Maker Session: Wi-Fi Performance Testing with Odroid Jerry R. Olla **Technical Engineer** Ekahau CONFEREN 🥑 @jolla

What Is The Goal?

Provide Wi-Fi professionals with better tools to measure network performance. Rather than...



Why Test Network Performance?

- Establish a baseline
- Assist in troubleshooting
- Test consistency
- Measure network throughput



Why Odroid?

Odroid-C2

- 1.5GHz 64-bit quad-core single board computer (SBC)
- Gigabit Ethernet
- eMMC Flash Storage boots in about 20 seconds
- Low power consumption around 1 amp
- Very versatile
- NO 2.4GHz only Wi-Fi!

Linux Performance Testing Tools



 The following tools have been installed and configured to run automatically on boot in the WLAN_PRO Odroid image

Application	Version	Running on boot?	Port
iperf3	3.1.6	Yes	5202
iperf2	2.0.9	Yes	5001
Ruckus zap	1.83	Yes	
<u>Ekahau eperf</u>	3.x	Yes	5201
OpenSpeedTest.com		Yes	80

Client Applications

• We'll be using the following applications to perform the exercises

Applications	Version	macOS	Windows	Android	iOS
iperf3	3.1.6	Х	Х		
iperf2	2.0.9	Х	Х		
zap	1.83	Х	Х		
Ekahau Site Survey	8.6.2		Х		
WiFiPerf (demo)	1.9	Х		Х	Х
Ruckus SpeedFlex	2.0.7			Х	Х
H/E Network Tools (iperf2/3)	1.5.0.289			Х	Х
Aruba Utilities (iperf2)				Х	

Windows/Mac Clients

Skip this step if you have successfully installed the iperf/zap clients using the emailed instructions

- Files are located on WLPC drive:
 - WLPC >

- Throughput Maker Session > Clients for Odroid excercises
- Copy the appropriate clients to your HD
 - Windows & Mac
 - Iperf2
 - Iperf3
 - zap

	Clients for O	droid exce	ercises
	n 😁 🔸	•	
Name		^	Date Modifie
🕨 🚞 An	droid		Feb 18, 201
🕨 📄 Ap	ple iOS		Feb 18, 201
🔻 📄 ipe	erf2		Feb 18, 201
Image: A start and a start	iperf-2.0.8-Wi	indows	Feb 18, 201
Image: A start and a start	iperf-2.0.9-ma	acOS	Feb 18, 201
@	iPerf2 use m	entation	Feb 15, 201
🔻 📄 ipe	erf3		Feb 18, 201
▶ 🚞	iperf-3.1.3-Wi	ndows	Feb 18, 201
🔹 🕨 🚞	iperf-3.1.6-ma	COS	Feb 18, 201
@	iPerf3 usem	entation	Feb 15, 201
E Lo	ading ipeo Ma	acintosh	Feb 15, 201
Sp	eedFlex.exe		Dec 4, 201
🔻 📄 zaj	p		Feb 18, 201
W	Zap_Quicksta	rt.doc	Jul 31, 200
🕨 🕨 🚞	zap-1.83-Win	dows	Feb 18, 201
Image: A start and a start	zap-1.83.18-m	nacOS	Feb 18, 201

Install Mobile Clients

- Files are located on WLPC drive:
 - WLPC >

Throughput Maker Session >

Clients for Odroid excercises

- Install appropriate clients on your mobile device
 - Android Play Store
 - Aruba Utilities
 - HE.NET Network Tools
 - Apple iOS App Store
 - HE.NET Network Tools



Powering On/Off

Powering on

- Once connected the KORAL Battery, the Odroid should power on automatically
- Alternatively, the Odroid can be powered with any 5v/2a USB power source

Powering off

 Using the KORAL battery pack – press the power button twice



Configure your MikroTik SSID's

- Pick a team lead to configure the MikroTik at your table
- Connect to your MikroTik preferably using wired Ethernet
- Open a web browser and navigate to 192.168.88.1
- Configure separate and unique SSID names for 2.4 and 5GHz
- Example:
 - 2.4 GHz SSID: not-so-awesome-2.4G
 - 5 GHz SSID: super-awesome-5G

•••) MikroTi	k - Quick Set at admine		
$\leftarrow \rightarrow \mathbf{G}$	D 192.	168.88.1		
here will be the two set and the two sets and				
I CAPSMAN				
2 Wireless				
Interfaces				
💦 Bridge				Wireless
🛫 Switch				
et PPP			2GHz	5GHz
°ta Mesh		Network Name	MikroTik-2.4	MikroTik-5G
IP	•			
Ø MPLS	•	Frequency	auto 🗘	(auto 🗘
😹 Routing	•	Band	2GHz-B/G/N ♠	5GHz-A/N/AC
💮 System	•			
Queues		Country	united states3 \$	
Files	-		0	
Log		USE ACCESS LIST (ACL)	U	



Connect Your Odroid

- 1. Connect your **Odroid** to the **MikroTik** using the **wired Ethernet ports 2-5**
 - Do NOT use Internet port
- 2. Power On the Odroid
- 3. The IP will display on the screen when the Odroid has finished booting

Connect Your Client Devices

- Connect your Laptop and/or mobile devices to either the 2.4 or 5GHz radios on your tables MikroTik.
- Notate the IP address each device obtained, we'll need these in the next steps

Login and Configure your Odroid

- SSH into the Odroid using an SSH client
 - Open Terminal (macOS) or Putty (Windows)

\$ ssh root@A.A.A.A

Default password = wlanpro

Change root password:

passwd

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jolla — root@WLAN_PRO: ~ — Jerrys-MacBook-Pro:~ jolla\$ ssh root@192.168.2.2



Retype new UNIX password: passwd: password updated successfully rootemLAN_PRO:~#

Prepare to run some tests

Open a new terminal (macOS) or command prompt (windows)

Skip the next step if you successfully installed the iperf/zap clients using the emailed instructions

- Change directory (cd) to the location of the previously copied client files
- \$ cd ~/Desktop/iperf2/iperf-2.0.9-macOS/

2/22/17

Lets do some performance testing!

	Description	Client Application	Client OS
Task 1	Basic performance test	iperf	Windows or Mac
Task 2	Network consistency test	zap	Windows or Mac
Task 3	Graph Network Performance	WiFiPerf	Mac
Task 4	Visualize Network Performance	Ekahau Site Survey	Windows
Task 5	Mobile performance test	zap	Android or iOS
Task 6	Mobile performance test	Aruba Utilities	Android
Task 7	Mobile performance test	Hurricane Electric	Android or iOS
Task 8	Remote performance test	zap	Any
Task 9	Web browser Speedtest (HTML5)	Web Browser	Any

Task 1 - Basic Performance Test

Use iPerf2 & iPerf3 to measure TCP & UDP network performance

- Execute an iPerf test
 \$ iperf -c A.A.A.A
- 2. Execute an iPerf3 test
 \$ iperf3 -c A.A.A.A -p 5202

-c specifies client mode
A.A.A.A = Odroid IP
-p specifies port

[Jerrys-MacBook-Pro:~ jolla\$ iperf -c 10.0.1.215

Client connecting to 10.0.1.215, TCP port 5001 TCP window size: 129 KByte (default)

[4] local 10.0.1.10 port 49811 connected with 10.0.1.215 port 5001
[ID] Interval Transfer Bandwidth
[4] 0.0-10.0 sec 241 MBytes 202 Mbits/sec
Jerrys-MacBook-Pro:~ jolla\$

Task 2 - Test Consistency

Use Ruckus Zap to measure the consistency of the network

1. Start zapd

Keep Zap daemon (zapd) running

- Open a separate terminal (macOS) or command prompt (windows)
- 3. Run a zap test
 - \$ zap -sA.A.A.A -dB.B.B.B

-s specifies source IP
A.A.A.A = Odroid IP
-d specifies destination IP
B.B.B.B = Your devices IP
*do not put a space after -s or -d

[Jerrys-MacBook-Pro:~ jolla\$ zapd & [1] 65230 Jerrys-MacBook-Pro:~ jolla\$ zapd version 1.83, Copyright (C) 2004-2009 Built Jan 7 2017 at 18:27:45 Zapd service started

[Jerrys-MacBook-Pro:~ jolla\$ zap -s10.0.1.10 -d10.0.1.215
zap version 1.83, Copyright (C) 2004-2009 Ruckus Wireless, Inc. All Rights Reserved.
Built Jan 7 2017 at 18:27:44
Engaging default options -p50000 -n1000 -l1472 -q0x0
0: 10.0.1.10->10.0.1.215 865=rx 0=dr 0=oo 0=rp 865=rx in 50.1ms 203.1

10.0.1.10->10.0.1.213	005=rX	0=ur	00=00	0=rp	002=rx 11	SQ.TW2	203.1mpps
10.0.1.10->10.0.1.215	1737=rx	0=dr	0=00	0=rp	872=rx in	50.6ms	203.1mbps
10.0.1.10->10.0.1.215	2637=rx	0=dr	0=00	0=rp	900=rx in	50.5ms	209.9mbps
10.0.1.10->10.0.1.215	3499=rx	0=dr	0=00	0=rp	862=rx in	50.2ms	202.4mbps
10.0.1.10->10.0.1.215	4381=rx	0=dr	0=00	0=rp	882=rx in	52.2ms	198.8mbps
10 0 1 10 . 10 0 1 315	E074	0 1	0 • • •	A	000	E0 0	200 Embra
	10.0.1.10->10.0.1.215 10.0.1.10->10.0.1.215 10.0.1.10->10.0.1.215 10.0.1.10->10.0.1.215 10.0.1.10->10.0.1.215	10.0.1.10->10.0.1.215 1737=rx 10.0.1.10->10.0.1.215 2637=rx 10.0.1.10->10.0.1.215 3499=rx 10.0.1.10->10.0.1.215 4381=rx 10.0.1.10->10.0.1.215 4381=rx	10.0.1.10->10.0.1.215 1737=rx 0=dr 10.0.1.10->10.0.1.215 1737=rx 0=dr 10.0.1.10->10.0.1.215 2637=rx 0=dr 10.0.1.10->10.0.1.215 3499=rx 0=dr 10.0.1.10->10.0.1.215 3491=rx 0=dr 10.0.1.10->10.0.1.215 4381=rx 0=dr	10.0.1.10->10.0.1.215 1737=rx 0=dr 0=oo 10.0.1.10->10.0.1.215 2637=rx 0=dr 0=oo 10.0.1.10->10.0.1.215 3499=rx 0=dr 0=oo 10.0.1.10->10.0.1.215 3499=rx 0=dr 0=oo 10.0.1.10->10.0.1.215 4381=rx 0=dr 0=oo	10.0.1.10->10.0.1.215 1737=rx 0=dr 0=oo 0=rp 10.0.1.10->10.0.1.215 2637=rx 0=dr 0=oo 0=rp 10.0.1.10->10.0.1.215 2637=rx 0=dr 0=oo 0=rp 10.0.1.10->10.0.1.215 3499=rx 0=dr 0=oo 0=rp 10.0.1.10->10.0.1.215 3499=rx 0=dr 0=oo 0=rp 10.0.1.10->10.0.1.215 4381=rx 0=dr 0=oo 0=rp	10.0.1.10->10.0.1.215 1737=rx 0=dr 0=oo 0=rp 872=rx in 10.0.1.10->10.0.1.215 2637=rx 0=dr 0=oo 0=rp 972=rx in 10.0.1.10->10.0.1.215 2637=rx 0=dr 0=oo 0=rp 900=rx in 10.0.1.10->10.0.1.215 3499=rx 0=dr 0=oo 0=rp 862=rx in 10.0.1.10->10.0.1.215 4381=rx 0=dr 0=oo 0=rp 882=rx in	10.0.1.10 >10.0.1.215 1737=rx 0=dr 0=oo 0=rp 872=rx in 50.6ms 10.0.1.10->10.0.1.215 2637=rx 0=dr 0=oo 0=rp 972=rx in 50.6ms 10.0.1.10->10.0.1.215 2637=rx 0=dr 0=oo 0=rp 900=rx in 50.5ms 10.0.1.10->10.0.1.215 3499=rx 0=dr 0=oo 0=rp 862=rx in 50.2ms 10.0.1.10->10.0.1.215 4381=rx 0=dr 0=oo 0=rp 882=rx in 52.2ms 10.0.1.10->10.0.1.215 4381=rx 0=dr 0=oo 0=rp 882=rx in 52.2ms

Task 3 - Network Performance Graph

Use WiFiPerf to measure and graph TCP & UDP network performance on macOS

- 1. Start WiFiPerf (macOS)
- 2. Configure WiFiPerf settings
 - Target Server Address: A.A.A.A
 - Server Port: 5202
- 3. Run Test

A.A.A = Odroid IP

• •						WiFiPerf			
Search Target	Servers				Cli	ent Ser	ver		
Target Server A	ddress:	10.0.1.217	Server Port:	5202		0	Mbps		
Length of Buffe	ers (KB):	8	Test Duration:	30	Data/BandWidth Fo	rmat: 🎽	Kbps Trans	sfer	Directio
Send Bandwidth	(Mbps):	1000	Stats Interval:	2	Graph Max Speed (M	bps): 10		Т	Fest Typ
T c		Server Addre	ess: 10.0.1.217 S	Send Band	width (Mbps): 1000	Test Du	uration: 30 s	ЭС	Tra
lest Informat	ion:	Server P	ort: 5202	Length o	f Buffers (KB): 8	Stats I	nterval: 2 sec		
Test Label	- T		LIDP Test From	This Con	aputer To 10.0.1.217		Interva		Transf.
UDP Test			001 1630, 11011	1113 001	iputer 10 10.0.1.2.17		0.00-3	10	1032
	×						28.00	3	67.77
UDP Test		i i					26.00	2	74.4
	×.	300		~		\wedge	24.00	2	67.03.
UDP Test							22.00-	2	71.84.
	*						20.00-	2	71.76.
UDP Test	~	(sd o					18.00-	2	58.2
	· • • •	¶W ² 2 ²					16.00-	1	61.00.
		p					14.00-	1	68.7
		bee					12.00-	1	70.73.
		0, 00					10.00-	1	67.50.
							8.00-1	0	70.3
		V					6.00-8	}	67.49.
		0					4.00-6		69.9
		0	10		20	3	2.00-4	·	70.4
			10	Test Dur	ation (30)		0.00-2		75.5

Task 4 - Visualize Network Performance

Ekahau Site Survey can be used to create heatmaps - visualizing network measurements of Jitter, Packet Loss, and Throughput

- Connect your internal Wi-Fi adapter to the SSID 1. you want to test
- Start Ekahau Site Survey (Windows version) 1.
- Configure internal adapter for Throughput 2.
 - Mode: iPerf3
 - Host: A.A.A.A
- Perform a Stop-and-Go Survey 3.
- or
- Open and analyze the sample throughput project: 1. Throughput-Project-Example.esx

Documents > 🔚 Ekahau Site Survey > 🔚 Projects > 🔚 Examples > 🦉 Throughput-Project-Example.esx

Disabled

Passive

Ping



Task 5 - Mobile Performance Test #1

Use **Ruckus SpeedFlex** to measure the network performance from an **Android** or **iOS** mobile device

1. Start SpeedFlex
 2. Configure SpeedFlex settings • Destination Address: A.A.A.A
3. Run Test
A.A.A.A = Odroid IP

Destination Addres	s	erizon २ ऽग	11:29 AM	- 7 ∦ 78%∎
192 · 168	· 0 · 132]		
Source Address				4 SEC
192 · 168	• 0 • 22			
Link			90	
Downlink	① Uplink	.0	01/1	140
Protocol		International Action	Ab per second	d Milling
ТСР	UDP			
Test Duration(sec)		0	$\mathbf{\Theta}$	
10			Ĩ	
	5	0 vnlink	① Uplink	
	0			

Task 6 - Mobile Performance Test #2

Use H/E Network Tools to perform an iperf2/3 measurement from Android or iOS

- 1. Start H/E Network Tools
- 2. Select iperf from the list of tools
- 3. Configure iPerf settings
 - Select: iperf2
 - iperf2 Server: A.A.A.A
 - Interval: 2
 - Bytes: 500M
- 4. Select field at top and click Go

*To use iperf3, select iperf3 and specify port **5202** Example: A.A.A.A -p 5202

-102 Verizon 🕏	11:57 AM		1 8 7	75% 💶 🕨									
	Iperf2 Iperf3			Û									
Tools				-102 Veri:	zon 🗟		1	1:59 AN	1		1	\$7	/4%
ARP / NDP							Iper	f2 Ipe	erf3				Û
Bonjour Browser		Bytes	500	Q 10.0).1.217								0
Dashboard		TCP	L	Interv	al 2					Byte	S	5001	м
Device Manager				IPv4	. If	V6				тс	P	U	DP
DNS													
Interface Informa	ition			10.0.1.:	217:500	1 (TCP)							
IP Calculator				48.5 0.0 - 2.	MByte 0 sec	e (203	8 Mbi	t/s)					
lperf				51.0 M 2.0 - 4.	MByte 0 sec	(214	Mbit	/s)					
MAC Browser		т		50.8 4.0 - 6.	MByte 0 sec	(213	Mbit	t/s)					
One Time Passw	ord			46.4 6.0 - 8.	MByte 0 sec	e (195	Mbit	t/s)					
Ping				45.6 8.0 - 10	MByte	e (191	Mbit	/s)					
Dia o ana				48.0	MByte	(201	Mbit	t/s)					
Ping Sweep				a	ΝĒ	e r	1	t v	1		i	0	p
Port Scan							1					-	1.5
SSL/TLS Informa	tion			а	s	d	f	g	h	j	k	2	T.
0 ~	0				z	x	с	v	b	n	m	1	()
					<u> </u>	Ë		Ľ		<u> </u>	_		
				122	æ	.0.		sna	-0				Go

Task 7 - Mobile Performance Test #3

Use Aruba Utilities to run an iPerf test from an Android device

- 1. Start Aruba Utilities (Android)
- 2. Select iPerf from the list
- 3. Configure iPerf settings -c A.A.A.A -i 2 -t 10

-c connect to an iPerf server at specified IP
-i sets the reporting interval time in seconds
-t time in seconds to run test for

4. Run



Task 8 - Remote test between 2 devices

Use Zap to remotely measure the network performance between two devices

- 1. Start Zapd or Ruckus SpeedFlex on any two devices Example: iPhone running SpeedFlex and Odroid running zapd
- Run a remote zap test from Windows or Mac \$ zap -sA.A.A.A -dB.B.B.B

-s specifies source IP
A.A.A.A = IP of Device 1
-d specifies destination IP
B.B.B.B = IP of Device 2

1:	10.0.1.10->10.0.1.215	1737=rx	0=dr	0=00	0=rp	872=rx in	50.6ms	203.1mbps
2:	10.0.1.10->10.0.1.215	2637=rx	0=dr	0=00	0=rp	900=rx in	50.5ms	209.9mbps
3:	10.0.1.10->10.0.1.215	3499=rx	0=dr	0=00	0=rp	862=rx in	50.2ms	202.4mbps
4:	10.0.1.10->10.0.1.215	4381=rx	0=dr	0=00	0=rp	882=rx in	52.2ms	198.8mbps
5:	10.0.1.10->10.0.1.215	5271=rx	0=dr	0=00	0=rp	890=rx in	50.0ms	209.5mbps
6:	10.0.1.10->10.0.1.215	6119=rx	0=dr	0=00	0=rp	848=rx in	50.2ms	198.9mbps
7:	10.0.1.10->10.0.1.215	6998=rx	0=dr	0=00	0=rp	879=rx in	50.0ms	207.0mbps
8:	10.0.1.10->10.0.1.215	7857=rx	0=dr	0=00	0=rp	859=rx in	50.2ms	201.5mbps
9:	10.0.1.10->10.0.1.215	8710=rx	0=dr	0=00	0=rp	853=rx in	50.0ms	200.9mbps
10:	10.0.1.10->10.0.1.215	9592=rx	0=dr	0=00	0=rp	882=rx in	50.0ms	207.7mbps

*do not put a space after -s or -d

Task 9 - Web browser Speedtest (HTML5)

Use **OpenSpeedTest** to test the throughput of the network

- 1. Open a web browser
- 2. Navigate to the IP address of Odroid
- 3. Click "Start Testing Speed"

*Test is performed locally, however an internet connection is required for OpenSpeedTest to work



What else can this Odroid box do?

Description	Client Application	Client
Turn your Odroid into a Wireless AP	SSH client	Windows or Mac
Analyze Live Wi-Fi Traffic with HORST	SSH client	Windows or Mac
Turn your Odroid into a remote WiFi sensor	WiFi Explorer Pro (beta)	Mac

Physical Buttons

- Button 1 = Toggle LCD Screen On/Off
- Button 2 = Toggle WiFi Explorer Pro Sensor
- Button 3 = Toggle Wireless AP / Hotspot
- Button 4 = Launch LXDE Desktop
- Button scripts located in:
- /boot/lcd_buttons/

Special thanks to Adrian Granados (@adriangrandos)

Turn your Odroid into a Wireless AP

- 1. Insert the USB Wi-Fi Adapter
- 2. Configure your AP
 - Locate and edit the AP config file: /boot/ap.txt
 - # nano /boot/ap.txt
 - Modify at least the following settings:
 - ssid=WLAN_PRO
 - wpa_passphrase=changeme
 - channel=36
- 3. Press button 3 to Start/Stop the AP



H.O.R.S.T

Highly Optimized Radio Scanning Tool

lightweight IEEE802.11 wireless LAN analyzer with a text interface http://br1.einfach.org/tech/horst/

By: Bruno Randolf

<u> https://twitter.com/spiralsun69</u>

horst

Note: "horst" has moved to GitHub: https://github.com/br101/horst! This information here is just kept for reference!

"horst" is a small, lightweight IEEE802.11 wireless LAN analyzer with a text interface. Its basic function is similar to tcpdump, Wireshark or Kismet, but it's much smaller and shows different, aggregated information which is not easily available from other tools. It is mainly targeted at debugging wireless LANs with a focus on ad-hoc (IBSS) mode in larger mesh networks. It can be useful to get a quick overview of what's going on on all wireless LAN channels and to identify problems.

- Shows signal (RSSI) values per station
- Calculates channel utilization ("usage") by adding up the amount of time the packets actually occupy the medium
- "Spectrum Analyzer" shows signal levels and usage per channel
- Graphical packet history, with signal, packet type and physical rate
- Shows all stations per ESSID and the live TSF per node as it is counting
- Detects IBSS "splits" (same ESSID but different BSSID this is a common driver problem)
- Statistics of packets/bytes per physical rate and per packet type
- Has some support for mesh protocols (OLSR and batman)
- · Can filter specific packet types, source addresses or BSSIDs
- Client/server support for monitoring on remote nodes

More info: https://github.com/br101/horst

HORST - Getting started

- 1. Power Cycle Odroid
- 2. Insert USB Odroid WiFi Module
- 3. SSH into Odroid

😑 🥚 🏫 jolla — root@WLAN_PRO: ~ —

Jerrys-MacBook-Pro:~ jolla\$ ssh root@192.168.2.2

4. Launch Horst

horst

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🖲 😑 🍵 👔 jolla — root@WLAN_PRO: ~ — ssh root@192.168.2.2 — 88×33							
Packet Statistics							
Packets: 3959				Retries: 65.6% (2597)			
Bytes: 855.5k (876054)				Total bit/sec: 336.1k (344240)			
Average: ~221 B/Pkt				Total Usage: 36.7% (366960)			
DATE	Dackata	Puttor	D/D	Dict-c9/	Dut-of	lleage	
			~D/ P			Usuge	,e
114	2513	571.1k	232	63.5	66.8	60.8	******
2M	468	107.4k	235	11.8	12.6	9.8	***
5M	24	4.0k	174	0.6	0.5	1.5	*
GM	148	32.5k	225	3.7	3.8	2.7	*
9M	11	1.8k	173	0.3	0.2	0.9	*
12M	107	17.1k	164	2.7	2.0	3.8	*
18 M	74	12.8k	177	1.9	1.5	2.1	*
24M	319	59.4k	190	8.1	6.9	14.1	****
36M	35	7.2k	211	0.9	0.8	0.5	*
54M	2	164	82	0.1	0.0	0.0	*
MCS2	7	1.4k	216	0.2	0.2	0.0	*
MCS3	48	7.3k	155	1.2	0.9	0.3	*
MCS4	136	22.0k	166	3.4	2.6	1.6	*
MCS5	6	486	81	0.2	0.1	0.0	*
MCS8	4	613	153	0.1	0.1	0.1	
MCS9	11	1.3K	129	0.3	0.2	0.1	*
MCSTO	40	8.3K	190	1.2	1.0	1.5	
TYPE	Packets	Rytes	$\sim R/P$	Pk+c%	Ryto%	llsaad	ĸ
DATA							
PROBRP	2402	544.6k	232	60.7	63.7	59.1	******
BEACON	672	156.9k	239	17.0	18.3	11.9	****

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WiFi Explorer Pro Remote Sensor

• Odroid:

- Press button #2 to enable and disable the wifiexplorer-sensor service
- SSH command line # service wifiexplorer-sensor start/stop

macOS Client:

- Start WiFi Explorer Pro (beta)
- Add Odroid as a Remote Sensor



Thank you!