



Global Internet (Areas, BGP, IPv6)

Border Gateway Protocol (BGP) is effectively the universal navigation system of the Internet, a digital postal service that provides the necessary routing information for public Internet networks, or autonomous systems (AS) to steer traffic to each other. The big challenge is that, although the Internet functions like a single network, it is really a collection of many different administrative domains working in harmony with each other. Without BGP, the Internet wouldn't work.

- Simply put, each AS is an administrative domain of one or several IP address blocks, also known as prefixes, and BGP is used by an AS to tell the rest of the Internet which addresses can be reached through that particular AS.
- It also provides other mechanisms to influence the way traffic is routed. Specific metrics can be applied, to control things like cost (for example, when prioritizing certain upstream transit providers) and load balancing.
- Filtering can also be implemented with BGP, providing AS network administrators with a powerful traffic engineering toolkit.

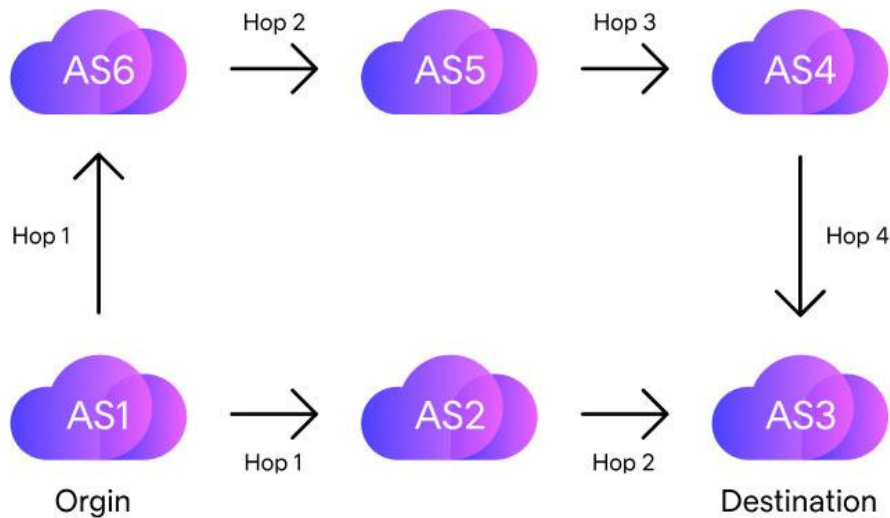
What is BGP used for?

- BGP is used to populate and maintain the global Internet routing table - a telephone book, if you like, for the Internet. This is essentially a route matrix that tells edge routers in a specific AS how to send traffic to a destination (IP address) outside the home network.
- From this, the best route can be established for traffic to take
- . Due to the vast number of networks connected, and the sheer number network prefixes involved, the global Internet routing table is very large and currently has more than 500,000 entries.
- It is for this reason that the IP address information communicated is aggregated into blocks or prefixes, and the routing table is only updated when a network communicates a significant change in its logical structure - for example, when a new network block is added or removed.

The size and complexity of the Internet routing table means that powerful routing hardware, capable of processing a very large routing table, is a prerequisite for anyone running their own AS. Because the Internet is a common system, all route information must be available to all networks connected to it.

The fundamental model of BGP

The following diagram illustrates, in very simple terms, the fundamental model of BGP and how it can be applied to manage routing across multiple paths:



If AS1 needs to route traffic to AS3, it has two different options:

- It can route via AS2 to reach AS3
- It can route via AS6, AS5, AS4 to reach AS3

In this over-simplified model, the choice is clear – routing via AS2 is the most efficient route, requiring fewer hops than the longer path via AS6. In reality route selection is made using complex algorithms and there are other factors that come into play, including the aforementioned BGP metrics and overriding business considerations. BGP is fundamentally a very trusting protocol and unable to verify the validity of route updates. This makes it susceptible to malicious interference. However, a mechanism known as **RPKI** is increasingly being used to increase the security of BGP updates and reduce the risk of outages and unauthorized manipulation.

What are the benefits of owning an AS and running BGP?

Owning and operating an AS is a significant administrative and operational undertaking that is usually beneficial for businesses with larger networks and significant traffic volumes. For those that do, there are a number of benefits:

- Much greater control over traffic towards the wider internet
- The possibility to purchase wholesale IP Transit services
- Lower unit costs for Internet connectivity
- The potential for greater supplier diversity

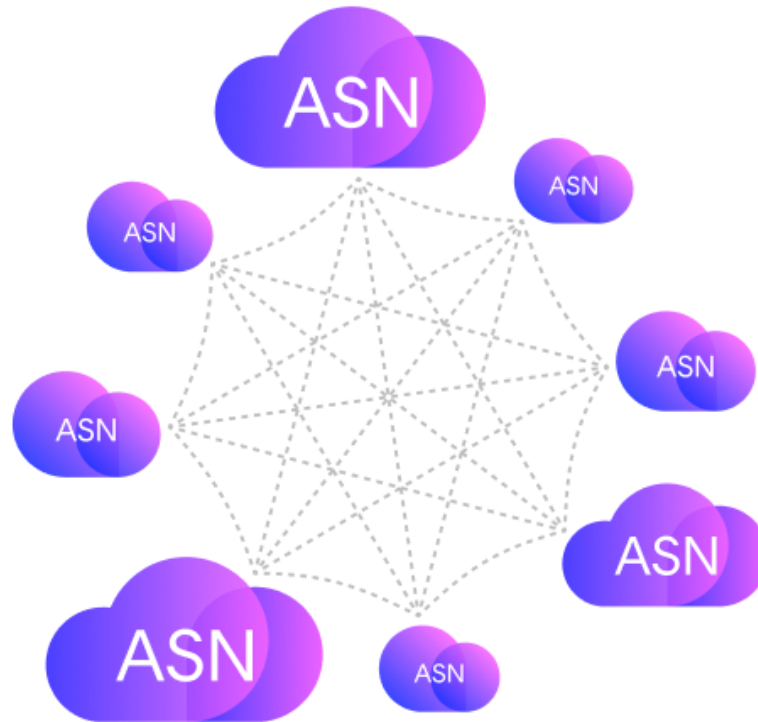
For smaller networks, or those not wanting to take on the additional responsibility of AS ownership, IP Connect and DIA services are compelling alternatives.

Our high first line resolution rate (77%) is made possible by our team of highly qualified engineers. Arelion has grown organically, without any acquisitions and provides a homogeneous and consistent network experience to our customers.



BGP and Routing

BGP (Border Gateway Protocol) routing is the central nervous system of the Internet. Stable and efficient IP routing between different Autonomous Systems (AS) is essential for the security of the entire Internet ecosystem. Our BGP communities and the added security of RPKI enable manageable and reliable traffic flows.





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