

Bonded Data Centers

Migration of Internet Servers to Data Centers

By Rene Cruz

Many businesses are choosing to place their Internet-based servers in an off-site data center. Off-site data centers provide a cost-effective way to achieve reliable and high performance Internet connectivity so that customers of a business may access its servers. Reliability of servers themselves and as well as the Internet connectivity are crucial to maintaining business operations, and is more cost effective to provide this reliability at a data center than at the offices.

A key problem facing businesses that use a data center is the provisioning of a data connection between the data center and the office facilities. The reliability of this data connection is crucial to business operations. In addition, a key issue is how much bandwidth, or throughput capacity, is available to transfer data. If the connection is too slow, operations can also be adversely affected.

If the data center is being used for storage backup, the data rate required for the connection between the office and the data center will depend on the total size of all the data objects being stored as well as the rate at which the data objects change. If the data rate is not high enough, the reliability of the backup system will be compromised.

In many cases, IT personnel need to interact and maintain the servers at the data center, and a data connection that is too slow will hamper the ability to keep the server available for business operations. Thus, the available data rate of the connection between the office and data center is a key metric for maintaining operations.

Connectivity Options

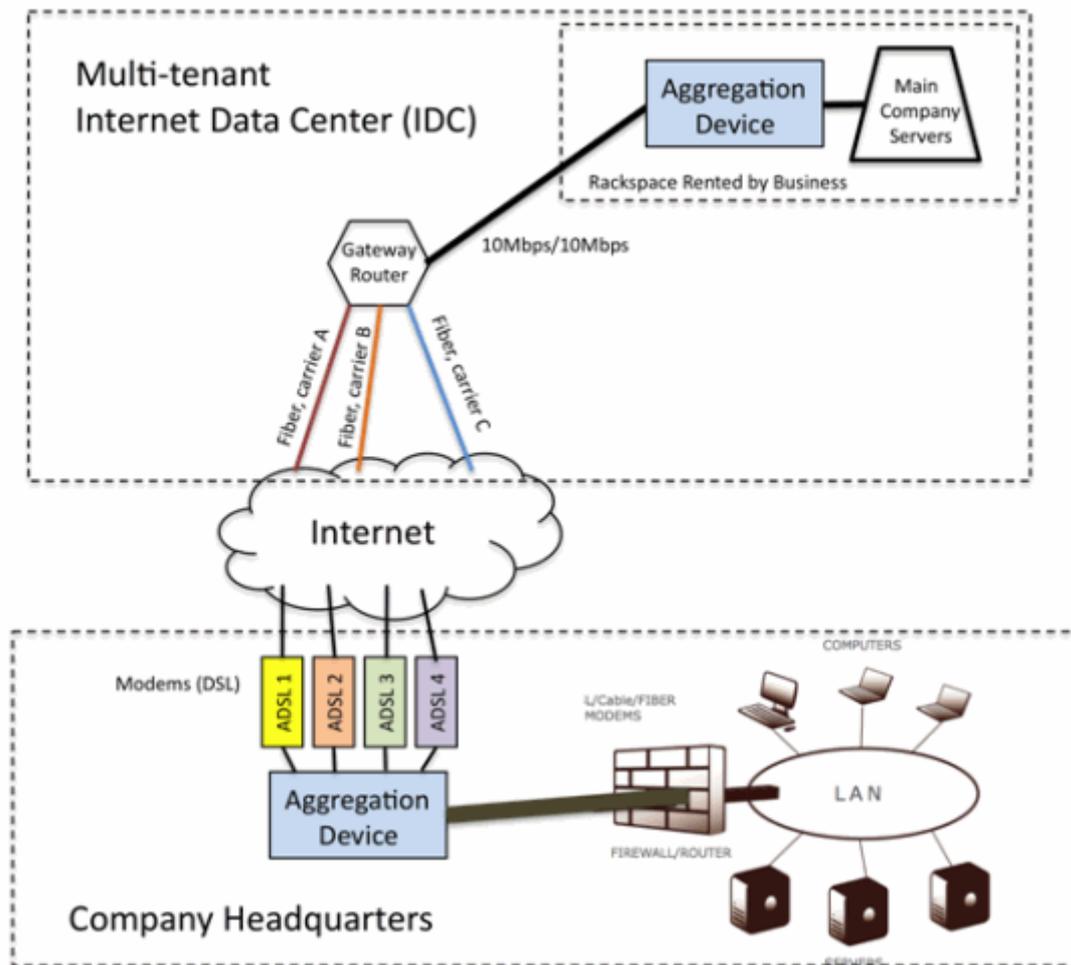
Businesses have many connectivity options available for providing the data link between the office and data center. Often, it is not economically feasible to provide a direct physical link between the office and the data center (e.g., a wireless link or a direct fiber connection). Instead, the data connection is routed through a carrier network, and most often through the Internet.

Typically, there may be a DSL or cable service available at the office facility, providing access to the Internet. A DSL or cable connection usually has asymmetric data rates, with the uplink direction being much slower than the downlink. Uplink data rates in the hundreds of kilobits per second range are typical.

Increasingly, however, a DSL or cable modem connection provides insufficient bandwidth, particularly in the uplink direction. Many businesses use a T1 line to provide connectivity between the office and data center. A T1 line provides a symmetric data rate of approximately 1.5Mbps/sec and is typically faster than the uplink of a DSL or cable modem connection.

Although at one time, a T1 line was considered a fast broadband connection, in today's terms it is relatively slow. Many companies need much more bandwidth than offered by this service. Bonded T1 service, where two or more T1 lines are combined together to create a fatter pipe, is available in many locations. This option, however, is relatively expensive in terms of cost per unit of bandwidth delivered.

For large corporations, higher-cost service offerings may be feasible. Telecommunications carriers may offer synchronous fiber-based services such as DS3 or fractional DS3s. Since fiber requires significant upgrades to the existing infrastructure, depending on the location, these solutions can be quite costly (in the range of several thousand dollars per



month).

Connection Aggregation

For smaller businesses where such high monthly costs are prohibitive, it is fruitful to consider the aggregation of lower speed connections that are more cost effective in terms of monthly cost per bit/sec of bandwidth. In the illustration, for example, an office uses a “bandwidth aggregation device” to combine several low cost ADSL lines. A mating bandwidth aggregation device is also present at the data center, attached to the server(s) there. The two bandwidth aggregation devices form a virtual data tunnel between them, making use of the multiple communication paths between them.

A new type of bonding technology has recently become available, called Broadband Bonding. Broadband bonding performs true aggregation in the sense that for even a single file transfer, all available communication resources are used.

For example, in the illustration, there are four ADSL lines used at the office, each providing a 6Mbps downlink and 768kbps uplink. Since Broadband Bonding provides true aggregation, this amounts to a 24Mbps pipe in the downlink direction and 3Mbps in the uplink direction. The 3Mbps uplink is now comparable to a bonded T1 line, even though the total subscription cost for the ADSL lines would typically be less than \$250. A bonded T1 line is typically in excess of \$750. Therefore, a significant cost savings can be realized by using ADSL technology rather than T1 lines.

By making use of broadband bonding between the office and data center, the office can “backdoor” its Internet access through the data center. In other words, since the aggregation device at the data center has a fast connection to the Internet, the office can funnel all Internet communications through the aggregation

device at the data center to enjoy this same fast connection to the Internet present at the data center. As discussed above, since the connection from the office to the data center has a speed of 24Mbps/3Mbps, then the office can effectively get general Internet access with a speed of 24Mbps/3Mbps, assuming that the bandwidth available at the data center is not the bottleneck.

Summary

A key issue for businesses with data centers is the bandwidth and reliability of the data connection between the office and data center. Businesses may wish to consider new technology that empowers them to combine cost effective transport technologies together. Multiple ISPs can be combined for increased reliability, and in the process significant savings and performance benefits can be realized, compared to using T1 lines. As a side benefit, the business can backdoor its Internet access through the data center, achieving high transfer rates in a highly cost-effective manner.

About the Author :

Dr. Rene Cruz co-founded Mushroom Networks and currently serves as chief science officer of the company. Mushroom Networks is the innovator of Broadband Bonding technology serving the small, medium and large enterprise markets. For more information about the company, go to www.mushroomnetworks.com.