***Since a FreeNAS server is meant to be run behind the firewall of the router, you have two options to gain access to the server and/or its WebGUI remotely, either a VPN or a multi-hop SSH***

A Multi-Hop SSH is a SSH tunnel over WAN to the router, with a second SSH tunnel through it to FreeNAS over LAN

* Remote device -> WAN SSH -> Router -> [multi-hop begins] -> LAN SSH -> FreeNAS

Utilizing PuTTY, the router & client profiles below will be required:

* SFTP via pscp.exe in the PuTTY root directory
  + Add C:\Program Files (x86)\PuTTY to your environment path to allow access to pscp from any PowerShell/command prompt
    - System - Advanced System Settings - Environment Variables - System Variables – Path

[JuiceSSH](https://play.google.com/store/apps/details?id=com.sonelli.juicessh) [Android] automates the multi-hop by setting Connection - Advanced Settings - Connect Via to Router's Remote SSH connection

**Router** (your.ddns.com)

* Edit Lines:
  + (5) "HostName"="your.ddns.com"
  + (6) "LogFileName"="C:\\Path\\To\\PuTTY\\Logs\\SSH.OpenWRT.Remote.log"
    - Log set to "All Session Output" [Session - Logging]
  + (15) "PortNumber"=dword:00000016
    - Hex value for SSH Port # ([hex] 00000016 = [dec] 22)
    - Windows Calculator has a "Programmer" mode with hex <-> dec
  + (58) "PublicKeyFile"="C:\\Path\\To\\PuTTY\\SSHkeys\\OpenWRT.SSH.ppk"

**FreeNAS** (192.168.1.20)

* **Edit Lines:**
  + (5) "HostName"=root@192.168.1.20
  + (6) "LogFileName"="C:\\Path\\To\\PuTTY\\Logs\\SSH.FreeNAS.Remote.log"
    - Log set to "All Session Output" [Session - Logging]
  + (15) "PortNumber"=dword:00000016
    - Hex value for SSH Port # ([hex] 00000016 = [dec] 22)
    - Windows Calculator has a "Programmer" mode with hex <-> dec
  + (58) "PublicKeyFile"="C:\\Path\\To\\PuTTY\\SSHkeys\\FreeNAS.SSH.ppk"
    - plink creates the multi-hop
  + (32) "ProxyTelnetCommand"="plink -v -load SSH.OpenWRT.Remote -nc %host:%port"
    - If Router's profile name changed, update it here too
    - Profile **cannot**contain spaces
  + *Once each profile has been edited, save as a .reg & merge into registry*
    - *Once merged, you should immediately see them as profile options in PuTTY*

***[Incorporate Existing Profiles]***

* ***Existing Remote Router Profile***
  + *Merge FreeNAS profile****after****also editing the profile name on line:*
    - *(32) "ProxyTelnetCommand"="plink -v -load Remote.Router.Profile -nc %host:%port"*
* ***Existing FreeNAS Profile***
  + *Create a copy of it*
    - *Under Settings - Connection - Proxy - Telnet Command add:*
      * *plink -v -load Remote.Router.Profile -nc %host:%port*

***[Initiating Multi-Hop]***

* *Initiate Multi-Hop by opening SSH.FreeNAS.Remote profile*
  + *If utilizing a password on PKI key:*
    - *First password request: SSH.OpenWRT.Remote*
    - *Second password request: SSH.FreeNAS.Remote*

***[PSCP commands]***

* ***Push***
  + *pscp -r -i "C:\Path\To\PuTTY\SSHkeys\FreeNAS.SSH.ppk" -2 -scp -P 22 "D:\Path\To\File.txt"root@192.168.1.20:/path/to/directory*
    - ***Without utilizing PKI***
      * *pscp -r -scp "D:\Path\To\File.txt" -P 22 root@192.168.1.20:/path/to/directory*
* ***Pull***
  + *pscp -r -i "C:\Path\To\PuTTY\SSHkeys\FreeNAS.SSH.ppk" -2 -scp -P 22root@192.168.1.20:/path/to/file.txt "D:\Path\To\Directory"*
    - ***Without utilizing PKI***
      * *pscp -r -scp root@192.168.1.20:/path/to/directory -P 22 "D:\Path\To\File.txt"*

**-r***[copy directories recursively]*

**-i** key *[private key file for user authentication]*

**-1**/**-2***[force use of particular SSH protocol version]*

**-scp***[force use of SCP protocol]*

​**-P**port[connect to specified port]

***[Recommendations]***

* ***GPG4Win****(*[*website*](http://gpg4win.org/download.html)*)*
  + *PKI & SSL certificate management*
  + *Seamlessly interfaces with PuTTY & autoloads keys into pageant via Kleopatra*
* ***WinSCP****(*[*website*](https://winscp.net/eng/download.php)*)*
  + *GUI for transferring files over SSH*
  + *Explorer like drag & drop*
  + *Interfaces seamlessly with PuTTY*
* **Pageant** *(*[*part of PuTTY*](http://the.earth.li/~sgtatham/putty/0.60/htmldoc/Chapter9.html)*)*
  + *Keeps PKI keys active for a specified amount of time*
    - *GPG4Win auto loads keys into pageant*
      * *pageant only operates on the backend with Kleopatra*
    - *Best compromise between security & convenience*
    - *While using, with or without GPG4Win,****do not****leave PC unsecured*
      * *Kleopatra [GPG4Win] will kick you out after ~30 min of terminal inactivity, pageant will not*
  + ***Load Keys***
    - *pageant "D:\Path\To\PuTTY\SSHkeys\FreeNAS.ppk" "D:\Path\To\PuTTY\SSHkeys\Router.ppk"*
  + ***Load Key & Start PuTTY***
    - *pageant "D:\Path\To\PuTTY\SSHkeys\FreeNAS.ppk" "C:\Program Files\PuTTY\putty.exe"*
      * *x64: "C:\Program Files (x86)\PuTTY\putty.exe"*