Home Network Optimization Case Study

Overview:

The goal of this project was to optimize my home network for improved performance, particularly aiming to achieve expected gigabit speeds on my gigabit fiber connection. The network had been experiencing speeds below expectations, impacting overall user experience.

Problem Statement:

Upon initial assessment, speed tests revealed download and upload speeds below the expected rates of 900 Mbps and 500 Mbps, respectively. This hindered activities such as streaming, gaming, and large file downloads. The network latency, represented by ping values, also needed improvement.

Actions Taken:

1. Troubleshooting:
Ethernet Cable Check: Ensured the Ethernet cable connecting the computer to the router was in optimal condition.
Router Settings Review: Logged into the router's web interface to check for any limiting factors such as Quality of Service (QoS) settings.
2. Network Setting Adjustments:
Secondary DNS Change: Adjusted the secondary DNS from 8.0.0.8 back to 8.8.4.4 for improved DNS resolution.
Primary DNS Retained: Kept the primary DNS as 8.8.8.8, Google's public DNS, for reliability.
3. Speed Test:
Conducted a new speed test at 1:04 on 4/03/2024, utilizing the 2Degrees server in Auckland for consistency.
Results:
Download: 891.16 Mbps
Upload: 523.61 Mbps
Ping:
Idle: 2 ms
During Download: 13 ms
During Upload: 7 ms
Results and Improvements:
Download Speed: Increased from an initial average of ~500 Mbps to 891.16 Mbps.
Upload Speed: Enhanced significantly from previous levels, now at 523.61 Mbps.
Ping Values: Consistently low, indicating improved network latency and responsiveness.
Conclusion:
The optimization efforts yielded substantial improvements in the home network's performance. By addressing connectivity issues, adjusting DNS settings, and conducting thorough speed tests, the network now meets and exceeds the expected gigabit speeds. This project underscores the importance of regular network maintenance and optimization for an optimal user experience.

Future Considerations:

For future enhancements, I plan to:

Continuously monitor network performance and conduct periodic speed tests.
Explore further optimization settings within the router, such as Quality of Service (QoS) rules.
Stay updated with firmware updates for the router to ensure optimal performance.
Documentation Details:
Date of Speed Test: 1:04 on 4/03/2024
Router Used: Tp-Link archer AX11000
Speed Test Server: 2Degrees server in Auckland
Computer Connection: Ethernet

Additional Notes:

The occasional drop in speeds to around 500 Mbps was observed but did not significantly impact the overall performance. The network now consistently delivers the expected gigabit speeds, enhancing the overall usability and reliability.