

Autonomous system (Internet)

Within the [Internet](#), an **autonomous system**(AS) is a collection of connected [Internet Protocol](#)(IP) [routing prefixes](#) under the control of one or more network operators on behalf of a single administrative entity or domain that presents a common, clearly defined [routing policy](#) to the Internet.^[1]

Originally the definition required control by a single entity, typically an [Internet service provider](#) or a very large organization with independent connections to multiple networks, that adhere to a single and clearly defined routing policy, as originally defined in [RFC 1771](#).^[2] The newer definition in [RFC 1930](#) came into use because multiple organizations can run [Border Gateway Protocol](#) (BGP) using private AS numbers to an [ISP](#) that connects all those organizations to the Internet. Even though there may be multiple autonomous systems supported by the ISP, the Internet only sees the routing policy of the ISP. That ISP must have an officially registered **autonomous system number**(ASN).

A unique ASN is allocated to each AS for use in [BGP](#) routing. AS numbers are important because the ASN uniquely identifies each network on the Internet.

Until 2007, AS numbers were defined as 16-bit integers, which allowed for a maximum of 65,536 assignments. [RFC 4893](#) introduced 32-bit AS numbers, which the Internet Assigned Numbers Authority (IANA) has begun to allocate to [regional Internet registries](#) (RIRs), although this proposed standard has now been replaced by [RFC 6793](#). These numbers are written preferably as simple integers (in a notation sometimes referred to as "asplain") ranging from 0 to 4,294,967,295, or in the form called "asdot" which looks like *x.y*, where *x* and *y* are 16-bit numbers. Numbers of the form *0.y* are exactly the old 16-bit AS numbers. The accepted textual representation of autonomous system numbers is defined in [RFC 5396](#) as "asplain".^[3] The special 16-bit ASN 23456 ("AS_TRANS"^[4]) was assigned by IANA as a placeholder for 32-bit ASN values for the case when 32-bit-ASN capable routers ("new BGP speakers") send BGP messages to routers with older BGP software ("old BGP speakers") which do not understand the new 32-bit ASNs.^[5]

The first and last ASNs of the original 16-bit integers, namely 0 and 65,535, and the last ASN of the 32-bit numbers, namely 4,294,967,295 are reserved and should not be used by operators. ASNs 64,496 to 64,511 of the original 16-bit range and 65,536 to 65,551 of the 32-bit range are reserved for use in documentation by [RFC 5398](#). ASNs 64,512 to 65,534 of the original 16-bit AS range, and 4,200,000,000 to 4,294,967,294 of the 32-bit range are reserved for Private Use by [RFC 6996](#), meaning they can be used internally but should not be announced to the global Internet. All other ASNs are subject to assignment by IANA.

The number of unique autonomous networks in the routing system of the Internet exceeded 5000 in 1999, 30000 in late 2008, 35000 in mid-2010, 42000 in late 2012, 54000 in mid-2016 and 60000 in early 2018.^[6]

The number of allocated ASNs exceeded 84000 in early 2018.^[7]

Contents

Assignment

ASN Table

Types

See also

References

External links

Assignment

AS numbers are assigned in blocks by the Internet Assigned Numbers Authority (IANA) to regional Internet registries (RIRs). The appropriate RIR then assigns AS numbers to entities within its designated area from the block assigned by the IANA. Entities wishing to receive an ASN must complete the application process of their local RIR and be approved before being assigned an ASN. Current IANA ASN assignments to RIRs can be found on the IANA website^[8]

- APNIC specific data can be found on a daily published textfile^[9]
- RIPE NCC specific data can be found on a daily published textfile^[10]
- AFRINIC specific data can be found on a daily published textfile^[11]
- ARIN specific data can be found on a daily published textfile^[12]
- LACNIC

ASN Table

A complete table of 16-bits and 32-bits ASN available can be found here^[13]

Number	Bits	Description	Reference
0	16	Reserved	[RFC1930]
1 - 23455	16	Public ASN's	
23456	16	Reserved for AS Pool Transition	[RFC6793]
23457 - 64534	16	Public ASN's	
64000 - 64495	16	Reserved by IANA	
64496 - 64511	16	Reserved for use in documentation/sample code	[RFC5398]
64512 - 65534	16	Reserved for Private Use	
65535	16	Reserved	
65536 - 65551	32	Reserved for use in documentation and sample code	[RFC4893][RFC5398]
65552 - 131071	32	Reserved	
131072 - 4199999999	32	Public 32-bit ASN's	
4200000000 - 4294967294	32	Reserved for Private Use	[RFC6996]
4294967295	32	Reserved	

Types

Autonomous systems (AS) can be grouped into four categories, depending on their connectivity and operating policy

A multihomed autonomous system is an AS that maintains connections to more than one other AS. This allows the AS to remain connected to the Internet in the event of a complete failure of one of their connections. However, unlike a transit AS, this type of AS would not allow traffic from one AS to pass through on its way to another AS.

A stub autonomous system refers to an AS that is connected to only one other AS. This may be an apparent waste of an AS number if the network's routing policy is the same as its upstream AS's. However, the stub AS may, in fact, have peering with other autonomous systems that is not reflected in public route-view servers. Specific examples include private interconnections in the financial and transportation sectors.

A transit autonomous system is an AS that provides connections through itself to other networks. That is, network A can use network B, the transit AS, to connect to network C. If one AS is an ISP for another, then the former is a transit AS.

An Internet Exchange Point autonomous system (IX or IXP) is a physical infrastructure through which Internet service providers (ISPs) or content delivery networks(CDNs) exchange Internet traffic between their networks (autonomous systems). Usually Internet Exchange Point ASNs are transparent.

See also

- Administrative distance
- INOC-DBA — a hotline communications system between the network operations centers of major Autonomous Systems
- Internet Routing Registry
- PeeringDB - a freely available web-based database of networks that are interested in peering
- Routing Assets Database(RADB)

References

1. RFC 1930, Section 3
2. RFC 1771, original definition (now obsolete) of the Border Gateway Protocol(BGP)
3. RFC 5396, *Textual Representation of Autonomous System (AS) Numbers*, G. Huston, G. Michaelson, The Internet Society (December 2008)
4. RFC 4893, BGP Support for Four-octet AS Number Space
5. "Using AS 23456: How BGP Uses Conversion or Truncation For Compatibility"(http://icons.apnic.net/display/ASN/Using+AS+23456). Retrieved 2012-12-17.
6. Tony Bates; Philip Smith; Geof Huston. "CIDR report"(http://www.cidr-report.org/as2.0/) Retrieved 2016-08-26.
7. "Regional Internet Registries Statistics"(https://www-public.tem-tsp.eu/~maigron/RIR_Stats/RIR_Delegations/Wild/ASN-ByNb.html). Retrieved 2018-03-25.
8. Autonomous System Numbers(http://www.iana.org/assignments/as-numbers)
9. "Resources by APNIC"(http://ftp.apnic.net/stats/apnic/) *Delegated resources by APNIC* 7 April 2015. Retrieved 7 April 2015.
10. "Delegated resources by RIPE"(ftp://ftp.ripe.net/ripe/stats/) *Delegated resources by RIPE* 7 April 2015. Retrieved 7 April 2015.
11. "Delegated resources by AfriNIC"(ftp://ftp.afrinic.net/pub/stats/afrinic/) *Delegated resources by AfriNIC* 7 April 2015. Retrieved 14 April 2015.
12. "Delegated resources by ARIN"(ftp://ftp.arin.net/pub/stats/arin/) *Delegated resources by ARIN* 20 October 2016. Retrieved 20 October 2016.
13. "BGP Autonomous System Number (AS Number) - InetDaemon's IT Tutorials" (http://www.inetdaemon.com/tutorials/internet/ip/routing/bgp/autonomous_system_numbershtml). *www.inetdaemon.com*. Retrieved 2018-06-14.

External links

- RIPEstat — Internet Measurements and Analysis
- Merit RADb is a public registry of network routing information that assists with the transfer of data over the Internet
- ASN FAQ
- CIDR and ASN assignment report update continuously
- ashunt, an AS traceroute utility (part of netsnffng)
- Autonomous System Whois Lookup
- what is my asn (shows your current asn)
- Autonomous Systems and Internet Routing
- Partial List of Autonomous system numbers
- Hurricane Electric BGP Toolkit
- Various kinds of research of IP numbers, Domain names, etc
- Lookin'STAT Graph: number of Autonomous systems online

Retrieved from '[https://en.wikipedia.org/w/index.php?title=Autonomous_system_\(Internet\)&oldid=850854570](https://en.wikipedia.org/w/index.php?title=Autonomous_system_(Internet)&oldid=850854570)

This page was last edited on 18 July 2018, at 11:34(UTC).

Text is available under the [Creative Commons Attribution-ShareAlike License](#); additional terms may apply. By using this site, you agree to the [Terms of Use](#) and [Privacy Policy](#). Wikipedia® is a registered trademark of the [Wikimedia Foundation, Inc.](#), a non-profit organization.