

通过接口 Null0 配置 IPv6 黑洞

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简介

本文档介绍如何通过接口 Null0 配置 IPv6 中的黑洞。黑洞路由是允许管理员通过将流量动态路由到失效接口或收集信息以供调查的主机来阻止非法流量(例如来自非法源的流量或拒绝服务(DoS)攻击生成的流量)的方法，可减轻攻击对网络的影响。

先决条件

要求

尝试进行此配置之前，请确保满足以下要求：

- 了解 BGP 路由协议及其操作
- 了解 IPv6 编址方案

使用的组件

本文中的信息基于装有 Cisco IOS® 软件版本 15.0(1) 的 Cisco 7200 系列路由器。

规则

有关文档规则的详细信息，请参阅 [Cisco 技术提示规则](#)。

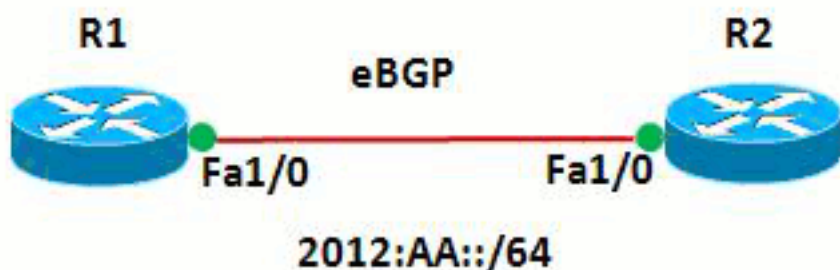
配置

本部分提供有关如何配置本文档所述功能的信息。

注意：使用[命令查找工具](#)(仅限注册客户)可查找有关本文档中使用的命令的详细信息。

网络图

本文档使用以下网络设置：



在此网络中，路由器 R1 与 R2 彼此形成 eBGP 关系。路由器使用 OSPFv3 进行内部通信。在路由器 R1 中，通过配置 Null0 来实现黑洞，使源地址为 20:20::20/128 的所有数据包都定向到 Null0。换句话说，路由到 Null0 的所有流量都被丢弃。

示例配置

本文档使用以下配置：

- [路由器 R1](#)
- [路由器 R2](#)

路由器 R1

```
!  
hostname R1  
!  
no ip domain lookup  
ip cef  
ipv6 unicast-routing  
ipv6 cef  
!  
!  
interface Loopback1  
no ip address  
ipv6 address AA::1/128  
ipv6 enable  
ipv6 ospf 10 area 0  
!  
interface Loopback10  
no ip address  
ipv6 address AA:10::10/128
```

```
ipv6 enable
!
interface FastEthernet1/0
  no ip address
  speed auto
  duplex auto
  ipv6 address 2012:AA::1/64
  ipv6 enable
  ipv6 ospf 10 area 0
!
router bgp 6501
  bgp router-id 1.1.1.1
  bgp log-neighbor-changes
  no bgp default ipv4-unicast
  neighbor BB::1 remote-as 6502
  neighbor BB::1 ebgp-multihop 2
  neighbor BB::1 update-source Loopback1
!
  address-family ipv4
  exit-address-family
!
  address-family ipv6
  redistribute static
  network AA:10::10/128
  neighbor BB::1 activate
  exit-address-family
!
ipv6 route 20:20::20/128 Null0
ipv6 router ospf 10
  router-id 1.1.1.1
!
end
```

路由器 R2

```
!
hostname R2
!
ipv6 unicast-routing
ipv6 cef
!
!
interface Loopback1
  no ip address
  ipv6 address BB::1/128
  ipv6 enable
  ipv6 ospf 10 area 0
!
interface Loopback20
  no ip address
  ipv6 address 20:20::20/128
  ipv6 enable
!
interface FastEthernet1/0
  no ip address
  speed auto
  duplex auto
  ipv6 address 2012:AA::2/64
  ipv6 enable
  ipv6 ospf 10 area 0
!
router bgp 6502
```

```

bgp router-id 2.2.2.2
bgp log-neighbor-changes
no bgp default ipv4-unicast
neighbor AA::1 remote-as 6501
neighbor AA::1 ebgp-multihop 2
neighbor AA::1 update-source Loopback1
!
address-family ipv4
exit-address-family
!
address-family ipv6
  network 20:20::20/128
  neighbor AA::1 activate
exit-address-family
!
ipv6 router ospf 10
  router-id 2.2.2.2
!
end

```

验证

使用本部分可确认配置能否正常运行。

[命令输出解释程序 \(仅限注册用户 \) \(OIT\) 支持某些 show 命令。](#) 使用 OIT 可查看对 show 命令输出的分析。

要验证eBGP配置，请在路由器R1中使用[show ipv6 route bgp](#)和[show bgp ipv6 unicast](#)命令。

路由器 R1

show ipv6 route

```

R1#show ipv6 route bgp
IPv6 Routing Table - default - 7 entries
Codes: C - Connected, L - Local, S - Static, U - Per-
user Static route
        B - BGP, HA - Home Agent, MR - Mobile Router, R -
RIP
        I1 - ISIS L1, I2 - ISIS L2, IA - ISIS interarea,
IS - ISIS summary
        D - EIGRP, EX - EIGRP external, ND - Neighbor
Discovery
        O - OSPF Intra, OI - OSPF Inter, OE1 - OSPF ext
1, OE2 - OSPF ext 2
        ON1 - OSPF NSSA ext 1, ON2 - OSPF NSSA ext 2
!--- The router R2 advertises the network 20:20::20/128,
!--- but still the routing table is empty.

```

要检查哪些是 BGP 接收的路由，请使用 **show bgp ipv6 unicast** 命令。

```

R1#show bgp ipv6 unicast
BGP table version is 3, local router ID is 1.1.1.1
Status codes: s suppressed, d damped, h history, *
valid, > best, I - internal,
                r RIB-failure, S Stale
Origin codes: I - IGP, e - EGP, ? - incomplete

   Network          Next Hop          Metric LocPrf
Weight Path
*  20:20::20/128    BB::1             0
0  6502 I

```

```
*>          ::          0
32768 ?
*> AA:10::10/128  ::          0
32768 I
  !--- Note that the route 20:20::20/128 is received, !---
- but it is not installed in the routing table.
```

请使用来源作为环回接口 20，以便从路由器 R2 ping 路由器 R1。

```
R2#ping ipv6 AA:10::10 source lo20
```

```
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to AA:10::10, timeout is 2 seconds:
Packet sent with a source address of 20:20::20
.....
Success rate is 0 percent (0/5)
!--- The reason is the ICMP packet reaches !--- router R1 with source address as !---
20:20::20/128 and therefore gets dropped.
```

尝试在不使用环回接口作为来源的情况下从路由器 R2 ping 路由器 R1。

```
R2#ping AA:10::10
```

```
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to AA:10::10, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 8/61/180 ms
!--- In this case, the ICMP packet has !--- the source address as BB::1.
```

如果从路由器R1中删除**ipv6 route 20:20::20/128 Null0**语句，则路由器R2通告的路由20:20::20/128将安装在路由器R1的路由表中。以下是输出示例：

在路由器 R1 中

```
R1(config)#no ipv6 route 20:20::20/128 Null0

!--- The Null0 command is removed from router R1.
R1#show bgp ipv6 unicast BGP table version is 7, local
router ID is 1.1.1.1 Status codes: s suppressed, d
damped, h history, * valid, > best, I - internal, r RIB-
failure, S Stale Origin codes: I - IGP, e - EGP, ? -
incomplete Network Next Hop Metric LocPrf Weight Path *>
20:20::20/128      ::          0
32768 ?
*                  BB::1          0
0 6502 I
*> AA:10::10/128  ::          0
32768 I
  !--- After the removal of the statement, !--- the route
20:20::20/128 is shown as best route. R1#show ipv6 route
bgp
IPv6 Routing Table - default - 7 entries
Codes: C - Connected, L - Local, S - Static, U - Per-
user Static route
      B - BGP, HA - Home Agent, MR - Mobile Router, R -
RIP
      I1 - ISIS L1, I2 - ISIS L2, IA - ISIS interarea,
IS - ISIS summary
```

```
D - EIGRP, EX - EIGRP external, ND - Neighbor
Discovery
O - OSPF Intra, OI - OSPF Inter, OE1 - OSPF ext
1, OE2 - OSPF ext 2
ON1 - OSPF NSSA ext 1, ON2 - OSPF NSSA ext 2
B 20:20::20/128 [20/0]
via BB::1

!--- You can see that the route is displayed in routing
table.
```

现在请设法从路由器 R2 ping 路由器 R1，将来源作为环回接口 Lo 20。

```
R2#ping ipv6 AA:10::10 source lo20
```

```
Type escape sequence to abort.
```

```
Sending 5, 100-byte ICMP Echos to AA:10::10, timeout is 2 seconds:
```

```
Packet sent with a source address of 20:20::20
```

```
!!!!
```

```
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/54/140 ms
```

```
!--- You can see that the ping is successful.
```

相关信息

- [远程触发黑洞过滤](#)
- [BGP 技术支持](#)
- [IP 版本 6 技术支持](#)
- [BGP 案例分析](#)
- [技术支持和文档 - Cisco Systems](#)