



Bandwidth Service Overview

November 2008

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1. Audience

This paper is intended for Chief Executive Officers, Chief Financial Officers, Chief Information Officers, Chief Technology Officers, and IT personal of small and mid-sized businesses.

2. Abstract

When choosing the necessary bandwidth for your business, there are several factors to consider. Understanding the difference between the speed of transferred data and the amount or number of bytes transferred your business requires helps to make this decision easier. But what happens in the event allotted bandwidth usage is exceeded? Online Technologies offers solutions for when bandwidth is exceeded, through the 95th percentile calculation. There is also an option to prevent overages entirely.

3. Introduction

This document provides an overview of “Internet bandwidth” service. Internet bandwidth is the amount of data transferred between (to and from) the Internet and Online Tech’s private network. The service described does not represent the bandwidth used internally to Online Tech’s network. For the purposes of this document, “bandwidth” is meant to imply “Internet bandwidth”.

This document will describe:

- The difference between Bandwidth traffic and Transfer traffic
- Contracted versus Overage Traffic
- How Online Tech calculates and bills for bandwidth
- SLA

4. Bandwidth vs. Transfer

Internet traffic can be measured two ways: bandwidth or transfer.

- Bandwidth is the rate at which data is sent to or received from the Internet.
 - Bandwidth is measured in terms of Megabits per second (Mb/s, often shortened to mbs or mbps).
 - Bandwidth represents the number of bits per second of data sent to or received from the Internet.
 - For example, a company may need 5.0 Mbs to satisfy its needs.
- Transfer is the number of bytes transferred to or received from the Internet for a specific time frame (generally one month).
 - It is measured in Gigabytes (GB) for the specific time period.
 - For example, a company might need to transfer 50 Gigabytes (GB) of data each month.

Note: Transfer is measured in bytes (symbol is “B”) while bandwidth is measured in bits (symbol is “b”). There are eight bits to each byte. So when calculating one from the other you divide or multiply the final answer by eight.

You can use basic algebra to estimate transfer given a certain bandwidth over a certain period of time:

- Gigabytes transferred = (((# of seconds X Bandwidth)/1000)/8)

Example:

You use 5.0 Mbs for the entire 2,592,000 seconds in a month (30 days x 24 hours x 60 minutes x 60 seconds), you can calculate transfer:

Gigabytes Transferred = ((5.0 Mbs x 2,592,000 seconds)/1,000 Mega in a Giga)/8 bits per Byte
Gigabytes of transfer in that month = 1,620 GB

You can also calculate the required bandwidth given a need to transfer a certain amount of data over a certain amount of time.

Mbs Bandwidth required = (Gigabytes to transfer * 1000 * 8)/# of seconds per month

Example:

You need to transfer 79 Gigabytes each month; then the bandwidth required is:

Mbs = (79 Gigabytes * 1000 Mega in a Giga * 8 bits in a Byte)/2,592,000 seconds in a month
Required bandwidth = 0.244 Mbs

5. Contracted vs. Overages

There are two forms of bandwidth fees: Contracted and Overages.

Contracted traffic is the amount of bandwidth or transfer your company commits to fund every month regardless of the amount used. It’s also the amount of bandwidth or transfer Online Tech commits to provide to your company. In essence, Online Tech has an obligation to ensure there is the contracted traffic available to your company, and your company has an obligation to fund that much traffic each month for the term of its contract.

Overage traffic is the amount of traffic your company uses beyond its contracted amount. Overages occur because customers are allowed to use more than their contracted amount. Online Tech allows its customers to burst as available and will let them know how much burst is available but does not guarantee any specific level of burstability.

6. Burstable Bandwidth

Burstable bandwidth is the flexible alternative to dedicated bandwidth, which only provides a fixed amount of maximum throughput. Burstable, on the other hand, allows your company to use additional network capacity beyond the portion it has purchased to handle periods of peak usage. For example, you may have purchased 3.0 Mbs of committed bandwidth but still

be able to burst up to 10 Mbs or more depending upon your original sales agreement. If your company bursts excessively beyond its committed bandwidth, which is included in your respective agreement, then your company will incur an overage charge.

In order to define excessive burstable use and whether an overage fee is warranted, Online Tech uses the 95th Percentile as the form of measurement. Based on the 95th Percentile, then your company is allowed to burst above its guaranteed bandwidth 5.0% of the time during a given month without receiving additional charges as described below.

7. Peak Bandwidth

Peak bandwidth is the maximum bandwidth you used for a specific time period. For example, your website may have received a significant spike in users causing your bandwidth to hit a maximum for the month of 25 megabits per second (mbs). This would be your peak bandwidth.

8. Measuring Bandwidth—95th Percentile

The industry uses a standard of 95th percentile for measuring traffic on shared, colocation, or dedicated server hosting. This enables Online Tech to maintain a network with sufficient capacity and to provide clients with the most accurate reading possible and deliver the defined service level agreement (SLA).

On the first of the month, the Online Tech system generates a report on bandwidth utilization for the previous month. This report is sent to Online Tech's System Administrators for review. Once the review process is complete, it is sent to the billing department for verification. Clients that exceed their committed amount of bandwidth will be charged for the overage and notified via email or mail.

It is important to understand the calculation method and for you to keep an eye on your company's bandwidth usage taking place on its server. In some cases, if your server has been compromised or the traffic has spiked—the amount of bandwidth that is being used will exceed your base rate.

The RTG server which monitors and records all bandwidth utilization for the month polls all of the switch ports in 5 minute intervals. From the 1st of the month to the last day of the month this data is stored on the RTG server. On the last day of the month, a final calculation is made. This provides Online Tech with a report of what the 95th percentile usage was for all of its servers. These calculations are used to inform customers of their usage exceeding the amount of bandwidth agreed upon in their contract. If this does occur, a "bandwidth overage" is charged for that exceeded amount.

The actual technical procedure that takes place is as follows:

- First day of the month, 12:00 AM EST the first RTG reading is polled on the switch and stored in a database.

- Every 5 minutes thereafter, the switch is polled to get another reading which is stored in the database.
- By the last day of the month, approximately 8,000 - 9,000 readings have been stored in the database.
- The entire month's readings are sorted from highest to lowest. The top 5% of these readings are discarded.
- The amount that remains is the 95th percentile reading that is recorded for monthly bandwidth usage.

9. Bandwidth Billing

Each month, your company will be billed for its contracted traffic plus any overages. Bandwidth overages are measured and invoiced in increments of 0.1 Mbs. The overage charge is calculated by taking the overage rate and multiplying it by the amount of overage bandwidth based on 95th percentile (see above).

Example:

The customer purchases (or guarantees) 2.00 Mbs per month. After the month is completed, the customer's total use is 3.63 Mbs based on the 95th percentile. The overage fee would be calculated as follows:

- Overage fees are in increments of 0.1 Mbs, so 3.63 Mbs is converted to 3.7 Mbs
- 3.7 Mbs consumed minus 2.0 Mbs committed equals 1.7 Mbs overage
- The overage fee rate is \$150/Mbs base price times 1.5 which is \$262.50/Mbs
- The overage fee is \$262.50 times 1.7 which equals \$446.25
- This is in addition to their \$350 for the 2.0 Mbs of guaranteed bandwidth
- The total bandwidth fee is \$350 + \$255 or \$605

10. How Your Company Can Avoid Overage Charges

If you are concerned about avoiding excessive overage charges, then Online Tech has two options that can help reduce your company's risk:

1. Online Tech can rate limit or "cap" the connection, so not to exceed an agreed upon range of utilization.
2. Your company can purchase additional bandwidth providing it a buffer zone.

You should contact your account manager to implement or discuss these options.

11. Handling Overage Charges

When a customer has an overage and the fee is calculated, Online Tech sends an invoice for that amount. As standard policy, Online Tech offers all its customers two payment options:

1. Pay the overage fee as invoiced according to the contract, or
2. Retroactively upgrade the contracted bandwidth to a higher level that includes the overage amount. In the example above, the customer can upgrade its contracted amount to 4.0 Mbs, saving almost \$255 in the current month and potentially every month based on actual usage.

12. Bandwidth Service Level Agreement (SLA)

The bandwidth service level agreement is included within Online Tech's Network Service Level Agreement document. The SLA ensures a specified uptime and maximum latency with regards to bandwidth guaranteed (committed) each month. Burstable bandwidth or overage bandwidth does not apply to these pre-defined standards, since only the customers can control excessive usage—whether intentional or due to denial of service (DoS) attacks on their systems.

About Online Tech

Online Tech (www.onlinetech.net) is Michigan's premier Managed Data Center Operator. Online Tech helps companies manage their growing demand for data and computing capacity through its highly secure and reliable data centers across Southeast Michigan. With a full range of colocation, dedicated server and managed service options, industry leaders trust Online Tech to ensure their servers are always on, always online, and always safe.