

# Configure *monerod* as an I2P Hidden Service

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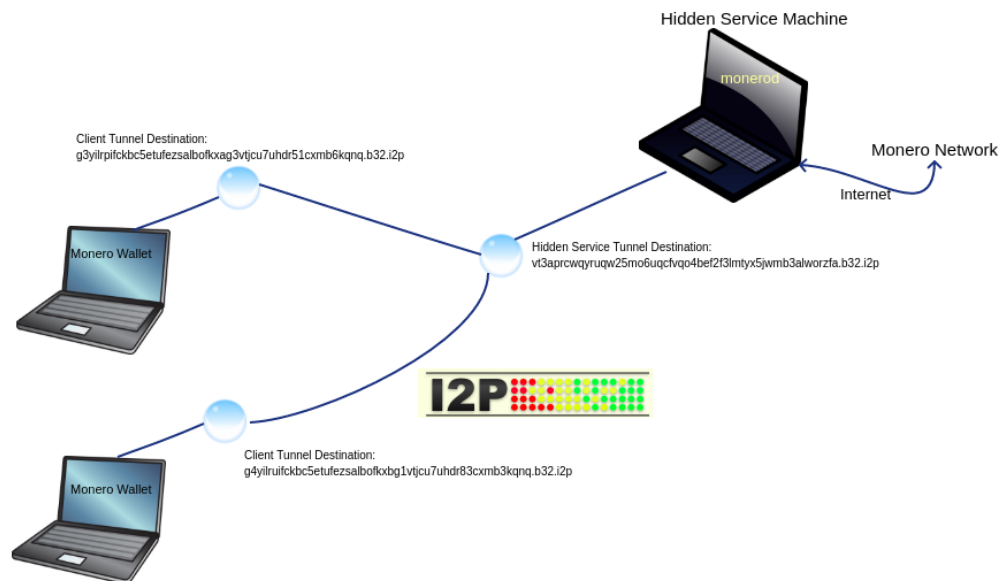
## Introduction

This paper will describe how to configure the Monero daemon (*monerod*) as an I2P hidden service. The value-added here is to provide an access path from Monero wallets to a remote Monero full node while hiding the Monero wallet machine's IP address. Hiding the Monero wallet client's IP address helps to maintain anonymity of Monero transactions at the network layer.

Since *monerod* needs to connect to the global Monero network to maintain an up-to-date blockchain along with the ability to process transactions, there are risks of exposing the IP address of the machine running the *monerod* service to prying eyes. There are a multitude of approaches to mitigating this risk which will be discussed in subsequent papers which will include the use of VPNs, Tor, and eventually the Kovri project which will integrate Monero with the I2P network.

Even though the machine running the I2P *monerod* hidden service incurs the risk of IP address exposure, this risk does not fall on the clients (wallets) that use the hidden service. Providing access to the I2P *monerod* hidden service to multiple clients provides plausible deniability to users of the hidden service.

The diagram below illustrates the domain space for this paper.



The I2P monerod hidden service communicates with client wallets through I2P tunnels. The tunnel endpoints are cryptographic constructs called *tunnel destinations* (not IP address:port number). All data transported via I2P tunnels are encrypted end-to-end. For additional information regarding the I2P protocol see: <https://geti2p.net/en/docs/how/intro>

The remainder of this paper will describe:


- Installing and running monerod on the “hidden service” computer
- Installing and running the I2P router on the “hidden service” computer
- Configuring the I2P monerod hidden service
- Configuring I2P client tunnels to use the I2P monerod hidden service
- Connecting wallet(s) to the I2P monerod hidden service

*All of the computers used to provide the I2P monerod hidden service described in this paper were running a 64-bit Linux operating system.*

## Installing and Running **monerod** on Hidden Service Computer

First you need to download the latest Monero software package. Goto <https://getmonero.org/downloads/>

and download the proper package for your computer. Since we are using a 64-bit Linux computer for our hidden service machine, we are going to download the **Linux 64-bit Command-Line Tools Only** software package as shown in the image below.

 <b>Linux, 64-bit</b>	
<b>Linux, 64-bit</b>	<b>Linux, 64-bit Command-Line Tools Only</b>
Current Version: 0.13.0.3 Beryllium Bullet	Current Version: 0.13.0.2 Beryllium Bullet
<b>SHA256 Hash (GUI):</b>	<b>SHA256 Hash (CLI):</b>
b26fe2fb921c5ab7f774ceac69cc0ff5ee0e0d730dd902aa4 f45046320e58749	a59fc0fffb325b4f92a5b500438bf340ddbf78e91581eb4df 95ad2d5e5fb42a8

Extract the downloaded file, then go to the directory in a terminal and type the following command:  
./monerod

If everything was done successfully, the Monero daemon will be running and displaying output on your terminal screen. Please consult <https://getmonero.org/> for specific information regarding the proper installation of the Monero software.

## Installing and Running I2P Router on Hidden Service Computer

You must have a Java runtime environment on your computer to run the I2P router. I used the **openjdk-8-jre-headless** package. To install on Linux (Debian/Ubuntu) I ran the following commands:


```
sudo apt-get update
```

```
sudo apt-get install openjdk-8-jre-headless
```


When the java runtime environment is installed, download and install the I2P router from:

<https://geti2p.net/en/download>

Follow the installation instructions on the I2P download page.



i2pinstall\_0.9.37.jar

Mirror:  sigterm.no

[select alternate mirror](#)

[sig](#)

Download that file and double-click it (if that works) or type `java -jar i2pinstall_0.9.37.jar` in a terminal to run the installer. On some platforms you may be able to right-click and select "Open with Java".

### Command line (headless) install:

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Download the graphical installer file above and run `java -jar i2pinstall_0.9.37.jar -console` from the command line.

After installation, start the I2P router by going to the directory where I2P is installed and enter:

```
./i2prouter start
```

## Configuring the I2P monerod Hidden Service

Go to the I2P Hidden Services Manager (on your I2P router machine) at:

<http://127.0.0.1:7657/i2ptunnelmgr>

(The web page is served up by your local machine, not an external web site). You should see a page similar to the one shown below:

ROUTER INFO

Version: 0.9.37-0  
Uptime: 2 days

BANDWIDTH IN/OUT

3 Sec: 4.93 / 2.01 KBps  
5 Min: 0.82 / 0.96 KBps  
Total: 2.21 / 1.36 KBps  
Used: 473 MB / 305 MB

Network: Firewallled

I2P SERVICES

Email  
Torrents  
Web Server  
SecureMail

I2P INTERNALS

Addressbook Graphs Help  
Hidden Services Manager Logs  
NetDB Peers Profiles Tunnels

HELP & FAQ

Advanced Settings Changelog  
Configuration FAQ Legal  
Reachability Sidebar Troubleshoot

PEERS

Active: 28 / 258  
Fast: 30  
High Capacity: 49

HIDDEN SERVICES MANAGER

STATUS MESSAGES

Tunnels ready for client: HTTP Proxy on 127.0.0.1:4444  
Client ready, listening on 127.0.0.1:4444  
Client ready, listening on 127.0.0.1:6668, delaying tunnel open until required  
Tunnels ready for client: Standard client on 127.0.0.1:7659  
Client ready, listening on 127.0.0.1:7659

Refresh Clear

GLOBAL TUNNEL CONTROL

Tunnel Wizard Stop All Start All Restart All

I2P HIDDEN SERVICES

Name	Type	Points at	Preview	Status	Control
I2P webserver	HTTP server	127.0.0.1:7658	No Preview		Start
Hostname: mysite.i2p Description: My eepsite					
New hidden service:				HTTP	Create

I2P CLIENT TUNNELS

Name	Type	Interface	Port	Status	Control
------	------	-----------	------	--------	---------

Create a new hidden service of type “Standard” in the list-box then click the *Create* button.

I2P HIDDEN SERVICES

Name	Type	Points at	Preview	Status	Control
I2P webserver	HTTP server	127.0.0.1:7658	No Preview		Start
Hostname: mysite.i2p Description: My eepsite					
New hidden service:				Standard	Create

You will then be presented with a screen similar to the one shown below:

ROUTER INFO

Version: 0.9.37-0  
Uptime: 2 days

BANDWIDTH IN/OUT

3 Sec: 6.48 / 1.95 KBps  
5 Min: 1.65 / 1.36 KBps  
Total: 2.21 / 1.36 KBps  
Used: 473 MB / 306 MB

Network: Firewallled

I2P SERVICES

Email  
Torrents  
Web Server  
SecureMail

I2P INTERNALS

Addressbook Graphs Help  
Hidden Services Manager Logs  
NetDB Peers Profiles Tunnels

HELP & FAQ

Advanced Settings Changelog  
Configuration FAQ Legal  
Reachability Sidebar Troubleshoot

PEERS

Active: 24 / 237  
Fast: 30  
High Capacity: 53

HIDDEN SERVICES MANAGER

NEW SERVER SETTINGS

Name

Type

Description

Auto Start Tunnel

Target

Host: 127.0.0.1

Port: required

Local destination

Private key file

Advanced Networking Options

Tunnel Options

Length

Variance

Count

Backup Count

Enter in the form:

Name = monerod hidden service

Check the *Automatically start tunnel when router starts* checkbox

Port = 18081

The your screen should look like the one shown below:

The screenshot shows the 'HIDDEN SERVICES MANAGER' interface. On the left is a sidebar with navigation links: ROUTER INFO, BANDWIDTH IN/OUT, I2P SERVICES (with sub-links for Email, Torrents, Web Server, SecureMail), I2P INTERNALS (with sub-links for Addressbook, Graphs, Help, Hidden Services Manager, Logs, NetDB, Peers, Profiles, Tunnels), HELP & FAQ (with sub-links for Advanced Settings, Changelog, Configuration, FAQ, Legal, Reachability, Sidebar, Troubleshoot), and PEERS. The main area is titled 'NEW SERVER SETTINGS' and contains several sections: 'Name' (monerod hidden service), 'Type' (Standard server), 'Description' (empty), 'Auto Start Tunnel' (checked), 'Target' (Host: 127.0.0.1, Port: 18081, Use SSL: unchecked), 'Local destination' (empty), 'Private key file' (i2ptunnel12-privKeys.dat), 'ADVANCED NETWORKING OPTIONS' (Tunnel Options: Length 3 hop tunnel, Variance 0 hop variance), 'Count' (2 inbound, 2 outbound tunnels), and 'Backup Count' (0 backup tunnels). At the bottom, there is a 'Save' button.

Click the *Save* button at the bottom of the form. You should now see a new *monerod hidden service* similar to the one shown below.

I2P HIDDEN SERVICES					
Name	Type	Points at	Preview	Status	Control
I2P webserver	HTTP server	127.0.0.1:7658	No Preview		<button>Start</button>
Hostname: mysite.i2p Description: My eepsite					
monerod hidden service	Standard server	127.0.0.1:18081	No Preview		<button>Stop</button>
Destination: idpanikuysadsz6tzowtbjub2eh12fu2hsgn3ks5djg5i22wzea.b32.i2p Description:					
New hidden service: HTTP <button>Create</button>					

Your tunnel *destination* will be different and you will need to reference this tunnel destination later when you setup your client tunnels. When the light in the hidden service *Status* field is green, your monerod hidden service will be operational and route requests to the I2P hidden service to the Monero daemon running on the machine.

## Configuring I2P Client Tunnels

On a different (client) machine, repeat the following steps presented above:

Install the Monero software package i.e., wallet (if not already installed)  
Install java runtime environment (if not already installed)  
Install I2P router (if not already installed)

On the client machine, go to the I2P Hidden Services Manager at:

<http://127.0.0.1:7657/i2ptunnelmgr>

(The web page is served up by your local machine, not an external web site). You should see a page similar to the one shown below:


The screenshot shows the I2P Hidden Services Manager web interface. On the left is a sidebar with navigation links: ROUTER INFO, BANDWIDTH IN/OUT, Network: Firewallled, I2P SERVICES (Email, Torrents, Web Server, SecureMail), I2P INTERNALS (Addressbook, Graphs, Help, Hidden Services Manager, Logs, NetDB, Peers, Profiles, Tunnels), HELP & FAQ (Advanced Settings, Changelog, Configuration, FAQ, Legal, Reachability, Sidebar, Troubleshoot), and PEERS (Active: 28 / 258, Fast: 30, High Capacity: 49). The main content area is titled 'HIDDEN SERVICES MANAGER' and contains several sections: STATUS MESSAGES (showing tunnel status logs), GLOBAL TUNNEL CONTROL (with buttons for Tunnel Wizard, Stop All, Start All, Restart All), I2P HIDDEN SERVICES (a table listing services like 'I2P webserver' with columns for Name, Type, Points at, Preview, Status, and Control), and I2P CLIENT TUNNELS (a table with columns for Name, Type, Interface, Port, Status, and Control). At the bottom of the I2P HIDDEN SERVICES section, there is a 'New hidden service' dropdown menu set to 'HTTP' and a 'Create' button.

Scroll down on this page until you see the area for creating a new *I2P Client tunnel*.

The form for creating a new I2P Client tunnel. It has a 'Description:' label and a text input field. Below the input field, there is a 'New client tunnel:' label, a dropdown menu set to 'Standard', and a 'Create' button.

Select a *Standard* tunnel type, then click the *Create* button.

You will then see a form similar to the one shown below:



## HIDDEN SERVICES MANAGER

ROUTER INFO

Version: 0.9.37-0  
Uptime: 2 days

BANDWIDTH IN/OUT

3 Sec: 16.37 / 3.20 KBps  
5 Min: 9.07 / 2.14 KBps  
Total: 2.25 / 1.37 KBps  
Used: 484 MB / 309 MB

Network: Firewallled

I2P SERVICES

Email  
Torrents  
Web Server  
SecureMail

I2P INTERNALS

Addressbook Graphs Help  
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NetDB Peers Profiles Tunnels

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PEERS

Active: 23 / 248  
Fast: 30  
High Capacity: 62

NEW PROXY SETTINGS

Name

New Tunnel1

Type

Standard client

Description

Auto Start Tunnel

☐ Automatically start tunnel when router starts

Access Point

Port: required

Reachable by: 127.0.0.1

Use SSL?

☐ Clients use SSL to connect to tunnel

Tunnel Destination

required

(name, name:port, or destination)

Shared Client

☐ Share tunnels with other clients and Irc/httpclients? (Change requires restart of client proxy tunnel)

ADVANCED NETWORKING OPTIONS

Note: When this client proxy is configured to share tunnels, then these options are for all the shared proxy clients!

Give the tunnel a name.

Enter **18081** for the *Port* number (enter over the red “required” text).

Enter the *hidden service tunnel destination* (from the creation of the hidden service above) in the *Tunnel Destination* field (that has the red “required” text in it).

Then scroll to the bottom of the page and click the Save button.

**You will need to start this tunnel prior to attempting to connect to the I2P monerod hidden service.** When your done using the hidden service, you can stop the client tunnel.

## Connecting Wallets to the I2P monerod Hidden Service

Now with the hidden service running on the hidden service machine and the client tunnel running on the client machine, you can connect your Monero wallet to the *I2P monerod hidden service*.

You can run the monero-wallet-cli on the client machine and it will access the Monero blockchain via the I2P monerod hidden service. You could also install the Monero GUI wallet client and it will access the I2P monerod hidden service.

Cycle times will be slower than running everything over the clearnet because the I2P network is end-to-end encrypted and goes through multiple hops to reach destinations. However, remember that as a result, your wallet machine’s IP address is no longer exposed to prying eyes and your network access to the Monero blockchain is anonymous.