LAN Turtle

LAN Turtle by Hak5

USB Ethernet adapters with covert backdoors. These seemingly innocent USB Ethernet adapters are discreet remote access toolkits and man-in-the-middles for penetration testers and systems administrators.

The e-book PDF generated by this document may not format correctly on all devices. For the most-to-date version, please see https://docs.hak5.org

Getting Started

LAN Turtle Basics

The LAN Turtle is managed through the Turtle Shell – a text based, menu-driven graphical user interface accessible by SSH. The menus may be navigated using standard arrow, tab, escape and return keys as well as mouse in most terminals.

The Turtle Shell Configuration Menu provides the ability to change advanced settings such as Password, MAC address, IP address. Firmware updates may be checked for and installed as they become available.

By default the Turtle Shell will start at login via SSH unless disabled from the Configuration Menu.

Exiting the Turtle Shell returns the user to the LAN Turtle's bash shell. To return to the Turtle Shell, run the "turtle" command.

The Module System

The LAN Turtle uses a modular system for managing its various tools and services. Turtle modules may be started, stopped, enabled, disabled or configured from the Module Menu.

CONFIGURE

Configuring a module typically involves entering data specific to your deployment. For example, when configuring the Meterpreter module, you must specify the listening host and port. When configuring the Nmap module you must specify a target, profile and log. Configuration changes made through the graphical Turtle Shell are generally saved in config files and are persistent upon reboot.

START / STOP

Once configured, a module may be Started or Stopped from the Module Menu. Generally a module may not be started until it has been configured. Some modules, such as the SSH Key Manager, do not support starting and only allow for configuration. Some modules stay running once started. For instance the autossh module will maintain a persistent secure shell until stopped. Other modules will start a task then stop when completed, such as script2email or nmap-scan.

ENABLE / DISABLE

Modules may be set to start up once the LAN Turtle has booted. For example an OpenVPN session may be established upon power-up by first configuring the module and testing it using the start and stop feature. Once the module is achieving the desired result, the module may be Enabled from the Module Menu. Now the LAN Turtle can be deployed on a target network with the OpenVPN module establishing a connection without intervention from the user. An enabled module will start on every boot unless disabled from the Module Menu.

ADDITIONAL MODULES

The LAN Turtle is designed to enable rapid module development. Any supported language (such as bash, php, or python) may be used to write a Turtle Module. With just a few core functions required, modules may be quickly developed and tested. Once submitted to the LAN Turtle Module Repository, they may become available for other LAN Turtle users to download and enjoy. For more information on writing modules, consult the developer documentation at LANTurtle.com

Default Settings

- IP Address: `172.16.84.1`
- Port: `22` *SSH default*
- Username: `root`
- Password: `sh3llz` **Must change on initial setup*

SSH Clients

LINUX AND OSX

Linux and Mac operators are recommended to use the built in SSH client (typically openssh). With the LAN Turtle plugged into the user’s PC, an SSH connection is usually initiated by issuing “ssh root@172.16.84.1” from the terminal.

```
ssh root@172.16.84.1
```

WINDOWS

Since Microsoft does not bundle an SSH client with Windows by default, Windows users are encouraged to use the open source PuTTY client from: http://www.chiark.greenend.org.uk/~sgtatham/putty

> Please Note: for the best experience, choose ISO-8859-1 Remote character set from Window > Translation. Otherwise the menu outlines may seem garbled.

ANDROID

For quick access and configuration changes in the field, the LAN Turtle’s Shell can be accessed from an Android Tablet or Smartphone by using a USB OTG cable and SSH client. ConnectBot is a free open source Secure Shell client available in the Google play store.

Setup Guides

Connecting for the First Time

When configuring the LAN Turtle for the first time, a direct connection to the operator’s notebook or desktop computer is recommended. The USB plug will both power the LAN Turtle (as indicated by the Green LED) as well as expose a USB Ethernet adapter to the computer for management.

Once connected to the operator’s computer via USB, the LAN Turtle will boot. The boot sequence completes in about 30 seconds, during which the the Amber LED will blink. The first time the LAN Turtle is plugged in, the Amber LED will continue blinking until initial configuration is completed via SSH.

Once bootup is complete, the LAN Turtle’s network interface on the USB facing side will offer the host computer an IP address via DHCP.

Ensure the host computer is configured to accept IP from DHCP, or alternatively specify a static address in the LAN Turtle’s IP range.

Once the LAN Turtle has completely booted and the host computer has been assigned an IP address, the operator may access the LAN Turtle’s Shell via SSH.

Setting up a new LAN Turtle

From time to time new version of the LAN Turtle firmware will become available. Thankfully upgrading is made very simple. Begin by getting your LAN Turtle connected to the Internet. Simply connect the RJ45 Ethernet port to a local network. By default the LAN Turtle will attempt to obtain IP information from DHCP. If a static IP address is required on your network it may be set from the Configuration menu.

Test your LAN Turtle’s Internet connection. From the SSH session to the LAN Turtle, exit the Turtle Shell menu (or press the ESCAPE key until you’re presented with a root@turtle:~# prompt). Ping your favorite host.

```
ping -c4 8.8.8.8
```

Once you’ve verified that your LAN Turtle is online, we’re ready to update the firmware. Return to the Turtle Shell by issuing the turtle command. Navigate to the Config screen and choose check for updates. This process takes about 10 minutes to complete. When the LAN Turtle downloads the update and begins flashing, the SSH session will close. This is expected.

When the update is complete you can SSH back into the LAN Turtle. The password will have been reset to the default (sh3llz), and once again you’ll be prompted to change the password.

Keep in mind that flashing the firmware replaces everything stored on the LAN Turtle memory, so be sure to backup any documents. Modules can be re-downloaded from the Module Manager upon firmware update.

Installing Modules

Installing modules on the LAN Turtle is a simple process. From the Turtle Shell main menu, navigate to Modules. Select Module Manager and press enter. Tab over to select Configure and press enter. From the module manager configuration screen you’ll have the ability to download modules over directly from lanturtle.com. Select Directory and press enter, then select Yes to confirm the connection.

The directory will list all of the available modules. Use the spacebar to check the box next to the modules you wish to install, then press enter to continue. Be sure to install the NetCat Reverse Shell (netcat-revshell) module if following along with the next section. Modules will be downloaded from the online repository and installed to /etc/turtle/modules on the LAN Turtle.

Similarly, the Delete option from Module Manager allows you to remove any modules you wish. The Update option will get the latest version of all modules currently installed.

Modules may be started, stopped and configured from the Modules menu in the Turtle Shell. Alternatively they may be started, stopped and configured manually from the command line as follows:

```
/etc/turtle/modules meterpreter configure
/etc/turtle/modules meterpreter start
/etc/turtle/modules meterpreter stop
```

Your First Reverse Shell

“Netcat (often abbreviated to nc) is a computer networking service for reading from and writing to network connections using TCP or UDP.

Netcat is designed to be a dependable back-end that can be used directly or easily driven by other programs and scripts. At the same time, it is a feature-rich network debugging and investigation tool, since it can produce almost any kind of correlation its user could need and has a number of built-in capabilities.

> Its list of features includes port scanning, transferring files, and port listening, and it can be used as a

> backdoor.” ?Wikipedia

In this section we’ll set up a “backdoor” on the LAN Turtle with Netcat. This will be achieved by configuring a server online to host a Netcat listener on port 8080. Then on the LAN Turtle we’ll configure the Netcat Reverse Shell module to connect to the server on boot.

Begin by SSH’ing into your online server. There are many inexpensive options for this, and a good VPS or shell is highly recommended. Most VPS hosts come with a static IP address and the operating system of your choice. In this example we’ll assume you have an Ubuntu server at 93.184.216.34. From the SSH session with your Ubuntu server online, start a netcat listener on port 8080.

```
nc -lp 8080
```

Netcat is included by default on most Linux distributions. If it is not, try installing it from the repositories. For example, on Ubuntu you may use apt-get to install netcat with the following:

```
apt-get install netcat
```

With our netcast listener running on the server online, we’re ready to configure the LAN Turtle. From the SSH session with the LAN Turtle, navigate to the Modules section of the Turtle Shell. Select the NetCat Reverse Shell module and configure. When prompted, enter the IP address and port number of your server’s netcat listener. In our example the IP address is 93.184.216.34 and port number is 8080. Tab over to Submit and press enter to save these values.

Now that the NetCat Reverse Shell module is configured, it can be tested by tabbing over to the Start option and pressing enter. You’ll receive a notice that the module has started. Press enter to return to the module screen and notice the current status and bootup status.

From the NetCat listener on our server it may not be apparent that anything has happened. This is because the netcat reverse shell does not pass over the prompt. That said, issuing a command will execute on the LAN Turtle just as it would over an SSH connection. Try concatenating the login banner.

```
cat /etc/banner
```

From the SSH session on the LAN Turtle, tab over to the Stop option on the module screen and press enter. You’ll receive a notice that the module has stopped. Now go back and notice the netcat listener on the server. It will have terminated. This means we’ll be unsuccessful if you attempt to start the module again. To solve this issue, we can either use a version of NetCat with a keepalive option, or run the NetCat listener in a screen session inside of a while loop.

From the server, try the following:

```
screen -dmS netcat_listener bash -c 'while true; do nc -lp 8080; done'
```

This will create a new detached screen session that will stay persistent even after you disconnect the SSH session with the server. The screen session will be running the bash one-liner while true; do nc -lp 8080;

done. This simple while loop means as soon as the NetCat listener terminates, it will start again. You can display the running screen sessions with the screen -list command, and reconnect to a running screen session with the screen -r netcat_listener command. Detatch from the screen session again using the CTRL+a, d keyboard combination.

Similar to NetCat, if screen isn’t installed by default on your server you may install it from the repositories. For example, on Ubuntu you may issue apt-get install screen.

With this more robust listener running, we can now enable the NetCat Reverse Shell module on the LAN Turtle. With the module enabled, the reverse shell will attempt to establish with our server every time the LAN Turtle boots.

Now this is a very basic reverse shell over NetCat. It can be used to manage the LAN Turtle from afar, as long as both you and the LAN Turtle have access to the server online. It illustrates the basic process of configuring, testing, enabling and deploying a module on the LAN Turtle.

Taking this a step further, I highly encourage setting up a persistent reverse shell over SSH since the AutoSSH module is much more robust than netcat and has built-in keepalive features. The process is very similar – it just requires configuring public / private key-pairs from the keymanager module first.

FAQ / Troubleshooting

Power Considerations

The LAN Turtle is powered via USB and requires 5V at ~200mA. Typical power usage is 1 Watt. Below are some example deployment scenarios and power considerations.

- Covertly installed in an available USB port on the back of a desktop computer at a client site, either in an “Ethernet Pass-through” configuration (With Network access provided by the LAN Turtle) or standalone (such as for DNS Poisoning).
- Concealed in a network closet plugged into Ethernet powered by a USB Battery Pack. For example: the Pineapple Juice 15000 USB Battery from HakShop.com would power the LAN Turtle for ~3 days.
- Concealed in a telephone room plugged into a free Ethernet cable powered by a typical smartphone USB wall charger.
- Concealed in a server rack powered by a server’s available USB port using a USB Data Blocker inline USB dongle (Available from HakShop.com) to prevent the server’s operating system from identifying the LAN Turtle.
- Connected to a penetration tester’s Android tablet or smartphone using a USB OTG cable (available from HakShop.com) for use on-the-go with an Android SSH client. Note: Some smartphones and tablets do not provide the current necessary to power the LAN Turtle. Most Nexus models have been tested to function properly.

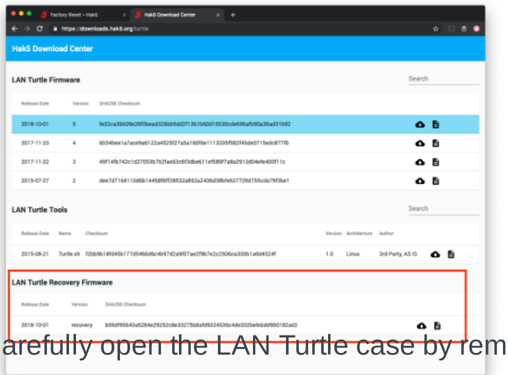
Specifications

- Atheros AR9331 SoC at 400 MHz MIPS
- 16 MB Onboard Flash
- 64 MB DDR2 RAM
- 10/100 Ethernet Port
- USB Ethernet Port – Realtek RTL8152
- Indicator LED (Green Power, Amber Status)
- Button (inside case for Factory Reset / Firmware Recovery)
- Dimensions: 95 x 23 x 31 mm

Factory Reset

In the extreme case that a LAN Turtle has become permanently inaccessible or inoperative, there is a quick method for recovery using a special web interface.

1. Download the latest LAN Turtle factory image from the Hak5 Download Center. Note that the factory recovery firmware differs from the regular firmware image and must be used for this process. Do not attempt firmware recovery using the normal LAN Turtle firmware.



Hak5 Download Center

LAN Turtle Firmware

Search

Release Date	Version	SHA256 Checksum
2018-10-01	5	fe32ca3bb09e26f0bead326bb5dd2f13b1b60d15530cde696afb90a36ad31b92
2017-11-23	4	6034bee1a7ace9a6122a4525f27a5a160f6e1113205f582f45de0715edc877f0
2017-11-22	3	49f14fb742c1d27053b762fae63c6f3dbe611ef589f7a8a2913d04efe400f11c
2015-07-27	2	dee7d7164110d6b14458f6ff28532a852a2436d38bfe627729d755cda79f3be1

LAN Turtle Tools

Search

Release Date	Name	Checksum	Version	Architecture	Author
2015-08-21	Turtle.sh	f2bb9b18fd45b177d5466d6c4b97d2a9f07ae2f9b7e2c2506ca300b1a9d4524f	1.0	Linux	3rd Party, AS IS

LAN Turtle Recovery Firmware

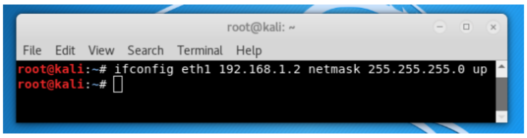
Release Date	Version	SHA256 Checksum
2018-10-01	recovery	b09df95643a5284e29252c8e33275b8afd9324536c4de202befebdd900182ad2

2. Carefully open the LAN Turtle case by removing the two screws underneath the sticker on the bottom and pry the bottom plate from the top, exposing the underneath of the PCB. Be careful not to remove the top plastic housing as the 3G variant has an antenna adhered to this section.

3. Locate the reset switch, button or jumper pad for your the LAN Turtle variant.o

4. While holding the reset button, switch or jumper on the bottom of the LAN Turtle, plug the device into a computer and continue holding for the first 5 seconds during bootup, then release. Wait an additional 30-180 seconds to receive an IP address from the LAN Turtle.

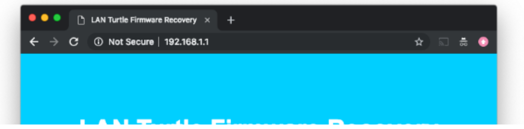
5. If you do not receive an IP address in the 192.168.x range from the LAN Turtle within a minute, statically assign the LAN Turtle's interface to 192.168.1.2 (netmask 255.255.255.0)



```
root@kali:~# ifconfig eth1 192.168.1.2 netmask 255.255.255.0 up
root@kali:~# 
```

6. Browse to the LAN Turtle firmware recovery web interface at http://192.168.1.1 and follow the on screen prompts to upload and flash the factory image downloaded in step 1.

7. Wait 5-10 minutes until flashing completes as indicated by a special LED blink pattern seen in the video above. When the flash is complete the LAN Turtle will reboot and will be accessible again from 172.16.84.1 with the default username root and password **sh3llz**



Manual Upgrade

LAN Turtle firmware may be updated”over the air” by choosing Check for Updates from the Config menu. If an Internet providing Ethernet connection is not available, updates may be flashed to the device manually using the following process:

1. Download the latest UPDATE file from the download center and verify its checksum.
2. Verify that the SHA256 checksums match
3. Manually SCP the file to the LAN Turtle in /tmp (ex: `scp turtle-5.bin root@172.16.84.1:/tmp/`)
4. From the LAN Turtle, exit shell to the bash prompt and issue: `sysupgrade -n /tmp/turtle-3.bin`
5. Wait about 5 minutes for the LAN Turtle to flash the firmware and reboot itself

Video Guides

First Boot and Software Update

The Turtle Shell and Turtle Modules

Metasploit and LAN Turtle with Meterpreter

Persistent Shell Access with AutoSSH

Remote File Systems with SSHFS

Man-in-the-Middle with URL Snarf

Man-in-the-Middle with DNS Spoof

Obtaining Credentials from a Locked PC