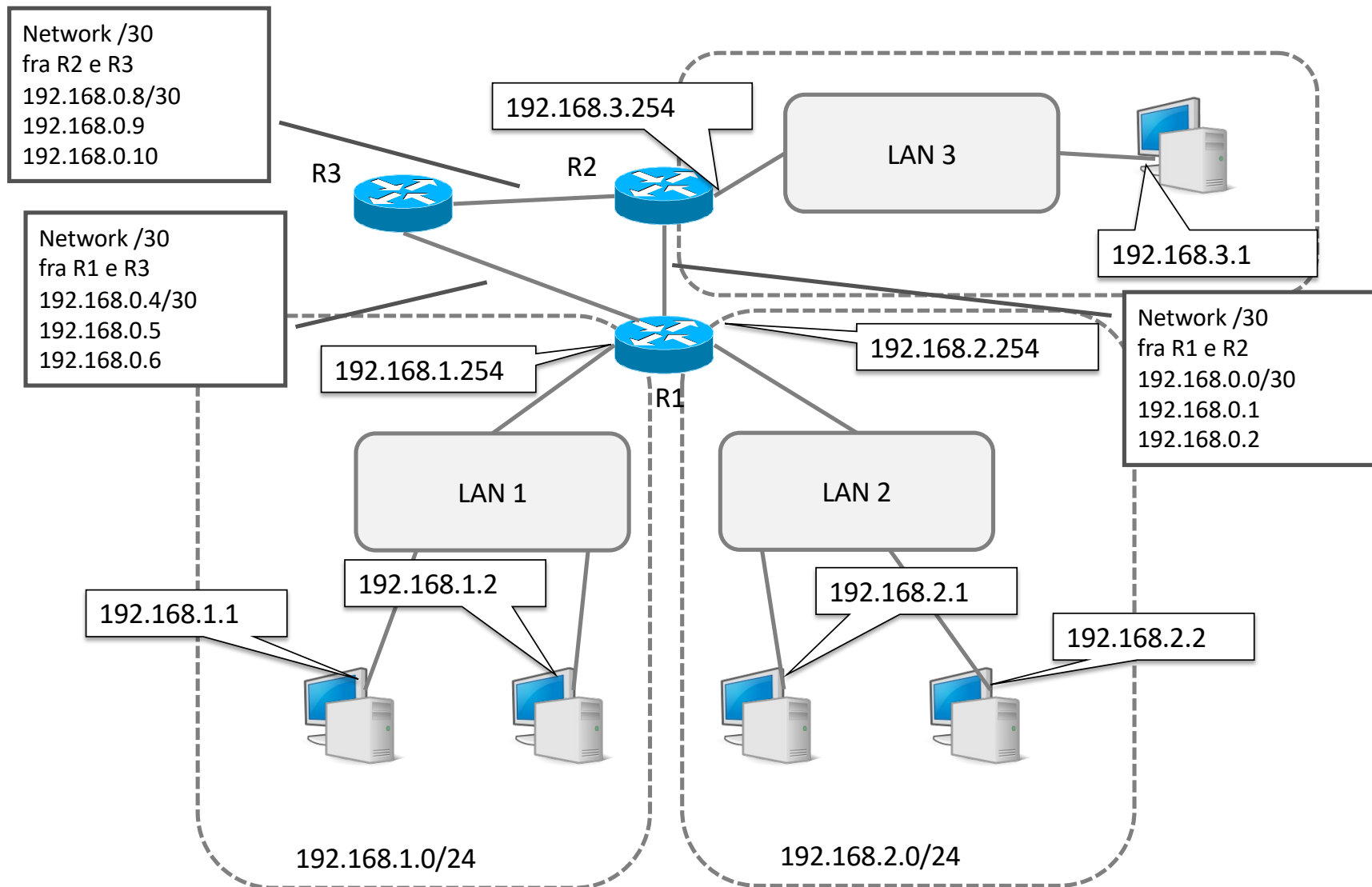# Esempio configurazione OSPF

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2023

Scenario

- Semplice topologie di rete con 3 router collegati ad anello

- Attivazione di OSPF su tutti i router

- Configurazione di una singola area di routing (Area 0)

- Router ID
  - R1 10.0.0.1
  - R2 10.0.0.2
  - R3 10.0.0.3

Network /30
fra R2 e R3
192.168.0.8/30
192.168.0.9
192.168.0.10

192.168.3.254

LAN 3

192.168.3.1

R3   R2

Network /30
fra R1 e R3
192.168.0.4/30
192.168.0.5
192.168.0.6

Network /30
fra R1 e R2
192.168.0.0/30
192.168.0.1
192.168.0.2

192.168.2.254

192.168.1.254

R1

LAN 1

LAN 2

192.168.1.1

192.168.1.2

192.168.2.1

192.168.2.2

192.168.1.0/24

192.168.2.0/24

Adiacenze

```
Router_R1#show ip ospf neighbor

Neighbor ID       Pri    State           Dead Time    Address          Interface
10.0.0.3           1     FULL/DR         00:00:31     192.168.0.6      Vlan4
10.0.0.2           1     FULL/DR         00:00:31     192.168.0.2      FastEthernet0


Router_R3#show ip ospf neighbor

Neighbor ID       Pri    State           Dead Time    Address          Interface
10.0.0.2           1     FULL/BDR        00:00:35     192.168.0.9      FastEthernet0
10.0.0.1           1     FULL/BDR        00:00:33     192.168.0.5      Vlan1
```

```
Router_R1#show ip ospf rib


OSPF local RIB for Process 10
Codes: * – Best, > – Installed in global RIB


*    192.168.0.0/30, Intra, cost 1, area 0, Connected
       via 192.168.0.1, FastEthernet0
*    192.168.0.4/30, Intra, cost 1, area 0, Connected
       via 192.168.0.5, Vlan4
*>   192.168.0.8/30, Intra, cost 2, area 0
       via 192.168.0.6, Vlan4
       via 192.168.0.2, FastEthernet0
*    192.168.1.0/24, Intra, cost 1, area 0, Connected
       via 192.168.1.254, Vlan1
*>   192.168.3.0/24, Intra, cost 2, area 0
       via 192.168.0.2, FastEthernet0
```

Notare che essendo stata definita solamente l'area 0 tutte le rotte figurano intra area

OSPF database

- Contiene l'elenco degli LSA ricevuti
- Gli LSA sono identificati tramite
  - router che li ha inviati
  - Età
- Sono di due tipi
  - Network
    - Identificano le reti elencando i router a loro connesse

    Descrivono una rete specifica elencando tutti i router connessi a quella rete. Vengono generati da Designated Router (DR) nelle reti multi-access (come Ethernet).
  - Router
    - Identificano i router ed elencano le reti a loro connesse

    Descrivono i router e tutte le reti direttamente connesse a ciascun router. Ogni router genera questo tipo di LSA per annunciare i propri collegamenti.
- Si noti che le network vengono classificate come Transit o Stub

`Router_R1#show ip ospf database`

OSPF Router with ID (10.0.0.1) (Process ID 10)

Identifica i Router con le network ad essi collegate

Router Link States (Area 0)

Identifica la versione dell'LSA.

per verificare l'integrità dei dati dell'LSA.

Indica il Router ID del router che ha originato l'LSA.

Indica il Router ID del router che ha pubblicizzato l'LSA.

Il tempo (in secondi) trascorso dalla creazione dell'LSA.

Indica il numero di collegamenti dichiarati dal router.

Link ID	ADV Router	Age	Seq#	Checksum	Link count
10.0.0.1	10.0.0.1	1033	0x8000000A	0x0025AF	3
10.0.0.2	10.0.0.2	1834	0x8000000E	0x0006BD	3
10.0.0.3	10.0.0.3	1161	0x80000008	0x00AC8F	2

Identifica le network con i router ad esse collegate

Net Link States (Area 0)

Indica il indirizzo IP del router che ha originato l'LSA.

Link ID	ADV Router	Age	Seq#	Checksum
192.168.0.2	10.0.0.2	1551	0x80000002	0x003677
192.168.0.6	10.0.0.3	1161	0x80000002	0x001295
192.168.0.10	10.0.0.3	1161	0x80000002	0x00F7AA

```
Router_R1#show ip ospf database network

            OSPF Router with ID (10.0.0.1) (Process ID 10)

              Net Link States (Area 0)

  Routing Bit Set on this LSA                    Routing Bit Set on this LSA
  LS age: 1857                                   LS age: 1467
  Options: (No TOS-capability, DC)               Options: (No TOS-capability, DC)
  LS Type: Network Links                         LS Type: Network Links
  Link State ID: 192.168.0.2 (address of Designated Router)   Link State ID: 192.168.0.6 (address of Designated Router)
  Advertising Router: 10.0.0.2                   Advertising Router: 10.0.0.3
  LS Seq Number: 80000002                        LS Seq Number: 80000002
  Checksum: 0x3677                               Checksum: 0x1295

  Length: 32                                     Length: 32
  Network Mask: /30                              Network Mask: /30
        Attached Router: 10.0.0.2                      Attached Router: 10.0.0.3
        Attached Router: 10.0.0.1                      Attached Router: 10.0.0.1


                                                 Routing Bit Set on this LSA
                                                 LS age: 1468
                                                 Options: (No TOS-capability, DC)
                                                 LS Type: Network Links
                                                 Link State ID: 192.168.0.10 (address of Designated Router)
                                                 Advertising Router: 10.0.0.3
                                                 LS Seq Number: 80000002
                                                 Checksum: 0xF7AA
                                                 Length: 32
                                                 Network Mask: /30
                                                       Attached Router: 10.0.0.3
                                                       Attached Router: 10.0.0.2
```

```
Router_R1#show ip ospf database router


        OSPF Router with ID (10.0.0.1) (Process ID 10)


            Router Link States (Area 0)
```

- **Stub:** non funge da percorso di transito per raggiungere altre destinazioni.
  - una network connessa ad un solo router e quindi che non può essere attraversata per raggiungere altre destinazioni
- **Transit:** può essere utilizzata come percorso per raggiungere altre reti.
  - Una network connessa a due o più router che quindi può essere attraversata per raggiungere altre network

```
LS age: 1446
Options: (No TOS-capability, DC)
LS Type: Router Links
Link State ID: 10.0.0.1
Advertising Router: 10.0.0.1
LS Seq Number: 8000000A
Checksum: 0x25AF
Length: 60
Number of Links: 3


  Link connected to: a Stub Network
   (Link ID) Network/subnet number: 192.168.1.0
   (Link Data) Network Mask: 255.255.255.0
    Number of TOS metrics: 0
     TOS 0 Metrics: 1


  Link connected to: a Transit Network
   (Link ID) Designated Router address: 192.168.0.6
   (Link Data) Router Interface address: 192.168.0.5
    Number of TOS metrics: 0
     TOS 0 Metrics: 1


  Link connected to: a Transit Network
   (Link ID) Designated Router address: 192.168.0.2
   (Link Data) Router Interface address: 192.168.0.1
    Number of TOS metrics: 0
     TOS 0 Metrics: 1
```

```
LS age: 229
  Options: (No TOS-capability, DC)
  LS Type: Router Links
  Link State ID: 10.0.0.2
  Advertising Router: 10.0.0.2
  LS Seq Number: 8000000F
  Checksum: 0x4BE
  Length: 60
  Number of Links: 3


    Link connected to: a Stub Network
     (Link ID) Network/subnet number: 192.168.3.0
     (Link Data) Network Mask: 255.255.255.0
      Number of TOS metrics: 0
        TOS 0 Metrics: 1


    Link connected to: a Transit Network
     (Link ID) Designated Router address: 192.168.0.10
     (Link Data) Router Interface address: 192.168.0.9
      Number of TOS metrics: 0
        TOS 0 Metrics: 1


    Link connected to: a Transit Network
     (Link ID) Designated Router address: 192.168.0.2
     (Link Data) Router Interface address: 192.168.0.2
      Number of TOS metrics: 0
        TOS 0 Metrics: 1
```

```
LS age: 5
  Options: (No TOS-capability, DC)
  LS Type: Router Links
  Link State ID: 10.0.0.3
  Advertising Router: 10.0.0.3
  LS Seq Number: 80000008
  Checksum: 0xAC8F
  Length: 48
  Number of Links: 2


    Link connected to: a Transit Network
     (Link ID) Designated Router address: 192.168.0.10
     (Link Data) Router Interface address: 192.168.0.10
      Number of TOS metrics: 0
       TOS 0 Metrics: 1


    Link connected to: a Transit Network
     (Link ID) Designated Router address: 192.168.0.6
     (Link Data) Router Interface address: 192.168.0.6
      Number of TOS metrics: 0
       TOS 0 Metrics: 1
```
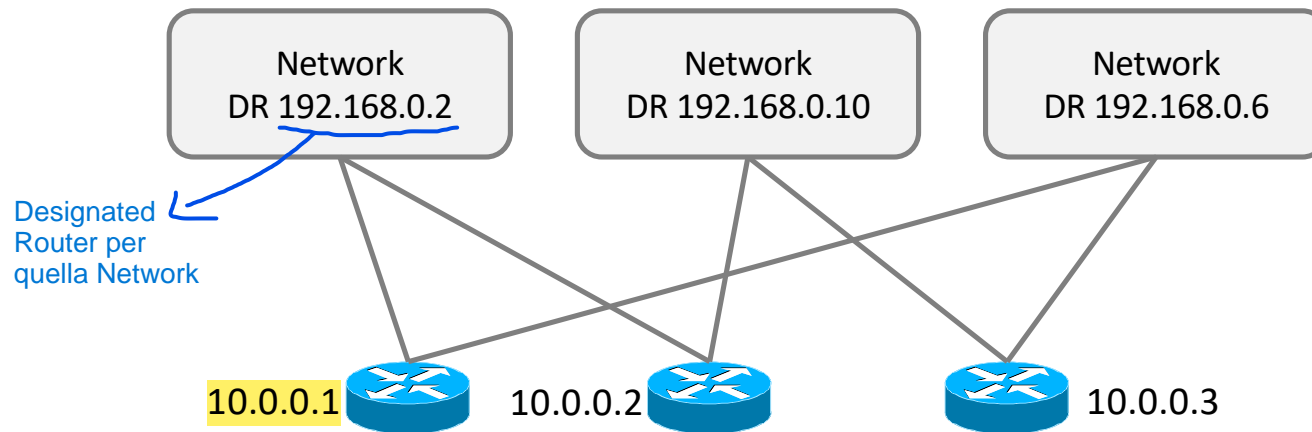
Dal punto di vista di R1

Network
DR 192.168.0.2

Network
DR 192.168.0.10

Network
DR 192.168.0.6
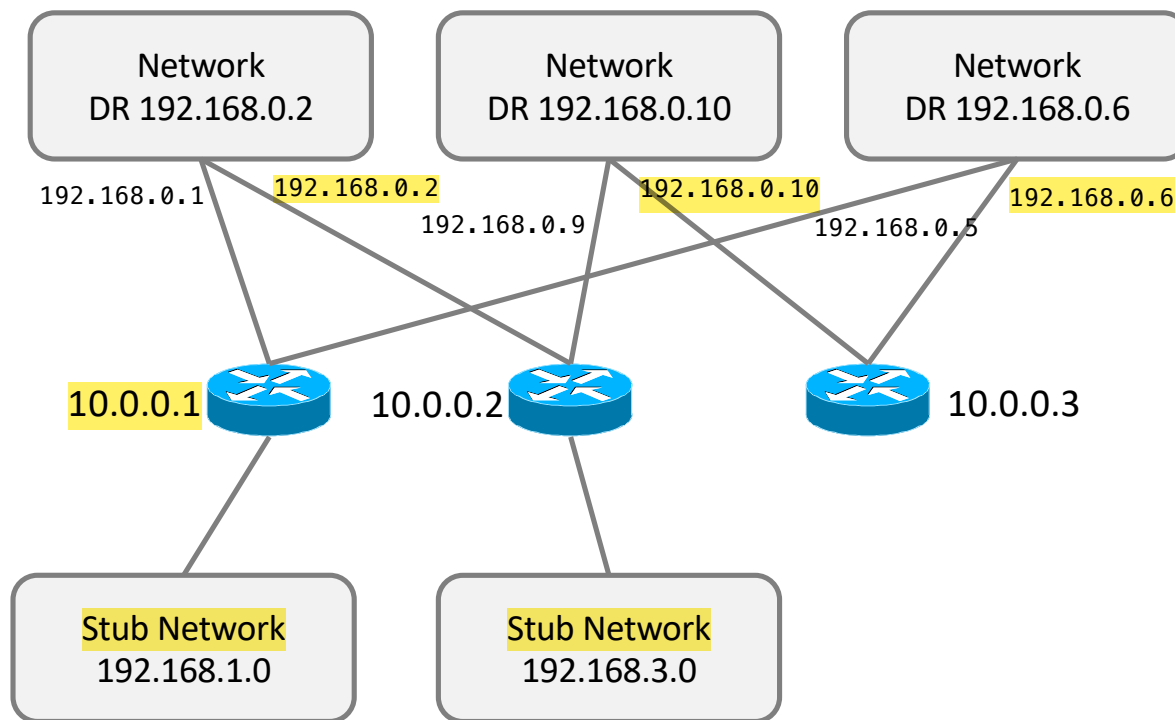
Designated
Router per
quella Network

10.0.0.1   10.0.0.2   10.0.0.3

Partendo dai network link state

descrivono le reti connesse ai Designated Router (DR).

Dal punto di vista di R1

Aggiungendo i router link state

```
Router_R3#show ip ospf database


        OSPF Router with ID (10.0.0.3) (Process ID 10)


            Router Link States (Area 0)


Link ID          ADV Router       Age         Seq#        Checksum Link count
10.0.0.1         10.0.0.1         1145        0x8000000D 0x007CCF 2
10.0.0.2         10.0.0.2         153         0x80000015 0x00D662 2
10.0.0.3         10.0.0.3         1286        0x80000009 0x00AA90 2


            Net Link States (Area 0)


Link ID          ADV Router       Age         Seq#        Checksum
192.168.0.2      10.0.0.2         1705        0x80000003 0x003478
192.168.0.6      10.0.0.3         1286        0x80000003 0x001096
192.168.0.10     10.0.0.3         1286        0x80000003 0x00F5AB
```

```
Router_R3#show ip ospf database summary

                 OSPF Router with ID (10.0.0.3) (Process ID 10)

                     Summary Net Link States (Area 0)


    Routing Bit Set on this LSA
    LS age: 1224
    Options: (No TOS-capability, DC, Upward)
    LS Type: Summary Links(Network)
    Link State ID: 192.168.1.0 (summary Network Number)
    Advertising Router: 10.0.0.1
    LS Seq Number: 80000001
    Checksum: 0x7650
    Length: 28
    Network Mask: /24
          TOS: 0  Metric: 1

    LS age: 190
    Options: (No TOS-capability, DC, Upward)
    LS Type: Summary Links(Network)
    Link State ID: 192.168.3.0 (summary Network Number)
    Advertising Router: 10.0.0.2
    LS Seq Number: 80000001
    Checksum: 0x5A69
    Length: 28
    Network Mask: /24
          TOS: 0  Metric: 1
```

```
Router_R3#show ip ospf database router


                OSPF Router with ID (10.0.0.3) (Process ID 10)


                    Router Link States (Area 0)


  Routing Bit Set on this LSA
  LS age: 1799
  Options: (No TOS-capability, DC)
  LS Type: Router Links
  Link State ID: 10.0.0.1
  Advertising Router: 10.0.0.1
  LS Seq Number: 8000000D
  Checksum: 0x7CCF
  Length: 48
  Area Border Router
  Number of Links: 2


    Link connected to: a Transit Network
     (Link ID) Designated Router address: 192.168.0.6
     (Link Data) Router Interface address: 192.168.0.5
      Number of TOS metrics: 0
       TOS 0 Metrics: 1


    Link connected to: a Transit Network
     (Link ID) Designated Router address: 192.168.0.2
     (Link Data) Router Interface address: 192.168.0.1
      Number of TOS metrics: 0
       TOS 0 Metrics: 1


  Routing Bit Set on this LSA
  LS age: 102
  Options: (No TOS-capability, DC)
  LS Type: Router Links
  Link State ID: 10.0.0.2
  Advertising Router: 10.0.0.2
  LS Seq Number: 80000017
  Checksum: 0xD264
  Length: 48
  Area Border Router
  Number of Links: 2


    Link connected to: a Transit Network
     (Link ID) Designated Router address: 192.168.0.10
     (Link Data) Router Interface address: 192.168.0.9
      Number of TOS metrics: 0
       TOS 0 Metrics: 1


    Link connected to: a Transit Network
     (Link ID) Designated Router address: 192.168.0.2
     (Link Data) Router Interface address: 192.168.0.2
      Number of TOS metrics: 0
       TOS 0 Metrics: 1
```

```
 LS age: 1944
Options: (No TOS-capability, DC)
LS Type: Router Links
Link State ID: 10.0.0.3
Advertising Router: 10.0.0.3
LS Seq Number: 80000009
Checksum: 0xAA90
Length: 48
Number of Links: 2


  Link connected to: a Transit Network
   (Link ID) Designated Router address: 192.168.0.10
   (Link Data) Router Interface address: 192.168.0.10
    Number of TOS metrics: 0
     TOS 0 Metrics: 1


  Link connected to: a Transit Network
   (Link ID) Designated Router address: 192.168.0.6
   (Link Data) Router Interface address: 192.168.0.6
    Number of TOS metrics: 0
     TOS 0 Metrics: 1
```

```
Router_R3#show ip ospf database network


              OSPF Router with ID (10.0.0.3) (Process ID 10)


              Net Link States (Area 0)


  Routing Bit Set on this LSA
  LS age: 745
  Options: (No TOS-capability, DC)
  LS Type: Network Links
  Link State ID: 192.168.0.2 (address of Designated Router)
  Advertising Router: 10.0.0.2
  LS Seq Number: 80000004
  Checksum: 0x3279
  Length: 32
  Network Mask: /30
        Attached Router: 10.0.0.2
        Attached Router: 10.0.0.1


  Routing Bit Set on this LSA
  LS age: 134
  Options: (No TOS-capability, DC)
  LS Type: Network Links
  Link State ID: 192.168.0.6 (address of Designated Router)
  Advertising Router: 10.0.0.3
  LS Seq Number: 80000004
  Checksum: 0xE97
  Length: 32
  Network Mask: /30
        Attached Router: 10.0.0.3
        Attached Router: 10.0.0.1


  Routing Bit Set on this LSA
  LS age: 135
  Options: (No TOS-capability, DC)
  LS Type: Network Links
  Link State ID: 192.168.0.10 (address of Designated Router)
  Advertising Router: 10.0.0.3
  LS Seq Number: 80000004
  Checksum: 0xF3AC
  Length: 32
  Network Mask: /30
        Attached Router: 10.0.0.3
        Attached Router: 10.0.0.2
```

```
Router_R3#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


     10.0.0.0/32 is subnetted, 1 subnets
C       10.0.0.3 is directly connected, Loopback0
     192.168.0.0/30 is subnetted, 3 subnets
C       192.168.0.8 is directly connected, FastEthernet0
O       192.168.0.0 [110/2] via 192.168.0.9, 01:30:18, FastEthernet0
                    [110/2] via 192.168.0.5, 01:30:28, Vlan1
C       192.168.0.4 is directly connected, Vlan1
O IA 192.168.1.0/24 [110/2] via 192.168.0.5, 00:21:37, Vlan1
O IA 192.168.3.0/24 [110/2] via 192.168.0.9, 00:04:24, FastEthernet0
```

```
Router_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


     10.0.0.0/32 is subnetted, 1 subnets
C       10.0.0.1 is directly connected, Loopback0
     192.168.0.0/30 is subnetted, 3 subnets
O       192.168.0.8 [110/2] via 192.168.0.6, 00:29:23, Vlan4
                    [110/2] via 192.168.0.2, 00:29:23, FastEthernet0
C       192.168.0.0 is directly connected, FastEthernet0
C       192.168.0.4 is directly connected, Vlan4
C     192.168.1.0/24 is directly connected, Vlan1
O IA 192.168.3.0/24 [110/2] via 192.168.0.2, 00:00:12, FastEthernet0
```

Scenario

- Medesima topologia
- Configurazione di quattro aree di routing come da figura

- Router ID
  - R1 10.0.0.1
  - R2 10.0.0.2
  - R3 10.0.0.3

/30 fra R1 e R3
  192.168.0.4/30
  192.168.0.5
  192.168.0.6

/30 fra R2 e R3
192.168.0.8/30
192.168.0.9
192.168.0.10
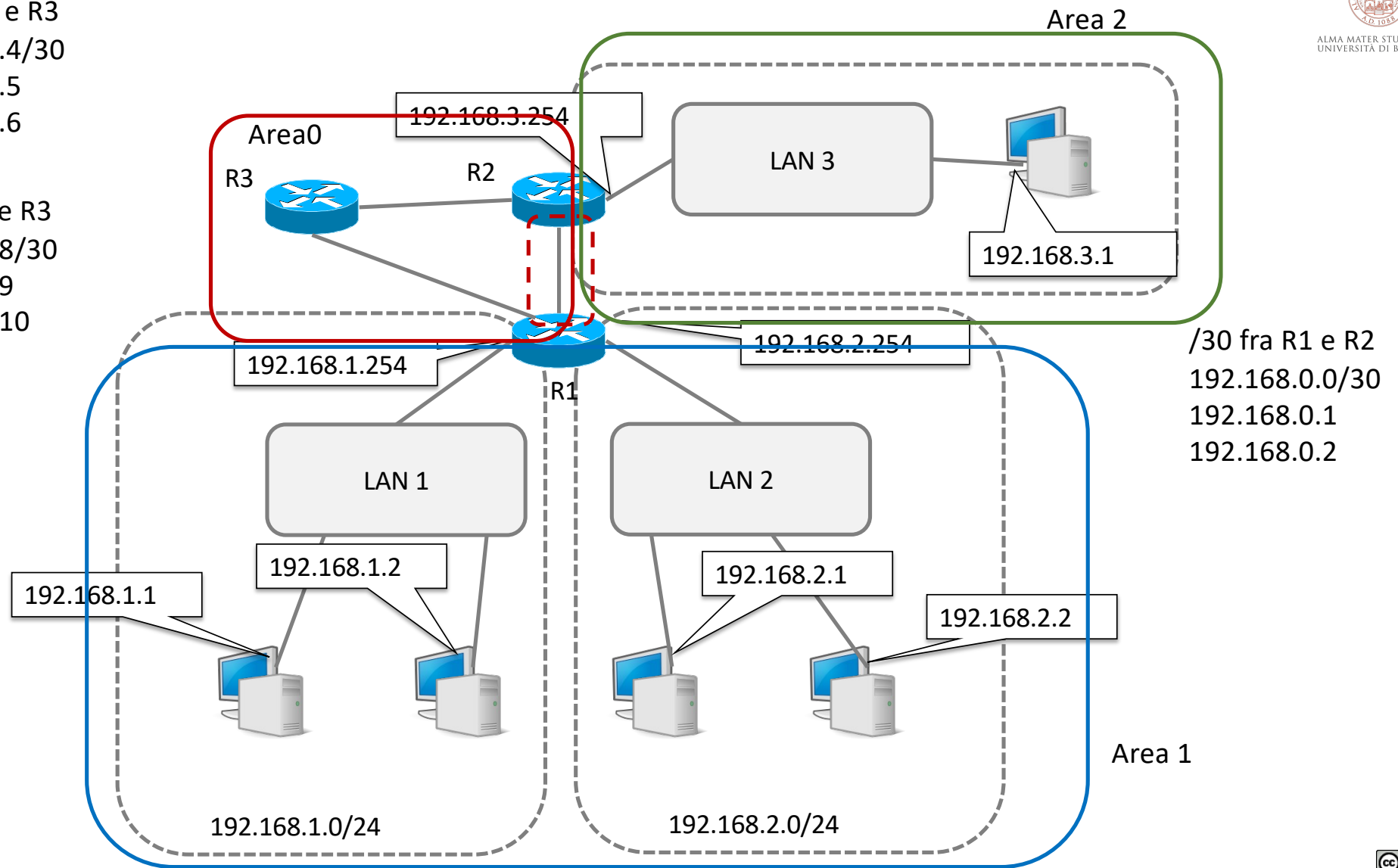
Area 2

192.168.3.254

Area0

R3   R2

LAN 3

192.168.3.1

/30 fra R1 e R2
192.168.0.0/30
192.168.0.1
192.168.0.2

192.168.2.254

192.168.1.254

R1

LAN 1   LAN 2

192.168.1.2

192.168.2.1

192.168.1.1

192.168.2.2

Area 1

192.168.1.0/24   192.168.2.0/24

```
Router_R1#show ip ospf database router


        OSPF Router with ID (10.0.0.1) (Process ID 10)


            Router Link States (Area 0)


    LS age: 36
    Options: (No TOS-capability, DC)
    LS Type: Router Links
    Link State ID: 10.0.0.1
    Advertising Router: 10.0.0.1
    LS Seq Number: 8000000E
    Checksum: 0x7AD0
    Length: 48
    Area Border Router
    Number of Links: 2


      Link connected to: a Transit Network
       (Link ID) Designated Router address: 192.168.0.6
       (Link Data) Router Interface address: 192.168.0.5
        Number of TOS metrics: 0
         TOS 0 Metrics: 1


      Link connected to: a Transit Network
       (Link ID) Designated Router address: 192.168.0.2
       (Link Data) Router Interface address: 192.168.0.1
        Number of TOS metrics: 0
         TOS 0 Metrics: 1



    Routing Bit Set on this LSA
    LS age: 348
    Options: (No TOS-capability, DC)
    LS Type: Router Links
    Link State ID: 10.0.0.2
    Advertising Router: 10.0.0.2
    LS Seq Number: 80000017
    Checksum: 0xD264
    Length: 48
    Area Border Router
    Number of Links: 2
```

```
    Link connected to: a Transit Network
     (Link ID) Designated Router address: 192.168.0.10
     (Link Data) Router Interface address: 192.168.0.9
      Number of TOS metrics: 0
       TOS 0 Metrics: 1


    Link connected to: a Transit Network
     (Link ID) Designated Router address: 192.168.0.2
     (Link Data) Router Interface address: 192.168.0.2
      Number of TOS metrics: 0
       TOS 0 Metrics: 1



  LS age: 196
  Options: (No TOS-capability, DC)
  LS Type: Router Links
  Link State ID: 10.0.0.3
  Advertising Router: 10.0.0.3
  LS Seq Number: 8000000A
  Checksum: 0xA891
  Length: 48
  Number of Links: 2


    Link connected to: a Transit Network
     (Link ID) Designated Router address: 192.168.0.10
     (Link Data) Router Interface address: 192.168.0.10
      Number of TOS metrics: 0
       TOS 0 Metrics: 1


    Link connected to: a Transit Network
     (Link ID) Designated Router address: 192.168.0.6
     (Link Data) Router Interface address: 192.168.0.6
      Number of TOS metrics: 0
       TOS 0 Metrics: 1
```

```
            Router Link States (Area 1)


  LS age: 282
  Options: (No TOS-capability, DC)
  LS Type: Router Links
  Link State ID: 10.0.0.1
  Advertising Router: 10.0.0.1
  LS Seq Number: 80000002
  Checksum: 0xA20D
  Length: 36
  Area Border Router
  Number of Links: 1


    Link connected to: a Stub Network
     (Link ID) Network/subnet number: 192.168.1.0
     (Link Data) Network Mask: 255.255.255.0
      Number of TOS metrics: 0
       TOS 0 Metrics: 1
```

```
Router_R1#show ip ospf database network
```

                OSPF Router with ID (10.0.0.1) (Process ID 10)

                        Net Link States (Area 0)

  Routing Bit Set on this LSA
  LS age: 915
  Options: (No TOS-capability, DC)
  LS Type: Network Links
  Link State ID: 192.168.0.2 (address of Designated Router)
  Advertising Router: 10.0.0.2
  LS Seq Number: 80000004
  Checksum: 0x3279
  Length: 32
  Network Mask: /30
        Attached Router: 10.0.0.2
        Attached Router: 10.0.0.1

  Routing Bit Set on this LSA
  LS age: 305
  Options: (No TOS-capability, DC)
  LS Type: Network Links
  Link State ID: 192.168.0.6 (address of Designated Router)
  Advertising Router: 10.0.0.3
  LS Seq Number: 80000004
  Checksum: 0xE97
  Length: 32
  Network Mask: /30
        Attached Router: 10.0.0.3
        Attached Router: 10.0.0.1

  Routing Bit Set on this LSA
  LS age: 305
  Options: (No TOS-capability, DC)
  LS Type: Network Links
  Link State ID: 192.168.0.10 (address of Designated Router)
  Advertising Router: 10.0.0.3
  LS Seq Number: 80000004
  Checksum: 0xF3AC
  Length: 32
  Network Mask: /30
        Attached Router: 10.0.0.3
        Attached Router: 10.0.0.2

```
Router_R1#show ip ospf database summary                              Summary Net Link States (Area 1)


            OSPF Router with ID (10.0.0.1) (Process ID 10)       LS age: 451
                                                                 Options: (No TOS-capability, DC, Upward)
                                                                 LS Type: Summary Links(Network)
              Summary Net Link States (Area 0)                   Link State ID: 192.168.0.0 (summary Network Number)
                                                                 Advertising Router: 10.0.0.1
                                                                 LS Seq Number: 80000002
                                                                 Checksum: 0x6D5C
    LS age: 451                                                  Length: 28
    Options: (No TOS-capability, DC, Upward)                     Network Mask: /30
    LS Type: Summary Links(Network)                                    TOS: 0  Metric: 1
    Link State ID: 192.168.1.0 (summary Network Number)
    Advertising Router: 10.0.0.1
    LS Seq Number: 80000002
    Checksum: 0x7451                                             LS age: 453
    Length: 28                                                   Options: (No TOS-capability, DC, Upward)
    Network Mask: /24                                            LS Type: Summary Links(Network)
          TOS: 0  Metric: 1                                      Link State ID: 192.168.0.4 (summary Network Number)
                                                                 Advertising Router: 10.0.0.1
                                                                 LS Seq Number: 80000002
                                                                 Checksum: 0x4580
    Routing Bit Set on this LSA                                  Length: 28
    LS age: 513                                                  Network Mask: /30
    Options: (No TOS-capability, DC, Upward)                           TOS: 0  Metric: 1
    LS Type: Summary Links(Network)
    Link State ID: 192.168.3.0 (summary Network Number)
    Advertising Router: 10.0.0.2
    LS Seq Number: 80000003                                      LS age: 454
    Checksum: 0x566B                                             Options: (No TOS-capability, DC, Upward)
    Length: 28                                                   LS Type: Summary Links(Network)
    Network Mask: /24                                            Link State ID: 192.168.0.8 (summary Network Number)
          TOS: 0  Metric: 1                                      Advertising Router: 10.0.0.1
                                                                 LS Seq Number: 80000002
                                                                 Checksum: 0x2799
                                                                 Length: 28
                                                                 Network Mask: /30
                                                                       TOS: 0  Metric: 2


                                                                 LS age: 512
                                                                 Options: (No TOS-capability, DC, Upward)
                                                                 LS Type: Summary Links(Network)
                                                                 Link State ID: 192.168.3.0 (summary Network Number)
                                                                 Advertising Router: 10.0.0.1
                                                                 LS Seq Number: 80000001
                                                                 Checksum: 0x6A59
                                                                 Length: 28
                                                                 Network Mask: /24
                                                                       TOS: 0  Metric: 2
```

```
Router_R2#show ip ospf database summary


                OSPF Router with ID (10.0.0.2) (Process ID 10)


                    Summary Net Link States (Area 0)


  Routing Bit Set on this LSA
  LS age: 581
  Options: (No TOS-capability, DC, Upward)
  LS Type: Summary Links(Network)
  Link State ID: 192.168.1.0 (summary Network Number)
  Advertising Router: 10.0.0.1
  LS Seq Number: 80000002
  Checksum: 0x7451
  Length: 28
  Network Mask: /24
        TOS: 0  Metric: 1


  LS age: 641
  Options: (No TOS-capability, DC, Upward)
  LS Type: Summary Links(Network)
  Link State ID: 192.168.3.0 (summary Network Number)
  Advertising Router: 10.0.0.2
  LS Seq Number: 80000003
  Checksum: 0x566B
  Length: 28
  Network Mask: /24
        TOS: 0  Metric: 1
```

```
                    Summary Net Link States (Area 2)


  LS age: 652
  Options: (No TOS-capability, DC, Upward)
  LS Type: Summary Links(Network)
  Link State ID: 192.168.0.0 (summary Network Number)
  Advertising Router: 10.0.0.2
  LS Seq Number: 80000002
  Checksum: 0x6761
  Length: 28
  Network Mask: /30
        TOS: 0  Metric: 1


  LS age: 654
  Options: (No TOS-capability, DC, Upward)
  LS Type: Summary Links(Network)
  Link State ID: 192.168.0.4 (summary Network Number)
  Advertising Router: 10.0.0.2
  LS Seq Number: 80000002
  Checksum: 0x497A
  Length: 28
  Network Mask: /30
        TOS: 0  Metric: 2


  LS age: 655
  Options: (No TOS-capability, DC, Upward)
  LS Type: Summary Links(Network)
  Link State ID: 192.168.0.8 (summary Network Number)
  Advertising Router: 10.0.0.2
  LS Seq Number: 80000002
  Checksum: 0x17A9
  Length: 28
  Network Mask: /30
        TOS: 0  Metric: 1


  LS age: 655
  Options: (No TOS-capability, DC, Upward)
  LS Type: Summary Links(Network)
  Link State ID: 192.168.1.0 (summary Network Number)
  Advertising Router: 10.0.0.2
  LS Seq Number: 80000002
  Checksum: 0x784B
  Length: 28
  Network Mask: /24
        TOS: 0  Metric: 2
```