

# INSTALLATION INSTRUCTIONS

## S.A.NE SERVER V 1.0

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# Dear Customer,

Thank you for purchasing Bondix S.A.NE Server v1.0!

Installing our software on your existing, supported infrastructure is easy and you'll be finished in a few minutes. This manual will show you step by step what you need to do and be careful about. The last chapter is for troubleshooting, should you run into difficulties.

In case you won't find the answers you need in this manual or have suggestions on how to improve it, please don't hesitate to contact us:

write to [info@bondixintelligence.com](mailto:info@bondixintelligence.com)

or

call +49 156 78 723 101

We'll be happy to help.

For now, we wish you joyful installing!

Your Bondix team

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# 1 PREPARATIONS

To install the Bondix S.A.NE Server, you will need a few minutes of stable Internet, a web browser, and possibly some coffee or tea.

## 1.1 Supported browsers

The following browsers have been tested to function properly with Bondix S.A.NE:

- Google Chrome
- MS Edge
- Mozilla Firefox

## 1.2 Installing the Linux VM (Ubuntu 20.4)



For the installation, you will need root rights.

Set your firewalls to the following settings:

```
S.A.NE server port shares
  - TCP: 443, 80
  - UDP: 44343
SSH (Optional): 22
```

Make sure your server has a public static IP and is reachable from the Internet.

Execute the following script in the terminal window of your server to download the latest version of the S.A.NE server:

```
wget https://releases.bondix.dev/endpoint/install-bondix-server.sh
```

```
System information as of Sun 27 Feb 2022 10:12:14 AM UTC

System load:  0.0          Processes:           103
Usage of /:   7.6% of 18.47GB  Users logged in:    1
Memory usage: 7%          IPv4 address for eth0: 49.12.238.202
Swap usage:  0%           IPv6 address for eth0: 2a01:4f8:c0c:7273::1

0 updates can be applied immediately.

The list of available updates is more than a week old.
To check for new updates run: sudo apt update

Last login: Sun Feb 27 10:09:35 2022 from 5.10.4.168
root@ubuntu-2gb-nbg1-1:~# wget https://releases.bondix.dev/endpoint/install-bondix-server.sh
--2022-02-27 10:17:19-- https://releases.bondix.dev/endpoint/install-bondix-server.sh
Resolving releases.bondix.dev (releases.bondix.dev)... 85.235.65.227
Connecting to releases.bondix.dev (releases.bondix.dev)|85.235.65.227|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 3930 (3.8K) [application/octet-stream]
Saving to: 'install-bondix-server.sh'

install-bondix-server.sh      100%[=====>]      3.84K  --.-KB/s   in 0s

2022-02-27 10:17:19 (468 MB/s) - 'install-bondix-server.sh' saved [3930/3930]

root@ubuntu-2gb-nbg1-1:~# |
```

To start the installation, enter the following commands:

```
chmod a+x install-bondix-server.sh
sudo ./install-bondix-server.sh
```

Confirm all the following prompts with the Enter key for a standard installation.

```
root@ubuntu-2gb-nbg1-1:~# chmod a+x install-bondix-server.sh
root@ubuntu-2gb-nbg1-1:~# sudo ./install-bondix-server.sh
Bondix S.A.NE Server Installation 0.1
=====
Installation Directory [/opt/bondix]:
Network interface for outgoing traffic [eth0]:
Downloading server package...
Extracting files...
Generating certificate...

Creating system.d service
Created symlink /etc/systemd/system/multi-user.target.wants/bondix.service → /etc/systemd/system/bondix.service.

Please copy your license.json file to /opt/bondix/server to complete the installation.
Afterwards, run 'systemctl restart bondix'. Without a license, the server will eventually stop working.

Web interface:
  https://49.12.238.202/      User: admin      Password: Vz1stfe/vI4IhQ7i
Real-Time tunnel monitor & debug settings:
  https://49.12.238.202/config Password: Vz1stfe/vI4IhQ7i

You can change your credentials by editing /etc/saneserver.json

Done!
root@ubuntu-2gb-nbg1-1:~#
```

After completing the installation, you can reach S.A.NE server web interface at the IP address shown. Log in with the username "admin" and the password previously generated during installation.

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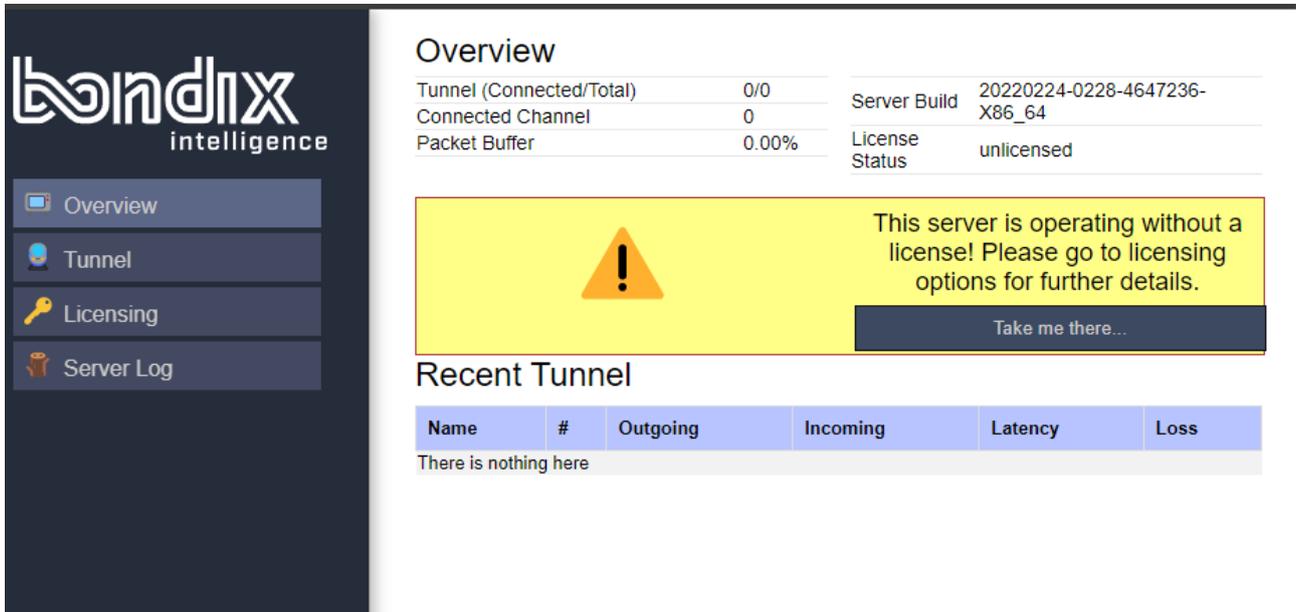


The screenshot shows a login form with two input fields: "Username" containing "admin" and "Password" containing a masked password. A "Login" button is positioned to the right of the password field. Below the form, the text "Login failed" is displayed.

## 2 BONDIX S.A.NE SERVER

### 2.1 Licensing

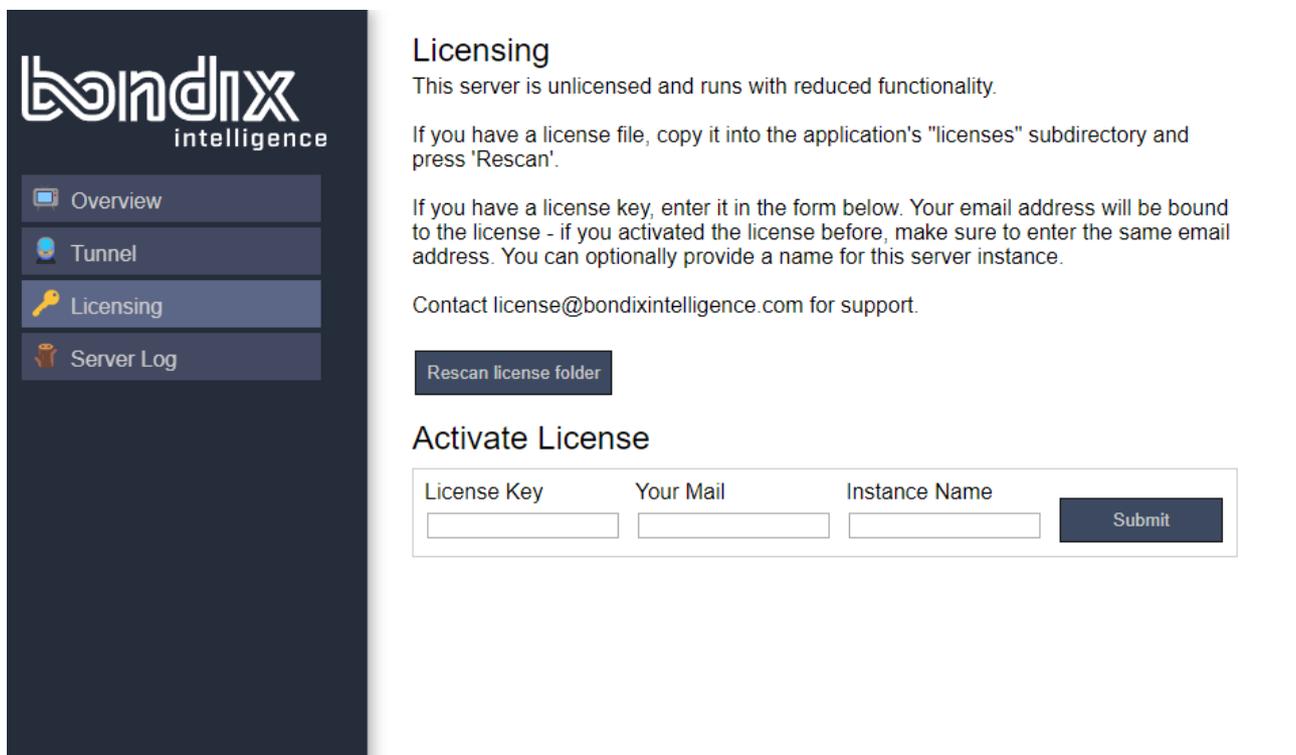
If your server is not already licensed, you first need to activate the S.A.NE Server Tunnel license under the menu item "Licensing".



The screenshot shows the 'Overview' page of the Bondix Intelligence server. The left sidebar contains navigation links for Overview, Tunnel, Licensing, and Server Log. The main content area has an 'Overview' section with a table of server statistics:

Tunnel (Connected/Total)	0/0	Server Build	20220224-0228-4647236-X86_64
Connected Channel	0	License Status	unlicensed
Packet Buffer	0.00%		

Below the table is a yellow warning box with a triangle icon and the text: "This server is operating without a license! Please go to licensing options for further details." A button labeled "Take me there..." is located at the bottom right of the warning box. Underneath is a "Recent Tunnel" section with a table header: Name, #, Outgoing, Incoming, Latency, Loss. The table content is empty, with the text "There is nothing here" below it.



The screenshot shows the 'Licensing' page of the Bondix Intelligence server. The left sidebar is the same as in the Overview page. The main content area has a 'Licensing' section with the following text:

This server is unlicensed and runs with reduced functionality.

If you have a license file, copy it into the application's "licenses" subdirectory and press 'Rescan'.

If you have a license key, enter it in the form below. Your email address will be bound to the license - if you activated the license before, make sure to enter the same email address. You can optionally provide a name for this server instance.

Contact [license@bondixintelligence.com](mailto:license@bondixintelligence.com) for support.

There is a button labeled "Rescan license folder".

Below is the "Activate License" section with a form:

License Key	Your Mail	Instance Name	Submit
<input type="text"/>	<input type="text"/>	<input type="text"/>	

Enter the S.A.NE license key here, as well as a valid email address to which the license key is bound. You can also enter a name for the server instance here. Then press "Submit".

Rescan license folder

## Activate License

License Key	Your Mail	Instance Name	Submit
6e5b31cb-c1ea-43a6-9	support@bondixintellig	Server	

After the successful activation, the Licensing overview will display the number of licensed tunnels as well as the expiry date of your active tunnel subscriptions with the respective expiry date and the maximum number of active server instances possible under this license number.

The screenshot shows the Bondix Intelligence web interface. On the left is a dark sidebar with the logo and navigation menu: Overview, Tunnel, Licensing (selected), and Server Log. The main content area is titled "Licensing" and contains the following information:

- Licensing**: Your server is authorized online. Active subscriptions are shown below.
- Registered to: support@bondixintelligence.com
- Instance Name: Server
- Licenses**: A table with 4 columns: ID, Tunnel, Instances, Valid Until.
- Activate License**: A form with a License Key input field and a Submit button.

ID	Tunnel	Instances	Valid Until
6e5b31cb-****-****-****-*****56f4	10	2	2023/03/01

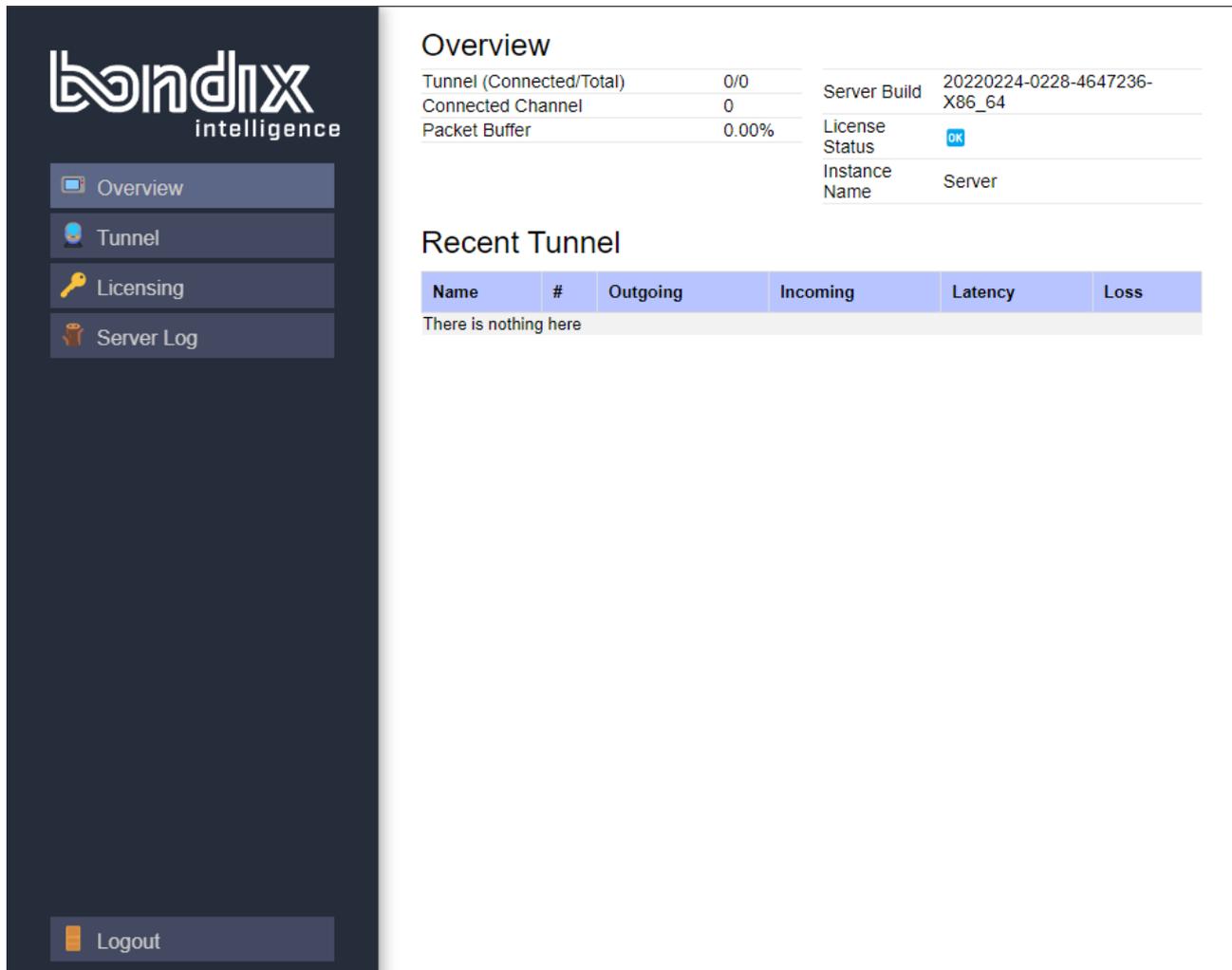
License was activated successfully.

You can add further additional tunnels/server instances at any time under the item "Activate License".

## 2.2 Administration

### 2.2.1 OVERVIEW

This is the web interface of a licensed S.ANE server.



The screenshot displays the Bondix Intelligence web interface. On the left is a dark sidebar with the logo and navigation menu. The main content area is titled 'Overview' and contains two tables. The first table shows server statistics, and the second table is titled 'Recent Tunnel' and is currently empty.

**Navigation Menu:**

- Overview
- Tunnel
- Licensing
- Server Log
- Logout

**Overview Section:**

Tunnel (Connected/Total)		0/0
Connected Channel		0
Packet Buffer		0.00%

Server Build	20220224-0228-4647236-X86_64
License Status	<span style="color: blue;">OK</span>
Instance Name	Server

**Recent Tunnel Section:**

Name	#	Outgoing	Incoming	Latency	Loss
There is nothing here					

## 2.2.2 BONDIX S.A.NE TUNNELS

To connect a S.A.NE-compatible router to a S.A.NE server, you first need to create a tunnel for this respective router. Only then does the server know that there will be a new router to receive data from and send data to.

### 2.2.2.1 Create a new S.A.NE tunnel

Navigate to the menu item "Tunnel". Select the tunnel environment for which you want to create the tunnel by clicking the corresponding tab; the default is set to "env0". Then, assign a unique tunnel name and press "Create".



The tunnel name must not contain any spaces.

**bandix**  
intelligence

- Overview
- Tunnel**
- Licensing
- Server Log

### Tunnel Environments

env0 Add Environment

Environment Settings

Name	#	Outgoing	Incoming	Latency	Loss
There is nothing here					

### Add Tunnel

Name  Create

### Tunnel Environments

env0 Add Environment

Environment Settings

Name	#	Outgoing	Incoming	Latency	Loss
There is nothing here					

### Add Tunnel

Name  Create

You will then automatically be navigated to the settings window of the newly created tunnel. There, set a password for establishing the connection, make sure that “Enabled” is ticked, and then press “Save”.

**Tunnel: Demo0001**

Enabled
   
 Override Client Settings

Name	Demo0001
Connected Channel	0
Authentication	manual
Environment	env0
Client IP	169.254.19.2
Last Connect	never
Last Disconnect	never
Upstream	0.00 KBit/sec
Downstream	0.00 KBit/sec

**Channel**

Name	Status	Latency	Loss

**Actions**

Your tunnel is now displayed under the menu item “Overview”. You can access settings for each tunnel simply by clicking on the tunnel name.

**Overview**

Tunnel (Connected/Total)	1/1
Connected Channel	3
Packet Buffer	0.00%

Server Build: 20220224-0228-4647236-X86\_64  
 License Status: OK  
 Instance Name: Server

**Recent Tunnel**

Name	#	Outgoing	Incoming	Latency	Loss
<a href="#">Demo0001</a>	3	0.50 KBit/sec	3.49 KBit/sec	19.43ms	0.00%

### 2.2.2.2 Connect a compatible router to a S.A.NE server.

Make sure that the latest Bondix S.A.NE client is installed on your router. Go to the settings menu of your router's S.A.NE client and enter the server's IP address and the tunnel name and password you created in [chapter 3.2.2](#) in the corresponding fields. Save your entry and then restart the service (Restart Service).

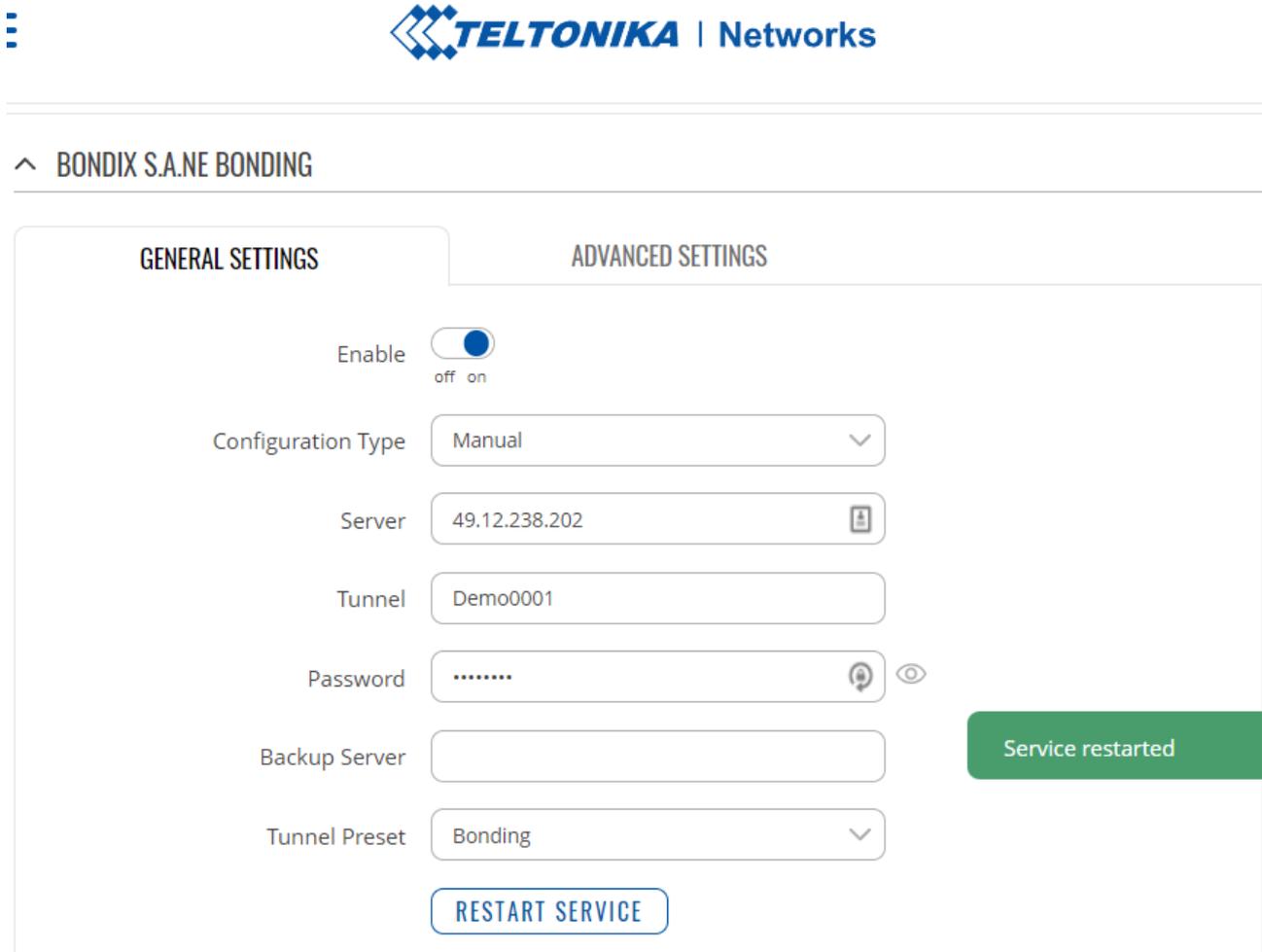
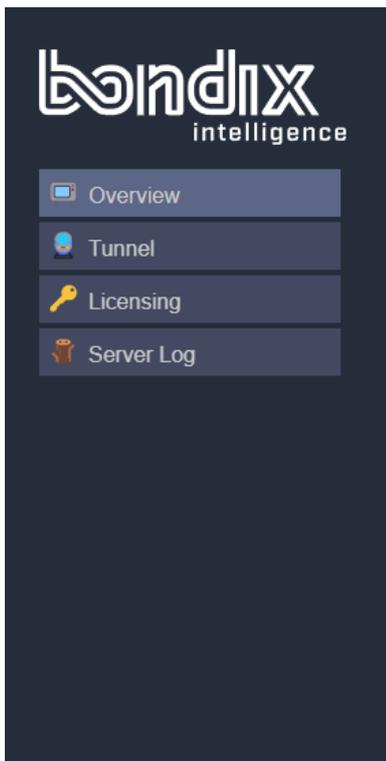


Image 1: Example configuration S.A.NE Client Teltonika RUTX Router (Firmware 02.06.1)

The tunnel is now listed in the S.A.NE server's menu "Overview" including the number of its active connections. Click on the tunnel name to access the tunnel settings and options.



### Overview

Tunnel (Connected/Total)	1/1	Server Build	20220224-0228-4647236-X86_64
Connected Channel	3	License Status	<span style="color: blue;">OK</span>
Packet Buffer	0.00%	Instance Name	Server

### Recent Tunnel

Name	#	Outgoing	Incoming	Latency	Loss
<a href="#">Demo0001</a>	3	0.50 KBit/sec	3.49 KBit/sec	19.43ms	0.00%

## 2.2.2.3 Tunnel details and settings

### 2.2.2.3.1 Functions

**Tunnel: Demo0001**

Password: [.....]

Enabled **1**

Override Client Settings

**2** Revert **3** Save

Name	Demo0001
Connected Channel	3
Authentication	manual
Environment	env0
Client IP	169.254.19.2
Last Connect	5.7 minutes ago
Last Disconnect	never
Upstream	0.00 KBit/sec
Downstream	2.91 KBit/sec
Architecture	ARMV7/ARMv7 Processor rev 5 (v7l)
Build	20211210-1003-ce94354 HEAD
Firmware	OpenWrt 19.07.4 r11208-ce6496d796

**4**

### Channel

Name	Status	Latency	Loss
wan/eth1	Connected	19.43ms	0.00%
mob2s1a1/qmimux0	Connected	153.41ms	0.00%
mob1s1a1/qmimux1	Connected	56.99ms	0.00%

### Actions

Restart Tunnel | Open Monitor | Expert Settings | Delete Tunnel

Logout

Function	Effect
<b>1</b> Enabled	Activates (ticked) or deactivates (unticked) the tunnel.
<b>2</b> Revert	Undoes any changes that have not yet been saved.
<b>3</b> Save	Saves changes.
<b>4</b> Channel	Provides an overview of channels currently connected.

### 2.2.2.3.1.1 Function “Override Client Settings”

If you activate this on server side, local tunnel presets and WAN priority settings of the connected router are overwritten or reset by the server’s S.A.NE. You will need to restart the tunnel.

**Override Client Settings**

**Tunnel Preset**  
<Use Client Settings> ▼

Name	Preset	Priority
<Default Preset>	<Use Client Settings> ▼	
wan/eth1	<Use Client Settings> ▼	Default ▼
mob2s1a1/qmimux0	<Use Client Settings> ▼	Default ▼
mob1s1a1/qmimux1	<Use Client Settings> ▼	Default ▼

Revert Save

## 2.2.2.3.2 Actions

**← Tunnel: Demo0001**

Password:    
 Enabled  
 Override Client Settings

Revert Save

Name	Demo0001
Connected Channel	3
Authentication	manual
Environment	env0
Client IP	169.254.19.2
Last Connect	5.7 minutes ago
Last Disconnect	never
Upstream	0.00 KBit/sec
Downstream	2.91 KBit/sec
Architecture	ARMV7/ARMv7 Processor rev 5 (v7l)
Build	20211210-1003-ce94354 HEAD
Firmware	OpenWrt 19.07.4 r11208-ce6496d796

**Channel**

Name	Status	Latency	Loss
wan/eth1	Connected	19.43ms	0.00%
mob2s1a1/qmimux0	Connected	153.41ms	0.00%
mob1s1a1/qmimux1	Connected	56.99ms	0.00%

**Actions**

Restart Tunnel Open Monitor Expert Settings Delete Tunnel

1 2 3 4

Logout

Function	Effect
1 Restart tunnel	Allows the tunnel connection to be disconnected briefly and then reconnected. This is needed for some changes to take effect.
2 Open Monitor	Displays a graphical overview of the connections of the router.
3 Expert Settings	Opens the server-side Bondix S.A.NE web monitor for diagnostic purposes.
4 Delete Tunnel	Deletes a tunnel permanently without the possibility to restore it.

## 2.2.2.4 Tunnel Environments

In Bondix S.A.NE, a tunnel environment is a pool of resources used by a group of tunnels. This includes packet cache, CPU core, a UDP listener, and a virtual network interface.

### 2.2.2.4.1 Add Environments

During the S.A.NE server installation, the software automatically creates a default environment with the name "env0". You can create and add further environments via the menu item "Add Environment".

#### Tunnel Environments

env0 Add Environment

#### Environment Settings

**Name**  
env1

**UDP Listener IP**  
0.0.0.0 (Any Interface)

**UDP Listener Port**  
44344

**Virtual Interface Name**  
bondix0

**Virtual Network (CIDR)**  
169.254.20.1/24

**Outgoing Interface**  
eth0

Disable traffic among tunnel

Revert Save

Delete Environment

A tunnel environment is a pool of resources shared across a group of tunnel. This includes packet cache, CPU core, an UDP listener, and a virtual network interface.

For common scenarios, you can choose 0.0.0.0 (Any Interface) for the UDP listener. For the listener port, make sure it is unique across multiple environments, not used elsewhere on the system and not blocked by any firewall.

Likewise, virtual interface name & network must be unique. If you leave the interface name empty, a name is chosen automatically.

The outgoing interface describes where traffic should be routed to. Supplying an IP address is optional.

Tunnel-To-Tunnel traffic allows routers to communicate with each other.

### 2.2.2.4.2 UDP Listener settings

For common scenarios, select "0.0.0.0 (Any Interface)" for the UDP Listener IP.



Each environment must be assigned its own unique UDP Listener Port. This port must not be used elsewhere in the system, and it must not be blocked by a firewall.

### 2.2.2.4.3 Virtual Interface settings

Leave the Virtual Interface Name blank to automatically generate a name for it.



The Virtual Interface Name and the Virtual Network (CIDR) assigned to the Tunnel Environment must also be unique, not to be used in any other environment.

#### **2.2.2.4.4 Outgoing settings**

The Outgoing Interface describes where you want to route your data traffic. Optionally, you can enter a specific Outgoing IP address.

#### **2.2.2.4.5 Activate Tunnel-to-Tunnel Communication**

The option “Disable traffic among routers” is activated by default due to Bondix S.A.NE providing multi-tenancy support. This feature prevents routers assigned to a Tunnel Environment from communicating with each other. If you deactivate “Disable traffic among routers”, routers in the same environment can interact. You can adjust this setting separately for each environment.

### 3 TROUBLESHOOTING

Sometimes, your Bondix S.A.NE server will not work as expected. If that happens, you may find possible solutions in this section.

Problem	Solution
	Re-install Server (Update)
	Remove Server
	Start Bondix Service
	Stop Bondix Service
	Server update notification in Web interface update via console

## 4 BONDIX SERVER LOG

This is an exemplary overview of a server's current log messages:

**Server Log**

2022-02-27 11:13:38.218	( 0.009s)	[ 8CA80410 ]	INFO	Bondix S.A.NE Server Build X86_64 20220224-0228-4647236 HEAD
2022-02-27 11:13:38.219	( 0.001s)	[ 8CA80410 ]	INFO	Reading config /etc/saneserver.json
2022-02-27 11:13:38.250	( 0.032s)	[ 8CA80410 ]	INFO	Now listening to 0.0.0.0:44343 (udp)
2022-02-27 11:13:38.251	( 0.032s)	[ 8CA80410 ]	INFO	Created environment env0 with network 169.254.19.1/24
2022-02-27 11:13:38.292	( 0.073s)	[ Tunnel Thread ]	INFO	Executing /opt/bondix/server/scripts/interface-start.sh tun0 "169.254.19.1/24" "eth0" ""
2022-02-27 11:13:38.353	( 0.134s)	[ 8CA80410 ]	INFO	Now listening to 0.0.0.0:443 (tcp)
2022-02-27 11:13:38.353	( 0.135s)	[ 8CA80410 ]	INFO	Now listening to 127.0.0.1:5112 (tcp)
2022-02-27 11:13:38.380	( 0.162s)	[ telemetry ]	ERR	Server is not authorized!
2022-02-27 11:13:38.483	( 0.265s)	[ Tunnel Thread ]	INFO	env0: Resized packet cache to 131072 packets
2022-02-27 11:50:11.630	(2193.412s)	[ telemetry ]	INFO	Starting license activation request...
2022-02-27 11:50:11.632	(2193.413s)	[ telemetry ]	INFO	License activation in progress...
2022-02-27 11:50:12.219	(2194.000s)	[ telemetry ]	INFO	License was activated successfully.
2022-02-27 11:50:12.223	(2194.005s)	[ telemetry ]	INFO	Server is now authorized
2022-02-27 11:50:12.682	(2194.464s)	[ telemetry ]	INFO	Telemetry data successfully delivered
2022-02-27 12:36:39.193	(4980.975s)	[ Tunnel Thread ]	INFO	Remote only wants 64 flow groups, 2048 are available.
2022-02-27 12:36:39.196	(4980.978s)	[ Tunnel Thread ]	INFO	Demo0001 Remote set max fragment size to 1360
2022-02-27 12:36:39.197	(4980.978s)	[ Tunnel Thread ]	INFO	Demo0001 Starting new session
2022-02-27 12:36:39.517	(4981.299s)	[ Tunnel Thread ]	INFO	Demo0001/wan/eth1 is now connected
2022-02-27 12:36:39.944	(4981.726s)	[ Tunnel Thread ]	INFO	Demo0001/mob2sial/qmimux0 is now connected
2022-02-27 12:36:39.963	(4981.745s)	[ Tunnel Thread ]	INFO	Demo0001/mob2sial/qmimux1 is now connected