Junos advanced

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Конфигурация Junos через CLI (адванс)

Deactivate / Activate

```
warrior@vmx-21# show snmp
trap-group 1 {
    targets {
        1.2.3.4;
        5.6.7.8;
    }
}

warrior@vmx-21# deactivate snmp trap-group 1 targets 1.2.3.4

warrior@vmx-21# show | compare
[edit snmp trap-group 1 targets]
!     inactive: 1.2.3.4 { ... }

warrior@vmx-21# commit
commit complete

warrior@vmx-21# show snmp
trap-group 1 {
    targets {
        inactive: 1.2.3.4;                    // не-активная часть конфигурации
        5.6.7.8;
    }
}
```

Аннотирование

```
w   warrior@vmx-21# show snmp
tr  trap-group 1 {
        targets {
            1.2.3.4;
            5.6.7.8;
        }
}   }

w   warrior@vmx-21# edit snmp trap-group 1 targets

[e  [edit snmp trap-group 1 targets]
w   warrior@vmx-21# annotate 1.2.3.4 "-- My primary server; Contact Ivan Ivanov for details"

[e  [edit snmp trap-group 1 targets]
w   warrior@vmx-21# commit

w   warrior@vmx-21# show snmp
tr  trap-group 1 {
        targets {
            /* -- My primary server; Contact Ivan Ivanov for details */          // аннотация
            1.2.3.4;
            5.6.7.8;
        }
}   }
```

Commit с автоматическим rollback через N минут

- Безопасно ли все это коммитить? Все ли учтено (!?!?!?)

```
warrior@vmx-28# show | compare
[edit system]
…                              // сложные/множественные изменения здесь
[edit interfaces]
…                              // и здесь
[edit protocols]
…                              // и здесь
[edit firewall]
…                              // и здесь

warrior@vmx-28# commit confirmed ?
<[Enter]>              Execute this command
  <timeout>            Number of minutes until automatic rollback (1..65535)
  and-quit             Quit configuration mode if commit succeeds
  comment              Message to write to commit log

warrior@vmx-28# commit confirmed 2
commit confirmed will be automatically rolled back in 2 minutes unless confirmed
commit complete
```

Configure exclusive

- “эксклюзивный” режим
- только один оператор может вносить изменения в конфигурацию

```
warrior@vmx-21> configure exclusive                          // пользователь warrior
warning: uncommitted changes will be discarded on exit
Entering configuration mode
```

```
student21@vmx-21> configure                                  // пользователь student21
Entering configuration mode
Users currently editing the configuration:
  warrior terminal p0 (pid 17567) on since 2017-11-25 17:20:41 UTC, idle 00:00:50
     exclusive [edit]

student21@vmx-21# set interfaces ge-0/0/9 description "--test interface"
error: configuration database locked by:
  warrior terminal p0 (pid 17567) on since 2017-11-25 17:20:41 UTC, idle 00:01:00
     exclusive [edit]

student21@vmx-21# show | compare                             // невозможно внести изменения

student21@vmx-21#
```

Configure private

- “приватный” режим конфигурации
- несколько операторов могут работать одновременно

```
warrior@vmx-21> edit private                // warrior
warning: uncommitted changes will be discarded on exit
Entering configuration mode

warrior@vmx-21# set snmp community public authorization read-only

warrior@vmx-21# show | compare
[edit]
+  snmp {
+      community public {
+          authorization read-only;
+      }
+  }

warrior@vmx-21# commit and-quit
commit complete
Exiting configuration mode
```

```
student21@vmx-21> edit private                // student21
warning: uncommitted changes will be discarded on exit
Entering configuration mode
Users currently editing the configuration:
  warrior terminal p0 (pid 22943) on since 2017-11-25 18:26:46 UTC
    private [edit]

student21@vmx-21# set system name-server 1.2.3.4

student21@vmx-21# show | compare
[edit system]
+  name-server {
+      1.2.3.4;
+  }

student21@vmx-21# commit and-quit
commit complete
Exiting configuration mode
```

Сохранение конфигурации (1)

- в локальную директорию

```
student21@vmx-21# run file list detail

/var/home/student21/:                          // домашняя директория для оператора student21
total blocks: 8
total files: 0

student21@vmx-21# save ?
Possible completions:
  <filename>          Filename (URL, local, remote, or floppy)
  terminal            Use login terminal

student21@vmx-21# save vmx21-config-for-test-setup.txt
Wrote 70 lines of configuration to 'vmx21-config-for-test-setup.txt'

student21@vmx-21# run file list detail

/var/home/student21/:
total blocks: 12
-rw-r--r--  1 student21 20      1551 Nov 25 17:33 vmx21-config-for-test-setup.txt
total files: 1
```

Сохранение конфигурации (2)

- на удаленный сервер (FTP, SCP)

```
warrior@vmx-21# save scp://warrior@192.168.64.64/home/warrior/my-best-config.txt
Password:
tempfile                                                                    100% 1593     1.6KB/s   00:00
Wrote 71 lines of configuration to 'scp://warrior@192.168.64.64/home/warrior/my-best-config.txt'
```

Сравнение конфигурации с файлом

```
student21@vmx-21# save /var/tmp/my-working-config-02-Dec-2017.txt
Wrote 70 lines of configuration to '/var/tmp/my-working-config-02-Dec-2017.txt'

student21@vmx-21# run file list /var/tmp/ detail | match config
-rw-r--r--  1 student21 field      1551 Nov 25 18:41 my-working-config-02-Dec-2017.txt
```

сеанс 02.12.2017
Сохранили рабочий конфиг в файл

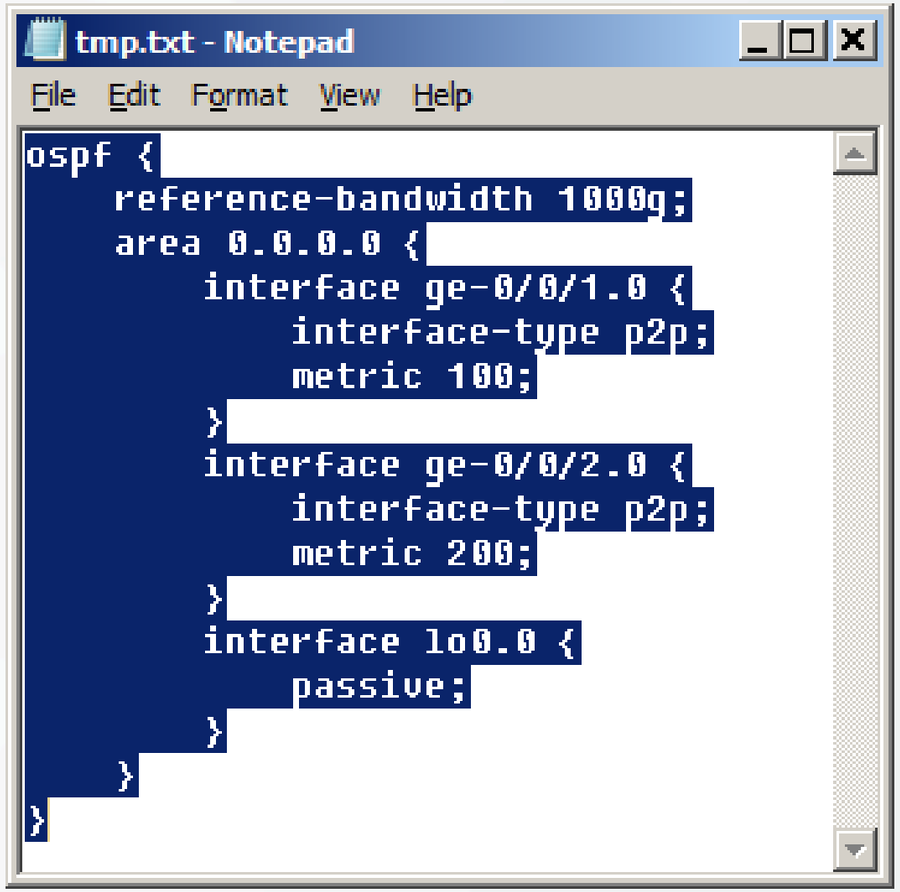
```
student21@vmx-21# show | compare /var/tmp/my-working-config-02-Dec-2017.txt
[edit interfaces ge-0/0/1]
-   mtu 2000;
+   mtu 1800;
[edit]
+  policy-options {
+      policy-statement my-policy-1 {
+          term 1 {
+              from protocol static;
+              then accept;
+          }
+      }
+  }
```

сеанс 05.12.2017
Что изменилось по сравнению с рабочим конфигом от 2-го декабря?

Загрузка куска конфигурации (load merge)

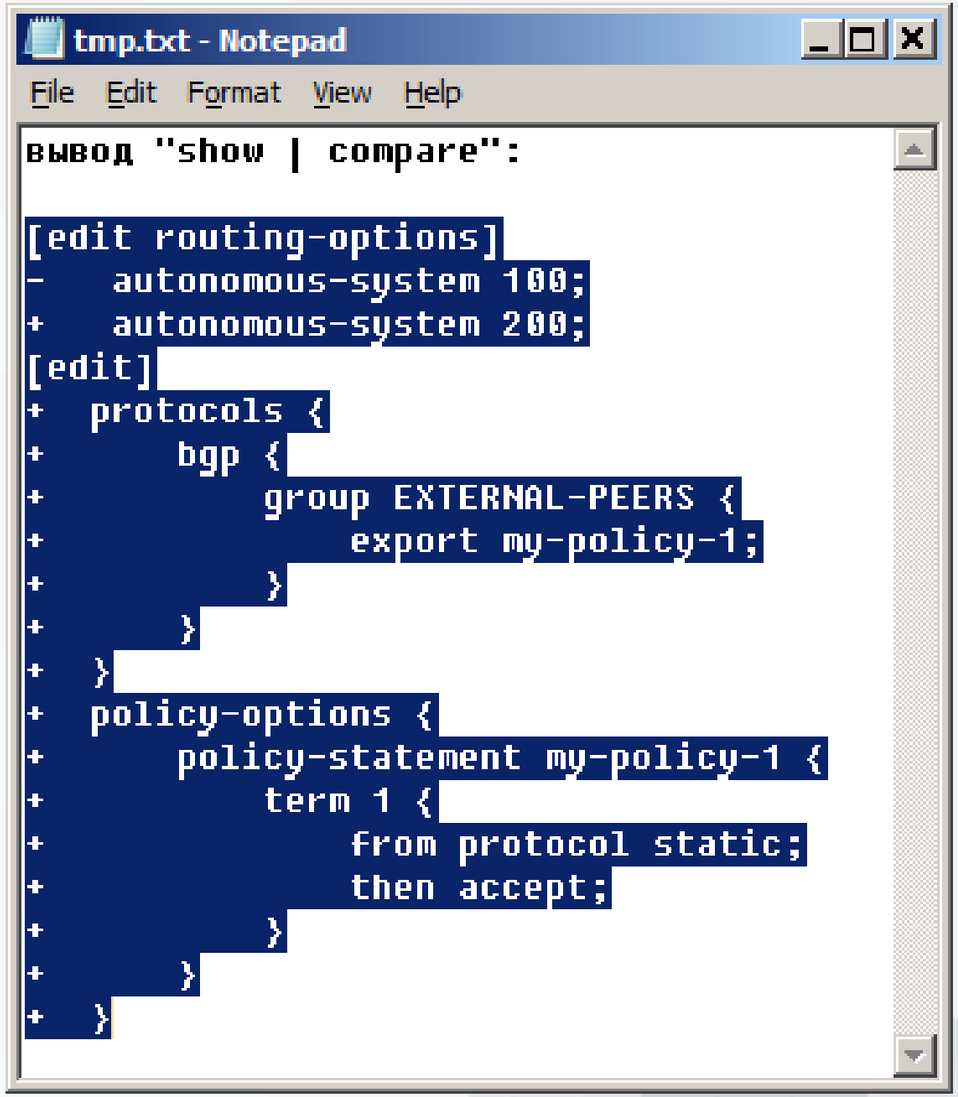
```
[edit protocols]
student21@vmx-21# load merge terminal relative
[Type ^D at a new line to end input]
ospf {
    reference-bandwidth 1000g;          // merge – добавляем в конфиг
    area 0.0.0.0 {                      // terminal – через терминал
        interface ge-0/0/1.0 {          // relative – относительно текущего
            interface-type p2p;                    уровня иерархии (protocols)
            metric 100;
        }
        interface ge-0/0/2.0 {
            interface-type p2p;
            metric 200;
        }
        interface lo0.0 {
            passive;
        }
    }
}                                                  // Ctrl+D
load complete

[edit protocols]
student21@vmx-21#
```



Загрузка куска конфигурации (load patch)

```
[edit]
student21@vmx-21# load patch terminal
[Type ^D at a new line to end input]
[edit routing-options]
-  autonomous-system 100;
+  autonomous-system 200;
[edit]                                  // patch – в формате патча (diff)
+  protocols {                          // terminal – через терминал
+     bgp {                             // находимся наверху иерархии (edit)
+        group EXTERNAL-PEERS {
+           export my-policy-1;
+        }
+     }
+  }
+  policy-options {
+     policy-statement my-policy-1 {
+        term 1 {
+           from protocol static;
+           then accept;
+        }
+     }
+  }                                     // Ctrl+D
load complete
```



Загрузка полной конфигурации (load override)

```
student21@vmx-21# run file list detail

/var/home/student21/:
-rw-r--r--  1 student21 20      1551 Nov 25 19:36 my-best-config.txt
total files: 1

student21@vmx-21# load override my-best-config.txt              // полностью переписываем весь конфиг
load complete

student21@vmx-21# show | compare
[edit]
-  policy-options {
-      policy-statement PLC-filter-bad-routes {
-          term 1 {
-              from {
-                  route-filter 22.22.22.0/24 orlonger;
-              }
-              then reject;
-          }
-      }
-  }

student21@vmx-21# commit
```

Перенос конфигурации через “display set”

```
student21@vmx-21# show interfaces ge-0/0/1
description "-- to vmx-28 (P-router)";
vlan-tagging;
mtu 2000;
mac 00:0c:29:2f:a2:c1;
gigether-options {
    no-flow-control;
}
unit 10 {
    vlan-id 10;
    family inet {
        address 10.0.0.2/30;
    }
}

student21@vmx-21# show interfaces ge-0/0/1 | display set
set interfaces ge-0/0/1 description "-- to vmx-28 (P-router)"
set interfaces ge-0/0/1 vlan-tagging
set interfaces ge-0/0/1 mtu 2000
set interfaces ge-0/0/1 mac 00:0c:29:2f:a2:c1
set interfaces ge-0/0/1 gigether-options no-flow-control
set interfaces ge-0/0/1 unit 10 vlan-id 10
set interfaces ge-0/0/1 unit 10 family inet address 10.0.0.2/30
```

Rescue конфигурация

- rescue = спасение
- rescue конфигурацию необходимо явно создать и сохранить

```
warrior@vmx-21> request system configuration rescue save          // сохранить текущий конфиг как rescue

warrior@vmx-21> file list /config/ detail | match rescue
-rw-r-----  1 root  929         613 Nov 25 21:51 rescue.conf.gz
```

```
[edit]
warrior@vmx-21# rollback rescue                                   // откатиться на rescue конфиг, при необходимости
load complete
```

```
warrior@vmx-21> request system configuration rescue delete        // удаление rescue конфига

warrior@vmx-21> file list /config/ detail | match rescue

warrior@vmx-21>
```

Сравнение двух rollback

- команда доступна только в операционом режиме

```
warrior@vmx-21# show | compare rollback ?
Possible completions:
  0              2017-12-04 19:00:54 MSK by warrior via cli
  1              2017-12-04 17:07:56 MSK by warrior via cli
  2              2017-12-04 15:16:03 MSK by warrior via cli
  3              2017-12-04 14:59:17 MSK by warrior via cli
  4              2017-12-04 13:38:15 MSK by warrior via cli
  5              2017-12-04 13:24:06 MSK by warrior via cli
  6              2017-12-04 13:17:21 MSK by warrior via cli
  7              2017-12-04 12:26:19 MSK by warrior via cli
  8              2017-12-04 12:17:45 MSK by warrior via cli
  9              2017-12-04 12:00:47 MSK by warrior via cli
  10             2017-12-04 11:58:34 MSK by warrior via cli
  11             2017-12-04 11:57:55 MSK by warrior via cli
  12             2017-12-04 11:56:36 MSK by warrior via cli
  13             2017-12-04 11:54:41 MSK by warrior via cli
  14             2017-12-04 11:53:58 MSK by warrior via cli
  15             2017-12-04 11:50:51 MSK by warrior via cli
  16             2017-12-04 11:44:50 MSK by warrior via cli
  17             2017-12-04 11:44:07 MSK by warrior via cli
  18             2017-11-26 04:39:54 MSK by warrior via cli
  19             2017-11-25 23:49:07 MSK by student21 via cli
  20             2017-11-25 23:37:03 MSK by student21 via cli
  21             2017-11-25 23:36:33 MSK by student21 via cli
  22             2017-11-25 23:35:59 MSK by student21 via cli
...
```

```
warrior@vmx-21> show system rollback compare 19 10
[edit system]
+  time-zone Europe/Moscow;
+  ntp {
+      server 185.22.60.71;
+      source-address 192.168.1.21;
+  }
[edit routing-options static]
     route 10.0.0.0/24 { ... }
+    route 185.22.60.71/32 next-hop 192.168.1.2;
+    route 194.100.100.151/32 next-hop 192.168.1.2;
```

какая разница между этими конфигами?

Массовая замена

```
warrior@vmx-21# replace pattern ge-0/0/1 with ge-0/0/9

warrior@vmx-21# show | compare
[edit interfaces]
-   ge-0/0/1 {
-       description "-- to vmx-28 (P-router)";
-       vlan-tagging;
-       mtu 2000;
-       mac 00:0c:29:2f:a2:c1;
-       gigether-options {
-           no-flow-control;
-       }
<-- skipped -->
-   }
+   ge-0/0/9 {
+       description "-- to vmx-28 (P-router)";
+       vlan-tagging;
+       mtu 2000;
+       mac 00:0c:29:2f:a2:c1;
+       gigether-options {
+           no-flow-control;
+       }
<-- skipped -->
+   }
[edit protocols ospf area 0.0.0.0]
+     interface ge-0/0/9.10 {
+         interface-type p2p;
+     }
      interface lo0.0 { ... }
[edit protocols ospf area 0.0.0.0]
-     interface ge-0/0/1.10 {
-         interface-type p2p;
-     }
```

Перестановка термов (routing policy, firewall filter)

```
[edit firewall family inet filter FF1]
warrior@vmx-72# show
term block-from-172-16-10 {
    from {
        source-address {
            172.16.10.0/24;
        }
    }
    then {
        count BLOCKED-PACKETS;
        discard;
    }
}
term permit-all-other-traffic {
    then accept;
}
term block-from-172-16-55 {
    from {
        source-address {
            172.16.55.0/24;
        }
    }
    then {
        count BLOCKED-PACKETS;
        discard;
    }
}
```

```
[edit firewall family inet filter FF1]
warrior@vmx-72# insert term permit-all-other-traffic after term block-from-172-16-55
warrior@vmx-72# show
term block-from-172-16-10 {
    from {
        source-address {
            172.16.10.0/24;
        }
    }
    then {
        count BLOCKED-PACKETS;
        discard;
    }
}
term block-from-172-16-55 {
    from {
        source-address {
            172.16.55.0/24;
        }
    }
    then {
        count BLOCKED-PACKETS;
        discard;
    }
}
term permit-all-other-traffic {
    then accept;
}
```

Конфигурационные группы

```
[edit]
+ groups {
+    CORE-GE-INTERFACE {
+       interfaces {
+          <ge-*> {
+             mtu 1985;
+             hold-time up 1000 down 0;
+             gigether-options {
+                no-flow-control;
+             }
+          }
+       }
+    }
+ }
[edit interfaces]
+   ge-0/0/7 {
+      apply-groups CORE-GE-INTERFACE;
+   }
+   ge-0/0/8 {
+      apply-groups CORE-GE-INTERFACE;
+   }
+   ge-0/0/9 {
+      apply-groups CORE-GE-INTERFACE;
+   }
```

```
warrior@vmx-21# show interfaces ge-0/0/7
apply-groups CORE-GE-INTERFACE;

warrior@vmx-21# show interfaces ge-0/0/7 | display inheritance no-comments
mtu 1985;                                   // настройка из группы
hold-time up 1000 down 0;                   // настройка из группы
gigether-options {                          // настройка из группы
   no-flow-control;
}
```

Настройки текущего сеанса CLI

```
warrior@vmx-21# run set cli ?
Possible completions:
  complete-on-space    Set whether typing space completes current word
  directory            Set working directory
  idle-timeout         Set maximum idle time before login session ends
  prompt               Set CLI command prompt string
  restart-on-upgrade   Set whether CLI prompts to restart after software upgrade
  screen-length        Set number of lines on screen
  screen-width         Set number of characters on a line
  terminal             Set terminal type
  timestamp            Timestamp CLI output

warrior@vmx-21# run show cli
CLI complete-on-space set to on
CLI idle-timeout disabled
CLI restart-on-upgrade set to on
CLI screen-length set to 61
CLI screen-width set to 207
CLI terminal is 'xterm'
CLI is operating in enhanced mode
CLI timestamp disabled
CLI working directory is '/var/home/warrior'
```

```
warrior@vmx-21# run set cli timestamp

Dec 05 01:58:17
CLI timestamp set to: %b %d %T

warrior@vmx-21# run show cli | match timestamp
Dec 05 01:58:35
CLI timestamp set to '%b %d %T'

warrior@vmx-21# run show ospf neighbor
Dec 05 01:59:47
Address         Interface              State     ID               Pri  Dead
10.0.0.1        ge-0/0/1.10            Full      7.0.0.28         128  31
```

Syslog

Что такое syslog?

- средство системного логирования в Unix (syslog = system log)
- сообщения можно сохранять в локальных файлах (=логах)
- сообщения можно пересылать на удаленный Syslog сервер
- сообщения (=события) разбиваются на:
  - классы (facility)
  - важность (severity)
- основной лог файл, обычно: */var/log/messages*

```
noc@KRD-TIH-P-MX480> file list /var/log/messages* detail
-rw-rw----  1 root  wheel    308885 Dec 2  19:25 /var/log/messages
-rw-rw----  1 root  wheel     47104 Nov 10 14:15 /var/log/messages.0.gz
-rw-rw----  1 root  wheel     39249 Oct 18 15:45 /var/log/messages.1.gz
-rw-rw----  1 root  wheel     58279 Oct 16 01:15 /var/log/messages.2.gz
-rw-rw----  1 root  wheel     46886 Sep 29 21:00 /var/log/messages.3.gz
```

Syslog конфигурация по умолчанию

```
warrior@vmx-21# show system syslog
user * {                                  // отправлять на терминал/консоль любому оператору
    any emergency;                        // класс = любой (any), важность = emergency и важнее
}
file messages {                           // записывать в файл /var/log/messages
    any notice;                           // любое событие с важностью notice и важнее
    authorization info;                   // события авторизации с важностью info и важнее
}
file interactive-commands {               // записывать в файл /var/log/interactive-commands
    interactive-commands any;             // команды которые вводит оператор, с любой важностью (т.е. все)
}
```

Какие бывают классы сообщений?

```
warrior@vmx-21# set system syslog file my-log-file ?
  ...
  any                 All facilities
  authorization       Authorization system
  change-log          Configuration change log
  conflict-log        Configuration conflict log
  daemon              Various system processes
  dfc                 Dynamic flow capture
  external            Local external applications
  firewall            Firewall filtering system
  ftp                 FTP process
  interactive-commands Commands executed by the UI
  kernel              Kernel
  match               Regular expression for lines to be logged
  ntp                 NTP process
  pfe                 Packet Forwarding Engine
  security            Security related
  user                User processes
  ...
```

Какие бывают важности (уровни)?

```
warrior@vmx-21# set system syslog file my-log-file firewall ?
...
  any             All levels                                    // любая важность
  none            No messages                                   // “никакие важности (уровни) не интересны”
  debug           Software debugging messages                   // отладочные сообщения (скрытая команда)
  info            Informational messages                        // информация
  notice          Conditions that should be handled specially   // замечания
  warning         Warning messages                              // предупреждения
  error           Error conditions                              // ошибки
  critical        Critical conditions                           // критические события
  alert           Conditions that should be corrected immediately // тревога, требуется немедленное вмешательство
  emergency       Panic conditions                              // прекращение функционирования
...
```

Пример syslog сообщения (события)

noc@KRD-TIH-P-MX480 show log messages | match OSPF

…

Nov 13 09:26:04.441 2017 KRD-TIH-P-MX480 rpd[7392]: RPD_OSPF_NBRDOWN: OSPF neighbor 62.183.28.135 (realm ospf-v2 xe-5/0/1.0 area 0.0.0.0) state changed from Full to Down due to KillNbr (event reason: interface went down)

…

noc@KRD-TIH-P-MX480> help syslog RPD_OSPF_NBRDOWN

Name: RPD_OSPF_NBRDOWN

Message: OSPF neighbor <neighbor-address> (realm <realm-name> <interface-name> area <area-id>i) state changed from <old-state> to <new-state> due to <event-name> (event reason: <reason>)

Help: OSPF neighbor adjacency was terminated

Description: An OSPF adjacency with the indicated neighboring router was terminated. The local router no longer exchanges routing information with, or directs traffic to, the neighboring router.

Type: Event: This message reports an event, not an error

Severity: notice

Facility: LOG_DAEMON

Action: For more information, see KB19074.

Отправка на внешний сервер

```
[edit]
warrior@vmx-21# show | compare
[edit system syslog]
+    host 1.2.3.4 {
+        daemon error;
+        kernel warning;
+        pfe any;
+        source-address 1.2.3.100;                    // IPv4 адрес источника
+        explicit-priority;                           // явно включать класс и важность в сообщение
+    }
```

Мониторинг лога в реальном времени

```
warrior@vmx-21# run show bgp summary
Groups: 1 Peers: 1 Down peers: 0
Table          Tot Paths  Act Paths Suppressed    History Damp State    Pending
inet.0
                      12         12          0          0          0          0
Peer                     AS      InPkt     OutPkt    OutQ   Flaps Last Up/Dwn State|#Active/Received/Accepted/Damped...
7.0.0.28                100        311        314       0       3     2:20:21 12/12/12/0          0/0/0/0

warrior@vmx-21# run monitor start messages
                                                        // выключаем BGP сессию на удаленной стороне
warrior@vmx-21#
*** messages ***
Dec  5 01:49:36  vmx-21 rpd[2303]: RPD_BGP_NEIGHBOR_STATE_CHANGED: BGP peer 7.0.0.28 (Internal AS 100) changed state from Established to Idle (event RecvNotify) (instance master)
Dec  5 01:49:36  vmx-21 rpd[2303]: bgp_read_v4_message:10745: NOTIFICATION received from 7.0.0.28 (Internal AS 100): code 6 (Cease) subcode 3 (Peer Unconfigured)

warrior@vmx-21# run monitor stop
```

Время и NTP

Время на маршрутизаторе

- каждая запись в лог файле имеет свой timestamp
- синхронизация времени между сетевыми устройствами необходима для эффективного траблшутинга

```
user@router# show | compare
[edit system]
+  time-zone Europe/Moscow;                                    // устанавливаем временную зону
```

```
user@router> set date ?                                        // устанавливаем дату и время
Possible completions:
  <time>              New date and time (YYYYMMDDhhmm.ss)
  ntp                 Set system date and time using Network Time Protocol servers
user@router> set date 201712041130.00                          // 11:30, 4-ое декабря 2017 года
Mon Dec  4 11:30:00 MSK 2017
```

Использование NTP

- NTP – Network Time Protocol
- синхронизация с серверами точного времени (NTP серверами)

```
user@router> ping 62.183.0.100
PING 62.183.0.100 (62.183.0.100): 56 data bytes
64 bytes from 62.183.0.100: icmp_seq=0 ttl=63 time=9.109 ms
64 bytes from 62.183.0.100: icmp_seq=1 ttl=63 time=7.588 ms
^C
--- 62.183.0.100 ping statistics ---
2 packets transmitted, 2 packets received, 0% packet loss
round-trip min/avg/max/stddev = 7.588/8.348/9.109/0.761 ms

user@router# show | compare
[edit system]
+   ntp {
+       server 62.183.0.100;
+       server 62.183.0.101;
+   }
```

Проверка статуса NTP и времени на коробке

```
user@router> show ntp associations
     remote           refid      st t when poll reach   delay   offset  jitter
==============================================================================
*62.183.0.100    194.190.168.1    2 -  880 1024  377    8.260  -11.499   0.302        // * - сервер выбран для синхронизации
+62.183.0.101    194.190.168.1    2 -  943 1024  377   11.669   -6.617   1.381        // + - запасной сервер

user@router> show ntp status
status=0644 leap_none, sync_ntp, 4 events, event_peer/strat_chg,
version="ntpd 4.2.0-a Thu Dec 22 10:48:40 UTC 2016 (1)",
processor="i386", system="JUNOS14.2R7-S4.1", leap=00, stratum=3,
precision=-21, rootdelay=27.532, rootdispersion=118.629, peer=58764,
refid=62.183.0.100,
reftime=ddcf8aa4.0acb42b4  Mon, Dec  4 2017 11:49:40.042, poll=10,
clock=ddcf8e1c.7cc10373  Mon, Dec  4 2017 12:04:28.487, state=4,
offset=-8.783, frequency=-65.770, jitter=5.714, stability=0.023

user@router> show system uptime
Current time: 2017-12-04 12:05:02 MSK
System booted: 2017-04-10 16:52:12 MSK (33w6d 19:12 ago)
Protocols started: 2017-04-11 05:29:49 MSK (33w6d 06:35 ago)
Last configured: 2017-12-01 09:19:23 MSK (3d 02:45 ago) by mic
12:05PM  up 237 days, 19:13, 1 user, load averages: 0.32, 0.10, 0.03
```

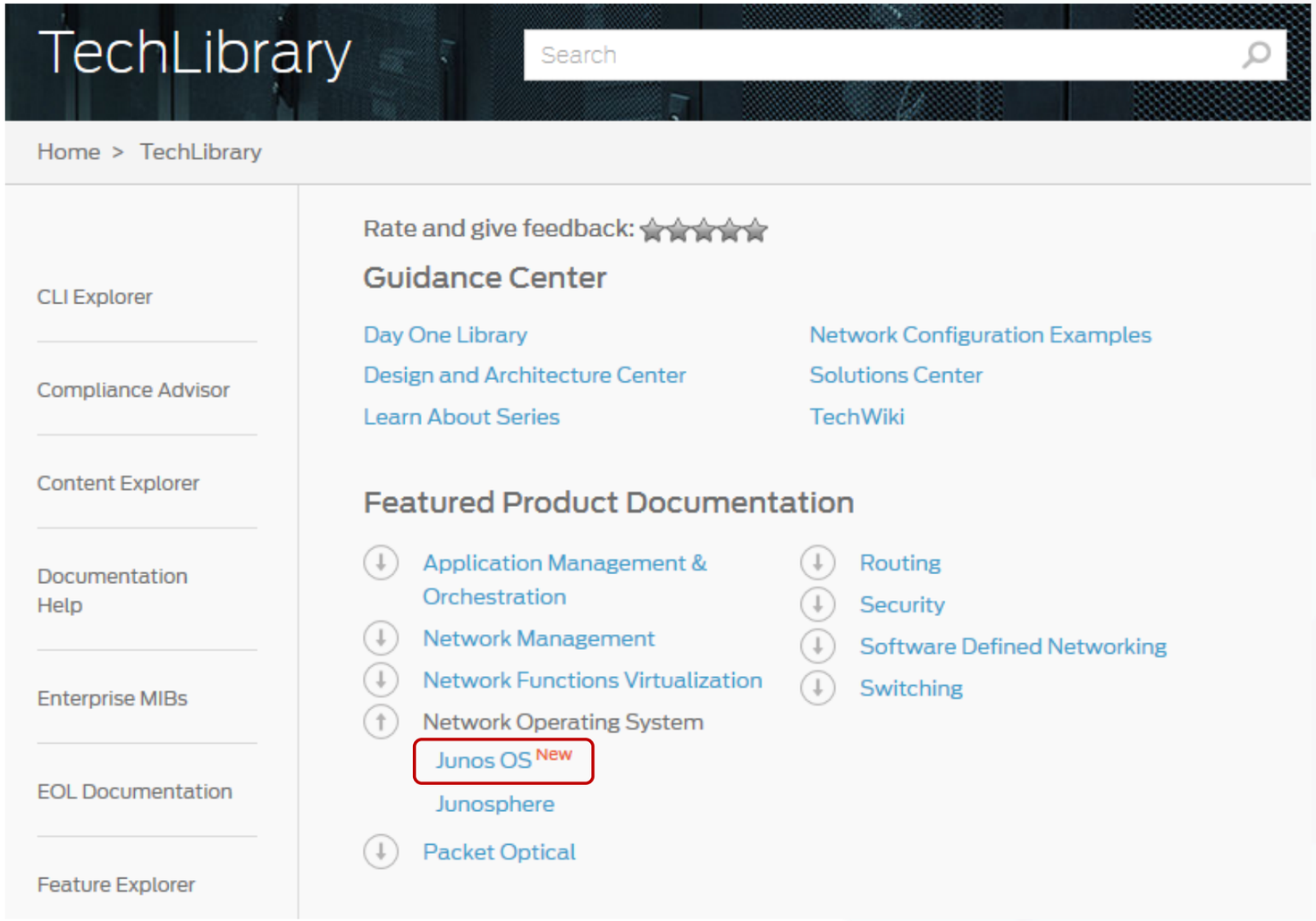
Где искать информацию?

Всегда есть контекстная подсказка, но ...

```
warrior@vmx-28# set protocols ospf area 0.0.0.0 interface ge-0/0/1.10 ?
> authentication
> bandwidth-based-metrics      Configure bandwidth based metrics
> bfd-liveness-detection       Bidirectional Forwarding Detection options
  dead-interval                Dead interval (seconds) (1..65535)
  demand-circuit               Interface functions as a demand circuit
  dynamic-neighbors            Learn neighbors dynamically on a p2mp interface
  flood-reduction              Enable flood reduction                    // что это значит? для чего это? как это можно использовать?
  hello-interval               Hello interval (seconds) (1..255)
  interface-type               Type of interface
> ldp-synchronization          Advertise maximum metric until LDP is operational
  link-protection              Protect interface from link faults only
  metric                       Interface metric (1..65535)
> neighbor                     NBMA neighbor
  no-eligible-backup           Not eligible to backup traffic from protected interfaces
  no-interface-state-traps     Do not send interface state change traps
  no-neighbor-down-notification  Don't inform other protocols about neighbor down events
  node-link-protection         Protect interface from both link and node faults
> passive                      Do not run OSPF, but advertise it
  poll-interval                Poll interval for NBMA interfaces (1..65535)
  priority                     Designated router priority (0..255)
  retransmit-interval          Retransmission interval (seconds) (1..65535)
  secondary                    Treat interface as secondary
  te-metric                    Traffic engineering metric (1..4294967295)
> topology                     Topology specific attributes
  transit-delay                Transit delay (seconds) (1..65535)
```

Поиск “сверху вниз” (1)

- www.juniper.net → Support → TechLibrary



Поиск “сверху вниз” (2)

Junos OS

Junos OS is the common operating system that runs on Juniper Networks’ routing, switching, and security products. It supports a standard set of features across products, and some product-specific features.

Release Notes

Routing

- Release 17.3
- Release 17.2
- Release 17.1
- Release 16.2
- Release 16.1
- Release 16.1X65
- Release 15.1
- Release 15.1F
- Release 15.1X54
- Release 14.2
- Release 14.1

Software Documentation

Getting started, maintenance, troubleshooting, and features.

- ACX Series
- CSE Series
- EX Series
- Junos Fusion
- LN Series
- M Series
- MX Series
- NFX Series

Поиск “сверху вниз” (3)

Junos OS for MX Series 3D Universal Edge Routers

Features

- Feature Explorer
- Class of Service
- MX Series Router Cloud cCPE Services Feature Guide
- Flow Monitoring
- High Availability and ISSU
- Junos Node Slicing
- Junos Telemetry Interface
- Multichassis Link Aggregation
- OpenConfig
- OpenFlow
- OVSDB and VXLAN
- Routing Policies, Firewall Filters, and Traffic Policers
- Routing Protocols
- Subscriber-Aware Traffic Treatment

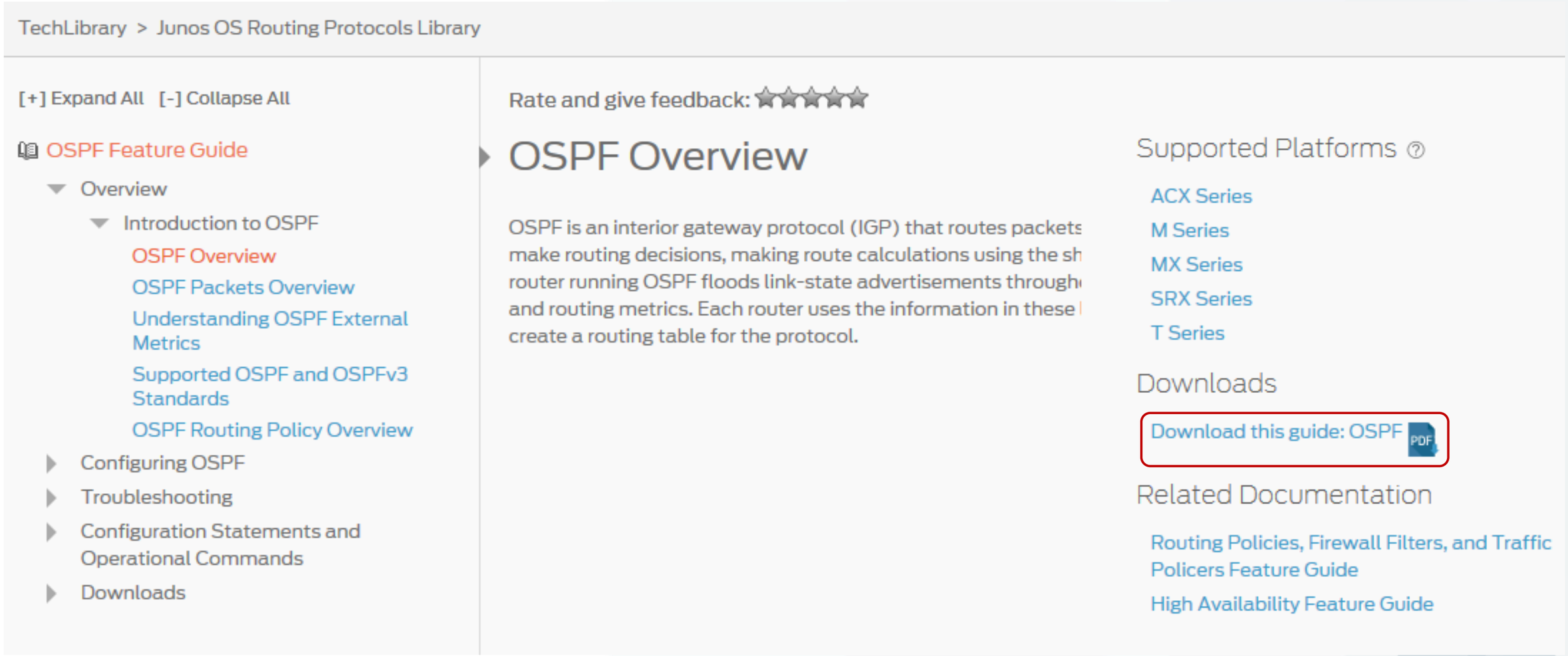
Поиск “сверху вниз” (4)

Junos OS Routing Protocols Library

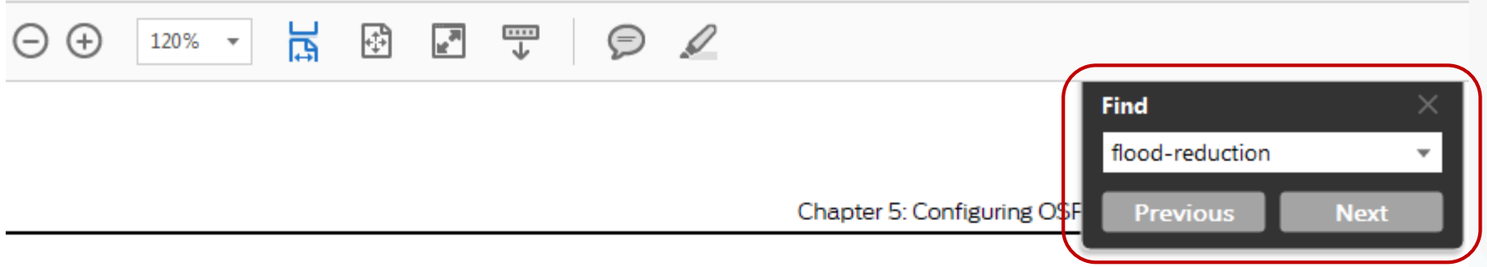
Routing Configuration

- Routing Protocols Overview
- BGP Feature Guide
- ICMP Router Discovery Protocol Feature Guide
- IS-IS Feature Guide
- Multitopology Routing Feature Guide
- IPv6 Neighbor Discovery Feature Guide
- OSPF Feature Guide
- Protocol-Independent Routing Properties Feature Guide
- RIP Feature Guide
- RIPng Feature Guide

Поиск “сверху вниз” (5)



Поиск “сверху вниз” (6)



To configure flooding reduction for an OSPF interface, include the **flood-reduction** statement at the **[edit protocols (ospf | ospf3) area *area-id* interface *interface-id*]** hierarchy level.

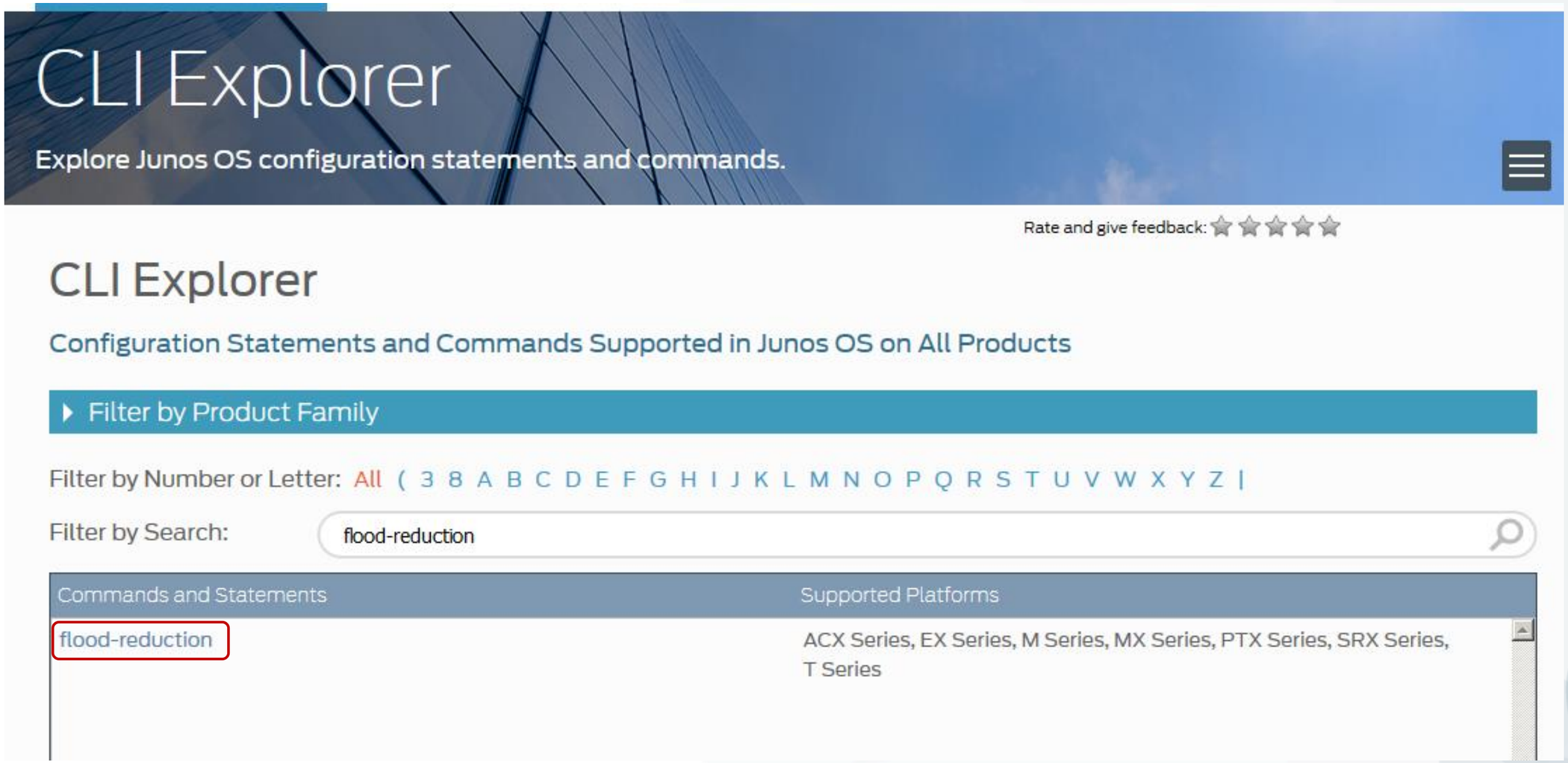
NOTE: If you configure flooding reduction for an interface configured as a demand circuit, the LSAs are not initially flooded, but sent only when their content has changed. Hello packets and LSAs are sent and received on a demand-circuit interface only when a change occurs in the network topology.

In the following example, the OSPF interface **so-0/0/1.0** is configured for flooding reduction. As a result, all the LSAs generated by the routes that traverse the specified interface have the DoNotAge bit set when they are initially flooded, and LSAs are refreshed only when a change occurs.

```
[edit]
protocols ospf {
   area 0.0.0.0 {
      interface so-0/0/1.0 {
         flood-reduction;
      }
```

Поиск “снизу вверх” (1)

- https://apps.juniper.net/cli-explorer/



Поиск “снизу вверх” (2)

flood-reduction

Syntax

```
flood-reduction;
```

Hierarchy Level

```
[edit protocols (ospf | ospf3) area area-id interface interface-name],
[edit logical-systems logical-system-name protocols (ospf | ospf3) area area-id interface interface-name],
[edit routing-instances routing-instance-name protocols (ospf | ospf3) area area-id interface interface-name],
[edit logical-systems logical-system-name routing-instances routing-instance-name protocols (ospf | ospf3) area area-
[edit protocols ospf3 realm (ipv4-multicast | ipv4-unicast | ipv6-multicast) area area-id interfaces interface-name],
[edit logical-systems logical-system-name protocols ospf3 realm (ipv4-multicast | ipv4-unicast | ipv6-multicast) area
[edit routing-instances routing-instance-name protocols ospf3 realm (ipv4-multicast | ipv4-unicast | ipv6-multicast) a
[edit logical-systems logical-system-name routing-instances routing-instance-name protocols ospf3 realm (ipv4-multicas
[edit protocols (ospf | ospf3) area area-id virtual-link neighbor-id router-id transit-area area-id],
[edit logical-systems logical-system-name protocols (ospf | ospf3) area area-id virtual-link neighbor-id router-id tra
[edit routing-instances routing-instance-name protocols (ospf | ospf3) area area-id virtual-link neighbor-id router-i
[edit logical-systems logical-system-name routing-instances routing-instance-name protocols (ospf | ospf3) area area-
[edit routing-instances routing-instance-name protocols ospf area area-id sham-link-remote address ],
[edit logical-systems logical-system-name routing-instances routing-instance-name protocols ospf area area-id sham-lin
[edit protocols ospf area area-id peer-interface interface-name],
[edit logical-systems logical-system-name protocols ospf area area-id peer-interface interface-name]
```

Release Information

Statement introduced in Junos OS Release 9.6.

Statement introduced in Junos OS Release 10.4 for EX Series switches.

Description

Specify to send self-generated link-state advertisements (LSAs) with the DoNotAge bit set. As a result, self-originated LSAs are not reflooded every 30 minutes, as required by OSPF by default. An LSA is refreshed only when the content of the LSA changes, which reduces OSPF traffic overhead in stable topologies.

Download This Guide

Download this guide: OSPF

Supported Platforms

- ACX Series
- EX Series
- M Series
- MX Series
- PTX Series
- SRX Series
- T Series

Related Documentation

ACX, EX, M, NFX, PTX, QFX, T Series, QFabric System

Configuring OSPF Refresh and Flooding Reduction in Stable Topologies

Полезные ссылки

- Introducing Junos OS Command-Line Interface
  - https://www.juniper.net/documentation/en_US/junos/information-products/pathway-pages/junos-cli/junos-cli.html
- Day One: Exploring the Junos CLI
  - https://www.juniper.net/us/en/training/jnbooks/day-one/fundamentals-series/cli/
- Day One: Junos for IOS Engineers
  - https://www.juniper.net/us/en/training/jnbooks/day-one/fundamentals-series/junos-for-ios-engineers/

Вопросы?

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