# Wi-Fi Tips & Recommendations

A router is essential for connecting multiple networks and routing traffic between them in a fast, efficient, and reliable manner. The City of LaGrange Internet service works with any router that is NOT a DSL router, NOT a cable modem, and NOT just a wireless AP (wireless access point). Most routers on the market meet these requirements.

Considerations

- Protocol and Speed
  - 802.11n are the low end basic routers and will have slower speeds.
  - 802.11ac routers are for faster speed.
  - 802.11ax is also known as Wi-Fi 6 and is the newest technology. It can handle 10Gbps speeds and higher performance on congested network.

Protocol	Frequency	Theoretical Speed
802.11a	5 GHz	54 Mbps
802.11b	2.4 GHz	11 Mbps
802.11g	2.4 GHz	54 Mbps
802.11n	2.4GHz, 5GHz	450Mbps
802.11ac	5 GHz	7 Gbps
802.11ax	2.4GHz, 5GHz	10 Gbps
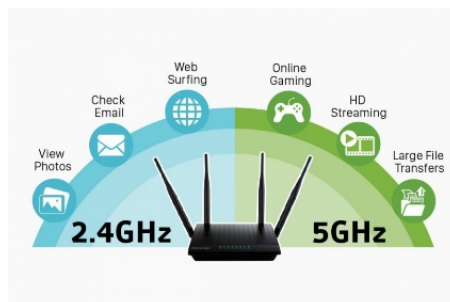
- Price
  - If you want an inexpensive router and you're not too concerned about speed, an 802.11a, b, g or n wireless router should cost between **$20 and $50.**
  - Expect to pay **$60 to $150** for a mid-range 802.11ac wireless router.
  - The price of a high-end 802.11ax wireless router is roughly **$150 to $350**.

- Additional Features to consider
  - Coverage Range – a router with multiple antennas will generally have a better range than one without antennas. Also check compatibility with Wireless APs or Mesh systems
  - VPN (Virtual Private Network) capability – allows you to establish a secure tunnel over the internet to work from home
  - NAT (Network Address Translation) – allows you to map certain devices (like a security system) from private to public IPs
  - Firewall & Security

WIRELESS ROUTER TIPS

- Direct cabling (CAT6) is the fastest and most reliable connection. Make sure your chosen router has sufficient LAN ports for all direct cabled connections, or add a switch.
- Finding an open space near the center of your business is the best way to ensure optimal coverage. Be aware that walls, floors, doors and other objects can impede Wi-Fi signals. The more obstructions you have between your devices and your router, the weaker (and potentially slower) the Wi-Fi signal will be. Avoid placing the router near large metal, glass, brick, or concrete objects.
- If your router has external antennas, you'll need to adjust them accordingly to your floor plan. Antenna placed vertically are best suited for one floor only. If any coverage is needed for upstairs or downstairs, then it is best to point the antenna at about a 30 degree angle from each other vertically.
- The average 802.11ac wireless router covers about 2,500 square feet. If your location is larger than that, use a range extender, wireless access point, or consider a mesh Wi-Fi system. Wi-Fi mesh systems are a work around to this problem by letting you place a node wherever coverage is weakest or to continue coverage in specific areas. Getting the best set-up does require some patience. WIFI Mesh should be spaced about 50ft apart for optimal coverage and speed.
- Most wireless routers can be configured with a smartphone app. While you're shopping, compare app store reviews of different companion apps to get a sense of what your experience will be like.
- Consider establishing a relationship with a local company to service your LAN needs. A LAN (local Area Network) consists of your computers, servers, cabling, switches, and routers. This company would be there for you to:
  - Recommend and install a router
  - Remove viruses from your PC
  - Set up a new server
  - Install software on a PC
  - Repair or replace a PC

SECURITY

There are a number of simple techniques that everyone should do to secure their wireless network, such as:

- Create a custom name (SSID) for your network.
- Create a separate network (SSID) for guests
- Set your wireless router closer to the center of your business, so less of your Wi-Fi signal will be detected outside of your property.
- Turn on wireless network encryption.
- Ensure that your wireless router's firewall is turned on.
- Turn off remote access if you are not going to use it.

TROUBLESHOOTING

If your wireless router isn't reliably emitting the Wi-Fi signal that it should be, there are a few quick fixes to test out:

- Reboot your wireless router. (This is usually the fix for all issues).
- Reposition your router and/or antenna.
- Ensure that all cables are securely inserted into the router.
- Update your wireless router's firmware.
- Add access points to extend the signal.