

## 6. Настраиваем BFD:

### а) На R1:

```
[R1]router id 1.1.1.1
[R1]int gi 0/0/0
[R1-GigabitEthernet0/0/0]ospf bfd enable
[R1-GigabitEthernet0/0/0]ospf bfd min-tx-interval 50 min-rx-interval 50 detect-
multiplier 3
[R1-GigabitEthernet0/0/0]interface gi 0/0/1
[R1-GigabitEthernet0/0/1]ospf bfd enable
[R1-GigabitEthernet0/0/1]ospf bfd min-tx-interval 50 min-rx-interval 50 detect-
multiplier 3
[R1-GigabitEthernet0/0/1]ospf 1
[R1-ospf-1]bfd all-interface enable
```

### б) На R2:

```
[R2]router id 2.2.2.2
Info: Router ID has been modified, please reset the relative protocols manually to
update the Router ID.
[R2]bfd
[R2-bfd]interface gi 0/0/0
[R2-GigabitEthernet0/0/0]ospf bfd enable
[R2-GigabitEthernet0/0/0]ospf bfd min-tx-interval 50 min-rx-interval 50 detect-
multiplier 3
[R2-ospf-1]int gi 0/0/1
[R2-GigabitEthernet0/0/1]ospf bfd enable
[R2-GigabitEthernet0/0/1]ospf bfd min-tx-interval 50 min-rx-interval 50 detect-
multiplier 3
[R2-GigabitEthernet0/0/1]ospf 1
[R2-ospf-1]bfd all-interfaces enable
```

### в) На Sw:

```
[Sw]ospf 1
[Sw-ospf-1]bfd all-interfaces enable
```

Убеждаемся, что сессия поднялась.

Сессия после нескольких секунд после ввода команды состояние будет active.

```
<R1>ping -c 1000 1.0.0.2
```

```
PING 1.0.0.2: 56 data bytes, press CTRL_C to break
```

```
Reply from 1.0.0.2: bytes=56 Sequence=1 ttl=254 time=10 ms
```

```
Reply from 1.0.0.2: bytes=56 Sequence=2 ttl=254 time=1 ms
```

```
Reply from 1.0.0.2: bytes=56 Sequence=3 ttl=254 time=1 ms
```

```
Reply from 1.0.0.2: bytes=56 Sequence=4 ttl=254 time=10 ms
```

```
Reply from 1.0.0.2: bytes=56 Sequence=5 ttl=254 time=1 ms
```

```
Reply from 1.0.0.2: bytes=56 Sequence=6 ttl=254 time=1 ms
```

```
Reply from 1.0.0.2: bytes=56 Sequence=7 ttl=254 time=1 ms
```

```
Reply from 1.0.0.2: bytes=56 Sequence=8 ttl=254 time=1 ms
```

```
Reply from 1.0.0.2: bytes=56 Sequence=9 ttl=254 time=1 ms
```

```
Reply from 1.0.0.2: bytes=56 Sequence=10 ttl=254 time=1 ms
```

```
Reply from 1.0.0.2: bytes=56 Sequence=11 ttl=254 time=10 ms
```

```
Reply from 1.0.0.2: bytes=56 Sequence=12 ttl=254 time=1 ms
```

```
Reply from 1.0.0.2: bytes=56 Sequence=13 ttl=254 time=1 ms
```

```
Reply from 1.0.0.2: bytes=56 Sequence=14 ttl=254 time=10 ms
```

```
Reply from 1.0.0.2: bytes=56 Sequence=15 ttl=254 time=1 ms
```

```
Reply from 1.0.0.2: bytes=56 Sequence=16 ttl=254 time=1 ms
```

```
Reply from 1.0.0.2: bytes=56 Sequence=17 ttl=254 time=8 ms
```

```
Reply from 1.0.0.2: bytes=56 Sequence=18 ttl=254 time=1 ms
```

```
Reply from 1.0.0.2: bytes=56 Sequence=19 ttl=254 time=27 ms
```

```
Reply from 1.0.0.2: bytes=56 Sequence=20 ttl=254 time=1 ms
```

```
Reply from 1.0.0.2: bytes=56 Sequence=21 ttl=254 time=1 ms
```

```
Jan 3 2001 00:57:33+04:00 R1 %%01BFD/4/STACHG_TODWN(1)[0]:BFD  
session changed to Down. (SlotNumber=0, Discriminator=8192,  
Diagnostic=DetectDown, Applications=OSPF, ProcessPST=False,  
BindInterfaceName=GigabitEthernet0/0/1, InterfacePhysicalState=Up,  
InterfaceProtocolState=Up)
```

```
<R1>
```

```
Jan 3 2001 00:57:33+04:00 R1 %%01OSPF/3/NBR_CHG_DOWN(1)[1]:Neighbor  
event:neighbor state changed to Down. (ProcessId=1, NeighborAddress=10.1.1.2,  
NeighborEvent=KillNbr, NeighborPreviousState=Full,  
NeighborCurrentState=Down)
```

```
<R1>
Jan          3          2001          00:57:33+04:00          R1
%%01OSPF/3/NBR_DOWN_REASON(1)[2]:Neighbor state leaves full or changed
to Down. (ProcessId=1, NeighborRouterId=10.1.1.2, NeighborAreaId=0,
NeighborInterface=GigabitEthernet0/0/1,NeighborDownImmediate
reason=Neighbor Down Due to Kill Neighbor, NeighborDownPrimeReason=BFD
Session Down, NeighborChangeTime=2001-01-03 00:57:33+04:00)
<R1>
Jan  3  2001  00:57:34+04:00  R1  %%01IFPDT/4/IF_STATE(1)[3]:Interface
GigabitEthernet0/0/1 has turned into DOWN state.
<R1>
Jan  3  2001  00:57:34+04:00  R1  %%01IFNET/4/LINK_STATE(1)[4]:The line
protocol IP on the interface GigabitEthernet0/0/1 has entered the DOWN state.
<R1>
Request time out
Reply from 1.0.0.2: bytes=56 Sequence=23 ttl=255 time=1 ms
Reply from 1.0.0.2: bytes=56 Sequence=24 ttl=255 time=10 ms
Reply from 1.0.0.2: bytes=56 Sequence=25 ttl=255 time=1 ms
Reply from 1.0.0.2: bytes=56 Sequence=26 ttl=255 time=2 ms
Reply from 1.0.0.2: bytes=56 Sequence=27 ttl=255 time=1 ms
Reply from 1.0.0.2: bytes=56 Sequence=28 ttl=255 time=1 ms
Reply from 1.0.0.2: bytes=56 Sequence=29 ttl=255 time=10 ms
Reply from 1.0.0.2: bytes=56 Sequence=30 ttl=255 time=1 ms
Reply from 1.0.0.2: bytes=56 Sequence=31 ttl=255 time=1 ms
Reply from 1.0.0.2: bytes=56 Sequence=32 ttl=255 time=1 ms
Reply from 1.0.0.2: bytes=56 Sequence=33 ttl=255 time=1 ms
Reply from 1.0.0.2: bytes=56 Sequence=34 ttl=255 time=10 ms
Reply from 1.0.0.2: bytes=56 Sequence=35 ttl=255 time=1 ms
Reply from 1.0.0.2: bytes=56 Sequence=36 ttl=255 time=1 ms
Jan  3  2001  00:57:42+04:00  R1  %%01IFPDT/4/IF_STATE(1)[5]:Interface
GigabitEthernet0/0/1 has turned into UP state.
<R1>
Jan  3  2001  00:57:42+04:00  R1  %%01IFNET/4/LINK_STATE(1)[6]:The line
protocol IP on the interface GigabitEthernet0/0/1 has entered the UP state.
<R1>
```

```
Reply from 1.0.0.2: bytes=56 Sequence=37 ttl=255 time=1 ms
Reply from 1.0.0.2: bytes=56 Sequence=38 ttl=255 time=1 ms
Reply from 1.0.0.2: bytes=56 Sequence=39 ttl=255 time=1 ms
Reply from 1.0.0.2: bytes=56 Sequence=40 ttl=255 time=1 ms
Reply from 1.0.0.2: bytes=56 Sequence=41 ttl=255 time=10 ms
Reply from 1.0.0.2: bytes=56 Sequence=42 ttl=255 time=1 ms
Reply from 1.0.0.2: bytes=56 Sequence=43 ttl=255 time=1 ms
Reply from 1.0.0.2: bytes=56 Sequence=44 ttl=255 time=10 ms
Reply from 1.0.0.2: bytes=56 Sequence=45 ttl=255 time=1 ms
Reply from 1.0.0.2: bytes=56 Sequence=46 ttl=255 time=1 ms
Reply from 1.0.0.2: bytes=56 Sequence=47 ttl=255 time=1 ms
Reply from 1.0.0.2: bytes=56 Sequence=48 ttl=255 time=1 ms
```

--- 1.0.0.2 ping statistics ---

48 packet(s) transmitted

47 packet(s) received

2.08% packet loss

round-trip min/avg/max = 1/3/27 ms

Вывод Display bfd session all:

```
<R1>display bfd session all
```

```
-----
Local Remote  PeerIpAddr  State  Type  InterfaceName
-----
8193 8193    10.1.3.2    Up     D_IP_IF  GigabitEthernet0/0/0
8194 8194    10.1.1.2    Up     D_IP_IF  GigabitEthernet0/0/1
-----
```

Total UP/DOWN Session Number : 2/0

Ставим на все интерфейсы минимальное значение min-tx-interval и min-rx-interval:

a) R1:

```
[R1]int gi 0/0/0
```

```
[R1-GigabitEthernet0/0/0]ospf bfd min-tx
```

```
[R1-GigabitEthernet0/0/0]ospf bfd min-tx-interval ?
```

INTEGER<10-2000> The minimum transmit interval(in milliseconds)

```
[R1-GigabitEthernet0/0/0]ospf bfd min-tx-interval 10 min-rx
[R1-GigabitEthernet0/0/0]ospf bfd min-tx-interval 10 min-rx-interval 10 detect
[R1-GigabitEthernet0/0/0]ospf bfd min-tx-interval 10 min-rx-interval 10 detect-
multiplier 3
```

б) R2:

```
[R2]int gi 0/0/0
[R2-GigabitEthernet0/0/0]ospf bfd min-tx
[R2-GigabitEthernet0/0/0]ospf bfd min-tx-interval 10 min-rx
[R2-GigabitEthernet0/0/0]ospf bfd min-tx-interval 10 min-rx-interval 10 dete
[R2-GigabitEthernet0/0/0]ospf bfd min-tx-interval 10 min-rx-interval 10 detect-
multiplier 3
```

И проверяем сходимость при разрыве – пингуем:

```
<R1>ping -c 1000 1.0.0.2
PING 1.0.0.2: 56 data bytes, press CTRL_C to break
Reply from 1.0.0.2: bytes=56 Sequence=1 ttl=254 time=1 ms
Reply from 1.0.0.2: bytes=56 Sequence=2 ttl=254 time=10 ms
Reply from 1.0.0.2: bytes=56 Sequence=3 ttl=254 time=1 ms
Reply from 1.0.0.2: bytes=56 Sequence=4 ttl=254 time=1 ms
Reply from 1.0.0.2: bytes=56 Sequence=5 ttl=254 time=10 ms
Reply from 1.0.0.2: bytes=56 Sequence=6 ttl=254 time=1 ms
Reply from 1.0.0.2: bytes=56 Sequence=7 ttl=254 time=1 ms
Reply from 1.0.0.2: bytes=56 Sequence=8 ttl=254 time=1 ms
Reply from 1.0.0.2: bytes=56 Sequence=9 ttl=254 time=1 ms
Reply from 1.0.0.2: bytes=56 Sequence=10 ttl=254 time=10 ms
Reply from 1.0.0.2: bytes=56 Sequence=11 ttl=254 time=1 ms
Reply from 1.0.0.2: bytes=56 Sequence=12 ttl=254 time=1 ms
Reply from 1.0.0.2: bytes=56 Sequence=13 ttl=254 time=1 ms
Reply from 1.0.0.2: bytes=56 Sequence=14 ttl=254 time=1 ms
Reply from 1.0.0.2: bytes=56 Sequence=15 ttl=254 time=10 ms
Reply from 1.0.0.2: bytes=56 Sequence=16 ttl=254 time=1 ms
Reply from 1.0.0.2: bytes=56 Sequence=17 ttl=254 time=1 ms
Reply from 1.0.0.2: bytes=56 Sequence=18 ttl=254 time=10 ms
Reply from 1.0.0.2: bytes=56 Sequence=19 ttl=254 time=1 ms
```

```
Reply from 1.0.0.2: bytes=56 Sequence=20 ttl=254 time=1 ms
Jan  3 2001 01:02:42+04:00 R1 %%01BFD/4/STACHG_TODWN(1)[23]:BFD
session changed to Down. (SlotNumber=0, Discriminator=8194,
Diagnostic=DetectDown, Applications=OSPF, ProcessPST=False,
BindInterfaceName=GigabitEthernet0/0/1, InterfacePhysicalState=Up,
InterfaceProtocolState=Up)
<R1>
Jan          3          2001          01:02:42+04:00          R1
%%01OSPF/3/NBR_CHG_DOWN(1)[24]:Neighbor event:neighbor state changed
to Down. (ProcessId=1, NeighborAddress=10.1.1.2, NeighborEvent=KillNbr,
NeighborPreviousState=Full, NeighborCurrentState=Down)
<R1>
Jan          3          2001          01:02:42+04:00          R1
%%01OSPF/3/NBR_DOWN_REASON(1)[25]:Neighbor state leaves full or
changed to Down. (ProcessId=1, NeighborRouterId=10.1.1.2, NeighborAreaId=0,
NeighborInterface=GigabitEthernet0/0/1,NeighborDownImmediate
reason=Neighbor Down Due to Kill Neighbor, NeighborDownPrimeReason=BFD
Session Down, NeighborChangeTime=2001-01-03 01:02:42+04:00)
<R1>
Jan  3 2001 01:02:43+04:00 R1 %%01IFPDT/4/IF_STATE(1)[26]:Interface
GigabitEthernet0/0/1 has turned into DOWN state.
<R1>
Jan  3 2001 01:02:43+04:00 R1 %%01IFNET/4/LINK_STATE(1)[27]:The line
protocol IP on the interface GigabitEthernet0/0/1 has entered the DOWN state.
<R1>
Request time out
Reply from 1.0.0.2: bytes=56 Sequence=22 ttl=255 time=1 ms
Reply from 1.0.0.2: bytes=56 Sequence=23 ttl=255 time=10 ms
Reply from 1.0.0.2: bytes=56 Sequence=24 ttl=255 time=1 ms
Reply from 1.0.0.2: bytes=56 Sequence=25 ttl=255 time=1 ms
Reply from 1.0.0.2: bytes=56 Sequence=26 ttl=255 time=1 ms
Reply from 1.0.0.2: bytes=56 Sequence=27 ttl=255 time=1 ms
Reply from 1.0.0.2: bytes=56 Sequence=28 ttl=255 time=10 ms
Reply from 1.0.0.2: bytes=56 Sequence=29 ttl=255 time=1 ms
Reply from 1.0.0.2: bytes=56 Sequence=30 ttl=255 time=1 ms
```

```
Reply from 1.0.0.2: bytes=56 Sequence=31 ttl=255 time=10 ms
Reply from 1.0.0.2: bytes=56 Sequence=32 ttl=255 time=1 ms
Reply from 1.0.0.2: bytes=56 Sequence=33 ttl=255 time=1 ms
Reply from 1.0.0.2: bytes=56 Sequence=34 ttl=255 time=1 ms
Reply from 1.0.0.2: bytes=56 Sequence=35 ttl=255 time=1 ms
Reply from 1.0.0.2: bytes=56 Sequence=36 ttl=255 time=10 ms
Reply from 1.0.0.2: bytes=56 Sequence=37 ttl=255 time=1 ms
Reply from 1.0.0.2: bytes=56 Sequence=38 ttl=255 time=11 ms
Reply from 1.0.0.2: bytes=56 Sequence=39 ttl=255 time=1 ms
Reply from 1.0.0.2: bytes=56 Sequence=40 ttl=255 time=1 ms
Jan  3 2001 01:02:54+04:00 R1 %%01IFPDT/4/IF_STATE(1)[28]:Interface
GigabitEthernet0/0/1 has turned into UP state.
<R1>
Jan  3 2001 01:02:54+04:00 R1 %%01IFNET/4/LINK_STATE(1)[29]:The line
protocol IP on the interface GigabitEthernet0/0/1 has entered the UP state.
<R1>
Reply from 1.0.0.2: bytes=56 Sequence=41 ttl=255 time=1 ms
Reply from 1.0.0.2: bytes=56 Sequence=42 ttl=255 time=1 ms
Reply from 1.0.0.2: bytes=56 Sequence=43 ttl=255 time=10 ms

--- 1.0.0.2 ping statistics ---
43 packet(s) transmitted
42 packet(s) received
2.32% packet loss
round-trip min/avg/max = 1/3/11 ms
```

Потерялся всего один пинг.