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BGP BASICS

REDUNDANCY FOR MULTIPLE INTERNET PROVIDERS

Maximizing uptime requires multiple Internet carriers. The Border Gateway Protocol (BGP) allows companies to use two or more Internet connections at the same time and maintain connectivity during an outage without having to change IP addresses.

BGP has many options, but here are the basics for using BGP with multiple Internet providers.

BGP: THREE TYPES OF ROUTES

BGP tells your router where to send *outbound* traffic. When you connect your network to an Internet provider's network using BGP, your router can receive three different routes: Default Route, Full Routes, or Partial Routes.

1. Default Route: failover but no optimization

Configuring BGP on each Internet provider using a default route allows a company to have automatic failover between two providers should one provider go down. However, BGP will not load-balance and will send all outgoing traffic to only one ISP. Default routes are often used on routers with less than 512 MB RAM.

2. Full Routes: failover plus optimization

Using full BGP routes with multiple Internet providers allows a company to:

1. **Optimize:** Automatically optimize outbound traffic to choose the provider with the shortest path (shortest AS number, by default) to each destination.
2. **Failover:** Have auto-failover should one of the ISPs go down. BGP tries to find the shortest path from your gateway to a destination IP address. If one of the carriers is down, the router simply chooses a path from the other carrier.

However, Full Routes typically require a router with minimum 1 GB RAM.

Advertising full routes requires keeping all the Internet's available paths in your router's memory. As of 2010, there are over 280,000 routes on the Internet, so having two ISPs means you'll need to store over 560,000 paths. A router with 1 GB memory typically starts around \$25,000, depending on the vendor.

3. Partial Routes: optimizing a subset of designated paths

What if your router does not have 1 GB memory? You do not have to store all the paths. With Partial Routes, you configure the router to receive only certain routes. You could ask the ISP to only send some routes, but filtering routes yourself allows for more control and the ability to receive full routes if you upgrade your router.

Typically, you would designate a default route for each provider, plus some specific routes through each provider to frequently-accessed IP addresses (web apps, frequently-used web sites and services, off-site servers, etc).

Getting Started with BGP

Regardless of whether you choose default, full, or partial routes, you will first need the following:

Advertisement Authorization from Both Carriers: To failover *incoming* traffic, you need permission from both carriers to advertise the other's routes.

AS Number: if you have multiple Internet providers, you need an Autonomous System Number (\$500 from ARIN). As long as you can show you are using multiple Internet carriers, you qualify for an AS number, no matter what size your organization.

/24 Subnet: Most ISPs require that you have at least a /24 set of IP addresses for them to advertise your subnet. You can buy one from your ISP, or you can buy one directly from ARIN.

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