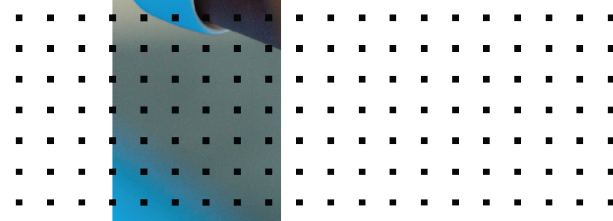


AliCloud Administration Guide

FortiOS 7.0



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March 22, 2022

FortiOS 7.0 AliCloud Administration Guide

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About FortiGate for AliCloud

By combining stateful inspection with a comprehensive suite of powerful security features, FortiGate Next Generation Firewall technology delivers complete content and network protection. This solution is available for deployment on AliCloud.

In addition to advanced features such as an extreme threat database, vulnerability management, and flow-based inspection, features including application control, firewall, antivirus, IPS, web filter, and VPN work in concert to identify and mitigate the latest complex security threats.

FortiGate for AliCloud supports active/passive high availability (HA) configuration using highly available virtual IP addresses (HAVIP). This enables FortiGate synchronization between the primary and secondary nodes for their configurations and sessions, and when the FortiGate detects a failure, the passive firewall instance becomes active.

Highlights of FortiGate for AliCloud include the following:

- Delivers complete content and network protection by combining stateful inspection with a comprehensive suite of powerful security features.
- IPS technology protects against current and emerging network-level threats. In addition to signature-based threat detection, IPS performs anomaly-based detection, which alerts users to any traffic that matches attack behavior profiles.
- Docker application control signatures protect your container environments from newly emerged security threats. See [FortiGate-VM on a Docker environment](#).

Instance type support

You can deploy FortiGate-VM as bring your own license (BYOL) on AliCloud on all available instances that the FortiGate-VM listing on the AliCloud marketplace supports. Supported instances on AliCloud for new deployments may change without notice.

For up-to-date information on instance type families, see the following:

- [Overview of instance families](#)
- [Fortinet FortiGate \(BYOL\) Next-Generation Firewall](#)
- [Retired instance types](#)

The following tables summarize instance type support for AliCloud:

Compute-optimized

c6

The c6 instance family supports 2.5 GHz Intel® Xeon® Platinum 8269CY (Cascade Lake) processors that deliver a turbo frequency of 3.2 GHz.

Instance type	vCPU	Max NIC	Recommended BYOL license
ecs.c6.large	2	2	FG-VM02 or FG-VM02v
ecs.c6.xlarge	4	3	FG-VM04 or FG-VM04v
ecs.c6.2xlarge	8	4	FG-VM08 or FG-VM08v
ecs.c6.4xlarge	16	8	FG-VM16 or FG-VM16v
ecs.c6.8xlarge	32	8	FG-VM32 or FG-VM32v

c5

The c5 instance family supports 2.5 GHz Intel® Xeon® Platinum 8163 (Skylake) or 8269CY (Cascade Lake) processors.

Instance type	vCPU	Max NIC	Recommended BYOL license
ecs.c5.large	2	2	FG-VM02 or FG-VM02v
ecs.c5.xlarge	4	3	FG-VM04 or FG-VM04v
ecs.c5.2xlarge	8	4	FG-VM08 or FG-VM08v
ecs.c5.4xlarge	16	8	FG-VM16 or FG-VM16v
ecs.c5.8xlarge	32	8	FG-VM32 or FG-VM32v

sn1ne

The network-enhanced compute-optimized sn1ne instance family supports 2.5 GHz Intel® Xeon® E5-2682 v4 (Broadwell) or Platinum 8163 (Skylake) processors.

Instance type	vCPU	Max NIC	Recommended BYOL license
ecs.sn1ne.large	2	2	FG-VM02 or FG-VM02v
ecs.sn1ne.xlarge	4	3	FG-VM04 or FG-VM04v
ecs.sn1ne.2xlarge	8	4	FG-VM08 or FG-VM08v
ecs.sn1ne.4xlarge	16	8	FG-VM16 or FG-VM16v
ecs.sn1ne.8xlarge	32	8	FG-VM32 or FG-VM32v

High clock speed

The following instance families are compute-optimized instance families with high clock speeds.

hfc5

The hfc5 instance family supports 3.1 GHz Intel® Xeon® Gold 6149 (Skylake) processors.

Instance type	vCPU	Max NIC	Recommended BYOL license
ecs.hfc5.large	2	2	FG-VM02 or FG-VM02v
ecs.hfc5.xlarge	4	3	FG-VM04 or FG-VM04v
ecs.hfc5.2xlarge	8	4	FG-VM08 or FG-VM08v
ecs.hfc5.4xlarge	16	8	FG-VM16 or FG-VM16v
ecs.hfc5.8xlarge	32	8	FG-VM32 or FG-VM32v

hfc6

The hfc6 instance family supports 3.1 GHz Intel® Xeon® Platinum 8269CY (Cascade Lake) processors that deliver a turbo frequency of 3.5 GHz.

Instance type	vCPU	Max NIC	Recommended BYOL license
ecs.hfc6.large	2	2	FG-VM02 or FG-VM02v
ecs.hfc6.xlarge	4	3	FG-VM04 or FG-VM04v
ecs.hfc6.2xlarge	8	4	FG-VM08 or FG-VM08v
ecs.hfc6.4xlarge	16	8	FG-VM16 or FG-VM16v
ecs.hfc6.8xlarge	32	8	FG-VM32 or FG-VM32v

Retired instance types

sn1

The compute-optimized sn1 instance family supports 2.5 GHz Intel Xeon E5-2682 v4 (Broadwell) or E5-2680 v3 (Haswell) processors for consistent computing performance.

Instance type	vCPU	Max NIC	Recommended BYOL license
ecs.sn1.medium	2	2	FG-VM02 or FG-VM02v
ecs.sn1.large	4	3	FG-VM04 or FG-VM04v
ecs.sn1.xlarge	8	4	FG-VM08 or FG-VM08v
ecs.sn1.3xlarge	16	8	FG-VM16 or FG-VM16v
ecs.sn1.7xlarge	32	8	FG-VM32 or FG-VM32v

Region support

FortiGate-VM is available for purchase in all the regions/datacenters that the AliCloud global marketplace covers. Available regions are:

- Hong Kong
- Asia Pacific SE 1 (Singapore)
- US East 1 (Virginia)
- Asia Pacific NE 1 (Tokyo)
- US West 1 (Silicon Valley)
- EU Central 1 (Frankfurt)
- Middle East 1 (Dubai)
- Asia Pacific SE 2 (Sydney)
- Asia Pacific SE 3 (Kuala Lumpur)
- Asia Pacific SOU 1 (Mumbai)
- Asia Pacific SE 5 (Jakarta)
- North China 1
- North China 2
- China North 3 (Zhangjiakou)
- China North 5 (Huhehaote)
- East China 1
- East China 2
- South China 1

Models

FortiGate-VM is available with different CPU and RAM sizes. You can deploy FortiGate-VM on various private and public cloud platforms. The following table shows the models conventionally available to order, also known as BYOL models. See [Order types on page 9](#).

Model name	vCPU	
	Minimum	Maximum
FG-VM01/01v/01s	1	1
FG-VM02/02v/02s	1	2
FG-VM04/04v/04s	1	4
FG-VM08/08v/08s	1	8
FG-VM16/16v/16s	1	16
FG-VM32/32v/32s	1	32
FG-VMUL/ULv/ULs	1	Unlimited



With the changes in the FortiGuard extended IPS database introduced in FortiOS 7.0.11, some workloads that depend on the extended IPS database must have the underlying VM resized to 8 vCPU or more to continue using the extended IPS database.

See [Support full extended IPS database for FortiGate VMs with eight cores or more](#).

For information about changing the instance type on an existing VM, see [Upgrade the instance types of subscription instances](#).

For more information about AliCloud instance families, see [Overview of instance families](#).



The v-series and s-series do not support virtual domains (VDMs) by default. To add VDMs, you must separately purchase perpetual VDM addition licenses. You can add and stack VDMs up to the maximum supported number after initial deployment.

Generally there are RAM size restrictions to FortiGate-BYOL licenses. However, these restrictions are not applicable to AliCloud deployments. Any RAM size with certain CPU models are allowed. Licenses are based on the number of CPUs only.

For information about each model's order information, capacity limits, and adding VDM, see the [FortiGate-VM datasheet](#).

Licensing

You must have a license to deploy FortiGate for AliCloud.

Order types

On AliCloud, there is one order type: bring-your-own-license (BYOL).

BYOL offers perpetual (normal series and v-series) and annual subscription (s-series) licensing. Subscription is month-based whereas PAYG is hour-based. BYOL licenses are available for purchase from resellers or your distributors, and the publicly available price list, which is updated quarterly, lists prices. BYOL licensing provides the same ordering practice across all private and public clouds, no matter what the platform is. You must activate a license for the first time you access the instance from the GUI or CLI before you can start using various features.

For all order types, cloud vendors charge separately for resource consumption on computing instances, storage, and so on, without use of software running on top of it (in this case the FortiGate-VM).

For BYOL, you typically order a combination of products and services including support entitlement. S-series SKUs contain the VM base and service bundle entitlements for easier ordering. To proceed with licensing a BYOL deployment, see [Creating a support account on page 9](#).

Creating a support account

FortiGate for AliCloud supports BYOL licensing models. See [Order types on page 9](#).

To make use of Fortinet technical support and ensure products function properly, you must complete certain steps to activate your entitlement. Our support team can identify your registration in the system thereafter.

First, if you do not have a Fortinet account, you can [create one](#).

You must obtain a license to activate the FortiGate-VM. If you have not activated the license, you see the license upload screen when you log in to the FortiGate-VM and cannot proceed to configure the FortiGate-VM.

You can obtain licenses for the BYOL licensing model through any Fortinet partner. If you do not have a partner, contact jerrywang@fortinet.com for assistance in purchasing a license.

After you purchase a license or obtain an evaluation license (60-day term), you receive a PDF with an activation code.

To register and download a license for BYOL:

1. Go to [Fortinet Service & Support](#) and create a new account or log in with an existing account.
2. Go to *Asset > Register/Activate* to start the registration process.
3. In the *Registration* page, enter the registration code that you received via email, and select *Register* to access the registration form.
4. If you register the S-series subscription model, the site prompts you to select one of the following:
 - a. Click *Register* to newly register the code to acquire a new serial number with a new license file.
 - b. Click *Renew* to renew and extend the licensed period on top of the existing serial number, so that all features on the VM node continue working uninterrupted upon license renewal.
5. At the end of the registration process, download the license (.lic) file to your computer. You upload this license later to activate the FortiGate-VM.

After registering a license, Fortinet servers may take up to 30 minutes to fully recognize the new license. When you upload the license (.lic) file to activate the FortiGate-VM, if you get an error that the license is invalid, wait 30 minutes and try again.

Migrating a FortiGate-VM instance between license types

When deploying a FortiGate-VM on public cloud, you determine the license type (on-demand or BYOL) during deployment. The license type is fixed for the VM's lifetime. The image that you use to deploy the FortiGate-VM on the public cloud marketplace predetermines the license type.

Migrating a FortiGate-VM instance from one license type to another requires a new deployment. You cannot simply switch license types on the same VM instance. However, you can migrate the configuration between two VMs running as different license types. There are also FortiOS feature differences between on-demand and BYOL license types. For example, a FortiGate-VM on-demand instance is packaged with Unified Threat Management protection and does not support VDOMEs, whereas a FortiGate-VM BYOL instance supports greater protection levels and features depending on its contract.

To migrate FortiOS configuration to a FortiGate-VM of another license type:

1. Connect to the FortiOS GUI or CLI and back up the configuration. See [Configuration backups](#).
2. Deploy a new FortiGate-VM instance with the desired license type. While deploying a BYOL instance, you must purchase a new license from a Fortinet reseller. You can apply the license after deployment via the FortiOS GUI.
3. Restore the configuration on the FortiGate-VM instance that you deployed in step 2 as described in [Configuration backups](#).



The pay-as-you-go licensing model on AliCloud is currently unavailable for FortiGate-VM.

Securing instances on AliCloud

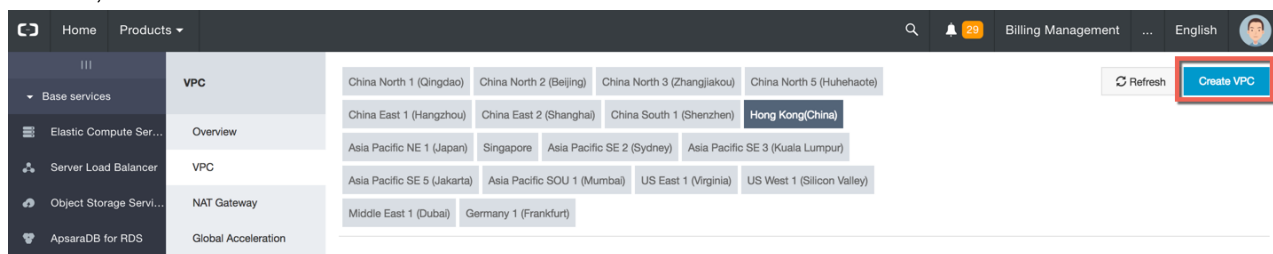
This guide describes FortiGate-VM single deployment on AliCloud. This deployment consists of the following steps:

1. [Configuring a virtual private cloud on page 11](#)
2. [Subscribing to the FortiGate-VM in the marketplace on page 13](#)
3. [Configuring routing to the FortiGate-VM on AliCloud on page 15](#)
4. [Connectivity test on page 16](#)

Configuring a virtual private cloud

To configure a virtual private cloud:

1. Assuming this is a new environment, the first step is to create the virtual private cloud (VPC). In the AliCloud web console, click *Create VPC*.



2. Enter the VPC name. Click *Create VPC*.
3. Click *Next Step*.
4. You need at least two VSwitches: one for the ECS and one for the FortiGate-VM. Create the ECS VSwitch first as shown.

Create VPC

Create VPC **Create VSwitch**

*VPC: vpc-j6cnfb11knn1hx4ghg0se

VPC CIDR Block: 192 . 168 . 0 . 0 / 16 [Show Binary](#)

*Name: Forti_VSwitchECS
The name can be 2-128 characters in length, including letters, digits, hyphens (-), and underscores (_), and must begin with either English letters or Chinese characters.

*Zone: Hong Kong Zone B
① It cannot be modified after creation.

*CIDR: 192 . 168 . 1 . 0 / 24 [Show Binary](#)
① It cannot be modified after creation.
The specified CIDR must be the same as, or belong to, that of the VPC. The allowed block size is between a /29 netmask and /16 netmask.
For example: 192.168.115.0/24
[Learn more.](#)

Number of Available Private IPs: 252 IPs

Description: VSwitch for ECS
The description can be 2-256 characters in length, and cannot begin with "http://" or "https://".

[Create VSwitch](#)

5. Click *Create More*.

6. Configure the VSwitch for the FortiGate-VM as shown, then click *Create VSwitch*.

Create VPC

Create VPC **Create VSwitch**

*VPC: vpc-j6cnfb11knn1hx4ghg0se

VPC CIDR Block: 192 . 168 . 0 . 0 / 16 [Show Binary](#)

*Name: Forti_VSwitchFW
The name can be 2-128 characters in length, including letters, digits, hyphens (-), and underscores (_), and must begin with either English letters or Chinese characters.

*Zone: Hong Kong Zone B
① It cannot be modified after creation.

*CIDR: 192 . 168 . 2 . 0 / 24 [Show Binary](#)
① It cannot be modified after creation.
The specified CIDR must be the same as, or belong to, that of the VPC. The allowed block size is between a /29 netmask and /16 netmask.
For example: 192.168.3.0/24
[Learn more.](#)

Number of Available Private IPs: 252 IPs

Description: VSwitch for the FW instance
The description can be 2-256 characters in length, and cannot begin with "http://" or "https://".

[Create VSwitch](#)

Created list 1

VSwitch
Name: Forti_VSwitchECS
Zone: Hong Kong Zone B
CIDR: 192.168.1.0/24

7. Click *Done*. VPC and VSwitch setup is complete.

Subscribing to the FortiGate-VM in the marketplace

To subscribe to the FortiGate-VM in the marketplace:

1. Go to the [AliCloud Marketplace](#) and search for Fortinet.
2. Create the FortiGate-VM instance. If you have your own FortiGate-VM license, select the BYOL image. Otherwise, select the on-demand image.
 - a. Click *Choose Your Plan*.
 - b. This example selects PAYG, Hong Kong, and Zone B for the pricing plan, region, and zone, respectively. Zone B is the location of the VPC and VSwitches. Click *ECS Advance Purchase page* to customize the data disk and VPC information.

The screenshot displays the AliCloud Marketplace interface for purchasing a FortiGate-VM instance. The interface is divided into several sections:

- Pricing Plan:** A dropdown menu is set to "Pay-as-you-go".
- Region:** A dropdown menu is set to "Hong Kong". Below it, two buttons for "Zone C" and "Zone B" are visible, with "Zone B" highlighted.
- Image:** The selected image is "Fortinet FortiGate-VM On-Demand (2 vCore CPU)". The version is set to "v5.6.3". A "Release Note: 5.6.3" link is provided.
- ECS Instance:** The "I/O Optimized" checkbox is checked. The default type is "ecs.n1.medium". A link "Select another instance type" is available.
- Overview:** This section provides a summary of the instance configuration:
 - Image: Fortinet FortiGate-VM On-Demand (2 vCore)
 - ECS Instance Type: ecs.n1.medium(2 Core 4 GB)
 - System Disk: 40GB (default)
 - Bandwidth: 2M (pay by traffic)
- Pricing Details:** This section lists the costs:
 - Software fee: \$ 0.73 /Hour
 - ECS instance usage fee: \$ 0.072 /Hour
 - Data Transfer: \$ 0.153 /GB
- Buttons:** An orange button "Agree Terms and Buy Now" is present. Below it, a disclaimer states: "By subscribing to this product you agree to [End User License Agreement \(EULA\)](#), and all applicable terms and conditions contained in the Alibaba Cloud International Website."
- Footer:** A link "ECS Advance Purchase page" is highlighted with a red box.

- c. Add a data disk for logs. It is suggested to use SSD for better performance.

The screenshot displays the AliCloud Storage configuration page for adding a data disk to the FortiGate-VM instance. The interface shows the following details:

- System Disk:** SSD Cloud Disk, 40GB.
- Data Disk:** A red box highlights the configuration for a new data disk:
 - Type: SSD Cloud Disk
 - Size: 50 GB
 - IOPS: 2700 IOPS
 - Quantity: 1
 - Device name: (empty)
 - Release with Instance: ☒
 - Encrypted: ☐
 - Create from snapshot: (empty)
- Buttons:** A blue button "Add Disk" is visible at the bottom left.

- d. In the **Network** section, select **TP_FortiVPC** and **Forti_VSwitchFW**. Assign a public IP address to the image.

Basic Configurations (Required) — **2 Networking (Required)** — 3 System Configurations — 4 Grouping — 5 Preview (Required)

Network

How to Select a Network

VPC: TP_FortiVPC
VSwitch Zone: Hong Kong Zone B (17)

VSwitch: Forti_VSwitchFW
VSwitch CIDR Block: 192.168.2.0/24

Network Billing Method

☒ Assign public IP Public IP addresses are assigned automatically. To use the more dynamic Elastic IP addresses, see [Bind Elastic IP](#)

Bandwidth Pricing

PayByTraffic With PayByTraffic (traffic in GB), bandwidth usage is billed on an hourly basis. Please make sure that your default payment method is valid.

1M 25M **50M** 75M 100M 50 Mbps

Alibaba Cloud provides up to 5Gbps of malicious traffic attack protection. [Learn more](#) | [Enhance security capability](#)
You can charge this instance's network usage to an existing Data Transfer plan. You can buy one [here](#).

Security Group

Reselect Security Group A security group is similar to a firewall, it is used to control connection requests, you can go to Security Group to see an overview. [Create Security Group](#) [How to create security group](#)

Instance Cost: **\$0.072 USD per Hour** + Marketplace image fee: **\$0.730 USD per Hour** + Public traffic fee: **0.153 USD**

[Prev: Basic Configurations](#) [Next: System Configurations](#) [Preview](#)

- e. Continue to create the instance.

Basic Configurations (Required) — Networking (Required) — System Configurations — Grouping — **5 Preview (Required)**

Configurations Selected

Basic Configurations ☒

Region: Hong Kong Zone B (17)
Image: Fortinet FortiGate-VM On-Demand (2 vCore CPU) v5.6.3
Instance Type: Compute Type n1 / ecs.n1.medium(2vCPU 4GB)
System Disk: SSD Cloud Disk 40GB
Quantity: 1
Data Disk: 1 Unit(s) ...

Networking ☒

Network: VPC
Network Billing Method: PayByTraffic 50Mbps
VPC: TP_FortiVPC / vpc-j6cnfb11knn1hx4ghg0se
VSwitch: Forti_VSwitchFW / vsw-j6cofovmnisqvlwfyxk / 192.1...

Automatic Release

☐ Auto Release Schedule
This ECS instance will be released at the scheduled time

Terms of Service

☒ ECS Service Terms and Product Terms of Service | Image Product Terms of Use

Instance Cost: **\$0.087 USD per Hour** + Marketplace image fee: **\$0.730 USD per Hour** + Public traffic fee: **0.153 USD per GB**

[Prev: Grouping](#) [Create Instance](#)

3. Click **Console** to return to the ECS instance list.

4. You can see that the VM has been created. Mark down the public IP address and the instance ID for later use. The instance ID is the FortiGate default password.

Select the instance attribute, or directly enter the keyword									
Instance ID/Name	Monitor	Zone	IP Address	Status	Network Type	Configuration	Tags	Billing Method	Action
<input type="checkbox"/> i-j6caixbrns90kz09juwf		Hong Kong	47.75.161.235	Running	VPC	CPU: 2 Core(s) Memory: 4 GB (I/O Optimized) 50Mbps (peak value)		Pay-As-You-Go 18-03-28 10:51 created	Manage Connect More
<input type="checkbox"/> TP-Fortinet-5.6.3-SE		Kong Zone B	192.168.2.8 (Private IP Address)						

5. You must now configure the default security group. Go to *Security Groups*, then click *Configure Rules*.
 - a. Click *Quickly Create Rules*.
 - b. Enable ports 80 and 443, then click OK.

6. You can now access the FortiGate-VM in a web browser using the username "admin". The password is the instance ID.
7. Change the password after the initial login.

Configuring routing to the FortiGate-VM on AliCloud

To configure routing to the FortiGate-VM on AliCloud:

1. On the VPC entry, click *Manage*.
2. Click *Add Route Entry*.
3. Add 0.0.0.0/0 and point it to the FortiGate-VM.

This ensures ECS outbound traffic goes through the FortiGate.

VRouter Information

You can create up to 48 custom route entries in a route table. [Refresh](#) [Add Route Entry](#)

VPC Details

VRouters

VSwitches

VRouter Basic Information

Name: - ID: vrt-j6c918bwxc9w9ayh0xr Created At: 2018-03-28 10:34:13

Description: -

Route Entry List

Route Table ID	Status	Destination CIDR Block	Next Hop	Next Hop Type	Type	Actions
vtb-j6co110hkd507tsi5wnpc	Available	0.0.0.0/0	Instance ID:j6caixbrs90kkz09juwf	ECS Instance	Custom	Delete

Connectivity test

The following instructions test whether you configured the FortiGate-VM and VPC properly. Complete the following steps in order:

1. [Configuring the initial firewall policy on the FortiGate-VM on page 16](#)
2. [Configuring an ECS worker VM for VNC access on page 16](#)
3. [Testing malware scan for outgoing traffic on page 18](#)
4. [Testing application control for outgoing traffic on page 18](#)
5. [Enabling NAT inbound protection in FortiOS on page 19](#)

Configuring the initial firewall policy on the FortiGate-VM

To configure the initial firewall policy on the FortiGate-VM:

1. In FortiOS, add an IPv4 policy for outbound traffic.
2. Specify the following "ToInternet" policy with AntiVirus, Application Control, and logs allowed for all sessions. Click **OK**.

Configuring an ECS worker VM for VNC access

To configure an ECS worker VM for VNC access:

1. In the AliCloud web console, click *Create Instance*.



2. Configure the ECS instance so that it does not use the same vSwitch as the FortiGate-VM. In this example, the ECS VSwitch was selected. There is no need to assign a public IP address since an ECS with a public IP address does not route through the FortiGate-VM.

Elastic Compute Service (ECS) **Basic** **Custom** [Buy Disk](#) [Buy Shared Block](#)

1 Basic Configurations (Required) **2 Networking (Required)** 3 System Configurations 4 Grouping

Network ☒ VPC ☐ Classic ?

How to Select a Network

TP_FortiVPC **Forti_VSwitchECS** Private IP Addresses Available: 252

If you need to create a new VPC, you can [Go to Console and Create](#)

VPC: TP_FortiVPC VSwitch: Forti_VSwitchECS
VSwitch Zone: Hong Kong Zone B (18) VSwitch CIDR Block: 192.168.1.0/24

Network Billing Method ☐ Assign public IP Do not assign public IP for instances. If you need to access to public network, configure and TBD [Bind Elastic IP](#)

Bandwidth Pricing

3. Confirm the configuration, then create the instance.
4. Reset the VNC password and login password, then restart the instance.

<input type="checkbox"/> Instance ID/Name	Tags	Monitor	Zone	IP Address	Status	Network Type	Configuration	Billing Method	Actions
<input type="checkbox"/> i-j6cdmbagds9axi0r8la TP-ECS-worker-SE			Hong Kong Zone B	192.168.1.36 (Private IP Address)	Running	VPC	2 vCPU 8 GB (I/O Optimized) ecs.sn2ne.large	Pay-As-You-Go 18-03-28 11:51 created	Manage Connect More
<input type="checkbox"/> i-j6caixbrs90kka09jwuf TP-Fortinet-5.6.3-SE			Hong Kong Zone B	47.75.161.235 (Internet IP Address) 192.168.2.8 (Private IP Address)	Running	VPC	2 vCPU 4 GB (I/O Optimized) ecs.n1.medium 50Mbps (peak value)	Pay-As-You-Go 18-03-28 10:51 created	Start Stop Restart Release Setting Reset Password Buy the Same Configuration Reset VNC Password Modify Information
<input type="checkbox"/> i-j6cfhyq9f0j9xfypeb TP-Windows-TestFW			Hong Kong Zone B	10.1.213.107 (Private IP Address)	Running	VPC	1 vCPU 4 GB (I/O Optimized) ecs.mn4.small	Pay-As-You-Go 18-03-27 16:56 created	
<input type="checkbox"/> i-j6cf7u83gshon904ktrm TP-Fortinet-5.6.3			Hong Kong Zone B	47.75.165.167 (Internet IP Address) 10.2.1.71 (Private IP Address)	Running	VPC	2 vCPU 4 GB (I/O Optimized) ecs.sn1.medium 50Mbps (peak value)	Pay-As-You-Go 18-03-27 16:55 created	

5. Connect to the VNC and log into Windows.

Select the instance attribute, or directly enter the keyword [Advanced Search](#) [?](#)

<input type="checkbox"/> Instance ID/Name	Tags	Monitor	Zone	IP Address	Status	Network Type	Configuration	Billing Method	Actions
<input type="checkbox"/> i-j6cdmbagds9axi0r8la TP-ECS-worker-SE			Hong Kong Zone B	192.168.1.36 (Private IP Address)	Running	VPC	2 vCPU 8 GB (I/O Optimized) ecs.sn2ne.large	Pay-As-You-Go 18-03-28 11:51 created	Manage Connect More
			Hong Kong Zone B	47.75.161.235 (Internet IP Address)	Running	VPC	2 vCPU 4 GB (I/O Optimized)	Pay-As-You-Go	

The VM should be able to connect to the Internet through the FortiGate-VM.

```
Microsoft Windows [Version 6.3.9600]
(c) 2013 Microsoft Corporation. All rights reserved.

C:\Users\Administrator>ping hk.yahoo.com

Pinging oob-media-router-fp1.prod.media.wg1.b.yahoo.com [106.10.250.11] with 32 bytes of data:
Reply from 106.10.250.11: bytes=32 time=35ms TTL=55
Reply from 106.10.250.11: bytes=32 time=35ms TTL=55
Reply from 106.10.250.11: bytes=32 time=35ms TTL=55

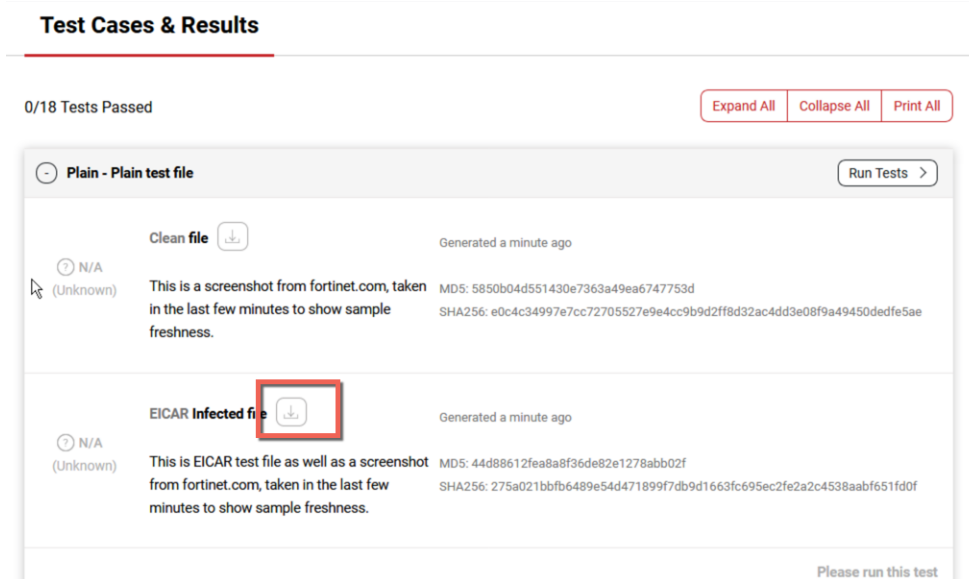
Ping statistics for 106.10.250.11:
    Packets: Sent = 3, Received = 3, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 35ms, Maximum = 35ms, Average = 35ms
Control-C
^C
C:\Users\Administrator>
```

FortiOS should also provide detailed log information.

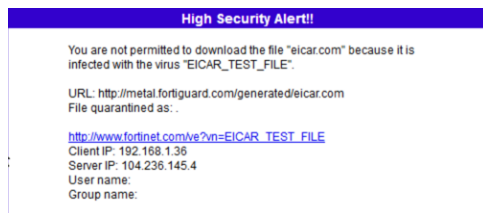
Testing malware scan for outgoing traffic

To test malware scan for outgoing traffic:

1. On the ECS worker node, visit this [website](#).
2. Click *Run Tests*. If there is no Application Firewall or AntiVirus protection, this test will fail.



FortiGate will block the file from being downloaded.



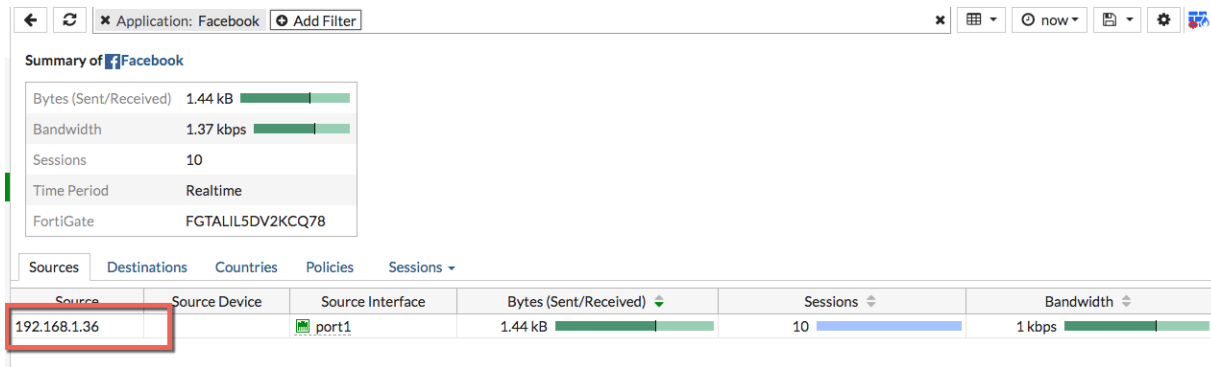
For the best AntiVirus scanning capabilities, ensure the AntiVirus definition is up-to-date in FortiOS.

3. In FortiOS, go to *FortiView > Threats*. You should see the attempted file download.

Testing application control for outgoing traffic

To test application control for outgoing traffic:

1. In FortiOS, go to *Security Profiles > Application Control*. Under *Categories*, block *Video/Audio* and *Social Media*. Click *OK*.
2. On the ECS, attempt to access Facebook and YouTube. It should not be able to connect. FortiOS shows the client trying to connect to Facebook and YouTube.



Enabling NAT inbound protection in FortiOS

In this example, you will enable the FortiGate-VM to protect inbound RDP traffic. The same concept can be applied to HTTP/HTTPS and other services. This demonstrates how to configure the FortiGate-VM to monitor inbound and outbound traffic.

To enable NAT inbound protection in FortiOS:

1. Create the virtual IP address:
 - a. In FortiOS, go to *Policy & Objects > Virtual IPs*.
 - b. Click *Create New*.
 - c. From the *Interface* dropdown list, select *port1*.
 - d. In the *Mapped IP address/range* field, enter 192.168.1.36, the ECS IP address.
 - e. Enable *Port Forwarding*.
 - f. In the *External service port* and *Map to port* fields, enter 3389.
 - g. Click *OK*.
2. Configure the inbound policy for the RDP redirection. Go to *Policy & Objects > Firewall Policy*, then click *Create New*.
3. In the *Destination* field, select the virtual IP address that you created in step 1.
4. Enable the desired security profiles, then log all sessions for demonstration purposes.
5. Click *OK*.

You can now use the FortiGate public address to RDP into the ECS.

```
Microsoft Windows [Version 6.3.9600]
(c) 2013 Microsoft Corporation. All rights reserved.

C:\Users\Administrator>ping hk.yahoo.com

Pinging oob-media-router-fp1.prod.media.wg1.b.yahoo.com [106.10.250.11] with 32
bytes of data:
Reply from 106.10.250.11: bytes=32 time=35ms TTL=55
Reply from 106.10.250.11: bytes=32 time=35ms TTL=55

Ping statistics for 106.10.250.11:
    Packets: Sent = 2, Received = 2, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 35ms, Maximum = 35ms, Average = 35ms
Control-C
^C
C:\Users\Administrator>
```

You can also view the logs and session information in FortiOS.

HA for FortiGate-VM on AliCloud

There are different ways to configure active-passive HA on FortiGate-VM for AliCloud.

The first deployment scenario, described in [Deploying and configuring FortiGate-VM on AliCloud using HAVIP on page 21](#), depends on the HAVIP function that AliCloud provides. In this scenario, you must locate both the internal and external interface at port1. The primary and secondary FortiGates share the same IP address. Failover may be quicker than in the second scenario, since there are no EIPs or route tables to update. This scenario natively supports session pickup.

The second deployment scenario, described in [Deploying FortiGate-VM HA on AliCloud using routing tables and EIPs on page 44](#), achieves HA by introducing EIP moving and route table updating capabilities. In this scenario, you can locate the internal and external interface on different interfaces. Optionally, you can also leverage HAVIP for external traffic on port1 and internal traffic on port2 for increased efficiency and flexibility. This scenario supports session pickup, but in a more limited way than in the first scenario.

Consider the following when deciding which HA scenario to deploy:

- If you need session pickup capabilities and cannot disable NAT for incoming firewall policies, you must use the first scenario.
- If you need session pickup capabilities and can disable NAT for incoming firewall policies, you can use the second scenario with HAVIP on port1 and attach an EIP to the HAVIP. This scenario does not require EIP moving but does require route table updating for internal traffic. This scenario provides the best balance between flexibility and efficiency.
- If you cannot use port1 for external traffic, you must use the second scenario with EIP moving and route table updating. This may require more failover time.

Deploying and configuring FortiGate-VM on AliCloud using HAVIP

You can configure active-passive HA with two FortiGate-VM instances using HAVIP, which is configurable on the AliCloud platform. FortiGate-VM configuration is synchronized between the two instances. When a primary FortiGate-VM is down, a failover to a secondary FortiGate-VM occurs while sessions are kept, and the secondary unit is promoted to become the primary unit. HAVIP forwards traffic to the new primary FortiGate-VM while keeping switching time minimal.

In this scenario, the AliCloud VPC cannot create multiple route tables, and the VPC only supports one-arm deployment mode. HAVIP covers an inter-VPC service, and the VPC default route points to the HAVIP. VPC outbound traffic forwards to the HAVIP, then forwards to the primary FortiGate-VM. You must bind the HAVIP to an EIP for VPC inbound traffic.

Setting up the VPC

- Assuming this is a new environment, the first step is to create the VPC. Click *Create VPC*.

The screenshot shows the AliCloud VPC console. On the left is a sidebar with navigation links: VPC, VPCs, Route Tables, VSwitches, Shared Bandwidth P..., and Shared Data Transfer. The main area is titled 'VPCs' and includes a 'Create VPC' button, 'Refresh', and 'Custom' filters. A search bar for 'Instance Name' is present. Below is a table of VPCs:

Instance ID/Name	Destination CIDR Block	Status	Default VPC	Route Table	VSwitch	Actions
	192.168.0.0/16	Available	No	1	3	Manage Delete

- Name the VPC TP_FortiVPC.

VPC

Region

China East 1 (Hangzhou)

Name ?

TP_FortiVPC

11/128 ✓

Destination CIDR Block ?

192.168.0.0/16

ⓘ The CIDR cannot be changed once the VPC is created.

Description ?

VPC For demo Fortinet

21/256

- In this scenario, you need at least three VSwitches: one for the ECS, one for the FortiGate-VM inbound/outbound interface, and one for the FortiGate-VM HA interface. You can also create a fourth VSwitch for the FortiGate

reserved management interface. Create the ECS VSwitch first, as seen below.

• **Name** ?

ECS_SW

6/128 ✓

• **Zone** ?

East China 1 Zone F

Zone Resource ?

ECS ✓

RDS ✓

SLB ✓

• **Destination CIDR Block**

192

▪

168

▪

4

▪

0

/

24

✓

ⓘ The CIDR cannot be changed once the VPC is created.

Number of Available Private IPs

252

Description ?

0/256

Contact Us

(You can only create three instances once.)

+ Add

🗑 Delete

4. Create the VSwitch for the FortiGate-VM inbound/outbound interface, as seen below.

VSwitch

• Name ?

FortiGate_Internet_SW

21/128 ✓

• Zone ?

East China 1 Zone F



Zone Resource ?

ECS ✓

RDS ✓

SLB ✓

• Destination CIDR Block

192

•

168

•

0

•

0

/

24



⚠ The CIDR cannot be changed once the VPC is created.

Number of Available Private IPs

252

Description ?

0/256

Contact Us

+ Add

🗑 Delete

5. Create the VSwitch for the FortiGate-VM HA interface, as seen below.

• **Name** ?

FortiGate_HA_SW

15/128 ✓

• **Zone** ?

East China 1 Zone F

Zone Resource ?

ECS ✓

RDS ✓

SLB ✓

• **Destination CIDR Block**

192

•

168

•

1

•

0

/

24

✓

ⓘ The CIDR cannot be changed once the VPC is created.

Number of Available Private IPs

252

Description ?

0/256

Contact Us



Add



Delete

6. (Optional) Create the VSwitch for the FortiGate reserved management interface.

Create VSwitch



• VPC

TP_FortiVPC/vpc-bp1ue3buvqego4vkha4wl

Destination CIDR Block

192.168.0.0/16

• Name ?

FortiGate_Reserved_MGMT_SW

26/128 ✓

• Zone ?

East China 1 Zone F

Zone Resource ?

ECS ✓

RDS ✓

SLB ✓

• Destination CIDR Block

192

•

168

•

3

•

0

/

24

✓

The CIDR cannot be changed once the VPC is created.

Number of Available Private IPs

252

Description ?

0/256

Contact Us

OK

Cancel

The VPC is now ready.

Create VPC



Details

VPC Name TP_FortiVPC

VPC ID vpc-bp1ue3buvqego4vkha4wl

Status Success [Create NAT Gateway](#)

VSwitch name FortiGate_Internet_SW

VSwitch ID vsw-bp18zyff1ou2azweoun6r

Status Success [Purchase](#) ✓

VSwitch name FortiGate_HA_SW

VSwitch ID vsw-bp1q5b9yoxinv9syb0jgc

Status Success [Purchase](#) ✓

VSwitch name ECS_SW

VSwitch ID vsw-bp1gejkl01u0j8brt4ioz

Status Success [Purchase](#) ✓

Complete

Subscribing to the FortiGate-VM in the marketplace

1. Go to the [AliCloud Marketplace](#) and search for Fortinet.
2. You will now create the FortiGate-VM instance. If you have your own FortiGate-VM license, select the BYOL image. Otherwise, select the on-demand image.

- Click **Choose Your Plan**.
- In this example, PAYG, China East 1 (Hangzhou), and Zone F were selected for the pricing plan, region, and zone, respectively. Zone F is the location of the VPC and VSwitches. Click **ECS Advance Purchase** page to customize the data disk and VPC information.

| Choose Your Plan

Pricing Plan

Subscription

Pay-as-you-go

Region

China East 1 (Hangzhou)

Zone G

Zone B

Zone F

Zone E

Image

Fortinet FortiGate-VM On-Demand (2 vCore CPU)

Version

v5.6.3

Release Note: 5.6.3

ECS Instance

I/O Optimized

Default Type: ecs.sn1ne.large

Select another instance type

You can choose more specific instance configurations on [ECS Advance Purchase page](#).

Overview

Image

Fortinet FortiGate-VM On-Demand (2 vCore CPU)

ECS Instance Type

ecs.sn1ne.large(2 Core 4 GB)

System Disk

40GB (default)

Bandwidth

2M (pay by traffic)

Pricing Details

Software fee

\$ 0.73 /Hour

ECS Instance usage fee

\$ 0.143 /Hour

Data Transfer

\$ 0.123 /GB

Agree Terms and Buy Now

By subscribing to this product you agree to [End User License Agreement \(EULA\)](#), and all applicable terms and conditions contained in the Alibaba Cloud International Website.

- Click the ECS type with 4 vCPU to launch the FortiGate instance. The 4 vCPU ECS can support a maximum of 3 NIC, while the 2 vCPU ECS can support 2 NIC. If the FortiGate reserved management interface is required, select the 4 vCPU ECS type.

Region

China East 1 (Hangzhou)

Random

China East 1 Zone G

China East 1 Zone B

China East 1 Zone F

China East 1 Zone E

Select a region

Cloud services available in different regions do not have intranet communication with one another. Select a region close to your visitors to achieve the best download experience and lowest latency.

Instance Type

Instance type families

Select a configuration

Request for Higher Specifications for Pay-As-You-Go Instances

IO-Optimized Instance

vCPU: Select vCPU

Memory: Select me...

Instance type: e.g. ecs.sn1ne.large

Current Generation

All Generations

Architecture: x86-Architecture

Heterogeneous Computing

Category: General Purpose

Compute Optimized

Memory Optimized

Big Data

Local SSD

High Clock Speed

Entry-Level (Shared)

Family	Instance type	vCPU	Memory	Physical processor	Clock speed	Intranet bandwidth	Packet forwarding rate
Compute Optimized Type sn1	ecs.sn1.medium	2 vCPU	4 GiB	Intel Xeon E5-2682v4 / Intel Xeon(Skylake) Platinum 8163	2.5 GHz	0.5 Gbps	100,000 PPS(Packets Per Second)
Compute Optimized Type sn1	ecs.sn1.large	4 vCPU	8 GiB	Intel Xeon E5-2682v4 / Intel Xeon(Skylake) Platinum 8163	2.5 GHz	0.8 Gbps	200,000 PPS(Packets Per Second)
Network Enhanced sn1ne	ecs.sn1ne.large	2 vCPU	4 GiB	Intel Xeon E5-2682v4 / Intel Xeon(Skylake) Platinum 8163	2.5 GHz	1 Gbps	300,000 PPS(Packets Per Second)

Bandwidth: 2Mbps PayByTraffic

Instance Cost: \$ 0.262 USD per Hour

Marketplace image fee: \$ 0.730 USD per Hour

Public traffic fee: \$ 0.123 USD per GB

Save \$ 0.013 USD per Hour

Save 5% for ECS

Next: Networking

Preview

- d. Add a data disk for logs. It is suggested to use SSD for better performance.

- e. In the *Network* section, select TP_FortiVPC and Forti_internet_SW. Assign a public IP address to the image. This NIC will be port1 on the FortiGate-VM, the default ENI.

- f. Leave the HTTPS, ICMP, and SSH ports and protocols open to allow connection. Add another ENI on FortiGate_HA_SW. This ENI will be port2 on the FortiGate.

- g. In the *Host* field, enter the FortiGate hostname.

h. Click *ECS Service Terms*.

☒ Automatic Release
 ☐ Auto Release Schedule
 This ECS instance will be released at the scheduled time

☐ Terms of Service
 ☒ **ECS Service Terms**

[Purchase Notice](#)
 You can view your bills and configure your billing in [Billing Management](#).
 Alibaba Cloud Services forbids TCP port 25 and port 25 related mail services, if you need access to this port, a request needs to be submitted and approved first. [see more>](#)

3. Click *Console* to return to the ECS instance list.

4. You can see that the VM has been created. Mark down the public IP address and the instance ID for later use. The instance ID is the FortiGate default password.

Instance List

Select the instance attribute, or directly enter the keyword

Instance ID/Name	Tags	Monitor	Zone	IP Address	Status	Network Type	Configuration	Billing Method	Actions
i-bp1cj6it8c8hndkxom7j FGT-Master			East China 1 Zone F	116.62.190.109 (Internet IP Address) 192.168.0.150 (Private IP Address)	Running	VPC	4 vCPU 16 GB (I/O Optimized) ecs.sn2.large 50Mbps (peak value)	Pay-As-You-Go 18-05-02 14:21 created	Manage Connect Change Instance Type More

5. Repeat steps 1 and 2 to create another FortiGate instance, named FGT-Slave.

Instance List

Select the instance attribute, or directly enter the keyword

Instance ID/Name	Tags	Monitor	Zone	IP Address	Status	Network Type	Configuration	Billing Method	Actions
i-bp167uui7rqzmp8ta0kw FGT-Slave			East China 1 Zone F	47.98.242.247 (Internet IP Address) 192.168.0.151 (Private IP Address)	Running	VPC	4 vCPU 16 GB (I/O Optimized) ecs.sn2.large 50Mbps (peak value)	Pay-As-You-Go 18-05-02 14:29 created	Manage Connect Change Instance Type More
i-bp1cj6it8c8hndkxom7j FGT-Master			East China 1 Zone F	116.62.190.109 (Internet IP Address) 192.168.0.150 (Private IP Address)	Running	VPC	4 vCPU 16 GB (I/O Optimized) ecs.sn2.large 50Mbps (peak value)	Pay-As-You-Go 18-05-02 14:21 created	Manage Connect Change Instance Type More
i-bp1i12dakoen7ncchpx8 SSL_VPN_Server			East China 1 Zone F	192.168.5.144 (Private IP Address)	Stopped	VPC	2 vCPU 8 GB (I/O Optimized) ecs.sn2ne.large	Pay-As-You-Go 18-04-04 07:50 created	Manage Change Instance Type More
i-bp1ionhm5ibeb1hyra65 client			China East 1 Zone G	192.168.3.84 (Private IP Address)	Running	VPC	2 vCPU 8 GB (I/O Optimized) ecs.sn2ne.large	Pay-As-You-Go 18-03-19 20:55 created	Manage Connect Change Instance Type More

Total: 4 item(s), Per Page: 20 item(s)

« ‹ 1 › »

6. You can create two ENI and attach them to the FortiGate instances. This step is optional.

a. Stop the two FortiGate instances.

Instance List

Select the instance attribute, or directly enter the keyword

Instance ID/Name	Tags	Monitor	Zone	IP Address	Status	Network Type	Configuration	Billing Method	Actions
<input checked="" type="checkbox"/> bp167uu17rqzmp8ta0kw FGT-Slave			East China 1 Zone F	47.98.242.247(Internet IP Address) 192.168.0.151(Private IP Address)	Running	VPC	4 vCPU 16 GB (I/O Optimized) ecs.sn2.large 50Mbps (peak value)	Pay-As-You-Go 18-05-02 14:29 created	Manage Connect
<input checked="" type="checkbox"/> i-bp1cj6it8c8hndkxom7j FGT-Master			East China 1 Zone F	116.62.190.109(Internet IP Address) 192.168.0.150(Private IP Address)	Running	VPC	4 vCPU 16 GB (I/O Optimized) ecs.sn2.large 50Mbps (peak value)	Pay-As-You-Go 18-05-02 14:21 created	Manage Connect
<input type="checkbox"/> bp1i12dakoen7nchepx8 SSL_VPN_Server			East China 1 Zone F	47.98.103.62(Internet IP Address) 192.168.5.144(Private IP Address)	Running	VPC	2 vCPU 8 GB (I/O Optimized) ecs.sn2ne.large 5Mbps (peak value)	Pay-As-You-Go 18-04-04 07:50 created	Manage Connect
<input type="checkbox"/> bp1ionhm5ibeb1hyra65 client			China East 1 Zone G	192.168.3.84(Private IP Address)	Running	VPC	2 vCPU 8 GB (I/O Optimized) ecs.sn2ne.large	Pay-As-You-Go 18-03-19 20:55 created	Manage Connect

Start Stop Restart Reset Password Renew Switch to Subscription Release Setting More

Total: 4 item(s), Per Page: 20 item(s)

b. Go to **Networks & Security > Network Interfaces** and create two ENI.

Elastic Compute Serv... Network Interfaces

Name Enter name Search

ID/Name	VSwitch/VPC	Zone	Security Group ID	Binded Instance	Public IP Address	Private IP Address	Type/MAC(All)	Status/Created At	Actions
eni-1...	vsw-1...	East China 1 Zone F	sg-1...	i-bp1...		192.168.0.151	Primary	Running	Modify Detach Delete
eni-2...	vsw-1...	East China 1 Zone F	sg-1...			192.168.0.152	Secondary	Running	Modify Detach Delete

Network Interfaces

Create



Network Interface
Name:

FGT-Master-Port3

2-128 characters, not http:// or https:// at the beginning,
must be based on the size of letters beginning, may
contain numbers, - or _

* VPC:

vpc-bp1ue3buvqego4vkha4wl / TP_Fort...

* VSwitch:

vsw-bp1n4o8m36029aq05akvk / FortiG...

CIDR: 192.168.3.0/24

IP:

Must be the free address in the address section
of the VSwitch to which it belongs. By default,
the free address in the switch is allocated
randomly.

* Security Group

sg-bp153m2jlzs6qlvntqt5

Description:

It must contain 2-256 characters and it cannot begin with http:// or https://

OK

Cancel

Create



Network Interface Name:

2-128 characters, not http:// or https:// at the beginning, must be based on the size of letters beginning, may contain numbers, - or _

* VPC:

* VSwitch:

CIDR: 192.168.3.0/24

IP:

Must be the free address in the address section of the VSwitch to which it belongs. By default, the free address in the switch is allocated randomly.

* Security Group:

Description:

It must contain 2-256 characters and it cannot begin with http:// or https://

OK

Cancel

c. Attach the two new ENI to the two FortiGate instances.

Network Interfaces Create

Name Search

ID/Name	VSwitch/VPC	Zone	Security Group ID	Binded Instance	Public IP Address	Private IP Address	Type/MAC(All)	Status/Created At	Actions
eni-bp126a4rnnfhnelnoksh FGT-Slave-Port3	vsw-bp1n4o8m36029aq05akvk vpc-bp1ue3buvqego4vkha4wl	East China 1 Zone F	sg-bp153m2jlzs6qlvntqt5			192.168.3.250	Secondary 00:16:3e:12:2b:bf	Available 2018-05-02	Modify Attach Delete
eni-bp126a4rnnfhnelnoksh FGT-Master-Port3	vsw-bp1n4o8m36029aq05akvk vpc-bp1ue3buvqego4vkha4wl	East China 1 Zone F	sg-bp153m2jlzs6qlvntqt5			192.168.3.249	Secondary 00:16:3e:10:13:3e	Available 2018-05-02	Modify Attach Delete

Attach



ID/Name: eni-bp126a4rnnfhnelnoksk/FGT-Slave-Port3

*Select Instance:

i-bp167uui7rqzmp8ta0kw

FGT-Slave

FGT-Master

OK

Cancel

Attach



ID/Name: eni-bp126a4rnnfhnelnoksh/FGT-Master-Port3

*Select Instance:

i-bp167uui7rqzmp8ta0kw

FGT-Slave

FGT-Master

OK

Cancel

Network Interfaces



Create

Update succes



ID/Name	VSwitch/VPC	Zone	Security Group ID	Binded Instance	Public IP Address	Private IP Address	Type/MAC(All)	Status/Created At	Actions
eni-bp126a4rnnfhnelnoksk FGT-Slave-Port3	vsw-bp1n4o8m... vpc-bp1ue3bu...	East China 1 Zone F	sg-bp153m2j...	i-bp167uui7r...		192.168.3.250	Secondary 00:16:3e:12:2b:bf	In Use 2018-05-02	Modify Detach Delete
eni-bp126a4rnnfhnelnoksh FGT-Master-Port3	vsw-bp1n4o8m... vpc-bp1ue3bu...	East China 1 Zone F	sg-bp153m2j...	i-bp1cj6it8c...		192.168.3.249	Secondary 00:16:3e:10:13:3e	In Use 2018-05-02	Modify Detach Delete

d. Restart the two FortiGate instances.

Instance List

Select the instance attribute, or directly enter the keyword

Instance ID/Name	Tags	Monitor	Zone	IP Address	Status	Network Type	Configuration	Billing Method	Actions
<input checked="" type="checkbox"/> i-bp167uui7rqzmp8ta0kw FGT-Slave			East China 1 Zone F	47.98.242.247(Internet IP Address) 192.168.0.151(Private IP Address)	Running	VPC	4 vCPU 16 GB (I/O Optimized) ecs.sn2.large 50Mbps (peak value)	Pay-As-You-Go 18-05-02 14:29 created	Manage Connect More
<input checked="" type="checkbox"/> i-bp1cj6it8c8hndkxom7j FGT-Master			East China 1 Zone F	116.62.190.109(Internet IP Address) 192.168.0.150(Private IP Address)	Running	VPC	4 vCPU 16 GB (I/O Optimized) ecs.sn2.large 50Mbps (peak value)	Pay-As-You-Go 18-05-02 14:21 created	Manage Connect More
<input type="checkbox"/> i-bp1i12dakoen7nchepx8 SSL_VPN_Server			East China 1 Zone F	47.98.103.62(Internet IP Address) 192.168.5.144(Private IP Address)	Running	VPC	2 vCPU 8 GB (I/O Optimized) ecs.sn2ne.large 5Mbps (peak value)	Pay-As-You-Go 18-04-04 07:50 created	Manage Connect More
<input type="checkbox"/> i-bp1ionhm5ibeb1hyra65 client			China East 1 Zone G	192.168.3.84(Private IP Address)	Running	VPC	2 vCPU 8 GB (I/O Optimized) ecs.sn2ne.large	Pay-As-You-Go 18-03-19 20:55 created	Manage Connect More

Start Stop **Restart** Reset Password Renew Switch to Subscription Release Setting More

Total: 4 item(s), Per Page: 20 item(s)

- You can now access the FortiGate-VM in a web browser using the username "admin". The password is the instance ID.
- Change the password after the initial login.
- Set the IP address on three interfaces on the FortiGate.

Elastic Compute Serv... Network Interfaces

Name Enter name Search

ID/Name	VSwitch/VPC	Zone	Security Group ID	Binded Instance	Public IP Address	Private IP Address	Type/MAC(All)	Status/Created At	Actions
eni-bp126a4rnnfhneinoksk FGT-Slave-Port3	vsw-bp1n4o8m... vpc-bp1ue3bu...	East China 1 Zone F	sg-bp153m2j...	i-bp167uui7r...		192.168.3.250	Secondary 00:16:3e:12:2b:bf	In Use 2018-05-02	Modify Detach Delete
eni-bp126a4rnnfhneinoksh FGT-Master-Port3	vsw-bp1n4o8m... vpc-bp1ue3bu...	East China 1 Zone F	sg-bp153m2j...	i-bp1cj6it8c...		192.168.3.249	Secondary 00:16:3e:10:13:3e	In Use 2018-05-02	Modify Detach Delete

Configuring the HAVIP on the AliCloud web console

1. Create a new HAVIP address. Select the VPC and FortiGate-VM port1 VSwitch, and set the HAVIP address.

The screenshot displays the AliCloud console interface for managing HAVIP addresses. On the left, a navigation sidebar lists various services, with 'HAVIP Addresses' highlighted under the 'VPN' section. The main content area is titled 'HAVIP Addresses' and features a 'Create HAVIP Address' button, which is highlighted with a red box. Below this button are 'Refresh' and 'Custom' buttons. A search bar with a dropdown for 'Instance ID' and a text input for 'Enter a name or ID' is located to the right. The main table lists existing HAVIP addresses with columns for Instance ID, IP Address, Status, Bind Instance, VPC, VSwitch, and Actions. The table contains three rows of data, each representing a different HAVIP address configuration.

Instance ID	IP Address	Status	Bind Instance	VPC	VSwitch	Actions
...
...
...

Create HAVIP Address

Region

China East 1 (Hangzhou)

VPC

vpc-bp1ue3buvqego4vkha4wl

VSwitch

vsw-bp18zyff1ou2azweoun6r

VSwitch CIDR Block

192.168.0.0/24

Private IP Address

192

168

0

252

2. Set the HA configuration on the FortiGate via the VNC console on the AliCloud Web GUI, or via SSH.
 - a. Set the configuration on the primary FortiGate-As follows. In this example, 192.168.3.253 is the gateway on the VSwitch, while 192.168.1.250 is the secondary FortiGate's port2's IP address. Note the FortiGate with a higher priority value will be the primary FortiGate.

```
config system ha
  set group-name "ha"
  set mode a-p
  set hbdev "port2" 0
  set session-pickup enable
  set ha-mgmt-status enable
  config ha-mgmt-interface
    edit 1
      set interface "port3"
      set gateway 192.168.3.253
    next
  end
  set priority 200
  set monitor "port1"
  set unicast-hb enable
  set unicast-hb-peerip 192.168.1.250
end
```

- b. Set the configuration on the secondary FortiGate-As follows. Here, 192.168.1.249 is the primary FortiGate's port2's IP address.

```
config system ha
  set group-name "ha"
  set mode a-p
```

```

set hbdev "port2" 0
set session-pickup enable
set ha-mgmt-status enable
config ha-mgmt-interface
    edit 1
        set interface "port3"
        set gateway 192.168.3.253
    next
end
set priority 100
set monitor "port1"
set unicast-hb enable
set unicast-hb-peerip 192.168.1.249
end

```

3. Reboot the two FortiGates.

4. Check the HA status by running `diagnose sys ha status` in the CLI. It should show the following:

```

FGT-Master # diagnose sys ha status
HA information
Statistics
    traffic.local = s:0 p:20456 b:7590378
    traffic.total = s:0 p:20467 b:7591052
    activity.fdb   = c:0 q:0

Model=90019, Mode=2 Group=0 Debug=0
ovcluster=1, ses_pickup=1, delay=0

[Debug_Zone HA information]
HA group member information: is_manage_master=1.
FGTALIG8XFM4RR79: Master, serialno_prio=1, usr_priority=200, hostname=FGT-Master
FGTALIZT2A540C07: Slave, serialno_prio=0, usr_priority=100, hostname=FGT-Slave

[Kernel HA information]
ovcluster 1, state=work, master_ip=192.168.1.249, master_id=0:
FGTALIG8XFM4RR79: Master ha_prio/o_ha_prio=0/0
FGTALIZT2A540C07: Slave ha_prio/o_ha_prio=1/1

```

5. Set the HAVIP address to the port1 secondary IP address on the two FortiGates. On both FortiGates, configure the following. The secondary IP address configured below should be the same as the HAVIP address.

```

config system interface
    edit "port1"
        set secondary-IP enable
        config secondaryip
            edit 1
                set ip 192.168.0.252 255.255.255.0
                set allowaccess ping https ssh
            next
        end
    next
end

```

6. Bind the elastic IP address and the two FortiGate ECS to HAVIP.

a. Create a new EIP.

Elastic IP Address

Elastic IP Address List

China North 1 (Qingdao)

China North 2 (Beijing)

China North 3 (Zhangjiakou)

China North 5 (Huhehaote)

China East 1 (Hangzhou)

China East 2 (Shanghai)

China South 1 (Shenzhen)

Hong Kong(China)

Asia Pacific NE 1 (Tokyo)

Asia Pacific SE 1 (Singapore)

Asia Pacific SE 2 (Sydney)

Asia Pacific SE 3 (Kuala Lumpur)

Asia Pacific SE 5 (Jakarta)

Asia Pacific SOU 1 (Mumbai)

US East 1 (Virginia)

US West 1 (Silicon Valley)

Middle East 1 (Dubai)

EU Central 1 (Frankfurt)

Refresh

Create EIP

Elastic IP Addresses

Elastic IP Address

Enter the Elastic IP address for an exact search

Search

Export

<input type="checkbox"/>	Instance ID	IP Address	Monitoring	Bandwidth	Billing Method(All)	Status(All)	Shared Bandwidth	Instance Bound	Instance Type	Actions
<input type="checkbox"/>	eip-bp1f5kuatanoco05jgk2	47.97.186.150		Pay by Traffic 10Mbps	Pay-As-You-Go Created at 2018-05-02 16:23:24	Available	-	-	-	Bind Unbind More

VPC

HAVIP Addresses

Create HAVIP Address

Refresh

Custom

Instance ID

Enter a name or ID

Instance ID	IP Address	Status	Bind Instance	VPC	VSwitch	Actions
havip-bp1bwya8f7ppbl0qq6l5	192.168.0.252(Intranet IP)	Available	No ECS Bound	vpc-bp1ue3buvqego4vkha4wl TP_FortiVPC	vsw-bp18zyff1ou2azweoun6r FortiGate_Interne...	Manage More

HAVIP Addresses

HAVIP Details

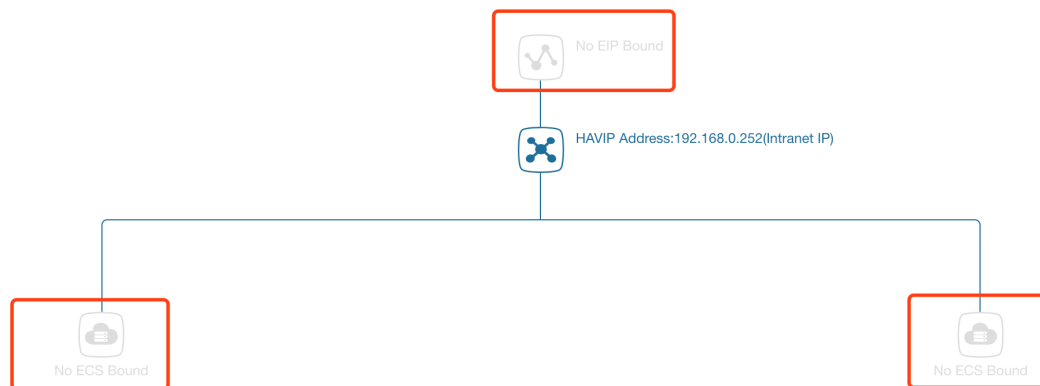
Refresh

Delete

Information

ID	havig-bp1bwya8f7lppbl0qq6l5	Status	Available
Region	China East 1 (Hangzhou)	Intranet IPIP	192.168.0.252
VPC ID	vpc-bp1ue3buvqego4vkha4wl	Created At	05/02/2018, 15:12:42
VSwitch	vsw-bp18zyff1ou2azweoun6r	Description	- Edit

Resources



b. Bind the EIP to the HAVIP.

Bind Elastic IP Address

HAVIP Address

havig-bp1bwya8f7lppbl0qq6l5

Intranet IPIP

192.168.0.252

● Elastic IP Address

Select ^

47.97.186.150

116.62.161.94

- c. Bind the two FortiGates to the HAVIP.

Bind an ECS Instance

HAVIP Address

havip-bp1bwya8f7lppbl0qq6l5

Intranet IPIP

192.168.0.252

● **ECS Instance**

i-bp167uui7rqzmp8ta0kw



Bind an ECS Instance

HAVIP Address

havip-bp1bwya8f7lppbl0qq6l5

Intranet IPIP

192.168.0.252

● **ECS Instance**

Select



i-bp167uui7rqzmp8ta0kw

i-bp1cj6it8c8hndkxom7j

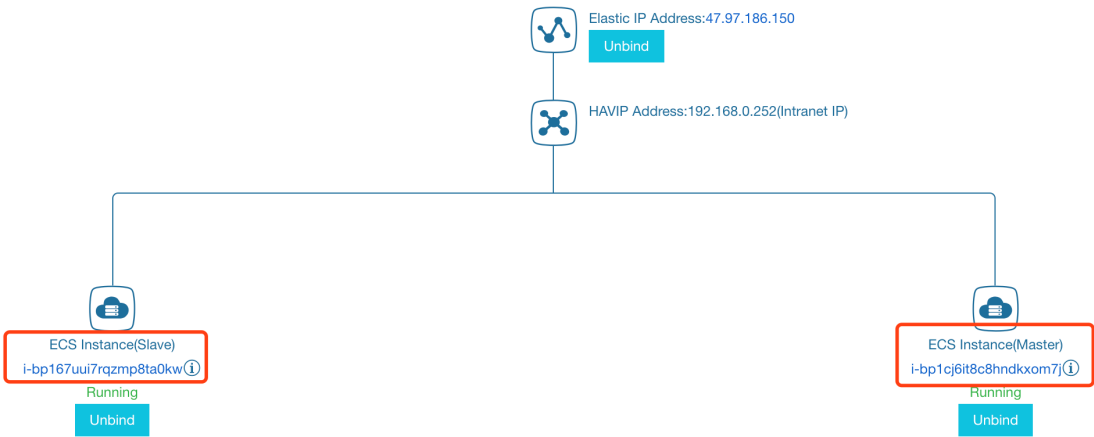
HAVIP Details

Refresh Delete

Information

ID	havip-bp1bwya8f7lppbl0qq6l5	Status	Allocated
Region	China East 1 (Hangzhou)	Intranet IPIP	192.168.0.252
VPC ID	vpc-bp1ue3buvqego4vkha4wl	Created At	05/02/2018, 15:12:42
VSwitch	vsw-bp18zyff1ou2azweoun6r	Description	- Edit

Resources



7. You must add the route entry to the FortiGate to ensure all outgoing traffic from ECS goes through the FortiGate.

Route Table

Route Table Details

Route Table ID vtb-bp1785omvus5wpyvwiogn

VPC ID vpc-bp1ue3buvqego4vkha4wl

Name - [Edit](#)

Route Table Type System

Created At 05/02/2018, 13:48:20

Description - [Edit](#)

Route Entry List

[Add Route Entry](#)[Refresh](#)

Destination CIDR Block	Status	Next Hop	Type	Actions
192.168.0.0/24	● Available	-	System	
192.168.1.0/24	● Available	-	System	
192.168.3.0/24	● Available	-	System	
192.168.4.0/24	● Available	-	System	
100.64.0.0/10	● Available	-	System	

Add Route Entry

Destination CIDR Block

0 . 0 . 0 . 0 / 0 [v](#)

Next Hop Type

HAVIP Address [v](#)

HAVIP Address

havip-bp1bwya8f7lppbl0qq6l5 [v](#)

Route Table

Route Table Details

Route Table ID vtb-bp1785omvus5wpyvwiogn

VPC ID vpc-bp1ue3buvqego4vkha4wl

Name - [Edit](#)

Route Table Type System

Created At 05/02/2018, 13:48:20

Description - [Edit](#)

Route Entry List

Add Route Entry		Refresh		
Destination CIDR Block	Status	Next Hop	Type	Actions
0.0.0.0/0	● Creating	Instance ID:havip-bp1bwya8f7lppbl0qq6l5 Instance Type:HAVIP	Custom	Delete
192.168.0.0/24	● Available	-	System	
192.168.1.0/24	● Available	-	System	
192.168.3.0/24	● Available	-	System	
192.168.4.0/24	● Available	-	System	
100.64.0.0/10	● Available	-	System	

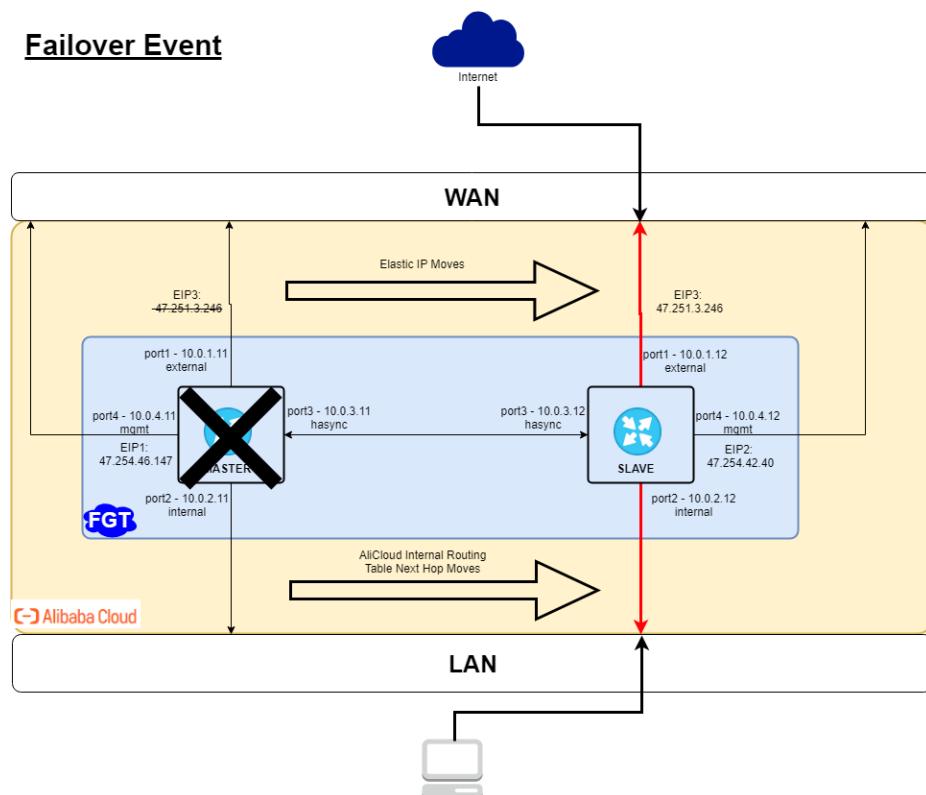
Connectivity test

You can test whether you configured the FortiGate-VM instances and VPC properly. See [Connectivity test on page 16](#).

Deploying FortiGate-VM HA on AliCloud using routing tables and EIPs

This guide provides a sample configuration of active-passive FortiGate-VM HA on AliCloud within one availability zone.

The following depicts the network topology for this sample deployment:

Failover Event

The following lists the IP address assignments for this sample deployment for FortiGate-A:

Port	AliCloud primary address	Subnet
port1	10.0.1.11	10.0.1.0/24 EIP3
port2	10.0.2.11	10.0.2.0/24
port3	10.0.3.11	10.0.3.0/24
port4	10.0.4.11	10.0.4.0/24 EIP1

The following lists the IP address assignments for this sample deployment for FortiGate-B:

Port	AliCloud primary address	Subnet
port1	10.0.1.12	10.0.1.0/24
port2	10.0.2.12	10.0.2.0/24
port3	10.0.3.12	10.0.3.0/24
port4	10.0.4.12	10.0.4.0/24

To check the prerequisites:

The following prerequisites must be met for this deployment:

- One VPC with one subnet each for management, external, internal, and heartbeat purposes
- Three public IP addresses:
 - EIP1 and EIP2 for FortiGate-A and FortiGate-B management
 - EIP3 for the HA external traffic IP address
- Two FortiGate-VM instances, both PAYG or BYOL
- The following summarizes minimum sufficient [RAM roles](#) for this deployment:
 - AliyunECSFullAccess
 - AliyunEIPFullAccess
 - AliyunVPCFullAccess



Actual role configurations may differ depending on your environments. Check with your company's public cloud administrators for details.

To configure FortiGate-VM HA in AliCloud:

1. In the AliCloud management console, create a VPC with four VSwitches:

VSwitch	Purpose
net1-external	External data traffic on the public network-facing side.
net2-internal	External data traffic on the private network-facing side.
net3-heartbeat	Heartbeat between two FortiGate nodes. This is unicast communication.
net4-mgmt	Dedicated management interface.

The screenshot shows the Alibaba Cloud console interface for VSwitches. The left sidebar contains navigation options: VPC, VPCs, Route Tables, VSwitches, Internet Shared Band..., Data Transfer Plan, Elastic IP Addresses, Elastic IP Addresses, NAT Gateways, Global Acceleration, VPN, VPN Gateways, and Customer Gateways. The main panel displays a table of VSwitches for VPC ID vpc-rj9h5m14eo5lu97hjaptw.

Instance ID/Name	VPC	Status	IPv4 CIDR Block	Default VSwitch	Zone	Route Table	Route Table Type	Actions
vsw-rj96khrfv15gmnj3fk0x net4-mgmt	vpc-rj9h5m14eo5lu97hjaptw thua-vpc-ha	Available	10.0.4.0/24	No	Silicon Valley Zone A	vtb-rj9g999919c2uoqoetza	System	Manage Delete Purchase
vsw-rj9973fznqxch9fhlqj net3-heartbeat	vpc-rj9h5m14eo5lu97hjaptw thua-vpc-ha	Available	10.0.3.0/24	No	Silicon Valley Zone A	vtb-rj9g999919c2uoqoetza	System	Manage Delete Purchase
vsw-rj9e6tqppf9v12xo0h1jr net2-internal	vpc-rj9h5m14eo5lu97hjaptw thua-vpc-ha	Available	10.0.2.0/24	No	Silicon Valley Zone A	vtb-rj9q11gufwqqe5ps3e60l	Custom	Manage Delete Purchase
vsw-rj9tgi2vla806u969hrd net1-external	vpc-rj9h5m14eo5lu97hjaptw thua-vpc-ha	Available	10.0.1.0/24	No	Silicon Valley Zone A	vtb-rj9g999919c2uoqoetza	System	Manage Delete Purchase

2. Add six ENIs.

Elastic Compute Serv...											
Overview											
Tags											
Instances & Images											
Instances											
Elastic Container In...											
HPC Clusters											
Reserved Instances											
Custom Images											
Deployment & Elastic											
Storage & Snapshots											
Network & Security											
Security Groups											
ENI											
SSH Key Pair											

3. Create two routing tables:

- Create a routing table called "rtb-internal" for the net2-internal VSwitch. Set the NIC2's IP address (10.0.2.11) as rtb-internal's default gateway. You can create this routing table after configuring NIC2 on FortiGate-A. Ensure that the default gateway is FortiGate-A's port2 ENI.

Route Table Details

Route Table ID

vtb-rj9q1tguvqqe5ps3q60i

Name

rtb-internal

Created At

05/31/2019, 16:18:42

VPC ID

vpc-rj9h5m14eo5lu97hjaplw

Route Table Type

Custom

Description

-

Route Entry List

Associated VSwitches

Add Route Entry

Refresh

Destination CIDR Block	Status	Next Hop	Type	Actions
0.0.0.0/0	Available	eni-rj94jg06fag0v1jneyv	Custom	Delete
10.0.1.0/24	Available	-	System	
10.0.2.0/24	Available	-	System	
10.0.3.0/24	Available	-	System	
10.0.4.0/24	Available	-	System	
100.64.0.0/10	Available	-	System	

- Create a routing table called "rtb-external" for the remaining VSwitches. Set this VPC's Internet gateway as its

default gateway. Ensure that this routing table can access the Internet.

Route Table Details

Route Table ID

vtb-rj9g999919c2uoqoztra

Name

rtb-external

Edit

Created At

05/30/2019, 16:26:01

VPC ID

vpc-rj9h5m14eo5lu97hjapw

Route Table Type

System

Description

- Edit

Route Entry List

Associated VSwitches

Add Route Entry

Refresh

Destination CIDR Block	Status	Next Hop	Type	Actions
10.0.1.0/24	Available	-	System	
10.0.2.0/24	Available	-	System	
10.0.3.0/24	Available	-	System	
10.0.4.0/24	Available	-	System	
100.64.0.0/10	Available	-	System	

To deploy the FortiGate-VMs in AliCloud:

To take advantage of A-P HA, you need four vNICs (port1 to port4) on each FortiGate-VM that constitutes an A-P HA cluster. Configure all required network interfaces (AliCloud ENIs and FortiGate-VM network interface configuration) that support A-P HA. You must choose an AliCloud instance type that supports at least four vNICs.

Ensure the following:

- You have configured the security group on each subnet for egress and ingress interfaces appropriately. It is particularly important that the management interfaces have egress Internet access for API calls to the AliCloud metadata server.
- You attached four NICs for each FortiGate-VM, and assigned the static private IP address.
- EIP1 was bound to the FortiGate-A port4 management interface.
- EIP3 was bound to the FortiGate-A port1 external interface.
- EIP2 was bound to the FortiGate-B port4 management interface.



You can attach a public IP address on the primary FortiGate-VM's external interface instead of an EIP by creating an HAVIP address in the VPC, then binding this HAVIP address to both FortiGates' external interfaces. This approach may shorten the failover time depending on the network environment.

FGT-A									
Instance Details									
Disks									
Instance Snapshots									
Network Interfaces									
Security Groups									
ID/Name	Tags	VSwitch/VPC	Zone	Security Group ID	Public IP Address	Primary Private IP Address	Type/MAC Address(All)	Status/Created At	Actions
eni-rj9dirmvg0hykoddv7z		vsw-rj9tgit2-vpc-rj9h5m14	Silicon Valley Zone A	sg-rj99v...	47.251.3.246	10.0.1.11	Primary 00:16:3e:00:02:4d	Bound May 31, 2019, 15:02	Modify Unbind Manage Secondary Private IP Address Delete
eni-rj9i1luoh9h3qd5doe3		vsw-rj9ekhrf-vpc-rj9h5m14	Silicon Valley Zone A	sg-rj99v...	47.254.46.147	10.0.4.11	Secondary 00:16:3e:00:2ba7	Bound May 31, 2019, 14:41	Modify Unbind Manage Secondary Private IP Address Delete
eni-rj9i1vj13vws7y1n25ow		vsw-rj9973fe-vpc-rj9h5m14	Silicon Valley Zone A	sg-rj99v...		10.0.3.11	Secondary 00:16:3e:00:45:3e	Bound May 31, 2019, 14:41	Modify Unbind Manage Secondary Private IP Address Delete
eni-rj94ig96fag0v1neyv		vsw-rj9e6tag-vpc-rj9h5m14	Silicon Valley Zone A	sg-rj99v...		10.0.2.11	Secondary 00:16:3e:00:c0:1a	Bound May 31, 2019, 14:39	Modify Unbind Manage Secondary Private IP Address Delete

<div> <div><</div> <div>FGT-B</div> <div>🔄</div> </div> <div> <div>Instance Details</div> <div>Disks</div> <div>Instance Snapshots</div> <div>Network Interfaces</div> <div>Security Groups</div> </div>	Network Interfaces									
	ID/Name	Tags	VSwitch/VPC	Zone	Security Group ID	Public IP Address	Primary Private IP Address	Type/MAC Address(All)	Status/Created At	Actions
	eni-rj9t5x9cp9skw6zh		vsw-rj9t9t2... vpc-rj9h5m14...	Silicon Valley Zone A	sg-rj99v...		10.0.1.12	Primary 00:16:3e:00:36:f1	Bound May 31, 2019, 14:47	Manage Secondary Private IP Address Delete Modify Unbind
	eni-rj9dirmg0nykeib18o		vsw-rj964hrt... vpc-rj9h5m14...	Silicon Valley Zone A	sg-rj99v...	47.254.42.40	10.0.4.12	Secondary 00:16:3e:00:c0:a5	Bound May 31, 2019, 14:42	Manage Secondary Private IP Address Delete Modify Unbind
	eni-rj9ga16wct17anp0ot7m		vsw-rj9973fz... vpc-rj9h5m14...	Silicon Valley Zone A	sg-rj99v...		10.0.3.12	Secondary 00:16:3e:00:14:b9	Bound May 31, 2019, 14:42	Manage Secondary Private IP Address Delete Modify Unbind
	eni-rj94extzg3bv65yq6x		vsw-rj9e6tag... vpc-rj9h5m14...	Silicon Valley Zone A	sg-rj99v...		10.0.2.12	Secondary 00:16:3e:00:1d:8d	Bound May 31, 2019, 14:42	Manage Secondary Private IP Address Delete Modify Unbind

To configure FortiGate-A using the CLI:

The next steps show you how to configure A-P HA settings by using CLI commands on the GUI or via SSH. If using SSH, the FortiGate may lose connection due to routing table changes, so configuring HA via the GUI is recommended.

```

config system interface
    edit "port1"
        set mode static
        set ip 10.0.1.11 255.255.255.0
        set allowaccess ping https ssh snmp http fgfm
    next
    edit "port2"
        set ip 10.0.2.11 255.255.255.0
        set allowaccess ping https ssh snmp http telnet
    next
    edit "port3"
        set ip 10.0.3.11 255.255.255.0
        set allowaccess ping https ssh snmp http telnet
    next
    edit "port4"
        set ip 10.0.4.11 255.255.255.0
        set allowaccess ping https ssh snmp http telnet
    next
end

config router static
    edit 1
        set gateway 10.0.1.253
        set device "port1"
    next
end

config firewall policy
    edit 1
        set srcintf "port2"
        set dstintf "port1"
        set srcaddr "all"
        set dstaddr "all"
        set action accept
        set schedule "always"
        set service "ALL"
        set nat enable

```

```
    next
end

config system ha
    set group-name "FGT-HA"
    set mode a-p
    set hbdev "port3" 50
    set ha-mgmt-status enable
    config ha-mgmt-interfaces
        edit 1
            set interface "port4"
            set gateway 10.0.4.253
        next
    end
    set priority 128
    set unicast-hb enable
    set unicast-hb-peerip 10.0.3.12
end
```

To configure FortiGate-B using the CLI:

The next steps show you how to configure A-P HA settings by using CLI commands on the GUI or via SSH. If using SSH, the FortiGate may lose connection due to routing table changes, so configuring HA via the GUI is recommended.

```
config system interface
    edit "port1"
        set mode static
        set ip 10.0.1.12 255.255.255.0
        set allowaccess ping https ssh snmp http fgfm
    next
    edit "port2"
        set ip 10.0.2.12 255.255.255.0
        set allowaccess ping https ssh snmp http telnet
    next
    edit "port3"
        set ip 10.0.3.12 255.255.255.0
        set allowaccess ping https ssh snmp http telnet
    next
    edit "port4"
        set ip 10.0.4.12 255.255.255.0
        set allowaccess ping https ssh snmp http telnet
    next
end

config router static
    edit 1
        set gateway 10.0.1.253
        set device "port1"
    next
end

config firewall policy
    edit 1
        set srcintf "port2"
        set dstintf "port1"
        set srcaddr "all"
        set dstaddr "all"
        set action accept
```

```

        set schedule "always"
        set service "ALL"
        set nat enable
    next
end

config system ha
    set group-name "FGT-HA"
    set mode a-p
    set hbdev "port3" 50
    set ha-mgmt-status enable
    config ha-mgmt-interfaces
        edit 1
            set interface "port4"
            set gateway 10.0.4.253
        next
    end
    set priority 64
    set unicast-hb enable
    set unicast-hb-peerip 10.0.3.11
end

```



You must set the FortiGate-B HA priority to a value lower than FortiGate-A's priority level. The node with the lower priority level is determined as the secondary node.

To check the HA status and function:

1. In FortiOS on the primary FortiGate, go to *System > HA*. Check that the HA status is synchronized.
2. Log into a PC that is located in the internal subnet. Verify that the PC can access the Internet via FortiGate-A when FortiGate-A is the primary node.
3. Shut down FortiGate-A. Verify that FortiGate-B becomes the primary node. Use an API call to verify that the secondary private IP address moves to FortiGate-B.
4. Log into the PC. Verify that the PC can access the Internet via FortiGate-B when FortiGate-B is the primary node.
5. You can use the following diagnose commands to see if the secondary private IP address moves from FortiGate-A to FortiGate-B during failover:

```

FGT-B # diagnose debug application alicloud-ha -1
Debug messages will be on for 30 minutes.

```

```

FGT-B # Become HA master mode 2
===== start acs ha failover =====
send_vip_arp: vd root master 1 intf port1 ip 10.0.1.12
send_vip_arp: vd root master 1 intf port2 ip 10.0.2.12
acs meta info [instance id]: i-rj9f5xs9cp9xsweedlcs
acs meta info [ram role]: fhua-ecs-role
acs meta info [region]: us-west-1
acs meta info [vpc id]: vpc-rj9h5m14eo5lu97hjaptw
acs ecs endpoint is resolved at ecs.us-west-1.aliyuncs.com:47.88.73.18
acs vpc endpoint is resolved at vpc.aliyuncs.com:106.11.61.112

```

```
acs is parsing page 1 of total 3(1 page) instances
acs is checking tags on instance FGT-A
  Tag.FGT_port1: eni-rj9dirnvg0hykoddvv7z
  Tag.FGT_port2: eni-rj94jig06fag0v1jneyv
  Tag.FGT_port3: eni-rj91wj13vwjs7yln25ow
  Tag.FGT_port4: eni-rj9illiuoh9t3qd5doe3
acs is checking tags on instance FGT-B
  Tag.FGT_port1: eni-rj9f5xs9cp9xswewk6zh
  Tag.FGT_port2: eni-rj9j4eztg3bv65yqd6x
  Tag.FGT_port3: eni-rj9gal6wcti7anp0ot7m
  Tag.FGT_port4: eni-rj9dirnvg0hykei8bl8o
acs is parsing page 1 of total 13(1 page) EIPs
acs local instance: FGT-B(i-rj9f5xs9cp9xswewdlcs)
  eni: 0, 10.0.1.12(eni-rj9f5xs9cp9xswewk6zh, port1)
  eni: 1, 10.0.2.12(eni-rj9j4eztg3bv65yqd6x, port2)
  eni: 2, 10.0.3.12(eni-rj9gal6wcti7anp0ot7m, port3)
  eni: 3, 10.0.4.12(eni-rj9dirnvg0hykei8bl8o, port4) <--- eip(47.254.42.40)
acs peer instance: FGT-A(i-rj9illiuoh9t408ila60)
  eni: 0, 10.0.1.11(eni-rj9dirnvg0hykoddvv7z, port1) <--- eip(47.251.3.246)
  eni: 1, 10.0.2.11(eni-rj94jig06fag0v1jneyv, port2)
  eni: 2, 10.0.3.11(eni-rj91wj13vwjs7yln25ow, port3)
  eni: 3, 10.0.4.11(eni-rj9illiuoh9t3qd5doe3, port4) <--- eip(47.254.46.147)
acs is moving eip(47.251.3.246) from eni0(10.0.1.11) to eni0(10.0.1.12)
acs eip(47.251.3.246) status: Unassociating
acs eip(47.251.3.246) status: Unassociating
acs eip(47.251.3.246) status: Available
acs unassociated eip(47.251.3.246) from instance FGT-A successfully
acs eip(47.251.3.246) status: Associating
acs eip(47.251.3.246) status: Associating
acs eip(47.251.3.246) status: InUse
acs associated eip(47.251.3.246) to instance FGT-B successfully
acs local instance: FGT-B(i-rj9f5xs9cp9xswewdlcs)
  eni: 0, 10.0.1.12(eni-rj9f5xs9cp9xswewk6zh, port1) <--- eip(47.251.3.246)
  eni: 1, 10.0.2.12(eni-rj9j4eztg3bv65yqd6x, port2)
  eni: 2, 10.0.3.12(eni-rj9gal6wcti7anp0ot7m, port3)
  eni: 3, 10.0.4.12(eni-rj9dirnvg0hykei8bl8o, port4) <--- eip(47.254.42.40)
acs peer instance: FGT-A(i-rj9illiuoh9t408ila60)
  eni: 0, 10.0.1.11(eni-rj9dirnvg0hykoddvv7z, port1)
  eni: 1, 10.0.2.11(eni-rj94jig06fag0v1jneyv, port2)
  eni: 2, 10.0.3.11(eni-rj91wj13vwjs7yln25ow, port3)
  eni: 3, 10.0.4.11(eni-rj9illiuoh9t3qd5doe3, port4) <--- eip(47.254.46.147)
acs route table: vtb-rj9qltgufwqqe5ps3q60i
  rule: cidr: 0.0.0.0/0, nexthop: 10.0.2.11(eni-rj94jig06fag0v1jneyv)
acs is deleting route table entry: 0.0.0.0/0 via 10.0.2.11
acs route table entry deleting
acs route table entry deleted
acs deleted route table entry: 0.0.0.0/0 via 10.0.2.11 successfully
acs is creating route table entry: 0.0.0.0/0 via 10.0.2.12
```



```

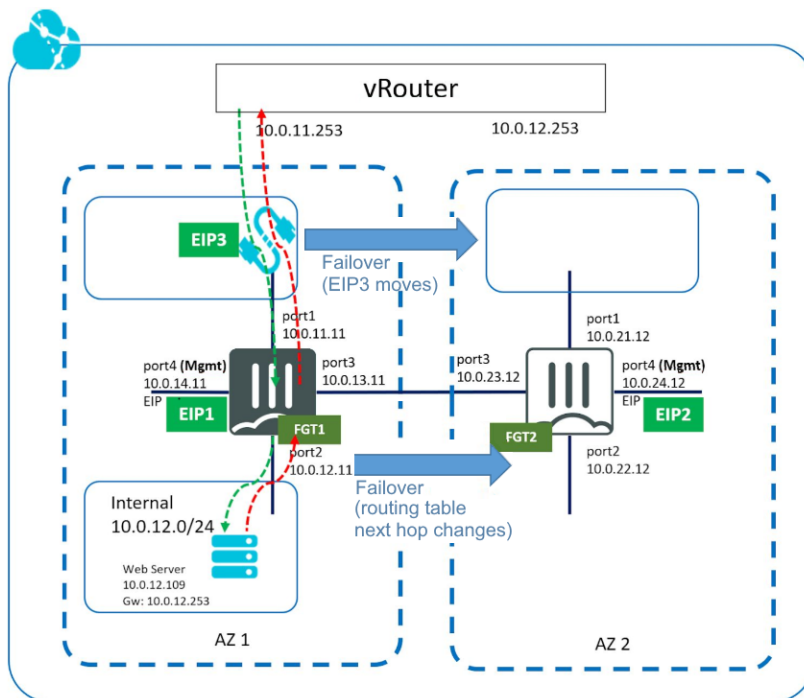
acs route table entry created
acs created route table entry: 0.0.0.0/0 via 10.0.2.12 successfully
acs route table: vtb-rj9qltgufwqqe5ps3q60i
    rule: cidr: 0.0.0.0/0, nexthop: 10.0.2.12 (eni-rj9j4eztzg3bv65yqd6x)
===== exit acs ha failover =====

```

Deploying FortiGate-VM HA on AliCloud between availability zones

This guide provides sample manual configuration of active-passive FortiGate-VM HA on AliCloud between availability zones (AZ)s in a single region.

The following depicts the network topology for this sample deployment:



The following lists the IP address assignments for this sample deployment for FortiGate-A:

Port	AliCloud primary address	Subnet
port1	10.0.11.11	10.0.11.0/24 EIP3
port2	10.0.12.11	10.0.12.0/24
port3	10.0.13.11	10.0.13.0/24
port4	10.0.14.11	10.0.14.0/24 EIP1

The following lists the IP address assignments for this sample deployment for FortiGate-B:

Port	AliCloud primary address	Subnet
port1	10.0.21.12	10.0.21.0/24
port2	10.0.22.12	10.0.22.0/24
port3	10.0.23.12	10.0.23.0/24
port4	10.0.24.12	10.0.24.0/24 EIP2



IPsec VPN phase 1 configuration does not synchronize between primary and secondary FortiGates across AZs. Phase 2 configuration does synchronize.

To check the prerequisites:

The following prerequisites must be met for this deployment:

- One VPC with one subnet each for management, external, internal, and heartbeat purposes for each AZ
- Three public IP addresses:
 - EIP1 and EIP2 for FortiGate-A and FortiGate-B management
 - EIP3 for the HA external traffic IP address
- Two FortiGate-VM instances of the same instance type. Select a type that supports at least four network interfaces.
- The following summarizes minimum sufficient [RAM roles](#) for this deployment:
 - AliyunECSFullAccess
 - AliyunEIPFullAccess
 - AliyunVPCFullAccess



Actual role configurations may differ depending on your environments. Check with your company's public cloud administrators for details.

To configure FortiGate-VM HA in AliCloud:

1. In the AliCloud management console, create a VPC with eight VSwitches (four for each AZ):

VSwitch	Purpose
net1-external-za	External data traffic on the public network-facing side.
net2-internal-za	Internal data traffic interface on the protected/trusted network-facing side.
net3-heartbeat-za	Heartbeat between two FortiGate nodes. Unicast communication.
net4-mgmt-za	Dedicated management interface.
net1-external-zb	External data traffic on the public network-facing side.
net2-internal-zb	Internal data traffic interface on the protected/trusted network-facing side.
net3-heartbeat-zb	Heartbeat between two FortiGate nodes. Unicast communication.
net4-mgmt-zb	Dedicated management interface.

The screenshot shows the 'VSwitches' tab in the Alibaba Cloud VPC console. The table lists the following VSwitches:

Instance ID/Name	VPC	Status	IPv4 CIDR Block	Number of Available Private IP	Default VSwitch	Zone	Route Table	Route Table Type	Actions
vsw-9995z34ag5d4g	vpc-9995z34ag5d4g	Available	10.0.14.0/24	250	No	Silicon Valley Zone A	vtb-9995z34ag5d4g	System	Manage Delete
vsw-9995z34ag5d4g	vpc-9995z34ag5d4g	Available	10.0.13.0/24	251	No	Silicon Valley Zone A	vtb-9995z34ag5d4g	System	Manage Delete
vsw-9995z34ag5d4g	vpc-9995z34ag5d4g	Available	10.0.12.0/24	251	No	Silicon Valley Zone A	vtb-9995z34ag5d4g	Custom	Manage Delete
vsw-9995z34ag5d4g	vpc-9995z34ag5d4g	Available	10.0.11.0/24	251	No	Silicon Valley Zone A	vtb-9995z34ag5d4g	System	Manage Delete
vsw-9995z34ag5d4g	vpc-9995z34ag5d4g	Available	10.0.24.0/24	251	No	Silicon Valley Zone B	vtb-9995z34ag5d4g	System	Manage Delete
vsw-9995z34ag5d4g	vpc-9995z34ag5d4g	Available	10.0.23.0/24	251	No	Silicon Valley Zone B	vtb-9995z34ag5d4g	System	Manage Delete
vsw-9995z34ag5d4g	vpc-9995z34ag5d4g	Available	10.0.22.0/24	251	No	Silicon Valley Zone B	vtb-9995z34ag5d4g	Custom	Manage Delete
vsw-9995z34ag5d4g	vpc-9995z34ag5d4g	Available	10.0.21.0/24	251	No	Silicon Valley Zone B	vtb-9995z34ag5d4g	System	Manage Delete

2. Add six ENIs: three for each AZ:

The screenshot shows the 'Network Interfaces' tab in the Alibaba Cloud console. The table lists the following ENIs:

ID/Name	Tags	VSwitch/VPC	Zone	Security Group ID	Bound Instance	Public IP Address	Primary Private IP Address	Type/MAC Address	Status/Created At	Actions
eni-9995z34ag5d4g		vsw-9995z34ag5d4g	Silicon Valley Zone A	sg-9995z34ag5d4g		47.254.42.40	10.0.24.12	Secondary 00:16:3e:00:8f:ce	Bound June 25, 2019, 14:06	Modify Unbind
eni-9995z34ag5d4g		vsw-9995z34ag5d4g	Silicon Valley Zone B	sg-9995z34ag5d4g		10.0.23.12	10.0.23.12	Secondary 00:16:3e:00:8f:ce	Bound June 25, 2019, 14:06	Modify Unbind
eni-9995z34ag5d4g		vsw-9995z34ag5d4g	Silicon Valley Zone B	sg-9995z34ag5d4g		10.0.22.12	10.0.22.12	Secondary 00:16:3e:00:8f:ce	Bound June 25, 2019, 14:06	Modify Unbind
eni-9995z34ag5d4g		vsw-9995z34ag5d4g	Silicon Valley Zone A	sg-9995z34ag5d4g		47.254.46.147	10.0.14.11	Secondary 00:16:3e:00:8f:ce	Bound June 25, 2019, 14:05	Modify Unbind
eni-9995z34ag5d4g		vsw-9995z34ag5d4g	Silicon Valley Zone A	sg-9995z34ag5d4g		10.0.13.11	10.0.13.11	Secondary 00:16:3e:00:8f:ce	Bound June 25, 2019, 14:05	Modify Unbind
eni-9995z34ag5d4g		vsw-9995z34ag5d4g	Silicon Valley Zone A	sg-9995z34ag5d4g		10.0.12.11	10.0.12.11	Secondary 00:16:3e:00:8f:ce	Bound June 25, 2019, 14:04	Modify Unbind

3. Create two routing tables:

- a. Create a routing table called "rtb-internal" for the net2-internal VSwitch. Set the NIC2 IP address (10.0.12.11) as rtb-internal's default gateway. You can create this routing table after configuring NIC2 on FortiGate-A. Ensure that the default gateway is FortiGate-A's port2 ENI.

The screenshot shows the 'Route Table' configuration in the Alibaba Cloud console. The route table is named 'rtb-internal' and is associated with VPC 'vpc-rpocwvrtzclzay/vpdr'. It is a custom route table. The 'Route Entry List' shows a default route (0.0.0.0/0) pointing to the Internet gateway 'en-gb2agpct3p1ghed'.

Destination CIDR Block	Status	Next Hop	Type	Actions
0.0.0.0/0	Available	en-gb2agpct3p1ghed	Custom	Delete
10.0.11.0/24	Available	-	System	
10.0.12.0/24	Available	-	System	
10.0.13.0/24	Available	-	System	
10.0.14.0/24	Available	-	System	
10.0.21.0/24	Available	-	System	
10.0.22.0/24	Available	-	System	
10.0.23.0/24	Available	-	System	
10.0.24.0/24	Available	-	System	
100.64.0.0/10	Available	-	System	

- b. Create a routing table called "rtb-external" for the remaining VSwitches. Set this VCN's Internet gateway as its default gateway. Ensure that this routing table can access the Internet.

The screenshot shows the 'Route Table' configuration in the Alibaba Cloud console for 'rtb-external'. It is a system route table associated with VPC 'vpc-rpocwvrtzclzay/vpdr'. The 'Route Entry List' shows a default route (0.0.0.0/0) pointing to the Internet gateway 'en-gb2agpct3p1ghed'.

Destination CIDR Block	Status	Next Hop	Type	Actions
10.0.11.0/24	Available	-	System	
10.0.12.0/24	Available	-	System	
10.0.13.0/24	Available	-	System	
10.0.14.0/24	Available	-	System	
10.0.21.0/24	Available	-	System	
10.0.22.0/24	Available	-	System	
10.0.23.0/24	Available	-	System	
10.0.24.0/24	Available	-	System	
100.64.0.0/10	Available	-	System	

To deploy the FortiGate-VMs in AliCloud:

To take advantage of A-P HA, you need four vNICs (port1 to port4) on each FortiGate-VM that constitutes an A-P HA cluster. Configure all required network interfaces (AliCloud ENIs and FortiGate-VM network interface configuration) that support A-P HA. You must choose an AliCloud instance type that supports at least four vNICs.

Ensure the following:

- You have configured the security group on each subnet for egress and ingress interfaces appropriately. It is particularly important that the management interfaces have egress Internet access for API calls to the AliCloud metadata server.
- You attached four NICs for each FortiGate-VM, and assigned the static private IP address.
- EIP1 was bound to the FortiGate-A port4 management interface.
- EIP3 was bound to the FortiGate-A port1 external interface.
- EIP2 was bound to the FortiGate-B port4 management interface.

FGT-HA-A

ID/Name	Tags	VSwitch/VPC	Zone	Security Group ID	Public IP Address	Primary Private IP Address	Type/MAC Address(es)	Status/Created At	Actions
eni-g906d4c2b0e8b0e4 fha-net0-0a		vsw-v99552... vpc-v9p0cke...	Silicon Valley Zone A	sg-v9ab...	47.254.48.147	10.0.14.11	Secondary 00:16:3e:00:a3:8b	Bound June 25, 2019, 14:05	Modify Unbind Manage Secondary Private IP Address Delete
eni-g9b1d6a3d8ac0c0f1 fha-net0-0a		vsw-v9a7d3g... vpc-v9p0cke...	Silicon Valley Zone A	sg-v9ab...		10.0.13.11	Secondary 00:16:3e:00:60:29	Bound June 25, 2019, 14:05	Modify Unbind Manage Secondary Private IP Address Delete
eni-g93b1e05151a9f0d fha-net0-0a		vsw-v90a9f1... vpc-v9p0cke...	Silicon Valley Zone A	sg-v9ab...		10.0.12.11	Secondary 00:16:3e:00:42:56	Bound June 25, 2019, 14:04	Modify Unbind Manage Secondary Private IP Address Delete
eni-g9a5e719d61ed0um3a fha-net0-0a		vsw-v90a5e1... vpc-v9p0cke...	Silicon Valley Zone A	sg-v9ab...	47.251.3.246	10.0.11.11	Primary 00:16:3e:00:90:3c	Bound June 25, 2019, 12:10	Modify Unbind Manage Secondary Private IP Address Delete

FGT-HA-B

ID/Name	Tags	VSwitch/VPC	Zone	Security Group ID	Public IP Address	Primary Private IP Address	Type/MAC Address(es)	Status/Created At	Actions
eni-g9a6d3e0a1a913a fha-net0-0b		vsw-v90a6d... vpc-v9p0cke...	Silicon Valley Zone B	sg-v9ab...		10.0.21.12	Primary 00:16:3e:00:8c:ae	Bound June 25, 2019, 14:13	Modify Unbind Manage Secondary Private IP Address Delete
eni-g913d5d0d084a9f6 fha-net0-0b		vsw-v90a3d... vpc-v9p0cke...	Silicon Valley Zone B	sg-v9ab...	47.254.42.40	10.0.24.12	Secondary 00:16:3e:00:81:ce	Bound June 25, 2019, 14:06	Modify Unbind Manage Secondary Private IP Address Delete
eni-g90a0a0a0a0a0a0a fha-net0-0b		vsw-v90a0a... vpc-v9p0cke...	Silicon Valley Zone B	sg-v9ab...		10.0.23.12	Secondary 00:16:3e:00:8e:fa	Bound June 25, 2019, 14:06	Modify Unbind Manage Secondary Private IP Address Delete
eni-g913d5d0d084a9f6 fha-net0-0b		vsw-v90a0a... vpc-v9p0cke...	Silicon Valley Zone B	sg-v9ab...		10.0.22.12	Secondary 00:16:3e:00:48:7e	Bound June 25, 2019, 14:06	Modify Unbind Manage Secondary Private IP Address Delete

To configure FortiGate-A using the CLI:

The next steps show you how to configure A-P HA settings by using CLI commands on the GUI or via SSH. If using SSH, the FortiGate may lose connection due to routing table changes, so configuring HA via the GUI is recommended.

```
config system interface
  edit "port1"
    set mode static
    set ip 10.0.11.11 255.255.255.0
    set allowaccess ping https ssh snmp http fgfm
  next
  edit "port2"
    set ip 10.0.12.11 255.255.255.0
    set allowaccess ping https ssh snmp http telnet
  next
  edit "port3"
    set ip 10.0.13.11 255.255.255.0
    set allowaccess ping https ssh snmp http telnet
  next
  edit "port4"
    set ip 10.0.14.11 255.255.255.0
    set allowaccess ping https ssh snmp http telnet
  next
end

config router static
  edit 1
    set gateway 10.0.11.253
    set device "port1"
  next
end

config firewall policy
  edit 1
    set srcintf "port2"
    set dstintf "port1"
```

```
        set srcaddr "all"
        set dstaddr "all"
        set action accept
        set schedule "always"
        set service "ALL"
        set nat enable
    next
end

config system ha
    set group-name "FGT-HA"
    set mode a-p
    set hbdev "port3" 50
    set ha-mgmt-status enable
    config ha-mgmt-interfaces
        edit 1
            set interface "port4"
            set gateway 10.0.14.253
        next
    end
    set priority 192
    set unicast-hb enable
    set unicast-hb-peerip 10.0.23.12
end
```

To configure FortiGate-B using the CLI:

The next steps show you how to configure A-P HA settings by using CLI commands on the GUI or via SSH. If using SSH, the FortiGate may lose connection due to routing table changes, so configuring HA via the GUI is recommended.

```
config system interface
    edit "port1"
        set mode static
        set ip 10.0.21.12 255.255.255.0
        set allowaccess ping https ssh snmp http fgfm
    next
    edit "port2"
        set ip 10.0.22.12 255.255.255.0
        set allowaccess ping https ssh snmp http telnet
    next
    edit "port3"
        set ip 10.0.23.12 255.255.255.0
        set allowaccess ping https ssh snmp http telnet
    next
    edit "port4"
        set ip 10.0.24.12 255.255.255.0
        set allowaccess ping https ssh snmp http telnet
    next
end

config router static
    edit 1
        set gateway 10.0.21.253
        set device "port1"
    next
end
```

```

config firewall policy
    edit 1
        set srcintf "port2"
        set dstintf "port1"
        set srcaddr "all"
        set dstaddr "all"
        set action accept
        set schedule "always"
        set service "ALL"
        set nat enable
    next
end

config system ha
    set group-name "FGT-HA"
    set mode a-p
    set hbdev "port3" 50
    set ha-mgmt-status enable
    config ha-mgmt-interfaces
        edit 1
            set interface "port4"
            set gateway 10.0.24.253
        next
    end
    set priority 64
    set unicast-hb enable
    set unicast-hb-peerip 10.0.13.11
end

```



You must set the FortiGate-B HA priority to a value lower than FortiGate-A's priority level. The node with the lower priority level is determined as the secondary node.

To check the HA status and function:

1. In FortiOS on the primary FortiGate, go to **System > HA**. Check that the HA status is synchronized.

Synchronized	Priority	Hostname	Serial No.	Role	Uptime	Sessions	Throughput
FortiGate VM64-ALIONDEMAND	192	FGT-A	FGTALIRNL7L40S9B	Master	00:00:37:36	11	29.00 kbps
FortiGate VM64-ALIONDEMAND	64	FGT-B	FGTALIAFPJABDCE	Slave	00:00:37:46	12	24.00 kbps

2. Log into a PC that is located in the internal subnet. Verify that the PC can access the Internet via FortiGate-A when FortiGate-A is the primary node.
3. Shut down FortiGate-A. Verify that FortiGate-B becomes the primary node.
4. Log into the PC. Verify that the PC can access the Internet via FortiGate-B when FortiGate-B is the primary node.
5. You can use the `diagnose debug application alicloud-ha -1` command to see if the secondary private IP address moves from FortiGate-A to FortiGate-B during failover.

Configuring FortiGate-VM active-active HA

See [Active-active egress route failover for AliCloud](#).

Deploying auto scaling on AliCloud

You can deploy FortiGate-VM to support Auto Scaling on AliCloud.

Multiple FortiGate-VM instances can form an Auto Scaling group to provide highly efficient clustering at times of high workloads. FortiGate-VM instances will be scaled out automatically according to predefined workload levels. Auto Scaling is achieved by using FortiGate-native high availability (HA) features such as `config-sync`, which synchronizes operating system (OS) configurations across multiple FortiGate-VM instances at the time of scale-out events.

FortiGate Autoscale for AliCloud is available with FortiOS 6.2 and later versions for On-Demand (PAYG) instances. The standard deployment contains the following:

- A highly available architecture that spans two Availability Zones (AZs).
- A virtual private cloud (VPC) configured with public and private subnets.
- A NAT gateway allowing egress traffic from the protected servers.
- An external facing network load balancer is created as part of the deployment process. An internal facing network load balancer is optional.
- AliCloud Function Compute, which runs Fortinet-provided scripts for running Auto Scaling. Functions are used to handle Auto Scaling and failover management.
- An Open Table Service or TableStore (OTS), a NoSQL database which stores information on the Auto Scaling configurations such as the primary or secondary IP addresses.

Planning

The easiest way to deploy FortiGate Autoscale for AliCloud is with Terraform.

This deployment was tested using:

- Terraform 0.11
- Terraform provider for AliCloud 1.48.0

Requirements

Installing and configuring FortiGate Autoscale for AliCloud requires knowledge of the following:

- Configuring a FortiGate using the CLI
- AliCloud services
- Terraform

It is expected that FortiGate Autoscale for AliCloud will be deployed by DevOps engineers or advanced system administrators who are familiar with the above.

RAM account permissions

The solution can be deployed with an administrator account. As an administrator account has full permission to all resources under your AliCloud account, you may wish to create a separate Resource Access Management (RAM) account with the following minimum required permissions:

- AliyunVPCFullAccess
- AliyunEIPFullAccess
- AliyunOSSFullAccess
- AliyunECSTFullAccess
- AliyunSLBFullAccess
- AliyunOTSFullAccess
- AliyunESSFullAccess
- AliyunFCFullAccess
- AliyunRAMFullAccess
- AliyunBSSOrderAccess

Region requirements

To deploy a FortiGate Auto Scaling cluster in AliCloud the region must support the following:

- TableStore
- OSS
- Function Compute
- Auto Scaling
- NAT Gateway

Supported regions

The following regions contain all of the necessary services to run FortiGate Autoscale for AliCloud:

Acronym	Expansion
Asia Pacific NE 1 (Tokyo)	m-6weakry8j13jxmjlmi4o
Asia Pacific SE 2 (Sydney)	m-p0wb4dw13d6qc1sndaj6
Asia Pacific SOU 1 (Mumbai)	m-a2dbkrpr8wsobn9ygddc
EU Central 1 (Frankfurt)	m-gw8cizn7dguyeikpgozb
US East 1 (Virginia)	m-0xif6xxwhjlqhoaajrr6
US West 1 (Silicon Valley)	m-rj91iqplyxdp7crb0gvj

Deployment information

Terraform will deploy the following resources:

- A VPC with two subnets split over two zones
- Two vswitches
- A NAT gateway
- An AutoScale cluster
- An AutoScale configuration
- Two AutoScale rules: Scale in and Scale out
- An Object Storage Service (OSS) bucket
- A Function Compute service, function and HTTP trigger
- Two security groups: *Allow all*, and *Allow only internal connections*
- A TableStore instance and 5 tables
- Three Elastic IP (EIP) addresses
- A RAM role with the ability to describe and create Elastic Network Interfaces (ENIs)
- An external-facing server load balancer

Deployment

1. Log into your AliCloud account. If you do not already have one, [create one](#) by following the instructions in the AliCloud article [Create a RAM user](#). The RAM account must have the minimum required permissions as listed in the section [RAM account permissions on page 62](#).
2. Create an AliCloud AccessKey. For details on creating one, refer to the AliCloud article [Create an AccessKey](#). This will create an AccessKeyID and an AccessKeySecret.
3. Install Terraform. For installation details, refer to the HashiCorp article [Install Terraform](#).
4. Obtain the FortiGate Autoscale for AliCloud deployment package. Visit the [GitHub project release page](#) and download the `fortigate-autoscale-alicloud.zip` release for the version you want to use.
5. Unzip the file on your local PC. The following files and folders will be extracted:

```
├── alicloud_function_compute
├── alicloud_terraform
├── core
├── dist
├── LICENSE
├── node_modules
├── package.json
├── scripts
└── test
```

6. In your terminal, change to the `alicloud_terraform` folder:

```
cd alicloud_terraform
```

The `alicloud_terraform` folder contains the following files:

```
├── assets
│   └── configset
│       ├── baseconfig
│       ├── httproutingpolicy
│       ├── httpsroutingpolicy
│       ├── internalelbweb
│       └── storelogtofaz
├── main.tf
└── vars.tf
```

- `baseconfig` contains the `cloud-init` configuration for the FortiGate-VM and can be adjusted to support more advanced setups.
 - `main.tf` contains the majority of the deployment code. As part of the deployment it will upload the `baseconfig` to an OSS bucket to be used by the FortiGate-VM instances.
 - `vars.tf` contains the variables required for the deployment. For example: image ID (`instance_ami`), cluster name, instance, region, etc. For descriptions of the included variables, refer to the section [Terraform variables on page 65](#).
7. Edit the `vars.tf` file and customize variables for the deployment.



The OSS bucket name must be lowercase.

The Function Compute URL may not be more than 127 characters. The variable `cluster_name` is used to create this URL.

8. Initialize the providers and modules with the command `terraform init`:

```
terraform init
```

9. Submit the Terraform plan using the command below.

```
terraform plan -var "access_key=<access_key>" -var "secret_key=<secret_key>" -var "region=<region>"
```

10. Confirm and apply the plan:

```
terraform apply -var "access_key=<access_key>" -var "secret_key=<secret_key>" -var "region=<region>"
```

Output will be similar to below. A randomly generated three letter suffix is added to all resources and can be used to help identify your cluster resources.

```
Apply complete! Resources: 48 added, 0 changed, 0 destroyed.
```

```
Outputs:
```

```
Auto Scaling Group ID = asg-0x1lg2hk9z048yn6cuul
AutoScale External Load Balancer IP = 47.89.136.18
PSK Secret = !_YfA7FQ@b_aYuei
Scale In Threshold = 35
Scale Out Threshold = 70
VPC name = FortigateAutoScale-rrr
```

Terraform variables

Following are variables listed in the `vars.tf` file. They can be changed to suit the needs of your cluster.

Resource	Default	Description
access_key	Requires input	AliCloud AccessKey. For details on creating an AccessKey, refer to the AliCloud article Create an AccessKey .
secret_key	Requires input	AliCloud Secret key created with the AccessKey. Used to access the API.
region	us-east-1	The AliCloud Region.
scale_in_threshold	35	Default aggregate CPU threshold (percentage) to scale in (remove) 1 instance.
scale_out_threshold	70	Default aggregate CPU threshold (percentage) to scale out (add) 1 instance.
alicloud_account	AliCloud account number	(datatype)
cluster_name	FortigateAutoScale	Name of the cluster to be used across objects.
bucket_name	fortigateautoscale	Name of the OSS bucket. Must be lowercase.

Resource	Default	Description
instance_ami	Requires input	If specified, this will be the image used by the build. Otherwise, the script will obtain the latest FortiGate AMI.
instance	ecs.sn1ne	The instance Family type to be used by the Auto Saling configuration.
vpc_cidr	172.16.0.0/16	VPC Classless Inter-Domain Routing (CIDR) block, it is divided into two /21 subnets.
vswitch_cidr_1	172.16.0.0/21	First Vswitch located in zone A of the region.
vswitch_cidr_2	172.16.8.0/21	Second Vswitch located in zone B of the region.
table_store_ instance_type	Capacity	Accepted values are <i>HighPerformance</i> or <i>Capacity</i> .

Variables can also be referenced from the command line using:

```
terraform plan -var "<var name>=<value>"
```

Verify the deployment

1. Log in to the AliCloud console and go to *TableStore*.
2. Go to the *FortiGateMasterElection* table.
3. Make note of the primary FortiGate-VM IP address and ensure the *voteState* is *done*. See below for an example:

FortiGateMasterElection

Table Data								Insert	Search	Update	Delete
Data Source:FortiGateMasterElection								Table can display up to 50 rows.			
Row Detail	asgName(Primary Key)	instanceId	ip	subnetId	voteEndTime	voteState	vpcId				
Row Detail	Master	i-0xi2pts0vr46rxhht3...	172.16.14.111	candidateInstance.su...	1.561416933046E12	done	candidateInstance.vi...				
Total: 1 item(s), Per Page: 10 item(s)								« < 1 > »			

4. Go to the *FortiGateAutoscale* table and confirm that instances that have been added to the cluster. Following is an example of a healthy cluster:

Table Data								Insert	Search	Update	Delete
Data Source:FortiGateAutoscale								Table can display up to 50 rows.			
Row Detail	instanceId(Primary K...	HeartBeatLossCount	MasterIp	NextHeartBeatTime	SyncState	autoScalingGroupName	heartBeatInterval				
Row Detail	i-0xi2pts0vr46rxhht3...	0.0	172.16.14.111	1.561418453349E12	in-sync	FortigateAutoScale-g...	10.0				
Row Detail	i-0xial3fyiqsf3tgbiz...	0.0	172.16.14.111	1.561418451745E12	in-sync	FortigateAutoScale-g...	10.0				
Total: 2 item(s), Per Page: 10 item(s)								« < 1 > »			



The *MasterIp* column displays the IP address of the primary FortiGate-VM.
When an instance is removed from a cluster its record will not be erased from this table.

5. Log in to the primary FortiGate-VM instance using the public IP address from step 3. The default admin port is *8443* and the default username/password will be *admin/<instance-id>*.
6. From the web interface you can tell the Instance role and current cluster size:

Virtual Machine			
Allocated vCPUs	2	Allocated RAM	4 GiB
Auto Scaling	Enabled	Role	Master
Group Size	2		

-
7. From the CLI type the following to get the role status and current *callback-url*:

```
get system auto-scale
```

Output will be similar to the following:

```
status          : enable
role            : master
sync-interface  : port1
callback-url     : https://*****.ap-southeast-5-internal.fc.aliyuncs.com/2016-
08-15/proxy/FortigateAutoScale-smc/FortiGateASG-rrr/
hb-interval     : 10
psksecret       : *
```


Destroying the cluster


To destroy the cluster, first enter and verify:

```
terraform destroy -var "access_key=<access_key>" -var "secret_key=<secret_key>" -var "region=<region>"
```

There are restrictions on deleting tables when they have data. As such, TableStore must then be deleted manually from the console.

To remove TableStore:

1. Go to your Table and click *Delete* for each table:

 **FortiGateASG-rrr**

[Refresh](#) [Bind VPC](#) [Create Table](#)


Instance Access URL

Intranet: <https://FortiGateASG-rrr.us-east-1.ots-internal.aliyuncs.com>

Internet: <https://FortiGateASG-rrr.us-east-1.ots.aliyuncs.com>

VPC: <https://FortiGateASG-rrr.us-east-1.vpc.tablestore.aliyuncs.com>

Accessed By [Change](#)

Any Network 

VPC List


 You have no bound VPC. You can [Bind VPC](#)






Table Size:

Table Counts:5

Table Size:0 B

Table List

[Search](#)

Table Name	Time To Live	Max Versions	Max Version Offset	Stream Status	Monitor	Table Size	Actions
FortiAnalyzer	-1	1	86400	Disabled		0 B	Manage Tunnels Delete
FortiGateAutoscale	-1	1	86400	Disabled		0 B	Manage Tunnels Delete
FortiGateLifecycleItem	-1	1	86400	Disabled		0 B	Manage Tunnels Delete
FortiGateMasterElection	-1	1	86400	Disabled		0 B	Manage Tunnels Delete
Settings	-1	1	86400	Disabled		0 B	Manage Tunnels Delete

2. After deleting the tables, return to the *Instance* page and click *Release*:

ⓘ This region supports high-performance instances and capacity instances.

Related Links: [Product Page](#)

Instance Name	Instance Type	Instance Description	Status	Created At	Monitor	Actions
FortiGateASG-rrr	Capacity	TableStore Instance Terraf...	Running	2019-06-20 12:45:51		Manage Release

Troubleshooting

Debugging cloud-init

Retrieving the `cloud-init` log can be useful when issues are occurring at boot up. To retrieve the log, log in to the FortiGate-VM and type the following into the CLI:

```
diag debug cloudinit show
```

Output will look similar to the following:

```
>> Checking metadata source ali
>> ALI user data obtained
>> Fos-instance-id: i-p0w3dr3bf9rck4jub4vb
>> Cloudinit trying to get config script from https://*****.ap-southeast-2-internal.fc.aliyuncs.com/2016-08-15/proxy/FortigateAutoScale-wke/FortigateAutoScale-rrr/
>> Cloudinit download config script successfully
>> Found metadata source: ali
>> Run config script
>> Finish running script
>> FortiGate-VM64-ALI $ config system dns
>> FortiGate-VM64-ALI (dns) $      unset primary
>> FortiGate-VM64-ALI (dns) $      unset secondary
>> FortiGate-VM64-ALI (dns) $      end
>> FortiGate-VM64-ALI $ config system auto-scale
>> FortiGate-VM64-ALI (auto-scale) $      set status enable
>> FortiGate-VM64-ALI (auto-scale) $      set sync-interface port 1
>> FortiGate-VM64-ALI (auto-scale) $      set role master
>> FortiGate-VM64-ALI (auto-scale) $      set callback-url
https://*****.ap-southeast-2-internal.fc.aliyuncs.com/2016-08-15/proxy/FortigateAutoScale-wke/FortigateAutoScale-rrr/
```

TableStore destroy time

TableStore deletion can take up to 10 minutes and may appear as follows:

```
alicloud_ots_instance.tablestore: Still destroying... (ID: FortiGateASG-rrr, 7m0s elapsed)
alicloud_ots_instance.tablestore: Still destroying... (ID: FortiGateASG-rrr, 7m10s elapsed)
alicloud_ots_instance.tablestore: Still destroying... (ID: FortiGateASG-rrr, 7m20s elapsed)
```

If you are seeing these messages after 10 minutes, it is likely that TableStore contains data. You will need to manually delete TableStore and then re-run the `terraform destroy` command. For details on manually deleting TableStore, refer to the section [Destroying the cluster on page 69](#).

Resource availability

If a region runs out of a specified resource an error like the one below will be displayed. In this case the cluster will need to be deployed into a different region.

```
1 error occurred:
  * alicloud_slb.default: 1 error occurred:
  * alicloud_slb.default: [ERROR] terraform-provider-alicloud/alicloud/resource_alicloud_slb.go:324: Resource alicloud_slb CreateLoadBalancer Failed!!! [SDK alibaba-cloud-sdk-go ERROR]:
SDK.ServerError
ErrorCode: OperationFailed.ZoneResourceLimit
Recommend:
RequestId: 83972A94-0640-49DA-8586-DCF535D14886
Message: The operation failed because of resource limit of the specified zone.
```

Timeout

If a timeout such as the one below occurs, re-run the command.

```
Error: Error applying plan:

1 error occurred:
  * alicloud_vswitch.vsw2: 1 error occurred:
  * alicloud_vswitch.vsw2: [ERROR] terraform-provider-alicloud/alicloud/resource_alicloud_vswitch.go:58:
[ERROR] terraform-provider-alicloud/alicloud/resource_alicloud_vswitch.go:170:
[ERROR] terraform-provider-alicloud/alicloud/service_alicloud_ecs.go:51: Resource us-east-1b DescribeZones Failed!!! [SDK alibaba-cloud-sdk-go ERROR]:
net/http: request canceled (Client.Timeout exceeded while reading body)
```

How to reset the elected primary FortiGate

To reset the elected primary FortiGate, go to *TableStore > FortiGateMasterElection* and delete the only item. A new primary FortiGate will be elected and a new record will be created as a result.

For details on locating *TableStore > FortiGateMasterElection*, refer to the section [Verify the deployment on page 67](#).

Appendix



FortiGate Autoscale for AliCloud features

Major components

- *The Auto Scaling group.* The Auto Scaling group contains one to many FortiGate-VMs (PAYG licensing model). This Auto Scaling group will dynamically scale-out or scale-in based on the scaling metrics specified in the scaling rules.
- The *configset* folder contains files that are loaded as the initial configuration for a new FortiGate-VM instance.
 - *baseconfig* is the base configuration. This file can be modified as needed to meet your network requirements. Placeholders such as {SYNC_INTERFACE} are explained in the [Configset placeholders on page 72](#) table below.
- *Tables in TableStore.* These tables are required to store information such as health check monitoring, primary election, state transitions, etc. These records should not be modified unless required for troubleshooting purposes.

Configset placeholders

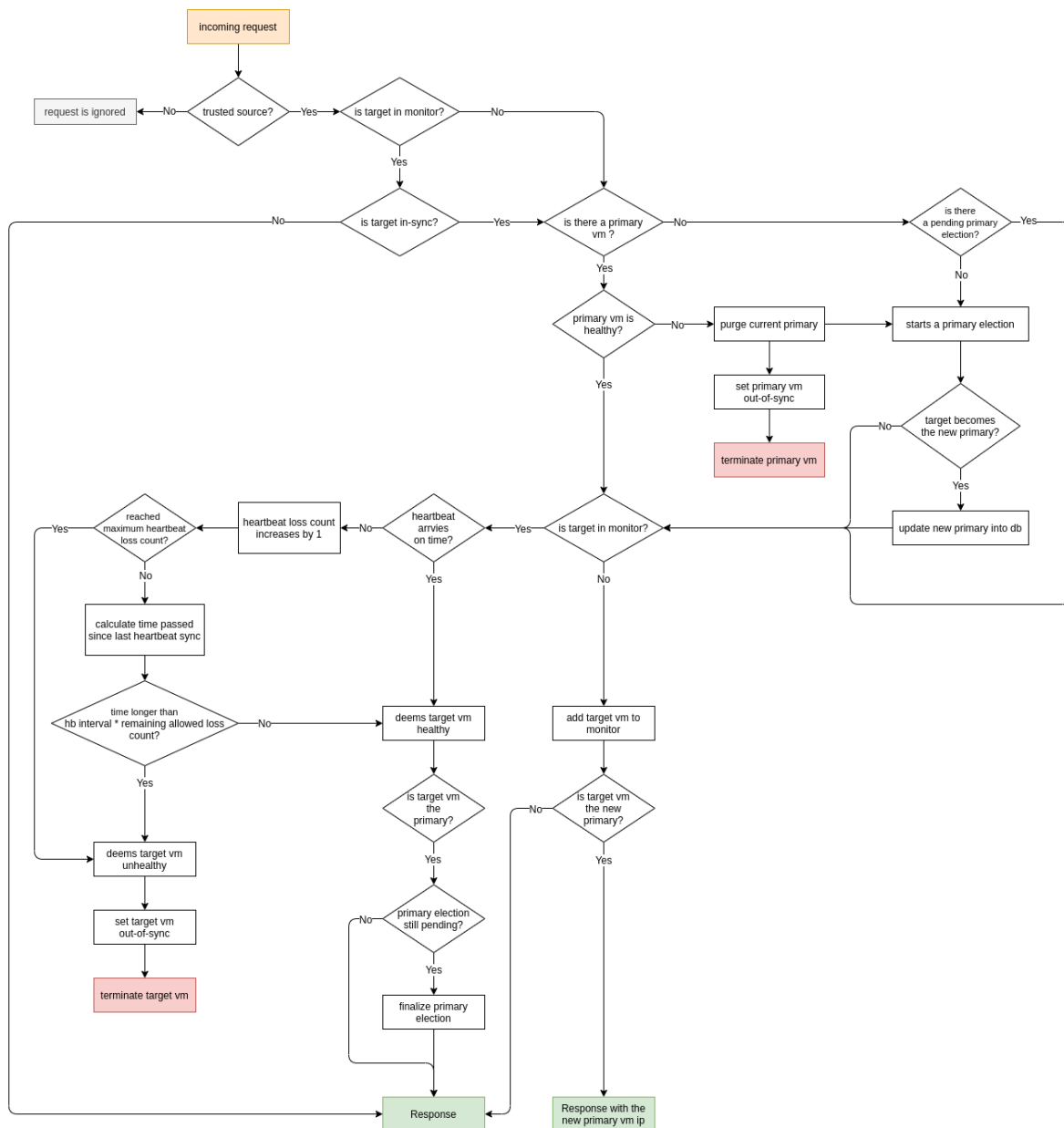
When the FortiGate-VM requests the configuration from the Auto Scaling function, the placeholders in the table below will be replaced with associated environment variables stored in Function Compute.

Placeholder	Type	Description
{SYNC_INTERFACE}	Text	The interface for FortiGate-VMs to synchronize information. All characters must be lowercase.
{CALLBACK_URL}	URL	The endpoint URL to interact with the Auto Scaling handler script. Automatically generated during the Terraform deployment.
{PSK_SECRET}	Text	The Pre-Shared key used in FortiOS. Randomly generated during the Terraform deployment.
		 Changes to the PSK secret after FortiGate Autoscale for AliCloud has been deployed are not reflected here. For new instances to be spawned with the changed PSK secret, this environment variable will need to be manually updated.
{ADMIN_PORT}	Number	A port number specified for administration login. A positive integer such as 443 etc. Default value: 8443.
		 Changes to the admin port after deployment are not reflected here. For new instances to be spawned with the changed admin port, this environment variable will need to be updated.

Architectural diagram

Election of the primary instance

FortiGate Autoscale with heartbeat response & failover management



Manual deployment of auto scaling on AliCloud

Following is a sample configuration for deploying Auto Scaling on AliCloud:

-
1. Create a scaling group in the AliCloud console.
 2. Create a scaling configuration in the AliCloud console.
 3. Create scaling rules in the AliCloud console.
 4. Configure a FortiGate-VM in the Auto Scaling group as the primary member.
 5. Scale out a new FortiGate-VM, configure it as a secondary member, and synchronize the configuration from the primary to the secondary FortiGate-VM.
 6. Run diagnose commands to confirm that Auto Scaling is functioning.

To create a scaling group in the AliCloud console:

1. Log into the AliCloud console.
2. Go to *Auto Scaling > Scaling Groups > Create Scaling Group*.
3. Set the following parameters for the Auto Scaling group:
 - a. *Scaling Group Name*: Enter a name for the scaling group. The sample configuration is named *FGT-ASG*.
 - b. *Maximum Instances*: Enter the maximum number of instances that can comprise the group. In the sample configuration, four (4) is the maximum number.
 - c. *Minimum Instances*: Enter the minimum number of instances that can comprise the group. In the sample configuration, one (1) is the minimum number.
 - d. *Instance Configuration Source*: Leave at the default value.
 - e. *Network Type*: Leave at the default value, which is VPC.
 - f. Select the VPC and VSwitch as desired.

Create Scaling Group

*Scaling Group Name:

FGT-ASG

The name can be 2 to 40 characters in length. It must start with a letter, number or Chinese character. It can also contain periods (.), underscores (_), and hyphens (-).

*Maximum Instances:

4

Valid range: 0 to 1000

*Minimum Instances:

1

Valid range: 0 to 1000

*Default Cooldown Time (Seconds):

300

The value must be an integer no less than 0.

Removal Policy:

First Pick

Earliest Instance Created Using :

Then Pick

Earliest Created Instance

To Remove

How can I ensure that a manually added ECS instance will not be removed from the scaling group?

* Instance Configuration Source:

Custom Scaling Configuration

Launch Template

* Network Type:

VPC

VPC

A scaling group can support multiple VSwitches.

* VPC:

VPC ID:

vpc-rj9kk7ico621z27p1fv4y

Create VPC network

VSwitch:

fgtswitch (US West 1 Zone A)

sw2 (US West 1 Zone A)

Multi-Zone Scaling Policy:

Priority

Distribution Balancing

Cost Optimization

Reclaim Mode:

Release Mode

Shutdown and Reclaim Mode

SLB Instances:

-- Select an SLB instance --

Manage SLB instances

Only SLB instances that have been configured with listeners can be used by scaling groups.

RDS Instances:

-- Select an RDS instance --

Manage RDS databases

Databases in the scaling group: configured=0, maximum=10

OK

Cancel

4. Click OK.

To create a scaling configuration in the AliCloud console:

1. After creating an Auto Scaling group, AliCloud displays a popup for creating a new scaling configuration before activating Auto Scaling. In the popup, click *Create Now*.
2. Select the instance type.
3. Select the desired FortiGate-VM image.
4. Ensure that *Assign Public IP* is selected.
5. Select the desired security group.

6. Click *Next: System Configurations*.

Auto Scaling | Scaling Group Name: FGT-ASG | [Return to Scaling Groups](#) | [Return to Scaling Configurations](#)

1 Basic Configurations (Required) | 2 System Configurations | 3 Preview (Required)

Billing Method: ☒ Pay-As-You-Go | ☐ Preemptible Instance

Instance Type

Filter Instances:

Current Generation | All Generations | Purchase History

Architecture: **x86-Architecture** | Heterogeneous Computing | ECS Bare Metal Instance | Super Computing Cluster

Category: **General Purpose** | Compute Optimized | Memory Optimized | Big Data | Local SSD | Storage Enhancement | High Clock Speed | Entry-Level (Shared)

Family	Instance Type	vCPU	Memory	Physical Processor	Clock Speed	Internal Network Bandwidth	Packets Rate
<input checked="" type="radio"/> Network Enhanced sn2ne	ecs.sn2ne.large	2 vCPU	8 GiB	Intel Xeon E5-2682v4 / Intel Xeon(Skylake) Platinum 8163	2.5 GHz	1 Gbps	300,000 PPS
<input type="radio"/> Network Enhanced sn2ne	ecs.sn2ne.xlarge	4 vCPU	16 GiB	Intel Xeon E5-2682v4 / Intel Xeon(Skylake) Platinum 8163	2.5 GHz	1.5 Gbps	500,000 PPS
<input type="radio"/> Network Enhanced sn2ne	ecs.sn2ne.2xlarge	8 vCPU	32 GiB	Intel Xeon E5-2682v4 / Intel Xeon(Skylake) Platinum 8163	2.5 GHz	2 Gbps	1,000,000 PPS
<input type="radio"/> Network Enhanced sn2ne	ecs.sn2ne.3xlarge	12 vCPU	48 GiB	Intel Xeon E5-2682v4 / Intel Xeon(Skylake) Platinum 8163	2.5 GHz	2.5 Gbps	1,300,000 PPS
<input type="radio"/> Compute Optimized Type sn2	ecs.sn2.medium	2 vCPU	8 GiB	Intel Xeon E5-2682v4 / Intel Xeon(Skylake) Platinum 8163	2.5 GHz	0.5 Gbps	100,000 PPS
<input type="radio"/> Compute Optimized Type sn2	ecs.sn2.large	4 vCPU	16 GiB	Intel Xeon E5-2682v4 / Intel Xeon(Skylake) Platinum 8163	2.5 GHz	0.8 Gbps	200,000 PPS

Selected Instance Type: ecs.sn2ne.large (2 vCPU, 8 GiB, Network Enhanced sn2ne)

Bandwidth: 5Mbps Pay-By-Traffic | Total: **\$ 0.124 USD per Hour** + Public traffic fee: **\$ 0.077 USD per GB**

Next: System Configurations | Preview

7. (Optional) set the key pair.

Auto Scaling | Scaling Group Name: FGT-ASG | [Return to Scaling Groups](#) | [Return to Scaling Configurations](#)

1 Basic Configurations (Required) | 2 System Configurations | 3 Preview (Required)

Tags

Tags are sorted by upper and lowercase key values. For example, you can add a tag with the key as "Name" and the value "Webserver". Tag keys must be unique and cannot exceed 64 characters. Tag values can be blank and cannot exceed 128 characters. Tag key and tag value cannot include "Alibaba cloud" or start with "https://" or "http://". You can create up to 20 tags, these tags will be applied to all the instances and disks created.

[Add Tag](#)

Log on Credentials: ☒ Key Pair | ☐ Inherit Password From Image | ☐ Set Later

Key Pair: [Refer to | Create Key Pair](#)

Instance Name: ☒ The name can be 2 to 128 characters in length and can contain letters, Chinese characters, numbers, hyphens (-), underscores (_), and periods (.). It must start with a letter or Chinese character.

> Advanced (based on instance RAM roles or cloud-init)

Bandwidth: 5Mbps Pay-By-Traffic | Total: **\$ 0.124 USD per Hour** + Public traffic fee: **\$ 0.077 USD per GB**

Prev: Basic Configurations | **Next: Preview** | Preview

8. Preview the scaling configuration, then click *Create* and *Enable Configuration*.

The screenshot shows the 'Preview' step of the AliCloud console for creating an Auto Scaling group. The page is titled 'Auto Scaling' and 'Scaling Group Name: FGT-ASG'. It features a progress bar with three steps: 'Basic Configurations (Required)', 'System Configurations', and '3 Preview (Required)'. The 'Basic Configurations' section includes 'Billing Method: Pay-As-You-Go', 'Network Billing Method: Pay-By-Traffic 5Mbps', 'Type Family: Network Enhanced sn2ne / ecs.sn2ne.large(2vCPU 8GB)', 'Image: fhua-ond-v62-b0822', 'System Disk: Ultra Disk 40GiB', 'Security Group: sg-rj952xgnqujs34f9pu1c / sg-rj952xgnqujs34f9pu1c', 'Log on Credentials: Key Pairfhua', and 'Instance Name: FGT-ASG-VM'. The 'System Configurations' section shows 'Log on Credentials: Key Pairfhua' and 'Instance Name: FGT-ASG-VM'. A 'Save Auto Scaling Configuration' section is at the bottom, with 'Scaling Configuration' set to 'FGT-ASG-Conf'. A 'Create' button is visible in the bottom right corner.

9. Go to *Auto Scaling > Scaling Groups* to ensure that AliCloud has created the Auto Scaling group and that the first FortiGate-VM has been automatically launched under the group.

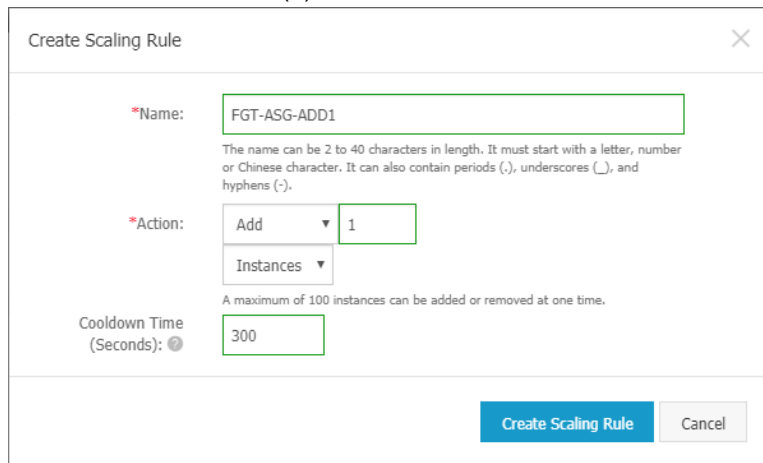
The screenshot shows the 'Scaling Groups' page in the AliCloud console. The page has a sidebar with 'Auto Scaling' and 'Scaling Groups' selected. The main content area shows a table of scaling groups. The table has columns: 'Scaling Group Name/ID', 'Status', 'Total Instances', 'Minimum Instances', 'Maximum Instances', 'Default Cooldown Time (Seconds)', 'Instance Configuration Source', 'Network Configuration Information', and 'Actions'. There is one entry in the table: 'FGT-ASG-asg-rj9c1r0xybraew2uuki' with status 'Enabled', 1 total instance, 1 minimum instance, 4 maximum instances, and a 300-second cooldown time. The 'Actions' column for this entry has links for 'Manage', 'Edit', and 'More'. A 'Create Scaling Group' button is visible in the top right corner.

Scaling Group Name/ID	Status	Total Instances	Minimum Instances	Maximum Instances	Default Cooldown Time (Seconds)	Instance Configuration Source	Network Configuration Information	Actions
FGT-ASG-asg-rj9c1r0xybraew2uuki	Enabled	1	1	4	300	Scaling Configurations: FGT-ASG-Conf	VPC ID: vpc-rj9kk7ic621z27p1fv4y> VSwitch: vsw-rj9aknbpz5imuvnikmfy5> vsw-rj9gfc11ln0q5veh5fa>	Manage Edit More

To create scaling rules in the AliCloud console:

1. In *Auto Scaling > Scaling Groups*, click the group name.
2. Click *Scaling Rules* from the right-side menu.
3. In the *Create Scaling Rule* dialog, enter a scaling rule name.
4. Configure an action. In the sample configuration, the scaling rule is configured to add one (1) FortiGate-VM instance.
5. Enter a cool down time, then click *Create Scaling Rule*. You could also configure another scaling rule which can be

executed to remove one (1) FortiGate-VM instance.



To configure a FortiGate-VM in the Auto Scaling group as the primary member:

1. Log into the FortiGate-VM.
2. Run the following commands in the CLI to enable Auto Scaling and configure this FortiGate-VM as the primary member of the Auto Scaling group:

```
config system auto-scale
  set status enable
  set role master
  set sync-interface "port1"
  set psksecret xxxxxx
end
```

To scale out a new FortiGate-VM, configure it as a secondary member, and synchronize the configuration:

1. In *Auto Scaling > Scaling Groups*, click the group name, then execute the scaling rule created earlier. AliCloud creates a new FortiGate-VM instance.
2. Log into the new FortiGate-VM.
3. Run the following commands in the CLI to enable Auto Scaling and configure this FortiGate-VM as the secondary member of the Auto Scaling group. The `master-ip` value should be the primary FortiGate-VM's private IP address:

```
config system auto-scale
  set status enable
  set role slave
  set sync-interface "port1"
  set master-ip 192.168.1.204
  set psksecret xxxxxx
end
```

The secondary FortiGate-VM will be synced with the primary FortiGate-VM. The secondary FortiGate-VM can receive configurations from the primary FortiGate-VM.

To run diagnose commands:

You can run the following `diagnose` commands to determine if the primary and secondary FortiGate-VMs are able to synchronize configurations:

```
FortiGate-VM64-ALION~AND # diag deb app hasync -1
```

```
slave's configuration is not in sync with master's, sequence:0
slave's configuration is not in sync with master's, sequence:1
slave's configuration is not in sync with master's, sequence:2
slave's configuration is not in sync with master's, sequence:3
slave's configuration is not in sync with master's, sequence:4
slave starts to sync with master
logout all admin users
```

SDN connector integration with AliCloud

Configuring AliCloud SDN connector using RAM roles

See the [FortiOS Administration Guide](#) for information on the AliCloud SDN connector.

The following summarizes minimum sufficient [RAM roles](#) for SDN connector integration with AliCloud:

- AliyunECSReadOnlyAccess
- AliyunEIPReadOnlyAccess
- AliyunVPCReadOnlyAccess



Actual role configurations may differ depending on your environments. Check with your company's public cloud administrators for details.

Pipelined automation using AliCloud Function Compute

See [GitHub](#).

VPN for FortiGate-VM on AliCloud

Connecting a local FortiGate to an AliCloud VPC VPN

This guide provides sample configuration of a site-to-site VPN connection from a local FortiGate to an AliCloud VPC VPN via IPsec VPN with static routing.

Instances that you launch into an AliCloud VPC can communicate with your own remote network via a site-to-site VPN between your on-premise FortiGate and AliCloud VPC VPN. You can enable access to your remote network from your VPC by configuring a VPN gateway and customer gateway to the VPC, then configuring the site-to-site VPC VPN.

This configuration requires the following prerequisites be met:

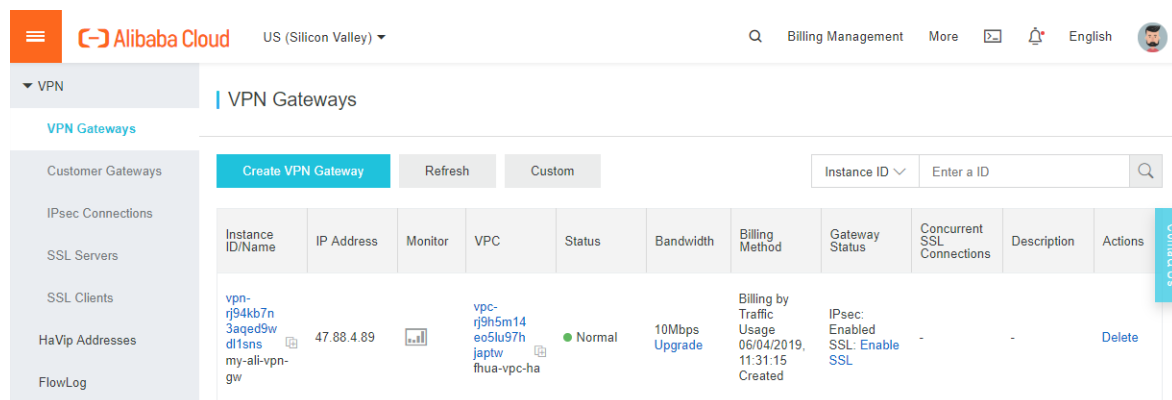
- AliCloud VPC with some configured subnets, routing tables, security group rules, and so on
- On-premise FortiGate with an external IP address

This guide consists of the following steps:

1. [Create a VPN gateway.](#)
2. [Create a customer gateway.](#)
3. [Create a site-to-site VPN connection on AliCloud.](#)
4. [Configure the on-premise FortiGate.](#)
5. [Run diagnose commands.](#)

To create a VPN gateway:

1. In the AliCloud management console, go to *VPN > VPN Gateways*.
2. Click *Create VPN Gateway*.
3. Create a virtual private gateway and attach it to the VPC from which you want to create the site-to-site VPN connection.



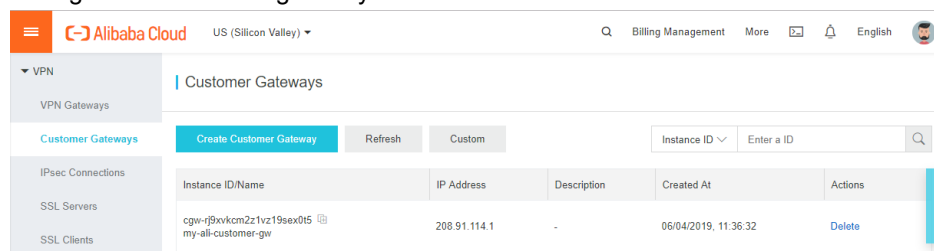
The screenshot shows the Alibaba Cloud management console interface for VPN Gateways. The top navigation bar includes the Alibaba Cloud logo, region selection (US (Silicon Valley)), and various utility links like Billing Management, More, and a search icon. The left sidebar contains a menu with options like VPN, Customer Gateways, IPsec Connections, SSL Servers, SSL Clients, HaVip Addresses, and FlowLog. The main content area is titled 'VPN Gateways' and features a 'Create VPN Gateway' button, a 'Refresh' button, and a 'Custom' button. Below these is a table listing existing VPN gateways. The table has columns for Instance ID/Name, IP Address, Monitor, VPC, Status, Bandwidth, Billing Method, Gateway Status, Concurrent SSL Connections, Description, and Actions. A single gateway is listed with the instance ID 'vpn-rj94kb7n3aqed9wdl1sns', IP address '47.88.4.89', and status 'Normal'. The 'Actions' column for this gateway includes a 'Delete' link.

Instance ID/Name	IP Address	Monitor	VPC	Status	Bandwidth	Billing Method	Gateway Status	Concurrent SSL Connections	Description	Actions
vpn-rj94kb7n3aqed9wdl1sns	47.88.4.89		vpc-rj9h5m14eo5ku97hjaptwfhua-vpc-ha	Normal	10Mbps Upgrade	Billing by Traffic Usage 06/04/2019, 11:31:15 Created	IPsec: Enabled SSL: Enable	-	-	Delete

To create a customer gateway:

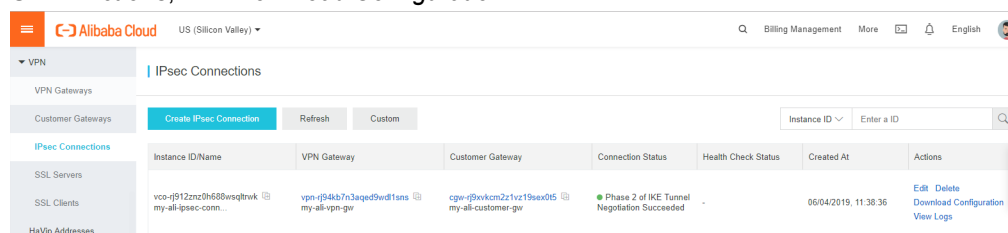
This example refers to the on-premise FortiGate for the VPC VPN to connect to as the customer gateway.

1. Go to *VPN > Customer Gateways*.
2. Click *Create Customer Gateway*.
3. Configure the customer gateway as shown:



To create a site-to-site VPN connection on AliCloud:

1. Go to *VPN > IPsec Connections*.
2. Click *Create IPsec Connection*.
3. Create an IPsec connection between the VPN and customer gateways.
4. Under *Actions*, click *Download Configuration*.



5. Note the IPsec-related parameters. You will use these parameters to configure the on-premise FortiGate in the next step:

```
{
  "LocalSubnet": "0.0.0.0/0",
  "RemoteSubnet": "0.0.0.0/0",
  "IpsecConfig": {
    "IpsecPfs": "group2",
    "IpsecEncAlg": "aes",
    "IpsecAuthAlg": "sha1",
    "IpsecLifetime": 86400
  },
  "Local": "x.x.x.x",
  "Remote": "47.88.4.89",
  "IkeConfig": {
    "IkeAuthAlg": "sha1",
    "LocalId": "x.x.x.x",
    "IkeEncAlg": "aes",
    "IkeVersion": "ikev1",
    "IkeMode": "main",
    "IkeLifetime": 86400,
    "RemoteId": "47.88.4.89",
    "Psk": "xxxxxxxxxxxxxxxx",
    "IkePfs": "group2"
  }
}
```

```

    }
}

```

To configure the on-premise FortiGate:

1. In the FortiOS CLI, configure the on-premise FortiGate with the above IPsec-related parameters. When setting `remote-gw` and `psksecret`, use the values found for `RemoteId` and `Psk` above, respectively. The example on-premise FortiGate uses `port9` as its external interface:

```

config vpn ipsec phase1-interface
    edit "AliCloudVPN"
        set interface "port9"
        set keylife 86400
        set peertype any
        set net-device enable
        set proposal aes128-sha1
        set dhgrp 14 2
        set remote-gw 47.88.4.89
        set psksecret xxxxxxxxxxxxxxxxx
    next
end
config vpn ipsec phase2-interface
    edit "AliCloudVPN"
        set phase1name "AliCloudVPN"
        set proposal aes128-sha1
        set dhgrp 14 2
        set keepalive enable
        set keylifeseconds 3600
    next
end
config firewall address
    edit "AliCloudVPN-local-subnet-1"
        set allow-routing enable
        set subnet 10.6.30.0 255.255.255.0
    next
end
config firewall address
    edit "AliCloudVPN-remote-subnet-1"
        set allow-routing enable
        set subnet 10.0.1.0 255.255.255.0
    next
end
config router static
    edit 2
        set device "AliCloudVPN"
        set dstaddr "AliCloudVPN-remote-subnet-1"
    next
end
config firewall policy
    edit 10

```

```

        set name "AliCloudVPN-local-ali"
        set srcintf "mgmt1"
        set dstintf "AliCloudVPN"
        set srcaddr "AliCloudVPN-local-subnet-1"
        set dstaddr "AliCloudVPN-remote-subnet-1"
        set action accept
        set schedule "always"
        set service "ALL"
    next
edit 20
    set name "AliCloudVPN-ali-local"
    set srcintf "AliCloudVPN"
    set dstintf "mgmt1"
    set srcaddr "AliCloudVPN-remote-subnet-1"
    set dstaddr "AliCloudVPN-local-subnet-1"
    set action accept
    set schedule "always"
    set service "ALL"
next
end

```

2. If the IPsec tunnel does not appear automatically, run the `diagnose vpn tunnel up AliCloudVPN` command.
3. In the FortiOS GUI, go to *VPN > IPsec Tunnels*. Verify that the tunnel is up. The on-premise FortiGate can now access the AliCloud VM with its private IP address. The AliCloud VM can also access the on-premise FortiGate with its private IP address.

To run diagnose commands:

```

FGT600D_B # diagnose vpn ike gateway list

vd: root/0
name: AliCloudVPN
version: 1
interface: port9 10
addr: 172.16.200.212:4500 -> 47.88.4.89:4500
created: 1087s ago
nat: me peer
IKE SA: created 1/1  established 1/1  time 9110/9110/9110 ms
IPsec SA: created 1/2  established 1/1  time 30/30/30 ms

id/spi: 0 d9d4ae9111a51b0b/de39f4ac9deffc18
direction: initiator
status: established 1087-1078s ago = 9110ms
proposal: aes128-sha1
key: 9bf9b58431949e77-a0c21ded48368db1
lifetime/rekey: 28800/27421
DPD sent/recv: 00000000/00000000

FGT600D_B # diagnose vpn tunnel list
list all ipsec tunnel in vd 0
-----

```



```

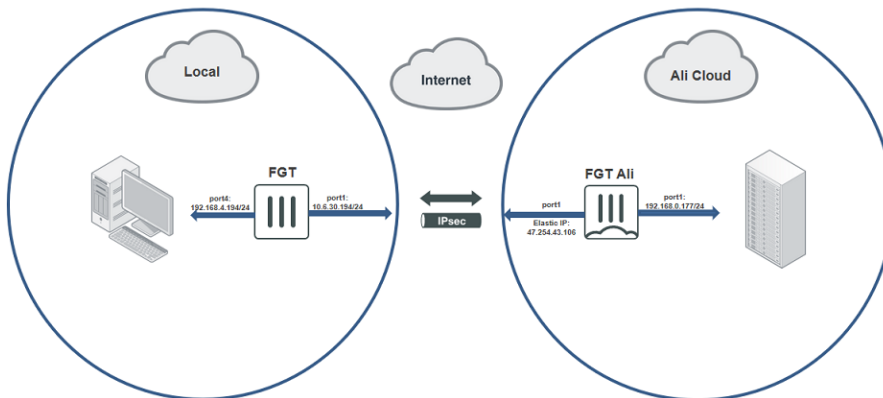
name=AliCloudVPN ver=1 serial=1 172.16.200.212:4500->47.88.4.89:4500 dst_mtu=1500
bound_if=10 lgwy=static/1 tun=intf/0 mode=auto/1 encap=none/536 options[0218]=npu create_dev
frag-rfc accept_traffic=1

proxyid_num=1 child_num=0 refcnt=14 ilast=1084 olast=270 ad=/0
stat: rxp=1 txp=43 rxb=16452 txb=4389
dpd: mode=on-demand on=0 idle=20000ms retry=3 count=0 seqno=0
natt: mode=keepalive draft=32 interval=10 remote_port=4500
proxyid=AliCloudVPN proto=0 sa=1 ref=2 serial=1
src: 0:0:0:0:0:0:0:0:0:0:0:0:0:0:0:0
dst: 0:0:0:0:0:0:0:0:0:0:0:0:0:0:0:0
SA: ref=6 options=10227 type=00 soft=0 mtu=1422 expire=2399/0B replaywin=2048
seqno=2c esn=0 replaywin_lastseq=00000001 itn=0 qat=0
life: type=01 bytes=0/0 timeout=3298/3600
dec: spi=ac5426a9 esp=aes key=16 417b83810bf1f17b30e8b0974716d37d
ah=sha1 key=20 a3e1d5ca5d85907a35c7720e9c640d0fafbb0ee3
enc: spi=c999e156 esp=aes key=16 837b20f727c957f700f6c89acbb9e9a9
ah=sha1 key=20 7f4634601d6962575c00761f7270d36a683c3d65
dec:pkts/bytes=1/16376, enc:pkts/bytes=43/7648
npu_flag=03 npu_rgwy=47.88.4.89 npu_lgwy=172.16.200.212 npu_selid=0 dec_npuid=1 enc_
npuid=1

```

Connecting a local FortiGate to an AliCloud FortiGate via site-to-site VPN

This guide provides sample configuration of a site-to-site VPN connection from a local FortiGate to an AliCloud FortiGate via site-to-site IPsec VPN with static routing. The following depicts the network topology for this sample deployment:



The following prerequisites must be met for this configuration:

- A FortiGate located on AliCloud with port1 connected to local LAN and a public IP address mapped to port1.
- A local FortiGate in a local environment. Determine if your FortiGate has a publicly accessible IP address or if it is behind NAT. In this example, the on-premise FortiGate is behind NAT.

This guide consists of the following steps:

1. [Configure the local FortiGate.](#)
2. [Configure the AliCloud FortiGate.](#)

3. Establish a VPN connection between the local and AliCloud FortiGates.
4. Run diagnose commands.

Configuring the local FortiGate

To configure the local FortiGate using the GUI:

1. Configure the interfaces:
 - a. In FortiOS, go to *Network > Interfaces*.
 - b. Edit port1. From the *Role* dropdown list, select *WAN*. In the *IP/Network Mask* field, enter 10.6.30.194/255.255.255.0 for the interface that is connected to the Internet.
 - c. Edit port4. From the *Role* dropdown list, select *LAN*. In the *IP/Network Mask* field, enter 192.168.4.194/255.255.255.0 for the interface that is connected to the local subnet.
2. Configure a static route to connect to the Internet:
 - a. Go to *Network > Static Routes*.
 - b. Click *Create New*.
 - c. In the *Destination* field, enter 0.0.0.0/0.0.0.0.
 - d. From the *Interface* dropdown list, select *port1*.
 - e. In the *Gateway Address* field, enter 10.6.30.254.
3. Configure IPsec VPN:
 - a. Go to *VPN > IPsec Wizard*.
 - b. Configure *VPN Setup*:
 - i. In the *Name* field, enter the desired name.
 - ii. For *Template Type*, select *Site to Site*.
 - iii. For *Remote Device Type*, select *FortiGate*.
 - iv. For *NAT Configuration*, select *This site is behind NAT*. Click *Next*. For non-dialup situations where the local FortiGate has an external IP address, select *No NAT between sites*.
 - c. Configure *Authentication*:
 - i. For *Remote Device*, select *IP Address*.
 - ii. In the *IP Address* field, enter 47.254.43.106. This is the AliCloud FortiGate port1 public IP address.
 - iii. From the *Outgoing Interface* dropdown list, select *port1*.
 - iv. For *Authentication Method*, select *Pre-shared Key*.
 - v. In the *Pre-shared Key* field, enter 123456. Click *Next*.
 - d. Configure *Policy & Routing*:
 - i. From the *Local Interface* dropdown list, select *port4*. This autofills the *Local Subnets* field with 192.168.4.0/24.
 - ii. In the *Remote Subnets* field, enter 192.168.4.0/24. This is the AliCloud FortiGate port1 subnet.
 - iii. For *Internet Access*, select *None*. Click *Create*.

To configure the local FortiGate using the CLI:

1. Configure the interfaces:

```
config system interface
  edit "port1"
    set vdom "root"
```

```

        set ip 10.6.30.194 255.255.255.0
        set allowaccess ping https ssh http fgfm
        set type physical
        set role wan
        set snmp-index 1
    next
    edit "port4"
        set vdom "root"
        set ip 192.168.4.194 255.255.255.0
        set allowaccess ping https ssh snmp fgfm ftm
        set type physical
        set device-identification enable
        set lldp-transmission enable
        set role lan
        set snmp-index 4
    next
end

```

2. Configure a static route to connect to the Internet:

```

config router static
    edit 1
        set gateway 10.6.30.254
        set device "port1"
    next
end

```

3. Configure IPsec VPN:

```

config vpn ipsec phase1-interface
    edit "to_ali"
        set interface "port1"
        set peertype any
        set net-device enable
        set proposal aes128-sha256 aes256-sha256 aes128-sha1 aes256-sha1
        set comments "VPN: to_ali (Created by VPN wizard)"
        set wizard-type static-fortigate
        set remote-gw 47.254.43.106
        set psksecret xxxxxx
    next
end
config vpn ipsec phase2-interface
    edit "to_ali"
        set phase1name "to_ali"
        set proposal aes128-sha1 aes256-sha1 aes128-sha256 aes256-sha256 aes128gcm
        aes256gcm chacha20poly1305
        set comments "VPN: to_ali (Created by VPN wizard)"
        set src-addr-type name
        set dst-addr-type name
        set src-name "to_ali_local"
        set dst-name "to_ali_remote"
    next
end

```

```
    next
end
config router static
    edit 2
        set device "to_ali"
        set comment "VPN: to_ali (Created by VPN wizard)"
        set dstaddr "to_ali_remote"
    next
    edit 3
        set distance 254
        set comment "VPN: to_ali (Created by VPN wizard)"
        set blackhole enable
        set dstaddr "to_ali_remote"
    next
end
config firewall policy
    edit 1
        set name "vpn_to_ali_local"
        set uuid c6b2d36e-6c65-51e9-5a78-9a0881a0b07c
        set srcintf "port4"
        set dstintf "to_ali"
        set srcaddr "to_ali_local"
        set dstaddr "to_ali_remote"
        set action accept
        set schedule "always"
        set service "ALL"
        set comments "VPN: to_ali (Created by VPN wizard)"
    next
    edit 2
        set name "vpn_to_ali_remote"
        set uuid c6bf126e-6c65-51e9-8652-cb88546929b4
        set srcintf "to_ali"
        set dstintf "port4"
        set srcaddr "to_ali_remote"
        set dstaddr "to_ali_local"
        set action accept
        set schedule "always"
        set service "ALL"
        set comments "VPN: to_ali (Created by VPN wizard)"
    next
end
```

Configuring the AliCloud FortiGate

To configure the AliCloud FortiGate using the GUI:

1. Configure the interface:
 - a. In FortiOS, go to *Network > Interfaces*.
 - b. Edit port1.

- c. From the *Role* dropdown list, select *LAN*.
 - d. Ensure that *Addressing mode* is set to *DHCP* and that the FortiGate can list the assigned IP address.
2. Configure IPsec VPN:
- a. Go to *VPN > IPsec Wizard*.
 - b. Configure *VPN Setup*:
 - i. In the *Name* field, enter the desired name.
 - ii. For *Template Type*, select *Site to Site*.
 - iii. For *Remote Device Type*, select *FortiGate*.
 - iv. For *NAT Configuration*, select *The remote site is behind NAT*. Click *Next*.
 - c. Configure *Authentication*:
 - i. From the *Incoming Interface* dropdown list, select *port1*.
 - ii. For *Authentication Method*, select *Pre-shared Key*.
 - iii. In the *Pre-shared Key* field, enter 123456. Click *Next*.
 - d. Configure *Policy & Routing*:
 - i. From the *Local Interface* dropdown list, select *port1*. This autofills the *Local Subnets* field with 192.168.4.0/24.
 - ii. In the *Remote Subnets* field, enter 192.168.4.0/24. This is the local FortiGate port4 subnet.
 - iii. For *Internet Access*, select *None*. Click *Create*.

To configure the AliCloud FortiGate using the CLI:

1. Configure the interface and ensure that the FortiGate can list the assigned IP address:

```
config system interface
    edit "port1"
        set vdom "root"
        set mode dhcp
        set allowaccess ping https ssh fgfm
        set type physical
        set device-identification enable
        set lldp-transmission enable
        set role lan
        set snmp-index 1
    next
end

diagnose ip address list
IP=192.168.0.177->192.168.0.177/255.255.255.0 index=3 devname=port1
```

2. Configure IPsec VPN:

```
config vpn ipsec phase1-interface
    edit "to_local"
        set type dynamic
        set interface "port1"
        set peertype any
        set net-device enable
        set proposal aes128-sha256 aes256-sha256 aes128-sha1 aes256-sha1
        set dpd on-idle
    end
end
```

```

        set comments "VPN: to_local (Created by VPN wizard)"
        set wizard-type dialup-fortigate
        set psksecret xxxxxx
        set dpd-retryinterval 60
    next
end
config vpn ipsec phase2-interface
    edit "to_local"
        set phase1name "to_local"
        set proposal aes128-sha1 aes256-sha1 aes128-sha256 aes256-sha256 aes128gcm
aes256gcm chacha20poly1305
        set comments "VPN: to_local (Created by VPN wizard)"
        set src-addr-type name
        set dst-addr-type name
        set src-name "to_local_local"
        set dst-name "to_local_remote"
    next
end
config firewall policy
    edit 1
        set name "vpn_to_local_local"
        set uuid e07aaa72-833c-51e9-ad33-4c1e96b656da
        set srcintf "port1"
        set dstintf "to_local"
        set srcaddr "to_local_local"
        set dstaddr "to_local_remote"
        set action accept
        set schedule "always"
        set service "ALL"
        set comments "VPN: to_local (Created by VPN wizard)"
    next
    edit 2
        set name "vpn_to_local_remote"
        set uuid e086b2b8-833c-51e9-3aaf-49e3cd4c5c70
        set srcintf "to_local"
        set dstintf "port1"
        set srcaddr "to_local_remote"
        set dstaddr "to_local_local"
        set action accept
        set schedule "always"
        set service "ALL"
        set comments "VPN: to_local (Created by VPN wizard)"
    next
end

```

To establish the VPN connection between the FortiGates:

The tunnel is down until you initiate connection from the local FortiGate.

1. In FortiOS on the local FortiGate, go to *Monitor > IPsec Monitor*.
2. Click the created tunnel.

3. Click *Bring Up*. The tunnel is up.

<div><div><div><div><div></div><div>Refresh</div></div></div><div><div><div></div><div>Reset Statistics</div></div></div><div><div><div></div><div>Bring Up</div></div></div><div><div><div></div><div>Bring Down</div></div></div><div><div><div></div><div>Locate on VPN Map</div></div></div></div></div>							
Name	Type	Remote Gateway	Peer ID	Incoming Data	Outgoing Data	Phase 1	Phase 2 Selectors
<div><div></div>to_all</div>	<div><div></div>Site to Site - FortiGate</div>	47.254.43.106		<div><div></div>94.46 kB</div>	<div><div></div>44.52 kB</div>	to_all	<div><div></div>to_all</div>

4. In FortiOS on the AliCloud FortiGate, go to *Monitor > IPsec Monitor* to verify that the tunnel is up.

<div><div><div>Refresh</div><div>Reset Statistics</div><div>Bring Up</div><div>Bring Down</div><div>Locate on VPN Map</div></div></div>							
Name	Type	Remote Gateway	Peer ID	Incoming Data	Outgoing Data	Phase 1	Phase 2 Selectors
<div><div>to_local</div><div>Dialup - FortiGate</div></div>		208.91.114.1		<div>126.59 kB</div>	<div>59.34 kB</div>	to_local	<div>to_local</div>

To run diagnose commands:

1. Show the local FortiGate VPN status:

```
FGT-194-Level1 # diagnose vpn ike gateway list
vd: root/0
name: to_ali
version: 1
interface: port1 3
addr: 10.6.30.194:4500 -> 47.254.43.106:4500
created: 4057s ago
nat: me peer
IKE SA: created 1/1 established 1/1 time 21180/21180/21180 ms
IPsec SA: created 1/3 established 1/3 time 20/26/30 ms
  id/spi: 2 fd018d163ea303aa/9d7a245f889ee6c4
  direction: initiator
  status: established 4057-4036s ago = 21180ms
  proposal: aes128-sha256
  key: c7bab4dd8883b727-3b249220088216f8
  lifetime/rekey: 86400/82063
  DPD sent/recvd: 00000000/00000009
FGT-194-Level1 # diagnose vpn tunnel list
list all ipsec tunnel in vd 0
-----
name=to_ali ver=1 serial=1 10.6.30.194:4500->47.254.43.106:4500 dst_mtu=1500
bound_if=3 lgwy=static/1 tun=intf/0 mode=auto/1 encap=none/528 options
[0210]=create_dev frag-rfc accept_traffic=1
proxyid_num=1 child_num=0 refcnt=14 ilast=0 olast=0 ad=/0
stat: rxp=3382 txp=3404 rxb=432896 txb=204240
dpd: mode=on-demand on=1 idle=20000ms retry=3 count=0 seqno=0
natt: mode=keepalive draft=32 interval=10 remote_port=4500
proxyid=to_ali proto=0 sa=1 ref=2 serial=3
  src: 0:192.168.4.0/255.255.255.0:0
  dst: 0:192.168.0.0/255.255.255.0:0
  SA: ref=3 options=10226 type=00 soft=0 mtu=1422 expire=39471/0B replaywin=2048
    seqno=d14 esn=0 replaywin_lastseq=00000d0d itn=0 qat=0
  life: type=01 bytes=0/0 timeout=42903/43200
  dec: spi=8427ce41 esp=aes key=16 961323608ef02c111ce4cc393cd79293
    ah=sha1 key=20 9cffabaa0163df6a92e1917efa333148b58ff9da
  enc: spi=e2723047 esp=aes key=16 f93b233906039c179924923a4f09ebae
    ah=sha1 key=20 c2c6225e26927de6381bf44c6ccd6d0a325e2e27
```

```
dec:pkts/bytes=3325/199500, enc:pkts/bytes=3347/428416
```

2. Show the AliCloud FortiGate VPN status:

```
FGT-ALIONDEMAND # diagnose vpn ike gateway list
vd: root/0
name: to_local_0
version: 1
interface: port1 3
addr: 192.168.0.177:4500 -> 208.91.114.1:64916
created: 4103s ago
nat: me peer
IKE SA: created 1/1 established 1/1 time 120/120/120 ms
IPsec SA: created 1/3 established 1/3 time 20/26/30 ms
  id/spi: 0 fd018d163ea303aa/9d7a245f889ee6c4
  direction: responder
  status: established 4103-4103s ago = 120ms
  proposal: aes128-sha256
  key: c7bab4dd8883b727-3b249220088216f8
  lifetime/rekey: 86400/82026
  DPD sent/recvd: 00000009/00000000
FGT-ALIONDEMAND # diagnose vpn tunnel list
list all ipsec tunnel in vd 0
-----
name=to_local ver=1 serial=1 192.168.0.177:0->0.0.0.0:0 dst_mtu=0
bound_if=3 lgwy=static/1 tun=intf/0 mode=dialup/2 encap=none/528 options
[0210]=create_dev frag-rfc accept_traffic=1
proxyid_num=0 child_num=1 refcnt=11 ilast=4118 olast=4118 ad=/0
stat: rxp=0 txp=0 rxb=0 txb=0
dpd: mode=on-idle on=0 idle=60000ms retry=3 count=0 seqno=0
natt: mode=none draft=0 interval=0 remote_port=0
-----
name=to_local_0 ver=1 serial=2 192.168.0.177:4500->208.91.114.1:64916 dst_mtu=1500
bound_if=3 lgwy=static/1 tun=intf/0 mode=dial_inst/3 encap=none/976 options
[03d0]=create_dev no-sysctl rgwy-chg rport-chg frag-rfc accept_traffic=1
parent=to_local index=0
proxyid_num=1 child_num=0 refcnt=14 ilast=0 olast=0 ad=/0
stat: rxp=3459 txp=3459 rxb=442752 txb=207540
dpd: mode=on-idle on=1 idle=60000ms retry=3 count=0 seqno=9
natt: mode=keepalive draft=32 interval=10 remote_port=64916
proxyid=to_local proto=0 sa=1 ref=2 serial=3 add-route
  src: 0:192.168.0.0/255.255.255.0:0
  dst: 0:192.168.4.0/255.255.255.0:0
  SA: ref=3 options=282 type=00 soft=0 mtu=1422 expire=39694/0B replaywin=2048
    seqno=d4b esn=0 replaywin_lastseq=00000d52 itn=0 qat=0
  life: type=01 bytes=0/0 timeout=43187/43200
  dec: spi=e2723047 esp=aes key=16 f93b233906039c179924923a4f09ebae
    ah=sha1 key=20 c2c6225e26927de6381bf44c6ccd6d0a325e2e27
  enc: spi=8427ce41 esp=aes key=16 961323608ef02c111ce4cc393cd79293
    ah=sha1 key=20 9cfffabaa0163df6a92e1917efa333148b58ff9da
```


dec:pkts/bytes=3402/204120, enc:pkts/bytes=3402/435456

Change log

Date	Change Description
2021-03-30	Initial release.
2022-03-22	Updated Instance type support on page 5 and Licensing on page 9 subtopics.



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