Realtek WiFi concurrent mode Introduction

Ver 1.0.1

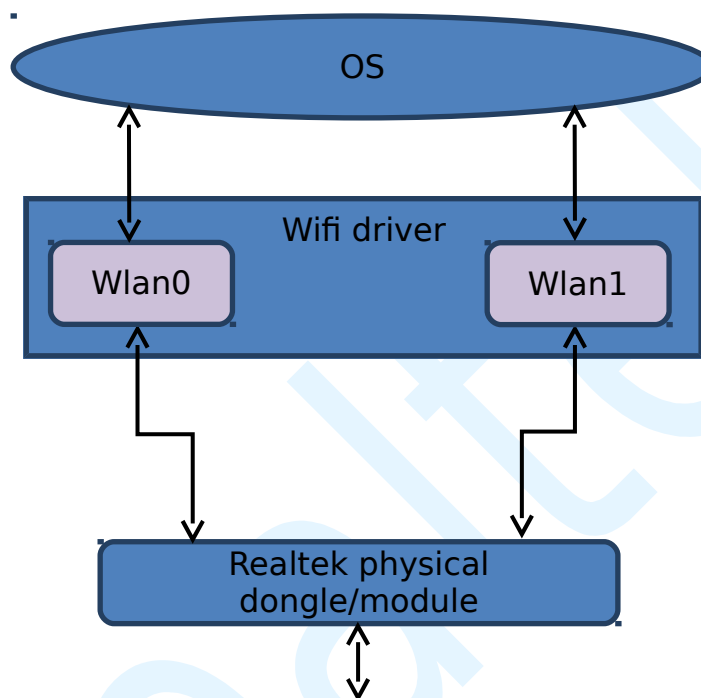**Contents**

Release History

1.0.1	2019/06/18	Add select P2P interface in concurrent mode
1.0.0	2016/11/29	Use Makefile to enable concurrent mode
0.9.0	2012/11/06	Aries Lee
0.1.0	2012/10/29	Aries Lee

WHAT'S CONCURRENT MODE

This feature registers 2 wireless network devices in OS (wlan0, wlan1) and those two interfaces share the same hardware device.

This feature allows performing 2 separate wireless tasks at the same time with single hardware device.

For example:

The system can perform station mode to connect with an AP router and access internet, at the same time, it also perform the p2p connection with another p2p device and get the resource of this p2p device.

Note: Realtek wifi only support 3 concurrent combination
1. **Station mode + Station mode**
2. **Station mode + AP mode**
3. **Station mode + P2P mode**

HOW TO ENABLE CONCURRENT

MODE

In Realtek wifi driver source code folder, edit Makefile to add
EXTRA_CFLAGS += -DCONFIG_CONCURRENT_MODE
to the target platform. After modification you have to rebuild the
driver and then reload it.

Use I386 as an example:

```
ifeq ($(CONFIG_PLATFORM_I386_PC), y)
EXTRA_CFLAGS += -DCONFIG_CONCURRENT_MODE
EXTRA_CFLAGS += -DCONFIG_LITTLE_ENDIAN
... ...
endif
```

You can verify if it works by typing "ifconfig –a" command, It is
supposed to show two wireless interfaces, and MAC address of
secondary interface is nearly the same except the bit1 of byte0
was assigned as 1.

```
[root@localhost rtl8192_8188CU_linux_v4.0.0_4932.20120822]# insmod ./8192cu.ko
[root@localhost rtl8192_8188CU_linux_v4.0.0_4932.20120822]# ifconfig -a
eth0      Link encap:Ethernet  HWaddr 90:E6:BA:36:06:58
          BROADCAST MULTICAST  MTU:1500  Metric:1
          RX packets:55 errors:0 dropped:0 overruns:0 frame:0
          TX packets:15 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:6429 (6.2 KiB)  TX bytes:1258 (1.2 KiB)
          Interrupt:43 Base address:0xc000

lo        Link encap:Local Loopback
          inet addr:127.0.0.1  Mask:255.0.0.0
          inet6 addr: ::1/128 Scope:Host
          UP LOOPBACK RUNNING  MTU:16436  Metric:1
          RX packets:12 errors:0 dropped:0 overruns:0 frame:0
          TX packets:12 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:720 (720.0 b)  TX bytes:720 (720.0 b)

wlan0     Link encap:Ethernet  HWaddr 00:1F:1F:D8:49:8A
          BROADCAST MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 b)  TX bytes:0 (0.0 b)

wlan1     Link encap:Ethernet  HWaddr 02:1F:1F:D8:49:8A
          BROADCAST MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 b)  TX bytes:0 (0.0 b)

[root@localhost rtl8192_8188CU_linux_v4.0.0_4932.20120822]# 
```

Base on the past experiences, we recommend our clients to verify whole system steps by steps – first check station mode, then check AP mode, finally station + AP mode (concurrent mode).

- Please reference "*wpa_cli_with_wpa_supplicant.pdf*" to understand how to run in station mode, "*Quick_Start_Guide_for_Station_Mode.pdf*" is also a good choice.
- Please reference "*Quick_Start_Guide_for_SoftAP.pdf*" to understand how to run in AP mode.

SELECT P2P INTRERFACE IN

CONCURRENT MODE

Method 1:

   If use driver version 5.8 or later and it supports "rtw_sel_p2p_iface" when insmod, you need to use this parameter to select p2p interface when driver define "CONFIG_CONCURRENT_MODE".

- Ex: #> insmod 8821cu.ko rtw_sel_p2p_iface=0
- (This example select interface 0 to be p2p interface, otherwise default use interface 1 to be p2p interface)

Method 2:

   If use driver version 5.11 or later, it supports modify "rtw_sel_p2p_iface" by Makefile. You need to add the "CONFIG_SEL_P2P_IFACE" to your platform dependent configuration section to select p2p interface when driver define "CONFIG_CONCURRENT_MODE".

- Ex:

```
ifeq ($(CONFIG_PLATFORM_RTK119X_AM), y)
EXTRA_CFLAGS += -DCONFIG_PLATFORM_RTK119X_AM
EXTRA_CFLAGS += -DCONFIG_LITTLE_ENDIAN
EXTRA_CFLAGS += -DCONFIG_TRAFFIC_PROTECT
EXTRA_CFLAGS += -DCONFIG_CONCURRENT_MODE -DCONFIG_FULL_CH_IN_P2P_HANDSHAKE
EXTRA_CFLAGS += -DCONFIG_SEL_P2P_IFACE=2
EXTRA_CFLAGS += -DCONFIG_IFACE_NUMBER=3
EXTRA_CFLAGS += -DCONFIG_IOCTL_CFG80211 -DRTW_USE_CFG80211_STA_EVENT

ifeq ($(CONFIG_USB_HCI), y)
EXTRA_CFLAGS += -DCONFIG_USE_USB_BUFFER_ALLOC_TX
endif
```

- (This example select interface 2 to be p2p interface, otherwise default use interface 1 to be p2p interface)
- Note: Method 1 has a higher priority than Method 2.

PORTING CONCURRENT MODE IN

ANDROID FRAMEWORK.

You can read the "readme.txt" in Realtek software SDK folder for more porting/testing information.
For example:
If the target system is Android JB, it will indicate you to follow the steps of "*Realtek_Wi-Fi_SDK_for_Android_JB.pdf*", you can easily accomplish the porting task.

Attention: The concurrent architecture starts at Android JB. For older version, you need to modify the Android framework by yourself.

Q&A

Q1: Why does the system still has only one interface after insmod the rebuilding module?
A: Please make sure you edit the correct autoconf.h and insmod the correct module, and also provide your autoconf.h and kernel message log to us.

Q2: Everything is fine when I only start hostapd, but when I start running a station mode in another interface in the same time, the hostapd will disconnect for a second then be

reconnected again, however ,the channel is differ from before setting. Is anything wrong?

A: Don't worry, it is fine! As I mention before, those two wireless interfaces actually share the same physical hardware device. **That means those 2 wireless interfaces must work under the same channel**. Our rule is AP/P2P interface should follow the channel of station interface, if both interface are running station mode, the connected APs MUST be the same channel.

Q3: How is the throughput in 2 wireless interfaces in concurrent mode?

A: Because there is only one physical hardware device, the two wireless interface (wlan0, wlan1) will share the transmit bandwidth, for example:

Assume the throughput limitation of current environment is 85Mb/s, then the throughput of wlan0 + the throughput of wlan1 is basically equal or smaller than 85Mb/s.

Q4: Which wireless interface can run in station mode? Which wireless interface can run in AP mode?

A: We recommend that run station mode in wlan0, run AP or P2P mode in wlan1.