OSPFv2 --ipv4
ospfv3 --ipv6
ospfv3 add family ipv4/ipv6 (Mandatory)

ipv6 is a logical address
 128 bit written in hexadecimal

Number systems
Base 2 binary   0,1
Base 10 decimal 0-9
Base 16 hexadecimal 0-9,A-F

Dec	Hex	Bin
		8421
0	0	0000
1	1	0001
2	2	0010
3	3	0011
4	4	0100
5	5	0101
6	6	0110
7	7	0111
8	8	1000
9	9	1001
10	A	1010
11	B	1011
12	C	1100
13	D	1101
14	E	1110
15	F	1111

2340:0000:0010:0100:1000:ABCD:0101:1010

1.Omit leading zeroes
2.Replace continious occurence of zeroes with :: (once)

2340::10:100:1000:ABCD:101:1010

210F:0000:0000:0000:CCCC:0000:0000:000D

210F::CCCC:0:0:D

210F:0000:0000:0001:0000:0000:0000:000D

210F:0:0:1::D

210F:0000:0000:0001:CCCC:0000:0000:000D

210F::1:CCCC:0:0:D

210F:0:0:1:CCCC::D

```
Prefix     64                          Interface ID  64
-----------------------------------   ----------------------------------
2340:0000:0010:0100  :1000:ABCD:0101:1010

RFC 1918
10.0.0.0/8
172.16.0.0/12
192.168.0.0/16

RFC 3330
0.0.0.0/8
169.254.0.0/16  -Link local
127.0.0.0/8


Global Unicast Address (Public address)

2000::/3

0010 ---> 2   (IN USE)
0011 ---> 3


LLA
FE80::/10

1111 1110 10|00  --> FE80  (IN USE)
1111 1110 10|01 --> FE90
1111 1110 10|10 -->FEA
1111 1110 10|11 ->FEB


ULA

FC00::/7

1111 110|0   ---> FC
1111 110|1   ---> FD  (IN USE)

Multicast
FF

int e0/0
ipv6 add 2001::1/64
no sh
exit
            Interface ID
FE80::A8BB:CCFF:FE00:100

aabb.cc00.0100   ---> 48 bit

aabb.cc    00.0100  ---> Splits the mac address in 2 halves 24 bits each

aabb.cc FFFE   00.0100   ---> inserts a 16 bit value FFFE between the the 2 halves

aabb:ccFF:FE00:0100   ----> Flips the 7th bit ( if the 7th is 0 it will change it
to 1 , if 1 changes to 0)
a           a
 1234 5678
```

1010 1010

1010 1000   A8bb:ccFF:FE00:0100

FE80::A8BB:CCFF:FE00:0100
prefix   interface ID
FE80:0000:0000:0000:   A8BB:CCFF:FE00:0100

ICANN -Owns the process of ipv4/ipv6
|
IANA -carries out the policies
|
RIR
|
NIR/ISP/LIR
|
End user

R1:
```
conf t
int e0/0
ipv6 add 2001::1/64
no sh
int e0/1
ipv6 add FD11::1111/64
no shut
exit

ipv6 unicast-routing

ipv6 router ospf 1
router-id 1.1.1.1
exit

int range e0/0-1
ipv6 ospf 1 area 0
exit
```

R2
```
conf t
int e0/0
ipv6 add 2222::2/64
no sh
int e0/1
ipv6 add FD22::2222/64
no shut
exit
```

```
ipv6 unicast-routing

ipv6 router ospf 1
router-id 2.2.2.2
exit

int range e0/0-1
ipv6 ospf 1 area 0
exit
```

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OSPFv3 Address family

R1:

```
conf t
int e0/0
ip add 10.12.1.1 255.255.255.0
ipv6 add 2001::1/64
no sh
int e0/1
ipv6 add FD11::1111/64
ip add 192.168.1.1 255.255.255.0
no shut
exit
```

R2:

```
conf t
int e0/0
ip add 10.12.1.2 255.255.255.0
ipv6 add 2222::2/64
no sh
int e0/1
ip add 192.168.2.2 255.255.255.0
ipv6 add FD22::2222/64
no shut
int e0/2
ip add 10.23.1.2 255.255.255.0
ipv6 add 2233::22/64
no sh
exit
```

R3:

```
conf t
int e0/0
ip add 10.23.1.3 255.255.255.0
ipv6 add 2233::33/64
no sh
int e0/1
ip add 192.168.3.3 255.255.255.0
ipv6 add FD33::3333/64
no shut
exit
```

OSPFV3 AF:

R1:
```
router ospfv3 1
address-family ipv4 unicast
router-id 1.1.1.1
address-family ipv6 unicast
router-id 1.1.1.111
exit
int r e0/0-1
ospfv3 1 ipv4 area 0
ospfv3 1 ipv6 area 0
exit
```

R2;
```
router ospfv3 1
address-family ipv4 unicast
router-id 2.2.2.2
address-family ipv6 unicast
router-id 2.2.2.22
exit

int r e0/0
ospfv3 1 ipv4 area 0
ospfv3 1 ipv6 area 0
exi

int r e0/1
ospfv3 1 ipv4 area 1
ospfv3 1 ipv6 area 1
exi
```

R3:
```
router ospfv3 1
address-family ipv4 unicast
router-id 3.3.3.3
address-family ipv6 unicast
router-id 3.3.3.33
exit
int r e0/0-1
ospfv3 1 ipv4 area 1
ospfv3 1 ipv6 area 1
exit
```

```
sh ospf neig
```