An Autonomous System (AS) is a group of routing prefixes that maintains a unique routing policy, controlled by an Internet Service Provider (ISP). A routing prefix is a list of IP addresses that can be reached from that ISP’s network. Each AS is identified by a unique Autonomous System Number (ASN). ISPs use their ASNs to control routing within their networks and to exchange routing information with other ISPs.

An ISP exchanges routing prefix information with other ISPs by using the Border Gateway Protocol (BGP). BGP is the standard for directing information among networks. This combination of using AS numbers and prefixes helps routers and networks identify where information comes from and where it should go outside of the ISP’s network.

When an AS is exchanging routing information with two or more ASes on the public Internet, it will need a public ASN to be visible to other ASes on the public Internet. If an AS is only required to communicate via BGP with a single provider or peer, it may use a private ASN, which will not be visible on the public Internet.

There are three types of ASes: multi-homed, stub, and transit.

1. A multi-homed AS is connected to two or more autonomous systems. This allows it to maintain its connection to the Internet even if one AS connection fails.

2. A stub AS is connected to only one other autonomous system. Stubs may have other private connections, but publicly appear to have only one connection to the rest of the Internet.

3. A transit AS links one AS to another and allows communication to pass through it. ISPs, for example, offer their customers and their customers’ networks access to other networks and the Internet via transit AS.
Why 4-byte ASNs?

The original group of 2-byte numbers allowed for 65,536 total ASNs. Massive Internet growth has nearly depleted these numbers, forcing the expansion of ASNs to 4 bytes, with a pool of over four billion numbers. The remaining pool of unassigned 2-byte ASNs is predicted to run out in 2011. All five Regional Internet Registries (RIRs) are taking a coordinated approach to prepare for the inclusion of 4-byte ASNs. RIRs began issuing 4-byte ASNs by default on 1 January 2009. However, you can still request a 2-byte ASN for as long as the RIRs have them to distribute. Many routers do not currently support the use of 4-byte ASNs.

How Do I Get an ASN?

To get an ASN from ARIN, an organization must have either a unique routing policy or a multi-homed site. If you are receiving a 4-byte ASN, you may not need to make any network changes to accommodate it. If you already have a 2-byte ASN, you can continue to run your network as-is indefinitely but you may lose diagnostic information without 4-byte AS support. When other networks are configured to use 4-byte ASNs, Internet routing will still operate correctly, and full connectivity to support the Internet will be maintained. You do not need to change BGP versions on your existing networks to support this transition.

However, if you are planning to set up a new network, or to make any changes to your network that would require additional ASNs, you may be assigned a 4-byte ASN rather than a 2-byte ASN, especially once the free pool of 2-byte numbers is depleted. In this case you must ensure that the BGP version on your routers and other equipment support 4-byte ASNs.

Without timely support from vendors, network operators risk having routers and network administration systems that won’t accept the expanded 4-byte number format. Operators should verify that their vendors’ routers support 4-byte ASNs now to avoid future problems.

To help vendors understand how to provide 4-byte ASN support and to assist network operators in locating products that support 4-byte ASNs, ARIN maintains a 4-byte ASN Wiki. The Wiki allows the Internet community to exchange and share information about 4-byte ASNs and contribute resources that may assist other community members including users, ISPs, and vendors. Please visit http://www.get4byteasn.info for more information and to share your 4-byte ASN experience.