

```
R1:Area 0
conf t
int e0/0
Desc conn to R2-ABR
ip add 10.12.1.1 255.255.255.0
no sh
int e0/1
Desc conn to R3-ABR
ip add 10.13.1.1 255.255.255.0
no sh
int e0/2
Desc conn to R8 in area 2
ip add 10.18.1.1 255.255.255.0
no sh
int lo0
ip add 192.168.0.1 255.255.255.0
ip ospf network point-to-point
int lo1
ip add 192.168.1.1 255.255.255.0
ip ospf network point-to-point
int lo2
ip add 192.168.2.2 255.255.255.0
ip ospf network point-to-point
int lo3
ip add 192.168.3.3 255.255.255.0
ip ospf network point-to-point
exit
```

```
Router ospf 1
Router-id 1.1.1.1
Net 10.0.0.0 0.255.255.255 area 0
net 192.168.0.0 0.0.255.255 area 0
exit
```

```
R2:ABR
conf t
int e0/0
Desc conn to R1
ip add 10.12.1.2 255.255.255.0
no sh
int e0/1
Desc conn to R4
ip add 10.24.1.2 255.255.255.0
no sh
exit
```

```
Router ospf 1
Router-id 2.2.2.2
net 10.12.1.2 0.0.0.0 area 0
net 10.24.1.2 0.0.0.0 area 1
exit
```

```
R3:ABR
conf t
int e0/0
```

```
Desc conn to R1
ip add 10.13.1.3 255.255.255.0
no sh
int e0/1
Desc conn to R5
ip add 10.35.1.3 255.255.255.0
no sh
exit
```

```
Router ospf 1
Router-id 3.3.3.3
net 10.13.1.3 0.0.0.0 area 0
net 10.35.1.3 0.0.0.0 area 1
exit
```

```
R4:ASBR
conf t
int e0/0
Desc conn to R2 in area 1
ip add 10.24.1.4 255.255.255.0
no sh
int e0/2
Desc conn to R7 in area 1
ip add 10.47.1.4 255.255.255.0
no sh
int e0/1
Desc conn to R6-Eigrp 100
ip add 10.46.1.4 255.255.255.0
no sh
exit
```

```
router eigrp 100
net 10.46.1.4 0.0.0.0
exit
```

```
Router ospf 1
Router-id 4.4.4.4
net 10.24.1.4 0.0.0.0 area 1
net 10.47.1.4 0.0.0.0 area 1
exit
```

```
R5:ASBR
conf t
int e0/0
Desc conn to R3 in area 1
ip add 10.35.1.5 255.255.255.0
no sh
int e0/2
Desc conn to R7 in area 1
ip add 10.57.1.5 255.255.255.0
no sh
int e0/1
Desc conn to R6-Eigrp 100
ip add 10.56.1.5 255.255.255.0
no sh
```

exit

```
router eigrp 100
net 10.56.1.5 0.0.0.0
exit
```

```
Router ospf 1
Router-id 5.5.5.5
net 10.35.1.5 0.0.0.0 area 1
net 10.57.1.5 0.0.0.0 area 1
exit
```

```
R7:Area 1
conf t
int e0/0
Desc conn to R4
ip add 10.47.1.7 255.255.255.0
no sh
int e0/1
Desc conn to R5
ip add 10.57.1.7 255.255.255.0
no sh
exit
```

```
Router ospf 1
router-id 7.7.7.7
exit
```

```
int range e0/0-1
ip ospf 1 area 1
exit
```

```
R2:ABR summ
 8 8 X H
192.168.0.0
192.168.1.0
192.168.2.0
192.168.3.0
```

```
Third octet
 128 64 32 16 8 4 |2 1
0   0 0 0 0 0 0 0 0
3   0 0 0 0 0 0 1 1
AND 0 0 0 0 0 0 0 0 =0
```

```
192.168.0.0/22
255.255.252.0
```

```
R2: ABR
router ospf 1
area 0 range 192.168.0.0 255.255.252.0
exit
```

```
R3:ABR
router ospf 1
area 0 range 192.168.0.0 255.255.252.0
area 0 range 192.168.2.0 255.255.255.0
exit
```

```
=====
R6:Eigrp 100
conf t
int e0/0
Desc conn to R4
ip add 10.46.1.6 255.255.255.0
no sh
int e0/1
Desc conn to R5
ip add 10.56.1.6 255.255.255.0
no sh
int lo0
ip add 200.1.1.1 255.255.255.0
exit
```

```
Router eigrp 100
net 0.0.0.0
exit
```

```
Conditional Redistribution on R4/R5-ASBR's
R4/R5
Access-list 1 permit 200.1.1.0 0.0.0.255
```

```
Route-map RM permit 10
match ip add 1
exit
```

```
Router ospf 1
redistribute eigrp 100 subnets route-map RM
exit
```

```
router ospf 1
redistribute eigrp 100 subnets route-map RM metric 19
exit
```

```
O E2
-----
```

```
R4/R5
Seed 20 FWD 20
R1:ECMP
```

```
R4
Seed 19 FWD 20
R5
Seed 20 FWD 20
```

R1:  
R4 as best path

R4  
Seed 19 FWD 25  
R5  
Seed 20 FWD 20  
R1:  
R4 as best path

R4  
Seed 19 FWD 25  
R5  
Seed 19 FWD 20  
R1:  
R5 as best path

=====

O E1

-----

R4  
E1  
Seed 19 FWD 20  
R5  
E2  
Seed 19 FWD 20  
R1:  
R4 E1>E2

R4  
E1  
Seed 19 FWD 30  
R5  
E2  
Seed 19 FWD 20  
R1:  
R4 E1>E2

R4  
E1  
Seed 19 FWD 20  
R5  
E1  
Seed 19 FWD 20  
R1:  
ECMP

R4  
E1  
Seed 19 FWD 25  
R5  
E1  
Seed 19 FWD 20

R1:  
ECMP

R4:  
access-list 1 permit 200.1.1.0 0.0.0.255  
access-list 2 permit 100.1.1.0 0.0.0.255

route-map RM permit 10  
  match ip address 1  
  set metric-type type-1  
!  
route-map RM permit 20  
  match ip address 2  
  set metric-type type-2

Router ospf 1  
redistribute eigrp 100 subnets route-map RM  
exit

R5:  
access-list 1 permit 200.1.1.0 0.0.0.255  
access-list 2 permit 100.1.1.0 0.0.0.255

route-map RM permit 10  
  match ip address 1  
  set metric-type type-1  
!  
route-map RM permit 20  
  match ip address 2  
  set metric-type type-2  
exit

Router ospf 1  
redistribute eigrp 100 subnets route-map RM  
exit

=====  
Stub  
R8:ABR  
conf t  
int e0/1  
Desc conn to R1 in area 0  
ip add 10.18.1.8 255.255.255.0  
no sh  
int e0/0  
Desc conn to R9 in area2  
ip add 10.89.1.8 255.255.255.0  
no sh  
exit  
Router ospf 1  
router-id 8.8.8.8  
net 10.18.1.8 0.0.0.0 area 0

```
net 10.89.1.8 0.0.0.0 area 2
exit
```

```
R9 Area 2
conf t
int e0/0
Desc conn to R8 in area2
ip add 10.89.1.9 255.255.255.0
no sh
exit
```

```
Router ospf 1
net 10.89.1.9 0.0.0.0 area 2
exit
```

Stub:

-----

```
R8:ABR
router ospf 1
area 2 stub
exit
```

```
R9:
router ospf 1
area 2 stub
exit
```

Stub:

Area 0 cannot be stub  
ABR blocks LSA type 4,5 (O E1,O E2)  
Allows LSA type1,2,3 ( O ,O IA , O \* IA)  
Installs a default route of type 3 with cost 1 to reach external NW's

Total stubby area:

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Stub:

-----

```
R8:ABR
router ospf 1
area 2 stub no-summary
exit
```

```
R9:
router ospf 1
area 2 stub
exit
```

Stub:

Area 0 cannot be total stub  
ABR blocks LSA type 3,4,5 (O IA ,O E1,O E2)  
Allows LSA type1,2,3 -Default ( O , O \* IA)

Installs a default route of type 3 with cost 1 to reach external NW's