ActualTech Media

US SIGNAL®

Next-Level Networking for Speed and Security

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IN THIS PAPER

With general Transit networks, you "get what you get." For business-critical workloads, a provider with strong public and private Peering is a more reliable, higher-performing, and more secure option.

This paper covers the affiliations that enable networks to, directly and indirectly, connect on the Internet using IP peering and IP transit relationships. The discussion centers around the differences, advantages, and disadvantages of both IP peering and IP transit. It also looks at why private peering (direct) and peering over a (public) Internet exchange (IX) could be more viable options, and which situations warrant one approach over the other.

As of 2022, an estimated 4.95 people access the internet every day. DataReportal, 2022. That's a lot of traffic traversing the globe. So, how do enterprises keep information flowing without having to endure incessant bottlenecks, tolerate poor perfor-mance, or compromise security? They do it through one or more variations of IP transit and IP peering.

IP Peering and IP Transit Open Up the Traffic Lanes

To grasp the concept of IP transit and IP peering, it's helpful to understand how the Internet works. At its simplest, the Internet is a connection of networks designed to connect all service providers, Internet service provider (ISP) networks, and hosting providers for the purpose of moving data packets from point A to point B. The mode of transport between these networks is done primarily via IP transit and IP peering. Although the terms are often used interchangeably, these two journeys take different roads.

IP TRANSIT VS. IP PEERING

In essence, IP transit allows traffic to "transit" a network that connects an ISP to other networks on the Internet. Many of these network connections are indi-rect since most providers don't have a global network footprint. As a result, the traffic travels through one or more third-party networks on the way to its final destination.

The IP transit provider decides how traffic connects to the available routes across the Internet, including those of their downstream partners, other peers, and upstream providers.

In contrast, IP peering parties only exchange data that travels the paths of their networks and their down-stream customers. Neither has visibility into the other's upstream routes over the peering connection. Two networks directly connect and exchange traffic, which allows for the most optimal and efficient path.

Often, ISPs use both services—IP transit supplemented by IP peering.

BENEFITS OF IP TRANSIT—EASE, FLEXIBILITY, SPEED, REDUNDANCY

IP transit offers several business advantages. First, it's an easy service to implement. Users pay for the service, and the ISP takes care of the provider's traffic requirements.

Furthermore, IP transit comes with guaranteed service level agreements (SLAs). Should the ISP fail to deliver within the agreed-upon parameters, the organization has recourse. In addition, IP transit contracts have a specific term, which offers companies the flexibility to change ISPs (or not) when the contract is up.

> Dynamic routing for ISPs using multiple IP transit providers can provide less exposure than a single channel, enabling immediate failover should a connection go down.

From a technical standpoint, IP transit offers speed, throughput, and redundancy. Dynamic routing for ISPs using multiple IP transit providers can provide less exposure than a single channel, enabling immediate failover should a connection go down.

Last, compared to a standard business Internet con-nection, dependent on routers with limited speed, an IP transit connection is faster. IP transit, delivered by an ISP with a strong peering network, eliminates extra hops in contrast with IP packets transiting through additional Tier 1 and Tier 2 networks.

WHEN IS IP PEERING PREFERABLE?

Peering involves two networks that exchange traffic with each other freely and for mutual benefit. It's an agreement between two networks that exchange traffic without the use of a third party, which reduces transit costs.

The cream of the crop is the Tier 1 network, the super-highway of the Internet. Tier 1 Internet providers form the underpinning of the global Internet by building the

infrastructure needed to connect the superhighways with other Internet providers.

If two Tier 1 networks peer to exchange an equal volume of traffic, each doubles its reach. Network A can access all the customers on Network B and vice versa.

IP peering is optimal for organizations that need to:

- Increase redundancy by providing a path in addition to IP transit
- Increase capacity for vast amounts of traffic
- Improve performance by giving traffic a more optimal "direct" path
- Reduce dependency on upstream transit providers to lower costs

The 2 Types of Peering Connections: Private and Public

Peering comes in two flavors: private peering (direct) or peering over a public Internet exchange (IX).

Public peering is an agreement between two or more networks to accept each other's packets and forward them at an Internet Exchange Point (IX or IXP). An IXP is composed of switches and routers. It's a public junction point on the Internet that serves as an on-ramp to the Internet and a location for carriers to exchange traffic. There are approximately 300 IXPs around the world, with more than 100 in the United States.

> One benefit of public peering is that it keeps the traffic local in an IXP, which offers a more direct route between network operators.

Through an IX or IXP, you can connect to other peers logically via the Border Gateway Protocol (BGP), using one or more physical connections, which optimizes the cost per peer when sending traffic to various networks. IX/IXPs often charge a port and membership fee to keep their infrastructure intact.

One benefit of public peering is that it keeps the traffic local in an IXP, which offers a more direct route between network operators. That path lessens the distance the data travels and results in lower latency and an experience without interruptions or content delays. See **Figure 1** for pros and cons of public peering.

Private peering is a direct physical connection between two or more networks that accept each other's packets and forward them. The interchange occurs at a common, private facility rather than at a public exchange point, and the buyer pays for using the infrastructure (such as a data center).

Private peering is a reasonable option when sending large volumes of traffic to a specific network, as it frees up capacity on public peering links for other traffic/peers. See **Figure 2** for the pros and cons of private peering.

Pros

Financial predictability. Hardware requirements and recurring costs are the same every month, making planning and budgeting less complicated. In addition, public peering may be the most cost-effective way to peer across multiple colocation facilities.

Ease of administration. No physical work is required. To bring up a peering session, the connection is "soft configured" by the two parties on the router.

New peers can be added, making it possible to scale large peering sessions.

Cons

Port and member fees for the IX.

Figure 1: The pros and cons of public peering

What Are the Alternatives? Dedicated Internet Access

Small networks, or midsize companies with their internal networks, may choose to buy dedicated Internet access (DIA) rather than IP transit. Dedicated Internet access is a private connection between a business and the web.

Pros	Cons
Reliable. In most cases, there are fewer network components that might break.	**Not easily scalable.** Each connection requires a dedicated port regardless of the amount of traffic exchanged, and most data center operators have a monthly recurring charge on each cross-connect.
Easy to monitor. Private peering provides greater visibility with no unknown port oversubscription.	**Less flexibility in terms of reach.** It can only exchange traffic with networks located in the same facility or campus.
Can be more cost-effective. There's no time- or CPU-intensive data collection and processing or expensive network analysis software required to determine per-peering-session traffic volume. Plus, router ports are costly while switch ports are cheap.	**Higher cost per Mbit.** Costs can be several times higher than with public peering, but are justifiable with large enough traffic volumes.
Less likely to be compromised. Since the network directly connects when there's an explicit peering arrangement, it's more secure than a pubic peering network that includes participants with no relationship with the company.	**Consumes IT resources.** It takes more time to set up new peering connections.

Figure 2: The pros and cons of public peering

With DIA, businesses aren't competing with other subscribers for bandwidth. It's like having an Internet express lane, and your data is the only traffic on the road. Upload speeds are as fast as download speeds. Even at rush hour, you're able to travel at a consistent speed to support your business's critical operations.

Partnering with US Signal for Faster, Safer, More Reliable Transport

For a powerhouse partner with robust colocation, IT infrastructure, security, IP transit, IP peering, and DIA services, choose US Signal. US Signal delivers rapid data transport over its own robust, secure fiber network via one-hop Internet connections through Tier 1 upstream relationships and direct connectivity to hyper-scale cloud providers.

US Signal's 14,000-mile network of lit fiber, with access to over 225 data centers and POPs, Tier 1 peering relationships, and metro rings in strategic markets, gives you more control over your traffic flows and ensures reliable, fast, and secure data delivery.

Direct peering connections with 115-plus third-party content providers and mega delivery networks (for example, Amazon, Facebook, and Microsoft) enable faster public Internet traffic speeds while reducing latency. Currently, US Signal is aggressively pursuing new peering relationships to increase the percentage of traffic that can use peering over its network.

> With DIA, businesses aren't competing with other subscribers for bandwidth. It's like having an Internet express lane, and your data is the only traffic on the road.

Moreover, US Signal offers DIA built on proven SONET and DWDM transport technologies that provide access to the Internet through redundant upstream and third-party content providers.

Which path is right for your organization or enterprise? US Signal can help you sort through all of the options and design a plan that meets your speed, security, and budget requirements.