Pi to Share: Utilizing the Raspberry Pi as a Home File Server

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The purpose of this experiment was to determine if a Raspberry Pi could be utilized as a low cost, energy efficient, home file server, and perform competitively in both speed and total cost against commercial methods of file sharing/backups. My procedure first consisted of configuring a Raspberry Pi as a file server by mounting external storage and utilizing open source software to share it across the network. I then compared the performance, energy efficiency, and overall cost of the Raspberry Pi to other common file sharing/backup options. In throughput testing (average of write and read speeds), the Raspberry Pi performed competitively (8.5 MBps) against the dedicated PC server/NAS (9.3 MBps) which was the most similar solution to the Pi. The client external drive was much faster for backups due to its direct USB connection (20.2 MBps) however it lacked in file sharing capabilities; whereas the cloud was hindered by internet bandwidth limitations (.3 MBps). In energy consumption testing the estimated annual cost of the Pi, client external drive, and NAS were all below $10; while the PC server was significantly higher at over $100. Regarding the overall three year cost of ownership: the Pi cost $186. This compared well to the PC server ($657), the 3 client drives ($277), NAS ($163), and the cloud ($540). However, in my case I re-purposed a spare hard drive which lowered the cost of the Raspberry Pi to $85, making it the cheapest solution. My experimentation indicated that the Raspberry Pi is a very low cost, competent and many times superior method of backing up/sharing files. It can fulfill all of the necessary tasks of a file server, double as a lightweight computer, run on little power, and is small for convenient placement.

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