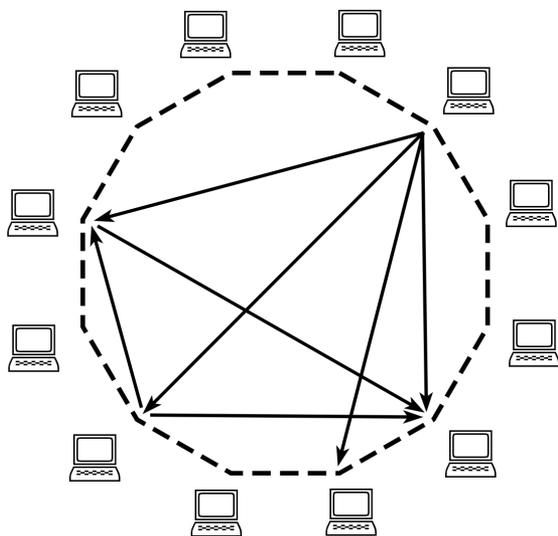


# Share a file with BitTorrent



a do-it-yourself  
guide from

**OSU**  
BOOKS



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# BitTorrent is a peer-to-peer file sharing protocol that anyone can use for free.

Have you ever wanted to share a large file with a friend (or many friends) and you weren't sure how to do it? Here are a few options that come to mind:

- ▶ Use a cloud storage service like Dropbox. This costs money, and it's usually linked to your public account.
- ▶ Host your file on a virtual private server. This option is pretty cheap, but it requires some expertise. And if your file gets a lot of downloads, you'll end up paying for the extra bandwidth.
- ▶ Use a file locker site like <https://hostb.org>. The link will be temporary and the download speed will be slow.
- ▶ Send a thumb drive in the mail. This option has its appeal, but it can only reach one person at a time.
- ▶ Or share the file from your own computer using BitTorrent!

Posting something on Dropbox or Google Drive is definitely easier than using BitTorrent, and in many cases it's the best way to go. But it's good to know your options.

This zine is a hands-on guide for beginners, and it leaves out lots of important technical and historical details. We encourage you to keep learning more about BitTorrent!



## How does BitTorrent work?

Resources on the web are centralized. When you enter a URL in your browser, your computer downloads files from a specific server (or maybe a network of servers) run by a company or an individual. If the server stops working, the website will disappear for everyone.

On the BitTorrent network, resources are decentralized. If you have a computer and an internet connection, you can use a **BitTorrent client** to connect to other **peers** (mostly other people's home computers). When your BitTorrent client finishes downloading a piece of a file from someone else, it immediately makes it available to anyone else on the network who wants it. A group of connected peers is called a **swarm**, and someone with a complete copy of the file (or files) is known as a **seeder**.

The word **torrent** is used loosely to refer to a resource shared via BitTorrent. If a torrent has more than one seeder, new peers will have multiple options for where to download various parts of the file. As a torrent gains more seeders, download speeds will generally get faster.

When you make a new torrent, you'll distribute a **torrent file** or a **magnet link to whomever wants to download the file**. They can then open the torrent file/link with a BitTorrent client and start downloading.

On one hand, the BitTorrent network is incredibly resilient. If a torrent is popular, thousands of people are able to download the files simultaneously without the bottlenecks you'd expect with a single host. And as long as one person is seeding a torrent, it will remain available to anyone on

the network. There isn't a central authority that can take a torrent down.

On the other hand, the BitTorrent network is fragile and ephemeral. When you close your BitTorrent client, your computer stops seeding the file(s). If you stop seeding when a torrent has other seeders, the files will remain available on the network. If there aren't any seeders left, the torrent is gone ... unless someone starts seeding it again.

And while the BitTorrent network is public, there aren't permanent, public records like you'd see in a blockchain. You can monitor the network in real time, but you can't easily find out what someone was sharing six months ago. (See "BitTorrent caveats" below for more details on privacy issues.)

## **Install a BitTorrent client**

To upload and download files using BitTorrent, you'll need to install a **BitTorrent client**. There are lots of options, but this tutorial will use **Transmission**. It's free, lightweight, and it doesn't have ads or malware. And it's available for macOS, Windows, and Linux.

Go to the following URL and download Transmission for your operating system:

<https://transmissionbt.com/download/>

Install Transmission and open the application.

## ➔ Download a file using BitTorrent

Before you create a new torrent, you should try downloading a file via BitTorrent so you can see how it works.

Go to the URL below, which takes you to a download page for the Ubuntu installer file. (Ubuntu is a popular Linux-based operating system.) Scroll down to the "BitTorrent" section and click the link for the latest version of Ubuntu Desktop.

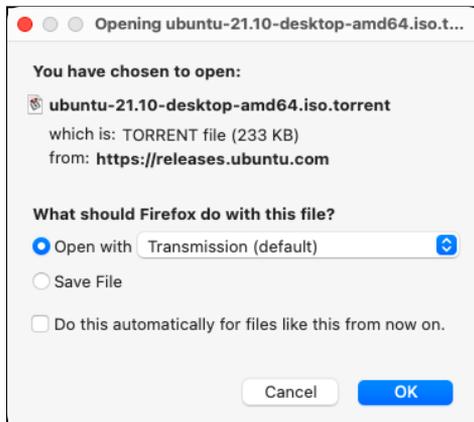
<https://ubuntu.com/download/alternative-downloads>

### BitTorrent

BitTorrent is a peer-to-peer download network that sometimes enables higher download speeds and more reliable downloads of large files. You need a BitTorrent client on your computer to enable this download method.

Ubuntu 21.10	Ubuntu 20.04.3 LTS	Ubuntu 18.04.6 LTS
<a href="#">Ubuntu 21.10 Desktop (64-bit)</a>	<a href="#">Ubuntu 20.04.3 Desktop (64-bit)</a>	<a href="#">Ubuntu 18.04.6 Desktop (64-bit)</a>
<a href="#">Ubuntu Server 21.10</a>	<a href="#">Ubuntu Server 20.04.3 LTS</a>	<a href="#">Ubuntu Server 18.04.6 LTS</a>

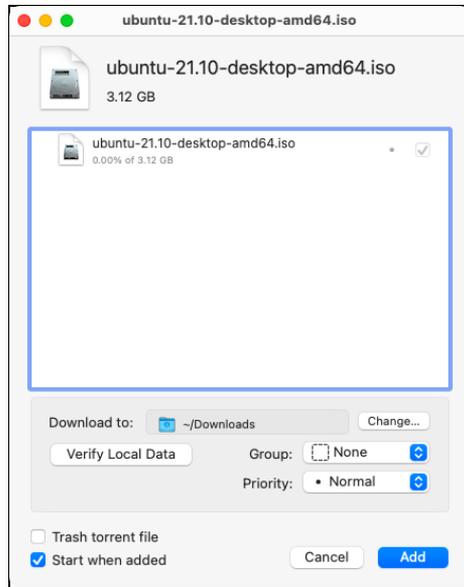
Your browser may ask whether you want to open the torrent file with Transmission. If so, click **OK**.



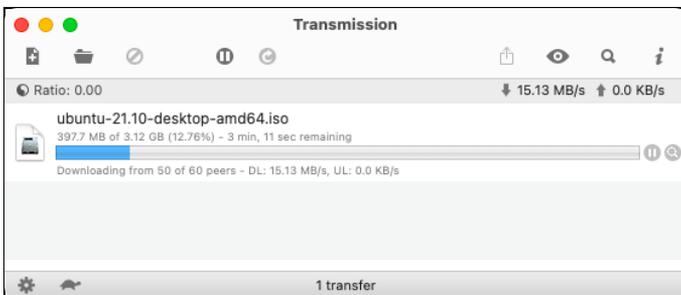
Otherwise, save the torrent file (which ends with **.torrent**) to your Downloads folder and open it with Transmission.

Transmission will show you a window with details about the torrent file. The Ubuntu installer file is about 3 GB, so you can skip this step if you don't have the free space.

Click **Add** to start downloading the torrent.

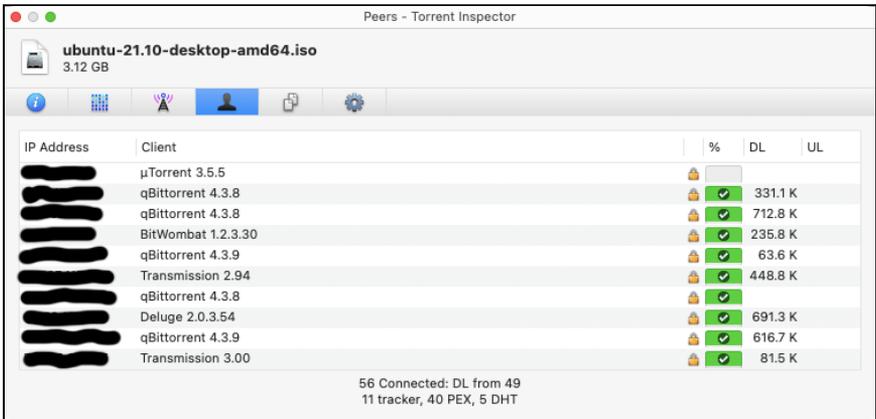


The file will start downloading in a few moments. Ubuntu torrents always have lots of seeders, so it will probably go faster than you expect.



Click on the progress bar to select the torrent, then click the "i" icon in the upper right corner to view more info.

In the info window, click the Peers icon ( 👤 ) to see information about all the peers you're currently connected to. You can see their IP addresses (redacted in the image below) and they can see yours.



The screenshot shows the 'Peers - Torrent Inspector' window for the torrent 'ubuntu-21.10-desktop-amd64.iso' (3.12 GB). The window displays a table of connected peers with columns for IP Address, Client, %, DL, and UL. The IP addresses are redacted with black bars. The table shows 11 peers connected, with various clients like µTorrent, qBittorrent, BitWombat, and Transmission. The bottom of the window indicates '56 Connected: DL from 49, 11 tracker, 40 PEX, 5 DHT'.

IP Address	Client	%	DL	UL
[Redacted]	µTorrent 3.5.5	[Lock]		
[Redacted]	qBittorrent 4.3.8	[Lock] [Green Check]	331.1 K	
[Redacted]	qBittorrent 4.3.8	[Lock] [Green Check]	712.8 K	
[Redacted]	BitWombat 1.2.3.30	[Lock] [Green Check]	235.8 K	
[Redacted]	qBittorrent 4.3.9	[Lock] [Green Check]	63.6 K	
[Redacted]	Transmission 2.94	[Lock] [Green Check]	448.8 K	
[Redacted]	qBittorrent 4.3.8	[Lock] [Green Check]		
[Redacted]	Deluge 2.0.3.54	[Lock] [Green Check]	691.3 K	
[Redacted]	qBittorrent 4.3.9	[Lock] [Green Check]	616.7 K	
[Redacted]	Transmission 3.00	[Lock] [Green Check]	81.5 K	

56 Connected: DL from 49  
11 tracker, 40 PEX, 5 DHT

When the torrent is finished downloading, Transmission will continue seeding until you close the application or pause the torrent.

## ➔ How do peers find each other on the BitTorrent network?

There are two ways for a BitTorrent client to find peers with a specific file: It can communicate with one or more **BitTorrent trackers**, or it can search the **distributed hash table (DHT)**.

**BitTorrent trackers** are dedicated servers that keep track of (a) which peers are active on the network, (b) which file pieces each peer is seeding, and (c) which file pieces each peer wants to download. BitTorrent trackers work quietly in

the background, helping peers find each other. There are many free public trackers out there that don't require sign up or authentication.

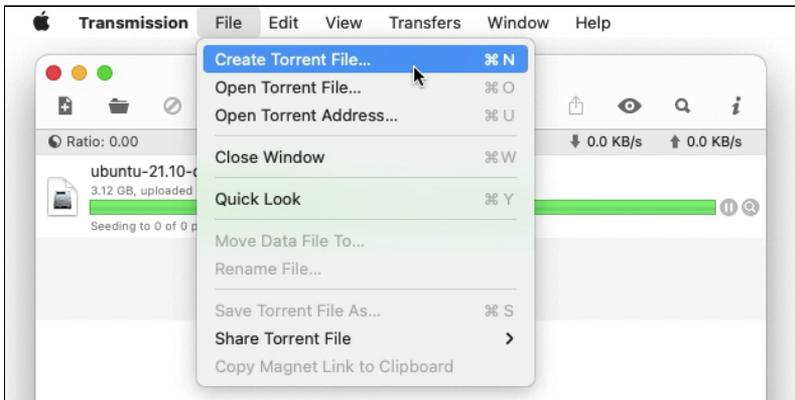
The **distributed hash table (DHT)** performs more or less the same tasks as a BitTorrent tracker, but without any dedicated servers. The DHT is completely decentralized, using a large network of BitTorrent clients to store lists of peers and file hashes.

If you want to learn more about BitTorrent's inner workings, this article by Brandon Skerritt is worth reading: <https://skerritt.blog/bit-torrent/>

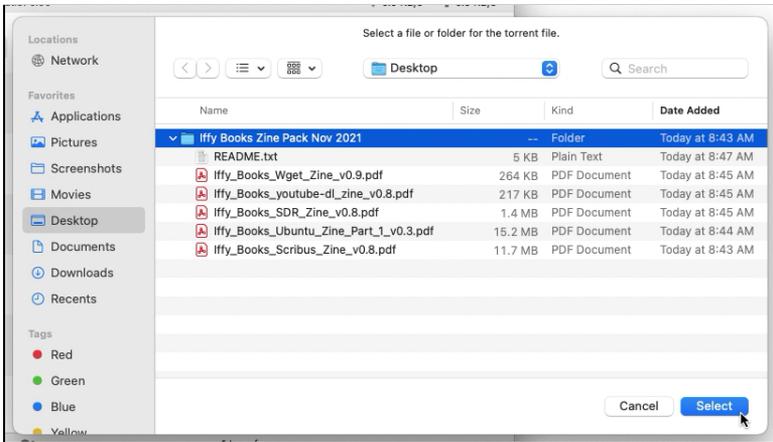
## → Create a new torrent

*Note:* Downloading files via BitTorrent is easy, but creating a new torrent and seeding it may take trial and error. The next section, "Become connectable," covers the tricky part.

To create a new torrent, go to the menu bar in Transmission and select **File > Create Torrent File...**

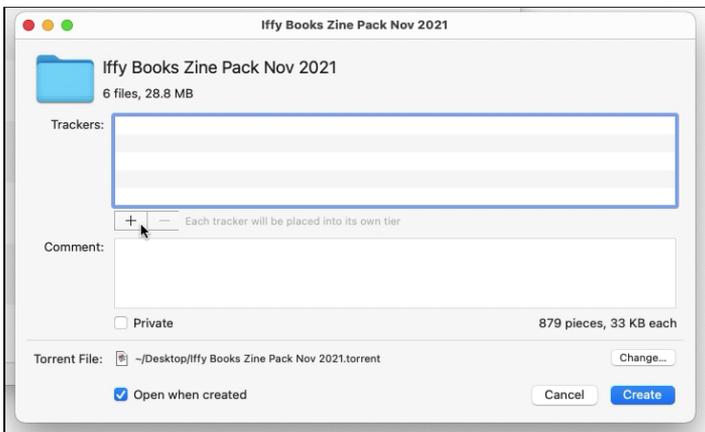


Navigate to the file(s) you want to share. Click on a file or directory to highlight it, then click **Select**.



In the next window, you can add URLs for one or more BitTorrent trackers. If you don't use any trackers, peers will still be able to find you using the DHT, but it might take a little longer.

Do a web search for "torrent tracker list" and you'll find lots of free public trackers to choose from. Then return to Transmission and click the **+** icon to add a tracker URL to your torrent.

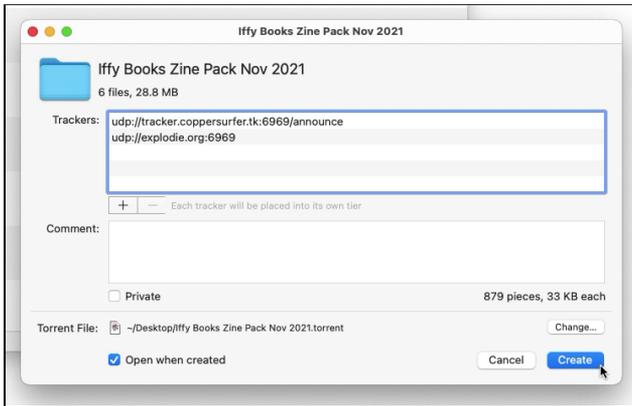


The example project uses two torrent trackers: <udp://tracker.coppersurfer.tk:6969> and <udp://explodie.org:6969>. You can add as many trackers as you want.

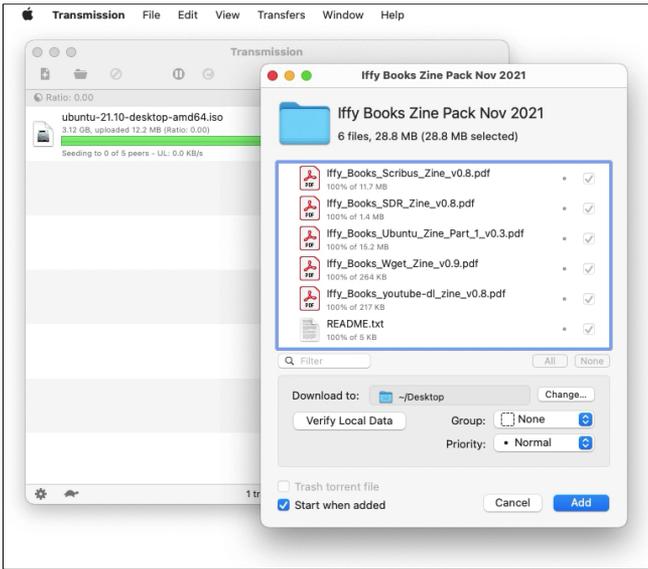
At the bottom of the window, note the location where your torrent file will be saved. Click **Change...** if you want to save it somewhere else.



Make sure the "Open when created" option in the bottom left is checked. When you're ready, click **Create** to make your torrent file.



Transmission will open the torrent you just created. Click **Add** to add it to your list of active torrents.



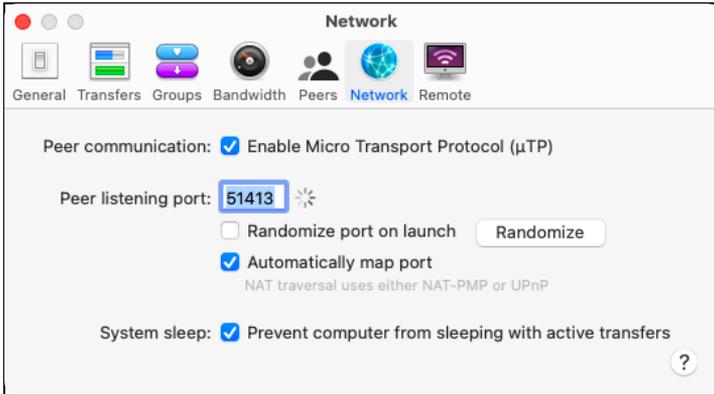
## ➔ Become connectable

In order for someone else to download your torrent, your BitTorrent client (or theirs) will need to be **connectable**. Being connectable means you have an **open port** that can receive incoming requests. (Various processes on your computer use their own ports to communicate over the network, each identified by a **port number** from 0 to 65535.)

*Note:* It's possible to start seeding a torrent without being connectable, but only if you're sharing with someone who's connectable. At least one peer in a swarm needs to be connectable, or else new peers won't be able to start downloading.

Depending on how you access the internet, opening a port for your BitTorrent client could be easy, difficult, or nearly impossible. Let's give it a shot.

In the Transmission menu bar, select **Edit > Preferences**. In the preferences window, click on **Network**. Find the port number next to "Peer listening port" and write it down. Next, make sure "Automatically map port" is checked.



Go to <https://canyouseeme.org> and enter the port number you're using. If the port is open, then you're all set. If not, you'll need to set up **port forwarding** and possibly update your **firewall**.

You're most likely connecting to the internet through a router, which uses **network address translation (NAT)** to let multiple devices on your network connect to the internet from a single IP address. If someone on the internet makes a request to your IP address using an unassigned port, your router's firewall will probably block the request. This is partly intended to keep your local network secure, and it's partly because it isn't always clear which device an incoming request should go to.

To allow incoming requests to reach an open port on your computer, you'll need to set up port forwarding in your router's admin settings. With port forwarding, you can set a rule that incoming requests to a single port (or port range) should be forwarded to that port on a specific device.

Open your router's admin settings and look for the port forwarding options. With many routers, you can enter an IP address like 192.168.1.1 or 192.168.1.100 in your browser and log in with a username and password. If you don't know how to access your router's admin settings, do a web search for the name of your router and the phrase "admin settings."

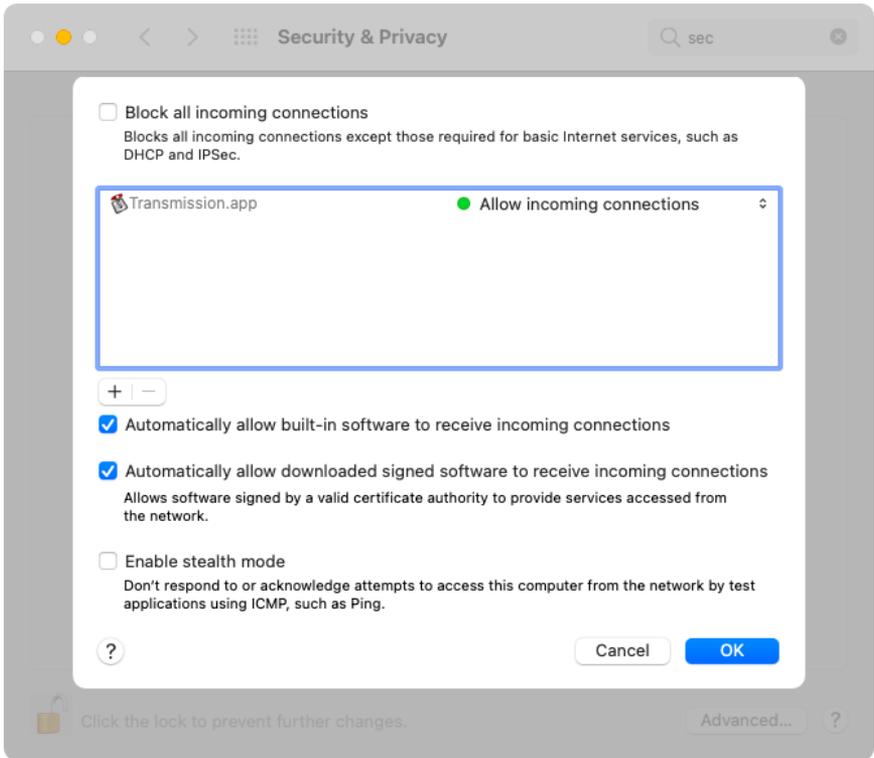
If you're using a router from Xfinity, you'll need to log into your account on Xfinity.com to access your router settings. Go to the following URL and click on **Advanced Settings**. Then click **Port Forwarding** to select your device and the port you want to use.

<https://internet.xfinity.com/connect/network>

If you're using a university or corporate network where you can't access your router's admin settings, you may be out of luck. One option is to look for a VPN that offers port forwarding. (But many VPNs don't allow it, so you'll need to do some research.)

Go to <https://canyouseeme.org> again and check whether your BitTorrent client's port is open. If not, the next step is to update your computer's firewall.

If you're using macOS, go to **System Preferences > Security & Privacy > Firewall** and allow Transmission to receive incoming connections.



If you're using Ubuntu (or similar), open a terminal window and run the following command to see if your firewall is active.

```
sudo ufw status
```

If it's active, run a command like the one below to enable incoming requests on your chosen port.

```
sudo ufw enable 51413
```

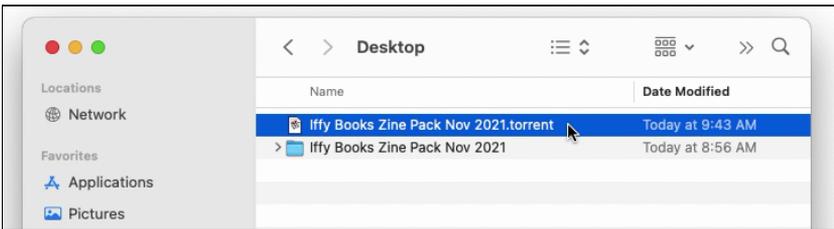
Is it safe to open a port on your computer to incoming network requests? The answer is ... maybe. Life is full of risks and tradeoffs; you'll probably be fine.

## → Share your torrent file

To let someone else download your torrent, you have two options: You can send them a **torrent file** or use a **magnet link**.

A torrent file is a small file (usually a few dozen kilobytes) with **.torrent** as its file extension. A torrent file contains metadata about the file(s) being shared, including **hash values** for individual chunks of each file. It also contains a list of BitTorrent trackers to use.

In your Finder/File Manager, navigate to the location of the torrent file you just created. (In the example, it's on the desktop.)



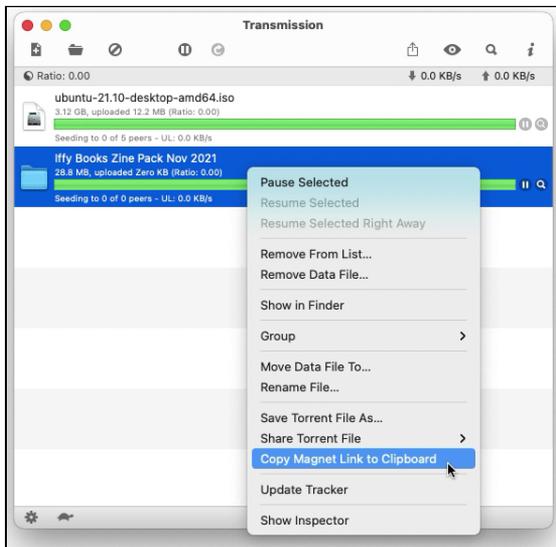
Send this torrent file to a friend, and they'll be able to open it in a BitTorrent client and start downloading. (One of you needs to be connectable, or the download won't start.)

Because torrent files are small, they're pretty easy to share. You can send a torrent file in an email, attach it to a chat message, or post it on Dropbox. Or you can upload it to a file locker like <https://hostb.org> and share a link to the file instead. (On hostb.org, files that aren't downloaded for 30 days are automatically deleted.)

## → Share your magnet link

If sending a torrent file is still too much of a hassle, you can use a **magnet link** instead. A BitTorrent magnet link contains a single hash value for the file(s) in a torrent, along with (optionally) a filename and a list of torrent trackers.

To get the magnet link for your torrent, right-click the torrent in Transmission and select **Copy Magnet Link to Clipboard** from the dropdown menu.



To view your magnet link, open a text editor and paste it into a document (command/ctrl + V). Here's the magnet link for the example torrent:

```
magnet:?xt=urn:btih:237c22f0c29fc82b60673f4aa24b2e46959d30a8&dn=Iffy%20Books%20Zine%20Pack%20Nov%202021&tr=udp%3A%2F%2Ftracker.coppersurfer.tk%3A6969%2Fannounce&tr=udp%3A%2F%2Fexplodie.org%3A6969
```

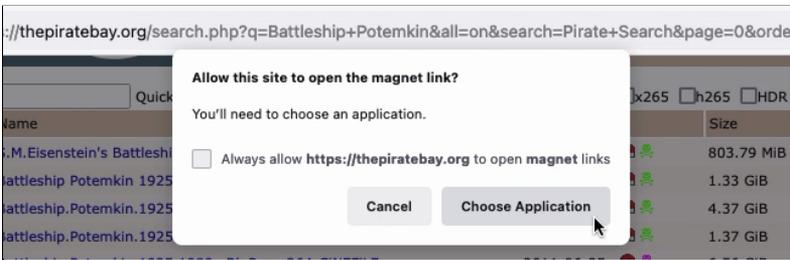
If you really want to go minimal, you can remove the metadata at the end and just use the beginning of the link:

magnet:?xt=urn:btih:237c22f0c29fc82b60673f4aa24b2e46959d30a8

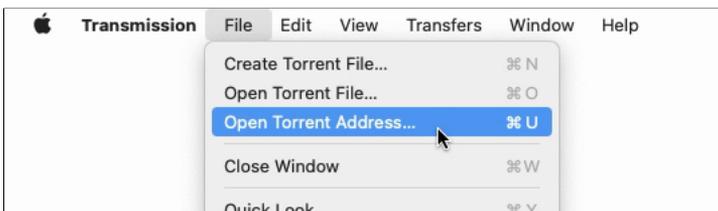
Magnet links are relatively short, so you can share them via email, chat, etc. You can also post your magnet link on <https://pad.riseup.net> or <https://textb.org> and share a link to it instead.

## ➔ Download a torrent using a magnet link

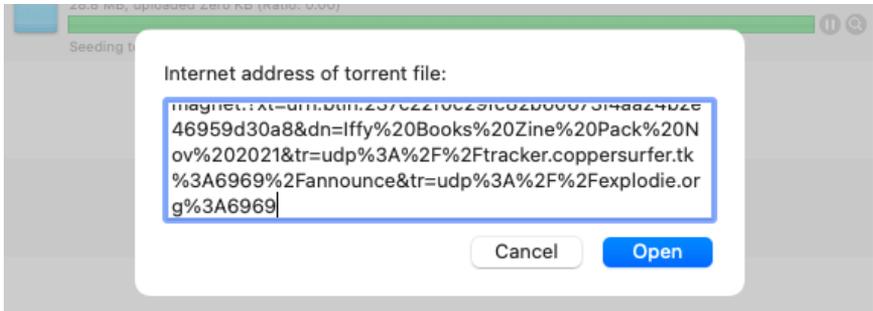
If you click on a magnet link in your browser, you'll probably see an alert window asking you to choose an application to open the link. Follow the prompts to open the magnet link with Transmission.



Or you can copy the magnet link and add it manually in Transmission. In the menu bar, select **Open Torrent Address....**



In the window that appears, paste a magnet link and click **Open**.



The torrent will appear in your list.

When you add a torrent to your client using a magnet link, the progress bar will always be red at the beginning. You'll see the message "Magnetized transfer - torrent metadata needed." Once your client connects to a tracker and/or the DHT, it should find the information it needs within a few minutes.

## → BitTorrent caveats

Remember that the DHT is public. Other peers can see your IP address, as well as the names of the files you're sharing.

In theory, your BitTorrent activity could be logged by someone else. And the torrent you post could potentially end up being recorded by a DHT search engine like <http://magnetdl.com>.

When there are no more seeders, the files associated with a torrent won't be available anymore. If you want a torrent to remain available for a long time, you should plan to keep seeding it yourself.

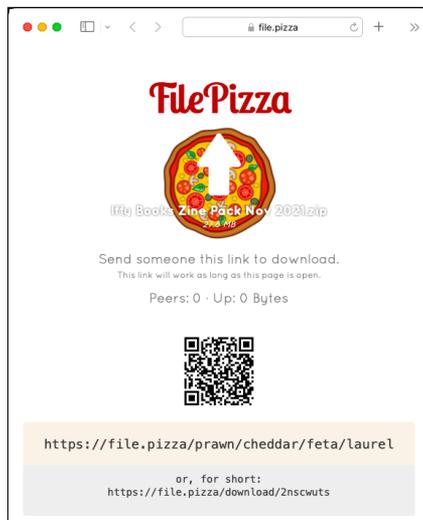
If you're worried about privacy but you still want to use BitTorrent, you can always encrypt your files and use nondescript filenames.

## → Another option: FilePizza

If you just want to transfer a file from one computer to another, FilePizza may be what you're looking for. FilePizza uses WebTorrent and WebRTC to let you choose a file on your computer and start seeding it in your browser. (The WebTorrent protocol is based on BitTorrent, but it uses a separate, incompatible network.)

Go to <https://file.pizza> and click "select a file." Select a file from your computer. If you want to share a directory with multiple files, create a .zip file first.

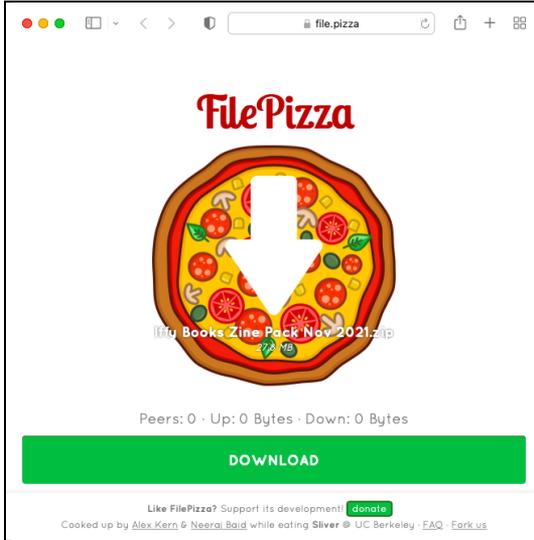
You'll be taken to a page like the one below, containing a QR code and a temporary link to your file. When you close this browser window, the link will stop working and your files won't be available anymore.



Here's what a temporary link from FilePizza looks like:

<https://file.pizza/prawn/cheddar/feta/laurel>

Follow the link and you'll see a download page like this one:



FilePizza encrypts your files during transfer, but you probably shouldn't use it for anything too private. As long as your browser window is open, anyone with the temporary URL will be able to download your file.

*Note:* If you're using Google Chrome, you might have trouble sending files larger than 500MB with FilePizza. Try using Firefox instead.

You can find FilePizza's code on GitHub, if you want to learn more or host it yourself: <https://github.com/kern/filepizza>

YOU WANT YOUR COUSIN TO SEND YOU A FILE? EASY.  
HE CAN EMAIL IT TO— ... OH, IT'S 25 MB? Hmm...

DO EITHER OF YOU HAVE AN FTP SERVER? NO, RIGHT.  
IF YOU HAD WEB HOSTING, YOU COULD UPLOAD IT...

HMM. WE COULD TRY ONE OF THOSE MEGASHAREUPLOAD SITES,  
BUT THEY'RE FLAKY AND FULL OF DELAYS AND PORN POPUPS.

HOW ABOUT AIM DIRECT CONNECT? ANYONE STILL USE THAT?

OH, WAIT, DROPBOX! IT'S THIS RECENT STARTUP FROM A FEW  
YEARS BACK THAT SYNCs FOLDERS BETWEEN COMPUTERS.  
YOU JUST NEED TO MAKE AN ACCOUNT, INSTALL THE—



OH, HE JUST DROVE  
OVER TO YOUR HOUSE  
WITH A USB DRIVE?

UH, COOL, THAT  
WORKS, TOO.

I LIKE HOW WE'VE HAD THE INTERNET FOR DECADES,  
YET "SENDING FILES" IS SOMETHING EARLY  
ADOPTERS ARE STILL FIGURING OUT HOW TO DO.

<https://xkcd.com/949>



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