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1. Verification of the issue

```
R2#ping 172.30.1.0
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.30.1.0, timeout is 2 seconds:
.....
Success rate is 0 percent (0/5)
R2#ping 2001:db8:cafe:130::/64
% Unrecognized host or address, or protocol not running.

R2#ping 2001:db8:cafe:130::
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 2001:DB8:CAFE:130::, timeout is 2 seconds:
.....
Success rate is 0 percent (0/5)
R2#
```

→ the connection between R2 and and the VLAN 130 in R1 is unsuccessful in both ipv4 and ipv6

2. Troubleshooting method used

Method: we used follow the path
→ this is the best method because the traffic must go through R2—R1—DLS1—VLAN 130 host (ipv4/ipv6)

3. Steps taken to find the issue(s)

```
DLS1#show vlan br

VLAN Name                             Status    Ports
---- -------------------------------- --------- -------------------------------
1    default                          active    Ap1/0/1
99   MANAGEMENT                       active
100  SERVERS                          active    Gi1/0/23
110  GUEST                            active
120  OFFICE                           active
130  HSVC                             active
200  VOICE                            active
300  E-PEER                           active
666  NATIVE                           active
999  PARKING_LOT                      active    Gi1/0/1, Gi1/0/2, Gi1/0/7
                                                Gi1/0/8, Gi1/0/9, Gi1/0/10
                                                Gi1/0/12, Gi1/0/13, Gi1/0/14
                                                Gi1/0/15, Gi1/0/16, Gi1/0/17
                                                Gi1/0/18, Gi1/0/19, Gi1/0/20
                                                Gi1/0/21, Gi1/0/22, Gi1/0/24
                                                Gi1/1/1, Gi1/1/2, Gi1/1/3
                                                Gi1/1/4
1002 fddi-default                     act/unsup
1003 token-ring-default               act/unsup
1004 fddinet-default                  act/unsup

VLAN Name                             Status    Ports
---- -------------------------------- --------- -------------------------------
1005 trnet-default                    act/unsup
DLS1#
```

→ verifying that vlan 130 exists on DLS1

```
DLS1#show ip int vlan 130
Vlan130 is up, line protocol is up
  Internet address is 172.30.1.1/27
  Broadcast address is 255.255.255.255
  Address determined by configuration file
  MTU is 1500 bytes
  Helper address is not set
  Directed broadcast forwarding is disabled
  Outgoing Common access list is not set
  Outgoing access list is not set
  Inbound Common access list is not set
  Inbound  access list is not set
  Proxy ARP is disabled
  Local Proxy ARP is disabled
  Security level is default
  Split horizon is enabled
  ICMP redirects are always sent
  ICMP unreachables are always sent
  ICMP mask replies are never sent
  IP fast switching is enabled
  IP Flow switching is disabled
  IP CEF switching is enabled
  IP CEF switching turbo vector
  IP Null turbo vector
  Associated unicast routing topologies:
        Topology "base", operation state is UP
  IP multicast fast switching is enabled
  IP multicast distributed fast switching is disabled
  IP route-cache flags are Fast, CEF
  Router Discovery is disabled
  IP output packet accounting is disabled
  IP access violation accounting is disabled
  TCP/IP header compression is disabled
  RTP/IP header compression is disabled
  Probe proxy name replies are disabled
  Policy routing is disabled
  Network address translation is disabled
  BGP Policy Mapping is disabled
  Input features: MCI Check
  IPv4 WCCP Redirect outbound is disabled
  IPv4 WCCP Redirect inbound is disabled
  IPv4 WCCP Redirect exclude is disabled
```

→ shows that vlan 130 is up and with the correct ip address

1. **No ip route for R1 and R2, but there is for ipv6 on both devices**

```
R1#show ip route 172.30.1.0
% Network not in table
```

→ since R1 is directly connected to the VLAN 130 on DLS1 from the topology, we can check the ip route of 172.30.1.0, and we find that that network is not in the table.

```
R1#show ip route 2001:db8:cafe:130::
                 ^
% Invalid input detected at '^' marker.

R1#show ipv6 route 2001:db8:cafe:130::
Routing entry for 2001:DB8:CAFE::/48
  Known via "static", distance 1, metric 0
  Route count is 1/1, share count 0
  Routing paths:
    directly connected via Null0
      Last updated 00:13:03 ago
```

→ ipv6 routes are directly connected to null0 rather than being connected to DLS1.

```
R2#show ip route 172.30.1.0
% Network not in table
```

→ 172.30.1.0 is not in the network table

```
R2#show ipv6 route 2001:db8:cafe:130::
Routing entry for ::/0
  Known via "static", distance 1, metric 0
  Route count is 1/1, share count 0
  Routing paths:
    directly connected via Null0
      Last updated 00:13:14 ago
```

→ shows a static route directly connected to null0.

2. IPV6

```
R1#show ip bgp
BGP table version is 2, local router ID is 1.0.0.1
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal,
              r RIB-failure, S Stale, m multipath, b backup-path, f RT-Filter,
              x best-external, a additional-path, c RIB-compressed,
              t secondary path, L long-lived-stale,
Origin codes: i - IGP, e - EGP, ? - incomplete
RPKI validation codes: V valid, I invalid, N Not found

     Network          Next Hop            Metric LocPrf Weight Path
 *>   0.0.0.0          192.168.2.1              0             0 65502 i
```

→ the only BGP route R1 has is the default route and its coming from r2

```
R1#show bgp ipv6 unicast
BGP table version is 2, local router ID is 1.0.0.1
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal
              r RIB-failure, S Stale, m multipath, b backup-path, f RT-Filter,
              x best-external, a additional-path, c RIB-compressed,
              t secondary path, L long-lived-stale,
Origin codes: i - IGP, e - EGP, ? - incomplete
RPKI validation codes: V valid, I invalid, N Not found

     Network          Next Hop            Metric LocPrf Weight Path
 *>   ::/0             2001:DB8:CAFE:202::2
                                               0             0 65502 i
R1#
```

→ r1 has no specific ipv6 routes, only an ipv6 default route coming from r2

```
R2#show ip bgp
BGP table version is 2, local router ID is 2.0.0.2
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal
              r RIB-failure, S Stale, m multipath, b backup-path, f RT-Filter,
              x best-external, a additional-path, c RIB-compressed,
              t secondary path, L long-lived-stale,
Origin codes: i - IGP, e - EGP, ? - incomplete
RPKI validation codes: V valid, I invalid, N Not found

     Network          Next Hop            Metric LocPrf Weight Path
 *>   0.0.0.0          0.0.0.0                  0         32768 i
```

```
R2#show bgp ipv6 unicast
BGP table version is 3, local router ID is 2.0.0.2
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal
              r RIB-failure, S Stale, m multipath, b backup-path, f RT-Filter,
              x best-external, a additional-path, c RIB-compressed,
              t secondary path, L long-lived-stale,
Origin codes: i - IGP, e - EGP, ? - incomplete
RPKI validation codes: V valid, I invalid, N Not found

     Network          Next Hop            Metric LocPrf Weight Path
 *>   ::/0             ::                       0         32768 i
```

→ both of these screenshots show the table empty. Meaning R1 has no routes to VLAN130

4. Description of the issue

1. IPV4

→ this means ipv4 packets were dropped because of a missing route.

2. IPV6

→ipv6 packets were going towards nothing by the null0 static route.

→ So traffic from R2's loopback to the server in VLAN130 could not be delivered over either ipv4 or ipv6

5. Commands entered to fix the issue

1. IP Route

Commands entered on R1:

→ ip route 172.30.1.0 255.255.255.224 10.1.2.1

→ ipv6 route 2001:db8:cafe:130::/64 2001:db8:cafe:20::D1

```
R1(config)#ip route 172.30.1.0 255.255.255.224 10.1.2.1
R1(config)#
Nov  6 14:46:49.043: %PARSER-5-CFGLOG_LOGGEDCMD: User:console  logged command:ip route 172.30.1.0 255.255.255.224
 10.1.2.1
R1(config)#ipv6 route 2001:db8:cafe:130::/64 2001:db8:cafe:20::D1
R1(config)#
Nov  6 14:47:51.255: %PARSER-5-CFGLOG_LOGGEDCMD: User:console  logged command:ipv6 route 2001:db8:cafe:130::/64
2001:db8:cafe:20::D1
R1(config)#
```

2. IPV6 Route

Commands entered on R1:
→ router bgp 65501
→ network 172.30.1.0 mask 255.255.255.224

```
R1#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R1(config)#router bgp 65501
R1(config-router)#
Nov  6 14:50:50.883: %PARSER-5-CFGLOG_LOGGEDCMD: User:console  logged command:router bgp 65501
R1(config-router)#network 172.30.1.0 mask 255.255.255.224
R1(config-router)#
Nov  6 14:51:09.251: %PARSER-5-CFGLOG_LOGGEDCMD: User:console  logged command:network 172.30.1.0 mask 255.255.255
.224
R1(config-router)#end
```

Commands entered on R1:
→router bgp 65501
→ address-family ipv6 unicast
→ network 2001:db8:cafe::/64
→end

```
R1(config)#router bgp 65501
R1(config-router)#
Nov  6 14:57:31.309: %PARSER-5-CFGLOG_LOGGEDCMD: User:console  logged command:router bgp 65501
R1(config-router)#address-family ipv6 unicast
R1(config-router-af)#
Nov  6 14:58:13.502: %PARSER-5-CFGLOG_LOGGEDCMD: User:console  logged command:address-family ipv6 unicast
R1(config-router-af)#network 2001:db8:cafe:130::/64
R1(config-router-af)#end
```

6. Verification the issue is resolved

1. IP Route

```
R1#show ip route 172.30.1.0
Routing entry for 172.30.1.0/27
  Known via "static", distance 1, metric 0
  Routing Descriptor Blocks:
  * 10.1.2.1
      Route metric is 0, traffic share count is 1
R1#
```

2. IPV6 Route

```
R1#show ip bgp
BGP table version is 3, local router ID is 1.0.0.1
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal,
              r RIB-failure, S Stale, m multipath, b backup-path, f RT-Filter,
              x best-external, a additional-path, c RIB-compressed,
              t secondary path, L long-lived-stale,
Origin codes: i - IGP, e - EGP, ? - incomplete
RPKI validation codes: V valid, I invalid, N Not found

     Network          Next Hop            Metric LocPrf Weight Path
 *>   0.0.0.0          192.168.2.1              0             0 65502 i
 *>   172.30.1.0/27    10.1.2.1                 0         32768 i
R1#
```

→

```
R2#ping 172.30.1.0
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.30.1.0, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/1/3 ms
```

```
R2#ping 2001:db8:cafe:130::d1 source Lo0
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 2001:DB8:CAFE:130::D1, timeout is 2 seconds:
Packet sent with a source address of 2001:DB8:CAFE:202::2
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/1/1 ms
R2#
```

→ the connection between R2 and and the VLAN 130 in R1 is now successful in both ipv4 and ipv6