TD – laboratoria 3

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1 Schemat adresacji

2 show cdp neighbours i show ip route po ustawieniu ip R1-R5

Przełączanie na ipv6

```
R1#show cdp neighbors
Capability Codes: R - Router, T - Trans Bridge, B - Source Route Bridge
                  S - Switch, H - Host, I - IGMP, r - Repeater

Device ID        Local Intrfce     Holdtme    Capability  Platform
 ↪  Port ID
R2               Eth 0/0            174        R S I      3640      Eth
 ↪  0/0
R1#show ip route
Codes: C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS
        ↪  level-2
       ia - IS-IS inter area, * - candidate default, U - per-user
        ↪  static route
       o - ODR, P - periodic downloaded static route

Gateway of last resort is not set
```

```
     192.168.11.0/30 is subnetted, 1 subnets
C       192.168.11.0 is directly connected, Ethernet0/0
```

Przełączanie na ipv6

```
R2# show cdp neighbors
Capability Codes: R - Router, T - Trans Bridge, B - Source Route Bridge
                  S - Switch, H - Host, I - IGMP, r - Repeater

Device ID        Local Intrfce     Holdtme    Capability  Platform
 ↪  Port ID
R3               Eth 0/2            171        R S I      3640      Eth
 ↪  0/2
R1               Eth 0/0            169        R S I      3640      Eth
 ↪  0/0
R4               Eth 0/1            177        R S I      3640      Eth
 ↪  0/1
R2#show ip route
Codes: C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS
        ↪  level-2
       ia - IS-IS inter area, * - candidate default, U - per-user
        ↪  static route
       o - ODR, P - periodic downloaded static route

Gateway of last resort is not set

     192.168.10.0/30 is subnetted, 2 subnets
C       192.168.10.0 is directly connected, Ethernet0/1
C       192.168.10.4 is directly connected, Ethernet0/2
     192.168.11.0/30 is subnetted, 1 subnets
C       192.168.11.0 is directly connected, Ethernet0/0
```

Przełączanie na ipv6

```
R5#show cdp neighbors
Capability Codes: R - Router, T - Trans Bridge, B - Source Route Bridge
                  S - Switch, H - Host, I - IGMP, r - Repeater

Device ID        Local Intrfce     Holdtme    Capability  Platform
 ↪  Port ID
R3               Eth 0/0            128        R S I      3640      Eth
 ↪  0/0
R4               Eth 0/2            176        R S I      3640      Eth
 ↪  0/2
R5#show cdp neighbors
Capability Codes: R - Router, T - Trans Bridge, B - Source Route Bridge
                  S - Switch, H - Host, I - IGMP, r - Repeater

Device ID        Local Intrfce     Holdtme    Capability  Platform
 ↪  Port ID
R3               Eth 0/0            153        R S I      3640      Eth
 ↪  0/0
R4               Eth 0/2            141        R S I      3640      Eth
 ↪  0/2
R5#show ip route
Codes: C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS
        ↪  level-2
       ia - IS-IS inter area, * - candidate default, U - per-user
        ↪  static route
       o - ODR, P - periodic downloaded static route

Gateway of last resort is not set

     192.168.10.0/30 is subnetted, 2 subnets
C       192.168.10.0 is directly connected, Ethernet0/0
```

```
C       192.168.10.4 is directly connected, Ethernet0/2
```

3 show ip ospf i show ip route po ospf network R1-R5

Przełączanie na ipv6

```
R1#show ip ospf
 Routing Process "ospf 1" with ID 192.168.0.1
 Start time: 00:41:12.040, Time elapsed: 00:05:15.920
 Supports only single TOS(TOS0) routes
 Supports opaque LSA
 Supports Link-local Signaling (LLS)
 Supports area transit capability
 Router is not originating router-LSAs with maximum metric
 Initial SPF schedule delay 5000 msecs
 Minimum hold time between two consecutive SPFs 10000 msecs
 Maximum wait time between two consecutive SPFs 10000 msecs
 Incremental-SPF disabled
 Minimum LSA interval 5 secs
 Minimum LSA arrival 1000 msecs
 LSA group pacing timer 240 secs
 Interface flood pacing timer 33 msecs
 Retransmission pacing timer 66 msecs
 Number of external LSA 0. Checksum Sum 0x000000
 Number of opaque AS LSA 0. Checksum Sum 0x000000
 Number of DCbitless external and opaque AS LSA 0
 Number of DoNotAge external and opaque AS LSA 0
 Number of areas in this router is 1. 1 normal 0 stub 0 nssa
 Number of areas transit capable is 0
 External flood list length 0
    Area BACKBONE(0) (Inactive)
        Number of interfaces in this area is 1
        Area has no authentication
        SPF algorithm last executed 00:00:51.576 ago
        SPF algorithm executed 1 times
```

```
        Area ranges are
        Number of LSA 1. Checksum Sum 0x00934F
        Number of opaque link LSA 0. Checksum Sum 0x000000
        Number of DCbitless LSA 0
        Number of indication LSA 0
        Number of DoNotAge LSA 0
        Flood list length 0

R1#show ip route
Codes: C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS
        ↪ level-2
       ia - IS-IS inter area, * - candidate default, U - per-user
        ↪ static route
       o - ODR, P - periodic downloaded static route

Gateway of last resort is not set

     192.168.11.0/30 is subnetted, 1 subnets
C       192.168.11.0 is directly connected, Ethernet0/0
     192.168.0.0/32 is subnetted, 1 subnets
C       192.168.0.1 is directly connected, Loopback0
```

Przełączanie na ipv6

```
R2#show ip ospf
 Routing Process "ospf 1" with ID 192.168.0.2
 Start time: 00:45:37.408, Time elapsed: 00:01:21.024
 Supports only single TOS(TOS0) routes
 Supports opaque LSA
 Supports Link-local Signaling (LLS)
 Supports area transit capability
 Router is not originating router-LSAs with maximum metric
```

```
 Initial SPF schedule delay 5000 msecs
 Minimum hold time between two consecutive SPFs 10000 msecs
 Maximum wait time between two consecutive SPFs 10000 msecs
 Incremental-SPF disabled
 Minimum LSA interval 5 secs
 Minimum LSA arrival 1000 msecs
 LSA group pacing timer 240 secs
 Interface flood pacing timer 33 msecs
 Retransmission pacing timer 66 msecs
 Number of external LSA 0. Checksum Sum 0x000000
 Number of opaque AS LSA 0. Checksum Sum 0x000000
 Number of DCbitless external and opaque AS LSA 0
 Number of DoNotAge external and opaque AS LSA 0
 Number of areas in this router is 1. 1 normal 0 stub 0 nssa
 Number of areas transit capable is 0
 External flood list length 0
    Area BACKBONE(0)
        Number of interfaces in this area is 3
        Area has no authentication
        SPF algorithm last executed 00:00:24.428 ago
        SPF algorithm executed 2 times
        Area ranges are
        Number of LSA 8. Checksum Sum 0x039683
        Number of opaque link LSA 0. Checksum Sum 0x000000
        Number of DCbitless LSA 0
        Number of indication LSA 0
        Number of DoNotAge LSA 0
        Flood list length 0

R2#show ip route
Codes: C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS
        ↪  level-2
```

```
       ia - IS-IS inter area, * - candidate default, U - per-user
        ↪  static route
       o - ODR, P - periodic downloaded static route

Gateway of last resort is not set

     192.168.10.0/30 is subnetted, 3 subnets
C       192.168.10.0 is directly connected, Ethernet0/1
C       192.168.10.4 is directly connected, Ethernet0/2
O       192.168.10.16 [110/20] via 192.168.10.6, 00:00:30, Ethernet0/2
                      [110/20] via 192.168.10.2, 00:00:30, Ethernet0/1
     192.168.11.0/30 is subnetted, 1 subnets
C       192.168.11.0 is directly connected, Ethernet0/0
     192.168.0.0/32 is subnetted, 1 subnets
C       192.168.0.2 is directly connected, Loopback0
```

Przełączanie na ipv6

```
R5#show ip ospf
 Routing Process "ospf 1" with ID 192.168.0.5
 Start time: 00:43:30.048, Time elapsed: 00:00:25.140
 Supports only single TOS(TOS0) routes
 Supports opaque LSA
 Supports Link-local Signaling (LLS)
 Supports area transit capability
 Router is not originating router-LSAs with maximum metric
 Initial SPF schedule delay 5000 msecs
 Minimum hold time between two consecutive SPFs 10000 msecs
 Maximum wait time between two consecutive SPFs 10000 msecs
 Incremental-SPF disabled
 Minimum LSA interval 5 secs
 Minimum LSA arrival 1000 msecs
 LSA group pacing timer 240 secs
 Interface flood pacing timer 33 msecs
 Retransmission pacing timer 66 msecs
 Number of external LSA 0. Checksum Sum 0x000000
```

```
 Number of opaque AS LSA 0. Checksum Sum 0x000000
 Number of DCbitless external and opaque AS LSA 0
 Number of DoNotAge external and opaque AS LSA 0
 Number of areas in this router is 1. 1 normal 0 stub 0 nssa
 Number of areas transit capable is 0
 External flood list length 0
    Area BACKBONE(0)
        Number of interfaces in this area is 2
        Area has no authentication
        SPF algorithm last executed 00:00:08.400 ago
        SPF algorithm executed 1 times
        Area ranges are
        Number of LSA 8. Checksum Sum 0x04688C
        Number of opaque link LSA 0. Checksum Sum 0x000000
        Number of DCbitless LSA 0
        Number of indication LSA 0
        Number of DoNotAge LSA 0
        Flood list length 3

R5#show ip route
Codes: C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS
        ↪  level-2
       ia - IS-IS inter area, * - candidate default, U - per-user
        ↪  static route
       o - ODR, P - periodic downloaded static route

Gateway of last resort is not set

     192.168.10.0/30 is subnetted, 3 subnets
C       192.168.10.0 is directly connected, Ethernet0/0
C       192.168.10.4 is directly connected, Ethernet0/2
O       192.168.10.16 [110/20] via 192.168.10.5, 00:00:02, Ethernet0/2
```

```
                     [110/20] via 192.168.10.1, 00:00:02, Ethernet0/0
     192.168.0.0/32 is subnetted, 1 subnets
C       192.168.0.5 is directly connected, Loopback0
```

4 show ip ospf dataabse R5

Przełączanie na ipv6

```
R5#show ip ospf database

            OSPF Router with ID (192.168.0.5) (Process ID 1)

                Router Link States (Area 0)

Link ID         ADV Router      Age         Seq#       Checksum Link
 ↪  count
192.168.0.1     192.168.0.1     458         0x80000002 0x0084E4 1
192.168.0.2     192.168.0.2     102         0x80000007 0x005BF5 5
192.168.0.3     192.168.0.3     188         0x80000006 0x00AC85 5
192.168.0.4     192.168.0.4     108         0x80000008 0x0076B6 5
192.168.0.5     192.168.0.5     30          0x80000006 0x000649 4

                Net Link States (Area 0)

Link ID         ADV Router      Age         Seq#       Checksum
192.168.10.17   192.168.0.3     530         0x80000001 0x00B5BC
192.168.11.1    192.168.0.1     458         0x80000001 0x002760
R5#show ip ospf database router

            OSPF Router with ID (192.168.0.5) (Process ID 1)

                Router Link States (Area 0)

  LS age: 475
  Options: (No TOS-capability, DC)
```

```
LS Type: Router Links
Link State ID: 192.168.0.1
Advertising Router: 192.168.0.1
LS Seq Number: 80000002
Checksum: 0x84E4
Length: 36
Number of Links: 1

  Link connected to: a Transit Network
   (Link ID) Designated Router address: 192.168.11.1
   (Link Data) Router Interface address: 192.168.11.1
    Number of TOS metrics: 0
     TOS 0 Metrics: 10



LS age: 119
Options: (No TOS-capability, DC)
LS Type: Router Links
Link State ID: 192.168.0.2
Advertising Router: 192.168.0.2
LS Seq Number: 80000007
Checksum: 0x5BF5
Length: 84
Number of Links: 5

  Link connected to: another Router (point-to-point)
   (Link ID) Neighboring Router ID: 192.168.0.3
   (Link Data) Router Interface address: 192.168.10.5
    Number of TOS metrics: 0
     TOS 0 Metrics: 10

  Link connected to: a Stub Network
   (Link ID) Network/subnet number: 192.168.10.4
   (Link Data) Network Mask: 255.255.255.252
    Number of TOS metrics: 0
     TOS 0 Metrics: 10
```

```
  Link connected to: another Router (point-to-point)
   (Link ID) Neighboring Router ID: 192.168.0.4
   (Link Data) Router Interface address: 192.168.10.1
    Number of TOS metrics: 0
     TOS 0 Metrics: 10

  Link connected to: a Stub Network
   (Link ID) Network/subnet number: 192.168.10.0
   (Link Data) Network Mask: 255.255.255.252
    Number of TOS metrics: 0
     TOS 0 Metrics: 10

  Link connected to: a Transit Network
   (Link ID) Designated Router address: 192.168.11.1
   (Link Data) Router Interface address: 192.168.11.2
    Number of TOS metrics: 0
     TOS 0 Metrics: 10


LS age: 238
Options: (No TOS-capability, DC)
LS Type: Router Links
Link State ID: 192.168.0.3
Advertising Router: 192.168.0.3
LS Seq Number: 80000006
Checksum: 0xAC85
Length: 84
Number of Links: 5

  Link connected to: a Transit Network
   (Link ID) Designated Router address: 192.168.10.17
   (Link Data) Router Interface address: 192.168.10.17
    Number of TOS metrics: 0
     TOS 0 Metrics: 10
```

```
  Link connected to: another Router (point-to-point)
   (Link ID) Neighboring Router ID: 192.168.0.2
   (Link Data) Router Interface address: 192.168.10.6
    Number of TOS metrics: 0
     TOS 0 Metrics: 10

  Link connected to: a Stub Network
   (Link ID) Network/subnet number: 192.168.10.4
   (Link Data) Network Mask: 255.255.255.252
    Number of TOS metrics: 0
     TOS 0 Metrics: 10

  Link connected to: another Router (point-to-point)
   (Link ID) Neighboring Router ID: 192.168.0.5
   (Link Data) Router Interface address: 192.168.10.1
    Number of TOS metrics: 0
     TOS 0 Metrics: 10

  Link connected to: a Stub Network
   (Link ID) Network/subnet number: 192.168.10.0
   (Link Data) Network Mask: 255.255.255.252
    Number of TOS metrics: 0
     TOS 0 Metrics: 10


LS age: 167
Options: (No TOS-capability, DC)
LS Type: Router Links
Link State ID: 192.168.0.4
Advertising Router: 192.168.0.4
LS Seq Number: 80000008
Checksum: 0x76B6
Length: 84
Number of Links: 5

  Link connected to: a Transit Network
```

```
    (Link ID) Designated Router address: 192.168.10.17
    (Link Data) Router Interface address: 192.168.10.18
     Number of TOS metrics: 0
      TOS 0 Metrics: 10

  Link connected to: another Router (point-to-point)
    (Link ID) Neighboring Router ID: 192.168.0.5
    (Link Data) Router Interface address: 192.168.10.5
     Number of TOS metrics: 0
      TOS 0 Metrics: 10

  Link connected to: a Stub Network
    (Link ID) Network/subnet number: 192.168.10.4
    (Link Data) Network Mask: 255.255.255.252
     Number of TOS metrics: 0
      TOS 0 Metrics: 10

  Link connected to: another Router (point-to-point)
    (Link ID) Neighboring Router ID: 192.168.0.2
    (Link Data) Router Interface address: 192.168.10.2
     Number of TOS metrics: 0
      TOS 0 Metrics: 10

  Link connected to: a Stub Network
    (Link ID) Network/subnet number: 192.168.10.0
    (Link Data) Network Mask: 255.255.255.252
     Number of TOS metrics: 0
      TOS 0 Metrics: 10


LS age: 92
Options: (No TOS-capability, DC)
LS Type: Router Links
Link State ID: 192.168.0.5
Advertising Router: 192.168.0.5
LS Seq Number: 80000006
```

```
  Checksum: 0x649
  Length: 72
  Number of Links: 4

    Link connected to: another Router (point-to-point)
     (Link ID) Neighboring Router ID: 192.168.0.4
     (Link Data) Router Interface address: 192.168.10.6
      Number of TOS metrics: 0
       TOS 0 Metrics: 10

    Link connected to: a Stub Network
     (Link ID) Network/subnet number: 192.168.10.4
     (Link Data) Network Mask: 255.255.255.252
      Number of TOS metrics: 0
       TOS 0 Metrics: 10

    Link connected to: another Router (point-to-point)
     (Link ID) Neighboring Router ID: 192.168.0.3
     (Link Data) Router Interface address: 192.168.10.2
      Number of TOS metrics: 0
       TOS 0 Metrics: 10

    Link connected to: a Stub Network
     (Link ID) Network/subnet number: 192.168.10.0
     (Link Data) Network Mask: 255.255.255.252
      Number of TOS metrics: 0
       TOS 0 Metrics: 10


R5#show ip ospf database network

            OSPF Router with ID (192.168.0.5) (Process ID 1)

                Net Link States (Area 0)

  Routing Bit Set on this LSA
```

```
  LS age: 622
  Options: (No TOS-capability, DC)
  LS Type: Network Links
  Link State ID: 192.168.10.17 (address of Designated Router)
  Advertising Router: 192.168.0.3
  LS Seq Number: 80000001
  Checksum: 0xB5BC
  Length: 32
  Network Mask: /30
        Attached Router: 192.168.0.3
        Attached Router: 192.168.0.4

  Routing Bit Set on this LSA
  LS age: 550
  Options: (No TOS-capability, DC)
  LS Type: Network Links
  Link State ID: 192.168.11.1 (address of Designated Router)
  Advertising Router: 192.168.0.1
  LS Seq Number: 80000001
  Checksum: 0x2760
  Length: 32
  Network Mask: /30
        Attached Router: 192.168.0.1
        Attached Router: 192.168.0.2
```

5 show ip ospf databse po zmianie area dla R1 i R5

Przełączanie na ipv6

```
R1#show ip ospf database

            OSPF Router with ID (192.168.0.1) (Process ID 1)

                Router Link States (Area 1)
```

```
Link ID         ADV Router      Age         Seq#       Checksum Link
↪  count
192.168.0.1     192.168.0.1     154         0x80000002 0x008ED9 1
192.168.0.2     192.168.0.2     155         0x80000002 0x008FD4 1

                Net Link States (Area 1)

Link ID         ADV Router      Age         Seq#       Checksum
192.168.11.2    192.168.0.2     155         0x80000001 0x001372

                Summary Net Link States (Area 1)

Link ID         ADV Router      Age         Seq#       Checksum
192.168.10.0    192.168.0.2     215         0x80000001 0x00A3B3
192.168.10.4    192.168.0.2     215         0x80000001 0x007BD7
192.168.10.16   192.168.0.2     215         0x80000001 0x0067D5
R1#show ip ospf database summary

            OSPF Router with ID (192.168.0.1) (Process ID 1)

                Summary Net Link States (Area 1)

  Routing Bit Set on this LSA
  LS age: 280
  Options: (No TOS-capability, DC, Upward)
  LS Type: Summary Links(Network)
  Link State ID: 192.168.10.0 (summary Network Number)
  Advertising Router: 192.168.0.2
  LS Seq Number: 80000001
  Checksum: 0xA3B3
  Length: 28
  Network Mask: /30
        TOS: 0  Metric: 10

  Routing Bit Set on this LSA
  LS age: 280
```

```
  Options: (No TOS-capability, DC, Upward)
  LS Type: Summary Links(Network)
  Link State ID: 192.168.10.4 (summary Network Number)
  Advertising Router: 192.168.0.2
  LS Seq Number: 80000001
  Checksum: 0x7BD7
  Length: 28
  Network Mask: /30
        TOS: 0  Metric: 10

  Routing Bit Set on this LSA
  LS age: 298
  Options: (No TOS-capability, DC, Upward)
  LS Type: Summary Links(Network)
  Link State ID: 192.168.10.16 (summary Network Number)
  Advertising Router: 192.168.0.2
  LS Seq Number: 80000001
  Checksum: 0x67D5
  Length: 28
  Network Mask: /30
        TOS: 0  Metric: 20

R1# show ip route
Codes: C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS
        ↪  level-2
       ia - IS-IS inter area, * - candidate default, U - per-user
        ↪  static route
       o - ODR, P - periodic downloaded static route

Gateway of last resort is not set

     192.168.10.0/30 is subnetted, 3 subnets
```

```
O IA    192.168.10.0 [110/20] via 192.168.11.2, 00:04:27, Ethernet0/0
O IA    192.168.10.4 [110/20] via 192.168.11.2, 00:04:27, Ethernet0/0
O IA    192.168.10.16 [110/30] via 192.168.11.2, 00:04:27, Ethernet0/0
     192.168.11.0/30 is subnetted, 1 subnets
C       192.168.11.0 is directly connected, Ethernet0/0
     192.168.0.0/32 is subnetted, 1 subnets
C       192.168.0.1 is directly connected, Loopback0
```

Przełączanie na ipv6

```
R5# show ip ospf database

            OSPF Router with ID (192.168.0.5) (Process ID 1)

                Router Link States (Area 0)

Link ID         ADV Router      Age         Seq#       Checksum Link
 ↪  count
192.168.0.1     192.168.0.1     587         0x80000002 0x0084E4 1
192.168.0.2     192.168.0.2     231         0x80000007 0x005BF5 5
192.168.0.3     192.168.0.3     317         0x80000006 0x00AC85 5
192.168.0.4     192.168.0.4     237         0x80000008 0x0076B6 5
192.168.0.5     192.168.0.5     159         0x80000006 0x000649 4

                Net Link States (Area 0)

Link ID         ADV Router      Age         Seq#       Checksum
192.168.10.17   192.168.0.3     659         0x80000001 0x00B5BC
192.168.11.1    192.168.0.1     587         0x80000001 0x002760
R5#show ip ospf database

            OSPF Router with ID (192.168.0.5) (Process ID 1)

                Router Link States (Area 0)

Link ID         ADV Router      Age         Seq#       Checksum Link
 ↪  count
```

```
192.168.0.1     192.168.0.1     1187        0x80000002 0x0084E4 1
192.168.0.2     192.168.0.2     409         0x80000008 0x00193B 4
192.168.0.3     192.168.0.3     917         0x80000006 0x00AC85 5
192.168.0.4     192.168.0.4     838         0x80000008 0x0076B6 5
192.168.0.5     192.168.0.5     760         0x80000006 0x000649 4

                Net Link States (Area 0)

Link ID         ADV Router      Age         Seq#       Checksum
192.168.10.17   192.168.0.3     1259        0x80000001 0x00B5BC
192.168.11.1    192.168.0.1     1187        0x80000001 0x002760

                Summary Net Link States (Area 0)

Link ID         ADV Router      Age         Seq#       Checksum
192.168.11.0    192.168.0.2     407         0x80000001 0x0098BD
R5#show ip ospf database summary

            OSPF Router with ID (192.168.0.5) (Process ID 1)

                Summary Net Link States (Area 0)

  Routing Bit Set on this LSA
  LS age: 424
  Options: (No TOS-capability, DC, Upward)
  LS Type: Summary Links(Network)
  Link State ID: 192.168.11.0 (summary Network Number)
  Advertising Router: 192.168.0.2
  LS Seq Number: 80000001
  Checksum: 0x98BD
  Length: 28
  Network Mask: /30
        TOS: 0  Metric: 10

R5#
*Mar  1 01:01:55.147: %OSPF-5-ADJCHG: Process 1, Nbr 192.168.0.3 on
 ↪  Ethernet0/0 from LOADING to FULL, Loading Done
```

```
R5#
*Mar  1 01:01:58.715: %OSPF-5-ADJCHG: Process 1, Nbr 192.168.0.4 on
 ↪  Ethernet0/2 from LOADING to FULL, Loading Done
R5#show ip route
Codes: C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS
        ↪  level-2
       ia - IS-IS inter area, * - candidate default, U - per-user
        ↪  static route
       o - ODR, P - periodic downloaded static route

Gateway of last resort is not set

     192.168.10.0/30 is subnetted, 3 subnets
C       192.168.10.0 is directly connected, Ethernet0/0
C       192.168.10.4 is directly connected, Ethernet0/2
O       192.168.10.16 [110/20] via 192.168.10.5, 00:00:49, Ethernet0/2
                      [110/20] via 192.168.10.1, 00:00:49, Ethernet0/0
     192.168.11.0/30 is subnetted, 1 subnets
O IA    192.168.11.0 [110/30] via 192.168.10.5, 00:00:49, Ethernet0/2
                     [110/30] via 192.168.10.1, 00:00:49, Ethernet0/0
     192.168.0.0/32 is subnetted, 1 subnets
C       192.168.0.5 is directly connected, Loopback0
```

6 tu omowic routing table z r1 to chyba najgorze xddd

jeszcze tu jakies banwidth link r2-r4 nwm o co cho znowu ping i traceroute r4 do r1

7 show ip route R1-R5 po zmianie na RIP i database na R5

Przełączanie na ipv6

```
R1#show ip route
Codes: C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS
        ↪  level-2
       ia - IS-IS inter area, * - candidate default, U - per-user
        ↪  static route
       o - ODR, P - periodic downloaded static route

Gateway of last resort is not set

R    192.168.10.0/24 [120/2] via 192.168.11.2, 00:00:20, Ethernet0/0
     192.168.11.0/30 is subnetted, 1 subnets
C       192.168.11.0 is directly connected, Ethernet0/0
     192.168.0.0/32 is subnetted, 1 subnets
C       192.168.0.1 is directly connected, Loopback0
```

Przełączanie na ipv6

```
R5#show ip route
Codes: C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS
        ↪  level-2
       ia - IS-IS inter area, * - candidate default, U - per-user
        ↪  static route
       o - ODR, P - periodic downloaded static route

Gateway of last resort is not set
```

```
     192.168.10.0/30 is subnetted, 3 subnets
C       192.168.10.0 is directly connected, Ethernet0/0
C       192.168.10.4 is directly connected, Ethernet0/2
O       192.168.10.16 [110/20] via 192.168.10.5, 00:15:35, Ethernet0/2
                      [110/20] via 192.168.10.1, 00:15:35, Ethernet0/0
     192.168.11.0/30 is subnetted, 1 subnets
O       192.168.11.0 [110/30] via 192.168.10.1, 00:15:35, Ethernet0/0
     192.168.0.0/32 is subnetted, 1 subnets
C       192.168.0.5 is directly connected, Loopback0
R5#show ip ospf database

            OSPF Router with ID (192.168.0.5) (Process ID 1)

                Router Link States (Area 0)

Link ID         ADV Router      Age         Seq#       Checksum Link
 ↪  count
192.168.0.2     192.168.0.2     1136        0x80000014 0x007096 5
192.168.0.3     192.168.0.3     1823        0x80000014 0x009A88 5
192.168.0.4     192.168.0.4     42          0x80000014 0x00C2A8 5
192.168.0.5     192.168.0.5     850         0x8000000D 0x00F750 4

                Net Link States (Area 0)

Link ID         ADV Router      Age         Seq#       Checksum
192.168.10.18   192.168.0.4     42          0x80000004 0x009BD1

                Type-5 AS External Link States

Link ID         ADV Router      Age         Seq#       Checksum Tag
192.168.11.0    192.168.0.2     341         0x80000001 0x00B5BD 0
R5#show ip ospf database external

            OSPF Router with ID (192.168.0.5) (Process ID 1)
```

```
                Type-5 AS External Link States

  LS age: 388
  Options: (No TOS-capability, DC)
  LS Type: AS External Link
  Link State ID: 192.168.11.0 (External Network Number )
  Advertising Router: 192.168.0.2
  LS Seq Number: 80000001
  Checksum: 0xB5BD
  Length: 36
  Network Mask: /30
        Metric Type: 2 (Larger than any link state path)
        TOS: 0
        Metric: 100
        Forward Address: 0.0.0.0
        External Route Tag: 0

R5#show ip ospf database router

            OSPF Router with ID (192.168.0.5) (Process ID 1)

                Router Link States (Area 0)

  Routing Bit Set on this LSA
  LS age: 1198
  Options: (No TOS-capability, DC)
  LS Type: Router Links
  Link State ID: 192.168.0.2
  Advertising Router: 192.168.0.2
  LS Seq Number: 80000014
  Checksum: 0x7096
  Length: 84
  AS Boundary Router
  Number of Links: 5

    Link connected to: a Stub Network
```

```
     (Link ID) Network/subnet number: 192.168.11.0
     (Link Data) Network Mask: 255.255.255.252
      Number of TOS metrics: 0
       TOS 0 Metrics: 10

    Link connected to: another Router (point-to-point)
     (Link ID) Neighboring Router ID: 192.168.0.3
     (Link Data) Router Interface address: 192.168.10.5
      Number of TOS metrics: 0
       TOS 0 Metrics: 10

    Link connected to: a Stub Network
     (Link ID) Network/subnet number: 192.168.10.4
     (Link Data) Network Mask: 255.255.255.252
      Number of TOS metrics: 0
       TOS 0 Metrics: 10

    Link connected to: another Router (point-to-point)
     (Link ID) Neighboring Router ID: 192.168.0.4
     (Link Data) Router Interface address: 192.168.10.1
      Number of TOS metrics: 0
       TOS 0 Metrics: 100

    Link connected to: a Stub Network
     (Link ID) Network/subnet number: 192.168.10.0
     (Link Data) Network Mask: 255.255.255.252
      Number of TOS metrics: 0
       TOS 0 Metrics: 100
```