

## WinRADIUS 2.2.10 (64-bit)

Thank you for choosing WinRADIUS Server 2.2.10 (64-bit).

### Build Options

- OpenSSL 1.0.2j (FIPS-enabled)
- OpenLDAP 2.4.44
- Kerberos V (Heimdal 1.7rc1)
- PostgreSQL 9.6.1
- ODBC support (unixODBC 2.3.4)
- Hiredis 0.13.3
- Python 2.7.12
- Perl 5.24.0
- HostAP 2.6
- IPv6

### Setup

- a) Start WinRADIUS Server (Start - Programs - WinRADIUS Server 2.2.10 - Start RADIUS Server (Debug)). *Make sure to stop the scheduled task!*
- b) Run tests (in bin\tests folder) (Start - Programs - WinRADIUS Server 2.2.10 - RADIUS Command Prompt)

### Useful commands (sanity checks)

- a) radiusd.exe -Xv
- b) radwho.exe -d ..\etc\raddb
- c) run radtestwin.cmd in bin\tests folder
- d) run radtest-digest.cmd in bin\tests folder
- e) run radtest-sim.cmd in bin\tests folder
- f) run radeapclient.cmd in bin\tests folder
- g) run rad\_test\_multiotp.cmd in bin\tests folder

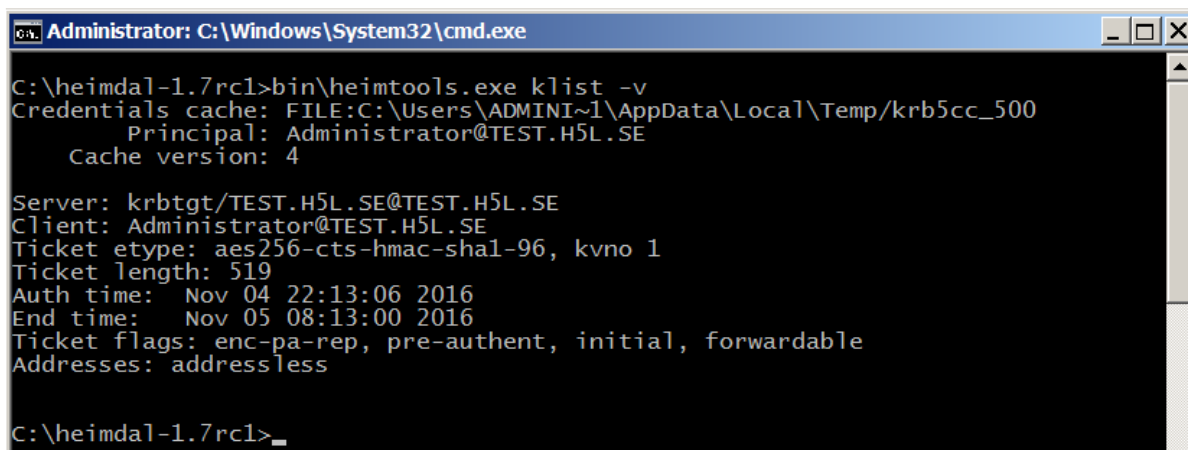
## Version Info

```
Administrator: RADIUS Command Prompt
C:\freeradius-2.2.10\sbin>radiusd.exe -Xv
Sun Nov 06 21:12:43 2016 : Info: radiusd.exe: FreeRADIUS Version 2.2.10, for host
t x86_64-pc-mingw32, built on Nov  4 2016 at 01:27:27
Sun Nov 06 21:12:43 2016 : Debug: Server was built with:
Sun Nov 06 21:12:43 2016 : Debug:   accounting
Sun Nov 06 21:12:43 2016 : Debug:   authentication
Sun Nov 06 21:12:43 2016 : Debug:   ascend binary attributes
Sun Nov 06 21:12:43 2016 : Debug:   coa
Sun Nov 06 21:12:43 2016 : Debug:   detail
Sun Nov 06 21:12:43 2016 : Debug:   dhcp
Sun Nov 06 21:12:43 2016 : Debug:   dynamic clients
Sun Nov 06 21:12:43 2016 : Debug:   proxy
Sun Nov 06 21:12:43 2016 : Debug:   regex-posix-extended
Sun Nov 06 21:12:43 2016 : Debug:   session-management
Sun Nov 06 21:12:43 2016 : Debug:   stats
Sun Nov 06 21:12:43 2016 : Debug:   threads
Sun Nov 06 21:12:43 2016 : Debug:   unlang
Sun Nov 06 21:12:43 2016 : Debug:   vmps
Sun Nov 06 21:12:43 2016 : Debug:   IPv6
Sun Nov 06 21:12:43 2016 : Debug: Server core libs:
Sun Nov 06 21:12:43 2016 : Debug:   ssl       : OpenSSL 1.0.2j-fips  26 Sep 2016
Sun Nov 06 21:12:43 2016 : Debug:   eap2      : HostAP 2.6
Sun Nov 06 21:12:43 2016 : Debug:   ldap     : OpenLDAP 2.4.44
Sun Nov 06 21:12:43 2016 : Debug:   krb5     : Heimdal 1.7rc1
Sun Nov 06 21:12:43 2016 : Debug:   sql      : PostgreSQL 9.6.1
Sun Nov 06 21:12:43 2016 : Debug:   odbc     : unixODBC 2.3.4
Sun Nov 06 21:12:43 2016 : Debug:   redis    : Hiredis 0.13.3
Sun Nov 06 21:12:43 2016 : Debug:   python   : Python 2.7.12
Sun Nov 06 21:12:43 2016 : Debug:   perl     : Perl 5.24.0
Sun Nov 06 21:12:43 2016 : Debug: Endianess:
Sun Nov 06 21:12:43 2016 : Debug:   little
Sun Nov 06 21:12:43 2016 : Info: Copyright (C) 1999-2015 The FreeRADIUS server p
roject and contributors.
Sun Nov 06 21:12:43 2016 : Info: There is NO warranty; not even for MERCHANTABILITY or FITNESS FOR A
PARTICULAR PURPOSE.
Sun Nov 06 21:12:43 2016 : Info: You may redistribute copies of FreeRADIUS under
the terms of the
Sun Nov 06 21:12:43 2016 : Info: GNU General Public License.
Sun Nov 06 21:12:43 2016 : Info: For more information about these matters, see t
he file named COPYRIGHT.
C:\freeradius-2.2.10\sbin>
```

## Modules Set Up

### rlm\_krb5

- ✓ Install and set up Heimdal Kerberos (Server)
- ✓ Obtain a valid kerberos ticket for a particular user (a.k.a. kinit <user name>)



```
Administrator: C:\Windows\System32\cmd.exe
C:\heimdal-1.7rc1>bin\heimtools.exe klist -v
Credentials cache: FILE:C:\Users\ADMINI~1\AppData\Local\Temp\krb5cc_500
Principal: Administrator@TEST.H5L.SE
Cache version: 4

Server: krbtgt/TEST.H5L.SE@TEST.H5L.SE
Client: Administrator@TEST.H5L.SE
Ticket etype: aes256-cts-hmac-sha1-96, kvno 1
Ticket length: 519
Auth time: Nov 04 22:13:06 2016
End time: Nov 05 08:13:00 2016
Ticket flags: enc-pa-rep, pre-authent, initial, forwardable
Addresses: addressless

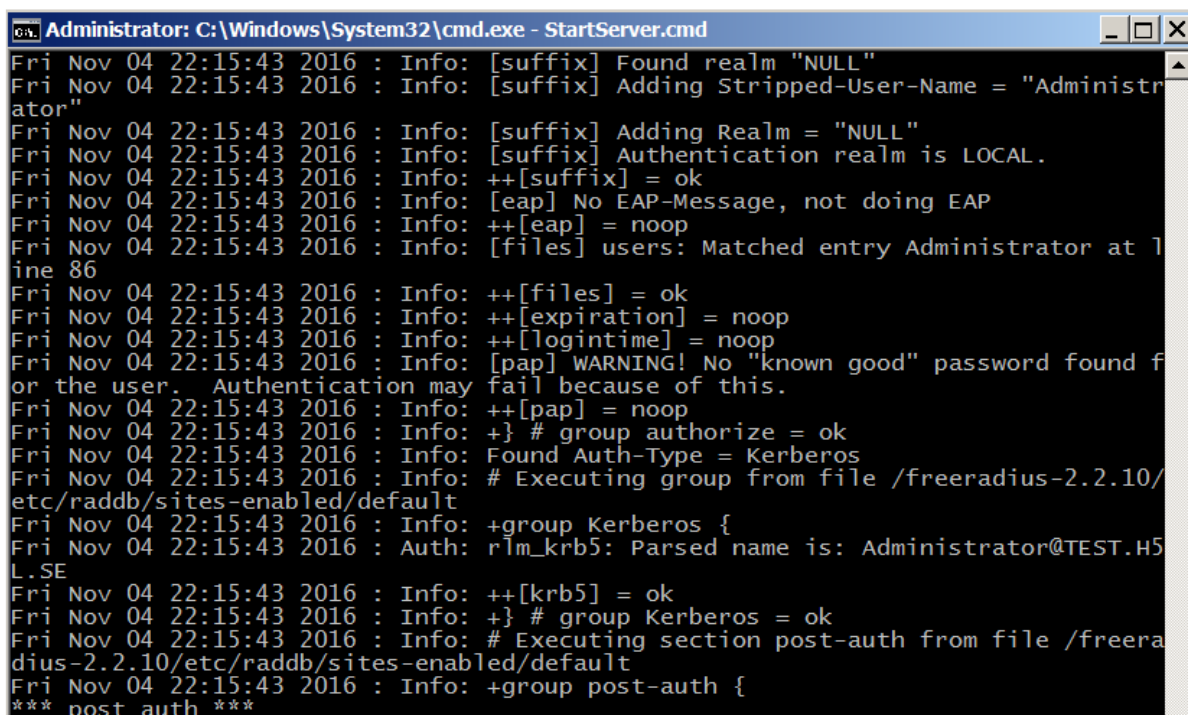
C:\heimdal-1.7rc1>
```

- ✓ Add/Adjust some values in: modules/krb5, users, and sites-enabled/default

```
krb5 {
    keytab = C:/heimdal-1.7rc1/etc/krb5.keytab
    service_principal = host/melbourne@TEST.H5L.SE
}

Auth-Type Kerberos {
    krb5
}
```

- ✓ RADIUS Server response



```
Administrator: C:\Windows\System32\cmd.exe - StartServer.cmd
Fri Nov 04 22:15:43 2016 : Info: [suffix] Found realm "NULL"
Fri Nov 04 22:15:43 2016 : Info: [suffix] Adding Stripped-User-Name = "Administrator"
Fri Nov 04 22:15:43 2016 : Info: [suffix] Adding Realm = "NULL"
Fri Nov 04 22:15:43 2016 : Info: [suffix] Authentication realm is LOCAL.
Fri Nov 04 22:15:43 2016 : Info: ++[suffix] = ok
Fri Nov 04 22:15:43 2016 : Info: [eap] No EAP-Message, not doing EAP
Fri Nov 04 22:15:43 2016 : Info: ++[eap] = noop
Fri Nov 04 22:15:43 2016 : Info: [files] users: Matched entry Administrator at line 86
Fri Nov 04 22:15:43 2016 : Info: ++[files] = ok
Fri Nov 04 22:15:43 2016 : Info: ++[expiration] = noop
Fri Nov 04 22:15:43 2016 : Info: ++[logintime] = noop
Fri Nov 04 22:15:43 2016 : Info: [pap] WARNING! No "known good" password found for the user. Authentication may fail because of this.
Fri Nov 04 22:15:43 2016 : Info: ++[pap] = noop
Fri Nov 04 22:15:43 2016 : Info: +} # group authorize = ok
Fri Nov 04 22:15:43 2016 : Info: Found Auth-Type = Kerberos
Fri Nov 04 22:15:43 2016 : Info: # Executing group from file /freeradius-2.2.10/etc/raddb/sites-enabled/default
Fri Nov 04 22:15:43 2016 : Info: +group Kerberos {
Fri Nov 04 22:15:43 2016 : Auth: rlm_krb5: Parsed name is: Administrator@TEST.H5L.SE
Fri Nov 04 22:15:43 2016 : Info: ++[krb5] = ok
Fri Nov 04 22:15:43 2016 : Info: +} # group Kerberos = ok
Fri Nov 04 22:15:43 2016 : Info: # Executing section post-auth from file /freeradius-2.2.10/etc/raddb/sites-enabled/default
Fri Nov 04 22:15:43 2016 : Info: +group post-auth {
*** post_auth ***
```

## rlm\_eap2

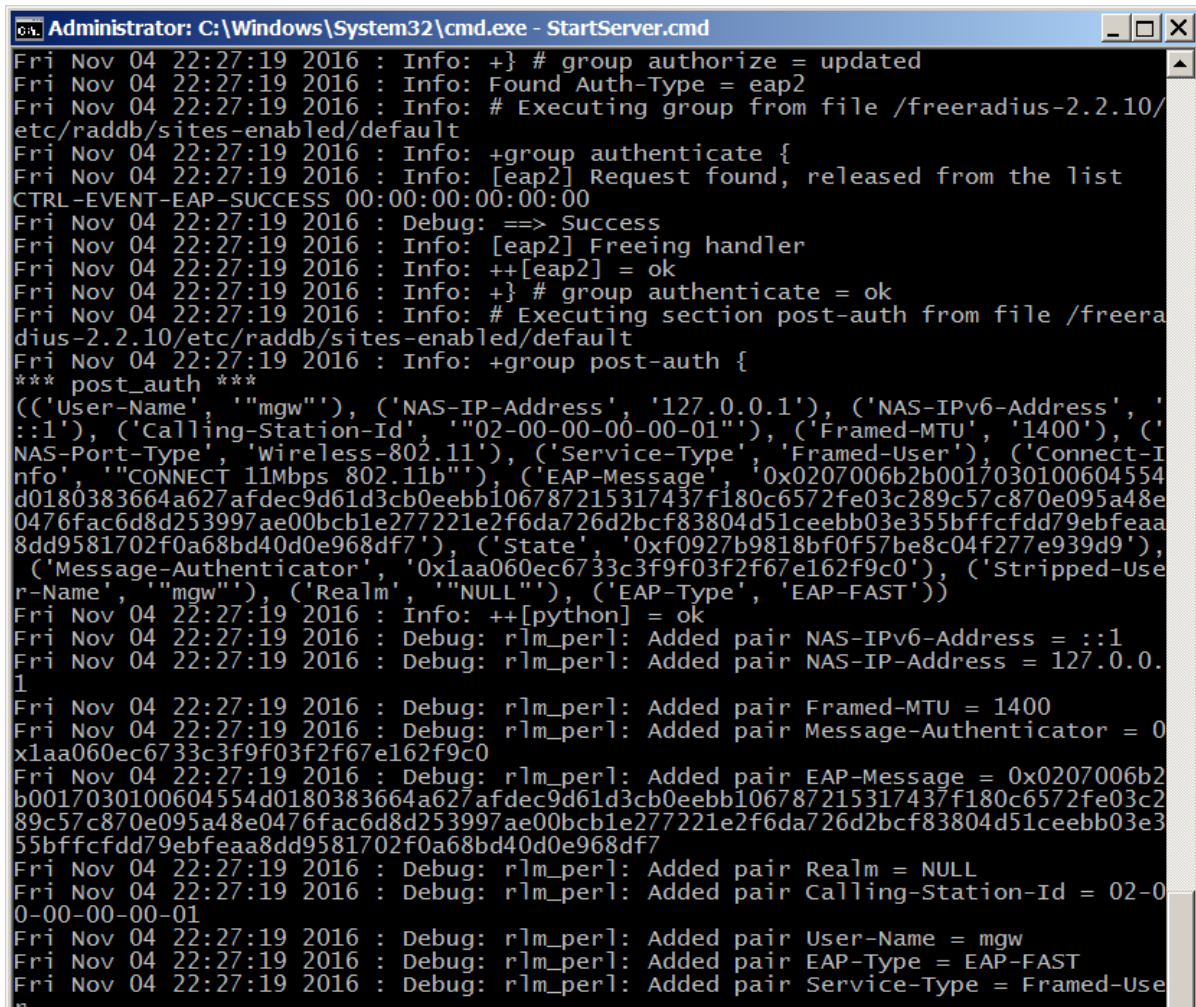
users file:

```
mgw    Auth-Type := eap2, Cleartext-Password := "tttt"
```

eap-fast.conf

```
network={
    ssid="test"
    key_mgmt=WPA-EAP
    eap=FAST
    anonymous_identity="mgw"
    identity="mgw"
    password="tttt"
    phase1="fast_provisioning=3"
    phase2="auth=MSCHAPV2"
    pac_file="freeradius.eap-fast-pac"
}
```

Use eapol\_test utility to test EAP-FAST



```
Administrator: C:\Windows\System32\cmd.exe - StartServer.cmd
Fri Nov 04 22:27:19 2016 : Info: +} # group authorize = updated
Fri Nov 04 22:27:19 2016 : Info: Found Auth-Type = eap2
Fri Nov 04 22:27:19 2016 : Info: # Executing group from file /freeradius-2.2.10/
etc/raddb/sites-enabled/default
Fri Nov 04 22:27:19 2016 : Info: +group authenticate {
Fri Nov 04 22:27:19 2016 : Info: [eap2] Request found, released from the list
CTRL-EVENT-EAP-SUCCESS 00:00:00:00:00:00
Fri Nov 04 22:27:19 2016 : Debug: ==> Success
Fri Nov 04 22:27:19 2016 : Info: [eap2] Freeing handler
Fri Nov 04 22:27:19 2016 : Info: ++[eap2] = ok
Fri Nov 04 22:27:19 2016 : Info: +} # group authenticate = ok
Fri Nov 04 22:27:19 2016 : Info: # Executing section post-auth from file /freera
dius-2.2.10/etc/raddb/sites-enabled/default
Fri Nov 04 22:27:19 2016 : Info: +group post-auth {
*** post_auth ***
(('User-Name', '"mgw"'), ('NAS-IP-Address', '127.0.0.1'), ('NAS-IPv6-Address', '
::1'), ('Calling-Station-Id', '"02-00-00-00-00-01"'), ('Framed-MTU', '1400'), ('
NAS-Port-Type', 'Wireless-802.11'), ('Service-Type', 'Framed-User'), ('Connect-I
nfo', '"CONNECT 11Mbps 802.11b"'), ('EAP-Message', '0x0207006b2b0017030100604554
d0180383664a627afdec9d61d3cb0eebb106787215317437f180c6572fe03c289c57c870e095a48e
0476fac6d8d253997ae00bcb1e277221e2f6da726d2bcf83804d51ceebb03e355bffcfd79ebfeaa
8dd9581702f0a68bd40d0e968df7'), ('State', '0xf0927b9818bf0f57be8c04f277e939d9'),
('Message-Authenticator', '0x1aa060ec6733c3f9f03f2f67e162f9c0'), ('Stripped-Use
r-Name', '"mgw"'), ('Realm', '"NULL"'), ('EAP-Type', 'EAP-FAST'))
Fri Nov 04 22:27:19 2016 : Info: ++[python] = ok
Fri Nov 04 22:27:19 2016 : Debug: rlm_perl: Added pair NAS-IPv6-Address = ::1
Fri Nov 04 22:27:19 2016 : Debug: rlm_perl: Added pair NAS-IP-Address = 127.0.0.
1
Fri Nov 04 22:27:19 2016 : Debug: rlm_perl: Added pair Framed-MTU = 1400
Fri Nov 04 22:27:19 2016 : Debug: rlm_perl: Added pair Message-Authenticator = 0
x1aa060ec6733c3f9f03f2f67e162f9c0
Fri Nov 04 22:27:19 2016 : Debug: rlm_perl: Added pair EAP-Message = 0x0207006b2
b0017030100604554d0180383664a627afdec9d61d3cb0eebb106787215317437f180c6572fe03c2
89c57c870e095a48e0476fac6d8d253997ae00bcb1e277221e2f6da726d2bcf83804d51ceebb03e3
55bffcfd79ebfeaa8dd9581702f0a68bd40d0e968df7
Fri Nov 04 22:27:19 2016 : Debug: rlm_perl: Added pair Realm = NULL
Fri Nov 04 22:27:19 2016 : Debug: rlm_perl: Added pair Calling-Station-Id = 02-0
0-00-00-01
Fri Nov 04 22:27:19 2016 : Debug: rlm_perl: Added pair User-Name = mgw
Fri Nov 04 22:27:19 2016 : Debug: rlm_perl: Added pair EAP-Type = EAP-FAST
Fri Nov 04 22:27:19 2016 : Debug: rlm_perl: Added pair Service-Type = Framed-Use
```

## EAPOL-TEST output

```
RADIUS packet matching with station
MS-MPPE-Send-Key (sign) - hexdump(len=32): a7 9c 32 36 47 7a 0a 54 36 eb b7 8a e
8 15 ab ea ab 94 dc ca 38 e6 3e 1c 1d 68 6f 31 22 aa 77 8b
MS-MPPE-Recv-Key (crypt) - hexdump(len=32): 62 dd 03 a0 bc d8 6f b0 18 84 14 4d
7e 40 1c 2f 18 87 01 af 63 f5 66 66 43 25 ce 54 e4 c9 0d d2
decapsulated EAP packet (code=3 id=7 len=4) from RADIUS server: EAP Success
EAPOL: Received EAP-Packet frame
EAPOL: SUPP_BE entering state REQUEST
EAPOL: getSuppRsp
EAP: EAP entering state RECEIVED
EAP: Received EAP-Success
EAP: Status notification: completion (param=success)
EAP: EAP entering state SUCCESS
CTRL-EVENT-EAP-SUCCESS EAP authentication completed successfully
EAPOL: IEEE 802.1X for plaintext connection; no EAPOL-Key frames required
WPA: EAPOL processing complete
Cancelling authentication timeout
State: DISCONNECTED -> COMPLETED
EAPOL: SUPP_PAE entering state AUTHENTICATED
EAPOL: SUPP_BE entering state RECEIVE
EAPOL: SUPP_BE entering state SUCCESS
EAPOL: SUPP_BE entering state IDLE
eapol_sm_cb: result=1
EAPOL: Successfully fetched key (len=32)
PMK from EAPOL - hexdump(len=32): 62 dd 03 a0 bc d8 6f b0 18 84 14 4d 7e 40 1c 2
f 18 87 01 af 63 f5 66 66 43 25 ce 54 e4 c9 0d d2
No EAP-Key-Name received from server
WPA: Clear old PMK and PTK
EAP: deinitialize previously used EAP method (43, FAST) at EAP deinit
ENGINE: engine deinit
MPPE keys OK: 1 mismatch: 0
SUCCESS
```

## EAP-SIM (via sim\_files)

```
Administrator: C:\Windows\System32\cmd.exe - radtest-sim.cmd
Kc1: 1021324354657687
Kc2: 30415263748596a7
versionlist[2]: 0001
select 00 01

Output
mk: 1fc08e11_3849ec90_d5719dba_a419d06c_95c7ca19
K_aut: c6366e97_950a6cf3_ab04464f_c51d92df
K_encr: 2a6371df_0c1987c9_de7228ee_06ace7f9
msk: 95fce06c_f2c44411_d22c50c1_0750a114_69edcfbd
5f4aadd5_1eade2a5_cbbf7307_212ebd23_a59635b8
7cdafaa5_d7d616b3_e4e6a3be_1b5f021d_778484fd
a33ec704
emsk: 7fb7d633_817dc18d_d0ce8b10_273c5c5b_f6d90111
7ca3986a_8cfd9c6e_63e2bb59_05cd2691_c4ab048c
85c85532_f0a5bc24_a59ccb9b_967a5526_e8ed675a
8876d60b
MAC check succeed
Sending Access-Request packet to host 127.0.0.1 port 1812, id=23, length=122
  User-Name = "eapsim"
  NAS-IP-Address = 127.0.0.1
  EAP-Code = Response
  EAP-Id = 134
  Message-Authenticator = 0x00000000000000000000000000000000
  NAS-Port = 0
  EAP-Sim-Rand1 = 0xabcd1234abcd1234abcd1234abcd1234
  EAP-Sim-Rand2 = 0xbcd1234abcd1234abcd1234abcd1234a
  EAP-Sim-Rand3 = 0xcd1234abcd1234abcd1234abcd1234ab
  EAP-Sim-SRES1 = 0x1234abcd
  EAP-Sim-SRES2 = 0x234abcd1
  EAP-Sim-SRES3 = 0x34abcd12
  EAP-Sim-KC1 = 0x0011223344556677
  EAP-Sim-KC2 = 0x1021324354657687
  EAP-Sim-KC3 = 0x30415263748596a7
  EAP-Sim-State = 1
  EAP-Sim-Subtype = Challenge
  State = 0x32ald2713327c0a299839b75fc2e6e5e
  EAP-Sim-MAC = 0x1234abcd234abcd134abcd12
  EAP-Sim-KEY = 0xc6366e97950a6cf3ab04464fc51d92df
  EAP-Message = 0x0286001c120b0000b050000e943da5c73201f120ae5d260300b0c18

Received Access-Accept packet from host 127.0.0.1 port 1812, id=23, length=168
  User-Name = "eapsim"
  EAP-Message = 0x03870004
  Message-Authenticator = 0x58154fb3683f2c8732c603277a3b1a0f
  MS-MPPE-Send-Key = 0x212ebd23a59635b87cdafaa5d7d616b3e4e6a3be1b5f021d778
484fda33ec704
  MS-MPPE-Recv-Key = 0x95fce06cf2c44411d22c50c10750a11469edcfbd5f4aadd51ea
de2a5cbbf7307
  EAP-Id = 135
  EAP-Code = Success

  Total approved auths: 1
  Total denied auths: 0
```

## Integration with HostAP Server

### SIM/AKA/AKA' Server

```
Administrator: C:\Windows\System32\cmd.exe - start_sim_aka_server.bat
HLR/AuC Gateway v2.6
Copyright (c) 2005-2016, Jouni Malinen <j@w1.fi>

Listening for requests on UDP 1888 (IPv4) ...
Received: SIM-REQ-AUTH 232010000000000 3
Send: SIM-RESP-AUTH 232010000000000 0675972b043d93a0:a700187d:e4dd0af3b8d070cbf2
c7cde31b4896cb 2ef29be45549a720:621fd0bb:21872260ba2b801e2baa515154b30b0b 93e047
612aafd30d:50b17025:ea46d7d90d89ababb1c4d158ca73c988
```

### RADIUS Server

```
Administrator: C:\Windows\System32\cmd.exe - StartServer.cmd
Sending Access-Request of id 201 to fe80::51f6:db9b:b75c:5c7f port 18121
  User-Name = "1232010000000000"
  NAS-IP-Address = 127.0.0.1
  NAS-IPv6-Address = ::1
  Calling-Station-Id = "02-00-00-00-00-01"
  Framed-MTU = 1400
  NAS-Port-Type = Wireless-802.11
  Service-Type = Framed-User
  Connect-Info = "CONNECT 11Mbps 802.11b"
  EAP-Message = 0x0202001c120b00000b050000194d4f642c08a85c2de6a4674eb0f88f

  State = 0x00000000
  Message-Authenticator = 0x00000000000000000000000000000000
  Proxy-State = 0x32
Mon Nov 07 09:19:32 2016 : Info: Proxying request 9 to home server fe80::51f6:db
9b:b75c:5c7f port 18121
Sending Access-Request of id 201 to fe80::51f6:db9b:b75c:5c7f port 18121
  User-Name = "1232010000000000"
  NAS-IP-Address = 127.0.0.1
  NAS-IPv6-Address = ::1
  Calling-Station-Id = "02-00-00-00-00-01"
  Framed-MTU = 1400
  NAS-Port-Type = Wireless-802.11
  Service-Type = Framed-User
  Connect-Info = "CONNECT 11Mbps 802.11b"
  EAP-Message = 0x0202001c120b00000b050000194d4f642c08a85c2de6a4674eb0f88f

  State = 0x00000000
  Message-Authenticator = 0x00000000000000000000000000000000
  Proxy-State = 0x32
Mon Nov 07 09:19:32 2016 : Debug: Going to the next request
Mon Nov 07 09:19:32 2016 : Debug: Waking up in 0.9 seconds.
rad_recv: Access-Accept packet from host fe80::51f6:db9b:b75c:5c7f port 18121, i
d=201, length=163
  EAP-Message = 0x03020004
  MS-MPPE-Send-Key = 0x70313c65428c15df878554d2bd549648a67a195bfc17d35e8e6
4e0aa6b78112c
  MS-MPPE-Recv-Key = 0xef97efd58404db844277e045195e867b3dc5946957854684a80
54a987993eae8
  Proxy-State = 0x32
  Message-Authenticator = 0x7d16ddf4cd95601d1c608829979528e6
Mon Nov 07 09:19:32 2016 : Info: # Executing section post-proxy from file /freer
adius-2.2.10/etc/raddb/sites-enabled/default
Mon Nov 07 09:19:32 2016 : Info: +group post-proxy {
Mon Nov 07 09:19:32 2016 : Info: [eap] No pre-existing handler found
Mon Nov 07 09:19:32 2016 : Info: ++[eap] = noop
Mon Nov 07 09:19:32 2016 : Info: +} # group post-proxy = noop
Mon Nov 07 09:19:32 2016 : Info: Found Auth-Type = eap2
Mon Nov 07 09:19:32 2016 : Info: Found Auth-Type = Accept
Mon Nov 07 09:19:32 2016 : Error: Warning: Found 2 auth-types on request for us
er '1232010000000000'
Mon Nov 07 09:19:32 2016 : Info: Auth-Type = Accept, accepting the user
Mon Nov 07 09:19:32 2016 : Info: # Executing section post-auth from file /freer
adius-2.2.10/etc/raddb/sites-enabled/default
```

## EAPOL-TEST Output (EAP-SIM)

```
Administrator: C:\Windows\System32\cmd.exe
STA 02:00:00:00:00:01: Received RADIUS packet matched with a pending request, round trip time 0.28 sec

RADIUS packet matching with station
MS-MPPE-Send-Key (sign) - hexdump(len=32): 70 31 3c 65 42 8c 15 df 87 85 54 d2 b
d 54 96 48 a6 7a 19 5b fc 17 d3 5e 8e 64 e0 aa 6b 78 11 2c
MS-MPPE-Recv-Key (crypt) - hexdump(len=32): ef 97 ef d5 84 04 db 84 42 77 e0 45
19 5e 86 7b 3d c5 94 69 57 85 46 84 a8 05 4a 98 79 93 ea e8
decapsulated EAP packet (code=3 id=2 len=4) from RADIUS server: EAP Success
EAPOL: Received EAP-Packet frame
EAPOL: SUPP_BE entering state REQUEST
EAPOL: getSuppRsp
EAP: EAP entering state RECEIVED
EAP: Received EAP-Success
EAP: Status notification: completion (param=success)
EAP: EAP entering state SUCCESS
CTRL-EVENT-EAP-SUCCESS EAP authentication completed successfully
EAPOL: IEEE 802.1X for plaintext connection; no EAPOL-Key frames required
WPA: EAPOL processing complete
Cancelling authentication timeout
State: DISCONNECTED -> COMPLETED
EAPOL: SUPP_PAE entering state AUTHENTICATED
EAPOL: SUPP_BE entering state RECEIVE
EAPOL: SUPP_BE entering state SUCCESS
EAPOL: SUPP_BE entering state IDLE
eapol_sm_cb: result=1
EAPOL: Successfully fetched key (len=32)
PMK from EAPOL - hexdump(len=32): ef 97 ef d5 84 04 db 84 42 77 e0 45 19 5e 86 7
b 3d c5 94 69 57 85 46 84 a8 05 4a 98 79 93 ea e8
No EAP-Key-Name received from server
WPA: Clear old PMK and PTK
EAP: deinitialize previously used EAP method (18, SIM) at EAP deinit
MPPE keys OK: 1 mismatch: 0
SUCCESS
```

## EAP-AKA & EAP-AKA'

```
Administrator: C:\Windows\System32\cmd.exe - start_sim_aka_server.bat
HLR/AuC Gateway v2.6
Copyright (c) 2005-2016, Jouni Malinen <j@w1.fi>

Listening for requests on UDP 1888 (IPv4) ...
Received: AKA-REQ-AUTH 2320100000000000
AKA: Milenage with SQN=000000000021
Send: AKA-RESP-AUTH 2320100000000000 ce95fbaa33837a6aaf7bdf3864c6ca1b 08502e5888f
961df3a75d9f61b0e99b7 e1307b99230b58d23d9cbf25c9d9312c 27bc020cf2312b6d8dc0094ca
c90b1a0 06e71ef0c9fb1327
Received: AKA-AUTS 2320100000000000 7b4dceeac8d9dda4efa750df9a3f ce95fbaa33837a6a
af7bdf3864c6ca1b
AKA-AUTS: IMSI=2320100000000000 AUTS=7b4dceeac8d9dda4efa750df9a3f RAND=ce95fbaa33
837a6aaf7bdf3864c6ca1b
AKA-AUTS: Re-synchronized: SQN=000000000123
No response
Received: AKA-REQ-AUTH 2320100000000000
AKA: Milenage with SQN=000000000144
Send: AKA-RESP-AUTH 2320100000000000 f6032e3e24f0be35eed91549638cae01 7293efec5da
961dfa78317ce4030fc81 4528d96f1ad7df47b4d8bd4f4c3b5ab5 bd20b680325c5c1747fc9d362
1a43b02 af2972b6bb0611d4
Received: AKA-REQ-AUTH 555444333222111
AKA: Milenage with SQN=16f3b3f70fe2
Send: AKA-RESP-AUTH 555444333222111 de367a0bb0cf7cbb6dc82e4b36b0d8c6 fcdfe80ce9f
1c3abcc3750f38485bc17 e5b7bb80bed3135cf2c11d3474c8bca9 70884e9edabdccf01b11e9903
8375a31 20ddf2ccbd4656d2
```



## RADIUS Server

```
Administrator: C:\Windows\System32\cmd.exe - StartServer.cmd
Sending Access-Request of id 29 to fe80::51f6:db9b:b75c:5c7f port 18121
  User-Name = "6555444333222111"
  NAS-IP-Address = 127.0.0.1
  NAS-IPv6-Address = ::1
  Calling-Station-Id = "02-00-00-00-00-01"
  Framed-MTU = 1400
  NAS-Port-Type = Wireless-802.11
  Service-Type = Framed-User
  Connect-Info = "CONNECT 11Mbps 802.11b"
  EAP-Message = 0x0202004c320100000303004020ddf2ccbd4656d286090000fe8790ff
81726080f9a62c67d3ee6a8ea14e47ec3aae8842d57bd60877cd5a8f0b0500007af75aab703758f9
a3462ec2929057ad
  State = 0x00000002
  Message-Authenticator = 0x00000000000000000000000000000000
  Proxy-State = 0x32
Mon Nov 07 09:55:14 2016 : Debug: Going to the next request
Mon Nov 07 09:55:14 2016 : Debug: Waking up in 0.9 seconds.
rad_recv: Access-Accept packet from host fe80::51f6:db9b:b75c:5c7f port 18121, i
d=29, length=163
  EAP-Message = 0x03020004
  MS-MPPE-Send-Key = 0x1ba920f66dbb2a0d00a614f6c3c9d4aaf36e859bc1d4dc40e87
4658d729773f2
  MS-MPPE-Recv-Key = 0x61ae847a4e3c4e6774b1588436c9225a0d058ee24b193837d55
7177404167b48
  Proxy-State = 0x32
  Message-Authenticator = 0xa8fd7750420dceefa74b722dadd1276
Mon Nov 07 09:55:14 2016 : Info: # Executing section post-proxy from file /freer
adius-2.2.10/etc/raddb/sites-enabled/default
Mon Nov 07 09:55:14 2016 : Info: +group post-proxy {
Mon Nov 07 09:55:14 2016 : Info: [eap] No pre-existing handler found
Mon Nov 07 09:55:14 2016 : Info: ++[eap] = noop
Mon Nov 07 09:55:14 2016 : Info: +} # group post-proxy = noop
Mon Nov 07 09:55:14 2016 : Info: Found Auth-Type = eap2
Mon Nov 07 09:55:14 2016 : Info: Found Auth-Type = Accept
Mon Nov 07 09:55:14 2016 : Error: Warning: Found 2 auth-types on request for us
er '6555444333222111'
Mon Nov 07 09:55:14 2016 : Info: Auth-Type = Accept, accepting the user
Mon Nov 07 09:55:14 2016 : Info: # Executing section post-auth from file /freer
adius-2.2.10/etc/raddb/sites-enabled/default
Mon Nov 07 09:55:14 2016 : Info: +group post-auth {
*** post_auth ***
```

## EAPOL-TEST Output

```
Administrator: C:\Windows\System32\cmd.exe
STA 02:00:00:00:00:01: Received RADIUS packet matched with a pending request, round trip time 0.26 sec

RADIUS packet matching with station
MS-MPPE-Send-Key (sign) - hexdump(len=32): 3e 6d 4a c0 ff d1 82 35 ed 6c 21 b6 9
3 c5 55 c0 d2 8f 56 d4 20 97 95 f9 6b 48 11 f3 0f 81 33 35
MS-MPPE-Recv-Key (crypt) - hexdump(len=32): 97 fe 26 fe 77 f6 03 40 33 27 09 bf
a4 fd 0a 01 31 c2 ce fe 21 f4 44 da 91 0f 03 2b 10 45 09 6f
decapsulated EAP packet (code=3 id=3 len=4) from RADIUS server: EAP Success
EAPOL: Received EAP-Packet frame
EAPOL: SUPP_BE entering state REQUEST
EAPOL: getSuppRsp
EAP: EAP entering state RECEIVED
EAP: Received EAP-Success
EAP: Status notification: completion (param=success)
EAP: EAP entering state SUCCESS
CTRL-EVENT-EAP-SUCCESS EAP authentication completed successfully
EAPOL: IEEE 802.1X for plaintext connection; no EAPOL-Key frames required
WPA: EAPOL processing complete
Cancelling authentication timeout
State: DISCONNECTED -> COMPLETED
EAPOL: SUPP_PAE entering state AUTHENTICATED
EAPOL: SUPP_BE entering state RECEIVE
EAPOL: SUPP_BE entering state SUCCESS
EAPOL: SUPP_BE entering state IDLE
eapol_sm_cb: result=1
EAPOL: Successfully fetched key (len=32)
PMK from EAPOL - hexdump(len=32): 97 fe 26 fe 77 f6 03 40 33 27 09 bf a4 fd 0a 0
1 31 c2 ce fe 21 f4 44 da 91 0f 03 2b 10 45 09 6f
No EAP-Key-Name received from server
WPA: Clear old PMK and PTK
EAP: deinitialize previously used EAP method (23, AKA) at EAP deinit
MPPE keys OK: 1 mismatch: 0
SUCCESS
```

```
Administrator: C:\Windows\System32\cmd.exe
STA 02:00:00:00:00:01: Received RADIUS packet matched with a pending request, round trip time 0.24 sec

RADIUS packet matching with station
MS-MPPE-Send-Key (sign) - hexdump(len=32): 1b a9 20 f6 6d bb 2a 0d 00 a6 14 f6 c
3 c9 d4 aa f3 6e 85 9b c1 d4 dc 40 e8 74 65 8d 72 97 73 f2
MS-MPPE-Recv-Key (crypt) - hexdump(len=32): 61 ae 84 7a 4e 3c 4e 67 74 b1 58 84
36 c9 22 5a 0d 05 8e e2 4b 19 38 37 d5 57 17 74 04 16 7b 48
decapsulated EAP packet (code=3 id=2 len=4) from RADIUS server: EAP Success
EAPOL: Received EAP-Packet frame
EAPOL: SUPP_BE entering state REQUEST
EAPOL: getSuppRsp
EAP: EAP entering state RECEIVED
EAP: Received EAP-Success
EAP: Status notification: completion (param=success)
EAP: EAP entering state SUCCESS
CTRL-EVENT-EAP-SUCCESS EAP authentication completed successfully
EAPOL: IEEE 802.1X for plaintext connection; no EAPOL-Key frames required
WPA: EAPOL processing complete
Cancelling authentication timeout
State: DISCONNECTED -> COMPLETED
EAPOL: SUPP_PAE entering state AUTHENTICATED
EAPOL: SUPP_BE entering state RECEIVE
EAPOL: SUPP_BE entering state SUCCESS
EAPOL: SUPP_BE entering state IDLE
eapol_sm_cb: result=1
EAPOL: Successfully fetched key (len=32)
PMK from EAPOL - hexdump(len=32): 61 ae 84 7a 4e 3c 4e 67 74 b1 58 84 36 c9 22 5
a 0d 05 8e e2 4b 19 38 37 d5 57 17 74 04 16 7b 48
No EAP-Key-Name received from server
WPA: Clear old PMK and PTK
EAP: deinitialize previously used EAP method (50, AKA') at EAP deinit
MPPE keys OK: 1 mismatch: 0
SUCCESS
```

## **rlm\_ldap**

- ✓ Install and set up OpenLDAP Server (For instance, add a testing user, certificates, etc)
- ✓ Edit sites-enabled/default file:

```
authorize {  
    ...  
    ...  
    ldap  
    ...  
    ...  
}  
  
authenticate {  
    ...  
    ...  
    Auth-Type LDAP {  
        ldap  
    }  
    ...  
    ...  
}
```

Edit modules/ldap file and adjust some values accordingly (e.g. server name, base dn, etc)

```
Administrator: Start RADIUS Server (Debug) - StartServer.cmd
Sun Nov 06 21:38:27 2016 : Debug: [ldap] setting TLS CACert File to /freeradius-2.2.10/etc/raddb/certs/ca.pem
Sun Nov 06 21:38:27 2016 : Debug: [ldap] setting TLS CACert Directory to /freeradius-2.2.10/etc/raddb/certs/
Sun Nov 06 21:38:27 2016 : Debug: [ldap] setting TLS Cert File to /freeradius-2.2.10/etc/raddb/certs/server.pem
Sun Nov 06 21:38:27 2016 : Debug: [ldap] setting TLS Key File to /freeradius-2.2.10/etc/raddb/certs/server-key.pem
Sun Nov 06 21:38:27 2016 : Debug: [ldap] setting TLS Rand File to /freeradius-2.2.10/etc/raddb/certs/random
Sun Nov 06 21:38:27 2016 : Debug: [ldap] starting TLS
Sun Nov 06 21:38:28 2016 : Debug: [ldap] bind as / to melbourne.matear.eu:389
Sun Nov 06 21:38:28 2016 : Debug: [ldap] waiting for bind result ...
Sun Nov 06 21:38:28 2016 : Debug: [ldap] Bind was successful
Sun Nov 06 21:38:28 2016 : Debug: [ldap] performing search in dc=my-domain,dc=com, with filter (uid=testuser)
Sun Nov 06 21:38:29 2016 : Info: [ldap] looking for check items in directory...
Sun Nov 06 21:38:29 2016 : Info: [ldap] looking for reply items in directory...
Sun Nov 06 21:38:29 2016 : Debug: [ldap] radiusTunnelPrivateGroupId -> Tunnel-Private-Group-Id:0 = "10"
Sun Nov 06 21:38:29 2016 : Debug: [ldap] radiusTunnelMediumType -> Tunnel-Medium-Type:0 = 802
Sun Nov 06 21:38:29 2016 : Debug: [ldap] radiusTunnelType -> Tunnel-Type:0 = VLAN
Sun Nov 06 21:38:29 2016 : Info: [ldap] Setting Auth-Type = LDAP
Sun Nov 06 21:38:29 2016 : Debug: [ldap] ldap_release_conn: Release Id: 0
Sun Nov 06 21:38:29 2016 : Info: ++[ldap] = ok
Sun Nov 06 21:38:29 2016 : Info: ++[expiration] = noop
Sun Nov 06 21:38:29 2016 : Info: ++[logintime] = noop
Sun Nov 06 21:38:29 2016 : Info: [pap] WARNING: Auth-Type already set. Not setting to PAP
Sun Nov 06 21:38:29 2016 : Info: ++[pap] = noop
Sun Nov 06 21:38:29 2016 : Info: +} # group authorize = ok
Sun Nov 06 21:38:29 2016 : Info: Found Auth-Type = LDAP
Sun Nov 06 21:38:29 2016 : Info: # Executing group from file /freeradius-2.2.10/etc/raddb/sites-enabled/default
Sun Nov 06 21:38:29 2016 : Info: +group LDAP {
Sun Nov 06 21:38:29 2016 : Info: [ldap] login attempt by "testuser" with password "testpw"
Sun Nov 06 21:38:29 2016 : Info: [ldap] user DN: uid=testuser,ou=People,dc=my-domain,dc=com
Sun Nov 06 21:38:29 2016 : Debug: [ldap] (re)connect to melbourne.matear.eu:389, authentication 1
Sun Nov 06 21:38:29 2016 : Debug: [ldap] setting TLS CACert File to /freeradius-2.2.10/etc/raddb/certs/ca.pem
Sun Nov 06 21:38:29 2016 : Debug: [ldap] setting TLS CACert Directory to /freeradius-2.2.10/etc/raddb/certs/
Sun Nov 06 21:38:29 2016 : Debug: [ldap] setting TLS Cert File to /freeradius-2.2.10/etc/raddb/certs/server.pem
Sun Nov 06 21:38:29 2016 : Debug: [ldap] setting TLS Key File to /freeradius-2.2.10/etc/raddb/certs/server-key.pem
Sun Nov 06 21:38:29 2016 : Debug: [ldap] setting TLS Rand File to /freeradius-2.2.10/etc/raddb/certs/random
Sun Nov 06 21:38:29 2016 : Debug: [ldap] starting TLS
Sun Nov 06 21:38:31 2016 : Debug: [ldap] bind as uid=testuser,ou=People,dc=my-domain,dc=com/testpw to melbourne.matear.eu:389
Sun Nov 06 21:38:31 2016 : Debug: [ldap] waiting for bind result ...
Sun Nov 06 21:38:31 2016 : Debug: [ldap] Bind was successful
Sun Nov 06 21:38:31 2016 : Info: [ldap] user testuser authenticated successfully
Sun Nov 06 21:38:31 2016 : Info: ++[ldap] = ok
Sun Nov 06 21:38:31 2016 : Info: +} # group LDAP = ok
```

## ***rlm\_sql (MS SQL, MySQL, PostgreSQL & ODBC)***

### **MS SQL**

- ✓ Make sure that MS SQL server service is up and running and it can be accessed. FreeTDS and unixODBC utilities can be used to test connection to MS SQL servers.
- ✓ Create 'radius' database
- ✓ Execute all SQL scripts under the *etc/raddb/sql/mssql* folder
- ✓ Edit *etc/raddb/sql.conf* file:

```
sql {
    #
    # Set the database to one of:
    #
    #     mysql, mssql, oracle, postgresql
    #
    database = "unixodbc"

    driver = "rlm_sql_${database}"

    server = "MSSQLTestServer"
    login = "testsqluser"
    password = "xxxx"

    ...
    ...
}
```

- ✓ Edit *etc/raddb/sites-enabled/default* file:

```
authorize {
    ...
    ...
    sql
    ...
    ...
}

accounting {
    ...
    ...
    sql
    ...
    ...
}
```

### **Test commands**

```
bin\odbcinst.exe -q -s ; bin\odbcinst.exe -q -d
```

```
bin\odbcinst.exe -j
```

```

Administrator: Start RADIUS Server (Debug) - StartServer.cmd
Sun Nov 06 22:11:16 2016 : Info: [sql] expand: %{User-Name} -> testuser
Sun Nov 06 22:11:16 2016 : Info: [sql] sql_set_user escaped user --> 'testuser'
Sun Nov 06 22:11:16 2016 : Debug: rlm_sql (sql): Reserving sql socket id: 3
Sun Nov 06 22:11:16 2016 : Info: [sql] expand: SELECT id,UserName,Attribute,Value,op FROM radcheck WHERE Username = '%{SQL-User-Name}' ORDER BY id -> SELECT id,UserName,Attribute,Value,op FROM radcheck WHERE Username = 'testuser' ORDER BY id
Sun Nov 06 22:11:16 2016 : Info: [sql] User found in radcheck table
Sun Nov 06 22:11:16 2016 : Info: [sql] expand: SELECT id,UserName,Attribute,Value,op FROM radreply WHERE Username = '%{SQL-User-Name}' ORDER BY id -> SELECT id,UserName,Attribute,Value,op FROM radreply WHERE Username = 'testuser' ORDER BY id
Sun Nov 06 22:11:16 2016 : Info: [sql] expand: SELECT groupname FROM radusergroup WHERE username = '%{SQL-User-Name}' ORDER BY priority -> SELECT groupname FROM radusergroup WHERE username = 'testuser' ORDER BY priority
Sun Nov 06 22:11:16 2016 : Info: [sql] expand: SELECT radgroupcheck.id,radgroupcheck.GroupName,radgroupcheck.Attribute,radgroupcheck.Value,radgroupcheck.op FROM radgroupcheck,radusergroup WHERE radusergroup.Username = '%{SQL-User-Name}' AND radusergroup.GroupName = radgroupcheck.GroupName ORDER BY radgroupcheck.id -> SELECT radgroupcheck.id,radgroupcheck.GroupName,radgroupcheck.Attribute,radgroupcheck.Value,radgroupcheck.op FROM radgroupcheck,radusergroup WHERE radusergroup.Username = 'testuser' AND radusergroup.GroupName = radgroupcheck.GroupName ORDER BY radgroupcheck.id
Sun Nov 06 22:11:16 2016 : Info: [sql] User found in group static
Sun Nov 06 22:11:16 2016 : Info: [sql] expand: SELECT radgroupreply.id,radgroupreply.GroupName,radgroupreply.Attribute,radgroupreply.Value,radgroupreply.op FROM radgroupreply,radusergroup WHERE radusergroup.Username = '%{SQL-User-Name}' AND radusergroup.GroupName = radgroupreply.GroupName ORDER BY radgroupreply.id -> SELECT radgroupreply.id,radgroupreply.GroupName,radgroupreply.Attribute,radgroupreply.Value,radgroupreply.op FROM radgroupreply,radusergroup WHERE radusergroup.Username = 'testuser' AND radusergroup.GroupName = radgroupreply.GroupName ORDER BY radgroupreply.id
Sun Nov 06 22:11:16 2016 : Debug: rlm_sql (sql): Released sql socket id: 3
Sun Nov 06 22:11:16 2016 : Info: ++[sql] = ok
Sun Nov 06 22:11:16 2016 : Info: ++[expiration] = noop
Sun Nov 06 22:11:16 2016 : Info: ++[logintime] = noop
Sun Nov 06 22:11:16 2016 : Info: [pap] WARNING: Auth-Type already set. Not setting to PAP
Sun Nov 06 22:11:16 2016 : Info: ++[pap] = noop
Sun Nov 06 22:11:16 2016 : Info: +} # group authorize = ok
Sun Nov 06 22:11:16 2016 : Info: Found Auth-Type = Local
Sun Nov 06 22:11:16 2016 : Info: WARNING: Please update your configuration, and remove 'Auth-Type = Local'
Sun Nov 06 22:11:16 2016 : Info: WARNING: Use the PAP or CHAP modules instead.
Sun Nov 06 22:11:16 2016 : Info: User-Password in the request is correct.
Sun Nov 06 22:11:16 2016 : Info: # Executing section post-auth from file /freeradius-2.2.10/etc/raddb/sites-enabled/default
Sun Nov 06 22:11:16 2016 : Info: +group post-auth {
*** post_auth ***
(('User-Name', '"testuser"'), ('User-Password', '"testpw"'), ('NAS-IP-Address', '127.0.0.1'), ('NAS-Port', '1812'), ('Stripped-User-Name', '"testuser"'), ('Realm', '"NULL"'))
Sun Nov 06 22:11:16 2016 : Info: ++[python] = ok

```

## *rlm\_perl*

Just uncomment *perl* from sites-enables/default post-auth section

**Note: Make sure Perl has been installed and check the *PERL5LIB* environment variable.**

```
Sun Nov 06 22:11:16 2016 : Debug: rlm_perl: Added pair Realm = NULL
Sun Nov 06 22:11:16 2016 : Debug: rlm_perl: Added pair User-Password = testpw
Sun Nov 06 22:11:16 2016 : Debug: rlm_perl: Added pair NAS-Port = 1812
Sun Nov 06 22:11:16 2016 : Debug: rlm_perl: Added pair User-Name = testuser
Sun Nov 06 22:11:16 2016 : Debug: rlm_perl: Added pair Stripped-User-Name = test
user
Sun Nov 06 22:11:16 2016 : Debug: rlm_perl: Added pair NAS-IP-Address = 127.0.0.
1
Sun Nov 06 22:11:16 2016 : Debug: rlm_perl: Added pair Framed-IP-Address = 127.0
.0.1
Sun Nov 06 22:11:16 2016 : Debug: rlm_perl: Added pair Reply-Message = Hello, te
stuser
Sun Nov 06 22:11:16 2016 : Debug: rlm_perl: Added pair Framed-Compression = Van-
Jacobson-TCP-IP
Sun Nov 06 22:11:16 2016 : Debug: rlm_perl: Added pair Service-Type = Framed-Use
r
Sun Nov 06 22:11:16 2016 : Debug: rlm_perl: Added pair Framed-Protocol = PPP
Sun Nov 06 22:11:16 2016 : Debug: rlm_perl: Added pair Auth-Type = Local
Sun Nov 06 22:11:16 2016 : Debug: rlm_perl: Added pair Cleartext-Password = test
pw
Sun Nov 06 22:11:16 2016 : Info: ++[perl] = ok
```

## *rlm\_python*

Just uncomment *python* from sites-enables/default post-auth section

**Note: Make sure Python 2.7 has been installed and check the *PYTHONHOME* environment variable.**

```
Sun Nov 06 22:11:16 2016 : Info: +group post-auth {
*** post_auth ***
(('User-Name', '"testuser"'), ('User-Password', '"testpw"'), ('NAS-IP-Address',
'127.0.0.1'), ('NAS-Port', '1812'), ('Stripped-User-Name', '"testuser"'), ('Real
m', '"NULL"'))
Sun Nov 06 22:11:16 2016 : Info: ++[python] = ok
```

## ***rlm\_smsotp***

- ✓ Start SMS OTP server (Start – All Programs - WinRADIUS Server 2.2.10 – Start SMS OTP server)
- ✓ Add/Adjust some values in: sites-enabled/default and users files

```
authenticate {
    ...
    ...
    Auth-Type smsotp {
        pap
        smsotp
    }

    Auth-Type smsotp-reply {
        smsotp
    }
    ...
    ...
}

authorize {
    ...
    ...
    smsotp
    ...
    ...
}

DEFAULT Auth-Type := smsotp
```

- ✓ Issue a RADIUS auth packet containing the username and password to validate against the SMS OTP Server (e.g. pap\_challenge\_request.pl utility found in the 'bin' folder)



```
Start SMS OTP Server - C:\FreeRADIUS\sbin\StartOtpServer.cmd
smsotpd server by Thomas Glanzmann. 2012-06-04
Waiting for incoming connections on port 1888

Client connected
Line complete <generate otp for testuser>
username = 'testuser'
Allocating new slot
id = 4682; otp = 18106
18106 => testpw
id = '4682' len = 4
Line complete <quit>
Client disconnected

Client connected
Line complete <check otp for testuser>
Line complete <user otp is 18106>
Line complete <otp id is 4682>
Line complete <get check result>
Line complete <quit>
Client disconnected

Administrator: RADIUS Command Prompt
C:\FreeRADIUS\bin>perl -w pap_challenge_request.pl testuser
Enter password:
server response type = Access-Challenge (11)
Enter otp: 18106
server response type = Access-Accept (2)
C:\FreeRADIUS\bin>
```

```
Administrator: Start RADIUS Server - StartServer.cmd
Fri May 02 21:27:48 2014 : Info: +group smsotp <
Fri May 02 21:27:48 2014 : Debug: rlm_smsotp: Generate OTP
Fri May 02 21:27:48 2014 : Auth: rlm_smsotp: Uniq id is 4682
Fri May 02 21:27:48 2014 : Debug: rlm_smsotp: Sending Access-Challenge.
Fri May 02 21:27:48 2014 : Info: ++[smsotpl] = handled
Fri May 02 21:27:48 2014 : Info: +> # group smsotp = handled
Sending Access-Challenge of id 241 to 127.0.0.1 port 57653
Reply-Message = "Enter Mobile PIN:"
State = 0x34363832
Fri May 02 21:27:48 2014 : Info: Finished request 0.
Fri May 02 21:27:48 2014 : Debug: Going to the next request
Fri May 02 21:27:48 2014 : Debug: Waking up in 5.0 seconds.
Fri May 02 21:27:53 2014 : Info: Cleaning up request 0 ID 241 with timestamp +9
Fri May 02 21:27:53 2014 : Info: Ready to process requests.
rad_recv: Access-Request packet from host 127.0.0.1 port 57653, id=242, length=73
Reply-Message = "Enter Mobile PIN:"
State = 0x34363832
User-Name = "testuser"
User-Password = "18106"
Fri May 02 21:27:56 2014 : Info: # Executing section authorize from file ../etc/raddb/sites-enabled/default
Fri May 02 21:27:56 2014 : Info: +group authorize <
Fri May 02 21:27:56 2014 : Info: ++[preprocess] = ok
Fri May 02 21:27:56 2014 : Info: ++[chap] = noop
Fri May 02 21:27:56 2014 : Info: ++[mschap] = noop
Fri May 02 21:27:56 2014 : Info: ++[digest] = noop
Fri May 02 21:27:56 2014 : Info: ++[wimax] = ok
Fri May 02 21:27:56 2014 : Info: [suffix] No 'e' in User-Name = "testuser", looking up realm NULL
Fri May 02 21:27:56 2014 : Info: [suffix] No such realm "NULL"
Fri May 02 21:27:56 2014 : Info: ++[suffix] = noop
Fri May 02 21:27:56 2014 : Debug: rlm_sim_files: insufficient number of challenges for imsi testuser: 0
Fri May 02 21:27:56 2014 : Info: ++[sim_files] = notfound
Fri May 02 21:27:56 2014 : Info: leap] No EAP-Message, not doing EAP
Fri May 02 21:27:56 2014 : Info: ++[leap] = noop
Fri May 02 21:27:56 2014 : Info: [files] users: Matched entry DEFAULT at line 51
Fri May 02 21:27:56 2014 : Info: ++[files] = ok
Fri May 02 21:27:56 2014 : Debug: rlm_smsotp: Found reply to access challenge (AUTZ), Adding Auth-Type 'smsotp-reply'
Fri May 02 21:27:56 2014 : Info: ++[smsotpl] = ok
Fri May 02 21:27:56 2014 : Info: ++[expiration] = noop
Fri May 02 21:27:56 2014 : Info: ++[logintime] = noop
Fri May 02 21:27:56 2014 : Info: [pap] WARNING! No "known good" password found for the user. Authentication may fail because of this.
Fri May 02 21:27:56 2014 : Info: ++[pap] = noop
Fri May 02 21:27:56 2014 : Info: +> # group authorize = ok
Fri May 02 21:27:56 2014 : Info: Found Auth-Type = smsotp-reply
Fri May 02 21:27:56 2014 : Info: # Executing group from file ../etc/raddb/sites-enabled/default
Fri May 02 21:27:56 2014 : Info: +group smsotp-reply <
Fri May 02 21:27:56 2014 : Debug: rlm_smsotp: Found reply to access challenge
Fri May 02 21:27:56 2014 : Auth: rlm_smsotp: SocketReply is OK
Fri May 02 21:27:56 2014 : Info: ++[smsotpl] = ok
Fri May 02 21:27:56 2014 : Info: +> # group smsotp-reply = ok
```

## Notes:

- IPv6 is enabled by default. If your system doesn't support it, please update the relevant sections in radiusd.conf file
- MySQL Authentication: create database 'radius' and run scripts in \etc\raddb\sql\mysql. More information in: <http://wiki.freeradius.org/guide/SQL-HOWTO>
- Uncomment all 'sql' references in radiusd.conf file. MySQL Server should be up and running before starting radius server
- LDAP Authentication: update etc\raddb\modules\ldap file (e.g. basedn, etc)
- OpenLDAP for Windows can be downloaded from SourceForge: <http://sourceforge.net/projects/openldapwindows/>
- Heimdal for Windows can be downloaded from SourceForge: <http://sourceforge.net/projects/heimdal-win/>
- Hostapd/WPA Supplicant for Windows can be downloaded from SourceForge: <http://sourceforge.net/projects/hostapd/>
- Redis Server for Windows can be downloaded from SourceForge: <http://sourceforge.net/projects/redis/>
- multiOTP can be downloaded from here: <http://www.multiotp.net/>  
Thanks to *Andre Liechti*, for the support and contribution

## Source Code

The source code is available at:

- FreeRADIUS Project, <http://freeradius.org/>
- WinRADIUS Project, <http://winradius.eu/>

\* Please, report any issues/feedback/etc to the following email address: [support@winradius.eu](mailto:support@winradius.eu)