WaveOS™ Development Guide

Release 0.6.0a

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CONTENTS

Wave® Smart Home Hotspot™ - HSPA+/LTE/5G/StarLink

RELEASE NOTES AND NOTICES

This section provides information about what is new or changed, including urgent issues, Software & documentation updates, maintenance and new releases.

- 'Updates' are the term used to describe significant changes to our public source code. These technical documents are now contained within our public source code.

1.1 Version 0.6.0

- Jumped from 0.1.x to 0.6.x

- This document wasn't updated with the softwares development, instead the blog was document the manual build proceedure.

- The blog was used to show progress and create a quick point of reference for troubleshooting.

- The methodology for development is now more clear to the development team now, so the supporting documentation revision process can be adheared to.

- Moving forward this document will be easier to maitain than a blog, because there now exists a pattern in the configuration and build process.

- This document will now contain all the main configuration files and installation proceedure of the applications and interfaces.

1.1.1 Older Versions

See below a table containing earlier version of this document:

Table 1: Table 1.0 - Older Versions of this Document

archive date	version	description	download link
2019-02-11	0.1.0	also known as 0.0.1	2019-02-11_wave-software-developers_guide_v0.1.1

1.1.2 Version 0.1.0

- Incorrect usage of version control - says 0.0.1 not 0.1.0

- Firt draft only, contained no useful guides for developers, since the development and manual build process was still uncertain.

1.2 Known and Corrected Issues

Below is a table of pending issues which have been reported to our team. These issues will be cleared from this list as and when they are remedied.

Table 2: Table 1.1 - Known Issues

date	version	subject	description
01-11-2018	0.0.1	N/A	no doubt many issues to report - first draft only

Comments - none

1.3 Recently Updated Topics

Nothing significant to report

INTRODUCTION

Welcome to the WaveOS™ developers guide. WaveOS™ is a free and open-source software. The purpose of WaveOS™ is to make Internet and IPTV access Free. This document guides you through maintaining and developing the operating system and its applications.

For more information visit https://makeitwave.com

MANUAL BUILD PROCESS

3.1 Introduction

WaveOS (Version 0.6.x - branch a) is based on the Raspbian Stretch Lite OS. This will be the base OS for our Smart Home Hotspot. The recommended hardware is a Raspberry Pi 3B+ (Armv7+ Processor) with a 16GB+ MicroSD Card. By connecting a HSPA+/4G Cellular/Wi-Fi Dongle to your Raspberry Pi (and either installing WaveOS V0.6.x (branch a) or following these manual build guides), you will have successfully produced a Wave Smart Home Hotspot.

This segment explains how to install Raspbian Stretch Lite. One of the first steps in manually building WaveOS (Version 0.6.x - branch a).

3.2 Step 1: Preperation

1. Download the latest version of Raspbian Stretch Lite from [Raspberrypi.org](https://www.raspberrypi.org/downloads/raspbian/).

2. Copy the latest copy of Raspbian Stretch Lite to the MicroSD Card using a program like [Etcher](https://www.balena.io/etcher) or [Win32 Disk Imager](https://sourceforge.net/projects/win32diskimager).

3. Insert the MicroSD Card into your Raspberry Pi and connect the keyboard. Then connect the Pi to a display via HDMI (making sure the display is turned on) then apply the power cord/ power to the Pi.

There's a strong likelyhood you'll need heatsinks on your Raspberry Pi because it will be overclocked and running at maximum capacity a lot of the time. You'll also need to make sure the power supply is correct e.g. 5 Volt and 2.5Amp. The quality of the MicroSD Card and the Power (and HDMI) cord will also make a difference.

3.3 Step 2: Wi-Fi, SSH & Update/Upgrade

1. Once the Pi has booted up, login with the default username and password :

```
Username:  pi
Password:  raspberry
```

2. Then enter setup in order to enable SSH and connect to another Wireless Hotspot e.g. your Cellular dongle Hotspot :

```
sudo raspi-config
```

3. Via your connected display (or a remote SSH terminal client over Wi-Fi e.g. [Putty](https://www.putty.org/)) you must update and upgrade the OS :

```
sudo apt-get update && sudo apt-get upgrade -y sudo rpi-update
```

4. Reboot the system :

```
sudo shutdown -r now
```

3.4 Step 3: Cellular to Wi-Fi

This segment explains how to obtain internet access from the cellular dongle over USB and then enable a Wireless Access Point using the Raspberry Pi's onboard Wi-Fi. Before proceeding with the steps below, the device should already be connected to the internet via Ethernet or using the onboard Wi-Fi to connect to another Wireless Hotspot.

3.4.1 1st - Cellar over USB

1. Install the software with these commands :

```
sudo apt-get update

sudo apt-get install ppp usb-modeswitch wvdial
```

2. Poweroff the system with the following command :

```
sudo poweroff
```

3. Once the system has powered off, Connect the cellular dongle via USB then reboot.

3.4.2 2nd - Wi-Fi Access Point

For the Wireless Access Point we will be using [RaspAP](https://github.com/billz/raspap-webgui). This application is ideal, since it features a user interface so the end-user can change the Access Point Name and Password. And the best thing is, RaspAP is now a one-line installation now.

```
wget -q https://git.io/voEUQ -O /tmp/raspap && bash /tmp/raspap
```

To see the default SSID and password, please refer to the GitHub page above. Then access the UI (http://10.3.141.1/ - username/password = admin, secret) and set the Wave SSID and password.

```
#SSID: Wave-Hotspot

#Password:  makeitwave2020!!
```

The system should now be receiving internet from the USB and broadcasting it as a Wireless Hotspot Access Point.

3.5 Step 4: Emulation Station

This segment explains how to install the Emulation Station Gaming System.

3.5.1 1st - Set the minimum amount of RAM to the GPU

```
sudo nano /boot/config.txt

# add or replace "gpu_mem = 32"

# if you skip this step, you will probably get "out of memory" errors
when compiling # Reboot to apply GPU RAM changes
```

3.5.2 2nd - Install Dependencies

```
sudo apt-get install -y libboost-system-dev libboost-filesystem-dev
libboost-date-time-dev libboost-locale-dev libfreeimage-dev
libfreetype6-dev libeigen3-dev libcurl4-openssl-dev libasound2-dev
cmake libsdl2-dev
```

3.5.3 3rd - Compile and Install

```
git clone https://github.com/Aloshi/EmulationStation

cd EmulationStation

mkdir build

cd build

# On the RPi 2, you may need to add "-DFREETYPE_INCLUDE_DIRS=/
usr/include/freetype2/".

# See issue #384 on GitHub for details.

cmake ..

# you can add -j2 here to use 2 threads for compiling in
parallel (depending on how many cores/how much memory your
RPi has)

make -j2
```

```
#If you want to install emulationstation to /usr/local/bin/
emulationstation, which will let you just type 'emulationstation' to
run it, you can do:
```

```
sudo make install
```

NOTE: This will conflict with RetroPie, which installs a bash script to /usr/bin/emulationstation. Otherwise, you can run the binary from the root of the EmulationStation folder:

```
../emulationstation
```

3.5.4 4th - Reset GPU RAM and Reboot

```
sudo nano /boot/config.txt
```

```
# change/add "gpu_mem = 32" to "gpu_mem = 128" or "gpu_mem = 256",
depending on your Pi model
```

```
sudo reboot
```

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	Founder & CEO	Make it Wave Ltd, British Corporation (England & Wales), Company Director ID 11363386
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