VAP (MLAG) COMMANDS

Оглавление

1. CONFIGURING VAP(MLAG)

1.1. Overview

A Virtual Aggregate Port (VAP) and Multi-Chassis Link Aggregation (MLAG) are composed of two APs on two independent devices.

For other devices accessed through this VAP, the two devices can be considered as one logic device and the two APs of the VAP can be considered as one AP, thereby raising the link reliability from the board level to the device level. See the figure below.

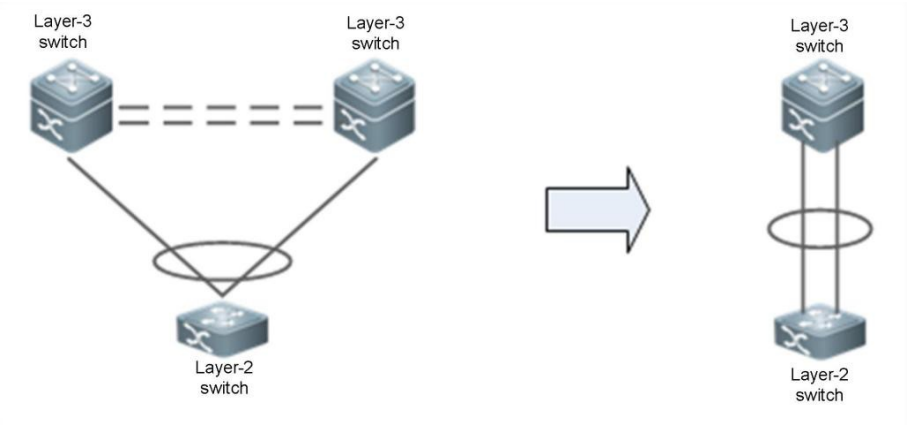


Figure 12-1 VAP

Another similar technology is Virtual Switching Unit (VSU), which virtualizes multiple devices into one device. Compared with VSU, the VAP technology has the following advantages:

- Stacking is discarded and only layer-2 virtualization is required. The two devices are still independent of each other. The VAP reduces deployment difficulties and eliminates shortcomings brought by device stacking (for example, the software failure of the master device may make both devices unavailable).
- Devices can be upgraded independently without affecting the normal operation of the other device.

1.2. Applications

Application	Description
Connecting to an IP Network in Dual-Homing Mode	The two devices of a VAP are connected to an IP network in uplink direction, to implement load balancing of network traffic.
Connecting to a Centralized VXLAN Network in Dual-Homing_Mode	The server connects to the network in VXLAN mode and the overlay gateway is configured on the core switch

1.2.1. Connecting to an IP Networking Dual-Homing Mode Scenario

The server connects to a network through VAP in dual-homing mode and the server gateway is configured on the VAP devices. The uplink traffic of the server is balanced to two access devices through APs. The downlink traffic is balanced to two access devices through ECMP and then locally forwarded to the server.

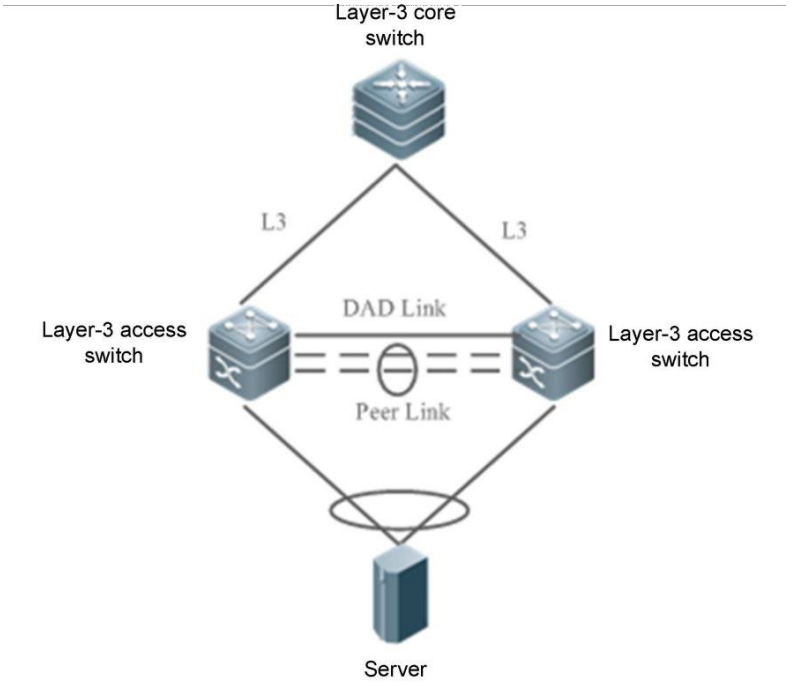


Figure 12-2 Connecting a VAP to an IP Network

Remarks **AP1 and AP2 are added to the same VAP and are connected to layer-3 devices in uplink direction through routing interfaces and to a server or layer-2 switch in downlink direction.**

Deployment

- Configure the same VAP domain on the two devices.
- Configure the same VAP for AP1 and AP2.

1.2.2. Connecting to a VXLAN Network in Dual-Homing Mode Scenario

The server connects to a VXLAN network through VAP in dual-homing mode and the server gateway is configured on the core switch. The uplink traffic of the server is balanced to two access devices through APs. The downlink traffic is balanced to two access devices through ECMP and then locally forwarded to the server.

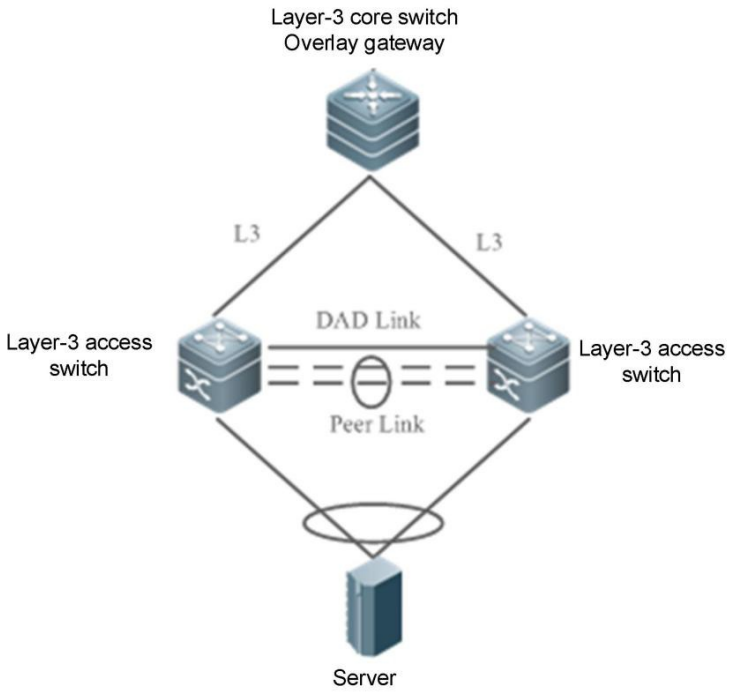


Figure 12-3 Connecting a VAP to a Centralized VXLAN Network

Remarks **AP1 and AP2 are added to the same VAP and are connected to a server or layer-2 switch in downlink direction.**

Deployment

- Configure the same VAP domain on the two devices.
- Configure the same VAP for AP1 and AP2.
- Configure VXLAN access and configure the gateway on the core switch

1.3. Features

1.3.1. Basic Concepts

VAP

APs on two independent devices form a VAP and only layer-2 APs are supported. Only one AP of a device can be added to the same VAP. One VAP can contain two APs at most.

VAP Member Interface

A member interface of a VAP is an AP added to the VAP. A local AP is called the VAP local member interface and a remote AP is called the VAP remote member interface.

Peer-link

The peer-link is a link between two devices of a VAP to synchronize data and transmit some traffic. The peer-link is also an AP. In order to enhance the reliability of the peer-link, you are recommended to configure the AP, to which the peer-link belongs, with two or more physical ports. For chassis devices, multiple physical ports should be deployed on different boards to reduce the impact of a board failure.

Peer-link Interface

A peer-link interface is a physical port of the peer-link.

VAP Domain

A VAP domain consists of two VAP devices connected through the peer-link. The two devices must share the same domain ID.

Dual-Active Detection Link

A dual-active detection link is used to detect the dual-active status of VAP devices when the peer-link fails.

HB Channel

A Hot-Backup (HB) channel is a TCP connection-based transmission channel established between two VAP devices. The VAP transmits and receives negotiation packets and data through this channel.

Feature	Description
VAP System Negotiation	A VAP system is built on two devices via negotiation.
Preferential Local Forwarding	Traffic balanced to VAP devices is preferentially forwarded through the local member interface. When the local member interface malfunctions, the traffic is forwarded through the peer-link.
Anti-Loop Mechanism	When the VAP remote member interface works properly, the traffic of the peer-link is not forwarded to the local member interface. When the VAP remote member interface malfunctions, the traffic of the peer-link needs to be forwarded to the local member interface.

1.3.2. VAP System Negotiation.

1.3.2.1. Working Principle

The basis of VAP application is that two devices pair with each other to form a system and provide inter-device aggregation capability. The process is as follows:

System pairing

After the domain ID, peer-link, and peer-link-based layer-3 channel are configured for the two VAP devices, the devices synchronize the domain ID with each other through the layer-3 channel. After receiving a synchronization message, a device checks whether the domain ID is consistent with its local domain ID. If yes, the two devices pair with each other successfully.

Master/slave negotiation

After successful pairing, the devices elect the master and slave roles based on their priority. The device with a higher priority is elected as the master device. If they share the same priority, the device with a smaller MAC address is elected as the master device.

Note: When both the master and slave devices work properly, packet forwarding is not different on them but different in failure scenarios. For example, when the peer-link is faulty, the

VAP between the two devices fails. To avoid abnormal forwarding of traffic from access devices, the system shuts down service ports on the slave device and switches traffic to the master device.

Forwarding entry synchronization

After successful VAP negotiation, the two devices synchronize forwarding entries mutually such as MAC entries and ARP entries, to ensure active-active forwarding.

Dual-active detection

After the VAP runs properly, heartbeat packets are sent periodically between the two devices to detect the availability of the dual-active link. When the dual-active link is detected to be faulty, if the peer-link works properly, a prompt is displayed, reminding users to check the dual-active link.

When the peer-link is faulty, the devices send dual-active detection packets to each other:

- If a device receives a detection response packet, dual master devices exist, and service interfaces (interfaces other than MGMT ports, peer-link interfaces, and stacked interfaces) on the slave device will be forced to enter error down state. To prevent an interface from entering error down state, you can configure it as an exceptional interface, for example, the interface for dual-active detection.
- If no detection response packet is received, the peer device is faulty.
  - If the local device is the slave device, it becomes the master device.
  - If the local device is the master device, it does not take any actions.

1.3.3. Preferential Local Forwarding

The peer-link can be understood as a backup link. When the network is stable and free of failures, service traffic is preferentially forwarded through the VAP local member interface. It should not be forwarded through the peer-link unless it is broadcast traffic. When the local member interface fails, service traffic needs to be forwarded through the peer-link. See the figure below.

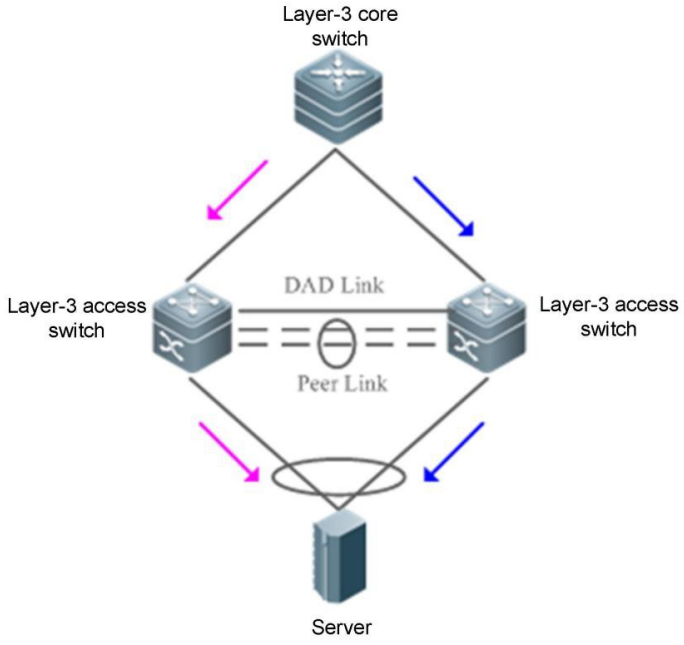


Figure 12-4 Forwarding by the VAP Local Member Interface

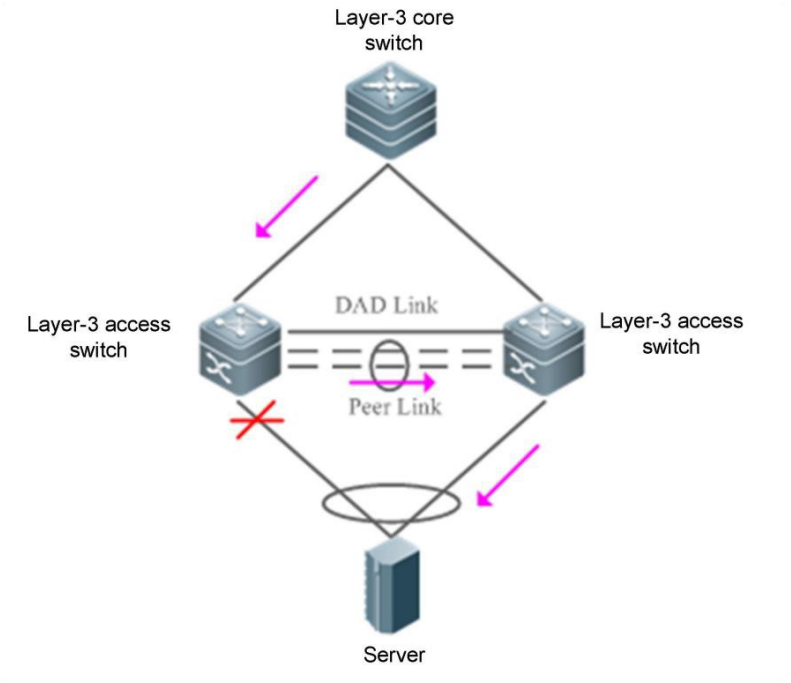


Figure 12-5 Failure of the VAP Local Member Interface

1.3.4. Anti-Loop Mechanism

When an access device connects to a network through VAP in dual-homing mode, the two APs of the VAP are distributed on two independent devices, and independent forwarding by the two APs may result in a loop or receiving of double packets. VAPanti-loop rules are configured as follows:

1. When the VAP remote member interface works properly, traffic from the peer-link is not forwarded to the local member interface. See the figure below.

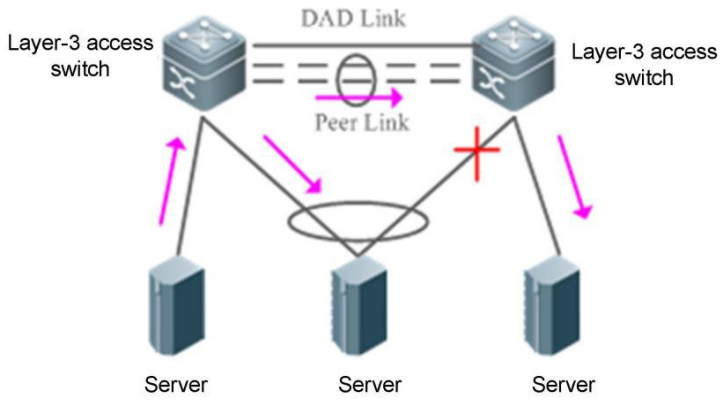


Figure 12-6 Peer-link Traffic Loop Prevention

2. When the VAP remote member interface fails, traffic from the peer-link needs to be forwarded to the local member interface. See the figurebelow.

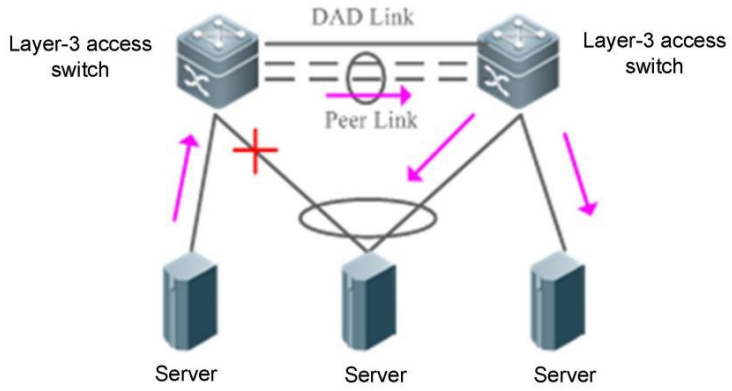


Figure 12-7 Peer-link Traffic Loop Release

1.4. Configuration

Configuration	Description and Command	
Configuring Basic Functions of VAP	**MANDATORY:**	
	vap domain	Configures a VAP domain.
	peer-link	Configures the peer-link.
	Vap	Adds an AP to the VAP.
	data-sync	Configures a data synchronization channel.
	OPTIONAL:	
	Priority	Configures the priority.

Configuration	Description and Command	
Configuring Dual-Active Detection	**MANDATORY:**	
	peer-keepalive	Configures a heartbeat link.
	OPTIONAL:	
	peer-keepalive hold-time	Configures the heartbeat holding time.
	dual-active auto recovery	Configures dual-active automatic recovery.
	vap error-down except	Configures an error down exceptional interface.
	recover up-delay	Configures the interface recovery delay.
Configuring the Domain Matching Delay	**OPTIONAL:**	
	domain-match delay	Configures the domain matching delay.
Configuring Convergence	**OPTIONAL:**	
	fast-convergence	Configures fast convergence.

1.4.1. Connecting to an IP Networking Dual-Homing Mode

Configuration Effect

- Two devices pair with each other to form a VAP system. The links of access devices are aggregated and connected to the VAP system in dual-homing mode.
- Traffic from VAP devices to access devices is first forwarded through the local VAP interface. When the local VAP interface fails, the traffic is forwarded to the VAP peer device.
- The server is connected to two independent network devices in dual-homing mode to form an active-active forwarding system. If a device malfunctions, user services can be still forwarded normally

Notes

- The server is connected to the network in dual-homing mode and interfaces on the two devices need to be added to the same VAP.
- It is recommended that the peer-link between the two devices be configured to allow all VLAN traffic to pass.
- Youare advised to configure multiple physical links for the peer-link. For chassis devices, you should deploy physical links on different boards to avoid the impact of a board failure on the network

1.4.1.1. Configuration Steps

Configuring a VAP Domain

- Mandatory.
- Perform the configuration on both network devices that provide dual-homing access.

Command	vap domain ***domain-id***
Parameter Description	*domain-id*: Indicates the domain ID. The value ranges from 1 to 255.
Defaults	No domain ID is configured by default.
Command Mode	Global configuration mode
Usage Guide	Only one domain ID can be configured on one device. VAP negotiation succeeds only when domain IDs on two devices are the same.

Configuring the Peer-link

- Mandatory.

Command	peer-link
Parameter Description	N/A
Defaults	An AP is not the peer-link by default.
Command Mode	Interface configuration mode
Usage Guide	When all member ports composing an AP of a VAP fail, traffic will be switched to the peer-link. When the remote member interface of a VAP works properly, traffic from the peer-link is not forwarded through the local member interface, in an effort to prevent loops. When the remote member interface of the VAP fails, traffic from the peer-link needs to be forwarded through the local member interface.

Adding an AP to the VAP

- Mandatory.
- One AP can be added to only one VAP and different APs on the same device must be added to different VAPs.

Command	vap ***vap-id***
Parameter	*vap-id*: Indicates the ID of a VAP. The value ranges from 1 to 65,535.
Description	
Defaults	An AP is not added to a VAP by default.
Command Mode	Interface configuration mode
Usage Guide	The two APs on the two network devices that provide dual-homing access must be added to the same VAP.

Configuring a Data Synchronization Channel

- Mandatory.

Command	data-sync local { ***ip-address*** | ***ipv6-address*** } peer { ***ip-address*** | ***ipv6-address*** }

Parameter Description	**local**{ *ip-address*| *ipv6-address* }: Indicates the local IP address. **peer** { *ip-address*| *ipv6-address* }: Indicates the peer IP address.
Defaults	No data synchronization channel is configured by default.
Command Mode	VAP domain configuration mode
Usage Guide	Data is synchronized between VAP devices through a layer-3 IP network and this configuration is required on each VAP device. Either IPv4 or IPv6 addresses can be configured.

Configuring a Heartbeat Link

- Mandatory.

Command	peer-keepalivelocal **{ *ip-address*|*ipv6-address* }** peer **{*ip-address* |*ipv6-address*}[*interface-typeinterface-number*]**
Parameter Description	*ip-address*: Indicates the IPv4 address used for heartbeat detection. *ipv6-address*: Indicates the IPv6 address used for heartbeat detection. *interface-type*: Indicates the interface type. Only MGMT interfaces are supported. *interface-number*: Indicates the interface number. All MGMT interfaces are supported.
Defaults	No heartbeat link is configured by default.
Command Mode	VAP domain configuration mode
Usage Guide	When the peer-link fails but the heartbeat link is normal, interfaces other than the MGMT interface, heartbeat interface, peer-link interface, and stacked interface on the slave device are triggered to enter the error down state. The interfaces return to the normal state after the peer-link is restored. Either IPv4 or IPv6 addresses can be configured.

Configuring the Priority

- Optional.

Command	priority ***priority***
Parameter Description	*priority*: Indicates the priority.
Defaults	The default priority is 4.
Command Mode	VAP domain configuration mode
Usage Guide	VAP devices negotiate to determine their master/slave state after establishing communication. The master/slave negotiation rules are as follows: 1. The device with a higher priority is elected as the master device. 2. If the devices share the same priority, the device with a smaller MAC address is elected as the master device.

Configuring the Heartbeat Holding Time

- Optional.

Command	peer-keepalive hold-time ***interval***
Parameter Description	*interval*: Indicates the heartbeat holding time.
Defaults	The default heartbeat holding time is 3s.
Command Mode	VAP domain configuration mode
Usage Guide	After the peer-link fails, the heartbeat link is retained for a period of time by default. After the time expires, if the heartbeat link is still normal, service interfaces on the slave device will enter error down state.

Configuring the Interface Recovery Delay

- Optional.

Command	recover up-delay ***interval*** [none-vap ***none-vap-interval***]

Parameter Description	*interval*: Indicates recovery delay of VAP interfaces, in seconds. The value ranges from 0 to 3,600. *none-vap-interval*: Indicatestherecoverydelayofnon-VAPinterfaces, inseconds.The valuerangesfrom 0 to 3,600.
Defaults	The default recovery delay of VAP interfaces is 120s. There is no delay in the recovery of non-VAP interfaces by default.
Command Mode	VAP configuration mode
Usage Guide	When the peer-link failure is rectified and devices are restarted, VAP interfaces are restored with a delay of 120s while non-VAP interfaces are restored without delay.

Configuring an Exceptional Port for Dual-Active Detection

- Optional.

Command	vap error-down except
Parameter Description	N/A
Defaults	No exceptional port for dual-active detection is configured by default.
Command Mode	Interface configuration mode
Usage Guide	After the VAP detects the dual-active mode, it brings physical ports on the slave device to the error down state. To prevent an interface from entering error down state, you can run this command to configure it as an exceptional port. Within the interface recovery delay, physical ports are still in error down state.

Configuring Fast Convergence Mode

- Optional.

Command	fast-convergence
Parameter Description	N/A
Defaults	Fast convergence is enabled by default.
Command Mode	VAP configuration mode
Usage Guide	After fast convergence is configured, the VAP fault convergence time is minimized. However, there may be considerable packets instantaneously, for example, flooding may occur.

Configuring Dual-Active Automatic Recovery

- Optional.

Command	dual-active auto recovery
Parameter Description	N/A
Defaults	Dual-active automatic recovery is not configured by default.
Command Mode	VAP configuration mode

Usage Guide	When the dual-active mode is detected, interfaces on the slave device are shutdown. If dual-active automatic recovery is enabled, after the master device malfunctions, service interfaces on the slave device are restored. When the MGMT port is configured to detect the dual-active mode, dual-active automatic recovery is enabled automatically. When a service interface is configured to detect the dual-active mode, dual-active automatic recovery is disabled by default. You can determine whether to enable this function based on the deployment scenario: 1. When the dual-active detection port is a port that directly connects two devices, configure the directly connected port as an exceptional port for dual-active detection (by running the vap dad-down except command), and then enable dual-active automatic recovery. 2. If the dual-active detection port is not a directly connected port of two devices (for example, uplink port), dual-active automatic recovery cannot be enabled. Otherwise, repeated flapping will occur during dual-active detection.

Verification

- Run the **show vap** *[id]* command to display the two APs in the VAP. One is the local AP and the other is the remote AP

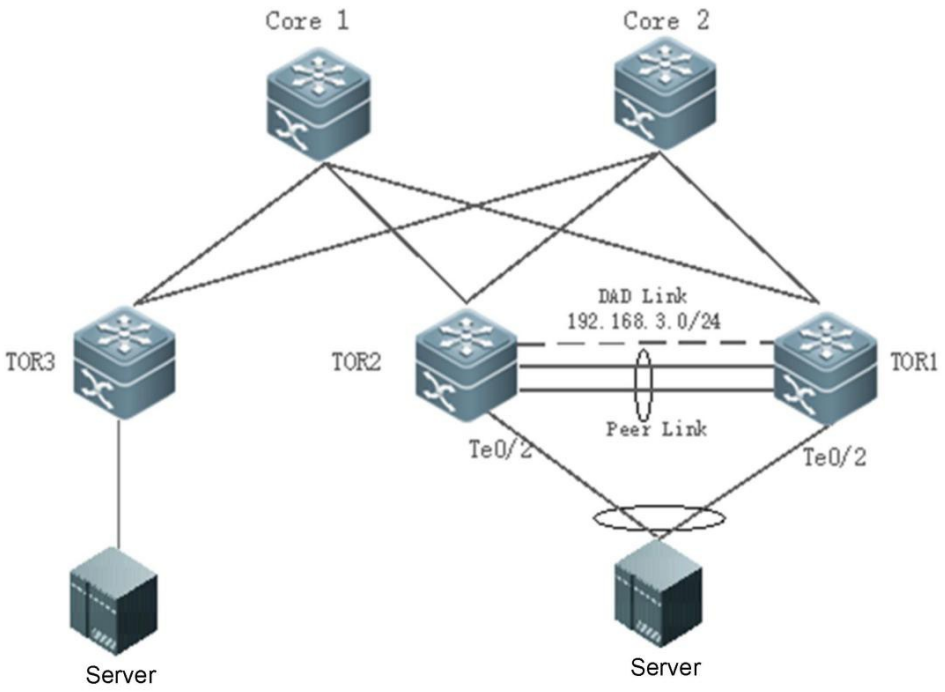
Command	show vap ***[id]***
Parameter Description	Indicates the ID of a VAP. The value ranges from 1 to 65,535.
Command Mode	Privileged EXEC mode, global configuration mode, and interface configuration mode
Usage Guide	This command is used to display information about a VAP.

Command Presentation	QTECH#show vap Vap domain: 245, Dev id: 2 Vap groups: 1 Vap 2 Local AggregatePort 2 is UP TenGigabitEthernet 0/21 is UP Remote AggregatePort 2 is UP TenGigabitEthernet 1/0/21 is UP

Note: For details about fields shown by the **show** command, see the command manual of the corresponding feature.

1.4.1.2. Configuration Example

1.4.2. Connecting to an IP Network in Dual-Homing Mode

Scenario Figure 12-10	
Configuration Steps	• Configure interface IP addresses for all devices (omitted). • Configure a dynamic routing protocol (such as OSPF) on TOR1, TOR2, and core switch (omitted). • Configure a VAP on TOR1 and TOR2.

TOR1	T1# configure terminal Configure a layer-3 IP address for VAP data synchronization and a heartbeat layer-3 IP address. T1(config)# intvlan 100 T1(config-if-VLAN 100)# ip address 192.168.1.1/24 T1(config-if-VLAN 100)# exit T1(config)# int mgmt 0 T1(config-if-Mgmt 0)# ip address 192.168.2.1/24 T1(config-if-Mgmt 0)# exit Configure a layer-3 IP address for VAP data synchronization and a heartbeat layer-3 IP address. T1(config)# intvlan 100 T1(config-if-VLAN 100)# ip address 192.168.1.1/24 T1(config-if-VLAN 100)# exit T1(config)# int mgmt 0 T1(config-if-Mgmt 0)# ip address 192.168.2.1/24 T1(config-if-Mgmt 0)# exit Configure a VAP domain, data synchronization channel, and heartbeat channel. T1(config)# vap domain 1 T1(config-vap)# data-sync local 192.168.1.1 peer 192.168.1.2 T1(config-vap)# peer-keepalive local 192.168.2.1 peer 192.168.2.2 mgmt 0 T1(config-vap)# exit Configure physical member ports for peer-link APs. T1(config)# interface TenGigabitEthernet 0/4 T1(config-if-TenGigabitEthernet 0/4)# port-group 1 T1(config-if-TenGigabitEthernet 0/4)# exit T1(config)# interface TenGigabitEthernet 0/5 T1(config-if-TenGigabitEthernet 0/5)# port-group 1 T1(config-if-TenGigabitEthernet 0/5)# exit Configure the peer-link. T1(config)# interface AggregatePort 1

T1(config-if-AggregatePort 1)# switchport mode trunk
T1(config-if-AggregatePort 1)# switchport tr allowed vlan all
T1(config-if-AggregatePort 1)# peer-link
T1(config-if-AggregatePort 1)# exit
Add downlink interface Te0/2 to AP2 and AP2 to VAP2
T1(config)# interface TenGigabitEthernet 0/2
T1(config-if-TenGigabitEthernet 0/2)# port-group 2
T1(config-if-TenGigabitEthernet 0/2)# exit
T1(config)# interface AggregatePort 2
T1(config-if-AggregatePort 2)# switchport access vlan 2

T1(config-if-AggregatePort 2)# vap 2

T1(config-if-AggregatePort 2)# exit
Add downlink interface Te0/3 to AP3 and AP3 to VAP3.
T1(config)# interface TenGigabitEthernet 0/3
T1(config-if-TenGigabitEthernet 0/3)# port-group 3
T1(config-if-TenGigabitEthernet 0/3)# exit
T1(config)# interface AggregatePort 3
T1(config-if-AggregatePort 3)# switchport access vlan 3

T1(config-if-AggregatePort 3)# vap 3

T1(config-if-AggregatePort 3)# exit
Configure a VRRP active-active gateway
T1(config)# vlan 2
T1(config-vlan)# exit T1(config)# interface vlan 2
T1(config-if-VLAN 2)# ip address 30.30.2.1/24
T1(config-if-VLAN 2)# vrrp 1 ip 30.30.2.1
T1(config-if-VLAN 2)# vrrp mode dual-active
T1(config-if-VLAN 2)# exit
T1(config)# vlan 3
T1(config-vlan)# exit
T1(config)# interface vlan 3
T1(config-if-VLAN 2)# ip address 30.30.3.1/24

	T1(config-if-VLAN 2)# vrrp 1 ip 30.30.3.1 T1(config-if-VLAN 2)# vrrp mode dual-active T1(config-if-VLAN 2)# exit Configure a Monitor Link, with the uplink interface of Te 0/1 and downlink interfaces of Te0/2 and Te0/3 T1(config)# link state track 1 up-delay 60 T1(config)# interface TenGigabitEthernet 0/1 T1(config-if-TenGigabitEthernet 0/1)# link state group 1 upstream T1(config-if-TenGigabitEthernet 0/1)# exit T1(config)# interface TenGigabitEthernet 0/2 T1(config-if-TenGigabitEthernet 0/2)# link state group 1 downstream T1(config-if-TenGigabitEthernet 0/2)# exit T1(config)# interface TenGigabitEthernet 0/3 T1(config-if-TenGigabitEthernet 0/3)# link state group 1 downstream T1(config-if-TenGigabitEthernet 0/3)# exit
TOR-2	T2# configure terminal Configure a layer-3 IP address for VAP data synchronization and a heartbeat layer-3 IP address. T2(config)# intvlan 100 T2(config-if-VLAN 100)# ip address 192.168.1.2/24 T2(config-if-VLAN 100)# exit T2(config)# int mgmt 0 T2(config-if-Mgmt 0)# ip address 192.168.2.2/24 T2(config-if-Mgmt 0)# exit Configure a VAP data synchronization channel and heartbeat channel. T2(config)# vap domain 1 T2(config-vap)# data-sync local 192.168.1.2 peer 192.168.1.1 T2(config-vap)# peer-keepalive local 192.168.2.2 peer 192.168.2.1 mgmt 0 T2(config-vap)# exit Configure physical member ports for peer-link APs.

	T2(config)# interface TenGigabitEthernet 0/4 T2(config-if-TenGigabitEthernet 0/4)# port-group 1 T2(config-if-TenGigabitEthernet 0/4)# exit T2(config)# interface TenGigabitEthernet 0/5 T2(config-if-TenGigabitEthernet 0/5)# port-group 1 T2(config-if-TenGigabitEthernet 0/5)# exit Configure the peer-link. T2(config)# interface AggregatePort 1 T2(config-if-AggregatePort 1)# switchport mode trunk T2(config-if-AggregatePort 1)# switchport tr allowed vlan all T2(config-if-AggregatePort 1)# peer-link T2(config-if-AggregatePort 1)# exit Add downlink interface Te0/2 to AP2 and AP2 to VAP2. T2(config)# interface TenGigabitEthernet 0/2 T2(config-if-TenGigabitEthernet 0/2)# port-group 2 T2(config-if-TenGigabitEthernet 0/2)# exit T2(config)# interface AggregatePort 2 T2(config-if-AggregatePort 2)# switchport access vlan 2 T2(config-if-AggregatePort 2)# vap 2 T2(config-if-AggregatePort 2)# exit Add downlink interface Te0/3 to AP3 and AP3 to VAP3. T2(config)# interface TenGigabitEthernet 0/3 T2(config-if-TenGigabitEthernet 0/3)# port-group 3 T2(config-if-TenGigabitEthernet 0/3)# exit T2(config)# interface AggregatePort 3 T2(config-if-AggregatePort 3)# switchport access vlan 3 T2(config-if-AggregatePort 3)# vap 3 T2(config-if-AggregatePort 3)# exit

	Configure a VRRP active-active gateway. T2(config)# vlan 2 T2(config-vlan)# exit T2(config)# interface vlan 2 T2(config-if-VLAN 2)# ip address 30.30.2.2/24 T2(config-if-VLAN 2)# vrrp 1 ip 30.30.2.1 T2(config-if-VLAN 2)# vrrp mode dual-active T2(config-if-VLAN 2)# exit T2(config)# vlan 3 T2(config-vlan)# exit T2(config)# interface vlan 3 T2(config-if-VLAN 2)# ip address 30.30.3.2/24 T2(config-if-VLAN 2)# vrrp 1 ip 30.30.3.1 T2(config-if-VLAN 2)# vrrp mode dual-active T2(config-if-VLAN 2)# exit Configurea Monito Link, withtheuplink interfaceof Te 0/1 and downlinkinterfacesof Te0/2 and Te0/3. T2(config)# link state track 1 up-delay 60 T2(config)# interface TenGigabitEthernet 0/1 T2(config-if-TenGigabitEthernet 0/1)# link state group 1 upstream T2(config-if-TenGigabitEthernet 0/1)# exit T2(config)# interface TenGigabitEthernet 0/2 T2(config-if-TenGigabitEthernet 0/2)# link state group 1 downstream T2(config-if-TenGigabitEthernet 0/2)# exit T2(config)# interface TenGigabitEthernet 0/3 T2(config-if-TenGigabitEthernet 0/3)# link state group 1 downstream T2(config-if-TenGigabitEthernet 0/3)# exit
Verification	Run the **show vap** command to display the two APs in the same VAP. The APs should be in the normal state.
T1	T1# show vap Vap domain: 1, Dev id: 1 Vap groups: 2

	Vap 2 Local AggregatePort 2 is UP TenGigabitEthernet 0/2 is UP Remote AggregatePort 2 is UP TenGigabitEthernet 0/2 is UP Vap 3 Local AggregatePort 3 is UP TenGigabitEthernet 0/3 is UP Remote AggregatePort 3 is UP
T1	TenGigabitEthernet 0/3 is UP T2# show vap Vap domain: 1, Dev id: 2 Vap groups: 2 Vap 2 Local AggregatePort 2 is UP TenGigabitEthernet 0/2 is UP Remote AggregatePort 2 is UP TenGigabitEthernet0/2isUP Vap 3 Local AggregatePort 3 is UP TenGigabitEthernet 0/3 is UP Remote AggregatePort 3 is UP TenGigabitEthernet 0/3 is UP

Common Errors N/A

1.4.3. Connecting to a Centralized VXLAN Network in Dual-Homing Mode

Configuration Effect

- Two devices pair with each other to form a VAPsystem. The links of access devices are aggregated and connected to the VAP system in dual-homing mode.

- Traffic from VAP devices to access devices is first forwarded through the local VAP interface. When the local VAP interface fails, the traffic is forwarded to the VAP peer device.
- Configure a centralized VXLAN, connect a server to a TOR switch, and configure the TOR switch to connect to the VXLAN active-active gateways in dual-homing mode. If one VXLAN gateway malfunctions, user services can be still forwarded normally.

Notes

- The TOR switch is connected to core switches in dual-homing mode and APs on the two core switches need to be added to the same VAP.
- It is recommended that the peer-link between the two devices be configured as a trunk link to allow all VLAN traffic to pass.
- You are advised to configure multiple physical links for the peer-link. For chassis devices, you should deploy physical links on different boards to avoid the impact of a board failure on the network.

1.4.4. Configuration Steps

Configuring a VAP Domain

- Mandatory.
- Perform the configuration on both network devices that provide dual-homing access.

Command	vap domain ***domain-id***
Parameter Description	*domain-id*: Indicates the domain ID. The value ranges from 1 to 255.
Defaults	No domain ID is configured by default.
Command Mode	Global configuration mode
Usage Guide	Only one domain ID can be configured on one device. VAP negotiation succeeds only when domain IDs on two devices are the same.

Configuring the Peer-link

- Mandatory.

Command	peer-link
Parameter Description	N/A
Defaults	An AP is not the peer-link by default.

Command Mode	Interface configuration mode
Usage Guide	When all member ports composing an AP of a VAP fail, traffic will be switched to the peer-link. When the remote member interface of a VAP works properly, traffic from the peer-link is not forwarded through the local member interface, in an effort to prevent loops. When the remote member interface of the VAP fails, traffic from the peer-link needs to be forwarded through the local member interface.

Addingan APtothe VAP

- Mandatory.
- One AP can be added to only one VAP and different APs on the same device must be added to different VAPs.

Command	vap ***vap-id***
Parameter Description	*vap-id*: Indicates the ID of a VAP. The value ranges from 1 to 65,535.
Defaults	An AP is not added to a VAP by default.
Command Mode	Interface configuration mode
Usage Guide	The two APs on the two network devices that provide dual-homing access must be added to the same VAP.

Configuring a Data Synchronization Channel

- Mandatory.

• **Command**	data-sync local **{ *ip-address* | *ipv6-address* }** peer **{ *ip-address* | *ipv6-address* }**
Parameter Description	**local**{ *ip-address*| *ipv6-address* }: Indicatesthelocal IPaddress. **peer** { *ip-address*| *ipv6-address* }: Indicatesthepeer IPaddress.
Defaults	No data synchronization channel is configured by default.
Command Mode	VAP domain configuration mode
Usage Guide	Data is synchronized between VAPdevices through a layer-3 IP network and this configuration is required on each VAP device. Either IPv4 or IPv6 addresses can be configured.

Configuring a Heartbeat Link

- Mandatory.

Command	peer-keepalivelocal **{ *ip-address*|*ipv6-address* }** peer **{*ip-address*|*ipv6-address*}[*interface-typeinterface-number*]**
Parameter Description	*ip-address*: Indicates the IPv4 address used for heartbeat detection. *ipv6-address*: Indicates the IPv6 address used for heartbeat detection. *interface-type*: Indicates the interface type. Only MGMT interfaces are supported.
Parameter Description	***interface-number*: Indicates the interface number. All MGMT interfaces are supported.**
Defaults	No heartbeat link is configured by default.
Command Mode	VAP domain configuration mode
Usage Guide	When the peer-link fails but the heartbeat link is normal, interfaces other than the MGMT interface, heartbeat interface, peer-link interface, and stacked interface on the slave device are triggered to enter the error down state. The interfaces return to the normal state after the peer-link is restored. Either IPv4 or IPv6 addresses can be configured.

Configuring the Priority

- Optional.

Command	priority ***priority***
Parameter Description	*priority*: Indicates the priority.
Defaults	The default priority is 4.

Command Mode	VAP domain configuration mode
Usage Guide	VAP devices negotiate to determine their master/slave state after establishing communication. The master/slave negotiation rules are as follows: 1. The device with a higher priority is elected as the master device. 2. If the devices sharethe same priority, the device with a smaller MAC address is elected as the master device.

Configuring the Heartbeat Holding Time

- Optional.

Command	peer-keepalive hold-time ***interval***
Parameter Description	*interval*: Indicates the heartbeat holding time.
Defaults	The default heartbeat holding time is 3s.
Command Mode	VAP domain configuration mode
Usage Guide	After the peer-link fails, the heartbeat link is retained for a period of time by default. After the time expires, if the heartbeat link is still normal, service interfaces on the slave device will enter error down state.

Configuring the Interface Recovery Delay

- Optional.

Command	recover up-delay ***interval*** **[**none-vap ***none-vap-interva*** **]**
Parameter Description	*interval*: Indicates recovery delay of VAP interfaces, in seconds. The value ranges from 0 to 3,600. *none-vap-interval*: Indicatestherecoverydelayofnon-VAPinterfaces, inseconds.The valuerangesfrom 0 to 3,600.
Defaults	The default recovery delay of VAP interfaces is 120s. There is no delay in the recovery of non-VAP interfaces by default.
Command Mode	VAP configuration mode
Usage Guide	When the peer-link failure is rectified and devices are restarted, VAP interfaces are restored with a delay of 120s while non-VAP interfaces are restored without delay.

Configuring an Exceptional Port for Dual-Active Detection

- Optional.

Command	vap error-down except
Parameter Description	N/A
Defaults	No exceptional port for dual-active detection is configured by default.
Command Mode	Interface configuration mode
Usage Guide	After the VAP detects the dual-active mode, it brings physical ports on the slave device to the error down state. To prevent an interface from entering error down state, you can run this command to configure it as an exceptional port. Within the interface recovery delay, physical ports are still in error down state.

Configuring Fast Convergence Mode

- Optional.

Command	fast-convergence
Parameter Description	N/A
Defaults	Fast convergence is enabled by default.
Command Mode	VAP configuration mode
Usage Guide	After fast convergence is configured, the VAP fault convergence time is minimized. However, there may be considerable packets instantaneously, for example, flooding may occur.

Configuring Dual-Active Automatic Recovery

- Optional.

Command	dual-active auto recovery
Parameter Description	N/A
Defaults	Dual-master automatic recovery is not configured by default.
Command Mode	VAP configuration mode

Usage Guide	When the dual-active mode is detected, interfaces on the slave device are shutdown. If dual-active automatic recovery is enabled, after the master device malfunctions, service interfaces on the slave device are restored. When the MGMT port is configured to detect the dual-active mode, dual-active automatic recovery is enabled automatically. When a service interface is configured to detect the dual-active mode, dual-active automatic recovery is disabled by default. You can determine whether to enable this function based on the deployment scenario: **1.** When the dual-active detection port is a port that directly connects two devices, configure the directly connected port as an exceptional port for dual-active detection (by running the **vap dad-down except** command), and then enable dual-active automatic recovery. **2.** If the dual-active detection port is not a directly connected port of two devices (for example, uplink port), dual-active automatic recovery cannot be enabled. Otherwise, repeated flapping will occur during dual-active detection.

Verification

- Run the **show vap** *[id]* command to display the two APs in the VAP. One is the local AP and the other is the remote AP.

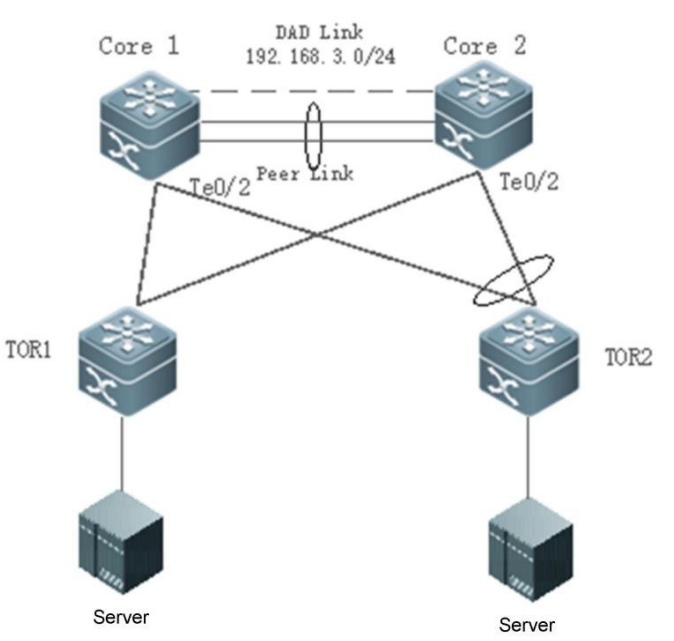
Command	show vap ***[id]***
Parameter Description	Indicates the ID of a VAP. The value ranges from 1 to 65,535.
Command Mode	Privileged EXEC mode, global configuration mode, and interface configuration mode
Usage Guide	This command is used to display information about a VAP.

Command Presentation	QTECH#show vap Vap domain: 245, Dev id: 2 Vap groups: 1 Vap 2 Local AggregatePort 2 is UP TenGigabitEthernet 0/21 is UP Remote AggregatePort 2 is UP TenGigabitEthernet 1/0/21 is UP

Note: For details about fields shown by the show command, see the command manual of the corresponding feature.

1.4.4.1. Configuration Example

Connecting to a Centralized VXLAN Network in Dual-Homing Mode

Scenario **Figure 12-9**	
Configuration Steps	• Configure interface IP addresses for all devices (omitted). • Configure a centralized EVPN VXLAN on TOR1, Core1, and Core2 (omitted). • Configure an AP on TOR2 and configure TOR2 to connect to Core1 and Core2 in dual-homing mode (omitted). • Configure a VAP on Core1 and Core2.
Core1	Core1# configure terminal Configure a layer-3 IP address for VAP data synchronization and a heartbeat layer-3 IP address. Core1(config)# int vlan 100 Core1(config-if-VLAN 100)# ip address 192.168.1.1/24 Core1(config-if-VLAN 100)# exit Core1(config)# int mgmt 0 Core1(config-if-Mgmt 0)# ipaddress 192.168.2.1/24 Core1(config-if-Mgmt 0)# exit

	Configure a VAP domain, data synchronization channel, and heartbeat detection channel. Core1(config)# vap domain 1
	Core1(config-vap)# data-sync local 192.168.1.1 peer 192.168.1.2 Core1(config-vap)# peer-keepalive local 192.168.2.1 peer 192.168.2.2 mgmt 0 Core1(config-vap)# exit Configure physical member ports for peer-link APs. Core1(config)# interface TenGigabitEthernet 0/4 Core1(config-if-TenGigabitEthernet 0/4)# port-group 1 Core1(config-if-TenGigabitEthernet 0/4)# exit Core1(config)# interface TenGigabitEthernet 0/5 Core1(config-if-TenGigabitEthernet 0/5)# port-group 1 Core1(config-if-TenGigabitEthernet 0/5)# exit Configure the peer-link. Core1(config)# interface AggregatePort 1 Core1(config-if-AggregatePort 1)# switchport mode trunk Core1(config-if-AggregatePort 1)# switchport tr allowed vlan all Core1(config-if-AggregatePort 1)# peer-link Core1(config-if-AggregatePort 1)# exit Add downlink interfaceTe0/2 to AP2 and AP2 to VAP2. Core1(config)# interface TenGigabitEthernet 0/2 Core1(config-if-TenGigabitEthernet 0/2)# port-group 2 Core1(config-if-TenGigabitEthernet 0/2)# exit Core1(config)# interface AggregatePort 2 Core1(config-if-AggregatePort 2)# switchport access vlan 2 Core1(config-if-AggregatePort 2)# vap 2 Core1(config-if-AggregatePort 2)# exit Configure an overlay router active-active gateway. Core1(config)# interface OverlayRouter 10 Core1(config-if-OverlayRouter 10)# ip address 30.30.2.1/24 Core1(config-if-OverlayRouter 10)# anycast-gateway Core1(config-if-OverlayRouter 10)# exit

Core2	Core2# configure terminal Configure a layer-3 IP address for VAP data synchronization and a heartbeat IP address. Core2(config)# int vlan 100
	Core2(config-if-VLAN 100)# ip address 192.168.1.2/24 Core2(config-if-VLAN 100)# exit Core2(config)# int mgmt 0 Core2(config-if-Mgmt 0)# ipaddress 192.168.2.2/24 Core2(config-if-Mgmt 0)# exit Configure a VAP data synchronization channel and heartbeat detection channel. Core2(config)# vap domain 1 Core2(config-vap)# data-sync local 192.168.1.2 peer 192.168.1.1 Core2(config-vap)# peer-keepalive local 192.168.2.2 peer 192.168.2.1 mgmt 0 Core2(config-vap)# exit Configure physical member ports for peer-link APs. Core2(config)# interface TenGigabitEthernet 0/4 Core2(config-if-TenGigabitEthernet 0/4)# port-group 1 Core2(config-if-TenGigabitEthernet 0/4)# exit Core2(config)# interface TenGigabitEthernet 0/5 Core2(config-if-TenGigabitEthernet 0/5)# port-group 1 Core2(config-if-TenGigabitEthernet 0/5)# exit Configure the peer-link. Core2(config)# interface AggregatePort 1 Core2(config-if-AggregatePort 1)# switchport mode trunk Core2(config-if-AggregatePort 1)# switchport tr allowed vlan all Core2(config-if-AggregatePort 1)# peer-link Core2(config-if-AggregatePort 1)# exit AdddownlinkinterfaceTe0/2toAP2 andAP2 toVAP2. Core2(config)# interface TenGigabitEthernet 0/2 Core2(config-if-TenGigabitEthernet 0/2)# port-group 2 Core2(config-if-TenGigabitEthernet 0/2)# exit

	Core2(config)# interface AggregatePort 2 Core2(config-if-AggregatePort 2)# switchport access vlan 2 Core2(config-if-AggregatePort 2)# vap 2 Core2(config-if-AggregatePort 2)# exit Configure an overlay router active-active gateway.
	Core2(config)# interface OverlayRouter 10 Core2(config-if-OverlayRouter 10)# ip address 30.30.2.1/24 Core2(config-if-OverlayRouter 10)# anycast-gateway Core2(config-if-OverlayRouter 10)# exit
Verification	Run the show vap command to display the two APs in the same VAP. The APs should be in the normal state.
Core1	Core1# show vap Vap domain: 1, Dev id: 1 Vap groups: 2 Vap 2 Local AggregatePort 2 is UP TenGigabitEthernet 0/2 is UP Remote AggregatePort 2 is UP TenGigabitEthernet 0/2 is UP
Core2	Core2# show vap Vap domain: 1, Dev id: 2 Vap groups: 2 Vap 2 Local AggregatePort 2 is UP TenGigabitEthernet 0/2 is UP Remote AggregatePort 2 is UP TenGigabitEthernet 0/2 is UP

Common Errors N/A

1.4.5. Connecting to a Distributed VXLAN Network in Dual-Homing Mode

Configuration Effect

- Two devices pair with each other to form a VAPsystem. The links of access devices are aggregated and connected to the VAP system in dual-homing mode.
- Traffic from VAP devices to access devices is first forwarded through the local VAP interface. When the local VAP interface fails, the traffic is forwarded to the VAP peer device.
- Configure a distributed VXLAN and configure a server to connect to the VXLAN active-active gateways in dual-homing mode. If one VXLAN gateway malfunctions, user services can be still forwarded normally.

Notes

- The server is connected to the network in dual-homing mode and interfaces on the two TOR devices need to be added to the same VAP.
- It is recommended that the peer-link between the two devices be configured as a trunk link to allow all VLAN traffic to pass.
- You are advised to configure multiple physical links for the peer-link. For chassis devices, you should deploy physical links on different boards to avoid the impact of a board failure on the network.

1.4.6. Configuration Steps

Configuring a VAP Domain

- Mandatory.
- Perform the configuration on both network devices that provide dual-homing access.

• **Command**	vap domain ***domain-id***
Parameter Description	*domain-id*: Indicates the domain ID. The value ranges from 1 to 255.
Defaults	No domain ID is configured by default.
Command Mode	Global configuration mode
Usage Guide	Only one domain ID can be configured on one device. VAP negotiation succeeds only when domain IDs on two devices are the same.

Configuring the Peer-link

- Mandatory.

Command	peer-link

Parameter Description	N/A
Defaults	An AP is not the peer-link by default.
Command Mode	Interface configuration mode
Usage Guide	When all member ports composing an AP of a VAP fail, traffic will be switched to the peer-link. When the remote member interface of a VAP works properly, traffic from the peer-link is not forwarded through the local member interface, in an effort to prevent loops. When the remote member interface of the VAP fails, traffic from the peer-link needs to be forwarded through the local member interface.

Adding an AP to the VAP

- Mandatory.
- One AP can be added to only one VAP and different APs on the same device must be added to different VAPs.

Command	vap ***vap-id***
Parameter Description	*vap-id*: Indicates the ID of a VAP. The value ranges from 1 to 65,535.
Defaults	An AP is not added to a VAP by default.
Command Mode	Interface configuration mode
Usage Guide	The two APs on the two network devices that provide dual-homing access must be added to the same VAP.

Configuring a Data Synchronization Channel

- Mandatory.

Command	data-sync local **{** ***ip-address*** **|** ***ipv6-address*** **}** peer **{** ***ip-address*** **|** ***ipv6-address*** **}**

Parameter Description	**local**{ *ip-address*| *ipv6-address* }: Indicatesthelocal IPaddress. **peer** { *ip-address*| *ipv6-address* }: Indicatesthepeer IPaddress.
Defaults	No data synchronization channel is configured by default.
Command Mode	VAP domain configuration mode
Usage Guide	Data is synchronized between VAPdevices through a layer-3 IP network and this configuration is required on each VAP device. Either IPv4 or IPv6 addresses can be configured.

Configuring a Heartbeat Link

- Mandatory.

Command	peer-keepalivelocal **{ *ip-address*|*ipv6-address* }** peer **{*ip-address* |*ipv6-address*}[*interface-typeinterface-number*]**
Parameter Description	*ip-address*: Indicates the IPv4 address used for heartbeat detection. *ipv6-address*: Indicates the IPv6 address used for heartbeat detection. *interface-type*: Indicates the interface type. Only MGMT interfaces are supported. *interface-number*: Indicates the interface number. All MGMT interfaces are supported.
Defaults	No heartbeat link is configured by default.
Command Mode	VAP domain configuration mode
Usage Guide	When the peer-link fails but the heartbeat link is normal, interfaces other than the MGMT interface, heartbeat interface, peer-link interface, and stacked interface on the slave device are triggered to enter the error down state. The interfaces return to the normal state after the peer-link is restored. Either IPv4 or IPv6 addresses can be configured.

Configuring the Priority

- Optional.

Command	priority ***priority***
ParameterDescription	*priority*: Indicates the priority.
Defaults	The default priority is 4.
CommandMode	VAP domain configuration mode
Usage Guide	VAP devices negotiate to determine their master/slave state after establishing communication. The master/slave negotiation rules are as follows: **1.**The device with a higher priority is elected as the master device. **2.**If the devices sharethe same priority, the device with a smaller MAC address is elected as the master device.

Configuring the Heartbeat Holding Time

- Optional.

Command	peer-keepalive hold-time ***interval***
Parameter Description	*interval*: Indicates the heartbeat holding time.
Defaults	The default heartbeat holding time is 3s.
Command Mode	VAP domain configuration mode
Usage Guide	After the peer-link fails, the heartbeat link is retained for a period of time by default. After the time expires, if the heartbeat link is still normal, service interfaces on the slave device will enter error down state.

Configuring the Interface Recovery Delay

- Optional.

Command	recover up-delay ***interval*** **[**none-vap ***none-vap-interval*****]**
Parameter Description	*interval*: Indicates recovery delay of VAP interfaces, in seconds. The value ranges from 0 to 3,600. *none-vap-interval*: Indicates the recovery delay of non-VAP interfaces, in seconds. The value ranges from 0 to 3,600.
Defaults	The default recovery delay of VAP interfaces is 120s. There is no delay in the recovery of non-VAP interfaces by default.
Command Mode	VAP configuration mode
Usage Guide	When the peer-link failure is rectified and devices are restarted, VAP interfaces are restored with a delay of 120s while non-VAP interfaces are restored without delay.

Configuring an Exceptional Port for Dual-Active Detection

- Optional.

Command	vap error-down except
Parameter Description	N/A
Defaults	No exceptional port for dual-active detection is configured by default.
Command Mode	Interface configuration mode
Usage Guide	After the VAP detects the dual-active mode, it brings physical ports on the slave device to the error down state. To prevent an interface from entering error down state, you can run this command to configure it as an exceptional port. Within the interface recovery delay, physical ports are still in error down state.

Configuring Fast Convergence Mode

- Optional.

Command	fast-convergence
Parameter Description	N/A
Defaults	Fast convergence is enabled by default.
Command Mode	VAP configuration mode
Usage Guide	After fast convergence is configured, the VAP fault convergence time is minimized. However, there may be considerable packets instantaneously, for example, flooding may occur.

Configuring Dual-Active Automatic Recovery

- Optional.

Command	dual-active auto recovery
Parameter Description	N/A
Defaults	Dual-active automatic recovery is not configured by default.
Command Mode	VAP configuration mode

Usage Guide	When the dual-active mode is detected, interfaces on the slave device are shutdown. If dual-active automatic recovery is enabled, after the master device malfunctions, service interfaces on the slave device are restored. When the MGMT port is configured to detect the dual-active mode, dual-active automatic recovery is enabled automatically. When a service interface is configured to detect the dual-active mode, dual-active automatic recovery is disabled by default. You can determine whether to enable this function based on the deployment scenario: **1.** When the dual-active detection port is a port that directly connects two devices, configure the directly connected port as an exceptional port for dual-active detection (by running the **vap dad-down except** command), and then enable dual-active automatic recovery. **2.** If the dual-active detection port is not a directly connected port of two devices (for example, uplink port), dual- active automatic recovery cannot be enabled. Otherwise, repeated flapping will occur during dual-active detection.

Verification

- Run the **show vap** *[id]* command to display the two APs in the VAP. One is the local AP and the other is the remote AP.

Command	show vap ***[id]***
Parameter Description	Indicates the ID of a VAP. The value ranges from 1 to 65,535.
Command Mode	Privileged EXEC mode, global configuration mode, and interface configuration mode
Usage Guide	This command is used to display information about a VAP.

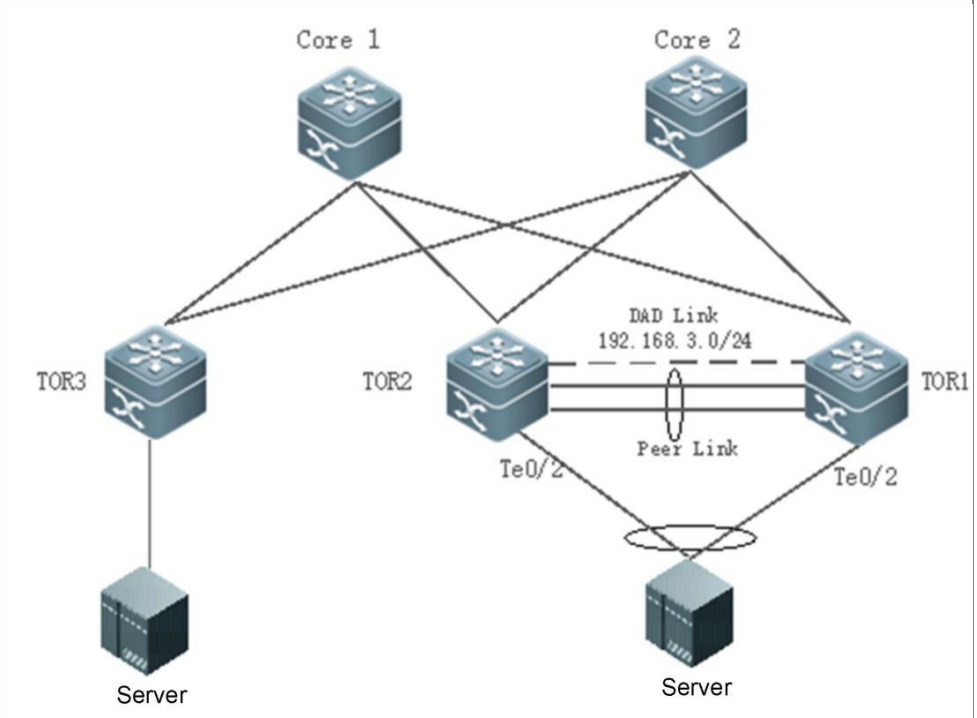
Command Presentation	QTECH#show vap Vap domain: 245, Dev id: 2 Vap groups: 1 Vap 2 Local AggregatePort 2 is UP TenGigabitEthernet 0/21 is UP Remote AggregatePort 2 is UP TenGigabitEthernet 1/0/21 is UP

Note: For details about fields shown by the **show** command, see the command manual of the corresponding feature.

1.4.6.1. Configuration Example

Connecting to a Distributed VXLAN Network in Dual-Homing Mode

Scenario
Figure 12-10



Configuration Steps	• Configure interface IP addresses for all devices (omitted). • Configureadynamic routingprotocol(suchas OSPF) on TOR1, TOR2, TOR3, Core1, and Core2 (omitted). • Configure a distributed VXLAN on TOR1, TOR2, TOR3, Core1, and Core2, and configure the same VTEP IP address for TOR2 and TOR3 (omitted). • Configure a VAP on TOR1 and TOR2.
TOR1	T1# configure terminal Configure a layer-3 IP address for VAP data synchronization and a heartbeat IP address. T1(config)# int vlan 100 T1(config-if-VLAN 100)# ip address 192.168.1.1/24 T1(config-if-VLAN 100)# exit T1(config)# int mgmt 0 T1(config-if-Mgmt 0)# ip address 192.168.2.1/24 T1(config-if-Mgmt 0)# exit Configure a VAP domain, data synchronization channel, and heartbeat detection channel. T1(config)# vap domain 1 T1(config-vap)# data-sync local 192.168.1.1 peer 192.168.1.2 T1(config-vap)# peer-keepalive local 192.168.2.1 peer 192.168.2.2 mgmt 0 T1(config-vap)# exit Configure physical member ports for peer-link APs. T1(config)# interface TenGigabitEthernet 0/4 T1(config-if-TenGigabitEthernet 0/4)# port-group 1 T1(config-if-

	TenGigabitEthernet 0/4)# exit T1(config)# interface TenGigabitEthernet 0/5 T1(config-if- TenGigabitEthernet 0/5)# port-group 1 T1(config-if- TenGigabitEthernet 0/5)# exit Configure the peer-link. T1(config)# interface AggregatePort 1 T1(config-if- AggregatePort 1)# switchport mode trunk T1(config-if-AggregatePort 1)# switchport tr allowed vlan all T1(config-if- AggregatePort 1)# peer- link T1(config-if-AggregatePort 1)# exit Add downlink interface Te0/2 to AP2 and AP2 to VAP2. T1(config)# interface TenGigabitEthernet 0/2 T1(config-if- TenGigabitEthernet 0/2)# port-group 2 T1(config-if- TenGigabitEthernet 0/2)#exit T1(config)# interface AggregatePort 2 T1(config-if-AggregatePort 2)# switchport access vlan 2 T1(config-if-AggregatePort 2)# vap 2

T1(config-if-AggregatePort 2)# exit

Add downlink interface Te0/3 to AP3 and AP3 to VAP3. T1(config)# interface TenGigabitEthernet 0/3 T1(config-if-TenGigabitEthernet 0/3)# port-group 3 T1(config-if-TenGigabitEthernet 0/3)#exit T1(config)# interface AggregatePort 3

T1(config-if-AggregatePort 3)# switchport access vlan 3

T1(config-if-AggregatePort 3)# vap 3

T1(config-if-AggregatePort 3)# exit

Configure an overlay router active-active gateway. T1(config)# interface OverlayRouter 10

T1(config-if-OverlayRouter 10)# ip address 30.30.2.1/24 T1(config-if-OverlayRouter 10)# anycast-gateway

T1(config-if-OverlayRouter 10)# exit

TOR-2	T2# configure terminal Configure a layer-3 IP address for VAP data synchronization and a heartbeat IP address. T2(config)# int vlan 100 T2(config-if-VLAN 100)# ip address 192.168.1.2/24 T2(config-if-VLAN 100)# exit T2(config)# int mgmt 0 T2(config-if-Mgmt 0)# ip address 192.168.2.2/24 T2(config-if-Mgmt 0)# exit Configure a VAP data synchronization channel and heartbeat detection channel. T2(config)# vap domain 1 T2(config-vap)# data-sync local 192.168.1.2 peer 192.168.1.1 T2(config-vap)# peer-keepalive local 192.168.2.2 peer 192.168.2.1 mgmt 0 T2(config-vap)# exit Configure physical member ports for peer-link APs. T2(config)# interface TenGigabitEthernet 0/4 T2(config-if-TenGigabitEthernet 0/4)# port-group 1 T2(config-if-TenGigabitEthernet 0/4)# exit T2(config)# interface TenGigabitEthernet 0/5 T2(config-if-TenGigabitEthernet 0/5)# port-group 1 T2(config-if-TenGigabitEthernet 0/5)# exit Configure the peer-link. T2(config)# interface AggregatePort 1 T2(config-if-AggregatePort 1)# switchport mode trunk

	T2(config-if-AggregatePort 1)# switchport tr allowed vlan all T2(config-if-AggregatePort 1)# peer-link T2(config-if-AggregatePort 1)# exit Add downlink interface Te0/2 to AP2 and AP2 to VAP2. T2(config)# interface TenGigabitEthernet 0/2 T2(config-if-TenGigabitEthernet 0/2)# port-group 2 T2(config-if-TenGigabitEthernet 0/2)# exit T2(config)# interface AggregatePort 2 T2(config-if-AggregatePort 2)# switchport access vlan 2 T2(config-if-AggregatePort 2)# vap 2 T2(config-if-AggregatePort 2)# exit Add downlink interface Te0/3 to AP3 and AP3 to VAP3. T2(config)# interface TenGigabitEthernet 0/3 T2(config-if-TenGigabitEthernet 0/3)# port-group 3
Verification	Run the **show vap** command to display the two APs in the same VAP. The APs should be in the normal state.
T1	T1# show vap Vap domain: 1, Dev id: 1 Vap groups: 2 Vap 2

	Local AggregatePort 2 is UP TenGigabitEthernet 0/2 is UP Remote AggregatePort 2 is UP TenGigabitEthernet 0/2 is UP
T2	T2# show vap Vap domain: 1, Dev id: 2 Vap groups: 2 Vap 2 Local AggregatePort 2 is UP TenGigabitEthernet 0/2 is UP Remote AggregatePort 2 is UP TenGigabitEthernet 0/2 is UP

Common Errors N/A

1.5. Monitoring

Clearing N/A

Displaying

Description	Command
Displays information about a VAP.	**show vap** *[id]*
Displays information about the peer-link.	**show vap peer-link**

Displays information about the peer of a ata channel.	**show vap data-sync**
Displays information about the heartbeat channel.	**show vap keepalive**
Displays MAC entry information.	**show vap mac**
Displays VXLAN MAC entry information.	**show vap xmac**
Displays a list of error down interfaces and a list of exceptional interfaces.	**show vap error-down**

Debugging

Note: System resources are occupied when debugging information is output. Therefore, disable the debugging switch immediately after use.

Description	Command
Debugs the VAP function globally.	**debug vap all**
Debugs VAP events.	**debug vap event**
Debugs VAP interfaces.	**debug vap lsm**
Debugs VAP packet receiving.	**debug vap recv**
Debugs VAP packet transmission.	**debug vap send**

Debugs keepalive packets of the VAP.	**debug vap hello**
Debugs hot backup information about the VAP.	**debug vap rdnd**
Debugs VAP bridge information.	**debug vap bridge**
Debugsdual-activedetectionofthe VAP.	**debug vap dad**
Debugs MAC information of the VAP.	**debug vap mac**
Debugs VXLAM MAC information of the VAP.	**debug vap xmac**
Debugs the VAP test.	**debug vap test**
Debugs the NETCONF of VAP.	**debug vap netconf**

2. ОБЩАЯ ИНФОРМАЦИЯ

2.1. Замечания и предложения

Мы всегда стремимся улучшить нашу документацию и помочь вам работать лучше, поэтому мы хотим услышать вас. Мы всегда рады обратной связи, в особенности:

- ошибки в содержании, непонятные или противоречащие места в тексте;
- идеи по улучшению документации, чтобы находить информацию быстрее;
- неработающие ссылки и замечания к навигации по документу.

Если вы хотите написать нам по поводу данного документа, то используйте, пожалуйста, форму обратной связи на qtech.ru.

2.2. Гарантия и сервис

Процедура и необходимые действия по вопросам гарантии описаны на сайте QTECH в разделе «Поддержка» −> «Гарантийное обслуживание».

Ознакомиться с информацией по вопросам тестирования оборудования можно на сайте QTECH в разделе «Поддержка» −> «Взять оборудование на тест».

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Телефон Технической поддержки +7 (495) 797-33-11 доб. 0

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