

Presentation to prpl Virtualization & Security PEG

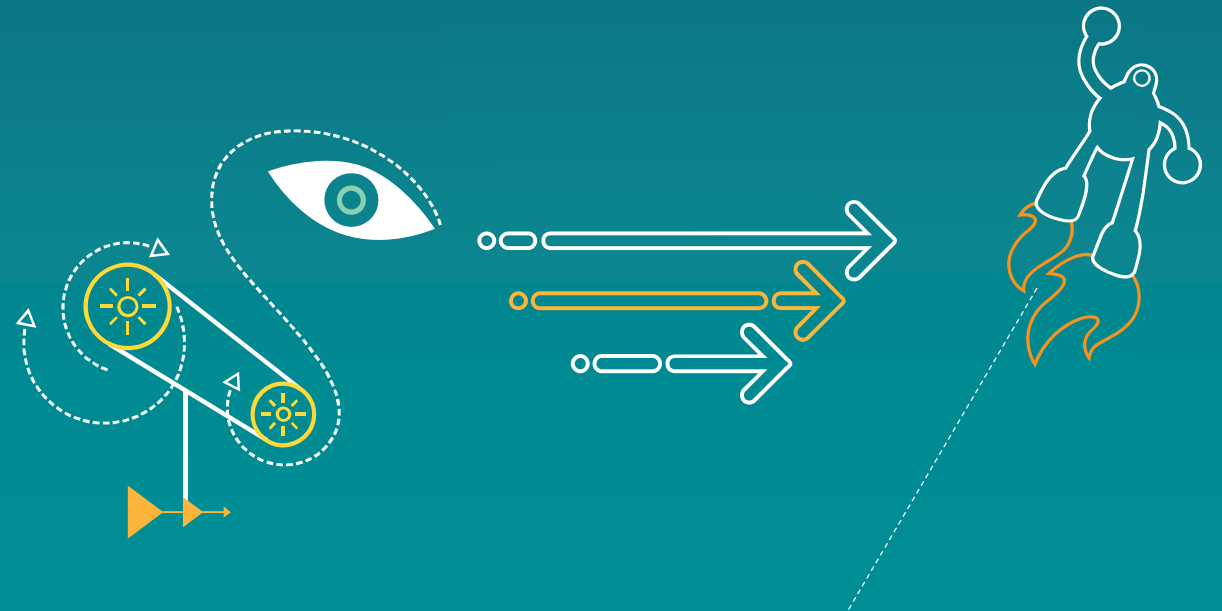
Qualcomm Atheros, Inc., June 2015

Kathy Giori

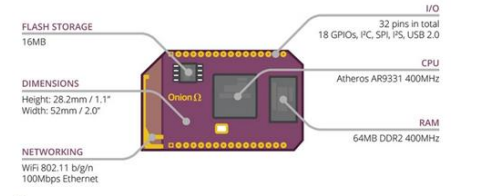
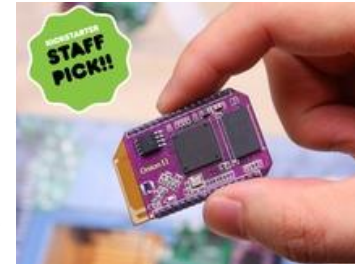
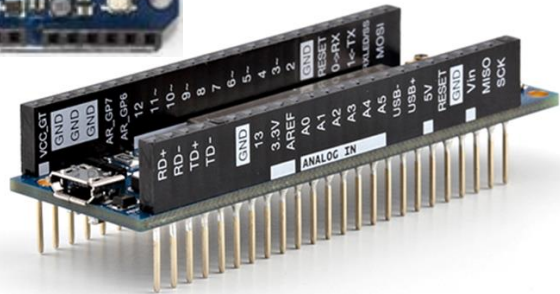
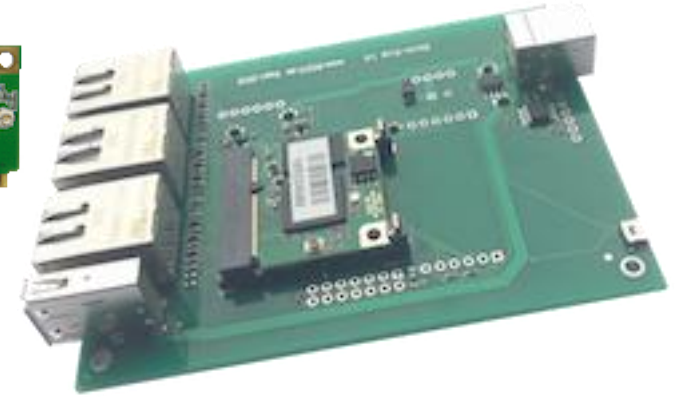
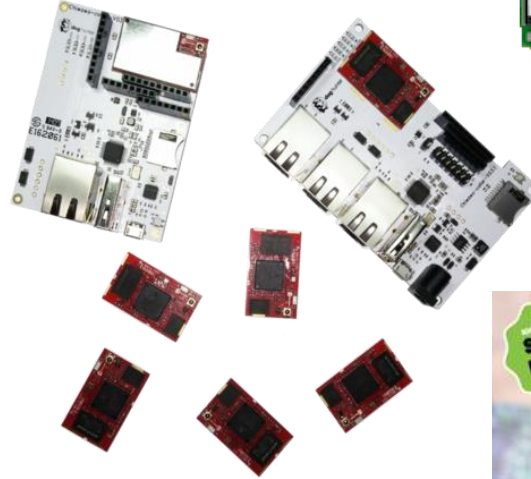
---

# OpenWrt – Driving Open Source Development

---



# ath9k/OpenWrt – IoE Products

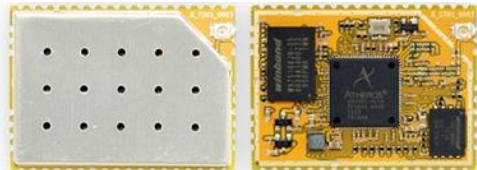


[o11s / open80211s](#)

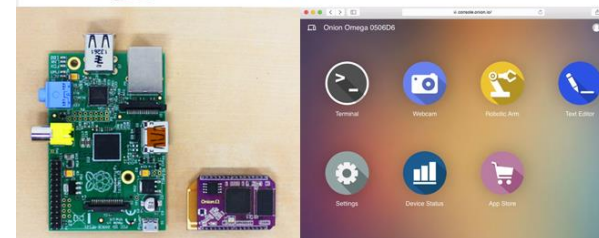
## Carambola 2 with mesh support in a nutshell

ashokrajnagarajan edited this page on Apr 25, 2014 · 11 revisions

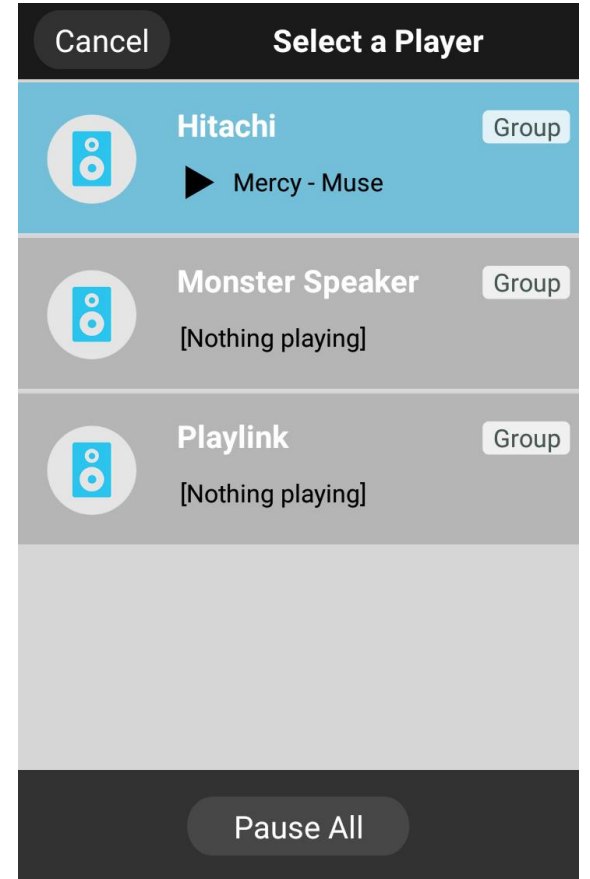
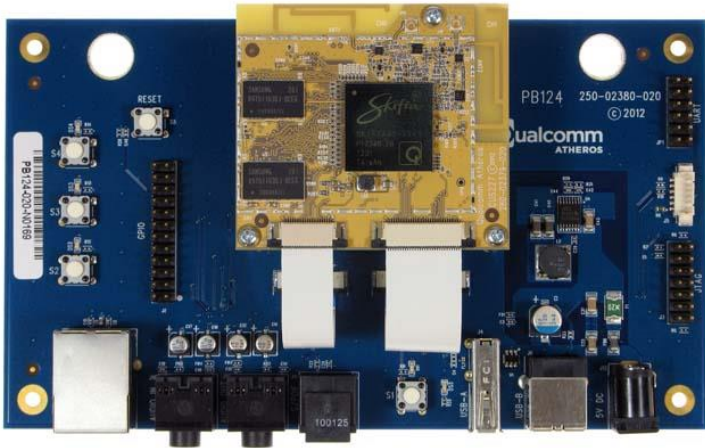
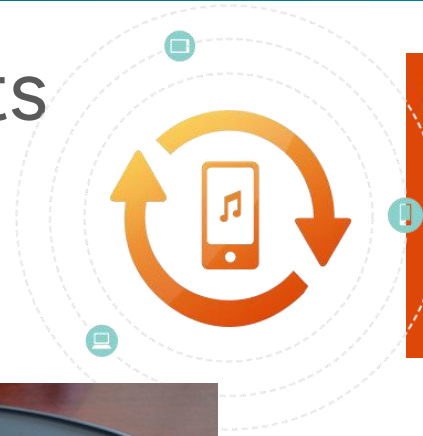
Carambola 2 development board comes with all necessary hardware create a 802.11s mesh network.



8devices Carambola 2 is a member of Carambola wireless modules family and is based on Qualcomm/Atheros AR9331 SoC.



# ath9k/OpenWrt – AllPlay Products



---

# Why Open Software in General?

## For security

- Innovation and fixing security vulnerabilities occurs slower in proprietary software
  - <http://cyber.law.harvard.edu/events/luncheon/2014/06/gettys>
  - “Binary blobs” used in these systems have the net effect of “freezing” software versions, often on many year old versions of system software. Even if update streams are available (which they seldom are), blobs may make it impossible to update to versions free of a vulnerability.
- “Heartbleed as Metaphor” by Jim Geer
  - <http://www.lawfareblog.com/2014/04/heartbleed-as-metaphor/>
  - “All of this brings us to the question of open versus closed source. While there are valid arguments all around, if one assumes that failures will happen, then open source is to be preferred insofar as in that case, (the collective) we can learn something from said failures. That being so, then the more one depends on XYZ the more one needs XYZ to be open source, along with the build environment through which it passes.”

---

# What is QSDK

- What is QSDK (QCA Software Development Kit)?
  - Linux tool box that contains a standard embedded Linux distribution (OpenWrt AA or later, with updated kernel and packages) with additional packages, and build and configuration scripts
  - Build scripts combine best-of-breed open source packages with QCA upstream (or proprietary) drivers, and value-add open or proprietary components
  - Full demonstration and evaluation platform for QCA reference hardware and chip sampling offerings
  - Reference implementation for value-add software integration
  - More standard/open software interfaces, less proprietary ones
- Net Takeway
  - QSDK = Built on top of strong open source community collaboration, it's a flexible way to build embedded systems software, make changes, and add features

---

# Why QSDK

- QSDK is the basis for QCA's platform approach
  - It provides a standard framework + a golden sample for QCA reference platforms
  - Allows partners to easily test and productize new QCA hardware and software: Hy-Fi, IoE, PLC, Ethernet, StreamBoost, AllJoyn, etc
- QSDK enables the “Smart” Router
  - Standard configuration tools, ability to install modules, writable file system, etc.
  - Easy to leverage open source modules, 3<sup>rd</sup> party modules, and create proprietary modules
- QSDK will save our partners time
  - Reduces porting work, reliance on proprietary tool chains, and the complexity around the partners build environment
- QSDK will ensure higher quality products
  - Leverage common, field-tested code for standard features

# QSDK: QCA's platform approach

## QSDK Profiles

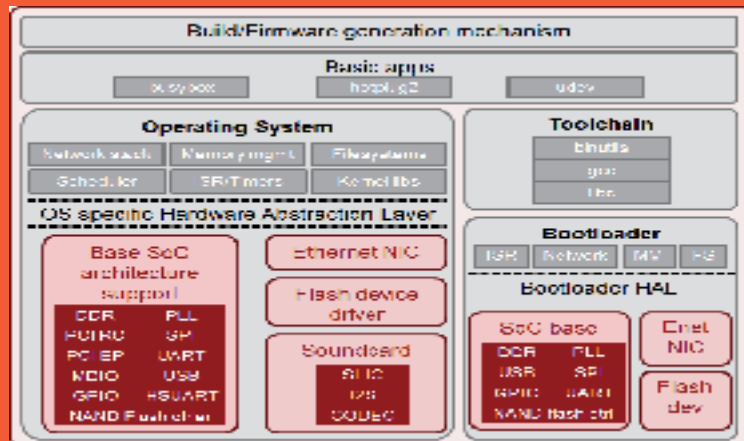
Coordination of integrated stack with value-add components

OpenWrt xx basic router stack

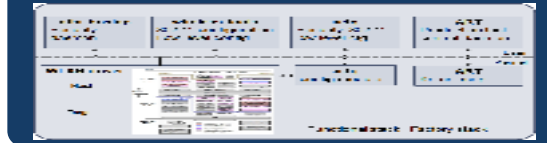
Configuration mechanism (GUI, scripts...)

Minimal board support release

SoC package



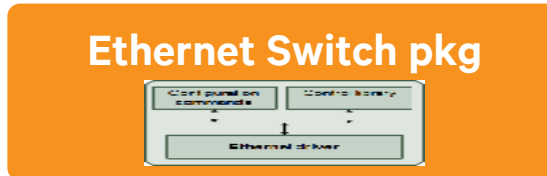
Wi-Fi pkg



PLC pkg



Ethernet Switch pkg



ebtables

dropbear

iptables

icmpv6proxy

igmpproxy

inadyn

iproute2

pptp

pppd

quagga

radvd

... lots more ...

AllJoyn

AllPlay

NSS

Streamboost

Streamboost UI

Synchrod

3<sup>rd</sup> Party

Dependent packages

... Other cool stuff

# Profile definition detail per component

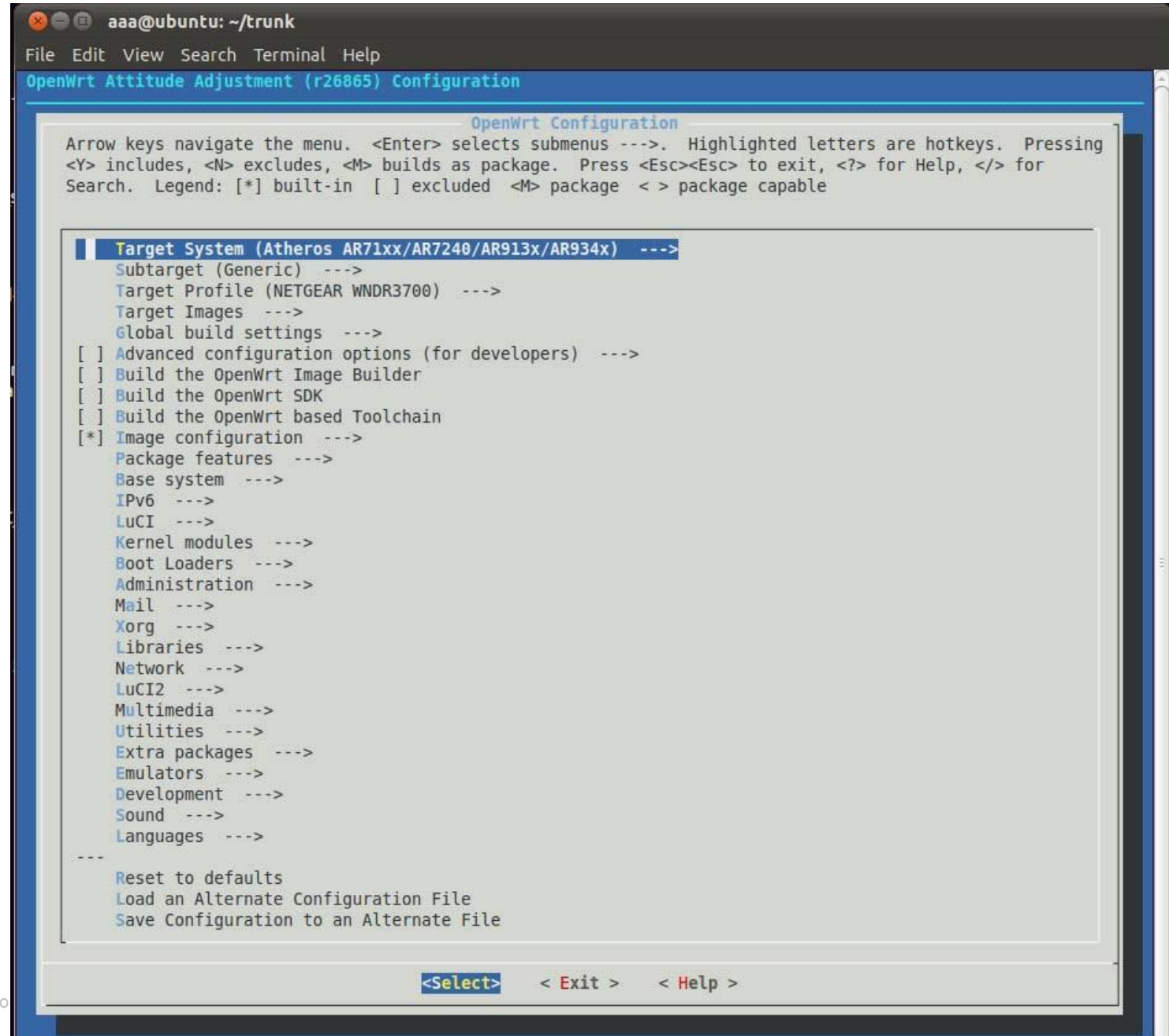
- QCA has defined certain profiles to address customer use cases
- Customers can maintain their own custom profiles

	A	B	D	G	I	J
1	SRC	PACKAGE	FEED	DESCRIPTION	ipq806x_open	ipq806x_prop
2	6rd	6rd	ipv6	Provides support for 6rd tunn	x	x
3	alljoyn	alljoyn-c	alljoyn	AllJoyn C binding. This provi	x	x
4		alljoyn		AllJoyn is a daemon and appl	x	x
5	alljoyn-config	alljoyn-about	alljoyn	AllJoyn About service library.	x	x
6		alljoyn-config		AllJoyn Config service library.	x	x
7	alljoyn-controlpanel	alljoyn-controlpanel	alljoyn	AllJoyn ControlPanel service	x	x
8	alljoyn-notification	alljoyn-notification	alljoyn	AllJoyn Notification service li	x	x
9	alljoyn-services_common	alljoyn-services_common	alljoyn	AllJoyn Services Common ser	x	x
10	arptables	arptables	utils	ARP firewalling software http	x	x
12	ath10k-firmware	ath10k-firmware	wlan_open	This package contains the ATH	x	
13	base-files	base-files	openwrt	This package contains a base	x	x
14	binutils	binutils	oldpackages	The Binutils package contains	x	x
15		objdump		objdump Felix Fietkau <nb	x	x
16	bluez	bluez	oldpackages	Bluez combined libs & utils (v	x	x
17	bridge-utils	bridge	oldpackages	Manage ethernet bridging: a	x	x
18	busybox	busybox	utils	The Swiss Army Knife of emb	x	x
19	bzip2	libbz2	oldpackages	bzip2 is a freely available, pat	x	x
20	dbus	dbus	oldpackages	Simple interprocess messag	x	x
21		libdbus		Simple interprocess messag	x	x
22	ddns-scripts	ddns-scripts	oldpackages	A highly configurable set of s	x	x
23	devmem2	devmem2	oldpackages	Simple program to read/write	x	x
24	dnsmasq	dnsmasq-dhcpv6	services	It is intended to provide coup	x	x
25	dropbear	dropbear	services	A small SSH2 server/client de	x	x
26	ds-lite	ds-lite	ipv6	Provides support for Dual-Sta	x	x
27	elfutils	libdw	oldpackages	ELF manipulation libraries (lik	x	x
28		libelf1		ELF manipulation libraries (lik	x	x
29	ethtool	ethtool	oldpackages	ethtool is a small utility for e	x	x
30	expat	libexpat	oldpackages	A fast, non-validating, stream	x	x
31	file	file	config	utility	x	x
32		libmagic		library	x	x
33	firewall	firewall	config	This package provides a confi	x	x
34	fstools	fstools	system	OpenWrt filesystem tools Joh	x	x
35	glib2	glib2	oldpackages	The GLib library of C routines	x	x
36	gmp	libgmp	oldpackages	GMP is a free library for arbit	x	x
37	hostapd	hostapd-utils	utils	This package contains a comm	x	
38		wpa-cli		WPA Supplicant command lin	x	
39		wpad		This package contains a full fe	x	
40		hostapd-common		hostapd/wpa_supplicant com	x	
41	iperf	iperf	utils	Iperf is a modern alternative	x	x
42	iproute2	tc	utils	Traffic control utility http://ir	x	x
43		ip		Routing control utility (Minim	x	x
44	iptables	iptables-mod-extra		Other extra iptables extensio	x	x
45		libxtables		IPv4/IPV6 firewall - shared xt	x	x
46		iptables-mod-ipopt		iptables extensions for match	x	x



# Profile customization

- Run 'make menuconfig' to further customize a QCA profile
- Then save your own profile(s) for later use on new platforms



The screenshot shows a terminal window titled 'aaa@ubuntu: ~/trunk' with a menu for 'OpenWrt Attitude Adjustment (r26865) Configuration'. The menu is titled 'OpenWrt Configuration' and includes instructions: 'Arrow keys navigate the menu. <Enter> selects submenus --->. Highlighted letters are hotkeys. Pressing <Y> includes, <N> excludes, <M> builds as package. Press <Esc><Esc> to exit, <?> for Help, </> for Search. Legend: [\*] built-in [ ] excluded <M> package <> package capable'. The menu items are: 'Target System (Atheros AR71xx/AR7240/AR913x/AR934x) --->', 'Subtarget (Generic) --->', 'Target Profile (NETGEAR WNDR3700) --->', 'Target Images --->', 'Global build settings --->', '[ ] Advanced configuration options (for developers) --->', '[ ] Build the OpenWrt Image Builder', '[ ] Build the OpenWrt SDK', '[ ] Build the OpenWrt based Toolchain', '[\*] Image configuration --->', 'Package features --->', 'Base system --->', 'IPv6 --->', 'LuCI --->', 'Kernel modules --->', 'Boot Loaders --->', 'Administration --->', 'Mail --->', 'Xorg --->', 'Libraries --->', 'Network --->', 'LuCI2 --->', 'Multimedia --->', 'Utilities --->', 'Extra packages --->', 'Emulators --->', 'Development --->', 'Sound --->', 'Languages --->', '---', 'Reset to defaults', 'Load an Alternate Configuration File', and 'Save Configuration to an Alternate File'. At the bottom, there are three buttons: '<Select>', '< Exit >', and '< Help >'. The 'Target System' option is highlighted with a blue bar.

---

# Thank you

Follow us on:  

For more information on Qualcomm Atheros, visit us at: [www.qca.qualcomm.com](http://www.qca.qualcomm.com)

All data and information contained in or disclosed by this document is confidential and proprietary information of Qualcomm Atheros, Inc. and all rights therein are expressly reserved. By accepting this material the recipient agrees that this material and the information contained therein is to be held in confidence and in trust and will not be used, copied, reproduced in whole or in part, nor its contents revealed in any manner to others without the express written permission of Qualcomm Atheros, Inc.

© 2013 Qualcomm Atheros, Inc. Qualcomm is a registered trademark of QUALCOMM Incorporated. Atheros is a registered trademark of Qualcomm Atheros, Inc. All other registered and unregistered trademarks are the property of QUALCOMM Incorporated, Qualcomm Atheros, Inc., or their respective owners and used with permission. Registered marks owned by QUALCOMM Incorporated and Qualcomm Atheros, Inc. are registered in the United States and may be registered in other countries.

Qualcomm VIVE, Qualcomm StreamBoost, Qualcomm Hy-Fi, Qualcomm AMP, Qualcomm IZat, Qualcomm Ethos, Qualcomm Skifta are products of Qualcomm Atheros, Inc.

Qualcomm Atheros, Inc., 1700 Technology Drive, San Jose, CA 95110

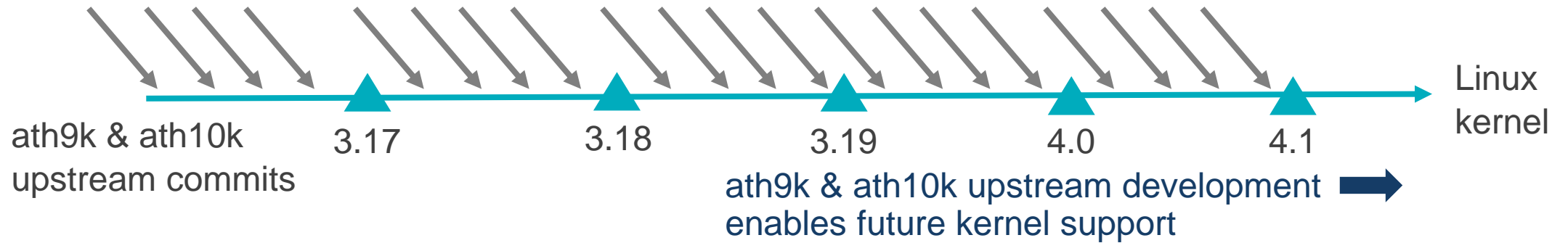
Qualcomm Confidential and Proprietary – shared  
with prpl Foundation Security PEG

QUALCOMM



# Linux Upstream Wi-Fi Portability is Automatic: fwd and back

Forward compatibility: **automatic**



Backward compatibility: **automatic**

