

# VoIP

- SIP-
- FXS/FXO-
- PBX-
- VoIP
- FXO-
- voip FXS- sip-
- voip pbx-

VoIP (. *Voice over IP*) — , IP-. VoIP IP- .

## SIP-

1	SIP-.	<b>esr(config)# sip profile &lt;NUM&gt;</b>	<NUM> – SIP-, 1 5.
2	SIP proxy- .	<b>esr(config-sip-profile)# proxy primary</b>	
3	SIP proxy-.	<b>esr(config-voip-sip-proxy)# ip address proxy-server &lt;IP&gt;</b>	<IP> – IP- proxy-
4	SIP proxy-.	<b>esr(config-voip-sip-proxy)# ip port proxy-server &lt;PORT&gt;</b>	<PORT> – UDP- proxy-, [1..65535]. 5060, .
5	.	<b>esr(config-voip-sip-proxy)# ip address registration-server &lt;IP&gt;</b>	<IP> – IP- .
6	.	<b>esr(config-voip-sip-proxy)# ip port registration-server &lt;PORT&gt;</b>	<PORT> – UDP- , [1..65535]. 5060, .
7	.	<b>esr(config-voip-sip-proxy)# registration</b>	
8	proxy- .	<b>esr(config-voip-sip-proxy)# enable</b>	
9	.	<b>esr(config-voip-sip-proxy)# ip address registration-server &lt;IP&gt;</b>	<IP> – IP- .
10	.	<b>esr(config-voip-sip-proxy)# ip port registration-server &lt;PORT&gt;</b>	<PORT> – UDP- , [1..65535]. 5060, .
11	SIP-, .	<b>esr(config-sip-profile)# sip-domain address &lt;ADDRESS&gt;</b>	<ADDRESS> – SIP-, , ipv4- .
12	SIP domain .	<b>esr(config-sip-profile)# sip-domain registration enable</b>	
13	SIP-.	<b>esr(config)# sip profile &lt;NUM&gt;</b>	<NUM> – SIP-, 1 5.
14	SIP-.	<b>esr(config-sip-profile)# dialplan pattern &lt;DNAME&gt;</b>	<DNAME> – , 31 .
15	SIP-.	<b>esr(config-sip-profile)# enable</b>	

## FXS/FXO-

1	FXO-/FXS-.	<b>esr(config)# interface voice-port &lt;NUM&gt;</b>	<NUM> – , 1 4.
2	, .	<b>esr(config-voice-port-fxs)# sip user phone &lt;PHONE&gt;</b>	<PHONE> – , , 50 .
3	, .	<b>esr-12v(config-voice-port-fxs)# sip user display-name &lt;LOGIN&gt;</b>	<LOGIN> – , Display-Name, 31 .
4	SIP- .	<b>esr(config-voice-port-fxs)# profile sip &lt;PROFILE&gt;</b>	<PROFILE> – SIP-, 1 5.
5	.	<b>esr(config-voice-port-fxs)# authentication name &lt;LOGIN&gt;</b>	<LOGIN> – , 31
6	.	<b>esr(config-voice-port-fxs)# authentication password &lt;PASS&gt;</b>	<PASS> – , 16 .
7	FXO-.	<b>esr(config)# interface voice-port &lt;NUM&gt;</b>	<NUM> – FXO- 1 4.
8	, .	<b>esr(config-voice-port-fxo)# sip user phone &lt;PHONE&gt;</b>	<PHONE> – , .
9	UDP-, FXO- SIP-.	<b>esr(config-voice-port-fxo)# sip port &lt;PORT&gt;</b>	<PORT> – UDP-.
10	, .	<b>esr(config-voice-port-fxo)# sip user display-name &lt;LOGIN&gt;</b>	<LOGIN> – , Display-Name, 31 .
11	.	<b>esr(config-voice-port-fxo)# authentication name &lt;LOGIN&gt;</b>	<LOGIN> – , 31 .
12	.	<b>esr(config-voice-port-fxo)# authentication password &lt;PASS&gt;</b>	<PASS> – , 16 .
13	.	<b>esr(config-voice-port-fxo)# pstn transmit-number</b>	

14	.	esr(config-voice-port-fxo)# no pstn transmit-prefix	
15	«Hostline PSTN to IP».	esr(config-voice-port-fxo)# hotline ipt	
16	, .	esr(config-voice-port-fxo)# hotline number ipt <PHONE>	<PHONE> – , , 1 50. «/ » VoIP.

1	.	esr(config)# dialplan pattern <DNAME>	<DNAME> – , 31 .
2	.	esr(config-dial-ruleset)# pattern <REGEXP>	<REGEXP> – , . 1024 .
3	.	esr(config-dial-ruleset)# enable	

## PBX-

1	PBX-.	esr(config)# pbx	
2	PBX-.	esr(config-pbx)# enable	
3	.	esr(config-pbx)# ruleset <rule_name>	<rule_name> – , 31 .
4	.	esr(config-pbx-ruleset)# rule <rule_index>	<rule_index> – , 1 1000.
5	.	esr(config-pbx-rule)# pattern <REGEXP>	<REGEXP> – , . 256 .
6	.	esr(config-pbx-rule)# enable	
7	SIP- PBX-.	esr(config-pbx)# profile <PROFILE>	<PROFILE> – SIP , PBX – , 31 .
8	, SIP-.	esr(config-pbx-profile)# codec allow { G711A(alaw)   G711U(ulaw)   G722   G726 }	
9	SIP-.	esr(config-pbx-profile)# client { peer   user   friend }	<ul style="list-style-type: none"> <li>• <b>peer</b> – .</li> <li>• <b>user</b> – .</li> <li>• <b>friend</b> – peer user.</li> </ul>
10	NAT ( ).	esr(config-pbx-profile)# nat { comedia   force-port   both }	<ul style="list-style-type: none"> <li>• <b>comedia</b> – PBX, SDP.</li> <li>• <b>force-port</b> – rport, .</li> <li>• <b>both</b> – comedia force-port.</li> </ul>
11	, SIP-.	esr(config-pbx-profile)# ruleset <NAME>	<NAME> – , 31 .
12	.	esr(config-pbx)# user <user>	<user> – , 31 .
13	( ).	esr(config-pbx-user)# password <password>	<password> – , , 16 .
14	SIP- .	esr(config-pbx-user)# profile <SIPPROFILE>	<SIPPROFILE> – SIP - , , 31 .

1	PBX-.	esr(config)# pbx	
2	.	esr(config-pbx)# register-server <name>	<name> – , 31 .
3	.	esr(config-pbx-reg-server)# ip address <IP>	<IP> – , , IP 31 .
4	.	esr(config-pbx-reg-server)# ip port <PORT>	<PORT> – UDP- , [1..65535]. 5060, .
5	.	esr(config-pbx-reg-server)# username <user>	<user> – , 31 .
6	.	esr(config-pbx-reg-server)# authentication password <password>	<password> – , 16 .
7	SIP- .	esr(config-pbx-reg-server)# profile <PROFILE>	<PROFILE> – SIP , , 31 .
8	( ).	esr(config-pbx-reg-server)# protocol {tcp   udp }	udp.
9	.	esr(config-pbx-reg-server)# enable	

## VoIP

:  
- IP- ESR. proxy- SIP-, ESR.  
:



SIP-:

```
esr(config)# sip profile 1
```

SIP proxy- :

```
esr(config-sip-profile)# proxy primary
```

SIP proxy- ( SIP proxy- SIP-):

```
esr(config-voip-sip-proxy)# ip address proxy-server 192.0.2.5
```

SIP proxy-:

```
esr(config-voip-sip-proxy)# ip port proxy-server 5080
```

5060, .

, :

( SIP-):

```
esr(config-voip-sip-proxy)# ip address registration-server 192.0.2.5
```

:

```
esr(config-voip-sip-proxy)# ip port registration-server 5080
```

5060, .

:

```
esr(config-voip-sip-proxy)# registration
```

proxy- :

```
esr(config-voip-sip-proxy)# enable
```

SIP proxy- :

```
esr(config-voip-sip-proxy)# exit
```

SIP-.

SIP-:

```
esr(config-sip-profile)# sip-domain address sipdomain.com
```

SIP Domain :

```
esr(config-sip-profile)# sip-domain registration enable
```

SIP proxy- , :

,. .

, SIP-:

```
esr(config)# sip profile 1
esr(config-sip-profile)# dialplan pattern firstDialplan
```

SIP-.

SIP-:

```
esr-l2v(config-sip-profile)# enable
```

SIP-:

```
esr(config-sip-profile)# exit
```

:

```
esr(config)# interface voice-port 1
```

:

```
esr(config-voice-port-fxs)# sip user phone 4101
```

:

```
esr(config-voice-port-fxs)# sip user display-name user-one
```

SIP-:

```
esr(config-voice-port-fxs)# profile sip 1
```

:

```
esr(config-voice-port-fxs)# authentication name login-4101
esr(config-voice-port-fxs)# authentication password superpassword
```

:

```
esr(config-voice-port-fxs)# exit
```

:

, ( ESR-12V) , SIP-proxy.

:

```
esr(config)# dialplan pattern firstDialplan
```

:

```
esr(config-dial-ruleset)# pattern "<regular expressions>"
```

, "<regular expressions>" :

**"S5, L5 (410[1-3]@{local} | [xABCD\*#].S)"**

:

- **410[1-3]@{local}** – 4101, 4102, 4103 ;
- **[xABCD\*#].S** – SIP-.

:

```
esr(config-dial-ruleset)# enable
```

.

```
esr(config-dial-ruleset)# exit
```

:

**Sxx, Lxx ( ),**

:

- – S L;
  - **()** – .
- . : , : 0, 1, 2, 3, ..., 9, # \*.



# !

, , .

- : ([1239]) – 1, 2, 3 9.
- 1: (1-5) – 1 5.
- 2: ([1-39]) – .  
X 0 9.
- : (1XX) – , 1.
- «.» – 0 .
- «+» – 1 .
- {a,b} – a b ;
- {a,} – a ;
- {,b} – b .
- : (810X.) – .
- Interdigit Long Timer ( «L» ) – , , ;
- Interdigit Short Timer ( «S» ) – , , .

:

1.

: <arg1:arg2>

- : (<83812:> XXXXXX) – 83812, SIP-.
- 2. ( - )
  - : (8, 770) – 8770 8 .
- 3. '!' , , .
  - : (8 10X xxxxxxx ! | 8 xxx xxxxxxx ) – .
- 4. , . «S» «Interdigit Short Timer», «L» – «Interdigit Long Timer» . , .
  - : S4 (8XXX.) S4,L8 (XXX)
  - : (S4 8XXX. | XXX) ([1-5] XX S0) – , 1,2, ... , 5.
- 5. (IP Dialing)  
«@», , , , . «IP Dialing», (« Call Without Reg », « Answer Without Reg »).

, IP Dialing , .

- 1: ( 8 xxx xxxxxxx ) – 11- , 8.
- 2: ( 8 xxx xxxxxxx | <:8495> xxxxxxx ) – 11- , 8, , 8495.
- 3: (0[123] | 8 [2-9]xx [2-9]xxxxxx) – , .
- 4: (S0 <:82125551234>) – , «Hotline» .
- 5: (S5 <:1000> | xxxx) – , , 5, 1000 ( , ).
- 6: (8, 10x.|1xx@10.110.60.51:5060) – 810 "810". 8 " " . , "1", Invite IP- 10.110.60.51 5060.
- 7: (S3 \*xx#|#xx#|#xx#|\*xx\*x+#+) – .
- , IP- , «{local}», .
- : (123@{local}) – 123 .

## FXO-

:

FXO- ESR-12V.

:

FXO-:

```
esr(config)# interface voice-port 4
```

FXO-, :

```
esr(config-voice-port-fxo)# sip user phone 9
```

UDP-, FXO- SIP-:

```
esr(config-voice-port-fxo)# sip port 5064
```

:

```
esr(config-voice-port-fxo)# sip user display-name user-one
```

:

```
esr(config-voice-port-fxo)# authentication name login-9  
esr(config-voice-port-fxo)# authentication password superpassword
```

SIP- FXO-:

```
esr(config-voice-port-fxo)# profile sip 1
```

:

```
esr(config-voice-port-fxo)# pstn transmit-number
```

:

```
esr(config-voice-port-fxo)# no pstn transmit-prefix
```

, , 9, FXO-:

**9x. @{local}:5064**

. , ( FXO-).

, , 305.

«Hotline PSTN to IP»:

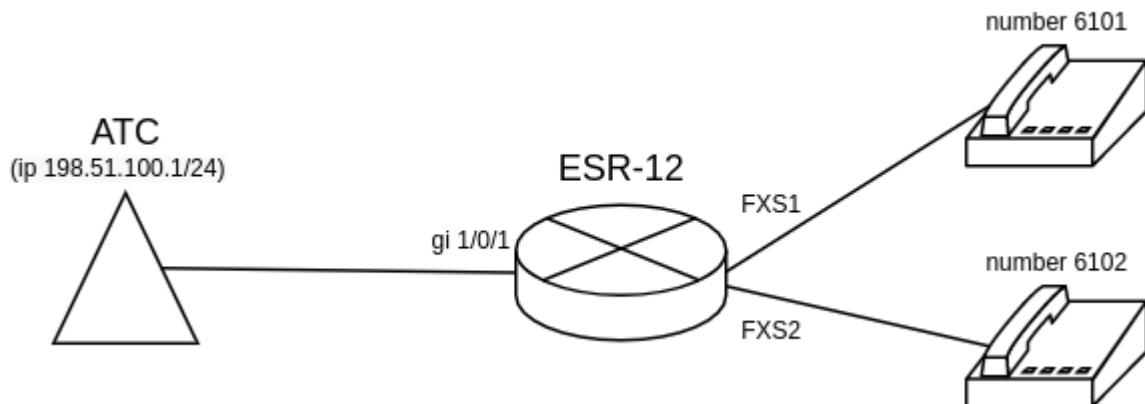
```
esr(config-voice-port-fxo)# hotline ipt
```

, :

```
esr(config-voice-port-fxo)# hotline number ipt 305
```

## voip FXS- sip-

:



:

voip FXS- sip-.

:

sip- proxy-server , FXS-:

```
esr(config)# sip profile 1
esr(config-sip-profile)# enable
esr(config-sip-profile)# sip-domain address 198.51.100.1
esr(config-sip-profile)# proxy primary
esr(config-voip-sip-proxy)# enable
esr(config-voip-sip-proxy)# ip address proxy-server 198.51.100.1
esr(config-voip-sip-proxy)# registration
esr(config-voip-sip-proxy)# ip address registration-server 198.51.100.1
esr(config-voip-sip-proxy)# exit
esr(config-sip-profile)# exit
esr(config)#
```

fxs- , sip-:

```

esr(config)# interface voice-port 1
esr(config-voice-port-fxs)# sip user phone 6101
esr(config-voice-port-fxs)# authentication name as-phone
esr(config-voice-port-fxs)# authentication password password
esr(config-voice-port-fxs)# profile sip 1
esr(config-voice-port-fxs)# exit
esr(config)# interface voice-port 2
esr(config-voice-port-fxs)# sip user phone 6102
esr(config-voice-port-fxs)# authentication name as-phone
esr(config-voice-port-fxs)# authentication password password
esr(config-voice-port-fxs)# profile sip 1
esr(config-voice-port-fxs)# exit
esr(config)#

```

voip- nat tracking nat sip, service-voip routing , sip-:

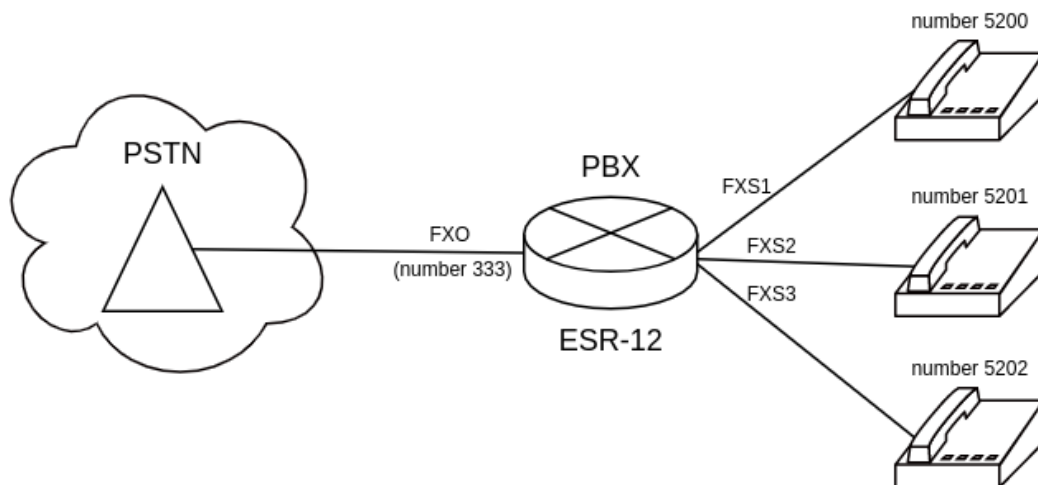
```

esr(config)# ip firewall sessions tracking sip
esr(config)# nat alg sip
esr(config)# interface gigabitethernet 1/0/1
esr(config-if-gi)# service-voip routing
esr(config-if-gi)# exit
esr(config)#

```

## voip pbx-

:



:

, FXS-, , FXO-. FXO- 5200.

:

PBX.

pbx-:

```

esr(config)# pbx
esr(config-pbx)#

```



pattern " ".



FXO- ( 5200-5202):

```
esr(config-pbx)# ruleset FXO
esr(config-pbx-ruleset)# rule 1
esr(config-pbx-rule)# pattern '_X.,1,Dial(SIP/5200&SIP/5201&SIP/5202)'
esr(config-pbx-rule)# enable
esr(config-pbx-rule)# exit
esr(config-pbx-ruleset)# exit
esr(config-pbx)#
```

FXS- ( 5200-5202):

```
esr(config-pbx)# ruleset main_rule
esr(config-pbx-ruleset)# rule 1
esr(config-pbx-rule)# pattern '_520[0-3],1,Dial(SIP/${EXTEN},,t)'
esr(config-pbx-rule)# enable
esr(config-pbx-rule)# exit
esr(config-pbx-ruleset)# exit
esr(config-pbx)#
```

sip- FXS-. , , :

```
esr(config-pbx)# profile fxs_ports
esr(config-pbx-profile)# client friend
esr(config-pbx-profile)# codec allow g711a
esr(config-pbx-profile)# codec allow g711u
esr(config-pbx-profile)# codec allow g729
esr(config-pbx-profile)# ruleset main_rule
esr(config-pbx-profile)# exit
esr(config-pbx)#
```

sip- FXO-. , , invite-port, :

```
esr(config-pbx)# profile fxo_ports
esr(config-pbx-profile)# client friend
esr(config-pbx-profile)# codec allow g711a
esr(config-pbx-profile)# codec allow g711u
esr(config-pbx-profile)# security level invite-port
esr(config-pbx-profile)# ruleset FXO
esr(config-pbx-profile)# exit
esr(config-pbx)#
```

PBX:

```
esr(config-pbx)# user 5200
esr(config-pbx-user)# profile fxs_ports
esr(config-pbx-user)# exit
esr(config-pbx)# user 5201
esr(config-pbx-user)# profile fxs_ports
esr(config-pbx-user)# exit
esr(config-pbx)# user 5202
esr(config-pbx-user)# profile fxs_ports
esr(config-pbx-user)# exit
esr(config-pbx)# user 333
esr(config-pbx-user)# profile fxo_ports
esr(config-pbx-user)# exit
esr(config-pbx)#
```

PBX-:

```
esr(config-pbx)# enable
esr(config-pbx)# exit
esr(config)#
```

FXS-. sip-:

```
esr(config)# interface voice-port 1
esr(config-voice-port-fxs)# sip user phone 5200
esr(config-voice-port-fxs)# profile pbx fxs_ports
esr(config-voice-port-fxs)# exit
esr(config)# interface voice-port 2
esr(config-voice-port-fxs)# sip user phone 5201
esr(config-voice-port-fxs)# profile pbx fxs_ports
esr(config-voice-port-fxs)# exit
esr(config)# interface voice-port 3
esr(config-voice-port-fxs)# sip user phone 5202
esr(config-voice-port-fxs)# profile pbx fxs_ports
esr(config-voice-port-fxs)# exit
esr(config)#
```

FXO-. sip-profile, caller-id, «Hotline PSTN to IP»: , :

```
esr(config)# interface voice-port 4
esr(config-voice-port-fxo)# sip user phone 333
esr(config-voice-port-fxo)# profile pbx fxo_ports
esr(config-voice-port-fxo)# caller-id mode off
esr(config-voice-port-fxo)# hotline ipt
esr(config-voice-port-fxo)# hotline number ipt 5200
esr(config-voice-port-fxo)# exit
esr(config)#
```