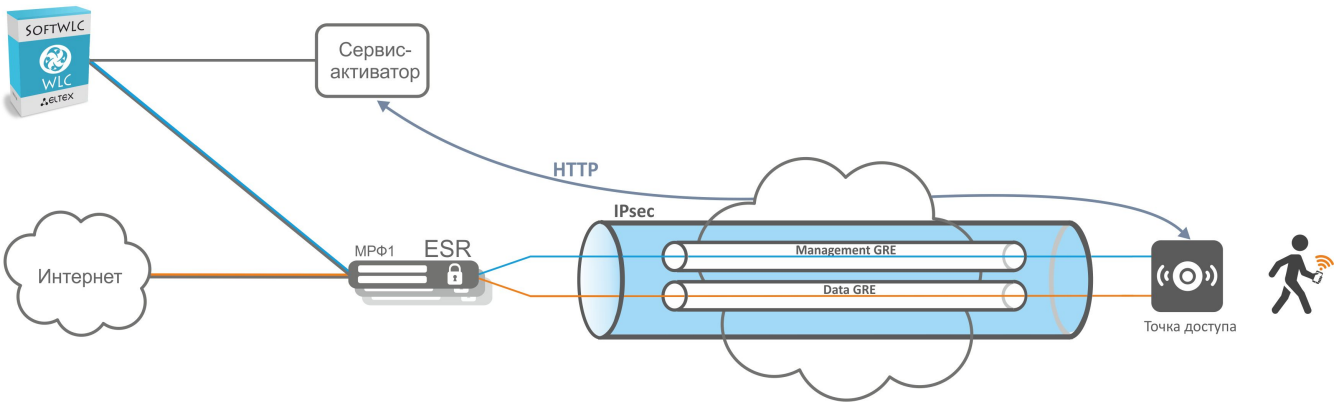
v1.19_OTT



. 1.

Quickstart

1. SoftWLC -:
2. /etc/eltex-wifi-sa/factory-fw.conf , () . downgrade false. /var/lib/eltex-wifi-sa/firmware/ , /etc/eltex-wifi-sa/factory-fw.conf.
3. /etc/eltex-wifi-sa/ -.
4. /etc/eltex-wifi-sa/application.conf -. CheckMAC yes. -:
   service eltex-wifi-sa restart.
5. ESR .
6. . SNMP TCP . (.)
7. . "Connected".(.)
8. OTT IPsec. "IPsec password" , ESR, "testing123". NBI – CreateOttProfile.(. ESR OTT)
9. EMS ESR . OTT: ServiceProvider BRAS. , ESR SoftWLC. (. ESR OTT)
10. NAS (Radius -) RADIUS ESR, , "testing123".
11. ESR OTT IP ESR OTT. NBI – CreateOttStation. (. ESR OTT)
12. SSID. SSID Location, ESR, "testing2".(.)
13. "" " ", . ( )
14. " " SSID.( )

-

- – x86, Ubuntu 16.04 18.04 . POST HTTPs , SoftWLC. - – WEB-. - 8043 IP-. - URL, IP- - DNS-. - EMS, SoftWLC. - EMS (firewall). - SoftWLC firewall 8080 (HTTP), - EMS.

- -c IP- . , -c POST- - TCP-. - TCP-, .

, HTTPs- - , - . - -, Provider-ID. Provider-ID – . , , , - . - MAC- , MAC- . . , handshake .. , - . */etc/eltex-wifi-sa/factory-fw.conf*. - , , - . - .

- , -, . , , - "" .

() . , , -.

2 :

1. **OTT.** IPsec, ESR IPsec-.
   1. NBI *CreateOttProfile*.
2. **OTT ESR**. IP- ESR , . IPsec OTT ESR. , -, ESR, IP- IPsec, ESR. , ESR IPsec. ESR IPsec, . OTT ESR NBI *CreateOttStation*.

OTT ESR - ESR , ESR EMS. (Service Provider), ESR . , IP-. ESR , OTT. , ESR.

, , MAC. OTT Connected. , ESR OTT .

- ESR, IPsec : - ESR OTT , . ESR , , OTT ESR. OTT ESR , - 4022. ESR - , . - X-Auth , IP ESR, IPsec, ESR, / X-Auth.

, , ESR. ESR, , , ESR, .

-

- . Wi-Fi . "ott.root" "ott_default" "ott.root". SSID . SSID , , , . ESR OTT OTT.

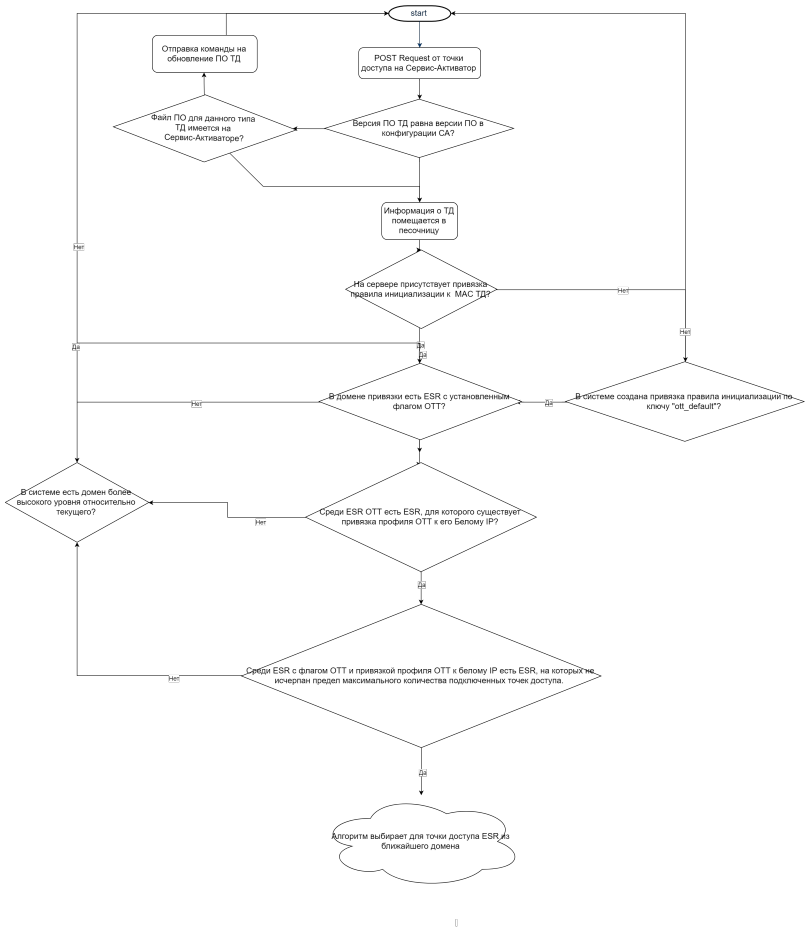
:

- POST- - .
- -, MAC- ESR .
- , IPsec-.
- SoftWLC, SSID, .

.

, MA, . , , - , . - . MAC , . .

-



. 2.

- "/etc/eltex-wifi-sa/". - : "service eltex-wifi-sa restart".

, :

"application.conf".

-.

logLevel	debug, info, warn, error	info	. /var/log/eltex-wifi-sa/main.log.
requestTimeout	integer	45	M (0). , .
http { enabled	yes, no	true	HTTP.
http { port	integer (0-65535)	8042	TCP, - HTTP.
https { enabled	yes, no	true	HTTP.
https { port	integer (0-65535)	8043	TCP, - HTTPs.
https { keyStore { path	string	server.p12	-. , , .
https { keyStore { password	string	""	-. – .
https { clients { certificate	string	client.crt	. , , .
https { clients { checkMAC	yes, no	yes	MAC- , .
https { clients { fwCheckCrt	yes, no	yes	ProviderID , .

ems { host	localhost IP		EMS-, -.
ems { port	integer (0-65535)	8080	, - EMS.
ems { parallelLimit	integer	5	EMS-
ipsec-activator { wait-timer	integer	180	, IPsec-. .
ipsec-activator { update-time	integer	600	, -. .

"factory-fw.conf"

.

downgrade	true, false	false	\ ,
min	string		,
file	string		, /var/lib/eltex-wifi-sa/firmware/

/usr/lib/eltex-radius-nbi/conf/ott/ott.xml

, ESR. - , - ESR OTT , . , ESR, - ESR , ESR.

subtype	100, 200, 1000, 1200, 1500, 1700		ESR (ESR-100, ESR-200, ESR-1000, ESR-1200, ESR-1500, ESR-1700)
max			ESR
param name, default, regex, description			, , , .

-.

- CPU 2 Core
- RAM 8GB
- HDD 100GB (5000)

-

root@vagrant-ubuntu-trusty-64:/home/vagrant# **echo "deb [arch=amd64] http://archive.eltex-co.ru/wireless softwlc-1.18-xenial main" >> /etc/apt/sources.list.d/eltex.list**

root@vagrant-ubuntu-trusty-64:/home/vagrant# **wget -O - http://archive.eltex-co.ru/wireless/repo.gpg.key | sudo apt-key add -**

root@vagrant-ubuntu-trusty-64:/home/vagrant# **apt-get update**

root@vagrant-ubuntu-trusty-64:/home/vagrant# **apt-get install openjdk-8-jdk**

root@vagrant-ubuntu-trusty-64:/home/vagrant# **update-java-alternatives -s java-1.8.0-openjdk-amd64**

root@vagrant-ubuntu-trusty-64:/home/vagrant# **apt-get install eltex-wifi-sa**

, - , /etc/eltex-wifi-sa/application.conf EMS -:

```
ems {
host = "localhost"
port = 8080
```

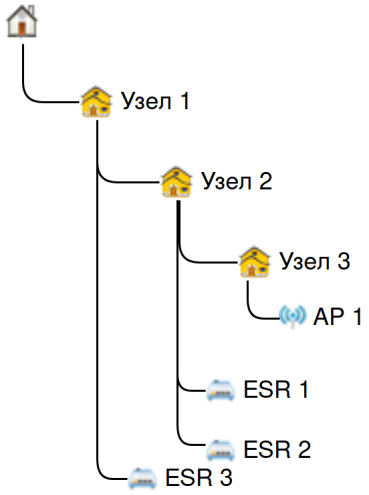
ESR

ESR 2 . , Default Gateway, ESR IPsec. ESR IP-. IP- IPsec, 500 4500 . ESR , . , 2 , Next-Hop Bridge, . , Bridge, , Next-Hop Default Gateway.

IPsec X-Auth . ESR (-) RADIUS- PCRF SoftWLC. PCRF Mongo DB ESR .

ESR N+1. ESR IPsec- - ESR. - ESR . ESR . ESR .

ESR -, C- ESR , . ESR ESR, - . ESR, .. ESR . ESR. , ESR . OTT ESR. ESR - , ESR. , ESR , . ESR OTT IPsec, , .. - IPsec, ESR, .



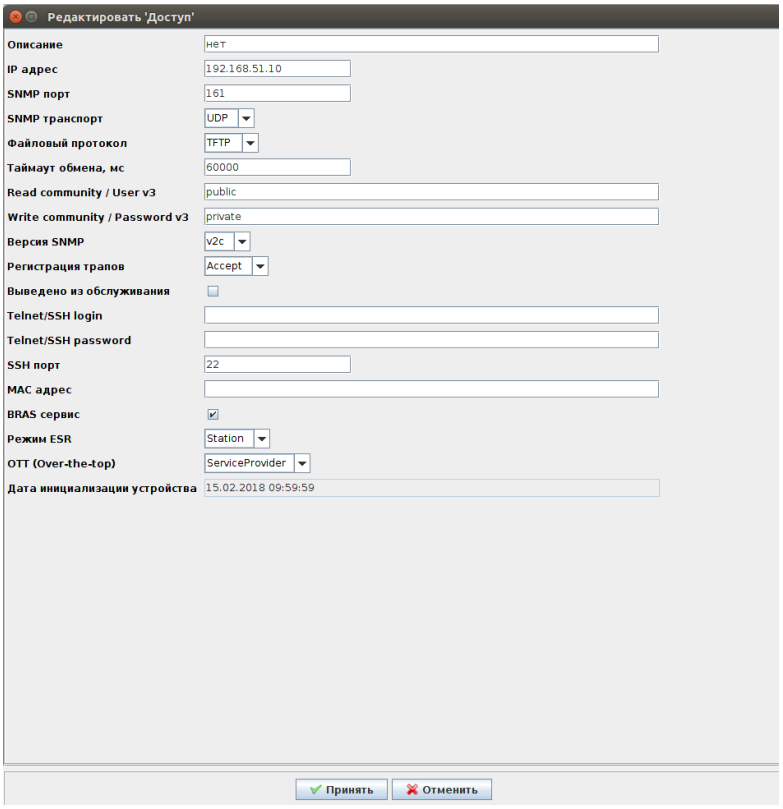
. 3.

, . 3:

- 3.
- -, , ESR 1 ESR2 2, .
- ESR 1, - ESR 2.
- ESR 1 ESR 2 - ESR 3, 1.
- - , ESR OTT-.
- ESR 1 ESR 2, -, ESR.

ESR "" . ESR "" "" .

ESR

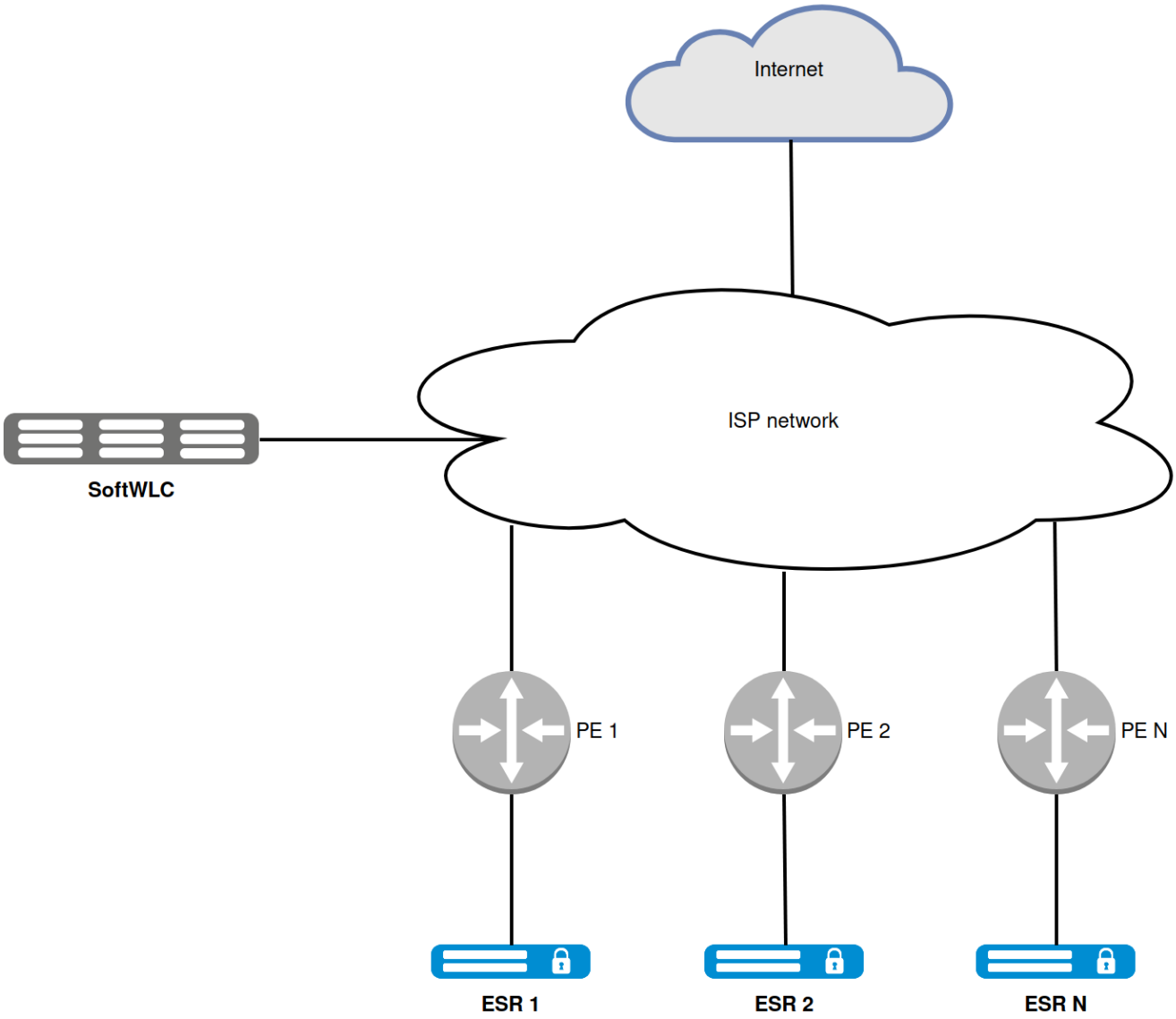


. 4.

1. .
2. bridge1. .
3. IPsec bridge 1.

4. IPsec bridge 1. GRE- bridge 2.
5. GRE VLAN bridge 6.
6. bridge 7 route-map , .

ESR



. 5.

1. ESR 1, ESR 2 ESR N, IPsec, PE 1, PE 2, PE N.
2. ESR 1, ESR 2, ESR N , , IPsec-, BGP, PE 1, PE 2, PE N .
3. PE 1, PE 2, PE N , , SoftWLC.
4. ESR . , , IPsec , -, ESR . ESR.
5. ESR IP WiFi.

, ESR . 3.

ESR 3.

-, IPsec IPsec-. , HTTPs, , , -. URL -, . :

1) , , "Provider-ID", URL -, . , URL . , - URL . - . - "Provider-ID", - , , – . , , , .

2) , Provider-ID, Provider-ID = "eltex" URL -. URL - , – OTT . URL - CLI WEB- . -. - Provider-ID = "eltex". Provider-ID - , URL. , , "" . "" .

MAC- . - MAC, MAC . , - . MAC.

, . . , , . , , .

(URL -), IP- DHCP 43 DHCP, . .

ESR - :

(GRE_ping_counter x 10) + waite_timer,

GRE_ping_counter – , waite_timer – -.

310 + 180 = 210 .

1) Eltex , . URL - . - SoftWLC. IP- , DNS .

2) IP- DHCP, . DHCP 43, , IPsec . 43 . 43, .

3) HTTPs - :

-
- MAC-
-
- HW
- Provider-ID ( )
- MAC- ( )

4) -, , Provider-ID MAC handshake, NBI EMS, .

5) :

- MAC- , : .
- OTT , EMS "" . -, .
- OTT, , , MAC, OTT - .
- , "".

6) IPsec-, EMS MAC-. .
OTT , , . EMS - OTT . , .

7) EMS, , :

- , ESR-1000. , EMS ESR-1000 IP-.
- EMS - IPsec- (MongoDB ott.xauth).
- -, EMS : IP- ESR, (x-auth), (ESR-1000 , IPsec-), IPsec ESR.
- - .

8) , IPsec- ESR-1000. IPsec- ESR-1000 PCRF SoftWLC. PCRF ott , , . , RADIUS access-accept.

IPsec IP- IPsec- . IP- EoGRE (Management Data) ESR-1000 IPsec .

, RADIUS :

root@vagrant-ubuntu-trusty-64:/home/vagrant# mongo
> show databases;
local 0.078125GB
notification-gw 0.203125GB
ott 0.203125GB
pcrf 0.453125GB
wifi-customer-cab 0.203125GB
> use ott

> show tables

system.indexes

xauth

> db.xauth.find()

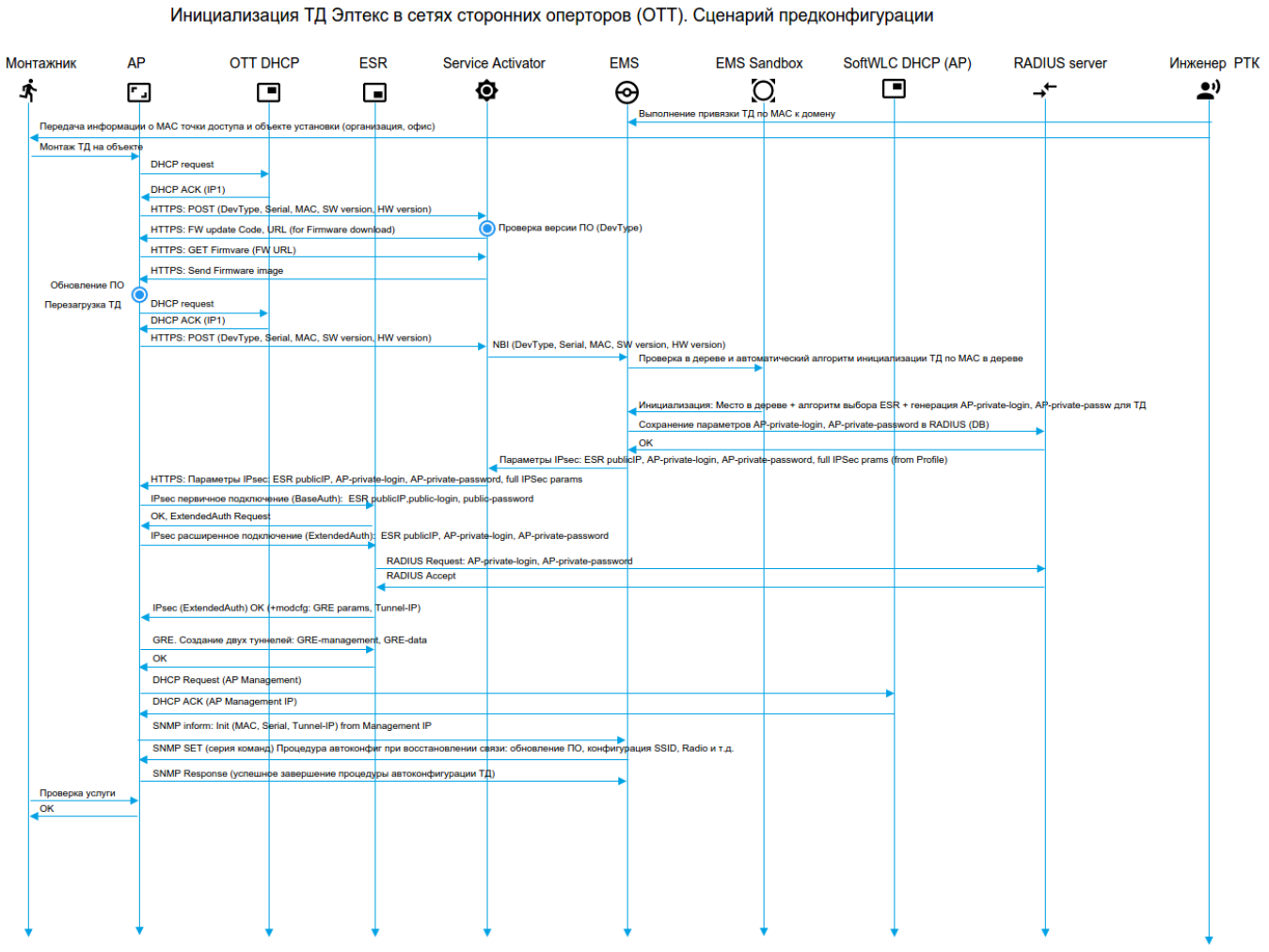
{ "_id" : ObjectId("5a6816b4e14c08c4d9c0854d"), "ipsec_login" : "login1", "ipsec_pass" : "password1" }

{ "_id" : ObjectId("5a6816b4e14c08c4d9c0854e"), "ipsec_login" : "login2", "ipsec_pass" : "password2" }

{ "_id" : ObjectId("5a6816b4e14c08c4d9c0854f"), "ipsec_login" : "login3", "ipsec_pass" : "password3" }

9) SoftWLC SNMP Management GRE , .

10) Data GRE ESR-1000 NAT.

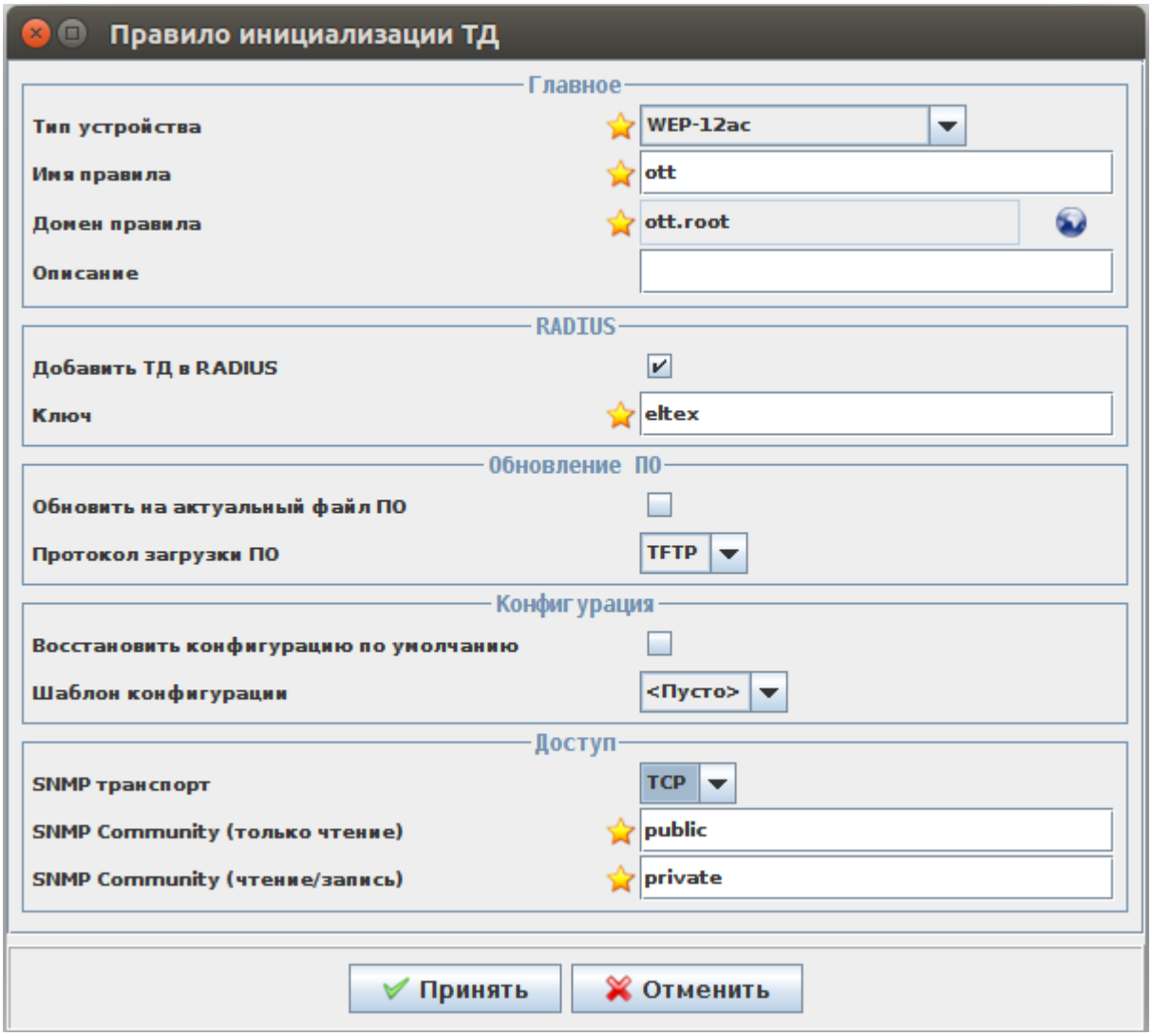


. 6.

.

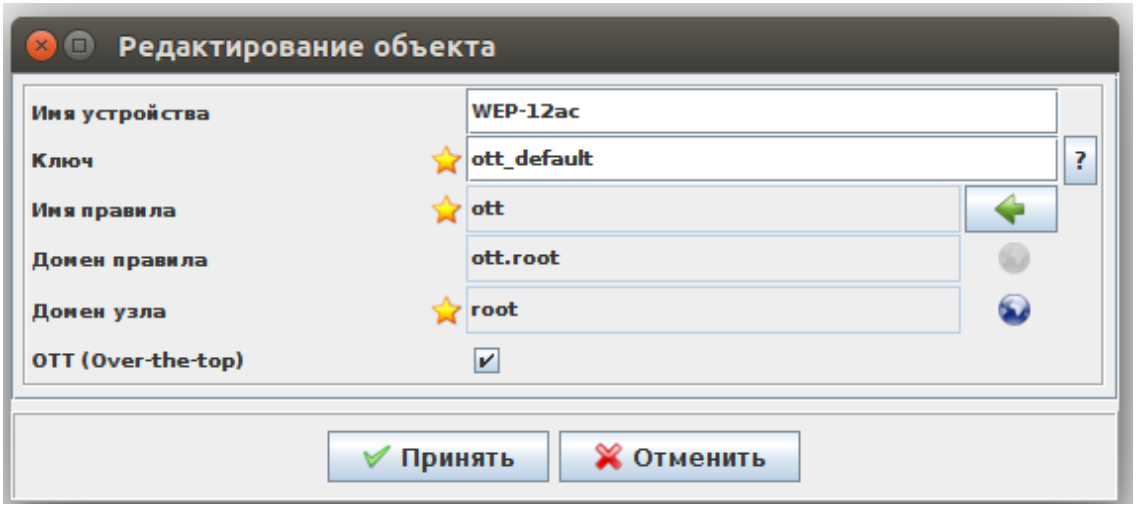
, OTT, *ott.root* EMS.

ott (Wireless/ /). *ott* . SNMP TCP.



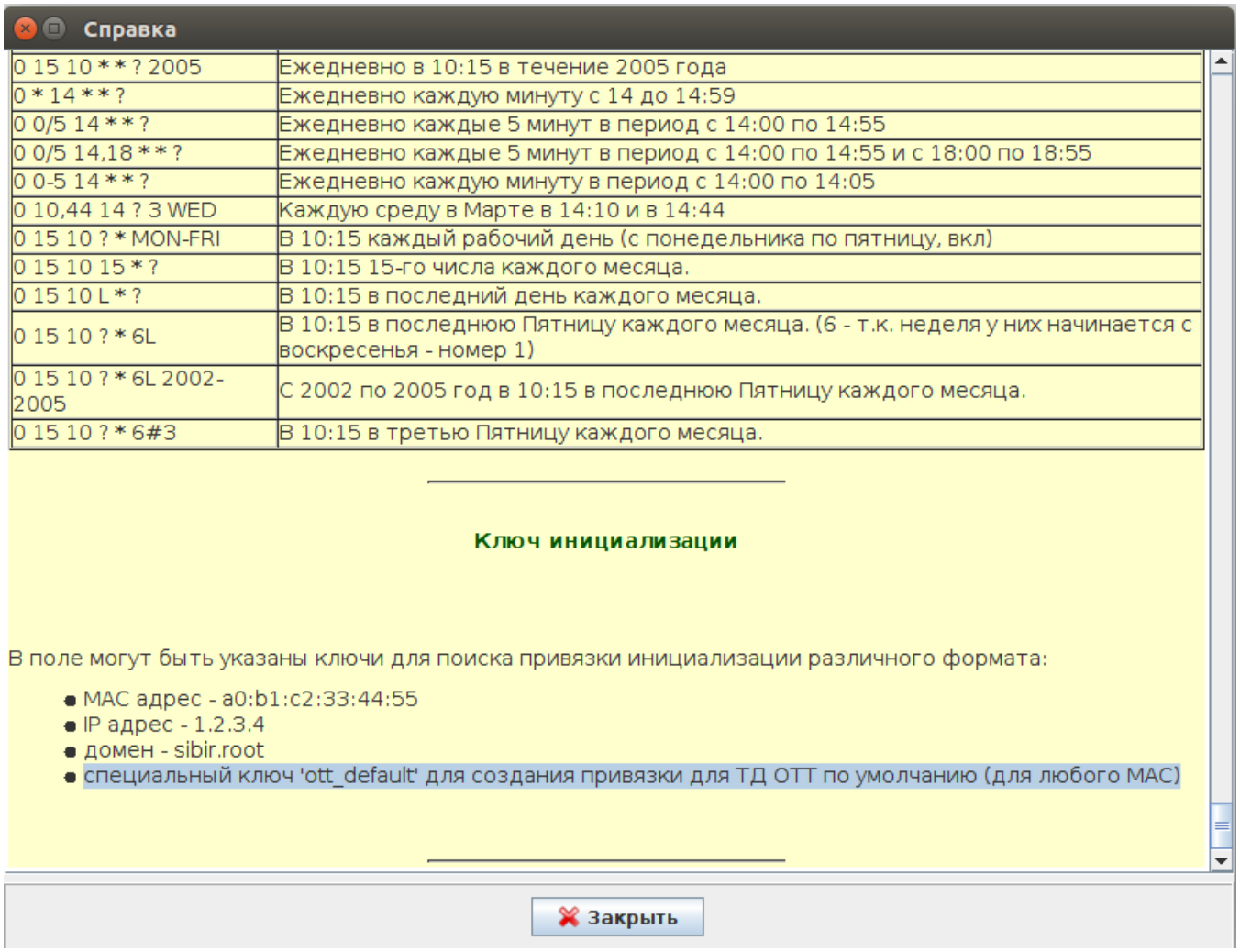
. 7.

ott_default, *ott* *ott.root.*



. 8.

ott_default , 

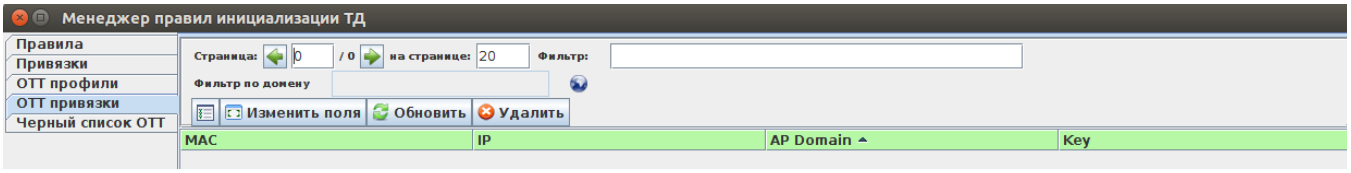


.9.

!

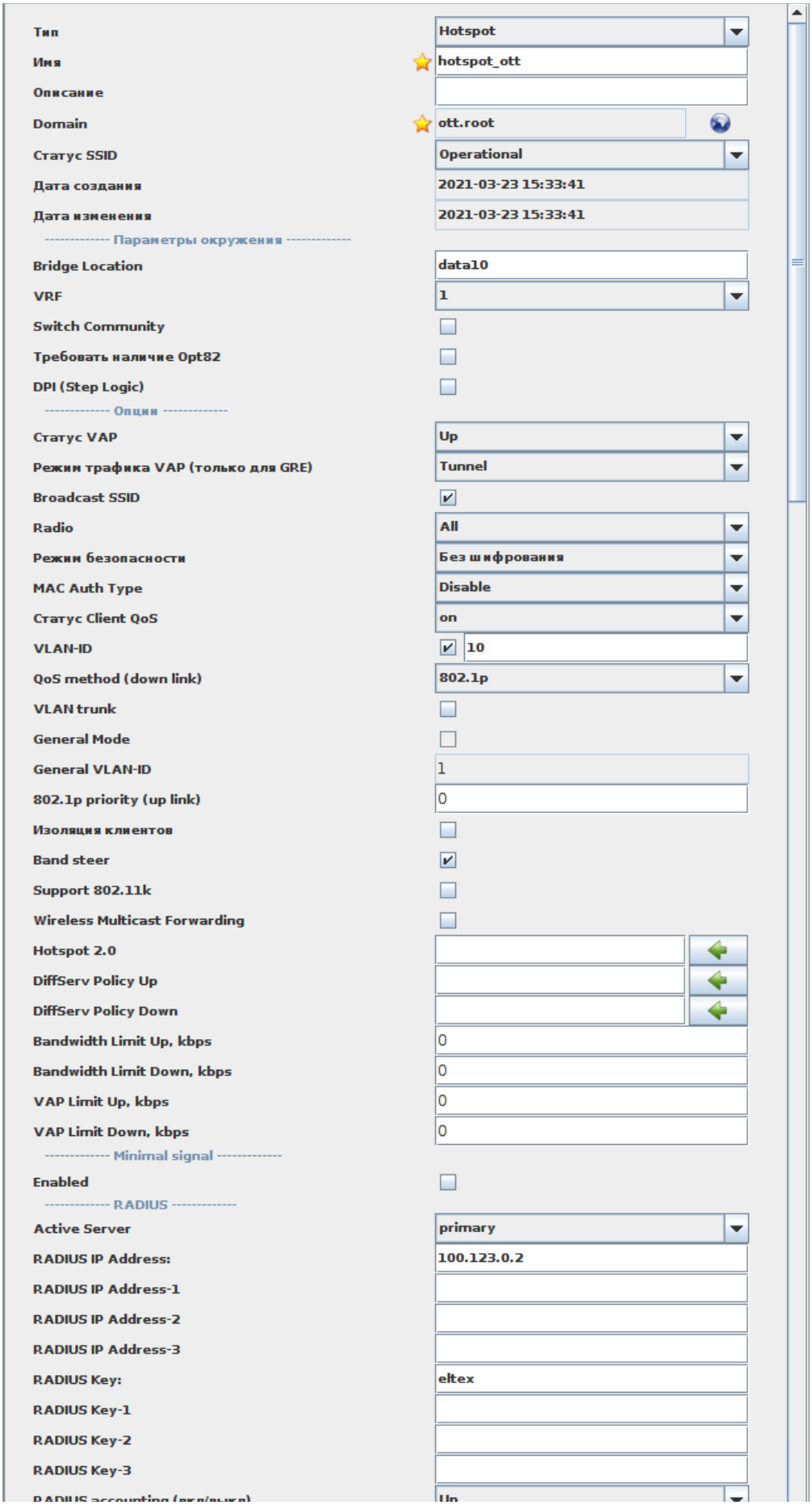
EMS "" " " " " "wirelessCommon" " ". "OTT Default" .

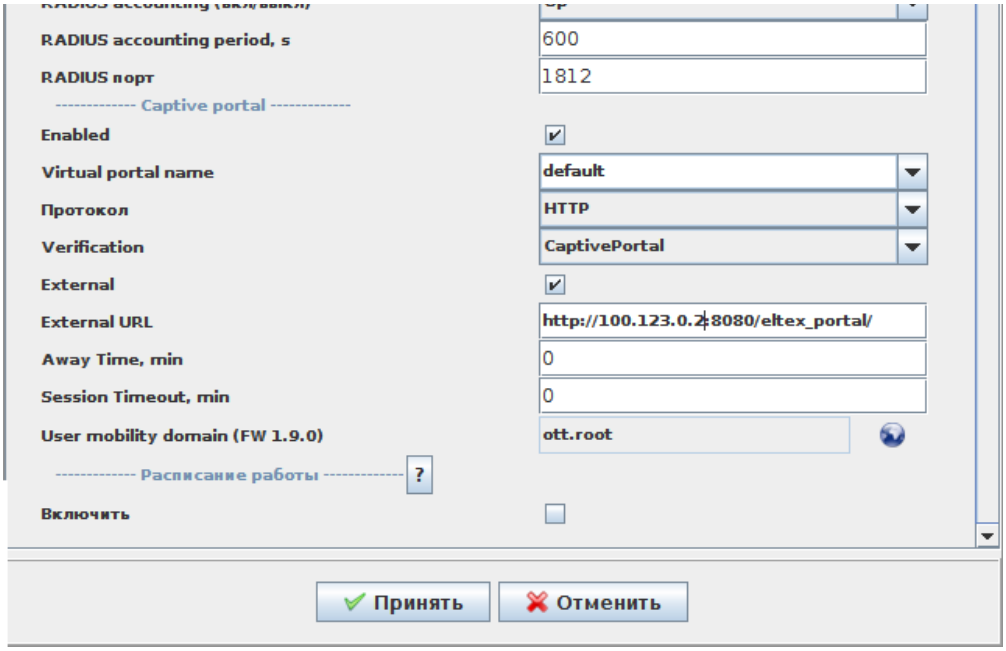
, , Wireless/ .



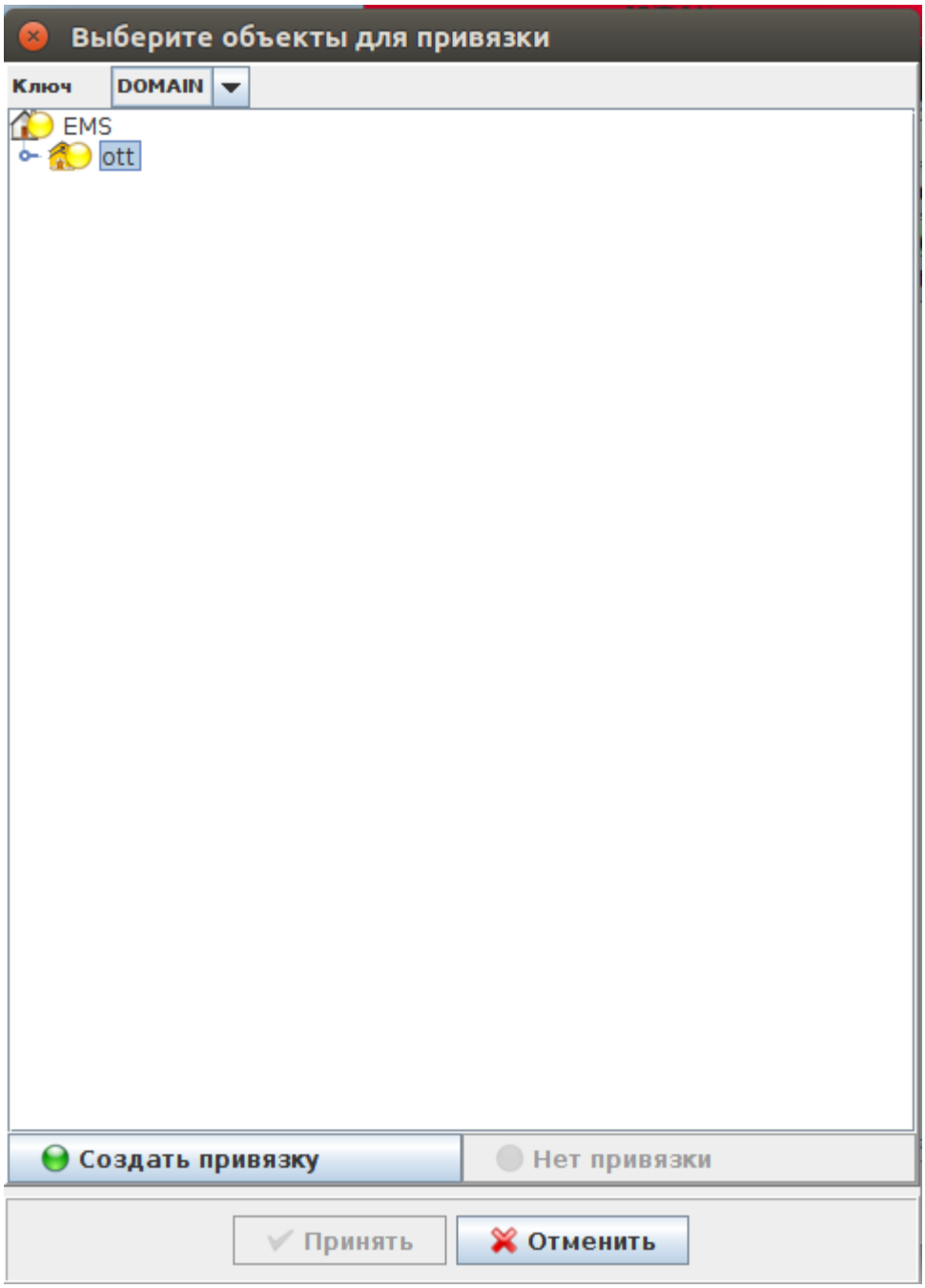
. 10.

SSID ott.root (Wireless/ SSID). *Bridge, Location* location, bridge ESR.


Тип
Hotspot
Имя
hotspot_ott
Описание
Domain
ott.root
Статус SSID
Operational
Дата создания
2021-03-23 15:33:41
Дата изменения
2021-03-23 15:33:41
---------- Параметры окружения ----------
Bridge Location
data10
VRF
1
Switch Community
Требовать наличие Opt82
DPI (Step Logic)
---------- Опции ----------
Статус VAP
Up
Режим трафика VAP (только для GRE)
Tunnel
Broadcast SSID
Radio
All
Режим безопасности
Без шифрования
MAC Auth Type
Disable
Статус Client QoS
on
VLAN-ID
10
QoS method (down link)
802.1p
VLAN trunk
General Mode
General VLAN-ID
1
802.1p priority (up link)
0
Изоляция клиентов
Band steer
Support 802.11k
Wireless Multicast Forwarding
Hotspot 2.0
DiffServ Policy Up
DiffServ Policy Down
Bandwidth Limit Up, kbps
0
Bandwidth Limit Down, kbps
0
VAP Limit Up, kbps
0
VAP Limit Down, kbps
0
---------- Minimal signal ----------
Enabled
---------- RADIUS ----------
Active Server
primary
RADIUS IP Address:
100.123.0.2
RADIUS IP Address-1
RADIUS IP Address-2
RADIUS IP Address-3
RADIUS Key:
eltex
RADIUS Key-1
RADIUS Key-2
RADIUS Key-3


RADIUS accounting period, s
600
RADIUS порт
1812
---------- Captive portal ----------
Enabled
Virtual portal name
default
Протокол
HTTP
Verification
CaptivePortal
External
External URL
http://100.123.0.2:8080/eltex_portal/
Away Time, min
0
Session Timeout, min
0
User mobility domain (FW 1.9.0)
ott.root
---------- Расписание работы ----------
?
Включить
Принять
Отменить

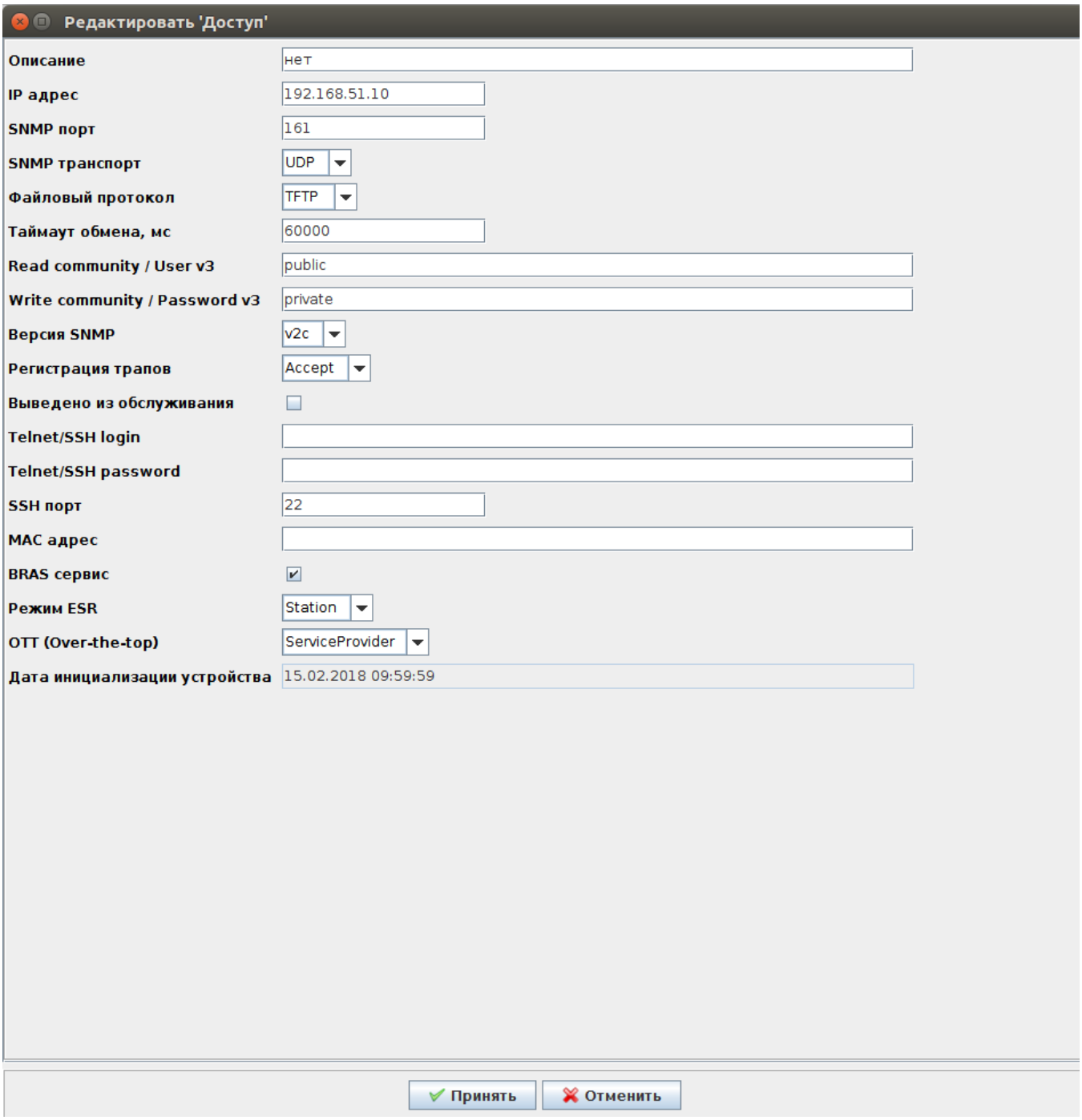
. 11.



. 12.

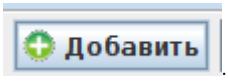
ESR OTT

: *ServiceProvider* BRAS, *BRAS* ESR, .

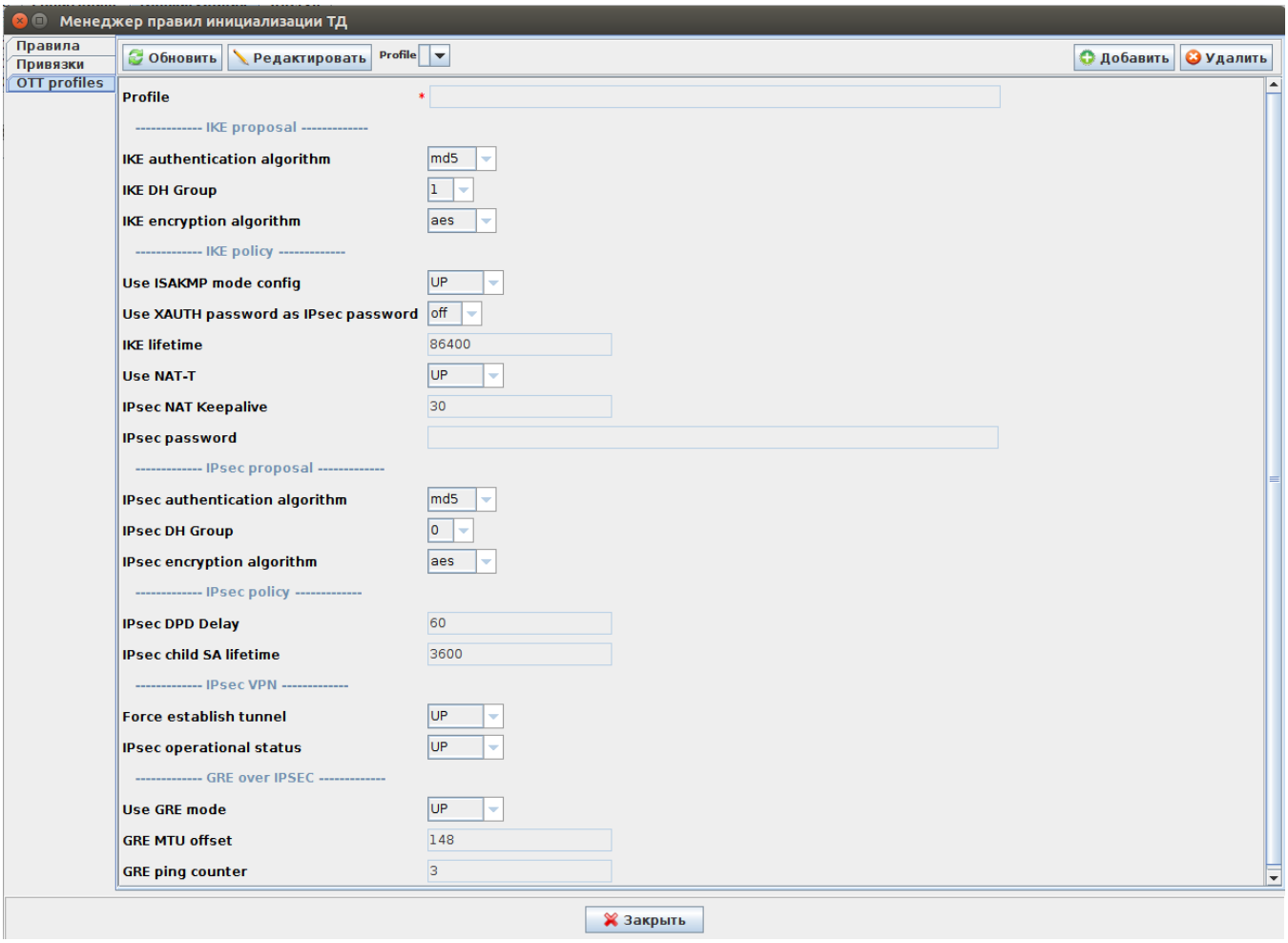


. 13.

IPsec ESR. ESR.

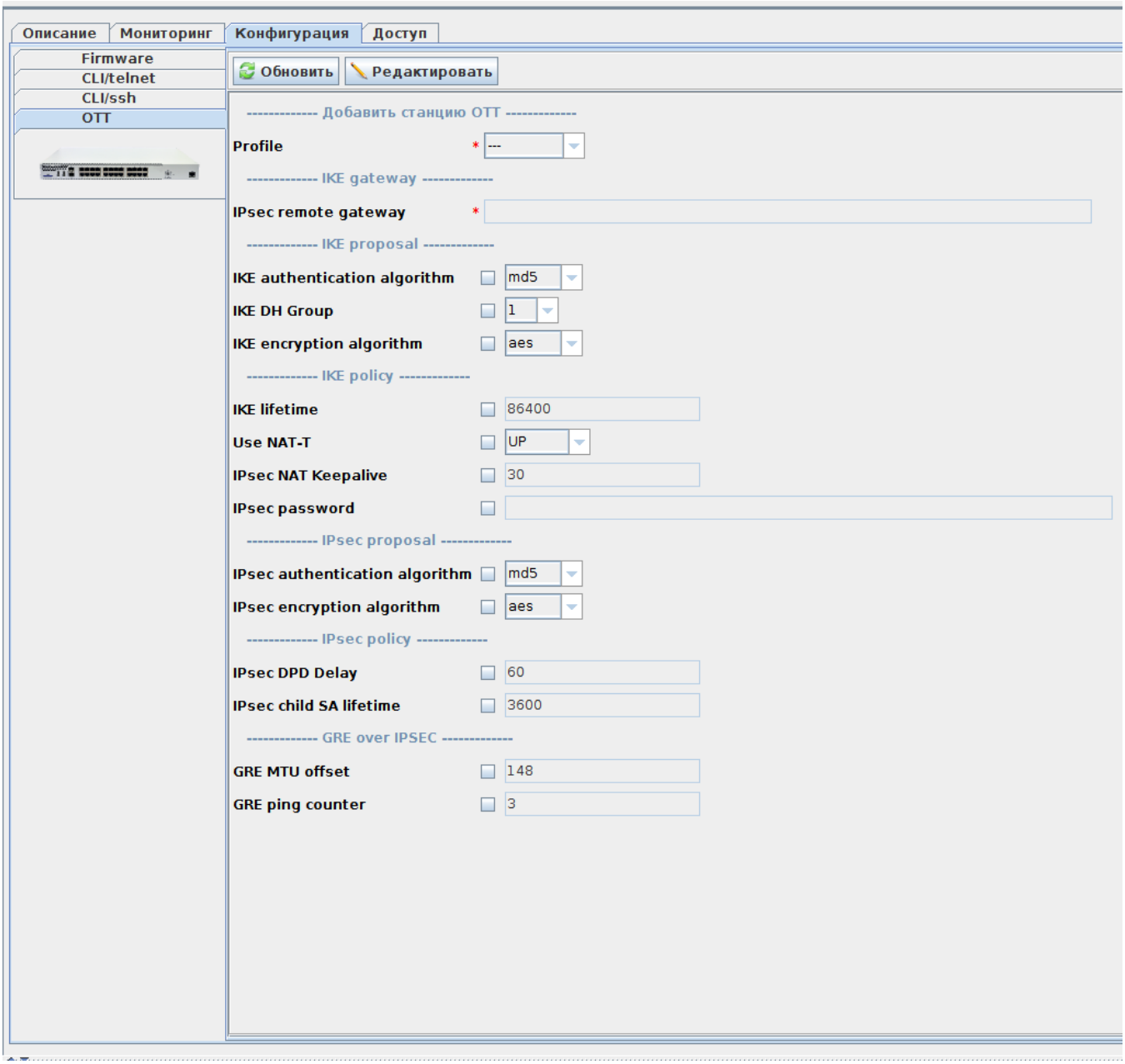
, *Wireless/ OTT profiles*. , 

.



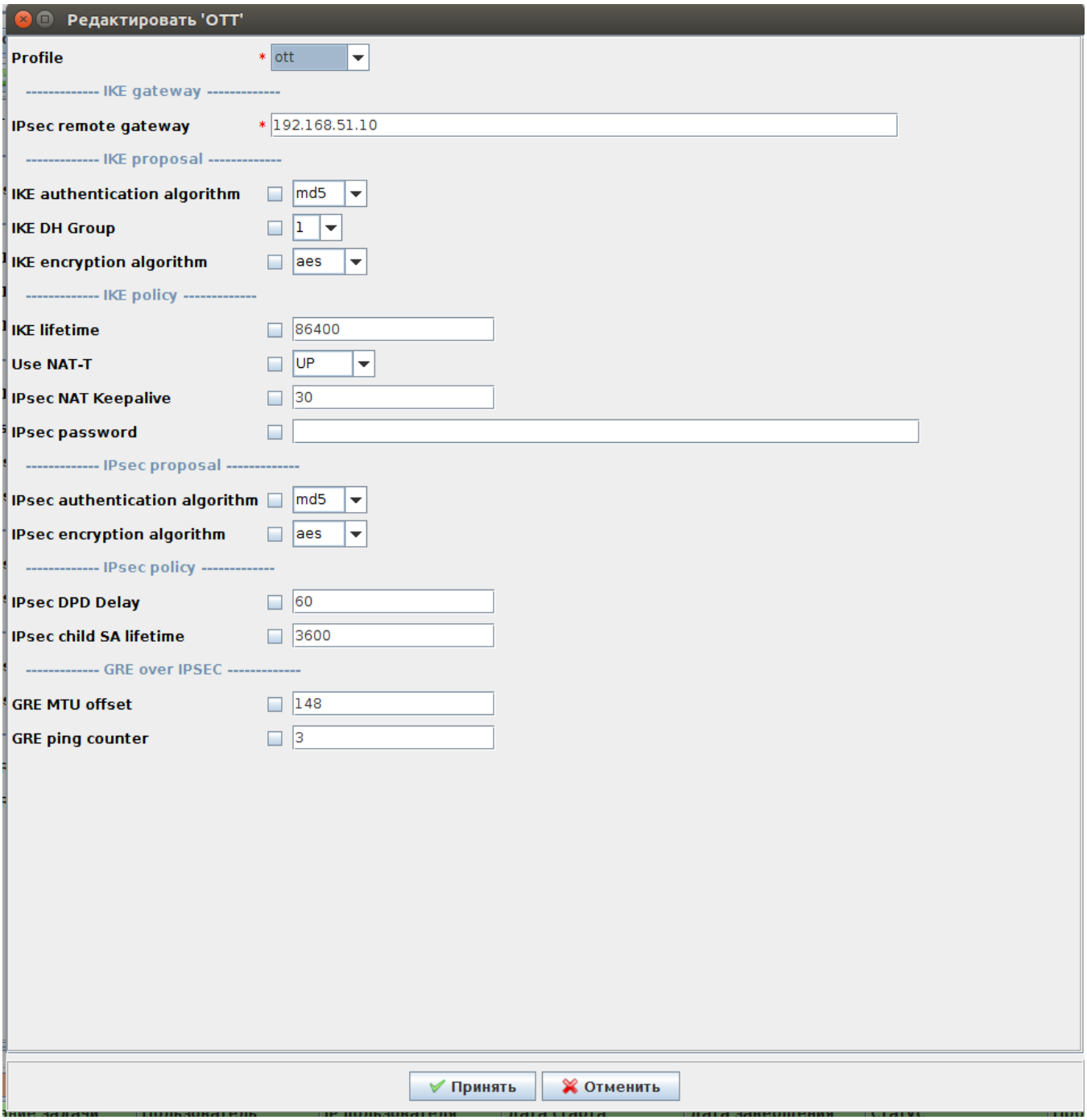
. 14.

, , ESR. EMS ESR .



. 15.

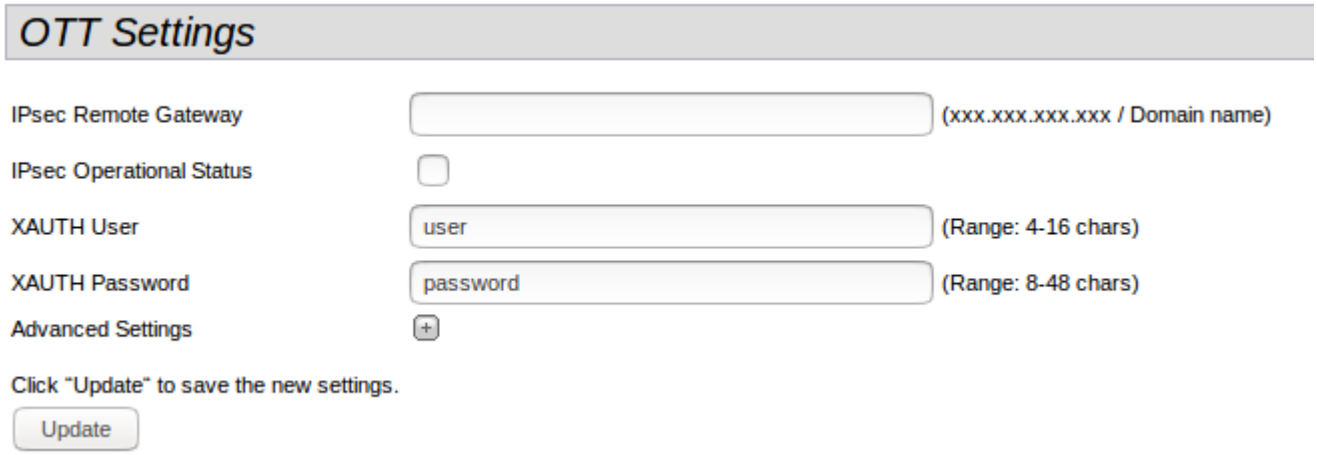
, . , IP- ESR. IPsec remote gateway , . ESR .



. 16.

IPsec , -

WEB- , Manage/OTT Settings

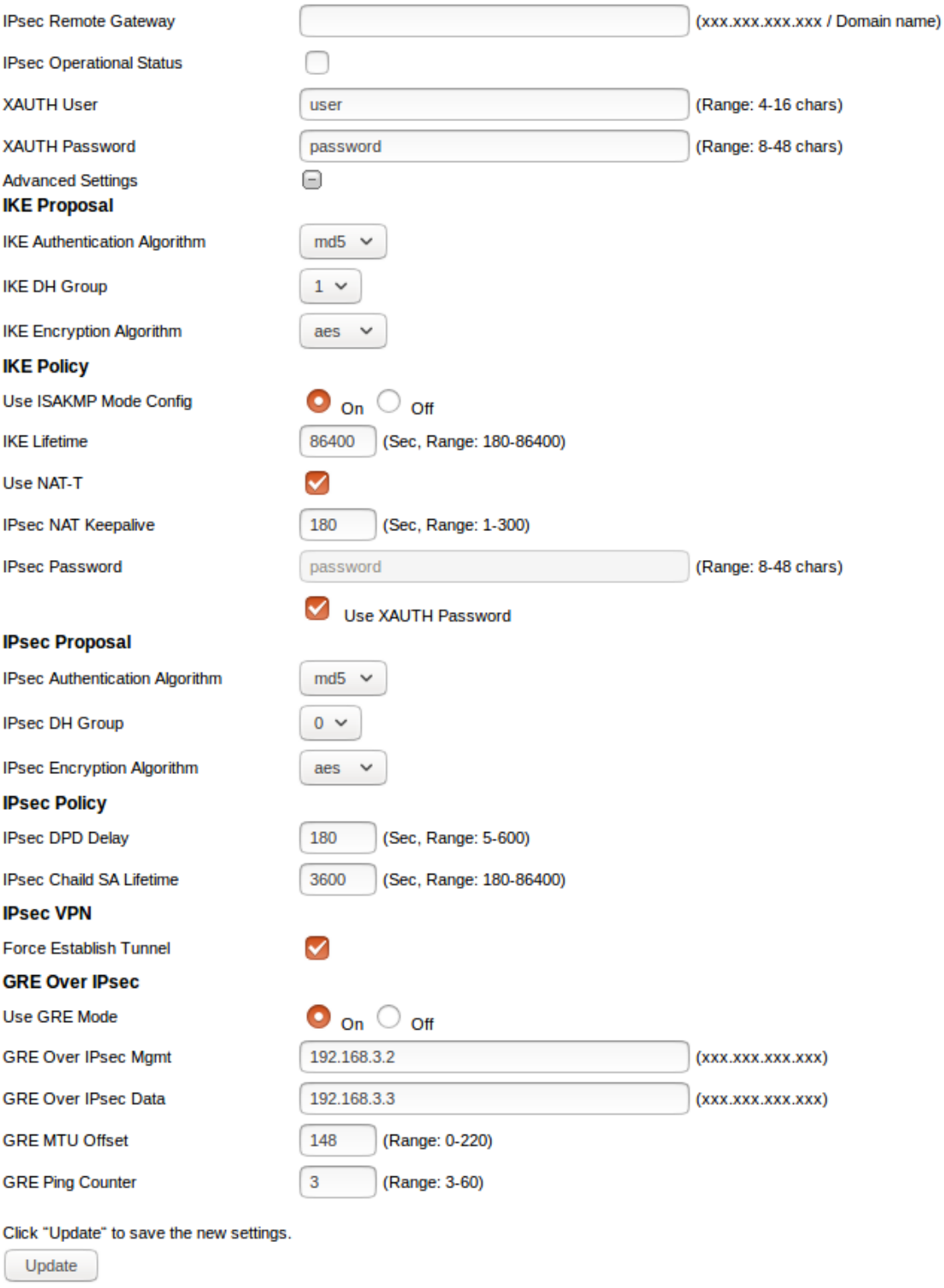


. 17.

IPsec, XAUTH (, XAUTH IPsec).

Use XAUTH Password, XAUTH IPsec. IPsec Password .

Advanced Settings, IPsec



Use ISAKMP Mode Config On, GRE Over IPsec Mgmt GRE Over IPsec Data . Use ISAKMP Mode Config Off, IKE Gateway GRE Over IPsec Mgmt GRE Over IPsec Data.

IPsec Remote Gateway (xxx.xxx.xxx.xxx / Domain name)

IPsec Operational Status

Advanced Settings

IKE Proposal

IKE Authentication Algorithm md5

IKE DH Group 1

IKE Encryption Algorithm aes

IKE Policy

Use ISAKMP Mode Config On Off

IKE Lifetime 86400 (Sec, Range: 180-86400)

Use NAT-T

IPsec NAT Keepalive 180 (Sec, Range: 1-300)

IPsec Password password (Range: 8-48 chars)

IKE Gateway

IPsec Local Address 192.168.2.10 (xxx.xxx.xxx.xxx)

IPsec Remote Network 192.168.3.0 (xxx.xxx.xxx.xxx)

IPsec Remote Mask 255.255.255.0 (xxx.xxx.xxx.xxx)

IPsec Proposal

IPsec Authentication Algorithm md5

IPsec DH Group 0

IPsec Encryption Algorithm aes

IPsec Policy

IPsec DPD Delay 180 (Sec, Range: 5-600)

IPsec Chaild SA Lifetime 3600 (Sec, Range: 180-86400)

IPsec VPN

Force Establish Tunnel

GRE Over IPsec

Use GRE Mode On Off

GRE Over IPsec Mgmt 192.168.3.2 (xxx.xxx.xxx.xxx)

GRE Over IPsec Data 192.168.3.3 (xxx.xxx.xxx.xxx)

GRE MTU Offset 148 (Range: 0-220)

GRE Ping Counter 3 (Range: 3-60)

Click "Update" to save the new settings.

Update

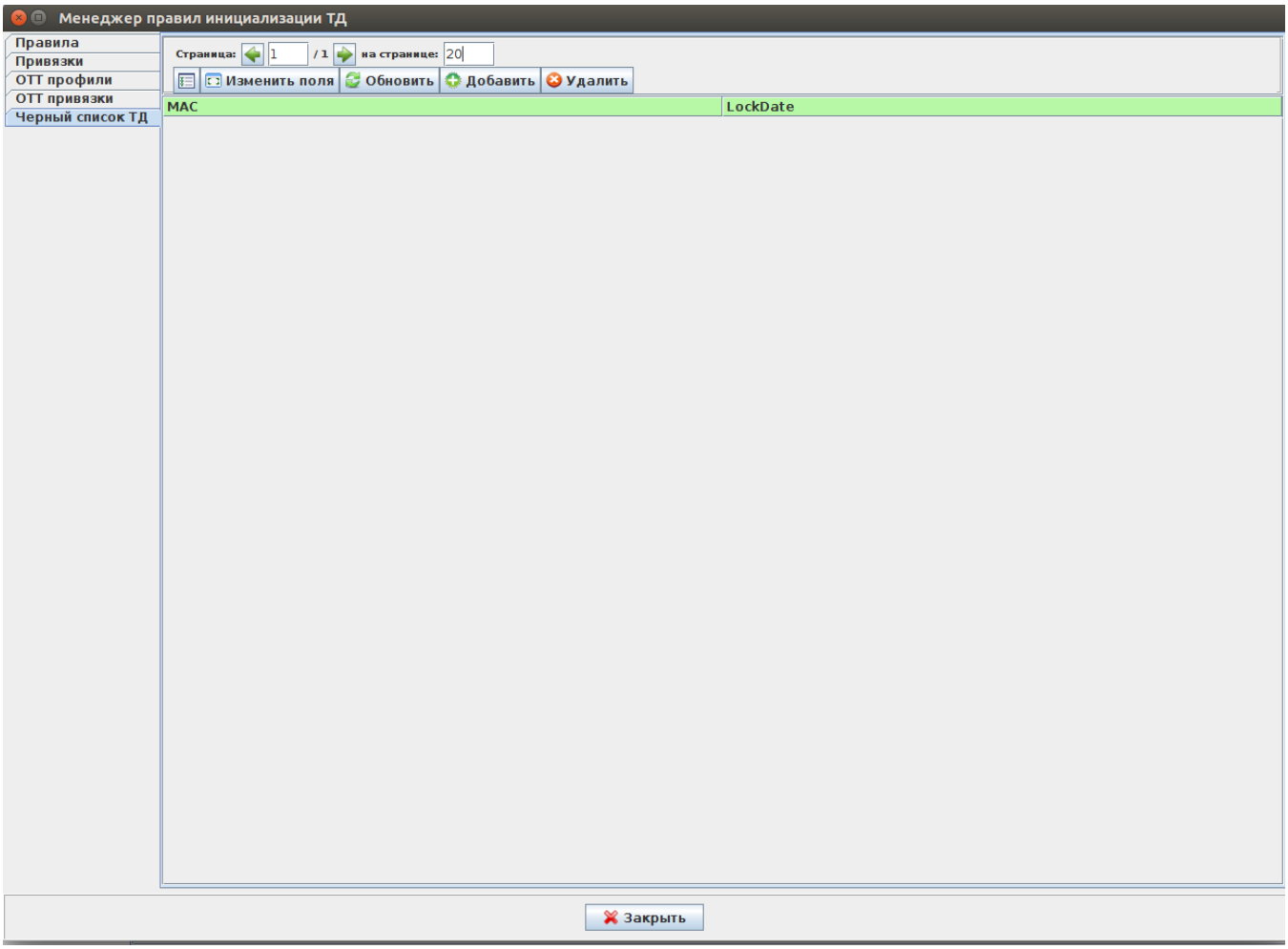
:

- **IPsec Remote Gateway –** IP- (xxx.xxx.xxx.xxx /).
- **IPsec Operational Status –** IPsec.
- **XAUTH User –** XAUTH, "Use ISAKMP Mode Config On" (: 4-16).
- **XAUTH Password –** XAUTH, "Use ISAKMP Mode Config On" (: 4-16).
- **IKE Authentication Algorithm –** , (md5, sha1).
- **IKE DH Group –** -, (1,2,5).
- **IKE Encryption Algorithm –** 1 IPsec (AES128, DES, 3DES).
- **Use ISAKMP Mode Config –** «On» – «GRE Over IPsec Mgmt», «GRE Over IPsec Data», « IPsec», « IPsec», « IPsec Remote Mask».
- **IKE Lifetime –** IKE SA (1) . IKE/IPsec (, : 180–86400).
- **Use NAT-T –** , NAT.
- **IPsec NAT Keepalive –** keepalive NAT (Sec, Range: 1-300).
- **IPsec Password –** IKE/ISPEC (: 8-48).
- **IPsec Local Address –** , IKE 255.255.255.255 (/ 32). , « ISAKMP Config On» (xxx.xxx.xxx.xxx).
- **IPsec Remote Network –** IKE. , « ISAKMP Config On» (xxx.xxx.xxx.xxx).
- **IPsec Remote Mask –** IKE . , « ISAKMP Config On» (xxx.xxx.xxx.xxx).
- **IPsec Authentication Algorithm –** , (md5, sha1).
- **IPsec DH Group –** - . 0 IKE (0,1,2,5)**.**
- **IPsec Encryption Algorithm –** 1 IPsec (AES128, DES, 3DES).
- **IPsec DPD Delay –** ESR , (: 5-600)
- **IPsec Child SA Lifetime –** IPsec VPN SA (2) . IKE/IPsec. , IKE Lifetime (Sec, Range: 180-86400).
- **Force Establish Tunnel –** GRE IPsec. IP- GRE IPsec.
- **GRE Over IPsec Mgmt –** IP- GRE (xxx.xxx.xxx.xxx).
- **GRE Over IPsec Data –** IP- GRE (xxx.xxx.xxx.xxx).
- **GRE MTU Offset –** MTU . MTU - GRE MTU Offset.
- **GRE Ping Counter –** gre-managment-ip, IPsec- . 10 . 3 60. 3.

> IPsec child SA lifetime IKE lifetime. . IKE lifetime 86400 (), IPsec child SA lifetime 3600 (). IPsec 24 , IKE .

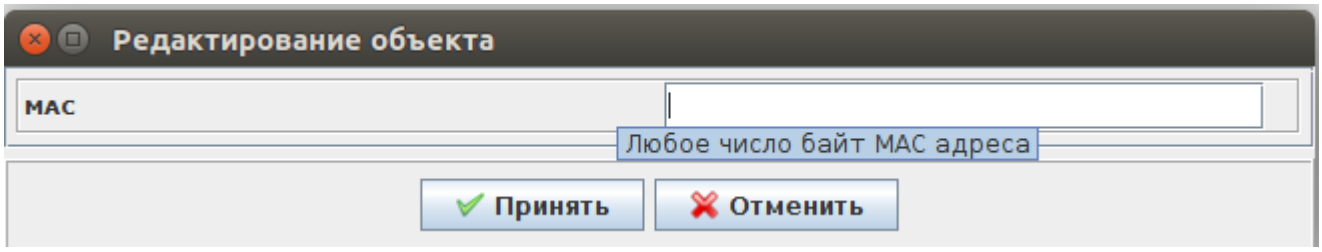
GUI EMS.

Wireless/ /



. 20.

-. MAC- .



. 21.

-. MAC-, .

, aa:bb:01, aa:bb:01:02:03:04 " aa:bb:01". , "".

OTT link

, OTT link:

- EMS ;
- EMS OTT, ;
- ESR EMS ;
- IP ESR EMS ;
- ESR EMS station;
- ESR OTT ;

OTT :

```
$ mongo
> use ott;
> db.station.find({esr_ip: '<ip  esr>'}).pretty();
```

OTT :

```
$ mongo
> use ott;
> db.xauth.find({esr_ip: '<ip  esr>'}).pretty();
> db.xauth.find({mac: '<mac  >'}).pretty();
```

NBI OTT

OTT NBI.

eltex-radius-nbi. http://localhost:8080/eltex-radius-nbi/asciidoc/

WSDL- http://localhost:8080/axis2/services/RadiusNbiService?wsdl

(localhost IP- nbi)

Описание команд NBI XML/SOAP

Система SoftWLC

Версия 1.9-105
Дата публикации 26-01-2018 18:14:15

1. IPsec

```
Description IKE authentication algorithm (md5, sha1), md5 by default
Name ipsec.auth-alg
Regex (md5|sha1)

Description IKE DH Group (1, 2, 5), 1 by default
Name ipsec.dh-group
Regex (1|2|5)

Description IPSEC DPD Delay (5..600), 60 by default
Name ipsec.dpd-delay
Regex ([5-9]|[1-9][0-9]|10[0-9]|1[1-9][0-9]|[2-5][0-9][0-9]|600)

Description IKE encryption algorithm (aes, des, 3des), aes by default
Name ipsec.encrypt-alg
Regex (aes|des|3des)

Description Force establish tunnel (UP, DOWN), UP by default
```

```
Name ipsec.force-establish
Regex (UP|DOWN)

Description Use GRE mode (UP, DOWN), UP by default
Name ipsec.gre-mode
Regex (UP|DOWN)

Description GRE mtu offset (0..220), 148 by default
Name ipsec.gre-mtu-offset
Regex ([0-9]|[1-9][0-9]|10[0-9]|1[1-9][0-9]|220|2[0-1][0-9])

Description IKE lifetime (180..86400), 86400 by default
Name ipsec.lifetime
Regex (18[0-9]|19[0-9]|[2-9][0-9][0-9]|[1-9][0-9][0-9][0-9]|1000[0-9]|100[1-9][0-9]|10[1-9][0-9][0-9]|1[1-9]
[0-9][0-9][0-9]|[2-7][0-9][0-9][0-9][0-9]|86400|86[0-3][0-9][0-9]|8[0-5][0-9][0-9][0-9])

Description Use ISAKMP mode config (UP, DOWN), UP by default
Name ipsec.mode-cfg
Regex (UP|DOWN)

Description Use NAT-T (UP, DOWN), UP by default
Name ipsec.nat
Regex (UP|DOWN)

Description IPSEC NAT Keepalive (1..300), 30 by default
Name ipsec.nat-keepalive
Regex ([1-9]|[1-9][0-9]|10[0-9]|1[1-9][0-9]|2[0-9][0-9]|300)

Description IPSEC password (8-48 chars)
Name ipsec.password
Regex ([A-Za-z0-9]{8,48})

Description IPSEC DH Group (0, 1, 2, 5), 0 by default
Name ipsec.pfs-group
Regex (0|1|2|5)

Description IPSEC authentication algorithm (md5, sha1), md5 by default
Name ipsec.sa-auth-alg
Regex (md5|sha1)

Description IPSEC encryption algorithm (aes, des, 3des), aes by default
Name ipsec.sa-encrypt-alg
Regex (aes|des|3des)

Description IPSEC child SA lifetime (180..86400), 3600 by default
Name ipsec.sa-lifetime
Regex (18[0-9]|19[0-9]|[2-9][0-9][0-9]|[1-9][0-9][0-9][0-9]|1000[0-9]|100[1-9][0-9]|10[1-9][0-9][0-9]|1[1-9]
[0-9][0-9][0-9]|[2-7][0-9][0-9][0-9][0-9]|86400|86[0-3][0-9][0-9]|8[0-5][0-9][0-9][0-9])

Description IPSEC operational status (UP, DOWN), UP by default
Name ipsec.status
Regex (UP|DOWN)

Description Use XAUTH password as IPSEC password (on/off) default off
Name ipsec.use-xauth-passwd
Regex (on|off)

Description XAUTH password (8-48 chars)
Name ipsec.xauth-password
Regex ([A-Za-z0-9]{8,48})

Description XAUTH user (4-16 chars)
Name ipsec.xauth-user
Regex ([A-Za-z0-9]{4,16})

Description IPSEC remote gateway (IP or URL)
Name ipsec.remote-gateway
<ax273:valueRegex xsi:nil="true"/>
```

2. , -

Message	
Connection refused	- 8042
"code":4022, "msg":"No init link found"	
"code":1,"msg":"In request by key 'domain' value is empty or null"	, , ESR OTT (OTT "")
"code":4024, "msg":"No OTT station configured"	ESR, OTT IP- ESR OTT, ESR, .
"code":4023	NB
"code": 4025, "msg": "/ott/upgrade/WOP-12ac-LR-RevB.tar.gz"	.

3. ESR

ESR .

1

1.6.2, BGP, ESR, EoGRE . :

1) gi1/0/1.4092: 10.12.20.4/28 - , , IPsec;

2) gi1/0/1.212: 100.64.0.66/30 - , VRF backbone SoftWLC, DHCP DNS ;

3) gi1/0/1.213: 100.64.0.70/30 - , VRF nat ;

4) bridge 1: 192.168.200.49/28 192.168.200.50/28 - EoGRE , ;

5) bridge 3: 192.168.128.0/22 - . 192.168.128.1 ESR SoftWLC;

6) bridge 10: 198.18.160.0/22 - . - 198.18.160.1, DNS 100.123.0.2;

7) 172.31.252.0/22 - , mode config, EoGRE ;

8) 100.123.0.0/24 - . 100.123.0.2 - SoftWLC, DHCP, DNS.

. . gi1/0/1.4092, gi1/0/1.213 PBR, ESR "users_map".

```
#!/usr/bin/clish
#18
hostname esr-ipsec

object-group service dhcp_server
  port-range 67
exit
object-group service dhcp_client
  port-range 68
exit
object-group service ipsec_ports
  port-range 500
  port-range 4500
exit
object-group service dns
  port-range 53
exit

object-group network SoftWLC
  ip prefix 100.123.0.0/24
exit
object-group network ipsec_remote_address
  ip prefix 10.100.0.0/16
  ip prefix 172.31.252.0/22
exit
object-group network gre_termination
```

```
  ip prefix 192.168.200.48/28
exit
object-group network AP_mgmt
  ip prefix 192.168.128.0/22
  ip prefix 198.18.160.0/22
exit
object-group network AP_users
  ip prefix 198.18.160.0/22
exit

syslog console none

radius-server timeout 10
radius-server retransmit 5
radius-server host 100.123.0.2
  key ascii-text testing123
  timeout 11
  priority 20
  source-address 192.168.128.1
  auth-port 31812
  acct-port 31813
  retransmit 10
  dead-interval 10
exit
aaa radius-profile PCRF
  radius-server host 100.123.0.2
exit
das-server COA
  key ascii-text testing123
  port 3799
  clients object-group SoftWLC
exit
aaa das-profile COA
  das-server COA
exit

tech-support login enable
root login enable

vlan 3
  force-up
exit
vlan 10
  force-up
exit

security zone trusted
exit
security zone untrusted
exit
security zone ipsec
exit
security zone gre
exit
security zone users
exit

ip access-list extended users_pbr
  rule 10
    action deny
    match protocol udp
    match source-port 68
    match destination-port 67
    enable
  exit
  rule 11
    action deny
    match protocol udp
    match destination-port 53
    enable
  exit
```

```
  rule 20
    action permit
    enable
  exit
exit

route-map out_BGP_AP
  rule 10
    match ip address object-group AP_mgmt
    action permit
  exit
exit
route-map out_BGP_NAT
  rule 10
    match ip address object-group AP_users
    action permit
  exit
exit
route-map users_map
  rule 10
    match ip access-group users_pbr
    action set ip next-hop verify-availability 100.64.0.69 10
    action permit
  exit
exit
router bgp 64604
  router-id 198.18.156.1
  neighbor 100.64.0.65
    remote-as 650001
    update-source 100.64.0.66
    address-family ipv4 unicast
      route-map out_BGP_AP out
      enable
    exit
    enable
  exit
  neighbor 100.64.0.69
    remote-as 650001
    update-source 100.64.0.70
    address-family ipv4 unicast
      route-map out_BGP_NAT out
      enable
    exit
    enable
  exit
  address-family ipv4 unicast
    redistribute connected
  exit
  enable
exit

snmp-server
snmp-server system-shutdown
snmp-server community "private1" rw
snmp-server community "public11" ro

snmp-server host 100.123.0.2
exit

snmp-server enable traps
snmp-server enable traps config
snmp-server enable traps config commit
snmp-server enable traps config confirm
snmp-server enable traps environment
snmp-server enable traps environment fan
snmp-server enable traps environment fan-speed-changed
snmp-server enable traps environment fan-speed-high
snmp-server enable traps environment memory-flash-critical-low
snmp-server enable traps environment memory-flash-low
snmp-server enable traps environment memory-ram-critical-low
snmp-server enable traps environment memory-ram-low
```

```
snmp-server enable traps environment cpu-load
snmp-server enable traps environment cpu-critical-temp
snmp-server enable traps environment cpu-overheat-temp
snmp-server enable traps environment cpu-supercooling-temp
snmp-server enable traps environment board-overheat-temp
snmp-server enable traps environment board-supercooling-temp
snmp-server enable traps wifi
snmp-server enable traps wifi wifi-tunnels-number-in-bridge-high
snmp-server enable traps file-operations
snmp-server enable traps file-operations successful
snmp-server enable traps file-operations failed
snmp-server enable traps file-operations canceled
snmp-server enable traps interfaces
snmp-server enable traps interfaces rx-utilization-high
snmp-server enable traps interfaces tx-utilization-high
snmp-server enable traps interfaces number-high
snmp-server enable traps bras
snmp-server enable traps bras sessions-number-high
snmp-server enable traps screen
snmp-server enable traps screen dest-limit
snmp-server enable traps screen source-limit
snmp-server enable traps screen icmp-threshold
snmp-server enable traps screen udp-threshold
snmp-server enable traps screen syn-flood
snmp-server enable traps screen land
snmp-server enable traps screen winnuke
snmp-server enable traps screen icmp-frag
snmp-server enable traps screen udp-frag
snmp-server enable traps screen icmp-large
snmp-server enable traps screen syn-frag
snmp-server enable traps screen unknown-proto
snmp-server enable traps screen ip-frag
snmp-server enable traps screen port-scan
snmp-server enable traps screen ip-sweep
snmp-server enable traps screen syn-fin
snmp-server enable traps screen fin-no-ack
snmp-server enable traps screen no-flag
snmp-server enable traps screen spoofing
snmp-server enable traps screen reserved
snmp-server enable traps screen quench
snmp-server enable traps screen echo-request
snmp-server enable traps screen time-exceeded
snmp-server enable traps screen unreachable
snmp-server enable traps screen tcp-all-flags
snmp-server enable traps entity
snmp-server enable traps entity config-change
snmp-server enable traps entity-sensor
snmp-server enable traps entity-sensor threshold
snmp-server enable traps envmon
snmp-server enable traps envmon fan
snmp-server enable traps envmon shutdown
snmp-server enable traps envmon temperature
snmp-server enable traps flash
snmp-server enable traps flash insertion
snmp-server enable traps flash removal
snmp-server enable traps snmp
snmp-server enable traps snmp authentication
snmp-server enable traps snmp coldstart
snmp-server enable traps snmp linkdown
snmp-server enable traps snmp linkup
snmp-server enable traps syslog

bridge 1
  description "gre_termination"
  vlan 1
  security-zone gre
  ip address 192.168.200.49/28
  ip address 192.168.200.50/28
  enable
exit
bridge 3
```

```
  description "AP_mgmt"
  vlan 3
  security-zone trusted
  ip address 192.168.128.1/22
  ip helper-address 100.123.0.2
  ip tcp adjust-mss 1312
  enable
exit
bridge 10
  description "Users"
  vlan 10
  security-zone users
  ip address 198.18.160.1/22
  ip helper-address 100.123.0.2
  ip policy route-map users_map
  ip tcp adjust-mss 1312
  location data10
  enable
exit

interface gigabitethernet 1/0/1
  description "UpLink"
exit
interface gigabitethernet 1/0/1.212
  description "VRF_backbone"
  security-zone trusted
  ip address 100.64.0.66/30
  ip tcp adjust-mss 1312
exit
interface gigabitethernet 1/0/1.213
  description "VRF_nat"
  security-zone untrusted
  ip address 100.64.0.70/30
  ip tcp adjust-mss 1312
exit
interface gigabitethernet 1/0/1.4092
  description "IPsec"
  security-zone ipsec
  ip address 10.12.20.4/28
exit
tunnel softgre 1
  description "mgmt"
  mode management
  local address 192.168.200.49
  default-profile
  enable
exit
tunnel softgre 1.1
  bridge-group 3
  enable
exit
tunnel softgre 2
  description "data"
  mode data
  local address 192.168.200.50
  default-profile
  enable
exit

security zone-pair trusted self
  rule 10
    action permit
    enable
  exit
exit
security zone-pair users self
  rule 10
    action permit
    match protocol udp
    match source-port dhcp_client
    match destination-port dhcp_server
```

```
    enable
  exit
exit
security zone-pair users untrusted
  rule 10
    action permit
    enable
  exit
exit
security zone-pair users trusted
  rule 10
    action permit
    match protocol udp
    match source-port dhcp_client
    match destination-port dhcp_server
    enable
  exit
  rule 20
    action permit
    match protocol udp
    match destination-port dns
    enable
  exit
exit
security zone-pair ipsec self
  rule 1
    action permit
    match protocol udp
    match destination-port ipsec_ports
    enable
  exit
  rule 2
    action permit
    match protocol esp
    enable
  exit
  rule 3
    action permit
    match protocol gre
    match source-address ipsec_remote_address
    match destination-address gre_termination
    enable
  exit
  rule 4
    action permit
    match protocol icmp
    enable
  exit
exit
security zone-pair trusted trusted
  rule 10
    action permit
    enable
  exit
exit

address-assignment pool ipsec_xauth_pool
  ip prefix 172.31.252.0/22
  data-tunnel address 192.168.200.50
  management-tunnel address 192.168.200.49
exit

security ike proposal dh1_md5_aes128
  authentication algorithm md5
  encryption algorithm aes128
exit

security ike policy psk_xauth
  lifetime seconds 86400
  pre-shared-key ascii-text testing123
  authentication method xauth-psk-key
```

```
  authentication mode radius
  proposal dh1_md5_aes128
exit

security ike gateway xauth_gw
  ike-policy psk_xauth
  local address 10.12.20.4
  local network 192.168.200.48/28
  remote address any
  remote network dynamic pool ipsec_xauth_pool
  mode policy-based
  dead-peer-detection action clear
  dead-peer-detection interval 60
  dead-peer-detection timeout 180
exit

security ipsec proposal md5_aes128_esp
  authentication algorithm md5
  encryption algorithm aes128
exit

security ipsec policy ipsec_pol
  proposal md5_aes128_esp
exit

security ipsec vpn xauth_ipsec
  mode ike
  ike establish-tunnel by-request
  ike gateway xauth_gw
  ike ipsec-policy ipsec_pol
  enable
exit

security passwords history 0
ip dhcp-relay

ip route 0.0.0.0/0 10.12.20.2

wireless-controller
  nas-ip-address 192.168.128.1
  resp-time 3
  failure-count 3
  data-tunnel configuration radius
  aaa das-profile COA
  aaa radius-profile PCRF
  enable
exit
ip telnet server
ip ssh server

clock timezone gmt +7

ntp enable
ntp server 100.123.0.2
exit
```

2

1.4.0, , ESR, EoGRE . :

1) bridge 1: 192.168.171/24 - , , IPsec;

2) bridge 2: 192.168.110.0.37/24 - , ;

2) bridge 3: 101.0.0.171/24 - SoftWLC, DHCP DNS . SoftWLC. SoftWLC 101.0.0.24;

3) bridge 5: 192.168.7.1/30 192.168.7.2.30 - EoGRE , ;

4) bridge 6: 172.31.239.1/26 - ;

5) bridge 7: 172.31.239.65/26 - ;

6) bridge 94: 10.12.12.1/30 - ;

7) 172.31.250.0/24 - , mode config, EoGRE .

. . bridge 1, bridge 94 PBR, ESR "clients_br7".

```
hostname esr-ipsec

tech-support login enable
root login enable

syslog max-files 3
syslog file-size 512

object-group service telnet
  port-range 23
exit
object-group service ssh
  port-range 22
exit
object-group service dhcp_server
  port-range 67
exit
object-group service dhcp_client
  port-range 68
exit
object-group service ntp
  port-range 123
exit
object-group service ipsec_ports
  port-range 500
  port-range 4500
exit
object-group service snmp
  port-range 161-162
exit
object-group service COA
  port-range 3799
  port-range 31812-31813
  port-range 1812-1813
exit
object-group service redirect
  port-range 3128
  port-range 3129
exit

object-group network SoftWLC
  ip address-range 101.0.0.24
exit
object-group network ipsec_remote_address
  ip prefix 172.31.250.0/24
exit
object-group network gre_termination
  ip prefix 192.168.7.0/30
exit

object-group url defaultserv
  url http://eltex-co.ru
exit

#   -,    data-  .
radius-server timeout 10
radius-server retransmit 5
radius-server host 101.0.0.24
```

```
  key ascii-text testing123
  timeout 11
  priority 20
  source-address 101.0.0.171
  auth-port 31812
  acct-port 31813
  retransmit 10
  dead-interval 10
exit
aaa radius-profile PCRF
  radius-server host 101.0.0.24
exit

# ESR,       -.
das-server COA
  key ascii-text testing123
  port 3799
  clients object-group SoftWLC
exit
aaa das-profile COA
  das-server COA
exit

vlan 2
  force-up
exit
vlan 7
  name "mgmt"
  force-up
exit
vlan 100
  name "user"
  force-up
exit
vlan 808
  name "GRE"
  force-up
exit
vlan 1001
  name "from_SoftWLC"
  force-up
exit
vlan 1108
  force-up
exit
vlan 4094
  force-up
exit

security zone trusted
exit
security zone user
exit
security zone mgmt
exit
security zone gre
exit
security zone ipsec
exit
security zone clients_inet
exit

#   ,      ,  policy-based routing.
ip access-list extended users_filter
  rule 1
    action permit
    match protocol any
    match source-address 172.31.239.64 255.255.255.192
    match destination-address any
    enable
  exit
```

```
exit

#DHCP-request          DHCP-,      ip,   SotfWLC.
ip access-list extended clients_dhcp
  rule 1
    action permit
    match protocol udp
    match source-address 172.31.239.64 255.255.255.192
    match destination-address 101.0.0.24 255.255.255.255
    match source-port 68
    match destination-port 67
    enable
  exit
exit

# route-map,  ,      .
route-map clients_br7
  rule 1 #DHCP-request     DHCP .
    match ip access-group clients_dhcp
    action set ip next-hop verify-availability 101.0.0.24 10
    action permit
  exit
  rule 2 #      ,        .
    match ip access-group users_filter
    action set ip next-hop verify-availability 10.12.12.2 10
    action permit
  exit
exit

snmp-server
snmp-server system-shutdown #  ESR  SNMP-  EMS.
snmp-server community "private1" rw
snmp-server community "public11" ro

snmp-server host 101.0.0.24
exit

#,    ,  IPSec   .
bridge 1
  vlan 1108
  security-zone ipsec
  ip address 192.168.108.171/24
  enable
exit

#   , .
bridge 2
  vlan 2
  security-zone trusted
  ip address 192.168.110.37/24
  enable
exit

#    SoftWLC.
bridge 3
  description "SoftWLC"
  vlan 1001
  security-zone mgmt
  ip address 101.0.0.171/24
  enable
exit

#  GRE   .
bridge 5
  vlan 808
  security-zone gre
  ip address 192.168.7.1/30
  ip address 192.168.7.2/30
  enable
exit
```

```
#   .
bridge 6
  vlan 7
  security-zone mgmt
  ip address 172.31.239.1/26
  ip helper-address 101.0.0.24
  ip tcp adjust-mss 1312
  protected-ports
  protected-ports exclude vlan
  enable
exit

#,   .
bridge 7
  vlan 100
  security-zone user
  ip address 172.31.239.65/26
  ip helper-address 101.0.0.24
  ip policy route-map clients_br7 # policy-based routing  .
  ip tcp adjust-mss 1312
  location testing2
  protected-ports
  protected-ports exclude vlan
  enable
exit

#,    ,        .
bridge 94
  vlan 4094
  security-zone clients_inet
  ip address 10.12.12.1/30
  ip tcp adjust-mss 1312
  enable
exit

interface port-channel 1
  switchport forbidden default-vlan
  switchport general acceptable-frame-type tagged-only
  switchport general allowed vlan add 2,1001,1108,4094 tagged
exit
interface gigabitethernet 1/0/1
  channel-group 1 mode auto
exit
interface gigabitethernet 1/0/2
  channel-group 1 mode auto
exit
interface gigabitethernet 1/0/3
  shutdown
  security-zone trusted
  ip firewall disable
exit
interface gigabitethernet 1/0/4
  shutdown
  security-zone trusted
  ip firewall disable
exit
interface tengigabitethernet 1/0/1
  shutdown
  ip firewall disable
  switchport forbidden default-vlan
exit
interface tengigabitethernet 1/0/2
  shutdown
  ip firewall disable
  switchport forbidden default-vlan
exit
exit
tunnel softgre 1
  description "mgmt"
  mode management
  local address 192.168.7.1
```

```
  default-profile
  enable
exit
tunnel softgre 1.1
  bridge-group 6
  enable
exit
tunnel softgre 2
  description "data"
  mode data
  local address 192.168.7.2
  default-profile
  enable
exit

security zone-pair trusted self
  rule 1
    action permit
    match protocol tcp
    match source-address any
    match destination-address any
    match source-port any
    match destination-port ssh
    enable
  exit
  rule 2
    action permit
    match protocol tcp
    match source-address any
    match destination-address any
    match source-port any
    match destination-port telnet
    enable
  exit
  rule 3
    action permit
    match protocol icmp
    match source-address SoftWLC
    match destination-address any
    enable
  exit
exit
security zone-pair user self
  rule 10
    action permit
    match protocol udp
    match source-address any
    match destination-address any
    match source-port dhcp_client
    match destination-port dhcp_server
    enable
  exit
  rule 20
    action permit
    match protocol tcp
    match source-address any
    match destination-address any
    match source-port any
    match destination-port redirect
    enable
  exit
exit
security zone-pair clients_inet self
  rule 10
    action permit
    match protocol any
    match source-address any
    match destination-address any
  exit
exit
security zone-pair user clients_inet
```

```
  rule 1
    action permit
    match protocol any
    match source-address any
    match destination-address any
    enable
  exit
exit
security zone-pair ipsec self
  rule 1
    action permit
    match protocol udp
    match source-address any
    match destination-address any
    match source-port ipsec_ports
    match destination-port ipsec_ports
    enable
  exit
  rule 2
    action permit
    match protocol esp
    match source-address any
    match destination-address any
    enable
  exit
  rule 3 #..  GRE   IPSec ,        ,    .
    action permit
    match protocol gre
    match source-address ipsec_remote_address
    match destination-address gre_termination
    enable
  exit
  rule 4
    action permit
    match protocol icmp
    match source-address ipsec_remote_address
    match destination-address gre_termination
    enable
  exit
exit
security zone-pair mgmt self
  rule 1
    action permit
    match protocol tcp
    match source-address any
    match destination-address any
    match source-port any
    match destination-port ssh
    enable
  exit
  rule 2
    action permit
    match protocol tcp
    match source-address any
    match destination-address any
    match source-port any
    match destination-port telnet
    enable
  exit
  rule 3
    action permit
    match protocol icmp
    match source-address SoftWLC
    match destination-address any
    enable
  exit
  rule 4
    action permit
    match protocol udp
    match source-address SoftWLC
    match destination-address any
```

```
    match source-port any
    match destination-port snmp
    enable
  exit
  rule 5
    action permit
    match protocol udp
    match source-address SoftWLC
    match destination-address any
    match source-port any
    match destination-port COA
    enable
  exit
  rule 6
    action permit
    match protocol tcp
    match source-address SoftWLC
    match destination-address any
    match source-port any
    match destination-port COA
    enable
  exit
  rule 7
    action permit
    match protocol icmp
    match source-address any
    match destination-address any
    enable
  exit
  rule 10
    action permit
    match protocol udp
    match source-address any
    match destination-address any
    match source-port dhcp_client
    match destination-port dhcp_server
    enable
  exit
  rule 11
    action permit
    match protocol udp
    match source-address any
    match destination-address any
    match source-port dhcp_server
    match destination-port dhcp_server
    enable
  exit
exit
security zone-pair mgmt mgmt
  rule 1
    action permit
    match protocol icmp
    match source-address any
    match destination-address any
    enable
  exit
  rule 10
    action permit
    match protocol udp
    match source-address any
    match destination-address any
    match source-port dhcp_client
    match destination-port dhcp_server
    enable
  exit
  rule 20
    action permit
    match protocol udp
    match source-address SoftWLC
    match destination-address any
    match source-port any
```

```
    match destination-port snmp
    enable
  exit
  rule 21
    action permit
    match protocol udp
    match source-address any
    match destination-address SoftWLC
    match source-port any
    match destination-port snmp
    enable
  exit
  rule 22
    action permit
    match protocol tcp
    match source-address SoftWLC
    match destination-address any
    match source-port any
    match destination-port snmp
    enable
  exit
  rule 23
    action permit
    match protocol tcp
    match source-address any
    match destination-address SoftWLC
    match source-port any
    match destination-port snmp
  exit
  rule 30
    action permit
    match protocol tcp
    match source-address any
    match destination-address any
    match source-port any
    match destination-port telnet
    enable
  exit
  rule 31
    action permit
    match protocol tcp
    match source-address any
    match destination-address any
    match source-port any
    match destination-port ssh
    enable
  exit
  rule 49
    action permit
    match protocol udp
    match source-address any
    match destination-address SoftWLC
    match source-port any
    match destination-port ntp
    enable
  exit
  rule 50
    action permit
    match protocol udp
    match source-address any
    match destination-address SoftWLC
    match source-port any
    match destination-port COA
    enable
  exit
exit
security zone-pair mgmt user
  rule 10
    action permit
    match protocol udp
    match source-address SoftWLC
```

```
    match destination-address any
    match source-port dhcp_server
    match destination-port dhcp_server
    enable
  exit
exit
security zone-pair gre ipsec
  rule 1
    action permit
    match protocol any
    match source-address gre_termination
    match destination-address ipsec_remote_address
    enable
  exit
exit

#  ,      mode config.
address-assignment pool ipsec_pool_1
  ip prefix 172.31.250.0/24             # ,
                                        #    ip (tunnel ip)  GRE .
                                        #      tunnel ip  EMS.
  data-tunnel address 192.168.7.2       #,       GRE data .
  management-tunnel address 192.168.7.1 #,       GRE  .
exit

# IKE :   MD5,  - DH1,   aes128.
security ike proposal dh1_md5_aes128
  authentication algorithm md5
  encryption algorithm aes128
exit

#  IKE.
security ike policy psk_xauth1
  lifetime seconds 86400               #    (     ).
  pre-shared-key ascii-text testing123 #
  authentication method xauth-psk-key  #    XAUTH.
  authentication mode radius           # -   .
  proposal dh1_md5_aes128              #   .
exit

# ,  .
security ike gateway ike1_from_inet
  ike-policy psk_xauth1                    #    IKE.
  local address 192.168.108.171            #,    IPSec .
  local network 192.168.7.0/30             # ,       IPSec .
  remote address any                       #   IPSec -     .
  remote network dynamic pool ipsec_pool_1 #       .
  mode policy-based                        #  policy-based
  dead-peer-detection action clear         #     IPSec   .
  dead-peer-detection interval 60          #  dead-peer-detection .
  dead-peer-detection interval 180         #,   ,   IPSec  ,
                                           #       DPD .
exit

#  IPSec:   MD5,   AES128,    ESP.
security ipsec proposal md5_aes128_esp
  authentication algorithm md5
  encryption algorithm aes128
exit

#  IPSec.
security ipsec policy vpn1_pol1
  lifetime seconds 3600   #  IPSec haild SA (     ).
  proposal md5_aes128_esp #  IPSec,  .
exit

# IPSec VPN,      .
security ipsec vpn for_INET_1
  mode ike                        # IKE.
  ike establish-tunnel by-request # IPSec     .
  ike gateway ike1_from_inet      #  , ,   IKE.
```

```
  ike ipsec-policy vpn1_pol1      #  IPSec,  .
  enable
exit

ip dhcp-relay

ip route 0.0.0.0/0 192.168.108.1 200

wireless-controller
  nas-ip-address 101.0.0.171
  data-tunnel configuration radius #   data-
  aaa das-profile COA
  aaa radius-profile PCRF
  enable
exit
ip telnet server
ip ssh server

clock timezone gmt +7

ntp enable
ntp server 101.0.0.24
  prefer
exit
```

ESR 1200/1500/1700 1.4.1 - , EoGRE. : ESR OTT .

Troubleshooting

-

- **/var/log/eltex-wifi-sa/wifi-sa-server.log**. application.conf LogLevel = debug

CLI :

- :

WEP-12ac_rev_C# *get ipsec-activator*

IPsec, -:

WEP-12ac_rev_C# *get ipsec-dynamic*

URL -, :

WEP-12ac_rev_C# *sh*

/mnt/root # *cd /etc/cert/*
/etc/cert # *cat sa-host.txt*
https://126.0.10.4:8043

provider-id MAC :

WEP-12ac_rev_C# *sh*

```
/etc/cert # openssl x509 -in /etc/cert/cert.pem -text -noout
WARNING: can't open config file: /etc/pki/tls/openssl.cnf
Certificate:
Data:
Version: 3 (0x2)
Serial Number:
e0:d9:e3:70:1d:00:bc:2a:aa:28:54:ee:9f:27:5a:77
Signature Algorithm: sha256WithRSAEncryption
Issuer: CN=OTT Certification Root (Test), O=Eltex Enterprise Ltd., OU=Wi-Fi, C=RU, L=Novosibirsk
Validity
Not Before: Jan 1 00:00:00 1999 GMT
Not After : Jan 1 00:00:00 2100 GMT
Subject: CN=E0:D9:E3:70:1D:00, O=provider_eltex
Subject Public Key Info:
Public Key Algorithm: rsaEncryption
Public-Key: (2048 bit)
Modulus:
.....
```

e0:d9:e3:70:1d:00 - MAC ,

provider_eltex - Provider-ID

-

service-activator https://<URL ->:8043 --msg-type register --timeout 300 -C /etc/cert/cert.pem -K /etc/cert/key.pem -A /etc/cert/ca.pem -d 15

- .