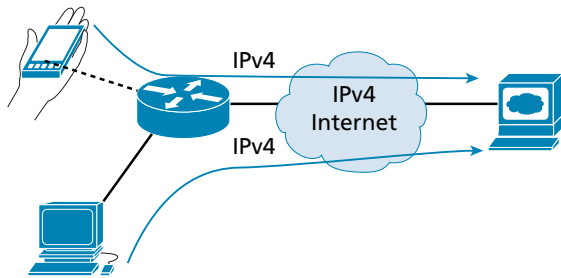


## IPv4 Only

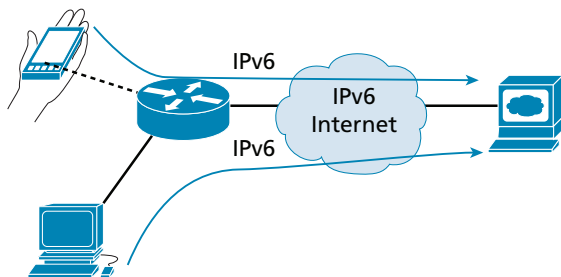
Within an IPv4 only network environment all communication is done by using IPv4 as a transport protocol.



When a client tries to connect to a remote Internet resource, for example [www.cisco.com](http://www.cisco.com), then the client will first do a DNS request to resolve the destination name into an IPv4 address.

Once the client has this IP address it can start the http (or ssh, or IPsec, or...) connection. In an IPv4 only environment this will be done all over an IPv4 only network layer.

## IPv6 Only



The IPv6 only environment is very alike to the IPv4 environment, except that "ALL" technology used is based upon IPv6.

## Dual Stack IPv4/IPv6

When a device has dual stack capabilities then it has access to both IPv4 and IPv6 technology available. It can use both of these technologies to connect to remote servers and destinations in parallel.

### How does a device know when to use IPv4 or IPv6?

When a client wants to connect to a server (e.g., [www.example.com](http://www.example.com)), the client issues two DNS requests in parallel: one request for IPv4 addresses, and one request for IPv6 addresses. After receiving the responses, the client generally follows the process described in IETF standard RFC3484 "Default Address Selection for IPv6" which leans towards an assumption that dual stack is a state of transitioning towards an IPv6-only network, and hence prefers IPv6 above IPv4 by design.

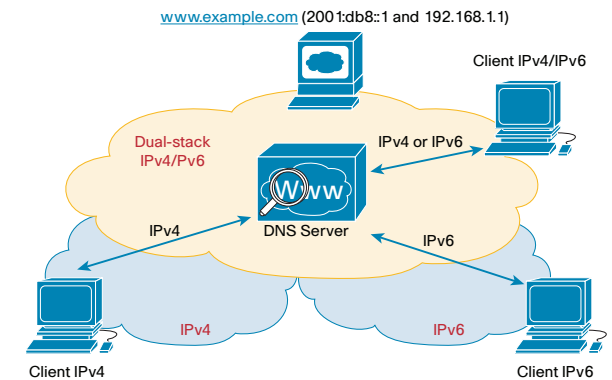
When a client receives a response including both an IPv4 and IPv6 address then based upon RFC3484 the IPv6 address is the preferred address. If, for whatever reason, the usage of that address was non-successful, an alternate address will be used, potentially a valid IPv4 address to connect to the remote location.

### What if I run dual stack and I want to connect to a single stack IPv4 or IPv6 remote site?

It is possible for a dual stack device to connect to an IPv4-only or IPv6-only device. The protocol selected, IPv4 or IPv6 is based upon the IP addresses received within a DNS response. If the DNS server returned only IPv4 addresses, then IPv4 is used, if the DNS server returned only IPv6 addresses then IPv6 is used.

## How does DNS work with IPv4 and IPv6 addresses?

There are two elements with respect to DNS. The first is related to the protocol the DNS client is using to speak to the DNS server, which could be IPv4 or IPv6 based. Most DNS servers support both IPv4 and IPv6 initiated requests.



Another element is related towards IP addresses being transferred within the DNS resource request. The addresses returned as response can either be an IPv4 address or IPv6 address. It is up to the client to decide which address it will use to connect to the remote Internet resource (i.e. [www.example.com](http://www.example.com)).