BBHN Mesh Network
Client Handbook
for Emergency Responders

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Version 16.18
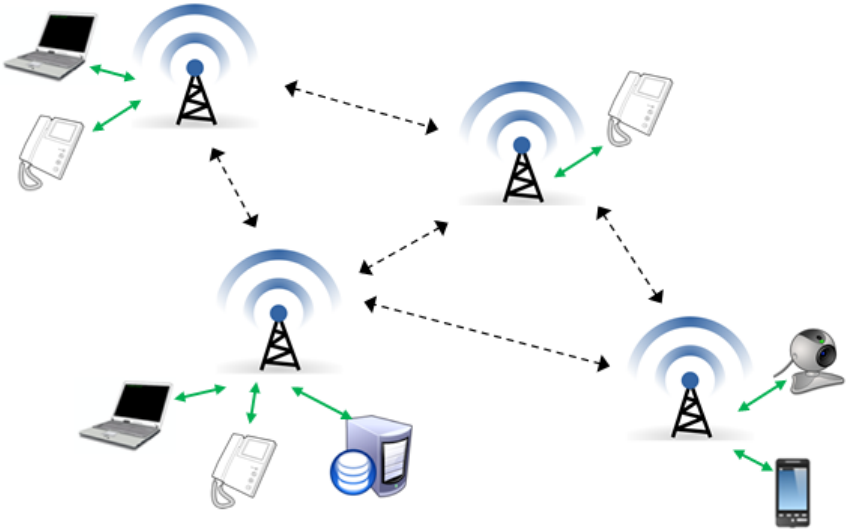
Table of Contents

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1   Introduction

1.1   Overview

The **client–server** computing model is a distributed application structure that partitions tasks between the providers of a resource or service, called **servers**, and service requesters, called **clients**. This description aligns nicely with the deployment approach taken by Santa Clara County RACES and its participating cities when considering a BroadBand HamNet™ Mesh Network deployment.

The purpose of the "*BBHN Client Handbook for Emergency Responders*" is to provide ARES/RACES responders with a straightforward reference for configuring, integrating, and operating a client BBHN mesh node within a deployed mesh network.

The title implies that there is a companion "*BBHN Server Handbook for Emergency Responders*" that describes the configuration and setup of a Linux-based server and resident applications that would support a network of BBHN mesh clients. That handbook exists as well.

1.2   Intended Audience

ARES/RACES members can use this handbook as a minimalist field reference when arriving and joining a mesh network. This handbook will also provide RACES Event and Emergency Planners with the menu of available services that could be deployed.

1.3   How to use this handbook

This handbook presents information on what we believe are the standard set of network services that would enhance communications for our served agencies in the execution of an emergency response and recovery.

Drills are a good time to carefully step through all the offered network services described in in this handbook to understand what they are, how they work, the opportunities and limitations that they each present, and challenge you to look for ways that they can enhance the response.

During an actual activation and mesh network deployment, this handbook is a quick reference of the steps that may be needed, given how infrequently we are called to deploy.

1.4   Revisions

To ensure the information remains relevant, accurate, and up-to-date, revisions to this handbook will occur as corrections are applied or new services and capabilities are added.

This handbook is only as good as its content. All users are encouraged to submit corrections and updates as they are uncovered.

Submit updates to Jim Oberhofer, kn6pe@arrl.net.

2   Mesh Node Startup

2.1   Introduction

The value of using the BBHN software is that the user interface is the same regardless of the mesh hardware on which it is flashed. However, the two supported types of WiFi routers– Linksys WRT54G and Ubiquiti – have different antenna, mounting, power, and cabling requirements; these considerations will not be addressed here, but will be generally referenced as needed.

For the initial setup, a PC/laptop connected to the node is required. Beyond the first setup, no PC/laptop is required.

NOTE: This handbook does not address flashing the router. Refer to the BBHN website for instructions on installing the firmware.

2.2   First-time power on

Confirm the node network cabling
1. Router to VoIP Phone
2. Router to PC

Confirm the Power configuration
1. Power Source to Router
2. Power Source to PC

Apply power to all devices
1. **Mesh Router:** The boot process will take about 1 minute.

    a. Linksys: Once the DMZ LED goes out, the node is ready for use.

    b. Ubiquiti Nano stations: The far right hand lamp will flash green. After about a minute, it will stop and the third lamp from the left will illuminate Red. At that point, the unit is ready for use.

    c. Ubiquiti Titanium Bullet: no LEDs… just wait 1 minute.

2. **PC:** Boot up your PC. Run the **cmd** Program (Windows Start), and then the **ipconfig** program to view your IP address.

    a. **VERIFY** that an IP address has been assigned to your Ethernet adaptor connector AND is in the range 10.###.###.###. If it is not, check your ethernet cable and modem power. Reboot your PC if necessary.

2.3   Standard power on sequence

The Standard power on sequence is the same as the first time power-on with the exception of the PC. The assumption is that the Router (and Phone when connected) power-up correctly as described above.

6. It is better to send one sentence at a time (short) instead of typing an entire paragraph (long).

7. When done, let people know you are signing off so there is a record of you leaving in case someone is looking for you.
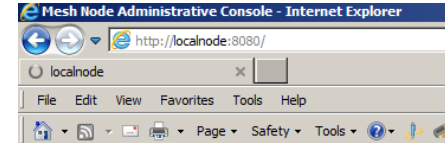
8.4   Troubleshooting

Problem	Try this
Cannot connect to the Chat service	1. Notify the network administrator if this problem arises.

Router Configuration Checkout

The next few sections describe how to access the mesh router for inspecting the configuration. It is unlikely that any changes need to be made during a field deployment. However, in the event a change is required, you may be asked to assist with direct access to your router.
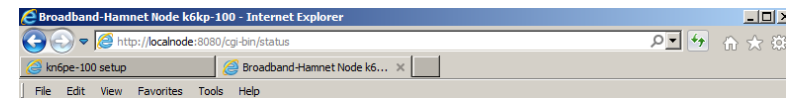
2.4   Accessing the Linksys / Mesh Configuration

1. Before you begin:
    a. Disable your PC's WiFi *(REQUIRED)*.
    b. With a CAT5 cable, connect your laptop/PC to the mesh network router.

2. Start up your browser.

3. Enter the following in the URL field: http://localnode:8080

4. The first thing you will see is a redirect page:

5. The main mesh status page is then presented.

In this example, the node name is "k6kp-100", and the firmware version is 3.0.0.

2.5   Reviewing the Mesh Status

1. Press the Mesh Status button. This form shows the local host name (your mesh node name) and the list of mesh node neighbors that you can hear.
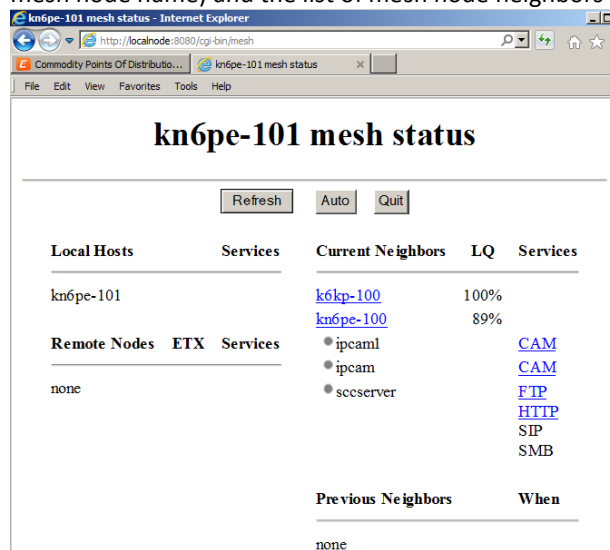

NOTE: *Current neighbors* are other nodes that have a direct link with your node. ***Remote nodes*** are other nodes that are one or more network hops away.

2. Note the list of neighbors and any services they offer. In the above example, you see the following:

    a. Neighbor: kn6pe-100. Alias: sccserver (this is an *example*)

    b. Services (**NOTE:** not all nodes will have all these services. If they do, then they may be called something different):

        a. **CAM:** two Webcams are listed as available

        b. **FTP:** File Transfer Protocol, this site hosts an FTP server for file upload and download

        c. **HTTP:** This neighbor offers HTTP web services

        d. **SIP:** This node hosts a SIP PBX phone server

        e. **SMB:** This service offers a file share.

3. Note the neighbors and their services that you see.

4. Other controls on this page:

    a. Press Refresh one-time refresh of the results on this page.

    b. Press Auto to automatically refresh the results of this page about every 10 seconds.

    c. Press Quit to return to the main status page.

5. When done, press Quit.

The chat form opens in a different browser tab.

1. Note the ☑Auto-Refresh button at the bottom. When checked, your page will be refreshed about once every second or two depending on the number of users on the system. Please CHECK this box so you don't miss any text messages intended for you.

2. The field right above the check box is the message text entry field. Enter your message and press the Enter key or the Send button. Your text string is posted to the server and received by anyone, including you, who is also currently logged into HamChat.
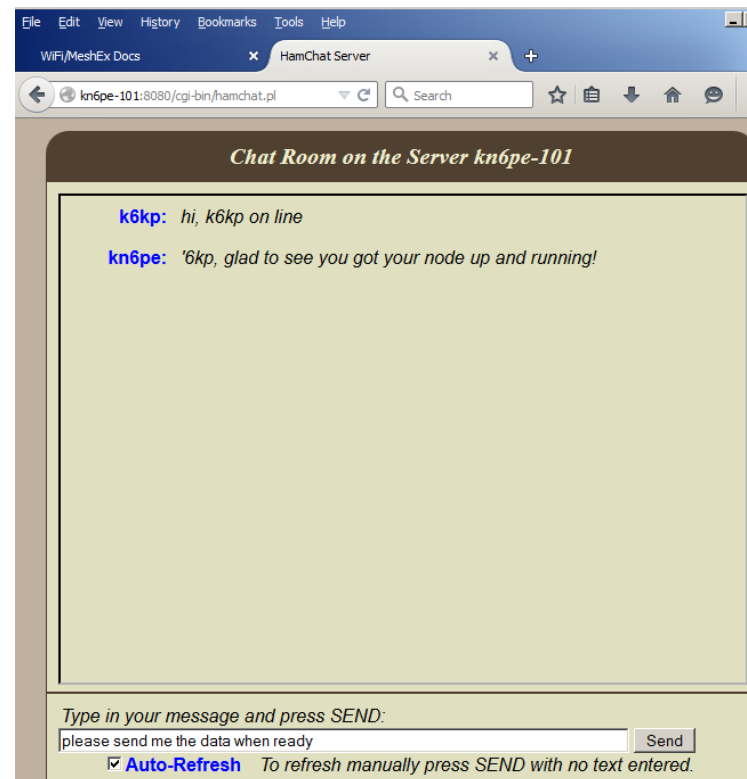
To send a message,

3. For the first message, get some greeting out there so your call sign gets on the board.

4. While this is faster than email for quick messages, there is still some network latency from the time you press Send to the time it is displayed on the other users form.

5. What you will not see is whether anyone else is in the middle of typing a response.

8   Instant Messaging with HamChat

8.1   Introduction

Instant messaging, often referred to as "texting", is exchanging text messages over the network in real time. Instant messaging differs from ordinary email because of the speed of the message exchange as well as making a continued exchange simpler than sending e-mail back and forth.

The HamChat is a BBHN mesh network application that runs on the mesh server to allow keyboard-to-keyboard chats between any connected users on the same mesh network. By using your web browser instead of chat client software, the complexity is reduced and the speed to deploy is increased.

8.2   Finding a Chat Server

1. There are two ways to determine if a Chat Server is available:

    a.   Query the mesh network.

    b.   Ask the network administrator

2. To query the mesh network,

    a.   Start up your browser.

    b.   Connect to your local mesh node with the URL
          http://localnode:8080

    c.   Press the Mesh Status button. This form shows a list of mesh node neighbors that your node can hear, and any services that these nodes may offer.

    d.   Look for something like CHAT or related name under the service header. It if is highlighted, click on it to access the application. Note the URL so you can go directly to it the next time.

8.3   Sending a Message with HamChat

Once you find it, click on the link. The first form opened prompts for your call sign. Press Connect when ready.
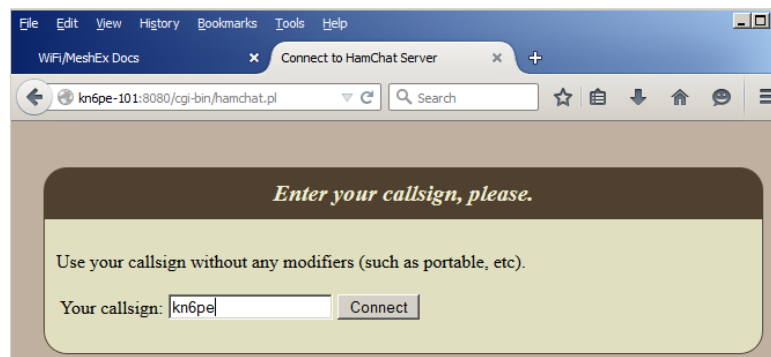
2.6   Mesh Node Setup

1. From the main mesh access page, press Setup to first log in.

    c.   Logon: root   .

    d.   Password: mesh   .

NOTE: Password information is specific for Santa Clara County RACES. Consult with the network administrator or station owner if the station password you are accessing is different.

2. **Changing Password.** Enter a new password in both fields, and press Save Changes.   *DO NOT LOSE YOUR PASSWORD*.

3. **Key default settings**

Column	Parameter	Setting
	Node Name:	Your call sign plus unique identifier
	Node Type	mesh node
WiFi	TX Power	19 dBm
	SSID	**NOTE** BBHN software: "BroadbandHamnet" AREDN: software: "AREN" If you are operating mixed versions, all SSIDs MUST BE THE SAME.
LAN	Lan Mode	5 Host Direct **NOTE:** Change to 13 Host Direct if more IP addresses are needed.

Column	Parameter	Setting
LAN	DHCP Server	Checked
WAN	DHCP Server	Checked

4. Port Forwarding, DHCP, and SERVICES
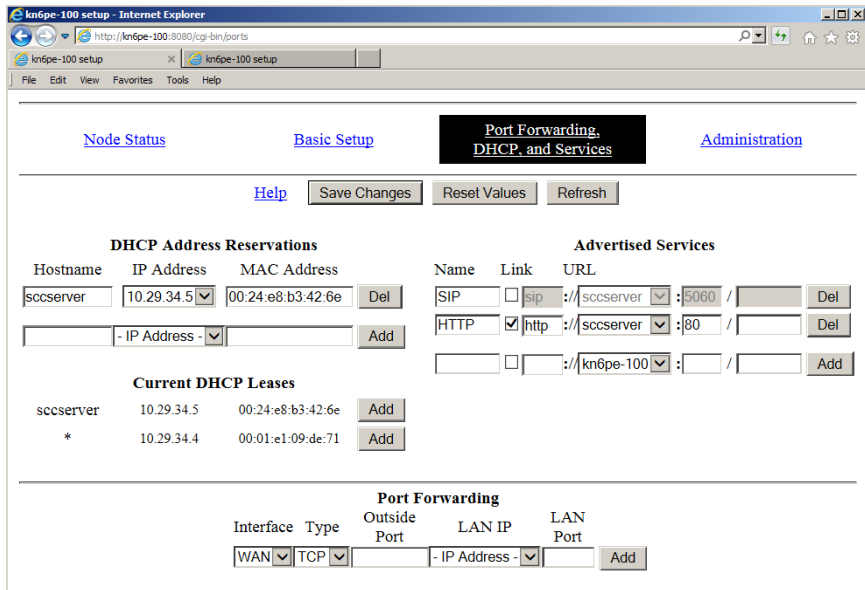
| Areas of Interest	Description
DHCP Address Reservations	This section lists the IP and MAC addresses of devices that have an IP address reserved. Reservation means: the IP address will not be assigned to any other device except the one that matches the MAC address. Click **Del** to remove the reservation for this device.
Current DHCP Leases	This section shows the IP and MAC addresses for devices configured into the network. Click **Add** to create a reservation for this device.
Advertised Services	This section configures services that are hosted on servers to be listed or "advertised" on the Mesh Status screen.

e.   Then press OK or Finish.
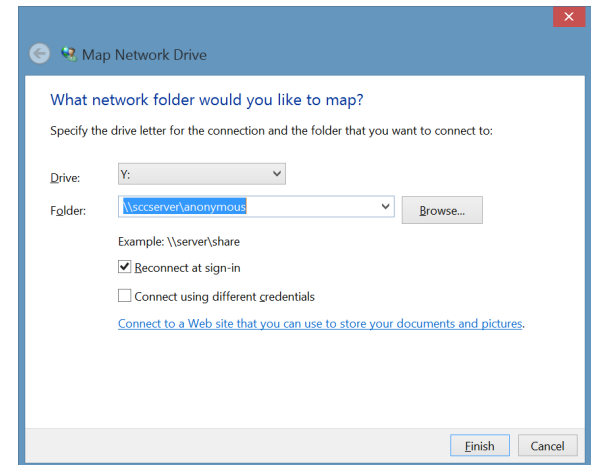
f.   If everything is correct, Windows Explorer will open to the share location.

g.   Begin accessing data files as if they were located on your PC.

7.3   Troubleshooting

Problem	Try this
Cannot connect to the network share	1. Turn off your PC's WiFi and other interfaces if they are on. Disconnect from any external networks if connected. 2. Double-check the share path, and it is in the form \\<server>\<name>. 3. Try entering the share path using the IP address instead: \\10.12.13.14\<share_name>
Cannot save an updated file	1. Possible messages: "document in use by another user" or "file open in READ ONLY". 2. The file is open to another user. Before editing, ensure you have it locked to you (your file editing application should do that) so do don't end up abandoning your entries.
My saved content is no longer there	1. DO NOT download a file, update it off-line, and then upload the file. You may overwrite someone else's content.

7 Network Shares

7.1 Introduction

A network share (also known as a network drive) is space on a server that is accessible over the network. Data on these servers can be accessed by a local PC transparently as if it was a resource on your own PC.

Network shares are an advertised service on a mesh network, but not a click-able service like the webcam or website links. Network shares are identified by **SMB** (Server Message Block protocol) **Share**, or some other name.

Shares are usually configured on a server in one of two ways:

1. *Anonymous* shares. These shares are open to anyone who can get to them, and offer no file-level security. Anonymous shares are ideal for a closed network setting with no external access, and when there is little risk of someone from outside the mesh network getting in.

2. *Protected* or *Secured* shares. These shares require a logon and password to gain access. These shares can hold group- or individual-specific data.

To access either type of share, you will need to know the path to the server and file share. Once you have the share mapped in, it will look like a separate disc drive on your PC.

CAUTION! It is important that you maintain your PC's virus checking capabilities. Even though you are not on the public internet, a co-worker may unknowingly have a virus that gets passed on in a file.

When in doubt, **virus scan before opening**.

7.2 Using network shares

To map in a network share, do the following:

1. Get the following from the network administrator:

   a. Path to the Share. This will be in the form
      \\<server>\<share name>   (Includes the backslashes)

   b. Logon and Password. If this is a protected share, you will need both.

2. To map in a share, Open Windows Explorer, and then…

   a. Windows XP: select Tools > Map Network Drive

   b. Windows 7, 8, 10: Find the network icon (on the left, right-click on it, and select **Map network drive.**

   c. Pick an unassigned drive letter (I usually start with the last letter of the alphabet).

   d. In the folder field, enter the path string, including the backslashes.

Areas of Interest	Description
Port Forwarding	Defines the path to connect this mesh node to the Internet.

2.7 Troubleshooting

Problem	Try this
No LEDs eliminated	1. Confirm that the router is correctly connected to the power source.

Cannot see any other mesh node.	1. Check that the mesh router is powered on. Observe the front LEDs.
	2. Log on to the router and check the following on the mesh node home page:
	  a. The mesh node name is assigned; confirm an FCC call sign is shown on the top of the page.
	  b. The "firmware version" is set to 3.0.0.
	  c. The "configuration" is set to Mesh
	3. Check the firmware revisions. BBHN firmware versions 1.0.0 and 3.0.0 are *incompatible*. All nodes should be at least revision v3.0.0. v3.0.0 and v3.1.0 are compatible with each other.

Can see some, but not all other mesh nodes.	1. Check that the other nodes are powered up. 2. Check that all network SSIDs are the same. This will be more obvious if some nodes are using Ubiquiti equipment.

3 Zultys Phone Operations

3.1 Reset to Factory Defaults

Your phone **MUST** be set to DHCP.

This step should be done whenever you are connecting your phone to a new network for the first time or if you are unsure of the phone settings last made. Or, check with the network administrator to determine if this step is required.
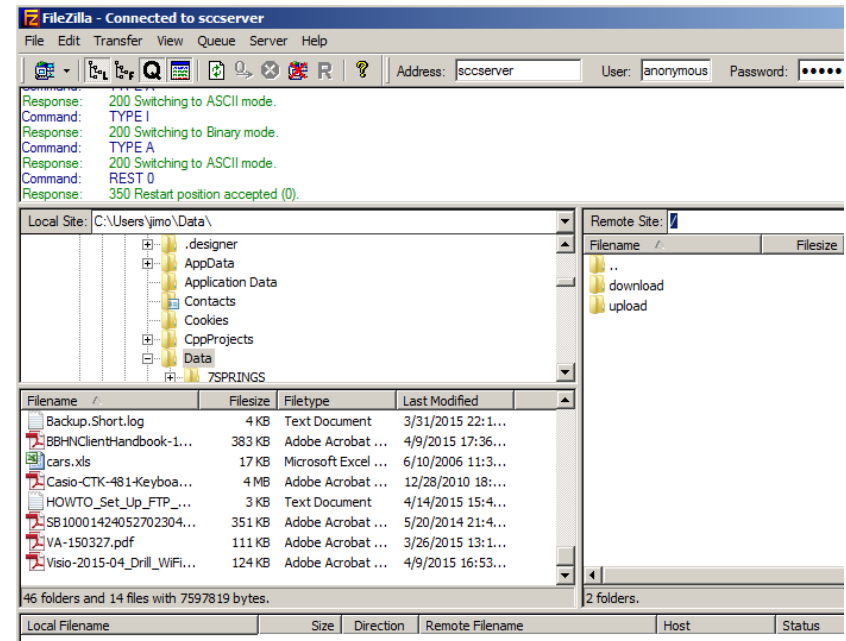
1. Perform a reset to factory defaults for your Zultys ZIP2 phone:

    a. Ensure that there is no power connected to the ZIP2 (do not connect the power adapter).

    b. Pick up the handset.

    c. While pressing the '1' button, connect power to the phone. Do not release the '1' button until both the red and yellow LEDs stop flashing; this usually takes about 10 seconds.

    d. Disconnect power from the ZIP2 by removing the power adapter.

3.2 Normal Phone Power-up Procedure

1. Once a phone has been configured into the network, the following is the normal phone power-up procedure.

    a. Connect the phone to the mesh router using an ethernet cable.

    b. Connect power to the ZIP2.

    c. The phone quickly flashes the red LED above the keypad and the yellow LED below the keypad twice. Both LEDs turn off a few seconds after the power stabilizes.

2. Within a minute, check for a dial tone. If you hear one, this means:

    a. the phone has power, and

    b. the phone has been assigned an IP address by the Router.

3. If you **did not hear** a dial-tone, see *Section 3.7. Troubleshooting.*

3.3 Find the Phone's IP Address

1. Before we can configure it, we need to find the phone's IP address. Do the following:

    a. Turn the phone over and write down the MAC Address. It will be a mix of HEX characters, 12 digits long.

    b. From the browser, connect to your router http://localnode:8080

6.6 Troubleshooting

Problem	Try this
Cannot connect to the FTP server	1. Turn off your PC's WiFi and other interfaces if they are on. 2. Disconnect from any external networks if connected. 3. Enter in the full URL string including the http:// portion of the address (i.e.: http://ftpserver). 4. Contact the network administrator and confirm the FTP Server is up and running.
Cannot upload a file to a specific directory.	The FTP data directory structure is can be tightly managed in terms of user access. Problems could be: 1. You are attempting to upload a file to an FTP data directory that is set to READ-ONLY. ACTION: contact the network administrator for the correct upload data directory. 2. The logon information does not give you permission to upload a file to a specific directory. ACTION: contact the network administrator for a logon that is granted permission to perform the upload.

5. In the above example, there are two folders in this location (if different, see the network administrator):

   a. **download**. This is usually a READ-ONLY directory that contains files to be downloaded to your machine.

      i. If you attempt to put (write) a file in this folder, you will get an error stating you "… do not have permission to put files on this server".

   b. **upload**. This is usually a WRITE-ONLY directory for uploading files that you may need to submit. Once submitted, it cannot be overwritten or deleted.

      i. If you attempt to replace a file with a new version, you will get an error. If you have to upload a replacement file, give the file name a version number, such as "my-data-file-v2.doc".

      ii. If you attempt to download (read) a file, you will get an error.

6. Double-click on each folder to a look at what files are already loaded.
   NOTE: Other folders may exist that provide a common location for sharing files between all FTP users.

6.4   Moving files with Windows Explorer

1. To upload a file: open a separate Windows Explorer, navigate to the location where the file for uploaded is located, and drag the file into the FTP data directory.

2. To download a file: in a different Windows Explorer window, drag the file from the FTP Data directory to your local file location.

6.5   Accessing the FTP server with FileZilla

FileZilla is a popular program for working with FTP Servers. Once running, it is simply a matter of filling in the Address name "sccserver" and pressing enter. It immediately fills in "**anonymous**" as the login and a default password.

1. The top text box shows you the exchange between FileZilla and the Server. This is a good place to check for errors.

2. The Local site box (left side) is your local directory, and below that are the files in the selected directory.

3. The Remote site box (right side) shows you where you are on the FTP server and what files already are present.

4. Uploading files is as easy as selecting the local directory and remote site directory and dragging a file from one side to the other.

5. The process is the reverse for downloading files.

   c. Select the Setup link. Enter the router's logon and password. See *Section 2.6* Mesh Node Setup in this handbook.

   d. Select the Port Forwarding, DHCP, and Services link.

   e. Look under the **Current DHCP Leases** section.

   f. On the lower left side of the form, look for the entry that matches the phone's MAC address that you recorded from Step 1 above. Write down the IP Address for this phone.

3.4   Accessing the Phone Interface

This procedure describes how to manually enter the configuration using the phone's web interface.

1. Open your browser and enter the phone's IP address in the URL address line. The phone's web page will be displayed.

2. From the left menu, select LAN. Note the various network settings that the phone discovered. Verify that "Dynamic IP Assignment" (DHCP) is set to YES.
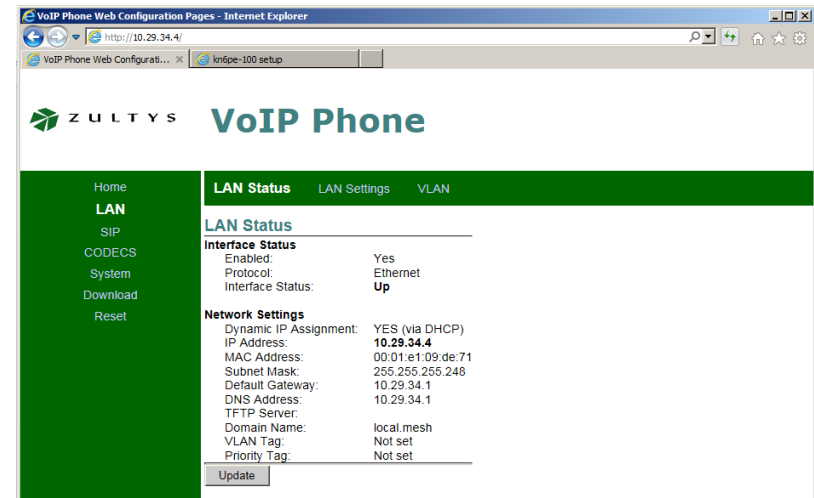
3.5   First-time Phone Setup

NOTE: Use this procedure whenever a new phone is being configured into an existing network. See the Mesh Network Administer for the Server Address, User Name, and Password.

1. Most of the phone settings can be defaulted. However, we do need to make this phone unique on the network.

2. From the left menu, select SIP.
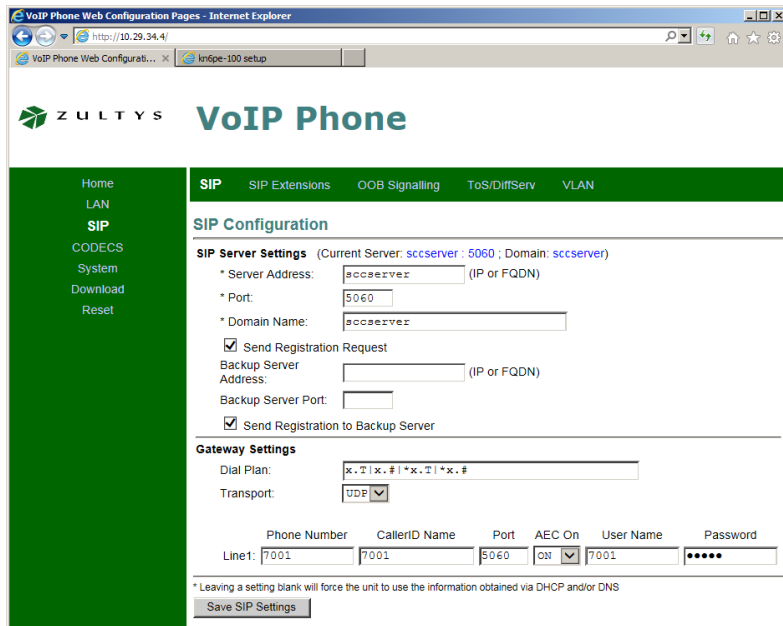
Example: extension 7001

3. The following needs to be confirmed or entered for this phone to work.
    a. **SIP Server Settings:** Defines where the phone can find the SIP server (manages all telephone call processing). The three fields that MUST be filled in are:
        i. Server Address: _____
        ii. Port Number: 5060_____
        iii. Domain Name: _____
    b. **Gateway Settings.** This section uniquely identifies the phone on the phone network. On boot-up, the phone connects to the SIP server (above), and then registers with the phone's user name and password that you will enter here. Once registered, you can then make and receive phone calls. The fields are:
        i. Phone Number: _____ (OK to leave blank)
        ii. Caller ID Name: _____ (OK to leave blank)
        iii. Port: **5060**_____
        iv. AEC ON: [**ON**] (must be set to **ON**)
        v. User Name: _____ (see the Network Admin)
        vi. Password: _____ (see the Network Admin)
    c. Press Save SIP Settings.

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Logon: <u>anonymous</u>
Password: <u>< blank ></u> or < email address>

2. After you are logged in, you are looking at the FTP root directory. Note the directories and files that you see. Double-click on a directory link to explore these directories.

3. To open the FTP Server in Windows Explorer from Internet Explorer 8,9,10,
    a. select **View** > **Open FTP Site in File Explorer**

4. You can also copy the displayed URL and paste it in the File Explorer File Path field as follows:
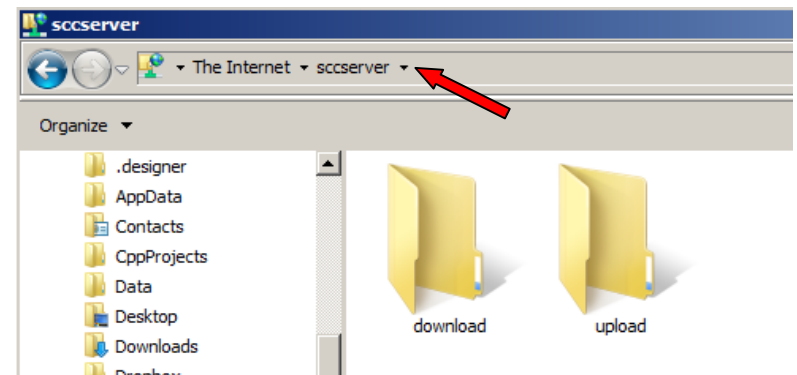   a. Run Windows Explorer.
    b. The File Navigation line is actually settable.
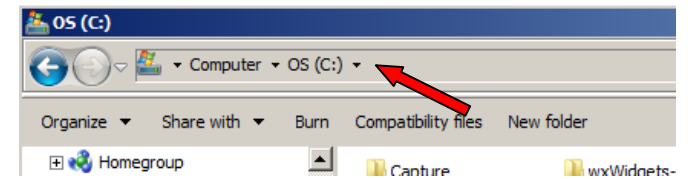
    c. With the FTP URL discovered above, enter it here, and press enter:
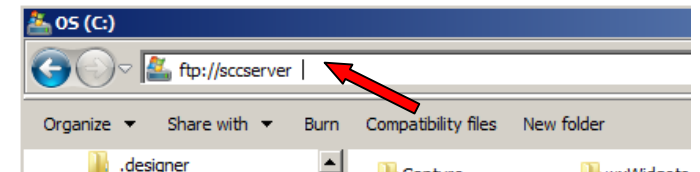
    d. If the FTP server requires a password, you will be prompted for it. If it is an "anonymous" FTP login, you will be taken directly to the file locations on the server.

6.1   Introduction

The File Transfer Protocol (FTP) is a standard Internet protocol for transmitting files between computers on the Internet.

The **FTP Server** resides on a computer connected to the network and listens for requests for access. The **FTP Client** is software that resides on your computer. The easiest was to access the server is from Windows Explorer. Another popular software package that exists for Windows and MACs is *FileZilla*. On the iPhone, *FTP Client Pro* (~$5) works well. Check your Android app store for something similar.

To access the server, you need to know the following:

1. Server name. This is either an IP address or fully qualified domain Name, like ftp.myserver.org.
2. Logon and Password. See your network administrator for logon details.
3. The name and directory of the file to upload or download.

6.2   Finding FTP Servers

1. There are two ways to determine if an FTP Server is available:
   a. Query the mesh network.
   b. Ask the network administrator
2. To query the mesh network,
   a. Start up your browser.
   b. Connect to your local mesh node with the URL:
      http://localnode:8080
   c. Press the Mesh Status button. This form shows the list of mesh node neighbors that your node can hear, and any services that these nodes may offer.
   d. Look for something like FTP as the service name. If it is highlighted, click on it to access the website. Note the URL so you can go direct to it the next time.

6.3   Accessing the FTP server with Windows Explorer

Microsoft's Windows Explorer is the easiest way to upload and download a file. Once Windows Explorer is pointing to the FTP server, it is simply a matter of dragging and dropping files to and from the FTP data directory.

1. At the mesh node Status Screen, click on the FTP link for the FTP site listed. A new window will open and prompt for the logon and password.

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4. **Reset the phone.** All new settings made to the phone will not take effect until you power cycle or reset the phone. Do either of the following:
   a. Remove phone power for a few seconds and then reapply power.
   b. To reset the phone,
      i. select Reset from the left menu
      ii. select Reset and execute Main Application, and then
      iii. press the Reset button at the bottom of the webpage.
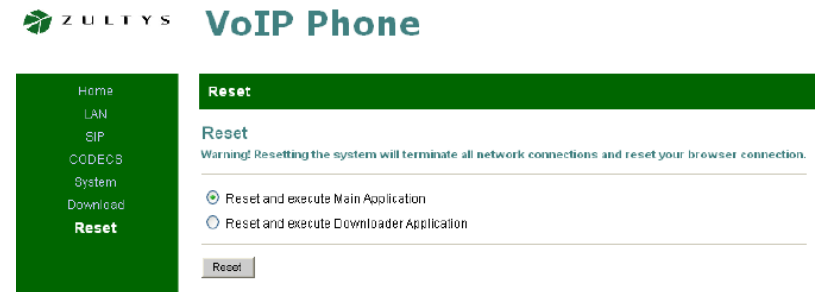
5. The phone will restart as described in *Section 3.2 Normal Phone Power-up Procedure*.

3.6   Test the Phone

1. Along with having all the phone numbers configured in, the SIP server has additional extensions defined for testing your phone's setup.
   a. Dial "100"   This is a very basic phone-to-SIP Server test.
   b. Dial "200"   Reply with your extension number.
   c. Dial "5000"   This is an echo test. Listen to the description and follow the prompts.

NOTE: The extensions listed above are not universally defined on all phone systems. Check with the network administrator for the best method to test your phone.

3.7   Troubleshooting

Problem	Try this
No Dial Tone	1. Check the network cable between the phone and the router and power cycle or reset the phone again. 2. Perform a reset to factory defaults to ensure the phone is configured for DHCP. Then, re-enter the phone configuration.

Rapid busy signal when making a call	Your phone did not register with the SIP Server.
	1. Check for a dial tone
	2. Check the LAN connection between the phone and mesh router
	3. Check the phone's power connection
	4. Check your settings: confirm …
	   a. Server Name
	   b. Port Number
	   c. User Name
	   d. Password
	5. Power cycle or reset the phone
	6. Check with the network administrator to confirm that the SIP server is operational.

a. A form to prompt for logon and password. If you are presented with such a form, check the Event website or contract your network administrator for the logon and password.

b. Viewing area where the image is present.

c. An azimuth control, also known as **Pan**, controls the view up to 360 degrees around the webcam site.

d. An elevation control, also known as **Tilt**, controls the view up or down over a specific range around the webcam site.

e. Continuous monitoring control. This control puts the camera in a continuous pan where it rotates through its range of coverage.

f. Also try putting your mouse over (don't click) a control; this may present a hint as to what the control does.

5.4   Troubleshooting

Problem	Try this
Cannot connect to the webcam	1. Turn off your PC's WiFi and other interfaces if they are on. 2. Disconnect from any external networks if connected. 3. Enter in the full URL string including the http:// portion of the address (i.e.: http://scccam1 or http://10.42.27.15). 4. Contact the network administrator and confirm the web services are up and running.
Cannot access the webcam controls	1. Verify that the logon and password are correct. 2. If more than one camera is present, make sure you have the logon and password for the correct camera.
Azimuth or elevation changes after I set it.	1. It is possible for more than one user to log on to the camera at a time. The last person to touch a control is the one that controls it. In short: you may be competing for access with someone else.

5 Webcam

5.1 Introduction

A web camera, also known as an Internet Protocol or IP camera, is a type of digital video camera commonly employed for surveillance that, unlike analog closed circuit television (CCTV) cameras, can send and receive data via a computer network and the Internet.

Most off-the-shelf webcams are accessed by entering the camera's IP addresses into your browser. The webcam user interface is essentially a web server built into the webcam that presents a viewing area for the streaming video and any available camera controls. A logon and password may be required to access the video.

Webcams are either fixed (what they are pointing at is what you see) or have controls to set the direction (azimuth) and tilt (elevation) of the camera so you can see around the camera. Steerable cameras are typically used for monitoring and security purposes.

5.2 Finding Webcams

1. There are two ways to determine if Webcams are available:

    a. Query the mesh network.

    b. Ask the network administrator.

2. To query the mesh network,

    a. Start up your browser.

    b. Connect to your local mesh node with the URL: http://localnode:8080

    c. Press the Mesh Status button. This form shows the list of mesh node neighbors that your node can hear, and any services that these nodes may offer.

    d. Look for a service name that implies it is a camera, such as CAM or something similar. It if is highlighted, click on it to access the website. Note the URL so you can go directly to it the next time.

    e. If the webcam prompts for a logon and password, contact the network administrator for details.

5.3 Controlling the Webcam

1. Because there is no standard user interface for webcams, no specific instructions are presented here. However, in general, a webcam UI may present the following features and controls.

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4 Website Access

4.1 Introduction

Mesh-based websites are an excellent way to deliver network, event, and organization information at the time of the deployment. During your station deployment, you should be briefed as to whether one or more websites are available.

4.2 Finding Websites

1. There are two ways to determine if a website is available:

    a. Query the mesh network.

    b. Ask the network administrator

2. To query the mesh network,

    a. Start up your browser.

    b. Connect to your local mesh node with the URL http://localnode:8080

    c. Press the Mesh Status button. This form shows the list of mesh node neighbors that your node can hear, and any services that these nodes may offer.

    d. Under the service header, look for something like web, WWW or HTTP. It if is highlighted, click on it to access the website. Note the URL so you can go directly to it the next time.
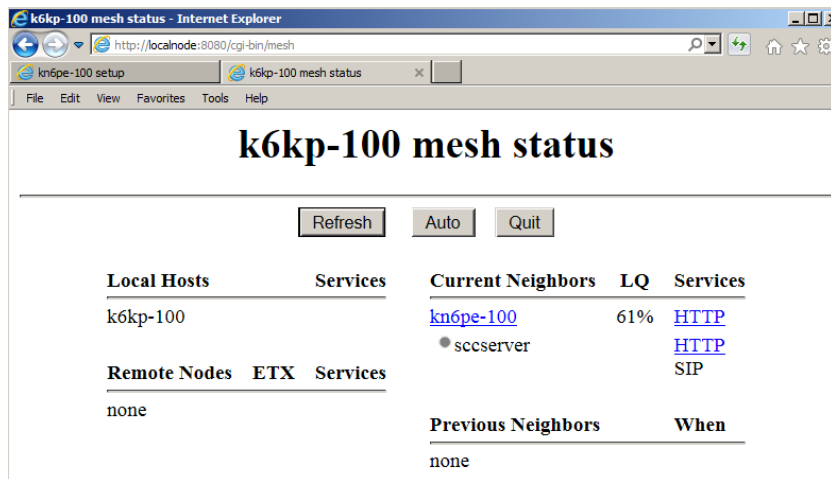
4.3 On the SCC Website

1. For direct access to the website, do the following:

    a. Disable your PC's WiFi *(REQUIRED)*.

    b. Open your browser, and enter http://sccserver in your browser's URL field.

    c. For SCC mesh, the site may contain any of the following information:

        i. Mesh-related downloads

        ii. Network phone book – names and extensions of VoIP phones currently deployed.

        iii. Links to webcams – these can also be found by querying the mesh network as described above.

        iv. Information about file shares – Your network may support the ability to map in a network file share.

        v. Information about an FTP server – Your network may support the ability to upload and download files from your FTP client.

        vi. Other information as dictated by your particular deployment.

    d. Spend some time familiarizing yourself with the website so you fully understand what information and capabilities are available.

4.4 Troubleshooting

Problem	Try this
Cannot connect to the website	1. Turn off your PC's WiFi and other interfaces if they are on. 2. Disconnect from any external networks if connected. 3. Enter in the full URL string including the http:// portion of the address (i.e.: http://sccserver or http://10.29.34.5). 4. Contact the network administrator and confirm the web services are up and running.