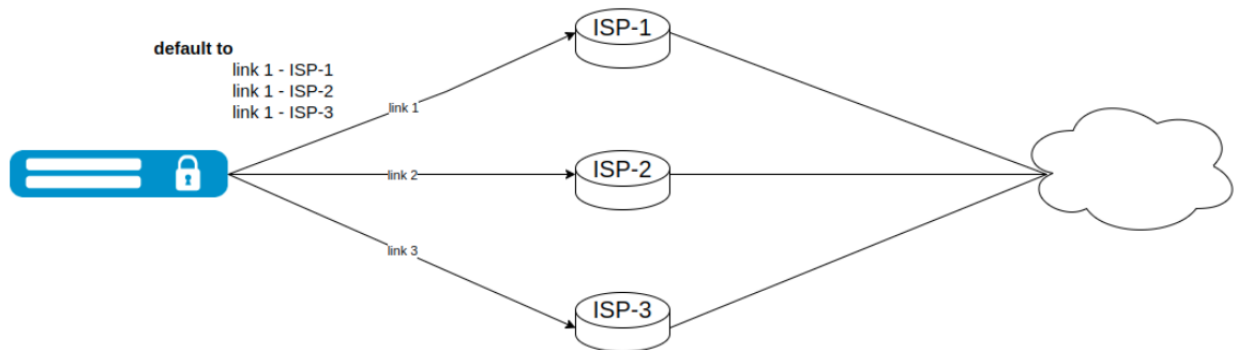


MultiWAN

-
- basic
- extended
- failover
- "cellular-multiwan"



MultiWAN ESR - (ISP).

-, ISP **wan load-balance.**, next-hop'a. ICMP- next-hop (IP- ISP), , **target-list.** , **Active** MultiWAN, **FIB.**

Target-list 50 (25 ESR-10) **target** -, . , , . **enable,** MultiWAN:

```
wan load-balance target-list Target
target 1
<...>
enable
exit
exit
```

target :

- basic
- extended

basic ICMP-, ICMP-, . ICMP.

extended ICMP-:

- ICMP-
- jitter
-
- ICMP-
-
- ICMP-

MultiWAN :

-
-

, **MultiWAN Active**, FIB. , **show ip route** . **multipath** , :

```

esr # show ip
route

Codes: C - connected, S - static, R - RIP
derived,

O - OSPF derived, IA - OSPF inter area
route,

E1 - OSPF external type 1 route, E2 - OSPF external type 2
route

B - BGP derived, D - DHCP derived, K - kernel route, V - VRRP
route
i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter
area
* - FIB
route

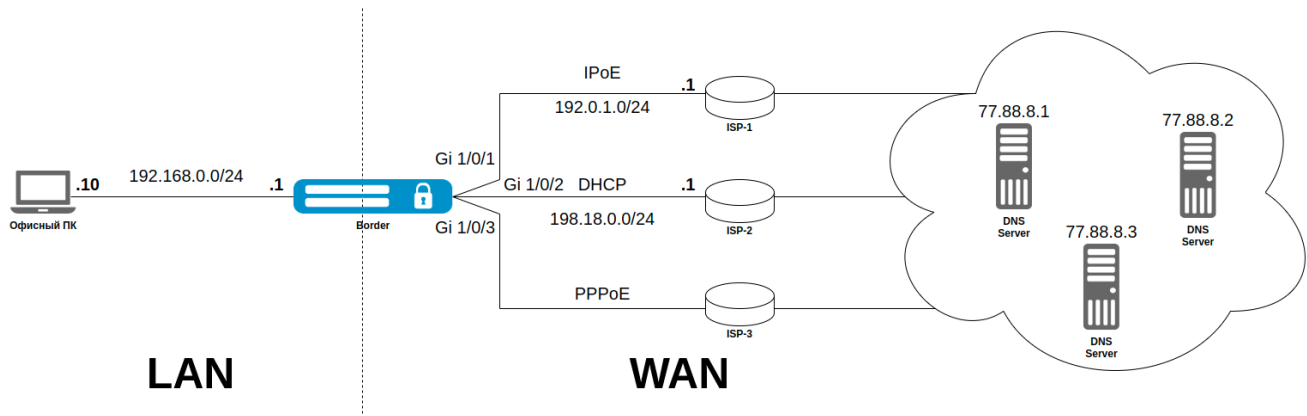
S      * 0.0.0.0/0      [1/0]      multipath      [static 10:04:
36]
      via 10.0.0.1 on pppoe 1 weight
40
      via 198.18.0.1 on gil/0/2 weight
40
      via 192.0.1.1 on gil/0/1 weight 20

```

- **weight.** , FIB, .
Active next-hop , Inactive next-hop'a FIB. , FIB , . **weight** , .

- 4 MultiWAN:
- **basic**
 - **extended**
 - **failover**
 - "cellular-multiwan"

basic
:



:
 , ESR Border : IPoE, DHCP PPPoE. (Active), next-hop.

- :
- ISP (Internet service provider) - ,
 - - , DNS Server, -
 - Border - ESR,
 - DNS Server - ,
 - LAN- - ,
 - WAN- - ,
 - Gi 1/0/1 - ,
 - 192.168.0.0/24 - ,
 - .10 - IP-,

- :
- - (Trust, Untrust)
 - NAT (Source NAT)

:

1. target-list , ICMP. 6:

```
wan load-balance target-list Targets
target 1
description "Ya DNS"
resp-time 6
ip address 77.88.8.1
enable
exit
target 2
description "Ya DNS-2"
resp-time 6
ip address 77.88.8.2
enable
exit
target 3
description "Ya DNS-3"
resp-time 6
ip address 77.88.8.3
enable
exit
exit
```

2. MultiWAN:

- gigabitethernet 1/0/1, - IPoE (,) :
 - nexthop- ISP-1
 - 6

- source-address
- 4
- **target-list Targets,**
- MultiWAN

```
interface gigabitethernet 1/0/1
 security-zone Untrust
 ip address 192.0.1.10/24
 ip address 192.0.1.2/24
 wan load-balance nexthop 192.0.1.1
 wan load-balance failure-count 6
 wan load-balance source-address 192.0.1.2
 wan load-balance success-count 4
 wan load-balance target-list Targets
 wan load-balance enable
exit
```

- **gigabitethernet 1/0/2, -DHCP ():**
 - **nexthop- DHCP**
 - 6
 - 4
 - **target-list Targets,**
 - MultiWAN

```
interface gigabitethernet 1/0/2
 security-zone Untrust
 ip address dhcp
 wan load-balance nexthop dhcp enable
 wan load-balance failure-count 6
 wan load-balance success-count 4
 wan load-balance target-list Targets
 wan load-balance enable
exit
```

- **ISP-3 tunnel pppoe 1 (.. ,):**
 - **nexthop- tunnel**
 - 6
 - 4
 - **target-list Targets,**
 - MultiWAN

```
tunnel pppoe 1
 authentication method mschap
 authentication method mschap-v2
 authentication method eap
 authentication method pap
 interface gigabitethernet 1/0/3
 security-zone Untrust
 ignore-default-route
 username <username> password ascii-text <password>
 enable
 wan load-balance nexthop tunnel enable
 wan load-balance failure-count 6
 wan load-balance success-count 4
 wan load-balance target-list Targets
 wan load-balance enable
exit
```

3. , :

```
ip route 0.0.0.0/0 wan load-balance rule 1
```

4. wan load-balance MultiWAN. interface gigabitethernet 1/0/2 weight 40, tunnel pppoe 1 weight 40 interface gigabitethernet 1/0/1 weight 20. :

```
wan load-balance rule 1
  description "Default gateway"
  outbound interface gigabitethernet 1/0/2 40
  outbound tunnel pppoe 1 40
  outbound interface gigabitethernet 1/0/1 20
  enable
exit
```

- wan load-balance MultiWAN , .

show wan rules <rules>:

```
esr # show wan rules 1
Rule 1 detailed information:
VRF:          default
Failover:     Disabled
Network: 0.0.0.0/0 Metric: 0
  gil/0/1 Weight: 20 Nexthop: 192.0.1.1 [Active]
  gil/0/2 Weight: 40 Nexthop: 198.18.0.1 [Active]
  pppoe 1 Weight: 40 Nexthop: 10.0.0.1 [Active]
```

MultiWAN show wan interfaces status:

```
esr # show wan interfaces status
```

Interface	Nexthop	Status	Uptime/Downtime
-----	-----	-----	-----
gil/0/1	192.0.1.1	Active	26 minutes and 36 seconds
gil/0/2	198.18.0.1 (dhcp)	Active	26 minutes and 34 seconds

MultiWAN show wan tunnel status:

```
esr # show wan tunnels status
```

Tunnel	Nexthop	Status	Uptime/Downtime
-----	-----	-----	-----
pppoe 1	10.0.0.1 (tunnel)	Active	30 minutes and 2 seconds

, MultiWAN show wan interfaces status <if-name>:

```

esr # show wan interfaces status gigabitethernet 1/0/2
Interface 'gigabitethernet 1/0/2' detailed information:
  VRF:                default
  State:               Active
  Nexthop address:    198.18.0.1 (dhcp)
  Last time success:  0 secs
  Last time failure:  7 seconds
  Uptime:              6 seconds
  Targets:
    77.88.8.1 Test/Ping State: pass Attempts: 3/3
    77.88.8.2 Test/Ping State: pass Attempts: 3/3
    77.88.8.3 Test/Ping State: pass Attempts: 3/3

```

extended

:

```

, ESR Border : IPoE, DHCP PPPoE. ( Active ), next-hop. , : jitter, rtt, .
,, , basic. target-list .

```

:

target-list , ICMP.

:

- ICMP- - 15
- ICMP- - 700
- - 60%
- jitter - 200
- ICMP- - 15
- -250

```

wan load-balance target-list Targets
target 1
  description "Ya DNS"
  mode extended
  extended count 15
    extended timeout 700
  extended loss 60
  extended jitter 200
    extended period 15
  extended rtt 250
  ip address 77.88.8.1
  enable
exit
target 2
  description "Ya DNS-2"
  mode extended
  extended count 15
    extended timeout 700
  extended loss 60
  extended jitter 200
    extended period 15
  extended rtt 250
  ip address 77.88.8.2
  enable
exit
target 3
  description "Ya DNS-3"
  mode extended
  extended count 15
    extended timeout 700
  extended loss 60
  extended jitter 200
    extended period 15
  extended rtt 250
  ip address 77.88.8.3
  enable
exit
exit

```

show wan interfaces status <if-name>:

```

esr # show wan interfaces status gigabitethernet 1/0/1
Interface 'gigabitethernet 1/0/1' detailed information:
VRF:                default
State:              Active
Nexthop address:    192.0.1.1
Last time success:  0 secs
Last time failure:  55 minutes and 16 seconds
Uptime:             55 minutes and 15 seconds
Targets:
  77.88.8.1 Test/Ping State: pass Attempts: 3/3
    Loss: 0/60% RTT: 1/900 Jitter: 0/800
  77.88.8.2 Test/Ping State: pass Attempts: 3/3
    Loss: 0/60% RTT: 1/900 Jitter: 0/800
  77.88.8.3 Test/Ping State: pass Attempts: 3/3
    Loss: 0/60% RTT: 1/900 Jitter: 0/800

```

show wan tunnels status <tun-name>:

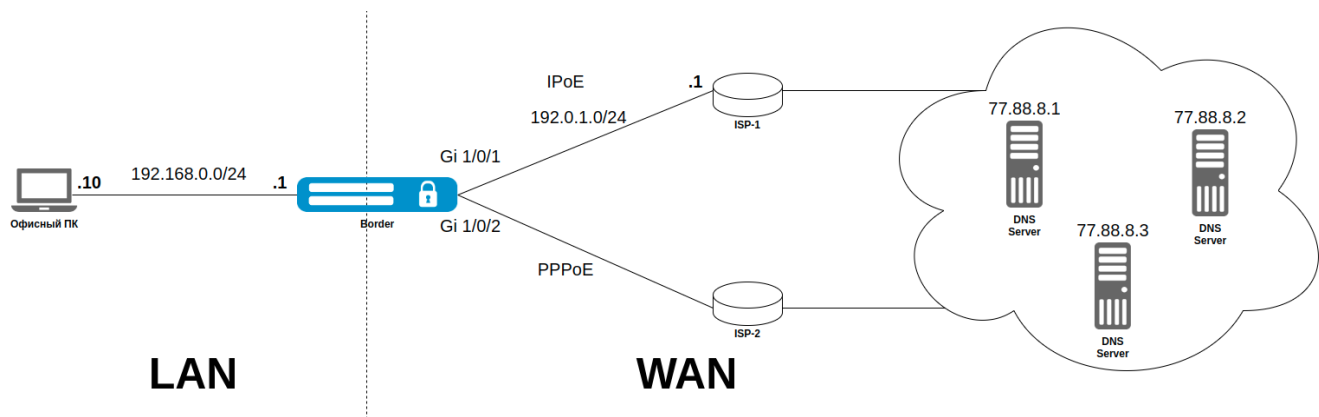
```

esr # show wan tunnels status pppoe 1
Tunnel 'pppoe 1' detailed information:
VRF:                default
State:              Active
Nexthop address:    10.0.0.1 (tunnel)
Last time success:  0 secs
Last time failure:  55 minutes and 23 seconds
Uptime:             55 minutes and 22 seconds
Targets:
  77.88.8.1 Test/Ping State: pass Attempts: 3/3
                Loss: 0/60% RTT: 1/900 Jitter: 0/800
  77.88.8.2 Test/Ping State: pass Attempts: 3/3
                Loss: 0/60% RTT: 1/900 Jitter: 0/800
  77.88.8.3 Test/Ping State: pass Attempts: 3/3
                Loss: 0/60% RTT: 1/900 Jitter: 0/800

```

failover

:



:

, ESR Border : IPoE PPPoE. (Active), next-hop. , FIB .

:

:

-
- (Trust, Untrust)
- NAT (Source NAT)

:

1. wan load-balance target-list Targets basic:


```

wan load-balance target-list Targets
  target 1
    description "Ya DNS"
    resp-time 6
    ip address 77.88.8.1
    enable
  exit
  target 2
    description "Ya DNS-2"
    resp-time 6
    ip address 77.88.8.2
    enable
  exit
  target 3
    description "Ya DNS-3"
    resp-time 6
    ip address 77.88.8.3
    enable
  exit
exit

```

2. basic:

```

interface gigabitethernet 1/0/1
  security-zone Untrust
  ip address 192.0.1.10/24
  ip address 192.0.1.2/24
  wan load-balance nexthop 192.0.1.1
  wan load-balance failure-count 6
  wan load-balance source-address 192.0.1.2
  wan load-balance success-count 4
  wan load-balance target-list Targets
  wan load-balance enable
exit

tunnel pppoe 1
  authentication method mschap
  authentication method mschap-v2
  authentication method eap
  authentication method pap
  interface gigabitethernet 1/0/2
  security-zone Untrust
  ignore-default-route
  username <username> password ascii-text <password>
  enable
  wan load-balance nexthop tunnel enable
  wan load-balance failure-count 6
  wan load-balance success-count 4
  wan load-balance target-list Targets
  wan load-balance enable
exit

```

3. MultiWAN:

```

ip route 0.0.0.0/0 wan load-balance rule 1

```

4. wan load-balance rule 1 failover. gigabitethernet 1/0/1 weight 80, gigabitethernet 1/0/1 , tunnel pppoe 1 :

```

wan load-balance rule 1
  description "Default gateway"
  failover
  outbound tunnel pppoe 1 20
  outbound interface gigabitethernet 1/0/1 80
  enable
exit

```

5. show ip route , gigabitethernet 1/0/1:

```

esr # show ip route
Codes: C - connected, S - static, R - RIP derived,
       O - OSPF derived, IA - OSPF inter area route,
       E1 - OSPF external type 1 route, E2 - OSPF external type 2 route
       B - BGP derived, D - DHCP derived, K - kernel route, V - VRRP route
       I - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - FIB route

S      * 0.0.0.0/0          [1/0]          via 192.0.1.1 on gil/0/1          [static 18:01:32]

```

MultiWAN:

```

esr # show wan interfaces status
Interface          Nexthop          Status          Uptime/Downtime
-----
gil/0/1            192.0.1.1        Active          4 hours, 24 minutes and 3 seconds
esr # show wan interfaces status gigabitethernet 1/0/1
Interface 'gigabitethernet 1/0/1' detailed information:
VRF:                default
State:               Active
Nexthop address:     192.0.1.1
Last time success:   0 secs
Last time failure:   4 hours, 24 minutes and 7 seconds
Uptime:              4 hours, 24 minutes and 6 seconds
Targets:
  77.88.8.1 Test/Ping State: pass Attempts: 3/3
  77.88.8.2 Test/Ping State: pass Attempts: 3/3
  77.88.8.3 Test/Ping State: pass Attempts: 3/3

```

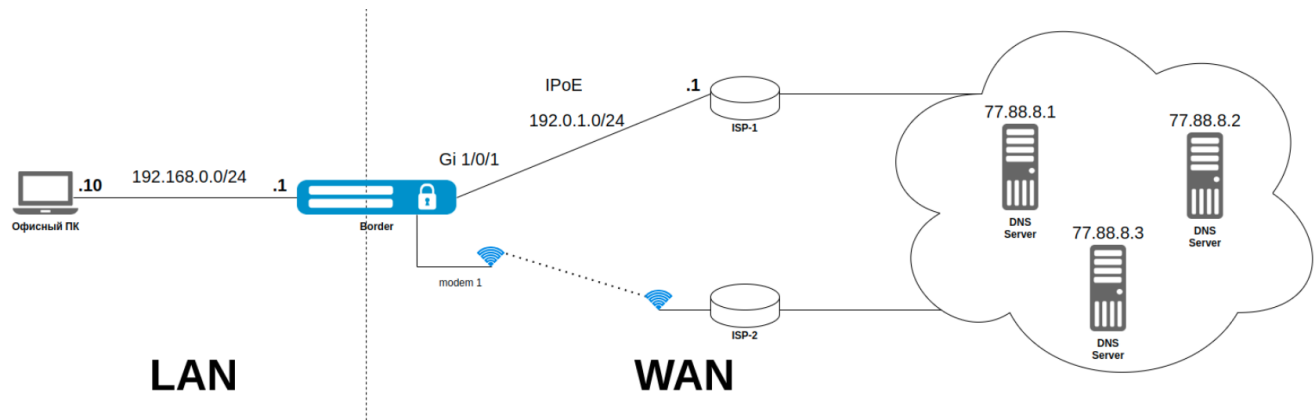
```

esr # show wan tunnels status
Tunnel             Nexthop             Status          Uptime/Downtime
-----
pppoe 1            10.0.0.1 (tunnel)    Active          4 hours, 32 minutes and 40 seconds
esr # show wan tunnels status pppoe 1
Tunnel 'pppoe 1' detailed information:
VRF:                default
State:               Active
Nexthop address:     10.0.0.1 (tunnel)
Last time success:   0 secs
Last time failure:   4 hours, 32 minutes and 44 seconds
Uptime:              4 hours, 32 minutes and 43 seconds
Targets:
  77.88.8.1 Test/Ping State: pass Attempts: 3/3
  77.88.8.2 Test/Ping State: pass Attempts: 3/3
  77.88.8.3 Test/Ping State: pass Attempts: 3/3

```

"cellular-multiwan"

:



:

, , , ISP, , (//). MultiWAN , ICMP- . , Extended-, . - , MultiWAN, . , MultiWAN, **FIB** , **RIB**, .. , . (,) , MultiWAN Inactive **FIB**, **RIB** .

:

:

-
- (Trust, Untrust)
- NAT (Source NAT)

:

1. wan load-balance target-list Targets basic:

```
wan load-balance target-list Targets
target 1
  description "Ya DNS"
  resp-time 6
  ip address 77.88.8.1
  enable
exit
target 2
  description "Ya DNS-2"
  resp-time 6
  ip address 77.88.8.2
  enable
exit
target 3
  description "Ya DNS-3"
  resp-time 6
  ip address 77.88.8.3
  enable
exit
exit
```

2. gigabitethernet 1/0/1 :

```

interface gigabitethernet 1/0/1
 security-zone Untrust
 ip firewall disable
 ip address 192.0.1.10/24
 ip address 192.0.1.2/24
 wan load-balance nexthop 192.0.1.1
 wan load-balance failure-count 4
 wan load-balance source-address 192.0.1.2
 wan load-balance success-count 6
 wan load-balance target-list Experimental
 wan load-balance enable
exit

```

3. cellular modem 1 :

```

cellular profile 1
 APN internet.beeline.ru
exit

```

```

cellular modem 1
 device 3-1
 ip firewall disable
 profile 1
 allowed-mode 3g
 allowed-mode 4g
 enable
exit

```

4. MultiWAN (1):

```

ip route 0.0.0.0/0 wan load-balance rule 1
ip route 0.0.0.0/0 interface modem 1 1

```

5. wan load-balance rule 1 gigabitethernet 1/0/1 - :

```

wan load-balance rule 1
 description "Default gateway"
 outbound interface gigabitethernet 1/0/1
 enable
exit

```

show ip route , gigabitethernet 1/0/1 :

```

esr # show ip route
Codes: C - connected, S - static, R - RIP derived,
       O - OSPF derived, IA - OSPF inter area route,
       E1 - OSPF external type 1 route, E2 - OSPF external type 2 route
       B - BGP derived, D - DHCP derived, K - kernel route, V - VRRP route
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - FIB route

S      * 0.0.0.0/0          [1/0]          via 192.0.1.1 on gil/0/1          [static 22:37:32]

```

(RIB) **show ip route all** , - **gigabitethernet 1/0/1** **modem 1**:

```
esr # show ip route all
Codes: C - connected, S - static, R - RIP derived,
       O - OSPF derived, IA - OSPF inter area route,
       E1 - OSPF external type 1 route, E2 - OSPF external type 2 route
       B - BGP derived, D - DHCP derived, K - kernel route, V - VRRP route
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - FIB route

S      * 0.0.0.0/0          [1/0]          via 192.0.1.1 on gil/0/1      [static 22:33:13]
S      0.0.0.0/0          [1/1]          via 10.64.64.64 on modem 1   [static 15:57:12]
```

gigabitethernet 1/0/1 **Adminstrative Down**, :

```
esr # configure
esr (config)# interface gigabitethernet 1/0/1
esr (config-if-gi)# shutdown
esr (config-if-gi)# end
esr # commit
```

show ip route , **modem 1 1**:

```
ESR-100-Balancer# sh ip route
Codes: C - connected, S - static, R - RIP derived,
       O - OSPF derived, IA - OSPF inter area route,
       E1 - OSPF external type 1 route, E2 - OSPF external type 2 route
       B - BGP derived, D - DHCP derived, K - kernel route, V - VRRP route
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - FIB route

S      * 0.0.0.0/0          [1/1]          via 10.64.64.64 on modem 1   [static 15:57:12]
```

, MultiWAN .