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MikroTik RouterOS IPsec VPN with RADIUS client & Windows 2016 Server NPS backend

MIKROTIK USER MEETING
BUCHAREST – ROMANIA, OCTOBER 29, 2018

PRESENTED BY:
DANIEL TUREAN - MIKRO TRAINING SRL

About me - Daniel Turean

- Over 18 years experience in Information Technology of which 10 years in Computer Networks
- 2007 –2010 Nortel Networks beta tester
- Cisco CCNA certified since 2013
- 2012 – Started working with MikroTik RouterOS and becoming MTCNA in 2015
- Currently Certified for MTCRE, MTCWE, MTCTCE and IPv6E
- 2016 – Founded Mikro Training SRL and become MikroTik Certified Trainer no:364
- MikroTik Certified Consultant on a variety of topics based on MikroTik RouterOS.

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Agenda, technical details and implementation steps

- General information about IPsec implementation in MikroTik RouterOS
- General information regarding RADIUS Client implementation in MikroTik RouterOS
- RouterOS IPsec related option settings
- RouterOS typical IP firewall settings for IPsec tunnels
- Preparing and configuring Microsoft Windows Server 2016 NPS role to provide RADIUS Server services to MikroTik RouterOS road warriors VPN Clients.
    - Configuring the ShrewSoft VPN software client for roadwarriors.
    - Configuring the Android mobile phone for using IPsec Xauth PSK

Why IPsec?

- Provides US DoD (Department of Defense) encryption strength
- Ability to mitigate many network threats like:
  - Data theft in transit
  - Credentials sniffing in transit
  - Network based attacks
- Provides Confidentiality, Integrity and Authentication
- Cross Vendor support, IETF standard
- GDPR? … Privacy by design!!!

General information about IPsec implementation in MikroTik RouterOS

- IPsec represents the set of protocols defined by IETF to provide secure transport means of sensitive data over untrusted networks.
  - Can be divided in 3 categories
    - IKE (Internet Key Exchange) Provides authenticated keying material for ISAKMP framework. Uses port UDP 500
    - AH (Authentication Header) RFC 4302 Provides authentication and integrity (no encryption) by hashing entire packet (header + payload). Uses AH IP protocol 51 and it is incompatible with NAT!
    - ESP (Encapsulating Security Payload) RFC 4303 Provides confidentiality, authentication and integrity by encrypting the payload but leaving the IP header intact, thus surviving through NAT*. Uses ESP IP protocol 50 or UDP 4500 for NAT-T.

* NAT-T is required to pass portless IP protocol 50 through NAT

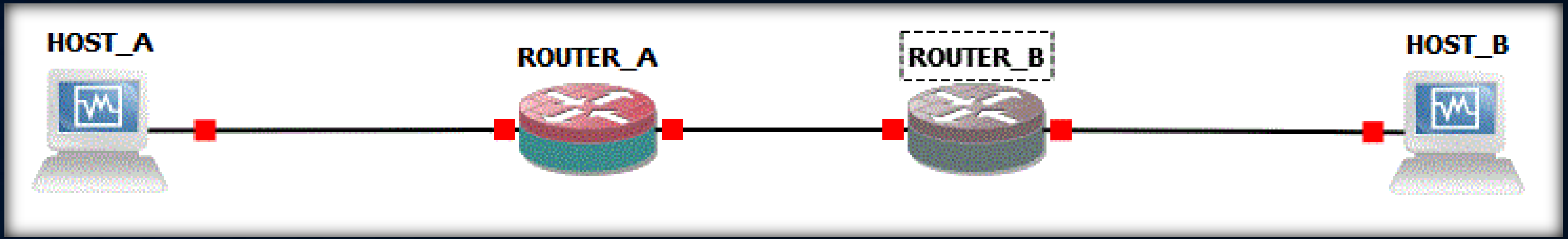
Internet Key Exchange

- Has two phases
  - **Phase 1 – IKE** Peers agree and settles for the keying material used to derive the keys for all SAs
  - **Phase 2 – IPsec (ISAKMP)** Peers establish one or more SA (depending on the unique or required option) that will be used to actually encrypt data

Note: RouterOS also supports IKEv2

Phase 1 IKE	Phase 2 IPsec
Auth Method	Ipsec Protocol
DH Group	Mode (Tun or Tap)
Encryption algorithm	Auth Method
Exchange mode	PFS (DH group)
Hash algorithm	Lifetime
NAT-T	
DPD and Lifetime	

IPsec IKE Security Association establish



- Host A (behind Router A) sends interesting traffic to Host B (behind Router B)

IKE Phase 1 kicks in

- Router A and B negotiate an IKE Phase one session

If IKE Phase 1 successful, peering Routers will start IPsec ISAKMP Phase 2

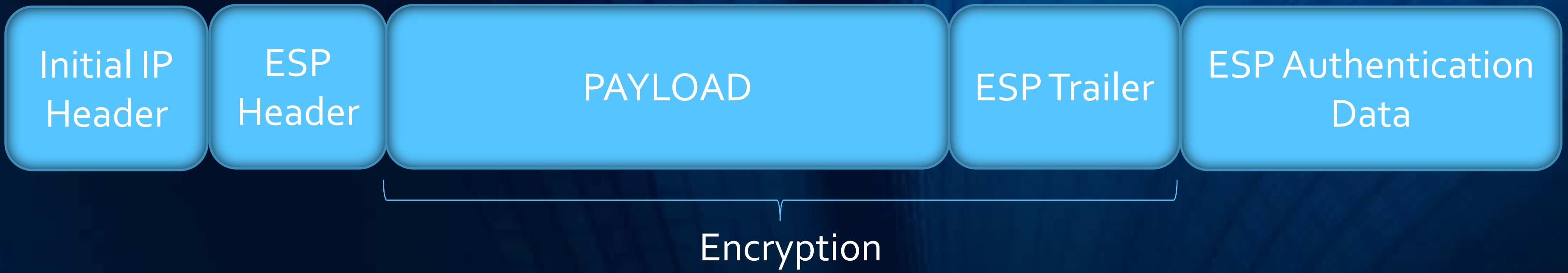
- Router A and B negotiate IPsec phase two session

If IPsec phase 2 successful, SA will be created and information exchanged via IPSEC established tunnel

Encapsulating Security Payload

USES SHARED KEYS FOR PROVIDING ENCRYPTION

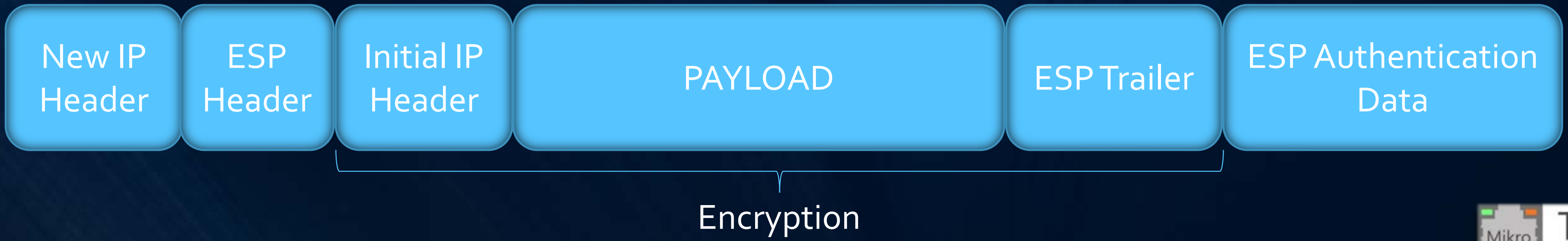
ESP Header/TRANSPORT Mode – existing between Original IP header and Payload data.



Initial IP Header | ESP Header | PAYLOAD | ESP Trailer | ESP Authentication Data

Encryption

ESP Header/TUNNEL Mode – Changes the position compared to TRANSPORT Mode, providing confidentiality to Original IP header as well.



New IP Header | ESP Header | Initial IP Header | PAYLOAD | ESP Trailer | ESP Authentication Data

Encryption

Encryption algorithms available in RouterOS

AUTHENTICATION

- MD5 - Obsolete
- SHA1 - somewhat obsolete
- SHA2 (256, 512) - Recommended

ENCRYPTION

- DES/3DES - Obsolete
- AES - 128, 256 bit keys CBC/GCM
- Blowfish
- Twofish
- Camellia - 128, 192 and 256 bit key

IKEv1 & IKEv2 comparison

IKE VERSION 1

How many Exchange messages

- 9 messages in Main Mode
- 6 messages in Aggressive Mode

PEER enforcement on Lifetime

Remote Access VPN NOT defined, implementation is by vendor specific,

- ModeConf
- XAUTH

IKE VERSION 2

How many Exchange messages

- Only 4 messages
- No Exchange modes (only 1 mode)

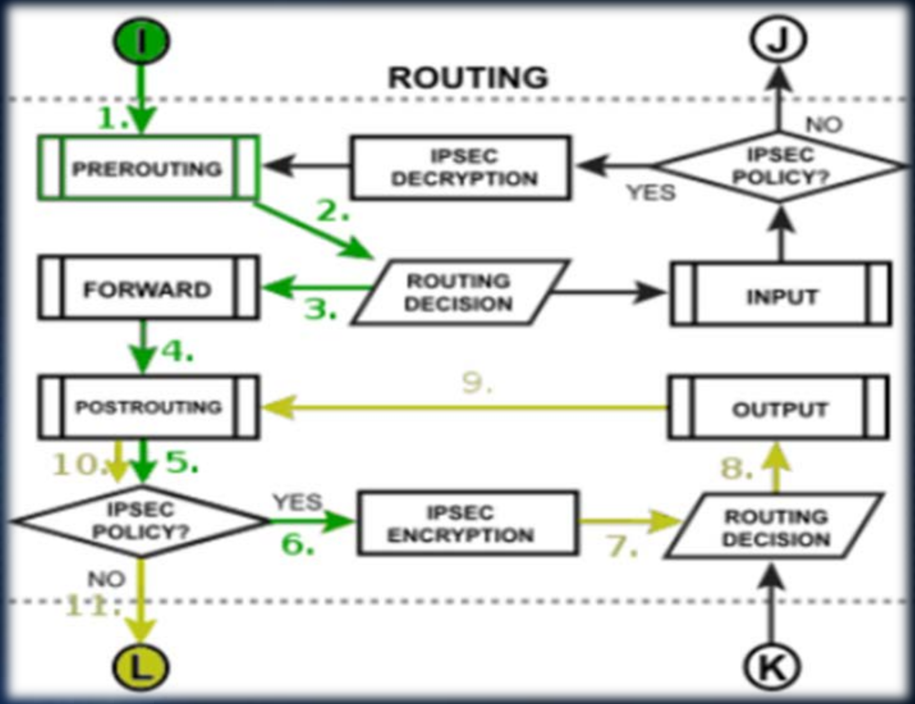
Lifetime NOT negotiated, each peer can delete SAs anytime by exchanging DELETE payloads

Remote Access VPN by default

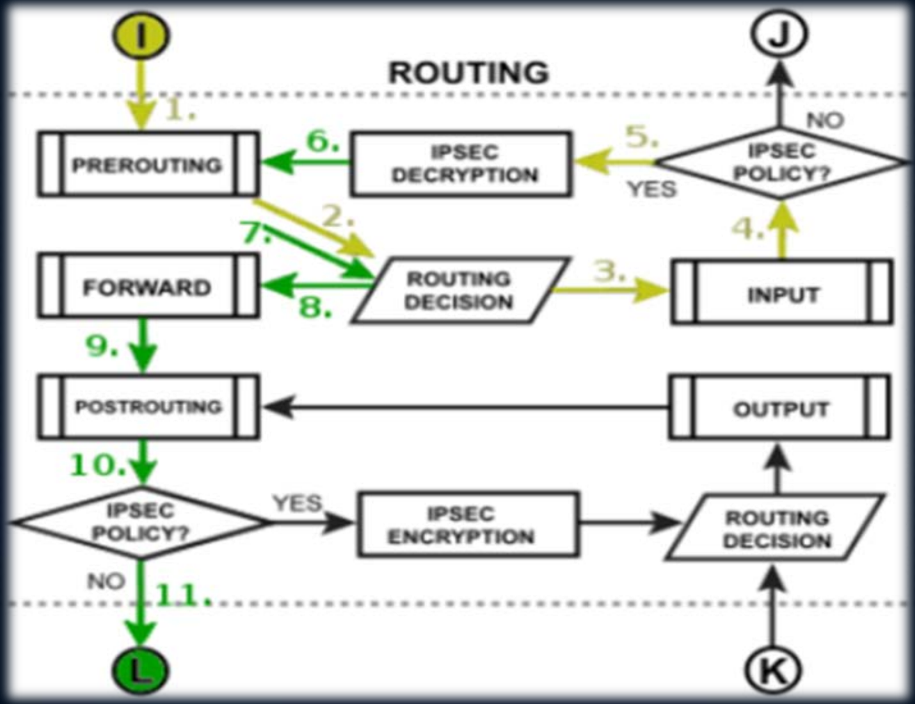
- EAP
- User authentication over EAP

Packet flow - IPsec

ENCRYPTION



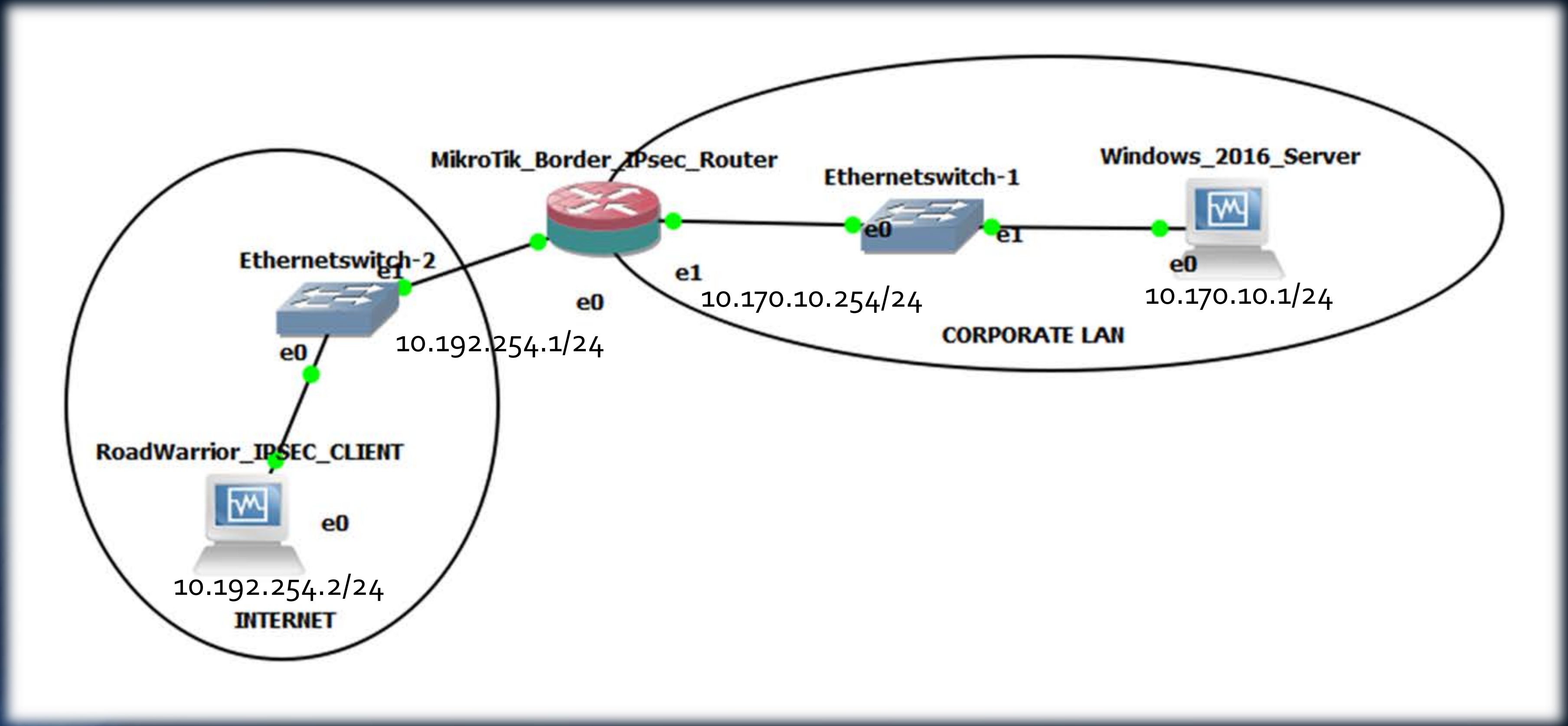
DECRYPTION



MikroTik RouterOS RADIUS Client

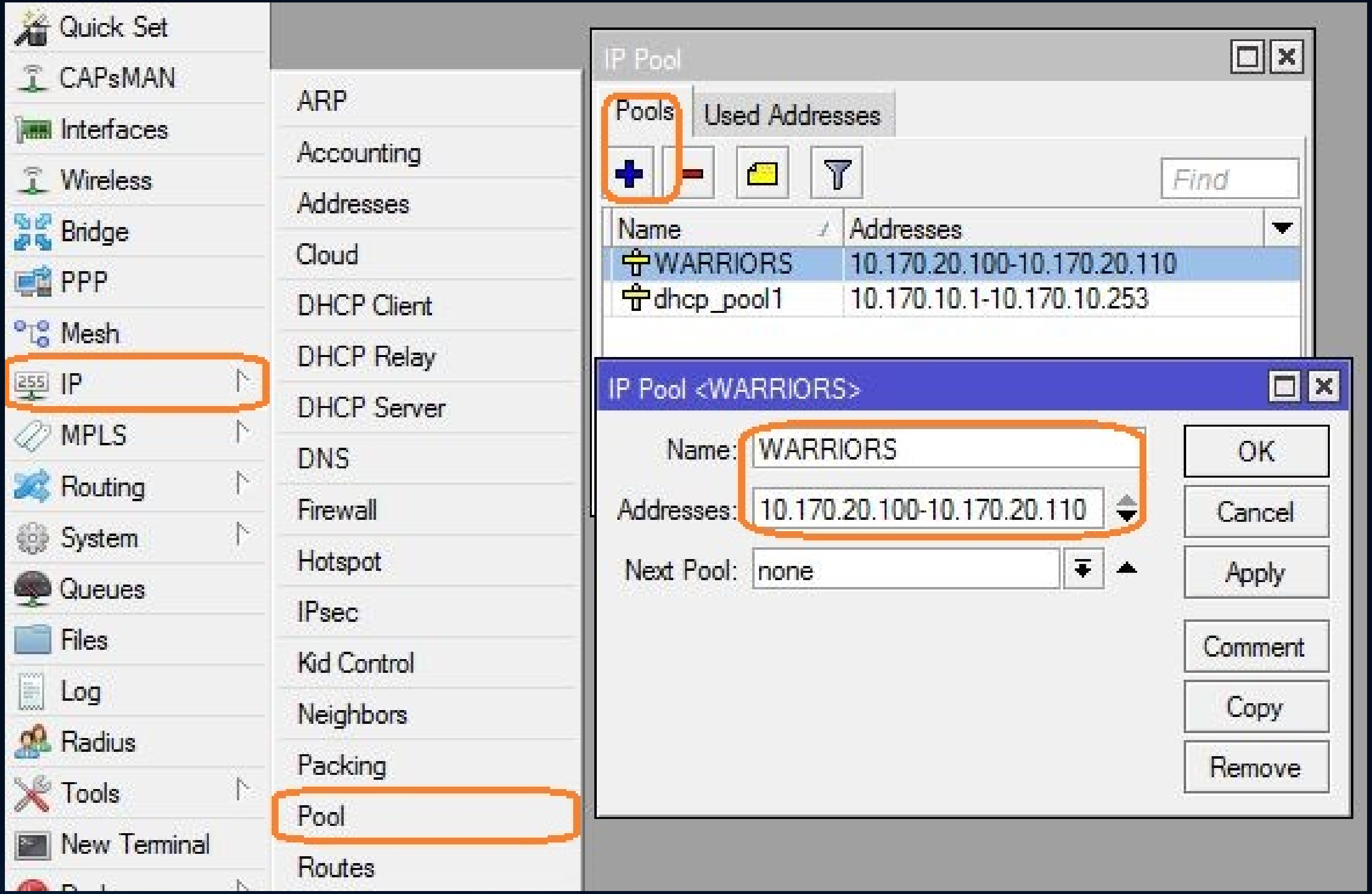
- Supports IPsec authentication along with other options like PPP, hotspot, wireless etc.
- Implements stardard RADIUS RFC 2865 and it is compatible with FreeRADIUS, XTRadius or similar servers.
- **Current limitation**: only PAP is supported for RouterOS RADIUS Ipsec
- Windows 2016 Server must have the NPS role configured in PAP mode

LAB topology and presentation scenario



RouterOS IPsec related option settings Pool

- Step 1 – Create an IP Pool for later use in IPsec Policy in order to assign IP addresses to IPsec VPN road warriors



IP Pool

Name	Addresses
WARRIORS	10.170.20.100-10.170.20.110
dhcp_pool1	10.170.10.1-10.170.10.253

IP Pool <WARRIORS>

Name: WARRIORS
Addresses: 10.170.20.100-10.170.20.110
Next Pool: none

Note: RouterOS already has the standard required configuration

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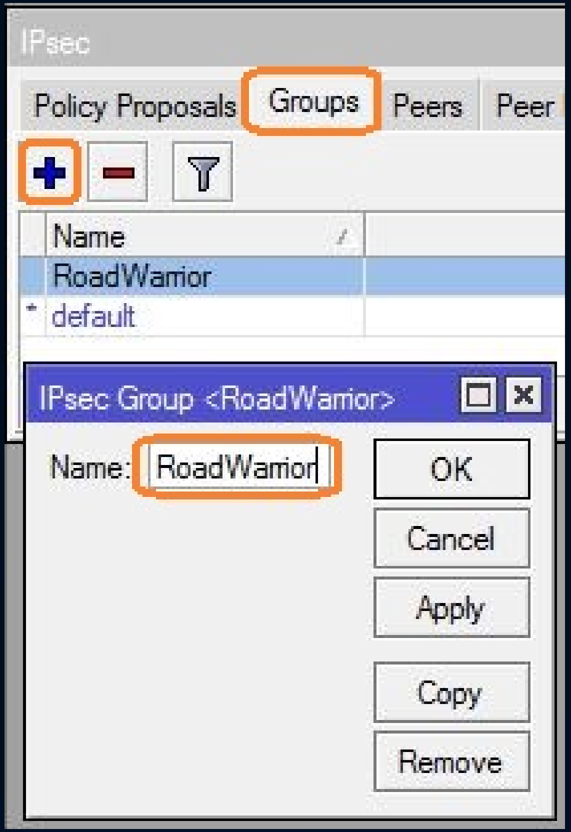
RouterOS IP IPsec menu option settings Groups

- Step 2 – Configure RoadWarrior Group that will later be invoked in the Policy template
- Starting with this slide, all remaining setttings are done in IP > IPsec menu



IPsec

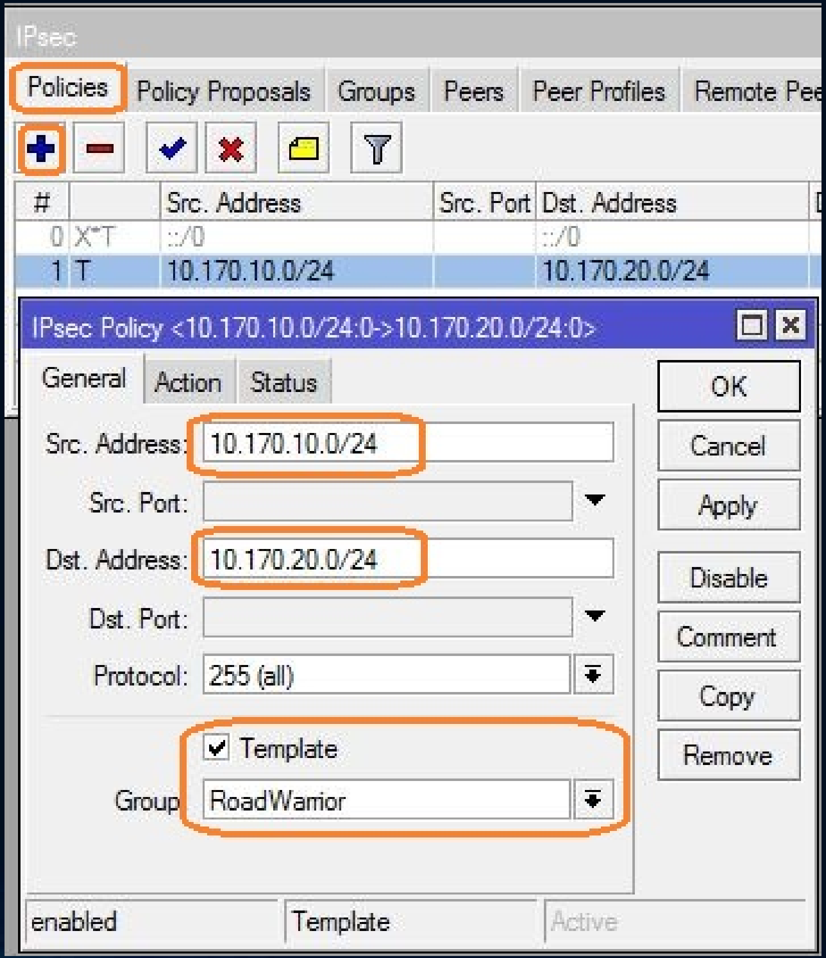
Name
RoadWarrior
* default

IPsec Group <RoadWarrior>

Name: RoadWarrior

RouterOS IP IPsec menu related option settings Policies General

- Step 3 – Policies configuration in Template mode, Src Address representing the local subnet and Dst. Address, the remote roadwarrior subnet
- We need Template option enabled because we do not know the public IP that the client will use to initiate the IKE session



#		Src. Address	Src. Port	Dst. Address
0	X*T	::/0		::/0
1	T	10.170.10.0/24		10.170.20.0/24

IPsec Policy <10.170.10.0/24:0->10.170.20.0/24:0>

Src. Address: 10.170.10.0/24

Src. Port:

Dst. Address: 10.170.20.0/24

Dst. Port:

Protocol: 255 (all)

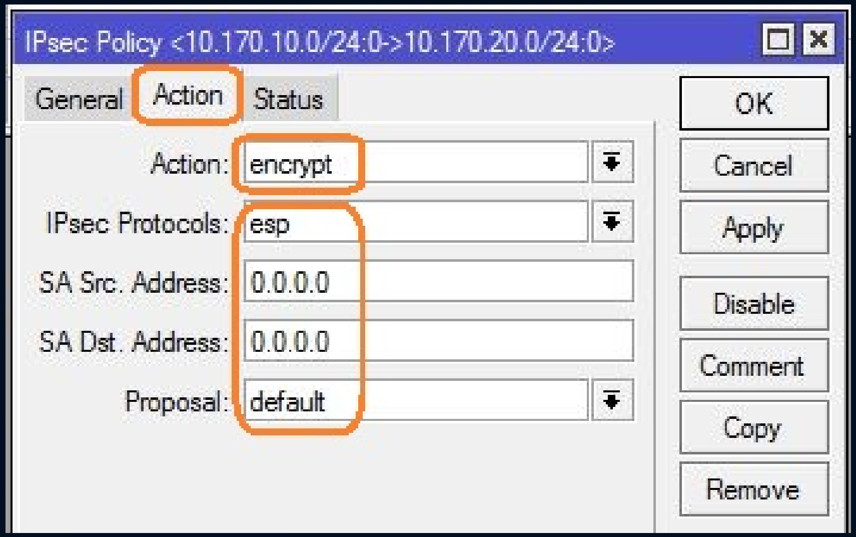
☑ Template

Group: RoadWarrior

enabled | Template | Active

RouterOS IP IPsec menu option settings Policies Action

- Step 4 – Policy Action tab is where we need to select the Action as encrypt
- IPsec protocol should be set as esp
- SA Src and Dst addresses remain unspecified to match clients connecting from anywhere
- Proposal is the default one following in the next slide



IPsec Policy <10.170.10.0/24:0->10.170.20.0/24:0>

Action: encrypt

IPsec Protocols: esp

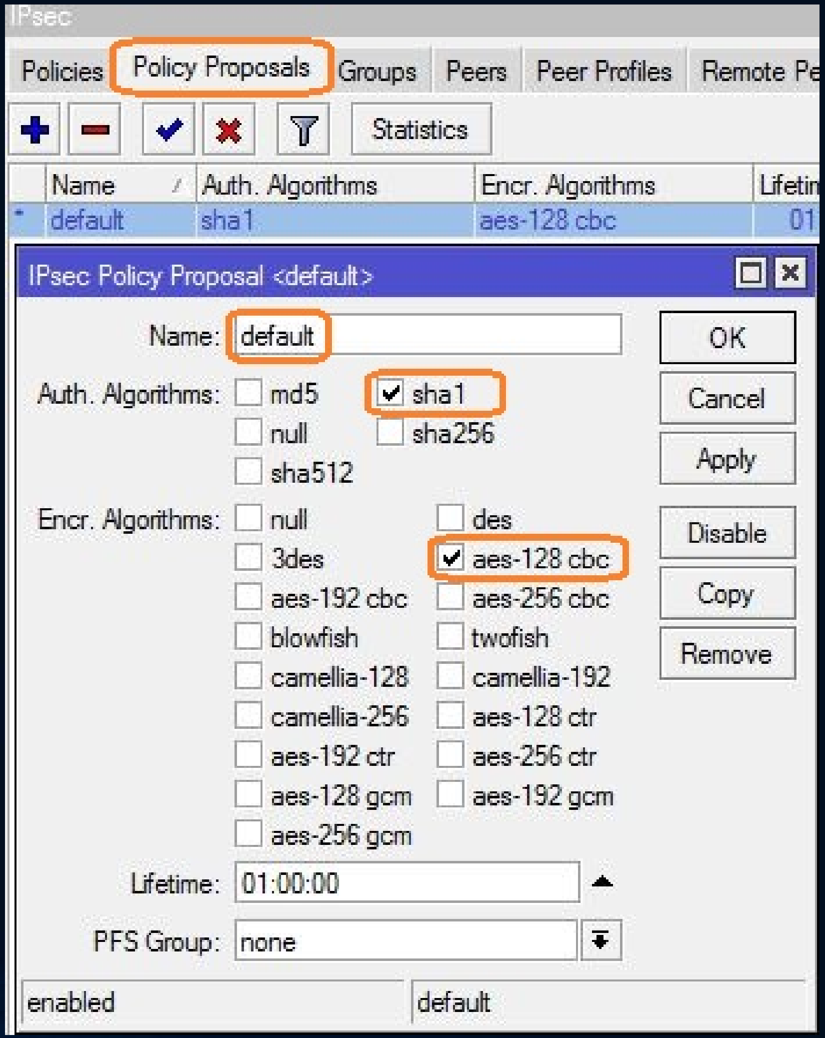
SA Src. Address: 0.0.0.0

SA Dst. Address: 0.0.0.0

Proposal: default

RouterOS IP IPsec menu related option settings Proposals

- Step 5 – Proposals can be named profiles where we declare Phase2 settings
- In our case we have edited the default policy proposal with following
  - Authentication sha1
  - Encryption aes-128 cbc (cypher block chain)
  - Lifetime of 1 hour



Name	Auth. Algorithms	Encr. Algorithms	Lifetim
* default	sha1	aes-128 cbc	01

IPsec Policy Proposal <default>

Name: default

Auth. Algorithms: □ md5 ☑ sha1 □ null □ sha256 □ sha512

Encr. Algorithms: □ null □ des □ 3des ☑ aes-128 cbc □ aes-192 cbc □ aes-256 cbc □ blowfish □ twofish □ camellia-128 □ camellia-192 □ camellia-256 □ aes-128 ctr □ aes-192 ctr □ aes-256 ctr □ aes-128 gcm □ aes-192 gcm □ aes-256 gcm

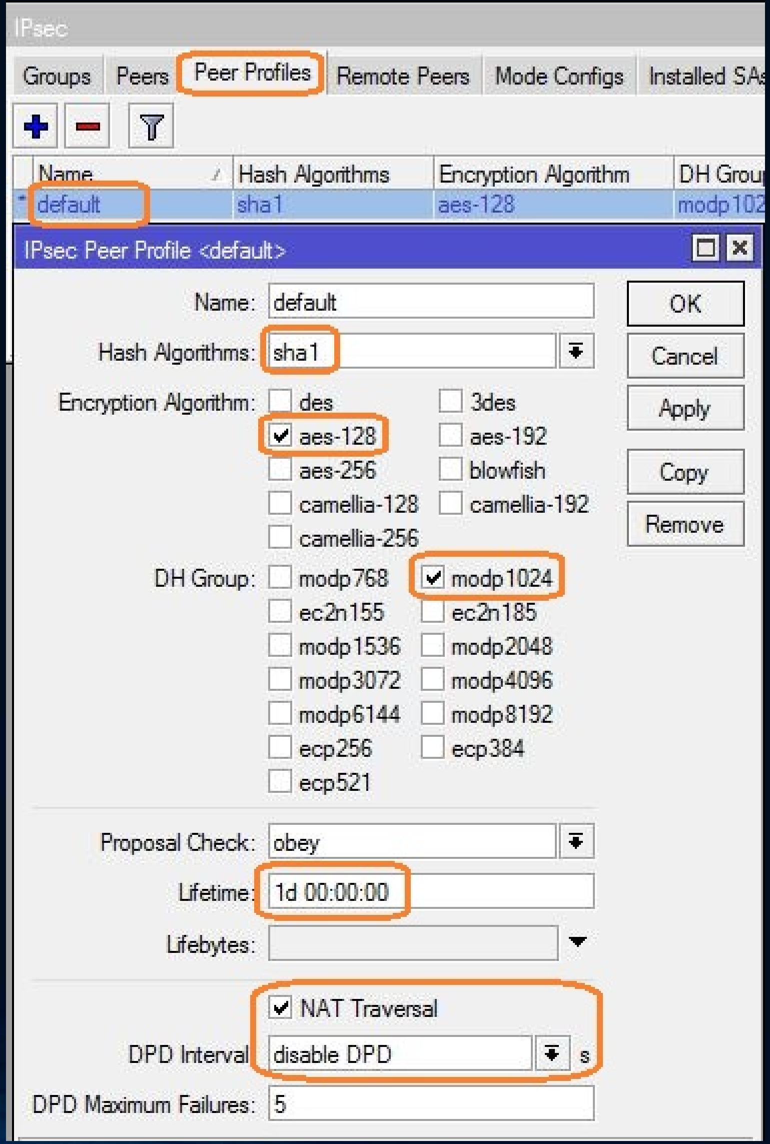
Lifetime: 01:00:00

PFS Group: none

enabled default

RouterOS IP IPsec menu related option settings Peer profiles

- Step 6 – Peer profiles are used to create Peer Phase1 encryption settings
- In our case we have edited the default peer profile, same as for the policy proposal at step 5 with settings as follow:
  - Sha1, aes-128 , modp 1024
  - Lifetime 1 day
  - NAT-T enabled



Name	Hash Algorithms	Encryption Algorithm	DH Grou
* default	sha1	aes-128	modp102

Name: default

Hash Algorithms: sha1

Encryption Algorithm: □ des □ 3des ☑ aes-128 □ aes-192 □ aes-256 □ blowfish □ camellia-128 □ camellia-192 □ camellia-256

DH Group: □ modp768 ☑ modp1024 □ ec2n155 □ ec2n185 □ modp1536 □ modp2048 □ modp3072 □ modp4096 □ modp6144 □ modp8192 □ ecp256 □ ecp384 □ ecp521

Proposal Check: obey

Lifetime: 1d 00:00:00

Lifebytes:

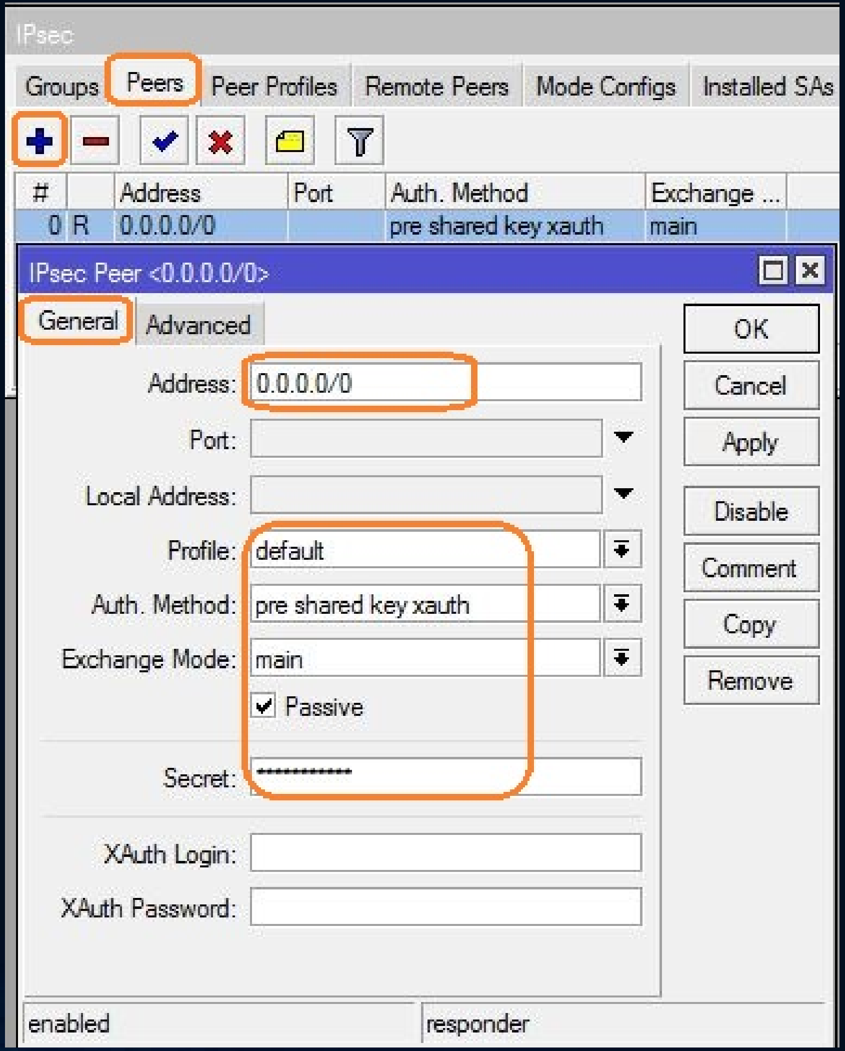
☑ NAT Traversal

DPD Interval: disable DPD s

DPD Maximum Failures: 5

RouterOS IP IPsec menu related option settings Peers

- Step 7 – Peers General tab provides settings for IPsec Peer, leaving the Address field as 0.0.0.0/0
- Profile is the default one configured at step6
- Authentication method is pre shared key Xauth
- Exchange mode main with passive mode



#		Address	Port	Auth. Method	Exchange ...
0	R	0.0.0.0/0		pre shared key xauth	main

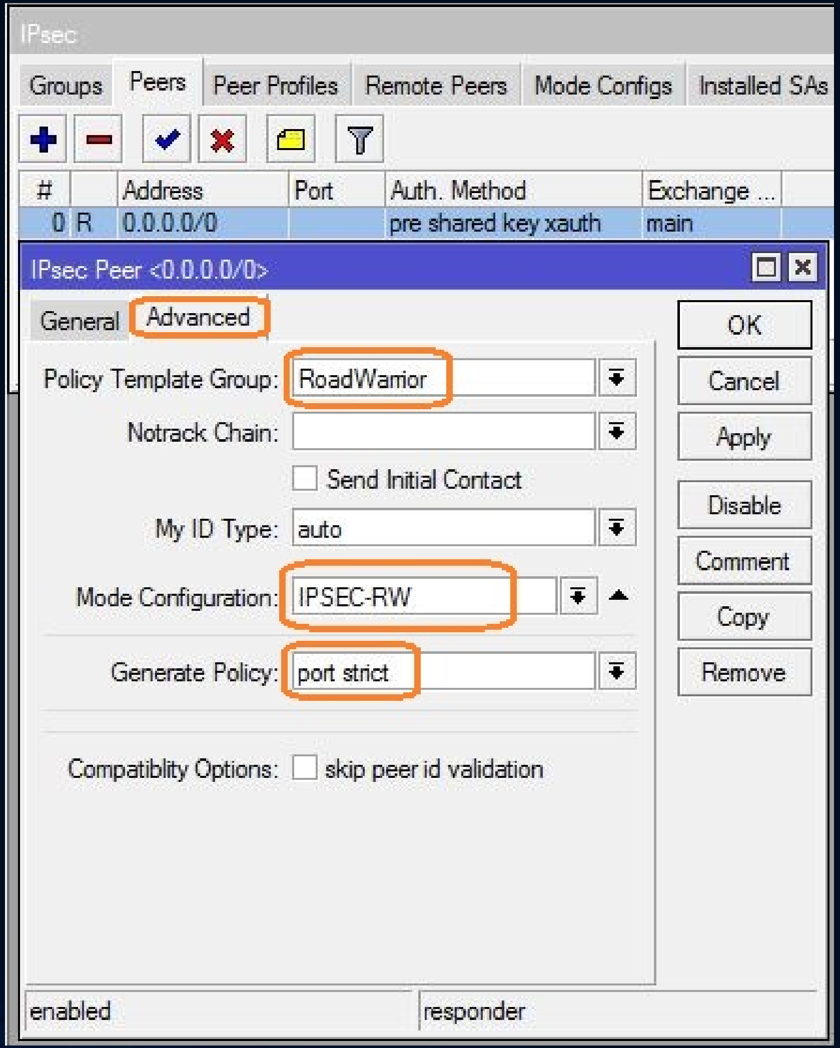
IPsec Peer <0.0.0.0/0>

Address: 0.0.0.0/0
Port:
Local Address:
Profile: default
Auth. Method: pre shared key xauth
Exchange Mode: main
☑ Passive
Secret: ************
XAuth Login:
XAuth Password:

enabled
responder

RouterOS IP IPsec menu related option settings Peers

- Step 8 – Peers Advanced tab configures Policy Template Group created at step2
- Mode Config is the one we will create in the next slide
- Generate Policy should have port strict option selected



#		Address	Port	Auth. Method	Exchange ...
0	R	0.0.0.0/0		pre shared key xauth	main

IPsec Peer <0.0.0.0/0>

Policy Template Group: RoadWarrior

Notrack Chain:

□ Send Initial Contact

My ID Type: auto

Mode Configuration: IPSEC-RW

Generate Policy: port strict

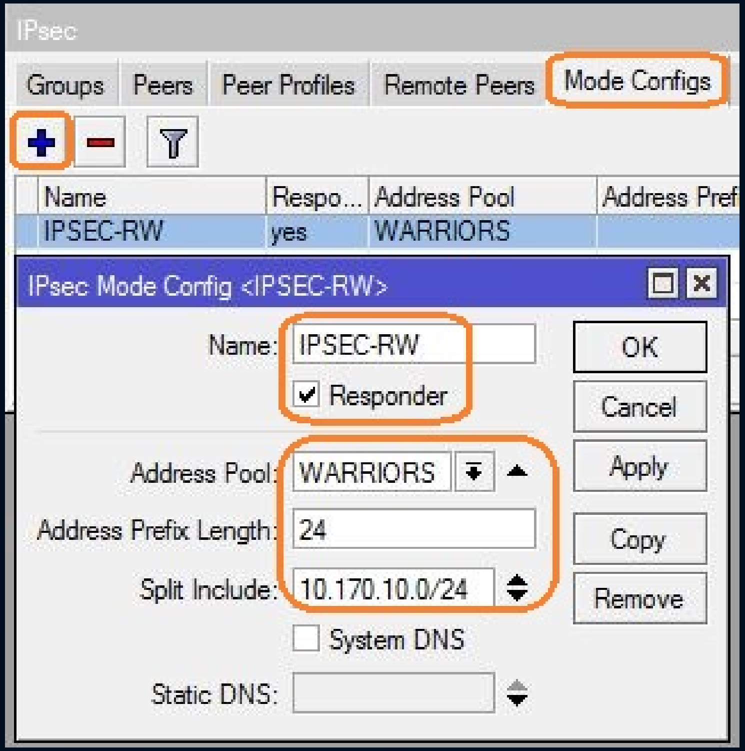
Compatiblity Options: □ skip peer id validation

enabled

responder

RouterOS IP IPsec menu related option settings Mode Configs

- Step 9 – Mode Configs tab configures ModeCfg options to be used at previous step8
- Responder must be enabled
- Must point to Address Pool created in IP Pool at 1st step
- Address prefix length represents the subnet size to be allocated to VPN clients
- Split Include represents the destinations reachable through the IPsec tunnel



Name	Respo...	Address Pool	Address Pref
IPSEC-RW	yes	WARRIORS	

IPsec Mode Config <IPSEC-RW>

Name: IPSEC-RW

☑ Responder

Address Pool: WARRIORS

Address Prefix Length: 24

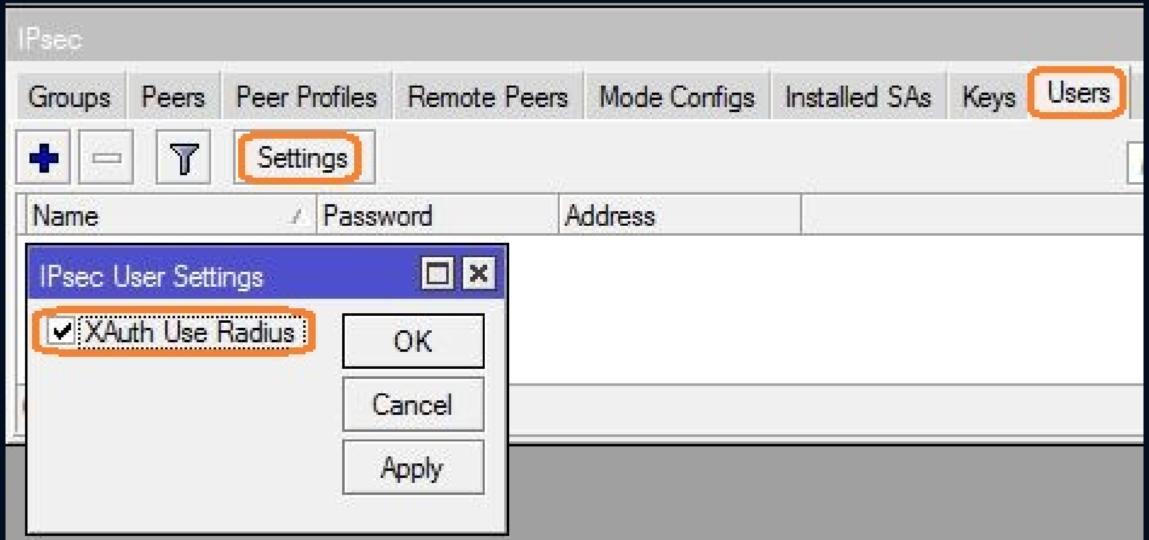
Split Include: 10.170.10.0/24

□ System DNS

Static DNS:

RouterOS IP IPsec menu related option settings Users

- Step 10 – Our last step in IPsec settings is the Users Tab, where we can manually create users for Extended Authentication mode but, we are not going to!
- Instead, we will enable Xauth Use RADIUS option in the Settings button in order to query the Microsoft Active Directory database for username and credentials

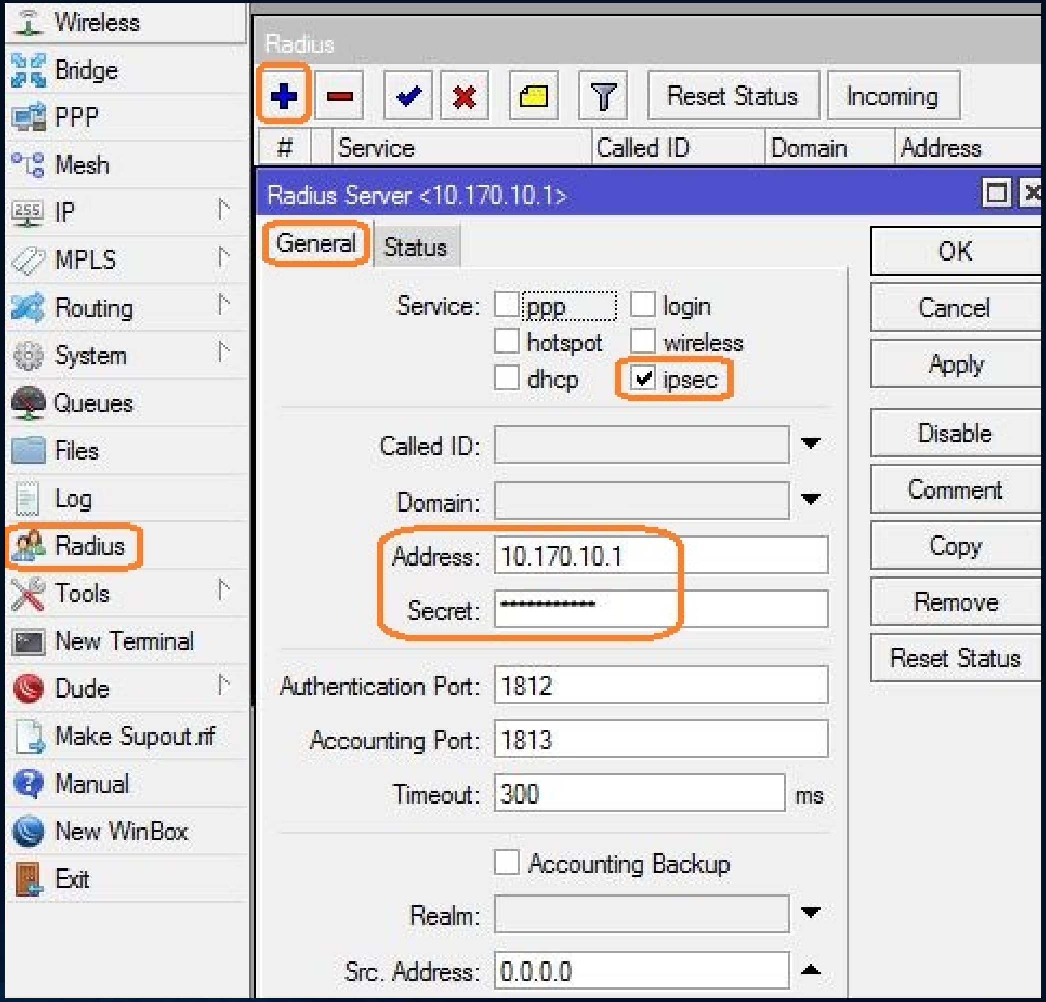


☑ XAuth Use Radius

RouterOS RADIUS Client related settings

- Step 11 - Last step is to actually configure the RADIUS Client used to query Active Directory for user credentials

- We need to enable the ipsec service for the configured RADIUS client and mention the IP address where RADIUS Server can be reached (Active Directory in our case), and also the shared secret



Radius Server <10.170.10.1>

Service: □ ppp □ login □ hotspot □ wireless □ dhcp ☑ ipsec

Called ID:

Domain:

Address: 10.170.10.1

Secret: ************

Authentication Port: 1812

Accounting Port: 1813

Timeout: 300 ms

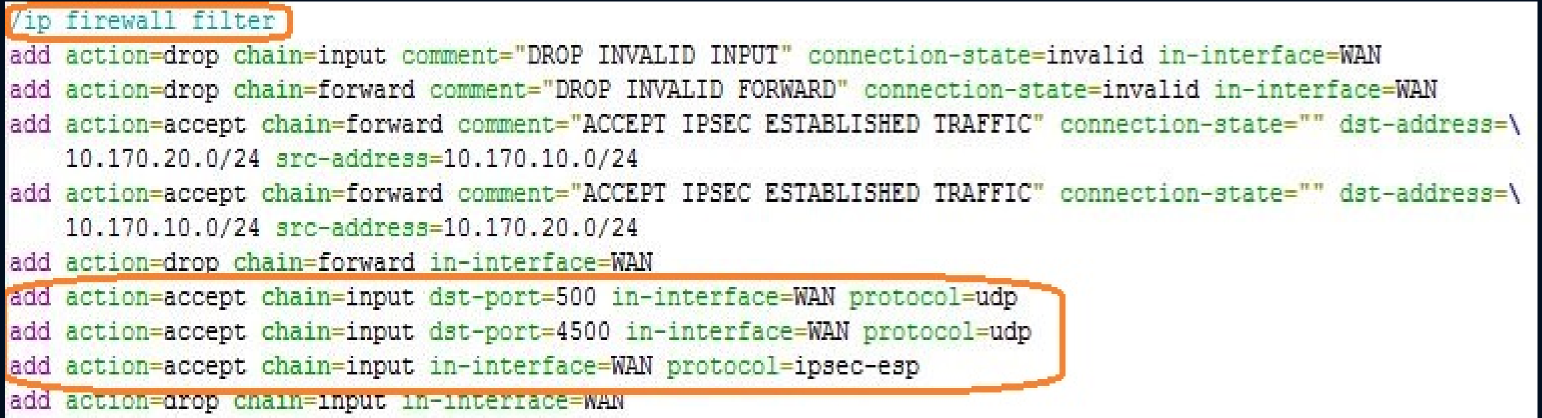
□ Accounting Backup

Realm:

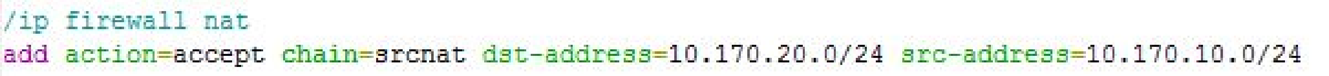
Src. Address: 0.0.0.0

RouterOS typical IP Firewall settings for IPsec tunnels

- IPsec gets more complicated if Fasttrack is used
- We need to make sure to allow ESP IP protocol 50 on the Input chain
- We need to make sure to allow UDP 500
- We need to make sure to allow UDP 4500 for NAT-T
- We also need to prevent IPsec destined traffic from being src-NATed (placed above src-NAT rule)



```
/ip firewall filter
add action=drop chain=input comment="DROP INVALID INPUT" connection-state=invalid in-interface=WAN
add action=drop chain=forward comment="DROP INVALID FORWARD" connection-state=invalid in-interface=WAN
add action=accept chain=forward comment="ACCEPT IPSEC ESTABLISHED TRAFFIC" connection-state="" dst-address=\
    10.170.20.0/24 src-address=10.170.10.0/24
add action=accept chain=forward comment="ACCEPT IPSEC ESTABLISHED TRAFFIC" connection-state="" dst-address=\
    10.170.10.0/24 src-address=10.170.20.0/24
add action=drop chain=forward in-interface=WAN
add action=accept chain=input dst-port=500 in-interface=WAN protocol=udp
add action=accept chain=input dst-port=4500 in-interface=WAN protocol=udp
add action=accept chain=input in-interface=WAN protocol=ipsec-esp
add action=drop chain=input in-interface=WAN
```

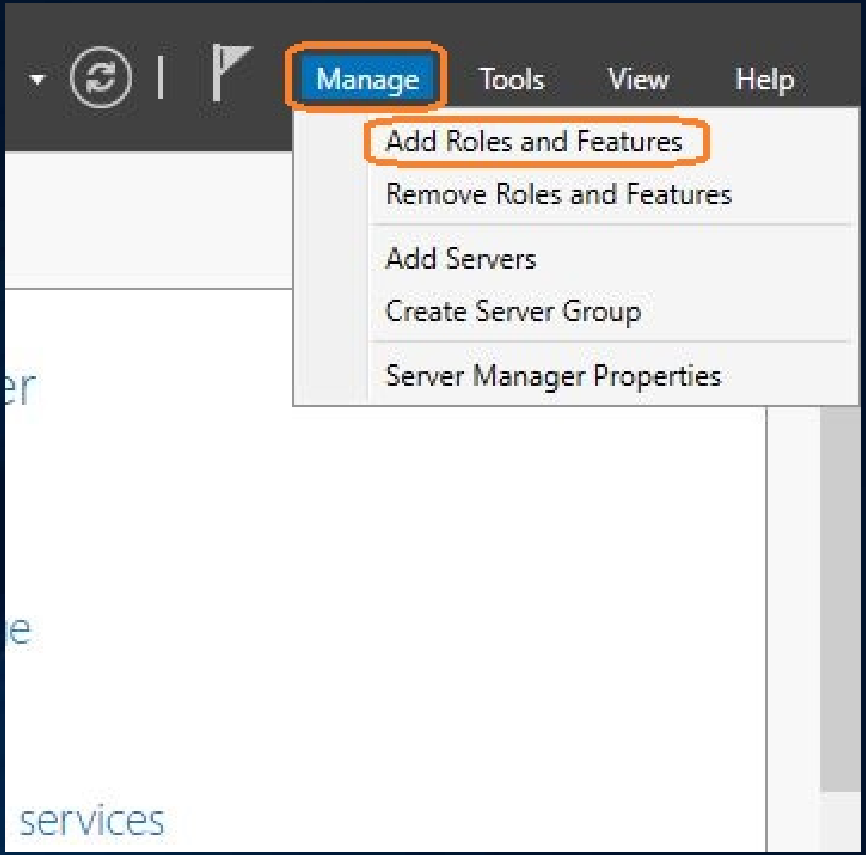


```
/ip firewall nat
add action=accept chain=srcnat dst-address=10.170.20.0/24 src-address=10.170.10.0/24
```

Preparing and configuring Microsoft Windows Server 2016 – Network Policy Server role

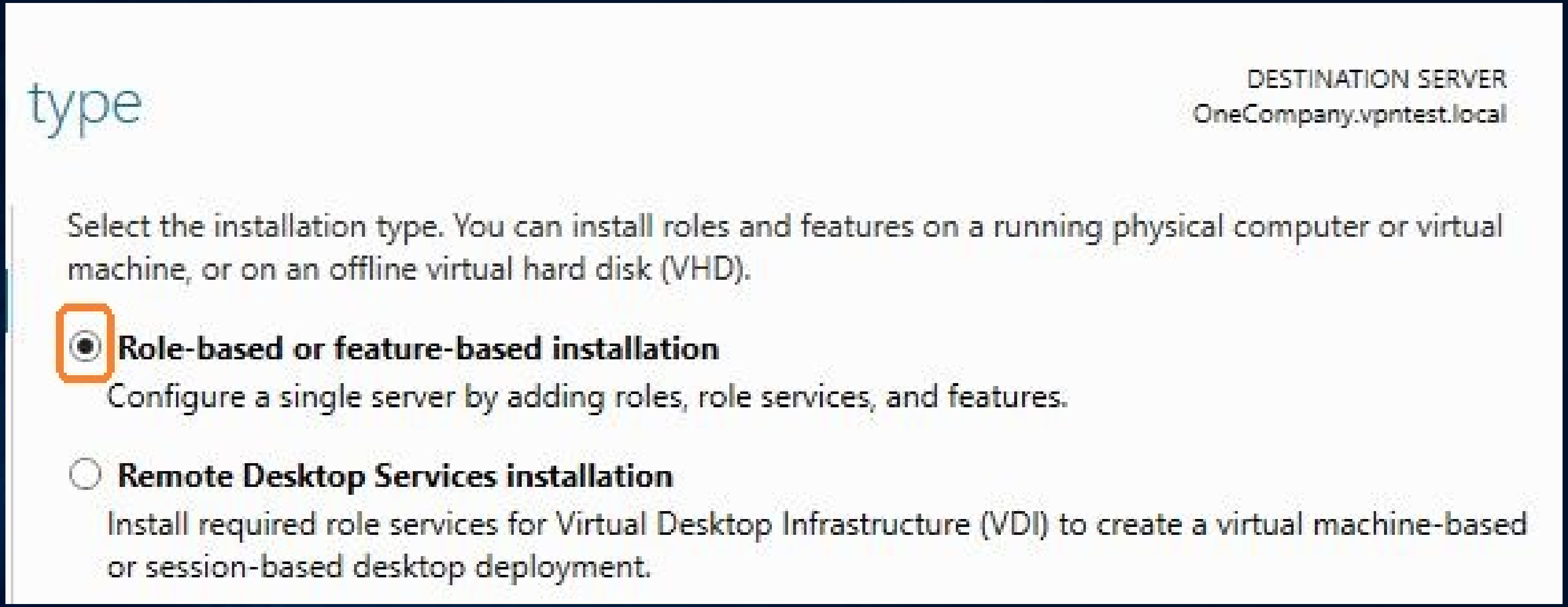
- One easy way to access the Add Roles and Features servlet is using the Server Manager in Windows Server 2016
- We will use it to add the Network Policy Server role detailed in the next slides

Note: Active Directory role is considered as already installed



Preparing and configuring Microsoft Windows Server 2016 – Network Policy Server role

- We should select Role-based or feature-based installation and select Next



type

DESTINATION SERVER
OneCompany.vpntest.local

Select the installation type. You can install roles and features on a running physical computer or virtual machine, or on an offline virtual hard disk (VHD).

● **Role-based or feature-based installation**
Configure a single server by adding roles, role services, and features.

○ **Remote Desktop Services installation**
Install required role services for Virtual Desktop Infrastructure (VDI) to create a virtual machine-based or session-based desktop deployment.

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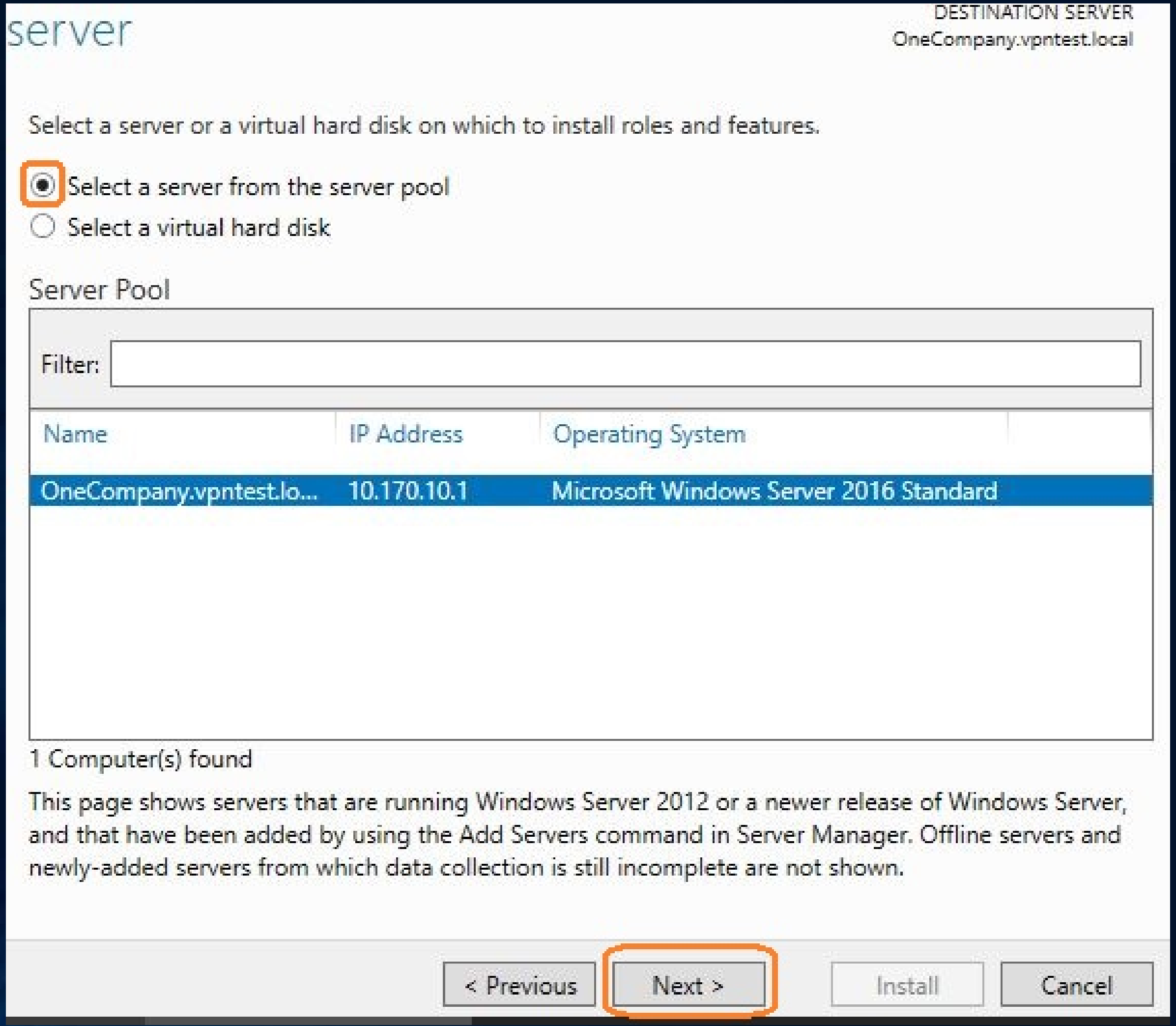
Preparing and configuring Microsoft Windows Server 2016 – Network Policy Server role

- We should leave the selection as default and go to Next menu



server

DESTINATION SERVER
OneCompany.vpntest.local

Select a server or a virtual hard disk on which to install roles and features.

● Select a server from the server pool

○ Select a virtual hard disk

Server Pool

Filter:

Name	IP Address	Operating System
OneCompany.vpntest.lo...	10.170.10.1	Microsoft Windows Server 2016 Standard

1 Computer(s) found

This page shows servers that are running Windows Server 2012 or a newer release of Windows Server, and that have been added by using the Add Servers command in Server Manager. Offline servers and newly-added servers from which data collection is still incomplete are not shown.

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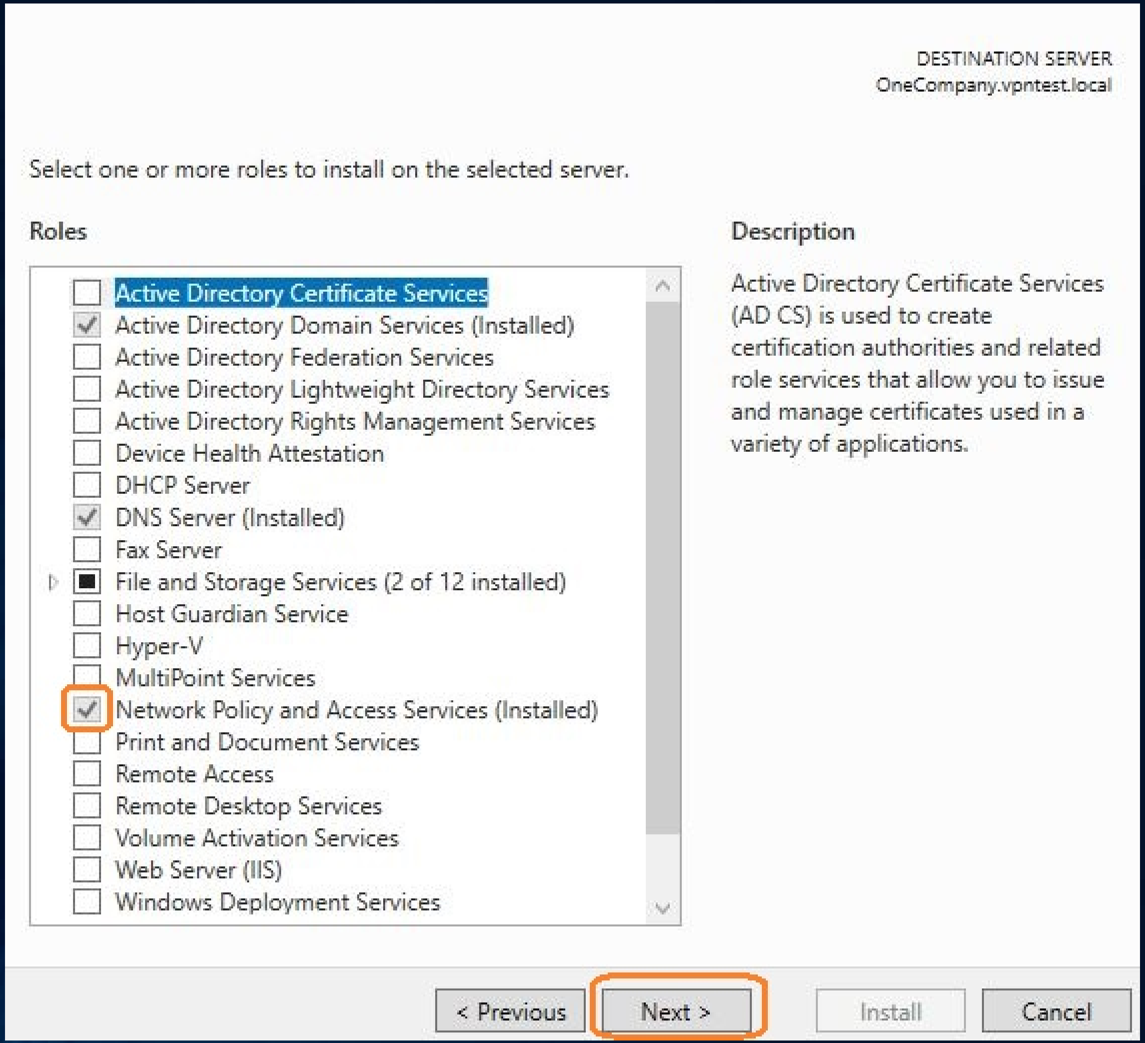
Preparing and configuring Microsoft Windows Server 2016 – Network Policy Server role

- We should select Network Policy and Access Services and continue with Next menu



DESTINATION SERVER
OneCompany.vpntest.local

Select one or more roles to install on the selected server.

Roles

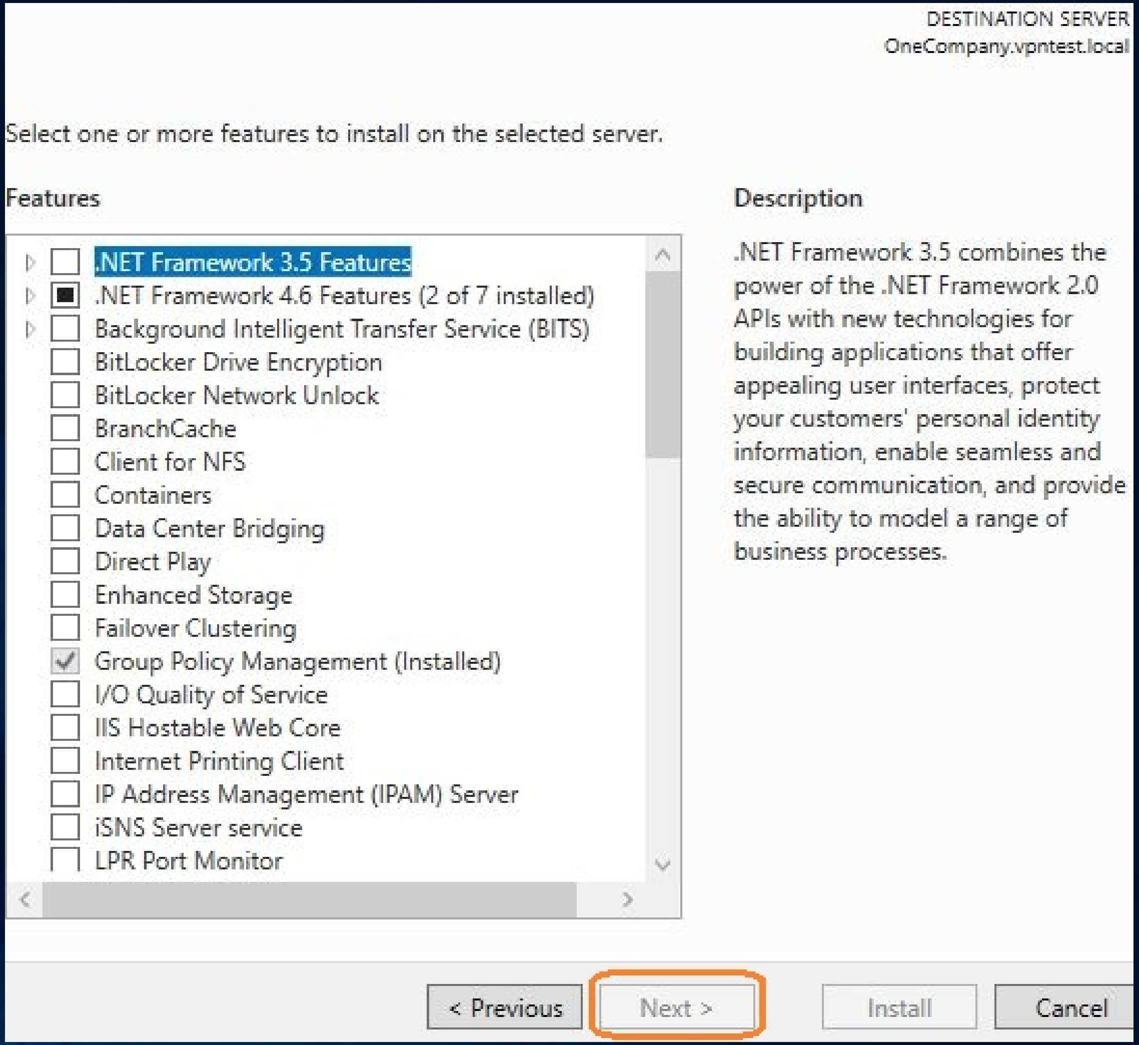
- □ Active Directory Certificate Services
- ☑ Active Directory Domain Services (Installed)
- □ Active Directory Federation Services
- □ Active Directory Lightweight Directory Services
- □ Active Directory Rights Management Services
- □ Device Health Attestation
- □ DHCP Server
- ☑ DNS Server (Installed)
- □ Fax Server
- ■ File and Storage Services (2 of 12 installed)
- □ Host Guardian Service
- □ Hyper-V
- □ MultiPoint Services
- ☑ Network Policy and Access Services (Installed)
- □ Print and Document Services
- □ Remote Access
- □ Remote Desktop Services
- □ Volume Activation Services
- □ Web Server (IIS)
- □ Windows Deployment Services

Description

Active Directory Certificate Services (AD CS) is used to create certification authorities and related role services that allow you to issue and manage certificates used in a variety of applications.

Preparing and configuring Microsoft Windows Server 2016 – Network Policy Server role

- We have no option to select on the Features part of the configuration so we just go with Next on this one
- On the next configuration menu we only need to review and click the Install button to actually start the NPS role installation.



DESTINATION SERVER
OneCompany.vpntest.local

Select one or more features to install on the selected server.

Features

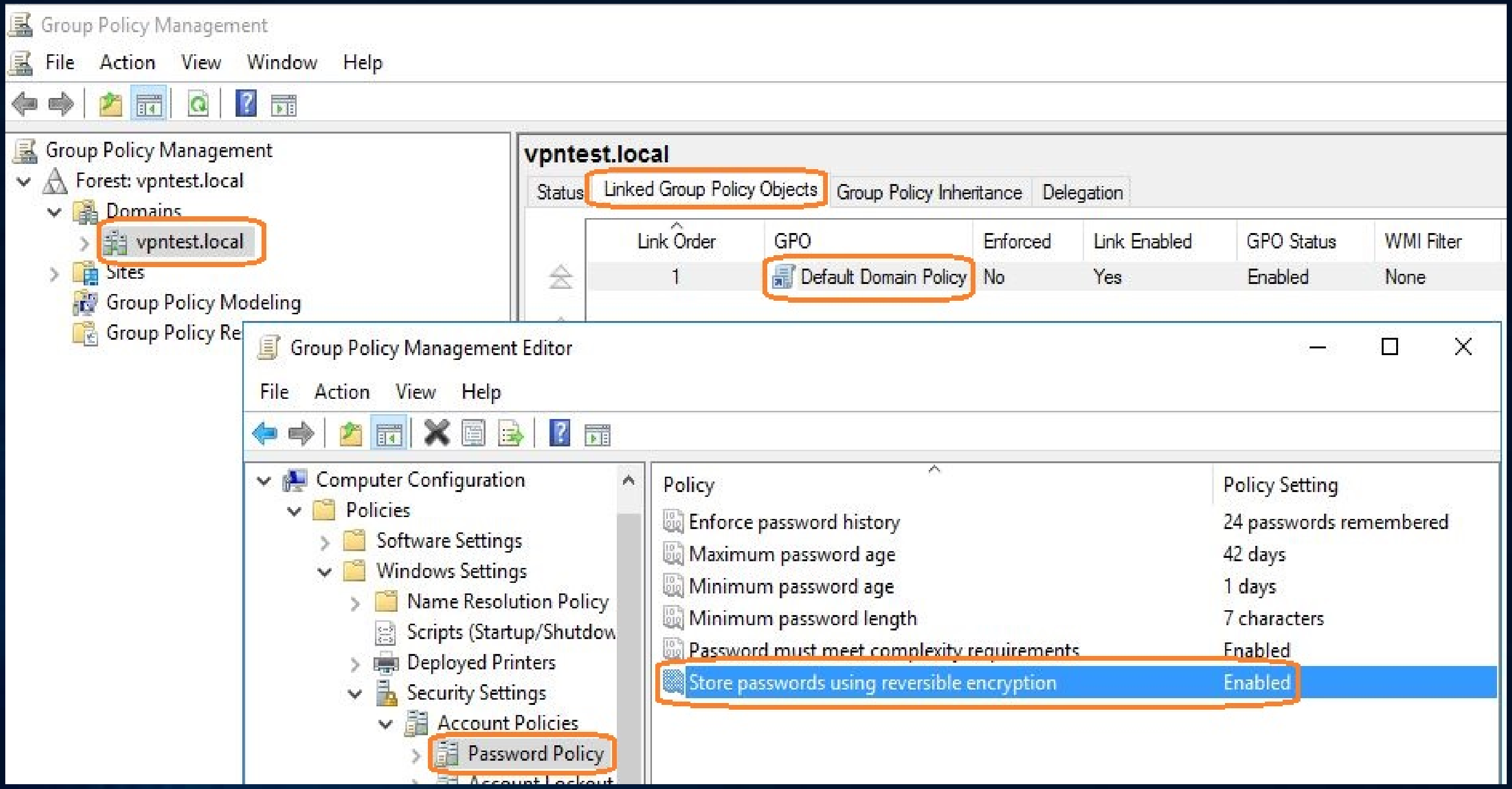
- □ .NET Framework 3.5 Features
- ■ .NET Framework 4.6 Features (2 of 7 installed)
- □ Background Intelligent Transfer Service (BITS)
- □ BitLocker Drive Encryption
- □ BitLocker Network Unlock
- □ BranchCache
- □ Client for NFS
- □ Containers
- □ Data Center Bridging
- □ Direct Play
- □ Enhanced Storage
- □ Failover Clustering
- ☑ Group Policy Management (Installed)
- □ I/O Quality of Service
- □ IIS Hostable Web Core
- □ Internet Printing Client
- □ IP Address Management (IPAM) Server
- □ iSNS Server service
- □ LPR Port Monitor

Description

.NET Framework 3.5 combines the power of the .NET Framework 2.0 APIs with new technologies for building applications that offer appealing user interfaces, protect your customers' personal identity information, enable seamless and secure communication, and provide the ability to model a range of business processes.

Preparing and configuring Microsoft Windows Server 2016 – Group Policy Management

- Using Group Policy Management from Server Manager, we need to enable Store password using reversible encryption
- On Default Domain Policy we need to right click and select Edit.
- Group Policy Management Editor we need to edit the Password Policy to store in reversible encryption as enabled

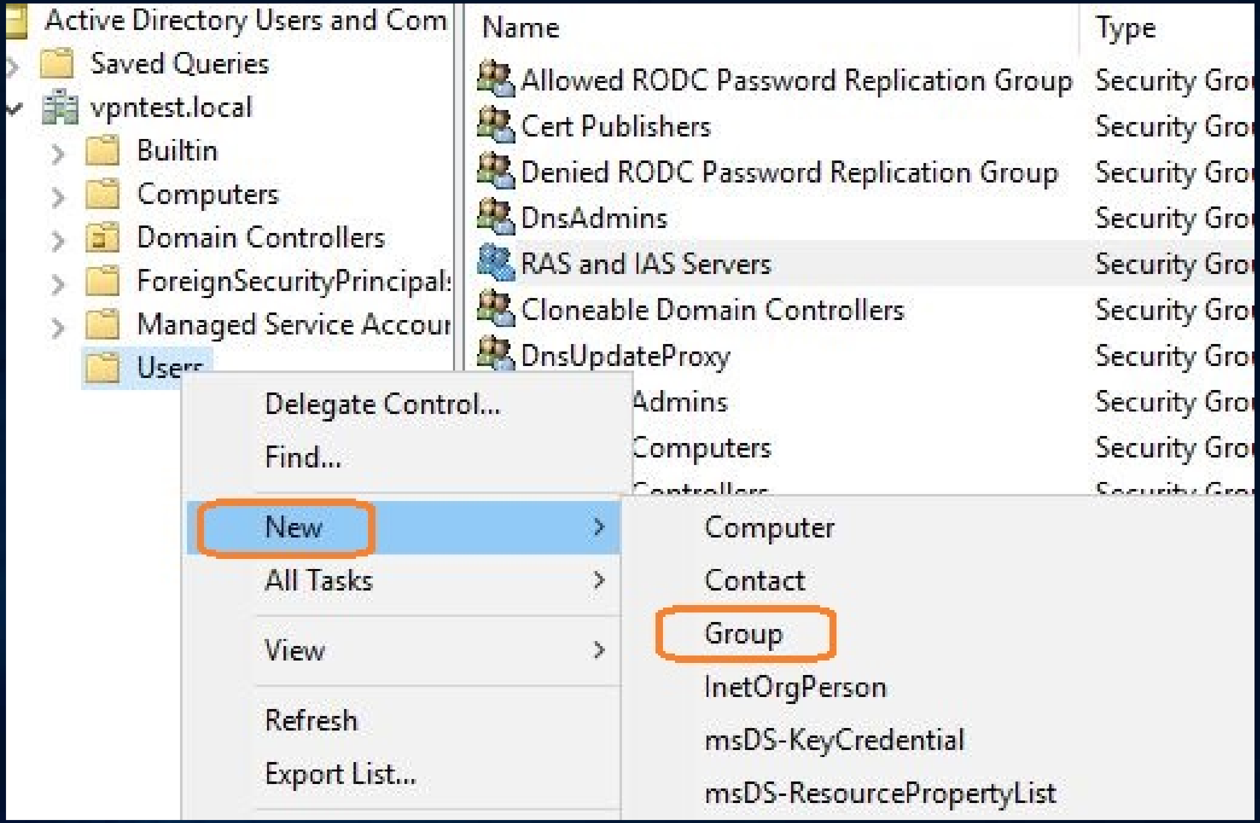


Link Order	GPO	Enforced	Link Enabled	GPO Status	WMI Filter
1	Default Domain Policy	No	Yes	Enabled	None

Policy	Policy Setting
Enforce password history	24 passwords remembered
Maximum password age	42 days
Minimum password age	1 days
Minimum password length	7 characters
Password must meet complexity requirements	Enabled
Store passwords using reversible encryption	Enabled

Preparing and configuring Microsoft Windows Server 2016 – Active Directory VPN Group

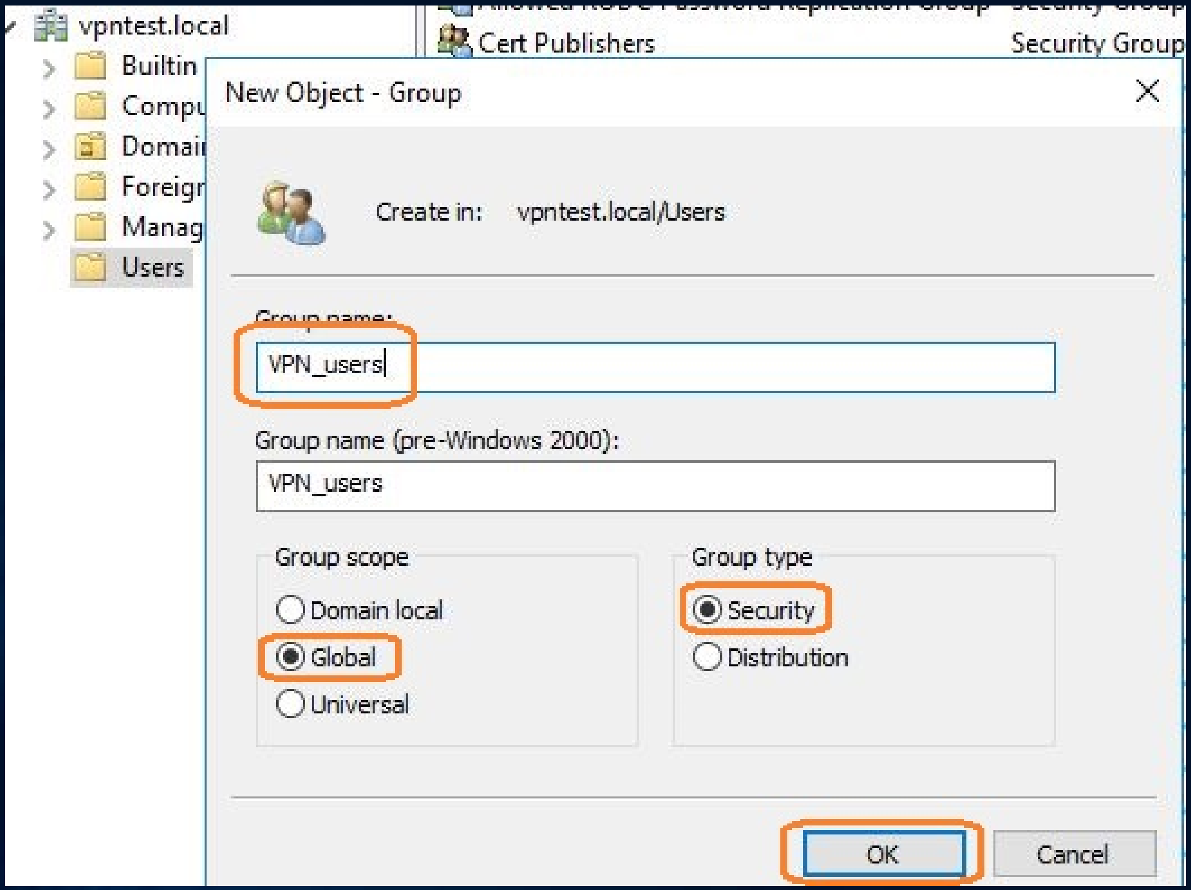
- In ADUC (Active Directory Users and Computers) console we need to create a Global Security Group
- Right click on the Users container and select New>Group



Name	Type
Allowed RODC Password Replication Group	Security Gro
Cert Publishers	Security Gro
Denied RODC Password Replication Group	Security Gro
DnsAdmins	Security Gro
RAS and IAS Servers	Security Gro
Cloneable Domain Controllers	Security Gro
DnsUpdateProxy	Security Gro
Admins	Security Gro
Computers	Security Gro
Controllers	Security Gro

Preparing and configuring Microsoft Windows Server 2016 – Active Directory VPN Group

- In ADUC console new Object Group we should name the group VPN_Users and keep it as Global scope and Security type, then click OK



New Object - Group

Create in: vpntest.local/Users

Group name: VPN_users

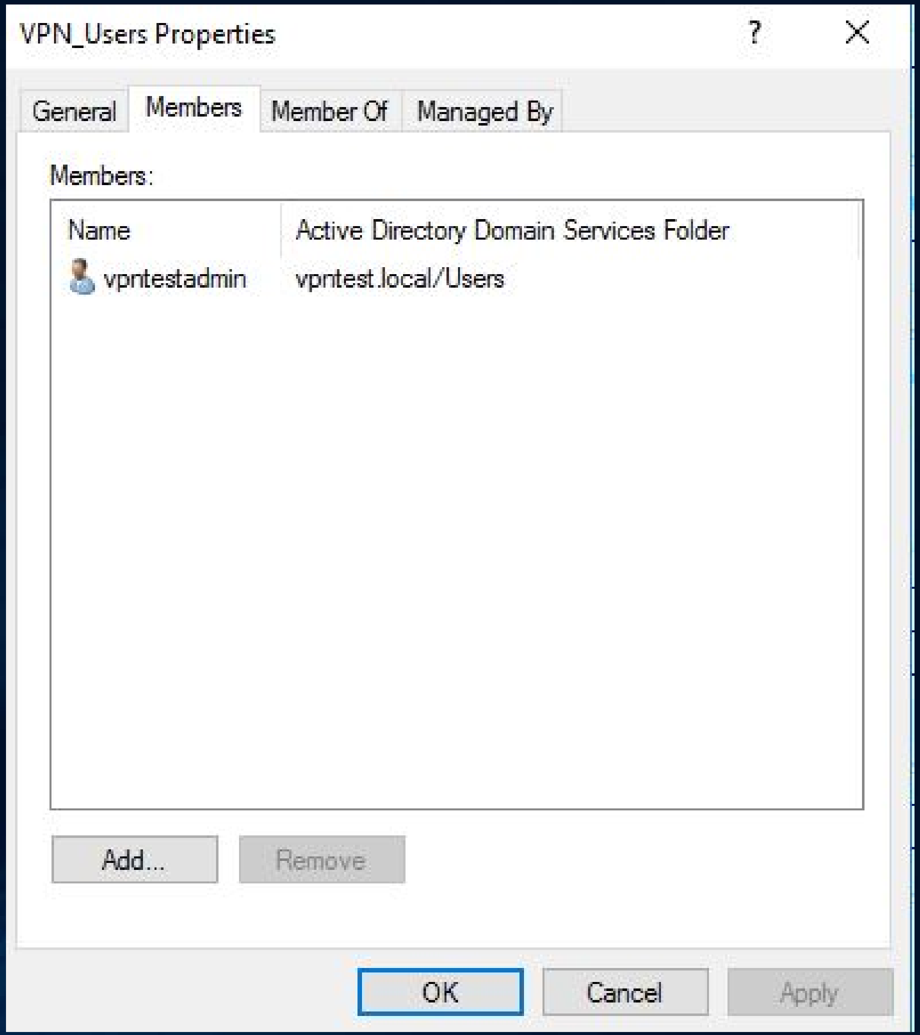
Group name (pre-Windows 2000): VPN_users

Group scope
○ Domain local
● Global
○ Universal

Group type
● Security
○ Distribution

Preparing and configuring Microsoft Windows Server 2016 – Active Directory VPN Group members

- In ADUC console we need to double click the VPN_Users group that we have created in previous step and add the required Active Directory User accounts that are approved to access corporate resources using IPsec tunnel.



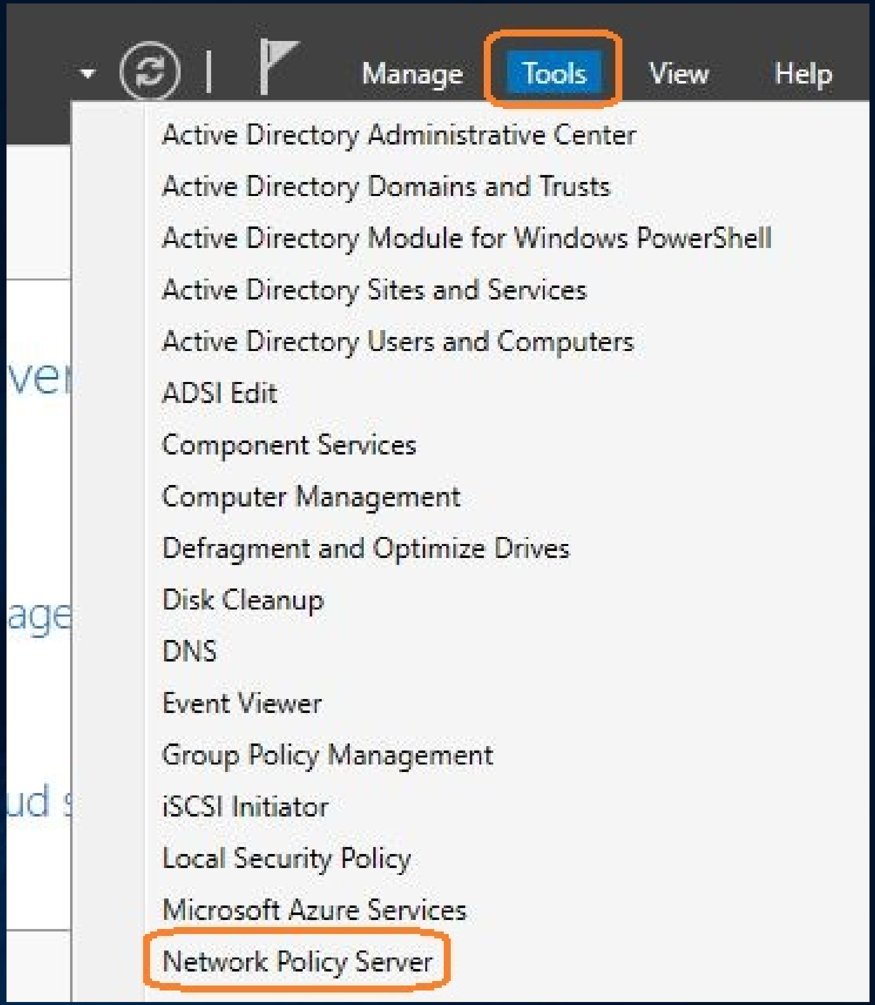
VPN_Users Properties

Members:

Name	Active Directory Domain Services Folder
vpntestadmin	vpntest.local/Users

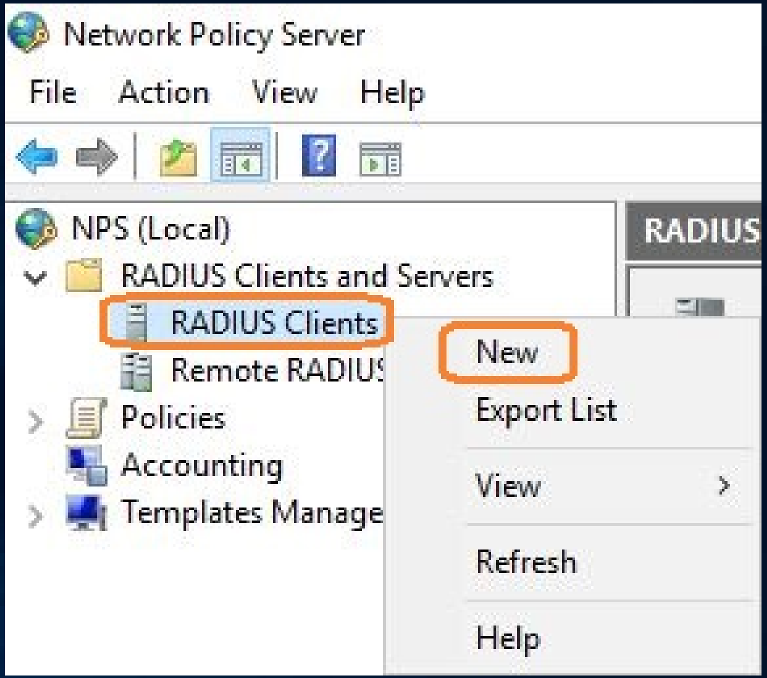
Preparing and configuring Microsoft Windows Server 2016 – Server manager NPS role config

- Using the Server Manager console again we can continue with the Network Policy Server role configuration.


Manage
Tools
View
Help
Active Directory Administrative Center
Active Directory Domains and Trusts
Active Directory Module for Windows PowerShell
Active Directory Sites and Services
Active Directory Users and Computers
ADSI Edit
Component Services
Computer Management
Defragment and Optimize Drives
Disk Cleanup
DNS
Event Viewer
Group Policy Management
iSCSI Initiator
Local Security Policy
Microsoft Azure Services
Network Policy Server

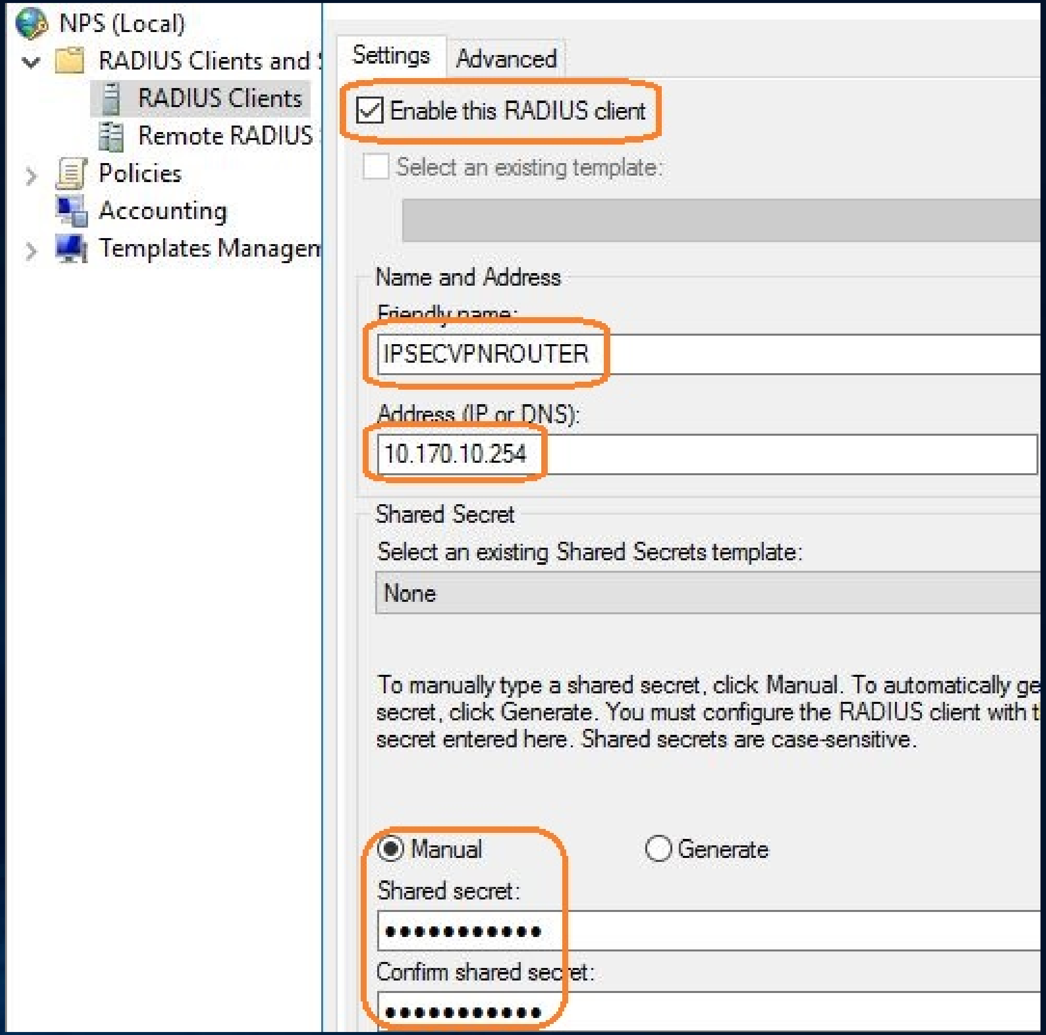
Preparing and configuring Microsoft Windows Server 2016 – Server manager NPS role config

- Using the Server Manager console again we can continue with the Network Policy Server role configuration.
- We need to right click the RADIUS Clients under RADIUS Clients and Servers and Select New



Preparing and configuring Microsoft Windows Server 2016 – Server manager NPS role config

- Using the Network Policy Server cmdlet we have created new RADIUS Client.
- The options were configured as Enable
  - Friendly name IPSECVPNROUTER
  - IP Address of RADIUS Client 10.170.10.254
  - Manual Shared secret (must match with secret configured at Step 11 from the RouterOS RADIUS Client configuration)



☑ Enable this RADIUS client

□ Select an existing template:

Name and Address

Friendly name:
IPSECVPNROUTER

Address (IP or DNS):
10.170.10.254

Shared Secret

Select an existing Shared Secrets template:
None

To manually type a shared secret, click Manual. To automatically ge secret, click Generate. You must configure the RADIUS client with t secret entered here. Shared secrets are case-sensitive.

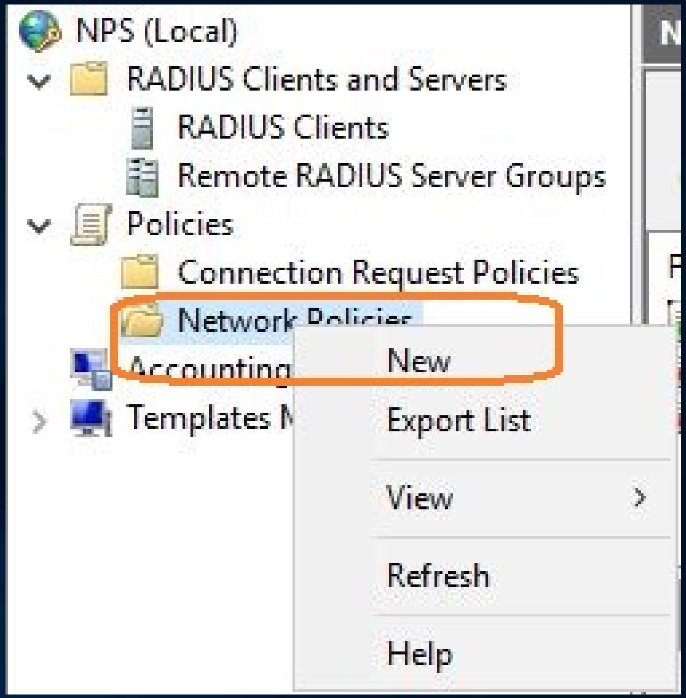
● Manual ○ Generate

Shared secret:
••••••••••••

Confirm shared secret:
••••••••••••

Preparing and configuring Microsoft Windows Server 2016 – NPS > Network Policies

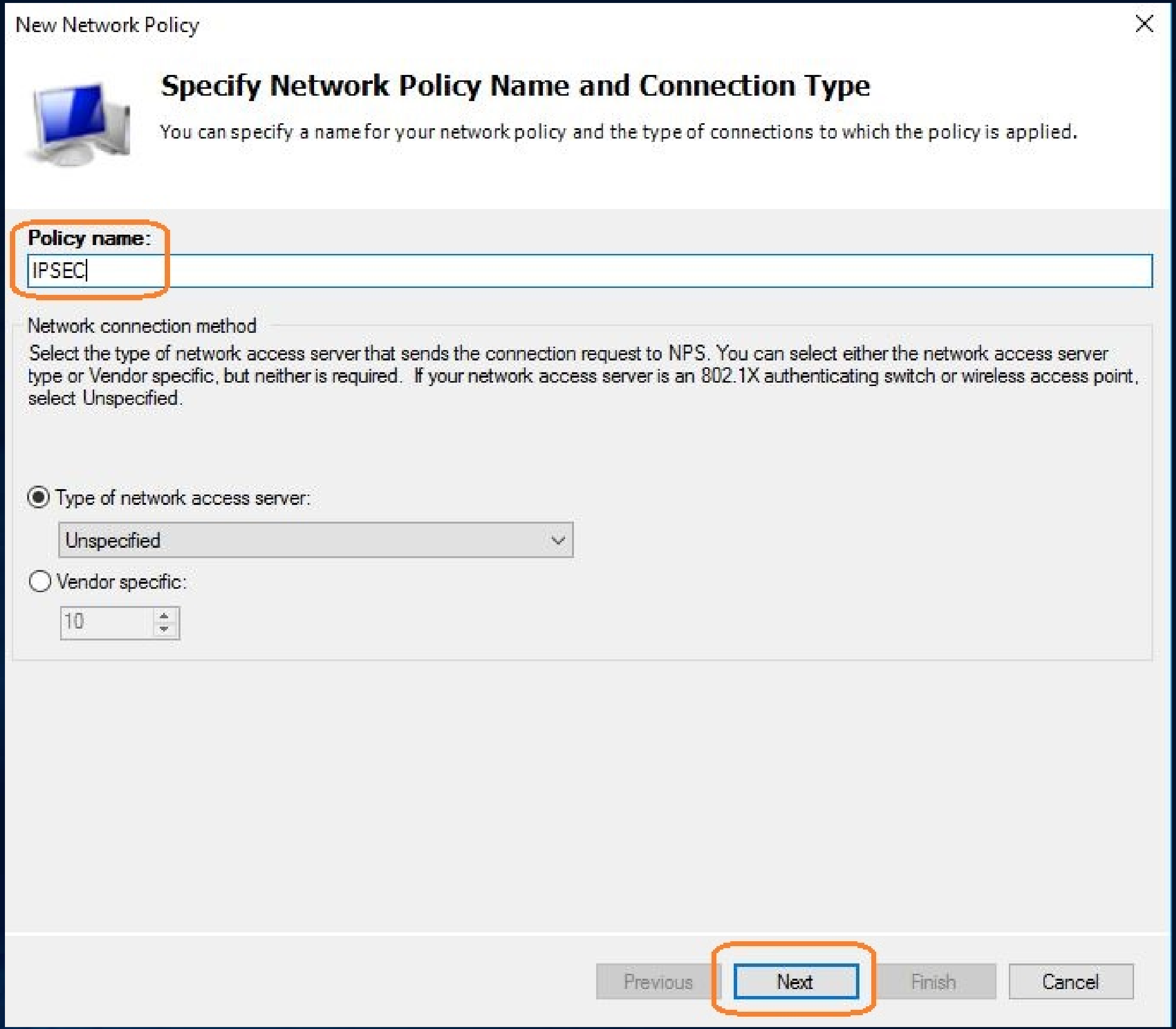
- Using the Network Policy Server cmdlet we need to right click Network Policies under Policies menu and select New.



Preparing and configuring Microsoft Windows Server 2016 – NPS > Network Policies

- Using the New Network Policy setup dialog we should name the policy as IPSEC for future reference and click Next.

Note: New Network Policy dialog has multiple pages so we can use Previous button in case we need to adjust some settings



New Network Policy

Specify Network Policy Name and Connection Type

You can specify a name for your network policy and the type of connections to which the policy is applied.

Policy name: IPSEC

Network connection method

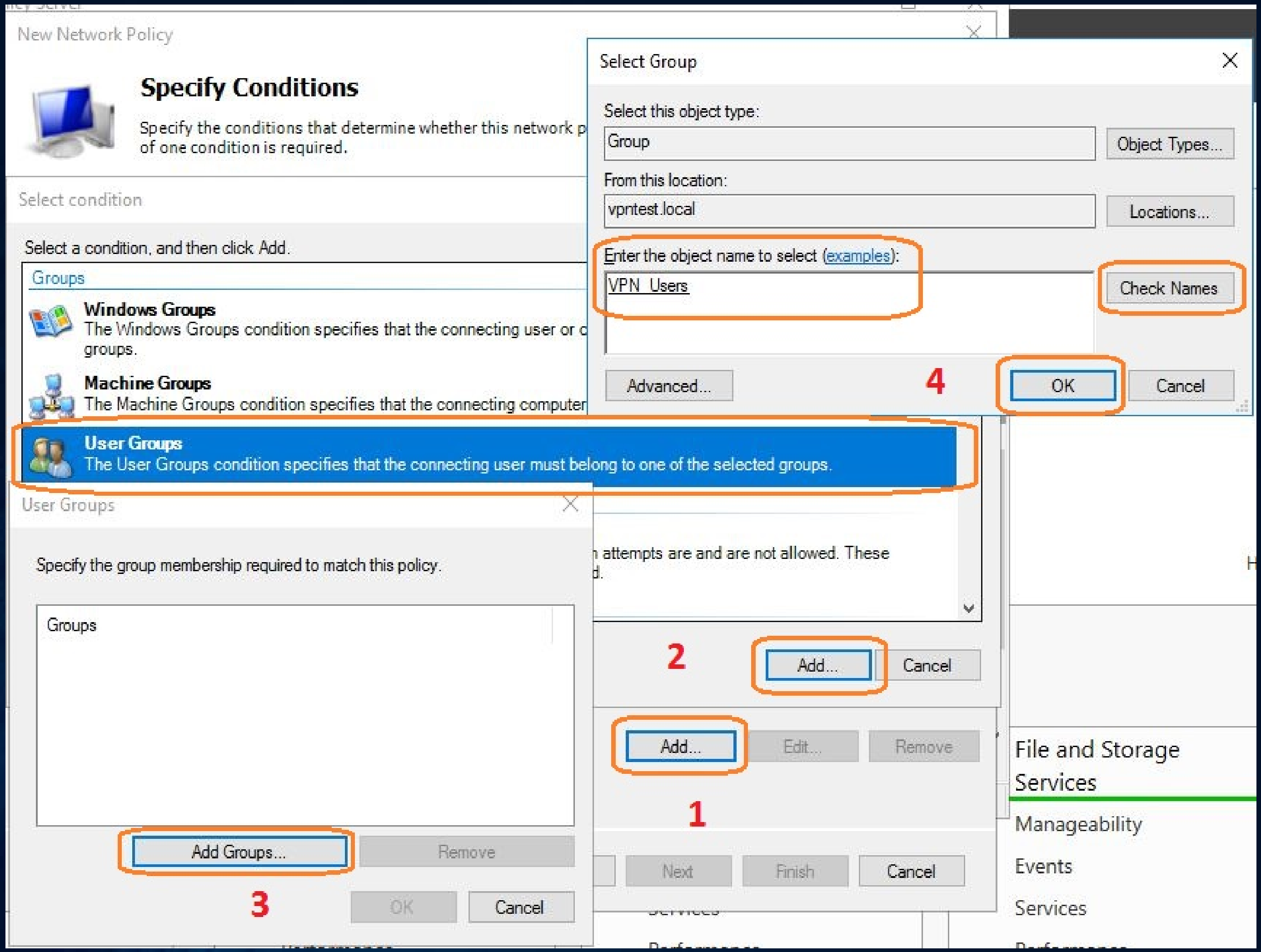
Select the type of network access server that sends the connection request to NPS. You can select either the network access server type or Vendor specific, but neither is required. If your network access server is an 802.1X authenticating switch or wireless access point, select Unspecified.

● Type of network access server: Unspecified

○ Vendor specific: 10

Preparing and configuring Microsoft Windows Server 2016 – NPS > Network Policies

- On the Specify Conditions page we should add the VPN_Users Active Directory security group created earlier.
- This will ensure that only VPN_Users group members are allowed to connect through VPN tunnel


New Network Policy

Specify Conditions

Specify the conditions that determine whether this network p… of one condition is required.

Select condition

Select a condition, and then click Add.

Groups

Windows Groups
The Windows Groups condition specifies that the connecting user or c… groups.

Machine Groups
The Machine Groups condition specifies that the connecting computer…

User Groups
The User Groups condition specifies that the connecting user must belong to one of the selected groups.

…attempts are and are not allowed. These …d.

User Groups

Specify the group membership required to match this policy.

Groups

Select Group

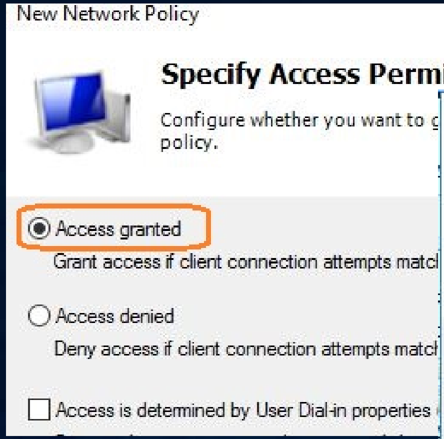
Select this object type:
Group

From this location:
vpntest.local

Enter the object name to select (examples):
VPN_Users

Preparing and configuring Microsoft Windows Server 2016 – NPS > Network Policies

- On Specify Access Permission setup page we should select Access granted option and click Next



New Network Policy

Specify Access Permission

Configure whether you want to g
policy.

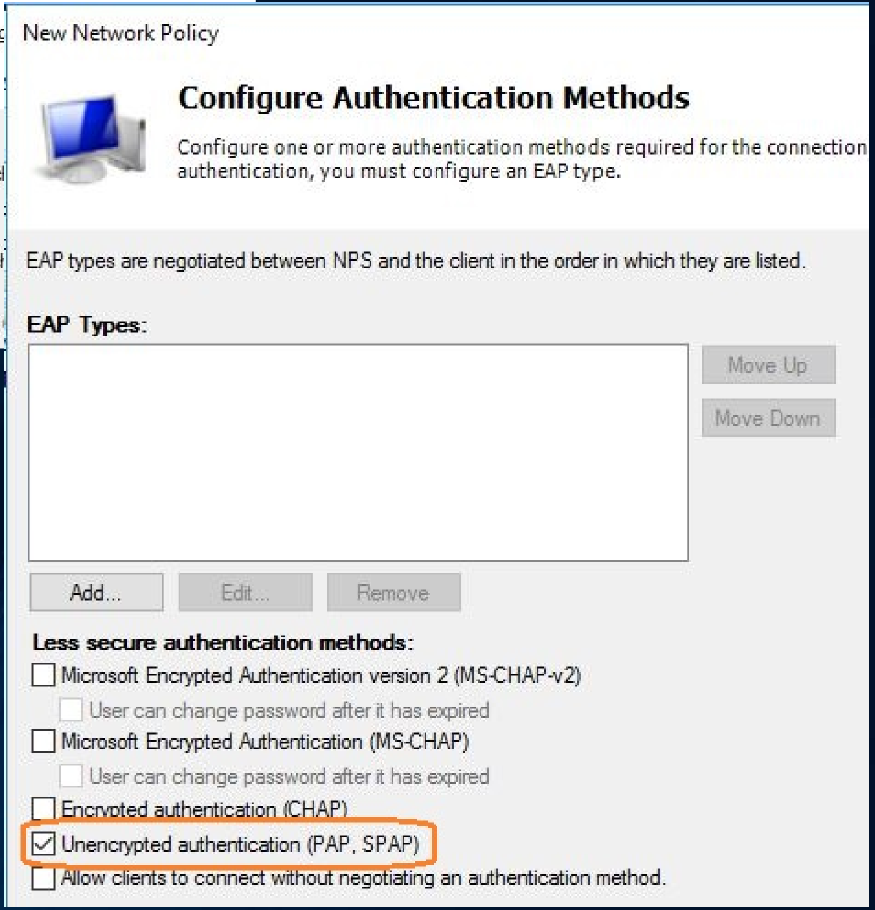
● Access granted

Grant access if client connection attempts matc

○ Access denied

Deny access if client connection attempts matcl

□ Access is determined by User Dial-in properties



New Network Policy

Configure Authentication Methods

Configure one or more authentication methods required for the connection
authentication, you must configure an EAP type.

EAP types are negotiated between NPS and the client in the order in which they are listed.

EAP Types:

Less secure authentication methods:

□ Microsoft Encrypted Authentication version 2 (MS-CHAP-v2)

□ User can change password after it has expired

□ Microsoft Encrypted Authentication (MS-CHAP)

□ User can change password after it has expired

□ Encrypted authentication (CHAP)

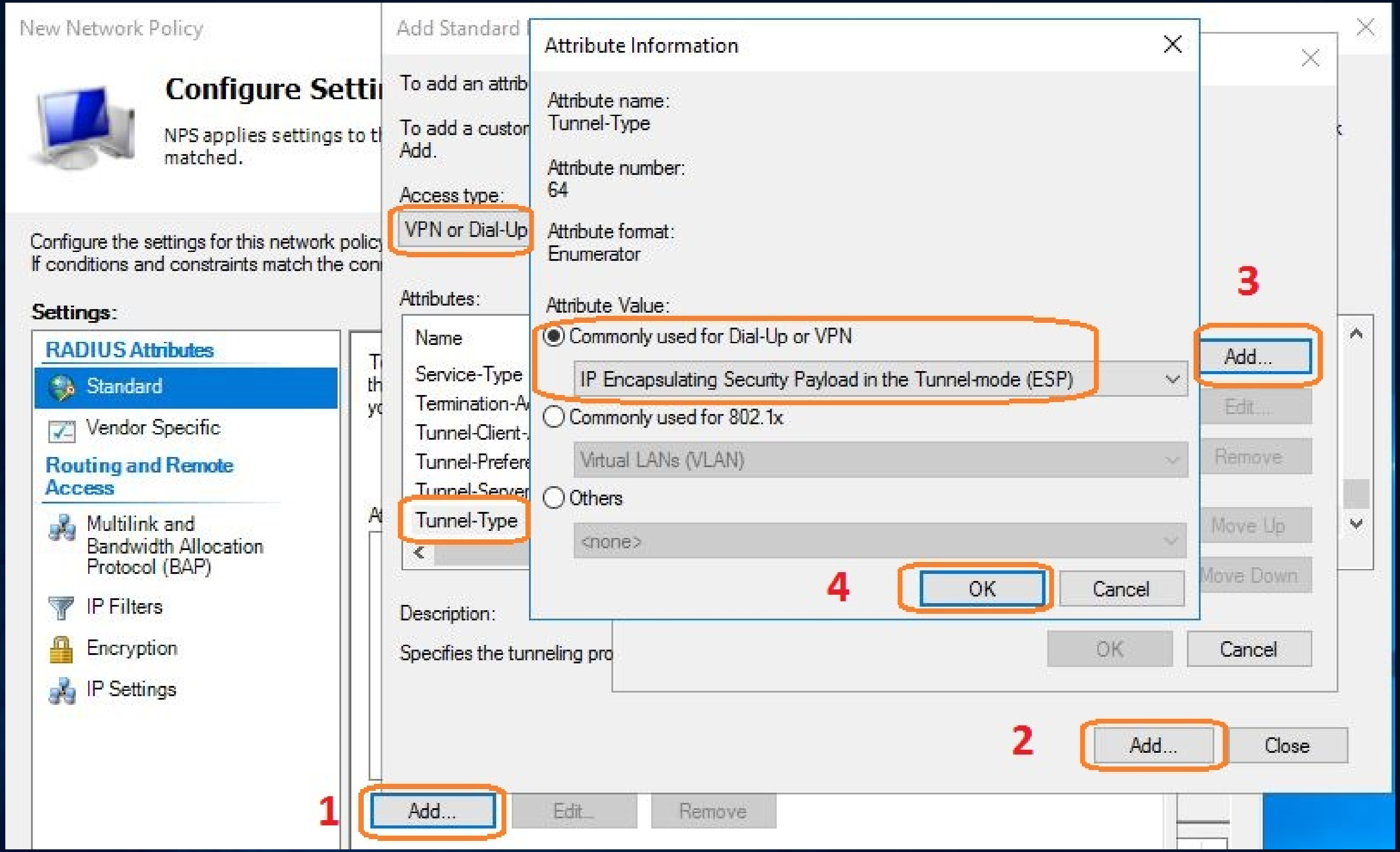
☑ Unencrypted authentication (PAP, SPAP)

□ Allow clients to connect without negotiating an authentication method.

- On the Configure Authentication Methods page we should only select Unencrypted authentication (PAP, SPAP) and click Next.
- Next setup page named Constraints is optional so we just continue with setup

Preparing and configuring Microsoft Windows Server 2016 – NPS > Network Policies

- On Configure Settings page we should remove existing PPP and Framed attributes
- Then, using the Add button we add the VPN tunnel type attribute for IPsec-ESP tunnel mode



New Network Policy

Configure Setti

NPS applies settings to t matched.

Configure the settings for this network policy
If conditions and constraints match the con

Settings:

Add Standard

To add an attrib

To add a custom Add.

Access type: VPN or Dial-Up

Attributes:

Attribute Information

Attribute name: Tunnel-Type

Attribute number: 64

Attribute format: Enumerator

Attribute Value:

● Commonly used for Dial-Up or VPN

IP Encapsulating Security Payload in the Tunnel-mode (ESP)

○ Commonly used for 802.1x

Virtual LANs (VLAN)

○ Others

<none>

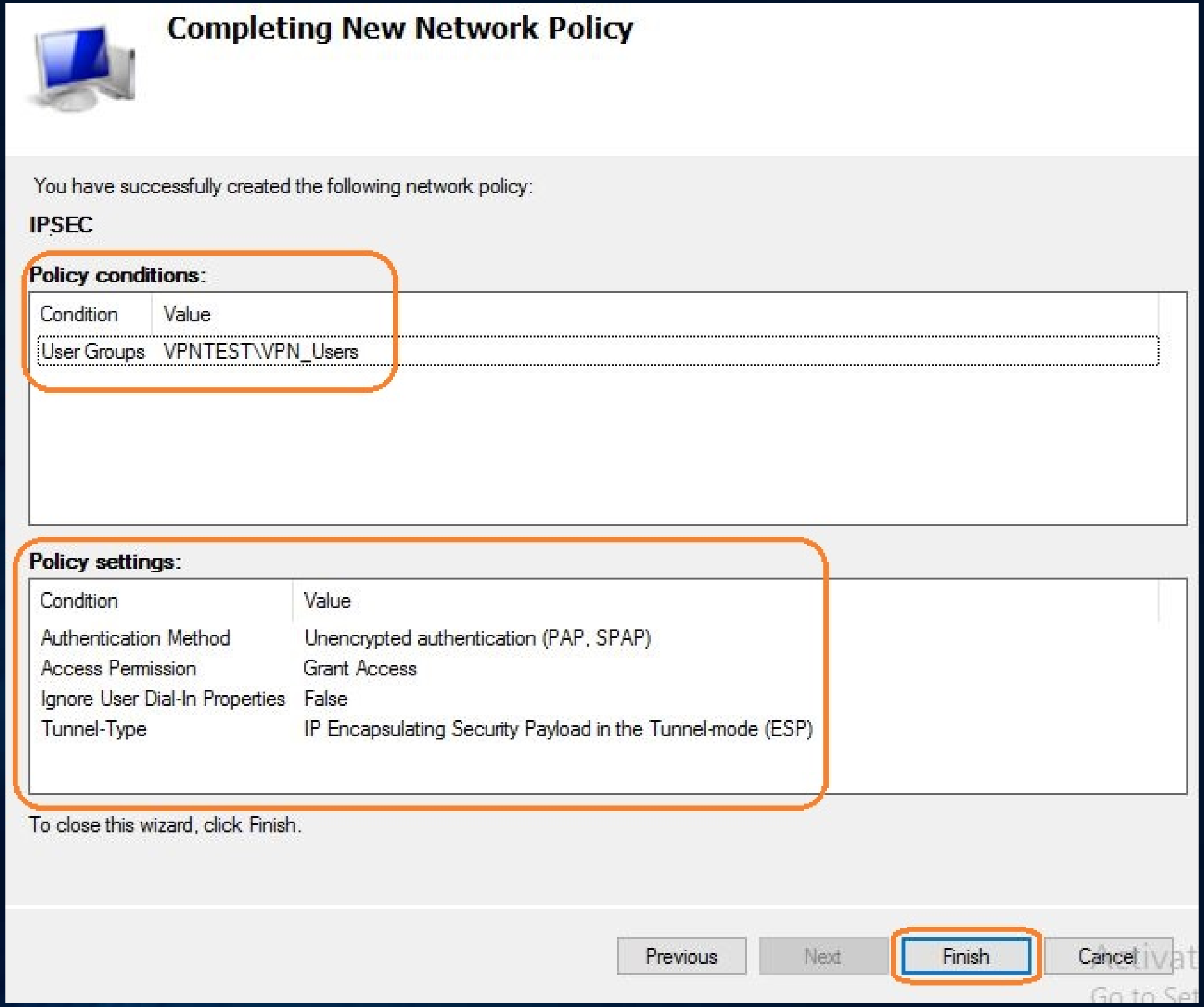
Description:

Specifies the tunneling pro

Preparing and configuring Microsoft Windows Server 2016 – NPS > Network Policies summary

- This is the last setup page which actually summarizes our settings

- In case we are satisfied with the setup we can select Finish



Completing New Network Policy

You have successfully created the following network policy:

IPSEC

Policy conditions:

Condition	Value
User Groups	VPNTEST\VPN_Users

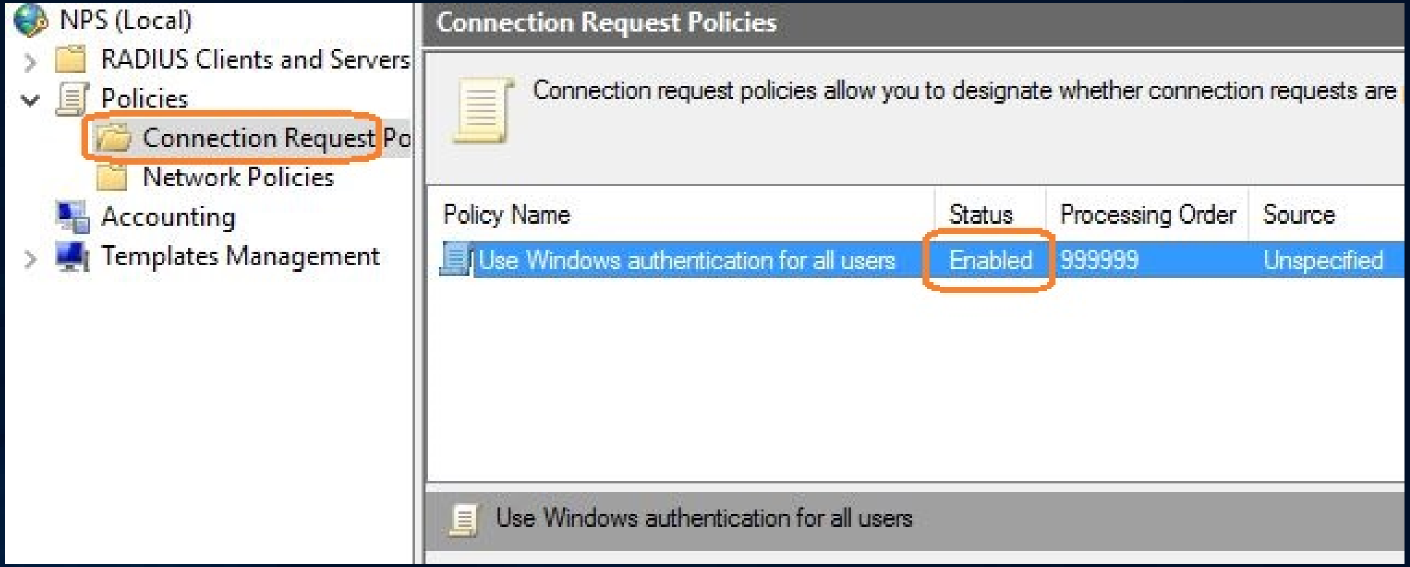
Policy settings:

Condition	Value
Authentication Method	Unencrypted authentication (PAP, SPAP)
Access Permission	Grant Access
Ignore User Dial-In Properties	False
Tunnel-Type	IP Encapsulating Security Payload in the Tunnel-mode (ESP)

To close this wizard, click Finish.

Preparing and configuring Microsoft Windows Server 2016 – NPS > Connection Requests

- On Policies > Connection Request Policies we should make sure that the Authentication process is done locally on the Domain Controller. We need to check if the policy is enabled

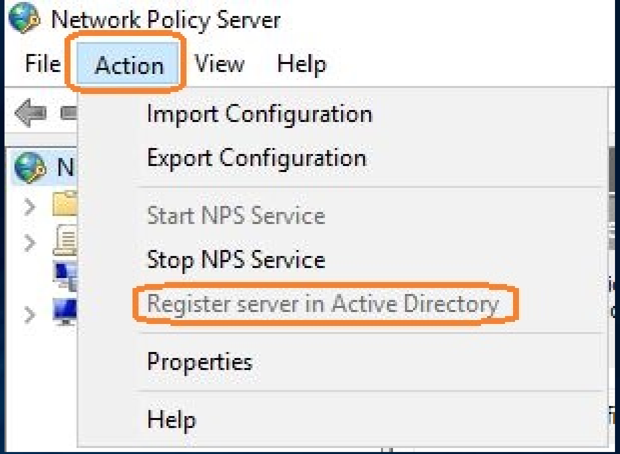


Connection request policies allow you to designate whether connection requests are

Policy Name	Status	Processing Order	Source
Use Windows authentication for all users	Enabled	999999	Unspecified

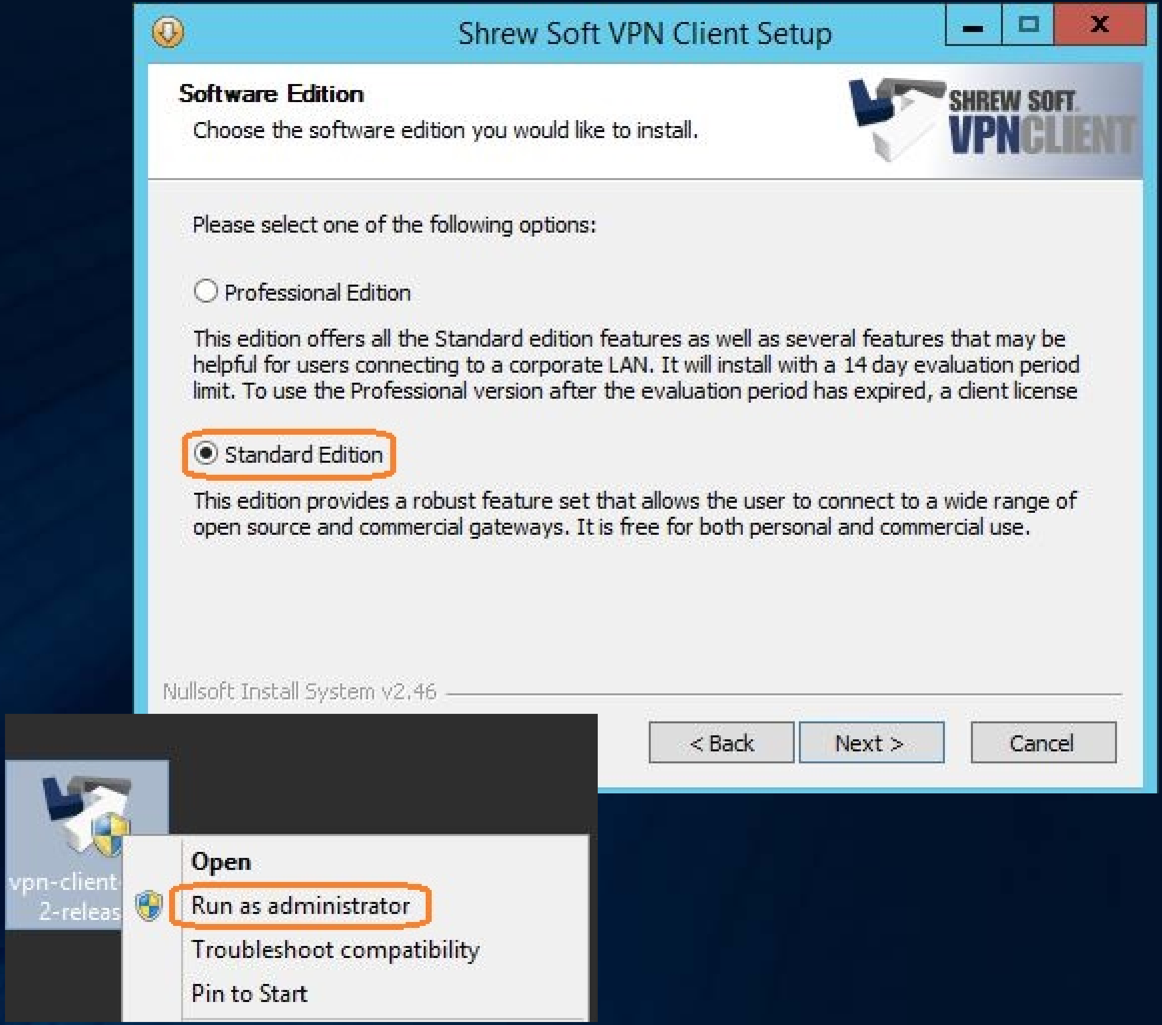
Use Windows authentication for all users

Note: Network Policy Server should already be registered with Active Directory but we can check that anyway



Preparing and configuring Microsoft Windows Client running ShrewSoft VPN software

- The ShrewSoft Installer works in:
  - Professional (paid license)
  - Standard (free license)



Shrew Soft VPN Client Setup

Software Edition

Choose the software edition you would like to install.

Please select one of the following options:

○ Professional Edition

This edition offers all the Standard edition features as well as several features that may be helpful for users connecting to a corporate LAN. It will install with a 14 day evaluation period limit. To use the Professional version after the evaluation period has expired, a client license

● Standard Edition

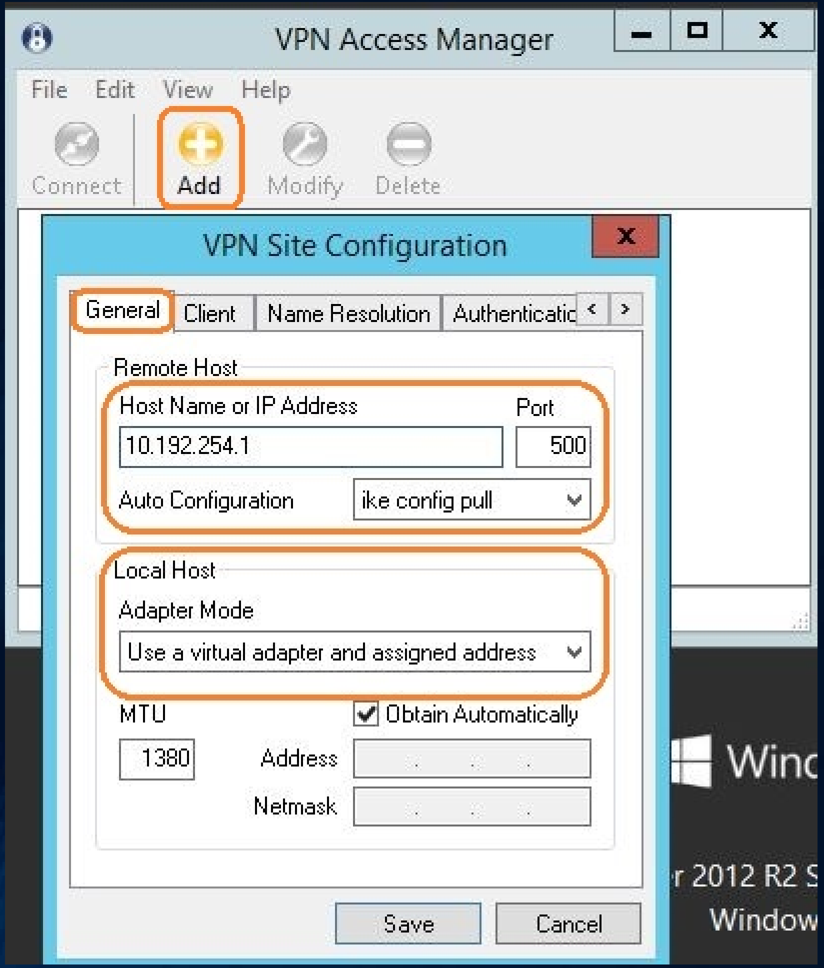
This edition provides a robust feature set that allows the user to connect to a wide range of open source and commercial gateways. It is free for both personal and commercial use.

Nullsoft Install System v2.46

Note: Always run the installer as admin privilege rights

Preparing and configuring Microsoft Windows Client running ShrewSoft VPN software

- We now need to add a Site configuration profile using the Add button
- On General tab we need to configure Remote VPN Gateway Host Name or IP address using udp 500 and ike config pull
- The local host section can use a virtual adapter obtained automatically



Remote Host

Host Name or IP Address: 10.192.254.1

Port: 500

Auto Configuration: ike config pull

Local Host

Adapter Mode: Use a virtual adapter and assigned address

MTU: 1380

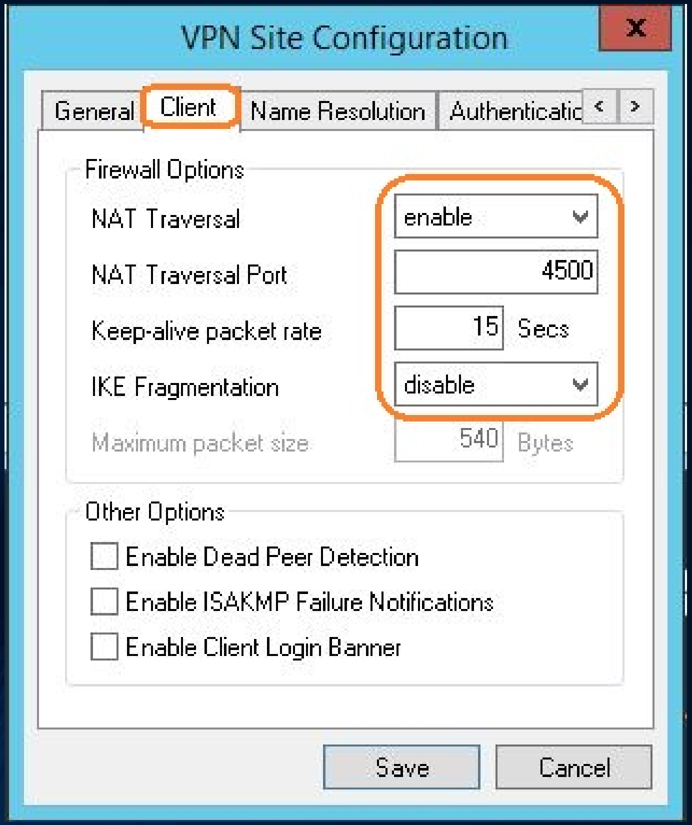
☑ Obtain Automatically

Address: . . .

Netmask: . . .

Preparing and configuring Microsoft Windows Client running ShrewSoft VPN software

- On the Client tab need to enable NAT-T mode
- Also we should disable IKE fragmentation



Firewall Options

NAT Traversal: enable

NAT Traversal Port: 4500

Keep-alive packet rate: 15 Secs

IKE Fragmentation: disable

Maximum packet size: 540 Bytes

Other Options

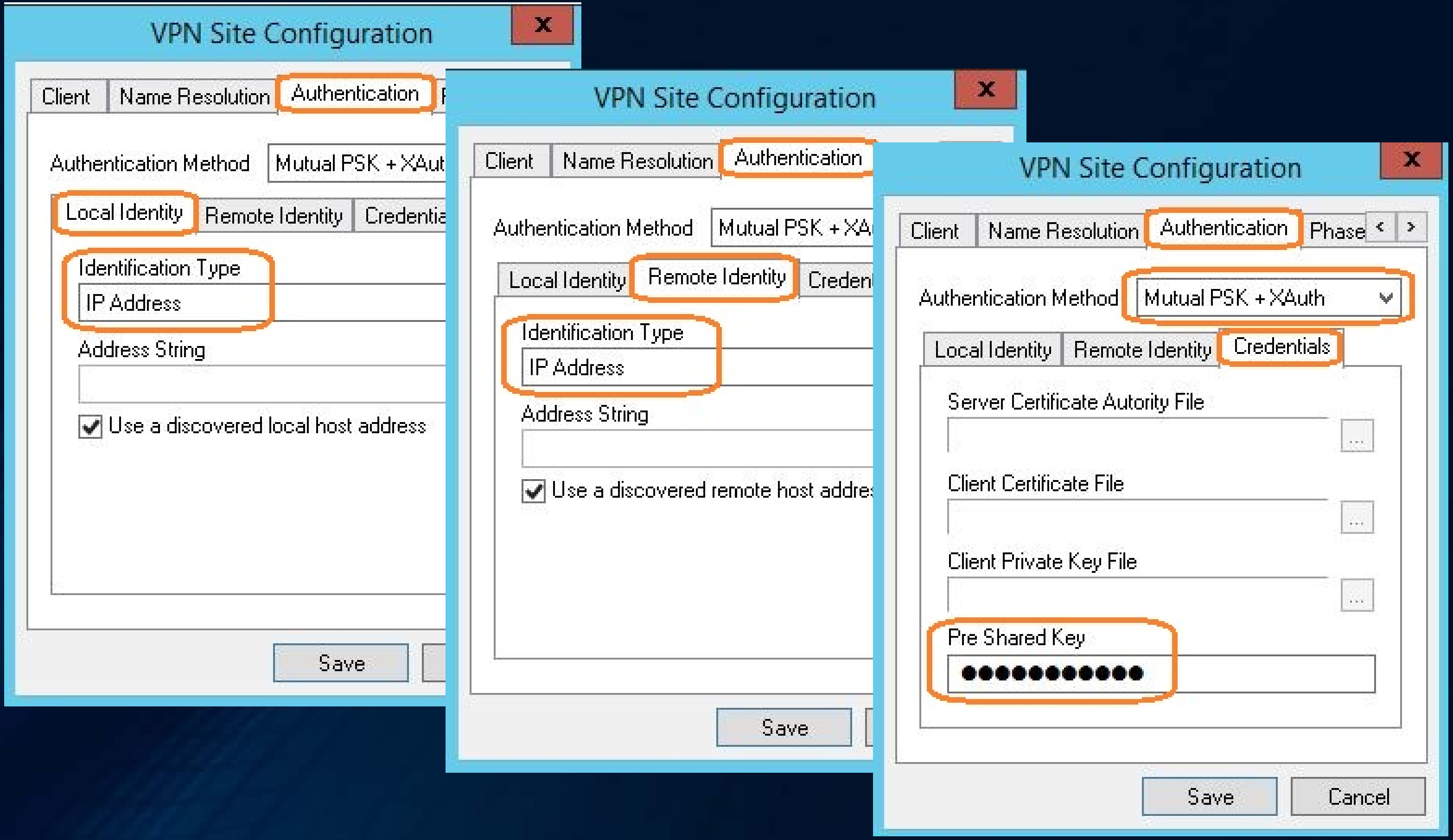
☐ Enable Dead Peer Detection

☐ Enable ISAKMP Failure Notifications

☐ Enable Client Login Banner

Preparing and configuring Microsoft Windows Client running ShrewSoft VPN software

- Leaving the Name Resolution tab as default we can continue with Authentication method Mutual PSK+XAuth
  - Local Identity should use IP Address as Identification type
  - Remote Identity should use same options
  - Credentials Pre Shared Key must match with IPsec PSK configured at step 7 from the RouterOS IPsec configuration section



VPN Site Configuration

Authentication Method: Mutual PSK + XAut

Local Identity

Identification Type: IP Address

Address String

☑ Use a discovered local host address

VPN Site Configuration

Authentication Method: Mutual PSK + XA

Remote Identity

Identification Type: IP Address

Address String

☑ Use a discovered remote host addre

VPN Site Configuration

Authentication Method: Mutual PSK + XAuth

Credentials

Server Certificate Autority File

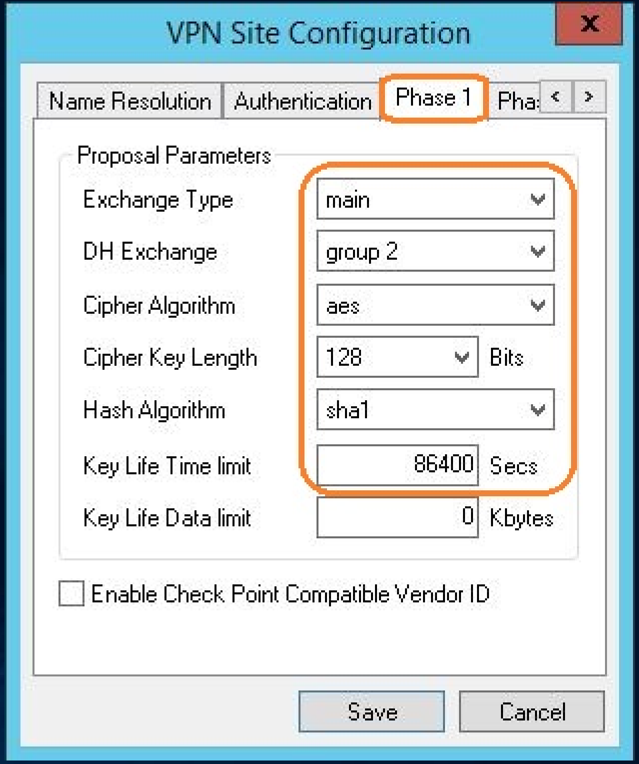
Client Certificate File

Client Private Key File

Pre Shared Key: ●●●●●●●●●●●●

Preparing and configuring Microsoft Windows Client running ShrewSoft VPN software

- Phase 1 menu options must match with Peer profiles setting at step 6 from RouterOS IPsec configuration section
    - Sha1, aes-128 , modp 1024
    - Lifetime 1 day
    - NAT-T enabled
- Phase 2 menu options should match with Policy proposals at step 5 from RouterOS IPsec configuration section
    - Authentication sha1
    - Encryption aes-128 cbc (cypher block chain)
    - Lifetime of 1 hour



VPN Site Configuration

Proposal Parameters

Exchange Type: main

DH Exchange: group 2

Cipher Algorithm: aes

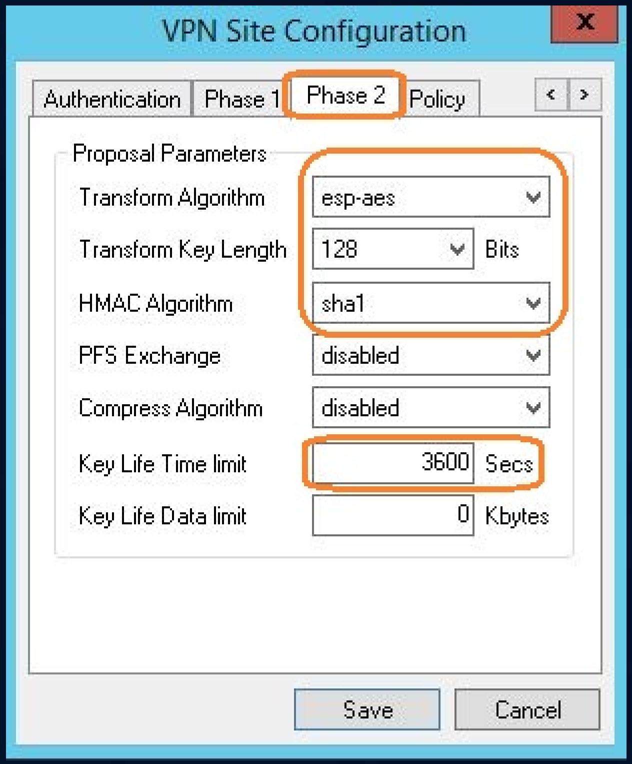
Cipher Key Length: 128 Bits

Hash Algorithm: sha1

Key Life Time limit: 86400 Secs

Key Life Data limit: 0 Kbytes

□ Enable Check Point Compatible Vendor ID



VPN Site Configuration

Proposal Parameters

Transform Algorithm: esp-aes

Transform Key Length: 128 Bits

HMAC Algorithm: sha1

PFS Exchange: disabled

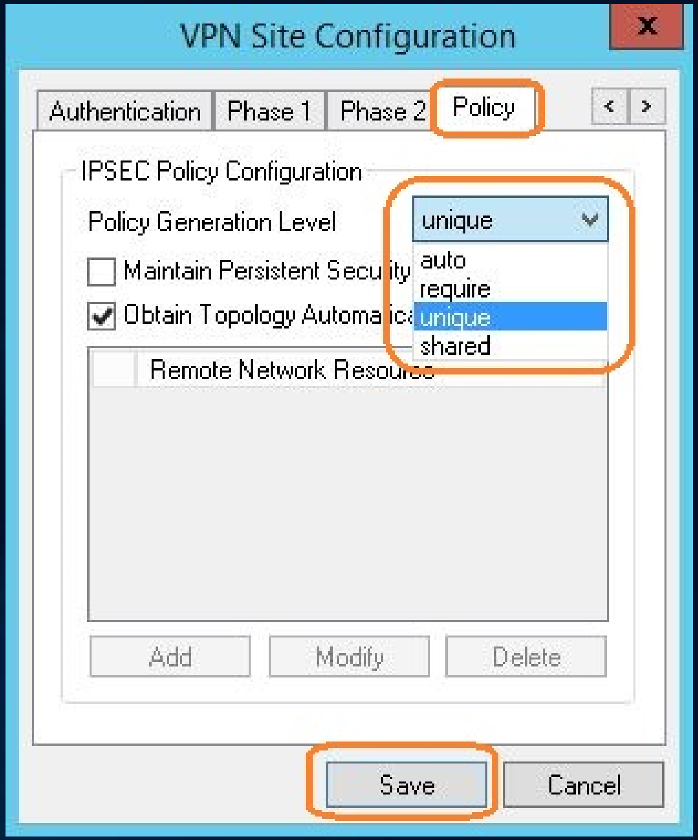
Compress Algorithm: disabled

Key Life Time limit: 3600 Secs

Key Life Data limit: 0 Kbytes

Preparing and configuring Microsoft Windows Client running ShrewSoft VPN software

- Policy configuration menu is where we configure the policy generation level
  - Auto (Cisco Vendor-ID format)
  - Require
  - Unique
  - Shared
- MikroTik RouterOS can work with Require or Unique options



IPSEC Policy Configuration

Policy Generation Level: unique

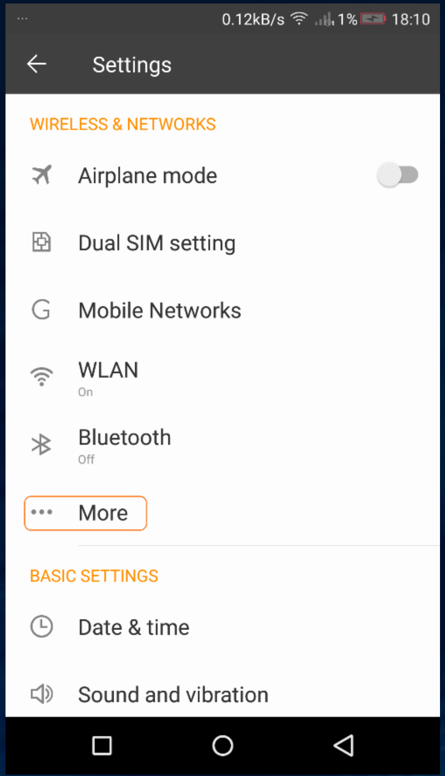
auto
require
unique
shared

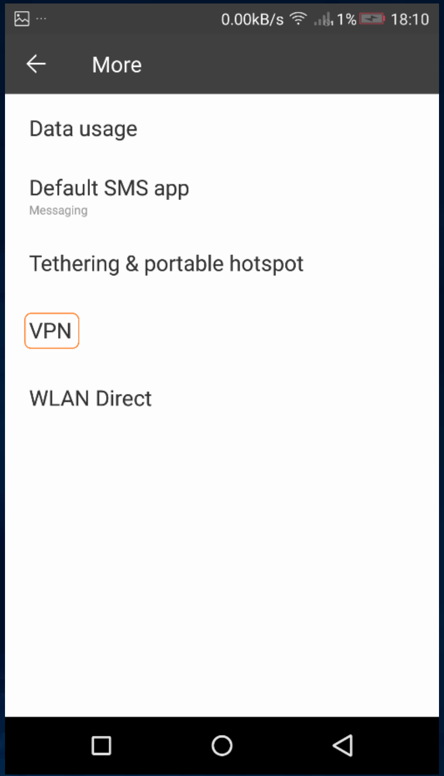
□ Maintain Persistent Secu ity

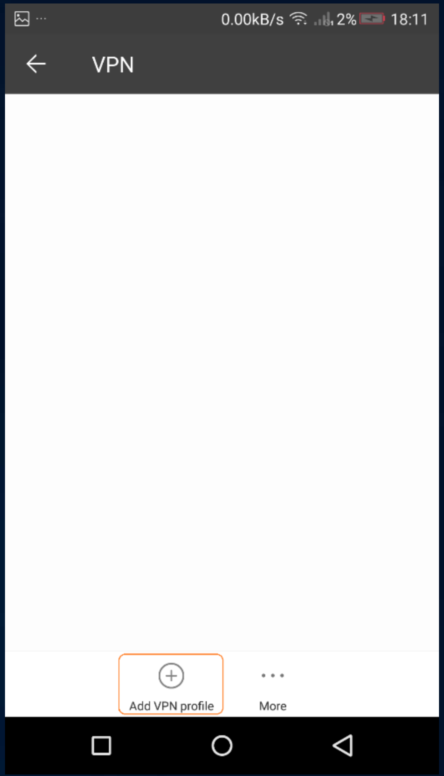
☑ Obtain Topology Automa ica

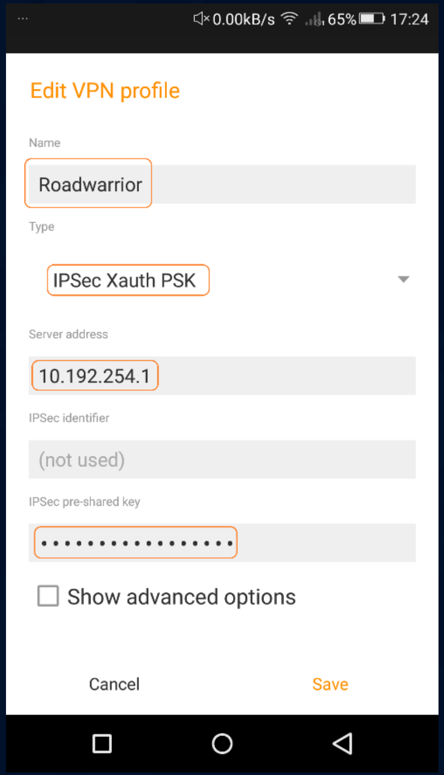
Preparing and configuring ANDROID mobile IPsec VPN client

- On ANDROID mobile you need to open Settings menu
- On Settings menu we need to open VPN
- On VPN we add VPN profile
- On edit VPN profile we add Server address, Xauth PSK mode and Pre Shared Key









Edit VPN profile

Name: Roadwarrior

Type: IPSec Xauth PSK

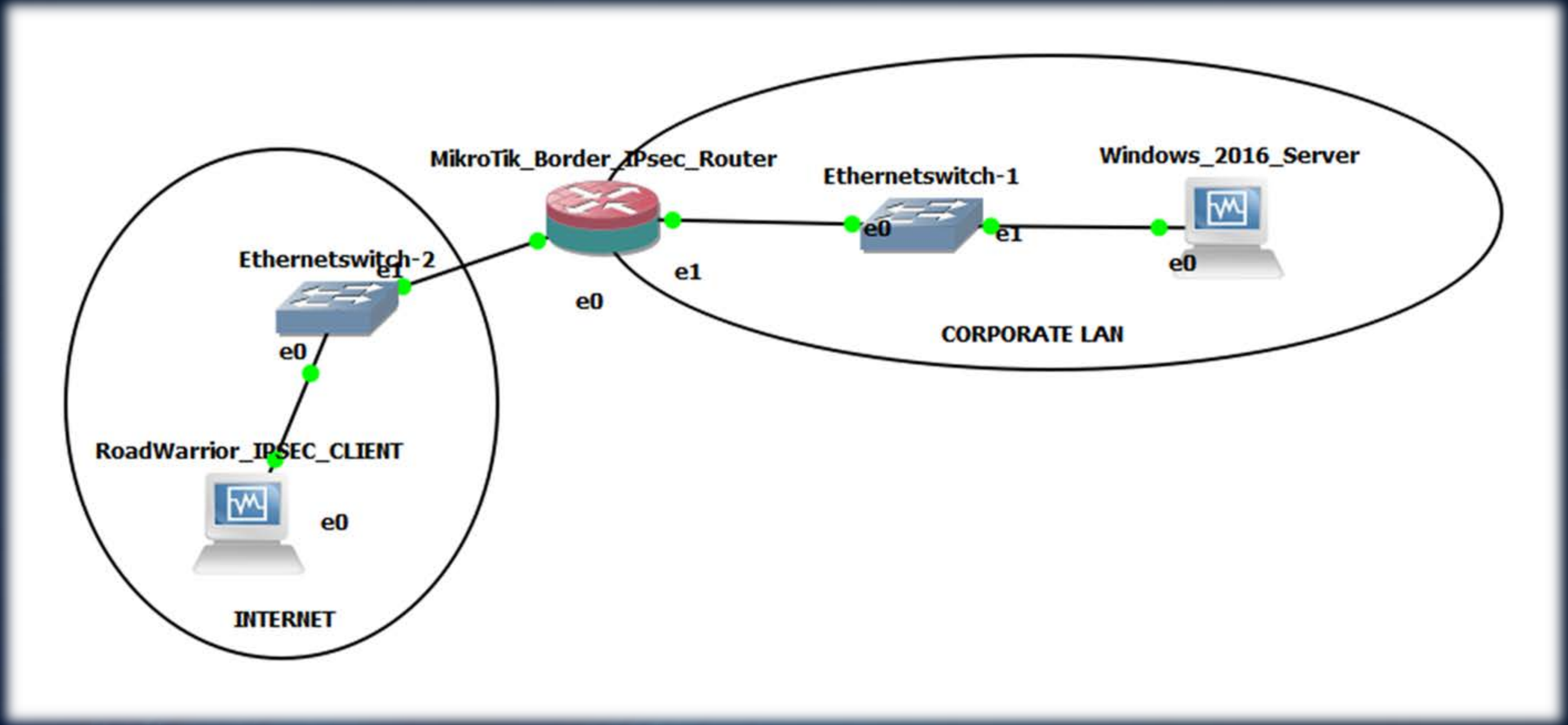
Server address: 10.192.254.1

IPSec identifier: (not used)

IPSec pre-shared key: ••••••••••••••••

□ Show advanced options

Presentation Lab



Mikro Training

https://www.mikrotraining.ro

Thank you!

Questions?