

GitHub - fatedier/frp: A fast reverse proxy to help you expose a local server behind a NAT or firewall to the internet.

By fatedier

Archived: 2026-04-05 19:51:54 UTC

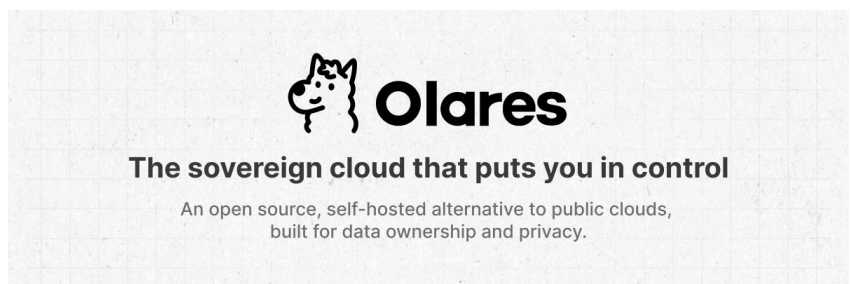
circleci passing release v0.68.0 go report A+ downloads 12M

[README](#) | [中文文档](#)

Sponsors

frp is an open source project with its ongoing development made possible entirely by the support of our awesome sponsors. If you'd like to join them, please consider [sponsoring frp's development](#).

Gold Sponsors



[The sovereign cloud that puts you in control](#)

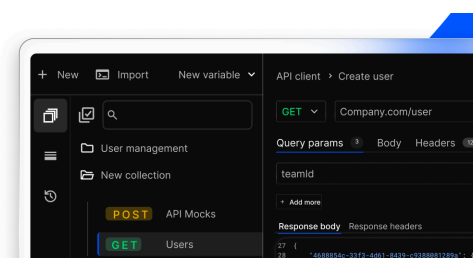
~~An open source, self-hosted alternative to public clouds, built for data ownership and privacy~~

Recall.ai - API for meeting recordings

If you're looking for a meeting recording API, consider checking out [Recall.ai](#),

an API that records Zoom, Google Meet, Microsoft Teams, in-person meetings, and more.

Requestly logo and text: "requestly Free & Open-Source alternative to Postman Loved by 300,000+ developers at 10,000 companies."



[Requestly - Free & Open-Source alternative to Postman](#)

~~All-in-one platform to Test, Mock and Intercept APIs.~~



GoLand

JETBRAINS IDE

The complete IDE crafted for professional Go developers.

[The complete IDE crafted for professional Go developers](#)

What is frp?

frp is a fast reverse proxy that allows you to expose a local server located behind a NAT or firewall to the Internet. It currently supports **TCP** and **UDP**, as well as **HTTP** and **HTTPS** protocols, enabling requests to be forwarded to internal services via domain name.

frp also offers a P2P connect mode.

Table of Contents

- [Development Status](#)
 - [About V2](#)
- [Architecture](#)
- [Example Usage](#)
 - [Access your computer in a LAN network via SSH](#)
 - [Multiple SSH services sharing the same port](#)
 - [Accessing Internal Web Services with Custom Domains in LAN](#)
 - [Forward DNS query requests](#)
 - [Forward Unix Domain Socket](#)
 - [Expose a simple HTTP file server](#)
 - [Enable HTTPS for a local HTTP\(S\) service](#)
 - [Expose your service privately.](#)
 - [P2P Mode](#)
- [Features](#)
 - [Configuration Files](#)
 - [Using Environment Variables](#)
 - [Split Configures Into Different Files](#)
 - [Server Dashboard](#)
 - [Client Admin UI](#)
 - [Dynamic Proxy Management \(Store\)](#)
 - [Monitor](#)
 - [Prometheus](#)
 - [Authenticating the Client](#)
 - [Token Authentication](#)
 - [OIDC Authentication](#)

- [Encryption and Compression](#)
 - [TLS](#)
- [Hot-Reloading frpc configuration](#)
- [Get proxy status from client](#)
- [Only allowing certain ports on the server](#)
- [Port Reuse](#)
- [Bandwidth Limit](#)
 - [For Each Proxy](#)
- [TCP Stream Multiplexing](#)
- [Support KCP Protocol](#)
- [Support QUIC Protocol](#)
- [Connection Pooling](#)
- [Load balancing](#)
- [Service Health Check](#)
- [Rewriting the HTTP Host Header](#)
- [Setting other HTTP Headers](#)
- [Get Real IP](#)
 - [HTTP X-Forwarded-For](#)
 - [Proxy Protocol](#)
- [Require HTTP Basic Auth \(Password\) for Web Services](#)
- [Custom Subdomain Names](#)
- [URL Routing](#)
- [TCP Port Multiplexing](#)
- [Connecting to frps via PROXY](#)
- [Port range mapping](#)
- [Client Plugins](#)
- [Server Manage Plugins](#)
- [SSH Tunnel Gateway](#)
- [Virtual Network \(VirtualNet\)](#)
- [Feature Gates](#)
 - [Available Feature Gates](#)
 - [Enabling Feature Gates](#)
 - [Feature Lifecycle](#)
- [Related Projects](#)
- [Contributing](#)
- [Donation](#)
 - [GitHub Sponsors](#)
 - [PayPal](#)

Development Status

frp is currently under development. You can try the latest release version in the `master` branch, or use the `dev` branch to access the version currently in development.

We are currently working on version 2 and attempting to perform some code refactoring and improvements. However, please note that it will not be compatible with version 1.

We will transition from version 0 to version 1 at the appropriate time and will only accept bug fixes and improvements, rather than big feature requests.

About V2

The complexity and difficulty of the v2 version are much higher than anticipated. I can only work on its development during fragmented time periods, and the constant interruptions disrupt productivity significantly. Given this situation, we will continue to optimize and iterate on the current version until we have more free time to proceed with the major version overhaul.

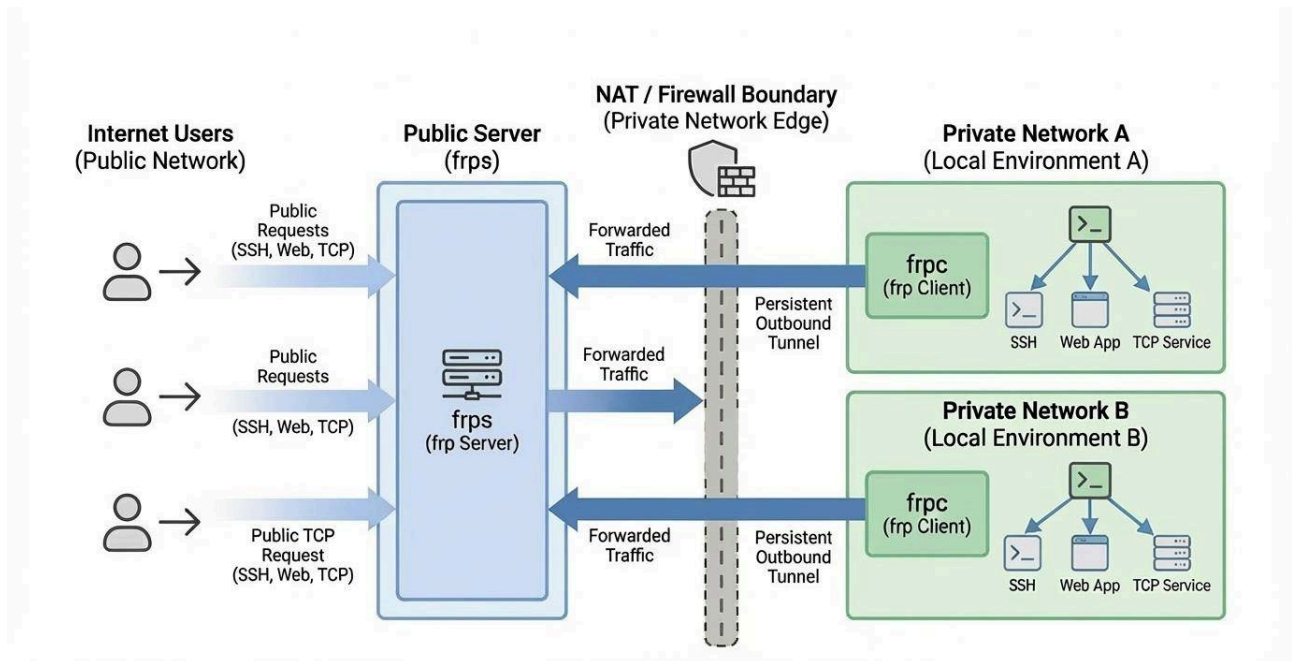
The concept behind v2 is based on my years of experience and reflection in the cloud-native domain, particularly in K8s and ServiceMesh. Its core is a modernized four-layer and seven-layer proxy, similar to envoy. This proxy itself is highly scalable, not only capable of implementing the functionality of intranet penetration but also applicable to various other domains. Building upon this highly scalable core, we aim to implement all the capabilities of frp v1 while also addressing the functionalities that were previously unachievable or difficult to implement in an elegant manner. Furthermore, we will maintain efficient development and iteration capabilities.

In addition, I envision frp itself becoming a highly extensible system and platform, similar to how we can provide a range of extension capabilities based on K8s. In K8s, we can customize development according to enterprise needs, utilizing features such as CRD, controller mode, webhook, CSI, and CNI. In frp v1, we introduced the concept of server plugins, which implemented some basic extensibility. However, it relies on a simple HTTP protocol and requires users to start independent processes and manage them on their own. This approach is far from flexible and convenient, and real-world demands vary greatly. It is unrealistic to expect a non-profit open-source project maintained by a few individuals to meet everyone's needs.

Finally, we acknowledge that the current design of modules such as configuration management, permission verification, certificate management, and API management is not modern enough. While we may carry out some optimizations in the v1 version, ensuring compatibility remains a challenging issue that requires a considerable amount of effort to address.

We sincerely appreciate your support for frp.

Architecture



Example Usage

To begin, download the latest program for your operating system and architecture from the [Release](#) page.

Next, place the `frps` binary and server configuration file on Server A, which has a public IP address.

Finally, place the `frpc` binary and client configuration file on Server B, which is located on a LAN that cannot be directly accessed from the public internet.

Some antiviruses improperly mark `frpc` as malware and delete it. This is due to `frp` being a networking tool capable of creating reverse proxies. Antiviruses sometimes flag reverse proxies due to their ability to bypass firewall port restrictions. If you are using antivirus, then you may need to whitelist/exclude `frpc` in your antivirus settings to avoid accidental quarantine/deletion. See [issue 3637](#) for more details.

Access your computer in a LAN network via SSH

1. Modify `frps.toml` on server A by setting the `bindPort` for frp clients to connect to:

```
# frps.toml
bindPort = 7000
```

2. Start `frps` on server A:

```
./frps -c ./frps.toml
```

3. Modify `frpc.toml` on server B and set the `serverAddr` field to the public IP address of your frps server:

```
# frpc.toml
serverAddr = "x.x.x.x"
serverPort = 7000

[[proxies]]
name = "ssh"
type = "tcp"
localIP = "127.0.0.1"
localPort = 22
remotePort = 6000
```

Note that the `localPort` (listened on the client) and `remotePort` (exposed on the server) are used for traffic going in and out of the frp system, while the `serverPort` is used for communication between frps and frpc.

4. Start `frpc` on server B:

```
./frpc -c ./frpc.toml
```

5. To access server B from another machine through server A via SSH (assuming the username is `test`), use the following command:

```
ssh -oPort=6000 test@x.x.x.x
```

Multiple SSH services sharing the same port

This example implements multiple SSH services exposed through the same port using a proxy of type `tcpmux`. Similarly, as long as the client supports the HTTP Connect proxy connection method, port reuse can be achieved in this way.

1. Deploy frps on a machine with a public IP and modify the frps.toml file. Here is a simplified configuration:

```
bindPort = 7000
tcpmuxHTTPConnectPort = 5002
```

2. Deploy frpc on the internal machine A with the following configuration:

```
serverAddr = "x.x.x.x"
serverPort = 7000

[[proxies]]
name = "ssh1"
type = "tcpmux"
multiplexer = "httpconnect"
customDomains = ["machine-a.example.com"]
```

```
localIP = "127.0.0.1"  
localPort = 22
```

3. Deploy another frpc on the internal machine B with the following configuration:

```
serverAddr = "x.x.x.x"  
serverPort = 7000  
  
[[proxies]]  
name = "ssh2"  
type = "tcpmux"  
multiplexer = "httpconnect"  
customDomains = ["machine-b.example.com"]  
localIP = "127.0.0.1"  
localPort = 22
```

4. To access internal machine A using SSH ProxyCommand, assuming the username is "test":

```
ssh -o 'proxycommand socat - PROXY:x.x.x.x:%h:%p,proxyport=5002' test@machine-a.example.com
```

5. To access internal machine B, the only difference is the domain name, assuming the username is "test":

```
ssh -o 'proxycommand socat - PROXY:x.x.x.x:%h:%p,proxyport=5002' test@machine-b.example.com
```

Accessing Internal Web Services with Custom Domains in LAN

Sometimes we need to expose a local web service behind a NAT network to others for testing purposes with our own domain name.

Unfortunately, we cannot resolve a domain name to a local IP. However, we can use frp to expose an HTTP(S) service.

1. Modify `frps.toml` and set the HTTP port for vhost to 8080:

```
# frps.toml  
bindPort = 7000  
vhostHTTPPort = 8080
```

If you want to configure an https proxy, you need to set up the `vhostHTTPSPort` .

2. Start `frps` :

```
./frps -c ./frps.toml
```

3. Modify `frpc.toml` and set `serverAddr` to the IP address of the remote frps server. Specify the `localPort` of your web service:

```
# frpc.toml
serverAddr = "x.x.x.x"
serverPort = 7000

[[proxies]]
name = "web"
type = "http"
localPort = 80
customDomains = ["www.example.com"]
```

4. Start `frpc` :

```
./frpc -c ./frpc.toml
```

5. Map the A record of `www.example.com` to either the public IP of the remote frps server or a CNAME record pointing to your original domain.

6. Visit your local web service using url `http://www.example.com:8080` .

Forward DNS query requests

1. Modify `frps.toml` :

```
# frps.toml
bindPort = 7000
```

2. Start `frps` :

```
./frps -c ./frps.toml
```

3. Modify `frpc.toml` and set `serverAddr` to the IP address of the remote frps server. Forward DNS query requests to the Google Public DNS server `8.8.8.8:53` :

```
# frpc.toml
serverAddr = "x.x.x.x"
serverPort = 7000

[[proxies]]
name = "dns"
type = "udp"
localIP = "8.8.8.8"
localPort = 53
remotePort = 6000
```

4. Start `frpc`:

```
./frpc -c ./frpc.toml
```

5. Test DNS resolution using the `dig` command:

```
dig @x.x.x.x -p 6000 www.google.com
```

Forward Unix Domain Socket

Expose a Unix domain socket (e.g. the Docker daemon socket) as TCP.

Configure `frps` as above.

1. Start `frpc` with the following configuration:

```
# frpc.toml
serverAddr = "x.x.x.x"
serverPort = 7000

[[proxies]]
name = "unix_domain_socket"
type = "tcp"
remotePort = 6000
[proxies.plugin]
type = "unix_domain_socket"
unixPath = "/var/run/docker.sock"
```

2. Test the configuration by getting the docker version using `curl` :

```
curl http://x.x.x.x:6000/version
```

Expose a simple HTTP file server

Expose a simple HTTP file server to access files stored in the LAN from the public Internet.

Configure `frps` as described above, then:

1. Start `frpc` with the following configuration:

```
# frpc.toml
serverAddr = "x.x.x.x"
serverPort = 7000

[[proxies]]
name = "test_static_file"
type = "tcp"
remotePort = 6000
[proxies.plugin]
type = "static_file"
```

```
localPath = "/tmp/files"
stripPrefix = "static"
httpUser = "abc"
httpPassword = "abc"
```

2. Visit `http://x.x.x.x:6000/static/` from your browser and specify correct username and password to view files in `/tmp/files` on the `frpc` machine.

Enable HTTPS for a local HTTP(S) service

You may substitute `https2https` for the plugin, and point the `localAddr` to a HTTPS endpoint.

1. Start `frpc` with the following configuration:

```
# frpc.toml
serverAddr = "x.x.x.x"
serverPort = 7000

[[proxies]]
name = "test_https2http"
type = "https"
customDomains = ["test.example.com"]

[proxies.plugin]
type = "https2http"
localAddr = "127.0.0.1:80"
crtPath = "./server.crt"
keyPath = "./server.key"
hostHeaderRewrite = "127.0.0.1"
requestHeaders.set.x-from-where = "frp"
```

2. Visit `https://test.example.com` .

Expose your service privately

To mitigate risks associated with exposing certain services directly to the public network, STCP (Secret TCP) mode requires a preshared key to be used for access to the service from other clients.

Configure `frps` same as above.

1. Start `frpc` on machine B with the following config. This example is for exposing the SSH service (port 22), and note the `secretKey` field for the preshared key, and that the `remotePort` field is removed here:

```
# frpc.toml
serverAddr = "x.x.x.x"
serverPort = 7000
```

```
[[proxies]]
name = "secret_ssh"
type = "stcp"
secretKey = "abcdefg"
localIP = "127.0.0.1"
localPort = 22
```

2. Start another `frpc` (typically on another machine C) with the following config to access the SSH service with a security key (`secretKey` field):

```
# frpc.toml
serverAddr = "x.x.x.x"
serverPort = 7000

[[visitors]]
name = "secret_ssh_visitor"
type = "stcp"
serverName = "secret_ssh"
secretKey = "abcdefg"
bindAddr = "127.0.0.1"
bindPort = 6000
```

3. On machine C, connect to SSH on machine B, using this command:

```
ssh -oPort=6000 127.0.0.1
```

P2P Mode

xtcp is designed to transmit large amounts of data directly between clients. A frps server is still needed, as P2P here only refers to the actual data transmission.

Note that it may not work with all types of NAT devices. You might want to fallback to stcp if xtcp doesn't work.

1. Start `frpc` on machine B, and expose the SSH port. Note that the `remotePort` field is removed:

```
# frpc.toml
serverAddr = "x.x.x.x"
serverPort = 7000
# set up a new stun server if the default one is not available.
# natHoleStunServer = "xxx"

[[proxies]]
name = "p2p_ssh"
type = "xtcp"
secretKey = "abcdefg"
```

```
localIP = "127.0.0.1"  
localPort = 22
```

2. Start another `frpc` (typically on another machine C) with the configuration to connect to SSH using P2P mode:

```
# frpc.toml  
serverAddr = "x.x.x.x"  
serverPort = 7000  
# set up a new stun server if the default one is not available.  
# natHoleStunServer = "xxx"  
  
[[visitors]]  
name = "p2p_ssh_visitor"  
type = "xtcp"  
serverName = "p2p_ssh"  
secretKey = "abcdefg"  
bindAddr = "127.0.0.1"  
bindPort = 6000  
# when automatic tunnel persistence is required, set it to true  
keepTunnelOpen = false
```

3. On machine C, connect to SSH on machine B, using this command:

```
ssh -oPort=6000 127.0.0.1
```

Features

Configuration Files

Since v0.52.0, we support TOML, YAML, and JSON for configuration. Please note that INI is deprecated and will be removed in future releases. New features will only be available in TOML, YAML, or JSON. Users wanting these new features should switch their configuration format accordingly.

Read the full example configuration files to find out even more features not described here.

Examples use TOML format, but you can still use YAML or JSON.

These configuration files is for reference only. Please do not use this configuration directly to run the program as it may have various issues.

[Full configuration file for frps \(Server\)](#)

[Full configuration file for frpc \(Client\)](#)

Using Environment Variables

Environment variables can be referenced in the configuration file, using Go's standard format:

```
# frpc.toml
serverAddr = "{{ .Envs.FRP_SERVER_ADDR }}"
serverPort = 7000

[[proxies]]
name = "ssh"
type = "tcp"
localIP = "127.0.0.1"
localPort = 22
remotePort = {{ .Envs.FRP_SSH_REMOTE_PORT }}
```

With the config above, variables can be passed into `frpc` program like this:

```
export FRP_SERVER_ADDR=x.x.x.x
export FRP_SSH_REMOTE_PORT=6000
./frpc -c ./frpc.toml
```

`frpc` will render configuration file template using OS environment variables. Remember to prefix your reference with `.Envs`.

Split Configures Into Different Files

You can split multiple proxy configs into different files and include them in the main file.

```
# frpc.toml
serverAddr = "x.x.x.x"
serverPort = 7000
includes = ["/confd/*.toml"]
```

```
# ./confd/test.toml

[[proxies]]
name = "ssh"
type = "tcp"
localIP = "127.0.0.1"
localPort = 22
remotePort = 6000
```

Server Dashboard

Check frp's status and proxies' statistics information by Dashboard.

Configure a port for dashboard to enable this feature:

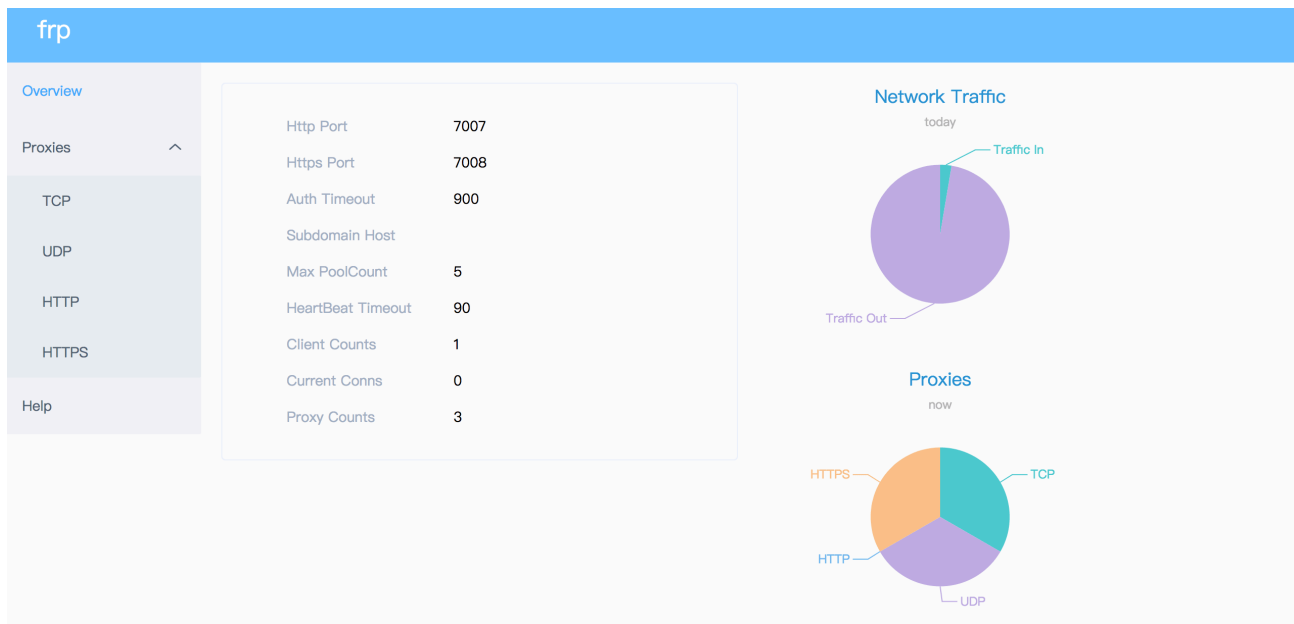
```
# The default value is 127.0.0.1. Change it to 0.0.0.0 when you want to access it from a public network
webServer.addr = "0.0.0.0"
webServer.port = 7500
# dashboard's username and password are both optional
webServer.user = "admin"
webServer.password = "admin"
```

Then visit `http://[serverAddr]:7500` to see the dashboard, with username and password both being `admin`.

Additionally, you can use HTTPS port by using your domains wildcard or normal SSL certificate:

```
webServer.port = 7500
# dashboard's username and password are both optional
webServer.user = "admin"
webServer.password = "admin"
webServer.tls.certFile = "server.crt"
webServer.tls.keyFile = "server.key"
```

Then visit `https://[serverAddr]:7500` to see the dashboard in secure HTTPS connection, with username and password both being `admin`.



Client Admin UI

The Client Admin UI helps you check and manage frpc's configuration and proxies.

Configure an address for admin UI to enable this feature:

```
webServer.addr = "127.0.0.1"  
webServer.port = 7400  
webServer.user = "admin"  
webServer.password = "admin"
```

Then visit `http://127.0.0.1:7400` to see admin UI, with username and password both being `admin`.

Dynamic Proxy Management (Store)

You can dynamically create, update, and delete proxies and visitors at runtime through the Web UI or API, without restarting frpc.

To enable this feature, configure `store.path` to specify a file for persisting the configurations:

```
[store]  
path = "./db.json"
```

Proxies and visitors managed through the Store are saved to disk and automatically restored on frpc restart. They work alongside proxies defined in the configuration file — Store entries take precedence when names conflict.

Monitor

When web server is enabled, frps will save monitor data in cache for 7 days. It will be cleared after process restart.

Prometheus is also supported.

Prometheus

Enable dashboard first, then configure `enablePrometheus = true` in `frps.toml`.

`http://{dashboard_addr}/metrics` will provide prometheus monitor data.

Authenticating the Client

There are 2 authentication methods to authenticate frpc with frps.

You can decide which one to use by configuring `auth.method` in `frpc.toml` and `frps.toml`, the default one is token.

Configuring `auth.additionalScopes = ["HeartBeats"]` will use the configured authentication method to add and validate authentication on every heartbeat between frpc and frps.

Configuring `auth.additionalScopes = ["NewWorkConns"]` will do the same for every new work connection between frpc and frps.

Token Authentication

When specifying `auth.method = "token"` in `frpc.toml` and `frps.toml` - token based authentication will be used.

Make sure to specify the same `auth.token` in `frps.toml` and `frpc.toml` for frpc to pass frps validation

Token Source

frp supports reading authentication tokens from external sources using the `tokenSource` configuration. Currently, file-based token source is supported.

File-based token source:

```
# frpc.toml
auth.method = "token"
auth.tokenSource.type = "file"
auth.tokenSource.file.path = "/path/to/token/file"
```

The token will be read from the specified file at startup. This is useful for scenarios where tokens are managed by external systems or need to be kept separate from configuration files for security reasons.

OIDC Authentication

When specifying `auth.method = "oidc"` in `frpc.toml` and `frps.toml` - OIDC based authentication will be used.

OIDC stands for OpenID Connect, and the flow used is called [Client Credentials Grant](#).

To use this authentication type - configure `frpc.toml` and `frps.toml` as follows:

```
# frps.toml
auth.method = "oidc"
auth.oidc.issuer = "https://example-oidc-issuer.com/"
auth.oidc.audience = "https://oidc-audience.com/.default"
```

```
# frpc.toml
auth.method = "oidc"
auth.oidc.clientID = "98692467-37de-409a-9fac-bb2585826f18" # Replace with OIDC client ID
auth.oidc.clientSecret = "oidc_secret"
auth.oidc.audience = "https://oidc-audience.com/.default"
auth.oidc.tokenEndpointURL = "https://example-oidc-endpoint.com/oauth2/v2.0/token"
```

Encryption and Compression

The features are off by default. You can turn on encryption and/or compression:

```
# frpc.toml

[[proxies]]
name = "ssh"
type = "tcp"
localPort = 22
remotePort = 6000
transport.useEncryption = true
transport.useCompression = true
```

TLS

Since v0.50.0, the default value of `transport.tls.enable` and `transport.tls.disableCustomTLSFirstByte` has been changed to true, and tls is enabled by default.

For port multiplexing, frp sends a first byte `0x17` to dial a TLS connection. This only takes effect when you set `transport.tls.disableCustomTLSFirstByte` to false.

To **enforce** `frps` to only accept TLS connections - configure `transport.tls.force = true` in `frps.toml`.

This is optional.

`frpc` **TLS settings:**

```
transport.tls.enable = true
transport.tls.certFile = "certificate.crt"
transport.tls.keyFile = "certificate.key"
transport.tls.trustedCaFile = "ca.crt"
```

`frps` **TLS settings:**

```
transport.tls.force = true
transport.tls.certFile = "certificate.crt"
transport.tls.keyFile = "certificate.key"
transport.tls.trustedCaFile = "ca.crt"
```

You will need a **root CA cert** and **at least one SSL/TLS certificate**. It **can** be self-signed or regular (such as Let's Encrypt or another SSL/TLS certificate provider).

If you using `frp` via IP address and not hostname, make sure to set the appropriate IP address in the Subject Alternative Name (SAN) area when generating SSL/TLS Certificates.

Given an example:

- Prepare openssl config file. It exists at `/etc/pki/tls/openssl.cnf` in Linux System and `/System/Library/OpenSSL/openssl.cnf` in MacOS, and you can copy it to current path, like `cp`

`/etc/pki/tls/openssl.cnf` `./my-openssl.cnf` . If not, you can build it by yourself, like:

```
cat > my-openssl.cnf << EOF
[ ca ]
default_ca = CA_default
[ CA_default ]
x509_extensions = usr_cert
[ req ]
default_bits      = 2048
default_md        = sha256
default_keyfile   = privkey.pem
distinguished_name = req_distinguished_name
attributes        = req_attributes
x509_extensions   = v3_ca
string_mask       = utf8only
[ req_distinguished_name ]
[ req_attributes ]
[ usr_cert ]
basicConstraints  = CA:FALSE
nsComment         = "OpenSSL Generated Certificate"
subjectKeyIdentifier = hash
authorityKeyIdentifier = keyid,issuer
[ v3_ca ]
subjectKeyIdentifier = hash
authorityKeyIdentifier = keyid:always,issuer
basicConstraints    = CA:true
EOF
```

- build ca certificates:

```
openssl genrsa -out ca.key 2048
openssl req -x509 -new -nodes -key ca.key -subj "/CN=example.ca.com" -days 5000 -out ca.crt
```

- build frps certificates:

```
openssl genrsa -out server.key 2048

openssl req -new -sha256 -key server.key \
  -subj "/C=XX/ST=DEFAULT/L=DEFAULT/O=DEFAULT/CN=server.com" \
  -reqexts SAN \
  -config <(cat my-openssl.cnf <(printf "\n[SAN]\nsubjectAltName=DNS:localhost,IP:127.0.0.1,DNS:example.server) \
  -out server.csr

openssl x509 -req -days 365 -sha256 \
  -in server.csr -CA ca.crt -CAkey ca.key -CAcreateserial \
```

```
-extfile <(printf "subjectAltName=DNS:localhost,IP:127.0.0.1,DNS:example.server.com") \
-out server.crt
```

- build frpc certificates :

```
openssl genrsa -out client.key 2048
openssl req -new -sha256 -key client.key \
  -subj "/C=XX/ST=DEFAULT/L=DEFAULT/O=DEFAULT/CN=client.com" \
  -reqexts SAN \
  -config <(cat my-openssl.cnf <(printf "\n[SAN]\nsubjectAltName=DNS:client.com,DNS:example.client.com")) \
  -out client.csr

openssl x509 -req -days 365 -sha256 \
  -in client.csr -CA ca.crt -CAkey ca.key -CAcreateserial \
  -extfile <(printf "subjectAltName=DNS:client.com,DNS:example.client.com") \
  -out client.crt
```

Hot-Reloading frpc configuration

The `webServer` fields are required for enabling HTTP API:

```
# frpc.toml
webServer.addr = "127.0.0.1"
webServer.port = 7400
```

Then run command `frpc reload -c ./frpc.toml` and wait for about 10 seconds to let `frpc` create or update or remove proxies.

Note that global client parameters won't be modified except 'start'.

`start` is a global allowlist evaluated after all sources are merged (config file/include/store). If `start` is non-empty, any proxy or visitor not listed there will not be started, including entries created via Store API.

`start` is kept mainly for compatibility and is generally not recommended for new configurations. Prefer per-proxy/per-visitor `enabled`, and keep `start` empty unless you explicitly want this global allowlist behavior.

You can run command `frpc verify -c ./frpc.toml` before reloading to check if there are config errors.

Get proxy status from client

Use `frpc status -c ./frpc.toml` to get status of all proxies. The `webServer` fields are required for enabling HTTP API.

Only allowing certain ports on the server

`allowPorts` in `frps.toml` is used to avoid abuse of ports:

```
# frps.toml
allowPorts = [
  { start = 2000, end = 3000 },
  { single = 3001 },
  { single = 3003 },
  { start = 4000, end = 50000 }
]
```

Port Reuse

`vhostHTTPPort` and `vhostHTTPSPort` in frps can use same port with `bindPort`. frps will detect the connection's protocol and handle it correspondingly.

What you need to pay attention to is that if you want to configure `vhostHTTPSPort` and `bindPort` to the same port, you need to first set `transport.tls.disableCustomTLSFirstByte` to false.

We would like to try to allow multiple proxies bind a same remote port with different protocols in the future.

Bandwidth Limit

For Each Proxy

```
# frpc.toml

[[proxies]]
name = "ssh"
type = "tcp"
localPort = 22
remotePort = 6000
transport.bandwidthLimit = "1MB"
```

Set `transport.bandwidthLimit` in each proxy's configure to enable this feature. Supported units are `MB` and `KB`.

Set `transport.bandwidthLimitMode` to `client` or `server` to limit bandwidth on the client or server side. Default is `client`.

TCP Stream Multiplexing

frp supports tcp stream multiplexing since v0.10.0 like HTTP2 Multiplexing, in which case all logic connections to the same frpc are multiplexed into the same TCP connection.

You can disable this feature by modify `frps.toml` and `frpc.toml` :

```
# frps.toml and frpc.toml, must be same
transport.tcpMux = false
```

Support KCP Protocol

KCP is a fast and reliable protocol that can achieve the transmission effect of a reduction of the average latency by 30% to 40% and reduction of the maximum delay by a factor of three, at the cost of 10% to 20% more bandwidth wasted than TCP.

KCP mode uses UDP as the underlying transport. Using KCP in frp:

1. Enable KCP in frps:

```
# frps.toml
bindPort = 7000
# Specify a UDP port for KCP.
kcpBindPort = 7000
```

The `kcpBindPort` number can be the same number as `bindPort`, since `bindPort` field specifies a TCP port.

2. Configure `frpc.toml` to use KCP to connect to frps:

```
# frpc.toml
serverAddr = "x.x.x.x"
# Same as the 'kcpBindPort' in frps.toml
serverPort = 7000
transport.protocol = "kcp"
```

Support QUIC Protocol

QUIC is a new multiplexed transport built on top of UDP.

Using QUIC in frp:

1. Enable QUIC in frps:

```
# frps.toml
bindPort = 7000
# Specify a UDP port for QUIC.
quicBindPort = 7000
```

The `quicBindPort` number can be the same number as `bindPort`, since `bindPort` field specifies a TCP port.

2. Configure `frpc.toml` to use QUIC to connect to frps:

```
# frpc.toml
serverAddr = "x.x.x.x"
# Same as the 'quicBindPort' in frps.toml
serverPort = 7000
transport.protocol = "quic"
```

Connection Pooling

By default, frps creates a new frpc connection to the backend service upon a user request. With connection pooling, frps keeps a certain number of pre-established connections, reducing the time needed to establish a connection.

This feature is suitable for a large number of short connections.

1. Configure the limit of pool count each proxy can use in `frps.toml` :

```
# frps.toml
transport.maxPoolCount = 5
```

2. Enable and specify the number of connection pool:

```
# frpc.toml
transport.poolCount = 1
```

Load balancing

Load balancing is supported by `group` .

This feature is only available for types `tcp` , `http` , `tcpmux` now.

```
# frpc.toml

[[proxies]]
name = "test1"
type = "tcp"
localPort = 8080
remotePort = 80
loadBalancer.group = "web"
loadBalancer.groupKey = "123"

[[proxies]]
name = "test2"
type = "tcp"
localPort = 8081
remotePort = 80
```

```
loadBalancer.group = "web"  
loadBalancer.groupKey = "123"
```

`loadBalancer.groupKey` is used for authentication.

Connections to port 80 will be dispatched to proxies in the same group randomly.

For type `tcp`, `remotePort` in the same group should be the same.

For type `http`, `customDomains`, `subdomain`, `locations` should be the same.

Service Health Check

Health check feature can help you achieve high availability with load balancing.

Add `healthCheck.type = "tcp"` or `healthCheck.type = "http"` to enable health check.

With health check type **tcp**, the service port will be pinged (TCPing):

```
# frpc.toml  
  
[[proxies]]  
name = "test1"  
type = "tcp"  
localPort = 22  
remotePort = 6000  
# Enable TCP health check  
healthCheck.type = "tcp"  
# TCPing timeout seconds  
healthCheck.timeoutSeconds = 3  
# If health check failed 3 times in a row, the proxy will be removed from frps  
healthCheck.maxFailed = 3  
# A health check every 10 seconds  
healthCheck.intervalSeconds = 10
```

With health check type **http**, an HTTP request will be sent to the service and an HTTP 2xx OK response is expected:

```
# frpc.toml  
  
[[proxies]]  
name = "web"  
type = "http"  
localIP = "127.0.0.1"  
localPort = 80  
customDomains = ["test.example.com"]  
# Enable HTTP health check
```

```
healthCheck.type = "http"  
# frpc will send a GET request to '/status'  
# and expect an HTTP 2xx OK response  
healthCheck.path = "/status"  
healthCheck.timeoutSeconds = 3  
healthCheck.maxFailed = 3  
healthCheck.intervalSeconds = 10
```

Rewriting the HTTP Host Header

By default frp does not modify the tunneled HTTP requests at all as it's a byte-for-byte copy.

However, speaking of web servers and HTTP requests, your web server might rely on the `Host` HTTP header to determine the website to be accessed. frp can rewrite the `Host` header when forwarding the HTTP requests, with the `hostHeaderRewrite` field:

```
# frpc.toml  
  
[[proxies]]  
name = "web"  
type = "http"  
localPort = 80  
customDomains = ["test.example.com"]  
hostHeaderRewrite = "dev.example.com"
```

The HTTP request will have the `Host` header rewritten to `Host: dev.example.com` when it reaches the actual web server, although the request from the browser probably has `Host: test.example.com`.

Setting other HTTP Headers

Similar to `Host`, You can override other HTTP request and response headers with proxy type `http`.

```
# frpc.toml  
  
[[proxies]]  
name = "web"  
type = "http"  
localPort = 80  
customDomains = ["test.example.com"]  
hostHeaderRewrite = "dev.example.com"  
requestHeaders.set.x-from-where = "frp"  
responseHeaders.set.foo = "bar"
```

In this example, it will set header `x-from-where: frp` in the HTTP request and `foo: bar` in the HTTP response.

Get Real IP

HTTP X-Forwarded-For

This feature is for `http` proxies or proxies with the `https2http` and `https2https` plugins enabled.

You can get user's real IP from HTTP request headers `X-Forwarded-For`.

Proxy Protocol

frp supports Proxy Protocol to send user's real IP to local services.

Here is an example for https service:

```
# frpc.toml

[[proxies]]
name = "web"
type = "https"
localPort = 443
customDomains = ["test.example.com"]

# now v1 and v2 are supported
transport.proxyProtocolVersion = "v2"
```

You can enable Proxy Protocol support in nginx to expose user's real IP in HTTP header `X-Real-IP`, and then read `X-Real-IP` header in your web service for the real IP.

Require HTTP Basic Auth (Password) for Web Services

Anyone who can guess your tunnel URL can access your local web server unless you protect it with a password.

This enforces HTTP Basic Auth on all requests with the username and password specified in frpc's configure file.

It can only be enabled when proxy type is http.

```
# frpc.toml

[[proxies]]
name = "web"
type = "http"
localPort = 80
customDomains = ["test.example.com"]
httpUser = "abc"
httpPassword = "abc"
```

Visit `http://test.example.com` in the browser and now you are prompted to enter the username and password.

Custom Subdomain Names

It is convenient to use `subdomain` configure for http and https types when many people share one frps server.

```
# frps.toml
subDomainHost = "frps.com"
```

Resolve `*.frps.com` to the frps server's IP. This is usually called a Wildcard DNS record.

```
# frpc.toml

[[proxies]]
name = "web"
type = "http"
localPort = 80
subdomain = "test"
```

Now you can visit your web service on `test.frps.com` .

Note that if `subdomainHost` is not empty, `customDomains` should not be the subdomain of `subdomainHost` .

URL Routing

frp supports forwarding HTTP requests to different backend web services by url routing.

`locations` specifies the prefix of URL used for routing. frps first searches for the most specific prefix location given by literal strings regardless of the listed order.

```
# frpc.toml

[[proxies]]
name = "web01"
type = "http"
localPort = 80
customDomains = ["web.example.com"]
locations = ["/"]

[[proxies]]
name = "web02"
type = "http"
localPort = 81
customDomains = ["web.example.com"]
locations = ["/news", "/about"]
```

HTTP requests with URL prefix `/news` or `/about` will be forwarded to **web02** and other requests to **web01**.

TCP Port Multiplexing

frp supports receiving TCP sockets directed to different proxies on a single port on frps, similar to `vhostHTTPPort` and `vhostHTTPSPort`.

The only supported TCP port multiplexing method available at the moment is `httpconnect` - HTTP CONNECT tunnel.

When setting `tcpmuxHTTPConnectPort` to anything other than 0 in frps, frps will listen on this port for HTTP CONNECT requests.

The host of the HTTP CONNECT request will be used to match the proxy in frps. Proxy hosts can be configured in frpc by configuring `customDomains` and / or `subdomain` under `tcpmux` proxies, when `multiplexer = "httpconnect"`.

For example:

```
# frps.toml
bindPort = 7000
tcpmuxHTTPConnectPort = 1337
```

```
# frpc.toml
serverAddr = "x.x.x.x"
serverPort = 7000

[[proxies]]
name = "proxy1"
type = "tcpmux"
multiplexer = "httpconnect"
customDomains = ["test1"]
localPort = 80

[[proxies]]
name = "proxy2"
type = "tcpmux"
multiplexer = "httpconnect"
customDomains = ["test2"]
localPort = 8080
```

In the above configuration - frps can be contacted on port 1337 with a HTTP CONNECT header such as:

```
CONNECT test1 HTTP/1.1\r\n\r\n
```

and the connection will be routed to `proxy1` .

Connecting to frps via PROXY

frpc can connect to frps through proxy if you set OS environment variable `HTTP_PROXY` , or if `transport.proxyURL` is set in frpc.toml file.

It only works when protocol is tcp.

```
# frpc.toml
serverAddr = "x.x.x.x"
serverPort = 7000
transport.proxyURL = "http://user:pwd@192.168.1.128:8080"
```

Port range mapping

Added in v0.56.0

We can use the range syntax of Go template combined with the built-in `parseNumberRangePair` function to achieve port range mapping.

The following example, when run, will create 8 proxies named `test-6000`, `test-6001` ... `test-6007` , each mapping the remote port to the local port.

```
{{- range $_, $v := parseNumberRangePair "6000-6006,6007" "6000-6006,6007" }}
[[proxies]]
name = "tcp-{{ $v.First }}"
type = "tcp"
localPort = {{ $v.First }}
remotePort = {{ $v.Second }}
{{- end }}
```

Client Plugins

frpc only forwards requests to local TCP or UDP ports by default.

Plugins are used for providing rich features. There are built-in plugins such as `unix_domain_socket` , `http_proxy` , `socks5` , `static_file` , `http2https` , `https2http` , `https2https` and you can see [example usage](#).

Using plugin **http_proxy**:

```
# frpc.toml

[[proxies]]
name = "http_proxy"
```

```
type = "tcp"  
remotePort = 6000  
[proxies.plugin]  
type = "http_proxy"  
httpUser = "abc"  
httpPassword = "abc"
```

`httpUser` and `httpPassword` are configuration parameters used in `http_proxy` plugin.

Server Manage Plugins

Read the [document](#).

Find more plugins in [gofrp/plugin](#).

SSH Tunnel Gateway

added in v0.53.0

frp supports listening to an SSH port on the frps side and achieves TCP protocol proxying through the SSH -R protocol, without relying on frpc.

```
# frps.toml  
sshTunnelGateway.bindPort = 2200
```

When running `./frps -c frps.toml`, a private key file named `.autogen_ssh_key` will be automatically created in the current working directory. This generated private key file will be used by the SSH server in frps.

Executing the command

```
ssh -R :80:127.0.0.1:8080 v0@{frp address} -p 2200 tcp --proxy_name "test-tcp" --remote_port 9090
```

sets up a proxy on frps that forwards the local 8080 service to the port 9090.

```
frp (via SSH) (Ctrl+C to quit)  
  
User:  
ProxyName: test-tcp  
Type: tcp  
RemoteAddress: :9090
```

This is equivalent to:

```
frpc tcp --proxy_name "test-tcp" --local_ip 127.0.0.1 --local_port 8080 --remote_port 9090
```

Please refer to this [document](#) for more information.

Virtual Network (VirtualNet)

Alpha feature added in v0.62.0

The VirtualNet feature enables frp to create and manage virtual network connections between clients and visitors through a TUN interface. This allows for IP-level routing between machines, extending frp beyond simple port forwarding to support full network connectivity.

For detailed information about configuration and usage, please refer to the [VirtualNet documentation](#).

Feature Gates

frp supports feature gates to enable or disable experimental features. This allows users to try out new features before they're considered stable.

Available Feature Gates

| Name | Stage | Default | Description |
|------------|-------|---------|--------------------------------------|
| VirtualNet | ALPHA | false | Virtual network capabilities for frp |

Enabling Feature Gates

To enable an experimental feature, add the feature gate to your configuration:

```
featureGates = { VirtualNet = true }
```

Feature Lifecycle

Features typically go through three stages:

1. **ALPHA**: Disabled by default, may be unstable
2. **BETA**: May be enabled by default, more stable but still evolving
3. **GA (Generally Available)**: Enabled by default, ready for production use

Related Projects

- [gofrp/plugin](#) - A repository for frp plugins that contains a variety of plugins implemented based on the frp extension mechanism, meeting the customization needs of different scenarios.
- [gofrp/tiny-frpc](#) - A lightweight version of the frp client (around 3.5MB at minimum) implemented using the ssh protocol, supporting some of the most commonly used features, suitable for devices with limited resources.

Contributing

Interested in getting involved? We would like to help you!

- Take a look at our [issues list](#) and consider sending a Pull Request to **dev branch**.
- If you want to add a new feature, please create an issue first to describe the new feature, as well as the implementation approach. Once a proposal is accepted, create an implementation of the new features and submit it as a pull request.
- Sorry for my poor English. Improvements for this document are welcome, even some typo fixes.
- If you have great ideas, send an email to fatedier@gmail.com.

Note: We prefer you to give your advise in [issues](#), so others with a same question can search it quickly and we don't need to answer them repeatedly.

Donation

If frp helps you a lot, you can support us by:

GitHub Sponsors

Support us by [Github Sponsors](#).

You can have your company's logo placed on README file of this project.

PayPal

Donate money by [PayPal](#) to my account fatedier@gmail.com.

Source: <https://github.com/fatedier/frp>