Send files securely with Magic Wormhole

a how-to zine from

IFFY
BOOKS

Magic Wormhole is an easy-to-use tool for sending and receiving files over an encrypted channel.

It can be surprisingly difficult to safely transfer files from one computer to another. Here are a few of the options:

- You can use Signal to send end-to-end encrypted messages, but it isn't very convenient for transferring files.

- Email isn't very private, and neither are file locker sites like Dropbox or hostb.org.

- You can use a USB drive to transfer files, but then you end up leaving a copy of the files on the drive. Even if you delete the files, there's a good chance they can be recovered. And plugging someone else's USB drive into your computer can potentially be risky.

- You can share files over BitTorrent, but then anyone can download them. And one of the computers will need to have an open port, which may not always be possible.

- You can encrypt your files with a program like GnuPG before sending. But there's a learning curve, and keeping your private key secure can be stressful.

➡️ Tips

Use the command **history -c** to delete your bash history. Or modify the file **~/.bash_history**

Check out Wormhole William, a Magic Wormhole app for Android: https://gioui.org/doc/showcase/wormhole-william

If you're interested in security, this thread on Hacker News is worth reading: https://news.ycombinator.com/item?id=14649727

➡️ Credit

Photo credit: ESO/F. Char
30-minute exposure of the night sky over the European Southern Observatory's Paranal Observatory in Chile. Photo by Farid Char.
https://www.eso.org/public/images/potw1313a/

Create a virtual environment for Python:

```
python3 -m venv ./transit-relay
```

Install the transit relay server Python module:

```
./transit-relay/bin/pip install \
magic-wormhole-transit-relay
```

Run the activation script:

```
source transit-relay/bin/activate
```

Get set up with Twist:

```
./transit-relay/bin/twist transitrelay
```

Start the server:

```
./transit-relay/bin/twist transitrelay \
--port=tcp:4001 --blur-usage=3600
```

That's it! Now you can test your transit relay server:

```
wormhole
--relay-url=ws://relay.iffybooks.net:4000/v1 \
--transit-helper=tcp:transit.iffybooks.net:4001 \
send ~/Desktop/Building_Zine.pdf
```

```
wormhole \
--relay-url=ws://relay.iffybooks.net:4000/v1 \
--transit-helper=tcp:transit.iffybooks.net:4001 \
receive 6-gadgetry-lockup
```

It's good to have options! And Magic Wormhole is a low-key file transfer option you should know about. It was created by Brian Warner and introduced at PyCon2016.

When you make a file available with Magic Wormhole, you simply give your friend a short, pronounceable **wormhole code** like this one:

56-inventive-select

When your friend enters the code on their computer, they'll be able to download the file and you'll get a confirmation message. It can only be downloaded once, and when the transfer is finished it's no longer available.

In this tutorial you'll learn to send and receive files securely using the command-line tool **wormhole**. If you want to go further, you can then set up your own instances of the servers that make it work.

The following URL will take you to the GitHub page for Magic Wormhole:

http://magic-wormhole.io

And you can read the documentation here:

https://magic-wormhole.readthedocs.io

➡️ Install Magic Wormhole (macOS)

If you haven't already installed the Homebrew package manager, go to **https://brew.sh** and copy the provided line of code. Open **Terminal**, paste the line of code into the window, and press enter. You'll need to enter your password to continue.

You may get a popup window asking you to install XCode Command Line Tools, which requires ~3 GB of hard drive space. When installation is done, follow the prompts in the terminal to finish installing Homebrew.

Run the following command to install Magic Wormhole:

```
brew install magic-wormhole
```

When the installation is complete, type the command **`wormhole --help`** and press enter. If Magic Wormhole is installed correctly, you'll see a list of options you can include in Magic Wormhole commands.

➡️ Install Magic Wormhole (Windows)

Open the Windows search box and type "PowerShell." Right-click "Windows PowerShell" and select "Run as administrator." Enter your password at the prompt.

If you haven't already installed the Chocolatey package manager, go to https://chocolatey.org/install/ and follow the installation instructions. You'll need to copy a line of code and paste it into your PowerShell window.

When Chocolatey is finished installing, type the following command in your PowerShell window and press enter.

```
choco install -y magic-wormhole
```

~/Desktop/Example_File.pdf with a path to the file you want to share.

```
wormhole \
--relay-url=ws://relay.iffybooks.net:4000/v1 \
send ~/Desktop/Example_File.pdf
```

And here's the command for receiving a file. Replace *relay.iffybooks.net* with your server's IP address or domain, and replace *7-wilmington-goldfish* with your wormhole code.

```
wormhole \
--relay-url=ws://relay.iffybooks.net:4000/v1 \
receive 7-wilmington-goldfish
```

➡️ Set up a transit relay server

Here's the transit relay code:

https://github.com/magic-wormhole/magic-wormhole-transit-relay

Run the commands below to set up the firewall. You'll allow connections on port 22 for SSH access, and on port 4001 for the transit relay server application.

```
ufw allow 22
ufw allow 4001
ufw enable
```

Update your package manager and packages, and install Python 3:

```
sudo apt update
sudo apt upgrade
sudo apt install python3
sudo apt install python3.8-venv
```

```
ufw enable
```

Update your package manager and packages:

```
sudo apt update
sudo apt upgrade
```

Go to the following URL and follow the instructions to install Docker.

https://docs.docker.com/engine/install/ubuntu/

You can find the Magic Wormhole rendezvous server code here:

https://github.com/magic-wormhole/magic-wormhole-mailbox-server

Copy the following code to a text file called **Dockerfile**.

```
FROM python:3.8
RUN pip install magic-wormhole-mailbox-server
CMD [ "twist",
"wormhole-mailbox","--usage-db=usage.sqlite" ]
```

Now use the following command to build the Docker image:

```
docker image build . -t magicwormhole
```

The following command will run the image:

```
docker run -p 4000:4000 -d magicwormhole
```

That's it! You can end the SSH session.

To test your rendezvous server, you can run a command like the one below. Replace *relay.iffybooks.net* with your server's IP address or domain, and replace

When the installation is complete, type the command **wormhole --help** and press enter. If Magic Wormhole is installed correctly, you'll see a list of options you can include in wormhole commands.

➡️ Install Magic Wormhole (Debian-based Linux)

Open a terminal window and update your package manager:

```
sudo apt-get update
```

Run the following command to install some dependencies you'll need.

```
sudo apt install python3-pip build-essential \
python-dev libffi-dev libssl-dev
```

Now run the following command to install Magic Wormhole:
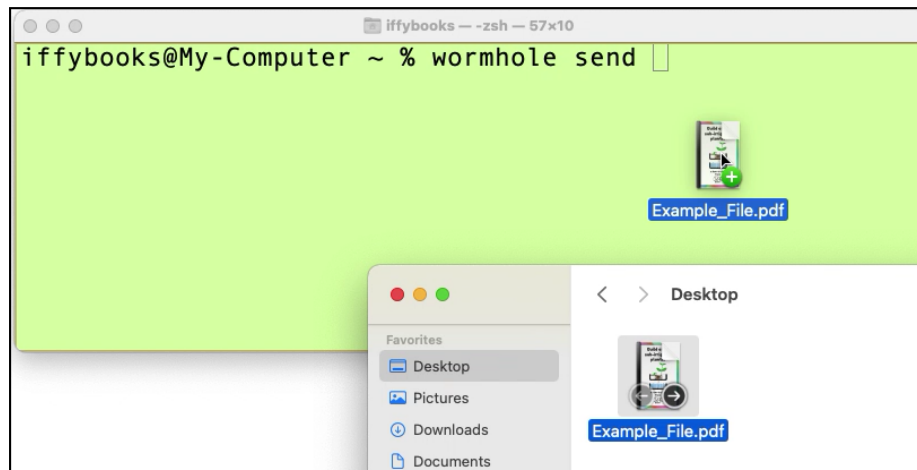
```
sudo apt install magic-wormhole
```

When the installation is complete, type the command **wormhole --help** and press enter. If Magic Wormhole is installed correctly, you'll see a list of options you can include in **wormhole** commands.

➡️ Send a file

Open a terminal window and type **`wormhole send`** followed by a space.

```
● ● ●            📄 iffybooks — -zsh — 64×10
iffybooks@My-Computer ~ % wormhole send ▎
```

Locate the file you want to share in your Finder/File Explorer and drag it onto the terminal window.

```
○ ○ ○            📄 iffybooks — -zsh — 57×10
iffybooks@My-Computer ~ % wormhole send │
```

Example_File.pdf

Desktop

Favorites
Desktop
Pictures
Downloads
Documents

Example_File.pdf

The file's full pathname will appear in the terminal, like this:

```
● ● ●            📄 iffybooks — -zsh — 57×10
iffybooks@My-Computer ~ % wormhole send /Users/iffybooks/
Desktop/Example_File.pdf ▊
```

Press enter.

Here's an example command for sending a file, using servers provided by Iffy Books. Replace *~/Desktop/Example_File.pdf* with a path to the file you want to share.

```
wormhole \
--relay-url=ws://relay.iffybooks.net:4000/v1 \
--transit-helper=tcp:transit.iffybooks.net:4001 \
send ~/Desktop/Example_File.pdf
```

> *Note*: In the code above, the backslash character (\) indicates that the command continues on the next line. You can copy and paste the command above, or type it as one line and omit the backslashes.

And here's the command your friend would enter to receive the file, replacing *9-therapist-seabird* with your wormhole code.

```
wormhole \
--relay-url=ws://relay.iffybooks.net:4000/v1 \
--transit-helper=tcp:transit.iffybooks.net:4001 \
receive 9-therapist-seabird
```

➡️ Set up a rendezvous server

Here's a link to the rendezvous server code:

https://github.com/magic-wormhole/magic-wormhole-mailbox-server

Set up a virtual private server with your provider of choice, then SSH to the server.

Run the commands below to set up the firewall. You'll allow connections on port 22 for SSH access, and on port 4000 for the rendezvous server application.

```
ufw allow 22
ufw allow 4000
```

```
cd ~/Desktop

wormhole send Example_directory/
```

➡️ Send some text

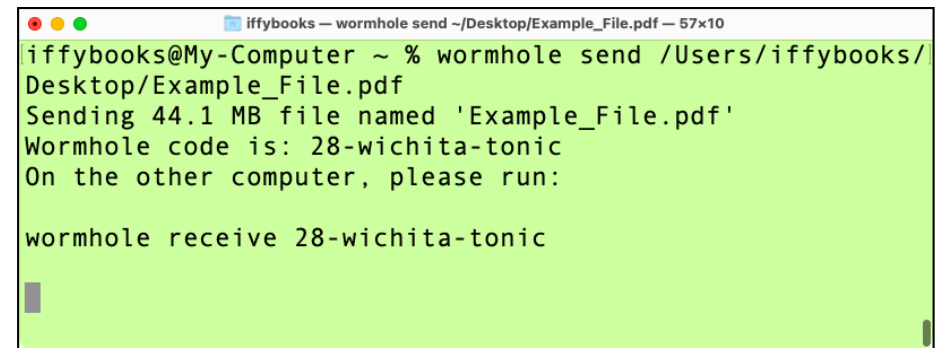To send a text snippet instead of a file, you can use a **wormhole** command like this:

```
wormhole send --text "Let's meet at 6:30."
```

➡️ Use alternate Magic Wormhole servers

Magic Wormhole uses one or two servers to set up an encrypted file transfer: a rendezvous server and a transit relay. By default, the program will use servers provided by the project's maintainers.

The rendezvous server helps you and your friend's computers find each other. If either one can accept an incoming connection, you'll disconnect from the rendezvous server and the file will be transferred directly. The `--relay-url` option lets you specify a rendezvous server.

If your computers aren't able to connect directly, they'll use a transit relay instead. This server glues the two computers' TCP connections together, simulating a direct connection. The `--transit-helper` option lets you specify a transit relay server.
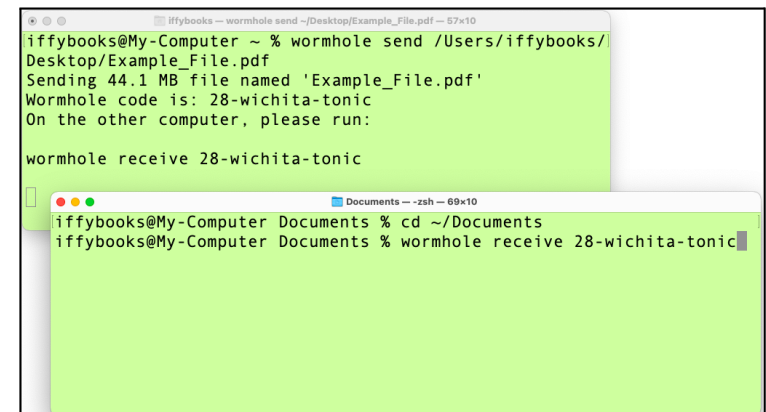

Open a new terminal window so you can practice receiving the file.

Type the command below, which will change the current directory to your **Documents** directory. Press enter.

```
cd ~/Documents
```

Now enter the command below, replacing *28-wichita-tonic* with the wormhole code from the other terminal window.

```
wormhole receive 28-wichita-tonic
```


If you're using Magic Wormhole for the first time, you might see an alert window like the one below. You should probably play it safe and click **Deny**. Magic Wormhole should work without accepting incoming connections.

Type **y** at the prompt and press **enter** to continue.

Your file transfer will begin, copying the file to your **Documents** directory.

To send your file from the Desktop without dragging it onto the terminal window, you can enter commands like the ones below. The **cd** command changes the current directory to the Desktop, and the **wormhole** command will send the file.

```
cd ~/Desktop
wormhole send Example_File.pdf
```

If your filename contains spaces, you can put double quotes around the filename:

```
wormhole send "Example File.pdf"
```

➡️ Send a directory

To send an entire directory on your Desktop, you can use a command like the one below:

```
wormhole send ~/Desktop/Example_directory/
```

Or **cd** to the Desktop and use a **wormhole** command like this: