DEPLOYMENT GUIDE

Fortinet FortiGate and Nozomi Networks SCADAguardian
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Overview

Fortinet (NASDAQ: FTNT) secures the largest enterprise, service provider, and government organizations around the world. Fortinet empowers its customers with intelligent, seamless protection across the expanding attack surface and the power to take on ever-increasing performance requirements of the borderless network - today and into the future. Only the Fortinet Security Fabric architecture can deliver security features without compromise to address the most critical security challenges, whether in networked, application, cloud or mobile environments. Fortinet ranks #1 in the most security appliances shipped worldwide and more than 400,000 customers trust Fortinet to protect their businesses. Learn more at https://www.fortinet.com, the Fortinet Blog, or FortiGuard Labs.

About Nozomi

Nozomi Networks is a leading provider of real-time visibility, advanced monitoring capabilities, and strong security for industrial control networks supporting critical infrastructure. Built by a team of industrial control systems (ICS) and network security expertise, Nozomi Networks’ SCADAguardian appliances and software inspect industrial networks non-intrusively and apply machine-learning (ML) with Artificial Intelligence (AI) technology to provide unique insight into the topology, devices, and behaviors present in it.

Deployment Prerequisites

1. FortiGate
2. FortiSwitch
3. Nozomi Networks’ SCADAguardians
4. An ICS environment with IT and OT networks

Industrial control systems have strict and unique environments that require security to be the top priority. In this document, we will look at the integration of Fortinet’s FortiGate to Nozomi Networks’ SCADAguardian appliance, to bring the power of the Security Fabric to the industrial control systems.

Version Compatibility

This Deployment and Integration Guide applies to FortiGates with FortiOS v5.4 and 5.6, and with Nozomi Networks’ SCADAguardian v17.0.0. This guide will assume the integration with FortiOS 5.6.

Licensing

For licenses to the Nozomi Networks’ SCADAguardian, please contact Nozomi Networks respective sales team. http://www.nozominetworks.com/company/contact-us.html

Deployment

Architecture Overview

This is an example of what a supervisory control and data acquisition (SCADA) network may look like, where the FortiGate and the SCADAguardian are located as a point of convergence between the IT and the OT networks (and/or the process and OT networks).
The FortiGate sits in-line between the IT and the OT networks, and within the local environments of each OT network themselves—actively controlling traffic between the IT network and the OT network. The Nozomi Networks’ SCADAguardian is connected in SPAN/port mirroring mode behind the respective switches, having visibility of network traffic of both networks.

For the purpose of this Integration Guide, we will focus on a single segment.

The communication between the FortiGate and the SCADAguardian occurs over the Security Fabric via the management network.

**FortiGate Configuration**

On the FortiGate, there are three basic requirements for the FortiGate to be in-line between the IT network and the OT network, and to be integrated with the SCADAguardian. There are three interfaces to be configured, one service, and one policy.

**Interfaces**
1. **IT Network**

A port on the FortiGate is required to be configured for the IT network on a dedicated subnet. Ensure that no Administrative Access options are enabled for this port. ICS environments require tightly secured networks. As such, the least possible administrative access to the interface is recommended.

Also ensure that the “**Active Scanning**” option is **disabled**, as this creates unnecessary noise on the network, which may impede the integration with the SCADAguardian.

This port will act as the gateway of the IT network.
2. **OT Network**

   Similarly, a port on the FortiGate is required to be configured for the OT network on a dedicated subnet. Ensure that no Administrative Access options are enabled for this port. ICS environments require tightly secured networks. As such, the least possible administrative access to the interface is recommended.

   ![FortiGate VM64](image)

   Also ensure that the “**Active Scanning**” option is disabled, as this creates unnecessary noise on the network, which may impede the integration with the SCADAguardian.

   This port will act as the gateway of the OT network.

3. **Management Network**

   A management network needs to be created on which the FortiGate will communicate with the SCADAguardian and from which it can be managed.
Protocol Service

Create services for your environment’s required protocols.

Typically, these are SCADA-oriented protocols such as MODBUS, DNP3, Profibus, FIP, etc. In this example, we are creating a service for the MODBUS protocol.

Name this service “Modbus” and select Protocol Type as TCP/UDP/SCTP and Destination Port as “TCP” and port 502. Click OK.

Policy

Creation of one policy is required for traffic coming in from the IT network to the OT network, allowing only the protocol services created from the previous step. Ensure that NAT is disabled, and for the purpose of analysis of incidents, enable all logging.
Create User for Nozomi Networks’ SCADAguardian

Create a new user for the Nozomi Networks’ SCADAguardian to access the FortiGate for the integration.

Go to System > Administrators and click on “Create New.” Enter the details for the user account and enter the details as shown in the screenshot below.

1. Enter the User Name, Password, and Comments.
2. Select the Type of the user to be “Local User.”
3. Set Administrator Profile to “super_admin.”
4. Enable Restrict login to trusted hosts and put in the IP of the Nozomi Networks’ SCADAguardian.
5. Click OK.
Nozomi Networks Configuration

The configuration on the SCADAguardian requires connectivity to the management interface and all the security integration options enabled. Ensure that the management interface of the Nozomi Networks’ SCADAguardian can reach using protocol ssh on port 22 the management.

Ensure that the SCADAguardian is connected to a switch for the IT network and the OT network in SPAN/mirrored ports. This gives the SCADAguardian visibility of the SCADA traffic between the networks.

Enable FortiGate + Nozomi Networks Configuration

1. Under Settings > Firewall Integration, choose “Fortinet FortiGate.”

2. Insert the IP address of the management interface of the FortiGate and the user with the password created on the FortiGate for the integration.
Preparing the Integration for Testing and Deployment

The Nozomi Networks' SCADAguardian works on the basis of behavioral analysis and machine learning. When a SCADAguardian is placed in a new environment, the appliance has to be put in the “Learning” state, prior to live production deployment, for a designated amount of time prior to enabling Protecting mode.

Placing SCADAguardian in Learning Mode

To ensure that the SCADAguardian is in Learning mode, all prior data must first be reset to a clean state:

1. Log in to the SCADAguardian.
2. Go to System -> Data.
3. Clear all settings by clicking on “Select all.”
4. Click on “Reset” and enter your password.

This will ensure that the appliance is started from a clean state with no prior learning.

To ensure that the system is in Learning mode:
1. Log in to the SCADAguardian.
2. Ensure that both the Network and Process sections have “Learning” selected. Here, you will be able to see the amount of time since the system has been in Learning mode.

Placing the System in Protecting Mode

Once the SCADAguardian has been in Learning mode for an appropriate amount of time, it can now be put into “Protecting” mode to begin actively monitoring the ICS environment.

To put the system into Protecting mode:

1. Click on “Settings” and go to “Learning.”
2. Under the “Network” section, click on “Protecting.”

Testing the Integration and Deployment

Before testing the integration, you should ensure that the SCADAguardian’s baseline and the learning phase is completed.

To test the Integration, please refer to the Nozomi Networks Integration Video to replicate the scenarios.

References

1. FortiGate/FortiOS Admin Guides  
   http://docs.fortinet.com/fortigate/admin-guides
2. Nozomi Networks SCADAguardian Data Sheet  
3. Nozomi Networks SCADAguardian Resources  
   http://www.nozominetworks.com/resources.html
4. Fortinet User Community  
   https://fuse.fortinet.com
5. Nozomi Networks  
   http://www.nozominetworks.com/