FortiNAC

Deployment Guide

Version: 8.5, 8.6, 8.7, 8.8, 9.1, 9.2

Date: August 29, 2022

Rev: V

FORTINET DOCUMENT LIBRARY

http://docs.fortinet.com

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http://video.fortinet.com

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https://community.fortinet.com/t5/Knowledge-Base/ct-p/knowledgebase

FORTINET BLOG

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CUSTOMER SERVICE & SUPPORT

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FORTINET COOKBOOK

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http://training.fortinet.com

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http://fortiguard.com

FORTICAST

http://forticast.fortinet.com

END USER LICENSE AGREEMENT

http://www.fortinet.com/doc/legal/EULA.pdf

Contents

Overview

The information contained in this document provides the steps necessary for deploying a new FortiNAC appliance in a network. This guide references other documents located in the Fortinet Document Library as necessary for more detailed information or instruction.

Important: Steps are cumulative and should be executed in the specified order.

Deployment Procedure Overview

1. **Product Registration** - Register all products in FortiCare.

2. **Appliance Installation** - Build virtual appliances/stack physical.

3. **Generate and Download Keys** – Appliance and license key creation.

4. **Appliance Configuration** - Install keys, Basic network configuration, passwords and eth1 configuration.

5. **Perform Operating System Updates** - Update appliance(s) to the latest CentOS patches.

6. **SSL Certificates** - Generate and install SSL certificates on all appliances.

7. **High Availability** - Optional. Configure FortiNAC appliances to operate in Active/Passive mode.

8. **Control Manager** - Optional. Configure Control Manager to manage multiple appliances at various sites.

9. **Software Upgrade** - Upgrade appliance(s) to the latest FortiNAC software version.

10. **System Settings** - Configure system level settings in the Administration UI.

11. **Network Visibility** - Configure FortiNAC to communicate with the wired infrastructure devices in order to gather basic information about connecting endpoints.

Terminology

Term	Definition
“Isolation” VLAN	Used for network segmentation of unknown and untrusted endpoints. Provides limited network access
FortiNAC Service Network Interface	Configured on the eth1 interface of the appliance. Serves DHCP, DNS and the Captive Portal to the “isolation” VLANs
FortiNAC Service Network VLAN	VLAN where the FortiNAC Service Network Interface resides in L3 Network Configurations. For more information, see Determine FortiNAC Service Configuration (Network Type) in the Appendix

Requirements

The Requirements Task List in the Appendix outline the requirements that must be in place in order for that specific step to be completed. The length of time it takes to complete deployment is dependent upon each customer, their requirements and time constraints. Customers can complete all requirements prior to deployment, or during the deployment as time permits for those requirements not needed until later steps.

Step 1: Product Registration

Products must be registered in order for the appropriate keys to be generated for the appliances. Without these keys, the appliances will not start.

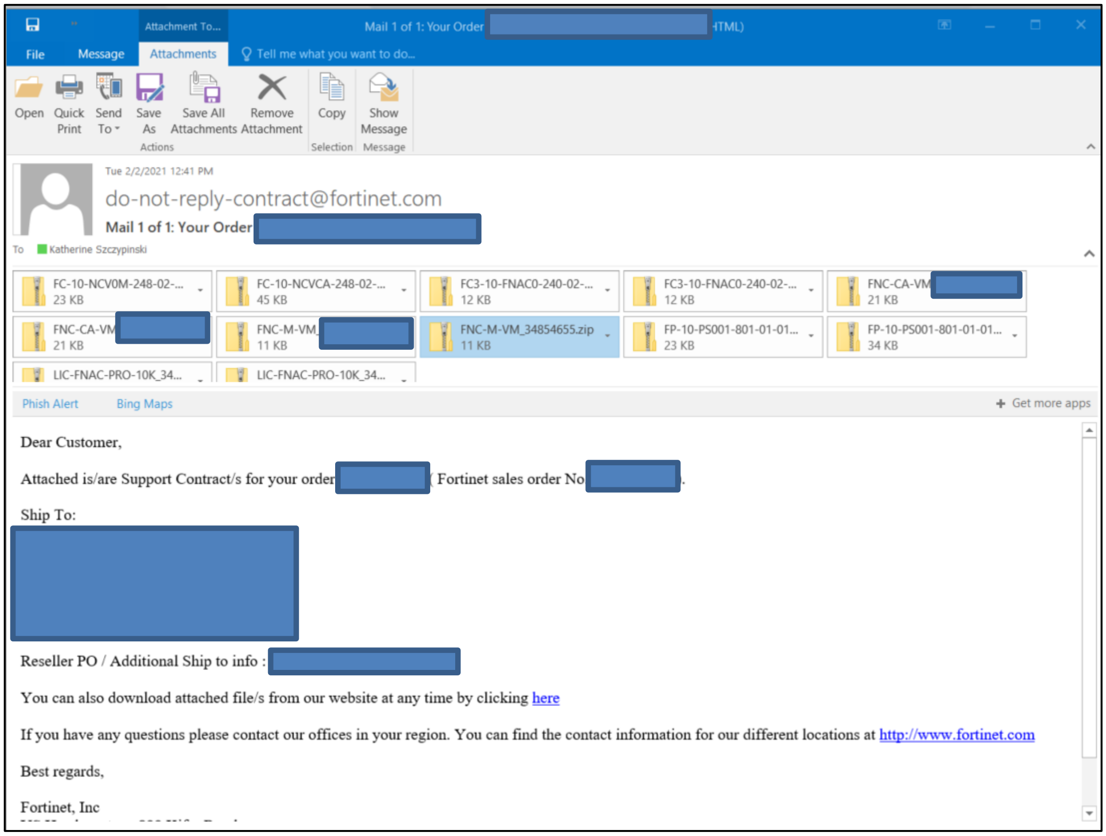
Registration Procedure Overview

1: Register the Managing Server
2: Register Support Contract for Managing Server
3: Register Licenses
4: Register Support Contract for License
5: Register Remaining Appliances

Requirements Checklist

Registration codes: Email from do-not-reply-contract@fortinet.com with attached .zip files containing registration codes for all products

Example



Mail 1 of 1: Your Order [redacted] HTML)

Tue 2/2/2021 12:41 PM

do-not-reply-contract@fortinet.com

Mail 1 of 1: Your Order [redacted]

To Katherine Szczypinski

FC-10-NCV0M-248-02-... 23 KB
FC-10-NCVCA-248-02-... 45 KB
FC3-10-FNAC0-240-02-... 12 KB
FC3-10-FNAC0-240-02-... 12 KB
FNC-CA-VM [redacted] 21 KB
FNC-CA-VM [redacted] 21 KB
FNC-M-VM_ [redacted] 11 KB
FNC-M-VM_34854655.zip 11 KB
FP-10-PS001-801-01-01... 23 KB
FP-10-PS001-801-01-01... 34 KB
LIC-FNAC-PRO-10K_34...
LIC-FNAC-PRO-10K_34...

Dear Customer,

Attached is/are Support Contract/s for your order [redacted] (Fortinet sales order No [redacted].

Ship To:

[redacted]

Reseller PO / Additional Ship to info : [redacted]

You can also download attached file/s from our website at any time by clicking here

If you have any questions please contact our offices in your region. You can find the contact information for our different locations at http://www.fortinet.com

Best regards,

Fortinet, Inc

File name examples:

FNC-M-VM_xxx.zip = Manager Server (virtual)
FC-10-NCxxM-xxx.zip = Support & Maintenance for Manager Server

FNC-CA-VM_xxx.zip = Control & Application Server (virtual)
FC-10-NCVCA-xxx.zip = Support & Maintenance for Control & Application Server (virtual)

FNC-CA-xxC_xxx.zip = Control & Application Server (physical)
FC-10-NCx00-xxx.zip = Support & Maintenance for Control & Application Server (physical)

LIC-FNAC-BASE-xxx.zip = Perpetual License, Base level
FC1-10-FNAC0-xxx.zip = Support & Maintenance for Perpetual Base Licenses

FCx-10-FNAC1-215-xx-xx.zip = Support & Maintenance for Subscription Base Licenses

LIC-FNAC-PLUS-xxx.zip = Perpetual License, Plus level
FC2-10-FNAC0-xxx.zip = Support & Maintenance for Perpetual Plus Licenses

FCx-10-FNAC1-213-xx-xx.zip = Support & Maintenance for Subscription Plus Licenses

LIC-FNAC-PRO-xxx.zip = Perpetual License, Pro level
FC3-10-FNAC0-xxx.zip = Support & Maintenance for Perpetual Pro Licenses

FCx-10-FNAC1-209-xx-xx.zip = Support & Maintenance for Subscription Pro Licenses

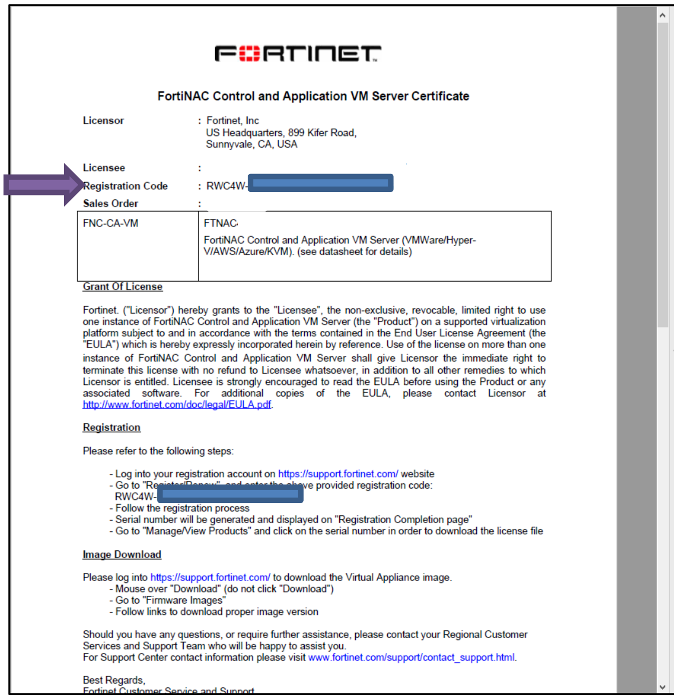
FP-10-PS-801-01-01.zip = Professional Service Days*
FP-10-PS-830-01-01.zip = Professional Service Days*

*Registered on the day of engagement only. See Fortinet Professional Services Contracts in the Appendix for more information.

Within the zip files are one or more PDFs which contain the Registration Code.

Tip: If multiple appliances were purchased, save these files in separate folders for each appliance.

Example A – CAVM



FortiNAC Control and Application VM Server Certificate

Licensor : Fortinet, Inc
US Headquarters, 899 Kifer Road,
Sunnyvale, CA, USA

Licensee :
Registration Code : RWC4W-[redacted]
Sales Order :

FNC-CA-VM	FTNAC FortiNAC Control and Application VM Server (VMWare/Hyper-V/AWS/Azure/KVM). (see datasheet for details)

Grant Of License

Fortinet. ("Licensor") hereby grants to the "Licensee", the non-exclusive, revocable, limited right to use one instance of FortiNAC Control and Application VM Server (the "Product") on a supported virtualization platform subject to and in accordance with the terms contained in the End User License Agreement (the "EULA") which is hereby expressly incorporated herein by reference. Use of the license on more than one instance of FortiNAC Control and Application VM Server shall give Licensor the immediate right to terminate this license with no refund to Licensee whatsoever, in addition to all other remedies to which Licensor is entitled. Licensee is strongly encouraged to read the EULA before using the Product or any associated software. For additional copies of the EULA, please contact Licensor at http://www.fortinet.com/doc/legal/EULA.pdf.

Registration

Please refer to the following steps:

- Log into your registration account on https://support.fortinet.com/ website
- Go to "Re[redacted]ve provided registration code:
  RWC4W-
- Follow the registration process
- Serial number will be generated and displayed on "Registration Completion page"
- Go to "Manage/View Products" and click on the serial number in order to download the license file

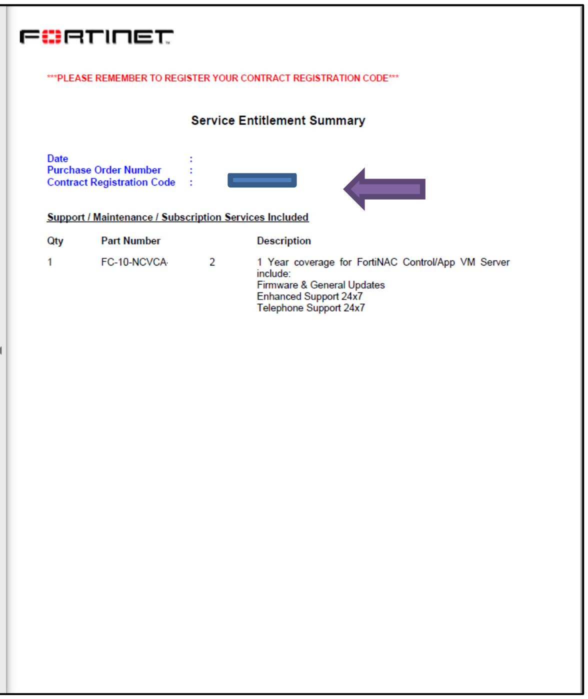
Image Download

Please log into https://support.fortinet.com/ to download the Virtual Appliance image.
- Mouse over "Download" (do not click "Download")
- Go to "Firmware Images"
- Follow links to download proper image version

Should you have any questions, or require further assistance, please contact your Regional Customer Services and Support Team who will be happy to assist you.
For Support Center contact information please visit www.fortinet.com/support/contact_support.html.

Best Regards,
Fortinet Customer Service and Support

Example B – Support for CAVM



PLEASE REMEMBER TO REGISTER YOUR CONTRACT REGISTRATION CODE

Service Entitlement Summary

Date :
Purchase Order Number :
Contract Registration Code : [redacted]

Support / Maintenance / Subscription Services Included

Qty	Part Number		Description
1	FC-10-NCVCA	2	1 Year coverage for FortiNAC Control/App VM Server include: Firmware & General Updates Enhanced Support 24x7 Telephone Support 24x7

Physical Appliances Only

- Serial number (FNxxxxxxxxxx). The serial number (S/N) is located on the label that shipped with the hardware. This label also contains the Product Name, Model/SKU, Fortinet P/N and HW ID.

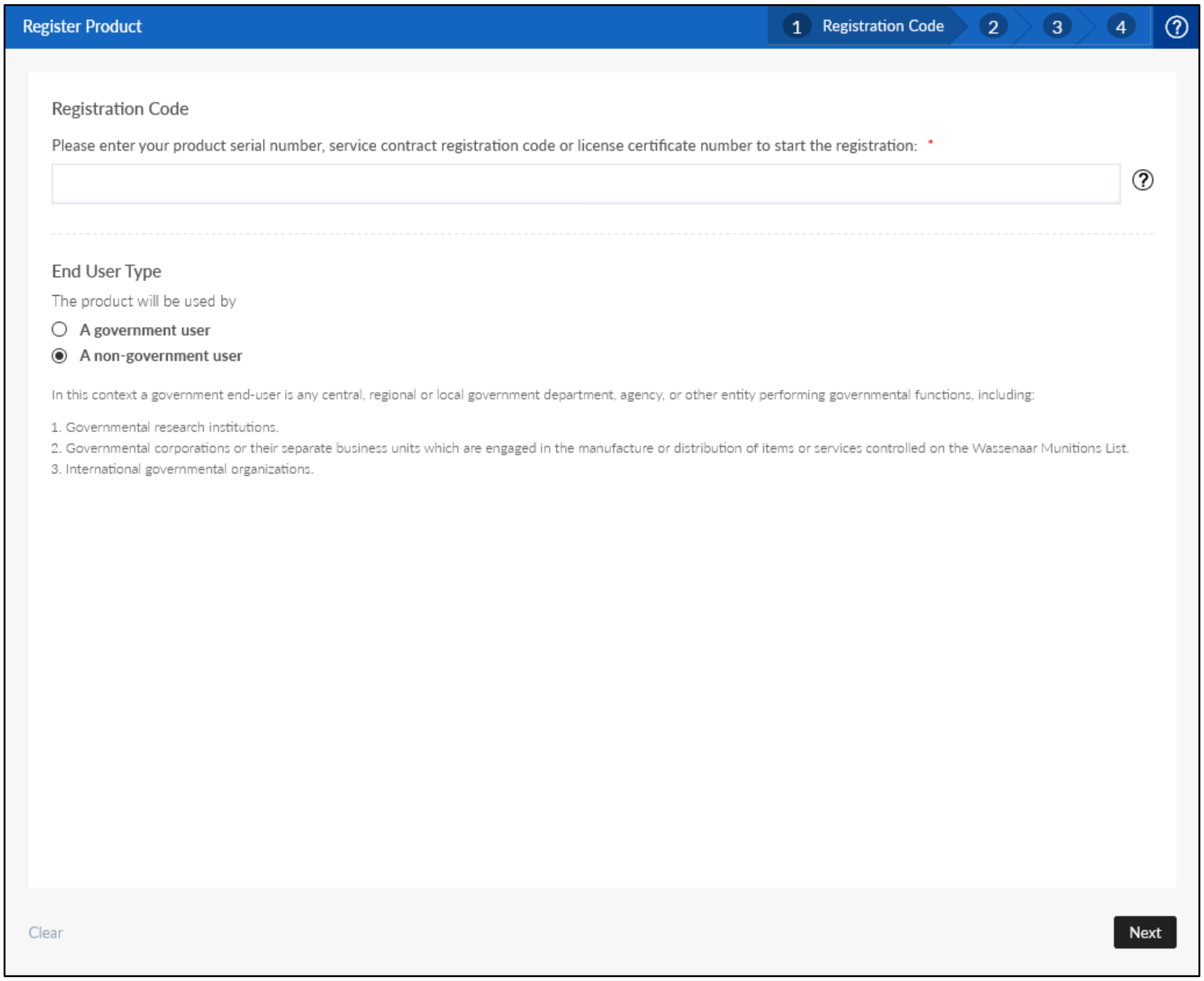
Register the "Managing" Server

1. Use the chart below to determine the "managing" server (appliance to which the Endpoint License Key will be installed). The remaining servers in multiple appliance deployments are installed with an Appliance (Base) License Key.

For more information on how licenses are distributed for each system configuration, see section **License Distribution** in the Appendix.

Deployment Configuration	Managing Server	Part Number
Standalone	CA Server	FNC-CA-VM or FNC-CA
Standalone with High Availability (HA)	Primary CA Server	FNC-CA-VM or FNC-CA
Multiple Independent Standalones	Each CA Server	FNC-CA-VM or FNC-CA
Multiple Independent with High Availability (HA)	Each Primary CA Server	FNC-CA-VM or FNC-CA
Distributed	Control Manager	FNC-M-VM or FNC-M
Distributed with High Availability (HA)	Primary Control Manager	FNC-M-VM or FNC-M

2. Log into the Customer Portal at https://support.fortinet.com/
3. Click **Register Product**.
4. In the **Registration Code** field, enter the appropriate value
    - **Virtual appliance**: Registration code from the pdf found in file FNC-CA-VM_xxx (or if a Manager FNC-M-VM.xxx).
    - **Physical appliance**: Serial number on label.
5. Click **Next**.



Register Product

1 Registration Code 2 3 4

Registration Code

Please enter your product serial number, service contract registration code or license certificate number to start the registration: *

End User Type

The product will be used by

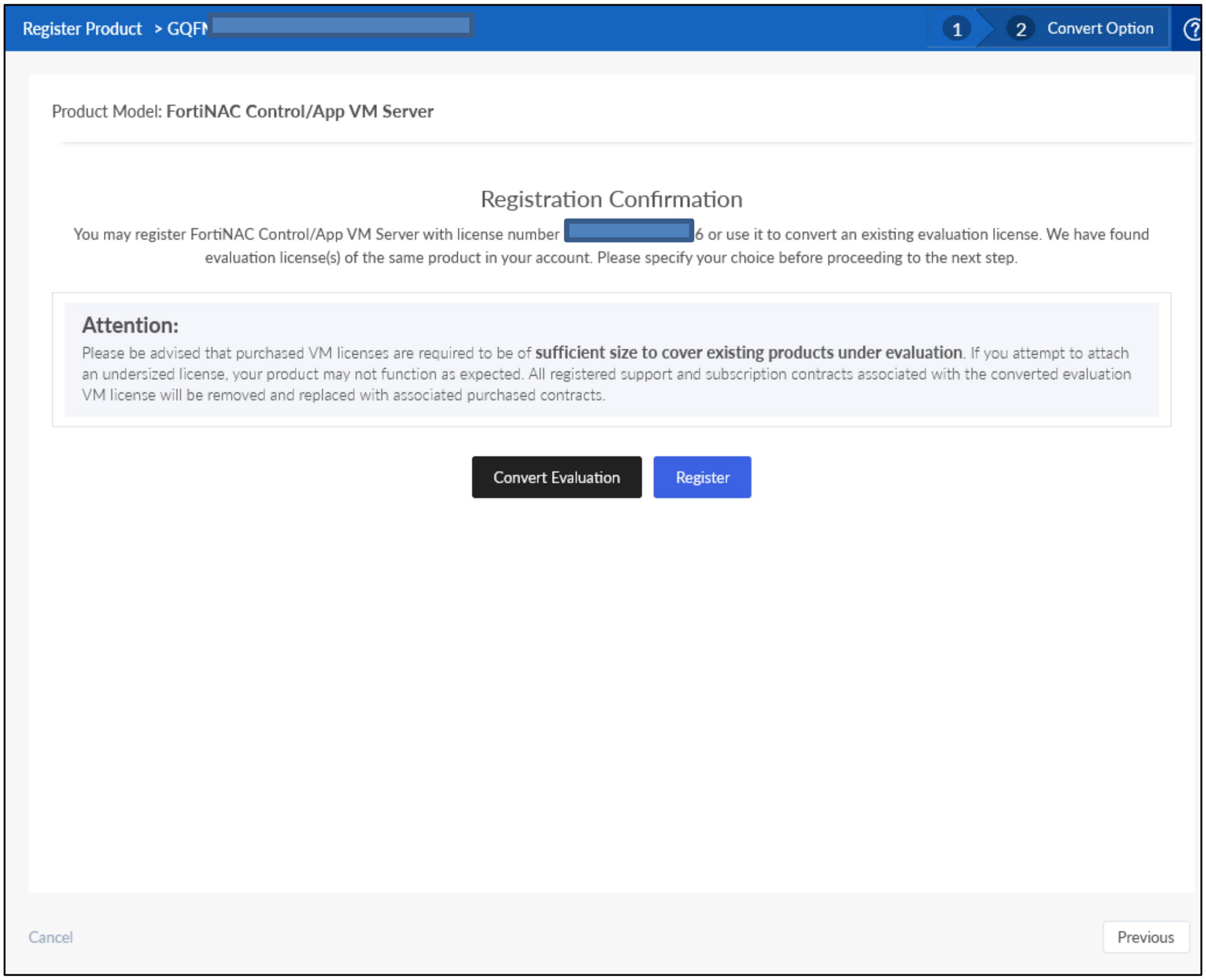
○ A government user

● A non-government user

In this context a government end-user is any central, regional or local government department, agency, or other entity performing governmental functions, including:

1. Governmental research institutions.
2. Governmental corporations or their separate business units which are engaged in the manufacture or distribution of items or services controlled on the Wassenaar Munitions List.
3. International governmental organizations.

This page may appear if there was a POC or active evaluation license.
If you are converting your POC to production, select **Convert Evaluation.**
If you not converting your POC to production, select **Register**.



Product Model: **FortiNAC Control/App VM Server**

Registration Confirmation

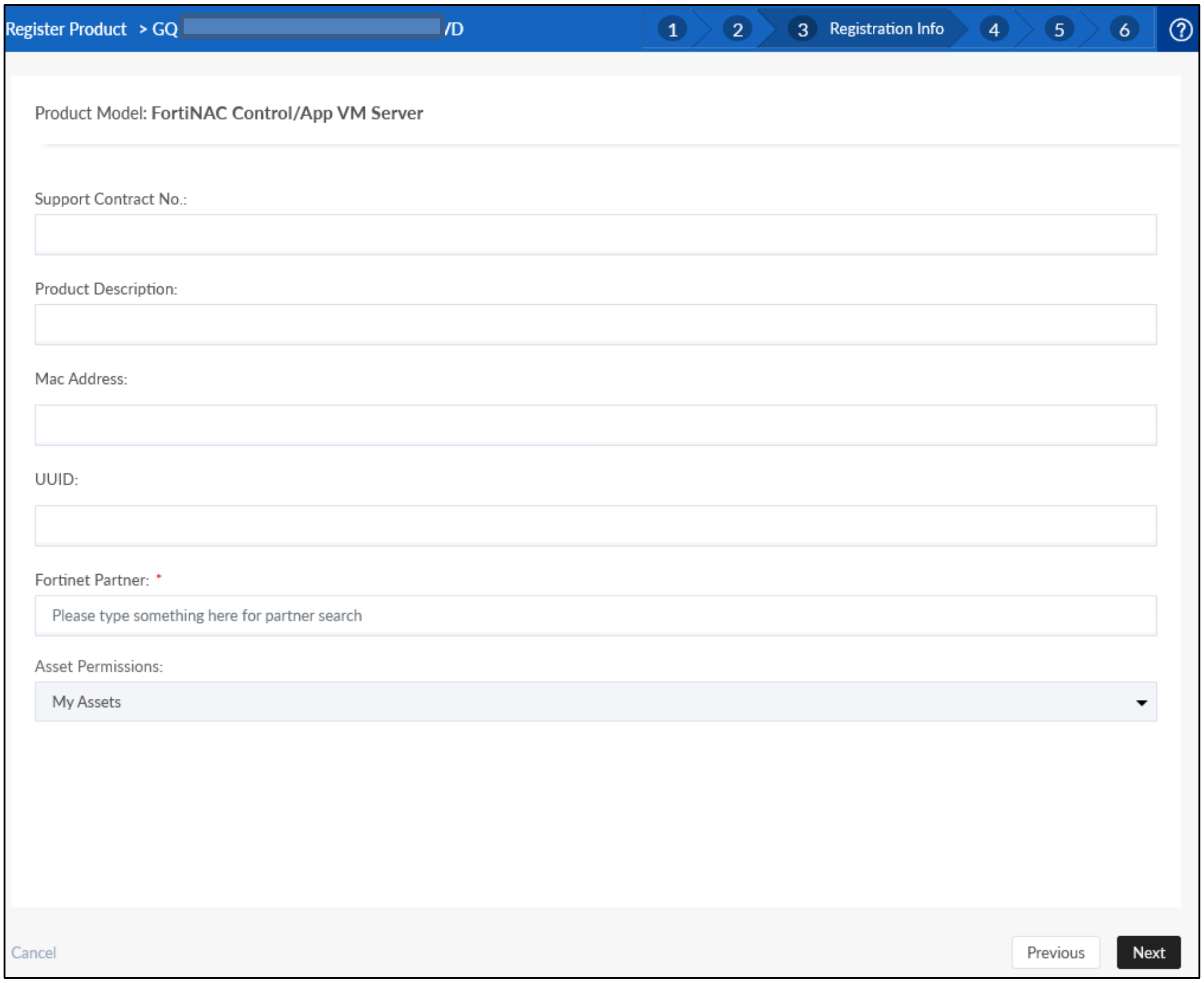
You may register FortiNAC Control/App VM Server with license number [redacted]6 or use it to convert an existing evaluation license. We have found evaluation license(s) of the same product in your account. Please specify your choice before proceeding to the next step.

Attention:
Please be advised that purchased VM licenses are required to be of **sufficient size to cover existing products under evaluation**. If you attempt to attach an undersized license, your product may not function as expected. All registered support and subscription contracts associated with the converted evaluation VM license will be removed and replaced with associated purchased contracts.

6. Under Product Description, enter managing server's hostname or "Managing Server" (this can be edited later)

7. Select Fortinet Partner (ignore all other fields).

8. Click **Next.**



Register Product > GQ[redacted]/D

Product Model: **FortiNAC Control/App VM Server**

Support Contract No.:

Product Description:

Mac Address:

UUID:

Fortinet Partner: *

Please type something here for partner search

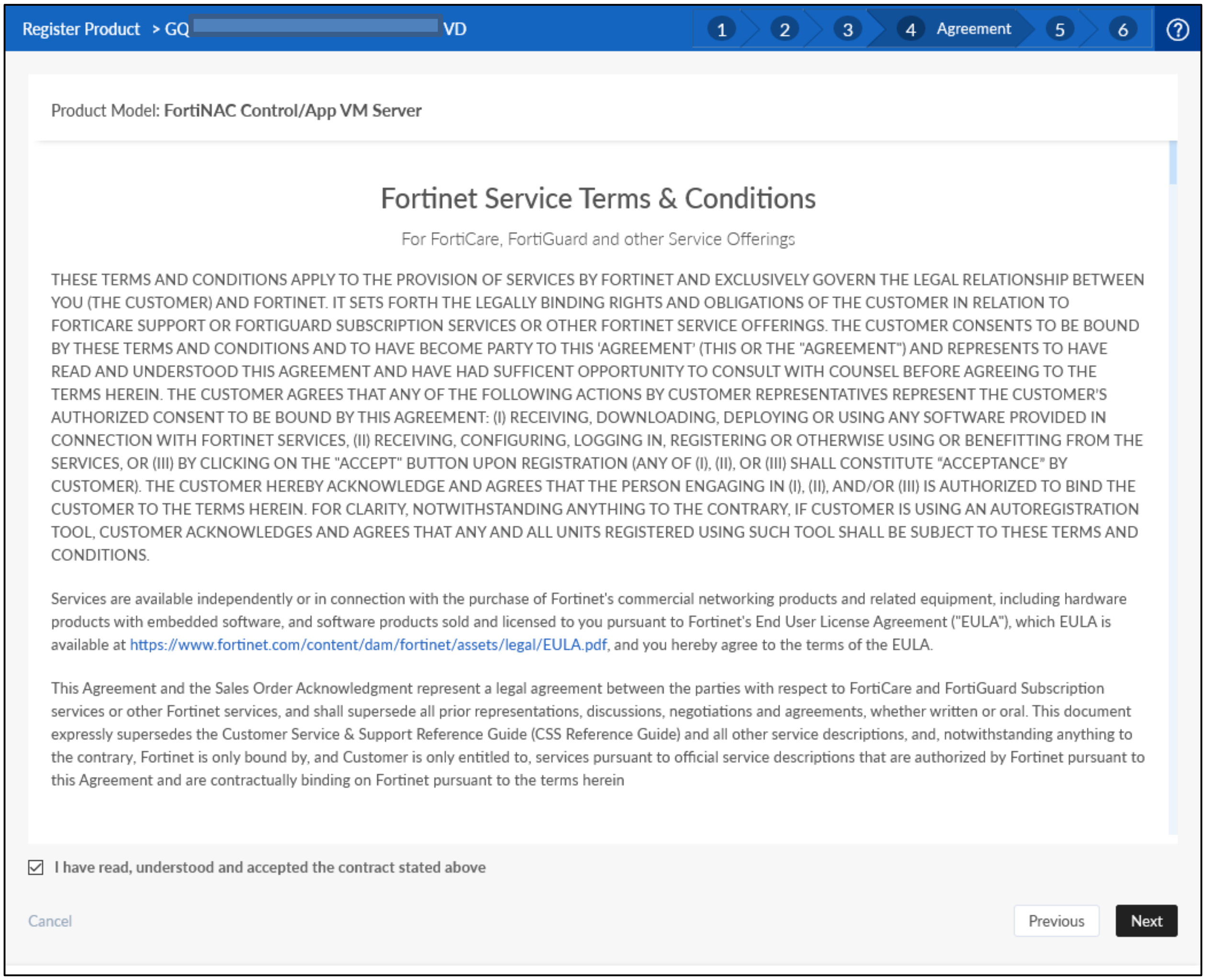
Asset Permissions:

My Assets

9. Read terms and conditions.

10. Click on radio button.

11. Click **Next**.



Product Model: **FortiNAC Control/App VM Server**

Fortinet Service Terms & Conditions

For FortiCare, FortiGuard and other Service Offerings

THESE TERMS AND CONDITIONS APPLY TO THE PROVISION OF SERVICES BY FORTINET AND EXCLUSIVELY GOVERN THE LEGAL RELATIONSHIP BETWEEN YOU (THE CUSTOMER) AND FORTINET. IT SETS FORTH THE LEGALLY BINDING RIGHTS AND OBLIGATIONS OF THE CUSTOMER IN RELATION TO FORTICARE SUPPORT OR FORTIGUARD SUBSCRIPTION SERVICES OR OTHER FORTINET SERVICE OFFERINGS. THE CUSTOMER CONSENTS TO BE BOUND BY THESE TERMS AND CONDITIONS AND TO HAVE BECOME PARTY TO THIS 'AGREEMENT' (THIS OR THE "AGREEMENT") AND REPRESENTS TO HAVE READ AND UNDERSTOOD THIS AGREEMENT AND HAVE HAD SUFFICENT OPPORTUNITY TO CONSULT WITH COUNSEL BEFORE AGREEING TO THE TERMS HEREIN. THE CUSTOMER AGREES THAT ANY OF THE FOLLOWING ACTIONS BY CUSTOMER REPRESENTATIVES REPRESENT THE CUSTOMER'S AUTHORIZED CONSENT TO BE BOUND BY THIS AGREEMENT: (I) RECEIVING, DOWNLOADING, DEPLOYING OR USING ANY SOFTWARE PROVIDED IN CONNECTION WITH FORTINET SERVICES, (II) RECEIVING, CONFIGURING, LOGGING IN, REGISTERING OR OTHERWISE USING OR BENEFITTING FROM THE SERVICES, OR (III) BY CLICKING ON THE "ACCEPT" BUTTON UPON REGISTRATION (ANY OF (I), (II), OR (III) SHALL CONSTITUTE "ACCEPTANCE" BY CUSTOMER). THE CUSTOMER HEREBY ACKNOWLEDGE AND AGREES THAT THE PERSON ENGAGING IN (I), (II), AND/OR (III) IS AUTHORIZED TO BIND THE CUSTOMER TO THE TERMS HEREIN. FOR CLARITY, NOTWITHSTANDING ANYTHING TO THE CONTRARY, IF CUSTOMER IS USING AN AUTOREGISTRATION TOOL, CUSTOMER ACKNOWLEDGES AND AGREES THAT ANY AND ALL UNITS REGISTERED USING SUCH TOOL SHALL BE SUBJECT TO THESE TERMS AND CONDITIONS.

Services are available independently or in connection with the purchase of Fortinet's commercial networking products and related equipment, including hardware products with embedded software, and software products sold and licensed to you pursuant to Fortinet's End User License Agreement ("EULA"), which EULA is available at https://www.fortinet.com/content/dam/fortinet/assets/legal/EULA.pdf, and you hereby agree to the terms of the EULA.

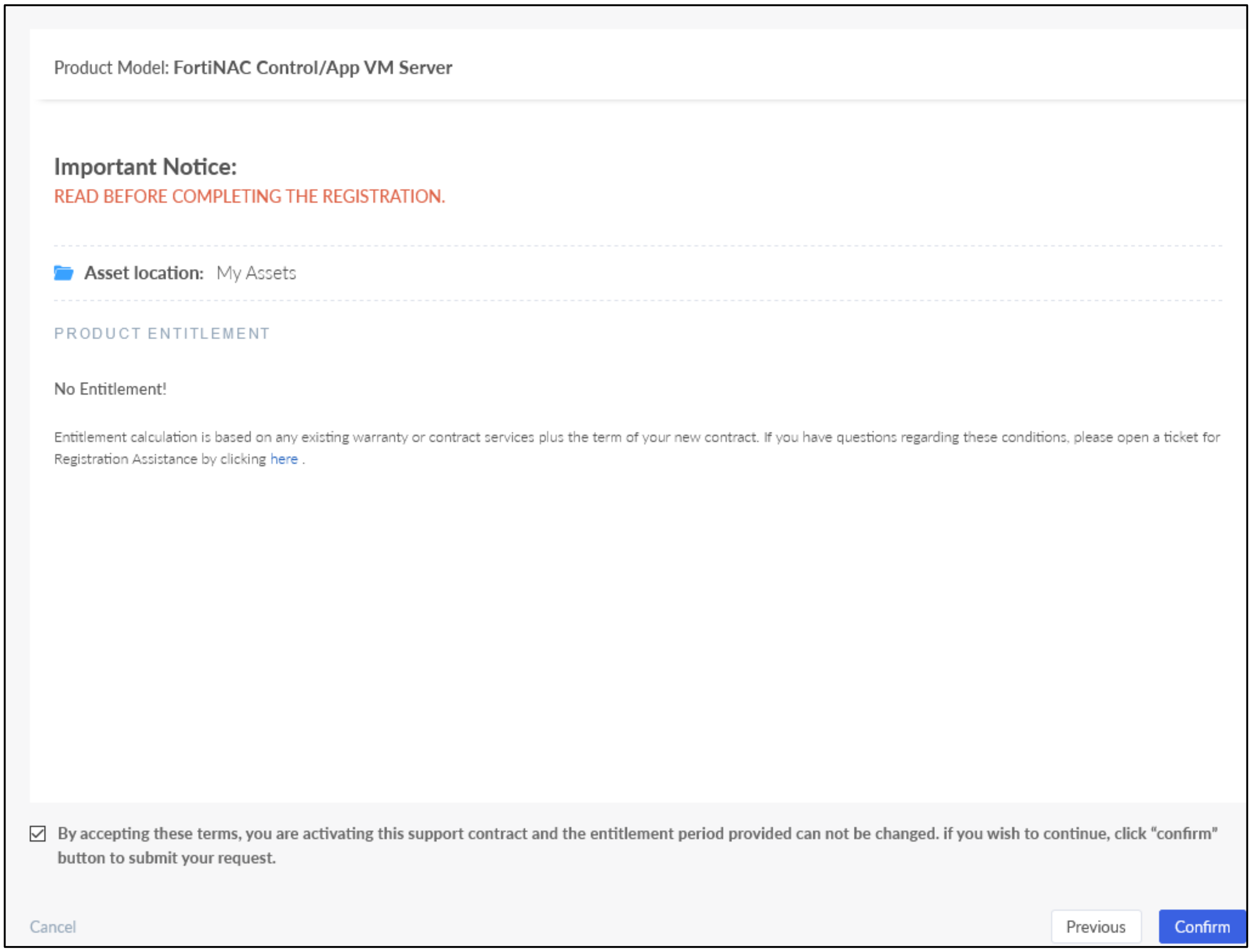
This Agreement and the Sales Order Acknowledgment represent a legal agreement between the parties with respect to FortiCare and FortiGuard Subscription services or other Fortinet services, and shall supersede all prior representations, discussions, negotiations and agreements, whether written or oral. This document expressly supersedes the Customer Service & Support Reference Guide (CSS Reference Guide) and all other service descriptions, and, notwithstanding anything to the contrary, Fortinet is only bound by, and Customer is only entitled to, services pursuant to official service descriptions that are authorized by Fortinet pursuant to this Agreement and are contractually binding on Fortinet pursuant to the terms herein

☑ I have read, understood and accepted the contract stated above

Note: “No Entitlement” will display. This is correct.

12. Click on radio button to accept.

13. Click **Confirm**.



Product Model: **FortiNAC Control/App VM Server**

Important Notice:
READ BEFORE COMPLETING THE REGISTRATION.

Asset location: My Assets

PRODUCT ENTITLEMENT

No Entitlement!

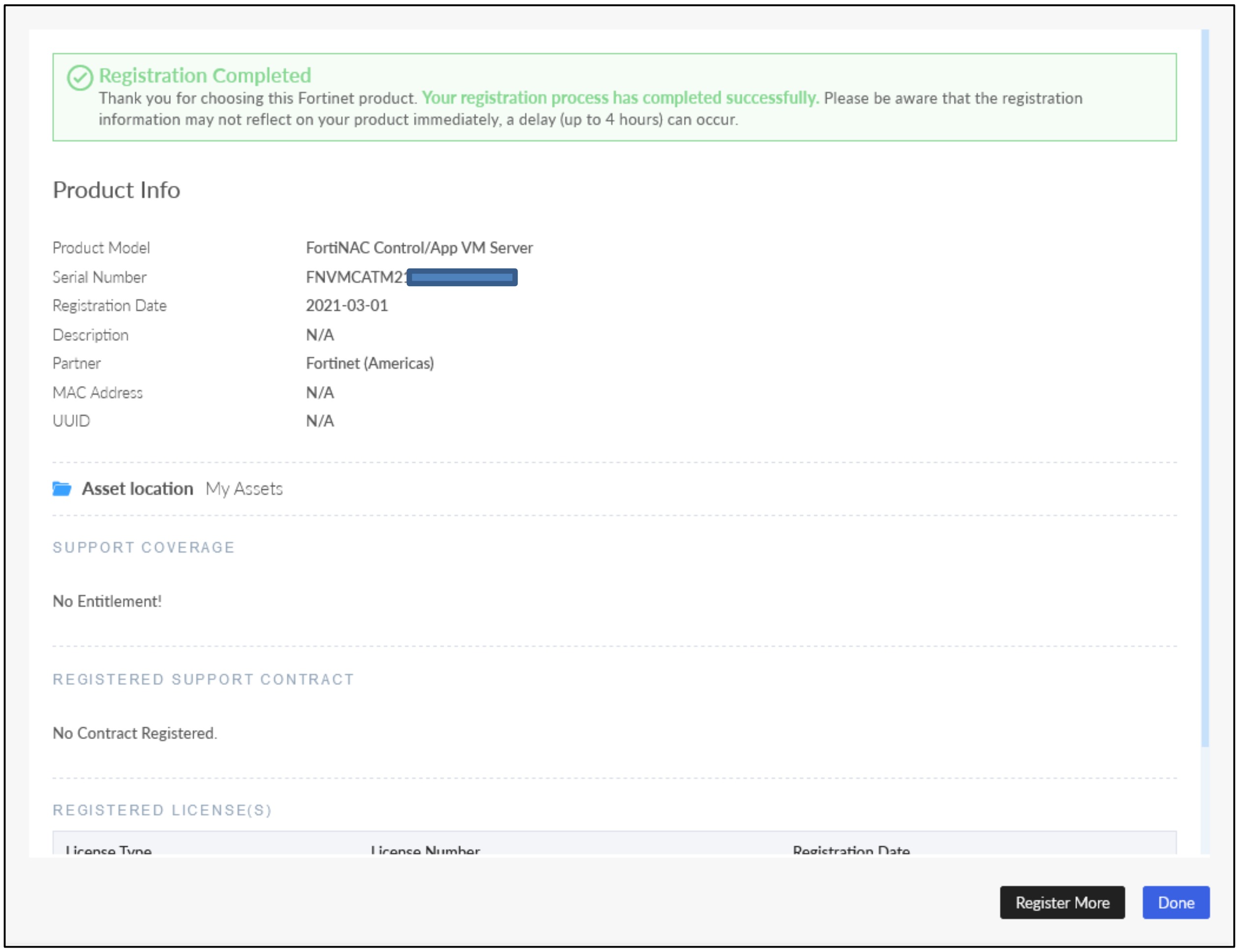
Entitlement calculation is based on any existing warranty or contract services plus the term of your new contract. If you have questions regarding these conditions, please open a ticket for Registration Assistance by clicking here .

☑ By accepting these terms, you are activating this support contract and the entitlement period provided can not be changed. if you wish to continue, click “confirm” button to submit your request.

CA(VM) product registration is now complete.

14. Note the Serial Number (will be used in a future step).

15. Proceed to register the support contract for the appliance. Click **Register More**.



Registration Completed

Thank you for choosing this Fortinet product. Your registration process has completed successfully. Please be aware that the registration information may not reflect on your product immediately, a delay (up to 4 hours) can occur.

Product Info

Product Model	FortiNAC Control/App VM Server
Serial Number	FNVMCATM2[redacted]
Registration Date	2021-03-01
Description	N/A
Partner	Fortinet (Americas)
MAC Address	N/A
UUID	N/A

Asset location My Assets

SUPPORT COVERAGE

No Entitlement!

REGISTERED SUPPORT CONTRACT

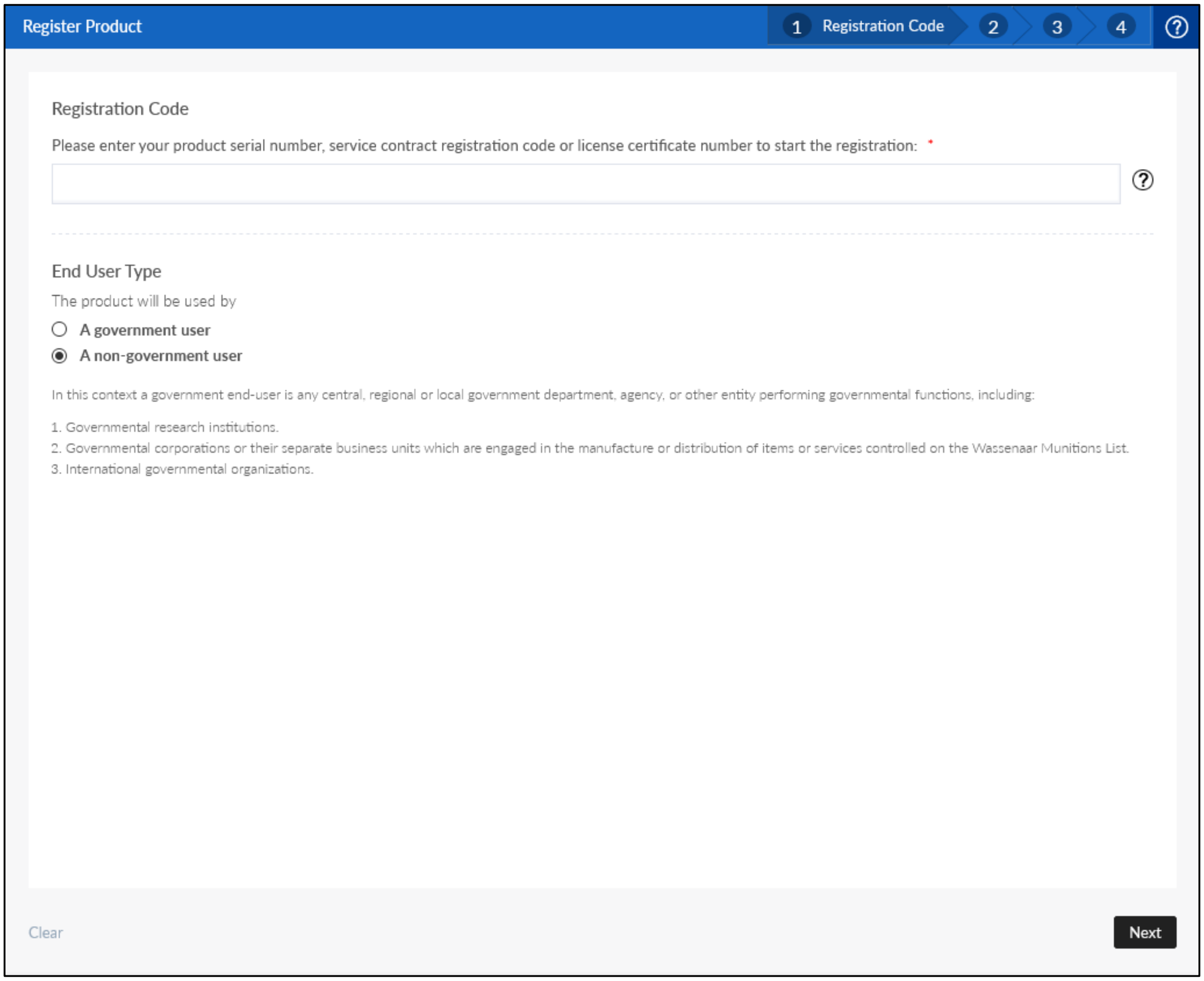
No Contract Registered.

REGISTERED LICENSE(S)

License Type	License Number	Registration Date

Register Support Contract for Managing Server

1. Enter registration code found on pdf from file FC-10-NCxx_xxx.
2. Click **Next.**



Registration Code

Please enter your product serial number, service contract registration code or license certificate number to start the registration: *

End User Type

The product will be used by

○ A government user

● A non-government user

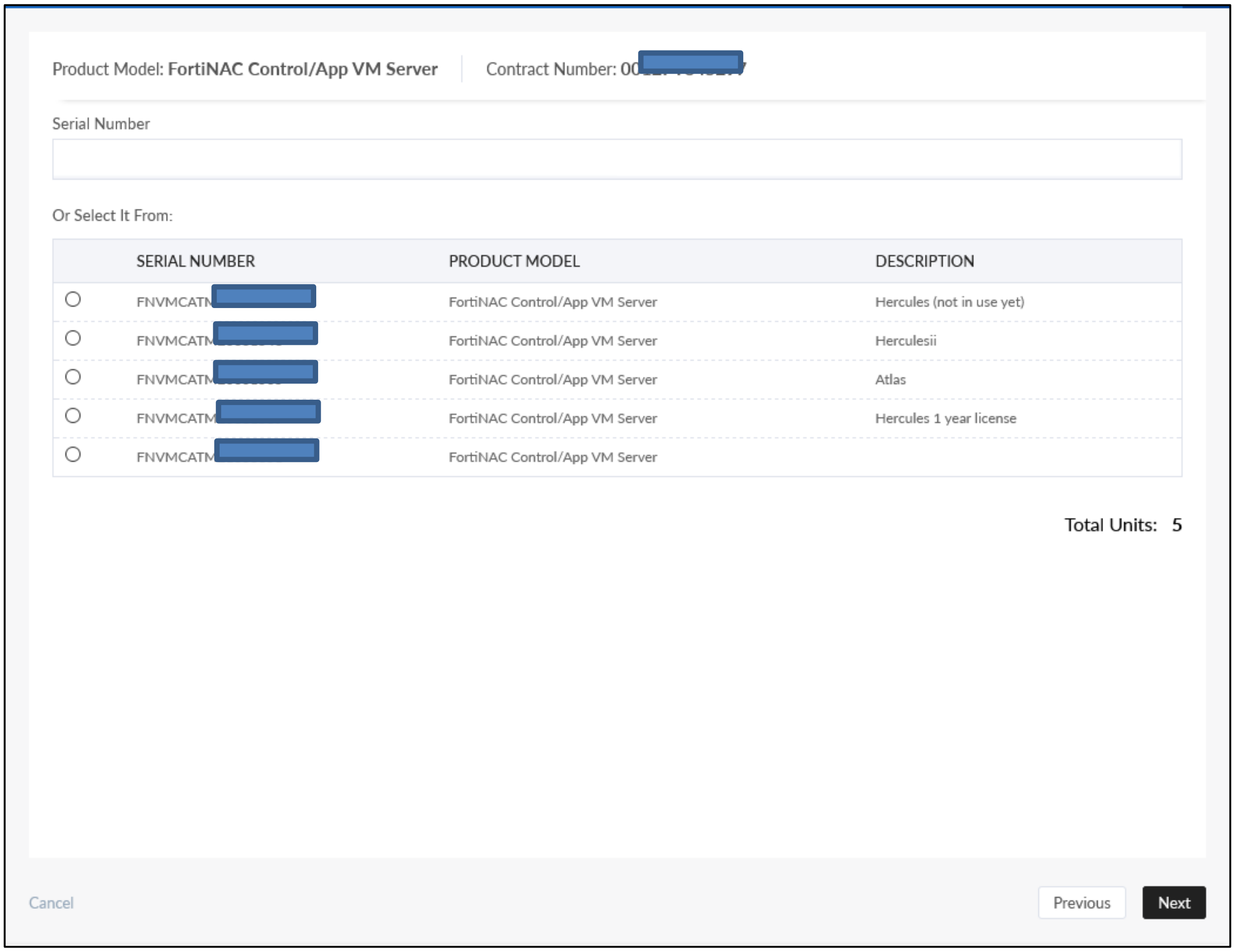
In this context a government end-user is any central, regional or local government department, agency, or other entity performing governmental functions, including:

1. Governmental research institutions.
2. Governmental corporations or their separate business units which are engaged in the manufacture or distribution of items or services controlled on the Wassenaar Munitions List.
3. International governmental organizations.

3. Associate the support contract to the appropriate CA(VM) Serial Number noted in previous step.

    - If only one CA(VM) is registered, there will only be on choice – select that radio button.

    - If more than one CA(VM) products are registered, select the appropriate CA(VM).



Product Model: **FortiNAC Control/App VM Server** | Contract Number: 00[redacted]

Serial Number

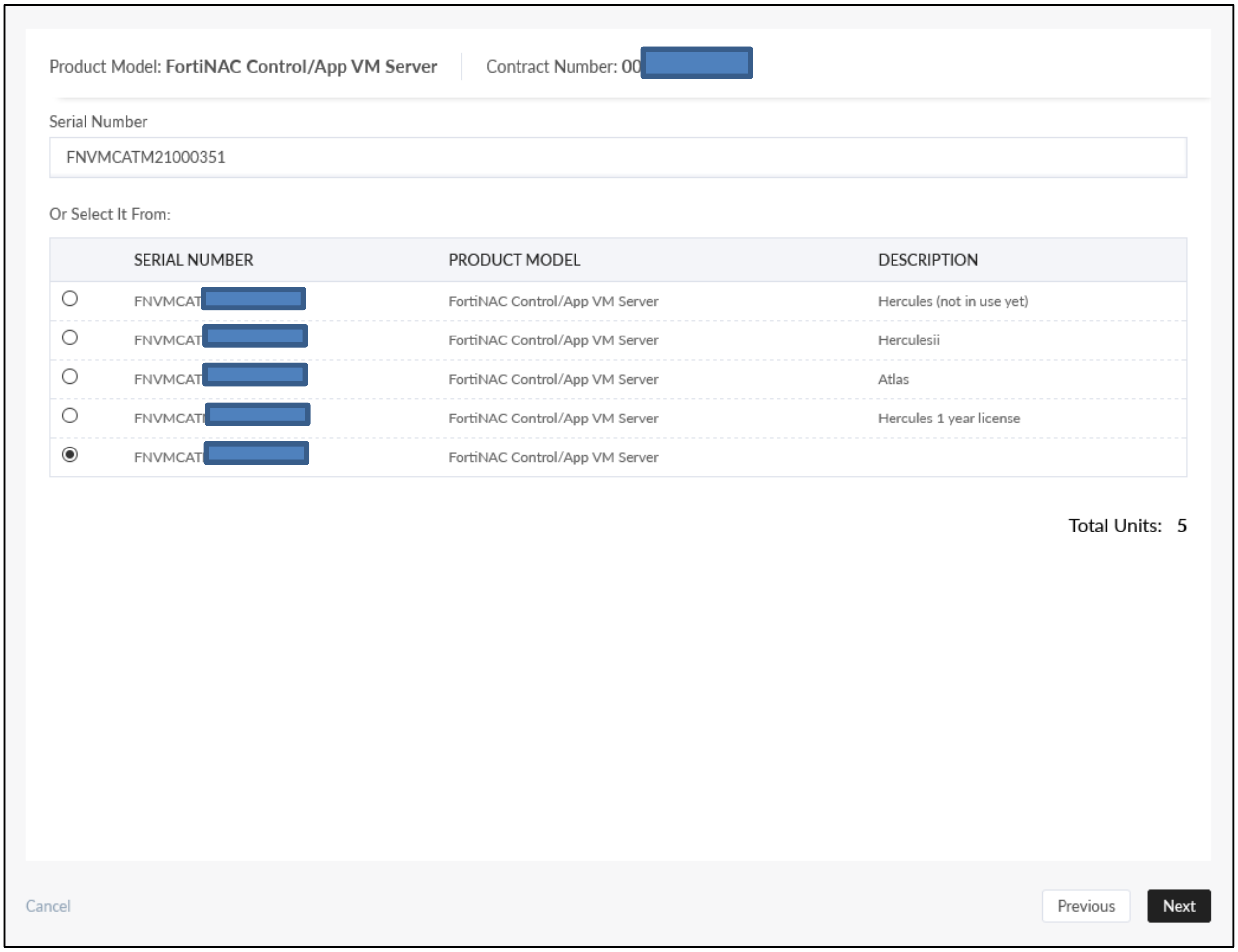
Or Select It From:

	SERIAL NUMBER	PRODUCT MODEL	DESCRIPTION
○	FNVMCATM[redacted]	FortiNAC Control/App VM Server	Hercules (not in use yet)
○	FNVMCATM[redacted]	FortiNAC Control/App VM Server	Herculesii
○	FNVMCATM[redacted]	FortiNAC Control/App VM Server	Atlas
○	FNVMCATM[redacted]	FortiNAC Control/App VM Server	Hercules 1 year license
○	FNVMCATM[redacted]	FortiNAC Control/App VM Server	

Total Units: 5

Selecting the radio button will auto-complete the Serial Number field.

4. Click **Next**.



Product Model: **FortiNAC Control/App VM Server** | Contract Number: 00[redacted]

Serial Number

FNVMCATM21000351

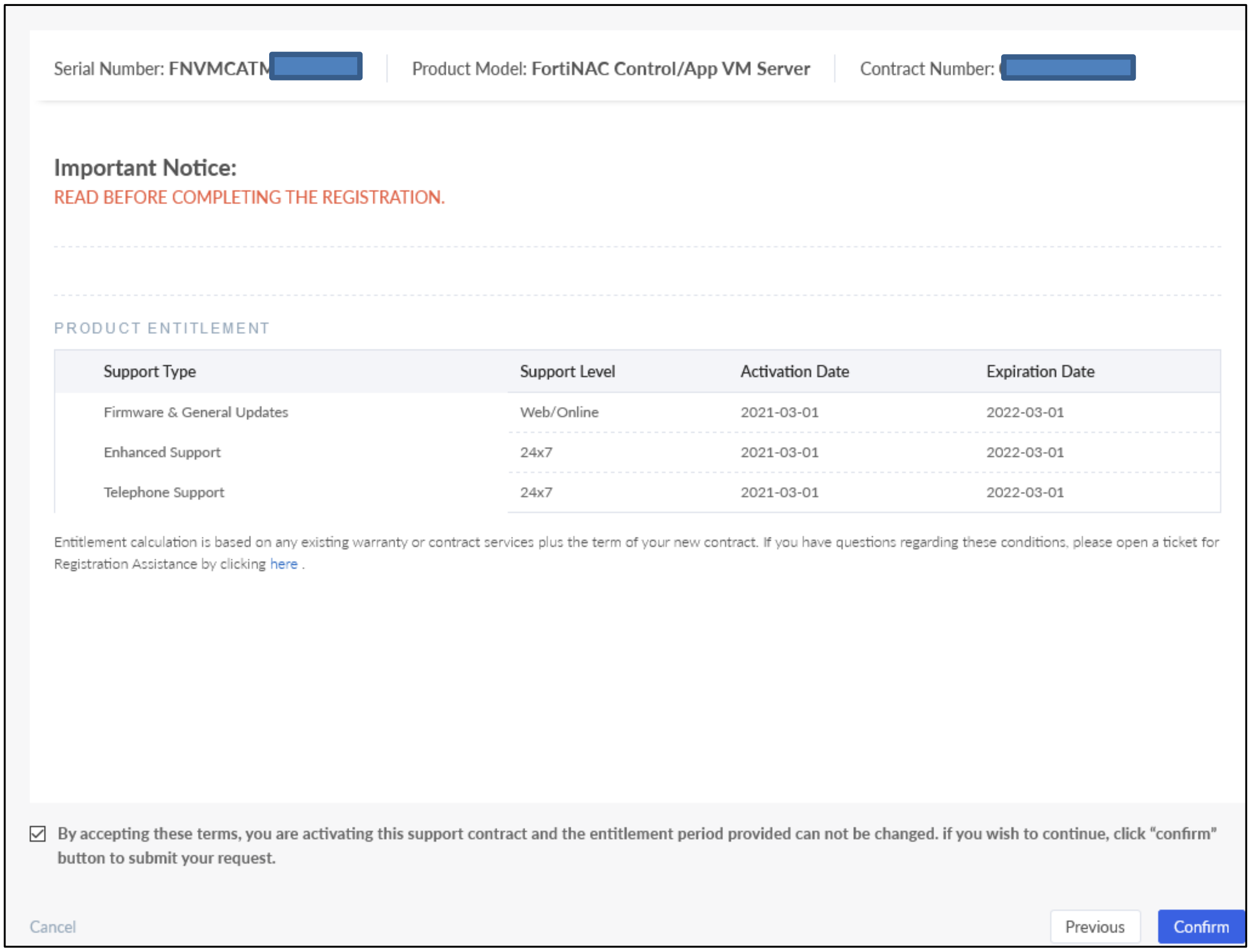
Or Select It From:

	SERIAL NUMBER	PRODUCT MODEL	DESCRIPTION
○	FNVMCAT[redacted]	FortiNAC Control/App VM Server	Hercules (not in use yet)
○	FNVMCAT[redacted]	FortiNAC Control/App VM Server	Herculesii
○	FNVMCAT[redacted]	FortiNAC Control/App VM Server	Atlas
○	FNVMCAT[redacted]	FortiNAC Control/App VM Server	Hercules 1 year license
●	FNVMCAT[redacted]	FortiNAC Control/App VM Server	

Total Units: 5

5. Click on radio button in the lower left corner.

6. Click **Confirm**.



Serial Number: FNVMCATM[redacted] | Product Model: FortiNAC Control/App VM Server | Contract Number: [redacted]

Important Notice:

READ BEFORE COMPLETING THE REGISTRATION.

PRODUCT ENTITLEMENT

Support Type	Support Level	Activation Date	Expiration Date
Firmware & General Updates	Web/Online	2021-03-01	2022-03-01
Enhanced Support	24x7	2021-03-01	2022-03-01
Telephone Support	24x7	2021-03-01	2022-03-01

Entitlement calculation is based on any existing warranty or contract services plus the term of your new contract. If you have questions regarding these conditions, please open a ticket for Registration Assistance by clicking here .

☑ By accepting these terms, you are activating this support contract and the entitlement period provided can not be changed. if you wish to continue, click "confirm" button to submit your request.

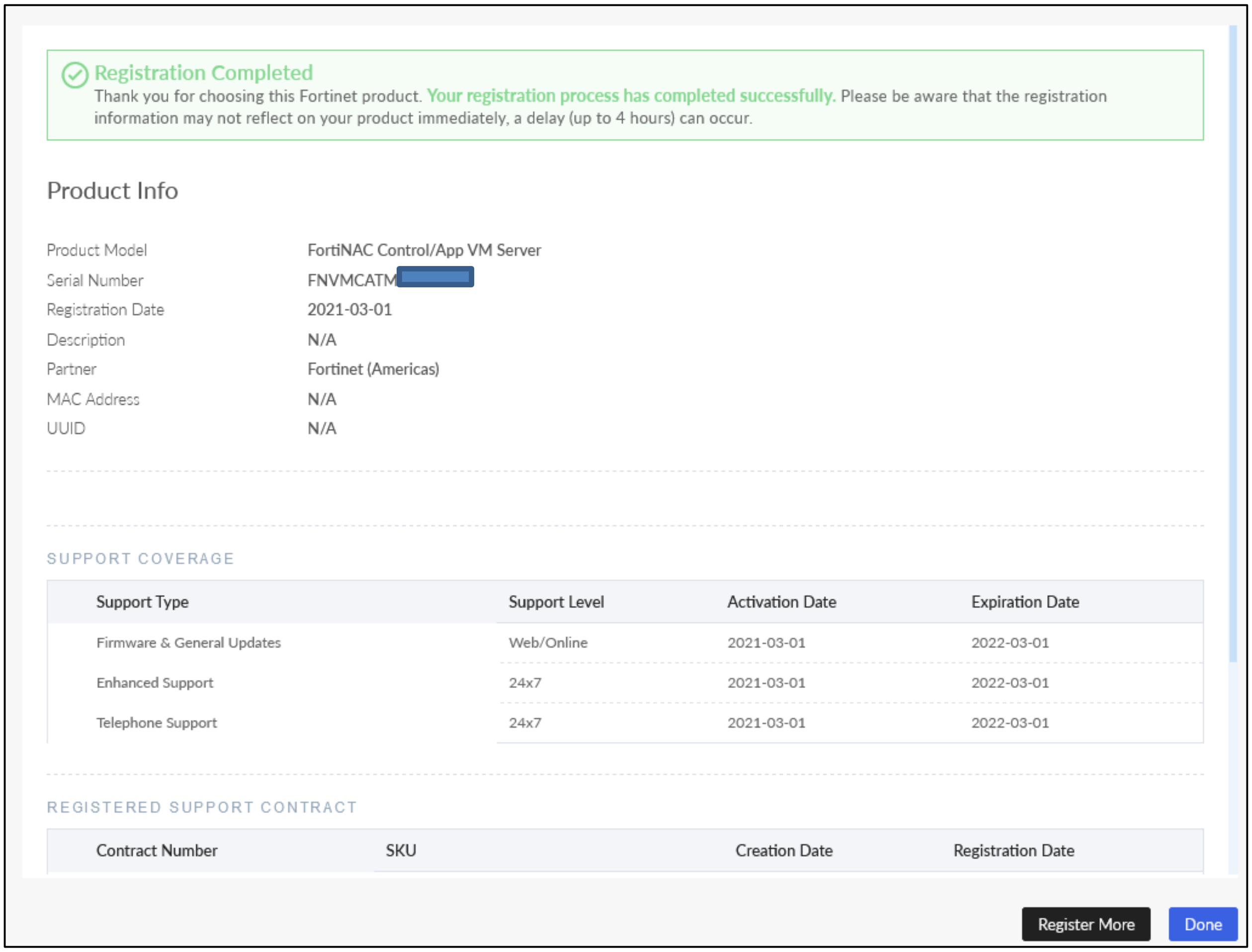
Support contract registration is now complete and applied to the CA(VM).

7. Click **Register More**.

8. Proceed to the appropriate section:

   Perpetual licenses: Register Perpetual Licenses

   Subscription licenses: Register Support Contract for License



Registration Completed

Thank you for choosing this Fortinet product. Your registration process has completed successfully. Please be aware that the registration information may not reflect on your product immediately, a delay (up to 4 hours) can occur.

Product Info

Product Model	FortiNAC Control/App VM Server
Serial Number	FNVMCATM[redacted]
Registration Date	2021-03-01
Description	N/A
Partner	Fortinet (Americas)
MAC Address	N/A
UUID	N/A

SUPPORT COVERAGE

Support Type	Support Level	Activation Date	Expiration Date
Firmware & General Updates	Web/Online	2021-03-01	2022-03-01
Enhanced Support	24x7	2021-03-01	2022-03-01
Telephone Support	24x7	2021-03-01	2022-03-01

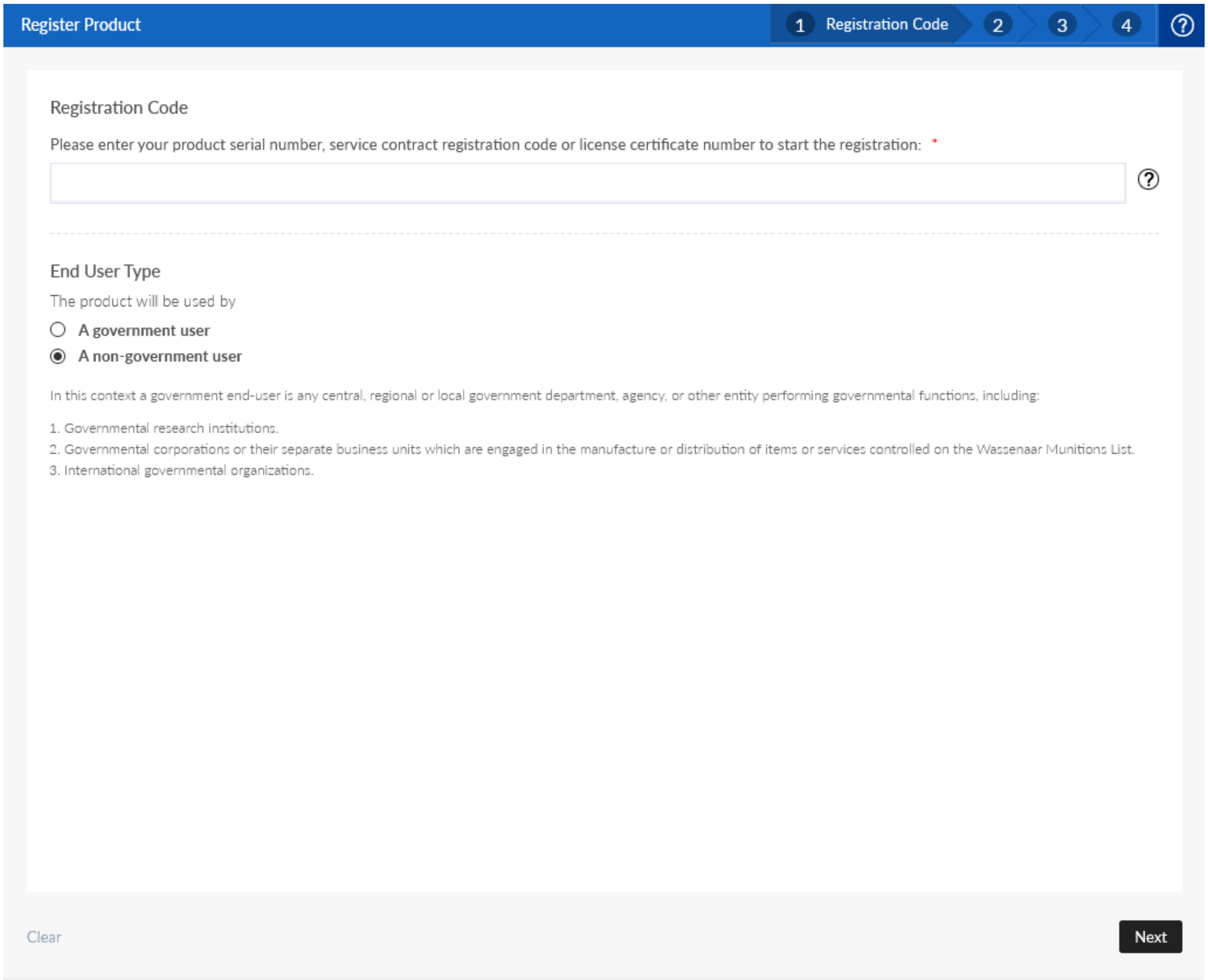
REGISTERED SUPPORT CONTRACT

Contract Number	SKU	Creation Date	Registration Date

Register Perpetual Licenses

1. Enter registration code from the pdf found in the appropriate License file:
   - LIC-FNAC-BASE-100_xxx
   - LIC-FNAC-PLUS-100_xxx
   - LIC-FNAC-PRO-100_xxx

2. Click on **Next.**



Registration Code

Please enter your product serial number, service contract registration code or license certificate number to start the registration: *

End User Type

The product will be used by

○ A government user

● A non-government user

In this context a government end-user is any central, regional or local government department, agency, or other entity performing governmental functions, including:

1. Governmental research institutions.
2. Governmental corporations or their separate business units which are engaged in the manufacture or distribution of items or services controlled on the Wassenaar Munitions List.
3. International governmental organizations.

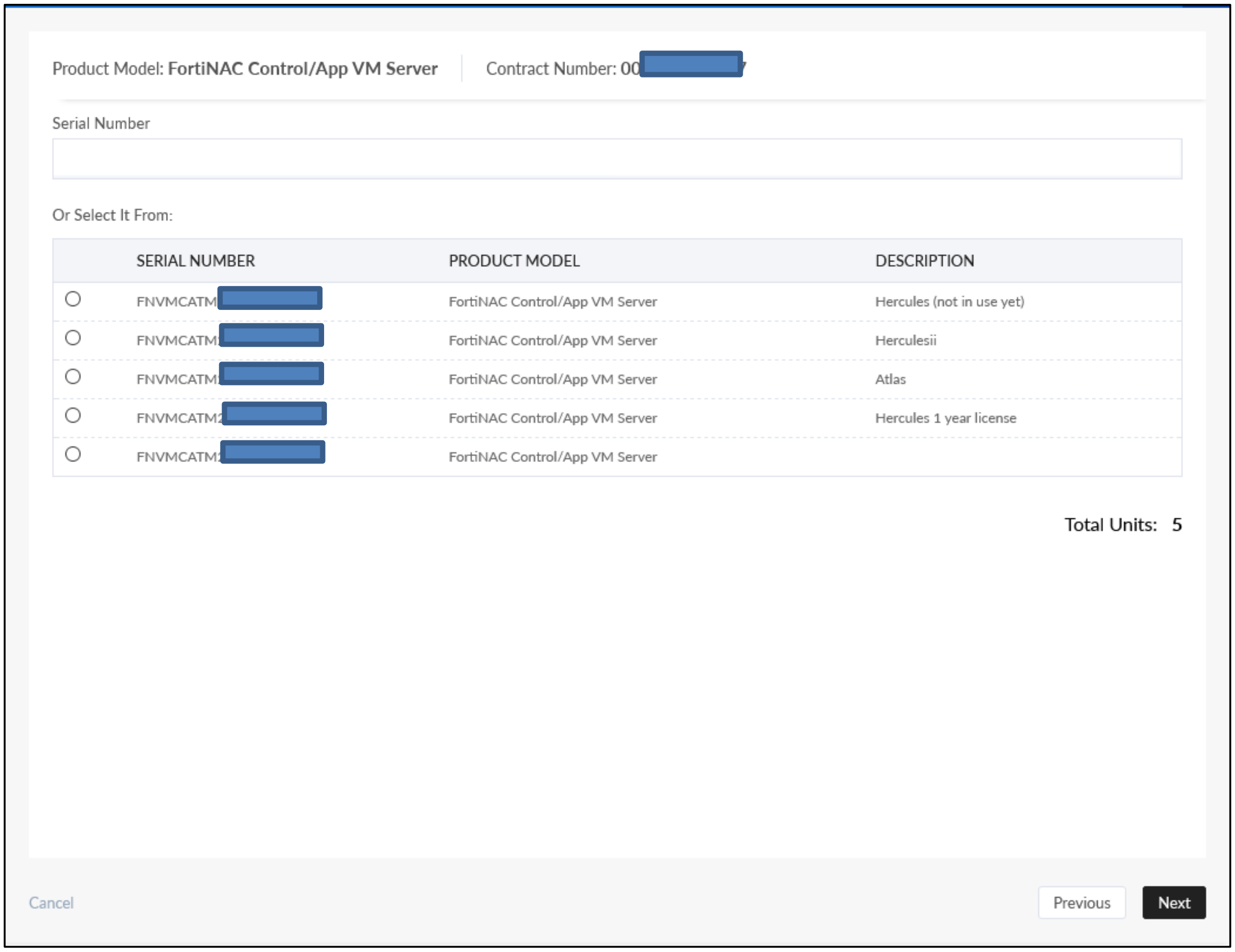
3. Associate the License to the managing server CA(VM).

   - If only one CA(VM) is registered, there will only be one choice – select that radio button.

   - If more than one CA(VM) is registered, select the appropriate CA(VM) (Primary/Control server).

   Important: DO NOT license the secondary server. The secondary server will obtain its license from the Primary after High Availability is configured.

4. Click **Next**.



Product Model: **FortiNAC Control/App VM Server** | Contract Number: 00[redacted]

Serial Number

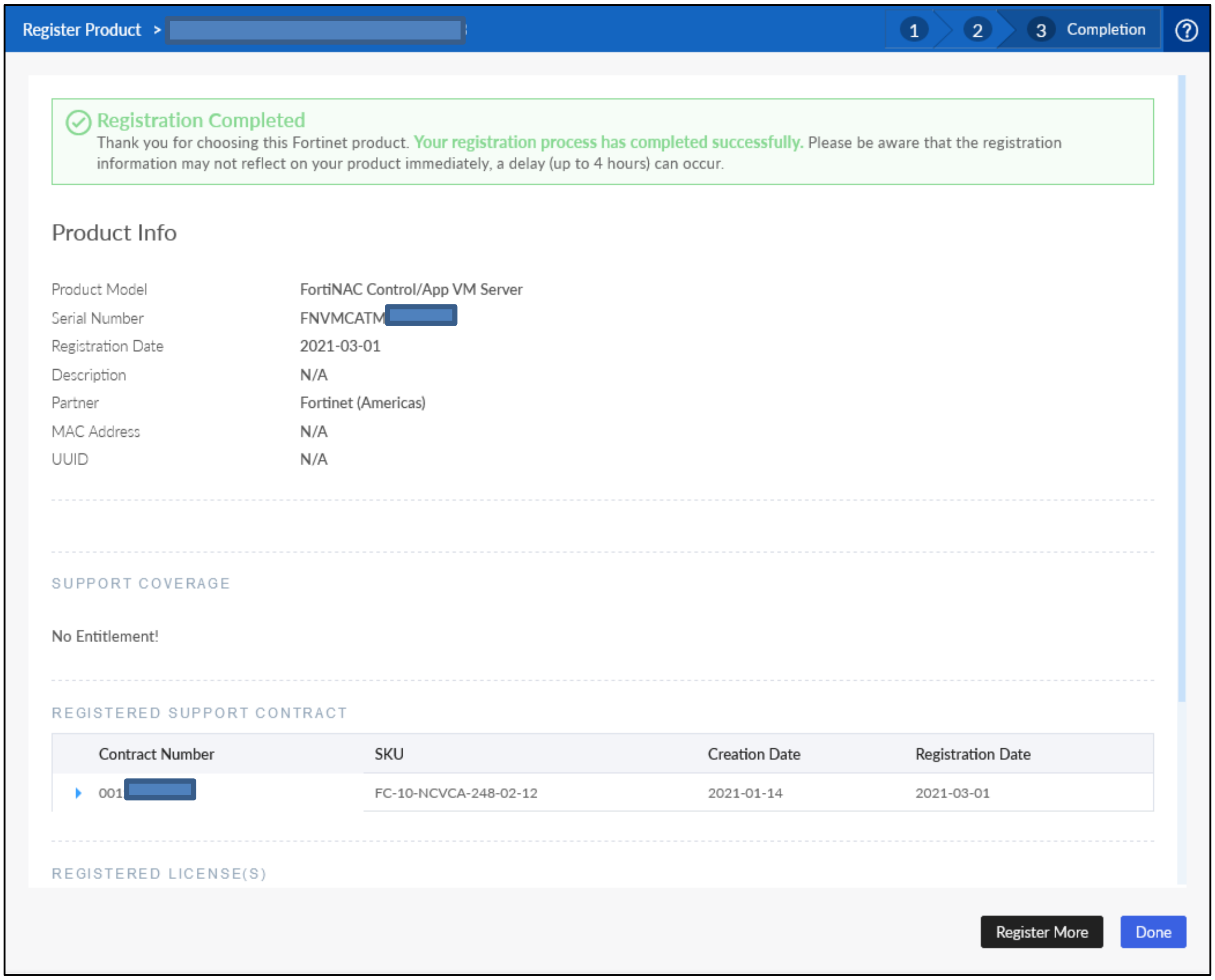
Or Select It From:

	SERIAL NUMBER	PRODUCT MODEL	DESCRIPTION
○	FNVMCATM[redacted]	FortiNAC Control/App VM Server	Hercules (not in use yet)
○	FNVMCATM[redacted]	FortiNAC Control/App VM Server	Herculesii
○	FNVMCATM[redacted]	FortiNAC Control/App VM Server	Atlas
○	FNVMCATM[redacted]	FortiNAC Control/App VM Server	Hercules 1 year license
○	FNVMCATM[redacted]	FortiNAC Control/App VM Server	

Total Units: 5

Perpetual license registration is complete.

5. **Next step**: Register the support contract for the License. Click **Register More**.



Registration Completed

Thank you for choosing this Fortinet product. Your registration process has completed successfully. Please be aware that the registration information may not reflect on your product immediately, a delay (up to 4 hours) can occur.

Product Info

Product Model	FortiNAC Control/App VM Server
Serial Number	FNVMCATM[redacted]
Registration Date	2021-03-01
Description	N/A
Partner	Fortinet (Americas)
MAC Address	N/A
UUID	N/A

SUPPORT COVERAGE

No Entitlement!

REGISTERED SUPPORT CONTRACT

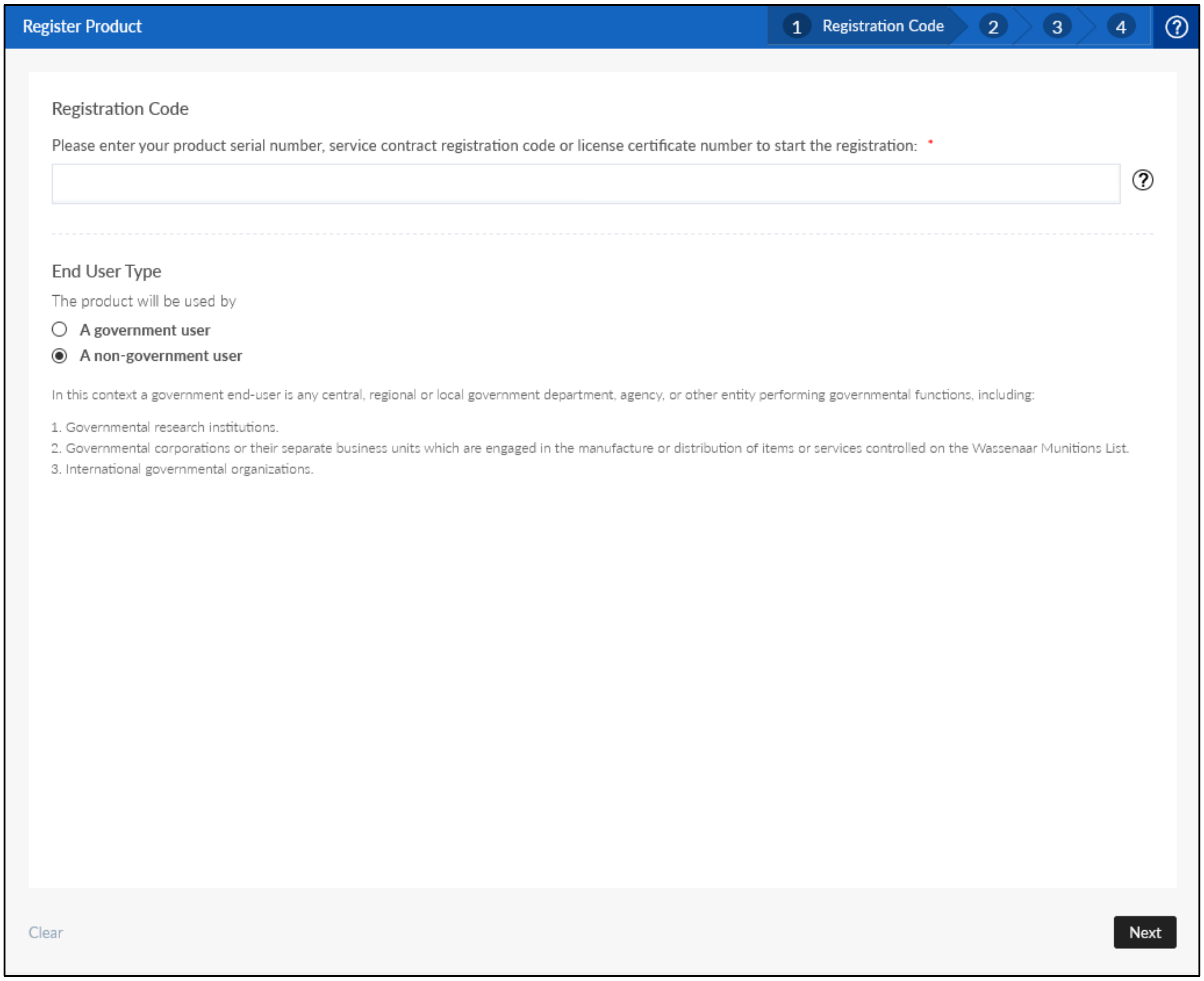
Contract Number	SKU	Creation Date	Registration Date
▸ 001[redacted]	FC-10-NCVCA-248-02-12	2021-01-14	2021-03-01

REGISTERED LICENSE(S)

Register Support Contract for License

1. Enter registration code from the pdf found in the appropriate License Support file:
   - FCx-10-FNAC**0**-xxx-xxx (support for Perpetual licenses)
   - FCx-10-FNAC**1**-xxx-xx-xx (support for Subscription licenses)

2. Click **Next**.



Registration Code

Please enter your product serial number, service contract registration code or license certificate number to start the registration: *

End User Type

The product will be used by

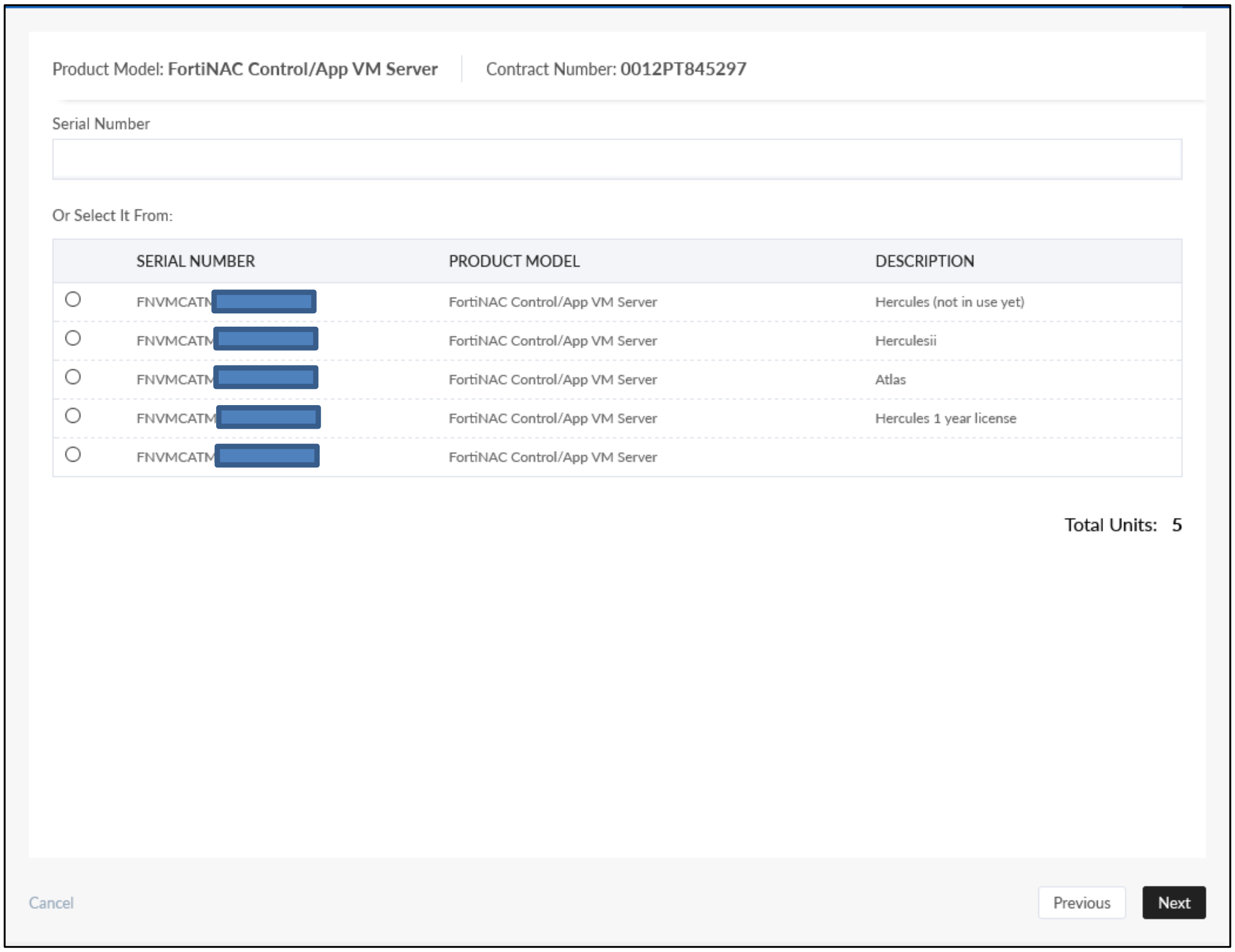
○ A government user
● A non-government user

In this context a government end-user is any central, regional or local government department, agency, or other entity performing governmental functions, including:

1. Governmental research institutions.
2. Governmental corporations or their separate business units which are engaged in the manufacture or distribution of items or services controlled on the Wassenaar Munitions List.
3. International governmental organizations.

3. Associate the License Support contract to the same serial number as the License (in previous step).

4. Click **Next**.



Product Model: **FortiNAC Control/App VM Server** | Contract Number: **0012PT845297**

Serial Number

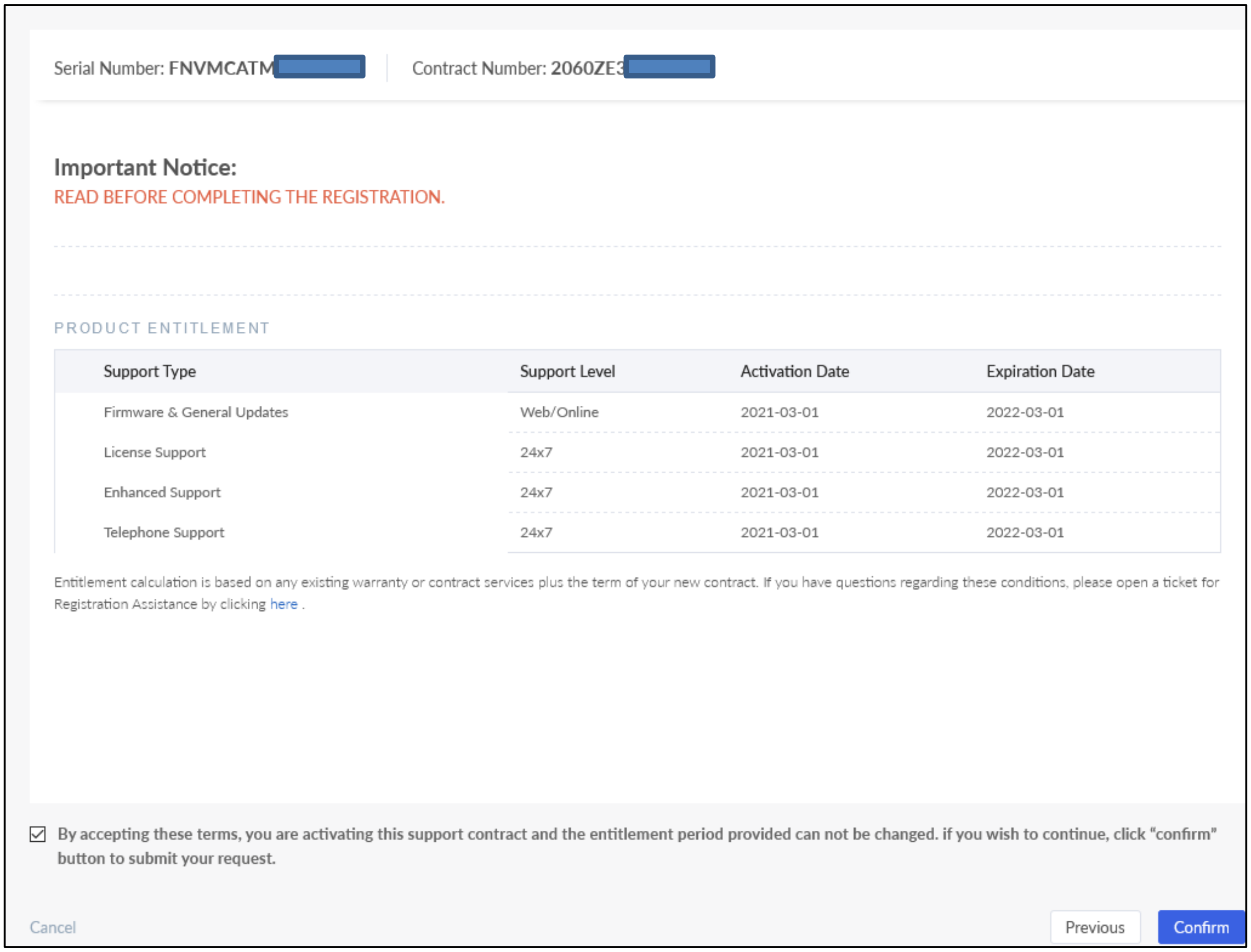
Or Select It From:

	SERIAL NUMBER	PRODUCT MODEL	DESCRIPTION
○	FNVMCAT[redacted]	FortiNAC Control/App VM Server	Hercules (not in use yet)
○	FNVMCATM[redacted]	FortiNAC Control/App VM Server	Herculesii
○	FNVMCATM[redacted]	FortiNAC Control/App VM Server	Atlas
○	FNVMCATM[redacted]	FortiNAC Control/App VM Server	Hercules 1 year license
○	FNVMCATM[redacted]	FortiNAC Control/App VM Server	

Total Units: 5

5. Click on radio button in lower left corner.

6. Click **Confirm.**



Serial Number: **FNVMCATM**[redacted] | Contract Number: **2060ZE3**[redacted]

Important Notice:

READ BEFORE COMPLETING THE REGISTRATION.

PRODUCT ENTITLEMENT

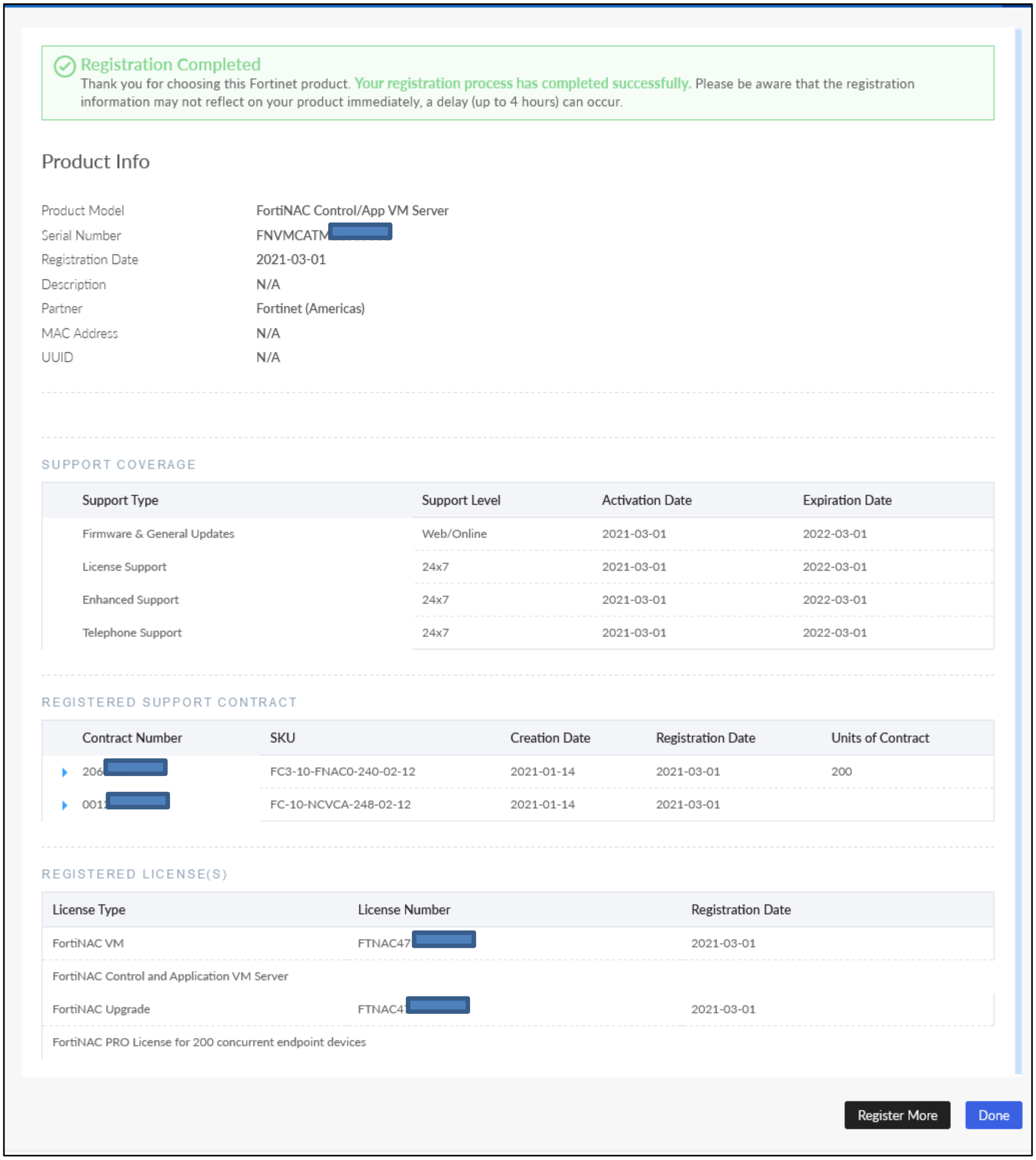
Support Type	Support Level	Activation Date	Expiration Date
Firmware & General Updates	Web/Online	2021-03-01	2022-03-01
License Support	24x7	2021-03-01	2022-03-01
Enhanced Support	24x7	2021-03-01	2022-03-01
Telephone Support	24x7	2021-03-01	2022-03-01

Entitlement calculation is based on any existing warranty or contract services plus the term of your new contract. If you have questions regarding these conditions, please open a ticket for Registration Assistance by clicking here .

☑ **By accepting these terms, you are activating this support contract and the entitlement period provided can not be changed. if you wish to continue, click "confirm" button to submit your request.**

Registration the License support contract is complete.

The page will display the products and support contracts registered.



Registration Completed

Thank you for choosing this Fortinet product. Your registration process has completed successfully. Please be aware that the registration information may not reflect on your product immediately, a delay (up to 4 hours) can occur.

Product Info

Product Model	FortiNAC Control/App VM Server
Serial Number	FNVMCATM[redacted]
Registration Date	2021-03-01
Description	N/A
Partner	Fortinet (Americas)
MAC Address	N/A
UUID	N/A

SUPPORT COVERAGE

Support Type	Support Level	Activation Date	Expiration Date
Firmware & General Updates	Web/Online	2021-03-01	2022-03-01
License Support	24x7	2021-03-01	2022-03-01
Enhanced Support	24x7	2021-03-01	2022-03-01
Telephone Support	24x7	2021-03-01	2022-03-01

REGISTERED SUPPORT CONTRACT

Contract Number	SKU	Creation Date	Registration Date	Units of Contract
206[redacted]	FC3-10-FNAC0-240-02-12	2021-01-14	2021-03-01	200
001[redacted]	FC-10-NCVCA-248-02-12	2021-01-14	2021-03-01	

REGISTERED LICENSE(S)

License Type	License Number	Registration Date
FortiNAC VM	FTNAC47[redacted]	2021-03-01
FortiNAC Control and Application VM Server		
FortiNAC Upgrade	FTNAC4[redacted]	2021-03-01
FortiNAC PRO License for 200 concurrent endpoint devices		

7. Close the PDF files used in the previous steps.

8. If there are additional CA(VM)s to register (and its support contracts), click on **Register More.** Otherwise, click **Done**.

Register Remaining Appliances

1. Open the folder for the next appliance to be registered.

2. Open the 2 PDF files

3. Register the appliance

   a. Click **Register Product**.

   b. Enter registration code from the pdf found in file FNC-CA-xx_xxx

      (or if there is a Manager FNC-M-xx.xxx).

   c. Click **Next**.

   d. If there was a POC or active evaluation license, a special page may display. If you are converting your POC to production, select **Convert Evaluation**. If you not converting your POC to production, select **Register**.

   e. Enter "Managing Server" under Product Description (this can be edited later)

   f. Select Fortinet Partner (ignore all other fields).

   g. Click **Next**.

   h. Read terms and conditions.

   i. Click on radio button.

   j. Click **Next**.

      Note: "No Entitlement" will display. This is correct.

   k. Click on radio button to accept.

   l. Click **Confirm**.

      CA(VM) product registration is now complete.

   m. Note the Serial Number (will be used to register the appliance support contract).

   n. Proceed to register the support contract for the appliance. Click **Register More**.

4. Register Support Contract for Appliance

    a. Enter registration code found on pdf from file FC-10-NCxx_xxx.

    b. Click **Next**.

    c. Associate the support contract to the appropriate CA(VM) Serial Number noted in previous step.

    d. If only one CA(VM) is registered, there will only be on choice – select that radio button.

    e. If more than one CA(VM) products are registered, select the appropriate CA(VM).

    f. Click **Next**.

    g. Click on radio button in the lower left corner.

    h. Click **Confirm**.

    i. Support contract registration is now complete and applied to the CA(VM).

    j. Close the PDF files used in the previous steps.

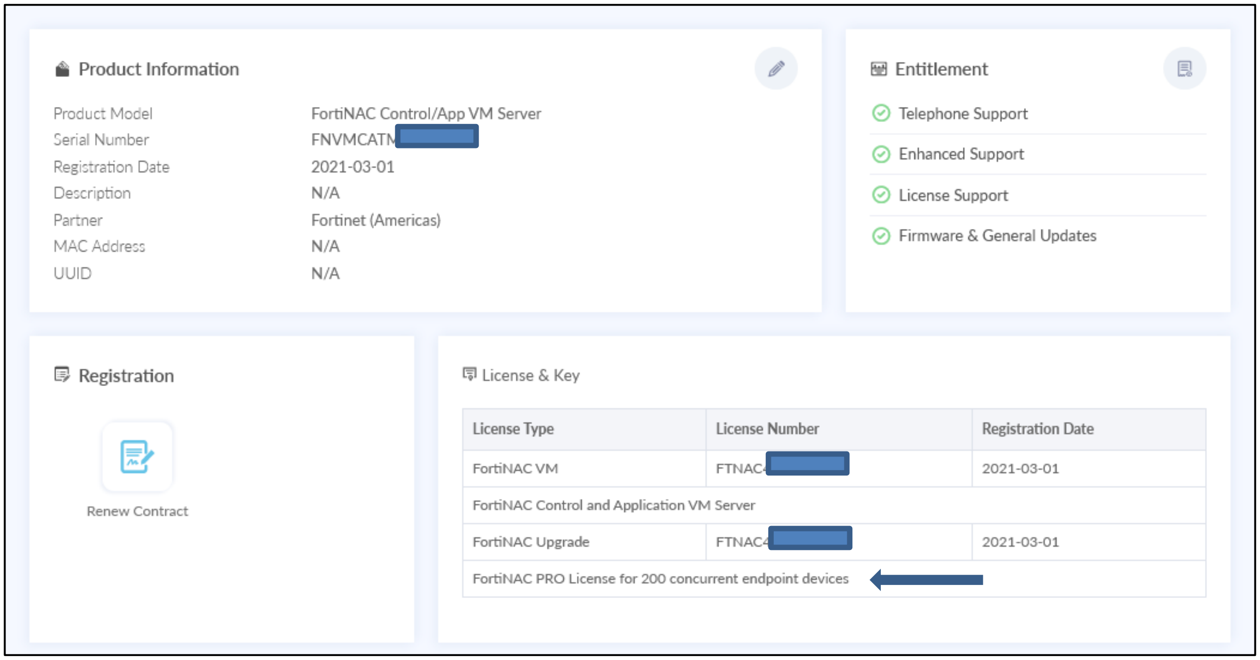
If there are additional CA(VM)s to register (and its support contracts), click on **Register More**. If registering more Otherwise, click **Done**

* DO NOT REGISTER THE PROFESSIONAL SERVICES CONTRACTS *

Important: If a file for Professional Services (FP-10-PS-801-01-01.zip or FP-10-PS-830-01-01.zip) was included in the email, <u>do not attempt to register</u>. These are ONLY to be registered one at a time and on the day of the Professional Services session. One contract is like an "admission ticket" to the Professional Services session.

End result:
Once product registrations are complete, the summary page for each appliance will look similar to the example below. Note only the managing server (example below) will have license information listed.

Perpetual License Example:



Product Information

Product Model	FortiNAC Control/App VM Server
Serial Number	FNVMCATM[redacted]
Registration Date	2021-03-01
Description	N/A
Partner	Fortinet (Americas)
MAC Address	N/A
UUID	N/A

Entitlement

- ✓ Telephone Support
- ✓ Enhanced Support
- ✓ License Support
- ✓ Firmware & General Updates

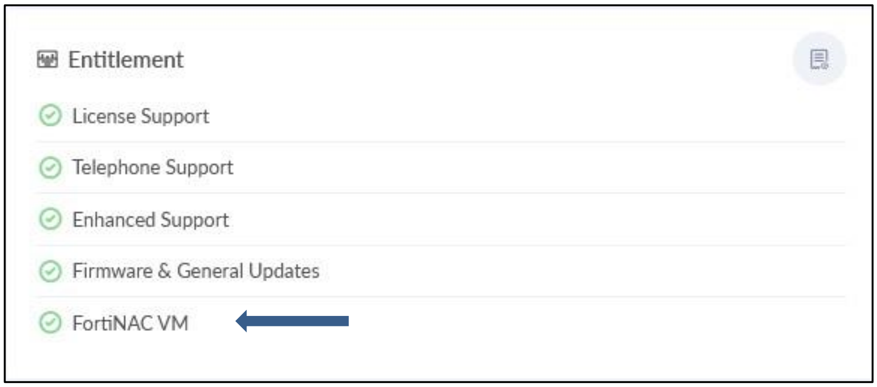
Registration

Renew Contract

License & Key

License Type	License Number	Registration Date
FortiNAC VM	FTNAC[redacted]	2021-03-01
FortiNAC Control and Application VM Server		
FortiNAC Upgrade	FTNAC4[redacted]	2021-03-01
FortiNAC PRO License for 200 concurrent endpoint devices		

Subscription License Example:



Entitlement

- ✓ License Support
- ✓ Telephone Support
- ✓ Enhanced Support
- ✓ Firmware & General Updates
- ✓ FortiNAC VM

If assistance is needed with registering devices, contact Fortinet Customer Service.

Product Registration is complete.   Proceed to next step.

Step 2: Appliance Installation

1. **Important:** If building virtual appliances, ensure there are sufficient resources available for the hosting machine and the appliance.

    a. Open the FortiNAC Data Sheet available online.

    b. Determine the appropriate parameters for the virtual environment. It is recommended they be comparable to those of hardware-based FortiNAC appliances.

        i. Identify the hardware server part number most appropriate for the target environment (FortiNAC-CA-500/600/700 or M-550). Refer to the **Hardware Server Sizing** table on page 11 of the Data Sheet.

        ii. See the **Specifications** table for details regarding that part number on pages 9 and 10 of the Data Sheet.

    c. Determine the appropriate amount of memory and CPU to allocate for the virtual appliance. See the **VM Server Resource Sizing** table for suggested values on page 11 of the Data Sheet.

    Note: Virtual appliance settings will vary depending on the underlying hardware being used for the hosting server and the type of FortiNAC server being run in the virtual appliance. The ideal result is to yield a virtual environment where the average load does not exceed the Total GHz Rating of CPU Resources Allocated.

2. Follow the instructions in the appropriate installation guide in the Fortinet Document Library:

    VMware

    HyperV

    AWS

    Azure

    KVM

    Physical

These steps guide the user through the building of virtual appliances/stacking physical appliances.

Once completed, proceed to next step.

Step 3: Generate and Download Keys

This step updates the product records in FortiCare with the required information for each appliance in order to generate the appropriate key files.

Key Generation Procedure Overview

1: Collect appliance information
2: Generate Key for Managing Server
3: Generate Key for Remaining Servers (VMs Only)

Collect Appliance Information

Collect the appropriate appliance information using one of the methods below.

UI Method

1. Launch the Configuration Wizard by opening a browser on your PC and navigating to:
   FortiNAC version 9.1 and below: `https://<FortiNAC hostname>:8443/configWizard`
   FortiNAC version 9.2 and greater: `https://<FortiNAC hostname>:8443`

2. Enter the Configuration Wizard credentials. The License Key window is displayed.

3. Click **Obtain a license key**. The UUID (virtual appliances only) and eth0 MAC address are displayed.

4. After recording the information, close browser window.

CLI Method

1. Login to the appliance CLI as root.

2. Record eth0 MAC Address. Type

   ```
   ifconfig eth0
   ```

   Example output

   ```
   eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
   inet 10.254.0.1  netmask 255.255.0.0  broadcast 10.254.255.255
   ether 70:4C:A5:ff:00:01  txqueuelen 1000  (Ethernet)
   ```

3. Record UUID (virtual appliances only). Type

   ```
   sysinfo -v | grep -i uuid
   ```

4. After recording the information, logout of CLI. Type

   ```
   logout
   ```

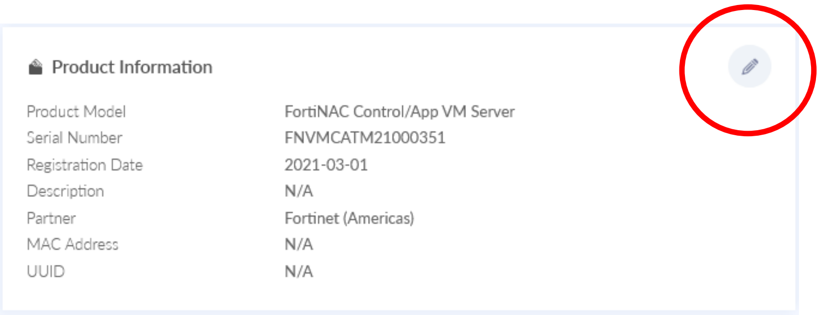
Physical Appliances

Eth 0 MAC address (xx:xx:xx:xx:xx:xx or xx-xx-xx-xx-xx-xx) can also be found in the following locations:

- Shipping label
- Appliance Identification Details document
- On the back or the top of the metal casing of the appliance

Generate Key for Managing Server

1. Log into the Customer Portal at https://support.fortinet.com/
2. Under products, click the serial number for the managing appliance.
3. Edit the record by clicking the pencil icon.

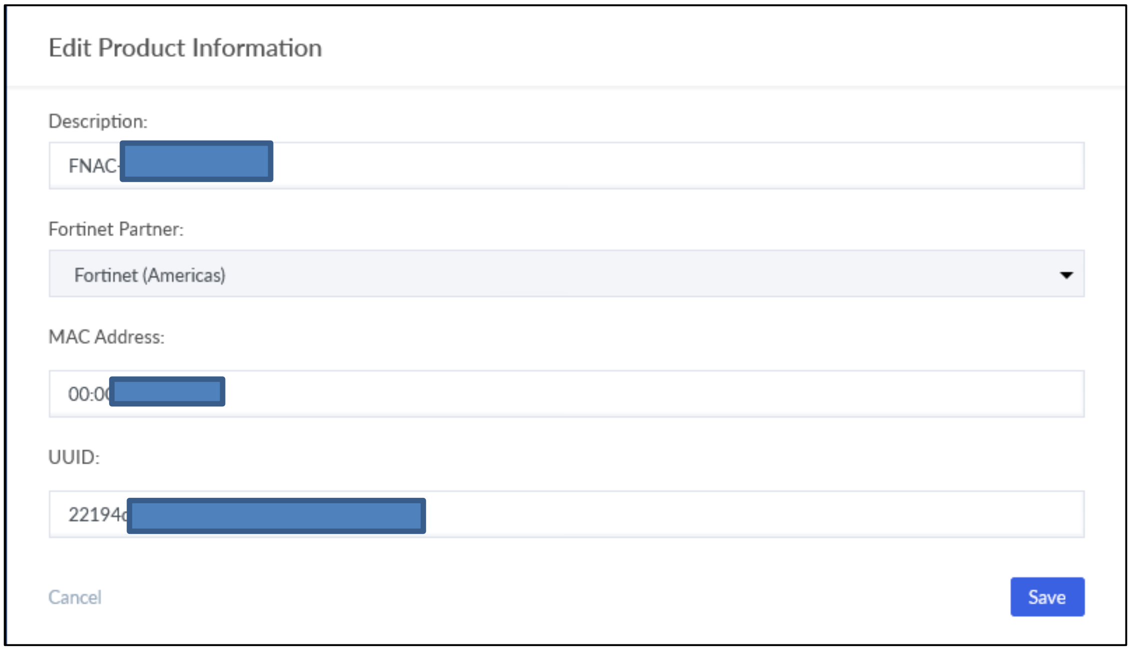


Product Information

Product Model	FortiNAC Control/App VM Server
Serial Number	FNVMCATM21000351
Registration Date	2021-03-01
Description	N/A
Partner	Fortinet (Americas)
MAC Address	N/A
UUID	N/A

4. Enter the following:
   - Description (if modification is required)
   - Eth0 MAC Address
   - UUID (Virtual appliances only)

Note: Once MAC Address and/or UUID is entered and saved, it cannot be changed online. If assistance is needed with registering devices or changing these entries, contact Fortinet Customer Service.



Edit Product Information

Description: FNAC[redacted]

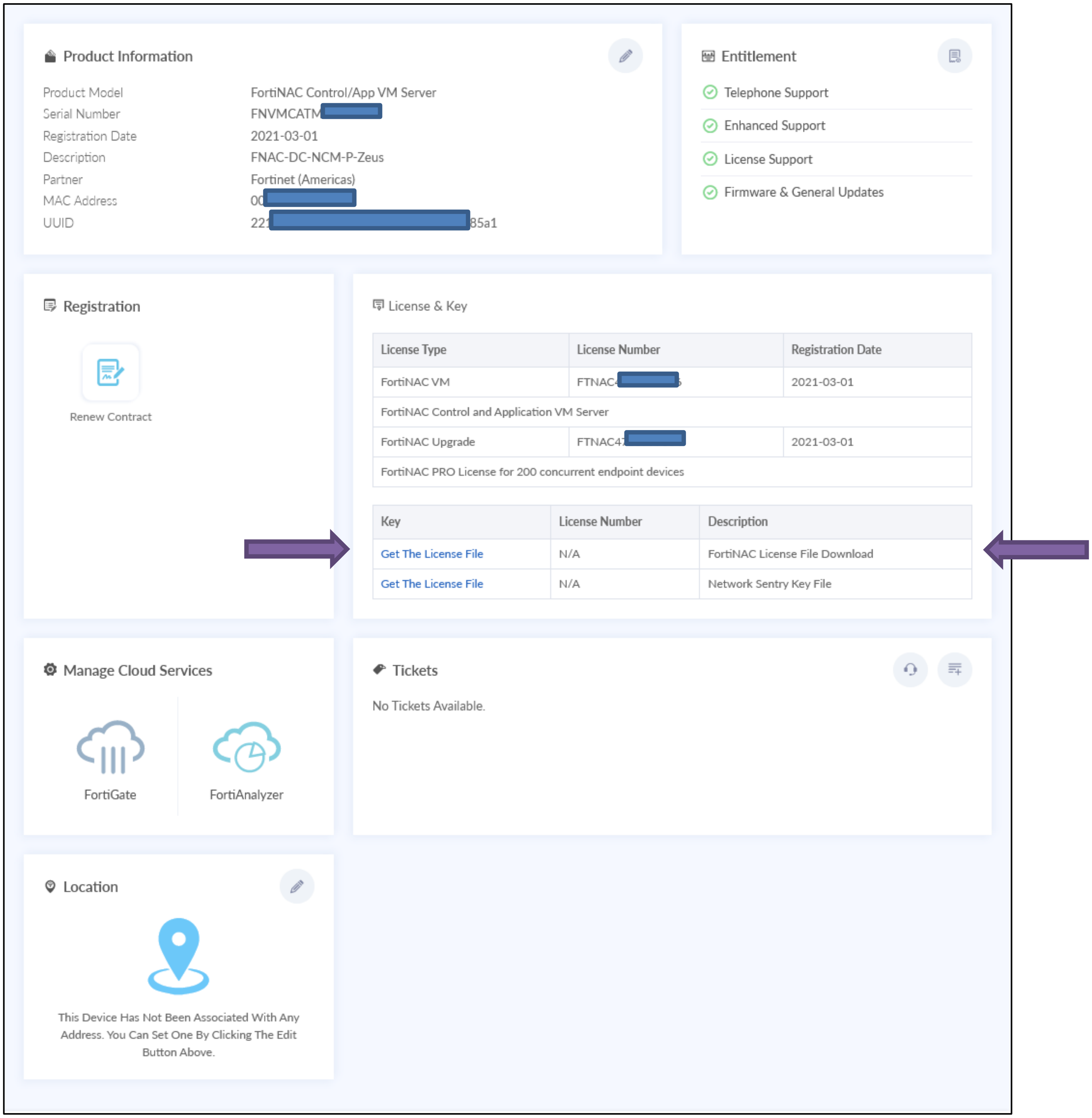
Fortinet Partner: Fortinet (Americas)

MAC Address: 00:0[redacted]

UUID: 22194[redacted]

5. Click **Save**.

The summary page has updated with the link to “Get The License File”
Important: Customers with new appliances should select the FortiNAC License File.



Product Information

Product Model	FortiNAC Control/App VM Server
Serial Number	FNVMCATM[redacted]
Registration Date	2021-03-01
Description	FNAC-DC-NCM-P-Zeus
Partner	Fortinet (Americas)
MAC Address	00[redacted]
UUID	221[redacted]85a1

Entitlement

- ✓ Telephone Support
- ✓ Enhanced Support
- ✓ License Support
- ✓ Firmware & General Updates

Registration

License & Key

License Type	License Number	Registration Date
FortiNAC VM	FTNAC-[redacted]	2021-03-01
FortiNAC Control and Application VM Server		
FortiNAC Upgrade	FTNAC47[redacted]	2021-03-01
FortiNAC PRO License for 200 concurrent endpoint devices		

Key	License Number	Description
Get The License File	N/A	FortiNAC License File Download
Get The License File	N/A	Network Sentry Key File

Manage Cloud Services

Tickets

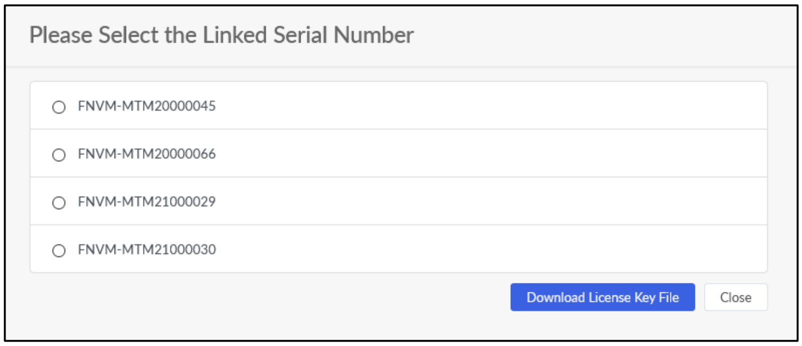
No Tickets Available.

Location

This Device Has Not Been Associated With Any Address. You Can Set One By Clicking The Edit Button Above.

6. Click **Get the License File.**

If a Control Manager is registered, this screen may appear.



Please Select the Linked Serial Number

○ FNVM-MTM20000045

○ FNVM-MTM20000066

○ FNVM-MTM21000029

○ FNVM-MTM21000030

7. Click the radio button for the serial number of the Control Manager that will be managing this appliance (select Primary Control Manager if Managers are configured for High Availability).

8. Click **Download License Key File**.

9. The .lic filename will reflect the appliance serial number.

10. Once the file is downloaded, click **Close**.

11. Save the .lic file to the appliance folder.

Remaining Servers

Virtual Appliances: Repeat the previous steps to update each appliance record and download the key, saving each key file to their appropriate folder.

Physical Appliances: Repeat the previous steps to update each appliance record with the MAC Address. Do not download any additional keys. The remaining appliances use the installed key shipped with the hardware.

Note: Once a MAC address or UUID is entered and saved, it cannot be changed online. If assistance is needed with registering devices or changing existing MAC address entries, contact Fortinet Customer Service.

Key generation is complete. Proceed to next step.

Step 4: Appliance Configuration

1. Follow the instructions in the appropriate document below:

   Software version 9.1 and lower: Configuration Wizard Guide in the Document Library.
   Software version 9.2 and greater: Guided Install in the Administration Guide.

   These steps guide the user through the following tasks:

   - License key installation
   - Network settings configuration
   - Password creation
   - Eth1 interface configuration

2. Verify appliance with the Endpoint License Key has the correct entitlements.

   a. In the appliance with the Endpoint License Key installed, access the Administration UI using one of the following URLs:

   ```
   https://<IP Address>:8443/
   https://<Host Name of the virtual  appliance>:8443/
   ```

   b. Enter the following UI credentials (User Name and Password fields are case sensitive). These credentials are independent of the passwords previously set in Configuration Wizard.

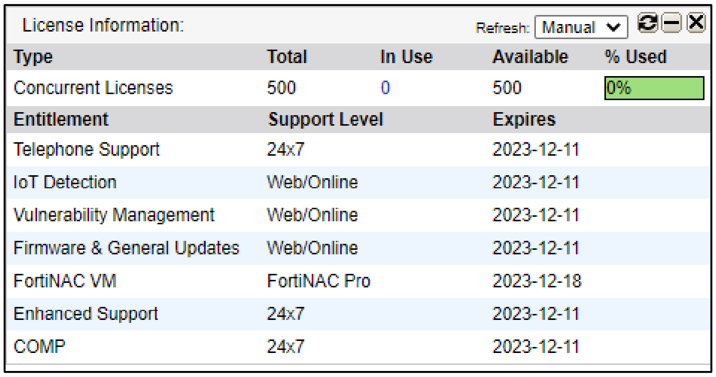
   User Name = root
   Password = YAMS

   If “Processes are Down” is displayed, there may be a UUID or MAC address mismatch. See related KB article 192992.

   c. Once logged into FortiNAC, review the End User License Agreement and click **Accept** to continue.

   d. On the Password screen, create a new Administrator user name and password and click **Apply**.

   e. Review the **License Information** panel in the Dashboard to confirm proper entitlements.



License Information:

Type	Total	In Use	Available	% Used
Concurrent Licenses	500	0	500	0%

Entitlement	Support Level	Expires
Telephone Support	24x7	2023-12-11
IoT Detection	Web/Online	2023-12-11
Vulnerability Management	Web/Online	2023-12-11
Firmware & General Updates	Web/Online	2023-12-11
FortiNAC VM	FortiNAC Pro	2023-12-18
Enhanced Support	24x7	2023-12-11
COMP	24x7	2023-12-11

If entitlements are populated but not correct, review the entitlements in the customer portal (https://support.fortinet.com/) for that product. Contact Customer Service for assistance.

Subscription License: If panel is blank, see KB article 191745 for troubleshooting steps.

For more information regarding the different license types, see Perpetual and Subscription Licenses in Appendix.

Proceed to next step.

Step 5: Operating System Updates

Requirements

- Administration UI password
- FQDN(s) of the FortiNAC server(s) are added to the production DNS server(s).
- HTTP access to **centos.org** and **updates.bradfordnetworks.com** from each appliance or virtual machine.
- **Note:** FortiNAC can be configured via CLI to use FTP or HTTPS for OS updates instead of HTTP.

The following options are also available with additional configuration. For instructions, refer to the Updating CentOS reference manual in the Fortinet Document Library:

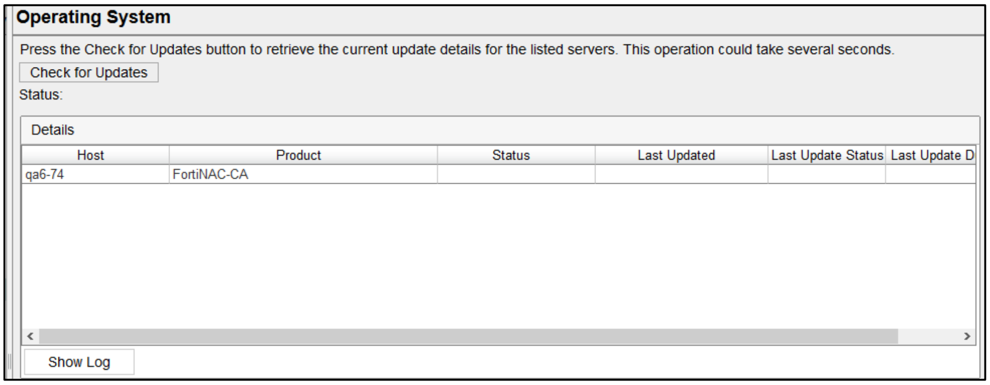
- Change Transfer Protocol from HTTP to FTP/HTTPS
- Update Using a Proxy Server
- Update Procedure for Sites without External Access

Procedure

1. If not already logged in, access the Administration UI of appliance with the Endpoint License Key installed. Use the newly created Administrator user name and password.

```
https://<IP Address>:8443/
https://<Host Name of the virtual  appliance>:8443/
```

2. Navigate to **System > Settings > Updates > Operating System.**



Operating System

Press the Check for Updates button to retrieve the current update details for the listed servers. This operation could take several seconds.

Status:

Details

Host	Product	Status	Last Updated	Last Update Status	Last Update D
qa6-74	FortiNAC-CA				

3. Click **Check for Updates** to check for available updates and assess whether the FortiNAC server is up to date or not.
4. Click **Update All** to begin downloading and installing the operating system updates.
5. A warning is displayed indicating that this is a long process and that you must reboot the server after the update. Click **Yes** to continue.
6. Use **Show Log** at the bottom of the table to view a log of the update process.

7. When the update is complete, select **System Management > Power Management** from the tree.
8. Select the server and click **Reboot** to reboot the FortiNAC Server.
9. Once rebooted, login to the UI again and navigate to **System > Settings > Updates > Operating System.**
10. Click **Check for Updates.** Status should now display "Up to Date".

Multiple Appliances
Update the Operating System on the remaining appliances.

1. Access the UI using
   `https://<IP Address>:8443/`
   `https://<Host Name of the virtual  appliance>:8443/`

2. Enter the default login credentials below.

   User Name = root
   Password = YAMS

3. Once logged into FortiNAC, review the End User License Agreement and click **Accept** to continue.
4. On the Password screen, create a new Administrator user name and password and click **Apply**.
5. Navigate to **System > Settings > Updates > Operating System** and update using the same steps as previous.

Once all appliances are updated, proceed to next step.

Step 6: Create and Install SSL Certificates

Requirements

- FortiNAC hostnames to be secured by the certificates (certificates required on all FortiNAC appliances)
- Hostname used for the Portal can be different than the actual hostname of the appliance. This is beneficial when using a combination of internal and external certificates. Setting the Portal hostname differently also prevents revealing the actual appliance hostname to users interacting with the Portal. See uses cases below for examples
- High Availability (HA) environments:
  - For ease of configuration, it is recommended to install certificates in both appliances prior to configuring HA. If some certificates must be installed after HA is configured, see pages 5 and 6 of the SSL Certificates How To in the Fortinet Document Library for instructions.
  - If a Virtual IP Address (VIP) will be used in a L2 HA configuration, VIP hostname will also need to be secured

Procedure

1. Determine use cases so the appropriate certificates can be acquired. FortiNAC can use SSL certificates issued by either an internal or public (external) Certificate Authority (CA). **Note**: Different certificates can be installed for different components.

Components secured by SSL Certificates

Component	**Function**	**Certificate to Use**
Administration UI	Access to the FortiNAC UI	Internal or External
Persistent Agent	Persistent Agent communication	Internal or External
Portal	Captive Portal access and Dissolvable Agent communication	External
Local RADIUS Server (EAP)	For use when FortiNAC is acting as the 802.1x EAP termination point.	Internal or External (avoid wildcard certificates)
RADIUS Endpoint Trust	Client-side certificate validation (EAP-TLS)	Internal or External (avoid wildcard certificates)

Use Case Examples

Internal domain: servername1.intdomainname.com

External domain: servername2.extdomainname.com

Use Case Example 1: Internal CA & 3rd Party RADIUS Server

- Computers to be used for Administration UI access have the company's internal CA root certificate installed
- Company owned computers require the Persistent Agent be installed also have the internal CA root certificate
- BYOD devices will be on-boarded via Captive Portal
- FortiNAC will manage wireless clients but will proxy RADIUS to 3rd party RADIUS Server

In this use case, 2 certificates will be required (1 internal and 1 external).

Hostname to Secure (Subject)	**Certificate**	**Component(s)**
FNACname1.intdomainname.com	Internal	Administration UI Persistent Agent
FNACname2.extdomainname.com	External	Portal

Use Case Example 2: Internal CA & Local RADIUS Server

- Computers to be used for Administration UI access have the company's internal CA root certificate installed
- Company owned computers require the Persistent Agent be installed also have the internal CA root certificate
- BYOD devices will be on-boarded via Captive Portal
- FortiNAC will manage wireless clients but will proxy RADIUS to 3rd party RADIUS Server

In this use case, 2 certificates will be required (1 internal and 1 external).

Hostname to Secure (Subject)	**Certificate**	**Component(s)**
FNACname1.intdomainname.com	Internal	Administration UI Persistent Agent Local RADIUS Server (EAP) RADIUS Endpoint Trust
FNACname2.extdomainname.com	External	Portal

Use Case Example 3: No Internal CA & Local RADIUS Server

- **Admin UI**: Use external certificate
- **Persistent Agent**: Use internal certificate
- **Portal**: Use external certificate
- **Local RADIUS Server (EAP)**: Use external certificate
- **RADIUS Endpoint Trust**: Use external certificate

In this use case, 1 certificate will be required (external).

Hostname to Secure (Subject)	**Certificate**	**Component(s)**
FNACname2.extdomainname.com	External	Administration UI Persistent Agent Portal Local RADIUS Server (EAP) RADIUS Endpoint Trust

2. Navigate to **System > Settings > Security > Certificate Management**.
3. Request certificates (if not already generated) and install on all appliances. For instructions, refer to the SSL Certificates How To in the Fortinet Document Library.
4. Upload certificates to the Admin UI first (if UI is going to be secured).
5. Logout of the Admin UI and reconnect using the following URL:

   ```
   https:// <FortiNAC Server Host Name included in certificate>:8443/
   ```

If browser reports certificate is not secure, an intermediate certificate may be missing. See related KB article 190860.

Proceed to next step.

Step 7: High Availability (Optional)

Requirements

- Open Ports
- All previous steps have been completed for both appliances to be configured for High Availability

Procedure

For details and instructions to configure High Availability, see section **Configuration** of the High Availability reference manual in the Fortinet Document Library.

Once High Availability is configured and validated, proceed to next step.

Step 8: Control Manager (Optional)

Requirements

- Open ports
- All previous steps have been completed for the Manager as well as the appliances to be managed.

Procedure

For details and instructions, refer to the Control Manager Admin Guide in the Fortinet Document Library.

Step 9: Software Upgrade

Requirements

- Open Ports

Procedure

Upgrade all appliances to the latest version. For details and instructions, refer to the following documents in the Fortinet Document Library:
Release Notes
Upgrade Instructions and Considerations

Once all appliances are upgraded, proceed to next step.

Step 10: System Settings

Requirements

- SSL certificates
- Authentication Directory account and details
- Email Account and details
- Remote backup server

Procedure

1. Configure communication settings for the appropriate authentication source.

   LDAP/Active Directory
   Navigate to **System** > **Settings** > **Authentication** > **LDAP**
   For additional details see section Directories Configuration of the **Administration Guide**.

   Connections Considerations

   - MAC Address: A valid MAC address must be used for the LDAP server. This will ensure the LDAP server model is properly created in Topology/Inventory.
   - LDAP login: include domain (example: domain/userid)
   - Secondary field contains information regarding a secondary directory containing the same user information.
   - Integration with multiple directories for authentication to distinct domains utilizes the “Domain Name” field in the Connection tab of each LDAP directory configuration.
   - Suggested LDAP Timeout: 30

Search Branch Considerations

Client Search Branches

- For simplicity, the root (i.e., dc=domain,dc=com) can be used.
- Granular search branches should be used when
  - A limited number of user information is required for authentication.
  - Lookups from the root take an extended period of time due to the size of the directory.
- When using multiple search branches, order the Client Search Branches with the most used branch first and least used last.

Group Search Branches

- Configure Group Search Branches only if intending to utilize LDAP/Active Directory group membership to assign Network Access or Endpoint Compliance policies.
- Granular search branches are suggested if there are a large number of groups in the directory. Otherwise, the root (i.e., dc=domain,dc=com) can be used.

RADIUS Server

Navigate to **System > Settings > Authentication > Radius**
For additional details see section Configure RADIUS settings of the **Administration Guide**.

Google

Navigate to **System > Settings > Authentication > Google**
Note: This integration requires configuration in the Google Developer's Console in addition to the FortiNAC Administration UI. For instructions, refer to the Google Authentication for the Captive Portal reference manual in the Fortinet Document Library.

2. Create Administrative Profiles and Users (optional).
   To provide access to the FortiNAC user interface, Administrative Users can be placed in special groups that set the appropriate privileges. This is done by placing users in special groups within the directory that correspond to matching groups in FortiNAC. When the Directory is synchronized with FortiNAC, users in the appropriate groups will be given Administrator or Administrative privileges based on their group settings and the Admin Profile Mapping that matches the user's group.

   For configuration instructions, refer to the Setting admin privileges by directory group reference manual in the Fortinet Document Library.

   To validate, logout of Administration UI and login using the new Admin User account with Administrator access.

3. Configure FortiNAC send email. This function is used for notification in features such as Alarm mappings and Guest registration.

   Navigate to **System > Settings > System Communication > Email Settings**

   For additional details see section Email settings of the **Administration Guide**.

To validate, use “Test Email Settings” button at the bottom of the view.

4. (Optional) Configure FortiNAC to send Event and Alarm records to an external server.
   Navigate to **System > Settings > System Communication > Log Receivers**

   For additional details see section Log receivers of the **Administration Guide**.

5. (Optional) Configure FortiNAC to respond to SNMP queries of appliance system information from an external Management System.
   Navigate to **System > Settings > System Communication > SNMP**

   For additional details see section SNMP of the **Administration Guide**.

6. Configure FortiNAC database backup schedule, storage duration and restoring of archives.
   Navigate to **System > Settings > System Management > Database Archive**
   Navigate to **System > Settings > System Management > Database Backup/Restore**

   For additional details see sections Database archive and Backup or restore a database of the **Administration Guide**.

   Best Practice: Perform database backups daily.

7. (Physical) Configure FortiNAC Remote System Backups. Virtual appliances should have snapshots scheduled.

   Backups by default are stored locally on the appliances. Remote backup stores the system configuration and database on a remote server for use in disaster recovery.

   Note: Administrator of remote server is responsible for file management.

   Navigate to **System > Settings > System Management > Remote Backup Configuration**

   For additional details see section Backup to a remote server of the **Administration Guide**.

8. Configure FortiNAC system backup schedule and storage duration.
   Navigate to **System > Settings > System Management > System Backups**

   For additional details see section System backups of the **Administration Guide**.
   Best Practice: Perform system backups weekly.

9. (Optional) Ensure System Update settings are accurate and download FortiNAC Agent Package updates to ensure the latest Agent version is available.
   a. Navigate to **System > Settings > Updates > System**
   b. Change Host to **updates.bradfordnetworks.com** and **Save**.

c. Refer to the latest Agent Release Notes for the appropriate Product Distribution Directory setting.
d. Navigate to **System > Settings > Updates > Agent Packages** and review the versions of the listed packages. For instructions on downloading new agent packages, see section Agent packages of the **Administration Guide**.

Proceed to next step.

Step 11: Network Visibility

Through communication with the wired infrastructure devices (switches, routers, wireless controllers and access points), FortiNAC gathers basic who, what, when and where information about connecting endpoints.

Requirements

- SNMP credentials
- CLI credentials

Procedure

1. Modify System Defined Uplink Count.

   When devices are added to Topology, FortiNAC determines whether or not switch ports should be considered uplinks based on specific criteria. The System Defined Uplink Count is the threshold value FortiNAC uses to convert a port to a Threshold Uplink. (**Note**: Uplinks will be discussed further in later steps).

   Before adding devices to Topology, the best practice is to change the System Defined Uplink Count from its default of 20 to 2000. This helps avoid ports changing to uplinks due to connecting computers generating an unusually high number of MAC addresses.

   a. Navigate to **System > Settings > Network Device.**
   b. Change **System Defined Uplink Count** to 2000.
   c. Click **Save Settings** at the bottom of the view.

2. Create Containers for logical grouping of network devices in Topology.

   Navigate to **Network Devices > Topology**

3. Perform Network Discovery of wired infrastructure.

   Add devices individually (Add or modify a device) or in bulk (Discovery).

Related KB article: Troubleshooting SNMP Communication Issues

Note: If a "?" appears as the icon, then support needs to be added for that device. See KB article Options for Devices Unable to Be Modeled in Topology for instructions.

4. Validate communication between FortiNAC and newly added devices.
   a. Correct any credential issues found during the discovery.
      i. Select the device model in tree in the left panel and click the **Credentials** tab.
      ii. Make the appropriate corrections and click the **Validate Credentials** button.
   b. Verify FortiNAC can read VLANS configured on the devices.
      i. Right click on the model and select **Network Access/VLANs.**
      ii. Click **Read VLANs.**

5. Perform Network Discovery of wireless infrastructure.

   Note: When defining the IP Range, *do not include AP's managed by controllers*.

   Add devices individually (Add or modify a device) or in bulk (Discovery).

Note: If a "?" appears as the icon, then support needs to be added for that device. See KB article Options for Devices Unable to Be Modeled in Topology for instructions.

6. Configure L3 (IP→MAC) sources.

   Navigate to **System > Groups > L3 (IP→MAC)**

   a. L3 (IP→MAC) group should contain all devices that are a source of FortiNAC ARP information. This includes routers, L3 switches, wireless controllers and autonomous AP's that are a source of ARP data.
   b. Perform Network Discovery for any devices not already discovered.

7. Look for any "L2 Poll Failed" and "L3 Poll Failed" events.

   Navigate to **Logs > Events**

   Related KB article: Troubleshooting Poll Failures

8. Uplink Review

   Identify ports in the network where FortiNAC has determined that the number of MAC addresses on the port exceeds the System Defined Uplink count. Review these ports and verify whether or not these are legitimate.

   Navigate to **Network Devices > Topology.**

   a. Filter on the Connection Status "Threshold Uplinks" under the **Ports** tab. This can be done at the top level or container level.
   b. Click **Update** to apply filter.

c. Manually set ports that should be an uplink to “Always Uplink.” This is a way to keep track of which uplinks have been verified. If any ports display “Threshold Uplink” as a Connection State in the future, it will indicate a new connection and should be verified.

   Switches with a mix of servers and access ports: Mark server ports as user defined uplinks *if* ports are physically secure and there is no interest in visibility of those servers.

For instructions see section Port properties of the **Administration Guide**.

There are different types of uplinks. Each uplink type is triggered by different criteria. For a complete list of uplink types and how they are detected, see section Port uplink types of the Administration Guide.

Appendix

Requirements Task List

FortiNAC deployment takes place in several steps. This list is broken out into these steps as outlined in this document.

The components listed under each step are the requirements that must be in place in order for that specific step to be completed. The length of time it takes to complete deployment is dependent upon each customer, their requirements and time constraints. Customers can complete all requirements prior to deployment, or during the deployment as time permits for those requirements not needed until later steps.

Click here for a printable version of the checklist.

Step	Pre-requisite	Resource	✓
Appliance Installation and Configuration	**Appliance Network Addressing** - Define the following for each FortiNAC appliance: • Hostname (**Important:** for internal name resolution reasons, avoid using "nac" as name. It is used for internal name resolution) ○ Example of correct usage: IT-NAC-HQ ○ Example of incorrect usage: NAC • Private IP address and Network Mask for Eth0 (Management Interface) – Requires network access for the following functions: ○ Administration UI access ○ Communication with Network Infrastructure (SNMP, CLI, API) ○ SNMP Traps ○ Syslog ○ Radius ○ LDAP ○ FSSO ○ REST API • Default Gateway • Domain name • DNS server(s) • NTP server(s)	Network Team	

Step	Pre-requisite	Resource	✓
Appliance Configuration	**Open Ports** - Certain ports are required to remain open for FortiNAC integrations. Click here for more detail.	Security team	
Appliance Configuration	**Appliance Passwords** – Define for the following access: • root CLI • admin CLI • Configuration Wizard Click here for more detail.	Network/Server Team	
Appliance Configuration	**Determine FortiNAC Service Network Configuration** • Layer 2: FortiNAC "isolation" VLAN(s) trunk back to eth1 interface • Layer 3: FortiNAC "isolation" VLAN(s) route back to eth1 interface • Private IP address and Network Mask for Eth1 (FortiNAC Service Interface) • At least one DHCP scope for FortiNAC "isolation" VLAN(s) (Private IP address range) Click here for more detail.	Network Team	
Operating System and Software Updates	**External Network Access** - Each appliance must have outbound internet access: • FTP access to **downloads.bradfordnetworks.com** from each appliance or virtual machine. (If not feasible, then HTTP or HTTPS). • HTTP access to **centos.org** from each appliance or virtual machine • Software Updates • FTP, PFTP, HTTP or HTTPS access to **update.bradfordnetworks.com**	Network team	
System Settings	**DNS Records**: Add host(s) name entries for the FortiNAC appliances into production DNS system(s).	Server Team	

Step	Pre-requisite	Resource	✓
System Settings	**SSL certificates** Have a resource available that can issue Internally signed certificates and/or request publicly signed certificates. • Admin UI ○ Corporate Internal Certificate Authority (recommended) ▪ Individual ▪ SAN ○ 3rd Party Public Certificate Authority ▪ Individual ▪ SAN ▪ Wildcard • Local RADIUS Server (EAP) ○ Corporate Internal Certificate Authority (recommended) ▪ Individual ▪ SAN ○ 3rd Party Public Certificate Authority ▪ Individual ▪ SAN ▪ Wildcard (Not recommended: some supplicants will not accept wildcard certificates) • Agent ○ Corporate Internal Certificate Authority (recommended) ▪ Individual ▪ SAN ○ 3rd Party Public Certificate Authority ▪ Individual ▪ SAN ▪ Wildcard • Portal ○ 3rd Party Public Certificate Authority ▪ Individual ▪ SAN ▪ Wildcard • RADIUS Endpoint Trust (EAP-TLS) ○ Corporate Internal Certificate Authority (recommended) ▪ Individual ▪ SAN ○ 3rd Party Public Certificate Authority ▪ Individual ▪ SAN ▪ Wildcard (Not recommended: some supplicants will not accept wildcard certificates) Click here for more detail.	Server Team	

Step	Pre-requisite	Resource	✓
System Settings	**Authentication Directory Account and Details** Provide the following for Directory Authentication integration • Identify IP, MAC Address and Hostname of Directory server(s) • LDAP/Active Directory service account (account must have read access to all requested search branches) • Provide specific User search branch(es) • Provide specific Group search branch(es) (if needed) • Identify any non-standard directory attributes used	Server Team	
System Settings	**Email Account and Details** Provide the following to enable FortiNAC to send email notifications. • Email Server • Email address for FortiNAC (may want to configure an alias for this address to better identify sender as FortiNAC) • Username and password if authentication is desired • Port used on email server. • Encryption used on email server for email communication (if any).	Server Team	
System Settings	**Remote Backup Server** Provide an FTP or SSH remote server for FortiNAC database and system configuration backup.	Server Team	
Network Visibility	**SNMP Credentials** Create if one does not already exist: SNMP community name (v1/v2) or account (v3) for all network infrastructure devices: • Devices FortiNAC will control: Read/write privileges • L3 devices from which FortiNAC will obtain ARP information but not control: Read privileges	Network Team	
Network Visibility	**PING Response** Network devices must be able to respond to PING requests from FortiNAC eth0 IP address.	Network Team	

Step	Pre-requisite	Resource	✓
Network Visibility	**CLI Credentials** Create if one does not already exist: CLI access account (SSH or Telnet) for all network infrastructure devices: • Devices FortiNAC will control: Read/write privileges (Cisco must be level 15 local user account) • L3 devices from which FortiNAC will obtain ARP information but not control: Read access (level 7) **Important**: When configuring the hardware device itself, use only letters, numbers and hyphens (-) in names for items within the device configuration, in SNMP and CLI credentials. Other characters may prevent FortiNAC from reading the device configuration. For example, in many cases the # sign is interpreted by FortiNAC as a prompt. Cisco restricts the use of @ and #.	Network Team	
Network Visibility	**Network Device IP's** Be able to provide the IP's of all specific network devices (routers, switches, firewalls, Access Points or controllers) that will be controlled or queried by FortiNAC.	Network Team	
Endpoint Classification	Required for distributing Persistent Agents: Line up resource responsible for deployment of software packages (i.e. SCCM administrator, Microsoft GPO).	Server Team	
Endpoint Classification	**DHCP Fingerprints (Optional)** FortiNAC can listen to DHCP exchanges and collect enhanced information about endpoints (hostname and operating system). Configure IP Helper addresses on L3 switches or routers for all production VLANs that use DHCP. Use the IP address of FortiNAC eth0 interface. **Note:** • Fingerprint collection is not required in order to achieve visibility, but does provide additional information. • FortiNAC updates or creates a Host record when it hears a DHCP packet (discover, request or inform) that provides OS and/or hostname. It does not matter if the host is offline or online. • Not all DHCP fingerprints provide hostname and FortiNAC is not always able to determine OS for all DHCP packets. The device's DHCP fingerprint may be unknown or too similar to other devices to name an OS.	Network Team	

Step	Pre-requisite	Resource	✓
Enforcement	**SNMP Traps** The following must be done on all wired network devices FortiNAC will control: • Trap Receivers: Configure trap receivers for the eth0 interface of the FortiNAC Server. • All devices: Enable Cold start and Warm start traps. • Enable one of the following traps to notify FortiNAC of endpoints connecting and disconnecting from the network: ○ MAC Notification traps (recommended) on supported devices. For a list of devices supported for MAC Notification traps, refer to the **SNMP Trap Support** chart in the Fortinet Document Library. For general configuration details, see **Configuring Traps for MAC Notification** in the Fortinet Document Library. ○ All other vendors - Enable Linkup/Linkdown traps.	Network/Security Team	
Enforcement	**Define and configure “isolation” VLANs**: • Registration • Remediation • Dead End or alternatively • Isolation (one “isolation” VLAN for all states) **Note:** Layer 3 deployments require a VLAN per state per location that is separated by an L3 device Ensure routing/firewall policies are configured for: • FortiNAC Service Network Interface (eth1) • "Isolation" VLANs ○ Block outbound DNS except for eth1 interface Click here for more detail.	Network/Security Team	

Step	Pre-requisite	Resource	✓
Enforcement	**Production Network Access** (available with Plus and Pro licensing) Identify network segmentation for • Who • What • Where • When Examples: • Employees with corporate assets connecting to the network at either Site 1 or Site 2 require internal network access. They are assigned VLAN 10 (CorpData). • Visitors connecting to the network at either Site 1 or Site 2 are allowed internet access only. They are assigned VLAN 20 (Guest).	Network Team	
Enforcement	**Wireless Integrations** For instructions on managing wireless networks using FortiNAC, review the applicable integration guide under the Reference Manual section of the Fortinet Document Library. • Review FortiNAC Integration Guides • Create test wireless environment identical to production environment & validate network access • Determine authentication method for FortiNAC integrations ○ MAC Authentication ○ 802.1X ▪ Provide Radius Server IP ▪ Configured FortiNAC ‘s eth0 IP as a Radius Client on the Radius Server	Network Team	
Enforcement	**VPN Integrations (Optional)** For instructions on managing VPN networks using FortiNAC, review the applicable integration guide under the Reference Manual section of the Fortinet Document Library. • Review FortiNAC Integration Guides • Supported for FortiGate and Cisco ASA only • SSL or IPSec • Create test VPN environment identical to production environment & validate network access	Network Team	

FNAC Part Numbers

Virtual Appliance (VM) Part Numbers

Part Number	Description
FNC-M-VM	Control Manager
FNC-CA-VM	Control and Application Server (CA)

Physical Part Numbers

Part Number	Description
FNC-M-550C	Control Manager
FNC-CA-500C	Control and Application Server (CA)
FNC-CA-600C	Control and Application Server (CA)
FNC-CA-700C	Control and Application Server (CA)

FortiNAC Appliance Deployment Configurations

Below is a general listing of components involved in product registration and configuration. The number of license keys, licenses and support contracts is determined by the type of deployment and number of appliances.

A license "pool" is defined by license type (Base, Plus or Pro) and quantity of endpoint licenses shared among multiple appliances. See **License Distribution** in the Appendix for details on how licenses are shared.

- **Standalone**
  - 1 CA, 1 support contract and 1 license
  - 1 endpoint license key
- **Standalone in High Availability**
  - 2 CA's, 2 support contracts (1 per CA) and 1 license pool
  - 1 endpoint license key and 1 appliance license key
- **Multiple Independent Standalones**
  - Multiple CA's, multiple support contracts and multiple licenses (1 per CA)
  - Multiple endpoint license keys (1 per CA)
- **Multiple Independent Standalones in High Availability**
  - Multiple CA's, multiple support contracts (1 per CA) and multiple license pools (1 per High Availability pair)
  - Per High Availability pair: 1 endpoint license key and 1 appliance license key
- **Distributed**
  - 1 Manager, Multiple CA's, multiple support contracts (1 per CA and Manager) and 1 license pool
  - 1 endpoint license key (for Manager) and multiple appliance license keys (1 per CA)
- **Distributed in High Availability**
  - Multiple CA's, 1 Manager, multiple support contracts (1 per CA and Manager) and 1 license pool
  - 1 endpoint license key (for Manager) and multiple appliance license keys (1 per CA and secondary Manager)

License Keys

Once all product is registered, license key(s) will be generated during the initial configuration. FortiNAC appliances will not start without a valid key installed. The type of license key generated and applied to the appliance(s) will depend upon the deployment configuration and the appliance roll within it. There are two different types of license keys:

- **Endpoint License Key**
  - Defines the type of license (Base, Plus or Pro) and endpoint quantity
  - Defines the type of appliance (Manager or CA)
  - Installed on the appliance that is associated with license support (the "managing" server)
- **Appliance (Base) License Key**
  - Defines the type of appliance (Manager or CA)
  - All hardware appliances are shipped with appliance key installed
  - Appliance key(s) are installed on all VMs that do not have an endpoint license key applied

Perpetual and Subscription Licenses

The process to register and download the Endpoint License Key is similar between Perpetual and Subscription licenses. The Endpoint License Key is installed on the "managing" FortiNAC appliance using Configuration Wizard. For appliances already running, the Administration UI can also be used.

Perpetual License: Entitlements are applied from the key and displayed in the Administration UI on the Dashboard and under **System > Settings > System Management > License Management.**

Subscription License: Entitlements are retrieved from FortiCloud over TCP port 443. Once retrieved, they are displayed in the Dashboard of the Administration UI. Only base key information will display under **System > Settings > System Management > License Management.**

- **Versions 8.8.9, 9.1.3 and lower**: FortiNAC polls FortiCloud upon system startup and every 12 hours for any entitlement updates.
- **Versions 8.8.10, 9.1.4, 9.2.0 and higher**:
  - FortiNAC polls FortiCloud upon initial system startup after license key installation. Entitlements and serial number(s) associated with the license contract are cached in the database. FortiCloud is then polled every 12 hours for any entitlement updates.
  - FortiNAC reads the cached entitlements information upon subsequent system startups.
  - Events are generated for entitlement poll failure and success. See Events and Alarms in the Administration Guide for details.

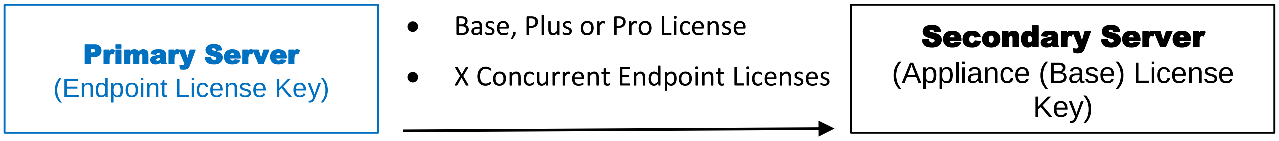
Perpetual + Subscription Licenses: A combination of both Perpetual and Subscription Licenses can be purchased to apply to the same appliance. The Perpetual license information is read from the license key and the subscription license pulled from FortiCloud. The two license totals are then added together.

License Distribution in Multiple Appliance Deployments

This section describes how a license pool's license type and endpoint quantity are shared among appliances in a multiple appliance deployment.

Standalone in High Availability – Perpetual License

Endpoint License Key is installed on the Primary Server. When the High Availability configuration is performed, the Primary Server updates the Secondary Server.



Primary Server
(Endpoint License Key)

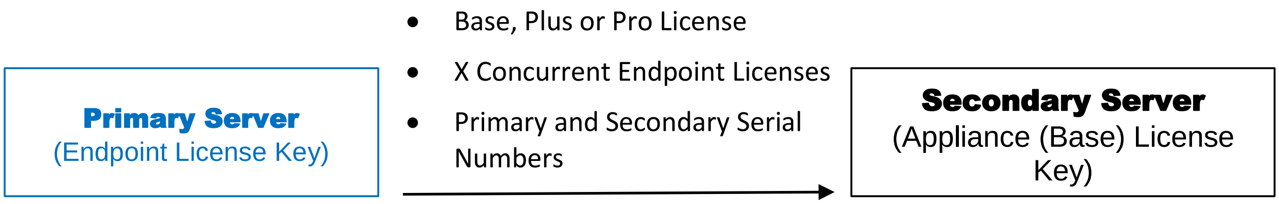
- Base, Plus or Pro License
- X Concurrent Endpoint Licenses

Secondary Server
(Appliance (Base) License Key)

Standalone in High Availability – Subscription License

Versions 8.8.10, 9.1.4, 9.2.0 and higher:

- Cached entitlement information is replicated to the Secondary Server.
- If Secondary Server is in control and the contract is valid, the secondary uses the cached entitlements. This ensures the state of the Secondary Server's licensing entitlements are the same as the Primary Server at the time of failover.
- FortiCloud is then polled every 12 hours for any entitlement updates.



Primary Server
(Endpoint License Key)

- Base, Plus or Pro License
- X Concurrent Endpoint Licenses
- Primary and Secondary Serial Numbers

Secondary Server
(Appliance (Base) License Key)

Multiple Independent Standalones in High Availability

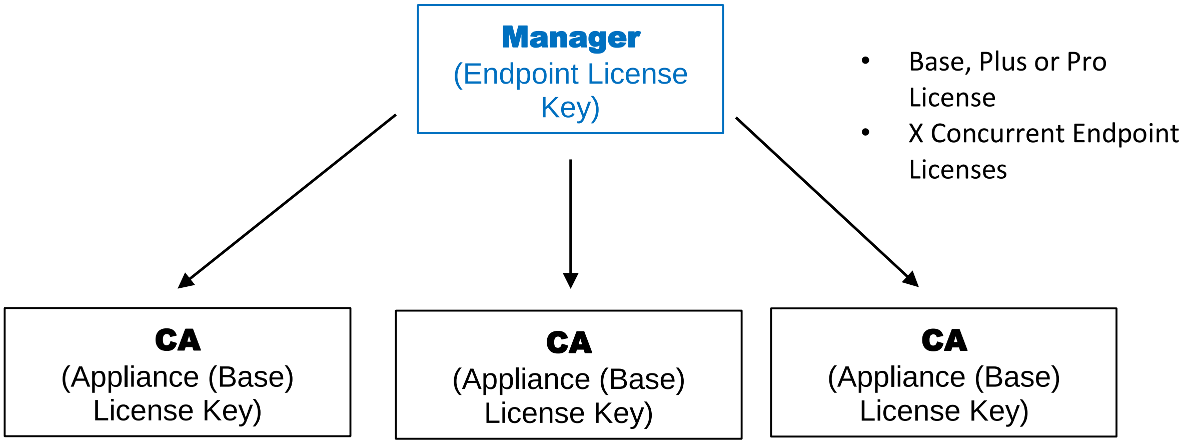
Same as above for each High Availability pair.

Distributed

- Endpoint License Key is installed on the Manager. CA's are updated by the Manager as they are added to the **Server List** in the Dashboard panel.

- If the Manager goes off line or is unreachable by the managed servers, all services will continue to function using the previously shared licenses from the Manager.

- Manager *removes* license and endpoint quantity from CA's as they are removed from the **Server List**.


Manager
(Endpoint License Key)
Base, Plus or Pro License
X Concurrent Endpoint Licenses
CA
(Appliance (Base) License Key)
CA
(Appliance (Base) License Key)
CA
(Appliance (Base) License Key)

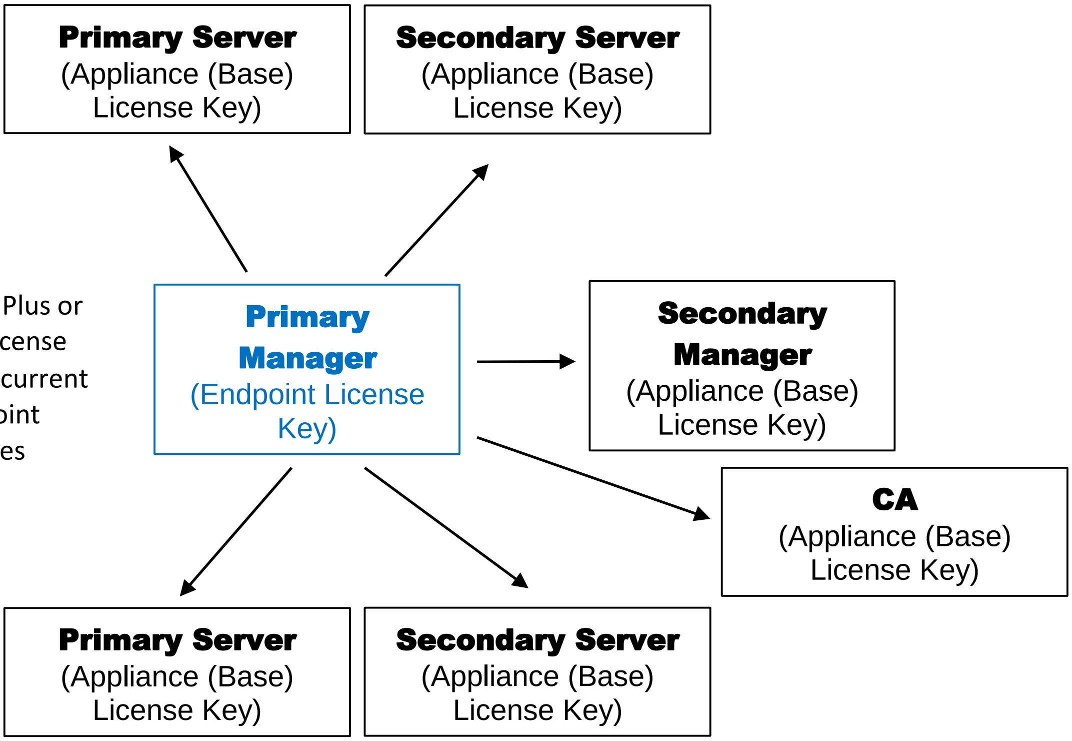
Distributed in High Availability

- Endpoint License Key is installed on the Manager. CA's not in High Availability pair and Primary Servers are updated as they are added to the **Server List** in the Dashboard panel.

- Once the Primary Server is added to the **Server List**, the Manager updates the Secondary Server upon the next failover of the High Availability pair.

- If the Manager goes off line or is unreachable by the managed servers, all services will continue to function using the previously shared licenses from the Manager.

- Manager *removes* license and endpoint quantity from CA's not in High Availability pair and Primary Servers as they are removed from the **Server List**.


Primary Server
(Appliance (Base) License Key)
Secondary Server
(Appliance (Base) License Key)
Primary Manager
(Endpoint License Key)
Secondary Manager
(Appliance (Base) License Key)
CA
(Appliance (Base) License Key)
Primary Server
(Appliance (Base) License Key)
Secondary Server
(Appliance (Base) License Key)

- Base, Plus or Pro License
- X Concurrent endpoint licenses

License Key Files and Locations

File Descriptions

.licenseKeyHW = Key file shipped with appliance hardware (only). File contains certificates used for authentication and required for many functions. DO NOT DELETE.

.licenseKey = License or appliance (base) key currently in use by the appliance.

- Used in both virtual and hardware appliances.
- When hardware appliances are shipped, the contents of .licenseKeyHW and .licenseKey files are the same.

.licenseKeyPrimary = Located on Secondary Server. Key file contains Endpoint License entitlements from Primary Server.

- Key file is created during High Availability configuration.
- If Primary Server Endpoint License is updated, .licenseKeyPrimary is updated once the High Availability configuration is re-applied or manually updated via CLI. For instructions, refer to the FortiNAC License Upgrade Guide.
- **Note:** This file should not be located on the Primary Server. See related KB article 203021.

.licenseKeyNCM = Located on all Control and ControlApplication Servers managed by a Manager. Key file containing Endpoint License entitlements from Manager.

- FortiNAC Versions 8.7.5, 8.8.1, 9.1.0 and greater
    - Primary Server
        - Key file is added once server is added to the Manager's Server List.
        - Key file is removed once server is removed from the Manager's Server List.
        - Key file is automatically updated once license is updated on Manager.
    - Secondary Server
        - Key file is added or removed if added or removed from the Primary Server.
        - Key file is automatically updated from the Primary Server.
- Prior Versions
    - Primary Server
        - Key file is added once server is added to the Manager's Server List.
        - Key file is removed once server is removed from the Manager's Server List.
        - Key file is automatically updated once license is updated on Manager.
    - Secondary Server
        - Key file is automatically updated from Manager upon the next failover.

File Locations

Standalone Server

`/bsc/campusMgr/.licenseKey`
`/bsc/campusMgr/.licenseKeyHW` ← Hardware appliances only

Primary Server (no Manager)

`/bsc/campusMgr/.licenseKey`
`/bsc/campusMgr/.licenseKeyHW` ← Hardware appliances only

Secondary Server (no Manager)

`/bsc/campusMgr/.licenseKey`
`/bsc/campusMgr/.licenseKeyPrimary`
`/bsc/campusMgr/.licenseKeyHW` ← Hardware appliances only

Manager (Primary Server)

`/bsc/campusMgr/.licenseKey`
`/bsc/campusMgr/.licenseKeyHW` ← Hardware appliances only

Manager (Secondary Server)

`/bsc/campusMgr/.licenseKey`
`/bsc/campusMgr/.licenseKeyPrimary`
`/bsc/campusMgr/.licenseKeyHW` ← Hardware appliances only

Standalone and Primary Server (under a Manager)

`/bsc/campusMgr/.licenseKey`
`/bsc/campusMgr/.licenseKeyNCM`
`/bsc/campusMgr/.licenseKeyHW` ← Hardware appliances only

Secondary Server (under a Manager)

`/bsc/campusMgr/.licenseKey`
`/bsc/campusMgr/.licenseKeyPrimary`
`/bsc/campusMgr/.licenseKeyNCM`
`/bsc/campusMgr/.licenseKeyHW` ← Hardware appliances only

Open Ports

The number of open (listening) TCP/UDP ports configured by default on the FortiNAC appliance is based on current best practices. These ports are kept to a minimum to provide maximum security by explicitly restricting unnecessary access from the outside. The best practice is to keep the number of open ports to a minimum, and block all other ports. If there is a need to provide users access to network resources through a static port (e.g., from outside a firewall), the best option is to allow users to connect by VPN.

Related Documents

http://www.iana.org/assignments/service-names-port-numbers/service-names-port-numbers.xhtml

Validate Open Ports

The current listening port configuration can be viewed by running an nmap of the appliance. Another useful command is "netstat" to list all listening and connected ports on the current appliance (e.g. "netstat –ln" lists just the listening ports).

In the FortiNAC CLI logged in as root, use the "netstat" command to verify that a TCP/UDP port is open.

netstat -ln | grep <port number>

For example, use `netstat -ln | grep 4568` to verify that the port used for Agent communications to FortiNAC is open.

```
tcp 0 0 0.0.0.0:4568 0.0.0.0:* LISTEN
```

Open Port List

The tables on the following pages list ports that should be open to end users, and ports that need to be open for FortiNAC communications.

Port	Protocol	Description	Direction
All ports outbound	All	Used by Device Profiler to classify devices. Uses NMAP as one of the profiling choices. Also can use SNMP to profile.	eth0: Outbound eth1: Outbound
UDP 21	FTP	Product Updates	eth0: Outbound to internet
TCP 21	FTP	Product Updates	eth0: Outbound to internet
TCP 22	SSH	High Availability: MYSQL replication from Primary Server to Secondary Server Control Manager (M) eth0: Manage FortiNAC Servers	Primary Server eth0: Outbound to Secondary Server eth0 Bi-directional between Managed Servers eth0 and Manager eth0
TCP 23	Telnet	Network Device Management	eth0: Outbound
UDP 53	DNS	Name Service	eth0: Outbound eth1: Inbound
TCP 53	DNS	Name Service	eth0: Outbound eth1: Inbound
UDP 67	DHCP	eth0: DHCP Fingerprinting eth1: Serving IP Addresses for Isolation Scopes	eth0: Inbound eth1: Inbound
UDP 68	DHCP	eth0: DHCP Fingerprinting eth1: Serving IP Addresses for Isolation Scopes	eth0: Inbound eth1: Outbound
TCP 80	HTTP	Web Server (Portal)	eth0: Inbound eth1: Inbound
TCP 22	SFTP	Product Updates	eth0: Outbound to internet
UDP 123	NTP	Time Service	eth0: Outbound
UDP 161	SNMP	Network Device Management	eth0: Outbound (Bi-directional if FortiNAC is configured to respond to SNMP queries. See section **SNMP** of the **Administration Guide**).
UDP 162	SNMP Traps	Device Changes Notification (Mostly Host Access Notification)	eth0: Inbound
TCP 443	HTTPS	Product Updates Web Server (Portal) Secure HTTP License Entitlements (fds1.fortinet.com) IoT data collection	eth0: Outbound to internet eth1: Inbound
UDP 514	Syslog	Device Change Notification and RTR (inbound) Logging of events to external server (outbound)	eth0: Bi-directional
TCP 514	OFTP	Communication with FortiAnalyzer (Available in FortiNAC version 8.5 and higher)	eth0: Outbound
TCP 1050	CORBA	Server Communication (See note on page 5) High Availability	Bi-directional between Primary and Secondary Server eth0 Bi-directional between Managed Servers and Manager eth0
UDP 1645	RADIUS	Host/User Authentication (Local RADIUS Server default)	eth0: Bi-directional
UDP 1812	RADIUS	Host/User Authentication (Proxy RADIUS mode default)	eth0: Bi-directional
UDP 1813	RADIUS Accounting	Host/User Authentication Changes and RTR (Proxy RADIUS Mode default)	eth0: Inbound
UDP 3799	RADIUS COA	Host/User Authentication Action (Moving/Removing)	eth0: Outbound
UDP 4567	Agent Server	Persistent Agent Communication (No longer used by agent 5.x and above with NAC 8.2 and above – TCP 4568 only)	eth0: Bi-directional eth1: Bi-directional

Port	Protocol	Description	Direction
TCP 4568	Agent Server	Used to establish the Persistent Agent Communication (SSL) connection (Used by agent 3.x and above)	eth0: Bi-directional eth1: Bi-directional
TCP 5555	Fortinet Server	Internally used by FortiNAC High Availability	Bi-directional between Primary and Secondary Server eth0 Bi-directional between Managed Servers and Manager eth0
TCP 5986 (user modifiable)	WinRM	WMI profiling method (Available in FortiNAC version 8.5 and higher)	eth0 and eth1: Outbound
TCP 8000	Private Protocol	Fortinet Security Fabric (FSSO) communications (Available in FortiNAC version 8.5 and higher)	eth0: Inbound
TCP 8443	HTTPS	Web Server Secure HTTP (Admin UI) FortiGuard (globaldevquery.fortinet.net) (Versions 8.8.9, 9.1.3 and above) Control Manager (M): Manage FortiNAC Servers	eth0: inbound eth0: Outbound to internet (Versions 8.8.9, 9.1.3 and above) Bi-directional between Managed Servers eth0 and Manager eth0
TCP 8080	HTTP Alternative	Web Server (Admin UI)	eth0: Inbound
TCP 8180	Analytics Server	Used to update/download the agent.	eth0: Inbound
TCP 8543	Analytics Server	Used to transfer data to the Analytics Server and for queries from the web browser.	eth0: Bi-directional

Note: FortiNAC uses port 1050 for CORBA (Common Object Request Broker Architecture) Management for accessing server objects and for interprocess communication between FortiNAC subsystems and servers. When a requestor connects to this port, the appliance dynamically reassigns it to a port in the 30000-64000 range.

TLS Versions

For instructions on enabling and disabling TLS versions via the Administration UI, see **TLS service settings** under Transport configurations in the Administration Guide.

Admin UI

FortiNAC Version	TLS Version (Enabled by Default)	TLS Version (Configurable via CLI*)	TLS Version (Configurable via UI)
8.8.6+, 9.1, 9.2	v1.2	v1.0 v1.1	N/A
9.4	v1.2 v1.3	N/A	v1.0 v1.1

*Configurable via CLI only and requires reconfiguration after each FortiNAC software upgrade. Contact Support for assistance and reference KB article 197091.

Persistent Agent

Agent Version	TLS Version (Enabled by default)
5.x and lower	v1.0 v1.1 v1.2
9.4	v1.2 v1.3

FortiNAC Version	TLS Version (Enabled by Default)	TLS Version (Configurable via UI)
8.8, 9.1, 9.2	v1.2	v1.0 v1.1 v1.2 v1.3
9.4	v1.2	v1.0 v1.1 v1.2 v1.3

RADIUS EAP Methods Using TLS

Note: TLSv1.3 not supported due to limitations in CentOS 7

FortiNAC Version	TLS Version (Enabled by Default)	TLS Version (Configurable via UI)
8.8, 9.1, 9.2, 9.4	v1.0 v1.1 v1.2	v1.2

Portal

Note: TLSv1.3 not supported due to limitations in CentOS 7

FortiNAC Version	TLS Version (Enabled by Default)	TLS Version (Configurable via CLI*)
8.8, 9.1, 9.2	v1.0 v1.1 v1.2	v1.2
9.4	v1.2	v1.2

*Configurable via CLI only and requires reconfiguration after each FortiNAC software upgrade. Contact Support for assistance and reference KB article 204860.

Appliance Password Requirements

Define passwords to be used to access appliance(s):

- **admin**: CLI/SSH password customer uses to log into the appliance.
- **root**: CLI/SSH password Support uses to log into the appliance.
- **Configuration Wizard**: Password used to log into the Configuration Wizard.
- **Administration UI**: User Name and password used to log into the Administration UI with full access.

Password Requirements

- Must be at least 8 characters and no more than 64 characters.
- Contain a lowercase letter, an uppercase letter, a number, and one required symbol.

Required Symbols		Prohibited Symbols	
!	exclamation point	(	open parenthesis
@	at	space	
_	underscore	{	open curly bracket
#	pound	)	close parenthesis
$	dollar	;	semicolon
~	tilde	}	close curly bracket
%	percent	'	back quote
^	caret	:	colon
-	hyphen	[	open square bracket
*	asterisk	&	ampersand
?	question mark	"	double quote
		]	close square bracket
		+	plus
		'	single quote
		,	comma
		=	equal
		<	less than
		.	period
		|	pipe
		>	greater than
		/	forward slash
		\	back slash

SSL Certificates

Required for securing FortiNAC communications for the components listed below. Have a resource available that can issue Internally Signed certificates and/or request publicly signed SSL certificates. For additional details regarding the certificate installation process, refer to the SSL Certificates How To in the Fortinet Document Library.

Admin UI: Secures the Administration User Interface.

Local RADIUS Server (EAP): Available for FortiNAC versions 8.8 and higher. For use when FortiNAC is acting as the 802.1x EAP termination point. **Note**: Wildcard certificates are not recommended. For details about this feature see section Local RADIUS Server of the **Administration Guide**.

Persistent Agent: Secures the communications between FortiNAC and the Persistent Agent.

Portal: Secures the captive portal and communications between FortiNAC and the Dissolvable Agent.

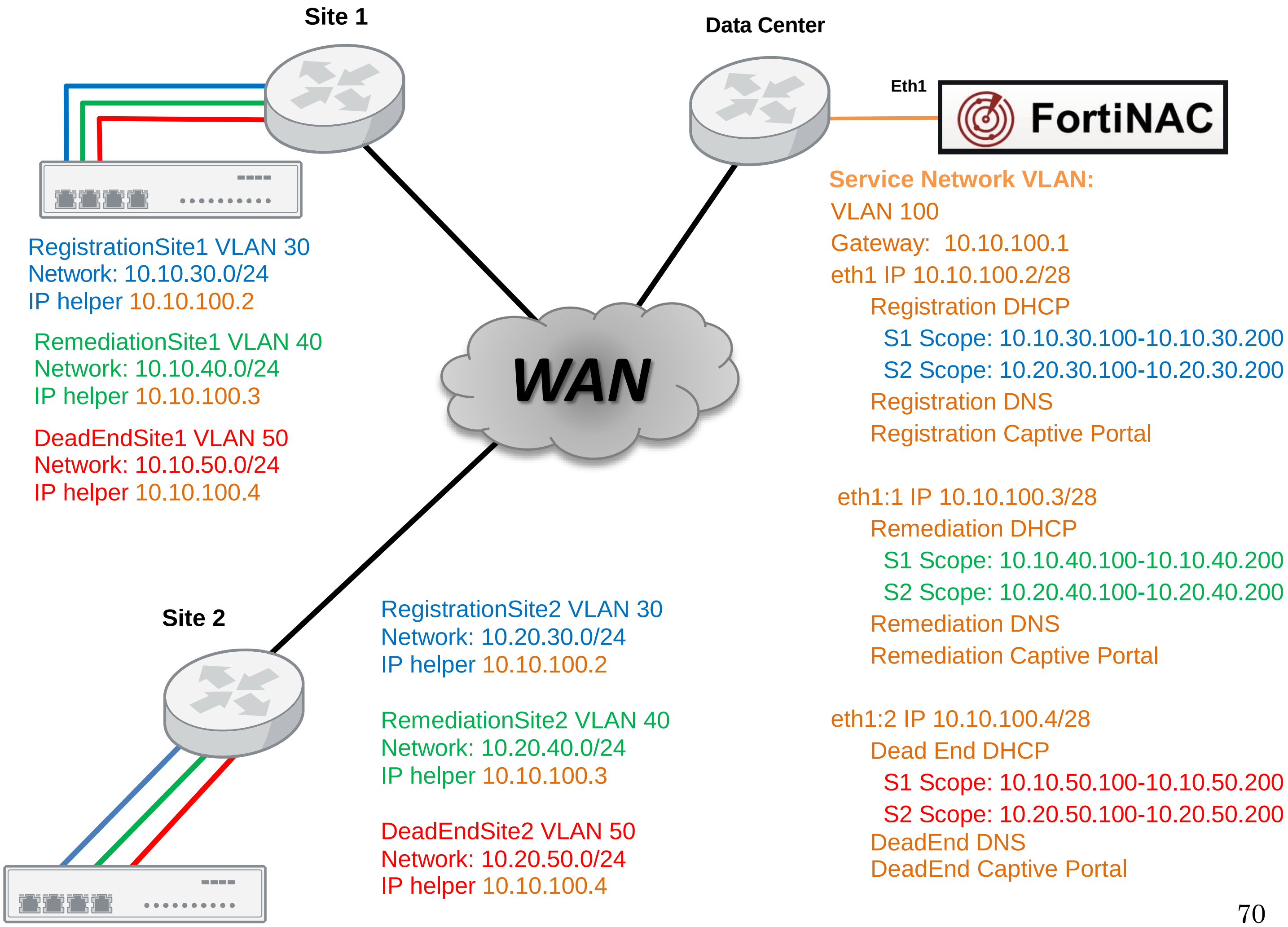
RADIUS Endpoint Trust: Endpoint Trust Certificate used by FortiNAC to validate the client-side certificate when Local RADIUS Server is configured and EAP-TLS is used for authentication. **Note**: Wildcard certificates are not recommended. For details about this feature see section Local RADIUS Server of the **Administration Guide**.

Determine FortiNAC Service Configuration (Network Type)

The FortiNAC Service Interface (Eth1) can be configured for either a Layer 2 or Layer 3 implementation. This configuration is referred to as **Network Type** in the Configuration Wizard. See below for descriptions and logical diagrams for each implementation type. The most common Network Type used by customers is Layer 3.

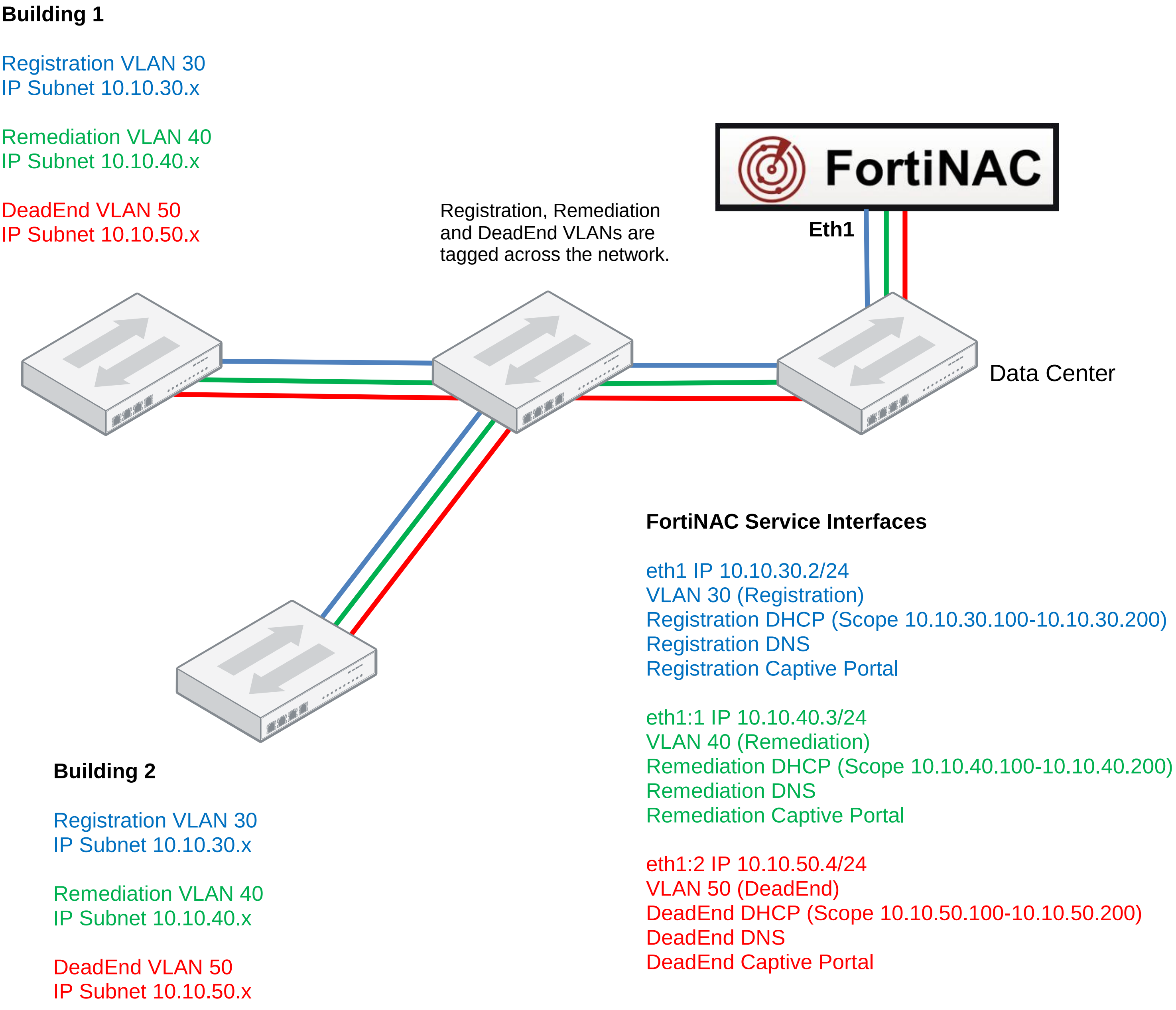
Layer 3 Implementation

- Required for Layer 3 High Availability configurations. See Configuration Wizard reference manual or Guided Install in the 9.2 Administration Guide.
- The FortiNAC Service Interface is a standard interface (IP and VLAN values below are for illustration purposes)
  - The interface exists on a single network
  - The interface is not within the same broadcast domain as a host assigned to an isolation network
  - The interface uses multiple IP addresses within the same subnet
  - DHCP relays must be configured on each isolation network pointing back to the isolation interface
  - The individual IP address is used by DNS



Layer 2 Implementation

- The FortiNAC Service Interface
  - 802.1q trunk
  - The interface accepts traffic tagged from any of the isolation VLANs
  - Same broadcast domain as hosts
  - IP address for each “isolation” subnet



Building 1

Registration VLAN 30
IP Subnet 10.10.30.x

Remediation VLAN 40
IP Subnet 10.10.40.x

DeadEnd VLAN 50
IP Subnet 10.10.50.x

Registration, Remediation and DeadEnd VLANs are tagged across the network.

FortiNAC Service Interfaces

eth1 IP 10.10.30.2/24
VLAN 30 (Registration)
Registration DHCP (Scope 10.10.30.100-10.10.30.200)
Registration DNS
Registration Captive Portal

eth1:1 IP 10.10.40.3/24
VLAN 40 (Remediation)
Remediation DHCP (Scope 10.10.40.100-10.10.40.200)
Remediation DNS
Remediation Captive Portal

eth1:2 IP 10.10.50.4/24
VLAN 50 (DeadEnd)
DeadEnd DHCP (Scope 10.10.50.100-10.10.50.200)
DeadEnd DNS
DeadEnd Captive Portal

Building 2

Registration VLAN 30
IP Subnet 10.10.30.x

Remediation VLAN 40
IP Subnet 10.10.40.x

DeadEnd VLAN 50
IP Subnet 10.10.50.x

FortiNAC “Isolation” VLANs

In the switches to be controlled by FortiNAC, configure the appropriate “isolation” VLANs.

- A single VLAN (Isolation) for restricting network access for the following host states
  (The following are possible options – not all may be used)
  - Unknown hosts (hosts not registered in FortiNAC)
  - Untrusted registered hosts (hosts marked "At-Risk")
  - Disabled registered hosts
  - Untrusted or unknown hosts connecting over VPN tunnel managed by FortiNAC
  - Registered hosts requiring user authenticated by FortiNAC. Validates user accessing the computer prior to allowing full network access

- Alternatively, separate VLANs for each host state
  (The following are possible options – not all may be used)
  - **Registration**: Isolates unknown hosts (hosts not registered in FortiNAC)
  - **Remediation**: Isolates untrusted registered hosts (hosts marked "At-Risk")
  - **Dead End**: Isolates disabled registered hosts
  - **Virtual Private Network (VPN)**: Isolates untrusted or unknown hosts connecting over VPN tunnel managed by FortiNAC
  - **Authentication**: Isolates registered hosts until user is authenticated by FortiNAC. Validates user accessing the computer prior to allowing full network access
  - **Access Point Management (Hub)**: Manages clients connected to hubs or simple access points by using DHCP as a means to control or restrict host network access. FortiNAC acts as the DHCP server for both known/trusted and unknown/untrusted hosts. See section Access point management of the Administration Guide for additional configuration instructions.

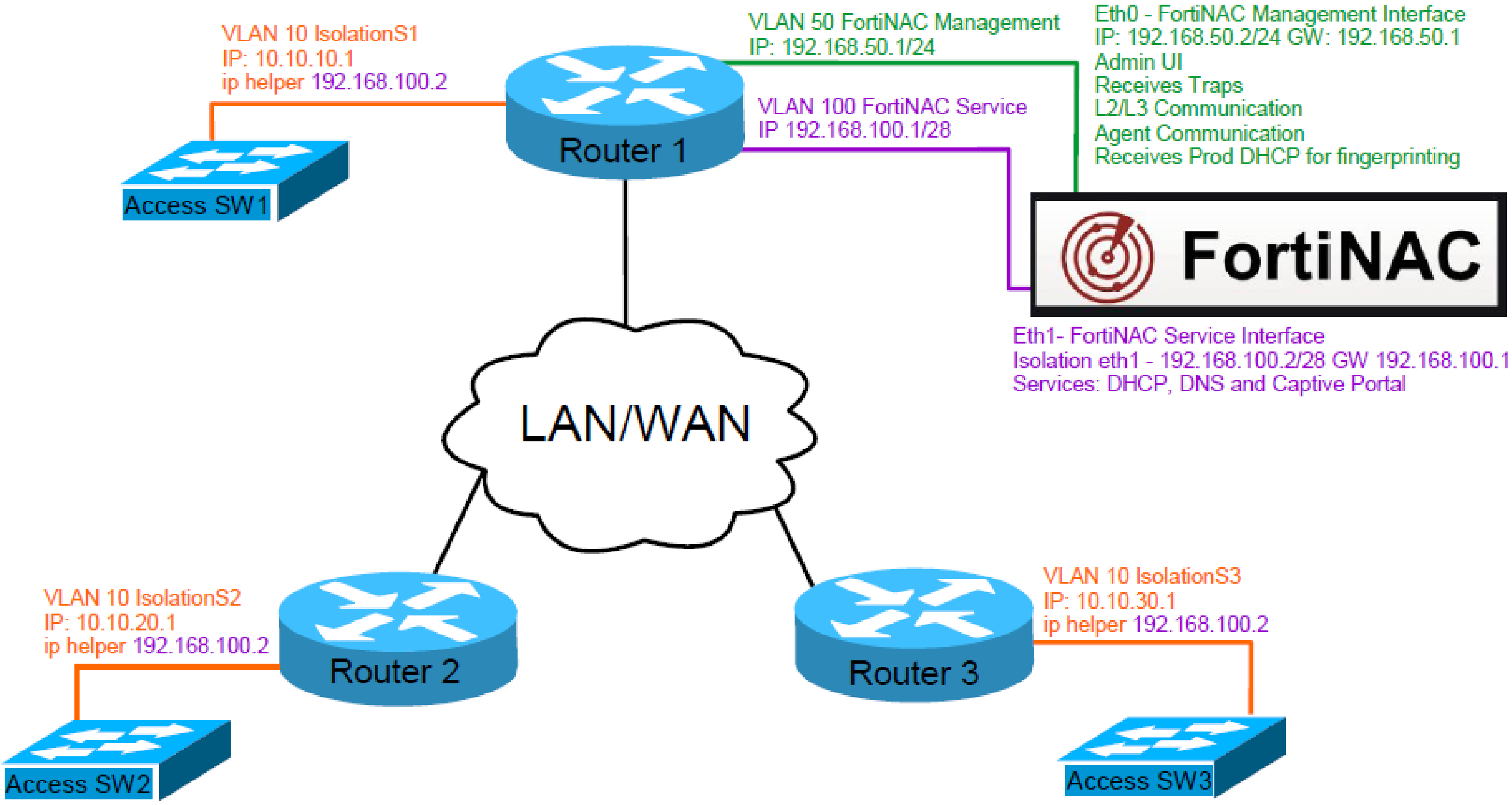
Layer 3 deployments require a VLAN per state per location that is separated by an L3 device.

The FortiNAC Service Network Interface is configured on the eth1 interface of the appliance. Serves DHCP, DNS and the Captive Portal to devices in the “isolation” VLANs.

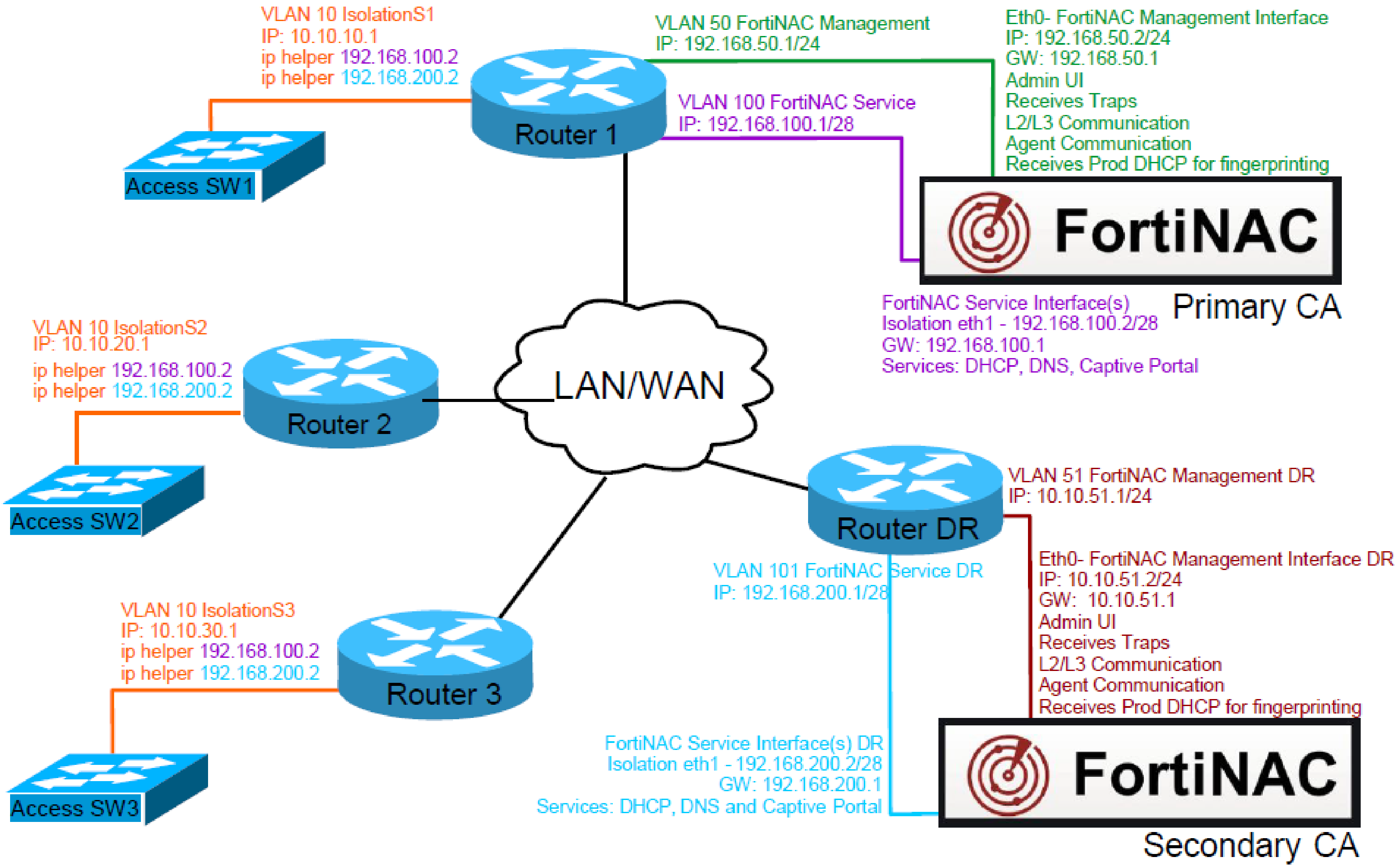
Note: To prevent isolated devices from resolving DNS from any other server, block outbound DNS except to the FortiNAC Service Network Interface (eth1) interface.

See following pages for logical network diagram examples.

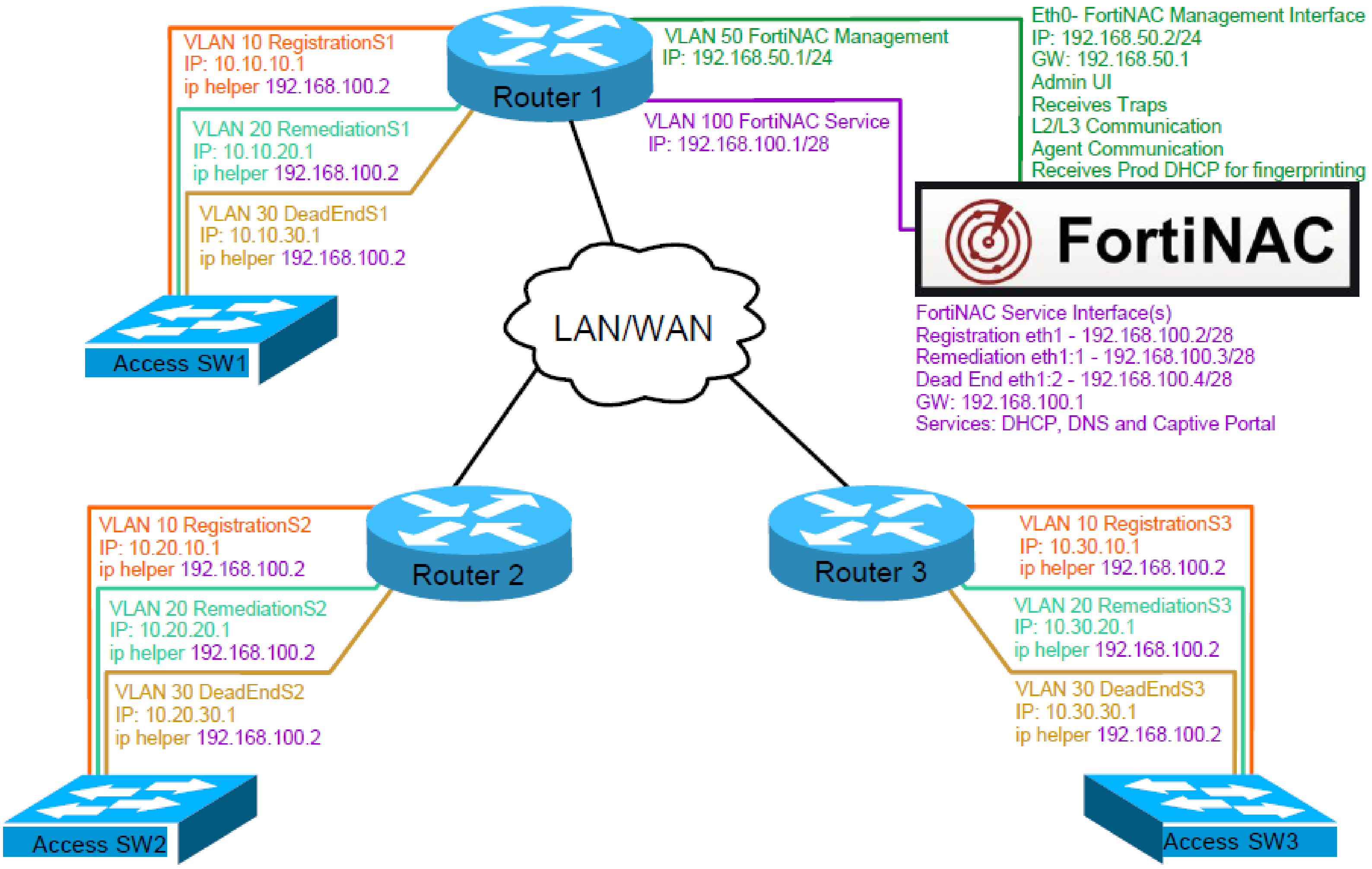
Single FortiNAC "Isolation" Network Configuration
Shared VLAN for all States
(L3 Network Type)



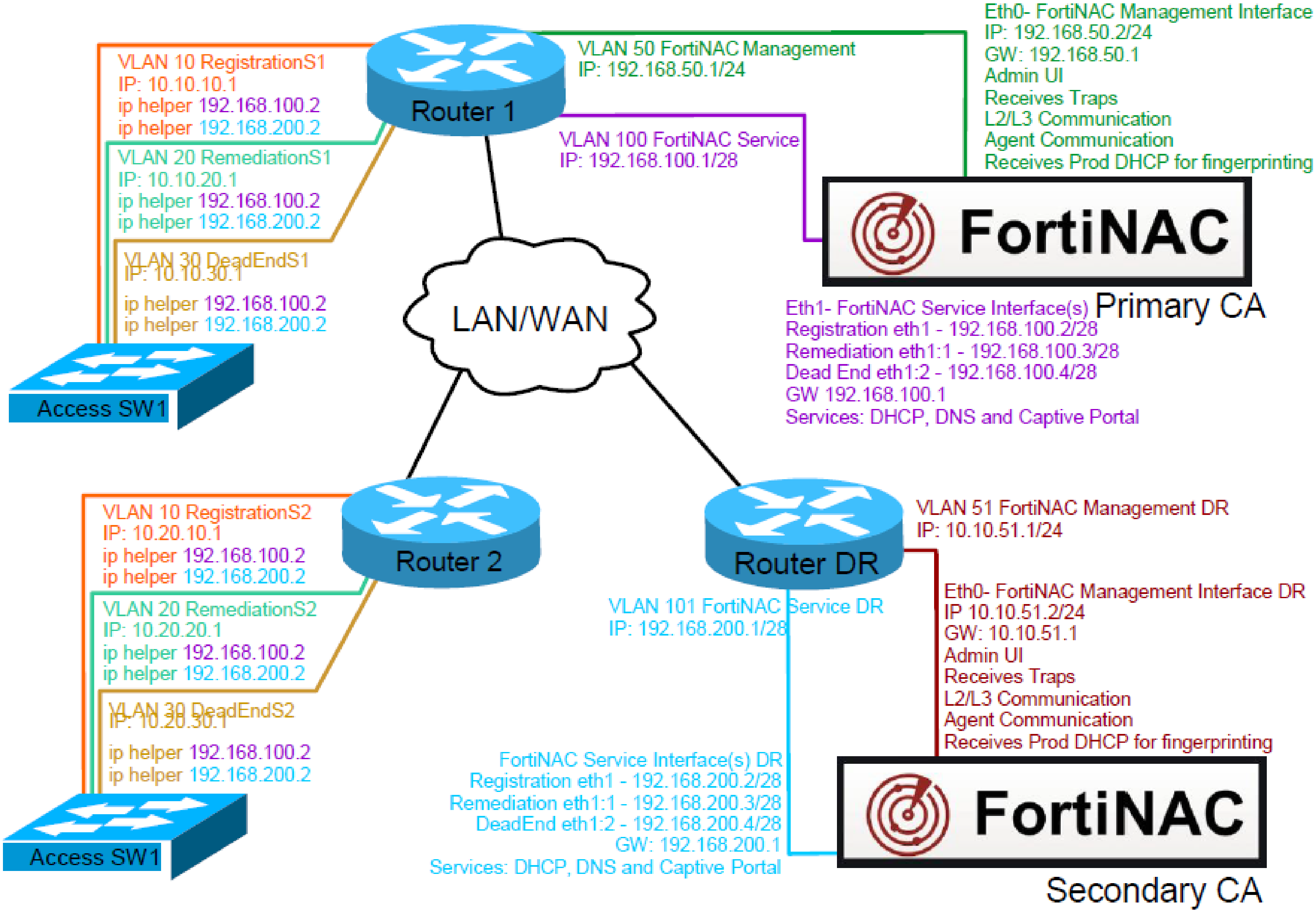
Single FortiNAC “Isolation” Network Configuration
Shared VLAN for all States
(L3 Network Type)
(High Availability Configuration)



Multiple FortiNAC "Isolation" Network Configuration
Individual VLANs per State
(L3 Network Type)



Multiple FortiNAC “Isolation” Network Configuration
Individual VLANs per State
(L3 Network Type)
(High Availability Configuration)



Appliance Operating System

Virtual appliance licenses for operating system, database and other FortiNAC services included in the virtual package (VMware/Hyper-V) are supported until the operating system is end of life.

FortiNAC currently ships with the CentOS 7 Linux operating system. Fortinet relies on the CentOS organization to publish periodic bug fixes and security updates for the CentOS Distribution.

Effective June 30 2024, CentOS will no longer provide updates for CentOS 7. Any vulnerabilities found with CentOS 7 after June 30th will not be addressed. Software releases will continue to be supported on CentOS 7 through December 31 2026.

Fortinet Professional Services Contracts

Professional Services contracts expire one (1) year from date of purchase. Registration of the Professional Services contract by the customer should occur on the day of the Professional Services session as proof of delivery for those services rendered.

When the contract is registered, a 30-day expiration date is set on the contract as it has been delivered and utilized. This is represented in the FortiCloud dashboard under Expiration date.

Prerequisite Checklist (Printable Version)

Step	Pre-requisite	Resource	✓
Appliance Installation and Configuration	FNAC Hostname	Network Team	
Appliance Installation and Configuration	IP address and Network Mask for FNAC Eth0 (Management Interface)	Network Team	
Appliance Installation and Configuration	FNAC Default Gateway	Network Team	
Appliance Installation and Configuration	Domain name	Network Team	
Appliance Installation and Configuration	DNS server(s)	Network Team	
Appliance Installation and Configuration	NTP server(s)	Network Team	
Appliance Configuration	Apply firewall policies ensuring ports are open for FortiNAC integrations.	Security Team	
Appliance Configuration	FNAC root CLI password	Network/Server Team	
Appliance Configuration	FNAC admin CLI password	Network/Server Team	
Appliance Configuration	FNAC Configuration Wizard	Network/Server Team	
Appliance Configuration	Determine FortiNAC Service Network Configuration (L2 or L3 Network Type)	Network Team	
Appliance Configuration	IP address and Network Mask for FNAC Eth1 (FortiNAC Service Interface)	Network Team	
Appliance Configuration	At least one DHCP scope for FortiNAC “isolation” Network.	Network Team	

Step	Pre-requisite	Resource	✓
Operating System and Software Updates	External network access (FTP, HTTP or HTTPS) from each appliance to **downloads.bradfordnetworks.com**	Network Team	
Operating System and Software Updates	External network access (HTTP) from each appliance to HTTP access to **centos.org**	Network Team	
Operating System and Software Updates	External network access (FTP, PFTP, HTTP or HTTPS) from each appliance to **update.bradfordnetworks.com**	Network Team	
Step	**Pre-requisite**	**Resource**	✓
System Settings	Add host(s) name entries for the FortiNAC appliances into production DNS system(s).	Server Team	
System Settings	Have a resource available that can issue Internally signed certificates and/or request publically signed certificates.	Server Team	
System Settings	LDAP/Active Directory Server(s) IP Address	Server Team	
System Settings	LDAP/Active Directory Server(s) MAC Address	Server Team	
System Settings	LDAP/Active Directory Server(s) Hostname	Server Team	
System Settings	LDAP/Active Directory service account (account must have read access to all requested search branches)	Server Team	
System Settings	LDAP/Active Directory User search branch(es)	Server Team	
System Settings	LDAP/Active Directory Group search branch(es) (if needed)	Server Team	
System Settings	Non-standard LDAP/Active Directory attributes used	Server Team	
System Settings	Email Server (example: smtp.googlemail.com)	Server Team	
System Settings	Email address for FortiNAC (may want to configure an alias for this address to better identify sender as FortiNAC)	Server Team	

Step	Pre-requisite	Resource	✓
System Settings	FNAC email account User Name (if authentication is desired).	Server Team	
System Settings	FNAC email account Password (if authentication is desired).	Server Team	
System Settings	Port used on email server.	Server Team	
System Settings	Encryption used on email server for email communication (if any).	Server Team	
System Settings	**Remote Backup Server (Physical only)** Provide an FTP or SSH remote server for FortiNAC database and system configuration backup.	Server Team	
Step	Pre-requisite	Resource	✓
Network Visibility	SNMP community name (v1/v2) or account (v3) for all network infrastructure devices	Network Team	
Network Visibility	Network devices must be able to respond to PING requests from FortiNAC eth0 IP address.	Network Team	
Network Visibility	CLI access account (SSH or Telnet) for all network infrastructure devices.	Network Team	
Network Visibility	IP's of all specific network devices (routers, switches, firewalls, Access Points or controllers) that will be controlled or queried by FortiNAC.	Network Team	
Step	Pre-requisite	Resource	✓
Endpoint Classification	Required for distributing Persistent Agents: Line up resource responsible for deployment of software packages (i.e. SCCM administrator, Microsoft GPO).	Server Team	
Endpoint Classification	DHCP Fingerprints: Configure IP Helper addresses on L3 switches or routers for all production VLANs that use DHCP. Use FortiNAC eth0 IP Address.	Network Team	

Step	Pre-requisite	Resource	✓
Enforcement	On all wired network devices FortiNAC will control, configure trap receivers for the FortiNAC eth0 IP Address	Network/Security Team	
Enforcement	On all wired network devices FortiNAC will control, enable Cold start and Warm start traps.	Network/Security Team	
Enforcement	On all wired network devices FortiNAC will control, enable either MAC Notification or Link State traps.	Network/Security Team	
Enforcement	Define and configure “isolation” VLANs	Network/Security Team	
Enforcement	Ensure routing/firewall policies are configured for: • FortiNAC Service Network Interface (eth1) • "Isolation" VLANs	Network/Security Team	
Enforcement	Identify network segmentation for • Who • What • Where • When	Network Team	
Enforcement	(Wireless integrations) Review applicable FortiNAC Integration Guides	Network Team	
Enforcement	(Wireless integrations) Create test wireless environment identical to production environment	Network Team	
Enforcement	(Wireless integrations) Determine authentication method for FortiNAC integrations (MAC Auth or 802.1x)	Network Team	
Enforcement	(802.1X Wireless integrations) RADIUS Server IP Address	Network Team	
Enforcement	(802.1X Wireless integrations) Configure FortiNAC ‘s eth0 IP as a RADIUS Client on the RADIUS Server	Network Team	
Enforcement	(VPN integrations) Review applicable FortiNAC Integration Guides	Network Team	
Enforcement	(VPN integrations) Create test VPN environment identical to production environment	Network Team	

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