

Broadband Options and Best Practices

GVM Broadband Committee
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There are 3 options currently available - DSL, Satellite, and Wireless Broadband (LTE). For each option we've listed where each is available, the suitability to different uses, and best practices.

Page 3 has best practices to help with slow internet.

Contact the Internet Service Provider (ISP) for prices. See note 5 on the last page about CenturyLink.

Keep abreast of the Larimer Broadband Project by signing up for the [News from Somewhere](#) at larimer.org/planning/broadband/

DSL close distance (CenturyLink)

Availability: Within ½ mile from the DSLAM ^{note 1} and have an existing CenturyLink account

Usability: Up to User C ^{see table on page 3}

Tips:

- You among the lucky few. Be careful to preserve it. Vacation suspensions sometimes do not get reinstated. If selling, it does not transfer to your buyer.
- Call loyalty department and request updated service and available discounts.
- Install DSL filters on any voice phones

DSL far distance (CenturyLink)

Availability: Further than ½ mile from the DSLAM ^{note 1} and have an existing CenturyLink account

Usability: User A ^{see table on page 3}

Tips:

- Call loyalty department and request updated service and available discounts.
- Follow best practices on page 4
- Install DSL filters on any voice phones

Satellite (Exede, Hughes)

Availability: Anywhere that a satellite dish can be located where it has an uninterrupted line of sight to the south

Usability: Up to User B ^{see table on page 3}

Tips:

- Watch usage during the month to avoid overcharges
- For Exede's Liberty plans, schedule updates and cloud storage during the Free Zone hours using the best practices on page 4
- Disregard claims such as "Up to 25Mbps download speed".
- There is no workaround for the latency (the 0.25 second delay it takes for the signal to travel to and from the satellite). This will cause phone conversations using microcells ^{note2} to have delays and/or dead times.

Wireless Broadband / LTE (Verizon, AT&T)

Availability: Locations that have at least 1 bar signal strength (-98dbm) and are able to send text messages. Providers that have unlimited data plans.

Usability: Up to User C ^{see table on page 3}

Tips:

- Install small-home signal booster such as WeBoost 4G \$399
Mount directional antenna at highest point available. Point to Livermore tower or Red Feather Lakes tower, whichever you can get a signal from
- Add a mobile hotspot such as Verizon Jetpack to your account and upgrade your data plan to unlimited.
- An alternative to a mobile hotspot is the LTE Internet and Home Phone router, which has ports for connecting wired devices and a jack for a wired home phone.
- An added benefit is this will extend the range of cell phone(s) to your outside deck plus 10 feet or so, depending on the location in the house where you put the Jetpack
- It's even more important to plug the booster into a UPS so you have phone operation during a power outage

Tips for all services

- Plug the modem into a UPS ^{note4} to shield it from power glitches and surges
- When you will be away for a long period, unplug the power to the broadband router/modem and to the power supply for the laptop or computer.

User A	User B	User C
<ul style="list-style-type: none"> • Household has 2 or less internet connected devices such as a desktop, laptop, tablet, smartphone, smart TV, cell extenders/microcell, or game console • Basic email (send and receive less than 20 emails daily) • Browse and search the web for news, read blogs, maps and to get directions • Shopping online services (Amazon and other retailers) • Occasional YouTube viewing • Occasional downloads (iTunes, documents, etc.) • Will tolerate occasional service outages of 2 hours or less 	<ul style="list-style-type: none"> • Household or business has 5 or less internet connected devices such as a desktop, laptop, tablet, smartphone, smart TV, cell extenders/microcell, or game console • Medium email usage with occasional attachments (send and receive less than 50 emails daily) • Browse and search the web for news, read blogs, maps and to get directions • Shopping online services (Amazon and other retailers) • Frequent YouTube viewing • Frequent downloads (iTunes, documents, etc.) • Occasional work from home • Uses cloud services to back up data from desktop, laptop, or smartphone (Carbonite, OneDrive, iCloud, etc.) • Receives cell phone service through a Wi-Fi extender, microcell, or “calling over Wi-Fi”. • Plays online games using computer or game consoles such as PlayStation or Xbox • Depends on internet for entertainment streaming services such as Netflix, Hulu, Apple TV, etc. • Occasional Voice Over IP (VOIP) calling using FaceTime, Skype etc. • May tolerate occasional service outages of 1 hours or less 	<ul style="list-style-type: none"> • Household or Business has 6 or more internet connected devices such as a desktop, laptop, tablet, smartphone, smart TV, cell extenders/microcell, or game console • Conducts primary business over the internet • The home is the primary workplace and remote access to the company is required • High email usage with large attachments (send and receive more than 50 emails daily) • Browse and search the web for news, read blogs, maps and to get directions • YouTube viewing and video publishing (upload) • Frequent downloads (iTunes, documents, videos, etc.) • Uses cloud services to back up data (Carbonite, OneDrive, iCloud, etc.) • Voice Over IP (VOIP) calling using FaceTime, Skype, or IP phones • Receives cell phone service through a Wi-Fi extender, microcell, or “calling over Wi-Fi”. • Plays and downloads online games using computer or game consoles such as PlayStation or Xbox • Depends on internet for entertainment streaming services such as Netflix, Hulu, and Apple TV • Can not tolerate occasional service outages of 1 hours or less

Low Bandwidth Best Practices

These best practices apply to all internet service technologies. DSL, Satellite, wireless broadband etc.

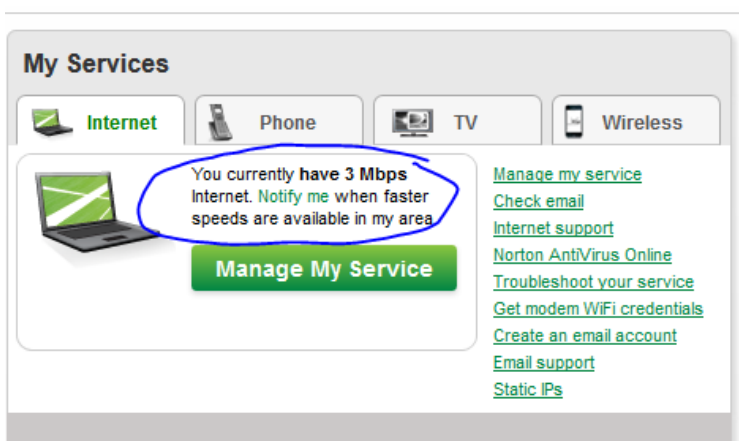
Topics

- Services in General
- Updates
- Cloud storage
- Anti-virus
- Browsers
- Email
- Mobile devices (smart phones, tablets)
- Other Internet Connected Devices

Services in General:

Be sure to contact your provider and ensure that you are indeed getting the fastest service that is available in your area. If you signed up for service years ago and changed nothing, you may be missing out on an upgrade opportunity. Examples:

DSL: Logging into your CenturyLink account will show an upgrade button if a higher speed is available for you. If a faster speed is available, it may require them to ship a new DSL modem to you.



Wireless Data Cards: If you are using a card or USB antennae that is 3 years or older, check to see if a new one is available. Newer ones may connect at a higher rate.

Satellite: Are you on the latest plan and their best deal? These plans are constantly changing and you may be able to negotiate a better deal including a higher data cap.

Updates:

Occasionally leave your laptop or desktop on overnight. This will allow updates to be downloaded and installed when you are not using the device instead of when you really need it and have to wait for updates to download and reboot.

Schedule updates using active hours in Windows 10

- Use the active hours feature to let Windows know when you're typically at your PC. They use that info to schedule updates and restarts when you're not using the PC.

- Select the **Start** Windows logo Start button button, select **Settings** Gear-shaped Settings icon > **Update & security** Circular arrows Sync icon > **Windows Update** Circular arrows Sync icon, then select **Change active hours**.
- Choose the start time and end time for active hours, and then select **Save**.

Schedule updates using Apple OSX

- Currently Apple does not offer a control to set when to update their software. However, occasionally leaving your device on overnight will accomplish the same thing. Controls for updates are found at: Finder / Apple Logo / System Preferences / App Store
- If you are on a very slow link you can disable updates until you take your system to a location with higher bandwidth and then check for new updates.

Cloud Storage

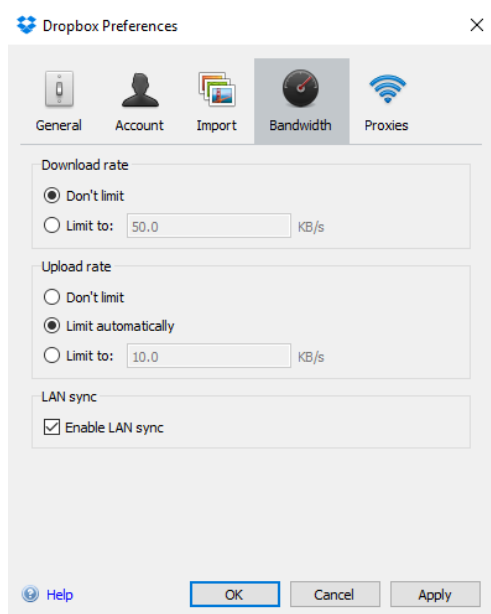
Cloud Back Up Programs:

Schedule cloud back up programs such as Carbonite to back up your data in off peak usage hours. Most have a control to allow you to set the times etc. The default is immediately at computer start up.

OneDrive, iCloud, DropBox, Google Drive:

Each has the ability to pause syncing for a time period or delay syncing after start up. Check their settings for details. This comes in handy if your device is off and you want to start it up and immediately accomplish a task like browse the web for directions, online banking etc. If you have all of these programs trying to up and download at the same time they will consume your immediate bandwidth for up to 10 or 15 minutes which is frustrating.

DropBox has a bandwidth tool to help. You can get to it in DropBox Preferences. It adjusts how much of your bandwidth to use for downloads and uploads.



Anti-Virus:

Many anti-virus programs also can be set to get updates during specific hours. Or set at specific intervals. Sophos checks every hour by default. Change it to every 4 or 6 hours.

Browsers:

- Disable browser add-ons that might impact performance or that you don't really need.
- Increase the cache size for your temporary internet files.
- Once you have signed into your work or school account, keep the browser window open throughout the day. You can open other tabs and windows without signing in again. If you need to sign in to another account, use Private Browsing.
- Once each page is downloaded and open, keep them open by using tabs. It's easy to navigate between tabs and use the page later on in the day. Refresh a page only if you need the latest data on that page.
- If a page is taking too long to open, stop the page download (press ESC) and then refresh the page (press F5).
- If video performance is poor, you may be able to download the video and watch it on your device. A download link may be available, or you may be able to right click the video link, and select Save Target as.

Email (Outlook Client and Web Client)

Best practices for using Outlook and Outlook Web App (From Microsoft)

Reading, writing, and organizing email is a big part of everyone's day. Both Outlook and Outlook Web App (OWA) offer offline support. Using an email app on your smart phone is another useful alternative. Use the following options that best fit your needs:

- Upgrade to Outlook 2013 SP1 or later for substantial performance improvements over previous versions.
- Outlook Web App lets you create offline messages, contacts, and calendar events that are uploaded when OWA is next able to connect to the email server. For more information about setting up and using OWA in offline mode, see [Using Outlook Web App offline](#).
- Outlook lets you work in cached mode, in which it automatically connects whenever possible. You can have Outlook download your entire mailbox, or just a portion of it. For more information, see [Turn on Cached Exchange Mode](#) and [Change how much mail to keep offline](#).
- Outlook also offers an offline mode. To use this, you must first set up cached mode so that information from your account is copied down to your computer. In offline mode, Outlook will try to connect using the send and receive settings, or when you manually set it to work online. For more information, see [Work offline to avoid data connection charges](#), [Change send and receive settings when you work offline](#), and [Switch from offline to online mode](#).

Cell Phones and other Mobile Devices (iOS and Android):

Extenders and MicroCells:

Most new smart phones have the ability to route a phone call through the Wi-Fi capability on the phone if there is Wi-Fi service available (home or outside of the home). If your phone can do Wi-Fi calling do not use the Extender or MicroCell as it adds additional load to your internet bandwidth over and above the required usage for calls. Having them both on adds latency. Simply unplug the extender or microcell if you are using Wi-Fi calling.

To enable on an iPhone, go to: *Settings / Phone / Wi-Fi Calling*

Using cloud services from your phone:

If you use services such as iCloud or OneDrive to automatically upload your photos from your phones camera to the cloud consider these options:

- Turn off auto upload while on a low bandwidth connection. Turn it on when you connect to high speed.
- If you also use iCloud or OneDrive on your computer or tablet and auto download the new files, use a sync cable and iTunes, Windows Explorer, or another local sync software instead. Otherwise, your photos are making multiple trips up and down taking up your bandwidth.

Apps and App Updates:

- Many apps stay alive in the background and constantly looking for new data (Facebook, DropBox, Maps, etc). You can control which apps run and refresh their data in the background by going to: *iPhone: Settings / General / Background App Refresh*
- Apps themselves are constantly being updated and sent down to your device. You can control how that is done on an iPhone at: *Settings/ iTunes & App Store / Updates.*
- Toggling Automatic Downloads on and off can enable you to only check for updates when connected to a high-speed connection.

Storage / iCloud:

Most of the apps can store data in iCloud which can take up bandwidth and cost extra. To control, go to: *Settings/General / Storage / iCloud*

Other Internet Connected Devices:

There are many devices now in the home that connect automatically to the internet and they all take up precious bandwidth. In low bandwidth scenarios, each of these can impact the user experience on other devices if these are on. They all get updates in the background even when not used. Some do have bandwidth controls. Consult the appropriate documentations for details. Devices in these categories include:

Web cams, Game Consoles (Playstation, Xbox, etc), Smart TV's (has Netflix, Hulu, etc. built in), Smart Devices (Alexa, Google Home), internet connected home and business printers.

Notes

Note 1: The Digital Subscriber Line Access Multiplier (DSLAM) makes the connection directly to the internet, which for GVM is the fiber cable along CR74. They are located in boxes that look similar to this one. Also known as a port or the Central Office (CO). There are DSLAMs within ¼ mile from CR74 at Gates 1, 6, 8, and 10.

Note 2: Microcells use the network connection to create a short-range cell phone signal. Examples are the Verizon Network Extender.

Note 3: A residential gateway is the device that connects to the Wide Area Network (WAN). It can be a cable modem, DSL modem, broadband mobile phone network, or other.

Note 4: An Uninterruptible Power Supply (UPS) is a battery backup for temporary power outages such as the APC BE600M1. [Buy here on Amazon.](#)

Note 5: If CenturyLink says they don't offer service up here, there is no escalation path available. Don't waste time making more phone calls. There is no evidence that there is a wait list even if you say you would like to be put on it.



Currently Available *					
	DSL close	DSL far	satellite	T1	3G/LTE
	CenturyLink see note 1	CenturyLink see note 1	Hughes, Exede	MegaPath	Verizon, AT&T
* availability	close to DSLAM	far from DSLAM	line of sight to satellite	repeaters on buried copper	line of sight to a tower
estimated percent availability	10%	20%	100%	1%	10%
cost	\$	\$	\$\$	\$\$\$	\$\$
email	✓✓	✓	✓	✓✓✓	✓
web browsing, shopping	✓✓	✓	✓	✓✓✓	✓
web video (YouTube, Vimeo)	✓✓	✓	✓	✓✓	✓
network extender (cell phone service over internet)	✓✓	reliability	✓	✓✓	does not apply
WiFi calling (VoIP)	✓✓	reliability	latency	✓✓	does not apply
online education or occasional work from home	✓	reliability	✓	✓✓	✓
uses online backup or photo sharing (Carbonite, OneDrive)	✓	reliability	off hours	✓✓	unlimited plan
live video conferencing (Skype, Facetime, Hangouts)	✓	reliability	latency	✓✓	unlimited plan
online games using Playstation, Xbox	✓	reliability	latency	✓✓	unlimited plan
downloaded recorded video (2 hour movie)	✓	reliability	free phone	✓✓	unlimited plan
streaming video (Netflix, Amazon Prime)	✓	reliability	measured	✓✓	unlimited plan
online live games	upload speed	reliability	measured	✓✓	✗
conducts business online or residence is primary workplace	✓	reliability	✓	✓✓✓	✓
hosts business services (financial transactions, web hosting)	upload speed	reliability	weaker	✓✓	✗
number of connected devices	up to 6	up to 6	up to 6	up to 12	up to 6
combined services available	landline phone, DTV	landline phone, DTV	phone	biz VoIP, monitoring	mobile phone

Performance	
✓	meets minimum
✓✓	sufficient
✓✓✓	exceeds
✗	does not meet minimum

note 1: Century Link has a limited number of "ports" available, and those that are more

note 2: DSLAM is the Digital Subscriber Line Access Multiplier, located in the large cabin