

## What is Hamachi<sup>2</sup>?

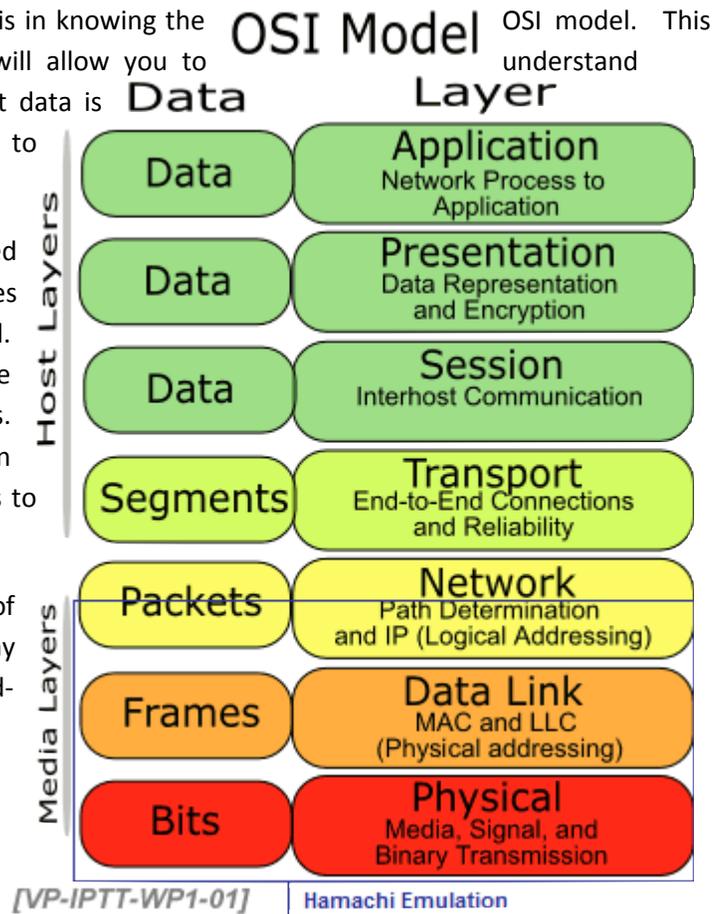
Hamachi<sup>2</sup> is a software-based Virtual Private Network (VPN). A VPN provides a virtual connection over a physical or wireless media. You can do many things with a VPN. You can share files, folders, printers. You can give access to Databases. You can even allow access to a Domain over a VPN.

But regardless of what you do with it, as a technician you must remember that the VPN itself is not responsible for this. The VPN merely provides the connection. What the customer does with it is up to them.

The easiest way to understand this is in knowing the is the current networking standard, and will allow you to where a VPN sits in its hierarchy. All sent data is transferred through each layer from top to bottom, and vice versa for received data.

Through the OSI model is indeed made of 7 layers; software VPN only emulates the bottom two, and about half of the third. All of the applications that one would use over a VPN would be on the top 3 layers. What this shows you is that before it even gets to the Hamachi<sup>2</sup> level, it already needs to know where it is supposed to go.

Since we do not function on any of the Application-based levels, you can see why we cannot support configuration of third-party software over Hamachi.



## Troubleshooting Hamachi<sup>2</sup>

### How does Hamachi<sup>2</sup> transfer data?

Hamachi<sup>2</sup> will receive the data from the software that is attempting to transfer data. That software has already determined where it wants to go; Hamachi<sup>2</sup>'s job is to actually get it there.

1. Data packet is sent to our Virtual Adapter by the application.
2. The Virtual Adapter sends this data to the Hamachi<sup>2</sup> Tunneling Engine.
3. This Engine ensures that it is destined for a Hamachi<sup>2</sup> IP.
4. The Engine then encrypts and wraps the entire data packet with a new request that will actually get it to the Tunneling Engine on the other computer through the Physical Adapter.

On the other computer...

1. Data packet is received by the Physical Adapter, and then sent to the Engine as that is its destination.
2. The engine then removes the encryption and wrapping, and sends it to the Virtual Adapter.
3. The Virtual Adapter handles it like the Physical adapter would, by sending it onto the destination Program.
4. Program processes the data, and it is then displayed to the user.

That is how Hamachi<sup>2</sup> transfers data from one side to the other. This will show you 2 things. First is that the software has nothing to do with what is sent to it. The second is that it will slow down your data transfer speeds, as the data essentially needs to be processed twice before it even gets sent to the other computer, and the back to the application. This will not half your transfer rate, but a good rule of thumb is that on an average computer, your transfer rate will be cut by up to 30% from an unencrypted, non-vpn connection.

### Troubleshooting the Installation

#### Software Install

Hamachi<sup>2</sup> will install the following...

- Tunneling Engine: Installed as a service 'Hamachi 2.0 Tunneling Engine'
- Service Configuration Folder:
  - C:\Documents and Settings\AllUsers\LocalSettings\AppData in **XP**

- C:\Windows\system32\config\systemprofile\localsettings\appdata\localallow in **Vista and 7**
- UI Config Folder:
  - C:\Documents and Settings\username\LocalSettings\AppData in **XP**
  - C:\Users\username\AppData\Local\LogMeIn Hamachi in **Vista and 7**
- Virtual Adapter: C:\Windows\System32\Drivers\hamachi.sys
- Registry keys for these to function:
  - HKEY\_LOCAL\_MACHINE\SOFTWARE\LogMeIn Hamachi
  - HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\Services\Hamachi?Svc
  - HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\Services\hamachi

If you receive any error during the install that forces an immediate rollback, you will need to purge the computer of any and all old Hamachi information. Generally you only receive these errors on Hamachi1 computers, but it can happen on computers that used to have Hamachi as well. It can happen to clean computers, but it is highly unlikely.

To remove Hamachi1...

1. Remove the Hamachi Adapter from the system via the Device Manager.
2. Go to the users AppData folder and remove Hamachi.
3. Go into Program Files and remove the Hamachi folder.
4. Remove any entry for Hamachi from the registry.

To remove badly install Hamachi<sup>2</sup>...

1. Remove the Hamachi Adapter from the system via the Device Manager.
2. Go to...
  - C:\Documents and Settings\AllUsers\LocalSettings\AppData in **XP**
  - C:\Windows\system32\config\systemprofile\localsettings\appdata\localallow in **Vista and 7**

And delete the LogMeIn Hamachi folder

3. Go to C:\Windows\system32\drivers, and delete the Hamachi.sys file (This file will be hidden)
4. Stop the Tunneling engine in the services menu.
5. Open the registry and delete the following keys (if present)
  - HKEY\_LOCAL\_MACHINE\SOFTWARE\LogMeIn Hamachi
  - HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\Services\Hamachi2Svc
  - HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\Services\hamachi

After a reboot, Hamachi<sup>2</sup> or Hamachi1 should be completely removed from the system. You should be able to cleanly install Hamachi<sup>2</sup> after this. If the install still fails, grab the following logs and escalate.

- HamachiSetup.log from %temp%
- SetupAPI.log from C:\Windows or C:\Windows\Inf for servers

### Adapter install

The install itself may be successful, but the customer may receive an error on the Connection Settings page (Right-click Client, Details... > Settings) titled, 'Failed to Connect to Adapter'. There are two ways to manually install. The first is through the program itself. Open the command prompt (as Admin in Vista/7), navigate to the installation folder, and type `hamachi-2.exe --add-tap Hamachi`. That will force the program to retry the install.

The other option is to manually install via the Operating System:

1. Go to Start > Run, and type `hdwwiz.cpl`. *If you receive an error, drop the .cpl*
2. If it begins searching immediately, let it finish, then choose the option **Yes, I have already connected the hardware**.
3. If it displays the currently installed devices, please scroll down to the bottom and choose **Add a new hardware device**. If it is not there, skip to the next step.
4. Choose **Install the hardware that I manually select from a list (Advanced)**.
5. Now select **Network Adapters**.
6. Choose **Have Disk**, and **Browse**.
7. Browse to Installation Folder, and select the Hamachi.inf file
8. Finish the install of the adapter.

Once the install is complete, check your Network Connections folder and see if Hamachi<sup>2</sup>'s adapter is called Hamachi, and not something like "Local Area Connection 4". If it is not named Hamachi, then rename it to Hamachi and restart the service. Make sure, the Network Connection is activated.

*Note: When instructing customers to do this, please refrain from using the command line option.*

The other error you may receive is “Failed to Configure Adapter”. This error is caused by intrusive Firewalls locking our adapter from “outside” changes. Uninstall the software, reboot, disable the firewall, reinstall. You will receive this very infrequently, if at all.

If for any reason the adapter install still fails, grab the following logs and escalate.

- HamachiSetup.log from %temp%
- SetupAPI.log from C:\Windows or C:\Windows\Inf for servers
- H2-engine.log from the Service Configuration Folder

## Troubleshooting Connectivity

### Peer Connectivity

As far as troubleshooting the Hamachi<sup>2</sup> connection, we only go as far as ensuring Hamachi<sup>2</sup> can ping the other clients. A ping originates from the Network Layer (3), and will test every aspect of Hamachi<sup>2</sup>. Ping requests are handled by Internet Control Message Protocol (ICMP). This is indeed regulated by the firewall, and will be in different locations depending on the firewall. You are looking for anything related to **Incoming Echo Requests** or anything referencing Pings (for the “simple” firewalls). If you have the ability, only enable this for the Hamachi adapter.

You have two ways to ping. Either right-click the client in the UI and Ping, or open the Command Prompt and type ping *Hamachi IP*. There are only a few errors you may see here:

- Request Timed Out: Revisit the firewall settings, as this indicates that though the ping request knew where to go, the destination just didn’t respond. This may also be caused by the adapter not being present, check to ensure this in the Network Connections page (ncpa.cpl). This will also occur when a client is attempting to ping another client in a Hub and Spoke network, as this network type prevents client communication through the engine. At that point it is normal.
- General Failure: The adapter is being regulated by a filtering utility which is forbidding connection to the specific IP. The other possibility is that there is indeed a failure in the computers network stack. The latter is something you do not fix, but can test by trying to ping a non-Hamachi<sup>2</sup> address. If you receive the same error, the customer’s computer needs its Network Stack reset.
- Reply from x.x.x.x – Destination Host Unreachable: This generally only occurs with relayed connections. The x.x.x.x will normally be the relay-server they are connected to. This indicates that the side you are on is correctly sending the ping, by the destination did not respond. This will also occur when a relayed client is attempting to ping another client (relayed or otherwise) in a Hub and Spoke network, as this network type prevents client communication through the engine. At that point it is normal.

## Blocked Connections

If you are receiving a blocked connection, you have a couple options. You can either have the customer allow all connections, or specify each and every client trust relationship manually. To configure this, go to System > Preferences > Security. To allow all, uncheck the “Block new members” check box. To specify, right click on the client and choose Trust.

## Relayed Connections

Sometimes you will be relayed, and there will be nothing you can do about this. If the customer has already tried to port forward, but they are still getting relayed; they have either forwarded wrong, or the Peer to Peer connection is failing for a network/ISP reason. This is not an error in the software. **A direct connection is not in any way guaranteed, and should not be escalated.** As a reference, here are the forwarding instructions:

- Click **System** option.
- Select **Preferences**.
- Click the **Settings** button.
- If you are in the Basic Settings view, click the Advanced Settings link at the bottom.
- Scroll down to the **Peer Connections** section, and enter the port values you set up in your port forward settings of the router/NAT in the **Local TCP Address** and **Local UDP Address**.
- You do not need to enter an IP Address, just the port number into the short box. *See note below*
- Restart Hamachi2.

You will then need to have the customer forward those ports through their router, you will not be doing this for them.

## Server Connectivity

Troubles connecting to the server are not as simple as they are with LogMeIn, and Rescue. Unfortunately, Hamachi2 will not graphically display any standard networking errors. You will either be stuck at Probing... or will be unable to connect.

To actually see what the problem is you will need to go to the log file. These are the possible errors you will see in the logs:

```
1    ERROR_cfg,          /* problem with configuration    */
2    ERROR_io,           /* retryable IO-related problem  */
3    ERROR_os,           /* non-retryable OS-level problem */
4    ERROR_msg,          /* received error message from srv */
5    ERROR_crypto,       /* decryption error !            */
6    ERROR_proto,        /* problem parsing server message */
7    ERROR_proxy_auth,   /* proxy authentication failed    */
8    ERROR_auth,         /* server authentication failed    */
```

```
9     ERROR_ports,          /* problem opening udp/tcp ports      */
10    ERROR_disc,           /* discovery failed (shouldn't happen) */
11    ERROR_weird,          /* unexpected/impossible problem      */
```

Generally, you will either see error 8 with server connectivity, which will be paired with one of two messages:

ses: >> msg\_auth, 9                    The client sent a wrong authentication password

ses: >> msg\_auth, 240                Then the client's account has been recycled, i.e. the client did not log in for a while and we recycled its account

Either of these messages indicates you will want to stop the service, purge the configuration folder, and then start the service again to receive a new config.

If the above messages are not present, then ensure that our software is allowed through whatever firewall the customer has.

## Gateway Networks

Gateway networks provide an extra challenge when it comes to troubleshooting. The difficult part in troubleshooting a Gateway network is in the Bridge. Hamachi2 will bridge a newly created Hamachi xxx-xxx-xxx adapter to either the Local Network Adapter that provides the internet connection, or the one specified in the override file under option VPN.BridgeTo.

Gateway networks cannot be established on Windows 2000 (Server or Workstation), or Windows Small Business Sever (any year). These OS' do not know how to establish a Network Bridge. The SBS version can be instructed on how to do that, but the customer must contact Microsoft for enabling instructions. When setting up a Gateway Network, please make sure the customer has physical access to the Gateway Node.

Some customers will attempt to setup a Gateway Network on a Virtual Server. If this is the case, the Virtual Machine needs to be configured with a Bridged adapter, and in what is commonly termed "Promiscuous" mode.

In some instances, you will run into scenario where the internet adapter does not carry over its settings to the Bridge. Open the Network Connections windows (ncpa.cpl), right click on the bridge, and choose properties. Here, you will want to highlight the Local Connection, and choose the TCP/IP (v4 if present) option, then hit Properties/Configure. Have the customer enter in this information manually.

If the customers DHCP settings are not providing IP Addresses to the Hamachi clients, or the customer using Static Addressing, you will need to manual assign a range to the Gateway Network. Right-click on the Network Name in the UI, and choose Gateway Settings. Specify the Start and End IP, the Subnet Mask, the Default Gateway, and at least one DNS server. If you have a customer that uses Static addressing, he will know what to put here.

Lastly, if the customer has additional subnets that he wants the customers to have access to, open the Gateway Settings option again, and go to Remote Networks. Enter the corresponding information there.

If you run into any other trouble, grab all the logs from the Gateway Node and escalate.

- HamachiSetup.log from %temp%
- SetupAPI.log from C:\Windows or C:\Windows\Inf for servers
- H2-engine.log from the Service Configuration Folder

## Configuration Entries

Attached is a list of configuration entries and their corresponding effects. They can be overridden by creating a file called h2-engine-override.cfg in the Service Configuration Folder, then restarting the service. You will not need to use them in most situations. But the one you should about is:

- VPN.BridgeTo: Setting this will force the software to bridge our adapter with the specified Local connection. Place the Name of the device here.

This setting is used in scenarios where the customer has 2 network adapters, one providing internet access, the other connecting the server (most cases) to the rest of the LAN. You will want to set the LAN adapter name here.

## Command Line Entries

Hamachi2 does not contain a command line installation method, nor does it contain very many options. There are a few however:

- `--add-tap <adapter>`
  - Installs the Hamachi adapter. `<adapter>` should be Hamachi (no quotes needed)
- `--upd-tap`
  - Updates the adapter with whatever Hamachi.sys file is in the Installation Folder
- `--del-tap [<adapter>]`
  - Deletes the adapter, if `[<adapter>]` is left empty, it will delete all Hamachi adapters.
- `--add-bridge <adapter1> <adapter2>`
  - Bridges the 2 adapters; `<adapter1>` should be Hamachi xxx-xxx-xxx, `<adapter2>` should be the LAN adapter.
- `--del-bridge`

- Deleted the Bridge

These options should be used sparingly. More than likely you will only find use for the add and delete network driver ones. These are internal only.