Segment Deployment Guide

Version: 5.2

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support@srccybersolutions.com

1. Introduction

This document describes the prerequisites and the procedure of deploying Zero Networks Segment.

Zero Networks is a revolutionary network attack prevention solution that automatically learns how your devices normally communicate and ensures network access is available only when needed – blocking all other connections, including malicious attempts to enumerate and traverse your network. By giving network access only to the devices that need it and only when they need it, Zero Networks prevents network discovery and lateral movement.

To ensure unusual but legitimate connections are not affected, Zero Network provides a bypass mechanism through a multi-factor (MFA) authentication wall on your users' mobile phones.

Zero Networks protects against both commodity threats and advanced attacks by regulating network connections, leaving threats with near zero network visibility and access. Because threats are contained, your security team saves cycles originally used to address alerts and hunt for undetected threat activity.

Our patent-pending technologies automatically learn and adapt to your network – you won't need to deal with complex rules to stay protected. There are no agents to deploy and update, or client apps that can impact end-user experiences.

2. Prerequisites

Zero Networks is a cloud network security solution and in order to operate it requires a component deployed in your network called: Segment Server.

The Segment Server machine that is installed from a deployment package that you can download from your Admin Portal.

These are the prerequisites for creating a new deployment:

2.1. Segment Server sizing

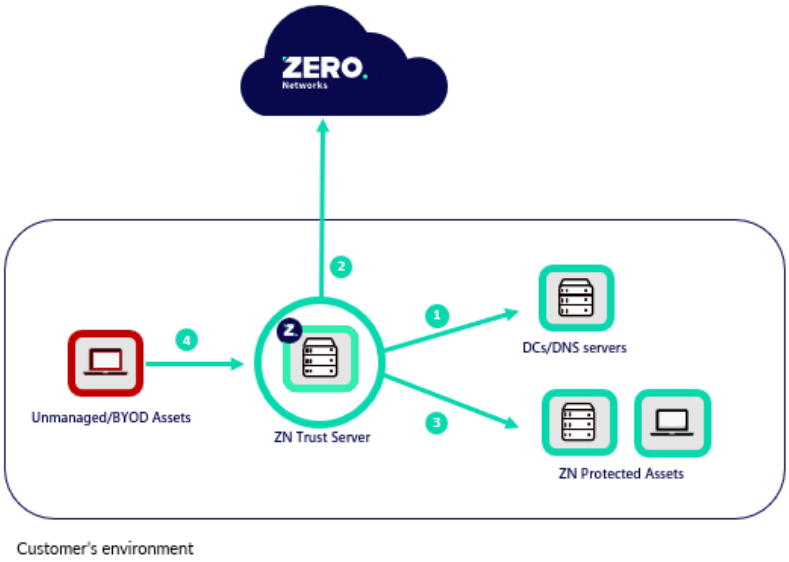
Number of machines*	CPU (cores)	Memory (GB)	HD storage (GB)	Network adapter**
1,000	2	4	100	1 GB bridged
2,000	4	8	100	1 GB bridged
5,000	8	16	100	1 GB bridged
10,000	16	16	100	1 GB bridged

* This is the number of machines that one Segment Server is protecting

** The network adapter should be bridged and NOT in a NAT configuration

2.2. Network access requirements

The following diagram and table describe the minimum ports that must be opened for the Segment Server to work properly:



1. Outbound connectivity to Domain Controllers and DNS servers:
   - LDAP – 389
   - LDAPS - 636
   - Global Catalog LDAP - 3268
   - Kerberos – 88
   - NTLM – 135/445
   - DNS - 53
2. Outbound connectivity to Zero Networks Cloud service (2 IP addresses):
   - HTTPS – 443, 30022
3. Outbound connectivity to monitored/protected assets:
   - WinRM – 5985
   - SSH - 22
4. Inbound connectivity from managed and unmanaged assets:
   - HTTPS – TCP & UDP 443

2.2.1 External network access requirements

Protocol	Transport	Port	From	To	Direction	Description
HTTPS	TCP	443	Segment Server	*.zeronetworks.com (34.74.201.149) [1]	Outbound	Used by the Segment Server to retrieve data and commands to/from the Zero Networks Segment cloud
HTTPS	TCP	443	Segment Server	monitor.zeronetworks.com (35.201.109.138) [1]	Outbound	Used by the Segment Server to send health and performance metrics to the Zero Networks Segment cloud

2.2.2 Internal network access requirements

Protocol	Transport	Port	From	To	Direction	Description
WinRM	TCP	5985	Segment Server	All Windows assets	Outbound	Used to retrieve information and control the firewall of Windows assets
SSH	TCP	22	Segment Server	All Linux assets	Outbound	Used to retrieve information and control the firewall of Linux assets
HTTPS	TCP and UDP	443	All assets	Segment Server	Inbound	Used to trigger JIT (MFA)
LDAP	TCP	389	Segment Server	Domain controllers	Outbound	
LDAPS	TCP	636	Segment Server	Domain controllers	Outbound	Used to retrieve information from Active Directory
Global Catalog LDAP	TCP	3268 and 3269	Segment Server	Domain controllers	Outbound	
Kerberos	TCP and UDP	88	Segment Server	Domain controllers	Outbound	
NTLM	TCP	135 and 445	Segment Server	Domain controllers	Outbound	Used for authentication
DNS	TCP and UDP	53	Segment Server	DNS Servers	Outbound	Used to retrieve IP and FQDN information from DNS

Note[1]: following is the complete list of all Zero Networks domains required to be accessible:

- portal.zeronetworks.com
- access.zeronetworks.com
- 2fa.zeronetworks.com
- cloud-prod-v2.zeronetworks.com
- register-prod.zeronetworks.com
- register-cloud-connector.zeronetworks.com

- cloud-connector.zeronetworks.com
- jamf-connector.zeronetworks.com
- connect-backend.zeronetworks.com
- connect-auth.zeronetworks.com
- connect.zeronetworks.com
- download.zeronetworks.com
- monitor.zeronetworks.com

Please run the following PowerShell script to test network connectivity to the hostnames and required ports: https://github.com/zeronetworks/Community/blob/master/Segment/Troubleshooting/ZNConnectivityTest.ps1

Note[2]: all communications between the Segment Server and the cloud service should bypass the proxy. In case you have proxy in your environment, see Appendix B: Proxy configuration for more details.

Note[3]: Given that Zero Networks implemented mutual authentication TLS (mTLS) to ensure security and privacy of communications with its Cloud services, some firewalls, IPS or IDPS systems might break HTTP/2 and/or gRPC communications. During setup or after installation if you see errors like "authentication handshake failed: context deadline exceeded" this is an indicator one of these systems is causing an issue. It is therefore advised to allowlist traffic towards Zero Networks Cloud services, bypassing any possible traffic inspection/interception.

2.3. Create a list of hosts to include for a PoC

If you're deploying as part of a Proof of Concept (PoC), it's good to know we can monitor & protect a selection of assets. To speed up the PoC deployment, please prepare a list of hostnames which you would like to add to the PoC. We recommend anything between 20 and 50 hosts, ideally a mix of client and server assets.

Later during the deployment, you will need to add these hostnames to a group called "**ZeroNetworksMonitoredAssets**" in AD.

2.4. Files and processes to exclude from security controls such as EDR

It's recommended to exclude the following from your EDR to avoid false positive alerts & installation failures:

- Directory: on the trust server exclude file path "C:\Program Files\Zero Networks\" and directories underneath, from file scanning.
- Process: on the assets part of the PoC a WSMPROVHOST.EXE process will be running under the context of the service account (the service account is defined during trust server setup).

In recent engagements we have seen Cisco AMP and Bitdefender remove critical files, we recommend adding exclusions to the locations/process mentioned above to prevent issues.

3. Deployment procedure

3.1. Create a Windows virtual machine

In your virtual infrastructure (Hyper-V / VMWare) create a Windows VM with the following resources:

- Operating system:
  - Windows Server 2019 (minimum build 17763) or
  - Windows Server 2022 (minimum build 20348)
- CPU: 4 cores
- RAM: 8 GB
- Hard disk: 100 GB
- Network: 1GB bridged network adapter (not NATed)

Note:

- Standard Windows installation without any special windows features
- Operating system language should be English
- The virtual machine should be domain joined
- The virtual machine should have a static IP address

3.2. Active Directory requirements

It's recommended to join the Segment server to the forest root. Zero Networks Segment supports adding additional child domains in the same forest or add additional forests and child domains.

3.3. Networking configuration

In your enterprise network firewall, open the required list of ports for the Segment Server to work properly (see Prerequisites: Ports open in network firewall).

In addition, in case you have a network proxy, see Appendix B: Proxy configuration for more details.

3.4. Provide details for first admin bootstrap user

A bootstrap user is required for the initial login to the Admin Portal prior to the integration with your environment (post initial setup and integration you will use users from your identity provider).

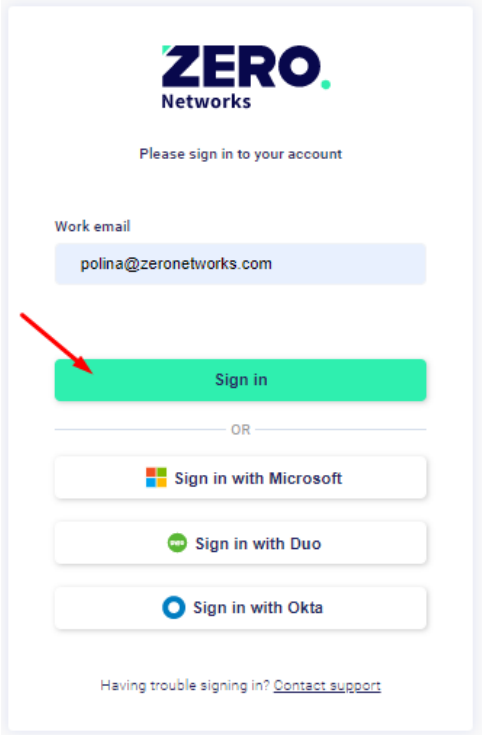
Note: the user should have access to his email to receive the verification code

Please send your Zero Networks point of contact the following details:

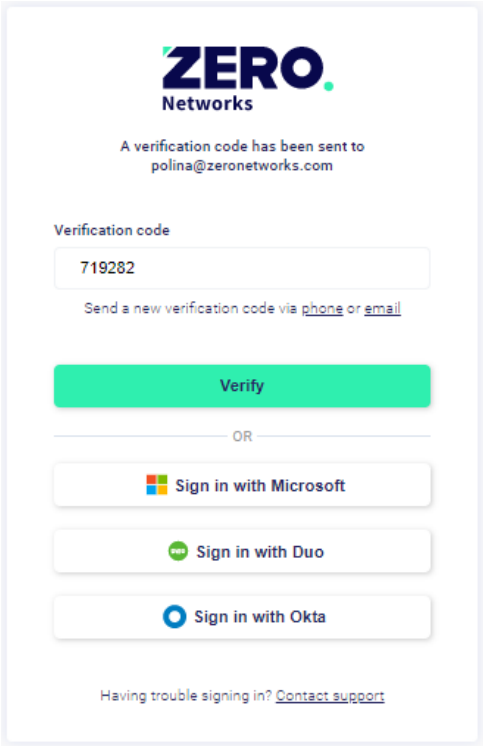
- Full name
- Email address

3.5. Download Zero Networks Segment Server deployment package

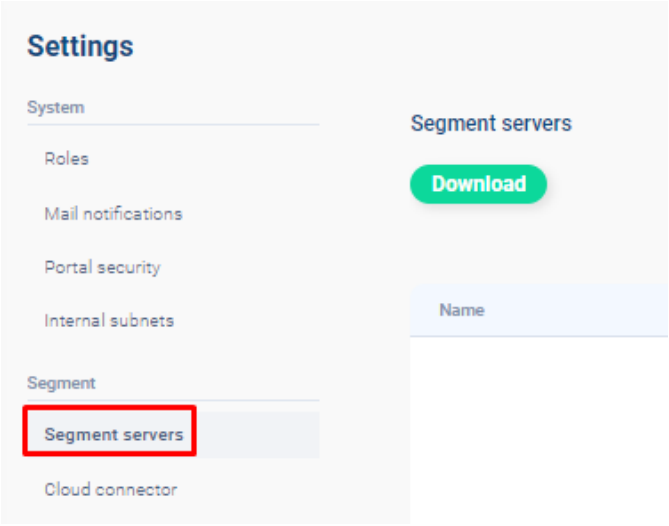
- Browse to portal.zeronetworks.com and login with your email → click **sign in**



- Authenticate with the code that was sent to your email → click **verify**



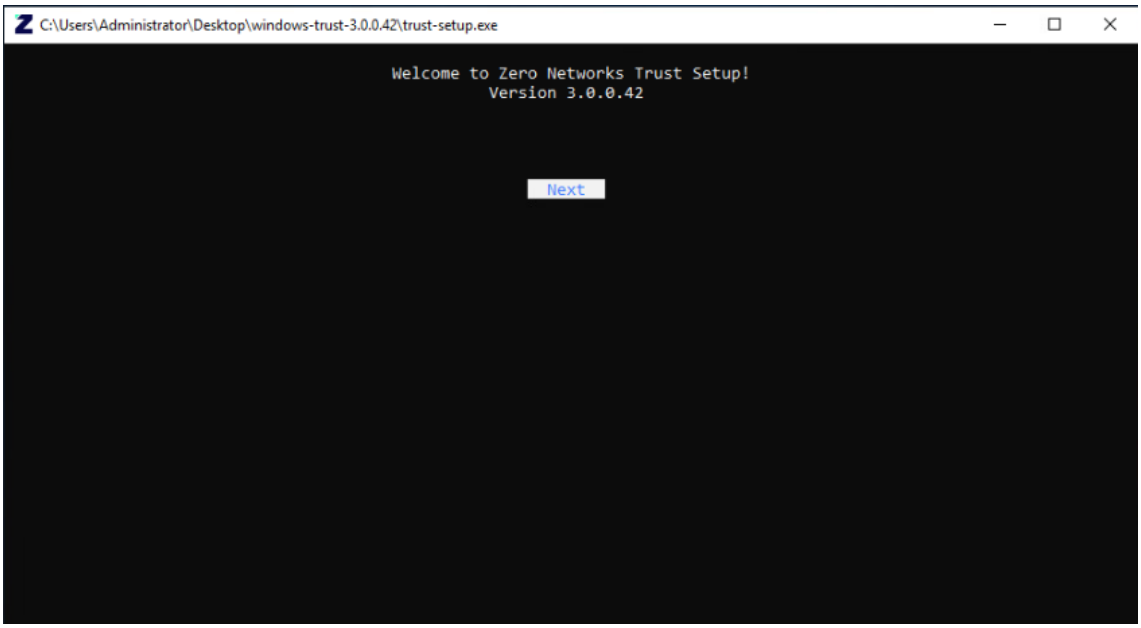
- Navigate to **Settings** → **Segment** → **Segment servers** → click **Download**



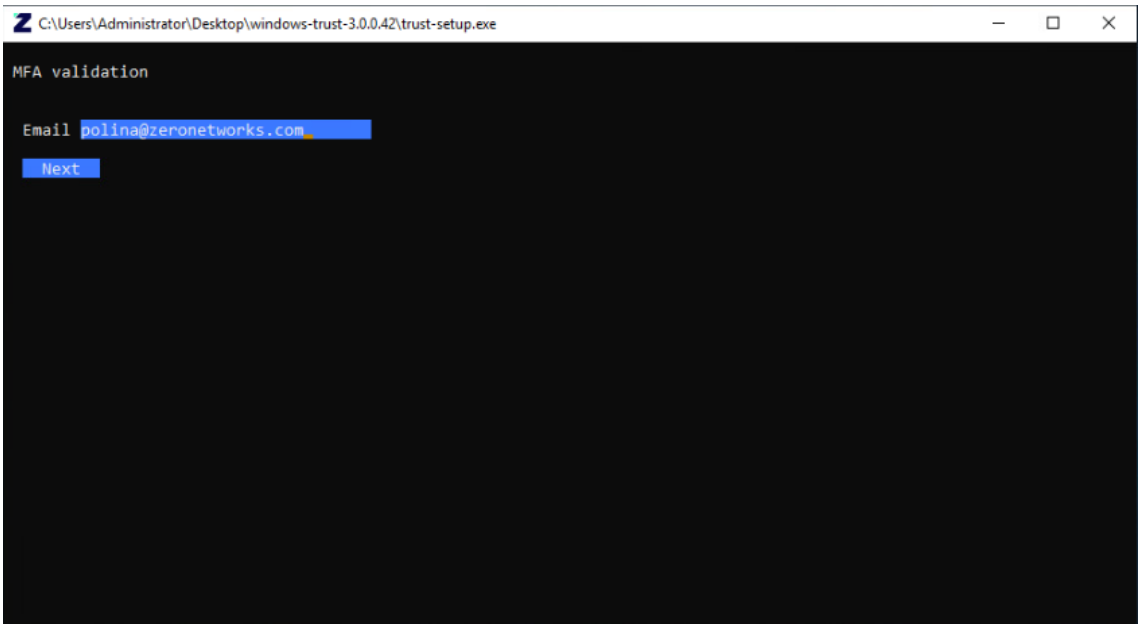
3.6. Run setup

- Copy the downloaded deployment package to the C drive on the Segment Server
- Run trust-setup.exe
    - **Note:** the user should be a domain admin

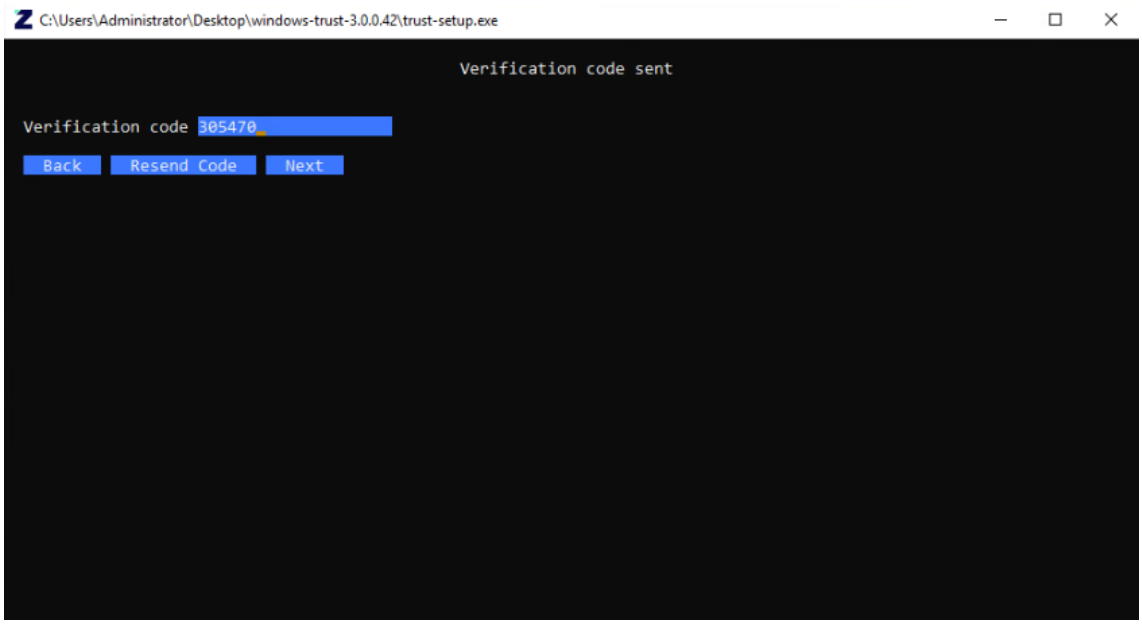
- Click “Next” to start the setup



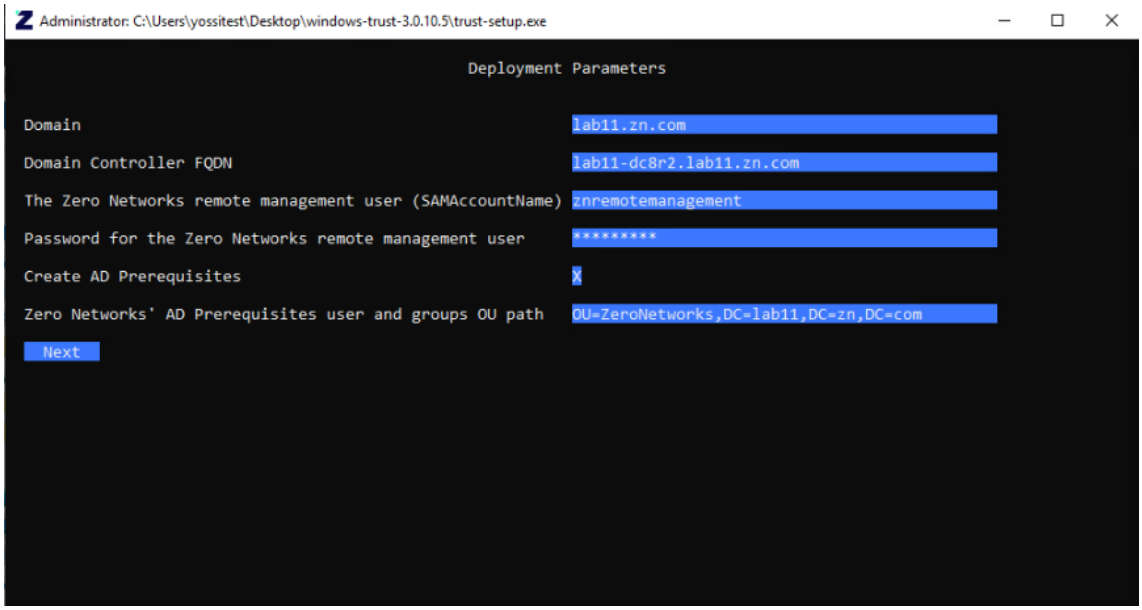
- Authenticate with the first admin bootstrap user (this is the user you used to login to the admin portal to download the setup)



- Enter the verification code



- Fill in the deployment parameters

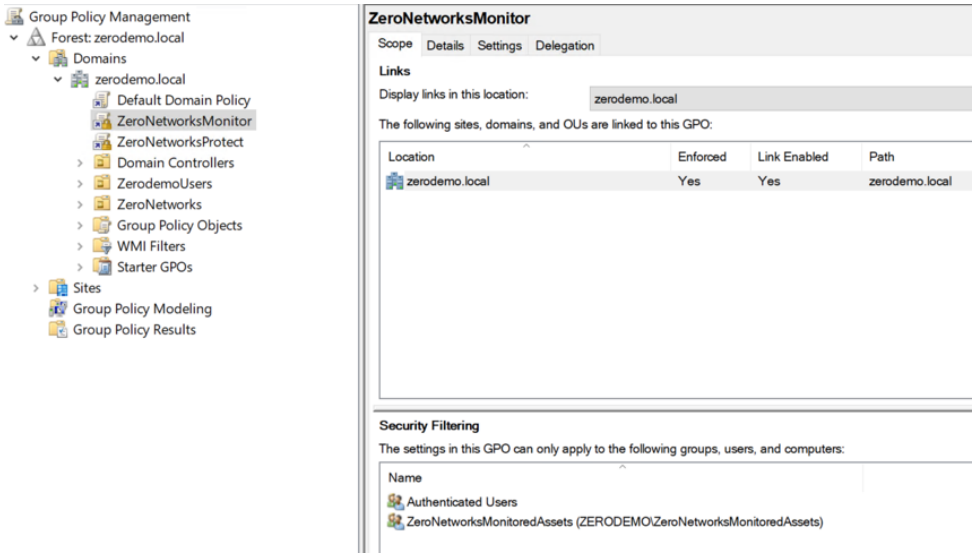


Note: The "**Create AD prerequisites**" option will create the following in Active Directory:

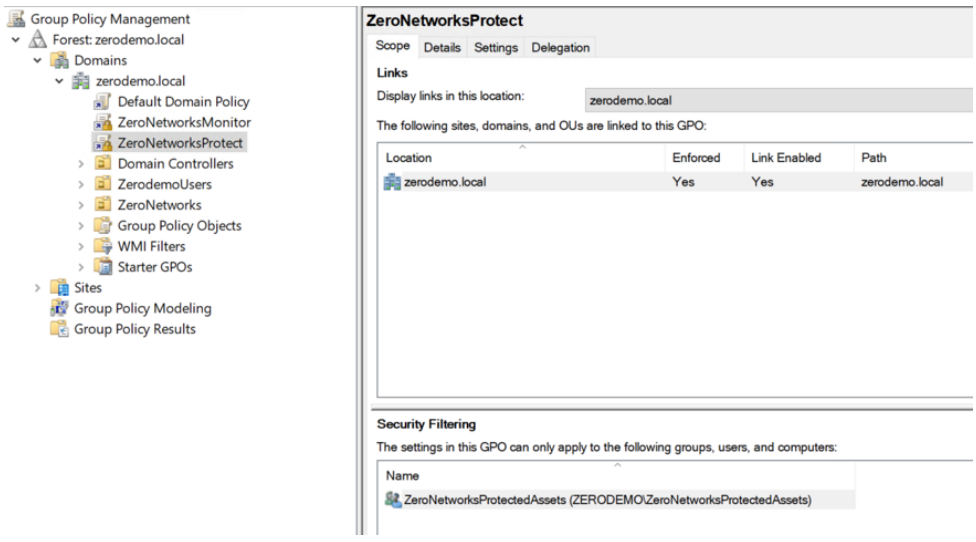
- 1 user ("**ZNRemoteManagment**") – this user will be granted permissions to perform remote firewall operations through WinRM
- 3 groups
  - "**ZeroNetworksMonitoredAssets**" – contains all computers to be monitored by Zero Networks – manually managed by the customer

- "**ZeroNetworksProtectedAssets**" – contains all computers protected by Zero Networks – automatically managed by Zero Networks when an asset moves to protection mode
- "**ZNRemoteManagementGroup**" – contains the "**ZNRemoteManagment**" user, used in various GPO setting for WinRM permissions and hardening

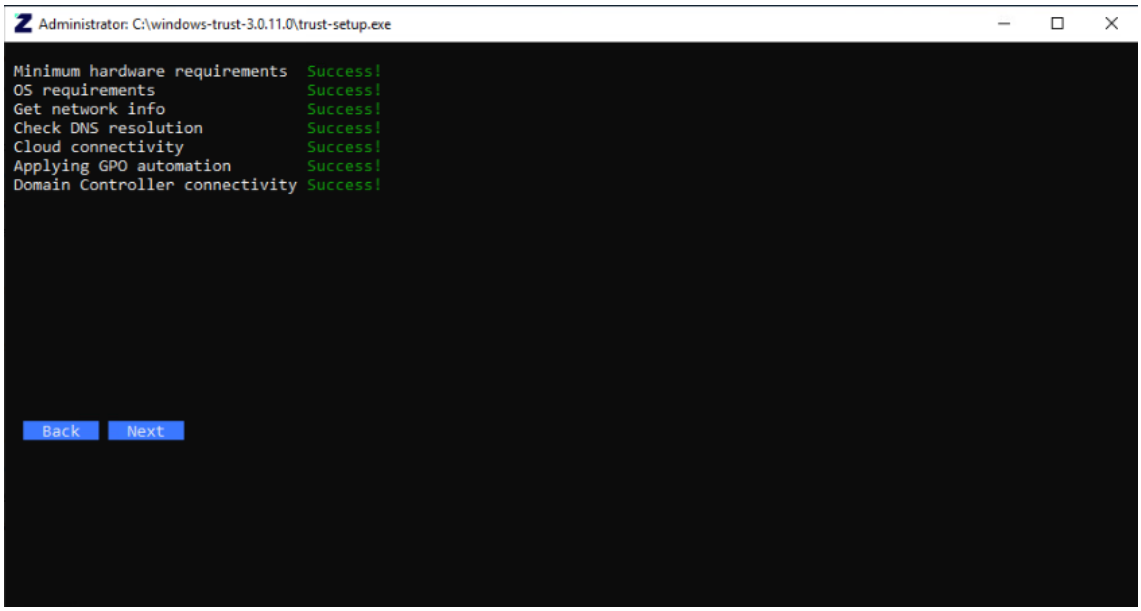
- 2 GPOs
  - "**ZeroNetworksMonitor**" – enables the Segment Server to remotely monitor the assets (by default will be applied to the **Authenticated Users** and "**ZeroNetworksMonitoredAssets**" group)



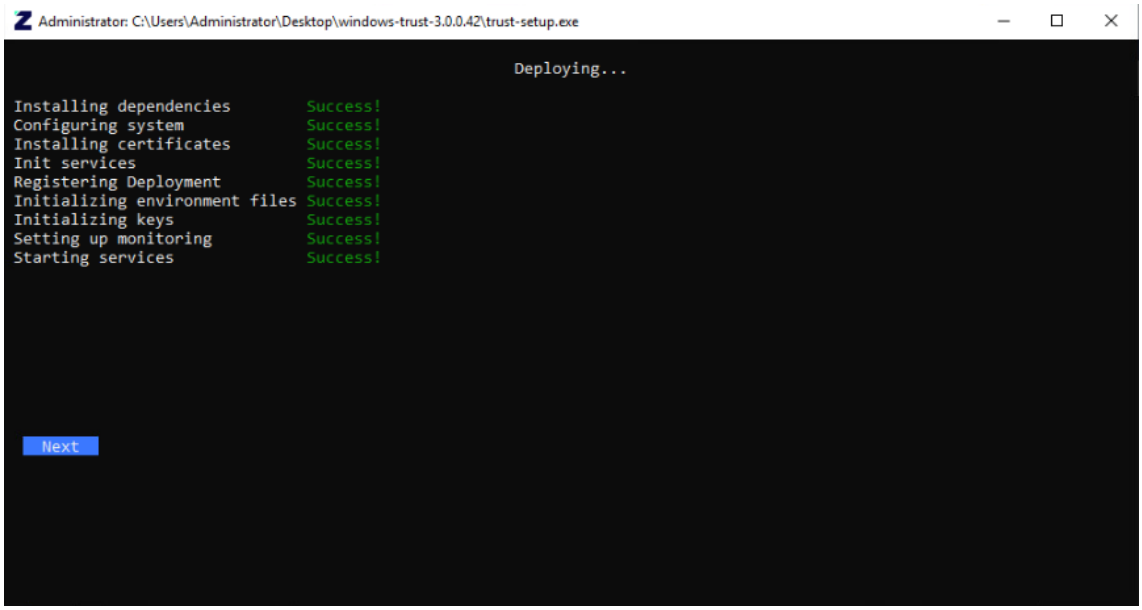
  - "**ZeroNetworksProtect**" – turns on the host-based firewall of assets in the assigned group and hardens important firewall configuration, will only be applied to assets in the "**ZeroNetworksProtectedAssets**"



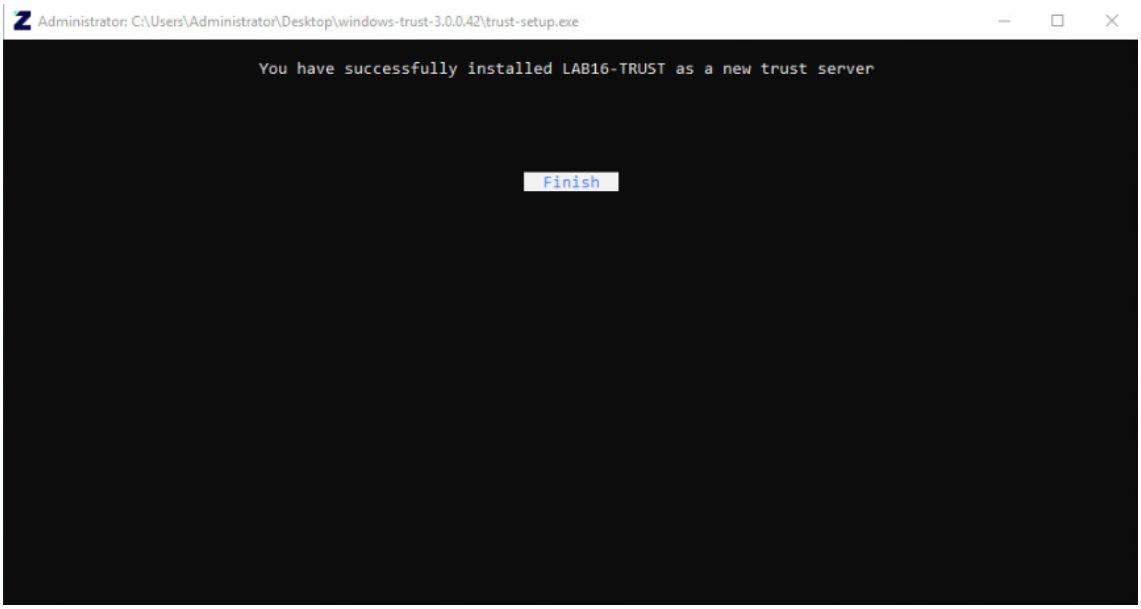
- Wait for all the tests to pass successfully



- Wait for the deployment to finish successfully



- Click “Finish” to exit setup



Appendix A: Recommended GPO hardening

For security reasons, it's recommended to harden the following settings in the **ZeroNetworksMonitor** GPO in case they are not already hardened by another GPO and don't conflict with your needs:

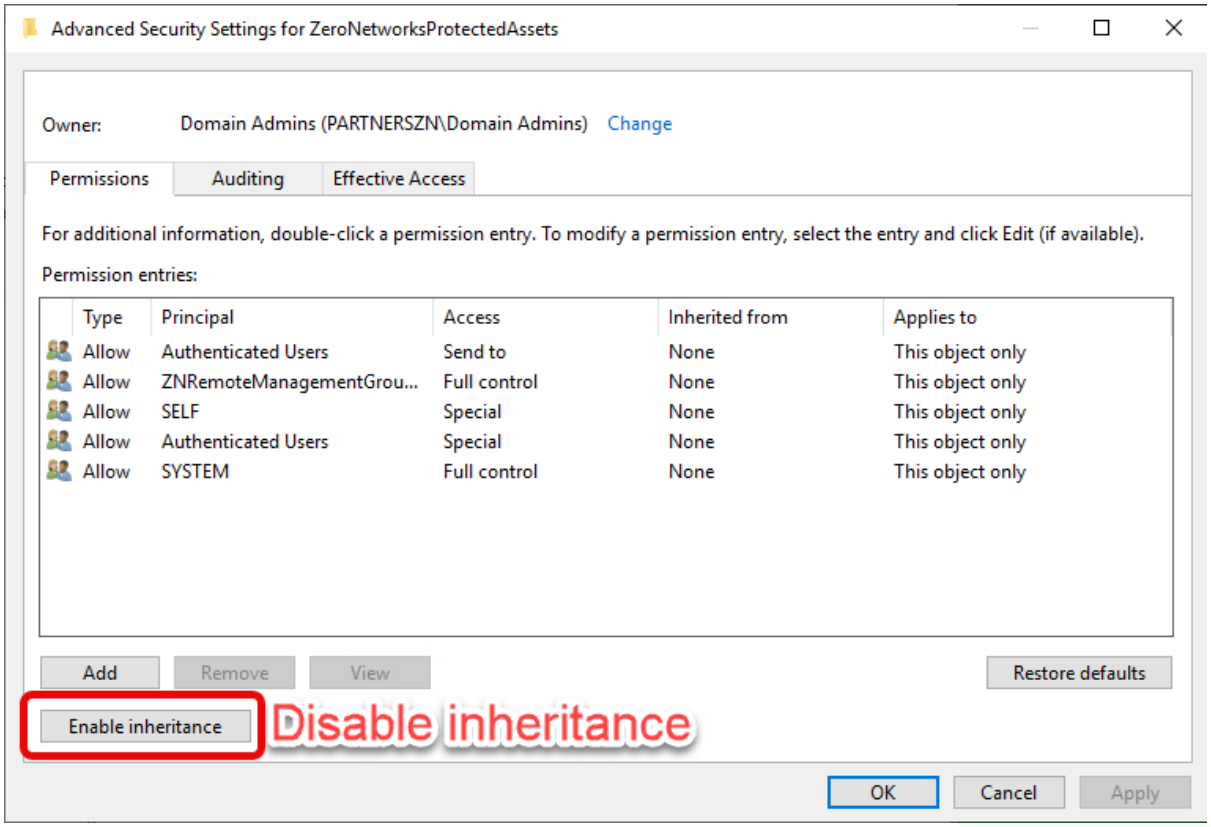
Setting	Setting Path	Setting Value
Safeguard the Zero Networks User and Groups	Computer Configuration\Policies\Windows Settings\Security Settings\Local Policies\User Rights Assignment\Deny log on locally	ZNRemoteManagementGroup
	Computer Configuration\Policies\Windows Settings\Security Settings\Local Policies\User Rights Assignment\Deny log on through Remote Desktop Services	ZNRemoteManagementGroup
WinRM Configuration	Computer Configuration\Policies\Administrative Templates: Policy definitions (ADMX files) retrieved from the local machine\Windows Components\Windows Remote Management (WinRM)\WinRM Service\Allow Basic Authentication	Disabled
	Computer Configuration\Policies\Administrative Templates: Policy definitions (ADMX files) retrieved from the local machine\Windows Components\Windows Remote Management (WinRM)\WinRM Service\Allow unencrypted traffic	Disabled

Appendix B: AD Group Hardening

Only the Zero Networks service account should add machines to the Zero Networks Protected Assets AD group. Moving systems into this group outside of the portal will cause systems to block all Inbound and Outbound connections resulting in dropped network connections and unwanted behavior. To prevent this unwanted behavior, it is recommended to remove permissions from all other groups in AD.

Permissions required:

- SYSTEM – Full Control
- ZNRemoteManagement Group – Full Control
- Authenticate Users – Read



Appendix B: Proxy configuration

To make sure your Segment Server is routing properly through the proxy, you should configure the environment variables required for the proxy:

```
HTTP_PROXY = http://<proxy_server_ip>:<port>
HTTPS_PROXY = https://<proxy_server_ip>:<port>
NO_PROXY = localhost, 127.0.0.1
ZN_SKIP_CONN_TEST = true
```

Note: in some cases, a reboot of the server is required after adding the environment variables.

To verify that the Segment Server is routing outbound traffic via the configured proxy, find the process ID of Zero Networks Remote service using the following command:

```
Get-Service | ? {$_.Name -match "^zn"}
```

```
PS C:\Users\administrator.TEACHJING> Get-Service | ? {$_.Name -match "^zn"}

Status   Name               DisplayName
------   ----               -----------
Running  znad               Zero Networks ActiveDirectoryManager
Running  znadmin            Zero Networks Admin
Running  znansiblemanager   Zero Networks AnsibleManager
Running  znconfig           Zero Networks Config
Running  znwinrm            Zero Networks RemoteManager
```

Look at all outbound connections from the Segment Server and verify they are routing through the proxy by referencing the process ID from the previous command.

```
netstat -ano | findstr <processID>
```

```
PS C:\Users\jing> tasklist| findstr Remote
ZeroNetworks.Trust.Remote     7484 Services                   0    126,488 K
ZeroNetworks.Trust.Remote     7396 Services                   0     27,524 K
PS C:\Users\jing> netstat -ano | findstr 7484
  TCP    10.60.0.189:50171      10.60.0.203:3128       ESTABLISHED     7484
  TCP    10.60.0.189:50172      10.60.0.203:3128       ESTABLISHED     7484
  TCP    10.60.0.189:50173      10.60.0.203:3128       ESTABLISHED     7484
  TCP    10.60.0.189:50174      10.60.0.203:3128       ESTABLISHED     7484
  TCP    10.60.0.189:50175      10.60.0.203:3128       ESTABLISHED     7484
  TCP    10.60.0.189:50176      10.60.0.203:3128       ESTABLISHED     7484
  TCP    10.60.0.189:50177      10.60.0.203:3128       ESTABLISHED     7484
  TCP    10.60.0.189:50178      10.60.0.203:3128       ESTABLISHED     7484
  TCP    10.60.0.189:50179      10.60.0.203:3128       ESTABLISHED     7484
  TCP    10.60.0.189:50180      10.60.0.203:3128       ESTABLISHED     7484
  TCP    10.60.0.189:50183      10.60.0.203:3128       ESTABLISHED     7484
```

Proxy IP