

# **T7 Cloud Simulation**

## **Connectivity Guide**

Version 2.1

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## 1. Introduction

This document explains the methods of connecting to your T7 Cloud Simulation instance via the Internet. Internet access is the only option offered right now.

Connecting to your T7 instance requires that you establish a VPN, using either SSL or GRE and IPsec.

You can choose which option to use when you create your instance, and we will automatically generate a basic configuration file that allows connection via either OpenVPN or strongSwan and compatible packages.

If your network infrastructure does not allow direct software tunnelling, these configuration files will at least serve as a template to allow you to configuration your infrastructure correctly.

Although we provide basic instructions on installing and configuring these packages, we do not directly support either package.

Due to the diverse nature of our customers' networks, we are generally unable to assist with network configuration.

## 2. OpenVPN

OpenVPN is a software VPN solution that uses the industry standard SSL/TLS protocol for data encryption. The OpenVPN tunnel connectivity to T7 Cloud Simulation is strictly a host-to-host solution, meaning that the tunnel to your instance should terminate on a host on your client side.

OpenVPN tunnel connectivity to T7 Cloud Simulation can be terminated on Windows, Linux, or Mac OSX.

### 2.1 Possible Endpoints

For official documentation and more detailed installation instructions about OpenVPN please visit <https://openvpn.net/community-resources/how-to/#install>

The following instructions assume that you have downloaded the OpenVPN configuration files associated with your T7 Cloud Simulation instance, available after logging in at [the service launchpad](#) or after creating an instance via the REST API.

After the creation of your T7 Cloud Simulation instance, you will be able to download your pre-configured OpenVPN configuration file, as well as associated keys and certificates, to create a VPN tunnel for access to your instance.

*NOTE: The OpenVPN endpoint on your instance is designed for use with the OpenVPN client version 2.4.8. Older versions of the client may not be compatible with your instance's server.*

#### 2.1.1 Windows

##### 2.1.1.1 Installation

OpenVPN for Windows can be installed from the installation packages on the [OpenVPN download page](#).

OpenVPN will only run on Windows XP or later and must be installed and run by a user who has administrative privileges.

Official OpenVPN Windows installers include OpenVPN-GUI, which allows managing OpenVPN connections from a system tray applet.

During the install process, when confronted with the "Choose Components" state, leave the default options selected.

IMPORTANT: When the installation prompts you to confirm the installation of the "TAP-Windows Adapter V9", select "Continue Anyway". This installs the necessary virtual network interface that the tunnel will be established on.

After you've completed the Windows installer, OpenVPN is ready for use and will associate itself with files having the `.ovpn` extension.

##### 2.1.1.2 Connection initiation

Download the configuration and keys from your instances, then extract the contents of the downloaded `.zip` file into any directory on your client machine (i.e. the machine from which you want to access T7 on your instance).

Right click on the `client.ovpn` file that you had previously extracted and select Start OpenVPN on this configuration file. OpenVPN will then establish a secure connection to your running instance.

OpenVPN can also be run from the command prompt with a command such as:

```
openvpn client.ovpn
```

It's also possible to run OpenVPN as a service by extracting all files downloaded from your instance to `\Program Files\OpenVPN\config` and starting the OpenVPN Service, which can be controlled from Start Menu -> Control Panel -> Administrative Tools -> Services.

For more details and trouble-shooting tips for OpenVPN on Windows, check out the [official documentation](#).

### 2.1.2 Linux

These instructions assume you have root privileges and have access to the appropriate commands (`apt-get/yum`, `unzip`, `service`).

If you are using Debian, Ubuntu, Fedora or RHEL/CentOS/Scientific Linux, OpenVPN is available through your distribution's repositories.

If using *Debian/Ubuntu* run:

```
apt-get install openvpn
```

If using *RHEL/Fedora* run:

```
yum install openvpn
```

Once OpenVPN has been successfully installed, unzip the contents of the "openvpn" directory from the .zip archive for your instance into `/etc/openvpn/` and run restart OpenVPN:

```
unzip -j {name of the downloaded zip file} 'openvpn/*' -d /etc/openvpn
```

```
systemctl restart openvpn
```

In case you have older system, you might need to use `service` command instead of `systemctl`

```
service openvpn restart
```

If everything has been done correctly and no errors have occurred, you should be able to see the successfully established VPN tunnel to your instance.

*Note: If OpenVPN is not available in your repositories, the OpenVPN source can be downloaded here: <https://openvpn.net/community-downloads-2>*

### 2.1.3 Mac OSX

OpenVPN does not provide an official GUI for Mac OSX, but we have found that the application Tunnelblick works well.

You can find the Tunnelblick download link and official instructions at <https://tunnelblick.net/>

Once the Tunnelblick .dmg file has been downloaded, double click it. In the new window, double

click the "Tunnelblick" icon and confirm the installation. When prompted for configuration files, click "Quit".

Once Tunnelblick has been successfully installed, simply double click XX\_XX\_XX\_XX.tblk provided with the .zip archive downloaded from your instance and your VPN tunnel should automatically be configured.

In the taskbar, click the Tunnelblick icon and connect to your instance.

If everything has been done correctly and no errors have occurred, you should be able to see the successfully established VPN tunnel to your T7 Cloud Simulation instance.

## 2.2 Firewall ports

Required firewall ports when using OpenVPN:

- OpenVPN tunnel TCP port 1194 (SSL)

### 3. IPsec/GRE

IPsec/GRE connectivity to T7 Cloud Simulation is an alternate connection method meant to accommodate customer networks that are incompatible with our OpenVPN solution.

Our IPsec/GRE connectivity leaves more of the configuration up to the customer, allowing for flexibility when it comes to larger internal networks whose security policies may not allow for direct host-to-host access.

In order to use IPsec/GRE as your tunnel method, you'll first need to have a static IP assigned to your T7 Cloud Simulation account that you can attach to your instances. You should already have one, but if not please contact our customer technical support team on [cts@deutsche-boerse.com](mailto:cts@deutsche-boerse.com).

This solution consists of two components.

The first component is IPsec, which provides encryption of all traffic between your T7 Cloud Simulation instance and your internet-facing entry point in your network.

Because IPsec alone is incapable of transporting multicast traffic (required for T7 Cloud Simulation's market data), a separate GRE tunnel is required. The GRE tunnel is also between the same endpoints as the IPsec tunnel, as the IPsec tunnel is simply meant to just encrypt the traffic sent via the GRE tunnel.

All traffic is sent via the GRE tunnel interface. The T7 software running in your instance is available directly through this GRE tunnel, and all exchange interfaces (market data interfaces, trading interfaces) need to be addressed via this interface.

Because of the flexibility of our IPsec/GRE connection solution, we are unable to provide an officially supported configuration, but this document will list several example network configurations that have been tested and work for us.

To clarify basic terminology, we will refer to the following IP addresses throughout our documentation.

Cloud Simulation instances are using Libreswan for IPsec connections. They are running within a cloud environment, behind a transparent NAT. To configure the connection on your end correctly, you shouldn't need to mention anything else but the instance's public IP address in the left= configuration parameter.

In some cases, however there are configuration options that might need to be tweaked as per your environment.

Term	Refers to
<CLOUDSIM_END-POINT_IP>	Publicly addressable IP address assigned to your T7 Cloud Simulation instance.
<CUSTOMER_END-POINT_IP>	Publicly addressable IP address assigned to the interface on which the customer chooses to terminate the IPsec tunnel.

## 3.1 IPsec Settings

### 3.1.1 Phase 1 (IKE-AES-256-SHA-DH5) Parameters

Setting	Parameter
Encryption Algorithm	AES256
Hashing Algorithm	SHA-1
Diffie-Hellman Group	Group 5 (1536-bit)
Authentication Mode	Pre-Shared Key
IKE version	2
IKE Timeout (ISAKMP)	3600 Seconds (1 Hour)

### 3.1.2 Phase 2 (ESP-AES-128-SHA-HMAC) Parameters

Setting	Parameter
Encryption Algorithm	AES128
Hashing Algorithm	SHA-1
PFS Diffie-Hellman Group	Group 5 (1536-bit)
IPsec Timeout (SA)	3360 Seconds (56 Minutes)

**Please be sure to set your SA lifetime is set to a value higher than 3360. Failure to do so may cause your tunnel to reset every 56 minutes, disconnecting you from your instance.**

### 3.1.3 Pre-Shared Key

The Pre-Shared Key (PSK) for your T7 Cloud Simulation instance is available for download on the instance details from the T7 Cloud Simulation after you have configured your initial set of keys for your instance's IP address. It is also available via the T7 Cloud Simulation REST API.

## 3.2 GRE Settings

10.8.0.1 is the T7 Cloud Simulation instance's IP address on the GRE tunnel interface. This is the peer on the other side of the GRE tunnel from the customer endpoint. This 10.8.0.1 address is the T7 "backend", being the address of multicast sources as well as TCP/IP connections. Explain how GRE endpoint is the "next router hop"

## 3.3 Firewall ports and IP protocols

UDP ports



- UDP port 500 (IKE)
- UDP port 4500 (for NAT-T)

IP Protocols used

- 50 (ESP)
- 51 (AH)

## 4. GUI Connectivity

Cloud Simulation provides graphical user interfaces (GUIs) for our participants to perform a variety of trading and maintenance activities.

Participants can only access the T7 Trader and Admin GUIs via the established VPN pointing to their Cloud Simulation instance.

The GUI landing page can only be accessed via the VPN at <http://10.8.0.1>. The GUI landing page contains the links to download the GUI applications and is hosted by the instance on the VPN tunnel network interface.

You will see some changes on the Launchpad instance management page.

- On the top left is a new T7 GUI status which, like the T7 Status, will show "degraded" until a login is possible (i.e. the T7 GUI cluster is up and running). For images where the T7 GUI is not enabled (T7 Release 11.0 images), these entries the status continuously will show "degraded".

### Instance Status

<p><b>T7 STATUS</b> <b>Degraded</b></p> <p><b>MARKET IDENTIFICATION CODE</b> XEUR</p> <p><b>CURRENT WALLCLOCK</b> 05:40:12 PM (63612 secs since midnight)</p>	<p><b>T7 GUI STATUS</b> degraded</p> <p><b>CURRENT BUSINESS DAY</b> 2013-12-19</p> <p><b>UPTIME</b> 0:04:39</p>
---	---

- At the lower right of the instance control page there is a link to the landing page which serves the Java Webstart files to launch the GUIs (Trader and Admin GUI). However, the link is to <http://10.8.0.1>, which is only accessible from the customer endpoint of the VPN tunnel.  
**Note:** You will need to open the landing page on the host connecting to the instance if you are viewing Launchpad from a host other than the one connecting to the Cloud Simulation instance via VPN.

#### ETI-session Gateways

NAME	IP ADDRESS:PORT	TLS PORT
Active Partition-specific ETI session gateway	10.8.0.1:19568	None
Standby Partition-specific ETI session gateway	10.8.0.1:19567	None
Low Frequency ETI session gateway	10.8.0.1:19542	19547

SESSION ID	SESSION COMPID	SESSION COMPID	High Frequency	Trading
120026	ESIMA_SHF_S9	ESIMA_SHF_S9	HighFrequency	Trading
120027	ESIMA_SHF_S10	ESIMA_SHF_S10	HighFrequency	Trading

#### FIX LF Interface

SESSION TYPE	SENDER COMPID	FIX VERSION	FIX ACCEPT ADDRESS	FIX ACCEPT PORT	FIX ACCEPT TLS PORT	FIX SESSION PASSWORD	DROP COPY
backoffice	160021-XEUR-FIX_LF-B-DEV	FIX.4.4	10.8.0.1	19524	19517	ESIMA_FG2_S1	True
trading	160022-XEUR-FIX_LF-T-DEV	FIX.4.4	10.8.0.1	19524	19517	ESIMA_FG2_S2	False
backoffice	160023-XEUR-FIX_LF-B-DEV	FIX.4.4	10.8.0.1	19524	19517	ESIMA_FG2_S3	False

#### Available Files

- reference-data-file  
[Download](#)
- product-and-instrument  
[Download](#)
- trade-parameters  
[Download](#)
- All Instance Details  
[Download](#)

#### T7 Graphical User Interface

The GUI landing page contains the links to download the GUI applications, and is served by the instance on the VPN tunnel network interface. This means you can only open it properly on your browser if your machine is connected via VPN (10.8.0.1 points to the Cloud Simulation instance). Logins will only be successful if the T7 GUI STATUS is "accepting logins" (see Instance Status).

[Landing Page](#)

If you are viewing Launchpad here using a different host than the one it is connecting via VPN to the Cloud Simulation instance, you'll need to open the landing page in that other host.

This is the landing page (for EUREX, other markets similar) served on port 80 on the customer's Cloud Simulation instance - accessible over the VPN, which means it is accessible from the customer's endpoint at <http://10.8.0.1>.

The links within the JNLP also all point to 10.8.0.1, which means that the T7 GUI itself will only run successfully on a customer machine where 10.8.0.1 is routed to the CS instance - which is the case on the customer's VPN endpoint machine.



## Cloud Simulation - VPN Access

### T7 Graphical User Interfaces for Eurex®

At Deutsche Börse Group we provide graphical user interfaces (GUIs) for our Exchange Participants to perform a wide variety of trading, maintenance and risk management activities. Participants can access the T7 GUIs for Eurex® via the Cloud Simulation VPN.

#### T7 Admin GUI

The T7 Admin GUI is used for all administration related functionality like trader setup, entitlement settings, maintenance of risk parameters, etc.

#### T7 Trader GUI

The T7 Trader GUI is used for trading by Participants for listed derivatives business, including the initiation and approval of off-book transactions via the T7 Entry Service (TES).

For CloudSimulation please use the links below:

[T7 Admin GUI, Simulation](#)

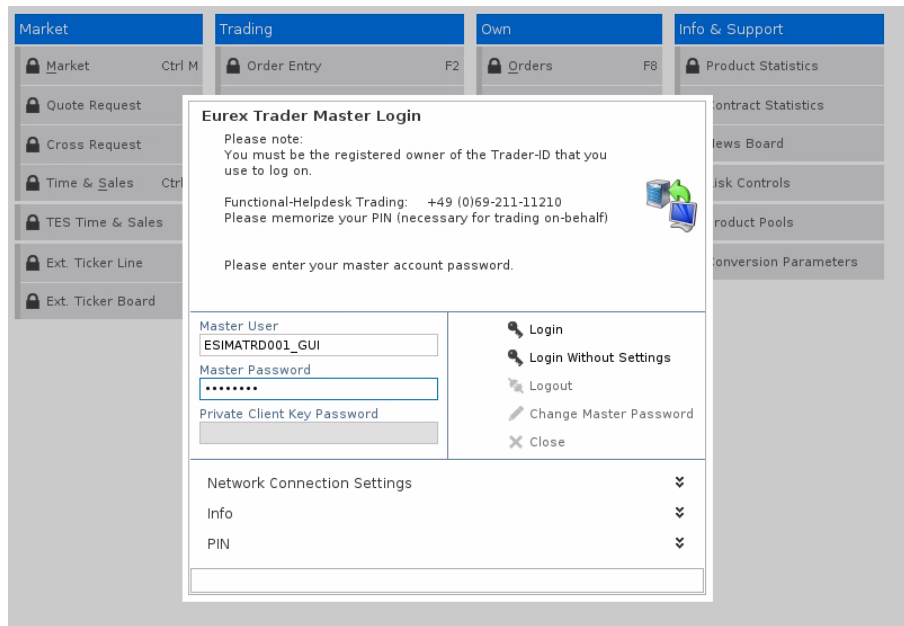
[T7 Trader GUI, Simulation](#)

Savvy customers may be able to create proper tunnels in their network so that 10.8.0.1 is routed to the CS instance - this is only required for ports 80 (Landing Page), 10116 (XEUR), 10118 (XETR), 10119 (XFRA).

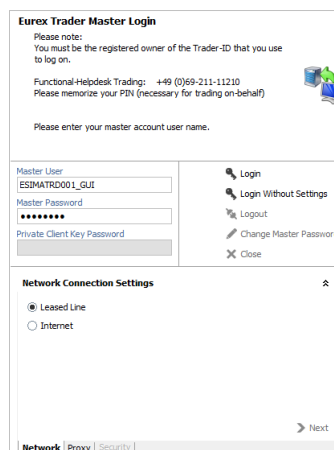
Otherwise, the usual setup required to use the T7 GUI applies, i.e. the correct Java version etc. is installed.

The T7 GUI Launcher is not offered for Cloud Simulation. Otherwise, there is no difference to the T7 simulation and production environments.

Please note: All GUI documentation can be found on the usual XEUR website at <https://www.eurex.com/ex-en/support/initiatives/> and then select the correct T7 release and for XETR and XFRA at <https://www.xetra.com/xetra-en/technology/t7/system-documentation/> in the relevant GUI documentation section.



Network Connection Settings should be made as if a leased line connection would be used (no client certificate or key required):



Proxy configuration as required (usually “none”).

The T7 GUI users are the same as for ETI and use the same password as shown on the Instance Details page.

**Instance Details**

Instance Name: xeur-gui | Image: Eurex 11.0 (test reference data) - Production version (published 2022-03-23) | IP Address: 3.77.195.32 | Expiration: 09:22 PM (in 3h 43m)

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**Instance Status**

T7 STATUS	T7 GUI STATUS
Exchange Up	accepting logins
MARKET IDENTIFICATION CODE	CURRENT BUSINESS DAY
XEUR	2013-12-19
CURRENT WALLCLOCK	UPTIME
05:38:56 PM (63536 secs since midnight)	0:25:01

---

**Users and Sessions**

Select member: [ESIMA ▼]

Clearing members: None

**ETI user details**

NAME / GUI USER NAME	TRADER	TRADER CAPABILITIES	ETI USER ID	ETI & GUI PASSWORD	MAX ORDER VALUE
ESIMASPV001	SupervisingTrader	Emergency/MassDelete Emergency/StopTrade MarketMaker ServiceAdmin	200009	ESIMASPV001	10000000
ESIMAHED001	HeadTrader	Emergency/MassDelete MarketMaker	200010	ESIMAHED001	10000000
ESIMATRD001	RegularTrader	Emergency/MassDelete	200011	ESIMATRD001	10000000
ESIMATRD002	RegularTrader	Emergency/MassDelete	200012	ESIMATRD002	50000000

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**Interfaces**

NAME	PRIMARY (A)	SECONDARY (B)

## 5. Change Log

Version	Date	Chapter	Change
1.0	12 May 2017	-	Creation of document
2.0	24 April 2023	4 & 5	Added GUI connectivity and the change log
2.1	02. August 2024	3	Deleted references to the depreciated IKEv1