**Type 1 (Router )** : Lists neighbor routers IP and the cost to each. INTRA AREA
**Type 2 (Network)** : Generated by a DR; lists all routers IP and netmask on adjacent segments. INTRA AREA
**Type 3 (Summary)** : Generated by an ABR; describe networks and netmask in the AS but outside of the area. INTER AREA
**Type 4 (ASBRSummary)** : Generated by an ABR into other areas to advertise the presence of an ASBR. INTER AREA
**Type 5 (External )** : Generated by an ASBR and flooded throughout the AS to advertise an external route.INTER AREA
**Type 7 (NSSA)** : Generated by an ASBR in a not-so-stubby area; converted into a type 5 LSA by the ABR when leaving the area. INTER AREA

**External Route Types**
E1 : Cost of the advertising ASBR + cost of links.
E2 : Cost of the route as seen by the ASBR ( default )

## Config on R1

```
ospf {
  area 0.0.0.0 {
       interface ...
  }
  area 0.0.0.1 {
       nssa {
            default-lsa {
                 default-metric 10;
            }
       }
       interface ...
  }
}
```
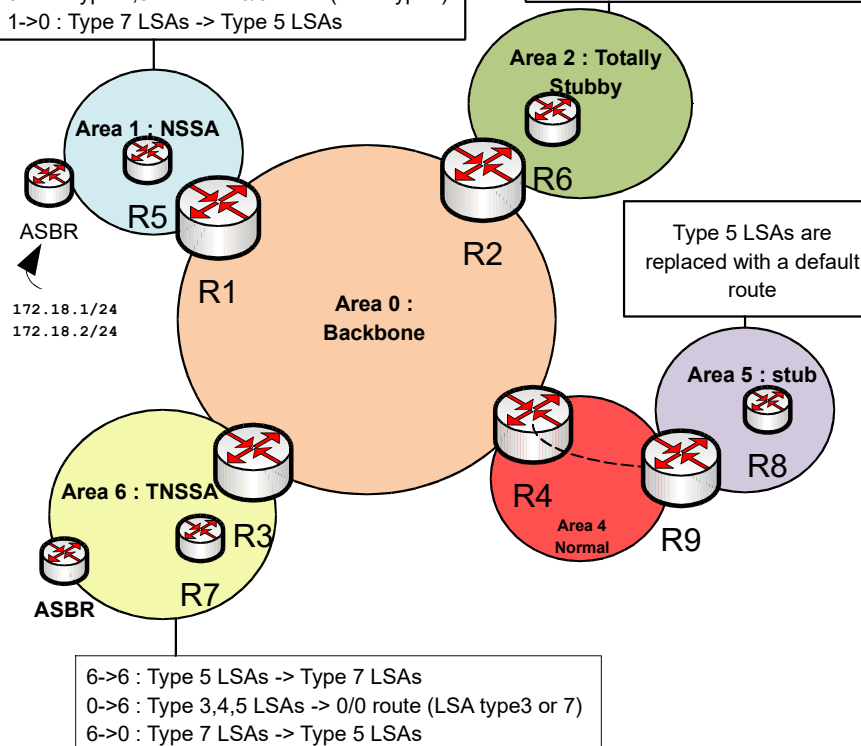
1->1 : Type 5 LSAs -> Type 7 LSAs
0->1 : Type 4,5 LSAs -> 0/0 route ( LSA type7)
1->0 : Type 7 LSAs -> Type 5 LSAs

Type 3,4,5 LSAs are replaced with a default route

**Area 2 : Totally Stubby**

## Config on R6 & R8

```
ospf {
    area 0.0.0.2 {
        stub;
        interface ...
    }
}
```

**Area 1 : NSSA**

ASBR

172.18.1/24
172.18.2/24

R5

R1

**Area 0 : Backbone**

R6

R2

Type 5 LSAs are replaced with a default route

**Area 5 : stub**

R8

## Config on R2

```
ospf {
    area 0.0.0.0 {
        interface ...
      }
    }
    area 0.0.0.2 {
        stub default-metric X no-summaries;
        interface ...
    }
}
```

## Config on R5 & R7

```
ospf {
    area 0.0.0.6 {
        nssa;
        interface ...
      }
    }
}
```

**Area 6 : TNSSA**

R3

R4

**Area 4 Normal**

R9

ASBR

R7

6->6 : Type 5 LSAs -> Type 7 LSAs
0->6 : Type 3,4,5 LSAs -> 0/0 route (LSA type3 or 7)
6->0 : Type 7 LSAs -> Type 5 LSAs

## Config on R4

```
ospf {
    area 0.0.0.0 {
        virtual-link neighbor-id <RID R9> transit-area 4;
        interface ...
      }
    area 0.0.0.4 {
        interface ...
      }
    }
}
```

## Config on R3

```
ospf {
    area 0.0.0.0 {
        interface ...
      }
    area 0.0.0.6 {
        nssa {
            default-lsa {
                 default-metric 10;
                 metric-type 1(or 2)
                 type-7;
            }
            no-summaries;
        }
        interface ...
      }
    }
}
```

## More OSPF

**Change router interface priority ( DR election / default 128 / highest is best )**
R1#set protocol ospf area 0 interface ge-0/0/0 pritority 200

**Change Interface metric ( default 1 for ge interfaces )**
R1#set protocol ospf area 0 interface ge-0/0/0 metric 100

**Set router-id manually**
R1#set routing-option router-id 192.168.1.1

**Set interface in a passive state**
R1#set protocol ospf area 0 interface lo0 passive

**Aggregate Internal routes before redistribution**
R1#set protocol ospf area 1 nssa area-range 172.18/24

**Change external route type ( default 2, metric does not change )**
R5#set policy-options policy-statement 5A8633k then external type 1
R5#set protocols ospf export 5A8633k

## Config on R9

```
ospf {
    area 0.0.0.0 {
        virtual-link neighbor-id <ABR RID> transit-area 4;
      }
    area 0.0.0.4 {
        interface ...
      }
    area 0.0.0.5 {
        stub default-metric 10
        interface ...
      }
    }
}
```