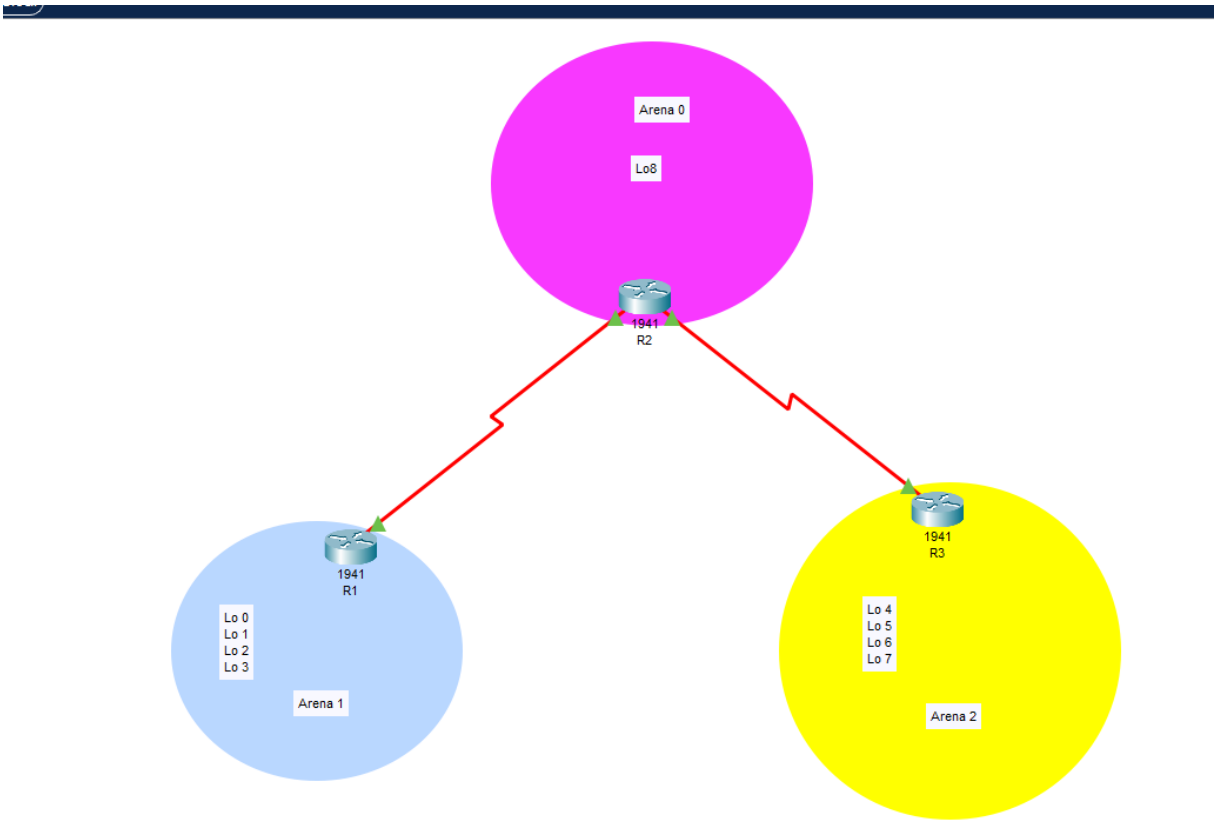
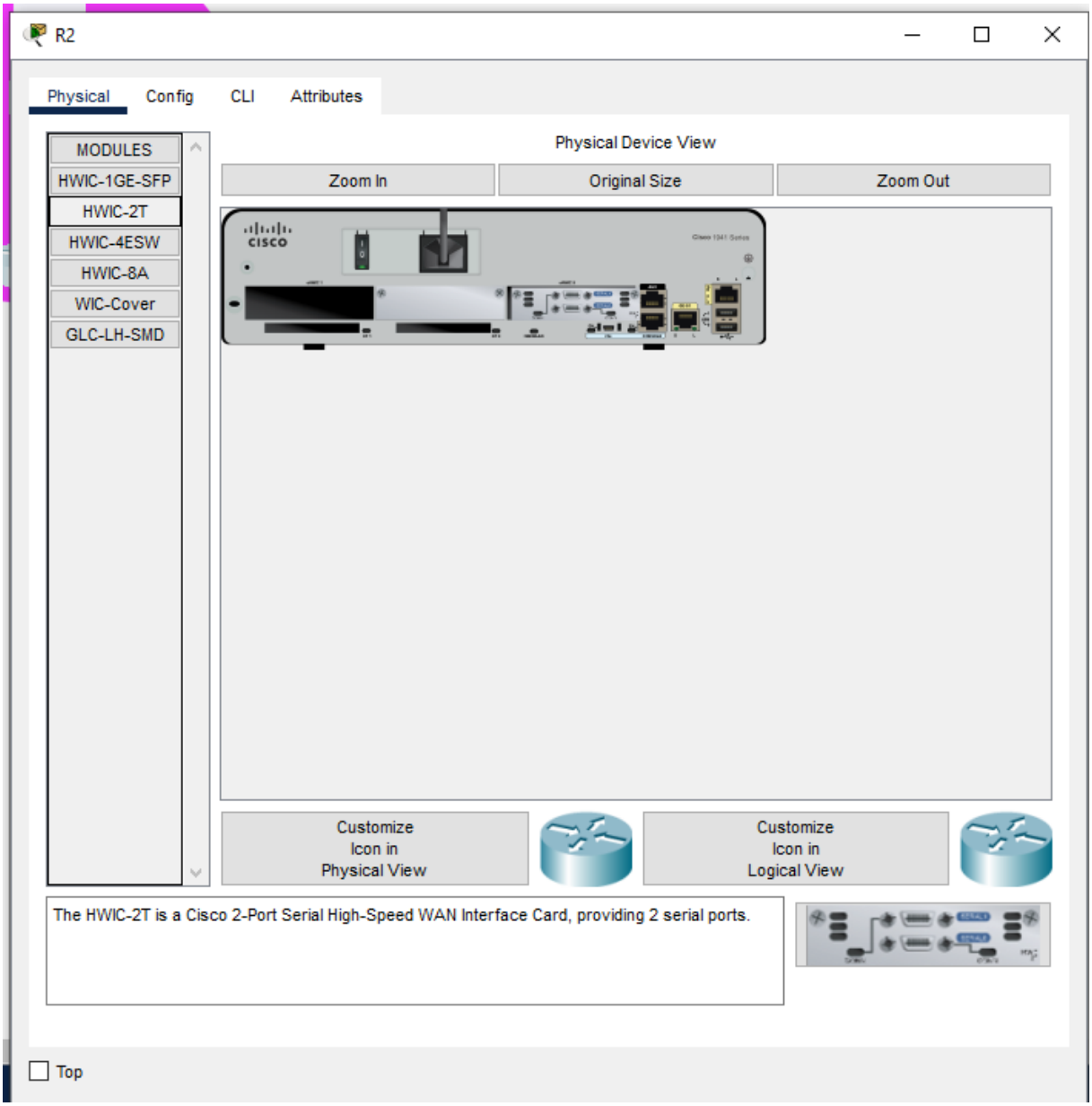
Zadanie 9.2.2.9

Piotr Boguszewski 63478 inis5_fd

Topologia sieci



Routery które w zadaniu nie posiadają domyślnie interfejsów serialowych więc należy je wyłączyć i dodać kartę.



Ustawienia ip routerów

R1

```
R1#show ipv6 interface brief
GigabitEthernet0/0         [administratively down/down]
    unassigned
GigabitEthernet0/1         [administratively down/down]
    unassigned
Serial0/0/0                [up/up]
    FE80::1
    2001:DB8:ACAD:12::1
Serial0/0/1                [administratively down/down]
    unassigned
Loopback0                  [up/up]
    FE80::204:9AFF:FE8A:1D3C
    2001:DB8:ACAD::1
Loopback1                  [up/up]
    FE80::260:5CFF:FE73:D19
    2001:DB8:ACAD:1::1
Loopback2                  [up/up]
    FE80::2D0:58FF:FE12:586A
    2001:DB8:ACAD:2::1
Loopback3                  [up/up]
    FE80::201:64FF:FE30:EC6E
    2001:DB8:ACAD:3::1
Vlan1                      [administratively down/down]
    unassigned
```

R2

```
R2#show ipv6 interface brief
GigabitEthernet0/0         [administratively down/down]
    unassigned
GigabitEthernet0/1         [administratively down/down]
    unassigned
Serial0/0/0                [up/up]
    FE80::2
    2001:DB8:ACAD:12::2
Serial0/0/1                [up/up]
    FE80::2
    2001:DB8:ACAD:23::2
Loopback8                  [up/up]
    FE80::2D0:58FF:FE35:D43
    2001:DB8:ACAD:8::1
Vlan1                      [administratively down/down]
    unassigned
```

R3

```
R3#show ipv6 interface brief
GigabitEthernet0/0         [administratively down/down]
    unassigned
GigabitEthernet0/1         [administratively down/down]
    unassigned
Serial0/0/0                [administratively down/down]
    unassigned
Serial0/0/1                [up/up]
    FE80::3
    2001:DB8:ACAD:23::3
Loopback4                  [up/up]
    FE80::20A:41FF:FECB:4EC5
    2001:DB8:ACAD:4::1
Loopback5                  [up/up]
    FE80::20A:41FF:FEE7:91E7
    2001:DB8:ACAD:5::1
Loopback6                  [up/up]
    FE80::2D0:BAFF:FE59:AB48
    2001:DB8:ACAD:6::1
Loopback7                  [up/up]
    FE80::2D0:FFFF:FE68:EEA2
    2001:DB8:ACAD:7::1
Vlan1                      [administratively down/down]
    unassigned
```

Ustawienia routerów

R1

```
R1#show ipv6 ospf
 Routing Process "ospfv3 1" with ID 1.1.1.1
 SPF schedule delay 5 secs, Hold time between two SPFs 10 secs
 Minimum LSA interval 5 secs. Minimum LSA arrival 1 secs
 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 areas in this router is 2. 2 normal 0 stub 0 nssa
 Reference bandwidth unit is 100 mbps
    Area 1
        Number of interfaces in this area is 4
        SPF algorithm executed 3 times
        Number of LSA 9. Checksum Sum 0x055597
        Number of DCbitless LSA 0
        Number of indication LSA 0
        Number of DoNotAge LSA 0
        Flood list length 0
    Area BACKBONE(0)
        Number of interfaces in this area is 1
        SPF algorithm executed 3 times
        Number of LSA 14. Checksum Sum 0x090547
        Number of DCbitless LSA 0
        Number of indication LSA 0
        Number of DoNotAge LSA 0
        Flood list length 0
```

```
R1#show ipv6 ospf interface brief
Interface     PID   Area              Intf ID   Cost  State  Nbrs F/C
Lo0             1   1                  5         1     WAIT  0/0
Lo1             1   1                  6         1     WAIT  0/0
Lo2             1   1                  7         1     WAIT  0/0
Lo3             1   1                  8         1     WAIT  0/0
Se0/0/0         1   0                  3         64    POINT  0/0
```

```
R1#show ipv6 protocols
IPv6 Routing Protocol is "connected"
IPv6 Routing Protocol is "ND"
IPv6 Routing Protocol is "ospf 1"
  Interfaces (Area 1)
    Loopback0
    Loopback1
    Loopback2
    Loopback3
  Interfaces (Area 0)
    Serial0/0/0
  Redistribution:
    None
```

```
R1#show ipv6 route ospf
IPv6 Routing Table - 17 entries
Codes: C - Connected, L - Local, S - Static, R - RIP, B - BGP
       U - Per-user Static route, M - MIPv6
       I1 - ISIS L1, I2 - ISIS L2, IA - ISIS interarea, IS - ISIS summary
       O - OSPF intra, OI - OSPF inter, OE1 - OSPF ext 1, OE2 - OSPF ext 2
       ON1 - OSPF NSSA ext 1, ON2 - OSPF NSSA ext 2
       D - EIGRP, EX - EIGRP external
OI  2001:DB8:ACAD:4::/64 [110/129]
     via FE80::2, Serial0/0/0
OI  2001:DB8:ACAD:5::/64 [110/129]
     via FE80::2, Serial0/0/0
OI  2001:DB8:ACAD:6::/64 [110/129]
     via FE80::2, Serial0/0/0
OI  2001:DB8:ACAD:7::/64 [110/129]
     via FE80::2, Serial0/0/0
O   2001:DB8:ACAD:8::/64 [110/65]
     via FE80::2, Serial0/0/0
O   2001:DB8:ACAD:23::/64 [110/128]
     via FE80::2, Serial0/0/0
```

```
R1#show ipv6 ospf database
            OSPF Router with ID (1.1.1.1) (Process ID 1)

                Router Link States (Area 1)

ADV Router      Age         Seq#       Fragment ID  Link count Bits
1.1.1.1         942         0x80000002 0             0          B

                Inter Area Prefix Link States (Area 1)
ADV Router      Age         Seq#       Metric Prefix
1.1.1.1         938         0x80000001 64     2001:DB8:ACAD:12::/64
1.1.1.1         923         0x80000002 65     2001:DB8:ACAD:8::/64
1.1.1.1         923         0x80000003 128    2001:DB8:ACAD:23::/64
1.1.1.1         913         0x80000004 129    2001:DB8:ACAD:4::/64
1.1.1.1         913         0x80000005 129    2001:DB8:ACAD:5::/64
1.1.1.1         913         0x80000006 129    2001:DB8:ACAD:6::/64
1.1.1.1         913         0x80000007 129    2001:DB8:ACAD:7::/64

                Intra Area Prefix Link States (Area 1)
ADV Router      Age         Seq#       Link ID    Ref-lstype  Ref-LSID
1.1.1.1         942         0x80000005 2          0x2001      0
            OSPF Router with ID (1.1.1.1) (Process ID 1)

                Router Link States (Area 0)

ADV Router      Age         Seq#       Fragment ID  Link count Bits
1.1.1.1         932         0x80000002 0             1          B
3.3.3.3         933         0x80000002 0             1          B
2.2.2.2         933         0x80000004 0             2

                Inter Area Prefix Link States (Area 0)
ADV Router      Age         Seq#       Metric Prefix
3.3.3.3         933         0x80000001 1      2001:DB8:ACAD:4::/64
3.3.3.3         933         0x80000002 1      2001:DB8:ACAD:5::/64
3.3.3.3         933         0x80000003 1      2001:DB8:ACAD:6::/64
3.3.3.3         933         0x80000004 1      2001:DB8:ACAD:7::/64
1.1.1.1         923         0x80000001 1      2001:DB8:ACAD::/64
1.1.1.1         923         0x80000002 1      2001:DB8:ACAD:1::/64
1.1.1.1         923         0x80000003 1      2001:DB8:ACAD:2::/64
1.1.1.1         923         0x80000004 1      2001:DB8:ACAD:3::/64

                Link (Type-8) Link States (Area 0)
ADV Router      Age         Seq#       Link ID    Interface
1.1.1.1         935         0x80000002 3          Se0/0/0
2.2.2.2         932         0x80000004 3          Se0/0/0

                Intra Area Prefix Link States (Area 0)
ADV Router      Age         Seq#       Link ID    Ref-lstype  Ref-LSID
1.1.1.1         942         0x80000002 2          0x2001      0
2.2.2.2         935         0x80000004 2          0x2001      0
3.3.3.3         933         0x80000002 2          0x2001      0
R1#
```

R2

```
R2#show ipv6 ospf
 Routing Process "ospfv3 1" with ID 2.2.2.2
 SPF schedule delay 5 secs, Hold time between two SPFs 10 secs
 Minimum LSA interval 5 secs. Minimum LSA arrival 1 secs
 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 areas in this router is 1. 1 normal 0 stub 0 nssa
 Reference bandwidth unit is 100 mbps
    Area BACKBONE(0)
        Number of interfaces in this area is 3
        SPF algorithm executed 3 times
        Number of LSA 14. Checksum Sum 0x090547
        Number of DCbitless LSA 0
        Number of indication LSA 0
        Number of DoNotAge LSA 0
        Flood list length 0
```

```
R2#show ipv6 ospf interface brief
Interface     PID   Area              Intf ID   Cost  State  Nbrs F/C
Lo8             1   0                  5         1     WAIT  0/0
Se0/0/1         1   0                  4         64    POINT  0/0
Se0/0/0         1   0                  3         64    POINT  0/0
```

```
R2#show ipv6 protocols
IPv6 Routing Protocol is "connected"
IPv6 Routing Protocol is "ND"
IPv6 Routing Protocol is "ospf 1"
  Interfaces (Area 0)
    Loopback8
    Serial0/0/1
    Serial0/0/0
  Redistribution:
    None
```

```
R2#show ipv6 route ospf
IPv6 Routing Table - 15 entries
Codes: C - Connected, L - Local, S - Static, R - RIP, B - BGP
       U - Per-user Static route, M - MIPv6
       I1 - ISIS L1, I2 - ISIS L2, IA - ISIS interarea, IS - ISIS summary
       O - OSPF intra, OI - OSPF inter, OE1 - OSPF ext 1, OE2 - OSPF ext 2
       ON1 - OSPF NSSA ext 1, ON2 - OSPF NSSA ext 2
       D - EIGRP, EX - EIGRP external
OI  2001:DB8:ACAD::/64 [110/65]
     via FE80::1, Serial0/0/0
OI  2001:DB8:ACAD:1::/64 [110/65]
     via FE80::1, Serial0/0/0
OI  2001:DB8:ACAD:2::/64 [110/65]
     via FE80::1, Serial0/0/0
OI  2001:DB8:ACAD:3::/64 [110/65]
     via FE80::1, Serial0/0/0
OI  2001:DB8:ACAD:4::/64 [110/65]
     via FE80::3, Serial0/0/1
OI  2001:DB8:ACAD:5::/64 [110/65]
     via FE80::3, Serial0/0/1
OI  2001:DB8:ACAD:6::/64 [110/65]
     via FE80::3, Serial0/0/1
OI  2001:DB8:ACAD:7::/64 [110/65]
     via FE80::3, Serial0/0/1



R2#show ipv6 ospf database
            OSPF Router with ID (2.2.2.2) (Process ID 1)

                Router Link States (Area 0)

ADV Router      Age         Seq#       Fragment ID  Link count Bits
2.2.2.2         991         0x80000004 0            2
1.1.1.1         992         0x80000002 0            1          B
3.3.3.3         992         0x80000002 0            1          B

                Inter Area Prefix Link States (Area 0)
ADV Router      Age         Seq#       Metric Prefix
3.3.3.3         992         0x80000001 1      2001:DB8:ACAD:4::/64
3.3.3.3         992         0x80000002 1      2001:DB8:ACAD:5::/64
3.3.3.3         992         0x80000003 1      2001:DB8:ACAD:6::/64
3.3.3.3         992         0x80000004 1      2001:DB8:ACAD:7::/64
1.1.1.1         982         0x80000001 1      2001:DB8:ACAD::/64
1.1.1.1         982         0x80000002 1      2001:DB8:ACAD:1::/64
1.1.1.1         982         0x80000003 1      2001:DB8:ACAD:2::/64
1.1.1.1         982         0x80000004 1      2001:DB8:ACAD:3::/64

                Link (Type-8) Link States (Area 0)
ADV Router      Age         Seq#       Link ID    Interface
2.2.2.2         992         0x80000003 4          Se0/0/1
2.2.2.2         991         0x80000004 3          Se0/0/0
1.1.1.1         994         0x80000002 3          Se0/0/0
3.3.3.3         992         0x80000002 4          Se0/0/1

                Intra Area Prefix Link States (Area 0)
ADV Router      Age         Seq#       Link ID    Ref-lstype  Ref-LSID
2.2.2.2         994         0x80000004 2          0x2001      0
1.1.1.1         1001        0x80000002 2          0x2001      0
3.3.3.3         992         0x80000002 2          0x2001      0
R2#
```

R3

```
R3#show ipv6 ospf
 Routing Process "ospfv3 1" with ID 3.3.3.3
 SPF schedule delay 5 secs, Hold time between two SPFs 10 secs
 Minimum LSA interval 5 secs. Minimum LSA arrival 1 secs
 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 areas in this router is 2. 2 normal 0 stub 0 nssa
 Reference bandwidth unit is 100 mbps
    Area 2
        Number of interfaces in this area is 4
        SPF algorithm executed 2 times
        Number of LSA 9. Checksum Sum 0x033eca
        Number of DCbitless LSA 0
        Number of indication LSA 0
        Number of DoNotAge LSA 0
        Flood list length 0
    Area BACKBONE(0)
        Number of interfaces in this area is 1
        SPF algorithm executed 2 times
        Number of LSA 14. Checksum Sum 0x090547
        Number of DCbitless LSA 0
        Number of indication LSA 0
        Number of DoNotAge LSA 0
        Flood list length 0
```

```
R3#show ipv6 ospf interface brief
Interface     PID   Area            Intf ID   Cost  State  Nbrs F/C
Lo4             1   2                5         1     WAIT  0/0
Lo5             1   2                6         1     WAIT  0/0
Lo6             1   2                7         1     WAIT  0/0
Lo7             1   2                8         1     WAIT  0/0
Se0/0/1         1   0                4         64    POINT 0/0
```

```
R3#show ipv6 protocols
IPv6 Routing Protocol is "connected"
IPv6 Routing Protocol is "ND"
IPv6 Routing Protocol is "ospf 1"
  Interfaces (Area 2)
    Loopback4
    Loopback5
    Loopback6
    Loopback7
  Interfaces (Area 0)
    Serial0/0/1
  Redistribution:
    None
```

```
R3#show ipv6 route ospf
IPv6 Routing Table - 17 entries
Codes: C - Connected, L - Local, S - Static, R - RIP, B - BGP
       U - Per-user Static route, M - MIPv6
       I1 - ISIS L1, I2 - ISIS L2, IA - ISIS interarea, IS - ISIS summary
       O - OSPF intra, OI - OSPF inter, OE1 - OSPF ext 1, OE2 - OSPF ext 2
       ON1 - OSPF NSSA ext 1, ON2 - OSPF NSSA ext 2
       D - EIGRP, EX - EIGRP external
OI  2001:DB8:ACAD::/64 [110/129]
     via FE80::2, Serial0/0/1
OI  2001:DB8:ACAD:1::/64 [110/129]
     via FE80::2, Serial0/0/1
OI  2001:DB8:ACAD:2::/64 [110/129]
     via FE80::2, Serial0/0/1
OI  2001:DB8:ACAD:3::/64 [110/129]
     via FE80::2, Serial0/0/1
O   2001:DB8:ACAD:8::/64 [110/65]
     via FE80::2, Serial0/0/1
O   2001:DB8:ACAD:12::/64 [110/128]
     via FE80::2, Serial0/0/1
```

```
R3#show ipv6 ospf database
            OSPF Router with ID (3.3.3.3) (Process ID 1)

                Router Link States (Area 2)

ADV Router      Age         Seq#       Fragment ID  Link count Bits
3.3.3.3         1037        0x80000002 0            0          B

                Inter Area Prefix Link States (Area 2)
ADV Router      Age         Seq#       Metric Prefix
3.3.3.3         1013        0x80000001 64     2001:DB8:ACAD:23::/64
3.3.3.3         1013        0x80000002 65     2001:DB8:ACAD:8::/64
3.3.3.3         1013        0x80000003 128    2001:DB8:ACAD:12::/64
3.3.3.3         1013        0x80000004 129    2001:DB8:ACAD::/64
3.3.3.3         1013        0x80000005 129    2001:DB8:ACAD:1::/64
3.3.3.3         1013        0x80000006 129    2001:DB8:ACAD:2::/64
3.3.3.3         1013        0x80000007 129    2001:DB8:ACAD:3::/64

                Intra Area Prefix Link States (Area 2)
ADV Router      Age         Seq#       Link ID    Ref-lstype  Ref-LSID
3.3.3.3         1037        0x80000005 2          0x2001      0
            OSPF Router with ID (3.3.3.3) (Process ID 1)

                Router Link States (Area 0)

ADV Router      Age         Seq#       Fragment ID  Link count Bits
3.3.3.3         1027        0x80000002 0            1          B
1.1.1.1         1028        0x80000002 0            1          B
2.2.2.2         1028        0x80000004 0            2

                Inter Area Prefix Link States (Area 0)
ADV Router      Age         Seq#       Metric Prefix
3.3.3.3         1028        0x80000001 1      2001:DB8:ACAD:4::/64
3.3.3.3         1028        0x80000002 1      2001:DB8:ACAD:5::/64
3.3.3.3         1028        0x80000003 1      2001:DB8:ACAD:6::/64
3.3.3.3         1028        0x80000004 1      2001:DB8:ACAD:7::/64
1.1.1.1         1018        0x80000001 1      2001:DB8:ACAD::/64
1.1.1.1         1018        0x80000002 1      2001:DB8:ACAD:1::/64
1.1.1.1         1018        0x80000003 1      2001:DB8:ACAD:2::/64
1.1.1.1         1018        0x80000004 1      2001:DB8:ACAD:3::/64

                Link (Type-8) Link States (Area 0)
ADV Router      Age         Seq#       Link ID    Interface
3.3.3.3         1028        0x80000002 4          Se0/0/1
2.2.2.2         1028        0x80000003 4          Se0/0/1

                Intra Area Prefix Link States (Area 0)
ADV Router      Age         Seq#       Link ID    Ref-lstype  Ref-LSID
3.3.3.3         1028        0x80000002 2          0x2001      0
2.2.2.2         1030        0x80000004 2          0x2001      0
1.1.1.1         1037        0x80000002 2          0x2001      0
```

OI, czyli trasa między obszarowa w OSPF, to trasa, którą router OSPF otrzymuje od innego routera OSPF znajdującego się w innym obszarze.

Podsumowanie

Wieloobszarowy OSPFv3 jest stosowany w dużych domenach sieciowych, aby zwiększyć efektywność routingu, zmniejszyć wielkość tablic routingu oraz obniżyć zapotrzebowanie na moc obliczeniową i pamięć routera, co przekłada się na lepszą wydajność całego procesu routingu.