serval
uniting the world through communication

Serval User Manual

Release Version: Serval-0.05

15 August 2011

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1   Release Information

'Serval-0.05' is a prototype release intended for the open source development community to test and provide feedback.

This release contains the following functionality:

- The ability to participate in an adhoc mesh (when the phone is rooted)
- The ability to connect to an access point
- The ability to manually set the Wi-Fi connectivity mode
- Initiating and receiving phone calls on the mesh
- Initiating and receiving phone calls on an access point

2   Installing Serval

2.1   Requirements

- Huawei U8150 IDEOS phone (or similar Android phone)
- Wireless network access point

2.2   Phone Configuration

Step 1	Navigate to:	`Menu → Settings → Wireless & Networks`
Step 2	Check:	`WiFi` is selected
Step 3	Navigate to:	`WiFi Settings`
Step 4	Navigate to:	`Menu → Settings → Applications`
Step 5	Check:	`Unknown Sources` is selected
Step 6	Navigate to:	`Menu → Settings → Applications → Development`
Step 7	Check:	`USB debugging` is selected

2.3   Super User Access (Root)

WARNING: Rooting the phone will void the manufacturer warranty. This step is **optional**. Rooting the phone will allow for adhoc mesh network capability and is required for full functionality of the software. By choosing not to root the phone, the software will still be able to provide free calls to phones that are connected to the same Access Point.

Step 1	Connect to a network
Step 2	In a web browser, go to URL http://developer.servalproject.org/files
Step 3	Select: `z4root.1.3.0.apk`
	z4root will download
Step 4	Launch z4root
Step 5	Select: `Permanent root`

The phone will reboot after a short wait and is now ready for use.

2.4   Serval BatPhone Installation

Step 1	In a web browser, go to URL http://developer.servalproject.org/files
Step 2	Select: `Serval-0.05.apk`

The installer will download

Step 3   Launch the installer. An installation screen will appear

Step 4   Select: `Install`

The application will install and a prompt will appear to open it. The following steps will need to be performed on the first use of the application.

Step 5   Select: `Open`

If the phone is rooted, a screen regarding super user access will appear.

Step 6   Select: `Allow`

When the BatPhone application is ready, a sound file will be played.

3   Starting and Stopping the Serval Service

From the applications screen, select the Serval icon to start the software.

Figure 1 - Serval Icon

If this is the first time using the Serval application, the software will take you through a configuration wizard (see section 4).

If a phone number has been configured then the main screen will be displayed as shown in **Error! Reference source not found.**.

Figure 2 - Main Screen

Selecting `SUSPEND` on the main Serval screen will stop the Serval services allowing your phone to work as normal. A `PLEASE WAIT...(Stopping)` indicator will appear and when complete, the button will toggle to `START`.

When the services are stopped, the Serval application will still be running in the background. When accessing the main Serval screen again, the services may be restarted by selecting `START`.

4 Configuring Your Phone Number

The configuration wizard is accessed in two ways. It will automatically be called upon first use of the software until a phone number has been set. It will also be activated when the RESET button on the main Serval screen is pressed.

As this is a prototype release, a disclaimer screen "Here Be Dragons" will appear as shown in Figure 3 - Disclaimer Screen. Select I AGREE to continue or CANCEL to exit the application.

Figure 3 - Disclaimer Screen

Once the terms are agreed to, a configuration wizard will appear to setup your phone number for use on the Serval Mesh, as shown in Figure 4 - Welcome Screen. Select the SETUP WIZARD button to proceed.
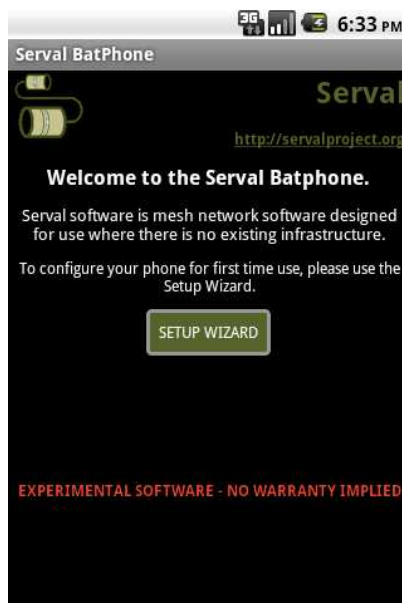

Figure 4 - Welcome Screen

A screen will appear containing the setup instructions as shown in Figure 5 - Setup Instructions. Select OK to continue.
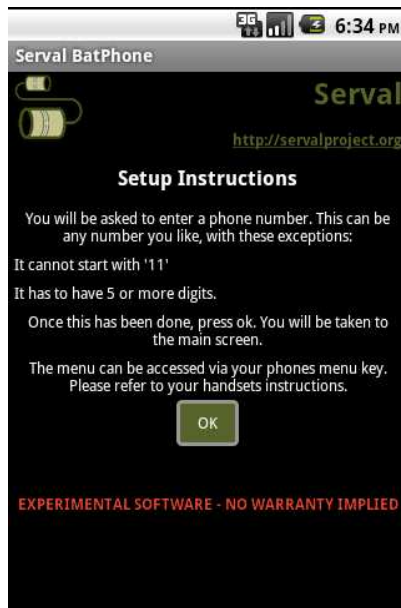
Figure 5 - Setup Instructions

The phone number entry screen will appear as shown in Figure 6 - Phone Number Entry.
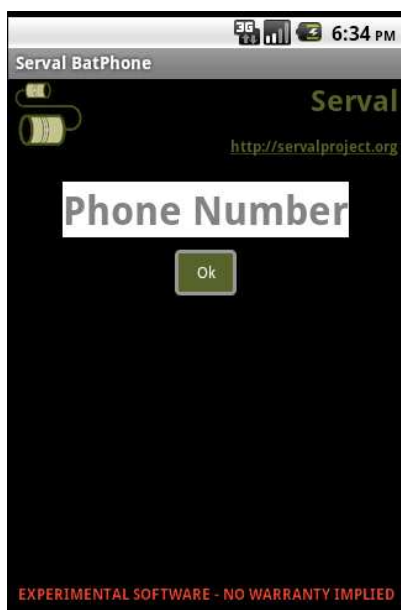

Figure 6 - Phone Number Entry

Select the Phone Number field to enter the number you wish to be contacted at when on the mesh. Usually this will be the same as the number issued to you by your telecommunications provider however you may set it to something different.

The following characters are allowed:

- digits between 0 and 9

- + symbol

- * symbol

- # symbol

The number must be a minimum of 5 and a maximum of 32 digits.

The number cannot start with the digits '11' as this range is reserved for emergency numbers.

Once the number has been entered, select OK to continue. If the rules above are not followed, an error message will appear. An example error is shown in Figure 7 - Phone Number Error Message.
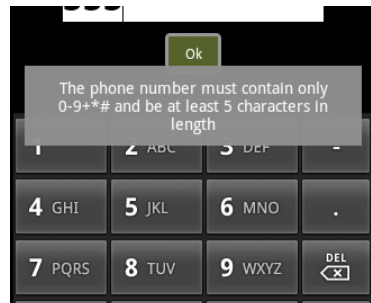

Figure 7 - Phone Number Error Message

If the number is accepted, the main Serval screen will appear.

5   Making a Phone Call

From the main Serval screen, as shown in Figure 8 - , select the MAKE A CALL button. A dialler will appear as shown in Figure 8 - Dialler.
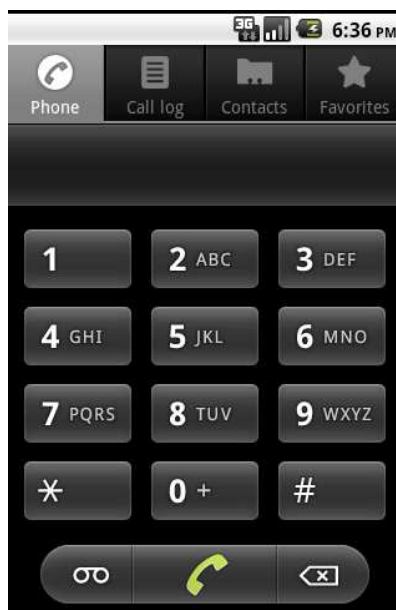

Figure 8 - Dialler

When making a call with the Serval services enabled, a pop-up will appear offering options to make a Mesh Call (on the mesh) or Phone Call (using your standard provider). Select one of these to continue.

6 Serval Sub-Menus

The Serval sub-menus can be accessed from the Serval main screen by selecting the Android menu button (consult your phone's user manual for the location of this button). The menu options will appear on the lower portion of the screen, as shown in Figure 9 - Sub-Menus.
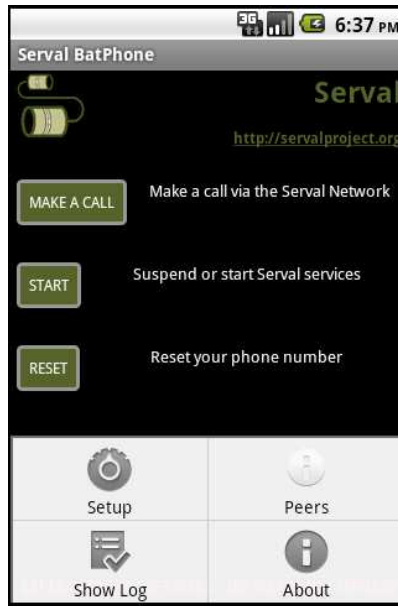

Figure 9 - Sub-Menus

6.1 Setup Menu Option

Selecting SETUP will provide a screen with further options, as shown in Figure 10 - Setup Options.
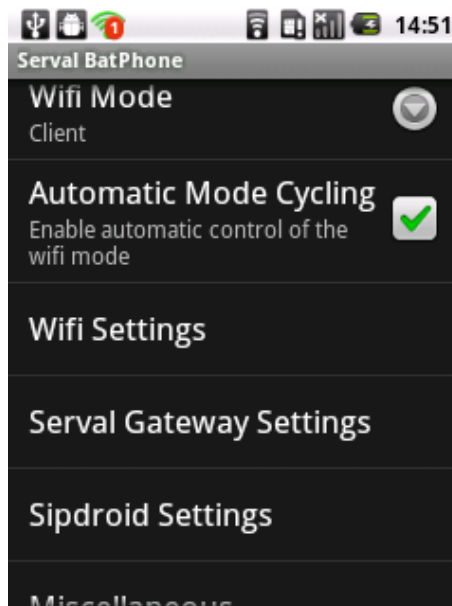

Figure 10 - Setup Options

6.1.1   Wifi Mode

The Wifi Mode drop-down list contains four options:

- `Adhoc` will enable you to participate in a mesh network. This option will only be available if you have super-user privileges on the phone.

- `Client` will enable you to connect to an access point.

- `Access Point` will enable other phones in Client mode to connect to your phone.

- `Off` will disable wifi on the phone.

If Automatic Mode Cycling is enabled (see 6.1.2) then this mode will be changed to the next mode in the list if there is no peer connection. If a peer is connected then the phone will remain in the selected wifi mode.

6.1.2   Automatic Mode Cycling

When enabled, the Automatic Mode Cycling option will change between the four wifi modes approximately every 30 seconds until a peer is detected. When the peer connection is lost, the cycling will resume.

When cycling is disabled, the phone will remain in the mode as selected through the WiFi Mode drop-down list (see section 6.1.1).

6.1.3   Wifi Settings

Modifying the Wifi Settings will enable you to troubleshoot problems with the wifi or to connect to an existing mesh network that is not using the default settings.

- `Device Chipset`. The detected chipset name will be displayed underneath this option. If this is blank, then the drop-down menu contains other chipset options that can be tried to see if they are compatible with your phone.

- `Change SSID`. This is the mesh network name. All devices participating in a mesh need to have the same SSID. To create a new mesh, all peers wishing to join the new mesh will need to change the SSID to the same value.

- `Change Channel`. The channel is the frequency that the mesh is operating on. As with the SSID, changing the channel will prevent communication with devices operating on another channel.

- `Routing Implementation`. The default routing protocol for Serval is B.A.T.M.A.N. however OLSR is also available as an alternative. Devices can only communicate with other devices using the same routing implementation.

- Network Address. This is your phone's identifier on the specified subnet. The subnet is indicated by the first number in the sequence and the suffix. The default addresses start with '10' and finish with '/8', for example '10.177.81.164/8'. The only situations where this would need to be changed are if the same number is allocated to multiple devices on the mesh (this is highly unlikely) or if you wish to create a new mesh on a different subnet. If a new subnet is created then all devices wishing to participate will need to change to be consistent.

6.2   Serval Gateway Settings

A gateway is a point in the mesh that connects to non-mesh communication infrastructure. Your phone can be configured to act as a gateway for other users on the mesh by connecting them to the outside world.

WARNING: By providing this service, other users will be sending data via your account. This may incur a cost to you from your provider.

- `Enable Gateway`. When ticked, this will set your phone as a gateway using the data provided in the other three options. If these have not been configured then an error will be displayed.

- `Server Name`. This is the name of the server as defined by your provider.

- `User Name`. This is your user name for your service.

- `Password`. This is your password for your service.

6.2.1 Sipdroid Settings

The Serval software makes use of the open source Sipdroid which is a SIP/VoIP client for Android. All options provided are a part of Sipdroid and can be referred to at http://sipdroid.org.

6.2.2 Miscellaneous

- `Run Mesh While Asleep`. This option will allow you to receive mesh calls while the phone is asleep. This will run the battery down faster.

- `Instrumentation Mode`. This option will allow you to publicly broadcast your usage data over the mesh. This option is used for development and research purposes and should only be enabled if requested by Serval.

- `Record Instrumentation`. This option will record to your phone the usage data from other devices on the mesh. This option is used for development and research purposes and should only be enabled if requested by Serval.

- `Enable Access Point`. This is used for Serval software installation on other phones. When selected, this option will set the phone up as an access point for other phones to be able to connect to and download the Serval software.

6.3 Peers Menu Option

The peer list will show all other users on the mesh with the following information:

`phone number (signal quality) time in milliseconds`

- The signal quality is a number between 0 and 255 with higher numbers indicating a more robust connection. The quality is influenced by the number of packets lost.

- The time is how long it takes for that peer to respond to a poll on the connection.

Example:

123456 (255) 7ms

223344 (218) 23ms

6.4 Show Log Menu Option

The log shows important checkpoints in the startup and configuration of the Serval software.

6.5 About Menu Option

The About menu displays information relating to the software and the Serval Project.