

- PPTP-
- L2TP over IPsec
- OpenVPN-
- PPPoE
- PPTP
- L2TP

PPTP-

PPTP (. Point-to-Point Tunneling Protocol) – -, . PPTP () PPP IP- IP-, . PPTP . TCP- .

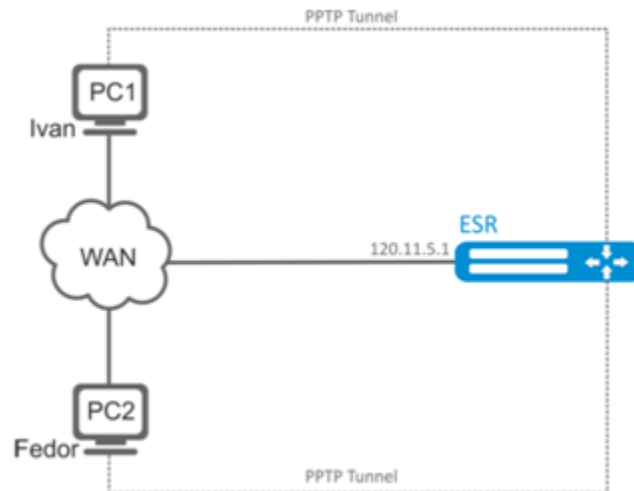
1	PPTP-.	esr(config)# remote-access pptp <NAME>	<NAME> – PPTP-, 31 .
2	().	esr(config-pptp-server)# description <DESCRIPTION>	<DESCRIPTION> – PPTP-, 255 .
3	IP-, PPTP-.	esr(config-pptp-server)# outside-address { object-group <OBJ-GROUP-NETWORK-NAME> ip-address <ADDR> interface { <IF> <TUN> } }	<OBJ-GROUP-NETWORK-NAME> – IP-, PPTP-, 31 ; <ADDR> – IP-, AAA.BBB.CCC.DDD, [0..255]; <IF> – ; <TUN> – .
4	IP- .	esr(config-pptp-server)# local-address { object-group <OBJ-GROUP-NETWORK-NAME> ip-address <ADDR> }	<OBJ-GROUP-NETWORK-NAME> – IP-, IP-, 31 ; <ADDR> – IP-, AAA.BBB.CCC.DDD, [0..255].
5	IP-, PPTP IP- .	esr(config-pptp-server)# remote-address { object-group <OBJ-GROUP-NETWORK-NAME> address-range <FROM-ADDR>-<TO-ADDR> }	<OBJ-GROUP-NETWORK-NAME> – IP-, IP-, 31 ; <FROM-ADDR> – IP-, AAA.BBB.CCC.DDD, [0..255]; <TO-ADDR> – IP-, AAA.BBB.CCC.DDD, [0..255].
6	PPTP-.	esr(config-pptp-server)# authentication mode { local radius }	<ul style="list-style-type: none"> • local – . • radius – RADIUS-. RADIUS- . AAA RADIUS
7	.	esr(config-pptp-server)# authentication method <METHOD>	<METHOD> - , [chap, mschap, mschap-v2, eap, pap]. chap
8	().	esr(config-pptp-server) username < NAME >	<NAME> – , 12 .
9	().	esr(config-pptp-user) password ascii-text { <PASSWORD> encrypted <PASSWORD> }	<PASSWORD> – , 32 .
10	().	esr(config-pptp-user) enable	
11	PPTP- firewall (. Firewall).	esr(config-pptp-server)# security-zone <NAME>	<NAME> – , 31 .
12	.	esr(config-pptp-server)# enable	
13	DSCP- ().	esr(config-pptp-server)# dscp <DSCP>	<DSCP>– dscp [0..63].
14	MPPE PPTP- ().	esr(config-pptp-server)# encryption mppe	
15	MTU (MaximumTransmissionUnit) (). MTU 1500 "system jumbo-frames".	esr(config-pptp-server) mtu <MTU>	<MTU> – MTU, [1280..1500]. : 1500.

16	DNS-, ().	esr(config-pptp-server)# dns-servers object-group <OBJ-GROUP-NETWORK -NAME >	<OBJ-GROUP-NETWORK-NAME> – IP-, , DNS-, 31 .
17	WINS-, ().	esr(config-pptp-server)# wins-servers object-group <OBJ-GROUP-NETWORK-NAME >	<OBJ-GROUP-NETWORK-NAME> – IP-, WINS-, 31 .

:

PPTP- .

- PPTP- – 120.11.5.1;
- – 10.10.10.1;
- IP- 10.10.10.5-10.10.10.25;
- DNS-: 8.8.8.8, 8.8.8.4;
- – fedor, ivan.



:

, , :

```
esr# configure
esr(config)# object-group network pptp_outside
esr(config-object-group-network)# ip address-range 120.11.5.1
esr(config-object-group-network)# exit
```

, :

```
esr(config)# object-group network pptp_local
esr(config-object-group-network)# ip address-range 10.10.10.1
esr(config-object-group-network)# exit
```

, :

```
esr(config)# object-group network pptp_remote
esr(config-object-group-network)# ip address-range 10.10.10.5-10.10.10.25
esr(config-object-group-network)# exit
```

PPTP- :

```
esr(config)# remote-access pptp remote-workers
esr(config-pptp)# local-address object-group pptp_local
esr(config-pptp)# remote-address object-group pptp_remote
esr(config-pptp)# outside-address object-group pptp_outside
esr(config-pptp)# dns-servers object-group pptp_dns
```

PPTP-:

```
esr(config-pptp)# authentication mode local
```

, :

```
esr(config-pptp)# security-zone VPN
```

PPTP- *Ivan Fedor* PPTP-:

```
esr(config-pptp)# username ivan
esr(config-pptp-user)# password ascii-text password1
esr(config-pptp-user)# enable
esr(config-pptp-user)# exit
esr(config-pptp)# username fedor
esr(config-pptp-user)# password ascii-text password2
esr(config-pptp-user)# enable
esr(config-pptp-user)# exit
esr(config-pptp)# exit
```

PPTP-:

```
esr(config-pptp)# enable
```

120.11.5.1:1723. PPTP- :

```
esr# show remote-access status pptp server remote-workers
```

PPTP- :

```
esr# show remote-access counters pptp server remote-workers
```

PPTP- :

```
esr# clear remote-access counters pptp server remote-workers
```

fedor PPTP- :

```
esr# clear remote-access session pptp username fedor
esr# clear remote-access session pptp server remote-workers username fedor
```

PPTP- :

```
esr# show remote-access configuration pptp remote-workers
```



PPTP- firewall TCP- 1723 GRE(47) .

L2TP over IPsec

L2TP (. Layer 2 Tunneling Protocol –) – , . L2TP () PPP IP- IP-, , L2TP . L2 UDP- . L2TP- IPsec, .

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1	L2TP-.	esr(config)# remote-access l2tp <NAME>	<NAME> – L2TP-, 31 .
2	().	esr(config-l2tp-server)# description <DESCRIPTION>	<DESCRIPTION> – L2TP-, 255 .
3	IP-, L2TP-.	esr(config-l2tp-server)# outside-address { object-group <NAME> ip-address <ADDR> interface { <IF> <TUN> } }	<OBJ-GROUP-NETWORK-NAME> – IP-, L2TP-, 31 ; <ADDR> – IP-, AAA.BBB.CCC.DDD, [0..255]; <IF> – ; <TUN> – .
4	IP- firewall PPTP-	esr(config-l2tp-server)# local-address { object-group <OBJ-GROUP-NETWORK -NAME> ip-address <ADDR> }	<OBJ-GROUP-NETWORK-NAME> – IP-, IP-, 31 ; <ADDR> – IP-, AAA.BBB.CCC.DDD, [0..255].
5	IP- L2TP IP- .	esr(config-l2tp-server)# remote-address { object-group <OBJ-GROUP-NETWORK -NAME > address-range <FROM-ADDR>-<TO-ADDR> }	<OBJ-GROUP-NETWORK-NAME> – IP-, IP-, 31 ; <FROM-ADDR> – IP-, AAA.BBB.CCC.DDD, [0..255]; <TO-ADDR> – IP-, AAA.BBB.CCC.DDD, [0..255].
6	L2TP-.	esr(config-l2tp-server)# authentication mode { local radius }	<ul style="list-style-type: none"> • local – . • radius – RADIUS-. RADIUS- . AAA RADIUS
7		esr(config-l2tp-server)# authentication method <METHOD>	<METHOD> – , [chap, mschap, mschap-v2, eap, pap]. chap.
8	L2TP- (. Firewall).	esr(config-l2tp-server)# security-zone <NAME>	<NAME> – , 31 .
9	().	esr(config-l2tp-server) username < NAME >	<NAME> – , 12 .
10	().	esr(config-l2tp-user) password ascii-text { <PASSWORD> encrypted <PASSWORD> }	<PASSWORD> – , 32 .
11	().	esr(config-l2tp-user) enable	
12	IKE- ().	esr(config-l2tp-server)# ipsec authentication method pre-shared-key	
13	, , .	esr(config-l2tp-server)# ipsec authentication pre-shared-key { ascii-text { <TEXT> encrypted <ENCRYPTED-TEXT> } hexadecimal {<HEX> encrypted <ENCRYPTED-HEX> } }	<TEXT> – [1..64] ASCII ; <HEX> – [1..32] [2..128] (0xYYYY...) (YYYY...). <ENCRYPTED-TEXT> – [1..32], [2..128] ; <ENCRYPTED-HEX> – [2..64], [2..256] .
14	ike ().	esr(config-l2tp-server)# ipsec ike proposal <NAME>	<NAME> – IKE, 31 .
15	ipsec ().	esr(config-l2tp-server)# ipsec proposal <NAME>	<NAME> – IPsec, 31 .
16	.	esr(config-l2tp-server)# enable	
17	DSCP .	esr(config-l2tp-server)# dscp <DSCP>	<DSCP> – dscp [0..63].
18	MTU (MaximumTransmissionUnit) (). MTU 1500 "system jumbo-frames".	esr(config-l2tp-server) mtu <MTU>	<MTU> – MTU, [1280..1500]. : 1500.
19	DNS-, ().	esr(config-l2tp-server)# dns-servers object-group <OBJ-GROUP-NETWORK -NAME >	<OBJ-GROUP-NETWORK-NAME> – IP-, , DNS-, 31 .
20	WINS-, ().	esr(config-l2tp-server)# wins-servers object-group <OBJ-GROUP-NETWORK -NAME >	<OBJ-GROUP-NETWORK-NAME> – IP-, WINS-, 31 .

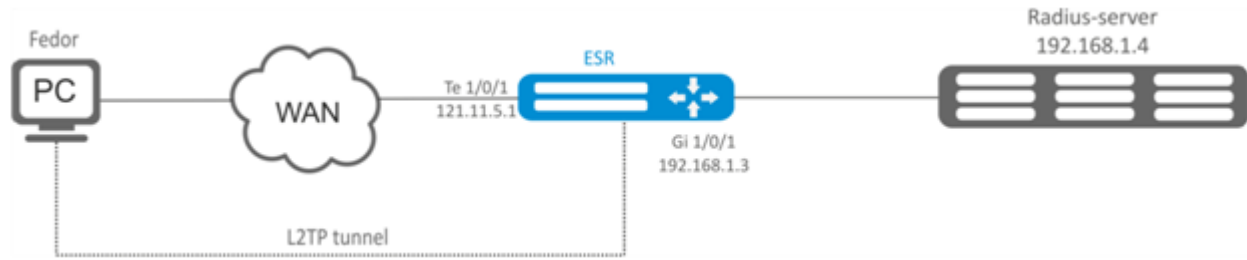
:

L2TP- . RADIUS-.

- L2TP – 120.11.5.1;
- – 10.10.10.1;

- Radius- – 192.168.1.4;

IPsec : — «password».



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:

- RADIUS-;
- te1/0/1 gi1/0/1;
- IP- te1/0/1 te1/0/1.

, :

```

esr(config)# object-group network l2tp_local
esr(config-object-group-network)# ip address-range 10.10.10.1
esr(config-object-group-network)# exit

```

, DNS-:

```

esr(config)# object-group network pptp_dns
esr(config-object-group-network)# ip address-range 8.8.8.8
esr(config-object-group-network)# ip address-range 8.8.4.4
esr(config-object-group-network)# exit

```

L2TP- :

```

esr(config)# remote-access l2tp remote-workers
esr(config-l2tp)# local-address ip-address 10.10.10.1
esr(config-l2tp)# remote-address address-range 10.10.10.5-10.10.10.15
esr(config-l2tp)# outside-address ip-address 120.11.5.1
esr(config-l2tp)# dns-server object-group l2tp_dns

```

L2TP-:

```

esr(config-l2tp)# authentication mode radius

```

, :

```

esr(config-l2tp)# security-zone VPN

```

IKE :

```

esr(config-l2tp)# ipsec authentication method psk
esr(config-l2tp)# ipsec authentication pre-shared-key ascii-text password

```

L2TP-:

```

esr(config-l2tp)# enable

```

IP- 120.11.5.1 1701. L2TP- :

```
esr# show remote-access status l2tp server remote-workers
```

L2TP- :

```
esr# show remote-access counters l2tp server remote-workers
```

L2TP- :

```
esr# clear remote-access counters l2tp server remote-workers
```

fedor L2TP- :

```
esr# clear remote-access session l2tp username fedor
esr# clear remote-access session l2tp server remote-workers username fedor
```

L2TP- :

```
esr# show remote-access configuration l2tp remote-workers
```



L2TP- firewall UDP- 500, 1701, 4500 ESP (50) GRE (47) .

OpenVPN-

OpenVPN — (Virtual Private Networks, VPN), , , , SSL.

1	OpenVPN-.	esr(config)# remote-access openvpn <NAME>	<NAME> – OpenVPN-, 31 .
2	().	esr(config-openvpn-server)# description <DESCRIPTION>	<DESCRIPTION> – OpenVPN-, 255 .
3	, IP- . (tunnel ip).	esr(config-openvpn-server)# network <ADDR/LEN>	<ADDR/LEN> – , : AAA.BBB.CCC.DDD/EE – IP- , AAA-DDD [0..255] EE [1..32];
4	.	esr(config-openvpn-server)# protocol <PROTOCOL>	<PROTOCOL> – , : <ul style="list-style-type: none">• TCP- TCP-;• UDP- UDP-.
5	OpenVPN-.	esr(config-openvpn-server)# tunnel <TYPE>	<TYPE> – , : <ul style="list-style-type: none">• ip – -;• ethernet – L2 .
6	IP-, OpenVPN IP- L2. (tunnel ethernet).	esr(config-openvpn-server)# address-range <FROM-ADDR>-<TO-ADDR>	<FROM-ADDR> – IP-, AAA.BBB.CCC.DDD, [0..255]; <TO-ADDR> – IP-, AAA.BBB.CCC.DDD, [0..255].
7	OpenVPN L2 (tunnel ethernet).	esr(config-openvpn-server)# bridge-group <BRIDGE-ID>	<BRIDGE-ID> – .

8	.	esr(config-openvpn-server)# certificate <CERTIFICATE-TYPE> <NAME>	<CERTIFICATE-TYPE> – , : <ul style="list-style-type: none"> • ca – ; • crl – ; • dh – -; • server - crt – ; • server - key – ; • ta – HMAC . <NAME> – , 31 .
9	, .	esr(config-openvpn-server)# encryption algorithm <ALGORITHM>	<ALGORITHM> – , : 3des,blowfish128, aes128.
10	OpenVPN- Firewall).	esr(config-openvpn-server)# security- zone <NAME>	<NAME> – , 31 .
11	OpenVPN- ().	esr(config-openvpn-server)# username < NAME >	<NAME> – , 31 .
12	OpenVPN-.	esr(config-openvpn-user)# subnet <ADDR/LEN>	<ADDR/LEN> – , : AAA.BBB.CCC.DDD/EE – IP- , AAA-DDD [0..255] EE [1..32].
13	ip- OpenVPN-	esr(config-openvpn-user)# ip address <ADDR>	<ADDR> – : AAA.BBB.CCC.DDD – IP- , AAA-DDD [0..255].
14	OpenVPN-.	esr(config-openvpn-server)# enable	
15	().	esr(config-openvpn-server)# client- isolation	
16	().	esr(config-openvpn-server)# client-max <VALUE>	<VALUE> – , [1..65535].
17	OpenVPN ().	esr(config-openvpn-server)# compression	
18	DNS-, ().	esr(config-openvpn-server)# dns-server <ADDR>	<ADDR> – IP- DNS , AAA.BBB.CCC.DDD, [0..255];
19	TCP-/UDP-, OpenVPN- ().	esr(config-openvpn-server)# port <PORT>	<PORT> – TCP/UDP , [1..65535]. : 1194
20	OpenVPN , ().	esr(config-openvpn-server)# redirect- gateway	
21	, IP- OpenVPN- ().	esr(config-openvpn-server)# route <ADDR/LEN>	<ADDR/LEN> – , : AAA.BBB.CCC.DDD/EE – IP- , AAA-DDD [0..255] EE [1..32];
22	, ().	esr(config-openvpn-server)# timers holdtime <TIME>	<TIME> – , [1..65535]. : 120
23	, ().	esr(config-openvpn-server)# timers keepalive <TIME>	<TIME> – , [1..65535]. : 10
24	OpenVPN- .	esr(config-openvpn-server)# duplicate- cn	
25	WINS-, ().	esr(config-openvpn-server)# wins-server <ADDR>	<ADDR> – IP- WINS , AAA.BBB.CCC.DDD, [0..255].
26	OpenVPN- ().	esr(config-openvpn-server)# authentication algorithm <ALGORITHM>	<ALGORITHM> – : <ul style="list-style-type: none"> • 8-128 bits key size: md4, rsa-md4, md5, rsa-md5, mdc2, rsa-mdc2 • 8-160 bits key size: sha, sha1, rsa-sha, rsa-sha1, rsa-sha1-2, dsa, dsa-sha, dsa-sha1, dsa-sha1-old, ripemd160, rsa-ripemd160, ecdsa-with-sha1 • 8-224 bits key size: sha-224, rsa-sha-224 • 8-256 bits key size: sha-256, rsa-sha-256 • 8-384 bits key size: sha-384, rsa-sha-384 • 8-512 bits key size: sha-512, rsa-sha-512, whirlpool : sha

:

OpenVPN- L3 .

- OpenVPN- – 10.10.100.0/24;
- – L3;
- .



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:

- :
- ()
- OpenVPN
- - HMAC TLS
- te1/0/1
- IP- te1/0/1.

tftp :

```

esr# copy tftp://192.168.16.10:/ca.crt certificate:ca/ca.crt
esr# copy tftp://192.168.16.10:/dh.pem certificate:dh/dh.pem
esr# copy tftp://192.168.16.10:/server.key certificate:server-key/server.key
esr# copy tftp://192.168.16.10:/server.crt certificate:server-crt/server.crt
esr# copy tftp://192.168.16.10:/ta.key certificate:ta/ta.key

```

OpenVPN- , :

```

esr(config)# remote-access openvpn AP
esr(config-openvpn)# network 10.10.100.0/24

```

L3 .

```

esr(config-openvpn)# tunnel ip
esr(config-openvpn)# protocol tcp

```

OpenVPN DNS

```

esr(config-)# route 10.10.0.0/20
esr(config-openvpn)# dns-server 10.10.1.1

```

, OpenVPN-:

```

esr(config-openvpn)# certificate ca ca.crt
esr(config-openvpn)# certificate dh dh.pem
esr(config-openvpn)# certificate server-key server.key
esr(config-openvpn)# certificate server-crt server.crt
esr(config-openvpn)# certificate ta ta.key

```

, :

```

esr(config-openvpn)# security-zone VPN

```

aes128:

```

esr(config-openvpn)# encryption algorithm aes128

```

OpenVPN-:


```
esr(config-openvpn)# enable
```

1194 ().

OpenVPN- :

```
esr# show remote-access status openvpn server AP
```

OpenVPN- :

```
esr# show remote-access counters openvpn server AP
```

OpenVPN- :

```
esr# clear remote-access counters openvpn server AP
```

fedor OpenVPN- :

```
esr# clear remote-access session openvpn username fedor
esr# clear remote-access session openvpn server AP username fedor
```

OpenVPN- :

```
esr# show remote-access configuration openvpn AP
```



OpenVPN- firewall TCP- 1194.

PPPoE

PPPoE — (tunneling protocol), IP PPP Ethernet PPP-, Ethernet- -, IP-, PPP. PPP- , , - (, Ethernet), -. , IP- PPPoE- , IP-.

1	PPPoE- PPPoE-.	esr(config)# tunnel pppoe <PPPoE>	<PPPoE> – 1 10.
2	().	esr(config-pppoe)# description <DESCRIPTION>	<DESCRIPTION> – PPPoE-, 255 .
3	VRF, PPPoE- ().	esr(config-pppoe)# ip vrf forwarding <VRF>	<VRF> – VRF, 31 .
4	PPPoE .	esr(config-pppoe)# interface <IF>	<IF> – .
5	PPPoE-.	esr(config-pppoe)# username <NAME> password ascii-text { <CLEAR-TEXT> encrypted <ENCRYPTED-TEXT> }	<NAME> – , 31 ; <CLEAR-TEXT> – , [8 .. 64] ; <ENCRYPTED-TEXT> – , [16..128] .
6	PPPoE- (. Firewall).	esr(config-pppoe)# security-zone <NAME>	<NAME> – , 31 .
7		esr(config-pppoe)# enable	
8	().	esr(config-pppoe)# authentication method <METHOD>	<METHOD> – , : chap, mschap, mschap-v2, eap, pap : chap
9	PPPoE- ().	esr(config-pppoe)# ignore-default-route	
10	, ().	esr(config-pppoe)# load-average <TIME>	<TIME> – 5 150 (5)


```
esr# show tunnels configuration pppoe 1
```

PPPoE- :

```
esr# show tunnels counters pppoe 1
```

PPTP

PPTP (. Point-to-Point Tunneling Protocol) – , . PPTP () PPP IP- IP-, , PPTP . TCP- .

1	PPTP- .	esr(config)# tunnel pptp <INDEX>	<INDEX> – : [1..10].
2	().	esr(config-pptp)# description <DESCRIPTION>	<DESCRIPTION> – , 255 .
3	VRF, PPTP- ().	esr(config-pptp)# ip vrf forwarding <VRF>	<VRF> – VRF, 31 .
4	PPTP- firewall (. Firewall).	esr(config-pptp)# security-zone <NAME>	<NAME> – , 31 .
		esr(config-pptp)# ip firewall disable	
5	IP- .	esr(config-pptp)# remote address <ADDR>	<ADDR> – IP- , AAA.BBB.CCC.DDD, [0..255].
6	MTU (MaximumTransmissionUnit) ()	esr(config-pptp)# mtu <MTU>	<MTU> – MTU, : <ul style="list-style-type: none">• ESR-10/12V(F)/14VF – [552..9600];• ESR-20/21 – [552..9500];• ESR-100/200/1000/1200/1500/1511/1700 – [552..10000]• ESR-3100 – [552..9190]. : 1500.
7	.	esr(config-pptp)# username <NAME> password ascii-text { <WORD> encrypted <HEX> }	<NAME> – , 31 . <WORD> – , [8..64], [0-9a-fA-F]. <HEX> – , [16..128] .
8	.	esr(config-pptp)# enable	
9	MSS (Maximum segment size) TCP- ().	esr(config-pptp)# ip tcp adjust-mss <MSS>	<MSS> – MSS, [500..1460]. : 1460
10	PPTP- ()	esr(config-pptp)# ignore-default-route	
11	, ().	esr(config-pptp)# load-average <TIME>	<TIME> – , [5..150] : 5
12	().	esr(config-pptp)# authentication method <METHOD>	<METHOD> – , : chap, mschap, mschap-v2, eap, pap : chap
13	().	esr(config-pptp)# history statistics	
14	, keepalive- ().	esr(config-pptp)# ppp timeout keepalive <TIME >	<TIME> – , [1..32767]. : 10
15	data-link ().	esr(config-pptp)# ppp failure-count <NUM>	<NUM> – data-link , [1..100]. : 10

:

PPTP- :

- PPTP- 20.20.0.1;

- – : ivan, : simplepass.



:

PPTP:

```
esr(config)# tunnel ptp 1
```

(Ivan) :

```
esr(config-ptp)# username ivan password ascii-text simplepass
```

:

```
esr(config-ptp)# remote address 20.20.0.1
```

:

```
esr(config-ptp)# security-zone VPN
```

PPTP:

```
esr(config-ptp)# enable
```

:

```
esr# show tunnels status ptp
```

:

```
esr# show tunnels counters ptp
```

:

```
esr# show tunnels configuration ptp
```

L2TP

L2TP (. Layer 2 Tunneling Protocol –) – , . L2TP () PPP IP- IP-, , L2TP . L2 UDP- . L2TP- IPsec, .

1	L2TP- .	esr(config)# tunnel l2tp <INDEX>	<INDEX> – : [1..10].

2	VRF, L2TP- ().	esr(config-l2tp)# ip vrf forwarding <VRF>	<VRF> – VRF, 31 .
3	().	esr(config-l2tp)# description <DESCRIPTION>	<DESCRIPTION> – , 255 .
4	L2TP- firewall (. Firewall).	esr(config-l2tp)# security-zone <NAME>	<NAME> – , 31 .
		esr(config-l2tp)# ip firewall disable	
5	IP- .	esr(config-l2tp)# remote address <ADDR>	<ADDR> – IP- , AAA.BBB.CCC.DDD, [0..255].
6	.	esr(config-l2tp)# username <NAME> password ascii-text { <WORD> encrypted <HEX> }	<NAME> – , 31 . <WORD> – , [8..64], [0-9a-fA-F]. <HEX> – , [16..128] .
7	IKE-.	esr(config-l2tp)# ipsec authentication method pre-shared-key	
8	, , .	esr(config-l2tp)# ipsec authentication pre- shared-key { ascii-text { <TEXT> encrypted <ENCRYPTED- TEXT> } hexadecimal {<HEX> encrypted <ENCRYPTED- HEX> } }	<TEXT> – [1..64] ASCII ; <HEX> – [1..32] [2..128] (0xYYYY...) (YYYY...); <ENCRYPTED-TEXT> – [1..32], [2..128] ; <ENCRYPTED-HEX> – [2..64], [2..256] .
9	ike ().	esr(config-l2tp)# ipsec ike proposal <NAME>	<NAME> – IKE, 31 .
10	ipsec ().	esr(config-l2tp)# ipsec proposal <NAME>	<NAME> – IPsec, 31 .
11	udp- l2tp- ().	esr(config-l2tp)# port <PORT>	<PORT> – udp-, [1024..65535]. : 1701
12	.	esr(config-l2tp)# enable	
13	MTU (MaximumTransmissionUnit) ().	esr(config-l2tp)# mtu <MTU>	<MTU> – MTU, : <ul style="list-style-type: none"> • ESR-10/12V(F)/14VF – [552..9600]; • ESR-20/21 – [552..9500]; • ESR-100/200/1000/1200/1500/1511/1700 – [552..10000] • ESR-3100 – [552..9190]. : 1500.
14	L2TP- ()	esr(config-l2tp)# ignore-default-route	
15	().	esr(config-l2tp)# authentication method <METHOD>	<METHOD> – , : chap, mschap, mschap- v2, eap, pap : chap
16	, ().	esr(config-l2tp)# load-average <TIME>	<TIME> – , [5..150] : 5
17	, keepalive- ().	esr(config-l2tp)# ppp timeout keepalive <TIME >	<TIME> – , [1..32767]. : 10
18	data-link ().	esr(config-l2tp)# ppp failure-count <NUM>	<NUM> – data-link , [1..100]. : 10
L2TP- QoS (. QoS).			

:

PPTP- :

- PPTP 20.20.0.1;
- – : ivan, : simplepass



:

L2TP:

```
esr(config)# tunnel l2tp 1
```

(Ivan) :

```
esr(config-l2tp)# username ivan password ascii-text simplepass
```

:

```
esr(config-l2tp)# remote address 20.20.0.1
```

:

```
esr(config-l2tp)# security-zone VPN
```

IPsec:

```
esr(config-l2tp)# ipsec authentication method pre-shared-key
```

IPsec:

```
esr(config-l2tp)# ipsec authentication pre-shared-key ascii-text password
```

L2TP:

```
esr(config-l2tp)# enable
```

:

```
esr# show tunnels status l2tp
```

:

```
esr# show tunnels counters l2tp
```

:

```
esr# show tunnels configuration l2tp
```