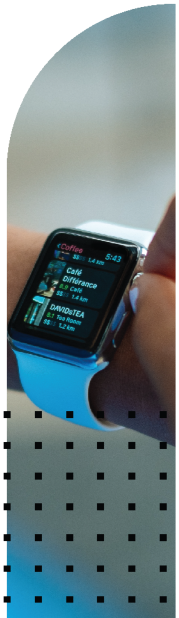
FORTINET

AWS Guide

FortiSandbox 4.2.3



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FortiSandbox 4.2.3 AWS Guide
34-423-856358-20230613

TABLE OF CONTENTS

Overview

Fortinet’s FortiSandbox on AWS enables organizations to defend against advanced threats in the cloud. It works with network, email, endpoint, and other security measures, or as an extension of on-premise security architecture to leverage scale with complete control.

FortiSandbox is available on the AWS Marketplace.

You can install FortiSandbox on AWS as a standalone zero-day threat prevention or you can configure it to work with your existing FortiGate, FortiMail, or FortiWeb AWS instances to identify malicious and suspicious files, ransomware, and network threats.

You can create custom VMs using pre-configured VMs, your own ISO image on VirtualBox. For more information, contact Fortinet Customer Service & Support.

This document conaitns images from the AWS interface. Some images and text strings may not reflect the current AWS version. Where possible, we have noted the version the image is based on.

For the most accurate AWS information, please refer to the product documentation.

Preparing for deployment

Prepare for deployment by reviewing the following information:

- Licensing on page 6
- Minimum system requirements on page 7
- Port usage on page 8

Licensing

Fortinet offers the FortiSandbox VM00 model (FSA-VM00) for your private cloud deployment solution.

The FSA-VM00 is a base license. You need to purchase the required Windows license keys to activate enabled Windows VMs with a minimum of 1 and maximum of 8 licenses. Ton increase capacity, the FSA-VM00 is capable of using the Windows Cloud VM with a minimum of 5 and maximum of 200 VMs.

Ordering and registering licenses

Licenses can be purchased through a Fortinet Authorized Reseller or directly from Fortinet. After placing an order for FortiSandbox VM, Fortinet sends a license registration code to the email address used to place the order. Use this license registration code to register the FortiSandbox VM with Customer Service & Support at https://support.fortinet.com.

After registration, you can download the license file. You will need this file to activate your FortiSandbox. You can configure basic network settings using CLI commands to complete the deployment. When the license file is uploaded and validated, the engines will be downloaded short after. Then, the system will be fully functional.

More information

Purchasing a license	Contact your Fortinet Authorized Reseller, or visit https://www.fortinet.com/how_to_buy/
FortiSandbox Ordering Guide	Visit https://www.fortinet.com/content/dam/fortinet/assets/data-sheets/og-fortisandbox.pdf
FortiSandbox product Datasheet	Visit https://www.fortinet.com/content/dam/fortinet/assets/data-sheets/FortiSandbox.pdf
Hardware recommendations	See Minimum system requirements on page 7.

Minimum system requirements

Before deploying the FortiSandbox virtual appliance, install and configure the latest stable release of VMware vSphere ESXi Hypervisor software. Supported versions are ESXi version 5.1 to 7.0.1.

Access VMware vSphere using a web browser or install the VMware vSphere client.

In VMware, you can expose full CPU virtualization to the guest operating system so that applications that require hardware virtualization can run on virtual machines without binary translation or paravirtualization. For more information, see https://docs.vmware.com/en/VMware-vSphere/6.5/com.vmware.vsphere.vm_admin.doc/GUID-2A98801C-68E8-47AF-99ED-00C63E4857F6.html.

When configuring your FortiSandbox hardware settings, use the following table as a guide with consideration for future expansion.

Technical Specification	Details		
	On-Premise (Private) Cloud	Public Cloud - BYOL	Public Cloud - PAYG
Hypervisor Support	VMware ESXi Microsoft Hyper-V Windows server 2016 and 2019	AWS Azure	
HA Support	FortiSandbox 3.2 or later		
Virtual CPUs (min / max)	4/Unlimited Fortinet recommends four virtual CPUs plus the number of VM clones.	4/16 Fortinet recommends following virtual CPUs based on the number of VM Clones: 0-4 clones - 4 cores, 5-32 clones - 8 cores, 33-100 clones - 16 cores, 101+ clones - 16 cores or higher. Pick up the appropriate Instance Type.	
Virtual Memory (min / max)	16 GB / 32 GB Fortinet recommends following virtual memory based on the number of VM Clones: 0-4 clones - 24 GB 5-8 clones - 32 GB	8 GB / 64 GB Recommended: Following virtual memory based on the number of VM Clones: 0-4 clones - 8 GB, 5-32 clones - 16 GB, 33-100 clones - 32 GB, 101+ clones - 64 GB. Pick the appropriate Instance Type.	
Virtual Storage (min / max)	200 GB / 16 TB Fortinet recommends at least 500 GB for a production environment.		
Virtual Network Interfaces	Recommended: 4 and above	Recommended: 2 and above	
VM Clones Support (Min/Max)	0[1]/ 8 (Local VMs) and 200 (Cloud VMs)	0[1] / 216[2]	0[1] / 128[3]

[1] For HA-Cluster deployment setup configured as Primary node acting as a dispatcher.

[2] Can enable any of the Custom VM or Cloud VM types up to the total seat count which is based on a combination of Windows licenses (max of 8), BYOL (8) and Cloud VMs (max of 200).

[3] Total seat count is based on the number of cores multiplied by 4. Maximum VMs is 128 since the highest available vCPU on PAYG is 32. CloudVMs can also be added on top and registered, however, this is not advised due to product serial number changes after shutdown.

SA_VM-vxxx-build0xxx-FORTINE

SA_VM-vxxx-build0xxx-FORTINE

Port usage

FortiSandbox requires the following ports to be accessible:

- 21 (FTP, for FSA communication with VM clone(s))
- 22 (if SSH access is needed)
- 443 (HTTPS)
- 514 (if Fortinet Fabric devices such as FortiGate and FortiMail need to submit jobs)
- 9833 (for on-demand interactive scans)

For more port information, see Port Information section of the *FortiSandboxAdministration Guide*.

Deployment

To deploy FortiSandbox-VM for AWS:

□ Prepare the AWS environment on page 9

□ Generate AWS access key for FortiSandbox on page 17

□ Deploy FortiSandbox on AWS (BYOL/On-Demand) on page 24

□ Configure FortiSandbox instance network settings on page 32

□ Prepare FortiSandbox for scanning contents on page 35

□ Set up a local custom Windows VM on page 36

□ Test FortiSandbox instance with a file scan on page 40

Prepare the AWS environment

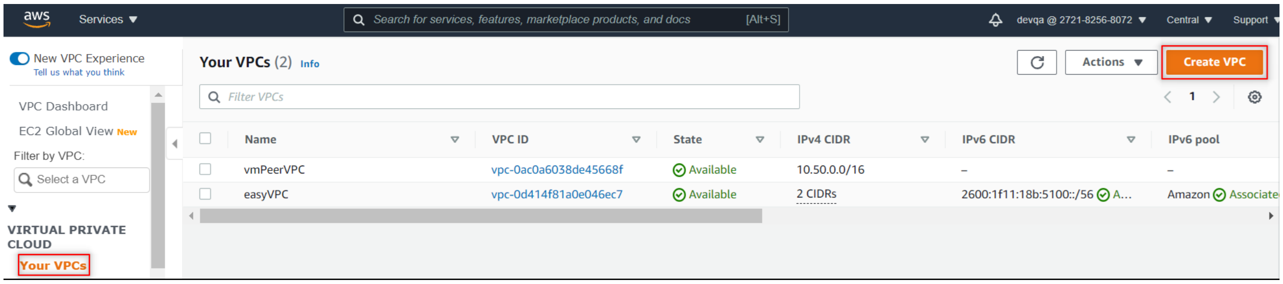
Before deploying a FortiSandbox instance, some basic steps are required to setup and run the AWS environment.

Start by logging into the AWS management console with a user account that has enough privileges to create a new Virtual Private Cloud (VPC).

Set up the basic AWS environment for FortiSandbox

Create a Virtual Private Cloud (VPC)

1. Go to *VPC Dashboard* > *Your VPCs* and click *Create VPC*.



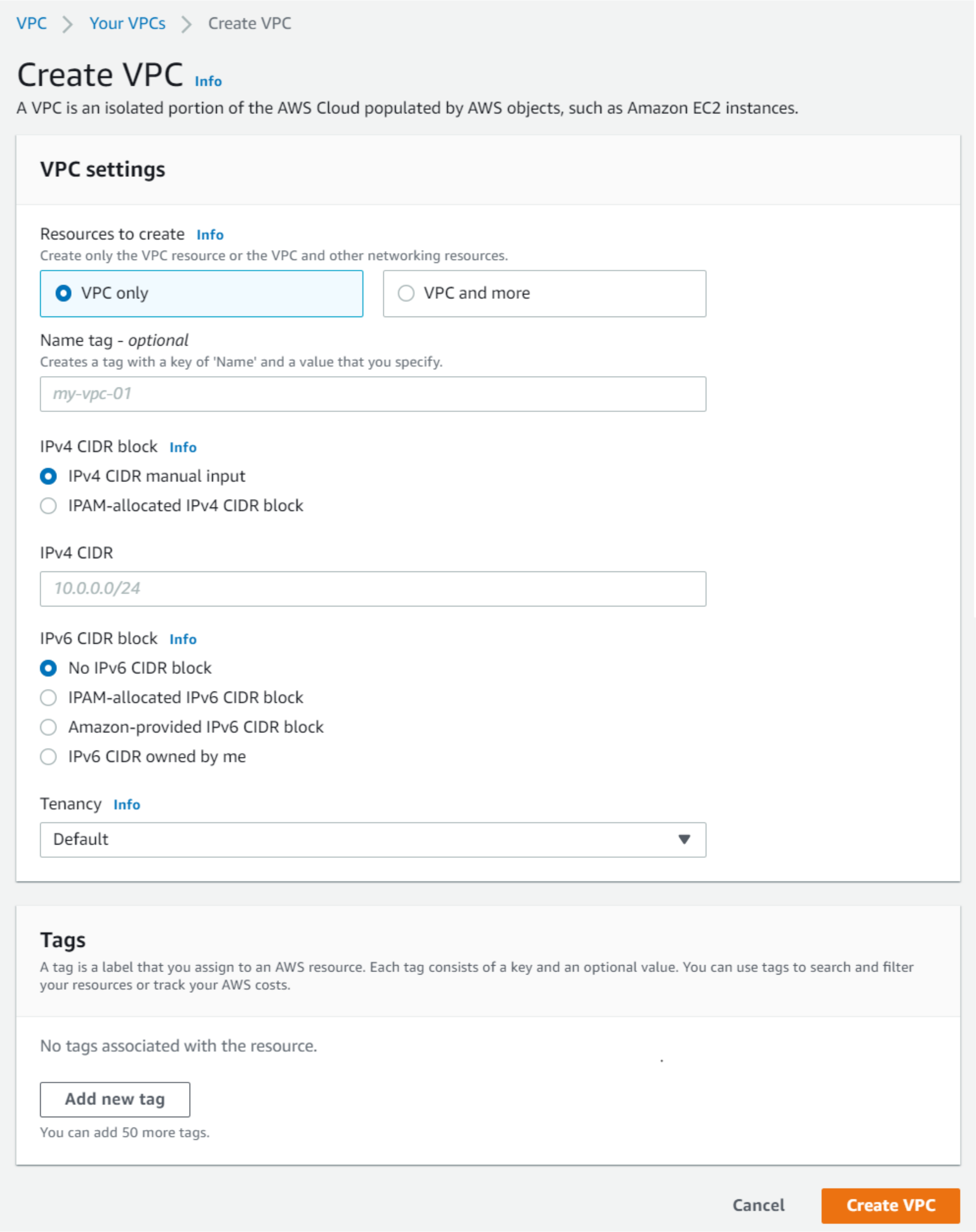
□	Name	VPC ID	State	IPv4 CIDR	IPv6 CIDR	IPv6 pool
□	vmPeerVPC	vpc-0ac0a6038de45668f	✓ Available	10.50.0.0/16	–	–
□	easyVPC	vpc-0d414f81a0e046ec7	✓ Available	2 CIDRs	2600:1f11:18b:5100::/56 ✓ A...	Amazon ✓ Associate

Create a new VPC even though there is a default VPC.

2. Enter the following information, then click *Create VPC*.

Name tag	Enter a name. For example, *FortiSandbox*.
IPv4 CIDR block	1. Enter a subnet such as 10.0.0.0/16 that will cover the IP ranges this VPC will use.
IPv6 CIDR block	Enter a valid IPv6 CIDR block that will cover IP ranges this VPC will use, or select *No IPv6 CIDR Block* if IPv6 IP address is not used.
Tenancy	Select *Default*.

- For *Name tag*,
- For *IPv4 CIDR block*, enter a subnet such as 10.0.0.0/16 that will cover the IP ranges this VPC will use.
- For *IPv6 CIDR block*, enter a valid IPv6 CIDR block that will cover IP ranges this VPC will use, or select *No IPv6 CIDR Block* if IPv6 IP address is not used.
- For *Tenancy*, select *Default*.



VPC > Your VPCs > Create VPC

Create VPC Info

A VPC is an isolated portion of the AWS Cloud populated by AWS objects, such as Amazon EC2 instances.

VPC settings

Resources to create Info

Create only the VPC resource or the VPC and other networking resources.

● VPC only ○ VPC and more

Name tag - *optional*

Creates a tag with a key of 'Name' and a value that you specify.

my-vpc-01

IPv4 CIDR block Info

● IPv4 CIDR manual input

○ IPAM-allocated IPv4 CIDR block

IPv4 CIDR

10.0.0.0/24

IPv6 CIDR block Info

● No IPv6 CIDR block

○ IPAM-allocated IPv6 CIDR block

○ Amazon-provided IPv6 CIDR block

○ IPv6 CIDR owned by me

Tenancy Info

Default ▼

Tags

A tag is a label that you assign to an AWS resource. Each tag consists of a key and an optional value. You can use tags to search and filter your resources or track your AWS costs.

No tags associated with the resource.

Add new tag

You can add 50 more tags.

Cancel Create VPC

Create network subnets for FortiSandbox instance

On AWS, FortiSandbox uses Port1 or any other administrative port set through the CLI command `set-admin-port` as reserved for device management, and Port2 be reserved to communicate with local Windows VM or Linux clones. The other ports are used for file inputs from client devices and inter-communication among cluster nodes. Each port should be on its dedicated subnet.

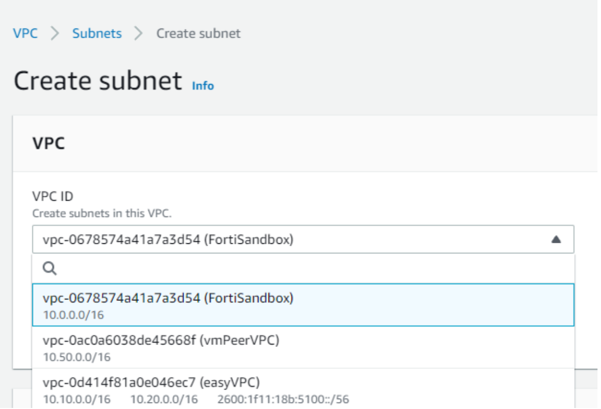
In a regular setup, these two subnets should be created:

- **Management subnet** on which FortiSandbox management interface listens. Client devices can also connect to this subnet to submit files. We will use *IPv4 CIDR 10.0.0.0/24* as an example in following sections.
- **Local VM clones communication subnet** which FortiSandbox instances use to communicate with local Windows or Linux clones. If you choose to use Windows cloud clones located in Fortinet Data Center, this subnet is not required. We will use IPv4 CIDR 10.0.1.0/24 as example in the following sections.

If needed, you can create more subnets, such as for client devices to submit files, or inter-communications between HA Cluster nodes.

To create a subnet:

1. Click *Subnets* > *Create Subnet*.
2. In the *Create Subnet* dialog box, enter the following information, then click *Create subnet*.
   - For *Name tag*, enter a meaningful name. For example, *Public_FortiSandbox*.
   - For *VPC*, select the VPC you just created.
   - For *IPV4 CIDR block*, enter a valid block such as `10.0.0.0/24`.



VPC > Subnets > Create subnet

Create subnet Info

VPC

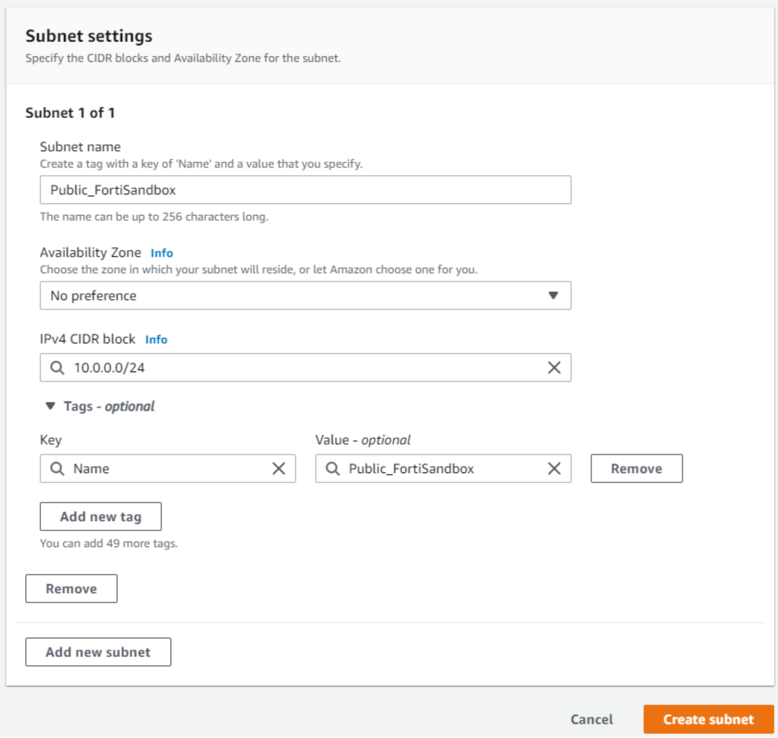
VPC ID
Create subnets in this VPC.

vpc-0678574a41a7a3d54 (FortiSandbox)

vpc-0678574a41a7a3d54 (FortiSandbox)
10.0.0.0/16

vpc-0ac0a6038de45668f (vmPeerVPC)
10.50.0.0/16

vpc-0d414f81a0e046ec7 (easyVPC)
10.10.0.0/16 10.20.0.0/16 2600:1f11:18b:5100::/56



Subnet settings

Specify the CIDR blocks and Availability Zone for the subnet.

Subnet 1 of 1

Subnet name

Create a tag with a key of 'Name' and a value that you specify.

Public_FortiSandbox

The name can be up to 256 characters long.

Availability Zone Info

Choose the zone in which your subnet will reside, or let Amazon choose one for you.

No preference

IPv4 CIDR block Info

10.0.0.0/24

Tags - *optional*

Key	Value - *optional*
Name	Public_FortiSandbox

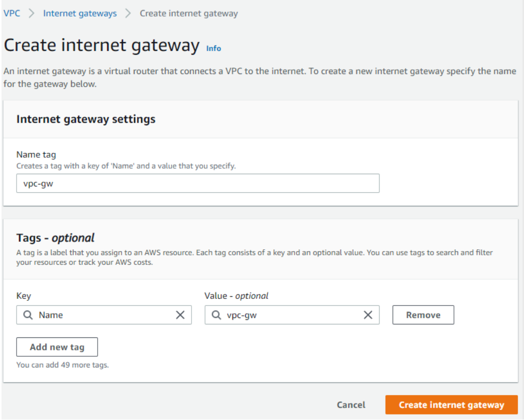
You can add 49 more tags.

Create an internet gateway

If VPC needs to communicate with the Internet, for example, for FortiSandbox instance to get FortiGuard updates from Fortinet, or to access FortiSandbox instance from the Internet, an Internet gateway is needed.

To create an Internet gateway:

1. Under *Virtual Private Cloud* > *Internet Gateways*, click *Create Internet Gateway*.
2. For *Name tag*, enter a name. For example, *vpc-gw* and click *Create internet gateway*.



Create internet gateway Info

An internet gateway is a virtual router that connects a VPC to the internet. To create a new internet gateway specify the name for the gateway below.

Internet gateway settings

Name tag

Creates a tag with a key of 'Name' and a value that you specify.

vpc-gw

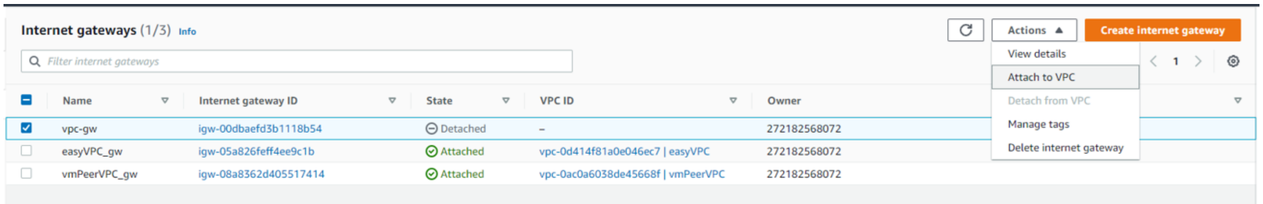
Tags - *optional*

A tag is a label that you assign to an AWS resource. Each tag consists of a key and an optional value. You can use tags to search and filter your resources or track your AWS costs.

Key	Value - *optional*
Name	vpc-gw

You can add 49 more tags.

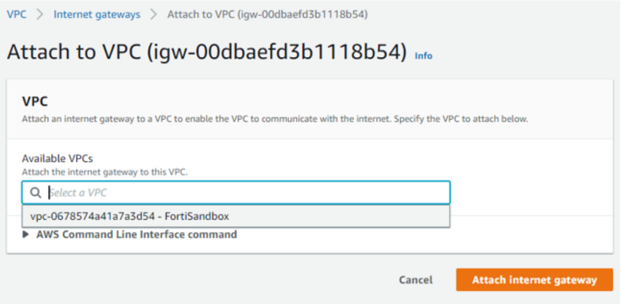
3. When the Internet Gateway is created, click *Attach to VPC*.



Internet gateways (1/3) Info

	Name	Internet gateway ID	State	VPC ID	Owner
☑	vpc-gw	igw-00dbaefd3b1118b54	Detached	–	272182568072
□	easyVPC_gw	igw-05a826feff4ee9c1b	Attached	vpc-0d414f81a0e046ec7 | easyVPC	272182568072
□	vmPeerVPC_gw	igw-08a8362d405517414	Attached	vpc-0ac0a6038de45668f | vmPeerVPC	272182568072

4. Select the VPC and click *Attach internet gateway*.



VPC > Internet gateways > Attach to VPC (igw-00dbaefd3b1118b54)

Attach to VPC (igw-00dbaefd3b1118b54) Info

VPC

Attach an internet gateway to a VPC to enable the VPC to communicate with the internet. Specify the VPC to attach below.

Available VPCs

Attach the internet gateway to this VPC.

Select a VPC

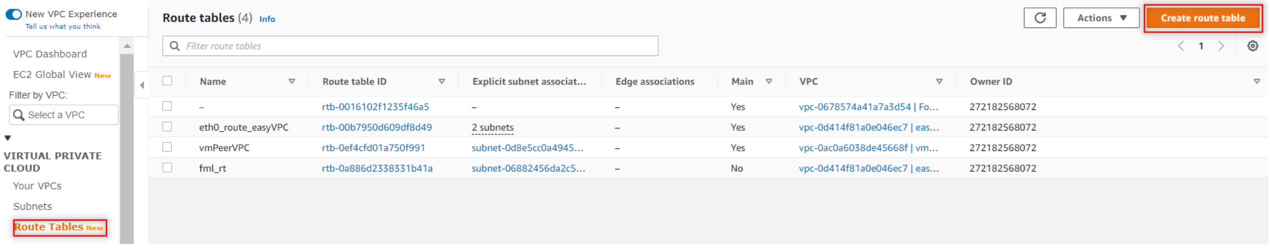
vpc-0678574a41a7a3d54 - FortiSandbox

Create a route table

Appropriate route table entries are needed for the FortiSandbox instance to communicate with other network entities.

To create route table and entries:

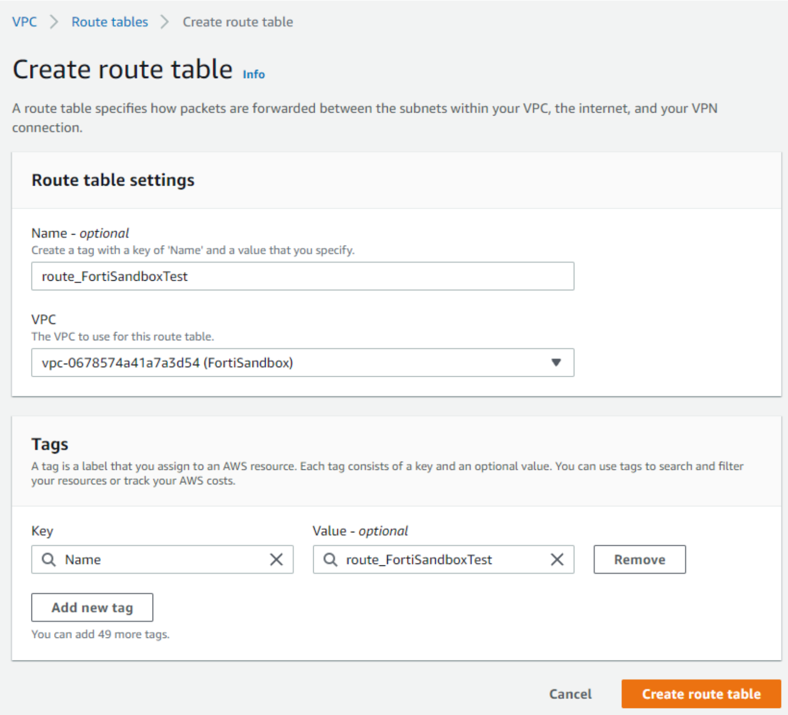
1. Under *Virtual Private Cloud* > *Route Tables*, click *Create Route Table*.



Route tables (4) Info

	Name	Route table ID	Explicit subnet associat...	Edge associations	Main	VPC	Owner ID
□	–	rtb-0016102f1235f46a5	–	–	Yes	vpc-0678574a41a7a3d54 | Fo...	272182568072
□	eth0_route_easyVPC	rtb-00b7950d609df8d49	2 subnets	–	Yes	vpc-0d414f81a0e046ec7 | eas...	272182568072
□	vmPeerVPC	rtb-0ef4cfd01a750f991	subnet-0d8e5cc0a4945...	–	Yes	vpc-0ac0a6038de45668f | vm...	272182568072
□	fml_rt	rtb-0a886d2338331b41a	subnet-06882456da2c5...	–	No	vpc-0d414f81a0e046ec7 | eas...	272182568072

2. In the *Create Route Table* dialog box, enter the following information, then click *Create route table*.
   - For *Name tag*, enter a name. For example, *route_FortiSandboxTest*.
   - For *VPC*, select the VPC you created.



VPC > Route tables > Create route table

Create route table Info

A route table specifies how packets are forwarded between the subnets within your VPC, the internet, and your VPN connection.

Route table settings

Name - *optional*
Create a tag with a key of 'Name' and a value that you specify.
route_FortiSandboxTest

VPC
The VPC to use for this route table.
vpc-0678574a41a7a3d54 (FortiSandbox)

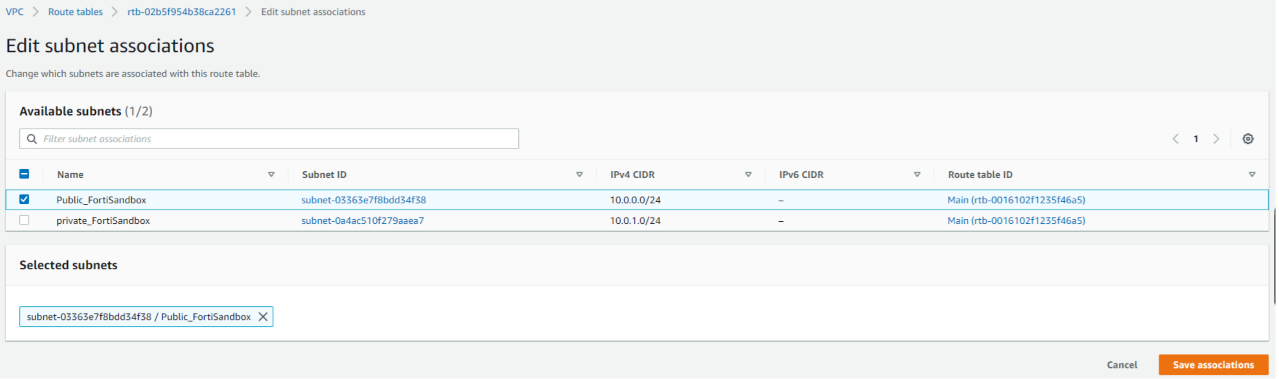
Tags
A tag is a label that you assign to an AWS resource. Each tag consists of a key and an optional value. You can use tags to search and filter your resources or track your AWS costs.

Key	Value - *optional*	
Name	route_FortiSandboxTest	Remove

Add new tag
You can add 49 more tags.

Cancel | Create route table

3. Go to *Subnet Associations > Edit subnet associations*, select the management subnet you created, then click *Save associations.*.



VPC > Route tables > rtb-02b5f954b38ca2261 > Edit subnet associations

Edit subnet associations

Change which subnets are associated with this route table.

Available subnets (1/2)

Filter subnet associations

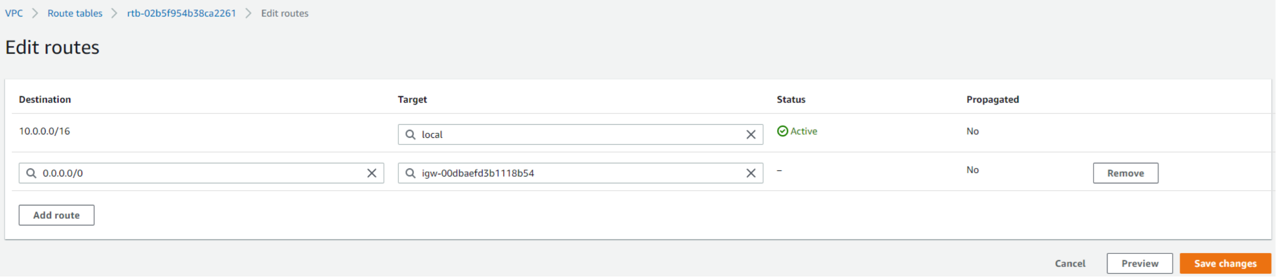
	Name	Subnet ID	IPv4 CIDR	IPv6 CIDR	Route table ID
☑	Public_FortiSandbox	subnet-03363e7f8bdd34f38	10.0.0.0/24	–	Main (rtb-0016102f1235f46a5)
□	private_FortiSandbox	subnet-0a4ac510f279aaea7	10.0.1.0/24	–	Main (rtb-0016102f1235f46a5)

Selected subnets

subnet-03363e7f8bdd34f38 / Public_FortiSandbox

Cancel | Save associations

4. After the route table is created, you can add static route entries to define how the FortiSandbox instance to communicate with others. For example, to access FortiSandbox instance from the Internet:
Go to *Routes > Add Route*, enter the following information, then click *Save changes*.
    - For *Destination*, enter `0.0.0.0/0`.
    - For *Target*, select the internet gateway for the management subnet you created.



VPC > Route tables > rtb-02b5f954b38ca2261 > Edit routes

Edit routes

Destination	Target	Status	Propagated	
10.0.0.0/16	local	✓ Active	No	
0.0.0.0/0	igw-00dbaefd3b1118b54	-	No	Remove

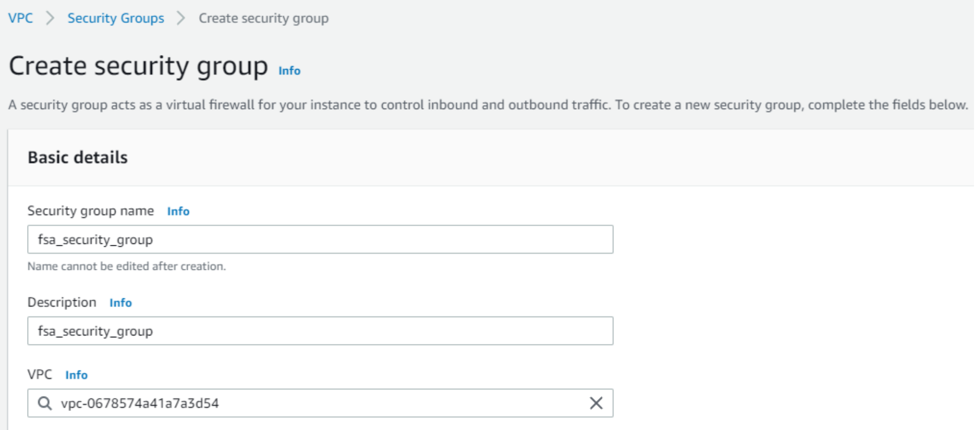
Add route

Cancel | Preview | Save changes

Create a security group

It's important to limit only valid network traffic to and from FortiSandbox instance. To do that, you will need to create security groups and security rules for traffic.

1. Under *Virtual Private Cloud* > *Security Groups*, click *Create security group*.
2. Enter the following information for the *Basic details* settings.
   - For *Security group name*, enter a name.
   - For *Description*, enter a description.
   - For *VPC*, select the VPC you just created.



Create security group Info

A security group acts as a virtual firewall for your instance to control inbound and outbound traffic. To create a new security group, complete the fields below.

Basic details

Security group name Info

fsa_security_group

Name cannot be edited after creation.

Description Info

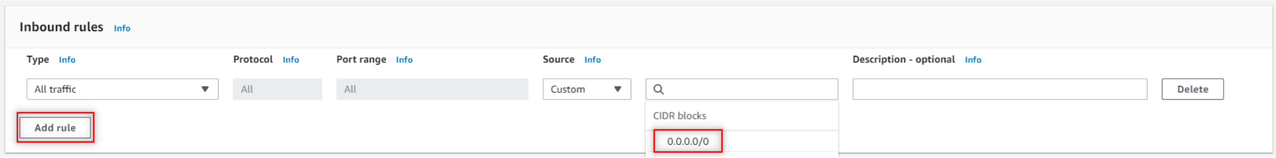
fsa_security_group

VPC Info

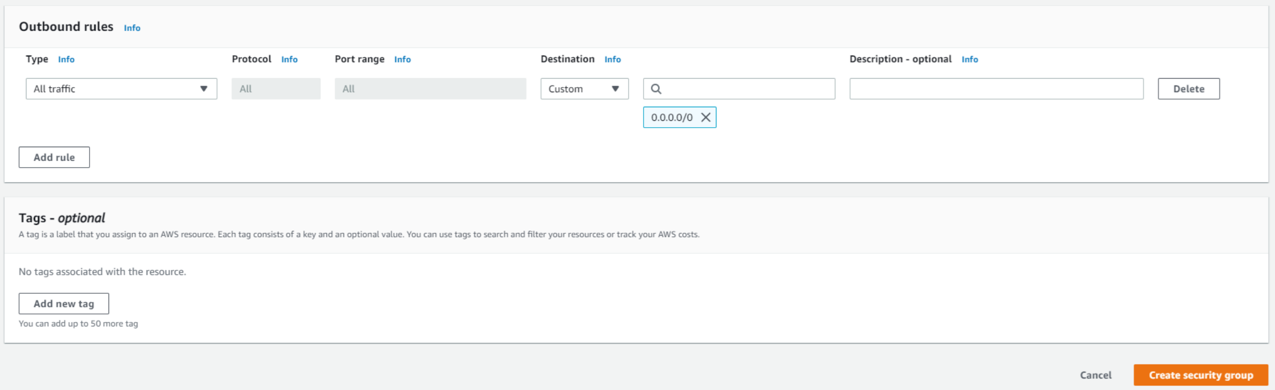
vpc-0678574a41a7a3d54

3. Add the following Inbound rules:

Details	Value
Type	Custom TCP.
Protocol	TCP
Port Range	Allow the following ports to be accessible: • 443 (HTTPS) • 22 (if SSH access is needed) • 514 (if Fortinet Fabric devices such as FortiGate and FortiMail need to submit jobs) • 9833 (for on-demand interactive scans) • 21 (FortiSandbox hardcoded port2 to communicate with custom VM clones via FTP) More rules can be added. For example, you can add a rule to allow access to FortiSandbox's MTA adapter. For more port information, see *Port Information* section of the *FortiSandbox Administration Guide*.
Source	Custom. For the *SourceIP*, enter a trusted IP range that can access the FortiSandbox instance.



4. Allow all traffic for outbound rules, then click *Create security group*.



A tag is a label that you assign to an AWS resource. Each tag consists of a key and an optional value. You can use tags to search and filter your resources or track your AWS costs.

No tags associated with the resource.

You can add up to 50 more tag

Generate AWS access key for FortiSandbox

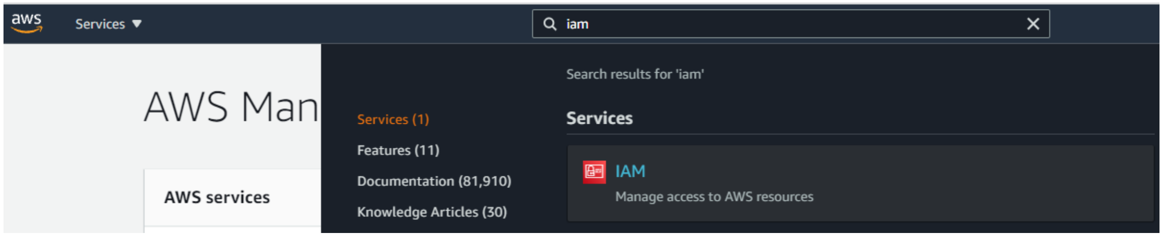
You will need to generate an access key from your AWS account to allow the FortiSandbox instance to access AWS resources.

To generate a AWS access key for FortiSandbox:

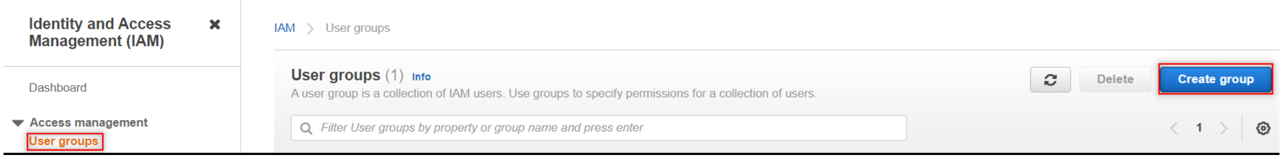
1. Create an IAM group
2. Attach policies
3. Create IAM users and an AWS API key

Create an IAM group

1. In the *AWS Management Console*, create one or more IAM users.
2. Log into the AWS Console.
3. Click *Search* and search for *IAM*.



4. Click *User Groups* > *Create Group*.


Identity and Access Management (IAM)
Dashboard
Access management
User groups
IAM > User groups
User groups (1) Info
Delete
Create group
Filter User groups by property or group name and press enter
1

A user group is a collection of IAM users. Use groups to specify permissions for a collection of users.

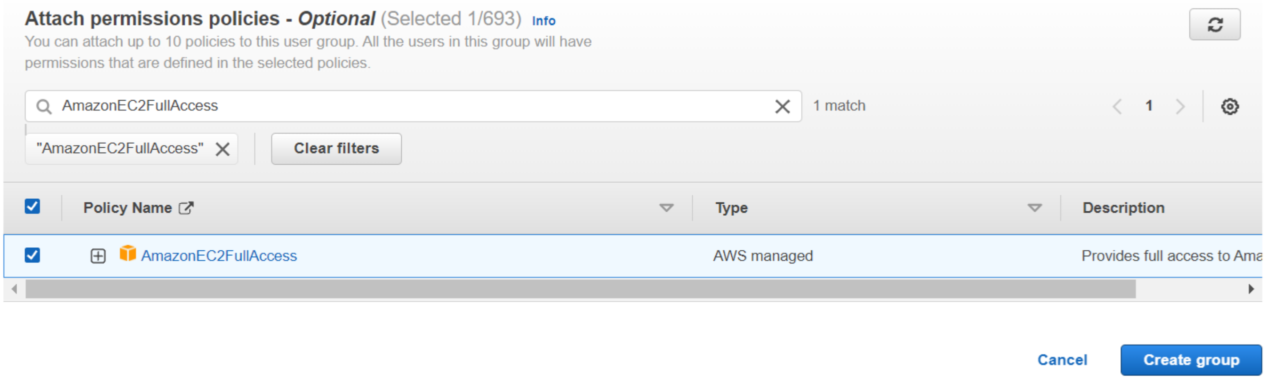
5. In the *User group name* field, enter a name, for example, *QA_FortiSandboxTest*.

Attach policies

You must have the correct permissions to attach policies to a group. Add the following policies to the group you created (QA_FortiSandbox).

- AmazonEC2FullAccess
- IAMFullAccess
- AmazonS3FullAccess
- AdministratorAccess
- AmazonVPCFullAccess
- AWSImportExportFullAccess
- VMImportExportRoleForAWSConnector
- AmazonRoute53FullAccess

1. Click *Filter* and enter *AmazonEC2FullAccess*.
2. Select the checkbox beside *AmazonEC2FullAccess*.


Attach permissions policies - Optional (Selected 1/693) Info
1 match
1
Clear filters
Cancel
Create group

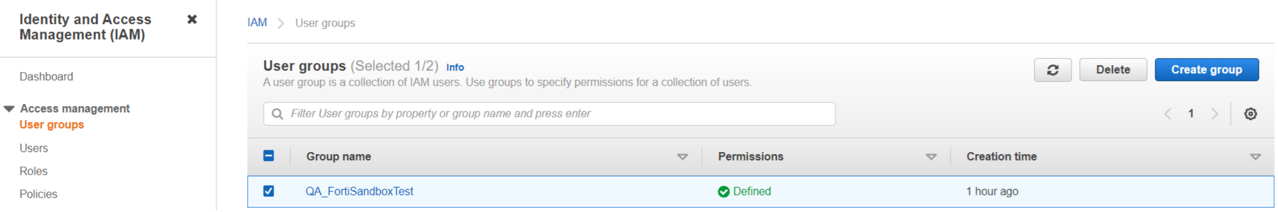
You can attach up to 10 policies to this user group. All the users in this group will have permissions that are defined in the selected policies.

AmazonEC2FullAccess

"AmazonEC2FullAccess"

☑	Policy Name	Type	Description
☑	AmazonEC2FullAccess	AWS managed	Provides full access to Ama

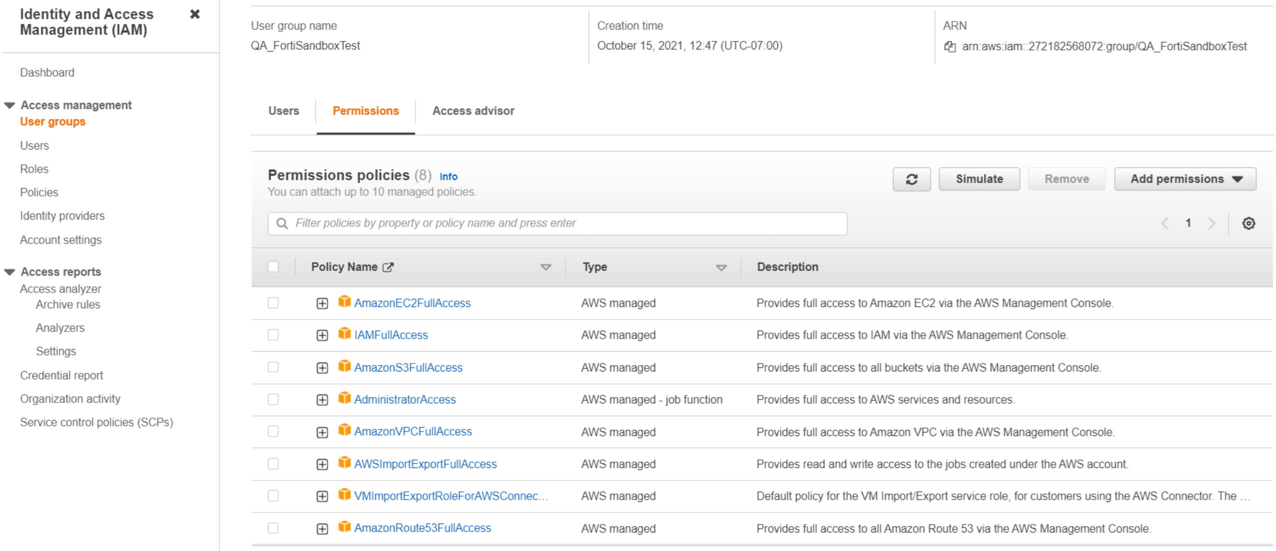
3. Repeat this for all policies.
4. Click *Create Group*.
5. Check the group you created (*QA_FortiSandbox*) to review the group summary.


Identity and Access Management (IAM)
Dashboard
Access management
User groups
Users
Roles
Policies
IAM > User groups
User groups (Selected 1/2) Info
Delete
Create group
Filter User groups by property or group name and press enter
1

A user group is a collection of IAM users. Use groups to specify permissions for a collection of users.

☐	Group name	Permissions	Creation time
☑	QA_FortiSandboxTest	✓ Defined	1 hour ago

6. In the *Permissions* tab, review the attached policies.



User group name: QA_FortiSandboxTest

Creation time: October 15, 2021, 12:47 (UTC-07:00)

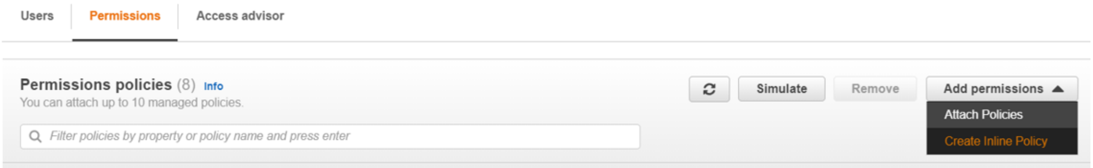
ARN: arn:aws:iam::272182568072:group/QA_FortiSandboxTest

Permissions policies (8) Info

You can attach up to 10 managed policies.

Policy Name	Type	Description
AmazonEC2FullAccess	AWS managed	Provides full access to Amazon EC2 via the AWS Management Console.
IAMFullAccess	AWS managed	Provides full access to IAM via the AWS Management Console.
AmazonS3FullAccess	AWS managed	Provides full access to all buckets via the AWS Management Console.
AdministratorAccess	AWS managed - job function	Provides full access to AWS services and resources.
AmazonVPCFullAccess	AWS managed	Provides full access to Amazon VPC via the AWS Management Console.
AWSImportExportFullAccess	AWS managed	Provides read and write access to the jobs created under the AWS account.
VMImportExportRoleForAWSConnec...	AWS managed	Default policy for the VM Import/Export service role, for customers using the AWS Connector. The ...
AmazonRoute53FullAccess	AWS managed	Provides full access to all Amazon Route 53 via the AWS Management Console.

7. Click *Add permissions* > *Create Inline Policies*. Select *Custom Policy* and use the policy editor to customize your own set of permissions.

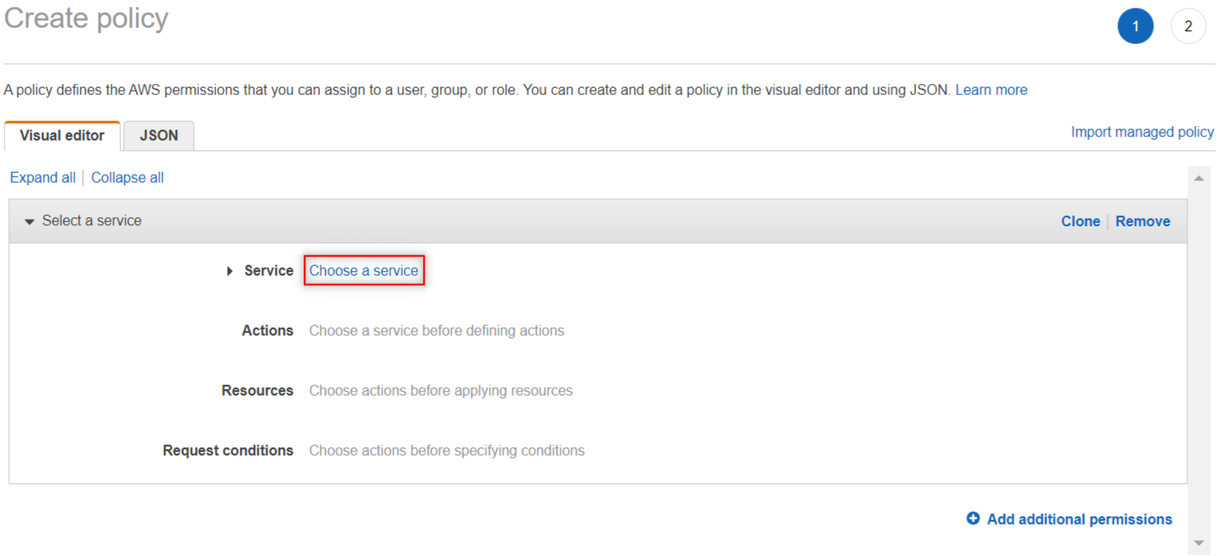


Permissions policies (8) Info

You can attach up to 10 managed policies.

8. You can use the AWS Visual editor or a JSON editor to create policies. If the validation is successful, click *Review Policy*.

- **To create the policy by using AWS Visual editor:**



A policy defines the AWS permissions that you can assign to a user, group, or role. You can create and edit a policy in the visual editor and using JSON. Learn more

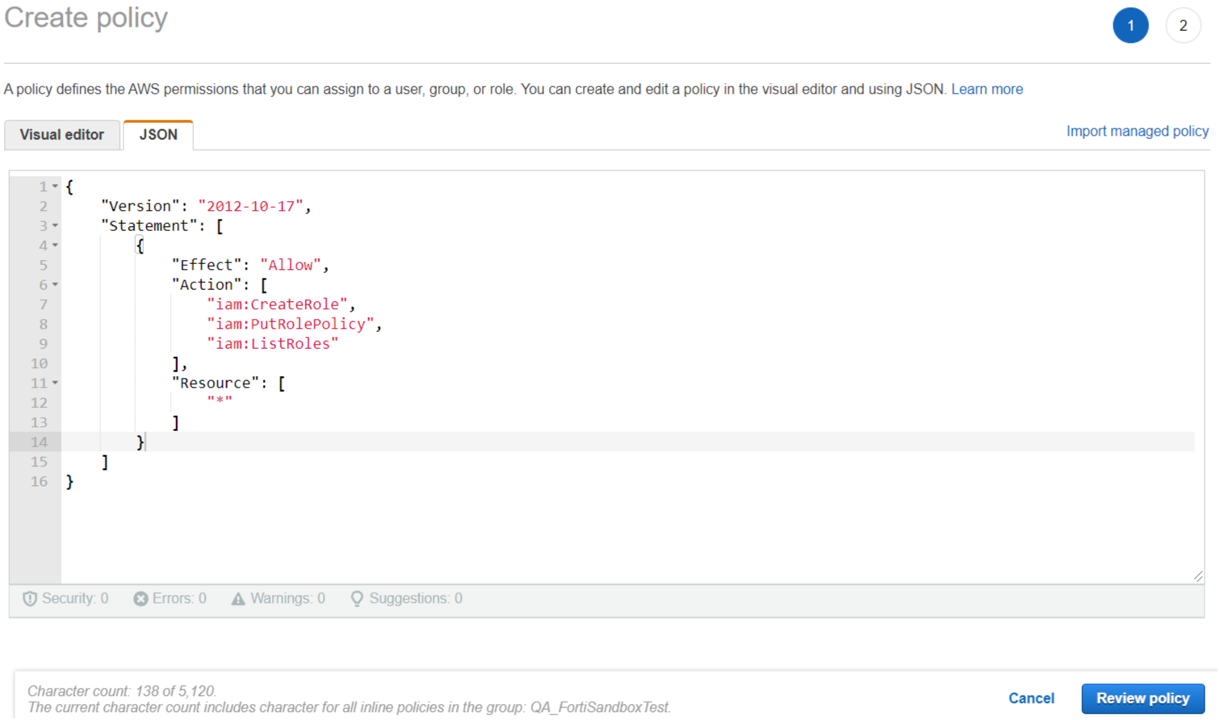
Service: Choose a service

Actions: Choose a service before defining actions

Resources: Choose actions before applying resources

Request conditions: Choose actions before specifying conditions

- **To create the policy in JSON format:**



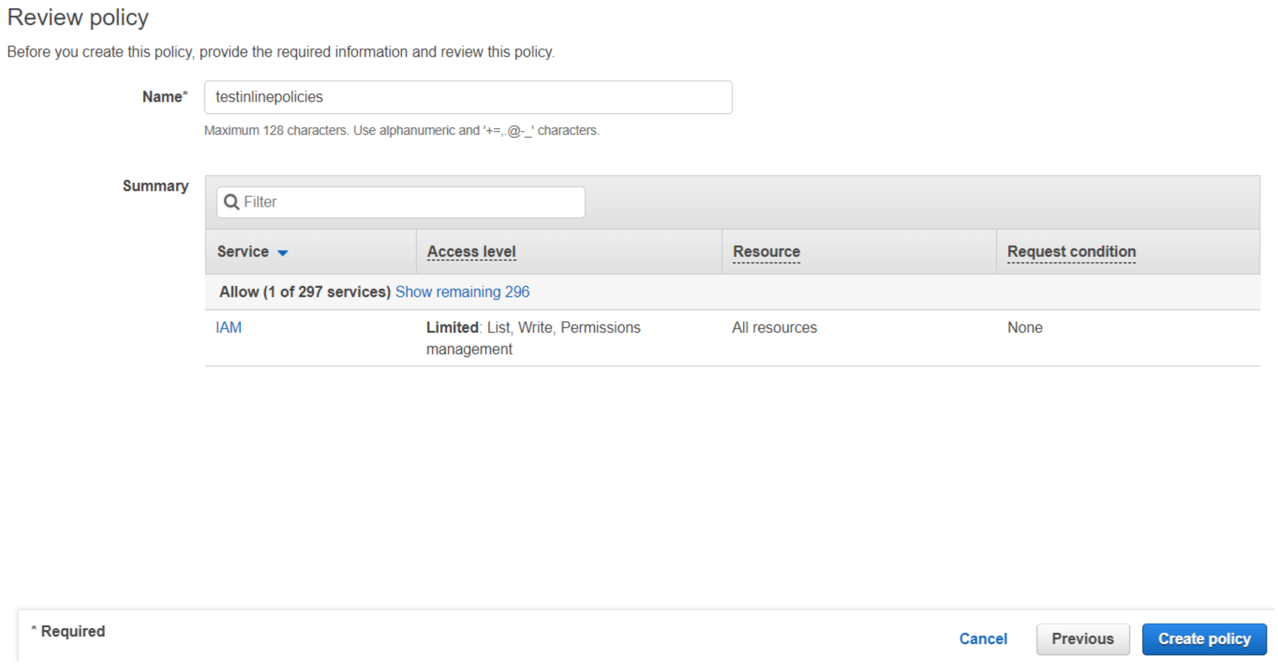
A policy defines the AWS permissions that you can assign to a user, group, or role. You can create and edit a policy in the visual editor and using JSON. Learn more

```
{
    "Version": "2012-10-17",
    "Statement": [
        {
            "Effect": "Allow",
            "Action": [
                "iam:CreateRole",
                "iam:PutRolePolicy",
                "iam:ListRoles"
            ],
            "Resource": [
                "*"
            ]
        }
    ]
}
```

Security: 0 Errors: 0 Warnings: 0 Suggestions: 0

Character count: 138 of 5,120.
The current character count includes character for all inline policies in the group: QA_FortiSandboxTest.

9. Under *Review policy*, enter a policy *Name* and then click *Create policy*.



Before you create this policy, provide the required information and review this policy.

Name* testinlinepolicies

Maximum 128 characters. Use alphanumeric and '+=,.@-_' characters.

Summary

Filter

Service	Access level	Resource	Request condition
Allow (1 of 297 services) Show remaining 296			
IAM	**Limited**: List, Write, Permissions management	All resources	None

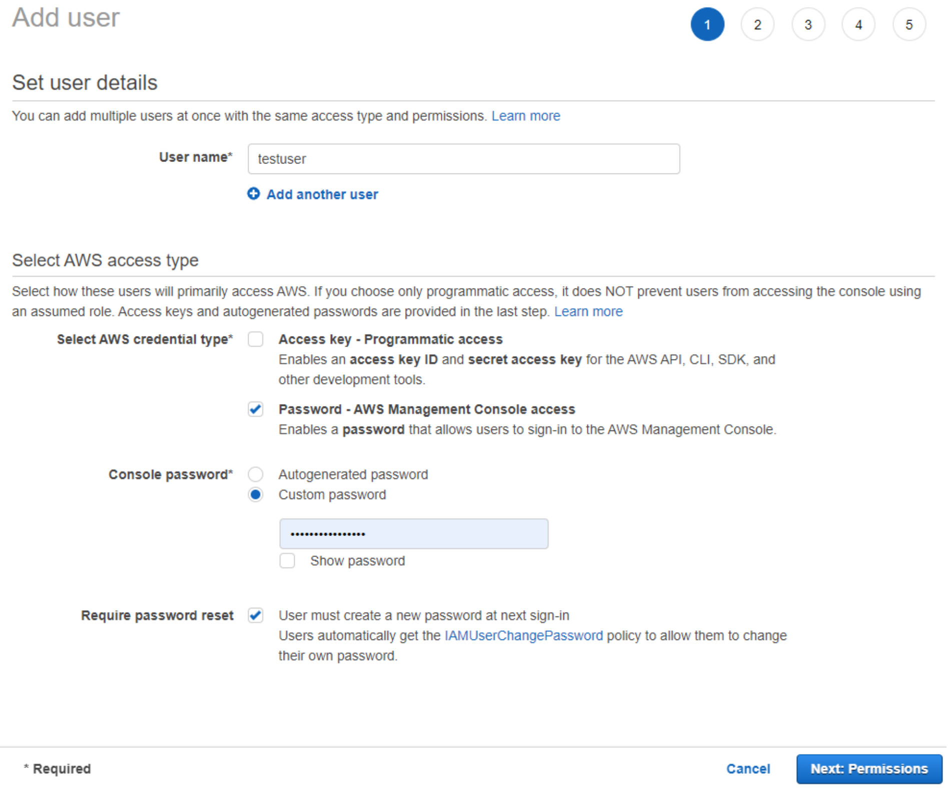
* **Required**

10. Under *Permissions policies*, review the policies you created.

Create IAM users and an AWS API key

To create an IAM user:

1. Go to *Users* and click *Add User*.
2. Configure the following and then click *Next: Permissions*.
   - For *User name*, enter a username.
   - For *Access type*, select *Password - AWS Management Console access*.
   - For *Console Password*, select *Custom password* and enter a password.



Add user

Set user details

You can add multiple users at once with the same access type and permissions. Learn more

User name* testuser

Select AWS access type

Select how these users will primarily access AWS. If you choose only programmatic access, it does NOT prevent users from accessing the console using an assumed role. Access keys and autogenerated passwords are provided in the last step. Learn more

Select AWS credential type*

□ **Access key - Programmatic access**
Enables an **access key ID** and **secret access key** for the AWS API, CLI, SDK, and other development tools.

☑ **Password - AWS Management Console access**
Enables a **password** that allows users to sign-in to the AWS Management Console.

Console password*

○ Autogenerated password
● Custom password

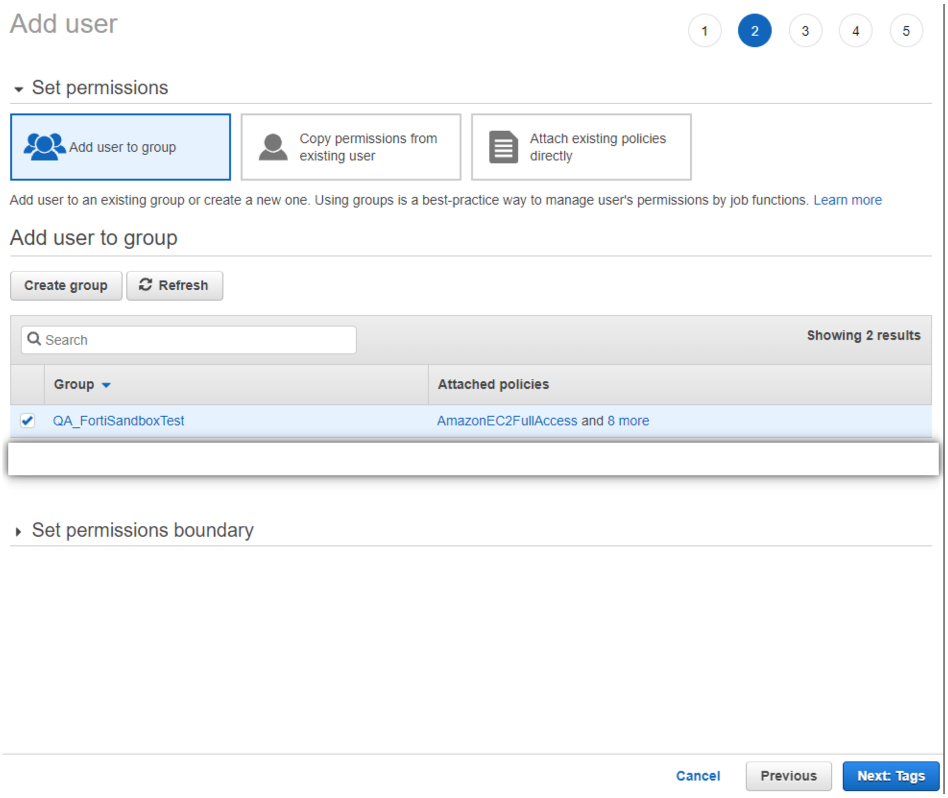
•••••••••••••••••

□ Show password

Require password reset ☑ User must create a new password at next sign-in
Users automatically get the IAMUserChangePassword policy to allow them to change their own password.

* Required

3. Search for the *Group Name* you created (*QA_FortiSandbox*) and then click *Next: Tags*.

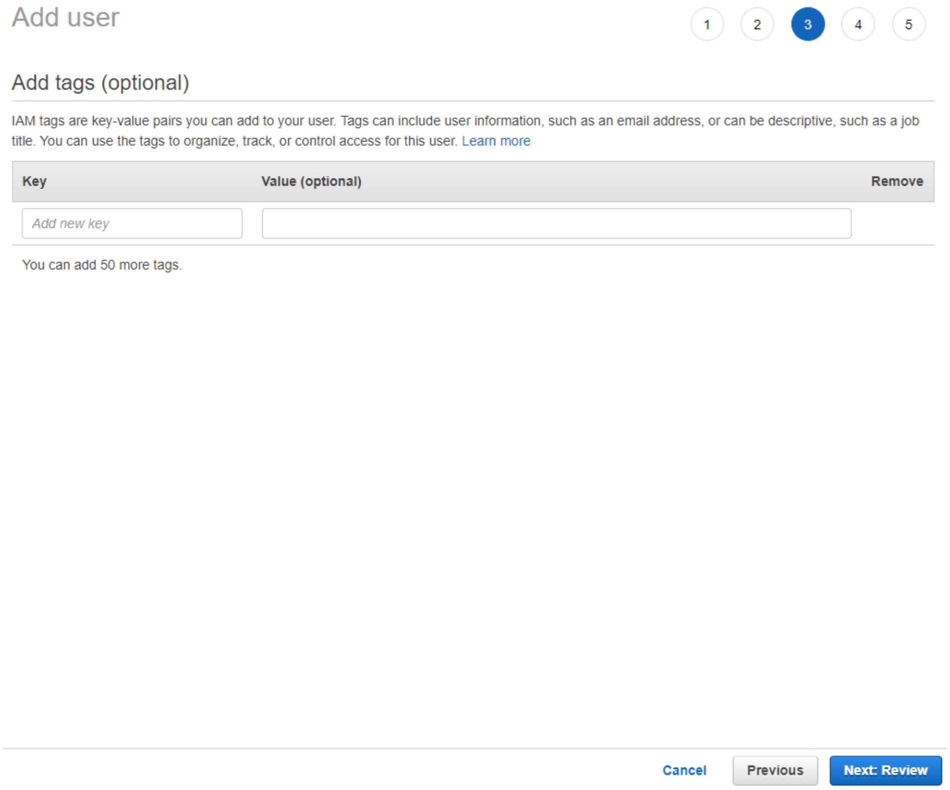


Add user to an existing group or create a new one. Using groups is a best-practice way to manage user's permissions by job functions. Learn more

Add user to group

	Group	Attached policies
☑	QA_FortiSandboxTest	AmazonEC2FullAccess and 8 more

4. (Optional) Add any tags that you need. If you do not require any tags, click *Next: Review*.



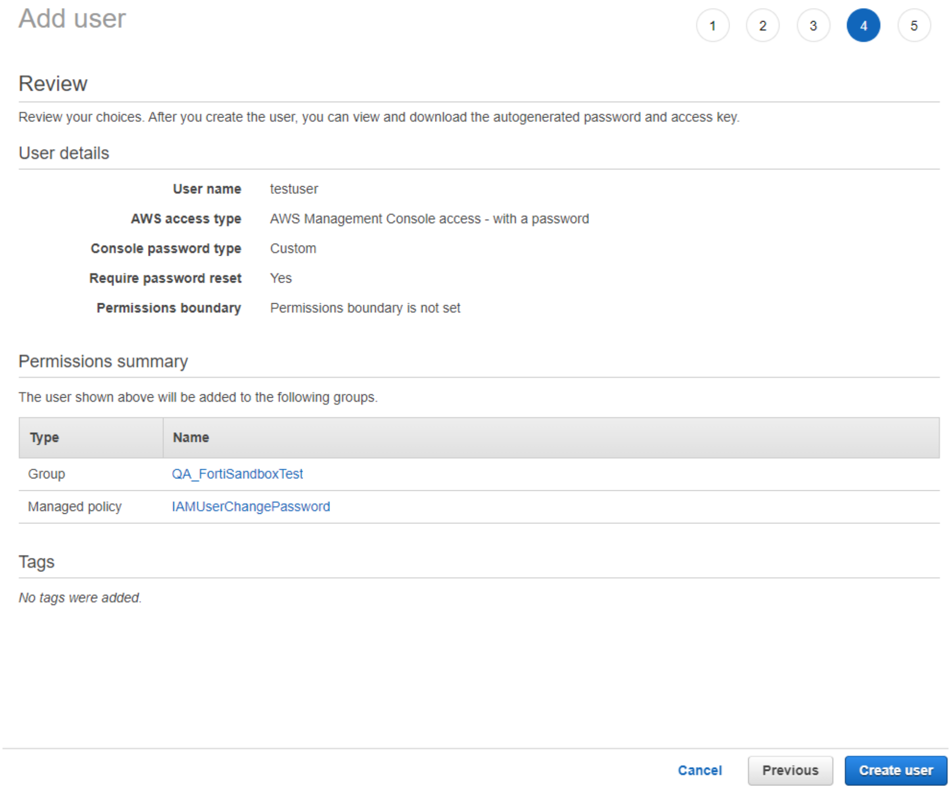
Add tags (optional)

IAM tags are key-value pairs you can add to your user. Tags can include user information, such as an email address, or can be descriptive, such as a job title. You can use the tags to organize, track, or control access for this user. Learn more

Key	Value (optional)	Remove
Add new key		

You can add 50 more tags.

5. Under *Review*, review the user details, then click *Create user*.



Review

Review your choices. After you create the user, you can view and download the autogenerated password and access key.

User details

User name	testuser
AWS access type	AWS Management Console access - with a password
Console password type	Custom
Require password reset	Yes
Permissions boundary	Permissions boundary is not set

Permissions summary

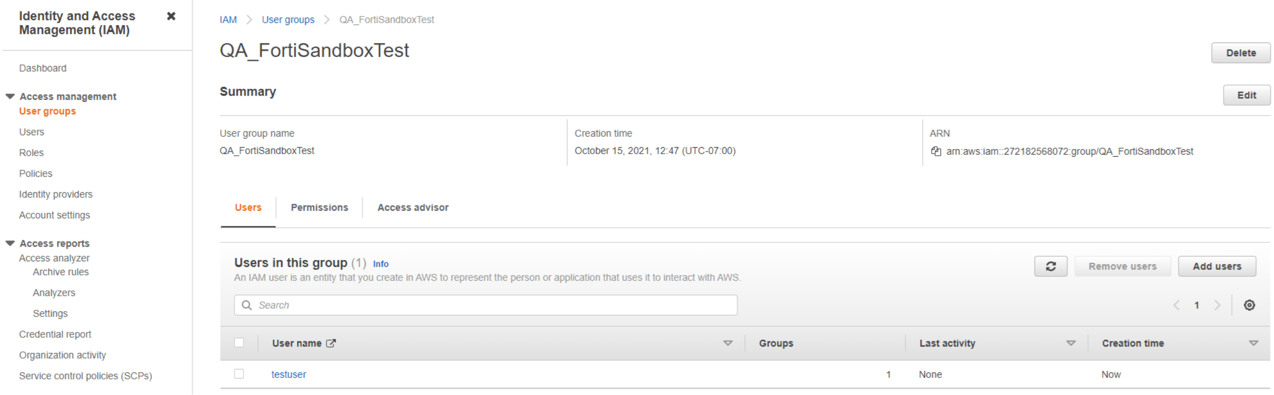
The user shown above will be added to the following groups.

Type	Name
Group	QA_FortiSandboxTest
Managed policy	IAMUserChangePassword

Tags

No tags were added.

6. Click *Close*.
7. Click *User groups* to view the user you created.



QA_FortiSandboxTest

Summary

User group name	Creation time	ARN
QA_FortiSandboxTest	October 15, 2021, 12:47 (UTC-07:00)	arn:aws:iam::272182568072:group/QA_FortiSandboxTest

Users in this group (1) Info

An IAM user is an entity that you create in AWS to represent the person or application that uses it to interact with AWS.

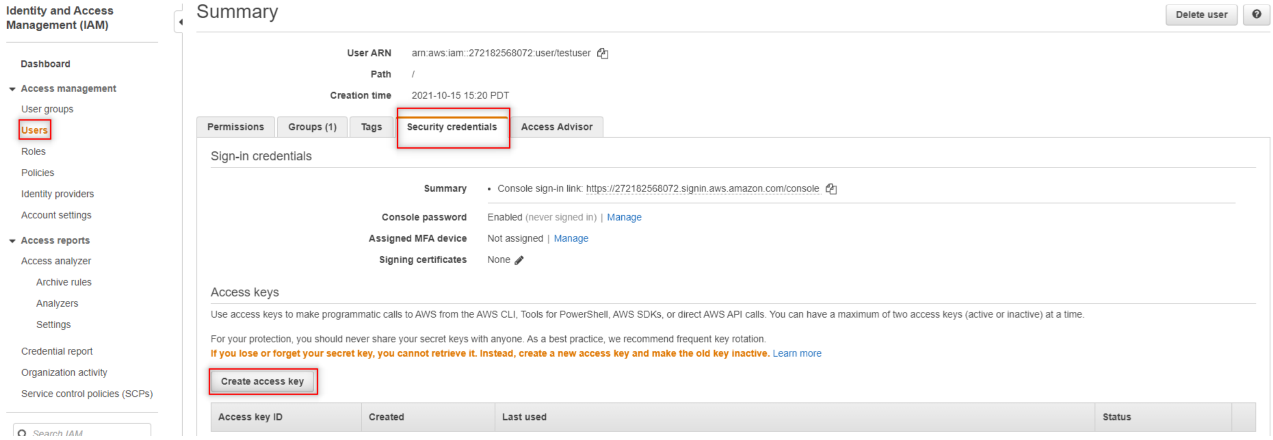
	User name	Groups	Last activity	Creation time
□	testuser	1	None	Now

8. Log out of the AWS management console and log in as the user you created.
9. Reset the password and click *Confirm* to change the password.

Create an AWS API Key

To create an AWS API key:

1. Go to *IAM* > *Users* > *created user* > *Security credentials* and click *Create access key*.



Summary

User ARN arn:aws:iam::272182568072:user/testuser

Path /

Creation time 2021-10-15 15:20 PDT

Sign-in credentials

Summary • Console sign-in link: https://272182568072.signin.aws.amazon.com/console

Console password Enabled (never signed in) | Manage

Assigned MFA device Not assigned | Manage

Signing certificates None

Access keys

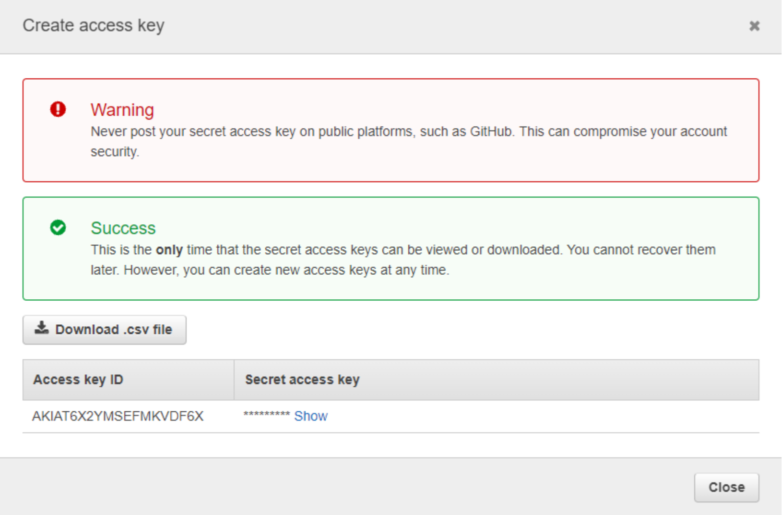
Use access keys to make programmatic calls to AWS from the AWS CLI, Tools for PowerShell, AWS SDKs, or direct AWS API calls. You can have a maximum of two access keys (active or inactive) at a time.

For your protection, you should never share your secret keys with anyone. As a best practice, we recommend frequent key rotation.

If you lose or forget your secret key, you cannot retrieve it. Instead, create a new access key and make the old key inactive. Learn more

Access key ID	Created	Last used	Status

2. In the *Create access key* dialog box, click *Download.csv file* to save the *Access key ID*.



Create access key

Warning
Never post your secret access key on public platforms, such as GitHub. This can compromise your account security.

Success
This is the **only** time that the secret access keys can be viewed or downloaded. You cannot recover them later. However, you can create new access keys at any time.

Access key ID	Secret access key
AKIAT6X2YMSEFMKVDF6X	********* Show

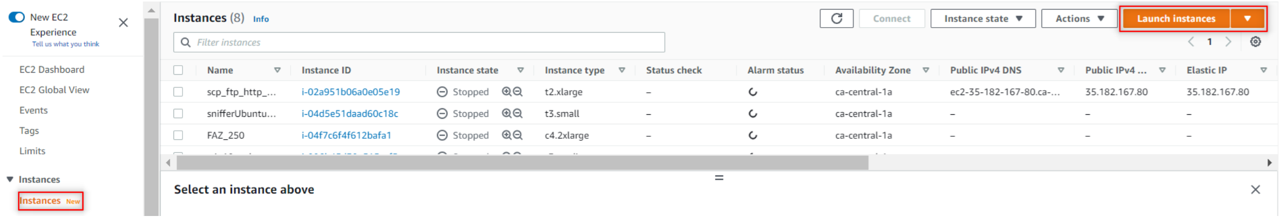
3. Click *Close*.

Deploy FortiSandbox on AWS (BYOL/On-Demand)

You can create your FortiSandbox instance on AWS in On-Demand mode or BYOL mode. For BYOL mode, a FortiNDR VM00 license file should be purchased and uploaded.

Choose an Amazon Machine Image (AMI)

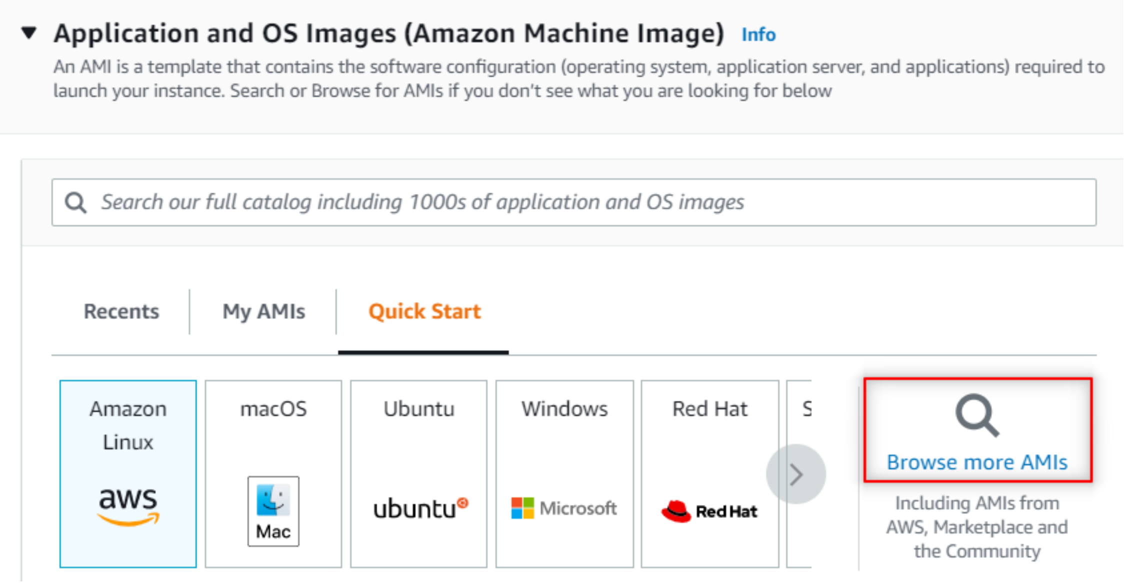
1. Go to *EC2* > *Instances* and click *Launch Instance*.



Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IPv4 DNS	Public IPv4 ...	Elastic IP
scp_ftp_http_...	i-02a951b06a0e05e19	Stopped	t2.xlarge	–		ca-central-1a	ec2-35-182-167-80.ca-...	35.182.167.80	35.182.167.80
snifferUbuntu...	i-04d5e51daad60c18c	Stopped	t3.small	–		ca-central-1a	–	–	–
FAZ_250	i-04f7c6f4f612bafa1	Stopped	c4.2xlarge	–		ca-central-1a	–	–	–

Select an instance above

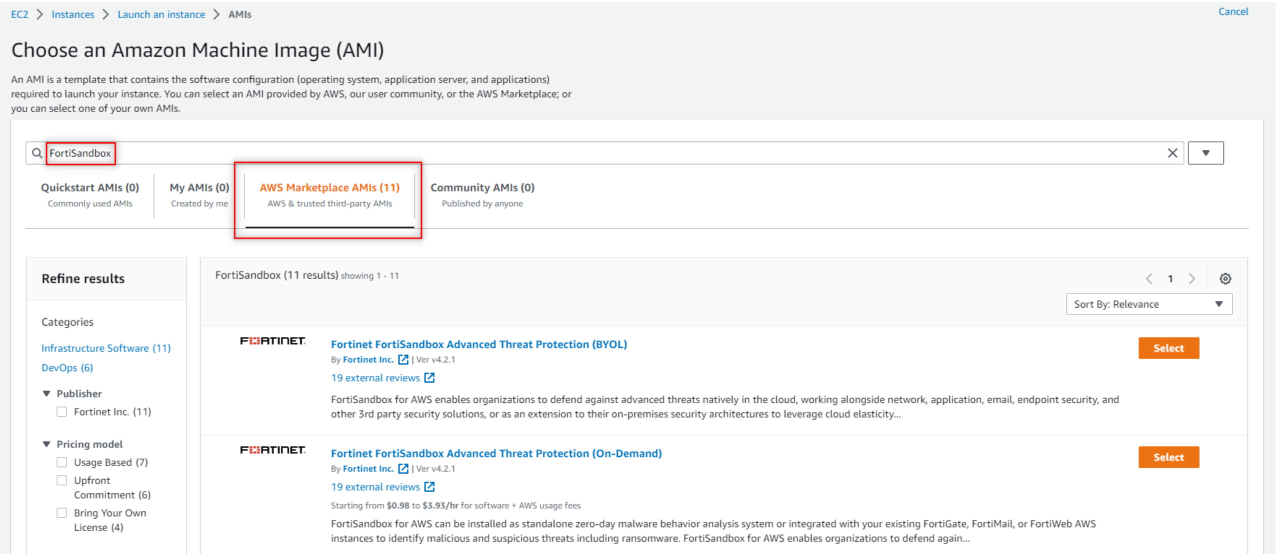
2. On the *Launch an instance* page, browse for the FortiSandbox AMI on AWS Marketplace



Application and OS Images (Amazon Machine Image) Info

An AMI is a template that contains the software configuration (operating system, application server, and applications) required to launch your instance. Search or Browse for AMIs if you don't see what you are looking for below

Search our full catalog including 1000s of application and OS images
Recents
My AMIs
Quick Start
Amazon Linux
aws
macOS
Mac
Ubuntu
ubuntu
Windows
Microsoft
Red Hat
Red Hat
Browse more AMIs
Including AMIs from AWS, Marketplace and the Community



Choose an Amazon Machine Image (AMI)

An AMI is a template that contains the software configuration (operating system, application server, and applications) required to launch your instance. You can select an AMI provided by AWS, our user community, or the AWS Marketplace; or you can select one of your own AMIs.

Fortinet FortiSandbox Advanced Threat Protection (BYOL)
By Fortinet Inc. | Ver v4.2.1
19 external reviews
FortiSandbox for AWS enables organizations to defend against advanced threats natively in the cloud, working alongside network, application, email, endpoint security, and other 3rd party security solutions, or as an extension to their on-premises security architectures to leverage cloud elasticity...

Fortinet FortiSandbox Advanced Threat Protection (On-Demand)
By Fortinet Inc. | Ver v4.2.1
19 external reviews
Starting from $0.98 to $3.93/hr for software + AWS usage fees
FortiSandbox for AWS can be installed as standalone zero-day malware behavior analysis system or integrated with your existing FortiGate, FortiMail, or FortiWeb AWS instances to identify malicious and suspicious threats including ransomware. FortiSandbox for AWS enables organizations to defend again...

3. Select *Fortinet FortiSandbox Advanced Threat Protection (BYOL)* or *Fortinet FortiSandbox Advanced Threat Protection (On-Demand)*.
Technical Specification Details:

Technical Specification	Details		
	On-Premise (Private) Cloud	Public Cloud - BYOL	Public Cloud - PAYG
Hypervisor Support	VMware ESXi Microsoft Hyper-V Windows server 2016 and 2019	AWS Azure	
HA Support	FortiSandbox 3.2 or later		
Virtual CPUs (min / max)	4/Unlimited Fortinet recommends four virtual CPUs plus the number of VM clones.	4/16 Fortinet recommends following virtual CPUs based on the number of VM Clones: 0-4 clones - 4 cores, 5-32 clones - 8 cores, 33-100 clones - 16 cores, 101+ clones - 16 cores or higher. Pick up the appropriate Instance Type.	
Virtual Memory (min / max)	16 GB / 32 GB Fortinet recommends following virtual memory based n the number of VM Clones: 0-4 clones - 24 GB 5-8 clones - 32 GB	8 GB / 64 GB Recommended: Following virtual memory based on the number of VM Clones: 0-4 clones - 8 GB, 5-32 clones - 16 GB, 33-100 clones - 32 GB, 101+ clones - 64 GB. Pick the appropriate Instance Type.	
Virtual Storage (min / max)	200 GB / 16 TB Fortinet recommends at least 500 GB for a production environment.		
Virtual Network Interfaces	Recommended: 4 and above	Recommended: 2 and above	
VM Clones Support (Min/Max)	0[1]/ 8 (Local VMs) and 200 (Cloud VMs)	0[1] / 216[2]	0[1] / 128[3]

[1] For HA-Cluster deployment setup configured as Primary node acting as a dispatcher.

[2] Can enable any of the Custom VM or Cloud VM types up to the total seat count which is based on a combination of Windows licenses (max of 8), BYOL (8) and Cloud VMs (max of 200).

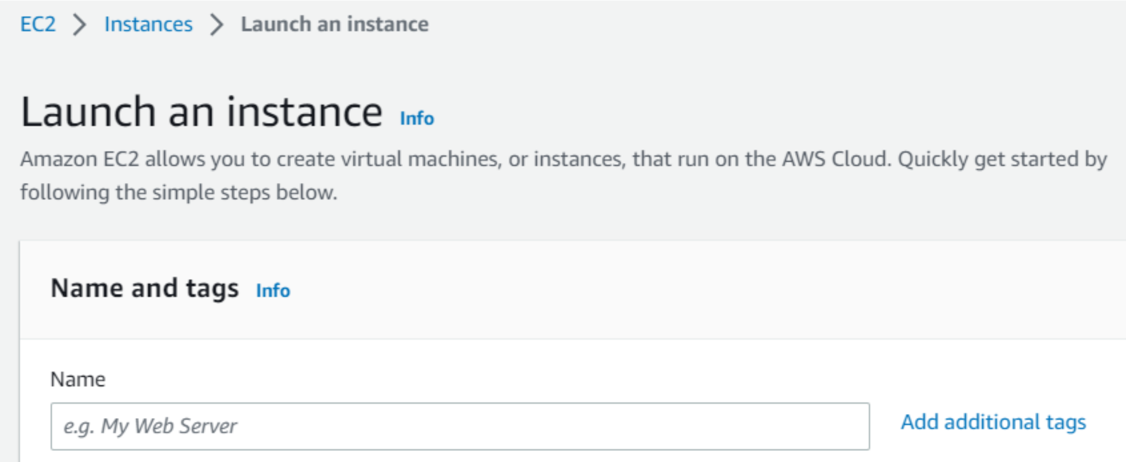
[3] Total seat count is based on the number of cores multiplied by 4. Maximum VMs is 128 since the highest available vCPU on PAYG is 32. CloudVMs can also be added on top and registered, however, this is not advised due to product serial number changes after shutdown.

4. Click *Next: Configure Instance Details*.

Configure the instance

Add Name and tags

Add descriptive name tags to identify this FortiSandbox instance.



EC2 > Instances > Launch an instance

Launch an instance Info

Amazon EC2 allows you to create virtual machines, or instances, that run on the AWS Cloud. Quickly get started by following the simple steps below.

Name and tags Info

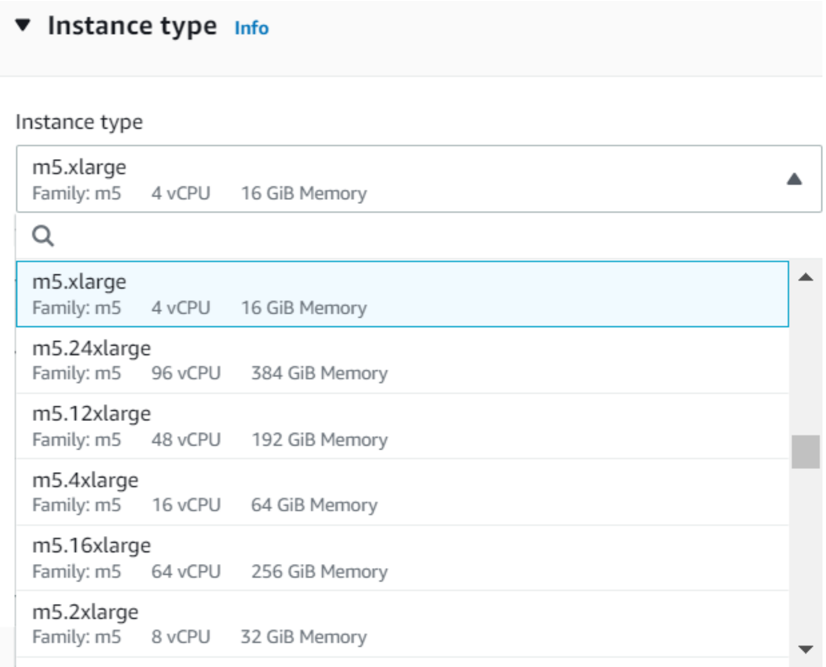
Name

e.g. My Web Server

Add additional tags

Choose the Instance type

To choose the instance type, refer to Technical Specification Details table.



▼ Instance type Info

Instance type

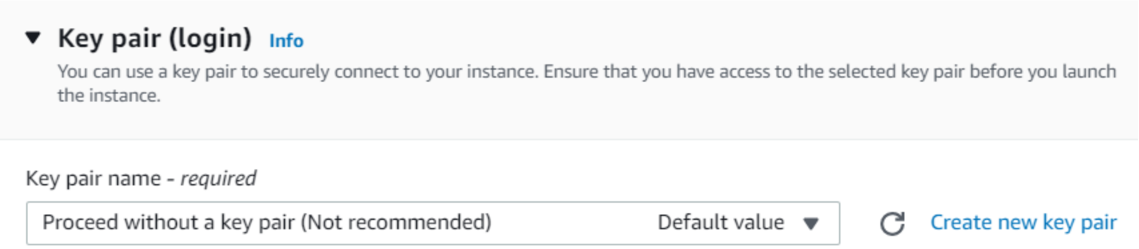
m5.xlarge
Family: m5 4 vCPU 16 GiB Memory ▲

Instance type	Family	vCPU	Memory
m5.xlarge	Family: m5	4 vCPU	16 GiB Memory
m5.24xlarge	Family: m5	96 vCPU	384 GiB Memory
m5.12xlarge	Family: m5	48 vCPU	192 GiB Memory
m5.4xlarge	Family: m5	16 vCPU	64 GiB Memory
m5.16xlarge	Family: m5	64 vCPU	256 GiB Memory
m5.2xlarge	Family: m5	8 vCPU	32 GiB Memory

Create a new key pair

You do not need to complete this task if you are using an existing key pair.

1. Click *Create new key pair*.



▼ Key pair (login) Info

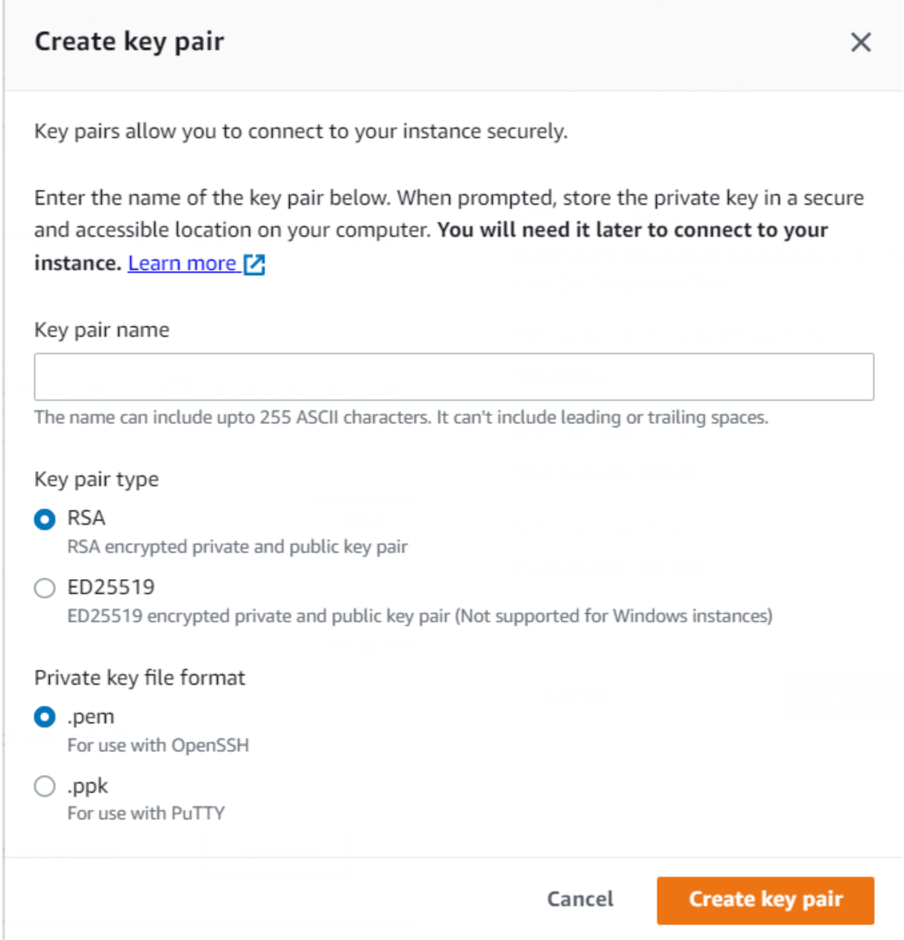
You can use a key pair to securely connect to your instance. Ensure that you have access to the selected key pair before you launch the instance.

Key pair name - *required*

Proceed without a key pair (Not recommended) Default value ▼

Create new key pair

2. In the *Create key pair* box, enter the *Key pair name*, then click *Create key pair*. The key pair downloads automatically.



Create key pair ✕

Key pairs allow you to connect to your instance securely.

Enter the name of the key pair below. When prompted, store the private key in a secure and accessible location on your computer. **You will need it later to connect to your instance.** Learn more

Key pair name

The name can include upto 255 ASCII characters. It can't include leading or trailing spaces.

Key pair type

● RSA
RSA encrypted private and public key pair

○ ED25519
ED25519 encrypted private and public key pair (Not supported for Windows instances)

Private key file format

● .pem
For use with OpenSSH

○ .ppk
For use with PuTTY

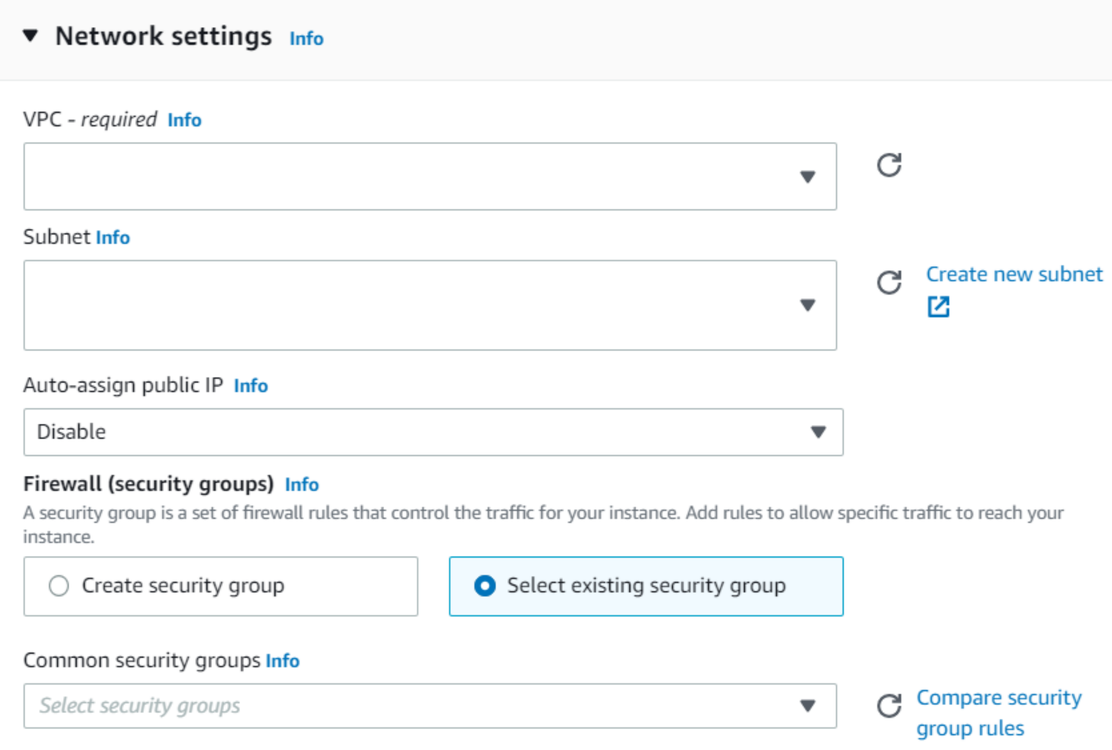
Cancel Create key pair

3. Save the key pair on your device.

Edit Network settings

1. Configure the following *Network Settings*:

VPC	Select the FortiSandbox VPC you created.
Subnet	Select the management interface subnet you created.
Auto-Assign public IP	Disable.
Firewall (security groups)	Choose the security group you created.



▼ **Network settings** Info

VPC - *required* Info

Subnet Info

Auto-assign public IP Info

Disable

Firewall (security groups) Info

A security group is a set of firewall rules that control the traffic for your instance. Add rules to allow specific traffic to reach your instance.

○ Create security group

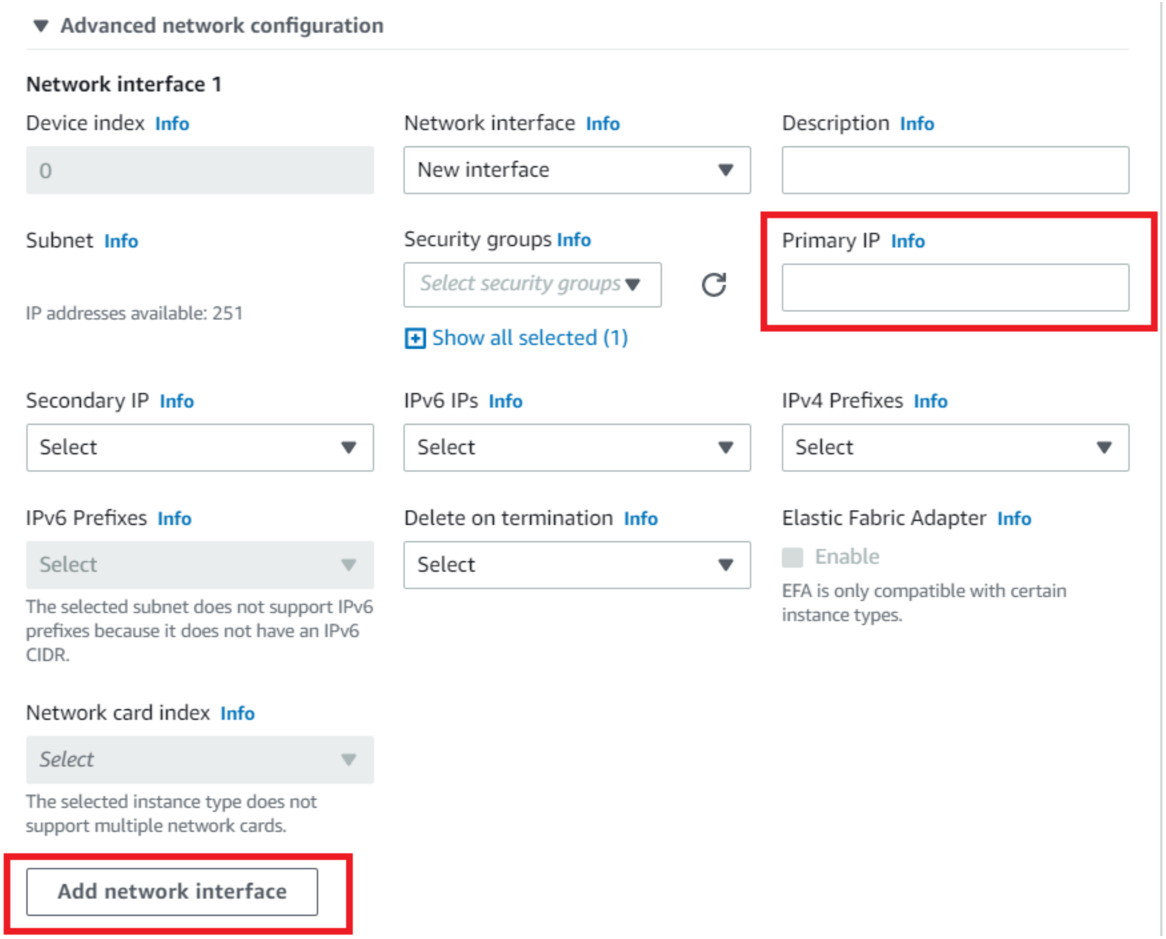
● Select existing security group

Common security groups Info

Select security groups

2. Configure the following *Advanced network configuration* settings and click *Add network interface*.

Network interface 1	Select the management interface subnet you created; Auto-Assign (or any IP in that subnet)
Network interface 2	Select the local VM clone communication subnet you created; Auto-Assign (or any IP in that subnet) You do not need to add *Network interface 2* if are not using a local VM clone. If needed, you can attach network interfaces later when the instance is not running.



▼ Advanced network configuration

Network interface 1

Device index Info: 0

Network interface Info: New interface

Description Info:

Subnet Info

IP addresses available: 251

Security groups Info: Select security groups

Show all selected (1)

Primary IP Info:

Secondary IP Info: Select

IPv6 IPs Info: Select

IPv4 Prefixes Info: Select

IPv6 Prefixes Info: Select

The selected subnet does not support IPv6 prefixes because it does not have an IPv6 CIDR.

Delete on termination Info: Select

Elastic Fabric Adapter Info: □ Enable

EFA is only compatible with certain instance types.

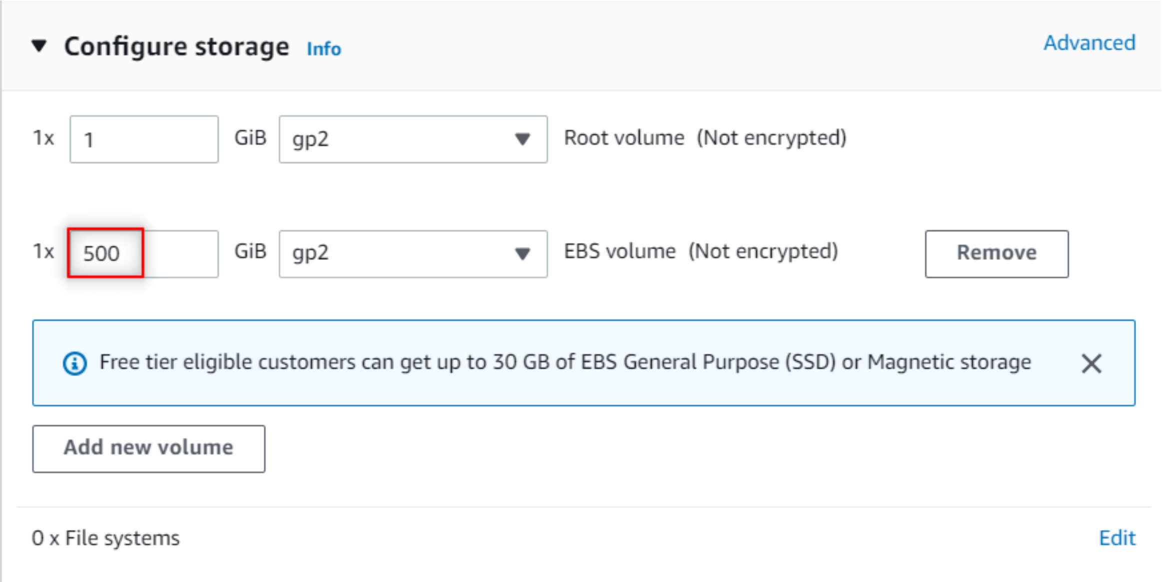
Network card index Info: Select

The selected instance type does not support multiple network cards.

Add network interface

Configure storage

Fortinet recommends allotting 500GB to 16TB for storage size, depending on the number of historical jobs you want to keep in the system.



▼ Configure storage Info

1x 1 GiB gp2 Root volume (Not encrypted)

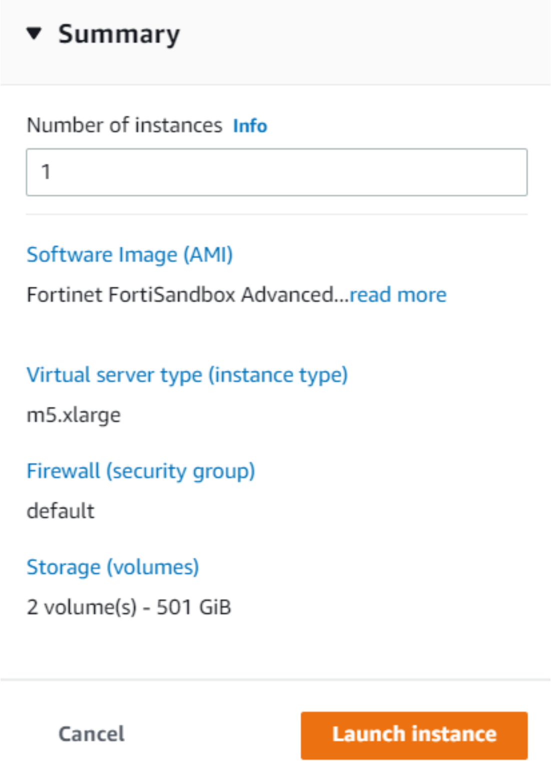
1x 500 GiB gp2 EBS volume (Not encrypted)

Free tier eligible customers can get up to 30 GB of EBS General Purpose (SSD) or Magnetic storage

0 x File systems

Launch the instance

1. Review the summary, then click *Launch instance*.



▼ Summary

Number of instances Info: 1

Software Image (AMI): Fortinet FortiSandbox Advanced...read more

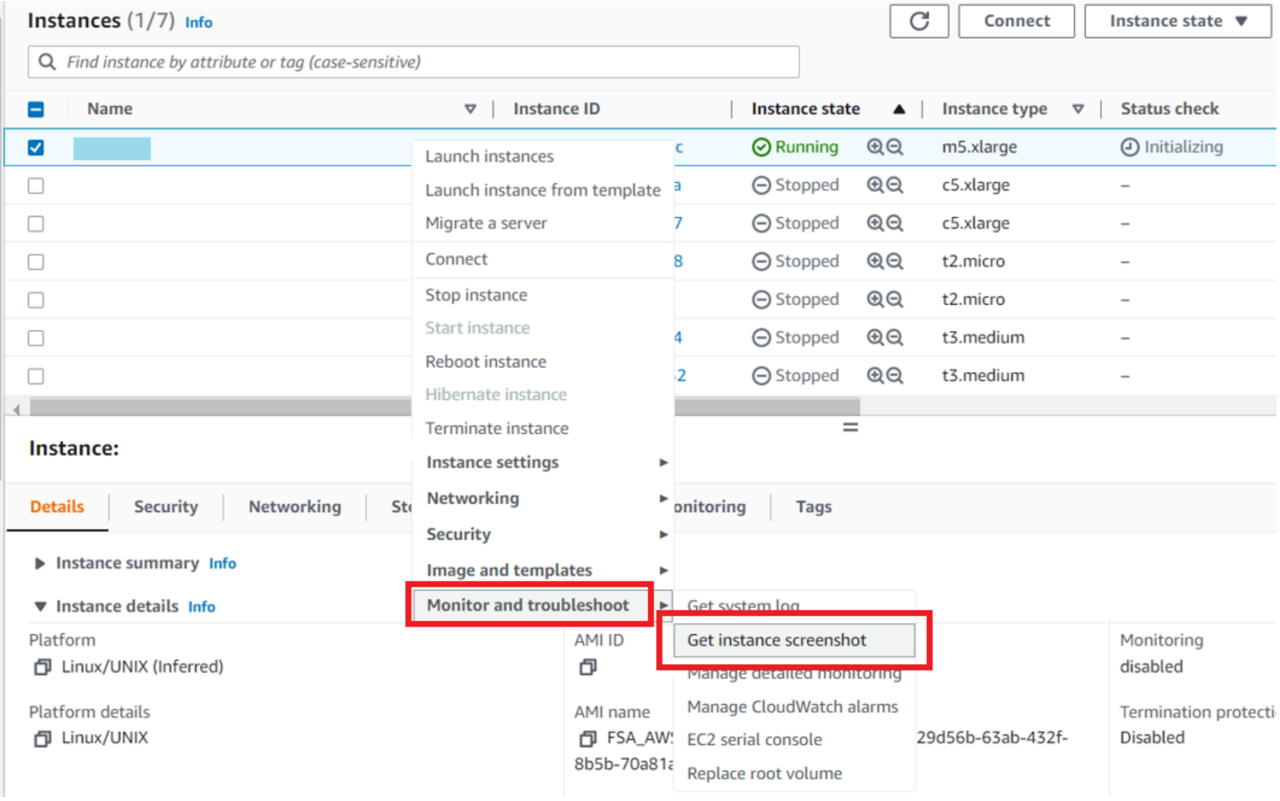
Virtual server type (instance type): m5.xlarge

Firewall (security group): default

Storage (volumes): 2 volume(s) - 501 GiB

2. Click *View Instances* to view the instance state. Allow several minutes for *Status Checks* to change from *Initializing* to *2/2 checks passed*.

3. Monitor the initialization, and select the created instance. Right-click the instance and select *Monitor and troubleshoot* > *Get Instance Screenshot* to view the status of the launched instance.



Instances (1/7) Info

☑	Name	Instance ID	Instance state	Instance type	Status check
☑		c	Running	m5.xlarge	Initializing
□		a	Stopped	c5.xlarge	–
□		7	Stopped	c5.xlarge	–
□		8	Stopped	t2.micro	–
□			Stopped	t2.micro	–
□		4	Stopped	t3.medium	–
□		2	Stopped	t3.medium	–

Instance:

Platform: Linux/UNIX (Inferred)

Platform details: Linux/UNIX

AMI ID

AMI name: FSA_AW 8b5b-70a81

29d56b-63ab-432f-

Monitoring: disabled

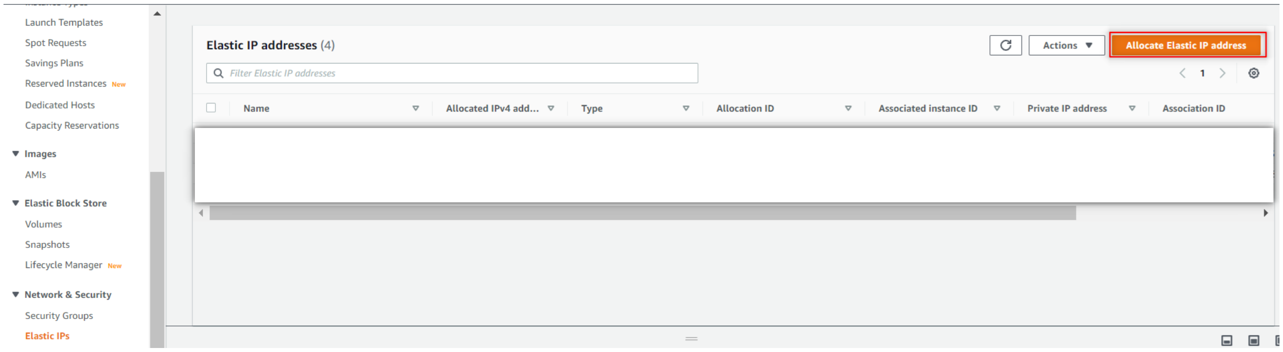
Termination protecti: Disabled

Configure FortiSandbox instance network settings

Create and assigning an Elastic IP to the instance

To access the FortiSandbox instance from the Internet, you will need to create an Elastic P (EIP) for your Virtual Private Cloud.

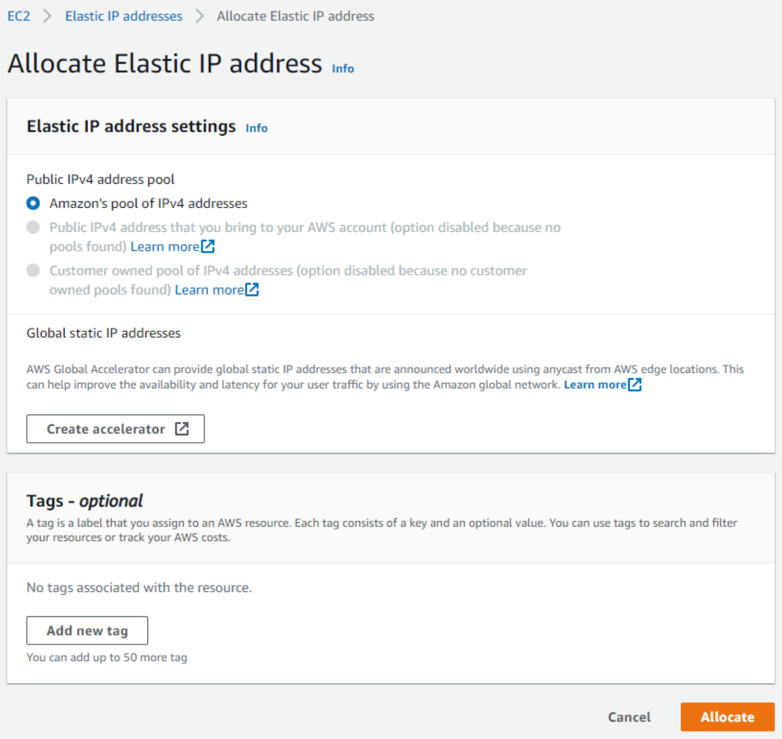
1. Click *Elastic IPs* > *Allocate Elastic IP address*.



Elastic IP addresses (4)

□	Name	Allocated IPv4 add...	Type	Allocation ID	Associated instance ID	Private IP address	Association ID

2. Click *Allocate* to get the new EIP Address.



EC2 > Elastic IP addresses > Allocate Elastic IP address

Allocate Elastic IP address Info

Elastic IP address settings Info

Public IPv4 address pool

● Amazon's pool of IPv4 addresses

○ Public IPv4 address that you bring to your AWS account (option disabled because no pools found) Learn more

○ Customer owned pool of IPv4 addresses (option disabled because no customer owned pools found) Learn more

Global static IP addresses

AWS Global Accelerator can provide global static IP addresses that are announced worldwide using anycast from AWS edge locations. This can help improve the availability and latency for your user traffic by using the Amazon global network. Learn more

Create accelerator

Tags - *optional*

A tag is a label that you assign to an AWS resource. Each tag consists of a key and an optional value. You can use tags to search and filter your resources or track your AWS costs.

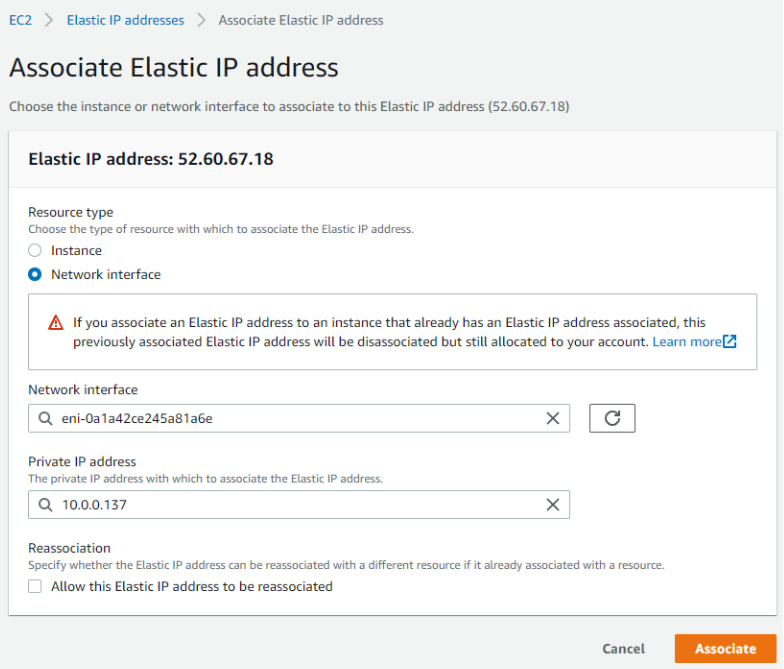
No tags associated with the resource.

Add new tag

You can add up to 50 more tag

Cancel Allocate

3. Select the Elastic IP address you just created and click *Actions* to associate the EIP to FortiSandbox port1.
4. On the Associate Elastic IP Address page:
   - In the *Resource type* section, select *Network Interface*.
   - In the *Network Interface* section, select the FortiSandbox port1.
   - In the *Private IP address* section, select the FortiSandbox port1 private IP address.
   - In the *Reassociation* section, clear the *Allow this Elastic IP address to be reassociated* checkbox.



EC2 > Elastic IP addresses > Associate Elastic IP address

Associate Elastic IP address

Choose the instance or network interface to associate to this Elastic IP address (52.60.67.18)

Elastic IP address: 52.60.67.18

Resource type

Choose the type of resource with which to associate the Elastic IP address.

○ Instance

● Network interface

⚠ If you associate an Elastic IP address to an instance that already has an Elastic IP address associated, this previously associated Elastic IP address will be disassociated but still allocated to your account. Learn more

Network interface

eni-0a1a42ce245a81a6e

Private IP address

The private IP address with which to associate the Elastic IP address.

10.0.0.137

Reassociation

Specify whether the Elastic IP address can be reassociated with a different resource if it already associated with a resource.

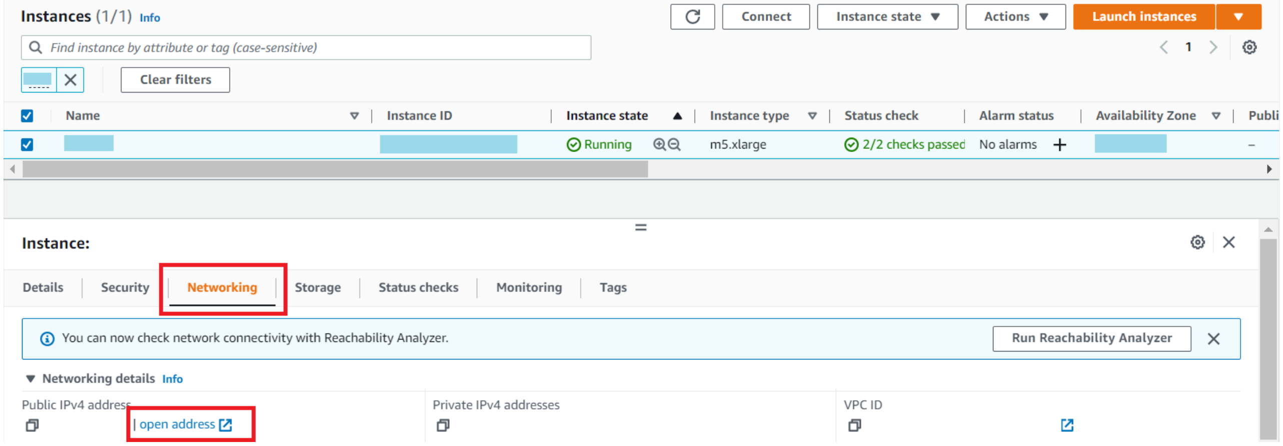
□ Allow this Elastic IP address to be reassociated

Cancel Associate

5. Click *Associate*.

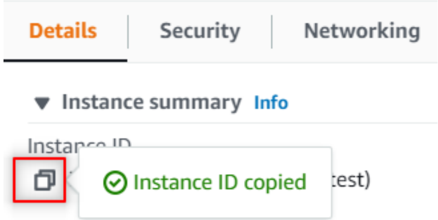
Access FortiSandbox Web UI the first time

1. In the *Networking* tab, click *Open address*.



☑	Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Publi
☑	[redacted]	[redacted]	Running	m5.xlarge	2/2 checks passed	No alarms +	[redacted]	–

2. Log into the FortiSandbox GUI.
   The default username is `admin` and the default password is your `Instance ID`. You can find this in the *EC2* > *Instances Management Console*.



Configure the DNS

1. Go to *Network* > *System DNS*.
2. Configure the primary and secondary DNS server addresses of your organization such as the following:

Detail	Value
Primary DNS Server	8.8.8.8
Secondary DNS Server	8.8.4.4

3. Click *OK*.

Access FortiSandbox CLI

You can execute CLI commands in the FortiSandbox console or use an SSH client. Before logging in, convert the saved `pem` file you downloaded when you created the key pair `ppk` file.

If you do not choose the *Without Key Pair* option, log in using the *admin* as the username, and the Instance ID as the password.

For more information, see Connecting to Your Linux Instance Using SSH and Connecting to Your Linux Instance from Windows Using PuTTY. For information about opening CLI console through web UI, see the *Port Information* section of the *FortiSandbox Administration Guide*.

Prepare FortiSandbox for scanning contents

Upload firmware license to FortiSandbox instance

If the deployment mode is *On-Demand*, a firmware license file is not required. If the mode is *BYOL*, download a firmware license from the Customer Support website and then upload it to FortiSandbox.

To upload the license:

- Go to *Dashboard* > *Status* > *Licenses* widget.
- Click the *Upload License* the button next to FortiSandbox-AWS and upload the license.

Upload the rating and tracer engine

A copy of the rating and tracer engines are required for your instance to be fully functional. The instance can automatically download and install the engines if it is connected to FDN. You can also upload the engines manually. These engines can be downloaded from the Customer Support web site. For more information, see the *Tracer and Rating Engines* section of the *FortiSandbox Release Notes*.

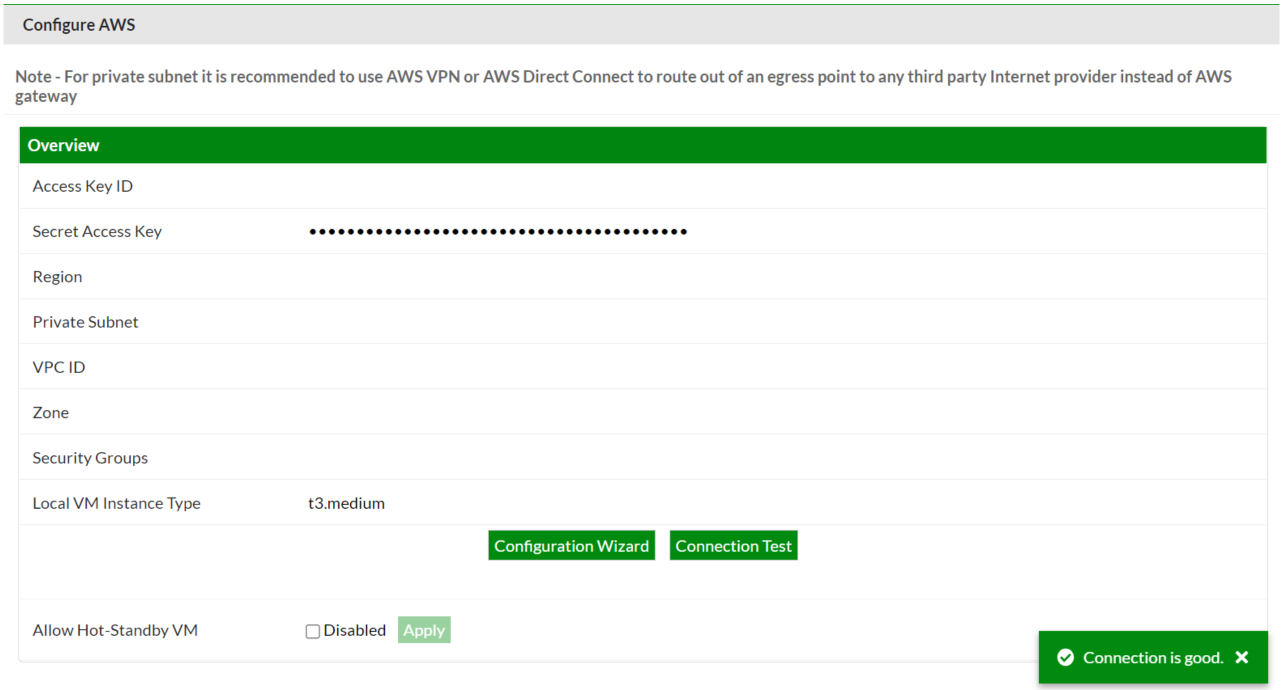
To manually upload the rating and tracer engine:

1. In FortiSandbox, go to *System* > *FortiGuard*.
2. Beside *Upload Package File*, click *Choose* file and locate the rating or tracer engine to be uploaded.

Import AWS settings into FortiSandbox

1. Go to *System* > *AWS Config* page, click *Configuration Wizard*, and enter the Access Key ID and Secret Access Key information created in Create an IAM group on page 17.
2. Select *Local VM Instance Type*. *t2-medium* and *t3-medium* are recommended
3. Click *Next*.
4. For *VPC ID*, select the VPC you created.
5. For *Private Subnet*, select the subnet created for the local Windows or Linux VM communication (port2) if one exists. Otherwise, select the management subnet.
6. For *Security Groups*, select the security group for the Private Subnet you selected in step 5.
7. Click *Save*.

8. Click *Connection Test*.



Configure AWS

Note - For private subnet it is recommended to use AWS VPN or AWS Direct Connect to route out of an egress point to any third party Internet provider instead of AWS gateway

Overview	
Access Key ID	
Secret Access Key	••
Region	
Private Subnet	
VPC ID	
Zone	
Security Groups	
Local VM Instance Type	t3.medium
Allow Hot-Standby VM	□ Disabled

Connection is good.

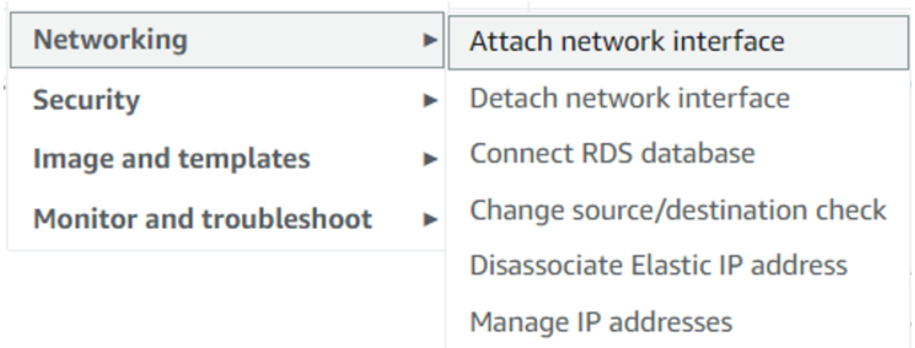
Set up a local custom Windows VM

Create custom VM for AWS

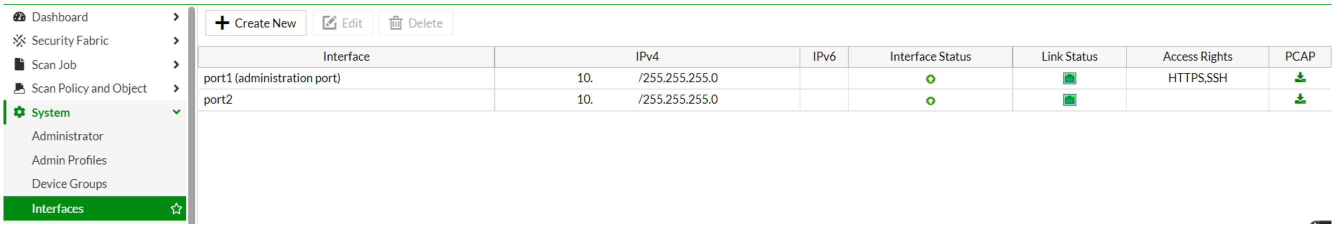
To create a custom Windows VM for AWS, follow steps in Custom VM Guide which can be found in the Fortinet Developer Network or is available on request from Customer Support.

Prepare the network interface for custom VM clones

The FortiSandbox instance uses port2 to communicate with local Windows or Linux clones. If you did not create an *eth1* in *Deploy FortiSandbox on AWS (BYOL/On-Demand)* > *Configure the instance*, you should create a new network interface under a local VM clone communication subnet and assign a private IP of this subnet to it.



After the interface is created, reboot the instance and go to *System* > *Interfaces* to verify the network interface is attached.



Interface	IPv4	IPv6	Interface Status	Link Status	Access Rights	PCAP
port1 (administration port)	10. /255.255.255.0		●	🟩	HTTPS,SSH	⤓
port2	10. /255.255.255.0		●	🟩		⤓

Create a NAT gateway

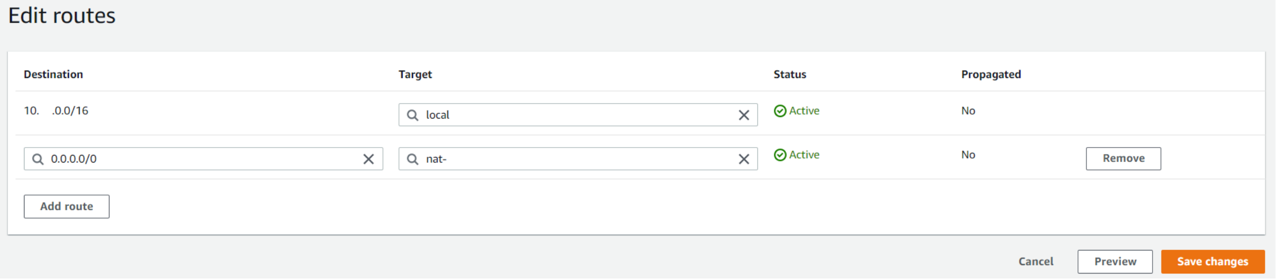
To create a NAT Gateway:

1. Go to *Virtual Private Cloud* > *NAT Gateways* and click *Create NAT gateway*.
2. Entre the following information, and click *Create NAT gateway*.

Name	Optional.
Subnet	Choose your management interface subnet (the one port1 is in).
Connectivity type	Choose *Public*.
Elastic IP allocation ID	Click *Allocate Elastic IP* and leave the optional bar empty as default.

Update the route table

1. Go to *Virtual Private Cloud* > *Route Table* > *Routes* > *Edit routes* > *Add route* and enter the following information:


Edit routes

Destination	Target	Status	Propagated	
10. .0.0/16	local	Active	No	
0.0.0.0/0	nat-	Active	No	Remove

Destination	Enter `0.0.0.0/0`.
Target	Select the NAT gateway you created in the previous step.

2. Click *Save changes*.

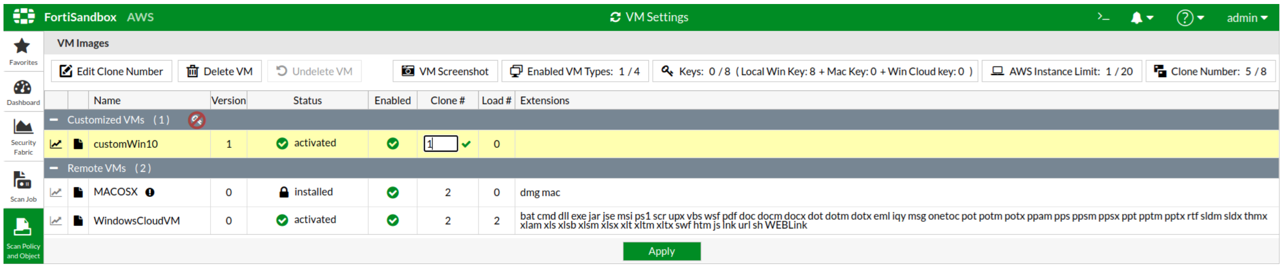
Install the custom VM using the CLI

After the custom VM image is created offline, it should be installed to AWS with the CLI. For details of using FortiSandbox CLI, see Access FortiSandbox CLI.

Do not use the `set admin-port` command to set port2 as the administrative port.

To install and enable a custom VM on AWS:

1. Go to the FortiSandbox firmware CLI.
2. Import the VHD image using the CLI command `vm-customized`.
   For more information about the `vm-customized` command, see the FortiSandbox CLI Reference Guide in the Fortinet Document Library.
3. In the FortiSandbox GUI, go to *Scan Policy and Object* > *VM Settings* and change *Clone #* to 1 or higher.

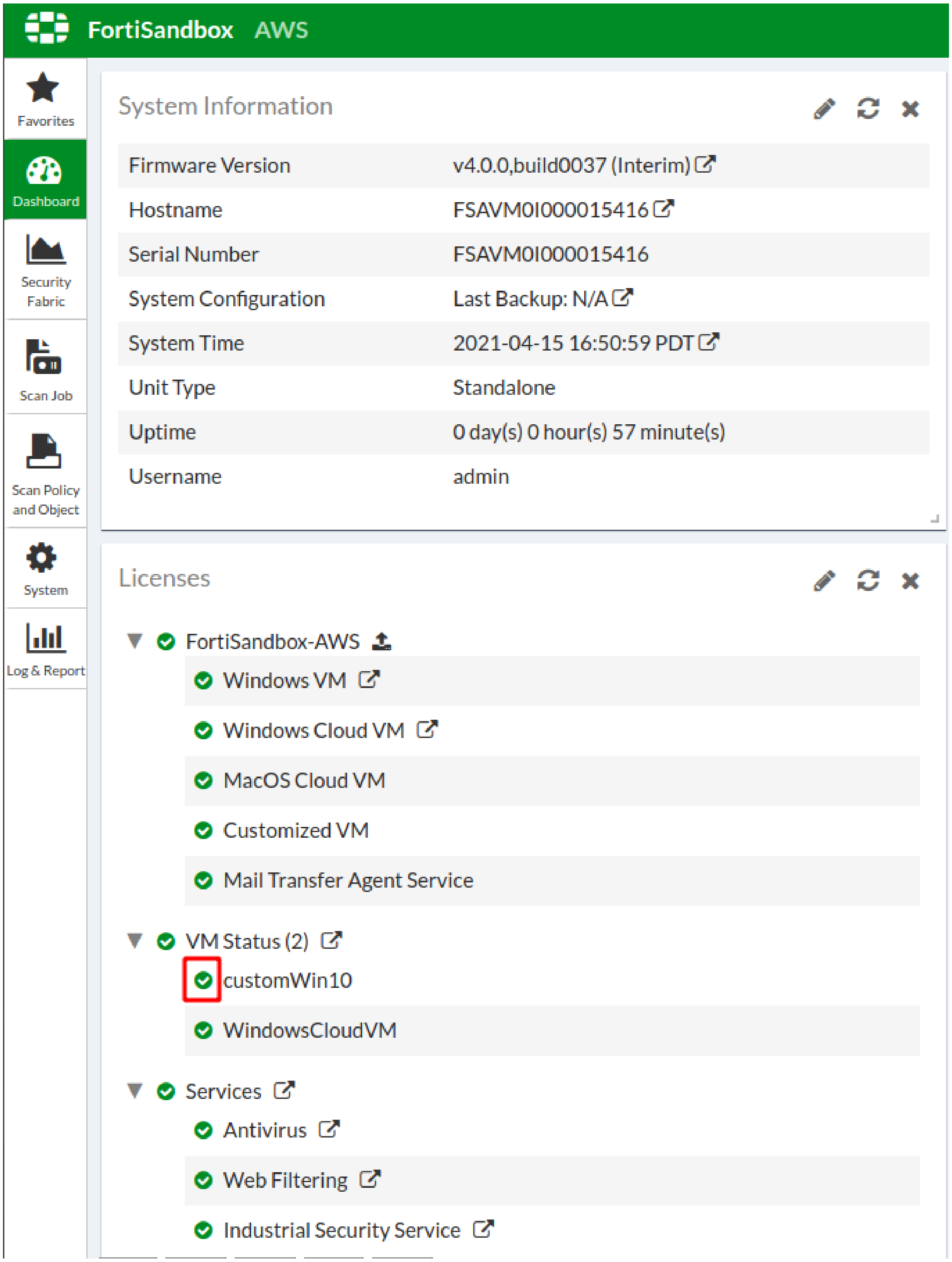


Enabled VM Types: 1 / 4
Keys: 0 / 8 (Local Win Key: 8 + Mac Key: 0 + Win Cloud key: 0)
AWS Instance Limit: 1 / 20
Clone Number: 5 / 8

Name	Version	Status	Enabled	Clone #	Load #	Extensions
Customized VMs (1)						
customWin10	1	✓ activated	✓	1 ✓	0	
Remote VMs (2)						
MACOSX	0	installed	✓	2	0	dmg mac
WindowsCloudVM	0	✓ activated	✓	2	2	bat cmd dll exe jar jse msi ps1 scr upx vbs wsf pdf doc docm docx dot dotm dotx eml iqy msg onetoc pot potm potx ppam pps ppsm ppsx ppt pptm pptx rtf sldm sldx thmx xlam xls xlsb xlsm xlsx xlt xltm xltx swf htm js lnk url sh WEBLink

4. In a new CLI window, execute `diagnose-debug vminit` command.

5. In the FortiSandbox GUI, go to the *Dashboard* to verify there is a green checkmark beside *Windows VM*.



System Information

Firmware Version	v4.0.0,build0037 (Interim)
Hostname	FSAVM0I000015416
Serial Number	FSAVM0I000015416
System Configuration	Last Backup: N/A
System Time	2021-04-15 16:50:59 PDT
Unit Type	Standalone
Uptime	0 day(s) 0 hour(s) 57 minute(s)
Username	admin

Licenses

- ✓ FortiSandbox-AWS
  - ✓ Windows VM
  - ✓ Windows Cloud VM
  - ✓ MacOS Cloud VM
  - ✓ Customized VM
  - ✓ Mail Transfer Agent Service
- ✓ VM Status (2)
  - ✓ customWin10
  - ✓ WindowsCloudVM
- ✓ Services
  - ✓ Antivirus
  - ✓ Web Filtering
  - ✓ Industrial Security Service

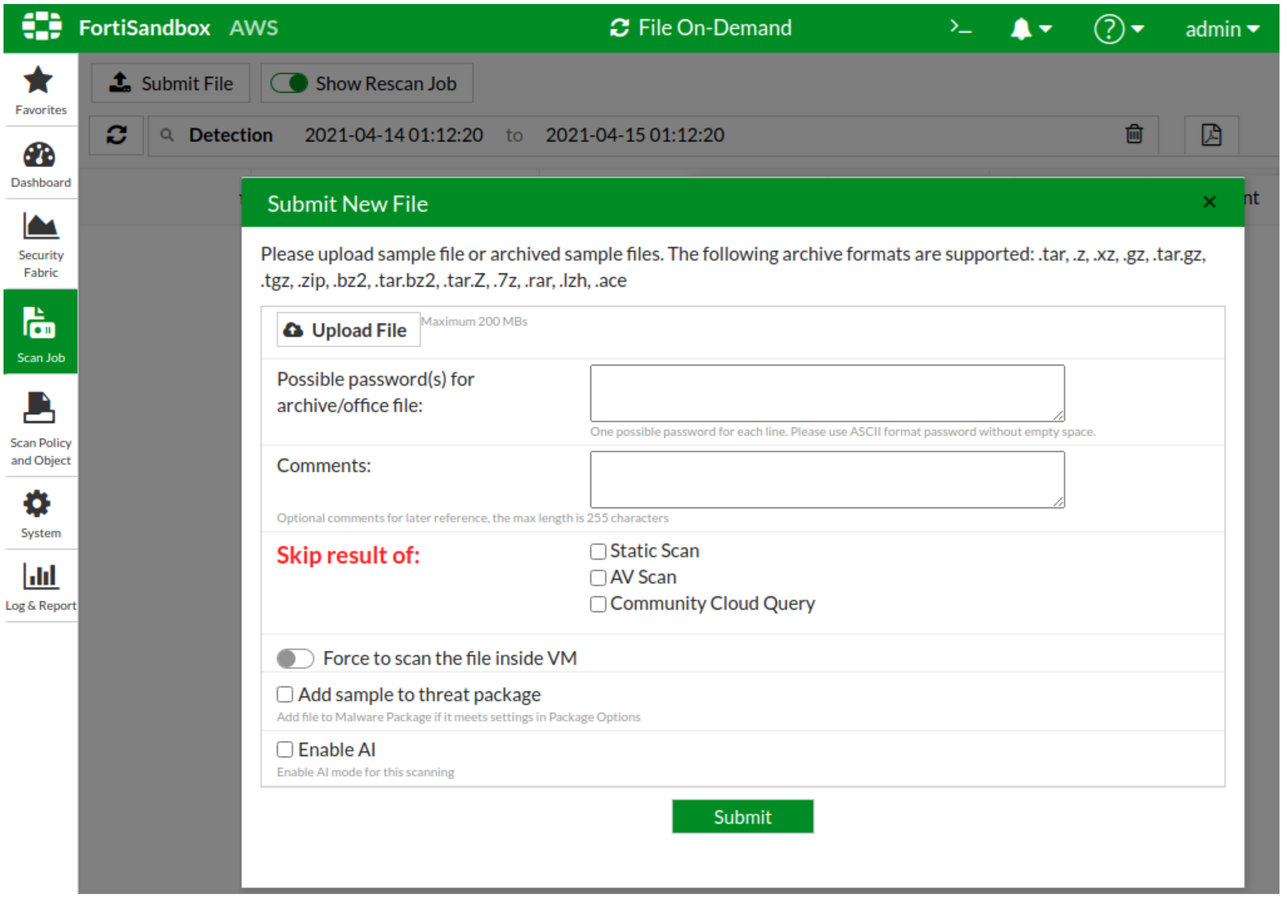
6. To associate file extensions to the custom VM, go to *Scan Policy and Object> Scan Profile* to the *VM Association* tab.

Test FortiSandbox instance with a file scan

To verify the configuration is successful, perform an on-demand file scan with a Windows VM clone.

To test FortiSandbox instance with a file scan:

1. Go to *Scan Job > File On-Demand > Submit File*.
2. Click *Choose File* and upload the sample file. You can force the file to be scanned inside a VM.
3. Click *Submit*.
   If the uploaded file is not malicious or suspicious, the rating is *Clean*.



Submit New File

Please upload sample file or archived sample files. The following archive formats are supported: .tar, .z, .xz, .gz, .tar.gz, .tgz, .zip, .bz2, .tar.bz2, .tar.Z, .7z, .rar, .lzh, .ace

Upload File Maximum 200 MBs

Possible password(s) for archive/office file:

One possible password for each line. Please use ASCII format password without empty space.

Comments:

Optional comments for later reference, the max length is 255 characters

Skip result of: □ Static Scan □ AV Scan □ Community Cloud Query

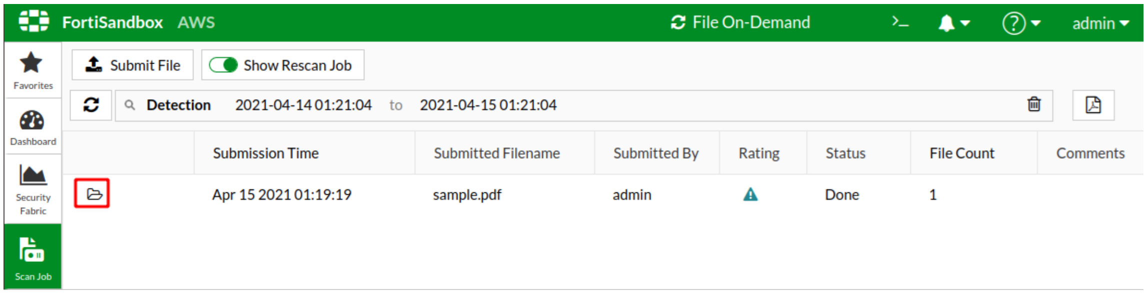
○ Force to scan the file inside VM

□ Add sample to threat package
Add file to Malware Package if it meets settings in Package Options

□ Enable AI
Enable AI mode for this scanning

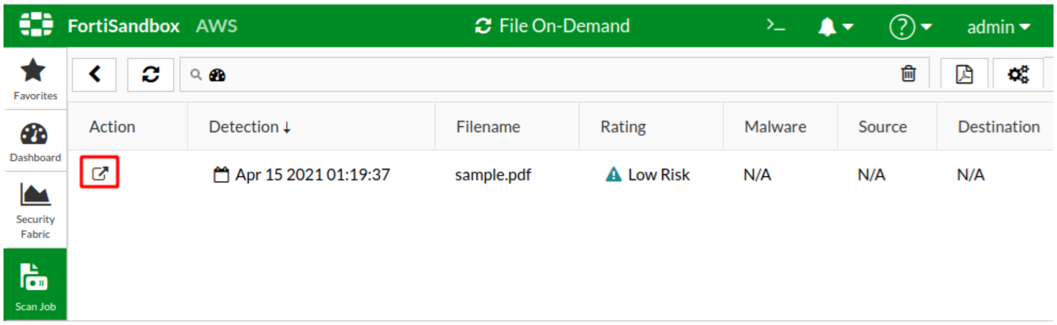
Submit

4. When the scan is finished, you can view files in *File On-Demand*.



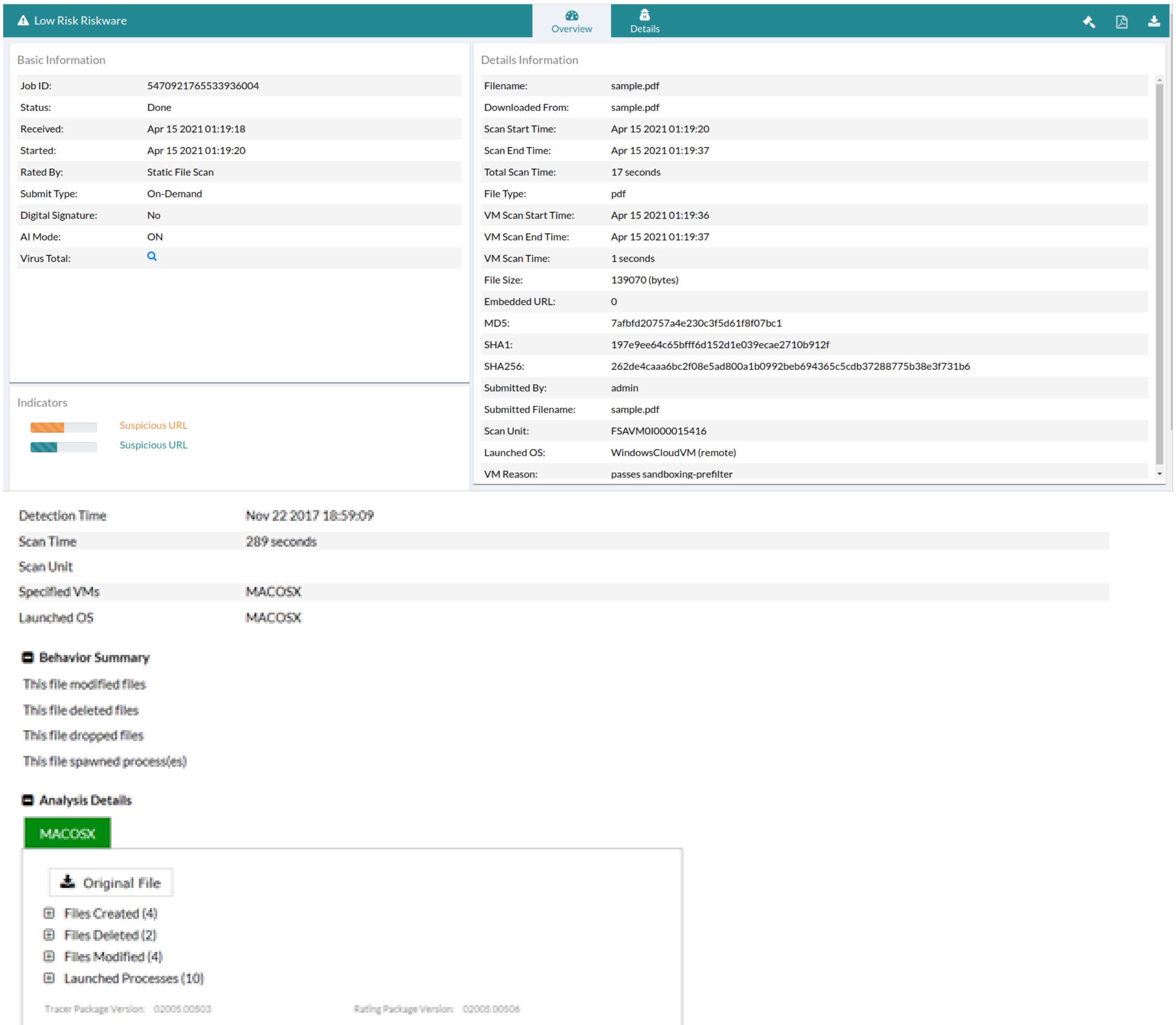
	Submission Time	Submitted Filename	Submitted By	Rating	Status	File Count	Comments
	Apr 15 2021 01:19:19	sample.pdf	admin	▲	Done	1	

5. In the *Action* column, click the *View File* icon.



Action	Detection ↓	Filename	Rating	Malware	Source	Destination
	Apr 15 2021 01:19:37	sample.pdf	Low Risk	N/A	N/A	N/A

6. Check the file details that is displayed.



Basic Information

Job ID:	5470921765533936004
Status:	Done
Received:	Apr 15 2021 01:19:18
Started:	Apr 15 2021 01:19:20
Rated By:	Static File Scan
Submit Type:	On-Demand
Digital Signature:	No
AI Mode:	ON
Virus Total:	

Indicators

Suspicious URL

Suspicious URL

Details Information

Filename:	sample.pdf
Downloaded From:	sample.pdf
Scan Start Time:	Apr 15 2021 01:19:20
Scan End Time:	Apr 15 2021 01:19:37
Total Scan Time:	17 seconds
File Type:	pdf
VM Scan Start Time:	Apr 15 2021 01:19:36
VM Scan End Time:	Apr 15 2021 01:19:37
VM Scan Time:	1 seconds
File Size:	139070 (bytes)
Embedded URL:	0
MD5:	7afbfd20757a4e230c3f5d61f8f07bc1
SHA1:	197e9ee64c65bfff6d152d1e039ecae2710b912f
SHA256:	262de4caaa6bc2f08e5ad800a1b0992beb694365c5cdb37288775b38e3f731b6
Submitted By:	admin
Submitted Filename:	sample.pdf
Scan Unit:	FSAVM0I000015416
Launched OS:	WindowsCloudVM (remote)
VM Reason:	passes sandboxing-prefilter

Detection Time	Nov 22 2017 18:59:09
Scan Time	289 seconds
Scan Unit	
Specified VMs	MACOSX
Launched OS	MACOSX

Behavior Summary

This file modified files

This file deleted files

This file dropped files

This file spawned process(es)

Analysis Details

Files Created (4)

Files Deleted (2)

Files Modified (4)

Launched Processes (10)

Tracer Package Version: 02005.00503 Rating Package Version: 02005.00506

Optional: Set up a HA-Cluster

You can set up multiple FortiSandbox instances in a load-balancing HA (high availability) cluster. For more information on using HA clusters, see the *FortiSandbox Administration Guide*.

Prepare the HA cluster in FortiSandbox

It is assumed the following operations are in the same VPC and the same availability zone

1. Prepare the following subnets:

Subnet	Port on FortiSandbox	Function
Subnet1	port1	Management port.
Subnet2	port2	Port to communicate with local customized VM.
Subnet3	port3	Port for cluster internal communication.

2. Prepare the following security groups:

Security-Group	For subnet	Description
Security-group1	subnet1	The default ports recommended by Fortinet when launching the instance are usually enough.
Security-group2	subnet2	Open at least TCP 21 for communication with local customized VM.
Security-group3	subnet3	Make sure to open ports TCP 2015, TCP 2018 for cluster internal communication.

For detailed port information, see *Port and access control information* in the *FortiSandbox Administration Guide*.

Launching a HA-Cluster

A cluster is comprised of the following nodes:

- One primary node
- One secondary node
- (Optional) One or more worker nodes

To launch FortiSandbox instances on AWS:

1. Launch FortiSandbox VMs. For example one primary, one secondary, one worker
2. For each FortiSandbox VM, follow the steps described in this AWS deployment guide, with the exception of the *Network Settings*:

a. Under *Firewall (security groups)*, choose *Select existing security group* and specify subnet1 for network interface.

b. Leave *Common security groups* empty.

c. Click the *Add network interface* button to add two more network interfaces:

   - Specify subnet2 for interface 2
   - Specify security-group2 for interface 2
   - Specify subnet3 for interface 3
   - Specify security-group3 for interface 3

3. Follow this guide and the on-screen instructions to finish launching the instances.
4. Associate an Elastic IP (EIP) to interface 1 of each FortiSandbox VM .
5. Log into each FortiSandbox HA-Cluster node using the EIP address. The initial password is the VM instance ID.
6. Go to *System* > *AWS Config*, and configure the subnet2 information for the primary, secondary and worker nodes.

Configuring an HA-Cluster

Ensure all the nodes meet the following requirements:

- Use the same scan environment on all nodes. For example, install the same set of Windows VMs on each node so that the same scan profiles can be used and controlled by the primary node.
- Run the same firmware build on all nodes.
- Set up a dedicated network interface (such as port2) for each node for custom VMs.
- Set up a dedicated network interface (such as port3) for each node for internal HA-Cluster communication.

In this example, `10.20.0.22/24` is a HA-Cluster failover IP address. It is configured as a secondary IP for port1 of the primary node in the CLI below.

To configure an HA-Cluster using FortiSandbox CLI commands:

1. Configure the primary node:
   - `hc-settings -sc -tM -nMyHAPrimary -cClusterName -p123 -iport3`
   - `hc-settings -si -iport1 -a10.20.0.22/24`
2. Configure the secondary node:
   - `hc-settings -sc -tP -nMyPWorker -cClusterName -p123 -iport3`
   - `hc-worker -a -sPrimary_Port3_private_IP -p123`
3. Configure the first worker node:
   - `hc-settings -sc -tR -nMyRWorker1 -cClusterName -p123 -iport3`
   - `hc-worker -a -sPrimary_Port3_private_IP -p123`
4. If necessary, configure consecutive worker nodes:
   - `hc-settings -sc -tR -nMyRWorker2 -cClusterName -p123 -iport3`
   - `hc-worker -a -sPrimary_Port3_private_IP -p123`

To check the status of the HA-Cluster:

On the primary node, use this CLI command to view the status of all units in the cluster.

```
hc-status -l
```

To use a custom VM on a HA-Cluster:

1. Install the same custom VM used by the primary node onto each worker node using the FortiSandbox CLI command `vm-customized`.
   All options must be the same when installing custom VMs on an HA-Cluster, including `-vn[VM name]`.
2. In the FortiSandbox AWS GUI, go to *Scan Policy and Object* > *VM Settings* and change *Clone #* to 1 for each node.
   After all VM clones on all nodes are configured, you can change the *Clone #* to a higher number.
3. In a new CLI window, check the VM clone initialization using the `diagnose-debug vminit` command.
4. In the FortiSandbox GUI, go to the *Dashboard* to verify there is a green checkmark beside *Windows VM*.
5. Associate the file extensions to the custom VM, go to *Scan Policy* > *Scan Profile* to the *VM Association* tab.

You can now submit scan jobs from the primary node. HA-Cluster supports VM Interaction on each node.

Configuring an HA-Cluster on dual-zone

Setup a HA cluster with two FortiSandbox-AWS instances located in different AWS Availability Zones, where their internal IP addresses are different.

HA-Cluster requirements:

- There are different subnets in different available zones under the same VPC.
- The subnets reserved for the same FortiSandbox's interfaces are in the same available zone.
- All nodes are running the same firmware build.
- There is a dedicated network interface (such as port3) on FortiSandbox for each node for internal HA-Cluster communication.

To configure an HA-Cluster on dual-zone:

In this example, *FSA01* is set as the HA primary node. *FSA02* is set as HA secondary node. More HA nodes follow the same logic.

1. On FSA01 go to *System* > *Static route* > *Create new route* to add a new route entry.

Destination IP/Mask	FSA02 HA inter-communication interface IP (in this example, FSA02 port3’s IP).
Gateway	FSA01 HA inter-communication interface gateway (in this example, FSA01 port3’s gateway).
Device	FSA01 HA inter-communication interface (in this example, port3).

2. On FSA02 go to *System* > *Static route* > *Create new route* and configure the new route:

Destination IP/Mask	FSA01 HA interface IP (such as FSA01 port3’s IP).
Gateway	FSA02 HA interface gateway (such as FSA02 port3’s gateway).
Device	FSA02 HA interface (such as port3).

3. In FSA01 ping FSA02's interfaces. The interfaces should be accessible.
4. In FSA02 ping FSA01's interfaces. The interfaces should be accessible.

After failover:

- HA roles are switched and HA internal communication are re-established.
- The HA-Cluster IP is lost.

Appendix A - Reduce scan time in custom Windows VM

When a file is sent to local Windows clone for dynamic scan, it takes time to boot up the clone from power-off state. You can keep the custom VM clones running to reduce scan time.

To reduce the scan time in a custom Windows VM:

1. Go to *System* > *AWS Config* and enable *Allow Hot-Standby VM*. After *Allow Hot-Standby VM* is enabled, FortiSandbox will perform `vminit` again to apply changes to existing custom VM clones or prepare new clone(s).

Allow Hot-Standby VM ☑ Enabled

2. After the clone initiation is done, go to the *AWS EC2* console to check that the clone(s) keep running with /without a scan job. Allow 2-3 minutes for a custom VM clone to restore status after a scan job done. Afterwards, the clone will keep running, and standby for the next scan job to reduce VM scan time.

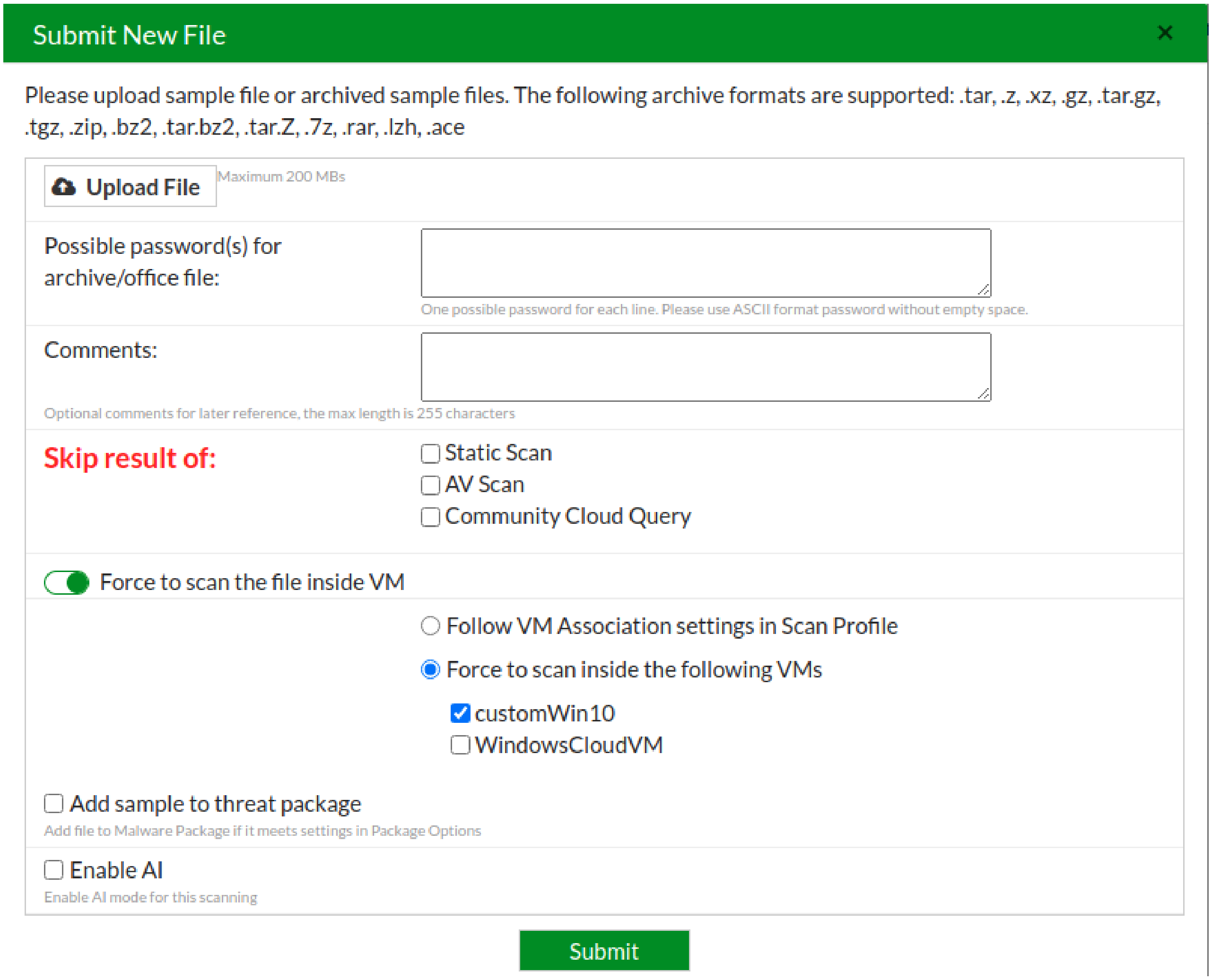
For this feature to work better we recommend enabling more clones than the maximum concurrent dynamic scan jobs, so when a new dynamic scan job is started, there are stand-by clones available immediately.

Appendix B - How to interact with a custom VM clone during scan

When a Windows clone is scanning a file, it's helpful to access it and monitor the scan process.

To interact with a custom clone during a scan:

1. Go to *Scan Job > File On-Demand* or *URL on-Demand* and click *Submit File* or *Submit File/URL*.
2. Enable *Force to scan the file inside VM* or *Force to scan the url inside VM*.
3. Select *Force to scan inside the following VMs* and select the custom VM.



Submit New File

Please upload sample file or archived sample files. The following archive formats are supported: .tar, .z, .xz, .gz, .tar.gz, .tgz, .zip, .bz2, .tar.bz2, .tar.Z, .7z, .rar, .lzh, .ace

Upload File — Maximum 200 MBs

Possible password(s) for archive/office file:

One possible password for each line. Please use ASCII format password without empty space.

Comments:

Optional comments for later reference, the max length is 255 characters

Skip result of: □ Static Scan □ AV Scan □ Community Cloud Query

Force to scan the file inside VM (enabled)

○ Follow VM Association settings in Scan Profile

● Force to scan inside the following VMs

☑ customWin10

□ WindowsCloudVM

□ Add sample to threat package

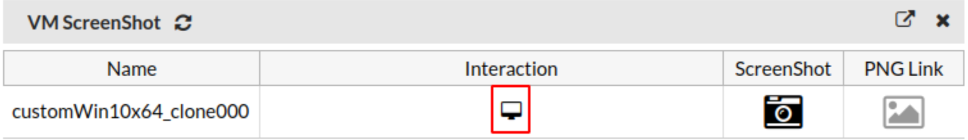
Add file to Malware Package if it meets settings in Package Options

□ Enable AI

Enable AI mode for this scanning

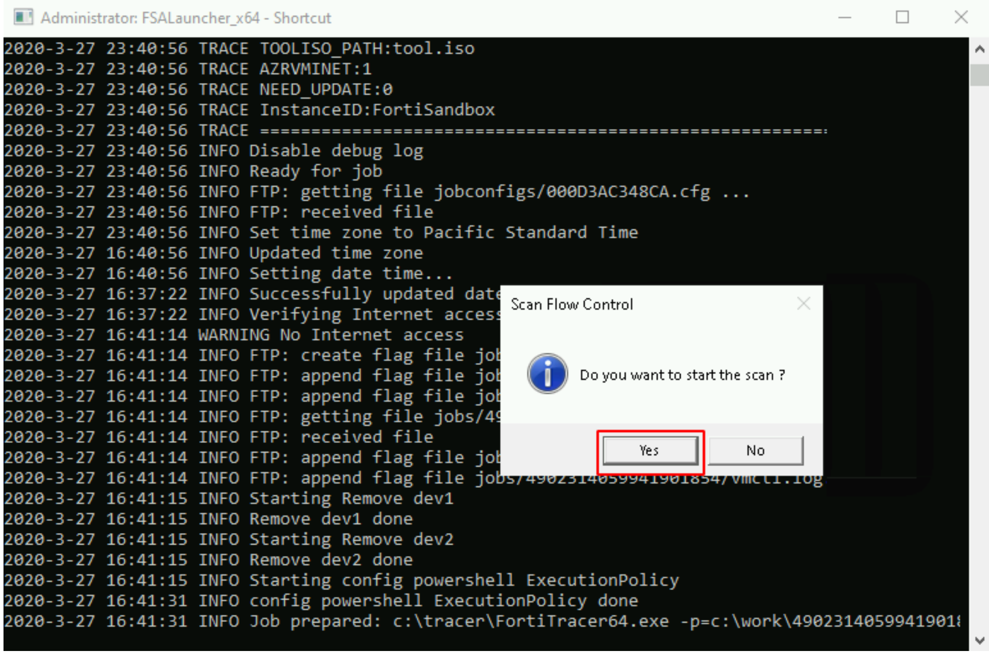
4. Click *Submit*.
5. Go to *Scan Policy and Object> VM Settings* and click *VM Screenshot*.

6. When the icon in the *Interaction* column is enabled, click the icon to establish an RDP tunnel.



Name	Interaction	ScreenShot	PNG Link
customWin10x64_clone000	🖥	📷	🖼

7. Click *Yes* to manually start the scan process with VM Interaction.

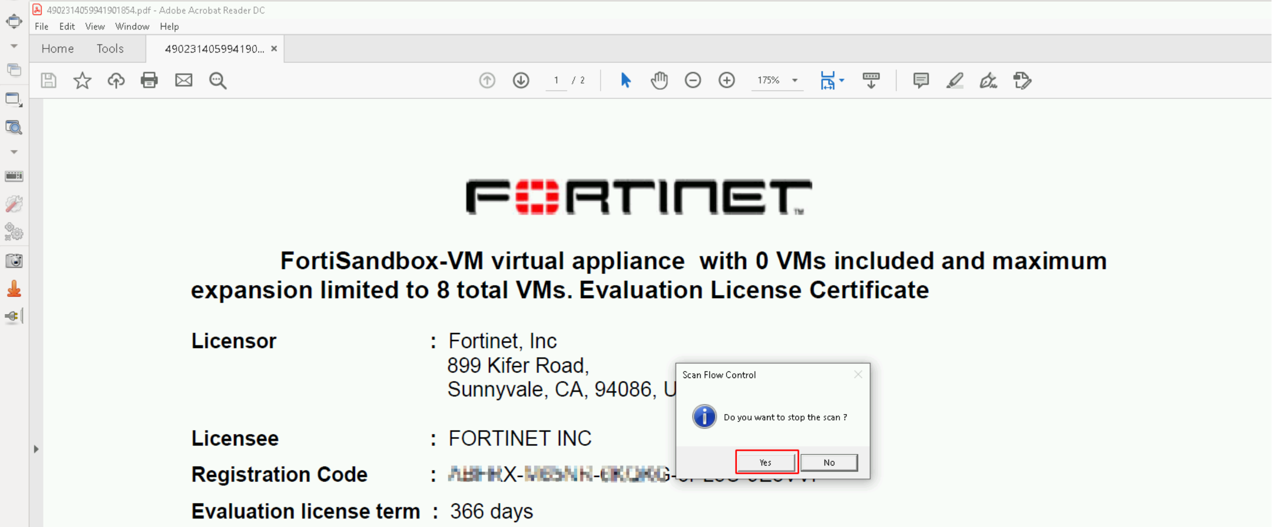


```
2020-3-27 23:40:56 TRACE TOOLISO_PATH:tool.iso
2020-3-27 23:40:56 TRACE AZRVMINET:1
2020-3-27 23:40:56 TRACE NEED_UPDATE:0
2020-3-27 23:40:56 TRACE InstanceID:FortiSandbox
2020-3-27 23:40:56 TRACE ========================================================
2020-3-27 23:40:56 INFO Disable debug log
2020-3-27 23:40:56 INFO Ready for job
2020-3-27 23:40:56 INFO FTP: getting file jobconfigs/000D3AC348CA.cfg ...
2020-3-27 23:40:56 INFO FTP: received file
2020-3-27 23:40:56 INFO Set time zone to Pacific Standard Time
2020-3-27 16:40:56 INFO Updated time zone
2020-3-27 16:40:56 INFO Setting date time...
2020-3-27 16:37:22 INFO Successfully updated date
2020-3-27 16:37:22 INFO Verifying Internet access
2020-3-27 16:41:14 WARNING No Internet access
2020-3-27 16:41:14 INFO FTP: create flag file jol
2020-3-27 16:41:14 INFO FTP: append flag file jol
2020-3-27 16:41:14 INFO FTP: append flag file jol
2020-3-27 16:41:14 INFO FTP: getting file jobs/49
2020-3-27 16:41:14 INFO FTP: received file
2020-3-27 16:41:14 INFO FTP: append flag file jol
2020-3-27 16:41:14 INFO FTP: append flag file jobs/4902314059941901854/vmctl.log
2020-3-27 16:41:15 INFO Starting Remove dev1
2020-3-27 16:41:15 INFO Remove dev1 done
2020-3-27 16:41:15 INFO Starting Remove dev2
2020-3-27 16:41:15 INFO Remove dev2 done
2020-3-27 16:41:15 INFO Starting config powershell ExecutionPolicy
2020-3-27 16:41:31 INFO config powershell ExecutionPolicy done
2020-3-27 16:41:31 INFO Job prepared: c:\tracer\FortiTracer64.exe -p=c:\work\4902314059941901
```

Scan Flow Control

Do you want to start the scan ?

8. When the FortiSandbox tracer engine displays the PDF sample, you can click *Yes* to manually stop the scan process.



4902314059941901854.pdf - Adobe Acrobat Reader DC
File Edit View Window Help
Home Tools 490231405994190... ×
1 / 2
175%

FortiSandbox-VM virtual appliance with 0 VMs included and maximum expansion limited to 8 total VMs. Evaluation License Certificate

Licensor : Fortinet, Inc
899 Kifer Road,
Sunnyvale, CA, 94086, U

Licensee : FORTINET INC

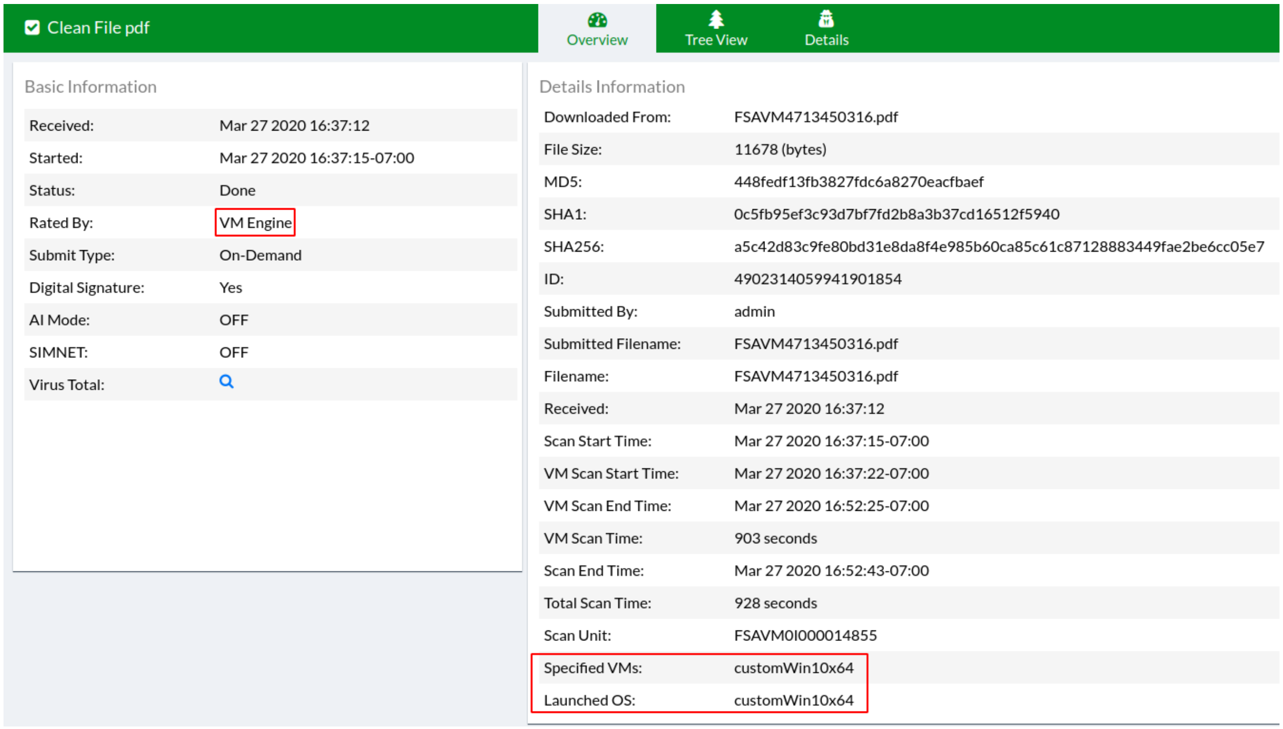
Registration Code : [redacted]

Evaluation license term : 366 days

Scan Flow Control

Do you want to stop the scan ?

9. When the scan is finished, go to the job details page to view the scan results.



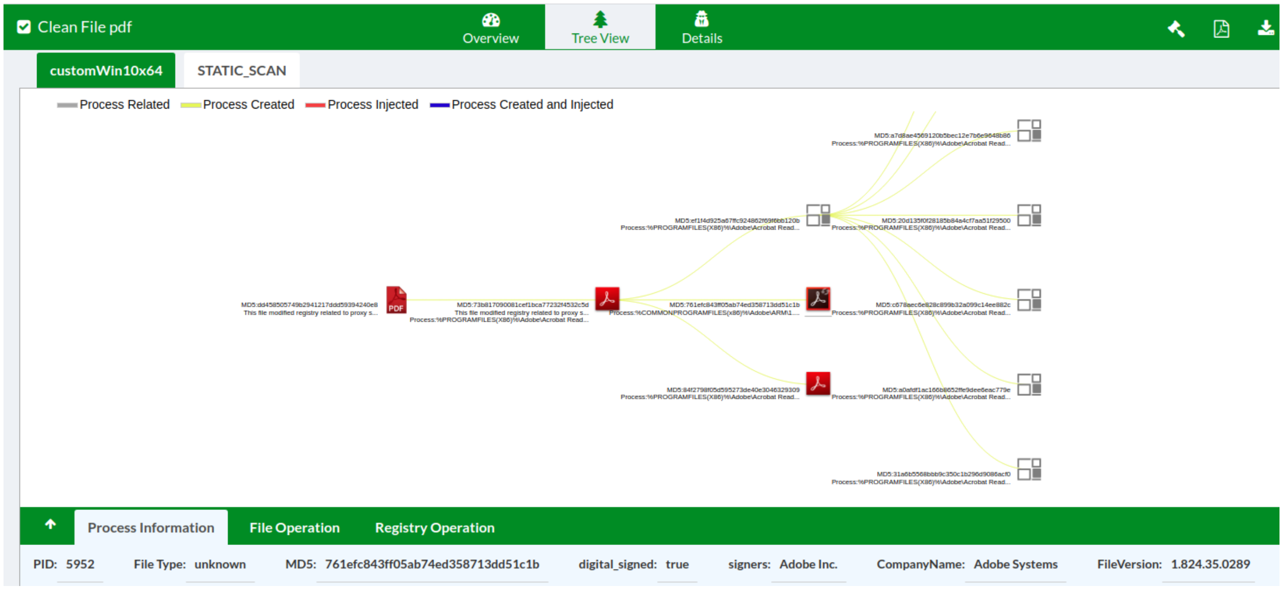
☑ Clean File pdf

Basic Information

Received:	Mar 27 2020 16:37:12
Started:	Mar 27 2020 16:37:15-07:00
Status:	Done
Rated By:	VM Engine
Submit Type:	On-Demand
Digital Signature:	Yes
AI Mode:	OFF
SIMNET:	OFF
Virus Total:	🔍

Details Information

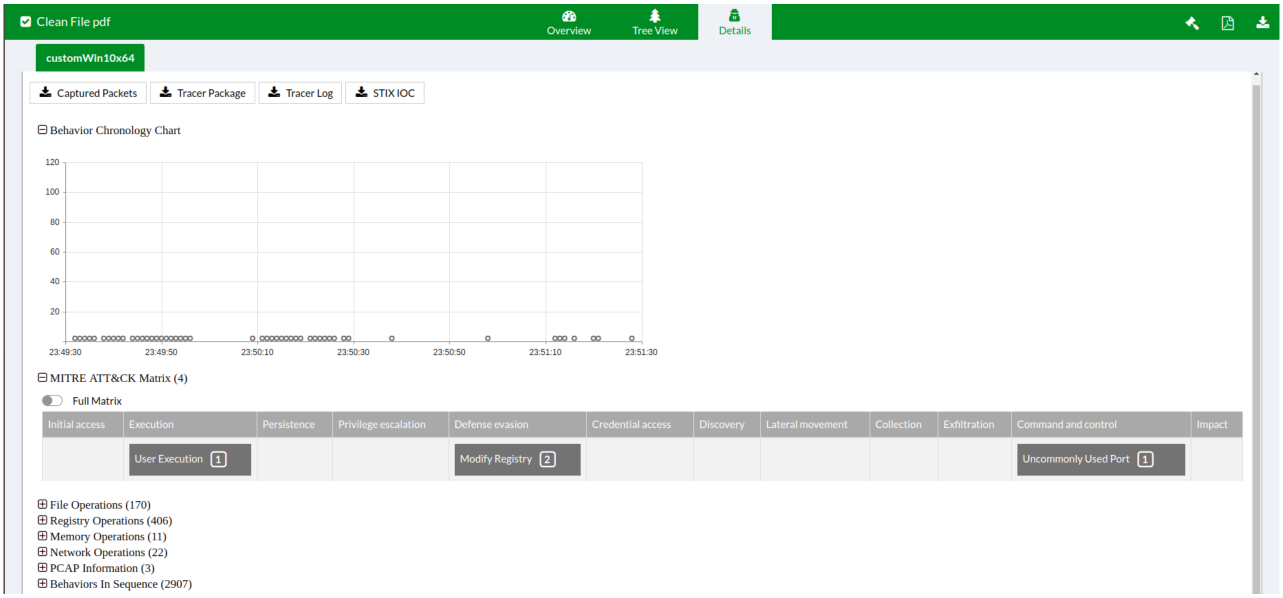
Downloaded From:	FSAVM4713450316.pdf
File Size:	11678 (bytes)
MD5:	448fedf13fb3827fdc6a8270eacfbaef
SHA1:	0c5fb95ef3c93d7bf7fd2b8a3b37cd16512f5940
SHA256:	a5c42d83c9fe80bd31e8da8f4e985b60ca85c61c87128883449fae2be6cc05e7
ID:	4902314059941901854
Submitted By:	admin
Submitted Filename:	FSAVM4713450316.pdf
Filename:	FSAVM4713450316.pdf
Received:	Mar 27 2020 16:37:12
Scan Start Time:	Mar 27 2020 16:37:15-07:00
VM Scan Start Time:	Mar 27 2020 16:37:22-07:00
VM Scan End Time:	Mar 27 2020 16:52:25-07:00
VM Scan Time:	903 seconds
Scan End Time:	Mar 27 2020 16:52:43-07:00
Total Scan Time:	928 seconds
Scan Unit:	FSAVM0I000014855
Specified VMs:	customWin10x64
Launched OS:	customWin10x64



☑ Clean File pdf

Overview
Tree View
Details
customWin10x64
STATIC_SCAN
Process Related
Process Created
Process Injected
Process Created and Injected
MD5:a7d8ae4569120b5bec12e7b6e9648b86
Process:%PROGRAMFILES(X86)%\Adobe\Acrobat Read...
MD5:ef1f4d925a67ffc924862f69f6bb120b
Process:%PROGRAMFILES(X86)%\Adobe\Acrobat Read...
MD5:20d135f0f28185b84a4cf7aa51f29500
Process:%PROGRAMFILES(X86)%\Adobe\Acrobat Read...
MD5:dd458505749b2941217ddd59394240e8
This file modified registry related to proxy s...
PDF
MD5:73b817090081cef1bca77232f4532c5d
This file modified registry related to proxy s...
Process:%PROGRAMFILES(X86)%\Adobe\Acrobat Read...
MD5:761efc843ff05ab74ed358713dd51c1b
Process:%COMMONPROGRAMFILES(x86)%\Adobe\ARM\1...
MD5:c678aec6e828c899b32a099c14ee882c
Process:%PROGRAMFILES(X86)%\Adobe\Acrobat Read...
MD5:84f2798f05d595273de40e3046329309
Process:%PROGRAMFILES(X86)%\Adobe\Acrobat Read...
MD5:a0afdf1ac166b8652ffe9dee6eac779e
Process:%PROGRAMFILES(X86)%\Adobe\Acrobat Read...
MD5:31a6b5568bbb9c350c1b296d9086acf0
Process:%PROGRAMFILES(X86)%\Adobe\Acrobat Read...
Process Information
File Operation
Registry Operation

PID:	File Type:	MD5:	digital_signed:	signers:	CompanyName:	FileVersion:
5952	unknown	761efc843ff05ab74ed358713dd51c1b	true	Adobe Inc.	Adobe Systems	1.824.35.0289



⊟ Behavior Chronology Chart

⊟ MITRE ATT&CK Matrix (4)

Initial access	Execution	Persistence	Privilege escalation	Defense evasion	Credential access	Discovery	Lateral movement	Collection	Exfiltration	Command and control	Impact
	User Execution 1			Modify Registry 2						Uncommonly Used Port 1	

⊞ File Operations (170)
⊞ Registry Operations (406)
⊞ Memory Operations (11)
⊞ Network Operations (22)
⊞ PCAP Information (3)
⊞ Behaviors In Sequence (2907)

Appendix C - Setup HA health check based on AWS Network Load Balancer in dual-zone

Step 1: Create and configure your target group

1. Open the Amazon EC2 console.
2. In the navigation pane, under *Load Balancing*, choose *Target Groups*.
3. Click *Create target group* and configure the group.

Target type	Choose *Instances*.
Target group name	Enter a name for the new target group
Protocol	Select *TCP* and for *Port*, select *514*. If the health check needs to be created on Port 443: • Select *TLS*, and for *Port*, select *443*.
VPC	Select the VPC that contains your instances.
Health checks	• For *Health check protocol*, choose *TCP*. • For *Advanced health check* settings, keep the default settings.

4. Click *Next*.
5. On the *Register targets* page, complete the following steps.

This is an optional step to create a target group. However, you must register your targets if you want to test your load balancer and ensure that it is routing traffic to your targets.

   a. For *Available instances*, select all FortiSandbox instances belonging to this HA Cluster.
   b. Verify the Ports for the selected instances is 514, or If the health check was created on Port 443, verify the Ports for the selected instances is 443
6. Click *Include as pending below*, then click *Create target group*.

Step 2: Create Network load balancer

1. On the navigation bar, choose a Region for your load balancer. Be sure to choose the same Region that you used for your FortiSandbox instances
2. In the navigation pane, under *Load Balancing*, choose *Load Balancers*.
3. Choose *Create load balancer* and then select the *Network Load Balancer*.
4. For *Network Load Balancer*, click *Create*.

Step 3: Configure network load balancer and listener

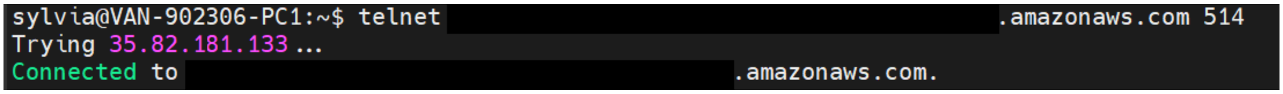
1. Configure the following settings:

Load balancer name	Enter a name for your load balancer.
Scheme and IP address type	Keep the default values.
Network mapping	1. Select the *VPC* that you used for your FortiSandbox instances. 2. Select all *Availability Zones* that you deployed FortiSandbox instances on. 3. Select the *FortiSandbox port1 subnets* under the selected *Availability Zones*. 4. For the *IPv4 address*, keep the default settings.
Listeners and routing	1. For *Protocol*, choose *TCP*. • If the target group health check was created on Port 443, for *Protocol*, choose *TLS*. 2. For *Port*, choose *514*. • If the target group health check was created on Port 443, for *Port*, choose *443*. • For Secure listener settings, refer to *Health check on 443 Secure listener settings*. 3. For *Default action*, select the target group you created and registered previously

2. Review your configuration, and click *Create load balancer*. A few default attributes are applied to your load balancer during creation. You can view and edit them after creating the load balancer

Step 4: Test your load balancer on TCP Port 514

1. After you are notified that your load balancer was created successfully, click *Close*.
2. In the navigation pane, under *Load Balancing*, choose *Target Groups*.
3. Select the newly created target group
4. Choose *Targets* and verify that your instances are ready. If the status of an instance is *initial*, it is likely because the instance is still in the process of being registered, or it has not passed the minimum number of health checks to be considered healthy. After the status of at least one instance is *healthy*, you can test your load balancer.
5. In the navigation pane, under *Load Balancing*, choose *Load Balancers.*
6. Select the name of the newly created load balancer to open its details page.
7. Copy the DNS name of the load balancer (for example, *my-load-balancer-1234567890abcdef.elb.us-east-2.amazonaws.com*).
8. Telnet the DNS name. For example, telnet my-load-balancer-1234567890abcdef.elb.us-east-2.amazonaws.com 514

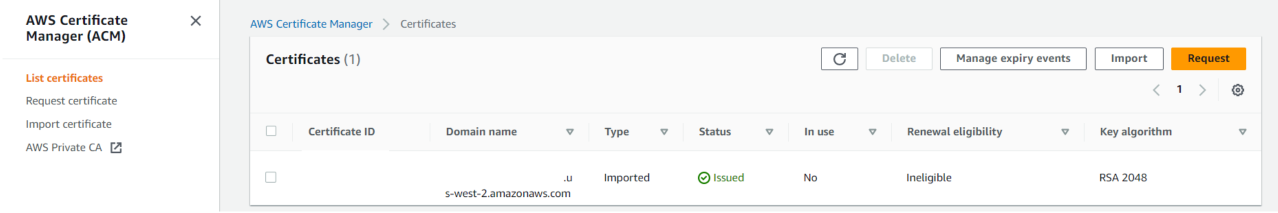


```
sylvia@VAN-902306-PC1:~$ telnet [redacted].amazonaws.com 514
Trying 35.82.181.133...
Connected to [redacted].amazonaws.com.
```

Health check for 443 Secure listener settings

To import certificate:

1. Open the Amazon EC2 console.
2. In the navigation pane, under *AWS Certificate Manager (ACM)*, choose *Import certificate*.



Certificates (1)

□	Certificate ID	Domain name	Type	Status	In use	Renewal eligibility	Key algorithm
□		.u s-west-2.amazonaws.com	Imported	✓ Issued	No	Ineligible	RSA 2048

3. Follows the AWS import certificate steps and complete the certificate import.

To configure network load balancer and listener on port 443

1. Follow the steps in Create and configure your target group. Where applicable:
   - For *Protocol* select *TCP/TLS*.
   - For *Port* select *443*.
2. Follow steps 1-3 in Step 3: Configure network load balancer and listener.
3. For Listeners and routing:
   a. For *Protocol*, choose *TLS*.
   b. For *Port*, choose *443*.
   c. For *Default action*, select the target group you created and registered previously.
4. For Secure listener settings:
   a. For *Security policy*, select the AWS recommended. For example, *ELBSecurityPolicy-TLS13-1-2-2021-06 (recommended)*.
   b. For Default *SSL/TLS certificate*, choose *From ACM* and select the imported certificate
   c. For *ALPN policy*, keep the default settings (*None*).
5. Review your configuration, and click *Create load balancer*.

To test your load balancer on TLS Port 443:

1. Open the target group details page, wait all members status change to *healthy*.
2. On the details page of newly created load balancer:
   a. Copy the DNS name of the load balancer.
   b. Paste the DNS name into the address field of an internet-connected web browser. If everything is working, the browser displays the default page of your server.

      For example, *https://my-load-balancer-1234567890abcdef.elb.us-east-2.amazonaws.com*

Change Log

Date	Change Description
2022-11-16	Initial release.
2023-05-31	Updated Optional: Set up a HA-Cluster on page 42.
2023-06-13	Added Setup HA health check based on AWS Network Load Balancer in dual-zone on page 51.

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