SUNWAY
INT'L BUSINESS SCHOOL

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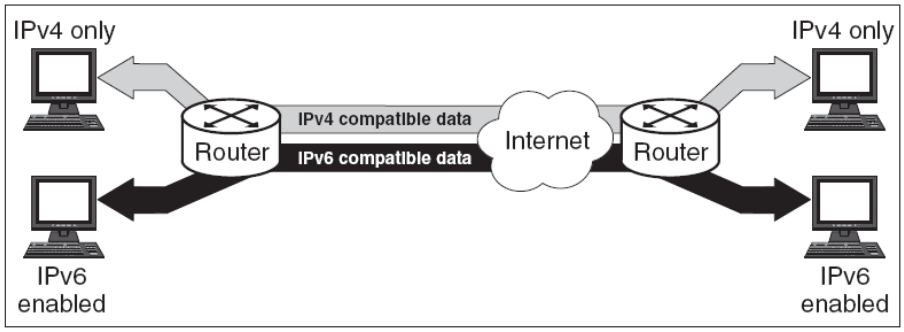
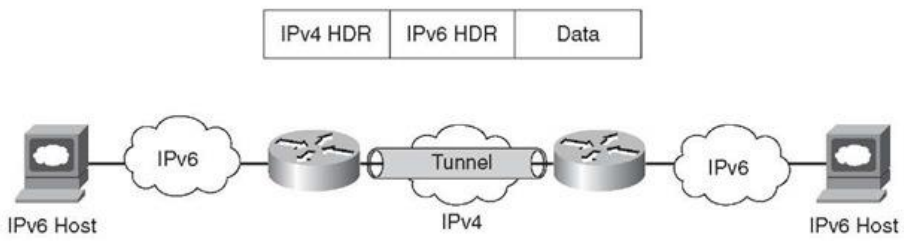
1. **IPv6 was developed by the Internet Engineering Task Force (IETF) to replace IPv4. Launched in 1998, the main and most obvious feature of IPv6 is extending IP addresses from 32 bits to 128 bits, allowing for more growth in the future and relief for the shrinking number of available network addresses. In order for IPV4 to communicate effectively with IPV6, Migration has to take place. Explain with a support of a diagram THREE (3) method to enable this process.**

   Migration is required for IPV4 and IPV6 to communicate successfully. A diagram should be used to explain three methods for enabling this operation.
   The methods for transitioning from IPV4 to IPV6 are enlisted below:

   Double stack:
   The ability of a device to operate both IPv4 and IPv6 at the same time is referred to as dual stack. It is a very flexible coexistence strategy since it allows hosts to access both IPv4 and IPv6 material at the same time. A dual-stack device is equipped with network ports that can simultaneously send and receive IPv4 and IPv6 packets. Other dual-stacked devices, as well as IPv4 and IPv6 devices, can connect with the dual-stacked device. Both devices agree on which IP version to use when they're dual stacked.



   Tunneling:
   IPV6 Tunneling connects two locations by encapsulating IPv4 and IPv6 packets in an IPv6 VPN. It's used to create a virtual point-to-point connection between two IPv6 nodes. There is no information regarding the settings or the existence of the distant tunnel endpoint in IPv6 tunnels. Once an IPv6 Tunnel is formed, packets are encapsulated and routed regardless of whether or not the decapsulating device is available. Manually designed IPv6 over IPv4 tunneling, IPv6 over IPv4 GRE tunneling, semi-automatic tunneling, fully automatic tunneling, and ISATAP tunneling are all options for tunneling IPv6 over existing IPv4 networks.



Translation:

An IPv4-addressed host on the Internet sends a request to an IPv6-capable server that does not recognize IPv4 addresses. In this case, the NAT-PT device can assist them in connecting. The NAT-PT device/router strips the IPv4 packet, removes the IPv4 header, inserts the IPv6 header, and delivers it across the Internet when an IPv4 host sends an IPv6 server a request packet. The router responds in the same way as an IPv6 server responds to an IPv4 host.

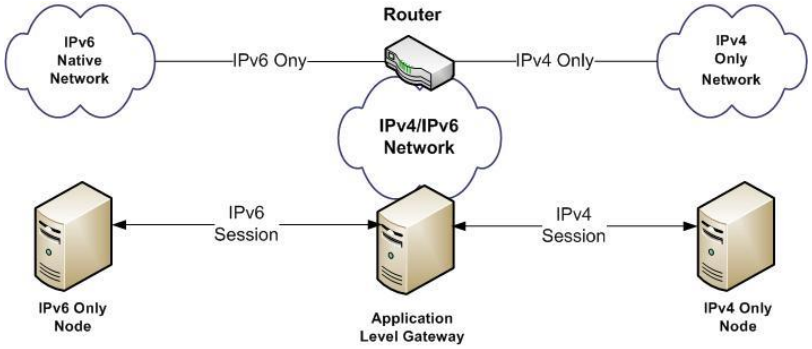
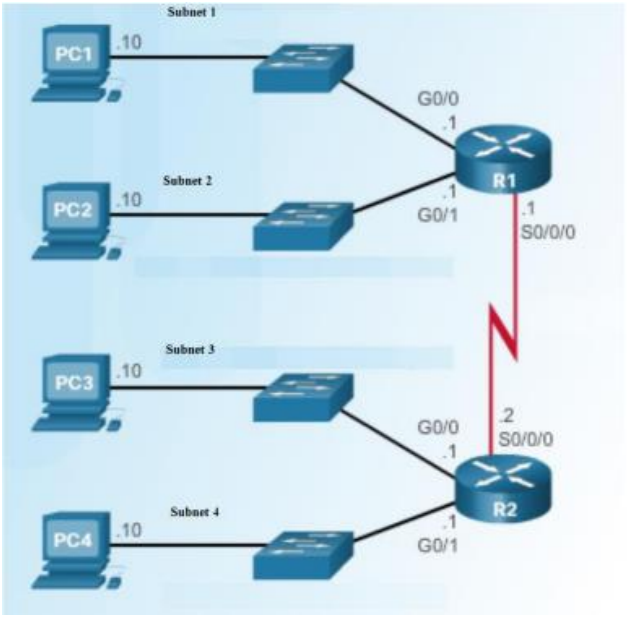


Figure 4: Application Level Gateway Translation

2. **Design an IPV6 addressing scheme and Configure a given network using network block of 2001:0DB8:ACAD::/48. Subnet the given address block with prefix /64 and use First FOUR(4) IPV6 subnets.From each subnet use first host Ipv6 address to configure the router R1(G0/0, G0/1) aand R2(G0/0, G0/1) gateway interfaces for each lan.**



Subnet	Gateway	Subnet Address	Gateway Address
Subnet 1	R1(G0/0)	2001:0DB8:ACAD:0:0:0:0:0/64	2001:0DB8:ACAD:0:0:0:0:1/64
Subnet 2	R1(G0/1)	2001:0DB8:ACAD:0:0:0:1:0/64	2001:0DB8:ACAD:0:0:0:1:1/64
Subnet 3	R2(G0/0)	2001:0DB8:ACAD:0:0:0:2:0/64	2001:0DB8:ACAD:0:0:0:2:1/64
Subnet 4	R2(G0/1)	2001:0DB8:ACAD:0:0:0:3:0/64	2001:0DB8:ACAD:0:0:0:3:1/64