HPE A-Series Switches - How to Configure Multi-Active Detection (MAD) Using Bidirectional Forwarding Detection (BFD) Protocol

Article Number mmr_sf-EN_US000005491

Environment

- HPE A-Series Switches

Issue

- An IRF virtual device appears as a single node on the network. All its member switches share the same IP address and Layer 3 configurations such as the routing configurations. When an IRF link failure causes the IRF virtual device to split, multiple active IRF virtual devices that have the same IP address and Layer 3 configurations appear on the network. They cause routing problems and data loss.
- The multi-active detection (MAD) feature detects identical active IRF virtual devices and handles multi-active collisions on a network. BFD MAD is implemented by using the Bidirectional Forwarding Detection (BFD) protocol, which helps fast detect link failures and loss of IP connectivity.

Cause

If the IRF virtual device is operating normally, only the MAD IP address of the master switch is effective, and the BFD sessions cannot be established. When the IRF virtual device splits, the IP addresses of the master switches in the partitioned IRF virtual devices take effect, and the two switches establishes a BFD session. The IRF virtual devices exchange their active IDs through the BFD session, and make a comparison. The virtual device with higher active ID changes to the recovery state and shuts down all physical ports but the IRF ports. The IRF virtual device with lower active ID remains in the active state and forwards traffic.

Resolution

In the following example, the two HP 12508 switches are configured for MAD using BFD. Vlan 100 is configured with the two MAD IP addresses. The ports GigabitEthernet1/4/0/1 and GigabitEthernet2/4/0/4 are assigned to this Vlan.
The configuration, verification, and testing associated with the diagram follows:

***** Vlan and Interface configuration/verification ****

<Rack4sw1>display current-configuration interface Vlan-interface 100

interface Vlan-interface100
mad bfd enable
mad ip address 192.168.100.1 255.255.255.0 member 1
mad ip address 192.168.100.2 255.255.255.0 member 2

<Rack4sw1>display current-configuration interface GigabitEthernet1/4/0/1

interface GigabitEthernet1/4/0/1
port link-mode bridge
port access vlan 100
stp disable

<Rack4sw1>display current-configuration interface GigabitEthernet2/4/0/4

interface GigabitEthernet2/4/0/4
port link-mode bridge
port access vlan 100
stp disable

<Rack4sw1>display ip interface Vlan-interface 100 brief

*down: administratively down
(s): spoofing (l): loopback
Interface Physical Protocol IP Address Description
Vlan100 up up 192.168.100.1 --

<Rack4sw1>display vlan 100

VLAN ID: 100
VLAN Type: static
Route Interface: configured
Description: VLAN 0100
Name: VLAN 0100
Tagged Ports: none
Untagged Ports:
GigabitEthernet1/4/0/1  GigabitEthernet2/4/0/4
***** IRF configuration/verification *****

<Rack4sw1>display current-configuration | begin irf-port

irf-port 1/1
  port group interface Ten-GigabitEthernet1/2/0/8

irf-port 2/2
  port group interface Ten-GigabitEthernet2/2/0/1

<Rack4sw1>display irf configuration

<table>
<thead>
<tr>
<th>MemberID</th>
<th>NewID</th>
<th>IRF-Port1</th>
<th>IRF-Port2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>Ten-GigabitEthernet1/2/0/8</td>
<td>disable</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>disable</td>
<td>Ten-GigabitEthernet2/2/0/1</td>
</tr>
</tbody>
</table>

***** MAD configuration/verification *****

<Rack4sw1>display current-configuration | include exclude

mad exclude interface GigabitEthernet1/4/0/1
mad exclude interface GigabitEthernet2/4/0/4
mad exclude interface Vlan-interface100

<Rack4sw1>display mad verbose

Current MAD status: Detect
Excluded ports(configurable):
  GigabitEthernet1/4/0/1
  GigabitEthernet2/4/0/4
  Vlan-interface100
Excluded ports(can not be configured):
  Ten-GigabitEthernet1/2/0/8
  Ten-GigabitEthernet2/2/0/1
MAD ARP disabled.
MAD LACP disabled.
MAD BFD enabled interface:
  Vlan-interface100
    mad ip address 192.168.100.1 255.255.255.0 member 1
    mad ip address 192.168.100.2 255.255.255.0 member 2

***** BFD verification before IRF split *****

<Rack4sw1>display bfd interface verbose

Total interface number: 1

<table>
<thead>
<tr>
<th>Interface</th>
<th>Session Num</th>
<th>Min Trans Int:</th>
<th>Min Recv Int:</th>
<th>Min Echo Recv Int:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vlan-interface100</td>
<td>1</td>
<td>400ms</td>
<td>400ms</td>
<td>400ms</td>
</tr>
</tbody>
</table>

LD/RD | SourceAddr | DestAddr | ConnType | State | Holdtime | Interface
1025/0 | 192.168.100.1 | 192.168.100.2 | Direct | Down | 0 | Vlan100

<Rack4sw1>display bfd session

Total session number: 1  Up session number: 0  Init mode: Active
IPv4 session working under Ctrl mode:

<table>
<thead>
<tr>
<th>LD/RD</th>
<th>SourceAddr</th>
<th>DestAddr</th>
<th>State</th>
<th>Holdtime</th>
<th>Interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>1025/0</td>
<td>192.168.100.1</td>
<td>192.168.100.2</td>
<td>Down</td>
<td>/</td>
<td>Vlan100</td>
</tr>
</tbody>
</table>

***** Testing *****

Testing is accomplished by disabling the IRF interface on the Master switch. After the interface is disabled, the MAD status and BFD states are displayed.
***** BFD verification after IRF split *****

Note: The BFD session changes to "State Up" when the split occurs.

```
<Rack4sw1>display bfd session
Total session number: 1  Up session number: 1  Init mode: Active
IPv4 session working under Ctrl mode:

<table>
<thead>
<tr>
<th>LD/RI</th>
<th>SourceAddr</th>
<th>DestAddr</th>
<th>State</th>
<th>Holdtime</th>
<th>Interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>1025/1025</td>
<td>192.168.100.1</td>
<td>192.168.100.2</td>
<td>Up</td>
<td>2000ms</td>
<td>Vlan100</td>
</tr>
</tbody>
</table>
```

***** IRF Member 1 MAD status *****

```
<Rack4sw1>display irf
Switch  Slot  Role  Priority  CPU-Mac       Description
*+1    0  Master 1  0210-fc01-0000  -----   
   1    1  Slave   1  0210-fc01-0001  -----   
--------------------------------------------------
* indicates the device is the master.
+ indicates the device through which the user logs in.

The Bridge MAC of the IRF is: b8af-67eb-2e00
Auto upgrade     : yes
Mac persistent   : always
Domain ID        : 20
Auto merge       : no
```

```
<Rack4sw1>display mad verbose | include status
Current MAD status: Detect <=======
```

***** IRF Member 2 MAD status *****

```
<Rack4sw1>display irf
Switch  Slot  Role  Priority  CPU-Mac       Description
  *2    1  Master 1  0210-fc02-0001  -----   
+2    0  Slave   1  0210-fc02-0000  -----   
--------------------------------------------------
* indicates the device is the master.
+ indicates the device through which the user logs in.

The Bridge MAC of the IRF is: b8af-67eb-2e00
Auto upgrade     : yes
Mac persistent   : always
Domain ID        : 20
Auto merge       : no
```

```
<Rack4sw1>display mad verbose | include status
Current MAD status: Recovery <=======
```

***** Physical interconnect *****

```
<Rack4sw1>display lldp neighbor-information list
System Name       Local Interface Chassis ID       Port ID
Rack4sw1          GE1/4/0/1  b8af-67eb-2e00  GigabitEthernet2/4/0/4
```