



VPC Network Tutorial

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Contents

Copyright Statement.....	I
1 Introduction.....	1
2 Prerequisites.....	5
3 Basic Deployment.....	6
Glossary.....	34

1 Introduction

Virtual Private Cloud (VPC) is a custom network environment that consists of VPC vRouters and VPC networks. With VPC, enterprise users can build a logically isolated private cloud.

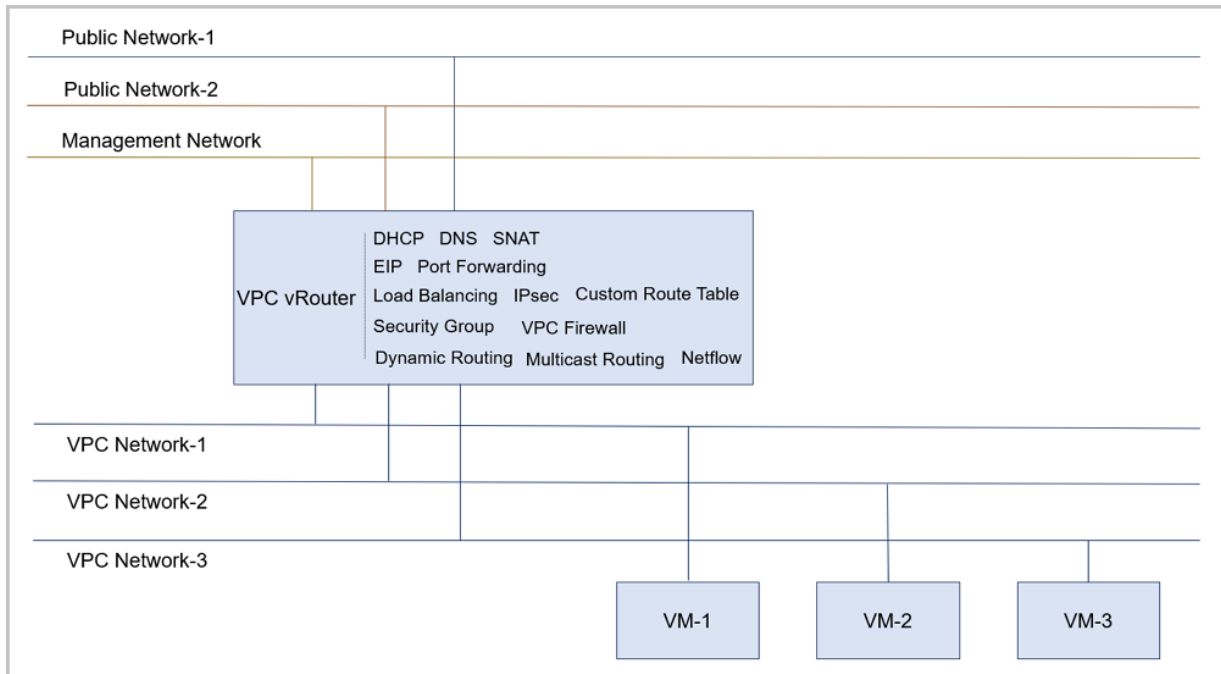
VPC vRouter and VPC Network

VPC consists of VPC vRouter and VPC network.

1. VPC vRouter: a vRouter that is created based on a vRouter offering. A VPC vRouter has two types of network: public network and management network.
 - VPC vRouters are the core of VPC. A VPC vRouter can be created by specifying a vRouter offering.
 - To create a vRouter offering, create the required public network, management network, and vRouter image in advance.
 - A VPC vRouter can be attached to or detached from VPC networks or other public networks.
 - The public network and the management network that are defined by a vRouter offering cannot be detached.
 - The same vRouter offering can be used to create multiple VPC vRouters. These VPC vRouters share both the public IP range and the management IP range defined by the same vRouter offering.
 - The public network is the default network used to provide network services.
 - VPC vRouters have higher resource priorities than VM instances. When the host workload rates are extremely high, and then resources contend with each other, the resource priority sequence from low to high is as follows: VM instances with **Normal** priorities < VM instances with **High** priorities < VPC vRouters. For example, when CPU resources contend with each other on hosts, VPC vRouters have higher CPU resource grabbing capability.
2. VPC network: a private network that can be attached to a VPC vRouter.
 - You need to create an L2 network before you can create an L3 VPC network.
 - When you create a VPC network, you can specify a vRouter. Or you can attach a vRouter to the VPC network after you create the VPC network.
 - If your VM instances use a VPC network, you cannot detach the VPC network from the VPC vRouter.
 - The newly created IP range must not overlap any IP range in the VPC vRouter.

The VPC network topology is shown in [VPC Network Topology](#).

Figure 1-1: VPC Network Topology



HA Group of VPC vRouter

High availability (HA) group: You can deploy two VPC vRouters according to the active-backup policy. When the active VPC vRouter is abnormal, the backup VPC vRouter will automatically take over to work properly, thus ensuring your business continuity.



Note:

The VPC vRouters in an HA group will be only displayed on the details page of the HA group, but will not be displayed independently in the vRouter table.

VPC Features

VPC has the following feature benefits:

- **Flexible network configuration:** Different VPC networks can be flexibly attached to the VPC vRouters. You can customize an independent IP range and an independent gateway for each VPC network. VPC vRouters allow you to attach or detach gateways, and also to dynamically configure your route tables and route entries.
- **Secure and reliable isolation:** Different VPC networks in different VPCs are logically isolated. That is, the VPC networks support VLAN and VXLAN for logical layer 2 isolation, and different VPCs of different accounts will not affect each other.

- Multi-subnet interconnection: Multiple VPC networks under the same VPC can communicate privately and securely with one another.
- Network traffic optimization: VPC supports distributed route features, indicating that VPC can optimize the east-west network traffic, and reduce the network latency effectively.
- VPC vRouter HA: In a VPC vRouter HA group, you can deploy two VPC vRouters according to the active-standby policy. When the active VPC vRouter is abnormal, the standby VPC vRouter will automatically take over to work properly, thus ensuring your business continuity.

VPC Network Service

The VPC network, which acts as a private network, provides a group of network services by using VPC vRouters.

- DHCP: By default, the VPC network provides distributed DHCP services by using the flat network service module.
- DNS: A VPC vRouter can act as a DNS server to provide DNS services. The DNS address in a VPC vRouter VM instance is the IP address of the VPC vRouter. Note that the DNS address that you set is forwarded by the VPC vRouter.
- SNAT: A VPC vRouter can provide the source network address translation (SNAT) services for VM instances. Then, the VM instances can directly access the Internet by using SNAT.
- Route table: Through the route table, you can manage and customize routes.
- Security group: The security group service is provided by the security group network service module. You can configure and manage firewalls for VM instances by using iptables.
- Elastic IP address (EIP): You can bind an EIP to a VPC network. Then, the public network can interconnect with the private network of the VM instance.
- Port forwarding: The port forwarding service allows a public IP address to interconnect with the private IP address of a VM instance. To be more specific, you can create port forwarding rules to allow external networks to reach specific ports of your VM instances.
- Load balancing: The load balancing service distributes your inbound traffics from a public IP address to a group of backend VM instances. Then, this service will automatically check and isolate the VM instances that are unavailable.
- IPsec tunnel: The IPsec tunnel can be used to achieve interconnection between different virtual private networks (VPNs).
- Dynamic routing: The VPC vRouter supports the Open Shortest Path First (OSPF) routing protocol, which is used to distribute routing information within a single autonomous system.

- Multicast routing: The VPC vRouter forwards the multicast information sent by the multicast source to VM instances, achieving one-to-multi-point communication in the transmission side and receiving side.
- VPC firewall: The VPC firewall filters the south-north traffic on the VPC vRouter ports, effectively protecting the VPC communication security and VPC vRouter security.
- Netflow: The Netflow service monitors and analyzes the inbound and outbound traffics of the VPC vRouter NICs. Currently, the following two types of data-flow output format are supported: Netflow V5 and Netflow V9.

2 Prerequisites

The latest version of ZStack is installed, and the basic initialization is completed. Specifically, basic hardware resources, such as the zone, cluster, host, backup storage, and primary storage, are added, and an instance offering is created. For more information, see the installation and deployment section and the wizard configuration section in the [User Guide](#).

This tutorial elaborates on the basic deployment of a VPC.

3 Basic Deployment

Context

The basic procedure for deploying a VPC is as follows:

1. Create an L2 public network and attach it to the corresponding cluster.
2. Create an L3 public network.
3. Create an L2 management network and attach it to the corresponding cluster.
4. Create an L3 management network to communicate with physical resources, such as hosts, primary storages, and backup storages.
5. Add a vRouter image.
6. Create a vRouter offering.
7. Create a VPC vRouter from the vRouter offering you created in the preceding step.
8. Create an L2 private network and attach it to the corresponding cluster. This L2 private network is used to create an L3 VPC network (VPC Network-1).
9. Specify a VPC vRouter to create an L3 VPC network (VPC Network-1). Note that the IP ranges cannot overlap.
10. Create an L2 private network and attach it to the corresponding cluster. This L2 private network is used to create an L3 VPC network (VPC Network-2).
11. Specify a VPC vRouter to create an L3 VPC network (VPC Network-2). Note that the IP ranges cannot overlap.
12. Use VPC Network-1 and VPC Network-2 to create VM-1 and VM-2, respectively.
13. Test the interoperability between VPC Network-1 and VPC Network-2.

Assume that your environment is as follows:

1. Public Network

Table 3-1: Configuration Information

Public Network	Configuration Information
NIC	em01
VLAN ID	No VLAN
IP range	10.108.10.100~10.108.10.200
Netmask	255.0.0.0

Public Network	Configuration Information
Gateway	10.0.0.1
DHCP IP	10.108.10.101

2. Management Network

Table 3-2: Configuration Information

Management Network	Configuration Information
NIC	em02
VLAN ID	No VLAN
IP range	192.168.29.10~192.168.29.20
Netmask	255.255.255.0
Gateway	192.168.29.1



Note:

- For security and stability reasons, we recommend that you deploy an independent management network and separate it from the public networks.
- The management network we mentioned here is the same as that in ZStack Private Cloud . That is, the management network is the network used to manage hosts, primary storages, and backup storages. If a management network was created before, you can use it directly.

3. VPC Network-1

Table 3-3: Configuration Information

Private Network	Configuration Information
NIC	em01
VLAN ID	2800
IP CIDR	192.168.10.0/24
Gateway	192.168.10.1
DHCP IP	192.168.10.2

4. VPC Network-2

Table 3-4: Configuration Information

Private Network	Configuration Information
NIC	em01
VLAN ID	2900
IP CIDR	192.168.11.0/24
Gateway	192.168.11.1
DHCP IP	192.168.11.2

To create a VPC in the Cloud, follow these steps:

Procedure

1. Create an L2 public network in the ZStack Private Cloud UI.

In the navigation pane of the ZStack Private Cloud UI, choose **Network Resource > L2 Network Resource > L2 Network**. On the **L2 Network** page, click **Create L2 Network**. On the displayed **Create L2 Network** page, set the following parameters according to the [Table 3-1: Configuration Information](#):

- **Name:** Enter a name for the L2 public network.
- **Description:** Optional. Enter a description for the L2 public network.
- **Type:** Select L2NoVlanNetwork.
- **Physical NIC:** Enter em01.
- **Enable SR-IOV:** Choose whether to enable SR-IOV. Here, leave this checkbox unselected.
- **Cluster:** Select a cluster, for example, Cluster-1.

Click **OK**. Then, an L2 public network will be created, as shown in [Figure 3-1: Create L2 Network](#).

Figure 3-1: Create L2 Network

OK Cancel

Create L2 Network

Zone: ZONE-1

Name *

L2 Public Network

Description

Type

L2NoVlanNetwork

Physical NIC *

em01

☐ Enable SR-IOV

Cluster

Cluster-1

2. Create an L3 public network in the ZStack Private Cloud UI.

In the navigation pane of the ZStack Private Cloud UI, choose **Network Resource > L3 Network > Public Network**. On the **Public Network** page, click **Create Public Network**. On the displayed **Create Public Network** page, set the following parameters according to the [Table 3-1: Configuration Information](#):

- **Name:** Enter a name for the L3 public network.
- **Description:** Optional. Enter a description for the L3 public network.
- **L2 Network:** Select the L2 public network you created in the preceding step.
- **Stop DHCP server:** Choose whether to enable the DHCP service.

**Note:**

- By default, this checkbox is not selected, indicating that the DHCP service is enabled, and IP addresses will be automatically allocated to VM instances. In this case, you can customize a DHCP IP address, or let the system randomly specify a DHCP IP address.
 - If selected, the DHCP service will be disabled, indicating that VM instances that use this network cannot obtain IP addresses automatically, and need to be configured manually with IP addresses. In this case, you cannot customize the DHCP IP address. In addition, the system cannot randomly specify a DHCP IP address.
- **Add IP Range:** Select the IPv4 IP address type and the IP range method.

**Note:**

ZStack supports both IPv4 and IPv6. You can choose to add an IP range or a CIDR. This tutorial takes the IPv4 IP address and IP range method as examples.

- **Start IP:** Enter a start IP address, for example, *10.108.10.100*.
- **End IP:** Enter an end IP address, for example, *10.108.10.200*.
- **Netmask:** Enter a netmask, for example, *255.0.0.0*.
- **Gateway:** Enter a gateway, for example, *10.0.0.1*.
- **DHCP IP:** Optional. Set a DHCP IP address as needed.

**Note:**

- If you create an L3 network and enable the DHCP service for the first time, or if you add the first IP range for the L3 network of the enabled DHCP service, you can customize the DHCP IP address.
- If the L3 network has a DHCP IP address, you cannot customize the DHCP IP address when you add an IP range.
- The DHCP IP address can be included or excluded on the added IP range. However, the DHCP IP address must be within the CIDR to which the added IP range belongs, and must not be occupied.
- The IP range specified within the start IP address and end IP address cannot contain IP addresses of the link-local address (169.254.0.0/16).
- If not specified, the system will randomly specify an IP address within the IP range that you added.

- **DNS:** Optional. Set a DNS, for example, *114.114.114.114*.

Click **OK**. Then, an L3 public network will be created, as shown in [Figure 3-2: Create L3 Public Network](#).

Figure 3-2: Create L3 Public Network

OK Cancel

Create Public Network

Name *

L3 Public Network

Description

L2 Network *

L2 Public Network

☐ Stop DHCP server

Add IP Range

IP Address Type

☒ IPv4 ☐ IPv6

Method

☒ IP Range ☐ CIDR

Start IP *

10.108.10.100

End IP *

10.108.10.200

Netmask *

255.0.0.0

Gateway *

10.0.0.1

DHCP IP

10.108.10.101

Add DNS

DNS

114.114.114.114

3. Create an L2 management network in the ZStack Private Cloud UI.

In the navigation pane of the ZStack Private Cloud UI, choose **Network Resource > L2 Network Resource > L2 Network**. On the **L2 Network** page, click **Create L2 Network**. On the displayed **Create L2 Network** page, set the following parameters according to the [Table 3-2: Configuration Information](#):

- **Name:** Enter a name for the L2 management network.

- **Description:** Optional. Enter a description for the L2 management network.
- **Type:** Select L2NoVlanNetwork.
- **Physical NIC:** Enter em02.
- **Enable SR-IOV:** Choose whether to enable SR-IOV. Here, leave this checkbox unselected.
- **Cluster:** Select a cluster, for example, Cluster-1.

Click **OK**. Then, an L2 management network will be created, as shown in [Figure 3-3: Create L2 Management Network](#).

Figure 3-3: Create L2 Management Network

OK Cancel

Create L2 Network

Zone: ZONE-1

Name *

L2 Management Network

Description

Type

L2NoVlanNetwork

Physical NIC *

em02

☐ Enable SR-IOV

Cluster

Cluster-1

4. Create an L3 management network in the ZStack Private Cloud UI.

In the navigation pane of the ZStack Private Cloud UI, choose **Network Resource > L3 Network > System Network**. On the **System Network** page, click **Create System Network**. On the displayed **Create System Network** page, set the following parameters according to the [Table 3-2: Configuration Information](#):

- **Name**: Enter a name for the L3 management network.
- **Description**: Optional. Enter a description for the L3 management network.
- **L2 Network**: Select the L2 management network you created in the preceding step.
- **Add IP Range**: Select the IP range method.
- **Start IP**: Enter a start IP address, for example, *192.168.29.10*.
- **End IP**: Enter an end IP address, for example, *192.168.29.20*.
- **Netmask**: Enter a netmask, for example, *255.255.255.0*.
- **Gateway**: Enter a gateway, for example, *192.168.29.1*.

Click **OK**. Then, an L3 management network will be created, as shown in [Figure 3-4: Create L3 Management Network](#).

Figure 3-4: Create L3 Management Network

OK

Cancel

Create System Network

Name *

L3 Management Network

Description

L2 Network *

L2 Management Network

Add IP Range

Method

☒ IP Range ☐ CIDR

Start IP *

192.168.29.30

End IP *

192.168.29.40

Netmask *

255.255.255.0

Gateway *

192.168.29.1

5. Add a vRouter image.

In the navigation pane of the ZStack Private Cloud UI, choose **Network Resource > vRouter Resource > vRouter Image**. On the **vRouter Image** page, click **Add vRouter Image**. On the displayed **Add vRouter Image** page, set the following parameters:

- **Name:** Enter a name for the vRouter image.
 - **Description:** Optional. Enter a description for the vRouter image.
 - **Backup Storage:** Select a backup storage to store the vRouter image, for example, BS-1.
 - **Image URL:** Enter a local URL or upload a local file.
1. **URL:** Enter the path that can download the vRouter image.



Note:

ZStack provides you with dedicated vRouter images. Download the latest vRouter images from [ZStack Official Website](#).

- File name: zstack-vRouter-3.10.0.qcow2
- Download address: Click [ZStack Official Website](#).

2. **Local file:** Upload a vRouter image file that can directly be accessed by the current browser.



Note:

- vRouter images can be uploaded to an ImageStore or Ceph backup storage.
- A local browser will serve as a transmission relay used for uploading vRouter images. Make sure that you do not refresh or stop the current browser, and do not stop your management node. Or otherwise, you will fail to add a vRouter image.

Click **OK**. Then, a vRouter image will be added, as shown in [Add vRouter Image](#).

Figure 3-5: Add vRouter Image

OK Cancel

Add vRouter Image

Name *

vRotuer Image

Description

Backup Storage *

BS-1

Image URL *

☒ URL ☐ Local file

http://192.168.1.100/mirror/diskimages/centos7-vrout

6. Create a vRouter offering.

In the navigation pane of the ZStack Private Cloud UI, choose **Network Resource > vRouter Resource > vRouter Offering**. On the **vRouter Offering** page, click **Create vRouter Offering**. On the displayed **Create vRouter Offering** page, set the following parameters:

- **Name:** Enter a name for the vRouter offering.
- **Description:** Optional. Enter a description for the vRouter offering.
- **CPU:** Set the CPU count for the vRouter offering. In an actual production environment, we recommend that the CPU count must be greater than 8.
- **Memory:** Set the memory size for the vRouter offering. Unit: M | G | T. In an actual production environment, we recommend that the memory size must be greater than 8 G.
- **Image:** Select the vRouter image that you added.

**Note:**

If the L3 public network in the vRouter offering has an IP range with the IPv6 type, when you create a VPC vRouter, you must use the vRouter image of version 3.10.0 and later.

- **Management Network:** Select the L3 management network that you created from the network list.
- **L3 Network:** Select an L3 network that you created from the network list, including public network and flat network.
 - If the L3 network is a public network, the vRouter or VPC vRouter created from this vRouter offering can provide various network services for vRouter networks and VPC networks.
 - If the L3 network is a public network, the vRouter created from this vRouter offering can provide load balancing network services for flat networks.
 - If the L3 network is a flat network, the vRouter created from this vRouter offering can provide load balancing network services for flat networks.

Click **OK**. Then, a vRouter offering will be created, as shown in [Create vRouter Offering](#).

Figure 3-6: Create vRouter Offering

OK Cancel

Create vRouter Offering

Zone: ZONE-SH

Name *

vRouter Offering

Description

CPU *

8

Memory *

8 G

Image *

vRouter Image

Management Network *

L3-ManagementNetwork

L3 Network *

L3-PublicNetwok

7. Create a VPC vRouter from the vRouter offering you created in the preceding step.

In the navigation pane of the ZStack Private Cloud UI, choose **Network Resource > VPC > VPC vRouter**. On the **VPC vRouter** page, click **Create VPC vRouter**. On the displayed **Create VPC vRouter** page, set the following parameters:

- **Name:** Enter a name for the VPC vRouter.
- **Description:** Optional. Enter a description for the VPC vRouter.
- **vRouter Offering:** Select the vRouter offering you created in the preceding step.
- **Specify Default IP:** Optional. Specify a public IP address as the default IP address of the VPC vRouter.
- **DNS:** Optional. Set the DNS for the VPC vRouter. Default value: 223.5.5.5.

Click **OK**. Then, a VPC vRouter will be created, as shown in [Figure 3-7: Create VPC vRouter](#).

Figure 3-7: Create VPC vRouter

The screenshot shows a 'Create VPC vRouter' dialog box. At the top are 'OK' and 'Cancel' buttons. The title bar says 'Create VPC vRouter'. Below it are five input fields: 'Name' with the value 'VPC vRouter', 'Description' which is empty, 'vRouter Offering' with the value 'vRouter Offering' and a minus icon, 'Specify Default IP' which is empty, and 'DNS' with the value '223.5.5.5'.

8. Create an L2 private network in the ZStack Private Cloud UI. This L2 private network is used to create an L3 VPC network (VPC Network-1).

In the navigation pane of the ZStack Private Cloud UI, choose **Network Resource > L2**

Network Resource > L2 Network. On the **L2 Network** page, click **Create L2 Network**. On the

displayed **Create L2 Network** page, set the following parameters according to the [Table 3-3: Configuration Information](#):

- **Name**: Enter a name for the L2 private network.
- **Description**: Optional. Enter a description for the L2 private network.
- **Type**: Select L2VlanNetwork.
- **VLAN ID**: Enter 2800.
- **Physical NIC**: Enter em01.
- **Enable SR-IOV**: Choose whether to enable SR-IOV. Here, leave this checkbox unselected.
- **Cluster**: Select a cluster, for example, Cluster-1.

Click **OK**. Then, an L2 private network will be created, as shown in [Figure 3-8: Create L2 Private Network](#).

Figure 3-8: Create L2 Private Network

OK Cancel

Create L2 Network

Zone: ZONE-1

Name *

L2 Private Network for VPC Network-1

Description

Type

L2VlanNetwork

VLAN ID *

2800

Physical NIC *

em01

☐ Enable SR-IOV

Cluster

Cluster-1

9. Specify a VPC vRouter in the ZStack Private Cloud to create an L3 VPC network (VPC Network-1).

In the navigation pane of the ZStack Private Cloud UI, choose **Network Resource > VPC > VPC Network**. On the **VPC Network** page, click **Create VPC Network**. On the displayed **Create VPC Network** page, set the following parameters according to the [Table 3-3: Configuration Information](#):

- **Name:** Enter a name for the VPC network, such as VPC Network-1.
- **Description:** Optional. Enter a description for the VPC network.
- **L2 Network:** Select the L2 private network you created in the preceding step.
- **VPC vRouter:** Optional. Specify a VPC vRouter directly, or attach a VPC vRouter after you create a VPC network.
- **Stop DHCP server:** Choose whether to enable the DHCP service.

**Note:**

- By default, this checkbox is not selected, indicating that the DHCP service is enabled, and IP addresses will be automatically allocated to VM instances. In this case, you can customize a DHCP IP address, or let the system randomly specify a DHCP IP address.
 - If selected, the DHCP service will be disabled, indicating that VM instances that use this network cannot obtain IP addresses automatically, and need to be configured manually with IP addresses. In this case, you cannot customize the DHCP IP address. In addition, the system cannot randomly specify a DHCP IP address.
- **Add IP Range:** Select the CIDR method.
 - **CIDR:** Enter a CIDR, for example, *192.168.10.0/24*.

**Note:**

The IP ranges cannot be overlapped.

- **Gateway:** Enter a gateway, for example, *192.168.10.1*.
- **DHCP IP:** Optional. Set a DHCP IP address as needed.

**Note:**

- If you create an L3 network and enable the DHCP service for the first time, or if you add the first network range for the L3 network of the enabled DHCP service, you can customize the DHCP IP address.
- If the L3 network has a DHCP IP address, you cannot customize the DHCP IP address when you add the IP range.
- The DHCP IP address can be included or excluded on the IP range that you added. However, the DHCP IP address must not be in conflict with the current CIDR.
- If not specified, the system will randomly specify an IP address within the added IP range.

- The first IP address in a CIDR is deemed as a gateway by default, and cannot serve as a DHCP IP address.

Click **OK**. Then, VPC Network-1 will be created, as shown in [Figure 3-9: Create VPC Network-1](#).

Figure 3-9: Create VPC Network-1

OK

Cancel

Create VPC Network

Name *

VPC Network-1

Description

L2 Network *

L2 Private Network for VPC Network-1

VPC vRouter

VPC vRouter

☐ Stop DHCP server

Add IP Range

Method

☐ IP Range

☒ CIDR

CIDR *

192.168.10.0/24

Gateway

192.168.10.1

DHCP IP

192.168.10.2

10. Create an L2 private network in the ZStack Private Cloud UI. This L2 private network is used to create an L3 VPC network (VPC Network-2).

In the navigation pane of the ZStack Private Cloud UI, choose **Network Resource > L2 Network Resource > L2 Network**. On the **L2 Network** page, click **Create L2 Network**. On the displayed **Create L2 Network** page, set the following parameters according to the [Table 3-4: Configuration Information](#):

- **Name:** Enter a name for the L2 private network.
- **Description:** Optional. Enter a description for the L2 private network.
- **Type:** Select L2VlanNetwork.
- **VLAN ID:** Enter 2900.
- **Physical NIC:** Enter em01.
- **Enable SR-IOV:** Choose whether to enable SR-IOV.
 - By default, this checkbox is not selected, indicating that SR-IOV is not enabled. In this case, SR-IOV cannot be enabled for the L3 network corresponding to the L2 network.
 - If selected, SR-IOV is enabled. You can also enable SR-IOV for the L3 network corresponding to the L2 network. In this case, make sure that VF NICs are generated from physical NICs used by the L2 network.
- **Cluster:** Select a cluster, for example, Cluster-1.

Click **OK**. Then, an L2 private network will be created, as shown in [Figure 3-10: Create L2 Private Network](#).

Figure 3-10: Create L2 Private Network

OK Cancel

Create L2 Network

Zone: ZONE-1

Name *

L2 Private Network for VPC Network-2

Description

Type

L2VlanNetwork

VLAN ID *

2900

Physical NIC *

em01

☐ Enable SR-IOV

Cluster

Cluster-1

11. Specify a VPC vRouter in the ZStack Private Cloud to create an L3 VPC network (VPC Network-2).

In the navigation pane of the ZStack Private Cloud UI, choose **Network Resource > VPC > VPC Network**. On the **VPC Network** page, click **Create VPC Network**. On the displayed

Create VPC Network page, set the following parameters according to the [Table 3-4: Configuration Information](#):

- **Name:** Enter a name for the VPC network, such as VPC Network-2.
- **Description:** Optional. Enter a description for the for the VPC network.
- **L2 Network:** Select the L2 private network you created in the preceding step.
- **VPC vRouter:** Optional. Specify a VPC vRouter directly, or attach a VPC vRouter after you create a VPC network.
- **Stop DHCP server:** Choose whether to enable the DHCP service.



Note:

- By default, this checkbox is not selected, indicating that the DHCP service is enabled, and IP addresses will be automatically allocated to VM instances. In this case, you can customize a DHCP IP address, or let the system randomly specify a DHCP IP address.
- If selected, the DHCP service will be disabled, indicating that VM instances that use this network cannot obtain IP addresses automatically, and need to be configured manually with IP addresses. In this case, you cannot customize the DHCP IP address. In addition, the system cannot randomly specify a DHCP IP address.

- **Add IP Range:** Select the CIDR method.
- **CIDR:** Enter a CIDR, for example, *192.168.11.0/24*.



Note:

The IP ranges cannot be overlapped.

- **Gateway:** Enter a gateway, for example, *192.168.11.1*.
- **DHCP IP:** Optional. Set a DHCP IP address as needed.

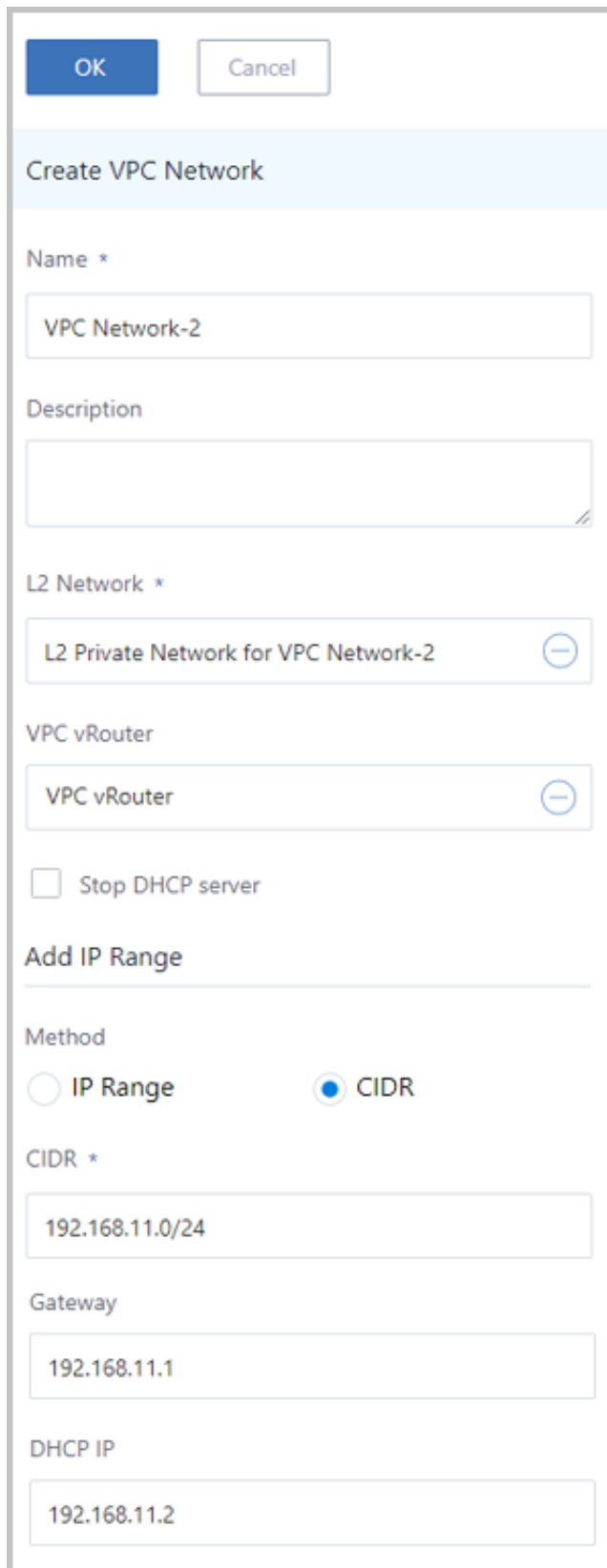


Note:

- If you create an L3 network and enable the DHCP service for the first time, or if you add the first network range for the L3 network of the enabled DHCP service, you can customize the DHCP IP address.
- If the L3 network has a DHCP IP address, you cannot customize the DHCP IP address when you add the IP range.
- The DHCP IP address can be included or excluded on the IP range that you added. However, the DHCP IP address must not be in conflict with the current CIDR.

- If not specified, the system will randomly specify an IP address within the added IP range.
- The first IP address in a CIDR is deemed as a gateway by default, and cannot serve as a DHCP IP address.

Click **OK**. Then, VPC Network-2 will be created, as shown in [Figure 3-11: Create VPC Network-2](#).

Figure 3-11: Create VPC Network-2

OK Cancel

Create VPC Network

Name *

VPC Network-2

Description

L2 Network *

L2 Private Network for VPC Network-2

VPC vRouter

VPC vRouter

☐ Stop DHCP server

Add IP Range

Method

☐ IP Range ☒ CIDR

CIDR *

192.168.11.0/24

Gateway

192.168.11.1

DHCP IP

192.168.11.2

12.Use VPC Network-1 to create VM-1, and use VPC Network-2 to create VM-2.

a) Use VPC Network-1 to create VM-1.

In the navigation pane of the ZStack Private Cloud UI, choose **Resource Pool > VM Instance**. On the **VM Instance** page, click **Create VM Instance**. On the displayed **Create VM Instance** page, set the following parameters:

- **Add Type:** Select `Single`.
- **Name:** Enter VM-1.
- **Description:** Optional. Enter a description for VM-1.
- **Instance Offering:** Select an instance offering you created before.
- **Image:** Select a VM image you added before.
- **Network:** Click on the IPv4 tab and select VPC Network-1.

Click **OK**. Then, VM-1 will be created, as shown in [Figure 3-12: Create VM-1](#).

Figure 3-12: Create VM-1

OK Cancel

Create VM Instance

Add Type

☒ Single ☐ Multiple

Name *

VM-1

Description

Instance Offering *

InstanceOffering-1

Image *

Image-1

Network

Network Address Type *

IPv4 IPv6 Double Stack

L3 Network *

L3 Network-1

☒ VPC Network -1

Default Network VM NIC Setting

☐ Enable SR-IOV

b) Use VPC Network-2 to create VM-2 with the same method.

13. Test the interoperability between VPC Network-1 and VPC Network-2.

1. Log in to VM-1 and check whether VM-1 can ping VM-2, as shown in [Figure 3-13: VM-1 Can ping M-2](#).

Figure 3-13: VM-1 Can ping M-2

```

[root@192-168-10-186 ~]# ip r
default via 192.168.10.1 dev eth0
169.254.0.0/16 dev eth0 scope link metric 1002
192.168.10.0/24 dev eth0 proto kernel scope link src 192.168.10.186
[root@192-168-10-186 ~]# ping 192.168.11.116
PING 192.168.11.116 (192.168.11.116) 56(84) bytes of data.
64 bytes from 192.168.11.116: icmp_seq=1 ttl=63 time=2.48 ms
64 bytes from 192.168.11.116: icmp_seq=2 ttl=63 time=1.50 ms
64 bytes from 192.168.11.116: icmp_seq=3 ttl=63 time=1.97 ms
64 bytes from 192.168.11.116: icmp_seq=4 ttl=63 time=2.14 ms
64 bytes from 192.168.11.116: icmp_seq=5 ttl=63 time=2.04 ms
64 bytes from 192.168.11.116: icmp_seq=6 ttl=63 time=2.02 ms
64 bytes from 192.168.11.116: icmp_seq=7 ttl=63 time=2.40 ms
^C
--- 192.168.11.116 ping statistics ---

```

2. Log in to VM-2 and check whether VM-2 can ping VM-1, as shown in [Figure 3-14: VM-2 Can ping VM-1](#).

Figure 3-14: VM-2 Can ping VM-1

```

[root@192-168-11-116 ~]# ip r
default via 192.168.11.1 dev eth0
169.254.0.0/16 dev eth0 scope link metric 1002
192.168.11.0/24 dev eth0 proto kernel scope link src 192.168.11.116
[root@192-168-11-116 ~]# ping 192.168.10.186
PING 192.168.10.186 (192.168.10.186) 56(84) bytes of data.
64 bytes from 192.168.10.186: icmp_seq=1 ttl=63 time=2.79 ms
64 bytes from 192.168.10.186: icmp_seq=2 ttl=63 time=1.57 ms
64 bytes from 192.168.10.186: icmp_seq=3 ttl=63 time=1.71 ms
64 bytes from 192.168.10.186: icmp_seq=4 ttl=63 time=1.73 ms
64 bytes from 192.168.10.186: icmp_seq=5 ttl=63 time=1.91 ms
64 bytes from 192.168.10.186: icmp_seq=6 ttl=63 time=1.48 ms
64 bytes from 192.168.10.186: icmp_seq=7 ttl=63 time=1.99 ms
^C
--- 192.168.10.186 ping statistics ---

```

What's next

So far, we introduced the basic deployment of a VPC.

Glossary

Zone

A zone is a logical group of resources such as clusters, L2 networks, and primary storages. Zone is the largest resource scope defined in ZStack.

Cluster

A cluster is a logical group of analogy hosts (compute nodes). Hosts in the same cluster must be installed with the same operating system, have the same network configuration, and be able to access the same primary storage. In a real data center, a cluster usually maps to a rack.

Management Node

A management node is a host with operating system installed to provide UI management and Cloud deployment.

Compute Node

A compute node is a physical server (also known as a host) that provides VM instances with compute, network, and storage resources.

Primary Storage

A primary storage is a storage server used to store disk files in VM instances. Local storage, NFS, Ceph, Shared Mount Point, and Shared Block are supported.

Backup Storage

A backup storage is a storage server used to store image template files. ImageStore, SFTP (Community Edition), and Ceph are supported. We recommend that you deploy backup storage separately.

ImageStore

ImageStore is a type of backup storage. You can use ImageStore to create images for VM instances that are in the running state and manage image version updates and release.

ImageStore allows you quickly upload, download, export images, and create image snapshots as needed.

VM Instance

A VM instance is a virtual machine instance running on a host. A VM instance has its own IP address to access public network and run application services.

Image

An image is an image template used by a VM instance or volume. Image templates include system volume images and data volume images.

Volume

A volume can either be a data volume or a root volume. A volume provides storage to a VM instance. A shared volume can be attached to one or more VM instances.

Instance Offering

An instance offering is a specification of the VM instance CPU and memory, and defines the host allocator strategy, disk bandwidth, and network bandwidth.

Disk Offering

A disk offering is a specification of a volume, which defines the size of a volume and how the volume will be created.

L2 Network

An L2 network is a layer 2 broadcast domain used for layer 2 isolation. Generally, L2 networks are identified by names of devices on the physical network.

L3 Network

An L3 network is a collection of network configurations for VM instances, including the IP range, gateway, and DNS.

Public Network

A public network is generally allocated with a public IP address by Network Information Center (NIC) and can be connected to IP addresses on the Internet.

Private Network

A private network is the internal network that can be connected and accessed by VM instances.

L2NoVlanNetwork

L2NoVlanNetwork is a network type for creating an L2 network. If L2NoVlanNetwork is selected, VLAN settings are not used for host connection.

L2VlanNetwork

L2VlanNetwork is a network type for creating an L2 network. If L2VlanNetwork is selected, VLAN settings are used for host connection and need to be configured on the corresponding switches in advance.

VXLAN Pool

A VXLAN pool is an underlay network in VXLAN. You can create multiple VXLAN overlay networks (VXLAN) in a VXLAN pool. The overlay networks can operate on the same underlay network device.

VXLAN

A VXLAN network is a L2 network encapsulated by using the VXLAN protocol. A VXLAN network belongs to a VXLAN pool. Different VXLAN networks are isolated from each other on the L2 network.

vRouter

A vRouter is a custom Linux VM instance that provides various network services.

Security Group

A security group provides L3 network firewall control over the VM instances. It can be used to set different security rules to filter IP addresses, network packet types, and the traffic flow of network packets.

EIP

An elastic IP address (EIP) is a method to access a private network through a public network.

Snapshot

A snapshot is a point-in-time capture of data status in a disk. A snapshot can be either an automatic snapshot or a manual snapshot.