

QoS

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- show qos statistics
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class

QoS- .

(no) .

[no] class <NAME>

<NAME> - , 31 . «class-default» .

```
esr(config-policy-map)# class telnet_traffic
esr(config-class-policy-map)#
```

class-map

QoS .

(no) .

[no] class-map <NAME>

<NAME> - , 31.

10

CONFIG

```
esr(config)# class-map telnet_traffic
```

compression header ip tcp

tcp .

(no) tcp .

[no] compression header ip tcp

.

10

CONFIG-POLICY-MAP-CLASS

```
esr(config-class-policy-map)# compression header ip tcp
```

description

QoS.

(no) .

description <DESCRIPTION>

no description

<DESCRIPTION> – , 255.

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CONFIG-CLASS-MAP

CONFIG-POLICY-MAP

```
esr(config-class-map)# description "VoIP"
```

fair-queue

.

(no) .

fair-queue <QUEUE-LIMIT>

no fair-queue

<QUEUE-LIMIT> – , [16..4096].

16

10

CONFIG-POLICY-MAP-CLASS

```
esr(config-class-policy-map)# fair-queue 200
```

ip firewall sessions classification enable

QoS.

(no) .

[no] ip firewall sessions classification enable

.

10

CONFIG

```
esr(config)# ip firewall sessions classification enable
```

match access-group

(ACL), .

(no) .

```
[no] match access-group {<NAME> | all }
```

<NAME>- , 31 .

"all" .

10


CONFIG-CLASS-MAP

```
esr(config-class-map)# match access-group acl-ssh-traffic
```

match application

, .

(no) .

 QoS firewall Stateless-.

```
[no] match application { <NAME> | all }
```

<NAME>- , 31 .

"all" .

10

CONFIG-CLASS-MAP

```
esr(config-class-map)# match application APP-PERMIT
```

match dscp

DSCP, class-map.

(no) .

[no] match dscp <DSCP>

<DSCP> – DSCP, [0..63].

"all" dscp.

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CONFIG-CLASS-MAP

```
esr(config-class-map)# match dscp 55
```

match url

url, .

(no) url.

 QoS url firewall Stateless-.

[no] match url { <NAME> | all }

<NAME> – url, 31 .

"all" .

10

CONFIG-CLASS-MAP

```
esr(config-class-map)# match url URL-PERMIT
```

mode

.
(no) .

mode <MODE>

no mode

<MODE> – :

- fifo – FIFO (First In, First Out);
- gred – GRED (Generalized RED);
- red – RED (Random Early Detection);
- sfq – SFQ (SFQ).

FIFO

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CONFIG-POLICY-MAP-CLASS

```
esr(config-class-policy-map)# mode red
```

policy-map

QoS .
(no) .

[no] policy-map <NAME>

<NAME> – , 31.

10

CONFIG

```
esr(config)# policy-map input_policy
```

priority class

WRR- .
(no) .

priority class <PRIORITY>
no priority

<PRIORITY> – WRR-, [1..8].

1

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CONFIG-POLICY-MAP-CLASS

```
esr(config-class-policy-map)# priority class 5
```

priority level

Strict Priority . . .
(no) WRR.

priority level <PRIORITY>
no priority

<PRIORITY> – Strict Priority-, [1..8].

WRR, .

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CONFIG-POLICY-MAP-CLASS

```
esr(config-class-policy-map)# priority level 5
```

priority-queue out

.
(no) .

```
priority-queue out <QUEUE> limit <LIMIT>
no priority-queue out <QUEUE> limit
```

<QUEUE> – , [1..8];

<LIMIT> – , [100-1000].

500

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CONFIG-GI ¹

CONFIG-SUBIF

CONFIG-PORT-CHANNEL ¹

CONFIG-BRIDGE

CONFIG-LOOPBACK

CONFIG-IP4IP4

CONFIG-GRE

CONFIG-L2TPV3

```
esr(config-if)# priority-queue out 1 limit 800
```



¹ ESR-10/12V/12VF/14VF/20/21/100/200.

priority-queue out num-of-queues

. .

(no) .

```
priority-queue out num-of-queues <VALUE>
```

```
no priority-queue out num-of-queues
```

<VALUE> – , [1..8], :

- 0 – WRR (WRR –);
- 8 – «strict priority» (strict priority – ,).

8

10

CONFIG

```
esr(config)# priority-queue out num-of-queues 5
```

qos dscp-mutation

DSCP DSCP-Mutation. DSCP QoS Basic.
(no) DSCP.

[no] qos dscp-mutation

.

.

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CONFIG

```
esr(config)# qos wrr-queue 3 bandwidth 130
```

qos enable

QoS . QoS ([service-policy](#)), Basic QoS, Policy-based QoS.
Basic QoS – DSCP / 802.1p ([qos trust](#)). DSCP-Queue / CoS-Queue.
Policy-based QoS – QoS . , . ACL (ACL [match access-group](#)), QoS- . QoS- .
(no) QoS .

[no] qos enable

.

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CONFIG-GI

CONFIG-TE
CONFIG-SUBIF
CONFIG-QINQ-IF
CONFIG-PORT-CHANNEL
CONFIG-CELLULAR-MODEM
CONFIG-BRIDGE
CONFIG-LOOPBACK
CONFIG-E1
CONFIG-IP4IP4
CONFIG-GRE
CONFIG-SUBTUNNEL
CONFIG-VTI
CONFIG-L2TPV3
CONFIG-PPPOE
CONFIG-PPTP
CONFIG-L2TP
CONFIG-OPENVPN

```
esr(config-if-gi)# qos enable
```

qos map cos-queue

802.1p .

(no) .

```
qos map cos-queue <COS> to <QUEUE>
```

```
no qos map dscp-queue <COS>
```

<COS> – 802.1q, [0..7];

<QUEUE> – , [1..8].

:

CoS: (0), 1

CoS: (1), 2

CoS: (2), 3

CoS: (3), 4

CoS: (4), 5

CoS: (5), 6

CoS: (6), 7

CoS: (7), 8

10

CONFIG

```
esr(config)# qos map cos-queue 7 to 5
```

qos map dscp-mutation

```
DSCP DSCP .  
(no) .
```

```
qos map dscp-mutation <DSCP> to <DSCP>  
no qos map dscp-mutation <DSCP>
```

```
<DSCP> - IP-, [0..63].  
:  
DSCP DSCP .
```

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CONFIG

```
esr(config)# qos map dscp-mutation 10 to 40
```

qos map dscp-queue

```
DSCP .  
(no) .
```

```
qos map dscp-queue <DSCP> to <QUEUE>  
no qos map dscp-queue <DSCP>
```

```
<DSCP> - IP-, [0..63];  
<QUEUE> - , DSCP, [1..8].  
:
```

```
DSCP: (0-7), 1  
DSCP: (8-15), 2  
DSCP: (16-23), 3
```

DSCP: (24-31), 4

DSCP: (32-39), 5

DSCP: (40-47), 6

DSCP: (48-55), 7

DSCP: (56-63), 8

10

CONFIG

```
esr(config)# qos map dscp-queue 42 to 5
```

qos queue default

, IP DSCP- Basic QoS, Policy-based QoS.

(no) .

```
qos queue default <QUEUE>
```

```
no qos queue default
```

<QUEUE> – , [1..8].

1

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CONFIG

```
esr(config)# qos queue default 3
```

qos trust

802.1p DSCP Basic QoS- .

(no) .

```
qos trust <MODE>
```

```
no qos trust
```

<MODE> – 802.1p DSCP, :

- dscp – DSCP IP-. IP- (qos queue default);
- cos – 802.1p 802.1q. (qos queue default);
- cos-dscp – DSCP IP- 802.1p .

DSCP (dscp).

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CONFIG

```
esr(config)# qos trust cos-dscp
```

qos wrr-queue

(no) .

qos wrr-queue <QUEUE> bandwidth <WEIGHT>

no qos wrr-queue <QUEUE>

<QUEUE> – , [1..8];

<WEIGHT> – , [1..255].

1

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CONFIG

```
esr(config)# qos wrr-queue 3 bandwidth 130
```

queue-limit

(no) .

queue-limit <QUEUE-LIMIT>

no queue-limit

<QUEUE-LIMIT> – , [2..4096].

127

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CONFIG-POLICY-MAP-CLASS

```
esr(config-class-policy-map)# queue-limit 200
```

random-detect

RED.

(no) .

random-detect <LIMIT> <MIN> <MAX> <APS> <APS-NUM> <PROBABILITY>

no random-detect

<LIMIT> – , [1..1000000];

<MIN> – , [1..1000000];

<MAX> – , [1..1000000];

<APS> – , [1..10000000];

<APS-NUM> – , [0..10000000];

<PROBABILITY> – , [0..100].

:

<MAX> > 2 * <MIN> <LIMIT> > 3 * <MAX>

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CONFIG-POLICY-MAP-CLASS

```
esr(config-class-policy-map)# random-detect 9000 1500 3000 10
```

random-detect queue

GRED.

(no) .

```
random-detect queue <QUEUE-NUM> [ dscp <DSCP> | precedence <IPP> ] <LIMIT> <MIN> <MAX> <APS> <APS-NUM>
<PROBABILITY>
```

```
no random-detect queue <PRECEDENCE>
```

<QUEUE-NUM> – [1..16];

<DSCP> – IP-, [0..63];

<IPP> – IP Precedence, [0..7];

<PRECEDENCE> – IP Precedence [0..7];

<LIMIT> – , [1..1000000];

<MIN> – , [1..1000000];

<MAX> – , [1..1000000];

<APS> – , [1..10000000];

<APS-NUM> – , [0..10000000];

<PROBABILITY> – , [0..100].

:

<MAX> > 2 * <MIN>

<LIMIT> > 3 * <MAX>

10

CONFIG-POLICY-MAP-CLASS

```
esr(config-class-policy-map)# random-detect precedence 2 9000 1500 3000 10
```

random-detect queue default

GRED.

(no) .

```
random-detect queue default <QUEUE-NUM>
```

```
no random-detect queue default <QUEUE-NUM>
```

<QUEUE-NUM> – [1..16];

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CONFIG-POLICY-MAP-CLASS

```
esr(config-class-policy-map)# random-detect queue default
```

rate-limit

. Basic QoS .

(no) .

```
rate-limit <BANDWIDTH> [BURST]
```

```
no rate-limit
```

<BANDWIDTH> – /, [1..10000000] TengigabitEthernet [1..1000000] ;

<BURST> – , [4..16000]. 128 .

.

10

CONFIG-GI

CONFIG-TE

CONFIG-SUBIF

CONFIG-QINQ-IF

CONFIG-PORT-CHANNEL

CONFIG-CELLULAR-MODEM

CONFIG-BRIDGE

CONFIG-LOOPBACK

CONFIG-E1

CONFIG-IP4IP4

CONFIG-GRE

CONFIG-VTI

CONFIG-L2TPV3

CONFIG-L2TP

CONFIG-PPPOE

CONFIG-PPTP

CONFIG-OPENVPN

```
esr(config-if-gi)# rate-limit 1670000
```

service-policy


```
QoS- (input) (output) .
(no) .
```

```
service-policy { input | output } <NAME>
service-policy dynamic { upstream | downstream | all }
no service-policy { input | output }
```

```
<NAME> - QoS-, 31.;
dynamic - QoS- (upstream), (downstream) (all). , RADIUS-.
```

10

```
CONFIG-GI
CONFIG-TE
CONFIG-SUBIF
CONFIG-QINQ-IF
CONFIG-PORT-CHANNEL
CONFIG-CELLULAR-MODEM
CONFIG-BRIDGE
CONFIG-LOOPBACK
CONFIG-E1
CONFIG-IP4IP4
CONFIG-GRE
CONFIG-VTI
CONFIG-L2TPV3
CONFIG-SUBTUNNEL ( "input")
CONFIG-PPPOE
CONFIG-PPTP
CONFIG-L2TP
CONFIG-OPENVPN
```

```
esr(config-if-gi)# service-policy input input_policy
```

service-policy

```
QoS QoS.
(no) .
```

```
[no] service-policy <NAME>
```

<NAME> – , 31.

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CONFIG-POLICY-MAP-CLASS

```
esr(config-class-policy-map)# service-policy input_policy
```

set class-default cos

802.1p, , (class-default).

(no) .

```
set class-default cos <COS>
```

```
no set class-default cos
```

<COS> – 802.1p, [0..7].

10

CONFIG-POLICY-MAP

```
esr(config-class-policy-map)# set class-default cos 5
```

set class-default dscp

DSCP, IP-, (class-default).

(no) .

```
set class-default dscp <DSCP>
```

```
no set class-default dscp
```

<DSCP> – DSCP, [0..63].

10

CONFIG-POLICY-MAP

```
esr(config-class-map)# set class-default dscp 16
```

set class-default ip-precedence

IP Precedence, IP-, (class-default).

(no) .

```
set class-default ip-precedence <IPP>
```

```
no set class-default ip-precedence
```

<IPP> – IP Precedence, [0..7].

10

CONFIG-POLICY-MAP

```
esr(config-class-map)# set class-default ip-precedence 5
```

set cos

802.1p, , .

(no) .

```
set cos <COS>
```

```
no set cos
```

<COS> – 802.1p, [0..7].

10

CONFIG-CLASS-MAP

```
esr(config-class-policy-map)# set cos 5
```

set dscp

DSCP, IP-, .

(no) .

```
set dscp <DSCP>
no set dscp
```

<DSCP> – DSCP, [0..63].

10

CONFIG-CLASS-MAP

```
esr(config-class-map)# set dscp 16
```

set ip-precedence

IP Precedence, IP-, .
(no) .

```
set ip-precedence <IPP>
no set ip-precedence
```

<IPP> – IP Precedence, [0..7].

10

CONFIG-CLASS-MAP

```
esr(config-class-map)# set ip-precedence 5
```

set queue



ESR-1000/1200/1500/1700.

QoS, , .
(no) .

```
set queue <QUEUE>
no set queue
```

<QUEUE> – QoS, [1..8].

CONFIG-CLASS-MAP

```
esr(config-class-map)# set queue 5
```

shape auto-distribution

```

, , .
(no) .

```

```
[no] shape auto-distribution
```

```
.
```

CONFIG-POLICY-MAP

```
esr(config-policy-map)# shape auto-distribution
```

shape average

```

.
(no) .

```

```
shape average <BANDWIDTH> [<BURST>]
```

```
no shape average
```

```
<BANDWIDTH> – /, [1..10000000];
```

```
<BURST> – , :
```

- ESR-10/12V/12VF/14VF/20/21/100/200/1000 – [128..16000000];
- ESR-1200/1500 – [1000..4096000].

```
:
```

```
<BANDWIDTH> –
```

```
<BURST> – 128000
```

CONFIG-POLICY-MAP
CONFIG-POLICY-MAP-CLASS

```
esr(config-policy-map)# shape average 100000 2000
```

shape peak

... (WRR).
(no) .

shape peak <BANDWIDTH> [BURST]
no shape peak

<BANDWIDTH> – /, [1..10000000];
<BURST> – , :
• ESR-10/12V/12VF/14VF/20/21/100/200/1000 – [128..16000000];
• ESR-1200/1500 – [1000..4096000].
:
<BANDWIDTH> –
<BURST> – 128000

10

CONFIG-POLICY-MAP-CLASS

```
esr(config-policy-map)# shape average 100000 2000
```

show qos interface shapers

QoS .

show qos interface shapers <IF>

<IF> – , , .

1

ROOT

```
esr# show qos interface shapers gigabitethernet 1/0/2
gigabitethernet 1/0/2
Committed rate: 100000 Kbps
Committed burst: 1600 KBytes
```

show qos map cos-queue

802.1p , QoS.

```
show qos map cos-queue
```

.

1

ROOT

```
esr# show qos map dscp-queue
d1 : d2    0  1  2  3  4  5  6  7
-----
0          01 02 03 04 05 06 07 08
```

show qos map dscp-mutation

DSCP DSCP .

```
show qos map dscp-mutation
```

.

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ROOT

```

esr# show qos map dscp-mutation
dl : d2    0  1  2  3  4  5  6  7  8  9
-----
0          00 01 02 03 04 05 06 07 08 09
1          10 11 12 13 14 15 16 17 18 19
2          20 21 22 23 24 25 26 27 28 29
3          30 31 32 33 34 35 36 37 38 39
4          40 41 42 43 44 45 46 47 48 49
5          50 51 52 53 54 55 56 57 58 59
6          60 61 62 63

```

show qos map dscp-queue

DSCP , QoS.

show qos map dscp-queue

.

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ROOT

```

esr# show qos map dscp-queue
dl : d2    0  1  2  3  4  5  6  7  8  9
-----
0          01 01 01 01 01 01 01 01 02 02
1          02 02 02 02 02 02 03 03 03 03
2          03 03 03 03 04 04 04 04 04 04
3          04 04 05 05 05 05 05 05 05 05
4          06 06 06 06 06 06 06 06 07 07
5          07 07 07 07 07 07 08 08 08 08
6          08 08 08 08

```

show qos policy binding

QoS- (input) (output) .

show qos policy binding [<IF> | <TUN>]

<IF> - , , ;
<TUN> - , , .

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ROOT


```
esr# show qos policy binding gil/0/1
gigabitethernet 1/0/1
Output: parent
  Class: class1
    Policy: child1
      Class: class3
  Class: class2
    Policy: child2
```

show qos policy configuration

QoS.

```
show qos policy configuration <NAME>
```

<NAME> - , 31.

1

ROOT

```

esr# show qos policy configuration parent
Policy-map: parent
  Shape average:
    Bandwidth:      --
    Burst:          128
  Class: class1
    Set:
      COS:          --
      DSCP:         --
      IP-Precedence: --
      Queue:        --
    Match access group: --
    Shape average:
      Bandwidth:      --
      Burst:          128
    Shape peak:
      Bandwidth:      --
      Burst:          128
    Mode:             FIFO
    Priority class:    8
    Queue limit:      127
    Service policy:   child1
  Class: class2
    Set:
      COS:          --
      DSCP:         --
      IP-Precedence: --
      Queue:        --
    Match access group: --
    Shape average:
      Bandwidth:      --
      Burst:          128
    Shape peak:
      Bandwidth:      --
      Burst:          128
    Mode:             FIFO
    Priority class:    8
    Queue limit:      127
    Service policy:   child2

```

show qos policy statistics

. Policy-based QoS .

```
show qos policy statistics [ <IF> | <TUN> ]
```

<IF> - , , ;

<TUN> - , , .

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ROOT

```

esr# sh qos policy statistics
gigabitethernet 1/0/2
  Policy pom-1
  Input policy root
  Input class root
  Shape: bytes 750947679, packets 496667, drops 1002200
    Class clm-1
      Shape: bytes 750946896, packets 496658, drops 1002200
    Class class-default
      Shape: bytes 783, packets 9, drops 0

```

show qos statistics

. basic QoS .

show qos statistics [<IF> | <TUN>]

<IF>- , , ;
<TUN>- , , .

1

ROOT

```

esr# show qos statistics vti 2
vti 2
Queue   Bytes           Packets           Drops
-----
1        0                0                0
2        0                0                0
3        0                0                0
4        0                0                0
5        0                0                0
6      964073836    1413598          0
7      121389180    177990           1235497
8        0                0                0

```

show qos tunnel shapers

QoS-.

show qos tunnel shapers <TUN>

<TUN>- , , .

1

ROOT

```
esr# show qos tunnel shapers vti 2
vti 2
qid    Target          Target
       Committed       Committed
       Rate [Kbps]     Burst [KBytes]
---    -
1      10000           128
2      6000            128
```

traffic-shape

. Basic QoS .

(no) .

```
traffic-shape { <BANDWIDTH> [BURST] | queue <QUEUE> <BANDWIDTH> [BURST] }
no traffic-shape [ queue <QUEUE> ]
```

<QUEUE> – , [1..8];

<BANDWIDTH> – /, :

- gigabitethernet, loopback, e1: [1..10000000];
- tengigabitethernet: [3000..100000000];
- fortyengigabitethernet: [3000..400000000];
- loopback:

<BURST> – , [4..16000]. 4.

:

<BANDWIDTH> –

<BURST> – 128

10

CONFIG-GI

CONFIG-TE

CONFIG-SUBIF

CONFIG-QINQ-IF

CONFIG-PORT-CHANNEL

CONFIG-CELLULAR-MODEM

CONFIG-BRIDGE

CONFIG-LOOPBACK

CONFIG-E1

CONFIG-IP4IP4

CONFIG-GRE

CONFIG-VTI

CONFIG-L2TPV3
CONFIG-PPPOE
CONFIG-PPTP
CONFIG-L2TP
CONFIG-OPENVPN

```
esr(config-if)# traffic-shape queue 3 100000 2000
```