



FortiAP?Fortinet??????(thin)??AP, ??????AP. ??????Zero Configuration, ??CAWAP??, ?????????????(P1).
FortiAP????????FortiGate??, ??????FortiWiFi??(20C/40C/50B/60C...). ??????????, ??????????(P1), ??????
FortiGate?, ??????????(?FortiOS??).



????????????????, ????. ?????????2R2T, ?222B?????, ??????2dbi. ?????????????, ?????????monitor??(??)
??AP-scan??. ?????????, ??????:



?????????LED???, WiFi1~3?????????, ???2R2T, ?Radio1?Radio2??FortiOS???, ????, WiFi3???????, ?????3R3T??
(???, Fortinet????). ETH??????, ??FortiGate???, ethernet???GbE, ??????????.



????????, USB????, ?????for future use, CONSOLE????RJ-45 to RS232 cable??CLI??, ??????. ETH PoE??
 ?????FortiGate, ?????802.3af, ???AC????, ?????????PoE adapter??L2/L3 PoE??.

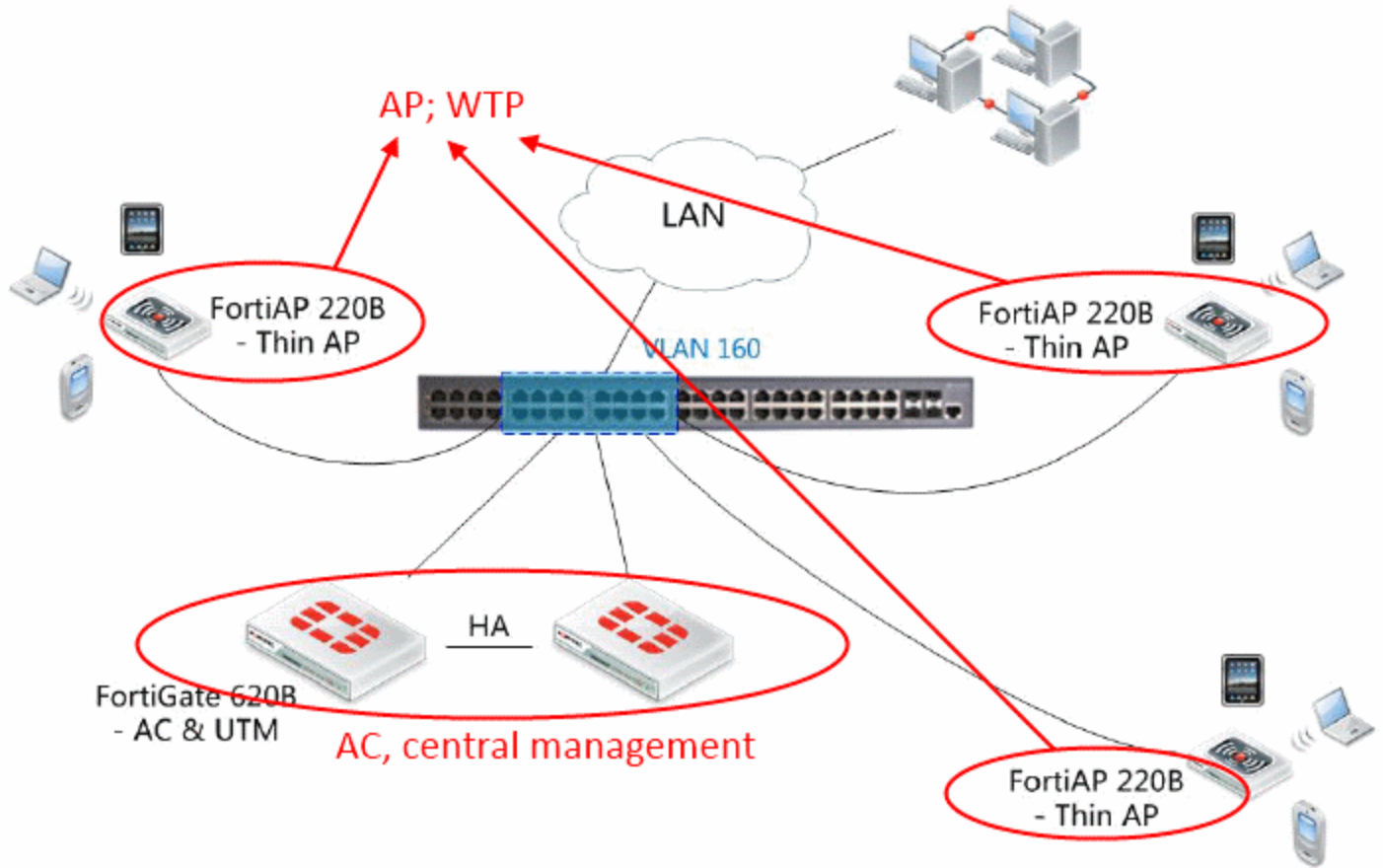
FortiAP????CAWAP(Control And Provisioning of Wireless Access Points)??, ???AP????????????
 (FortiGate)???, CAWAP????RFC-5415?RFC-5416??:

1. <http://tools.ietf.org/html/rfc5415>
2. <http://tools.ietf.org/html/rfc5416>

??CAWAP???, Fortinet????????, ??????: AP(WTP)?AC.

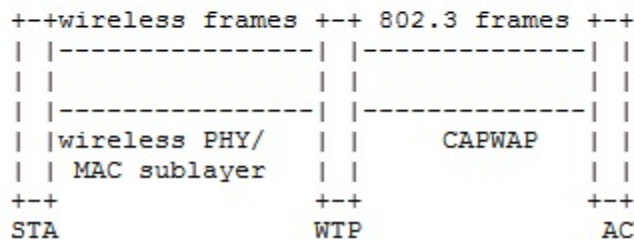
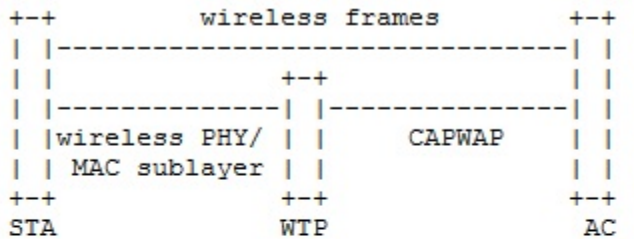
1. AP: Access Point, ??????, ??????(wireless frames)????, ??WTP(*).
2. AC: Access Controller, ?AP????, ?????AC????, AC????.

* WTP: Wireless Termination Point



?AP?AC?Fortinet???????, AP??FortiAP; ?AC??????FortiGate. ??CAWAP?????, ??????:

1. AP????AC????, ?????AC-Discovery??????.
2. ??CAWAP?????, ???(??IP??)??port?5246/5247, UDP(*)
3. CAWAP??????DTLS(Datagram Transport Layer Security)??????, ?????. Fortinet?????control traffic????.
4. ??(frame)????????802.11?????(wireless frame)??802.3??????????.



5. ??AC??????10????AP(WTP, managed AP), AC??????????????.

????CAWAP???, ??FortiAP, ???CLI??????AP???????, ???! ????????, ??GUI, ????????????(FortiWiFi?????? FortiGate?CLI????).

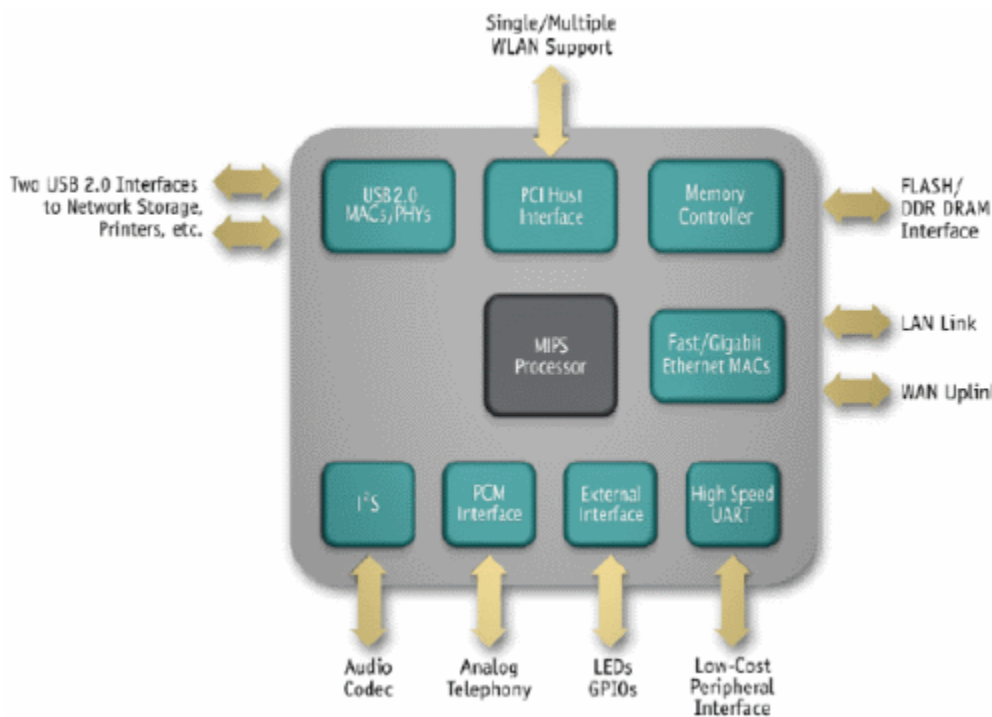
```

COM1 - PuTTY
Ver:04000010
Serial number: FAP22B3U11005034
Region code: T
DRAM: b8050000: 0xc0140180
64 MB
id read 0x100000ff
flash size 16MB, sector count = 256
Flash: 16 MB
Using default environment

In:    serial
Out:   serial
Err:   serial
Net:   ag7100_enet_initialize...
ATHRF1E:
No phy found for unit 0
eth0: 00:09:0f:f1:a7:e2
eth0 up
ATHRF1E: Port 1, Negotiation timeout
ATHRF1E: unit 1 phy addr 0 ATHRF1E: reg0 1000
eth1: 00:09:0f:f1:a7:e3
eth1 up
eth0, eth1
Hit any key to stop autoboot: 0

```

?AP????????, ?????????, DRAM buffer?64MB, FLASH?16MB, ??SoC?????????Atheros?AR7100.



http://www.atheros.com/media/resourc...e_23_file2.pdf

??SoC??MIPS????????????????, ??AP-scan. ??FortiAP????????, ?????MIPS????, ???FortiGate(AC)??

??cat /proc/cpuinfo?????AR7100?MIPS CPU??, ?????????:


```

BusyBox v1.01 (2012.08.07-23:24+0000) Built-in shell (ash)
Enter 'help' for a list of built-in commands.

FAP22B3U11005034 # cat /proc/cpuinfo
system type       : Atheros AR7100 (hydra)
processor         : 0
cpu model        : MIPS 24K V7.4
BogoMIPS         : 451.58
wait instruction  : yes
microsecond timers : yes
tlb_entries      : 16
extra interrupt vector : yes
hardware watchpoint : yes
ASEs implemented : mips16
VCEd exceptions  : not available
VCEI exceptions  : not available

```

BogoMIPS?451.58, ??clock??????300~400MHz??, MIPS 24K??.

```

COM1 - PuTTY
No phy found for unit 0
eth0: 00:09:0f:f1:a7:e2
eth0 up
ATHRF1E: Port 1, Negotiation timeout
ATHRF1E: unit 1 phy addr 0 ATHRF1E: reg0 1000
eth1: 00:09:0f:f1:a7:e3
eth1 up
eth0, eth1
Hit any key to stop autoboot: 0
## Booting image at bf940000 ...
Image Name: Linux Kernel Image
Created: 2012-08-07 23:21:44 UTC
Image Type: MIPS Linux Kernel Image (gzip compressed)
Data Size: 1044785 Bytes = 1020.3 kB
Load Address: 80002000
Entry Point: 80212000
Verifying Checksum ... OK
Uncompressing Kernel Image ... OK

init started: BusyBox v1.01 (2012.08.07-23:24+0000) multi-call binary
init started: BusyBox v1.01 (2012.08.07-23:24+0000) multi-call binary
Starting pid 570, console /dev/
FAP22B3U11005034 mips #1 Tue Aug 7 16:21:37 PDT 2012 (none)
FAP22B3U11005034 login: █

```

?????????BusyBox OS, Fortinet??FortiAP????????????????AC-Discovery?????, ??????????????:

```

COM1 - PuTTY
LOGIN_PASSWD
COUNTRY_STR
WTP_NAME
WTP_LOCATION
AC_DISCOVERY_TYPE
    0(auto), 1(static) 2(dhcp), 5(broadcast), 6(multicast)
AC_IPADDR_1
AC_IPADDR_2
AC_IPADDR_3
AC_CTL_PORT
AC_DISCOVERY_MC_ADDR
AC_DISCOVERY_DHCP_OPTION_CODE
FAP22B3U11005034 # cfg -s
AP_IPADDR:=10.1.32.224
AP_NETMASK:=255.255.255.0
IPGW:=10.1.32.192
ADDR_MODE:=STATIC
TELNET_ALLOW:=0
AC_DISCOVERY_TYPE:=0
AC_IPADDR_1:=10.1.32.254
AC_CTL_PORT:=5246
AC_DISCOVERY_MC_ADDR:=224.0.1.140
AC_DISCOVERY_DHCP_OPTION_CODE:=139
FAP22B3U11005034 #

```

????????????????????, ??FortiGate????????????(L2+L3...). ??CAWAP??, AP(WTP)?AC????????AC-Discovery?
 ???, AC?(Discovery)???FortiGate?FortiAP???, AP(WTP)????AC????, ??????????, ??NAT, DHCP?, ??????. ??
 AC????????? ?????????FortiGate????FortiAP???, ?????????ADDR_MODE, ??????. STATIC????????????, ??
 ?????DHCP. ?????DHCP?????????. ?DHCP??:

1. 0.0.0.0/24??, port 67~68=[?]=>255.255.255.255/32
2. Gateway???, port 67~68=[?]=>255.255.255.255/32
3. FortiAP??IP, ????? 5246 port?FortiGate??.

| | | | | | | | | |
|---|---|----------|----------|------------------------------|-----------------------------------|--|--|--|
| 3 | 7 | internal | wan1 | ipANY_intANY | ipFIXED_BROADCAST | | <input checked="" type="checkbox"/> always | <input checked="" type="checkbox"/> DHCP |
| 4 | 8 | wan1 | internal | ipPTR_wan1 | ipFIXED_BROADCAST | | <input checked="" type="checkbox"/> always | <input checked="" type="checkbox"/> DHCP |

[for example]

Broadcast DHCP request:

wan1-- 0.0.0.0.68 -> 255.255.255.255.67: udp

wan1 -- 192.168.8.1.67 -> 192.168.8.2.68: udp

The FortiAP unit is assigned the IP address 192.168.8.2. It will then communicate with the WiFi controller on 192.168.8.1 using the CAPWAP control port 5246.

5246?AC port(udp)????????, ???FortiGate?????. ?????, ??????????. ?????, ?????????multicast, ???DST address?: 240.0.1.140???multicast?. ?????L3???, ??mutlicast??, ??????????. ???????.

[for example]

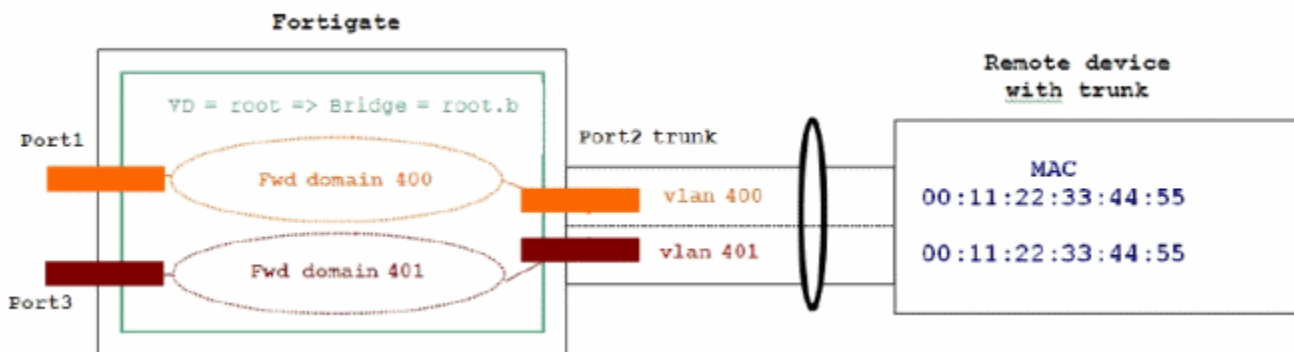
FortiAP[DMZ]FGT 110C(TP)[wan1]<===>[wan1]FGT 60C[wan1]VTU-R

<<includes>>{

vap1[DMZ]FGT 110C(TP)[vlan1@wan1]<===>[vlan1@wan1]FGT 60C[wan1]VTU-R

```
vap2[DMZ]FGT 110C(TP)[vlan2@wan1]<==>[vlan2@wan1]FGT 60C[wan1]VTU-R
}
```

110C??TP mode, ??????firwall?UTM?????, 60C??DHCP Server??IP, vap?????, ?????FortiAP??PHY????? VAP(Virtual AP), ?????AP?????, ??????. ?????????????????, ?????????????, ?????????????, ??VLAN??, ????????? ?????, ??????????. FortiGate????????collision domain[def: 0], VLAN????????????????, ?????????, ???CLI? collision domain????: set forward-domain [var|var is number].



?????VLAN??(*), ?????????(????!), ?????????FortiAP?????
 * ?VLAN?, ??VLAN??PHY??CLI?vlanforward???, ??VLAN?????????????.

???110C ??FortiAP(WTP)?????(AC), ???WTP????110C(AC)?, ???VLAN????????????, ???collision domain??, ??? FortiAP?????????. ???collision domain????????, ?????????????????, FortiAP(WTP)???110C?TP???, ??60C??DHCP server?????????????????. ?????CLI??ping??:

```
Connected
FWF60C3G11012569 # exe ping 10.1.32.193
PING 10.1.32.193 (10.1.32.193): 56 data bytes
64 bytes from 10.1.32.193: icmp_seq=0 ttl=255 time=1.1 ms
64 bytes from 10.1.32.193: icmp_seq=0 ttl=255 time=1.2 ms (DUP!)
64 bytes from 10.1.32.193: icmp_seq=0 ttl=255 time=1.3 ms (DUP!)
64 bytes from 10.1.32.193: icmp_seq=1 ttl=255 time=0.5 ms
64 bytes from 10.1.32.193: icmp_seq=1 ttl=255 time=0.7 ms (DUP!)
64 bytes from 10.1.32.193: icmp_seq=1 ttl=255 time=0.7 ms (DUP!)
64 bytes from 10.1.32.193: icmp_seq=2 ttl=255 time=0.5 ms
64 bytes from 10.1.32.193: icmp_seq=2 ttl=255 time=0.6 ms (DUP!)
64 bytes from 10.1.32.193: icmp_seq=2 ttl=255 time=0.7 ms (DUP!)
```

?DHCP????????FortiAP?????, ?????????, ?????????. ???AC-Discovery?????????. ???solution?????:

1. ??FortiAP?CLI(BusyBox)??static configuration????????, ??unicast??.
2. ?110C?TP mode??NAT mode, ??! NAT?TP????????????????????.
3. ?WTP????60C(AC)?, ??????????. ??FortiAP??VAPs????????110C?????????, ??QoS.

??, ??????????, ?????FortiAP?BusyBox????????????(*). ??! ?????????, ??TP?NAT?????????????, ??NAT????????????? ?, ?????pass-through. ???solution?????, ?????????! ??FortiAP?Gateway UTM???FortiAP??VAPs????????, ?????????(??bridge). ?????FortiAP??60C?.

* ?????FortiWiFi????FortiOS?CLI????.

?????, ?????????????????, collision domain???. ?????????, ?????mutlicast???:


```

Connected
FGT80C3911620414 # config fire multicast-policy
FGT80C3911620414 (multicast-policy) #

```

????AC??(Discovery)?, FortiAP?FortiGate?????????(port: 5246, udp):

1. Multicast, ????, ???domain
2. Broadcast
3. Static IP, unicast, ????

Broadcast????, ????????. ??????????Static IP, ??????????AP??DHCP??, ??????????. ???FortiWiFi?????(WiFi unit? ???AP?????managed AP?????FortiGate????????), ??????????, ??????commands:

```

config sys glo
set wireless-mode wtp
[after reboot...]
config wire glo
set ac-disc static
(the following commands not in any docs, I don't know why..)
config ac-l
edit 1
set ip A.B.C.D(80C, Gateway IP)
end

```

AC-Discovery??FortiAP?????, ??????????! ??????????????, ????(Multicast, DHCP)????????, ?????????.

????DHCP???, ?DHCP server, ???FortiGate?????????. ??????DHCP Server????:

Interface Name:

Mode:

Enable:

Type: Regular IPsec

IP: -

Network Mask:

Default Gateway:

DNS Service: Use System DNS Setting Specify

IP Reservation

Create New Edit Delete Add from DHCP Client List

| IP |
|-------------|
| 10.17.32.64 |

▼ [Advanced...] (DNS, WINS, Custom Options, Exclude Ranges.)

Domain:

Lease Time: Unlimited
 3 (days) 0 (hours) 0 (minutes)
 (5 minutes - 100 days)

IP Assignment Mode: Server IP range User-group defined method

WINS Server 0:

WINS Server 1:

Options

Code: Options:

Exclude Ranges

| Starting IP | End IP | Delete |
|---|---|----------------------------------|
| <input type="text" value="10.17.32.192"/> | <input type="text" value="10.17.32.192"/> | <input type="button" value="🗑"/> |
| <input type="text" value="10.17.32.1"/> | <input type="text" value="10.17.32.63"/> | <input type="button" value="🗑"/> |
| <input type="text" value="10.17.32.64"/> | <input type="text" value="10.17.32.127"/> | <input type="button" value="🗑"/> |
| <input type="text" value="10.17.32.193"/> | <input type="text" value="10.17.32.254"/> | <input type="button" value="🗑"/> |

????????????????Options????, ??OPTION CODE, ??CODE????FortiAP??FortiWiFi??OPTION CODE????????.

```

AP_IPADDR:=10.1.32.224
AP_NETMASK:=255.255.255.0
IPGW:=10.1.32.192
ADDR_MODE:=STATIC
TELNET_ALLOW:=0
AC_DISCOVERY_TYPE:=0
AC_IPADDR_1:=10.1.32.254
AC_CTL_PORT:=5246
AC_DISCOVERY MC ADDR:=224.0.1.140
AC_DISCOVERY DHCP OPTION CODE:=139
FAP22B3U11005034 #
    
```

OPTION CODE?????, ???FortiAP(AC)????(bind), ???16??(Hex)??IPv4????FortiAP:
 C0A819C3=> C0.A8.19.C3=> 192.168.25.195

??????AP??, ??????AP??OPTION CODE???, ????. ??????DHCP??ForiAP??. ?multicast???, FortiGate?????
 FortiAP???, ???Managed AP??????????????.

| State | Status | Name | Clients |
|-------|------------|--------------|---------|
| | Connected | FAP22B3U1100 | 3 |
| | Connecting | FWF60C3G1101 | 0 |

?????, FortiAP?????????????????. ??????, ???AC????????(?????Disconnected).

Serial Number: FWF60C3G11012569

Name:

Description: WTP [Change]

Managed AP Status

Status: Connecting

State: Discovered Authorize

??????, ??????AP?????????. ??????AC??????????????.

| | |
|--------------------------|--|
| Serial Number | <input type="text" value="FWF60C3G11012569"/> |
| Name | <input type="text"/> |
| Description | WTP [Change] |
| Managed AP Status | |
| Status | Connected |
| Connecting From | 10.1.32.192 |
| Join Time | 09/22/12 14:15 |
| Clients | 0 |
| FortiAP OS Version | FWF60C-v4.0-build639 [Upgrade] |
| State | Authorized <input type="button" value="Deauthorize"/> <input type="button" value="Restart"/> |
| Wireless Settings | |
| AP Profile | FWF60CR12d4GpNOSCAN [Change] |
| Radio 1 | |
| Mode | Access Point |
| Band | 802.11n |
| Channel | 1, 6, 11 |

????????, ?????f/w, ?????????...???? AP????????, Fortinet????????AP profile?????. ?????????model???. ????

Name Comments 0/63Platform **FAP220B/FAP221B** ▼

▼ Radio 1

Mode Disable Access Point Dedicated MonitorBackground Scan Disable EnableRadio Resource Provision

Band 802.11na_5G ▼

Short Guard Interval 20/40 MHz Channel Width Channel 149 153 157 161

TX Power 100 %

SSID

Available

Selected

FORTINET_MANAGED
FORTINET_UNMANAGED

▼ Radio 2

Mode Disable Access Point Dedicated MonitorBackground Scan Disable EnableRadio Resource Provision

Band 802.11ng_2.4G ▼

Short Guard Interval Channel 1 2 3 4 5 6 7 8 9 10 11

TX Power 100 %

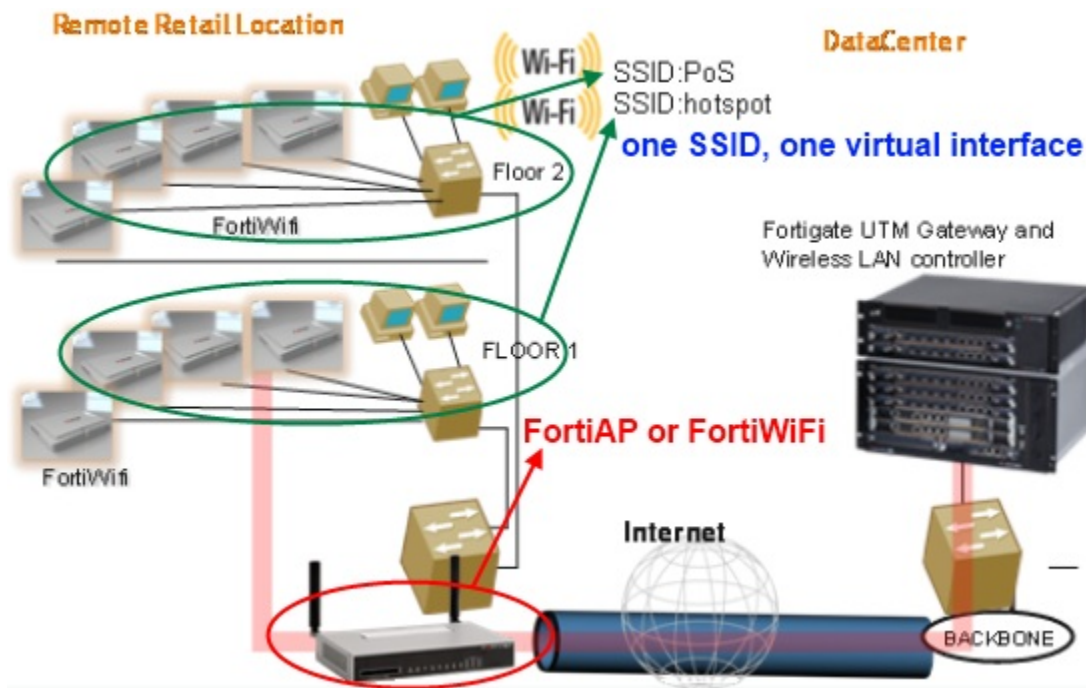
SSID

Available

Selected

FORTINET_MANAGED
FORTINET_UNMANAGED

FortiAP 220B??dual-band, ??????2.4G?5G?????, ??5G??radio 1???. ??????! 40MHz????5G??, 2.4G???.
 FortiAP??SSID????, ?????FortiOS??????Managed AP????SSID. SSID????AP??AP???????, FortiAP??????
 PHY, ??PHY????VAPs(???, ?????14???)



??VAP????????????, ?????????????, ?policy-based configuration????????????QoS, ??????...

System

Policy

Firewall Objects

UTM Profiles

VPN

User

WiFi Controller



- WiFi Network
 - SSID**
 - Rogue AP Settings
- Managed Access Points
 - Managed FortiAP
 - Custom AP Profile
- Monitor

+ Create New Edit Delete

| | SSID |
|--------------------------|--------------------|
| <input type="checkbox"/> | FORTINET_MANAGED |
| <input type="checkbox"/> | FORTINET_UNMANAGED |

可以建立超過10組以上的SSID

??SSID????????????(????VAP), ?????????DHCP. ?????, ??SSID????, ??TP????, ??NAT?????
 DHCP?????

| | |
|--------------------------|---|
| Interface Name | <input type="text"/> |
| Status | <input checked="" type="radio"/> Enabled  <input type="radio"/> Disabled  |
| WiFi Settings | |
| SSID | <input type="text" value="fortinet"/> |
| Security Mode | <input type="text" value="WPA/WPA2-Personal"/> ▼ |
| Data Encryption | <input checked="" type="radio"/> AES <input type="radio"/> TKIP <input type="radio"/> TKIP+AES |
| Pre-shared Key | <input type="text"/> (8 - 63 characters) |
| Block Intra-SSID Traffic | <input type="checkbox"/> |
| Maximum Clients | <input type="checkbox"/> Limit Concurrent WiFi Clients |
| Comments | <input type="text" value="Write a comment..."/> 0/63 |

SSID?????????, ???VAP, TP?????????SSID??policy????DHCP Server?????. ??NAT?????????, ???combined, ???
 ???:

<http://kb.fortinet.com/kb/microsites...200%2037796535>

???????Rogue AP Settings??, ??AP Scan??. FortiOS???AP Scan?????:

1. ???Monitor????radio?
2. Monitor????????????.

Name

Comments 0/63

Platform

Radio 1

Mode Disable Access Point Dedicated Monitor

Rogue AP On-Wire Scan

Radio 2

Mode Disable Access Point Dedicated Monitor

Background Scan Disable Enable

Radio Resource Provision

Band

Short Guard Interval

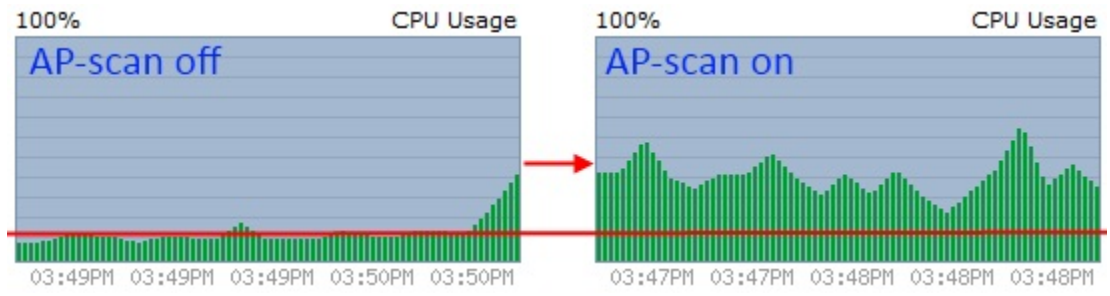
Channel 1 2 3 4 5 6 7 8 9 10 11

TX Power

SSID

| Available | Selected |
|--|----------|
| FORTINET_MANAGED FORTINET_UNMANAGED | |

???????????, ?????, ??????. ??????????????, ??????CLI?????. FortiAP??AP-scan?????????MIPS????????, ??????????
 FortiGate?CPU??, ??FortiWiFi?????????, ?unit??WiFi controller??AP-scan??CPU?????????. ?60C??, ????
 15~20%?CPU??, ???????????.



???AP-scan???, ??????????. Rogue AP On-Wire?????????, ??????FortiAP?????????. ????????, ??????????GUI
 monitor?Rogue AP???, ??????:

| System | State | Online Status | SSID | Security Type | Channel | MAC Address | Vendor Info | Signal Strength | Detected By | On-wire |
|-----------------|-------|---------------|------------------|---------------|---------|-------------------|---------------------|-----------------|--|---------|
| WiFi Controller | ? | ? | | OPEN | 1 | 00:24:6c:49:7d:52 | ARUBA NETWORKS, | ? | FWF60C3G11012569 (1) | ? |
| | ? | ? | | OPEN | 1 | 00:24:6c:49:7d:53 | ARUBA NETWORKS, | ? | FWF60C3G11012569 (1) | ? |
| | ? | ? | | WPA2 | 8 | 34:08:04:27:8f:82 | D-Link Corporation | ? | FWF60C3G11012569 (1) | ? |
| | ? | ? | 0024A5B4... | WPA Auto | 8 | 06:24:a5:b4:ce:dd | Buffalo Inc. | ? | FWF60C3G11012569 (1) | ? |
| | ? | ? | ani99... | WPA2 | 11 | 80:1f:02:67:3b:34 | Edimax Technology | ? | FWF60C3G11012569 (1) | ? |
| | ? | ? | APTG Wi-Fi | OPEN | 6 | 04:12:46:9a:ac:22 | | ? | FWF60C3G11012569 (1) | ? |
| | ? | ? | ASUS | WPA2 | 11 | bc:ae:c5:c4:c8:8a | ASUSTek COMPUTER | ? | FAP22B3U11005034 (2), FWF60C3G11012569 (1) | ? |
| | ? | ? | Betty-AP2 | WPA Auto | 4 | f4:ec:38:ae:d4:ca | TP-LINK | ? | FWF60C3G11012569 (1) | ? |
| | ? | ? | CHT Wi-Fi(HiNet) | OPEN | 6 | 04:11:46:9a:ac:22 | | ? | FWF60C3G11012569 (1) | ? |
| | ? | ? | CHT Wi-Fi(HiNet) | OPEN | 8 | 34:01:04:27:8f:82 | | ? | FWF60C3G11012569 (1) | ? |
| | ? | ? | DC_FTP | WPA2 | 1 | c8:6c:87:1a:c0:7d | Zyxel | ? | FWF60C3G11012569 (1) | ? |
| | ? | ? | FET Wi-Fi | OPEN | 1 | 00:24:6c:49:7d:50 | ARUBA NETWORKS, | ? | FWF60C3G11012569 (1) | ? |
| | ? | ? | FET-Network | WEP | 1 | f4:c7:14:8b:93:5f | Huawei Device Co., | ? | FWF60C3G11012569 (1) | ? |
| | ? | ? | harrynet880 | WPA2 | 11 | b0:b2:dc:31:f8:e0 | Zyxel | ? | FWF60C3G11012569 (1), FAP22B3U11005034 (2) | ? |
| | ? | ? | HiLife-MAC | OPEN | 1 | 00:24:6c:49:7d:51 | ARUBA NETWORKS, | ? | FWF60C3G11012569 (1) | ? |
| | ? | ? | HPC5A5B1 | OPEN | 10 | 02:25:05:04:4f:ff | eks Engel GmbH & | ? | FWF60C3G11012569 (1) | ? |
| | ? | ? | jalai | WPA | 1 | 20:cf:30:d7:2d:d8 | ASUSTek COMPUTER | ? | FWF60C3G11012569 (1), FAP22B3U11005034 (2) | ? |
| | ? | ? | mpcm | OPEN | 11 | 00:24:a5:0f:7a:57 | Buffalo Inc. | ? | FWF60C3G11012569 (1) | ? |
| | ? | ? | NBG4104 | WPA2 | 1 | ca:6c:87:8c:63:b0 | | ? | FWF60C3G11012569 (1) | ? |
| | ? | ? | one | OPEN | 6 | 38:16:d1:cf:8e:e1 | Samsung Electronics | ? | FWF60C3G11012569 (1) | ? |
| | ? | ? | P874 | WPA | 1 | c8:6c:87:1c:8f:5e | Zyxel | ? | FWF60C3G11012569 (1) | ? |
| | ? | ? | popo | WEP | 6 | 00:26:f3:5f:05:42 | SMC Networks | ? | FWF60C3G11012569 (1), FAP22B3U11005034 (2) | ? |
| | ? | ? | TOTOLINK-3F | OPEN | 11 | 78:44:76:d7:52:e0 | Zioncom technology | ? | FWF60C3G11012569 (1), FAP22B3U11005034 (2) | ? |
| | ? | ? | 林昱鑫 | WPA2 | 1 | 7e:59:48:65:18:f5 | | ? | FWF60C3G11012569 (1) | ? |
| | ? | ? | | WEP | 3 | 00:13:1a:4b:eb:90 | Cisco Systems | ? | FWF60C3G11012569 (1) | ? |

????????????????Rogue??Accepted, ??????????. ??????????(report), ?Event Log?????. ???AP-scan?????????, ?????????????, ??????CLI?????:

Each WiFi radio can perform monitoring of radio channels in its operating band while acting as an AP. It does this by briefly switching from AP to monitoring mode. By default, a scan period starts every 300 seconds. Each second a different channel is monitored for 20ms until all channels have been checked.

During heavy AP traffic, it is possible for background scanning to cause lost packets when the radio switches to monitoring. To reduce the probability of lost packets, you can set the CLI `ap-bgscan-idle` field to delay the switch to monitoring until the AP has been idle for a specified period. This means that heavy AP traffic may slow background scanning.

The following CLI example configures default background rogue scanning operation except that it sets `ap-bgscan-idle` to require 100ms of AP inactivity before scanning the next channel.

```

config wireless-controller wtp-profile
edit ourprofile
config radio-1
set ap-bgscan enable
set rogue-scan enable
set ap-bgscan-period 300
set ap-bgscan-intv 1
set ap-bgscan-duration 20
set ap-bgscan-idle 100
end
end
    
```

AP-scan?????15???, ??????. ?! ???CLI????, ??????600??????:

```
FGT80C3911620414 (FWF60CR1DMpSCAN) # config radio-1

FGT80C3911620414 (radio-1) # get
ap-fgscan-report-intv: 15
ap-scan-passive      : disable
mode                 : monitor
rogue-scan           : enable
```

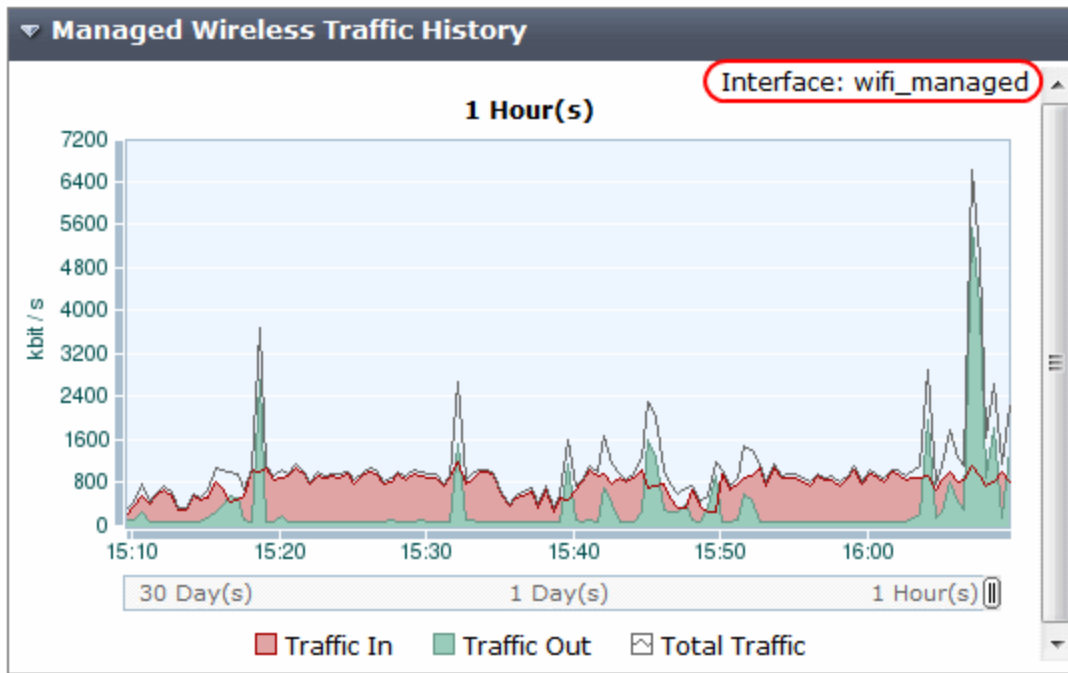
????, Log Config?Wireless Event Log????, ???Event Log?????????Rogue AP????, ?????:

| # | Date | Time | Level | User Interface | Action | Message |
|----|------------|----------|---------|----------------|-------------------|---|
| 6 | 2012-09-24 | 15:49:18 | Warning | | ap-leave | AP FWF60C3G11012569 left. |
| 7 | 2012-09-24 | 15:49:18 | Warning | | ap-fail | AP FWF60C3G11012569 failed. |
| 8 | 2012-09-24 | 15:49:13 | Warning | | ap-kick | AP FWF60C3G11012569 kicked. |
| 9 | 2012-09-24 | 15:49:13 | Warning | | ap-kick | AP FWF60C3G11012569 kicked. |
| 10 | 2012-09-24 | 15:48:58 | Warning | | rogue-ap-off-air | AP HTC Portable Hotspot d4:20:6d:28:01:88 chan 1 live 981 age 927 |
| 11 | 2012-09-24 | 15:48:46 | Warning | | rogue-ap-detected | AP CHT Wi-Fi(HiNet) 04:11:46:9a:ac:22 chan 6 live 96257 |
| 12 | 2012-09-24 | 15:48:30 | Warning | | rogue-ap-detected | AP 0024A5B4CEDD 00:24:a5:b4:ce:dd chan 8 live 91734 |
| 13 | 2012-09-24 | 15:48:30 | Warning | | rogue-ap-detected | AP 0024A5B4CEDD-1 06:24:a5:b4:ce:dd chan 8 live 95935 |
| 14 | 2012-09-24 | 15:47:58 | Warning | | rogue-ap-detected | AP S170(0000) 00:17:b2:b2:b4:39 chan 6 live 9 |
| 15 | 2012-09-24 | 15:47:28 | Warning | | rogue-ap-on-wire | AP FORTINET_MANAGED 00:09:0f:f1:a7:e4 MAA 00:09:0f:f1:a7:e2 |
| 16 | 2012-09-24 | 15:47:10 | Warning | | rogue-ap-detected | AP mpcm 00:24:a5:0f:7a:57 chan 11 live 95561 |
| 17 | 2012-09-24 | 15:46:59 | Warning | | rogue-ap-detected | AP FORTINET_UNMANAGED 06:09:0f:f1:a7:e4 chan 149 live 0 |
| 18 | 2012-09-24 | 15:46:59 | Warning | | rogue-ap-detected | AP FORTINET_MANAGED 00:09:0f:f1:a7:e4 chan 149 live 0 |
| 19 | 2012-09-24 | 15:46:54 | Warning | | ap-join | AP FWF60C3G11012569 joined. |
| 20 | 2012-09-24 | 15:46:50 | Warning | | ap-leave | AP FWF60C3G11012569 left. |
| 21 | 2012-09-24 | 15:46:50 | Warning | | ap-fail | AP FWF60C3G11012569 failed. |

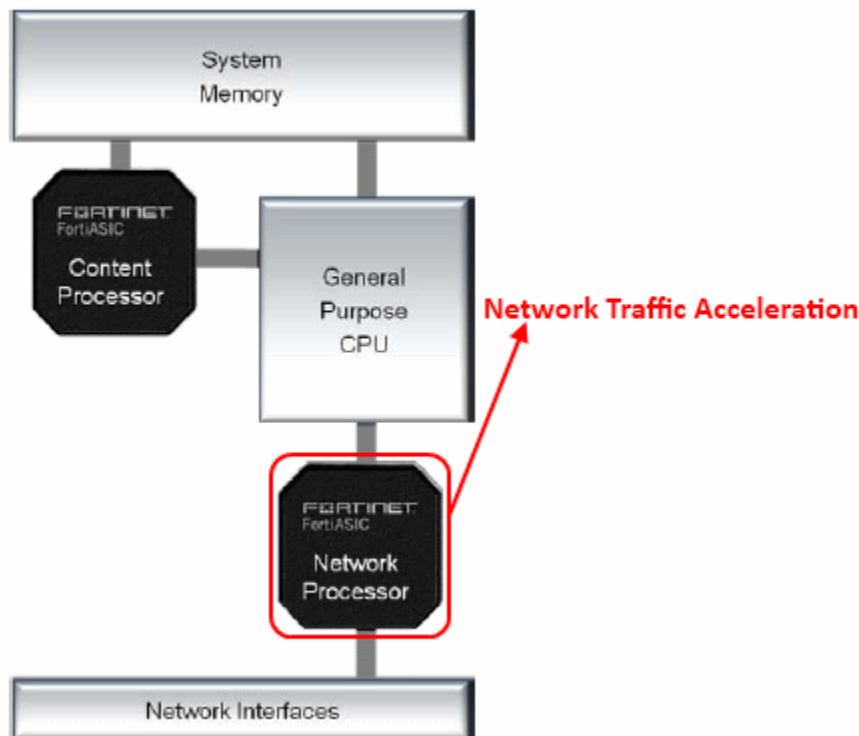
????????, ???client???FortiAP(WTP)???FortiGate(AC), ??IP?????, ????????DHCP Monitor?????, ????? Client Monitor????????????, ?????:

| MAC | Auth | IP | FortiAP | SSID | Channel | Bandwidth Tx/Rx | Signal Strength/Noise | Association Time | Band | Rate |
|-------------------|------|--------------|----------------------|------------------|---------|-----------------|-----------------------|------------------|-------------|------------|
| f4:6d:04:5e:1b:46 | Pass | 10.17.32.64 | FAP22B3U11005034 (1) | FORTINET_MANAGED | 149 | 915 Kbps | 37 dB | 09/23/12 15:06 | 802.11na_5G | 130.0 Mbps |
| f4:6d:04:5e:1b:7a | Pass | 10.17.32.129 | FAP22B3U11005034 (1) | FORTINET_MANAGED | 149 | 2163 Kbps | 30 dB | 09/23/12 13:24 | 802.11na_5G | 130.0 Mbps |

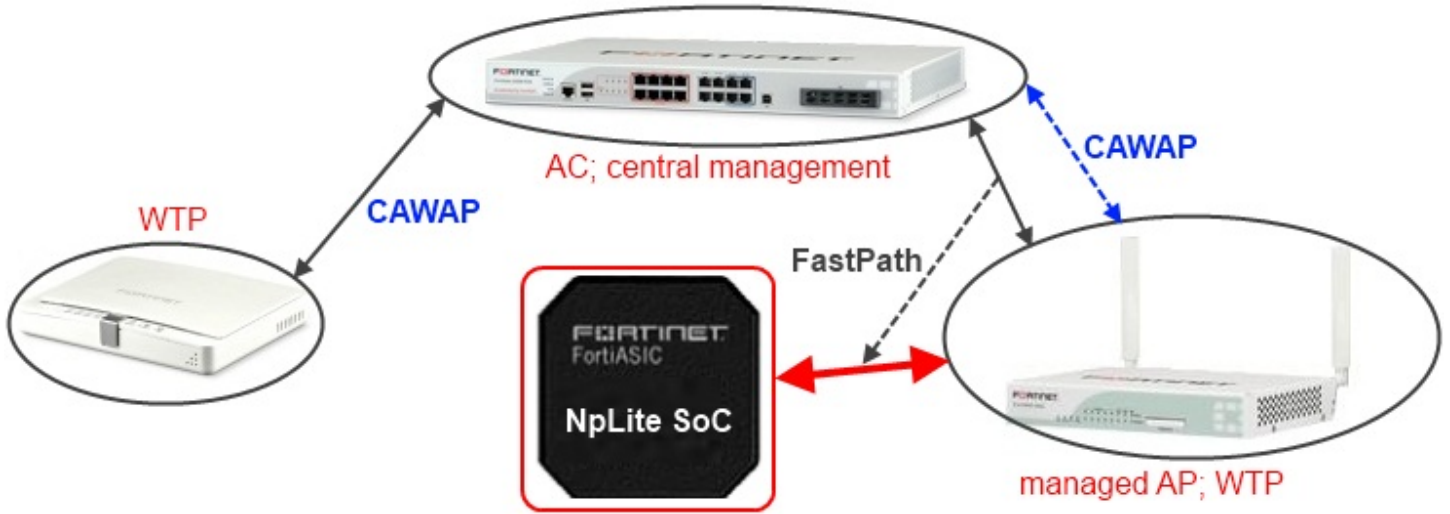
?????Dashboard??, ??Traffic History?????VAP?????????????????:



?Fortinet?????ASIC????-FortiASIC, ?????Network Processor, ???NPU. NPU?????????????????.



NPU?????????I/O??, ?????VPN?????. ?????????????(100D, 200B or up)?????ASIC??, ?????????FortiGate 60C(or FortiWiFi)????NPU?(?NpLite), ???NPU???FastPath, ???CPU?SlowPath?. ?????????, ?????wireless???traffic ???NPU??, ???CPU????, ?????????????????, ???FortiWiFi??, ???NPU, ??wireless traffic????, ??????????????. ????????? ???managed AP??????????, ??200B(Celeron 1.2GHz, 2GB DRAM, NP2, CP6), ??AC??wireless traffic???I/O??.



????????????????????, ??UTM, QoS Traffic Shaper????NPU????, ?????????FortiGate???

??, ?????FortiAP?????:

1. ??CAWAP??, ?????AP??, ??FortiGate??AC??????.
2. AC-Discovery????????????, ?????????????.
3. ?PHY???VAP??, ?????????.
4. Rogue AP???FortiWiFi???????CPU??; ?FortiAP?????MIPS????.
5. ???, ?????????Static IP configuration????.
6. ???FortiOS 5.0????????????, ?????????.
7. wireless???traffic???NPU????, ??CPU????.
8. ??CAWAP??, AP?AC?????tunnel, ??control traffic??DLTS????.
9. ??FortiAP????????????, ??AP?PHY?????SSID. ??SSID?????virtual interface.
10. ??PoE??, ???PoE????.
12. ??2.4G?5G??, ??40MHz????5G??.
13. virtual interface?????physical interface????????, ?????????.

????FortiAP??FortiWiFi?????:

| Wireless Standards & Features | FortiWi-Fi | | | | | FortiAP | | |
|--|---|-------------|-------------|---------------|---------------|---------------|---------------|---------------|
| | 30B | 50B | 60B | 60C | 80/81CM | 210B | 220B | 222B |
| Thick AP | ✓ | ✓ | ✓ | ✓ | ✓ | N/A | N/A | N/A |
| Thin AP | Option | Option | Option | Option | Option | ✓ | ✓ | ✓ |
| Number of Wi-Fi radios | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 |
| 802.11a | | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 802.11b | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 802.11e and WME Multimedia Extensions | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 802.11g | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 802.11h | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 802.11i (TKIP/AES) | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 802.11j | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 802.11n (2x2 MIMO) | | | | ✓ | ✓ | ✓ | ✓ | ✓ |
| 802.11X | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Power over Ethernet (PoE) option | | 802.3af | | | | 802.3af | 802.3af | 802.3at |
| High Throughput 40Mhz option | | | | ✓ | ✓ | ✓ | ✓ | ✓ |
| Short Guard interval | | | | ✓ | ✓ | ✓ | ✓ | ✓ |
| Max wireless Association / Total | 54Mbps | 54Mbps | 54Mbps | 300Mbps | 300Mbps | 300Mbps | 600Mbps | 600Mbps |
| Number of SSID's per Radio (one reserved per radio) | 8 | 8 | 8 | 8 | 8 | 8 | 16 | 16 |
| Simultaneous client access and background Scan | 2.4GHz only | 2.4GHz only | 2.4GHz only | 2.4GHz & 5GHz | 2.4GHz & 5GHz | 2.4GHz & 5GHz | 2.4GHz & 5GHz | 2.4GHz & 5GHz |
| Simultaneous client access and full-time Rogue Detection | | | | | | | ✓ | |
| 'On-wire' Rogue correlation and Suppression | | | | ✓ | | ✓ | ✓ | ✓ |
| Ability to serve as wireless controller for FortiAP | | ✓ | ✓ | ✓ | ✓ | N/A | N/A | N/A |
| Fast Roaming | | | | | | ✓ | ✓ | ✓ |
| Number of Thin APs supported | See Controller Sizing Matrix at Docs.Fortinet.Com | | | | | N/A | | |

***FOS v5.0 improvement:**

1. IDS supported.
2. VLAN supported.
3. improve wireless performance.
4. enhanced mesh network supported.
5. improve CAPWAP support.(data channel encryption(s/w-based)).
6. Client Load-balancing(Freq&AP).
7. WTP mode is not supported.