 200.200.200.200**

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 200.200.200.200, timeout is 2 seconds:

!!!!

面向LAN的接口连接到分布层交换机，分布层交换机又连接到主机。

```
ASR-1#show run int GigabitEthernet0/0/0
interface GigabitEthernet0/0/0
 ip address 172.16.1.2 255.255.255.248
 ip nat inside
 negotiation auto
 cdp enable
 redundancy rii 100
 redundancy group 1 ip 172.16.1.5
 exclusive decrement 100
end
```

```
ASR-2#show run int GigabitEthernet0/0/0
interface GigabitEthernet0/0/0
 ip address 172.16.1.3 255.255.255.248
 ip nat inside
 negotiation auto
 cdp enable
 redundancy rii 100
 redundancy group 1 ip 172.16.1.5
 exclusive decrement 100
end
```

面向ISP的接口具有以下配置：

```
ASR-1#show run int gi0/0/1
interface GigabitEthernet0/0/1
 ip address 192.168.3.2 255.255.255.252
 ip nat outside
 negotiation auto
 cdp enable
 redundancy rii 101
 redundancy asymmetric-routing enable
 redundancy group 1 decrement 20
end
```

```
ASR-2#show run int gi0/0/1
interface GigabitEthernet0/0/1
 ip address 192.168.4.2 255.255.255.252
 ip nat outside
 negotiation auto
 cdp enable
 redundancy rii 101
 redundancy asymmetric-routing enable
 redundancy group 1 decrement 20
end
```

ASR之间的数据接口和控制接口已配置如以下各节所示。

控制接口

```
ASR-1#show run int gi0/0/2
interface GigabitEthernet0/0/2
 description CONTROL-INTERFACE
 ip address 10.10.10.1 255.255.255.252
 negotiation auto
 cdp enable
end
```

```
ASR-2#show run int gi0/0/2
interface GigabitEthernet0/0/2
 description CONTROL INTERFACE
 ip address 10.10.10.2 255.255.255.252
 negotiation auto
 cdp enable
end
```

数据接口

```
ASR-1#show run int gi0/0/3
interface GigabitEthernet0/0/3
 description DATA INTERFACE
 encapsulation dot1Q 10
 ip address 10.11.11.1 255.255.255.252
end
```

```
ASR-2#show run int gi0/0/3
interface GigabitEthernet0/0/3
 description DATA INTERFACE
 encapsulation dot1Q 10
 ip address 10.11.11.2 255.255.255.252
end
```

注意：

- 不能在配置为数据接口或控制接口的接口上配置冗余接口标识符(RII)。
- 必须在主用和备用设备上配置RII和非对称路由。
- 不能在已配置虚拟IP地址的接口上启用非对称路由。

验证

验证命令和预期输出

思科 CLI 分析器 (仅适用于注册客户) 支持某些 show 命令。要查看对 show 命令输出的分析，请使用思科 CLI 分析器。

```
ASR-1#show redundancy application group
```

Group ID	Group Name	State
1	TEST	ACTIVE

```
ASR-2#show redundancy application group
```

Group ID	Group Name	State
1	TEST	STANDBY

```
ASR-1#show redundancy application group 1
```

```
Group ID:1  
Group Name:TEST
```

```
Administrative State: No Shutdown  
Aggregate operational state : Up  
My Role: ACTIVE  
Peer Role: STANDBY  
Peer Presence: Yes  
Peer Comm: Yes  
Peer Progression Started: Yes
```

```
RF Domain: btob-one  
RF state: ACTIVE  
Peer RF state: STANDBY HOT
```

```
ASR-2#show redundancy application group 1
```

```
Group ID:1  
Group Name:TEST
```

```
Administrative State: No Shutdown  
Aggregate operational state : Up  
My Role: STANDBY  
Peer Role: ACTIVE  
Peer Presence: Yes  
Peer Comm: Yes  
Peer Progression Started: Yes
```

```
RF Domain: btob-one  
RF state: STANDBY HOT  
Peer RF state: ACTIVE
```

```
ASR-1#show ip nat translations
```

Pro	Inside global	Inside local	Outside local	Outside global
---	200.200.200.200	172.16.1.4	---	---
icmp	200.200.200.200:98	172.16.1.4:98	192.168.5.5:98	192.168.5.5:98

Total number of translations: 2

```
ASR-2#show ip nat translations
```

Pro	Inside global	Inside local	Outside local	Outside global
---	200.200.200.200	172.16.1.4	---	---
icmp	200.200.200.200:98	172.16.1.4:98	192.168.5.5:98	192.168.5.5:98

Total number of translations: 2

ASR-1#show redundancy application protocol group 1

RG Protocol RG 1

Role: Active
Negotiation: Enabled
Priority: 150
Protocol state: Active
Ctrl Intf(s) state: Up
Active Peer: Local
Standby Peer: address 10.10.10.2, priority 50, intf Gi0/0/2
Log counters:
 role change to active: 7
 role change to standby: 7
 disable events: rg down state 7, rg shut 0
 ctrl intf events: up 7, down 8, admin_down 7
 reload events: local request 0, peer request 0

RG Media Context for RG 1

Ctx State: Active
Protocol ID: 1
Media type: Default
Control Interface: GigabitEthernet0/0/2
 Current Hello timer: 3000
Configured Hello timer: 3000, Hold timer: 9000
Peer Hello timer: 3000, Peer Hold timer: 9000
Stats:
 Pkts 386597, Bytes 23969014, HA Seq 0, Seq Number 386597, Pkt Loss 0
 Authentication not configured
 Authentication Failure: 0
 Reload Peer: TX 0, RX 0
 Resign: TX 0, RX 1
Standby Peer: Present. Hold Timer: 9000
 Pkts 386589, Bytes 13144026, HA Seq 0, Seq Number 1503658, Pkt Loss 0

ASR-2#show redundancy application protocol group 1

RG Protocol RG 1

Role: Standby
Negotiation: Enabled
Priority: 50
Protocol state: Standby-hot
Ctrl Intf(s) state: Up
Active Peer: address 10.10.10.1, priority 150, intf Gi0/0/2
Standby Peer: Local
Log counters:
 role change to active: 8
 role change to standby: 16009
 disable events: rg down state 1, rg shut 0
 ctrl intf events: up 9, down 10, admin_down 1
 reload events: local request 15999, peer request 2

RG Media Context for RG 1

Ctx State: Standby
Protocol ID: 1
Media type: Default
Control Interface: GigabitEthernet0/0/2
 Current Hello timer: 3000
Configured Hello timer: 3000, Hold timer: 9000
Peer Hello timer: 3000, Peer Hold timer: 9000

Stats:

Pkts 1503674, Bytes 93227788, HA Seq 0, Seq Number 1503674, Pkt Loss 0
Authentication not configured
Authentication Failure: 0
Reload Peer: TX 2, RX 2
Resign: TX 8, RX 7

Active Peer: Present. Hold Timer: 9000

Pkts 386603, Bytes 13144502, HA Seq 0, Seq Number 386613, Pkt Loss 0

ASR-1#show platform hardware qfp active system rg 1

Redundancy Group 1

State: RG_ACTIVE

Bulksync: NO BULKSYNC REQ

Transport:

SYNC_B2B LISTEN

cp hdl 0x01013e8d dp hdl 0x03010006, platfm hdl 0x0000fa35

L3_IPV4

src addr 10.11.11.1 dest addr 10.11.11.2

L4_UDP_RELIABLE

src port 19510 dest port 3497

AR transport not available

Stats:

RG Request:

CREATE 0

UPDATE 32048

DELETE 0

RG State:

RG_PREINIT 0

RG_INIT 7

RG_STANDBY 21

RG_ACTIVE 32020

RG Transport Request:

NA 0

OPEN 16014

CLOSE 0

RG Transport Status:

CONN_ESTB 7

CONN_FAIL 0

TRANS_DOWN 0

TRANS_DOWN_GRACEFUL 8

Bulksync:

Request 7

Success 7

Fail 0

ASR-1#show platform hardware qfp active system rg 1 stats

trans index: 00000006 Trans Type: 00000001 RG 1

mf_flags 0x40000000 seq_flags 0x700003ff

ha_control_state 0x5

pending ack 00000000

keepalive_timeout 00000100

rx_seq_flags 0x80000000

rx_seq_num 0x2c0d4a44

tx_seq 0xb4965908

tx_ack_tail 0xb4965908

tx_seq_flags 0x700003ff

tx 0000000000580126

rx 0000000000580089

retx 0000000000000000

rx dropped 0000000000000000

records dropped 0000000000000000

tx dropped 0000000000000000

ack dropped 00000000 oob pkts dropped 00000000

```
send dropped 00000000 rx_control_msgs 00580090
tx control_msgs 00580078 for_us_hits 01160217
sync_alloc_failures 00000000 status_notifications 00000001
sync_msgs_received 00580093 sync_msgs_sent 00580133
for_us_udp_checksum_drops 00000000
acks sent 00580089 rcvd 00580126 nacks sent 00000000 rcvd 00000000
```

有用的命令

- 在执行模式下，使用redundancy application reload group <rg-number> **self**命令重新加载活动上的RG。
- 在冗余配置模式下使用以下CLI命令关闭活动上的RG:

```
ISR1(config-red-app)#group 1
ISR1(config-red-app-grp)#shutdown
```

故障排除

目前没有针对此配置的故障排除信息。