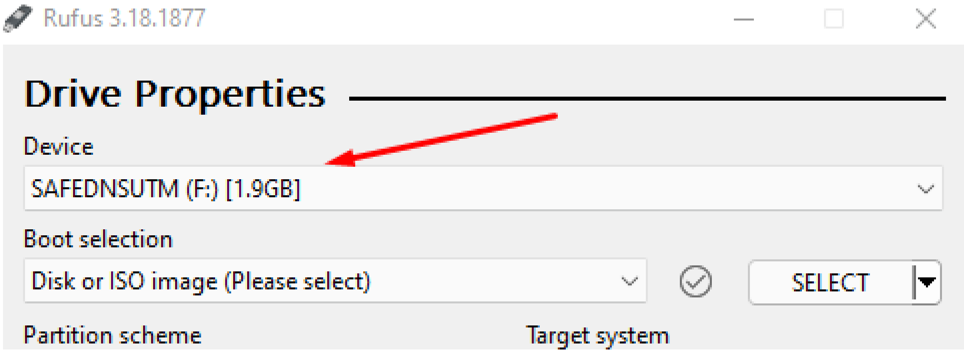
3. Installation

Creating a USB flash startup disk

Windows

> The creation of the ISO image will erase all existing information from the USB drive.

1. Download **Rufus** software and open the downloaded file.
2. Choose the designated USB flash drive in the **Device**:



Rufus 3.18.1877

Drive Properties

Device

SAFEDNSUTM (F:) [1.9GB]

Boot selection

Disk or ISO image (Please select)

Partition scheme

Target system

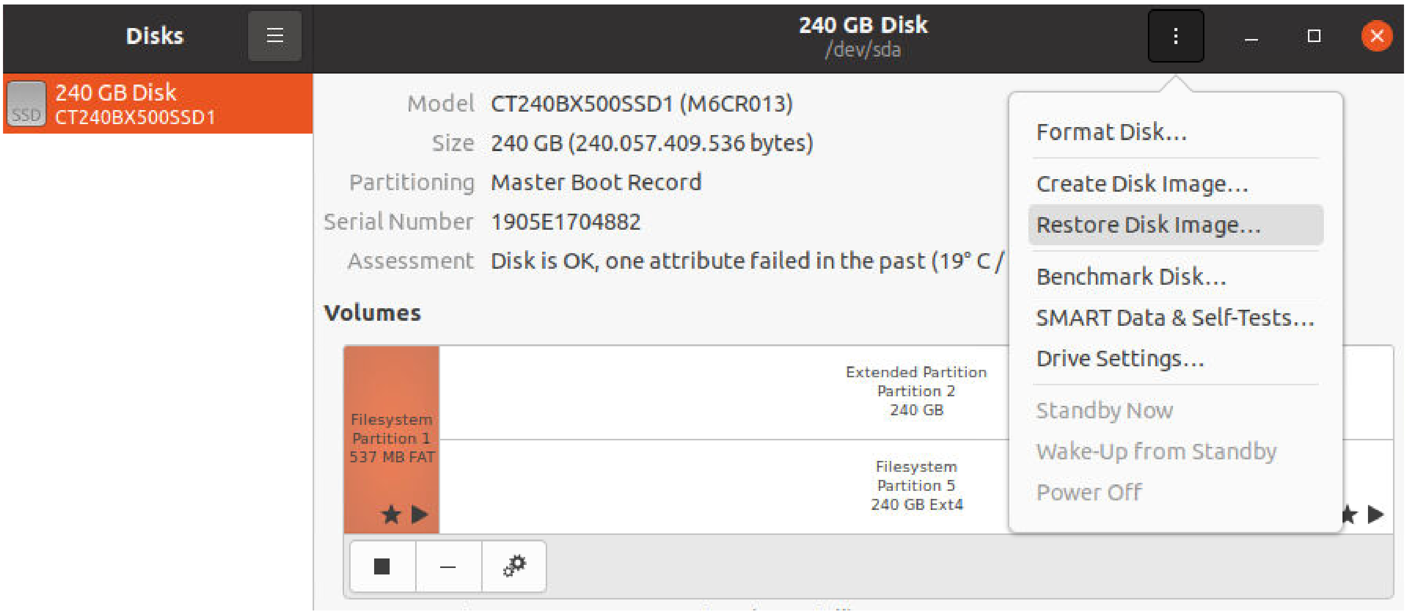
3. Select **Disk or ISO image** in Boot Selection.
4. Click on **Select** and open the downloaded SafeUTM image.
5. All other settings remain default.
6. Click on **Start**.
7. In the drop-down menu, select **Write in DD image mode**.
8. A dialog window will pop up for you to confirm the USB flash drive write.

Further, follow the instructions of the installation wizard. SafeUTM installation steps are described in the **Installation Process** article.

Linux

In order to create a USB flash startup disk in Linux, all you need is to copy blocks of SafeUTM ISO image to your device. Below two ways to do it are described:

Using the command `gnome-disks`



Model CT240BX500SSD1 (M6CR013)

Size 240 GB (240.057.409.536 bytes)

Partitioning Master Boot Record

Serial Number 1905E1704882

Assessment Disk is OK, one attribute failed in the past (19° C /

Manually

1. Check image integrity:

```
$ md5sum /home/safedns/SafeUTM.iso
8c872cb6b720f6fd6683107681645156 /home/safedns/SafeUTM.iso
```

The size must be the same as in the account the image was downloaded from. If the number is different, the file is corrupted and needs to be downloaded again.

2. Find the USB flash disk in the system:

```
$ lsblk --nodeps  -o name,size,fstype,tran,model,mountpoint /dev/sd*
NAME  SIZE FSTYPE TRAN MODEL        MOUNTPOINT
sdx   7,5G        usb  USB_DISK_3.0
sdx1  7,5G vfat                     /run/media/safedns/D661-82E2
```

We can see there is `/dev/sdx` USB flash disk, as well as the file system mounted on it.

3. Unmount the file system:

```
sudo umount /run/media/safedns/D661-82E2
```

4. Write the image to the disk:

```
$ sudo dd if=/home/safedns/SafeUTM.iso of=/dev/sdx bs=1M oflag=direct status=progress
```

5. Prepare the disk to be ejected:

```
$ sudo eject /dev/sdx
```

Setting up Hypervisors

Necessary conditions for SafeUTM work:
1. UEFI support.
2. Legacy download mode must be turned off (it may also be called CSM - Compatibility Support Module).
3. Turn off Secure Boot in UEFI.

SafeUTM supports the following hypervisors:

- VMware (Workstation and ESXi) versions 6.5.0 and higher;
- Microsoft Hyper-V (2nd generation);
- VirtualBox;
- KVM;
- Citrix XenServer.

In order to work on virtual machines, there is no need to install additional drivers or utilities on SafeUTM. Guest add-ons are included in the distribution package.

General Recommendations

- OS type to create a virtual machine: Linux Fedora, 64-bit;
- Minimum hard drive capacity - 64 Gb;
- Hard drive dynamic expansion is not automated but possible upon contacting technical support;
- Minimum memory size - 8 Gb;
- An internal VM clock must be set up for keeping time in the UTC time zone.

If during the installation of SafeUTM an error **"At least 8 GB of RAM is required"** appears on the screen, and you specified the recommended amount of RAM, then reduce the size of the resources allocated for video memory to the minimum.

Microsoft Hyper-V

Only the 2nd generation VMs for Windows Server 2012 R2 or higher are supported. It is necessary to turn off Secure Boot.

Always use a regular virtual network adapter.

VMware ESXi

Before SafeUTM installation it is necessary to increase video memory for the virtual machine to 16 Mb (the default is 4 Mb).

Vmxnet3 virtual network adapters are recommended for use.

Citrix XenServer

In case XenServer cannot be downloaded from an ISO file, follow these steps:

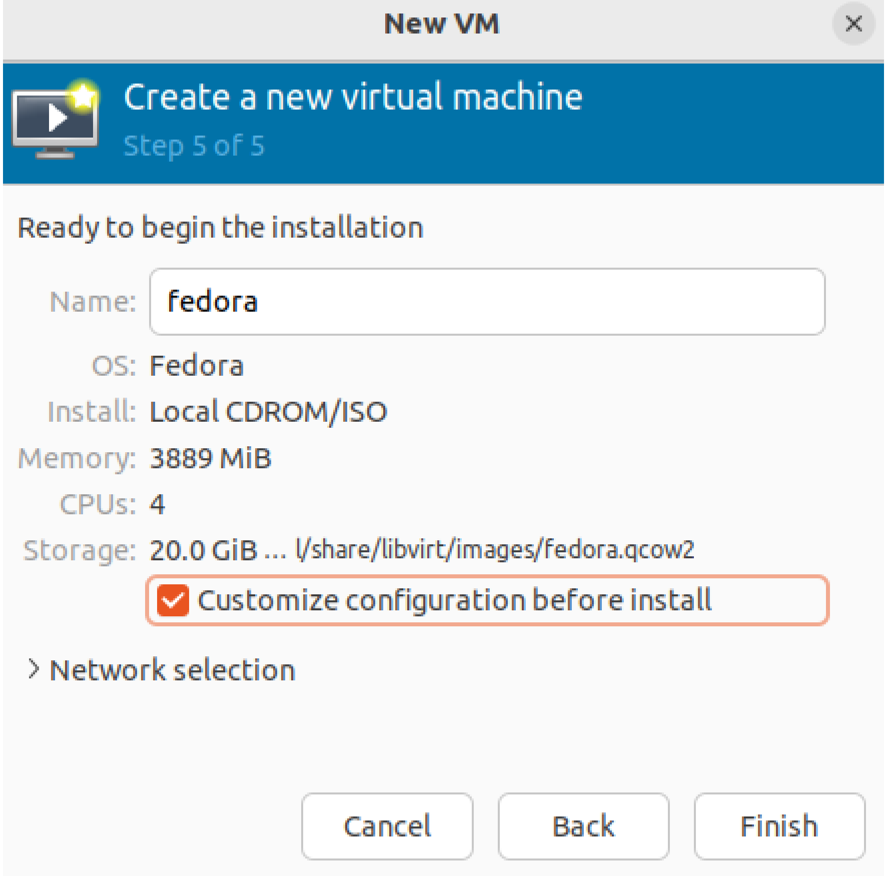
1. Run command `xe vm-list`. This command will show the list of virtual machines on XenServer.
2. Select a virtual machine with UTM and memorize its UUID.
3. Run command `xe vm-param-set uuid=<UUID> HVM-boot-policy=BIOS\ order HVM-boot-params:order=dc`

These steps should start the installation from the installation medium.

KVM

1. When installing SafeUTM choose **Fedora** as the type of operating system.

2. At Step 5 (virtm-manager) of installation make sure to tick **Customize configuration before installation** and click **Finish**.



New VM

Create a new virtual machine

Step 5 of 5

Ready to begin the installation

Name: fedora

OS: Fedora

Install: Local CDROM/ISO

Memory: 3889 MiB

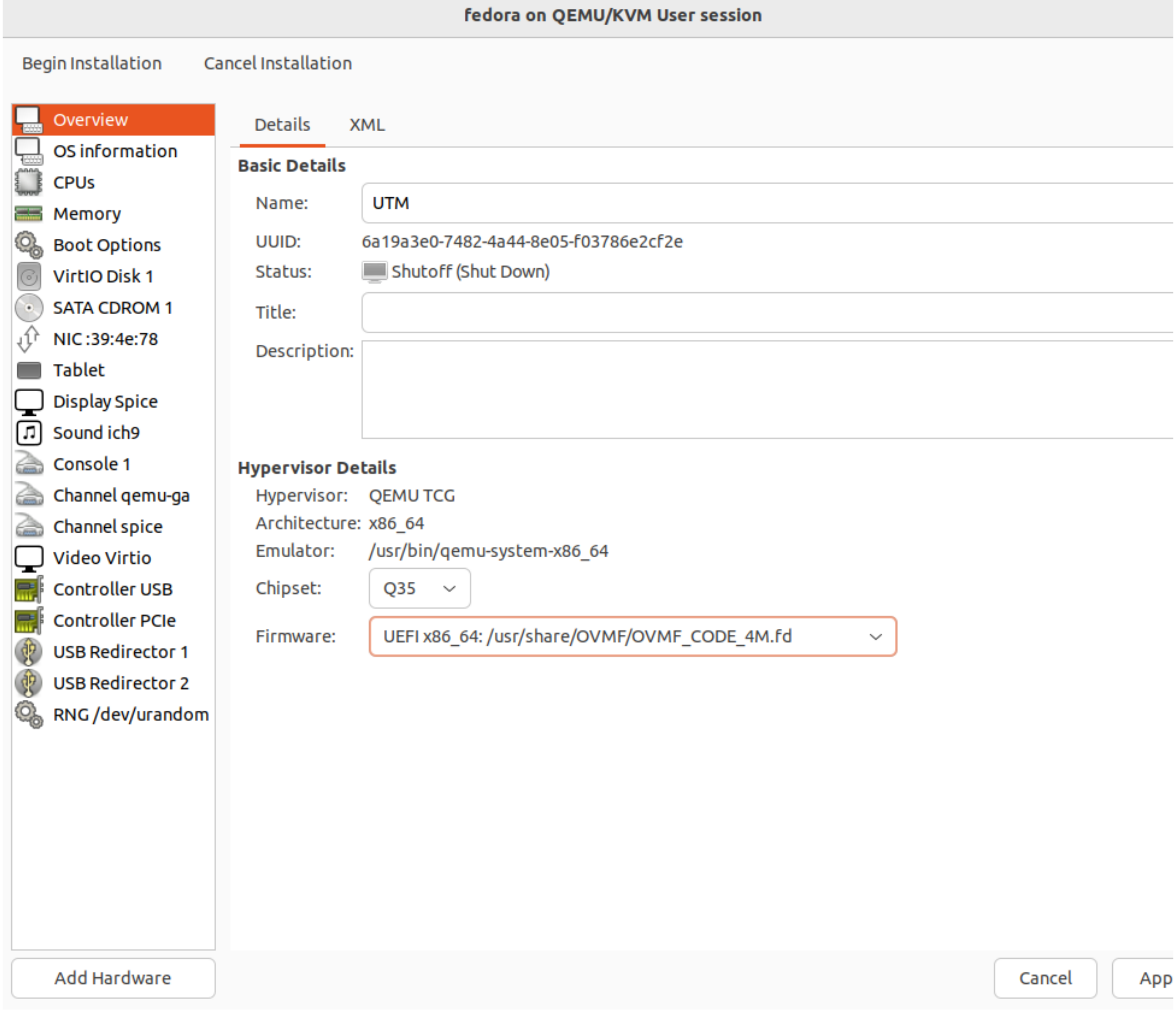
CPUs: 4

Storage: 20.0 GiB ... l/share/libvirt/images/fedora.qcow2

☑ Customize configuration before install

3. For disks and NICs select/change the network interface to **virtio.**
4. For disks use **writeback** cache mode if disks are stored in qcow2 or raw files. If it is not the case, please consult your storage admin or our technical support about the cache mode selection.

5. In the window, select **Overview** in the Firmware field and select **UEFI x86_64:/usr/share/OVMF/OVMF_CODE.fd**. This selection will turn on UEFI and turn off **Secure Boot**.



fedora on QEMU/KVM User session

Name: UTM

UUID: 6a19a3e0-7482-4a44-8e05-f03786e2cf2e

Status: Shutoff (Shut Down)

Title:

Description:

Hypervisor: QEMU TCG

Architecture: x86_64

Emulator: /usr/bin/qemu-system-x86_64

Chipset: Q35

Firmware: UEFI x86_64: /usr/share/OVMF/OVMF_CODE_4M.fd

If there is no **UEFI x86_64:/usr/share/OVMF/OVMF_CODE.fd** on the list, you need to install ovmf package. In Ubuntu, this package is installed with the command **sudo apt install ovmf**.

Installation Process

System Requirements

Mandatory conditions for work with SafeUTM:
1. UEFI support.
2. Turn off Legacy boot mode, it may be called CSM (Compatibility Support Module).
3. Turn off the Secure Boot option in UEFI.

Hardware	Minimum system requirements	Note
Processor	Intel Pentium G/i3/i5/Xeon E3/Xeon E5 with SSE 4.2 instructions support	Requirements may differ depending on network load and services used, as well as content filtering, antiviruses, and intrusion prevention system. The system requires at least 2 cores; a 4-core processor is better.
RAM	8 Gb (16Gb if the number of users is over 75)	Requirements may differ depending on network load and services used, as well as content filtering, antiviruses, and intrusion prevention system.
Disk subsystem	HDD or SSD, capacity 64 Gb or more, with SATA, SAS. Additional HDD or SSD when using a mail server is required.	Software RAID controllers are not supported (those integrated into the chipset or motherboard). Using hardware RAID controllers is not recommended.
Network adapters	One network adapter	Gigabit (or 10G) Intel network cards are recommended.
Additional	Display and keyboard	No preinstalled OS or additional software is required to install and run SafeUTM. SafeUTM is installed to a dedicated server from an installation USB-flash, a file system is automatically created and all necessary components are installed.

In order to choose the best hardware platform for you please follow the **guidelines** on equipment choice for SafeUTM. The approximate hard drive capacity to store the information of about 1000 users for 1 year is 10-15 Gb.

Browser support for server administration web interface

All up-to-date versions of Firefox, Chrome, and browsers based on Chromium are supported. Internet Explorer is not supported.

Hypervisor support

Microsoft Hyper-V (2nd generation, Windows 2012R2 or higher), VMware, VirtualBox, KVM, Citrix XenServer. More information can be found **here**.

Configuration examples

Examples of several types of configurations depending on the number of users can be seen in the table below.

Hardware	25	50-200	200-500	1000	2000
Processor	Intel Pentium Gold G5400 or compatible	Intel i3 8100 or compatible	Intel i5, i7, Xeon E3, 3 GHz and up, or compatible	Intel Xeon E3, E5 or compatible	Intel Xeon or compatible 8-core one
RAM	8 Gb	8 Gb	16 Gb	16 Gb	32 Gb
Storage space	64 Gb	64 Gb	250 Gb	500 Gb	500 Gb
Network adapters	2 pcs.	2 pcs.	2 pcs.	2 pcs.	2 pcs.

Performance data:

Configuration example: Intel Xeon E-2234, 16 GB DDR4, 1 GB LAN.

- Mode L3: TCP up to 1 Gbps, UDP up to 1 Gbps, HTTP up to Gbps.
- *Mode L7: TCP up to 550 Mbps, UDP up to 900 Mbps, HTTP up to 500 Mbps.

* - Mode L7: IPS modules, content filtering, application control, and antivirus scan are on.

Installation Options

You can install SafeUTM on a dedicated server or a virtual machine. It depends on the expected load and equipment capacity.

SafeUTM installation from a USB flash drive

SafeUTM can be installed from a flash drive by using an installation ISO file. This process is described in the **Creation of boot USB flash drive** article.

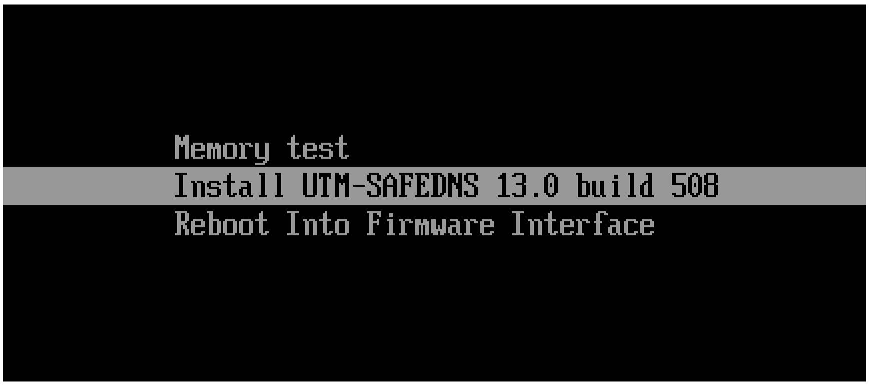
Installation on a dedicated server

In order to install the SafeUTM security gateway you need to follow these steps:

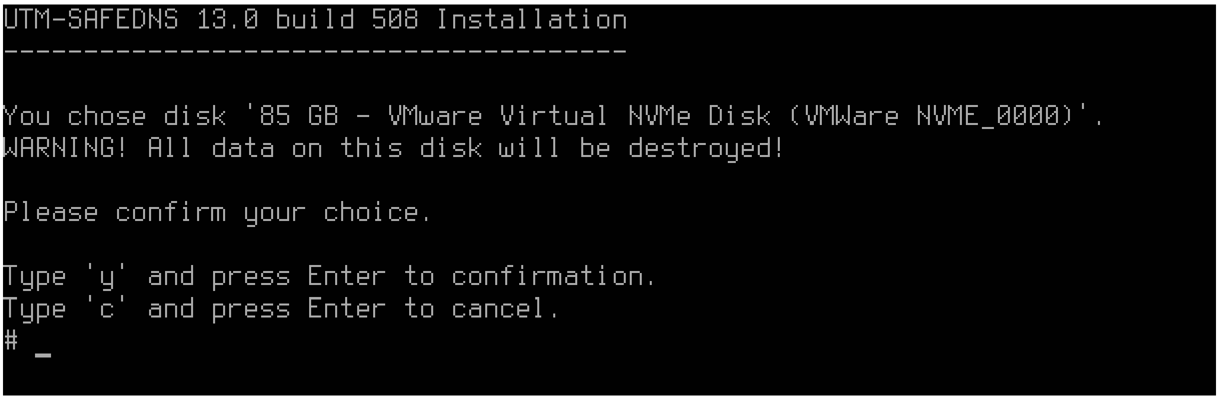
1. Prepare hardware in accordance with technical requirements.
2. Prepare a USB-flash drive with a capacity of over 2 Gb.
3. Receive the ISO file from your manager.
4. For safety reasons check the downloaded file checksum, which you can find on the SafeUTM downloads page in your personal account.
5. Create the bootable USB-flash drive using the ISO file.
6. In the computer’s BIOS settings choose "boot from USB-flash drive" and start the system installation from this USB drive. SafeUTM installer should appear on the screen as seen below.

Installation Process

Stage 1. Start of installation


Memory test
Install UTM-SAFEDNS 13.0 build 508
Reboot Into Firmware Interface

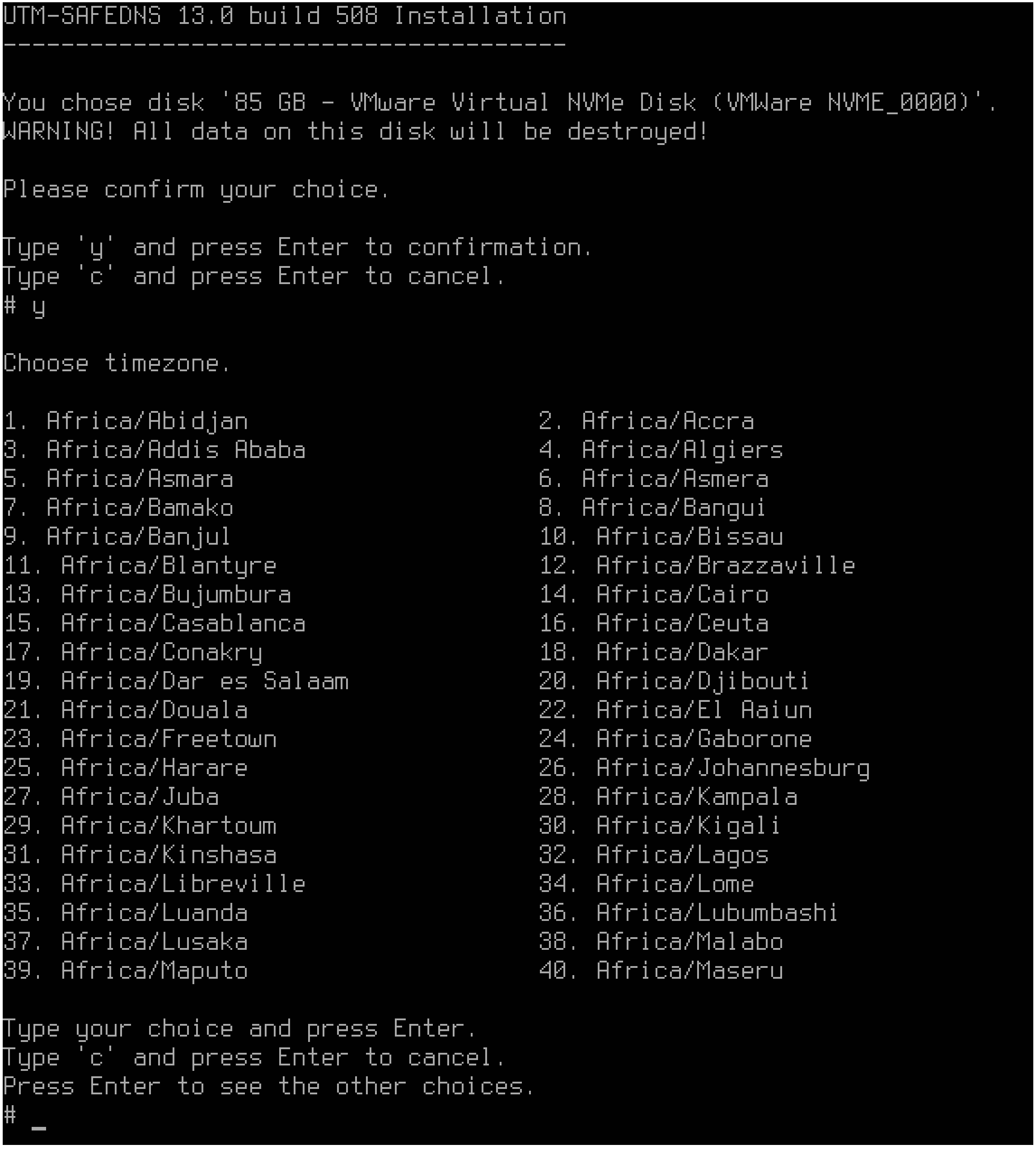
Choose a disk for installation. To do this, enter the number of the disk you wish to use and press **Enter**.



```
UTM-SAFEDNS 13.0 build 508 Installation
---------------------------------------

You chose disk '85 GB - VMware Virtual NVMe Disk (VMWare NVME_0000)'.
WARNING! All data on this disk will be destroyed!

Please confirm your choice.

Type 'y' and press Enter to confirmation.
Type 'c' and press Enter to cancel.
# _
```

The system will warn about the loss of all data stored on the disk. We recommend that you make sure the disk does not contain any important information, as it will not be possible to recover it. The data loss alert can be seen in the screenshot below. To continue, type **y** and press **Enter**.

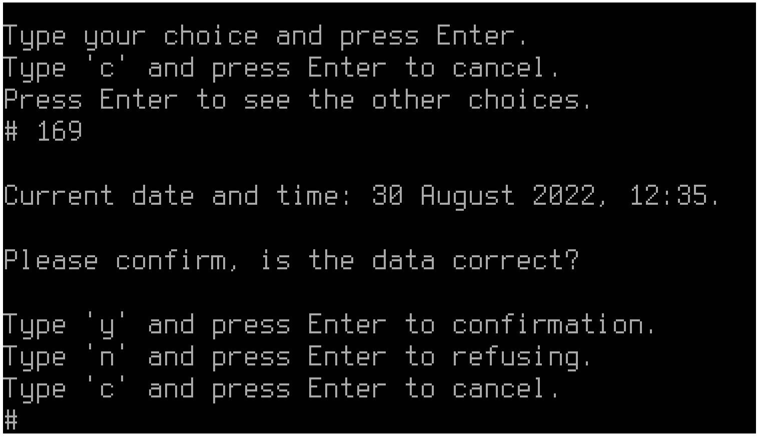
Now you need to select the time zone. Select the time zone you are in. To do this, type **y** and press **Enter**.



```
UTM-SAFEDNS 13.0 build 508 Installation
---------------------------------------

You chose disk '85 GB - VMware Virtual NVMe Disk (VMWare NVME_0000)'.
WARNING! All data on this disk will be destroyed!

Please confirm your choice.

Type 'y' and press Enter to confirmation.
Type 'c' and press Enter to cancel.
# y

Choose timezone.

1. Africa/Abidjan                    2. Africa/Accra
3. Africa/Addis Ababa                4. Africa/Algiers
5. Africa/Asmara                     6. Africa/Asmera
7. Africa/Bamako                     8. Africa/Bangui
9. Africa/Banjul                     10. Africa/Bissau
11. Africa/Blantyre                  12. Africa/Brazzaville
13. Africa/Bujumbura                 14. Africa/Cairo
15. Africa/Casablanca                16. Africa/Ceuta
17. Africa/Conakry                   18. Africa/Dakar
19. Africa/Dar es Salaam             20. Africa/Djibouti
21. Africa/Douala                    22. Africa/El Aaiun
23. Africa/Freetown                  24. Africa/Gaborone
25. Africa/Harare                    26. Africa/Johannesburg
27. Africa/Juba                      28. Africa/Kampala
29. Africa/Khartoum                  30. Africa/Kigali
31. Africa/Kinshasa                  32. Africa/Lagos
33. Africa/Libreville                34. Africa/Lome
35. Africa/Luanda                    36. Africa/Lubumbashi
37. Africa/Lusaka                    38. Africa/Malabo
39. Africa/Maputo                    40. Africa/Maseru

Type your choice and press Enter.
Type 'c' and press Enter to cancel.
Press Enter to see the other choices.
# _
```

In the next dialog box, you need to set up a date and time. If the settings are correct, type **y** and press **Enter**.

If the current settings are incorrect, type **n** and put in the correct data, then press **Enter**.



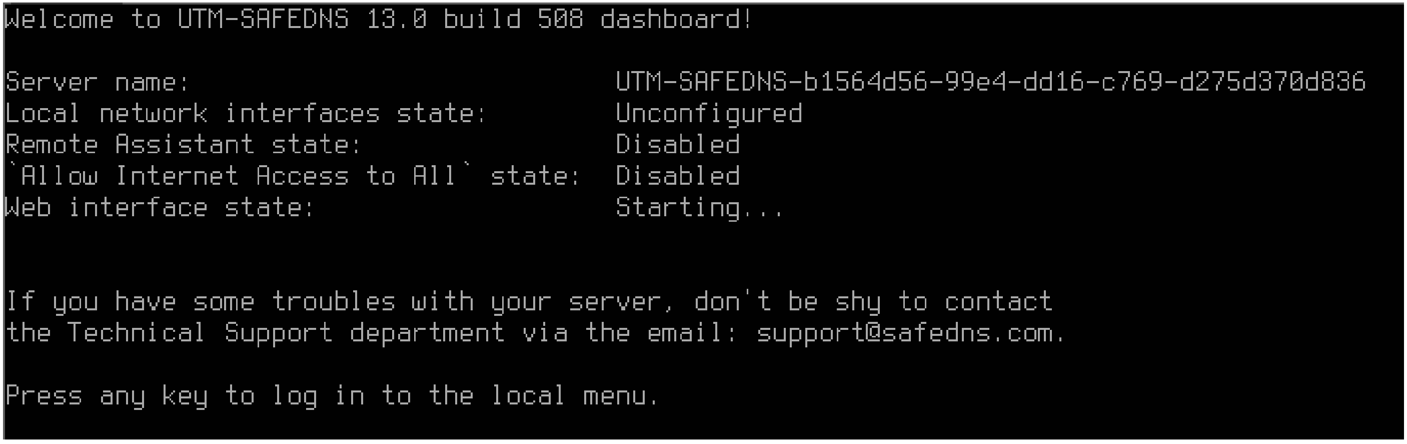
```
Type your choice and press Enter.
Type 'c' and press Enter to cancel.
Press Enter to see the other choices.
# 169

Current date and time: 30 August 2022, 12:35.

Please confirm, is the data correct?

Type 'y' and press Enter to confirmation.
Type 'n' and press Enter to refusing.
Type 'c' and press Enter to cancel.
#
```

Then the system will perform disk subsystem tests necessary for installation:

- A partition table will be created and formatted.
- System files will be copied onto the disk.
- Basic system settings will be configured according to your computer configuration.

> Don’t forget to eject the USB drive when restarting UTM so that the system doesn’t start booting from the installation drive.

After the server restarts, you will see a window with system info. An example of such a window can be seen below. To continue press any key.



```
Welcome to UTM-SAFEDNS 13.0 build 508 dashboard!

Server name:                           UTM-SAFEDNS-b1564d56-99e4-dd16-c769-d275d370d836
Local network interfaces state:        Unconfigured
Remote Assistant state:                Disabled
`Allow Internet Access to All` state:  Disabled
Web interface state:                   Starting...


If you have some troubles with your server, don't be shy to contact
the Technical Support department via the email: support@safedns.com.

Press any key to log in to the local menu.
```

If you want to configure the server as the second node of the cluster, press **y** and then **Enter**. For more information about configuring clustering, see the **High Availability** article.

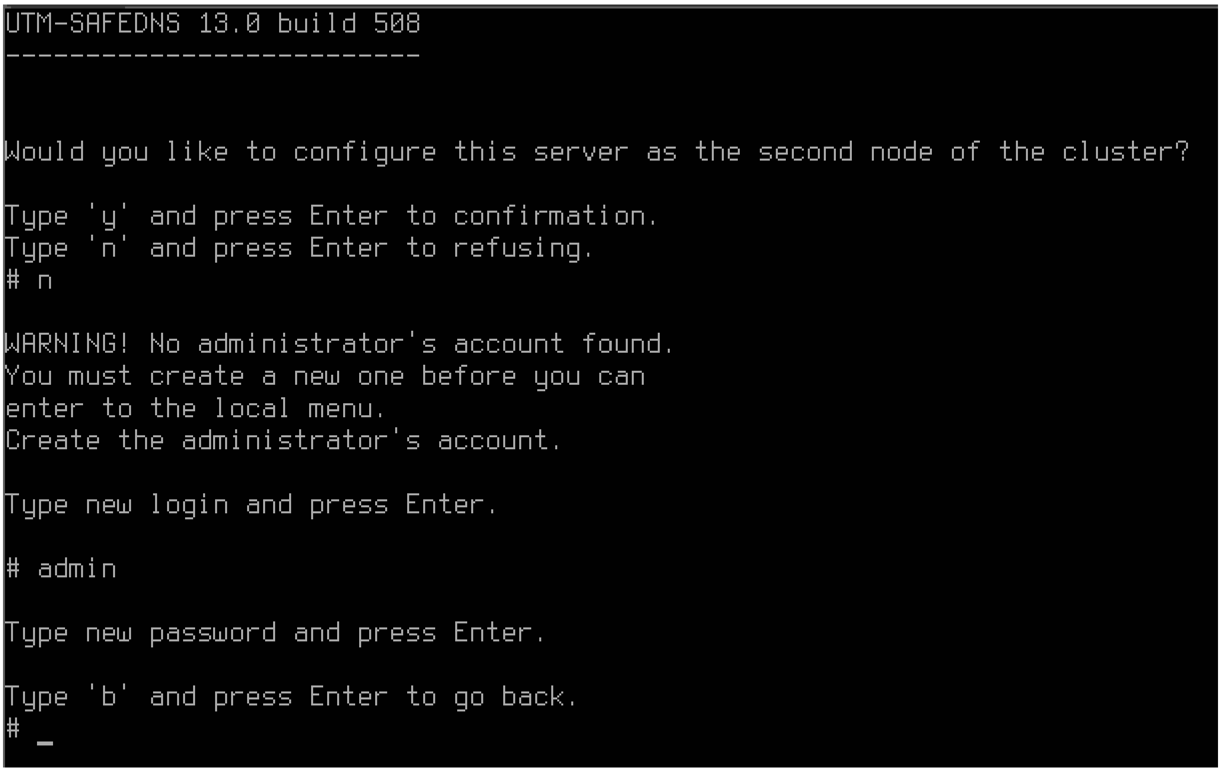
If the clustering setup is not required, press **n** and then **Enter**.

Stage 2. Creating admin’s account

Create an admin account. After typing in login press **Enter** and type in a new account password, then press **Enter**.

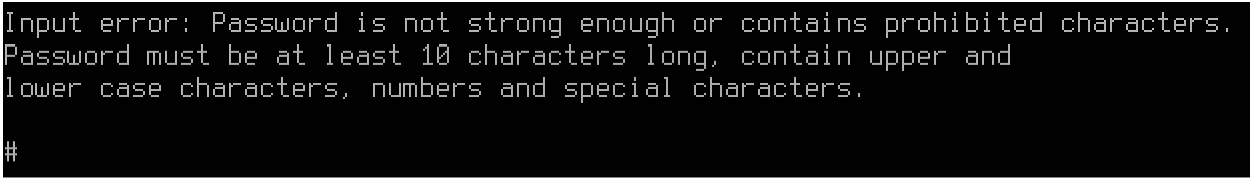
Admin password requirements:

- Minimum 10 symbols.
- Upper- and lower-case Latin letters.
- At least one digit
- Special characters (! # $ % & ' * + etc.)



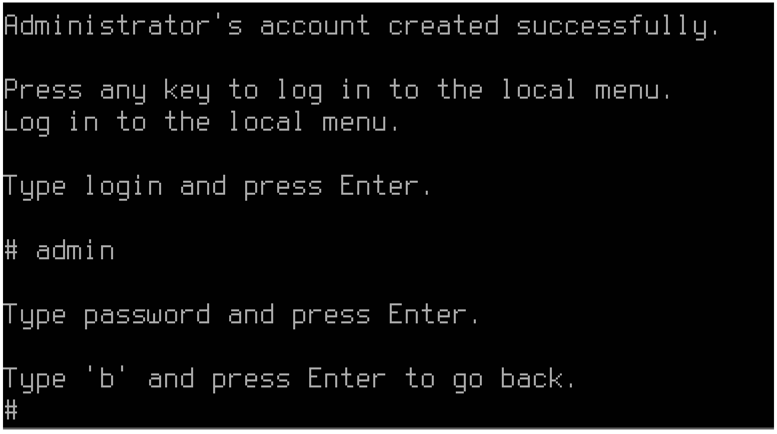
```
UTM-SAFEDNS 13.0 build 508
--------------------------


Would you like to configure this server as the second node of the cluster?

Type 'y' and press Enter to confirmation.
Type 'n' and press Enter to refusing.
# n

WARNING! No administrator's account found.
You must create a new one before you can
enter to the local menu.
Create the administrator's account.

Type new login and press Enter.

# admin

Type new password and press Enter.

Type 'b' and press Enter to go back.
# _
```

If the password does not pass the security policy requirements, a notification about password unreliability will appear. You need to type in another password taking into consideration password requirements and press **Enter**.



```
Input error: Password is not strong enough or contains prohibited characters.
Password must be at least 10 characters long, contain upper and
lower case characters, numbers and special characters.

#
```

When the account has been created, press any key to switch to the local menu and type in data from the newly created admin’s account.

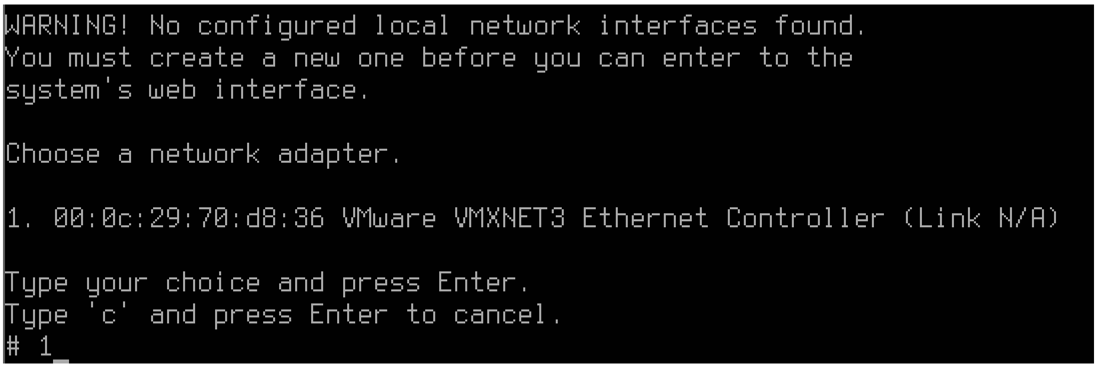


```
Administrator's account created successfully.

Press any key to log in to the local menu.
Log in to the local menu.

Type login and press Enter.

# admin

Type password and press Enter.

Type 'b' and press Enter to go back.
#
```

Stage 3. Network adapter setup

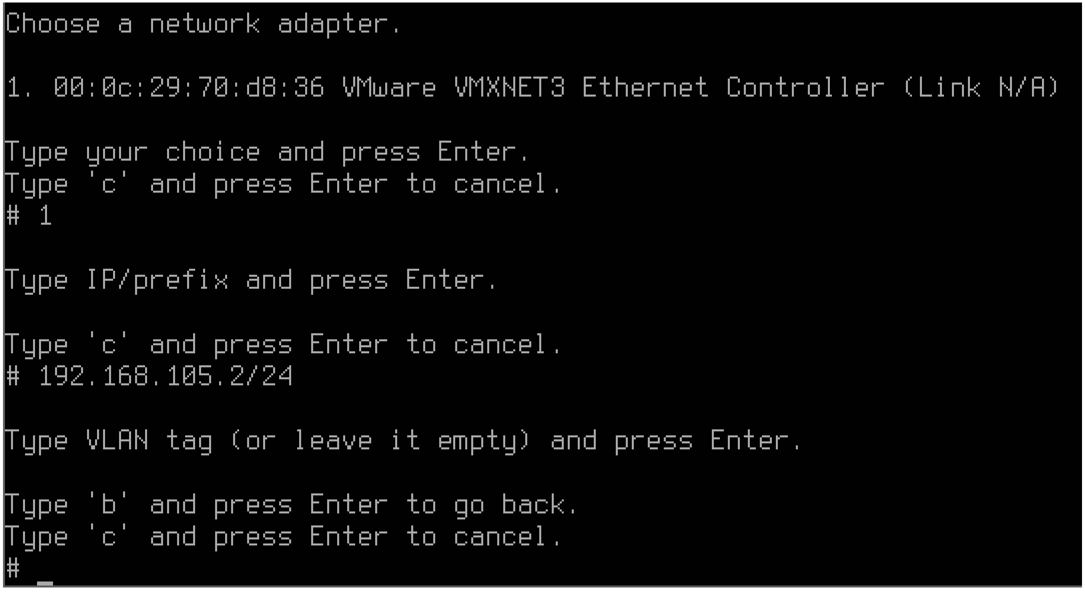
Now the system will suggest that you set up a local network interface. It is the interface to which all your enterprise network will be connected. Type in the network adapter number from the list and press **Enter**.

During local interface definition, you may encounter difficulties with NIC identification. Sometimes several adapters may have the same manufacturer. In such a case in order to avoid a mistake, you need to identify the device by its MAC address. Do not worry about making a mistake, you can change these settings later.



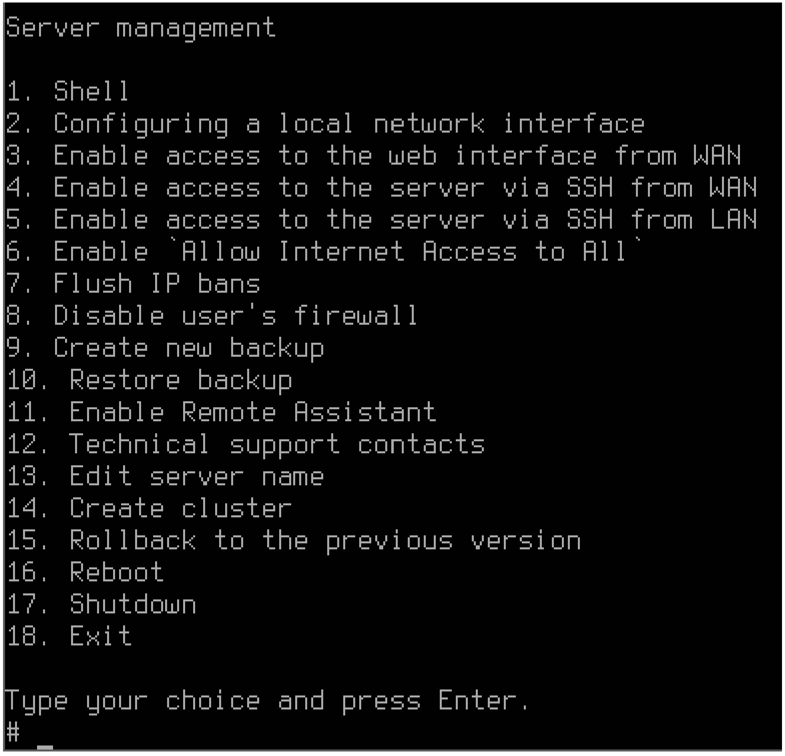
```
WARNING! No configured local network interfaces found.
You must create a new one before you can enter to the
system's web interface.

Choose a network adapter.

1. 00:0c:29:70:d8:36 VMware VMXNET3 Ethernet Controller (Link N/A)

Type your choice and press Enter.
Type 'c' and press Enter to cancel.
# 1_
```

Type in the local IP address subnet mask as `ip/mask` and press **Enter**.
Next, if necessary, create a VLAN tag or leave the field empty and press **Enter**.



```
Choose a network adapter.

1. 00:0c:29:70:d8:36 VMware VMXNET3 Ethernet Controller (Link N/A)

Type your choice and press Enter.
Type 'c' and press Enter to cancel.
# 1

Type IP/prefix and press Enter.

Type 'c' and press Enter to cancel.
# 192.168.105.2/24

Type VLAN tag (or leave it empty) and press Enter.

Type 'b' and press Enter to go back.
Type 'c' and press Enter to cancel.
# _
```

After creating a local interface, the server administration menu will open.



```
Server management

1. Shell
2. Configuring a local network interface
3. Enable access to the web interface from WAN
4. Enable access to the server via SSH from WAN
5. Enable access to the server via SSH from LAN
6. Enable `Allow Internet Access to All`
7. Flush IP bans
8. Disable user's firewall
9. Create new backup
10. Restore backup
11. Enable Remote Assistant
12. Technical support contacts
13. Edit server name
14. Create cluster
15. Rollback to the previous version
16. Reboot
17. Shutdown
18. Exit

Type your choice and press Enter.
# _
```

The next step is SafeUTM configuration. This process is described in the **Initial configuration** article.

Initial Configuration

Connection to SafeUTM Web Interface

> If you haven’t installed SafeUTM yet, please see the **Installation Process** article.

After you have successfully installed SafeUTM you can start its initial configuration.

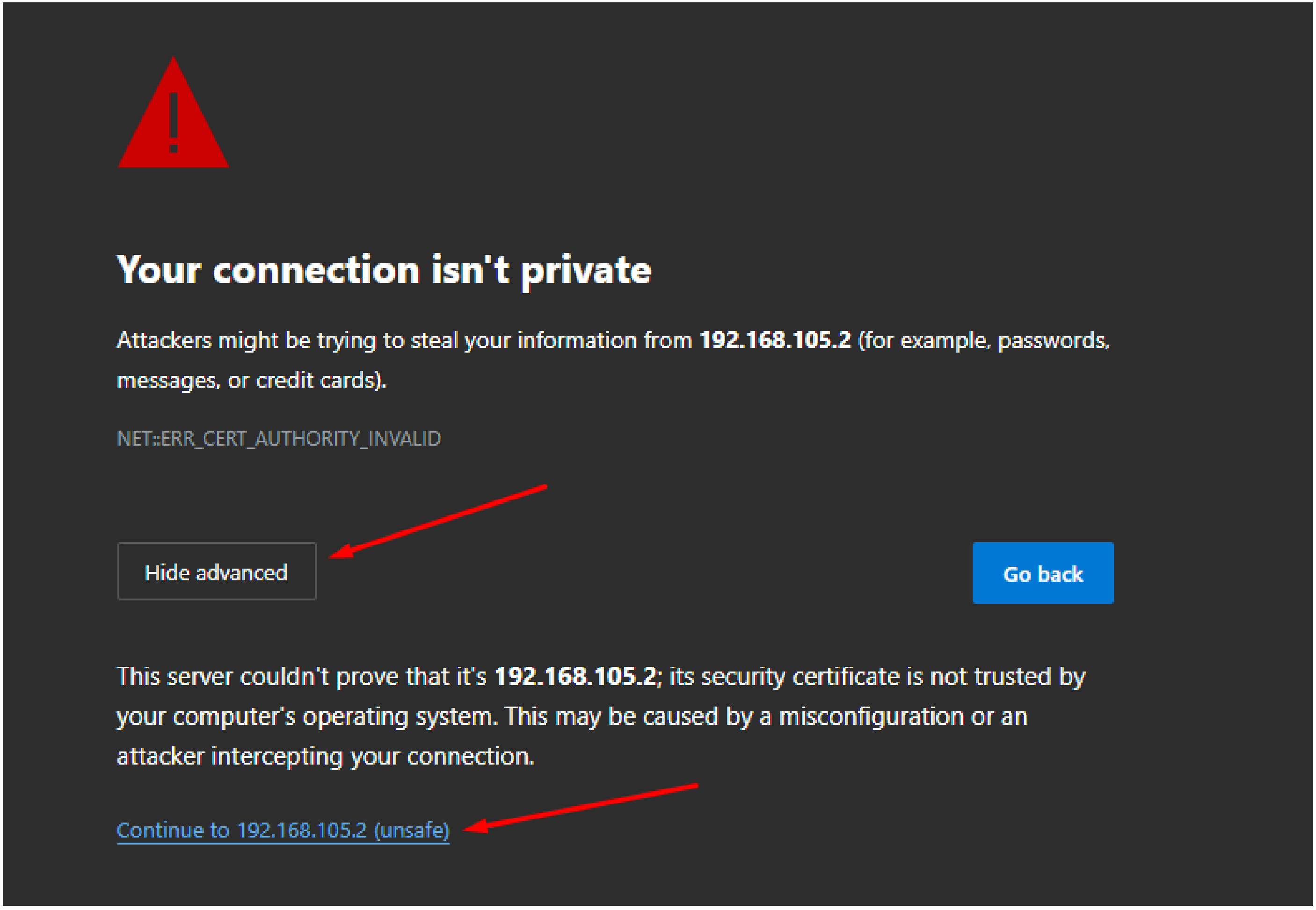
Start an internet browser on any local network computer, for example, Mozilla Firefox or Google Chrome (Internet Explorer is not supported). In the address bar type in the local IP address indicated in the settings during the local network interface installation and port **8443** used by the web interface in the format:

`IP-address:port`

Example: 192.168.100.2:8443

As encryption is used during connection to the web interface, the internet browser may display an error saying the security certificate was not issued by a trusted certificate authority. In such a case you need to continue to the website by clicking on the corresponding button at the bottom of the window.

Error example in Google Chrome:



Your connection isn't private

Attackers might be trying to steal your information from **192.168.105.2** (for example, passwords, messages, or credit cards).

NET::ERR_CERT_AUTHORITY_INVALID

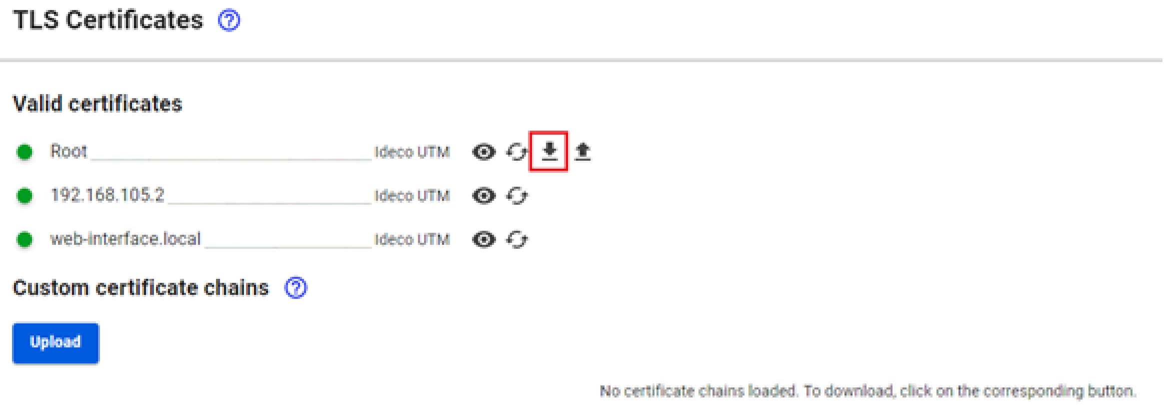
This server couldn't prove that it's **192.168.105.2**; its security certificate is not trusted by your computer's operating system. This may be caused by a misconfiguration or an attacker intercepting your connection.

When you continued to the website using the IP address, a SafeUTM web interface authorization window will open. Type in the admin account login and password information you used during SafeUTM installation.

In order to avoid the error in the future, import the UTM root certificate into the browser.

There are two ways to download the certificate:

1. Go to **Services -> TLS Certificates**, and click on the **Download root certificate** icon:



TLS Certificates

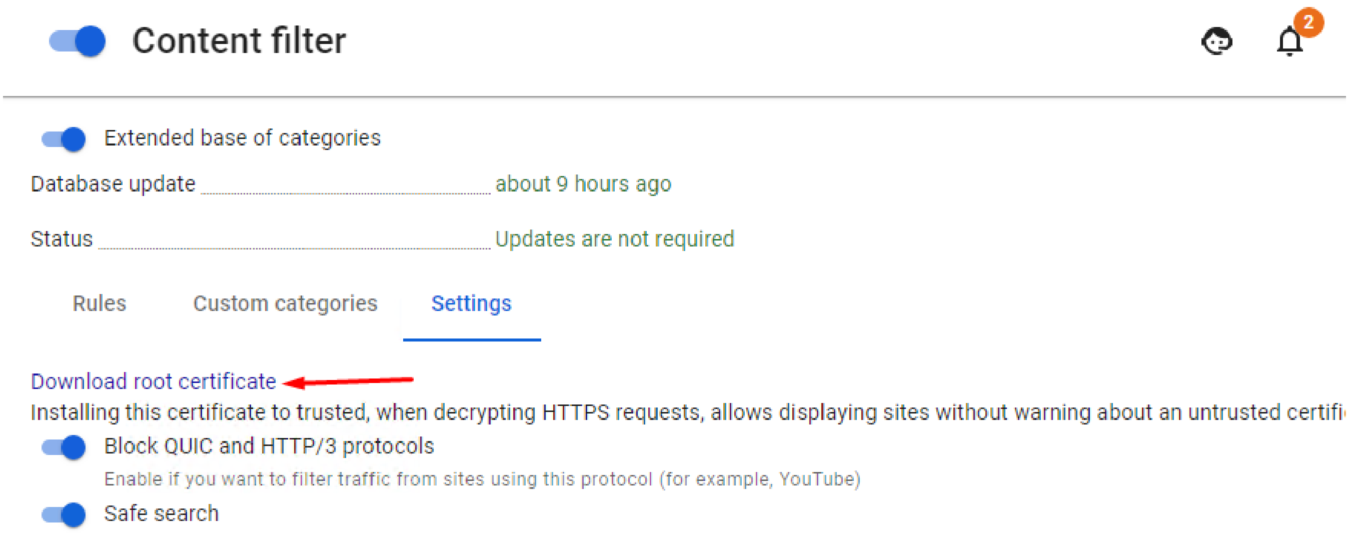
Valid certificates

● Root	Ideco UTM
● 192.168.105.2	Ideco UTM
● web-interface.local	Ideco UTM

Custom certificate chains

No certificate chains loaded. To download, click on the corresponding button.

2. Go to **Traffic rules -> Content filter -> Settings**:



Content filter

Extended base of categories

Database update .... about 9 hours ago

Status .... Updates are not required

Download root certificate

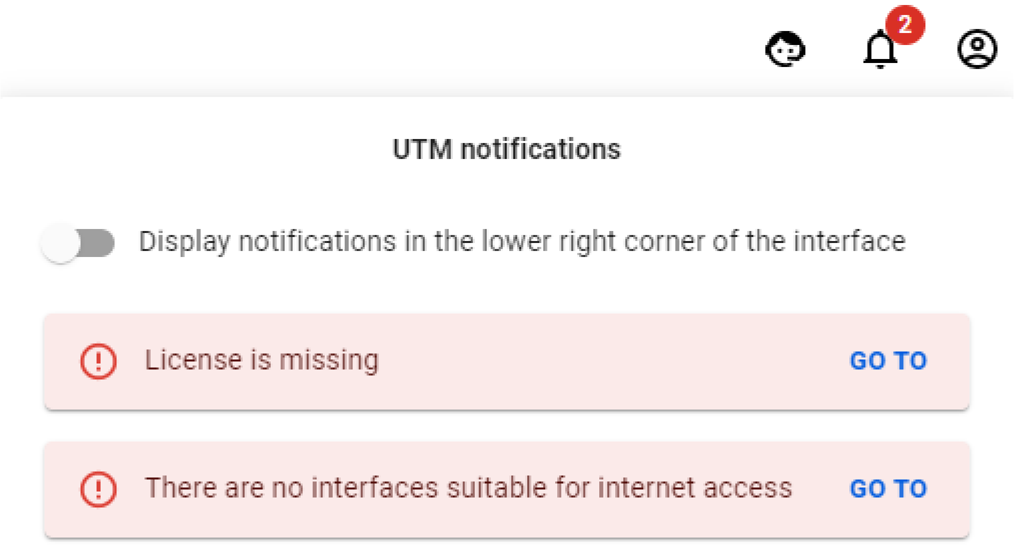
Installing this certificate to trusted, when decrypting HTTPS requests, allows displaying sites without warning about an untrusted certifi

Block QUIC and HTTP/3 protocols

Enable if you want to filter traffic from sites using this protocol (for example, YouTube)

Safe search

After you first log in, you will see a few notifications that will advise you that in order to work correctly SafeUTM needs to set up a connection to the provider and register a server.



UTM notifications

Display notifications in the lower right corner of the interface

License is missing

There are no interfaces suitable for internet access

Setting up a Connection to the Internet Provider

In order to set up a connection to the provider go to **Services -> Network Interfaces**.

Ethernet connection setup

This type of connection requires setting up the parameters described in the table below.

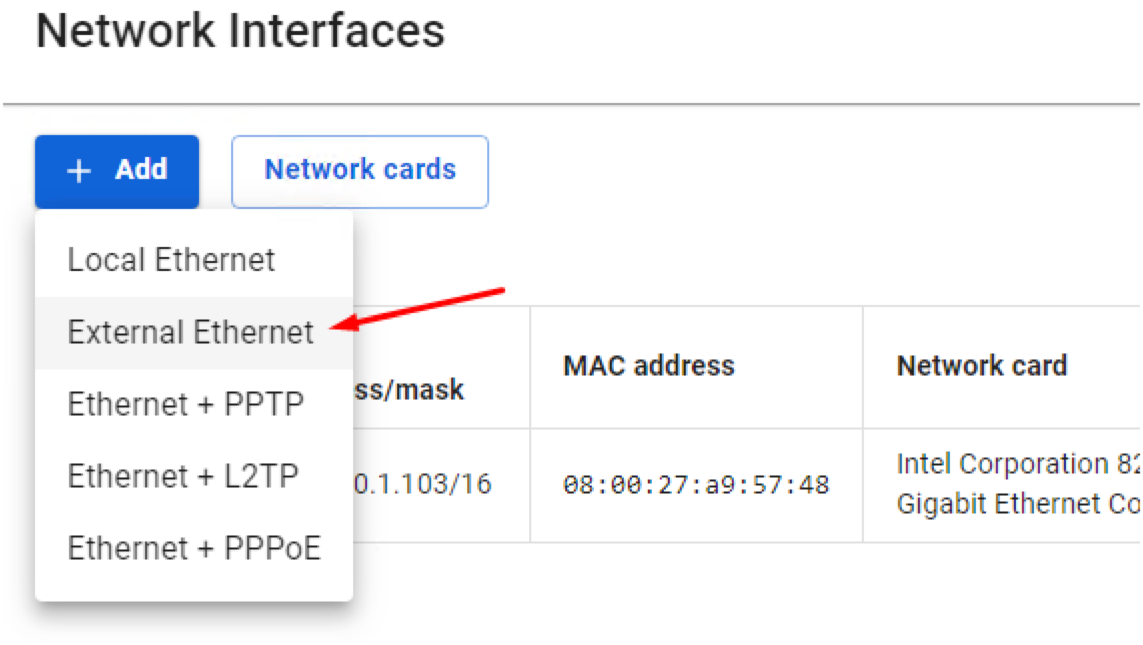
Parameter	**Note**
Network card	It is necessary to identify the network adaptor that will be used to connect to the internet provider. To identify the adaptor, you can use either the manufacturer’s name or MAC address.

IP-address and mask	The network credentials are assigned by the provider. Specify the IP address and netmask as CIDR or a four-octet number.
Default gateway	Specify the internet provider’s IP address that will be used to connect to the internet.

> If your provider supports auto-configuration of an external network interface using DHCP protocol, tick **Automatic Configuration via DHCP**.

In order to set up an Ethernet connection follow these steps:

1. Click on "**+ Add**" in the upper left corner and select **External Ethernet**.



ss/mask	MAC address	Network card
0.1.103/16	08:00:27:a9:57:48	Intel Corporation 82 Gigabit Ethernet Co

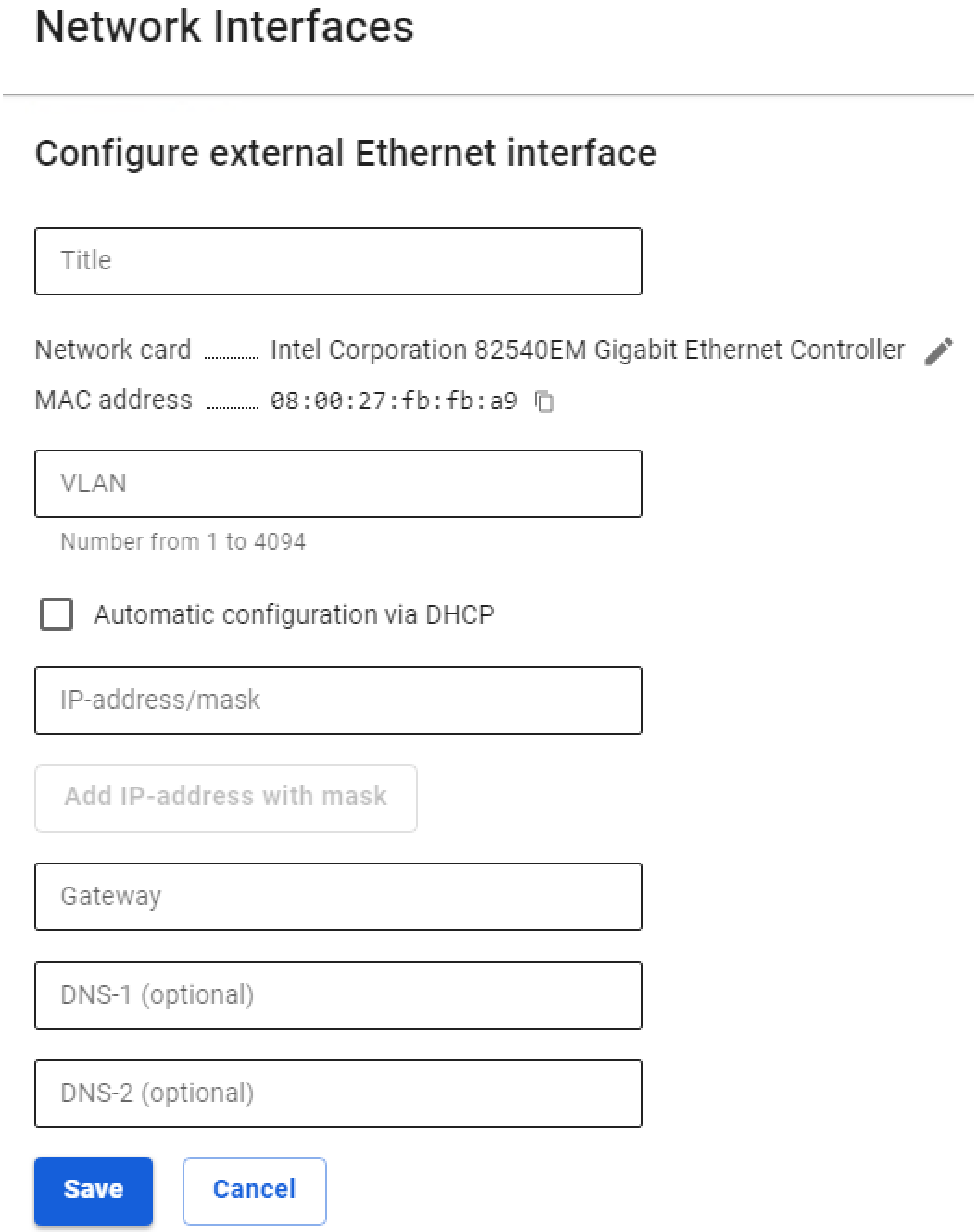
> **Attention!**
> If you select **Local Ethernet** and set it up as **External Ethernet, internet access will not be possible.**

2. Choose the applicable Network card.

3. Fill out the following mandatory fields:

- Title
- IP-address/mask

- Gateway (or tick the *Automatic configuration via DHCP*);



Network Interfaces

Configure external Ethernet interface

Network card .... Intel Corporation 82540EM Gigabit Ethernet Controller

MAC address 08:00:27:fb:fb:a9

4. Check that all the data are correct and click **Save**.

Setting up other types of connection

If your provider uses another type of connection, you can see other setup manuals following the links below:

- **PPPoE connection**
- **PPTP connection**
- **L2TP connection**
- **Local Ethernet connection**

- **3G and 4G connection**
- **Simultaneous connection to several providers**

After connecting to the internet, it is necessary to **register** a server.