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Using One-Arm BFD in Cloud Network
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Abstract

Bidirectional Forwarding Detection (BFD) is a fault detection protocol that can quickly determine a communication failure between devices and notify upper-layer applications [RFC5880]. BFD has asynchronous detecting mode and demand detection mode to satisfy different scenarios, also supports echo function to reduce the device requirement for BFD. One-Arm BFD this draft descripted supports another BFD detecting function rather than the echo as described in [RFC5880] [RFC5881], it needs nothing BFD capability to one of the devices deployed BFD detecting. Using One-Arm BFD function, the one device works on BFD detecting normally and the other device just loopback the BFD packets like echo function. One-Arm BFD is suitable for the cloud virtualization network, the One-Arm BFD is deploy on NFV gateways, and NFV virtual machine vNICs just enable the echo/ loopback process.

Status of This Memo

This Internet-Draft is submitted in full conformance with the provisions of BCP 78 and BCP 79.

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1. Introduction

To minimize the impact of device faults on services and improve network availability, a network device must be able to quickly detect faults in communication with adjacent devices. Measures can then be taken to promptly rectify the faults to ensure service continuity.

BFD is a low-overhead, short-duration method to detect faults on the path between adjacent forwarding engines. The faults can be interface, data link, and even forwarding engine faults. It is a single, unified mechanism to monitor any media and protocol layers in real time.

BFD has asynchronous detecting mode and demand detection mode to

satisfy different scenarios, also supports echo function to reduce the device requirement for BFD. BFD echo function is used when two devices are connected but only one of them supports full BFD capability. When the echo function is activated, the local system sends a BFD control packet and the remote system loops back the

packet through the forwarding channel. If several consecutive echo packets are not received, the session is declared to be Down. BFD echo function reduces one of the two devices requirement for BFD.

With the development of network cloud and NFV virtualization, there are many connections between gateway devices and the virtual machine devices. The virtual machine devices don't support BFD capacity at all. There is difficult to deploy BFD between the gateway devices and the virtual machine vNICs. One-Arm BFD supports this scenario, it supports gateway enable full BFD capability and virtual machine don't support BFD at all, just simply loopback BFD packets on vNICs.

1.1. Conventions Used in This Document

1.1.1. Terminology

BFD: Bidirectional Forwarding Detection

NFV: Network Function Virtualization

1.1.2. Requirements Language

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "NOT RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in BCP 14 [RFC2119] [RFC8174] when, and only when, they appear in all capitals, as shown here.

2. One-Arm BFD Use Case

With the development of network cloud and NFV virtualization, there are many connections between gateway devices and the virtual machine devices. The virtual machine(VM) devices don't support BFD capacity at all. If the gateway devices are deployed BFD protocol, there are some problems including scalability, detecting period and so on. And the VM can't support BFD protocol currently. One-Arm echo BFD can

resolve these problems. One-arm echo BFD is used when two devices are connected and only one of them supports BFD. A one-arm BFD echo session can be established on the device that supports BFD, the other device just loopback BFD packets.

After receiving a one-arm BFD echo session packet, the device that does not support BFD immediately loops back the packet, implementing quick link failure detection. As shown in Figure 1, Device A such as a NFV gateway supports BFD, whereas Device B such as a virtual machine does not. To rapidly detect faults in the link between Device A and Device B, configure a one-arm BFD echo session on Device A. After receiving a one-arm BFD echo session packet from Device A,

Device B immediately loops back the packet, implementing rapid link fault detection.

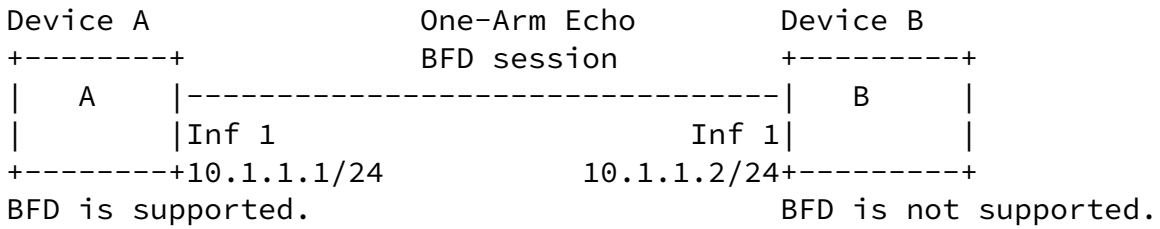

Figure 1: One-Arm BFD deploying scenario

3. Discussion

One-Arm BFD detecting function is better than BFD echo function mode. First One-Arm BFD can use full BFD capacity in the BFD-supported device. So One-Arm BFD can also support fast detecting and manage BFD sessions effectively. Second it is scalable using one-arm BFD detecting to adapt the NFV virtualization. Finally, it is the same process in the non-BFD-supported devices with echo function. So one-arm BFD can be deployed to the cloud network, and the VMs don't require to support BFD capacity.

4. Security Considerations

TBD.

5. IANA Considerations

This document has no IANA action requested.

6. Acknowledgements

TBD.

7. Normative References

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