FortiGate MAC+Portal 认证

测试介绍

版本	1.0
时间	2018 年 8 月
支持的版本	FortiGate-51E v6.0.2,build0163,180725 (GA) FAP221C FP221C-v5.6-build0499 Ningdun:6.7.3.3
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目录

简介

Portal 认证是无线网络部署时经常用到的一种认证方式，主要用于访客对于无线网络的访问，在实际使用过程中，经常会遇到的一种情况,就是用户通过 Portal 认证后，离开无线网络一段时间后,又再次接入无线网络时，需要重新做 Portal 认证，这样造成无线用户不方便的使用体验.

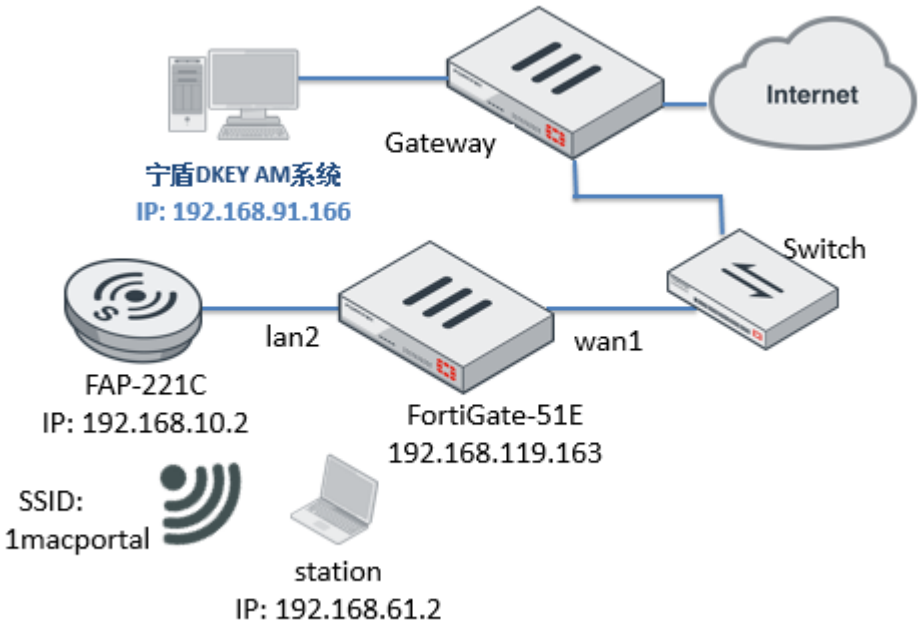
针对无线用户的这种使用情况，我们可以配置无线 MAC+Portal 认证，通过后台的 MAC 无感知认证来代替 Portal 认证,提高用户无线使用体验.

MAC+Portal 认证的过程为:

- ✓ 用户首次接入无线网络时，首先先做 MAC 认证,因为是新用户，Radius server 后台没有记录此用户的 MAC 地址，所以 MAC 认证失败，引导用户做 Portal 认证；Portal 认证成功后，后台 Radius server 记录用户的 MAC 地址信息,以便后续的 MAC 认证

- ✓ 当用户离开无线网络后，再次接入无线网路时，首先还是先对用户做无感知的 MAC 认证，由于用户 MAC 地址已经记录在 Radius server 上,所以用户 MAC 认证成功后，用户就可以直接上网了,无需再做 Portal 认证，提高用户体验.

测试网络拓扑



相关组件:

FGT51E:

lan2 口开启 CAPWAP，管理 FAP, IP: 192.168.10.1/24

无线接口 1macportal:　开启 mac+portal 认证, IP: 192.168.61.1/24

wan1: 192.168.119.163

宁盾 AM 系统:

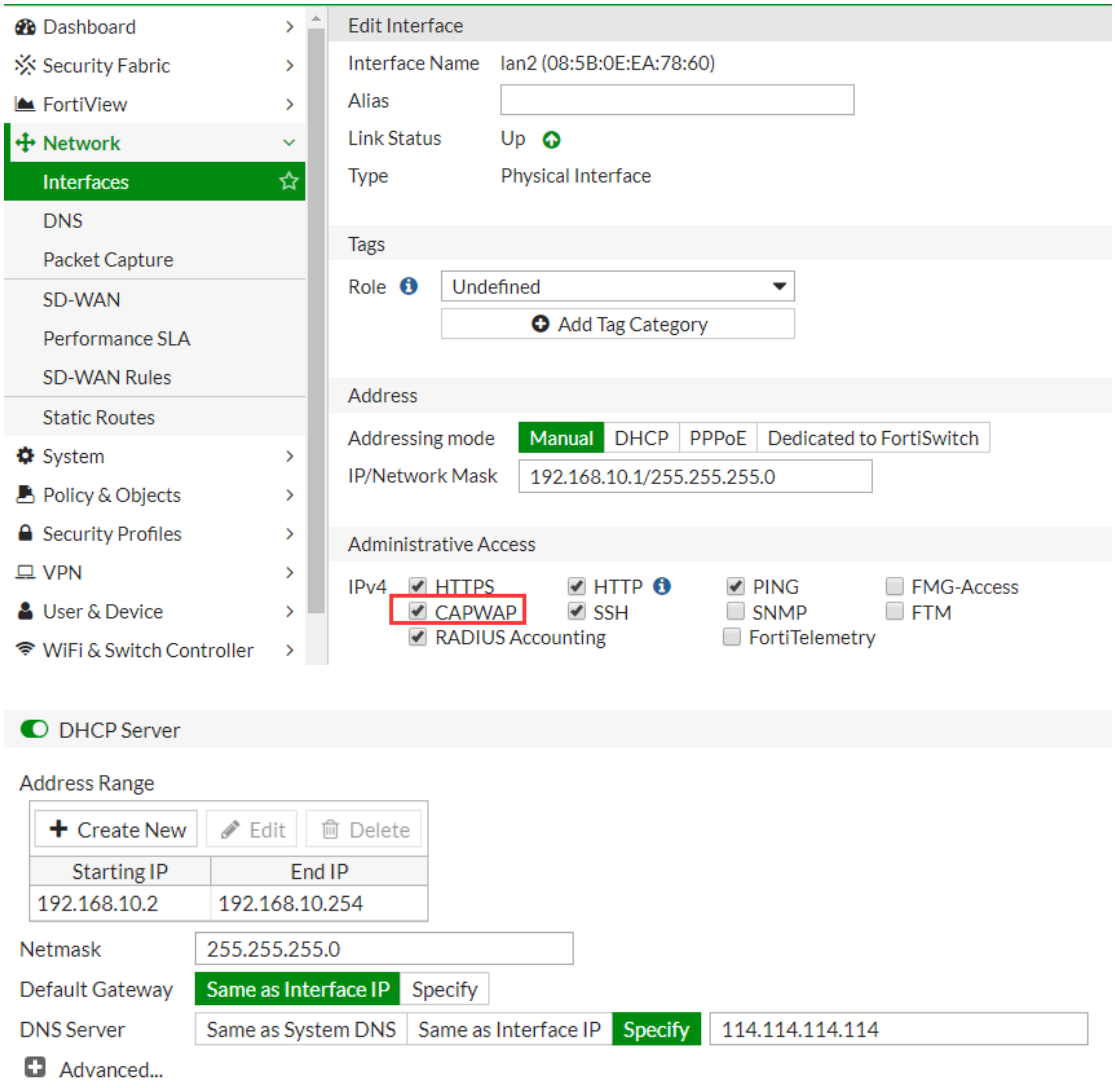
IP: 192.168.91.166, Radius/Portal 服务器，支持 MAC+Portal 认证.

FAP221C:

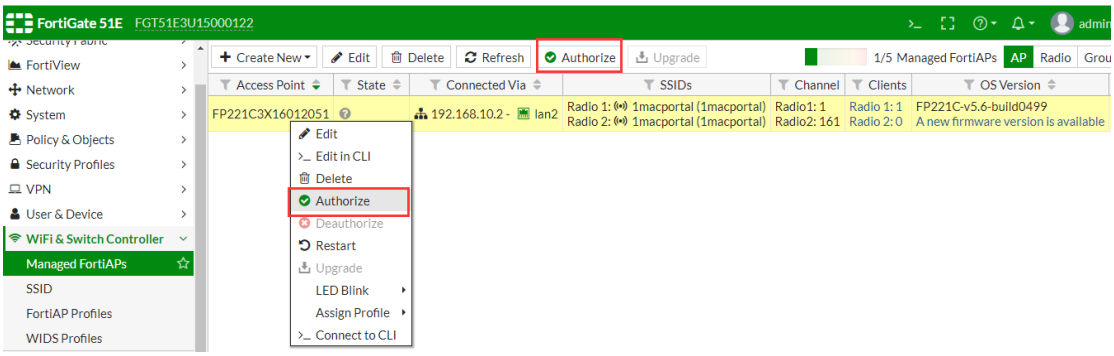
AP221C 被 FGT51E 接管，无线 SSID: 1macportal

1. 配置防火墙

1.1. 配置防火墙接管 AP



1.2 授权 AP

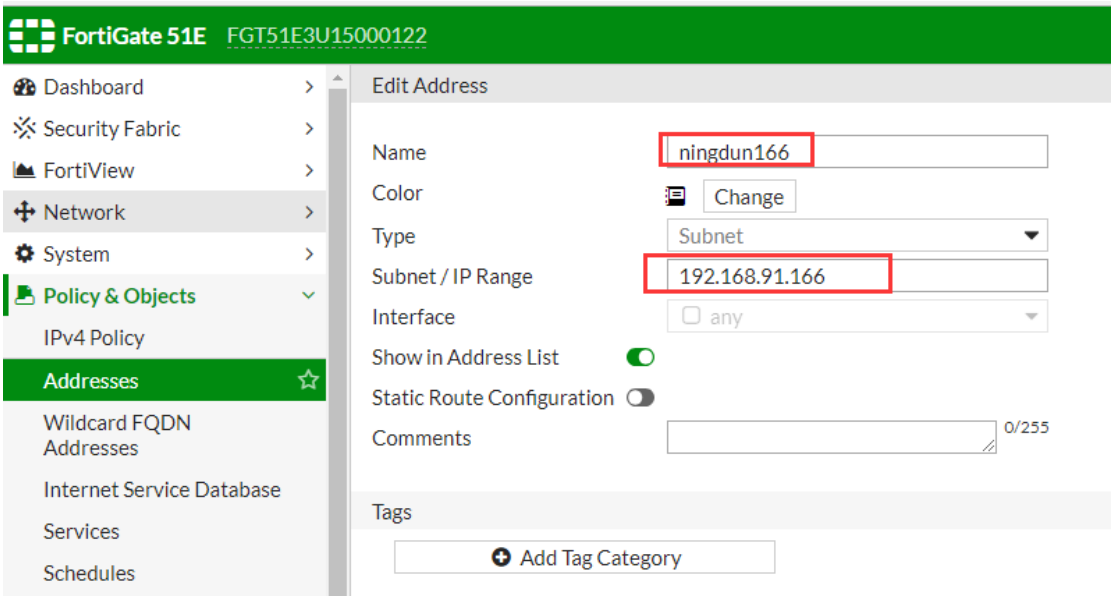


1.3 配置无线 SSID

由于 GUI 不支持配置 MAC+Portal 认证，所以相关在命令行下配置.

1.3.1 配置无线 Portal 认证的例外

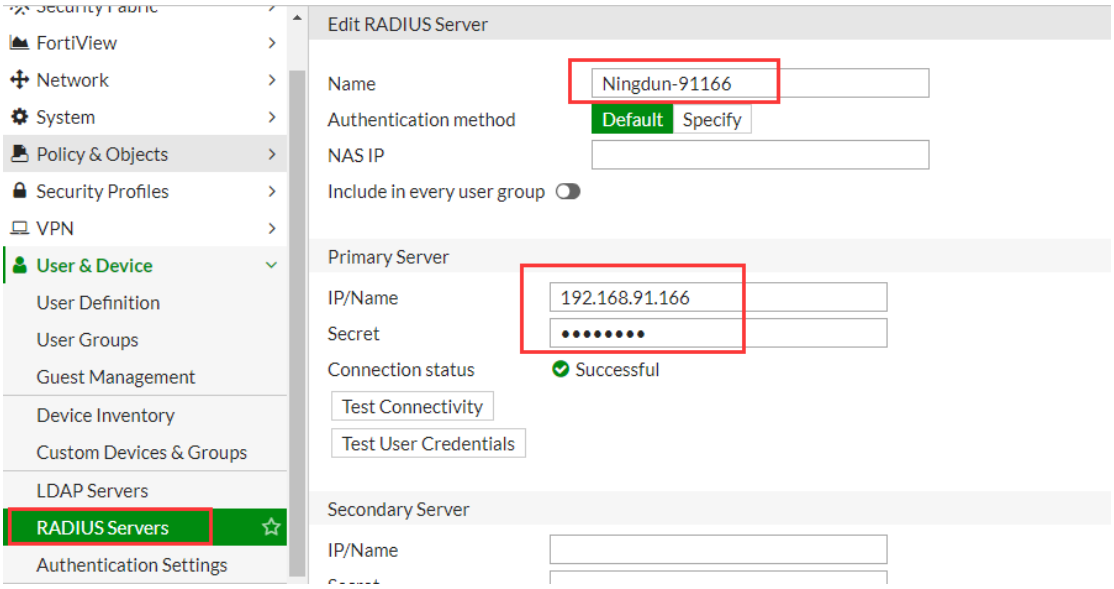
即认证成功之前,可以访问的相关地址，一般为 Portal server IP 地址，本例中为 192.168.91.166



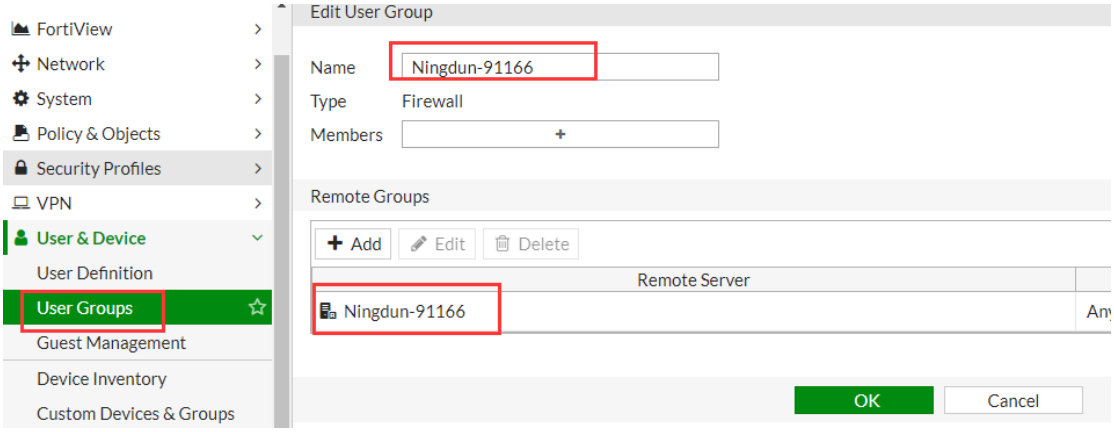
配置例外:

```
FGT51E3U15000122 (security-exempt-list) # show
config user security-exempt-list
    edit "imacportal-exempt-list"
        config rule
            edit 2
                set dstaddr "ningdun166"
            next
        end
    next
end
```

1.3.2 配置 radius 服务器和 user group

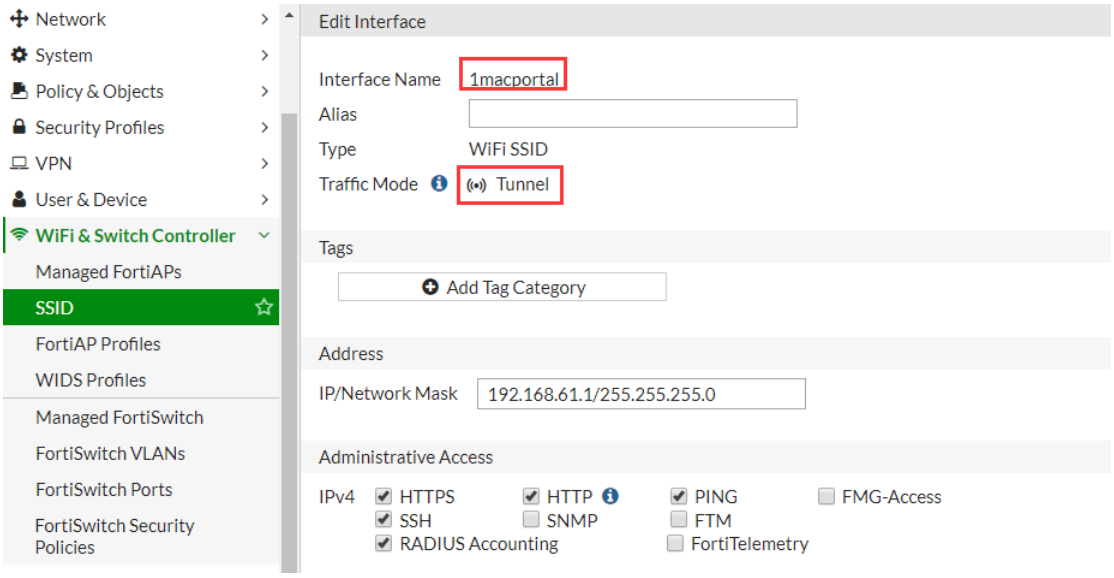


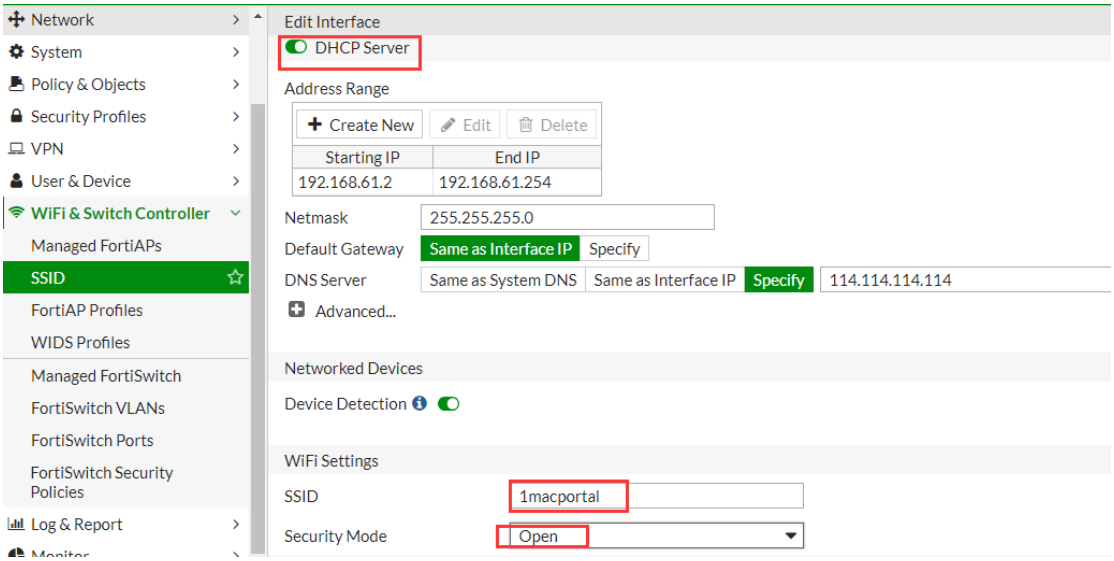
配置 user group



1.4.1 无线接口配置

先配置一个集中转发的无线接口，配置为 open 认证，后续在命令行配置为 MAC+Portal 认证



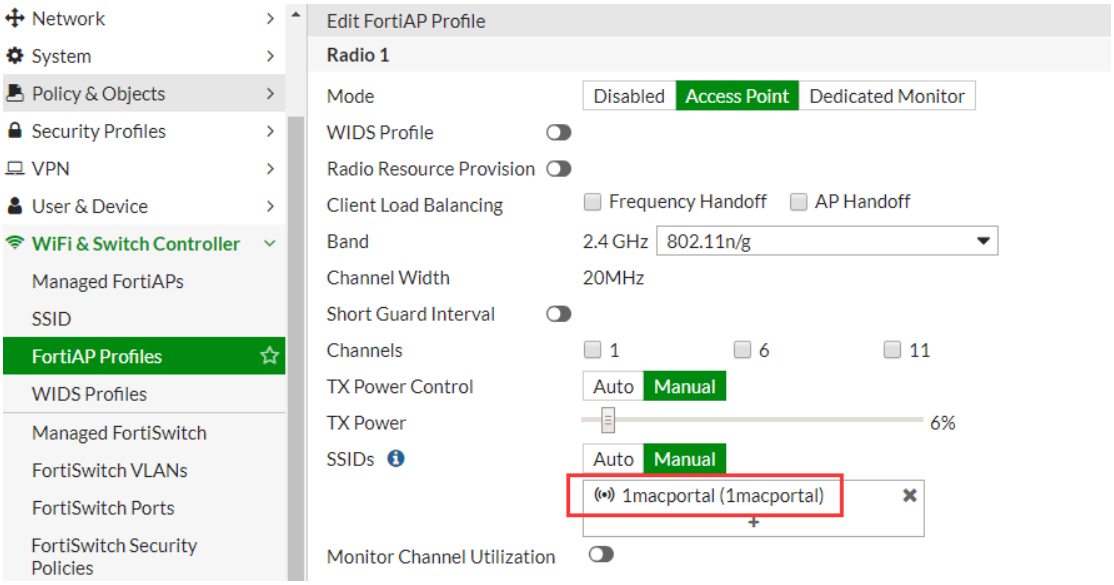


命令行下配置此 SSID 为 MAC+Portal 认证:

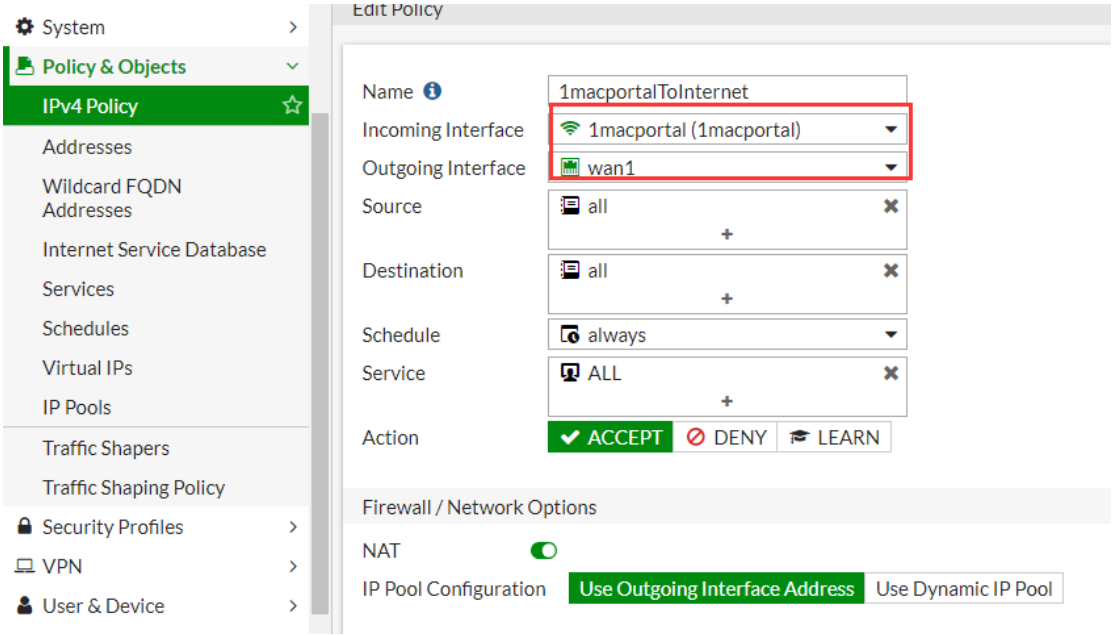
```
FGT51E3U15000122 #
FGT51E3U15000122 # config wireless-controller vap

FGT51E3U15000122 (vap) # edit 1macportal

FGT51E3U15000122 (1macportal) # show
config wireless-controller vap
    edit "1macportal"
        set vdom "root"
        set ssid "1macportal"
        set security captive-portal
        set mac-auth-bypass enable
        set selected-usergroups "Ningdun-91166"
        set security-exempt-list "1macportal-exempt-list"
        set schedule "always"
        set external-web "http://192.168.91.166:8080/am/portal/serviceId/SN180814214524/ac/FGT51E"
    next
end
```

1.4 配置无线 WTP profile

设置 AP 发出 SSID 为 1macportal 的无线信号



1.5 配置无线用户上网的策略



2. 测试终端无线接入及 debug

2.1 无线用户首次接入

无线用户首次接入时，会 MAC 认证失败:

FGT 上 debug 日志(FGT51E3U15000122 # diagnose debug application fnbamd 255):

```
[2224] handle_req-Rcvd auth req 1838071636 for e0-06-e6-ce-50-9f in  opt=00000500 prot=10
[394] __compose_group_list_from_req-Group 4
[614] fnbamd_pop3_start-e0-06-e6-ce-50-9f
[605] __fnbamd_cfg_get_radius_list_by_group-Loading RADIUS server 'Ningdun-91166' for usergroup 'Ningdun-91166' (4)
[305] fnbamd_create_radius_socket-Opened radius socket 13
[305] fnbamd_create_radius_socket-Opened radius socket 14
[1338] fnbamd_radius_auth_send-Compose RADIUS request
[1305] fnbamd_rad_dns_cb-192.168.91.166->192.168.91.166
[1280] __fnbamd_rad_send-Sent radius req to server 'Ningdun-91166': fd=13, IP=192.168.91.166(192.168.91.166:1812) code=1 id=115 l
en=211 user="e0-06-e6-ce-50-9f" using CHAP
[282] radius_server_auth-Timer of rad 'Ningdun-91166' is added
[718] auth_tac_plus_start-Didn't find tac_plus servers (0)
[439] ldap_start-Didn't find ldap servers (0)
[556] create_auth_session-Total 1 server(s) to try
[2502] fnbamd_auth_handle_radius_result-Timer of rad 'Ningdun-91166' is deleted
[1746] fnbamd_radius_auth_validate_pkt-RADIUS resp code 3
[2528] fnbamd_auth_handle_radius_result-->Result for radius svr 'Ningdun-91166' 192.168.91.166(1) is 1
[182] fnbamd_comm_send_result-Sending result 1 (error 0, nid 0) for req 1838071636
[708] destroy_auth_session-delete session 1838071636
```

Radius resp code 3 即 radius access reject.

下面是 radius server 侧的抓包:

No.	Time	Source	Destination	Protocol	Length	Info
346	12.608068	192.168.91.254	192.168.91.166	RADIUS	253	Access-Request(1) (id=115, l=211)
347	12.640805	192.168.91.166	192.168.91.254	RADIUS	78	Access-Reject(3) (id=115, l=36)

```
Frame 346: 253 bytes on wire (2024 bits), 253 bytes captured (2024 bits) on interface 0
Ethernet II, Src: Fortinet_bc:e5:97 (08:5b:0e:bc:e5:97), Dst: Vmware_b6:12:00 (00:0c:29:b6:12:00)
Internet Protocol Version 4, Src: 192.168.91.254, Dst: 192.168.91.166
User Datagram Protocol, Src Port: 61883, Dst Port: 1812
RADIUS Protocol
    Code: Access-Request (1)
    Packet identifier: 0x73 (115)
    Length: 211
    Authenticator: 3fea2e2df1c04af48bd8e699dc94b9e9
    [The response to this request is in frame 347]
  Attribute Value Pairs
    AVP: l=18 t=NAS-Identifier(32): FGT51E3U15000122
    AVP: l=19 t=User-Name(1): e0-06-e6-ce-50-9f
    AVP: l=19 t=CHAP-Password(3): b02672cd967e5b498e31582417780b9c99
    AVP: l=6 t=NAS-Port-Type(61): Virtual(5)
    AVP: l=30 t=Called-Station-Id(30): 90-6C-AC-5D-C6-2D:1macportal
    AVP: l=19 t=Calling-Station-Id(31): E0-06-E6-CE-50-9F
    AVP: l=18 t=Vendor-Specific(26) v=Fortinet, Inc.(12356)
    AVP: l=24 t=Vendor-Specific(26) v=Fortinet, Inc.(12356)
    AVP: l=10 t=Acct-Session-Id(44): 6d8ebf54
    AVP: l=10 t=Connect-Info(77): web-auth
    AVP: l=12 t=Vendor-Specific(26) v=Fortinet, Inc.(12356)
    AVP: l=6 t=Service-Type(6): Login(1)
```

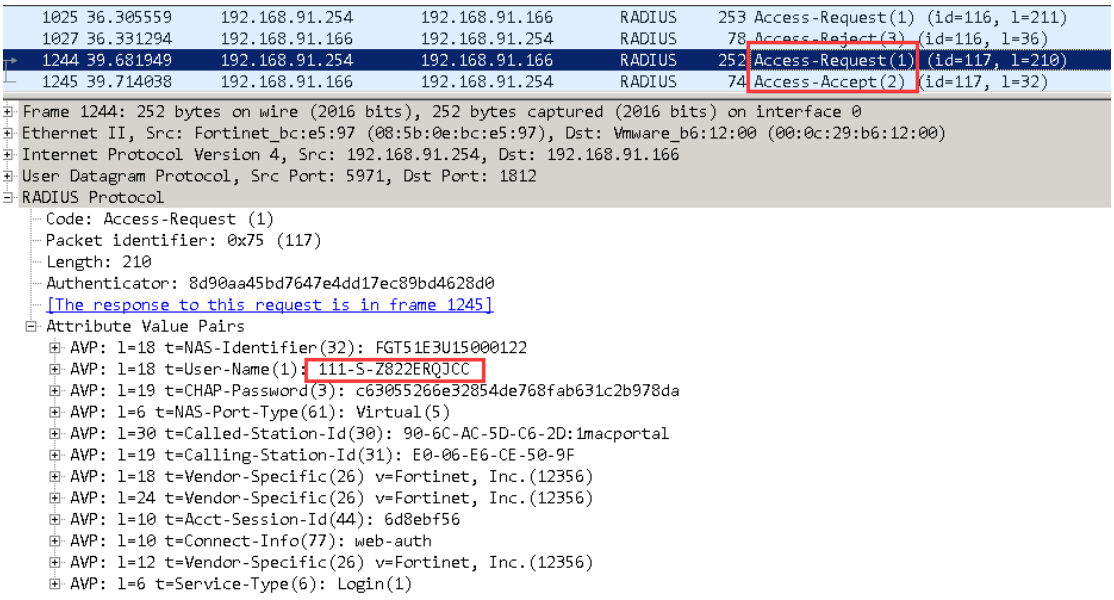
MAC 认证失败后，转 Portal 认证，用户在 Portal 登录页面输入正确的用户名和密码后:

FGT 上的 debug 日志:

```
[1338] fnbamd_radius_auth_send-Compose RADIUS request
[1305] fnbamd_rad_dns_cb-192.168.91.166->192.168.91.166
[1280] __fnbamd_rad_send-Sent radius req to server 'Ningdun-91166': fd=13, IP=192.168.91.166(192.168.91.166:1812) code=1 id=117 l
en=210 user="111-S-Z822ERQJCC" using CHAP
[282] radius_server_auth-Timer of rad 'Ningdun-91166' is added
[718] auth_tac_plus_start-Didn't find tac_plus servers (0)
[439] ldap_start-Didn't find ldap servers (0)
[556] create_auth_session-Total 1 server(s) to try
[2502] fnbamd_auth_handle_radius_result-Timer of rad 'Ningdun-91166' is deleted
[1746] fnbamd_radius_auth_validate_pkt-RADIUS resp code 2
[2528] fnbamd_auth_handle_radius_result-->Result for radius svr 'Ningdun-91166' 192.168.91.166(1) is 0
```

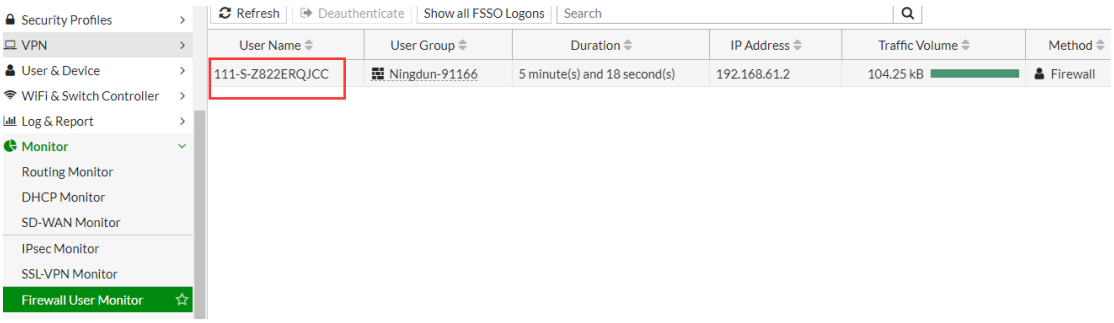
Radius resp code 2 即 radius access accept

Radius server 侧的抓包:



防火墙上认证状态查询:

GUI:



命令行下:

```
FGT51E3U15000122 #
FGT51E3U15000122 # diagnose firewall auth list

192.168.61.2, 111-S-Z822ERQJCC
        src_mac: e0:06:e6:ce:50:9f
        type: fw, id: 0, duration: 370, idled: 0
        expire: 300, allow-idle: 300
        flag(130): radius idle wsso
        server: Ningdun-91166
        packets: in 330 out 401, bytes: in 72556 out 33076
        group_id: 4
        group_name: Ningdun-91166

----- 1 listed, 0 filtered ------
```

2.2 用户离开无线网络一段时间后再次接入无线网络

首先用户会进行 MAC 认证，由于之前此 MAC 的 Portal 认证成功过, radius

server 上已经记录了此 MAC,所以 MAC 认证会显示成功.

FGT 上的 debug 日志:

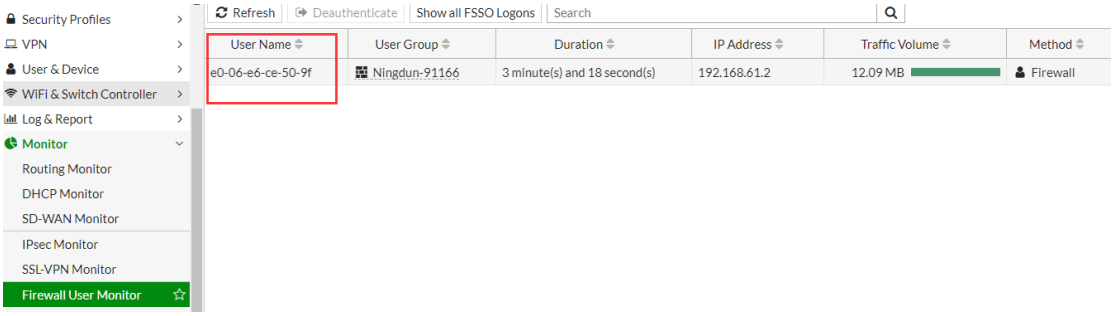
```
[1338] fnbamd_radius_auth_send-Compose RADIUS request
[1305] fnbamd_rad_dns_cb-192.168.91.166->192.168.91.166
[1280] __fnbamd_rad_send-Sent radius req to server 'Ningdun-91166': fd=13, IP=192.168.91.166(192.168.91.166:1812) code=1 id=120 l
en=211 user="e0-06-e6-ce-50-9f" using CHAP
[282] radius_server_auth-Timer of rad 'Ningdun-91166' is added
[718] auth_tac_plus_start-Didn't find tac_plus servers (0)
[439] ldap_start-Didn't find ldap servers (0)
[556] create_auth_session-Total 1 server(s) to try
[2502] fnbamd_auth_handle_radius_result-Timer of rad 'Ningdun-91166' is deleted
[1746] fnbamd_radius_auth_validate_pkt-RADIUS resp code 2
[2528] fnbamd_auth_handle_radius_result-->Result for radius svr 'Ningdun-91166' 192.168.91.166(1) is 0
```

Radius server 侧的抓包:

```
3744 141.892064   192.168.91.254   192.168.91.166   RADIUS   253 Access-Request(1) (id=120, l=211)
3746 141.926175   192.168.91.166   192.168.91.254   RADIUS    62 Access-Accept(2) (id=120, l=20)

Frame 3744: 253 bytes on wire (2024 bits), 253 bytes captured (2024 bits) on interface 0
Ethernet II, Src: Fortinet_bc:e5:97 (08:5b:0e:bc:e5:97), Dst: Vmware_b6:12:00 (00:0c:29:b6:12:00)
Internet Protocol Version 4, Src: 192.168.91.254, Dst: 192.168.91.166
User Datagram Protocol, Src Port: 24791, Dst Port: 1812
RADIUS Protocol
    Code: Access-Request (1)
    Packet identifier: 0x78 (120)
    Length: 211
    Authenticator: 0adfe5d50f9dfe34f76ed761ef777dfb
    [The response to this request is in frame 3746]
  Attribute Value Pairs
    AVP: l=18 t=NAS-Identifier(32): FGT51E3U15000122
    AVP: l=19 t=User-Name(1): e0-06-e6-ce-50-9f
    AVP: l=19 t=CHAP-Password(3): 54037bfee532bad5c10dbafc424876579a
    AVP: l=6 t=NAS-Port-Type(61): Virtual(5)
    AVP: l=30 t=Called-Station-Id(30): 90-6C-AC-5D-C6-2D:1macportal
    AVP: l=19 t=Calling-Station-Id(31): E0-06-E6-CE-50-9F
    AVP: l=18 t=Vendor-Specific(26) v=Fortinet, Inc.(12356)
    AVP: l=24 t=Vendor-Specific(26) v=Fortinet, Inc.(12356)
    AVP: l=10 t=Acct-Session-Id(44): 6d8ebf57
    AVP: l=10 t=Connect-Info(77): web-auth
    AVP: l=12 t=Vendor-Specific(26) v=Fortinet, Inc.(12356)
    AVP: l=6 t=Service-Type(6): Login(1)
```

防火墙上认证状态查询:

GUI:



命令行显示:

```
FGT51E3U15000122 # diagnose firewall auth list

192.168.61.2, e0-06-e6-ce-50-9f
        src_mac: e0:06:e6:ce:50:9f
        type: fw, id: 0, duration: 249, idled: 0
        expire: 300, allow-idle: 300
        flag(130): radius idle wsso
        server: Ningdun-91166
        packets: in 10693 out 7149, bytes: in 11354487 out 757819
        group_id: 4
        group_name: Ningdun-91166

----- 1 listed, 0 filtered ------
```

3. 测试中的 radius 认证抓包

   首次 MAC 认证失败,转 Portal 认证, Portal 认证成功:

   fgt_mac_portal_radius-portal.pcapn

   用户再次接入无线网络时, MAC 认证成功:

   fgt_mac_portal_radius-mac.pcapng

   测试使用的 FortiGate 配置:

   FGT_Wireless_MacPortal_Tunnel_FG