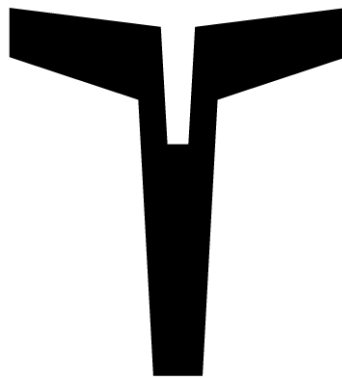


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**LETHEAN**



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## Audience

Public

## Document Summary

Quick reference on how to setup a Lethean Exit node.

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## Getting Started

Install Docker on your host system relevant to your operating system.

<https://www.docker.com/products/docker-desktop/>

## Easy Deploy

Easy Deploy is a process which sets up most of the default and required configurations to minimise exit node manual configuration.

Easy Deploy covers:

1. Setup of exit node provider ID, key and default **proxy and vpn** node configuration setup.
2. Generation of self-signed CA certificates, Diffie–Hellman parameters and server side certificates signed by CA for local haproxy and openvpn servers.
3. Wallet creation with randomised password for wallet and wallet RPC.

## Get the basics setup

```
mkdir -p ~/Lethean/vpn/etc ~/Lethean/vpn/log
cd ~/Lethean/vpn

docker run --rm \
--mount type=bind,source=$(pwd)/etc,target=/opt/lthn/etc \
--mount type=bind,source=$(pwd)/log,target=/dev/log \
lthn/vpn easy-deploy
```

**IMPORTANT NOTE:** Capture the whole “easy-deploy” output and store in a safe location other than the node itself. This contains the provider nodes wallet information and your (local certificate authority) CA passwords which can not be retrieved later on if not saved now.

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## Update dispatcher.ini and sdp.json with node specific configurations

Once the initial easy-deploy process is completed some manual steps are presently required to ensure the configuration is setup as expected.

### dispatcher.ini

```
cd ~/Lethean/vpn/etc
nano dispatcher.ini
```

**At a minimum**, update the following values:

```
;provider-type=commercial - (Default) Needs updating to reflect your deployment choice. Remove the leading “;”, and include one of the following “residential, commercial, government”.

provider-name=Provider - (Default) Friendly name for your provider, make it unique!

provider-terms=Some Terms - (Default) This can be text or even pointed to a URL if wanting to provide a more detailed requirement for node usage.

OR

;provider-terms=@from_file.txt - (Default) Use if not wishing to use “provider-terms”. Remove the leading “;” and commenting

[service-1A] - (Default) Do not edit.
name=Proxy - A chosen name for your proxy, currently “Proxy”. Do the same for any other services you have on the same exit node docker container instance.

[service-1B] - (Default) Do not edit.
reneg=600 - (Default) Add a leading comment “;” to prevent a warning occurring during dispatcher start-up in a later section.

;dns=127.0.0.1 - (Default) Remove leading comment “;” to ensure this is set. Dispatcher will fail to run without a defined dns server.
```

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## sdp.json

**dispatcher.ini** configurations mostly need to match the **sdp.json** configuration, therefore ensure provider names, terms and service names are the same to avoid dispatcher type starting errors further on in the instructions.

We now require the setup of the **sdp.json** file. The dispatcher binary lives within the lethean docker image `lthn/vpn` hence we'll be opening a shell to start an interactive sdp configuration step inside the docker container.

The resulting **sdp.json** configuration file will be updated in/outside the container on the host path `~/Lethean/vpn/etc/sdp.json` upon completion of configuration.

*# Start a new container with the lthn/vpn:latest image, in attached mode while having an interactive session and being presented with a shell.*

```
cd ~/Lethean/vpn
docker run -ti \
  --name lthn-sh \
  --mount type=bind,source=$(pwd)/etc,target=/opt/lthn/etc \
  --mount type=bind,source=$(pwd)/log,target=/dev/log \
  lthn/vpn sh
```

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*# Generate a new update SDP file with your desired exit node configuration. You can repeat this step for any corrections if required later. The final step is ensuring to follow-up with “--upload-sdp” as per section [Publish via SDP](#).*

Below is a valid **Proxy** configuration for your sdp.json file.

```
/opt/lthn/bin/lvmgmt --generate-sdp \
--wallet-address <providers-wallet> \
--sdp-provider-name "Lethernet Reborn" \
--sdp-service-id 1a \
--sdp-service-name "DE Proxy 1" \
--sdp-service-type proxy \
--sdp-service-endpoint de01.proxy.lt.hn \
--sdp-service-port 8080 \
--sdp-service-dlspeed 10 \
--sdp-service-ulspeed 10 \
--sdp-service-cost 0.1 \
--sdp-service-prepaid-mins 60 \
--sdp-service-verifications 1

# Below is outputted once the command completes successfully
Initialising SDP file /opt/lthn/etc/sdp.json
SDP configuration saved to /opt/lthn/etc/sdp.json

# Make a backup of this file to confirm and confirm this is related to proxy.

cp /opt/lthn/etc/sdp.json /opt/lthn/etc/sdp.json.p1.bak
```

**If you only require proxy**, you may now skip to the [next section](#)

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Below is a valid **VPN** configuration for your sdp.json file.

```

/opt/lthn/bin/lvmgmt --generate-sdp \
--wallet-address <providers-wallet> \
--sdp-provider-name "Lethernet Reborn" \
--sdp-service-id 1b \
--sdp-service-name "DE Proxy 1" \
--sdp-service-type vpn \
--sdp-service-endpoint de01.vpn.lt.hn \
--sdp-service-port 20001 \
--sdp-service-dlspeed 10 \
--sdp-service-ulspeed 10 \
--sdp-service-cost 0.1 \
--sdp-service-prepaid-mins 60 \
--sdp-service-verifications 1

# Below is outputted once the command completes successfully
Initialising SDP file /opt/lthn/etc/sdp.json
SDP configuration saved to /opt/lthn/etc/sdp.json

# Make a backup of this file to confirm this is related to vpn. Use a preferred
name.

cp /opt/lthn/etc/sdp.json /opt/lthn/etc/sdp.json.v1.bak

```

You'll notice at this point your **sdp.json** created for **proxy** was overwritten with your **vpn** generated configuration. The earlier backup is therefore important.

**You will now be required to merge the two sdp.json** files for the **services** section of the files to include both **proxy** and **vpn** in one file.

From the host edit the files with your preferred text editor.



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### **IMPORTANT NOTE:**

At the time of writing, the **sdp.json** file generation process does not automatically transfer **dispatcher.ini** “**provider-terms**” to **sdp.json**. This must be added manually to the **sdp.json** file.

This also includes the following syntax which does not generate the necessary configuration and needs to be added to the **sdp.json** file manually. The following section gives examples on how to update configuration manually based on the below command options.

```
--sdp-provider-type [residential | commercial | government ]
--sdp-provider-terms TEXT (no service specific "terms" command
exists, which also needs adding manually)
--sdp-service-endpoint FQDN
--sdp-service-proto PROTOCOL
```

Below is an example of the merged services section. Additional fields have been added which are explained in the following section:

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```

"services": [
  {
    "allowRefunds": false,
    "certificates": [
      {
        "id": 0
      }
    ],
    "cost": "0.10000000",
    "disable": false,
    "downloadSpeed": 10000000,
    "firstPrePaidMinutes": 60,
    "firstVerificationsNeeded": 1,
    "id": "1A",
    "name": "DE Proxy 1",
    "proxy": [
      {
        "endpoint": "de01.proxy.lt.hn",
        "port": "8080/TCP"
      }
    ],
    "subsequentPrePaidMinutes": 30,
    "subsequentVerificationsNeeded": 1,
    "terms": "https://node-terms.lt.hn",
    "type": "proxy",
    "uploadSpeed": 10000000,
    "vpn": []
  },
  {
    "allowRefunds": false,
    "certificates": [
      {
        "id": 0
      }
    ],
    "cost": "0.10000000",
    "disable": false,
    "downloadSpeed": 10000000,
    "firstPrePaidMinutes": 60,
    "firstVerificationsNeeded": 1,
    "id": "1B",
    "name": "DE VPN 1",
    "proxy": [],
    "subsequentPrePaidMinutes": 30,
    "subsequentVerificationsNeeded": 1,
    "terms": "https://node-terms.lt.hn",
    "type": "vpn",
    "uploadSpeed": 10000000,
    "vpn": [
      {
        "endpoint": "de01.vpn.lt.hn",
        "port": "20001/UDP"
      }
    ]
  }
]

```

]

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**Take a backup of the merged file while keeping a backup of the original files** in-case it is required in future.

Type “**exit**” once the above process completes to exit the container. It’s no longer required.

## **sdp.json manual updates (presently required)**

From the local host edit the **sdp.json** file updated by the last step:

```
cd ~/Lethean/vpn/etc
nano sdp.json
```

Example of required manual field updates for **nodeType** and **terms**. Strip trailing comma if this is the last property in the object:

```
"nodeType": "residential",
"terms": "https://node-terms.lt.hn",
```

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Update **proxy** and **vpn** sections:

- Add endpoint
- Update port/protocol (if required)
- Terms for the specific service.
- Save all changes.

```
# For services relating to proxy.

"proxy": [
  {
    "endpoint": "de01.proxy.lt.hn",
    "port": "8080/TCP"
  }
],
"terms": "https://node-terms.lt.hn",

# For services relating to vpn.

"vpn": [
  {
    "endpoint": "de01.vpn.lt.hn",
    "port": "20001/UDP"
  }
],
"terms": "https://node-terms.lt.hn",
```

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## Run Dispatcher

Retrieve your **easy-deploy output backup** for the below passwords.

**WALLET\_PASSWORD**

**WALLET\_RPC\_PASSWORD**

To ensure you can have a container level interactive session to enter commands, there is an option to run the shell using the **sh** option. This will provide flexibility to manage the node with more flexibility and all services within:

```
cd ~/Lethean/vpn
docker run -ti \
  --name lthn-vpn \
  -p 8080:8080/tcp \
  -p 20001:20001/udp \
  -e WALLET_PASSWORD=<exit nodes wallet password> \
  -e WALLET_RPC_PASSWORD=<exit nodes RPC wallet password> \
  --mount type=bind,source=$(pwd)/etc,target=/opt/lthn/etc \
  --mount type=bind,source=$(pwd)/log,target=/dev/log \
  --cap-add=NET_ADMIN \
  --device=/dev/net/tun:/opt/lthn/dev/net/tun \
  lthn/vpn sh
```

*# Strip the above "--cap-add" and "--device" options if only using proxy.*

```
sudo apt-get update && sudo apt-get install -y systemctl screen socat
```

```
sudo cp /opt/lthn/etc/squid.conf /etc/squid/squid.conf
sudo systemctl start squid
sudo systemctl start openvpn
```

*# Check that squid and openvpn (if setup earlier) services are running. Each should confirm it is running.*

```
systemctl status squid
systemctl status openvpn
```

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*# Run RPC wallet. The wallet will open successfully if the password prepared earlier is correct.*

```
cd / && ./entrypoint-lethean-vpn.sh wallet-rpc
```

*# Run a screen session called "dispatcher" for easy identification and run the dispatcher with the INFO logging flag.*

```
screen -S dispatcher
```

```
lthnvpnd --wallet-rpc-uri "http://localhost:14660/json_rpc" -l INFO
```

```
* OR *
```

```
./entrypoint-lethean-vpn.sh run
```

*# The last command which runs a script will start squid (if down), the RPC wallet and dispatcher in order and is optional to use once confident each component is working.*

*# Below are some typical messages you will see while dispatcher is starting. Final output shown is below and indicates the dispatcher is working.*

```
~~~~~
INFO:audit:action=START,type=SERVICE,obj=lthnvpnd,
INFO:lthnvpnd:Service DE Proxy 1 (proxy), id 1A
INFO:lthnvpnd:Starting service Syslog server[SS]
INFO:lthnvpnd:Starting service Management server[MS]
INFO:lthnvpnd:Starting service HTTP server[HS]
INFO:lthnvpnd:Created haproxy config file /opt/lthn/var/proxy_1A/cfg
INFO:lthnvpnd:Waiting for pid
INFO:lthnvpnd:Service 1A: [pid=None]
INFO:lthnvpnd:Starting service DE Proxy 1[1A]
INFO:lthnvpnd:No new payments in wallet
.
.
INFO:audit:action=START,type=SERVICE,serviceid=1A,cmd='/usr/sbin/
haproxy -Ds -p /opt/lthn/var/proxy_1A/pid -f
/opt/lthn/var/proxy_1A/cfg',
~~~~~
```

*# Detach from screen session leaving dispatcher running.*

**Ctrl+a** then press **d** key

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## Manually add sessions to node without SDP (untested)

**IMPORTANT NOTE:** Needs testing to confirm working and if the syntax is correct.

From existing container running exit node dispatcher, the following is an example of steps which can be performed.

```
docker exec lthn-vpn echo "add authid EF8A812B358956F9 1a" |  
socat stdio ./mgmt
```

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## Publish via SDP

### Make payment to SDP

Open your node wallet to make payment to the SDP before attempting upload-sdp.

Transfer funds to the nodes wallet before proceeding.

```
cd ~/Lethean/vpn

docker run -ti \
  --name lthn-wallet \
  -e WALLET_PASSWORD=your-password \
  --mount type=bind,source=$(pwd)/etc,target=/opt/lthn/etc \
  --mount type=bind,source=$(pwd)/log,target=/dev/log \
  lthn/vpn wallet-cli

### MAKE PAYMENT ###

transfer normal
iz5HSgJUWJmax8Hs2TEAacKhKA9LXLLDvc4u7yCV7Lm4iwkgFXTMFBA dtj2mqMp
qy7T4BNveDQdW8LBPVxWqy94B2A6sKJXQ7 10.0
EFAA812B358956F93A0E324385C8B44469A99E5A82F2DE327297B25D8C2EE28
8
```

#### Syntax:

```
transfer normal <address> <amount> <paymentID is the node
providerID>
```

Type “**exit**” if no longer requiring the wallet container, or detach from the container using the key sequence “**Ctrl+P+Q**” without stopping the “**lthn-wallet**” container and allow future use. Stop/exit the container when not required to avoid locking wallet for dispatchers requirements.



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## Upload node configuration to SDP

This process will utilise the default Lethean Community SDP location and wallet.

Payment details will be requested when attempting to upload node sdp.json configuration without a payment of 10 LTHN.

```
cd ~/Lethean/vpn
docker run --rm \
  --mount type=bind,source=$(pwd)/etc,target=/opt/lthn/etc \
  --mount type=bind,source=$(pwd)/log,target=/dev/log \
  lthn/vpn upload-sdp
```

**IMPORTANT NOTE:** Upload will use <https://sdp.lethean.io> by default at the present moment.

Default wallet is:

“iz4xKrEdzsF5dP7rWaxEUT4sdaDVFbXTnD3Y9vXK5EniBFujLVp6fiAMMLEpoRno3VUccxJPnHWyRc  
tmsPiX5Xcd3B61aDeas”

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## Publish via Self-hosted SDP

SDP URI and wallet only needs to be defined in the **upload-sdp** command syntax if utilising a private SDP.

### docker shell

```
cd ~/Lethean/vpn

docker run -ti \
  --name lthn-sh \
  --mount type=bind,source=$(pwd)/etc,target=/opt/lthn/etc \
  --mount type=bind,source=$(pwd)/log,target=/dev/log \
  lthn/vpn sh

lvmgmt --sdp-server-uri https://<your-custom-sdp-fqdn-or-ip> --
sdp-wallet-address <your-sdp-wallet-address> --upload-sdp
```

Example:

```
lvmgmt --sdp-server-uri https://sdp.lt.hn -upload-sdp --sdp-
wallet-address
iz5HSgJUWJmax8Hs2TEAacKhKA9LXLLDvc4u7yCV7Lm4iwkgFXTMFBA dtj2mqMp
qy7T4BNveDQdW8LBPVxWqy94B2A6sKJXQ7
```

Type **“exit”** if no longer requiring a container with shell access.

Or key sequence **“Ctrl+P+Q”** to escape container without stopping the **“lthn-sh”** container for future use.

### docker

```
docker exec lthn-vpn /opt/lthn/bin/lvmgmt --sdp-server-uri
http://sdp.lt.hn --sdp-wallet-address
iz5HSgJUWJmax8Hs2TEAacKhKA9LXLLDvc4u7yCV7Lm4iwkgFXTMFBA dtj2mqMp
qy7T4BNveDQdW8LBPVxWqy94B2A6sKJXQ7 --upload-sdp
```

**NOTE:** This method may not override SDP defaults, if so use docker shell section above to perform the upload-sdp.

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## Test Proxy – Squid

Check the Squid service is running:

```
$docker attach lthn-vpn

! Ensure the lthn squid config is used instead of default.
$sudo cp /opt/lthn/etc/squid.conf /etc/squid/squid.conf

$/etc/init.d/squid status
squid is not running ... failed!

$sudo /etc/init.d/squid start
Starting Squid HTTP Proxy: squid2022/04/09 14:38:49| WARNING:
BCP 177 violation. Detected non-functional IPv6 loopback.
squid[24277]: Squid Parent: will start 1 kids
squid[24277]: Squid Parent: (squid-1) process 24279 started
.

$/etc/init.d/squid status
squid is running.
```

Test the Squid proxy is working. There should be no aborted or refused messages. When working you will see the website in HTML outputted in the terminal. This confirms correct squid operation.

```
$curl -x http://localhost:3128 -L https://lt.hn

<!DOCTYPE html><html lang="en"><head><link rel="preconnect"
href="https://fonts.gstatic.com" crossorigin="">
  <meta charset="utf-8">
  <meta http-equiv="X-UA-Compatible"
content="IE=edge,chrome=1">
  <title>Lethean - Web3 Systems</title>
  <meta content="width=device-width, initial-scale=1.0,
maximum-scale=1.0, user-scalable=0" name="viewport">
  <meta name="viewport" content="width=device-width">
  <meta name="twitter:creator" content="@letheanVPN">
..
..
Ctrl+P+Q
```

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## Test VPN

To be added.

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## Using the Lethean Client – CLI

Prepare the Lethean client configuration for the CLI client and have it ready for use.

```
mkdir -p ~/Lethean/prepare-conf/etc ~/Lethean/prepare-conf/log
cd ~/Lethean/prepare-conf

docker run -ti \
  --name lthn-client \
  -p 8186:8186 \
  --mount type=bind,source=$(pwd)/etc,target=/opt/lthn/etc \
  --mount type=bind,source=$(pwd)/log,target=/dev/log \
  lthn/vpn sh

cd / && ./entrypoint-lethean-vpn.sh prepare-conf

#####

Don't type exit if wishing to continue using the Lethean
client. This will bring down your container. If wishing to
detach from the container for later use, use Ctrl+P+Q. Re-
attach using `docker attach lthn-client`.

#####
```

### lthnvpnc

#### List – Show available exit nodes

List all available exit nodes on the Lethean Community SDP.

```
lthnvpnc list
```

List all available exit nodes on a defined self-hosted or custom SDP location.

```
lthnvpnc list --sdp-server-uri https://sdp.lt.hn
```

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## Connect – Connect to an exit node

There are 2 main ways of connecting to an exit node:

1. Using **your own authID** (this is your **paymentID**), meaning you have already made payment to the remote node(s) using this authID.
2. **Node generated authID** provided to client during the connect process. This generates a random 14 HEX characters while appending 2 leading HEX characters signifying the providers service ID.

## Connect with an authID – connect immediately

### Community Node – Example

```
lthnvpnc connect
1A577756DA4061D4@efaa812b358956f93a0e324385c8b44469a99e5a82f2de
327297b25d8c2ee288/1A
```

### Private Node – Example

```
lthnvpnc connect
1A577756DA4061D4@efaa812b358956f93a0e324385c8b44469a99e5a82f2de
327297b25d8c2ee288/1A --sdp-server-uri https://private.sdp.com
```

## Connect without an authID – connect after payment

An easier approach is to pay based on the details supplied by the remote node. Once paid the connection will automatically occur within ~2 mins (block confirmation time).

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```
lthnvpnc connect
efaa812b358956f93a0e324385c8b44469a99e5a82f2de327297b25d8c2ee288/1A
INFO:audit:action=START,type=SERVICE,obj=lthnvpnc,
WARNING:lthnvpnc:Cannot read local SDP file /opt/lthn/etc/sdp.json
WARNING:lthnvpnc:Configuration files created at
/opt/lthn/var/proxy_EFAA812B358956F93A0E324385C8B44469A99E5A82F2DE327297B25D
8C2EE288_1A/
INFO:audit:action=START,type=SERVICE,serviceid=EFAA812B358956F93A0E324385C8B
44469A99E5A82F2DE327297B25D8C2EE288_1A,cmd='/usr/sbin/haproxy -Ds -p
/opt/lthn/var/proxy_EFAA812B358956F93A0E324385C8B44469A99E5A82F2DE327297B25D
8C2EE288_1A/pid -f
/opt/lthn/var/proxy_EFAA812B358956F93A0E324385C8B44469A99E5A82F2DE327297B25D
8C2EE288_1A/cfg',
WARNING:lthnvpnc:Waiting for local proxy...
WARNING:lthnvpnc:Local proxy OK
WARNING:lthnvpnc:Waiting for remote proxy...
WARNING:lthnvpnc:Remote proxy is connected.
WARNING:lthnvpnc:Now you need to pay to provider's wallet.
INFO:audit:action=NEED_PAYMENT,type=PROVIDER_WALLET,wallet=iz5HSgJUWJmax8Hs2
TEAacKhKA9LXLlDvc4u7yCV7Lm4iWkgFXTMFBAAdj2mqMpQy7T4BNveDQdW8LBPVxWqy94B2A6sK
JXQ7,paymentid=1A9E3204EBE3A89A,
WARNING:lthnvpnc:Waiting for payment to settle...
```

**NOTE:** The **WARNING** messages can be ignored and does not affect use of the **lthnvpnc** client

The following is the behaviour of **lthnvpnc** process during the connect phase:

1. Connection made to SDP to retrieve selected node details in order to connect.
2. DNS query occurs towards the remote node's **endpoint** value retrieved in the SDP servers **sdp.json** file. This has now been cached locally (default=5mins).
3. Client will keep trying to connect periodically. The retry will occur for ~2mins until payment is confirmed received by the remote nodes dispatcher service. This will not stop until the **lthnvpnc haproxy process** is stopped. A timeout value can be set to allow the process to terminate cleanly after a set amount of time when no payment is made.
4. Once the remote node dispatcher service confirms payment, the **lthnvpnc** will authenticate using the **wallet** and **authID** details used to make payment.
5. **HAProxy → Squid Proxy** or **HAProxy → OpenVPN** server session is established and ready to pass user data.

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## Make payment to the remote exit node

```
[wallet iz4DhU]: transfer normal
iz5HSgJUWJmax8Hs2TEAacKhKA9LXLLDvc4u7yCV7Lm4iwwkgFXTMFBAAdj2mqMpqy7T4BNveDQdW
8LBPVxWqy94B2A6sKJXQ7 6 1A9E3204EBE3A89A
Wallet password: *****
Sending 6.000000000. The transaction fee is 0.00649600
Is this okay? (Y/Yes/N/No): Y
Transaction successfully submitted, transaction
<d2ffdaf3db9b58ccf03cb2438715017f6c531521e1ff32ab87d0f101e56f1c3a>
You can check its status by using the `show_transfers` command.
Height 1191568, transaction
<d2ffdaf3db9b58ccf03cb2438715017f6c531521e1ff32ab87d0f101e56f1c3a>, received
116.05350400
Height 1191568, transaction
<d2ffdaf3db9b58ccf03cb2438715017f6c531521e1ff32ab87d0f101e56f1c3a>, spent
102.13000000
Height 1191568, transaction
<d2ffdaf3db9b58ccf03cb2438715017f6c531521e1ff32ab87d0f101e56f1c3a>, spent
19.93000000
```

The above is 0.1 LTHN x 60mins for the minimum time permitted by the node for the first time connection payment.

**Enjoy!**