The Impact of Broadband Speed and Price on Small Business

by

Columbia Telecommunications Corporation
Kensington, MD 20895

for

under contract number SBAHQ-09-C-0050

Release Date: November 2010

This contract was developed under a contract with the Small Business Administration, Office of Advocacy, and contains information and analysis that was reviewed by officials of the Office of Advocacy. However, the final conclusions of the report do not necessarily reflect the views of the Office of Advocacy.

3.2.   Broadband Needs Are Expanding

Broadband is not an end in itself. The value of broadband to small business is in its ability to re-liably and consistently deliver applications—in other words, Internet content, e-mail, and e-commerce. Broadband applications also include telecommuting, videoconferencing, data backup, Voice over Internet Protocol (VoIP), distance learning, security cameras, and remote access.

Broadband must provide the needed applications to and from the business for all the users at the business, as well as the business' customers. Higher-quality broadband means more flexibility in using and adding applications, and applications running better and more reliably. Therefore, a suitable business broadband connection requires taking into account all of the presently used ap-plications, all of the users using them, and all of the applications that the business might need to use in the future. The service should also be scalable, in the event that the business outgrows the connection.

Some businesses have more critical needs—for example, those that could not function if the business could not connect, or if customers or suppliers could not connect into the business. While websites and e-commerce are typically "hosted" away from the business at a data center, many other applications must connect to the business. For those businesses, it is critical to have an option to secure a primary and a backup connection, or to obtain a service with an SLA from the provider, guaranteeing a particular level of performance, with penalties for nonperformance.

Business processes can run radically differently if high-capacity, high-quality broadband is available for a reasonable cost. Given suitable assumptions, entire classes of applications—server access, videoconferencing, VoIP trunking, video upload, server backup, telecommuting, and distance learning, for example—require more than 5 Mbps downstream. These applications are not currently supported by satellite, and hence will require other broadband services. The ap-plications can be supported by higher-speed DSL services and higher-end cable services if those services are available at the location of the business. Five Mbps DSL services require, however, the appropriate proximity to a phone central office or DSLAM, and therefore might not be avail-able at a business location, even if the phone company has lines to the business. Cable may ade-quately support the applications, but again, cable might not be present at the business location. And these speed requirements assume a single user at a given location; as more users are added the suitability of DSL and cable modem services quickly decline. It is also important to note that cable services from the smaller providers in smaller markets become significantly more expen-sive above 5 Mbps—typically more than $100 per month. In sum, even businesses with some broadband availability will face availability and cost barriers that may slow or stop their use of broadband applications.

Table 2 provides examples of applications available to businesses, given a particular broadband service speed. The table assumes:

- A single user.
- For downloading small files up to 1 MB, download time less than 10 seconds is good, 10 to 15 seconds is fair, and more than 15 seconds is not acceptable.
- For downloading small files up to 2 MB, download time less than 20 seconds is good, 20 to 25 seconds is fair, and more than 25 seconds is not acceptable.

- For uploading videos of 1 GB, upload time less than 30 minutes is good, 30 to 90 minutes is fair, and more than 90 minutes is not acceptable.
- For downloading high-definition videos (2 GB), download time less than 10 minutes is good, 10 to 15 minutes is fair, and more than 15 minutes is not acceptable.
- For applications such as videoconferencing and remote server access, no concurrent usage of the same application by the same user.
- Server back-up will normally occur during off-peak times (10 p.m. to 6 a.m.).
- For telemedicine files up to 160 MB,[20] download time of less than 30 seconds is good, 30 to 60 seconds is fair, and more than 60 seconds is unacceptable.

---

[20] Ackerman, "Telemedicine."

Table 2: Typical Applications and Their Performance for Various Download/Upload Broadband Speeds (Single User)

Applications	56 Kbps/ 56 Kbps *(Dial-up, maximum speed)*	256 Kbps/ 256 Kbps *(DSL; Cable)*	768 Kbps/ 384 Kbps *(DSL; Cable; Satellite)*	1 Mbps/ 384 Kbps *(DSL; Cable; Satellite)*	3 Mbps/ 768 Kbps *(DSL; Cable; Satellite)*	7 Mbps / 768 Kbps *(DSL; Cable; Fiber)*	10 Mbps/ 1 Mbps *(DSL; Cable; Fiber)*	15 Mbps/ 2 Mbps *(Cable; Fiber)*	20 Mbps/ 2 Mbps *(Cable; Fiber)*	25 Mbps/ 5 Mbps *(Cable; Fiber)*	50 Mbps/ 10 Mbps *(Cable; Fiber)*	100 Mbps/ 10 Mbps *(Fiber)*
Simple text e-mail without attachments (50 KB)	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good
Web browsing	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good
E-mail with large attachments or graphics (500 KB)	Bad	OK	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good
Download small files (e.g., a 50-page text document with limited graphics) (1 MB) [1]	Bad	Bad	OK (11 sec.)	Good (8 sec.)	Good (3 sec.)	Good (2 sec.)	Good (1 sec.)	Good (1 sec.)	Good (1 sec.)	Good (1 sec.)	Good (1 sec.)	Good (1 sec.)
Download large files (e.g., a 100-page text document with graphics) (2 MB) [2]	Bad	Bad	OK (21 sec.)	Good (16 sec.)	Good (6 sec.)	Good (3 sec.)	Good (2 sec.)	Good (2 sec.)	Good (1 sec.)	Good (1 sec.)	Good (1 sec.)	Good (1 sec.)
Online trading, e-business	Bad	Bad	OK	Good	Good	Good	Good	Good	Good	Good	Good	Good
Online meeting presentation and document sharing	Bad	Bad	OK	Good	Good	Good	Good	Good	Good	Good	Good	Good
Videoconferencing streaming at 384 Kbps (desktop/single user) [3]	Bad	Bad	OK	OK	Good	Good	Good	Good	Good	Good	Good	Good
Third-party hosted applications such as e-mail, data backup [4]	Bad	Bad	OK	OK	OK	Good	Good	Good	Good	Good	Good	Good
Remote server access using VPN client [3]	Bad	Bad	Bad	Bad	OK	OK	OK	OK	Good	Good	Good	Good
Multi-point videoconferencing streaming at 768 Kbps for a group of five to six [3]	Bad	Bad	Bad	Bad	Bad	OK	Good	Good	Good	Good	Good	Good

Applications	56 Kbps/ 56 Kbps *(Dial-up, maximum speed)*	256 Kbps/ 256 Kbps *(DSL; Cable)*	768 Kbps/ 384 Kbps *(DSL; Cable; Satellite)*	1 Mbps/ 384 Kbps *(DSL; Cable; Satellite)*	3 Mbps/ 768 Kbps *(DSL; Cable; Satellite)*	7 Mbps / 768 Kbps *(DSL; Cable; Fiber)*	10 Mbps/ 1 Mbps *(DSL; Cable; Fiber)*	15 Mbps/ 2 Mbps *(Cable; Fiber)*	20 Mbps/ 2 Mbps *(Cable; Fiber)*	25 Mbps/ 5 Mbps *(Cable; Fiber)*	50 Mbps/ 10 Mbps *(Cable; Fiber)*	100 Mbps/ 10 Mbps *(Fiber)*
Voice over IP (ten external lines)	Bad	Bad	Bad	Bad	Bad	OK	OK	Good	Good	Good	Good	Good
Upload videos, presentations (1 GB)[5]	Bad	Bad	Bad	Bad	Bad	Bad	Bad	OK (67 min.)	OK (67 min.)	Good (27 min.)	Good (14 min.)	Good (14 min.)
Download high-definition video in real time (2 GB)[6]	Bad	Bad	Bad	Bad	Bad	Bad	Bad	Bad	OK (14 min.)	OK (11 min.)	Good (6 min.)	Good (3 min.)
Server backup (1 TB capacity) with daily incremental backup up to 20 GB[4]	Bad	Bad	Bad	Bad	Bad	Bad	Bad	Bad	Bad	OK	Good	Good
Telecommuting	Bad	Bad	Bad	Bad	Bad	Bad	Bad	Bad	Bad	OK	Good	Good
Distance learning	Bad	Bad	Bad	Bad	Bad	Bad	Bad	Bad	Bad	OK	Good	Good
Telemedicine (e.g., radiological images such as mammograms) (160 MB)[7]	Bad	Bad	Bad	Bad	Bad	Bad	Bad	Bad	Bad	OK (52 sec.)	Good (26 sec.)	Good (13 sec.)

Notes:
1. For downloading small files up to 1 MB, download time less than 10 seconds is good, 10 to 15 seconds is fair, and more than 15 seconds is not acceptable.
2. For downloading small files up to 2 MB, download time less than 20 seconds is good, 20 to 25 seconds is fair, and more than 25 seconds is not acceptable.
3. For applications such as videoconferencing and remote server access, no concurrent usage of the same application by the same user.
4. Server backup will normally occur during off-peak times (10 p.m. to 6 a.m.).
5. For uploading videos of 1 GB, upload time less than 30 minutes is good, 30 to 90 minutes is fair, and more than 90 minutes is not acceptable.
6. For downloading high-definition videos (2 GB), download time less than 10 minutes is good, 10 to 15 minutes is fair, and more than 15 minutes is not acceptable.
7. For telemedicine files up to 160 MB, download time of less than 30 seconds is good, 30 to 60 seconds is fair, and more than 60 seconds is unacceptable.