**IPv6**

**IPv6 link-local vs. unique local vs. global addresses**

<http://www.cisco.com/c/en/us/td/docs/voice_ip_comm/cucm/srnd/ipv6/ipv6srnd/basics.html>

**Why does my PC have so many IPv6 addresses and what can I do about it?**

<http://www.cabrillo.edu/~rgraziani/cis116/SLAAC-Stateless-StatefulDHCPv6.htm>

# **IPv6 Address Configuration**

<http://www.freeccnastudyguide.com/study-guides/ccna/ch13/13-2-ipv6-address-configuration/>

# [**Why is there a percent sign '%' in the IPv6 address?**](http://superuser.com/questions/99746/why-is-there-a-percent-sign-in-the-ipv6-address)

<http://superuser.com/questions/99746/why-is-there-a-percent-sign-in-the-ipv6-address>

The number after the '%' is the scope ID.

IPv6 defines at least three reachability scopes for addresses:

1. Globally addressable. This is an IPv6 address given to you by your ISP. It is available to use on the public Internet.
2. Link-local. This is similar to the 169.254.X.X range. It is an address that a computer assigns itself in order to facilitate local communications. These addresses don't get routed around on the public Internet because they're not globally unique.
3. Node-local. This is an address that identifies the local interface, similar to 127.0.0.1. Basically, this is the address ::1.

[Microsoft has published this article describing IPv6 addressing](http://msdn.microsoft.com/en-us/library/aa917150.aspx), which is the least-confusing article I found. The article indicates that the presence of a scope ID in your address means it is a [link-local address](http://en.wikipedia.org/wiki/Link-local_address). You can also tell it is link-local because the address begins with fe80.

Clear, simply-understood information on this topic seems to be rare, so I'm putting the rest of this together based on my best understanding of [RFC 4007](http://tools.ietf.org/html/rfc4007) and the other information out there.

A computer can have multiple link-local addresses, each with a different scope. The scope ID indicates which scope the address is for. For example, imagine the scenario of a computer with two NICs, each with a link-local address on different networks. If you try to send something to another address beginning with fe80, how will the computer know which NIC to send out on? The scope ID appears to be the solution for this.

**show ipv6 route Field Descriptions**

<http://www.cisco.com/c/en/us/td/docs/ios/ipv6/command/reference/ipv6_book/ipv6_16.html>

[200/0]
The first number in the brackets is the administrative distance of the information source; the second number is the metric for the route.

**Administrative Distance**

<http://www.cisco.com/c/en/us/support/docs/ip/border-gateway-protocol-bgp/15986-admin-distance.html>

Most routing protocols have metric structures and algorithms that are not compatible with other protocols. In a network with multiple routing protocols, the exchange of route information and the capability to select the best path across the multiple protocols are critical.

Administrative distance is the feature that routers use in order to select the best path when there are two or more different routes to the same destination from two different routing protocols. Administrative distance defines the reliability of a routing protocol. Each routing protocol is prioritized in order of most to least reliable (believable) with the help of an administrative distance value.

### **Default Distance Value Table**

This table lists the administrative distance default values of the protocols that Cisco supports:

|  |  |
| --- | --- |
| **Route Source** | **Default Distance Values** |
| Connected interface | 0 |
| Static route | 1 |
| Enhanced Interior Gateway Routing Protocol (EIGRP) summary route | 5 |
| External Border Gateway Protocol (BGP) | 20 |
| Internal EIGRP | 90 |
| IGRP | 100 |
| OSPF | 110 |
| Intermediate System-to-Intermediate System (IS-IS) | 115 |
| Routing Information Protocol (RIP) | 120 |
| Exterior Gateway Protocol (EGP) | 140 |
| On Demand Routing (ODR) | 160 |
| External EIGRP | 170 |
| Internal BGP | 200 |
| Unknown\* | 255 |

\* If the administrative distance is 255, the router does not believe the source of that route and does not install the route in the routing table.

**Solicited-Node multicast address**

<https://tools.ietf.org/html/rfc4291>

 Solicited-Node Address: FF02:0:0:0:0:1:FFXX:XXXX

 Solicited-Node multicast address are computed as a function of a

 node's unicast and anycast addresses. A Solicited-Node multicast

 address is formed by taking the low-order 24 bits of an address

 (unicast or anycast) and appending those bits to the prefix

 FF02:0:0:0:0:1:FF00::/104 resulting in a multicast address in the

 range

 FF02:0:0:0:0:1:FF00:0000

 to

 FF02:0:0:0:0:1:FFFF:FFFF

**Multicast address**

IANA - <http://www.iana.org/assignments/ipv6-multicast-addresses/ipv6-multicast-addresses.xhtml#link-local>

Wikipedia - <https://en.wikipedia.org/wiki/Multicast_address>

NAT and PAT - What's the Difference?

<http://blog.boson.com/bid/53313/NAT-and-PAT-What-s-the-Difference>

NAT (Network Address Translation)

PAT = NAT overloading? Overriding, most widely used NAT