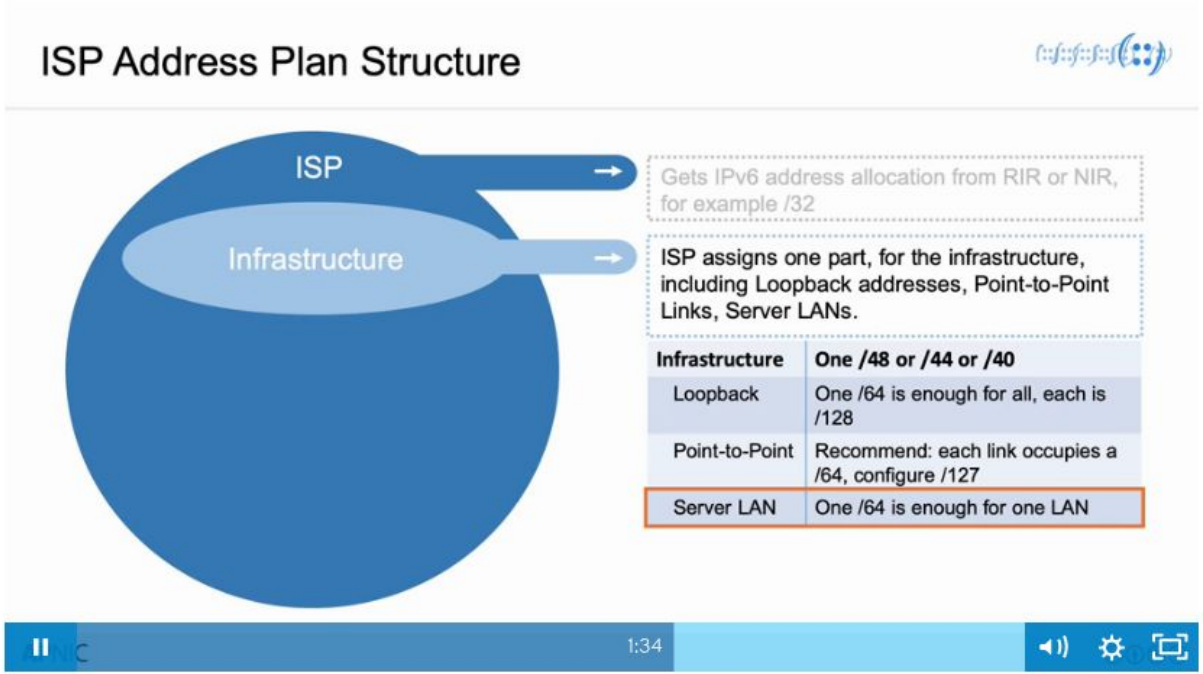
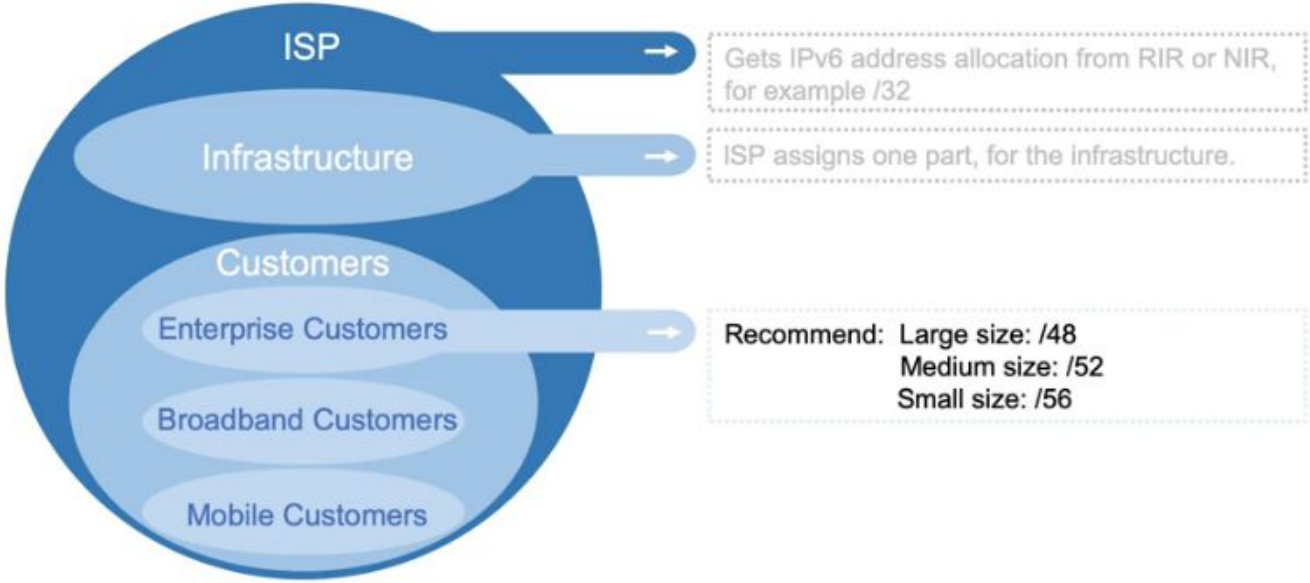
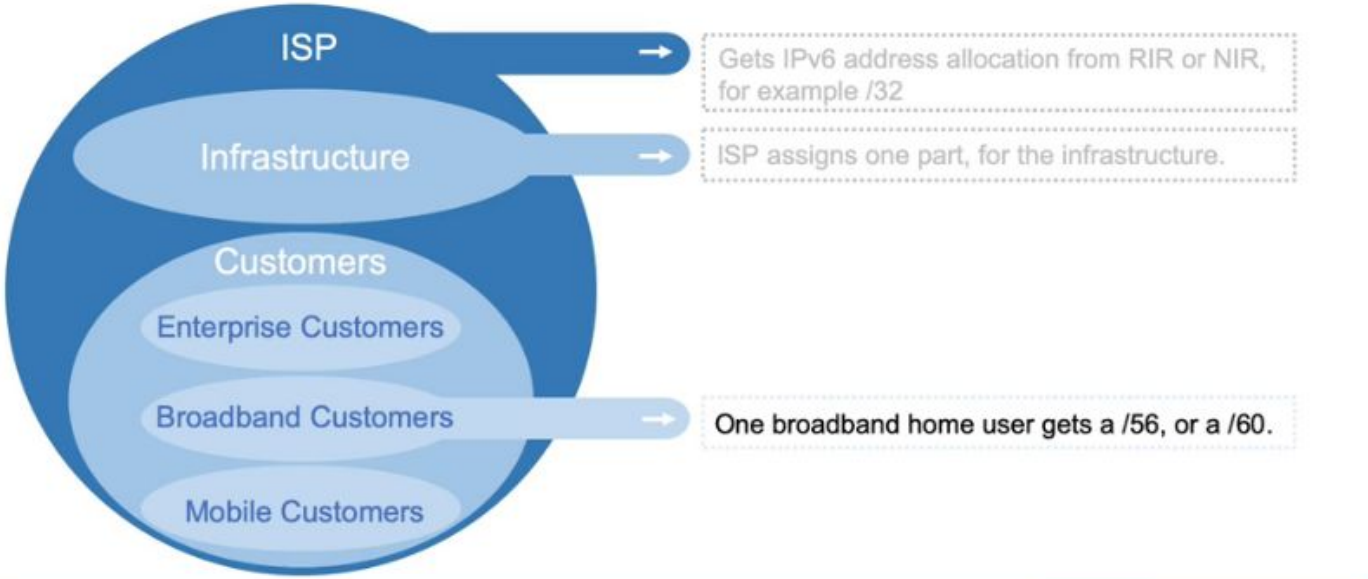
ISP IPv6 Address Planning Structure



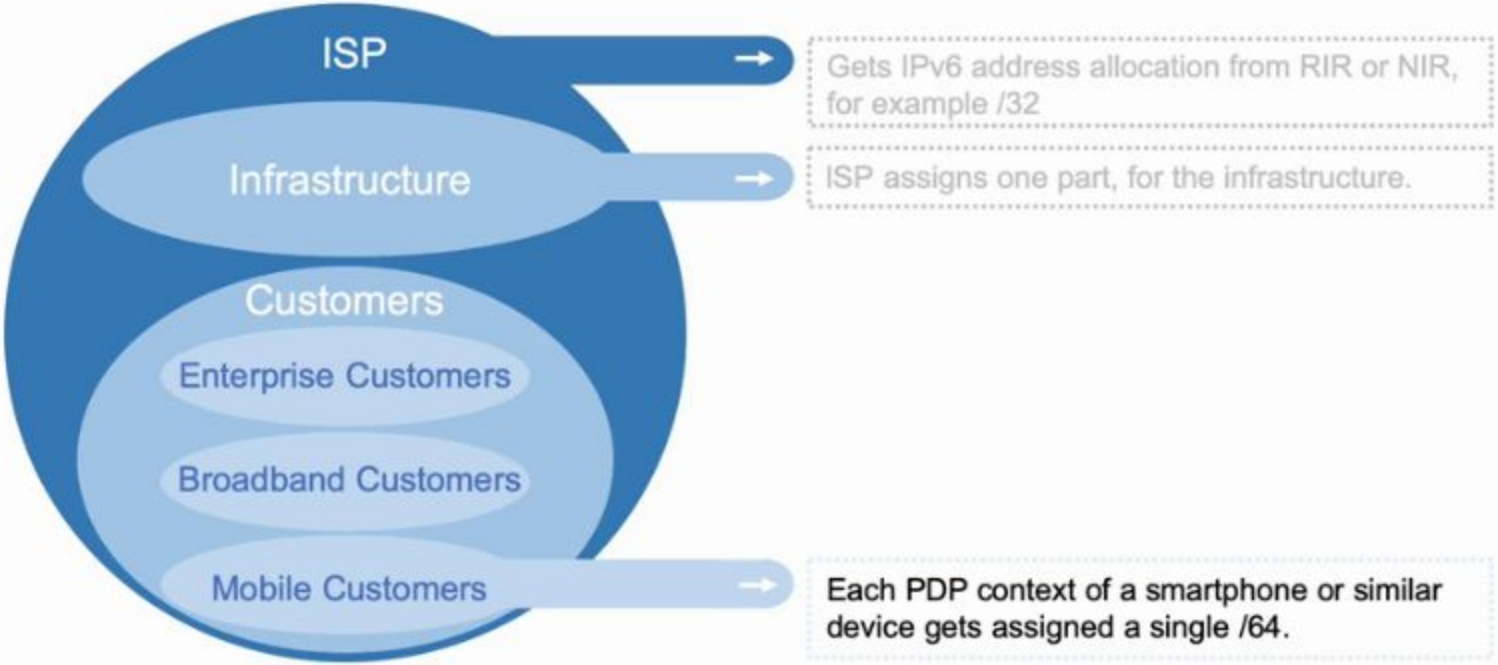
ISP Address Plan Structure



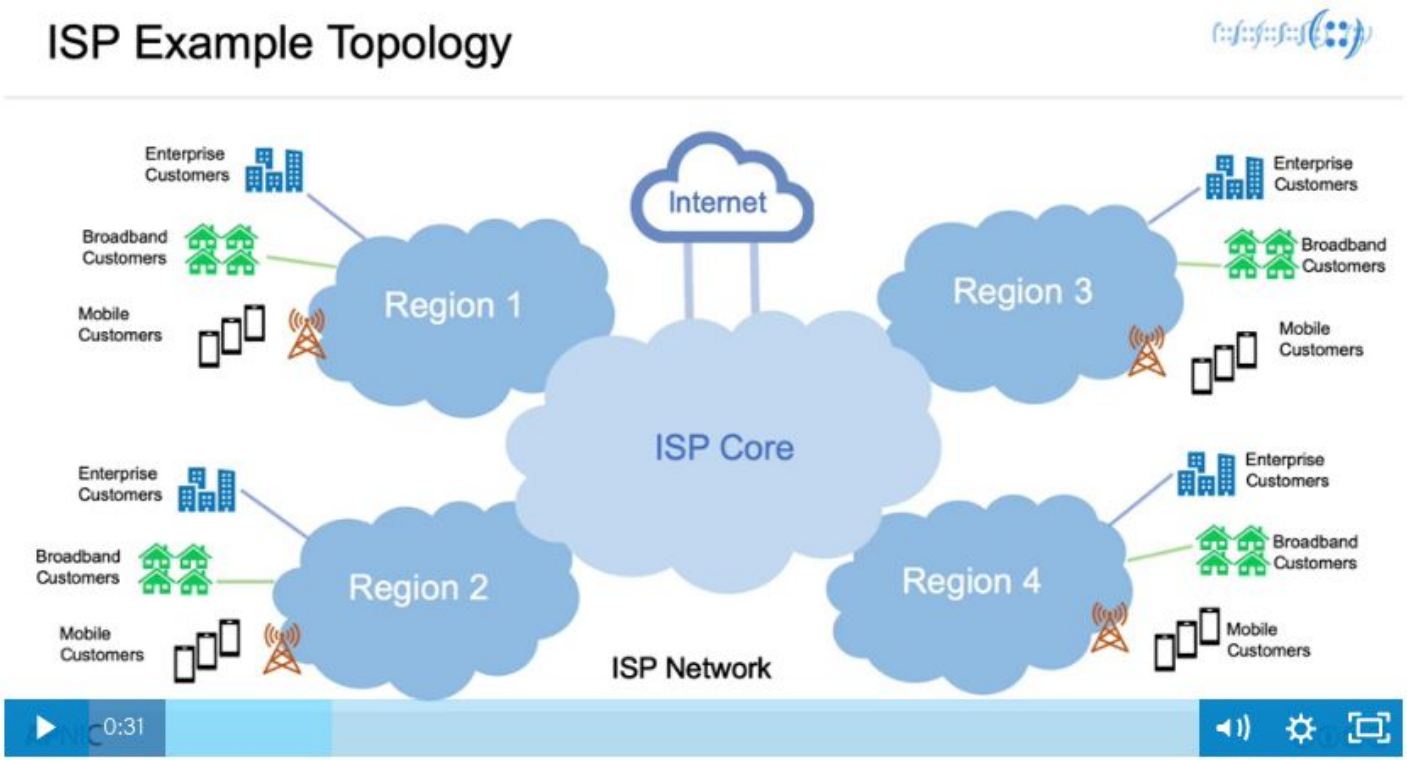
ISP Address Plan Structure



ISP Address Plan Structure



ISP IPv6 Address Planning Structure

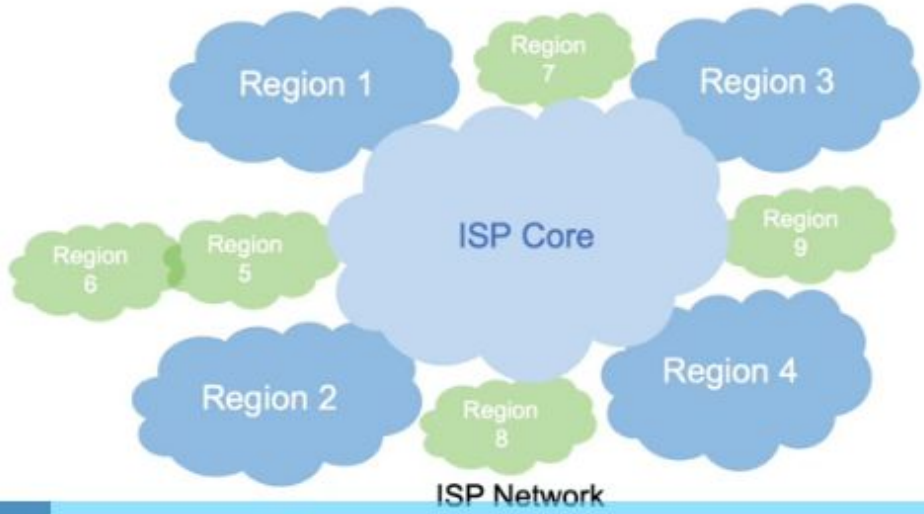


ISP IPv6 Address Allocation

- For example, the ISP has been allocated 2001:db8::/32 by the RIR.

IPv6 Address Plan: ISP Regions

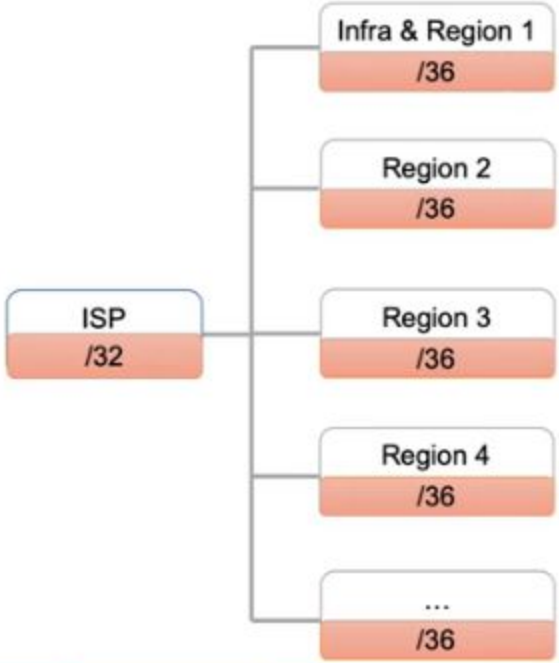
- This example ISP network has 4 regions currently, but there are plans to expand to 9 regions in future years. The network will use a 4-bit nibble for subnetting its regions.



2001:db8:0000::/32

Nibble for subnetting regions

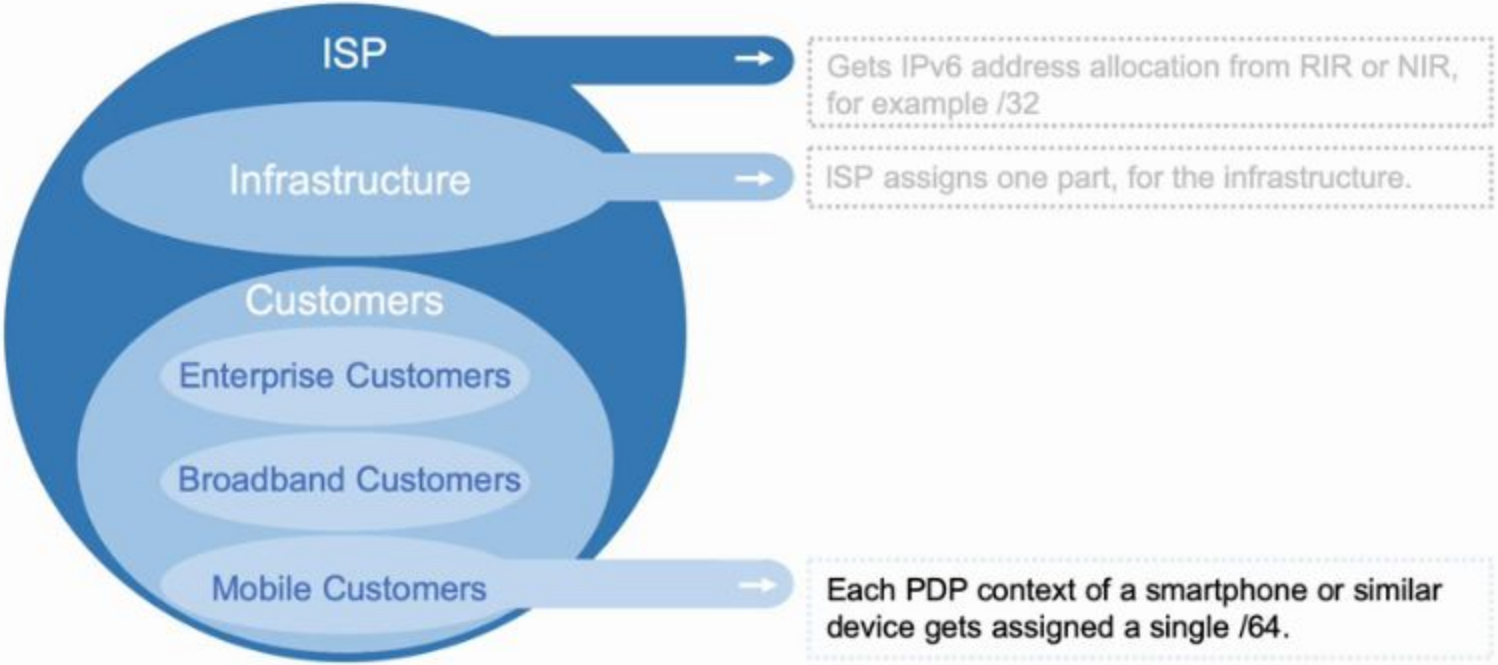
ISP IPv6 Address Distribution



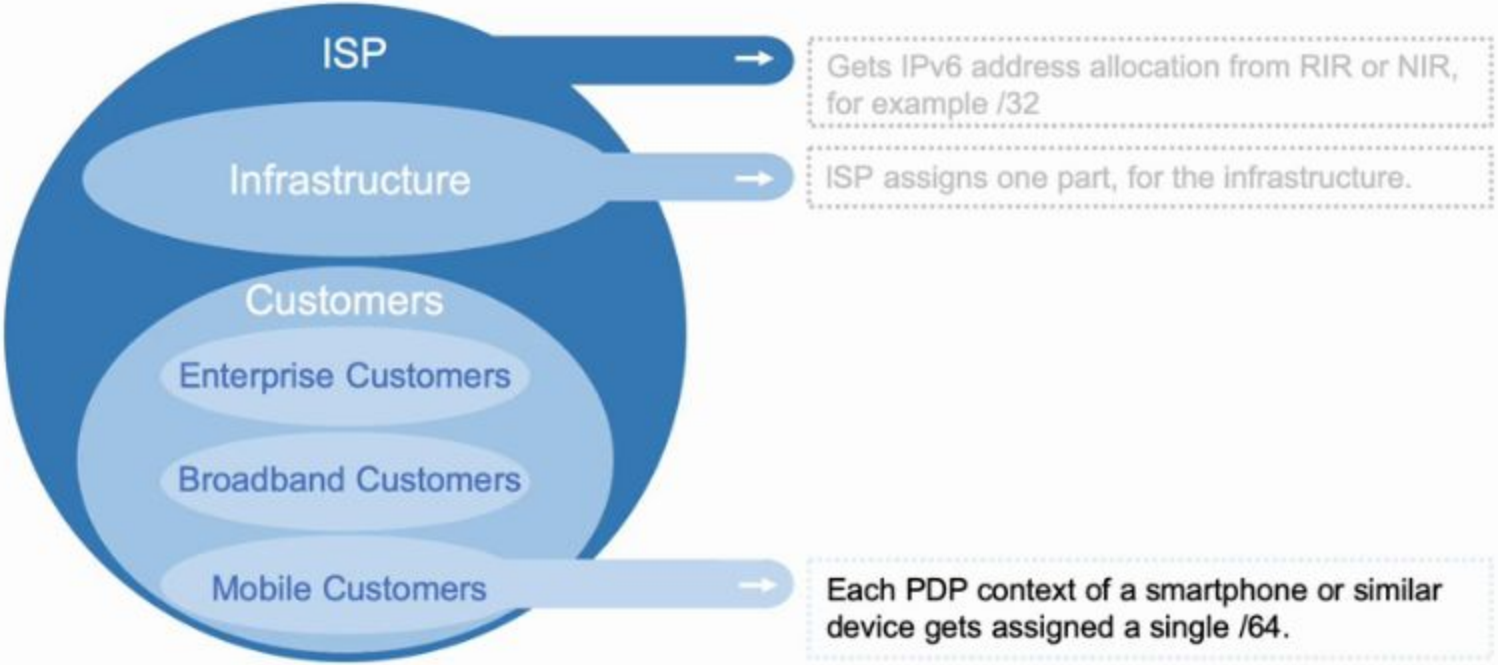
IPv6 Address Plan: ISP Regions

Function	Assigned IPv6 Address
Infrastructure and Region 1 customers	**2001:db8:0000::/36**
Reserved for future	2001:db8:1000::/36
Reserved for future	2001:db8:2000::/36
Reserved for future	2001:db8:3000::/36
Region 3 customers	**2001:db8:4000::/36**
Reserved for future	2001:db8:5000::/36
Reserved for future	2001:db8:6000::/36
Reserved for future	2001:db8:7000::/36
Region 2 customers	**2001:db8:8000::/36**
Reserved for future	2001:db8:9000::/36
Reserved for future	2001:db8:a000::/36
Reserved for future	2001:db8:b000::/36
Region 4 customers	**2001:db8:c000::/36**
Reserved for future	2001:db8:d000::/36
Reserved for future	2001:db8:e000::/36
Reserved for future	2001:db8:f000::/36

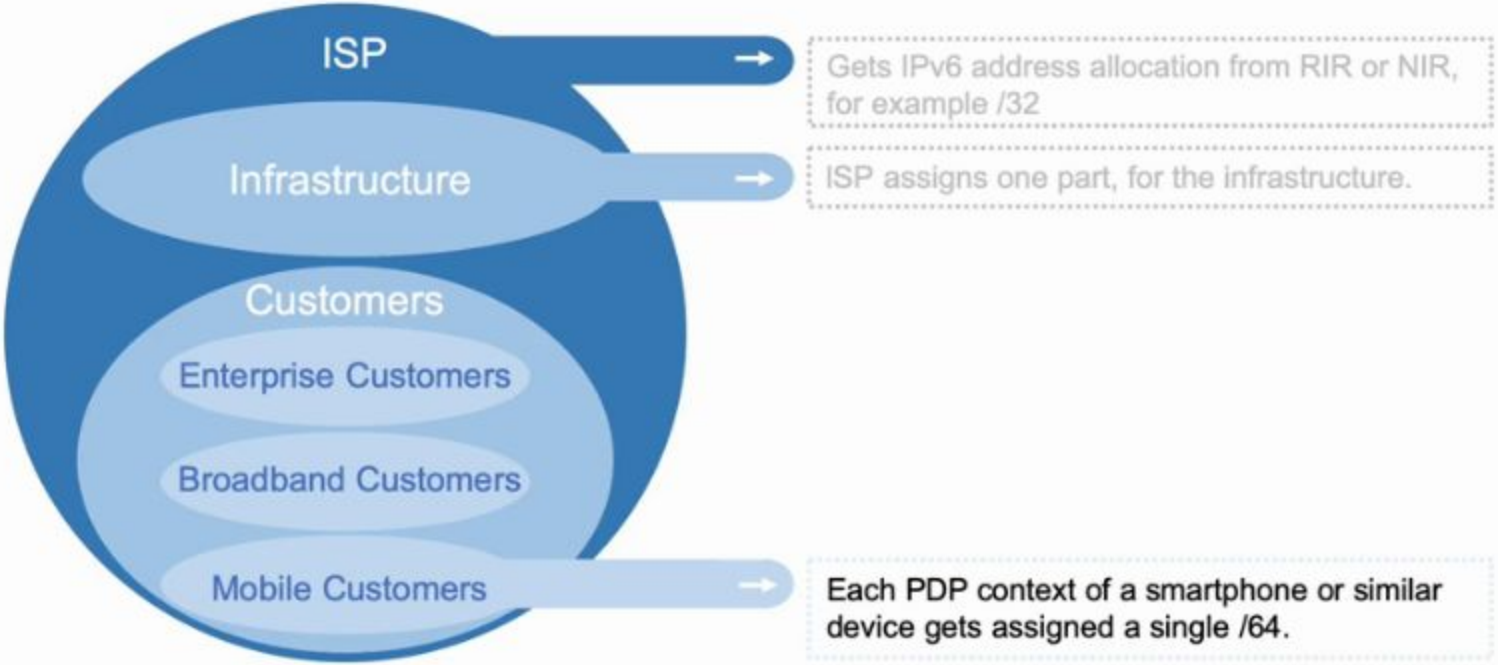
ISP Address Plan Structure



ISP Address Plan Structure



ISP Address Plan Structure



Topic 1.4: Address Allocation Methods

Topic Progress:

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Example of Sequential Allocation Method

- Here is an example of how an ISP may distribute IPv6 address blocks to its regions using the sequential allocation method.

The ISP is allocating 2001:db8::/32 prefix to multiple regions; each region has a /40.

Regions	IPv6 Address Block
Region 1	2001:db8:0000::/40
Region 2	2001:db8:0100::/40
Region 3	2001:db8:0200::/40
Region 4	2001:db8:0300::/40
Region 5	2001:db8:0400::/40
…	…

Topic 1.4: Address Allocation Methods

Topic Progress:

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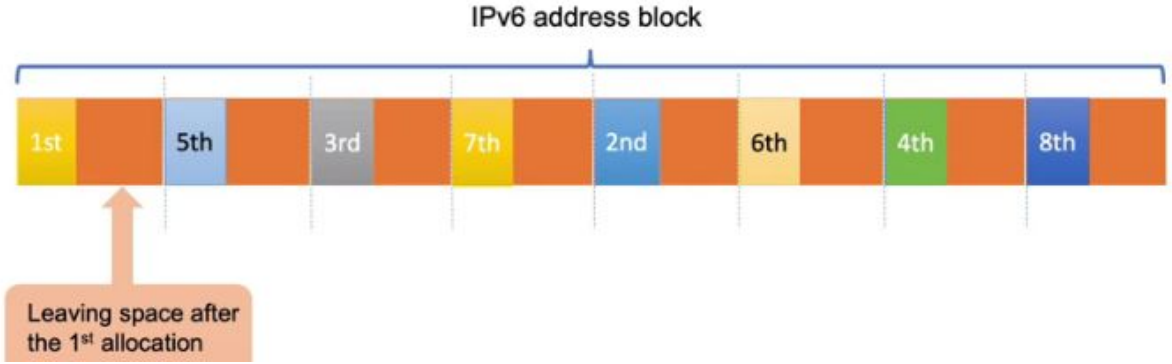
Sparse Allocation Method

- Sparse allocation method is about leaving a lot of space in between address allocations.
- The effect of the sparse allocation method is to create assignments that are spaced apart from one another, ensuring assignments can grow as needed while maintaining route aggregation.



Topic 1.4: Address Allocation Methods

Topic Progress:

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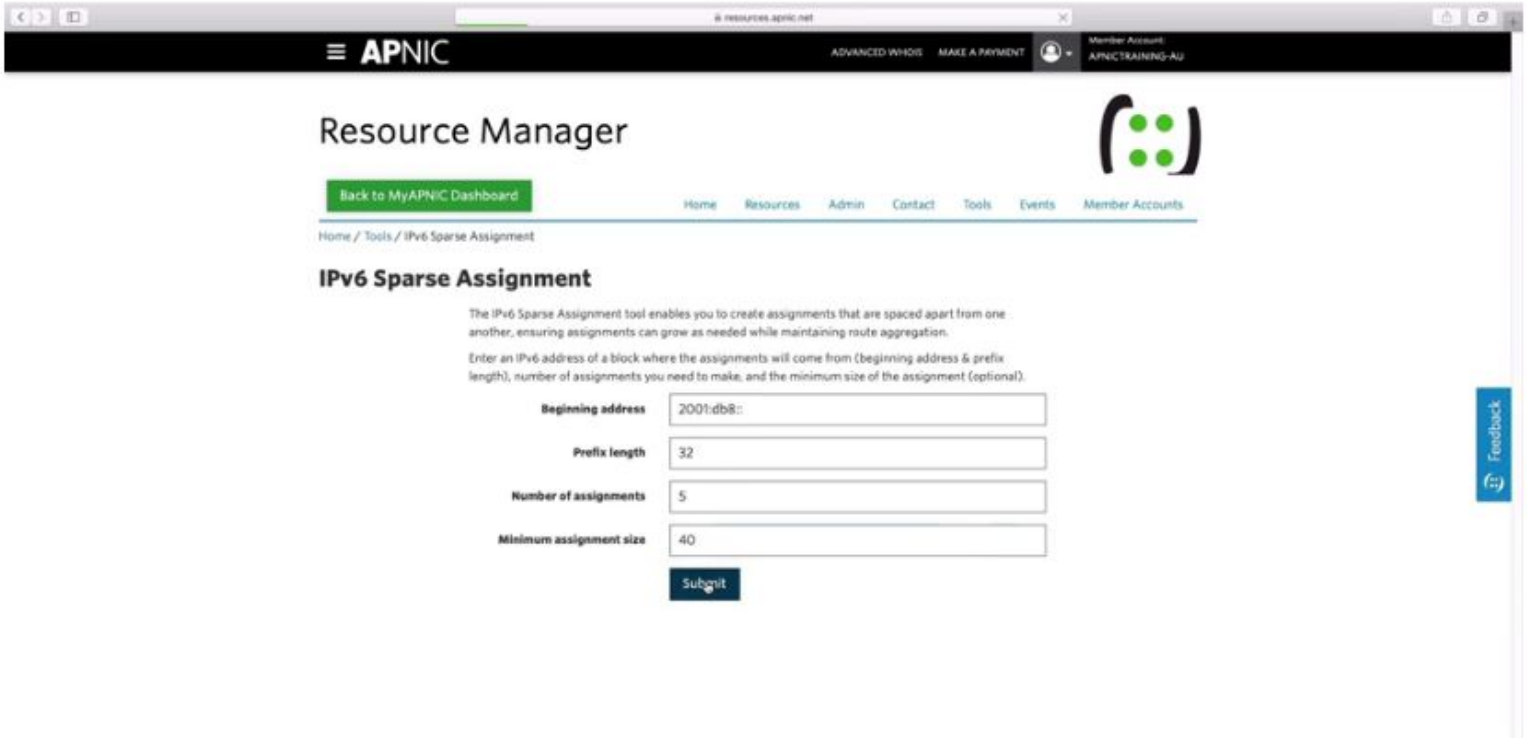

Topic 1.4: Address Allocation Methods

Topic Progress:

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Example of Sparse Allocation Method

- Here is an example of how an ISP distributes IPv6 address blocks to its regions using the sparse allocation method.

The ISP will allocate 2001:db8::/32 prefix to multiple regions; each region has a /40.

Regions	IPv6 Address Block
Region 1	2001:db8:0000::/40
Region 2	2001:db8:8000::/40
Region 3	2001:db8:4000::/40
Region 4	2001:db8:c000::/40
Region 5	2001:db8:2000::/40
…	…

You can see the allocation is using the sparse allocation method.

Topic 2.4: Nibble Boundary

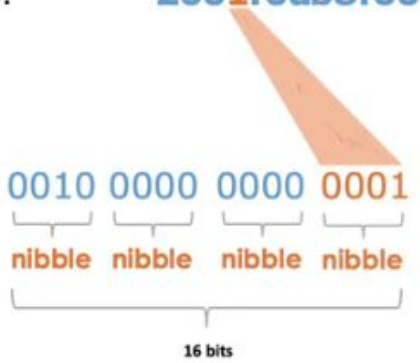
Topic Progress:

← Back to Module

Review of Nibble

Components of an IPv6 address:

Example: 2001:0db8:0000:0000:0000:036e:1250:2b00



Dec	Hex	Binary
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

Topic 2.4: Nibble Boundary

Topic Progress:

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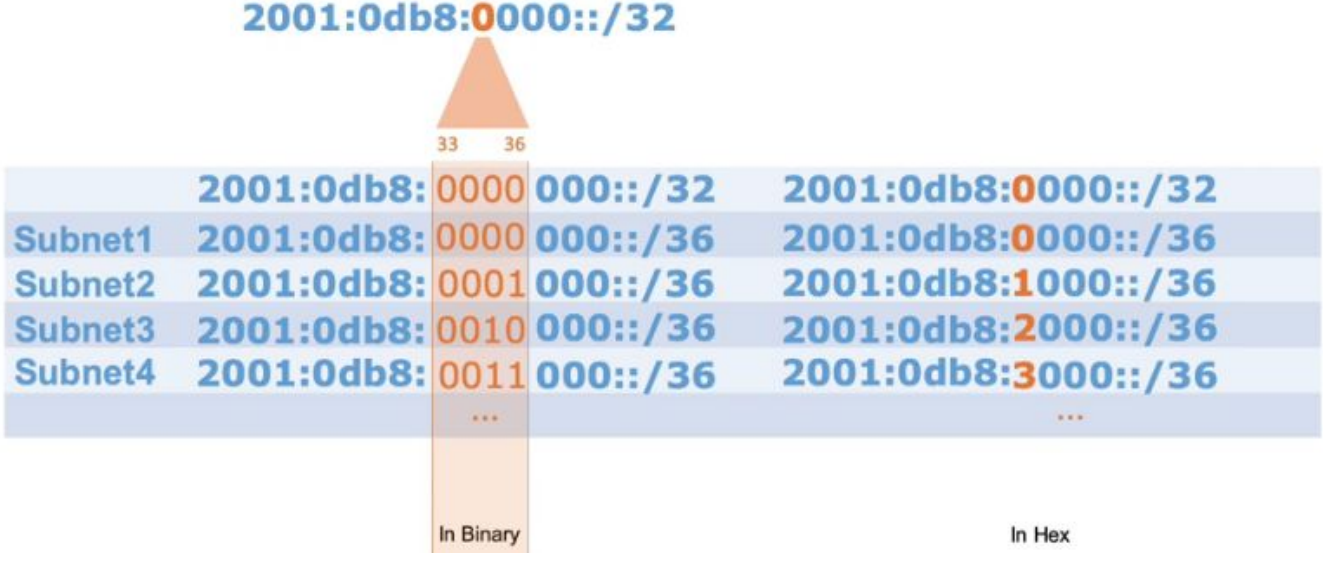
Subnet /32 into /36



Topic 5.2: Enterprise Network IPv6 Address Planning Scenario

Topic Progress:

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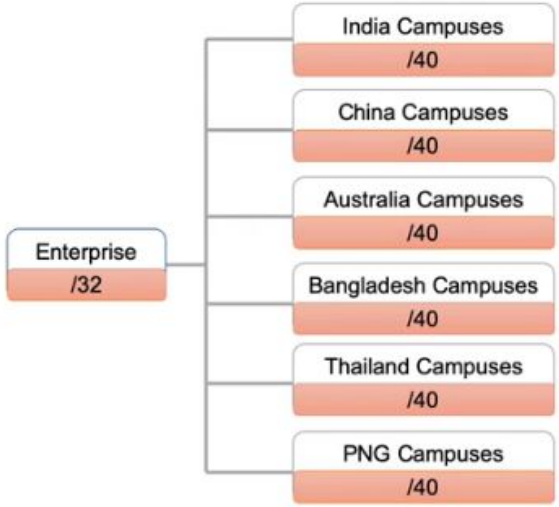
Enterprise Network IPv6 Address Distribution



Function	Assigned IPv6 Address
Enterprise	2001:db8::/32
India Campuses	2001:db8:0000::/40
China Campuses	2001:db8:0100::/40
Australia Campuses	2001:db8:0200::/40
Bangladesh Campuses	2001:db8:0300::/40
Thailand Campuses	2001:db8:0400::/40
PNG Campuses	2001:db8:0500::/40
Reserved for future	2001:db8:0600::/40
	...
	2001:db8:ff00::/40

Topic 5.2: Enterprise Network IPv6 Address Planning Scenario

Topic Progress:

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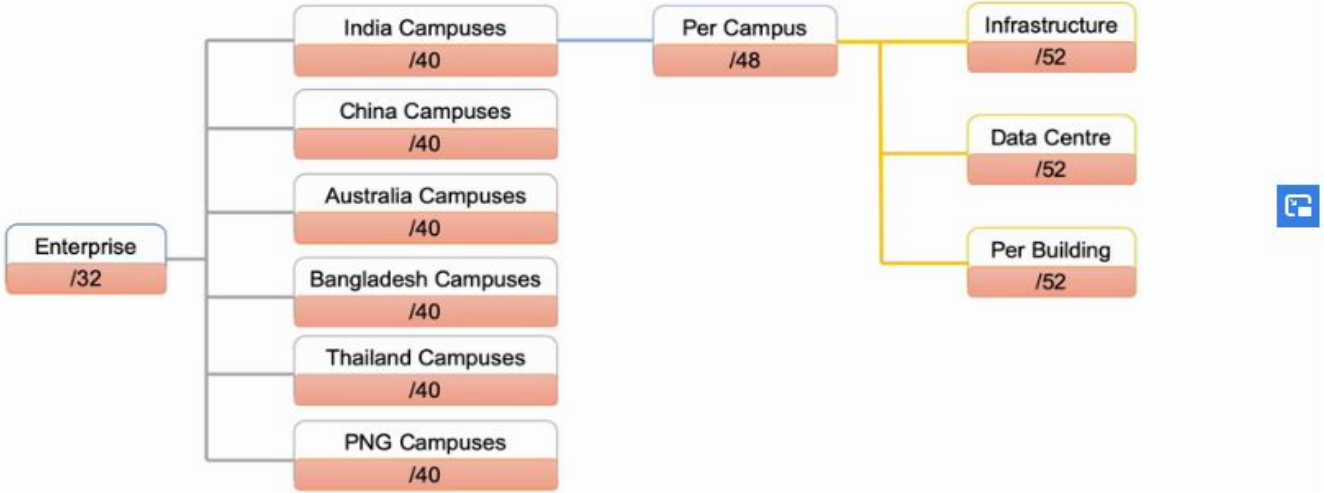
Enterprise Network IPv6 Address Distribution



Topic 5.2: Enterprise Network IPv6 Address Planning Scenario

Topic Progress:

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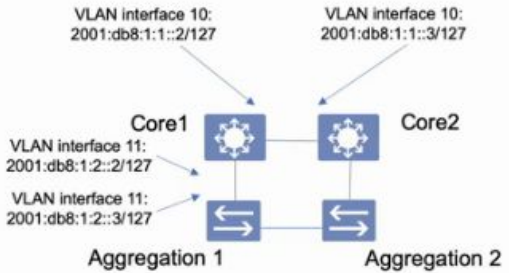
IPv6 Address Plan: Point-to-Point Link



RFC

Function	Assigned IPv6 Address
India-Campus1	2001:db8:0001::/48
Infrastructure	2001:db8:0001:0000::/52
Loopback interfaces	2001:db8:0001:0000::/56
Point-to-Point links	2001:db8:0001:0100::/56
Reserved	2001:db8:0001:0100::/64
Core1-Core2 P-to-P link	2001:db8:0001:0101::/64
Core1 VLAN interface 10	2001:db8:0001:0101::2/127
Core2 VLAN interface 10	2001:db8:0001:0101::3/127
Core1-Agg1 P-to-P link	2001:db8:0001:0102::/64
Core1 VLAN interface 11	2001:db8:0001:0102::2/127
Agg1 VLAN interface 11	2001:db8:0001:0102::3/127
…	…
Network services	2001:db8:0001:0200::/56
Reserved for future	2001:db8:0001:0300::/56

Topic Progress:

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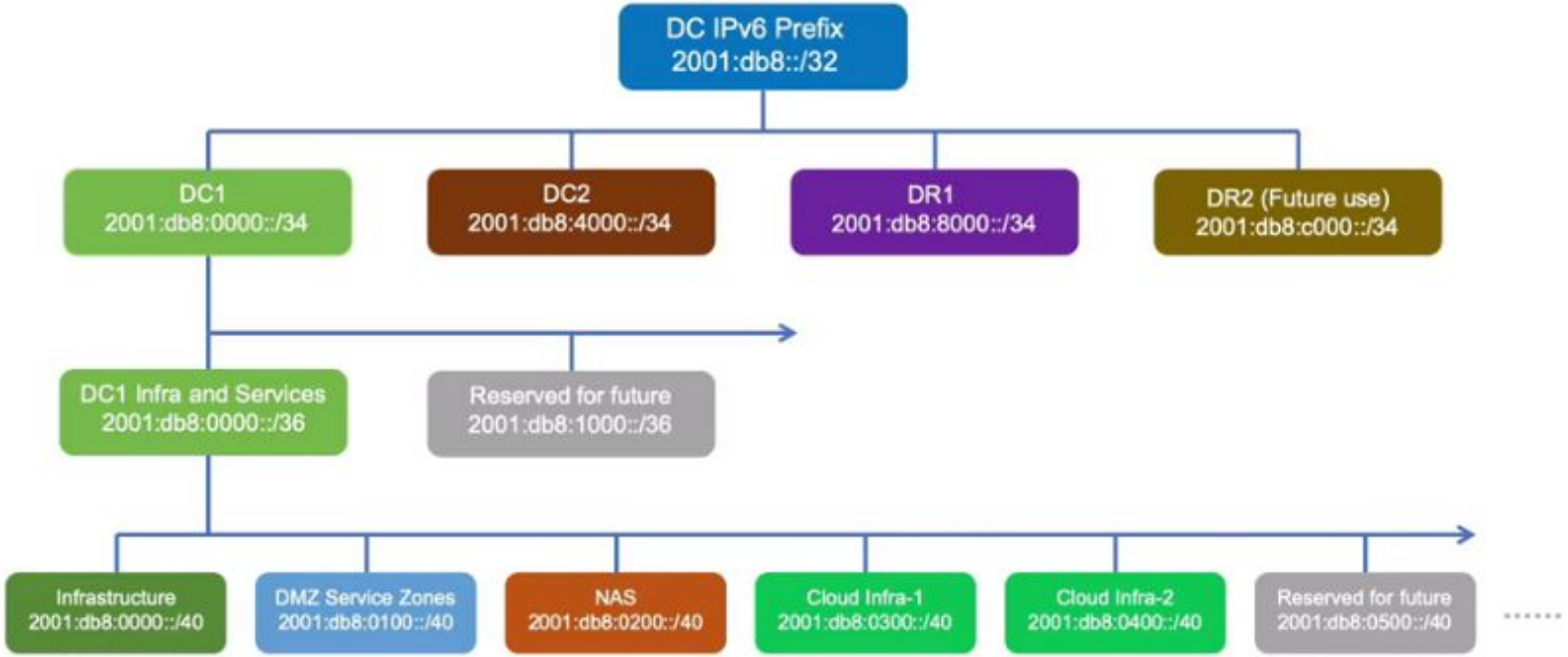
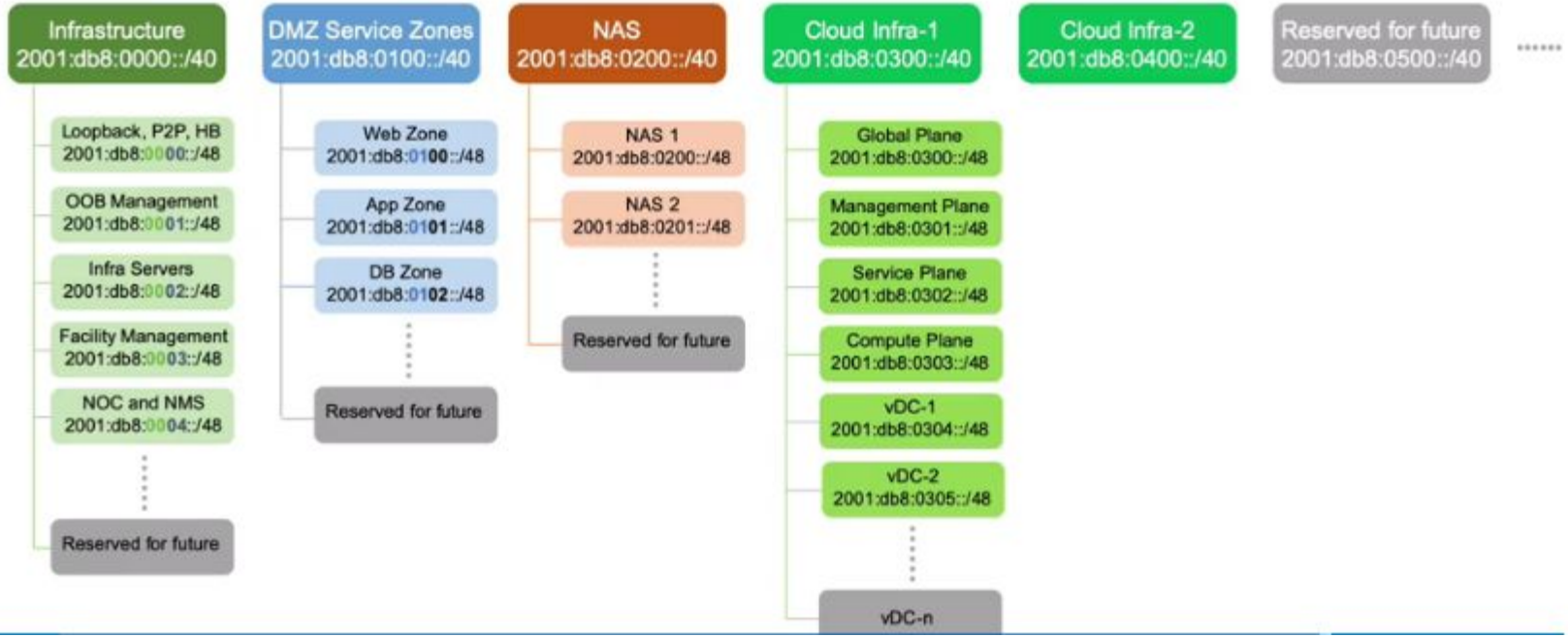
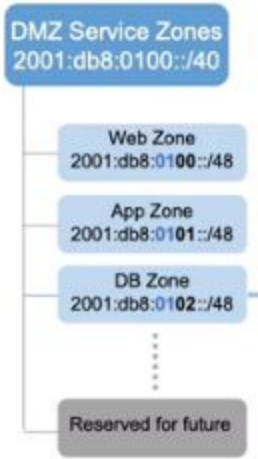
IPv6 Address Structure: Enterprise DC



IPv6 Address Plan for Data Centre



IPv6 Address Plan: DMZ Service Zones



Component	Assigned IPv6 Address
DB Zone-1	2001:db8:0102:0000::/64
DB Zone-2	2001:db8:0102:0001::/64
DB Zone-3	2001:db8:0102:0002::/64
…	…

- DB Zone
  - Web and App may access the DB VMs
  - External access are not allowed

Getting IPv6 Global Unicast Addresses