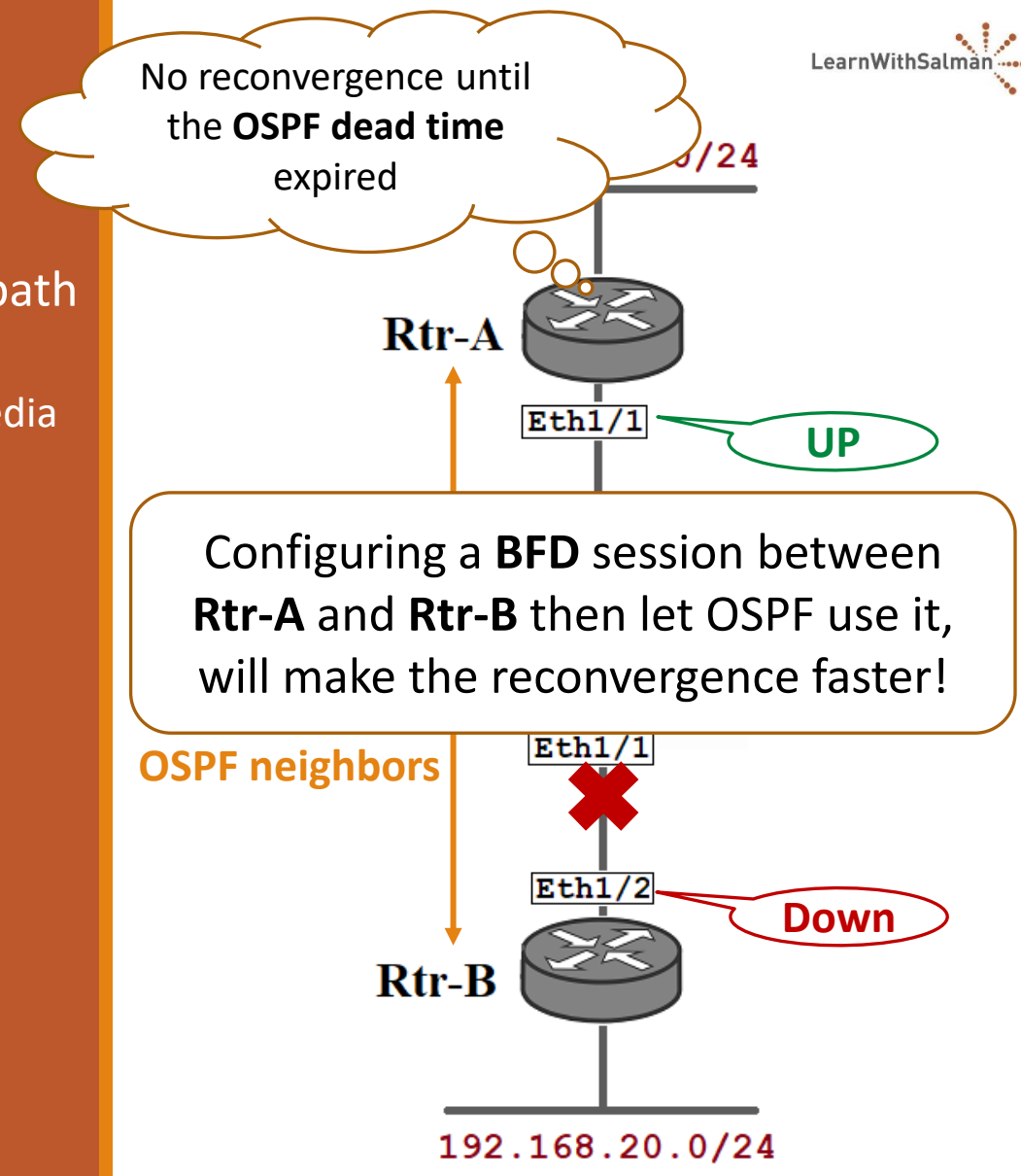# CCIE DATA CENTER

L2 & L3 TECHNOLOGIES

# Bidirectional Forwarding Detection (BFD)

BFD Overview

- Bidirectional Forwarding Detection (BFD) is a simple, fixed-length protocol that is used for fast detection of forwarding-path failures.

  - BFD provides low-overhead subsecond detection of faults even on media types that do not support failure detection, such as Ethernet, virtual circuits (VC), tunnels, and MPLS label switched paths.

  - BFD is less CPU-intensive than the IGP protocol's hello messages, and some of the BFD load can be distributed onto the data plane.

  - BFD is an open standard protocol defined in RFCs (5880-5884).

No reconvergence until the **OSPF dead time** expired

Rtr-A

Eth1/1 — UP

Configuring a **BFD** session between **Rtr-A** and **Rtr-B** then let OSPF use it, will make the reconvergence faster!

OSPF neighbors

Eth1/1

Eth1/2 — Down

Rtr-B

192.168.20.0/24

BFD Overview

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- BFD has two running modes: Asynchronous and Demand.

  - Cisco NX-OS supports the BFD asynchronous mode only, where each device periodically sends BFD control packets to one another.

- The BFD session parameters include the following:

  - **Desired minimum transmit interval (Tx)**: The interval at which the local device wants to send BFD hello messages.

  - **Required minimum receive interval (Rx)**: The minimum interval at which the local device can accept BFD hello messages from another BFD device.

  - **Detect multiplier**: The number of missing BFD hello messages from another BFD device before the local device detects a fault in the path.

The BFD session goes down! OSPF process is informed. Now, reconvergence without **OSPF dead time** expiration!
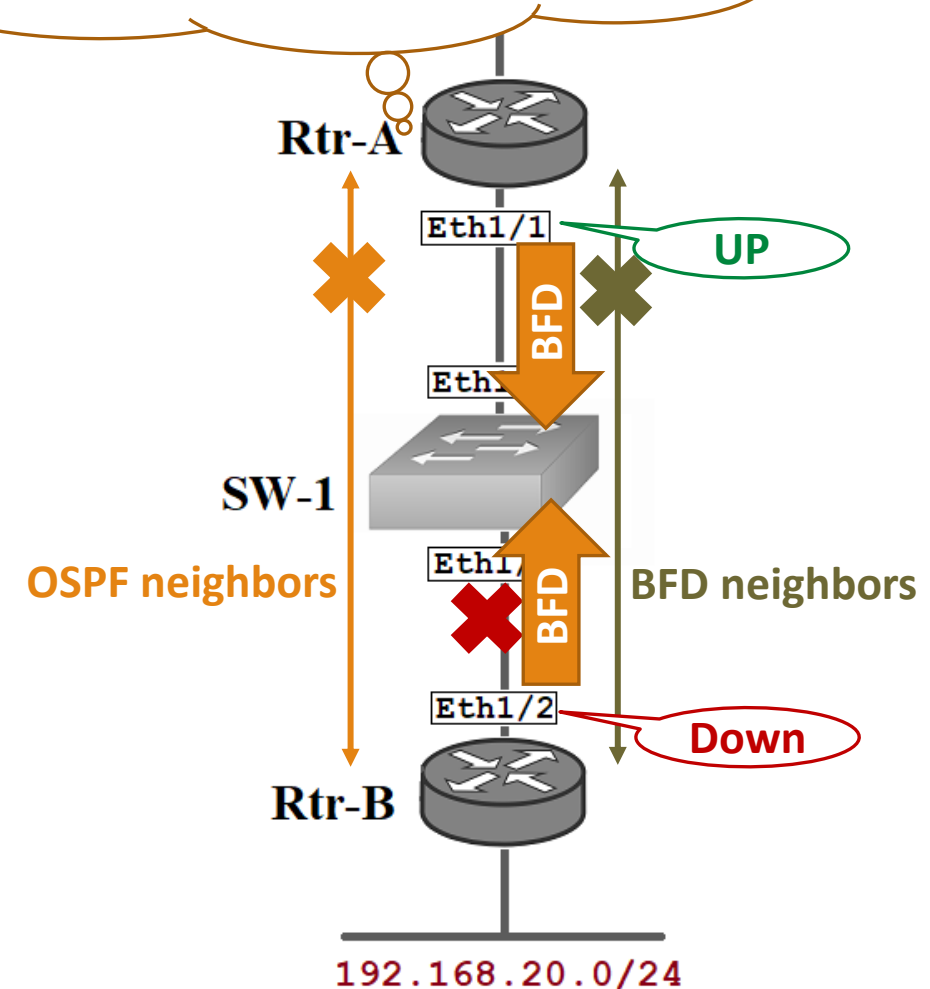
BFD Overview (Cont.)

- BFD control packets are sent on UDP port 3784. The BFD source port must be in the range of 49152 through 65535.

- Cisco NX-OS uses the packet Time to Live (TTL) 255 value to verify that the BFD packet came from an adjacent (L3) BFD peer.

- BFD is configured in L3 interfaces only! It can be Ethernet, SVI or port-channel interfaces.

- The ICMP redirect messages should be disabled on BFD-enabled interfaces.

- Cisco NX-OS supports the BFD echo function in which the local system sends BFD echo packets and the remote system loops back the packets.

  - A packet sent by Rtr-B has both the source and destination ip addresses belong to Rtr-B interface.

  - The BFD control packets with echo function enabled are sent as UDP packets with the source and destination port 3785.

  - For the echo function to work, the remote node should also be capable of echo function.

  - Because echo packets do not require application or host stack processing on the remote end, BFD echo function can be used for aggressive detections timers.
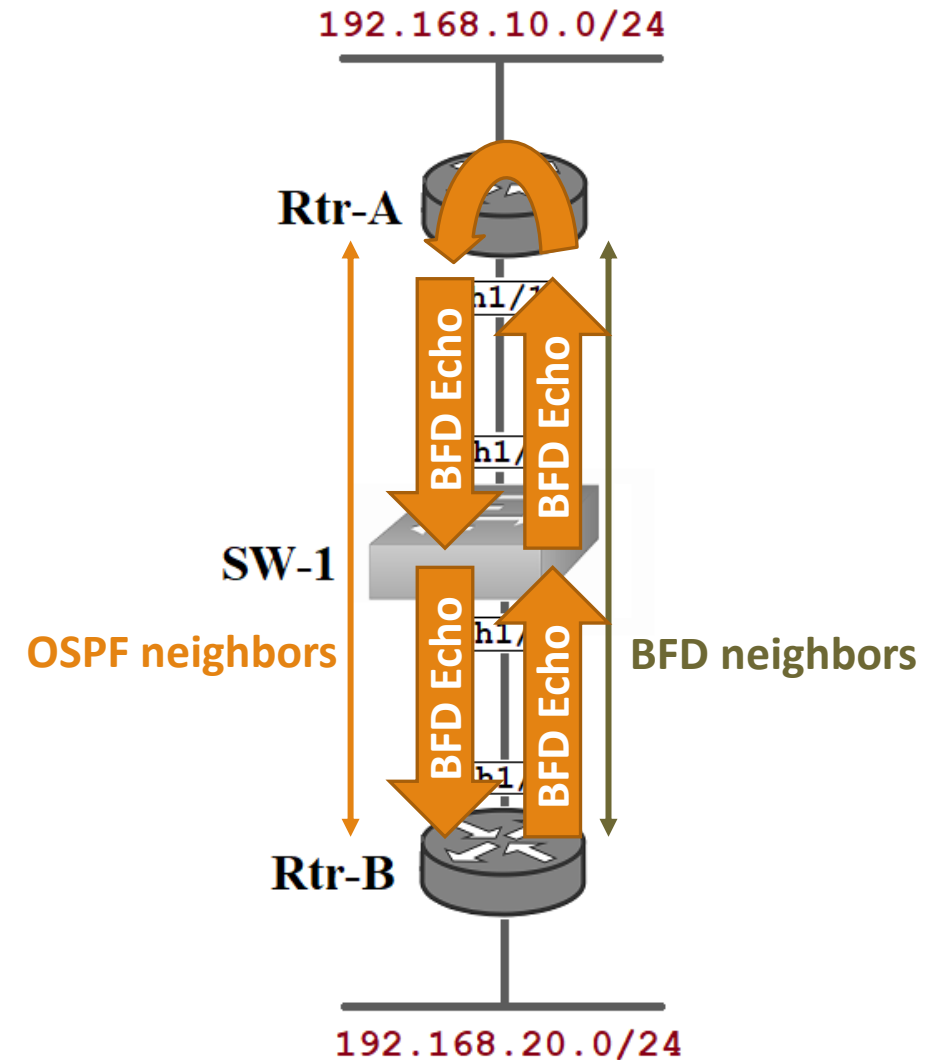
BFD Configuration

Step 1: Enable BFD feature

feature bfd

Step 2: Disable ICMP redirects on the interface.
Interface *eth1/1*
   no ip redirects

Step 3: Configure the BFD session parameters
(Can be configured in global configuration mode)
Interface *eth1/1*
   bfd interval *50* **min_rx** *50* **multiplier** *3*

Step 4: Disable *BFD echo* **if not desired (default is**
enable) or configure the *slow timer*.
Interface *eth1/1*
   [no] bfd echo
   bfd slow-timer *2000*

Step 5: (Optional) Configure BFD authentication.
Interface *eth1/1*
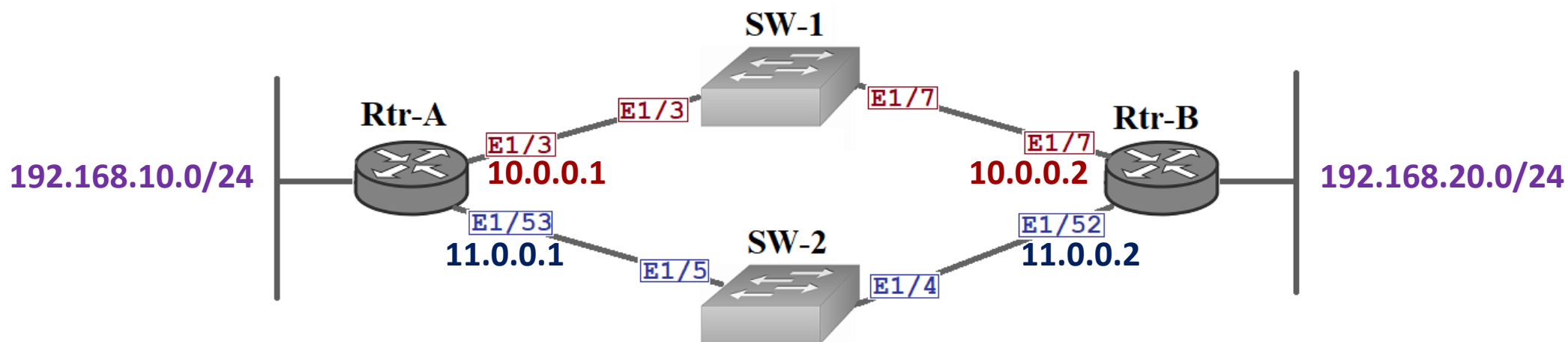   **bfd authentication keyed-SHA1 key-id** *1* **key** *CCIE_DC*

Step 6: Enable BFD for the routing protocol.
Interface *eth1/1*
   ip ospf bfd
router ospf *CCIE_DC*
   bfd
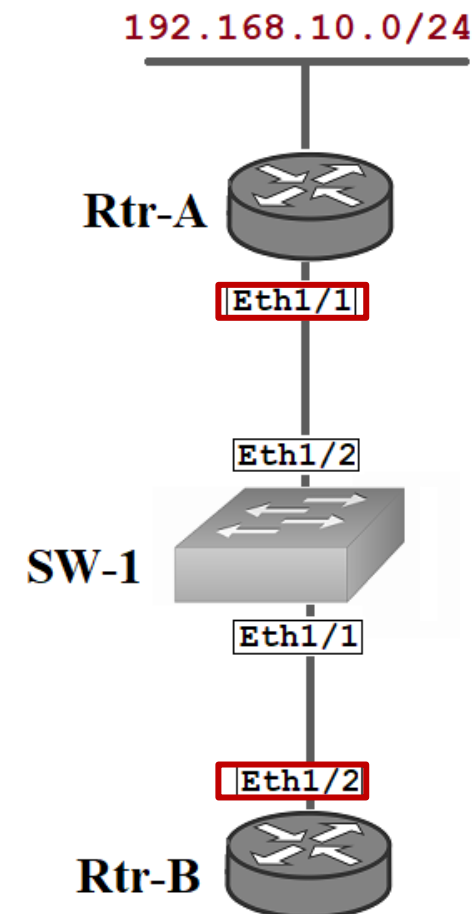
For BGP, BFD configuration is
under the neighbor statement.
router bgp *1234*
   neighbor *1.2.3.4*
      bfd

192.168.10.0/24

Rtr-A
Eth1/1
Eth1/2
SW-1
Eth1/1
Eth1/2
Rtr-B

SW-1

Rtr-A

E1/3

E1/3
10.0.0.1

192.168.10.0/24

E1/53
11.0.0.1

E1/5

SW-2

E1/7

E1/7
10.0.0.2

Rtr-B

192.168.20.0/24

E1/52
11.0.0.2

E1/4

LearnWithSalman

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Thanks for watching!