I2P

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|  | This article **relies too much on**[**references**](https://en.wikipedia.org/wiki/Wikipedia:Verifiability)**to**[**primary sources**](https://en.wikipedia.org/wiki/Wikipedia:No_original_research#Primary,_secondary_and_tertiary_sources). Please improve this article by adding [secondary or tertiary sources](https://en.wikipedia.org/wiki/Wikipedia:No_original_research#Primary,_secondary_and_tertiary_sources). *(August 2017) (*[*Learn how and when to remove this template message*](https://en.wikipedia.org/wiki/Help:Maintenance_template_removal)*)* |

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| --- | --- |
| **I2P** | |
|  | |
| [**Original author(s)**](https://en.wikipedia.org/wiki/Software_developer) | I2P Team[[1]](https://en.wikipedia.org/wiki/I2P#cite_note-team-1) |
| **Initial release** | 2003; 17 years ago |
| [**Stable release**](https://en.wikipedia.org/wiki/Software_release_life_cycle) | 0.9.47 / 24 August 2020; 40 days ago[[2]](https://en.wikipedia.org/wiki/I2P#cite_note-recentRelease-2) |
| [**Repository**](https://en.wikipedia.org/wiki/Repository_(version_control)) | * [github.com/i2p/i2p.i2p](https://github.com/i2p/i2p.i2p)   [Edit this at Wikidata](https://www.wikidata.org/wiki/Q565283#P1324) |
| **Written in** | [Java](https://en.wikipedia.org/wiki/Java_(programming_language)) |
| [**Operating system**](https://en.wikipedia.org/wiki/Operating_system) | [Cross-platform](https://en.wikipedia.org/wiki/Cross-platform) |
| **Available in** | English, Spanish Incomplete translations: Russian, French,Romanian, German, Swedish, Italian, Portuguese, Chinese, Dutch, Polish, Hungarian, Arabic, Japanese, Estonian, Persian[[3]](https://en.wikipedia.org/wiki/I2P#cite_note-3) |
| [**Type**](https://en.wikipedia.org/wiki/Software_categories#Categorization_approaches) | [Overlay network](https://en.wikipedia.org/wiki/Overlay_network) |
| [**License**](https://en.wikipedia.org/wiki/Software_license) | Free/Open Source – different licenses for different parts[[4]](https://en.wikipedia.org/wiki/I2P#cite_note-4) [Public domain](https://en.wikipedia.org/wiki/Public_domain), [BSD](https://en.wikipedia.org/wiki/BSD_license), [GPL](https://en.wikipedia.org/wiki/GNU_General_Public_License), [MIT](https://en.wikipedia.org/wiki/MIT_license) |
| **Website** | [https://geti2p.net](https://geti2p.net/) |

The **Invisible Internet Project** (**I2P**) is an anonymous network layer (implemented as a [Mix Network](https://en.wikipedia.org/wiki/Mix_network)) that allows for [censorship resistant](https://en.wikipedia.org/wiki/Internet_censorship_circumvention), [peer to peer](https://en.wikipedia.org/wiki/Peer-to-peer) communication. Anonymous connections are achieved by [encrypting](https://en.wikipedia.org/wiki/Encryption) the user's traffic (by using [end-to-end encryption](https://en.wikipedia.org/wiki/End-to-end_encryption)), and sending it through a volunteer-run network of roughly 55,000 computers distributed around the world. Given the high number of possible paths the traffic can transit, a third party watching a full connection is unlikely. The software that [implements](https://en.wikipedia.org/wiki/Implementation) this layer is called an "I2P [router](https://en.wikipedia.org/wiki/Router_(computing))", and a computer running I2P is called an "I2P [node](https://en.wikipedia.org/wiki/Node_(networking))". I2P is [free](https://en.wikipedia.org/wiki/Free_software) and [open source](https://en.wikipedia.org/wiki/Open-source_software), and is published under multiple [licenses](https://en.wikipedia.org/wiki/Software_license).[[5]](https://en.wikipedia.org/wiki/I2P#cite_note-5)



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* [7References](https://en.wikipedia.org/wiki/I2P#References)
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Technical design[[edit](https://en.wikipedia.org/w/index.php?title=I2P&action=edit&section=1)]

I2P is [beta](https://en.wikipedia.org/wiki/Development_stage#Beta) software since 2003.[[6]](https://en.wikipedia.org/wiki/I2P#cite_note-6) The software's developers emphasize that there are likely to be [bugs](https://en.wikipedia.org/wiki/Software_bug) in the beta version and that there has been insufficient [peer review](https://en.wikipedia.org/wiki/Peer_review) to date.[[7]](https://en.wikipedia.org/wiki/I2P#cite_note-7) However, they believe the code is now reasonably stable and well-developed, and more exposure can help the development of I2P.

The network itself is strictly message-based (like [IP](https://en.wikipedia.org/wiki/Internet_Protocol)), but there is a [library](https://en.wikipedia.org/wiki/Library_(computing)) available to allow reliable [streaming](https://en.wikipedia.org/wiki/Streaming_algorithm) communication on top of it (similar to [TCP](https://en.wikipedia.org/wiki/Transmission_control_protocol), although from version 0.6 there is a new [UDP](https://en.wikipedia.org/wiki/User_datagram_protocol)-based [SSU](https://en.wikipedia.org/wiki/Synchronization_in_telecommunications#Synchronization_Supply_Unit) transport). All communication is [end-to-end](https://en.wikipedia.org/wiki/End-to-end_encryption) [encrypted](https://en.wikipedia.org/wiki/Encryption) (in total there are four layers of encryption used when sending a message) through [garlic routing](https://en.wikipedia.org/wiki/Garlic_routing),[[8]](https://en.wikipedia.org/wiki/I2P#cite_note-8) and even the [end points](https://en.wikipedia.org/wiki/Communication_endpoint) ("destinations") are [cryptographic](https://en.wikipedia.org/wiki/Cryptographic) identifiers (essentially a pair of [public keys](https://en.wikipedia.org/wiki/Public_key)), so that neither sender nor recipient of a message need to reveal their [IP address](https://en.wikipedia.org/wiki/IP_address) to the other side or to third-party observers.

Although many developers had been a part of the *Invisible IRC Project (IIP)*[[9]](https://en.wikipedia.org/wiki/I2P#cite_note-9) and [Freenet](https://en.wikipedia.org/wiki/Freenet) communities, there are significant differences between their designs and concepts. IIP was an anonymous centralized [IRC](https://en.wikipedia.org/wiki/Internet_Relay_Chat) server. Freenet is a [censorship](https://en.wikipedia.org/wiki/Censorship)-resistant [distributed data store](https://en.wikipedia.org/wiki/Distributed_data_store). I2P is an [anonymous peer-to-peer](https://en.wikipedia.org/wiki/Anonymous_P2P) distributed communication layer designed to run *any* traditional internet service (e.g. [Usenet](https://en.wikipedia.org/wiki/Usenet), [email](https://en.wikipedia.org/wiki/Email), [IRC](https://en.wikipedia.org/wiki/Internet_Relay_Chat), [file sharing](https://en.wikipedia.org/wiki/File_sharing), [Web hosting](https://en.wikipedia.org/wiki/Web_hosting) and [HTTP](https://en.wikipedia.org/wiki/HTTP), [Telnet](https://en.wikipedia.org/wiki/Telnet)), as well as more traditional distributed applications (e.g. a distributed data store, a [web proxy](https://en.wikipedia.org/wiki/Web_proxy) network using [Squid](https://en.wikipedia.org/wiki/Squid_(software)), or [DNS](https://en.wikipedia.org/wiki/Domain_Name_System)).

Many developers of I2P are known only under [pseudonyms](https://en.wikipedia.org/wiki/Pseudonymity). While the previous main developer, [*jrandom*](https://en.wikipedia.org/wiki/J._Random_Hacker), is currently on hiatus,[[10]](https://en.wikipedia.org/wiki/I2P#cite_note-10) others, such as *zzz*, *killyourtv*, and *Complication* have continued to lead development efforts, and are assisted by numerous contributors.[[1]](https://en.wikipedia.org/wiki/I2P#cite_note-team-1)

I2P uses 2048bit [ElGamal](https://en.wikipedia.org/wiki/ElGamal)/[AES256](https://en.wikipedia.org/wiki/AES256)/[SHA256](https://en.wikipedia.org/wiki/SHA256)+Session Tags encryption[[11]](https://en.wikipedia.org/wiki/I2P#cite_note-11) and [Ed25519](https://en.wikipedia.org/wiki/Ed25519) [EdDSA](https://en.wikipedia.org/wiki/EdDSA)/[ECDSA](https://en.wikipedia.org/wiki/ECDSA) [signatures](https://en.wikipedia.org/wiki/Digital_signature).[[12]](https://en.wikipedia.org/wiki/I2P#cite_note-12)

**Releases**[[edit](https://en.wikipedia.org/w/index.php?title=I2P&action=edit&section=2)]

I2P has had a stable release every six to eight weeks. Updates are distributed via I2P torrents and are signed by the release manager (generally *zzz* or *str4d*).

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| show**I2P Versions** |

Software[[edit](https://en.wikipedia.org/w/index.php?title=I2P&action=edit&section=3)]

[](https://en.wikipedia.org/wiki/File:I2P_router_console_0.9.31-0.png)

I2P 0.9.31-0 router console

Since I2P is an anonymous [network layer](https://en.wikipedia.org/wiki/Network_layer), it is designed so other software can use it for anonymous communication. As such, there are a variety of tools currently available for I2P or in development.

The I2P [router](https://en.wikipedia.org/wiki/Router_(computing)) is controlled through the router console, which is a web frontend accessed through a web browser.

**General networking**[[edit](https://en.wikipedia.org/w/index.php?title=I2P&action=edit&section=4)]

* *I2PTunnel* is an application embedded into I2P that allows arbitrary TCP/IP applications to communicate over I2P by setting up "[tunnels](https://en.wikipedia.org/wiki/Tunneling_protocol)" which can be accessed by connecting to pre-determined ports on [localhost](https://en.wikipedia.org/wiki/Localhost).
* *SAM* (*Simple Anonymous Messaging*) is a [protocol](https://en.wikipedia.org/wiki/Communications_protocol) which allows a client application written in any [programming language](https://en.wikipedia.org/wiki/Programming_language) to communicate over I2P, by using a socket-based interface to the I2P router.[[50]](https://en.wikipedia.org/wiki/I2P#cite_note-50)
* *BOB* (*Basic Open Bridge*) is a less complex app to router protocol similar to "SAM"[[51]](https://en.wikipedia.org/wiki/I2P#cite_note-51)
* *Orchid* Outproxy [Tor](https://en.wikipedia.org/wiki/Tor_(anonymity_network)) plugin[[52]](https://en.wikipedia.org/wiki/I2P#cite_note-52)

**Chat**[[edit](https://en.wikipedia.org/w/index.php?title=I2P&action=edit&section=5)]

* Any [IRC client](https://en.wikipedia.org/wiki/IRC_client) made for the Internet Relay Chat can work, once connected to the I2P [IRC server](https://en.wikipedia.org/wiki/IRC_server) (on localhost).

**File sharing**[[edit](https://en.wikipedia.org/w/index.php?title=I2P&action=edit&section=6)]

* Several programs provide [BitTorrent](https://en.wikipedia.org/wiki/BitTorrent_(protocol)) functionality for use within the I2P network. Users cannot connect to non-I2P torrents or peers from within I2P, nor can they connect to I2P torrents or peers from outside I2P.[[53]](https://en.wikipedia.org/wiki/I2P#cite_note-53) [*I2PSnark*](https://en.wikipedia.org/w/index.php?title=I2PSnark&action=edit&redlink=1), included in the I2P install package, is a port of the BitTorrent client named Snark.[[54]](https://en.wikipedia.org/wiki/I2P#cite_note-54) [*Vuze*](https://en.wikipedia.org/wiki/Vuze), formerly known as Azureus, is a [BitTorrent client](https://en.wikipedia.org/wiki/BitTorrent_client) that includes a plugin for I2P, allowing anonymous [swarming](https://en.wikipedia.org/wiki/Segmented_downloading) through this network.[[55]](https://en.wikipedia.org/wiki/I2P#cite_note-55) This plugin is still in an early stage of development, however it is already fairly stable. *I2P-BT* is a BitTorrent client for I2P that allows anonymous swarming for [file sharing](https://en.wikipedia.org/wiki/File_sharing). This client is a modified version of the original BitTorrent 3.4.2 program which runs on [MS](https://en.wikipedia.org/wiki/Microsoft) Windows and most dialects of [Unix](https://en.wikipedia.org/wiki/Unix) in a GUI and command-line environment. It was developed by the individual known as 'duck' on I2P in cooperation with 'smeghead'. It is no longer being actively developed; however, there is a small effort to upgrade the I2P-BT client up to par with the BitTorrent 4.0 release. *I2PRufus* is an I2P port of the Rufus BitTorrent client.[[56]](https://en.wikipedia.org/wiki/I2P#cite_note-56) [Robert (P2P Software)](https://en.wikipedia.org/wiki/Robert_(P2P_Software)) is the most actively maintained I2PRufus fork. XD is a standalone BitTorrent client written in Go.[[57]](https://en.wikipedia.org/wiki/I2P#cite_note-57) BiglyBT is a fork of Vuze, created by two former developers of that program, that includes a plugin for I2P.[[58]](https://en.wikipedia.org/wiki/I2P#cite_note-58)
* Two [Kad network](https://en.wikipedia.org/wiki/Kad_network) clients exist for the I2P network, *iMule* and *Nachtblitz*. [iMule](https://en.wikipedia.org/wiki/IMule) (*invisible Mule*) is a port of [eMule](https://en.wikipedia.org/wiki/EMule) for I2P network. iMule has not been developed since 2013. iMule is made for anonymous file sharing. In contrast to other [eDonkey](https://en.wikipedia.org/wiki/EDonkey_network) clients, iMule only uses the [Kademlia](https://en.wikipedia.org/wiki/Kademlia) for proceeding to connect through I2P network, so no servers are needed. [*Nachtblitz*](https://en.wikipedia.org/w/index.php?title=Nachtblitz&action=edit&redlink=1)[[*citation needed*](https://en.wikipedia.org/wiki/Wikipedia:Citation_needed)] is a custom client built on the .NET Framework. The latest version is 1.4.27, released on March 23, 2016.[[*citation needed*](https://en.wikipedia.org/wiki/Wikipedia:Citation_needed)] Nachtblitz includes a time lock to disable the software one year after its release date.
* [I2Phex](https://en.wikipedia.org/wiki/I2Phex) is a port of the popular [Gnutella](https://en.wikipedia.org/wiki/Gnutella) client [Phex](https://en.wikipedia.org/wiki/Phex) to I2P. It is stable and fairly functional.
* A port of [Tahoe-LAFS](https://en.wikipedia.org/wiki/Tahoe-LAFS) has been ported to I2P. This allows for files to be anonymously stored in Tahoe-LAFS grids.
* MuWire is a file-sharing program inspired by the LimeWire Gnutella client that works atop the I2P network.[[59]](https://en.wikipedia.org/wiki/I2P#cite_note-59)

**Bridging to Clearnet**[[edit](https://en.wikipedia.org/w/index.php?title=I2P&action=edit&section=7)]

Currently, Vuze and BiglyBT are the only torrent clients that makes clearnet (connections not through I2P) torrents available on I2P and vice versa, by using a plugin that connects them to the I2P network. Depending on the client settings, torrents from the internet can be made available on I2P (via announcements to I2P's DHT network) and torrents from I2P can be made available to the internet. For this reason, torrents previously published only on I2P can be made available to the entire Internet, and users of I2P can often download popular content from the Internet while maintaining the anonymity of I2P.[[60]](https://en.wikipedia.org/wiki/I2P#cite_note-60)[[61]](https://en.wikipedia.org/wiki/I2P#cite_note-61)

**Email**[[edit](https://en.wikipedia.org/w/index.php?title=I2P&action=edit&section=8)]

[](https://en.wikipedia.org/wiki/File:I2PBote-inbox-0.4.png)

A screenshot of the inbox of I2P-Bote.

* *I2P-Bote(*[*github*](https://github.com/i2p/i2p.i2p-bote)) is a free, fully [decentralized](https://en.wikipedia.org/wiki/Decentralized_computing) and distributed anonymous email system with a strong focus on security.[[*citation needed*](https://en.wikipedia.org/wiki/Wikipedia:Citation_needed)] It supports multiple identities and does not expose email [metadata](https://en.wikipedia.org/wiki/Metadata). As of 2015, it is still considered [beta software](https://en.wikipedia.org/wiki/Beta_version). I2P-Bote is accessible via the I2P [web console](https://en.wikipedia.org/wiki/Web_application) interface or using standard email protocols (i.e. [IMAP](https://en.wikipedia.org/wiki/IMAP)/[SMTP](https://en.wikipedia.org/wiki/SMTP)). All bote-mails are transparently end-to-end encrypted and signed by the sender's private key, thus removing the need for [PGP](https://en.wikipedia.org/wiki/Pretty_Good_Privacy) or other email encryption software. I2P-Bote offers additional anonymity by allowing for the use of mail relays with variable length delays. Since it is decentralized, there is no centralized email server that could correlate different email identities as communicating with each other (i.e. *profiling*). Even the [nodes](https://en.wikipedia.org/wiki/Node_(networking)) relaying the mails do not know the sender, and apart from sender and receiver, only the end of the high-[latency](https://en.wikipedia.org/wiki/Latency_(engineering)) mail route and the storing nodes will know to whom (which I2P-Bote address – the user's IP address is still hidden by I2P) the mail is destined. The original sender could have gone offline long before the email becomes available to the recipient. No account registration is necessary, all you have to do in order to use it is create a new identity. I2P-Bote can be installed as an I2P plugin .[[*citation needed*](https://en.wikipedia.org/wiki/Wikipedia:Citation_needed)]
* I2P also has a free pseudonymous e-mail service run by an individual called *Postman*. [Susimail](https://en.wikipedia.org/wiki/Susimail) is a [web-based](https://en.wikipedia.org/wiki/Web-based) email client intended primarily for use with Postman's mail servers, and is designed with security and anonymity in mind. Susimail was created to address privacy concerns in using these servers directly using traditional email clients, such as leaking the user's hostname while communicating with the SMTP server. It is currently included in the default I2P distribution, and can be accessed through the I2P router console web interface. Mail.i2p can contact both I2P email users and public internet email users.
* [Bitmessage.ch](https://en.wikipedia.org/wiki/Bitmessage#Bitmessage.ch) can be used over I2P or Tor.

**Instant Messaging**[[edit](https://en.wikipedia.org/w/index.php?title=I2P&action=edit&section=9)]

* *I2P-Messenger* is a simple [Qt](https://en.wikipedia.org/wiki/Qt_(framework))-based, serverless, end-to-end-encrypted [instant messenger](https://en.wikipedia.org/wiki/Instant_messenger) for I2P.[[62]](https://en.wikipedia.org/wiki/I2P#cite_note-62) No servers can log the user's conversations. No ISP can log with whom the user chats, when, or for how long. As it is serverless, it can make use of I2P's end-to-end encryption, preventing any node between two parties from having access to the plain text. I2P-Messenger can be used for fully anonymous instant communication with persons the user doesn't even know, or, alternatively, to communicate securely and untraceably with friends, family members, or colleagues. In addition to messaging, [file transfer](https://en.wikipedia.org/wiki/File_transfer) is also supported.
* *I2P-Talk* is another simple instant messenger incompatible with I2P-Messenger, but having the same security properties

**Publishing**[[edit](https://en.wikipedia.org/w/index.php?title=I2P&action=edit&section=10)]

* [*Syndie*](https://en.wikipedia.org/wiki/Syndie) is a content distribution application, suitable for [blogs](https://en.wikipedia.org/wiki/Blogs), [newsgroups](https://en.wikipedia.org/wiki/Newsgroups), [forums](https://en.wikipedia.org/wiki/Internet_forum) and small media attachments. Syndie is designed for [network resilience](https://en.wikipedia.org/wiki/Resilience_(network)). It supports connections to I2P, the Tor network (Syndie does not support Socks proxies, workaround needed for Tor access), Freenet and the regular internet. Server connections are intermittent, and support [higher-latency communications](https://en.wikipedia.org/wiki/Network_performance#Examples_of_latency_or_throughput_dominated_systems). Connections can be made to any number of known servers. Content is spread efficiently using a [Gossip protocol](https://en.wikipedia.org/wiki/Gossip_protocol).
* *Aktie* is an anonymous file sharing and distributed [Web of trust](https://en.wikipedia.org/wiki/Web_of_trust) forums system. Aktie can connect to I2P with its internal router or use an external router. To fight spam, "hash payments" (proof of CPU work) is computed for every published item.

**Routers**[[edit](https://en.wikipedia.org/w/index.php?title=I2P&action=edit&section=11)]

* I2PBerry is a Linux distribution which can be used as a router to encrypt and route network traffic through the I2P network.
* i2pd is a light-weight I2P router written in C++, stripping the excessive applications such as e-mail, torrents, and others that can be regarded as bloat.[[63]](https://en.wikipedia.org/wiki/I2P#cite_note-63)[[64]](https://en.wikipedia.org/wiki/I2P#cite_note-64)
* Kovri is an I2P router written in C++.[[65]](https://en.wikipedia.org/wiki/I2P#cite_note-65) It was forked from i2pd following developer disagreements.[[66]](https://en.wikipedia.org/wiki/I2P#cite_note-66) Kovri's primary purpose is to integrate with the cryptocurrency [Monero](https://en.wikipedia.org/wiki/Monero_(cryptocurrency)) to send new transaction information over I2P, making it much more difficult to find which node is the origin of a transaction request.[[67]](https://en.wikipedia.org/wiki/I2P#cite_note-67) Those using the Kovri router will be running full I2P routers that contribute to the I2P network the same way the current [Java](https://en.wikipedia.org/wiki/Java_(programming_language)) router does. This project is expected to benefit both the Monero and I2P communities, since it will allow for greater privacy in Monero, and it should increase the number of nodes on the I2P network.[[68]](https://en.wikipedia.org/wiki/I2P#cite_note-68)

**The Privacy Solutions project**[[edit](https://en.wikipedia.org/w/index.php?title=I2P&action=edit&section=12)]

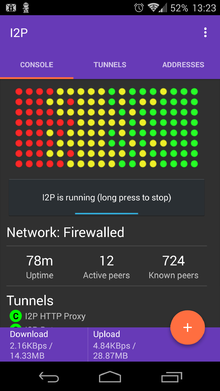
The Privacy Solutions project,[[69]](https://en.wikipedia.org/wiki/I2P#cite_note-69) a new organization that develops and maintains I2P software, launched several new development efforts designed to enhance the privacy, security, and anonymity for users, based on I2P protocols and technology.

These efforts include:[[70]](https://en.wikipedia.org/wiki/I2P#cite_note-70)

* The Abscond browser bundle.
* i2pd,[[71]](https://en.wikipedia.org/wiki/I2P#cite_note-71) an alternate implementation of I2P, written in C++ (rather than Java).
* The "BigBrother" I2P [network monitoring](https://en.wikipedia.org/wiki/Network_monitoring) project.

The code repository and download sections for the i2pd and Abscond project is available for the public to review and download.[[72]](https://en.wikipedia.org/wiki/I2P#cite_note-72) Effective January, 2015 i2pd is operating under PurpleI2P.[[73]](https://en.wikipedia.org/wiki/I2P#cite_note-73)

**Android**[[edit](https://en.wikipedia.org/w/index.php?title=I2P&action=edit&section=13)]

[](https://en.wikipedia.org/wiki/File:I2PAndroid-console-0.9.20.png)

I2P running on [Android](https://en.wikipedia.org/wiki/Android_(operating_system)).

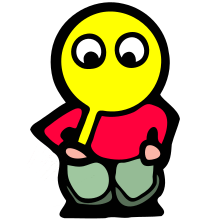
* Release builds of an I2P Router application for Android can be found on the [Google Play](https://en.wikipedia.org/wiki/Google_Play) store under The Privacy Solutions Project's Google Play account or on an [F-Droid](https://en.wikipedia.org/wiki/F-Droid) repository hosted by the developers.[[74]](https://en.wikipedia.org/wiki/I2P#cite_note-74)
* *Nightweb* is an Android application that utilizes I2P and Bittorrent to share blog posts, photos, and other similar content. It can also be run as a desktop application. It is no longer in development.[[75]](https://en.wikipedia.org/wiki/I2P#cite_note-75)

**Crypto-Currency**[[edit](https://en.wikipedia.org/w/index.php?title=I2P&action=edit&section=14)]

Some crypto currencies that support I2P are listed below.

* [Monero (cryptocurrency)](https://en.wikipedia.org/wiki/Monero_(cryptocurrency))
* [Verge (cryptocurrency)](https://en.wikipedia.org/wiki/Verge_(cryptocurrency))

Terminology[[edit](https://en.wikipedia.org/w/index.php?title=I2P&action=edit&section=15)]

[](https://en.wikipedia.org/wiki/File:Itoopie.svg)

I2P's mascot, itoopie, who is looking through a magnifying glass.[[76]](https://en.wikipedia.org/wiki/I2P#cite_note-76)

**Eepsite**

Eepsites are [websites](https://en.wikipedia.org/wiki/Website) that are hosted anonymously within the I2P network. Eepsite names end in *.i2p*, such as *ugha.i2p* or *forum.i2p*. EepProxy can locate these sites through the [cryptographic identifier keys](https://en.wikipedia.org/wiki/Key_(cryptography)) stored in the [hosts](https://en.wikipedia.org/wiki/Hosts_(file)).txt file found within the I2P program directory. Typically, I2P is required to access these eepsites.[[77]](https://en.wikipedia.org/wiki/I2P#cite_note-77)

**.i2p**

'I2p' is a [pseudo-top-level domain](https://en.wikipedia.org/wiki/Pseudo-top-level_domain) which is only valid within the I2P [overlay network](https://en.wikipedia.org/wiki/Overlay_network) scope. .i2p [names are resolved](https://en.wikipedia.org/wiki/Name_resolution_(computer_systems)) by browsers by submitting requests to EepProxy which will resolve names to an I2P peer key and will handle data transfers over the I2P network while remaining transparent to the browser.[[78]](https://en.wikipedia.org/wiki/I2P#cite_note-78)

**EepProxy**

The EepProxy program handles all communication between the browser and any eepsite. It functions as a [proxy server](https://en.wikipedia.org/wiki/Proxy_server) that can be used by any [web browser](https://en.wikipedia.org/wiki/Web_browser).

**Peers, I2P nodes**

Other machines using I2P that are connected to user's machine within the network. Each machine within the network shares the routing and forwarding of encrypted [packets](https://en.wikipedia.org/wiki/Network_packet).

**Tunnels**

Every ten minutes, a connection is established between the user's machine and another peer. Data to and from the user, along with the data for other peers (routed through the user's machine), pass through these tunnels and are forwarded to their final destination (may include more [jumps](https://en.wikipedia.org/wiki/Jump_Server)).[[79]](https://en.wikipedia.org/wiki/I2P#cite_note-79)

**netDb**

The [distributed hash table](https://en.wikipedia.org/wiki/Distributed_hash_table) (DHT) [database](https://en.wikipedia.org/wiki/Database) based on the [Kademlia](https://en.wikipedia.org/wiki/Kademlia) [algorithm](https://en.wikipedia.org/wiki/Algorithm) that holds information on I2P nodes and I2P eepsites. This database is split up among routers known as "floodfill routers". When a user wants to know how to contact an eepsite, or where more peers are, they query the [database](https://en.wikipedia.org/wiki/Database).[[80]](https://en.wikipedia.org/wiki/I2P#cite_note-80)[[81]](https://en.wikipedia.org/wiki/I2P#cite_note-81)

I2PCon[[edit](https://en.wikipedia.org/w/index.php?title=I2P&action=edit&section=16)]

[](https://en.wikipedia.org/wiki/File:I2PCon-2015-David-Dagon.jpg)

David Dagon presenting at the first I2Pcon.

From August 15, 2015 to August 16, 2015 the first I2P convention was held in [Toronto, Ontario](https://en.wikipedia.org/wiki/Toronto).[[82]](https://en.wikipedia.org/wiki/I2P#cite_note-82) The conference was hosted by a local [hackerspace](https://en.wikipedia.org/wiki/Hackerspace), Hacklab. The conference featured presentations from I2P developers and security researchers.

August 15, 2015 mainly had presentations on the past growth of the I2P network, a talk on what happens when companies sell people's personal information, and a round-table discussion on general privacy and security topics. The day ended with a [CryptoParty](https://en.wikipedia.org/wiki/CryptoParty), which helped to introduce new users to installing I2P, sending secure emails with I2P-Bote, and using I2P along with Vuze.

August 16, 2015 had more technical discussions than the previous day. The talks focused what how to dissuade bad-actors from using the network, how I2P has worked computer connection limits, how to do application development using I2P, and the development of the Android version. This day ended with a development meeting.

Cultural references[[edit](https://en.wikipedia.org/w/index.php?title=I2P&action=edit&section=17)]

In [*House of Cards*](https://en.wikipedia.org/wiki/House_of_Cards_(U.S._TV_series)) season 2 episode 2, I2P is referenced.[[83]](https://en.wikipedia.org/wiki/I2P#cite_note-83)

See also[[edit](https://en.wikipedia.org/w/index.php?title=I2P&action=edit&section=18)]

* [Rendezvous protocol](https://en.wikipedia.org/wiki/Rendezvous_protocol)
* [Crypto-anarchism](https://en.wikipedia.org/wiki/Crypto-anarchism)
* [Darknet](https://en.wikipedia.org/wiki/Darknet)
* [Garlic routing](https://en.wikipedia.org/wiki/Garlic_routing)
* [Key-based routing](https://en.wikipedia.org/wiki/Key-based_routing)
* [Public-key cryptography](https://en.wikipedia.org/wiki/Public-key_cryptography)
* [Secure communication](https://en.wikipedia.org/wiki/Secure_communication)
* [Threat model](https://en.wikipedia.org/wiki/Threat_model)

**Software**[[edit](https://en.wikipedia.org/w/index.php?title=I2P&action=edit&section=19)]

* [Retroshare](https://en.wikipedia.org/wiki/Retroshare)
* [Tor](https://en.wikipedia.org/wiki/Tor_(anonymity_network))
* [Tribler](https://en.wikipedia.org/wiki/Tribler)
* [ZeroNet](https://en.wikipedia.org/wiki/ZeroNet)
* [Freenet](https://en.wikipedia.org/wiki/Freenet)
* [Mixnet](https://en.wikipedia.org/wiki/Mixnet)

References[[edit](https://en.wikipedia.org/w/index.php?title=I2P&action=edit&section=20)]

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  72. [**^**](https://en.wikipedia.org/wiki/I2P#cite_ref-72) [*Active development*](https://github.com/PrivacySolutions/i2pd)*, The Privacy Solutions*
  73. [**^**](https://en.wikipedia.org/wiki/I2P#cite_ref-73) [*Active development*](https://github.com/PurpleI2P/i2pd)*, Purple I2P*
  74. [**^**](https://en.wikipedia.org/wiki/I2P#cite_ref-74) [*Android App Releases*](https://geti2p.net/en/blog/post/2014/12/01/Android-app-releases)
  75. [**^**](https://en.wikipedia.org/wiki/I2P#cite_ref-75) [*Discontinued*](https://sekao.net/nightweb/blog/discontinued.html)*, Nightweb*.
  76. [**^**](https://en.wikipedia.org/wiki/I2P#cite_ref-76) [*"I2P con 2015 - Growing the Network, Spreading the Word, 03:41"*](https://www.youtube.com/watch?v=_R85duCOWsY&t=221)*. YouTube.*
  77. [**^**](https://en.wikipedia.org/wiki/I2P#cite_ref-77) [*"Intro"*](https://geti2p.net/en/about/intro)*. I2P. Retrieved 4 June 2016.*
  78. [**^**](https://en.wikipedia.org/wiki/I2P#cite_ref-78) [*"Naming and Addressbook - I2P"*](https://geti2p.net/en/docs/naming)*. geti2p.net. Retrieved 4 June2016.*
  79. [**^**](https://en.wikipedia.org/wiki/I2P#cite_ref-79) [*"Tunnel Routing"*](https://geti2p.net/en/docs/how/tunnel-routing)*. I2P. Retrieved 4 June 2016.*
  80. [**^**](https://en.wikipedia.org/wiki/I2P#cite_ref-80) [*"The Network Database"*](https://geti2p.net/en/docs/how/network-database)*. I2P. Retrieved 4 June 2016.*
  81. [**^**](https://en.wikipedia.org/wiki/I2P#cite_ref-81) [*"Intro - I2P"*](https://geti2p.net/en/about/intro)*. geti2p.net.*
  82. [**^**](https://en.wikipedia.org/wiki/I2P#cite_ref-82) [*"I2PCon: Mission Accomplished - Blog"*](https://geti2p.net/en/blog/post/2015/08/20/I2PCon_Mission_Accomplished)*. I2P. Retrieved 4 June2016.*
  83. [**^**](https://en.wikipedia.org/wiki/I2P#cite_ref-83) [*"Hacker-Turned-Consultant Helps 'House Of Cards'"*](http://wwno.org/post/hacker-turned-consultant-helps-house-cards)*. New Orleans Public Radio. 9 April 2014. Retrieved 4 October 2017.*

External links[[edit](https://en.wikipedia.org/w/index.php?title=I2P&action=edit&section=21)]

* [Official website](https://geti2p.net/) [Edit this at Wikidata](https://www.wikidata.org/wiki/Q565283#P856)

Many people are familiar with Tor. Tor is an anonymous network overlaid on the public internet that allows its users to anonymously access the internet, and to use internal Tor websites that reside only within the Tor network. These types of anonymous networks are called *dark webs* because they are not searchable like the public internet, and users need special software to access them. Tor is the most well-known dark web, but the Invisible Internet Project (I2P) is arguably more anonymous, albeit much smaller.

RELATED: [How to access the dark web](https://www.comparitech.com/blog/vpn-privacy/how-to-access-the-deep-web-and-darknet/)

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* [2 Installing the I2P client](https://www.comparitech.com/blog/vpn-privacy/i2p-install-use-guide/#Installing_the_I2P_client)
* [3 Using I2P](https://www.comparitech.com/blog/vpn-privacy/i2p-install-use-guide/#Using_I2P)
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* [6 How to set up your own eepsite (I2P site)](https://www.comparitech.com/blog/vpn-privacy/i2p-install-use-guide/#How_to_set_up_your_own_eepsite_I2P_site)
* [7 Adding functionality to your I2P console](https://www.comparitech.com/blog/vpn-privacy/i2p-install-use-guide/#Adding_functionality_to_your_I2P_console)
* [8 Finding content on I2P](https://www.comparitech.com/blog/vpn-privacy/i2p-install-use-guide/#Finding_content_on_I2P)
* [9 Final words on using I2P and anonymity](https://www.comparitech.com/blog/vpn-privacy/i2p-install-use-guide/#Final_words_on_using_I2P_and_anonymity)

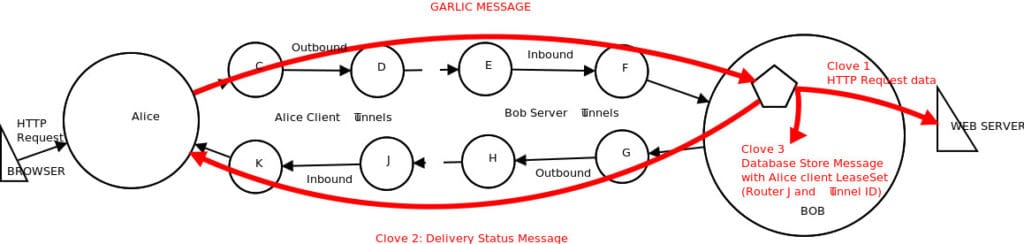
**I2P vs Tor vs Freenet**

The most common use of Tor is to access the public internet anonymously. Users connect to the Tor network and pass through it to the regular internet, called the *clear web*. When Tor is running, internet traffic is routed through the Tor network in such a way that it is difficult to to correlate a request entering the Tor network with the same request exiting the network. In addition, services can reside *inside* the Tor network meaning that the traffic never exits Tor to the clear web. I2P has limited support for clear net access, but has the same basic dark web function in that it supports sites that exist inside the I2P network.

RELATED: [The ultimate guide to Tor](https://www.comparitech.com/blog/vpn-privacy/ultimate-guide-to-tor/)

**Garlic routing**

The word Tor is derived from its routing technology named *The Onion Router*. Onion routing involves encrypting data packets in layers of encryption. Each node only decrypts the layer it needs to understand where to send the packet next. In that way, the layers of encryption are said to resemble the layers of an onion. I2P does not use onion routing. Rather, it uses garlic routing.



*Garlic routing* is a variation of onion routing that clumps messages together much like a garlic bulb has many cloves. The layered “onion” method of Tor means that a single packet is encrypted repeatedly but it is still a single message. This makes timing observations —- a method to correlate a Tor entry and exit node — easier. To reduce the risk of a single message being used by an observer in this way, I2P bundles messages together in a packet where each message is like a clove hanging off a garlic bulb Another important feature of garlic routing is that it is *uni-directional*. This means that data sent through I2P takes one path to get to the destination site and a different path to send data back to the requester. This make observation more difficult because it’s not possible to know what path the other half of the conversation is taking. Tor’s routing is bi-directional, meaning that traffic to and from the destination take the same path through Tor.

**Eepsites**

An I2P site is called an *eepsite*, which is analogous to a Tor *onion service*. An eepsite is just a normal website with the notable exception that it is only available to users who are connected to I2P. An eepsite is analogous to the more well-known Tor *onion* sites.

One use of Tor is to [create an *onion service*](https://www.comparitech.com/blog/vpn-privacy/how-to-set-up-a-tor-hidden-service/), which is a website only accessible when connected to the Tor network. This type of Tor use has even greater anonymity because the traffic never leaves the Tor network, so it is difficult to even see the traffic, never mind spy on it.

**Outproxies**

I2P is a little different than Tor, although they both have the same aim. It is technically possible to set up an I2P exit node (called an *outproxy* in I2P parlance) but in practice I2P is not generally used that way. I2P is almost exclusively used to access eepsites sites instead of using it as an anonymous way to access the public internet.

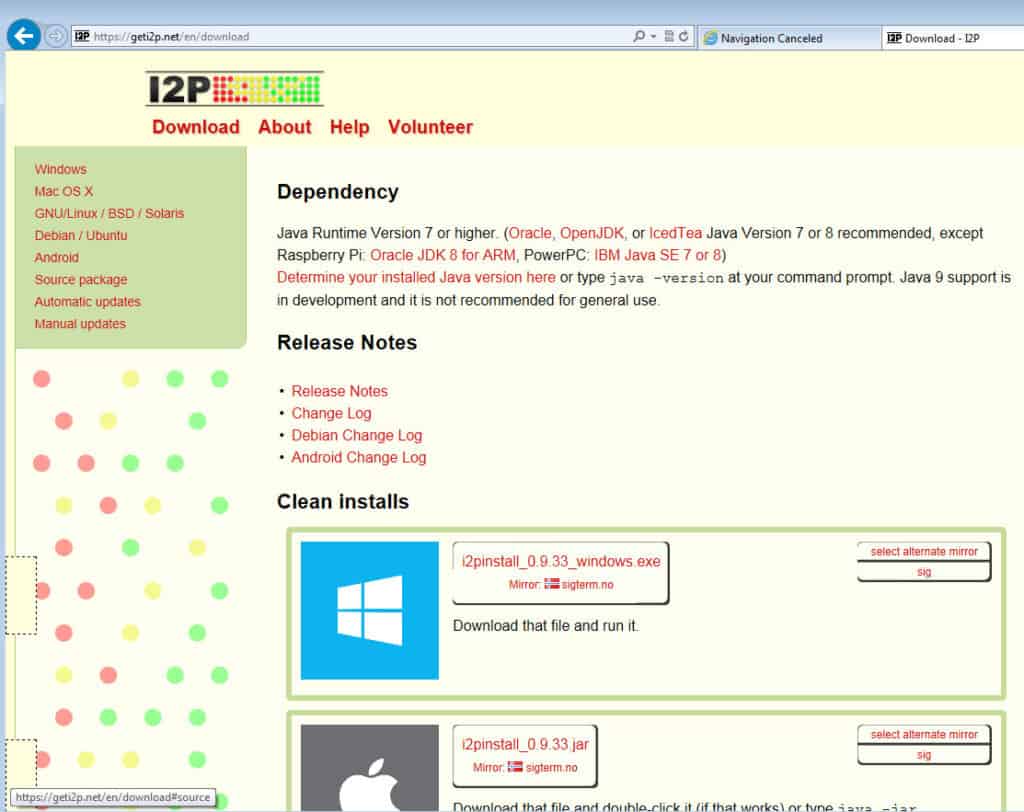
**Freenet**

Freenet is another anonymity-based darknet. Unlike I2P or Tor, Freenet is not designed to be a proxy to the clear web, therefore there is no such concept as outproxies or exit nodes. Freenet is primarily concerned with the anonymous distribution and storage of content across the Freenet which can be retrieved by other Freenet users even after the publishing node goes offline. Internal Freenet sites are named *freesites* which is synonymous with Tor’s *onion* sites and I2P’s *eepsites*. Like other darknets, Freenet encrypts data in transit and at rest, and routes traffic through an arbitrary number of nodes to obfsucate the originator. No Freenet node knows whether the node it is forwarding data to is the final destination or just another node along the way. Upon receipt of a request, each node checks its local content cache to see if it has the requested content. If it does not, it sends the request to its next *neighbor node*. If it does have the content, the node sends it back along the same path, and the nodes along the way will cache that content to make future requests faster.

**Installing the I2P client**

The IP2 project has [applications for Windows, macOS, Linux, and Android](https://geti2p.net/en/download). The only notable exception is iOS.

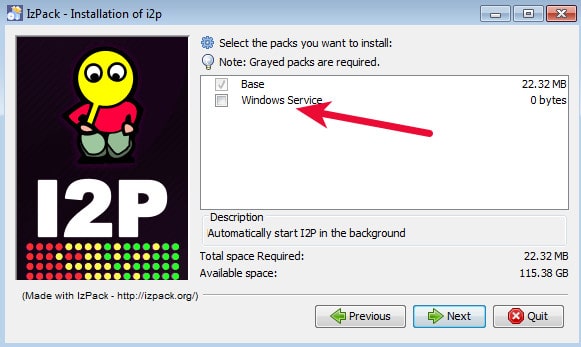
To get started, grab the version of the I2P client that fits your operating system from [this page](https://geti2p.net/en/download).



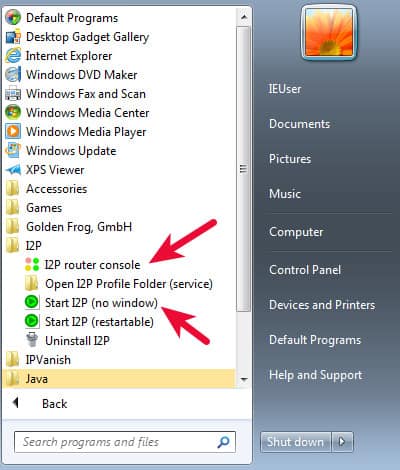
I2P requires Java. If you don’t have a suitable Java installation on your computer, the I2P installation will fail with a message to that effect. It will then bring you to the Java homepage to install Java so you can continue with the installation.



Select the *Windows Service* option if you want I2P to run all the time beginning at Windows startup. If you want to easily toggle I2P on and off as you need it, leave that checkbox blank.

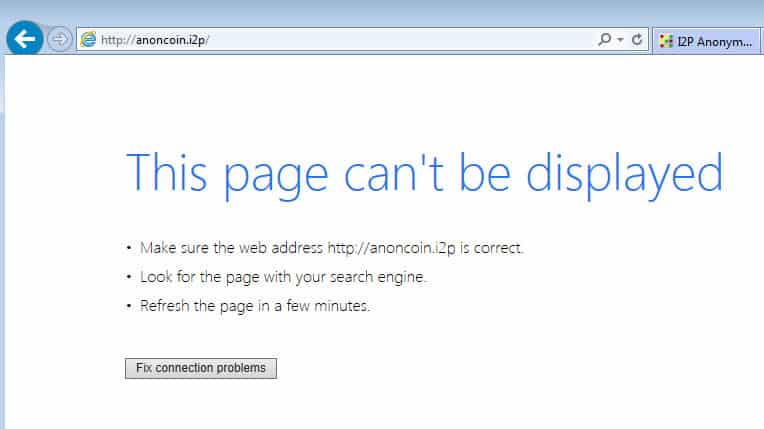


The rest of the installation is very straightforward. If you’ve left the default settings alone during installation you will see an I2P group in your Start Menu. Click one of the *Start I2P* options to get it running, and then click the *I2P router console* entry to view and configure the I2P router.



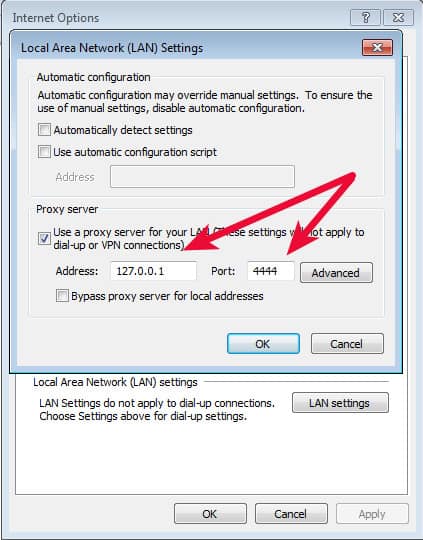
**Using I2P**

The I2P router console is the place to control everything about your I2P usage. The router application runs quietly in the background and you will interface with it via your web browser at 127.0.0.1:7657. Note that just because the router is running does not mean your applications are using it. The first thing you will likely want to do is configure your browser to use I2P. If you have not done this, your browser will not be able to resolve eepsites and will show some kind of DNS resolution error like this one from Internet Explorer.

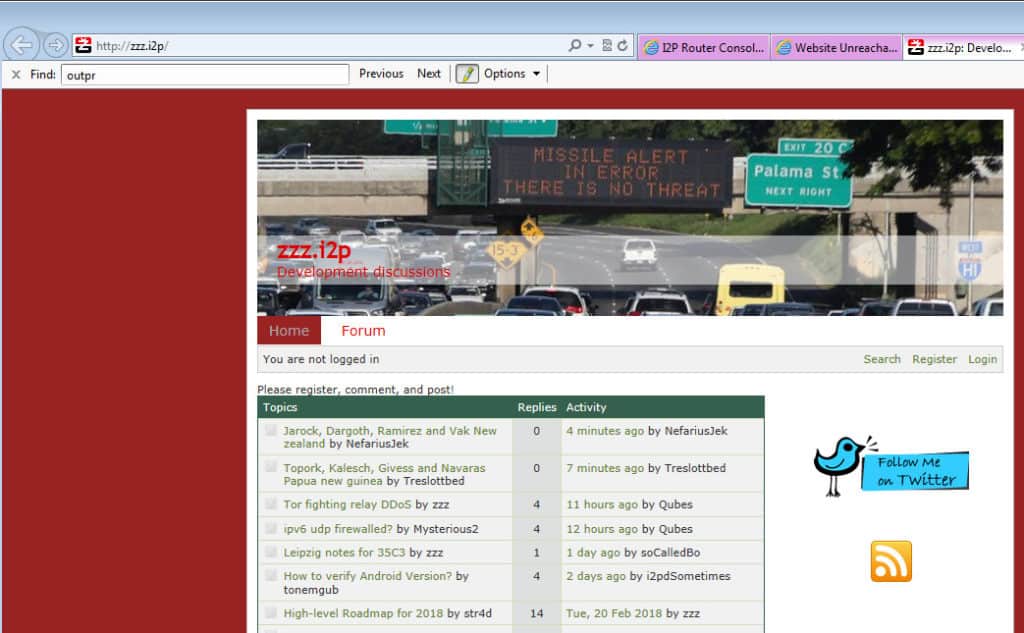


The cure for this is to tell your browser to use the I2P proxy that the router provides. The router home page states, “Also you can setup your browser to use the I2P proxy to reach eepsites. Just enter 127.0.0.1 (or localhost) port 4444 as a http proxy into your browser settings. Do not use SOCKS for this.” It contains directions on how to configure a proxy for most browsers on the [clearnet I2P page here.](https://geti2p.net/en/about/browser-config)

Browsers such as Internet Explorer and Firefox have their own internet connections settings. Within those settings it is possible to configure the browser to use the I2P proxy on port 4444 of your computer. For example, in Internet Explorer the path is Settings -> Internet Options -> Connections Tab -> LAN Settings button to get here:



If you’ve set the proxy up correctly, you will be able to browse eepsites now such as the I2P dev forum at [http://zzz.i2p](http://zzz.i2p/) (eepsite)

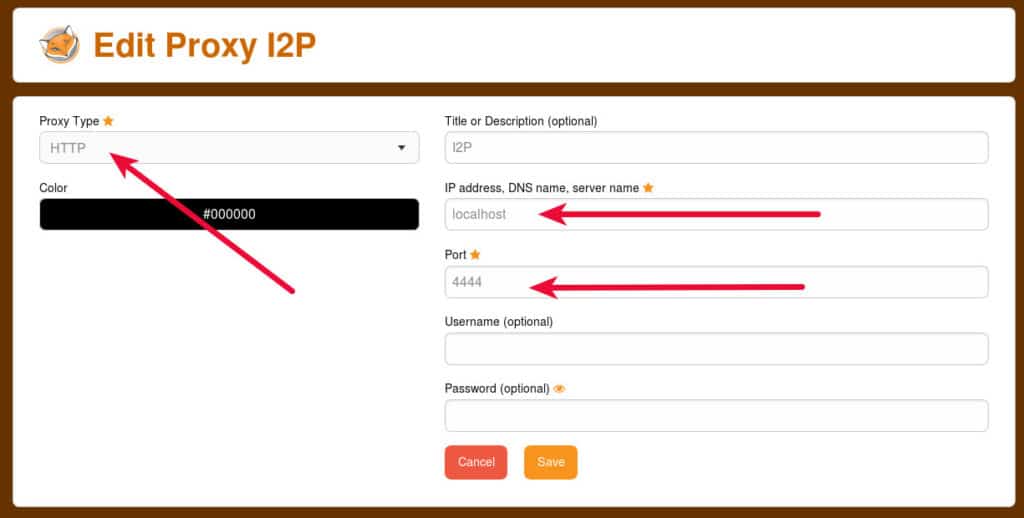


To resume browsing the internet you’ll need to remove those proxy settings. All this repeated configuration can be a pain and a much easier way to handle it is to use a proxy plugin such as FoxyProxy. FoxyProxy can automatically use the I2P proxy for eepsites and the regular internet for everything else with three simple steps.

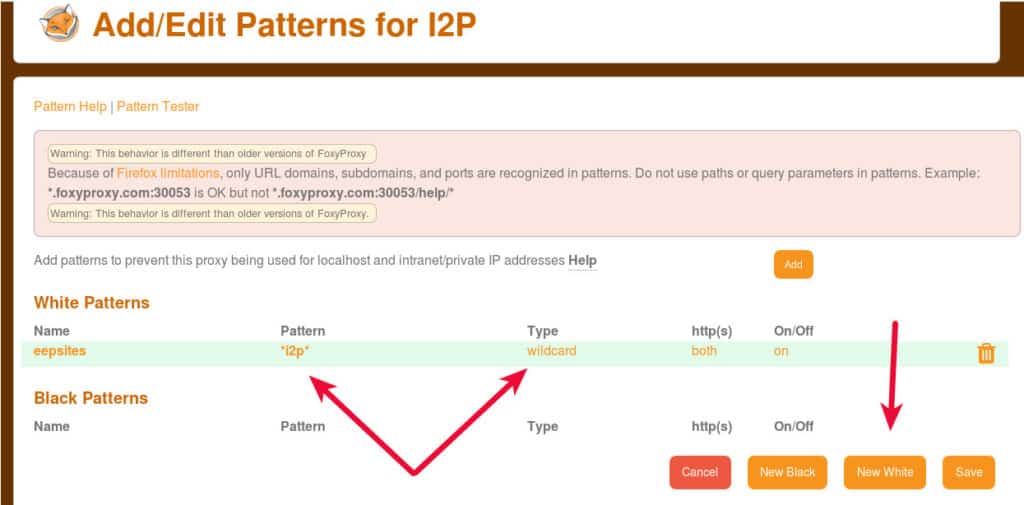
**Add the FoxyProxy plugin**

FoxyProxy is available for [Chrome](https://chrome.google.com/webstore/detail/foxyproxy-standard/gcknhkkoolaabfmlnjonogaaifnjlfnp?hl=en) and [Firefox](https://addons.mozilla.org/en-US/firefox/addon/foxyproxy-standard/). Keep in mind that any proxy plugin will necessarily see all of your internet traffic so you need to trust it.

**Add the I2P proxy on locahost port 4444**

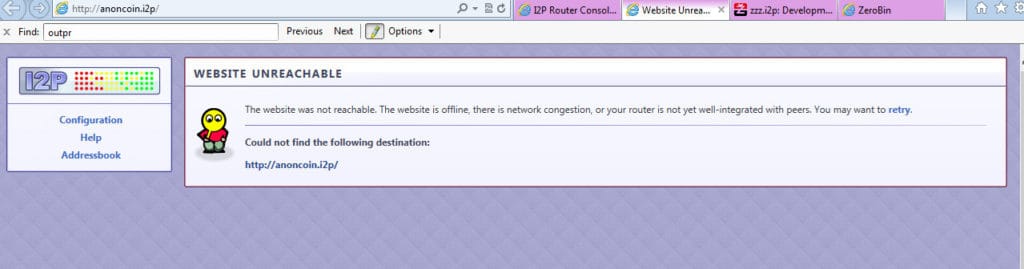


**Add in a URL pattern so that FoxyProxy will only use that I2P setting for eepsites**



*Warning: Setting Foxyproxy up like this will not route your regular internet traffic through I2P. It will use your regular internet connect for regular internet traffic and the I2P proxy for eepsites. There is more information in the next section about accessing websites within I2P.*

Keep in mind that I2P is a small and bumpy network. Eepsites are usually hosted on individual users’ computers and as such can have varying degrees of uptime. It is not at all unusual to come across dead eepsites which come back at some later time. If you see a page like this, it does not mean you’ve done anything incorrect. I2P is working, you just can’t get to that site right now.



**Using I2P to access websites**

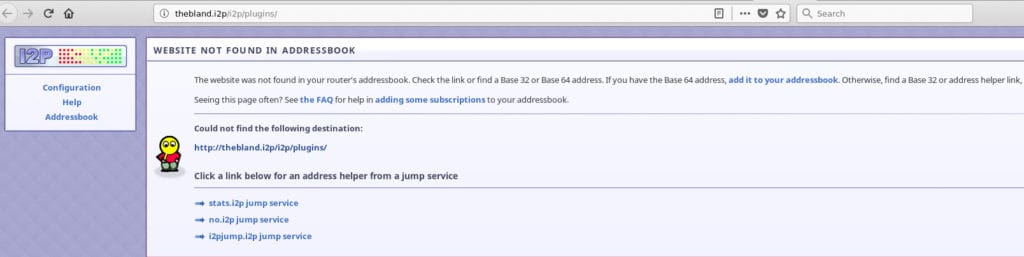
If you’re not using the FoxyProxy method, you’ll notice that once you’ve activated the proxy settings you will lose connection to the clear net. This is because I2P does not provide *outproxies* by default. In I2P parlance, an *outproxy* is an I2P node that connects to the clear web and allows internal I2P traffic out onto the regular internet. In Tor language, this is called an *exit node*. I2P is a much more reclusive network and is not normally used as a proxy to the clear net. The I2P FAQ has this to say about outproxies:

How do I access IRC, BitTorrent, or other services on the regular Internet?

Unless an outproxy has been set up for the service you want to connect to, this is not possible. There are only three types of outproxies running right now: HTTP, HTTPS, and email. Note that there is currently no publicly listed SOCKS outproxy. If this type of service is required, try Tor.

At this time, there are three outproxy [plugins](http://i2pwiki.i2p/index.php?title=Plugins) (eepsite) listed in the IP2 plugin repository. Two no longer exist and the remaining one points to an I2P developer forum containing instructions on how to hack together a testing setup from 2016. I wasn’t able to get that working so it does not appear there is any publically available way to use I2P as an anonymous internet proxy at this time.

While browsing I2P dark web eepsites, you may sometimes be unable to load a site and instead be presented with a page like this.

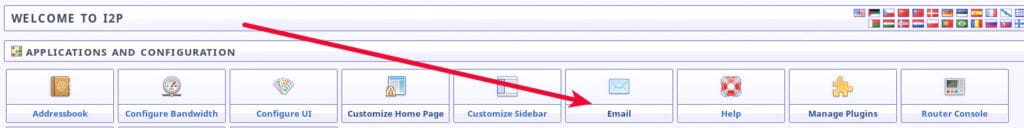


This means that your I2P router doesn’t know where that site is, but that does not necessarily mean the site does not exist; other routers may know where it is. To find out, click one or all of the *jump* links presented. Those links will consult well-informed I2P routers to see if the site can be found. In many cases, it works.

**Using I2P to send and receive email**

At this time there are two common ways to send and receive email between I2P and regular internet email addresses. SusiMail comes bundled with your I2P router and there is also a plugin named I2P Bote. Both can be used to send email within I2P, but at this time only SusiMail can be used to send email to and from regular internet addresses.

To get started with SusiMail, click the Email icon on your I2P router page.



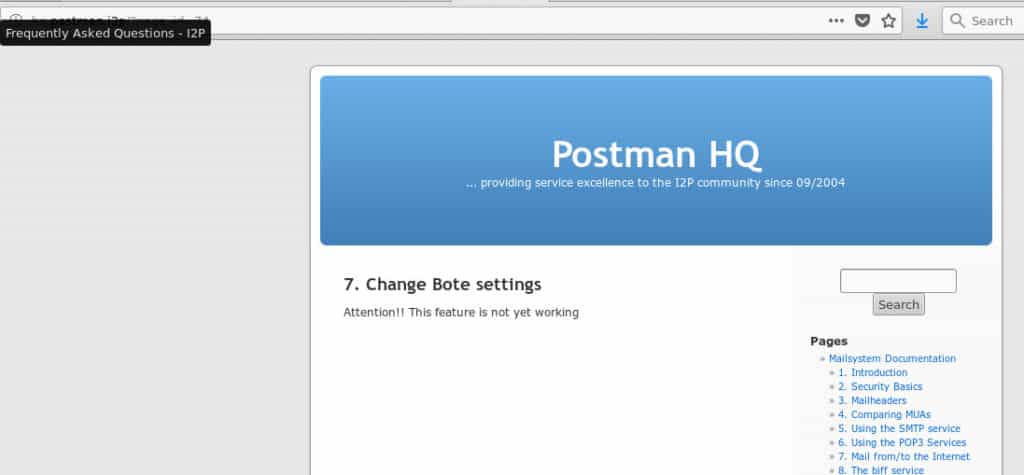
SusiMail will prompt you to create an account on the I2P Postman site before you can use it. From there, you will recognize a fairly standard webmail interface and should be able to send and receive email to both I2P addresses and regular internet email addresses.

*Note: It can take literally hours for I2P emails to arrive at regular internet addresses. This is actually a benefit as it makes timing correlation observations more difficult. If a known I2P user sends and email and then is observed leaving her house, and a few moments later an email arrives from an I2P email address, that can compromise her anonymity. Having emails arrive much later eliminates this correlation possibility.*

When I set up my I2P email account, it took the form of *user@mail.i2p*. Emails sent within the I2P network will retain that email address. However, since the *.i2p* top-level domain is not resolvable on the public internet, it is modified for emails sent outside the I2P network to use a *.i2pmail.org* top-level domain. Because .org is resolvable, internet emails are sent back to that getway before being forwarded through I2P to my particular SusiMail instance.

Unlike SusiMail, I2P Bote views account creation as option, and does not require an account to send anonymous email. If you wish to be able to receive email, then you will need to go through the account creation process.

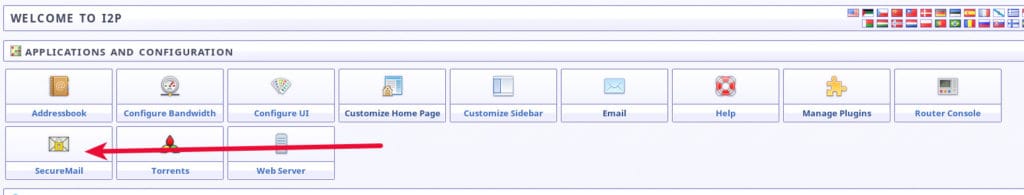
The I2P Bote project is working on implementing Internet <-> I2P email gateway but it is not functional at this time.



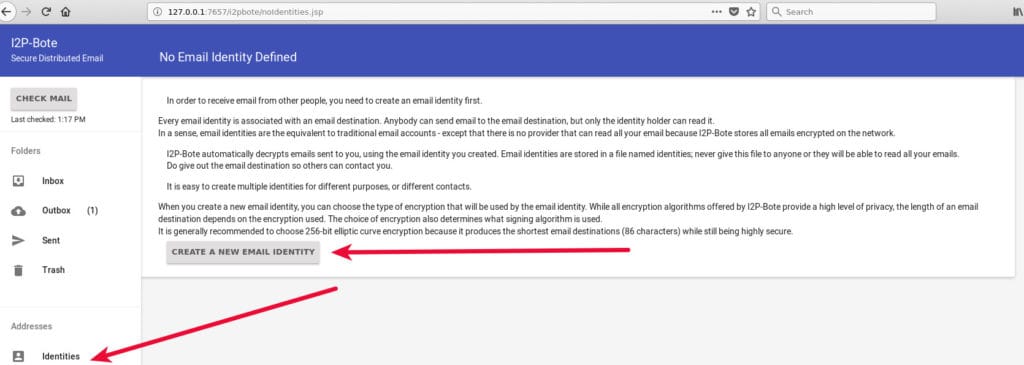
I2P Bote setup requires a little more work. The installation steps can be found on the [I2PBote installation page](http://bote.i2p/install/)(eepsite).

1. Go to the plugin install form in your router console: <http://127.0.0.1:7657/configclients#plugin>
2. Paste in the URL <http://bote.i2p/i2pbote.su3>
3. Click Install Plugin.
4. Once installed, click SecureMail in the routerconsole sidebar or homepage, or go to <http://127.0.0.1:7657/i2pbote/>

It can take a long time for the installation process to complete and there is no progress bar to let you know what is happening. After about five minutes, I refreshed my I2P router home page and was rewarded with a new Bote SecureMail icon.



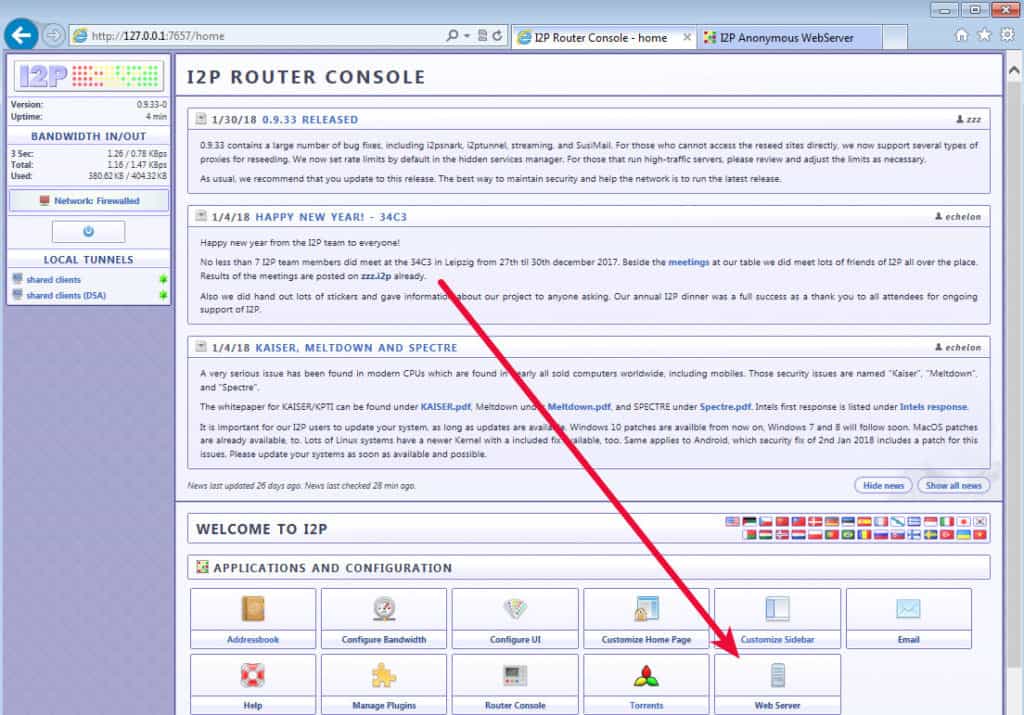
In true dark web fashion, there is no need to create any type of account or identity to send email with Bote. You can click the *+* icon at the bottom right of the screen, type up an email, and send it off with complete anonymity. However, you will not be able to receive email since you’re completely anonymous. If you want to be able to receive email, you will need to create an identity.



**How to set up your own eepsite (I2P site)**

Your I2P router comes with an eeepsite ready to go, you just need to add content.

To view the instructions on how to get it set up properly, click the *Web Server* button or paste this into your I2P router address bar: [**http://127.0.0.1:7658/help/**](http://127.0.0.1:7658/help/)



**Adding functionality to your I2P console**

I2P comes with the basic toolset most dark web users are looking for bundled right in. The main I2P router page has tools for IRC, file transfer, email, and web servers, as well as many others. That functionality can be extended with I2P’s plugin framework, although there are very few plugins available.

To manage your plugins, navigate to the *configplugins* page http://127.0.0.1:7657/configplugins and you will see options to install plugins in two ways. If you have a plugin in an xpi2p and su3 file, you can upload it to your router. Another way is to provide the URL to one of those types of files.

The I2P plugin repository is on the [I2P eepsite](http://i2pwiki.i2p/index.php?title=Plugins) (eepsite). It seems very likely that an attacker or observer would have a lot to gain from tricking an I2P user into installing a surveillance plugin, so be sure to get your plugins from this official repository and not from untrusted third-party sources.

**Finding content on I2P**

Unlike the clear web, dark webs aren’t exactly into promoting their sites. There’s no Google for the dark web and even if there was, many dark web sites are up and down due to their unorthodox hosting set ups. Having said that, there are a few places where you can find I2P services if you have no particular destination in mind

**The I2P Planet – The latest around the world of I2P**

The [I2P Planet](http://planet.i2p/) (eepsite) is an aggregate site of activity around the I2P network. It mostly contains torrent links, but also has some news interspersed regarding the project’s support tickets and application news.

**The I2P FAQ**

There are a lot of misconceptions about I2P; what it is and why it isn’t Tor. Many of those questions are addressed on the [I2P FAQ page](http://i2p-projekt.i2p/en/faq) (eepsite).

**The I2P Bug Tracker**

Think you’ve found a bug? Wondering if anyone knows about it, or if there is a patch available for it? The I2P bug tracker is the place to find that information. Community projects like I2P need fresh eyes and different systems to uncover bugs that may exist in the software. Do your part and report new bugs you find on the [I2P Bug Tracker](http://trac.i2p2.i2p/report/1) (eepsite).

**Final words on using I2P and anonymity**

I2P is not a replacement for Tor. While [Tor certainly has its security problems](https://www.comparitech.com/blog/vpn-privacy/is-tor-anonymous/), it is also much more mature and its advanced functionality makes it infinitely more useful for most people. If your intent is to gain anonymity on the internet by using a proxy, then Tor is the better choice. I2P only grudgingly incorporates the ability to connect to the clear net at all, and its ability to do so is unreliable. However, if you’re looking to run a full-on dark web site that remains as hidden as possible, I2P may be the better choice. If your intended user base is already using I2P, or is technically savvy enough to set it up, I2P’s garlic routing provides a better defence against the tactics that can be used on Tor to break anonymity.