

Huawei E9000 Server V100R001

easyLink Feature White Paper (HMM)

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1 E9000 easyLink Feature Description

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1.1 Background Information

With the development of services, the scale of data centers becomes larger, network converged, and networking more complex. A flat network will prevail in the future. A chassis-type blade server has switch modules installed in its chassis, that is, a switching layer is added to the network. How to reduce networking complexity?

As a chassis-type blade server, the E9000 server has switch modules installed in its chassis and connections exist between compute nodes, compute node NICs (mezzanine cards), and switch modules. It is more complex to configure a service network because a user has to understand connections between each compute node NIC and switch modules, configurations between switch modules, and connections between switch modules in chassis and external switches.

The E9000 easyLink feature allows compute nodes in the chassis to serve as a combination of servers running virtual services and switch modules to serve as server NICs. Therefore, not only is a flat network achieved (networking of switch modules in the chassis and external switches is simplified.), but also internal switch configuration can be completed automatically to simplify internal network management and configuration because a user can ignore physical connections between compute nodes and the switch modules in the chassis by setting service belonging of the compute node NICs.

Figure 1-1 shows connections between E9000 mezzanine cards and switch modules.



Figure 1-1 Connections between mezzanine cards and switch modules

Figure 1-2 shows an easyLink service model.



Figure 1-2 easyLink service model

Compute nodes in the E9000 chassis are divided into different computing resource pools. The computing resource pools that provide the same services communicate with each other through the same business VLAN. Each business VLAN serves as a service NIC that communicates with external switches using uplink ports on the business VLAN. In easyLink configuration, associate compute nodes with business VLANs to complete the switch configuration.

1.2 Working Principle and Related Concepts

The E9000 easyLink feature allows users to use the Hyper Module Management (HMM) WebUI to perform end-to-end management of the network connecting switch modules in the chassis to server NICs.

easyLink Management Functions

easyLink management provides switch module configuration and information query:

• Switch module configuration consists of switch profile and NIC profile configuration.

Switch Profile Configuration

A switch profile defines the relationships between business types and external switches and includes the following:

Business VLAN: indicates the type of business data transmitted between the chassis and external switches.

Uplink: indicates switch module panel ports for business data transmission.

FC configuration: indicates FC SAN connection attributes, including FC mode, FCoE port DCB, and zone configuration.

NIC Profile Configuration

A NIC profile defines the relationships between physical computing resources and service types.

NIC profiles are associated with compute nodes and consist of three parts: NIC teaming, vNICs based on NIC teaming, and relationships between vNICs and business VLANs.

- NIC teaming indicates combining NIC ports into a group for redundancy.
- vNICs are based on NIC teaming and serve as communication interfaces of compute nodes in blade servers. Create vNICs for NIC teams based on the service types.
- Associate vNICs with business VLANs to complete the association between service types of compute nodes and those of switch modules.

In this way, computing services on the compute nodes can communicate with external switches through vNICs. After the preceding configuration, the system will automatically configure the interfaces between compute nodes and switch modules and form a link that connects NICs, internal switch modules, and external networks. During the configuration, users do not need to focus on relationships between switch module ports and compute nodes.

Figure 1-3 shows the easyLink configuration diagram.

Figure 1-3 easyLink configuration



• Switch module information query enables query of Ethernet plane, FC plane, and MAC address information, including physical and statistical information of ports.

Concepts

Concepts related to the E9000 easyLink configuration are as follows:

For switch profiles:

- EndHost
- Stack and Twin
- Business VLAN types: Normal and Trans
- Uplink types: Share Uplink, Normal Uplink, and Cascade Uplink
- Interface types: Eth Trunk, SmartLink, and Physical Link

For NIC profiles:

- NIC teaming and vNIC
- NIC teaming modes: Active-Backup, Balance, and LACP
- vNIC types: Ethernet, FCoE, FC, Port, PF, and VF

Concepts Related to Switch Profile Configuration

- EndHost: indicates the host mode of E9000 switch modules. In this mode, switch modules serve as service NICs and connect to external switches, and STP and other protocols are disabled. This simplifies the internal switch module architecture and configuration and prevents network loops.
- Stack: indicates that two paired switch modules (in slots 1E and 4E or in slots 2X and 3X) are stacked and work as a switch. The easyLink feature allows users to manage and configure the paired switch modules as one unit, simplifying operations.

- Twin: indicates that two switch modules are not stacked, but they have the same service configuration (except switch module management information), so that dual planes are provided for the service network for backup.
- Business VLAN: indicates a bearer that carries services on switch modules. Specify
 VLAN IDs for business VLANs and the IDs range from 2 to 4063. Business VLANs
 include Trans VLANs and normal VLANs. Multiple business VLANs can be created, but
 duplicate VLAN IDs are not allowed. When multiple VLAN IDs are required for data
 transmission, use a Trans VLAN. If only one VLAN ID is required, use a normal VLAN.
- Trans VLAN: indicates a transparent transmission VLAN that consists of one or more VLAN ranges. Packets in all VLAN ranges can be transparently transmitted to external switches through the Trans VLAN. See Figure 1-4.



Figure 1-4 Trans VLAN

- Normal VLAN: indicates a normal VLAN with only one ID.
- Domain VLAN: easyLink enables switch modules to be divided into up to 16 domains. A domain supports transparent transmission of data packets carrying any VLAN tags. Data packets in different domains can have the same VLAN tags. Domain VLANs are unique IDs of domains. Domain VLAN IDs cannot be the same as any normal or Trans VLAN IDs. For example, if the compute node in slot 1 requires VLANs 1 to 100 with uplink 1 and the compute node in slot 2 requires VLANs 1 to 100 with uplink 2, the two compute nodes need to be separated by using different domain VLANs.
- Uplink: corresponds to an internal switch module port, connects internal switch modules to external switches, and serves as the communication channel between business VLANs and external networks.
- Share uplink: indicates a shared uplink. Multiple normal VLANs and Trans VLANs can share a shared uplink to connect to external networks. Packets over a shared uplink carry VLAN tags.
- Normal uplink: serves as the uplink interface of a single normal VLAN. A user can specify whether packets over a normal uplink carry VLAN tags.
- Cascade uplink: indicates an uplink used for cascading chassis. A cascade uplink can be associated with Trans VLANs and normal VLANs. The interface between cascaded chassis must be configured as a cascade uplink. Packets over the cascade uplink carry VLAN tags. The cascade uplink can be used only when switch modules work in stack mode.
- Uplink types: Eth Trunk, SmartLink, and Physical Link

- Eth Trunk: indicates an Ethernet trunk, which is a logical interface formed by bonding multiple physical ports. Traffic is shared among active physical ports based on MAC addresses, which increases bandwidth and provides port redundancy.
- SmartLink: consists of an active link and a standby link, both of which can be Ethernet trunks. In active/standby mode, the active link is activated and the standby link does not forward traffic. When the active link is faulty, traffic is switched over to the standby link. The SmartLink feature requires external switches, which must be Huawei switches.
- Physical Link: corresponds to a physical port.

Chassis 2 is cascaded with chassis 1 over the cascade uplink and connects to an external switch over the shared uplinks and normal uplink of chassis 1. See Figure 1-5.



Figure 1-5 Links

- FC SAN: Two FC SANs can be configured when switch modules support FC. Each of the paired switch slots corresponds to an FC SAN. FC SANs work in NPV or Switch mode. In NPV mode, the N port in the chassis connects to external FC switches. In Switch mode, the E port (license required) connects to external FC switches, or the N port connects directly to storage devices.
- FCoE VLAN: If CX311 switch modules are used in the chassis, two FCoE VLANs must be set.
- Zone: If FC SANs work in Switch mode, zones can be configured based on ports or world wide port names (WWPNs), depending on the switch modules.

A cascade uplink is only used for cascading chassis. If a cascade link belongs to the same business VLAN as other uplink types, do not connect the cascade uplink to external switches; otherwise, network loops will occur.

NIC Profile

- NIC teaming: Multiple physical ports are bonded together to improve bandwidth and provide link redundancy.
- NIC teaming modes: Active-Backup, Balance, and LACP
- Active-Backup: indicates that physical NIC ports in a bond work in active/standby mode.
- Balance: indicates the Ethernet trunk mode. Physical NIC ports in a bond form a static Ethernet trunk. Data packets are shared among healthy NIC ports.
- LACP: indicates the static LACP mode of the Ethernet trunk. LACP is used between NIC ports and switch modules.

If UMC or FCoE is enabled on the NIC, LACP mode is not supported.

Two ports on Mezz1 are bonded to form a NIC team. See Figure 1-6.





Table 1-1 shows the relationships between OSs, bonding modes, and NIC teaming modes.

Only NIC ports that correspond to paired switch modules can form a NIC team.

For example, port 1 on the switch module in slot 2X and port 2 on the switch module in slot 3X can form a NIC team.

However, port 1 on the switch module in slot 1E and port 2 on the switch module in slot 2X cannot form a NIC team.

Table 1-1 Relationships between OSs, bonding modes, and NIC teaming modes

OS	Bonding Mode	NIC Teaming Mode
Linux	balance-rr or 0 (default) balance-xor or 2 broadcast or 3	Balance
	active-backup or 1 balance-tlb or 5	Active-Backup

OS	Bonding Mode	NIC Teaming Mode
	balance-alb or 6	
	802.3ad(LACP) or 4	LACP
VMware	Routing based on VM source ports	Active-Backup
	Hash routing based on the VM source MAC address	
	Routing based on the failover sequence	
	Hash routing based on the source and destination IP addresses	Balance
	LACP	LACP

The Balance or LACP mode is available only when the corresponding paired switch modules work in stack mode. If FCoE vNICs are involved, the Balance and LACP modes are unavailable even if the corresponding paired switch modules work in stack mode.

 vNIC: vNICs must be created when NIC teaming is used. Configure vNICs based on service requirements. FCoE vNICs can be created if NICs support FCoE. Ethernet vNICs must be associated with business VLANs.

vNIC types: Port, PF, and VF

- Port: Only one Port vNIC can be created for a NIC team. If a Port vNIC has been created for a NIC team, vNICs of other types cannot be created. If a NIC team is not used as multiple virtual interfaces, a Port vNIC can be created and associated with a Trans VLAN or normal VLAN. FC network ports support only Port vNICs.
- PF: PF vNICs can be created only for NICs that support multiple physical functions (PFs). When PF vNICs are created, the support for multiple PFs must be enabled for the NICs. PFs can be Ethernet or FCoE PFs. A NIC team supports only one FCoE PF. PF vNICs can be associated with Trans VLANs or normal VLANs. When PF vNICs are created, vNICs of other types cannot be created.
- VF: indicates vNICs created in the software system of a blade server. The number of VF vNICs is not limited but cannot exceed the maximum number of vNICs. VF vNICs have no requirements for physical NICs and can be associated with Trans VLANs or normal VLANs. When VF vNICs are created, vNICs of other types cannot be created.

Create Port, PF, and VF NICs based on actual requirements.

Domain

easyLink enables switching modules in the E9000 to be divided into multiple areas, each functioning as an independent virtual switch. This function is suitable for shared leasing environment. These areas are called domains. easyLink supports a maximum of 16 domains. Each domain can independently and transparently transmit data packets with VLAN IDs ranging from 1 to 4094.

easyLink domain VLANs are a type of business VLAN. Domain VLANs are unique IDs of domains. Domain, normal, and Trans VLANs can coexist, but VLAN IDs must be unique. Domain VLAN IDs are used to differentiate domains and isolate transparent data transmission between domains.



easyLink divides a switch module into domains by port, so only Port vNICs can be associated with domains. PF and VF vNICs cannot be associated with domains.

easyLink supports online and offline delivery. Offline delivery must be performed first if easyLink is used for the first time.

1.3 E9000 easyLink Reliability Assurance

In easyLink configuration, all links are in 1+1 redundancy mode. Ethernet switching planes of switch modules have two reliability assurance modes: stack and twin. Pay attention to the two modes when configuring uplinks. If the paired switch modules have FC switching planes, the FC switching planes work independently, and the application on compute nodes selects one of the links to achieve link redundancy. The details are not described here.

Stack Mode

Paired switch modules are stacked as a unit when working in stack mode. When one switch module is faulty, the other one works properly. To ensure data transmission on the business VLAN, uplink ports on the business VLAN should support redundancy across switches. For example, if the uplink ports are Ethernet trunk ports, the ports in the trunk must contain ports on two switch modules, ensuring data links working properly when one switch module is faulty. See Figure 1-7.



Figure 1-7 Stack mode

Twin Mode

When working in twin mode, two switch modules are independent of each other and are in mutual backup mode. Therefore, configurations for the two switch modules are independent and switchover is required when one data link is faulty.

In twin mode, a switch system enables the link monitoring function. When the uplink (connecting to an external switch) is down, the system disables the downlink (connecting to server NICs). Therefore, when the uplink is detected faulty, services are switched to the backup link.

Note: Virtual links exist between virtual NICs and business VLANs. When a physical link is down, all virtual links are down. This requires that the virtual links on the same physical link must have the same uplink, facilitating link switchover. See Figure 1-8.

Figure 1-8 Twin mode

1.4 VLAN Tags

VLAN tags are involved in all easyLink configurations. Whether data packets carry VLAN tags depends on the actual configuration. See Table 1-2.

easyLink Configuration			Data Packets	Data Packets
Uplink Configuration	Business VLAN Configuration	vNIC Configuration	from Compute Nodes to Internal Switch Modules Carry VLAN Tags	from Internal Switch Modules to External Switches Carry VLAN Tags
Normal uplink	Normal VLAN	Port	No	No
(without tags)		PF	Yes	No
		VF	Yes	No
Normal uplink	Normal VLAN	Port	No	Yes
(with tags)		PF	Yes	Yes
		VF	Yes	Yes

Table 1-2 easyLink VLAN tags

Shared uplink	Normal VLAN	Port	No	Yes
		PF	Yes	Yes
		VF	Yes	Yes
Shared uplink	Trans VLAN	Port	Yes	Yes
		PF	Yes	Yes
		VF	Yes	Yes
Normal uplink	Domain VLAN	Port	Yes	Yes
Normal uplink	Domain VLAN	Port	No	No
Cascade uplink	Trans VLAN	N/A	N/A	Yes (between chassis)
	Normal VLAN	N/A	N/A	Yes (between chassis)

Uplinks:

For shared uplinks and cascade uplinks, all data packets carry VLAN tags.

For normal uplinks, you can set whether data packets carry VLAN tags.

Internal interfaces connecting switch modules to compute nodes:

If the interfaces are associated with Trans VLANs, all data packets carry VLAN tags.

If the interfaces are associated with normal VLANs, VLAN tags are not carried only in the case of Port vNICs.

1.5 FC Configuration

• FC SAN description:

A storage area network (SAN) is a technology that integrates storage and connection devices into a high-speed network. Fibre Channel (FC) is a data transmission protocol used in a SAN. An FC SAN is a SAN that uses the FC protocol stack.

• FCoE description:

Fibre Channel over Ethernet (FCoE) is a converged network technology defined by the T11 Technical Committee of the American National Standards Institute (ANSI) and is an I/O consolidation solution based on FC.

FCoE enables transport of FC frames on the Ethernet so that LAN and SAN environments can share network resources.

• FCF description:

A Fibre Channel Forwarder (FCF) switch supports both FCoE and FC protocol stacks for connecting to SAN and LAN environments. In an FC SAN, an FCF is mainly used for transmitting FC data. An FCF forwards FCoE packets and encapsulates or decapsulates FCoE packets.

• NPV description:

A SAN has high demands for edge switches directly connected to node devices. N-Port virtualization (NPV) switches do not occupy domain IDs and enable a SAN to exceed the limit of 239 edge switches.

• Zone description:

In an FCoE network, users can use zones to control access between node devices to improve network security.

• FSB description

An FIP Snooping Bridge (FSB) functions as a bridge in FCF networks. The access switch serves as an FCoE switch without complete FCF functionality.

1.6 Hardware Requirements

easyLink has no special hardware requirements and supports all E9000 hardware. However, different features have different requirements:

- Version requirements:
 - Switch module software version: 2.14 or later
 - MM910 version: 5.00 or later (FC configuration requires version 5.09 or later.)
 - BMC version: iBMCv1 5.21 or later; iBMCv2 1.62 or later
 - FCoE gateway (MX510 FC module on the CX311) firmware version: later than 9.8.1.04.00
- Requirements of port splitting and flexible subcards:
 - Hardware requirement: CX320 switch module
 - MM910 version: 5.75 or later

2 Configuring E9000 easyLink

- 2.1 Configuration Procedure
- 2.2 Service Configuration Instances

2.1 Configuration Procedure

The easyLink configuration procedure is as follows:

First, based on service requirements of switch modules in slots 1E, 4E, 2X, and 3X, configure switch profiles, which include internal business VLANs and uplinks connecting to external switches. Uplinks are not required for intra-chassis communication.

Second, import NIC information of compute nodes and create NIC profiles. If all slots have the same compute nodes and mezzanine cards, import the NIC information only once. Bond NIC ports based on the imported NIC information. Ports in the same group are redundant to each other. Then create vNICs for NIC teams based on service requirements. vNIC information includes relationships between vNICs and business VLANs.

Finally, bond NIC profiles to corresponding slots. Restart the switch modules or forcibly deliver the switch configuration for the configuration to take effect.

Figure 2-1 Configuration guidelines

If an FC storage network is included, FC SAN configuration is required. FC SAN configuration includes the working mode (NPV/Switch), FCoE VLAN (required for CX311 switch modules), and zoning (available in Switch mode).

Enabling Switch Centralized Management

Step 1 Enable Switch Centralized Management Configuration.

The corresponding configuration window is displayed. Because the original configuration page (see Figure 2-3) is invalid, configure the switch module management IP addresses in the basic information about switch profiles. Figure 2-2 shows the page for enabling centralized switch management.

1. After centralized switch management is enabled, the configuration for the switch modules using the CLI cannot be saved and the saved configuration will be invalid. After the compute nodes are restarted, the configuration saved using the CLI will be lost and only the easyLink configuration takes effect.

Figure 2-2 Enabling Switch Centralized Management

HMM Web	Chassis Information Chassis Settings Stateless Computing PSUs&Fans Alarm Monitoring System Management
 ✓ Stateless Computing Management Profile Management MAC Address Pool Management 	Stateless Computing > Network Configuration > Switch Centralized Management Save Cancel Switch Controlling Management Configuration (ON)
Network Configuration	swith Centralized Wanagement Conngol abort
Switch Centralized Management Switch Configuration	
NIC Configuration	

Figure 2-3 Invalid page for configuring the switch management IP address

HMM Web	Chassis	Information	Chassis Settings Stateless Com	puting PSUs&Fans	Alarm Monitoring	System Management Independent Ch.	root 🥹 🔁 🗗
Basic Settings	Chassis Settings > Ne	twork Settings > !	Swi				Help 🚺
Chassis Information Boot option in BIOS Blackbox configuration FC port configuration	1. Del saved 2. Per restar	iver: Sets a manag , check the config manently Save: Le ted.	ement network port IP address for a uration result. ts a switching plane to save all setting	switching plane. The setting	g will be lost if the switch nt network port IP addre	hing plane is restarted.After the config ess setting. The setting will not be lost	uration is successfully if the switching plane is
Network Settings	Kerresh						
MM	Slot Number	Plane	Management Network Port	IP address	Sul	bnet mask	
Node	Swil	Fabric	0.0.0		0.	.0.0.0	
Swi	Swi2	Fabric	10.78.10.22		25	55.255.255.0	
	Swi3	Fabric					

Configuring a Switch Profile

Step 1 Create a profile.

Create a switch profile based on the switch module type.

Select the switch module type, switch module slot, and work relationship (stack or twin). See Figure 2-4.

Profile Name	Switch Type	Switch Slot	Work Mode	Work Relation	Notes	Associated Slot	Delivery Status
CX111_PCY	C×111	New Profile			8*0	None	
CX311_PCY	CX311				_	None	
CX910	C×910	*Profile Name				None	
c×311	CX311	* Switch Slot	● 2×/3× () 1E/4E		None	
cx3111_t	CX311	* Switch Type	CX311	•		None	
slot14_c×111	C×111	*Work Mode	EndHost			None	
test1	CX311	*Work Relation	🖲 Stack 🏾 🤅) Twin		None	
test_14	CX311					None	
test_guide	CX311		OK	Cancel		None	
uykyuk	CX311	2X/3X	EndHost	Stack		None	

Figure 2-4 Creating a profile

Step 2 Configure basic management information.

On the **Switch Configuration** page, set the IP address of the management port, administrator, **root** user password, and serial port password. See Figure 2-5.

Figure 2-5 Configuring basic management information

e Switch Configuration			
Edit			
Switch Slot	Management Network Port IP address	Subnet Mask	Default Gateway
Swil			
Swi4			
Switch Slot	Management Mode	User Name	Operation
Swil	COM		
Swi1	Adiministrator		
Swil	User root	root	
Swi4	COM		
Swi4	Adiministrator		
Swi4	User root	root	

Step 3 Create an uplink.

1. On the uplink creation page, set the uplink type and switch module ports. See Figure 2-6.

There is no channel between the paired switch modules CX111s or CX915s (in slots 1E and 4E or in slots 2X and 3X). When the CX111s or CX915s work in stack mode, 10GE ports 3 and 4 on the panels serve as stack ports and cable connection is required.

Figure 2-6 Creating an uplink

	\otimes
Share Uplink 🔍	
💿 Eth Trunk 🛛 Smart Link 🔘 Physical Link	
Enable	
Manual O LACP	
•	
OK Cancel	
	Share Uplink Share Uplink Smart Link Physical Link Cancel

2. Select uplink ports based on ports connected to external switches. See Figure 2-7.

Port types:

- **10GE 2:1**: This port type is available only when the switch modules work in stack mode. **10GE** indicates a 10GE port, **2** indicates slot 2X, and **1** indicates the first port on the switch module panel (the silkscreen is 1).
- **10GE 1**: This port type is available only when the switch modules work in twin mode. It indicates the first 10GE port on the switch module panel (the silkscreen is 1).
- **10GE 2:1 M** or **10GE 1 M**: **M** indicates that the port is an expansion port on a switch module, for example, the eight 10GE ports in the lower section of a CX312 and four 10GE ports on a CX110.

Figure 2-7 Uplink ports

New Upl	link Configuration		\otimes
* Uplink	Name		
* Uplink	Please Select Physical Ports		\otimes
*Interf:	Available Ports	Selected Ports	
* Nego	10GE 2:1		
Notes	10GE 2:2 10GE 2:3 ■	Add>>	
Eth Ti	10GE 2:4		
	10GE 2:5 10GE 2:6 10GE 2:7 10GE 2:8 10GE 2:9	< < Del	
Mor	10GE 2:10 👻		
Leas		OK	

Step 4 Create business VLANs.

Create business VLANs based on service requirements and associate the business VLANs with uplinks. See Figure 2-8.

Figure 2-8 Creating a business VLAN

VLAN Name		
VLAN Type	💿 Trans Vlan 🛛 🔘 Normal Vlan	🔘 Domain Vlan
VLAN ID		Add
Uplink Name	[NULL]	
📝 Modify Cascade Uplink		
Notes		
ſ	OK	

Step 5 Configure the FC SAN.

Configure the FC SAN based on the business plan. Configuration includes the IP address for FC switch module management, user password, work mode, and zoning. See Figure 2-9.

- For the converged switch module CX311, FCoE VLAN configuration is required. The FCoE VLAN ID is 1002 or 1003 by default and cannot be the same as business VLAN IDs.
- FC configuration does not include uplink configuration. The connected ingress FC port is used automatically.

Figure 2-9 FC configuration

When FC switches work in Switch mode, zoning configuration based on ports or WWPNs is available. To create a zone, first create an alias based on a port or WWPN, and then create a zone using the alias.

- If a switch profile includes zoning configuration, it will replace the zoning configuration on the switch modules. When E ports are connected to external switches, zoning configuration in the switch profile will be synchronized to all switch modules. Therefore, it is recommended that zoning be configured on external FC switches instead of in the switch profile.
- The CX311 supports zoning configuration based on WWPNs, but does not support zoning configuration based on ports.

Figure 2-10 Creating an alias

New Alias	8
* Name	
Notes	
* WWPNs	Add

Figure 2-11 Creating a zone

W ZONE				
* Zone name				
Notes				
WWPNs			Add	
Alias		Used Aliases		
Aliases	Add>>	Used Allases		
	< <del< td=""><td></td><td></td><td></td></del<>			
Juplink Port				
Available Ports		Selected Ports		
	Add>>			
	< <del< td=""><td></td><td></td><td></td></del<>			
	Or	Cancel		

Configuring a NIC Profile

Step 1 Create NIC profiles.

NIC profiles are based on the imported NIC information of compute nodes. See Figure 2-12.

Figure 2-12 Creating a NIC profile

HMM Web	Chassis Informatio	n Chassis Settings Stateless	Computing PSUs&Fans	Alarm Monitoring	System Management	root 😧 🙃 E+ 🕿 0 👎 2 🔺 0
	Stateless Computing > Network Con	ifiguration > NIC Configuration				Help 💼
MAC Address Pool Management	Profile Name Node Type	Import from board	witch Associated Sw	Votes	Associated Slot	Operation
Switch Centralized Management Switch Configuration NEC Configuration >	10 rows V Total: 0 records	A NIC profile must be associated solution Profile Name Associated Switch Profile(22/33) Associated Switch Profile(1E/4E) OK	ted with at least one switch pr Slot 13 p1 Profile_test [NULL] Cancel	ofile v v v		(Previous 1 Nox5)

Figure 2-13 shows the NIC information.

Figure 2-13 NIC information

					🛃 Save
p1					
CH121					
Profile_test					
n cannot be restored afti tion .at: Switch module slot nu .ber	er being deleted. To use th umber:Compute node port	e NIC information, you hav number. PCIe Info format: PF Numbers	e to import the NIC inform Root Port Bus Number:Roo Switch Port	ation from the blade again. Exe of Port Device Number.Root Por	rcise caution t Function
	10GE	4	2:1	00:03.0-0	operation
	10GE	4	3:1	00:03.0-1	×
	10GE	1	4:1	00:02.0-0	
	10GE	1	1:1	00:02.0-1	~
	8G FC	1		00:02.0-4	~
	8G FC	1		00:02.0-5	
	p1 CH121 Profile_test ion at Switch module slot no ber	p1 CH121 Profile_test n cannot be restored after being deleted. To use the ion att Switch module slot number:Compute node port ber ort Port Type 10GE 10GE 10GE 10GE 10GE 10GE 10GE 10GE 10GE 10GE 10GE 10GE 10GE 10GE 10GE 10GE 10GE	p1 CH121 Profile_test ion acannot be restored after being deleted. To use the NIC information, you have ion att Switch module slot number:Compute node port number. PCIE Info formats ber ort Port Type PF Numbers ort 100E 4 100E 4 100E 1 106E 1 106E 1 106E 1 106E 1	p1 CH121 Profile_test an cannot be restored after being deleted. To use the NIC information, you have to import the NIC information at Switch module slot number:Compute node port number. PCIe Info format: Root Port Bus Number:Root ber att Switch module slot number:Compute node port number. PCIe Info format: Root Port Bus Number:Root ber att Switch module slot number:Compute node port number. PCIe Info format: Root Port Bus Number:Root ber att Switch module slot number:Compute node port number. PCIe Info format: Root Port Bus Number:Root ber att Switch module slot number:Compute node port number. PCIe Info format: Root Port Bus Number:Root ber att Switch module slot number:Compute node port number. PCIe Info format: Root Port Bus Number:Root ber att Switch Module slot number:Compute node port number. PCIe Info format: Root Port Bus Number:Root ber att Switch Module slot number: Difference state	p1 CH121 Profile_test a cannot be restored after being deleted. To use the NIC information, you have to import the NIC information from the blade again. Exe tion at Switch module slot number:Compute node port number: PCIE Info format: Root Port Bus Number:Root Port Device Number:Root Port ber ort Port Type PF Numbers Switch Port 1 00:03.0-0 10GE 4 21 00:03.0-1 10GE 1 00:02.0-0 10GE 1 01 00:02.0-0

Step 2 Create a NIC team.

Configure NIC teaming based on NIC information. See Figure 2-14.

To bond NIC ports into a NIC team, the NIC ports must correspond to paired switch slots and the port types (such as 10GE) must be the same.

For example, for a four-port NIC on Mezz 2, if two ports connect to the switch module in slot 1E and the other two connect to the switch module in slot 4E, these four ports can form a NIC team. Three ports cannot form a NIC team, nor can two ports that correspond to the same switch slot. Likewise, Mezz 2 ports and Mezz 1 ports cannot form a NIC team because their corresponding switch modules are not in paired slots.

Figure 2-14 Creating a NIC team

	NIC Location	NIC Type	Port	Port Type	PF	Numbers	Switch Po	rt	PCIe Info	Operation
		N/7510	0	10GE	4		2:1		00:03.0-0	~
	mezzi	IVIZOTU	1	10GE	4		3:1		00:03.0-1	^
		_	n	10GE	1		4.1		00:02.0-0	
		Create NIC Te	aming				\otimes		00:02.0-1	
	mezz2						- 1		00:02.0-4	*
		* NIC Teaming	g Name	n1	I		- 1		00:02.0-5	
				Available NICs		Selected NICs				
e	NIC Teaming Conf	1		mezz2:0		mezz1:0				
				mezz2:1	Add>>	mezz1:1				
	Create NIC Teaming	Select NIC		mezz2:2	. 1					
	Name	l		mezz2:3	< < Del			Switch Por	t PCIe Info	Operation
:	.0 rows 🔻 Tot	Work Mode		Active-Backup	•				< Previo	ous 1 Next >
		Notes					- 1			
9	vNIC Configuration									
	Add vNIC Configura	3		OK	Cancel					
	vNIC Name vN	√IC Type vN	ICMode NIC "	eaming Name	Business VLAN Na	me Busines	s VLAN ID	Notes N	IC Location PC	Cle Info Operation
[.0 rows 🔻 Tot	al: 0 records							< Previ	ous 1 Next>

Step 3 Create vNICs.

Create vNICs based on NIC teaming. See Figure 2-15.

- The number of PF vNICs cannot exceed the maximum number of PFs supported by the NICs.
- FCoE vNICs can be created only if switch modules and NICs support FCoE.

Figure 2-15 Creating a vNIC

Add vNIC Configuration			Q
*vNIC Name			
*NIC Teaming Name	1	•	
*∨NIC Type	Ethernet	•	
* Mode	Port		
*Business VLAN	A	•	
VLAN Type	Normal Vlan		
VLAN ID	3 - 3		
Notes			
	ОК	Cancel	

Step 4 Bond the NIC profiles to slots.

Bond the NIC profiles to required slots. See Figure 2-16.

Bond the NIC profiles to the slots in which the compute node types, NIC types, and NIC installation status are consistent to the profiles. Otherwise, alarms are generated and the compute node network may fail.

Figure 2-16 Bonding a NIC profile to slots

Select Associated Slo	t		8
After you select a associated switch the switch modul	associated slots, a co n profile. The informa les when the switch p	onfiguration file will b ation in the configura rofile is delivered	e generated in the tion file takes effect in
🔲 Select All			
Slot 01	Slot 02	Slot 03	Slot 04
Slot 05	Slot 06	Slot 07	🔲 Slot 08
Slot 09	Slot 10	Slot 11	Slot 12
🔲 Slot 13	Slot 14	Slot 15	Slot 16
Slot 17	Slot 18	Slot 19	Slot 20
Slot 21	Slot 22	Slot 23	Slot 24
Slot 25	Slot 26	Slot 27	Slot 28
Slot 29	Slot 30	Slot 31	Slot 32
	ок	Cancel	

Enabling the configuration

To enable the configuration, click the button for delivering configuration or install switch modules. The switch module types must be consistent with the configuration; otherwise, the configuration will not be delivered.

As shown in Figure 2-17, operation icons from left to right are Edit, Copy, Delete, and Deliver respectively.

311_yang CX311 2X/3X EndHost Stack

Swi2, Swi3, Swi2:F

Delivered: Swi2:Fabric, Swi2:FC, Swi3:Fabric, 🛛 🥏 Normal Swi3:FC,

There are two methods for enabling a configuration:

1. Offline delivery: restarts the Ethernet switching plane of switch modules.

2. Online delivery: delivers the configuration without restarting switch modules. This method has less impact on services.

Delivery of new switch configurations must be offline. Delivery of updated switch configurations can be online or offline.

2.2 Service Configuration Instances

2.2.1 Stacked Networking (1)

In a cloud resource pool project, four data service planes are required: VM management plane, VM migration plane, virtualization service data plane, and FC storage plane.

MZ910s in Mezz 1 and Mezz 3 and MZ510s in Mezz 2 and Mezz 4 are installed in a CH242. External switches are stacked.

See Figure 2-18.

Step 1 Create a switch profile for switch modules in slots 2X and 3X.

As the switch modules are CX911s and the external switches are stacked, set the working mode of the CX911s to **Stack**.

Step 2 Create two normal uplinks in the CX911 profile for connecting to external switches.

The two uplinks are the VM uplink and VM migration uplink. The uplink ports are Ethernet trunk ports across switch modules.

- Step 3 Create two normal business VLANs in the CX911 profile and associate the VLANs with the VM management uplink and the VM migration uplink respectively.
- Step 4 Configure the FC SANs in the CX911 profile and set the SAN working mode to NPV.
- Step 5 Bond the CX911 profile to slots 2X and 3X.

Figure 2-19 CX911 networking

Step 6 Create a switch profile for switch modules in slots 1E and 4E.

As the switch modules are CX310s and the external switches are stacked, set the working mode of the CX310s to **Stack**.

Step 7 Create a shared uplink in the CX310 profile to connect to external switches. Create a Trans VLAN to serve as a data service business VLAN. Associate the business VLAN with the shared uplink.

Set the transparent VLAN ID range based on service requirements, for example, 100 to 228.

Step 8 Bond the CX310 profile to slots 1E and 4E.

Figure 2-20 CX310 networking

Step 9 Import the NIC configuration from the installed CH242 and create three NIC teams.

Teaming 1: two Ethernet ports on Mezz 1, which are in LACP mode; Teaming 2: four Ethernet ports on Mezz 2 or Mezz 4, which are in LACP mode; Teaming 3: two Ethernet ports on Mezz 3, which are in LACP mode.

Step 10 Create vNICs based on the NIC team.

Create Port vNICs on Teaming 1 and associate the vNICs with the VM management business VLANs (switch profiles for CX911s in slots 2X and 3X).

Create Port vNICs on Teaming 2 and associate the vNICs with the VM data transparent transmission business VLANs (switch profiles for CX310s in slots 1E and 4E). Create Port vNICs on Teaming 3 and associate the vNICs with the VM migration business VLANs (switch profiles for CX911s in slots 2X and 3X).

FC ports do not need to be configured and automatically associate with the FC SAN.

Step 11 Bond the NIC profile to slots 1 to 8 and deliver the NIC profile for the configuration to take effect.

----End

2.2.2 FCoE Networking (2)

In a desktop cloud FCoE SAN solution, four 10GE uplink ports connect to external switches. The MZ510 in Mezz1 is installed in a CH121 and UMC is enabled. vNIC 0 and vNIC 1 are bound to serve as a service plane, and vNIC 2 and vNIC 3 are bound to serve as a management plane. Configure different VLANs for management and services. Enable FCoE ports for connecting NICs to storage devices. See Figure 2-22.

Figure 2-22 FCoE networking

- **Step 1** Create a switch profile for switch modules in slots 2X and 3X. The switch modules are CX311s that work in stack mode.
- Step 2 Create two normal uplinks in the CX311 profile for connecting to external switches.

The two uplinks are the management uplink and service data uplink. The uplink ports are Ethernet trunk ports across switch modules.

Step 3 Create two normal business VLANs in the CX311 profile.

Associate the two VLANs with the management uplink and service data uplink.

Step 4 Deliver the CX311 profile to slots 2X and 3X.

Stack (TOR) Uplink+ Data service Uplink+ Management Business VLAN 2+ CX311

Figure 2-23 CX311 networking

Step 5 Import NIC (the MZ510 in Mezz1) configuration from the installed CH121, and create the NIC Teaming (two ports on the MZ510 in Mezz1). Two Ethernet ports work in active/backup mode and FCoE ports must work in active/backup mode.

- **Step 6** Create three vNICs in the NIC Teaming. Two are Ethernet or PF vNICs that associate with the data service business VLAN and management VLAN respectively, and the other one is an FC or PF vNIC that does not associate with a VLAN.
- **Step 7** Bond the NIC profile to slots 0 to 6 and deliver the NIC profile for the configuration to take effect.

Figure 2-24 E9000 networking

----End

2.2.3 FCoE Networking (3)

2.2.3.1 FCF Application Scenario

A Fibre Channel Forwarder (FCF) switch supports both FCoE and FC protocol stacks for connecting to SAN and LAN environments. In an FC SAN, an FCF is mainly used for transmitting FC data. An FCF forwards FCoE packets and encapsulates or decapsulates FCoE packets.

Figure 2-25 Overall networking

Figure 2-26 FC networking

2.2.3.2 Networking Requirements

1. The chassis provides eight 10GE uplinks to connect to aggregation switches. The switch modules are redundant to each other.

2. The chassis provides four 8 Gbit/s uplinks to directly connect to dual-controller FC storage (such as S3900), or provides four 10 Gbit/s uplinks to directly connect to dual-controller FCoE storage.

The CX320 switch module can directly connect to storage by using FC or FCoE ports. To use FCoE ports to connect to storage, the storage device needs to provide FCoE ports.

3. Three types of services run on different physical network adapters of each compute node. Multiple physical network adapters share two 10GE uplinks.

In this scenario, FC ports are directly connected to storage. To directly connect FC ports to external FC switches, see 2.2.4 FCoE Networking (4).

2.2.3.3 Physical Networking Description

- Install two CX320 converged switch modules in slots 2X and 3X, which use FC or FCoE uplinks to connect to storage and Ethernet uplinks to connect to the aggregation switch.
- Configure the two CX320 switch modules as a stack by using the default stack IDs and the 40GE midplane links as cascading channels. Enable local preferential forwarding for the uplink Eth-Trunk ports.
- Install CH121 half-width compute nodes in slots 1, 2, and 3, install MZ510 converged network adapters in their Mezz1 positions. Each MZ510 provides one 10GE link to connect to each CX320.
- Connect ports 10GE 2/17/1 to 2/17/4 and 3/17/1 to 3/17/4 of the CX320 panels to the uplink aggregation switch.
- Connect subcard ports FC 2/21/1, FC 2/21/2, FC 3/21/1, and FC 3/21/2 of the CX320 to the uplink FC storage, or connect panel ports 10GE 2/17/7, 10GE 2/17/8, 10GE 3/17/7, and 10GE 3/17/8 on the CX320 to the uplink FCoE storage.

The CX320 switch module can directly connect to storage by using FC or FCoE ports. If FC ports are used to directly connect to storage, only subcard ports can be converted to FC ports. If FCoE ports are used to directly connect to storage, use panel ports or subcard ports. The two situations require different configurations, which are described in the following sections.

2.2.3.4 easyLink Configuration Procedure

After centralized switch management is enabled, switch module configurations on the CLI cannot be saved and the saved configurations will be

invalid. After switch modules are restarted, the configurations saved on the CLI will be lost and only the easyLink configuration takes effect.

Step 1 On the MM910 WebUI, choose Stateless Computing > easyLink Configuration > Switch Centralized Management. Enable Switch Centralized Management Configuration, as shown in Figure 2-27.

Figure 2-27 Enabling Switch Centralized Management

HMM Web	root 🖗 Chassis Information Chassis Settings Stateless Computing >> Independent Chassis 🛠 1	❶ 中文 E+ ▼1 A 1
Stateless Computing Management easyLink Configuration	Stateless Computing > easyLink Configuration > Switch Centralized Management Save Cancel	Help 🔽
Switch Centralized Management > Configuration Wizard Switch Configuration NIC Profile easyLink Network Info	1. If the switch centralized management function is enabled for the first time (ON), you are advised to click Configuration Wizan left anigation tree, and follow the wizard to create and deliver profile 2. When the switch centralized management function is enabled (ON), the IP address of management network port and gatewa subnet mask on the 10GE switching plane can be set only with the switch configuration performed on the Fabric plane does r synchronize the configuration to the HMM. Switch configuration uses the data configured in switch policies that associate with	I on the 7 and tot the HMM
	Switch Centralized Management Configuration	

Step 2 Choose Stateless Computing > easyLink Configuration > Switch Configuration and click New Profile. On the displayed dialog box, set Switch Slot to 2X/3X, Switch Type to CX320, and Work Relation to Stack, as shown in Figure 2-28. Ensure that the flexible card configuration under Panel Port Configuration is correct, as shown in Figure 2-29.

Figure 2-28 Creating a switch profile

New Profile	8
* Profile Name	for_CX320
* Switch Slot	
* Switch Type	CX320 -
*Work Mode	Tradition (EndHost) Smart Channel (EndHost)
* Work Relation	◉ Stack ⊚ Twin
	OK Cancel

Figure 2-29 Panel Port Configuration

Panel Port Configuration	
When the por When the por	t name suffix is E1, the port belongs to Flexible card (PIC) 1. t name suffix is E2, the port belongs to Flexible card (PIC) 2.
Edit	
Split 40G panel ports	□ 40GE 2:1 □ 40GE 2:2 □ 40GE 3:1 □ 40GE 3:2
Merge 10G panel ports	□ 10GE 2:1/2/3/4 □ 10GE 2:5/6/7/8 □ 10GE 3:1/2/3/4 □ 10GE 3:5/6/7/8
Flexible card (PIC)1	MX517
Flexible card (PIC)2	MX517

Step 3 Under **Uplink Configuration**, click **New Uplink** and set **Uplink Type** to **Normal Uplink**, as shown in Figure 2-30.

~		
New Uplink		×
* Uplink Name	Upllink_CX320	
* Uplink Type	Normal Uplink 💌	
* Interface Type	🖲 Eth Trunk 🛛 Smart Link 🔘 Physical Link	
* Negotiation	Enabled	
Notes		
Eth Trunk Configuration		
* 🍺 Modify Ports		
	10GE 2:1	
	10GE 2:2	
	10GE 3:1	
* Mode	⊘ Manual	
* Least Active Link Number	1	
* Max Active Link Number	4	
	OK Cancel	

Figure 2-30 Creating an uplink

- Step 4 Under Business VLAN Configuration, click New Business VLAN, set VLAN Type to Normal Vlan, and associate with the uplink created in Step 3.
- Step 5 Under FC Configuration, set Enable FC to Enable, set FC working mode to Switch (FCF), and retain default values for DCBX configuration, as shown in Figure 2-31.

Figure 2-31 FC configuration

	Panel ports can be configured as FCoE ports. Flex NPV VLAN must be set to the same as the FCoE V	ible card ports can be configured as FCoE or F LAN of the external FCF switch	-C por
nable FC			
FCoE Port D	B Configuration		
E .P.			
Edit			
Edit		ETS Configuration	
Enable DCBX	© enable C disable	ETS Configuration PG0	
Enable DCBX	© enable C disable C 1555 C intel-oui	ETS Configuration PG0 PG1	
Edit Enable DCBX DCBX version	© enable C disable C IEEE © intel-oui	ETS Configuration PG0 PG1 PG15	
Enable DCBX DCBX version PFC work mode	@ enable ← disable ← IEEE @ intel-oui @ auto ← manual	ETS Configuration PG0 PG1 PG15	
Enable DCBX DCBX version PFC work mode	© enable ⊂ disable CIEEE © intel-oui © auto ⊂ manual □ 0 □ 1 □ 2 ☑ 3	ETS Configuration PG0 PG1 PG15	

- **Step 6** If FC ports are used to directly connect to storage, go to Step 7. If FCoE ports are used to directly connect to storage, go to Step 8.
- Step 7 Under Swi2 FC SAN Configuration and Swi3 FC SAN Configuration, click FC Port Settings and add ports, as shown in Figure 2-32.

Figure 2-32	Swi2 FC SAN	configuration
-------------	-------------	---------------

	Please Select Physical Ports	8
Cancel	Available Ports	Selected Ports
E Ports Settings	10GE 2:3 E1	10GE 2:1 E1
	10GE 2:4 E1	10GE 2:2 E1
	10GE 2:1 E2	Add>>
	10GE 2:2 E2	
	10GE 2:3 E2	
	10GE 2:4 E2	
name		< <del< td=""></del<>
E Data VLAN		
w Alias		
me WWPNs		
rows 👻 Total: 0 reco	OK	Cancel
ows 👻 Total: 0 reco	ОК	Cancel

Step 8 Under Swi2 FC SAN Configuration and Swi3 FC SAN Configuration, click FCoE Port Settings and add ports, as shown in Figure 2-33.

Figure 2-33 Swi2 FC SAN configuration

Save Cancel	Please Select Physical Ports	(8)
CoE Ports Settings	Available Ports	Selected Ports
coc Ports Settings	10GE 2:5 *	10GE 2:1
	10GE 2:6	10GE 2:2
	10GE 2:7 Add>	> 10GE 2:3
	10GE 2:8	10GE 2:4
	40GE 2:1	
AN name	40GE 2:2	
	10GE 2:1 E1 <<>De	l
CoE Data VLAN	10GE 2:2 E1	
a.t	10GE 2:3 E1	
New Alias	10GE 2:4 E1	
Name W/W/P	10GE 2:1 E2	
Harrie WWW	10GE 2:2 E2 👻	
10 rows 👻 Total: 0 rec	or	
	ОК	Cancel

Step 9 Choose Stateless Computing > easyLink Configuration > NIC Profile, click New Profile, select Slot 01, enter the profile name, associate with the switch profile of slots 2X and 3X, and click OK. Figure 2-34 shows NIC information.

Figure 2-34 NIC information

NIC Location	NIC Type	Port	Port Type	Maximum Number of PFs	Switch Port	PCIe Info	Operation
mezz1	MZ510	0	10GE	4	2:1	00:02.0-0	×
		1	10GE	4	3:1	00:02.0-1	
mezz2	MZ510	0	10GE	4	1:1	80:02.0-0	
		1	10GE	4	4:1	80:02.0-1	~

Step 10 Click **Create NIC Teaming**, add NIC ports, set the PVID (optional and usually left empty), retain the default work mode **Active-Backup**, and click **OK**, as shown in Figure 2-35.

Create NIC Teaming		×
*NIC Teaming Name	default	⊘
	Available NICs	Selected NICs
		Add>> mezz1:0 mezz1:1
* Select NIC		< < Del
*Work Mode	Active-Backup	•
PVID		The PVID can be set only for Ethernet ports.
Notes		
	ок	Cancel

Figure 2-35 Creating a NIC team

Step 11 Click Add vNIC Configuration, enter the vNIC name, select the NIC team created in Step 10, set vNIC Type to FCoE, set Mode to PF, and click OK, as shown in Figure 2-36. Click Add vNIC Configuration, enter the vNIC name, select the NIC team created in Step 10, set vNIC Type to Ethernet, set Mode to PF, select the business VLAN created in Step 4, and click OK, as shown in Figure 2-37.

Figure 2-36 Creating an FCoE vNIC

Add vNIC Configuration				\otimes
*vNIC Name	fcoe_vnic		0	
* NIC Teaming Name	default	•		
PVID	-			
*vNIC Type	FCoE	•		
* Mode	PF	•		
Notes				
	ок	Cancel		

Figure 2-37 Creating an Ethernet vNIC

Add vNIC Configuration		\otimes
*vNIC Name	Ethernet_vnic	
* NIC Teaming Name	default	
PVID	-	
*vNIC Type	Ethernet 💌	
* Mode	Port 💌	
*Business VLAN	N	
VLAN Type	Domain Vlan	
VLAN ID	2001	
Notes		
	OK	

Step 12 Return to the NIC profile list, click None in the Associated Slot column, and select Slot 01, Slot 02, and Slot 03, as shown in Figure 2-38.

Figure 2-38 Associating with slots

Select Associated Slo	ot		0		
After you select associated slots, a configuration file will be generated in the associated switch profile. The information in the configuration file takes effect in the switch modules when the switch profile is delivered					
🔲 Select All					
🔽 Slot 01	Slot 02	🔽 Slot 03	Slot 04		
🔲 Slot 05	🔲 Slot 06	Slot 07	🔲 Slot 08		
🔲 Slot 09	Slot 10	🔲 Slot 11	Slot 12		
🔲 Slot 13	Slot 14	🔲 Slot 15	🔲 Slot 16		
Slot 17	Slot 18	Slot 19	Slot 20		
Slot 21	Slot 22	Slot 23	Slot 24		
Slot 25	Slot 26	Slot 27	Slot 28		
Slot 29	Slot 30	Slot 31	Slot 32		
	ОК	Cancel			

Step 13 Choose Stateless Computing > easyLink Configuration > Switch Configuration, click None in the Associated Slot column, select Swi2/Swi3, and click OK, as shown in Figure 2-39.

Figure 2-39 Associating with slots

	After you select associated slots, the configuration file will be automatically delivered to the switch modules in the associated slots after the switch modules restart
	Swi2/Swi3
tep 14	Click , select Offline Delivery , and select Swi2 and Swi3 , as shown in Figure 2

Figure 2-40 Manually delivering a profile

Ν	Manually Deliver Profile						×
Delivery Mode 💿 Online delivery 🖲 Offline delivery							
	\land Selec	t two slots	for delivering a	a switch profile wł	nose work relation is Stack		
		Slot	Switching plane	Profile Name	Switch Module Status	Status	
	~	Swi2	Fabric	for_CX320	The flexible card 2 is not detected	Not delivered	
	~	Swi3	Fabric	for_CX320	Switch module not detected	Not delivered	

Associated Compute Node

Functional slots	None
Compute node not detected	None
Compute node type mismatch	None
Mismatched NIC (type, quantity, and slot)	None
Abnormal BMC	None
Deliver	Cancel

----End

2.2.3.5 NIC Configuration in the OS

In the OS, create three bonds and associate each bond with two NIC ports (ethx), which are one PF on port 0 and one on port 1. For details, see the E9000 Server V100R001 Deployment Guide.

2.2.4 FCoE Networking (4)

2.2.4.1 NPV Application Scenario

A SAN has high demands for edge switches directly connected to node devices. N-Port virtualization (NPV) switches do not occupy domain IDs and enable a SAN to exceed the limit of 239 edge switches.

Figure 2-41 Overall networking

2.2.4.2 Networking Requirements

- 1. The CX320 switch modules forward FC traffic in NPV mode and directly connect to FC or FCoE switches. Ethernet traffic is sent to the customer's network through Ethernet aggregation switches. The switch modules are redundant to each other.
- 2. The chassis provides eight 10GE uplinks to connect to Ethernet aggregation switches, and provides four 8 Gbit/s uplinks to connect to FC switches.

If the FC switch supports FCoE ports, the FCoE ports can also be used for connections.

3. Each compute node provides two 10GE uplinks.

In this scenario, FC ports are used to connect to an external FC switch. If FC ports are directly connected to storage, see 2.2.3 FCoE Networking (3).

The CX320 switch modules can provide FC ports to connect to FC switches if NPV is configured.

2.2.4.3 Physical Networking Description

• Install two CX320 converged switch modules in slots 2X and 3X, which use FC or FCoE uplinks to directly connect to FC switches and use Ethernet uplinks to connect to aggregation switches.

- Configure the two CX320 switch modules as a stack by using the default stack IDs and the 40GE midplane links as cascading channels. Enable local preferential forwarding for the uplink Eth-Trunk ports.
- Install CH121 half-width compute nodes in slots 1, 2, and 3, install MZ510 converged network adapters in their Mezz1 positions. Each MZ510 provides one 10GE link to connect to each CX320.
- Connect ports 10GE 2/17/1 to 2/17/4 and 3/17/1 to 3/17/4 of the CX320 panels to the uplink aggregation switch.

Connect ports FC 2/21/1, FC 2/21/2, FC 3/21/1, and FC 3/21/2 of the CX320 subcards to the uplink FC switch, or connect ports 10GE 2/17/7, 10GE 2/17/8, 10GE 3/17/7, and 10GE 3/17/8 on the CX320 panels to the uplink FCoE switch.

CX320 switch modules can use FC ports to directly connect to FC switches or use FCoE ports to directly connect to FCoE switches. To directly connect to FC switch, only subcard ports can be used. To directly connect to FCoE switch, use panel ports or subcard ports. The two situations require different configurations, which are described in the following sections.

2.2.4.4 easyLink Configuration Procedure

After centralized switch management is enabled, switch module configurations on the CLI cannot be saved and the saved configurations will be

invalid. After switch modules are restarted, the configurations saved on the CLI will be lost and only the easyLink configuration takes effect.

Step 1 On the MM910 WebUI, choose Stateless Computing > easyLink Configuration > Switch Centralized Management. Enable Switch Centralized Management Configuration, as shown in Figure 2-42.

Figure 2-42 Enabling Switch Centralized Management

HMM Web	root 📦 r Chassis Information Chassis Settings Stateless Computing >> Independent Chassis 🗶 1	D 中文 E+ ▼1 A 1
Stateless Computing Management easyLink Configuration	Stateless Computing > easyLink. Configuration > Switch Centralized Management Save Cancel	Help 🔝
Switch Centralized Management > Configuration Wizard Switch Configuration NIC Profile @ easyLink Network Info	1. If the switch centralized management function is enabled for the first time (ON), you are advised to click Configuration Wizard left navigation tree, and follow the wizard to create and deliver profile 2. When the switch centralized management function is enabled (ON), the IP address of management network port and gateway subnet mask on the 10GE switching plane can be set only with the switch configuration of the Fabric plane does n 3. When the switch centralized management function is enabled (ON), the tave operation performed on the Fabric plane does n synchronize the configuration to the HMM. Switch configuration uses the data configured in switch policies that associate with 1	on the and ot he HMM
	Switch Centralized Management Configuration	

Step 2 Choose Stateless Computing > easyLink Configuration > Switch Configuration and click New Profile. On the displayed dialog box, set Switch Slot to 2X/3X, Switch Type to CX320, and Work Relation to Stack, as shown in Figure 2-43. Ensure that the flexible card configuration under Panel Port Configuration is correct, as shown in Figure 2-44.

Figure 2-43 Creating a switch profile

New Profile	8
* Profile Name	for_CX320
* Switch Slot	
* Switch Type	CX320 -
* Work Mode	Tradition (EndHost) Smart Channel (EndHost)
* Work Relation	◉ Stack ⊚ Twin
	OK

Figure 2-44 Panel Port Configuration

Panel Port Configuration	
When the p When the p	ort name suffix is E1, the port belongs to Flexible card (PIC) 1. ort name suffix is E2, the port belongs to Flexible card (PIC) 2.
Edit	
Split 40G panel ports	□ 40GE 2:1 □ 40GE 2:2 □ 40GE 3:1 □ 40GE 3:2
Merge 10G panel ports	□ 10GE 2:1/2/3/4 □ 10GE 2:5/6/7/8 □ 10GE 3:1/2/3/4 □ 10GE 3:5/6/7/8
Flexible card (PIC)1	MX517
Flexible card (PIC)2	MX517

Step 3 Under Uplink Configuration, click New Uplink and set Uplink Type to Normal Uplink, as shown in Figure 2-45.

Figure 2-45 Creating an uplink

New Uplink		×
* Uplink Name * Uplink Type	Upllink_CX320	
* Interface Type	🖲 Eth Trunk 🛛 Smart Link 🔘 Physical Link	
* Negotiation	Enabled	
Notes		
Eth Trunk Configuration		
* 🍺 Modify Ports		
	10GE 2:1 10GE 2:2 10GE 3:1	
* Mode	Manual ACP	
* Least Active Link Number	1	
* Max Active Link Number	4	
	OK	

- Step 4 Under Business VLAN Configuration, click New Business VLAN, set VLAN Type to Normal Vlan, and associate with the uplink created in Step 3.
- Step 5 Under FC Configuration, click Enable FC, set FC working mode to NPV, and retain default values for DCBX configuration, as shown in Figure 2-46.

Figure 2-46 FC configuration

FC Configuration	tion	
	Panel ports can be configured as FCoE ports. Flexib NPV VLAN must be set to the same as the FCoE VLA	le card ports can be configured as FCoE or FC ports. AN of the external FCF switch
Enable FC	Enable	
FC working mo	ode 💿 NPV 🔘 Switch (FCF) 🔘 FSB	
FCoE Port D	CB Configuration	
Edit		
		ETS Configuration
Enable DCBX) enable 🖉 disable	PGO
DCBX version	IEEE (@ intel-oui	PG1
		PG15
PFC work mod	le 🍥 auto 🔵 manual	
PFC priority	0 1 2 3	
	4 5 6 7	

- **Step 6** If FC ports are used to directly connect to FC switches, go to Step 7. If FCoE ports are used to directly connect to FCoE switches, go to Step 8.
- Step 7 Under Swi2 FC SAN Configuration and Swi3 FC SAN Configuration, click FC Port Settings and add ports, as shown in Figure 2-47.

Figure 2-47 Swi2 FC SAN configuration

in re onit coningat	Ple	ase Select Physical Ports			×
Save Cancel		Available Ports		Selected Ports	
E Ports Settings		10GE 2:3 E1		10GE 2:1 E1	
		10GE 2:4 E1		10GE 2:2 E1	
		10GE 2:1 E2	Add>>	1	
		10GE 2:2 E2			
		10GE 2:3 E2			
		10GE 2:4 E2			
name			< <del< td=""><td></td><td></td></del<>		
E Data VLAN					
w Alias					
me	WWPNs				
rows 👻 Tota	l: 0 recoi		OK Cance	el	

Step 8 Under Swi2 FC SAN Configuration and Swi3 FC SAN Configuration, click FCoE Port Settings and add ports, as shown in Figure 2-48.

NPV VLAN configuration of the CX320 must be consistent with the FCoE VLAN configuration of the external FCF instance.

Figure 2-48 Swi2 FC SAN configuration

Save	Cancel	Please Select Physical Ports	×
CoF Ports Satt	1005	Available Ports	Selected Ports
rede rons den		10GE 2:5	10GE 2:1
	10GE 2:6	10GE 2:2	
		10GE 2:7 Add>>	10GE 2:3
		10GE 2:8	10GE 2:4
		40GE 2:1	
SAN name	40GE 2:2		
		10GE 2:1 E1 << Del	
FCoE Data VLAN	1	10GE 2:2 E1	
		10GE 2:3 E1	
New Alias		10GE 2:4 E1	
Name	14/14/D	Ne 10GE 2:1 E2	
Nume		10GE 2:2 E2 👻	
10 rows 🔻	Total: 0 re	cor	
		OK Cancel	

Step 9 Choose Stateless Computing > easyLink Configuration > NIC Profile, click New Profile, select Slot 01, enter the profile name, associate with the switch profile of slots 2X and 3X, and click OK. Figure 2-49 shows NIC information.

Figure 2-49 NIC information

NIC Location	NIC Type	Port	Port Type	Maximum Number of PFs	Switch Port	PCIe Info	Operation
	N47E10	0	10GE	4	2:1	00:02.0-0	~
mezz1 MZ510	NIZOTO	1	10GE	4	3:1	00:02.0-1	~
-		0	10GE	4	1:1	80:02.0-0	~
mezz2 MZ510	IVIZSIU	1	10GE	4	4:1	80:02.0-1	~

Step 10 Under NIC Teaming Configuration, click Create NIC Teaming, add NIC ports, retain the Active-Standby work mode, and click OK, as shown in Figure 2-50.

Create NIC Teaming		Q	9
*NIC Teaming Name	default	⊘	
	Available NICs	Selected NICs	
		Add>> mezz1:0 mezz1:1	
*Select NIC		< <del< td=""><td></td></del<>	
*Work Mode	Active-Backup		
PVID		The PVID can be set only for Ethernet ports.	
Notes			
	ок	Cancel	

Figure 2-50 Creating a NIC team

Step 11 Click Add vNIC Configuration, enter the vNIC name, select the NIC team created in Step 10, set vNIC Type to FCoE, set Mode to PF, and click OK, as shown in Figure 2-51. Click Add vNIC Configuration, enter the vNIC name, select the NIC team created in Step 10, set vNIC Type to Ethernet, set Mode to PF, select the business VLAN created in Step 4, and click OK, as shown in Figure 2-52.

Figure 2-51 Creating an FCoE vNIC

Add vNIC Configuration		\otimes	
*vNIC Name	fcoe_vnic		
* NIC Teaming Name	default 🔻		
PVID	-		
*vNIC Type	FCoE 🔻		
* Mode	PF 🔻		
Notes			
	OK	ncel	

Figure 2-52 Creating an Ethernet vNIC

Add vNIC Configuration		\otimes
*vNIC Name	Ethernet_vnic	
* NIC Teaming Name	default	
PVID	-	
*vNIC Type	Ethernet 💌	
* Mode	Port	
*Business VLAN	N	
VLAN Type	Domain Vlan	
VLAN ID	2001	
Notes		
	OK	

Step 12 Return to the NIC profile list, click None in the Associated Slot column, and select Slot 01, Slot 02, and Slot 03, as shown in Figure 2-53.

Figure 2-53 Associating with slots

Select Associated Slo	ot		\otimes
After you select associated switc the switch modu	associated slots, a co h profile. The informa les when the switch p	onfiguration file will b ation in the configura profile is delivered	e generated in the tion file takes effect in
🔲 Select All			
🗹 Slot 01	Slot 02	🔽 Slot 03	Slot 04
Slot 05	🔲 Slot 06	🔲 Slot 07	Slot 08
Slot 09	Slot 10	🔲 Slot 11	Slot 12
Slot 13	Slot 14	🔲 Slot 15	Slot 16
Slot 17	Slot 18	Slot 19	Slot 20
Slot 21	Slot 22	Slot 23	Slot 24
Slot 25	Slot 26	Slot 27	Slot 28
Slot 29	Slot 30	Slot 31	Slot 32
	ОК	Cancel	

Step 13 Choose Stateless Computing > easyLink Configuration > Switch Configuration, click None in the Associated Slot column, select Swi2/Swi3, and click OK, as shown in Figure 2-54.

Figure 2-54 Associating with slots

Select Associat	ed Slot	×
After you s be automa associated	elect associated slots, the configuration file w nically delivered to the switch modules in the slots after the switch modules restart	ill
Swi2/Swi3		
	OK Cancel	

Step 14 Click *Step 14*, select Offline Delivery, and select Swi2 and Swi3, as shown in Figure 2-55.

0		•	•				
Manually Deliver Profile						\times	
Delivery Mode 💿 Online d			delivery 🖲 Offlin	e delivery			
A Select two slots for delivering a switch profile whose work relation is Stack							
	Slot	Switching plane	Profile Name	Switch Module Status	Status		
V	Swi2	Fabric	for_CX320	The flexible card 2 is not detected	Not delivered		
~	Swi3	Fabric	for_CX320	Switch module not detected	Not delivered		

Figure 2-55 Manually delivering a profile

Associated Compute Node

Functional slots	None
Compute node not detected	None
Compute node type mismatch	None
Mismatched NIC (type, quantity, and	slot) None
Abnormal BMC	None
	Deliver
l	Cancer

----End

2.2.4.5 NIC Configuration in the OS

In the OS, create three bonds and associate each bond with two NIC ports (ethx), which are one PF on port 0 and one on port 1. For details, see the E9000 Server V100R001 Deployment Guide.

A Acronyms and Abbreviations

В	
BIOS	Basic Input Output System
BMC	Baseboard Management Controller
F	
FC	Fiber Channel
FCoE	Fiber Channel over Ethernet
Μ	
MAC	Medium Access Control
L	
LACP	Link Aggregation Control Protocol
Р	
PF	Physical Function
Т	
TOR	Top of Rack
V	
VF	Virtual Function
W	

A Acronyms and Abbreviations

WebUI Web User Interface